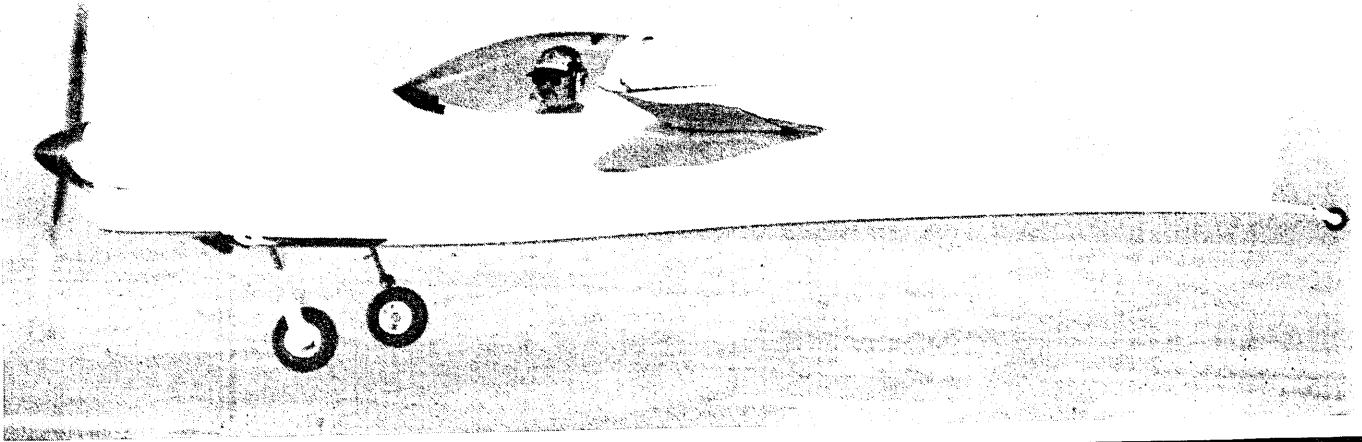


DRAGONFLY BUILDERS AND FLYERS NEWSLETTER

THE OFFICAL VOICE OF DRAGONFLYERS ALL OVER THE WORLD

VOLUME 51

JANUARY - FEBRUARY 1994



FRED WIEBE OF MARSEILLES, IL. MAKES THE FIRST FLIGHT IN HIS MARK II DRAGONFLY

Hi Spud!

Here's my "First Flight" information on my Dragonfly! Finally!!! I had spent three hours with Steve Larabee in Mattoon, IL. (Thanks again Steve!) for some familiarization flight time, but unfortunately it was a low-level turbulent day. So, I was really apprehensive for the two

weeks before I had the confidence to try my Dragonfly out!

I picked a perfect morning and sneaked out of the house at 5:30 AM (so my wife wouldn't follow). A fellow pilot met me at the airport and my plan was to do a few high-speed taxis before lifting off; however, it didn't

work that way. After back-taxiing to the end of the runway, I did my run-ups, lined up, poured the power to it, and the tail soon came up, tracking straight as an arrow down the runway which reinforced my confidence and I felt right at home in my soon-to-be airplane. I knew the time was right, so I gave slight back-pressure at 70 m.p.h. with my mind set ready to fly. It lifted right into the air. I didn't notice any out-of-trim tendencies, and I let it climb in a slow spiral above the airport. At 6000 feet, all instruments were in the green, and so I leveled off to sit back and enjoy the view, realizing that this five-year project really does work! I loosened my grip on the stick to see if any small-rigging adjustments were needed. It banked slightly to the left, indicating an elevator adjustment.

After about a hour of playing with some slight roll and pitch adjustments, it was time to see if I could land it. I descended down to pattern altitude, and remembering everything that Steve had told me, on final I locked in at 75 m.p.h. speed. I slowed my descent rate at 5 feet above the runway, and then leveled off at 2 feet. I touched down with no irregularities. I was down to walking speed in less than 1500 feet! END OF FIRST FLIGHT!

Now, with 50 hours on the tachometer, I now can really appreciate the characteristics of the Dragonfly, WHATTA AIRPLANE! It handles like my own personal FIGHTER PLANE! I have experimented with all kinds of weather conditions which include 22 knot crosswinds, which wasn't bad at all. As for rain, speeds for takeoff and landing, I saw increase needs up to 20 m.p.h. over normal, which may come down some when I get a chance to play with the gap seals that some of the other people with Dragonflies are having good results with.

Right now, empty weight is 702 with an 82 horsepower Hapi Magnum Plus, 54/44 Props Inc. prop, without wheel pants, gap seals, tail wheel fairings (not a very clean airplane yet, I'm having to much fun flying it), it

will true out at 162 m.p.h. at 3150 rpm at 6000 ft. Fuel burn at 160 m.p.h. is excellent at only 4 gph and drops to 2 gph at 110 mph. I'm really liking this part!

I highly recommend a familiarization ride before taking one's own Dragonfly up. There's nothing difficult at all about flying a Dragonfly--it's just different. I consistently land less than 1500 feet every time unless I come in too fast. The landing distance increase is proportionate to your speed over the your regular approach & landing speeds. It's my opinion not to waste construction time on the belly boards--they're not need! If you come in

high, just put it a forward slip which the Dragonfly does very well and you'll drop like an elevator!

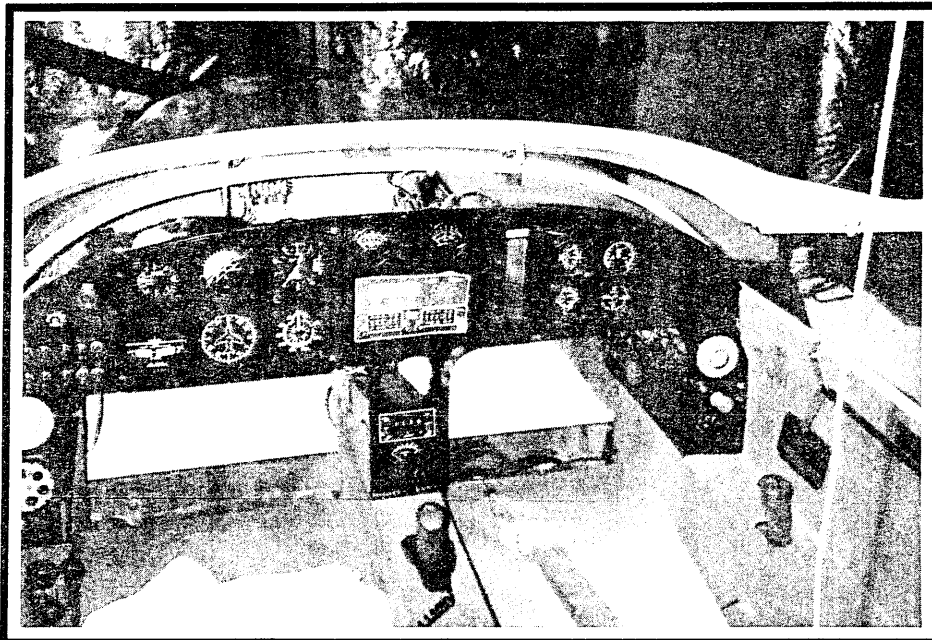
My fiberglass gear legs lasted 2 flights. The left leg began to twist at the transition over the top of the tire (I had 3 plys of 10 oz. wrapped (they all fail there without 8 to 10 plys-Spud)) so after much deliberation I decided to

switch to steel gear legs. So off to Steve Larabee's for help again--flew down and drew up plans of steel legs and made a set for \$60.00.

I haven't been able to find out why I have a mixture distribution problem; my right bank of cylinders run rich, the left side lean. I updated the intake system to a new Mosler, which helped somewhat because it had a swirl plate. Compression is even. The next area here is to play with a balance tubes between banks (I'll keep you posted on those results). I do have more oil leaks than I'd like, but I'll remedy those in the spring when it warms up a little. My only mod to the airplane is the baffling system for more efficient cooling; the inlets have been reduced by 30%. My baffling has no 90 degree bends, which results in much smoother air flow. I won't be able to properly determine if this will work until the return of hot weather.

Things to do

Wheel pants, tailwheel fairings, gap seals, upholstery, radio's, GPS, balance tubes on engine.



So far, I can't find the words to express my appreciation for this airplanes benefits and how fun it is to fly! I sincerely appreciate the backing of this newsletter, and all the support from my fellow builders and flyers that helped me along the way.

I like to say something to everyone out there that is building, whether you are just beginning, halfway threw or are in the finishing stages, I know it's a ton of work, but it all becomes *instantly worth it* when those wheels leave the ground for the first time. It's got to be the one of the most gratifying things I've every done and I'm can assure it will be for you to!

I hope to see a lot of you at Sun N" Fun in Florida, *I'll be there in my Dragonfly!*

Fred Wiebe

RT#2 2561 N. 2879th Road

Marseilles, IL .61341

(815) 795-2531



Eric White's Mark I

Another first flight!

Please find enclosed a couple pictures of my Mark I Dragonfly which I flew for the first time on November 7, 1993.

I took off on runway 30 with a 10 m.p.h. head wind and almost instantly found out that this particular flight was going to be "very" unpleasant one. I had to use almost full back stick to maintain climb, as the 3450 feet of runway was quickly used up. I had almost enough time to think about, either landing on the grass at the end, or go around to runway 22 which is 2700 foot plus.

Well, my little Mark one was easily controllable in yaw and roll, so I went for runway 22. I maintained full power, until I knew that I would make the airport property. The highest airspeed I saw during the flight was 80 m.p.h. as my elevators were acting as huge drag flaps. My engine a 1602 cc's that I built up my self, was putting out about 53 horsepower to a 48 inch three blade Ivoprop. The cylinder head temperature was 450

degrees at 3250 rpm.

My approach to 22 looks OK on the video, but from where I was, knowing full well that this was an one shot deal (as can't go around again), ant way I flared at approximately 65 m.p.h. To high of coarse. I would not use power at this time, as I wanted it "DOWN". Well, we (we being the Mark I and me) bounced five times! If only my propeller was one half inch shorter! This would have been the only damage.

I have checked the wing, canard incidence and they are "OK". I found that my engine was tipped down one degree, or .418 out at the end of my propeller (24 inches). This, I think, is part of my problem. I call it the "lawn mower mode"! I have adjusted the engine thrust line 1/2 degree up from zero.

At the time of this first flight the gross was at 983.6 plane, me and

fuel on board. The center of gravity calculated out to 59.62 inches. My ailerons are not flexed up now, or at the time of flight. The basic empty weight is 706.75 lbs. and the c.g. is 55.32 inches. I have removed the battery (10 lbs.) from the firewall which was at 22 inches and reinstalling a 15 lb. battery at 132 inches. With everything else remaining the same as the last flight my CG now calculates to be 60.72 inched. Of coarse I will be doing another weigh.

I would like to here from others, where they think the best place for the CG should be. Aft of 60 or 61 inches??????

Eric White

87 Pinedale Crescent

Courtice, Ontario,

Canada L1E-1C4

(905) 725-0346

WILL MY WINGS FALL OFF ?

OR JUST HOW STRONG ARE THOSE CANARD / WING ATTACH POINTS?

Dear Bill (Spud is that you?):

As I was installing my wing lift fitting reinforcing plies I noticed two things. First, is that the resin runs toward the bottom of the fuselage and leaves the upper part of the laminate (yeah, the part hold the wings on) dry. Second, the .75 aluminum insert looks like it is too close to the top of the bulkhead to hold things together. This worried me, I know that there are a lot of Dragonflies out there and I have not heard of a problem with the attach fittings, but it is my pink bod that is going to be sitting in this one.

Since one of the reasons the FAA lets us build these things is education, I decided to learn more about the strength of the left fittings. Being an engineer by trade I thought that I would analyze the fitting. I checked around at my work (Lockheed) for mechanical properties, but came up short. We don't use much plywood and room temperature cure epoxy to build the F-16. I did find some plywood data in the form of the ANC-18 handbook that is available from the EAA library for the cost of reproduction. I did not find enough data to feel comfortable using analysis only to say that the fitting was good. So I decided to build some specimens and test them.

I fabricated five specimens. The first was plywood only, the next two were coupons representative of a good

laminate and a dry laminate on a drag fitting. The last two were good and dry lift fittings. The specimens were 2.0 inches wide and 5.0 inches long. The .75 insert was centered 1.0 inch from the end of the coupon. I attached .125 thick end tabs to the bottom of the coupons with epoxy and 4 quarter inch bolts. I used .25 thick tabs on the top of the lift fitting coupons and .125 thick tabs on the others. These were bolted to the coupons in the same fashion as the lift and drag fittings are attached in the wing with an AN-970 washer under the head of the 5/16 bolt.

With the help of Harold Carter, a friend of mine with access to a tensile test machine, these specimens were tested to failure.

I have included a table that summarizes the results of the testing. The table shows yield strength, which is defined as the load at which we could hear the fibers in the specimen begin to break. The ultimate strength is the maximum load the specimen would resist. I calculated yield and ultimate factors of safety for the canard lift fittings based on a gross weight of 1150 lbs, the most forward CG location of 58.7 inches and a 1 g load case. The factor of safety at 1 g is the same as the g loading at which failure can be expected.

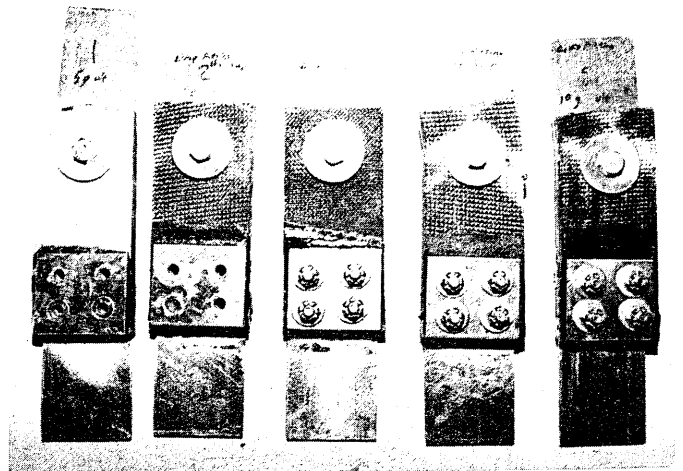
The results of these tests show that the fittings are good for the advertised 4.4 g limit and 6 g ultimate if you do not exceed gross weight. So like we say back at the Lockheed fighter factory, "do it light the first time".

Curtis Chapin

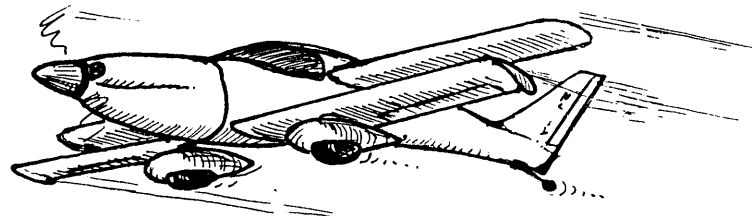
4672 Misty Ridge

Fort Worth, Texas 73137

Specimen	yield strength	ultimate strength	lift yield factor of safety	lift ultimate factor of safety
.50 plywood		2040 lb		5.1
good drag	1890 lb	2790 lb	4.7	7.0
dry drag	2160 lb	2835 lb	5.4	7.1
good lift	2380 lb	4140 lb	6.0	10.4
dry lift	1940 lb	3900 lb	4.8	9.8



DRAGONFLY



HEADER TANK SIGHT GAUGE

Hi Spud!

Here a couple of things that I always get asked about at other builders at the fly-in's and that I get calls on a regular basis's. They are header tank sight gauge and aileron servo tabs (on page 6) With this amount of requests for this information I figure quite a few others in the group might like to know about also.

First here the information on the header tank sight gauge that I use in my Dragonfly. The idea for this sight gauge came with the original Task/Viking kit. The sight gauge was installed in my aircraft during construction and the airframe now has in the excess of 250 flight hours. If you go back through some of the past issues of the newsletter you will see the gauge installed in several Dragonflies some with 300-400+ hours to date without any problems. Briefly, some of the aircraft are:

Ted Givins, C-GGEM	Volume 32, page 12, photo B,
Chuck Ufkes,	Volume 32, page 14, photo G,
Rob Kermanj,	Volume 35, page 3
Stan Meleski	Volume 37 page 5
Gene Divincenzo,	Volume 37, page 3

The following information is a repeat of the information that was provided with the Task/Viking kit. This is exactly as I

have install the gauge on my header tank/instrument panel. The float indicator is any material that will not react with fuel, ie cork, coloured plastic or possibly the float balls used in a battery tester.

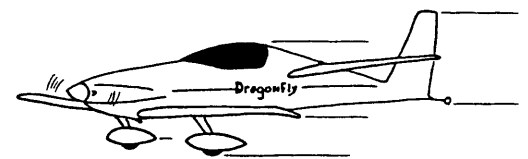
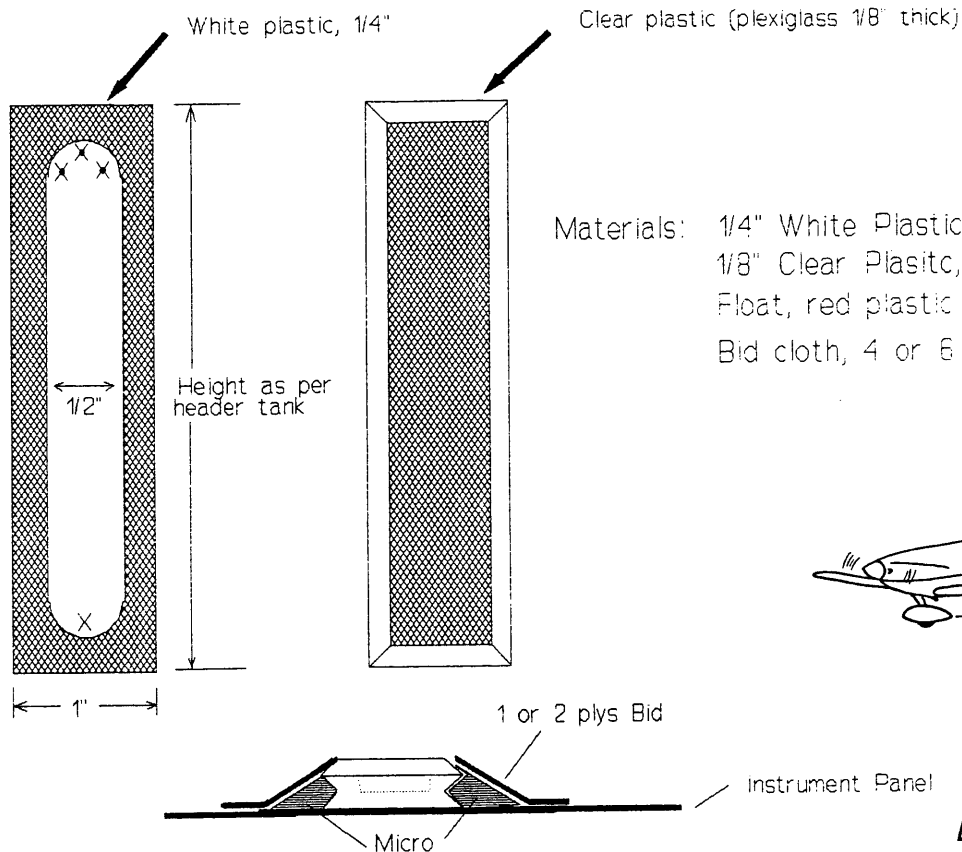
These gauges are designed as retrofits (or original installations) to be installed over the existing gauges, which are fiberglass to fiberglass with no foam in between.

Locate the white plastic part as low on the instrument panel as your header tank bottom and mark the location of same. Location should be so that a small hole (3/32) can be drilled through the plastic at the 'X' mark and through the face of the panel. This hole should be as near as possible to the bottom of the header fuel tank. Also drill three holes in the top end of the white plastic at 'X' marks and through the panel face.

Now sand (#80 grit) the hatched area of the white plastic part and extreme edge of the clear plastic part. Be careful not to mar the centre area of the clear plastic-use masking tape. Clean all surfaces. Epoxy the parts together. Ensure a red (colour optional) float inside! Clamp parts together and allow to cure.

Next install a couple layers of masking tape or duck tape to the indicator face of the clear plastic. Then install the unit to the panel marked previously using five minute epoxy. Fill and bevel the edges with micro and then apply one or two layers of BID (4 or 6oz.). When cured, sand down to the beveled edge, and then remove the tape, which makes for straight edges.

Major Ted Givins, P Eng.
Onatario, Canada



TED GIVIN'S SERVO TABS

Here's a modifications that is becoming very popular with the people that install it on their Dragonfly, especially the ones with a higher cruise speeds. Quite a few people at the air show/fly-ins ask what they are and what do they do. They are called aileron servo tabs and are used in general and military aviation. What they basically do for you is give you "Power Steering" in the aileron department. Which comes in very handy as the aileron control stiffens up proportionately on a Dragonfly as the air speed increases and is very pronounced. over 145-150 mph.

The linkage tabs are shown with several attach holes so

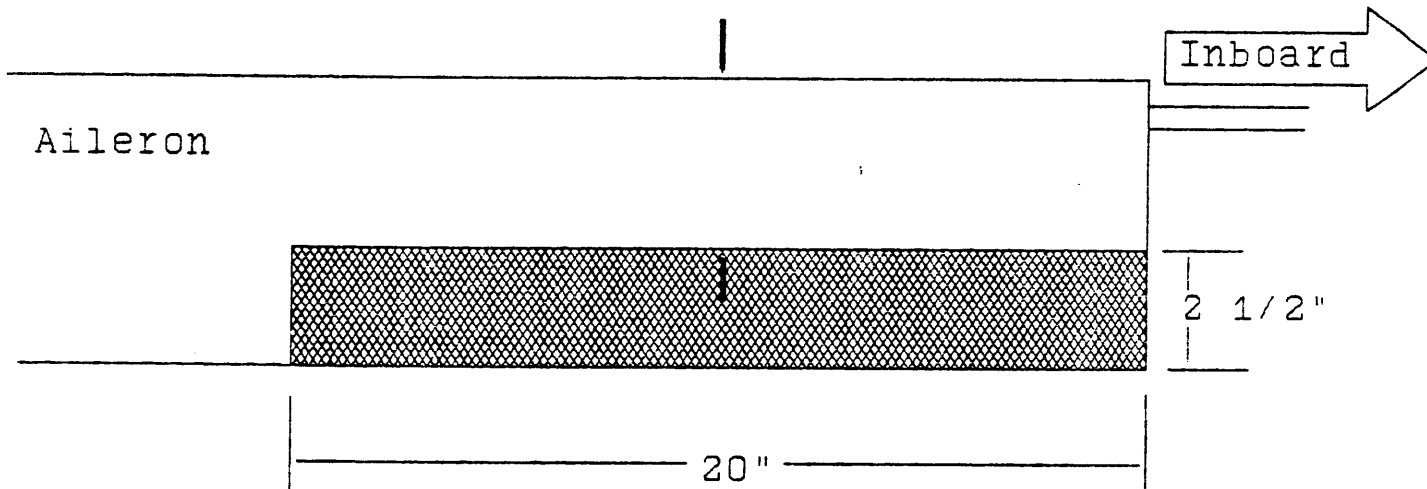
that small adjustments to fine tune the controls can be made. Very important ensure the linkage is secure and cannot become loose. Check the linkage before every flight. I have connected mine using 4 x 40 screws and nylon lock nuts. Also do not let the servo tab deflect more than 75% of control deflection (ei aileron travel 1 inch, servo should deflect a max of 3/4 inch). This is the general rule of thumb to prevent control flutter. Also check the construction light.

The clevis ends and threaded rod and brass tubing used in the control linkage arm should be commonly available at your local hobby shop that carries radio control aircraft equipment.

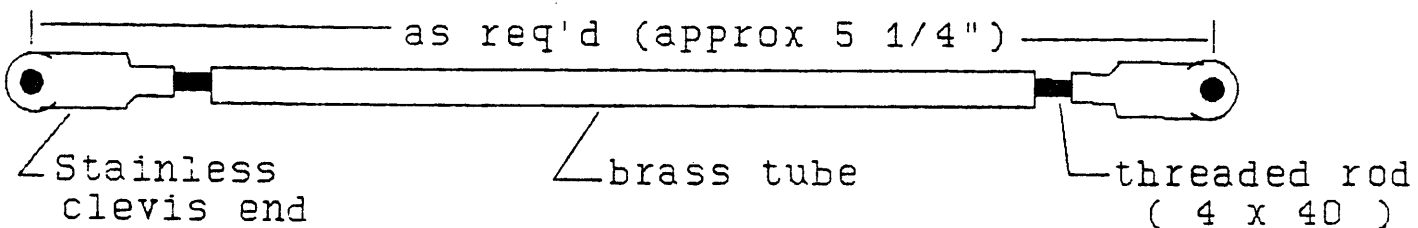
Major Ted Givins P. Eng.

Ontario, Canada

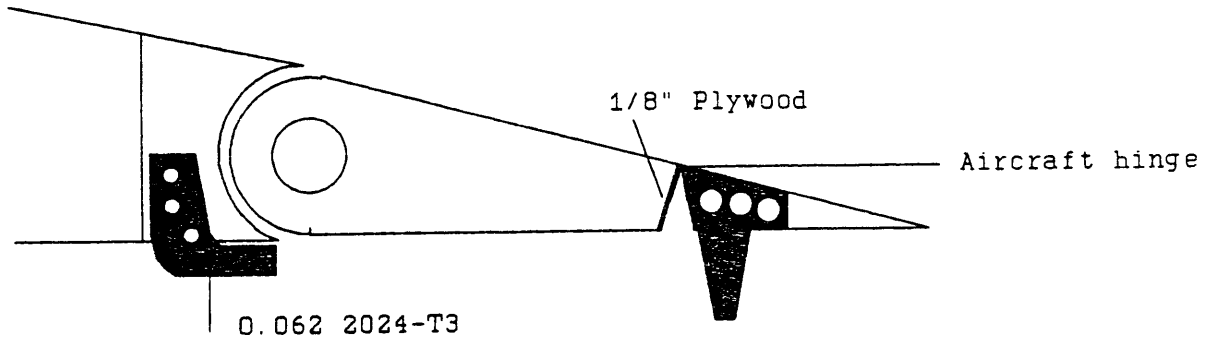
| - indicates linkage tab locations.



NOTE: The length shown is as the servo tabs were installed on C-GGEM. I believe Justin Mace's tabs were 24" in length. I would recommend the longer length to get more benifit.

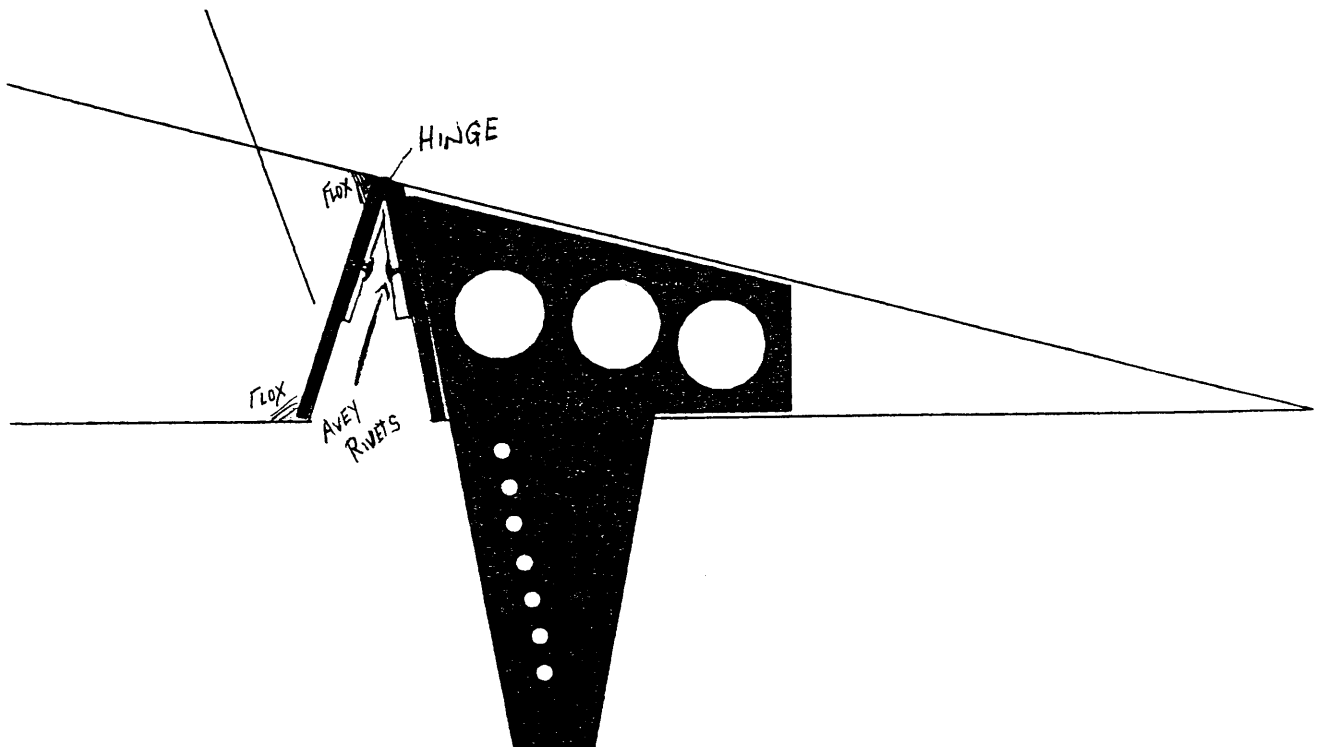


AILERON SERVO TABS



1. Cut out servo-tab from inboard portion of aileron.
2. Remove sufficient material to allow deflection of tab.
3. Remove foam to allow plywood to fit in tab and aileron.
4. Flox glass edges and micro plywood to foam. Glass exposed plywood
5. Position hinge and rivet (avex) to plywood/glass. Can put small amount of flox under hinge.
6. Cut slots in tab and control fairing and insert linkage tabs. Flox linkage tabs in place.

1/8" Plywood



DEFECTIVE NUTS

To follow is a copy of a letter on defective fasteners (lock nuts) which was supplied to Ben Owens of the EAA by our fellow Dragonflyer Major Ted Givins. Even though these part numbers are not specifically called out for in the Dragonfly plans (the plans list MS21042-3's & 4's), it would not be on common for a Dragonfly builder (or any builder) to change styles or go up one size of fasteners.

Feb 24, 1994

Ben Owen

Executive Director, Information Services

EAA Aviation Center P.O. Box 3086

Oshkosh, WI 54903-3086

Ben,

I have recently received information regarding Hydrogen Embrittled MS hard ware. This information should be given the widest distribution possible, Tech Counselor News, Sport Aviation, etc.

The manufacturer, Bristol Industries of California, identified several production batches of MS21042 lock nuts as being Hydrogen embrittled and apparently initiated recalls in 1989

but recalls were not widely distributed. The suspect nuts were manufactured prior to 1988. The specific part numbers are;

MS21042-5

MS21042L-5

MS21042-6

MS21042L-6



The hydrogen embrittled nuts will crack sometime after installation. They will not normally crack during installation unless overtorqued. Since these nuts are used extensively on all aircraft all EAA members should be aware of the problem.

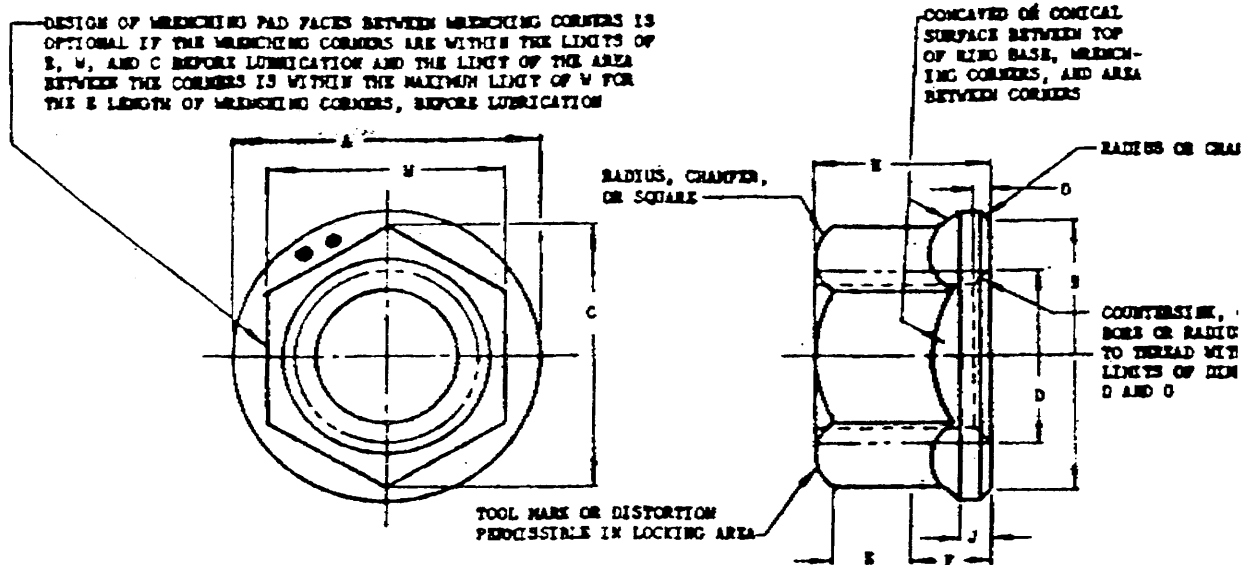
That's the bad news; the good news is that Bristol Industries places a manufacturing mark on their nuts. The specific production batches can not be identified but nuts from Bristol can be identified.

Bristol's manufacturing mark is two raised dots on the nut flange. Refer to the enclosed figure for the exact location of the marks.

Currently, these suspect nuts are being found in the military stocks and may be seen for sale at Sun N' Fun and Oshkosh.

M.E. (Ted) Givins, Tech Counselor 3033

MS21042 FASTENER



● ● RAISED DOTS INDICATE MANUFACTURE - BRISTOL INDUSTRIES

LETTERS, LETTERS!

Hi Spud

N4388D has 45 hours on the tach as of this writing and is out of restrictions. Performance is slightly less than expected but it is still very dirty, no wheel pants, leg fairings, etc. (you'll be very surprised how much difference this will make-Spud). I've got the Hapi 60-2DM engine turning a 52/42 Tennessee prop. Take-off distance is 1300 feet and landing roll-out about 1300 feet when using the airspeed of 70 mph indicated over the number. In cruise mode, CHT is 350 degrees, oil temp 190-195 mph, 125 mph at 3100 rpm (but then it's still fairly dirty) all based on OAT standard or above. Now that the weather has turned cold I've blocked off the oil cooler and see 165 F degrees and 325 F CHT.

At around 25 hours engine time I pulled the engine to investigate a rather pronounced oil leak. Well one thing always leads to another. The rear seal was leaking caused in part by the flywheel coming apart - talk about "Luck". It seems the early Hapi VW conversion used a stock flywheel made in two pieces and bonded by rivets - modified for A/C use.

Great Plains Aircraft came to the "Rescue" and a couple of weeks and \$\$\$ later we were in the air again!

My observations - I've only flown solo to 1050 lbs., Rate of Climb is 500 fpm. The airplane is very pitch sensitive and stiff in roll control comparatively. It has excellent rudder response. I really think it's under powered with the 60 hp VW. Any builder should think very seriously about the adequacy of the gravity feed fuel system. Steve Bennett isn't the greatest fan of gravity feed in A/C like the Dragonfly - not enough head pressure.

I plan to make several changes to N4388D this winter, going to retrofit the aileron servos and reflex trim system. Anew engine is in the plans - I have a Type IV case and would like to build it up 2600 cc's (90hp) but this will put 30 lbs. more on the nose, right where it's not needed. Then there is always the 912 Rotax, \$4000.00 more but can burn auto fuel at .80 to .95 cents a gallon, savings that almost \$3000.00 in real dollars in 800 hours (I may talk my self into this yet!).

Has anyone tried the Type IV yet? Would be interested in hearing from them.

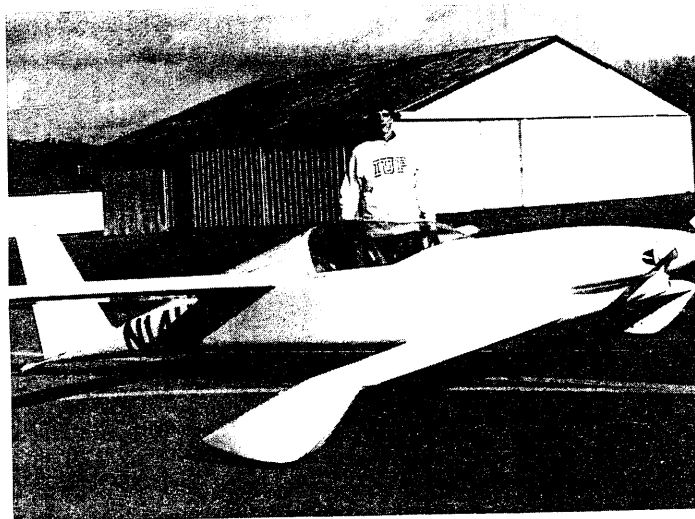
Till next time

Dan Blaskie (616)979-3951

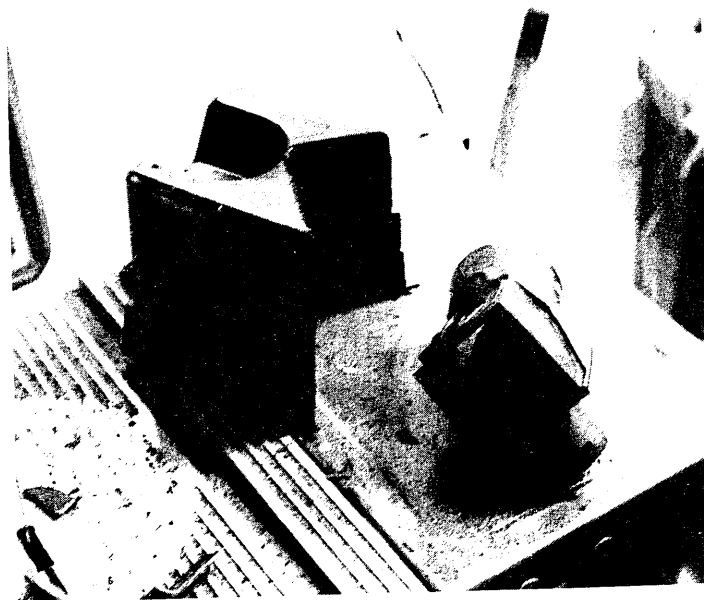
Hi Spud,

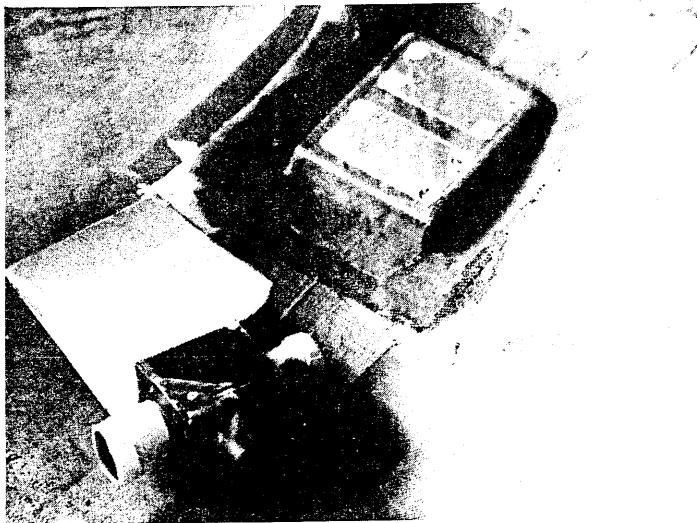
Enclosed is a photo of my Dragonfly, which is finally ready to go, as soon as I safety wire the turnbuckles on the rudder cables, get the carburetor adjusted, and have it inspected. It is powered by an 1835CC that I built up myself, and equipped with an Apollo Loran, Terra transponder and comm. I'm shocked to say that, in spite of all my efforts to keep it light, it weighs 725 pounds. I painted it myself, using PPG base coat-clear coat. The "N" number ("N14U") was picked for me by a helpful FAA person whose signature was illegible. I wanted the 12 inch letters so I could fly into Canada, and asked for a combination that would fit between the wing and tail. I got "ONE FOR YOU."

I thought the 'flyers still under construction might be



interested in my air filter/carb heat box. I started with a small filter box from a junkyard (I think maybe an Omni) and sawed it off for the carb heat valve.





I carved a likeness of an aircraft filter out of styrofoam and laid up a fiberglass form on the bottom of the cowling, before I cut through to the snorkel. Then I cut as seen in the photo, made another foam form attached to the valve, and laid up another layer to complete the whole thing, and dissolved in gasoline when it was cured. After trimming, I laid up a little lip on the cowling at the aft side, and drilled two place in the front corners, then riveted nut plates into the filter box, so it slides back into place, then screws in place from the outside.

I looking forward to flying the Dragonfly, as soon as I get some weather.

Alan Luckey
Indiana, PA



Dear Spud

Well my Dragin'fly now has 525 hours on the clock with 275 of that under the power of a Subaru Legacy engine. I just changed oil again at 120 hrs. NO maintenance of any kind on the engine to date. I did have an alternator bracket crack

and exhaust pipe develop a hole but those were design and builder problems and no fault of the engine. I do plan to change the cam belt at 500 engine hours (225 hrs. to go). 130 mph X 500 equals 65,000 miles. Most auto manufacturers recommend a cam belt change at that many miles as part of a regular maintenance program.

As you know, last winter I finally got tired of brake problems and designed a set of new 5160 steel gear legs. They were very easy to make and cost me about \$58.00. I then installed 500 X 6 Cleveland wheels and brakes. This is the same set up that piper uses on the Tomahawk. You can never have toooo much braking power. I can now land as short as most DF's even at my heavier weight.

I have always had a problem of the plane wanting to dart left or right under hard braking. I never had good control of the plane while using the brakes. Upon talking to Gene Evans last week, I find he has the same problem. He attributes it to the flex in the glass gear legs. This sounds like a quite reasonable explanation to me because, after installing the steel gear I can now break very hard and am able to keep the aircraft in a straight line. I wonder if other builders who have changed the gear from glass to steel have noticed the same problem?

Here is a photo (on back cover) of my project. Its the small white one, in the shade!

Keep up the good work!

Justin "Hollywood" Mace

SUBARU ENGINE VIDEO

Reg Clarke's phone has been ringing off the wall with inquiries about his direct drive turbocharged Subaru engine in his Dragonfly.

He has released two videos on the subject; First one is; "How to rebuild your Subaru to Zero time Spec's". This video will show what to do and what not to do when preparing the 1.8 Subaru engine for direct drive or reduction applications. Included are Reg's tips on balancing, blueprinting of the engine and the very important steps on to make the turbocharging work in an aircraft application. This video sales for \$89.00.

The second video will be on the firewall forward installation. It will discuss, how to make a engine mount, the cooling system, the turbocharger system and its installation in a Dragonfly. This video sales for \$69.00

Both video's can be purchased combined for \$149.00

Reg is also working on a streamlined cowl for the Dragonfly when using the the direct drive turbocharged Subaru engine.

The new cowling is 4.5" longer than the original and will include the side cheeks and special inlets. The mold is done and they should be able to ship very soon.

The complete cowling package will be \$575.00

Those interested in these items may contact;

Reg Clarke
c/o Clarke Upholstery
Box 6896
Wetaskiwin, Alberta
Canada T9A 2G5
Phone/Fax (403) 352-5001



934-3529 nights/weekends <49/50> PHOTO

For Sale: Mark I Dragonfly 240 hrs., plans built less canard & engine. \$4500.00 Call Kenny for spec's-(402)593-9492 after 6:00 PM CST<49/50/51>

For Sale: Rotax 503, 2.24:1 gearbox, Dual CDI ignition, Run great. Jon (406)443-7311

THE CLASSIFIEDS

For Sale: Sterba 60X68 prop \$250.00, spin-on oil filter adapter for continental \$125.00, two new Lamb 11:00X400 tires \$50.00 Day (508)668-4784, Eve(508)668-5285 EST

For Sale: Mark II Dragonfly 70 TT. New style hoop gear, Dual hyd. brakes, Loran flybuddy, transponder, Escort II radio, 4 position EGT/CHT, Vortex generators, Quality workmanship. \$14,000. Ask for Guenther, evenings (407) 395-9267 2

For Sale: Dragonfly project 90% complete, all instruments and controls, less radio's, Loran & transponder, 82hp Hapi engine. All for \$8900.00 Flybuddy with central U.S. data card \$1190.00, Narco Com 810 radio \$935.00, Narco AT-150.AR850 transponder/encoder - \$955.00 Temper foam for Dragonfly/Q-2/Q-200 seats and headrests - \$385.00 Tom Thompson P.O. Box 30 Randolph, TX 75475 (214) 575-4646

For Sale: INSTRUMENT PANEL LAYOUT STICKERS- Trying to lay out your instrument panel and you've forgotten which circle is which? Here's what you need!! A packet of 10 pages of full size photo-repro's of instruments, gauges, switches, etc. Just peel them off and stick them to a mockup of the panel or on the instrument panel itself. A good way to fly the instruments before the plane is finished. Send \$20.00+\$2.50 S/H to Houde Enterprises, 12573 U.S. HWY 26, Riverton, WY 82501 <50-54>

For Sale: Mark II Dragonfly airframe - complete and painted. Cowling needs painting. Revmaster 2100D mounted, 10hrs TT approx.. Also includes Prop, inboard gear, tachometer and quad instruments from Westach, basic flight instruments, strobes, center stick, reflexer, tires and brakes. All \$7800.00 Bob (214)980-3733 days &

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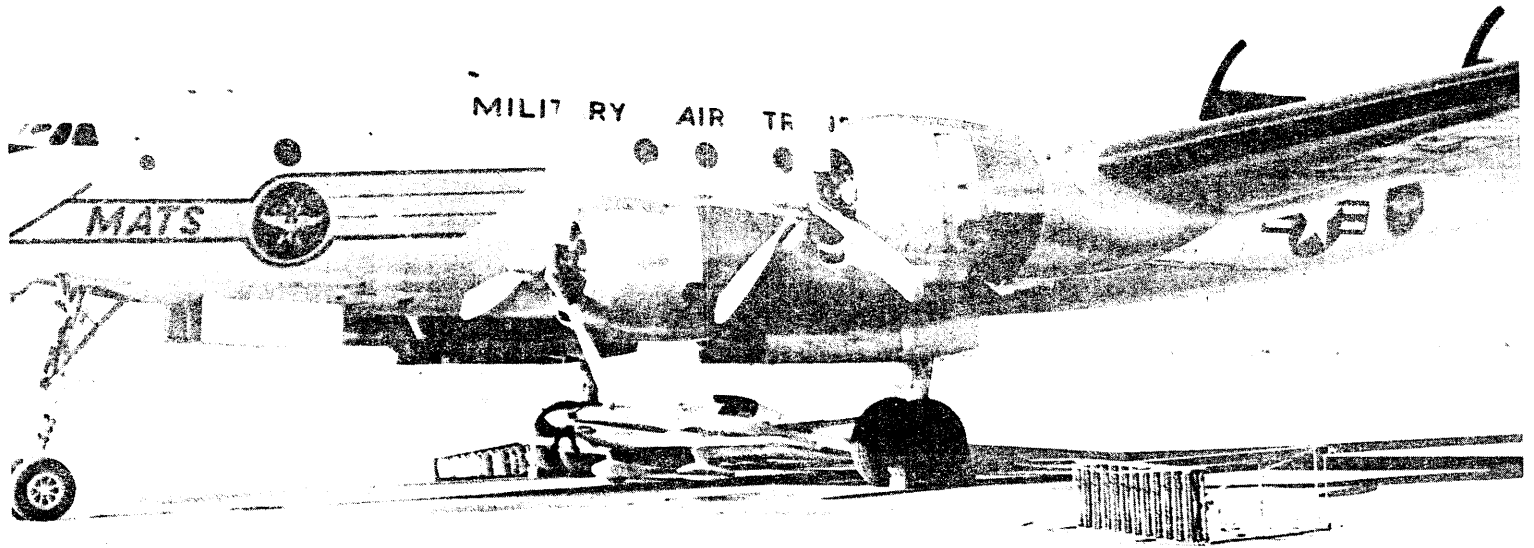
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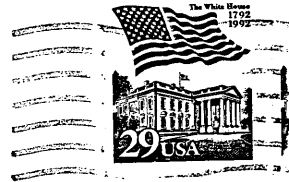
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Justin Mace's idea of keeping cool in the shade



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