

THE CANARD PUSHER

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Note! Price increase for the Canard Pusher Newsletter. This is due to the higher costs of the paper, printing, and builder support. This is our first increase since CP#1 in 1974.

If you are building a VariViggen from 1st Edition plans you must have newsletter 1 through 23. If you are building a VariViggen from 2nd Edition plans you must have newsletter 18 through 23. If you are building a VariEze from the 1st Edition plans you must have newsletters 10 through 23. If you are building a VariEze from the 2nd Edition plans, you must have newsletters 16 through 23.

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 Monday through Saturday.

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 fly-ins.

When writing to RAF always send a stamped, self-addressed envelope along if you have questions. If you are making an order, its 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 your reply.

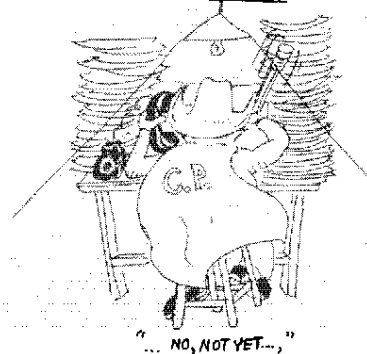
RAF ACTIVITY since the October '79 newsletter has involved:

- (1) Final modifications on the Long-EZ.
- (2) Completion of Long-EZ flight tests
- (3) Development of new equipment and production method for manufacturing Long-EZ/VariEze landing gear.
- (4) Manufacture of new tooling for Long-EZ VariEze landing gear, cowling and other prefab fiberglass parts.
- (5) Setting a new worlds distance record with the Long-EZ.
- (6) Preparation of drawings for the Long-EZ.
- (7) Production of Long-EZ/VariEze nose and main landing gear struts.

NEW VARIIEZE OWNERS MANUAL The second edition of the EZ manual is over two years old. We have just updated it to a third edition. The third edition includes all the newsletter additions since November 1977. We recommend the new manual for all your VariEze flyers unless you have been complete in writing in all additions.

LONG-EZ PLANS The Long-EZ plans have our number one priority now and Burt and Mike are burning the midnight oil to try to get them out as soon as possible. Considering what is left to do - - typing, proofing, layout, and printing, the best guess is not later than the middle of March.

We are taking names for a mailing list for those who are interested in Long-Ez/Plans. We should have a flyer in two/three weeks which will give the price and availability of the plans. If you would like to be notified, send a self addressed stamped envelope.



VARIIEZE/LONG-EZ PREFAB MOLDED FIBERGLASS PARTS

last newsletter you were told that the new fiberglass manufacturer (for cowlings, nosegear box and strut-cover) would be in production by mid December. There has been at least a 6 week delay in this schedule, due to our failure to obtain our tooling from the previous manufacturer. Our dispute concerning transfer of this tooling appeared to be one that would take considerable time, and result in the non-availability of these important prefab molded parts. So, in November we at RAF undertook the job of manufacturing a completely new set of tooling. This allowed us to incorporate some improvements.

- (1) The strut cover was deepened to accommodate both the old and the new (deeper) nose gear strut.
- (2) Additional size was added to the Continental cowl where some builders have had interference with the top spark plugs.
- (3) Additional size was added to the bottom of both the Continental and Lycoming cowls where clearance with exhaust system bends is marginal
- (4) The lower bumps and entire upper mold-lines of the Lycoming cowl were reduced in size and recontoured to reduce aerodynamic drag.
- (5) The Lycoming oil-check door depression was made to accommodate a single-contour aluminum door.
- (6) The cowl ribs were extended to seal the cooling air leaks at the trailing edge.

The new tooling was completed in early January and we are currently evaluating several bids from fiberglass shops for manufacturing these parts. We are attempting to get these made at as low as possible prices consistent with acceptable quality. We should have the new manufacturer identified, including price and availability schedule, by the time this newsletter reaches you.

FLASH - As this newsletter is going to print the new fiberglass vendor has been identified. The parts will be available through Aircraft Spruce and Wicks Aircraft Supply - see the flyer in this newsletter for addresses. Contact them for price and availability schedule. The new parts are CI - Cowl Inlet, NB - nosewheel box, SC - Strut cover, CLR - left cowl rib, CRR - right cowl rib, CCT - top Continental cowl, CCB - bottom Continental Cowl, LCT - top Lycoming cowl and LCB - bottom Lycoming cowl. Later, we will add wheel pants and prefab Long-EZ fuel tanks.

LONG-EZ - THE WHOLE STORY

In late 1978 we at RAF were addressing the enormous task of development and certification of the twin engine Defiant. Knowing that once started, that job would preclude further work on homebuilts for some time, we took a look back at the VariEze status to see if it was really what we wanted to market over the next several years. After assessing what was occurring with a large number of EZ projects, we decided to put the Defiant on the shelf for a while and develop an improved EZ that would solve some remaining problems. The EZ, designed around the A-75 Continental, is generally tailheavy when using an O-200 with alternator. Also, a large number of builders were being forced into using the O-235 Lycoming engine because of the high price and scarcity of the Continentals. Even with no engine accessories, their EZ is tail heavy and overweight. They desire electrical systems and need a greater useful load.

We decided to design a new aircraft around the Lycoming O-235 with starter and alternator. It would have unusually long range, thus the name "Long-EZ". It would have good forward visibility on landing and a lower approach and landing speed than the VariEze, making it more suitable for the low-proficiency pilot and shorter airfields. The original configuration of the Long-EZ used VariEze wings placed out on a centersection spar that was 4 ft longer than a VariEze. The wings were swept more than a VariEze to support the heavier engine. It had "Rhino" rudder on the nose and no control surfaces on the winglets. That aircraft 79RA, was built in four months in the spring of '79 and made its first flight on June 12 '79. It did not fly well. Directional stability was weak. Dihedral effect was excessive. Adverse yaw was high. Roll rate was sluggish. Early airflow separation on the wing caused pitch instability at low speeds. The stall speed was too high.

During the next five weeks, N79RA made 51 flights, testing the effects of over 30 different modifications. Modifications included many configurations of wing leading-edge cuffs, wing fences and vortex generators. The winglet "cant" angle was changed. The ailerons were rigged to various neutral positions. Some of the changes resulted in improvements in pitch stability and lateral-directional flying qualities.

However, we were unable to improve the stall speed, landing attitude and roll rate to a satisfactory level. By August we were convinced that to get the Long-EZ we really wanted, we would have to build an entire new aft wing.

The new aft wing, first flown in October '79, had the following improvements:

- (1) Less sweep
- (2) More area
- (3) A new Eppler airfoil similar to that on the Defiant.
- (4) Longer ailerons.
- (5) Improved winglet juncture to eliminate airflow separation at wingtip.
- (6) Overlap-type wing attachment to centersection spar, allowing incidence adjustment and eliminating the expensive fittings.

The new wing performed excellently in test. Approach and stall speeds were lowered. The lower approach and landing attitudes allowed "full stall" landings with good runway visibility. Roll rate was superb. Directional stability was still weak and rudder power at the new lower landing speeds was inadequate. We then built new, larger winglets with rudders and removed the "Rhino" rudder from the nose. That configuration completed flight tests in December '79 with very excellent results in every respect.

It has been shown to be resistant to departure during every conceivable stall entry including tailslides. Its stability is firm even at max aft cg (obtained with a 120 lb pilot with starter, alternator, vacuum pump installed on the O-235 Lycoming). Even though it has a wing area 41% greater than the VariEze and a 26% greater gross weight, it cruises at 184 mph at 75% - only 10 mph slower than the VariEze.

Designing an aircraft for long range also results in excellent high altitude performance. Even though the Long-EZ has a fixed pitch prop and no turbo charger, it can climb to 18,000 feet in less than 20 minutes and cruise 155 mph true at 23,000 feet at light weights. Maximum ceiling is over 27,000 feet. Its long range and up to 80 mpg per seat economy are more than welcome with today's fuel price and availability.

The Long-EZ is now the recommended airplane for the O-200 Continental and O-235 Lycoming engines. Complete electrical systems, including starter and night lighting will be approved. The fuel system and trim system are different from the VariEze. Its 142" span canard and elevators are identical to the VariEze. We will be recommending the VariEze only for the 75 and 85 horsepower engines and of course, still without electrical systems. We at RAF are currently preparing Long-EZ drawings for release to homebuilder by early March. Distribution of materials will be through the same suppliers as for the VariEze. Most of the prefab parts are common. The new wing attachment will not be available for retrofit on a standard VariEze.

Long-EZ flight test data will be published in future C.P. newsletters where room permits. The following table lists specifications and measured performance of both types. The first column is the VW-powered prototype, a smaller airplane built in 1975 but never marketed.

SPECIFICATIONS/PERFORMANCE OF RUTAN PROTOTYPES

	Prototype N7EZ	VariEze N4EZ	Long-EZ N79RA
Engine	62' hp VW	100hp Cont	108hp Lyc.
Span Ft.	21	22.2	26.3
Total Wing Area Ft ²	59	66.6	94.1
Gross Weight lb.	880	1050	1325
Empty Weight lb	399 bare	585	750 with electric
Useful Load lb.	481	465	575
Weight - solo with 1 hr fuel	598	796	961
Normal fuel capacity gal.	14	28	52
Cabin Length in	95	100	100
Cabin Width in.	21.5	22.2	24.2

Performance at Solo Weight

Takeoff Distance ft.	660	650	550
S.L. Climb fpm	1680	1900	1750
Max Cruise Speed mph.	175	196	186
Demonstrated Ceiling ft.	N.A.	25,300	26,900
Calibrated Stall speed mph.	64	60	57
Landing Speed mph.	73	69	59
Landing Distance.	N.A.	800	450

Performance at Gross Weight

Take off Distance ft.	N.A.	860	830
S.L. Climb fpm	1100	1500	1350
Max Cruise Speed mph	173	193	184
Ceiling ft.	14,000	20,500	22,000
Range at 75% sm.	580	780	1250
Range at 40% sm.	780	1050	1970
Calibrated Stall speed mph	76	68	66
Landing Speed mph	84	74	68
Landing Distance. ft.	N.A.	1000	680

NEW FIRST FLIGHTS The following is a list of those EZs that have flown since C.P.#22. If you know of someone who should be on this list, contact us so they are included should an emergency safety advisory be necessary. If you have an EZ flying and did not get a Christmas card from RAF, contact us, giving name, address, N-Number and date of first flight.

Name	City	State
David Richter	Roselle,	NJ
Rick Himrich	San Antonio	TX
Charlie Richey	Los Cruces	Nm
John Pascarella	Milwaukee	Wi
John Koskan	Wichita,	Ks
Key Robey	Australia	
Ray Cole	Memphis,	Tn
John Jackson	Jackson	Ms
Steve Darlington	Anderson	In
Bill Keeher	Australia	
Bill Rice	Eureka	Ca
Don Owens	Bedford	Tx

LONG-EZ BREAKS WORLD DISTANCE RECORD

At 7:27 a.m. December 15, 1979 Dick Rutan took off from the Mojave, California Airport in the new Long-EZ prototype in an attempt to break a distance record held by a Czechoslovakian since 1959. The record is distance in a closed course for piston-engine aircraft weighing between 500 and 1000 kilograms (1102 to 2204 lb). The old record was held by Jiri Kunc who flew 2955.39 miles in a L-40 Metsa Sokal aircraft in August 1959.

When Dick landed at 5:01 p.m. the next day, he had covered a distance of about 4900 statute miles, 4800.28 of it credited for the new world's distance record, pending FAI approval. The credited distance is equivalent to a straight line flight from Seattle to London, or from Hawaii to Washington, D.C.

Dick's O-235 Lycoming-powered Long-EZ was modified to carry extra fuel in two wing tanks and a 74 gallon back-seat tank. Takeoff fuel was 143.6 gallons, loading the Long-EZ 600 pounds over its normal 1300 pound gross weight. Initial rate of climb was over 600 ft per minute allowing Dick to promptly climb the heavily-laden Long-EZ to his cruise altitude of 11000 feet. His course took him 15 complete laps around Mojave Airport and the Bishop, California Airport. The entire flight was blessed with perfect weather, cloudless visibility, smooth air, and less than 5 knots average wind at cruise altitude. However, the flight included over 14 hours of darkness over a sparsely populated area requiring extra demands on the pilot for attitude orientation and navigation. The aircraft did not have an autopilot, directional gyro nor attitude indicator.

The solo flight lasted 33 hour 34 minutes. The average speed for the flight was 145.7 mph. The average fuel flow was 4.17 gallons per hour giving a mileage of 35 miles per gallon (The Long-EZ can attain over 40 miles per gallon at its normal gross weights). Dick landed with 3.75 gallons of fuel onboard - enough for an additional 150 miles, but not enough for another lap to Bishop and return.

The 108 horsepower Lycoming engine performed flawlessly despite its 1500-hour-since-overhaul condition. It burned 2.3 quarts of oil during the flight.

Note that, at 1900 lb (300 lb under the allowed maximum for C1B). The range to dry tanks was over 5000 miles. Future attempts, ie. straight line distance, can be flown at 1000 kg take off weight (2205 lb) and achieve over 6500 miles range!

Dick reported the cockpit was extremely comfortable, the only discomfort being suppressing the urge to sleep. The good speed stability allowed extensive cruising without need to monitor airspeed or altitude.

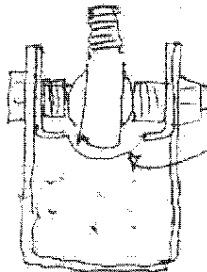
VARI-EZE/LONG-EZ LANDING GEAR As noted in the last newsletter, we were required to locate a new manufacturer for the special S-glass main and nose struts for the EZ airplanes. The search for a manufacturer was difficult - the normal fiberglass production shops do not have structural roving experience and do not have the necessary ovens, instrumentation and impregnation machines needed for this work. The shops that do have the equipment and engineering capability to produce these parts are those who only make expensive aircraft components and they have bid excessive prices on these items, to cover the development costs. We were faced with either no landing gear, or a price increase.

We felt that the price of the gear, having been raised 250% since 1976, was already excessive. In early November we decided to tackle the job ourselves - the only alternative available to provide a reasonable gear for the builders. We knew this job would result in delays in plans preparation for Long-EZ but it really was our only alternative. Within six weeks we did the following: produced patterns and tooling for the new strengthened nose and main gear, developed a new production method, built a convection oven and filament winding machine, setup a quality control process, tested a new epoxy system, and began production of the new parts.

Our new method, which winds roving and tapers it for accurate mold filling, requires less man-hours and results in more uniformity than the previous process. Thus, we are able to sell the parts for only 70% of the previous price per pound.

The new nose gear strut has a deeper cross-section, increasing its strength 20%, yet allowing use of the same NG3, NG4, NG6 and NG15A parts. A gap will exist between NG15A and the forward plate. (ditto for NG6). The new nose gear is also longer, for the Long-EZ - VariEze builders will saw it to length.

The NG-1L strut, being thicker, results in interference at the rod-end when installing NG4 and NG3. We have specified a lengthened NG4, but it will be some time before these are available. In the mean time you should trim NG3 and the strut as shown to clear the rod end.



Trim under rod end
to clear.

NOTE: NEW NG4
IS 0.3" TALLER

The new main gear is 65% stronger than the old VariEze gear and should not be susceptible to the long-term creep (spreading and loss of camber) experienced on some of the heavier VariEzes. The new gear is 3 inches longer on each end to raise the prop clearance on the Long-EZ. VariEze builders using the new gear will saw off the 3 inches. The old main gear weighed 16 lb. The new one weighs 21 lb. While we regret any increase in empty weight

the experience has shown that many VariEze are being operated heavier than expected and need the extra beef in the gear.

We have completed Chapter 18 of the Long-EZ plans - 4 pages plus a new A5 drawing, that details the installation of the new main gear-to-fuselage attachment. This is a new, wider-stance arrangement that mounts a permanent steel tube on the strut and provides accurate gear installation using one large through-bolt per side. Since several VariEzes have experienced attachment failure due to gear vibration and rough terrain, we have incorporated a considerable amount of extra beef in the new attachment, making it more than twice as strong as the present design. Since many have expressed the desire to install the Long-EZ gear or the Long-EZ gear attachment configuration in their VariEzes, we have printed the Long-EZ Chapter 18 separately and have added an extra page detailing how to install it in a VariEze. This package, called "VariEze Installation -- Long-EZ gear" will be included in VariEze plans, sold after 1st February 1980. If you want this package to retrofit or incorporate in your VariEze currently under construction you can order it from RAF. Price is \$7.50, availability is immediate.

Prices - RAF manufactured Landing Gear.
21 lb. Main Gear part # MG1-L - \$277.95
2.6 lb Nose Gear part # NG1-L \$ 49.75

Prices include packaging. Nose gears can be shipped UPS. Main gears must be shipped via Greyhound bus. Shipments will be sent freight-collect. Or, better yet, pick them up here at RAF. We currently have a 4-week backlog, but expect to catch up to an on-the-shelf basis by mid-March.

CHECKOUTS/FIRST FLIGHT ASSISTANCE We also get a lot of requests for check outs and rides here at RAF. Although we do this occasionally, it's not within our capability and insurance coverage to do so as a matter of policy. We do recommend you find a local VariEze builder/flyer and have him help you. Generally, an experienced EZ pilot will agree to do your first flight, or at least the first runway flights. This is a very good idea since he knows exactly how your aircraft should fly.

B.B. Williams of 9503 E. 63rd, Suite 110 Raytown, Mo. 64133 has offered to provide a VariEze check to any one about ready to fly. If any others are willing to do this, contact RAF and we will list you in the next CP.

For you VariViggen builders, Mike Melvill here at RAF will provide a Viggen check out for those Viggen builders who have their airplanes completed and ready to fly, provided their pilot experience is current. We recommend each of you take advantage of this if at all possible.

VARIEZE CHECK OUTS/FIRST FLIGHTS

In the past we have done considerable preaching about initial flight testing and pilot checkout. We talk about understanding the VariEze differences, being proficient, being current in a number of different aircraft. All these requirements/procedures are necessary and should be followed to the letter to give your "galactic wonder" every chance of surviving its initial steps toward the stratosphere. By this, we have given some the impression the VariEze is a real squirrel to fly. Not true, the great majority of first-time EZ pilots report no problems and surprise at how easy it is to fly. The reason for our preaching is that the majority of problems or accidents have occurred during the early stages of pilot checkout in cases where basic proficiency is low. (reference Canard Pusher #11 through 23).

The following quotes represent an average cross-section of comments we receive about first flights. Experience levels range from student pilot to many-thousand hour military pilots. Student pilot? Yes, Bruce Evans visited us recently on his first solo cross country trip - flying his EZ! Although Bruce has sailplane experience, the EZ was his first powered solo!

Stuart Kingman - "After three years of blood, sweat, and tears I had my own airplane! I taxi tested for two or three days just to get the feel of the airplane, and also because I was scared, and rightfully so after reading of all those experienced pilots getting killed in their EZs! All of my experience rested on 150 hours in a Cessna 150 and one hour in a Grumman TR-2. After the taxi tests, my Dad took out a \$10,000 life insurance policy for me, and I lifted N222SK off the pavement and around the pattern! The feeling I had during those few moments were completely void of any fear - it was the most fun I had ever had! The plane flew as if it had been flying for years. Absolutely no problems whatsoever. What surprised me even more was the landing. I had never flown an airplane with a stick, much less a side stick! That first landing was the smoothest landing I've ever made. Every other landing since then has also been smooth too. N222SK cruises at a true airspeed of 180 mph at 6000 ft and 75% throttle. The engine is a Continental C-90-12F turning a Bruce Tiffit prop. Empty weight is 597 lb. I am extremely pleased with the airplane. I have never flown a plane even similar to it. Like I've said many times before, it flies like a airplane should". ~~STUART IS 18 YR OLD.~~

Bob Woodall - "Just a quicknote to say that I flew N301RW, on July 4. Should have written before - but have been very busy getting in the 25 hours and fixing minor items. Had the 25 hour flight test program completed 16 July. No major problems. She trims easily - very solid at cruise - starts to roll back and forth undamped at 60 mph indicated but no problem to control".

Dan Hogan - "Add another EZ to the list! N5846 made its first flight with Bob Ohletsz's EZ flying chase. Ten hours logged so far - no problems. Thanks for an outstanding design. Quite a change after flying an Ercoupe for 8 years. P.S. There are seven EZs now at Chino Airport".

Lee Roan - "Made first flight on October 21 - something I had not planned to do that day as I had not flown much in the last 5 or 6 months and had not yet had the planned Yankee checkout. I made a high speed taxi, got to 70 mph with nose wheel off then was flying. Pulled throttle back but floated past the half way mark still floating. Decided it was time to fly. I took off and flew around the field and came in too fast the first time so I went around and made a good landing the next time. The plane flies good and I have no problems with it".

Jack Day - "Bill rogers flew my first flight - first EZ he had flown with cuffs. Says low speed stability is fantastic. Needs more pitch trim".

Norm Ross - "The VariEze is a pleasure to fly".

Dr. James Wright - "My VariEze was easy to fly from the first, even on that first flight after getting over making a fool of myself in a way I would have thought impossible (tookoff without latching canopy - safety catch caught it). If you fly the aircraft it is a dandy little ship with no real problems at all, that I can see. It has been flown by three other pilots - all report same (two are TWA instructors). I'm pleased with and proud of N26JW - Thank you for a good design and fine support program. When an EZ pilot goes into a new airport he is, indeed a celebrity".

Dan Lee - "After flying experience I can say that my original faith in Burt's design has been justified. It's a remarkable homebuilt".

Jennings Chestnut - "It flew well, no heavy wings etc. I have to adjust pitch spring tension, but outside of that its ready to go. I am real proud of the plane".

Don Youngs - First flight scared him - pitched up and down and did not seem to climb. Made first flight with long canard, narrow elevators and turbulent air. Made both modifications and now reports "absolutely perfect. Requires a tad of rudder trim and thats all. Very happy with it".

Roger Klemm - "First flight was GREAT! I personally think you have overrated the EZ's "different" handling characteristics. The docile nature of the first flight was wonderful and that was due to all taxi testing and runway flying I did".

J. Steecheh - "I'm sure you are tired of excited first time fliers but it did fly great, once I got used to the trim. Thank you for the outstanding builder support".

Jeff Danes - "First flight per the book. Instructions were perfect".

James Langley - "Accelerated to 80 mph, reduced power & lifted off. Everything seemed good so reduced to idle and it settled back to the runway. No problems. Back on the active, repeated the first but brought power back up after liftoff. I was off and climbing at 100 mph - after several trips around the pattern approach was made at 100 mph, near approach end power to idle settled on the runway at 80. Wow! what a thrill it is!".

Bob Hudgins - "Straightened out the weight and balance and now it flies and handles great. I really love the way it handles even in gusty and crosswinds I've had no problems" (Bob initially damaged his EZ trying to fly it with cg too far aft).

Tom Bradford - "Your test preparations and procedures were followed and everything worked beautifully. Thanks for 2 years building fun and fantastic very easy VariEze flying".

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Rich Clark - "Lift off surprised me. Continuing acceleration with the stick slightly back is a lot different from stabilizing speed with the nose held down. - - - I tried mentally to freeze my hand and succeeded in a series of damped pitch oscillations during initial climb. Roll/yaw ok. I let out a Texas yell, wiggled the wings for the congregation and settled down to trim out. Descent and approach were smooth. Love those ailerons. Over the numbers at 80 knots, overflared up to 20 ft, and another series of pitch oscillations. Eventually E-Z-60 got tired of the comedy and sank to the runway. The solid rumbling of gear on runway and straight rollout were reassuring. Why could I not drive it on? Main factors were pitch sensitivity and Cessna training. Also, confusion with left hand throttle where up is go and down is slow - - Later - - feelin' at home expanding the envelope. Sure enough, won't stall, just nods. Heavy back pressure at low speeds. Easy to locate traffic up here in the bubble. High on final, I ease back to 70 knots to below glide slope. Ease power on to hold it. Good flare and soft rumble and I'm at jogging speed". "Had a lot of confidence before I had flown it, now I have much more".

Steve Darlington - "I can't put into words how much fun it is to fly an aircraft that I built myself. I always get so excited before and after each flight that I usually forget all the flying data. (Now I write it down!). The VariEze is extremely easy to fly and has very normal flying characteristics being a little more sensitive in pitch than in roll. Ailerons are not as effective as expected but with a little rudder they come alive. The stalls seem to be non-existent at the present time. At full aft stick 1500rpm 55 mph indicated she's still flying with only very small buffeting and all controls still effective. I have had it up to 178 mph indicated at 7000 ft full bore, 2800rpm (195 mph true). A little rpm goes a long way in the airplane. My EZ is VariEze to land especially with its built-in attitude indicator. (nose canard). If you can't see the runway the nose is too high. Holding the nose off after touch down really slows her down and eliminates heavy braking. Touch and go's are fun since the nose-gear never touches the runway.

Gion Bezzola (Swiss Airforce Instructor) - "After putting the plane together and carrying out a comprehensive pre-flight check, according to the American Handbook, I did two taxi tests with the nose up, and another with about 30% power to test the elevators and to get used to them. The nose allowed itself to be lifted from the ground at about 50 mph, and to be held there. The VariEze began to dance about on its toes as if she couldn't wait to get into the air. I wished to remain captain in charge, so we stayed on the ground a while longer to test the steering. The direction of flight had to be retained with the brakes up to about 30 mph, and above that, the rudder was sufficient. I had to remember to bring my feet back when I wasn't using them, otherwise I would have inadvertently used the brakes. The acceleration was very good. We were very excited before the first lift-off, but this was carried out with no cause for alarm. The wings were flat, the stick was exactly in the neutral position. I got used to the lateral position of the stick very quick and then the Eze was flying, one meter above the ground down the runway. I held the speed at about 80 mph. I decelerated by throttling down slowly, lowered the plane and landed like a feather. The steering felt finely balanced and the brakes were adequate. The first part of the test program, awaited with bated breath, was completed. After four more short flights at a height of 1-2 metres, the inspectors from the Air Ministry arrived and then I was ready for the first big flight of HB-YBG.

The five short flights, the taxi tests, the performance of the engine and the faultless work that the builder had done, gave me a lot of confidence in the machine. We worked out that the center of gravity lay in the allowed area when I was wearing a parachute. The motor was running quietly, and so I asked for starting permission from the Tower. That moment was here again - the first big flight in a new plane, a fantastic exciting moment. I had already experienced such a moment in 1977 when I test flew

my own construction the Lutibus, HB-YAY, and now I was looking forward to it again, even though my mind was full of concentration. I opened the throttle, lifted the nose at 50 mph, at 70 mph I lifted the Eze from the runway and held the resulting angle of climb. The angle of climb came as no great surprise to me - I, as a jet-fighter pilot, am already used to such a steep angle of climb! But the fact that this was a home-built machine, powered by only 90 hp, that was a fantastic surprise.

We, the Eze and I, had hardly started, and already I was crazy about her. The steering reacted marvellously, and I trimmed it out with short blips on the electric trim switches. I had to keep watching out that I didn't exceed the permitted maximum speed for a wheel-out flight, because the plane kept wanting to go faster. The Eze was a real little thorough-bred! The air-brake worked very well when it was out, and showed this by slightly noticeable buffeting.

I realized something pretty quickly: this was probably the most phenomenal plane that I had flown, and I had flown forty different types, Mirage and Hunter included!

After about twenty minutes, I carried out a simulated touch and go, and could judge my imagined landing point very well, a fact that was later supported by the actual landing. On final, at about 90 mph, then over the beginning of the runway with about 80 mph on the clock, the Eze was landed with enough pilot visibility. I landed the Eze and held the nose up in order to brake aerodynamically. Rolling down the long runway gave me time to savour the thrill of that first flight. I was also pleased for the builder of HB-YBG, who had, through his extremely clean work, given me one of the best flying experiences of my life.

The loud 'hellos' from the spectators who had gathered in the meantime, the happy smile of the builder Rudi Kurth, the congratulations from friends and from the officials of the Air Ministry, was payment enough for the preparation made for this flight, that was threatened at no time by an uncalculated risk. The knowledge that the VariEze constructor, Burt Rutan, knew exactly what he was recommending to future Eze pilots through the handbook, proved to me that a very conscientious pilot was the spiritual father of brand new type of plane. This knowledge grew stronger as the days past, especially when I took the Eze through the stall test, and through the largest part of the tests. How many crashed planes and their pilots could have been saved had this type of plane been designed earlier, because the behaviour of the Eze in extreme conditions is simply fantastic. That a plane can still fly controlled turns when it is stalled, and climbs with full throttle, without the slightest danger of a spin is a wonderful performance of modern aerodynamics.

The manufacturers of conventional planes will have to think again if they wish to equal this type of safe flying. The influence which the VariEze will have on general aviation cannot yet be judged, but I have the feeling that it will be a great influence. After the first flights, I was sure that Rutan had not promised too much. The plane which Rudi Kurth had built was exactly according to the specifications which could be found in the handbook".

Steve Stuff - "First landing like all since then, was very easy, due no doubt to the ground-effect flights. Quite maneuverable, very safe and loads of fun".

LBF RACE 1980 Just a reminder that we are still active in organizing the VariEze class within the LBF race this year at Oshkosh and are expecting a large VariEze turnout. (see C.P.#22 page 1). We are working with the sponsors for the prize money. It will be worth the effort so start planning now. Final details in C.P.#24. See C.P.#22 and December '78 Sport Aviation for rules. Also, we have decided to allow Long-EZ's to compete with VariEzes.

If you as a company or individual would like to help promote this efficiency race by providing a prize/cash for the winners, please contact us before mid March.

SAFE-T-POXY WORKING TEMPERATURE Builder feedback has indicated some difficulty using the Safe-T-Poxy in cold climates. Typical situations are where most EZs are built in garages that are difficult to heat in the winter. Problems are where the builder will heat up the room/garage (air only) and go directly to work but the epoxy, glass, parts, tools etc are still cold-soaked. In use, cold epoxy wets slow and greatly extends the time to wet the cloth properly.

The Safe-T-Poxy has a higher viscosity than the previous resins, thus requiring a higher working temperature to use, especially on the larger layups. The high viscosity was selected for the Safe-T-Poxy to eliminate the tendency of the previous material to bleed-out (inducing air in the lay-up during cure).

If you are building in a cold garage in the winter you can still use the new Safe-T-Poxy if you take the following precautions:

- (1) Warm the resin and hardener evenly to 85-90°F prior to mixing. Don't try to hurry this. We use a light bulb under the ratio pump 3-4 hours prior to use, or keep your resin jugs in a cabinet with a light bulb inside.
- (2) Its important to have everything thoroughly warm prior to starting to work. This also cannot be rushed. It takes time to get the parts (wings, foam blocks, etc) up to a stable temperature through out. If you are starting from a very cold garage the warming process could take 4 hours or more. Don't think just because the air is warm that all the material is warm.
- (3) Use an electric hair dryer to warm the area as you work, being carefull not to over-heat the part or epoxy. When, due to cool temperatures, a part is slow to wet out, a few quick passes with a hair dryer will greatly speed the layup time. Do not use a hair dryer to heat a cup of epoxy. This can give local hot spots and ruin pot life.

What shop temperature is satisfactory? That has a lot to do with the size of the job. Small jobs can be worked to as low as 65°F but the working time will be excessive. It will also be more difficult to remove excess epoxy, resulting in a heavier part. On large lay-ups like the fuselage, wings, etc, where there is a lot of epoxy to drag around, 77°F should be considered the minimum. That's epoxy prewarmed to 85-90°F and all parts, glass, foam, tools, table - - everything up to 77°F for 4 hours then go to work. Those temperatures are minimums - add 5 to 10°F and your working time will be greatly

reduced and parts built lighter. Optimum working temperature range for the current Safe-T-Poxy is 85-95°F. We realize that this is higher than desired, thus we are now working with the formulator, testing improvements. These will be incorporated - however, by the time the pipeline is filled the cold season will be over.

Safe-T-Poxy is sold in 1/2 gallon kits. The price is the same per gallon as the previous resin.

POSSIBLE STROMBERG CARB PROBLEMS Ray Cole from Memphis, Tn. reported to us that he had two engine failures on his first two flights just after take off and has attributed the problem to the original Stromberg carburetor on his C-85. Both forced landings were without damage, which is extremely lucky considering they involved turning back to the airport from only 200 ft altitude! After extensive trouble shooting he determined the climb angle resulted in an uncovered jet in the carb, although this could not be simulated on the ground. He replaced the Stromberg with a Marvel Schebler carb and has had no problem. We here at RAF have no experience with the Stromberg carb and thus could not offer any solution. If anyone out there has had any experience with this carb and could enlighten us please contact us and Ray Cole at 4948 Clearbrook Cove, Memphis, Tn 38118

RESIN/HARDNER STORAGE

(1) Never keep your resin/hardner in a cold place. Even for long term storage. It should be stored at room temperature. If you see your resin start to crystallize and settle out, its important that it be returned to its normal state as soon as possible even if you don't plan on using it right away.

To return crystallized or seperated resin to its normal state put the jugs of resin in hot water 160 - 190°F until the resin clears. Be patient this could take several hours. Occasional mild agitation/shaking will accelerate the process. Leaving the resin hot for 3-5 hours after it clears will reduce its susceptability to recrystallize. If, after 5 hours at 160-190°F your resin is not clear, return it to the distributor.

VARIEZE SEAT BELT RECALL UPDATE

Reference CP 22 page 11 EON 8000 seat belt buckle recall. We have learned that some of the recalled buckles are being replaced with an improved version of the same 'cap over' design. We found EON is doing this because they had nothing else to replace them with ~~at this time~~. The improved design has the side edges of the cap trimmed up higher, rather than extending down to flush with the bottom and has the words "lift to open" on the cap. Our tests of the improved E-8000 show that it does not pop open as easily as the previous one. However, if it is placed on the side of the lap over the leg and the body is thrown forward, it can still release - particularly if it snags on your belt or is pressed against an object in a front pants pocket. It is more susceptible to release if it is loosely, rather than tightly, adjusted in your lap. Thus, in our opinion this buckle is not satisfactory.

We just had a meeting with EON and have concluded that the E8000 still requires further modification before it's airworthy. We are very encouraged that EON is willing to redesign and replace the buckle with one that acceptable. However, redesign, tooling, manufacture and delivery will take time. So an immediate solution to those of you that are grounded is not available right now from EON. Those who are waiting for a buckle replacement should consider an alternate until EON can supply you with an acceptable belt.

Our recommendation to those who have recieved the "improved" buckle is to conduct your own test - hook the belt to the back of a chair and throw the body forward.

Evaluate for yourself the effects if any protrusion in your lap area coming in contact with the belt side edges - including a pants belt buckle or keys in your pocket. If you agree that there is a problem, write a letter to EON and to FAA describing your concern.

EON Corp.,
2425 San Fernando Rd.,
Los Angeles, Ca 90065

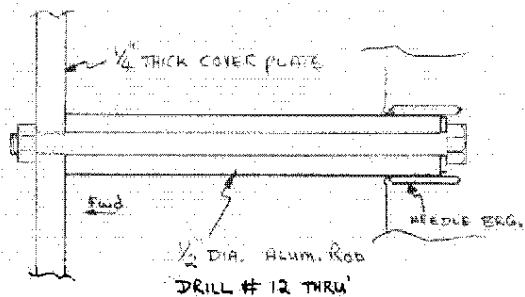
FAA AWE-130
Attn: Fred Jenkins
15000 Aviation Blvd
Lawndale, Ca 90260

RUDDER TRAVEL In CP #22 Page 8, we issued a Mandatory Grounding bulletin that reduced rudder travel from 3.5" to 2.0". To do this it stated that the cable is cut and shortened. However, due to a missing sentence, it didn't tell which cable to cut. The correct cable that should be shortened is the 3/32" cable that runs from the top hole of VECS 15 bellcrank up to the brake cylinder arm (ref page 16-2 of the plans). Also note that the repeatability of the stop, (rudder out to only 2") depends on the condition of the brake master cylinder. If it leaks or bleeds down the amount of maximum rudder travel will increase. Keep your VariEze brake system in top shape, it's your onlymeans of directional control under about 30 mph speed. What ever you do, don't put any other stop in the system or you will find yourself without brakes.

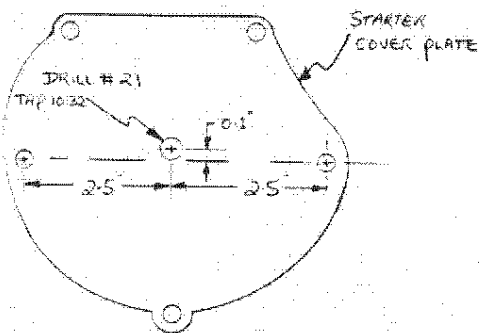
The rudder deflection bulletin is being repeated in this newsletter with the clarification.

URGENT CONTINENTAL ENGINE DIRECTIVE We had a report of a VariEze Continental O-200 engine failure due to oil pressure loss. Teardown inspection of the engine found that some of the needle roller bearings out of the starter shaft support found their way into the oil pump, causing considerable mechanical damage. The starter's shaft on some models is supported in the accessory case by a small (5"dia) needle roller bearing that is pressed into the engine case. When the starter is removed as is the case for VariEze use, this bearing remains in the engine. If the bearing races are worn, the rollers can fall out and then destroy the oil pump or other components. Not all Continental engines have this bearing, some have a pinion pivot. But in any case, each aircraft with a Continental engine that is operating without a starter (normally the starter shaft holds this bearing in place) should immediately be grounded until the following inspection/modification is accomplished.

Pull the starter cover plate on the top of the accessory section and with a mirror and flashlight determine if your engine has this open roller bearing. Be very careful not to drop anything down in the case or you will be faced with an engine removal and teardown to remove it. The open needle bearing must be removed or "plugged" to prevent the rollers from falling out. We did not have a puller adequate to remove the bearing, so decided to use a plug. The plug is a 1/2" diameter shaft inserted in the hole taking the place of the starter shaft. Refer to the adjacent drawings. Drill and tap a 10-32 thread in the starter cover plate at the location shown. Cut a 1/2" diameter aluminum rod to a length of 3.15". Drill a 3/16" (#10 drill) hole through the center and bolt it to the cover plate with an AN3-34A bolt and AN960-10 washer under the bolt head. Safety it with a MS21042-3 lock nut on the outside of the cover plate. This assembly then inserts into the needle bearing, providing retention of possible loose rollers.



6061T-6 ALUM. 1/2" DIA. ROD 3.15 LONG



AEROBATICS We often get asked "is the VariEze aerobatic?" Answer "No". The VariEze was not designed for aerobatics and the flight manual states they are not permitted. Long range cruise efficiency was the design goal rather than any aerobatic capability. Those who want to do aerobatics should consider an airplane specifically designed for aerobatics. Recently Dick and Burt had an opportunity to fly Richard Grunsven's new RV-4 and thoroughly enjoyed it. The RV-4 is an excellent acro aircraft and would recommend it to those who want an aerobatic aircraft.

Category	Definition
MAN-GRD	Mandatory, ground the aircraft Do not fly until the change is 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.

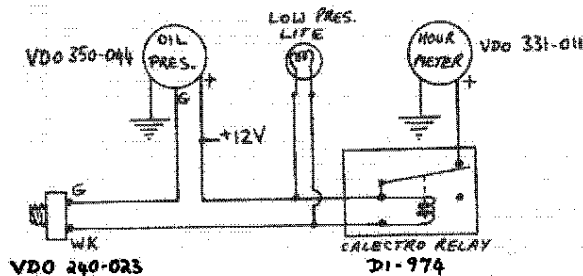
VARIIZE PLANS CHANGES

- DES Sect III
Page 3 Connect a 6-volt bulb across the two leads to the roll trim servo motor.
- MEO Sect V
Page 1 Caution. Never use any (Chemical) paint stripper or solvents on your aircraft fiber glass structure. These materials may not be compatible with the epoxy and damage the basic structure or penetrate the fiber glass and destroy the foam underneath.
- MAN-GRD Sect I
Page 19-12 - Repeated with clarification from Sect IV
Page 28 C.P.#22.
Rudder Travel - Mandatory change before next flight. Reduce rudder travel from 3.5" to 2.0". This can be done by shortening the vertical cable that runs from the top hole of VEC515 up to the brake arm. Make fine adjustment with the fitting on the top of the master cylinder. The rigging check takes two people - one in the cockpit pushing full rudder pedal deflection and one measuring at the top of the rudder while applying a mild aft airload (about 3-5 lb) on the rudder trailing edge.
- MAN-GRD Sect IIA
Page 1 Continental engines operating without starter - inspect for open needle bearing. Remove or plug bearing per this newsletter to avoid possible engine damage.
Sect IV
Page 29
- OPT Sect I
Page 17-6 You can substitute a HM-6C with a steel insert to 1" dia. in place of the RE4M6 rod ends. (suppliers are having trouble getting the RE4M6).

ACCIDENTS In December an Australian VariEze crashed just after take off fatally injuring its owner/pilot. The information we have recieved to date is sketchy at best, but what appears to have happened is that the pilot made a normal takeoff to about 20 ft AGL then dove back to the runway hard enough to hit the prop and wheel brake discs. The aircraft then pitched up nearly vertical (70 degrees), rolled inverted and crashed from about 100 foot altitude. This was the pilots first flight in the aircraft.

The aircraft however, had flown 5 hours by a competent pilot, had completed it basic tests including stalls and found to be normal. The accident is still under investigation. If any significant finding is recieved, we will pass it on.

NEW VDO ENGINE INSTRUMENTS In newsletter 22 we listed a new line of engine instruments we had been testing in the Long-EZ and were very happy with. We also stated the oil pressure indicator could also incorporate a low pressure warning light and run the hour meter only when the engine runs. The following is the wiring diagram for both the low pressure warning light and the hour meter hook up. Route the 12 volt input through the master switch and protect with a 2 amp breaker.



In newsletter 22 page 5, we listed a set of VDO/CARR instruments that we tested in the Long-EZ. We erroneously listed the cylinder head temp sender Part No. VDO 323-701. This is a sender for a small 14 mm spark plug. Unfortunately VDO does not make a sender for a standard size aircraft spark plug (18mm). However, the Westac CAT sender #712-5W is compatible with the VDO cylinder head temp gauge. Our calibration indicated essentially zero error. Just a reminder to check the calibration of any new gauge prior to use. (see C.P. 19, page 4). Remember these CHT systems are not temperature compensated. They are calibrated to 70°F and read the difference between the sender at the cylinder head and the end of the thermocouple wires coming from the sender. If the air temperature is above 70°F you must add the difference to the gauge reading - if below 70° the difference must be subtracted. So if its 100°F outside, your actual CHT is 30°F more than what's showing on the CHT gauge. Most installations terminate the thermocouple sender wires on the fire wall and run aircraft wiring up front to the gauge. In this case use the outside air temperature for the correction reference.

LIGHT WEIGHT ALTERNATOR Thanks to a suggestion by Ben Duarte from Richardson Texas. We have adapted a 10 amp Kobota tractor alternator to run on the Long-EZ. The alternator is a small, very rugged, well built unit. Unfortunately extensive machining is required to remove excess material. We have run it over 45 hours with no problems (one flight was 33.5 hours long!) The whole thing is real slick, total weight is under 5 lbs and the hookup/belt drive is very simple. Technically it is not an alternator but a dyno for it has permanent magnets and it's output is not regulated by the field current. The dyno output is constant AC and needs a special rectifier/regulator. If there is enough interest/demand for such a unit we could arrange to have a complete package put together and made available through one of our suppliers. Let us know - should be under \$200 complete

OVERSEAS VARIEZE BUILDERS There can be a significant savings in the cost of shipping various items like canopies, cowlings etc overseas if multiple shipments are made (5-10 in one box). Some of the distributors will also discount multiple orders. Attempt to combine orders before contacting the distributor, if possible. If you would like to be the focal point for combining orders in your area send your name and address to RAF, we will print it in a future C.P. newsletter so that other builders in your area can contact you to arrange a multiple shipment.

CP23 Pg 8

HOSPITALITY CLUB ACTIVITY The club is planning a get together at Bull Head City Arizona on April 13th and 14th. Rain date is the 19th and 20th April. Camping and motel rooms will be available. For further information about the Bull Head gathering and also the Hospitality Club, contact Don Shupe, 2531 College Lane, La Verne, Ca 91750 (714)593-1197.

Ed and Joann Hamlin hosted a Hospitality Club New Years Eve party. Seven EZs arrived to join the fun.

FLYING EZE BOOK - "Thank you all 48 who have sent me pictures and wonderful letters, great information. Now please, the other 162 please, I need your pictures etc. to complete the "Flying Eze Book before we go to Oshkosh this year".

Burt's Mom Mrs. Irene Rutan,
8526 Calmada,
Whittier, Ca 90605

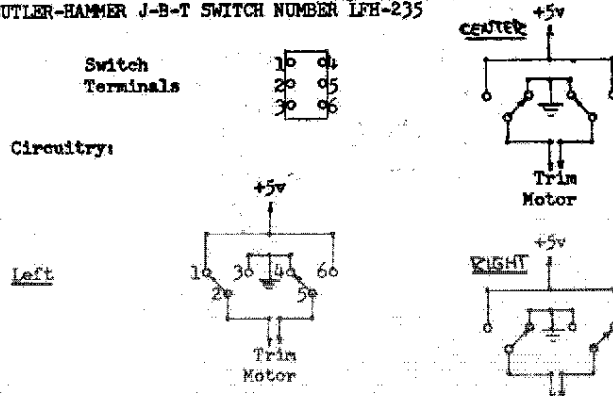
Mrs. Rutan is the VariEze Hospitality Club historian.

VARIEZE BUILDER HINTS Fuselage - center section spar mating method. You may find it easier to skin the fuselage prior to installing the center section spar. To do this, assemble and glass the fuselage but tack the firewall on for alignment only. Peel ply the skin where the center section spar will be cut out later and around the firewall area. After cure, remove the firewall, cut out the slot for the center section spar and glass on to the fuselage peel ply area with 3 inch wide tapes of 45° BID - 2 plies. Use 2 inch wide tapes lapping onto the firewall. This allows you to skin the fuselage before building wings and center section spar.

In C.P.#22 we recommended a dual switch that shorts across the roll trim servo motor that keeps it from backing off. Since we published C.P.#22 we have recieved numerous suggestions on how this could be more easily accomplished. Tom Martin suggested connecting a 6volt light bulb (available at Radio Shack stores) in parallel with the servo motor (across the two leads to the servo). You "pinball freaks" can mount the bulb where you can see it light up every time you tweak the roll trim! Two other solutions to short the motor are shown below:

Jim Eggeston suggested a single switch that does the job:

CUTLER-HAMMER J-B-T SWITCH NUMBER LFH-235



Richard Clark and William Ruben pointed out that the C.P.#22 dual switching is simpler with two single-pole micro switches. Part # 8A1061. MICRO.



The "Real" George Scott, builder of the award winning VariEze N240EZ publishes a monthly newsletter that is full of builder tips and flying hints. Really great. Subscriptions are \$6.00 and payable to George Scott, Jr., 9 Chestnut Hill Rd., Rt 7, Cummings, Ga 30130

FOR SALE

VariEze Prop -Teds used 58 x 70,C-90 engine Alan McPherson (408)258-4212 - \$185.00

Aircraft Spruce spinner cut out for this prop - \$80.00

VariViggen Canard complete except for top skin \$600

Delbert D. Dester
109 Holland's Grove Lane
Washington, Ill 61571
(309)745-8232

VariViggen engine mount. Modified from a 1963 Cherokee. \$180

Bruce Olsen
137 Las Flores
Goodyear, Az 85338
(602)932-1739

Franklin engine 2A-120-C, 2 cylinder 60hp. 30 hours SMOH. Rebuilt bendix mags & carb with pusher prop. \$1900 FOB Mojave. This is the engine out of N7EZ original prototype. The aircraft is EAA museum bound and engine is available. This engine is NOT recommended for a VariEze. Ask for Dick. (805)824-2645

VariEze Cassidy prop, almost new \$150 for a C-85 engine.

Nat Puffer.
Evenings (612)776-1145

Lycoming O-235 for sale

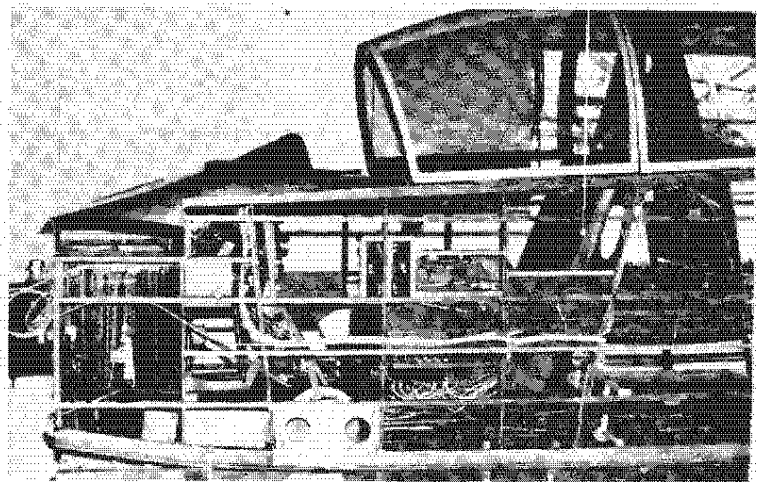
W.E. Clark
116 West University Pkwy,
Baltimore, Md 21210
(301)256-5671

VARIVIGGEN NEWS Not much to report this time, only a few Viggen builders have been in touch. Charles Allen is progressing very well and judging from the photos he sent, he is aiming at a Grand Championship - just beautiful workmanship, Charles. See photos. The French built VariViggen powered by two microturbo jet engines is undergoing flight test and has been featured in several European magazines. Performance figure quoted in "Avimag" are quite impressive: top speed - 248 mph, cruise speed - 198 mph, rate of climb - 1180fpm. Of course this aircraft is a flying test bed for the microturbo engines, and is not a real ideal "homebuilt" due to severe range limitations, range is only about 200/250 miles or 1 hour of flying time!

N27MS now has 400 hours on it and just over 500 landings. This means that the worm gear main gear retract system (now standard in the 2nd Edition Plans) has over 500 cycles under load on it, with absolutely no problems whatsoever. The only problems I have had have been the alternator, which for some reason or another, have failed at a rate of one every 100 hours. My alternator is a Chrysler product, standard equipment on many Piper aircraft, and is a certified aircraft part. All four failures have been different, bearings, diodes, field coil windings failed, etc. Anyway, I have decided to try a different make of alternator, and am in the process of installing a brand new Alcor(Motorola) 55 amp alternator. I intend ducting cold air onto the alternator, even though I tried that with the last Chrysler one, without much success. The Alcor has about three times the warranty so hopefully I will have more luck.

The other thing that has come up is brakes. N27MS never has had very good brakes. They have been adequate but not near as powerful as Burt's N27VV. Both aircraft have Cleveland 500 x 5 wheels, tires and brake calipers. This has puzzled me to the point that some time ago I went in and changed the pedal to master cylinder leverage ratio. This helped some, but did not give the expected results.

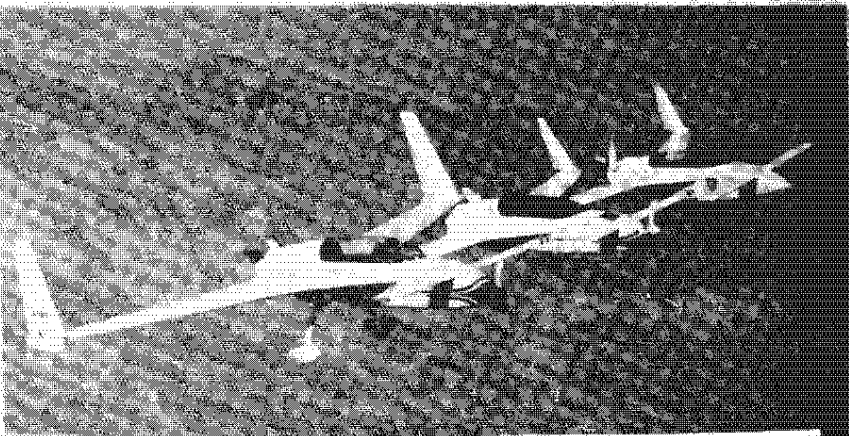
Building and flying the Long-EZ which has the same wheels and brakes. I was amazed at the tremendous braking power it has. Even allowing for the difference in gross weights, it was much superior to mine, so I looked little further, and don't know why I did not catch it before. What I had done was to buy a brand new set of 500 x 5 Cleveland wheels and brakes, and then because I was "cheap", I bought Gerdes master cylinders instead of Cleavelands because at the time they were about half the price. It turns out that the Gerdes master cylinder piston is .625" in diameter, and the Cleveland is .562" in diameter. This does not seem like much, but makes all the difference in the world. The Gerdes wheels and brake calipers work fine with the Gerdes master cylinders, the piston in the caliper is larger and thus they work well together. However I am not positive but I believe the Gerdes wheel and brake assembly is wider and may not fit up into a Viggen wheel well, the Cleavelands only just barely fit. The moral here of course is to be sure you have compatible brake cylinder/brake caliper combination. The Rosenhaan brake master cylinder is .50" in diameter and is compatible with the Cleveland wheels and brakes, and at a much more affordable price than the Cleveland master cylinders.



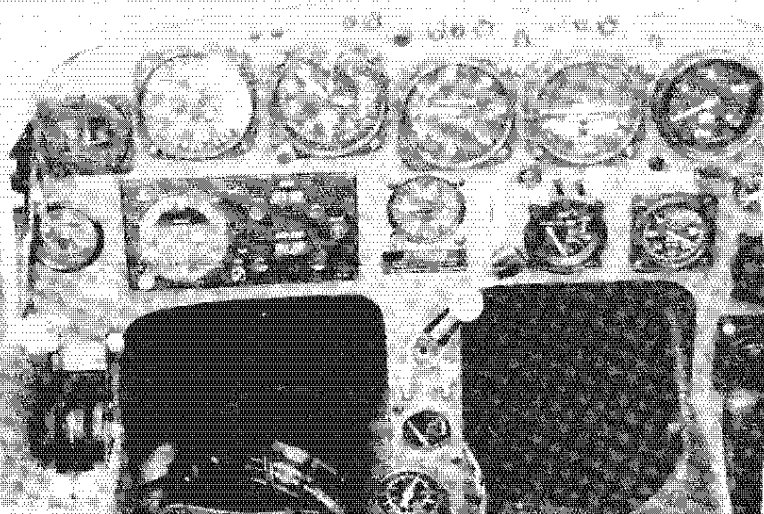
Charles Allen's Viggen - note all equipment installed before skinning fuselage.



Bruce Evans with his EZ on his first solo cross country trip!

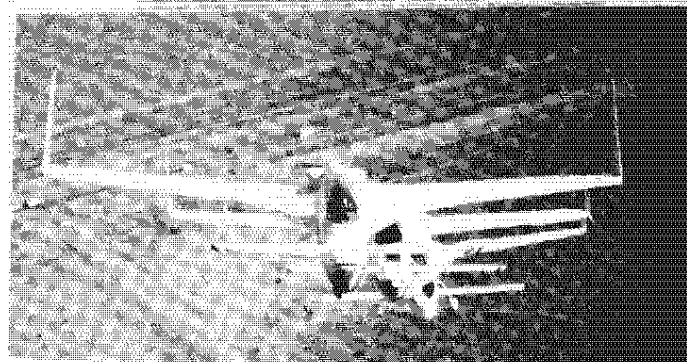
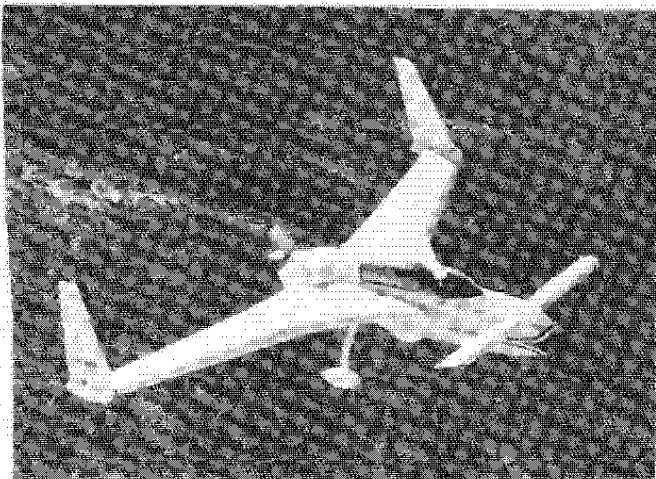
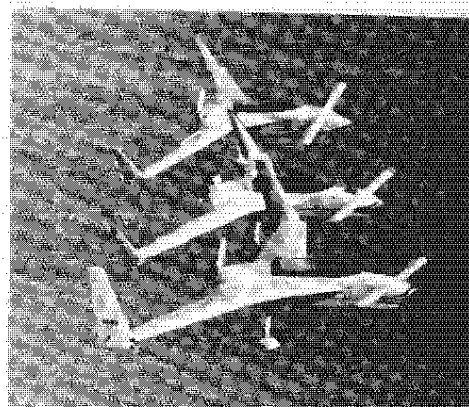


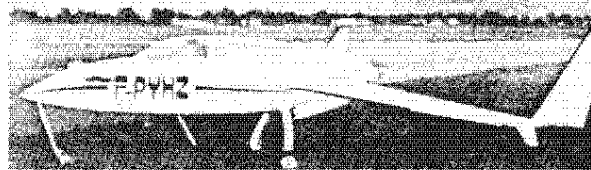
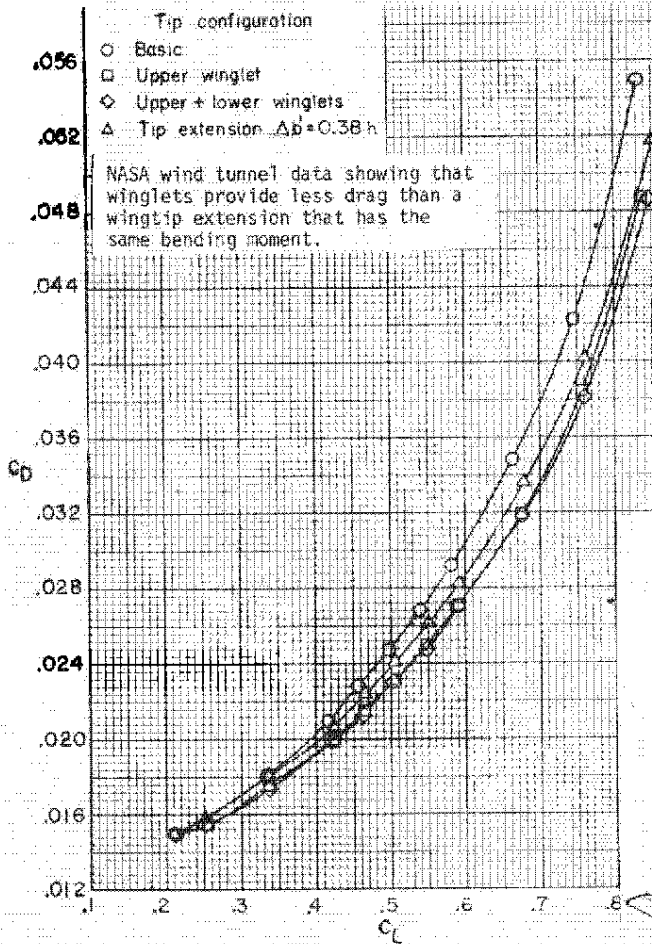
Three generations of EZs in formation. Long-EZ, VariEze and 60hp prototype built in 1975.



Instrument panel on the Long-EZ. The new pitch trim is on the left console, aft of the throttle. Note the large CARR Tach (upper right). Two more instruments are on center floor, just out of view.

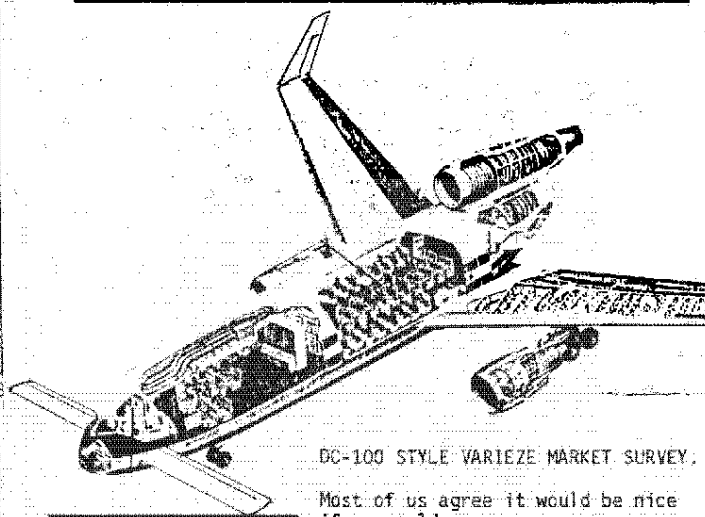
Long-EZ during Distance Record flight. Note the 74 gallon rear seat tank (450 lb!).





Le premier « VariEze » français

Il a été construit par un jeune élève-ingénieur des Arts et Métiers : Bruno Guimbal, et vole depuis deux mois à St. Etienne-Bouthéon où ses essais sont assurés par le chef-pilote de l'Aéro-Club, M. Joubert. Une remarquable réalisation, menée à bien en moins de deux années par un jeune de vingt ans — qui donc, au départ, n'en avait guère plus de dix huit... Un certain nombre de « VariEze » ont été mis en chantier par d'autres amateurs français, et certaines des ces constructions sont maintenant très avancées, ce qui laisse espérer la présence de plusieurs « canards » Rutan à Brienne-le-Château l'été prochain, pour le Rassemblement du R.S.A.

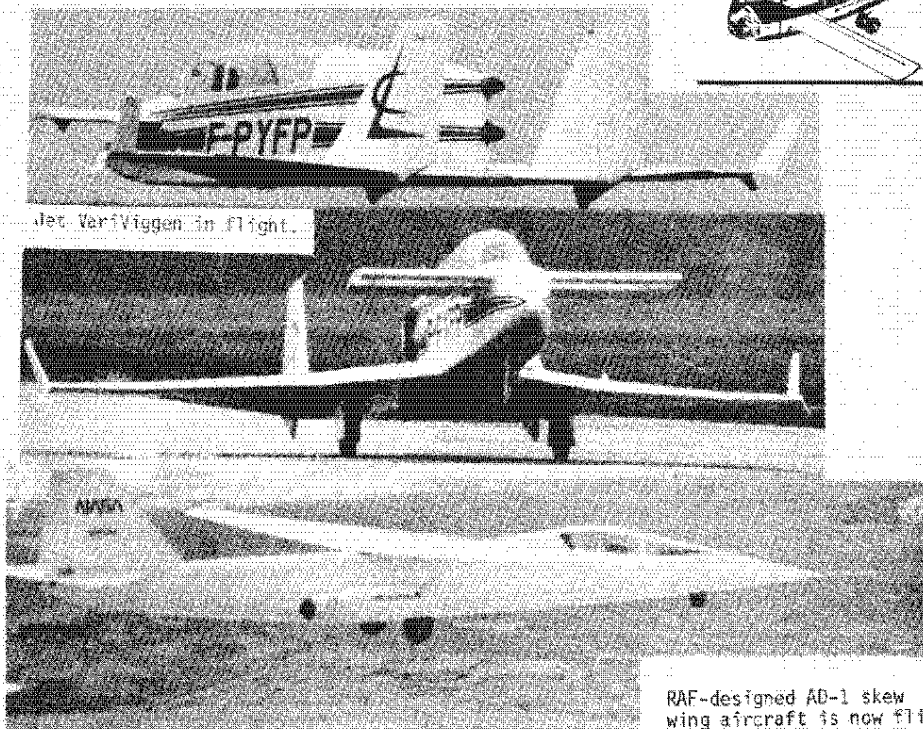


DC-100 STYLE VARIEZE MARKET SURVEY.

Most of us agree it would be nice if we could carry more passengers in our VariEzes. A builder in Western Massachusetts has come up with a kit to modify your VariEze so that it will carry 310 passengers, a pilot, co-pilot, engineer and six Swedish stewardesses. The full kit including three jet engines, plans, materials, 2,500 gals resin shipped to the siding of your choice and will probably cost \$1,310,000. We would consider making the system available as a kit or fully assembled if there is enough interest.

Check appropriate box:

- Send plans only;
- Send Kit, enclosed M.O.
- Send fully assembled (6 wks)
- Send Stewardesses only.
- Wadayououtayourmind??!



Oblique Wing Aircraft in First Flight

National Aeronautics and Space Administration's AD-1 oblique-wing research aircraft flew its first flight Dec. 21 and is expected to begin skewed-wing flight tests around mid-February, following a series of preliminary test flights aimed at gathering base data with the wing in a normal perpendicular position with respect to the fuselage (Avast Jan. 7, p. 14). The wing can be pivoted up to 60 deg. from the

normal perpendicular position. Propulsion is provided by two Microturbo TSR-18 turbojets of 220 lb. thrust each. NASA is studying the application of the oblique wing concept to future high-speed transport aircraft, where the wing would be pivoted at higher speeds to reduce drag and thereby allow higher speeds and longer range for the same fuel expenditure.

RAF-designed AD-1 skew wing aircraft is now flight test. Artical from Aviation Week.

CP23 P911

VariEze

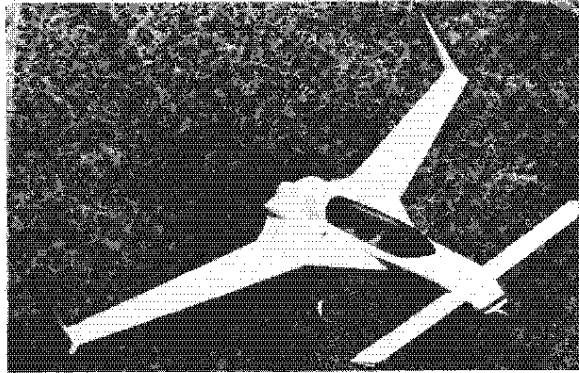


TODAY'S HOMEBUILT WITH TOMORROW'S TECHNOLOGY

THE AIRPLANE. The VariEze is a small, high-performance homebuilt sportplane. It can be built from raw materials costing approximately \$3500 (less engine) in about 1200 man-hours or from prefab parts and materials, costing approximately \$5000 in about 800 man-hours (about eight months spare time work). Its structure is a sandwich of high-strength fiberglass, using low-density, rigid foam as core material. The structure is fabricated directly over the shaped core, thus expensive tools and molds are not required. Composite-sandwich structure offers the following advantages over conventional wood or metal: less construction time requiring less skills, improved corrosion resistance, improved contour stability, better surface durability, dramatic reduction in hardware and number of parts, easier to inspect, and repair. The VariEze uses the small four cylinder Continental. The Lycoming O-235 without starter or alternator can also be used. The airplane has exceptional climb and cruise performance. It can carry two people 700 miles at 185 mph on less than 22 gallons of fuel. Frontseat passengers up to 6'4" and 220 lb and backseat passengers up to 6'2" and 220 lb, can be accommodated plus a modest amount of baggage in a suitcase. The airplane does not have full dual controls, but does have a backseat control stick. Due to its small size (only 67-sq-ft. wing area) it is not the airplane for installing extra equipment for IFR, night flying, etc. It can handle a simple electrical system with a single NAV COM and gyro instrument. These can even be powered with a solar panel, thus eliminating the heavy alternator. The VariEze is recommended for day-VFR operation only. Due to its relatively high landing speed (70 mph) and small tires, it is acceptable only for smooth, hard-surface runways. Its stability and overall flying qualities are superb. Once trimmed, it will hold attitude and level flight "hands-off" even in turbulence. Trim changes due to power, gear retraction, or landing brake are all very small. Its unique aerodynamic design allows it to be flown with full aft-stick, at less than 50 knots, without a stall departure or loss of control, and without altitude loss. The VariEze uses the latest aerodynamic features: NASA winglets, both wings cruise at best L/D, basic arrangement provides stall safety, stiff structure provides accurate contour maintenance, basic system's design eliminates or combines complex control systems, which saves weight, cost and building time while increasing reliability and lowering maintenance.

THE TEST PROGRAM. The VariEze 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 tests and landing gear drop tests exceeding part 23 criteria, environmental/thermal tests on structural materials/components, manufacturing methods testing, and many others.

THE HOMEBUILDER SUPPORT. The manufacturing manual is 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 mid 1974, updates plans, provides building hints, etc. Complete owners manual provides all necessary information for safe initial testing and for normal and emergency operations.



VARIEZE DOCUMENTATION is available in six sections.

SECTION I - MANUFACTURING MANUAL - This is the complete education manual for composite materials and methods, also, the complete plans and construction manual for the entire VariEze except engine installation. The manual consists of a 153-page, bound 11" x 17" book plus nine larger full size drawings. It includes 168 photos, over 800 drawings and illustrations, and over 65,000 words. The builder is led, step-by-step through the entire construction of the airplane. The manual identifies sources for all materials and all prefabricated components. NASA approved.

SECTION II - ENGINE INSTALLATION - This is a set of drawings and construction manual for the complete engine installation including mount, baffles instrumentation, electricals, fuel, exhaust and induction systems, carb heat box and muff, cowling installation, prop and spinner.

SECTION IIA - Continental A65, C85, C90, O-200
SECTION IIC - Lycoming O-235 - No accessories.

SECTION III - ELECTRICAL - This is an optional (not required) set of drawings and installation instructions for electrical system.

SECTION IV - OWNERS MANUAL - This is an operations handbook and checklists, including normal and emergency operation, detailed flying qualities and performance charts, maintenance, maiden flight procedure, and pilot checkout, etc.

SECTION V - FINISHING THE COMPOSITE AIRCRAFT - applies not only to a VariEze, but to other epoxy/composite aircraft. Includes filling/contouring/priming/U.V. barrier/ color and trim.

SECTION VI - LANDING BRAKE - Complete full size drawings for an optional drag device. The brake dramatically increases the airplane's glide angle and deceleration in the flare. Without the brake the airplane is limited to runways at least 2400-ft long. With it, runways down to 1800-ft long can be used with appropriate pilot proficiency.

SPECS AND PERFORMANCE WITH 100-HP CONTINENTAL, FIXED-PITCH PROP @ GROSS WEIGHT

Take Off	900 ft	Range @ Max Cruise	700 mi
Climb	1600 fpm	Range @ Econ Cruise	850 mi
Max Cruise	195 mph	Landing Speed	70 mph
Econ Cruise	165 mph	Landing Distance	900 ft
Empty Weight	570 lb	Wing Span/Area	22.2' / 53.6 ²
Gross Weight	1050 lb	Canard Span/Area	12.5' / 13 ²

SPECS AND PERFORMANCE WITH 75-HP CONTINENTAL

Take Off	1200 ft	Econ Cruise	145 mph
Climb	900 fpm	Empty Weight	550 lb
Max Cruise	172 mph	Gross Weight	950 lb

THE FOLLOWING ARE RAF-AUTHORIZED DISTRIBUTORS OF VARIEZE MATERIALS AND COMPONENTS. CONTACT THE DISTRIBUTORS AT THE ADDRESSES SHOWN FOR THEIR CATALOGUES AND DESCRIPTION OF ITEMS

ALL RAW MATERIALS.

AIRCRAFT SPRUCE & SPECIALTY CO 201 N. Trustlow Ave, Bx 424, Fullerton, Ca. 92632 (714)870-7551 Catalog \$3	WICKS AIRCRAFT SUPPLY 430 Pine, Highland, IL 62249 (618)664-7447 Catalog \$2
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KEN BROCK MANUFACTURING, 11852 Western Ave. Stanton, Ca 90680 (714)898-4366: Prefabricated components - wing attach assembly, nosegear machined parts, control system components, fuel caps, engine mount, rudder pedals. Catalog costs \$2.

THE AIRPLANE FACTORY, 7111A Brandt Vista, Dayton, OH 45424 (513)845-9872 or 233-7754 - Canopy. Send SASE

Check items desired	Price, including first-class rail U.S. and Canada	Air Mail Overseas*
VariEze info kit includes current issue of "Canard Pusher" newsletter	\$5.00	\$6.00
"Canard Pusher" newsletter published quarterly. One-year subscription	\$6.75	\$8.75
<input type="radio"/> Section I	\$139.00	\$153.00
<input type="radio"/> Section IIA	\$ 19.00	\$ 21.00
<input type="radio"/> Section IIC	\$ 21.50	\$ 23.50
<input type="radio"/> Section III	\$ 8.00	\$ 9.50
<input type="radio"/> Section IV	\$ 8.00	\$ 9.50
<input type="radio"/> Section V	\$ 7.00	\$ 8.00
<input type="radio"/> Section VI	\$ 10.00	\$ 11.00
<input type="radio"/> 3" tri-colored jacket patch	\$ 1.95	\$ 1.95
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