Happy New Year

January 2019

Home of the "Panhandle Pelicans"

Squawk 485

EAA 485

President

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Hello Everyone,

Happy New Year! I wish you all a Happy, Healthy, Safe and Prosperous 2019.

As we begin a new year we've added a new chapter officer: Ralph Moser has graciously stepped forward to assume the roles of our Ray Aviation Scholarship Fund Coordinator.

Chapter Meeting January 9th 1000

The January chapter meeting will be Saturday January 12th @ 1000 at our clubhouse at 82J.

February Chapter Meeting NAS Museum Saturday February 9th @ 0900

We've scheduled our February meeting for the NAS Aviation Museum for February. The location is the small theater adjacent to the Cubi Bar & Grill. Please notice the time starting at 0900. This will allow us to conduct our regular meeting, do somethings in the museum and be back for and optional lunch at 1130 at the Cubi Bar & Grill. We've reserved the special room for this event. We'll take a head count at the meeting start for lunch attendees so they can setup the room for the appropriate number.

There is a fixed group charge of $12.50 per person if you attend lunch.

We encourage significant others and friends to attend as it always is an interesting event.

Don't miss this event.

(Continued on page 2)

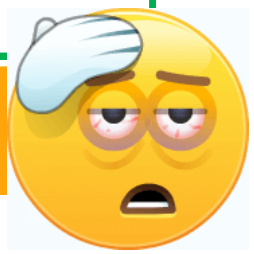
Monthly Meeting Ferguson 82J Saturday January 12th @ 1000

December 1st Meeting called to order at 0940

Pledge

- President discussed Young Eagles program, documentation going to be digitized
- Possibilities of WiFi becoming available at the clubhouse or we'll use a local WiFi for YE events
- Limited access to airports due to security impacting youth aviation enthusiasm
- Road trip to Continental Motors and Airbus in Mobile for next quarter. Chinese aviation investment in Continental discussed
- Initiative to bring the website up to date was discussed and will be followed up with a fact sheet survey to the membership.
- Pearl Harbor day December 7th activities at the NAS Museum discussed
- Ardell Johnson's 92nd birthday is coming up Glen Miller concert coming up Jan 15th
- Museum meeting discussed and will be scheduled for February
- Ray Aviation Scholarship was discussed at length, following a very detailed briefing by the project officer Ralph Moser.
- Everyone should complete the Youth Protection Program at the EAA so that we are covered for youth mentoring activities. Two member policy in dealing with youth discussed.
- Treasurer presented current Chapter bank info $5348.75 in account after payment of 2019 EAA National chapter dues and insurance policy of 520.00

Adjourned



EAA Ray Aviation Scholarship Fund

Ralph Moser is keeping abreast of the program, but as yet we are still awaiting the first phase which is the chapter application process. We have a handful of prospective scholarship awardees and Ralph is also keeping them in the loop.

Once we get the application we are ready to make an immediate application. We should have any information at hand and that process should be completed rapidly. If the chapter is accepted we hopefully will have a great "slam dunk" prospective scholar "waiting in the wings." Pun intended! The requirement is that the prospective candidate when applying has a 3rd class medical in hand. The cost for the physical is to be absorbed by the individual, however, I'm proposing that the chapter assume this expense of $125-150. We'll be discussing and voting on this at the meeting.

Ralph will be briefing on where we stand at the upcoming meeting. Once again this is an all hands effort on making this program a success.

Future Road Trips / Training Coordinator

Recently we've discussed doing some road trips in 2019. We will try to setup a tour of Continentals facility and possibly include the Airbus facility at the same time.

The chapter needs a volunteer to look into what's available and we also are soliciting input from all of our members on what they would like to do.in 2019. This isn't limited to touring nearby businesses and facilities but will look into hands on type training as a chapter.

I'm going to be covering my Avid wings some time in the future so maybe we'll use a couple of consecutive Saturdays for interested people to get some training on covering.

Let's make an effort to do some interesting things this year. Don't be afraid to step forward and make some things happen.

Thanks, John

Rebuilding an Avid Flyer Fuselage

My son Patrick has been busy working on the Avid. I always questioned why this Avid had a slightly different structure than the taildragger I have. They both are listed as a MK IV model, however I did some investigating and now we've determined that it is "C" model where the Mark IV aircraft were all based on the "D" model. The Experimental Aircraft world is a different animal. As companies go out of business and re-emerge information becomes harder to find. However, with the internet and knowledgeable individuals some of the pieces can be found

In the Avid's case and in many other aircraft, the original design is of a much lower gross weight. The prototype Avid had a gross weight of 764lbs. Its empty weight was slightly more than 100 lbs heavier than an ultralight. The first production model had an 850lb gross weight having more than a 450lb useful load.

Airframe changes as well as engine modifications (more horsepower) allow the aircraft to support more weight. The next increase included both 950 and 1050 lb aircraft with a new engine. The last model was my Avid D model Mark IV heavy hauler that has up to 1200 lbs gross weight. Of course the empty weight continually increased. To make this possible the tubing is beefed up in places. On the Avid aircraft this comes in the form of some additional tubes in the cockpit area, gussets in the aft spar carry through, closing the front and rear carry through tubes and using larger diameter wing struts along with a longer high lift wing.

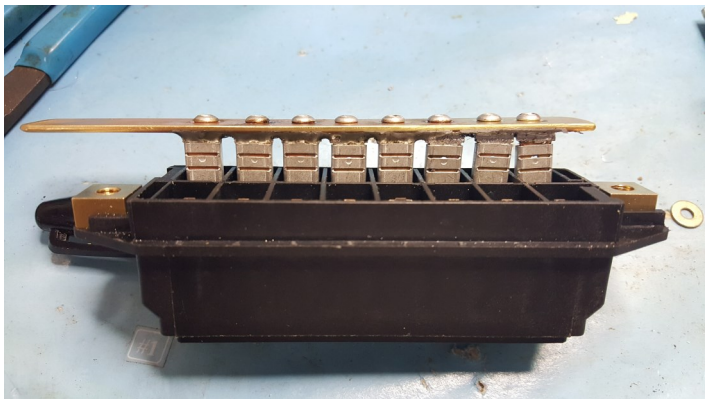
The Avid Pat is working on is a hybrid. Many of the C models invoked Mark IV options. An actual baggage compartment. A larger landing gear with a wended in step along with a dorsal spine tube. On the elevator there is electric trim and a rounded vertical fin rudder combination.

Following the accident Ruth and I spent about 4 days down in Palm Bay. A quick inspection amazingly revealed very little airframe dam-

age. The gear would need some welding and recovering and a pair of new tires. A new set of bungees would also be in order along with some SS safety cables for the gear. We decided to remove all the covering at this point to get a good look at all the fuselage tubing. There were some slightly bent tubes aft of the strut attach points that appeared capable of straightening.

I had brought my aircraft medical kit and a few things I made before we left. Pat had been given the green light from the NTSB to begin repairs to the aircraft so we began by removing all the wiring. I never cared for how it was originally done and just had done some mild modifications. Now it was time to simplify and consolidate and get everything using Milspec Tefzel wire. I started with a similar fuse block that I did for Rusty and my other Avid. Nice and clean providing 8 fuses mounted on the instrument panel. The old system had the old screw in glass tube fuses that were soldered in a daisy chain, using more wire to a soldered switch and more wire. It was a regular rat's nest.

Here is the fuse block with the bus bar.



The entire bus bar can be insulated using a slit clear nylon hose cable tied. It makes for a super neat central distribution point. The best part is the fuses are standard inexpensive auto store parts.

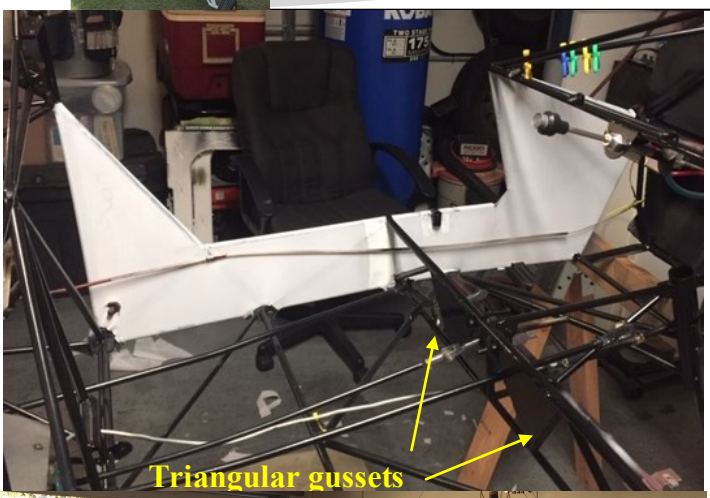
I also replaced the old Narco transponder with a Garmin 327 digital unit. I didn't have the tools necessary to build the harness between the Narco AK 850 encoder and GTX 327 so brought the encoder and the Garmin connector back to build in my hangar.

With the new electrical system installed we stripped the fuselage of all fabric. I took an hour looking over all of the tubes. There were a pair of longerons aft of the strut attach points that had a slight easily straightened bend. The rest of the tubing appeared in great shape. By the time we headed home a pair of sawhorses were built to use for the covering and painting of the fuselage.

Patrick found a set of Mark IV conventional gear and a Maule tailwheel over in Dunnellon, FL This was a huge find on rare landing gear. The gear was never used as the aircraft was eventually built as a tricycle aircraft. The covering was very poorly done, so off with the covering.

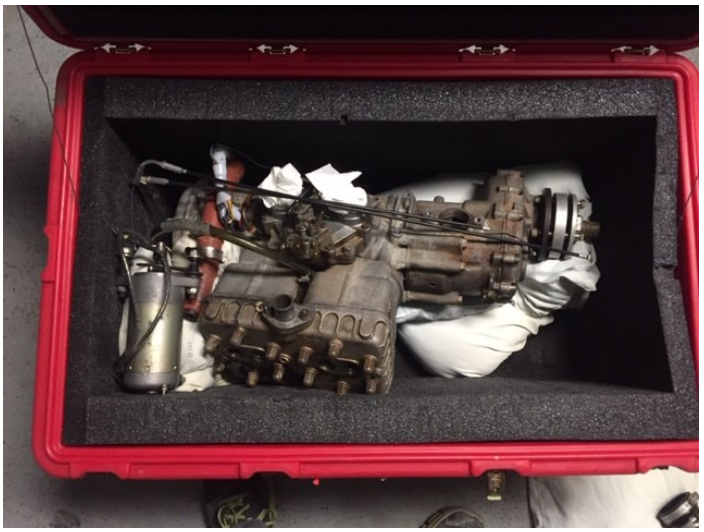
There was some reinforcements done to the tubing to strengthen some areas. The first was to install some triangular plates in the forward truss where the gear bungees would now wrap around since the conventional gear in the Avid is moved forward 12". Also the Mark IV models have gussets installed between the aft spar carry through tube and the supporting structure below and on the side of the door opening. Pat used some .050" steel and made up the plates and had a welder install them.

Ready to start covering. New Mark IV gear was covered as a test piece and installed.



I had sent a care package down south that consisted of lots of fabric tape and various items including the encoder with harness.

It was time to send the engine to the shop to determine the cause of the engine failure. Pat had a heavy duty plastic case with foam lining in his garage. Some old pillows completed the packing material. Everything was sent back. Remember this engine had only 70 hours since "new" and the insides from what I could inspect showed no abnormal wear.



The engine went to "Rotax Rick" who takes the time to explain about the engines. He has a shop in Naples, FL so it wasn't very far away. He didn't care for the crank that was in the pre-94 582 engines and definitely didn't like the oil injection system. He said he sees engines with way under scheduled oil with a ratio over 70:1 at take-off power. He also explained about how to operate these motors and the warmup needs to be conducted at a high rpm and water temp needs to be 150 degrees before takeoff.

Pat was still involved with the NTSB and FAA wanting to look at the teardown. Numerous calls were made but there wasn't a coordination between them. The FAA rep said that they wouldn't cover the teardown and the NTSB never responded back to "Rotax Rick" or Pat's phone calls or emails. The decision was made to do the rebuild and furnish all parts that were re-

placed to Pat for their inspection if necessary.

Rick had already done a cursory inspection of the engine when it arrived. He said that there was no apparent mechanical damage and the engine turned freely. Before removing a bolt he went to the carbs. After an examination he said the issue was with the carb vent tube on one cylinder and a float needle valve intermittently sticking. There was some type of residual oil/fuel in the vent line which ultimately blocked the exit holes leading to a continuous unscheduled fuel to the cylinder, basically blowing out the flame. This would explain the initial failure with the engine running down to 2000 rpm (basically idle).

After a teardown the internal pieces all looked good. However, due to the age and available upgraded newer components, the crankshaft, rods, pistons and bearings were all replaced. The cylinders still had a crosshatch pattern, but after examining it was discovered that one of them was .010" oversized. This was outside the normal Rotax guidance for piston to cylinder clearance. After finding forged pistons slightly oversized were installed over the standard Rotax pistons. Obviously with crosshatched oversized cylinders this engine was rebuilt during its life and installed in the aircraft back in 1993. Of course, no logbook entry detailed this fact. The piston clearance wasn't an issue or contributed to the engine failure..

Here is the motor after rebuild on the test cell.

Looks great!

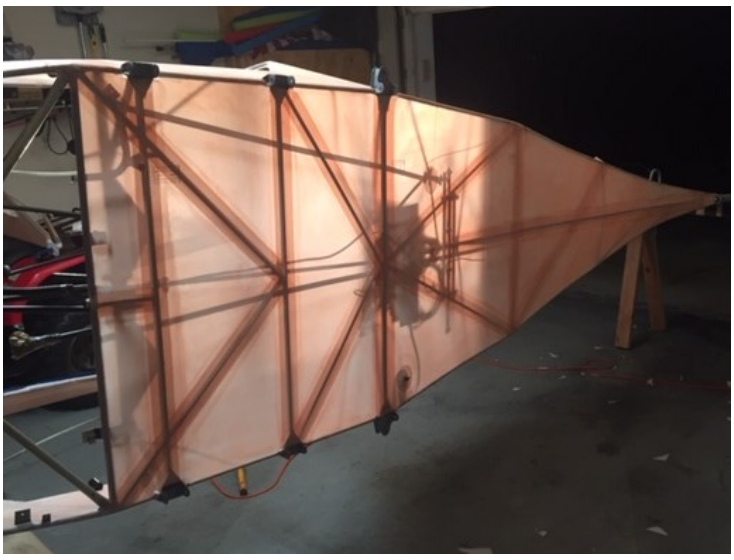
Here is a quote from my son Pat:

"3k all said and done. Looks very nice. Hopefully it will keep my ass in the air this time...."

The only thing worse than finding the cause of an engine failure, is not finding the cause.

1st coat Polybrush.

And now on to the tapes. Although some of the tubes will never come in contact with the fabric, the decision was made to do all of them for aesthetics. Here Pat is working on the bottom.



Tapes are done.

There are still a few items before getting the spray gun fired up. Fortunately Pat had a birthday in December and got a new toy. His old compressor had given up the ghost so we sent this to him.

I've had one of these at my hangar since I began building it in 2006. Mine is just a single stage 135 psi. I'm still running the original belt and it runs like a sewing machine. OK, maybe a little noisier. It's not run very hard normally, but I do some sandblasting which uses tons of air.
Pretty amazing that the price was less for this better model 12 years later. This should be great for shooting since the tank can hold lots of air at 175 psi and you'd be able to shoot at a reasonable 40 psi for a long time.

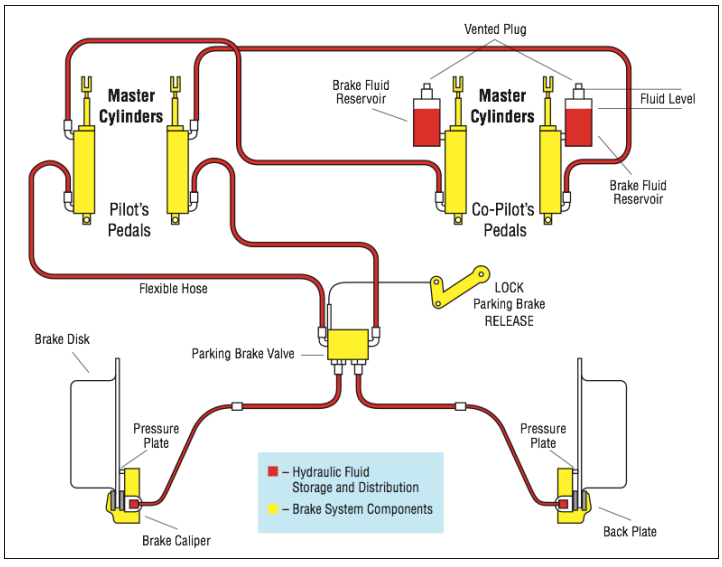
Next up is will be time to shoot the Polybrush and Polyspray (Silver) followed by the Aerothane (polyurethane) Daytona White. Before the final paint Pat needs to prep some of his other pieces such as the cowl, tailfeathers, ailerons, doors, wings and small pieces. The idea is to put a 2 or 3 coats on the fuselage and 1 coat on each of the parts to get an even match on the Daytona White paint.

Hopefully next month the conclusion.

Brakes 101

Brakes are often overlooked but certainly a very important part of an aircraft. Most general aviation aircraft have good brakes. Brakes get daily abuse with dirt, gravel, stones and grease. I hate working on them and jacking up aircraft. They are very important in any aircraft not having a steerable nose wheel and of course in tailwheel aircraft.

When we move over to experimental aircraft sometimes the brakes are well, inadequate. My RV-7 has good brakes. Well designed and certainly ample for the weight of the aircraft. The Avid on the other hand are very poor in their standard configuration. There is a simple reason for this and it's one word. Geometry!
Yuck, what does that have to do with it? Well we'll get to that in a moment. First, let's look at a typical modern day dual-brake aircraft system.



In theory it's a simple early automotive system, however, uses independent master cylinders for each main wheel. This allows for asymmetric braking aiding taxiing. In this dual system an additional pair of master cylinders on the co-pilots side is added in series. Hydraulic fluid flows from the pilot's cylinders to the calipers. The system is a manual disk brake system. I had a 66 Mustang GT with front manual disk brakes. You had to "Stand On" the brakes to make them work. Ruth wouldn't drive it for that reason.

In an automobile, the braking system is very complex adding antiskid., master cylinders with multiple reservoirs, equalizers, electronics and a powerful brake booster. We refer to this as Power Brakes because your movement of the brake pedal translates into lots of pressure to the master cylinder from the booster doing its job.

OK so here's where the math comes in. We need to create a mechanical advantage from our aircraft brake pedals to our master cylinders. Matco Brake Company says we need to be able to generate 450 psi from the master cylinder to deliver the rated torque (stopping power) to the calipers. They also recommend a **minimum** 2.5:1 ratio between to the brake pedal arm to the actuation arm.

Matco Brake Diagram. Minimum ratio 2.5:1 would require 55 lbs to generate the max torque to the brake disk.

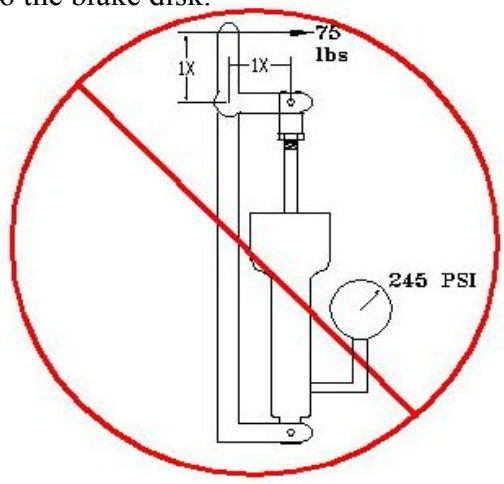
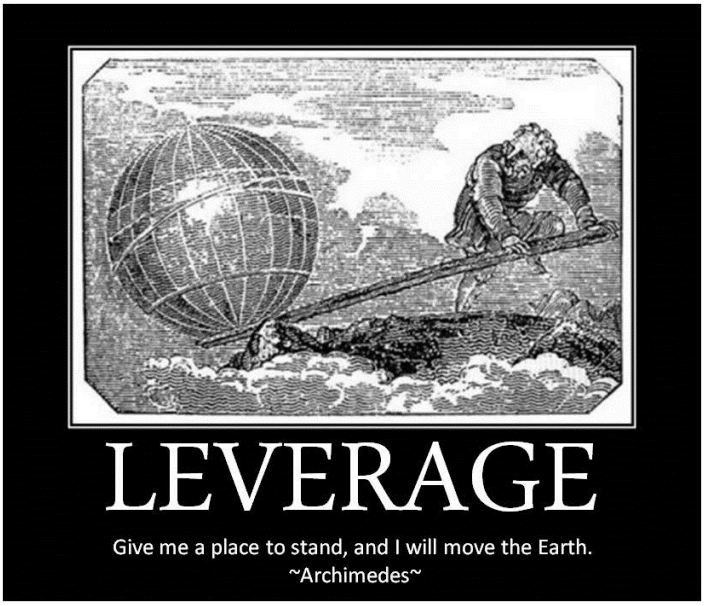


FIG 1
Poor Geometry

For those of you who have a good memory, you may recall the name **Archimedes.** Well, for those of you who don't. Archimedes was a Greek mathematician, physicist, engineer, inventor and astronomer. I guess he had a problem holding a job. He lived a long time ago from 287-215 BC and was a pretty smart guy. He once said: "Give me a place to stand and I will move the Earth."



The Lever was simple and early tool of man. It was probably used in the construction of Pyramids and moving large mass stones in building projects.

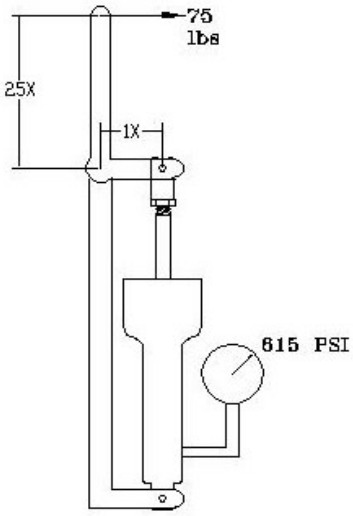


FIG 2
Minimum Geometry

OK, so now we get the picture that our brake system must be designed to use the principle of leverage from the pedals to generate adequate exit pressure from the master cylinders for good braking. Using the minimum 2.5:1 ratio would take **55 lbs** of force on the top of the brake pedal to get maximum braking.

The Avid brake system as far as I can determine never was upgraded from the original system on the prototype. It uses Matco MC-5 master cylinders. Looking at the geometry of the system they only can generate about a 1:1 ratio and we've already seen that this won't give adequate brakes. In reality about 50%.maximum braking using 75lbs of force.

Here is the stock setup for the Avid brakes.

You can see there is more problems than a lack of good mechanical advantage. The brake pedal part is weak being open ended and will twist with excessive force. On the left brake at least the cylinder attach point is located near the middle pressure point. On the right it is far away causing the brake pedal tubing to flex when depressed. Notice also that the attach points are both located on the upper portion of the brake pedals which gives virtually no mechanical advantage. With this configuration I couldn't even do a runup without the tires turning. I flew the plane on floats for a couple of years and forgot about the poor brake issues until I built my hangar returned to conventional wheels.

There were several issues I needed to deal with:

- The lower cylinder attach points were located on the top of the tubes effectively making the master cylinders about 3/4" longer
- The right pedal attach point needed to be relocated centering it on the brake pedal
- New brake pedals would need to be made with horns allowing a 2.5:1 MA minimum
- The cylinders shown were the older reservoirs same used on Pat's aircraft. They are a bit slimmer than what I had. The larger reservoir on top interfered with the pedal on the right side.

Here is what was done for Pat's brakes. His aircraft empty weight is 120 lbs lighter than my larger winged Subaru powered Avid. Even so it had mediocre brakes. It also had a steerable nose wheel that helped quite a bit. So the first order of business was new pedals.

Here are the brake pedals I made for Pat's aircraft from 4130 .050" to replace the stock ones. I needed to make a filler with some spacers to keep the mounting bolt centered and keep the pedals from moving back and forth. I used a 4130 tube in the center and two Delrin rods

which I drilled for clearance for the AN3 (3/16") bolt.

Once the brake pedals were completed the hard part was to mount them and determine linkage points setup. This would entail not using the original lower tab attach points to gain a little clearance. Some rough horns and tabs were made using mild steel of .050" The odds were they would have to be remade and that's what happened. After setting up the horns and attach tabs

Pat tack welded them to the pedals and tubes. Next we drilled holes in the components. Jose Martinez welded the tabs on the control column and horns to the rudder pedals. Nice Job Jose!

Here is the left rudder pedal finished

The unused tabs are on the top of the column with new ones welded on the front side. This allows for the entire assembly to still pivot with the control column The clevises are adjustable on the end of the master cylinders which is helpful. My RV-7s are not. In the final aircraft installation the brake pedals will be set allowing for an initial slight tilt away from vertical axis. This will help prevent inadvertent brake actuation while using

Preliminary Brake Pedal Adjustment

the rudders. As you can see we now have great Mechanical Advantage slightly above the required 2.5:1

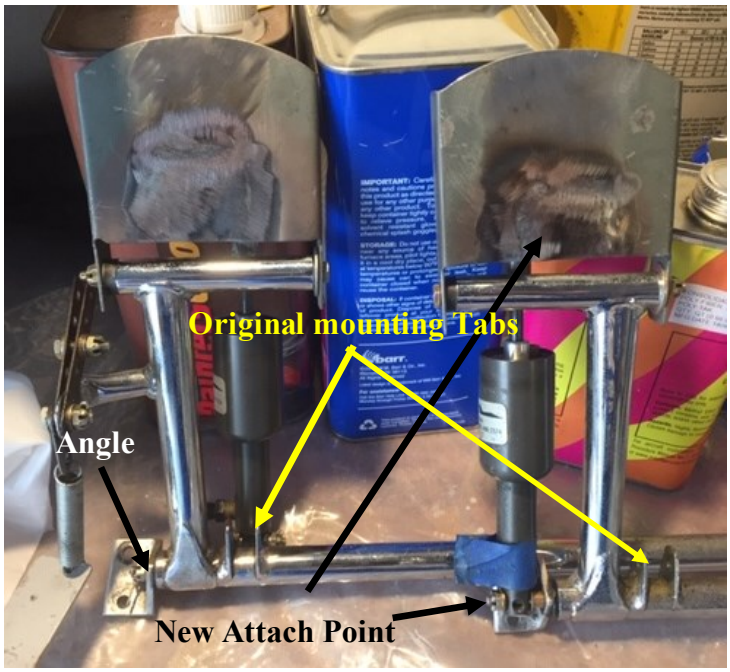
The final picture shows both pedals and the solution for mounting the lower portion of the right master cylinder. Due to the relationship of the tubes there was no space to use tabs on the control tube. The right brake attach point as mentioned earlier needed to be moved over to a more central location in relationship to the brake pedal

The control tubes are anchored to the flooring with a piece of 1/8” aluminum angle and two AN3 bolts. They use a standard AN3 bolt from the inside of the tube passing

through a slightly tapered rubber "cork". Once installed tightening the nut clamps the bolt in place as the cork compresses and the angle surface ensures nothing can come apart. Pretty clever simple design. I just installed a longer bolt to mount the cylinder to the angle, This allows the entire cylinder to pivot on it.

With the loss of nose wheel steering it was essential to modify the brake pedals for conventional gear.

Completed brake upgrade awaiting installation in the aircraft



Right master cylinder now pivots on the center of the control tube. Locating it on the end of the tube moved it to nearly the center of the brake pedal.

RV8A ADS-B In Dual Channel Upgrade

Dynon was nice enough to send me a no cost ADSB dual channel in receiver for Ron Lock's RV8A. They are very good about it since they brought out the dual channel about 2 months after Ron bought the single channel. The dual channel is about 1/3 the size and the installation took about 20 minutes of finding a mechanical mounting place. The Dsub 9 pin connector was the same as the original installation. All that was required was to plug it into the new unit and transfer the coax connected to the belly antenna.

A quick check flight proved that incorrect. No weather or traffic. I rechecked everything and found no installation errors. I contacted the Dynon tech department. Gave my spiel and they wanted me to check some other things. OK, most of what they asked I had already accomplished. I flew again but no joy.

Here is the startup of the Skyview EFIS. It's looking for a position at KMCI, Kansas City. Very strange it took 4 minutes to find

itself in Pensacola. I contacted Dynon and sent them the picture. I would up swapping the SkyView GPS antenna with one I had bought just in case I built a SV system for my RV-7. In 90 seconds the new GPS acquired the position. It was a couple of weeks till I was able to verify that the failure of the antenna prevented the ADS-b receiver from sending any data to the Skyview. Without a dependable map it won't send any data including weather and Metars which makes sense since it's GPS dependent data. I'll send the original GPS receiver to Dynon to determine the failure. At least we're good to go.

January 2019 [11]

EAA 485 news

2018 Officers and Committee Chairmen

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Secretary/Treasurer: Mark Rogers (251) 228-0356 22959 Carnoustie Dr. Foley, AL 36535 marbren75@yahoo.com

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Chris Hornady 423 718-6324 chris.hornady@yahoo.com

Flight Advisor: Harry Herman (850) 857-4353 Harry_herman@bellsouth.net

EAA and Local Chapter Sites

EAA 485 EAA 1265
EAA HDQTRS EAA 108
Lite Blue Angels EAA 105

Interesting Links

Blue Angel 360 Way cool
Drone on USS Bush
Build Your Own ADSB Receiver
F-18 Low Level

Miscellaneous

FAA Notams
Thatcher Build Site
Aircraft Parts Express
Barnstormers
Skyvector.com Flight Planning, Charts
AirNav.com Airport info, Fuel Prices

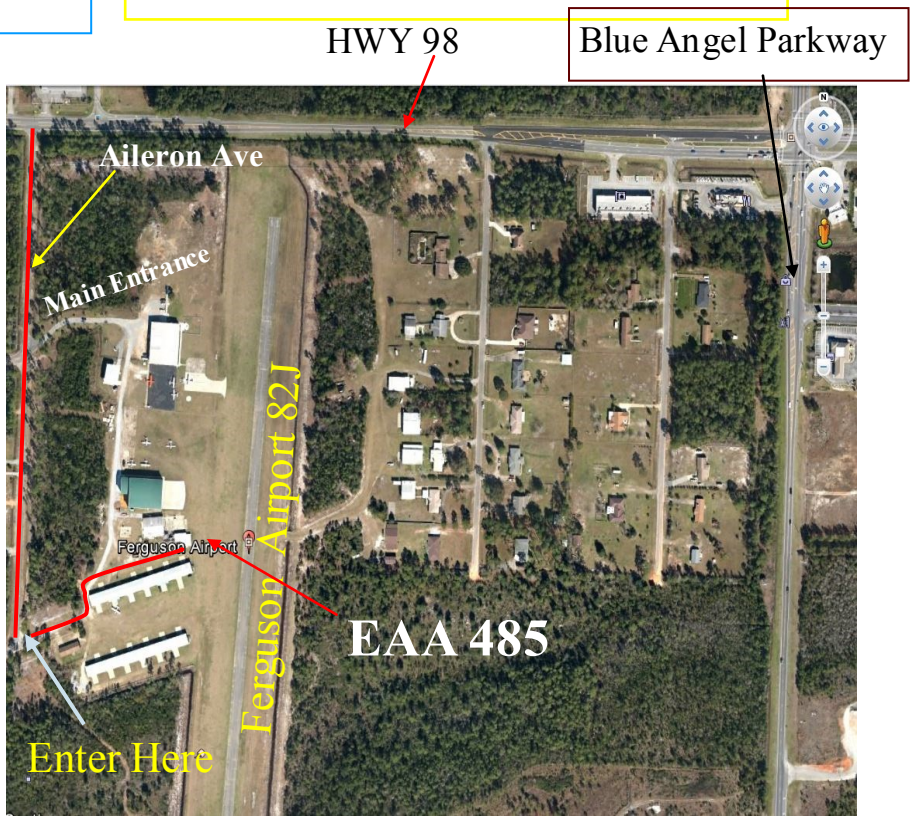
Barin OLF ASOS 251 970-2469

Normally meetings will be held at Ferguson Airport (82J) (Uni **122.8**) on the **First Saturday** of each month at 11:30 AM unless otherwise posted. Please check the Ferguson Resource Page if flying in.

Go past the main airport entrance and take the next left. Go thru the gate and make a left on the gravel road. Make a right past the T hangar you'll see our building down on the left side. Anyone interested in general aviation and building or restoring aircraft are welcome.

For more info contact:

John McKiernan 850 291-4134
rockyjs@mchsi.com



Home Of The
PANHANDLE PELICANS

EAA 485 Pensacola, FL

2019

82J Monthly Pancake Breakfast Sched

Feb 2nd tentative:

The breakfast schedule will be updated. The breakfast may be moved to the third weekend.

Here's a New Years Project for someone who is bored and looking for something to do.

Build Your very own Boeing 737-800 cockpit simulator

Oh, by the way if you have a wiring project I'd contact this guy.

"Once you have tasted flight, you will forever walk the earth with your eyes turned skyward, for there you have been, and there you will always long to return"
Leonardo da Vinci
(1452-1519)

2019 Events Calendar

January 12th 2019

1000 Meeting Call Order
Pledge
Introductions & Guests
Ralph Moser Ray Aviation Scholarship Fund Update
Young Eagles Update Terry/ Chris
Road Trip/Activities
We need a coordinator
NAS Museum Chapter Meeting Scheduled for February 9th
Project Updates
Video Magazine Jan 2019
Lunch

Lunch $5 donation requested

Calendar

Future Meeting Dates:

Feb	**9th**	**Meeting at NAS 0900**
Mar	**9th**	
Apr	**13th**	

Fly Ins:

S&F	**April 2-7**
Defuniak Springs	**April 13th**
Oshkosh	**July 22-28**

Blue Angels S&F April 6-7

2004 RV8A Total Time 400 hours airframe and engine since major overhaul $85K

Lycoming IO-360 180 HP Sensenich fixed pitch prop
Well built and maintained aircraft. All SBs complied with including Aero Splat nose gear reinforcement and skid plate.
New PC680 battery
Complete Dynon 10" Skyview System:

- Full EMS system (4 CHT & EGT, Fuel Flow, RPM, MAP, Oil Press , Oil Temp, Fuel Press, OAT
- Dual axis autopilots with electric trim
- SV Knobs Panel
- SV Autopilot Panel
- Dynon ADSB-In receiver (single channel, on list for dual channel)

Stratus ESG ADSB-Out transponder Installed September 2017
Garmin 300XL GPS/Comm #2 (enroute and non-precision IFR certified)
Microair Comm #1
Garmin GMA 240 Audio Panel.
No Nav at present however tail VOR antenna and coax cable run to instrument panel
Great Instrument panel setup
2 ¼" backup Airspeed , Altimeter, Vertical Speed
Separate Lift Control pneumatic stall indicating system.
Rear seat rudder pedals. (currently uninstalled)
Ram mount for tablet
Well documented maintenance record. Full Engine logbooks

This is a sweet flying aircraft at 8500' leaned it flies 150 kts TAS @ 8.2 gph

Contact: John McKiernan 850 291-4134 rockyjs@mchsi.com