THE CANARD PUSHER

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If you are building a VariViggen from 1st Edition plans you must have newsletter 1 through 37. If you are building from 2nd Edition plans you must have newsletters 18 through 37. If you are building a VariEze from 1st Edition plans you must have newsletters from 10 to 36. If you are building a VariEze from 2nd Edition plans you must have newsletters from 16 through 37. If you are building a Long-EZ you must have newsletters from 24 through 37. If you are building a Solitaire, you must have newsletter starting with 38.

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

The RAF hangar is located on the west end of the flight line at the Mojave Airport, Mojave, Ca. approximately 80 miles north of Los Angeles. You are welcome to come by and see our aircraft or to bring in any parts for our comments. We are normally open from 8:00 to 12:00 and 1:00 to 5:00 on Monday through Friday and 9:00 to 3:00 on Saturday. Closed on Sunday

If you are planning a trip to see us, please call first to assure that someone will be here to assist you, since occasionally we are gone to flyins. When arriving at Mojave by car turn east at the Carl's Jr. restaurant to find the airport.

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.

SUBSCRIPTIONS

Many of our subscribers have aked us if a renewal can be made for a two or three year period at one time. This is ok with RAF. Please remember to state your subscription number when renewing. A lot of our readers send in the label from their last CP along with their renewal. This really helps us process your renewal quickly and more accurately.

OSHKOSH

It is that time again when RAF trucks and flys across the country to meet old and new friends once again. Any guesses on how many EZs we will have this year? Here at RAF everyone takes a "no money" bet on how many of each Rutan type there will be!! RAF will have the Long-EZ and the Solitaire on display.

Burt will be giving talks on the following dates:

Solitaire	July 31	12:00 pm
Design College	Aug 1	10:30 pm
Long-EZ	Aug 1	1:30 pm

The Design College talk will be about "High Angle of Attack Flight Test".

The International VariEze Hospitality Club banquet is being held on July 31 at Butch's Anchor Inn. You need to be a member of the club to attend. Tickets are available from Don Shupe, 2531 College Lane, La Verne, CA 91750 at $11.00 each.

We will have the usual daily "bull sessions" for the EZ pilots. A note will be posted in the booth for times.

Please remember that there will not be anyone to answer builder calls at RAF during Oshkosh. The office will be open but both Michaels will be gone.

SOLITAIRE

The plans were taken to the printer this week. As always, writing the plans for an airplane is a long, tough haul.

The plans consist of 25 pages of 23 x 33 full size drawings and an 11 x 17 book with 81 pages. The plans will be available for sale at Oshkosh. We will start writing the engine installation and the owners manual after Oshkosh and anticipate that these will be available around the first of the year.

Peter Garrison of Flying magazine and Peter Lert of Air Progress have both flown Solitaire recently. Look for magazine articles. There will be an article in the Sport Aviation August issue.

HAPPY BIRTHDAY BURT!!

The RAF gang decided that it was time again to have an EZ flyin at Mojave. What better way to do that, than to give Burt a party!! 30 VariEzes, 12 Long-EZs and 1 Viggen flew in to Mojave (despite the 20-40 knot winds) to help RAF wish Burt a Happy Birthday.

A chicken and fresh fruit lunch was enjoyed by about 140 people. We had one VariEze fly in from Louisville, MS. The builder/pilot Bud Foster could not make it but he wanted his EZ to enjoy the day. So his friend Bob Langley flew it in for him!! Everyone had a great time meeting new friends and saying hello to old ones. Lots and lots of hangar stories. Mule Ferguson from Boone, North Carolina could not make it, but sent a video tape to wish Burt a happy day. We all enjoyed Mules singing and at last visiting Boone. Mule included a few surprises on the tape which Sally says she needs to talk to him about!!

With 43 EZ type aircraft on Mojave Airport, it made the largest gathering of EZs other than Oshkosh. Burt was wandering around the airplanes with a smile on his face when he sort of looked around and said "Everyone looks so happy!" EZ people are !!

We thank everyone that came by to help make the day such a success. The day was very special and one to be remembered. EZ folks are just great!!

Invitations were sent to all the folks we have on our EZ fly list. We recieved quite a few back because of incorrect address, moved, not known etc. Please let us know if you do change your address as we occasionally do need to notify you of changes or send you invites to fun parties. Please keep us up to date. Thanks.

Local Flyins

N26MS representing RAF went to the Watsonville, Merced and Porterville flyins so far this year. Watsonville as usual was great, over 30 EZs were parked in the display area. The weather on Saturday was crummy but cleared up on Sunday. The strawberries (the size of apples!) and cream, the artichoke hearts and the extremely well organized parking area, the security for your airplane, the way you are treated as a pilot flying in - outstanding. Oshkosh could certainly learn a thing or

two from the folks at Watsonville. Merced was very nice, the weather excellent. The antique aircraft on display are without peer. Again, quite a few EZs were there. After the airshow, a group of us flew up to Mariposa and had an excellent barbeque at Frank and Marge Tifft's home. Their Long-EZ is gorgeous! The Porterville flyin was neat. Not so many EZs, we only counted 6, but a real country flyin, laid back atmosphere, lots of flybys with a great dance band with dancing on the ramp after sun down into the "wee" hours of the morning!

CAFE 400 - 1983 - EZs Win Again this Year!!

This year RAF entered the prototype VariEze N4EZ and the prototype Long-EZ N79RA as well as the Defiant. The course was much more representative of a practical cross country and included a fair amount of climbing with some reasonably high altitude flying. The procedures for weighing the aircraft both before and after the race as well as the quality of the electronic scales were of the highest order. Brien Seeley and his CAFE 400 crew are to be complimented on an excellently organized race.

The weather on race day could not have been better. Sally flew N79RA. This was her first try at a competitive event such as this and she decided to try for maximum MPG (a separate award) rather than a high CAFE score since we knew the Long-EZ could not beat the CAFE number for a VariEze (the VariEze is smaller and faster). For this reason she flew very slowly. Her race time showed a speed of 107 mph, very close to her aim speed. Her credited mpg was dissapointing at 36.93 mpg, but it still gave her the third highest mpg in the race. Her mpg was a bit of a curiosity to us, since her credited fuel use was more than the total fuel carried in the tank used. Our measurements showed she should have attained 48 mpg and placed 5th in the CAFE number. Burt flew Defiant a little slower this year also shooting for higher mpg. He placed 2nd in his class, 3 or more seats experimental and third in the twin engine class.

Mike flew N4EZ and this turned out to be an opportunity for a head to head contest with the Quickie Aircraft Corp. Q2. The Q2 now has an O-200 Continental as does N4EZ. The factory Q2 was very carefully prepared, including a dyno tested engine with a special AR (reverse cone) exhaust system, race optimized propeller and a Texas Instrument Loran C for accurate navigation. Also much test flying was done prior to the race by the Q2, presumably to determine best speed to fly.

Conversely, N4EZ was wheeled out of the hangar for the first time in over 6 months the day before the race. We blew the dust out of the cockpit with a shop air hose, fired her up and flew for 15 minutes to warm up the oil. Landed and changed the oil and checked the bottom spark plugs. That was the full extent of our pre-race preparation. We did not even wash or wax the "old girl".

The results speak for themselves. N4EZ's speed was slower by 1.5 mph but the mpg was higher as a result of which, N4EZ easily beat the Quickie Q2 in the CAFE score (2098489 vs 2040888). This verfied to us what we have known all along, that a VariEze (even a tired, dirty one) is more efficient than a Q2 (even a super clean, specially prepared one). The other Q2 in the race, powered by a Revmaster and turning a variable pitch prop, was soundly beaten by all 4 VariEzes in the race. N4EZ beat this Q2 not only in mpg, but also by almost 20 mph in speed.

The crowning glory of the course was the excellent performance of Gary Hertzler's VariEze (Continental A-80, 80 hp) which turned in 44.65 mpg at a speed of 145.4 mph. He carried 400 lbs of payload, so this gave him a CAFE score of 2596258! This placed Gary first in the two place category and 5th overall. His CAFE score was over 27% higher than the best Q2! He was only beaten by aircraft carrying four or six passengers. All four VariEzes competing got higher mpg scores than either one of the Q2s. This race, as well as last years, in which a Long-EZ won the experimental catagory, really makes a person wonder what ever happened to "the world's most efficient airplane"?

Incidentally, we ran Gary's VariEze performance numbers through using the original CAFE 250 rules and formula. He would have beaten the Q2 that year as well, 125159 for the Q2 and 129784 for the VariEze. Unfortunatly he did not enter his VariEze in the first CAFE race, the CAFE 250, 1981. The results of the 1983 CAFE 400, in the two place, experimental category are as follows:

	Aircraft	Pilot	Payload	Speed (MPH)	MPG	CAFE Score
1	VariEze	Hertzler	400 lbs	145.4	44.63	2596528
2	Dragonfly	Rutan	400	128.3	45.08	2312985
3	Glasair	Hamilton	400	178.6	29.82	2130225
4	VariEze	Melvill	400	154.2	34.02	2098489
5	Q2	Sheehan	400	155.7	32.76	2040886
6	VariEze	Sorensen	400	148.6	33.56	1994933
7	VariEze	Wallrath	375*	146.4	35.38	1941886
8	Q2	Schilling	400	135.0	33.52	1809342
9	Glasair	Srour	386	172.3	24.68	1642267
10	RV-4	Grunsven	400	168.7	23.90	1612300
11	Long-EZ	Melvill	400	106.9	36.93	1579890
12	Mustang II	Devereux	400	165.8	23.73	1573868
13	Glasair	Powell	400	156.3	23.78	1486520
14	Tailwind	Weaver	400	139.2	21.56	1200235

*Note:

If Wallrath had carried his maximum allowable payload, of 400 lbs, he would have placed 5th.

OVERSEAS

Australian Race - A Fuel Efficiency Race was held in Mangalore, Australia. The race was 250 miles with rules similar to the LBF at Oshkosh. The winner was Bob MacGillivray in a VariEze. The results were 33.7 miles/gal (imperial gallons) at a speed of 145.3 knots. Congratulations Bob!!

South Africa - Annual EAA Flyin. George Allison of South Africa called to let us know that he "cleaned up" with his Long-EZ at the flyin. He came away with Grand Champion, 1st place Best Composite, 1st place Concorse de Elegance. Good for you George!!

England - Don Foreman recently won Grand Champion with his Long-EZ at the Cranfield Airshow, (the English version of Oshkosh). He is having a ball with his Long-EZ and has promised some performance figures and photos soon. Don has the first Long-EZ to fly in England. He has a Continental O-240, 130 hp engine and tells us "it flies great".

CLUBS

Dayton 'Ducks' (Dayton United Canard Klub) held its first organizational meeting and workshop. 18 memebers were present, most of whom are building VariEzes and Long-EZs. The 'Ducks' would like to extend an invitation to all EZ types to contact them for meeting dates and times to share knowledge, special skills and above all, have a lot of fun the 'EZ' way.
Contact: Mike Zimmerman, 7313 Dabel Court, Dayton, OH 45499. (513)434-6800 or (513)435-0882.

Late Flash

Jackpot, Nevada Flyin

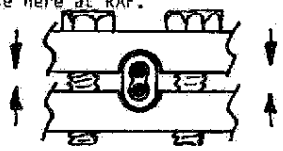
The IVHC flyin at Jackpot, NV was a great success. Shirl Dicky organized it and the flyin was super according to Debbie Iwatate. Debbie flew her Long-EZ in from Washington state. She tells us two Long-EZ and 17 VariEzes flew in. The consensus was to make this an annual flyin.

The 'Real' George Scott reports over 80 hours on his Long-EZ and he is very happy with it. George is willing

to help local builders with a back seat check out before they fly their Longs. Contact George at 14102 Susan Crest, San Antonio, TX 78232.

CAUTION - SWAGING NICOPRESS SLEEVES

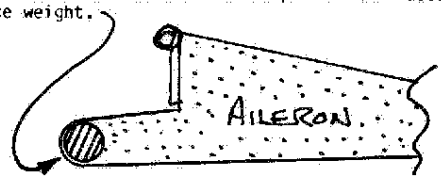
A properly installed nicopress sleeve will hold beyond the point where the cable breaks. Be certain that you are swaging your cables correctly. The "cheap" nicopress swaging tools that commonly sell for around $15.00 and work by tightening two bolts, are fine. That is what we use here at RAF.



It is important to use the tool correctly. The sleeve should be oriented vertically per the sketch with the cables as shown. Tighten both bolts equally, about a half turn at a time until the two steel faces of the swaging tool are firmly together.

CAUTION

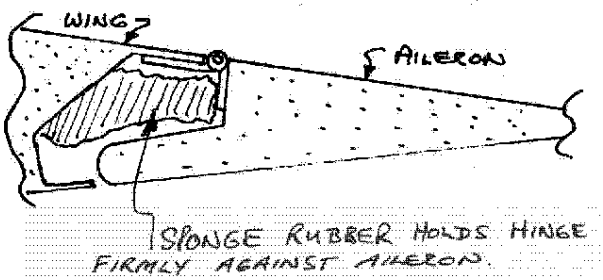
We have had this one in the CP before but it is important enough to warrant a rerun. The leading edges of the lower surface of your ailerons must be rounded per plans per page 19-14. If you have a sharp corner here your aileron could develop a heavy vibration at full control deflection from 90 to 120 knots. Sand this corner round to follow the shape of the steel mass balance weight.



CAUTION: Testing experimental props may be a hazardous thing to do. A Long-EZ builder/flyer was testing a pretty fancy, thin bladed, flexible prop when both blades failed just outboard of the hub. Fortunately this particular prop had a ply of Kevlar wrapped over the prop full span. Only the Kevlar stopped the blades from departing the airplane, the pilot made a safe landing.

BUILDER HINTS

Mike Rhodes reports having difficulty bonding the aileron hinges to the aileron and keeping everything aligned at the same time. He came up with a neat idea to use a piece of scrap foam rubber between the wing and the hinge which due to its springiness will hold the hinge tight against the aileron at A2 and A5 until the Rondo sets. (see sketch).



FUEL TANK AND SUMP BLISTER LEAKS

There is nothing more discouraging than getting your airplane ready all the way through to paint and then to find fuel tank leaks. Lately a few builders have reported leaks found in the sump blisters. You must paint a generous coat of Safe-T-Poxy on the inside of your fuel strakes, on the side of the fuselage, on the forward face of the centersection spar and the inside face of the baggage wall and outboard rib. Do not neglect to do this. Its a good idea to squeegee the epoxy onto these surfaces to ensure that you force the epoxy into any tiny pin holes that may exist. Allow the epoxy on the inside of the top of the strake to tack up or even cure before installing.

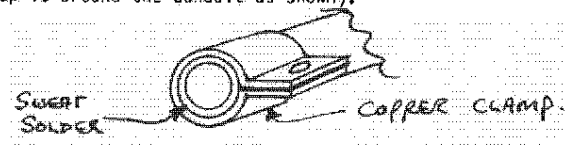
Paint a real generous coat of Safe-T-Poxy inside the sump blister prior to installation. Most important, leak check your tanks before you do any finishing work. Leaks should be repaired per the instructions in previous CPs.

Long-EZ builder, T.Dinneen has the following suggestion for obtaining an engine for your Long-EZ. He paid $7500 for a 1978 Tomahawk in good flying condition. Not only did he get an airplane to fly and stay current in, but he also got (1) a Lycoming O-235 L2C engine complete, including a mechanical fuel pump with 920 hours total time,
2) a full gyro panel and instruments
3) 500 x 5 wheels, tires, brakes, axles and master cylinders.
4) 720 channel com, Nav and VOR head.
5) Transponder
6) Nav lights/strobe anticollision light system
7) ELT and seat belts
8) Circuit breakers, engine instruments and battery.
9) Fuel plumbing, fuel valve, electric fuel pump etc.
In addition, he figures he can sell the airframe for about $1000.00 after he has 'gutted' it. This means he has laid out $6500.00 for the lot. On top of that you can bank finance the whole deal. Check Trade-a-Plane for "deals" on Tomahawks!

LORAN C IN A LONG-EZ

This is becoming more and more popular. We at RAF have no experience with the Loran C at all. Several builders have installed them and a few are flying. None that we know of work perfectly.

Loran C is very sensitive to noise. Electrical, generators, alternators, voltage regulators, compucruise all put out noise. This noise is not noticed normally by your VHF equipment (nav and comm) but it is noticed by VLF like the Loran C. This can disrupt your reception and drop out the signal giving you erratic performance. Almost all of the problems we experience with Loran C with our EZs, do not occurr with aluminum airplanes due to their inherent shielding and large ground plane. If you intend installing a Loran C, do everything you can to shield your electrical system. Every wire should be shielded. In addition, it is an excellent idea to run your wiring inside a metal conduit. Tom Williams, a Long-EZ builder/flyer suggests using 1/2" diameter copper refrigeration tubing. Run this from the battery to the aft face of the firewall, one piece down each side of the fuselage on the floor against the sides. All wiring except antenna coax and the positive wire to the starter, should go inside these conduits. Sweat solder a copper clamp to each end of these copper conduits (make a clamp from a 2 1/2" length of the same copper tube. Split it, flatten it out and wrap it around the conduit as shown).



Bolt a short length of #2 wire (for 12 volt systems, #4 for 24 volt systems from the clamp on the forward end of one conduit to the negative terminal of your battery and the aft end should be securely grounded to the firewall, which in turn should have a braided ground strap to the engine. Thus you are killing two birds with one stone. The copper conduit serves as the ground wire from your engine to the battery, as well as an excellent shield for the wiring.

Rodie Rodewald, a Long-EZ builder/flyer from Hawaii has been working with Loran C in his Long for over a year. He finally cleaned up his electrical noise by installing one of B & C Specialties 35 amp alternators and their latest and quietest voltage regulator. He tells us it is an absolutely first class piece of equipment. Rodie has also tried many different types of antennas with varying success. Of course in Hawaii, he has the worst possible situation, since he is using one station on Hawaii and one on Guam! We figure if it works for him, it should work great for anyone here on the 'Big Island'! Rodie's antenna consists of RG-58U coax cable from the Loran C set to the preamp in the winglet. He buried his antenna preamp in the lower winglet. From the preamp he ran .025 stainless safety wire up past the

rudder, keeping it as far as practical from rudder hinges, bolts, nutplates and wing tip lights/strobes etc. Once in the upper winglet, he zig zagged fore and aft going up until he used 108" of wire. This antenna has worked the best so far of any he has tried, including the use of the rudder cable in the wing.

Anyone with any more information on how to make a Loran C work well in a composite airplane, please drop us a line. This is not a real straight forward problem guys, if you think you can just bolt a whip antenna on the belly and have a flawless, reliable Loran C, you are in for a surprise. This will work on a fiberglass boat, but remember, a boat is sitting on the largest ground plane possible, the ocean!

We will continue to gather data on Loran C, as it really does seem to be the way to go. It would really compliment the excellent cross country capability of the Long-EZ making it even more of a utility airplane.

VariEze/Long-EZ Cowlings.

The aft stiffener rib that runs across the inside aft edge of the cowlings, both top and bottom shold be taped in with a 1 1/2" wide BID tape all around. These ribs are floxed in but may pop loose due to vibration.

The following letter is from a builder who had an epoxy reaction.

"Dear RAF,
I am writing this letter to express my appreciation to you and Applied Plastics for "saving" my composite homebuilt Long-EZ project! About two months ago, I called you to get your advise re: how to prevent any further or worsening of the dermatological (rash, burning, itching hands and arms) reaction I had experienced after a six hour session with Safe-T-Poxy and acetone.

I followed your advice and changed my shop routine as follows:
a) Started using Norton Butyl rubber gloves exclusively.
b) Stopped using acetone (I now discard brushes and just wipe down squeegees).
Since I was already using a charcoal filter respirator, no change required there. I did improve the ventilation in my shop.

I have had some lengthy lay ups since with no sign of a problem. While they are relatively expensive, I think you should strongly recommend the use of the Butyl gloves.

Thank you again for your professional, prompt and sincere response to a problem, which very easily could have "shot down" a project which is very important to me.

Sincerely, Gary Holmes."

PLANS CHANGES.

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

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

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

LPC #116 Owners Manual Page 30, change aft limit from 104 to 103.

Section IIL - NOTE: The engine installation plans update and supercede information in Section I. Do not do any work aft of the firewall without having Section IIL in your hands. Section IIL also has lots of information on engines, which may help you to make your selection.

NOTE: NO plans changes for VariEze this time.

SHOPPING

Please note that prices for the Com. Antenna from Radio Systems Technology is as follows:

$25.00 for the assembled antenna
$15.00 for the unassembled antenna
plus $3.25 for shipping and handling.

Task Research has a price increase on the main and nose gears. The main gear is now $344.00 and the nose gear $61.70. (805)525-4545.

PROPELLERS

We recently tested a Great American prop on our O-235-L2C (118 hp) powered Long-EZ and found it to be an excellent prop. Performance was virtually identical to the best Ted's prop we had previously tested. Take off distance was slightly shorter, climb slightly better and top speed was only down about 1 mph.
Contact:
Great American Props.
555 Westmont Drive
San Luis Obispo, CA 93401
(805)481-4450

Sensenich Corporation is now manufacturing VariEze props. They are excellent. The only source for the prop is John Benjamin, 973 Nissley Road, Lancaster, PA 17601 (717)898-8586.

John usually carries two different props in stock and they are available for immediate shipment.
VariEze Prop W58LKL-69 (climb prop)
VariEze Prop W58LKL-71 (cruise)

These props have 13 laminations of selected birch in them and also have a rain resistant epoxy leading edge. Call or write to John Benjamin for more information. John is a VariEze builder/pilot and is 2/3 of the way through building a Long-EZ.

The alternator and special regulator mentioned in the Loran C article is available from:

B and C Specialty Products,
518 Sunnyside Court
Newton, KS 67114 (316)283-8662

FOR SALE

Brand new - direct from the factory O-235-L2C - $8,695
Contact:
Norm Bender
(910)794-0032

Lycoming Engines - call for pricing information
Contact:
Aircraft Spruce and Specialty
(714)870-7551

O-320 hp Lycoming 160hp - bent flange, dual mags and starter.
Contact:
Nick (714)824-1020

O-320-E2D 150 hp, 761 since major, all accessories and mounting plate for fuel pump. $5000 or best offer.
Contact:
Larry (408)296-5218

O-235 L2C Lycoming, 200 hours since major, all accessories. Crankshaft bent (flange) .008, will need to be tore down and straightened. $3500

O-235 L2C - 1180 total time since new. All accessories, $3500

O-235-C1 Lycoming - needs to be rebuilt. $2000
Contact:
Al Head (213)426-8309 for all three of the above.

Original VariEze main and nose gear
Contact:
Ed Hanley
4351 Firerock Cir
Memphis, TN 38118 (901)794-5685

Solar Panels designed by Solair Development Co., available from Aircraft Spruce and Specialty for $188.00

ACCIDENTS

Unfortunately this newsletter we have several bad accidents to report. As always, we publish this information in the hope that possibly it may save someone else in the future. The really distressing part about these accidents is that it appears that almost all of them have one thing in common. Low level, close proximity to the ground, high speed flying. This fact has nothing to do with the airplane. This is purely pilot. We all should be aware of this and each of us should realize that the risk of flying fast and close to obstacles is very high risk and if you continue to fly this way, it is only a matter of time before you too become a statistic.

A northeastern California VariEze pilot and passenger were fatally injured when their VariEze crashed into trees on a ridge at 7000 feet. The aircraft was traveling upslope towards the ridge when it struck the tree tops. The engine was developing power at the time of impact. No control system failures or airframe failures were found or suspected. The aircraft had been reported to be flying at extremely low altitudes earlier.

A Long-EZ crashed in central California. Both occupants were fatally injured. The aircraft was observed flying low down a river. As it flew over a bridge it struck unmarked power lines. The aircraft continued on for about a half mile where it crashed into trees. No problems were found or suspected with the aircraft.

A Long-EZ flying over the ocean in south western Florida crashed into the water. Both occupants were fatally injured. This aircraft was observed by several eye witnesses to be flying at cruise speed low across the water, estimates of from one wingspan to 100 feet above the water. It hit the water and was heavily damaged. The pilot was found to have a brain tumor and had been experiencing severe headaches. It is not known however, it there is any connection.

A VariEze in France, took off from the Nice, France airport with two people aboard. The airplane climbed straight ahead to about 150 AGL, turned left, started loosing altitude while continuing the left turn until it impacted the ground at a point at about midfield on a heading 180° opposite the take off heading. We have not had much information on this, but there is reason to believe that the canopy may have been unlatched.

Shortly before this newsletter went to press, we began investigating a fatal accident in which a Long-EZ apparently struck the ground in a flat attitude, possibly from a flat spin or deep stall. Of course, the results of all testing shows that a Long-EZ is not capable of a flat spin or deep stall, when flown within the allowed limits. Preliminary information shows that the cg may have been behind the aft limit. Even though this aircraft was highly modified, we are concerned that it is possible that others operating near the aft limit and with contour tolerances that degrade flying qualities from the intended and tested configuration, may also be susceptible to spins. At least until this accident is totally investigated and understood we are recommending that the Long-EZ aft cg limit be moved forward one inch. Also, be sure you follow to the word all information on Pages 44 and 45 of the Owners Manual.

VARIVIGGEN NEWS

We have recieved several letters from Viggen builders that were circulated to all the builders through the Viggen Club list. This is encouraging and we are sure this is helping each of you to maintain the necesary drive and enthusiasm to complete a project of this magnitude.

Arthur Schwartz called and tells us he has over 230 hours now on his bird. He is hoping to join up with Peter Lawrence and fly the two Viggens to Oshkosh. Unfortunately we will not be taking N27MS to Oshkosh this year. This will be the first year she has missed since 1978.

One thing has struck me recently about almost all Viggen builders - most are gadget/gismo freaks, including me. Knowing what I do now, what with over 600 hours each on my Viggen and my Long-EZ, I would build a Viggen as light and simple as it was possible to do. Contrary to popular belief, the Viggen is not an airplane to load up with avionics and instruments. Do not put anything in there that is not absolutely necessary for flight. Inspite of its 180 hp, our Viggen, at an empty weight of 1252 lbs, is really hard pressed to make it out of many high density altitude airports. We have been in and out of a few, Denver, Laramie, Rock Springs, Rawlins, Teas, even Albuqueque, but each time I have carefully calculated density and used every bit of knowledge and skill I had to get out. At full gross weight our Viggen is a marginal high density airplane. Burt's prototype N27VV, was much lighter at 1070 lbs and was quite sprightly compared to mine, even though he had only 150 hp. Keep them light. Believe me, I would give anything to be able to take 200 lbs out of my Viggen.

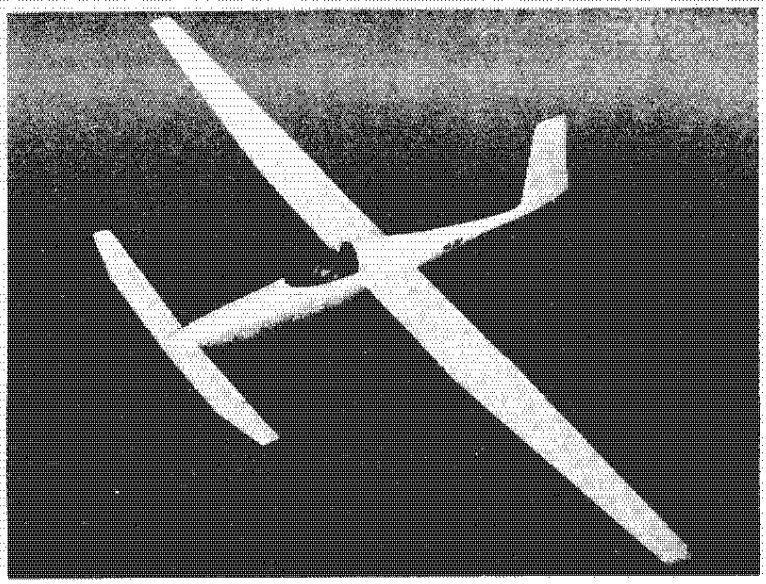
See you at Oshkosh. Any thoughts on how many Viggens will fly in? We know of a total of 14 Viggens that have flown since the plans were released in 1974. I wonder how may will be at the show?

A multitude of Viggen parts.
Contact:
Richard Stewart
RT 2, Box 251-D
Lovettsville, VA 22080

Several Viggen parts and plywood.
Contact:
Delbert Dester,
109 Holland Grove Lane,
Washington, IL 61571

SOLITAIRE —

A Self-Launching Sailplane



The Problem

For a long time soaring has been an exclusive sport requiring a special license and training. Soaring in a glider of enough performance to allow the average pilot to feel the true thrill of 'engineless' flight has been expensive enough to severely limit the number of people who enter the sport. At the same time, interest in ultra-light and light sport aircraft has reached an all time high.

The Challenge

The Soaring Society of America recognized the problem. Other segments of homebuilt aircraft were experiencing great interest and activity on the part of designers and the general public. The sailplane market was not getting it's share of the attention. To correct this, the SSA issued a challenge in the form of a contest. Develop a self launching sailplane capable of take off and climb to altitude without the use of a tow plane. The new design could be flown without the special license required of a sailplane pilot, just a private pilot's license. The aircraft must be easy to fly, as well as easy and quick to build. Strict rules were set up and an actual structural test of the finished aircraft was required. The Solitaire was designed around these goals and achieved these and more.

The Winner

At the flyoff held at Tehachapi, California, on September 6, 1982, the judges studied the entries and flew the SOLITAIRE and unanimously declared it the winner.

WHAT

The SOLITAIRE is a single-place self launching sailplane, fitted with an engine package that folds into the nose of the aircraft after it pulls the SOLITIARE to soaring altitude. With the engine folded, it has a L/D of 32 to one giving it true soaring capability. The engine can be deployed and restarted inflight using it's electric starter. The canard concept results in high resistance to inadvertant stalls and spins. It's 'spoilflap' descent control system has been acclaimed as "excellent" by all evaluators, providing crisp, variable glide path control without trim upsets. Unlike conventional sailplanes, the pilot sits within the allowable cg range.

HOW

The SOLITAIRE uses the proven materials and methods pioneered by Burt Rutan and used in the VariEze and Long-EZ, two of the most successful aircraft ever designed for the homebuilder. The wings are special uni-directional fiberglass cloth and epoxy resin. They are built using the moldless composite technique developed in the VariEze, and consist of prefabricated 'S' glass spars and a solid foam wing core. The fuselage comes as two prefabricated halves. The bulkheads are available prefab and the wooden fixtures and templates will be available premanufactured. The canopy comes installed in the frame and the turtledeck is available prefabricated. All of the metal parts and complete landing gear components are available premachined. The premolded parts are of aerospace quality. Construction consists of prepreg fiberglass skins with a honeycomb core and an adhesive film to bond them together. These parts are then vacumm bagged and cured in an oven. In short, this aircraft will have more prefabricated parts than any previous design from Rutan Aircraft Factory. Of the available prefabricated parts, the builder can buy all, or as few parts as he wishes. We estimate that an average builder, purchasing all the available parts, could build the aircraft in 400 hours at a cost of between $7000 and $9000. When the quality of the parts and ease of building is considered the value of the SOLITIARE becomes apparent.

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Support

Rutan Aircraft Factory support has been a key factor in the history of success with homebuilt aircraft. When you buy plans, you become one of a family of builders. Rutan Aircraft prides itself on it's builder support program. We will answer questions either by phone or in writing. Builders are also welcome to bring parts to Mojave for inspections and advice. The quarterly newsletter is manadatory when you are building, as it provides continuing builder hints, ideas and plans updates.

SPECIFICATIONS

SOLITAIRE - RAF Model 77-6

Empty Weight	380 lbs.
Gross Weight	620 lbs.
Total Wing Area	102.44 ft ^{2}
Span	41.75 ft.
Wing Loading	6.05 lbs/ft^2
Engine	KFM 107E
BHP	23 at 6000 RPM
Fuel	5 gal. premixed @ 40:1
L/D	32/1 at 50 knots
Min.Sink	150 ft/mn @ 40 knots (aprox)
Descent Control	Spoilflaps usable to V_{ne}
Min. Flying Speed	32 knots
V_{ne}	115 knots.
CG.	unaffected by pilot weight.

SOLITAIRE DOCUMENTATION

Section I - Manufacturing Manual — — — $225.00

This is the complete education and construction manual for building the entire SOLITAIRE except for the engine installation. This manual consists of a spiral bound book 11" x 17" together with a set 23" x 33" drawings, which include all necessary full size templates, jigs and cross sections.

Section IIKFM - Engine Installation — — — $15.00

Instructions for the installation of the KFM engine.

SOLIATIRE Owner's Manual — — — — $5.00

This is the required operations handbook and checklists for flying the SOLITIARE.

ALL RAW MATERIALS.

Near Los Angeles.
AIRCRAFT SPRUCE
201 W. Truslow, Box 424,
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LONG-EZ

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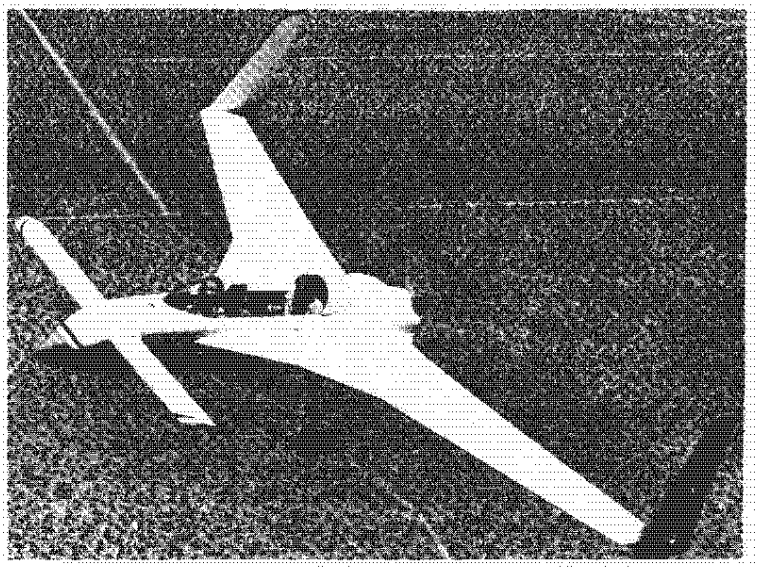
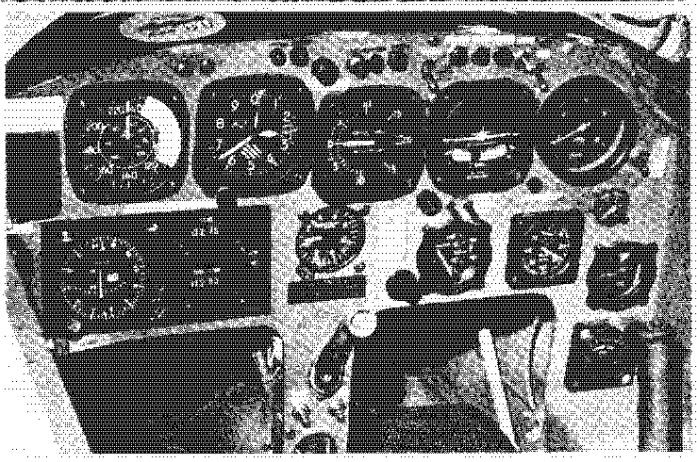




THE AIRPLANE

The Long-EZ is a small, high-performance, high utility homebuilt sportplane. While recommended mainly for day-VFR operation, competent pilots can also equip it for night and IFR flying. The recommended power plant is any model of the O-235 Lycoming. Note that a mechanical fuel pump is required. It has an alternator-powered electrical system and can be equipped with electric engine starter. Its cockpit layout is designed to complement pilot work load, with throttle, mixture, carb heat, pitch trim and landing brake controls on the left console and side-stick controller on the right console. Seating provides correct armrest, lumbar, thigh, and headrest support allowing "recliner-chair" comfort not found in conventional aircraft seats. This allows long, fatigue-free flights. The inboard portion of the large wingstrakes are used as baggage areas, accessible from the front and rear cockpit. These, combined with special suitcases and three other storage areas, provide nearly 10 cubic feet of baggage room.

The airframe structure is a sandwich of high-strength fiberglass facings with a core of rigid closed cell foam. Extensive use is made of the new type R45 PV core foam (poly vinyl). The facings are laid up directly over the shaped core, thus expensive tooling is not required. Flying surfaces are full-core, reducing complexity, increasing contour stability, and improving corrosion resistance. As compared to conventional metal and wood, composite sandwich structure offers less construction time, more uniform stresses, improved fatigue life, better environmental resistance, and increased surface durability.

TRAVELING MACHINE

At last, an airplane that is specifically developed for efficient, high speed, long range traveling with room for two adults and plenty of baggage. Fuel allowance with two adults is 41 gallons. Single place, you can carry 52 gallons. If you're in a hurry, you can cruise at 75% power at 8000 feet at 189 mph (164 kts) burning 6.6 gallons per hour. This will take two of you from Los Angeles to Seattle or Chicago to Daytona Beach non-stop (965 miles) in 5.1 hours with one hour fuel reserve. If you're not in a hurry, you can cruise "economy" at 12,000 feet at 146 mph (127 kts), burning only 3.6 gallons per hour. This will take two of you from New York to Dallas non-stop (1430 miles) in 9.8 hours with a 1.5 hour fuel reserve. Single place, using the entire 52 gallon fuel capacity, stretches the maximum range and endurance to over 2400 miles and 23 hours!!

UNUSUAL EFFICIENCY

The Long-EZ uses the very latest aerodynamic technology, combining winglets, a high aspect-ratio wing with Eppler airfoils optimized for efficient cruise, and a configuration with far less wetted area than conventional airplanes. As a demonstration of its efficiency, our prototype with a large rear-seat fuel tank flew over 4800 miles, setting a world's distance record, and landing with enough fuel to surpass 5000 miles. At that, its capability was not taxed — its initial climb rate was over 600 ft/min! At light weight, it climbed to 27,000 ft. in still air — an altitude unheard of, for a fixed-pitch, non-turbocharged airplane. Our Long-EZ is so efficient, the engine can be shut down while at 5 foot altitude over the numbers at only 120 knots, then it can pull up, fly a 360 degree pattern and land on the same runway — completely without power! Its power-off glide angle is only 3.7 degrees — thus a belly mounted drag device (landing brake) is used for landings.

SUPERB FLYING QUALITIES

Development of the Long-EZ included flight testing of many refinements to optimize flying qualities. It is a very solid, stable airplane that has responsive ailerons, good turbulence response, excellent "hands-off" stability and docile stall characteristics. It resists stall or spin even when maneuvered sharply to full aft stick. Flight tests show the prototype to be free from stall departures and spins for all type of entries, including tailslides. Climb is excellent, even at the full-aft-stick speed. Trim changes due to power, gear retraction or landing brake are all very small. Its wide cg range allows a large range of pilots or passengers weighing up to 250 lbs.

The Long-EZ's approach and landing speed are 75 mph (65 kts) and 60 mph (52 kts) at normal landing weights. The approach and landing are docile and conventional. Forward visibility is excellent even during a "full stall" touchdown — a considerable improvement over our earlier VariEze.

THE HOMEBUILDER SUPPORT

The plans are a literal education in using the materials and is a detailed step-by-step guide to construction using an illustrated format not common in aircraft plans. The Rutan newsletter, the "Canard Pusher" published since 1974, updates plans, provides building hints, etc. Complete Owners Manual provides all necessary information for initial testing and for normal emergency operations. You may call, write or bring parts in for inspection at any time.

THE TEST PROGRAM

The test program was probably the most extensive and successful ever conducted on a homebuilt. It included basic flight tests for flying qualities, performance and systems, spin and dive test to FAR Part 23 requirements, static load test and landing gear drop test exceeding Part 23 criteria, environmental/thermal tests on structural materials/components, manufacturing methods testing and many others.

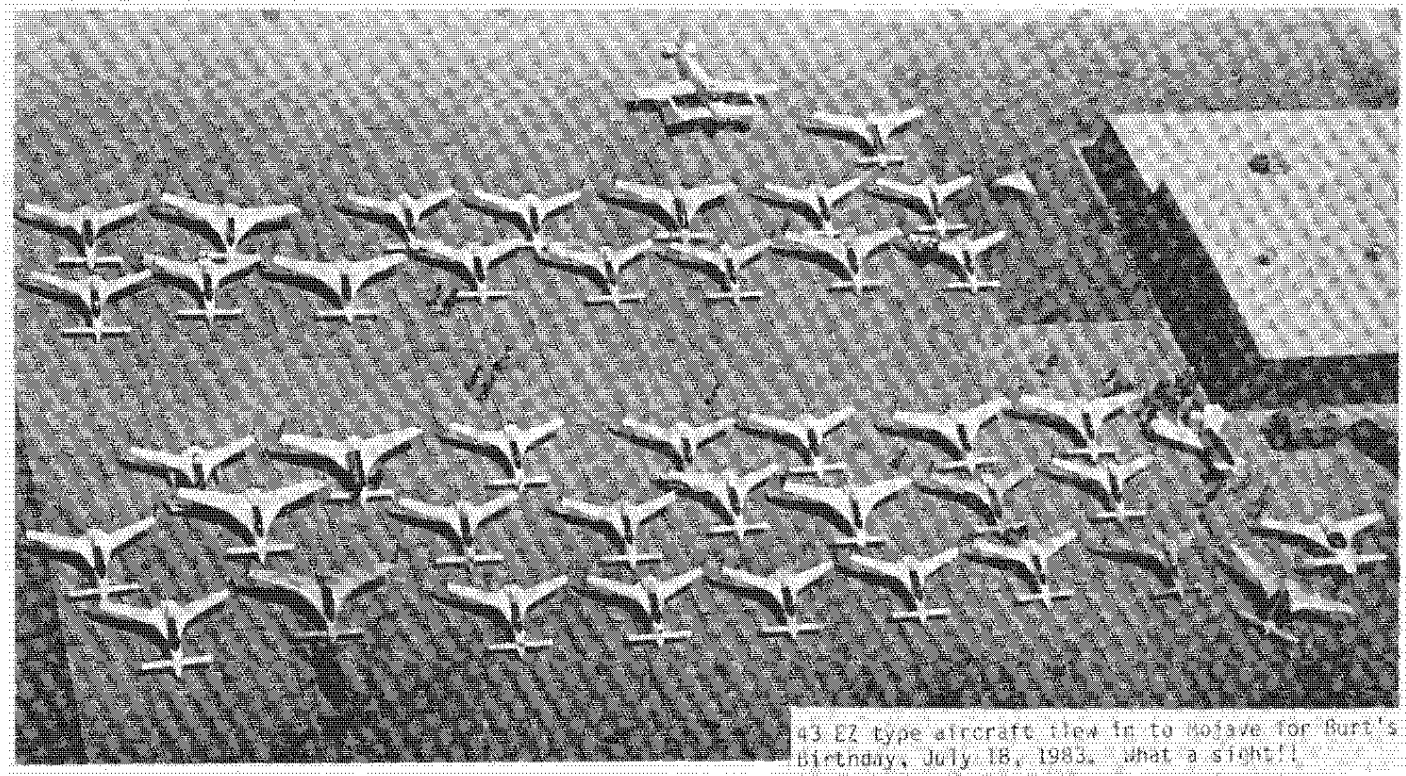
COST AND BUILDING TIME

The complete package of raw materials available from the two distributors listed, including all fiberglass, epoxies, foams, fillers, sheet metal, tubing, hardware, controls system materials, plumbing, tires, wheels and brakes cost about $3600. Any of these items can be purchased separately. We strongly recommend that you get the distributors' catalogs to familiarize yourself with the materials. A complete bill-of-materials is in the plans.

Many other prefab parts ranging from main gear, nose gear, propellers, cowlings, canopies and welded engine mounts to small aluminum brackets and bushings can be purchased from the listed distributors. All those prefab parts cost approximately $3000 — and using them, the competent builder can build a Long-EZ in as little as 1000 man-hours. The budget-minded builder may elect to build most of these prefab parts himself, using the drawings in the plans. His building time would exceed 1500 hours and he would save most of the above costs of the prefab items. Contact the distributors for their catalogs showing available prefab parts. These are also listed in the plans bill-of-materials.

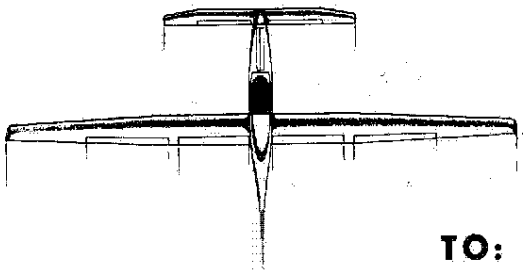
Engine costs vary widely. Our prototype has an O-235 Lycoming, that had 1400 hours when purchased, for $1,500. It has 600 hours to overhaul and will be worth then, about what we paid, thus this is a very economical way to go. Newly overhauled or new engines can cost from $3000 to $6000. Engine accessories, such as instruments, prop extensions, etc. cost about $500 to $700.

In summary the total cost can run from $6000 for a basic airplane with a ¾ runout engine and owner-built prefab parts, to $14,000 for everything available purchased and a zero-time engine. IFR avionics can add from $2,000 to $15,000 to those numbers, with many options available.



43 EZ type aircraft flew in to Mojave for Burt's Birthday, July 18, 1983. What a sight!!

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



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