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An InFO contains valuable information for operators that should help them meet certain administrative, regulatory, or operational requirements with relatively low urgency or impact on safety.

Subject: Installation, Training, and Use of Non-required/Supplemental Angle-of-Attack (AOA) Based Systems for General Aviation (GA) Airplanes

Purpose: This InFO explains the Federal Aviation Administration's (FAA) initiative promoting the voluntary installation and use of AOA-based systems in GA airplanes.

Background: The FAA is promoting the use of AOA-based systems to reduce GA accidents caused by loss-of-control (LOC). The General Aviation Joint Steering Committee (GAJSC), including its Safety Assessment Team (SAT), is a joint government and aviation industry group, established with the goal of improving GA safety. The GAJSC/SAT accomplishes this by providing a mechanism for government/industry cooperation, communication, and coordination concerning GA safety issues. In April 2011, the GAJSC chartered the SAT to conduct a review of fatal GA airplane accidents from 2001 through 2010. The SAT reviewed 2,472 fatal GA accidents and identified inflight LOC accidents as the most prevalent cause, with 1,259 fatalities attributed.¹ Currently, GA accidents continue to be responsible for more than 440 fatalities each year in the United States. LOC, mainly stalls, accounted for approximately 40 percent of fatal GA accidents.² Based on this data, the GAJSC/SAT formed a work group to research, analyze, and develop solutions for GA LOC accidents. The work group used a data-driven approach to identify risks and trends through root cause analysis, and concluded that the use of AOA-based systems by the GA community is an effective method for reducing LOC accidents in the approach and landing phase of flight.

Discussion: Through the analysis described above, the FAA and its industry partners are striving to reduce LOC accidents through initiatives that include the installation of AOA-based systems in GA airplanes. AOA-based displays provide a pilot with a visual indication that can assist in preventing LOC during critical phases of flight. The use of an AOA-based system in an airplane keeps the pilot informed of the AOA. The objective of AOA-based displays is to provide input to the pilot as a crosscheck to standard required instrumentation. AOA indication may improve pilot situational awareness to avoid exceeding the critical AOA³ and thus reduce the risk of an inadvertent stall. The FAA believes that the

¹ Findings based on the Common Taxonomy Team categories recognized by the Commercial Aviation Safety Team and International Civil Aviation Organization

² See FAA Fact Sheet—General Aviation Safety—online January 27, 2014:
https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=13672

³ The critical AOA is the angle of attack at which a wing stalls regardless of airspeed, flight attitude, or weight; a stall is a rapid decrease in lift caused by the separation of airflow from the wing's surface, brought on by exceeding the critical AOA.

GA community can reduce LOC accidents through widespread acceptance, training, and appropriate use of AOA-based systems.

There are additional potential benefits from the use of an AOA-based system. Embry-Riddle Aeronautical University installed AOA-based systems in its training airplanes. Initial research conducted by the university found that using AOA-based systems during training improved student awareness of airplane performance.⁴ This was especially true at slower airspeeds, such as during the approach and landing phases of flight. AOA-based systems can also aid in obtaining better cruise efficiency by enabling the pilot to configure the aircraft for minimum drag.

Original equipment manufacturers are producing low-cost AOA-based systems that are available for simple installation in GA airplanes. The FAA supports the retrofit of existing GA airplanes and encourages manufacturers of GA airplanes to incorporate AOA-based systems into both existing production airplanes and new designs as standard equipment. To meet this goal, the FAA has issued a new policy memo streamlining the design and production approval process of non-required/supplemental AOA-based systems for GA airplanes.⁵ Note that under this policy, an AOA-based system is for reference only, used to supplement a GA airplane's existing stall warning system, and cannot be used as a primary flight instrument. The policy meets the need for design and production approval; the installer remains responsible for the installation approval, which, in many cases, may be accomplished as a minor alteration.

Finally, as part of GAJSC initiatives, the FAA and industry will develop additional educational resources and guidance regarding the safety benefits and usage of AOA-based systems.

Recommended Action: Aircraft maintenance providers, GA pilots, GA airplane owners/operators, flight instructors, flight schools/institutions of higher aeronautical education, training centers, and other stakeholders should implement the following recommendations identified below for their respective roles:

1. The GA community should install and use AOA-based systems to reduce the risk of an inadvertent stall that may result in a LOC accident;
2. Flight instructors and GA pilots should review operational material provided by AOA-based system manufacturers regarding the use of the specific system installed in the make and model airplane flown;
3. Aircraft maintenance providers and aircraft owners/operators should review the FAA policy MEMO regarding "Approval of Non-required AOA-based Systems," dated February 5, 2014;
4. Flight schools, institutions of higher education, and other training providers should develop and integrate material into ground training, flight training, and academic education programs to train pilots on the appropriate use of AOA-based systems.

Contact: Questions or comments regarding this InFO should be directed to Allan Kash, General Aviation & Commercial Division, AFS-800, at (202) 385-9600 or allan.g.kash@faa.gov.

⁴ See Embry-Riddle News Center: <http://news.erau.edu/top-news/embry-riddle-installs-angle-of-attack-indicators-in-entire-cessna-training-fleet-to-enhance-quality-of-flight-education.html>

⁵ See policy number AIR100-14-110-PM01(final) dated February 5, 2014 and associated FAA MEMO: http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgPolicy.nsf/0/EB0FAC0C1641509586257C76005E6274?OpenDocument