

THE CANARD PUSHER

No. 71

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

VariViggen (1st Edition), newsletters 1 to 71.
VariViggen (2nd Edition), newsletters 18 to 71.
VariEze (1st Edition), newsletters 10 thru 71.
VariEze (2nd Edition), newsletters 16 thru 71.
Long-EZ, newsletters 24 through 71.
Solitaire, newsletters 37 through 71.
Defiant, newsletters 41 through 71.

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.

WARNING - STRUCTURAL DEGRADATION OF FOAM CORES

We have noted that many of you have not been adequately inspecting your structure and may not be aware of how seriously the structure can be affected by a degradation or defect in the underlying foam core. For example, a 3-inch diameter depression or bulge in the skin due to damage in the foam (void, crush or de-lam) can weaken a winglet or wing (particularly a VariEze outboard wing that has no discrete spar) by as much as 50% or more! A skin dis-bond on an elevator or aileron can result in flutter failure even within the allowable flight envelope.

We have recently found foam damage to several of our own aircraft structures. One was due to the inadvertent intrusion of an agent used to clean a wing before it was primed and painted. Another was traced to a stress crack that was in the foam block, a flotation billet, not the proper fabrication billet. Never substitute a different material even if it seems to work okay. We have also had dis-bonds in control surfaces. These can grow rapidly when exposed to high altitude flight. (The void is trapped and expands at altitude).

The solvent-susceptible and easily-damaged cores we use need constant attention to maintain safety. We know of no accidents due to this problem, however, the potential is high if you are careless with the maintenance of your airplane. Please let us know what you find on your inspections so we can pass this on to everyone. Since these types of structures are used on non-RAF types, we are asking Sport Aviation to also publish this caution.

FLY-INS

KANSAS CITY GRAZIN' IN THE GRASS

DATE CHANGE

A recent change in airport administration thinking has caused us to change the date from what has previously been advertised.

June 5, 6, 7, 1992
Johnson County Industrial Airport, (KIXD),
Olathe, KS.

**Second National Gathering for Canard
Type Airplanes.**
Social events, races, seminars, prizes.

Contact: Terry Yake
8904 West 116 Terr.
Overland, KS 66210-1963
913-451-8904

FALL FESTIVAL OF FLIGHT

September 26 & 27, 1992
New Castle county airport
Wilmington, Delaware

**EAA East Coast Fall Festival of Flight
"Milestones in Aviation"**
Award judging Saturday & Sunday
Forums, Parade of flight, Fly-bys, exhibits,
vendors, aviation celebrities,
Pancake breakfast, fast foods, Saturday dinner,
Mode C waiver & no-radio procedure

For info packet contact:
EAA East Coast Fly-In Corp.
2002 Elnora St.
Wheaton, MD 20902-2706
301-942-3309

SHOPPING

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 of the Digest, see CP57). Includes all builder related information from CPs 24-68. The 2nd edition has now grown to 654 pages and is professionally printed on double sided paper from a laser printed master.

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

Quarterly updates to the Digest are also available. These updates provide additional

information from newly published CPs to bring the Digest current. The updates are compatible with either Digest edition.

CP Digest for the Long-EZ (2nd Edition) \$75.00.
Overseas orders add \$20.00
for airmail, otherwise, it will
be sent via surface vessel
Annual Update Subscription \$25.00.
(4 updates)
Overseas orders add \$5.00 for airmail.

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). Specify which you would want, for \$24.00. This index will be updated annually.

Contact: Bill Greer
222 McLennan Dr.
Fayetteville, NY 13066
315-637-3795

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 CP 67, page 2 for information on subscribing to the Defiant Flyer.

THE AERO ELECTRIC CONNECTION

This is a book published for people who desire a working understanding of aircraft electrical systems and components. It is produced as a periodical publication of chapters on specific topics. For example, issue #1 covers d.c. electrical fundamentals, batteries, engine driven power sources, voltage regulators and grounding. Issue #2 continues over-voltage protection, low voltage warning systems, wiring, wire terminations and circuit protection. This first of a series of simplified wiring diagrams for composite airplane with high capacity alternators was published with issue #2. Issue #3 added diagrams for airplanes with and without starters plus versions using small permanent magnet, dynamo type alternators. A series of do-it-yourself avionics articles and kits are in planning. An entire issue will be devoted to providing a customizable book form wiring diagram for your airplane.

Contact: The AeroElectric Connection
Medicine River Press
6936 Bainbridge Rd.
Wichita, KS 67226-1008
316-685-8617

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 with 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

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)	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

FOR SALE

LONG-EZ EXHAUST SYSTEM

All 321 stainless tubing 1-3/4" diameter with 1/4" thick stainless steel flanges. Pipes exit the cowling one above the other, two each side. Fits all Lycoming engines from 0-235 to 0-360 (no heat muff). This is the same exhaust system Dave Ronneberg designed and built and has been flying on his Long-EZ for several years. It is similar to the 4-pipe system Mike Melvill has on his Long-EZ, N26MS, for over 4 years and 600+ trouble-free hours.

Contact: Hal Hunt
6249 Longridge Ave
Van Nuys, CA 91401
818-989-5534

Note: Hal Hunt also makes and sells a neat air intake with filter and carb heat valve that provides filtered carb heat. Contact Hal for details.

NACA FRESH AIR INLET VENT DOORS.

Gene Zabler's neat little vent door is still available for \$7.50 pp. Gene tells us that after 8 years in service some of these little doors are wearing out. If yours is, send an SASE and \$2.00 to Gene and he will ship you a new rubber insert. Gene also manufactures and sells a light weight

nose wheel fender (protects your prop from gravel damage) for \$45.00 pp.

Contact: Gene Zabler
48 Robin Hill Drive
Racine, WI 53406
414-886-5315

FLUSH RUDDER BELHORN SPRINGS.

Many builders have had difficulty locating the correct springs called out to be installed in the rudder cables when installing the flush rudder belhorn modification. The springs called out in the plans are available from Century Spring Corp. but this company has a \$25.00 minimum charge! Fortunately, John York, a Long-EZ builder who experienced the same problem, has informed us that he has a supply of these springs and is willing to keep them in stock for a year or two. He will sell the springs for \$1.50 each plus \$1.00 shipping. So send John a check or money order for \$4.00 and he will send you a pair of springs!

Contact: John York
903 W. 24th Street
Lawrence, KS 66046
913-832-2049

**NOTE: NEW ADDRESS FOR ORDERING
NOSE GEAR RATCHET**

Dr. Curtis Smith's nose gear crank ratchet is still available at \$38.00 pp. 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

FEATHER LITE PRODUCTS

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: Larry Lombard or
Mike Dilley at
Feather Lite, Inc.
PO Box 781
Boonville, CA 95415
707-895-2718

Standard 500x5 wheels and brakes - never used - \$200.00.

Contact: John Vukos
7386 Darrow Rd.
Neenah, WI 54956

Curt Smith's nose gear ratchet assy. new-\$30.00
Westach combination CHT-EGT 30.00
Alcor bayonet CHT probe & pipe adapter 25.00
3/32" a/c cable w/swaged fork end 25.00

Contact: Dan Worley
11019 Woodley Ave.
Granada Hills, CA 91344

Starter (MZ4204) for 0-235 - yellow tag \$150.00
Carburetor - used 400.00
Facet fuel pump - new 20.00
Essex primer pump - new 30.00
Carb heat valve - new 50.00
Landing brake parts - new 50.00
Throttle assembly - new 60.00
Lycoming mechanical fuel pump 100.00
(LW15472 - used)

Contact: Ron Verderame
414 Second St. #244
Hermosa Beach, CA 90254
310-374-2061

EZ flyers can now have a 1/48th scale model of their VariEze or Long-EZ. An existing plastic model kit is used to obtain the fuselage, wings & winglets. Strakes, canard & wheel pants are made from materials of the builders choice. Plans are \$10.00.

Contact: James Plans
Bill James
3424 Wren Ave.
Fort Worth, TX 76133

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.

PROPS FOR EZ'S AND DEFIANTS

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

While we still have not had an opportunity to try one of Performance Propellers (Nogales, Arizona) props, we have now had a chance to see and touch several of them, and to talk with pilots who fly them. We have also received nothing but enthusiastic letters of recommendation for these props. See their ad in *Sport Aviation*.

PLANS CHANGES AND OTHER IMPORTANT MAINTENANCE INFORMATION

THERE ARE NO NEW CHANGES TO ANY AIRCRAFT IN THIS CP.

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.

MAN-GND

ADD THE FOLLOWING TO THE MAINTENANCE/INSPECTION SECTION OF VARI-VIGGEN, VARIEZE, LONG-EZ, DEFIANT AND SOLITAIRE OWNERS MANUALS.

PREFIGHT CHECKLIST

Check all skin surfaces of wings, canard, winglets and control surfaces for cracks, dents, or bulges and for evidence of interior foam damage (skin moves when you push on it or has a dull thud if tapped with a coin). Do not fly if structure is damaged beyond the limits noted in the 25-hour inspection (page 46).

COMPOSITE STRUCTURE

WARNING - The foam core in composite control surfaces, wings, canard and winglets is easily damaged by solvents, including solvents found in paint primer, most cleaning products and, of course, oils and fuel. Never wash the structure with anything but soap and water. The smallest invisible pinhole through the epoxy surface structure can allow intrusion of liquids or vapors that will attack the styrofoam core. A void or dis-bond (separation from the skin) will weaken the structure and can result in a fatal accident. The foam core can also be damaged by local concentrated loads such as a dropped tool or by using your shoulder to set the gear. Never use a wing as a workbench or to stack luggage. Treat all composite skins like eggshells.

EACH 25 HOURS Conduct a general inspection of all composite structure. Any visible crack must be investigated to determine if it is only paint and filler damage or if it extends into the fiberglass structure. All paint and filler cracks should be repaired or sealed to prevent water intrusion. All fiberglass damage must be repainted before flight. Check skin surfaces for evidence of depressions or bulges that indicate a failure of the underlying foam core. Note the integrity of the underlying core by pushing on the skin and tapping with a 25-cent coin. Good core is indicated by a sharp "tap" or "knock" noise. Bad core is indicated by a "dull thud". Listen carefully as you tap and mark with a grease pen directly on the skin the boundary of any suspected dis-bond area. Ground the aircraft if any core damage area is larger than the following:

- Fuselage, wing/canard - 3" diameter.
- Winglet, control surface or VariEze outboard wing - 2" diameter.

Repair per instructions in the annual/100 hour below.

ANNUAL/100 HOUR Conduct a very careful 100% skin surface coin tap, surface stiffness and contour smoothness inspection. Include interior areas in fuselage, cowl and wing with wings removed. Repair all suspect areas (even 1" diameter ones) by drilling #50 holes and injecting epoxy in one side of the void/bulge/dent area until the epoxy vents out the bulge (any divergence from the intended smooth contour) must also be repaired and reinforced per the standard repair methods in the plans.

MAN-GND - VARIEZE

ALL HM-3 ROD ENDS MUST BE REPLACED BY HM-1/4-28 ROD ENDS BEFORE NEXT FLIGHT AS PER CP20, PAGE 4.

SEE ARTICLE THIS ISSUE, THIS PAGE, LAST PARAGRAPH AND NEXT PAGE FIRST PARAGRAPH.

IMPORTANT REMINDER

Do not omit the required placard for minimum pilot weight. Keep in mind that someone other than you may someday fly your airplane. If that

someone is not as heavy as you are, he or she may take-off with an out of CG, aft condition that could cause an accident.

LICENSE AGREEMENTS

RAF continues to receive requests for new license agreements on Long-EZs, Defiants, Etc. This is particularly true from foreign countries. Please understand. RAF cannot issue any new license agreements to anyone for any reason. This is final, official and irrevocable.

DEEP STALL TEST PROGRAM

Some work has been done on how to conduct this test but because we do not have an aircraft (Long-EZ), we have not built any hardware. We have so far received offers of two Long-EZ airframes, one structurally complete with no finish, no engine or cowling. The other has been modified and is not a stock Long-EZ shape.

RAF desperately needs a plans-built Long-EZ, complete, including cowling (engine not required). What we really need is a Long-EZ that has flown (is contoured and is complete) but is not currently being flown for some reason. We will have to cut holes in the bottom of each baggage-strake area and mount a pivot on the vertical and longitudinal CG. The airplane will then be mounted on a custom built trailer using these two pivot mounts and will be ballasted using lead shot bags to the various CGs we want to look at. This "damage" (holes in strakes) will be repaired by RAF prior to returning the airplane.

If you know of a Long-EZ such as this that may be available, please let us know. Possibly someone has one they are no longer flying but they don't get this newsletter. Please contact the owner or let us know who and where he or she is.

DASH 3 ROD ENDS IN VARIEZE PITCH CONTROL SYSTEM.

We were shocked to hear from a VariEze builder/flyer who had a failure of one of the rod

end bearing in his pitch control push rod. This rod end was an HM-3 (10-32) and should have been a HM-4 (1/4").

This mandatory change was called out in CP20, page 4. The four HM-3 (10-3) rod ends in the pitch control linkage must be removed and replaced with HN-4 (1/4-28) rod ends. Check your VariEze before next flight. Replace all HM-3 rod ends with HM-4s. DO NOT FLY WITH HM-3 ROD ENDS.

SHOP AIR AND FOAM CORE WINGS

High pressure shop air can cause serious dis-bonds between skins and foam cores. Be extremely careful using shop air to blow off a wing, winglet, canard, etc. If there is a small hole such as a drilled hole for wiring, antennas, etc. and the high pressure air gets into this hole, it will literally blow the skins off the surface. We have had it happen to us and we have had several reports from homebuilders who have had this problem. Sometimes it can be repaired fairly simply - other times, it can be a really tough repair. The answer is not to get into this situation. The greatest danger would be if it occurred and went undetected. This could lead to a structural failure and a serious accident. See "Warning" in this newsletter for information on "tap" testing for dis-bonds.

LETTERS

"Dear RAF,

My Long-EZ, N60AK (Ser.#1172), has 900 hours since first flight in Aug. 1985. I have had no significant problems other than the Nyflow brake lines which always leaked at the fittings on the brake end. I switched to Stratoflex hose and have had no problems since.

I have had some problems with paint bubbling, particularly on the upper surface of one strake. All bubbling is on the upper surfaces that are exposed to the sun (when we get it). The bubbling seems to get worse when I fly to the "lower 48" and is exposed to higher airport elevations,

higher ambient air temps and more direct solar radiation than here in Alaska.

The airplane has been a joy to fly and is great for transportation. A couple summers ago, I flew up over the ice pack on the Arctic Ocean north of Alaska (just for kicks). Has anyone else done that with an EZ? That may be my only claim to fame in life, such as it is.

Jerry Nibler
Anchorage, AK"

"Dear RAF,

Just a note to pass along some information that might be of interest to your builders.

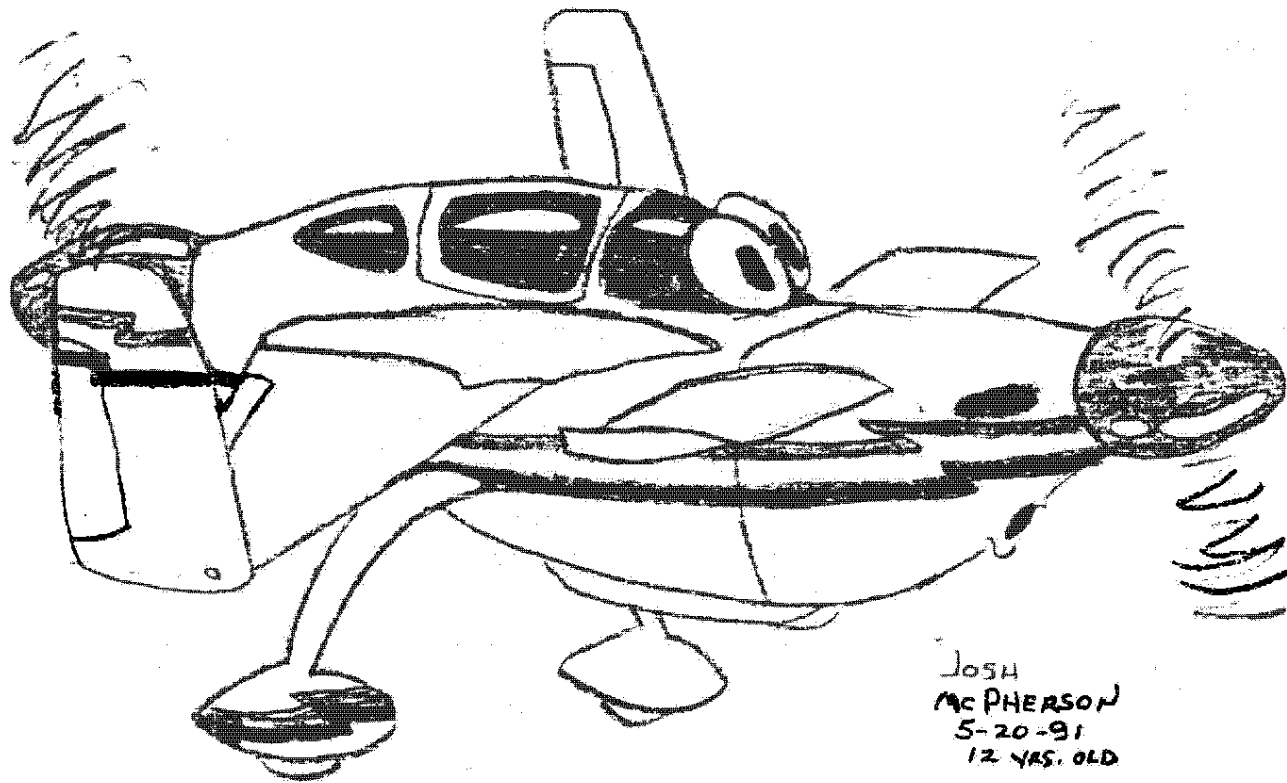
I recently contoured my Long-EZ using West System epoxy and West System 410 Microlight filler rather than glass bubbles.

The 410 sands a little easier than "micro" and seems to be less prone to developing pinholes. The biggest advantage, however, is that it takes about 1/3 the time to mix with the epoxy and there is much less airborne loss while mixing.

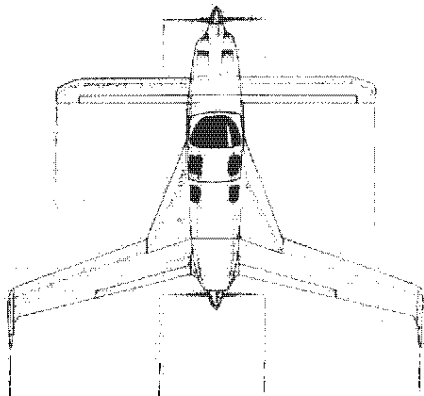
Jim Smith
Logan, UT"

Editor's note: We have also used 410 Microlite filler and found it very easy to sand and essentially all the dust falls to the floor (does not become airborne particles nearly as bad as does micro). However, the 410 is softer than micro and more easily damaged. For this reason, it should never be used along any leading edges (wings, winglets, canard, nose area back a foot or so, etc.). The only other disadvantage is the cost - it is fairly expensive - but may be worth it since it mixes quicker and is much faster to sand to contour.

FAIR WINDS



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



TO:

April '92

The line which appears above your name lets you know through which Canard Pusher you are paid. If your label says **LAST ISSUE CP 71** then this is your last issue, and you need to renew.

CP 71