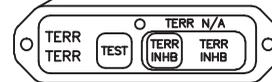
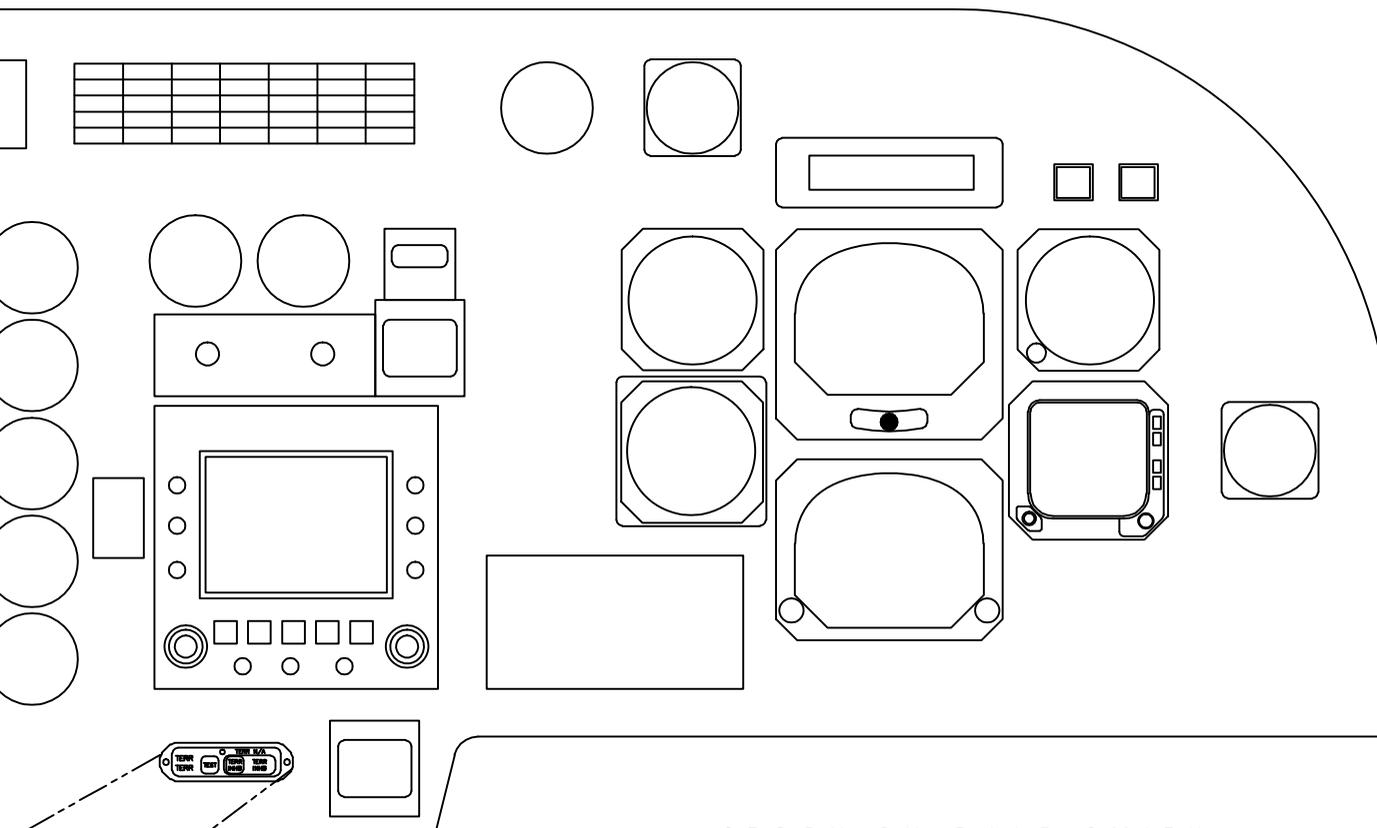


The **ABC**s of
Working
with **DER**s



“Simply put, a DER approves data. It seems simple, but a lot of people get that point confused.”

ROBERT BELGAU,
owner of *DER Services Inc.*



STORY BY DALE SMITH

According to the Federal Aviation Administration, a designated engineering representative is, “an individual appointed in accordance with 14 CFR §183.29 who holds an engineering degree or equivalent, possesses technical knowledge and experience, and meets the qualification requirements of Order 8100.8.”

In English now: What does a DER do?

“Simply put, a DER approves data. It seems simple, but a lot of people get that point confused,” said Robert Belgau, owner of DER Services Inc. “They think we can approve the installation on the airplane, but actually the only thing we can approve is the alteration or repair data within our particular disciplines. In my discipline, which is structures, I can approve structural modifications and repair drawings for an aircraft.

“The usual workflow is, an avionics shop will call me because they are putting in some sort of system — say a Garmin GPS or XM satellite radio

— and they need to puncture through the pressure vessel to put this antenna on,” he said. “What they are looking for is the structural approval to mount this antenna or to put the pass-throughs in the pressure bulkhead or out of the aircraft.”

Belgau said an avionics shop or an engineering company would generate a set of drawings, which he, as an engineering DER, would approve through an 8110-3, “Finding of Compliance.”

“Now, they have approved data, and they can take that to the floor and give it to their technician and he can perform the work per this approved data. Then, the appropriate airworthiness inspector can come and approve the work,” Belgau said. “That’s how all the DER stuff comes together.”

Bill Shields, managing member of 3S Certification, said there are two actions from an engineering perspective that happen when doing

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a modification to an airplane: the “showing of compliance” and the “finding of compliance.”

According to the FAA, showing compliance is the responsibility of the applicant/avionics shop, and it is where a DER can be of great help. For example, if you are adding a piece of electronics into an existing avionics suite, as the “applicant,” you have to show the new unit will not negatively impact an airplane’s electrical system.

“The applicant’s engineering effort would be to write an analysis showing that conclusion,” Shields said. “This analysis is written to prove it is acceptable — that is, the showing of compliance to a particular rule.

“The finding of compliance happens either by the FAA — a field inspector who will sign a 337 form — or a DER can sign an 8110-3. Any of those are considered as the finding of compliance,” he said. “The showing of compliance is the responsibility of the applicant, and the finding of compliance is the responsibility of the FAA or its designee — the DER. Most people don’t fully understand that language.”

Another thing many shops new to the installation and program game are not familiar with is that there are different DERs for different types of projects.

“A mechanical systems guy can only do mechanical stuff, and an electrical DER can only do electrical stuff,” Belgau said. “There are a lot of different disciplines today. The shop needs to find the ones that fill their particular needs.”

If you’re really not familiar with all the different DER areas of expertise or don’t really know which one you might need, a great first step is to contact a management DER and ask

them to help you put a plan together.

“My specialty is electrical systems, but I’m also a management DER,” Shields said. “The FAA has delegated specific program management functions to me at the project level.”

FAA Spoken Here

“Our real deal is certification,” Belgau said. “How do you take this system and get it certified on the airplane? If this is new territory for an avionics shop, I would say — and they’re probably going to freak out to hear it — but the best first step for them is to talk to their local FSDO representative. They should be able to take a look at what the shop is doing and be able to say they need to get a DER for whatever it is.”

Shields said it can be very confusing to figure all of this out today.

“Everyone overuses the term ‘field approvals;’ they use it for everything. It can be fairly complicated knowing which approvals you need and the best way to get them” he said. According to Shields, the only indication of a field approval is an FAA inspector’s signature in Block 3 of the 337 form.

“However, most of the day-to-day avionics modifications completed today can be done using a DER’s approved data. That alleviates the need for an FAA signature in Block 3,” Shields said.

“Unless (the shop has) some experience in getting DER approvals, especially if the project is large enough to require an STC, they need someone who speaks the language,” he said. “If you don’t, the process can take forever. You need to know what to submit and when, and what the FAA is going to require. If you’re doing it without some experienced help, it’s like putting one of those big corner desks together without the instructions.”

Shields said there is an FAA website that offers good guidance about what projects require what type of approvals. Visit <http://fsims.faa.gov/PICResults.aspx?mode=EBookContents>, then click “Volume 4, Chapter 9, Section 1, Figure 4–68, Major Alterations Job Aid.”

“The chart lists typical modifications and what the approval method is,” Shields said. “If it says, ‘STC,’ then you need an STC. If it says ‘ENG’ (engineering) or ‘EVL’ (evaluation), it doesn’t necessarily mean you don’t need an STC; it just means you need to evaluate the project and figure it out. That’s where a management DER would come in — to help you sort out and plan your project.

“It covers Part 23, Part 25 aircraft and rotorcraft,” he said. “It’s an excellent

source of information. It grew out of the documents the FAA inspector was supposed to use if a shop called him for guidance on a modification project.”

Choosing Your DER

It’s pretty clear in today’s world, if you want to be able to do any aircraft installations or alterations, especially on Part 25 aircraft, you need to have a good stable of DERs to call.

So, how do you choose the right DERs for your projects?

“The first thing I’d recommend is to call around to other shops and see who they are using,” said Brian Wilson, director of avionics sales for Banyan Air Service. “Ask for referrals. Once you get a few, set up a face-to-face meeting — it’s like a short job interview. The

DER is going to perform some very important work for you.

“You are trusting this DER to work with you and bring you approved data in a timely fashion. You need to know the DER will be responsive to your needs. That’s critical today,” he said. “Ask him if they do a lot of remote trips. DERs work on projects all over the world; they can be gone for a month at a time. If the airplane is ready to leave and he’s over in China on a project, you’re not going to have a very happy customer. Remember, the customer signed the contract with you and he doesn’t care about other issues you may have. If the airplane is not ready on time, it’s your problem.”

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Wilson said one thing to get cleared up right away is the DER's pricing structure. Remember, DERs are not FAA employees. They are independent contractors and, as such, are free to charge whatever they feel is fair for their services. In today's economy, prices can vary significantly, which means you might end up working with a DER on the other side of the country.

"At times, we use a structural DER who is located in California," said Wilson, who is in Fort Lauderdale, Fla. "Now, with the detail provided by digital pictures and the other technologies available, they don't have to be standing there looking at the airplane for everything.

"We use this particular DER because, quite frankly, it came down to responsiveness and pricing," he said. "These guys don't do anything for free. We shopped around and found this DER had very reasonable pricing for his work and he's been very responsive."

The bottom line is, working with a DER is just like working with any other contractor — make your choice wisely and it will bring you great benefits in the long run.

The Care and Feeding of DERs

Speaking of working with a DER, there are some key points to remember to make the relationship and subsequent projects work out better for everyone.

"Shops don't understand that their very best bet is to develop a great working relationship with their FSDO representative," Belgau said.

"They can get a lot of guidance out of those guys, and it can save a shop a lot of time and effort. The FSDO guys know which DERs to

call in when you need them," he said.

Belgau said to get your DER involved before you quote a first-time job to a customer. "Aviation safety should be everybody's top priority, and sometimes, it can get pretty expensive showing compliance to the applicable regulations."

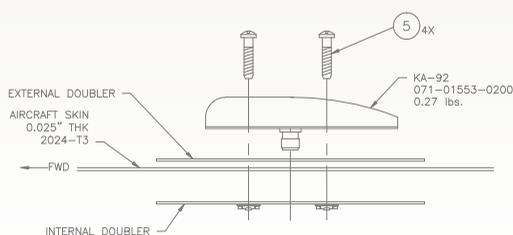
According to Belgau, the current requirements for the installation of a simple antenna weighing less than four pounds on a Part 25 airplane includes damage tolerance and fatigue (14 CFR, 25.571), pressurization compartment loads (14 CFR, 25.365), vibration (14 CFR, 25.251), aeroelastic stability (14 CFR, 25.629), noise (14 CFR 36) and performance (14 CFR, Part 25, Subpart B).

"DERs from several technical disciplines may be needed to make all the necessary compliance findings for the required items," Belgau said. "I highly recommend contacting everyone involved for a solid quote prior to giving the job quote to your customer."

Shields said his best piece of advice for shops is to communicate clear and communicate often.

"I'm a firm believer that the engineer and the DER never really know the absolute best way to do any particular project at the aircraft level. Every situation is different," he said. "The best way is to do very detailed drawings and give the shop's lead technician time to review and change them if necessary.

"There are some really, really smart guys who put on a uniform every morning and work on the airplane. It's imperative to get the input from the shop's lead technician or engineer early on in the process. Reworks can be very expensive and, most often, can be avoided with communication."



Shields said a typical and easy-to-avoid situation is one in which the design engineer calls for a particular splice, pin or terminal junction that the shop doesn't have the correct crimping tool to complete. But they do have another tool and are very familiar with another process that would be acceptable.

If the engineer knows about this upfront, he can do the drawings to reflect this requirement, and it will ultimately save a lot of time and money for the shop.

Another thing to have early on is all the approved data, including the structural repair manual for the aircraft on which the team will be working — and it's often harder to get than you might think.

"Say we're going to install an antenna on a Lear 60 — we're going to need the SRM. We need to identify this piece of metal that we're going to be drilling a hole into," Belgau said. "We need the aircraft data to determine the thickness of the skin. What is it made of? We need the antenna data to calculate the aerodynamic loads.

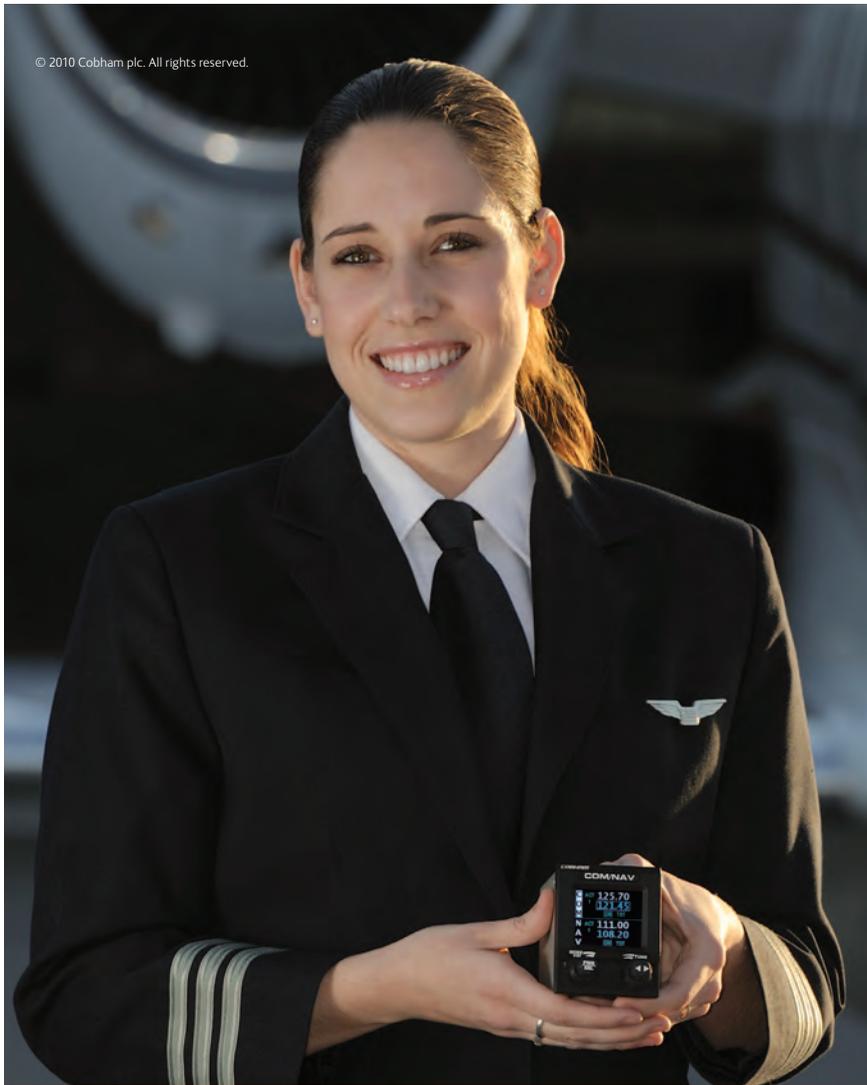
"Believe it or not, getting that information is challenging in its own right," he said.

"It used to be easy to get from the OEMs, but now it's all 'proprietary information' and nearly impossible to get these days. That can cause great headaches."

Before starting any project, make sure you have all your ducks in a row: SRMs, wiring diagrams, electrical load analysis, etc.

"The key point for any shop to remember is to put your plan together early," Shields said.

"Figure out what rules and guidance you are going to use, what your process is going to be and whom you will be working with. After that, it's pretty easy." □



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