DRAGONFLY BUILDERS AND FLYERS NEWSLETTER

THE OFFICIAL VOICE OF DRAGONFLY BUILDERS ALL OVER THE WORLD

Volume 97 *May / June 2002*

Look! Up in the sky! It's a bird! It's a plane! It's an EOS RAPTOR!!!

T-10 seconds and Counting

"Space Coast Regional Tower…… Experimental 968F holding short of the active for once around the pattern". Could that be me saying those words??? This had to be a dream. Yeah that was it, I was really in my computer lab playing with X-Plane and had fallen asleep. Only problem was that I was more awake and revved up than I had ever been in my life. Could I really be stupid enough to push that throttle forward and take this untried flying machine for a first flight ???

In fact it would be the plane's second flight, but the first one was unplanned and nearly ended in disaster. The 10 second hop made the day before nearly convinced me that this flying machine I had built was not air-worthy. I mean it had all the systems working as such, but that first little hop off the ground was very nearly its last flight. During high speed taxi testing I deployed the elevators to see if the

Continued on next page

stick loads were manageable. Up to that point I had cut power, slowed to 75 mph and was about ½ way down the runway. As the elevators went past 10 degrees the nose of the aircraft rotated smoothly to some impossible attitude and the plane hopped into the air. I was 20 ft off the ground before I realized that the nose was not coming down no matter what I did with the elevators. Having simulated this "deep stall of the rear wing" before, I knew what would not work and did not do that. The plane eventually mushed out and came down softly (still nose high) at the very end of the runway.

That night, simulations made to misbehave the same way convinced me that all I needed was a bit more aft wing lift. The reflexors were the best option. In flight, they could be deployed to "dial in" the handling characteristics needed.

Sunday afternoon I found myself on the very runway I first soloed on many years ago. I knew this runway blindfolded. 09 TIX was an old friend that held no surprises for a very anxious test pilot and his untried flying machine. It only took the tower a single transmission to realized it was the same experimental as the day before. Wisely, they cleared the entire pattern of traffic and closed down the approach to the ILS. I don't remember the exact exchange, but the tower's responses were very formal and they reminded Experimental Aircraft N968F that Fire/Rescue was stationed on the west side of the field.

Drew, soaring high above the swampy test area.

Simulated Raptor power plants do not shake the entire room you are sitting in like the real one does. Sitting at the end of that long, black runway and pushing the throttle to full was a rush that I will not soon forget. At 80 mph the plane rotated slightly (with a little bump of the elevators) and lifted off smooth. Immediately, the p-factor and my lack of right rudder started dragging the aircraft into a slow left roll. This was so reminiscent of the simulator's behavior that I started feeling around for the mouse to click the throttle back some. Reality check, no mouse found, but the throttle quadrant sure did the trick.

The remainder of the flight was filled with textbook mistakes that only very novice pilots are forgiven for. I climbed out too shallow, banked left too hard, never made it to pattern altitude on downwind, forgot to call the tower for landing instructions, busted the pattern speed limit, undershot the turn to base, overshot base to final and had to do a high g split S maneuver to center the plane on final approach. I came over the numbers at 120 mph and bobbed like a cork most of the way down the runway. When I touched down and cleared the active I fully expected the tower to tell me to "Please come see them" after I put my flying machine to bed. The radio silence was dreadful and I actually forgot about what I had just accomplished..

In fact, no such dire consequences occurred. In a moment, there were 10 different voices on the tower frequency, all congratulating me at once. As I taxied by the tower they were all waving and cheering. It was quite a moment. Not as cool as that first lift-off, but way better than reaching for a mouse and resetting a simulation.

Six plus years of building and it was over in less than 6 minutes. Space Coast Tower re-opened the airfield to normal traffic and ended there transmission with an announcement: "Raptor 6-8 Foxtrot was welcome to the family of flying machines that grace the skies of Sunny Florida".

Andrew Aurigema

Raising a husband

Raising a husband

A few years ago my husband decided to build an airplane.

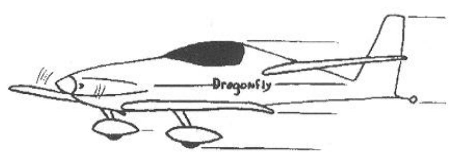
Kathy gives the Raptor a test fit

Of course I was there from the beginning to supervise and make sure he did not get into trouble. After all, this was my plane, and it was going to be made to my liking, or not at all.

Over the years I had to step in and make sure that he and his "buds" didn't mess my plane up. They were terrible at cutting foam for my Canard. Not a one of them has any patience. I spent months trying to learn them boys the simplest of task.

Finally, he had my plane ready to fly. Well almost, once again I found the curtains removed from the gull wing door windows. Husbands, they just never listen. Sunday, I dropped him off at the airport to work on the plane while I went to Wal-Mart. I returned to find the fuel tank nearly empty and him chattering about how great it flew. Of course it flew well, it is my airplane. Now who do you suppose is going to the Zippy station and fetch me some more gas!

Kathy Aurigema



An important notice

Check your control linkage

To the flyers and builders.

This a point that we found when doing our annual condition inspection. During a normal preflight checklist walk around, we would hold one of the ailerons and reach across the fuselage and sort of shake or somehow move the other one in order to see if there is any looseness in the control system. After 772 hours of flying there just hasn't been any ---at all---. Well fellas, maybe what we feel is not all that's going on. Here's the deal.

I have been changing my aileron trim system in order to clear the area forward of the control stick to make room for an electric elevator trim devise, while disconnected the plans aileron trim springs. While the springs were disconnected I did the aileron check and found some movement that wasn't there before!

What I found out was actually taking place, was the springs preloaded the system and I didn't apply enough pressure to override the tension. The tension of the spring was actually masking the problem.

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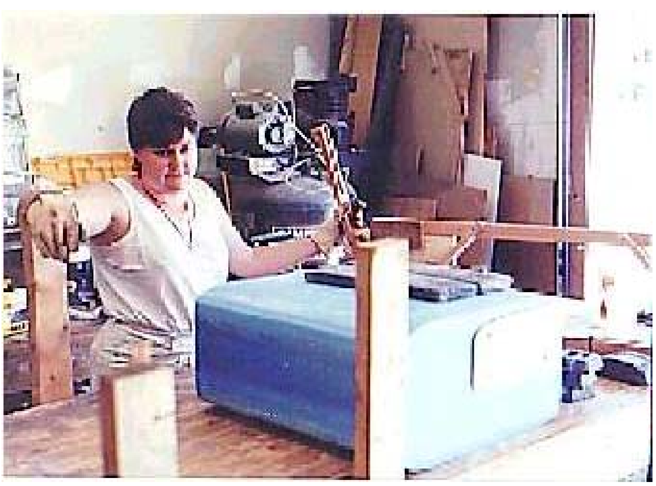


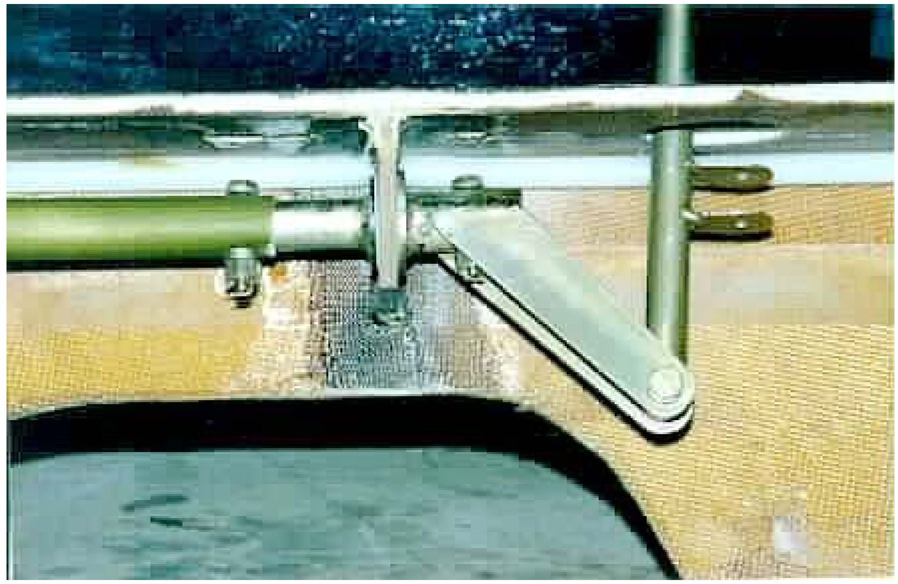
An important notice, continued from page 3

The culprit was the aileron bell cranks. They, being made of aluminum, had ever so slightly elongated bolt holes.

Now keep in mind that this plane was constructed by an expert machinist who knew how to drill and ream and do things correctly. 772 hours ago these 10-32 holes were drilled undersized and reamed to fit the grip of an AN3-10 bolt. In addition the proper torque was applied to each and every nut in the system. This tightens the bell crank bracket to the ball of the rod end bearing and secures the connection even more. I guess that there is a lot of buzzing going on while an airplane is in flight and after that many hours something had to give.

I am replacing the 10-32 bolts with the next size larger. AN4-10. The drilling and reaming is being done on a Bridgeport vertical mill. The fix should last for a long time. New builders might consider using .250X 1/4-28 rod ends anyway. The rod has 1/4-28 threads, and the price is the same as the smaller ones, and you will have more surface to hold. So why not make the bell crank holes 1/4 inch instead of 3/16 and go for it. Check it every 1500 hrs J

Another point I might mention (and some of you may have already taken care of this) is the twisting of the control stick weldment. If you can picture as I try to explain. There is the vertical control stick and welded to the bottom of it are two pieces of metal, about 1" X 4" long that are at an angle of approx. 45 degrees aft. they are in turn welded to a sleeve that is slipped on and bolted to the aluminum aileron control torque tube. These two pieces are welded to opposite sides of the stick and sleeve and are parallel. We found,(Our friend Pat got in on this) that when full aileron was applied, the stick could actually be cranked farther to both the right and left. It twisted the parallel pieces of metal and gave the feeling that we were torquing the control tube, when in reality we were torquing the weldment. We welded two pieces of metal to the angle bracket and boxed it up. By god that took care of torquing the weldment. And by the way, no more the feeling of torquing the tube.



Although this photo is if a side stick configuration, John's center stick hardware is very similar. The pair of "legs" that supports the base of the stick, is the source of bending while trying to use aileron.

Photo curtsey of Jon Crawford

I guess that's it for now.

John Mason
N142JE

Thank you John, for this very informative article. I would encourage every Dragonfly pilot to check their aileron control connections, looking specifically for this anomaly John brought to our attention. Additionally, John's fix for the control stick is really worth considering.

~Pat

Another loss

It saddens me deeply to have to report that Robert E. Roe, long time Arizona Dragonfly builder and pilot of N93RR, died Sunday morning, July 14, 2002 after a 3 month battle with Hotchkins Disease.

The Funeral was held in Wyoming.

Cards may be sent to the family in care of:

Carol Roe
PO Box 132
Big Horn WY 82833

The family requests that, in lieu of flowers, donations be made to:

Your local Experimental Aircraft Association (EAA) Chapter's Young Eagles Program.

Regards
Don Stewart

Anti-servo elevator tabs, mass balancing and flutter

By Terry O'Neill

General steps I took to make the anti-servo trim tab system for Dragonfly N189SM.

I removed the canard, then the elevators. I marked and then cut out the tab areas per my drawings, 3" by 24" each side. (This surface area works fine, but an additional span of about 4 to 6 inches would probably give the same trim power, but with less tab deflection.)

The design calls for a piano hinge to be imbedded in the upper surface of the elevator and the new tab. I removed foam from inside the elevator under the piano hinge, to allow the tab's forward lower edge to swing in to the elevator, (in to this new cavity created by removing foam)) as noted on the drawings, and then smoothed the edges.

I then removed a slot of foam in both the elevator and tab to allow inserting the piano hinge. This slot is immediately adjacent to the upper skin surface and the foam core. I also removed foam from the end of the tab, to permit me to insert the control horn at the tab's end.

Next I cut the horns to shape, and cut the hinges to length. I applied tape to the center of both sides of the hinge-lines to keep epoxy out, and I roughed up the hinge surfaces with sand paper, for better bonding with the epoxy. I did a test fit first with 3/32" clecos, and then applied flox onto the hinges and into the slots, and assembled all with the clecos. I removed the excess epoxy, and cleaned up with alcohol.

Then I made the mounting pad for the single MAC 6A actuator, and made the pad for the cross-tube's anchoring pads and installed the bronze bearings. I made the cross-tube's sleeve-with-control horn. And made the plates for mounting the bushings at both fuselage sides. I also made the two cross-tubes and their small horns, which I welded to their ends. They are installed by inserting each tube from the outside, through the outer bearing, and joined to the other cross tube (in the middle) by inserting both into the cross tube sleeve-with-control-horn, and pinning with clevis pins, washers and cotters. (Tapered pins would produce a more secure and accurate fit).

Terry's elevator tab replaces the sparrow strainer and the pitch trim mechanism. Additionally, the "anti-servo" function of this system adds stick loads in the pitch axis, helping to stabilize pitch, and to make stick pressures more equal, in the pitch and roll axis.

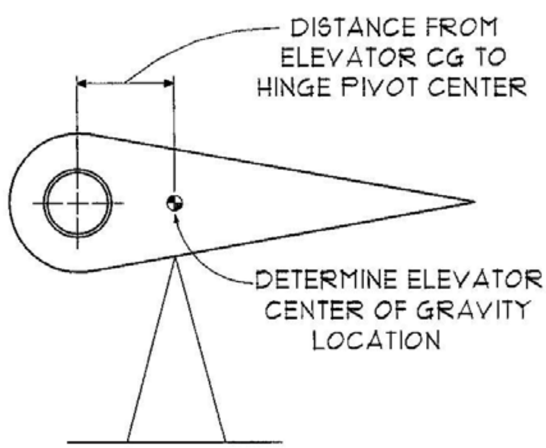
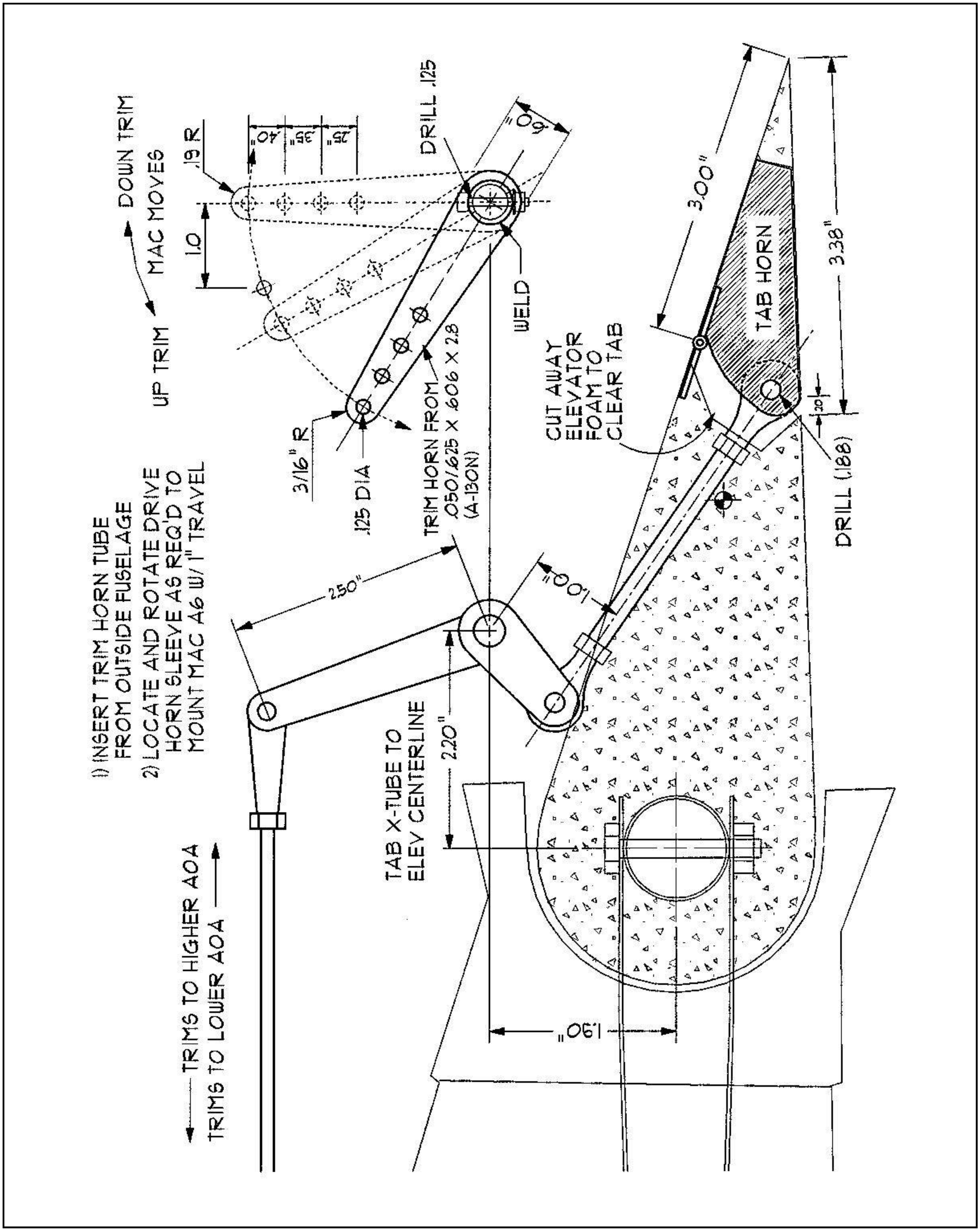
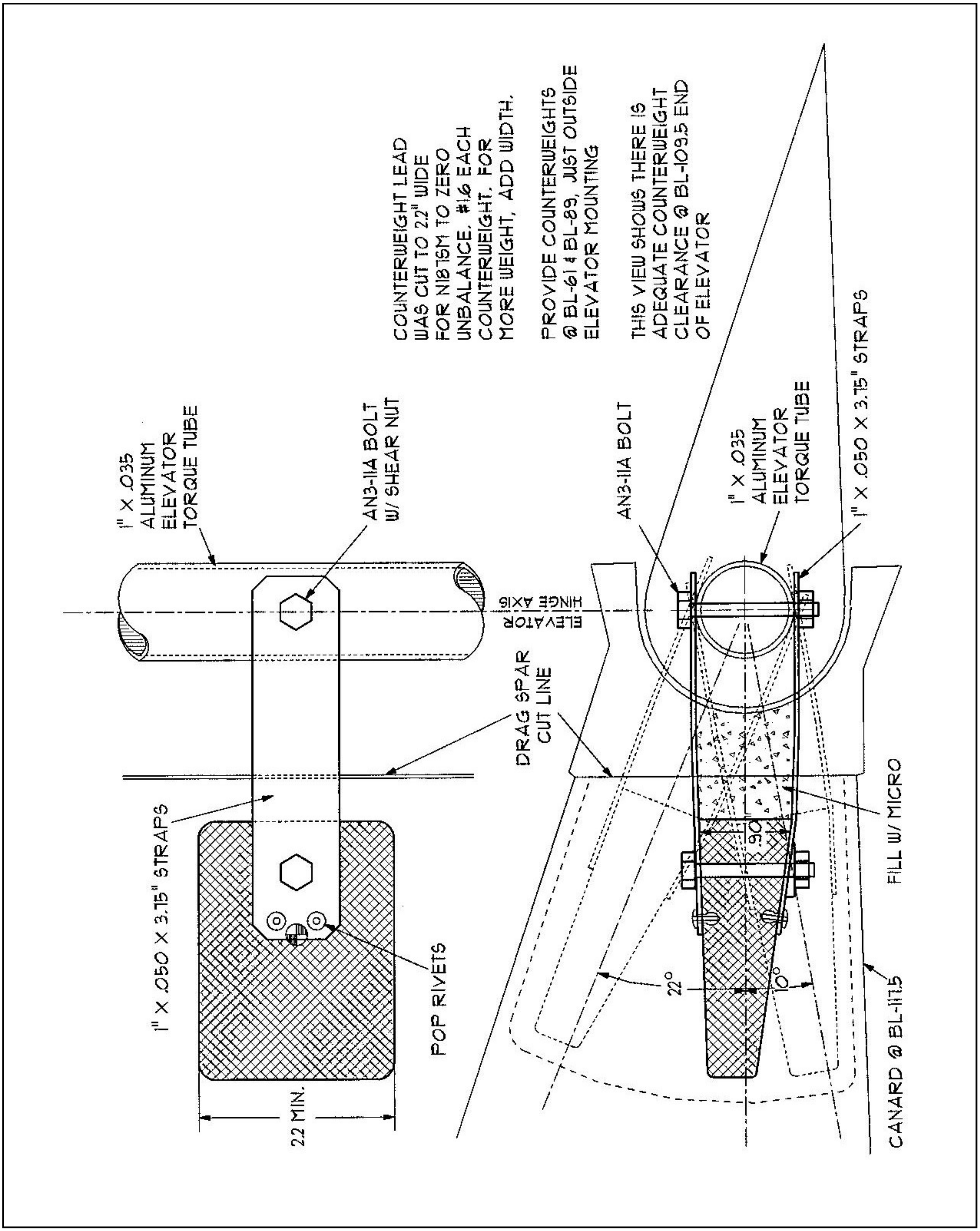


Figure 1. Finding the CG of the elevator.

After cleaning up and finishing the elevator tab assemblies, I made stands for each elevator, to measure the unbalance (after first weighing each elevator and then balancing it on an edge to determine the elevator's center of gravity) and marking it on the elevator. (See figure 1 this page).

Continued page 8


1) INSERT TRIM HORN TUBE FROM OUTSIDE FUSELAGE
2) LOCATE AND ROTATE DRIVE HORN SLEEVE AS REQ'D TO MOUNT MAC A6 W/1" TRAVEL
TRIMS TO HIGHER AOA
TRIMS TO LOWER AOA
UP TRIM
MAC MOVES
DOWN TRIM
.19 R
1.0
.40"
.35"
.25"
DRILL .125
.60"
WELD
3/16" R
.125 DIA
TRIM HORN FROM .050/.625 X .606 X 2.8 (A-130N)
2.50"
2.20"
1.00"
TAB X-TUBE TO ELEV CENTERLINE
1.90"
CUT AWAY ELEVATOR FOAM TO CLEAR TAB
3.00"
TAB HORN
3.38"
.30
DRILL (.188)


COUNTERWEIGHT LEAD WAS CUT TO 2.2" WIDE FOR N181SM TO ZERO UNBALANCE. #1.6 EACH COUNTERWEIGHT. FOR MORE WEIGHT, ADD WIDTH.
PROVIDE COUNTERWEIGHTS @ BL-61 & BL-89, JUST OUTSIDE ELEVATOR MOUNTING
THIS VIEW SHOWS THERE IS ADEQUATE COUNTERWEIGHT CLEARANCE @ BL-109.5 END OF ELEVATOR
1" X .035 ALUMINUM ELEVATOR TORQUE TUBE
AN3-11A BOLT W/ SHEAR NUT
ELEVATOR HINGE AXIS
DRAG SPAR CUT LINE
1" X .050 X 3.75" STRAPS
POP RIVETS
2.2 MIN.
AN3-11A BOLT
1" X .035 ALUMINUM ELEVATOR TORQUE TUBE
1" X .050 X 3.75" STRAPS
.90
FILL W/ MICRO
22°
10°
CANARD @ BL-117.5

I then supported each elevator on its stand, by putting a point on top of a scale, and lifting the elevator at a point 4-inches aft of the elevator hinge axis. (See figure 2 this page) This gave me the unbalance moment

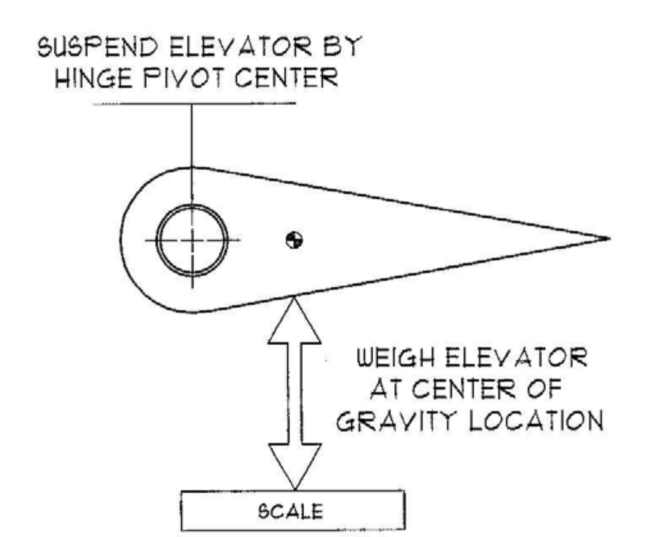


Figure 2. Weighing the elevator at the CG.

Here's just an example to illustrate the formula:

2.8 lbs (elevator weight) x 4.0"(arm) = 11.2# (moment).
Counterweight (on a 3.5" arm)…
Counterweight. = 11.2# ÷ 3.5" = 3.2 lbs.

inch-pounds. Because I was going to use two counterweights on each elevator, I divided this weight (3.2 lbs) by 2, and used 1.6 lbs of lead for each of the 4 (total) counterweights.

Next I made a simple clamp-together plywood mold for casting lead counterweights, which I determined had to weigh about 1.6-lbs each. If more weight would have been needed, the counterweights would have been wider, not longer or thicker, so they will still fit inside the canard as the drawing illustrates.

I decided to install the counterweights at a point just outside the two intermediate elevator bearings. The lead counterweights were mounted to the aluminum strap brackets, and these were inserted into the elevator through slots I cut into the leading edge, so that the brackets extended to pass just tangent to the top and bottom of the elevator torque tube. I used a cut-off piece of hacksaw blade to make the slots.

The aluminum straps were adjusted per the drawings, so the counterweights were centered on the chord line, to allow 22° (for 'up') inside the canard, and 10 ° for 'down'. When the position was right I drilled through the bracket and elevator torque tube for an AN3 bolt. A similar bolt, plus four pop rivets attached the counterweights to the bracket.

With everything aligned, the balance was checked once again, and the brackets were epoxied and bolted into the elevator, and 4.5PCF foam was used to fill between the bracket arms and epoxied for stiffness. The balance was then checked again on the stand. If needed, more weight could have been added to the sides of the counterweights, or lead could be drilled out to lighten.

Next I marked the canard where the elevator-mounted counterweights needed to be inserted through the trailing edge spar, and I cut and sanded out enough material to allow the counterweights to be inserted and then moved sideways enough to attach the elevator to the canard's elevator hinge brackets. The drag spar needed to be cut through to allow the weight to be installed.

It's good to be cautious about spars. In this case, the spar WEB only – was holed, and this is common in aft or control spar webs, and usually only a flange is added to the hole to stiffen the web. The DF drag spar web (where I cut the holes) is next to the two center elevator mounting brackets, which (in my opinion) strengthens up the web, and transmit the loads to skins and forward to the main spar.

Further, this solid-core sandwich wing structure we use, appears as if it is torsionally very stiff. I felt comfortable enough that I didn't even glass-reinforce the hole, other than to paint in some epoxy. The inside of the cutout could easily be reinforced with a layer of BID if one wanted to.

With the elevator installed, the pivot position for the tab-actuator cross-tube (which spans all the way across the fuselage) was marked and drilled, and the flanged bronze bearings fitted in place, taking care to assure that the holes aligned with the tube's axis and did not bind.

Then the cross tubes were installed from the outside, the left one through the left-side tube stay, and their lengths cut, to almost meet inside the sleeve-horn, which is located just to the left of center, so that clevis pins could be drilled from left and right of the console.

The single MAC 6A actuator was positioned directly ahead of the sleeve-horn, on its mount, which is

Continued on next page

Anti-servo elevator tabs, mass balancing and flutter, continued from page 8

then floxed into place on the top of the canard after prepping the surface of the canard for a good bond. The 6A actuator pushrod was then cut to length, and the ends attached.

Finally, with tab, elevator, and all parts clamped into alignment, the 1/8" holes are drilled through the sleeve-horn, through the cross-tubes (L and R) ends, and the clevis pins, washers and cotters inserted.

The MAC 6A control switch and indicator may then be located as desired on the panel or console. I located in on the console, near the aileron trim mechanism.

The cross-tube horn was attached to the tab by a push-pull rod (with rod ends), which can be adjusted for alignment. The tab should be positioned to allow at least .75-inch upward travel when the elevator is in aligned with the canard. The push-pull rods are locked on one end with jam nuts.

The actuator was tested to assure when the indicator is full-up, the tab is pulled to be deflected upward at least .75-inches, for initial flight checks. Adjustments are available for the MAC-6, and on the actuator's center horn, with additional holes for more or less sensitivity.

Adjustments can also be made during calibration by lengthening or shortening the distance between the push-pull rod's rodends center holes.

Tab in the full nose up trim, with the elevator in trail

Same elevator position as in the photo above, but viewed from the underside

On N189SM I put the tab to full up at forward CG (solo) for takeoff and landing, and then trim the nose down as the speed increases and the AOA goes down (I have an AOA on the left canard). At gross weight, with a passenger, I position the tab with a little more nose-down pitch, perhaps a quarter inch less up-deflection with the elevator in trail.

At cruise, position of the tabs themselves are deflected upward about 3/8".

Why balance your control surfaces?

Indicated in the old CAA Simplified Report No. 45, "Flutter Prevention Criteria for Personal Aircraft" (about 50 years old and about 30 pages long; and also indicated by MIL-A-8870 (ASG) from 1960 Mil-Specs for Air Force and Navy aircraft, regarding strength, rigidity, vibration, flutter and divergence; and also indicated by (1979) FAA Advisory Circular 23.6290.1, "Means of Compliance with Fed Air Regs on Flutter",

Continued on next page

balancing the control surface is of primary importance in preventing flutter.

The basic guidelines for criteria to prevent flutter in small planes (less than 200mph) at altitudes below 14,000-ft., for elevators, relies on torsional stiffness of the surface ahead of the elevator, and dynamic balance criteria, including static balance about the hinge line, mass moment of inertia about hinge mass, and elevator product of inertia referred to stabilizer centerline and elevator hinge line,. etc.

I thought to offer you some considerations about how flutter works on our elevator.

The Dragonfly elevator is free to rotate about it's hinge line, even with zero slop in the controls, since your hand-pressure is not perfectly rigid. We're talking resonance here, which can work with very small movements, at high frequencies, which can be magnified to infinity.

If you hold the control perfectly rigid, the rotation can still be caused by gusts, or power vibration, and the slight flexing of the canard.

This rotation can be prevented by balancing the elevator about its own hinge line, so that when a gust hits the plane, and the plane is accelerated upward, the whole elevator tends to rise upward too. If the elevator is heavy behind the hinge line, it will deflect downward and increase the lift on the wing, tending to move it even further upward and increasing the load on it. Then the whole thing reverses, and the unbalance tends to increase the load in the opposite direction, building up the stress with each reversal. But if the elevator is balanced, the gust can move the elevator as a whole, as the plane is accelerated upward, but the elevator moves without rotating about the hinge , and that's the key.

The easiest kind of balance to do is "static" but the best is "dynamic". Dynamic balance is when the CG of the counter weights are the same distance AHEAD of the hinge line as the unbalanced CG of the elevator is BEHIND the hinge line.

Another consideration is the tuned or resonant frequency of vibration of the wing-elevator. All surfaces have a resonant frequency. Generally, the stiffer a surface is, the higher its frequency will be, and the higher the flutter speed will be.

There's a paragraph in the older MiLSpec which I think helps to clarify the importance of balancing a control surface."3.2.1.1. For high speed airplanes (over 300-mph) the static unbalance of each reversible main movable control surface shall not exceed ZERO. For low speed airplanes (under 200-mph) complete static balance is not required if flutter analysis show that the unbalance used is adequate.. The K/I (dynamic balance coefficient) may not exceed 0.20[6-(Vl/130)squared]."

Since these variables are complex to estimate and calculate, it is simpler for us to just balance the surfaces 100% to be sure.

Later, in Paragraph 3.3.3.1.3. (a), on Data for Low Speed Aircraft, the MilSpec says "the two-dimensional analysis for bending, torsion and rotation need not be performed if the control surface is sufficiently dynamically balanced with respect to the perpendicular axis, and is completely statically balanced."

Gang, this is still not a guarantee that the surface won't flutter, but it indicates to me that static balancing is a very important thing to have accomplished to prevent flutter.

I was told by my wife's cousin, John Hartman, who was on McDonnell's design team (before the merger with Douglas) that flutter still had a lot of unknowns, and that even with high powered engineering, the F-15's right tail still fluttered, and needed a fix. Fortunately it had two tails, or they might have lost the aircraft.

Anyway, I hope this persuades you that balancing the elevator is very important, and that removing the slop only raises the flutter speed a little , in my humble opinion, although it's still mandatory

One last note; Is spring trim good for reducing the chances for flutter? Good question. Picture this setup in your mind: the elevator is still heavy aft of the hinge line, and when you hit a bump that sends you upward, the spring trimmer lets the elevator sag downward, because it not only has to resist the weight, but also the acceleration of the bump. This action lets the airflow put more energy into the canard, etc. Basically, the reason why springs won't 'balance' is that springs produce a elastic force, and balance requires MASS, which is rigid to the surface.

To make a spring work as mass, it would have to be so thick and stiff it would be effectively irreversible, like a powered actuator, and then your elevator surface would not need to be balanced, nor would you be able to move it with your arm.

Terry O'Neill

The photos in Terry's article are curtsey of Andrew Aurigema. CAD renderings were produced by Pat Panzera, working from Terry's original hand sketches. ~Pat

Correction

It was brought to my attention that in the previous newsletter, in David Gall's excellent article on "Prop Clocking", a small error was printed. On page 8 of issue 96, the statement, "I have been told by a manufacturer… will break props if the prop is mounted…

This should read that the CRANKS can break, not the props. Pat

Calendar

The Second Annual Livermore Tandem Wing Fly In is scheduled for Friday August 16-17-18. http://www.farnamengineering.com/LivermoreTandemWingFlyin.html

Last year's event was well attended and a lot of fun was had by all. The BBQ was a total hit! Since this forum is for Q's as well as DF's, please feel free to invite friends that may not know of this event. There will be several DF's and Q's in attendance, including James Patillo's 2002 "Lindy Award" winning Q-200.

As you may know, Livermore is centrally located for anyone up or down the west coast and there is a ton of things to do and see around the San Francisco Bay Area. Are you Canada and San Diego guys listening

For the gals, my wife Veronica will be heading up an all day trip to San Francisco. Around mid morning Sat. a short car ride to the BART (bay area rapid transit) then on to points of interest, fun and frivolity.

For those of you with out internet access, feel free to call me for more info. (559) 584-3306 Pat

The Classifieds

Classified ads are published free for those who are current newsletter subscribers. All ads must be renewed after 2 issues.

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@midwest.net

***For sale or trade*: NEW Cleveland 500-5 wheels and brakes**, a pair, with mounted new Lamb 11x4.00-5 tires w/ tubes, a $550 value. Will sell, or trade for 'like new' Cleveland 600-6 wheels and brakes, no tires. troneill@midwest.net; tel: 618-594-2681 or e-mail: troneill@midwest.net

For Sale: **Dragonfly MK II.** Excellent workmanship. Complete plane except the canard and gauges. Everything to complete a new canard except the landing gear. The canard is on the table, awaiting final lay-up. The spar is laid up, the gear leg boxes are installed and all cloth / carbon fiber to complete the project is included. The aircraft has always been hangared, and it comes with a HAPI 1835 cc engine, with dual electric ignition, and latest mods. New Props Inc. 52/42 prop, spinner included. Beautiful red cloth seats. Fuselage is complete with new forward hatch cut out, but not finished. The wing and the entire paint job are both in excellent condition. I would entertain splitting up the engine from the airframe. Priced for quick sale **$4800.00** Call Bill Brutsman at 913-888-8942, Lenexa KS, Fax: 913-599-1290 e-mail: wdbrtsmn@aol.com

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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12th Annual "Field of Dreams" Tandem Wing Fly-in for 2002 at Coffey County Airport, Burlington, Kansas
September 27th, 28th & 29th.

The Field of Dreams Tandem Wing Fly-in has been the annual meeting place for Quickie, Q-2, Q-200 and Dragonfly builders, flyers and enthusiasts around the world for 12 years. Over those twelve years the event has evolved into a fast paced event covering the full spectrum of builder/pilot concerns and how-to's. The event offers a full forum schedule where the builder/pilot can choose topics ranging from Quickie/Dragonfly construction and flying techniques to engine forums that cover, VW Type I & IV, Jabaru, Subaru, Corvair and Continental engines. Other forums cover aircraft electrical/component philosophies and how-to's. There's even a "Performance Run" (this is not to be considered a Race!) to measure and compare the pilot/builder's engine/prop/airframe efficiencies. Attending pilots are known to give rides in their handsome steeds. You wouldn't want to miss that chance, would you?

Social Fun? Lots of it! On Friday night pilot/builder's and friends gather for dinner where the topic is airplanes, airplanes and more airplanes! And you can't have a fly-in without an awards banquet! Saturday night we have a fine dinner in our own private facility, then we give out some door prizes and awards to builders of the attending aircraft in categories of "Longest Distance", "High-timer", "Best Interior" and "Best Overall". **http://pages.sbcglobal.net/bspornitz/fly-in2002.htm**

This event is open to everyone, not just for those people building or flying Quickies, Q-2's, Q-200's or Dragonfly's. We would particularly like to extend an invitation to those people building or flying any aircraft that utilize the VW, Jabaru, Subaru and Corvair engine packages and/or have an original designer gross weight of 1400 lbs or less. **Spud Spornitz** (913) 764-5118

DRAGONFLY BUILDERS & FLYERS NEWSLETTER

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