AV-30-C

Pilot's Guide

1 Revision History

Revision	Date	Comments
A	4/16/2020	Initial release
B	7/13/2020	Added AHRS/ADC startup time. Added clarification on AI/DG toggle function. Clarified power input description, air data connections, GPS interface, low speed arc operation. Modified roll alerts to not specify left or right direction. Clarified AoA description text, alert clearing (mute operation).

2 Warnings / Disclaimers

All device operational procedures must be learned on the ground.

uAvionix is not liable for damages arising from the use or misuse of this product.

This equipment is classified by the United States Department of Commerce's Bureau of Industry and Security (BIS) as Export Control Classification Number (ECCN) 7A994.

These items are controlled by the U.S. Government and authorized for export only to the country of ultimate destination for use by the ultimate consignee or end-user(s) herein identified. They may not be resold, transferred, or otherwise disposed of, to any other country or to any person other than the authorized ultimate consignee or end-user(s), either in their original form or after being incorporated into other items, without first obtaining approval from the U.S. government or as otherwise authorized by U.S. law and regulations.

3 Table of Contents

4 AV-30-C System Information

4.1 System Description

The uAvionix AV-30-C is a fully digital multi-mode instrument that mounts in the legacy 3 1/8” round instrument panel. It can be field configured as either an Attitude Indicator (AI) or a Directional Gyro (DG) indicator. It is fully self-contained with dual-precision inertial and pressure sensors and allows for a wide variety of pilot customization.

Figure 1 - AV-30-C Multi Mode AI/DG – Basic Display

When configured as an AI, primary attitude and slip are always displayed. The un-used portions of the display area can be customized by the pilot to show a variety of textual and graphical data-overlay fields. Three pages may be customized by the pilot while a fourth page presents a fully decluttered view of only attitude and slip.

When configured as a Directional Gyro (DG), direction of flight information is presented. The flight direction can be configured to be presented as non-slaved heading or inertially stabilized GPS track when connected to an external GPS navigator. Multiple display presentations, including compass rose, GPS HSI, and GPS Arc views can be selected by the pilot. The unused portions of the display area can similarly be configured for a variety of textual data-overlays.

In both operating modes, the pilot may select from multiple visual styles which are intended to improve visual compatibility with legacy

aircraft instrumentation and preserve the look-and-feel of older aircraft applications.

A wide variety of supplemental functions, including audio alerting, derived angle of attack presentation, G-load display, and more are provided. An internal, rechargeable LiPo battery allows for operation for a nominal 2 hours in the event of aircraft power loss and 30 minutes minimum under all temperature conditions.

When installed as a non-required instrument (not replacing the existing approved AI or DG), the functional mode of the unit can be toggled between AI and DG by pressing and holding the rotary knob for 3 seconds.

4.2 System Functions

Primary Functions:

- Primary Attitude (AI Mode)
- Primary Slip (AI Mode)
- Primary Direction of Flight Indication (DG Mode)

Supplemental Functions:

- Indicated Airspeed
- Altitude
- V-Speeds
- Angle Of Attack
- Vertical Trend
- Vertical Speed
- Set Altitude
- Heading
- Bus Voltage
- G Load
- Outside Air Temp
- True Airspeed
- Density Altitude
- GPS Navigator / Waypoint Data
- GPS Navigator Nav Data
- GPS Navigator Route Line
- Heading Bug

Audio and Visual Alerting Functions:

- AoA Alerting
- G Limit Alerting
- Excessive Roll Alerting

Misc. Functions:

- Internal Battery Operation
- Auto / Manual Brightness

5 Unit Interfaces

5.1 Aircraft Systems Interfaces

The following describes each of the AV-30-C system interconnects for both the AI and DG installation configurations. Note that some interfaces are optional and may not be available in a given installation.

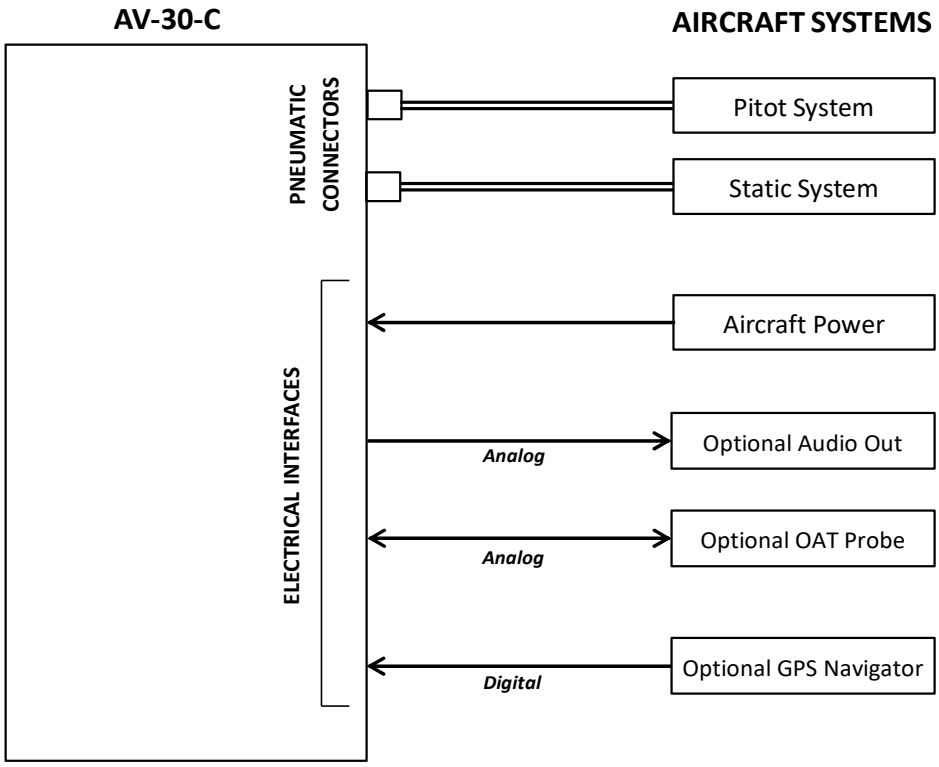

Figure 2 – AV-30-C Aircraft Systems Interfaces – AI Mode

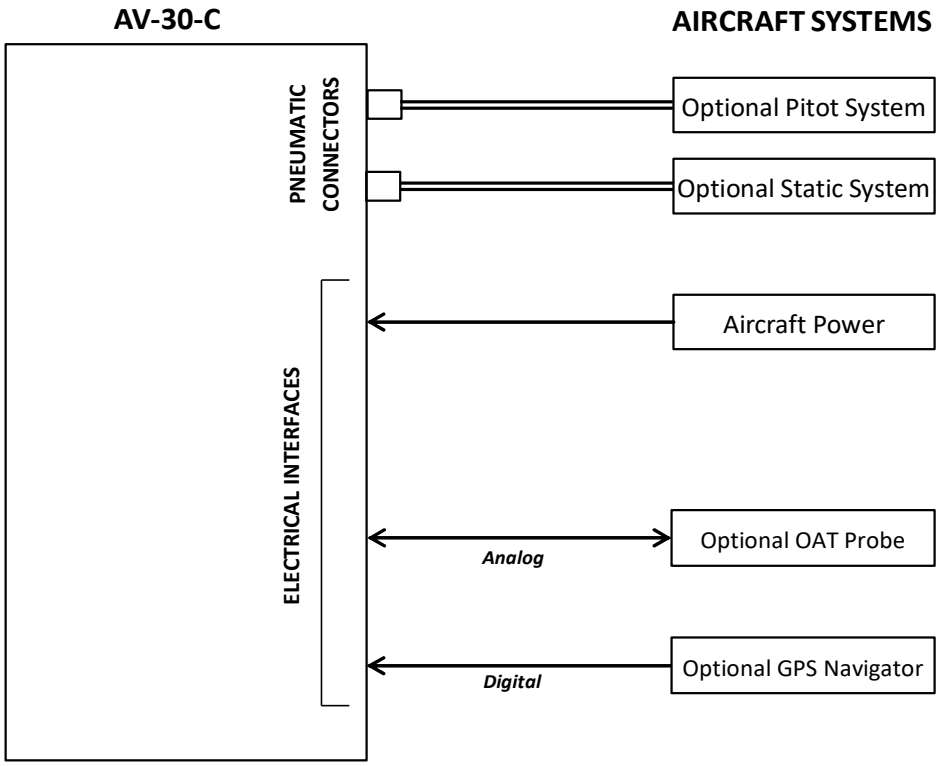

Figure 3 – AV-30-C Aircraft Systems Interfaces – DG Mode

When installed as a DG, no audio outputs are supported, and air data related parameters are only available when the optional OAT probe is equipped.

5.2 Power Input (Required)

Power input is required in both AI and DG configurations and each unit has a dedicated circuit breaker and internal backup battery. This architecture allows the unit to continue operation if external power fluctuates or is completely lost.

When external power is supplied to the AV-30-C, there is no mechanism to turn the unit off. When operating on battery, the unit may be forced off with a user interface action. Reference *Section 10 - Internal Battery Operation* for more information.

5.3 Pitot and Static Interfaces

Pitot and static connections are required for the AI, and optional for DG installations.

Airspeed, altitude, derived angle of attack, TAS and DALT all require pitot static connections as they are based on either altitude or airspeed measured from those connections.

When installed as a DG, pitot static connections are required if the optional OAT probe is installed in order to display TAS and DALT air data parameters.

5.4 GPS Interface (Optional)

The GPS interface is an optional serial interface provided to display data from most panel mounted and hand-held GPS units.

This output does not provide IFR compliant lateral or vertical guidance, therefore all GPS track and deviation related data presented is for VFR operations only.

The AV-30-C does no computations or operations on the data obtained from the GPS navigator, and simply displays the received data in a textual or graphical format as configured by the pilot.

5.5 OAT Probe (Optional)

The optional OAT probe interface is compatible with the industry standard “Davtron” probe which is mounted external to the aircraft. OAT data is available as a textual data overlay and is used to compute temperature dependent data such as TAS and DALT. Each AV-30-C requires a dedicated probe and a single OAT probe cannot be shared between multiple units.

The OAT probe is automatically detected by the system, and when present, allows temperature related parameters to be selected for display. If the OAT probe is not detected, display of these parameters is inhibited.

5.6 Audio Output (Optional)

The optional audio output provides audio alerts for the various alerting conditions. This output is typically connected to the aircraft's non-switched audio input on the audio panel. Audio alerting thresholds and enable / disable of the alerts are configured by the pilot in the Setup Menu.

Audio alerting is only supported when configured as an AI.

6 User Interface

6.1 Startup and Common Controls

The initial power-on splash screen presents the company logo, unit model number, and the currently installed software version.

Figure 4 – Splash Screen

Operation in both AI and DG modes share common user interface controls as follows:

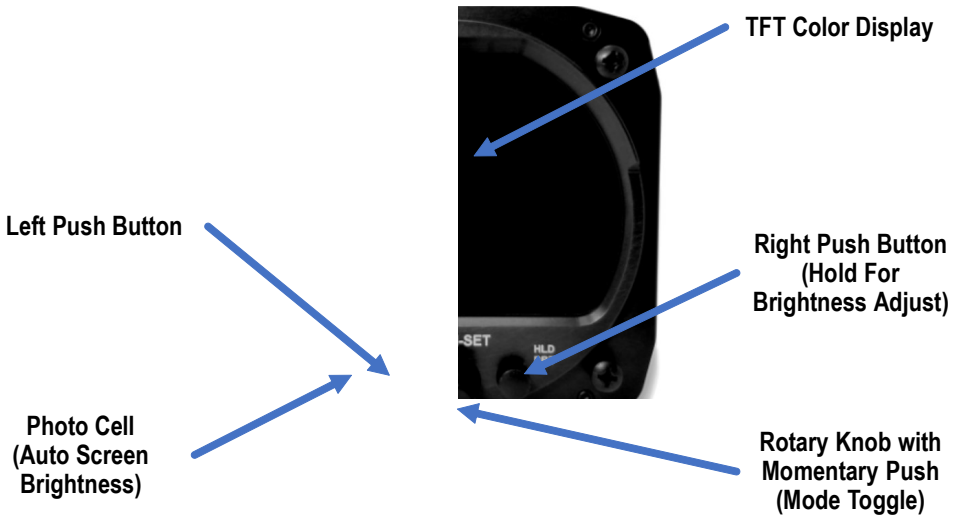

Figure 5 - Common User Interface Components

When installed as a non-required instrument (not replacing the existing approved AI or DG), the functional mode of the unit can be toggled between AI and DG by pressing and holding the rotary knob for 3 seconds.

6.2 AI Mode Display Components

The following section describes the user interface operations when operating as an AI.

6.2.1 AI Mode – Basic Components

The following figure shows the basic AI with all customizable data overlay fields turned off.

The data shown cannot be disabled or customized:

Figure 6 – Basic AI Mode User Interface

The following figure shows an example of the pilot customizable data overlays (both textual and graphical), located in the non-utilized areas of the display area.

Figure 7 – Data Overlay Examples

There are three independently customizable pages which are selected round-robin fashion by sequentially pressing the Page Selection button (shown as page 1 of 3 in the figures above).

A fourth, fully decluttered page allows all supplemental information to be hidden, leaving just attitude and slip displayed.

6.2.2 AI Mode – Attitude / Slip

The basic display of attitude and slip consists of a traditional attitude indicator display and slip-ball as follows:

Figure 8 - AI Mode, Attitude Indicator

On initial startup the red ALIGN flag will flash, indicating that the attitude is still stabilizing.

The aircraft should be held as motionless as possible during the aligning process.

When the ALIGN flag is displayed, the presented attitude may be incorrect.

6.2.3 AI Mode – Airspeed Indicator

Indicated airspeed can be configured for display on the left side of the screen. The configured units (KTS or MPH) is displayed below the speed value.

Figure 9 – AI Mode, IAS Indicator

The inner arc is a color-coded v-Speed band that rotates to show the configured v-Speed limits against the non-moving white tic-mark. The lower arc portion below Vs1 provides a red colored slow-speed band that is only triggered to display once the aircraft flies faster than Vs1 (for a given flight).

The color of the indicated airspeed numerals will turn yellow when operating in the yellow speed arc, red when operating in a red speed arc, but are otherwise white.

Figure 10 – V-Speed Limits

On initial startup, the airspeed field will be dashed while sensor stabilization occurs.

Airspeed display units and v-Speed limits are configured during installation and are not pilot accessible.

6.2.4 AI Mode – Flight Direction Indicator

The upper portion of the AI can be configured to display direction of flight in the form of either non-slaved DG (non-slaved heading) or GPS track.

Both modes support a magenta heading bug and the GPS track mode supports a green bearing-to indicator. The heading bug is not interfaced to the autopilot and is for reference only.

If no GPS is detected, an amber “NO GPS” will be displayed in lieu of the track.

If either the heading bug or the bearing to bug are off the left or right sides of the screen, a colored arrow will show the shortest-turn direction to the corresponding bug.

Figure 11 - AI Mode, Direction Indication, Bearing To Off-Screen

6.2.5 AI Mode – Baro Corrected Altitude Indicator

Baro corrected altitude can be configured for display on the right side of the screen and shows the baro altitude in feet. When this field is configured for altitude display, the lower right field will be locked to the baro setting and cannot be modified to display a different parameter.

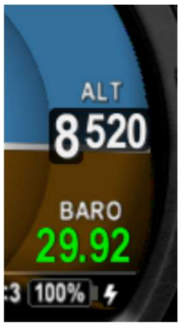

Figure 12 - AI Mode, Altitude Indicator

The baro setting is adjusted utilizing the rotary knob. See *Section 7.1- Push-Set Window* for addition details.

Baro setting in InHg or MB units can be configured during installation but is not a pilot accessible setting.

On initial startup, the field will be dashed while sensor stabilization occurs.

On unit power-down, the current field elevation and barometric pressure are stored in internal non-volatile memory. On the next power-up, this field elevation is utilized to reverse compute and estimated baro setting, potentially reducing the required adjustment amount required by the pilot. During this reverse computation process, the baro value will be shown in light grey.

6.2.6 AI Mode – AoA Indication

Derived Angle of Attack can be configured for display in the inner left area of the screen and consists of a series of colored stacked bars that indicates the current AoA relative to the configured minimum and maximum limits.

The lowest green bar corresponds to a current AoA matching the configured lower limit point. The first red bar corresponds to a current AoA matching the configured upper limit.

AoA limit points are pilot selectable and are set in the pilot accessible Setup Menu.

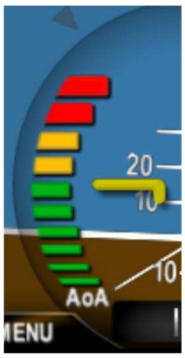

Figure 13 - AI Mode, AoA Indication

AoA is determined by the difference between the aircrafts pitch angle and the path through the air. See *Section 11 - AoA Operation and Configuration* for additional details on the AoA operation and setup.

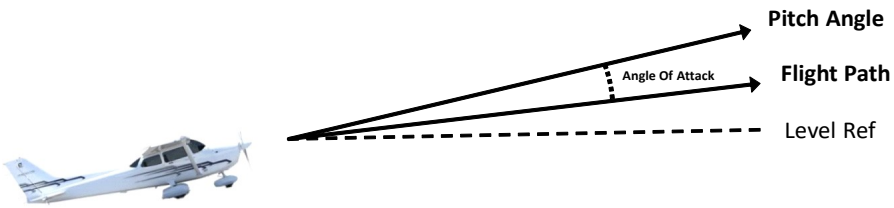

Figure 14 – AoA Computation

6.2.7 AI Mode – Vertical Trend Indicator

Vertical trend can be configured for display in the inner right area of the screen and consists of a white tick mark on a background scale. The upper and lower limits of the scale correspond to + / - 1000 feet per minute. This display augments the existing vertical speed in the aircraft but does not replaces its functionality.

Figure 15 - AI Mode, Vertical Trend Indication

6.2.8 AI Mode – G-Load Indicator

The current G-Load can be configured for display on the inner right or left area of the screen and consists of a ball marker on a background scale. The upper and lower limits of the scale correspond to the upper and lower G limits set in the pilot accessible Setup Menu.

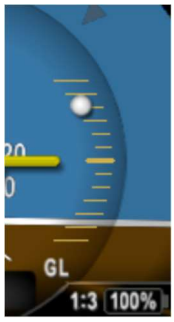

Figure 16 - AI Mode, G-Load Indication

The center most tic mark represents 1.0 G. Values above the center mark represent positive G, while those below represent less than 1.0 G levels. The scale markers will change color based on the G limits. See *Section 9 - Alerts and Alert Limits* for additional G limit alerting details.

6.2.9 AI Mode – Text Fields

The four corners of the display screen can be configured to show various textual parameters.

Figure 17 - AI Mode, Text Fields

If a given parameter is invalid or currently unavailable, it will be presented as a dashed field.

See *Section 7.4* AI / DG Displayable Parameters for which parameters can be configured for display in these fields.

6.3 DG Mode Display Components

The following section describes the user interface operations when operating as a DG.

6.3.1 DG Mode – Non-Slaved Heading Mode

The following figure shows the non-slaved DG heading mode (DG HDG). Six textual fields are available for customization:

Figure 18 – Basic DG Mode User Interface

6.3.2 DG Mode – GPS HSI Mode

The display type can also be configured to show GPS nav data when connected to an external GPS navigator and presented in the traditional HSI format:

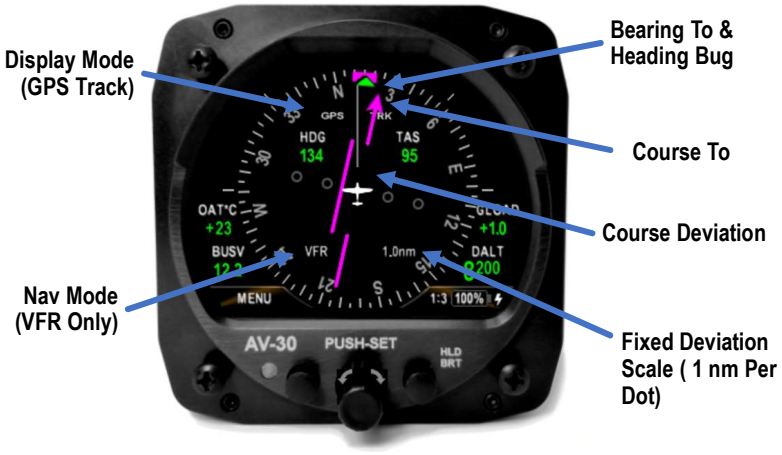

Figure 19 – GPS HSI Mode

6.3.3 DG Mode – GPS ARC Mode

The display type can also be configured to show GPS track in an ARC mode, showing a map style presentation of the current waypoint and current navigational leg.

Figure 20 – GPS ARC Mode

The entire programmed flight plan is not displayed, only the current nav leg and current waypoint.

The display scale is adjusted by rotating the rotary knob and represents the display distance from the own-ship icon to the outer compass ring. The following scales may be selected for display:

Selectable Display Scales:

1, 2, 5, 10, 20, 50 and 100 nm

All GPS deviation data is limited to VFR operations only, as indicated by the Nav Mode indication (“VFR”).

6.3.4 DG Mode – Operational Aspects

The following applies to operation in DG mode:

- As with the AI mode, three customizable pages can be setup by the pilot. Each page can be configured to show any of the above three display modes.
- Non-Slaved Heading mode requires the pilot to set the initial heading and occasionally correct the heading based on the wet compass. The system will initialize to the last set heading on shutdown.
- GPS HSI and ARC modes are for VFR operations only. No vertical deviations are shown, and lateral deviations are not scaled for approach / IFR operations.
- Air data / temperature related parameters (TAS, DALT, OAT) are only available if the DG has been connected to an OAT probe, otherwise they will not be selectable for display.
- The currently displayed GPS track may optionally be gyroscopically stabilized, allow smoother operation when in turns. This option is configured in the pilot accessible Setup Menu (GPS Track Stabilization).

6.4 Reversionary Fourth-Page Attitude / Slip

The fourth page of both the AI and DG operating modes consists of a reversionary style display of just attitude and slip. This page / mode cannot be customized by the pilot.

Figure 21 – AI/DG Fourth Page - Reversionary AI

7 Common UI Operations

7.1 Push-Set Window

The Push-Set window is activated by pushing the main rotary knob in momentarily.

This will activate a window along the bottom of the display to allow various parameters to be adjusted with the rotary knob. Pushing the rotary knob after a value has been adjusted will accept the modified value.

The parameters that can be adjusted will vary, based on the mode of the unit and the current configuration of the display. The following indicates how baro is adjusted when altitude has been configured for display:

Figure 22 - Push-Set Example - Baro

Rotating the knob when this is displayed will change the baro setting. If however, the display is configured NOT to show altitude, the baro setting will not be presented as an option to adjust.

Push-Set Value	When Presented
Baro Setting	When altitude is configured for display
Direction Indication	When non-slaved heading is configured for display
Heading Bug	When non-slaved heading or GPS track is configured for display
Set Altitude	When set altitude is configured for display

Table 1 – Context Sensitive Push-Set Values

7.2 Brightness Menu

The Brightness Menu is activated by pressing and holding the lower right button

Figure 23 - Brightness Menu

The left button toggles between AUTO BRT (Automatic brightness mode), and MANUAL BRT (Manual brightness mode).

When in manual brightness mode, the display brightness can be adjusted from 1 to 100 utilizing the rotary knob. When in automatic brightness mode, the display brightness is set automatically based on the bezel-mounted photocell.

Pressing the DONE button will exit the Brightness Menu.

7.3 User Interface Customization

7.3.1 Customizable Data Overlay Fields

The following shows the locations of the inner and outer customizable fields when operating in the AI mode.

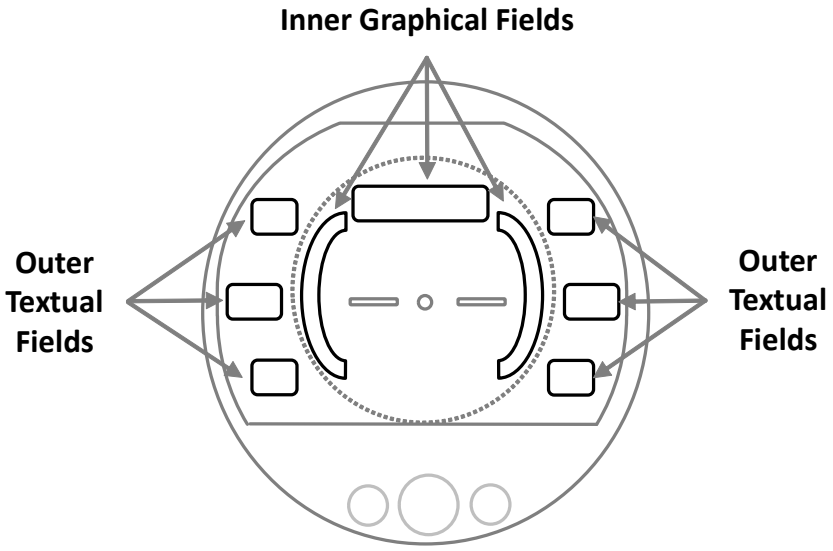

Figure 24 - Customizable Field Locations (AI Mode)

There are three independent pages that can be configured as desired. The fourth page is not configurable.

In general, is it suggested that the display be customized prior to flight, and that each page be setup for the different basic modes of flight operations (Departure, Enroute, Terminal) prior to actual flight operations.

7.3.2 Activating Customize Menu

Pressing the lower left MENU button will bring up the first menu, which is the user interface customization menu. In this mode, the cursor can be moved to each customizable area by rotating the rotary knob.

Figure 25 – UI Customization, Menu Entry

The currently selected field will be indicated by a darkened block with a cyan bracket. Rotating the knob left and right will change the currently selected field. To edit the overlay value presented in the currently highlighted field, push the rotary knob.

Figure 26 – UI Customization - Field Selection

7.3.3 Edit Presented Data

The following shows the display when the edit mode is active. Rotating the knob left and right will then select from the various overlay values that can be presented in the selected field.

When the desired data type is presented, pressing the knob in will accept the current value, and the edit mode will remain active.

Pressing the DONE shown in the lower left button will accept the current value and exit the UI customization mode.

Figure 27 - Display Edit Value

Note that not all data values can be presented in each editable field area. For example, airspeed will only be displayed on the left main area and altitude will only be displayed on the right side. Additionally, when operating in the DG mode, the available data displayed is different than when operating in the AI mode.

7.3.4 DG Mode Customization

The DG customization mode is similar to the AI customization and the same method is utilized to enter and exit the customization mode.

Editing the upper most field will change the overall direction indication between basic ROSE presentation, GPS HSI presentation, and the GPS arc presentation.

The individual textual fields may also be selected and customized.

All three pages of the DG can be customized in a similar manner.

Figure 28 - DG Mode UI Customization

7.4 AI / DG Displayable Parameters

The following table shows which data fields can be presented when operating in the AI and DG modes.

The presentation type of graphical indicates that the data is presented in a graphical format (dial, tape, bug, etc.), while a presentation type of text indicates that a textual presentation is available.

The OAT field indicates that an OAT probe must be installed for this parameter to be selectable.

The GPS field indicates that a connection to an external GPS navigator is required for the parameter to be selectable.

Data Type	Presentation	AI Mode	DG Mode	OAT	GPS
Blank Overlay Field	N/A	✓	✓		
Attitude	Graphical	✓	✓		
Non-Slaved Heading	Graphical	✓	✓		
Bus Voltage	Textual	✓	✓		
G Load Value	Textual	✓	✓		
G Load Indicator	Graphical	✓	×		
Indicated Airspeed	Textual	✓	×		
Baro Corrected Altitude	Textual	✓	×		
Angle Of Attack	Graphical	✓	×		
Vertical Trend Indicator	Graphical	✓	×		
Vertical Speed Value	Textual	✓	×		
Set Altitude	Textual	✓	×		
Outside Air Temp	Textual	✓	×	✓	
True Airspeed	Textual	✓	×	✓	
Density Altitude	Textual	✓	×	✓	
Direction Tape	Graphical	✓	×		

Direction Rose	Graphical	×	✓		
Direction Arc	Graphical	×	✓		✓
Direction HSI	Graphical	×	✓		✓
GPS Navigator Data	Textual	✓	✓		✓
GPS HSI Indicator	Graphical	×	✓		✓
GPS Navigator Route	Graphical	×	✓		✓
Heading Bug	Graphical	✓	✓		

Figure 29 - Data Overlay Types vs Operational Mode

8 User Interface and Font Style Options

Three different cosmetic styles and two different fonts are selectable by the pilot. The three UI styles are LEGACY, EFIS and VINTAGE. The two font selections are ARIEL and LCD.

These settings only effect the displayed colors and font style – all functional operations are identical regardless of the style settings.

Figure 30 - UI Style Options

9 Alerts and Alert Limits

Three alert types are supported: Excessive Bank Angle Alerts, Excessive G-Load Limit Alerts and Excessive AoA Limit Alerts. The following shows an example how the visual alerts are displayed.

Figure 31 – Alert Example

The priority and warning / alert levels, from the lowest priority to the highest priority are as follows (Roll Left and Roll Right alerts are exclusive of each other, and therefore have the same priority level:

Type	Priority	Percent	Aural	Visual
Roll Left	7	100%	“Roll”	Amber “ROLL”
Roll Right	7	100%	“Roll”	Amber “ROLL”
AoA	6	80%	One Tone	Amber “ANGLE”
AoA	5	90%	Two Tones	Amber “ANGLE”
AoA	4	100%	“Check Angle”	Red “ANGLE”
G-Load	3	80%	One Tone	Amber “G-LOAD”
G-Load	2	90%	Two Tones	Amber “G-LOAD”
G-Load	1	100%	“G Limit”	Red “G-LOAD”

Table 2 - Alert Types and Priorities

The thresholds for each alert are pilot adjustable, and each alert type can be independently enabled or disabled.

Pressing the rotary knob when an alert is active will cancel the alert.

10 Internal Battery Operation

10.1 General

The internal battery consists of a rechargeable LiPo battery system with automatic recharge, self-test and power switching capability. The internal battery capacity will provide approximately 2 hours of operation at standard temperatures and 30 minutes (minimum) of operational capacity over the operational temperature range.

10.2 Battery Transition Logic

The battery is tested, enabled and disabled based on airspeed and aircraft bus voltage as follows:

10.2.1 Power-On Self-Test (Pre-Flight)

On powerup, the battery charge status will show TEST in amber. During this process, an internal load is being applied to the battery to determine general capacity capability. If the battery fails this self-test, the charge status field with show FAIL in red and no battery capability will be available.

Figure 32 - Battery Fail Indication

If the battery status shows FAIL, departure into actual or planned IFR conditions must not be performed.

10.2.2 Power Loss, Airspeed Above 40 kts (In-Flight)

When in flight and the bus voltage drops below 7 VDC, the unit will automatically transition to internal battery operation; no pilot action is required for continued operation.

The ON BATTERY annunciation will be displayed:

Figure 33 - On Battery Operation

If bus voltage returns, the unit will automatically transition back to aircraft bus power; no pilot action is required. The ON BATTERY annunciation will extinguish.

10.2.3 Power Loss, Airspeed Below 40 kts (On-Ground)

When on ground and the bus voltage drops below 7 VDC, the unit will initiate a shut-down sequence. This is the normal “on-ground” shutdown method. Pilot may abort the shutdown with any knob or button push.

If bus voltage returns, the shutdown sequence will automatically be aborted and the unit will return to normal operating mode.

10.3 Battery Charge Status

The battery charge state is shown in percentage. An internal battery charger will re-charge the battery if bus voltage is above approximately 10 VDC. The battery charge icon (presented adjacent to the battery charge state), will be illuminated during the charge cycle.

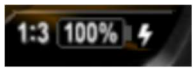

Figure 34 - Battery Charge Status

It is normal for the battery charge icon to intermittently flash during battery charge cycle.

11 AoA Operation and Configuration

The following provides a description of how the derived Angle of Attack (AoA) operates and presents the corresponding AoA information to the pilot.

One of the main advantages of an AoA system is that it can provide an early indication of a stall, bringing enhanced awareness to the pilot.

However, the AV-30-C system is supplemental in nature and does not replace the functionality provided by the aircraft's existing stall warning system.

11.1 Operational Methodology

Angle of attack is determined by comparing aircraft pitch to the aircraft flight path angle through the air. This directly corresponds to the angle at which the wing is intercepting the oncoming air.

Pitch is determined by the precision internal AHRS and flight path angle is determined by air-data based airspeed versus vertical speed measurements.

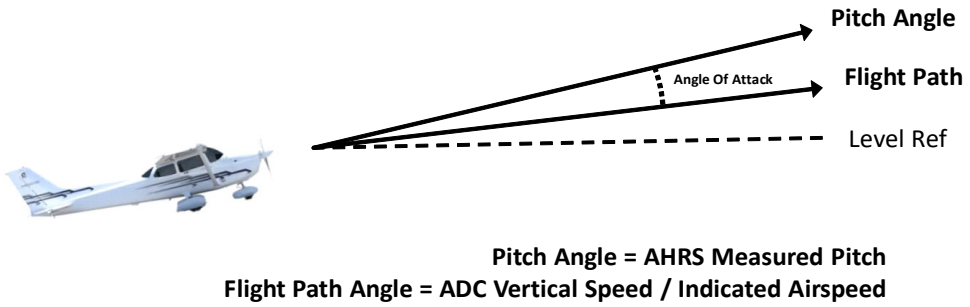

Figure 35 – AoA Computation

As an example of this relationship, during a climb, if the pitch angle is 10 degrees up, and the aircrafts flight path through the air (forward airspeed and vertical speed) is also 10 degrees up, the equivalent AoA is 0 Degrees. If, however, the pitch angle is 10 degrees up, and the aircrafts flight path through the air is only 5 degrees, this corresponds to a positive 5 degree AoA.

A second example is where the pitch is 0 degrees, but the aircraft is actually ascending - the AoA is then equivalent to the ascent angle, which will be a negative AoA. This may occur during a significant up-draft conditions.

11.2 Configured Limits

As each aircraft make and model has different flight characteristics and post-production modifications such as altered wing tips, performance kits and other related modifications may change the flight dynamics of the aircraft, each aircraft has unique configuration limits that must be set for proper AoA operation.

An upper and lower configuration limit is pilot adjustable and provides the scaling mechanism for individual aircraft flight characteristics as it relates to the corresponding AoA display.

The setting of these configuration limits is implemented with a pilot-lockout feature that prevents inadvertent modification.

The upper near-stall configuration limit is set when the aircraft is in the “base-to-final” configuration with flaps and gear set to their normal positions for this maneuver. This provides the best protection when the aircraft is low-and-slow, and the pilot may inadvertently stall based on over-corrections.

- The upper limit is configured to coincide with the on-set of the aircraft’s existing stall warning system and is typically on the order of 10 to 15 degrees. This visually correlates to the first red bar on the AoA display with the second (upper most) red bar providing indication for operation between the aircrafts stall warning and actual stall point.

- A lower limit is configured to coincide with the aircraft’s V_A (Gross weight adjusted maneuvering speed) and is set to visually correlate with the lowest one or two green bars on the AoA display.

The figure below shows how the configured upper and lower limits are mapped onto the color coded AoA indication. The number of, and color of the bars on the AoA indicator are fixed.

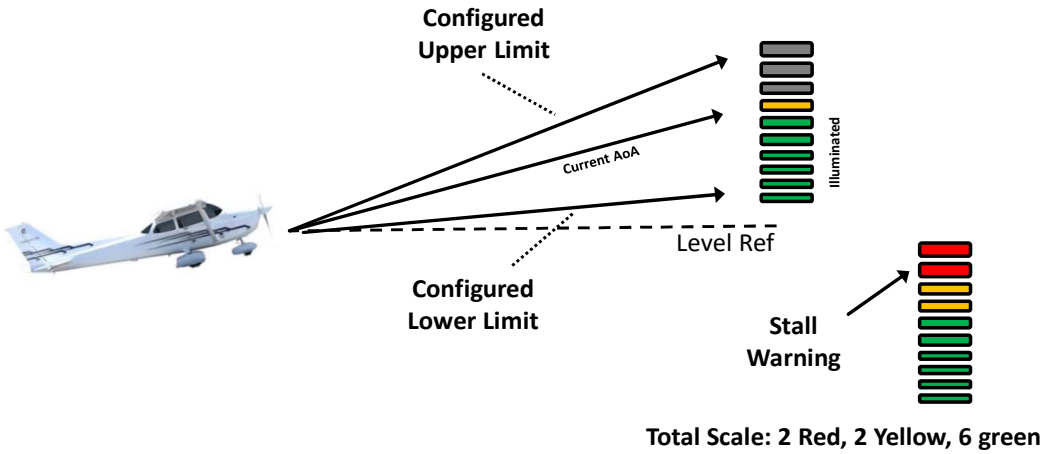

Figure 36 – AoA Upper and Lower Limits

11.3 Stable Flight Conditions

Stable flight conditions should be present when determining the upper and lower AoA limits. The in-flight procedures described should be executed when there is minimal turbulence, minimal crosswinds, and the pilot should operate the aircraft as closely as possible to the following:

Stable power setting

± 5° Heading

± 5 Knots Airspeed

± 50 Feet Altitude

± 50 Ft/Min Vertical Speed

Any offsets beyond the parameters above may directly correlate with AoA errors.

11.4 Setting AoA Upper Limit

The objective is to set the upper AoA limit such that the first red bar illuminates at roughly the same time as the on-set of the aircraft's stall warning system.

To find the upper limit, the following procedure is recommended:

- Ensure the AV-30-C is in INSTALLATION MODE (see Section 12.1).

- Select a safe altitude suitable for stalls, minimum 1,500 feet AGL.

- Aircraft Configuration:
  - Airspeed V_{FE} or less
  - Flaps 20°
  - Power as required
  - Sable flight conditions

- Slowly reduce speed at a rate of 1 knot per second and maintain a constant altitude.

- Monitor the displayed AoA as the aircrafts angle of attack increases.

- If the aircrafts stall-warning occurs prior to the indicator reaching the first red bar, the upper AoA limit needs to be numerically lowered to coincide with the aircrafts stall-warning point.

- If the aircrafts stall-warning occurs after the indicator has reached the first red bar, the upper AoA limit needs to be numerically raised to coincide with the aircrafts stall-warning point.

- Utilize the Setup Menu section and associated procedure in this manual to adjust the upper limit as required.

- Repeat the above procedure as needed and to ensure consistency.

11.5 Setting AoA Lower Limit

The objective is to set the lower AoA limit such that the first green bar illuminates at roughly V_A (Gross weight adjusted maneuvering speed).

To find the lower limit, the following procedure is recommended:

- Ensure the AV-30-C is in INSTALLATION MODE (see Section 12.1).

- Select a safe altitude suitable for stalls, minimum 1,500 feet AGL.

- Aircraft Configuration:
  - Airspeed V_A
  - Flaps 0°
  - Power as required
  - Sable flight conditions

- Monitor the displayed AoA.

- If no green bars are showing, the lower AoA limit needs to be numerically increased. If more than one green bar is showing, the AoA lower limit needs to be numerically decreased. A fluctuating green bar indicates that the lower AoA limit is acceptable.

- Utilize the Setup Menu section and associated procedure in this manual to adjust the upper limit as required.

- Repeat the above procedure as needed and to ensure consistency.

11.6 AoA Alert Types and Thresholds

AoA alerts consist of both aural and visual alerts may be enabled or disabled. Three alert levels are provided and are triggered on how close the current AoA is to the configured upper limit (as a percentage) as follows:

Level	Percent	Aural	Visual
Alert 1	80%	One Tone	Amber “ANGLE”
Alert 2	90%	Double Tone	Amber “ANGLE”
Alert 3	100%	“Check Angle”	Red “ANGLE”

Table 3 - AoA Alert Limits

When an alert is being generated, pressing any button will mute the aural alert. AoA alerts can also be completely disabled under the pilot preference settings.

11.7 Flap Setting Observations

The pilot should document the actual indications provided for the various phases of flight in relation to speed and flap settings.

In the following table, highlight the AoA presentation for the indicated combination of speeds and flap settings:

	Flaps 0°	Flaps 10°	Flaps 20°	Flaps Full
Stall Warning Activation				
1.1 V_S				
1.2 V_S				
1.3 V_S				
V_X				
V_Y				
V_A				
Cruise @ 75% Power				

Table 4 - AoA Observations

12 Setup Menu

The Setup Menu allows customization of settings that are pilot-accessible. Non-pilot related settings are summarized here to provide awareness to the pilot on the various parameters that can additionally be adjusted.

To access the Setup Menu, press the Menu button twice until the SETUP is shown in the lower window:

Figure 37 - Setup Menu Access

Rotating the knob left and right will access the various parameters that may be configured. Pressing the knob when the desired field is shown will allow the associated setting to be adjusted.

After adjustment, pressing the knob again will disable the editing mode.

Pressing DONE will exit the Setup Menu.

12.1 Pilot-Accessible Setup Menu

The following options are available to the pilot for customization of the unit:

Setting	Description	Options / Setting Range
UI Style	Sets Visual Style	LEGACY, EFIS, VINTAGE
UI Font	Sets Font Style	ARIAL, LCD
Audio Volume	Audio Volume for Alerts	1 to 10
AoA Alert Enable	Enable AoA Alerts	ENABLE, DISABLE
AoA High Limit	Upper AoA Limit	-28 to +30 (See Note Below)
AoA Low Limit	Lower AoA Limit	-30 to +28 (See Note Below)
G Alert Enable	Enable G Load Alert	ENABLE, DISABLE
G Positive Limit	Positive G Limit	+8
G Negative Limit	Negative G Limit	-8
Roll Alert Enable	Enable Roll Alert	ENABLE, DISABLE
Roll Alert Thresholds	Roll Alert Threshold	30 to 80
GPS Track Stabilization	Inertial Track Smoothing	ENABLE, DISABLE

Table 5 – Setup Menu - Pilot Adjustable Settings

NOTE: The AoA settings are locked out during normal operation to prevent inadvertent modification.

To access these settings, activate the INSTALLATION MODE by pressing the rotary knob in while initial power is being applied to the unit.

These settings are then available to be modified until the unit's power is cycled.

Also note that in this mode, an additional INSTALL mode menu is available. The pilot should not make any changes to the settings in this menu.

12.2 Non-Pilot Accessible Install Menu

Non-Pilot Accessible settings and options range from air data and attitude trimming, display units and interface options. Contact an authorized facility to access and modify any of these settings.

13 Operating Limits & System Specifications

13.1 Operating Limits

Operating Limits	
Startup Time	< 3 Minutes
Attitude Rate Limit	±250 Degrees / Second
Attitude Operational Range	360° Roll, 180° Pitch
Attitude Accuracy	1° Static, 2.5° Dynamic
Airspeed Operational Range	40 to 300 Knots
Altitude Operational Range	-1,000 to +25,000 Feet
AoA Operational Range	-30° to +30°
AoA Resolution	1°
AoA Valid Speed Range	+35 to +300 Knots
AoA Accuracy	2.5°
DALT Operational Range	-1,000 to +25,000 Feet
DALT Accuracy	± 500ft
TAS Operational Range	+35 to +300 Knots
TAS Accuracy	± 20 kts
G-Load Operational Range	± 8 g
OAT Operational Range	-40°C to +70°C
OAT Accuracy	±4°C
Bus Voltage Range	7 to 35 Volts
Bus Voltage Accuracy	±1.0 Volt

Table 6 - Operating Limits