

THE CANARD PUSHER

No. 74

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

VariViggen (1st Edition), newsletters 1 to 74.

VariViggen (2nd Edition), newsletters 18 to 74.

VariEze (1st Edition), newsletters 10 thru 74.

VariEze (2nd Edition), newsletters 16 thru 74.

Long-EZ, newsletters 24 through 734

Solitaire, newsletters 37 through 74.

Defiant, newsletters 41 through 74.

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

PLEASE NOTE: BUILDER SUPPORT IS ON TUESDAY ONLY FROM 8:00 TO 5:00. When you call on Tuesdays for builder assistance, please give your name, serial number, and nature of the problem. If you are not in an emergency situation, we ask that you write to Mike. However, if you require immediate assistance, Mike will make every effort to return your call between 2:30pm and 4:00pm (our time).

When writing to RAF, send along a stamped, self addressed envelope if you have builder's questions to be answered. Please put your name and address on the back of any photos you send.

SOMETHING NEW HAS BEEN ADDED

The post office has decreed that a change be made to our address. The flight line number must appear above the city name or they will not deliver our mail beginning March 1, 1993.

Please read and heed.

OSHKOSH 1993

Note new start date. This year, Oshkosh 1993 will start on Thursday, July 29th and will end on Wednesday, August 4th.

For several years now, the fly-in has started on Friday. Most people, of course, arrive on Thursday. We suppose most people, including us, will now arrive on Wednesday!

Burt's talks this year will be tentatively on Friday, July 30th; Saturday, July 31st; and Sunday, August 1st. All of these will start at 10:00am. Design College will start at 8:30am on Saturday, July 31st.

LETTERS

"Dear RAF:

Thought that you might be interested in knowing some of the details of another world record set by a Long-EZ during my flight to 30,500 ft. in N121DT. The flight has yet to be certified by FAI and NAA, however I see no problems at this time. After altimeter errors are computed in, expect to be certified to 30,370. (Editor's note: Verification from NAA has been received since this letter arrived at RAF).

My Long-EZ, fully equipped including oil, weighs 889 lbs. having no starter. Class C.1.a. has a max take off weight of 1102 lbs. including instrumentation to certify the flight. Needless to say, with fuel, added instrumentation and me at 175 lbs the aircraft would be about 50 lbs. over weight.

To make the flight, I removed the back seat upholstery, navigational lighting, wing-leveller autopilot, fire extinguisher, ELT, alternator, all radios, prop spinner, oil cooler, carb heat muff and 15 lbs. of body weight. Had to eat a lot of

popcorn without beer to wash it down to bring my body weight down to 160 lbs. On a previous test flight I discovered that the vacuum pump still pulled almost 3 inches at 25,000 ft. so I elected to keep my vacuum pump and gyro instruments in case the inside of my canopy frosted over, which it did partly.

I added an electronic ignition made by Electroair and removed the right mag to give me advanced timing and performance at altitude which worked flawlessly. I also had a climb prop (70Dx46P) made by Performance Propellers for my Lycoming O-290. The prop turned 2800 RPM on climb out and 2600 RPM at 30,000 ft. For communications with ATC and the ground during the flight, I fabricated a microphone into my oxygen mask and carried a hand held radio.

Weigh-in was 1099 lbs with 10.5 gallons of fuel, 8 gallons in the right tank for climb and 2.5 in the left for return flight. I also carried a video camera mounted over my right shoulder and a recording barograph in place of the back seat.

Take off from Camarillo airport was at 08:15 Dec. 5, 1992 with an initial climb rate of 2300 ft./min. ATC had been FAXed of my intentions for airspace more than 12 miles off the coast of California. So when I was handed off to LA Center they were expecting me and cooperated to keep me out of the Continental Control Area before climbing above FL180 VFR, as well as recording my mode C replies for the record. Interestingly, at 29,000, ATC asked if I was turbo charged!

Passing through 20,000 ft. I was climbing at 700 ft./min. However, it took me a couple of minutes to make the last 100 ft. to 30,500 indicated. I had reached my goal of breaking 30,000 so at 1 hour and 4 minutes into the flight, I leveled off and held that altitude for another three minutes. The engine was turning 2600 RPM at approximately 8.5 inches of manifold pressure and I figured that I was developing about 30% power. Outside air temp. was -40C and my hands and feet were getting cold through my gloves, layers of clothes and snow boots.

Descent and return to CMA was uneventful. I found a warm reception waiting for me with Dick Freeborg, the National Aeronautic Association and FAI representative, the first one to shake my hand.

Note worthy is that this altitude record breaks the previous of record of 27,040 ft. set two years ago by Hoot Gibson, astronaut and space shuttle commander, in a modified Cassutt.

Dave Timms"

Ed. note: Hoot Gibson took his record away from Norm Howell, Quickie and Long-EZ builder, flying Terry Schubert's Long-EZ.

"Dear RAF;

At the Long-EZ's annual this spring, I made some changes which caused me a lot of misery. Relating them might help someone else who might contact you with a similar problem. I decided to install a starter (lightweight), which I had never had before. After installing my new starter switch with the start position, my engine would not run on the right mag unless the right grounding wire was disconnected. I traced wires. I ohm-ed out wires. I replaced wires. I changed starter switches. I installed new series 4300 Slick mags as my 4100 series mags had 500 hours on them and were 14 years old. The mags would operate normally when the switch was hooked up but not installed in the panel, but the right mag would cut out when the switch was installed. I replaced the capacitor in the new right mag. Finally, my friend Frank Caldeiro figured out that the right mag lug on the switch was grounding on my radio stack tray just above the switch. Once the switch was insulated from the radio tray, the mags worked fine. Incidentally, Chief Aircraft who sold me the mags said that Lycoming recommended the 4370 right mag and the 4372 left mag for the O-235-L2C. The 4372 has only 15 degrees of lag when cranking the engine which gives ignition at 5 degrees BTDC when you set the timing at the 20 degrees BTDC called for on the engine's data plate. My old 4100 series left mag had about 25 degrees of lag which gave me spark at 5 degrees ATDC. Tomahawks (L2C) and 152's (L2A) have had a reputation for hard starting. My L2C starts much better now than it ever did, either hand propping or cranking. I highly recommend the 15 degree lag for the left mags on O-235-L's.

Best wishes,
Fred I. Mahan"

BRUCE TIFFT, PROP MAKER

We first met Bruce and his wife, Bonnie, in 1979 at Mojave. He had brought up one of his props for Burt to test on the prototype VariEze, N4EZ. Bruce was a gyrocopter builder/pilot and had been building gyrocopter props for some time. He had started building a VariEze and was thinking of manufacturing props for the speedy pusher to help offset the cost of building his own example. It did take a couple of iterations to get the prop to work but Bruce persisted, and today, B&T Props builds lots of props each year, most of them for VariEzes and Long-Ezs with a few RVs Defiants and Glasairs thrown in.

Bruce and Bonnie lived in Ventura, California where B&T Props began. Their yellow VariEze was hangared and operated out of Santa Paula airport. Sadly, after some 700 hours of flying, an accident destroyed their VariEze at the Santa Paula airport (Bruce was not flying). Not having this swift method of visiting airshows and delivering finished props to their customers put a serious crimp in their lifestyle and their business. They resolved to build another VariEze. Meanwhile, the Long-EZ had come along. When Bruce got the opportunity to buy a partially built VariEze, he decided to combine the attributes of both aircraft. The result is their beautiful "Vari-Long", a highly modified VariEze with Long-EZ wings and winglets. A one-of-a-kind aircraft that embodies all of the remarkable skills of the quiet, unassuming prop maker, Bruce Tift.

When we visited Bruce and Bonnie in Oregon at their neat little "Bend in the Creek Ranch", just outside Cottage Grove, Bruce very kindly demonstrated what goes into building a prop from start to finish.

First, and most important, he must have good raw material. Bruce lucked out here. It turns out that there is a lumber yard in Eugene, Oregon that willingly obtains, and keeps in stock just for him, premium grade, straight grain, Canadian Hardrock Maple. Not only that, but they plane it to the thickness and smoothness he requires, in lengths that he can use.

He starts off by trimming the ends of each board on his cross-cut saw to get rid of any cracks that sometimes occur in the extreme ends of these boards. He then cuts the board into appropriate lengths, depending on what prop he plans on building. It takes six boards laminated together to provide the blank from which he carves the propeller. The six boards are stacked neatly and he drills a small hole at each end. The holes will accommodate steel pins which locate the boards relative to each other while they are in the press during the glueing cycle. Glue is then hand rolled onto each surface of each board. They are then stacked back together and pinned to prevent slippage. This stack of maple is then placed in a special hydraulic press which Bruce designed and built himself. This press can accommodate up to three prop blanks. Each is separated by plastic film to prevent the blanks from sticking to each other. The nine hydraulic jacks are then slowly tightened, in sequence, until an enormous force is uniformly applied to the wet glued blanks. An amazing amount of glue squeezes out from between the boards as they are left to cure for at least 48 hours.

The cured blank is then cut square at each end and, using an appropriate template or pattern, Bruce marks the blank. Using a band saw, he removes material to arrive at a rough planform of the prop, as well as to come somewhere close to the shape of each blade. Bruce has literally dozens of patterns derived over the years that help him to produce his consistently excellent props.

Next, he lays out and drills "center" holes in each end of the blank and installs it in his wood-turning lathe which has been highly modified to trace a "master" propeller. This "master" is installed between centers about 2 feet behind the lathe and is driven by a chain and sprockets at the same RPM as the lathe. A large aluminum wheel traces the master and, in turn, drives a powerful circular saw in and out of the new blank. The lathe's automatic-feed moves this carbide saw from the tip of one prop blade, through the prop hub, and all the way to the tip of the other blade. It takes one roughing cut which removes one to one-and-a-half inches of wood and glue, and one finishing cut to complete the automatic tracer lathe part of this job. This machine is located in a small building behind the

farm house and while it is running, you must wear hearing protection. The noise has to be experienced to be believed!

The "prop" is now ready for the extensive hand finishing that Bruce puts into his product. The carbide circular saw leaves a line across the blades and around the hub which Bruce sands off using various power sanders, as well as hand-held sanding blocks and sand paper. The trick is to sand only until these lines just disappear, and no more, otherwise the prop will not be exactly the same as the "master".

Prior to this sanding operation, Bruce drills the center hole through the prop; the counter bore that locates the prop on the prop extension; the six prop bolt holes and the counter bores for the drive lugs - using heavy steel drill fixtures designed and custom built for this job.

We could see that it would be very easy to ruin a prop at this point since a pusher prop and a tractor prop must have the counter bores on opposite faces!

Once the prop has been hand sanded to the required finish and balanced, Bruce uses a router to remove about 1/4" from the leading edge of each blade. He then casts a urethane leading edge in place, using a proprietary system that he developed (B&T Props pioneered the urethane "rain" leading edge since copied in some form or other by nearly all of today's prop makers). A sanding sealer, followed by many coats of clear Imron is carefully sprayed on while the balance is checked between each coat. Once fully dry, the B&T decals are installed and the prop is shipped to the customer.

Bruce and Bonnie have shipped their beautiful propellers all over the world during the past 14 years and there are hundreds of EZs (as well as many other homebuilt designs) currently being propelled by Bruce's craftsmanship. Bruce has had the advantage of first having his own VariEze and then his own Long-EZ on which to develop and test his props. One of the other very nice services Bruce offers is a repair/refinish for any wood prop. Also, as many of you know, Bruce can usually provide a "loaner" in the event of a damaged prop. Recently, with the demise of Great American Props, Bruce has been literally

swamped with prop orders and has been having to try to complete his props on an "as required" schedule instead of a "when ordered" schedule. He asks that you have patience and that you let him know, as accurately as you can, when you will actually be needing your prop so that he can satisfy the builders who are ready to fly in a timely manner.

If you are in need of a wood prop for your project, give Bruce a call or drop him and Bonnie a line. They are neat people and Bruce knows more about fitting the right prop to EZs, regardless of what engine they have, than anyone else we know.

Contact: B&T Props
75872 Mosby Creek Rd.
Cottage Grove, OR 97424
503-942-7068

SAFETY-POXY SAFETY BULLETIN

The Occupational Safety and Health Administration (OSHA) has issued a ruling on exposure to 4,4'-methylene Dianilen (MDA). This ruling was published as 29 CFR (Code of Federal Regulations) and 1910.1050 (Applicable to General Industry). MDA is contained in Hexcel's product, Safety-Poxy Hardner (2183 or 2184) in sufficient quantities to be toxic to the human liver as well as being suspect as a human carcinogen.

To obtain copies of the appropriate standard from OSHA's national office, call 202-523-9667, or obtain from any regional or area OSHA office.

Fully cured articles made with MDA are exempt from this regulation.

Based on all of the information available to Scaled Composites, it is our opinion that all but a very few manufacturers will find the requirements for safe use of products containing MDA to be so restrictive and expensive as to necessitate the replacement of these products with alternative materials containing no MDA but which serve essentially the same function.

To this end, Scaled Composites has recently tested more than 70 possible alternate epoxies

and has found at least one which satisfies all structural, pot life and wet-out characteristics. Fuel compatibility tests are now in process. It contains no MDA and all chemicals incorporated in it meet, or exceed, current OSHA requirements for safe use. The resin is PR2032 and the hardener is PH3660-2. The mix ratio is 100 parts resin to 27 parts (by weight) hardener. By volume, the mix ratio is 3.2 to 1 (resin to hardener). As you will all be aware, this is not the same as Safety Poxy which is 100 parts resin to 44 parts hardener. Michael's Engineering is working on a method to convert your current Safety Poxy ratio pump to correctly ratio the new epoxy. Send a SASE to RAF for a copy of this simple conversion.

In order to be able to mix this new epoxy using your ratio balance, you should re-configure your ratio balance to place the hardener cup at 3.7 inches from the pivot (dimension B) and the resin cup at 13.7 inches from the pivot (dimension A). This will give an accurate 100:27 ratio, by weight.

Our suppliers, Aircraft Spruce and Wicks, are presently proceeding to stock this material.

Our safety regulations for use at Scaled allow us to continue to use our remaining supply of 2410/2183 provided satisfactory precautions on skin contact are used. Refer to OSHA's MDA standard for further information.

MARVEL METAL FLOATS

Terry Schubert reports difficulty getting a new metal float to work correctly. It turns out that the tooling to manufacture these carburetor float bowls is very old and no two bowls are, in fact, identical, therefore, no one float will fit all bowls! Terry got a lot of help from Bill Smith of Consolidated Fuel Systems and highly recommends talking to Bill if you are having trouble in this area. Phone: 205-286-8551

ENGINE MOUNT CRACKING (UPDATE)

Only one report has come in regarding a cracked engine mount. This one was a conical Lycoming mount. After 530 hours, the tube from the lower

right engine mount bolt hole was found cracked completely through about 1" above the bolt. This was repaired by welding a sleeve around this fracture. The prop was dynamically balanced and there has been no further sign of a problem with 807 hours now. The vibration is noticeably less and an exhaust flange cracking problem has also been solved.

We have been talking to anyone we can regarding this engine mount cracking problem. We spoke with one very experienced builder/flyer who had a tube crack through on a Dynafocal engine mount. The fracture occurred about 1/4" from the weld between the tube and the right upper Lord mount cup. This kind of crack is usually caused by improper normalizing of a TIG welded 4130 weldment. There is simply not enough evidence at this time to point at whether this may be a design problem or a heat-treat problem.

Anyone who finds a crack or fracture in an engine mount, please report it to us here at RAF. In the meantime, a close inspection of you engine mount, using a strong light, every 25 hours is recommended. Any unusual vibration felt in flight is cause to land and check the mount. On the bright side, there are now dozens of VariEzes and Long-Ezs with accumulated flight times of more than 2000 hours with no engine mount problems whatever. Please do contact RAF if you hear of, or experience a problem like these.

AEROQUIP SERVICE BULLETIN

TO OWNERS/OPERATORS OF ALL GENERAL AVIATION AIRCRAFT USING AVIATION GASOLINES (E.G., INCLUDING, BUT NOT LIMITED TO, 100 OCTANE LOW LEAD, HIGH OCTANE AUTOMOTIVE UNLEADED, ETC., HEREINAFTER REFERRED TO AS "AVIATION GASOLINE").

Aeroquip Corporation's Aerospace Group has recorded several failures of its 601-type hose over the past 12-month period. The subject hose meets all required specifications, however, based upon data accumulated to date, it appears that the use of this hose in fuel systems which carry AVIATION GASOLINE is adversely affecting the life expectancy and performance which Aeroquip has historically experienced with this type of hose.

Aeroquip has seen degradation of the elastomeric inner tube which has resulted in the tube cracking which, in turn, has caused leaking of the 601 hose in these limited types of applications. Based on data which Aeroquip has accumulated to date, it appears that this phenomenon is occurring after approximately two (2) years installation time (independent of actual service hours on the subject hose). To the extent your aircraft may be affected by this phenomenon, Aeroquip recommends that you inspect your aircraft to determine: (a) if your aircraft has 601-type hose fuel lines; and (b) the age and condition of said hoses. Aeroquip strongly recommends that any 601 hose, which is approaching, or has more than, two (2) years in an AVIATION GASOLINE application, be replaced in accordance with the recommended action outlined in this Service Bulletin.

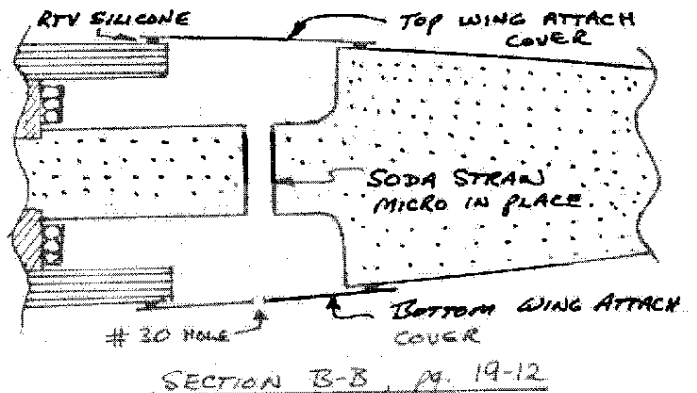
Note: This Service Bulletin does not apply to applications using Jet A, JP4, JP8 grades of fuel commonly used for turbine/jet engines. It also does not apply to other fluids such as lubricating oils, REF. MIL-L-7808 or MIL-L-23699.

Editor's Note: It is interesting to note that this exact type of failure was reported as early as 1986 in the CP and several times since then. Do not use Aeroquip 601 series hoses for fuel lines. Use only Stratoflex Teflon lined, stainless, braided or equivalent MIL-H-8794 Hose, TSO'd to MIL spec. C53A.

WING FITTING VENTILATION - LONG-EZ

The outboard main wing attach fitting recesses in the wings should be ventilated to avoid an accumulation of condensation. Drill a #30 hole in the bottom cover. Remove the top cover and drill a hole in the lowest point of the recess such that it will break into the recess underneath the wing. This hole should allow a soda straw to slip through. Work a little micro into this hole and slip a soda straw through. Allow to cure. Now, carefully cut the soda straw flush with the bottom of the recess. Silicone the top cover back on. This will allow the two covered areas to "breathe" and eliminate condensation which could corrode the wing bolts.

SEE SKETCH TOP OF NEXT COLUMN



PLANS CHANGES AND OTHER IMPORTANT MAINTENANCE INFORMATION

 SEE NEW EPOXY TO REPLACE HEXCEL'S SAFETY POXY.

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

FOR SALE

NOSE GEAR RATCHET

Dr. Curtis Smith's nose gear crank ratchet is still available at \$38.00 which includes postage and packaging. No need to call, just send check or money order. This little device should be considered a "must" by all Long-EZ and VariEze builder/flyers. Once you have flown with it you will wonder how you ever did without it.
 Contact: Curtis Smith
 1846 Sextant Dr.
 Worden, IL 62097
 618-656-5120

SIGHT GAUGES

New, improved fuel sight gauges. Use with auto fuel or Avgas. Clear bubble with white background. Retrofit for Long-EZ and VariEze. \$30.00 per set.

Contact: Vance Atkinson
3604 Willomet Court
Bedford, TX 76021-2431
817-354-8064

THE "BEAD BUSTER" TM

If you have ever tried to remove a tire from a 500x5 wheel you will understand what a neat tool this is. (Mike purchased one of these tools and wonders how he ever got along without it!) Designed by a Long-EZ builder who became frustrated by this problem, the kit consists of a canvas pouch, a vulcanizing patch kit, cadmium plated fulcrum lever and base, and the heat treated aluminum "Bead Busting" shoe - \$75.00.

Contact: Tom Caughlin
10958 National Blvd. #1
Los Angeles, CA 90064

AIRCRAFT COVERS

Custom cover for you Long-EZ. This neat design completely covers your prop, canopy and nose and only uses two straps. Made from space-age Evolution 3 material. Reasonable price.

Contact: Tony Brazier
PO Box 6478
Ocala, FL 32678
904-237-1811

FOR SALE

Two prop extensions for Continental engine - one is 3" long and is drilled, the other is 5" long and is not drilled.

I need a prop extension for a Lycoming. Will sell or trade.

I have two props for Continental A-75 - one is Ted's 58x63, the other is Hegy's 58x63. Both in good condition.

Contact: Richard Long
17220 Esperanza Dr.
Perris, CA 92570
909-780-3507

New 6" SAE #1 prop extension with crush plate - \$150.00.

New A1 spinner with backplate - \$50.00.

Contact: Jim Capistran
6016 Star Valley Street
Mesa, AZ 35205

New EZ axles for 500x5 Cleveland wheels - \$600.00 pair.

Original Paul Prout EZ fuel gauge kit. Lighted, with low fuel warning. Complete, in the box. AVgas only - \$100.00.

Contact: Jim Carraway
415-499-1163

Whelen #1 single flash strobe/position light system - new, in the box - \$500.00.

Lycoming O-235-C2C with carb, fuel pump, mags, spark plugs, HT harness, cylinders overhauled - 640TT - \$2200.00 OBO.

Three year old custom 3 BR, 2 bath home near Scottsdale, AZ

Contact: Phil
602-837-8245

WANTED

PARTICIPANTS

THIRD NATIONAL GATHERING FOR CANARD TYPE AIRPLANES

June 11, 12, 13, 1993

Johnson County Industrial Airport (KIXD)
Olathe, Kansas

Social events, seminars, prizes

Guest speaker - Astronaut - Long-EZ builder,
Jim Voss

Contact: Terry Yake
8904 W, 116th Terrace
Overland, KS 66210-1963
913-451-8904

HELP!! -- We've lost John York! Last we heard, he was in Virginia and we don't know if his belhorn springs are available any longer. Please let us know if you have any information of interest to other builders. ED.

"Dear RAF;

Recently, when talking to the nice people at Feather Lite, Inc., I found that the Long-EZ cowlings I wanted would cost a large percentage of the purchase price just for shipping. It seems that if the shippers know the material is aircraft parts, the price goes up dramatically! I have considered trying to build my own cowlings, but I'm sure I'd fall short of the quality and light weight provided by Feather Lite.

The people I spoke to suggested that the shipping price could be greatly reduced if shared by two or more orders shipped at once, hence this letter. If there are any builders out there in the northeast who have not yet ordered their cowlings and would be interested in combining their orders to save money, perhaps they could contact me and we could arrange a combined shipment. The delivery of cowlings from a common location in this part of the country could be easily arranged. I can be contacted at:

David Kleinschmitt
5 Webb Road
Bethel, CT 06801
203-797-1081

SHOPPING

FLUSH, INTERNALLY MOUNTED ANTENNAS

A complete line of antennas, specifically designed for, and flight tested on, composite aircraft. The antennas are tuned for maximum performance and, in general those who have used them so far, report reception is doubled over standard external antennas.

VariEze builder/flyer, Bill Butters, has started a company to develop a full range of buried antennas. These are normally supplied with a BNC connector built into the actual antenna, but can be supplied without connectors to include enough length of co-ax cable to facilitate easy

installation with minimum weight and bulk.
Contact: Bill Butters
Advanced Aircraft Electronics
PO Box 4111
Florissant, MO 63032
1-800-758-8632

CANARD PUSHER DIGEST, 2ND EDITION

Stet Elliott's "Canard Pusher Digest for the Long-EZ" is now in its 2nd Edition. (For a complete description, see CP57). Includes all builder related information from CPs 24-72. The 2nd edition of the Digest has now grown to over 700 pages, and is professionally printed on double sided 8 1/2 x 11" paper from a laser printed master.

Quarterly updates to the Digest are also available. The updates provide additional information from newly published CPs to bring the Digest current. The updates are compatible with either Digest edition.

Note that the Digest is builders and flyers of the Long-EZ only. It does not support other RAF designs.

CP Digest for the Long-EZ (2nd Edition)

\$75.00

(Overseas orders add \$20.00 for airmail)

Annual Update Subscription (4 updates)

\$25.00

Overseas orders add \$5.00 for airmail

CANARD PUSHER NEWSLETTERS "ON DISK"

Stet Elliott has also compiled the text of all the Canard Pusher newsletters in electronic format. The set includes all of the Canard Pusher Newsletters, from the very first one published in May of 1974, to the present. The set of CPs is provided in a text only format which should be 100% compatible with any computer word processor you presently use. It is available for either the IBM or Macintosh platforms. A hard disk is strongly recommended since the set contains over five megabytes of textual information!

This product is ideal for anyone interested in reading about the evolutionary development of RAF's canard designs through the years, or for

those builders still plagued with the "I know I read it here somewhere!!" syndrome. With one of the inexpensive text search and retrieval programs, text string searches across the entire set of files are a snap.

CPs on disk costs \$65.00. Specify disk size, (3 1/2" or 5 1/4"), platform (IBM or Mac), and disk capacity.

For either the CP Digest for the Long-EZ, or the CPs on disk, contact:

Stet Elliott
5322 W. Melric Dr.
Santa Ana, CA 92704
(714) 839-4156

VARIEZE INDEX

Lists all plans changes from CP10 through CP68 as well as all suggestions, problems, etc. For any VariEze builder, this is a must. Bill sells it a couple of different ways. You can buy just the printed book for \$20.00 or you can get the book plus a 5-1/4" IBM compatible floppy disc with a delimited ASCII listing of the data base (or optional PFS professional file data file) for \$24.00. Specify which you would want. This index will be updated annually.

Contact: Bill Greer
8827 Larchwood Dr.
Dallas, TX 75238
214-348-0215

PLEASE NOTE: Those of you who have the first edition, Bill has improved the indexing of several topics and added more cross-indexing. You may find it helpful to get an up-grade.

DEFIANT FLYER

If you are building a Defiant and you are not currently receiving John Steichen's Defiant Flyer, you are missing a bet. This publication is exactly what is required by both builders and flyers. It contains all kinds of helpful information and great articles. Bayard DuPont's letter on his Ford-powered Defiant in the December issue is a case in point. See CP67, page

2 for information on subscribing to the Defiant Flyer.

Seen at Oshkosh. Beautiful leather seat cushions (also available in various fabrics) for Long-EZ, VariEze and Defiant.

Contact: Diana Davidson
Alexander Aeroplane Co.
900 S. Pine Hill Road
PO Box 909
Griffin, GA 30224
404-228-3901

LONG-EZ PARTS PRICE LIST FROM FEATHER LITE

Main gear strut	\$ 349.00
Nose gear strut	58.00
Engine cowls, pr. (glass)	329.00
Engine cowls, pr. (Kevlar)	480.00
Cowl inlet	48.00
Wheel pants (3.5x5)	150.00
Wheel pants (500x5)	180.00
Above item in Kevlar	215.00
NG 30 cover	21.00
Pre-cut canard cores	160.00
Pre-cut wing & winglets	1199.00
Leading edge fuel strakes w/bulkheads	524.00
Strut cover SC	19.50
Nose wheel cover NB	19.50
Sump blister	19.50
NACA inlet	47.00
3" extended nose gear	70.00

Feather Lite, Inc. is proud to announce another product to re-introduce to EZ builders: The original Space Saver Panel by the late Rusty Foster. This is a bare fiberglass panel with a molded recess for builder installation of an aluminum flat stock electrical panel. \$40.00
Contact Michael Dilley or Larry Lombard (both ex-RAF employees and EZ builders and flyers) at:

Feather Lite, Inc.
PO Box 781
Boonville, CA 95415
707-895-2718

RAF "GOODIES" AVAILABLE

Charms-Long-EZ/VariEze (gold or silver)	6.50
Name patch	1.50
Silhouette patch (no Defiant or Long-EZ)	3.50
3-ship poster (17"x22")	3.75
2 Long-EZs in trail (11"x17")	3.00
Defiant on water (11"x17")	8.00
RAF Chronological poster	15.00
Long-EZ lithograph	10.00
Color photos (EZs, Solitaire, Defiant)	1.25
Night photo by Jim Sugar	5.00
Videos - Building the Rutan Composite	39.00
Go-A-Long-EZ	39.00

RAF RECOMMENDED SUPPLIERS

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

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

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

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

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

RAF recommends the following prop manufacturers:

Bruce Tiff
 B&T Props
 75872 Mosby Creek Rd.
 Cottage Grove, OR 97424
 503-942-7068

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

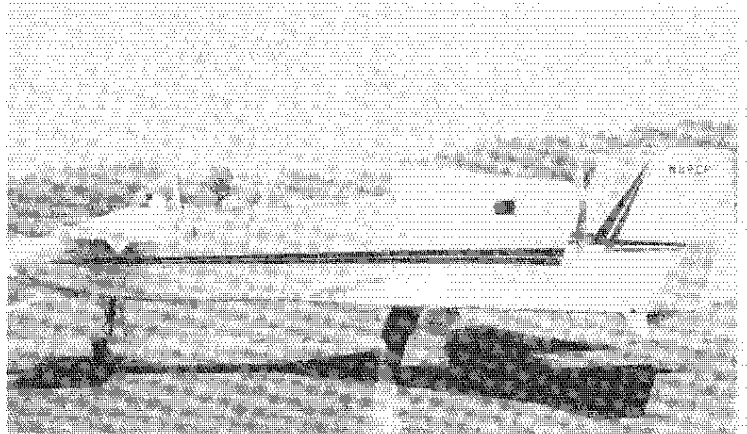
AIRCRAFT SPRUCE has opened a distribution center and order desk in England. They will handle the full line of homebuilt supplies and materials.

Contact: Aircraft Spruce
 Unit 8, Cam Centre
 Hitchin
 Hertfordshire SG4 OTW
 462-441-995

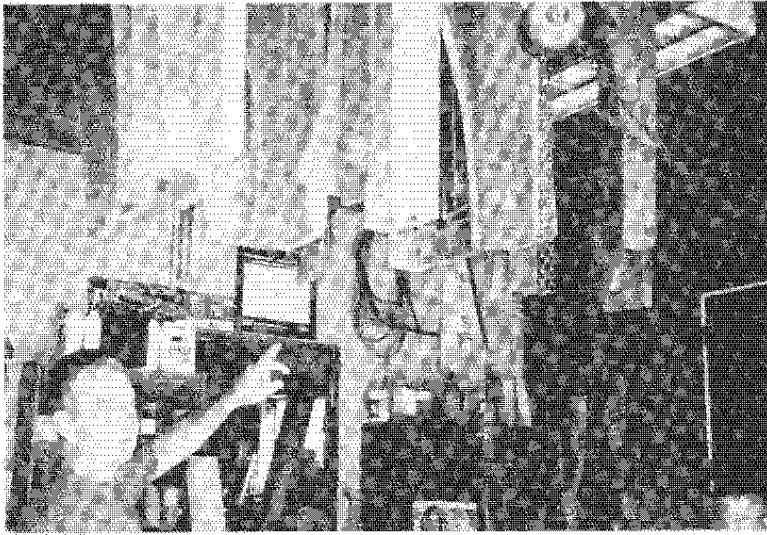
PERFORMANCE PROPS

While we continue to receive favorable reports from users of these propellers, we have received one very negative report. Warren North, Glendale, AZ bought one and tested it on his Long-EZ. He was not satisfied due to the blades cavitating/fluttering during a full power run-up on the ground. The prop also fluttered in flight at high power. He returned the prop for modification/repair together with a carefully prepared test report. When he got the prop back, it was no better and, in his opinion, was unsafe to fly. Warren is very experienced with a test pilot background.

We appreciate the report, Warren, and we continue to solicit reports on Performance Props from those who are flying them.



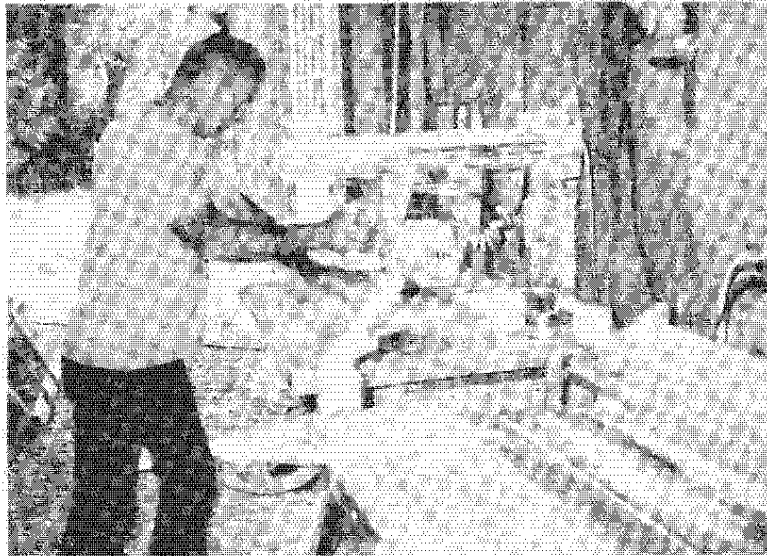
The gorgeous VariViggen belonging to Carl Pieper of Cincinnati, OH.



Bruce points to some of the templates or patterns for the various props he has developed over the past 14 years.



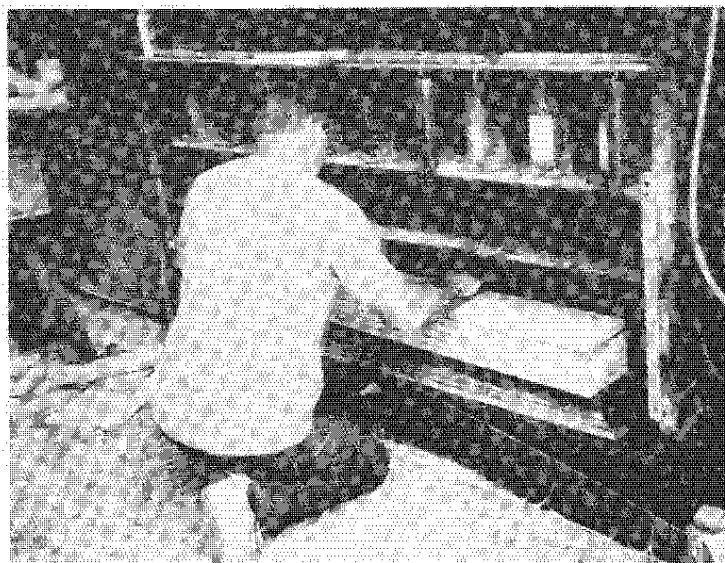
Rolling the glue onto each face of each board. Every square inch must be evenly coated.



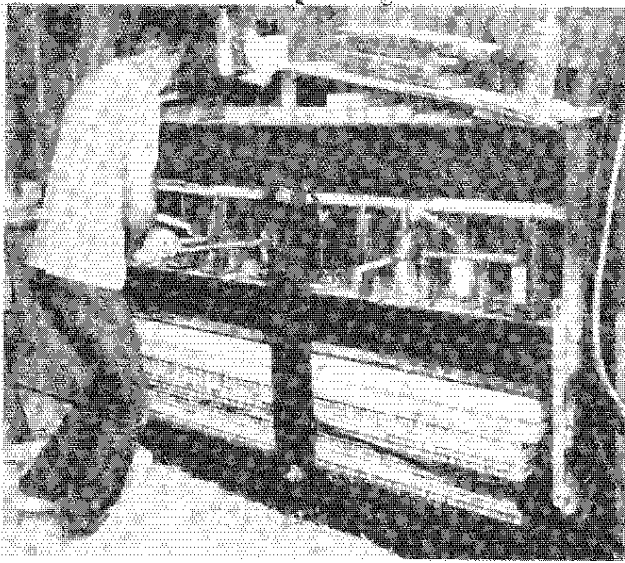
Trimming the cracked ends off a piece of Hardrock Maple. This old crosscut saw was used to cut up the material for Bruce's first prop.



Driving in one of his special steel locator pins. This prevents the boards moving relative to one another while in the hydraulic press.



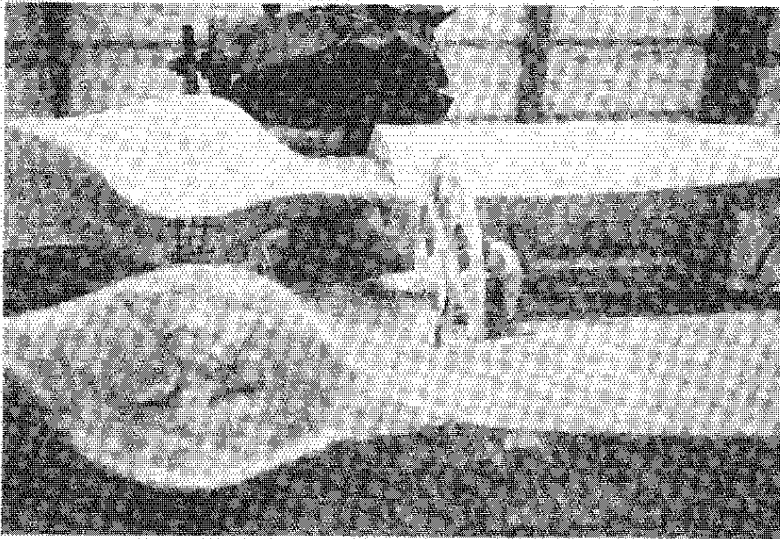
Placing a pile of freshly glued boards into the hydraulic press.



Applying the pressure! Note the copious squeeze-out between boards!



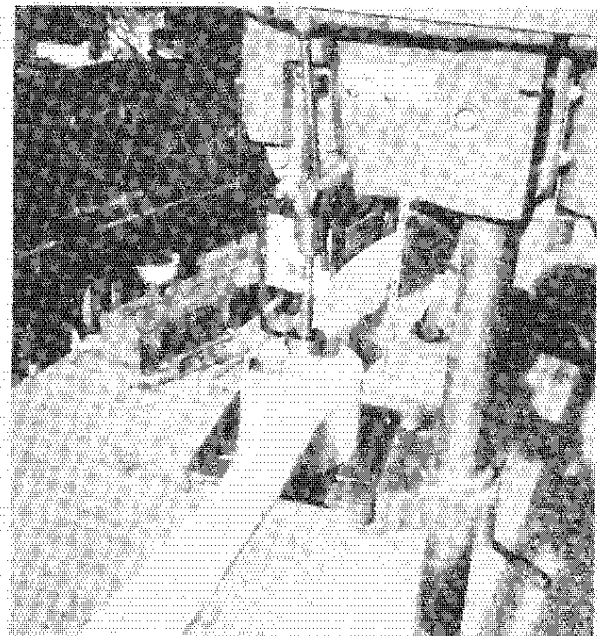
Bruce holds two freshly carved blanks. These have just been removed from the automatic traced lathe. Ends need to be trimmed, holes need to be drilled and then entire prop must be sanded and clear coated.



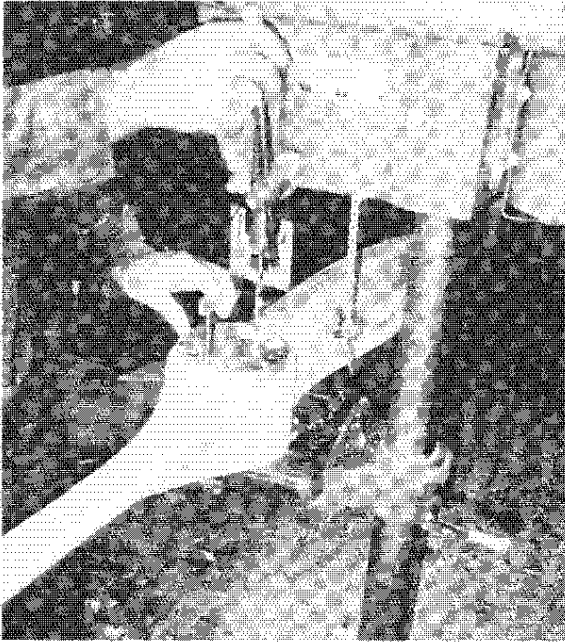
"Master" prop in the foreground, new blank in the background. Note the large amount of material removed in the "roughing" cut.



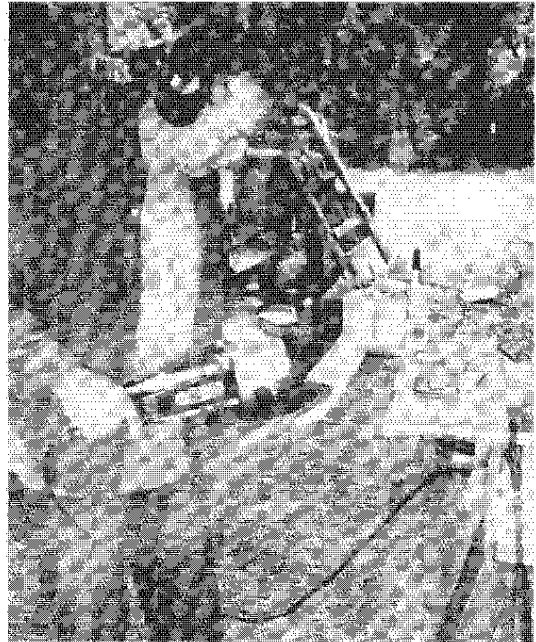
New prop blank on the left "master" prop on the right. Note large aluminum wheel with lightening holes which follows the "master" prop as it revolves.



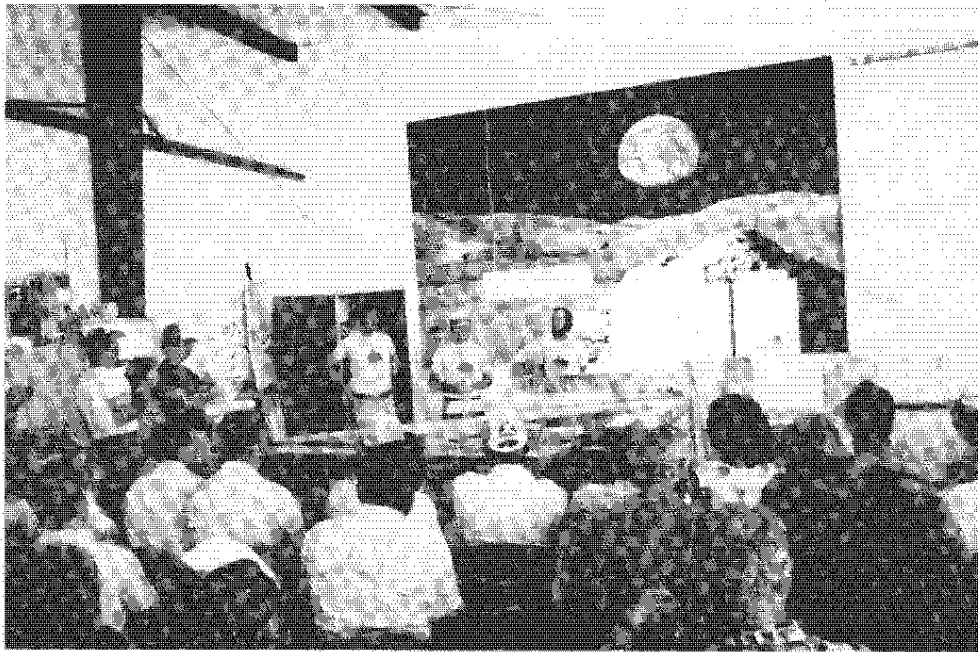
Boring center hole and 2-1/4" counter-bored hole.



Drilling six bolt holes using steel drill fixture.



First stage of sanding prop after carving on tracer lathe.

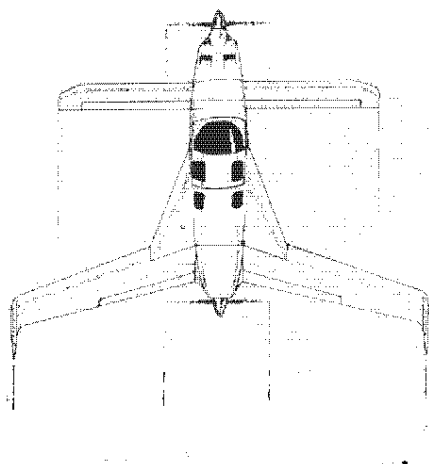


How about this for a little bit of history? Burt, Mike Melvill and Michael Dilley. A Saturday demo at RAF in the "good old days".

Dave Timms in his Long-Ez, N121DT, on December 5, 1992 prior to altitude flight after canopy has been sealed by NAA representative, Dick Freeborg.



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



TO:

January '93

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CP 74