

Panel, Electrics, Avionics





Design, layout and construct center console to accommodate the EFIS (Dynon Skyview 7" EFIS), Dual Comms (Dynon) and cooling temp gauges, radiator exit vent controls, and water pump management switches. Frame is urethane foam with 3 oz. BID glass cloth (2 plies) and front panel is 1/16" mahogany plywood with a 3 oz. BID glass ply front and back. February 2016





View of center console frame and front panel before joining. Front panel is drilled and nutplates are mounted and inserted in foam core before bonding. These retain the 6-32 mounting screws that secure the EFIS and comm radio panels





Design and install shelf (1/8" mahogany plywood) in level position on rear panel of header tank. This position will be occupied by Skyview ADHRS module. November 2015.





4BID mounting flanges are bonded to the rear face of the header tank to hold the center console in place. Center console is fitted into position and mount holes drilled in mount flanges. Note also the platform for the Skyview ADHRS that has been mounted on the right side of the rear face of the header tank. This is mounted to be level and normal to the fuselage axis per Skyview installation recommendations. February 2016





Console panel test fit into position with header tank in mount position. The EFIS panel and comm radio panels are cardboard mockups to test for position and fit. All clearances with elevator controls are verified. February 2016





Layout, design and construct pilot instrument and control panels. In addition to the center console, two other removable components consist of: 1) a tiered 3 instrument cluster (airspeed, ROC, and Altimeter, right to left) with a rectangular cutout for a precision AGL altimeter readout; and 2) an engine control console on the far left designed to contain throttle, mixture, ignition and starter control, carb heat, and primer. Fuel selector and fuel pump switch console can be seen below the removable center console.





Instrument cluster is trimmed and glassed with 2 plies of BID glass on the rear (flox corners) and one BID on the front. 3 ¼" instrument cutouts are cut with a hole saw and entire assembly is test fit in place to verify position of side and top fasteners. April 2016





Glassed cluster assembly is further trimmed to fit specific instruments, then nutplates are rivetted into position to retain instrument screws.





Engine control panel support bracket is fabricated from plywood and glassed in place on fuselage, engine control panel is glassed front and back like the instrument cluster, a top shelf and exhaust fans are fitted on center console, fresh air vent is fitted into top of engine control panel, then instrument cluster and center console are filled with micro and sanded to contour for painting.





Instrument cluster and center console are primed, sanded and primed again with fill primer, then fit back in place with engine control console. Alternator control switch and over current breakers and alternator fault enunciator lamp are fitted in panel above instrument cluster. One cabin vent push-pull control is fitted into position to test for reach and clearance. April 2016





Instrument cluster and center console are painted black and all instruments and coolant temperature gauges are test fit to final position. Also master switch and low oil pressure enunciator light (red) are fitted into position above center console shelf. April 2016





Passenger side consoles laid out, designed and constructed of 1/16" plywood. Right console support anchor designed and glassed to fuselage side. July 2016





Passenger side console plywood glassed front and back with 1 BID and right side of console cut to accommodate cubby, which is constructed from urethane foam and 3 oz. BID glass. Console is also cut to fit right side fresh air “eyeball” vent. Mounting nutplates are located and riveted in place to allow secure mounting. Mount under overhang is fit and reinforced with glass to mount in place to allow the console to be removed and reinstalled.





View of the pilot's side panel components from behind the panel. Engine control panel on the right, instrument cluster to the left of that and center console to the left of than. Gray stick on right, below the engine control console is the reflexor control stick. January, 2017





View of the passenger's side panel components from behind the panel. Center console is on the right, to the left of that is a blank panel section, then the cubby at an angle to left. Partially shown below that is the left console containing the Hobbs meter, a USB power port and the fresh air eyeball vent below this is a conduit for running wiring to the rear of the airplane through the passenger side console. January, 2017



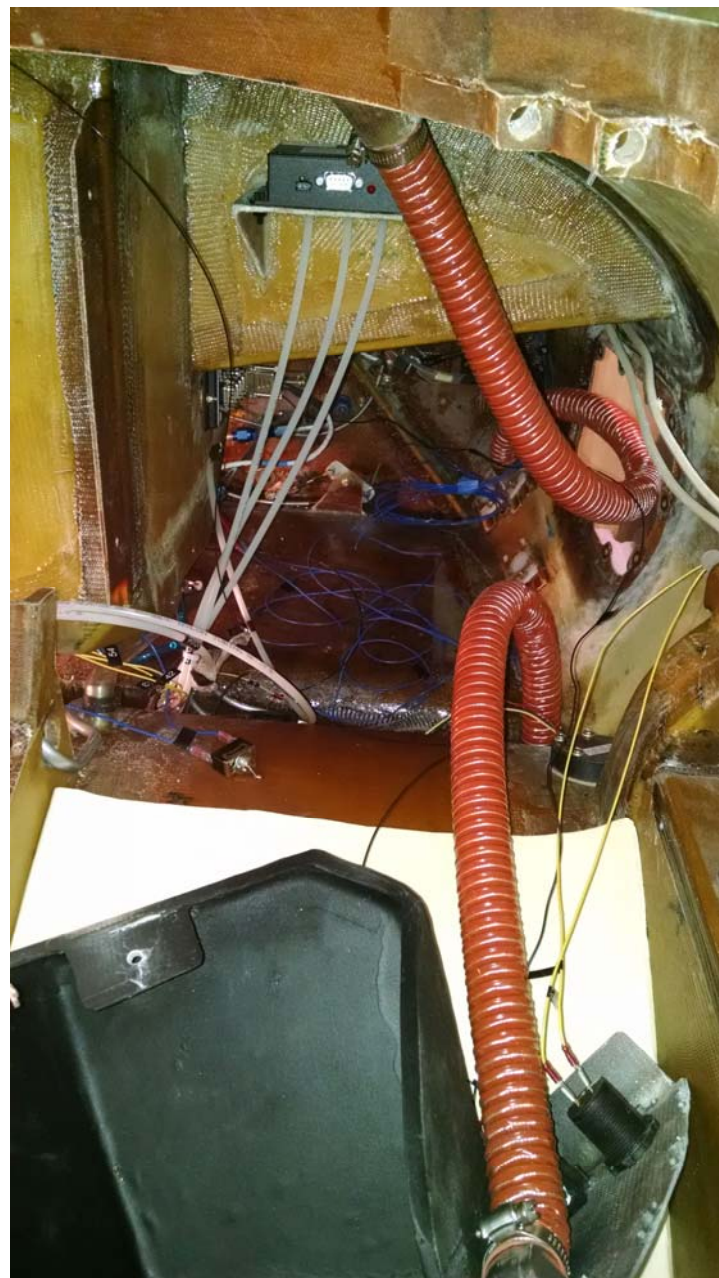


View from front of the passenger side console without the center console installed.
March 2017





Fresh air and heated air ducts are connected with SCAT tubing. Two of the SCAT lines go to eyeball vents for fresh cabin air. The other two SCAT lines go to the warm air vents to forward fixed windscreen (defog vents). Additional vents for both fresh and heated air are present on near the pilot's and passenger's feet.





View of final passenger side console with all labeling, and components in place. Note passenger warning, eyeball vent, hobbs meter, USB power port and right side cabin air controls.





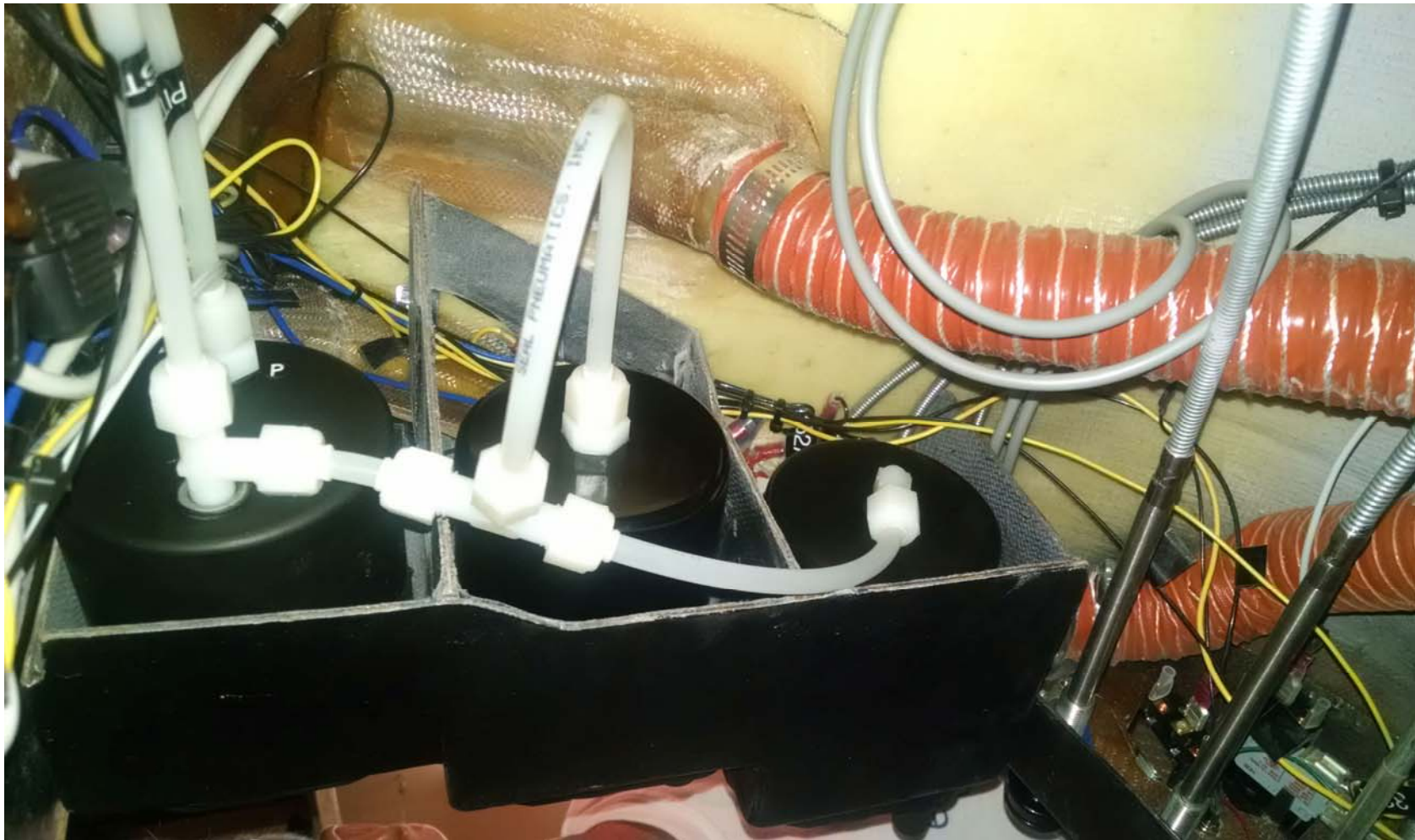
Center console coolant management panel completed with labeling, gauges painted with operational arcs, air exit door controllers installed, wiring complete and coolant pump switches installed and operational. May 2017





Infrared laser altimeter is tested, calibrated and installed in the left side canard strake behind the elevator torque tube. The instrument is protected from exposure by a Plexiglas panel. The instrument has a digital readout screen above the altimeter on the panel, showing Alt. AGL, reads zero when main gear touch down. Operational switch for altimeter is on the top of the readout screen enclosure (rocker switch)





Install pitot-static plumbing with $\frac{1}{4}$ flexible nylon fittings and connectors. View of the back of the instrument cluster mounted in position. Also note position of windscreen defog duct and hot air SCAT tubes.





Final layout and test of laser altimeter. Note position on panel relative to other instruments. The EFIS in this photo is a cardboard mock-up.





Engine control panel painted, labelled and test fit. Also laid out, designed and fabricated pitch and rudder trim console, build mount points and test fit for operation.





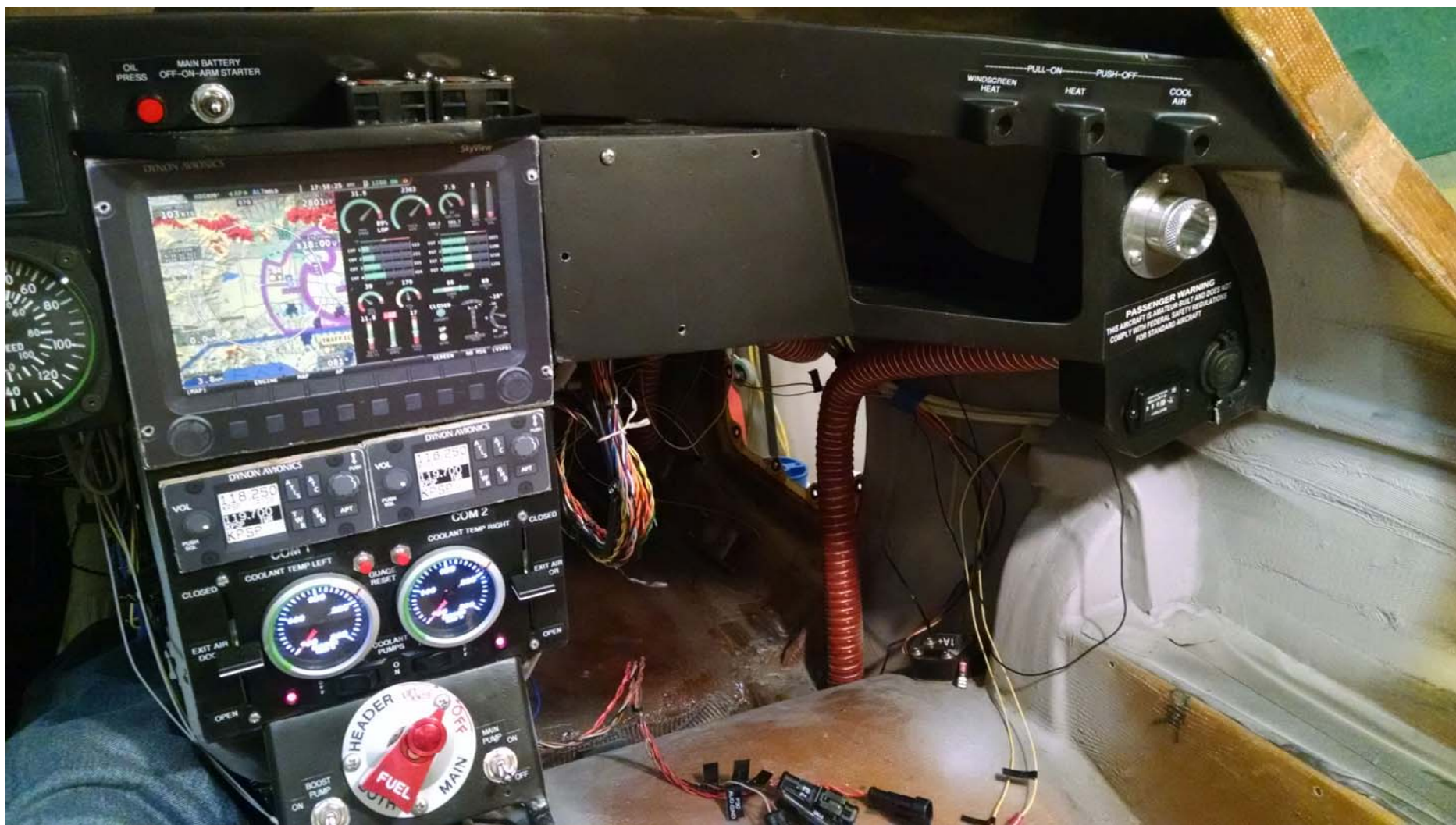
Pilot's side consoles showing all engine control and ventilation components in place. Tested for fit and function. June 2017





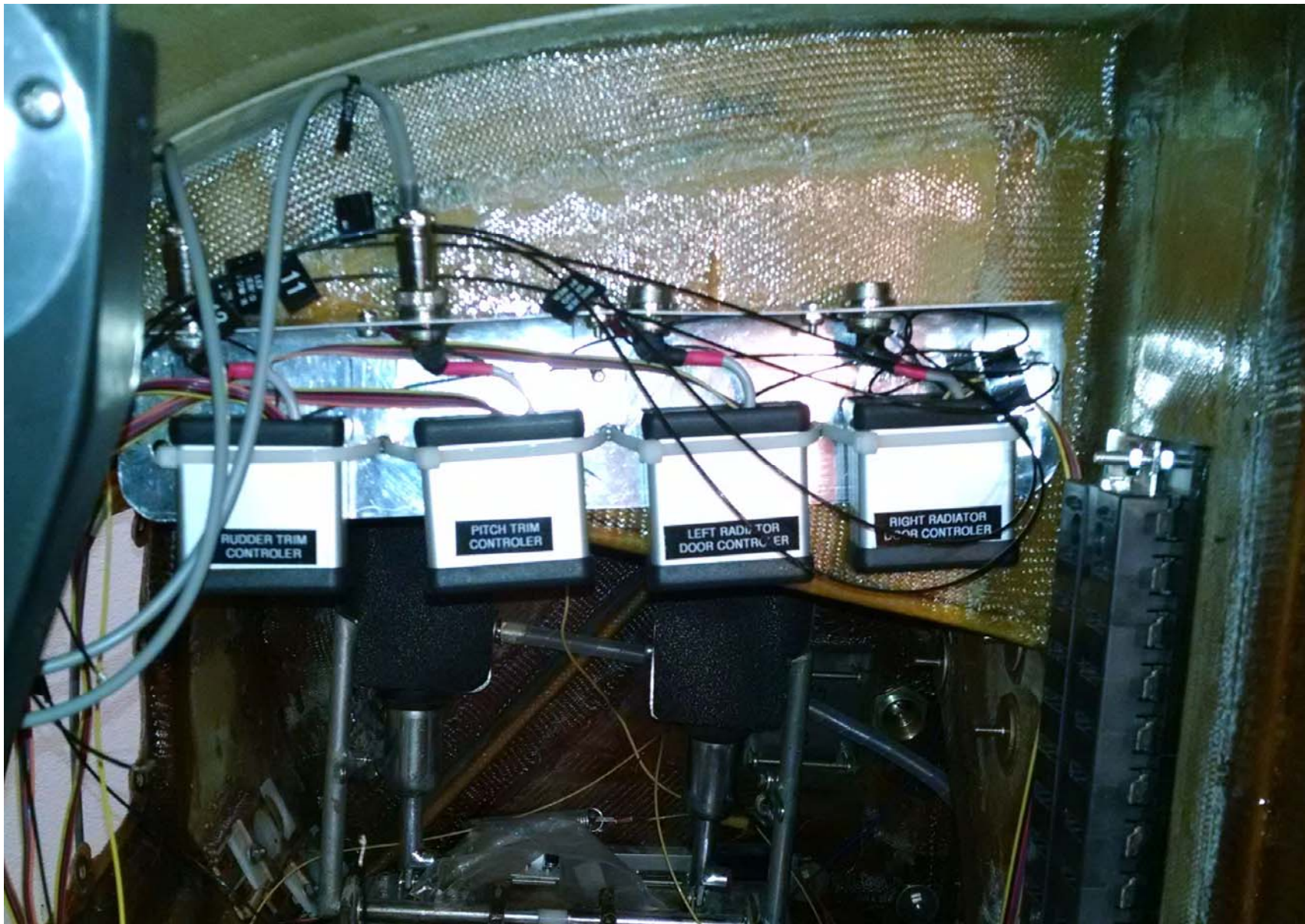
Layout of all pilot side instruments. The layout is designed to allow knees to be pulled up in flight.





Passenger side panel consisting of temporarily blank panel section (for future expansion), storage cubby, passenger ventilation panel (also contains hobbs meter and USB power port, and passenger warning).





Servo controller mounting panel is fabricated from aluminum sheet and mounting hardware installed on rear face of header tank on pilot's side. All wiring for servos is installed and power for each is connected to fuse block. Servo controllers are labeled and panel is installed. March 2017.





Fill with micro on permanent portions of panel including upper dash support and fuel management panel (fuel selector and pump switch panel)





Prime permanent panel components. June 2017.





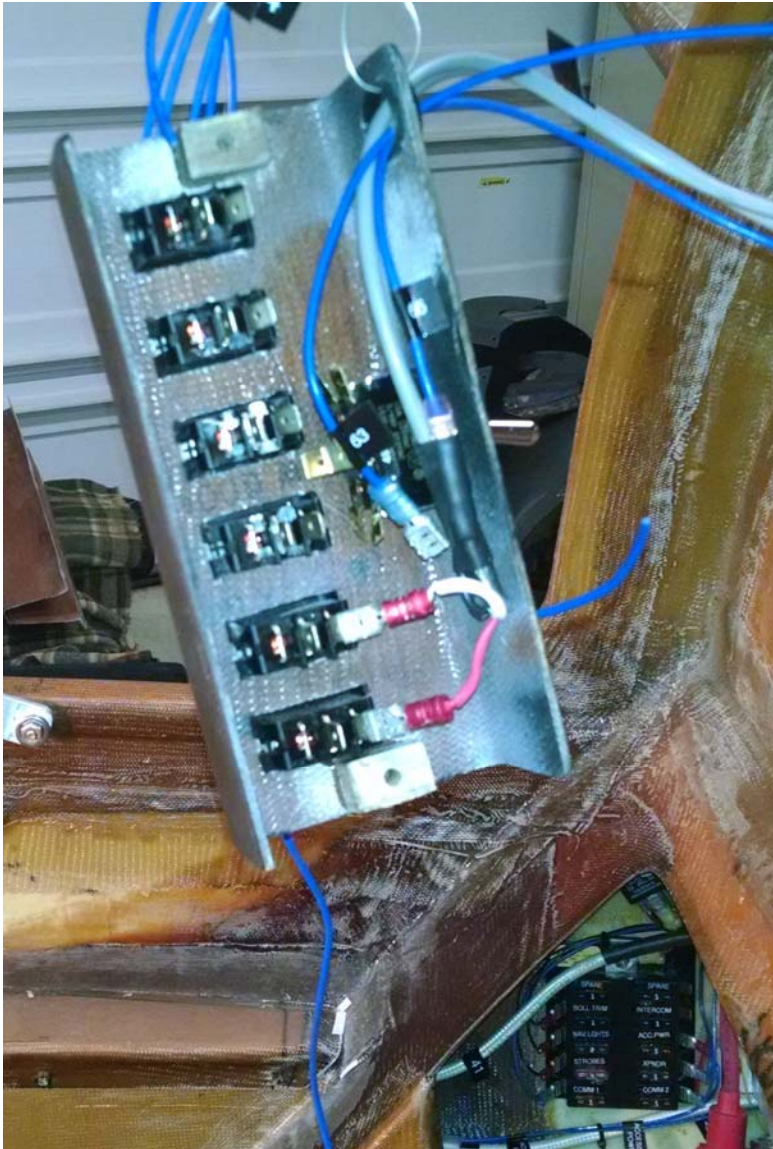
Apply black paint, label controls and apply matte finish clear lacquer. Install fuel selector control backing plate and check for fit and operation. June 2017





Overhead (avionics) switch panel is constructed from 1/6" plywood and glassed with 1 BID on front and back, then primed, painted black and fitted to support anchors in overhead structure on fuselage. March 2017.





Install rocker switches and Avionics master toggle switch and run wires to appropriate switches to verify fit, then apply labels for switch operation and identification, then install panel into position.





Construct magnetic compass mount and enclosure to fit in forward portion of overhead console. Fabricated from 1/16" Mohogany plywood and glassed with 1BID glass on front and back of enclosure. Mount enclosure in place on overhead structure with 2 BID overlapping 1" on both enclosure and overhead structure. Trim and mount compass in enclose to test function and visibility. March 2017





Installation of intercom is between seats. The seatback bulkhead is modified to accommodate the mounting of both the intercom and the headphone jacks. This is done by cutting the openings, then glassing the front with additional plies of BID to create glass to glass bonds to preserve the structural integrity of the seatback bulkhead. A card cutout mockup of the intercom is installed into mounting nutplates to verify fit. July 2016





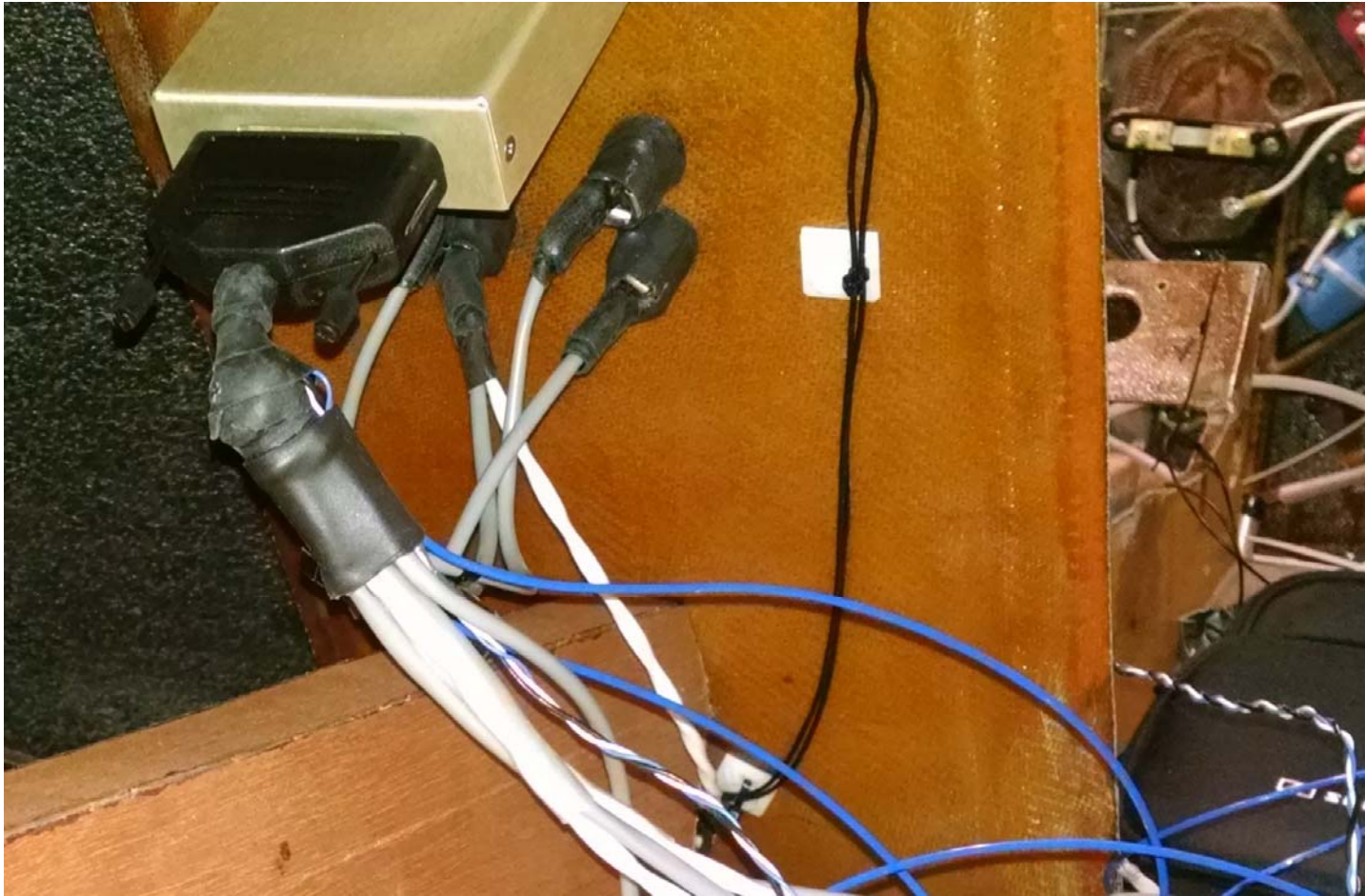
Add outer rim and fill
weave with micro in
intercom panel to
prep for primer. June
2017





Sand and prime
intercom panel (seat
back bulkhead)





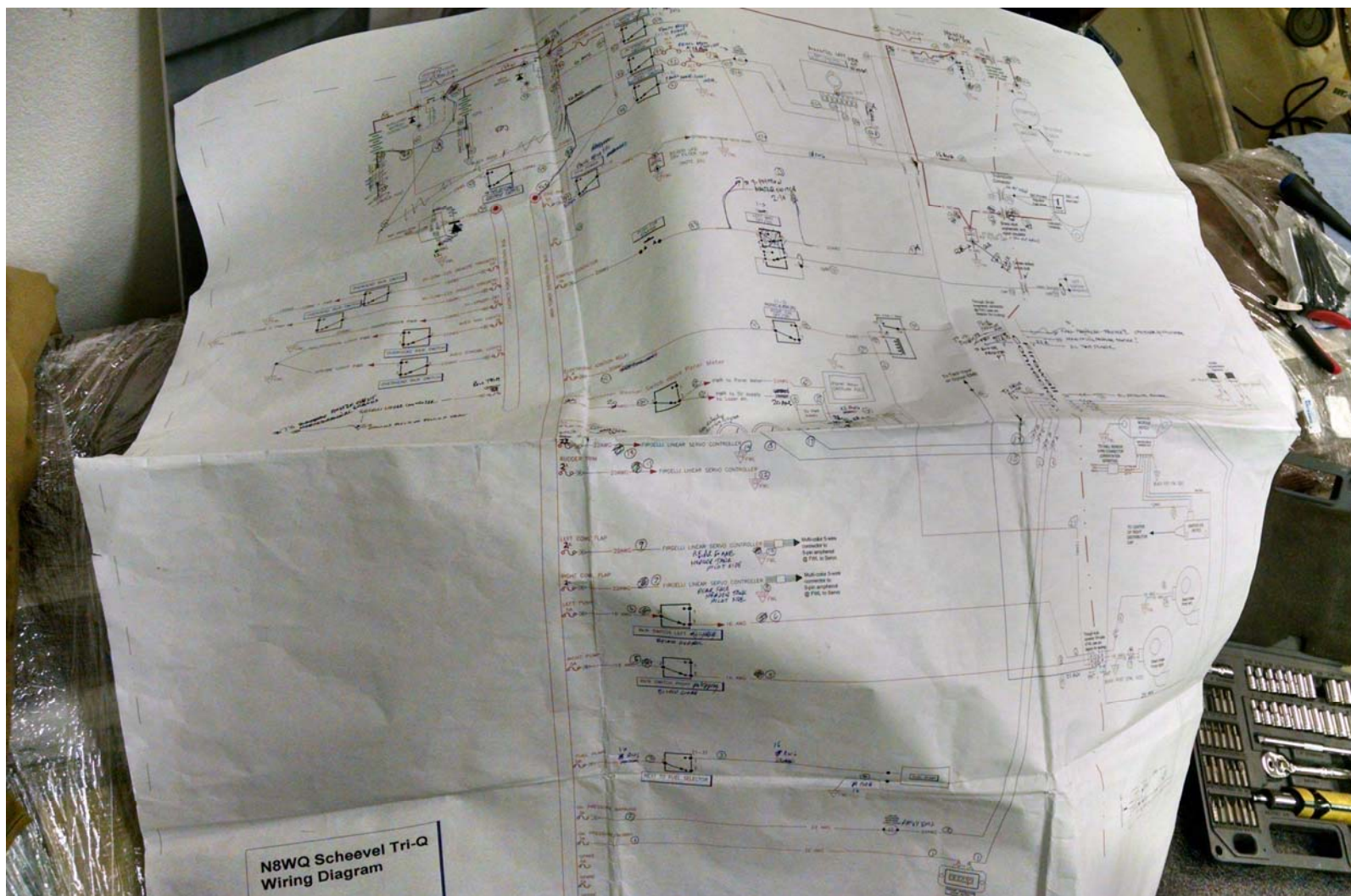
Intercom harness is fabricated according to recommended wiring shown in Skyview install documentation. The phone and mic jacks are also wired into this harness and tested. These are shown mounted into the rear of the seatback bulkhead in the appropriate position. The center console can be seen through the seatback opening. Initial plywood construction of the aileron torque-tube “guard tunnel” can be seen below the intercom harness. February 2017





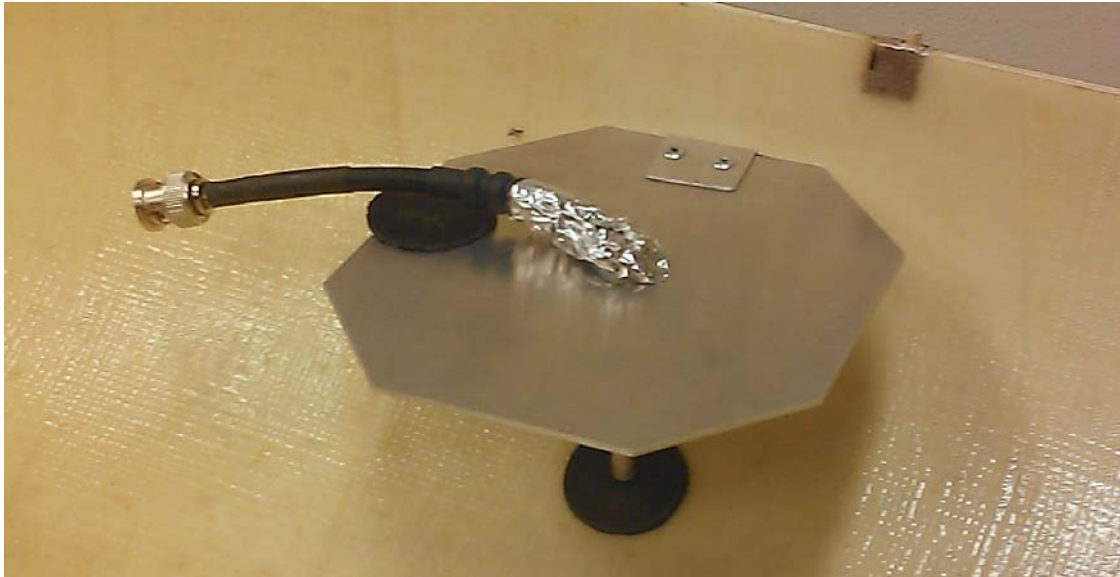
Two views of the completed intercom panel with Dynon intercom, Comm selector switch and both pilot and passenger headset jacks installed and tested. June 2017





All wiring installed per master wiring design, edits and clarifications made by hand as installation proceeds. All wires labeled and identified. Most wires have insulation colors selected to identify AWG and then are tagged with wire numbers shown on diagram. Final version (link): http://n8wq.scheevel.com/documents/Main_electrical_schematic3.pdf





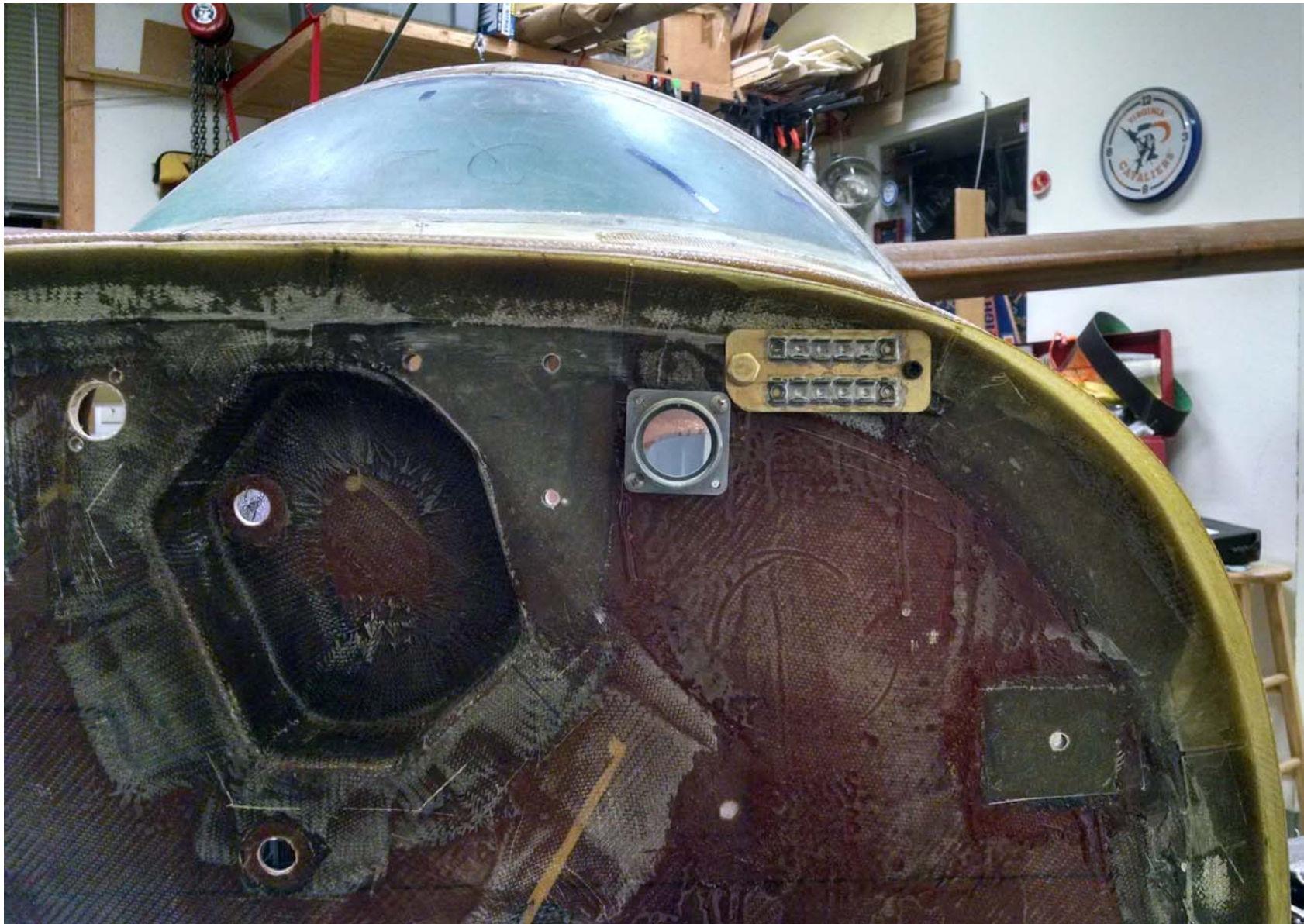
Construct and install Radio Systems Technologies (RST) transponder antenna in rear fuselage shell prior to joining the two fuselage halves





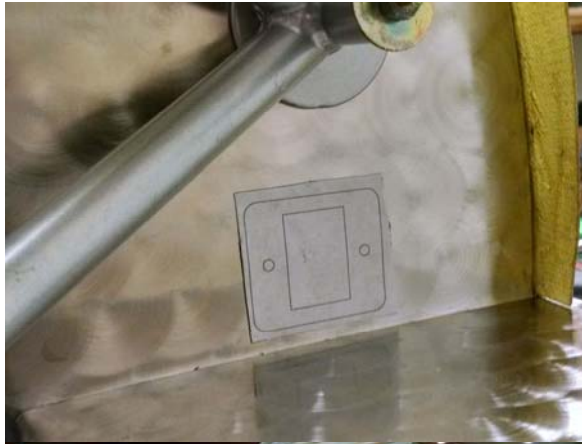
Install RST dipole comm antenna on sidewall of fuselage shell after joining fuselage halves and installing FS 120 bulkhead. Note position of transponder antenna behind bulkhead. Comm antenna is on the passenger side of fuselage. Additional RST dipole antenna was built into the vertical fin prior to glassing. Both antennas tested with hand held radio receiving well. Transmit will be tested after construction is complete.



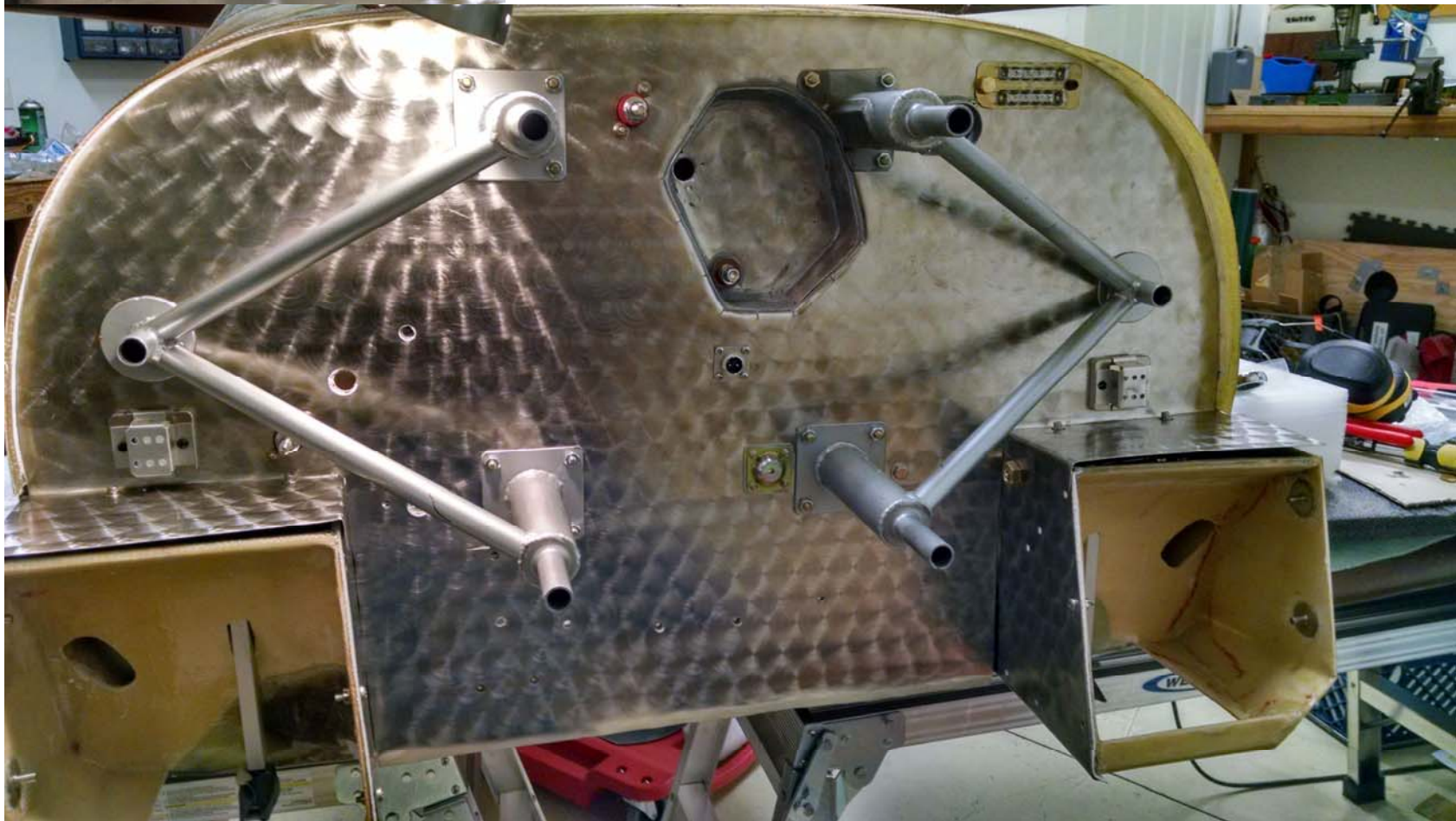


Layout drill, install anchor seats and install pass-throughs and ground block (B&C electrics) on firewall. Additional connectors for starter power and grounds are installed later.





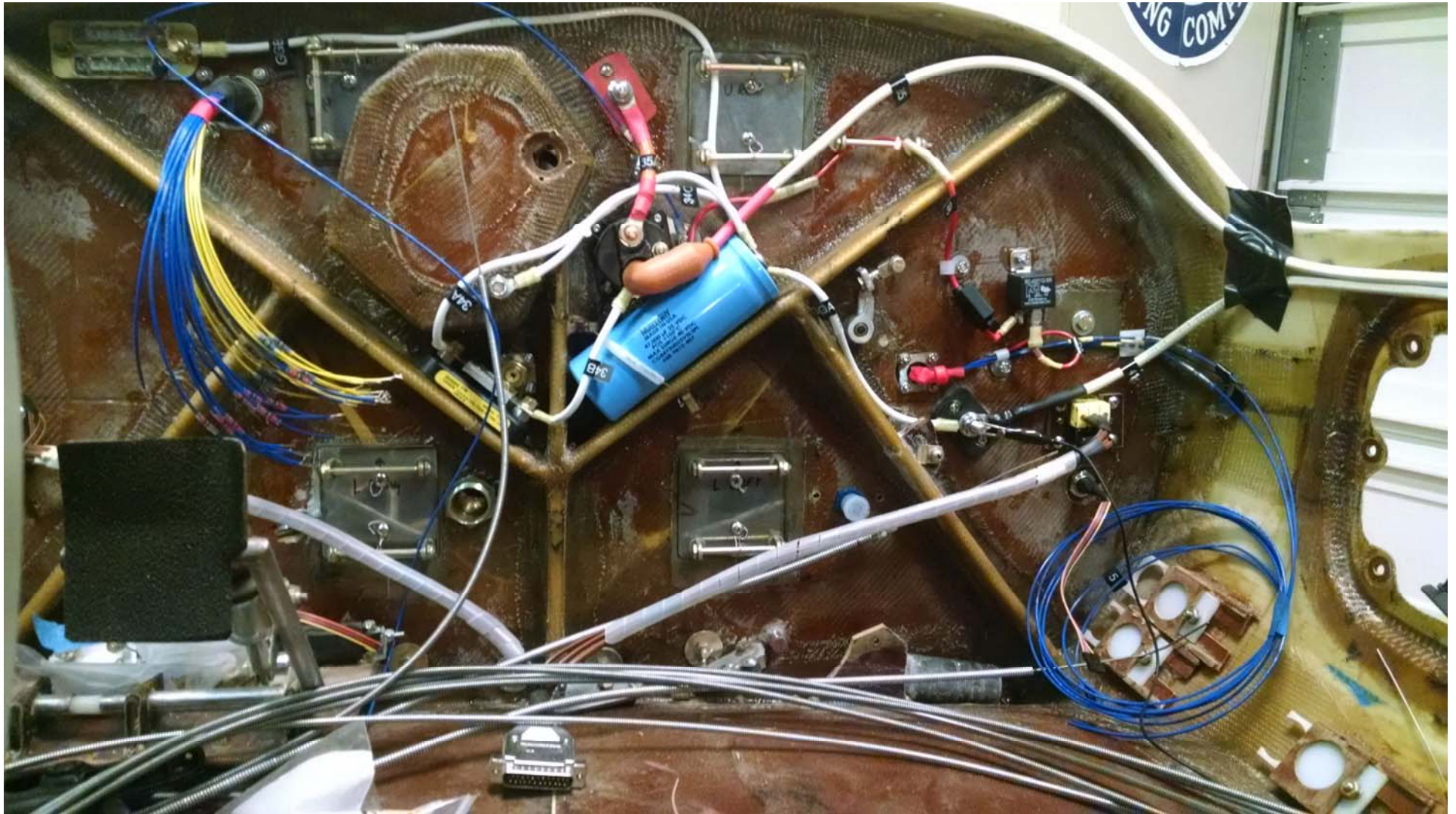
EGT/CHT thermocouple pass through connectors designed for firewall and built to accommodate 6 individual thermocouple connector plugs on both left and right side of firewall. Firewall and thermocouple connector assembly parts cut out using commercial waterjet cutting. November 2015





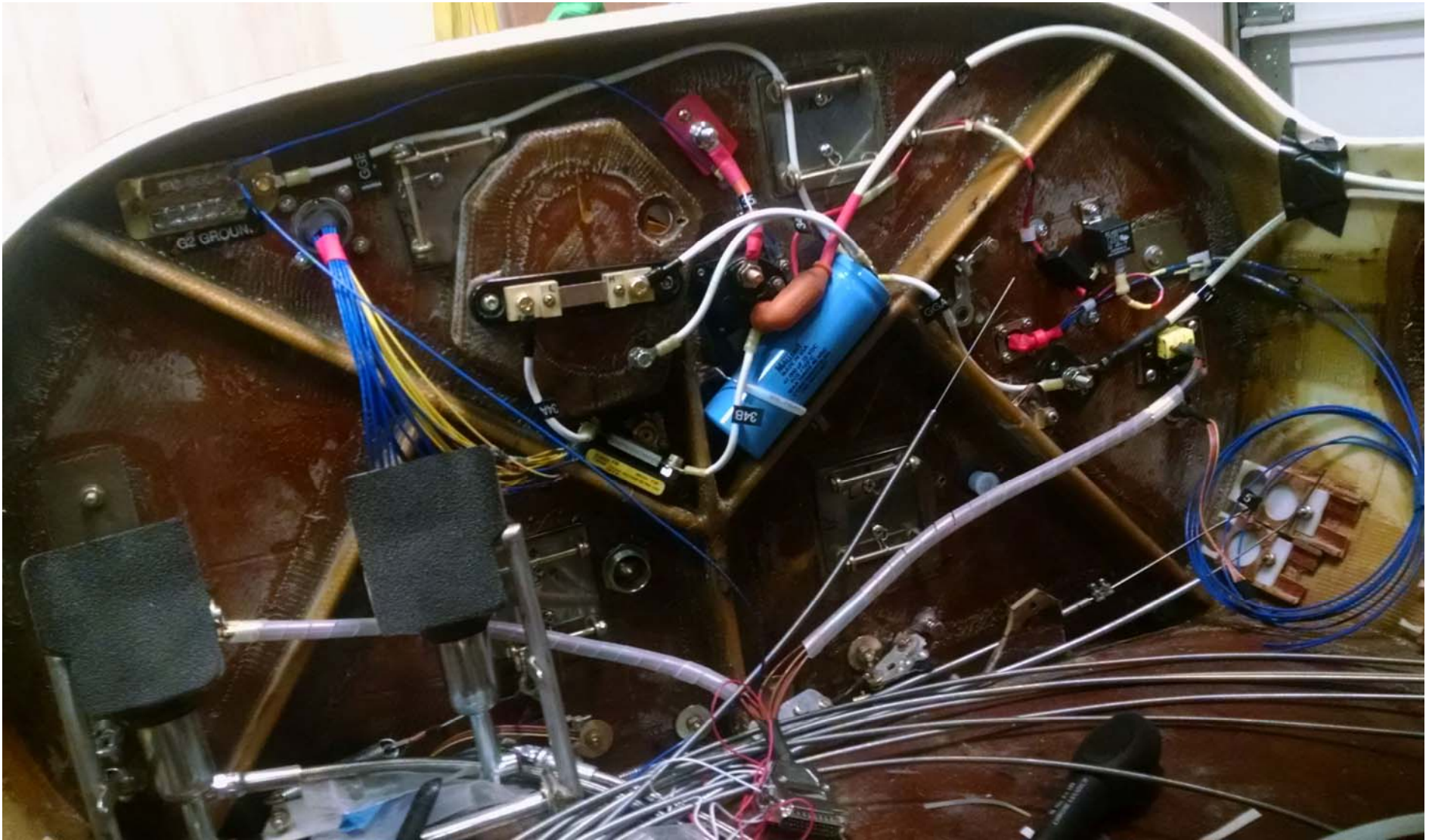
Back side of firewall showing pass through connectors and anchors. The red based post is the high amperage power pass through for the starter. The black based post is the engine/starter ground post.





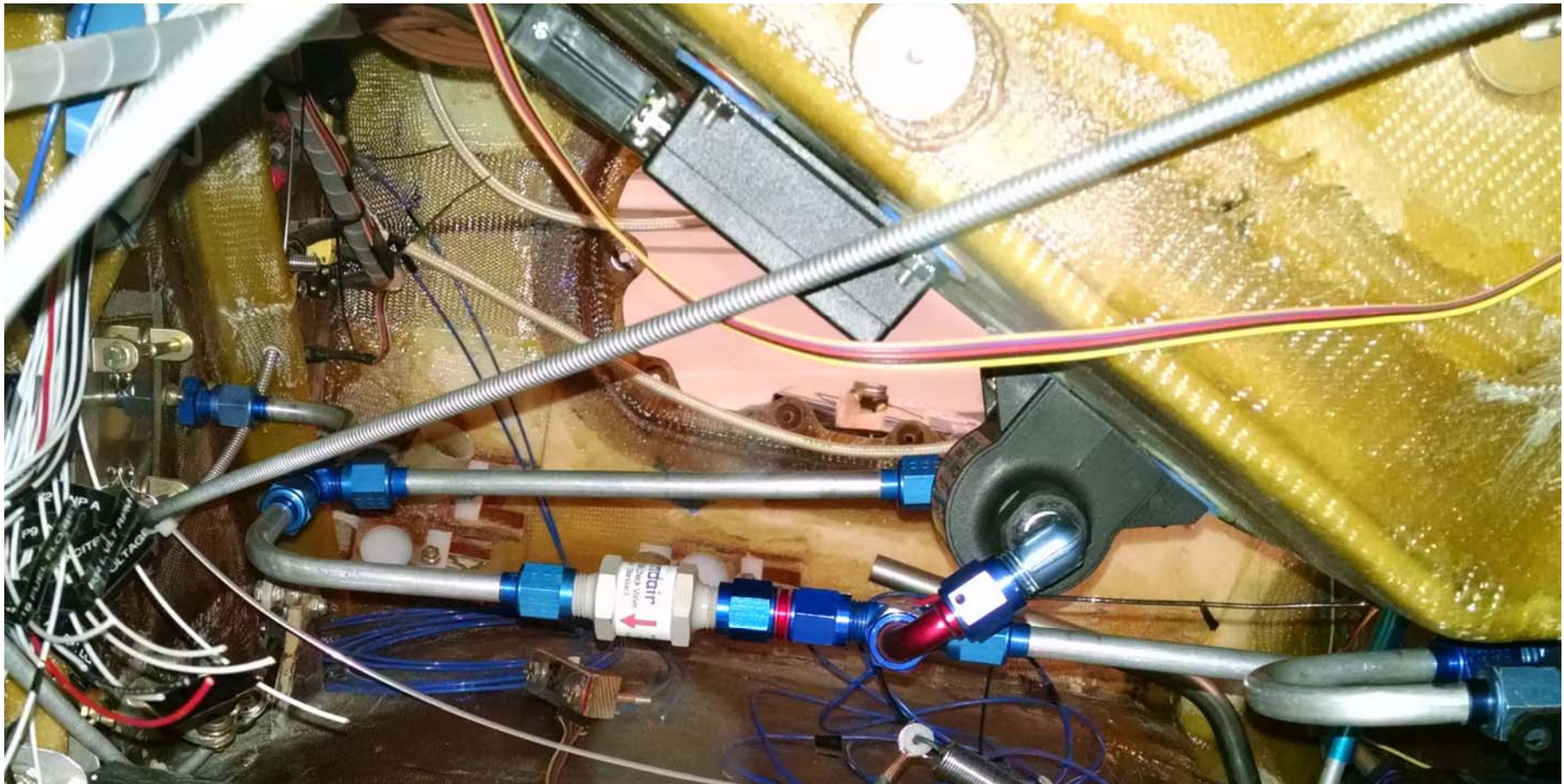
Leads and wiring in place on connectors on rear of firewall on all pass-through connectors. The high amperage wiring 4 AWG leads on right side of photo run through outboard passenger console and seatback bulkhead to batteries on right side of fuselage in baggage compartment. The large blue cylinder is a large capacitor (47 K μ F) to damp any voltage spikes. The complete wiring diagram is located at: http://n8wq.scheevel.com/documents/Main_electrical_schematic3.pdf





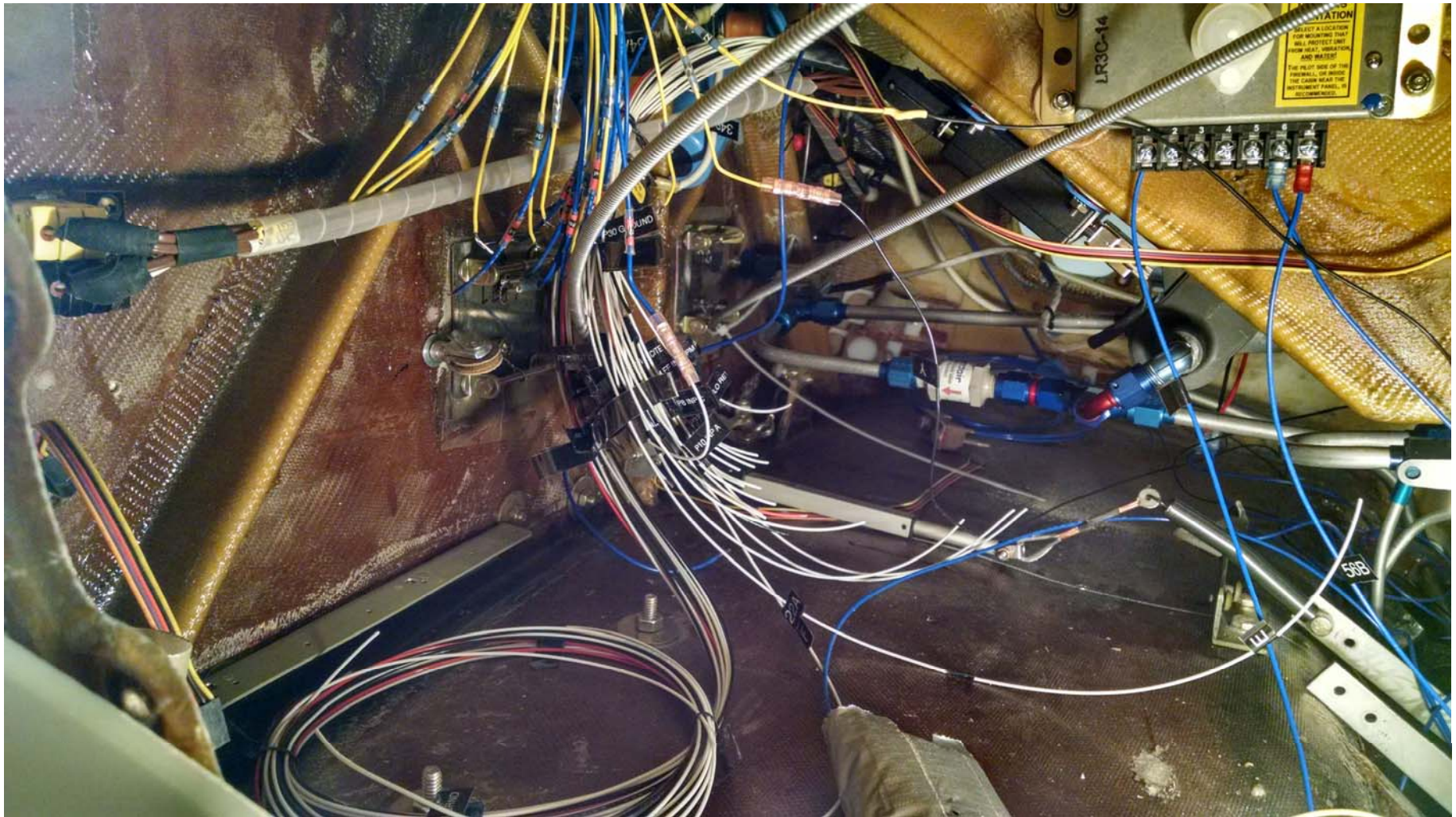
Additional view of the back of firewall with wiring in place. Note that the Blue/Yellow pigtail are the 24 connector amphenol connector. Most of the wires in the pigtail are not used at present time, but allow for future expanded engine monitoring functions.





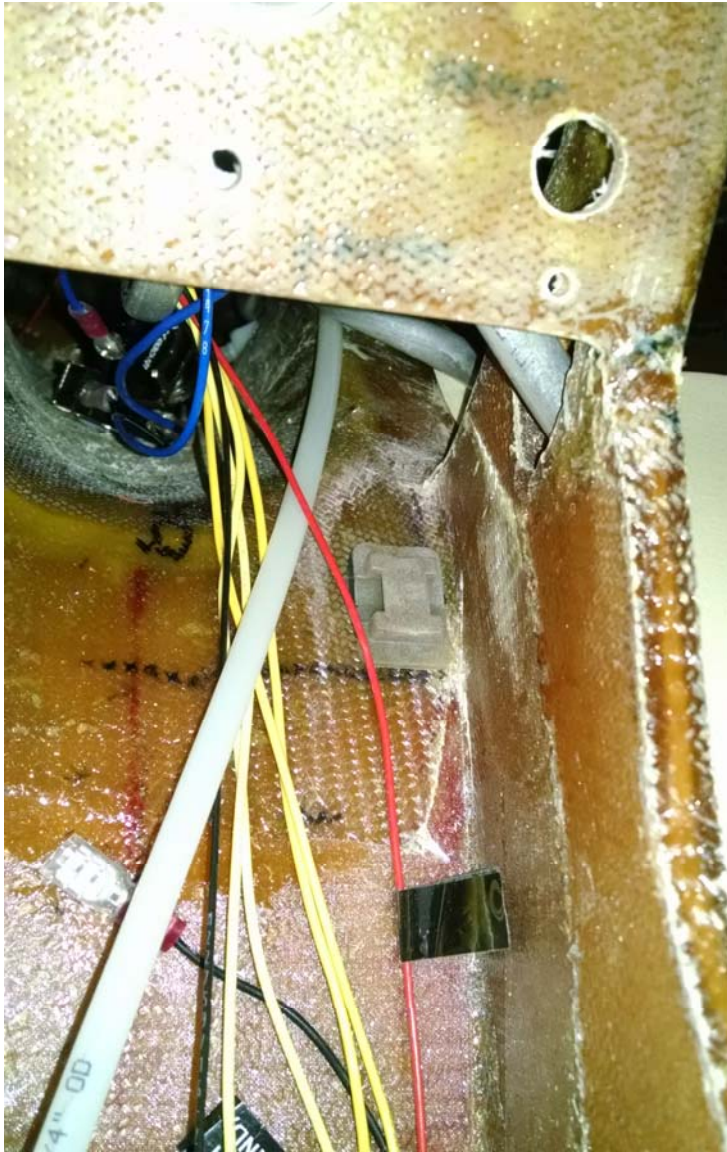
View from pilot's side fuselage access panel shows fuel line routing through boost pump on forward tilted face of the header tank. Above the boost pump, is the Dynon Skyview EMS module (rectangular box) with EGT/CHT harness connectors in place.



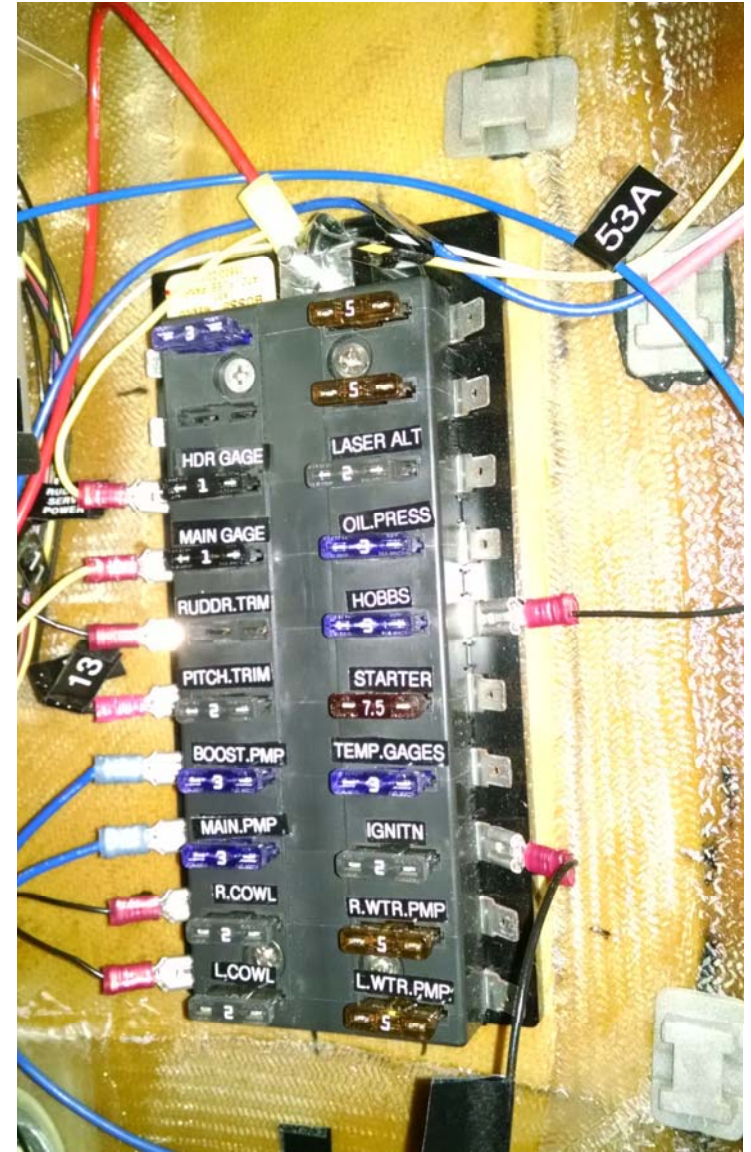


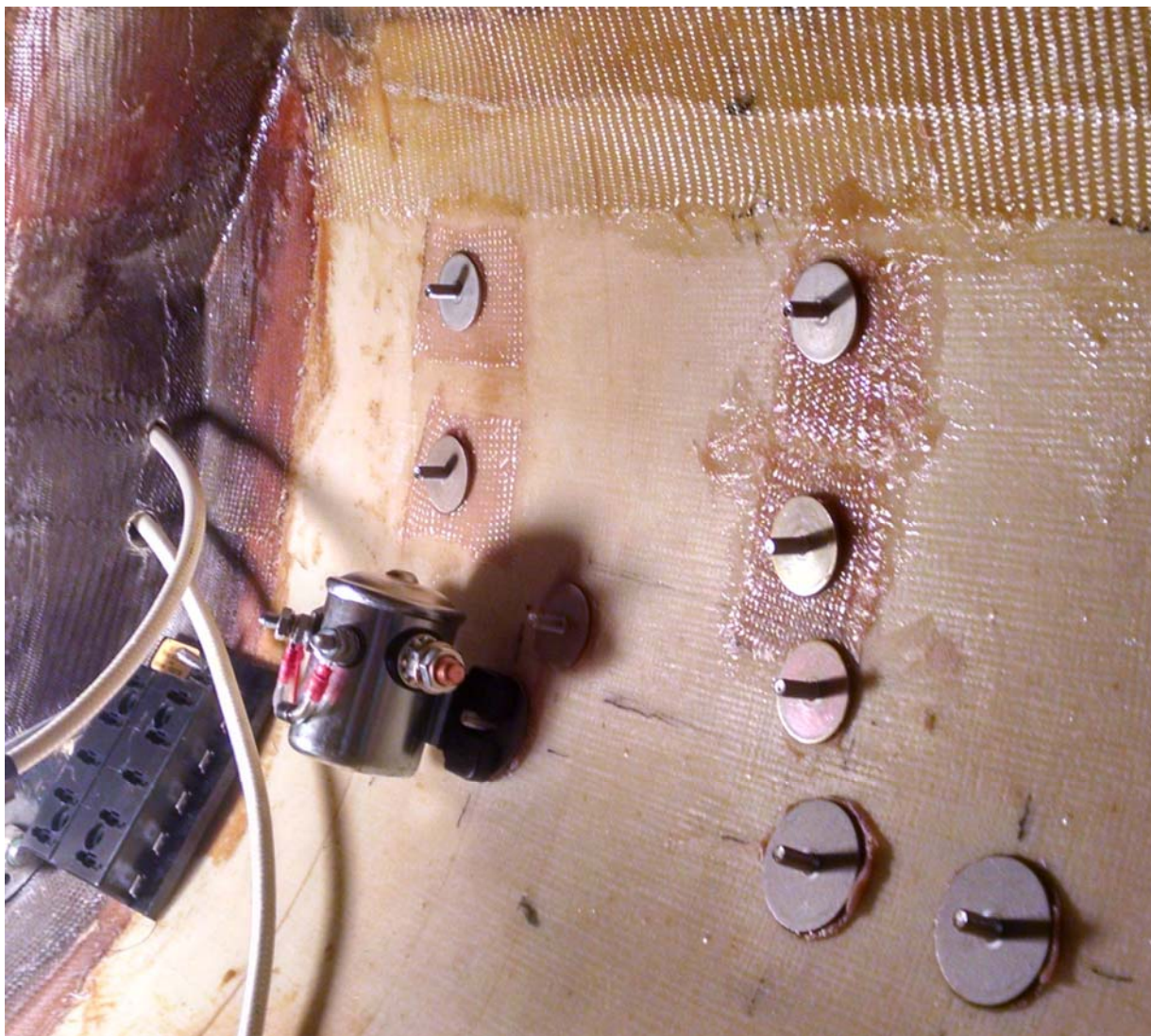
Another view of the left side of the header tank and mounted electrics, EMS module, fuel line routing. At the top of the photo on the right is the B&C Specialties LR3C regulator. On the left is the left side cylinder back EGT and CHT harness. The white wire pigtail in the center of the photo with wires labelled with black tags are the leads to the Skyview EMS D37 engine monitoring wire harness connected to the EMS. All of these are accessible from the fuselage access port located over the canard on the left side of the fuselage. May 2017.





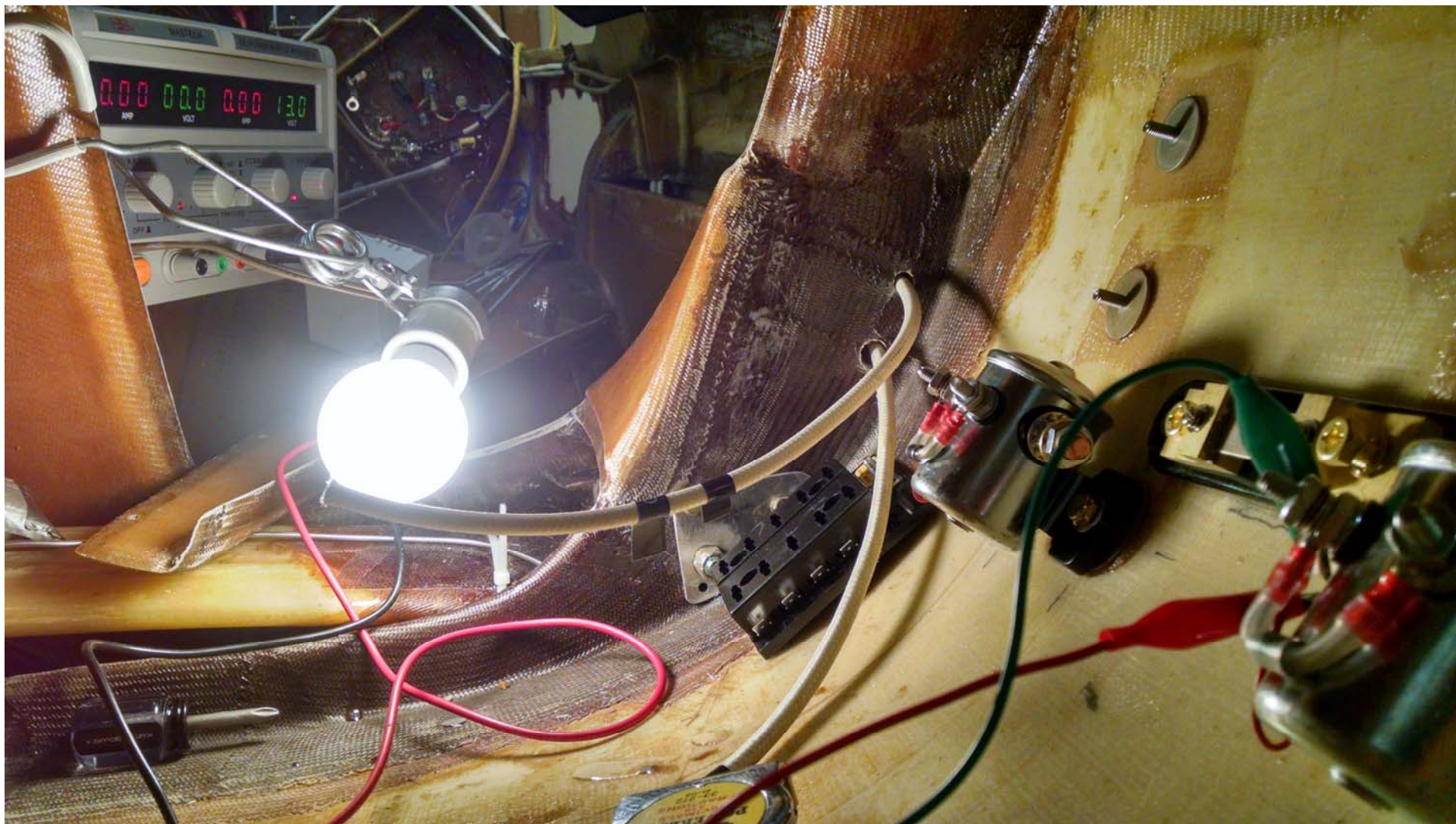
Routing of wires through center console (left photo) and installation of wire bundle tie down anchors (Click bond) to facilitate fastening wire bundles with zip-ties. Right photo shows installed main fuseblock on side of header tank and tie down anchors bonded in place. June 2017





EZ-point 10-32 anchors and glass reinforcements for installation of battery boxes and standoffs for continuous-duty contactors (B&C Specialties) in baggage compartment. Note also the 4AWG power wires from firewall and the avionics fuse block mounted in place





Testing continuous duty contactors and wiring circuit integrity using a power supply. Basic circuits and contactors verified this way. Ammeter shunt shown in this photo was later moved to the firewall per Skyview instructions for shunt placement. February 2017





Initial installation and testing of EarthX ETX680C batteries, with contactors and G3 (avionic bay) ground block installed below Main battery in this photo. Avionics fuse block is also shown. Top of photo shows a partial view of the B&C S8009 relay that activates the avionics fuse block via the avionics master switch on the overhead switch panel February 2017





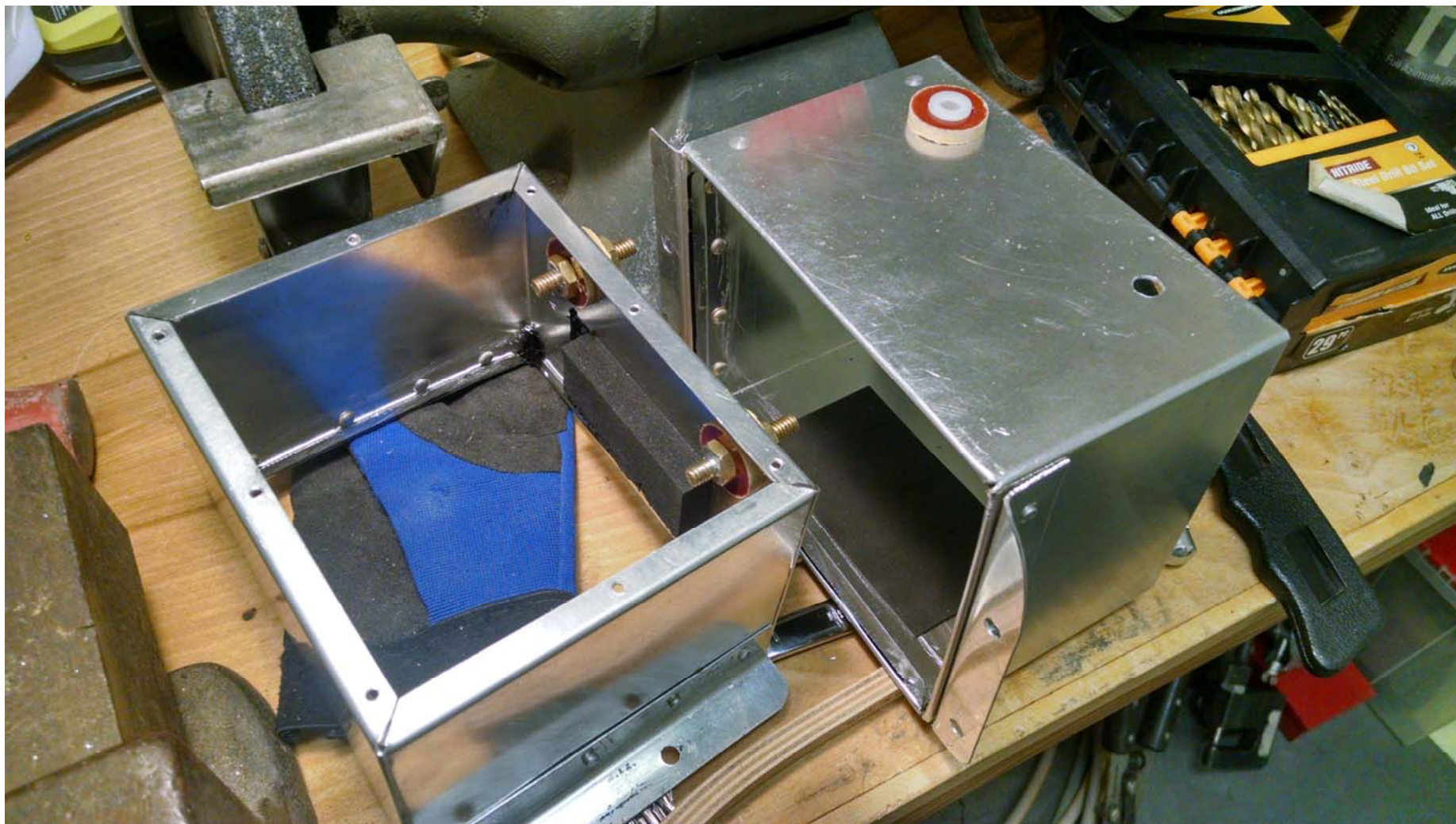
Battery installation was modified per EarthX recommendation in order to place batteries in sealed battery boxes that are separately vented to the exterior of the fuselage. The frame of the battery box is fit to the supporting bracket in the photo. Also shown is the Plexiglas shield designed to prevent battery, ground block and contactors from coming in contact with baggage area contents. March 2017





View of Main battery box fitted into position on mount brackets and 10-32 EX-point pedestal mounts. Also note position of G3 ground block and both Main and Aux battery contactors.





Fabricating brass bolt external terminals for sealed battery boxes. Terminal pedestal is $\frac{1}{4}$ " phenolic with a nylon shoulder bushing passing through the box case and brass nut on base silver soldered in place with removable brass nut on exterior. The mount brackets are riveted to the side of the case for mounting. March 2017





Construction of battery boxes with Airequip fittings being fixed in place to allow venting. Aluminum tank-welding flanges retain the threaded vent fittings and are secured with 8-32 screws and JB-Weld as sealant. All other seams are sealed with Silicone. March 2017





½" Aluminum tubing is cut to length and holes drilled through fuselage side to accommodate venting tubes for battery boxes. A vent "in" tube is in front near seat back bulkhead (left photo) and the "out" vent is near the FS 95 bulkhead. These tubes are floxed in place and project on the outside of the fuselage. Micro is shaped around the outside to accept ram air in front and vent that air back out in the rear after it passes through both battery boxes (see below). April 2017





Sealed battery boxes installed wired and tested. Note the vent fittings connected to the fuselage vent tubes and connecting two battery boxes in series for venting. Connections are made with high temperature silicone tubing and hose clamps. The terminals are connected to the appropriate contactors. April 2017

