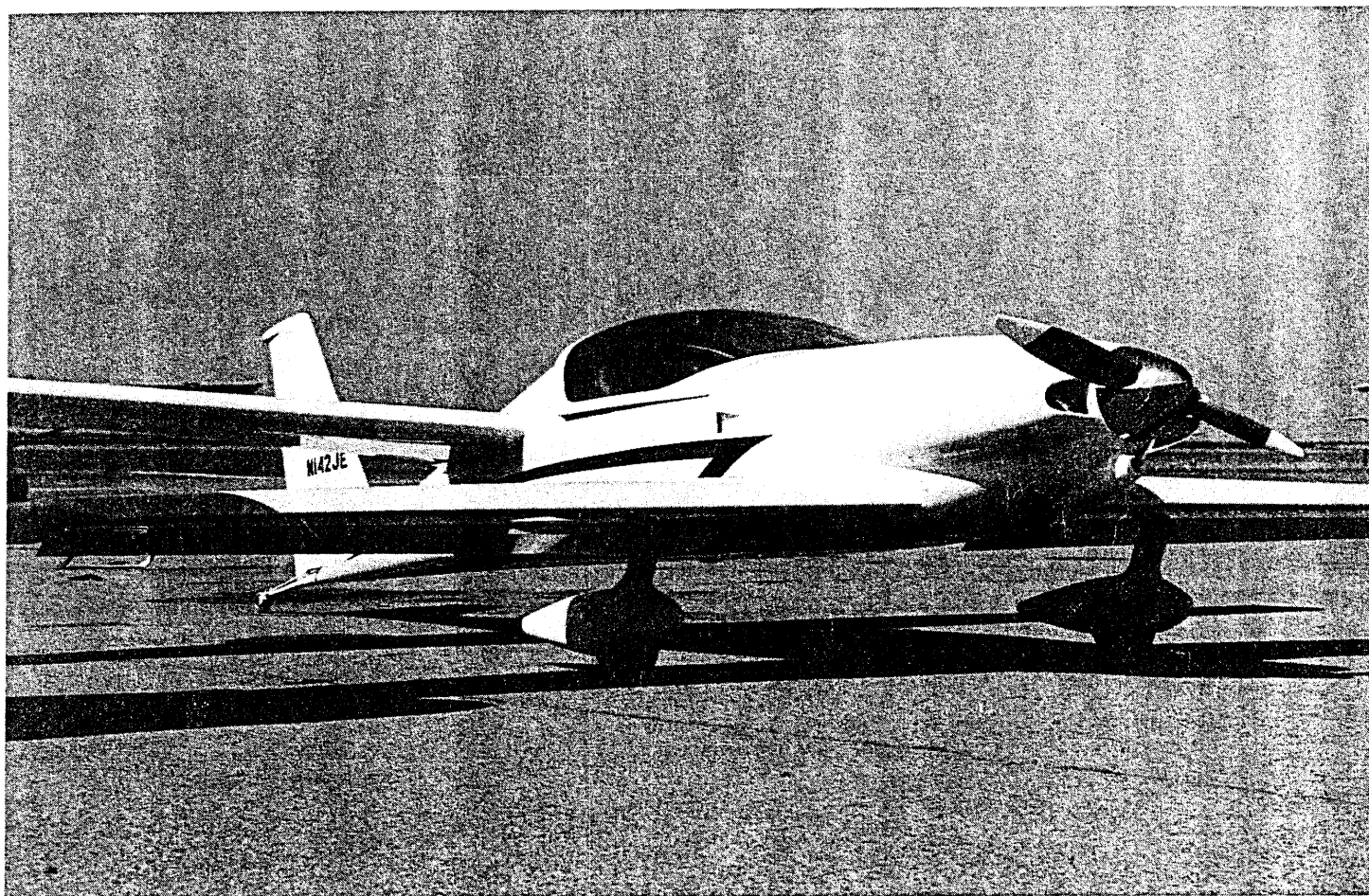


DRAGONFLY BUILDERS & FLYERS NEWSLETTER

THE OFFICAL VOICE OF DRAGONFLYERS ALL OVER THE WORLD

VOLUME 34

MARCH -APRIL 1991



Gene and Guy Evans of Visalia, Ca. Dragonfly

Dear Spud,

I really look forward to DBFN, It seems we have been given a new lease on life. With the increases in fuel prices over the last 6 months the old Dragonfly is becoming even a better economical flying bargain. It is great to be able to just jump in and forget all the days problems with a fun hour or so of fun flying for about \$8.00. The old spam can cost about \$27.00 for the same time. We carry 19 gallons

of fuel which gives us a 4 hour flying window with a 45 minute reserve. What else could you ask for.

Our DF is running a home built engine using 2180cc with a ellison carburetor developing approx. 75HP. We are cruising at 165 to 175 MPH using between 3.75 to 4 GPH. On a cold day we are able to fly at VMAX (180 MPH) in level flight. The DF is using a Great American 52x50 prop with a 3 inch thick hub that gives us a 1200 fpm climb with

one on board and 900 fpm with two.

We have been very happy with the way the DF airframe has held up for the last three and half years and 300 hours of flying time. The only exception to this was one weak landing gear leg and a cracked tail spring support early in our flying.

One of the weak areas that we have encountered is the alternator system. We have a full IFR panel, Mark 12D with glide slope, DME, marker beacons, Whelen strobes, nav lights and a Hapi secondary ignition system. In total we need at least 30 amps to run this system. We have tried three permanent magnet alternators with marginal results. When the last system burnt out the regulators, after three months of trying to get a replacement; we found out that the parts were no longer available. So we were forced to do what we should have come in the first place when we built the engine.

We went to the local foreign car salvage yard and found the lightest and smallest alternator we could find. It turned out to be a Suzuki Samari unit that weighed about the same as the permanent magnet unit we took out. The installation required cutting a slot in the top of the accessory case for a drive belt to come through and machining a mounting bracket for the alternator that attaches to the top two engine mount bolts and a pulley that bolts in place of the magnet ring on the Revmaster flywheel. The whole modification took about four hours to install and its working just GREAT! at 1200 rpm we can turn on everything and the alternator will still be charging the battery. Maybe we will try some night flying now. - Gene

I'm looking forward to making the Swarming and Oshkosh this year!

We are going to have a one hell of a turn out this year at Oshkosh, We already have 4 Dragonfly pledged for Oshkosh from California alone! I can hardly wait - Spudley

I would also like input from everyone on whether we should ask Gene and Guy if they would entertain building some of these alternator kits, they could be with or without alternator. Please respond to me on this so we can get a idea on the demand. We should not flood them with question or requests until they think its a project they would like to do. Spud

Wet Weather Excitement!

After putting in about two years and 200 hours in our Dragonfly you think you have just about everything figured

out. This experience is a good example of how you can get yourself in big trouble in a very short period of time when you least expect it.

I got in the habit of getting up early on Saturday mornings and flying out to have breakfast. On this particular morning it had rained the evening before with some puffy clouds still lingering; but the visibility was about 30 miles and the flying was going to be GREAT!

The airport where I intended on having breakfast was about 50 miles away and I had a glass smooth 20 minute trip. I spent about a hour having breakfast and hangar flying with many of the local aviators in a very relaxed atmosphere. While I was enjoying breakfast with my friends, one of those lingering clouds passed right over the top of my plane and decided to rain on it for about 15 minutes. When I was ready to fly home the skies had cleared up and it looked like it would be a beautiful flight.

I pre-flighted the Old DF and everything was great with the exception of some rain drops on the wing and canard. No sweat! The water will surely blow off before take off (RIGHT?). After taxiing out and announcing my departure I pulled out onto the 3600 foot runway and gave her the gas. The DF usually gets off the ground in about 600 - 800 feet. Today however, we were hitting some rain puddles so I held it on the runway until reaching 1000 feet to be sure it had enough speed to take off without any problems. At the about 1000 feet the DF was up to 65 MPH so I pulled back on the stick and expected it to jump into the air, BUT NOTHING HAPPENED! (Gulp!) It felt liked somebody had disconnected the elevators. I took a quick look and they were working properly. With the 75 HP engine the DF accelerates fairly rapidly; and while I was looking at the elevators, trying to keep it centered on the runway, it was now going 75 MPH. We had used up another 1000 feet (Double Gulp !). I gave it full aft trim with the reflexer hoping that this would help it fly. It was starting to dart from left to right from hitting the puddles. By now we were going past 80 Mph, I was going to fast and had used up to much runway to Stop. I passed the 3000 foot mark (Quad-Triple GULP!). I finally forced into the air. Twenty feet off the ground it started to go into the DF stall. slowly bobbing; which is very exciting this close to the ground. We were approaching the end of the runway fairly fast with plenty of trees, a fence and no altitude! I gritted my teeth and very gently pushed the stick forward hoping to pickup some much needed airspeed to get out of the stall and get flying. Luckily just a little forward pressure brought up the airspeed up to 85 MPH and the DF took off. At this speed the water that I thought

would have blown off the canard at 35 or 40 MPH finally did blow off and we started into a good 1200 fpm climb.

If I would of had a passenger or a smaller engine, I'm sure I would have run right off the end of that runway at about 85 MPH, NOT MUCH FUN!

The flight home was rather a sobering trip. While I thought about what just happened; There were several lessons to be learned here.

First, you should always pick a point of "Go - No GO" at any airport just like the big boys. After 1500 feet I should have pulled the power and aborted the takeoff. When you become over confident and don't have a preplan for this type of problem, things happen so fast you don't always have time to react properly in time.

Secondly, I know that the canard should be clean. We always remove the bugs before every flight. I should have done the same with the rain droplets. Not to smart. I have flown the DF in rain without any adverse problems of flight or the need for excessive trim. Just don't attempt to fly with big rain drops on the canard. If you can't clean the canard don't fly unless you have about 12000 feet of runway.

The DF is a lot of fun to fly , but don't let over confidence get in the way of good judgment. Always have a plan made up in advance for this type of situation. Listen to other fliers that may of had this situation and store those experiences in you "Memory Bank" so you won't have to go through the same situation.

Gene Evans

1546 Wellsley

Visalia, Ca. 93277

Thanks a Million Gene. It would have been real easy to keep that little episode to yourself. I know that everybody appreciates your input.

We are also going to do a more detailed report on Gene & Guys DF in a future issue - Spud

I would like to start off by prefacing this article a little bit, These gentlemen have well over 300 hours on this system and are seeing 3 to 5 MPH gains consistently at the same power setting in a cruise mode. They do not use the reflexer to "adjust" the plane for take-off & landings.- Spud

Hello Spud

Here's the info on the Reflexer system that we installed in

our Dragonfly.

We installed the reflexer into our Dragonfly during construction. It can be retrofitted, but you need to consider the following:

1. You may have to move the rudder cable and aileron trim conduits up to allow enough room to install the phenolic donut.

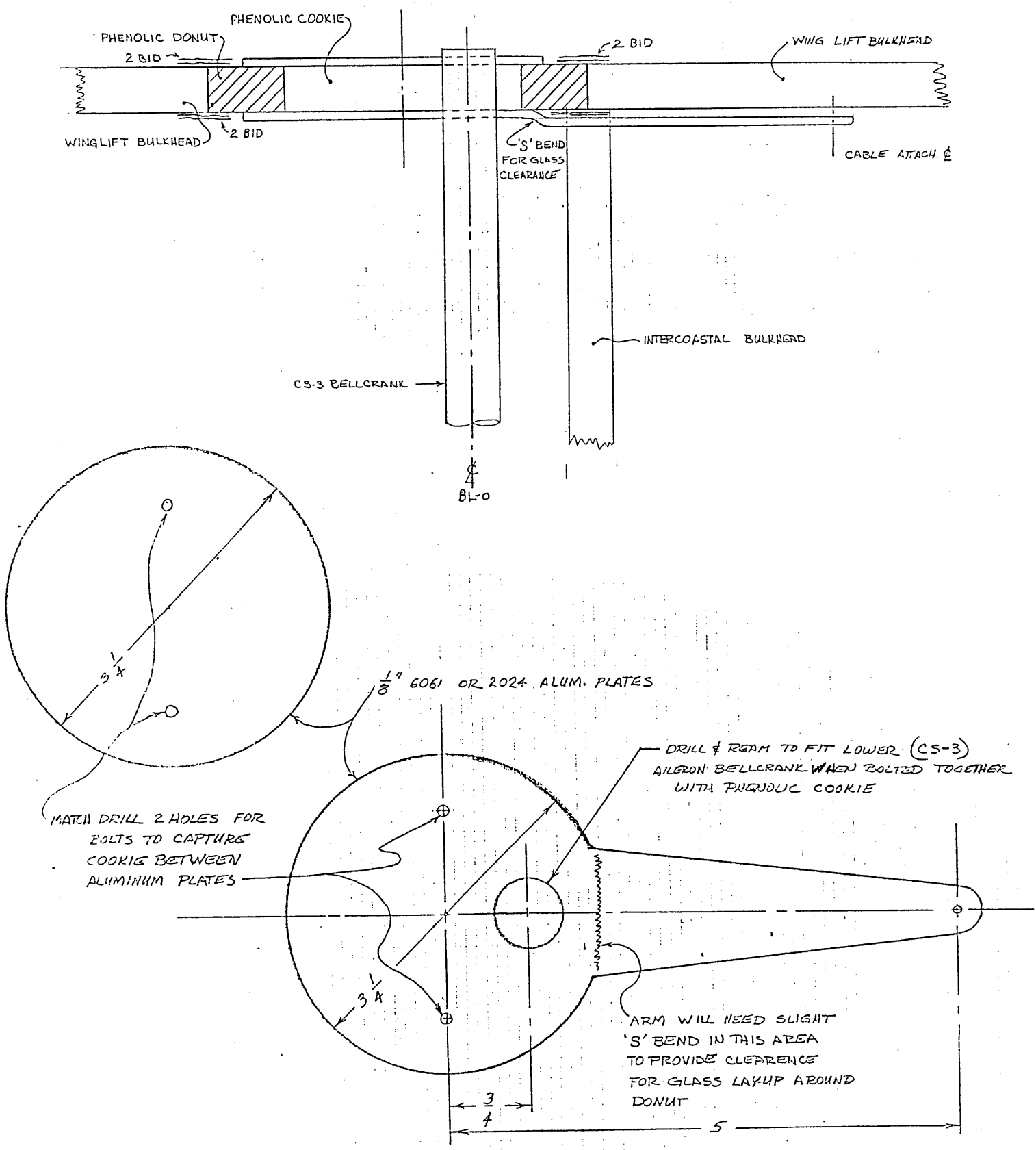
2. If you have dual controls with intermediate bearing (CS-14) you may need to install some type of universal joint after the crossover bell-crank. This is to allow for the up & down movement of the lower aileron bellcrank (CS-3) in the reflexer. If this is needed you must use a high quality universal that results in NO slop in the system. You might 5 minute epoxy the reflexer system in first and check for any binding before installing a universal.

We only installed a single stick in our plane so the intermediate bearing (CS-14) was eliminated. The control stick bearing (CS-13) was given additional plies of glass for added strength. We used one long continuous aluminum torque tube from CS-8 to CS-3. This longer tube allowed us to have an up and down movement at the reflexer without any binding at the control stick bearing (CS-13) or in the reflexer itself.

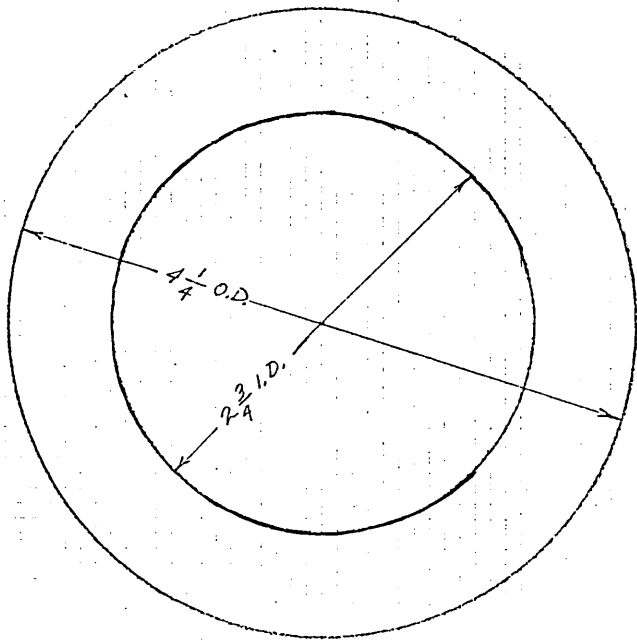
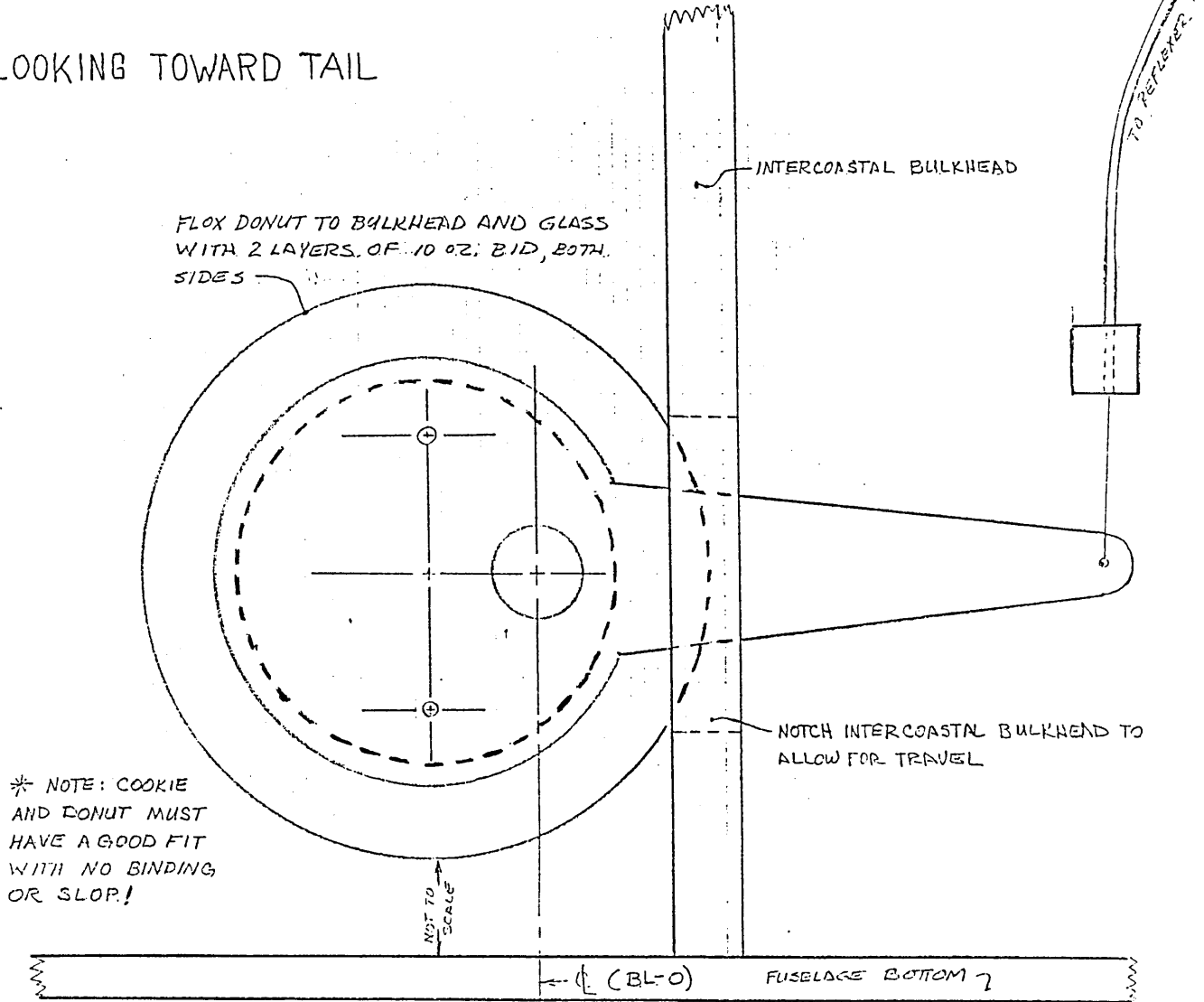
When floxing in the reflexer you need to make sure it will be in alignment with the control stick's aluminum torque tube when it cures. You may want to 5 minute epoxy it in place first and check the alignment before glassing it in with 2 layers of 10 oz. BID. Don't get any of this glass or resin on the surface between the cookie and the donut. be sure to scuff up the donut with some 40 grit before glassing.

I used a little grease on the rotating surface of the cookie before final assembly into the donut to reduce drag. Use self locking nuts or safety wired bolts to hold the reflexer together. For the actuating cable we ordered a new teflon lined replacement cable for the three lever throttle quadrant that Rex advertised in Newsletter #13. We made a bracket firmly grips the outside of this cable and used two of the bolts that hold the bellcrank attachment bracket (CS-2) for the attachment to the wing lift bulkhead. For ease of adjustment we located the reflexers' adjustment lever close to the 3 lever throttle quadrant. We also incorporated an adjustable pinch-bolt arrangement on the pivot of this lever to apply some friction so as not to allow any reflexer adjustment to change in flight as a results of vibration or turbulence. We have not found ours to change adjustment at all and we have very little tension on our lever.

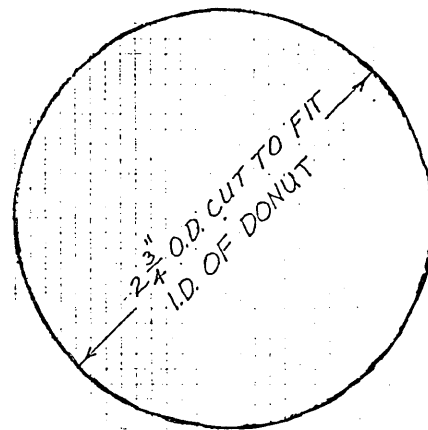
TOP VIEW



VIEW LOOKING TOWARD TAIL



$\frac{1}{2}$ " THICK PHENOLIC DONUT
(CAN BE MADE OF TWO $\frac{1}{4}$ " THICK PIECES)



$\frac{1}{2}$ " THICK PHENOLIC COOKIE:
(CAN BE MADE OF TWO $\frac{1}{4}$ " THICK PIECES) EPOXIED TOGETHER

It takes very little adjustment with the reflexer to trim out the aircraft to the angle of attack that gives us the best speed. You then add pitch trim to reduce any control stick pressure. To give you an idea of how little movement is used, take a look at the cable attachment hole at the end of the arm coming off of the forward aluminum washer that captures the cookie between the donut. From a neutral position (where the ailerons trailing edge are both in alignment with the trailing edge of the rear wing) this hole is moved no more than 3/8" down and 1/8" from its standard position.

Because so little movement makes such changes in flying attitude; the checking of the reflexer position prior to take off and landing is mandatory. Don't under-estimate this little item. It may ruin your whole day (and life).

Guy Evans

Everybody's in the Doghouse

All right guy's let's take this from the top! When I was at Oshkosh last year and a mass amount of you gentlemen that have written have said. " Oh! We got to have T-shirts", "I'll order nine million myself." " I don't care how much they cost!", "Where are the T-shirts".

We have received orders for about 50 T-shirts so far, with an average of 3 - 4 per subscriber, and holding those orders. The interesting thing so far is that all those guys that wanted those T-shirts haven't ordered Yet. Now I went back and reread my article on the T-shirt Program. it seemed clear to me, so I called several of the "accused". Boy! Did I get stories! "I've got the order right here. I was just mailing it", " I thought you were going to sell them after you had them printed," and "Are they really going to be worth \$9.00"?

I'm going to run the info again on the T-shirts, but Gentlemen I need a little more show of support for this project. If the majority of you would just order one shirt we would have more than enough to meet our Minimum of 144. WE NEED TO ORDER THESE T- SHIRTS IN ADVANCE OF HAVING THEM PRINTED. This means you must send in your check & order NOW!

The people that have already ordered their T-shirts, I thank you and I appreciate your patience as we wait for the balance of the group to follow with their orders.

If we do not receive enough orders for these shirts in the next 45 days, we'll cancel the project and return everybody's checks. But I don't want to here a darn thing about

them in the future, Period! - Spud

It's T-Shirt Time

We need to get started on this project!

Star Design of Lenexa, Ks. is going to be doing the shirts. They have a in house artist that is just fantastic!

Here's the game plan: We have to purchase a quantity of 144, the shirts are 50/50 blend, white, no pocket, available in S,M,L,XL. The drawing will be in the front, the plane will be somewhat of a isometric view in flight, Mark II, The word "Dragonfly" will be on the plane and at the top of the drawing (I don't want to be confused with Q-2's) The background will be a sunset, clouds or mountains. The printing we 4 or 5 color silkscreening process which won't bleed, chip off or wear off.

One thing that raises the price up a bit is the artists fees and screens of \$285.00. But the price of the shirts are still only going to be \$9.00 and for 4 or 5 color that's excellent!

Ordering: You are more than welcome to order just one shirt, but this is where I need everybody to step-up and get 2,3, 4 or more (you can mix sizes). This is going to be a one time order for this year and that's it until 1992. I'm going to hold everybody's checks until we get all the orders in (at least close) for the 144. If we fall short of our goal, I'll send back everybody's checks. There are 247 subscribers, we should be able buy at least 144 shirts.

Send in \$9.00 for every shirt you would like. and then add \$2.75 for the first shirt and add a \$1.00 for every additional shirt you order. Foreign orders must add \$6.00 for "every" shirt they order.

Well gang. here's your chance to show your colors! Don't put this down and forget. Order your T-Shirts TODAY!

Make checks payable and send to:

DBFN

1112 Layton Drive - Olathe, Kansas 66061

Missing Persons

I need your help Gang ! The following is a list of returned mailings from our original solicitation letter that we had mailed out in early October 1990.

All these letter were, " moved no forwarding address", " no such address", " forwarding order expired" etc., etc..If you are or know any of these gentlemen, I GREATLY

would appreciate it if you would notify them and/or supply DBFN with their current address so we can update our records. Offer them the newsletter and see if they are building, flying or may have sold their project to someone else.

Thomas Adams - Monterey, Ca. Noel Allen - Victoria, Australia Alex Balic - Denton, Tx. M. Paul Bardon - France Arnold Borreson - Burley, ID. Joe Brooks - Clarksville, Tn. Roland Burandt - Alberta, Canada Myron Coelho - Mesa, Az. Michael Coultas - Fort Collins, Co. Ed Cunningham - Las Vegas, Nv. George Cusimano - Lancaster, Ca. Gil Deguire- Owen sound, Canada Ed De la Torre - Riverside, Ca John Derr - Golden, Co. J.Scott Dodds- Long Beach, Ca. Elery Flint - Hollister, Ca Brian Gordon - Crawfordsville, In Jackie Hall - Wood River, Il. Robert Haynes - Ooltewah, Tn. Caraig Hinkle - Reading, Mi. Eugene Jaffe - Warwick, Ri. Jan Karwaowski - Sugarland, Tx Lazlo Kiss - Uppsalam, Sweden Joe Kreft - Shawnee, Ok. Frank Kopecky - Van Nuys, Ca. Lloyd Lafflin - Jericho, Vt. Donald Lorenzen - Camarillo, Ca. Bruce Martin - Santa Cruz, Ca. Mark Martin - Alberta, Canada Cryus Ostwari - College station, Tx Tim Parker - Stanford, Ca. William Patterson - Jacksonville, Fl. David Philpott - Galveston, Tx William Rankin - Tucson, Az. Gerald Reed - Ballwin, Mo. Carlos Romero - Grand Forks, Nd. Gilberto Saeger - Torrance, Ca. Donald Sessions - Tucson, Ca. Kevin Shreve - Altmonte Springs, Fl. Mike Ward - Portland, Or. Mike Welchter - Chicago, Il. Thomas Weekes - Rancho Calif., Ca. Stephen Wessel - Endicott, Ny. Tim Zowada - Battle

New products

Custom Stick Grips

This issues new product is not a new product, but it seems like such a well kept secret. Everybody that sees & feels my stick grip just loves it; also everybody I've ever talked to about them never knew how and where to get them. So here you go.

This is a project that you can do for yourself whether you just beginning to build, almost finished or if you have been flying for a long time. Its just different enough to be the perfect finishing touch to your cockpit.

The gentleman that makes these custom grips is Harley Seguine of Rainier, Oregon. You have seen plenty of his work, you just don't know it. You see, Harvey makes all the stick grips for all Lancair and Glasair kit and his quality

is Superb.

Now heres Harley to tell you how to get started on your grip project:

A custom fit grip starts with a wax pattern that "you" must provide (it's your hand that the grip has to fit). The next step is for me to make a female plaster mold from your wax pattern that you send in, pour it with polyester resin and fillers, and fit a steel mandrel that fits the copy machine. You just supply the wax pattern and I'll do the rest.



The wax pattern:

Purchase a 1/4 lb block of paraffin from the grocery store, It's about the right size to start with. Heat the wax in hot water for about 20 minutes or until it is soft all the way through.

You should be sitting down, preferably in the the airplane, and move your hand in the same position and directions that you would when flying. The wax pattern will come out much better if you squeeze it very slowly with light pressure. (If you squeeze too hard, your grip will only fit your hand when you are squeezing it tightly.)

Be sure the grip is large enough to go over your control stick, I would recommend a 1/2" hole if it is practical.

Try to avoid deep indentions at your finger tips or any sharp ridges. Some of the wax will have to be trimmed off unless your hand is very large. Form the top and bottom of your grip to your liking.

I would suggest that you make several wax patterns and select the one you like the best.

When you have completed the wax pattern, chill it in the refrigerator overnight. Pack the wax grip with about 1 inch of soft paper, kleenex or toilet tissue. Pack it in a sturdy box, and send it first class mail or UPS. (My UPS address is - 607 B street East, Rainer, Or. 97048

Prices:

Make plaster & polyester molds -----\$17.50

Carving, rough sanding, hand rubbed Tung oil finish using alder wood -----\$12.50

Options:

Walnut, Teak or Mahogany wood----- \$5.00

Push to talk switch-----\$5.00

The process take about 2 weeks, Please state what your control stick O.D. is (Dragonfly plans call for 1/2"- Spud)

Harley Seguire P.O. box 571 607 B Street East Rainer. Oregon 97048

When I ordered my grip from Harley, I order all options:
Mold-----\$17.50

Carving & sanding----\$12.50

Teak-----\$5.00

Push to Talk Switch-----\$5.00

Grand Total----- \$40.00 This includes shipping.

Those wishing to economize may do so by telling Harley to use one of his "in-house grips" for the Glasair or Lancair thus saving \$ 17.50

There you go Guys,if want to treat yourself to something special! Harleys got you covered - Spud.

Sun N' Fun

It's almost here!

In the last newsletter I asked for input on Sun n' Fun attendance and I did receive quite a bit info -- here's what I learned. Thanks.

The event runs from Sunday thru Saturday, but quite a few people and planes show up on Saturday and stay thru Monday. Several people commented that by Wednesday the majority of the action has been there and gone.

On those notes we are going to have most of our activities

based around that first weekend. I'm going to be there late Friday night thru late Monday afternoon.

We have a Dragonfly Forum/seminar set-up for Sunday (April 7th) 1:00 to 2:00++. There will not be any specific topics, but I'll be bringing everybody up to date on items that DBFN is handling and answer any questions on plans availability and parts, etc. (Rex will not be there). Other than that I would like to keep it open for our fellow Dragonflyers to bring us up to date on their construction and flying techniques or difficulties; and to answer any & all questions that our new or potential builders might have about our Dragonfly.

I would suggest that everyone attending bring there photo albums along on the DF's, I'll be bringing mine. I have over 300 pictures now of just Dragonflys ranging from start to flying. Bringing these pictures really help clarify things when we want to assist a fellow builder. You know the old saying " A picture is worth a million words"

If you are planning on being a contender for one of the award trophies and can not be there by noon Monday, but will be there later in the week, please take pictures of your plane and have them sent to me no later than April 3rd.

There are 5 categories of awards. 3 catogories which will be voted on:

1. Best overall Dragonfly
2. Best Engine compartment
3. Best Cockpit/interior

They will be voted on by: DBFN subscribers, Dragonfly owners, Current plans holder and Vendor or magazine writer or principal. The general public will not be asked to vote. These will be tentively tabulated at noon Monday. No you do not have to be there to win (I'll mail you the award).

The two other awards none voting and are on their own Merit:

1. " Hi- timer"
2. " Longest Distance flown to event"

I would like to tentively plan for a get together Saturday and/or Sunday evenings. The gang around the Dragonfly's will be aware of whats going on and/or we'll leave a sign in the DF area of our plans. It will be very informal. primarily just more hangar flying.

See Ya there! - Spud

An A.D. issued by Mosler Motors

Tim Kerns, the C.E.O. of Mosler sent me this Homebuilders Airworthiness Directive. I'm placing the entire AD for your review.

Homebuilders' Airworthiness Directive

Concerning HAPI "MAGNUM" and "MAGNUM PLUS" engines and certain Mosler separate-head four-cylinder engines (NOT conventional-head engines using modified Volkswagen heads):

At the time when Rex and Patrick Taylor left Mosler Motors, Inc., a thorough review of the HAPI design and production procedures was made by Mosler Motors, Inc. Mosler experts determined, through an analysis of old HAPI correspondence and actual examination of several heads, that a particular and specific problem may exist in a small percentage of the separate-head engines (known variously as HAPI and Mosler 75 hp and 82 hp, MAGNUM and MAGNUM PLUS), traced to worn-out tooling used by HAPI and brought to Mosler by HAPI.

Symptoms include: hard cranking of the engine (especially when hot); rough idle when hot; high EGT; poor fuel economy. These symptoms may exist singly or in combination. The cause of these symptoms is one or more stuck valves, due to use of an old undersize valve guide reamer.

Engines made (and warranted by) HAPI, as well as Mosler engines signed off prior to November 21, 1990 are susceptible. Mosler engines signed off after November 20, 1990, are NOT affected.

All HAPI and Mosler four-cylinder engines may also have a valve spring which is too strong. This is evidenced by an orange color code, and a seat pressure of 180-200 lbs. These heavy springs should be replaced by either a 150 lb spring (coral or lavender color code) or even the stock VW valve spring, provided seat pressure is at least 90 lbs, and that the valve guide clearances are correct.

Mosler Motors, Inc., is offering, on any HAPI or out-of-warranty Mosler engine to receive heads and perform the following:

- 1) Clean and disassemble heads
- 2) Inspect valves, guides, and seats
- 3) Knurl and ream guides to proper size; replace if necessary
- 4) Reseat valves; replace seats and / or valves if necessary
- 5) Measure and cc heads to produce proper compression ratio (usually necessary on HAPI engines), and list proper deck height for reassembly
- 6) Reassemble heads, using the proper valve springs.

This service is available for \$265.00 if assembled heads (heads only - no rocker boxes, etc.) are shipped prepaid to Mosler Motors, Inc. The completed, reworked heads will be returned COD, freight collect within three weeks.

This offer extends until July 4, 1991, and extends only to HAPI and Mosler four-head engines of any vintage. The work carries Mosler's one-year, 100-hour warranty. Owners of in-warranty Mosler engines may have the work performed at no charge, subject to the terms of the warranty.

For further information and return authorization, contact:

Mosler Motors, Inc.
140 Ashwood Road
Hendersonville, North Carolina 28739 USA
(704) 692 - 7713
(704) 692 - 2008 FAX

required information: Engine size (or stroke) and serial number Date of purchase Airplane type or use (if not aircraft) Return address for shipment

Also in his letter, he did answer a question that all of us have been wondering about. He states in his letter.

"Of course, Mosler is honoring any warranty on any Mosler or Mosler/H.A.P.I. engine still under warranty, shipped new from North Carolina."

An area that I'm concerned with is the recommended 150 lb spring pressures. It's way to high and over kill. I have been selling TRW, Speed Pro, Crane Cams, Competition Cams, Cam Dynamics camshafts and related valve train items for 20 years. We have been running consistently in small block Chevrolet hydraulic and mechanical (solid lifter) to 7000 + RPMs with a 100 to 110 seat pressure and Roller camshafts combinations to 9000++ starting at 140 lbs seat pressure. Now these camshaft profile of

these VW engines are not very aggressive nor do they turn anywhere over 4000 RPM.

A figure of 80 - 90 lbs will work just fine. Depending on where your springs installed heights are, you can use a stock small block chevy valve spring; remove the inner dampener and it will land right in this range. This spring combination is a natural since they use a small block Chevrolet lifter in the hydraulic conversion in these VW motors. - Spud

MAGNUM HEAD VALVE CLEARANCE PROBLEM MOSLER " HOMEBUILDERS' AIRWORTHINESS DIRECTIVE"

The recently issued Mosler " Homebuilders' Airworthiness Directive" documents a legitimate problem with some Magnum Heads. Last summer I purchased and installed the Magnum Heads on C-GGEM. Since installation I have had recurring valve problems always indicated by loss of compression in one or more cylinders. After a detailed investigation of the engine, I found that the exhaust valves had less than 0.002" clearance in the valve guides. To correct the problem I had a Automotive machine shop clean the heads, regrind the valves and seats, and ream the valve guides to give 0.004 - 0.005" clearance. The total cost was \$125.00 (US). I am now reassembling the engine and hope to be flying in the near future.

Regarding the Mosler " Homebuilders' Airworthiness Directive" there are a few comments required:

1. Only the airworthiness authority of a country, ie. FAA or Transport Canada, have the authority to issue Airworthiness Directives. Once issued they become part of the Airworthiness regulations and must be complied with in order to maintain the airworthiness of your aircraft. A manufacturer may issue Service Bulletins regarding their equipment.

2. Not all engines are affected and if your engine has more than 50 hours with no loss of compression it is very unlikely that you have a valve problem.

3. There is no requirement to return your engine to Mosler if you do have a problem unless you are attempting to get the repair done under a current warranty. The repairs required can easily be done by any competent automotive machine shop (and will cost less than \$265.00).

THE BOTTOM LINE IS TO BE AWARE OF THE POTENTIAL PROBLEM AND IF NECESSARY REPAIR YOUR ENGINE.

MAGNUM ENGINE PUSHROD TUBE INTERFERENCE

While disassembling my engine (HAPI) to resolve sticking valves I found a small amount of fine metal particles in the oil. After a detailed inspection the source was found to be the No 4 cylinder exhaust valve pushrod. The engine had the two piece pushrod tubes and the tube springs was rubbing against the pushrod. The pushrod had a groove approximately 1/16" worn half way around the circum-

ference.

Recommendation: If your engine has Magnum heads and two piece pushrod tubes, carefully inspect oil for metal particles on each oil change. If any metal is found inspect the pushrods for damage. If there is any damage replace the pushrods and consider replacing the pushrod tubes with the one piece tubes. (One pieces, cad plated, are available from Great plains for \$12.95/set).

MOSLER SERVICES

During the past year I have dealt with Mosler on at least three occasions and in each instance my orders have been "screwed up". Some of the problems have been:

-incomplete orders, parts missing; -wrong parts shipped; -orders not shipped as requested; -no responses to correspondence; and -wrong prices charged to Visa.

It would be interesting to know if others are having similar problems. The obvious solution is to buy elsewhere. Great Plains have most of the required engine parts and I have had good service from Steve Bennett. My personal recommendation is don't use Mosler unless absolutely necessary and if you must expect your order to be "screwed up".

Major Ted Givins

6318 Fortune Drive

Orleans, Ontario

Canada K1C 1Z1

Dear Fellow Dragonflyers

I am having a problem with Mosler Motors. The new owners of H.A.P.I., are not honoring their responsibility to me on a H.A.P.I. product.

I purchased a H.A.P.I. Magnum plus engine from H.A.P.I. while they were in Eloy, Az. and had it at home on my airplane when the crankshaft problem was discovered. I returned the engine for the crank fix as per H.A.P.I.'s instructions. When Mosler purchased H.A.P.I., my engine was taken to Mosler's shop, along with everything else of H.A.P.I.s from Eloy.

On approximately 11-15-90 I was told (by Pat Taylor at Mosler) that my engine was finally ready. After another three weeks or so without my engine, I contacted Mr. Tim Kern at Mosler about this. After numerous phone calls, during which Mr. Kern changed his story from "I can't find your engine" to "I found your cases only" to "It's an almost complete engine, using Mosler's parts on your case", Mr Kern finally got to the bottom line... he wants me to pay for the repair work.

The repairs were mandated by a design flaw and were to be done as no cost warranty work, according to H.A.P.I. this was made very clear at the time the recall was sent out.

I understand that this is not the first time that Mosler has pulled something like this on a H.A.P.I. customer. I am interested in talking with anyone else who is in this situation, or who was in the same situation and resolved it. Perhaps we can help each other to get what is owed to us.

Please call or write about your experiences with Mosler's actions about H.A.P.I. products.

Thanks,

Mike Starkey

2910 Roc Rd

Placerville, Ca 95667

(916)621 0069

A letter from Viking Aircraft

Hey Spudley !

We have been super busy with the COYOTE flight test program. Anyhow here's some input for the newsletter.

VIKING AIRCRAFT IS SOLIDLY BACK IN BUSINESS !

ALL OF THE PREFABRICATED PARTS ARE NOW BEING OFFERED AND SOME OF THE MORE CRITICAL PARTS ARE " IN STOCK ".

WE HAVE ---

LANDING GEAR LEGS, TAIL WHEEL SPRINGS, COWLINGS, CANOPIES, CONTROL SYSTEM PARTS

WE ALSO HAVE A GENEROUS SUPPLY OF NEW PLANS IN STOCK.

WE HAVE PLENTY OF MOST ISSUES OF THE ORIGINAL DRAGONFLY NEWSLETTERS. FOR THOSE WHO DON'T HAVE THEM, A PACK OF OLD NEWSLETTERS, LACKING A COUPLE OF ISSUES ARE " SPECIAL PRICED" AT \$35.00 PER SET. THIS SHOULD BRING A NEW BUILDER " UP TO DATE ".

GENERAL NEWS UPDATE

The prototype is undergoing some modifications which I believe will make it an even better aircraft. All of those mods will be retrofittable to presently flying DRAGONFLYs, or DRAGONFLYs being built.

Viking will be working closely with our approved vendors to assist them in their stocking of exact plans specified materials for DRAGONFLYs.

OUR APPROVED VENDORS ARE:

WICKS AIRCRAFT SUPPLY - HIGHLAND, ILL

ALEXANDER AEROPLANE CO - GRIFFIN, GA

AIRCRAFT SPRUCE & SPEC. - FULLERTON, CA

In the future our goal is help these approved firms provide builders with correct materials to successfully complete their aircraft.

Wicks has " In Stock" a new carbon fiber spar material to replace the old material which is no longer in production.

Vikings now owns all the tooling and molds for every piece of the DRAGONFLY-----

Completely PREFABRICATED DRAGONFLY KITS WITH PRE-MOLDED PARTS, PRECUT WING CORES AND ALL THE OTHER SMALL PARTS WILL BEGIN SHIPPING BY MAY 1, 1991

VIDEO TAPES

Available through Viking - DRAGONFLY CONSTRUCTION TAPES

8 hours of video tapes showing techniques and short cuts developed in our past 8 years of building over 50 DRAGONFLYs. These tapes will save a Dragonfly builder hundreds of hours work and much frustration.

Shows you HOW TO DO IT RIGHT THE FIRST TIME !

\$89.50 (3 tapes) include \$5.00 for first class postage.

HOW TO BUILD A RELIABLE V.W. AERO ENGINE VIDEO

A video version of Rex Taylor's book that has sold 40,000 copies. A DRAGONFLY builder who wants to build his own engine should have this one.

\$69.50 include \$3.00 for first class postage.

An unbelievable amount of people have called or wrote and asked me to do their engines for them, frankly I'm very flattered, but Rex Taylor is no longer in the VW engine business.

I would also like to make it very clear that Mosler Motors is not an approved vendor !

THE NAMES DRAGONFLY AND VIKING AIRCRAFT ARE COPYRIGHTED TO VIKING AIRCRAFT, LTD. AS ARE THE PLANS. ANY PERSON OR BUSINESS INFRINGING ON THOSE COPYRIGHTS & TRADEMARKS FOR COMMERCIAL PURPOSES WILL BE SUBJECT TO PROSECUTION UNDER CIVIL LAW.

I will not be able to attend Sun N' Fun but I'm sure Spud will keep the troops well informed and talking.

I am installing several new goodies on the prototype, some such as aileron servo tabs I originated on Justin Mace's Dragonfly, and some good ideas originated by some of our other excellent builders.

At the time when the prototype is again flying and the modifications have been tested and proven in the air to work as intended they will be released to the builders. I still firmly believe that modifications supplied to you by Viking should be fully tested before publication.

I am working on a new water cooled overhead cam in line

engine to be installed in the Dragonfly prototype for flight test. I do expect this engine to add some to the top speed and rate of climb.

This modification will have no affect on the airframe aft of the firewall except for the radiator aft of the wing.

DON'T ANYONE STOP THEIR PROJECTS AND WAIT !

Go ahead and build the plane just as if you were using a V.W. based engine, just don't go out and build or buy an engine yet. If this is a bust, you won't have lose anything.

PLEASE ! No further details or comments on this engine UNTIL it is FLYING ! That's all for now.

Viking Aircraft

Intercoms

Dear Spud;

The newsletter we recently received asked for some information on intercoms. I have installed several intercoms of various types last year and this is what I learned:

Each installation requires careful tuning of the headsets, microphones, and radios to achieve a good performance, particularly in a noisy environment (like an open cockpit). So far I have not found a system that I could just buy off the shelf, install and use.

Choosing an Intercom. -----

A voice activated intercom senses the sound level from the microphones and when it exceeds a threshold set by the squelch control, the unit is activated audio is transferred to the headphones. It is in this voice detection system that most intercoms differ. Most intercoms, on detecting a voice from either microphone, open both mics. What gets to the headphones is therefore the speakers voice, noise from the speaker's mic and noise from the passnger's mic. In other words the signal to noise ratio is 1 to 2.

A better kind of intercom uses independent voice detection circuits so that only the speaker has his/her mic live. You can readily tell this type of unit because they have a squelch control for each user (usually 2).

The best kind of all have independent voice circuits and automatic background compensation. This means that the unit measures the background noise and sets the squelch control automatically.

I would strongly recommend builders ensure the intercom they buy has separate squelch controls for each occupant.

Headphones:

The headphones you choose don't make a whole lot of difference but the microphones attached to the headphones most certainly do. In a fabric or composite aeroplane, the wiring, intercom and microphones all

pick-up some of the transmitted signal from the radio and if this pick-up is too great, all kinds of squeaks and squeals will result while transmitting. Most intercoms are shielded so they seldom have a problem, the wiring from the microphones can be shielded but most microphones ARE NOT shielded against RFI. One of the few that is, is made by Sigtronics and is used on their S40 headset. If you encounter whistles or squeaks when transmitting, S40s may well be the answer. These headphones are amongst the least expensive on the market and work very well in all respects.

Problems:

The most common problem I see with intercoms, other than those already mentioned, is distortion and is caused by the signal level from the microphones being too high for the intercom to handle.

In a quiet aeroplane, your voice produces a signal in the microphone which is of just the right level for the intercom to handle. In a noisy environment however, the background noise, when added to your voice, creates a level which is just too high for the intercom to handle and results in garbled, distorted speech.

If your headphones have adjustable microphones (Telex and David Clark do) reduce the level to the absolute minimum (counterclockwise adjustment of the pot). If the microphones cannot be adjusted, many intercoms may be adjusted or modified to reduce their sensitivity.

Sigtronics intercoms for example, can be fitted with a " High noise" modification which the manufacturer will do free and greatly improves the performance of the unit in noisy aircraft.

Finally, do keep the microphones close to your lips and don't set the volume control too high. If you do, it encourages people to speak quietly and they get lost in the noise again.

Steve Beaver - Sci.com Research US, Inc.

107 North Kent Street

Winchester, Va 22601

(703)667-2130 Fax (703)667-0158

Super Thanks Steve for the Good input! - Spud

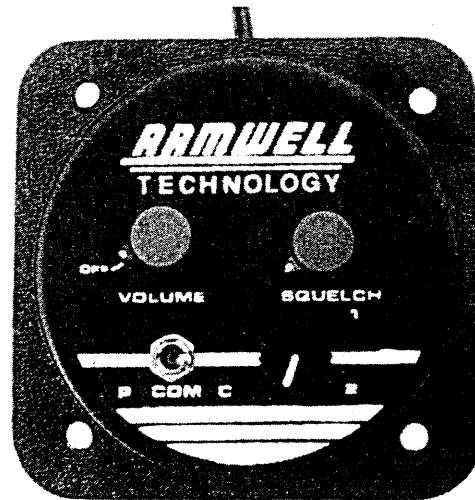
I have had almost 20 reply's to my request in DBFN #32 for information on a good intercom system. It has almost been 75% about this intercom kit and I really feel good about it because it's manufactured by one of our own fellow Dragonflyers Rene de Lathauwer's Aamwell Technology of Phoenix.

I called Rene and had him send me all the current info on his system and here's what I came up with. We are going to talk about his two place units, which is what we use in our DF's but Rene does offer four place units.

First off lets look at the basic features of all models of Renes Intercoms.

1. Superior two squelch circuit - Handles any noise level
2. Won't clip off first word
3. Passenger isolation when pilot transmits
4. ATC override - you won't miss inbound transmissions
5. 2 Radio capable (any Radio)
6. Automatic on/off power - (w/ 9 volt back up)
7. Record input - Tape ATC, weather report, clearances
8. Playback
9. Music input - Music automatically mutes during during talking
10. Expandable to 8 positions without loss of signal
11. Five year warranty on all electronic parts

I asked Rene to give me the plain English version on how this two squelch thing works This is what he said "The primary # 1 squelch doesn't have a fixed window, but can be literally moved up or down ! The secondary # 2 squelch now works within that window. More noise, just turn Sq #1 up (clockwise)and the intercom will still be voice activated. One of the big assets of this intercom is that you can plug in an AM/FM radio or Cassette tape player



Aamwell Technologys panel mount

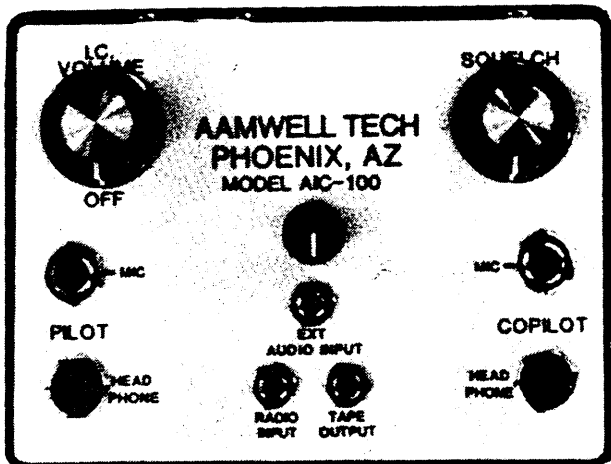
and play your favorite music (All right! I can play my sound track tapes from "TOP GUN" and "IRON EAGLE" - Spudley) and anytime there's a transmission or conversation in the cockpit it automatically mutes".

There are four basic 2 - place models:

1. Two place mini series kit - \$95.00 Plain unit no panel,box or related items that make it portable. There is

also a optional silkscreened 3" faceplate (pictured) with drawings for those wishing to make it a panel mount - \$7.95. The mounting bracket are also available for \$9.95.

2. Two place full kit - \$135.00, Now this is the full kit, panel, box and all relate items to make portable. (Pictured)



Aamwell Technologys portable 2 place

3. Two place intercom completely assembled - \$175.00 (pictured)

4. Two place intercom 3" panel mount for std. Instrument hole assembled - \$205.00 (pictured)

The only other costs is the shipping and handling \$3.75, Canada, Alaska & Hawaii \$7.50. All C.O.D. add \$4.50, He also accepts Master Card & Visa

Those wishing to order one contact:

Rene de Lathauwer c/o Aamwell Technology

2744 E. Glenrosa

Phoenix, Az 85016-5716

(602) 955-8857

Also coming up in the next issue # 35 Rene and Claude Canterbury have designed and manufactured a P.I.M. - **Passenger Isolation Module**. Which allows the passenger to do there own thing, they have the option of listening to the pilot & ATC or listen to there own Music. More on this in the next Issue.

Bob Meadors retractable Dragonfly

The letter to follow is from Bob Meador of Cincinnati, Ohio who has intensely modified his Dragonfly. You could say that its a experimental - experimental aircraft. It is really

no longer a Dragonfly because of the modifications, but we still call it a Dragonfly. One thing I want to point out is that none of this is tested, flown or whatever and I highly recommend that no one even entertain doing any of these mods until till Bob has many, many hours of testing done. - Spud.

Hello Spud and Fellow DF's

I'm glad you and the readers are interested in My project, because for the most part I've been solo on this since I started it.

I have way to much money in this project, and 7 1/2 years of work . I'm sure most other guys that have this much time in a project will agree, that as much as we fuss or complain about it, you still love it.

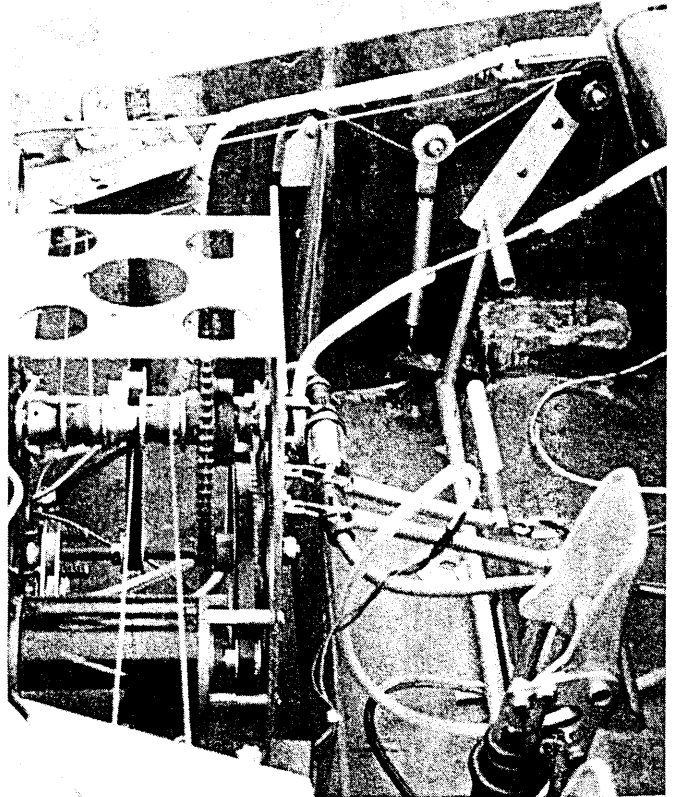
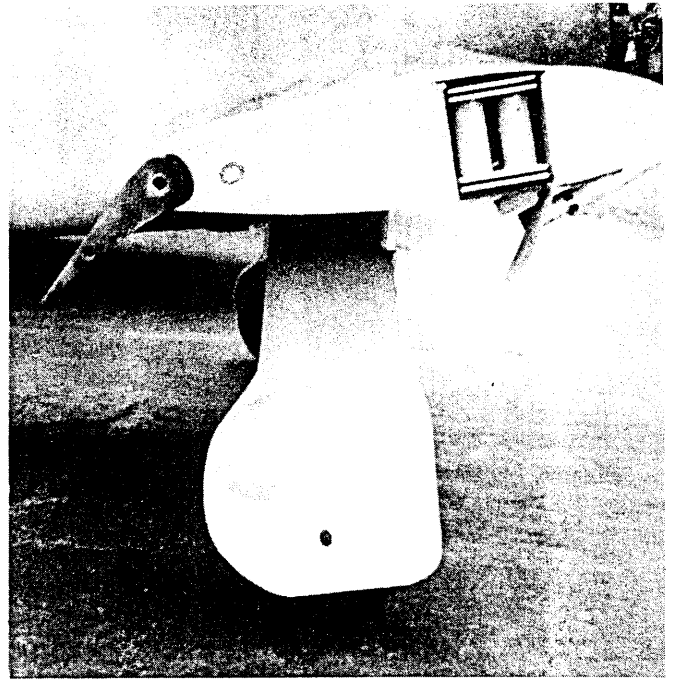
Let's face it, these things are experimental, especially mine. Even though most of the modifications were designed by aeronautical engineers, I would not feel comfortable giving someone the impression these changes are safe, they are not, until well proven. I do not mind sharing this info with the group but I do not encourage them to follow in my foot steps.

The canard airfoil is a NASA LS (1) -0417-MOD, with the same chord width and length as the originals, and is straight without any dihedral except the surface on the bottom angles up. This airfoil produces more lift and is not degraded with a dirty surface, however it has a sharper stall. It does not start producing lift at the same negative angle as the original. Overall it is suppose to perform better both in lift and with contamination on the leading edge. Anticipated benefits will be slower approach speed, slower stalls, and higher rate of climb.

The disconnect fitting were also designed by an aeronautical engineer. They are made of 1/4" aluminum plate that intermeshes to form a extension of the top and bottom spars, in sort of a box arrangement. They are held together with tapered thimbles top and bottom (4) with 2 bolts tension on the thimble/plate assemblies. I was told it is similar to what Rutan did on the Vari-eze. They were designed for a load of 10Gs, but I load tested the canard to only 2600 lbs (3.5 Gs). The torque tube disconnect fitting is made up of, believe it or not, 1/2" drive Craftsmans socket (can't remember what size) and a 1/2" drive universal joint. They have a perfect fit inside the torque tube and work very well together.

The landing gear was something else. As far as space available goes the new airfoil is thinner than the original, therefore it was harder to find room to fit everything in.

To keep the width of the center section less than 8 ft. and maintain good prop clearance, the wheels retract inward. The legs are made of unidirectional fiberglass but could have been made of formed aluminum. The retract mechanism consist of cables, pulleys, struts and one electric winch. This single motor winch system winds both sides at once. To compensate for unevenness between both sides, the winch is on a sliding mount. This causes a



self alignment between both sides of the cable. The winch is made up of a small 12 volt motor and a set of cogged belt/pulleys for a ratio of 80 to 1. This ratio was necessary to get a nice speed of 8 seconds to retract. Also, because at 80 to 1 translates to over 1000lbs of pull it provides plenty of resistance to hold the legs in place. In the event of a overload or jam the system has a electronic control unit that will stop, wait and then try again. Essentially, it is a smart motor that will not break the cable. The control

unit also monitors the position of the leg and will turn on red or green bi-colored LEDs to indicate the status. The red will flash when a fault exists.

To lock the gear down a strut with an over center pivot point is used. To unlock the strut, the same cable for retraction passes over a cam at the pivot point to unlock the strut and pull the leg up in one smooth motion, Very neat!

For shock absorption, the legs are mounted on an angle against a block of neoprene rubber. The legs alone have just enough give to be sufficient, while the rubber cushions are just added protection. The struts are mounted with rubber pillow blocks so they give a little.

The elevator trim system consists of a conventional looking trim wheel and is mounted on the left console at a position that feels good. This wheel controls a small hobby geared motor bought years ago that is used in model boats. The geared motor pulls on 2 springs attached to a pivot arm mounted on the left end of the elevator torque tube. This system has not been proven yet, but basically it emulates the original system of springs.

The next system I would like to work on is a scanner to monitor the 4 CHT's and EGT's. It will be a electronic switching device that will scan each cylinder and provide temperature information to a standard CHT/EGT gauge at a cycle time of 8 seconds.

The BRS Parachute system has not arrived yet so I can't say much about the installation. Except, that it will be a soft pack and mount on the rear wing. The rocket will mount behind the seat pointing up and to the rear. The rocket and cables will punch through a thin foam hatch that is covered by a material that is used to cover model airplane wings. Two of the four attachment cables will run around the perimeter of the canopy and pass through the fuselage side and attach to the rear canard mounting bolts. The outside cables will be covered by a thin flaring. If the rocket is ever fired it will blast through the thin foam and pull the parachute out first followed by the bridle cable, followed by the 4 attachment cables. Two of the cables will literally rip out of the flaring around the canopy and the airplane will hang in level position. The rocket produces an unbelievable amount of thrust in the first 1.5 seconds enabling the parachute to be fully deployed in a matter of seconds. It also has a device that senses the speed of the airplane and prevents the chute from opening to quickly if the speed is over the 165 mph limit. The only maintenance required is every 2 years it must be repacked by BRS. The cost of this system was only \$1995.00 which I felt was a reasonable price to pay, especially when you consider the cost of individual parachutes at \$700.00 each. At \$1400.00, you and your passenger can easily WATCH your years of hard work spiral into the ground (If the occasion should ever come up, Heaven forbid). The weight of the entire system is about 24 lbs. and shouldn't cause too much of a CG problem. BRS, Inc.. 1845B Henry Ave. ,South St. Paul, Minn 55075 (612) 457-7491 -Jeff Peitier.

On a final note, I would like to here from other builders and flyers in my area, Ohio, Kentucky, Indiana and Michigan. If possible maybe someone can help me with some Dragonfly flight training. I should be ready by June of 1991. I would like to hear from the builder I met from Youngstown, Ohio this last September at Marion, Ohio (MERF). I anxiously waited along side the runway and watched his Dragonfly take off. It was the first Dragonfly I

ever saw fly and then realized I forgot to get his name.

I would also like to see someone publish technical tips about such things like; breaking in a new engines; specification for CHT and EGT with cowling on and off; oil pressure/ temperature figures; Pros and cons of using avgas vs Auto gas; Use of LLgas, Unleaded gas or using a lead additive.

Best Regards

Bob Meador

3272 Sunnyside Drive

Cincinnati, Ohio 45251

The Engine Shop

As stated last issue, this article is going to address the top-end, that is from the crankcase out. In general, a top end overhaul will restore most of the deterioration that your engine has suffered. This is a pretty easy operation so don't be afraid to try it. You can tell it's due when your oil consumption seems high or the bottom of the bird is oily or the plugs show signs of oil fouling, your compression is uneven (a good rule is 10% max spread). If you have trouble keeping valves adjusted, have high oil and CHT temps or have oil leaks, then also consider getting in and fixing the problem. A top end will generally not fix low oil pressure except if it was due to high temps. If your oil pressure is low or temp is high, it may also be a stuck oil pressure relief piston which can be accessed now. Although possible at this point, we will not be replacing the rod bearings. That is best done with the crankcase split.

Let's start with the teardown. We will try to understand how the engine was doing so that we can properly apply any needed medicine. Warm the engine up then record the compression. Then drain the oil. Now you should decide if the engine is staying on the bird or going onto your workbench or preferably an engine stand. The little bench-top stands are great if your bench is strong enough to support the weight of the engine hanging over the edge. Be sure to bolt it down securely. If it's going onto a stand the accessory case will have to come off. Remove the intake and exhaust systems, noting any leakage at the interfaces to the heads. If you have a pan (big cookie sheet) to put under the engine it will save a lot of mess and lost washers. Remove the rocker shaft assy noting the position (L or R). Pull the pushrods, keeping them in their same location and orientation for re-assy. Note any shiny spots on these which indicates rub against the tubes. Remove the 8 nuts holding the heads on, noting the breakaway torque on each nut. Loose head nuts may be due to soft studs. If any studs or case inserts come out on any of the above operations, don't worry about it yet. Now remove one of the heads, if necessary you can tap on the exhaust areas with a rubber mallet to loosen it. Mark it for position (L or R) by scratching on a fin. Try not

to loosen the cylinders yet when the head comes off. The pushrod tubes will fall off now also. Now let's measure the deck height. Get a single edge razor blade and scrape off a 1 1/2 inch circle of the carbon in the middle of each piston top. By holding the razor at an angle you can avoid scratching the piston. Put a straight edge along the top of the cylinder and feeler gauge the clearance between each piston top and the straight edge at each piston's Top Dead Center. This is at the center of the crank rotation where you feel the slop due to rod bearing clearance. The right way to do this is with the cylinder held onto the case with a tool that is held on by the studs. Some pieces of tubing and some washers to act as spacers for the head nuts works too. Now mark the piston location and direction toward the flywheel (back of the engine). Remove the lower cylinder shroud. Scratch a mark on top of the fins to identify the cylinders and pull them off. Protect the case from dropping objects in and damage from the con rod by wrapping a clean rag around the protruding con rod. The wrist pins may be retained by clips or Teflon buttons. WEAR GLASSES when removing clips and don't drop them into the case. Needle nose pliers and a small pointed awl work OK. Push out the wrist pins, which should be a loose fit in the pistons. If not you may have to use a drift (such as a 3/8" extension) and great caution not to exert any side load on the connecting rod. Do not contact the rod small-end bearing or it will be damaged. Be sure to not sideload your rod, IT WILL BEND. The right way to do this is with a pin puller which acts against the piston. Get both pistons off this side and repeat for the other side. Don't forget to protect the case openings from the rods. Note that the rod big-end bearings will seem to have a lot of side slop. If they are all about even and turn smoothly, don't worry about it.

The plugs and combustion chambers will tell how your mixture was and if you were burning oil. Do all the cylinders appear the same? If one side looks leaner than the other it may have been due to an intake leak or a poor manifold/carb match-up. If you suspect a leak, look at the intake manifold joints and the gasket surfaces. Look at the area of the head where the top of the cylinder contacts. This should be a shiny ring with no signs of leakage. There should not be any signs of the cylinder pounding into the head. If so the studs were not holding the head on securely. This can be due to weak studs, improper torque on the heads, or detonation -and probably all three.

Now let's look at the heads themselves. You don't have to but if you are going to disassemble the heads, obtain a valve spring compression tool. These range from the c-clamp type sold at motorcycle shops (I have one that was for a Honda 50) to the ones sold by the volume VW parts suppliers. Using an egg container or equivalent to keep your parts separate, remove the valve springs, retainers and keepers. If the keepers come loose from the retainers with a sudden pop this is good, they were wedged into the retainer nice and tight. If there is raised material on the valve stem grooves and wear marks on the surfaces between the keepers then the keepers were

binding against each other and not gripping the valve stems which is bad. This raised material may have to be filed down to get the valve through the guide. Look at the intake valves. By wiggling the valve stems you can get an idea of how much your valve guides have worn. How do the seats look? Both intake and exhaust valve seats and valves should show a good contact area. If not the valve may have been too tight, warped, or never properly sealing in the first place. If the exhaust valve wasn't seating properly it can burn due to poor heat transfer to the head. Have you found the cause for a cylinder reading lower compression than the others? How do the valve adjusters and valve stem tips look? I've seen unhardened valve adjusters and pitted adjusters. The stock adjusters should show a series of facets from the different adjusting positions, but that's all if they were heat treated. Now call Rimco or Berg and get your heads fixed-up (notice I didn't say "take them down to ole' Joe Bob's Auto Shop"). Head preparation is a VERY important aspect of these engines and unfortunately is out of scope of this newsletter. Let me just say that even new stock heads get a lot of attention prior to going onto my engines. Refer to Fischers book for some tips. I suggest that you also read all Berg's literature on the subject, prior to sending them off. Notice how important even valve spring pressure is.

You can save a lot of work now and disappointment later if you have a 92mm bore by setting the 92mm pistons/cyls (P/C's) on the shelf and pop for a set of new forged Cima 90.5's. Your old P/C's are probably too worn to successfully reuse and new ones don't cost that much. I personally think that 92's have too thin a cylinder wall, distort from heat, and therefore lose the power advantage over 90.5's. If your 1835 leaks a lot of oil it may be due to the ring blow-by resulting from this. 1776cc engines enjoy a good reputation for reliability. But it's your engine and decision. If you are going to use the old P/C's then scrape the carbon from the area at the top of your cylinders with the razor blade held at an angle. Finish scraping the tops of the pistons, remove the rings (pop for ring pliers-Sears has 'em) and wash in a good strong parts cleaner. There are a few brands of cleaner that come in one gallon dip-em cans and contain all kinds of acid and other nasty stuff. This works good but don't get the stuff on you or you will stink for days. Don't scrape the grooves to remove the carbon! The only way to clean ring grooves is to get the grooves glass bead blasted. Tell the blaster to only do the grooves and to not over do it. But first let's see if the piston/cylinder set is worth keeping. Cylinders that are not badly scratched or have a ridge at the top that catches your thumbnail can be honed. Measure the clearances and roundness' per a VW manual. Also check the rod bushings. The rings wear in thickness as well as diameter. Check the grooves in the piston for such wear. Check the wrist pin for nasty grooves. Light wear can be polished out with crocus cloth. Clean the cylinder bases on a wire wheel. Oil the insides after honing to prevent rust. The outsides can be painted with a light coat of black Rustolem. The rings can be obtained from VW speed

shops. I've heard Total seal rings are the hot tip but am only now trying them. They cost twice as much as the Grant rings that are available as replacements for Cima P/C's. After all this work and expense, see why it may be wise to just get new P/C's? While we are ordering parts, pick up a set of either Berg's swivel feet valve adjusters or the Taiwan made Ball-end swivel type. The ball type can be made to work great if your rocker arms have the adjuster end oil hole welded. By some fitting and grinding on the rocker arm the oil hole can be made to align with the oil hole on these adjusters and they become pressure lubricated. Mine have survived some real abuse with dual springs. Some rockers don't have the hole at the adjuster end outside surface welded. Get them welded shut. I like to use the bolt together rocker shafts after I polish them and the rocker ID with crocus cloth. I have had good luck with Teflon buttons and recommend them. There are 90.5 and 92 mm buttons. They are not necessary for good cranks but make assembly much easier. The stories I have heard about these collecting dirt and causing cylinder scratches seem silly. What is the dirt doing there in the first place? I have never experienced this problem. Drill a 1/16 hole through the end of the buttons to relieve pressure that may build up behind them.

IF THIS ARTICLE HAS CURED YOUR INSOMNIA, WAKE UP NOW. Let's look at that compression ratio (CR). If you want to use 87 octane auto gas, and/or want a cool and reliable engine that turns over easily, then use a maximum CR of 6.6-1. If you are going to ONLY use 100LL, then don't exceed 7.5-1. (I know I'll take some flak over this from a power standpoint. My own 1776 will be 6.6-1. For more power I'll use more displacement, via more stroke. Again: your engine, your choice). Most heads will measure about 51cc's volume. This can be checked with a plate available from Berg. You should strive for even cc's on all heads, adjusting the cc's by removing material as shown in Fischer's book. An 1835 has 459cc's volume per cylinder ($1835/4=459$), a 1776 has 444cc's. The deck height from the piston top to the cylinder top is our most easily changed variable. The VW typically has .060 deck height with standard parts. If you have .060 (gives 10 cc's) deck height then your 1835 has a CR of 8.5-1: $(459+51+10)$ divided by $(51+10)$. I sometimes wonder if this isn't why so many 1835's are set-up as 8.5-1. 1776's would be 8.2-1 with this deck height. To reduce the CR you can enlarge the combustion chamber volume and/or enlarge the deck height. The common method of enlarging the combustion chamber is called a "Semi-Hemi" machine cut on the combustion chamber and gives up to 58 cc's. This may interfere with your second set of plugs if you have dual ignition. If you don't, Rimco or Berg can fix you up. To increase the deck height we install spacers between the cylinders and the case to space out the heads. This is also nice if you are re-using your old cylinders, because it gets the top ring away from the ridge you didn't remove when you only honed the cylinder. To obtain a 6.6-1 CR, we need to increase the deck height volume to 28cc on a 1776: $(444+51+28)/(51+28) = 6.6-1$

;and 32cc's on an 1835. The spacer needed without modifying the heads is .110 for the 1835 and .130 for the 1776, assuming the deck height was .060 without spacers. This same methodology works on longer stroke engines also. Rimco can fix you up with spacers and help calculate the required thickness. Check to make sure that the spacers will seal against the case. They should have faced the case when they opened the holes for larger clys, otherwise they may leak without a lot of Silicon seal. I had to send my 1835 in to have the seating surface machined (requires the engine to be disassembled). Note, if the deck height measurements are more than .003 spread then: 1) you screwed up and should recheck, 2) the measurements on each side are close to each other but different from side to side then you can compensate by using different thickness spacer pairs or remachine the case openings, 3) if one is way off then the rod bushings were machined improperly and thus the rods don't have the same length. I've seen as much as .030 on cheap rebuilt rods. Try swapping the P/C's around, but don't count on the piston to be the problem. Here is the one case for replacing the rods now (Rimco's are even length and they can also balance them). This can't be fixed with a single spacer because the head won't seat right. Don't machine the piston top - these are already pretty thin (6mm for Cimas). Get your CR squared away and you are on your way to reliability and a smooth running engine.

Now let's get into the cylinder studs. When VW had to cope with the demand for more power (heat,load) and cheaper gas (detonation), they introduced the case inserts and skinny studs to fix the problem of studs pulling out of the case. The material these studs are made of matches the expansion requirements of the engine so they stretch and return to keep the heads on tight. They cost about \$50.00/set new now and didn't come with the Mexican or Brazilian cases that are the basis for our engines. There are cheap (\$18.00/set new) studs available that look similar. Guess which ones you probably have. How do you tell? That is a good question. A Rockwell hardness check could be done (Berg claims it's Rc16 min). Visually I look for a lack of a chamfer on the thread ends (saved 'em even more money) but this is no guarantee. If the threads do not raise higher than the shank due to being rolled (as opposed to cut), then they are definitely not genuine. If you have had valve adjustments or head torques that won't hold, try getting some genuine skinny studs from an old case, or Rimco (\$20.00 used), or Berg (\$50.00 new with instructions). Much cheaper and better than hydraulic lifters. Don't get "high strength" studs. If you have single port heads, they use longer studs at the center two upper locations than dual ports, which is what the studs were originally used with. Don't mix bad and good studs. I remove/install these by using two head nuts tightened against each other and turning one nut, NOT a set of vice grips on the shank. Any case inserts that come out with the studs should be red Locktited back into the case and the studs blue Locktited into the inserts. Ensure that the inserts are not interfering with the cylinders or the spacers

seating on the case.

Assembly is covered in manuals. Let me highlight some tips. Work in a clean area, with clean tools and rags. Be patient and don't accept "probably good enough". Murphy will bite you unless it is right, and you will be doing the job again anyways when you have to do it over. Get your pistons balanced, including all the rings, buttons and wrist pins. Do a trial assembly to ensure that the deck height is set correctly and the ring gap is between .016 and .020. Use the ring pliers, not your fingers. Use lots of engine oil for assy lube (rods, valves, rockers, etc... but go very light on the rings). Position the pistons with the arrow toward the flywheel and the rings with the mark up. Space the rings gaps to lessen leakage. I use 10:00 and 2:00 positions alternately. I like to put the pistons into the cylinders then put the wrist pins and buttons in (don't forget the spacers-and don't use base gaskets) while the P/C's go onto the case. Keep the cyls from contacting the studs and don't forget the air deflectors. If you use the type III air deflectors, or "cool tin", be sure that it is tight against the skinny studs by tweaking the tin. Use new (they are cheap) pushrod tubes, expanded about 1/4 inch per end by hand (watch it they are sharp) and installed with the welded seam up. You can paint them lightly with flat black Rustolem to prevent rust and promote cooling. All the oil that cools the heads returns through these. Check that they will not interfere with the pushrods. I seal the tube seals, cylinder bases and spacers, and head nut washers (inside the valve covers only) with high temperature silicon sealant. The stuff works best when the metal and rubber surfaces to be applied onto are cleaned with lacquer thinner. Don't try to seal the heads onto the cylinders with sealer, lap the cylinders into the heads with valve lapping compound until the head and cylinder show a full ring of dull finish. They will seal just fine metal-metal. Torque your heads as per the procedure in the assembly chapter of "How to Hot-Rod..." doing both sides at once. I like to do the final torque value 1 ft-lb low then repeat at full final torque. If you are using the stock valve adjusters, set your rocker arm geometry so that the valve adjuster contacts the valve stem just off center (to rotate the valve) and the arc swung by the rocker is centered about the valve stem angle (to minimize side load on the stem). This is done with shims, also available from Berg. Don't seal the gasket on the rocker covers or you will not want to check your valve adjustments. If they leak then try stock covers and bails. Use the copper exhaust nuts and your studs won't come out of the heads every time you remove the exhaust pipes.

When it's all together and ready to start, try using 20W non-detergent oil for the initial run. Make sure that all the oil passageways are full by rotating the engine without plugs prior to initial firing. I've rigged up a garden sprayer and 1/8 NPT fitting to pre-lube my engines. Get the engine warm and do a 60 minute initial break-in including full power, watching your temps and looking for leaks. Drain the oil (look at all that metal floating in it!) and check the valve adjustments. There should not be any that are very

different from the rest unless it was not initially set properly. Use a good oil like Valvoline (10W-30 for most climates) and change it within a few hours. You are seating the rings by wearing them in and you want that steel out of your engine. Hopefully you have an oil filtration system. If not, next article we can put one in when we get into the bottom end. We can also add a side mount mechanical fuel pump then.

I would like to finish this article with a request to other VW builders to submit their configurations of homebuilt "magnums". Bore x stroke, heads, cam, intake system, ignition, as well as how much prop it could pull, etc... Once we get the reliability basics squared away, we can get into the power aspects (mo power!). I am currently piling up the parts that are going into my 2211cc (90.5 x 86). Let's hear from others on what they have tried and have had good success with.

Chris Barber

Huntsville, Alabama

Newsletter Contributor

Incentive Program

Our first winner of our incentive program is, Nate Rambo III of Camarillo, Ca.

Nate has won a \$25.00 gift Certificate from Sportys Pilot Shop. He should be receiving it shortly by mail. Congratulation Nate !

For those of you wondering just how we choose the winners of our incentive program its rather scientific. We take everyones name that was in the newsletter (we combined NL's 32 & 33) drop it into a bowl and I have one of the kids pull out a name.

The whole idea of the incentive program is to make it a little fun for the submitters and give the readers a wide selection of information. Hopefully in the near future, if I get time to get hold of some of the vendors I would like to get some product prizes for this Program which could be partially sponsored by them.

There have been a tremendous amount of you that have sent in letters and everyone of them will get published in one of the up coming issues. I feel for the size of our group, so far input has been excellent. Keep up the good work ! - Spud

Also while we are talking about Nate, I forgot to thank him, he was the one that sent in the pictures on Jerry Scott, his two planes and the foursome shot of Meleski, Rambo, Burris & Scott. Super Thanks Nate!

FAA Flight Testing Handbook

The FAA has really done a nice job on this Advisory Circular. It consists of 60 pages and is very upbeat for a Governmental publication sprinkled with humor all the way through. I've included a listing of the contents for your review below;

I'm sure there may of been other items they could have

Chapter 1.	Preparation
Section 1.	Airport selection
	Figure 1. Runway Length Chart.....
Section 2.	Emergency plans and equipment.....
Section 3.	Test pilot.....
Section 4.	Transporting your aircraft to the airport.....
Section 5.	Assembly and airworthiness inspection.....
Section 6.	Paperwork
Section 7.	Powerplant tests.....
	Figure 2. Propeller Tracking
Section 8.	Additional engine tests
Chapter 2.	Taxi Tests
Section 1.	Low speed taxi tests.....
Section 2.	High speed taxi tests
Section 3.	The role of the chase plane.....
Chapter 3.	The First Flight
Section 1.	General.....
Section 2.	Emergency procedures.....
Section 3.	First flight.....
Section 4.	First flight procedures
Chapter 4.	The First 10 Hours
Section 1.	The second flight
Section 2.	The third flight.....
Section 3.	Hours 3 through 10.....
Chapter 5.	Expanding the Envelope
Section 1.	General.....
Section 2.	Hours 11 through 20.....
	Figure 3. Climb Airspeed and Altitude Graph
	Figure 4. Best Rate of Climb Speed Graph
Section 3.	Hours 21 through 35, Stability and control checks..
	Figure 5. Static Stability.....
	Figure 6. Positive Dynamic Stability
Section 4.	A word or two about flutter.....
Section 5.	Spins
Section 6.	Accelerated stalls
Chapter 6.	Putting It All Together: 36 Hours to _____ ?
Section 1.	Maximum gross weight and center of gravity checks ..
Section 2.	Service ceiling tests
Section 3.	Navigation, fuel consumption and night flying
Appendix 1.	Sample Checklist for a Condition Inspection
Appendix 2.	Address for Accident/Incident Information
Appendix 3.	Additional References on Flight Testing

expanded on, but the thing that this AC does and what it is meant to do, is to get your "Brain Thinking" and help you get organized with your flight testing.

You may obtain this Advisory circular in two ways;

1. Visit your local FSDO/GADO office.
2. Write to: Superintendent of Documents

U.S. Government Printing Office

Washington, D.C. 20402

Advisory Circular AC-90-89 Amateur-Built Aircraft Flight Testing Handbook \$5.00

Last year at Oshkosh they gave these to us free after the seminar, they maybe handing them out again this year at Sun N' Fun and Oshkosh.

Either way you should have this handbook or its equivalent prior to any testing begins. - Spud

Supporting Vendors

When I received the mailing list for both Dragonflyer & Dragonfiles I noticed that there were a few vendors on those lists that were being sent the newsletters at no charge. Well I pondered that for a while and I thought the roles were reversed, Why should we give the newsletter to a company (s) that are selling us parts at a profit (hopefully)?

I sent out letters to about 20 of these vendors that were have a sales interested with our group with a sample newsletter enclosed and asked them to subscribe at a slightly higher rate-\$5.00 per issue instead of \$3.00. Which would make them a Supporting Vendor.

These two companies responded instantly,

They are:

Wicks Aircraft Company 410 Pine St. Highland, Ill 62249 (618) 654-7447 Fax (618) 654-6253 Parts order line 800 221-9425 Toll free

Wicks is just east of St.Louis, Mo which makes them close where ever you are in the U.S. They do same day shipment before 11:00 AM Monday thru Friday from the 10,000 items that they carry in stock. They accept Master Card, Visa, & Discover.

In reviewing their catalog there is very little that Wicks can't supply you for your Dragonfly.

They are also the only vendor that has the new "Approved by Viking Aircraft" Carbon fiber that all you new builders will be needing.

There catalog is available for \$4.00 and is refundable on your first order over \$45.00. Orders yours today!

Alexander Aeroplane Company. Inc 900 South Pine Hill Road Griffin, GA 30223 (404) 228-3815 Fax (404) 229-2329 Parts order line 800 831-2949

Alexander has been helping the restorer and homebuilder since 1979 but has just recently in 1990 merged with Alpha Plastic of Houston, Texas. Most of you may be familiar with composite Guru Ralph Bradshaw from his seminars at Sun N' Fun and Oshkosh or talking to him at Alpha Plastics.

They also specialize in same day shipment of their full line of supplies for the Dragonfly. They accept Master Card & Visa.

Alexander also is the only vendor that carries the "Tri-ply" cloth (Approved by Viking Aircraft) which is the tremendous timesaver cloth used on the wing and canard of our Dragonflies. They have all those Vacuum Bagging supplies also! Their catalog is available Free!

"THE CLASSIFIEDS"

For Sale or Trade: New complete set of Westak engine instruments - Reduced at least 20 %. Send name and address for COMPLETE LIST and PRICES. One set of Hapi fiberglass gear legs/steel axles and nuts - Sell for best offer or trade for true airspeed indicator. Rene de Lathauwer. 2744 E. Glenrosa, Phoenix, Az. 85016-5716 (602) 955-8857.

For Sale: Dragonfly project, Task fuselage finished with controls and hardware installed. Canard with Mark I gear with Hydraulic brakes. Canopy, engine Mount, spinner, Hapi instruments & more. \$2250.00 Randy Mears, Rt.1, Box 174-A, Harrisburg, Ar. 72432 (501) 578- 9142 evenings.

For Sale: New Revmaster starter - \$135.00, New Revmaster oil filter system w. oil pump & engine driven fuel pump - \$200.00, New Nippon piston & cyl assy. 92mm & 78mm - \$75.00, Chuck Kaplan, 475 West st., Walpole, Ma. Day- (508)668-4784, evenings - (508) 668-5285.

For Sale or Trade: Will trade for Corvette or motorhome of equal value. Plans built MKI, 1835cc, 65TT, Waranke prop, dual mags, wing strobes, custom seats and upholstery, Imron pant U555 white, over \$12,000.00 invested . Lets talk! based and hangered at Kankakee, Ill. 50 miles so of Chicago. Nick Mustari 3730 w. 97st Evergreen Park, Ill. 60642 (708) 422-6808.

For Sale: Dragonfly "N89VE" MKII 18TT, Excellent Workmanship, New Hapi 60-hp, hyd. lifters, dual electronic ignition; all new instruments, Terra nav/com, Terra loran, Navco transponder w/mode C, intercom with two David Clark Headsets; 165 mph cruise, 3.5 gph, 18 gallon fuel, always hangered, capacity \$22,000.00 invested -take \$15,000.00, reason for selling - loss of medical. Also would

possibly take trade of Ultra light. Everett Vidrine - 1700 W. Laurel - Eunice, La 70535 (318) 457-5989

For Sale: Original fiberglass cowling unused and uncut except aft trimming. Is UPSable \$75.00 Call Phil Williams 10-6 Eastern time. (212) 722 -3677 Monday - Saturday or nites (718) 424-7242 or write 63-53 Haring St., Rego Park, N.Y. 11374

Wanted: If someone out there has Mark I landing gear for sale reasonable, I would be interested. Wheels, brakes, tires, maybe even cut-off fairings that could be fitted onto my canard. Alan Luckey 645 So. 7th Str. Indiana, PA 15701

For Sale: Diehl accessory case for VW, Make offer. Alan Luckey, 645 So. 7th Str., Indiana, Pa 15701

For Sale: Dragonfly project (extra, I have another!). Modified for tricycle gear, But can be fitted for MKII easily. Fuselage, wing, Rudder, canopy, cowling, control surfaces. No canard. Excellent workmanship can be inspected, not painted. First \$2500.00 takes it home. For further information contact Chris Barber at (205) 722-7341 Daytime, Possible delivery in S.E. USA.

Wanted: Plans built MK II canard & gear or a set of MK II gear legs & hardware. Chris Barber (205) 651-4602

In Closing.....#34

This was the beginning of our Bi-monthly issues and was meant to be approx. 12 pages. So we missed a little bit! There was still a lot more that should have been in. We'll get it in the next Issue #35 May - June. Thank you- Spud

1991 Building / Flying Roster Questionnaire

Here is our questionnaire, everything is straight up and should be self-explanatory. It is very important that "everyone" no matter what level of construction or flying time respond to get a good roster.

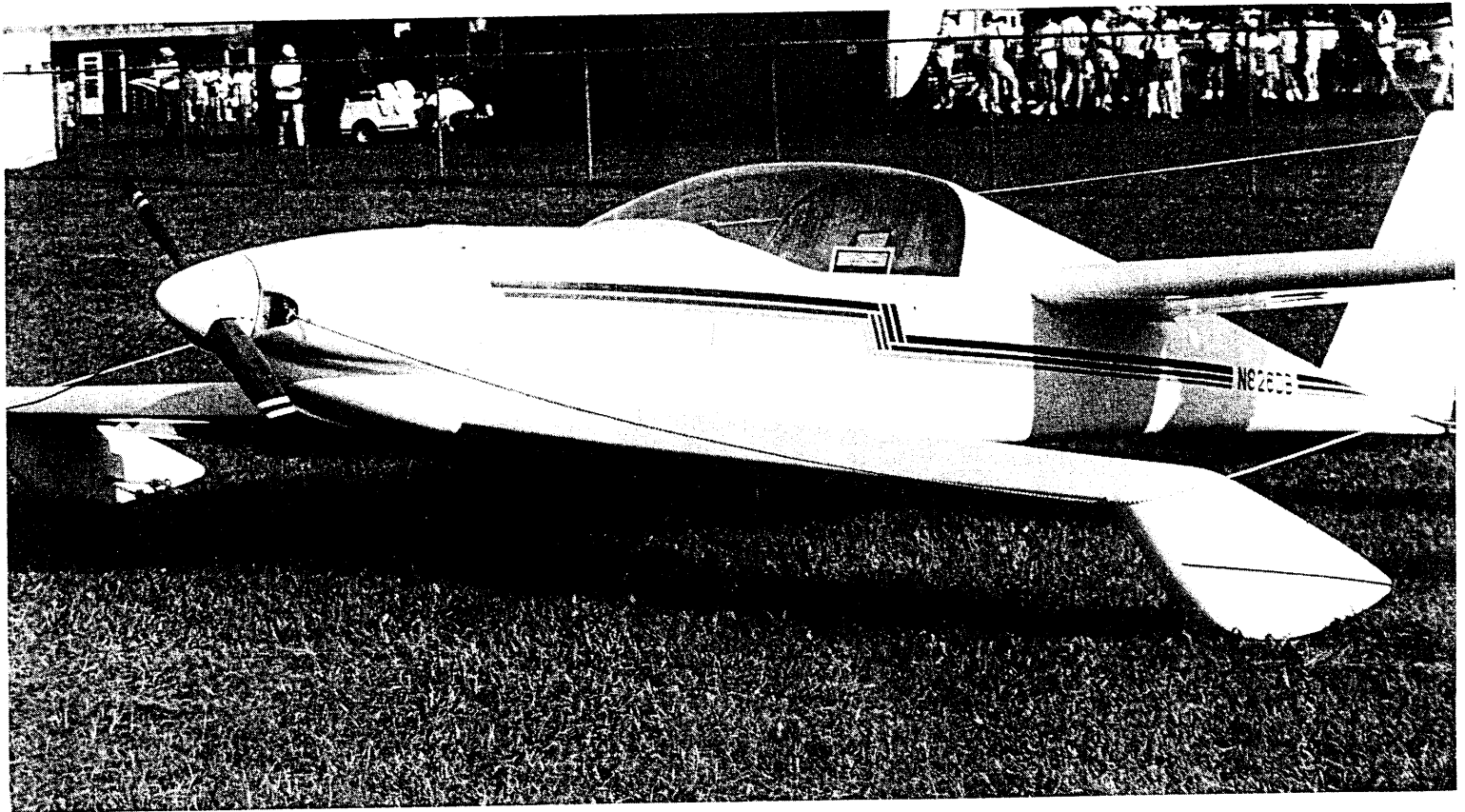
This also would be an excellent time for you to send in those letters that you have been saying were coming a long time ago, but what ever you do please send in at least the Questionnaire soon.

Depending on the response rate, the results will be in DBFN # 35 or #36.

Thanks Spud

**DRAGONFLY
BUILDERS & FLYERS
QUESTIONNAIRE**

AIRCRAFT REGISTRATION		DRAGONFLY	MKI,	MKII,	MKIII
AIRCRAFT SERIAL NO.		PLANS SERIAL NO.			
OWNER: NAME:					
ADDRESS					
CITY		STATE/PROV	COUNTRY		
ZIP/POST CODE		PHONE NO.			
BUILDER: NAME:					
ADDRESS					
CITY		STATE			
DATE CONSTRUCTION STARTED		DATE CONSTRUCTION COMPLETED			
DATE OF FIRST FLIGHT		COMMENTS:			
AIRCRAFT INFO:		COMMENTS			
ENGINE TYPE	SIZE	HP	CARB		
PROP		TOTAL ENGINE HOURS			
TOTAL AIRFRAME HOURS		EMPTY WEIGHT			
PERFORMANCE: TOP SPEED	T.A.S./MPH	CRUISE	T.A.S. / MPH		
TAKE-OFF DISTANCE		LANDING DISTANCE			
MODIFICATIONS					
INCIDENT/ACCIDENTS					
DETAILS					
DO YOU WANT YOUR INFORMATION TO BE DISTRIBUTED TO OTHERS?					YES / NO
ARE YOU WILLING TO GIVE DEMO / FAMILIARIZATION FLIGHTS?					YES / NO
WILL YOU BE ATTENDING OSHKOSH THIS YEAR?					YES / NO
WILL YOU BE FLYING YOUR DRAGONFLY TO THIS EVENT?					YES / NO
WE ARE TENTATIVELY PLANNING A SWARMING IN LATE SEPT IN OLATHE,KS. WILL YOU ATTEND?					YES / NO
IF *YES* WILL YOU FLY YOUR DRAGONFLY TO THIS EVENT ?					YES / NO
WHO THINKS IT IS IMPORTANT THAT NATE RAMBO III FLYS HIS DF TO OSHKOSH THIS YR ?					YES / YES
ADDITIONAL COMMENTS: _____					
PLEASE MAIL: DBFN - 1112 LAYTON DRIVE - OLATHE, KANSAS - 66061					



Len Griffin of Silver City, New Mexico's beautiful Mark 1 Dragonfly

DRAGONFLY
BUILDERS & FLYERS
NEWSLETTER

1112 LAYTON DRIVE
OLATHE, KANSAS 66061

FIRST CLASS MAIL

Your last issue is