MARCH 2012

The TWIN CESSNA Flyer

FEATURING:

COST EFFECTIVE 310G PANEL UPGRADE

ENGINE OUT TRAINING IN A 421

THE TWIN CESSNA MARKET IN 2012

READERS WRITE AND MUCH MORE.....

Supporting Twin Cessna Owners Worldwide since 1988

COST EFFECTIVE 310G PANEL UPGRADE

By Patrick Ripp, TTCF Member

Like a lot of Cessna 310 owners, I have been enamored by these aircraft since watching "Sky King" in the 1950's and 1960's. I am an AP/IA and AP Instructor, and I also own a small general aviation maintenance facility. While working as DOM at a flight school in the 1990's, I was fortunate to be able to obtain my Commercial MEL in a 310 while maintaining several different models that we used as trainers and several others that were hangar tenants. I have flown G, I, J, K, N, Q and R models. After several years of looking, in 2006 I located a 1962 G that I was comfortable with. I like the mid-production, short-nosed 310's, and was looking for a G or H model. The G was the first model with the canted tail and dihedral tanks, and the H was the last year for the over wing exhaust and 45 deg. flaps. They are also lighter and, I believe, a bit cleaner and faster than the I and newer models that have underwing augmenters.

My shopping list was fairly simple: decent airframe time with little or no damage history, new or upgraded propellers, decent paint and interior and decent instruments and avionics. I was not as concerned about the engines as long as they were running well and not so far out of TBO times that they would be unreliable. I have been building engines for over forty years, and as an AP Instructor, I teach mostly piston engine technology so monitoring, maintaining and rebuilding these engines is not a problem. N8941Z fit the bill nicely, with just over 2900 hours and no damage history. Propellers are the original Hartzells upgraded to the MV configuration. Right engine is at 1550 hours/200 hours on new cylinders. Left engine is at 1275 hours. Both are running well with clean oil analysis and 6-8 hours/qt oil consumption. Paint and interior are older but in very nice condition. Avionics included a KLN-89B and KNS-81 coupled to a KCS-55A HSI system, KY-196, KX-155, KT76A, WX-10 Stormscope and Terra 350D Audio Panel/Intercom. The KCS-55A and KX-155 couple to a fully functional Century III autopilot. Other nice features include VG's and a recent one-piece windshield. The original mufflers have been maintained and the wing interiors are clean.

> *" This type of panel upgrade is a good alternative for owners that do not want or need the new glass technology. "*

We purchased the aircraft in June of 2006 and flew it until the Wisconsin winter caught up with us in December. I knew I wanted to tidy up the panel so I "pickled" the engines and put the aircraft down to begin the project. What I envisioned as a 6-month project turned into almost 3 years of on and off work as time permitted. As you can see, the original panel was a 45-year hodge-podge of original equipment with various additions and modifications. There were radios and circuit breakers in various odd places, the Stormscope and EGT were off on the right and hard to see. My original plan was simply to take out the original left side panel and tidy it up with a standard "T" arrangement. This was not to be. As I got behind the panel, I was shocked at the condition of the wiring, instrument plumbing and overall shabby avionics installations. I have seen a lot of bad panel "behinds" over the years, but this was an unsafe mess so I decided to start over completely.

Both original panels and the avionics rack were removed. All of the instrument plumbing was original hose dated 1961 and quite brittle. The panel lighting wiring was badly cut up so most of it was removed back to the buss bars in preparation for installation of "Nulite" light bezels. Many of the ground circuits were spliced and piggy backed in numerous places. Some wires had as many as 6 splices on them. All of the instrument, lighting and avionics ground circuits were replaced and run to a pair of buss bars on the forward bulkhead just forward of the control column. All of the avionics wiring was removed and "cleaned up" for reinstallation. Once the years of accumulated wiring modifications and repairs were removed, the basic original

(continued on page 8)

Original panel showing the hodgepodge arrangement of instruments, radios, switches and wiring hanging out from under the panel.

310G PANEL UPGRADE

(continued from page 6)

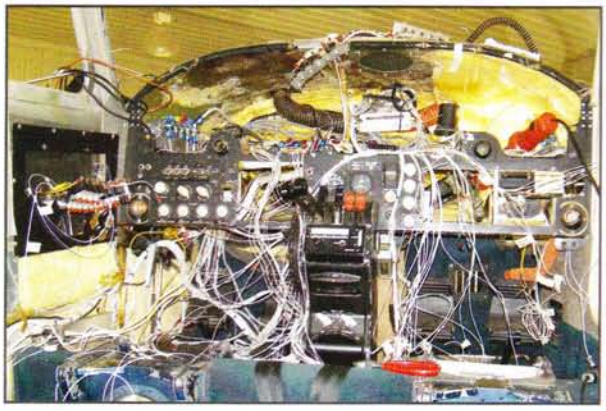
harness was actually in good condition. All questionable wiring was properly repaired or replaced.

By this time the entire interior had been removed for wiring and antenna lead work so with the sides opened up I started to think about how to incorporate all of the needed circuit breakers into the original breaker panel on the left sidewall. The original panel is quite small and just does not have enough room for everything if you include the avionics. The small breaker panel is mounted onto a larger mounting panel assembly that is simply screwed into the aircraft structure behind the upholstery. With the mounting panel removed, one of the larger panels from a newer aircraft fits perfectly in the aircraft structure with some minor upholstery changes. All of the old breakers were replaced with mil-spec Klixon breakers. New buss bars were fabricated for the aircraft buss and a new avionics buss– and all on the same panel. All of the Type Certificate required placards also fit on the new panel along with the placard for the fuel pump switch modification. Also on the new panel are the avionics master, backup avionics master, GPS data loader port, head phone/mic jacks and a handheld radio antenna jack wired to a dedicated antenna on the belly.

With both face panels and avionics removed, I decided to swap out the "T" control column for a later "Y" column to gain radio clearance in the center of the panel. The geometry between the yoke shaft centers and lower pivot are identical so this is a very easy swap with everything out of the way and allows a full-length radio stack in the center of the panel. It took longer to re rig the elevators and ailerons than it did to swap the column assembly. The original avionics mounting rails were a mess so they were replaced with a set of "Radio-Rax" extruded rails attached to the right face panel. This is a very easy system to install and makes future radio changes VERY easy. The original panel lighting busses are attached to the left side of the avionics rails. These were removed and adapted to the new rails. With everything apart, I removed the original vacuum gage source switch, vacuum system filter assembly and gage. These were replaced with a current design filter assembly and two-button gage. These older systems use a single field serviceable regulator with a pair of simple check valves instead of a manifold assembly to isolate the two vacuum sources. The newer gage works fine with them and has no irritating switch to fool with. With all of the radios now in the center stack, miscellaneous circuit breakers in a proper panel and the vacuum switch gone, there was lower panel space to install a Gemini 1200 engine monitor and a Flo Scan 450 Fuel computer. There was also room to reinstall the glove box that had been removed at some time for radio installation.

The early 310's only have one light for gear down indication. A field-approved upgrade I have done a couple of times is the installation of the three light gear down annunciator and press-to-test switch as used in the 340's. This requires a couple of extra wires run from the left junction box to the annunciator and moving a couple wires around in the junction box to separate the three gear micro switch circuits. This was an easy addition with everything open. Another addition was adding a pair of starter-engaged lights on the center quadrant ahead of the control levers. Again, easy to do with everything open. The circuits are simply fused off the starter relays in

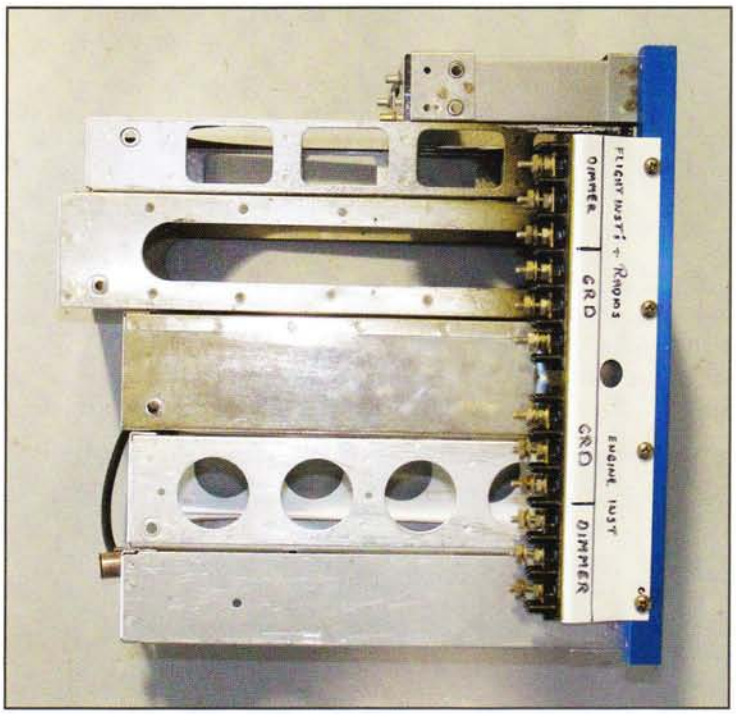
(continued on page 10)



The usual, in-progress shot showing the nightmare of wires, cables, and hoses. Note the mounting panel on the left side panel that can be removed to install a larger late model circuit breaker panel.

The wiring is mostly cleaned and up and in place. The new panel sections are temporarily installed along with the avionics racks.

310G PANEL UPGRADE (continued from page 8)



"Radio-Rax" mounting rails with trays installed, showing modified busses for the flight instruments and radios mounted.

the left nacelle.

The basic aircraft instruments were mostly in good condition. The airspeed indicator was looking rough and was replaced with a true airspeed indicator. The VSI was replaced with an IVSI and the tachometer was replaced with an overhauled unit with a synchrcoscope. All of the flexible instrument lines behind the panel were replaced with proper hose and hardware. I installed a static system manifold with fittings for each component that required a static source. Each component now has its own line and, with a dedicated test fitting included, the system is very easy to test and troubleshoot. The aircraft had dual gyros installed when purchased. I changed the primary attitude indicator to an electric instrument to match the HSI. I considered putting the vacuum gyros on the right side of the panel, but decided that these aircraft are usually single pilot and the back up gyros would be more useful on the left. The Stormscope was moved back to the far left panel were it could be seen without leaning over. I had a 400 series two color 45 degree flap indicator remarked with the proper speeds to replace the original black and white indicator. Without the presets, it now only takes a quick glance to see that first 15 degrees.

While the interior was out, I installed sidewall insulation and fabricated new main floor panels to replace the original ones which were in pretty sad shape from decades of being taken in and out. I removed almost 30 pounds of old wiring, abandoned cables, unused radio components and antennas left in the aircraft from years of changes.

The aircraft is now a joy to fly. Everything on the panel works and the layout makes sense. The gear lights are easy to see with LED's replacing the original lamps in the annunciator. This type of panel upgrade is a good alternative for owners that do not want or need the new glass technology. Not being a hard IFR flyer, the older GPS and RNAV units will take me anywhere I need to go. I do use a yoke mounted 396 that gives me a good picture of where I am. I would like to swap out the KLN-89B for a KLN-94 at some time. The cost of doing the panel was not too bad in terms of dollars, but if I had to count my time it would be substantial. The 310 instrument face panels are not structural so they can be configured to anything an owner wants. There are only a few structural components behind the panel that need to be worked around. For a competent AP/owner or an owner that can work under supervision of a competent AP, this is a great way to upgrade your aircraft and really get to know how its systems.

The new panel. This upgrade, plus a yoke-mounted Garmin 696, gives me some "glass-panel" capability at a fraction of the cost. These older radios are reliable and have plenty of life left in them.