

# THE CANARD PUSHER

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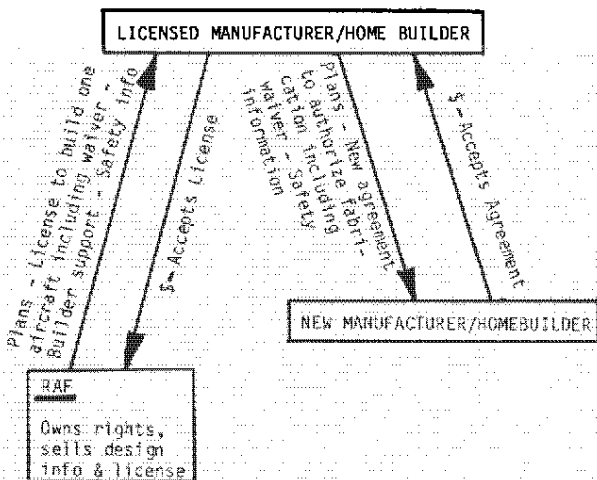
If you are building a VariViggen from 1st Edition plans you must have newsletter 1 through 54. If you are building from 2nd Edition plans you must have newsletters 18 through 54. If you are building a VariEze from 1st Edition plans you must have newsletters from 10 to 54. If you are building a VariEze from 2nd Edition plans you must have newsletters from 16 through 54. If you are building a Long-EZ you must have newsletters from 24 through 54. If you are building a Solitaire, you must have newsletters from 37 through 54. If you are building a Defiant, you must have newsletters 41 through 54.

A current subscription for future issues is mandatory for builders, as this is the only formal means to distribute mandatory changes. Reproduction and redistribution of this newsletter is approved and encouraged.

PLEASE NOTE: BUILDER SUPPORT IS ON TUESDAY AND FRIDAY FROM 8:00 am to 5:00 pm ONLY. If you have parts that you would like us to see and or would like to drop in, please make it Tuesdays and Fridays if you can. If you need to come up other than those days, please call so that we can be sure to be here. When you call on Tuesdays and Fridays for builder assistance, please have your serial number ready. It is required before you can be put through to Mike. This is a company policy and we must adhere to it.

When writing to RAF send a stamped, self addressed envelope along if you have any questions. If you are placing an order, it's best to keep it separate from a request for an answer to a builder question. Mark the outside of your envelope "builder questions". This will speed up your reply.

## WHAT HAPPENS IF YOU SELL YOUR PROJECT OR YOUR PLANS?



Note: The licensee, not RAF, is responsible to the new manufacturer. If you sell a completed aircraft, you may be liable for any manufacturing flaws. If you sell a partially completed aircraft, you may be liable for any flaws in your work. If you sell your project, or even just your plans, you are ethically responsible to provide builder support and to pass on safety information.

## LICENSE TO BUILD RAF AIRCRAFT

Those of you who are active builders know that your purchase of plans from RAF, entitles the holder to apply for a license to allow him to construct one aircraft from the purchased set of plans. Plans sold without the license indicate that the purchaser has obtained the plans for the purposes of using as a book or educational material to learn fabrication or design processes but not to build an airplane of this specific design.

When RAF had been selling plans, RAF had accepted transfer of the license from the original purchaser to a second party, when that transfer was requested. However since mid 1985 when rights to the RAF designs were sold agreements specify that RAF support only those who are previously licensed to build the RAF designs and we cannot issue further licenses for any further production of the designs. In order to provide the best possible service to those licensed to build the aircraft with the remaining funds available for support we must insist that the support be limited to only those who are legally building the aircraft ie; those who have obtained a license to build one of the designs from RAF.

We are aware that there are instances where people are fabricating an EZ without a license from RAF. If those people have gotten information or authorization to do so from one of the licensees it must be made clear as to what the licensee's responsibilities are. Keep in mind that the individual that has obtained a license to build a Long-EZ for example, has the permission of RAF to copy the RAF prototype Long-EZ for one airframe. He is the aircraft manufacturer and he is using certain design information purchased from RAF as well as other design information that he has generated himself or obtained elsewhere. There is no such thing as a conformal amateur built aircraft since there are no official conformity drawings accepted by the FAA or anyone. The FAA thus assumes that each aircraft is indeed a new type and does not have to conform to specific drawings or manufacturing processes. The drawings and manufacturing processes to be used on each airplane are totally the decision and right of the homebuilding manufacturer.

Now if you as a licensee wish to discontinue your project and sell it to someone, the new buyer is dealing with you the licensed manufacturer, not with RAF.

RAF's responsibility is to support the individual that has the license, not a third party. Thus keep in mind that if you are selling a project, don't expect that RAF can or will provide builder support to the person buying your project. That responsibility rests with you the manufacturer. You are then effectively licensing the third party to produce an airplane of which you own all manufacturing rights. It is strongly suggested that if you do sell a project, either a completed airplane or a partially built airplane or a set of plans, that you contact an attorney and have him draw up an agreement between yourself as manufacturer and the new party whom you are authorizing to build an airplane and be certain that the agreement provides you with some release or indemnification from liability should that aircraft ever be completed and flown. Keep in mind that you are ethically obligated and responsible to the person who has trusted you for that information and that he may need continuing support to allow him to operate the aircraft safely. If you own a license from RAF, RAF will provide the support to you, however, it is your responsibility to pass that on to the individual that you have your own agreement with.

## SCALED COMPOSITES RECENTLY COMPLETED THE NEWEST OF BURT'S DESIGNS, THE ADVANCED TECHNOLOGY TACTICAL TRANSPORT (AT<sup>3</sup>).

The 62% scale, proof-of-concept, twin, turboprop was designed to operate STOL from unimproved runways and to have high performance to fill the void between the larger C-130 transport and helicopters.

Scaled Composites' chief test pilot, Fitz Fulton (former NASA test pilot and flyer of the 747 with shuttle), made the first flight on December 29, 1987, and all subsequent flights to date. Burt said it was the cleanest, most successful first flight the company had

ever had. Mike Melvill, with Burt as observer/photographer, flew chase in a Beech T-34C, a civilian version of a single engine turboprop (550 hp) Navy trainer. The AT<sup>3</sup> uses a novel, tandem wing design linked by the nacelles of its turboprop engines. Each high-aspect ratio wing has extensive fast acting trailing edge flaps which are lowered late in the take-off run to boost the aircraft into the air. The entire proof-of-concept aircraft is constructed of composite materials.

Performance goals for the full scale AT<sup>3</sup> include a low altitude, unrefueled range of 2400 nautical miles, a cruise speed of 326 knots, and a payload of 14 troops plus 5000 lbs. of cargo. Maximum gross take-off weight would be in the 50,000 lb. range.

#### BURT'S "CATBIRD" FLIES JAN 14, 1988

This very sleek little 5 place tractor airplane is powered by a Lycoming TIO-360-C1A6D, 210 hp with turbo charger. A Hartzell constant speed prop is on the front end. This airplane was the last airplane Burt designed at RAF before Scaled was bought out by Beech and RAF stopped selling plans. It has been a "back burner" project ever since then. Michael Dilley built the plugs and made some of the fuselage molds before he left RAF to go to work with Larry Lombard at Featherlite Products.

Bruce Evans (Voyager's crew chief) came in to help and between him and Mike Melvill, the rest of the fuselage molds were completed. Larry Lombard and Mike Dilley made the plugs and panel molds for the wing panels, and Bruce Evans did most of the work on the vertical and horizontal tail surfaces. Slowly but surely, the Catbird took shape. For the last year or so the crew at Composite Prototypes, Jim Shultzman, Ray Ratzlaff (both Long-EZ builders) and Greg Garrett have brought the project to completion. On January 13, 1988, Mike Melvill conducted low-speed taxi, high-speed taxi, and runway lift-offs in ground effect. This afternoon, Jan. 14th, Mike taxied out accompanied by Burt and Doug Shane in the Duchess chase plane. Three more runway flights were conducted to verify the pitch trim position. Finally, Mike pushed up the power, it was time to fly! She rotated at 50 KIAS, lifted off at 60 KIAS. Climb was flown at 80 KIAS to 8000 feet. All the tufts behaved just as Burt said they would, flying qualities are excellent, engine temperatures were optimum.

One hour later, with the gear retracted, Mike flew two low approaches for the large crowd of Scaled Composites and Composite Prototypes employees assembled on the ramp. Then put the gear down and landed smoothly on Mojave's runway 7. "Catbird", Burt's latest design has flown and it is good - took for this one in the 1988 CAFE 400 Efficiency Race.

#### VOYAGER - ON DISPLAY IN THE NATIONAL AIR AND SPACE MUSEUM, WASHINGTON, DC - DECEMBER 14, 1987

Almost all of the Voyager volunteers were there - it was a great time of remembrance - the Voyager looks magnificent, her wing tips ground away and tattered, just as they were when she landed. She hangs in the entrance within a few short feet of the original Wright flyer, the X-1 and the X-15. Lindberg's Ryan is close, too. A fitting place for the Voyager and a tribute to her brave crew and to the volunteers and VIP's who helped her do it.

On the morning of December 14, 1987, exactly one year after that exciting early morning takeoff at Edwards, Jeana and Dick hosted a breakfast for several hundred of the VIP's at the Grand Hyatt not far from the museum. A moment we will all remember for a long time was when Dick called for silence at exactly 8:00am, Mojave time. Then he described the takeoff roll, from brake release to lift-off, an unbelievable 2 minutes and 4 seconds it took. Sitting on comfortable chairs in the hotel, it was hard to imagine what it must have felt like to roll for that long before lift-off. The wing tips dragging, the radio calls from the chase and ground control - quite a moment, quite a thrill. Jeana, Dick and Burt, as well as Mom and Pop Rutan, said a few words. A very special breakfast - we were glad to be there.

That evening, Teledyne Continental hosted a party right under the Voyager in the National Air and Space Museum for about 500 people. Mostly Voyager volunteers, VIP's (Voyager's Impressive People) and sponsors of the Smithsonian Institute. A band played. The champagne flowed, delicious treats were passed out and everyone had a ball. The Voyager display, including a video of the whole thing from beginning to end, is really fine and well worth a visit if you find yourself in D.C.

After the official opening of the Voyager display at NASM, we got taxi's in the rain and returned to the Grand Hyatt. There we had a grand "family" dinner. It really was a great time - a chance to meet with friends we had made during the record-setting flight. We would not have missed it for the world.

#### Joan Richey

Who answers the phone here at RAF on Tuesdays and Fridays? Some of you probably think it is still Sally or Trish. Not so, they both work for Burt over at Scaled. It is Joan Richey, VariEze pilot and wife of Chuck Richey. Between them, they built one of the early VariEzes at their home in Las Cruces, New Mexico.

Just over five years ago, they quit their jobs and moved to Mojave where Chuck went to work for Burt at Scaled Composites.

Joan co-owned and operated an FBO on the airport at Las Cruces before coming to Mojave and has flown a number of different general aviation airplanes as well as their EZ. We were fortunate to have Joan write us an article on an incident she had when the canopy opened in flight on her EZ while she was flying solo. (See CP30).

Joan is a storyteller and, when she is scheduled to tell stories at the Mojave library, you better get there early if you want a seat - she is great!

With her knowledge of EZ's and her business background, we are lucky, indeed, to have her working here at RAF. She types the newsletter, handles all the mail as well as answers the phone - so next time you call, say hello to a fellow EZ pilot, Joan Richey.

#### Correction/Retraction - OOPS!

We goofed in CP53, page 2. In our story of John Koch and Ed Roman's trip around the world, we said they had had a bad experience in Thailand - WRONG, Thailand was great, it was TAIWAN that was bad, and both agree that they would never go back there. They would return to Thailand in a minute and they called to request that we correct our mistake. We are sorry for the error.

Mike Melvill will be out of the country on vacation from Jan. 25th to Feb 25th. Builder support will be very limited during that approximately four week period. Joan will be able to support any CP subscription-related problems, and Jim Shultzman, a Long-EZ builder/flyer will be available for routine questions. Burt is only very occasionally available, but if anyone had a serious structural or flutter related question, Joan may possibly be able to put you in touch with Burt.

Mike will be visiting family in South Africa and hopes to visit some of the Long-EZ/VariEze builders in that country while he is there.

#### JOHN BENJAMIN - NOVEMBER 27, 1987

Any builders who have visited Oshkosh will be familiar with John Benjamin's excellent airplanes.

We first knew him when he flew a Whitman Tailwind with a pretty hot engine in it. Later, he built what was probably the most accurately built VariEze, ever. He also had a "breathed on" engine in this beautiful airplane, and it was fast!

John bought a set of Long-EZ plans after getting a back seat ride in Mike and Sally's Long-EZ and built a really beautiful example, "Plane Vanilla", using a Lycoming O-235-L2C. John made the firewall a couple of inches wider than plans, otherwise it was plans, stock. The contour and attention to detail were typical "John Benjamin" - essentially perfect.

John worked hard to help other builders and was responsible for making Sensenich propellers available to all homebuilders.

We are very sad to have to report that this quiet gentleman has passed on. John suffered a fatal heart attack on the 27th of November, 1987, while on a hunting trip. He will be sorely missed.

We, at RAF, would like to join all of our builders in sending our condolences to John's family.

"The Airplane will always try to tell you before it lets you down."

This is a well remembered statement Dick Rutan always preached at RAF when he worked here. Many, many times we have found it to be so very true. The problem is to recognize and act on the information.

A classic case in point occurred a few months ago with Burt's Defiant. N78RA had always had lower fuel pressure on the front engine than on the back, at least as long ago as any of us could remember, even after we installed the 180 hp engines and constant speed props. Lately though, it seemed the pressure was even lower. On the way to Oshkosh 1987, Burt said he had only 2 psi on the front and 6 psi on the rear. Must be the gauge, right? Wrong! On the approach into Oshkosh, the pressure dropped to 1 psi. Mike and Sally moved into very close formation, looking for any sign of a fuel leak - nothing.

On the trip back from Oshkosh, the fuel pressure hung between 1 & 2 psi. The engine seemed okay though, so Burt pressed on. A few weeks after the return from Oshkosh, Burt and Tonya decided to take two friends to Big Bear for lunch. The takeoff and climb to 300 feet were normal. Then, suddenly, the front engine began to die. Burt was frozen for a second trying to determine if he should turn back and land - should he shut it down and feather it? What?

He happened to glance at the two fuel pressure gauges - the rear was at 6 psi, the front was showing ZERO! He reached down and cross fed the front engine to the rear engine fuel tank - instantly, the front engine recovered and returned to full power! This airplane had been trying to tell us for a couple of years that something was wrong, but no one was listening.

We knew now that it was in the left (front) fuel system. We checked all the screens and filters - nothing. Finally we pulled out the fuel lines themselves and there we found a blockage of foam chips, small pieces of fiberglass and tiny fragments of micro and epoxy. This blockage was fully 4 inches long in the fuel line from the left tank to the fuel valve, right at the fuel valve. We replaced all the ~~fuel line in the airplane and now we have 6 psi, front and rear, at all times.~~

The moral of the story is this: If you notice anything unusual, pay attention, the airplane may be trying to tell you something. A new noise, a "different" vibration, any change in fuel or oil pressure, don't ignore these things - remember Dick's teachings, "The airplane will always try to tell you, before it zaps you!"

P.S. The accumulation of debris was caused when we had to replace two low-level light switches in the aft sump tank in Burt's Defiant. Apparently, we were not careful enough when cleaning out the tank before closing it. Burt's sump tanks do not have screens in them, the assumption being that the screen in the main tank should do the job.

#### Similar Problems in a Long-EZ

Marc Borom, N966EZ, writes that he had had many engine hesitations, slight rough running periods, some requiring the use of the boost pump to make it run smooth. All of this was during Marc's first 25 hours in his test area. Needless to say, Marc was rapidly losing confidence in his new Long-EZ. How would he ever be able to fly cross country in this thing?

He called us here at RAF several times and we had long discussions about his problem. Finally, one day he decided to make a short cross country to visit a fellow Long-EZ builder.

During this flight, the engine literally quit each time he shut off the boost pump. He asked himself, "Am I having fun yet?" The answer was an obvious - NO!

Safely back on the ground, he once more broke down the fuel lines aft of the firewall. Same results, no problems downstream of the gascolator. Then he remembered that when he had done his fuel flow checks, the fuel flow was sluggish at the gascolator (the airplane was trying to tell him!). He mentioned this fact to other pilots who persuaded him that it was due to low fuel "head" pressure with the nose down. He put that important data point aside as probably not being pertinent.

With no other clues, it was time to check the fuel lines forward of the firewall and back to the sumps. He disassembled the gascolator and found he could blow through both lines from the valve to each sump with very little effort. While he had the system apart, he decided to check the line from the fuel valve to the gascolator. To his amazement and horror, he could not blow through this section of fuel line. He had, at last, found the source of his problems.

He called RAF to discuss this problem and we suggested he use shop air to blow the line clear. The blockage cleared itself with a loud "POP". What he found was a 1" long plug of foam and fiberglass chips that had backed up behind a needle of epoxy coated fiberglass that had lodged in the first sharp bend in the aluminum tube.

This problem was very similar to Burt's problem in the Defiant, and it re-enforces the necessity to "listen" to your airplane. When she tries to tell you something, don't ignore her, check it out and you will become more confident in this machine you have built. In time, you will come to trust her and, therefore, enjoy her and to get more utility out of her. Remember, she will always try to tell you...

#### Suggested Method of Checking Static Fuel Flow

VariEze, Long-EZ and Defiant - Before first flight, and if you are now flying but have never done this check, we strongly recommend a fuel flow check. Disconnect the fuel line at the carburetor and hold the airplane in the normal level flight attitude of approximately 1-1/2° nose up (a 24" level with a 5/8" block under the rear end of the level on the top longeron will give you this attitude). Now, using a stop watch and a bucket, turn the fuel valve on for two minutes. Weigh the bucket of fuel, then weigh the bucket empty. The result is the weight of fuel that flowed in two minutes. Since a minimum of 10 gph for a VariEze is required, you should have at least 1/3 gallon (2 lbs.) of fuel in the bucket after a 2 minute run.

For a Long-EZ, you need a minimum of 12 gph, so you should have .4 of a gallon or 2.4 lbs. (without the electric boost pump running). This should increase to a minimum of 16 gph with the boost pump running, or 1/2 of a gallon (3.2 lbs.) in the bucket after 2 minutes. Remember to check both tanks in a Long-EZ, left and right.

For a Defiant you need a minimum of 14 gph (NO boost pump), 0.46 gallons or 2.8 lbs. in 2 minutes. With the boost pump running, you should see a minimum flow of 18 gph, or 0.6 gallons or 3.6 lbs. in two minutes. Don't forget to test both tanks as well as cross feed on both tanks.

These flows are fairly arbitrary, but are flows we have tested for and measured on each of the above aircraft. You should get at least, and probably better than, these numbers when you test your own airplane. If you are way down on these numbers, you should disassemble the fuel lines and blow through them to check for a blockage. Use caution blowing through lines that go into fuel tanks. High pressure shop air might rupture a fuel tank even with the fuel cap removed.

This fuel flow test should be conducted on any new airplane and it would not hurt at all to retest at each annual. Keep in mind that foam chips tend to float on the surface of the fuel and may not get into the fuel lines for a long time or, at least, until you run that tank very low or all the way empty.

#### N78RA, Burt's Defiant

During a short flight test the other day, we performed the following test. At 7500' MSL, outside air temperature 21°C, we shut down and feathered the front engine and pushed the back engine to full throttle (22.4" manifold pressure) and best power mixture (peak EGT). We showed 121 knots indicated at an indicated 12.7 gph on the digital Alcor fuel flow indicator. The best we saw on the tachometer was 2550 RPM even with the prop control all the way forward (max RPM). This computes to a true airspeed of 139 kt (160 mph) giving 10.9 nmpg (12.7 smpg).

Next, we reversed the process and shut down and feathered the rear engine, pushing the front engine to maximum power (23.4" manifold pressure), the prop to maximum RPM and the mixture to best power. This yielded 108 knots indicated at

12.7 gph with 2625 RPM. This gave a true airspeed of 125 knots (144 mph) giving 9.8 nmpg (11.3 smpg). The 1" difference in manifold pressure may be an anomaly in the gauges or, more likely, some difference in the intake/filter system, also influenced by the front prop "blowing" air into the intake.

These numbers printed here are for Burt's Defiant, N78RA, which is not representative of the plans-built Defiant. His airplane has a shorter canard as well as wing span and, therefore, has a different drag polar. These numbers are for the sake of interest only. If you want to know what your airplane will do single engine, you will have to perform your own tests and document the information in your own owners manual.

As in all tests involving single engine flight in a twin engine aircraft, there is an element of risk. For testing such as this, you should have plenty of altitude and wear a parachute. Review your engine restart procedure before shutting down an engine, and be ready to restart if the one running stops running - you all be careful, hear?

P.S. You will notice that in spite of all modifications suggested by the Hoffmann factory, plus some ideas of our own, we have been unable to get these constant speed, feathering props to hold full (2700) RPM once the engine oil is up to the normal operating temperature of 180°F to 210°F. This is one of the main reasons that the Hoffmann props have never been officially approved by RAF for installation on a Defiant.

#### HOMEBUILT WING-LEVELER (SINGLE AXIS AUTOPILOT)

We saw it at Oshkosh 1987 - Navaid Devices, Inc., single axis wing leveler/turn coordinator which can track a VOR and/or a Loran. I have known the designer and owner of Navaid Devices, Doug Spears, for several years now. He has been flying his VariEze for quite a number of years and he developed this little autopilot specifically for his own VariEze. He has been flying it in his VariEze for over one and a half years. He has done some pretty impressive testing of this device and, when he showed it to me at Oshkosh, I was very interested. The entire system weighs only 2-1/4 lbs., including the servo actuator and turn coordinator/computer! Amazing! If you replace your electric turn coordinator or needle-and-ball with this auto pilot, you may actually reduce the weight of your EZ by a small amount!

Sally and I have been thinking about installing some sort of wing leveler in our Long-EZ for some time now. We have looked into the Century 1 and the S-TEC auto pilots, both excellent systems, but, frankly, out of our price range. Doug Spears' little autopilot is in the form of a kit, something like a "Heathkit", and you will have to build it yourself. It is about 1/3 of the cost of the simplest S-TEC single axis system. I believe Doug will build it for you if you are willing to pay him extra for his time, but I would strongly recommend that you do it yourself - it is fun!

Our kit arrived in the mail and I began to read the assembly manual. There is really no way to go wrong! The manual is quite the best thing of this kind I have seen. It leads you by the nose, step by step, and as you get each step done, you check it off - when you have all the steps done, it is ready to test!

The quality of the circuit board and components is first rate. All you need is a small soldering iron and a small pair of side cutters, available at Radio Shack, and you can easily put the whole thing together in a few evenings of your time. It took me four evenings, working, perhaps, 3 hours each evening. I work slow on things as intricate as electronic gadgets such as this. This line of work is not my strong point, but I must say, I really did enjoy putting the kit together.

I followed the instructions exactly and tested it per the book, using a car battery and battery charger and a digital voltmeter, which I borrowed from work. The installation into a Long-EZ or VariEze is straight forward - the most time consuming thing for me was threading the wiring from the panel to the engine compartment. By the time I had it installed and working, it took most of a Saturday.

First flight to test it, Sally went with me to watch for traffic while I had my head down calibrating the five (5) little trim pots that must be adjusted in flight. It worked perfectly, first time! But only for a short time -

alas, I had done something wrong and it glitched! I could not figure it out, so I called Doug and he had me ship it back to him. He checked it out thoroughly and found where, in spite of my care, I had soldered a capacitor into one of the circuit boards backwards! What a bummer! Anyway, he shipped it back all nicely calibrated and it worked perfectly, right out of the box, requiring essentially no adjustment.

The wing leveler is really neat - now I can easily fold and unfold maps without having the airplane roll over! It does not have a heading hold feature, however it will do a very nice job of tracking a VOR and an even nicer job of tracking my Loran. It is especially impressive to watch it track the Loran in the approach mode! Really amazing, the silly little machine does a better job than I can do!

Doug does not recommend his autopilot for IFR use, he designed it for the day, VFR, sport pilot, to make your cross country flying more enjoyable, and it certainly does that. Don Shupe, founder of the VariEze hospitality club, has recently installed one in his VariEze and he is ecstatic about his. I really believe the thing is a great safety device since it does allow you to spend more time navigating, checking your map and your check points.

If you ever did inadvertently end up in a cloud or fog bank, it would keep you upright and fly you back out into VFR conditions.

Used in the tracking mode, it will fly a much straighter course than an average pilot would, thus saving time as well as gas. I am very, very pleased with mine and I would recommend it for anyone flying an EZ and, for that matter, just about any type of homebuilt. For more information contact Doug Spears. He really is a neat guy and is very knowledgeable and sharp on autopilots in general - and especially the lightweight one he designed.

Contact: NAVAID DEVICES, INC.  
241 Signal Mountain Road  
Chattanooga, TN 37405  
1-615-265-7809

#### Rough River Report

"The sun was slowly sinking behind the Kentucky hills and already several rows of EZ's were tied down for the night. It was Friday evening - the start of the Fly-In at Rough River Dam State Park.

The event began with a Friday evening reception at the lodge for early arrivals followed by Saturday morning out on the ramp. Many builders were given the opportunity to take their first ride in an EZ. Norm Howell, with the help of Byron McKean, conducted a first rate forum on formation flying.

Then the buses came and took us away to Mammoth Cave National Park. We climbed up, down and around the caves and passages on a 2 hour tour. It's really good exercise for those pilot-types. After exploring the natural underground landscape, we returned to Rough River to a wonderful outdoor dinner on the lake front.

Sunday's air features were dog fighting and aerobatics in EZ's - a real pleasure to watch. In the evening was the Sunday banquet and get together.

For the weekend, we had over 80 participants and 25 EZ types. The winners of our competition were:

Best VariEze	Steve Wright
Best Long-EZ	Martin Kennedy
Best Interior	Arnie Ash
Best Modification	Darrell Craig (strake windows)

Buzz and I do not look at ourselves as tour guides. We just make the arrangements for the fly-in and everyone shows up and has a good time. We want to thank everyone who came and joined our group of enthusiasts because it's you who make the fly-in and it's great getting to know everyone and the low-down on your planes. Everyone wants to make this a repeat performance for next year. Scheduled dates are Sept. 30, Oct. 1 & 2.

by Peggy Talbot

## IVCHC Honoring "Pop" George & "Mom" Irene Rutan!

Over 40 EZers showed up at Flo's Cafe, Chino Airport, CA on New Year's day for the Club Fly-In which was dedicated to George & Irene Rutan, IVCHC Historian, for their "50th" Wedding Anniversary!

The remarkable celebration of the Rutans' special occasion lasted from 8:00am to around 1:30 in the afternoon. The arrival of these EZs gave the tower and the local residents more thrill than the Rose Parade & the Rose Bowl - UFO's on New Year's Day!

IVCHC would like to thank the following EZers who participated in the Fly-In.

(In random order) From CA - George & Irene Rutan of Palmdale, Wes & Millie Gardner of Redlands, Bruce & Bonnie Tift of Mariposa, Les Faus of Van Nuys, David & nephew & Trevor Orr of L.A., Eric Cobb & Dan Mason of Santa Monica, John Lambert of San Diego, Emedine & Earl Haguewood of Huntington Beach, Erin Haggard of S.F., Bill Dertel of Norco, Gai & JoAnne Cadwell of Brea, Sally & Randy Randall of San Diego, Bill & Julie Lermer of Spring Valley, Steve Irvin of Hawthorne, Mike Henderson of Long Beach, Bob & Doris Ohletz of Riverside, Jimmie & Ferne Hays of Chula Vista, Clayton Kau of Redondo Beach, Klaus Savier of Fountain Valley, Don Converse & his friend, Don & Bernadette Shupe of La Verne, and Dan Thompson of Cathedral City; From ID - Art & Bonnie Lazzarini of Hailey; From IL - Jake & Tip Bach of Carbondale; From KS - David & Mabel Haggard of Wichita.

IVCHC wishes everyone a "HEALTHY" & "HAPPY" EZ flying year - 1988!

## INTERNATIONAL VARIEZE and COMPOSITE HOSPITALITY CLUB

IVCHC was founded in 1979 by Donald and Bernadette Shupe of California to encourage and promote hospitality, travel, and support for builders and pilots of VariEze and Other Composite aircraft.

A Quarterly Newsletter is published that contains letters from members on safety, first flight reports, builders hints, and information on past and future club flyins.

A list of members is published yearly with quarterly updates. These lists are provided to all members but they are CONFIDENTIAL and are NOT to be duplicated, posted, or shared for any reason with nonmembers.

Members are expected to provide emergency assistance, shelter and comfort to other members according to their ability to do so. Courtesy demands as much prior notice as possible of an impending visit to the host by visiting dignitaries. The major complaint we get from members is that they are not visited enough. Members who are still building especially treasure talk, examples, and occasional rides.

Club members have frequent lapses of sanity and take on the task of hosting a flyin. They have complete freedom to do this when and where they please. All we ask is that they take credit for their accomplishment and simply send us the notice for the flyin and a report after the event (and perhaps recruit a few new members).

IVCHC hosts a Fantastic Banquet at Oshkosh each year with an average of 240 attendees. A few well established and successful flyins are ones like New Year's Party at Chino, CA; the Rough River Dam and the Brookridge Airport Flyin by Buzz Talbot et. al.; Jackpot Air Race by Shirl Dickey (SHIRI started his own group - R. A. C. E. in 1987); in 1979 Bruce & Bonnie Tift organized the "IVHC Bahamas FlyIn" and in 1987 Mike & Sharon Bridges organized the second "Bahamas Flyin"!

IVCHC members support other members by lending, replacing, and repairing parts and extending aid and comfort to any member who has become stranded in their vicinity. Members who have been helped are only expected to replace whatever they have borrowed and cover any expenses of the helping members.

When people visit you, they are expected to cover all their own expenses including food and transportation. It should not cost you to be a host. The most common hosting task is to pick people up at an airport, provide a bed overnight or two, sometimes a meal or two, and then take them back to the airport so they may continue their journey. (We recommend that everyone gets a telephone call # to use when they are traveling & visiting).

It is very comforting to know that no matter where you are in the world, if something should go wrong or you need a place to stay there will be a member within a few hundred miles. Help is never far away if you keep an IVCHC Membership List with you while you travel.

If IVCHC sounds like an organization that may fit your needs and interest, please join us by sending your name(s) phone #s, address, airplane type & N#, (Your must be a pilot and a composite homebuilt builder or owner to join), home airport, date of 1st flight, and anything you think might be helpful to us, along with a check for \$17.00 domestic (U.S.A. & CANADA) or \$20.00 OVERSEAS, and mail to:

SHUPE/IVCHC  
2531 College Lane  
La Verne, CA 91750

In 1978 we, the Shupes, were lucky enough to have Burt Rutan's blessing in starting the "IVHC" and it was he who put our little note in the "CP" to get us our very first "twenty" members. Today we have 240 current members (since memberships are accepted on the basis of per airplane, we actually have plus or minus "480" people in the club), and seven of the original twenty are still with us. Because of the purpose and nature of our club, we know that we have the most unique, friendly, fun, interesting, nice, and delightful people in our club. And we have also been able to keep the size of our club fairly small and stable for the last several years.

Those of us who choose to provide our services to such a small and specialized group are not in it for the "MONEY"! We, as well as Dick Kreidel of Long-EZ Squadron No.1, Dave Orr of Long-EZ Squadron No.2, Al Coha of San Diego EZ Squadron, Marshall Gray of EZ Builders of FL, and the newest but one of the fastest growing groups - Arnie Ash of Central States; simply enjoy providing our services to a bunch of pilots who are crazy enough as we are to build and fly our own homebuilts.

## BUILDERS HINTS

NOSE GEAR SHOCK STRUCT SPRING REPLACEMENT - Several builders have reported a 3 to 5 knot reduction in nose wheel lift off speed after replacing the "sagging" old LST spring as called out in CP51. The easiest way to remove the LST spring is to leave NG-3 and NG-5 attached. Remove the retainer bolt nut and, with the gear in the extended position, have someone push down on the nose. You can now easily lift out the retainer bolt and the shock strut will come apart for easy replacement of the LST spring. Look for wear on the retainer bolt, replace the bolt if there is any sign of groves worn into it. Look for sharp edges on the LST-2 slotted holes, dress these down with a smooth file if necessary. Apply a generous quantity of grease to the shock strut before re-assembly. If your nose gear shock strut comes off the extended stop when you get into your EZ, you need a new LST spring which is available from Ken Brock Mfg.

## Nose Gear Shock Strut

Reference Long-EZ plans, 13-2, and CP25, page 8

The rod ends used on the shock strut can be either RE4M6, REP4M6, or HM-6. RE4M6 and REP4M6 are functionally and dimensionally equivalent, the difference being that RE4M6 are "new surplus" with solid metal seals, and the REP4M6 are of new manufacture with P1yo-Seal or Teflon seals.

The major difference between the "RE" rod ends and the HM-6 rod end is the diameter of the hole machined into the ball of the rod end. The "RE" rod ends have a 1/4" diameter hole in the ball, while the HM-6 rod end comes with a .3750 (3/8") diameter hole.

The "RE" rod ends can be used "out of the box" because you will be using AN4 (1/4" dia.) bolts through the rod end ball. The HM-6 rod ends, however, need a bushing to reduce the bore size from 3/8" to 1/4". These bushings can be ordered from Aircraft Spruce along with your HM-6 rod end for an additional \$1.00 each. The Wicks catalog does not list the required bushing, however, they may be available upon request.

If you desire to make the bushings yourself (as I did), it's a very easy task. First, get hold of a piece of 3/8" OD x 1/4" ID 1015/1020 steel bushing stock. Both Wicks and Aircraft Spruce carry this item for under \$2.50 per foot. The bushing stock I ordered was a perfect slip fit into the HM-6 ball, however, the 1/4" ID was a little undersize. A 1/4" reamer took care of this problem in short order. The length of your bushings should be slightly less (approx. 1/16" less) than the width of the ball. After cutting the bushing stock to the approximate length with a hack saw, chuck the bushing into your drill and face the ends of the bushing with a metal file, until the bushing is the proper length. The whole process took me less than an hour.

It is much simpler to use the "RE" rod ends instead of the HM-6's with bushings, however, there is another factor you should consider before you make your decision. PRICE! A quick comparison of the price difference between the HM-6's and the "RE's" will show a savings of over \$16.00 each in using the HM-6's, or a savings of over \$32.00 for the two required for the shock strut."

The above sent in by Stet Elliott who has been working hard on a complete computer printout of all CP's from #24 to the present, listing all hints and changes in chapter form. We are looking forward to this and will announce it in the CP when it is available.

**EDITOR'S NOTE:** If you have a 'heavy' Long-EZ or you are on the heavy side, you would be wise to increase the AN4-15A bolt to an AN5-15A. This would require drilling and reaming the 1/4" hole in NG-3 and NG-4 to 5/16" and you would need to drill and ream the HM-6 "bushing" to fit a 5/16" bolt.

Easier Long-EZ Wing Removal During the Construction Period, After Wings Have Been Installed and Before the Strakes Are Closed Out.

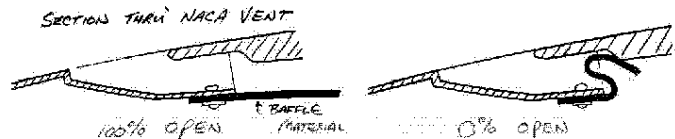
You may be surprised how many times you will install and remove your wings during this time. To make it easier on yourself, using a 1-1/4" diameter hole saw, open the 1/4" dia. pilot holes in the forward face of the centersection spar to 1-1/4" diameter to allow yourself to get your 3/4" socket wrench through the forward face of the centersection spar. Of course, these 1-1/4" dia. holes must be filled with PVC foam plugs and glassed with 2 wet plies of BID before you close out the fuel tanks/strakes - don't forget, or you will have an unbelievable fuel leak!!

Make the Job of Installing Your Main Wings Easier - sent in by Mike and Nancy Mayo. The problem is that it is difficult to align everything, then push in the bolts and keep the spacer washers on the bolts. A small piece of styrofoam, such as a piece of the round core you cut out of the foam blocks for the wiring conduit holes, is ideal. Cut to the right length and jam into the wing attach bolt access holes such that the outboard two bolts are held firmly in place, including any washers required. Wing rigging then becomes an easy task even for only two people, one at the wing tips and one at the root. The root person holds the inboard wing attach bolt in place while the wing is slid into place. A neat, simple way to do what can be a rather frustrating job.

Shaping the Fuselage - Dana Terrill sent this one in. Using a small Hitachi electric hand plane, he was able to carve the fuselage to match the template in just a few minutes, see photo. Skill, Stanley, Black & Decker, etc., all make small handheld electric planers which will cut through the PVC foam, the fiberglass and wood longeron (even the firewall and F-22 bulkhead) like butter. Experiment a little with depth of cut, 1/16" works quite well. This can be a big time saver and will allow you to make a nice clean job.

A Quick Fix for the Pilot's Vent or NACA Scoop. This idea sent in by new Long-EZ builder/flyer, an Englishman working and living in France, N. W. Ruston.

"I used two 1/8" diameter pop rivets to attach a rectangle of the flexible black neoprene/asbestos to the bottom lip of the NACA inlet. The width of the rectangle should be such that it is a tight fit in the NACA inlet."



By pushing part, or all, of the rectangle into the inlet, you can adjust the air flow easily and simply from zero to 100% air flow - neat idea.

#### NOSE WHEEL/FORK ASSEMBLY ATTACH

The plans call out four (4) AN525-10R24 screws to attach the NG-15A nose gear casting to the 'S' glass strut. As we have reported previously, a really hard landing can pop the heads off these AN525 screws allowing the 1/8" aluminum plate to separate from the NG-15A casting which allows the whole nose wheel/fork/pivot assembly to depart from the strut! We strongly recommend that these AN525 screws be replaced by AN3-14A bolts. These are much stronger and the heads will not pull off as they can do with the AN525.

We have called out this recommended change before but we still get occasional builder/flyers who did not get the word and have ended up with this failure. It is an easy fix - can be done in a few minutes and it can save you much grief and frustration.

#### HOW TO REMOVE AND REPLACE SLICK MAGNETOS EASILY ON A LYCOMING POWERED VARIEZE OR LONG-EZ

Have you ever spent an hour just trying to remove or replace the distributor cover on your magnetos? I have and it is very, very frustrating. The main problem is removing and replacing the three (3) slotted-head screws that hold the cover on to the mag. The magnetos are so close to the firewall that it requires a 90° screwdriver to get at the screws. Getting the screwdriver into the head of the screws when you cannot see the screw is very difficult, maddening, and time consuming. You can probably tell I hate this job on my airplane and, over the years, I have had to do it more times than I care to remember.

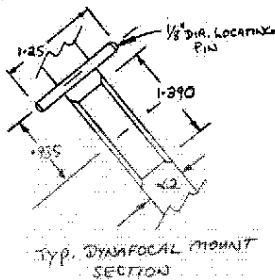
I don't know why it took so long to figure it out, but as I said, the main problem is the three slotted-head screws in each distributor cap. So the easy way to cure that problem is to go to Allen head screws! So simple, yet so effective. I bought 100 screws, they are stainless steel, flat head, socket cap screws and are 10-32 thread, 1" long. It took 20 minutes to remove 3 of the original screws and less than 1 minute to install all 3 of the new Allen screws. I fitted each screw on to the short end of a 3/32" Allen wrench, reached around the mag and simply wound the Allen wrench round and round with my finger until it was tight! Astonished me how easy it was to do!

I do not know of a source of these screws in lots of 6 which is all you need, but I bought mine from Garrett Industrial Supply. They are made by Soc-Pro and cost \$16.00 per 100 which was the minimum order. Perhaps a group of 16 could get together and buy 100 at a time. Or better yet, I have 94 left and I know where to get more. I would be glad to mail a set of 6 to anyone who would like a set and would be willing to send me \$1.00 plus a SASE. Write to: Mike Melvill  
Building 13 - Airport  
Mojave, CA 93501

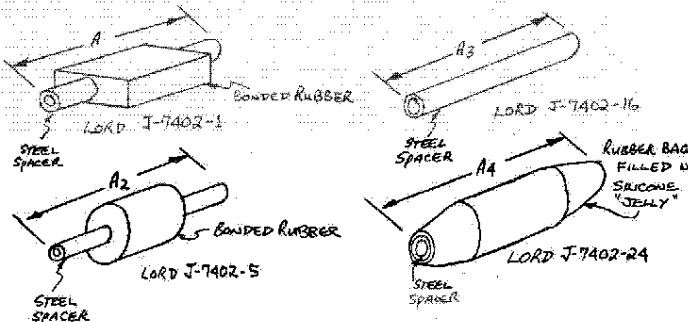
Some Thoughts on Dynafocal Rubber Mounts - sent in by Long-EZ builder/flyer, Dick Kreidel, a founding member of Long-EZ Squadron 1 in the Los Angeles basin.

"As you may or may not know, the Lord mounts, Barry Control mounts, (even the cheaper imitations such as sold by Aircraft Spruce) have a stamped hole in the metal ring that is bonded to the rubber sandwich. The purpose of this hole

is to index the rubber/steel bonded sandwich mount to the welded Dynafocal motor mount to prevent it from rotating as the bolt is torqued up, and also to correctly orient the spacer. On all Cessna and Piper mounts I have seen, there is a 1/8" dia. x 1-1/4" long roll pin pressed into each corner of the Dynafocal ring to engage the hole in the metal of each rubber sandwich. See the sketch below for the position of this pin.

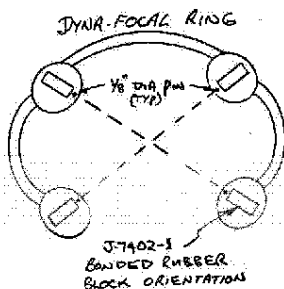


There are four different Lord mounts that will work on an EZ. The main difference is the spacer: Lord p/n J7402-1, Lord p/n J7402-5, Lord p/n J-7402-16, Lord p/n J-7402-24.



Note that the lengths of the steel spacers on the bonded rubber and steel sandwiches are all different resulting in varying pre-loads on the bonded rubber and steel sandwiches. Most EZ builder/flyers in Long-EZ Squadron 1 have found that the J-7402-1 with the rectangular rubber spacer is best for the Lycoming O-235. I have tried all four with my O-235 and I, also, found -1 to be best. Currently, I am using the -24 spacer and find it to be satisfactory, however at \$260.00 per set compared to about \$120.00 for the -1, -5, and -16, they probably are not worth the extra dollars.

One last point, the rectangular spacers for the -1 version are designed to be oriented as shown below for maximum effectiveness. The 1/8" roll pin assures this and prevents torsional windup of the rubber block bonded to the spacer.



According to the Lord Manufacturing Co., provisions must be made to allow the engine to move in its mount up to a maximum of plus or minus 2025' laterally from a vertical C<sub>1</sub> (roll). Under thrust loads, it should be able to push into the mount as much as .070". Vertical displacement, under heavy 'G' loads, it should be able to move as much as plus or minus .34" measured at the engine CG, about 15" aft of the crankshaft prop flange. You should be certain that your engine can move up to these maximum call-outs without interference with cowling, baffling, etc." Thank you, Dick, for the effort in obtaining this information.

How to Change Main Wheel Axles and Fix a Loose Main Gear Strut - From Gene Zabier, VariEze N3793X.

"An "A.D." issued in 1985 by RAF called for immediate inspection of Rosenhan axles for cracks and/or broken axle stubs. Thereafter, they were to be inspected every 100

hours. Even though our axles were fine, we decided to purchase a set of replacement 4130 axles manufactured by Stolp Aviation.

With an early, warm Spring this past year, I decided to put on new brake pads. The old set had 310 hours on them and were about 2/3 worn out. In the process of changing the brakes, I inspected the axles again. They both looked good. Because VariEze N3793X flies and lands heavy at times, I decided to take the axles off and have them zt-glowed. Both axles were cracked, one all around and the other halfway around on the top side. I had always cleaned them with gas and a brush and still missed the cracks. The new set of axles had to be drilled for mounting holes but installed nicely and we rechecked the toe-in in the process. Now N3793X has new brakes and new heavy duty steel axles.

But, she creaked a little whenever we picked up the nose so I decided to check the gear attachment bolts for hole elongation. This can only be done with the wheels off the floor. I built a jack stand, 2x6's with tripod bases and a floating top pad. The 4 gear attachment bolts should be loosened about 2 turns before checking the gear (per RAF), then take a firm hold and shake. We had movement, not a real lot, but decided it was time to install the 5/16" dia. bolts as recommended by RAF.

What a job! Twenty hours later and 4 new bolts, the gear was stronger than new. A few tips follow: A 5/16" dia, twist drill ground down to 1/4 dia. on the first inch to act as a guide through the existing holes. The back end of the drill bit was turned down to 1/4" dia. and glued with 5 minute epoxy into a 80" piece of brass tubing. A 1/4" dia. plug was put into the end so that the drill chuck would not crush the tube. By using the electric drill right behind the front seat with the long brass extension in the drill, drill holes through the rear seat. The lead on the 5/16" drill bit guides the 5/16" drill through the front sets of holes. Do only one at a time so that you don't lose the alignment.

The rear set of 5/16" holes was a real bear. But, by shortening the drill bit to 2" long and borrowing a small 90° head electric drill, I enlarged the holes. Another thing, bolts are undersize from .001 to .005.

By holding a whetstone on the cutting edges of the drill bit when it is running, you can make an undersize drill to match your bolts. I took off another .002 for the hand drilling. I then lubed the bolts and pressed them in. No more loose gear.

We thought the information on the gear tab bolts might be helpful. If anyone is still building a VariEze, I would suggest installing the 5/16" dia. bolts or use the 1/4" bolts, but install 3/8" OD x 1/4" ID x 1/8" long steel bushing in the 1/8" extrusions while the plane is still in the shop."

FeatherLite Fuel/Baggage Strakes

Doug Shane has just completed the installation of a set of these strakes from Larry and Michael in Boonville, CA. Doug was sceptical of his ability to do a nice job on the strakes and was almost reluctant to start on the project. Ultimately though, there was nothing else left to do, so he went for it!

It was easy! He was amazed, the pre-formed leading edge sections were easy to fit to the fuselage and wing root. Hot Stuff was used to temporarily locate them in position while the prefab ribs were trimmed to fit. Most of the trimming and fitting was done at the centersection spar forward face, then Hot Stuff was again used to jig all the ribs, baffles, and baggage compartment walls into place.

Doug cut each of the top and bottom skins out of a single piece of 3/8" H-45 Divinylce PVC foam and glassed the inside face. Then the whole assembly was broken down and permanently glued together with flox, after sanding judiciously in all the appropriate spots. This framework was allowed to cure. The bottom was then floxed into place using straight pieces of 2x4 lumber at the leading and trailing edges with 1x2 lumber "legs" to the floor of his garage to hold the bottom skin firmly into place and this was allowed to cure. All plumbing, vents, drains, etc., were installed per plans and the top was floxed on after a heavy coat of epoxy was painted everywhere in each tank. (Don't neglect to do this or your tank will leak.) The top was held in place with weights until cured. A little careful sanding and each strake was ready to be glassed on the outside. A rather simple way to do a difficult job, and they really do look nice. The leading edges are a very nice shape and will probably hold a little more fuel than a Task strake or a homebuilt strake. Doug would happily recommend the FeatherLite strake kit and he says if he can do it, anyone can!

Doug's Long-EZ is now into the messy finishing and wiring stage. Engine has been installed and he and Mike Melvill have built a custom cowling, in place, on the airplane. See photos of Doug's strakes in this CP.

Electric Primer for Long-EZ

While this is not a new idea, it does seem to work well. Mike and Sally recently installed an electric solenoid valve into the primer system of their Long-EZ, N26MS. This simple, on/off valve allows them to use the electric boost pump to prime the engine while the starter is cranking, thus getting the fuel into the cylinders where it belongs.

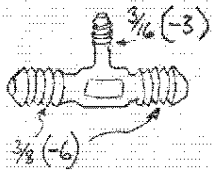
These little electric solenoid valves are available in 12 volt as well as 24 volt. They are manufactured by Skinner, the part number is: B2Dx62 (12 volt or 24 volt). You must specify the voltage. An excellent source for these valves is:

Norman Equipment Co.  
Bridgeview, IL

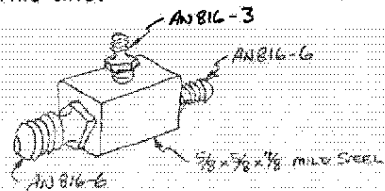
Toll free, call: 1-800-323-2710

The Skinner valve must be placed in the primer line such that it can allow fuel, under pressure from the boost pump, to enter the primer lines to each of the cylinders.

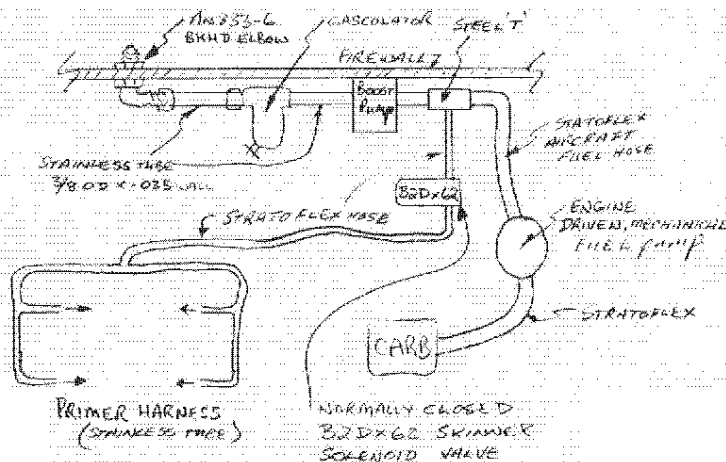
Mike made a simple "T" fitting which he installed in the fuel line between the boost pump and the engine-driven mechanical pump. He was unable to find a suitable off-the-shelf "T". The problem is that the primer lines are dash 2 (1/8") size, whereas the fuel line downstream from the boost pump is dash 6 (3/8"). Therefore, the "T" would have to look like this:



If anyone knows of a source for such a fitting (in steel), please let us know and we will put it in the CP. Mike made his "T" fitting like this:



5/8"x5/8"x1" drilled and tapped with one 1/8" NTP thread, and two 1/4" NTP threads. This worked fine, if a little heavy.



The B2Dx62 Skinner valve should be wired to a momentary switch on the panel near the starter switch. This lets you crank the engine and "blip" the primer as required. Of course, the boost pump must be on for this to work.

Why an electric primer? Well, first of all, it eliminates having primer fuel lines in the cockpit. It is simple and lightweight. This system is commonly used on general aviation aircraft, for example, the Beech Duchess (BE-76). The only disadvantage we can think of is if your battery was flat you could not prime the engine to allow you to hand prop the engine. This system may not be as good on an engine with no starter. It is primarily intended to be used in conjunction with an electric starter. Mike is very happy with his and he knows of at least two other Long-EZ with the same installation and they work great as well.

ACCIDENTS/INCIDENTS

An Anchorage, Alaska Long-EZ pilot took off from Merrill Field one afternoon with about 2 hours fuel on board. He flew to nearby Birchwood airport where he practiced takeoffs and landings for almost an hour. Then he headed back to Merrill Field at 2000 feet (required to cross above the approach corridor at Elmendorf Airforce Base). He intended to switch tanks over Elmendorf, but when he ran into low ceilings and had to descend to 600 feet to cross under the approach corridor, he forgot. During the descent from 2000 feet to 600 feet, he was at hard idle and was cleared for a straight-in to Merrill Field's runway 18. Seeing that he was going to be a little bit short, he added power only to find that the engine had quit.

Too late to switch tanks and restart, he was committed. A tiny 550 foot long empty lot was in front of him and he went for it. Nose gear down, landing brake down, and put it down firmly on the end, too short to finesse the touchdown. The nose gear NG-15A casting failed and the nose gear strut dug into the soft field. He rolled/slid only 225 feet! The Long-EZ stopped short of a chain link fence between the empty lot and 5th Avenue's busy traffic in downtown Anchorage! No other damage occurred to the plane or pilot.

This pilot's recommendation, based on this incident? Post a landing checklist on the panel and use it religiously every time you land - a very good suggestion. This is at least the second time an incident such as this has occurred with Long-EZs. Good as they are, they can not fly if the pilot screws up. Learn from this close call and use your check list. You may not be as lucky or as skilled as this Alaska pilot.

SHOPPING

Access Doors for Wheelpants. These 1" diameter, spring loaded doors can be rivetted into your wheelpants. They open inward, so that using an appropriate tool, you can check pressure or inflate your tires quite easily without removing the wheelpants. These little access doors are made of stainless steel (which can be polished) by the Cam Loc Company. Bud Myers of Wicks Aircraft has obtained a supply of these high quality parts.

Contact: Wicks Aircraft  
410 Pine Street  
Highland, IL 62249  
1-618-654-2191

Ask for: Part number KM713-16-080 access doors.

(See photos and further details elsewhere in this CP)

NACA, Canopy Vent Doors and Light Weight Front Wheel Fenders. By now most of us are familiar with Gene Zabler's neat, quality vent doors and fenders. Gene tells us that he has not had a price increase since he introduced these parts more than four years ago. Increased costs of materials and shipping costs have forced him to raise his prices. The vent door will now cost \$7.50 p.p. and the front wheel fender will now cost \$40.00 p.p. If you have not tried one of Gene's simple, easy to install, vent doors, you owe it to yourself to try one, particularly at this time of the year. The nose wheel fender can really extend the life of your prop by helping to keep small stones and gravel out of the prop during taxi, take-off and landing. Write to: Gene Zabler  
48 Robin Hill Drive  
Racine, WI 53406  
1-414-886-5315



**FOR SALE**

1979 Lycoming O-235-L2C. 1940 hours, set up per Long-EZ specs. All accessories are either new or factory re-manufactured. #3500.00. Contact: Grant Ross  
36 Walnut Drive  
Morgan Hill, CA  
95037  
1-408-778-3578

Epoxy ratio pump (for Saf-T-Poxy). Used, but fully functional. \$100.00 (Canadian).  
Contact: Doug Osborne  
230 39th Avenue, SW  
Calgary, Alta., T2S 0W5  
Canada  
403-243-3653

Wood prop for O-200 Continental VariEze (Great American Prop), Multilaminate, like new, cost \$400.00, no waiting, \$370.00. Pair of Cleveland 500x5 wheels and brakes PN#40-788 and 30-9. Used 80 hours. Cost \$300.00, sell \$195.00. Westach gauges. 3-1/8" tach (0-3500), 4 cylinder 3AT3-2. Cost \$60.00, sell \$30.00. 2-1/4" voltmeter, PN#2A5. Cost \$33.00, sell \$20.00. 1" suction gauge. Cost \$50.00, sell \$25.00. Contact: Phil Wimberly  
4020A Verdant Street  
Los Angeles, CA 90039  
1-818-246-7946

12V infrared, quartz electric cabin heater - never used. \$60.00. Call: Larry Dodge  
1-303-860-4357

Original 500x5 Cleveland wheels, brakes and axles for Long-EZ. \$225.00. Contact: Michael Blais  
168 Bradford Avenue  
Napoleon, Ohio 43545  
1-419-592-1659

**RAF QUARTERLY SPECIAL**

We get such tremendous response from you that we know you must read every word of the newsletter - so here's an item that many of you may not know we have.

"Wings of Glass", a short (less than 10 minutes) video of the most glorious EZ flying you have ever seen, accompanied by soothing, soaring music. This is a "sit on the couch with the lights down low" kind of tape. You'll want to watch and listen with someone you love. Done for RAF by Ferde Grofe. VHS only, no BETA \$15.00

We still have the poster of all of Burt's designs and they can still be autographed. A must for any builder. \$15.00 plus 3.00 for postage, shipping and handling.

Arnie Ash, founder and editor of the Central States newsletter, is attempting to get a group of VariEzes and Long-EZs together for a group flight to the Sun and Fun Fly-In in Lakeland, Florida this year. Anyone interested, please contact: Arnie Ash  
RR 5  
Davenport, IA  
52806

Aircraft Spruce  
PO Box 424  
Fullerton, CA 92632  
714-870-7551

Wicks Aircraft  
410 Pine Street  
Highland, IL 62249  
618-654-7447

FeatherLite  
PO Box 781  
Boonville, CA 95415  
707-895-2718

Brock Mfg.  
11852 Western Ave.  
Stanton, CA 90580  
714-898-4366

The above suppliers are still the only authorized RAF dealers for all your various aircraft materials and components.

**PLANS CHANGES.**

We at RAF, of course, cannot enforce a mandatory change, as FAA can on a type-certified aircraft. The regulations allowing amateur-built experimental aircraft recognize that the homebuilder is the aircraft manufacturer and, that the aircraft does not need to conform to certification requirements. This allows experimentation by the homebuilder, giving him the freedom to develop new ideas. FAA achieves their goal of providing adequate public safety by restricting the homebuilder to unpopulated areas and to solo flight until his aircraft is proven safe.

It is the homebuilder's responsibility to maintain, inspect and modify his aircraft as he desires. However, we at RAF feel that part of our job is to provide information to the homebuilder in the form of recommendations that, in our opinion, are required for him to achieve a satisfactory level of flight safety.

Category	Definition
MAN-GRD	Mandatory, ground the aircraft Do not fly until the change has been accomplished.
MAN-XXHR	Mandatory, accomplish the change at next convenient maintenance interval or within XX flight hours whichever comes first.
DES	Desired - strongly recommended but not requiring grounding of the aircraft.
OPT	Optional - does not effect flight safety.
OBS	Obsoleted by a later change.
MEO	Minor error or omission.

**PLANS CHANGES**

**VARIEZE PLANS CHANGES**

DES Check the static flow of your fuel system per the method shown in this CP

**LONG-EZ PLANS CHANGES**

LPC #133  
DES Check the static flow, as well as the flow with the boost pump running per the method shown in this CP.

**SOLITAIRE - NO PLANS CHANGES**

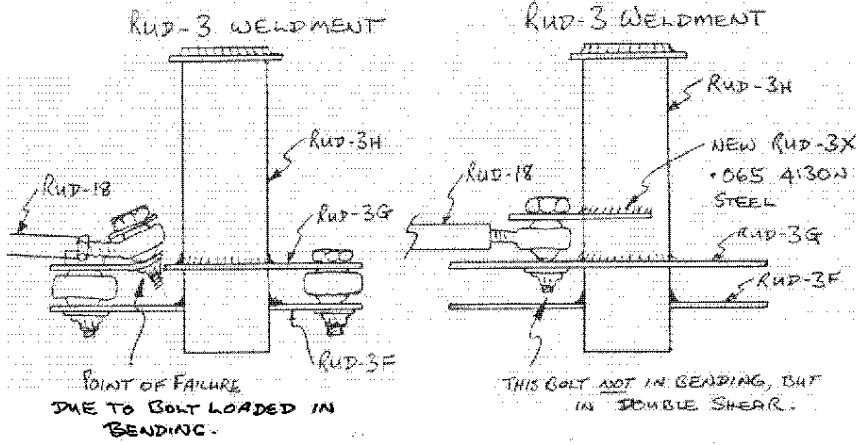
**DEFIANT PLANS CHANGES**

All Defiant builders should have received a four (4) page nose gear modification information package in the mail - we mailed it in October of 1987. If you did not receive one, please let us know and we will mail another to you.

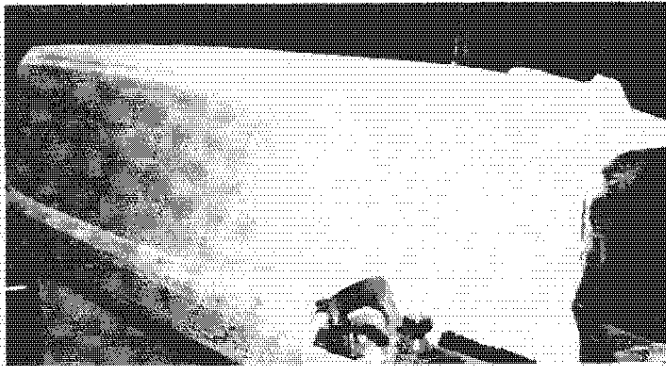
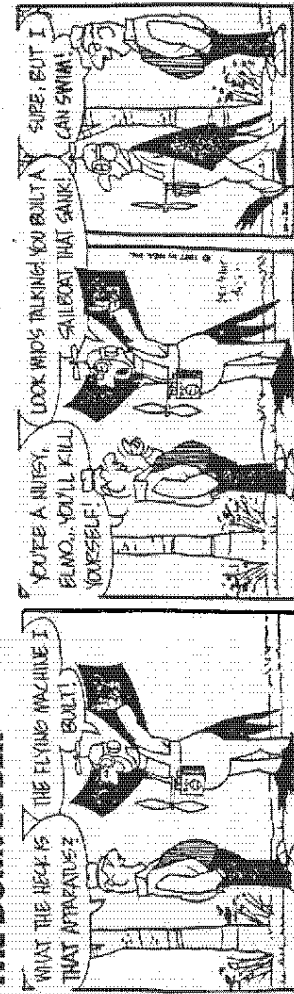
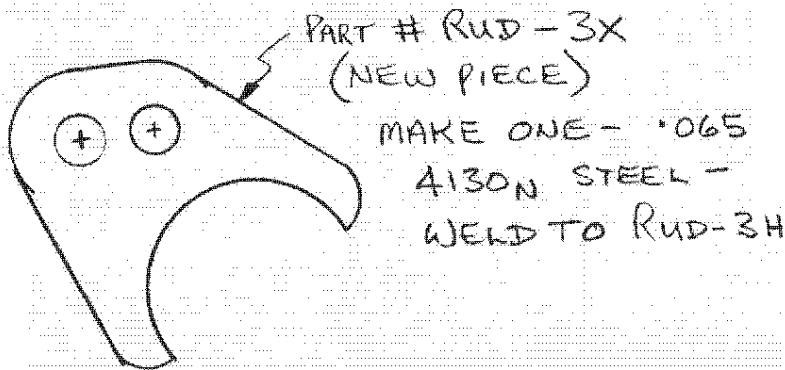
DPC #45  
MEO In the above package, the tubing wall thickness call-out for NG-3 was wrongly called out as .065. It should be .095 as called out in the plans as well as CP 53, page 4.

DPC #46  
MEO RUD-3G failure potential at the point where the steering arm RUD-18 rod end bearing bolts on. This failure occurred on Dr. George Best's Defiant. The fix for this potential point of failure is to weld a small plate above RUD-3G to RUD-3H (see pages D-40 and D-42) to sandwich the rod end on the end of RUD-18. This puts the bolt through the rod end in double shear and eliminates the bending loads on this bolt which eventually fatigued Dr. Best's RUD-3G.

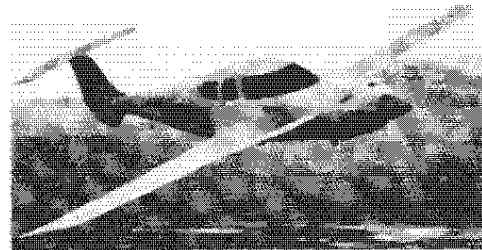
DPC #47  
DES Before first flight, check the static flow of your fuel system on both tanks and on crossfeed. Also, check static flow with boost pump running as shown in this CP.



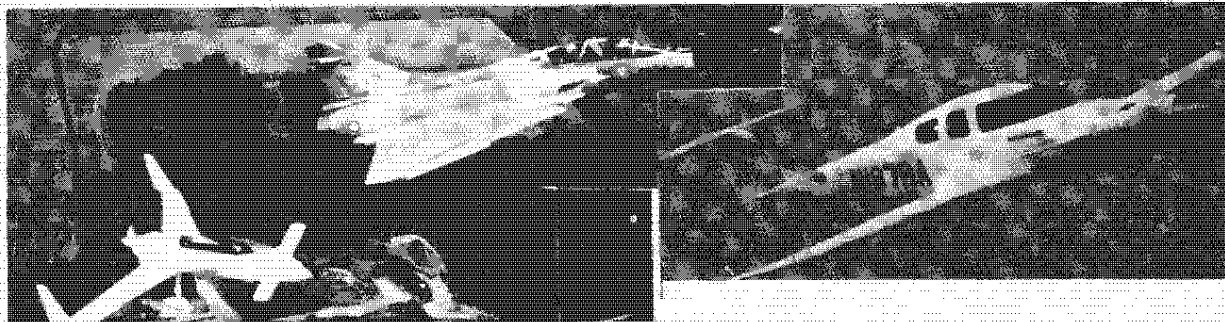
This is a full size pattern for the new piece, part #RUD-3X.



Dana Terrill's Long-EZ fuselage, after a few minutes work with the small Hitachi electric planer - bottom of photo.



Burt's slick new speedster "Catbird" flying over the Mojave desert.



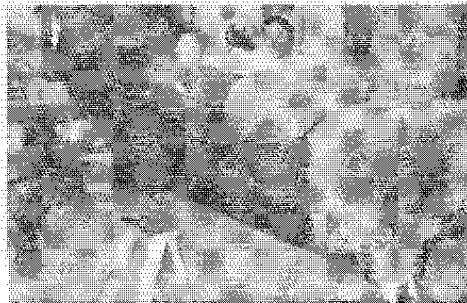
A factory fresh, new Mirage 2000 flies over the French countryside with Lieutenant Real Weber's new VariEze in close formation - note the enormous difference in angle of attack!



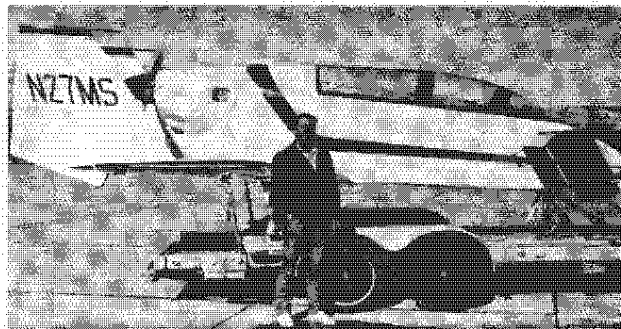
"Pop" George and "Mom" Irene Rutan were honored by IVCHC for their 50th Wedding Anniversary on New Years day at Chino Airport, CA. (IVHC Photo).



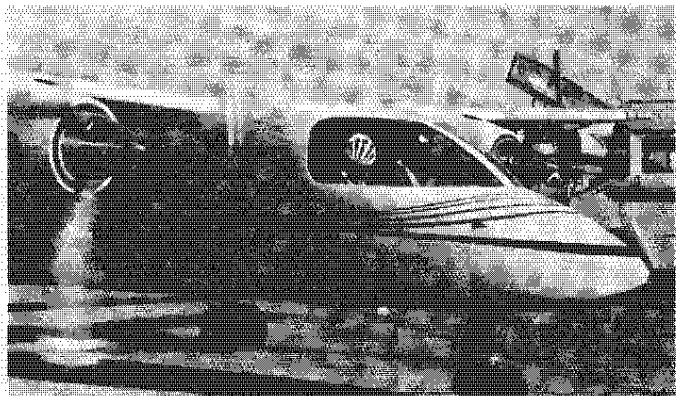
Don Foreman, left seat and friend in Don's brand new Defiant. The first Defiant outside the USA Don also built the first VariEze and the first Long-EZ in England.



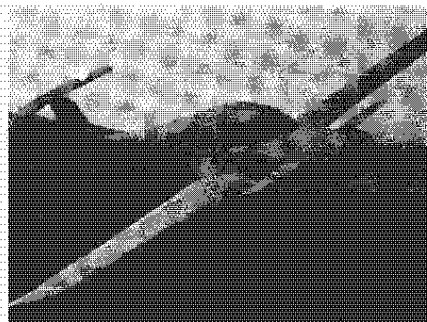
Bob and Dot LaBonte trying their Defiant on for size. Bob built a very nice Long-EZ some time ago.



Cory Bird Drove Mike and Sally's VariViggen all the way to Seattle, Washington and delivered it to the Museum of Flight Cory is a friend and co-worker at Scaled Composites.



Fitz Fulton, left seat and Jon Marion right seat, taxiing in after the first flight of the 62% scale proof-of-concept AT<sup>3</sup>.

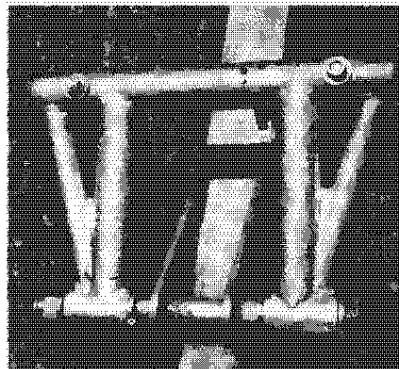


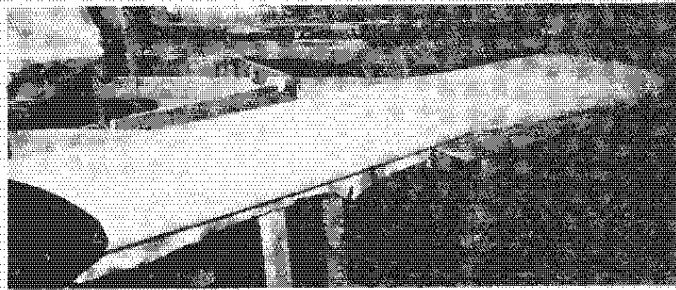
'Catbird' - 5 place high performance single over the windmill farms on the Tehachapi mountains.

Don Foreman's NG-2 Defiant nose gear retraction link - now thats beefy!

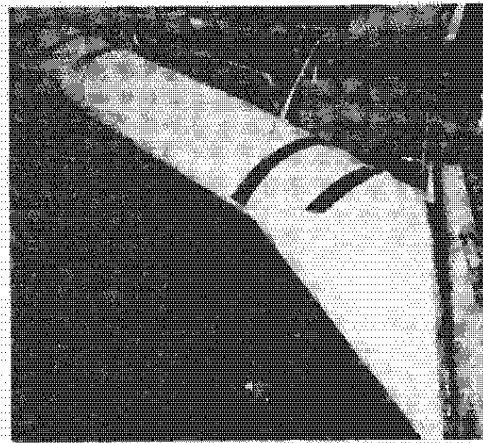


Rough River flyin, the crowd gathers at a forum on formation flying.

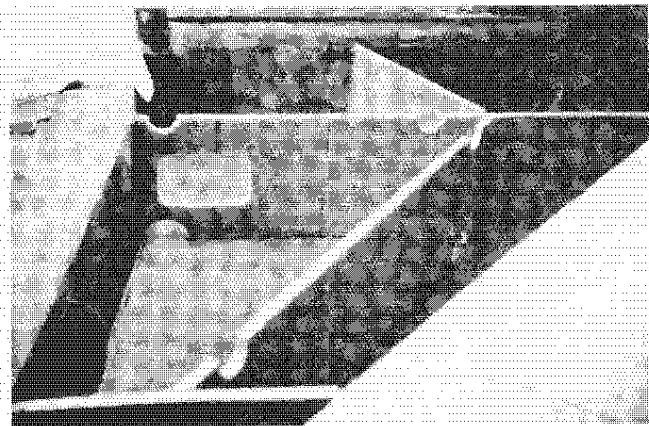




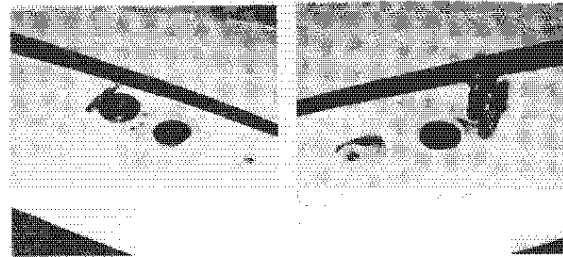
Featherlite leading edge fuel/baggage strake, ribs and baffles installed in Doug Shane's Long-EZ.



Leading edge fuel/baggage strakes come glassed on the inside.

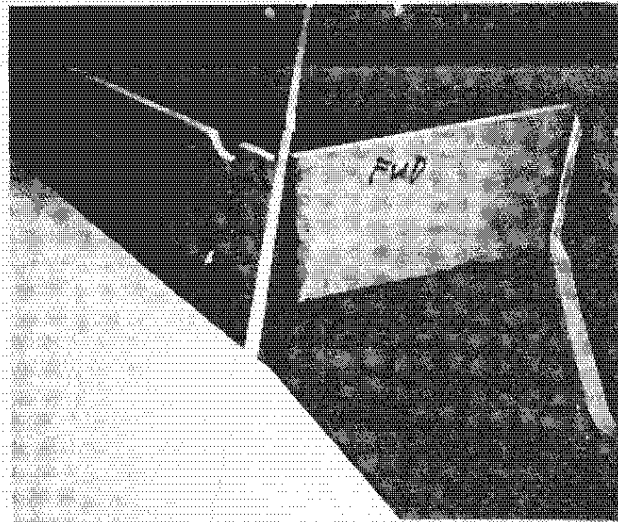


Prefab rib kit is cut essentially to size, requiring only a little trimming to fit.



Wheel pant prepared for installation of Camloc access door.

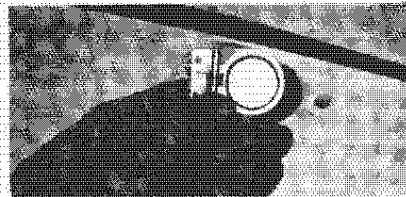
Camloc access door, cleco'd in place, ready to rivet.



Baggage compartment walls, baffles and ribs come prefabbed.



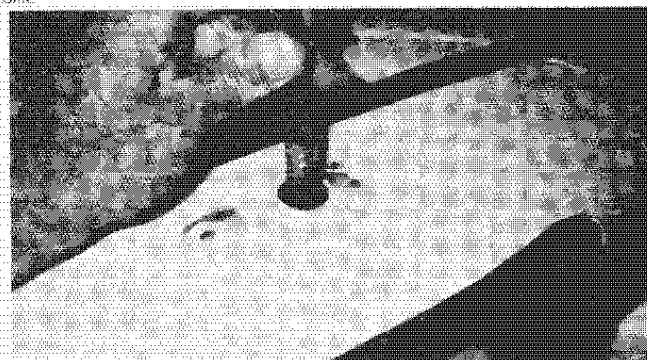
Access door rivetted in place, ready to paint.



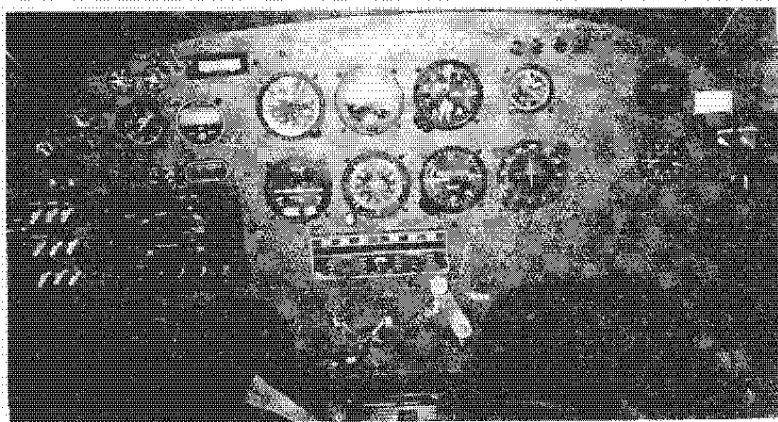
Spring loaded, Camloc access door, available from Wicks Aircraft Supply.



Access door seen from inside wheel pant.



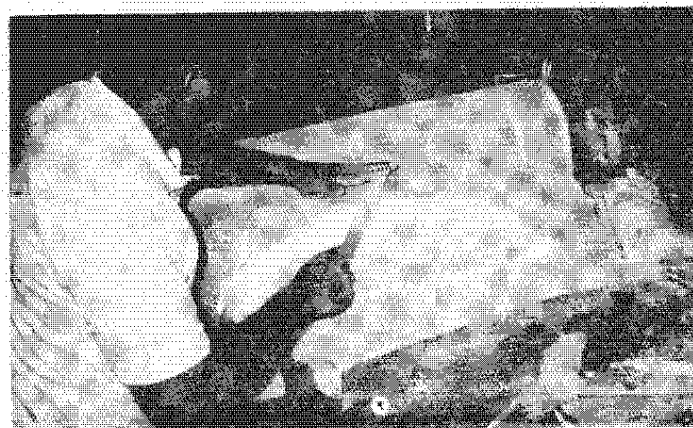
Air tool to inflate tire, simply line up valve and push in the Camloc access door.



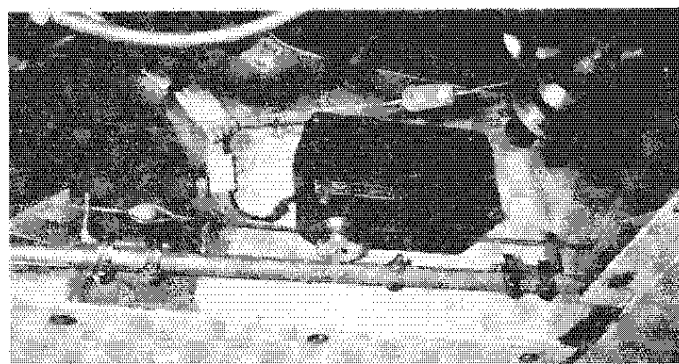
'Catbird's' spacious instrument panel.



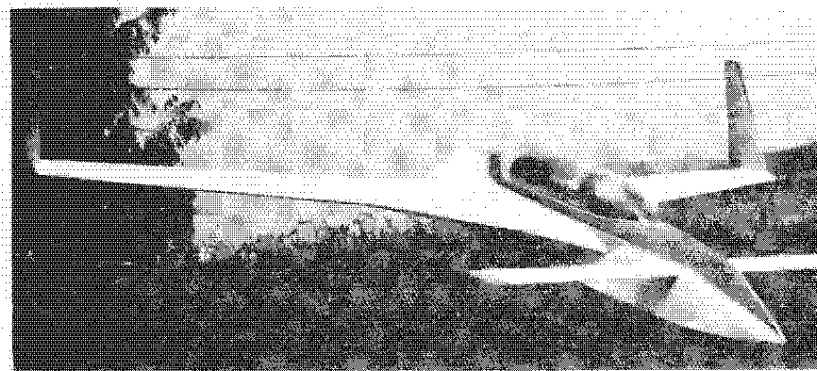
Bayard DuPont's Defiant.



Sculpturing a foam plug for Doug Shane's Long-EZ cowling.



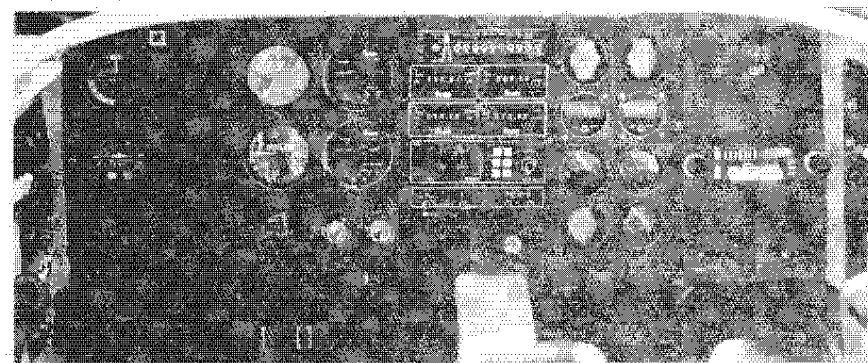
Doug Spear's wing leveller servo actuator, mounted on Mike and Sally's N26MS centersection spar - capstan drives ailerons through 1/16" cable.



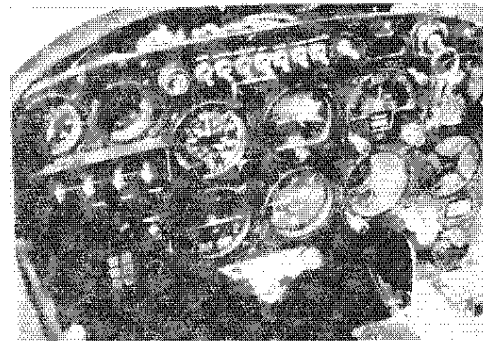
Steven Harmon's Long-EZ



W.N.Hubin, Kent, Ohio.



Dennis Riehm's Defiant instrument panel.

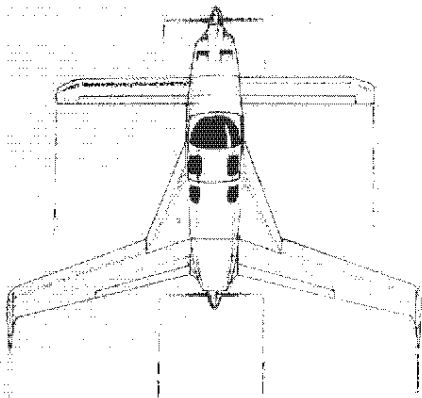


Jim Stanley's very complete LongEZ instrument panel.



Burt's new 'CATBIRD' - a turbocharged, pressurized, high performance 3-surface airplane. A 5 place retractable, with a forward swept 'T' tail and wet wings, designed for high altitude, high speed, fuel efficient transportation - First Flight, January 14, 1988.

**Rutan Aircraft Factory  
Building 13, Mojave Airport  
Mojave, CA 93501**



**TO:**

**first class mail**

**January '88**

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**CP 54**