

**FlightSim Developers**

*Flying high in digital aviation*

# **Piper** Navajo



## Pilot Handbook

Revised  
June 2009



## Table of Contents

---

Table of Contents .....	1
Getting Started .....	1
Instrument Panel.....	3
Additional Panels .....	5
Circuit Breakers .....	5
Lower Panel .....	6
Warning Indicators.....	6
Cowl Flaps Control .....	7
Clock.....	7
VC Clickspots .....	8
SPECIFICATIONS: .....	9
History .....	13

## EULA

All rights reserved per the terms of the **End User License Agreement**. No part of this manual may be scanned, reproduced, copied, transmitted, distributed, downloaded or used for any purpose without the express written consent of FSD International.

Information contained herein is subject to change without notice.

## Getting Started

---

This guide describes the operation of the Piper Navajo. The manual consists of this document, which details the panel controls and systems, as well as the aircraft specifications. The following handbooks are also provided in this directory for the following:

- [Climb and cruise checklist.pdf](#)
- [Clock Instructions.pdf](#)
- [ECS Checklist.pdf](#)
- [Emergency Procedures.pdf](#)
- [Fuel System.pdf](#)
- [Landing and shutdown checklist.pdf](#)
- [Load Manager Documentation.pdf](#)
- [Normal Procedures.pdf](#)
- [Paintkit.pdf](#)
- [Receiving Aircraft And Startup Procedures.pdf](#)
- [Taxi and takeoff checklist.pdf](#)
- [Totalizer Instruction Manual.pdf](#)

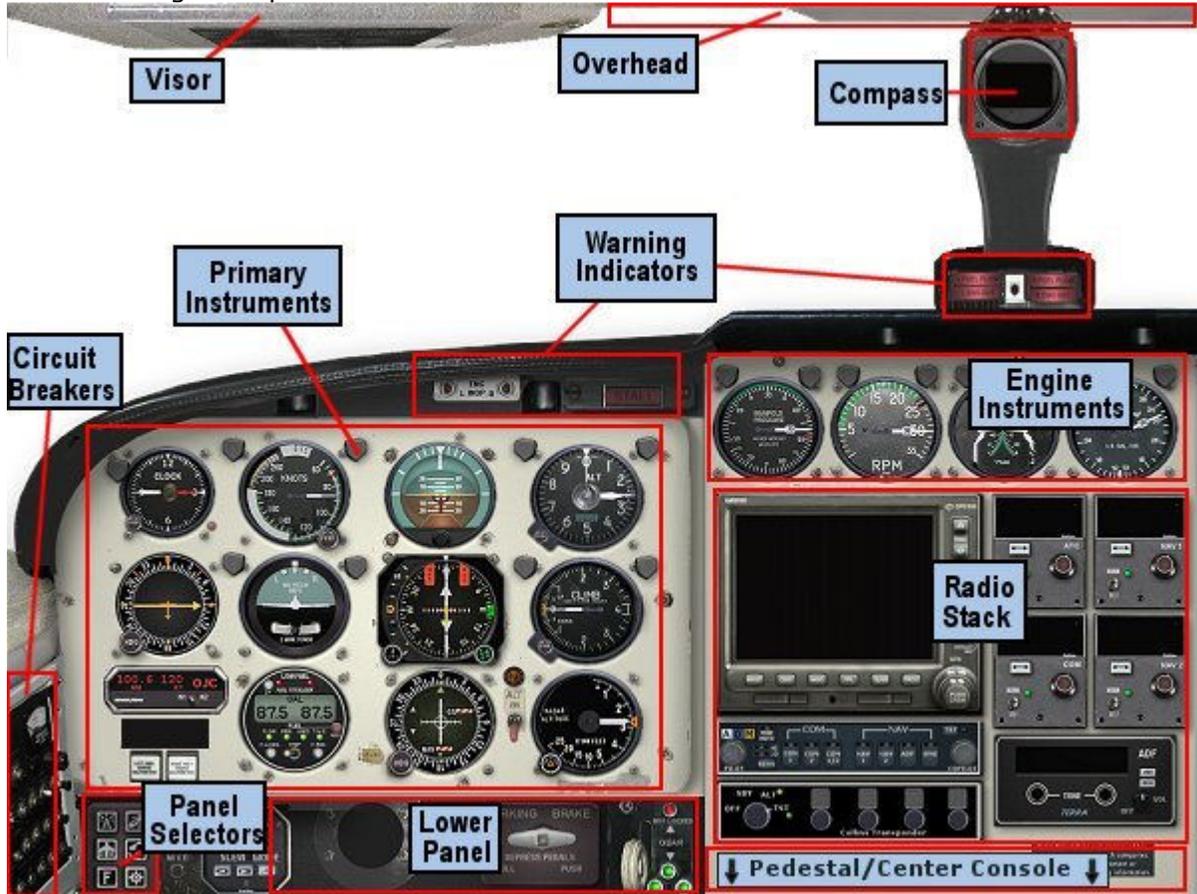
Separate documents are used to better facilitate changes and updates, which otherwise would require a large download size. We recommend you review all of these documents to fully familiarize yourself with the Navajo instrumentation and systems.



**Pilot Operating  
Handbook  
PA 31 Navajo**

## Instrument Panel

Click on image hotspots for detailed information



The instrument panel is designed to be functional and professional and will accommodate complete instruments and avionics. The owner's individual needs can surely be fulfilled with the wide selection of optional equipment available.

**Important**  
It is very important that the 2D panel be loaded at the beginning of your flight. Even if you prefer to fly strictly in the Virtual Cockpit. Otherwise a number of critical aircraft systems will not initialize. You can select and load the aircraft while in VC mode, but in this case, make sure you open the 2D panel at least momentarily.

Flight instruments are directly in front of the pilot and are grouped in a standard "T" configuration. The radio navigational indicators are to the right of the flight instruments. The radios are located in the middle panel and the engine instruments are mounted below the radios. Additional engine gauges are located in the right instrument panel. The tachometer and manifold pressure gauges are located in the center panel and are positioned respective of the propeller and throttle controls.

The attitude indicator and heading indicator are operated by air under pressure, whereas the turn and slip indicator is operated electrically to serve as a standby instrument in case the pneumatic system becomes inoperative.

Instrument lighting is provided by individual post lamps mounted adjacent to each instrument. These lights are controlled by a rotary switch located on the overhead panel. This switch can activate the instrument lighting alone, or both instrument lighting and panel floodlighting. A pilot and copilot dome light is located between the pilots' seats. The rocker switch is located on the overhead panel switches on this dome light, as well as the interior cabin light.

The landing and taxi lights are mounted to the upper nose gear strut. The rocker style switches are located in the overhead switch panel.

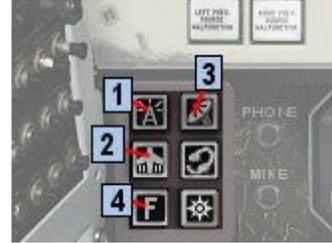
Each of these main instruments can be expanded in a zoom view by clicking on the center of the gauge,



**ADDITIONAL PANELS**

There are several auxiliary panels incorporated into the Navajo cockpit, to control the various aircraft systems:

- Radio Stack (pop-up)
- Throttle/Trim (pop-up)
- GPS
- Fuel Tank Controls (and cowl flaps)
- Also, controls for ATC and Map pop-ups.



You can also raise and lower the sun visor by clicking on it.



**Circuit Breakers**

Access to the circuit breaker panel is obtained through the hotspot on the main panel, as illustrated above. Critical engine and aircraft system electrical circuits feed through this panel.



**Lower Panel**

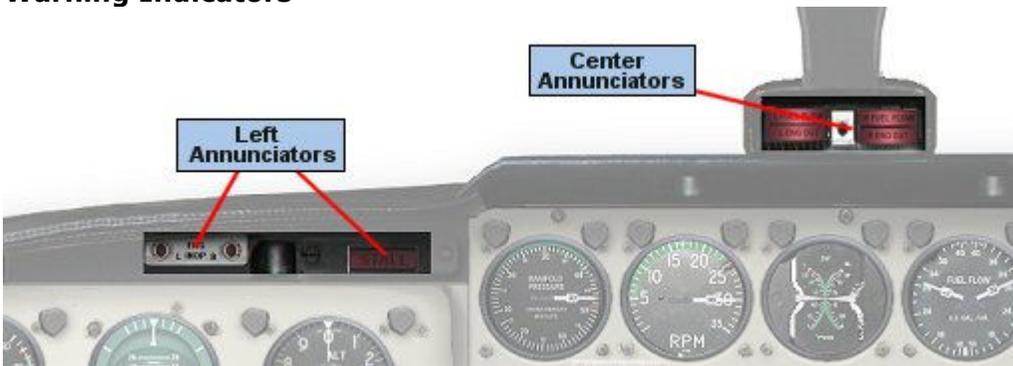


This section includes:  
 Gear handle and indicators  
 HSI compass control module (see [HSI information](#))  
 Parking brake



The landing gear indicators will show 3-green when all three gears are down and locked. Otherwise they will show red (in transit, but not locked) or they will be dark (gear up). If the gear handle is in the down position, and all three gears are not locked, the Gear Not Locked warning indicator will illuminate red. Additionally, if the gear handle is inadvertently lowered while the aircraft is on the ground, this indicator will illuminate red, and an audible alarm will sound (depending on Load Manager Alarms setting).

**Warning Indicators**



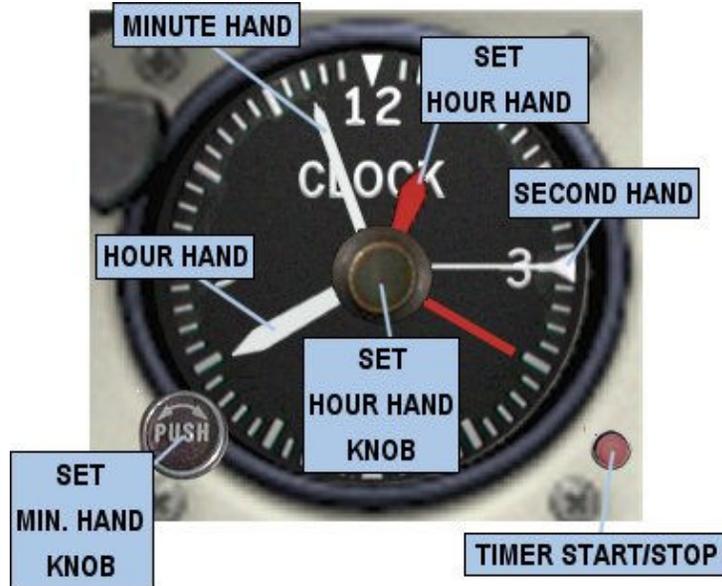
Left Annunciators	Center Annunciators:
Engine Out	Low Fuel Flow
Indicators	Low Oil Pressure
Stall Warning	

**Cowl Flaps Control**

The cowl flaps switches are electronically controlled. The switches are located directly above the Fuel Control Module. Cowl flaps position on the Navajo are either fully deployed or fully retracted. You can access these controls by selecting the Fuel Control Module:



**Clock**



The Navajo clock/timer is a standard 12-hour cycle clock and a 12 hour timer. Timer settings can be adjusted in increments of 1 minute. A buzzer will sound when the timer has counted down to zero.

The current time, and the current timer setting are also displayed on the mouse tooltip for the Clock. *Note that you must have **Show Tooltips** checked in your Flight Simulator **Options/general menu** in order to see any mouse tooltips.*

### CONTROLS

There are three control devices for the timer:

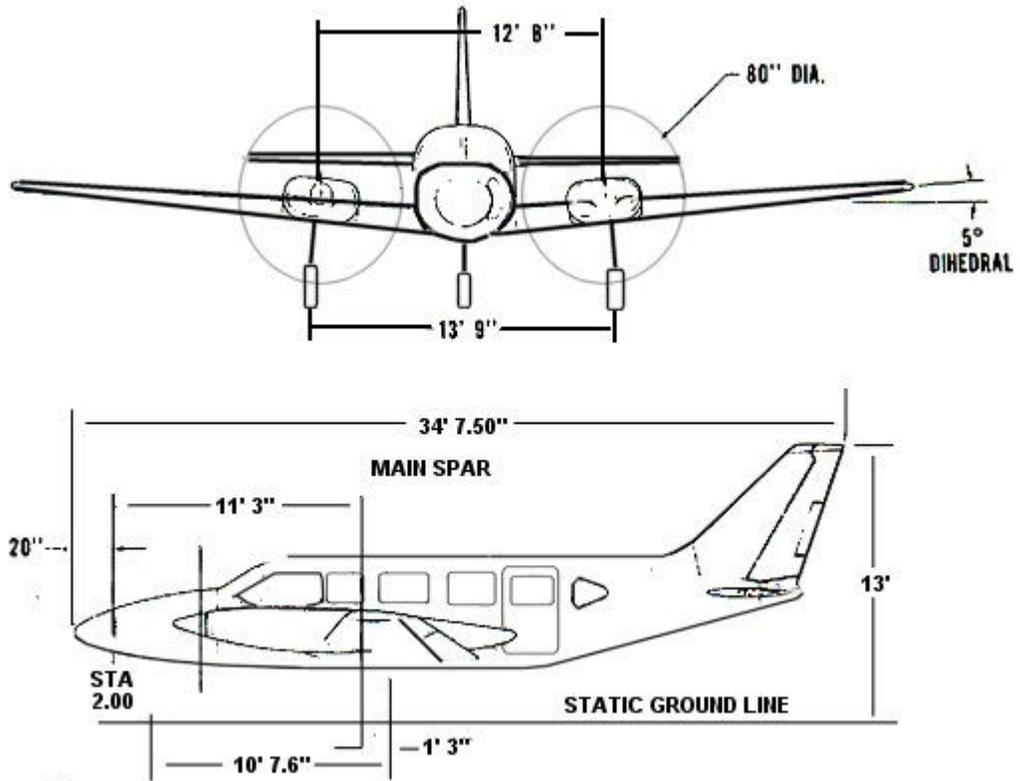
1. Set Minutes Knob - Turn clockwise to increase timer minutes, counter-clockwise to decrease. In steps of 1 minute.
2. Set Hours Knob - Turn clockwise to increase timer hours, counter-clockwise to decrease. In steps of 1 hour.
3. Timer Start/Stop Button - Press to start or stop timer.

### VC Clickspots

The illustration to the right illustrates the clickspots that are available in the VC.



**SPECIFICATIONS:**



<b>Aircraft Dimensions</b>	
<b>Wing span</b>	40' 8"
<b>Length</b>	34' 7"
<b>Height</b>	11' 3"

<b>Weight and Balance</b>	
<b>Empty weight</b>	4,250 lb.
<b>Maximum Takeoff Weight (MTOW)</b>	8,130 lb.

<b>Engine</b>	
<b>Left</b>	Lycoming TIO-540-J2BD
<b>Right</b>	Lycoming LTIO-540-J2BD
<b>Horsepower (ea.)</b>	350 @ 2,575 RPM
<b>Fuel</b>	100/130 Grade Aviation Gasoline (minimum)

<b>Propeller</b>	
<b>Manufacturer</b>	Hartzell Propeller, Inc.
<b>Hub Model</b>	
<b>Left</b>	HC-E3YR-2A
<b>Right</b>	HC-EY3YR-2AL
<b>Blade Model</b>	
<b>Left</b>	C8468-6R
<b>Right</b>	JC8468-6R

<b>Altitude Limits</b>	
<b>Maximum Operating Altitude</b>	27,200 ft..
<b>Service Ceiling</b>	28,300 ft.

<b>Temperature Limits</b>	
<b>Maximum</b>	50 °C
<b>Minimum</b>	-50 °C

<b>Airspeed Limitations</b>	
<b>V<sub>A</sub></b>	Maneuvering Speed 162 KIAS
<b>V<sub>MO</sub></b>	Maximum Operating Speed 187 KIAS
<b>V<sub>NO</sub></b>	Max Structural Cruising Speed 187 KIAS
<b>V<sub>NE</sub></b>	Never Exceed Speed 236 KIAS
<b>V<sub>SO</sub></b>	Stalling Speed in Landing Configuration 74 KIAS
<b>V<sub>MC</sub></b>	Velocity Minimum Control 77 KIAS
<b>V<sub>FE</sub></b>	Flaps Max Extend Speed Approach           152 KIAS Full                 130 KIAS
<b>V<sub>LO</sub></b>	Landing Gear - Operation 130 KIAS
<b>V<sub>LE</sub></b>	Landing Gear - Max speed when extended 130 KIAS

<b>Maximum Flap Extended Speeds</b>	
<b>Flaps degrees</b>	<b>KIAS</b>
<b>25</b>	130
<b>15 - 25</b>	152

<b>Cruising Range</b>	<b>RPM</b>	<b>Range</b>
<b>182 Gal. usable fuel</b>	2400	1,185 nm
<b>With 45 min. fuel reserve</b>	2400	1,005 nm

<b>Engine Specifications (ea)</b>	
<b>Rated Horsepower</b>	350
<b>Rated Speed</b>	2,575 RPM
<b>Displacement</b>	541 cubic inches

<b>Airframe Systems</b>	
<b>Air Conditioning</b>	<p>Cabin heating is achieved by mixing ram air with engine bleed air in variable proportions for temperature control.</p> <p>The cabin ventilating system consists of ram air inlet, a booster fan, and two fresh air nozzles under the instrument panel.</p>
<b>Electrical Power</b>	<p>Electrical power is provided by a 28 V DC negative ground system. The system incorporates a generator busbar, a battery busbar, and electrical hotbus bar.</p> <p>The primary source of power is a 28 V DC, 200 A engine driven starter/generator.</p>
<b>Fuel System</b>	<p>Fuel is contained in four integral fuel tanks with a total usable capacity of 182 US gallons. The <a href="#">fuel quantity indicators</a> are located on the overhead panel, and register the quantity of fuel in the tank selected by the fuel control module. See the <a href="#">Fuel System Checklists</a> for more information.</p> <p><a href="#">Fuel flow indicators</a> are located on the main instrument panel with the engine instrumentation. <a href="#">Fuel pressure indicators</a> are located on the copilot panel.</p>
<b>Ice Protection</b>	<p>Ice protection consists of an electrical heating system for the pitot tube, static ports, and the fuel control unit. Prop heating elements are also provided.</p> <p>The <a href="#">deice controls</a> are located on the overhead panel.</p>

## History

One of the most enduring and robust general aviation twins ever made is the Piper Navajo.

In 1964 Piper released the first of what was to become several Navajo variants over the course of a production run lasting almost two decades. The original 300Hp Navajo offered a spacious and roomy cabin with generous seating for six, a roomy flight deck, and a generous baggage allowance. The air-stair door set the Navajo apart from contemporary, more traditional low-wing twin designs of that day.

The Navajo - when released - was the largest design then undertaken by Piper and the basic design evolved considerably over the years to include longer, more capacious cabins with increased performance and useful loads. A pressurized Navajo variant (Pa-31P) was produced for fifteen years until the Navajo ended production in 1984. Over the life of the design, the original 300HP Lycoming 540 engine variants grew steadily in power, as did the airframe through various growths until peaking at 350HP installed in the substantially stretched fuselage.

In character, the Navajo could best be described as a robust workhorse. It is a satisfying aircraft to fly if flown well, and this durable design serves operators well. From a pilot's perspective it is a pleasant albeit noisy aircraft to fly. Flight deck noise levels are quite intrusive at even moderate power settings and few choose to operate the Navajo without the use of headsets. In the spacious rear cabin (in low density seating) the noise levels are appreciably lower and not unpleasant. Whilst relatively solid on the controls, the Navajo remains responsive if not nimble and is stable throughout the flight envelope. The Navajo is a good IFR platform.

The Navajo has been the focus of much attention and design enhancements by third party remanufacturers. Aerodynamic improvements and improved sound insulation, and cabin sealing being two areas of interest. The basic airframe offered considerable scope for comfort enhancements especially as the airframe aged.

Power plant options available from engine manufacturers are many, as are propeller options. One such variant is the Panther modification of the Navajo CR, which the Navajo the FSD model represents. This visually striking modification of the venerable Navajo CR features some immediately obvious aerodynamic enhancements in the form of prominent winglets. Power plant modifications include contra-rotating four bladed 'Q-Tip' propellers and higher performance 350Hp engines with dual magnetos for improved reliability. The engine and propeller modifications, combined with aerodynamic enhancements, result in an appreciably quieter cabin and usefully improved performance in terms of acceleration, increased climb and cruise performance.

Although it has been out of production for almost twenty years, the Navajo remains one of the most sought after twin engine general aviation designs of all time.