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DRAGONFLY BUILDERS AND FLYERS NEWSLETTER

Dragonfly N901DR Flies!!!!

The Saga of N901DR or "How Perseverance Can Overcome Procrastination, Given Enough Time" - *By Dave Richardson*

Photos by—Gene Knapp

N901DR started its journey in the winter of 1984. I made good progress through the year and thought surely I would be done in a year or two. Sure I did! Lots of life things happened: three kids through college, three weddings, etc., you know how it goes. By the fall of 1989 I was far enough along to sell my share in a Grumman AA-1B to pay for the Dragonfly engine. I used Steve Bennett's (Great Plains) 1835 kit as the base.

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Inside this issue:

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I had the engine pretty well ready to dyno when a tornado decided to visit my neighborhood. Boy did that move my cheese! The wing and all the control surfaces were busted. The canard survived, but the fuselage was whacked pretty hard by a huge pine tree which came to rest in the wing cut-out. A friend and I crawled into the carnage with jacks and a chainsaw to extract the pieces. Amazingly enough, the canopy structure was twisted probably twenty degrees from side to side, but survived with only one minor scratch. I had so much time in the canopy that I had no choice but to build the other stuff again.

Dave getting ready for the first flight in his BEAUTIFUL Dragonfly MK-II

The airframe is per the plans with only a few exceptions. The gear legs are made from cut-down Grumman Yankee blanks, seated in false ribs similar to the standard MK-II plans. They work fine and have just about the right amount of spring. The canopy is front hinged with quick release pins. Canopy retention is via four pins that are operable from inside and outside via a flush lever on the pilot side.

I don't have to tell you what a tough job finishing is. I used a two-part water-based polyurethane system, the one where they say you can drink their thinner. By the time I was done I wished I would have drunk the paint. After about a zillion hours of sanding and buffing I actually had a nice looking finish. Unfortunately, after three years in a hangar it had fractured into millions of tiny cracks. I refinished the canard from the filler out with Interlux Brightside one part polyurethane. It rolls on and after a day or two miraculously flows into an almost perfect surface. It's intended for fiberglass boats sitting out in the Florida sun and so far it is holding up without even a nick.

Check out the details here

The engine is a Great Plains 1835 kit with my custom made intake and exhaust. I chose a top-mounted Ellison EFS-2 throttle body carburetor arrangement for a few reasons. I wanted the carburetor to be easily accessible since you spend so much time setting them up and this also gave me room for a relatively large airbox and filter. I have tried to heat the plenum with out-flow from

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the carburetor heat muff to help distribution, but the carburetor heat itself was inadequate. I am adding a flap in the intake runner to close off the incoming air and force the carburetor to breathe from the carburetor heat box. The Ellison was easy to set up and I'm very pleased with it, although I do wish they made one with about 3/4 the airflow capacity.

Very neat 1835 VW engine installation

The headers are 4 into 1 from 1.5" tubing. I have an external oil filter but I'm thinking of removing it to save a little weight. The ignition consists of one Slick magneto and one HAPI electronic ignition. The electronic allows a slow idle which really shortens the landing roll. When I am on short final I shut the magneto down.

The fuel system is a hybrid with a Facet pump sucking on the main tank and feeding the stock bottom inlet of the Ellison. I have a stock VW mechanical pump sucking on the header and feeding a tee on the top side of the Ellison (unauthorized modification) which is also the return line to the header through an orifice. The only pressurized fuel inside the cockpit is a 6" long braided stainless steel Aeroquip –4 hose from the Facet pump to the firewall (all fittings are Aeroquip). It took a couple of tries on the orifice size to get balance on the return flow rate to keep the header full. I've been thinking about valving the main tank in so I can fly on the mechanical pump alone but that's a future project.

Test flying has been one of the most interesting things I have ever done. I have a background in racing boats (APBA alcohol runabouts and hydros) and cars (IMSA road racing). Technically they are similar, but the big difference is that with boats and cars if you miss the set-up you just go a little slower. Once you get more than ten feet up it gets a lot more serious. I did that once in a boat and it really hit hard.

The first flights were challenging in that the Dragonfly is a different kind of cat. At altitude it's like a really fast Cessna 152 and a joy with incredible visibility and response. It took me a few hours to get comfortable with the landings, time in the Grumman helped. It also likes to be flown all the way to the ground and punishes the foot-high flare. During the first few landings, I was ok, but fast and shallow. I was glad I had a 6,000 foot long runway to roll out on. As I slowed the approach speed down, things got better. I'm down to 75 MPH over the threshold and off at the mid-field turn-off without brakes. She slips better than anything I've ever flown; I can get 1,500 FPM rate of descent at less than 90 MPH without any problems. You really don't need a belly board.

I've heard a lot of discussion about airfoils, etc. to get more lift from the canard. At gross, which is also near the aft CG limit, the last thing I want is more lift from the canard as I get slow. I've only been in one brief shower, but it was a non-event, as was a pretty good bug bath (Is there such a thing as a cloud of ladybugs?).

The Dragonfly is a great simple airplane with outstanding bang for the buck. If you want more, go ahead and build an RV-6 type. It will be a lot simpler process and will retain more of your investment. If most of your flying is less than 300 miles from home, you can't beat the Dragonfly.

Rudder Horn Bearing Protection

Preface by Jeff LeTempt

The Dragonfly was originally designed to use mechanical brakes activated with a handle. Differential brakes were considered unsafe for many years because the of the long lateral arm of the main landing gear. Some brave builder decided to use some toe activated hydraulic brakes and the rest is history….well almost.

You know what they say about changing one system….you have to change 10 others, well at least one more change should be considered in this case. With the old cable pull brakes pressure was being applied to one rudder pedal at a time. With the installation of the individual toe brakes, pressure is being applied to both rudder pedals at the same time.

Those pedal forces are being transmitted directly to the rudder horn bearing trying to pull it forward. A few high time aircraft have had to replace the rudder horn bearing; and although it would not be a extremely time consuming or difficult job, it would take some effort and would certainly harm your beautiful paint job. So how do you keep those loads out of the rudder horn bearing? You simply need to isolate the bearing and place the loads in a different place.

The Q guys seem to have more serious ground handling problems than the Dragonfly's, especially with an aircraft that is not set-up just right. So a few Q guys have come up with what they call the Jim—Bob 6 pack. Jim and Bob after the developers, Jim Ham and Bob Farnam. Six pack because the propose 6 changes to the Q: toe brakes, Aviation Products full swivel tail wheel, a bellcrank to separate the rudder and tail wheel cables, LaRue brake mod, belly board and springs for the tail wheel.

This article was written for Q-Talk, and primarily addresses the tail wheel modification and the bellcrank to separate the rudder and the tail wheel assembly. The bellcrank modification is a weekend job and would only add a few ounces to our planes. If you had a MK-III this bellcrank could be mounted anywhere in the system that was easy to get to.

Thanks to Brad Olson for sharing his experience and also thanks to Dave Richardson, Q Talk editor, for allowing me to reprint this article.

Tame Your Taildragger Yes, You Can!

By Brad Olson—San Ramon, CA

Brad's Beautiful Q200

Taxi for 5-10 hours before you fly! Taxi until you are sick of it, then taxi some more! I'm certain that all who've researched Quickies have seen or heard this advice, based upon actual and sometimes unfortunate experiences pilots have had with the Quickie's ground handling. Bob Farnam would tell me, "It's not a bad tail dragger. It is very controllable, if properly set up." Well, I have found Bob to be right. I have personally experienced the change in handling after making the 6 pack modifications Bob and Jim Ham implemented to make a Q more like "other taildraggers."

I purchased the Q200, N321TM, from Tom Moore, who built and put about 300 hours on the plane. Tom told me that after 17 years of work, he wasn't sure he would ever fly it as the plane was hard to handle on the ground. After aligning the wheels, Tom was able to get on with flying, but remained careful, often selecting airports with multiple runways in order to avoid crosswinds.

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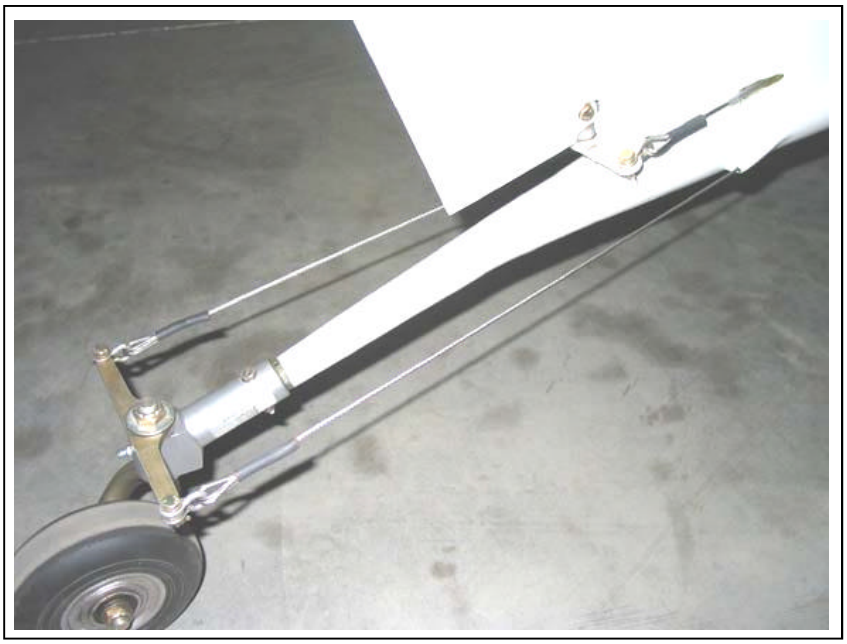
Tom delivered 1TM to Livermore and I began the learning process of taxi testing. Wow, it took a light touch; the brakes were sensitive; and finger controls – what are these? A quick decision was made to install toe brakes, using pedals designed by Bob Farnam. Jim Patillo provided a lot of advice and assistance, and I was back on the runway with toe brakes and the same, stock tail wheel. At 45-50 mph, things got exciting, but I figured after 5-10 hrs, I, too, would get the hang of it. Later, during a 45 mph pass, the plane hit a small bump and instantly turned 30 degrees. I barely saved it and knew it would be a matter of time before a ground loop or off runway trip would occur. Still, I kept trying until another "fun" ride occurred, this time with Jim Patillo in the passenger seat. Jim told me to park it and make a small fix or I would soon face some larger repairs.

With Jim's considerable help, 1TM was given a new tail wheel and control setup. I didn't have to travel more than 500 ft. down the runway to feel the change. Pedal inputs didn't cause large or abrupt changes in direction and bumps were not a factor. After one pass, I made a 60 mph run and felt in total control! I didn't feel I needed the 5-10 hours taxiing on the ground before I flew and I continue to be happy with the plane's handling today.

Bob and Jim talk about these mods as a system: toe brakes, Aviation Products full swivel tail wheel, a bellcrank to separate the rudder and tail wheel cables, LaRue brake mod, belly board and springs for the tail wheel. Many pilots are comfortable with the plane's original finger brakes but we would still recommend the rest of the mods. They work!

Tail wheel

Aviation Products makes the tail wheel. Phone (805)646-6042 and ask for the 6 inch full swivel wheel for a 5/8ths round spring. The tail wheel can be purchased with a 10 or 20 degree body. I got both, selected the best setup, and sent the unused one back. The body should put the wheel in a vertical or slight trailing position – I used 20 degrees. Builders are using this wheel on different tail springs. For example, Bob Farnam has a Dragonfly spring, Jim Patillo has a 5/8ths round steel spring and I have a stock, but built up, QAC tail spring.



The tail wheel body was drilled out to fit my spring. The wheel was floxed on the lightly sanded spring, leveled, and taped into position. Later, the tail wheel/spring were drilled and bolted.

Bellcrank and Block

A paper pattern was used to shape the bellcrank - 6061T6 aluminum with tapered ends to allow the shackles to rotate. The forward and aft outside holes are the same width apart as the horn holes (6 inches). The aft, inner holes are the same width apart as the rudder horn holes. My bellcrank bearing is from Aircraft Spruce and is riveted to the bellcrank, with washers on each side. Jim and Bob got bearings locally. Jim's is press fit into the bellcrank, captured with washers, and held up on a sleeve over a bolt. My bearing fit over an AN4 bolt. Bob Farnam went with an AN5 bolt (and larger bearing) after looking at the potential loads that could be put on the bearing.

The phenolic block was 3/4 inch thick, about 6 inches long and about 2.5 inches wide. The block was completely sanded to remove the shiny surfaces, and all sides were sanded to 45 degrees to provide a transition for the glass. My AN4 bolt head was countersunk flush with the bottom of the block using a Dremel to cut the head shape. The bolt was checked that it did not rotate in the block.

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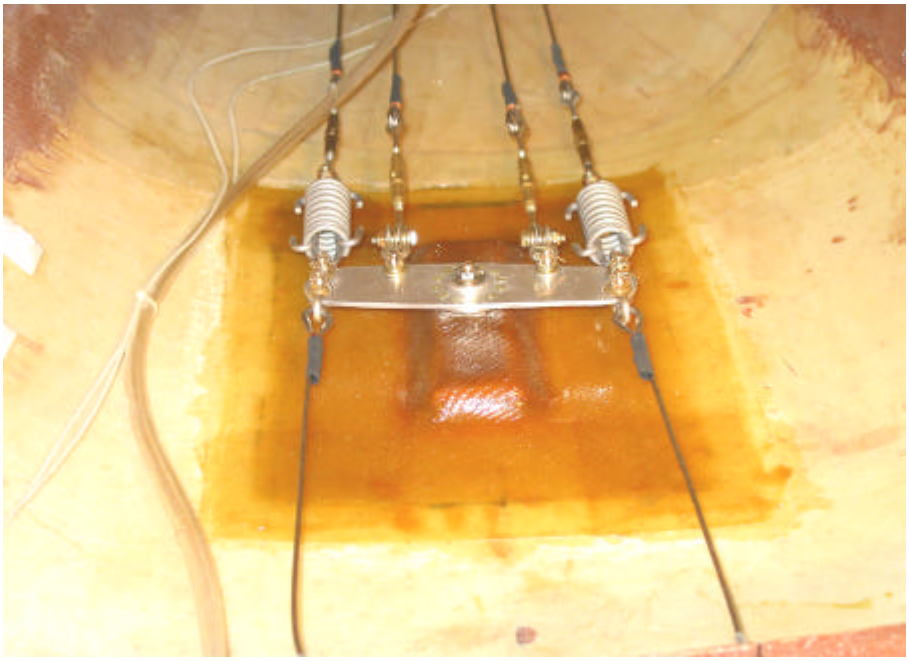
Everything was made up and checked for freedom of movement before the block was installed. All other bolts were AN3. Jim and I have our tail wheel springs inside of the plane at the bellcrank and Bob has his outside at the wheel. The springs are from Aircraft Spruce. Turnbuckles are used to adjust the cable lengths and keep the cables tight enough tp prevent the springs from dragging on the deck.

Block Installation



Jim's and my bellcrank are located 38 inches aft of the part line. My phenolic block runs fore and aft and Jim's is side to side.All hardware was removed from the block except for the center bolt. Tape was put on the bolt threads to keep them epoxy free. The block's location was set, and a marker was used to trace around the block. The inner glass fuselage skin was cut at the marked position using a Dremel. The skin is thin, so don't cut too deep. The cut was removed, exposing the foam between the inner and outer skins. The foam was removed, the block was test fit, and the inner skin around the cut was sanded.

The block was floxed into place, with a bead of flox left around the block about the width of a finger. After the flox cured, a Dremel with a drum sander was used to make a smooth radius in the bead of flox. The skin was sanded about 4 inches on either side of the block and about 3 inches in front and behind the block. Four layers of bid were laid over the block and the sanded area, with each piece having a small hole to go over the bolt

Rudder Cable Installation

The tail was leveled, and the locations where the tail wheel cables enter the tail were sighted. Marks were made above these entry points and a small hole was drilled perpendicular to the direction of each new rudder cable. The hole was a quarter inch in diameter and only deep enough to cut the skin. Then, the Dremel, with a router attachment, was used to cut a slot where the cable would enter the tail. The slot was about a quarter inch in height, a couple of inches long, and about a quarter inch deep.

An 18 inch long, quarter inch diameter bit to was used to drill the tail, using the slot as a guide. Two people were involved. One person drilled and kept the bit aligned vertically. The other sighted over the bit and checked that it wasn't moving laterally. The holes were drilled until the bit went through the aft bulkhead.

Once the holes were drilled, a stiff wire was inserted into nyloseal tubing and into the hole. After some fishing around, the wire found the bulkhead hole, and a couple of feet of tubing were fed into the tail. The tube was cut and taped at the exterior slot so that it wouldn't be lost.

New stainless cables were fed in, and the bellcrank connections were made up outside the tail. Then, the bellcrank was put on the bolt, and the cables were pulled back out the tail. Everything was checked for freedom of movement, and all bellcrank nuts were pinned into place. The cables were connected at the tail wheel and rudder, and the turnbuckles in the tail were adjusted to center up the bellcrank and take out cable slack.

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The cables from the rudder pedals need to be routed to the bellcrank. My cables (and Jim's) are on either side of the fuselage, so they take quite a turn going to the center where the bellcrank is. Jim installed pulleys at the first bulkhead in from the part line to guide the cables to the bellcrank. I just drilled holes in the bulkhead the same distance apart as the bellcrank connections and put in a couple of feet of tubing to run the cables in. I will have to keep an eye on the tubing and cable for wear.

This modification was completed over two weekends – what a difference it made!

New Editor Introduction

My name is Jeff LeTempt and I am very pleased to take over as the editor of the Dragonfly Builders and Flyers Newsletter (DBFN). I think I would be remiss in my duties if I did not say thanks to Pat and Spud for their service to the Dragonfly community. They have done a tremendous job with the newsletter and I pledge to everyone (especially Pat and Spud) that I will do my best to uphold the fine tradition of the DBFN. I want to introduce myself, describe what my goals are for the DBFN, and explain what I see the charter for the newsletter is.

So who is Jeff LeTempt…..I was born in 1962 and I grew up on a farm in Evansville, Illinois where I lived until I was 22 years old. I was always fascinated with aircraft, but no one in my family had any aviation background at all. Finally as I was getting ready to head off to college in the summer of 1980 I saw an advertisement in the local newspaper for one of the $20 Cessna discovery flights. I went to the local FBO and plunked down my $20….the rest, as they say, was history.

My Dragonfly MK-III

I enrolled in a ground school class my first semester of college and in the Spring of 1981 I started taking flying lessons. I soloed at 5.5 hours and earned my license on August 8, 1981. I was really hooked now and made a decision that I wanted to pursue a career in aviation, but how in the world was I going to get a flying job with no flight time in my book? I decided I would make myself more aviation marketable if I also had my A&P, so I attended a 1 year program at Belleville Area College in Illinois and earned my A&P in February of 1984.

After I earned my A&P I got a job at the FBO where I learned to fly in Perryville, MO. I was one of three mechanics and we worked Piper Chieftains and smaller. I was having a lot of fun and learning new things every day. Within about 3 months the other 2 mechanics moved on and I was a 1 man show, I really enjoyed the responsibility but I really wanted to be flying rather than wrenching.

In the Summer of 1984 we had an Army UH-1 come in for fuel. Once the thing quit making noise I started asking the pilots questions…...in December of that same year I was heading off to basic training and then flight school. I graduated flight school as a Honor Graduate in February of 1986. My plan was to build up maybe 1,000 hours during my 4 year commitment to the Army and then get out and get a job in the civilian aviation field…..not sure what happened, but I am still in the Army today as a Chief Warrant Officer 4 and I am getting ready to retire (hopefully in December of 2004). I have amassed over 3,500 hours of helicopter time and have about 200 fixed wing hours.

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I am very lucky to be married to my high school sweetheart Jill and we have two terrific children, Jessica and Justin. We have been very fortunate to have had the opportunity to see a lot of the world over the last almost 20 years. We have been stationed in Alabama, Washington, Germany, Texas, and Missouri. Of course I have had the opportunity to visit a few not so nice places without my family, maybe we can swap war stories over a cold one some day.

My first experience with the Dragonfly was in 1984 while I was working as an A&P. A gentleman from across the river in Illinois brought this funny looking airplane over for final assembly and test flying, it was a Dragonfly. Sure was a pretty thing and his craftsmanship looked good. He was out one day doing some high speed taxi testing and the airplane became airborne. Things seemed to be going well so he decided to make this his first flight...until he was about 100 feet AGL with about 1,000 feet of runway remaining and the engine decided to quit running. At about 20 feet off the ground at the end of the runway it regained partial power and he managed to make a safe circuit of the field. The culprit was carburetor ice.

I really wanted to build my own plane, but the Army lifestyle of moving around the world every few years made this an impossibility for me. Finally when I figured that I was close to the end of my Army career I bought a partially built Dragonfly from a guy in Houston, TX in May of 2000. I knew I was going to be moving in December of 2000 so I never started any work on the project. Once we got established here in Rolla, MO I had an opportunity to buy an almost completed MK-I Dragonfly from Norman Fanning and I could not pass up this opportunity. I thought I would spend 6 months to 1 year finishing the plane….but as with most airplane building things it takes a lot longer than we think, but I am getting closer.

Me in Iraq in March of 1991 in front of my ride

Now for my philosophy on the Dragonfly Builders and Flyers Newsletter (DBFN). As we all know there is currently no factory support for the old Dragonfly plans owners….we are kind of on our own. The most valuable resources are the DBFN and the Dragonfly email list. In my opinion they have different, but equally important, missions. The DBFN is great for posting detailed information on a modification or a way to build something…..the email list is great for almost instant advice on anything Dragonfly. I highly encourage everyone with a computer and access to the internet to subscribe to the email list. To sign up for the Dragonfly email list go to http://groups.yahoo.com/group/Dragonflylist/ and sign up.

The DBFN relies on YOU to provide information that you want to share with others. Maybe you have a great idea on how to build something better, faster, lighter, cheaper…..maybe you found a great source for raw materials…..maybe you have a great modification…...maybe something went wrong with your plane and there is a possible safety of flight situation…….maybe you had a particularly fun flight, I am sure you get my drift. I need to hear from you and we can make this a truly must-have publication for anyone involved with the Dragonfly. I feel that the DBFN has to be a technically oriented publication, but there is always room for a human interest story.

The DBFN will be published 6 times per year and the goal will be to have the newsletter in your hands within two weeks after the period covered. For example the January/February issue should be in you hands not later than about the 15 of March. Please understand that things will come up that may not allow this to happen, but I will give it my best effort to ensure this happens. The standard for the newsletter will be 12 pages, but do not be upset if there is an occasional issue that is 8 or 16 pages long.

I have a Bachelor of Science degree in Professional Aeronautics from Embry-Riddle Aeronautical University. Notice that I said Professional Aeronautics, not English Composition. With that said I will do my best to provide an easy to read technically oriented newsletter, but I may make a few grammatical errors along the way...please bear with me.

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For 2004 I will continue to offer the DBFN as a downloadable document at the US subscription rate of $21 per year. There are a few advantages to do this: (1) faster delivery, (2) color pictures, and (3) cheaper for all the subscribers outside the US. Not 100% at this point, but I will likely have a DBFN web site where members will have a user ID and password to download the documents. The DBFN Yahoo Group works well, but every time I would try to download a new newsletter I would get an error message telling me that the authorized band width limit has been exceeded to try again later.

What I would like to do is establish a DBFN web site, not just for newsletter distribution, but I would like it to be a one stop shop for everything Dragonfly. I have been pricing web hosting and think it is doable. I would also like to offer all of you a very low priced advertisement free place to host your web sites. When I say low priced, I am thinking like about $1.00 per month for maybe 50 MB of web space. If this is something you are possibly interested in please let me know.

As you can imagine, all of this stuff is a labor of love….I will not be retiring early to my villa in the south of France with all the money I will be raking in with the DBFN. I am doing this because most of the Dragonfly builders and owners are fantastic people who would go out of their way to help another Dragonfly guy and I think the Dragonfly is a great airplane that offers a lot of bang for the buck. The Dragonfly is kind of an old design, but I am very optimistic for its future and I look forward to serving you as the DBFN editor. Sorry I rambled on a little, but I thought it would be a good idea for you to know a little about me and what my goals are for the DBFN. Please let me know what you would like to see in YOUR newsletter.

Jeff

The Epoxy Trick

By Andrew Aurigema—the "Mad Rocket Scientist"

The fiberglass / foam / fiberglass composite structure is very strong for its weight. If you make it right, it will be mostly air. Unfortunately you have to have a solid surface that meets the onrushing air so you need a nice finished layer as the last thing you build. The best stuff to expose to the universe is 100% pure epoxy. It is tough, hard, and non-porous. It has many more advantages but I cant think of them. It has one huge drawback for all this goodness, it runs like water when you put it on. So we are going to show you how to do the "epoxy trick".

First you need to know that you are not saving any weight with this process. You are saving time. There are millions of little holes in your surface (whether you know that or not they are there) and you will be filling them in with the heaviest thing you have to work with…….. epoxy.

Second you need to know that the epoxy trick will only hide the tiniest of surface mistakes (like fine scratches or pin holes. It will make a non-pours surface of that surface, but it will also follow every crack, crevis and blemish you leave behind.

Third, you need to know that you have to have a micro-ed (or bondo-ed) surface done and sanded to at least 60 grit before you can start the epoxy trick.

The micro you think is solid is really only splotchy. The epoxy trick will fill in all the millions of holes you left behind and make a uniform non-porous surface onto which you can apply paint. Don't wory if you have 60 or 40 grit scratches on the surface. They will fill in with epoxy. Cuts, gouges or breaks in the glass will not. Raw weave will not fill in so you better have some micro on it or it will look like trash when you finish. (you know this trick will not work on raw foam or glass….. right ???) So get your surfaces ready and follow the simple instructions.

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Ok, so you have your glass surface all done and ready to make non porous. It has been sanded down to at least 60 grit and is all scratched and what-not-ed. Mix up some epoxy, 3 or 4 ounces will do. You need "pure" epoxy, no fillers no nothing. Get yourself a flexible spreader. It has to have a clean new edge on it so it can smear the epoxy uniformly. Pour the epoxy on the glass like somebody else is paying for it. Smear it around with the squeegee getting all the surface wet. It will run like water so try not to make a mess. Then squeegee the epoxy back off. Do not try to take every molecule of the epoxy back off, just most of it. Well more than most of it, try to get it all. Do not use a rag, or a brush or you helpers shirt. Use only the squeegee. Clean up your squeegee or throw it away, but it better be like new an hour from now.

Now wait for an hour or until the epoxy is just near tacky and mix up another ounce of epoxy. You will use a lot less on this pass. Pour the epoxy on the tacky epoxy. Wet the squeegee and squeegee the entire surface again. Take the epoxy back off the surface. Don't go nuts, but take it back off. Clean up your squeegee or throw it away, but it better be like new an hour from now.

You are going to do this a total of five times so repeat the above procedure three more times. At the end of the 5th pass, you will have a multi thousands thick layer of pure epoxy on your surface. It will stand up to anything you throw at your wing surface. It is non-porous and even fuel resistant. It will not let anything in or out.

Alternate method : We get bored easily with repetition. So we only sanded the micro with 40 grit pads then did the first epoxy wetting. Then we let it set and dry completely. Then we sanded the entire surface with 180 grit wet or dry that we use wet. That allowed us to get all the little epoxy dribbles sanded down to nothing and make the surface really nice. Most of the bad scratches went away with the first layer of epoxy. Then we cleaned up and did the next two epoxy passes an hour or two apart. Allowed to dry and it all worked great. Not a single pinhole at the priming stage. The first sanding was the key.

Just so you know, surfaces like the canard elevator well are going to be a bitch to do. You have to have them well prepped and they will still puddle and pool or run or drip on you. Just muddle thru and think about that magic moment when you put on the gray primer and all this mottled surface disappears forever under a glorious coat of uniform gray.

Modifying Your Experimental Airplane

By Jeff LeTempt

So you want to make a change to your experimental airplane? Sounds easy enough, after all they always told you that you can do anything you want to an experimental airplane—right? Well maybe it is not quite as easy as that, it really depends on what you are going to do. Let's take a look at what the regulations say.

The first place to go is FAA Order (FAAO) 8130.2E Airworthiness Certification of Aircraft and Related Products. Chapter 4 Section 7 covers Experimental Amateur-Built Airworthiness Certifications. This document gives us the framework for applying for our airworthiness certificate. If we work our way down to paragraph 134b(19) we will see what is required if we want to make a change to our experimental airplane that has already received an airworthiness certificate. Here is an extract from FAAO 8130.2E.

FAAO 8130.2E Airworthiness Certification Of Aircraft And Related Products, Chapter 4 Special Airworthiness Certification, Section 7 Experimental Amateur-Built Airworthiness Certifications Paragraph 134 Issuance of Experimental Amateur-Built Operating Limitations b(19) After incorporating a ***major change*** *as described in § **21.93**, the aircraft owner is required to reestablish compliance with § **91.319(b)** and notify the geographically responsible FSDO of the location of the proposed test area. The aircraft owner must obtain concurrence from the FSDO as to the suitability of the proposed test area. If the major change includes installing a different make and model of engine or propeller, the*

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aircraft owner must fill out a revised Form 8130-6 to update the aircraft's file in the FAA Aircraft Registry. All operations must be conducted under day VFR conditions in a sparsely populated area. The aircraft must remain in flight test for a minimum of 5 hours or for the time the FSDO assigns. Persons nonessential to the flight must not be carried. The aircraft owner must make a detailed logbook entry describing the change before the test flight. Following satisfactory completion of the required number of flight hours in the flight test area, the pilot must certify in the records that the aircraft has been shown to comply with § 91.319(b). Compliance with § 91.319(b) must be recorded in the aircraft records with the following, or a similarly worded, statement: "I certify that the prescribed flight test hours have been completed and the aircraft is controllable throughout its normal range of speeds and throughout all maneuvers to be executed, has no hazardous characteristics or design features, and is safe for operation. The following aircraft operating data has been demonstrated during the flight testing: speeds Vso _____, Vx _____, and Vy _____, and the weight _____, and CG location _____ at which they were obtained."

So what is considered a major change in accordance with Federal Aviation Regulation (FAR) Part 21.93?

FAR Part 21-Certification Procedures For Products and Parts, Subpart D-Changes to Type Certificates, Section 21.93-Classification of Changes in Type Design, (a) In addition to changes in type design specified in paragraph (b) of this section, changes in type design are classified as minor and major. A "minor change" is one that has no appreciable effect on the weight, balance, structural strength, reliability, operational characteristics, or other characteristics affecting the airworthiness of the product. All other changes are "major changes".

And what is all that compliance stuff in accordance to FAR Part 91.319(b)?

FAR Part 91-General Operating And Flight Rules, Subpart D-Special Flight Operations, Section 91.319-Aircraft Having Experimental Certificates: Operating Limitations (b) No person may operate an aircraft that has an experimental certificate outside of an area assigned by the Administrator until it is shown that--(1) The aircraft is controllable throughout its normal range of speeds and throughout all the maneuvers to be executed; and (2) The aircraft has no hazardous operating characteristics or design features.

There are some things that may muddy the water a little. Our beloved EAA has some information on their web site that discusses this very topic, but they reference FAAO 8130.2D and it is obsolete. This all seems pretty straight forward…...once you have found the appropriate references. All of the references that I quoted can be found on the internet at: http://www1.faa.gov/certification/aircraft/ Of course if you ever have any questions you should contact your local Flight Standards District Office (FSDO).

Mountain States Fly-In 2004

By Don Stewart

The Mountain States Fly-In has traditionally been a meeting place for canard wing experimental aircraft (typically Dragonfly, Quickie and their derivatives), owners, builders, and wannabe's who live too far away from Kansas or Missouri to attend the Annual Field of Dreams Tandem Wing Fly-In in the fall. The event will be held at Bullhead City/Laughlin International Airport (IFP) on March 19-20, 2004. Festivities will begin with an informal dinner at Harrah's Casino Buffet at 7:00 pm on Friday night.

The emphasis at the Mountain States Fly-In for the past few years has been on the Corvair Confab held during the event and this year will be no exception. Pat Panzera (and others) will host the annual Corvair Confab on Saturday, however with a twist. Pat is the editor of CONTACT! Magazine, and he'll be hosting an "Alternative Engine Round-Up". He has several engine forums lined up, not just Corvair. For a full list of speakers, visit www.ContactMagazine.com

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The FBO has graciously offered a 10% fuel discount to all attendees, and the regular $5/night tie-down fee is waived if you purchase fuel. Inside parking is available for a discounted fee if you purchase fuel. There are two rental car agencies at the terminal, but several of us will shuttle those who need it back and forth from the hotels, the airport and the dinner restaurant.

Pat Panzera is arranging the dinner for Saturday night. Dinner starts at about 7:30pm at PERKINS FAMILY RESTAURANT, 2250 HIGHWAY 95, BULLHEAD CITY, AZ 86442 (928) 763-1960. Please RSVP to Pat at panzera@experimental-aviation.com or call him at (559) 584-3306. Be sure to arrange your ride to the dinner before everyone leaves the tarmac for the day.

The fly-In is FREE to participants, while the dinner is an extra-cost item. There will be plaques awarded recognizing the Best of Show and the Longest Distance, so donations will be cheerfully accepted to offset expenses.

For more information, visit the fly-in web site at: http://www.siinc-sources.com/MSFly-In2004/

Classifieds

For Sale: **Dragonfly MK II** N90003, HAPI 1835 engine installed, plus all the parts for a Corvair conversion. All parts William Wynne sells right down to the dual ignition, installed in a box, new throttle body carb, complete engine cleaned and ready, plus LOTS of extras. In excellent condition. I have lots of pictures if your seriously interested. Hangared. Asking $11,000 for everything. My wife prefers our Cessna 150 (Go Figure). Call Fish Fischer (503-861-7034) or e-mail: fishhole@pacifier.com

For Sale: **Dragonfly MK II** N189SM, with 80hp Continental A-80. 250-hrs SMHO by Skeezix Adkisson, and dual Savier electronic ignition. 3 blade Warp Drive prop w/ Gary Hunter blades. Curses 145-150 mph on 4.9 gph. 21+ gallon fuel capacity, dual throttles, hydraulic brakes, ELT, cabin heat, oil cooler and filter. Garmin 195, vortex generators, electric pitch trim. Asking **$23,000** or possibility trade for 2 place side-by-side, tri-gear with turbo or bigger engine. See photos in a recent KITPLANES ® magazine, featuring details on electronic ignition. Call 618-594-2681 and ask for Terry, or e-mail: troneill@charter.net

For Sale: **Carbon Fiber NACA Inlets and Spinners.** Spinners are **$250 each**, including back plate, but w/o front bulkhead. Inlets are $30 per pair, set in glass. Contact Charlie Johnson, 2228 East 7875 South, Ogden UT 84405 (801)-479-7446 or e-mail: OneSkyDog@aol.com

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