

THE CANARD PUSHER

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If you are building a VariViggen from 1st Edition plans you must have newsletter 1 through 52. If you are building from 2nd Edition plans you must have newsletters 18 through 52. If you are building a VariEze from 1st Edition plans you must have newsletters from 10 to 52. If you are building a VariEze from 2nd Edition plans you must have newsletters from 16 through 52. If you are building a Long-EZ you must have newsletters from 24 through 52. If you are building a Solitaire, you must have newsletters from 37 through 52. If you are building a Defiant, you must have newsletters 41 through 52.

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

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

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

OSHKOSH SCHEDULE - 1987

Friday, July 31

9:30am - Burt, Dick and Jeana at Theater in the Woods.

Saturday, August 1

9:30am - Burt, Dick and Jeana at Theater in the Woods.

2:45pm - Burt and Mike, Tent #3, builder support question and answer session.

Sunday, August 2

1:15pm - Burt in Tent #2, "Chronology of the Rutan Aircraft".

8:30pm - Burt at Theater in the Woods, "The Voyager Story".

Monday, August 3

9:30am - Burt, Dick and Jeana at Theater in the Woods.

2:45pm - Burt in Tent #2, "Forget Evolution for Tomorrow's Light Plane".

In addition to the above schedule, RAF will be in the Wicks booth every morning from 10:00am to 11:00am to answer builder questions. As usual, we will also have pilot "bull sessions" every day at 1:00pm under the wing of Burt's Defiant. These sessions are not for builder questions, but are used to discuss various experiences of builder/pilots actually flying RAF-type airplanes.

RAF will have the usual #G-7 booth in the South display building. This booth will be shared with Larry Lombard and Michael Dille of FeatherLite Products, Inc. Both of these guys used to work for RAF and both are very familiar with all RAF airplanes. They will have many of their products on display. Larry and Michael do all of the prefab composite parts for VariEzes and Long-EZs.

Many of the Voyager items - posters, etc., as well as our new poster, will be available at our booth.

DEFIANT REPORT

We requested in CP51 that all Defiant flyers send in a short note giving a brief summary of performance, top speed at 8000' at full throttle, approximate take-off distance, and approximate rate of climb.

We received one report, from Dennis Riehm of Bowling Green, KY. Dennis' Defiant will go 178kts (true air speed - 205 mph) at full throttle at 8000ft. Rate of climb will remain pegged at 2000ft/min through 4000 feet at 120 KIAS. "Flight characteristics are delightful, very, very stable, and it is easy to land. Pitch is more sensitive than roll but the plane is easily trimmed for hands-off flight." He has installed O-360-A1A(180hp) engines and is using Great American fixed-pitch, wood props.

Dr. George Best from Phoenix, AZ made his first flight on Friday, May 22, 1987 and he stated, briefly, in a phone call that he is happy with it. All systems are OK, temperatures and pressures were OK, and he is amazed how slowly it will fly on short final! He saw 168kts on his airspeed indicator at full throttle in level flight for a true airspeed of 191kts (220mph). George has Lycoming O-360 (180hp) engines with Hoffmann 3-blade, constant-speed propellers. Congratulations, George!

We have heard from two more Defiant builders who, at this point, have their planes in white paint and ready to go to the airport. They are Rodie Rodewald of Hawaii and Ted Rogers of North Carolina. There are nine Defiants currently flying that we know of.

If you are flying, please do send in the information we requested in CP51.

We were most pleased to meet Byrdell Mathews from Spring, TX at the Jackpot, NV fly-in. Byrdell and his wife flew up to Jackpot in their Defiant. Byrdell does not have wheel pants on his Defiant yet, so he does not have a good speed for us. Burt flew the prototype, N78RA, to Jackpot as well, so we had two Defiants to look at.

DEFIANT CANARD UPDATE

After the CP51 announcement of Don Foreman's Defiant canard failure in a static load test conducted for the British CAA, a couple of Defiant builders in Florida got together and decided to also do a static test on a spare canard they had.

Johnny Murphy, builder of a Quickie, a VariEze, a Long-EZ, an Adventure, a Glasair and a Defiant (to name only the composite airplanes he has done!), got together with Mike Cardinale, builder and flyer of a Defiant, and they decided to salvage Mike's canard that was damaged and rejected in a landing accident very early in his Defiant flying program. The canard was repaired and Johnny (who is a mechanical engineer) designed and built a steel support to adequately handle the expected static loads.

During one of this area's local EAA chapter meetings, the canard was static loaded according to the exact same instructions that we sent to Don Foreman in England. Unfortunately, because the canard was not mounted in a Defiant fuselage as Don's was, the attach tabs on the canard were bolted to the rigid angle iron support jig in such a way that these lift tabs or main attach tabs "saw" an enormous side load instead of only a pure lift load as they were designed to do. As a result, one of the lift tabs failed at 5 "G" at which point the canard tip was deflected no less than 18"! , thus allowing approximately 2/3 of the load on the left side to be added to the full load on the right side - all of

which was then successfully supported by the remaining lift tab which was now supporting the load as it should. Unbelievably, the remaining lift tab held this static load and also held the dynamic load as the left tab failed and the whole canard and load fell several inches until the left canard tip struck the ground. This dynamic load could easily have been double the static load, at least momentarily!

The interesting result was that this canard did not fail as Don Foreman's had, even though it was loaded to a higher static load and even though this canard had been rather seriously damaged in an accident and subsequently rather roughly repaired.

Johnny and Mike have informed us that they are planning to repair the lift/attach tab and hang the canard to let these lift/attach tabs "see" the load as they should, and do, in the aircraft. They then plan on loading it until they break it. They will collect deflection and "G" load data and we will present it here in the CP when it becomes available.

This data and the photos printed in this CP are presented to help builders of Defiants feel a little more confident in their structures, but RAF is not withdrawing the mandatory requirement for a 2 ply UND structural beefup as called out in CP51. This change still stands.

IVCHC 1987 OSHKOSH EAA CONVENTION ACTIVITIES

Saturday, August 1 - IVCHC Lady's Luncheon

Butch's Anchor Inn
11 a.m. to ?

Please let Bernadette know if you plan to attend

Sunday, August 2 - IVCHC Social Hour

Free coffee & donuts
(courtesy of IVCHC)

9 a.m. to 12
Homebuilt Headquarters

(Near EZ flight line and the main gate)

Monday, August 3 - IVCHC Oshkosh Banquet

Butch's Anchor Inn
6:30 p.m. (no host bar)

7:30 p.m. (dinner)
\$14.00/person (current members)
\$15.50/person (non-members)
(shrimp or prime rib)

(Tickets may be purchased at the RAF Booth at Oshkosh)

IVCHC will reserve a block of rooms at the University of Wisconsin, Oshkosh once again for the "1988" EAA Oshkosh Convention. THERE IS NO CHARGE FOR THIS SERVICE - one night deposit, pay to UWO. Is all it takes!

ROUGH RIVER, KY RESORT FALL FLY-IN

Springtime is the time to start making plans to attend the VE Hospitality Club Fall Fly-In at the scenic Rough River Dam State Resort, Falls of Rough, Kentucky.

Mark your calendar for Columbus Day week-end, October 16-19, 1987. Call early for reservations: 1-800-325-1713 or 1-502-257-2311. Be sure to ask for the IVCHC discount room rate!

We are now planning and would like to hear from you about activities, and to get a head count to give the lodge chef.

Some ideas are: square dance at the lodge, outdoor cook-out and camp fire. Steve Wright's tri-park air race, Mammoth Cave side-trip, river cruise, and pilot-builder forums.

For more information please contact:

Buzz Talbot
222 Sunshine
Bolingbrook, IL 60439

Include a SASE and receive a flyer and airport diagram.

CAFE 400 - 1987

Although no one from RAF went up to the race held at Santa Rosa, CA, RAF-type airplanes were rather well represented with four of the eleven finishers in the 2-Seat Experimental Race being VariEzes and a Long-EZ.

Experimental - Single Place

Place	A/C Type	Pilot	Speed	MPG	HP	Score
1	Quickie	Turner	118.0	65.95	30	1354141

Experimental - 2 Place

1	VariEze	Savier	187.5	36.95	100	2252109
2	Q-200	Sheehan	171.5	39.51	100	2193009
3	VariEze	Hertzler	149.4	45.04	80	2103623
4	Lancair	Niebauer	179.9	26.62	118	1568901
5	Falco	Hansen	184.0	24.90	160	1508985
6	Glasair III	Klix	205.2	21.25	300	1475939
7	RV-6	Vanerunsven	174.5	25.76	160	1461169
8	Glasair	Powell	169.6	26.22	180	1435562
9	Celerity	Burton	170.8	21.39	160	1180728
10	Long-EZ	Ellison	182.5	19.88	160	1168080
11	VariEze	McPherson	142.6	28.04	90	1167567

The CAFE 400 event, of course, is strictly an efficiency run. Top speed is not even a consideration. Klaus Savier who won the two-place experimental class, not only has an extremely efficient little airplane, he also is unbelievably fast based on his times at Sun and Fun and at Wendover. Quite a remarkable achievement.

JACKPOT, 4TH OF JULY WEEKEND, 1987

This year this very popular fly-in once again broke records for attendance as well as speed. Last year 43 EZs flew in, this year an incredible 57 EZs were parked on the ramp and 116 guests registered for the banquet at Casino Pete's! The distances that some people flew to get to this fly-in were amazing. One Long-EZ came from Cape Cod, MA. Another from New York, yet another from Columbus, OH and one from Milwaukee, WI!

Almost everyone showed up on Friday, lots of them during a serious thundershower which dumped quite a bit of rain and some impressive lightning. Saturday morning was crystal clear with essentially no wind. Shirl Dickey, the race organizer, briefed the race pilots (a record field of 36) on the new race course, a triangular course to eliminate the danger of head-on traffic at the turn point. The distance this year was exactly 125 statute miles.

With no less than 17 airplanes entered in the "unlimited" class, Shirl decided to break these into two races with 8 and 7 airplanes. As usual, Bruce Tiffit in his yellow VariLong (!!) was the starter and all the racers formed up on either side of him several miles from the start point. When he judged them all in a relatively straight line, he pulled up and away they went.

It is really fun to watch these airborne starts and quite amazing how straight the line of airplanes racing was. The most interesting race this year was undoubtedly the stock Long-EZ race in which 12 0-235-powered Long-EZs competed. An excellent start and an unbelievably close finish, with all airplanes finishing within 6mph of each other!

As usual, the events were well organized, lots of fun, and most important of all - SAFE. Shirl and Diane Dickey are the greatest. This was the fifth year that they have organized this fly-in and it just gets better each year.

This year we were very pleased to have Burt and Dick Rutan fly in. Burt brought his Defiant which he raced in the unlimited event. Dick flew in in his blue Long-EZ which has 1450 hours on it now. Surely the highest time Long-EZ in existence. Unfortunately, there were no Glasairs in attendance this year. The builder of the most perfect Midget Mustang (Grand Champ at Oshkosh 1983, N3X) you have ever seen, was heard to say when asked where all the Glasairs were, "I don't know, I guess bad news travels fast!"

A great weekend, beautiful weather, a neat airport and many beautiful airplanes. Lots of hangar flying around the pool, frisbee games, spot landing contests, ribbon cutting (a roll of toilet paper thrown from a Cessna 152, and each contestant tries to cut it as many times as he can before it falls to 1000ft AGL - won by Dick Rutan with 7 cuts!). What more could a bunch of EZ builders/flyers want? One Long-EZ flew in on Sunday morning and this was a special moment because this was the Long-EZ which was heavily damaged in a take-off accident last year at Jackpot. While no one was

seriously hurt, the amount of damage was very disheartening to this couple who had only just completed their Long-EZ. They took it home and Art Lazzarini tells us that his wife went to work on it, building a new canard, a new right wing, two new winglets and then got a new canopy. He says she did most of the work herself and they got it finished and put the first hour on it July 4th, then flew into Jackpot on Sunday morning, July 5th. Congratulations to the Lazzarinis. You guys have definitely got what it takes.

Here are the race results along with the results of the Spot Landing and Ribbon Cutting events. Why not try to be there next year on July the 4th weekend, it is more fun than you can believe.

RESULTS OF JACKPOT EVENTS - 1987

Unlimited	- 1st	- Mike Melvill	225.98
	2nd	- John Chambers	215.16
	3rd	- Burt Rutan	211.59
0-200 VariEze	- 1st	- Joe Moore	196.41
	2nd	- Shirl Dickey	196.21
	3rd	- Gary Hertzler	193.38
0-235 VariEze	- 1st	- Bob Paulson	189.74
	2nd	- John Lambert	171.53
0-235 Long-EZ	- 1st	- Clayton Kau	182.12
	2nd	- Robert Campbell	181.96
	3rd	- Gus Sabo	181.14
Ribbon Cutting	- 1st	- Dick Rutan	7 cuts
	2nd	- Mike Melvill	6 cuts
Spot Landing	- 1st	- Mike Melvill	A tie at
	1st	- Dave Ronneberg	6 inches
Longest Distance	- Peter Magnuson	- 2040nm (2548sm)	
	Dennisport, MA	(Cape Cod area)	

WENDOVER - 1987 BONNEVILLE 125

Sally and I had not been to Wendover, UT before and we were looking forward to it. On checking the weather on Friday afternoon, we were promised scattered thundershowers along the route with up and down drafts over the ridges. Visibility was excellent with strong tailwinds at high altitude.

We departed from Mojave after work, lifting off at 5:10pm. We climbed steadily as we headed north over Red Rock Canyon into the Owens Valley. The China Lake Naval Facility restricted area was in the way of a direct flight so we flew to the northwest corner of this restricted area before turning slightly right for a direct course to the Tonapah VOR. This course also guaranteed that we would remain clear of the very large restricted area in Nevada. The view was breathtaking from the Long-EZ. On our left was the sawtooth ridge with the highest peak in the contiguous 48 states, Mount Whitney, reaching almost 14,500ft. On our right, the White Mountains reaching over 12,000ft. Crossing the White Mountains, at 17,500ft, breathing easily from our Aerox nasal canulas, we had just over 200kts showing in the Northstar Loran for ground speed. Good tailwinds, spectacular scenery, glass smooth air - what more could you ask for?

We trimmed the old Long up to fly hands off and steered left and right by using weight shifting! This can only be done in perfectly smooth air. When we both moved as far left in the cockpit as we could and stayed there for a minute or so, the airplane would slowly come left. Move to the right and the left turn would stop. Really a neat thing to do.

We crossed Tonapah VOR and then headed directly to Wendover airport, using the Loran for navigation. The incredibly desolate desert country of western Nevada slowly gave way to some green ridged mountains covered in pine trees as we moved toward the Utah border. We had to dodge a few thundershowers and even got wet a few times, but it was an easy flight. As we let down towards the ex-military base of Wendover, we had several rainbows around us. The terrain of Wendover can best be

described as looking like the surface of the moon! "Why would anyone want to come here", we wondered. We landed at 7:20pm, a two hour and ten minute flight, averaging 193kts (222mph). The advantages of an on-board oxygen system and flying high where the strong tailwinds are, were obvious.

There were about 15 VariEzes and Long-EZs on the ramp, but everyone was already in the motel. We got a short ride in the motel shuttle bus to the really nice looking Stateline Casino/Motel which is just a few feet over the Utah state line into Nevada.

Good company, good food, and a fun place with a beautiful swimming pool - that's why people come here! This is where the land speed records have been set over the years. The Bonneville Salt Flats! We were amazed to see that back in 1949, John Cobb became the first person to exceed 400mph in a really special car called the Railton Special, 1949! Wow! Now the record is over 620mph on land. Incredible.

Early the next morning, Shirl Dickey, the host and organizer of the Bonneville 125, held a pre-race briefing and then we all were off. Bruce Tiff was the starter in his bright yellow, highly modified Long/VariEze (?). The first race was the unlimited. There were six planes entered, 3 VariEzes, 2 Long-EZs and a Glasair.

We formed up, three on each side of Bruce, into a straight line as we approached the start point on the Wendover airport. Suddenly, Bruce pulled up steeply and we were off! I knew there was some fast competition so I pushed up the power a little and leaned to best power mixture. I looked at the other five contestants, expecting to see at least the 180hp RG Glasair going by, but no, they were all slowly falling back!

I let down to 5500ft MSL over the Salt Flats, noting that Shirl was right, the best emergency landing area was the blacktop frontage road south of the I-80 highway. I searched the eastern shore of the salt flats for the hill with the microwave tower which was to be our turnpoint. Still too far away, no, there it is, correct the heading a tiny bit, look back, can't see anyone. Where are they? Are they behind me? Are they under me? No way to tell. Here is the Microwave tower and there are Joan Hansen and Barbara Wilson in their yellow slickers. They're the turnpoint officials. I call that I am rounding the pylon and Joan acknowledges. As I sweep over them on my way back to Wendover, I hear the next arrival, the Glasair, calling his turn and I think, "Wow, maybe I can beat him". I concentrate on holding a dead straight line back to Wendover. I use the Loran as well as my map to be sure to fly the shortest possible distance. I notice that my ground speed readout is 13kts lower going West than it was going East. Drat! Must have a head wind. I push the power up a little more keeping a sharp eye on the temperatures and pressures. Everything is in the green but the oil temperature is higher than normal. I am back over the salt flats now and have the highway in sight. I am tempted to go down on the deck where I am sure the headwind is not as bad, but I figure that would leave me with zero options if I had any kind of engine problem. From 5500ft, I know I can glide to the road. I look around and see nobody! I wonder and worry if they are playing possum and sitting under and behind me in my blind spot. I begin to think that I might win! "Hold together for 13 more miles", I whisper to my trusty steed. I watch the miles count down on the Loran, when suddenly, Klaus calls a 2 mile straight in for the finish line! I am still 4 miles out but I can't see him. Then the Glasair and John Chambers announce they are 3 to 4 miles out. I start a shallow descent hoping to pick up a few knots, and call when I am at 2 miles.

Thirty-nine seconds later, I flash over the finish line. I'd won! Klaus was trying to psyche me out! What a neat feeling as I taxi in to see Sally smiling happily and walking out to meet me. Our Long-EZ performed flawlessly.

I stood behind Diane Dickey, the timekeeper, and watched the rest of the races. NEAT! You should have been there! It is really exciting when you hear the sound of EZs coming in over the salt flats, but you can't see them yet. Suddenly, there they are. "Who's in front?" Shirl Dickey and Joe Moore finish 1-2, so close it's hard call, only 1/2 second apart! Wow.

Four races are held, all are successful, all are safe and everyone enjoyed. That evening, at a really fine dinner in one of the banquet rooms at the Stateline, Shirl announces the results and presents the prizes. I win enough cash to buy a new volt/amp gauge I have had my eye on! Neat.

What a weekend, what a neat bunch of people, and what a neat place. We will be back next year! Hope this gives you a taste, an idea, of the fun that you can have with your EZ. Come next time. Shirl and Diane do a superb job of organizing a really neat weekend at Wendover as well as Jackpot, NV which is held over the 4th of July weekend.

Results of the 1987 Bonneville 125 (125 miles)

Stock VariEze (Cont. 0-200)

Place	Name	Time	Speed (mph)
1st	Joe Moore	36:54:74	203.14
2nd	Shirl Dickey	36:55:29	203.12
3rd	Gerry Gardner	40:10:65	186.64

Stock Long-EZ

1st	Gordon Jones	40:13:07	187.41
2nd	Gus Sabo	40:13:18	186.47
3rd	Stan Snyderman	41:22:41	181.26

0-235 VariEze (New class)

1st	Bob Paulson	39:29:10	189.94
2nd	John Lambert	39:42:25	188.88
3rd	Bill Lermer	43:45:95	171.33

Unlimited

1st (Long-EZ)	Mike Melvill	32:29:45	230.80
2nd (VariEze)	Klaus Xavier	33:13:68	225.66
3rd (Glasair)	Ken Ashby	33:17:90	225.17
4th (VariEze)	John Chambers	33:19:14	225.09

BUILDER HINTS

Heavy Duty Brakes

If you elect to install the larger brakes as strongly recommended in CP51, there is a possible problem to watch out for. If you have not installed the wheel pants, the easiest way to take care of the problem is to order two special steel spacers from Brock. The part number is A484-187. These new spacers will be installed on the axles first, then the main wheels will be installed normally. This will space the wheels 3/16" outboard.

If you already have wheel pants installed, watch for an interference between the wheel/tire and wheelpant. The amount of interference will depend on how tightly fitted your wheelpant is. The only alternative to this fix, which will not affect the wheel-to-wheelpant fit, is to make new, longer locator pins and install them in the brake calipers. This requires some machining capability as well as lathe and thread cutting capability. We did go this route and we simply removed the locator pins by removing the nuts and pressing the pins out. We carefully measured these pins and machined up four new ones, but made them 1/4" longer. This will cure the potential problem without causing any wheel-to-wheelpant interference, but is much more difficult to accomplish than the first option of using the two Brock spacer rings.

The reason for the above change is the possibility of the brake caliper locator pins pulling out of the fixed brake plate, thus allowing the brake caliper to rotate. This has already occurred in one case and it caused considerable damage to the wheelpant and the gear strut. Look carefully at the brake caliper and disc and you will see that as the brake linings wear down, the brake caliper will move inboard, away from the wheel and disc. If the brake linings are allowed to wear all the way down to the rivets, the locator pins may pull out of the steel bushings in the fixed brake plate. This is a real GOTCHA, so don't ignore it if you have the heavy duty brakes.

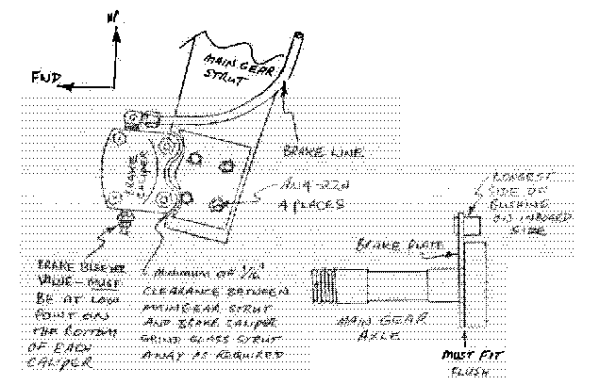
NOTE: This will not occur if you are still using the standard 500x5 Cleveland brakes. However, we feel very strongly that any Long-EZ should use the heavy duty brakes (part #199-152, see CP51) and even some of the heavier VariEzes probably should be using them.

Installing and Bleeding Brakes

We had assumed that everyone would know how to install and plumb the brakes on an EZ, and that everyone would know how to bleed the brakes. This has not been an area of great problems but has been an ongoing support requirement. Recently we saw a brake installation on a new Long-EZ that was done so as to make it extremely difficult, if not impossible, to successfully bleed the brakes.

First of all, when you receive a new set of Cleveland brakes, the brake bleeder fittings will almost certainly be installed into both brake calipers the same way. In other words, you may assume you have two left hand or two right hand brakes. Not so! The bleeder fitting must be installed so it is on the bottom, or lowest point, on each brake caliper. You should never have a brake bleeder valve on the top of a brake caliper. So remove the one that will end up on top of the caliper and install it on the bottom, using teflon thread paste or tape. The 90° elbows should be similarly installed on the top of each caliper.

The brake plate, or brake caliper locator, a steel plate with a large hole in the center and 8 smaller holes punched around the large hole and with two steel bushings in it, should be slipped over the axle and should seat snugly against the axle flange. If it does not, which is quite common, use a file or a Dremel tool and radius the large hole in the steel plate until it will fit tightly against the axle flange. Choose the appropriate 4-hole bolt pattern (you have two choices) and bolt the axles onto your main gear strut. See CP34, page 11 for a clear photo of the left main wheel and brake on a Long-EZ installed correctly. Also see the sketch below.



Now, when you are ready to bleed the brakes, a really handy gadget is a Cleveland brake line bleeder tool (part #87-5) currently \$21.30 in the Aircraft Spruce catalog. Install an 18" long flexible rubber or tygothane hose on this tool and connect the other end of the rubber hose to the nozzle of a large oil can with a trigger-type pump. Fill the oil can with Dot 5 automotive 100% silicone brake fluid, usually purple in color and made by most brake fluid manufacturers including GE which is the one we used. Now, remove the rubber bleeder cap and install the 87-5 tool onto the brake bleeder valve. Using a 1/4" wrench, loosen the bleeder valve 1 to 2 turns. Pump the silicon brake fluid until the master cylinder reservoir is 3/4 full and tighten the bleeder valve (be gentle, this is a tiny little valve!). Remove the 87-5 tool and your brake is ready to fly. Since the whole system goes continuously uphill, there will not be any air in the system. Due to the small size and throw of an aircraft-type master cylinder, it is almost impossible to fill the brake master cylinder and line from the top as you would in an automobile. Using an 87-5 tool and filling from the bottom mounted brake bleeder valve, bleeding your EZ brakes is quite literally a 5 minute or less job. It helps to have an assistant watching the level in the master cylinder reservoir so you can quit before you pump fluid all over the place.

We highly recommend the 100% silicone brake fluid (must be Dot 5). Since it is completely inert, it is compatible with any type "O" rings and seals. It is not flammable and it does not destroy your paint as normal aircraft brake fluid does. We bought it at a Hot Rod-type auto parts store locally.

HIGH CHT'S

Recently we have had two separate cases where builder/flyers had been battling with really high cylinder head temperatures. Talking to them on the phone, we discussed baffling, cowling inlet and outlet sizes, carburetion, and spark plug heat range. Frankly, we, and they, were running out of ideas. Amazingly, both of these EZ flyers had obtained their engines in the same way, removed from a factory airplane with relatively low time and running fine when removed. As a result, both of these engines were installed in the EZs and flown as they were received.

The cause of the high CHT's was finally traced to one or both magnetos being timed too far advanced. In one case, one mag was timed 15° ahead of normal. In the other case, both mags were 25° too far advanced!! Beware, guys, some of the supposed FAA approved mechanics, A&P's and even AI's may not be any smarter than you are when it comes to timing magnetos.

In both cases, once the mag timing was adjusted to the normal position, CHT's were immediately reduced to normal. There is a lesson here. No matter where you obtain your engine, whether it is a factory new one, a rebuilt one, or a "used one running well when removed", check the timing before you go flying. If you don't know how to do this, get help from an experienced person who does. Assuming that the timing is correct could be a very expensive mistake.

PROP BOLT TORQUE PROBLEM

Long-EZ builder, Art Bianconi from Staten Island, NY sent in this hint. While he was torquing his prop bolts, he noticed a suspiciously high torque reading even though the bolt heads had not bottomed on the crush plate. Each bolt was an easy slip-fit in the holes in the wood prop hub and each bolt was an easy fit through the aluminum crush plate. On closer examination, Art noticed that the black anodize finish in each hole in the crush plate was worn off inside the holes, but only in one spot, on the outermost surface of each hole. This indicated that the bolt circle in the crush plate was too small in diameter! He simply drilled each hole out .015" larger and that cured the problem.

It is possible that more crush plates like Art's are out there in the field, so if your bolts are tight, or even difficult to install through the crush plate and prop, take a look at the inside of each hole. If there is a polished spot on one side or the other, consider running a .015" oversize drill through the crush plate. It is very important that there is no such interference to give you a false torque reading on your torque wrench when you are checking your prop bolts. We appreciate this tip from Art Bianconi.

CRACKED WELDS IN EXHAUST SYSTEMS

We have heard of only one instance of cracks in a Brock Long-EZ exhaust system. It occurred at the flange where the pipe is welded to the flange. Careful inspection is necessary to find this type of crack. You may even need to lightly sandblast the area to detect these cracks. After these cracks were welded, there has not been any further sign of a crack but it is being inspected regularly.

There are several types of exhausts that are currently being used on EZs. Our own experience is limited to the exhaust systems made and sold by Ken Brock and to systems we have welded up ourselves. Exhaust systems, even on certified airplanes, are generally on-going maintenance problems. A simple, four separate pipe exhaust system we tried recently has been plagued with cracks. In fact, every time we have taken the cowling off, we have found cracks all the way from minor, little cracks to major cracks, all the way through one tube. So far, we have severely damaged the prop only once, when a rather large piece went through the prop, but we have been fortunate to catch potential problems before they became serious by careful inspection.

Any and all exhaust systems should be removed to be very carefully inspected at least every annual. If you have a history of exhaust system cracks, check it every 50 hours.

The most reliable exhaust systems we have used on the VariEze were made by Herb Sanders of Memphis, TN, who sold out to Sport Flight which is now located in

Florida. On the Long-EZ, by far the most reliable exhaust system has been the one made by Ken Brock Mfg.

CAUTION - WING ATTACH BOLTS

We recently heard from a Cozy builder who had been chasing a minor but annoying vibration in his aircraft for some time. He finally traced it to the fact that his wing attach bolts were slightly loose allowing his wings to move a little in flight. After he tightened the three 1/2" bolts in each wing (the Cozy uses the Long-EZ wing and wing attach system) the vibration went away. He checked several Long-EZs in his area and found a couple of them with the same problem. We had not had anything like this reported to us before and we checked the two Long-EZs we have here at RAF, both were solid.

The way to check for this problem is to have someone put their hands on the joint between the centersection spar and the wing to feel for excess movement while you lift at the wing tip. A small amount of movement, less than 1/16" at the wing root leading edge, is normal. If excessive movement is detected, you must remove the wing bolt covers and torque the bolts. It is difficult to use a torque wrench in this area. We simply used two ratchet wrenches, each 6" long, and pulled about as hard as we could. It takes two people to do it right.

Since a person can pull with about 75lbs of force with one hand, we can calculate the torque = 75x5=375in/lbs or 31ft/lbs. Using this method, we have never had one of these bolts work loose. A 1/2-20 aircraft bolt can handle 600in/lbs (50ft/lbs) of torque. However, with the glass plies in between the aluminum hard points, we would recommend no more than 400in/lbs (33ft/lbs) of torque on these bolts.

CAUTION - Aeroquip 601 Hose Leaks.

We have yet another report of one of these rubber, reinforced-with-stainless-steel, outer, braid hoses that has suddenly sprung a massive leak. Again, it happened after the airplane had not been flown for a while. Our own experience with the Grizzly was that the airplane was not used for almost one year, then when we turned on the fuel valve and the boost pump, fuel ran out of the cowling just as though a line had been removed. A fuel line, an Aeroquip 601, was leaking at one of the fittings. This hose had never leaked before and no one had touched it between flights. We have now heard from at least four builders with this problem.

Here at RAF, we have gone over to Stratoflex Teflon hoses and we order them made up to the length we want. We have them pressure checked and have fire sleeves installed on each fuel line. These fuel lines are more expensive but we believe they are a much safer way to go. We have been getting our hoses from Aircraft Spruce and they are available from dash-3 to dash-8.

Check all your hoses aft of the firewall, both oil lines and fuel lines, frequently, especially if you have Aeroquip 601 hoses and even more frequently if you made these up yourself. A fuel leak aft of the firewall must be considered one of the most hazardous situations that can occur and must be taken care of before it happens while airborne. Replace any suspect fuel/oil lines. Have them pressure tested and have fire sleeves installed on each line.

ACCIDENTS/INCIDENTS

As always, the following reports are printed here solely in the hope that we can all learn from someone else's experience and/or mistakes.

A VariEze at an Airshow in France was seen to take off and fly low to the end of the short grass runway. He then pulled straight up, barely made it over the top of the half loop, then attempted a "Split S" recovery but was too low. The VariEze hit the ground just as the pilot leveled out, tearing out the main gear and sliding for over 70 yards on the belly. The bottom was ripped off from the nose to the rear seat. The pilot was seriously injured.

What can you say about such an accident? Don't let it happen to you. Low level aerobatics and buzz-jobs cause more accidents in EZs than all the rest of the accidents put together!

The following two incident reports were sent in by Long-EZ builder/flyer, Jimmie Hays.

"I had a totally unnecessary off-airport landing the other day. I pulled the airplane into an exceptionally nose high attitude while bleeding off speed from cruise to do some stall tests. As I pushed over to recover, the carburetor became unported and the engine quit. This wasn't altogether a surprise, but when the engine would not start right away after speed and "G" forces were returned, it was a definite surprise!

I went through all the emergency procedures (several times!), switched tanks, boost pump on, pumped the throttle, tried carb heat, talked to ATC, all to no avail! I was over distinctly unhealthy terrain but, fortunately, there were a couple of fields in gliding distance. I made the decision to lower the nose gear on short final, to absorb some of the landing shock and minimize nose-over possibilities. At about 25 feet, I noticed, for the first time, the tach was resting on zero! Too late to hit the starter, I went ahead with the landing. A very short landing roll in very sandy, loose soil. I am sure happy I decided to put down the nose gear. The only damage was some paint damage and the loss of one vortilon while loading it onto the wrecking truck which got stuck 4 times getting out of the field!

Obviously, checking the tach has now become VERY MUCH a part of my personal engine-out procedures. The prop had stopped in the horizontal position and may not have been noticed, even if I had looked back."

Canopy/Nose Gear Experience

"Less than 6 hours into my test flight period, I failed to lock the canopy before take-off. Everything went perfectly normally through rotation and until the mains came off the runway. Suddenly, the canopy slammed open against the safety catch. The noise level immediately went up from wind and engine noises. I, also immediately, thought of all the stories I'd read about control problems with the canopy open. I reached to grab the canopy with my left hand and my right hand subconsciously followed, driving the nose gear smartly back into the runway. I reacted almost as quickly, raising the nose again but, alas, the nose wheel was no longer there. What a strange looking thing that nose gear strut is in the bare state when you look at it through the little plexiglass window.

Naturally, the nose wheel assembly had found the prop, so now I also had a lopsided prop to add to my problems. The nose wheel and fork assembly came through the whole affair quite nicely (and is still doing well with 200-plus hours). The only damage was the four bolts having failed as described in CP51. I retracted the nose gear strut and landed with minimal skin damage in the nose area. LESSONS LEARNED: 1) fly the airplane! 2) the airplane would have flown quite nicely with the canopy open against the safety catch. 3) the airplane is distractingly noisy with the canopy partly open. 4) the canopy won't lift against the safety catch until just at take-off speed and altitude. 5) wooden props will keep going with quite a lot of damage. 6) FLY THE AIRPLANE, STUPID!"

REFUELING FIRE

We received this information third hand. We have not had any contact with the Long-EZ pilot. Apparently, after a flight in his Long-EZ, a Norwegian builder/pilot landed at an airport in Norway and requested fuel. As the attendant started to fill one of his tanks, a static spark jumped and ignited the fumes around the fuel cap area. Fortunately, a fire extinguisher was available and the fire was extinguished.

The above is all the information we have. We are endeavoring to find out more about this incident and we would appreciate any information anyone may have about this or any other similar incident.

This is the first time we have had a report of a fire while fueling an EZ. We have, of course, fueled many composite airplanes here at Mojave, literally hundreds of times, and we have never even seen a static spark. That is not to say it could not happen but of all the

places it should happen, Mojave, with its extremely dry climate, would seem to be a likely candidate.

What can be done to prevent such an incident? If you built a ground strap into the tank connecting the fuel cap ring to the aircraft ground, and you grounded the aircraft during a refueling operation, this should not be able to occur. However, if your airplane was ever struck by lightning, the ground strap would conduct the charge. It would become red hot and melt which may cause an explosion/fire! Not a good alternative.

The most practical thing to do would be to always touch the fuel truck's ground cable to each fuel cap BEFORE you open these caps. This would discharge any static build-up on the aircraft skin/strake area. Another suggestion was made in EAA's Sport Aviation magazine and that is to make up a length of brass bathroom chain with a small clip on one end. Clip it to the fuel nozzle and drop the chain into your fuel BEFORE pumping fuel into the tank. The idea is to discharge any static that may build up due to the friction of the fuel running out of the nozzle into the tank. This would be in addition to the first suggestion.

We are not experts in this field at all. During fueling we, ourselves, have never taken any special precautions other than the normal grounding of the exhaust pipe (which may or may not do anything at all!) We have been fueling composite airplanes here at Mojave and, indeed, all over the United States for more than ten years without any evidence of a problem. We simply present the report of this incident as food for thought. If anyone has any suggestion as to what could be done to prevent such a thing, we would be pleased to hear from you.

PLANS CHANGES

There are no plans changes for this newsletter. Not for any of the RAF airplanes including VariEze, Long-EZ, Solitaire, or 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 help from you, the builder. If you come across an obvious error or omission in the RAF plans you are working from, please send us the information so that we can print it here to help other builders.

For the same reasons, we request any information about building, flying or maintaining any of the RAF airplanes so that we can publish this information in the CP newsletter. This newsletter is for your benefit so if you want it to continue and be helpful and interesting to builders and flyers of RAF-types, send in your hints and suggestions!

FOR SALE

Cont. 0-200A with 88 hrs. since major overhaul. Many other parts for a VariEze since we have decided to "part out" our EZ. Contact: George B. Stillwagon, Jr.
546 Hathaway Rd.
Dayton, OH 45419

Cont. 0-200A with log, 359 hrs. since major. 1861 hrs total time. \$3600.00. Also many other parts for VariEze. Contact: Daryl Lambert
11215 161 Court, NE
Redmond, WA 98052
206-882-2852

NACA FLUSH INLET FOR EZ'S

PLEASE NOTE: Tim Gehres has decided not to sell anymore plans for the flush inlet. He has gone out of business. There is no known source of the plans and RAF cannot assist you in trying to build a flush inlet.

BOB DAVENPORT'S NOSE GEAR SHIMMY DAMPER

Unfortunately, Bob gave us the wrong area code for his phone number - the correct phone number is 305-567-1844. Bob's address is PO Box 650581, Vero Beach, FL 32965. We continue to run two of Bob's shimmy dampers and grow more and more convinced that this is the only way to go. Bob has complete kits and instructions available for

\$39.05. We strongly recommend this excellent shimmy damper to all VariEze and Long-EZ flyers.

GREAT AMERICAN PROPS

Great American is pleased to announce that they have completed a development program on a protective leading edge for their props. This is available on a new prop for \$75.00 additional cost, or for \$150.00 if you send your old prop in for a rebuild. This includes repairing, refinishing, and balancing with the new tough urethane leading edge. The urethane wraps around the leading edge and extends back almost an inch, giving a very large bond area, and offering exceptional protection from rain erosion.

Contact: Great American Props
1180 Pike Lane #5
Oceano, CA 93445
805-481-9054

RETROFITTABLE FUEL SIGHT GAUGES

Aircraft Component Technology (ACT) has developed a new fuel gauge for Rutan composite airplanes. A look over your shoulder rewards you with the truth about your fuel supply. It is a clear, shatter-resistant gauge which is backed by an opaque, white plastic base. Repeated blows with a hammer have resulted in deformation, never breakage. This is important because a broken gauge would mean uncontrollable fuel leakage into the cockpit. Like the Rutan composites, the gauges are intended for use with avgas. They are retrofittable from the cockpit side using floc and BID tape. A hand drill is the only tool needed.

Unlike the earlier model ACT EZ gauges, the new gauges are not illuminated nor are they equipped with a low-fuel warning system. Kits are \$30.00 (\$33.00 outside the U.S.) including shipping and peace-of-mind. Each kit contains two complete gauges and detailed installation instructions. Each gauge is 2" wide, 6 5/8" high and about 5/8" deep.

Inquiries may be directed to: Aircraft Component Tech.
Attn: John Van Osterom
1501 Albright
Upland, CA 91786
Tel: 1-714-985-5887

WANTED

Cont. 0-200 1/2 to 3/4 life, reasonable price.

Call: Simon Evans
0-689-349-75

Write: 27 Friar Road
Orpington Road
Kent, England

RAF QUARTERLY SPECIAL

We are closing out all shirts and have a few left at a special price. We'll sell these on a first come/first served basis. There are only small and extra large in the "Laughter Silvered Wings" T-shirts (blue) and extra large only in the RAF Polo shirts (white).

T-shirts - \$ 5.00 ea.
Polo shirts - \$10.00 ea.

SPECIAL	NEW	SPECIAL	NEW	SPECIAL	NEW
Color Poster featuring All The Rutan-designed Aircraft					
Introduced this year at Oshkosh shows 18 of the Rutan aircraft in a beautiful formation flyby. The poster is a laser print of an original oil painting by aviation artist Jack Leynwood. On the back is a complete chronological chart of all the Rutan designed airplanes. Poster is approximately 20"x30" and will sell for \$15.00 plus \$3.00 postage and handling.					

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

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

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

Brock Mfg.
11852 Western Ave.
Stanton, CA 90680
714-898-4366

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

FIRST FLIGHT PREPARATIONS

Tom Jewett of Littleton, CO sent us the following essay concerning preparation for your first flight. We enjoyed it and we agree with him 100%. We have printed it here so that all potential flyers can benefit from his perceptive point of view.

"March 22, 1986 7:35am Long-EZ, N35TM, takes off for its very first flight. After 2700 hours of work, it was time for some fun! That's right, fun! I believe that if all preparations are properly made, first flights of homebuilt aircraft should be fun. I would like to pass along my thoughts about the first flight of my Long-EZ, hoping that it will help others to have fun on their first flights.

A successful first flight depends upon four things being 100 percent ready. This simple checklist of four items includes: 1) The airplane, 2) The pilot, 3) The weather, 4) The circumstances. Great discipline is required to assure yourself that all four items on the checklist are 100 percent ready before attempting your first flight. Pressure to fly your new airplane will come from the most unlikely sources.

Obviously, the airplane must be ready, but what is less obvious is making sure that you have 100 percent confidence in you airplane. Prove to yourself that everything is in proper working order. If there is the slightest doubt about anything, fix it! The last thing you need on your first flight is doubt. I found that the best way to inspect your airplane is to have someone else double check your inspection. I was lucky enough to have other EZ builders and flyers who were willing to look over my work during construction and prior to the first flight. I was always amazed at the number of seemingly minor items to be corrected or adjusted that a different set of eyes would find. Even if you do not have other EZ builders or flyers in your area, enlist someone else to inspect your work. Do whatever it takes to develop 100 percent confidence in you airplane.

Pilot preparation for the first flight is very important because of all the "unknowns" that will be thrust upon the test pilot. Basic pilot proficiency must be very high so that the pilot can concentrate on how the airplane performs, not on basic pilot skills.

In my opinion, the best pilot proficiency preparation is recency of experience. During the four years of construction of my Long-EZ, I flew one airplane a total of 47 hours (less than one hour per month!) Needless to say, I was extremely rusty. To prepare myself, I flew the following aircraft: CE 150, CE 152, CE 172, American Yankee. All flights were made from the right seat to practice flying with my right hand and doing other chores with my left hand. I felt that flying the Yankee was the most beneficial because it is very similar to the Long-EZ, both in ground handling and flight characteristics. The major differences are: 1) The Yankee requires a higher power setting to maintain a comfortable decent rate during landing approach, 2) The climb rate of the Yankee is much lower than that of the Long-EZ. After I felt proficient in all these airplanes, I was lucky enough to get a one hour flight in the back seat of a VariEze. The resulting critique of my pilot skills from an experienced EZ pilot was invaluable. In summary, I flew 13.8 hours in five different aircraft in the two months prior to flying my Long-EZ.

The other pilot preparation which I would highly recommend is to make a definite flight plan for your first flight. Use your owner's manual for procedures and target airspeeds, but do not forget that your airplane may behave differently from the airplane upon which the owner's manual is based. Discuss your flight plan with as many experienced pilots as you can. You will get good and bad suggestions, but overall, it will help. I wrote my plan out in the form of a checklist and practiced flying through it in familiar airplanes. You will be a test pilot on your first flight (and many flights thereafter) so practice being one!

The weather is a simple checklist item, but it should not be overlooked or neglected. Proper weather conditions are at least as important as any other item on the first flight check list. If, for any reason, you are uncomfortable about the weather, wait. Don't make yourself fight adverse weather conditions on your first flight. Make sure you have plenty of ceiling so you can fly at a safe altitude, and try to make your first flight on a cool day. All airplanes perform better at cooler temperatures.

Last, but not least, on the first flight checklist is the "catch-all" that I call circumstances. It includes many intangible things, the most important of which is the condition of the pilot. If you are tired from a full day of preparing yourself and your airplane, it is probably best to wait a day until you are fresh and your mind is clear.

Another circumstance to consider is traffic. Try to make your first flight at a time of low traffic. You will have your hands full with your new airplane, and heavy traffic will be an unnecessary distraction. Also, consider the number of spectators/assistants on hand to witness the big event. As you build your airplane everyone says, "Call me when you get ready to fly that thing." I, personally, think that having many spectators around provides more distractions than benefits. I chose to have only my wife and a fellow Long-EZ builder present at my first flight, and this worked quite well. The "ground crew" used a hand held radio and a copy of my flight plan so they could follow the progress of the flight and make notes as I transmitted them down. Having a support crew member who is familiar with your type of airplane and its systems is very helpful (especially in the event of any malfunction). However you decide to make your first flight, make sure that all the circumstances are correct and that your support crew is the one that you have chosen.

As you approach your first flight, you will be anxious to fly, and many opportunities to do so will present themselves, as they did for me. I mentally went through the checklist: 1) Airplane, 2) Pilot, 3) Weather, 4) Circumstances. At least twice I had three of the four items ready so I decided to wait. When I had four of four ready, I went flying, and I had fun! I was well prepared, the airplane performed beautifully, the weather was great, and the circumstances were perfect. Be careful, and have fun!

VARIVIGGEN NEWS

Emerald J. Ullman, builder and pilot of VariViggen N22VV, wrote recently of a gear-up landing he had. It was night time at the Litchfield airport in Illinois when Emerald discovered that for some reason he was unable to lower the main gear. He tried the manual extension system and it, too, was jammed. He extended the nose gear, lined up on a hard surface runway, pulled the mixture, stopping the engine, and touched down on the small wheel/skids under the vertical stabilizers and the nose wheel. The aircraft rolled/slid out along the centerline of the runway and stopped within 600 feet. The small skids were ground down to within 1-1/2" of the bottom of the wing. No other damage was incurred to the aircraft. The skids have since been repaired and repainted and the aircraft was being reassembled as of June 28, 1987.

"Main gear retract/extend system was built per Mike Melvill's modification, dated May 1978. The references to suspect parts that may have caused the left main gear to lock in the up position will apply to the drawings and parts of Melvill's modification.

As mentioned above: The left main gear refused to extend from the up and locked position. Investigation at my shop revealed the following:

Ref. Drawing #1: Set screw in left drive of Boston miter gear HLK-110Y was found to be loose. However the miter gear was retained within the gear box and on the MGB-4 shaft by the key/key-way. Note: It is possible that the shaft could have moved outboard-however probably no more than 1/8 inch.

Ref. Drawing #3: Sec. A-A: AN 509 counter sunk bolt (left worm & worm gear drive assembly) through the center of CD1145 Boston worm gear and MG7 helcrank bearing had partially backed out of the anchor nut

allowing some play in the worm gear CD1145 to the Boston HDVH worm. Note: It is possible that the worm gear/worm could have locked in a misaligned situation preventing both the electric drive and the manual crank down drive from functioning. (Speculation only)

No other loose bolts, nuts, etc. were found throughout the main gear modification.

My emergency manual crankdown system is very similar to Melvill's suggested plan as shown on Dwg. #6. The manual gear take off from the main gear box assembly was still solidly intact and not binding.

After tightening the set screw on the miter gear, got into pilot's seat and performed the emergency gear let down procedure of releasing the electric motor from the main gear box assembly and releasing the uplocks on the main gear. (Note: the uplocks were not visible for inspection prior to letting the main gear down since wheel covers were in place). The main gear was then manually cranked down with no binding of the manual crank down handle as had previously been encountered during inflight attempt to crank the main gear down.

Main gear box assembly was removed from aircraft and shafts under set screws of the three miter gears were recessed drilled. Gear box assembly was reassembled and set screws installed with "Locktite" and gear box reinstalled in aircraft. AN 509 bolt was tightened and secured in place with "Locktite".

Wheel covers were removed to observe full movement of main gear and uplocks. Electric drive to gear box was used to retract and extend main gear. Uplocks functioned properly and no binding encountered, even with simulated negative and positive loads on the system while in operation. Manual crank down was performed and operated flawlessly in the static position of the aircraft.

Other than the "speculation" of what could have happened as noted in the previous investigation, I cannot add to the reason(s) for malfunction of the main gear retract/extend system.

Sincerely, Emerald J. Ullman
Builder/Pilot of N22VV

EDITORS COMMENT

Emerald is to be congratulated on the excellent job he did of bringing his Viggen in at night with the main gear locked up. He kept cool, he made good, sound decisions, and he landed successfully and safely; a really impressive accomplishment.

We have studied Emerald's report and, although there is a possibility that the loose set screw on the miter gear, or the loose AN 509 bolt through the center of the CD1145 main gear might have caused some kind of binding, we doubt it. The miter gear is retained in the gearbox and connected to the shaft with a key in a keyway. The worm gear and worm should work until the AN509 fell out, being loose should not have affected its ability to work. No, we believe the problem was probably associated with the uplock. Burt Rutan had three gear-up landings in the original prototype, N27VV, and they were all associated with the uplock for one reason or another. Since Emerald did not look at the uplock on the side that jammed, it is hard to know what happened, but we would strongly suggest that all Viggen flyers carefully inspect the uplocks and be absolutely certain that nothing can bind or jam this spring operated catch. If it won't unlock, no amount of effort will get the gear down, not electric motors nor hand cranks. Keep in mind that airloads in the air may push the gear up onto the uplock and make it bind to the point that the spring may be unable to pull the lock free to let the gear come down. Perhaps a little grit on the lock or bolt could jam it. It could be a number of things. In any event, it is mandatory that the pilot has the ability to manually pull the uplocks free with a strong cable. Check this in your Viggen and be absolutely certain you can manually unlock the uplocks before you fly again.

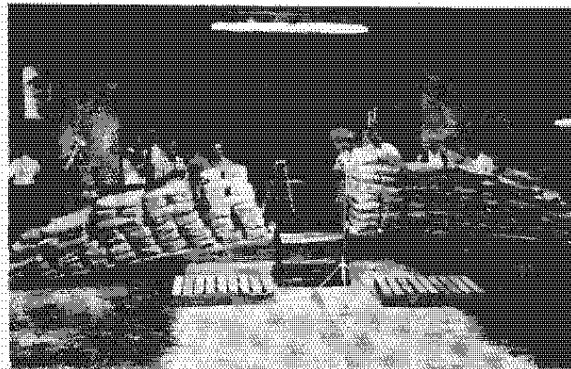
Once you are certain the uplock unlocking system is fool proof, you should practice lowering the main gear using the emergency extension system. Do this first on saw horses on the ground - do it until you are satisfied it

will work every time - then take off and climb to a safe altitude, pull the circuit breaker on the main gear motor, manually unlock the uplocks, and crank it all the way down. When you reset the circuit breaker, the green lights should be on and the motor should not run at all. If your emergency main gear extend system does not work perfectly, repair it and don't fly until it does.

We do not recommend routine use of the nose gear emergency extension system while airborne since this really puts a heavy shock load on everything, including your instruments. However, you should be certain that it works freely and reliably on the ground before you go flying.



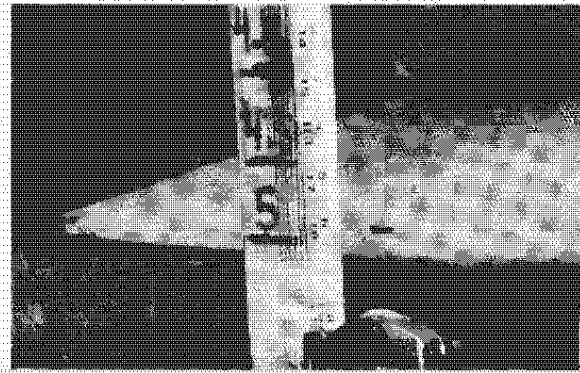
Johnny Murphy & his helpers preparing to static load Mike Cardinale's rejected Defiant Canard.



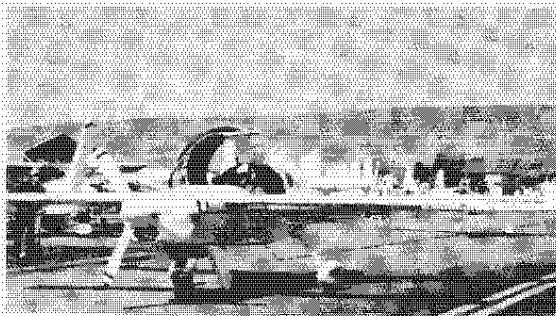
Left canard tip is on the ground after the left lift tab failed due to incorrect mounting method. Right lift tab is carrying all of the load on the right plus 2/3 of the load on the left!



Left lift tab failure caused by extremely rigid steel fixture not allowing the lift tabs to flex apart when the canard bends. The bulkhead in the fuselage flexes under load.



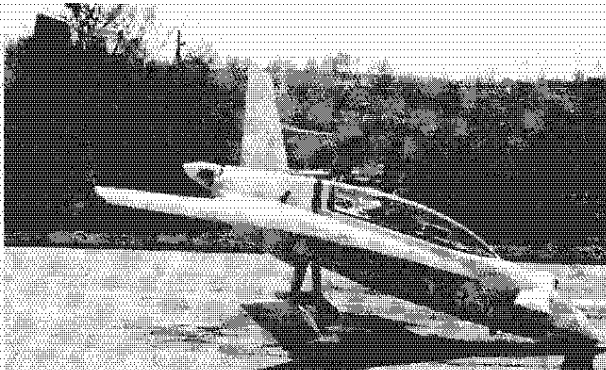
5 "G" static load causes 18" of deflection at the canard tip with no failure of the canard.



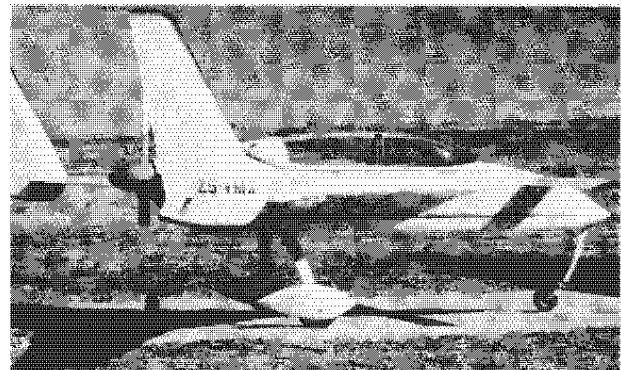
Burt in the prototype Defiant taxiing out for the Unlimited race at Jackpot - He turned a 211.6mph lap!



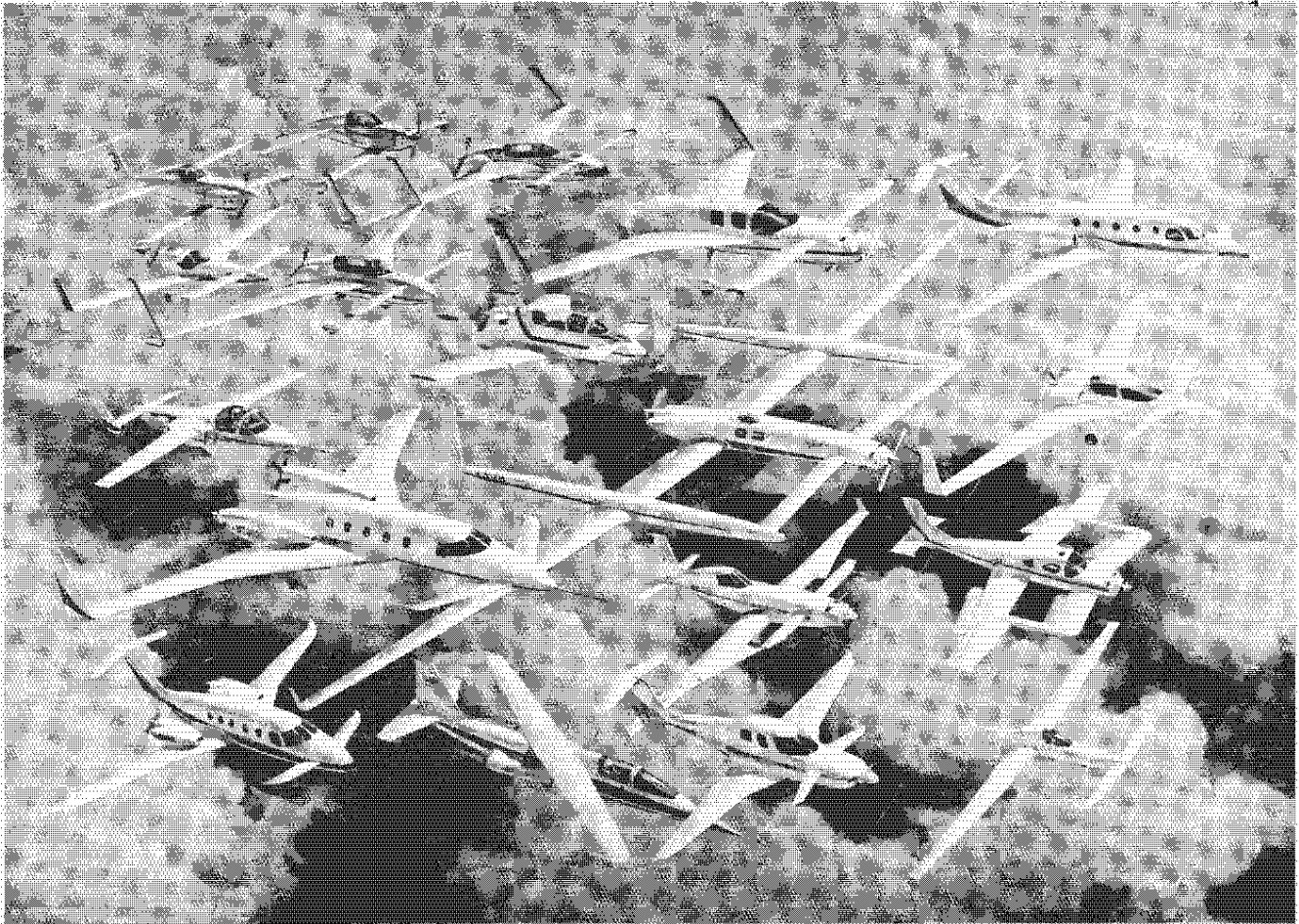
Some of the 56 EZs and 2 Defiants in Casino Pete's parking lot at Jackpot, NV. It was quite a sight to see 110 winglets standing to attention.



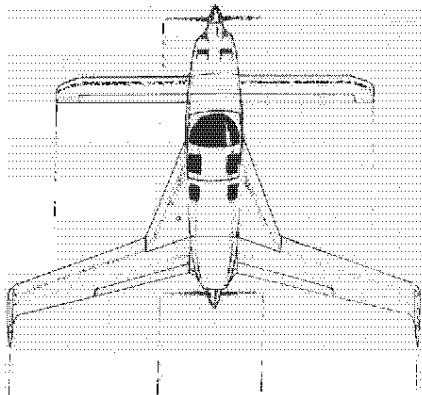
Peter Froidevaux's beautiful newly completed Long-EZ in Switzerland.



Dave O'Neill's brand new Long-EZ, winner of the "Best Composite Construction" Award at the South African equivalent of the EAA convention held at Margate, RSA.



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



TO:

first class mail

July '87

The line which appears above your name lets you know through which Canard Pusher you are paid. If your label says **LAST ISSUE CP 52**, then this is your last issue, and you need to renew.

CP 52