

## SECTION 2 LIMITATIONS

The following information must be presented in the form of a placard located on the inside of the ground service plug access door:

**CAUTION**                      24 VOLTS D.C.  
This aircraft is equipped with alternator  
and a negative ground system.  
**OBSERVE PROPER POLARITY**  
Reverse polarity will damage electrical  
components.

## SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when the ground service plug receptacle is installed.

## SECTION 4 NORMAL PROCEDURES

Just before connecting an external power source (generator type or battery cart), the avionics power switch should be turned off, and the master switch on.

### **WARNING**

When turning on the master switch, using an external power source, or pulling the propeller through by hand, treat the propeller as if the ignition switch were ON. Do not stand, nor allow anyone else to stand, within the arc of the propeller, since a loose or broken wire, or a component malfunction, could cause the propeller to rotate.

The ground service plug receptacle circuit incorporates a polarity reversal protection. Power from the external power source will flow only if the ground service plug is correctly connected to the airplane. If the plug is accidentally connected backwards, no power will flow to the electrical system, thereby preventing any damage to electrical equipment.

## SECTION 5

### PERFORMANCE

There is no change to the airplane performance when the ground service plug receptacle is installed.

# **SUPPLEMENT**

## **STROBE LIGHT SYSTEM**

### **SECTION 1**

#### **GENERAL**

The high intensity strobe light system enhances anti-collision protection for the airplane. The system consists of two wing tip-mounted strobe lights (with integral power supplies), a two-position rocker switch labeled STROBE LT on the left switch and control panel, and a 5-amp push-to-reset circuit breaker, also located on the left switch and control panel.

### **SECTION 2**

#### **LIMITATIONS**

Strobe lights must be turned off when taxiing in the vicinity of other airplanes, or during night flight through clouds, fog or haze.

### **SECTION 3**

#### **EMERGENCY PROCEDURES**

There is no change to the airplane emergency procedures when strobe lights are installed.

### **SECTION 4**

#### **NORMAL PROCEDURES**

To operate the strobe light system, proceed as follows:

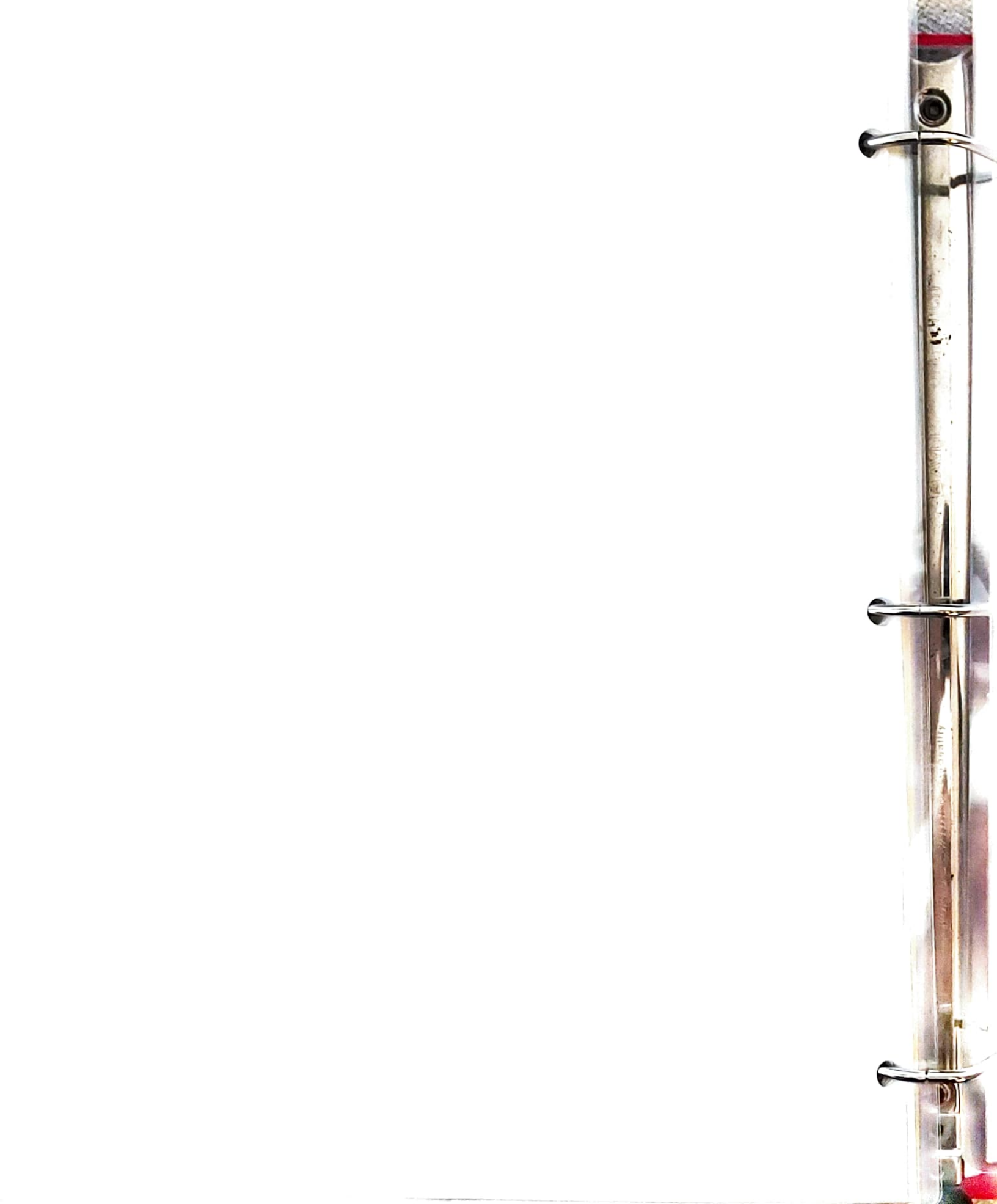
1. Master Switch -- ON.
2. Strobe Light Switch -- ON.

STROBE LIGHT SYSTEM  
MODEL 172N

PILOT'S OPERATING HANDBOOK  
SUPPLEMENT

## SECTION 5 PERFORMANCE

The installation of strobe lights will result in a minor reduction in cruise performance.





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Airplane Flight Manual Supplement for  
Cessna 172N equipped with GNS-430  
VHF Communications Transceiver  
VOR/ILS Receiver/GPS Receiver

CRAIG AVIONICS SUPPLEMENT TO  
THE AIRPLANE FLIGHT MANUAL FOR  
CESSNA

REGISTRATION NO. N3337E

SERIAL NO. 17271510

This document must be carried in the aircraft at all times. It describes the operating procedures for the Garmin GNS-430 navigation system when it has been installed in accordance with Garmin Installation Manual 190-00140-02 Rev \_\_\_\_ (Rev A or later) and FAA Form 337 dated Nov 15, 2004.

For aircraft with an FAA Approved Flight Manual, this document serves as the FAA Approved Flight Manual Supplement for the Garmin GNS-430. For aircraft that do not have an approved flight manual, this document serves as the FAA Approved Supplemental Flight Manual for the Garmin GNS-430.

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

FAA APPROVED



Scott E. Pratt  
Assistant Principal Avionics Inspector NE-FSDO-05  
2 Al McKay Avenue  
Portland, ME 04102

DATED: \_\_\_\_\_

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The revision date is shown at the bottom of each revised page.  
The vertical bar on the outer margin indicates the latest revised  
portion of each revised page.

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REVISION NO.	DATE	PAGES AFFECTED	REMARKS	FAA APPROVAL
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Original

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DATED: \_\_\_\_\_



## SECTION I GENERAL

1. The GNS-430 system is a fully integrated, panel-mounted instrument, which contains a VHF Communications Transceiver, VOR/ILS Receiver, and a Global Positioning System (GPS) Navigation Computer. The system consists of a GPS antenna, GPS receiver, VHF VOR/LOC/GS antenna, VOR/ILS receiver, VHF COMM antenna and a VHF Communications Transceiver. The primary function of the VHF Communication portion of the equipment is to facilitate communication with Air Traffic Control. The primary function of the VOR/ILS receiver portion of the equipment is to receive and demodulate VOR, Localizer, and Glide Slope signals. The primary function of the GPS portion of the system is to acquire signals from the GPS system satellites, recover orbital data, make range and Doppler measurements, and process this information in real-time to obtain the user's position, velocity and time.
2. Provided the Garmin GNS-430's GPS receiver is receiving adequate usable signals, it has been demonstrated capable of and has been shown to meet the accuracy specifications for:
  - VFR/IFR enroute, terminal and non-precision instrument approach (GPS, Loran-C, VOR, VOR-DME, TACAN, NDB, NDB-DME, RNAV) operation within the U.S. National Airspace System in accordance with AC 20-138.
  - One of the approved sensors, for a single or dual GNS-430 installation, for North Atlantic Minimum Navigation Performance Specifications (MNPS) Airspace in accordance with AC 91-49 and AC 120-33.
  - The system meets RNP5 airspace (BRNAV) requirements of AC 90-96 and in accordance with AC20-138, and JAA GAI-20 ACJ 20X4, provided it is receiving usable navigation information from the GPS receiver.
  - The equipment as installed has been found to comply with the requirements for GPS primary means of navigation in oceanic and remote airspace, when used in conjunction with the 400 Series Trainer Program incorporating the FDE Prediction Program. This does not constitute an operational approval.

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

## SECTION II LIMITATIONS

1. The Garmin GNS-430 Pilot's Guide, P/N 190-00140-00, Rev A dated October 1998, or later appropriate revision, must be immediately available to the flight crew whenever navigation is predicated on the use of the system. In addition to the Pilot's Guide, the appropriate Pilot's Guide Addendum if the information is not already incorporated into

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the Pilot's Guide) also must be immediately available to the flight crew if lightning detection or traffic advisory equipment is interfaced to the system or if primary means oceanic/remote navigation is conducted.

2. The GNS-430 must utilize the following or later FAA approved software versions:

Function	Sub-System Version				
	Main	GPS	COM	VOR/LOC	G/S
Initial Approval	2.00	2.00	2.00	1.25	2.00
Traffic / Weather Interface	2.08	2.00	2.00	1.25	2.00
Primary Oceanic / Remote	3.00	3.00	2.00	1.25	2.00
TIS Interface	4.00	2.00	2.00	1.25	2.00

The main software version is displayed on the GNS-430 self-test page immediately after turn-on for 5 seconds. The remaining system software versions can be verified on the AUX group sub-page 2, "SOFTWARE/DATABASE VER".

3. IFR enroute and terminal navigation predicated upon the GNS-430's GPS receiver is prohibited unless the pilot verifies the currency of the data base or verifies each selected waypoint for accuracy by reference to current approved data.
4. Instrument approach navigation predicated upon the GNS-430's GPS receiver must be accomplished in accordance with approved instrument approach procedures that are retrieved from the GPS equipment database. The GPS equipment database must incorporate the current update cycle.
- a) Instrument approaches utilizing the GPS receiver must be conducted in the approach mode and Receiver Autonomous Integrity Monitoring (RAIM) must be available at the Final Approach Fix.
  - b) Accomplishment of ILS, LOC, LOC-BC, LDA, SDF, MLS or any other type of approach not approved for GPS overlay with the GNS-430's GPS receiver is not authorized.
  - c) Use of the GNS-430 VOR/ILS receiver to fly approaches not approved for GPS require VOR/ILS navigation data to be present on the external indicator.
  - d) When an alternate airport is required by the applicable operating rules, it must be served by an approach based on other than GPS or Loran-C navigation, the aircraft must have the operational equipment capable of using that navigation aid, and the required navigation aid must be operational.
  - e) VNAV information may be utilized for advisory information only. Use of VNAV information for Instrument Approach Procedures does not guarantee Step-Down Fix altitude protection, or arrival at approach minimums in normal position to land.

DATED: \_\_\_\_\_



If not previously defined, the following default settings must be made in the "SETUP 1" menu of the GNS-430 prior to operation (refer to Pilot's Guide for procedure if necessary):

- a) **dis, spd** . . . .  $\frac{n}{m}$   $\frac{k}{t}$  (sets navigation units to "nautical miles" and "knots")
- b) **alt, vs** . . . . .  $\frac{f}{t}$  fpm (sets altitude units to "feet" and "feet per minute")
- c) **map datum**. WGS 84 (sets map datum to WGS-84, see note below)
- d) **posn** . . . . . deg-min (sets navigation grid units to decimal minutes)

NOTE: In some areas outside of the United States, datum other than WGS-84 or NAD-83 may be used. If the GNS-430 is authorized for use by the appropriate Airworthiness authority, the required geodetic datum must be set in the GNS-430 prior to its use for the navigation.

### SECTION III EMERGENCY PROCEDURES/ABNORMAL PROCEDURES

1. If Garmin GNS-430 navigation information is not available or invalid, utilize remaining operational navigation equipment as required.
2. If "RAIM POSITION WARNING" message is displayed the system will flag and no longer provide GPS based navigational guidance. The crew should revert to the GNS-430 VOR/ILS receiver or an alternate means of navigation other than the GNS-430's GPS receiver.
3. If "RAIM IS NOT AVAILABLE" message is displayed in the enroute, terminal, or initial approach phase of flight, continue to navigate using the GPS equipment or revert to an alternate means of navigation other than the GNS-430's GPS receiver appropriate to the route and phase of flight. When continuing to use GPS navigation, position must be verified every 15 minutes using the GNS-430's VOR/ILS receiver or another IFR-approved navigation system.
4. If "RAIM IS NOT AVAILABLE" message is displayed while on the final approach segment, GPS based navigation will continue for up to 5 minutes with approach CDI sensitivity (0.3 nautical mile). After 5 minutes the system will flag and no longer provide course guidance with approach sensitivity. Missed approach course guidance may still be available with 1 nautical mile CDI sensitivity by executing the missed approach.
5. In an in-flight emergency, depressing and holding the Comm transfer button for 2 seconds will select the emergency frequency of 121.500 MHz into the "Active" frequency window.

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## SECTION IV NORMAL PROCEDURES

### 1. DETAILED OPERATING PROCEDURES

Normal operating procedures are described in the Garmin GNS-430 Pilot's Guide, P/N 190-00140-00, Rev A, dated October 1998, or later appropriate revision. Normal operating procedures for the Traffic Information Service (TIS) interface and the Weather Data Link interface are described in the 400/500 Series Garmin Display Interfaces Pilot's Guide Addendum, P/N 190-00140-13, Rev B, or later appropriate revision.

### 2. PILOT'S DISPLAY

The GNS-430 system data will appear on the Pilot's #1 Nav indicator. The source of data is either GPS or VLOC as annunciated on the display above the CDI key.

**NOTE: It is the pilot's responsibility to assure that published or assigned procedures are correctly complied with. Course guidance is not provided for all possible ARINC 424 leg types. See the GNS-430 Pilot's Guide for detailed operating procedures regarding navigation capabilities for specific ARINC 424 leg types.**

### 3. CROSSFILL OPERATIONS

For dual GNC-400 Product Series installations, crossfill capabilities exist between the number one and number two GNC-400 systems. Refer to the Garmin GNS-430 Pilot's Guide for detailed crossfill operating instructions.

### 4. AUTOMATIC LOCALIZER COURSE CAPTURE

By default, the GNS-430 automatic localizer course capture feature is enabled. This feature provides a method for system navigation data present on the external indicators to be switched automatically from GPS guidance to localizer/glide slope guidance as the aircraft approaches the localizer course inbound to the final approach fix. If an offset from the final approach course is being flown, it is possible that the automatic switch from GPS course guidance to localizer/glide slope course guidance will not occur. It is the pilot's responsibility to ensure correct system navigation data is present on the external indicator before continuing a localizer-based approach beyond the final approach fix. Refer to the GNS-430 Pilot's Guide for detailed operating instructions.

### 5. DISPLAY OF LIGHTNING STRIKE DATA

For installations that interface the BFGoodrich WX-500 Stormscope and the GNS-430, lightning strike data detected by the WX-500 will appear on the GNS-430. For detailed operating instructions regarding the interface of the GNS-430 with the WX-500, refer to the WX-500 Pilot's Guide and the 400/500 Series Display Interfaces Pilot's Guide.



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Addendum, P/N 190-00140-10, Rev D, or later appropriate revision for the WX-500  
Stormscope interface.

6. DISPLAY OF TRAFFIC ADVISORY DATA

For installations that interface a Traffic Advisory System (TAS) and the GNS-430, traffic data detected by the TAS will appear on the GNS-430. For detailed operating instructions regarding the interface of the GNS-430 with the TAS, refer to the FAA Approved Flight Manual Supplement for the TAS, the Pilot's Guide for the TAS and the GNS-430 Pilot's Guide Addendum for the TAS interface.

7. DISPLAY OF TRAFFIC INFORMATION SERVICE DATA

TIS surveillance data uplinked by Air Traffic Control (ATC) radar through the GTX-330 Mode S Transponder will appear on the moving map and traffic display pages of the GNS 430. For detailed operating instructions regarding the interface of the GNS-430 with the GTX-330, refer to the 400/500 Series Garmin Display Interfaces Pilot's Guide Addendum, P/N 190-00140-13, Rev B, or later appropriate revision for the TIS System interface.

**SECTION V  
PERFORMANCE**

No Change

**SECTION VI  
WEIGHT AND BALANCE**

See current weight and balance data.

**SECTION VII  
AIRPLANE & SYSTEM DESCRIPTIONS**

See GNS-430 Pilot's Guide for a complete description of the GNS-430 system.

See 400/500 Series Garmin Display Interfaces Pilot's Guide Addendum, P/N 190-00140-13, Rev B, or later appropriate revision for information pertaining to the Traffic Information Service (TIS) interface and the Weather Data Link Interface.

See 400/500 Display Interfaces Pilot's Guide Addendum, P/N 190-00140-10, Rev D, or later appropriate revision for information pertaining to the lightning strike data.

DATED OCT 27 2000



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Airplane Flight Manual Supplement  
for AML STC SA04112CH

**FAA-APPROVED**

**Airplane Flight Manual Supplement**

**Appareo Stratus ES/ESG**

**ADS-B Out Transponder**

Aircraft Make and Model: Cessna 172N

Registration Number: N3337E

Serial Number: 17271510

This supplement must be attached to the FAA-Approved Airplane Flight Manual when Stratus ES/ESG is installed in accordance with STC SA04112CH.

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

FAA-Approved

[Signature]  
Manager, Southwest Flight Test Section, AIR 713  
Federal Aviation Administration  
Ft. Worth, Tx

Date: SEP 20 2017

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Airplane Flight Manual Supplement  
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## Log of Revisions

Revision Number	Pages Affected	Change Description	FAA Approved	Date
1.0	All	Initial Release		
1.1	All	CM 10298		
1.2	All	CM 10631		
1.3	All	CM 10938		
1.4	All	CM 11058		
1.5	All	CM 11113		
1.6	All	CM 11317	Steve Lardinois	7/7/16
1.7	All	CM 13060	Steve Lardinois	4/12/17
2.0	All	Added Stratus ES	 Manager, Southwest Flight Test Section, AIR 713 Federal Aviation Administration Ft. Worth, Tx	9/20/17

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### Related Documentation

Information specific to the normal operation of Stratus ES/ESG can be found in the Stratus ES/ESG Pilot's Guide (Appareo document number 600890-000049). Additional information about the operation and maintenance of Stratus ES/ESG can be found in the documents below.

Document Number	Title
600840-000032	Stratus ES/ESG Installation Instructions
600845-000025	Stratus ES/ESG Instructions for Continued Airworthiness
601837-000024	Stratus ES/ESG Installation Drawings and Wiring Diagrams

To view the most current version of this document, go to [appareo.com/dealer-portal](http://appareo.com/dealer-portal) or [www.appareo.com/resources](http://www.appareo.com/resources).

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
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Airplane Flight Manual Supplement  
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## Chapter 1. General

Stratus ES/ESG by Appareo is an ADS-B Out transponder designed to help pilots meet the FAA 2020 mandate. Stratus ES/ESG responds to legacy Mode A/C interrogations and Mode S interrogations from both ground radar and airborne collision avoidance systems. Stratus ES/ESG are 1090 ES transponders, where Stratus ES connects to an external GPS and Stratus ESG has a certified WAAS GPS in the same box.

## Chapter 2. Operating Limitations

- Stratus ES/ESG meets 14 CFR 91.227 ADS-B Out equipment performance requirements. Ensure that the system is functioning properly, including verifying the following items:
  - Stratus ES/ESG transponder display is functional.
  - GPS integrity is assured. The  icon will display if GPS integrity is assured.
  - No built-in-tests (BITs) were detected by the system. If a BIT failure is detected, the  icon will display along with an error message describing the BIT code.
- The Stratus ES/ESG Pilot's Guide (600890-000049) must be immediately available to crew members whenever Stratus ES/ESG is in operation.
- Stratus ES/ESG must operate with current software. Software listed below is current as of the time of publication of this document.

Software	Part number	Revision (or later FAA approved)
Embedded Hardware (FPGA)	501010-000109	R04
Software (DSC)	501010-000113	R06

## Chapter 3. Emergency Procedures

No change

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### Chapter 4. Normal Procedures

- When directed by ATC to suppress pressure altitude reporting, use Stratus ES/ESG's ON key.

See the Stratus ES/ESG Pilot's Guide (Appareo document number 600890-000049) for a full description of Stratus ES/ESG's function.

### Chapter 5. Abnormal Operating Procedures

- The location of the circuit breaker will generally be located on the avionics circuit breaker panel. Location of the breaker may vary with each aircraft. The breaker has a rating of 5 amps and is labeled "XPNDR."
- If the circuit breaker opens, it may be reset only once.
- Use the table below to troubleshoot possible problems with Stratus ES/ESG.

Problem	Troubleshooting Steps
GPS information is not being received	Verify that the aircraft has a clear view of the sky.  <b>NOTE:</b> Initial GPS fix could take up to 20 minutes.
The power key does not power on Stratus ES/ESG	1. Verify that the power key is not stuck. 2. Verify that the circuit breaker has not tripped.  <b>If it has tripped:</b> Reset the circuit breaker switch and try the power key again.  <b>NOTE:</b> If the circuit breaker opens it may be reset only once.  <b>If it did not trip:</b> Contact your dealer for further assistance.

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The screen displays a  
BIT failure

The display screen will  
display a warning  
message and degraded  
state indicator **A** if any  
of Stratus ES/ESG's  
BITs fail.

The Stratus ES/ESG screen might display a  
warning message with one of these  
instructions. See below for how to assess  
the failure:

- **PRESS FUNC TO CLEAR:** A non-critical error has been detected. Stratus ES/ESG will run in a degraded state until the error is resolved. Contact your dealer for further assistance.
- **PLEASE RESTART UNIT:** A critical error has been detected. Restarting the unit might fix the error. If the message returns after restarting, contact your dealer for further assistance.
- **PLEASE SHUTDOWN UNIT:** A critical error has been detected. Power off the unit and do not turn it back on. Contact your dealer for further assistance.
- **WAITING TO BE UNSTUCK:** A key has been depressed for more than 20 seconds. If a key is stuck, try to unstick the key.
- **WAITING FOR RELEASE:** The external suppression input is constantly in a suppressed state. Contact your dealer for further assistance.
- **ATTEMPTING TO RECOVER:** A squitter rate error has been detected. The transponder may recover itself, but if it does not, restart the unit. If the message returns after restarting, contact your dealer for further assistance.

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### **Chapter 6. Performance**

No change.

### **Chapter 7. Mass and Balance/Equipment Lists**

See aircraft Weight & Balance information for current Basic Empty Weight, Center of Gravity (CG), and Moment.

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