



BARRY BALLENGER

# If Clyde and Walter Had Only Known

## How STCs Are Handling the Growing Changes in Aviation Design

Photo courtesy of Cirrus Aircraft

**An STC will allow you to install a Ballistic Recovery System on select aircraft**

**D**on't know who Clyde and Walter are? We are speaking about Clyde Cessna and Walter Beech — two of the giants in general aviation history of course! And my, how these two gentlemen would marvel at how their creations are used today.

As general aviation began to mature to more than just recreational flying out of farm fields and grass strips, the industry began to take notice of how much the airplane could be used as a business and commercial tool. The airplane began to be seen as a legitimate solution to many business and commercial problems and so it began to morph from the standard cookie-cutter designs of the late 1950s and 1960s into a platform which could be modified to meet certain specialized tasks. These tasks included pipeline patrol, small cargo and passenger duty, fire control, and many others. Industry began to change the configuration of the standard design to meet specific job requirements and needs of the missions being conducted.

It was then the FAA recognized that the growing need for altering type designs would only accelerate. Many design changes were documented and approved under the field approval process, but as complexity and the effects of airplane operational

performance measures grew larger, the process outgrew the field approval process. The field approval process was designed to make changes to one specific airplane with less formal documentation requirements. Today, most changes require a supplemental type certificate (STC).

The STC process approves major changes to the product's type design and requires more specific engineering documentation. It also may be effective for more than just one airplane. One unique aspect of the STC is that the STC design approval holder may sell the STC to others for installation on their airplanes if they qualify per the affectivity of the STC. The use of the STC process continues to grow in numbers and is becoming big business.

### So How Do I Build a Better Plane?

What happens when you want to obtain an STC for a major change in type design to an airplane? The best place to start is the FAA's Advisory Circular 21-40A, *Guide for Obtaining a Supplemental Type Certificate*, found here: <http://1.usa.gov/1hl343B>.

The following discussion on the phases of an STC is for illustrative purposes; each project will take on its own flow and the steps may be not be exactly

the same each time, but typically the accomplishments will be very similar.

### **Phase I: Design and Requirements Definition**

Some of the early steps include the applicant preparing the application and Certification Plan, as required by the FAA, and meeting with the Aircraft Certification Office (ACO). For first time applicants, it is recommended to set up a familiarization meeting with the ACO to discuss the proposed project and for the applicant to understand what the ACO is expecting from them. This allows the ACO the opportunity to determine what FAA resources may be required and to assist the applicant in understanding the STC process.

The FAA, in turn, will formally establish the project, review, and approve the Certification Plan.

One key component that must be considered by the applicant is compatibility of the proposed STC with the product on which it is being installed. As well, the installer of the STC on a specific airplane is responsible to perform a compatibility evaluation for that specific installation as stated in the limitations section of the STC. To read more about the risks of STC “layering” — that is, applying modifications to an aircraft that has already been previously modified, check out the article on page 12 of this edition of *FAA Safety Briefing*.

### **Phase II: Compliance Planning**

This phase consists of determining how to perform the inspection and testing of the various components of the proposed design. Meetings between the ACO and the applicant will center on the certification plan and how it will be followed. Changes to the plan may be required to satisfy necessary requirements and to address issues discovered during this phase. The intent of the certification plan is to reach the point where if the plan is successfully executed, its results would show full compliance to all applicable rules.

At this point it is a good idea for the applicant to seek the help of a designated engineering representative (DER). DERs are fully qualified technical experts that are appointed to act on the behalf of the FAA and authorized to approve or recommend approval of technical data. Using designees allows the applicant to have more control over the schedule of the project.

The certification team should agree on the certification plan before commencing with conformity requests, approving test plans, witnessing or observing certification tests, or performing any other certification activities.



Photo by H. Dean Chamberlain

### **Phase III: Implementation**

During this phase, work begins on the technical aspects of the proposed project. The applicant begins the process of showing compliance to the regulations through various types of tests, analyses, and evaluations for both ground and flight operations as needed. It is imperative the applicant’s data shows compliance to all the necessary regulations applicable to the specific aircraft project.

After all of the FAA compliance inspections and testing, the applicant submits the final data to the ACO project manager for final review and approval. If the ACO determines that the data demonstrates compliance with all applicable regulations, the final approval is granted to the applicant who now becomes the STC design approval holder.

### **Phase IV: Post Certification Activities**

Once the STC is active in the field, post certification activities include monitoring continued operational safety by the STC holder. The STC holder is the entity primarily responsible for ensuring the STC remains safe in service. Also, the STC holder is responsible for any changes to the Instructions for Continued Airworthiness (ICA) or Aircraft Flight Manual Supplement (AFMS), if issues are discovered post certification.

As aviation continues to emerge as a dynamic business and commercial tool, the airplane itself will have to meet even more diverse expectations of what exactly is its primary purpose. As the need grows for more special-equipped airplanes to meet the demand, the STC will become more the “standard” than not. Changes to your aircraft can be a good thing, but with every modification we make we must make sure it is well researched, well documented, properly installed, and safe for flight. ✈️

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