



## 06 What is the "Angle" with AOA Indicators?

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I got this information off a GREAT post from the Cessna Flyers Facebook PAGE on Angle of Attack Indicators. Not only is there a description of several products, but there is also a discussion on Angle of Attack (AOA). Having flown military aircraft with AOA Indicators, I can definitely attest to the practicality of the instrument in ANY aircraft. I have added additional images and an embedded video of the AOA indicator discussion on the new "Icon A5" aircraft. ~ Sam



A rundown of three products on the market today.

The FAA encourages GA aircraft owners to install and use angle of attack (AOA) instruments. FAA Administrator Michael Huerta discussed the FAA's recommendation for the installation, training and use of angle of attack systems at AirVenture in 2014; detailed information appeared in an InFO ("Information for Operators") briefing on July 25 of this year. (See Resources for the link to view InFO 14010 through our website. —Ed.) Although adding even the easiest-to-install electronic system in your aircraft can feel like a lot of work, the procedure for the installation paperwork for an AOA could not be simpler. All that is needed is your

A&P's logbook notation after installation. Naval aviators have an excellent safety record for high performance fighter carrier landings. AOA heads-up displays contribute to that high level of safety. Of course we don't fly under those conditions—but knowing where your aircraft's stall margin is when you're making the turn to final and during stabilized approaches can keep you out of inadvertent high-risk situations and lead to more consistent landings.

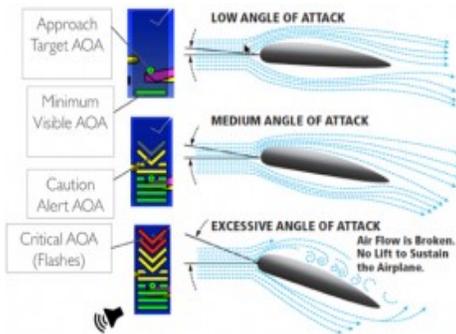
Do you know the difference in stall speed for your aircraft at:

- Gross weight condition and flap up?
- Landing weight with minimum fuel and full flaps?

For example, a Cessna T210 has a 19-knot stall speed differential in these two configurations. Using a one-size-fits-all approach speed will typically have you landing too fast and using more runway than necessary.

There are several companies that manufacture and market AOA instruments. The three vendors I'll discuss in this article all offer AOA devices with these four components/features:

- External AOA measuring device
- Transducer to convert pressures to signal for display
- Cockpit display
- Audio response to key critical angles of attack



### ALPHA SYSTEMS

Alpha Systems has been marketing its AOA devices for over 10 years. Alpha Systems AOA's give owners the widest number of options in the industry. Displays are available for heads-up mounts on top of the glareshield and instrument panel. A second display connects to the same transducer.

Where do you look when flying a final approach? You look outside the aircraft for three things: traffic, the surrounding terrain and the runway ahead of you. This is the reason I strongly recommend having the primary display on the glareshield and not in the instrument panel. Of the seven products in Alpha Systems' lineup, its Falcon heads-up displays offer the best sensitivity to AOA changes with 19 individual elements.

Glareshield sunlight has long been a challenge for heads-up display contrast. Alpha Systems' latest-generation displays overcome this problem; Alpha currently is the industry standard for brightness contrast and pitch angle sensitivity. Audio response is standard on all models. Hardware cost for a complete system, including one display, is \$1,995. Adding a second display costs \$600, and heated probes are available for an additional \$200.

### BENDIX KING

Bendix King's Model KLR 10 Lift Reserve Indicator has a heads-up LED display with audio response and is a unique design. For \$1,600 the kit includes a glareshield display, transducer and under-the-wing-mounted pressure differential sensor. A heated probe is optional. The KLR 10 display is just two inches in size and weighs two pounds. This reserve indicator operates independently from pilot-static systems, so it can be used when the existing air data system is compromised (due to ice, water or contaminants).

<http://www.maine-flying.com/angle-aoa-indicators/>

## GARMIN

Garmin's glareshield-mounted AOA display with audio response is available as a non-heated probe system for \$1,499 or with a heated probe for \$1,649. The probe looks like a conventional pitot airspeed probe that contains three inputs; the direct impact area is divided into two sections that sense the impact air at different angles, thus creating a differential pressure that changes with the wing's angle of attack. The probe also contains a static port. That reading, combined with the differential pressure measurements, creates an angle of attack reading through Garmin's air data computer. Garmin claims that this "normalized differential pressure" measurement provides a more accurate indication of AOA.



AOA Indicator in the new Icon A5

## Resources

[Alpha Systems AOA](#)

[AlphaSystemsAOA.com](http://AlphaSystemsAOA.com)

Bendix King KLR 10

Reserve Indicator

[bendixking.com](http://bendixking.com) (search for "KLR 10" )

Garmin GI 260 AOA System

[Garmin.com](http://Garmin.com) (search for "AOA")

## Further reading

InFO 14010

Memo published by FAA

on July 25, 2014

[CessnaFlyer.org/InFO14010](http://CessnaFlyer.org/InFO14010)