US Department of Transportation Federal Aviation Administration

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

OMB No. 2120-0020 Exp: 5/31/2018 | Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See Title 14 CFR §43.9, Part 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. §44701). Failure to report can result in a civil penalty for each such violation. (49 U.S.C. §46301(a))

1. Aircraft

Nationality and Registration Mark	Serial No.
N20HK	414A0088
Make CESSNA	**Model** 414A / **Series**

2. Owner

Name *(As shown on registration certificate)*	Address *(As shown on registration certificate)*
20-HK LLC	Address 7313 WILLIAM BARRY BLVD.
	City NORTH SYRACUSE State NY
	Zip 13212 Country USA

3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial No.
☐	☒ xx	AIRFRAME	CESSNA	*(As described in Item 1 above)*	414A0088
☐	☐	POWERPLANT			
☐	☐	PROPELLER			
☐	☐	APPLIANCE	Type / Manufacturer		

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency	
Name PRECISION AVIONICS INC	☐ U. S. Certificated Mechanic	☐ Manufacturer
Address 40 CITATION DRIVE	☐ Foreign Certificated Mechanic	C. Certificate No.
City WAPPINGERS FALLS State NY	xx Certificated Repair Station	OQ1R383K
Zip 12590 Country USA	☐ Certificated Maintenance Organization	

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 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.

Extended range fuel per 14 CFR Part 43 App. B ☐

Signature/Date of Authorized Individual: Gretchen S Gleason 2-8-2016

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ xx Approved ☐ Rejected

BY								
	☐	FAA Flt. Standards Inspector		☐ Manufacturer		☐ Maintenance Organization		☐ Persons Approved by Canadian Department of Transport
	☐	FAA Designee	X	☐ Repair Station		☐ Inspection Authorization		Other *(Specify)*

Certificate or Designation No. OQ1R383K

Signature/Date of Authorized Individual: CK Gleason 2-8-2016

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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

N20HK	2-8-2016
Nationality and Registration Mark	Date

Removed King KY-196 Com-1 and Com-2, KNS-80 RNAV-1 and RNAV-2 systems KLN-89B GPS system and #1 KT-76A transponder.

Installed Garmin GIN-750 as #1 and GIN-650 as #2 panel mounted Touch Screen Nav-Com and WAAS Approved GPS with internal color moving map display, GTX-330ES transponder with ADSB out and GDL-69A XM weather and audio receiver.

Installation was completed In Accordance With GIN-750/GIN-650 FAA Approved AML-STC # SA02019SE-D dated November 25, 2014, GTX-330ES AML-STC # STCSA01714WI dated April 1, 2014 and GDL-69A AML-STC # SA01487SE-D dated June 1, 2015.

Installation was completed I.A.W. with Garmin GIN-750/650 installation manual p/n 190-01007-A3 revision 8 dated November 1, 2014, GTX-330ES install manual p/n 190-00734-10 revision 4 dated September 1, 2014. Mode-S address was stored as "N20HK" and GDL-69A install manual p/n 190-00355-07 revision F dated June 1, 2015.

Existing Nav-Com-Glideslope-Marker-transponder antenna were utilized. Garmin GIN-750 was interfaced with existing King KI-525A HSI and GIN-650 was interfaced with existing KI-206 CDI. GA-35 GPS antenna was installed where King KA-92 GPS antenna was removed using same hole pattern and doubler. GA-37 GPS/XM antennna was installed I.A.W. Cessna 414A Maintenance manual p/n D778-34-13 section 16 for structural repairs and AC 43.13-2B chapter 3 paragraphs 301-309.

A ground test to check for any adverse E.M.I. was conducted satisfactory. An electrical load analysis was completed and running load is less than 80% alternator capacity. Existing aircraft cooling fan and internal cooling fans were used to meet cooling requirements. Tests required by 14 CFR part 91.411 and 91.413 were conducted satisfactory. Equipment list and weight and balance have been revised. Instructions for Continued Airworthiness and FAA Approved Flight Manual Supplement's are attached.

.....END.....

☒ Additional Sheets Are Attached

Garmin International, Inc.
1200 E. 151st Street
Olathe, Kansas 66062 U.S.A.

FAA Approved

AIRPLANE FLIGHT MANUAL SUPPLEMENT

or

SUPPLEMENTAL AIRPLANE FLIGHT MANUAL

Garmin GTX 330/33 with ADS-B Out

Dwg. Number: 190-00734-15 Rev. 1

This document serves as an FAA Approved Airplane Flight Manual Supplement or Supplemental Airplane Flight Manual when the GTX 330/33 with ADS-B Out 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.

Make and Model Airplane: Cessna 414A

Airplane Serial Number: 414A0088

Airplane Registration Number: N20HK

FAA Approved:

Robert Murray
ODA STC Unit Administrator
Garmin International, Inc
ODA-240087-CE

Date: 5/1/2013

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Garmin International
1200 E. 151st Street
Olathe, KS 66062 USA

Garmin International, Inc.

FAA Approved Airplane Flight Manual Supplement or

Supplemental Airplane Flight Manual

for

Garmin GTX 330/33 with ADS-B Out

Log of Revisions

REV NO.	PAGE NO(S)	DESCRIPTION	DATE OF APPROVAL	FAA APPROVED
1	ALL	Original Issue	See Cover	See Cover

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Table of Contents

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Section 1. General

1.1 GTX 330/33 ES

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

All Garmin GTX 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 and will reply to ATCRBS Mode A, Mode C and Mode S All-Call interrogation. Interfaces to the GTX 330/33 are shown in the following block diagrams.

Figure 1. GTX 330 or GTX 330D Interface Summary

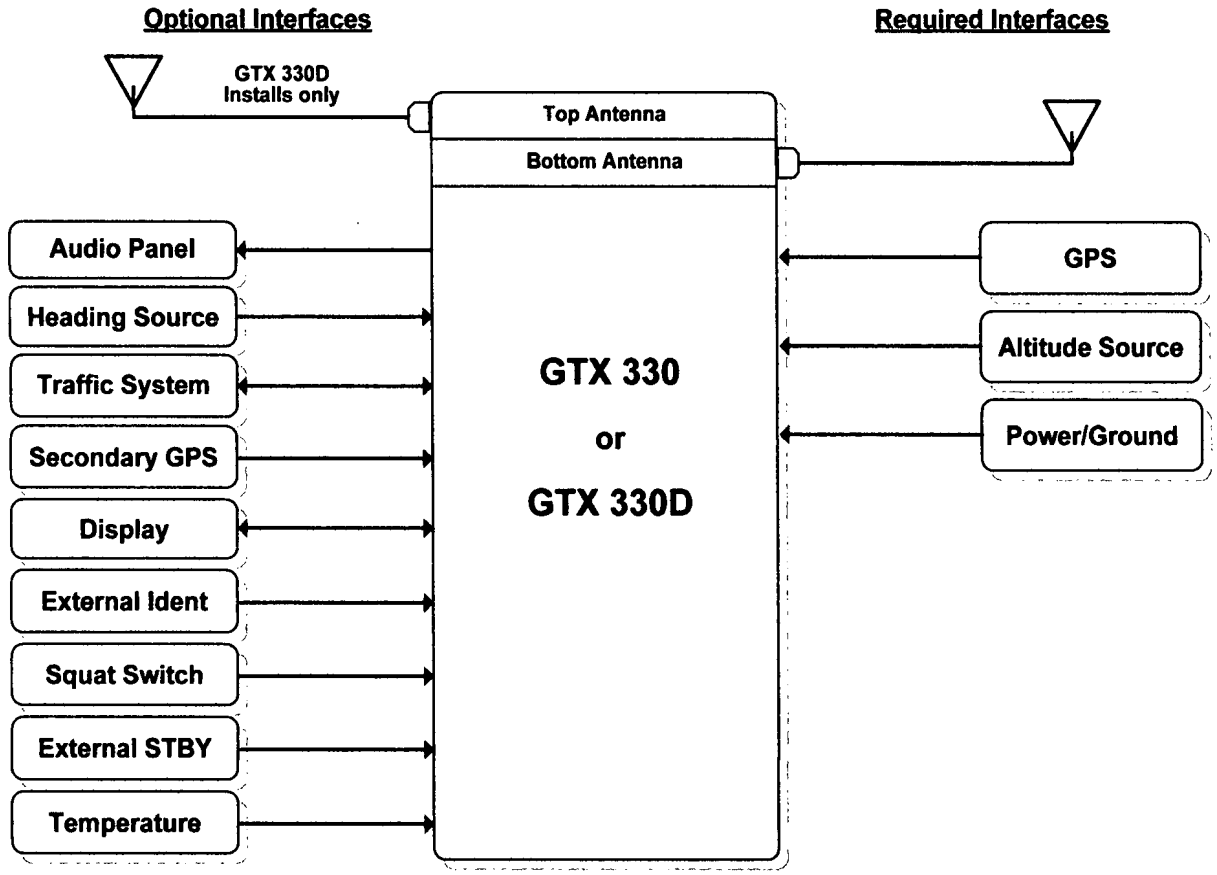
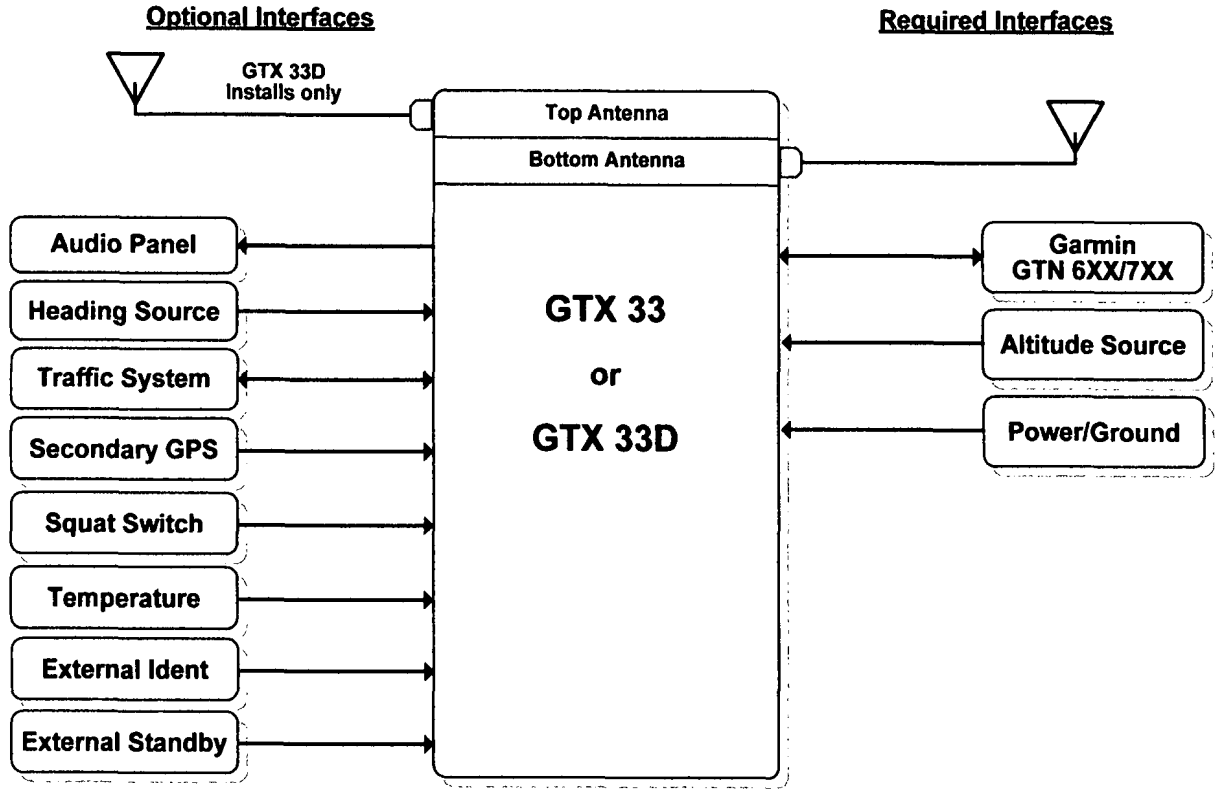


Figure 2. GTX 33 or GTX 33D Interface Summary



The GTX 330/33 performs the following ADS-B Out functions:

- Transmission of ADS-B out data on 1090 extended squitter (1090ES) (1090 MHz)
- Integration of data from internal and external sources to transmit the following data per 14 CFR 91.227:
    - oGPS Position, Altitude, and Position Integrity
    - oGround Track and/or Heading, Ground Speed, and Velocity Integrity
    - oAir Ground Status
    - oFlight ID, Call Sign, ICAO Registration Number
    - oCapability and Status Information
    - oTransponder squawk code, IDENT, and emergency status
- Pressure Altitude Broadcast Inhibit

1.2 Capabilities

The Garmin GTX 330/33 with ADS-B Out functionality as installed in this aircraft has been shown to meet the equipment requirements of 14 CFR § 91.227.

1.3 Installation Configuration

This aircraft is equipped with a GTX 330/33 with ADS-B Out system with the following interfaces/ features:

Equipment Installed:

☒ #1 GTX 330	☐ #1 GTX 33
☐ #1 GTX 330D	☐ #1 GTX 33D
☐ #2 GTX 330	☐ #2 GTX 33
☐ #2 GTX 330D	☐ #2 GTX 33D

Interfaced GTN 6XX/7XX or GNS 4XX/5XX Position Source(s):

	Transponder (#1 or #2)		Transponder (#1 or #2)		Transponder (#1 or #2)
☐ GTN 725		☐ GNS 430AW		☐ GNS 530AW	
☒ GTN 750	#1	☐ GNS 430W		☐ GNS 530W	
☐ GTN 625		☐ GNC 420AW		☐ GPS 500W	
☐ GTN 635		☐ GNC 420W			
☒ GTN 650	#2	☐ GPS 400W			

1.4 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

TX: Transmit

Section 2. Limitations

2.1 Minimum Equipment

The GTX 330/33 with ADS-B Out 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 1. Required Equipment

Interfaced Equipment	Number Installed	Number Required
Uncorrected Pressure Altitude Source	1	1
GPS SBAS Position Source	1 or more	1
GTN series navigator (for aircraft equipped with GTX 33/33D only)	1 or more	1

2.2 ADS-B Out

The GTX 330/33 only complies 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 GTN control interface, or GTX 330 display.

2.3 Applicable System Software

This AFMS/AFM is applicable to the software versions shown in Table 2.

The Main GTX software version is displayed on the splash screen during start up, for the GTX 330, and the external LRU page on the GTN for the GTX 33.

Table 2. Software Versions

Software Item	Software Version *(or later FAA Approved versions for this STC)*
Main SW Version	7.02

2.4 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, per 14 CFR 91.227. PABI is enabled by selecting the GTX to ON mode.

Section 3. Emergency Procedures

3.1 Emergency Procedures

None

3.2 Abnormal Procedures

3.2.1 Abnormal Indications

The loss of an interfaced input to the GTX 330/33 may cause the transponder to stop transmitting ADS-B Out data. Depending on the nature of the fault or failure, the GTX may no longer be transmitting all of the required data in the ADS-B Out messages.

For GTX 330 installations:

If the GTX 330 detects any internal faults or failures with the ADS-B Out functionality, the GTX 330 will annunciate this event via the NO ADSB annunciator on the GTX 330 display screen. When the GTX 330 annunciates the NO ADSB annunciation, one of the following failures or faults have occurred:

- Loss of adequate GPS position data
- ADS-B TX (transmit) is selected OFF

When the GTX 330 annunciates FAIL to the flight crew, the GTX 330 has detected an internal failure and no transponder data is transmitted.

When a GTX 330 NO ADSB, or FAIL annunciation is received, verify proper operation of all interfaced equipment (refer to Section 1.3) as the failure of one of these devices could be the cause of the abnormal indication.

For GTX 33 installations:

Reference Display Device documentation for applicable annunciations.

3.2.2 Loss of Aircraft Electrical Power Generation

Loss of electrical power generation ..... **REMOVE POWER FROM GTX**

If the GTX should be load shed due to a loss of electrical power generation, ADS-B Out data 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.

3.2.3 Loss of GPS/SBAS Navigation 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 33 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 GTX 330. Cockpit Reference Guides and Pilot Guides for interfaced 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.

4.1 Unit Power On

NO ADSB ..... **CONSIDERED**

NOTE

The NO ADS-B 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

NO ADSB ..... **EXTINGUISHED**

NOTE

The NO ADS-B 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 (NO ADSB annunciator **EXTINGUISHED**) 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. Systems Description

The Garmin GTX 330 Pilot's Guide, part number and revision listed below, contain additional information regarding GTX system description, control, and function. Pilots Guides for interfaced displays, part number and revision listed below, provide additional operating information for the Garmin GTX 33.

Title	Part Number	Revision
GTX 330 Pilot's Guide	190-00207-00	Rev G (or later)
Garmin GTN 725/750 Pilot's Guide	190-01007-03	Rev. E (or later)
Garmin GTN 625/635/650 Pilot's Guide	190-01004-03	Rev. E (or later)

Section 8. Handling, Service, and Maintenance

No Change

Garmin International, Inc.
1200 E. 151st Street
Olathe, Kansas 66062 U.S.A.

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for the
Garmin GTN 625, 635, 650, 725, or 750 GPS/SBAS Navigation System
as installed in

CESSNA 414A
Make and Model Airplane

Registration Number: N20HK Serial Number: 414A0088

This document serves as an Airplane Flight Manual Supplement or as a Supplemental Airplane Flight Manual when the aircraft is equipped in accordance with Supplemental Type Certificate SA02019SE-D for the installation and operation of the Garmin GTN 625, 635, 650, 725, or 750 GPS/SBAS Navigation System. 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 information in 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: 

Michael Warren
ODA STC Unit Administrator
Garmin International, Inc.
ODA-240087-CE

Date: 25-NOV-2014

LOG OF REVISIONS				
	Page			
Revision Number	Date	Number	Description	FAA Approved
1	03/18/11	All	Complete Supplement	*Robert Grove* Robert Grove ODA STC Unit Administrator GARMIN International, Inc. ODA-240087-CE Date: *03/18/2011*
2	12/18/12	6 8 10 10 12 12	Table 1 • Added new functions Section 1.2 • Added capabilities checkboxes • Added GPS approaches without vertical • Added reference to EASA AMC 20-4 Section 1.3 • Removed suggestion for secondary charts • Changed to Type B Software in accordance with AC 120-76B. Section 1.4 • Added ADS-B, AEG, FIS-B, NOTAM, TFR Section 2.2 • Removed VFR only limitation Section 2.3 • Clarified secondary navigation source requirement	*Michael Warren* Michael Warren ODA STC Unit Administrator GARMIN International, Inc. ODA-240087-CE Date: *12/18/2012*

LOG OF REVISIONS				
	Page			
Revision Number	Date	Number	Description	FAA Approved
		18	Section 2.14 • Modified datalinked weather limitations	
		18	Section 2.16 • Modified limitation	
		19	Section 2.17 • Modified limitation	
		19	Section 2.21 • New limitation	
		24 & 25	Section 3.2.8 and 3.2.9 • Modified section title	
		25	Section 3.2.10 • New section	
		26	Section 4.1 • Added telephone audio deactivation	
		27	Section 4.3 • Modified caution statement	
		27	Section 4.4 • Added caution statement	
		29	Section 4.6 • New section	
		31	Section 7.7 • Added TCAD and GDL 88 as optional traffic systems	
		32	Section 7.8 • Modified Heading Not Available operation	
		34 - 35	Sections 7.12 – 7.16 • New sections	

3	03/26/13	20	Section 2.17 • Modified limitation	*Michael Warren* Michael Warren ODA STC Unit Administrator GARMIN International, Inc. ODA-240087-CE Date: *04/12/2013*
4	11/24/14	8	Table 1 • Added new functions	See Page 1
		12	Section 1.4 • New section	
		17	Section 2.7 • Modified limitation	
		19	Section 2.12 • Added wire obstacles	
		22	Section 2.21 • Modified limitation	
		22 & 23	Section 2.22, 2.23 & 2.24 • Added limitations	
		24	Section 3.1.1 • Modified procedure, added note	
		27	Section 3.2.5 • Added note	
		28	Section 3.2.10 • Added Flight Stream 210 to procedure	
		29	Section 4.1 • Removed telephone audio deactivation procedure	
		34-35	Section 7.5 • Added wire obstacles	
		36	Section 7.9 • Added Flight Stream 210	

		36-37 40-42	Section 7.10 • Added wire obstacles Sections 7.17-7.19 • New sections	

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Section 1. GENERAL

1.1 *Garmin GTN Navigators*

The Garmin GTN navigation system is a GPS system with a Satellite Based Augmentation System (SBAS), comprised of one or more Garmin TSO-C146c GTN 625, 635, 650, 725, or 750 navigator(s) and one or more Garmin approved GPS/SBAS antenna(s). The GTN navigation system is installed in accordance with AC 20-138A.

GTN system functions are shown in Table 1.

	GTN 625	GTN 635	GTN 650	GTN 725	GTN 750
GPS SBAS Navigation: • Oceanic, enroute, terminal, and non-precision approach guidance • Precision approach guidance (LP, LPV)	X	X	X	X	X
VHF Com Radio, 118.00 to 136.990, MHz, 8.33 or 25 kHz increments		X	X		X
VHF Nav Radio, 108.00 to 117.95 MHz, 50 kHz increments			X		X
LOC and Glideslope non-precision and precision approach guidance for Cat 1 minimums, 328.6 to 335.4 MHz tuning range			X		X
Moving map including topographic, terrain, aviation, and geopolitical data	X	X	X	X	X
Display of datalink weather products, SiriusXM, FIS-B, Connext (all optional)	X	X	X	X	X
Control and display of airborne weather radar (optional)				X	X
Display of terminal procedures data (optional)				X	X
Display of traffic data, including ADS-B (optional)	X	X	X	X	X
Display of StormScope® data (optional)	X	X	X	X	X
Display of marker beacon annunciators (optional)				X	X
Remote audio panel control (optional)				X	X
Remote transponder control (optional)	X	X	X	X	X
Remote audio entertainment datalink control (optional)	X	X	X	X	X
TSO-C151c Class B TAWS (optional)	X	X	X	X	X
Supplemental calculators and timers	X	X	X	X	X
Control of GSR 56 Iridium Satellite Phone and SMS Text	X	X	X	X	X
Control of Flight Stream 210 (optional)	X	X	X	X	X

Table 1 – GTN Functions

The GPS navigation functions and optional VHF communication and navigation radio functions are operated by dedicated hard keys, a dual concentric rotary knob, or the touchscreen.

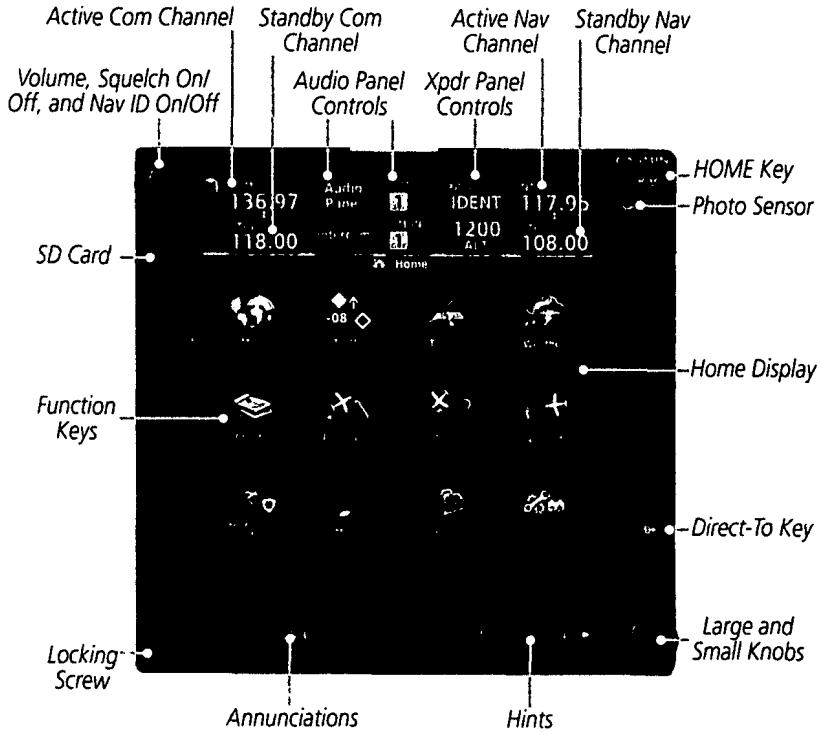


Figure 1 - GTN 750 Control and Display Layout

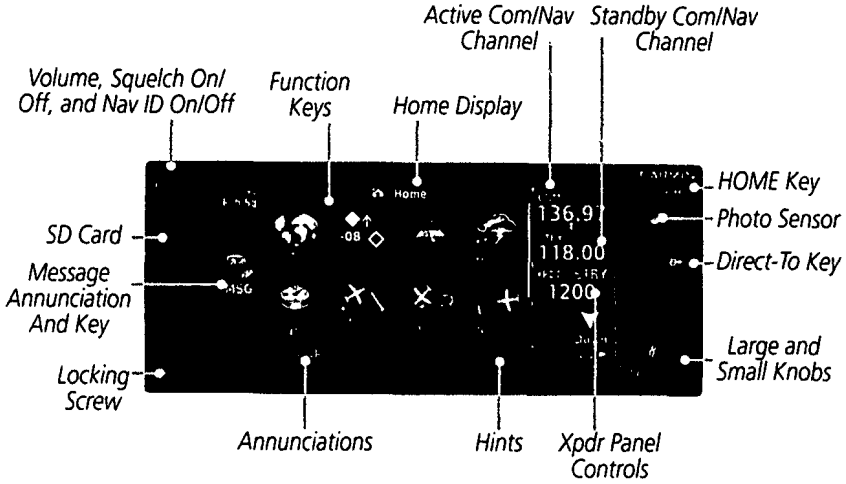


Figure 2 - GTN 635/650 Control and Display Layout

1.2 System Capabilities

The GTN system and associated navigation interface in this aircraft have the following capabilities, in addition to the core multifunction display capability:

- ☒ VHF Communication Radio
- ☒ Primary VHF Navigation
- ☒ Primary GPS Navigation (Enroute) and Approach Capability (LP/LNAV) – See below
- ☒ Primary GPS Approach Capability with Vertical Guidance (LNAV/VNAV, LPV) – See below
- ☐ TSO-C151c Terrain Awareness and Warning System – See section 2.13

GPS/SBAS TSO-C146c Class 3 Operation

The GTN complies with AC 20-138A and has airworthiness approval for navigation using GPS and SBAS (within the coverage of a Satellite Based Augmentation System complying with ICAO Annex 10) for IFR en route, terminal area, and non-precision approach operations (including those approaches titled "GPS", "or GPS", and "RNAV (GPS)" approaches). The Garmin GNSS navigation system is composed of the GTN navigator and antenna, and is approved for approach procedures with vertical guidance including "LPV" and "LNAV/VNAV" and without vertical guidance including "LP" and "LNAV," within the U.S. National Airspace System.

The Garmin GNSS navigation system complies with the equipment requirements of AC 90-105 and meets the equipment performance and functional requirements to conduct RNP terminal departure and arrival procedures and RNP approach procedures without RF (radius to fix) legs. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval from the FAA.

The Garmin GNSS navigation system complies with the equipment requirements of AC 90-100A for RNAV 2 and RNAV 1 operations. In accordance with AC 90-100A, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-100A are authorized to fly RNAV 2 and RNAV 1 procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval from the FAA.

Applicable to dual installations consisting of two Garmin GNSS units: The Garmin GNSS navigation system has been found to comply with the requirements for GPS Class II oceanic and remote navigation (RNP-10) without time limitations in accordance with AC 20-138A and FAA Order 8400.12A. The Garmin GNSS navigation system can be used without reliance on other long-range navigation systems. This does not constitute an operational approval.

The Garmin GNSS navigation system has been found to comply with the navigation requirements for GPS Class II oceanic and remote navigation (RNP-4) in accordance with AC 20-138A and FAA Order 8400.33. The Garmin GNSS navigation system can be used without reliance on other long-range navigation systems. Additional equipment may be required to obtain operational approval to utilize RNP-4 performance. This does not constitute an operational approval.

The Garmin GNSS navigation system complies with the accuracy, integrity, and continuity of function, and contains the minimum system functions required for P-RNAV operations in accordance with JAA Administrative & Guidance Material Section One: General Part 3: Temporary Guidance Leaflets, Leaflet No 10 (JAA TGL-10 Rev 1). The GNSS navigation system has one or more TSO-C146c Class 3 approved Garmin GTN Navigation Systems. The Garmin GNSS navigation system complies with the accuracy, integrity, and continuity of function, and contains the minimum system functions required for B-RNAV operations in accordance with EASA AMC 20-4. The Garmin GNSS navigation system complies with the equipment requirements for P-RNAV and B-RNAV/RNAV-5 operations in accordance with AC 90-96A CHG 1. This does not constitute an operational approval.

Garmin International holds an FAA Type 2 Letter of Acceptance (LOA) in accordance with AC 20-153 for database integrity, quality, and database management practices for the navigation database. Flight crew and operators can view the LOA status at FlyGarmin.com then select "Type 2 LOA Status."

Navigation information is referenced to the WGS-84 reference system.

Note that for some types of aircraft operation and for operation in non-U.S. airspace, separate operational approval(s) may be required in addition to equipment installation and airworthiness approval.

1.3 Electronic Flight Bag

The GTN 750/725 are operationally suitable as Class 3 Hardware, Type B Software in accordance with AC 120-76B EFB electronic aeronautical information when using current FliteChart or ChartView data.

1.4 Electronic Checklists

The GTN checklist functions are designed to DO-178B software design assurance level B and support a minor failure classification. While this STC does not grant operational approval for operators requiring such approval, there are no limitations precluding operators from obtaining their own operational approval for the checklist function.

1.5 Definitions

The following terminology is used within this document:

ADF:	Automatic Direction Finder
ADS-B:	Automatic Dependent Surveillance Broadcast
AEG:	Aircraft Evaluation Group (FAA)
APR:	Approach
CDI:	Course Deviation Indicator
DME:	Distance Measuring Equipment
EFB:	Electronic Flight Bag
EHSI:	Electronic Horizontal Situation Indicator
FIS-B:	Flight Information Services Broadcast
GNSS:	Global Navigation Satellite System
GPS:	Global Positioning System
GPSS:	GPS Roll Steering
GTN:	Garmin Touchscreen Navigator
HOT:	Hazardous Obstacle Transmission wires
HSI:	Horizontal Situation Indicator
IAP:	Instrument Approach Procedure
IFR:	Instrument Flight Rules
ILS:	Instrument Landing System
IMC:	Instrument Meteorological Conditions
LDA:	Localizer Directional Aid
LNAV:	Lateral Navigation
LNAV+V:	Lateral Navigation with advisory Vertical Guidance
L/VNAV:	Lateral/Vertical Navigation
LOC:	Localizer
LOC-BC:	Localizer Backcourse

LP:	Localizer Performance
LPV:	Localizer Performance with Vertical Guidance
MLS:	Microwave Landing System
NOTAM:	Notice to Airmen
OBS:	Omnibearing Select
PED:	Portable Electronic Device
RAIM:	Receiver Autonomous Integrity Monitoring
RMT:	Remote
RNAV:	Area Navigation
RNP:	Required Navigational Performance
SBAS:	Satellite Based Augmentation System
SD:	Secure Digital
SDF:	Simplified Directional Facility
SUSP:	Suspend
TACAN:	Tactical Air Navigation System
TAS:	Traffic Awareness System
TAWS:	Terrain Awareness and Warning System
TCAS:	Traffic Collision Avoidance System
TFR:	Temporary Flight Restriction
TIS:	Traffic Information Service
VHF:	Very High Frequency
VFR:	Visual Flight Rules
VLOC:	VOR/Localizer
VMC:	Visual Meteorological Conditions
VOR:	VHF Omnidirectional Range
WAAS:	Wide Area Augmentation System
WFDE:	WAAS Fault Data Exclusion
XFR:	Transfer

Section 2. LIMITATIONS

2.1 Cockpit Reference Guide

The Garmin GTN 6XX or GTN 7XX Cockpit Reference Guide, part number and revision listed below (or later revisions), *must* be immediately available to the flight crew whenever navigation is predicated on the use of the GTN.

- GTN 6XX Cockpit Reference Guide P/N 190-01004-04 Rev C
- GTN 7XX Cockpit Reference Guide P/N 190-01007-04 Rev C

2.2 Kinds of Operation

This AFM supplement does not grant approval for IFR operations to aircraft limited to VFR operations.

2.3 Minimum Equipment

The GTN must have the following system interfaces fully functional in order to be used for primary navigation during IFR operations:

Interfaced Equipment	Number installed	Number Required for IFR
External HSI/CDI/EHSI	1 or more	1
External GPS Annunciator	See Note 1	1

Table 2 – Required Equipment

Note 1: Certain installations require an external GPS annunciator panel. If installed, this annunciator must be fully functional to use the GTN GPS navigation for IFR operations.

Single engine piston aircraft under 6,000 lbs maximum takeoff weight:
Required Equipment for IFR operations utilizing GPS navigation: Single GTN Navigator

All other aircraft:
Required Equipment for IFR operations utilizing GPS navigation: Single GTN Navigator plus a second source of GPS navigation or a separate source of VHF navigation. The separate source of VHF navigation must not be the primary GTN, but it may be a secondary GTN.

Operation in remote or oceanic operation requires two sources of GPS navigation.

2.4 Flight Planning

For flight planning purposes, in areas where SBAS coverage is not available, the flight crew must check RAIM availability.

- Within the United States, RAIM availability can be determined using the Garmin WFDE Prediction program, Garmin part number 006-A0154-04 (included in GTN trainer) software version 3.00 or later approved version with Garmin approved antennas or the FAA's en route and terminal RAIM prediction website: www.raimprediction.net, or by contacting a Flight Service Station.
- Within Europe, RAIM availability can be determined using the Garmin WFDE Prediction program or Europe's AUGER GPS RAIM Prediction Tool at http://augur.ecacnav.com/augur/app/home.
- For other areas, use the Garmin WFDE Prediction program.

This RAIM availability requirement is not necessary if SBAS coverage is confirmed to be available along the entire route of flight. The route planning and WFDE prediction program may be downloaded from the Garmin website on the internet. For information on using the WFDE Prediction Program, refer to Garmin WAAS FDE Prediction Program, part number 190-00643-01, 'WFDE Prediction Program Instructions'.

For flight planning purposes, for operations within the U.S. National Airspace System on RNP and RNAV procedures when SBAS signals are not available, the availability of GPS RAIM shall be confirmed for the intended route of flight. In the event of a predicted continuous loss of RAIM of more than five minutes for any part of the intended route of flight, the flight shall be delayed, canceled, or rerouted on a track where RAIM requirements can be met. The flight may also be re-planned using non-GPS based navigational capabilities.

For flight planning purposes for operations within European B-RNAV/RNAV-5 and P-RNAV airspace, if more than one satellite is scheduled to be out of service, then the availability of GPS RAIM shall be confirmed for the intended flight (route and time). In the event of a predicted continuous loss of RAIM of more than five minutes for any part of the intended flight, the flight shall be delayed, canceled, or rerouted on a track where RAIM requirements can be met.

Applicable to dual installations consisting of two Garmin GNSS units:

For flight planning purposes, for operations where the route requires Class II navigation the aircraft's operator or flight crew must use the Garmin WFDE Prediction program to demonstrate that there are no outages on the specified route that would prevent the Garmin GNSS navigation system to provide GPS Class II navigation in oceanic and remote areas of operation that requires RNP-10 or RNP-4 capability. If the Garmin WFDE Prediction program indicates fault exclusion (FDE) will be unavailable for more than 34 minutes in accordance with FAA Order 8400.12A for RNP-10 requirements, or 25 minutes in accordance

with FAA Order 8400.33 for RNP-4 requirements, then the operation must be rescheduled when FDE is available.

Both Garmin GPS navigation receivers must be operating and providing GPS navigation guidance for operations requiring RNP-4 performance.

North Atlantic (NAT) Minimum Navigational Performance Specifications (MNPS) Airspace operations per AC 91-49 and AC 120-33 require both GPS/SBAS receivers to be operating and receiving usable signals except for routes requiring only one Long Range Navigation sensor. Each display computes an independent navigation solution based on its internal GPS receiver.

Whenever possible, RNP and RNAV routes including Standard Instrument Departures (SIDs), Standard Terminal Arrival (STAR), and enroute RNAV "Q" and RNAV "T" routes should be loaded into the flight plan from the database in their entirety, rather than loading route waypoints from the database into the flight plan individually. Selecting and inserting individual named fixes from the database is permitted, provided all fixes along the published route to be flown are inserted. Manual entry of waypoints using latitude/longitude or place/bearing is prohibited.

It is not acceptable to flight plan a required alternate airport based on RNAV(GPS) LP/LPV or LNAV/VNAV approach minimums. The required alternate airport must be flight planned using an LNAV approach minimums or available ground-based approach aid.

Navigation information is referenced to the WGS-84 reference system, and should only be used where the Aeronautical Information Publication (including electronic data and aeronautical charts) conform to WGS-84 or equivalent.

2.5 System Use

In installations with two GTNs and an external GPS annunciator (See Table 2) the GTN connected to the external GPS annunciator must be used as the navigation source for all IFR operations.

The only approved sources of course guidance are on the external CDI, HSI, or EHSI display. The moving map and CDI depiction on the GTN display are for situational awareness only and are not approved for course guidance.

2.6 Applicable System Software

This AFMS/AFM is applicable to the software versions shown in Table 3.

The Main and GPS software versions are displayed on the start-up page immediately after power-on. All software versions displayed in Table 3 can be viewed on the System – System Status or Connext Setup pages.

Software Item	**Software Version** *(or later FAA Approved versions for this STC)*
Main SW Version	5.13
GPS SW Version	5.0
Com SW Version	2.13
Nav SW Version	6.02
Flight Stream 210	2.11

Table 3 - Software Versions

2.7 SD/Database Card

It is required that the SD/database card be present in the unit at all times. The card must not be removed or inserted during flight and/or while the GTN is powered on.

NOTE

Removal of the SD card will result in certain features/databases not being available and/or slow system performance.

2.8 Navigation Database

GPS/SBAS based IFR enroute, oceanic, and terminal navigation is prohibited unless the flight crew verifies and uses a valid, compatible, and current navigation database or verifies each waypoint for accuracy by reference to current approved data.

"GPS", "or GPS", and "RNAV (GPS)" instrument approaches using the Garmin navigation system are prohibited unless the flight crew verifies and uses the current navigation database. GPS based instrument approaches must be flown in

accordance with an approved instrument approach procedure that is loaded from the navigation database.

Discrepancies that invalidate a procedure should be reported to Garmin International. The affected procedure is prohibited from being flown using data from the navigation database until a new navigation database is installed in the aircraft and verified that the discrepancy has been corrected. Navigation database discrepancies can be reported at FlyGarmin.com by selecting "Aviation Data Error Report." Flight crew and operators can view navigation database alerts at FlyGarmin.com then select "NavData Alerts."

If the navigation database cycle will change during flight, the flight crew must ensure the accuracy of navigation data, including suitability of navigation facilities used to define the routes and procedures for flight. If an amended chart affecting navigation data is published for the procedure, the database must not be used to conduct the procedure.

2.9 Ground Operations

Do not use SafeTaxi or Chartview functions as the basis for ground maneuvering. SafeTaxi and Chartview functions do not comply with the requirements of AC 20-159 and are not qualified to be used as an airport moving map display (AMMD). SafeTaxi and Chartview are to be used by the flight crew to orient themselves on the airport surface to improve flight crew situational awareness during ground operations.

2.10 Approaches

a) Instrument approaches using GPS guidance may only be conducted when the GTN is operating in the approach mode. (LNAV, LNAV+V, L/VNAV, LPV, or LP)
b) When conducting instrument approaches referenced to true North, the NAV Angle on the System -Units page must be set to **True**.
c) The navigation equipment required to join and fly an instrument approach procedure is indicated by the title of the procedure and notes on the IAP chart. Navigating the final approach segment (that segment from the final approach fix to the missed approach point) of an ILS, LOC, LOC-BC, LDA, SDF, MLS, VOR, TACAN approach, or any other type of approach not approved for GPS, is not authorized with GPS navigation guidance. GPS guidance can only be used for approach procedures with GPS or RNAV in the procedure title. When using the Garmin VOR/LOC/GS receivers to fly the final approach segment, VOR/LOC/GS navigation data must be selected and presented on the CDI of the pilot flying.
d) Advisory vertical guidance deviation is provided when the GTN annunciates LNAV + V. Vertical guidance information displayed on the VDI in this mode is only an aid to help flight crews comply with altitude restrictions. When using advisory vertical guidance, the flight crew must use the primary barometric altimeter to ensure compliance with all altitude restrictions.

e) Not all published Instrument Approach Procedures (IAP) are in the navigation database. Flight crews planning to fly an RNAV instrument approach must ensure that the navigation database contains the planned RNAV Instrument Approach Procedure and that approach procedure must be loaded from the navigation database into the GTN system flight plan by its name. Pilots are prohibited from flying any approach path that contains manually entered waypoints.
f) IFR approaches are prohibited whenever any physical or visual obstruction (such as a throw-over yoke) restricts pilot view or access to the GTN and/or the CDI.

2.11 Autopilot Coupling

The flight crew may fly all phases of flight based on the navigation information presented to the flight crew; however, not all modes may be coupled to the autopilot. All autopilots may be coupled in Oceanic (OCN), Enroute (ENR), and Terminal (TERM) modes.

This installation is limited to:

- ☐ Lateral coupling only for GPS approaches. Coupling to the vertical path for GPS approaches is not authorized.

2.12 Terrain Proximity Function (All Units)

Terrain, point obstacle, and wire obstacle information appears on the map and terrain display pages as red and amber terrain, obstacles, or wires and is depicted for advisory use only. Aircraft maneuvers and navigation must not be predicated upon the use of the terrain display. Terrain, obstacle and wire information is advisory only and is not equivalent to warnings provided by TAWS.

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.

NOTE

Terrain and TAWS are separate features and mutually exclusive. If "TAWS B" is shown on the bottom right of the dedicated terrain page, then TAWS is installed.

2.13 TAWS Function (Optional)

Flight crews are authorized to deviate from their current ATC clearance to the extent necessary to comply with TAWS warnings. Navigation must not be predicated upon the use of TAWS.

If an external TAWS annunciator panel is installed in the aircraft, this annunciator panel must be fully functional in order to use the TAWS system.

NOTE

Terrain and TAWS are separate features and mutually exclusive. If "TAWS B" is shown on the bottom right of the dedicated terrain page, then TAWS is installed.

2.14 Datalinked Weather Display (Optional)

This limitation applies to datalinked weather products from SiriusXM via a GDL 69/69A, FIS-B via a GDL 88, and Connext via a GSR 56.

Do not use data link weather information for maneuvering in, near, or around areas of hazardous weather. Information provided by data link weather products may not accurately depict current weather conditions.

Do not use the indicated data link weather product age to determine the age of the weather information shown by the data link weather product. 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.

Do not rely solely upon data link services to provide Temporary Flight Restriction (TFR) or Notice to Airmen (NOTAM) information. Not all TFRs and NOTAMS can be depicted on the GTN.

2.15 Traffic Display (Optional)

Traffic may be displayed on the GTN when connected to an approved optional TCAS I, TAS, TIS, or ADS-B traffic device. These systems are capable of providing traffic monitoring and alerting to the flight crew. Traffic shown on the display may or may not have traffic alerting available. The display of traffic is an aid to visual acquisition and may not be utilized for aircraft maneuvering.

2.16 StormScope® Display (Optional)

StormScope® lightning information displayed by the GTN is limited to supplemental use only. The use of the StormScope® lightning data on the display for hazardous weather (thunderstorm) penetration is prohibited. StormScope® lightning data on the display is intended only as an aid to enhance situational awareness of hazardous weather, not penetration. It is the flight crew's responsibility to avoid hazardous weather using official weather data sources.

When the GTN StormScope® page is operating without a heading source, as indicated by the "HDG N/A" label at the upper right corner of the StormScope® page, strikes must be cleared after each heading change.

2.17 Flight Planner/Calculator Functions

The Fuel Planning page uses Fuel on Board or Fuel Flow as received from an on board fuel totalizer, as entered by the pilot at system startup, or as entered by the pilot when on the Fuel Planning page. This *is not* a direct indication of actual aircraft fuel flow or fuel on board and those values are only used for the Fuel Planning page. The fuel required to destination is only a calculated and predicted value based on the data entered into the planner. It is not a direct indication of how much fuel the aircraft will have upon reaching the destination.

2.18 Glove Use / Covered Fingers

No device may be used to cover fingers used to operate the GTN unless the Glove Qualification Procedure located in the Pilot's Guide/Cockpit Reference Guide has been successfully completed. The Glove Qualification Procedure is specific to a pilot / glove / GTN 725, 750 or GTN 625, 635, 650 combination.

2.19 Demo Mode

Demo mode may not be used in flight under any circumstances.

2.20 Active Weather Radar

Radar is broadcasting energy while in Weather or Ground mapping modes. If the GTN 750/725 system is configured to control an airborne weather radar unit, observe all safety precautions, including:

- Do not operate in the vicinity of refueling operations.
- Do not operate while personnel are in the vicinity (approximately 20 feet) of the radar sweep area.

CAUTION

If a radar system is installed, it generates microwave radiation and improper use, or exposure, may cause serious bodily injury. Do not operate the radar equipment until you have read and carefully followed the safety precautions and instructions in the weather radar user manual and/or pilot's guide.

2.21 Telephone Audio

Telephone audio must not be distributed to the pilot or co-pilot unless a phone call is active.

CAUTION

Failure to turn off telephone audio when the telephone is not in use may result in telephone ringer or text message aural notifications being received during critical phases of flight.

2.22 Multi Crew Aircraft (GMA 35 Only)

For aircraft type certified with more than one required pilot, or operations requiring more than one pilot, the "Group Co-Pilot with Passenger" audio panel

option must not be activated. This option is found in the Intercom Setup Menu when a Garmin GMA 35 audio panel is installed.

2.23 Wire Obstacle Database

Only the "Obstacle/HOT Line" database may be used. Use of the "Obstacle/Wire" database is prohibited. The database version can be viewed on the start-up database verification or System- System Status pages.

2.24 Portable Electronic Devices

This STC does not relieve the operator from complying with the requirements of 91.23 or any other operational regulation regarding portable electronic devices.

Section 3. EMERGENCY PROCEDURES

3.1 Emergency Procedures

3.1.1 TAWS WARNING

Red annunciator and aural "PULL UP":

Autopilot ..... **DISCONNECT**
Aircraft Controls ..... **INITIATE MAXIMUM POWER CLIMB**
Airspeed ..... **BEST ANGLE OF CLIMB SPEED**

After Warning Ceases:

Altitude .....**CLIMB AND MAINTAIN SAFE ALTITUDE**
Advise ATC of Altitude Deviation, if appropriate.

NOTE

Only vertical maneuvers are recommended, unless either operating in visual meteorological conditions (VMC), or the flight crew determines, based on all available information, that turning in addition to the vertical escape maneuver is the safest course of action, or both.

NOTE

TAWS annunciators external to the GTN may not indicate the exact threat causing the alert. Example: WIRE alerts may be annunciated as TERR or OBSTACLE on external devices.

3.2 Abnormal Procedures

3.2.1 LOSS OF GPS/SBAS NAVIGATION DATA

When the GPS/SBAS receiver is inoperative or GPS navigation information is not available or invalid, the GTN will enter one of two modes: Dead Reckoning mode (DR) or Loss Of Integrity mode (LOI). The mode is indicated on the GTN by an amber "DR" or "LOI".

If the Loss Of Integrity annunciation is displayed, revert to an alternate means of navigation appropriate to the route and phase of flight.

If the Dead Reckoning annunciation is displayed, the map will continue to be displayed with an amber 'DR' overwriting the ownship icon. Course guidance will be removed on the CDI. Aircraft position will be based upon the last valid GPS position, then estimated by Dead Reckoning methods. Changes in true airspeed, altitude, heading, or winds aloft can affect the estimated position substantially. Dead Reckoning is only available in Enroute and Oceanic modes. Terminal and Approach modes do not support Dead Reckoning.

If Alternate Navigation Sources (ILS, LOC, VOR, DME, ADF) Are Available:

Navigation.....**USE ALTERNATE SOURCES**

If No Alternate Navigation Sources Are Available:

DEAD RECKONING (DR) MODE:

Navigation..... **USE GTN**

NOTE

All information normally derived from GPS will become less accurate over time.

LOSS OF INTEGRITY (LOI) MODE:

Navigation..... **FLY TOWARDS KNOWN VISUAL CONDITIONS**

NOTE

All information derived from GPS will be removed.

NOTE

The airplane symbol is removed from all maps. The map will remain centered at the last known position. "NO GPS POSITION" will be annunciated in the center of the map.

3.2.2 GPS APPROACH DOWNGRADE

During a GPS LPV, LNAV/VNAV, or LNAV+V approach, if GPS accuracy requirements cannot be met by the GPS receiver, the GTN will downgrade the approach. The downgrade will remove vertical deviation indication from the VDI and change the approach annunciation accordingly from LPV, L/VNAV, or LNAV+V to LNAV. The approach may be continued using the LNAV only minimums.

During a GPS approach in which GPS accuracy requirements cannot be met by the GPS receiver for any GPS approach type, the GTN will flag all CDI guidance and display a system message "ABORT APPROACH-GPS approach no longer available". Immediately upon viewing the message, the unit will revert to Terminal navigation mode alarm limits. If the position integrity is within these limits lateral guidance will be restored and the GPS may be used to execute the missed approach, otherwise alternate means of navigation must be utilized.

3.2.3 LOSS OF COM RADIO TUNING FUNCTIONS

If alternate COM is available:
Communications..... **USE ALTERNATE COM**

If no alternate COM is available:
COM RMT XFR key (if installed).....**PRESS AND HOLD FOR 2 SECONDS**

NOTE

This procedure will tune the active COM radio the emergency frequency 121.5, regardless of what frequency is displayed on the GTN. Certain failures of the tuning system will automatically tune 121.5 without flight crew action.

3.2.4 LOSS OF AUDIO PANEL FUNCTIONS (GMA 35 Only)

Audio Panel Circuit Breaker .....**PULL**

NOTE

This procedure will force the audio panel into fail safe mode which provides only the pilot with communications and only on a single COM radio. If any non GTN 750 COM is installed, communication will be only on that radio. If only a GTN 750 is installed in the aircraft, then the pilot will have only the GTN 750 COM available. No other audio panel functions including the crew and passenger intercom will function.

3.2.5 TAWS CAUTION (Terrain or Obstacle Ahead, Sink Rate, Don't Sink)

When a TAWS CAUTION occurs, take corrective action until the alert ceases. Stop descending or initiate either a climb or a turn, or both as necessary, based on analysis of all available instruments and information.

NOTE

TAWS annunciators external to the GTN may not indicate the exact threat causing the alert. Example: WIRE alerts may be annunciated as TERR or OBSTACLE on external devices.

3.2.6 TAWS INHIBIT

The TAWS Forward Looking Terrain Avoidance (FLTA) and Premature Descent Alerts (PDA) functions may be inhibited to prevent alerting, if desired. Refer to GTN Cockpit Reference Guide for additional information.

To Inhibit TAWS:

Home Hardkey ..... PRESS
Terrain Button ..... PRESS
Menu Button ..... PRESS
TAWS Inhibit Button ..... PRESS TO ACTIVATE

3.2.7 TER N/A and TER FAIL

If the amber **TER N/A** or **TER FAIL** status annunciator is displayed, the system will no longer provide TAWS alerting or display relative terrain and obstacle elevations. The crew must maintain compliance with procedures that ensure minimum terrain and obstacle separation.

3.2.8 DATA SOURCE - HEADING SOURCE INOPERATIVE OR CONNECTION TO GTN LOST MESSAGE

Without a heading source to the GTN, the following features will not operate:

- GPSS will not be provided to the autopilot for heading legs. The autopilot must be placed in HDG mode for heading legs.
- Map cannot be oriented to Heading Up.
- All overlaying traffic data from a TAS/TCAS I or GDL 88 interfaced to an on board traffic system on the main map display. The flight crew must use the dedicated traffic page on the GTN system to display TAS/TCAS I or GDL 88 traffic data.
- All overlaying StormScope® data on the main map display. The flight crew must use the dedicated StormScope® page on the GTN system to display StormScope® data.

StormScope® must be operated in accordance with Section 7.8 when no heading is available.

3.2.9 DATA SOURCE – PRESSURE ALTITUDE SOURCE INOPERATIVE OR CONNECTION TO GTN LOST MESSAGE

Without a barometric altitude source to the GTN, the following features will not operate:

- Automatic leg sequencing of legs requiring an altitude source. The flight crew must manually sequence altitude legs, as prompted by the system.

3.2.10 UNRECOVERABLE LOSS OF ALL ELECTRICAL GENERATORS OR ALTERNATORS

Remove power from all equipment which is not necessary for flight, including GTN #2 (NAV/GPS 2, COM 2) and the Flight Stream 210 (BT LINK), if installed.

Section 4. NORMAL PROCEDURES

Refer to the Cockpit Reference Guide defined in Section 2.1 of this document or the Pilot's Guide defined in Section 7.1 for normal operating procedures and a complete list of system messages and associated flight crew actions. This includes all GPS operations, VHF communication and navigation, traffic, data linked weather, StormScope®, TAWS, and Multi-Function Display information.

The GTN requires a reasonable degree of familiarity to avoid becoming too engrossed at the expense of basic instrument flying in IMC and basic see-and-avoid in VMC. 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.

4.1 Unit Power On

Database ..... **REVIEW EFFECTIVE DATES**
Self Test ..... **VERIFY OUTPUTS TO NAV INDICATORS**
Self Test - TAWS Remote Annunciator:
- PULL UP ..... **ILLUMINATED**
- TERR ..... **ILLUMINATED**
- TERR N/A ..... **ILLUMINATED**
- TERR INHB ..... **ILLUMINATED**

Self Test - GPS Remote Annunciator:
- VLOC ..... **ILLUMINATED**
- GPS ..... **ILLUMINATED**
- LOI or INTG ..... **ILLUMINATED**
- TERM ..... **ILLUMINATED**
- WPT ..... **ILLUMINATED**
- APR ..... **ILLUMINATED**
- MSG ..... **ILLUMINATED**
- SUSP or OBS ..... **ILLUMINATED**

4.2 Before Takeoff

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

4.3 HSI and EHSI Operation

If an HSI is used to display navigation data from the GTN the pilot should rotate the course pointer as prompted on the GTN.

If an EHSI is used to display navigation data from the GTN the course pointer may autoslew to the correct course when using GPS navigation. When using VLOC navigation the course pointer will not autoslew and must be rotated to the correct course by the pilot. For detailed information about the functionality of the EHSI system, refer to the FAA approved Flight Manual or Flight Manual Supplement for that system.

CAUTION

The pilot must verify the active course and waypoint for each flight plan leg. The pilot must verify proper course selection each time the CDI source is changed from GPS to VLOC.

4.4 Autopilot Operation

The GTN may be coupled to an optional autopilot, if installed in the aircraft, when operating as prescribed in the LIMITATIONS section of this manual.

Autopilots coupled to the GTN system in an analog (NAV) mode will follow GPS or VHF navigation guidance as they would with existing VOR receivers.

Autopilots that support GPSS or GPS Roll Steering in addition to the analog course guidance will lead course changes, fly arcing procedures, procedure turns, and holding patterns if coupled in GPSS mode.

CAUTION

The GTN cannot provide course deviation to the autopilot for heading legs. Some autopilots do not allow the use of GPSS when course deviation is not provided.

For autopilot operating instructions, refer to the FAA approved Flight Manual or Flight Manual Supplement for the autopilot.

4.5 Coupling the Autopilot during approaches

CAUTION

When the CDI source is changed on the GTN, autopilot mode may change. Confirm autopilot mode selection after CDI source change on the GTN. Refer to the FAA approved Flight Manual or Flight Manual Supplement for the autopilot.

Analog only autopilots should use APR mode for coupling to LNAV approaches. Autopilots which support digital roll steering commands (GPSS) may utilize NAV mode and take advantage of the digital tracking during LNAV only approaches.

☐ This installation prompts the flight crew and requires the pilot to enable the approach outputs just prior to engaging the autopilot in APR mode.

To couple an approach:
Once established on the final approach course with the final approach fix as the active waypoint, the GTN will issue a flashing message indication.

Flashing Message Button..... **PRESS**
"Enable APR Output" Button..... **PRESS**

If coupled, Autopilot will revert to ROL mode at this time.

Autopilot.....**ENGAGE APPROACH MODE**

☒ This installation supports coupling to the autopilot in approach mode once vertical guidance is available.

To couple an approach:
Once established on the final approach course with the final approach fix as the active waypoint, the GTN will enable vertical guidance.

Vertical Guidance.....**CONFIRM AVAILABLE**
Autopilot.....**ENGAGE APPROACH MODE**

☐ The installation *does not* support any vertical capture or vertical tracking.

4.6 Telephone & SMS Text (Optional)

Audio from the GSR 56 Iridium datalink is routed through the aircraft's audio panel Audio from the GSR 56 must be deactivated (turned off) unless making a phone call. The primary indication of an incoming phone call or SMS text are the visual indications on the GTN.

Section 5. PERFORMANCE

No change.

Section 6. WEIGHT AND BALANCE

See current weight and balance data.

Section 7. SYSTEM DESCRIPTIONS

7.1 Pilot's Guide

The Garmin GTN 6XX or GTN 7XX Pilot's Guide, part number and revision listed below, contain additional information regarding GTN system description, control and function. The Pilot's Guides *do not* need to be immediately available to the flight crew.

- GTN 6XX Pilot's Guide — P/N 190-01004-03 Rev H or later
- GTN 7XX Pilot's Guide — P/N 190-01007-03 Rev H or later

7.2 Leg Sequencing

The GTN supports all ARINC 424 leg types. Certain leg types require altitude input in order to sequence (course to altitude, for example). If a barometric corrected altitude source is not interfaced to the GTN, a popup will appear prompting the flight crew to manually sequence the leg once the altitude prescribed in the procedure is reached.

☐ This installation *has* a barometric corrected altitude source. The GTN will automatically sequence altitude legs.

☒ This installation *does not have* a barometric corrected altitude source. The flight crew will be prompted to manually sequence altitude legs.

7.3 Auto ILS CDI Capture

Auto ILS CDI Capture will not automatically switch from GPS to VLOC for LOC-BC or VOR approaches.

7.4 Activate GPS Missed Approach

☒ This installation *will* autoswitch from VLOC to GPS when the "Activate GPS Missed Approach" button is pressed.

☐ This installation *will not* autoswitch from VLOC to GPS when the "Activate GPS Missed Approach" button is pressed. The pilot must manually switch from VLOC to GPS if GPS guidance is desired after the missed approach point.

7.5 Terrain Proximity and TAWS

CAUTION

Not all obstacles and wires are contained in the Obstacle/HOT Line database. The system provides depiction (and alerts, if TAWS is installed) only for obstacles and wires contained in the database.

NOTE

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

☒ This installation supports *Terrain Proximity. No aural or visual alerts* for terrain or obstacles are provided. Terrain Proximity *does not* satisfy the TAWS requirement of 91.223.

☐ This installation supports *TAWS B.* Aural and visual alerts *will be* provided. This installation *does* support the TAWS requirement of 91.223.

To avoid unwanted alerts, TAWS may be inhibited when landing at an airport that is not included in the airport database.

Terrain on the dedicated terrain page or main map overlay is depicted in the following manner:

- Terrain more than 1,000 ft below the aircraft is not depicted, or depicted as black.
- Terrain between 1,000 ft and 100 ft below the aircraft is depicted as amber.
- Terrain within 100 ft below the aircraft, or above the aircraft, is depicted as red.

Obstacles and wires on the dedicated terrain page or main map are depicted in the following manner:

- Obstacles and wires more than 2,000 ft below the aircraft are not depicted.
- Obstacles and wires between 2,000 ft and 1,000 ft below the aircraft are depicted as white.
- Obstacles and wires between 1,000 ft and 100 ft below the aircraft are depicted as amber.
- Obstacles and wires within 100 ft below the aircraft, or above the aircraft, are depicted as red.

Multiple obstacles may be depicted using a single obstacle icon and an asterisk to indicate obstacle grouping is occurring. The color of the asterisk indicates the relative altitude of the tallest obstacle in the group. The asterisk does not indicate any information about the relative altitude or number of obstacles not being displayed in the obstacle group.

The Garmin GTN 6XX or GTN 7XX Cockpit Reference Guide or Garmin GTN 6XX or GTN 7XX Pilot's Guide provides additional information regarding terrain and obstacle colors and grouped obstacle icons.

7.6 GMA 35 Audio Panel (Optional)

The GTN 725 and 750 can interface to a GMA 35 remotely mounted audio panel and marker beacon receiver. Controls for listening to various radios, activating the cabin speaker, clearance playback control, and marker beacon are accessed by pressing the "Audio Panel" button on the GTN display screen. Volume controls for the audio panel are accessed by pressing the "Intercom" button on the GTN display screen.

7.7 Traffic System (Optional)

This system is configured for the following type of traffic system. The Garmin GTN 6XX or GTN 7XX Cockpit Reference Guide or Garmin GTN 6XX or GTN 7XX Pilot's Guide provides additional information regarding the functionality of the traffic device.

- ☐ No traffic system is interfaced to the GTN.
- ☐ A TAS/TCAS I traffic system is interfaced to the GTN.
- ☒ A TIS traffic system is interfaced to the GTN.
- ☐ A TCAD traffic system is interfaced to the GTN.
- ☐ A Garmin GDL 88 ADS-B traffic system is interfaced to the GTN.
- ☐ A Garmin GDL 88 ADS-B traffic system is interfaced to the GTN. The GDL 88 ADS-B traffic system is also interfaced to an on board traffic system.

7.8 StormScope® (Optional)

When optionally interfaced to a StormScope® weather detection system, the GTN may be used to display the StormScope® information. Weather information supplied by the StormScope® will be displayed on the StormScope® page of the GTN system. For detailed information about the capabilities and limitations of the StormScope® system, refer to the documentation provided with that system.

Heading Up mode:

If the GTN system is receiving valid heading information, the StormScope® page will operate in the heading up mode as indicated by the label "HDG UP" presented at the upper right corner of the display. In this mode, information provided by the StormScope® system is displayed relative to the nose of the aircraft and *is* automatically rotated to the correct relative position as the aircraft turns.

Heading Not Available mode:

If the GTN system is not receiving valid heading information, either because a compatible heading system is not installed, or the interfaced heading system has malfunctioned, the StormScope® page will continue to operate without a heading source and indicate "HDG N/A" in the upper right corner of the GTN display. In this mode, information provided by the StormScope® system is displayed relative to the nose of the aircraft but *is not* automatically rotated to the correct relative position as the aircraft turns. When operating in this mode, StormScope® strikes must be cleared after each turn the aircraft performs.

7.9 Power

- Power to the GTN is provided through a circuit breaker labeled NAV/GPS (1/2).
- Power to the optional GTN COM is provided through a circuit breaker labeled COMM (1/2)
- Power to the optional GMA 35 is provided through a circuit breaker labeled AUDIO.
- Power to the optional Flight Stream 210 is provided through a circuit breaker labeled BT LINK.

7.10 Databases and Flight Plan Waypoints/Procedures

Database versions and effective dates are displayed on the start-up database verification page immediately after power-on. Database information can also be viewed on the System – System Status page.

The Obstacle Database has an area of coverage that includes the United States and Europe, and is updated as frequently as every 56 days. The HOT Line wire database only includes the continental United States and portions of Canada/Mexico.

Only the Obstacle/HOT Line wire database may be used in accordance with the limitation found in section 2.23.

If a flight plan contains a waypoint or procedure that does not correspond to a waypoint or procedure in the navigation database in use, the waypoint or procedure will become locked (depicted as "lockd") in the flight plan. Flight plans with locked waypoints may be placed in the active flight plan portion of the system but no active navigation will be provided. The locked waypoint/procedure must be resolved by removing or replacing it with the correct waypoint/procedures in the flight plan before the system will provide active navigation.

7.11 External Switches

External switches may be installed and interfaced to the GTN. These switches may be stand alone, or integrated with a TAWS or GPS annunciator. Table 4 lists the switches and function they perform:

Switch Label	Function
CDI	Toggles between GPS / VLOC sources. This switch may be part of an external annunciator panel.
COM CHAN DN	Toggles down through the preset com frequencies.
COM CHAN UP	Toggles up through the preset com frequencies.
COM RMT XFR	Transfers the com active / standby frequencies.
NAV RMT XFR	Transfers the nav active / standby frequencies.
OBS	Performs an OBS or SUSP function. This switch is part of an external annunciator panel and is placarded with the following: "Green OBS indicates OBS or SUSP mode – GTN annunciator bar indicates which is active. Push OBS button to change OBS or SUSP mode."
OBS/SUSP	Performs an OBS or SUSP function.
TERR INHB	Toggles the TAWS Inhibit function on/off. This switch is part of an external annunciator panel. The terrain display is still presented if TAWS is Inhibited.

Table 4 – External Switches

7.12 Airspace Depiction and Alerts

The GTN aides the flight crew in avoiding certain airspaces with Smart Airspace and airspace alerts. Smart Airspace de-emphasizes depicted airspace that is not near the aircraft's current altitude. Airspace Alerts provide a message indication to the flight crew when the aircraft's current ground track will intercept an airspace type that has been selected for alerting.

NOTE

Smart Airspace and Airspace Alerts are separate features. Turning on/off Smart Airspace does not affect Airspace Alerts, and vice versa.

7.13 GDL 88 ADS-B Traffic System Interface (Optional)

The GDL 88 is an ADS-B traffic system that can interface to the GTN. The *nose* of the ownship symbol on both the GTN main map page and dedicated traffic page serves as the actual location of your aircraft. The *center* of the traffic target icon serves as the reported location for the target aircraft. Motion vectors for traffic may be displayed in either absolute or relative motion. The location of the traffic targets relative to the ownship are the same, regardless of the selected motion vector.

Absolute motion vectors are colored either cyan or white, depending on unit configuration. Absolute motion vectors depict the reported track of the traffic target referenced to the ground. An absolute motion vector pointed towards your ownship symbol *does not* necessarily mean the traffic target is getting closer to your aircraft.

Relative motion vectors are always colored green and depict the motion of the traffic target relative to your ownship symbol. The direction the traffic target is pointed may vary greatly from the motion vector and a target may be getting closer to your aircraft independent of the direction the target is pointed. A green relative motion vector pointed towards your ownship indicates that the traffic target *is* converging on your aircraft.

If more than one target is occupying the same area of the screen, the GTN will combine the two or more traffic targets into one traffic group. The presence of an asterisk to the left of a target indicates that traffic has been grouped. The highest priority traffic target in the group is displayed to the pilot. When applied to airborne targets the asterisk will be displayed in white or cyan depending on the traffic depiction color used in the installation. The asterisk will be brown for grouped ground targets. The asterisk will not turn amber, even if an alerted target is included in the group.

An alerted target may be placed in the same group as non-alerted targets. In this case, the alerted target will be displayed. Two alerted targets will not be placed in the same group. All alerted targets will be displayed on the screen.

Traffic targets displayed on the dedicated traffic page may be selected in order to obtain additional information about a traffic target or to view all targets in a grouped target. When a grouped target is selected, the "Next" button on the dedicated traffic page will cycle through all targets located in close proximity to where the screen has been touched.

7.14 GWX 70 Weather Radar (Optional)

The GWX 70 Weather Radar uses Doppler technology to provide advanced features to the flight crew such as turbulence detection and ground clutter suppression. These features that rely on Doppler technology are only supported by GWX 70 units that have a 12 inch antenna or lager. Turbulence detection is only supported at display ranges 40-160 nautical miles.

NOTE

Turbulence detection does not detect all turbulence, especially that which is occurring in clear air. The display of turbulence indicates the possibility of Severe or greater turbulence, as defined in the Aeronautical Information Manual.

7.15 Charts (Optional)

The GTN 750/725 can display both procedure charts and weather data on the main map page at the same time. When datalinked Nexrad or Precipitation is overlaid on the main map page, the weather data is displayed *below* an overlaid procedure chart. When airborne weather radar is overlaid on the main map page, the radar data is displayed *above* an overlaid procedure chart.

7.16 Transponder Control (Optional)

The GTN can be interfaced to a Garmin transponder for control and display of squawk code, mode, and additional transponder functions. The activation of the "Enable ES" button on the transponder page does not indicate the aircraft is in full compliance with an ADS-B Out solution in accordance with TSO-C166b (1090ES). Consult your transponder documentation for additional information.

7.17 Telephone Audio (Optional)

Telephone audio distribution defaults to off on each power cycle of the GTN. Prior to utilizing the telephone function the crew must distribute telephone audio to the desired recipients. If the crew is utilizing the telephone function it is required that the telephone audio be turned off upon completing telephone usage.

7.18 Depiction of Obstacles and Wires

7.18.1 Dedicated Terrain Page

The dedicated Terrain page will always depict point obstacles at zoom scales of 10 nm or less and depict wire obstacles at zoom scales of 5 nm or less. The obstacle or wire overlay icon (see Figure 3) will be shown near the bottom of the display when the obstacle or wire depiction is active based on the zoom scale.

NOTE

Only obstacles and wires within 2,000 ft vertically of the aircraft will be drawn on the Terrain page. It is therefore possible to have an obstacle or wire overlay icon displayed with no obstacles or wires being depicted on the display.

Figure 3 – Obstacle Overlay Icon (Left), Wire Overlay Icon (Right)

7.18.2 Map Page

The Map page may be configured to depict point obstacles and wire obstacles at various zoom scales by the pilot by using the Map page menu. The obstacle or wire overlay icon (see Figure 4) will be shown near the bottom of the display when the obstacle or wire overlay is active based on the current zoom scale and setting selected by the pilot.

The settings chosen by the pilot on the Map page menu (including obstacle and wire display ranges) are saved over a power cycle.

NOTE

Only obstacles and wires within 2,000 ft vertically of the aircraft will be drawn on the Map page. It is therefore possible to have an obstacle or wire overlay icon displayed with no obstacles or wires being depicted on the display.

NOTE

The Map page may be configured by the pilot to not show any obstacles or wires at any zoom scale.

Figure 4 – Obstacle Overlay Icon (Left), Wire Overlay Icon (Right)

7.19 Flight Stream 210 (Optional)

The Flight Stream 210 is a remotely mounted unit that provides the capability to interface Portable Electronic Devices (PEDs) to the GTN. Data such as traffic, flight plan, datalinked weather and entertainment audio information, and attitude information is sent form the Flight Stream 210 to the PED. The PED is capable of sending flight plans to the Flight Stream which will then be displayed on the GTN and controlling the datalinked entertainment audio.

Garmin provides a list of tested and compatible devices that can be used with the Flight Stream 210. Connection to the Flight Stream 210 may be possible with devices other than those on the supported device list, but Bluetooth® stability and wireless data integrity cannot be guaranteed.

For details about the Garmin supported devices and apps for use with the Flight Stream 210, please visit: http://garmin.com/connext/supported_devices

4 INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

4.1 Airworthiness Limitations

There are no additional Airworthiness Limitations as defined in 14 CFR §23, Appendix G, G23.4 that result from this modification.

The Airworthiness Limitations section is FAA approved and specifies maintenance required under §43.16 and §91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

FAA APPROVED

Michael Warren
ODA STC Unit Administrator
ODA-240087-CE

25-NOV-2014
Date

4.2 Servicing Information

The GTN and GMA do not require servicing. In the event of system failure, troubleshoot the GTN 6XX/7XX and GMA 35 in accordance with Section 5.

4.2.1 Periodic Maintenance

The GTN and GMA 35 are designed to detect internal failures. A thorough self-test is executed automatically upon application of power to the units, and built-in tests (BIT) are continuously executed. Detected errors are indicated as failure annunciations, system messages, or a combination of the two.

All antennas connected to the GTN should be maintained in accordance with appropriate inspection data for the antenna installation.

4.2.2 Special Tools

A milliohm meter with an accuracy of +/- 0.1 milliohms ohms (or better) is required to measure the electrical bonding between the GTN/GMA system components and aircraft ground.

4.3 Maintenance Intervals

Table 4-1. Periodic Maintenance

Item	Description/Procedure	Interval
Equipment Removal and Replacement	Removal and replacement of the following items. See Section 6 of this document for instructions. • GTN 6XX/7XX, Flight Stream 210, or GMA 35 units • NAV antenna cable splitter • NAV antenna cable diplexer • Fan	On Condition
Cleaning the Front Panel	The front bezel, keypad, and display can be cleaned with a soft cotton cloth dampened with clean water. DO NOT use any chemical-cleaning agents. Care should be taken to avoid scratching the surface of the display.	On Condition
Display Backlight	The display backlight LEDs are rated by the manufacturer as having a usable life of at least 36,000 hours. This life may be more or less than the rated time depending on the operating conditions of the GTN. Over time, the backlight lamp may dim and the display may not perform as well in direct sunlight conditions. The user must determine by observation when the display brightness is not suitable for its intended use. Contact the Garmin factory repair station when the backlight lamp requires service.	On Condition
Battery Replacement	The GTN has an internal keep-alive battery that will last about 10 years. The battery is used for GPS system information. Regular planned replacement is not necessary. The GTN will display a 'low battery' message when replacement is required. Once the low battery message is displayed, the battery should be replaced within 1 to 2 months. If the battery is not replaced and becomes totally discharged, the GTN unit will remain fully operational, but the GPS signal acquisition time may be increased. There is no loss of function or accuracy of the GTN unit with a dead battery. The battery must be replaced by the Garmin factory repair station or factory authorized repair station.	On Condition
Test - Bonding Check	Perform an electrical bonding check of the GTN, GMA 35 (if installed), and Flight Stream 210 (if installed) per Section 4.5.	Every 10 years or 2000 flight hours, whichever comes first.
Test TVS Lightning Protection	The GTN #1 main power input will have a TVS located at the LRU, for **IFR non-metallic aircraft only**. The TVS must be checked or replaced in accordance with Section 4.6.1.	24 Calendar Months

Item	Description/Procedure	Interval
Test Lightning Protection	The GTN #1 main power input and NAV power input will have a TVS located at the LRU, for **IFR non-metallic aircraft only**. The TVS must be replaced in accordance with Section 4.6.1. Conduct a visual check of the GPS/SBAS antenna cable overbraid in accordance with Section 4.7 Conduct a visual check of the WXR cable overbraid in accordance with Section 4.8 if installed.	After a suspected or actual lightning strike
Visual Inspection	The GTN unit, GMA 35 (if installed), Flight Stream 210 (if installed), switches, and wiring harnesses should be inspected to ensure continued integrity of the installation. These items must be inspected in accordance with Section 4.4.	12 Calendar Months

4.4 Visual Inspection

Conduct a visual check of the GTN unit, switches, GMA 35 (if installed), and their wiring harnesses to ensure continued installation integrity.

1. Inspect the GTN unit(s), GMA 35, and Flight Stream 210 for security of attachment, including visual inspection of mounting racks and other supporting structure attaching the racks to aircraft instrument panel.
   - **GTN 6XX/7XX** - Verify the countersunk fastener heads are in full contact with the unit mounting rack holes. Re-torque the mounting screws 12-15 in-lbs if required.
   - **GMT 35** - If the GMA 35 is installed, verify the countersunk fastener heads are in full contact with the unit mounting rack holes. Re-torque the GMA 35 mounting screws to 8.5-9.5 in-lbs if required.
   - **Flight Stream 210** - If the Flight Stream 210 is installed and screws are not securely attached, tighten any loose Flight Stream 210 mounting screws as necessary to snug plus one-quarter turn. If required, re-torque bonding strap hardware to 12-15 in-lbs.

CAUTION

Care should be taken when tightening the mounting screws of the Flight Stream 210. Excessive tightening may damage the mounting flange.

2. Inspect for signs of corrosion.
3. Inspect all switches, knobs, and buttons for damage.
4. Inspect condition of wiring, shield terminations, routing, and attachment/clamping.
5. Check the fan intake slots on the sides and bottom of the GTN unit's bezel for dust, dirt, or obstructions. Clean as needed.
6. Conduct a visual check of the GPS/SBAS antenna cable overbraid if installed.
7. Conduct a visual check of the WXR cable overbraid if installed.
8. Conduct a visual check of any bonding strap or conductive tape used for electrical bonding or RF ground plane (if installed). Replace any damaged or torn strap. See Section 6.12 or Section 6.13 for details. Replace any torn bonding tape using a heavy duty aluminum foil tape such as 3M P/N 438 or other foil with aluminum that is 7.2 mils thick or greater. If strap termination hardware is loose, tighten and retest bonding, see Section 4.5 for details.

4.5 Electrical Bonding Test

4.5.1 GTN Bonding Check (Metallic or Tube/Fabric Aircraft)

Perform an electrical bonding check as follows:

1. Remove the GTN 6XX or GTN 7XX from the mounting rack.
2. Remove the backplate assembly from the rack.

NOTE

For GTN 7XX only, if the GMA 35 is installed, it must be removed from its rack and the GMA 35 backplate assembly must be removed prior to performing Step 3. When a GMA 35 bonding check is planned, perform the GMA 35 bonding check prior to reinstalling the GTN backplate assembly to the rack.

3. Measure the resistance between the mounting rack and nearby exposed portion of aircraft metallic structure and verify it is less than or equal to 10 milliohms.

NOTE

A bonding test failure may occur if a fastener is not secured to the specified torque value. For installations that use screws in lieu of rivets to secure the rack to surrounding structure, verify that the screws are torqued to the appropriate value before proceeding to remove the rack. See Section 4.4 for torque values.

In the event of bonding test failure, remove the GTN rack and clean the attachment points with a bonding brush at both the GTN rack and the aircraft and reattach the rack to the rails in the panel. Re-verify the resistance between the mounting rack and nearby exposed portion of aircraft metallic structure and ensure that the resistance is less than or equal to 2.5 milliohms.

4. Reinstall the backplate assembly and reinstall the GTN in the mounting rack.

4.5.2 GTN (Composite Aircraft)

Perform an electrical bonding check as follows:

1. Remove the GTN 6XX or GTN 7XX from the mounting rack.
2. Remove the backplate assembly from the rack.

NOTE

For GTN 7XX only, if the GMA 35 is installed, it must be removed from its rack and the GMA 35 backplate assembly must be removed prior to performing Step 3.

3. Measure the resistance between the mounting rack and the instrument panel, verify it is less than or equal to 10 milliohms.

NOTE

A bonding test failure may occur if a fastener is not secured to the specified torque value. For installations that use screws in lieu of rivets to secure the rack to surrounding structure, verify that the screws are torqued to the appropriate value before proceeding to remove the rack. See Section 4.4 for torque values.

In the event of bonding test failure, remove the GTN rack and clean the attachment points with a bonding brush at both the GTN rack and the aircraft and reattach the rack to the rails in the panel. Re-verify the resistance between the mounting rack and the instrument panel and ensure that the resistance is less than or equal to 5 milliohms.

4. Reinstall the backplate assembly and reinstall the GTN in the mounting rack.

4.5.3 GMA 35 (Metallic or Tube/Fabric Aircraft)

A bonding check is required for the GMA 35. Perform an electrical bonding check as follows:

1. Gain access to the GMA 35 by removing the GTN 7XX.
2. Remove the GMA unit from the mounting rack.
3. Remove backplate assembly from the rack.

NOTE

The GTN 7XX backplate assembly must be removed from the GTN rack prior to performing Step 4.

4. Measure the resistance between the mounting rack and nearby exposed portion of aircraft metallic structure and verify it is less than or equal to 10 milliohms.

NOTE

A bonding test failure may occur if a fastener is not secured to the specified torque value. For installations that use screws in lieu of rivets to secure the rack to surrounding structure, verify that the screws are torqued to the appropriate value before proceeding to remove the rack. See Section 4.4 for torque values.

In the event of bonding test failure, remove the GMA 35 rack and clean the attachment points with a bonding brush at both the GMA rack and the aircraft attachment points. Re-verify the resistance between the mounting rack and nearby exposed portion of aircraft metallic structure and ensure that the resistance is less than or equal to 2.5 milliohms.

5. Reinstall the backplate assembly and reinstall the GMA unit in the mounting rack.

4.5.4 GMA 35 (Composite Aircraft)

1. Gain access to the GMA 35 by removing the GTN 7XX.
2. Remove the GMA unit from the mounting rack.
3. Remove the backplate assembly from the rack.

NOTE

The GTN 7XX backplate assembly must be removed from the GTN rack prior to performing Step 4.

4. Measure the resistance between the mounting rack and the instrument panel, and verify it is less than or equal to 10 milliohms.

NOTE

A bonding test failure may occur if a fastener is not secured to the specified torque value. For installations that use screws in lieu of rivets to secure the rack to surrounding structure, verify that the screws are torqued to the appropriate value before proceeding to remove the rack. See Section 4.4 for torque values.

In the event of bonding test failure, remove the GMA 35 rack and clean the attachment points with a bonding brush at both the GMA rack and the aircraft attachment points. Re-verify the resistance between the mounting rack and the instrument panel and ensure that the resistance is less than or equal to 5 milliohms.

5. Reinstall the backplate assembly and reinstall the GMA unit in the mounting rack.

4.5.5 Flight Stream 210 (Metallic or Tube/Fabric Aircraft)

1. Disconnect the shield terminations from the Flight Stream connector backshell.
2. Measure the resistance between the connector and nearby exposed portion of aircraft metallic structure and check that it is less than or equal to 20 milliohms.

In the event of bonding test failure, remove the Flight Stream connector bonding strap from the aircraft ground plane and clean the attachment point with a bonding brush. Re-attach the bonding strap to the aircraft ground plane, torque to 12-15 in-lbs. Re-check the resistance between the Flight Stream connector and aircraft structure, ensuring that the resistance is less than or equal to 10 milliohms. If cleaning the far side of the strap is not enough, remove, clean, and reattach on the Flight Stream 210 side.

3. Connect the shield terminations to the Flight Stream connector backshell.

4.5.6 Flight Stream 210 (Composite Aircraft)

1. Disconnect the shield terminations from the Flight Stream connector backshell.
2. Measure the resistance between the connector and instrument panel (or other aircraft ground) and check that it is less than or equal to 20 milliohms.

In the event of bonding test failure, remove the Flight Stream connector bonding strap from the aircraft ground plane and clean the attachment point with a bonding brush. Re-attach the bonding strap to the aircraft ground plane, torque to 12-15 in-lbs. Re-check the resistance between the Flight Stream connector and aircraft ground, ensuring that the resistance is less than or equal to 10 milliohms. If cleaning the far side of the strap is not enough, remove, clean, and reattach on the Flight Stream 210 side.

3. Connect the shield terminations to the Flight Stream connector backshell.

4.6 Transient Voltage Suppressor (TVS) (If Installed)

After a suspected lightning strike, each TVS and TVS assembly (if installed) must be replaced. Refer to Section 6.9.1 for information on installing in-line TVSs.

4.6.1 GTN TVS1 Check (GTN #1 Only)

NOTE

The GTN should be the only LRU connected to the NAV/GPS circuit breaker. If other equipment is connected to the NAV/GPS circuit breaker it must also be disconnected prior to conducting the following check. No other TVS devices should be on this circuit. If the TVS being checked is not isolated, erroneous readings may result.

For a dual GTN installation, only GTN #1 will have the TVS protection. The following checks will only apply to GTN #1. Reference the appropriate GTN power interconnect drawings. To check the TVS on the GTN power inputs, the following steps should be followed:

1. Remove the GTN as described in Section 6.1.
2. Open the GTN's circuit breaker and use a multi-meter to perform a diode check between P1001-19 and ground:
   a. The meter should indicate open with the red lead on P1001-19 and the black lead on ground.
   b. The meter should indicate a diode drop of between 2.0V and 2.5V with the red lead on ground and the black lead on P1001-19.
      i) If the diode drop is outside of the above range, replace the TVS.
      ii) If the meter indicates a short during steps 2a or 2b, replace the TVS.
      iii) If the meter indicates an open in both directions, check the continuity of the fuse.
      iv) If the fuse is open, replace the fuse and repeat the check.
      v) If the fuse is good, check the wiring for faults. If the wiring is good, replace the TVS.
3. Verify continuity between P1001-19 and P1001-20.
4. Reinstall the GTN as described in Section 6.1 and reset the GTN's circuit breaker.

4.6.2 GTN TVS2 Assembly Check (GTN #1 Only)

The TVS assembly (refer to Section 6.9) and fuse on the power bus side of GTN #1 must be inspected. Verify operation of all four TVSs prior to replacing any failed TVS.

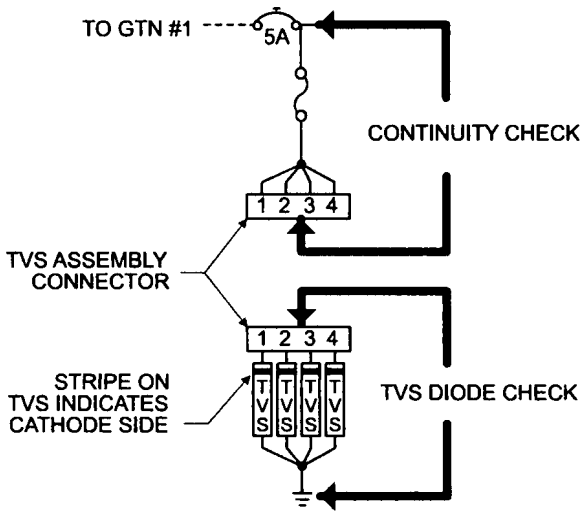


Figure 4-1. TVS Assembly Check

Check the TVS assembly (TVS2) as follows:

1. Ensure that the power to the bus is off and disconnect the connector in the TVS assembly.
2. Use a multi-meter to perform a diode check between the first connector contact (socket contact on the first TVS) and ground. Refer to Figure 4-1.
3. The meter should indicate open with the red lead on the connector socket contact and the black lead on ground:
    a) The meter should indicate a diode drop of between 2.0V and 2.5V with the red lead on ground and the black lead on the connector socket contact.
        i. If the diode drop is outside of the above range, replace the TVS diode corresponding to the contact being checked.
        ii. If the meter indicates a short, replace the TVS diode corresponding to the contact being checked.
        iii. If the meter indicates an open, check the wiring for faults. If the wiring is good, replace the TVS diode corresponding to the contact being checked.
4. Repeat checks in the previous step for each of the three remaining contacts/TVS diodes.
5. On the other connector, verify continuity between each of the four contacts and the power bus.
    a) If there is no continuity between the power bus and all four contacts, check the continuity of the fuse.
    b) If there is continuity between the power bus and some contacts but not others, check the wiring to the 'open' contacts and repair as necessary.
6. Reconnect the connector in the TVS assembly.

4.7 GPS/SBAS Antenna Cable Overbraid Inspection (If Installed)

The GPS/SBAS antenna cable overbraid must be inspected after a known or suspected lightning strike. Check the antenna and overbraid for the following:

1. Check the cable overbraid for pinching, melting or evidence of arcing at the GPS/SBAS antenna end and at the GTN 6XX/7XX.
2. Check the lug at the GTN end for evidence of arcing and verify that the lug is still secured to the overbraid and to the GTN connector shield block.
3. Check that the overbraid is securely attached at the GPS/SBAS antenna end and at the GTN6XX/7XX.

If any of these checks shows evidence of a lightning strike, replace the overbraid assembly in accordance with Section 6.10.

4.8 WXR HSDB Cable Overbraid Inspection (If Installed)

The WXR HSDB cable overbraid must be inspected after a known or suspected lightning strike. Check the overbraid for the following:

1. Check the cable overbraid for pinching, melting or evidence of arcing at the WXR end and at the bulkhead to which the WXR R/T is mounted.
2. Check the lug at the WXR end for evidence of arcing and verify that the lug is still secured to the overbraid and to the WXR shield block.
3. Check that the overbraid is securely attached at the bulkhead end.

If any of these checks shows evidence of a lightning strike, replace the overbraid assembly in accordance with Section 6.11.

4 INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

This section provides Instruction for Continued Airworthiness for the GTX 330/33 with ADS-B Out installation. This section satisfies the requirements for continued airworthiness as defined by 14 CFR Part 23.1529 and Part 23 Appendix G. Information in this section is required to maintain the continued airworthiness of the GTX Transponder units as installed under this AML STC.

4.1 Applicability

This document applies to all aircraft equipped with GTX 330/330D/33/33D Mode S Transponders with ADS-B Out per STC SA01714WI.

Modification of an aircraft by this Supplemental Type Certificate (STC) obligates the aircraft operator to include the maintenance information provided by this document in the operator's Aircraft Maintenance Manual and the operator's Aircraft Scheduled Maintenance Program.

4.2 Airworthiness Limitations

The Airworthiness Limitations section is FAA approved and specifies maintenance required under §43.16 and §91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

There are no airworthiness limitations associated with this type design change (STC SA01714WI).

FAA APPROVED

Mike Warren — 18-SEP-2014

Mike Warren
STC Unit Administrator
ODA-240087-CE

Date

4.3 Servicing Information

GTX 330/33 LRU maintenance is 'on condition' only. No component-level overhaul is required for the GTX 330/33 with ADS-B Out installation.

4.3.1 On Condition Servicing

'On Condition' replacement and/or servicing should occur when an item exhibits conditions, symptoms, and/or abnormalities defined in Section 5 of this manual. Replacement and/or servicing should be made only after the technician troubleshoots the system to the extent determined necessary by using the guidance in this manual along with common avionics maintenance practices.

4.3.2 Special Tools

The following tools are needed to perform maintenance tasks:

- Calibrated milliohm meter
  A milliohm meter with an accuracy of ±0.1 milliohm or better is required to measure the electrical bonding between GTX system components and aircraft ground.
- Calibrated transponder ramp tester
- Calibrated pitot/static ramp tester

4.4 Maintenance Intervals

Table 4-1 shows systems and items, installed by this STC, which must undergo tests or checks at specific intervals. Those inspections that are based on calendar elapsed time have specific intervals stated in Table 4-1.

NOTE

The maintenance intervals listed in the table below must be adhered to for each installed GTX.

Table 4-1. Maintenance Intervals

Item	Description/Procedure	Section No.	Interval
Equipment Removal and Reinstallation	Removal and reinstallation of GTX LRUs	6	On Condition
Cleaning	The GTX 330 display and bezel may be cleaned periodically when required. Cleaning can be accomplished using a soft cotton cloth dampened with clean water. DO NOT use any chemical cleaning agents. Care should be taken to avoid scratching the surface of the display.	N/A	On Condition
Antenna Visual Inspection	Removal and replacement	4.5	On Condition
Lightning Strike - Actual or Suspected	Inspect the coaxial cable connections, GTX bonding hardware (including bonding straps and tape), antenna and surrounding areas.	4.5	On Condition
	The GTX 330/33 transponder receiver sensitivity must be tested and shown to comply with Title 14 CFR Part 43 Appendix F.	8.4.1	On Condition
Testing	The GTX 330/33 transponders must be tested and shown to comply with Title 14 CFR Part 91.225 and 91.227.	8.4.2	Replacement of GPS Position source(s).
Equipment Visual Inspection	A visual inspection of the equipment installed by this STC must be performed.	4.5	12 Calendar Months
Testing	The GTX 330/33 transponders must be tested and shown to comply with Title 14 CFR Part 91.411, 91.413, and Part 43 Appendix E and F.	8.4.1	24 Calendar Months
Electrical Bonding Test	An electrical bonding test must be performed on equipment installed by this STC.	4.6	10 Years or 2000 hours

4.5 Visual Inspection

Perform a visual inspection in accordance with requirements in Table 4-1. Check for corrosion, damage, or other defects for each of the installed items. Replace any damaged parts as required. Inspection may require the temporary removal of a unit or units to gain access to connectors. Follow guidance in Section 6 for equipment removal and replacement. Refer to Appendix A of this manual for equipment locations and refer to the specific Aircraft Maintenance Manual for instructions on removing any access panels.

GTX 330/330D Visual Inspection

During normal aircraft inspections not to exceed 12 calendar month intervals, conduct a visual inspection of the GTX 330/330D installation in the following locations:

Instrument Panel

1. Inspect all GTX 330/330D knobs and buttons for legibility of labels and markings.
2. Inspect GTX 330/330D units for security of attachment.
3. Inspect mounting rack and hardware for integrity.
   a. Verify the racks, fasteners, and support structure are in good condition and are securely fastened.
   b. Inspect for signs of corrosion.
   c. For composite aircraft, inspect any aluminum foil tape used to ground the GTX and verify that it is not torn, damaged or showing signs of corrosion. If any of these occurs then the tape must be replaced (see Appendix B)
4. Inspect any bonding straps for corrosion, loose connections, or signs of damage (see Appendix B).
5. Inspect the condition of the wiring harnesses and coaxial cables.
   a. Inspect all instrument panel wiring and coax for chafing, damage, proper routing of wire bundles and security of attachment in accordance with AC 43.13-1B, Chapter 11, Section 8, Paragraph 11-96. Pay particular attention to possible areas of chaffing.
   b. Verify that the harness shows no signs of cracking, chaffing, abrasion, melting, or any other form of damage.
   c. Inspect the GTX 330/330D connectors for corrosion or other defects. Check the integrity of the shield block ground attachments to the harness connector assembly as well as the integrity of the individual shields and their attachment.

GTX 33/33D Visual Inspection

During normal aircraft inspections not to exceed 12 calendar month intervals, conduct a visual inspection of the GTX 33/33D installation in the following locations:

Remote Mount Rack

1. Inspect GTX 33/33D units for security of attachment.
2. Inspect mounting rack and hardware for integrity.
   a. Verify the racks, fasteners, and support structure are in good condition and are securely fastened.
   b. Inspect for signs of corrosion.
   c. For composite aircraft, inspect any aluminum foil tape used to ground the GTX and verify that it is not torn, damaged or showing signs of corrosion. If any of these occurs then the tape must be replaced (see Appendix B).
3. Inspect any bonding straps for corrosion, loose connections, or signs of damage (see Appendix B).
4. Inspect the condition of the wiring harnesses and coaxial cables.
   a. Verify that all wiring and cables are securely fastened.
   b. Verify that the harness shows no signs of cracking, chaffing, abrasion, melting, or any other form of damage.

Antenna Visual Inspection

During normal aircraft inspections not to exceed 12 calendar month intervals, conduct a visual inspection of the transponder antennas for the following:

1. Leading edge erosion, cracks, dents, or broken antenna. If these conditions are present, antenna must be replaced (see Appendix B).
2. If the attachment is not secure, re-work the installation and complete electrical bonding test specified in Section 4.6.
3. Condition of base seals. In the event the antenna seal shows sign of damage or decomposition, re-seal and complete the electrical bonding test specified in Section 4.6.

Post Lightning Strike Inspection

A post lightning strike inspection must be performed for a suspected or actual lightning strike to antennas or any temperature sensor connected to the GTX unit. Inspect antenna or sensor and surrounding installation to ensure that there is no structural damage around the areas where lightning may have attached. If there is visible sign of damage to the antenna or sensor, then it should be replaced.

Also inspect the antenna coax connection to GTX unit, grounding hardware, bonding straps or tape, and surrounding areas of the remotely mounted GTX 33 to ensure that there is no damage. Repair any damaged areas and components, then complete the electrical bonding test specified in Section 4.6.

4.6 Electrical Bonding Test

1. Disconnect the antenna coaxial cable from the GTX 330/33.
2. Disconnect the P3301 connector from the GTX 330/33.
3. Measure the DC resistance between each of the following test points and the aircraft ground reference as defined in Table B-1 and verify the resistance is less than or equal to the appropriate periodic test resistance value listed in the table.
   - Top metal case of GTX 330 #1 (if installed)
   - Top metal case of GTX 330 #2 (if installed)
   - GTX 33 #1 chassis (if installed)
   - GTX 33 #2 chassis (if installed)
   - Upper Transponder Antenna (if installed)
   - Lower Transponder Antenna (if installed)
4. If the resistance is more than the periodic test resistance value in the table, the bond must be improved enough to meet the reconditioned resistance value listed in Table B-1.

4 INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

This manual is designed for use by the installing agency of the Garmin GDL 69/69A system as Instructions for Continued Airworthiness (ICA), in accordance with 14 CFR 23.1529, and part 23, appendix G. This ICA includes information required by the operator to adequately maintain the GDL 69/69A system installed under the AML STC.

4.1 Airworthiness Limitations

There are no additional Airworthiness Limitations as defined in 14 CFR §23, appendix G, G23.4 that result from modifications made to an aircraft under STC SA01487SE-D.

The Airworthiness Limitations section is FAA approved and specifies maintenance required under §43.16 and §91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

FAA APPROVED

Michael Warren
ODA STC Unit Administrator
ODA-240087-CE

11-JUN-2015
Date

4.2 Servicing Information

The GDL 69/69A does not require servicing. In the event of a system failure, troubleshoot the GDL 69/69A in accordance with section 5.

GRC 10 Remote Control Battery Replacement

If the unit does not turn on, or the battery level indicator on the display shows no bars, replace the batteries. See Section 6.4 for details.

NOTE

Failure of the GRC 10 (i.e. dead batteries) has no impact on normal aircraft operations and is only used for passengers to control audio entertainment.

4.2.1 Periodic Maintenance

All antennas connected to the GDL 69/69A should be maintained in accordance with appropriate inspection data for the antenna installation.

4.2.2 Special Tools

A milliohm meter with an accuracy of +/- 0.1 mΩ (or better) is required to measure the electrical bonding between the GDL 69/69A system components and aircraft ground.

4.3 Maintenance Intervals

Table 4-1 Periodic Maintenance

Item	Description/Procedure	Interval
Equipment Removal and Replacement	Removal and replacement of the following items. See section 6 for instructions. • GDL 69/69A unit • GRT 10 unit • Flight Stream 110	On Condition
Battery Replacement	Removal and replacement of GRC 10 batteries. See section 6.4 for instructions.	On Condition
Visual Inspection	The GDL 69/69A, GRT 10 (if installed), Flight Stream 110 (if installed), switches, and wiring harnesses should be inspected to ensure continued integrity of the installation. **Visual inspection of the GDL 69/69A.** 1. Inspect the GDL 69/69A for security of attachment, including visual inspection of mounting rack and other supporting structure attaching the rack to aircraft. 2. Verify the countersunk fastener heads are in full contact with unit mounting rack holes. If fasteners are loose, re-torque to 12 to 15 in-lbs and complete the electrical bonding test. 3. Inspect for signs of corrosion. If corrosion is found, treat in accordance with aircraft maintenance manual. 4. Inspect condition of wiring, switches, shield terminations, routing, and attachment/clamping. Correct any issues identified by replacing damaged wiring/shield terminations and re-attaching as necessary. Replace any damaged switches. **Visual inspection of the GRT 10 (if installed).** 1. Inspect the GRT 10 for security of attachment. 2. Verify fastener heads are secure. Tighten to snug plus one-quarter turn if necessary. 3. Inspect condition of wiring, shield terminations, routing, and attachment/clamping. Correct any issues identified by replacing damaged wiring/shield terminations and re-attaching as necessary. **Visual inspection of the Flight Stream 110 (if installed).** 1. Inspect the Flight Stream 110 for security of attachment. 2. Verify fastener heads are secure. Tighten to snug plus one-quarter turn if necessary. 3. Inspect condition of wiring, shield terminations, routing, and attachment/clamping. Correct any issues identified by replacing damaged wiring/shield terminations and re-attaching as necessary.	12 Calendar Months

Item	Description/Procedure	Interval
Audio Suppression Verification	**Verify each audio suppression input for proper operation.** Verify the GDL 69A audio to the crew headphones is muted when each connected warning alarm system is activated. When possible, activate all warning alarms at the system source. For example, the stall warning may be activated by raising the stall vane on the leading edge of the wing. The gear warning horn may be simulated by providing power or ground, as appropriate, directly to the horn; provided the horn has been tested for proper operation when a gear retraction test was performed.	12 Calendar Months
Electrical Bonding Check	**Electrical bonding check of GDL 69/69A** 1. Remove the GDL 69/69A from the mounting rack. 2. Remove the backplate assembly from the rack to disconnect the cable harnesses. 3. Measure the resistance between the mounting rack and ground location as defined by table 2-1, verifying that the resistance is less than or equal to the periodic test value defined by table 2-1. If the bonding check fails, perform the following procedures: a) Remove the rack and verify that the countersunk areas around the holes are free of corrosion or any other debris. b) Clean all metal contact points with a bonding brush. c) Reattach the rack and verify the resistance between the mounting rack and nearby exposed aircraft metallic structure, ensuring that the resistance is less than or equal to the reconditioned test value defined by table 2-1. 4. Reinstall the backplate assembly then reinstall the GDL 69/69A in the mounting rack.	Every 10 years or 2000 flight hours, whichever comes first.

Item	Description/Procedure	Interval
Electrical Bonding Continued	**Electrical bonding check of Flight Stream 110 (metallic or tube/fabric aircraft).** 1. Disconnect the shield terminations from the Flight Stream 110 connector backshell. 2. Measure the resistance between the connector and ground location defined by table 2-1, and check that it is less than or equal to 20 milliohms. If the bonding check fails, perform the following procedures: a) Remove the Flight Stream 110 connector bonding strap from the aircraft ground plane and clean the attachment point with a bonding brush. b) Re-attach the bonding strap to the aircraft ground plane, torque to 12 to 15 in-lbs. Verify the resistance between the Flight Stream 110 connector and aircraft structure, ensuring that the resistance is less than or equal to 10 milliohms. c) If cleaning the aircraft ground plane side of the strap is not enough, remove, clean, and re-attach on the Flight Stream 110 side. Verify the resistance between the Flight Stream 110 connector and aircraft structure, ensuring that the resistance is less than or equal to 10 milliohms. 3. Reattach the shield terminations to the Flight Stream 110 connector backshell. **Electrical bonding check of Flight Stream 110 (composite aircraft).** 1. Disconnect the shield terminations from the Flight Stream 110 connector backshell. 2. Measure the resistance between the connector and ground location defined by table 2-1, and check that it is less than or equal to 20 milliohms. If the bonding check fails, perform the following procedures: a) Remove the Flight Stream 110 connector bonding strap from the aircraft ground plane and clean the attachment point with a bonding brush. b) Re-attach the bonding strap to the aircraft ground plane, torque to 12 to 15 in-lbs. Verify the resistance between the Flight Stream 110 connector and aircraft structure, ensuring that the resistance is less than or equal to 10 milliohms. c) If cleaning the aircraft ground plane side of the strap is not enough, remove, clean, and re-attach on the Flight Stream 110 side. Verify the resistance between the Flight Stream 110 connector and aircraft structure, ensuring that the resistance is less than or equal to 10 milliohms. 3. Reattach the shield terminations to the Flight Stream 110 connector backshell.	

US Department of Transportation
Federal Aviation Administration

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

Form Approved OMB No. 2120-0020 11/30/2007 | Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See Title 14 CFR §43.9, Part 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. §44701). Failure to report can result in a civil penalty for each such violation. (49 U.S.C. §46301(a))

1. Aircraft

Nationality and Registration Mark	Serial No.	
USA N20HK	414A0088	
Make	**Model**	**Series**
CESSNA	414A	400

2. Owner

Name *(As shown on registration certificate)*	Address *(As shown on registration certificate)*
20-HK LLC	Address 6333 DAEDALUS RD City CICERO State NY Zip 13039 Country USA

3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial No.
☐	☐	AIRFRAME	———	*(As described in Item 1 above)*	———
☐	☑	POWERPLANT	Teledyne Continental Motors	TSIO-520-NB	503099
☐	☐	PROPELLER			
☐	☐	APPLIANCE	Type Manufacturer		

6. Conformity Statement

A. Agency's Name and Address

Name RAM Aircraft, Limited Partnership
Address 7505 Karl May Drive
City Waco State Texas
Zip 76708 Country United States

B. Kind of Agency

	U. S. Certificated Mechanic		Manufacturer
	Foreign Certificated Mechanic	C. Certificate No.	
✓	Certificated Repair Station	Airframe Class III, Powerplant Class I VA1R551K	
	Certificated Maintenance Organization		

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 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.

Extended range fuel per 14 CFR Part 43 App. B ☐

Signature/Date of Authorized Individual

Anthony S. Czajkowski 6/2/09

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☑ Approved ☐ Rejected

BY								
		FAA Flt. Standards Inspector		Manufacturer		Maintenance Organization		Persons Approved by Canadian Department of Transport
		FAA Designee	✓	Repair Station		Inspection Authorization		Other *(Specify)*

Certificate or Designation No. VA1R551K

Signature/Date of Authorized Individual

Anthony S. Czajkowski 6/2/09

FAA Form 337 (10-06)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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

N20HK	6/2/09
Nationality and Registration Mark	Date

Engine modified to TSIO-520-NB 335 HP I/A/W RAM Dwg. 1778, Rev. K, dated 01/14/08 per STC SE09104SC-D.

Engine modified for all operation power rating to 335 HP at 38" MAP and 2700 RPM. Modified in accordance with STC SE4327SW-D Rev. 4. Customer furnished with RAM Overhaul Manual Supplement, Operators Manual Supplement, and Parts Manual Supplement. See specific operating limitations in Aircraft Flight Manual or Supplemental Flight Manual.

Installed Slick pressurized magnetos p/n 6320 per Dwg. 1036, Rev. AB, dated 10/22/04 I/A/W STC SE4651SW-D and SE09104SC-D.

Installation mechanic must complete Block 1 and 2 on reverse side and mail one copy to the Federal Aviation Administration, Aircraft Registration Branch AFS-750, P.O. BOX 25504, Oklahoma City, Oklahoma 73125

Negligible weight and balance change.

Customer furnished with FAA approved instructions for continued airworthiness for all alterations.

Pertinent details of the above installations are on file under Project No. 4764.

---End---

☐ Additional Sheets Are Attached

US Department of Transportation
Federal Aviation Administration

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

Form Approved OMB No. 2120-0020 11/30/2007 | Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See Title 14 CFR §43.9, Part 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. §44701). Failure to report can result in a civil penalty for each such violation. (49 U.S.C. §46301(a))

1. Aircraft	Nationality and Registration Mark: USA N20HK	Serial No.: 414A0088
	Make: CESSNA	Model: 414A / Series: 400
2. Owner	Name *(As shown on registration certificate)*: 20-HK LLC	Address *(As shown on registration certificate)*: Address 6333 DAEDALUS RD; City CICERO; State NY; Zip 13039; Country USA

3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial No.
☐	☐	AIRFRAME	—	*(As described in Item 1 above)*	—
☐	☑	POWERPLANT	Teledyne Continental Motors	TSIO-520-NB	521349
☐	☐	PROPELLER			
☐	☐	APPLIANCE	Type / Manufacturer		

6. Conformity Statement

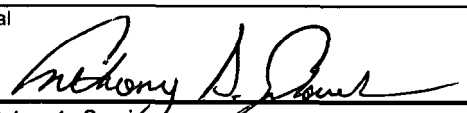
A. Agency's Name and Address
Name: RAM Aircraft, Limited Partnership
Address: 7505 Karl May Drive
City: Waco State: Texas
Zip: 76708 Country: United States

B. Kind of Agency

	U. S. Certificated Mechanic		Manufacturer
	Foreign Certificated Mechanic	C. Certificate No.	
✓	Certificated Repair Station	Airframe Class III, Powerplant Class I VA1R551K	
	Certificated Maintenance Organization		

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 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.

Extended range fuel per 14 CFR Part 43 App. B ☐

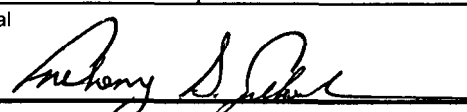
Signature/Date of Authorized Individual
Anthony S. Czajkowski 6/2/09 

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☑ Approved ☐ Rejected

BY		FAA Flt. Standards Inspector		Manufacturer		Maintenance Organization	Persons Approved by Canadian Department of Transport
		FAA Designee	✓	Repair Station		Inspection Authorization	Other *(Specify)*

Certificate or Designation No.: VA1R551K

Signature/Date of Authorized Individual
Anthony S. Czajkowski 6/2/09 

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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

N20HK	6/2/09
Nationality and Registration Mark	Date

Engine modified to TSIO-520-NB 335 HP I/A/W RAM Dwg. 1778, Rev. K, dated 01/14/08 per STC SE09104SC-D.

Engine modified for all operation power rating to 335 HP at 38" MAP and 2700 RPM. Modified in accordance with STC SE4327SW-D Rev. 4. Customer furnished with RAM Overhaul Manual Supplement, Operators Manual Supplement, and Parts Manual Supplement. See specific operating limitations in Aircraft Flight Manual or Supplemental Flight Manual.

Engine modified by installation of P/N S539800M30 starter adapter spring I/A/W Aircraft Specialties Services, Inc. S539800 Spring Installation Instructions No. 1101-1 dated February 15, 2000 per STC SE09846SC.

Installed Slick pressurized magnetos p/n 6320 per Dwg. 1036, Rev. AB, dated 10/22/04 I/A/W STC SE4651SW-D and SE09104SC-D.

Installation mechanic must complete Block 1 and 2 on reverse side and mail one copy to the Federal Aviation Administration, Aircraft Registration Branch AFS-750, P.O. BOX 25504, Oklahoma City, Oklahoma 73125

Negligible weight and balance change.

Customer furnished with FAA approved instructions for continued airworthiness for all alterations.

Pertinent details of the above installations are on file under Project No. 4764.

---End---

☐ Additional Sheets Are Attached

US Department of Transportation
Federal Aviation Administration

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

Form Approved OMB No. 2120-0020 11/30/2007 | Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See Title 14 CFR §43.9, Part 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. §44701). Failure to report can result in a civil penalty for each such violation. (49 U.S.C. §46301(a))

1. Aircraft

Nationality and Registration Mark	Serial No.		
USA N20HK	414A0088		
Make	**Model**	**Series**	
Cessna	414A	400	

2. Owner

Name *(As shown on registration certificate)*	Address *(As shown on registration certificate)*
20-HK LLC	Address 6333 Daedalus Rd
	City Cicero State NY
	Zip 13039 Country USA

3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial No.
[X]	[ ]	AIRFRAME	—	*(As described in Item 1 above)*	—
[ ]	[ ]	POWERPLANT			
[ ]	[ ]	PROPELLER			
[ ]	[ ]	APPLIANCE	Type / Manufacturer		

6. Conformity Statement

A. Agency's Name and Address

Name David Carter
Address 56 Cleveland Ave
City Auburn State ME
Zip 04210 Country USA

B. Kind of Agency

[X]	U. S. Certificated Mechanic	[ ]	Manufacturer
[ ]	Foreign Certificated Mechanic	C. Certificate No.	
[ ]	Certificated Repair Station	2288142	
[ ]	Certificated Maintenance Organization		

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 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.

Extended range fuel per 14 CFR Part 43 App. B [ ]

Signature/Date of Authorized Individual

February 1, 2010 David Carter David Carter

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is [X] Approved [ ] Rejected.

BY								
	[ ]	FAA Flt. Standards Inspector	[ ]	Manufacturer	[ ]	Maintenance Organization	[ ]	Persons Approved by Canadian Department of Transport
	[ ]	FAA Designee	[ ]	Repair Station	[X]	Inspection Authorization		Other *(Specify)*

Certificate or Designation No. 305841457

Signature/Date of Authorized Individual

February 1, 2010 Ben M. Mosher

FAA Form 337 (10-06)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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

USA N20HK	02/01/2010
Nationality and Registration Mark	Date

1. Removed L/H outboard wing leading edge and installed new leading edge Cessna P/N 5122003-601 IAW Cessna MEB 95-11R1.

2. Negligible change to weight and balance.

END

☐ Additional Sheets Are Attached

US Department of Transportation
Federal Aviation Administration

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

Form Approved
OMB No. 2120-0020

For FAA Use Only
Office Identification GL13

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 of 1958).

1. Aircraft	Make: Cessna	Model: 414A
	Serial No.: 414A-0088	Nationality and Registration Mark: N20HK
2. Owner	Name *(As shown on registration certificate)*: Hotel Kilo, Inc.	Address *(As shown on registration certificate)*: W9266 Hunter Road, Hortonville, WI 54944

'THE DATA ~~DESCRIBED~~ IDENTIFIED HEREIN COMPLIES WITH THE APPLICABLE AIRWORTHINESS REQUIREMENTS AND IS APPROVED FOR THE ABOVE DESCRIBED AIRCRAFT, SUBJECT TO CONFORMITY INSPECTION BY A PERSON AUTHORIZED IN FAR 43, SECTION 43.7"
DATE 12-01-97 SIGNATURE Edward C Stevens
FAA AGL-FSDO-61

3. For FAA Use Only

4. Unit Identification / **5. Type**

Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	~~~~~ (As described in Item 1 above) ~~~~~				X
POWERPLANT					
PROPELLER					
APPLIANCE	Type				
	Manufacturer				

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency	C. Certificate No.
Airtronics, Inc. P. O. Box 297 Clintonville, WI 54929	[ ] U.S. Certificated Mechanic [ ] Foreign Certificated Mechanic [X] Certificated Repair Station [ ] Manufacturer	JW5R977M

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
November 20, 1997	Frank Kostka

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 [X] APPROVED [ ] REJECTED

BY							Other *(Specify)*
	[ ]	FAA Flt. Standards Inspector	[ ]	Manufacturer	[ ]	Inspection Authorization	
	[ ]	FAA Designee	[X]	Repair Station	[ ]	Person Approved by Transport Canada Airworthiness Group	

Date of Approval or Rejection	Certificate or Designation No.	Signature of Authorized Individual
December 2, 1997	JW5R977M	Frank Kostka

FAA Form 337 (12-88)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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

The King KLN-89B was previously approved for VFR on FAA Form 337 dated June 19, 1997 and installed in accordance with King KLN-89B GPS installation manual, P/N 006-10522-0001, Rev. 1, dated June, 1995: ac 43.13 - 1A, Chapter 11, 13, & 15; and AC 43.13 - 2A, Chapter 1, 2, & 3; and in reference to STC SA00244WI-D. The King KLN-89B and KA-92 Antenna are TSO'D under TSO #C129 Class A1. The purpose of the Form 337 is for the non-precision approach IFR approval.

Operation software in this installation is #ORS-20.

The GPS system has been ground tested, flight tested, and found to meet operations in accordance with Bendix/King specifications and AC #20-138, Paragraph 8 (c)(2)(i)(ii)(iii)(iv), (A) thru (K).

The flight test was performed at the following points with results as follows:

Surveyed Lat/Long	Actual Flight Test Results	
GPS OSH RWY 27 N43°59.49' W088°32.92'	N43°59.49'	W088°32.85'
GPS ATW RWY 03 N44°14.39' W088°31.90'	N44°14.37'	W088°31.88'
GPS GRB RWY 12 N44°29.50' W088°08.10'	N44°29.52'	W088°08.11'

The flight test was done on 11/20/97.

Flight Manual Supplement is required for this approval. Any changes in existing computer software is considered a major alteration and a flight manual revision is required.

A pilot's handbook, P/N 81449, rev. C dated March 1, 1995 or later and/or supplemental guidelines for use of this system must be carried aboard the aircraft.

This GPS is approved for IFR enroute, terminal and/or non-precision approach use when FAA Approved Flight Manual Supplement dated DEC 0 1 1997 is received and the VFR placard is removed.

Placarded Panel "GPS NOT APPROVED FOR PRECISION APPROACHES" in full view of the pilot.

This installation has been inspected in accordance with AC 43.13 - 1A, Chapter 11: AC 43.13 - 2A, Chapter 2, and AC 20-138.
END

☐ Additional Sheets Are Attached

☆U.S. GOVERNMENT PRINTING OFFICE: 1992-769-012/60157

RECEIVED RECEIVED JUN 30 1997

US Department of Transportation
Federal Aviation Administration

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

Form Approved
OMB No. 2120-0020

For FAA Use Only
Office Identification AL13

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 of 1958).

1. Aircraft	Make: Cessna	Model: 414A
	Serial No.: 414A-0088	Nationality and Registration Mark: N20HK
2. Owner	Name *(As shown on registration certificate)*: Hotel Kilo, Inc.	Address *(As shown on registration certificate)*: W9266 Hunter Road, Hortonville, WI 54944

"THE DATA ~~APPROVED~~ IDENTIFIED HEREIN COMPLIES WITH THE APPLICABLE AIRWORTHINESS REQUIREMENTS AND IS APPROVED FOR THE ABOVE DESCRIBED AIRCRAFT, SUBJECT TO CONFORMITY INSPECTION BY A PERSON AUTHORIZED IN FAR 43, SECTION 43.7".

3. For FAA Use Only

DATE 6-30-97 SIGNATURE Edward C Stevens
FAA AGL-FSDO-61

4. Unit Identification				**5. Type**	
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	~~~~~ (As described in Item 1 above) ~~~~~				X
POWERPLANT					
PROPELLER					
APPLIANCE	Type / Manufacturer				

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency	C. Certificate No.
Airtronics, Inc. P. O. Box 297 Clintonville, WI 54929	[ ] U.S. Certificated Mechanic [ ] Foreign Certificated Mechanic [X] Certificated Repair Station [ ] Manufacturer	JW5R977M

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
June 19, 1997	Fran Kostka

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 [X] APPROVED [ ] REJECTED

BY							
	[ ]	FAA Flt. Standards Inspector	[ ]	Manufacturer	[ ]	Inspection Authorization	Other *(Specify)*
	[ ]	FAA Designee	[X]	Repair Station	[ ]	Person Approved by Transport Canada Airworthiness Group	

Date of Approval or Rejection	Certificate or Designation No.	Signature of Authorized Individual
July 2, 1997	JW5R977M	Fran Kostka

FAA Form 337 (12-88)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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

The following units were installed:

King KLN-89B GPS Receiver at station 111.0 center instrument panel
King KA-92 GPS Antenna at station 141.0, top fuselage

This installation was accomplished in accordance with King KLN-89B GPS installation manual, P/N 006-10522-0001, dated June 1995, rev. 1: AC 43.13 - 1A, Chapter 11, 13, & 15, and AC 43.13 - 2A, Chapter 1, 2, & 3.

Steering output data from the GPS is interfaced through a AK-950 Display and Switching Unit. This switching unit provides for reversionary ILS information to the HSI when the respective VOR/ILS receiver is tuned to an ILS frequency.

Aircraft panel placarded GPS VFR ONLY.

The aircraft weight and balance equipment list has been revised to reflect this installation and entered into the permanent aircraft records.

END

☐ Additional Sheets Are Attached

☆U.S. GOVERNMENT PRINTING OFFICE: 1992-769-012/60157

US Department of Transportation

Federal Aviation Administration

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

Form Approved OMB No. 2120-0020

For FAA Use Only

Office Identification MKE
File FSDO

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 of 1958).

1. Aircraft	Make: Cessna	Model: 414A
	Serial No.: 414A0088	Nationality and Registration Mark: N20HK
2. Owner	NAME (As shown on registration certificate): Hotel Kilo, Inc.	Address (As shown on registration certificate): W9266 Hunter Road, Hortonville, WI 54944

For FAA Use Only

4. Unit Identification / **5. Type**

Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	*(As described inem 1 above)*				X
POWERPLANT	TCM	TSIO-520-NB	L-234143.R R-503229		X X
PROPELLER					
APPLIANCE	Type				
	Manufacturer				

6. Conformity Statement

#22

A. Agency's Name and Address	B. Kind of Agency		C. Certificate No.
RAM AIRCRAFT CORPORATION P. O. BOX 5219 WACO, TEXAS 76708		U. S. Certificated Mechanic	VA1R551K
		Foreign Certificated Mechanic	
	X	Certificated Repair Station	
		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
3/13/97	Robert Franklin

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 [X]APPROVED [ ]REJECTED

BY		FAA Flt. Standards Inspector		Manufacturer	X	Inspection Authorization	OTHER *(Specify)*
		FAA Designee		Repair Station		Person Approved by Transport Canada Airworthiness Group	

Date of Approval or Rejection	Certificate or Designation No.	Signature of Authorized Individual
3/13/97	057466467	Glenn D. Mabe

COMPUTER GENERATED FAA FORM 337 (12-88)

NOTICE

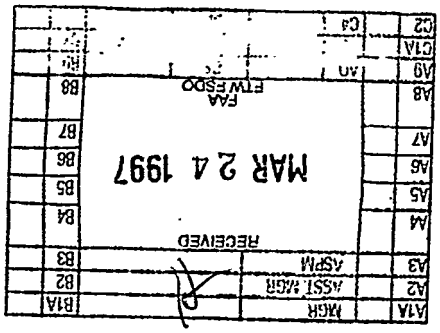
Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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

Installed Floscan Fuel Flow transducers per Dwg. 1083, Rev. H, dated 11/30/95 in accordance with STC SE5726SW.

Installed Shadin Fuel Flow Indicating System; per Dwg. 1078, Rev. M, dated 2/27/96 I/A/W STC SA5796SW Flight Manual Supplement FM1043 dated 9/1/93 furnished.

----------END----------



☐ Additional Sheets Are Attached

US Department of Transportation

Federal Aviation Administration

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

Form Approved
OMB No. 2120-0020

For FAA Use Only

Office Identification FTWE510 NE

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 of 1958).

1. Aircraft	Make: Cessna	Model: 414A
	Serial No.: 414A0088	Nationality and Registration Mark: N20HK
2. Owner	NAME (As shown on registration certificate): Hotel Kilo, Inc.	Address (As shown on registration certificate): W9266 Hunter Road, Hortonville, WI 54944

For FAA Use Only

4. Unit Identification				5. Type	
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	*(As described inem 1 above)*				X
POWERPLANT	TCM	TSIO-520-NB	L-234143.R R-503229		X X
PROPELLER					
APPLIANCE	Type				
	Manufacturer				

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency		C. Certificate No.
RAM AIRCRAFT CORPORATION P. O. BOX 5219 WACO, TEXAS 76708		U. S. Certificated Mechanic	VA1R551K
		Foreign Certificated Mechanic	
	X	Certificated Repair Station	
		Manufacturer	

A2

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
3/13/97	Robert Franklin

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 [X]APPROVED [ ]REJECTED

BY							
		FAA Flt. Standards Inspector		Manufacturer		Inspection Authorization	OTHER *(Specify)*
		FAA Designee	X	Repair Station		Person Approved by Transport Canada Airworthiness Group	

Date of Approval or Rejection	Certificate or Designation No.	Signature of Authorized Individual
3/13/97	CRS VA1R551K	Robert Franklin

COMPUTER GENERATED FAA FORM 337 (12-88)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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

Engines modified I/A/W RAM Dwg. 1872 dtaed 8/15/96 to increase power output to 335 HP, install Garrett/Allied Signal TA-81 turbocharger, RAM intercooler, RAM economy camshaft, RAM oil pump pick-up tube, RAM forged pistons with gapless rings, per STC SE09261SC. (Series VII-A)

Aircraft modified per intercooler scoop installation, structural changes and engines installed per RAM Dwg. 1765, Rev. F, dated 1/3/97 per STC SA09105SC (includes STC SA4546SW). (Series VII)

Engine cylinders modified per Dwg. 1158, Rev. AD dated 6/21/96 I/A/W STC SE09261SC.

Engine crankcases modified per Dwg. 1157, Rev. Y, dated 12/23/96 I/A/W STC SE09261SC.

Engines installed per RAM Dwg. 1016, Rev. Q, dated 5/17/96, I/A/W STC SA4546SW. Note: Series VII: See STC SA09105SC.

Installed wastegate actuator inline oil strainers p/n 1737. Installation I/A/W Dwg. No. 1866 dated 8/7/96. Installed per STC SA09105SC.

Increased ramp and takeoff weight to 7087 lbs., zero fuel weight 6515 lbs., and installed winglets per Dwg. 1042, Rev. P, dated 11/12/96. Installation and changes per STC SA4943SW. Customer furnished with FAA approved Flight Manual Supplement AFMS 1080 dated 2-8-96.

McCauley propellers model 3AF32C515/G-82NLA-4 installed per Dwg. List No. 1765, Rev. F, dated 1/3/97 I/A/W STC SA09105SC in conjunction with TSIO-520-NB engines modified to 335 HP per STC SE09261SC.

Installed McCauley MC-1 synchrophaser system per RAM Dwg. 1406, Rev. D, dated 10/30/95 I/A/W STC SA4546SW.

Installed Alcor EGT system per manufacturer's instructions I/A/W STC SA522SW.

Installed Slick pressurized magnetos p/n 6320 per Dwg. 1036, Rev. V, dated 8/23/96, I/A/W STC SE09261SC.

Installed spring load induction hose clamps per Dwg. 1171 dated 5/23/85 I/A/W STC SE09261SC.

Installed combination aft position/strobe light per Dwg. 1041, Rev. G, dated 2/1/91 I/A/W STC SA4851SW.

Installed new NDM oil cooler p/n CAM 649479 on left and right engines I/A/W STC SE00427NY.

Exhaust slip joints modified to slip joint configuration per Dwg. 1001, Rev. O, dated 7/26/96 I/A/W STC SA4331SW.

Installed vacuum pump cooling shroud on left and right engine vacuum pumps I/A/W RAM Dwg. 1221, Rev. H, dated 3/21/94 and RAM Dwg. 1199, Rev. H, dated 9/30/96 per STC SA3721SW.

Supplemental Oil Filter Installation per RAM Dwg. No. 1807, Rev. A dated 4/26/96 I/A/W STC SA09127SC.

New empty weight and balance computed.

Customer furnished with FAA approved Overhaul and Parts Manual Supplements for all alterations.

Customer furnished with FAA approved Flight Manual Supplements for all operations.

Pertinent details of the above installations are on file under work order no. 2611.

----------END----------

☐ Additional Sheets Are Attached

US Department of Transportation

Federal Aviation Administration

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

Form Approved OMB No. 2120-0020

For FAA Use Only

Office Identification ACE FSDO-07

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 of 1958).

1. Aircraft	Make: Cessna	Model: 414A
	Serial No.: 414A-0088	Nationality and Registration Mark: UAS N20HK
2. Owner	NAME (As shown on registration certificate): Hotel Kilo, Inc.	Address (As shown on registration certificate): W9266 Hunter Road, Hortonville, WI 54944

For FAA Use Only

4. Unit Identification				5. Type	
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	*(As described inem 1 above)*				
POWERPLANT	TCM	TSIO-520-EBcNB	L-271261-R		X
PROPELLER					
APPLIANCE	Type				
	Manufacturer				

RECEIVED
SEP 05 1996
ICT FSDO
Wichita, Kansas

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency		C. Certificate No.
RAM AIRCRAFT CORPORATION P. O. BOX 5219 WACO, TEXAS 76708		U. S. Certificated Mechanic	VA1R551K
		Foreign Certificated Mechanic	
	X	Certificated Repair Station	
		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
8/19/96	Larry D. Hammond

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 [X]APPROVED [ ]REJECTED

BY							
		FAA Flt. Standards Inspector		Manufacturer		Inspection Authorization	OTHER *(Specify)*
		FAA Designee	X	Repair Station		Person Approved by Transport Canada Airworthiness Group	

Date of Approval or Rejection	Certificate or Designation No.	Signature of Authorized Individual
8/19/96	CRS VA1R551K	Larry D. Hammond

COMPUTER GENERATED FAA FORM 337 (12-88)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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

Engine modified for all operation power rating to 325 HP at 41" MAP and 2700 RPM according to RAM Dwg. List 1186, Rev. S, dated 7/7/95. Modified in accordance with STC SE4327SW Rev. 3. Customer furnished with RAM Overhaul Manual Supplement, Operators Manual Supplement, and Parts Manual Supplement. See specific operating limitations in Aircraft Flight Manual or Supplemental Flight Manual.

Engine cylinders modified per Dwg. 1158, Rev. AA dated 2/27/95 I/A/W STC SE3631SW.

Installed Slick pressurized magnetos p/n 6320 per Dwg. 1036, Rev. T, dated 2/24/94.

Installed spring load induction hose clamps per Dwg. 1171 dated 5/23/85 I/A/W STC SE3632SW.

Installation mechanic must complete Block 1 and 2 on reverse side and mail one copy to their local FSDO.

Negligible weight and balance change.

Customer furnished with FAA approved Overhaul and Parts Manual Supplements for all alterations.

Pertinent details of the above installations are on file under Work Order No. 2358, BB0063.

----------END----------

☐ Additional Sheets Are Attached

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

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

Form Approved
Budget Bureau No. 04-R060.1

FOR FAA USE ONLY

OFFICE IDENTIFICATION
ACEFSDO-07

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.

1. AIRCRAFT	MAKE: Cessna	MODEL: 414A
	SERIAL NO.: 414A-0088	NATIONALITY AND REGISTRATION MARK: USA N20HK
2. OWNER	NAME (As shown on registration certificate): Hotel Kilo, Inc.	ADDRESS (As shown on registration certificate): W2966 Hunter Road, Hortonville, WI 54944

3. FOR FAA USE ONLY

4. UNIT IDENTIFICATION / **5. TYPE**

UNIT	MAKE	MODEL	SERIAL NO.	5. TYPE: REPAIR	5. TYPE: ALTERATION
AIRFRAME	◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆ (As described in item 1 above) ◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆				
POWERPLANT	TCM	TSIO-520-NB	R-514668		X
PROPELLER					
APPLIANCE	TYPE				
	MANUFACTURER				

RECEIVED
SEP 05 1996
ICT FSDO
Wichita, Kansas

6. CONFORMITY STATEMENT

A. AGENCY'S NAME AND ADDRESS	B. KIND OF AGENCY	C. CERTIFICATE NO.
RAM Aircraft Corporation P. O. Box 5219 Waco, Texas 76708	[ ] U.S. CERTIFICATED MECHANIC [ ] FOREIGN CERTIFICATED MECHANIC [X] CERTIFICATED REPAIR STATION [ ] MANUFACTURER	VA1R551K

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
6/17/91	John Sexton

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 [X] APPROVED [ ] REJECTED

BY						OTHER (Specify)
	[ ] FAA FLT. STANDARDS INSPECTOR		[ ] MANUFACTURER		[ ] INSPECTION AUTHORIZATION	
	[ ] FAA DESIGNEE	[X]	[ ] REPAIR STATION		[ ] CANADIAN DEPARTMENT OF TRANSPORT INSPECTOR OF AIRCRAFT	

DATE OF APPROVAL OR REJECTION	CERTIFICATE OR DESIGNATION NO.	SIGNATURE OF AUTHORIZED INDIVIDUAL
6/17/91	6/17/91	John Sexton

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. **DESCRIPTION OF WORK ACCOMPLISHED** *(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

Engine cylinders modified per Dwg. 1158, Rev. N, dated 12/4/89 I/A/W STC SE3631SW.

Engine crankcase modified per Dwg. 1157, Rev. L, dated 1/26/90 I/A/W STC SE3630SW.

Installed Slick pressurized magnetos p/n 6220 per Dwg. 1036, Rev. O, dated 5/09/90 I/A/W STC SE4651SW.

Installed spring load induction hose clamps per Dwg. 1171 dated 5/23/85 I/A/W STC SE3632SW.

Negligible weight and balance change.

Customer furnished w/FAA approved Overhaul and Parts Manual Supplements for all alterations.

Pertinent details of the above installations are on file under work order #11693/A9231.

----------END----------

☐ ADDITIONAL SHEETS ARE ATTACHED

☆ U.S. GPO: 1981 - 775-332/47

FAA AIRCRAFT REGISTRY
CAMERA NO. 2 N DATE: 2-7-95

DEC 5 1994

US Department of Transportation
Federal Aviation Administration

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

CHF

Form Approved
OMB No. 2120-0020

For FAA Use Only
Office Identification ACE-FSDO-23

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 of 1958).

1. Aircraft	Make: Cessna	Model: 414A
	Serial No.: 414A-0088	Nationality and Registration Mark: USA N20HK
2. Owner	Name *(As shown on registration certificate)*: Hotel Kilo, Inc.	Address *(As shown on registration certificate)*: W9266 Hunter Road, Hortonville, WI 54944

3. For FAA Use Only

4. Unit Identification / **5. Type**

Unit	Make	Model	Serial No.	5. Repair	5. Alteration
AIRFRAME	*(As described in Item 1 above)*				
POWERPLANT	TCM	TSIO-520-N	228259-P		X
PROPELLER					
APPLIANCE	Type:				
	Manufacturer:				

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency	C. Certificate No.
Miller Aviation, Inc. Binghamton Regional Airport Johnson City, NY 13790-9724	U.S. Certificated Mechanic X Foreign Certificated Mechanic Certificated Repair Station Manufacturer	DJFR206D

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
12-1-94	

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						Other *(Specify)*
	FAA Flt. Standards Inspector		Manufacturer		Inspection Authorization	
	FAA Designee	X	Repair Station		Person Approved by Transport Canada Airworthiness Group	

Date of Approval or Rejection	Certificate or Designation No.	Signature of Authorized Individual
12-1-94	DJFR206D	

FAA Form 337 (12-88)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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

Installed Slick pressurized magnetos P/N 6230 per Drawing 1036, Rev. T, dated 12/20/88, in accordance with STC SA4546SW. Weight and balance revised as required.
********** END **********

☐ Additional Sheets Are Attached

AC 43-9 1988 0 66 171

FAA AIRCRAFT REGISTRY
CAMERA NO. 2 DATE: 2-12-92

US Department of Transportation
Federal Aviation Administration

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

Form Approved
OMB No. 2120-0020
For FAA Use Only
Office Identification
AEA FSDO-23

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 of 1958).

1. Aircraft	Make: Cessna	Model: 414A
	Serial No.: 414A0088	Nationality and Registration Mark: N20HK
2. Owner	Name *(As shown on registration certificate)*: Hassan Kadah	Address *(As shown on registration certificate)*: 306 S. State Street Dover, DE 19901

3. For FAA Use Only

4. Unit Identification / **5. Type**

Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	(As described in Item 1 above)				XX
POWERPLANT					
PROPELLER					
APPLIANCE	Type				
	Manufacturer				

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency	C. Certificate No.
Sair Aviation 1801 Malden Road Syracuse, NY 13211	U.S. Certificated Mechanic	EASR436D
	Foreign Certificated Mechanic	
	XX Certificated Repair Station	
	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
26DEC91	Robert F. Kellaway, Jr.

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						
	FAA Flt. Standards Inspector		Manufacturer		Inspection Authorization	Other *(Specify)*
	FAA Designee	XX	Repair Station		Person Approved by Transport Canada Airworthiness Group	

Date of Approval or Rejection	Certificate or Designation No.	Signature of Authorized Individual
26DEC.91	EASR436D	Robert F. Kellaway, Jr.

FAA Form 337 (12-88)

FAA AIRCRAFT REGISTRY
CAMERA NO. 2 DATE: 2-12-92

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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

-Removed one Bonzer Radar Altimeter System consisting of antenna, receiver/transmitter and indicator. Installed one Terra TRA3000 system consisting of one TRA3000 receiver/transmitter/antenna, and TRI30 indicator by utilizing provisions provided by this aircraft manufacturer for standard avionics equipment installations.

-This installation has been ground checked in accordance with the appropriate manufacturers performance specifications and does not interfere with any other electro/mechanical device.

-This installation conforms to manufacturers installation instructions AC 43.13-2A PARA 2D, 21 and 27B and FAR's 23.1301, 23.1309, 23.1431 and 23.561.

-Negligable change to aircraft weight and balance.

-Aircraft logs and equipment list revised per this alteration.

END

☐ Additional Sheets Are Attached

★U.S.GPO:1990-0-588-012/40004

FAA AIRCRAFT REGISTRY
CAMERA NO. 2 DATE: 10-13-89

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

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

Form Approved
Budget Bureau No. 04-R060.1

FOR FAA USE ONLY

OFFICE IDENTIFICATION
CE65

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.

1. AIRCRAFT	MAKE: Cessna	MODEL: 414A
	SERIAL NO.: 414A0088	NATIONALITY AND REGISTRATION MARK: USA N#20HK
2. OWNER	NAME (As shown on registration certificate): KADAH HASSAN ℅ Starmaster INC	ADDRESS (As shown on registration certificate): 306 S State St Dover, DE 19901

3. FOR FAA USE ONLY

4. UNIT IDENTIFICATION / 5. TYPE

UNIT	MAKE	MODEL	SERIAL NO.	5. TYPE: REPAIR	5. TYPE: ALTERATION
AIRFRAME	(As described in item 1 above)				X
POWERPLANT					
PROPELLER					
APPLIANCE	TYPE / MANUFACTURER				

RECD
DEC 07 88
ACE-FSDO-65
LINCOLN, NE

6. CONFORMITY STATEMENT

A. AGENCY'S NAME AND ADDRESS	B. KIND OF AGENCY	C. CERTIFICATE NO.
Sky Harbor Air Service 3737 Orville Plaza Eppley Airfield Omaha, NE 68110	[ ] U.S. CERTIFICATED MECHANIC [ ] FOREIGN CERTIFICATED MECHANIC [X] CERTIFICATED REPAIR STATION [ ] MANUFACTURER	3018

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
12/02/88	Carl J. Link

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 [X] APPROVED [ ] REJECTED

BY						
	[ ] FAA FLT. STANDARDS INSPECTOR		[ ] MANUFACTURER		[ ] INSPECTION AUTHORIZATION	OTHER (Specify)
	[ ] FAA DESIGNEE	[X]	[ ] REPAIR STATION		[ ] CANADIAN DEPARTMENT OF TRANSPORT INSPECTOR OF AIRCRAFT	

DATE OF APPROVAL OR REJECTION	CERTIFICATE OR DESIGNATION NO.	SIGNATURE OF AUTHORIZED INDIVIDUAL
12/02/88	3018	Harry K Shuttle

FAA Form 337 (7-67) (8320)

FAA AIRCRAFT REGISTRY
CAMERA NO. 2 DATE: 10-13-89

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. DESCRIPTION OF WORK ACCOMPLISHED *(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

I.. lled RS08-001 Nav Loran switching unit.
All work accomplished in accordance with manufacturer's installation instructions, AC 43-13 1A chapter 11, sections 2, 3, and 7, chapter 15, sections 5, and AC 43-13 2A chapters 1, and 2.
Weight and balance and equipment list revised. Log book entry made

END

☐ ADDITIONAL SHEETS ARE ATTACHED

☆ U.S. GOVERNMENT PRINTING OFFICE: 1986-659-121/4(146

FAA AIRCRAFT REGISTRY
CAMERA NO. 3 DATE: 16 FEB 89

FAA AIRCRAFT REGISTRY
CAMERA NO. DATE:

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Form Approved
Budget Bureau No. 04-R060.1

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

FOR FAA USE ONLY
OFFICE IDENTIFICATION CE68

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.

1. AIRCRAFT
- MAKE: Cessna
- MODEL: 414A
- SERIAL NO.: 414A0088
- NATIONALITY AND REGISTRATION MARK: USA N#20HK

2. OWNER
- NAME (As shown on registration certificate): KADEH HASSAN / Z Starmaster INC
- ADDRESS (As shown on registration certificate): 306 S State St, Dover, DE 19901

3. FOR FAA USE ONLY

4. UNIT IDENTIFICATION

UNIT	MAKE	MODEL	SERIAL NO.	5. TYPE REPAIR	5. TYPE ALTERATION
AIRFRAME	(As described in item 1 above)				X
POWERPLANT					
PROPELLER					
APPLIANCE	TYPE / MANUFACTURER				

RECD
DEC 07 88
ACE-FSDO-65
LINCOLN, NE

6. CONFORMITY STATEMENT

A. AGENCY NAME AND ADDRESS	B. KIND OF AGENCY	C. CERTIFICATE NO.
Sky Harbor Air Service 3737 Orville Plaza Eppley Airfield Omaha, NE 68110	U.S. CERTIFICATED MECHANIC	
	FOREIGN CERTIFICATED MECHANIC	
	X CERTIFICATED REPAIR STATION	3018
	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: 12/02/88

SIGNATURE OF AUTHORIZED INDIVIDUAL: Carl J. Sack

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 [X] APPROVED [ ] REJECTED

BY					
	FAA FLT. STANDARDS INSPECTOR	MANUFACTURER	INSPECTION AUTHORIZATION	OTHER (Specify)
	FAA DESIGNEE	REPAIR STATION X	CANADIAN DEPARTMENT OF TRANSPORT INSPECTOR OF AIRCRAFT	

DATE OF APPROVAL OR REJECTION	CERTIFICATE OR DESIGNATION NO.	SIGNATURE OF AUTHORIZED INDIVIDUAL
12/02/88	3018	By: Barry K Shuttle

FAA Form 337 (7-67)

(8320)

CAMERA NO. 3 DATE: 12-13-89

CAMERA NO. DATE: 12-13-89

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. DESCRIPTION OF WORK ACCOMPLISHED *(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

Installed RS08-001 Nav Loran switching unit.
All work accomplished in accordance with manufacturer's installation
instruct[illegible]C 43-13 1A chapter 11, sections 2, 3, and 7, chapter 15,
sections [illegible]d AC 43-13 2A chapters 1, and 2.
Weight a[illegible]lance and equipment list revised. Log book entry made.
END

VOID

DEC 0 1

☑ ADDITIONAL SHEETS ARE ATTACHED

FAA AC 72-4906

☆ U.S. GOVERNMENT PRINTING OFFICE: 1986-659-121/40146

FAA AIRCRAFT REGISTRY
CAMERA NO. 2 DATE: 7 - 29 - 87

THOSE DOCUMENTS PRECEDING THIS NOTICE WERE FILMED WITHOUT A DATE IN THE ANNOTATION WINDOW. THE DATE OF JULY 29, 1987, SHOULD HAVE APPEARED IN THE ANNTOTATION WINDOW.

Jmaxine Bennett

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

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

Form Approved
Budget Bureau No. 04-R060.1

FOR FAA USE ONLY
OFFICE IDENTIFICATION

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.

1. AIRCRAFT	MAKE: Cessna	MODEL: 414A
	SERIAL NO.: 414A0088	NATIONALITY AND REGISTRATION MARK: N 20HK
2. OWNER	NAME *(As shown on registration certificate)*: Kadah Hassan C/O Starmaster Inc.	ADDRESS *(As shown on registration certificate)*: 306 S. State Street Dover, DE 19901

3. FOR FAA USE ONLY

RECEIVED
SEP 10 1986
FAA DALLAS
SW-FSDO-83

4. UNIT IDENTIFICATION

UNIT	MAKE	MODEL	SERIAL NO.	TYPE: REPAIR	TYPE: ALTERATION
AIRFRAME	◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆ *(As described in item 1 above)* ◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆				XX
POWERPLANT					
PROPELLER					
APPLIANCE	TYPE / MANUFACTURER				

6. CONFORMITY STATEMENT

A. AGENCY'S NAME AND ADDRESS	B. KIND OF AGENCY	C. CERTIFICATE NO.
RAM Aircraft Corporation P. O. Box 5219 Waco, Texas 76708	U.S. CERTIFICATED MECHANIC FOREIGN CERTIFICATED MECHANIC X CERTIFICATED REPAIR STATION MANUFACTURER	202-76

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
8/25/86	Randal Schaper

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 [X] APPROVED [ ] REJECTED

BY						OTHER *(Specify)*
	FAA FLT. STANDARDS INSPECTOR		MANUFACTURER		INSPECTION AUTHORIZATION	
	FAA DESIGNEE	X	REPAIR STATION		CANADIAN DEPARTMENT OF TRANSPORT INSPECTOR OF AIRCRAFT	

DATE OF APPROVAL OR REJECTION	CERTIFICATE OR DESIGNATION NO.	SIGNATURE OF AUTHORIZED INDIVIDUAL
8/25/86	202-76	Randal Schaper

FAA Form 337 (7-67) (8320)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. DESCRIPTION OF WORK ACCOMPLISHED *(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

Exhaust slip joints modified to slip joint configuration per Dwg. 1001, Rev. E, dated 7/16/85 I/A/W STC SA4331SW.

Customer FAA approved Flight Manual not required.

Pertinent details of the above installation are on file under W. O. # 9790.

----------END----------

☐ ADDITIONAL SHEETS ARE ATTACHED

☆U.S. GOVERNMENT PRINTING OFFICE: 1977—771-021/344

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

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

Form Approved
Budget Bureau No. 04-R060.1
FOR FAA USE ONLY
OFFICE IDENTIFICATION

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.

1. AIRCRAFT	MAKE: Cessna	MODEL: 414A
	SERIAL NO.: 414A0088	NATIONALITY AND REGISTRATION MARK: N20HK
2. OWNER	NAME (As shown on registration certificate): Kadah Hassan C/O Starmaster Inc.	ADDRESS (As shown on registration certificate): 306 S. State Street Dover, DE 19901

3. FOR FAA USE ONLY

RECEIVED
SEP 10 1986
FAA-DALLAS
SW-FSDO-63

4. UNIT IDENTIFICATION

UNIT	MAKE	MODEL	SERIAL NO.	REPAIR	ALTERATION
AIRFRAME	(As described in item 1 above)				
POWERPLANT	TCM	TSIO-520-N	L-228259-R R-228362-R		XX
PROPELLER					
APPLIANCE	TYPE MANUFACTURER				

6. CONFORMITY STATEMENT

A. AGENCY'S NAME AND ADDRESS	B. KIND OF AGENCY	C. CERTIFICATE NO.
RAM Aircraft Corporation P O Box 5219 Waco, Texas 76708	U.S. CERTIFICATED MECHANIC FOREIGN CERTIFICATED MECHANIC X CERTIFICATED REPAIR STATION MANUFACTURER	202-76

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse of 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
9/2/86	Randal Schaap

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 [X] APPROVED [ ] REJECTED

BY						OTHER (Specify)
		FAA FLT. STANDARDS INSPECTOR		MANUFACTURER	INSPECTION AUTHORIZATION	
		FAA DESIGNEE	X	REPAIR STATION	CANADIAN DEPARTMENT OF TRANSPORT INSPECTOR OF AIRCRAFT	

DATE OF APPROVAL OR REJECTION	CERTIFICATE OR DESIGNATION NO.	SIGNATURE OF AUTHORIZED INDIVIDUAL
9/2/86	202-76	Randal Schaap

FAA Form 337 (7-67) (8320)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. DESCRIPTION OF WORK ACCOMPLISHED *(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

Left engine crankcase modified per Dwg. 1157, Rev. E dated 7/9/86 in accordance with STC SE3630SW.

Installed Spring Load Induction Hose Clamps per Dwg. 1171 dated 5/23/85 in accordance with SE3632SW.

Customer furnished w/FAA approved Flight Manual Supplements for all operations if required.

Pertinent details of the above installations are on file under work order # 9790.

----------END----------

☐ ADDITIONAL SHEETS ARE ATTACHED

☆U.S. GOVERNMENT PRINTING OFFICE: 1977—771-021/344

FAA AIRCRAFT REGISTRY
CAMERA NO. 3 DATE: 3-7-83

N20HK

19

Form Approved
Budget Bureau No. 04-R0058

MAY 8 1980

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

APPLICATION FOR AIRWORTHINESS CERTIFICATE

INSTRUCTIONS—Print or type. Do not write in shaded areas; these are for FAA use only. Submit original only to an authorized FAA Representative. If additional space is required, use an attachment. For special flight permits complete Sections II and VI or VII as applicable.

I. AIRCRAFT DESCRIPTION

1. REGISTRATION MARK	2. AIRCRAFT BUILDER'S NAME (make)	3. AIRCRAFT MODEL DESIGNATION	4. YR. MFG.	FAA CODING
N4732A	Cessna	414A	1978	2Ø759Ø7
5. AIRCRAFT SERIAL NO.	**6. ENGINE BUILDER'S NAME (make)**	**7. ENGINE MODEL DESIGNATION**		17Ø4Ø
414A0088	Continental	TSIO-520-N		
8. NUMBER OF ENGINES	**9. PROPELLER BUILDER'S NAME (make)**	**10. PROPELLER MODEL DESIGNATION**	**11. AIRCRAFT IS**	
Two	McCauley	3AF32C93/82NC-5.5		IMPORT

II. CERTIFICATION REQUESTED

APPLICATION IS HEREBY MADE FOR: (Check applicable items)

- A 1 [X] STANDARD AIRWORTHINESS CERT. (Indicate category) [X] NORMAL [ ] UTILITY [ ] ACROBATIC [ ] TRANSPORT [ ] GLIDER [ ] BALLOON
- B [ ] SPECIAL AIRWORTHINESS CERTIFICATE (Check appropriate items)
  - 2 [ ] LIMITED
  - 5 [ ] PROVISIONAL (Indicate class)
    - 1 CLASS I
    - 2 CLASS II
  - 3 [ ] RESTRICTED (Indicate operation(s) to be conducted)
    - 1 AGRICULTURE & PEST CONTROL; 2 AERIAL SURVEYING; 3 AERIAL ADVERTISING
    - 4 FOREST (Wild life conservation); 5 PATROLLING; 6 WEATHER CONTROL
    - 0 OTHER (Specify)
  - 4 [ ] EXPERIMENTAL (Indicate operation(s) to be conducted)
    - 1 RESEARCH AND DEVELOPMENT; 2 AMATEUR BUILT; 3 EXHIBITION
    - 4 RACING; 5 CREW TRAINING; 6 MKT. SURVEY
    - 0 TO SHOW COMPLIANCE WITH FAR
  - 8 [ ] SPECIAL FLIGHT PERMIT (Indicate operation to be conducted then complete Section VI or VII as applicable on reverse side)
    - 1 FERRY FLIGHT FOR REPAIRS, ALTERATIONS, MAINTENANCE OR STORAGE
    - 2 EVACUATE FROM AREA OF IMPENDING DANGER
    - 3 OPERATION IN EXCESS OF MAX. CERTIFICATED TAKE-OFF WEIGHT
    - 4 DELIVERING OR EXPORT; 5 PRODUCTION FLIGHT TESTING
- C 6 [ ] MULTIPLE AIRWORTHINESS CERTIFICATE (Check appropriate Restricted Operation and Standard or Limited as applicable above)

III. OWNER'S CERTIFICATION

A. REGISTERED OWNER (As shown on Certificate of Aircraft Registration) — IF DEALER, CHECK HERE → [ ]

NAME	ADDRESS
Cessna Aircraft Company	West K-42 Highway, P. O. Box 7704 Wichita, Kansas 67277

B. AIRCRAFT CERTIFICATION BASIS (Check applicable blocks and complete items as indicated)

[X]	AIRCRAFT SPECIFICATION OR TYPE CERTIFICATION DATA SHEET (Give No. and Revision No.): A7CE Rev. 19	[X]	AIRWORTHINESS DIRECTIVES (Check if all applicable AD's complied with and give Latest AD No.): Issue 78-13-08
	AIRCRAFT LISTING (Give page No(s).): NA		SUPPLEMENTAL TYPE CERTIFICATE (List number of each STC incorporated): NA

C. AIRCRAFT OPERATION AND MAINTENANCE RECORDS

[X]	CHECK IF RECORDS IN COMPLIANCE WITH FAR 91.173	TOTAL AIRFRAME HOURS— 4.5	3 EXPERIMENTAL ONLY—Enter hours flown since last certificate issued or renewed: NA

D. CERTIFICATION—I hereby certify that I am the owner (or his agent) of the aircraft described above; that the aircraft is registered with the Federal Aviation Administration in accordance with Section 501 of the Federal Aviation Act of 1958, and applicable Federal Aviation Regulations; and that the aircraft has been inspected and is airworthy and eligible for the airworthiness certificate requested.

DATE OF APPLICATION	NAME AND TITLE (Print or type)	SIGNATURE
8-01-78	A. D. Schmidt, Quality Control Manager	A D Schmidt

IV. INSPECTION AGENCY VERIFICATION

A. THE AIRCRAFT DESCRIBED ABOVE HAS BEEN INSPECTED AND FOUND AIRWORTHY BY: (Complete this section only if FAR 21.183 (d) applies)

- 2 [ ] FAR PART 121 OR 127 CERTIFICATE HOLDER (Give Certificate No.)
- 3 [ ] CERTIFICATED MECHANIC (Give Certificate No.)
- 6 [ ] CERTIFICATED REPAIR STATION (Give Certificate No.)
- 5 [ ] AIRCRAFT MANUFACTURER (Give Name of Firm)

DATE	TITLE	SIGNATURE

V. FAA REPRESENTATIVE CERTIFICATION

(Check ALL applicable blocks) I find that the aircraft described in Section I or VII meets the requirements for: [X] The certification requested, or [X] [ ] Amendment or modification of its current airworthiness certificate. Inspection for a special flight permit under Section VII was conducted by: [ ] FAA Inspector; certificate holder under [ ] FAR 65, [ ] FAR 121 or 127, or [ ] FAR 145.

DATE	DISTRICT OFFICE	4 DESIGNATION NO.	1 FAA INSPECTOR'S SIGNATURE
8-01-78	CE EMDO 3-0-43	Executive Engineer Cessna Aircraft Co., Wallace Div. Delegation Option Manufacturer, CE-3 By Raymond M. Rowden	

FAA Form 8130-6 (7-70)

FAA AIRCRAFT REGISTRY
CAMERA NO. 3 DATE: 3-7-83

VI. PRODUCTION FLIGHT TESTING

A. MANUFACTURER

NAME	ADDRESS

B. PRODUCTION BASIS *(Check applicable item)*

- ☐ PRODUCTION CERTIFICATE *(Give production certificate number)*
- ☐ TYPE CERTIFICATE ONLY
- ☐ APPROVED PRODUCTION INSPECTION SYSTEM

C. GIVE QUANTITY OF CERTIFICATES REQUIRED FOR OPERATING NEEDS:

DATE OF APPLICATION	NAME AND TITLE *(Print or type)*	SIGNATURE

VII. SPECIAL FLIGHT PERMIT PURPOSES OTHER THAN PRODUCTION FLIGHT TEST

A. DESCRIPTION OF AIRCRAFT

☐ REGISTERED OWNER	ADDRESS
☐ BUILDER *(Maker)*	MODEL
☐ SERIAL NUMBER	REGISTRATION MARK

B. DESCRIPTION OF FLIGHT

☐ FROM	TO	
☐ VIA	DEPARTURE DATE	DURATION

C. CREW REQUIRED TO OPERATE THE AIRCRAFT AND ITS EQUIPMENT

☐ PILOT ☐ CO-PILOT ☐ NAVIGATOR ☐ OTHER *(Specify)*

D. THE AIRCRAFT DOES NOT MEET THE APPLICABLE AIRWORTHINESS REQUIREMENTS AS FOLLOWS:

E. THE FOLLOWING RESTRICTIONS ARE CONSIDERED NECESSARY FOR SAFE OPERATION *(Use attachment if necessary)*

F. **CERTIFICATION**—I hereby certify that I am the registered owner (or his agent) of the aircraft described above, that the aircraft is registered with the Federal Aviation Administration in accordance with Section 501 of the Federal Aviation Act of 1958, and applicable Federal Aviation Regulations; and that the aircraft has been inspected and is airworthy for the flight described.

DATE	NAME AND TITLE *(Print or type)*	SIGNATURE

VIII. AIRWORTHINESS DOCUMENTATION (FAA use only)

X	A. Operating Limitations and Markings in Compliance with FAR 91.31 as Applicable		G. Statement of Conformity, FAA Form 317 *(Attach when required)*
	B. Current Operating Limitations Attached		H. Foreign Airworthiness Certification for Import Aircraft *(Attach when required)*
	C. Data, Drawings, Photographs, etc. *(Attach when required)*		I. Previous Airworthiness Certificate Issued in Accordance with FAR ____ CAR ____ *(Original attached)*
X	D. Current Weight and Balance Information Available in Aircraft		
	E. Major Repair and Alteration, FAA 337 *(Attach when required)*	X	J. Current Airworthiness Certificate Issued in Accordance with FAR 21.183a per 21.273 *(Copy attached)*
X	F. This Inspection Recorded in Aircraft Records		

Typed by # 38

C FAA AC 72-0771

FAA AIRCRAFT REGISTRY
CAMERA NO. 3 DATE: 3-7-83

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

STANDARD AIRWORTHINESS CERTIFICATE

1. NATIONALITY AND REGISTRATION MARKS	2. MANUFACTURER AND MODEL	3. AIRCRAFT SERIAL NUMBER	4. CATEGORY
N4732A	Cessna 414A	414A0088	Normal

5. AUTHORITY AND BASIS FOR ISSUANCE
This airworthiness certificate is issued pursuant to the Federal Aviation Act of 1958 and certifies that, as of the date of issuance, the aircraft to which issued has been inspected and found to conform to the type certificate therefor, to be in condition for safe operation, and has been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation, except as noted herein.
Exceptions:
None

6. TERMS AND CONDITIONS
Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator, this airworthiness certificate is effective as long as the maintenance, preventive maintenance, and alterations are performed in accordance with Parts 21, 43, and 91 of the Federal Aviation Regulations, as appropriate, and the aircraft is registered in the United States. Cessna Aircraft Co., Wallace Div.

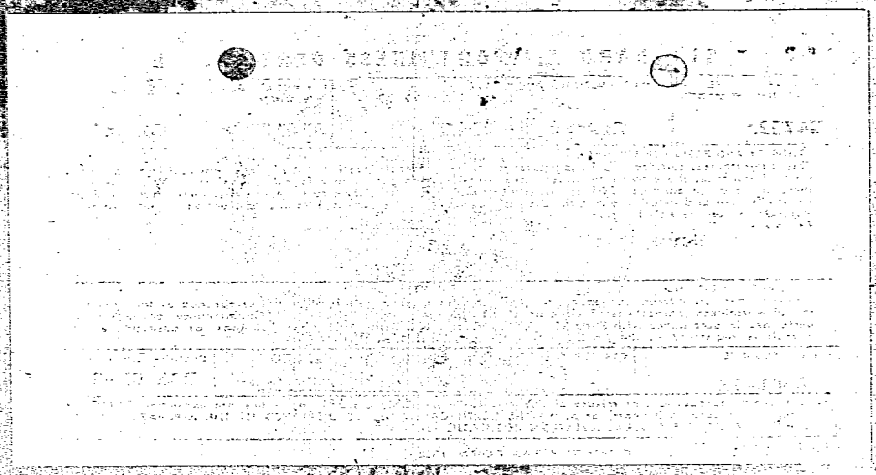
DATE OF ISSUANCE	FAA REPRESENTATIVE (Signature, Option, Manufacturer, CE-3)	DESIGNATION NUMBER
8-01-78	Raymond M. Rourke	DOA CE-3

Any alteration, reproduction, or misuse of this certificate may be punishable by a fine not exceeding $1,000, or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS.

FAA Form 8100-2 (7-67) FORMERLY FAA FORM 1362

☆ U.S. Government Printing Office — 1976-675-526

FAA AIRCRAFT REGISTRY
CAMERA NO. 3 DATE: 3-7-83



FAA AIRCRAFT REGISTRY
CAMERA NO. 3 DATE: 3-7-83

DUB

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Form Approved
Budget Bureau No. 04-R060.1

FOR FAA USE ONLY

OFFICE IDENTIFICATION
SO-FSDO-63

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.

1. AIRCRAFT	MAKE: Cessna	MODEL: 414
	SERIAL NO.: 414-0088	NATIONALITY AND REGISTRATION MARK: N4732A
2. OWNER	NAME (As shown on registration certificate): Kadah, Hassan c/o Starmaster, Inc.	ADDRESS (As shown on registration certificate): 306 So. State St. Dover, Delaware 19901

3. FOR FAA USE ONLY

4. UNIT IDENTIFICATION / **5. TYPE**

UNIT	MAKE	MODEL	SERIAL NO.	5. TYPE: REPAIR	5. TYPE: ALTERATION
AIRFRAME	◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆ (As described in item 1 above) ◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆				XXX
POWERPLANT					
PROPELLER					
APPLIANCE	TYPE:				
	MANUFACTURER:				

6. CONFORMITY STATEMENT

A. AGENCY'S NAME AND ADDRESS	B. KIND OF AGENCY	C. CERTIFICATE NO.
Aero Electronics, Inc 2451 Democrat Road Memphis, TN 38118	U.S. CERTIFICATED MECHANIC FOREIGN CERTIFICATED MECHANIC XX CERTIFICATED REPAIR STATION MANUFACTURER	5423 Radio Class 1,2,3LI

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
February 5, 1979	William C. Shoplaw

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 [X] APPROVED [ ] REJECTED

BY						
	FAA FLT. STANDARDS INSPECTOR		MANUFACTURER		INSPECTION AUTHORIZATION	OTHER (Specify)
	FAA DESIGNEE	XX	REPAIR STATION		CANADIAN DEPARTMENT OF TRANSPORT INSPECTOR OF AIRCRAFT	

DATE OF APPROVAL OR REJECTION	CERTIFICATE OR DESIGNATION NO.	SIGNATURE OF AUTHORIZED INDIVIDUAL
2-5-79	Class 1, 2, 3LI	Kenneth M. Mesh

FAA Form 337 (7-67) (8320)

FAA AIRCRAFT REGISTRY
CAMERA NO. 3 DATE: 3-7-83

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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

Removed Cessna Standard Altimeter.

Installed two each King KY196 Comm Transceiver, two each King KNS80 R-Nav, two each King KT76A ATC Transponder, one King KMA20 Audio Marker Receiver, one Bendix RDR160 IN2026A Color Weather Radar Indicator, one King KT96 Radio Telephone, and one Collins ADF650 ADF Receiver, in center panel of Cessna provided radio area.

Installed one King KI206 VOR/LOC/GS Indicator, one King KA40 Marker Indictor, one Collins IN650ADF Indicator, one King KA51A Slaving Control, one King KI525A HSI Indicator, one Bonzer MK10 Radar Altimeter Indicator, one Aerosonic 35,000ft serial number 101435-01229, certified 11-4-78 Encoding Altimeter, one ANS50 Turn and Bank, one TAS True Airspeed, one AIM 500 DCF Aritificial Horizon, one Aerosonic 360-27-1210 Rate of Climb, one LC-2 Digital Clock, and one outside air temperature in pilot's panel.

Moved existing Airspeed, Vertical speed, Turn and Bank, Artificial Horizon, Directional Gyro and clock from pilot's panel to copilot's panel. Installed one King KEA-126-17, 30,000ft serial number 10789, certified 12-20-78 encoding altimeter in co-pilot's panel in accordance to AC43:13-2, chapter 2, paragraph 21-23 and equipment installation manual.

Installed one Bendix RDR160 Weather Radar Antenna Receiver Transmitter to most forward nose section bulkhead. Installed one King KG102A Directional Gyro, one King KA39 Power Converter, and three voltage reducers resistors in nose section radio compartment to existing structure. Installed one King KA52 Autopilot Adapter and one Bendix TBL25 cooling fan in control pedestal. Installed King KMI112 Flux Detector in tail section of aircraft bracket of .063 aluminum and 5/8 aluminum angle. The above installation was done in accordance to AC43:13-2, chapter 2, paragraph 21, 24, 25 and equipment installation manual.

Installed to bottom nose section of fuselage two each ATC Transponder antennas. Installed to bottom cabin section of fuselage two-each DME Antennas, one ADF Antenna, one VHF Antenna(Comm), and one phone antenna. Installed to bottom tail section of fuselage one Marker Beacon Antenna Installed to toptail section of fuselage one VHF Nav Antenna. Installed in tail cap one VHF Comm Antennea. The above installation was done in accordance to AC43:13-2, chapter 3, paragraph 33-38 and equipment installation manual.

Installed number two pitot system in accordance to Cessna AK414-13E approved June 22, 1977 and installation manual for Model 414.

☒ ADDITIONAL SHEETS ARE ATTACHED

★1975-G.H.O.-1703-M/673-200/175

FAA AIRCRAFT REGISTRY
CAMERA NO. 3 DATE: 3-7-83

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Form Approved
Budget Bureau No. 04-R060.1

FOR FAA USE ONLY
OFFICE IDENTIFICATION

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.

1. AIRCRAFT	MAKE: CESSNA	MODEL: 414
	SERIAL NO.: 414-0088	NATIONALITY AND REGISTRATION MARK: N4732A
2. OWNER	NAME (As shown on registration certificate): Kadah Hassan C/O Starmaster Inc	ADDRESS (As shown on registration certificate): 306 So. State St. Dover, Delaware, 19901

3. FOR FAA USE ONLY

4. UNIT IDENTIFICATION / 5. TYPE

UNIT	MAKE	MODEL	SERIAL NO.	5. TYPE: REPAIR	5. TYPE: ALTERATION
AIRFRAME	(As described in item 1 above)				XXX
POWERPLANT					
PROPELLER					
APPLIANCE	TYPE / MANUFACTURER				

6. CONFORMITY STATEMENT

A. AGENCY'S NAME AND ADDRESS	B. KIND OF AGENCY	C. CERTIFICATE NO.
Aero Electronics, Inc 2451 Democrat Road Memphis, TN 3811	U.S. CERTIFICATED MECHANIC	
	FOREIGN CERTIFICATED MECHANIC	
	XX CERTIFICATED REPAIR STATION	5423 Radio Class 1,2,3LI
	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: February 5, 1979

SIGNATURE OF AUTHORIZED INDIVIDUAL: William C. Stapleton

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 [X] APPROVED [ ] REJECTED

BY					
	FAA FLT. STANDARDS INSPECTOR		MANUFACTURER	INSPECTION AUTHORIZATION	OTHER (Specify)
	FAA DESIGNEE XX		REPAIR STATION	CANADIAN DEPARTMENT OF TRANSPORT INSPECTOR OF AIRCRAFT	

DATE OF APPROVAL OR REJECTION	CERTIFICATE OR DESIGNATION NO.	SIGNATURE OF AUTHORIZED INDIVIDUAL
8-15-79	5423 Radio Class 1,2,3LI	Thomas M. Wood

FAA Form 337 (7-67) (8320)

FAA AIRCRAFT REGISTRY
CAMERA NO. 3 DATE: 3-7-83

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

B. DESCRIPTION OF WORK ACCOMPLISHED *(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

The King KEA-126-17 Encoding Altimeter and the King KT76A ATC Transponder were connected per King wiring diagrams and the system was installed and checked according to AC43:6 and found to comply with FAR91:170 and FAR91:177.

The Aerosonic #101435-01229 Encoding Altimeter and the King KT76A ATC Transponder were connected per King and Aerosonic wiring diagrams and the system was installed and checked in accordance to AC43:6 and found to comply with FAR91:170 and FAR91:177.

The number one and number two King KNS80 R-Nav Systems were tested and calbrated in accordance to instructions contained in the installation and maintenance manuals and meets requirements for enroute and terminal modes of IFR operations in accordance to AC90:45/

Wiring of the above installation was done in accordance to AC43:13-1 chapter 11 and equipment installation manual.

Total continuous electrical load does not exceed 80% of single engine alternator output.

See work order #24813 of this repair station for further reference.

See aircraft log book this date for computed weight and balance.

THE END.

☐ ADDITIONAL SHEETS ARE ATTACHED

★1975-G.H.O.-1703-M/673-200/175