

N9520D Upgrade Changes

(READ BEFORE OPERATING AIRCRAFT)

A. Introduction

This document outlines N9520D aircraft operating, performance and system changes resulting from upgrades completed as of January 31, 2022.

It is **IMPORTANT** to review the following information before operating this aircraft. Additional information about changes is included in the updated Pilot's Operating Handbook (POH) and individual equipment Pilot User Guides located on the Hodge Flight Services website. You may also contact Hodge Flight Services at 925-627-8255 if you have questions.

B. Aircraft Changes Overview

The FAA approved ***AirPlain's 180 HP Upgrade STC*** has been installed allowing the aircraft's engine to now produce 180 brake horse power at maximum RPMs.

The following highlights aircraft performance changes resulting from the 180 HP STC installation:

- Increased useful payload by 100 lbs
- Increased climb rate
- Increased RPMs to 2700 RPMs
- Increased cruise airspeed by 8 to 10 KTS
- Increased fuel consumption (12 GPH at 75% power)

Because of the increased payload and RPMs a number of aircraft performance values such as engine operating limits, V-speeds, weight & balance, climb rates, landing distances and range have changed. These changes are included in the aircraft's POH. Some are also highlighted in ***Section C***.

In addition to the AirPlain's STC, a second ***Garmin G5 Electronic Flight Instrument*** was also installed. This G5 is installed as a ***Horizontal Situation Indicator (HSI)*** replacing the Direction Gyro (DG) and independently displays the aircraft's current magnetic heading relative to magnet headings on a rotating compass card. In addition, this second G5 has enabled removal of the aircraft's vacuum system, and has significantly enhanced and integrated the aircraft's navigation systems. More information about the aircraft's new navigation capabilities is highlighted in ***Section D***. Detailed information about the Garmin G5 features and operations is included in the Garmin G5 Operator's Manual included in the POH and on the Hodge Flight Services website.

C. Aircraft Operating Limits

NOTE: Changes are due to aircraft useful load and horse power increases

Sym	V-Speeds	KIAS
VNE	Never Exceed Speed	163
VNO	Maximum Structural Cruising Speed	129
VA	Maneuvering Speeds 2550 lbs 2200 lbs 1900 lbs	105 98 90
VFE	Maximum Flap Extended Speed 10 degrees flaps 10 to 30 degrees flaps	110 85
Vx	Best Angle of Climb (at 10 degs of flap)	56
Vy	Best Rate of Climb	75-85
VSO	Stall Speed (Landing Configuration)	40
VS1	Stall Speed	48
Best Glide Speed		68

RPM Settings	
Sea Level	2100 – 2500 RPMs
5000 FT.	2100 – 2600 RPMs
10,000 FT.	2100 – 2700 RPMs
RED LINE	2700 RPMs

Weight & Balance Info	
CG = 39.62	MOMENTS = 65,393.53
Aircraft Empty Weight = 1,651 lbs.	
Max Take-Off Weight = 2550 lbs.	
Max Useful Load = 899 lbs. (including occupants, fuel and bags)	
Max baggage capacity = 120 lbs.	

Aircraft Operations & Servicing Information	
Oil Temp	MAX – 245F
Oil Pressure	MIN – 20PSI, MAX – 115PSI
Oil Quantity	MIN – 6 QTS, MAX – 8 QTS (Add no more than 7.5 QTS)
Preferred Oil Type	Aero Shell W100Plus (SAE-J-1899 SAE 50)
Fuel Flow	0 to 12 GPH
Usable Fuel Quantities	53 gals Total (26.5 gals for each tank) To tabs 17.5 gals for each tank
Nose Wheel Tire Pressure	45 PSI
Main Wheel Tire Pressure	38 PSI

D. Aircraft Flight Data and Navigation Systems

The flight data and navigation systems for N9520D include the following:

Primary Flight Instruments

- **Magnetic Compass**
- **Airspeed Indicator (ASI)**
- **Vertical Speed Indicator (VSI)**
- **Garmin G5 Attitude Indicator (G5 AI)** – The G5 AI primary function is to display aircraft pitch and roll information. However, it also displays as a secondary / backup instrument airspeed, altimeter, turn rate, slip/skid, and ground speed data. When used in conjunction with the G5 HSI, it also displays course deviation and glide slope information. **Reference Figure 1.0 and Garmin G5 operator’s manual for additional details.**
- **Altimeter (ALT)**
- **Turn Coordinator (Turn Coord.)**

The G5 AI is directly connected to the aircraft main power bus and will automatically power up and down with the aircraft master switch.

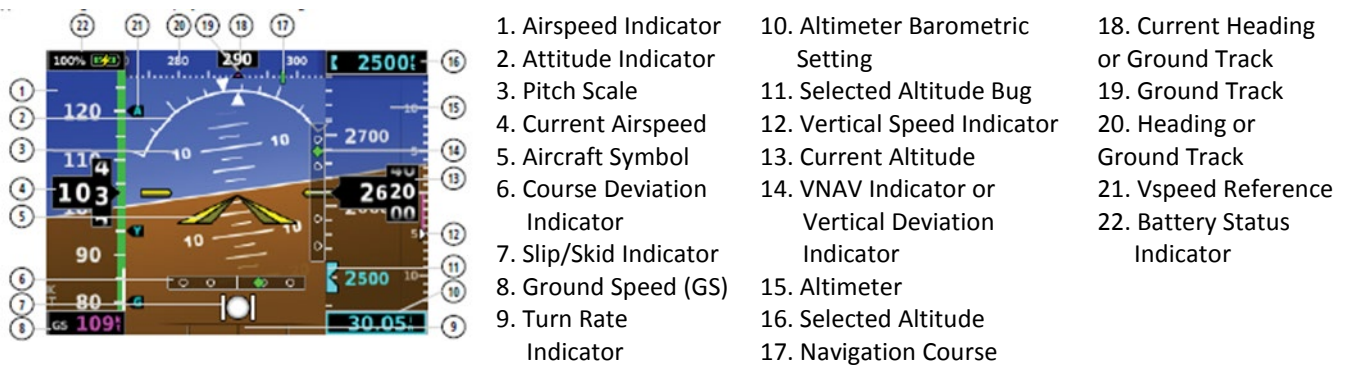


Figure 1.0

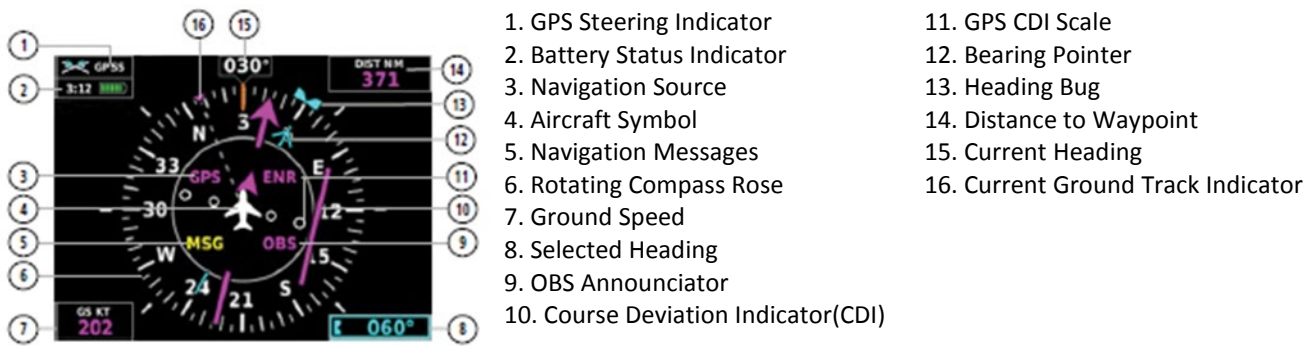
Navigation Equipment

- **Garmin G5 Horizontal Situation Indicator (G5 HSI)** – The G5 HSI replaces the directional gyro (DG) and independently displays the aircraft’s current magnetic heading relative to magnet headings on a rotating compass card. Because the unit is solid state and receives magnetic heading reference information from a magnetometer there is no compass card procession to be adjusted.

In addition, the G5 HSI provides enhanced navigation features when used with VOR and GPS navigation inputs. In these modes the HSI displays horizontal / vertical deviation, ground track, ground speed, and distance measurement information. **Green** deviation pointers and needles are displayed when VOR navigation input signals are used. **Magenta** deviation pointers and needles are displayed when GPS navigation input signals are used. The G5 HSI also provides OBS and Heading selection output data to the Garmin GTN 750 GPS and Bendix King KAP 140 auto-pilot respectively.

The G5 HSI is directly connected to the avionics power bus and will automatically power up and down with the avionics master switch.

In addition, the G5 HSI automatically backups the G5 AI should the G5 AI fail. **Reference Figure 2.0 and Garmin G5 operator's manual for additional details.**



- | | |
|-------------------------------------|------------------------------------|
| 1. GPS Steering Indicator | 11. GPS CDI Scale |
| 2. Battery Status Indicator | 12. Bearing Pointer |
| 3. Navigation Source | 13. Heading Bug |
| 4. Aircraft Symbol | 14. Distance to Waypoint |
| 5. Navigation Messages | 15. Current Heading |
| 6. Rotating Compass Rose | 16. Current Ground Track Indicator |
| 7. Ground Speed | |
| 8. Selected Heading | |
| 9. OBS Annunciator | |
| 10. Course Deviation Indicator(CDI) | |

Figure 2.0



CAUTION: Both the G5 AI and HSI have an internal standby lithium battery that powers the primary function(s) up to 4 hours should aircraft electrical power fail. Because of the unit's automatic battery backup capability it is imperative to ensure the unit is completely powered off when the aircraft is shut down. **Failure to make sure the unit is off can cause the standby battery to drain and hamper unit startup operation.**

NOTE 1: Both the G5 AI and HSI are solid state electronic devices that do not require vacuum pressure to operate. Therefore, the aircraft's vacuum pressure system has been removed.

Figure 3.0

For additional instruction on the use of the Garmin G5 AI and HSI installed in N9520D click on the following video link: <https://vimeo.com/676142941>

- **Garmin GTN 750 Navigation Radio (NAV 1)** – The GTN 750 NAV 1 radio provides continuous VOR or Glide Slope signal data to the GI 106A CDI 1 course/glide slope indicator when a VOR station or Glide Slope frequency is selected. When the **VLOC Mode** is selected on the GTN 750 GPS this same signal data is also sent to the G5 HSI and G5 AI to drive course deviation and glide slope indicators. CDI 1 works independent of the G5 HSI and is not affected by the HSI navigation input signal source selected or operations. **Reference Figure 4.0 and the Garmin GTN 750 operator's manual for additional information.**
- **Garmin GTN 750 GPS** – The GTN 750 GPS provides Course or Glide Slope signal data to the G5 HSI and AI course indicators when the **GPS Mode** is selected and a route or waypoint is entered into the GPS. When the **OBS function** is selected on both the GPS and G5 HSI, the HSI will provide an OBS course line displayed on the GPS screen. The course line is adjusted by using the G5 HSI selection knob to turn the heading bug the desired course heading. **Reference Figure 4.0 and the Garmin GTN 750 operator's manual for additional information.**

- **Bendix King KX 155A Navigation Radio (NAV 2)** – The navigation radio part of the KX 155A provides NAV 2 radio VOR signal data to the KI 208 CDI 2 course indicator when a VOR station is selected. The NAV 2 radio and connected CDI 2 work independently of the G5 HSI and NAV 1 radio / CDI 1. **Reference Figure 4.0 and KX 155A operator’s manual for additional information.**
- **Bendix King KAP 140 Auto-Pilot** – When in “HDG” or “NAV” mode the KAP 140 auto-pilot steers the aircraft to and maintains a heading selected by the G5 HSI heading bug. Heading information can also be provided to the auto-pilot from the GTN 750 GPS based on the waypoint(s), or flight plan data entered. When the GPS steering function (GPSS) is selected on the G5 HSI course heading intercept turns are anticipated making smoother turns to new waypoint and/or course headings.

To avoid abrupt and/or high banking turns determine and enter heading information via the G5 HSI and/or GTN 750 GPS before turning on the auto-pilot. **Reference Figure 4.0, Garmin G5 operator’s manual and KAP 140 Auto-Pilot operator’s manual for additional information.**

- **Garmin Magnetometer (GMU 11)** – The GMU provides magnetic heading reference data to the G5 AI and HSI. The reference data is used to determine and display the aircraft’s current heading relative to compass headings. **Reference Figure 4.0**
- **Garmin GAD 29** – The GAD 29 converts and forwards OBS data, determined by the HSI heading bug position, to the GTN 750 GPS for display when the OBS function is selected on both the GPS and HSI. It also converts and forwards heading data, determined by the HSI heading bug position, to the KAP 140 auto-pilot when GPSS is selected on both the AI and HIS and the HDG mode is selected on the KAP 140. **Reference Figure 4.0**

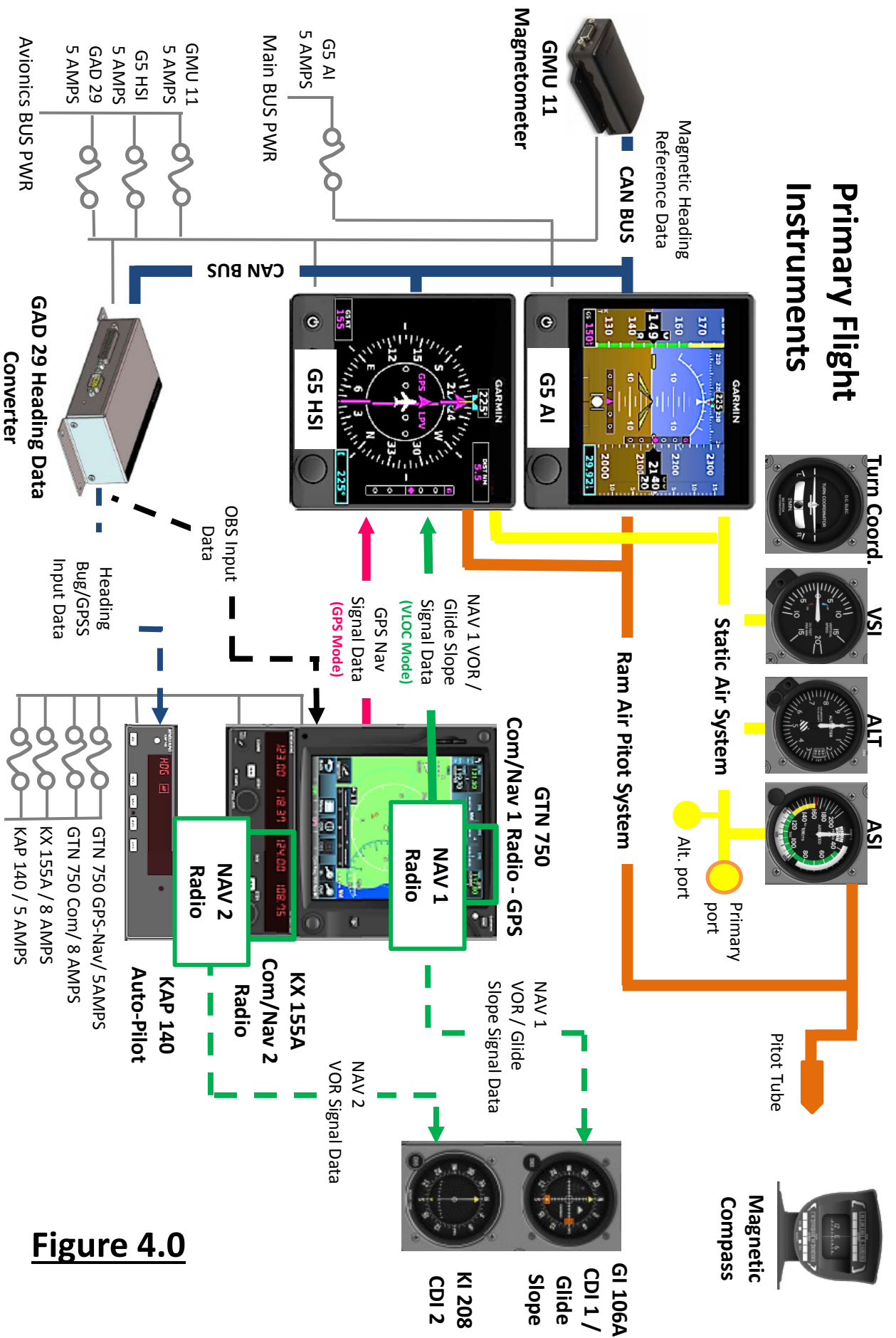


Figure 4.0