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Fear the Unknown

How a Well-Planned Test Flight Can Prevent Any Unwanted Surprises

It's been a labor of love for 10 years; one that has pretty much taken over your garage (and maybe most of your basement) with a growing assortment of tools, hardware, and empty coffee cups as far as the eye can see. As you put the finishing touches on your new experimental amateur-built (E-AB) aircraft, you envision the tremendous joy you'll get from flying this bird, a product of your own blood, sweat, and, well, after seeing how empty your wallet has become, there's bound to have been a few tears!

But before you and your new flying machine take to the skies, there are still a few important questions to consider. How do you know your aircraft is in a condition for safe flight? Will it operate safely within its operational envelope? Will it have any quirky characteristics or design limitations? To find out, you'll need to develop a detailed flight test plan.

Thankfully the FAA has produced an excellent document that can help you develop such a flight test plan, taking into account everything from selecting the right airport and runway to an exhaustive list of first flight and emergency procedures. It is Advisory Circular (AC) 90-89, *Amateur-Built Aircraft and Ultralight Flight Testing Handbook*, and it can be accessed by clicking the Advisory Circular link under the Regulations and Guidelines tab on www.faa.gov.

In addition to providing recommendations and suggestions to assist in developing an individualized aircraft flight test plan, this AC also stresses the critical nature of test flying to amateur-built/ultralight aircraft pilots. According to the AC, "the flight test plan is the heart of all professional flight testing." It also states that "the plan should account for every hour spent in the flight test phase and should be adhered to with the same respect for the unknown that all successful test pilots share."

While you might be chomping at the bit to get your new baby airborne, it's important to heed the advice this AC offers in terms of flight test preparation. In addition to discovering any unwanted characteristics (e.g., perhaps you rigged the aileron cables too tightly), a thorough flight test plan will also help point out performance limitations you may not be used to with your previous aircraft type. For example, those transitioning to an ultralight will notice a big difference in how power settings can affect airspeed. In a light-weight aircraft, it is possible to go from cruise speed to a stall in less than 4 seconds. This is due to the low mass, high drag configuration, and smaller speed range characteristic of the majority of ultralights.

Another question to consider before you make that first flight in an E-AB airplane is how much time and experience you have in this type of aircraft. According to a 2011 National Transportation Safety Board (NTSB) study, 10 of 102 E-AB aircraft accidents involving aircraft built by their owner crashed on their first flight that year. Those buying used aircraft didn't fare much better: 14 of 125 EAB accidents in used aircraft involved first flight crashes as well. These numbers clearly underscore the need for better transition training methods, especially if you're unfamiliar with the aircraft's systems and operations.

So, before you formulate your flight test game plan with AC 90-89, be sure to also review AC 90-109, *Airmen Transition to Experimental or Unfamiliar Airplanes*, to help you develop the skills and knowledge you'll need *before* you participate in a flight test program. Incidentally, the AC is also useful when planning a transition to any unfamiliar fixed-wing airplanes, including type-certificated airplanes. Also noteworthy is the fact that this AC was developed in a true collaborative fashion under the direction of the General Aviation Joint Steering Committee, a joint panel of FAA and aviation industry experts.

"The keys to safely and successfully flying your aircraft for the first time are a detailed flight test plan, knowing what to expect in flight, and having a great support team of advisors on the ground," says Aviation Safety Inspector Mark Giron with the FAA's General Aviation and Commercial Division. "Practicing the information in these ACs goes a long way in mitigating risks associated with your first flight in any aircraft."

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