

Planning for Panel Upgrades

By Randy Lervold

It seems like every aviation magazine you pick these days up has news of some new electronic widget with stunning new capabilities heretofore only available for jet class aircraft for hundreds of thousands of dollars, and all for some new shockingly low price. I think it's fair to say that there's a revolution going on with EFIS systems alone, and in this day and age an electronic engine monitor with CHT and EGT for each cylinder is considered standard.

If you have a certified aircraft you can largely just watch and salivate as upgrading your panel is an expensive proposition. First off the products must be TSO'd and then you'll likely require an STC to install them, or worse yet a 337 field approval. Then there's installation, you'll need to pay a shop hundreds (thousands?) of dollars to install everything. Fortunately though, most of us fly experimental aircraft where we can put in anything our hearts desire, ha!, no STCs and no paying some FBO mechanic too much money for installation. Aren't you glad you went with an experimental?

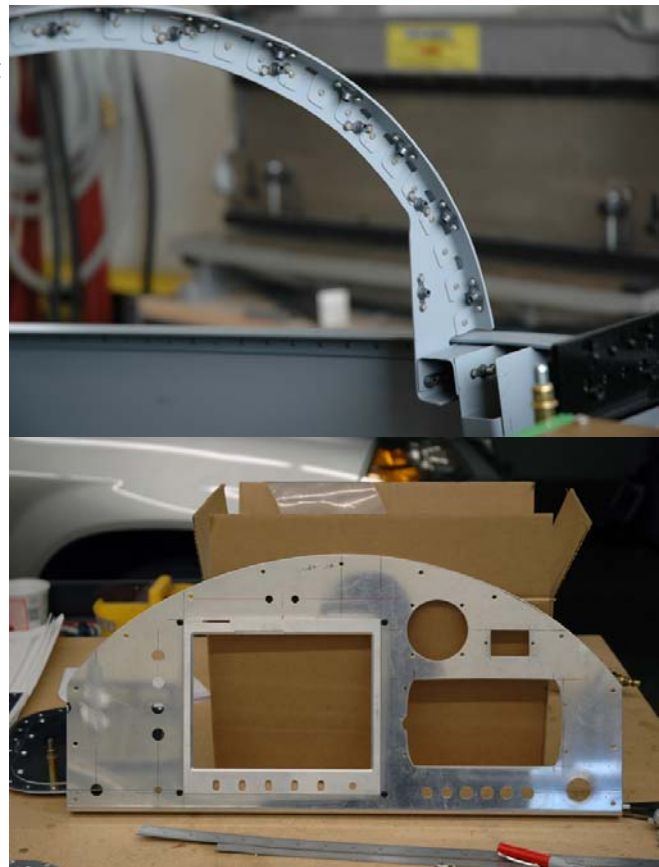
Given the steady stream of new electronics with increasing capabilities that we have access to I submit that it would be wise for builders of experimental aircraft to actually *plan* for panel upgrades, that they are *inevitable*. In this day and age of rapidly changing electronics why not give yourself access to all this neat stuff? Yes, retrofitting anything can be a hassle, but with a different mindset and some planning up front you can make it much easier. Let's discuss four key strategies you can employ when building your plane to facilitate easier upgrades in the future...

#1 Make your panel removable

Early RV models such as the RV-3 and RV-4 were designed with the panel as a structural part of the fuselage structure and replacing it is difficult. It's not much extra work to fabricate separate mounts, or sacrifice a panel blank to use as a mount with platenuts for the actual panel. Whatever you do though, *make the panel easily removable*.

#2 Have an extra panel blank in advance

Almost regardless of what aircraft you are building, but especially if it's an RV, the panel starts life as a "blank" of aluminum or fiberglass. When you make your initial original panel (or your first upgrade panel), make an extra panel blank, or maybe two just in case. This means getting the perimeter outline correct and the mounting holes matched while you are making the first one and have all dimensions handy. Of course you'll just leave the area where the instruments go blank for that cool new \$1,000 all-in-one-EFIS that doesn't yet exist. Panel blanks for most RVs are around \$25, a cheap way to give yourself a head start on that next panel version. Then on those dark winter nights you have that blank to start laying out your new design on it at home.



#3 Wiring penetrations

Electronics use *wires* to talk to each other and make things work. If you are upgrading an existing panel you will have already designed in your wire paths and fit grommets or snap bushings in all the bulkhead or skin penetrations. Here's the tip... make all penetrations for wiring a bit *larger* than you currently need, that way you can accommodate additional wires in the future without completely unwiring existing runs. In some locations it simply might not be possible to enlarge existing penetrations later once the aircraft is completed and closed up. If you plan ahead you'll have room to just slide the new wires in alongside existing wires.



#4 Fusing

Traditionally aviation panels have used “acres of breakers” to fuse electronic appliances. Personally, I think this looks cool, very aviationlike. But it does have a down side in that each instrument is then hard wired. If you change an instrument then it throws the breaker scheme off – what if your new EFIS box replaces three or four formerly separate instruments? Instead, the use of automotive style blade fuse blocks has emerged as the technique of choice. You power each block with a fused supply such as an avionics master, then each appliance can be changed and fused with whatever value fuse is appropriate. It's also cheaper, faster to build, and lighter.



Lastly, regarding wiring your bird, observe all proper wiring techniques and keep best practices in mind...

- Use single point ground wiring architecture
- Use only aircraft grade tefzel wire exclusively
- Use only PIDG double insulated crimp connectors
- Wires routed and retained consistent with AC 43.13

Now, which of the trick new goodies will you build into your next panel?

...Randy