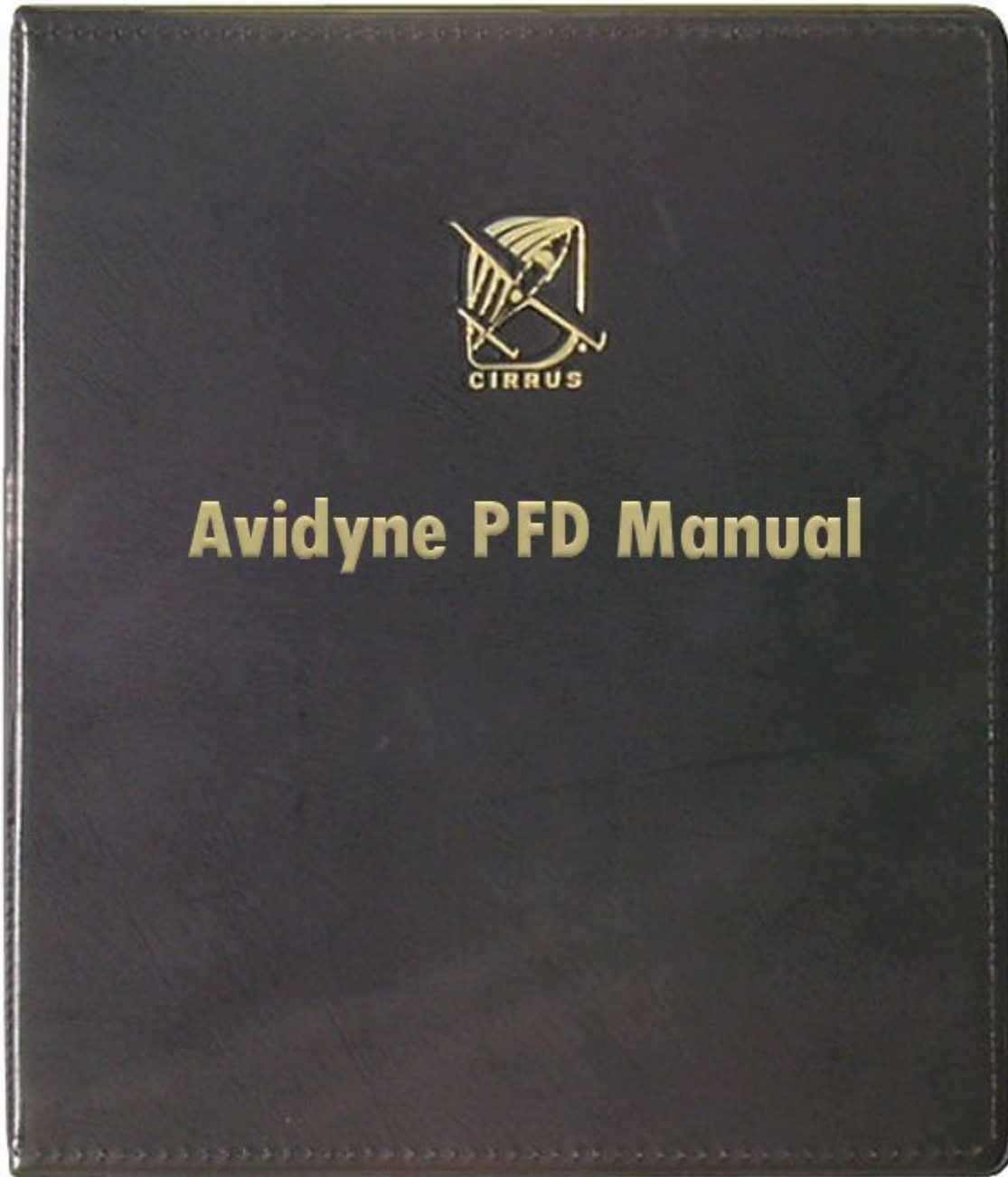


**Primary Flight Display [PFD]**



**Standard Disclaimer**

This manual is intended for recreational use in Flight Simulation ONLY and may NOT be used in any Real World Aviation application. The authors are not responsible for errors or omissions.

## Primary Flight Display [PFD]

The Eaglesoft Development Group Avidyne Flightmax Entegra Primary Flight Display...

Every effort has been made to faithfully simulate the Avidyne Flightmax Entegra Primary Flight Display within the limitations of Microsoft Flight Simulator 2004. We believe that our efforts will provide years of enjoyment for owners of our Cirrus SR20 G2.



The Avidyne Flightmax Entegra Primary Flight Display Manual pages will help experienced or novice flight simulation pilots become familiar with the operation of the Avidyne Flightmax Entegra Primary Flight Display.

**Note:** For Real World information and free Real World PDF Documents please visit the Avidyne Site from the following URL. <http://www.avidyne.com/techpubs.shtml>

**Product Support:** Please **Register** and **Login** to our **Support Forums** for product support at the following URL. <http://www.eaglesoftdg.com/forum/>

## Primary Flight Display [PFD]

The Flight Max Entegra PFD combines the panel instrumentation of the Airspeed Indicator, Attitude Indicator, Altimeter, Vertical Speed Indicator and Horizontal Situation Indicator into one intuitive glass display. In addition, the display provides trending data, autopilot indicators and advanced navigational information.



### 1. Brightness Control [BRT/DIM]

This switch controls the display brightness of the PFD. When the system is powered up, the default brightness is set at 75%.

### 2. Buttons and Knobs

Left/Right Knobs are used to select various modes and changes to the display. See details on pages 11/12

### 3. Air Data [OAT Toggle Controls]

Outside Air Temperature [OAT] Display Control ... Left clicking a transparent "Hotspot" located at the **Large Upper Left** screw on the PFD Bezel. Right clicking the same "Hotspot" toggles the **Celsius** or **Fahrenheit** readout.

### 4. Barometric Pressure Window [Barometric Pressure Controls]

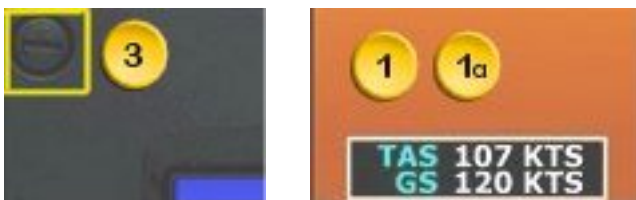
This display toggles between **In Hg.** and **Mb.** by clicking the **Large Upper Right** screw on the PFD Bezel.

### 5. [ADAHRS] Boot Window [Bypass Controls]

This "Hotspot" toggles the [ADAHRS] "Boot Screen" OFF if you are in a hurry.

## Air Data [OAT Toggle Controls]

The OAT and Barometric Pressure Control locations and descriptions listed here are illustrated in the large pictures above and below this section.



### 1. Air Data [OAT Default 1]

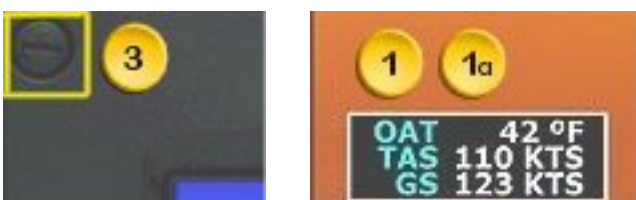
This data box displays the aircraft's **True Airspeed [TAS]** and **Ground Speed [GS]** in knots. Invalid data is displayed as dashes [---].

### 2. Air Data [OAT Toggle 1a]

This data box displays the aircraft's **True Airspeed [TAS]** and **Ground Speed [GS]** in knots, and the **Outside Air Temperature [OAT]** in degrees **Celsius** or **Fahrenheit**. Invalid data will be displayed as dashes [---].

### 3. Air Data [OAT Toggle Controls]

**Outside Air Temperature [OAT] Display Control ...** **Left** clicking a transparent "Hotspot" located at the **Large Upper Left** screw on the PFD Bezel. **Right** clicking the same "Hotspot" toggles the **Celsius** or **Fahrenheit** readout.



## Air Data [Barometric Pressure Controls]

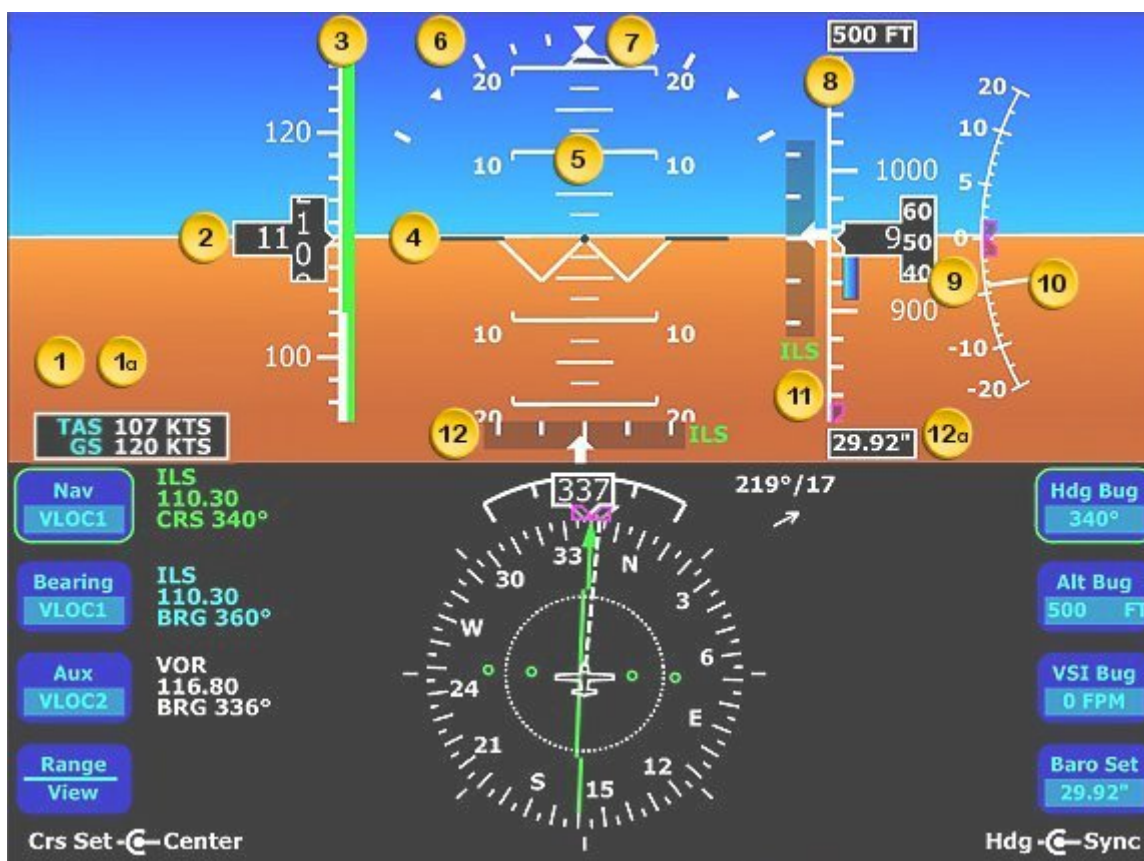


### 4. Barometric Pressure Window [Barometric Pressure Controls]

This display toggles between **In Hg.** and **Mb.** by clicking the **Large Upper Right** screw on the PFD Bezel.



## ADI Reference

**1. Air Data**

This data box displays the aircraft's True Airspeed (TAS) and Ground Speed (GS) in knots, and the Outside Air Temperature (OAT) in degrees Celsius. Invalid data is displayed as dashes (---).

**2. Airspeed Window**

This data window displays the current indicated airspeed in knots. At speeds under 20 knots hash marks are displayed.

**3. Airspeed Tape**

Displays current indicated airspeed in knots with a display range from 20 knots to 300 knots. Each minor tick mark represents 2 knots and each major tick mark is labeled. Color bands indicate additional airspeed reminders.

<span style="display:inline-block; width:15px; height:15px; background-color:red;"></span>	<b>Red Band</b>	Never Exceed Speed, $V_{NE}$ , extends to the top of airspeed tape.
<span style="display:inline-block; width:15px; height:15px; background-color:yellow;"></span>	<b>Yellow Band</b>	Maximum structural cruise speed, $V_{NO}$ , extends up to never exceed speed, $V_{NE}$ .
<span style="display:inline-block; width:15px; height:15px; background-color:green;"></span>	<b>Green Band</b>	No flap stall speed, $V_{S_0}$ , extends up to maximum structural cruise speed, $V_{NO}$ .
<span style="display:inline-block; width:15px; height:15px; background-color:white;"></span>	<b>White Band</b>	Full flap stall speed, $V_{SO}$ , extends up to maximum flap extension speed, $V_{FE}$ .
<span style="display:inline-block; width:15px; height:15px; background-color:red;"></span>	<b>Red Band</b>	20 knots up to full flap stall speed, $V_{SO}$ .

**4. Aircraft Reference Symbol**

Displays the current aircraft pitch angle represented by a black dot in the center of the "W" symbol against the pitch ladder.

## ADI Reference

### 5. Pitch Ladder

The pitch ladder has gradations every  $2^{1/2}$  degrees with the range of +/- 20 degrees and gradations every 5 degrees from +20 degrees to +50 degrees and -20 degrees to -30 degrees. The 10 degree gradations of the pitch ladder have ends on their horizontal bars which point to the horizon line. Large chevron visible at excessive pitch angles, point toward the horizon [above +50 degrees and below -30 degrees]. +/- 90 degrees is represented by small circles.

### 6. Bank Angle Indicator

The indicator consists of an inverted white triangle and an upright triangular Roll Pointer. The upright white triangle points to the current bank angle. Gradations are at 0, 10, 20, 30, 45 and 60 degrees. The 0 and 45 degree marks are inverted triangles.

### 7. Skid / Slip Indicator

The black trapezoid is centered under the roll pointer in coordinated flight. In uncoordinated flight it moves left or right of center indicated a slip or skid. Full scale deflection is the width of the trapezoid.

### 8. Altitude Tape

This tape displays pressure altitude [with barometric correction] in a display range from -1000 feet to 25,000 feet. Each minor gradation represents 20 feet and each 100 foot gradation is labeled.

### 9. Altitude Window

This window displays the current barometric corrected altitude.

### 10. Vertical Speed Indicator [VSI]

This indicator displays vertical speed of the aircraft in feet per minute. The scale gradations between +/- 1,000 fpm are every 100 fpm. Above the scale limits, digital readout of the current vertical speed is displayed on the appropriate end of the VSI scale.

### 11. Vertical Deviation Indicator [VDI]

This indicator displays when VLOC is selected as the NAV source and the ILS glide slope signal is being received. The source of the VDI data is displayed immediately below the VDI [eg. ILS]. Once displayed, the VDI may be removed by changing the NAV source or changing the localizer frequency.

### 12. Horizontal Deviation Indicator [HDI]

This indicator displays when VLOC is selected as the NAV source and the localizer signal is being received. The source of the HDI data is displayed immediately to the right of the ADI [eg. LOC or ILS]. Once displayed, the HDI may be removed by changing the NAV source or changing the VOR/LOC frequency.

## HSI Reference



### 1. HSI Moving Map

The HSI displays up to 15 waypoints and labels from the Active flight plan or the Direct To plan. The active leg of the flight plan is illustrated in **magenta**, and all other legs of the flight plan are in white. The moving map will also display waypoints and labels if using an approach and hold provided the **Plan or Approach is ACTIVE in the GPS**.

### 2. Magnetic Heading

The numeric indication displays the aircraft's current magnetic heading.

### 3. Wind Vector

Wind Vector displays the current wind speed and wind direction. The arrow indicates the direction of the wind relative to the aircraft's current heading. After completing a turn, it will take several seconds to update this information.

### 4. HSI Map Range

When the moving map is selected for display on the HSI via the "View" knob, the outer and inner rings of the compass rose are labeled with the range in nautical miles. Selectable ranges for the outer ring are 2, 5, 10, 20, 50, 100 and 200 nm.

### 5. Projected Track Line

The dashed white projected track line displays a projection of the current ground track of the aircraft.

### 6. Course Deviation Indicator [CDI]

The green single line CDI displays deviation from the set or desired course.

## HSI Reference

### 7. Bearing Pointer

The blue dual-line bearing pointer is associated with the bearing source and displays the current bearing waypoint [GPS1] or bearing to the station [VLOC1 or VLOC2]. A bearing pointer is not displayed if the VLOC source is tuned to an ILS or LOC station. **Not shown in this picture.**

### 8. Compass Rose



In both 360 full view and the 120 arc view, the minor gradation marks represent 5 degrees, major gradation marks represent 10 degrees with every 30 degrees labeled. The outer edge of the compass rose is marked with reference marks every 45 degrees.





## RIGHT KNOB & BUTTONS

### 1. Right Knob

The function of the right knob varies based on which button on the right side of the PFD is selected. The currently selected button is indicated by the green high lighted ring around the button label. The symbol above the knob denotes the current function of the knob.

The circular symbol  describes the rotary action on the knob. The line symbol  describes the push button action of the knob.

Active Button	Knob Label	Rotary Action	Push Action
HDG Bug	<b>Hdg</b>  <b>Sync</b>	Sets heading bug	Syncs heading bug to current magnetic
Alt Bug	<b>Alt</b>  <b>Sync</b>	Sets altitude bug	Syncs altitude bug to nearest 100'
VSI Bug	<b>VSI</b>  <b>Sync</b>	Sets VSI bug	Syncs VSI bug to nearest 50 fpm
Baro Set	<b>Baro</b>  <b>Std</b>	Sets Baro	Sets Baro to 29.92

The Alt Bug, VSI Bug and Baro Set button selections will all timeout back to the Hdg Bug button selection ten seconds after they were last pushed or changed by knob rotation. Because of the button timeouts a recommended technique is to always select the desired button prior to rotating the knob.

### 2. Heading Bug Button [Hdg Bug]

When selected, allows the right knob [1] to control the position and value of the heading bug [3] on the HSI compass rose. The selected value [001-360] appears in the button label.

### 3. Heading Bug

Controlled by the right knob when the 'Hdg Bug' button is selected, the notched part of the magenta bug symbol indicates the current heading bug value.



**Note:** The bug is solid when coupled with the autopilot and hollow when not coupled. The heading bug is positioned at the appropriate side of the tape and remains in partial view when Arc View is selected and the selected heading bug value is outside the current compass Rose field of view.

### 4. Altitude Bug Button (Alt. Bug)

When selected allows the right knob to control the position of the altitude bug and the autopilot altitude pre select value. The range of values is the same as the altitude tape (1,000 feet to 25,000 feet). The Alt Bug has three resolution setting modes: 1,000 ft., 100 ft., 10 ft. modes.

The default adjustment position is at the 1,000 ft. mode and each button press steps the adjustment position down one place. The selected numeric value appears in the button and in the Altitude Pre select window.

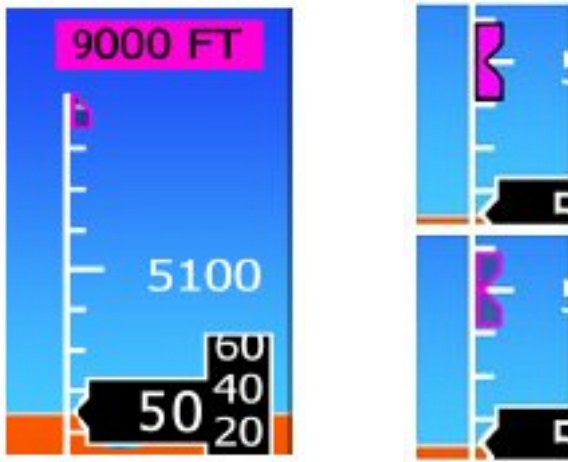
## RIGHT KNOB & BUTTONS



### 5. Altitude Bug

Controlled by the right knob when the 'Alt Bug' button is selected. The notched part of the magenta bug symbol indicates the current altitude pre select value.

When the selected value is outside the current altimeter field of view, the bug is positioned at the appropriate end of the tape and remains in partial view (below left). The bug is solid when coupled to the autopilot and hollow when not coupled (below right).



### 6. Altitude Pre select

Displays the digital value of the altitude bug setting and when enabled, the altitude that the autopilot is commanding to capture and hold. Digits appear as black numbers on magenta background when Alt. Bug button is selected. Default setting is Thousands selection, click Alt. Bug button twice to toggle Hundreds Selection.

### 7. Vertical Speed Indicator Bug

When selected allows the right knob (1) to control position of the VSI bug (8) and the autopilot vertical speed command. The range of allowable values matches the allowable rates of the autopilot. The selected numeric value appears in the button label. Default is 0.

**RIGHT KNOB & BUTTONS****8. VSI Bug**

Controlled by the right knob when the 'VSI Bug' button is selected. The notched part of the magenta bug symbol indicates the current VSI bug set value. VSI bug range is +/- 1,600 fpm. The bug is solid when coupled with the autopilot, and hollow when not coupled.

**9. Barometric Correction Setting Button (Baro Set)**

When selected allows the right knob to control the value of the barometric correction setting. The range allowable values are 27.50" to 31.50". The selected value appears in the button label and in the Barometric Correction Setting Window. See illustrations on page 4 for **Barometric Pressure Window** display toggle between **In Hg.** and **Mb.** by clicking the **Large Upper Right** screw on the **PFD Bezel**.



**10. Barometric Correction Setting**

Controlled by the right knob when the 'Baro Set' button is selected, the boxed value indicates the current barometric correction setting in inches of mercury. Digits appear as black numbers on white background when the Baro Set button is selected.

## LEFT KNOB & BUTTONS

### 1. Left Knob Correction Setting

The function of the left knob changes based on which button on the left side is selected (indicated by green highlighted ring around the button label).

The  symbol describes the rotary action of the knob. The  symbol describes the push action of the knob.

### 2. Crs Set (Course Set)

Knob is displayed when it is allowable to set a course as indicated below.

When Range / View button selection is made, clicking the center of Left Knob toggles between Arc / Rose Mode. Clicking again on the center of Left Knob toggles the Range for selected Arc / Rose Mode.

The Bearing, Aux and Range / View button selections will all timeout back to the Nav Button selection ten seconds after they were last pushed or changed by knob rotation. Because of the button timeouts, a recommended technique is to always select the desired button prior to rotating the knob.

Due to flightsimulator limitations the GPS1 is the only GPS selection available!

NAV Source	GPS Nav Condition	Left Knob Label
GPS1	GPS in Auto-leg mode	(No label)
GPS1	GPS in OBS mode	Crs Set / Center
VLOC1 or VLOC2	Tuned NavAid is a VOR	Crs Set / Center
VLOC1 or VLOC2	Tuned NavAid is an ILS or LOC	Crs Set (as reference)

### 3. Nav (Primary Navigation)

Controls the source for the CDI and adjacent data block. In a dual GPS/Nav configuration, the available sources are GPS1, VLOC1, and VLOC2. The content of the associated data block varies according to the selected source as follows.

NAV Source	Data Block Format
GPS1	Waypoint Identifier Desired Track to Waypoint Distance to Waypoint Time-To-Go to Waypoint
VLOC1 or VLOC2 (VOR tuned)	'VOR' VOR Frequency Course
VLOC1 or VLOC2 (ILS or LOC Tuned)	'ILS' or 'LOC' Localizer Frequency Course

### 4. Bearing (Secondary Navigation)

The adjacent push button controls the source for the Bearing Pointer and adjacent data block in a dual GPS/Nav configuration, the available sources are GPS1, VLOC1, VLOC2, OFF. The content of the associated data block varies according to the selected source as follows.

Bearing Source	Data Block Format
GPS1	Waypoint Identifier Bearing to Waypoint Distance to Waypoint Time-To-Go to Waypoint
VLOC1 or VLOC2 (VOR tuned)	'VOR' VOR Frequency Bearing to station
VLOC1 or VLOC2 (ILS or LOC Tuned)	'ILS' or 'LOC' Localizer Frequency
OFF	Blank

## LEFT KNOB & BUTTONS

### 5. Aux (Auxiliary Navigation)

The adjacent push button controls the source of the adjacent data block only. In a dual GPS/Nav configuration, the available sources are: GPS1, VLOC1, VLOC2, OFF. The content of the associated block varies according to the selected source as follows.

Aux Source	Data Block Format
GPS1	Waypoint Identifier Bearing to Waypoint Distance to Waypoint Time-To-Go to Waypoint
VLOC1 or VLOC2 (VOR tuned)	'VOR' VOR Frequency Bearing to station
VLOC1 or VLOC2 (ILS or LOC Tuned)	'ILS' or 'LOC' Localizer Frequency
OFF	Blank

When Range / View button selection is made, clicking the center of Left Knob toggles between Arc / Rose Mode. Clicking again on the center of Left Knob toggles the Range for selected Arc / Rose Mode.

The Bearing, Aux and Range / View button selections will all timeout back to the Nav Button selection ten seconds after they were last pushed or changed by knob rotation. Because of the button timeouts, a recommended technique is to always select the desired button prior to rotating the knob.

Due to flight simulator limitations the GPS1 is the only GPS selection available even though GPS2 button is displayed!



## Initialization

The Entegra PFD is equipped with a solid state Air Data Heading Reference System (ADAHRS) which requires a 3 to 5 minute alignment time prior to flight.

The Entegra PFD is designed to operate during engine start and shutdown procedures. PFD start-up is automatic once power is applied to the system via the battery switch. Engine start will not effect the ADAHRS alignment. A common Entegra startup procedure is to turn on BAT1 and conduct the aircraft preflight during the ADAHRS alignment process.



The PFD presents the initialization display immediately after power is applied. Remain stationary until the warmup block is removed. Typical alignment time is 3 minutes but may take longer if the aircraft is subjected to forward motion. The second line "Gyro warming up" changes to a countdown timer when there are 40 seconds left to completion. Air data (airspeed, altitude, vertical speed) will become valid prior to attitude data. The warm up block is automatically removed when warm-up is complete.



The flight simulation version allows bypassing of the initialization screens by clicking the center Avidyne logo as illustrated above.

## Default settings at startup

Alt Bug.....	Nearest 100' to current elevation (based on 29.92")
Alt Bug Mode.....	Thousands mode
VSI Bug.....	0 fpm
HDG Bug .....	360 degrees
Baro Set .....	29.92
Nav .....	GPS1
Bearing .....	OFF
Aux.....	OFF
View .....	360 degree view with flight plan
Range .....	10 nm
Right Side Active Buttons .....	Hdg Bug
Left Side Active Button .....	Nav
Right Knob.....	Set Hdg Bug
Left Knob.....	Inactive

## Setting up the HSI



GPS1 selected, without a flight plan active. HSI shows a red "X" in place of the CDI.

The FlightMax Entegra PFD can integrate with single or dual GNS 400/500 series GPS/NAV systems. At the time of initial install the Entegra PFD is configured for the number of GPS/NAV systems on board.

The "Nav" button (Primary Nav) is used to select the GPS/NAV source for the green single-line CDI and the moving map data. The active flight plan from the selected GPS/NAV unit drives the moving map on the HSI and will display up to a maximum of 15 waypoints, including the ability to display curved approach path and holding pattern segments. Moving map data is displayed on the HSI portion of the Entegra PFD in two of the four possible view selections (full compass rose with map, arc view with map). GPS/NAV1 is also the primary source for ground-speed readout and a required element for the wind vector calculation and display. In the event GPS/NAV1 is unavailable, ground speed and wind vector are derived from GPS/NAV2. If the Nav source is selected to a VOR or localizer source, the HSI will display the course deviation indicator without a map display.

The Bearing button is used to select the GPS/NAV source for the blue double-line bearing pointer. If the selected bearing source is a Localizer, the bearing pointer will not be displayed.

To take full advantage of the real world Entegra PFD, GPS/NAV2 can be loaded with Direct-To waypoints, alternative flight plans, or Navaid frequencies to provide additional guidance beyond what is loaded into GPS/NAV1. This information can be selected to display on the Entegra PFD as the "Bearing" or "Aux."

For increased situational awareness, it is important to remember that the CDI on the Entegra PFD's HSI comes from the selected "Nav" source which may be different from the CDI displayed on the GPS/NAV1 or GPS/NAV2 displays. **While real world use of cross fill capability of the GPS/NAVs in dual configurations is fully supported the Simulation Version does NOT support cross fill capability. This is due to simulator limitation to ONE GPS**

## Use of GPS/NAV

Primary navigation course setting is allowed when one of the three conditions is met.

1. PFD Nav Source is GPS1 and the requested GPS/NAV is in OBS mode, or
2. PFD Nav Source is VLOC and the current frequency is a VOR station, or
3. PFD Nav Source is VLOC and the current frequency is an ILS or localizer. In this case, the ability to set a course is for reference. The CDI is driven by the received localizer signal regardless of the set course.

## Setting up the HSI

The scaling of the CDI on the Entegra HSI is automatically set by the GPS/NAV system as a function of the NAV source selected by the PFD Nav button.



The source selected for "Nav" is coupled with the CDI button on the GPS/NAV. As the "Nav" button on the Entegra PFD is toggled from GPS1 to VLOC1 and back, the CDI source on GPS/NAV1 toggles from GPS to VLOC and back to match the current "Nav" setting. Similarly, as the CDI button on the GPS/NAV is toggled from GPS to VLOC and back, the "Nav" source of the Entegra PFD will change to follow.

A recommended technique is to use the CDI button on the GPS/NAV1 to toggle the Nav source back and forth, especially in a dual GPS/NAV configuration where the PFD Nav button cycles through all four Nav sources (GPS1, VLOC1, VLOC), and the CDI button on the GPS/NAV1 makes it easy to switch the PFD between GPS1 and VLOC1 and back.

## Precision Flight with the PFD

This section describes several techniques which take advantage of the Entegra PFD's features to produce precision flight performance.

Level flight may be obtained by placing the black dot in the middle of the aircraft reference symbol ("flying-W") on the horizon line in cruise conditions of 6,000' MSL at 160 KIAS. The pitch angle for level flight will vary with flight conditions, depending on speed altitude and weight.

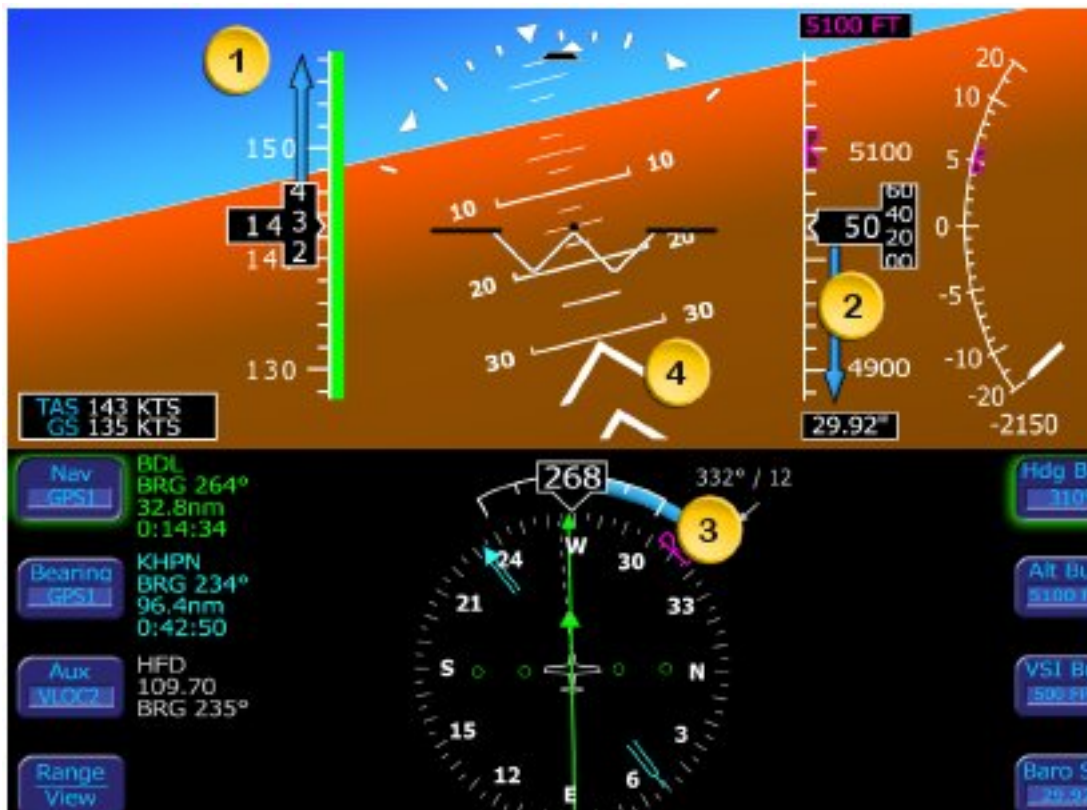
The proper technique for flying a constant rate turn involves using a combination of the turn indicator and the bank angle indicator. Typical bank angles for a standard rate turn are approximately 23 degrees in cruise conditions.

Initiate a standard rate turn by banking to an angle indicator, and then adjust the bank angle to standard rate by reference to the standard rate turn indicator. Deviations from an intended bank angle are very easy to notice with Entegra's wide screen ADI horizon.

Capture and maintenance of desired airspeed and altitude can be accomplished using the aid of the trend indicators. Changes in speed greater than .8 knots/sec are indicated by the airspeed trend bar. Changes in altitude greater than 240 feet / min are indicated by the altitude trend bar.

The trend indicators display the aircraft's projected airspeed and altitude six seconds in the future. To capture and maintain a desired airspeed or altitude, adjust pitch and/or power to align the trend indicator with the desired airspeed or altitude. This will result in a smooth capture of the desired airspeed and altitude.

## Trend Indicators in the PFD

**1. Airspeed Trend Indicator**

The tip of the blue airspeed trend indicator displays the predicted airspeed six seconds into the future at the current rate of change. An arrowhead indicates a value beyond the current tape field of view.

**2. Altitude Trend Indicator**

The tip of the blue altitude trend indicator displays the predicted altitude six seconds into the future at the current rate of change. An arrowhead indicates a value beyond the current tape field of view.

**3. Rate of Turn Indicator**

The tip of the blue rate of turn indicator displays the current rate of turn. The indicator is marked for  $\frac{1}{2}$  and full standard rate of turn. An arrowhead indicates a value beyond  $1 \frac{1}{2}$  standard rate.

**4. Excessive Pitch Chevrons**

The large white chevrons are displayed at pitch values greater than +50 degrees and less than -30 degrees. In all cases, the chevrons point towards the horizon line.

## Autopilot Use and Control

The Entegra PFD is fully integrated with the S-Tec System 55X autopilot. The Heading, Altitude and VSI reference bugs are provided on the Entegra PFD to aid in pilot situational awareness and autopilot control.

When an active autopilot mode is selected, full guidance is provided from the Entegra PFD to the autopilot, including smooth transitions to altitude and heading captures. In an inactive autopilot mode is not selected (i.e. manual flight), the Entegra PFD does not provide guidance other than to display the position of the appropriate bugs as set by the pilot.

The reference bugs status will indicate when Entegra is coupled with the autopilot. A solid magenta Heading, Altitude or VSI bug indicates that function is currently coupled to an active mode of the autopilot. A hollow magenta bug indicates that the function is not currently coupled to the autopilot in an active mode.

The following is a description of the six autopilot modes supported by the Entegra PFD. The autopilot may only be coupled to the GPS/NAV selected as the PFD Nav source. The autopilot may not be coupled to the GPS/NAV selected as the PFD Bearing source.

## Horizontal Modes

### 1. Heading Capture/Hold Mode

Press the Heading Bug button on the PFD and rotate the right knob to set a desired heading. Press the HDG button on the autopilot control head to engage the heading mode. The heading bug will become solid magenta and the autopilot will track the input heading. The autopilot control head will indicate "HDG". The heading bug will remain solid magenta until the heading mode is cancelled. Select a new heading any time while the autopilot is in heading mode and the autopilot will track the new heading bug value.

### 2. Nav Mode

Press the NAV button on the autopilot control head to engage Nav mode. The autopilot will intercept and track the desired course. In this mode, the autopilot tracks the active plan of the selected GPS/NAV source whether (GPS1) or an active VOR or localizer (VLOC1 or VLOC2). The autopilot control head will indicate "NAV". In this mode, the heading bug will be hollow and remains at its last set value, which is not necessarily aligned with the Nav course.

### 3. GPS Roll Steering Mode

In this mode, the autopilot tracks the active flight plan of the selected GPS/NAV (GPS1). Press the NAV button on the autopilot control head twice to engage the GPSS mode. The autopilot will then begin tracking the GPS steering commands from the selected GPS/NAV. The autopilot control head will indicate "GPSS". GPSS mode is the recommended Nav mode during autopilot operations due to increased accuracy. In this mode, the heading bug will be hollow and remains at its last set value, which is not necessarily aligned with the Nav course.

## Vertical Modes

One of the Horizontal Modes (HDG or NAV) must be engaged on the autopilot control head before a vertical mode can be used.

### 1. Altitude Hold Mode [Not Modeled]

Push the ALT button on the autopilot control panel to enable altitude hold. Current Altitude at the time of button press will be selected as the target altitude and the autopilot will hold that altitude. The Alt bug will be set to the nearest 100 feet of the current altitude and will become solid magenta.

Altitude bump IS NOT implemented because the smallest A/P target altitude increment that FS recognizes is 100'.

In real world the knob on the right side of the autopilot control head can be used as altitude "bump" such that each rotational click of the knob will change the target altitude by 20 feet. The altitude bug setting will not change.



## Vertical Modes

### 2. Vertical Speed Mode

Push the VSI Bug button and rotate the PFD knob to set the desired vertical speed. The VSI bug is hollow at this point. Engage the VS mode by pressing the VS button on the autopilot control head. At this point, the VSI bug will become solid magenta. When VS mode is cancelled the VSI bug will become hollow but remains at its last value.

The VSI Bug may be set to a range of +/- 1,600 fpm. This range coincides with the VS limits of the autopilot.

### 3. Altitude Capture Mode

Push the alt Bug button on the Entegra PFD and rotate the right knob to set a desired target altitude. Engage Altitude Capture mode by pressing ALT and VS buttons on the autopilot control head simultaneously. The Alt Bug and VSI Bug will become solid magenta. The autopilot will then follow the VSI bug to the selected target altitude. As the target altitude is approached, the VSI bug will automatically move toward zero and will become hollow when the target altitude is captured.

Only GSP/NAV1 is capable of being the navigation source to the autopilot in the event of a PFD failure.  
Note: Failures not modeled in sim version.

## Wind Vector and Track Line



The wind vector on the HSI is very useful in any phase of flight where winds aloft should be taken into account. A combination of the wind vector and projected track line can be used to your advantage in navigation tasks. A very useful technique is to align the projected track line with the desired course. This will take the guess work out of determining proper crab angles for wind corrections.

## Precision Approaches



The Entegra PFD is designed to take full advantage of the auto transition capability of the GPS/NAV systems for flying a GPS flight plan ending in an ILS approach. In this case, the GPS/NAV CDI source automatically switches from GPS to VLOC when it begins receiving the glideslope / glidepath signal. At that time, the Entegra PFD “Nav” source also changes and the horizontal deviation indicator (HDI) and vertical deviation indicator (VDI) windows are displayed on the ADI. The CDI course is automatically set to the inbound localizer course resulting in a hands-free transition.

As long as a localizer or ILS has been selected via the Entegra PFD “Nav” button the HDI and VDI will be automatically displayed when applicable localizer and glideslope signals are received. No pilot action is required for the horizontal and vertical deviation indicators to be displayed.

It is recommended that the inbound course be set via the Entegra PFD course set knob to serve as reference during the localizer intercept and tracking. This is automatic if the GPS/NAV system has been setup to Autoslew. The CDI deflection will be driven by the localizer signal itself, regardless of the course setting.

To perform an autopilot-coupled approach, ensure the approach has been activated in the GPS selected as the Nav source. At that point, press the NAV button on the autopilot control head to activate Nav mode. Press the APR button on the Autopilot control head to activate the glideslope capture capability. The autopilot will then track the glideslope and localizer.

As a reminder, set the altitude bug to the published approach Decision Height to serve as a visual reference during the approach.

For maximum situational awareness during all types of precision and non-precision instrument approaches, always select and activate the approach in the GPS/NAV. This will enable the Entegra PFD to display the approach waypoint on its moving map.

Upon reaching the Final Approach Fix (FAF), ensure that the correct baro is entered in both the PFD and standby altimeter. Also verify that the PFD and standby altimeter indicate the same altitude.

## Non-Precision Approaches

The Entegra PFD is also designed to aid in the flying of non-precision approaches. Once the published approach has been activated in the GPS/NAV system, the inbound course on the Entegra PFD will be automatically set to match the inbound course of the published approach.

A recommended technique when performing an autopilot-coupled non-precision approach is to select the HDG, NAV and ALT buttons on the autopilot while still outside the FAF. Prior to reaching the FAF, use Entegra's VSI bug to set the desired VS descent rate, use Entegra's Hdg Bug to set the desired heading for climbout/missed approach, and use Entegra's Alt Bug to set the desired intermediate level of altitude or the MDA as a visual reminder. Crossing the FAF, VS mode should be selected on the autopilot and just prior to reaching MDA, ALT should be selected on the autopilot to command altitude hold.

## Missed Approach

Prior to missed approach, disconnect the autopilot, ensure the aircraft is trimmed for the power setting. Establish a climb attitude and use Entegra's Alt Bug to set the desired missed altitude. On the climbout, select HDG or NAV (depending on missed approach instructions) on the autopilot, press ALT and VS simultaneously on the autopilot, and press OBS on the GPS/NAV to continue the coupled missed approach.

**CAUTION:** If an altitude capture is attempted to a target altitude above current aircraft altitude and a negative value has been set in the VSI Bug, the system will not proceed with the altitude capture but will transition into altitude hold mode instead. The same is true for target altitudes below current aircraft altitude but with positive values set in the VSI Bug.