National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: July 12, 2012

In reply refer to: A-12-40 through -43

Mr. Rod Hightower, President and CEO
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The National Transportation Safety Board (NTSB) is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. In addition to investigating accidents, the NTSB also conducts safety studies and evaluates the effectiveness of other government agencies' programs for preventing transportation accidents. We are providing the following information to urge your organization to take action on the safety recommendations in this letter. The NTSB is vitally interested in these recommendations because they are designed to prevent accidents and save lives.

These recommendations address the flight testing of new experimental amateur-built (E-AB) aircraft and the training of the builders and test pilots of these aircraft, as well as of pilots who buy an E-AB as a used aircraft. The recommendations are derived from the NTSB's safety study, *The Safety of Experimental Amateur-Built Aircraft* (E-AB study), which was adopted by the Board on May 22, 2012.[1] As a result of this study, the NTSB has issued 16 safety recommendations, 4 of which are addressed to the Experimental Aircraft Association (EAA). Information supporting these recommendations is discussed below. The NTSB would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendations.

Flight Test Training

The high proportion of E-AB aircraft accidents occurring early in the operational life of the aircraft, particularly during the first flight, provides evidence for the potential for safety improvements during Phase I flight testing. An area identified for improvement includes

[1] For more information, see *The Safety of Experimental Amateur-Built Aircraft*, Safety Study NTSB/SS-12/01 (Washington, D.C.: National Transportation Safety Board, 2012) on the NTSB website at http://www.ntsb.gov.

making sure that pilots are adequately prepared and capable of conducting flight test operations. Thirty-four of the E-AB aircraft accidents investigated during 2011 involved aircraft being operated in Phase I, ostensibly undergoing flight testing. Eight of these accidents occurred on the first test flight. Unfortunately, no information is available from these accidents regarding the flight test plan that was presumably being followed. The NTSB has concluded that the E-AB aircraft safety record could be improved by providing pilots with additional training and guidance to safely perform Phase I test pilot functions such as that provided in the EAA Sport Aviation Workshop titled *Test Flying and Developing Pilot Operating Handbook*. This course trains the builder/pilot to safely explore the aircraft's flight envelope, gather and interpret flight test data, and develop the aircraft flight manual. The NTSB recommends that the EAA identify and apply incentives to encourage owners, builders, and pilots of E-AB aircraft to complete flight test training, such as that available in the Experimental Aircraft Association's *Test Flying and Developing Pilot Operating Handbook*, prior to conducting flight tests of experimental amateur-built aircraft.

Data Recording

FAA Advisory Circular (AC) 90-89A, *Amateur-Built Aircraft and Ultralight Flight Testing Handbook*, describes, in general terms, the tests to be performed to explore the aircraft's flight envelope but does not prescribe specific parameters to be measured or data to be collected. Since FAA AC 90-89A was published on May 24, 1995, a number of technological improvements to such data collection have been introduced. Citing these data recording capabilities in its 2010 safety study of the introduction of glass cockpit avionics into light aircraft,[2] the NTSB concluded, "Some glass cockpit displays include recording capabilities that have significantly benefited accident investigations and that provide the general aviation community with the ability to improve equipment reliability and the safety and efficiency of aircraft operations through data analyses."

Similarly, a number of manufacturers make electronic flight information systems and primary flight displays that provide capable and sophisticated electronic recording of aerodynamic and engine parameters that can greatly facilitate the collection of data needed to carefully map the E-AB aircraft's flight envelope and performance characteristics. Glass cockpit avionics were reported by 16 percent of EAA survey respondents who had bought used aircraft, 35 percent of respondents who had finished their E-AB aircraft, and 58 percent of respondents who were in the process of building their aircraft. Among the 2011 accident aircraft, 34 percent of the built-by-owner aircraft were equipped with glass cockpit instruments compared with 14 percent of the bought-used accident aircraft. The NTSB has concluded that data obtained from glass cockpit avionics, electronic flight instruments, or other recording devices can significantly enhance the efficient accomplishment of E-AB flight test objectives, as well as the monitoring of parameters important to the continuing airworthiness of the E-AB aircraft. The NTSB recommends that the EAA work with its membership, aircraft kit manufacturers, and avionics manufacturers to develop standards for the recording of data in electronic flight displays, engine instruments, or other recording devices to be used in support of flight tests or continued airworthiness of E-AB aircraft.

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[2] National Transportation Safety Board. 2010. *Introduction of Glass Cockpit Avionics into Light Aircraft.* Safety Study NTSB/SS-10/01. Washington, DC. Available: http://www.ntsb.gov/doclib/safetystudies/SS1001.pdf.

Listing of LODA Holders

The E-AB study found that the largest proportion of fatal E-AB aircraft accidents involve loss of aircraft control in flight. The study identified several opportunities to reduce loss of control accidents by improving pilots' access to training prior to flying an E-AB aircraft, and ensuring that pilots have the performance information necessary to safely operate their E-AB aircraft. Analysis of responses to the EAA survey of E-AB aircraft owners and builders indicates that 1,499 (58 percent) of the 2,583 respondents who built their E-AB aircraft and who answered the question reported some type of transition training prior to their first flight. In contrast, NTSB investigators found evidence of a transition training requirement—typically from an aircraft insurance company—for only 19 of the 227 pilots of E-AB accident aircraft investigated in 2011.

One of the factors affecting the availability of such training is access to a qualified instructor and an E-AB aircraft in which the training can be conducted. An instructor who wishes to conduct flight training in his/her E-AB must obtain a Letter of Deviation Authority (LODA) from the FAA, per 14 CFR 91.319(h). Based on discussions with members of the EAA Builder's Council, E-AB aircraft builders, kit manufacturers, and type club representatives, the NTSB has concluded that the guidance currently available to qualified E-AB aircraft owner/instructors to obtain a LODA to conduct flight training is deficient and variable from one FAA region to another. The NTSB has made a recommendation to the FAA to clarify and make uniform the procedures for qualified instructors who own E-ABs to apply for and secure a LODA. The NTSB recommends that the EAA create and publish a repository of voluntarily provided information regarding holders of LODAs to conduct flight instruction in experimental aircraft.

Transition Training

In the summer of 2011, representatives of the EAA, pilot groups, and owner type clubs announced the intention to form a coalition to improve safety. One of the planned efforts is to specifically seek out pilots transitioning to new aircraft to notify them of model-specific safety information and how to obtain transition training. In March 2011, the FAA also published AC 90-109, *Airmen Transition to Experimental or Unfamiliar Airplanes,* to be used as a guide for pilots flying an aircraft for the first time, with an emphasis on amateur-built experimental aircraft. The NTSB recommends to the EAA and the FAA that they complete planned action to create a coalition of kit manufacturers, type clubs, and pilot and owner groups and (1) develop transition training resources and (2) identify and apply incentives to encourage both builders of experimental amateur-built aircraft and purchasers of used experimental amateur-built aircraft to complete the training that is developed.

Therefore, based upon the findings and conclusions in the E-AB study, the National Transportation Safety Board makes the following safety recommendations to the Experimental Aircraft Association:

> Identify and apply incentives to encourage owners, builders, and pilots of experimental amateur-built aircraft to complete flight test training, such as that available in the Experimental Aircraft Association's *Test Flying and Developing Pilot Operating Handbook*, prior to conducting flight tests of experimental amateur-built aircraft. (A-12-40)
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> Work with your membership, aircraft kit manufacturers, and avionics manufacturers to develop standards for the recording of data in electronic flight displays, engine instruments, or other recording devices to be used in support of flight tests or continued airworthiness of experimental amateur-built aircraft. (A-12-41)
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> Create and publish a repository of voluntarily provided information regarding holders of Letters of Deviation Authority to conduct flight instruction in experimental aircraft. (A-12-42)
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> Complete planned action to create a coalition of kit manufacturers, type clubs, and pilot and owner groups and (1) develop transition training resources and (2) identify and apply incentives to encourage both builders of experimental amateur-built aircraft and purchasers of used experimental amateur-built aircraft to complete the training that is developed. (A-12-43)

The NTSB also issued 12 safety recommendations to the Federal Aviation Administration. In response to the recommendations in this letter, please refer to Safety Recommendations A-12-40 through -43. We encourage you to submit updates electronically at the following e-mail address: correspondence@ntsb.gov. If your response includes attachments that exceed 5 megabytes, please e-mail us at the same address for instructions. To avoid confusion, please do not submit both an electronic copy and a hard copy of the same response.

Chairman HERSMAN, Vice Chairman HART, and Members SUMWALT, ROSEKIND, and WEENER concurred in these recommendations.

[Original Signed]

By: Deborah A.P. Hersman
Chairman