

THE CANARD PUSHER

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If you are building a VariViggen from 1st Edition plans you must have newsletter 1 through 49. If you are building from 2nd Edition plans you must have newsletters 18 through 49. If you are building a VariEze from 1st Edition plans you must have newsletters from 10 to 49. If you are building a VariEze from 2nd Edition plans you must have newsletters from 16 through 49. If you are building a Long-EZ you must have newsletters from 24 through 49. If you are building a Solitaire, you must have newsletters from 37 through 49. If you are building a Defiant, you must have newsletters 41 through 49.

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 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.

VOYAGER CLOSED COURSE RECORD ATTEMPT

Dick and Jeana took off from Mojave just after 8:00AM on Wednesday morning, July 9th. After flying for about 7 hours, the electric variable speed prop on the rear engine developed a problem and Dick decided to land at Vandenberg Air Force Base to check it out. After a good nights sleep, they repaired the problem the next morning and then made the decision to try again. They took off from Vandenberg at 2:47PM on Thursday, July 10th and flew up and down the California coast about 20 miles out to sea around a closed course that is 500 nautical miles per lap.

The decision was made not to chase the Voyager continuously, but to fly out and join up with them for an hour or two at dawn each day and then again for an hour or so before dark. The reasoning here, of course, was to be able to assure the crew that there was no visible problems such as oil or fuel leaks.

On Friday evening, June 11th, Mike, Sally and Mark Greenberg (a professional photographer) took off in the Voyager chase aircraft, a Beech Sierra, and with excellent help from LA Center, we were vectored to an intercept with Voyager 20 miles off the California coast at Big Sur. The sun was getting low in the sky, the ocean was sparkling blue and the Big Sur coastline was beautiful. All eyes in the chase were searching the endless blue skies. Center called them at 12 o'clock and six miles. Sally was the first to spot them, a thin, curved line in the sky.

As we closed with them, the air was glass smooth and the sight of the regal shape of Voyager, as it slowly floated back towards us, was breathtaking. Mark, the photographer, was shooting film like a mad man as we slid into close trail formation to give the Voyager a quick look. She was absolutely clean, except for a tiny trace of oil from the aft engine breather which is

normal. Dick and Jeana were fine and sounded in good spirits. Both had managed to get some sleep and were very confident of the Voyager's ability to fly for almost four more days and nights!

We parked on their wing and floated up the coast beyond San Francisco. We chatted and took photos and they took photos of us. We made the north turn point at dusk. As the sun sank into the ocean like a ball of red fire, the Voyager looked magnificent against the skyline - the photographer was blowing his mind! As it got dark, we moved in very close for a thorough inspection of the machine, reported to the crew that they looked great, and said "good night". We were low on fuel ourselves and headed toward the coast to refuel at Salinas.

As we drifted away from Dick and Jeana, the silhouette of the Voyager against the night sky with the evening star and a two day old new moon just above her, it was a sight we will never forget.

As I write this, it is Sunday morning, June 13th. I have just checked in with Voyager base and all is well. They are both in good spirits, both have managed to sleep quite well and the Voyager is running like a Swiss watch. Fuel condition is excellent and it is a "GO" for the record. The weather looks like it will hold, but a small system which may have some rain in it, is expected to move in on Monday night. I will be joining up with them again on Tuesday morning at dawn and will escort them home. What a superb effort - what a tremendous team, to have got this record attempt off in such good shape. Go for it Dick and Jeana, we are all pulling for you!

OSHKOSH 1986

Burt is planning on flying his Defiant, N78RA, and Mike and Sally will fly their Long-EZ, N26MS, to Oshkosh this year. We are planning on arriving on Thursday afternoon in order to set up the booth. It will be same booth, G-7, which RAF has had for years but this year we will be sharing it with Larry and Michael of FeatherLite Products. Burt and Mike are hoping to be able to spend more time on the flight line visiting with the builders and looking at individual airplanes.

Burt's talks this year will be as follows:
Sat. - Aug. 2 -- 8:45 -- Forum - Long-EZ & Defiant
Mon. - Aug. 4 -- 8:45 -- Plans & Kit Business-The Designer's Responsibility
Tue. - Aug. 5 -- 2:45 -- Next Generation General Aviation Aircraft

DEFIANT NEWS

There are now, at least 6 Defiants flying! Burt, Fred Keller, Johnny Murphy, Frank Yost, Mike Cardinale and Byrdell Mathews.

Mike Cardinale, based at Merrit Island, Florida, had his Defiant ready to go on May 28th and Johnny Murphy made the first flight. Johnny reported that the airplane flew well, it has 160HP Lycomings with wood props. Mike's empty weight is 1740 lbs. A few weeks later, during a landing rollout at low speed, the rudder/brake pedal assembly failed forward leaving Johnny with no rudder, no brakes and no steering. He shut down both engines and sat helpless while the airplane slowly rolled off the runway into a ditch, breaking the prop, the nose gear and fracturing the canard. No one was hurt, but the fix for the rudder/brake pedal assembly is mandatory and should be done before next flight. Mike repaired the airplane, built a new canard and has the airplane back in the air! He is presently flying off his hours and trying to finish up all the little details to get it ready for Oshkosh.

Byrdell Mathews had his Defiant ready some time ago, but as reported in an earlier CP, Byrdell had the heartbreaking experience of a tornado hitting his hangar. Both wings/winglets were damaged. He has since repaired the damage and has flown his first flight on June 18th. Empty weight is 1854 lbs. Byrdell started his Defiant project in August of 1984 - quite an achievement.

Johnny Murphy reports that his own Defiant is flying very well and that he is very pleased with it. He recently flew a couple of tests to see how much drag the constant speed props create when they are not feathered. He flew both examples at 4000 feet, two-place, with enough fuel to bring the gross weight up to 2500 lbs. The 160HP Lycomings with Hartzell constant speed props (not approved or recommended by RAF) provide good takeoff and climb performance, but when either one is shut down and not feathered (windmilling), the drag is so high that the good engine can only just hold altitude at 4000 feet and 2500 lbs. At 3000 lbs. gross, Johnny does not believe it would hold altitude. Once the dead engine is feathered though, speed increases almost 25 KIAS and the airplane feels real comfortable.

After many months of spasmodic (due to other commitments), work on Burt's Defiant, N78RA, the Hoffmann props are working. While takeoff and climb are excellent, top speed is disappointing and Burt feels that if he had to do it again, he would opt for fixed pitch, wood props.

DEFIANT PROPELLERS

Since the last newsletter extensive developmental tests have been done toward qualifying the Hoffmann constant speed/feathering propellers for the Defiant. At this time, we cannot approve this installation nor any other constant speed installation on the aircraft and do not have an assessment as to whether this approval will be forthcoming.

The development of the constant speed propellers was initiated to improve the airplane in two areas, 1) take-off and climb performance and, 2) the ability to cruise at low rpm to increase fuel efficiency. Currently, our assessment is that the disadvantages heavily outweigh the advantages. There exists a specific and serious safety problem with the constant speed propellers on the Defiant. That safety consideration relates to the inability of the airplane to provide adequate climb performance with a failed engine unless the failed propeller is feathered. The reason this is serious is that due to the Defiant's centerline thrust configuration, the pilot does not have the adequate cue to assist him in recognizing which engine has failed. When an engine fails on a constant speed installation, the rpm and manifold pressure will generally remain the same without an indication of a failure. Thus, the pilot must guess which engine has failed and verify it with a throttle reduction before he makes his decision to feather the failed propeller. If he does not feather the failed propeller, the flat pitch of the constant speed propeller, unlike the low drag of the high pitch, fixed pitch propeller, results in inadequate climb and a dangerous engine-out situation.

Another safety concern is the structural adequacy of the propeller blades and/or propeller hub on the aft engine when operating in the flow field of the aircraft. The blades and hub are continuously experiencing bending vibrations. These vibrations have not been measured nor evaluated analytically and all indications from previous testing indicate that an unsafe blade or hub fatigue situation may exist.

Our experience within the last several years with several pusher configurations has shown this to be a serious problem. We had anticipated that the wooden blades on the Hoffmann propellers may alleviate the concern. However, recent testing with wooden blades on another adjustable pitch pusher installation has shown propeller retention bearing failures in less than 100 hours of operations. Thus, we must warn against use of any constant speed propeller installation on the Defiant and for the Long-EZ, for that matter.

JACKPOT 1986

Over 40 VariEzes and Long-EZs flew into Cactus Pete's Jackpot airport, just a stone's throw south of the Idaho border and almost into Utah. This is high country, the airport is at over 5000 feet elevation, the scenery is beautiful, the nearest town of any consequence is Twin Falls, Idaho. On the morning of the 4th of July, the winds were really blowing. Conditions at the airport were steadily getting worse with strong gusty crosswinds of 30 to 40 knots almost 90° to the only runway. To the credit of the pilots, all but seven of the aircraft to arrive at the flyin managed to land without incident. A

dinner show in the casino was enjoyed by all, followed by an impressive fireworks display.

On Saturday morning, the famous Jackpot 120 Races were held. Shirl and Diane Dickey go to tremendous lengths to make this both a fun and safe event. It is, however, an out and out race and the fastest airplane will win. There are no tricky formulas or pilot techniques that can help you - it is a "no messing around" speed event.

The first race was for unlimited aircraft, those with larger than standard engines, and this year that event included a 160HP tail dragger Glassair. This race was very close, with the first three airplanes crossing the line within 15 seconds. The first seven airplanes averaged over 200MPH!! The Glassair was soundly beaten by Long-EZs and VariEzes with similar power plants! The second race was for "standard Long-EZs" powered by O-235 Lycomings. The third and final race was for "standard VariEzes" powered by Continental O-200 engines. The three races went off without a hitch and some very impressive times were turned.

Following the races, a spot landing contest was held and this one always sorts out the pilots! Debbie Iwatate touched down only 11" from the line and we figured she was a shoo-in for the second year in a row. However, along came Joe Moore in his Rolls Royce powered VariEze and touched down just 8" from the line! Incredible.

Next, came the ribbon cutting contest which is always good for a few laughs. It looks a lot easier than it really is. After that, everyone retired to the swimming pool and a little sun tanning.

Unfortunately, this year one of the Long-EZs was involved in a takeoff accident. The airplane veered off the runway and flipped over. Fortunately, the two people onboard suffered only minor injuries. The airplane should be repairable though probably not in time for Oshkosh.

Saturday evening brought the usual great banquet. Cactus Pete really does us proud. Over 100 people enjoyed the food and the conversation. After dinner, Shirl and Diane presented the prizes and trophies.

Jim Shultzman won Grand Champion, or People's Choice and was presented with a magnificent silver tray. This was the second such win Jim had received for his beautiful Long-EZ. He won Grand Champion at Porterville just a few weeks previous. The silver tray was conceived and presented by Ian and Chris Ayton who won this award last year. Race results as follows:

Unlimited			
1st Place	--	Mike Melvil	209.14
2nd Place	--	Dick Kriedel	207.66
3rd Place	--	Wes Gardner	205.56
Stock Long-EZ			
1st Place	--	Ian Ayton	182.91
2nd Place	--	Gus Sabo	181.00
3rd Place	--	Mark McHenry	180.25
Stock VariEze			
1st Place	--	Klaus Savier	207.90
2nd Place	--	Shirl Dickey	191.16
3rd Place	--	Joe Moore	186.75

Once again, many thanks to Shirl and Diane Dickey who, for four years in a row, have organized the best flyin there is anywhere. It was great! Don't miss it next year.

INTERNATIONAL VARIEZE and COMPOSITE HOSPITALITY CLUB

FlyIn Update

Jackpot Air Race NV, July 4th Weekend

41 Composite Homebuilt Showbirds attended the great IVCHC Air Race which was fun, successful, friendly, and EZ -except the wind- as usual. Two members, Magnum & Glen Liset, were from Australia. And this year many EZ's clocked over 200mph - breathtaking! Race winners: Unlimited - Mike Melville, VariEze - Klaus Savier, Long-EZ - Ian Ayton, Ribbon Cutting, 14 cuts "WOW" - Mike Melville. Our special thanks to the Dickeys, members of the Air Race Support Team, and all the attendees for their wonderful support!

Prosser States WA, Labor Day Weekend
Please contact Ivar & Sue Husa 509-943-3693
1821 Wright Ave, Richland, WA 99352
Free steak barbeque to those who fly in plus "old time fiddler" band and a tour of the St. Michelle Winery at Paterson!

Rough River, KY, Columbus Day Weekend
Please contact Buzz Talbot 312-759-1124
222 Sunshine Dr. Bolingbrook, IL 60439
All the previous available lodge rooms are taken, but Buzz has located two more motels: Sarver's 502-257-2771 & St. Clair 502-257-2561

Mexico Flyin, Thanksgiving Weekend
Please contact David Kolstad 818-349-3274
9955 Babbitt Ave, Northridge, CA 91325
Puerto Escondido - Beautiful place according to Bruce Evans, #3 man in the Voyager! Flyin combines the Mexican EAA Chapter and AOPA.

IVCHC 1986 OSHKOSH BANQUET
Date: August 4, 1986 Monday
Time: 6:40 check in, 7:00 cash bar, 8:00 dinner
Cost: \$14.00 per person (includes tax & tip)
IVCHC members may order tickets through mail with the deadline on July 18, 1986, or at Oshkosh in person. Non-members may purchase tickets at the RAF booth at Oshkosh on August 3 & 4.

Anyone interested in joining the IVCHC may send dues of \$14.00 for USA & Canada or \$17.00 for International members to: IVCHC/Shupes
2531 College Lane
La Verne, CA 91750

IVCHC now also has really classy T-shirts, Patches, and Window Decals available to members!

LORAN-C FOLLOWUP

Sally and I have been flying a Micrologig ML6500 Loran-C for the past 250 hours. Once you have flown Loran it would be difficult to do without it, to say the least. The Micrologig is an excellent Loran, and for the price, is probably as good as you can do. We had a home-made antenna in the winglet and, in retrospect, I believe this was a mistake. I believe the antenna should be as close as possible to the aircraft centerline. I say this because several EZ flyers I know who have the winglet antenna have the same complaint, drop out during maneuvering. Those with antenna on or close to the centerline do not report this problem.

Anyway, we sold our Micrologig and bought a new Northstar M1 from Dusty and Brenda. They have the best prices on the M1 that we could find. This Loran-C unit is the best I have seen, and I have flown most of them. It has an unbelievable data base of over 14000 waypoints and is the easiest to use of all the Lorans I have tried. Dusty provided the unit with the wiring including the antenna prewired to suit our Long-EZ. All I had to do was mount it and hook it up!

We bought the bent whip antenna with a turned and matched pre-amp because we figured if we were going to spend this much money, we may as well go all the way to get the best possible performance. I installed the bent whip on the belly under the passenger's thigh support. I laminated a piece of copper screen about 20"x30" onto the floor and layed up one ply of BID over this to hold it in place and to protect it. The antenna base is bolted to the copper screen as is the antenna pre-amp. In addition, I bolted a ground wire to the pre-amp, the antenna base, the Loran mounting tray and then directly to the battery negative terminal. This ground was in addition to the normal radio ground or 28 volt negative. The Northstar M1 operates on any voltage from 8 volts to 30 volts, and so far, we are ecstatic with our new toy!! We flew it on a cross country from Mojave to Twin Falls, Idaho, to Salt Lake City and back to Mojave and it performed flawlessly, never dropping out even during an aileron roll! This is without a doubt the neatest navigation device to become available to the homebuilder since the Long-EZ itself and I heartily recommend it.

The general feeling about home-made antennas seems to be that the best results come from a wire stuck on the canopy. Bob Evans reports that he has tried them all and the one he likes best goes along the plexiglass just above the fiberglass frame from the front to the back, then over the top and back up the other side. The pre-amp must be for a long wire antenna and should be mounted on the canopy frame as close as possible to the antenna. Ground the pre-amp case and mounting tray directly to the negative terminal of your battery. If your alternator makes noise that interferes, you might try one of Bill Bainbridge's linear voltage regulators and/or a Loran filter in the main wire from the alternator to the battery. Mount this filter as close to the alternator as possible.

SHOPPING

UP-DATE FROM B & T PROPELLERS (and "The Beez"):
June 1986

"Since it's been a while, thought we'd write an up-date on what's been going on with B & T Propellers since relocating to the beautiful foothills of Yosemite (central California).

We've found that many of the builders are doing lots of different and innovative things with their airplanes, engine-wise, these days and we've been busy keeping up with all these creative people. We've really been enjoying working on a more custom basis with many of the builders in getting the most efficient prop for their particular airplane.

We've been able to accomplish this by roughing out a prop - having them test it for performance data - refining and finishing it up from those figures. It takes a little more time and effort, but the results seem to make it worth it.

We have also developed and tested a new design for the Long-EZ with the standard O-235 engine and are really happy with the results. This new design is of a lower pitch, wider tip, and a new blade angle which has raised the static rpm and still maintains top-end performances. We have also changed the tips on our propellers which has reduced the noise level considerably.

We offer the props in either the five-laminate or multi-laminate. Both are made of maple, and both perform basically the same. We personally prefer the five-laminate because it tends to flex a little more and helps the take-off performance somewhat. However, the multi-laminate are beautiful, so it is mostly just a builder preference. A note we would like to emphasize is that although the multi-laminate does hold torque a little better due to all the glue, it is still absolutely necessary to check your prop on a periodic basis. Periodic checks and maintenance of your propeller is just good common sense no matter if it's five or multi-laminate.

Our props are all manufactured with the rubber leading edge which has proven so effective against rain erosion damage. We ship props worldwide, and have been certified in Australia, England, Canada, etc., for many years.

By the way, that yellow streak, alias Earl Wilson's Yellow EZ - Tuff, that has won the Jackpot, Nevada unlimited race both years that it's run (1983 & 1985) is propelled by a B & T.

We are still thoroughly enjoying our travels and adventures in our "Vari-Long" and look forward to the '86 flying season and seeing all the great "canard" people.

Bruce & Bonnie Tiff"

Ocean No. 1644 Flexibilized - Intumescent Fireproof Coating Compound, a remarkable heat protection paint for use on firewalls, wing roots and engine cowling areas, is available from: Wicks Aircraft
410 Pine St.
Highland, IL 62249
618-654-7447

Bill Bainbridge of B&C Specialty has completed a two year development program on a lightweight starter for Lycoming O-235 through O-360's. This starter weighs 10.2 lbs and is about 8 lbs lighter than a geared Prestolite starter or about 6-1/2 to 7 lbs. lighter than a standard starter such as found on an O-235 or O-320. Fred Keller has installed two of Bill's new starters on his Defiant and he is very pleased. They crank the engines better in cold weather than the standard starters do, and he saved about 14 lbs. Bill will have his new starters at Oshkosh '86. Of course, Bill still offers a full line of lightweight alternators well suited to EZ's as well as his really high quality linear voltage regulator which is highly recommended if you intend to install a Loran-C. Contact: Bill Bainbridge
B&C Specialty Products
518 Sunnyside Ct.
Newton, KS. 67114
316-283-8662

VISTA AVIATION
Whiteman Airport
818-896-6442

Dusty Rhodes and Brenda own and operate this small but neat avionics-type store. Dusty is an authorized King dealer and carries a variety of avionics including ARNAV, Apollo, and Northstar Loran-C's. They also have a number of other items of interest to homebuilders, and in almost every case, the price is very competitive. The store is located on the Whiteman Airport and you can taxi up to the door.

Dusty built a very nice VarIEze back in 1978 and is knowledgeable on homebuilts. He has been doing quite a lot of installations of radios and various avionics in homebuilts and can pre-wire an entire radio stack for you to meet your requirements.

Give Vista Aviation a try, we are very glad we did.

LIGHTWEIGHT ALTERNATORS FOR LYCOMING ENGINES.

Made by Pelican Aviation of Costa Mesa, CA and sold by Aircraft Spruce of Fullerton, CA, these alternators come in 35amp (4-3/4" dia, 7 lbs) or 55amp (5-1/2" dia., 9 lbs). The alternator brackets are machined from solid aluminum and are anodized and stressed for aerobatics. Both are available in 12 volts or 24 volts.

Contact: Aircraft Spruce
Box 424
Fullerton, CA 92632
914-870-7551

CORRECTION TO CP48

Aerox Oxygen Systems phone number was incorrectly printed. It should be 800-237-6902 not 6702 as printed in CP48.

FOR SALE

Marvel Schebler carburetor MA-3A, part # 10-3103-1.
\$280.00: Write to: Jim Cord
16525 E. Whittier Blvd.
Whittier, CA 90603

Lycoming O-235-C2C, 115 HP. 1535 hrs. total since new. Includes all accessories plus new mags. \$3500.00 or will include Long-EZ engine mount, B&T prop, spinner & prop extension for \$3800.00. Call: Mac
213-834-8850

B&T prop 62x66 - \$150.00
Spinner for above - \$50.00
6" prop extension - \$125.00
Call: George
213-596-3051

HELP!

Do you have a successful working ADF in your plastic airplane? Squadrons I and II in southern California are very interested in such an installation. If you have, or know of, a good method of installation with an antenna that will allow nominal range, write or call:

Joe Heapy,
8561 Fairmount Cr,
Westminster, CA 92683 (714)-895-7943

CAUTION - PROP BOLT OVER-TORQUING

We continue to hear of various abuses being committed on prop bolts - the latest is over-torquing! A standard O-235 uses 3/8"x24 (AN6) bolts. The recommended limits for these bolts is 225 in/lbs (minimum) and 300 in/lbs (maximum). If you over-torque this size bolt to 400 or 450 in/lbs, you will fail the bolts at the threads. The recommended torque value is 200 to 250 in/lbs (18-21 ft/lbs) for the 5-laminate wood props or as much as a maximum of 300 in/lbs (25 ft/lbs) for the newer, multi-laminate wood props. A quality thread lubricant should be used on prop bolt threads. A 50/50 mix of 50 weight engine oil and STP is also good.

BE CAREFUL AND CONCIENCIOS ABOUT PROP BOLTS - THE LOSS OF A PROP CAN BE POTENTIALLY LETHAL.

CAUTION

We heard from a builder the other day who was preparing to build his centersection spar and was planning to substitute blue styrofoam (wing foam) for the urethane! This is an absolute NO-NO. The centersection spar box is the aft wall of the fuel tanks and one tiny pinhole leak in the glass facing would allow fuel to permeate into the styrofoam which would then desolve. Once the foam, which supports the glass spar caps was gone, the spar would fail. Don't even think about substituting styrofoam anywhere where it may come in contact with fuel.

If it ever crosses your mind to do so, do yourself a favor and pour a little gasoline onto a styrofoam scrap and watch what happens!! PVC foam and urethane foams are not affected by fuel.

CAUTION

If someone plays with your rudder, or even if the wind blows your rudder forward, in some cases it may be possible to get the rudder cable snagged inside the cowling. This is especially the case on the left side where most of us have our oil cooler. We know of at least two instances where this did, indeed, occur, and it really does make for an interesting landing technique. Remove the top cowl and have someone move the rudder back and forth and carefully evaluate the chances of this happening. If it can, it will! Install a guard or shield to prevent this possibility and be absolutely certain that your guard does not make the situation worse! Thoroughly test your installation before installing the top cowling.

CAUTION

On a Marvel Schebler carburetor equipped with an accelerator pump, there is a small "half moon" shaped bowl held on with two screws. Byron McKean reported that while he was inspecting his carburetor float bowl, which had absolutely nothing in it, he removed this little cover under the accelerator pump and found it literally packed with sediment. It had not caused any problems at that point, but obviously it is something to watch for during inspections.

ACCIDENTS

The CP newsletter reports accidents and discusses their conditions and causes for information purposes for all operators. We have always investigated accidents in the interest of determining information that we can disseminate to you, the builders, to help prevent reoccurrence. It should be recognized in our discussion of accident conditions or causes that generally this information is preliminary, since it is published before the availability of the FAA or NTSB accident report.

A Long-EZ in Illinois landed in a row of trees after the engine quit. The pilot was on a 1/2 mile final at 300 feet at idle power due to another plane in front of him. When he added power, the engine quit. Two attempts were made to start the engine using the electric starter, to no avail. He hit a small electric wire, then landed in a row of trees planted as a wind break. The canard broke on both sides, the right wing broke at 1/2 span, the left wing was damaged near the strake. The main gear was still attached but bent aft. The left wheel/axle was sheared off breaking all four bolts. The pilot received a small cut on his hand and that was all. No cause for the engine quitting has been determined. The first thing that comes to mind, of course, is the engine idle speed. This may or may not have had

anything to do with this accident, but we have seen airplanes set up with such low idle speeds that they do have a tendency to quit on short final. However, that is normally an occurrence in the flare where it is only an annoyance as far as taxiing after the landing. An excessively high idle RPM is not satisfactory in that it makes it tough to land an airplane with the L/D of a Long-EZ. In general, if your engine will idle OK on the ground, it will idle even easier at approach due to inflow assisting the propeller

* These values are probably incorrect as a Long-EZ can easily glide 1/2 mile from 300 feet while decelerating 10 knots.

A Northern Nevada VariViggen was involved in a first flight, take-off accident. The airplane was demolished but the pilot suffered only minor cuts and bruises. Unfortunately, this accident could easily have been avoided. The pilot had no current medical or biennial, nor had he flown at all in the past 3 years. He did not inform the FAA of his intention to fly and he attempted to take-off on an uphill runway with a tail wind.

A California VariEze crashed on final approach. The pilot was seriously injured and the airplane was badly damaged. His approach was at a busy flyin with a lot of airplanes on final. He got down too low and far too slow. Eyewitnesses saw the airplane very low with wing rock. The airplane caught a wing on the approach light system, 800 feet short of the runway and 15 feet above the ground. The airplane cartwheeled and hit upside down and slid to a stop 300 feet short of the runway. The moral here is "never be too proud to execute a go-around, no matter how much pressure there is to land."

A Long-EZ on its first flight after installing a newly overhauled engine suffered an inflight engine fire and was unable to make it back to the runway. The engine quit on approach and the pilot attempted to land in a housing tract. There was not enough room and he rolled into a car which also burst into flames. He landed under control, thus, inflight structural failure or control failure are not suspect. Sadly, the pilot was killed by fire. The fire was so intense in the engine/cowling area that the FAA accident investigator was unable to determine what could have started the fire. The fuel pumps, carburetor, etc., were consumed. The airplane had been airborne for only a few minutes. Reportedly, the engine was an O-320 and he was using auto fuel. We may never know what caused the fire, but it is easy to overlook a loose fitting - we have done it ourselves. A fuel leak, particularly auto fuel, could be ignited by hot exhaust or any number of things. Always try to have at least one other person go over your work, especially engine related work like plumbing or control systems. The more pairs of eyes that look at your engine installation, the better chance that you will catch some overlooked items. This is specifically important if you are developing new, unapproved installations.

Never, ever, cowl an engine that has been worked on without a brief engine run to check for leaks. We, here at RAF, have more than once found fairly drastic leaks during the leak-check engine run.

FIREWALLS AND FIRE PROTECTION OF FLIGHT CONTROLS

The study of VariEze accident history has always shown considerably reduced incidents of fire as a result of an accident than the conventional metal aircraft with the engine on the front. The reasons for this are relatively obvious in that the sources of ignition of a fire are more remote to the major impact. Another feature that has been considered safer than the tractor aircraft is the airflow pattern through the engine area which pulls the fire away from the aircraft rather than impinging it toward the firewall. There have been no accidents or incidents in the VariEze or Long-EZ that have been caused by fire destroying aircraft structure or flight controls. There may be, however, a possibility of this occurring and this possibility is something that we feel obligated to address and, thus, are recommending specific modifications to the VariEze,

Defiant and Long-EZ to reduce, as much as possible, the exposure to this risk.

Several years ago, we tested a product called Liquid Firewall and found it did not provide satisfactory fireproofing/insulation and, thus, did not recommend its use and, in fact, specifically cautioned those who would attempt substituting it for the recommended firewall. A couple of weeks ago, Wicks Aircraft sent us a new product (Ocean 1644 Intumescent) to evaluate. This material is intumescent which means it swells up to a very thick layer of high temperature insulation and provides surprising results in that it will protect an aluminum surface from fire damage for a considerable time period. We do not have the equipment to specifically qualify this material to FAR 23 regulations, however the torch tests we have conducted have convinced us that it can provide a considerable barrier to deterioration by fire to aluminum or composite structure. The other good news is that this material costs considerably less than the previous liquid protection product.

Because of our concern that it may be possible to suffer unacceptable structural damage or loss of flight controls, we are recommending mandatory changes in this newsletter to all our designs except the Solitaire. This is particularly important in the VariEze and Long-EZ where both yaw and roll systems pass through the engine compartment. Loss of roll control on a Defiant may allow recovery using rudder.

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.

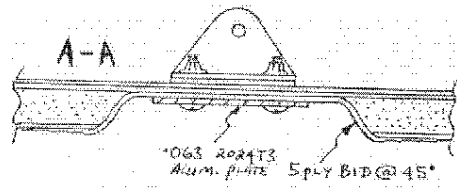
It is the homebuilder's responsibility to maintain, inspect and modify his aircraft as he desires. However, we at RAF feel that part of our job is to provide information to the homebuilder in the form of recommendations that, in our opinion, are required for him to achieve a satisfactory level of flight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

<u>Category</u>	<u>Definition</u>
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.

VARIEZE PLANS CHANGES

MAN-GRD Modify the roll and yaw control systems between the firewall and the wing roots by substituting 4130 steel or any stainless steel for all aluminum components with thicknesses less than 0.1 inches. This includes tubes, pushrods (with inserts), pulley brackets and bellcrank brackets. Apply Ocean No. 1644 Flexibilized - Intumescent Fireproof Coating Compound to the aft face of the centersection spar including interior flang surfaces between the existing firewall and the wing root rib. If your Fiberfrax shield is aluminum rather than the stainless steel option, coat its aft surface with Ocean 1644 Intumescent. Inspect

all fuel system plumbing and fuel system components for approved fireproof components. Substitute approved fireproof components (steel or stainless) for any aluminum components and be sure that fireproof sleeves are used on all hose components. Any exposed aluminum tubing or fittings should be corrected with approved stainless steel or steel aircraft fitting. If your gasolator bowl is aluminum, wrap it with approved fire sleeve material similar to the hose sleeves.



LONG-EZ PLANS CHANGES

LPC #130
MAN-GRD

Add to owners manual page 16. "Clear" idling engine every 15 seconds or so on the approach. Also, always fly final with the speed brake and at an altitude to allow reaching the runway without the engine after retracting the speed brake. Accounting for deceleration to the stall speed, this can be done from a 3° flight path at a 1/2 mile final.

LPC #131
MAN-GRD

Modify the roll and yaw control systems between the firewall and the aluminum protective ribs at the wing roots by substituting 4130 steel or any stainless steel for all aluminum components with thicknesses less than 0.1 inches. This includes tubes, pushrods (with inserts), pulley brackets and bellcrank brackets. Apply Ocean NO. 1644 Flexibilized - Intumescent Fireproof Coating Compound to the engine-side surface of the aluminum wing root shield ribs. Apply Ocean 1644 Intumescent to the aft face of the centersection spar including interior flange surfaces between the existing firewall and the wing root rib. If your Fiberfrax shield is aluminum rather than the stainless steel option, coat its aft surface with Ocean 1644 Intumescent. Inspect all fuel system plumbing and fuel system components for approved fireproof components. Substitute approved fireproof components (steel or stainless) for any aluminum components and be sure that fireproof sleeves are used on all hose components. Any exposed aluminum tubing or fittings should be corrected with approved stainless steel or steel aircraft fitting. If your gasolator bowl is aluminum, wrap it with approved fire sleeve material similar to the hose sleeves.

DPC #40
MAN-GRD

Before next flight, inspect two rigging areas for nose gear (1) steering pivot vertical to tolerance, 2° bottom forward to 1° bottom aft, (2) "trail" of axle relative to pivot axis. See elsewhere this newsletter.

DPC #41
MAN-GRD

Modify the roll and yaw control systems between the firewall and the wing roots by substituting 4130 steel or any stainless steel for all aluminum components with thicknesses less than 0.1 inches. This includes tubes, pushrods (with inserts), pulley brackets and bellcrank brackets. Apply Ocean No. 1644 Flexibilized - Intumescent Fireproof Coating Compound to the aft face of the centersection spar including interior flange surfaces between the existing firewall and the wing root rib. If your Fiberfrax shield is aluminum rather than the stainless steel option, coat its aft surface with Ocean 1644 Intumescent. Unlike the Long-EZ, the Defiant does not have the aluminum wing root shields. These areas are covered by the cowling which continues through the wing root area. Coat the interior face of the cowling with Ocean 1644 Intumescent extending 2" above and below the wing. Inspect all fuel system plumbing and fuel system components for approved fireproof components. Substitute approved fireproof components (steel or stainless) for any aluminum components and be sure that fireproof sleeves are used on all hose components. Any exposed aluminum tubing or fittings should be corrected with approved stainless steel or steel aircraft fittings. If your gasolator bowl is aluminum, wrap it with approved fire sleeve material similar to the hose sleeves.

DEFIANT PLANS CHANGES

DPC #39
MAN-GRD

Section 1, page D-40, Rudder pedal/brake assembly. Outboard mount, RUD-7 should be mounted per the sketch below. Do not fly your Defiant with the RUD-7 bracket mounted to the floor per page D-40 - it is possible, under heavy steering or braking forces that the AN525-10R8 screws can pull through the floor. Also, see sketch below for additional stiffening required under the master cylinder brackets - use 1/4 birch plywood as shown.

DEFIANT ENGINE PLANS

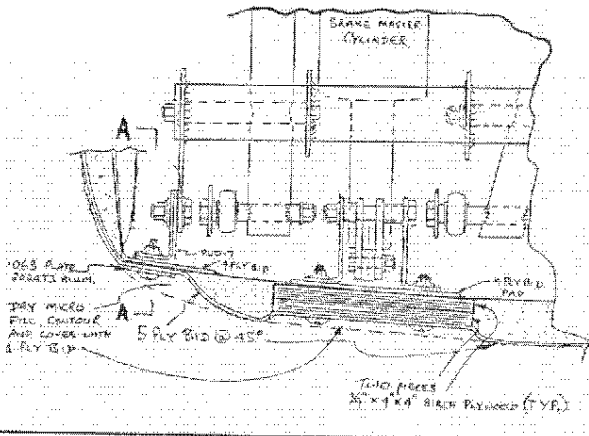
At last the Engine plans for the Defiant are ready. We have these in stock and the cost is \$54.50. The plans consist of an 11 x 17 book and 14 blue print pages, 24 x 36.

BUILDER HINTS

PVC foam, Divinylce or Klegecel can be joined with micro at any time. For example, for the bulkheads, NG-30's F-22, F-28, etc, if your PVC foam is too small, you can micro pieces together in order to make the piece large enough to cut a bulkhead out of. The micro joint is stronger than the foam itself and, therefore, this technique can be used anywhere. The only disadvantage is, of course, that the more micro joints you have, the heavier the part and, therefore, the airplane will be.

LANDING LIGHTS

Mike and Sally's Long-EZ has a 28 volt system and for the past 5 years, they have flown over 1130 hours including approximately 100 hours at night. They have always used a GE sealed beam, #4594 (100 watt, 28 volt) landing light, and Mike has always wished for more light. This would, obviously, be very beneficial in the event of a forced landing at night. Finally, a few weeks ago while visiting Dusty and Brenda's airplane parts store, Vista Aviation, on the Whiteman Airport, there it was, a 28 volt, 250 watt, par 36 landing light! He purchased and installed it immediately and reports a huge improvement. For those of you who have 14 volt systems, Dusty has 14 volt, 250 watt, par 36 landing light sealed beam units. In fact, he has the whole range: Part #4509-14 volt, 100 watt
Part #4313-14 volt, 250 watt (requires 25amp C/B)
Part #4594-28 volt, 100 watt
Part #4596-28 volt, 250 watt (requires 15amp C/B)



LONG-EZ BRAKES

Those of us who have heavy Long-EZs have known for a long time that the standard Cleveland 500x5 brakes were somewhat marginal. At best, they eat up brake pads at the rate of a set every 25 hours! Over a year ago, Mike Melville obtained a heavy duty set of brakes from "Flying Magazine" journalist, Peter Garrison. Peter designed and built the Melmoth, an ultra long range airplane which he flew across the Atlantic as well as the Pacific. Melmoth weighed over 3000 lbs at gross weight, yet it used 500x5 wheels.

Peter obtained a special set of brakes from Cleveland which was working with the Italian company, Caproni, to develop a heavy duty brake for Caproni's jet trainer. These brakes consisted of a stock 500x5 disc, except it was almost 3/8" thick. The caliper was from a 600x6 brake.

Peter Garrison put over 2000 hours on his Melmoth before it was destroyed in a freak accident. He gave the brakes to Mike and Sally and they have flown them now for over 300 hours.

Mike reports that these brakes are over 60% more effective than the standard brake and do not use up brake linings. He finally replaced the linings after 250 hours and they really weren't all that worn!! Of course, RAF has been attempting to find out if Cleveland could provide these brakes for Long-EZ builders, but with no luck. Dick Kriedel of Squadron 1 in Los Angeles tried even harder and finally got them to special-build him a set of the thick discs. Apparently the right hand does not talk to the left hand at Cleveland because Tom Mcnelly, an experienced builder from the Phoenix, Arizona area, who has built two beautiful Long-EZs, has managed to discover that Cleveland does, indeed, manufacture these brakes and that they are, in fact, still available. We sure appreciate Tom's efforts for these brakes really do fix the one weak point on the Long-EZ (particularly a heavy one) and we certainly recommend them. Tom has installed them on two Long-EZs so far and reports a dramatic improvement in braking effectiveness. He feels the safety benefits are well worth the money.

Tom obtained his brakes through: Varga Enterprises
2350 S. Airport Blvd.
Chandler, AZ 85249
602-963-6936

Talk to George Varga. The part numbers are: Caliper Assembly - 30-133, Heavy Duty Disc - 168-85. Total cost is around \$400.00. The installation is simple. The caliper assembly slips right on to your existing 500x5 brake plate and the disc is a direct bolt-on replacement. The thicker discs can absorb much more energy, and the 30-133 caliper assembly has a piston in it that has almost twice the area (2" diameter versus 1.5" diameter) of the standard 500x5.

Keep in mind that this more powerful brake will generate more heat! Fiberglass protection for the gear strut is even more important. If your disc is too close to the strut, consider installing a 1/4" thick aluminum spacer between the axle flange and the gear leg. Ventilate the top of the wheel pants by cutting a hole at the highest point in the wheel pant when the airplane is parked nose down. This will allow a chimney effect to the brakes after you stop when there would normally be no flow through the wheel pants. For new installation, it is even more important to remove your wheel pants before conducting any taxi testing!!

Now that he has good brakes, Mike has noticed that the additional heat generated is even harder on the nylon brake lines and even though he has carefully insulated them, the heat transfer from the brass elbow seems to cause the nylon close to the brass elbow to become brittle and to cause a small hydraulic oil leak at the fitting. Since his experience of a brake fire in the Defiant, he is very suspicious of small leaks and has been inspecting these fittings frequently. His conclusion has been that he is going to change the brake lines from nylon to stainless braided teflon high pressure brake lines. This is a big step but he feels it is worth it. While he is at it, he is going to drain the aircraft grade brake fluid which is flammable and carefully flush the system with 100% denatured alcohol. Then he will use automotive DOT 5 100% silicone brake fluid. The main advantages are that silicone fluid is not flammable and is completely inert and therefore does not affect O-rings or rubber seals. There are a number of EZ flyers already using this brake fluid with perfect results. The Antique Aircraft builders have used it for years because it does not affect their dope and fabric airplanes!

We can talk more about this at Oshkosh.

FUEL LEAKS IN THE ENGINE COMPARTMENT

We recently heard from a Long-EZ pilot who had just installed new fuel lines in his airplane. While on a cross country flight, he noticed that his cylinder head temperatures were way down from where they normally ran, and they continued to run cool for the duration of the flight. Upon landing, he removed the bottom cowling and found that the engine looked as though it has been steam cleaned! He turned on the boost pump and a fine mist of fuel sprayed out of one of the new fuel lines. These were stainless braided fuel lines, supposedly aircraft quality, and yet, one of them had several tiny pinhole leaks that had allowed a fine spray of AV gas to drain the engine. Apparently, the high speed cooling air, mixed with fuel, had literally scoured the engine clean as a whistle! Why no fire? Perhaps it is the relatively high flash point of AV gas which is much higher than auto gas. According to Popular Science, March 1986, it is becoming increasingly commonplace to boost octane ratings by dissolving cheap "light ends" such as butane into auto fuel. This increases vapor pressure and volatility and lowers the flash point. If this Long-EZ pilot had been using auto fuel, he may not have been so lucky. See "Accidents" in this issue.

Fuel leaks aft of the firewall are potential killers. If you have recently broken your fuel lines, or if you are in a new, untried installation, it is mandatory that you conduct a short engine run with the cowling removed.

Carefully inspect all the lines and fittings for leaks (including oil leaks) while the engine is running (watch out for the prop!) and fuel and oil is under pressure. It is common to find one or more fittings loose and you would be surprised how much oil you can lose through a finger tight (but not correctly tightened with a wrench) oil line nut.

Some years ago, Dick Rutan had a fuel line fitting break in flight during a speed record attempt. He lost most of his fuel over board before he became aware of the problem. When he landed, the entire aft end of the cowling and wings were stained with 100LL blue stain. This was the result of mounting an electric fuel pressure sender directly to the carburetor. The vibration failed the aluminum fitting. It is very important that fuel pressure and oil pressure senders be remotely mounted with flexible, aircraft quality hoses connecting them to the engine.

Use only steel elbows, nuts and nipples aft of the firewall in the fuel system. In certified aircraft, only steel or stainless steel fittings and tubes are used between the firewall and the engine, and all fuel and all oil flexible hoses have fire sleeves covering them. The reason is that in the event of an engine fire, the fuel and oil system will not burn through, thus allowing the pilot enough time to execute an emergency landing. Other than an inflight structural failure, an inflight fire would have to be the scariest thing that could happen to a pilot. As the builder of your own airplane, you owe it to yourself to do the best possible job you can on your engine/fuel/oil system. If in doubt, have an A&P or AI mechanic look it over. At least, have other EZ builders look at your engine installation. Many times, in spite of our best efforts, we miss something important which may be easily spotted by someone not so close to the project.

DEFIANT NOSE GEAR

The Mooney nose gear on the Defiant has caused several problems. On Burt's prototype, N788A, he flew the first hundred hours with no shimmy damper. Several times, he experienced mild nose wheel shimmy, and once, heavy nose wheel shimmy. Mooney provided a rebuild-kit for the nose gear which helped a lot since all new bushings tightened the whole assembly. This did not fully cure the nose wheel shimmy problem however and, ultimately, we had to install a shimmy damper.

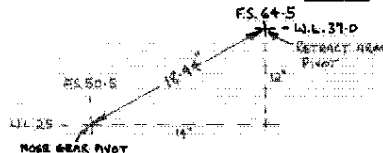
Unfortunately, it is not a readily available part. We converted a double acting hydraulic cylinder we found in a junk yard and it has worked flawlessly ever since.

Fred Keller also has installed a hydraulic shimmy damper in his Defiant. It works very well, but once again, it is something Fred found in a salvage yard, and it has no markings or part numbers on it.

We believe you should install a shimmy damper in the Defiant nose gear steering system, or sooner or later you will experience nose wheel shimmy. Any commonly available shimmy damper, such as can be found on a Cessna 150 or any Cessna, Piper or Beech for that matter. The one on a Beech Duchess is an excellent unit. It is small and should be relatively easy to mount. The main thing is to build a strong mounting point that is stiff and does not have any play in it.

We have noticed on several of the new Defiants that are now flying, that the nose gear does not appear to go all the way down and forward the way it should and does on Burt's and Fred's airplanes. One problem here may be that the firewall was not correctly notched away to clear the nose gear weldment. You will have to cut away approximately a 1" x 8" notch in order that the nose gear can go all the way down into the correct position and that it will clear the firewall at full steering lock, both left and right.

Probably the most important dimension of all is the distance between the nose gear retract pivot at F.S. 25 and W.L. 50.5 and the retract arm main pivot at F.S. 64.5 and W.L. 37.0. The linear distance between these points is 18.44, and this dimension must be held as closely as possible, even if you are slightly off on the actual pivot points. The 18.44" dimension is "golden".



In CP 47, Page 4, we've reprinted a Mooney service bulletin on checking the "trail" of the nose gear. Unfortunately, we misprinted the important dimension! The 0.6 dimension shown in CP 47 is not correct. This dimension should be .06. Do not set your nose gear geometry using the CP 47 dimension.

If you do, unsafe oversteering tendencies will result during high speed taxi. The plumb bob will indicate properly only if you jack the airplane to a position in which the steering pivot axis is exactly vertical! Mooney recommends installing the 20-202-3 spacer if the position of the axle is forward of the .06 dimension. No guidance is given on what to do if the dimension is too far aft. Our experience has shown that aft trail is susceptible to shimmy. Thus, we recommend adjustment to as close to the 0.06 dimension (forward) as possible. Note that this results in the axle being well forward of the steering axis due to the plumb line laying over the forward side of the trunion tube. For further information, refer to Mooney service bulletin M20-202 Mooney, Kerrville, TX 78028.

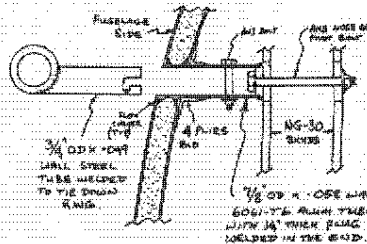
Keep in mind that the "vertical" steering pivot should be essentially vertical to very slightly top aft, when the aircraft's waterline is level. Take great pains to get the geometry correct and your nose gear will operate smoothly and should give years of trouble free service.

When you set up your linkage between the nose rudder, the nose gear steering and the rudder pedals, you should center the nose gear. Then set the rudder so it is parallel to the fuselage centerline. Now clamp the

rudder pedals in an even position. Install the linkage and lock them to retain this relationship between rudder pedals, nose gear and rudder. Jack the nose wheel off the ground and check that the full travel of the nose gear does not interfere with anything, especially the firewall. Get someone to apply a light aft load on the nose gear and retract it and extend it a few times. This check is to ensure that the mechanism does not interfere with anything under, and in front of, the instrument panel. Recently we installed a Loran-C into Burt's Defiant and neglected to perform this test. Needless to say, we were unable to retract the nose wheel! Be careful.

NOSE TIE DOWN

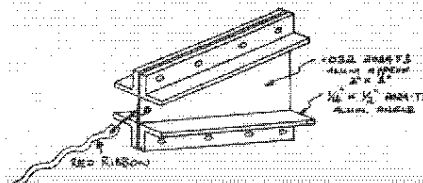
It can be difficult, even impossible, to remove the nose gear strut due to the AN5 Pivot bolt having to go through the side of the nose. This problem can easily be solved and you get a good nose tie down into the bargain!



By removing the AN5 cross bolt from the aluminum tube, you can reach the head of the AN5 nose gear pivot bolt using a socket on an extension, and the bolt can be withdrawn through the aluminum tube allowing periodic inspection of the nose gear pivot.

CONTROL GUST LOCKS

Control locks on the ailerons and rudders can prevent damage to the control system and to the winglets when the rudders are blown forward allowing the rudder beam to gouge the paint. A nice, simple gust lock can be made up using a few pieces of .032 aluminum and some short lengths of aluminum angle. See sketch.



A little weatherstrip rubber can be stuck to the face of the angles to help the gust lock remain tightly in place and to prevent damage to the painted surfaces.

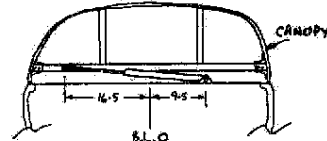
Other gust locks we have seen include simple duct tape (red is best since it is easy to see) and large spring clips with rubber glued to the jaws. A long, red ribbon would help prevent accidentally leaving them on. Which brings up the question of safety. Down through the years, there are many, many instances of accidents caused by leaving gust locks in place. A thorough preflight should eliminate this possibility. The elevators really don't need gust locks, just set the bungee trim to hold the elevator in the fairred position and always try to park the EZ nose down facing into the prevailing wind.

CANOPY GAS SPRING FOR THE DEFIANT

Roger Rupp (907-262-9265) from Soldotna, Alaska, is building a Defiant and, after much research, came up with a source for the proper gas spring.

Gas Spring Company
92 County Line Rd.
Colmar, PA 19315-9607
215-222-1982
Order a: Prototype, non-auto
FB22A (P1-60)

This gas spring is approximately 36-1/4" long and Roger's installation works very nicely. (See sketch)



Note: This gas spring has 60psi in it, and this means you must take care to very thoroughly secure the cross tube to the sides of the canopy, or the 60psi will eventually work the cross tube loose, especially from the right side. Contact Roger if you would like to discuss his installation.

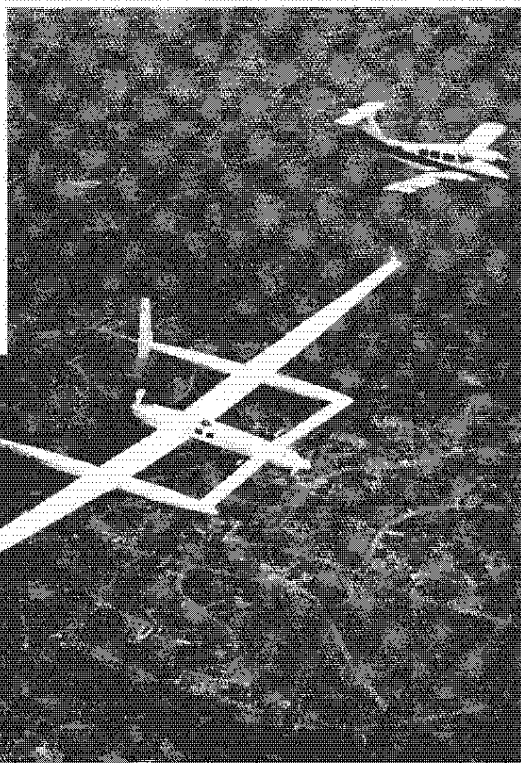
EPOXY BRUSHES

Yet another method to get the most out of your brushes. Rinse the brush in acetone, wrap it still wet with acetone in a folded paper towel. Put the brush in a plastic sandwich bag and wrap it with a rubber band to hold the paper towel against the bristles. As the brush dries, the paper towel leeches out the epoxy/acetone leaving a clean reusable brush. Don't be discouraged by the stiff paper towel, just peel it off and press on the bristles to restore the bristles to good shape.

TUESDAY , 15TH JUNE, 6:36AM PDT

FLASH!

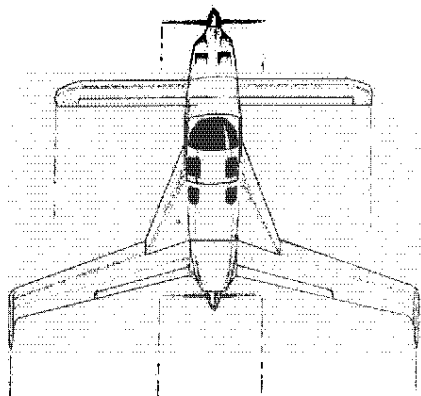
As we go to press, Dick and Jeana have successfully completed their flight up and down the California Coast. They have set a "provisional" closed course distance record of approximately 10,074 nautical miles (11,600 statute miles) in 110 plus hours of flight. "Provisional" because it has not been officially ratified at this time. The flight was essentially flawless. The pilots were in excellent shape when they climbed out of the airplane and they are pleased with the results. After landing, the Voyager was carefully weighed and it had, in fact, enough fuel on board to have gone on to New York with fuel to spare!! An outstanding job well done.



"Coming Home" - Dick and Jeana in the Voyager over Tehachapi on her way to a triumphant reception at Mojave after flying more than 10,000 nautical miles, non stop, non refueled, over a four day, five night flight. Bruce Evans flies chase in a Sierra, while Burt and Mike fly the left wing in a Duchess.

Photo by Mark Greenberg.

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



first class mail

TO:

July '86

The line which appears above your name lets you know through which Canard Pusher you are paid. If your label says **LAST ISSUE CP 49**, then this is your last issue, and you need to renew.

CP 49