

CANARD PUSHER

APRIL 2002

RUTAN AIRCRAFT FACTORY

VOL 18 ISSUE 2 NO. 108

Central States to sponsor Canard Owners Seminar

FROM THE CENTRAL STATES
NEWSLETTER APRIL 2002

The popular Rutan and Rutan-derivative canards are being sold in increasing numbers. New owners are seeking information to properly operate and maintain their aircraft. Non-builders do not have the advantage of gradual learning about the airplane while involved in a lengthy building process.

New owners must learn these topics rapidly, so they frequently inquire about materials, material sources, techniques, limits, and procedures. These topics are second nature to builder/pilots who fly what they built. Non-builder owners however, soon discover that finding and purchasing a homebuilt is only the first of the many ownership responsibilities.

The Central States Association will present a seminar August 17-18, 2002 in Kansas City. This educational seminar will focus on satisfying needs of non-builder owner pilots of composite canard aircraft. The event's primary goal will be to enhance safety by improving operation and maintenance skills.

One of the primary objectives of the Central States Association has been to promote safe operation of these unique aircraft. It is evident that we need to do a better job of developing safety awareness and encourage proficiency training. The CSA is fortunate to have many excellent and experienced builders and pilots who are technical experts in their own right. We will draw from these trainers, engineers and pilots to prepare and present the course material.

For Agenda and Reservation Form see CP pages 8-9. Contact Seminar Coordinator Terry Yake at (913) 451-8904 or terry200ty@sprintmail.com

Warning to Sellers

by Burt Rutan

It is clear that many still do not understand the responsibilities of those that build an experimental, then choose to sell it.

As you probably know, after closing down plan sales in 1985, RAF was not able to provide unlimited builder support to future owners who never did business with RAF. Clearly, the responsibility for owner assistance lies with the manufacturer of the aircraft. He is the only one capable to support his product, including modifications he has made.

RAF can only provide assistance to its customers in interpreting the plans and providing safety updates. The seller of an experimental aircraft must provide the new owner with the required documentation and all other needed support, since it is his manufactured product and the new owner is his customer. RAF can and will support the original buyer, since he bought a product from RAF.

Now that may be difficult for a manufacturer to do and many do not take their responsibility seriously. Those that act irresponsible are exposing themselves to significant liability. All RAF-built aircraft have been either destroyed or donated in non-flying condition to museums. We are not alone in this . . . experimental aircraft built by Beech or Cessna, that do not have an FAA certification conformity are never sold to the public.

For these reasons we do not recommend that an experimental aircraft be sold to a non-builder/owner. Original builders are good at incorporating CP additions. Second owners do not appear to be — and if not — they cannot safely operate an EZ. •

BRIEFS

Canard: A Revolution in Flight by Andy Lennon. I have been looking everywhere for a copy of this book. A very old posting on the net said you guys had some. This was many years ago, but a guy can hope. Might you have one for sale or know someone that does? Jim Mott jim@VIEO.com

RAF HOURS: Rutan Aircraft is officially open every Wednesday. Please call between 10 am - 2 pm (661) 824-2645 and 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.

Note — Sometimes you can catch Tonya or Nell at RAF Monday thru Friday.

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

RAF ADDRESS

1654 Flightline, Mojave, CA 93501

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\$16; Back issues \$4

RAF is no longer accepting
multi-year subscriptions. Please
renew only after your current
subscription has expired.

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

VariViggen (1st Ed)

CP 1 to current

VariViggen (2nd Ed)

CP 18 to current

VariEze (1st Ed)

CP 10 to current

VariEze (2nd Ed)

CP 16 to current

Long-EZ

CP 24 to current

Solitaire

CP 37 to current

Defiant

CP 41 to current

A current
subscription of the
Canard Pusher is
mandatory for
builders, as it is the
only formal means
to distribute
mandatory changes.

CORE DIS-BOND Concern

Bill Archer — I recently attended the Professional Aviation Maintenance Association convention in Indianapolis, IN. While there, attending a training seminar concerning composite aircraft repair techniques in room 103/104 of the Indianapolis Convention Center on 3/28/02 at about 6:00 pm local time, there was a very unusual statement made that I thought you should be aware of. In the interest of safety, as well as the interest of the reputation of a design that I highly respect, I was compelled to advise RAF of this statement. The speaker was Mr. Fred Workle. I'm not sure of the spelling of the last name. He was speaking of repair methods and particularly, the use of the Wichitech hot bonder and the ultrasonic tap hammer that they have available.

He was stating how this tap hammer could be used to not only detect a delamination, but also a void in the foam below the delamination. He asked if anyone was familiar with the Varieze aircraft. He pronounced it "very ease", not easy, which made me wonder how familiar he was. He said that you can buy these aircraft really cheap right now because about a third of the fleet is grounded due to the foam inside turning to a powder, as he rubbed his fingers together. That was pretty much the end of it. No one asked any more questions about it or anything, maybe because he was running over on time. I was going to follow up with him after the meeting, but wasn't able to.

The only deterioration of the styrofoam I was aware of is due to solvent attack, one way or another. I certainly haven't heard of any mass grounding of Varieze aircraft. As a subscriber to the Canard Aviator's list, as well as the Q-List, I have never noticed any similar information. If there is any truth to these statements, I would like to know. If not, I would like to help squelch this rumor.

Burt — Actually Fred is not too far off here, although I do not know where he got the 'one third' data. As you are probably aware all our homebuilt designs are almost exclusively constructed of a foam sandwich configuration. It is a normal required procedure (annual or 100-hr, not a fleet-grounding directive) to check for core disbonds and it is mandatory to ground the aircraft for repair if they occur. The VariEze (not Long-EZ) used a 2 pcf urethane foam in the fuselage and wing centersection spar. Unlike the PVC foam, the urethane ('green foam') is very frangible. This make it extremely easy to shape, but relatively susceptible to core-disbond failure. It usually can be repaired without too much problems, but in bad cases owners resorted to building new fuselages. In an extreme case, reported in the CP newsletter, the foam was attached by insets and destroyed much of the lower fuselage.

All EZ flyers must be diligent in inspecting the structure for core disbond, and, yes many Variezes have been grounded or scrapped for this problem.

RAF Plans Changes, Mandatory Ground now on-line

Thanks to Marc Borom & Tim Crawford

Marc Borom (AZ) — Joe Masone put together a list of all Long-EZ plans changes through CP# 54. I put his list in an Excel file which can be sorted by chapter or type of change (e.g. mandatory) or however you wish. THERE IS NO GUARANTEE THAT THE FILE IS EITHER COMPLETE OR CORRECT (but I think it is). I have converted the Excel file into a web page:

<http://www.dreamwater.org/marcborom/LongEZfiles/LONGEZ%20Plans%Changes.htm>

Tim Crawford (ID) — I updated Marc's file. As I work on things, I will make additional changes. If you are interested, it is at

<http://www.noaa.inel.gov/capabilities/longez/LongEZPlansChanges.htm>

Checking for correct weight and balance on Long EZ elevators designed to mount on the Roncz canard

by Mike Melvill

Please note that all of the below discussion applies ONLY to the Roncz Canard as installed on a Long-EZ.

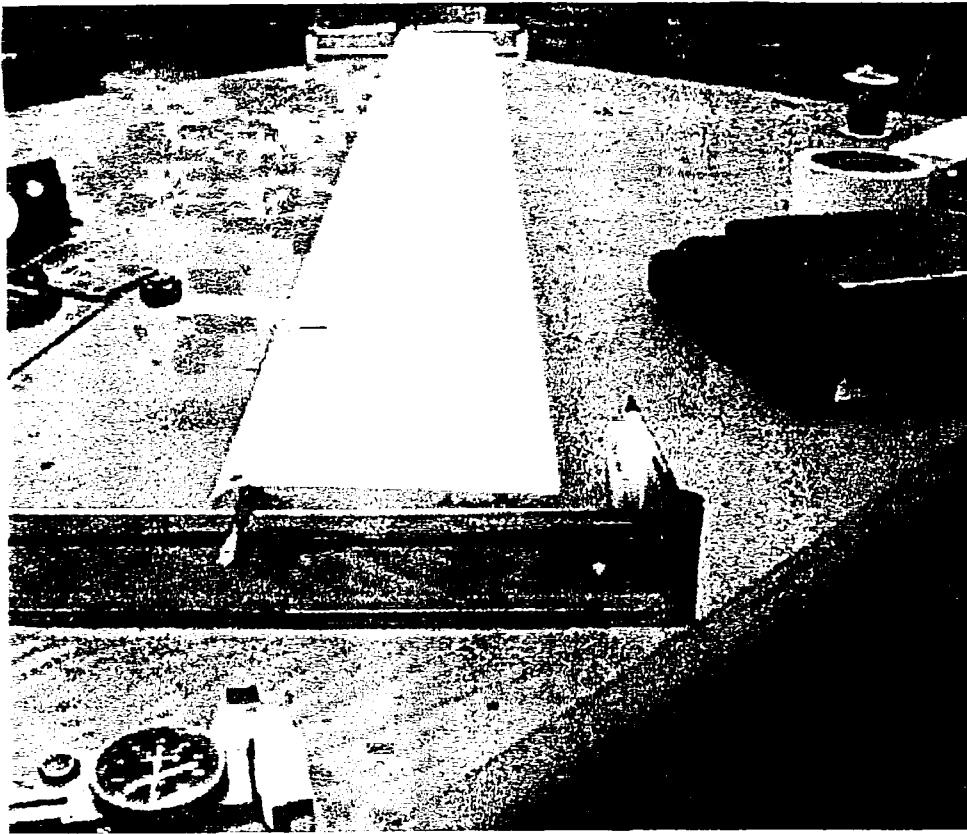
Because the hinge pivot point is so close to the vertical CG of these elevators, it is not possible to check for correct balance by hanging from a wire and checking the hang-angle as described in the plans for the original GU canard. It should be done by installing the hinge pin in the out board end, and the dash 3 bolt/spacer assembly in the inboard end, and supporting the elevator upside down on "knife" edges. At this point, the elevators should be flight ready. They should have their final top coat of white paint, and should have the NC-12A control horn weldments installed at the root ends, with all mounting hardware, including the CS-11 rectangular lead weights. The NC-5A pitch trim bellhorn assembly should be installed on the left elevator per the plans. The knife edges can be as simple as two short pieces of angle iron, or angle aluminum. We used two metal paper towel holders which happened to be available, and they worked great. (See photos). At the inboard end, the short hinge bolt with spacer should rest on one of the knife edges, The outboard knife edge should support the elevator under the protruding stainless hinge pin, close to the outboard end of each elevator. The elevators should be upside down. Use your fingers to hold the trailing edge such that the bottom skin is level. Gently release the elevator, and it is correctly balanced if it remains in this position, or if it falls nose down. The elevators are not flight worthy if they fall trailing edge down! Due to the close proximity of the center of the hinge pivot to the vertical CG of each elevator, this is a very fine balance, and just a tiny change in balance weight or elevator weight, will make a big

difference!

Your elevators are also not airworthy if they are too heavy! The weight of the elevators is critically important. The Roncz elevator design has a smaller diameter torque tube than the original GU elevators, and thus, they should weigh less. The heavier the elevator is built, the lower the airspeed will be at which it might flutter! The only test data available to RAF on the Roncz elevators is that of Mike's Long-EZ, N26MS. N4EZ and N79RA were both flown only with the original GU elevators. Based on the weights of Mike's elevators, and with more than 2000 hours of flutter free flight time on them, it is RAF's recommendation is that any Roncz elevator (after it has been balanced to the pivot line) that weighs more than 3.8 lb (left) and 3.4 lb (right) should not be flown.

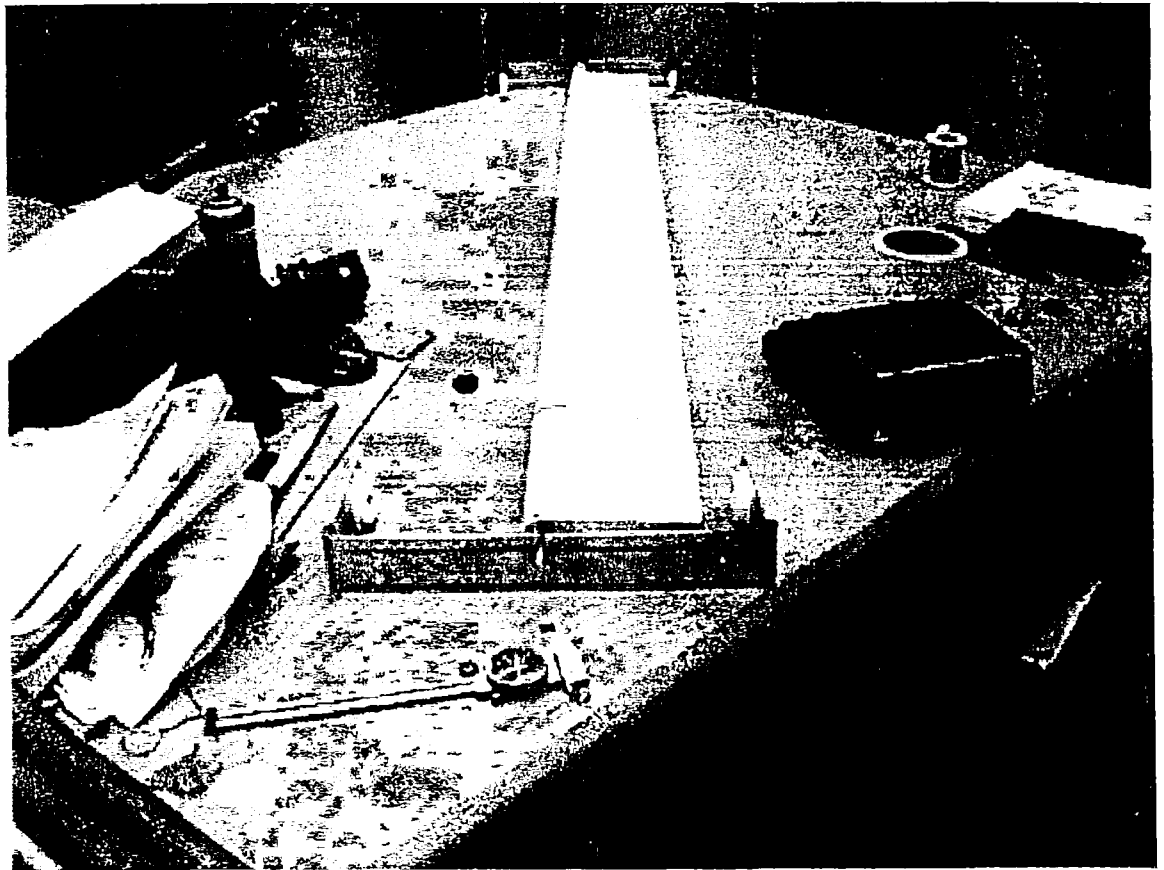
During a recent check of Mike's elevators, they were both found to actually hang slightly trailing edge low/nose high. An additional 12.7 grams, placed on the forward tip of each out board mass balance, allowed them to balance with the elevator bottom skin level. (see photo) Burt is insisting, and rightly so, that all homebuilders balance their elevators to at least the pivot axis, or forward of it, after paint, and flight ready.

Keep in mind that the most recent fatal Varieze accident, reported in the CP, was caused by elevator flutter. These elevators were grossly trailing edge heavy, but had been balanced by adding an enormous amount of additional lead to the INBOARD mass balance only!! This is not acceptable, and if you have to add weight, it MUST be added only to the outboard mass balance. ●



Mike's right elevator shown positioned on the "knife edges" upside down with the bottom skin level.

Note the 12.7 gram steel nut placed on the forward tip of the outboard mass balance weight to bring this elevator into perfect balance.



Elevator/Canard dynamics

John Nobile, Fairfield Product engineering Corporation — I am not (yet) the owner of a canard aircraft, but I am a consulting mechanical engineer, and as I am interested in building one, I came across your elevator related grounding notice.

The reason I am writing is because the warning & inspection you recommend is related to the elevator weight only, and no comment was made with regard to the torsional rigidity of the canard itself. I believe that the torsional compliance of the canard is a large part of the equation that will determine the critical frequency of the system (the excitor is the airstream, the mass is primarily the elevator, and the spring is partially the canard). It seems likely that it is the twisting canard, which is both being caused by and further inducing the fluttering elevator, that caused the failure. I don't think that the maximum load on the canard generated by the aerodynamic forces created by the fluttering elevators alone (even at high frequency) is enough to structurally damage an otherwise properly built aircraft.

I don't how much the average builder might vary their lay-up thickness & orientations from the plans (none, I would hope), but if the canard has been built with fewer 45 degree layers than expected, it would certainly be at more risk for flutter, and all things being equal, would flutter with a lighter elevator.

I am familiar with this type of problem because I've constructed a human powered helicopter that had a tip flutter problem, and after some analysis, we decided that increasing the torsional stiffness would be the only sure cure, and it seemed to work for our situation. Luckily, my experience occurred very close to the ground (actually, on it).

Burt — John, you are correct about the factors that are the players. However, there is very little difference in the torsional stiffness (or bending stiffness) of a perfect and a poor canard. There have been big differences in elevator balance and we have seen that the system is safe as long as the elevators are balanced & built correctly.

Re: " I don't think that the maximum load on the canard generated by the aerodynamic forces created by the fluttering elevators alone (even at high frequency) is enough to structurally damage an otherwise properly built aircraft." Unfortunately this is not true, a resonating elevator can fail the canard.

Defiant Gyro

R. Winkel — I still have not given up on providing an explanation for the "sideways flying Defiant" phenomenon. For the last year a writing from Charlie Gray has haunted me about the handling of his Defiant. (Steichens Defiant Flyer from May of 1994) This is now Dick MacArthur Defiant & has Prince props installed. In 1994 it was flying with the Hoffman Constant Speeds on both engines. Also be sure to note this craft has restricted aileron movement.

Back in 1994, David Morgan had flown this Defiant and made a comment that the aircraft failed to turn well to the left. (He was referring to the aircraft in normal flight) He made a suggestion of maybe a mechanical bind or interference in the nose gear linkage.

Charlie came back with a reply on this:

"First, we had no interference between rudder and nose gear steering. The winglet rudder break out force is quite high at high speed. Maybe a different setup would help, say a longer arm on the rudder and a shorter one at the nose gear pivot."

"Second, it seems at high angle of attack and slow speed (pattern speed) the wing strake would blank out part of the aileron making it very sluggish, and some time almost frightening, I am not sure if engine P factor is part of the problem. I learned not to pull nose up high on takeoff and make a tight turn left or right. Maybe the answer is to extend the aileron out a few inches."

So wrote Charlie. Obviously anyone who describes flight as frightening is in a situation where the aircraft is flying them, and they believe they don't have the control.

My thoughts are that P factor maybe is part of the problem. Retarded aileron movement is a big part of the problem, but also there is this statement about the craft failing to turn left in normal flight.

I believe there is an additional factor here that is quite serious, and could have implications on other "push-pull" designs. I believe that it is necessary for the flight controls to have plenty of authority at even the slowest possible airspeeds.

You may picture a drum major or majorette moving a baton. Now I decide to attach a gyro to each end of the baton. There would be a definite resistance to the baton movements, and our major or majorette would get quite frustrated.

Of course an aircraft with an engine on each end will exhibit the same type of resistance to attitude or direction change due to the gyroscopic forces of

the propellers. Especially prevalent in the high RPM 3 bladed constant speed prop during takeoff. No doubt quite a bit of gyroscopic forces are exhibited by the "wide out to the end" blades of the Hoffman. Thus the flight control shortcomings of Charlie's Defiant are exhibited.

I believe I have experienced some symptoms of this same gyroscopic effect in Harry Manvel's Defiant with the fixed pitch Prince props. I believe it does have a tendency to pull the Defiant a bit sideways.

Burt — The gyro forces from props do not increase because the engines move farther from the cg, but having engines farther from the cg does increase the overall inertia, thus generally requiring stronger control forces. I suspect this aircraft is either crooked or has limited control travels, if it will not turn correctly.

It should only be flown in a flight test mode (no winds for takeoff/landing, solo pilot wearing a chute, lots of altitude and test maneuvers intended to evaluate the control modifications) until it is fixed. If you are not willing to do this, then the aircraft should be grounded.

**Non-Builder Owner
Canard Seminar Course
Description**

Subsequent owners of EZ's find they lack a lot of information that would be helpful in operating and maintaining their newly acquired planes. Further, if you subscribe to the Canard Aviators newsgroup on Yahoo and read the issues that continually resurface, you'll probably agree that some of the topics are important but not easily described or resolved using an email message board.

A few of us CSA members have begun planning for a 2002 Central States Association sponsored seminar. This will focus on education of the non-builder owner pilot of the Rutan and Rutan-derivative designs which most of us built and still fly. The primary goal of the event will be to continue the excellent safety record by improving operation and maintenance skills.

Course Outline

What you bought and what you got:

This acquaints the non-builder-owner with the differences between their purchase and what they would have if they had purchased a Type Certified aircraft. It is approached from a variety of perspectives, including regulatory, performance, safety, and operational standpoints.

Unique Aspects of the Canard Design:

A brief overview of canard aerodynamics, with a comparison to conventional plane aerodynamics. Explain the benefits of the canard design. This is not intended to be a PhD discussion of aerodynamics, but merely a foundation for later discussions. Also we will discuss various common changes and modifications and how an owner might begin to evaluate the merits of a given change before implementing it.

Canard Design Overview:

The topic covers naming of the different parts, components and systems. This design overview will allow the students to recognize at what point in the classes a given system will be discussed.

How the planes are built:

Explanation of moldless and molded composite construction is offered. Discussion of the basic structure, including spars, shear webs, longerons, etc. helps provide confidence in composite materials' amazing strength.

Flight Control Systems:

Explains the use of pushrods, torque tubes, rod-end, bellcranks, cables and pulleys. It examines the importance of maintaining the appropriate geometry of Elevators and Ailerons and how to evaluate it.

Fuel Systems:

This topic helps one get acquainted with a particular airplane type's fuel system. How much fuel does your plane really hold? How much of it can you use? How does it get distributed to your engine? Although there are significant differences in the fuel systems of different designs, this section provides an overview of the more common ones.

Engine Systems:

The intent of this section is not a complete explanation of all engine operations, but rather an exploration of factors unique to canard pusher airplanes.

As an example of the level of detail to expect in all course sections, these are the sub-topics of the Engine Systems section.

- Engine Cooling Challenges
- Differences between planes, even those of the same type
- Updraft / downdraft cooling
- Performance measurements
- Implications for engine limitations
- Oil cooling

- Electronic ignition and the experimental aircraft
- Different spark plug gaps with electronic ignitions than magnetos
- Exhaust system – what happens if it breaks off
- Oil screens and filter locations

Care and Feeding:

An overview of how to inspect and maintain a composite aircraft's structure and skin is detailed. This session is not intended to teach enough to actually perform repairs and modifications. (I recommend a close association with competent composite aircraft builders if owners really want to do any work on their planes.)

Propellers and Prop Extensions:

This reveals why props for canards are different from tractor airplanes. A review of different materials used in their construction and why they are required is included.

Flying Characteristics:

A discussion of general flying characteristics, as well as peculiarities of canard configuration is offered. The intent is to create awareness of the canard design's unique features, not to teach one how to fly the plane. Brief discussion of some limitations of these planes will be had.

The course material and a resource guide will be provided on a CD-ROM at the end of the seminar.

If there is a particular personal need not identified in the course material, there will probably be people available to provide some one-on-one support, as well.

**Fly
Safely**

Reservation Form (Hotel Reservations must be made by June 16, 2002.)

**Central States Association
Canard Owner
Non-builder Seminar
17-18 August, 2002**

Personal Information:

Name _____

Telephone _____

Address _____

E-mail _____

A donation of \$100 is requested to share in covering some of the expenses of this course. Please include a check, made out to "Terry Yake", with this reservation form. Donation refunds will be made for cancellations received by August 14, 2002. Special needs? _____

Will you be flying your Homebuilt? Yes _____, No _____, If yes, what type? _____

(There are plenty of tie-down spaces at the closest airport, New Century AirCenter (KIXD), but it's always a good idea to bring your own tie-down equipment.)

Ground Transportation: Rental cars can be pre-arranged by calling the KIXD Executive Beech FBO, 913-829-0665. If you just need a ride to the motel, email Terry Yake with your approximate arrival time. TERRY200TY@SPRINTMAIL.COM. or call 913-451-8904 (cell 913-488-8904) after you land and expect to wait 30 minutes for pick-up.

If you will be flying commercial into Kansas City International, it's a 40-minute drive to the Comfort Suites. An alternative to renting a car would be to take the KCI Shuttle Bus (approx. \$20.00) to the Overland Park Marriott and call Terry Yake for the "last mile" transportation needs. It would be his pleasure to assist.

Hotel Accommodations: A group room rate has been arranged at the Comfort Suites-Olathe Station Motel, 12070 South Strang Line Rd. in Olathe, KS (call 800-965-0502 for direct group rate reservations). The rate is \$85.00 per night plus 13% tax for single or double occupancy rooms, either with two queen-sized beds. Please tell them you are with the Central States Group to get the better room rate. The motel is located at the intersection of I-35 and 119th Street at exit 220. You can check out the hotel at WWW.HOARI.COM. (After leaving the New Century airport find your way to I-35 and go north on I-35 about 10-15 miles.)

Reservation/cancellation policy

Reservations must be made by June 16, 2002 and guaranteed with a credit card to get the group rate. If cancellation is necessary, this must be done by 4:00 PM of the day of arrival.

The Comfort Suites provides a deluxe (aka hot) continental breakfast, included in the room charge. There are approximately 30 restaurants of all types within easy walking distance for other meals.

Seminar Location and Session Times

The seminar will be held in the Comfort Suites Motel. The sessions will be Saturday, August 17, 7:30 AM – 5:00 PM, and Sunday, August 18, 7:45 AM – 12:00 PM.

Once your reservation is submitted, other informational items will be sent to you. If there are personal questions, contact the seminar coordinator in any of the ways shown below. Please send your completed reservation to:

Terry Yake 913-451-8904 home
8904 W. 116th Terrace 913-488-8904 (cell phone the week of the seminar only please)
Overland Park, KS 66210 TERRY200TY@SPRINTMAIL.COM

Thanks for signing up. Your attendance is the first step toward a successful educational opportunity.

Spin-On Oil Filter Adapter for Lycomings

B & C Specialty Products' latest product is the neatest idea I have seen in a long time. It is a 90-degree, spin-on oil filter adapter for Lycoming engines. It is beautifully made by CNC milling out of a solid aluminum billet and bolts onto the accessory case in place of your oil screen housing or AC spin on filter adaptor. It fits perfectly, does not interfere with the magnetos, the vacuum pump or even the mechanical tachometer drive. It also has plenty of clearance on your engine mount and firewall. Important considerations when you operate an EZ!

I installed one on N26MS and now have a full flow, spin on champion oil filter, with no high pressure hoses to a remote mounted filter which could leak. It comes with everything you need to install it: a new gasket, new aluminum washer for the vernatherm, and new copper washer for the oil temperature sensor. They even send a small container of the proper sealant for the gaskets. Of course it comes with new Lycoming bolts to mount it.

It is fairly expensive at \$395 but is available to EZ flyers until the end of 1996 for \$350. I am extremely pleased with mine and I heartily recommend it for anyone running a Lycoming engine on an EZ. A fuel flow spin-on filter allows 50 hours between oil changes and prolongs the life of your engine.

Give B&C a call at (316) 283-8662 or fax (316) 283-8000. You'll be glad you did! *Mike*

RAF Recommended Suppliers

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

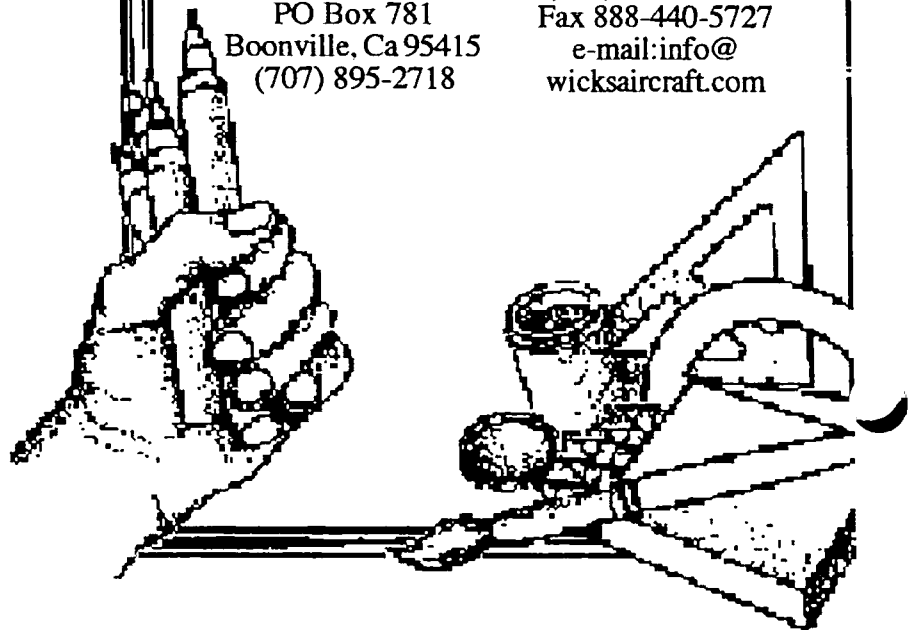
Brock Mfg.
11852 Western Ave
Stanton, Ca 90680
(714) 898-4366

Aircraft Spruce West
PO Box 4000
Corona, Ca 91718-9961
(909) 372-9555
Fax (909) 372-0555

Feather Lite
PO Box 781
Boonville, Ca 95415
(707) 895-2718

Aircraft Spruce East
PO Box 909
Griffin, GA 30224
(770) 228-3901
(800) 831-2949

Wicks Aircraft
410 Pine Street
Highland, IL 62249
(800) - 221-9425
Fax 888-440-5727
e-mail: info@
wicksaircraft.com



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.

Call Bill Butters 800-758-8632 Advanced Aircraft Electronics, PO Box 4111, Florissant, MO 63032

Feather Lite Inc.

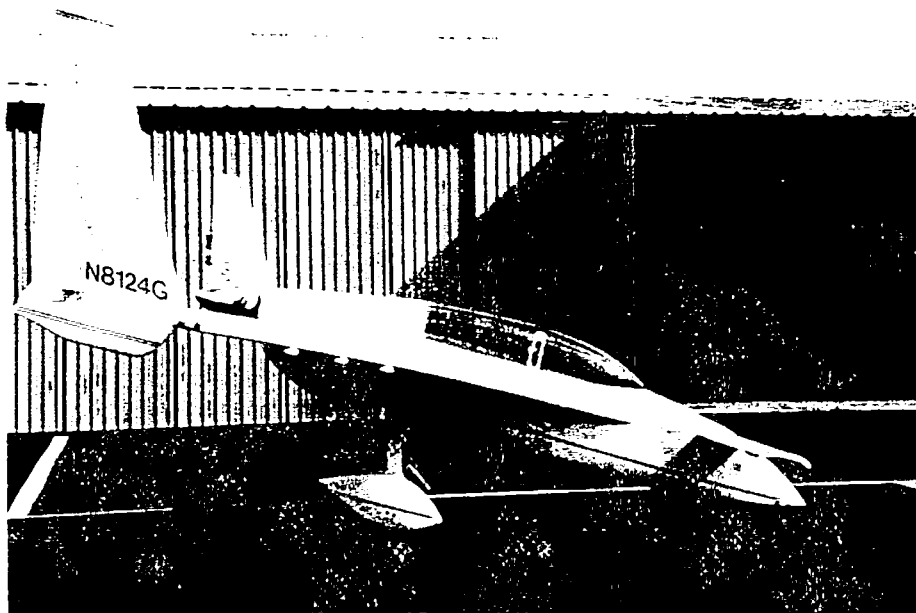
LONG-EZ PARTS PRICE LIST

Main Landing Gear Strut	\$379.00
Nose gear strut	\$64.00
Engine Cowl Glass Top & Bottom Set	\$369.00
Engine Cowl Kevlar Top & Bottom Set	\$499.00
Cowl inlet	\$ 60.00
Wheel pants (3.5x5 set)	\$170.00
Wheel pants (500x5)	\$195.00
Wheel Pants Kevlar	
500x5 Set original style only	\$230.00
NG 30 cover	\$23.00
Pre-cut Foam Cores Canard	\$180.00
*Pre-cut Foam Cores Wing & Winglets	\$1180.00
Leading Edge Fuel Strakes	\$420.00
Bulkheads Left & Right	\$199.00
Strut cover SC	\$23.00
Nose wheel cover NB	\$23.00
Sump blister SB	\$23.00
Carb. Air Box Kit	\$165.00
Baggage Pod Set	\$395.00
Nose Bumper Rubber	\$10.00
NACA inlet	\$55.00 (requires cowl modification)
Propellers, with rain leading edge (call for quote)	

Contact Michael Dilley or Larry Lombard
(both former RAF employees
and EZ builders and flyers)
Feather Lite, Inc., 1327 South State Street,
Ukiah Airport, Ukiah, CA. 95482
707-462-2939

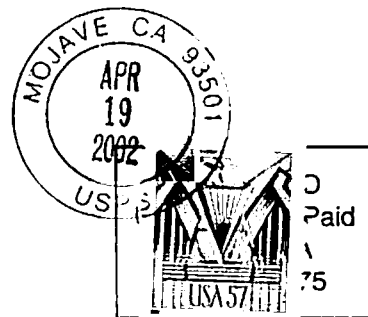
A check or money order is required to process orders.
Orders are filled by postmark date.
California residents add 7 1/4% sales tax.
All Truck orders shipped freight collect.
We've negotiated a 40% discount with Viking Freight.
Please include a telephone number, a mailing and a street address.
Please allow 30 days for delivery, we will expedite when possible.
We will discuss questions regarding our products by phone or mail.

*Items must be shipped by truck.



James Gadbury of Visalla, CA completed his Long EZ #536 In July 1990. Engine Lyc. L2c 0-235, Prop 62x62 Tift, Cruise 175 mph at 4500-feet, weight 896 lbs, total air frame hrs 204, 1150 hrs on engine TT

**RUTAN AIRCRAFT FACTORY
1654 Flight Line
Mojave, CA 93501**



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87* LAST CP IS 150
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44138-2407

If your label says LAST ISSUE CP 108, this is your last issue and you need to renew.

April 2002
CP 108