

MOONEY AIRCRAFT CORPORATION
LOUIS SCHREINER FIELD
KERRVILLE, TEXAS 78028

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT

FOR

MOONEY AIRCRAFT MODELS
M20J, M20K, M20M, M20R, M20S

WITH
GARMIN GNS 430 VHF COMMUNICATION

MODEL NO. _____

REG. NO. _____

SERIAL NO. _____

This Supplement must be inserted in the applicable FAA Approved Pilot's Operating Handbook and Airplane Flight Manual (POH/AFM) when the GARMIN GNS 430 VHF Communication Transceiver / VOR/ILS Receiver / Global Positioning System is installed in accordance with Mooney Drawing No. 810445. The information contained herein supplements or supersedes the basic manual only in those areas listed herein. For limitations, procedures and performance information not contained in the supplement, consult the basic POH/AFM. The pilot should become thoroughly familiar with this Supplement as well as the Pilot Handbook for this equipment, if applicable, issued by the manufacturer of the equipment covered by this Supplement.

FAA APPROVED: _____

Michele M. Owsley
Manager, Airplane Certification Office
FEDERAL AVIATION ADMINISTRATION
2601 Meacham Boulevard
Fort Worth, Texas 76137-0150

Issue Date: October 31, 1999
REVISION A: February 1, 2000
REVISION B: October, 15, 2002

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LOG OF REVISIONS

REV NO.	REVISED PAGES	DESCRIPTION OF REVISIONS	FAA APPROVED	DATE
B	<p>1 of 8 thru 8 of 8</p> <p>4 of 8 thru 5 of 8, 8 of 8</p> <p>6 of 8 thru 7 of 8</p>	<p>Minor formatting changes</p> <p>Inserted data related to WX-500 Stormscope® and the SKYWATCH™ Traffic Advisory System.</p> <p>Added info for Mod 2 units (Garmin Service Bulletin 0101), Note pertaining to AIRINC 424 leg types, and info concerning Garmin GNS 430/530 configurations.</p>		
<p>The revised portions of affected pages are indicated by vertical black lines in the margin.</p>				

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SECTION I - GENERAL

1. The GNS 430 System is a fully integrated, panel mounted instrument, which contains a VHF Communications Transceiver, a VOR/ILS receiver, and a Global Positioning System (GPS) Navigation computer. The system consists of a GPS antenna, GPS Receiver, VHF VOR/LOC/GS antenna, VOR/ILS receiver, VHF COMM antenna and a VHF Communications Transceiver. The primary function of the VHF Communication portion of the equipment is to facilitate communication with Air Traffic Control. The primary function of the VOR/ILS Receiver portion of the equipment is to receive and demodulate VOR, Localizer, and Glide Slope signals. The primary function of the GPS portion of the system is to acquire signals from the GPS system satellites, recover orbital data, make range and Doppler measurements, and process this information in real-time to obtain the user's position, velocity, and time.

Electrical power for the GNS-430 system is supplied through two circuit breakers (C/Bs) for each installed GNS-430. A 5 amp C/B labeled GPS1 (GPS2 for #2 system, if installed), located on the C/B panel. RH Copilot's side of cabin, supplies power to the GPS and display system. Another 5 amp C/B labeled COM1/NAV1 (COM2/NAV2 for #2 system, if installed), also located on the C/B panel (RH Copilot's side of the cabin), supplies power to the communications and navigation portion of the system. These C/B's protect the GNS-430 wiring. In the event of a failure of a system or subsystem which causes either C/B to trip, remaining system capabilities, redundant systems and standardized procedures (i.e. Lost Comm procedures, etc.) should be used and flight planning should be reevaluated.

Electrical power for the BFGoodrich SKYWATCH™ Traffic Advisory System (TAS), if installed, is supplied through one 5 amp C/B labeled **TRAFFIC ALERT**. It's purpose is to protect the SKYWATCH™ wiring. In the event of a failure of the SKYWATCH™ system which causes the TRAFFIC ALERT C/B to trip, the functionality of the GNS-430 will be unaffected except for the loss of traffic alert information.

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 Specification (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 AC 20-138, and JAA AMJ 20X2 Leaflet 2 Revision 1, provided it is receiving usable navigation information from the GPS receiver.

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

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.
2. The GARMIN 400 Series Pilot's Guide Addendum, *Display Interface for Traffic and Weather Data*, must be immediately available to the flight crew if the BFGoodrich WX-500 Stormscope® or the BFGoodrich SKYWATCH™ Traffic Advisory System (TAS) is installed.

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

SUB-SYSTEM	SOFTWARE VERSION
MAIN	2.00
GPS	2.00
COMM.....	1.22
VOR/LOC	1.25
G/S	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 data base. The GPS equipment database must incorporate the current update cycle.
 - (a) Instrument approaches utilizing the GPS receiver must be conducted in the approach mode and Receiver Autonomous Integrity Monitoring (RAIM) must be available at the Final Approach Fix.
 - (b) Accomplishment of ILS, LOC, LOC-BC, LDA, SDF, MLS or any other type of approach not approved for GPS overlay with the GNS 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.

5. 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** ^{kt} (sets navigation units to "nautical miles" and "knots")
 - (b) **alt, vs** ^{ft fpm} (sets altitude units to "feet" and "feet per minute")
 - (c) **map datum** WGS 84 (sets map datum to WGS-84, see note below)
 - (d) **posn** deg-min (sets navigation grid units to decimal minutes)

NOTE: In some areas outside the United States, datums other than WGS-84 or NAD-83 may be used. If the GNS 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 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. With Mod 2 and later units the Comm will ignore any commands from the front controls of the unit until the Remote Comm transfer input is activated again.

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.

2. PILOT'S DISPLAY

The number one GNS 430 or 530 System data will appear on the Pilot's HSI. The source of data for the HSI is either GPS or VLOC as annunciated on the

display above the CDI key on the number one GNS 430 or 530. The number two (if installed) GNS 430 System data will appear on the secondary indicator. The source of data for the secondary indicator is either GPS or VLOC as annunciated on the display above the CDI key on the number two GNS 430 System.

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. AUTOPILOT / FLIGHT DIRECTOR OPERATION

Coupling of the number one GNS 430 or 530 System steering information to the autopilot can be accomplished by engaging the autopilot in the NAV or APR mode. The number two (if installed) GNS 430 System is not connected to the autopilot system and cannot be autopilot coupled.

When the autopilot system is using course information supplied by the number one GNS 430 or 530 System, the course pointer on the HSI must be manually set to the desired track (DTK) indicated by the number one GNS 430 or 530 System. For detailed autopilot operational instructions, refer to the FAA Approved Flight Manual Supplement for the autopilot.

4. CROSSFILL BETWEEN NUMBER ONE AND TWO GNS 430 or 530 SYSTEMS (if #2 installed)

Manual crossfill capabilities exist between the number one and number two (if installed) GNS 430 or 530 Systems. Refer to the GARMIN GNS 430 or 530 Pilot's Guide for detailed crossfill operating instructions.

5. REMOTE DME CHANNELING

The capability exists to channel the DME system (if installed) in the aircraft with either the number one or two (if installed) GNS 430 or 530 Systems. The source selector switch for remote DME channeling is located on the top section of the panel in front of the copilot. The source selector switch has two positions - the up position is for the number one GNS 430 or 530 System and the down position is for the number two GNS 430 System (if installed). When operating the DME in remote channeling mode, the tuned DME channel is determined by the source selector switch and the VOR/LOC frequency in the active window of the selected GNS 430 or 530 source.

6. 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 at the point of course intercept on a localizer at which GPS derived course deviation equals localizer derived course deviation. 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.

7. DISPLAY OF LIGHTNING STRIKE DATA

Lightning strike data detected by the BFGoodrich WX-500 Stormscope, if installed, will appear on the moving map and weather pages of 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 GNS 400 Series Pilot's Guide Addendum, *Display Interface for Traffic and Weather Data*.

8. DISPLAY OF TRAFFIC ADVISORY DATA

Traffic data detected by the BFGoodrich SKYWATCH™ Traffic Advisory System (TAS), if installed, 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 SKYWATCH, refer to the Pilot's Guide for the SKYWATCH and the GNS 400 Series Pilot's Guide Addendum, *Display Interface for Traffic and Weather Data*.

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.

SECTION VII THRU SECTION X

No change to these sections.