PILOT PRODUCTS

Better safety, softer landings

KLR 10 AOA review

BY DAVE HIRSCHMAN

FINAL APPROACH SPEEDS in most GA aircraft are a guessing game. The recommended speed is found in the pilot's operating handbook, but that's calculated at full gross weight. Then there's the time-honored practice of noting the power-off, flaps-down stall speed (found at the bottom of the white arc on the airspeed indicator) and multiplying it by 1.3 to get a ballpark approach figure. And if the wind is gusty, add half the gust factor. As a result, our target speeds vary and tend to be based more on habit and intuition than hard numbers.

Bendix King's new KLR 10 Lift Reserve Indicator avoids the guesswork and helps pilots fly more precise approaches, accounting for variables such as payload and density altitude. Consistently better, and shorter, landings are among the benefits.

We recently installed the KLR 10 system in Editor in Chief Tom Haines' Bonanza A36, an aircraft the staff uses for photography and company travel, and the KLR 10 light bar on the glareshield has quickly become indispensable. Up- and down-arrows are quick and easy to interpret, and the AOA indicator's prominent placement means pilots don't have to divide their attention between the airspeed indicator and the outside world.

During a series of flights in which the A36's center of gravity ranged from full forward to nearly full aft, and loads varied from a single pilot and less than half fuel to four adults and full fuel, the AOA indicator provided a steady and accurate guide during approaches and landings. While flying the optimum AOA, the target final approach speed ranged from 81 mph when the airplane was light to 87 when fully loaded. Transitions during roundout and flare, however, felt nearly identical.

In the five years I've flown this particular A36, I've tended to approach too fast with the resulting few extra seconds floating in ground effect (and longer-than-necessary ground roll) as the obvious consequence. My rationalization was that slightly too fast is better than too slow, and since most GA airports have runways long enough to land an A36 two or three times—using that extra real estate hardly seemed like a tragedy.

But the KLR 10 will simplify future trips to short runways, and it allows pilots to keep their eyes outside throughout each approach and landing. As my confidence in the AOA indicator grew, the airspeed indicator became increasingly irrelevant. (The airspeed indicator lets you know when it's safe to lower the gear and flaps.)

The technology's real promise is reducing in-flight loss-of-control accidents in which airplanes inadvertently stall and spin. These often fatal accidents happen in airport traffic patterns when pilots get distracted and allow their airplanes to get too slow, turn too steeply, fly uncoordinated, or take other actions that raise the angle of attack to the "critical angle" at which the wing aerodynamically stalls.

The FAA's Small Airplane Directorate has taken the forward-looking step of allowing aircraft owners and pilots to install a new generation of relatively low-cost, non-TSO angle of attack indicators with minimal paperwork. (The KLR 10 has a retail price of $1,600.)

It's the avionics equivalent to adding seatbelt shoulder harnesses: It can't hurt, and may help a lot.

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INSTALLING THE KLR 10

The KLR 10 comes with all the required hardware, manuals, and even a small screwdriver to complete the installation and calibration. The probe is built to fit in an aluminum inspection hole cover. It's exceptionally well manufactured, and completely independent from the aircraft pitot-static system.

Fitting the probe to an inspection plate in the Bonanza's left wing, routing the associated plumbing into the fuselage, connecting the "interface module" under the left seat, and installing the AOA indicator took most of one day. Then it was time to calibrate the unit.

The calibration is a three-step process that requires smooth air—and that was in short supply this winter and spring on the East Coast. Our first few in-flight calibration attempts were unsuccessful and required altering the fixed angle of the probe. That meant filing out a groove in the inspection plate cover and repeating the process. The probe angle was reduced from 50 degrees to 45 and finally 40 before the calibration took hold. Once completed, it never has to be reset.

Also, for IFR airplanes, a heated AOA probe is highly desirable, since the tiny holes that sense differential pressure are susceptible to even trace amounts of airframe ice.

Flying with the AOA system brings home lessons that all pilots learn academically but don't always understand intuitively: namely, that an airplane can stall at any airspeed and any attitude. In a steep turn, for example, AOA increases and can easily reach the critical angle at airspeeds far in excess of the power-off stall speed. Also, it's possible to exceed the critical angle of attack even when pointed straight down, for example, on the back side of a loop. (Note to Tom: *This is a purely theoretical discussion and I have not been looping your Bonanza!*)

The AOA education and constant awareness that the KLR 10 and other indicators provide may ultimately be their most enduring safety legacy.—*DMH*

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