

THE CANARD PUSHER

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by

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If you are building a RAF design, you must have the following newsletters:

VariViggen (1st Edition), newsletters 1 to 61.
VariViggen (2nd Edition), newsletter 18 to 61.
VariEze (1st Edition), newsletters 10 thru 61.
VariEze (2nd Edition), newsletters 16 thru 61.
Long-EZ, newsletters 24 through 61.
Solitaire, newsletters 37 through 61.
Defiant, newsletters 41 through 61.

~~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 other than those days, please call so we will be sure to be here. When you call on Tuesdays and Fridays for builder assistance, please give you name and serial number. 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 along a stamped, self addressed envelope if you have builder's questions to be answered. If you are placing an order, it's best to keep it separate from a request for an answer.

OSHKOSH 1989

Burt and Tonya departed Mojave and flew to Dayton Ohio, in the Catbird where Burt had a business meeting the day before the Oshkosh flyin. He flew into Oshkosh skirting some pretty nasty weather on the first day of the show. Mike and Sally flew their Long-EZ (her 9th year at Oshkosh!) from Mojave direct to Norfolk, Nebraska for lunch, then direct to Oshkosh. Flight time - 8 hours and 16 minutes. They flew at 17,500 feet breathing O₂, average ground speed was 176 knots and the flight was flown using Doug Spear's AP-1 Auto Pilot tracking the Northstar Loran which did not glitch once between Mojave and Oshkosh.

Mom Rutan counted 99 EZ's, Defiants and Viggens at Oshkosh but the airplanes are so scattered about the airport these days it is difficult to say if that was all there were.

The big news at Oshkosh, for us anyway, was the presence of the Russians. We were fortunate to meet most of them and, of course, Burt had the designer of the Sukhoi 26M, a fantastic aerobatic airplane, as a guest during one of his talks, and all who were present had to have been impressed with this man's knowledge, integrity and quiet sense of humor. He even went so far as to invite us EZ flyers to fly to his country next year to attend a major flyin. Several people we know are actively pursuing this.

Coming back from Oshkosh, Burt and Tonya headed straight back with a lunch stop at Aspen, Colorado, while Sally and Mike took a weeks vacation visiting the Waterton Park in Canada (just north of, and actually part of, Glacier Park in Northern Montana). Quite the most beautiful place these two had ever seen. After hiking all over for several days, they flew on to Seattle, Washington, for three more days before returning to Mojave. Perfect weather, perfect scenery, good friends and lots of airplanes. What more could you ask for?

If you are looking for a simply wonderful place to fly to and spend a few days, fly in to Lethbridge, Canada, rent a car and drive in to Waterton Park - Wow!

CONGRATULATIONS, FRED KELLER!

Fred became the first builder ever to win Grand Champion Homebuilt with two different airplanes. In 1980, Fred won Grand Champion Homebuilt with his marvelous VariEze and this year, 1989, he did it again with his original design, the "Prospector", a Fred Keller bush plane. Super job, Fred. For more details, read Jack Cox' excellent article on Fred's new design in October's *Sport Aviation*, Fred and The Prospector as featured on the cover.

FLO IRWIN, IN MEMORIAM

The founder in 1965 of Aircraft Spruce and Specialties passed away in June 1989.

I first got to know Flo when I began placing phone calls to Aircraft Spruce to order parts and materials for the construction of my VariViggen. This was in August of 1974. She was friendly, incredibly efficient and knew far more about what I needed than I did! Her help and advice, and the marvelous service she provided were very instrumental in the building of my Viggen, N27MS. This aircraft was later the reason for my getting the job I still have, working for Burt Rutan. I feel that Flo was indirectly a part of my getting this job. In 1980 when Sally and I decided to build our Long-EZ, I called Flo to check on parts and materials availability and to tell her what we were planning. Being a very astute business person, Flo could see immediately that the Long-EZ plans, and therefore, materials would be positively influenced by Burt's employees building his latest design, and she gave me her private phone number so that anytime I needed parts, all I had to do was call her and she would personally hand carry my order to the shipping department. Dick Rutan then decided to build a Long-EZ also and, in fact, Sally and I and Dick built the two Long-EZ's together. As anyone knows who is building or has built a homebuilt, one of the enormous frustrations is finding you need a part or some material you don't have and then having to wait sometimes for weeks to get it. Well, with Flo so positively on our side, Dick and I never had to wait for anything. We would call in an order one day and have it in our hands the next day. Flo was wonderful to deal with

in person and on the phone. She was so sharp and so knowledgeable about aircraft parts. I do miss her and will miss her an awful lot.

The fact that Sally and I managed to complete our Long-EZ in only 5-1/2 months from the day we picked up the kit till the day we first flew, is in no small way due to the simply fantastic service that Flo provided to us. Thank you, Flo, for all you did for us and for the enormous influence you had on sport aviation.

Flo's son, Jim, has pledged to continue to provide Aircraft Spruce's customers with the very best service anywhere and with a woman like Flo Irwin for a mother and a role model, we are betting Jim will do it.

Mike Melvill - Editor.

KUDOS KUDOS KUDOS KUDOS KUDOS

"With the possible exception of the P-51, my EZ is the most fun of anything I have ever flown in 46 years of flying - including 25 years military. On second thought, my EZ is the most fun." Bob Woodall

SOLITAIRE NEWS

"My Solitaire, 78DW, was finished, christened, and duly inspected by the local FAA officials on the 14th of March 1988. The first flight, however, did not take place until the 1st of October, almost seven months later. The reason for the delay was a matter of insurance. I have never carried hull insurance on any of my sailplanes. I've been flying sailplanes for over 35 years and have been an owner for over 25, yet I've never had a major accident necessitating a claim. So I feel that I have saved more than enough in NOT making hull insurance payments through the years to pay for the total destruction of at least one sailplane and still be money ahead! I do, however, feel that liability insurance is a must. I don't have much, but what I have managed to accumulate, I'd like to keep.

So, after the inspection, off to the telephone to call the Soaring Society of America's approved agent with whom I also have liability insurance for my Schweizer 1-26 and Standard

Libelle. I pay about \$160 per year on each of those two ships, and when the company quoted me \$760 a year for the Solitaire, they really got my attention!~ Words that bothered them were; "Experimental", "Self-launching", and "Motorglider"! Even talking to the head of the company had no effect in reducing the premium, so I looked for other carriers. In *Sport Aviation*, I finally found one that would give me liability coverage at a relatively reasonable price, \$172 per year. There was a catch, however. I had to have a third class medical certificate! Normally no problem, but I had suffered a heart attack two years previously, and as you might have heard, getting a medical for the first time after a health problem like that is no small task. I won't go through the entire story, but after cardiologist examination reports, treadmill tests, radio-thalium heart perfusion scans plus a lot of letters and telephone calls to the FAA medicos in Oklahoma City, I was finally granted a certificate and applied for the liability policy. It came through on my 59th birthday, in late September, and on October 1st I was out on the runway at Ryan Field, Hemet, California with 78DW.

One great advantage that a self launching sailplane has over a conventional one in its early test flights is that power can be added gradually during separate passes down the runway until finally one reaches liftoff speed. It gives one quite a bit of time to get accustomed to the feel of the controls before really taking that first flight. I can remember that in my flight testing of the Schrede HP-18 that I built eight years ago, the few, low-speed auto tows that I made certainly didn't prepare me for the first real airplane tow!. I had planned on this first day of Solitaire testing to do only slowly increasing speed runs down the runway. The first run indicated that the ailerons were very adequate to balance the wings at about 5-8 kts. speed. They also did not seem to be overly "twitchy", but well balanced. I got up to 25 kts. then throttled back as I passed the center taxiway finally turning at the end of the runway to go back for another try. My next run of 35 kts. showed me that I was able to raise the ship easily off the front wheel, holding the canard quite level and supporting its weight with its lift. On the third run at 40 kts. I got airborne and things felt very comfortable indeed. I had a chance

to try the spoilflaps on that one and they responded as advertised--plenty of drag but with no pitch change as one gets with simple flaps. That run went so well there just seemed to be no reason not to try to go-around on the next pass and off I went. The rate of climb was rather slow, but I knew that my engine RPM was a bit low due to an inadequate extractor system of my own design, but was still faster than some contest tows that I have experienced with the HP-18 fully loaded with water. Once around the patch went perfectly. Deployment of the spoilflaps resulted in a nice smooth landing on the rear wheel and then a gentle lowering onto the front.

Later that afternoon when thermal conditions were a bit better I took a second flight that lasted over an hour and a half. During that flight I was able to do some control tests for possible flutter--increasing the speed in 5 kt. increments and slapping the stick and kicking the rudder pedals. I was able to carry on these tests up to 100 kts. and there was no indication of the slightest flutter in either aileron, elevator, or rudder. In later flights I was able to expand this envelope to 120 kts. In the hands off mode, the Solitaire's nose drops slightly and the speed gradually increases to 75 kts. then the nose rises and speed backs off to 55. Slow oscillations continue until the speed stabilizes at 63 kts. During this time the flight path is absolutely straight ahead with no tendency to fall off on one wing. Thermalling speed, 45kts., requires a bit of back pressure on the stick and reminds me that I should install a trim mechanism during the next maintenance session.

"Tuning" the exhaust is an important part of getting the maximum out of a two-cycle engine such as the KFM 107e. With my self-designed system I was able to develop only 5200 rpm rather than the 6300 that the manufacturer says is possible. Rather than to immediately redesign, I phoned up RAF since I knew that they were not actively flying the prototype and asked if I might borrow their exhaust system. Within 4 days it arrived UPS! Love that builders support! I did have to fabricate a new set of headers for the RAF system since there appears to be some variation among engines, but I found that once it was installed, my rpm was now a stronger 5500. Flying after

the first of the year showed an improved rate of climb--now 250 fpm--and using low altitude thermals to circle in while the motor was still running allowed rates of climb exceeding 500-600 fpm and a rather brisk climb to an altitude where I could safely stow the engine and go entirely solar powered. The flight on the 12th of March illustrates what the Solitaire can do: a 12 minute engine run resulted in a 4 hour flight with a maximum altitude gained of 6000 feet.

There are still a few changes that I want to make on my ship--a continuing process as all of you builders know. I am fabricating a new muffler that utilizes the twin-pipe Gemini system that was not available when the prototype was built. My two-cycle exhaust experts tell me that you always court disaster in the form of backpressure when you try to merge multiple cylinder output into a single expansion chamber. Secondly, I want to install a device on the inside of the canopy like the one on the "Ezes" that prevents the canopy from fully opening in flight if the latch fails. Yes, mine did! Fortunately I was at 4000 feet and not just taking off or landing when it could of caused a LOT of trouble. I did manage to lose my headrest cushion and my hat in the process. Also one of the arrow shaft pieces to which the cushion is attached managed to break off and jam, preventing me from closing the canopy after it once blew open. So I had to hold the canopy closed with my left hand, hold the stick with my right, and make a landing without spoilflaps after calling a "MayDay" to clear the pattern! No problem, really. My over 2000 hours sailplane time, however, was a help.

Some of you who follow sailplanes know that the Solitaire won the "Sailplane Design of the Year" from the Soaring Society of America in 1982. Burt and Company actually designed and completed the prototype in that one, single year, a miracle that we have come to expect from RAF, but certainly found nowhere else in all of aviation. The thought of an inexpensive, relatively easily built, self-launching sailplane, excited the imaginations of a lot of us. I personally talked to Walt Mooney, one of the more prominent test pilots of experimental aircraft among us, who had flown it at the SSA "flyoff" at Tehachapi. He had glowing praise for it in all respects.

Unfortunately RAF didn't have Mooney do the follow-up article about the Solitaire in *Soaring* magazine. Rather they asked Einer Enevoldsen, a professional test pilot, to evaluate the ship. Einer, a very competent sailplane pilot with whom I've flown in competition, chose to compare the performance of the Solitaire to what might be considered the "standard" of America's sailplane fleet, the Schweizer 1-26. He particularly spoke of the inability of the Solitaire to climb in small circles--something the 1-26 is most noted for. Just this paragraph alone in his article was, I think, enough to spell the death knell for the Solitaire within the soaring community. There is nothing that turns off a glider pilot faster than to say that a ship doesn't thermal well! It is too bad that Einer had to compare the Solitaire to ANYTHING! It, like all of Burt's designs is incomparable! Just to look at it--like a VariViggen, the "Eze's, the Grizzly, the Defiant, and the Voyager--says that it's a different breed of a soaring machine! Well, anyway, the damage was done, and the dreams at RAF of radically changing the face of soaring in America collapsed as well as those of Task Aviation at Santa Paula, producers of the spars, fuselage shells, and accessories, when those parts just didn't sell as expected. There does appear to be out there somewhere about 25 or so uncompleted Solitaires. Let's hope that most of them will eventually see the green air of a good thermal because this sailplane is fun to fly.

Don Wemple
Diamond Badge #350 (#9 in 1-26's)"

FAA - ENFORCEMENT PROGRAM

We noticed in the latest *Sport Aviation* magazine that the FAA has petitioned the US Congress to extend its current temporary authorization to act as prosecutor, judge and jury in aviation related enforcement cases.

The FAA currently has a zero tolerance civil penalty enforcement program in force and their ability to continue this authority, that many legal experts believe to be unconstitutional, depends on you, the voter! This temporary authority will expire on December 30, 1989.

For the sake of everyone who flies, everyone who reads this is urged to call, write or wire his other Senator and Congressmen immediately, asking them to not extend this authority. Let's get back to the situation where the FAA was indeed helpful to the pilot who inadvertently made a mistake, encouraging the pilot to get more training instead of what we have now where the only thing the FAA appears to be interested in is enforcing the maximum possible penalty on every pilot, no matter what the circumstances of his or her mistake.

The FAA is currently holding public hearings on its regulatory review of the rules governing the training of pilots, flight and ground instructors. An EAA representative at one of these hearings has pointed out to the FAA that part of the problems currently faced by general aviation is simply over-regulation. "FAA is, in fact, smothering general aviation to death with a blanket of ever increasing rules and regulations, regulation that cannot be justified by any statistical evidence." FAA, of course, ignores these facts.

The FAA was originally charged by the congress with ensuring the safe development and growth of aviation. Their current zero tolerance enforcement plan does not accomplish this at all. Contact your Senators and Congressmen and let them know your opinion. No segment of this country ever was intended to be ruled by a dictatorship, but rather by the people. You can make a difference. Let your thoughts be heard.

STRONGER, STIFFER NOSE GEAR SHOCK SPRING.

Nat Puffer, designer of the Cozy, has found and has tested a shock strut spring that is much stronger than the original. Several Long-EZ builders have tried this spring and all have reported good results. If your shock strut does not stay all the way up with you in the pilot seat, you may want to consider one of these springs. They are available from:

Danley Die Set
3019 South Tanager
Los Angeles, CA 90040
213-685-8151

EXHAUST THOUGHTS

Ever since Mike and Sally installed a four separate stacks exhaust system on N26MS in July of 1985, RAF has received many inquiries as to where to get on of these systems. Well, Mike built it himself, was impressed with the noticeable power increase but had problems getting the 4 pipe system to stay together. It seemed that each time they landed after a flight, the exhaust system had yet another crack in it. Time has gone by, several more exhaust systems have been built and tested. Vance Atkinson, VariEze and Cozy builder built and tested one for his Cozy and made the statement at Jackpot, NV, that it was the single biggest improvement he made to his Cozy. On the other hand, Dick Kriedel built one and reported essentially no change on his Long-EZ. Doug Shane has one of Mike's on his Long-EZ with over 400 hours on it now and no cracks or failures. Mike has probably got 250 hours on the latest configuration with no cracks, so maybe it is something for the person who wants to experiment and is not afraid of the work that will be involved in making the exhaust fit the cowling! This is not a trivial task, by the way.

Anyway, making one of these exhaust systems is a lot of work, and none of RAF's present suppliers are set up to do this work. However, we were down at Santa Monica airport recently and we saw Dave Ronneberg's welding fixture and several examples of his version of the 4 separate pipe exhaust system. They look very nice. He has done a lot of development work himself on his own Long-EZ and most of his friends and associates are running one of his systems. Dave is a very knowledgeable Long-EZ person, having built, helped build, and generally worked around more Long-EZ's than anyone we know. If you are interested in a 4 pipe exhaust system for your Long-EZ, give Dave a call or drop him a line at:

Experimental Aviation
3021 Airport Blvd. #109
Santa Monica, CA 90405
213-391-1943

WARNING-EXHAUST SYSTEM CRACKS

We have recently seen two sets of Brock exhausts for Long-EZs with cracks around the flanges, in one case the flange itself was cracked in half. We have also received a written report from one other builder who had a similar problem. We do not understand why, suddenly, there are some failures of these exhaust systems. We ran two of these systems for over 1000 hours each here at RAF and Dick Rutan has almost 1700 hours on his Brock exhaust system to date. The Long-EZ was introduced in 1980, the first homebuilts started hatching in 1981 or so. Not one report of a cracked exhaust system until recently. While we do not believe this to be a major problem, we do believe that your exhaust system should be very carefully inspected using a bright light. If any sign of exhaust gas leakage is found anywhere on the exhaust pipes, the entire exhaust system should be removed and thoroughly cleaned and then carefully inspected, paying particular attention to the welds and especially the welds holding the stainless steel flanges on to the tubes.

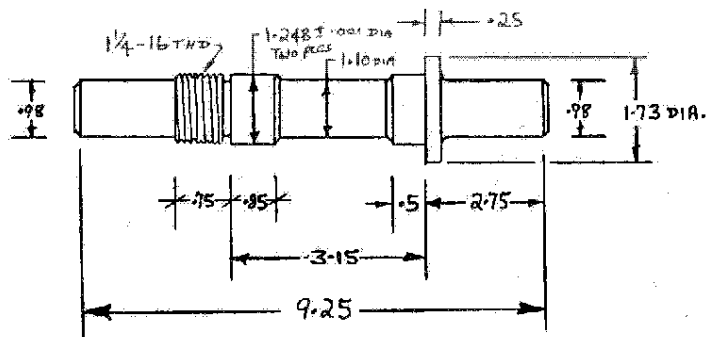
If any cracks are found, they may be TIG welded if they are not too bad. However, if the exhaust has very much time on it, even the TIG welding won't hold for long due to contamination. In this case, it may be wise to simply install a new exhaust system. In any case, new exhaust gaskets must be used when installing any exhaust system unless you use approved re-usable gaskets. Keep in mind that if there is an exhaust system leak inside the cowling, it may be possible for some carbon monoxide to find its way into the cockpit. A carbon monoxide cockpit indicator is an excellent idea.

IMPORTANCE OF WHEEL BALANCING

Many builders ignore this rather important step. Our plastic airplanes with their plastic gear are probably more prone to being effected by an out of balance wheel than a standard spam can, but all airplanes will benefit from keeping the wheels balanced.

Do you experience a vibration right after lift-off? Can you see the canard tips vibrating up and down at this point? If so, you need to balance your main wheels, and perhaps even the nose wheel. At RAF we religiously balance all of the wheels on all the aircraft, and we do it fairly routinely, usually at least once a year at the annual.

You will need to build a pair of knife edges. Planer blades from a thickness planer, or jointer will work very well. They should be bondo'd to a "U" shaped wood frame so that the steel blades are level to each other and exactly parallel. Now you will need an arbor. It probably is not practical for each individual to make his or her own arbor, rather a group or chapter could make one (or get it made) and lend it to the members. Dick Kreidel very kindly sent us a drawing of one he machined out of a length of 2" diameter cold rolled steel (CRS). The wheel is slipped onto this "axle" type arbor, an axle nut is used to secure the wheel, then the arbor is set down on the knife edges. Use sticky backed tape lead weights (available from any wheel balancing garage which handles mag wheels) to balance the wheel. The idea is to get it to the point where the wheel will not roll either way. The weights should be stuck inside the wheel or inside the brake disc. Just be certain that there is no interference with the brake caliper. You may be shocked to find out just how much lead weight it takes to balance your wheel, even with a new tire installed. However, you will be delighted when you see the difference just after lift-off. Balanced wheels can also help the vibration some EZ flyers see in the gear on rollout.



SPIN ON OIL FILTER FOR
CONTINENTALS A-65 THRU 0-200

Gary Hertzler has designed and is testing a spin on oil filter adaptor which fits all Continental engines. He is very pleased with it so far and says that it offers less flow restrictions than the stock screen which it replaces. He gets slightly higher oil pressures at idle with the engine hot, and no oil pressure fall off with high oil temperatures. The only disadvantage he has found is the increased weight which he estimates at approximately 1.5 lbs. However, he believes the added engine life and, possibly, longer time between oil changes would offset the weight disadvantage.

Gary has offered to provide a free drawing of this adaptor to anyone who will send him a self addressed, stamped envelope. This drawing would have to be taken to a machine shop and used to machine up the oil filter adaptor which is designed to use the Fram PH2951 oil filter. Send SASE to: Gary Hertzler

2507 E. Barboa Dr.
Tempe, AZ 85282

ACCIDENTS AND INCIDENTS

A New York VariViggen crash landed in the Piconic Bay shortly after take-off when the engine quit. The pilot, an experienced Viggen flyer attempted two re-starts but could not get it to run. He then turned into the wind and executed a near perfect gear up water landing.

The Viggen floated and the pilot was quickly rescued by some pleasure boaters. The Viggen was towed to the beach and, after spending some 20 hours in salt water, was returned to its hangar. The left wing root was heavily damaged and the builder probably will not rebuild. The pilot was bruised and shaken up but not seriously hurt.

The cause of the engine failure was traced to the mixture outer cable attach point near the carburetor. This attachment had been perfect for seven years and almost 600 hours but

failed at 600 feet over the bay shortly after take-off. This failure was such that the mixture lever arm on the carburetor was pulled to the idle cut-off position. The pilot was unable to richen the mixture, or even to move the mixture at the carburetor, in spite of his best efforts.

What can we learn from this accident? Engine controls are every bit as important and critical to flight safety as flight controls are. Check you engine controls for correct travel and try to imagine what you could do to make sure that no matter what fails, the mixture fails to full rich and the throttle fails to full power. The opposite result is simply unacceptable. A spring that pulls mixture and throttle arms to full rich and full power could prevent such a problem. At least with full power you could use the cockpit mixture lever to regulate power (it works just like a throttle) or even the mag switches to cut power off to facilitate a landing. Using mag switches to regulate power is not as good as using the mixture control. Above all, check that the clamp that secures your throttle outer cable and mixture outer cable are as near perfect as your ability and skill allows. A failure here is not acceptable.

"Dear Burt,

I regret to inform you that VariEze Serial No. 235, N13EG, "Old Dog's New Trick", was destroyed in a landing accident at Blackhawk Airport, Cottage Grove, WI on Saturday, July 29, 1989.

After planning to fly to Oshkosh on Thursday, the weather wasn't reported as good until Saturday when the Washington FSS allowed as how it was good weather all the way to Oshkosh so I took off and flew to Findlay, Ohio, planning a fuel stop there. When I got to Findlay, they were giving Special VFR clearances from the FSS there. I called the FSS and when they answered my transmitter went out so I could not reply to them. So I flew on to Putnam County Airport about 30 miles west of Findlay, landed and called the FSS on the phone and explained the situation. As Oshkosh did not want you to talk to them, I decided to press on as I could receive very well. I then flew to Porter County Airport at

Valparaiso, IN. Findlay FSS also gave me a good forecast for my route. After refueling at Porter County, I proceeded to the Peoria VOR and took up a 337⁰ heading to miss the Chicago TCA. When I reached the town of Marengo, IL, I was due south of Oshkosh so took up a 360⁰ heading. I had not been able to go higher than 3500 MSL after leaving Putnam County and the ceiling now started dropping. Soon it started to rain and I did a 180 and ran out of it again. Deciding that sitting it out on the ground would be the best idea, I started to look for airports on my chart and spotted Blackhawk about ten miles east of Madison. I was tuned to the Madison VOR and was on the 90⁰ radial. According to my chart, there was a super highway running near Blackhawk so I flew until I spotted the highway and turned west, as I got onto base leg the rain started again. I could see alright out of my canopy except for the critical lower front area where I needed to see the runway. On my first pass, I could see that I was too low so I released the landing brake, added power and started a go-around. Just then I heard and felt a thump but the airplane kept on flying and climbed out. I checked what I could from the cockpit and discovered that the front of my left winglet had a crushed area about the size of my hand just above opposite the top of the rudder.

The only thing I can figure was that I had hit a big bird as I was flying over a cornfield and there were no trees or poles in the field. I climbed out and then tried to land the other way. This time I was all set up but had closed the air vent to keep the rain out of my face and just as I came down final the canopy steamed up so it was another go-around. On my final pass I tried Runway 27 again. I was set up well and as the runway was 2600 feet I was trying for the numbers. I could see that I was to the left of the runway so I banked right to line up, just as I banked left again, I felt it hit.

What I hadn't seen in the rain was that Runway 27 had a 275' displaced threshold because of a mound with a cornfield and a road that was about two feet higher than the end of the runway. The main gear and the left wingtip hit the edge of the road and separated from the airplane. The fuselage then skidded

across the grass and up the runway, stopping just on the right edge of the runway just before the displaced threshold markings. I was completely unhurt so unbuckled my harness, opened the canopy and stepped out into the rain. The ELT worked because even though the radio was tuned to 119.3 the sound of the ELT signal could be heard.

The destruction was almost total, the only thing that could have been salvaged was the canard and that had some tip damage. The left wing had been torn from the center section spar. The left side of the center section spar outboard of the fuselage had been torn off separately. The center section spar with the engine mount, engine, and fuselage tank had ripped loose from the fuselage and the fuel strakes, the only thing keeping it with the fuselage was the aileron torque tube. The right wing attach fitting was wrenched both at the wing and the center section spar. The fuselage lower aft cover was ripped off when the gear separated. It had the all glass gear tabs according to CP 14 and the tabs stayed in the airplane, although the gear legs did delaminate between the tabs. The nose gear failed to the right and crushed a small section of the lower nose. The belly of the airplane was surprisingly unscathed, just some paint scratches, at no point was the fiberglass abraded through. The engine sustained some damage, the main thing was the air intake pulled the carburetor with the intake spider attached loose from the case, breaking one bolt and cracking the boss where the other bolt was attached. The carburetor and intake spider stayed with the carcass held on with the fuel line. When the left wing separated, it swung in and dented the valve covers on cylinders 1 & 3. The propeller was shattered and the spinner had a few dents. I was lucky that it was raining as the center section spar coming loose dumped all the fuel into the engine compartment. The lower cowling and wheel pants disintegrated.

What should I have done? The first two things were lapses of memory. When I was getting the airplane ready for the trip I had planned to put RAIN-X on the canopy after polishing it but I left the RAIN-X home. The second item was that I forgot my handheld radio when I started on the trip. I'm sure that the canopy would have been easier to see through with RAIN-X and the handheld radio would have

allowed me to go into a controlled field with long, wide runways. Next, when I ran into rain again I should have headed south again until I was well in the clear, there was plenty of fuel on board, having flown less than 2 hours on full tanks. Also I could have dialed up 7700 on my transponder and gone on ten miles to Truax Field which has an ARSA, I was definitely in an emergency situation.

To what do I attribute my luck in being unscathed? First of all to a great design, the one witness to the accident stated that the airplane came apart just as it was supposed to. The fuselage cocoon ended up intact. The seat belt and shoulder harness helped. Also had TEMPER FOAM cushions, even though the airplane hit with such force that it broke the bracket on the back of the radio stack the cushions absorbed the impact so that I could not feel it. I'm sure that the TEMPER FOAM saved me from serious back injury.

Such is my sad tale and is the reason that I did not see you at Oshkosh this year.

Sincerely
James O. Eggleston"

~~Many thanks, Jim, for this accurate and honest~~ accident report. We can all learn from an accident like this. Rain-X is a great idea when flying into rain, and carrying a hand held radio for emergency use is another. ED.

A Florida Long-EZ was heavily damaged during a landing attempt on a grass strip. Reportedly, the aircraft drifted off the edge of the runway area during the landing roll and struck two concrete culverts. The pilot sustained serious leg injuries and had to be cut out of the airplane. There was no fire and the pilot, who never lost consciousness, was able to talk with the firemen and medics who were helping to get him out. We are hoping to receive a report from this pilot when he has fully recovered. If he agrees, we will publish it in the CP at that time.

An Alaska Long-EZ struck the top of a tree and crashed, fatally injuring the builder pilot. The pilot was apparently practicing night landings and got too low on final,

crashing into the tree.

This kind of accident is by no means confined to homebuilt aircraft, in fact, it is unusual in homebuilts. Night landings, especially at a country airport with few lights around, can be demanding and require lots of proficiency and extra care.

A California VariEze crashed during an attempted go-around after landing and drifting off the runway.

The aircraft struck several landing lights then hit a 10 foot high earth berm and crashed into a fence. The aircraft caught fire and was completely destroyed. The pilot was severely burned and is in critical condition. His passenger was killed.

The pilot was not the builder of the VariEze. He had recently purchased the airplane and had his instructor with him to help him get comfortable in the aircraft. It was only his fourth flight in his newly acquired airplane. The FAA has not concluded their investigation as yet but at least for now, it does not appear that there was anything amiss with the airplane.

A VariEze crashed in Southern California recently and both occupants were killed. There was one eye witness who reported observing the VariEze performing some aerobatic maneuvers before it abruptly lost power and fell to the surface of a wet salt pan. The VariEze hit the surface essentially flat with little or no forward motion and was inverted. These very unusual circumstances called for a full investigation. Two representatives from RAF assisted the FAA in trying to determine what might have caused this tragedy. The investigation team was forced to use a helicopter to examine the crash site since it was not possible to walk across the muddy salt pan which was many feet deep in places.

It was obvious from 300 feet above the crash site that the VariEze had impacted inverted, with little or no forward or lateral velocity. This was evidenced by the mud splash marks radiating out from the center of impact.

The RAF representatives returned to the crash site several times over the next three days and many photographs were taken, and there was much discussion and theorizing. While the exact cause may never be known for absolute certain, it is our belief, based on our knowledge of the VariEze design as well as our previous experiences examining several crash sites somewhat similar to this one, that this aircraft fell essentially vertically onto the surface of the salt pan. It struck the salt crust in a nose low, wings level, but inverted attitude. There was no evidence of a spin, no sign of rotation at the time of impact. The engine was not developing power and, most probably, was not even windmilling.

Two of the the eight large wing attach taper plugs were missing. We believe they departed the airplane in flight, as did the AN-4 bolt and nut that secures them in place. When the remaining six taper plugs were removed, they were easily removed without having to drive them out. All three AN-4 bolts had had the length of threads increased to about 3/4" using a threading die to cut these additional threads. All three bolts showed evidence of elongation of the threaded area where they had stretched possibly due to being over-torqued.

We theorize that possibly the forth bolt was over-torqued to the point of failure, or almost failure. During this last flight, and probably aggravated by the acrobatic maneuvers, this bolt failed. None of the taper plugs fitted very well into the tapered holes in the wing fittings. For this reason, we believe that the two forward plugs on the left wing worked their way out of the tapered holes after the bolt broke, thus allowing the left wing to pivot aft on the aft two tapered plugs. There are marks on the left wing attach fittings which clearly show that the wing pivoted aft as much as 15°.

The wing swinging aft by itself would not have caused this accident, however the winglet mounted on the end of the wing swinging 15° left would create a powerful yaw with perhaps four times the authority of the rudder alone. Such a huge yaw angle would immediately drive the aircraft into a drastic departure from controlled flight. The airplane would flip over and experience heavy negative "G" forces which would cause the engine to starve

of fuel, whereupon it would quit.

Apparently, this tumbling departure occurred at a rather high speed because the enormous negative, as well as positive "G" forces overstressed the aluminum wing fittings as evidenced by the considerable elongation of the taper plug holes in the outer plate, both top and bottom, of each wing. The inner plates of each wing fitting, top and bottom, showed much less evidence of elongation, leading us to conclude that the home made taper plugs did not perfectly fit into the tapered holes.

It is probable that the left wing, swept aft, may have caused the airplane to fall in a somewhat stable inverted spiral (as described by the eye witness). Flight experience and NASA testing have shown that a normal VariEze cannot maintain an inverted developed spin.

There is no evidence to suggest that there was any inflight structural failure of any composite parts. Every single part of this aircraft (with the exception of the two wing attach taper plugs and the securing bolt) were found at the impact site.

IMPORTANT

All VariEze builders and flyers should be aware of the seriousness of this situation. If you know of anyone flying a VariEze who may not be receiving the Canard Pusher, please pass on the following critical information:

- 1) A mandatory inspection of the long AN-4, 1/4" diameter bolts and nuts that secure the steel tapered plugs into the wing fittings. There are four (4) of these bolts, each must be removed and carefully examined for any evidence of over-torquing (stretched threads, necked down diameter anywhere on the length of the bolt). Double check to see that the threads on each bolt are not bottoming in the threaded lower taper plugs. You may have to use thin shim washers under the head of each bolt to assure a proper fit with no bottoming of threads. Check that the jam nuts have at least 1-1/2 to 2 threads showing after they are tight. If you purchased your VariEze wing fitting from Ken Brock Manufacturing, you will notice that the AN-4 bolts have a longer

than standard thread. These threads as they are on any AN bolt are not cut threads, they are rolled threads. If you see any evidence of the threads having been cut with a threading die, discard them and install new bolts.

Look for any corrosion on these bolts. Any corrosion should be carefully cleaned off and the bolts should be greased before re-installing them. Excessive corrosion is cause to discard the bolts.

If you did not personally install the bolts, you may have to assume that they might have been over-torqued. Any suspicion of over-torquing is cause to discard these bolts.

If your wing attach fittings were not manufactured by Ken Brock Mfg., you will need to carefully inspect the tapered plugs for perfect fit in the tapered holes. If in doubt, you may have to carefully lap each plug into its tapered hole, checking for perfect fit with engineering blue. Check to be certain that the tapered plugs do not go too deeply into the tapered holes. The top of the plugs must not go below flush with the top of the wing fittings.

The design of a wing fitting such as the VariEze calls for the tapered steel plugs to take all flight loads. The AN-4 bolts should never see flight loads. All they are for is to retain the tapered plugs. If the tapered plus are a perfect fit, these bolts will require only a very light torque to snug the plugs into their respective holes. Three (3) foot/lbs. (36 inch/lbs.) of torque are all that should be required. If you need more torque to pull the tapered plugs into their tapered holes, your tapered plugs do not fit correctly. Do not fly until you have corrected this situation.

Two people have died because of improperly fitting wing attach taper plugs. Do not take this lightly. Your life depends on these wing attach fittings. You owe it to yourself and your passengers to do absolutely the very best work you are capable of here. This is especially true if your wing fittings are homemade. The Brock fittings are very accurately machined and all the tapered plugs are hand lapped and fit perfectly.

Once you have installed a pair of tapered

plugs and torqued the bolt (3 ft./lbs), as a double check, remove the bolt and check for a tight fit of each taper plug. It should take a sharp blow with a wood drift to loosen each plug. If the plugs fall out or are not tight, they do not fit correctly. Fix this problem before next flight.

PLEASE NOTE NEW FORMAT

PLANS CHANGES AND OTHER IMPORTANT MAINTENANCE INFORMATION

VARIVIGGEN Check engine control cables for secure attachment at the engine as well as at the throttle quadrant. Install springs to guarantee that carburetor controls fail safe.

VARIEZE MAN/GND Ground your VariEze until you have completed a full and careful inspection of your wing attach fittings, taper plugs, and AN 4 bolts as described on page 10 of this CP.

The engine control cable check as called out for the VariViggen applies equally to the VariEze.

LONG-EZ The Long-Ez wing attach method is completely different from the VariEze and there is no mandatory inspection or concern for Long-EZs in this area at this time.

The engine control cable check called out for the VariViggen applies equally to the Long-EZ.

DEFIANT The wing attach method on the Defiant is essentially the same as the Long-EZ and there is no concern or mandatory inspection for Defiants in this area at this time.

The engine control cable check as called out for the VariViggen applies equally to the front and the rear engines and quadrants of the Defiant.

Since RAF is no longer active in the development of homebuilts, we are not likely to discover many new errors or omissions in the plans. For this reason, we need your help. Please submit any significant plans changes that you may come across as you go through the building process.

FOR SALE

Items from salvaged VariEze: Wheels, Brakes, Canopy, instruments, radios, etc. Send #10 SASE for 3 page listing: Jim Eggleston
2602 Elnora Street
Wheaton, MD
20902-2706

Marvel Schebler carburetor for Lycoming O-235. MA3PA complete with throttle pump. Good condition. Contact: Bruce Tiff
3850 Sherrod Rd.
Mariposa, CA 95338
209-742-6743

I have a factory brand new Lycoming O-235-L2C still in the crate. Zero time, complete with mags, ignition harness, starter, flywheel/ring gear, and carburetor with throttle pump. \$16,000.00 outright. Contact: Kurt Daentz
818-798-8786

Stewart Warner oil cooler #8406R - \$100.00. 4" prop extension for SAE-2 (used only 10 hours) - \$200.00. Call: Joe Hill
602-299-0733 (H)
602-529-2272 (W)

SHOPPING

Cockpit vent doors for Long-EZ and VariEze. \$8.00 each. EZ to install - work great. Nose wheel fenders (help keep rocks off your prop) made from glass and aluminum. Ready to paint and install - \$40.00 each. Gene has had these products for sale now for over 7 years and is not sure how long he will continue to supply them. Do yourself a favor and get them now. Contact: Gene Zabler
48 Robin Hill Dr.
Racine, WI 53406

To make it easy to install the new fuel boost pump with 37° flare fittings use a 90° elbow with 37° swivel nut and 37° flare. The Aeroquip part #2071-6-6S is for use in tight corners. Bill Bainbridge of B&C Specialties has promised to keep these in stock. This swivel elbow makes installing the fuel boost pump a simple proposition. Bill Bainbridge, of course, still sells his LR-2 Linear voltage regulator (the very best we have seen) also, dry-fit sealed, immobilized Electrolite batteries. Mike and Sally use two of these (small 15amp/hour) for their 28v Long-EZ. Burt uses two of the same for the 28v Catbird. These have been in continuous use for two years and have been flawless. Contact: B & C Specialty Products

Box B, 518 Sunnyside Ct.
Newton, KS 67114
313-283-8662

Wicks Aircraft and Aircraft Spruce both stock the recommended Cherokee-type fuel valve, part #6S122. This is the best fuel valve we have seen. It incorporates a cylindrical valve turning in a hard anodized aluminum body. (It does not use a tapered valve which sometimes stick.) The seal is accomplished with "O" rings which can easily be replaced by removing a snap ring. There are two large "O" rings, Part #MS29513-114 and two small "O" rings, Part #M83248/1-011. A synthetic silicone base lube should be used such as Dow Chemical's DC-4 grease.

We have received many enthusiastic reports from builders and flyers who have installed this new aircraft quality valve and RAF heartily recommends it. We only wish this valve had been available when the Long-EZ was first developed! It would have saved a lot of confusion.

"The Aero Electrical Connection", a homebuilders guide to the design and construction of aircraft wiring and electrical systems. This publication, a newsletter that, unfortunately, comes out rather infrequently, is positively the best source for anyone trying to wire up a homebuilt aircraft. It is especially good for those of us who are trying to complete plastic airplanes such as EZ's, Defiants, etc. Bob Nuckolls is an extremely

knowledgeable electrical wizard who can and will answer your questions and help solve your problems. The newest newsletter, Volume 1, #2 has an excellent schematic wiring diagram in it, specifically for composite aircraft using an alternator and starter. Contact:

The Aero-Electrical Connection
PO Box 12703
Wichita, KS 67277-2703
Subscription is \$20.00 per year.

PROPS FOR EZ'S AND DEFIANTS

RAF recommends the following prop manufacturers:

Ted Hendrickson
PO Box 824
Concrete, WA 98237
206-853-8947

Bruce Tiff
B&T Props
3850 Sherrod Rd.
Mariposa, CA 95338
209-742-6743

Great American Propeller Co.
1180 Pike Lane, #5
Oceano, CA 93445
805-481-9054

RAF has received feedback from a number of builders who have had difficulty getting a prop. We contacted our recommended prop suppliers and all of them are having varying degrees of difficulties obtaining quality wood or wood blanks. Our best advice concerning props is to pick out a supplier you like and place an order at least 4 months before you think you will need it. You can always store the prop (store it level, not vertical). If you don't have one and can't get one, and you have your airplane complete and ready to fly, it could be very frustrating.

FEATHERLITE, INC., LARRY LOMBARD'S AND Michael Dilley's composite company, producers of the prefab composite parts for EZ's, Solitaires, etc. announced that they are currently working on a NACA inlet cowling kit for the Long-EZ. This will be similar to Mike and Sally's N26MS which has a 12" wide

NACA flush inlet. The cowling will have the NACA lip mounted on it.

Michael and Larry have one set only of Defiant pre-cut foam cores. Also, one set only of prefab Defiant fuselage bulkheads, plus a few other bits and pieces. First come, first served. Call: FeatherLite
707-895-2718

DEFIANT NEWS

Don Jakusz reports the first flight of his new Defiant, N86DJ. First flight was August 23, 1989 at Albuquerque, NM. Don's makes 17 Defiants now flying that we know of at RAF. Congratulations, Don.

SANTA MONICA AIRPORT

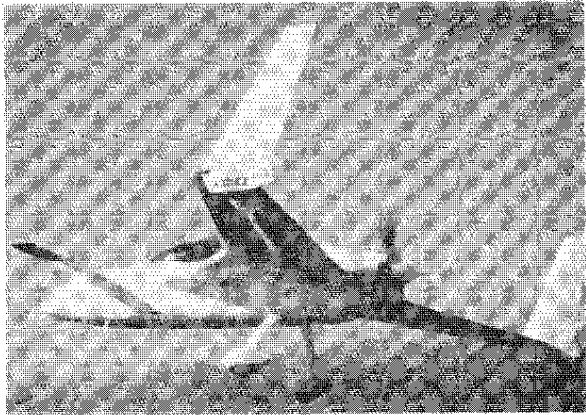
We were recently at the Santa Monica Airport in the Los Angeles basin and were amazed to find no less than 12 Long-EZ's based there, all flying and at least 4 more under construction! Talk about a hot bed of composite activity. There is also a beautiful new museum on the airport. Some magnificent airplanes are on display there including a pristine Supermarine Spitfire MK1X. This museum is in a brand new 3 story building which also contains the DC-3 restaurant, an excellent spot for lunch. If you are in the area, don't miss this airport, it has lots and lots of interesting airplanes. See *Sport Aviation*, August 1989 for more details on this museum.

RAF RECOMMENDED SUPPLIERS

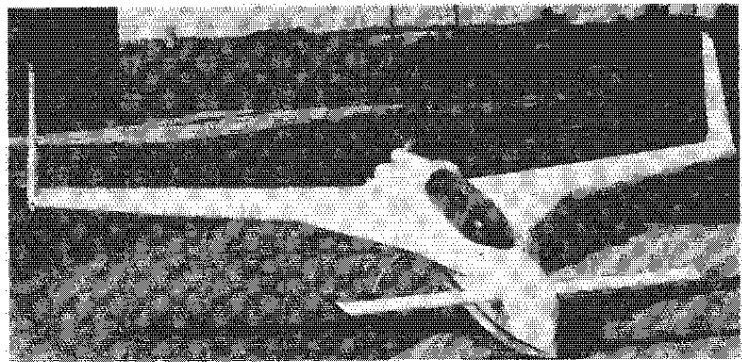
Aircraft Spruce PO Box 424 Fullerton, CA 92632 714-870-7551	Wicks Aircraft 410 Pine Street Highland, IL 62249 618-654-7447
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FeatherLite PO Box 781 Boonville, CA 95415 707-895-2718	Brock Mfg. 11852 Western Ave. Stanton, CA 90680 714-898-4366
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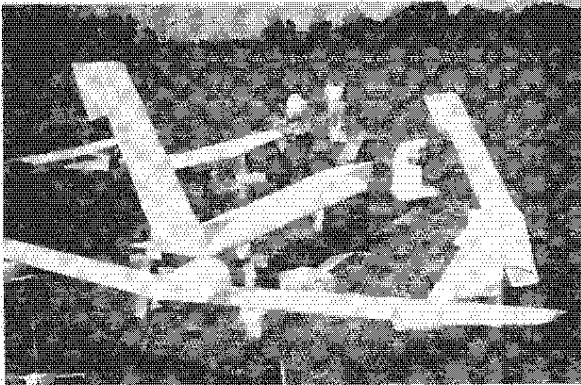
The above suppliers are still the only authorized RAF dealers for all your various aircraft materials and components.



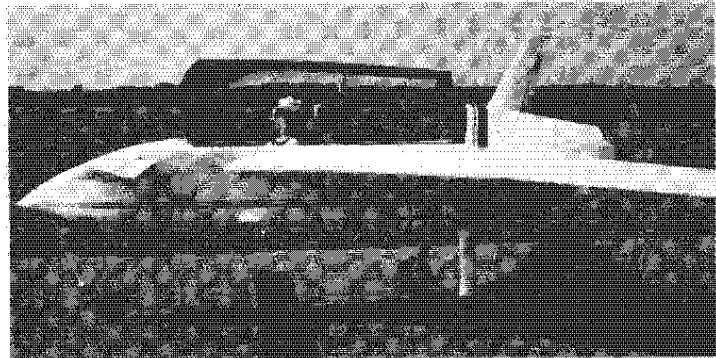
David Orr's Long-EZ sporting one of Klaus Savier's "Hershey Kiss" spinners.



Scotty and Karen Maddox' Long-EZ. Looks like a real beauty!



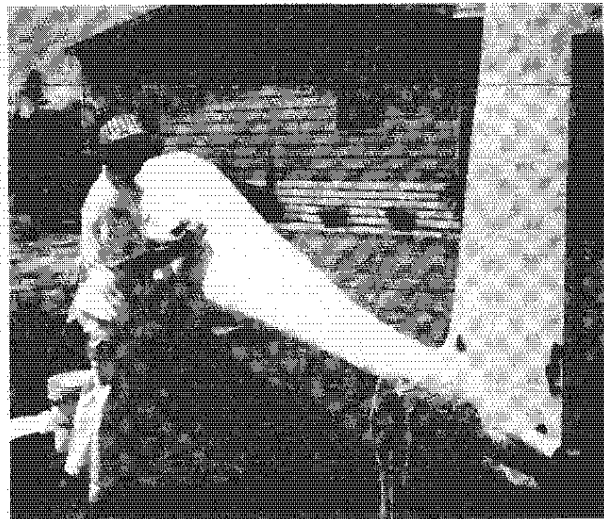
What is Marshall Gray painting?! Actually 2 planes - Herb Abrams Solitaire and Charlie Gray's second Defiant.



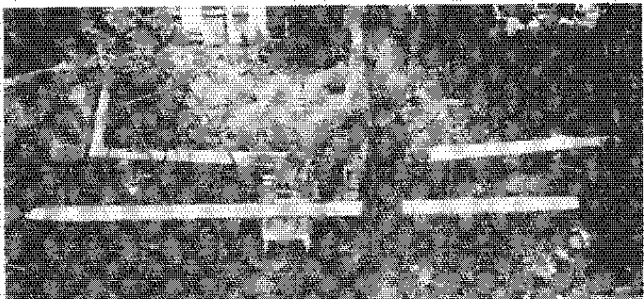
Ron Sweet's snappy looking new Long-EZ - first flight, August 31, 1989. Congratulations, Ron, looks great!



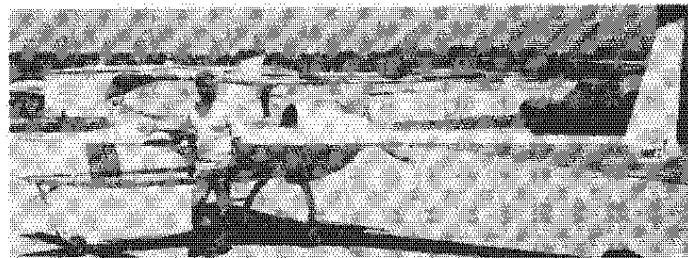
Sam Kreidel's nifty battery access door. It is held shut by two small camlock screws. This is Sam's second Long-EZ and this one is something pretty special!



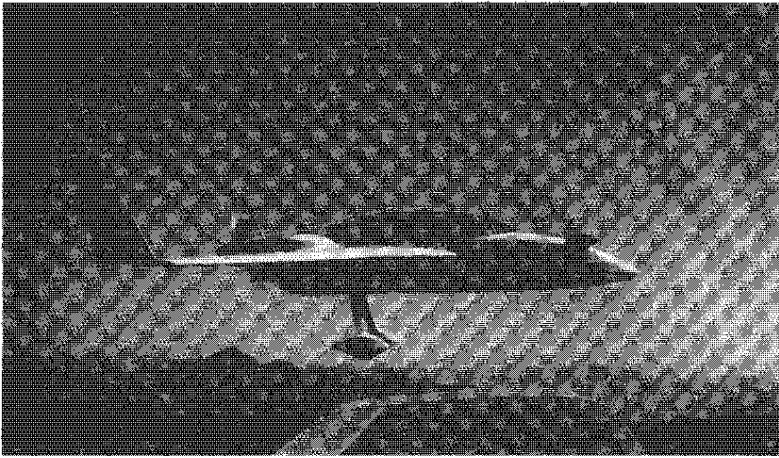
Herb Abrams better half, Ruth, sanding their Solitaire. This one has now made its maiden flight and we are looking forward to a detailed pilot report. Herb has designed a very clever power pack that should provide excellent climb.



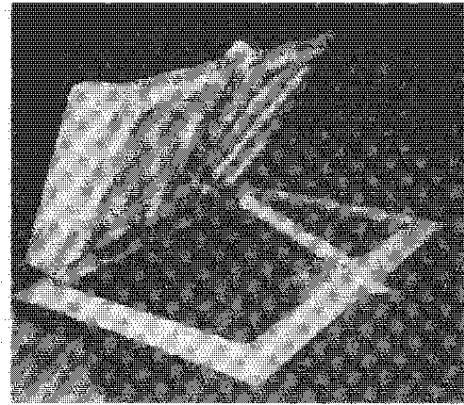
Joe Stevens getting some stick time in his Defiant in his yard in Terneuzen, Netherlands. Go for it, Joe!



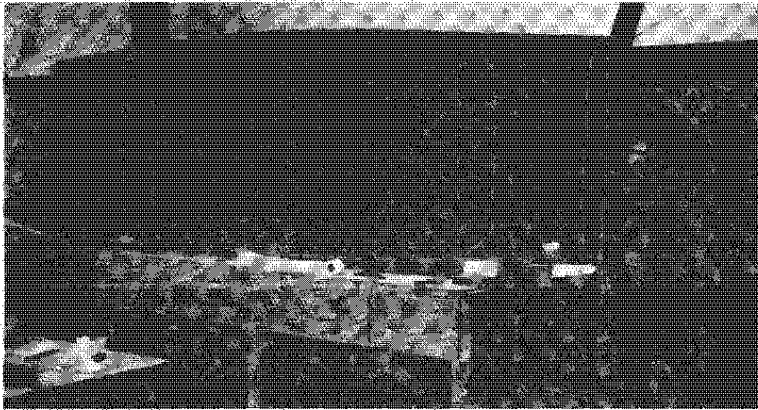
Pete MacCauley from Canyon Country, CA. First flight of his good looking Long-EZ, N8EZ, at Camarillo, CA.



This is the one to beat! The fastest VariEze on the planet - John and Sally Chambers' absolutely exquisite VariEze. Powered by a Lycoming O-235, John has got this VariEze about as aerodynamically clean as it is possible to do. John and Sally hail from Boise, Idaho and John has been unbeatable in his class at the Jackpot and Wendover races.

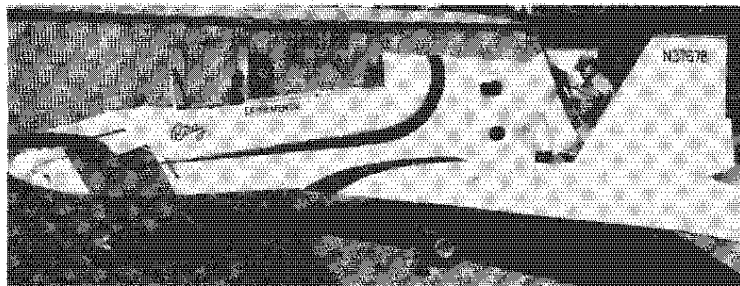


Don Foreman is installing this prefab landing brake on the belly of his Defiant. He made it off the airplane and will simply tape it in place. We look forward to a report on the performance of this drag device.

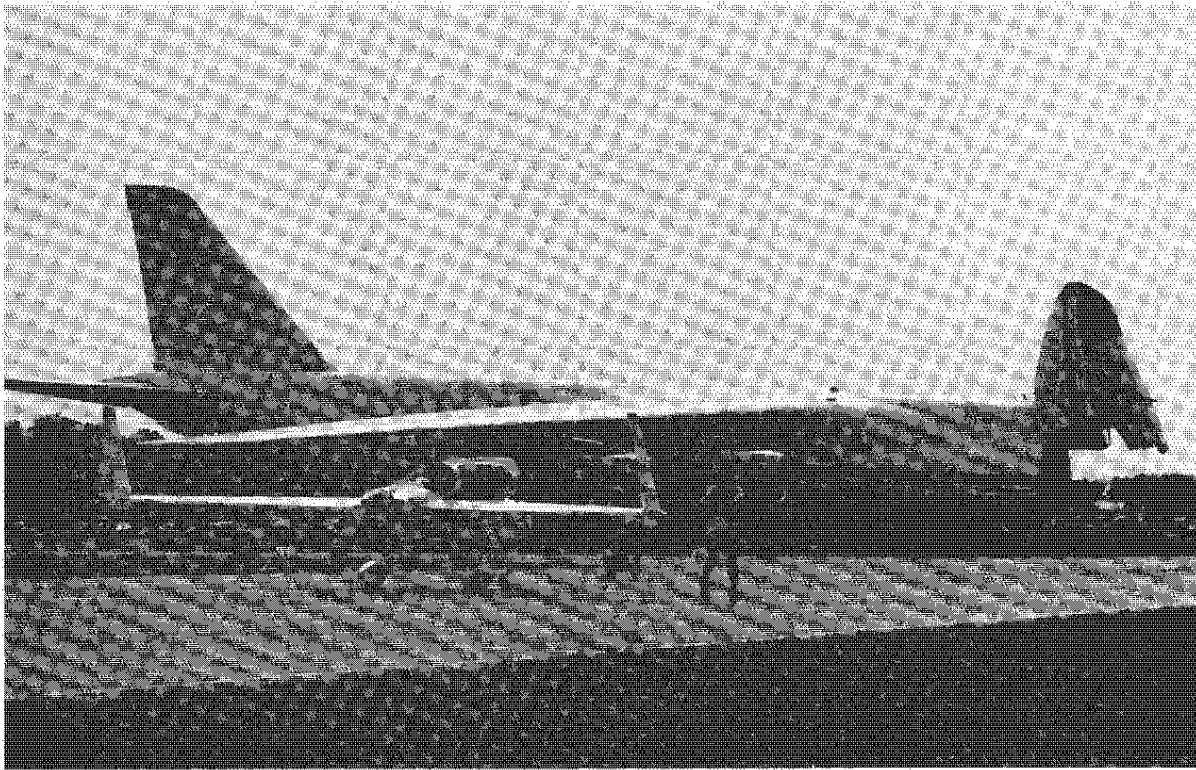


We started building in November 1986 and have about 1300 hours on it. The fuselage is on a rotisserie in a 90 degree bank to make the motor mount layups easier. I have not heard of anyone doing this before, but it seemed like a good idea and certainly makes turning the airplane over easier. The trunnions are made from 3" PVC pipe and the pedestals are 2 x 10's. There are 4 holes in each pedestal to allow different heights, with the top hole just high enough to allow the spar to clear the ground. This height also allows the plans-built benches to be used to chock the fuselage. One person can easily rotate the fuselage, but it takes two to raise or lower it.

Dan and Kay DeLong
Toney, Alabama



Arthur Schwartz' beautiful VariViggen. This is how it looked before he was forced to land in the Piconic Bay.

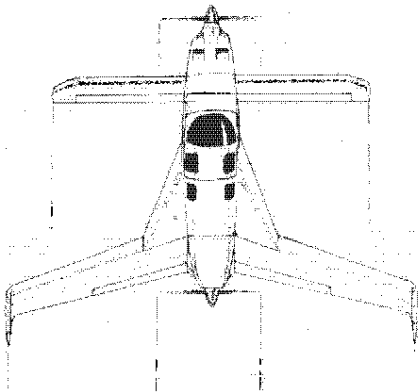


Mike and Sally arriving at Oshkosh in N26MS the day before the show opened. The huge Russian AN-124 kneels, nose down, for "EZ" access. Interestingly, this was one of two non-military, privately owned, AN-124's. They operated all over the world as a free enterprise freight hauling business.

Photo by Ann Cooper - Ann is an aviation writer who also takes beautiful pictures.

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

first class mail



TO:

October '89

The line which appears above your name lets you know through which Canard Pusher you are paid. If your label says **LAST ISSUE CP 61**, then this is your last issue, and you need to renew.

CP 61