EAA Chapter 32 News

The official publication of Experimental Aircraft Association Chapter 32 - St. Louis, MO (Jim Bower, Editor)

April, 2020

April Meeting is Canceled

President's Corner

by Bill Doherty

As the entire world continues its journey through the twilight zone or living out some Michael Crichton novel (he wrote The Andromeda Strain) we must continue to cancel ALL chapter functions at least through April and probably May. Once the bans on leaving home and gathering in groups are lifted, we'll evaluate the situation and announce when we can resume at some level. I'm hopeful maybe we can at least have some form of chapter meeting by June…maybe. So far, Airventure-Oshkosh is still planned for July 20 through 26. I'm keeping my fingers crossed and want to be optimistic, but we'll just have to wait and see where we are as the pandemic progresses. As before, this temporary holding pattern for Chapter 32 includes **ALL** meetings for the chapter and Explorer Post, Young Eagle events, and any social activities like Movie Nights. Our mutual love of aviation, flying machines and shared experiences must take a back seat to everyone staying safe and healthy.

I'm looking into some of the virtual meeting apps. like Zoom and Microsoft Teams so we could possibly have some committee meetings online, especially for flood planning. (The river level today, April 13 at Grafton is 20.85 ft.) I've recently heard some security concerns about Zoom, though. At work we started using Microsoft Teams on our phones. These video meetings are a new experience for me. We're still open for business at TAC-Air as we're considered essential infrastructure but we're keeping our shift teams separated and maintaining minimal staffing. To do that, our weekly supervisor meetings are on the phone via the Teams app. Fortunately, the app. allows you to turn off the camera. At meeting time most of us are back at home or trying to sleep so we all look just APPALLING! Ain't nobody need to see that!

I'll start contacting our chapter members in the coming days just to check in on everyone and see how we're all doing. I encourage everyone as chapter members and friends to reach out to each other, stay in touch, and engaged with one another. This chapter has a long and proud heritage of helping one another in times of need. Let's keep our lines of communication open and flowing. I hope to learn we've been finding ways to work on and make progress on projects at home, maybe even related to airplanes! At my house we're cleaning out the garage! I've found several items I'd given up as lost! For some strange reason I keep hearing about putting cars in there. Weird, huh?

Last month I had mentioned sharing things that have inspired each of us in aviation. For me one of those big inspirations was the Apollo Program. Anyone who knows me also knows I'm an Apollo nerd. Our family was on a trip to Florida in the spring of 1971 and visited the Kennedy Space Center. On the bus tour we saw Apollo 15 sitting on the launch pad. The sight of that gargantuan rocket pointed at the sky will forever be burned into my memory! So was the scary encounter with an alligator in the Everglades with my brothers but that's a story for another time. I was 6 at the time and for a while my childhood drawings changed from weird looking P-51s to weird looking Saturn V rockets.

Right now, as I write this month's article on April 13th, we are 50 years to the day when Apollo 13 had the explosion in oxygen tank #2 that precipitated the famous "Houston, we've had a problem" radio call. Last night at work I pondered whether Jim Lovell and Fred Haise still relive that moment each year. I do remember watching on TV as the reports came in about the mission. And I still remember seeing each Astronaut lift into the helicopter in that little cage, everyone relieved they made it back.

It was beyond my level of understanding at the time. I just knew everyone was very worried about them. Now I marvel at the level of intense problem solving that went on by all those involved. So many bright engineers worked around the clock along with so many others to get them home. It was such enormous focus and a defining moment for NASA and America.

On a global scale we're seeing that same intensity of focus right now with the pandemic. So many are working so hard to save those who are critically sick and we're all working to stop the spread. This is a defining moment for the world and for generations to come but this will pass. We mourn the many fallen and pray for them and their loved ones to find peace. We'll come out of it realizing many new technologies, new ways of doing things, making things, and new opportunities that evolved out of necessity. But we'll be fine. We will. Now like Apollo 13, failure is not an option!

I'm continuing to pray for every one of us to stay healthy and safe and I'm looking forward to being together again. As always, stay vigilant and fly safe!

C.A.V.U!!!
Bill Doherty
Interim President
EAA Spirit of St. Louis Chapter 32

A2Z Aircraft

Do you need something from Aircraft Spruce? Would you like to support EAA32 and save some money at the same time? Of course you would!

Just go to https://a2zaircraft.com/ to place your order for anything that Aircraft Spruce sells. You will get a discount and EAA32 will get a donation.

Prototyping an Instrument Panel

Bob Murray

John Vreuls, Shawn Eaker, Bryan Peetz, and I, all members of EAA32, bought an RV-10 in 2018. Mitch, the builder, was a daytime VFR pilot in Lakeland Florida. No heat, no lights, no motor monitoring system, not a single luxury!

This was perfect because I was looking to design a full glass IFR panel to keep myself diverted. We were lucky to find a really good airplane with a minimal round-dial panel, which kept the purchase price lower. It did have a non-WAAS Garmin 430 but Mitch never figured out how to use it. He was almost surprised when we powered it up and it worked well when we were looking over the plane before we bought it.

In 2018, we added nav/strobe/landing lights, cabin heat, flap controller, engine oil heater, Garmin G5, VOR/ILS antenna, and an up-to-date 430 database to make it a pretty good IFR, night, and winter plane. Later that year, we replaced the Garmin 430 with an Avidyne 440, which is a direct plug-in replacement for the 430, and a WAAS GPS antenna. The 440, along with a Jeppesen database subscription, provides LPV approaches, getting it closer to being a really good IFR machine.

Replacing the Garmin 327 with a Stratus ES transponder in 2019 gave us ADS-B Out capability before the 2020 deadline.

But the holy grail was still dual EFIS, autopilot, engine monitoring of all six cylinders, built-in ADS-B In, heated pitot, multi-button stick grips, plenty of electrical backup (because there are no vacuum pump instruments), and simply plenty of backup everything.

We started designing the new panel in earnest in early 2019, assuming “this will take only a couple of months”. Of course, you double every estimate twice and then add an unknown fudge factor, so a year later and we’re right on schedule. The design is done and most of the parts are powered up and connected with prototype wiring. The goal was to test everything as much as practical on the bench before taking the plane out of service for installation.

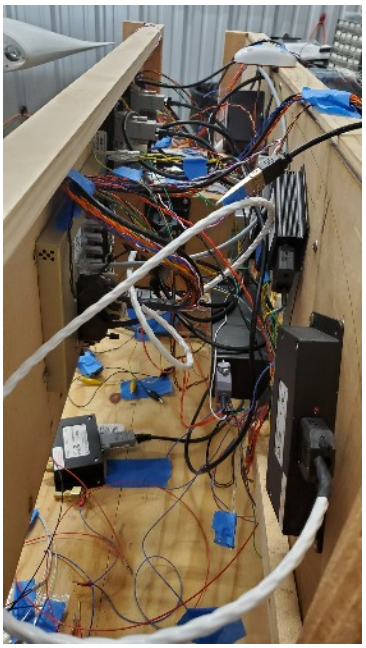
The first picture shows the bench build about as far as we will take it as a prototype. The autopilot servo in the picture had just finished testing. The G5, transponder, and Artex ELT have been flying in the plane so no need to test them on the bench.

As you can see, we went with a dual Dynon Skyview HDX system. Because we chose the Avidyne GPS first, we had to make sure the EFIS we selected would work with it. The folks at both Dynon and Avidyne assured us they know and talk to each other. There are planes flying successfully with this combination. From what we can test on the bench, so far so good.

Here’s a list of the redundant capability

1. Two EFIS screens
2. Two independent GPS navigators and antennas - Avidyne and Dynon
3. Two independent Air Data, Attitude, Heading (ADAHRS) - Dynon and G5
4. Two Comm radios - Avidyne and Dynon
5. Two backup batteries in case of alternator failure, along with the main battery
6. Redundant devices are not on the same backup battery

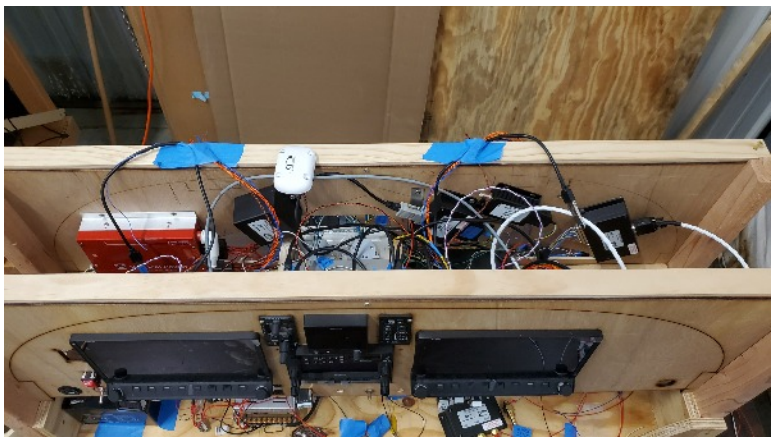
John made a SolidWorks CAD drawing of the panel with all the hole cutouts. He also created a CAD drawing for the middle bulkhead between the panel and the firewall. John cut plywood from the CAD drawings with a CNC laser at the Inventor Forge maker space in St. Peters. He then built the 3-D wooden bench fixture shown in the remaining pictures.

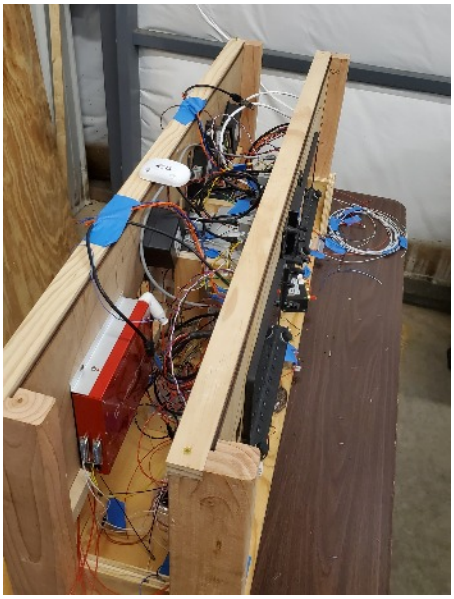


This was a great help in determining where all the remote boxes will mount, mostly on the middle bulkhead. There are almost as many boxes behind the panel as there are in the panel. This includes Vertical Power VP-X, two backup batteries, Dynon com radio, two ARINC-429 adapters, ADS-B receiver, Engine Monitoring System (EMS), SkyView network hub, and nav/strobe light controller. The Dynon ADAHRS and pitch servo mount in the tail, and the the roll servo in the right wing. The G5 ADAHRS is self-contained except for a magnetometer in the left wing.

The throw-away prototype wiring uses cheap hookup wire and solder connectors. Cat 5 Ethernet cable makes good prototype SkyView network wiring. The real aircraft wiring is tefzel insulated with aircraft-quality crimped D connectors.

We have some "store-bought" wiring harnesses to make the job easier. Dynon supplies harnesses for the HDX screens and two harnesses for the EMS. I bought one long SkyView network cable that I'll cut up into shorter pieces and add connectors to save cost. The PS Engineering audio panel warranty requires the audio wiring to be made by an authorized fabricator, Aircraft Spruce in our case. Not cheap, but it saved a lot of time and frustration with the two 44-pin high-density connectors and many shielded cables required by that panel.





So I highly recommend a bench build and prototyping, both electrical and physical, as much as possible before cutting any aluminum. We've already made three fiberboard test cutouts to tweak the placement of switches and controls, and to see how it fits in the airplane. One problem was the first panel design didn't clear the front vents and had to be made 1/4 inch shorter. This is a whole lot easier to fix in a CAD drawing than with a sheet of aluminum already cut and bent.

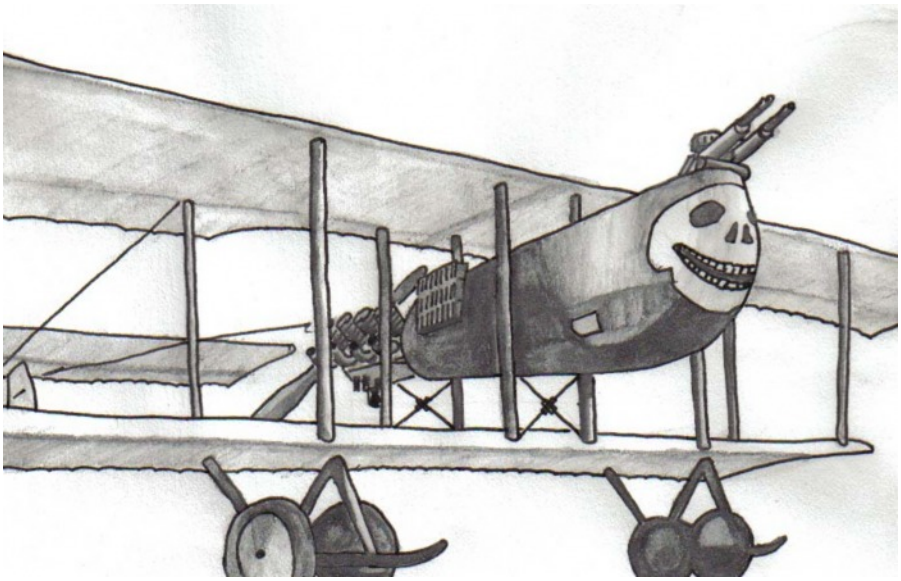
I originally thought we would make much of the actual wiring harness on the bench. We've found we're not 100% sure of the final placement of all the boxes and wire routing to clear the aircraft structure. Plus, everything connects to everything, so instead of several cleanly defined harnesses, you end with a single spider web of connectivity. Therefore, we're connectorizing one end of many harnesses for real on the bench but leaving the other end to cut and terminate in the airplane. This is how the store-bought harnesses arrive, with one end unterminated to route, cut, and connectorize in place. Still, this will save a lot of airplane downtime because 95% of the hard decisions are already made and mistakes fixed before taking the plane apart.

The next step is to start demolition and construction of the real thing. As long as that's not an embarrassing failure, you'll be hearing from me again to report on how that goes.

Happy building.

Thoughts of Flying Machines From the COVID Bunker

Dave Deweese



Here's an odd bat-looking gadget constructed decades ago from plans in some model airplane magazine. While many a crudely glued and brush painted model went to the landfill I couldn't bring myself to pitch something that could be returned to flying status. This fellow provided several amusing hours of diversion: replacing rubber then figuring out the right balance to get him to flutter skyward. I saved several other free flight aircraft, a bunch of scrap balsa, and tubes of R/C plans - here's a game that can go on for some time.

I drew this Farman F.40 a while back, caught by the cheerful expression of the death's head nose art. It reminds me of my ambivalence around our current kerfuffle. On the one hand are the dire warnings, on the other hand I don't have to drive to the office and am being assigned fewer shopping missions. Some of that extra time can be applied to important matters, specifically things that fly.

Late last year my middle daughter and her fiance bought the house I grew up in from my parents, who had moved to assisted living. Fortunately, in the interim, I had the foresight to retrieve many treasures. This salvage is proving a bulwark against boredom and stagnation.

I searched in vain for the Guillow Lancer, an old school stick and doped-tissue model Dad built when I was very small. Its performance compared to the drugstore rubber band airplanes blew my little mind. It was lost to time, however, and although reproducing it was an option I resisted looking back and opted to pay tribute with a more modern incarnation. The cool kids of today are into electrical wizardry, and with the help of Amazon delivery I have collected all the requisite tokens and amulets necessary to bring this thing to life.

The blue and yellow colors are a nod to the tissue paper colors of the plane that led to this one.

Also pictured here is a swell old Weller soldering pistol I've been practicing with. It was Dad's, yet more salvage from the homestead, and maybe using it will imbue me with some of his engineering prowess. My past experience is with the stick kind, and that a long time ago, but I'm starting to remember how this dance goes. Soon I'll be confident enough to add bullet connectors to motor leads.

Yet another pursuit I'm revisiting in this unusual time is the flight simulator. Maybe you got the email from HQ regarding the EAA Virtual Flight Academy: six free lessons you can download and work through in Microsoft's FSX steam edition. I've got that, and a yoke and throttle and rudder pedals, and you can't beat free with a stick, so I'm giving it a go. When we're all ungrounded I'll bum a ride in somebody's Cessna and make a non-pilot's assessment of how close it is to real.

That, then, is a brief rundown of what your faithful chapter secretary is up to when not taking notes or running young eagles back and forth to planes. If, by next month, we're still locked down I hope to see some articles about what the rest of you are up to.

Onwards and upwards,

(Do335)Dave+

Pass the Salt

In this time of "social distancing", some folks have a whole lot of time on their hands. Click on the link below to see how a couple of guys achieved a necessary task while remaining distant. (Don't worry…the link is safe!)

Pass the Salt

Dave McGougan's Kitfox Project

Here are pictures of some of my Kitfox parts painted brilliant yellow. So far I have painted the landing gear, doors, cowling, rudder, stabilizer, both flaperons, elevator and spinner. I brought the doors home and have installed the glass windows. I plan to do (paint) the fuselage next and the wings last. I will send more pics as I go.

Dave M

Editor's Corner (Sort of)

Activities During the Quarantine

In keeping with Dave Deweese's example of what to do during a shutdown, here's my contribution:

I worked hard to build a flying airplane and I succeeded. It gave me many hours of enjoyment, but I found myself starting to get less interested. I think part of the problem was I wasn't flying a lot, and it seemed like the only time I went out there was to do some work or move the airplane.

I, along with almost everybody else, had to evacuate my hangar whenever the mighty Mississippi decided to overflow its banks and intrude on Smartt Field.

I need not go into detail what happened last year, but even before the flood I was contemplating putting the RV up for sale. The sale took place after a very long and hard summer, and I feel like I got a fair price for it…maybe even more than if I had sold it in an un-flooded condition.

This is not to say I am not still interested in aviation. I am, but right now I'm taking a break. I will gladly go flying with anybody (hint, hint), but as of now I have no plans to renew my medical or BFR.

So what am I doing to keep busy and alleviate the boredom, you ask? I resurrected my lifelong hobby of plastic modeling, which was on hiatus during the RV project. This hobby lends itself perfectly to staying home, which is what we're all supposed to be doing these days. I confess to being a homebody even before COVID. How else could I have a 2 year old car with just over 11,000 miles on it?

I started this Douglas F-4D Skyray project before the virus, but I finished it after the quarantine, so I declare it my first virus project.

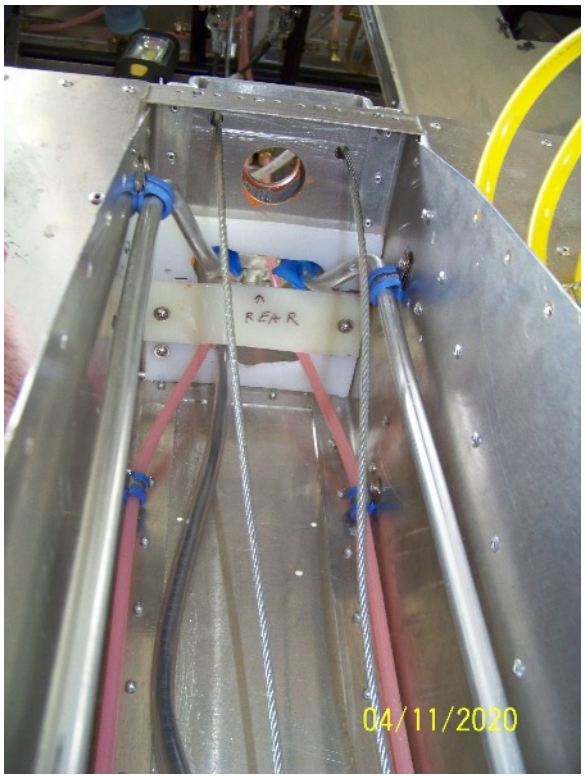
Growing up, I was blessed to live on the final approach path for a Reserve Naval Air Station. Among a lot of other interesting aircraft of the 1950s and 60s, many many F-4D Skyrays flew over my house.

Autopilot or Not?

Art Graves

Dear Flying Friends,

I hope this finds you all well and safe. Things have been slow on the build front lately, but there has been progress. I am building the console and associated fuel plumbing. Getting the fuel lines through the tunnel to the console was an adventure. At the front of the tunnel (just aft of the console) things are very congested because of the torque tube and control yoke, especially the lower extension of the yoke that operates the elevator control rod. The Parker Superflex fuel hose is not only fat, but fairly stiff. I could route the line clear of the moving mechanical parts until I tried to get it through the bulkhead to the console. I could not train the hose so that the yoke extension did not interfere. I ended up hard piping the supply through the tunnel, with Superflex in the console and behind the tunnel. I



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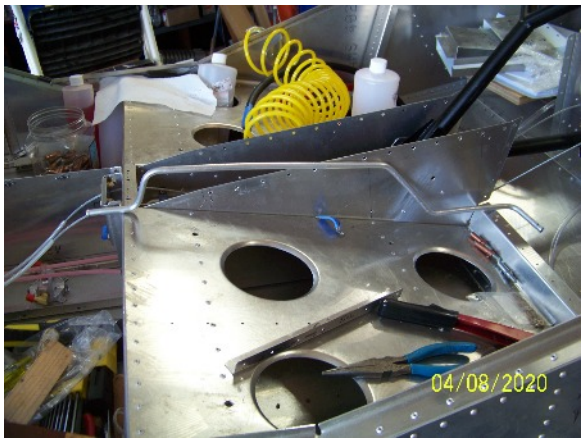

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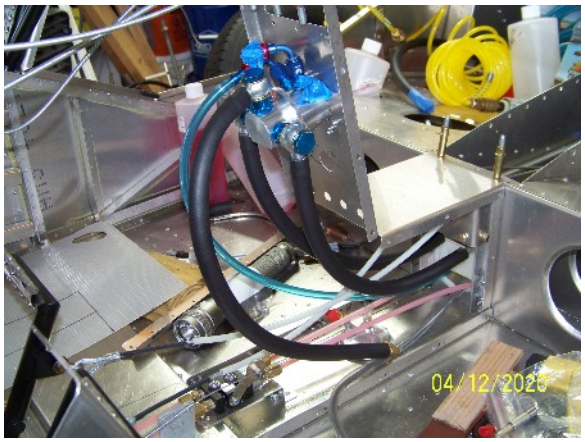
was able to bend the aluminum lines so that they will never be hit by the yoke or extension. My next plane may be easier to build if I know what I am doing. See pics 6571 & 6576. Pic 6583 shows the console cover with the fuel selector mounted. The

6583

cable knobs above mount into the opening at the top of console. 6584 shows the plumbing going into the fuel selector. I think it is going to work.

Now for the question. When I was planning this project I saw no need for an autopilot. In fact I did not want an autopilot. I was also thinking steam gauges. I recently read an article by Paul Dye that described the safety benefits of autopilot. My Dynon HDX will support autopilot. I would just have to buy and install two servos, for pitch and roll. How much of a safety enhancement is an autopilot? Is it worth installing? Let me know what you think at aeg2@sbcglobal.net.



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Now would be the easiest time to install the servos, before I close up the back of the cabin, and while I am doing the rest of

“Going for the B-737 Type Rating”
or
“Nailed it!” Her Words Not Mine
mr. bill

“Ladies and gentlemen, welcome to The Twilight Zone.” I would like to type CRAZY but that is a medical term. I was told to write “unhinged” because that is more like the off the wall stuff we are dealing with these days.

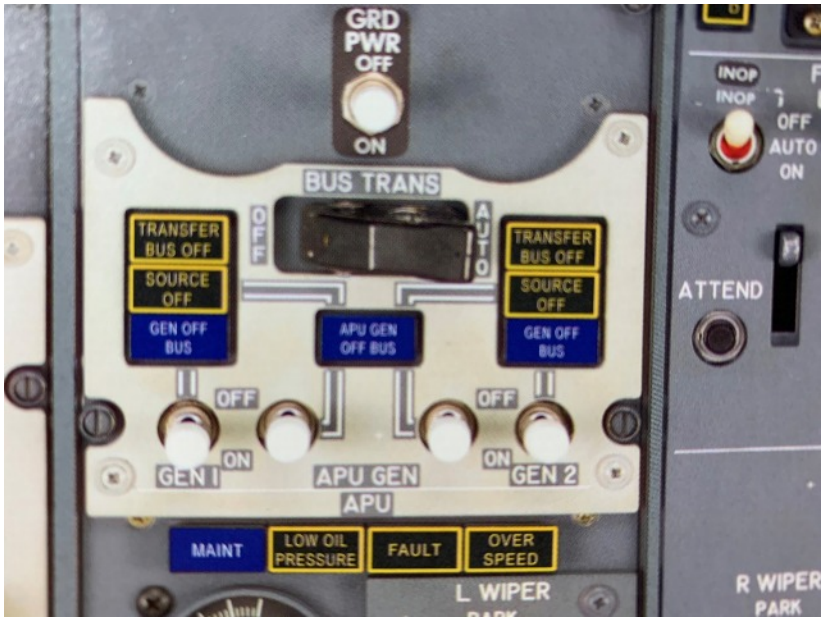
Last March 13, 2020 I walked into the AA Flight Academy for my Boeing 737-800 NG (Next Generation) ground school. Not an easy task for the many souls that were on the Mc Donnell-Douglas MD-80 flying it for all those years between 1983 until 2019. The last AA MD-80 flight was September 04, 2019. It was very good and helpful for me to have the 6 months off from flying (teaching the diversity class) to forget the “ways” of the MD-80. So now with a rested mind and 30 hours of iPad ground school under my belt, I entered the Flight Academy training center, had my body temperature checked (for Coronavirus disease symptoms) and I was allowed to enter the world of “Triggers and Flows.”

Today’s flying is accomplished through procedures. If you hear a certain word or phrase, it “TRIGGERS” you to accomplish this flow over the instrument panel and “things” (switches) are prepared for that procedure.

Gone are the days of drawing out the whole electrical system. Or knowing how a direct current battery can make alternating current. There are diagrams or system schematics that pop up on the SYStems computer DISPLAY screen and show you the details of “WHAT” SYStem you want to view and what part or pump has failed with red ink. Heck on most of these new airplanes, the EMERGENCY checklist pops up and you follow that checklist to solve the situation that is at hand. That is not the way with Boeing 737 though.

The Boeing 737 aircraft is unique. The first passenger flight was December 15, 1967 with Delta Airlines. Can you believe that the flight deck’s overhead panel is STILL the same? If it works why change it? If you change THAT overhead panel the airline would be changing the “switchology” and that would require more training according to the FAA and the airlines want to keep things as “easy peazy” as possible with the transition and training of its pilots down to a minimum.

How simple are things? The Boeing 737 uses the Boeing 727 throttle quadrant. Instead of three throttles as the 727 had for its three engines, the B-737 has two thrust levers with bigger knobs to fill in the gap. The overhead electrical panel was once a three dial gauge that now has the middle gauge cut out of it. To prevent updated “automation” from switching over the engine driven generators from coming on line automatically on the B 737 NG, the pilot must manually place the engine driven generator switches, on line just like they did in 1967.



Again, no additional or “differences” training needed here so we is good to go!

Ahh but wait! With the new B-737 MAX they put new engines on the airplane which raised the front of the jet up 8 inches. No problem. To duplicate the same landing picture or view from the flight deck of the MAX as with the view on the 737 NG, the wing spoilers come up automatically on final approach causing the aircraft nose to be in the same attitude as the B-737 NG. So no differences between both airplanes.

The other “item” that was automatic was an aircraft nose lowering system that gave you 35 turns of nose down trim in one second to help you lower the nose in case of a very nose high attitude or situation. Only trouble with it was if you did not try to correct it yourself it gave you another “burst of nose trim” again in ten seconds from the previous shot of trim. It was something close to four units of trim at a time. The jet usually takes off with 5.0 units of nose up trim. One can see how a couple of shots of “nose down trim” in 30 seconds could make the

airplane a fairly (heavy) nose down trimmed airplane pretty quick which would require some he man or he woman pulls on the control yoke.

Now with the new "fix" you only get one shot of nose down trim.

Well after 50 hours of simulator time, mr. bill and Ms. Heather (A C-130 driver) made it thru the Boeing 737

Type Rating Ride with flying colors.

Piece of cake, right gang?

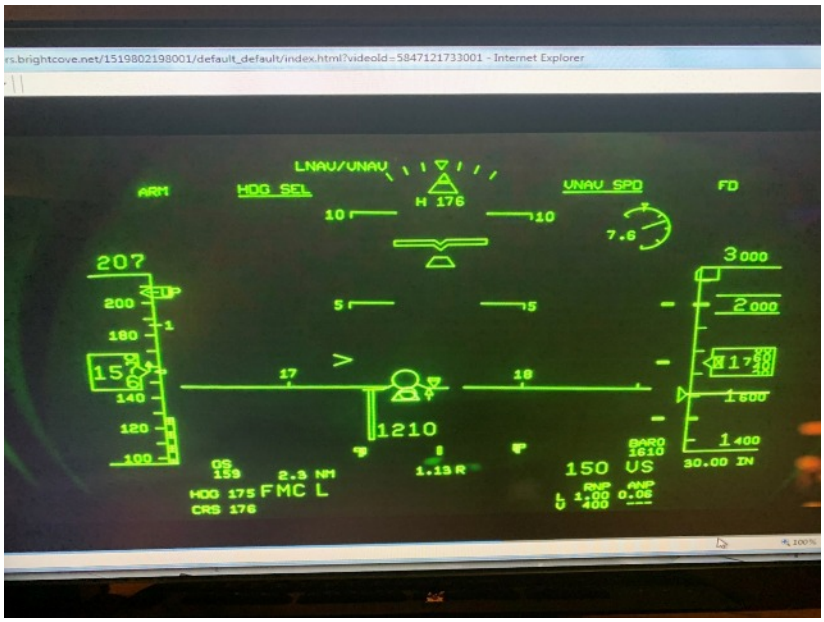
Q? Why is it called a **TYPE** Rating?

A: Airplanes that weigh over 12,500 pounds gross weight are considered complex and required a special or type rating.

Q? Which **EXPERIMENTAL** Aircraft require a **TYPE** rating?

A: The Sub Sonex does because aircraft with a turbine engine are complex and also require a **TYPE** Rating for that specific airframe. Also for insurance purposes too.

A new toy that I was trained to work with was the BAE 2020 and the Rockwell Collins HUD-Heads Up Display. This nifty piece of glass shows me everything that is on the forward instrument panel on a piece of glass 16 inches from my face. You must find the sweet spot so it shows all the info so I can Hand Fly the B-737 down to 50 feet above the ground in Runway Visual Values of 300 feet visibility forward visibility. The runway edge lights are 200 feet apart soooooo…. When I roll onto the runway with the use of the HUD I only see one edge runway light and 4 runway centerline lights. Ready for take-off? There is an airplane symbol with two landing gear legs and I have the Localizer needle that must remain between the symbols landing gear legs in order to stay on the runway centerline. The picture below shows the HUD's display. You can see the airspeed on the left and the altitude on the right with several other informative symbols. This picture was taken shooting the ILS 17Center runway approach in DFW. The airspeed is 157 knots and the altitude is 1,760 feet. The tape off the left airplane wing means I am slowing down and I am trying to put the BIG circle around the little circle (look towards the landing gear.) The airline calls it "keeping the donut hole in the in the donut!" It is an amazing task but with this display the jet can take off or land in 300 foot visibility.



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Check out our fantastic Web Pages at

WWW.EAA32.ORG

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While you're there, take time to join the Yahoo Groups to help you stay abreast of Chapter happenings!

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