

# THE CANARD PUSHER

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If you are building a VariViggen from 1st Edition plans you must have newsletter 1 through 46. If you are building from 2nd Edition plans you must have newsletters 18 through 46. If you are building a VariEze from 1st Edition plans you must have newsletters from 10 to 46. If you are building a VariEze from 2nd Edition plans you must have newsletters from 16 through 46. If you are building a Long-EZ you must have newsletters from 24 through 46. If you are building a Solitaire, you must have newsletters from 37 through 46. If you are building a Defiant, you must have newsletters 41 through 46.

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 AND FRIDAY FROM 8:00 am to 5:00 pm ONLY. If you have parts that you would like us to see and or would like to drop in, please make it Tuesdays and Fridays if you can. If you need to come up other than those days, please call so that we can be sure to be here.

When writing to RAF send a stamped, self addressed envelope along if you have any questions. If you are placing an order, it's best to keep it separate from a request for an answer to a builder question. Mark the outside of your envelope "builder questions". This will speed up your reply.

## RAF ACTIVITY

Most of our time since Oshkosh has been spent working on the Defiant engine modification. We removed the 160 hp O-320s and have installed 180 hp O-360s. Baffling these engines, hooking up controls, modifying cowlings to fit and modifying the instrument panel with the attendant rewiring has been quite a job. Since Michael Dillely left, Mike Melvill has been working on the Defiant until this week when Jerry Moore, an experienced glass laminating man joined us. Jerry has been working on the Defiant and will be working on the new projects as they come in.

RAF has been wound down to using only one office and no shop space in building 13. An independent division of Scaled Composites has been formed, called Composite Prototypes which now occupies building 13. This division will be building prototype composite aircraft for other companies as required. Composite Prototypes is much like a smaller or scaled down version of Scaled Composites.

## OSHKOSH 1985

RAF designs once again were far and away the most numerous on the flight line. Irene "Mom" Rutan counted 54 VariEzes, 57 Long-EZs, 3 Defiants, and 3 VariViggens during the week of the flyin. 9 VariEzes and 5 Long-EZs did not register. Come on Guys, it costs nothing to register and it helps RAF in the official count. A total of 117 RAF type airplanes were at Oshkosh during the week. "Mom" of course is the International VariEze Hospitality Club Historian, and she takes pride in the

fact that she knows most EZ flyers. PLEASE, Irene would like to hear from all builders after their first flight and she would really like to have a photo of your airplane for her very extensive photo albums.

This years flyin was "bigger and better" than ever, more noisy warbirds than ever! Apparently this is where the money is, as this is what we are told that the public wants. The weather was excellent all week and the crowd, particularly on Saturday and Sunday were enormous. The Concorde was really spectacular and made a nice change. Quite an innovative aircraft with many interesting features. Note that in 1984 the Voyager was the 'Concorde', ie; the special new attraction that provided the excitement.

The IVHC dinner was once again a full house and as usual was the event of the week. This is an evening to renew old acquaintances and meet new EZ flyers. The "real" George Scott was again the organizer and did his usual fantastic job. Unfortunately this was George's last year of hosting the IVHC dinner. We shall really miss him. Thank you George and Dolores for all of the years you have given so selflessly to our organization, you guys are really something. Don and Bernadette Shupe presented a special award to George and Dolores. Shirl and Diane Dickey tied with Don and Edna Foreman from England for the Ed Hamlin Memorial Award. Don and his son Jamie were on hand for the presentation and gave us a very funny account of his role as IVHC representative in England. Apparently U.S. EZ builders continuously arrive at the Foreman's for one or two night and spend a fortnight! Don was the first to complete and fly a VariEze in England, he was also the first to complete and fly a Long-EZ and is rapidly approaching completion of a Defiant - sounds like a certain Florida fellow we all know and love!! If you are not already a member of the IVHC, do yourself a favor, write to Don and Bernadette and join up. Its a fun group and everyone understands EZ talk! Don and Bernadette Shupe, 2531 College Lane; La Verne, CA 91750. The dues are \$8.00 per year.

A number of you have asked if RAF will continue to attend the EAA convention at Oshkosh, Wisconsin. We consider that the face to face builder/operator support function that is experienced at Oshkosh is extremely important to the continuity of the flight safety of all the homebuilt aircraft. The pilots bull sessions, personal builder support sessions and the opportunity to inspect the wide assortment of completed aircraft, is an important factor that should not be overlooked. Ezs at Oshkosh 1985 totaled 117, more than 3 times the number of the next most common homebuilt. The candid discussions we are able to provide as well as the communication that prevails at the IVHC banquet is an item we do not plan to abandon. Look for us at Booth G-7 next year operating in the same role as in 1985 and also look for us at the various flyins that emphasize homebuilt aircraft, such as Watsonville and Jackpot.

After Oshkosh, the Voyager crowd, Dick, Jeana, Bruce Evans, Sue Bowman and Wanda Wolf and Mike and Sally flew up to West Yellowstone airport, just west of the National Park. This is a fabulous place to visit, the airport is excellent, the people friendly, the hotel comfortable and reasonable. We rented a station wagon and drove into the park, where we wandered around watching most of the geysers. This is really a neat place and a "must visit sometime" trip. Perhaps an IVHC flyin?

We all arrived home safely and as far as we know, so did all of the EZ types, although Bruce and Bonnie Tiftt had quite an experience at Cheyenne, Wyoming. They made an overnight stop and were caught in that incredible hailstorm/flash flood. They were unable to get their EZ into a hangar, so it sat out through the worst of the storm. Fortunately there was little damage, although the hail made tiny little dimples all over the airplane. During the height of the storm, Bruce says the rain flooded the ramp to the point that his wheelpants were completely under water. That Imron must be tough paint!

Shirl and Diane Dickey once again hosted and organized the most enjoyable flyin of the year. A total of 42 EZ types flew in to this neat place the extreme northeast corner of Nevada. Cactus Pete's Casir made all of us feel welcome in their beautiful hotel/ino. Burt flew up in his Grizzly. Old Grizzly really did look strange parked in the middle of the EZs! A special treat for us 'old' EZ folks was that we were able to share the weekend with Joanne Hamlin.

The flyin was over the 4th of July weekend with most of those attending flying in on Thursday evening and flying home on Sunday. The weather was great and of course the favorite spot for hanger flying was around the pool. A dinner show was enjoyed by all on Friday, and Saturday was race day. The Jackpot races really do show who has the fastest EZ.

Klaus Savier flying Larry Godsey's VariEze set a new course record with an unbelievable 205.28 mph! Shirl Dickey posted a 197.59 mph lap, a dramatic improvement over last year. Earl Wilson won the unlimited EZ race in his VariEze defeating several "big engine" Long-EZs.

Early Sunday morning, some folk heard what sounded like another race. It turned out that a 'grudge' race was being run. Klaus Savier in his VariEze challenged Ed Kelly in his Long-EZ - Ed Kelly won. We're sure that this will also become an annual event!! Bob Hansen won the spot landing contest, and Mike Melvill flying the prototype, N79RA tied with Shirl Dickey in the ribbon cutting contest.

Anyone who has not attended the Jackpot flyin really is missing one of the neatest EZ get togethers there is. You owe it to yourself to try to make it next year. Once again Cactus Pete's put up a very generous cash purse for the races and quite a number of EZ flyers went home with money in their pockets. 24 VariEzes and 17 Long-EZs and one Grizzly were counted for the weekend.

Here are the race results:

Standard VariEze

1. Klaus Savier	35:38:89	205.28
2. Shirl Dickey	37:02:44	197.59
3. Rich Clark	38:51:43	188.36
4. Gerry Gardner	39:39:87	184.50
5. Gene Zabler	40:25:38	181.07
6. Steve Sorenson	40:50:81	179.17
7. Bryan Giesler	42:46:64	171.09
8. Don Youngs	43:40:19	167.61

Standard Long-EZ

1. Dick Kreidel	37:49:43	193.50
2. Ian Ayton	40:08:66	182.31
3. Gus Sabo	40:15:83	181.76
4. Bob Hansen	40:45:63	179.55
5. Mike Melvill	41:19:02	177.17
6. Bob McCoy	42:03:84	173.98
7. Jerry Bugni	42:21:44	172.80
8. Debbie Iwatate	44:22:81	164.91
9. Frank Tiff	44:53:52	163.04

Unlimited EZ

1. Earl Wilson	36:56:32	198.15
2. Jerry Sloan	37:08:06	197.12
3. Sam Kreidel	38:17:62	191.12
4. Wes Gardner	38:24:26	190.59
5. Dave Werner	39:26:05	185.62
6. Bob Paulsen	39:43:31	184.27
7. Larry Nogeles	39:48:66	183.83
8. Ed Kelly	41:01:11	178.45
9. Lynn Burks	41:34:84	176.00

CLUBS

Arnie Ash reported an excellent turnout for EZ types in the central part of the country. The flyin/drive in was organized and hosted by Arnie who says that 17 EZ types flew and over 70 people enjoyed the kind of a weekend only EZ people can. Arnie is trying to organize a builder/flyer group in the area and is planning on holding another flyin next spring. Anyone interested in joining this group and receiving their newsletter, contact: Arnie Ash, Route 5, Davenport, IA 52806. To join the group is a cost of \$10.00 per year.

The most asked question these days is how long will RAF remain in existence to support the homebuilder? The answer to that question depends largely on you the homebuilders. We will be here as long as you support RAF, that is to say, you send in information on your project, photos, builder hints, safety/maintenance related information on your aircraft and you continue to subscribe to the Canard Pusher newsletter. Now that RAF has zero income from plan sales, its important that you support RAF by buying your raw materials, prefabricated metal parts, or prefab glass parts from RAF approved suppliers, such as Aircraft Spruce, Wicks Aircraft, Ken Brock, Lombard's and Dayton Airplane Factory. This will go a long way to making sure RAF is around for many years since RAF gets a small percentage of your cost from each of these suppliers. If you elect to buy your part or supplies one of the "bootleggers", you are contributing to the demise of RAF and we will not be here to support you should you have a problem while building or flying your RAF design.

If you buy from non-recommended suppliers, you are not only not supporting RAF financially, but you also do not know if you are getting correct materials or safe parts. When you buy from RAF recommended suppliers, you are absolutely getting RAF recommended materials and parts we have tested and are happy with.

It is up to you the licensed homebuilder. If you want RAF to be around to publish the Canard Pusher, to help when you have a problem, support RAF. Send in your builder hints, your photos and flight reports. We will be here as long as we possibly can to assimilate and disseminate safety information and to try to promote the safe building and flying of our various RAF designed airplanes.

HOMEBUILDER MODIFICATIONS

Recently we have noticed a trend towards homebuilder modified Long-Ezs, particularly the long nose and heavier engines. These are not RAF approved modifications and we are concerned that most pilots may not be aware of what they could possibly be getting into. First of all, the longer nose IS destabilizing in pitch as well as directionally (yaw). How much of it may influence your particular airplane is not known. We believe you as the pilot should know just how stable your own airplane is. We strongly recommend to anyone who has modified their own aircraft in this way, that first of all you should install vortilons on the main wings. The vortilons allow a little more stall margin. Secondly, you should put on a parachute, and climb to at least 10,000 feet above the ground and at that altitude, you should fully explore the stall/full aft stick characteristics of your airplane. Do it first at a mid cg position, then ballast to the aft limit, (103") and do it again. In this way at least you will be aware of any possible unpleasant stall behavior or unstable tendency, and you would be a lot less likely to later discover any nasty trait at low altitude with no margin for a safe recovery.

We are really concerned when we hear that a particular builder has done a major modification to his airplane. For example, a larger, heavier engine and a longer nose. Then he goes out and flies it for a few hours and then tells all the builders in his area what a neat thing he has done. Now some of these builders decide, based on his results to do the same thing. Meanwhile, the original experimenter never did test his airplane at aft limit cg, at full aft stick, with aggravated control inputs, or at the red line or at limit g so he never knew for a fact that his airplane was safe. Another builder, influenced by the first experimenter makes similar changes, goes out and while demonstrating the much touted stall characteristics to a passenger, enters a deep stall condition at low altitude, does not have enough room to recover, and so he and his airplane become another statistic and make not only the Long-EZ look bad, but also puts a blot on the accident record of all homebuilts.

To sum up: If you must make changes to your aircraft, keep in mind that you now have a different airplane than the original plans built Long-EZ prototype. Your new design may have perfectly safe aft cg, high angle of attack flying characteristics, but it may also have unsafe, nasty characteristics, just waiting to bite you at an inopportune time. To protect yourself, and any

future passenger you may take for a ride, 1) you should install the vortilons, 2) you should thoroughly test your airplane at aft cg, high angle of attack (full aft stick) with aggravated control inputs. If your airplane does not handle well, limit your aft cg. You do not have to go back to the published limit. If you are not comfortable at 103, try 102 or 102.5. If it is good there, limit it there, note it in your log book, placard the airplane, and don't ever exceed this (or any other) limitation. Remember, each Long-EZ, or any other homebuilt design, is different. Don't assume because Joe Blow did it and was safe, that you will be. You may not be and that really can take the fun out of the whole project. Don't ever lose sight of the fact that, that is what this whole thing is about - having fun!! FLY SAFE AND ENJOY.

#### NEW RONCZ 1145MS CANARD UPDATE

Quite a number of these plans have been sold now and we have been receiving lots of feedback. There are several small errors in the plans, (see this issue, Long-EZ plans changes) but generally most builders have been doing real well building the canard.

There are at least three flying now, the first homebuilder to notify us that he was flying his new canard was Harold Martindale of Anchorage, Alaska. Harold called after his first flight during which he had flown in and out of several rain showers and was delighted with the lack of trim change.

One of the errors in the plans has caused a few people to build a shorter canard by 2". This is not good. The elevators are shown the correct length, the elevator torque tubes as provided by Ken Brock are the correct length. Do not cut your elevators down. If you have built your canard too short (Page C1, 64" dimension should be 65", 10" dimension should be 11"), you will need to glue a 1" piece of foam to each end of the canard, carefully sand it to match the airfoil shape.

Mount the elevators, then proceed according to the plans, with the shaped wingtips. Now, when you glass these wingtips, simply run the two ply layup on the tip over the 1" foam addition onto the canard. ~~Do this top, bottom and trailing edge and your canard will be the proper length.~~

Do not cut down the length of this canard. There is apparently a rumor being put out by someone in the Florida area, that you can vary the length of the canard depending on your weight. This is absolutely not true. We have tested this airfoil section at various lengths and the length called out in the plans is the optimum length and should not be changed.

Do not neglect to install the vortilons on your main wings - vortilons on the main wings are MANDATORY when using the R1145MS canard. They are optional when using the original GU section and we have had reports varying from no change to "really makes a big difference" with the original canard. Try them and see.

#### FROM THE BUILDERS

From France, Chris de Brichambant reports that his beautiful Long-EZ has set a world record from Paris, France to Tunis, North Africa and back, non-stop. This is a distance of 1600 nautical miles at an average speed of 126 knots using only 52 gallons of gas. This gives a very respectable 30.8 nautical miles per gallon. Congratulations to Chris and all the folks who helped build this gorgeous Long-EZ.

From England, Bill Allen won best composite airplane at the Popular Flying Associations Rally, the English equivalent of Oshkosh. There were 17 EZs at this flyin and Bill topped them all. Congratulations Bill.

#### N26MS, MIKE AND SALLY'S LONG-EZ - the first 1000 hours.

As many of you (who attended the RAF flyin in June and also Oshkosh this year), will know we have given our "old" Long-EZ a face lift. It is hard to believe, but she will be 5 years old this December.

It all started when Mike decided (and the check book

said ok) that we needed a Loran C!! After much looking around, we opted for the MicroLogic ML6500. Our reasoning included, easy to operate, fully automatic chain selection and a size and shape that would fit our panel. It turned out that the panel had to be cut out and a completely new one be designed, built and installed! While we were at it, we tore out all the wiring (it was done in a hurry and Mike was never very happy with it). Our panel night lighting was never very good, so we installed post lights over all the instruments, as well as a dimmer switch. Panel lighting at night is now superb.

In order to do all this work, we removed the wings and canard, cut out the side consoles, cut out the instrument panel, reshaped the nose to allow installation of brake master cylinders up front and optimum placement of the two 12 volt motorcycle batteries, that make up our 24 volt electrical system. We also reshaped the cowling extending it aft a full 3" to reduce the closure angle and hopefully reduce drag a bit.

The structure was given a very thorough inspection, wing attach hardpoints looked like the first day they were put together. We are extremely pleased with the composite structure. A few small cracks were found in the paint, all were examined, by removing all finish down to the glass. In no case did any crack extend into the glass, we are ashamed to admit that each crack was over a rather generous build up of Bondo! The moral here is use dry micro not Bondo. We did a little recontouring, filling with West System, sanding and priming with Mortons Eliminator. We installed the new Roncz 1145MS canard, carefully fairing it into the nose. We designed and built two battery access doors (they work nicely, but are not worth the amount of work it took). We installed the Loran C antenna in the left winglet. Then we wet sanded the original Imron finish down until the whole airplane was dull.

Mike sprayed the entire airplane with Imron using a slightly whiter white than we used last time, and we trimmed it in metallic gray instead of the green we used the first time. We had the seat cushions recovered in gray to match the trim. ~~All the consoles were glued and glassed back into place, the interior was once again painted in charcoal gray Zolatone. We installed the Ian Aytons canopy/gear warning systems, (it flashes the warning light and buzzes the horn intermittently). We cannot say enough about this system. It is really neat. It is small, easy to install and you absolutely cannot ignore it. If you override the horn, the light continues to flash, and in about 50 seconds, the horn starts to buzz again, a very worthwhile addition and one we both heartily recommend.~~

When we finally reassembled her, she looked like new! We did a careful weight and balance on 3 certified aircraft scales (naturally she had put on a little weight), then we rolled her outside, fired her up and went flying.

The whole face lift was supposed to take a few weeks and in fact ended up taking over three months. (It only took 5 1/2 months to build her from scratch!!)

The Loran C works well. We get SNRs (signal to noise ratio) of 99 on the master as well as both slave stations, with everything turned on, engine running and in flight. This is true in the Mojave, Bakersfield, Fresno area at least where the testing was done. Obviously there are many places where we cannot get these kind of optimum results. The antenna we use is a 3/16" O.D. hobby store brass tube. We sharpened the end, put it in an electric drill, and "drilled" it into the bottom of the lower winglet, pushing it all the way to the top of the winglet. It goes up the leading edge of the upper winglet. We soldered the preamp to the bottom of this brass tube, removed a wingtip light assembly, dug out a little foam and installed the preamp behind the wingtip light. We are very pleased with this simple, cheap antenna

We recently installed miniature fuel and oil pressure gauges (1 1/4" dia) that read actual pressure (not electrons!) They are plumbed directly from the engine to the instrument. We used nyloseal tubing fittings. These are really great little instruments, a bit expensive, but worth it. (See page 206 in the Aircraft

Spruce catalog). In addition we have an Electronics International digital CHT-EGT with a four way switch, so we can look at all four cylinders. We bought an oil temperature probe and connected the cylinder #1 EGT to the oil temp. Thus we have 4 CHT, 3 EGT and oil temperature in one gauge. Also in this small side panel, is a digital voltmeter by Davtron. Again, expensive but worth it. We know exactly how the electrical system, alternator charge, etc is doing, plus or minus 0.1 volt.

The only item that really required maintenance was the nose gear strut and associated pivots. Mike removed the top bolt and took the whole strut out. The bushings in the NG-6 assembly (NG-23 as shown on Page 13-1) were quite worn allowing considerable side to side play in the top pivot. Mike machined up two steel bushings, pressed them into the NG-6 casting then reamed them to be a very close fit on the NG-7 steel spacer. A grease fitting (Zerk) was installed in the NG-6 casting allowing future lubrication of this pivot without dismantling it. The two HM-6 rodend bearings in the shock strut were also somewhat worn, allowing some fore-aft movement of the nose gear strut. We replaced these rodend bearings with very expensive aircraft quality rodend bearings (approximately \$25.00 each) which essentially eliminate any play.

The vertical pivot at the nose wheel fork had already been overhauled per CP 44, page 7. Thus the entire nose gear strut and wheel has received a complete major overhaul. It is now working flawlessly and we are very pleased with the above modification and repairs.

The brake master cylinders up forward modification was done for three reasons: To help move the CG forward, to allow better access for inspection and hydraulic fluid replacement, and to also allow better access to the magnetos.

Mike designed this particular installation, it works quite well, but if we were to do it again, we would use Debbie Iwatate's method. (See "for sale" this CP)

We did find one drawback to the forward mounted brake cylinders, that we had not foreseen. It is now quite difficult to adjust the rudder position for various size pilots. The original design used only adjustment to lengthen or shorten the cable aft of the pedal. Now we have to also adjust the pedal to brake master cylinder relationship, which with our design is awkward. As a result no one else gets to fly our long - advantage or disadvantage?!?!?

We have also done a lot of work on optimizing engine and oil cooling. At this point in time though it is too early for us to comment on the success. We are flying the airplane quite a lot, in fact since Oshkosh we have put over 100 hours on her. N26MS continues to meet or exceed our expectations. We have enjoyed nearly 5 years of fun flying, visiting faraway places and meeting interesting people. We are looking forward to the next 1000 hours.

#### FUEL VALVE STICKING PROBLEMS

During the past 1000 hours of operation in N26MS, we like many EZ pilots have had problems with the fuel valve becoming stiff with time. We have used Parker Fuel lube for about 3 years, but this has been a temporary situation at best. In fact lately the Parker Fuel lube only lasts a few weeks, then the valve is just as stiff as before. This is a bad situation, and could even become a dangerous situation.

Recently Dick Kreidel, past president of Squadron I in the Los Angeles basin area, introduced us to a new grease. This material is very expensive, try almost \$800.00 for a one pound can!! Dick gave us a minute amount, enough to cover your thumb nail, and frankly we thought, what a scrooge! Wrong! This is in fact probably a life time supply. Seriously, we ran the Long-EZ down to two or three gallons of gas on each side. We raised the nose as high as we could to get the fuel valve above the fuel level. We tied the nose down to avoid having it fall on its tail and then used a small ladder to reach inside and disassemble the fuel valve.

We removed the whole thing and noticed signs of 'galling' on the tapered brass valve. We cleaned it thoroughly and "lapped" the valve using jewelers rouge. Brasso metal polish or something similar would also work. Then we cleaned the valve and parts and applied the new "Kreidel" magic grease sparingly all over the tapered brass valve. We reassembled the valve and greased the "detent" mechanism. We had also in the past removed a small amount off the length of the spring. This was done by carefully grinding about half the wire thickness in the spring on each end of the spring on a grinding wheel. Don't get the spring too hot or you will ruin the temper.

We reinstalled the valve and have now got over 80 hours operation over a period of a couple of months since the "lube" job. The valve literally turns like it was on ball bearings. We are very satisfied with this system and heartily recommend it.

Obviously, at \$800.00 /lb this grease is not reasonable for each individual to purchase, so we (Mike and Sally) have bought a small can of it and we would be happy to send a "small" (literally less than 1/2 teaspoon) quantity to any builder or EZ flyer who will send \$10.00 to us at RAF. The \$10.00 will cover the cost of a small plastic container, a jiffy bag, postage and cost of the grease. It is on back order at the time of this writing, and should be in our hands November 15, 1985.

Dick Kreidel has been using it for almost two years (over 500 hours) in his beautiful Long-EZ and he says that although it does eventually wear down to where the valve starts to get a little stiff, he says it seems to last longer with each application. He has only greased his twice in 500 hours.

#### LORAN-C, SOME PERSONAL OBSERVATIONS

I am new to Loran-C and like most pilots I had heard the glowing reports on how great it was and how it would replace VORs. I never did read or hear any negative reports, so like many others I talked Sally into us spending the necessary dollars and before you could spell Loran-C, we had a Micrologic ML6500 in our Long-EZ!!

I have used it on every flight for the past 4 months and the following observations are strictly my own for the better education of other pilots looking at Loran-C.

Before you buy a Loran of any kind, find out if your area is good for accurate Loran coverage. While Loran navigation is good in some areas, it can be essentially useless in others. I am not talking about the mid continent gap either. Ask your dealer to explain base line extensions. This is in simple terms, when your airplane is positioned so that two of the three necessary stations "line up" thus giving the receiver on board excellent information in one plane and zilch in the other plane. This causes the unit to flash an unreliable signal and to give crazy ground speed readouts of as much as 50 knot errors and cross track errors as much as 40 miles. Distance to the stations remains somewhat reasonable, but still questionable and therefore for practical, accurate navigation, probably useless, especially in marginal rainy weather, when the rain upsets the Loran somewhat too, must to static? I have experienced this exact scenario many times in the area between Bullhead City, Arizona and Prescott, Arizona. Certainly this is not in the mid continent gap. I assume this to be classic baseline extension gremlins at work.

My other pet gripe is the fact that I can be flying along wings level with SNRs of 99 on all three stations, with all data showing good. I see something below that I would like my back seat passenger to see so I bank quite steeply to give her a better view and when I roll back to wings level on the original heading, the Loran has lost its mind. Ground speed is way off, cross track error is miles off, only distance to the station is reasonable. According to the manufacturer, this is due to the fact that the microprocessor does not update fast enough, and with the information changing rapidly due to the heading change, the computer goes "tft". It takes about 2 minutes of straight and level flight before the information is reliable again.

Oh well, nothing is perfect! In good Loran reception areas this is a neat navigation tool, but don't throw away your VOR equipment yet. Loran-C is very accurate provided it has been there before. That is to say, my Loran receiver has my hangar's position absolutely nailed. It will bring me back to the hangar plus or minus 50 feet (actually its more accurate than that in Mojave). If you look up the Lat/Long of a given airport or VOR in your handy Loran booklet, and dial it in, your Loran will sometimes bring you right to the spot, but most times will bring you only to within a mile or two. In VFR conditions you can always see where you were trying to get to.

I have found the distance to the station to be the most useful and reliable information displayed by my Loran receiver. Ground speed and cross track error are much less reliable. If it's been there before and you are in a so called good area, it's great! I have talked with pilots who fly Appollo IIs, Arnay 21 and SRD Labs Loran-C receivers and generally they have had the same results I have spelled out in this article.

I would be interested in hearing from others with their experiences. I do not intend to discourage anyone from buying and installing a Loran, rather I hope I have given you food for thought, allowing you to make an intelligent decision and to help you to understand some of the "quirks" of the so called 'lower-priced' Loran-C receivers. I have essentially no experience with the so called 'pro-line' type Lorans (\$5000.00 and more).

Generally speaking, I like my Loran. It is a neat navigation aid. I enjoy using it and most of my cross country flights are probably flown more accurately - therefore my airplane is more gas efficient. As I get more familiar with it, learn about its good points as well as its bad points, I get more out of it. Would I do it again? You bet!! Mike Melvill

Following letter is from Judge King, a Minneapolis, Minnesota Long-EZ builder/flyer. Judge installed an Arnay 21 Loran-C receiver in his Long and from my conversations with him, he feels about the same way about his as I do about mine.

#### Retrofit a Loran-C for your EZ - by Judge King

The stories I had heard about the problems of installing Lorans in plastic airplanes almost discouraged me from attempting a retrofit for my Long. There were the ongoing antenna problems and the problem of where to put the unit. Claims of no panel space are a myth if one plans well in advance.

I decided to plan a Loran installation because the price was right compared to the new equipment that depends on VOR signals. I ignored all the stories about Lorans and electrical interference and did nothing special during my installation to eliminate problems discussed in many articles related to strobe lights, alternators etc.

The antenna is a straight piece of RG58 co-ax cable four feet long and installed in the winglet on the left side of the airplane. The top 24 inches of the cable is stripped of its outer insulation and shield. The lower 24" portion plugs into the preamp. Putting this in the winglet during construction would be a snap. It is also a snap in a retrofit.

1. Remove the position-strobe light assembly exposing the hole in the wing for running wires. If your Long was built per plans this hole is forward and below the upper winglet.
2. Using a .25 x 4ft drill bit (the kind that burglar alarm installers use) drill a channel through this hole from the inside into the upper winglet staying as close to the leading edge of the winglet as possible. (My channel wandered and the drill bit came out the top of the winglet about half way aft. It is important to note that this hole is being drilled through a structural attachment point so one small hole is enough. The antenna co-ax was pulled through from the top.
3. Placing the preamp. Since the preamp has to be attached at the end of the antenna a cavity was carved in the same space behind the strobe light assembly to accommodate the preamp. (There is only styrofoam in this area - thus an easy carving job). The distance from the preamp to the Loran is less than 25 feet of fishing cable through the wing and center section spar and fuselage.

I had no cable fishing to do because I installed a comm antenna in the left winglet during construction which I never used, so I used the RG58 cable that was already there. With my antenna installed I turned to the problem of where do I put the unit. I got rid of my ARC radio and VOR head, lowered my transponder by 1" and was able to fit my 3.1" Arnay at the top of the stack of my new TXN960 (720 channel radio with locator and glideslope and VOR head all in one unit) and transponder.

The Arnay unit is higher than some other units but I was determined to make it fit because it has some features that others are lacking. I don't have to ask flight service for winds aloft anymore and I was aware that Arnay was in the process of a new safety feature which I just ordered for my R-21. Enroute to a distant waypoint I can punch in 911 and get immediate indication of bearing and distance to the nearest six airports.

Flying the VORs was great when that was all I had but I consider my R-21 Arnay the best thing since sliced bread.

#### VOYAGER UPDATE - Dick and Jeana

First I would like to thank Burt for this opportunity to include in the RAF newsletter an update of the Voyager Around the World Flight Program. The project is still alive and well and progress is being made as fast as funds and resources will permit.

The last flight Voyager made was mid-November, 1984, at which time the Phase One flight testing was completed. Phase One was done with worn out junked engines and instrumentation we had readily available. Out of this we were able to evaluate the performance and handling qualities of the aircraft. The conclusion was that Voyager is capable of its designed goal ... world unrefueled flight.

From the data acquired from the first phase of testing, we were able to select the world flight engines and avionics. King Radio is providing the avionics and Teledyne Continental Motors is providing the two engines. The front engine is a standard O-240 air-cooled (130 hp) and the rear engine is the newly developed 10L-200 liquid cooled (110 hp).

For the past year it seems little has been said about the project but as usual, if we're not talking, we're working! Our time has been tied up in test cell runs, wind tunnel evaluations, propeller acquisition/testing, putting together the avionics package, making new cowls, engine mount-hook up, aircrew life support systems (heat-vent-oxygen), the deployment planning and operational logistics. Things are coming together nicely. We expect to have Voyager flying before the end of the year and continue testing with the new engines, avionics and aircrew systems.

When are we going? I wish we knew! Voyager is a research and development (R & D) program that basically means there is more to it than first meets the eye and working towards a schedule is somewhat of a laugh. A very frustrating one at that. As it looks right now we will not be ready for a world flight attempt before the "weather window" closes toward the end of November. Although we should be flying, testing the new engine/avionics before that. At present we are looking at sometime next year before any attempt on the world flight can be made.

As you are all pretty much aware, Voyager has been funded mainly by individual contributions. If it hadn't been for this kind of support the project would have folded a long time ago. WE STILL NEED YOUR HELP!

Please let everyone know Voyager is alive and well. We have no intentions of giving up! There's a challenge to be met and with your help we will make it happen.

Thank you,  
Dick Rutan and Jeana Yeager  
Voyager Aircraft Inc.  
Hangar 77 - Airport,  
Mojave, CA 93501  
805-824-4790 or 824-4645

## PLANS CHANGES.

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

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

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

## NO VARIEZE CHANGES.

## LONG EZ PLANS CHANGES

- LPC 122 MEO New canard plans, page B top right, third paragraph down. AN2-21A bolt should be AN4-21A. Also the 2 1/2" long spacer should be 1 3/4" long.
- LPC 123 MEO New canard plans, page CI right corner of the page - the dimension 64" should be 65" and the dimension 10" should be 11". The elevator lengths shown are correct and should NOT be cut down.
- LPC 124 MEO New canard plans, page C4 shows 7 x 14 x 64 foam block. Clarification: FB-1 should be 7" x 10" x 54", FB-2 should be 7" x 9 1/2" x 14" and FB-3 should be 4" x 7" x 54" - NOTE: Inboard cores (with spar troughs 54" long) are cut out of FB-1. Outboard cores (no troughs, 11" long are cut from FB-2. Elevators are cut out of FB-3.
- LPC 125 MEO New canard plans, page C4 calls out the length of the 3/16" stainless hinge pins, NC-8R as 36". This is correct. On page C, bottom right it is called out as 34", this is not correct but will work ok if you have already cut the material.

## DEFIANT PLANS CHANGES

- DPC 29 MEO Section I, page A-3 in the bill of materials, part #BRL-2 and BRL-3 are shown on page 34. This is not correct and should be 54.
- DPC 30 MEO Section I, page D-41, part NGB-18 flanged bushing. Two are required. These are called out in the bill of materials as steel machined parts. Should be oilite, Boston or bunting bronze bushings as shown on Page D-41.

- DPC 31 MEO Section I, bill of materials. Increase 4130N steel .050 thick from 6" x 6" to 6" x 12".
- DPC 32 MEO Section I, page D-44 center of page, Section A-A. AN509-10R12 (6 places) should be AN525-10R12 (6 places). Add 6 AN525-10R12 screws to bill of materials.
- DPC 33 MEO Section I, page D-32 - bill of materials calls out 52" of hinge material required to attach the ailerons to the wings. Since you must reverse this hinge stock, you will require at least 53" of MS20001 P6.
- DPC 34 MEO Section I, page D-40. The two screws AN509-10R14 required to mount RUD-8 are not called out in the bill of materials.
- DPC 35 MEO Section I, page D-48. The C-26 elevator push rod cannot be built as called out due to the AN4790HT16P not fitting inside a 1/2 x .035 wall aluminum tube. We suggest that a solid aluminum rod 1/2" in diameter be substituted for the 1/2" x .035" A. This solid rod should be 2024T3, should be approximately 4.5" long and will have to be drilled and tapped 1/4-28 into one end and 3/8-24 into the other end. You will need HM-4 and HM-6 rodends instead of the HF-4 and HF-6 called out. There are two C-26 assemblies required so you must double the above and change the bill of materials to suit. Add two AN316-6 jam nuts to the bill of materials.
- DPC 36 MEO Section I, page D-26, the elevator acuator tube (weldment) is correctly shown as C-27 should be C-20 (two places).
- DPC 37 Section I, page D-48. Small sketch of rear view of C-20 has notation at each end "shoulder of oilite bushing". Delete this notation, two places.

## NO SOLITAIRE PLANS CHANGES

## MAINTENANCE ITEMS

VariEze and Long-EZ engine mounts. Ray Cullen, VariEze builder/flyer reports a cracked engine mount. He says his wife noticed a change in the sound of the engine, so he returned to the airport. A subsequent careful inspection of the engine area revealed a crack 1/4" aft of the weld at the upper left attach point. Ray says he almost missed spotting it as it was hidden behind the brake arm. He and his mechanic had completed an annual inspection of this area just 20 hours previous to this, and both failed to find it. Evidently this crack had existed for some time and Ray suggests that the engine mount area should be closely examined on a regular basis.

This is the third known case of an EZ engine mount cracking. One was a Long-EZ (with unauthorized engine), the other also an O-200 powered VariEze. All were conical mounts, we have never heard of a dynafocal mount cracking. We have carefully examined all of the RAF aircraft and even though they are all high time aircraft, we have found no signs of any cracks.

Inspect your mount regularly, especially the hard to see places around the welds near the firewall. If you notice a change in engine noise or a vibration, land and check the mount and the prop. Please report any findings to RAF.

## BUILDER HINTS

Long-EZ builder Bill Friend sends in the following suggestions for insulating the brake lines at the wheel. Bill wrapped the exposed nylaflo (or nyloseal) brake line (from the trailing edge of the strut to the caliper) with fiberfrax (RTV silicone will help stick it down). The fiberfrax was then wrapped with aluminum foil. A length of heat shrink tubing was then slipped over the whole thing and shrunk into place (the heat



shrink must be slipped on before the nut and ferrule are installed). We tried this system recently and it works great.

Lycoming rocker cover gaskets. Mike now has approximately 120 hours of time on a set of four gray colored rocker cover gaskets, manufactured and sold by the REAL Gasket Corp. Doug Price designed, developed and is in the process of getting STCs for most Continental and Lycoming rocker cover gaskets. This is an area in our experience that has always been prone to minor, but annoying oil leaks. These silicone rubber gaskets have absolutely eliminated any sign of oil leaks. These gaskets are quite expensive, but if treated reasonably they are reusable. Doug Price has a supply of these gaskets that are not STC'd, that he is prepared to sell to homebuilders for \$12.50 a set. (They normally sell for \$8.91 each). These are the same as Mike used on his Long-EZ and the method he used to install them is as follows: Clean the two faces (rocker cover and cylinder head) until they are absolutely dry, with no oil on them. Install the gaskets dry (no sealer of any kind), put a drop of Loctite on each screw and tighten the screw using a normal screw driver until they are good and tight - by hand, no torque wrenches. Do not retorque at all, leave them be and they will last a long time and will not leak. Caution: DO NOT TIGHTEN THESE SCREWS IF THE ENGINE IS HOT.

For further information contact: The Real Gasket Corp.  
P.O. Box 14852,  
Portland, OR 97214  
503-231-0341

Talk to Doug Price and tell him you are interested in his homebuilder special as discussed with Mike Melville at RAF. Doug has gaskets for Lycoming O-235, O-320 as well as Continental C-75, C-85, C-90 and O-200.

#### ROSENHAAN WHEELS, BRAKES AND AXLES

We have received very little feedback on the axle problem reported in CP 45. Those who have called have reported cracked axles, but no source to replace them. Ken Brock says he will set up and manufacture a run of these axles if there is enough demand. Please let RAF or Ken Brock know if you would like a pair and we will get with Ken on a specification. These axles should be machined from 4130N steel, with generous radii in all the corners.

The common problem of this type of brake rattling or chattering can be alleviated by installing a light spring vertically from the aft part of the Rosenhaan brake caliper up to the trailing edge of the gear leg. A glass tab on the gear leg will be required.

#### NOSE GEARS ON ALL EZs

Several builder/flyers have reported having the nose gear vibrate or jump out of the over center, down and locked position when landing hard, or on a rough runway. Should this happen, it will normally result in the gear retracting, allowing the airplane to come to rest on its nose. This will almost always result in the cast iron worm gear being stripped of its teeth. Keep in mind that this gear is never supposed to see any load greater than the retract or extend load. It will not support the airplane if the load gets into this gear. The design calls for the mechanism to crank the nose wheel down at which point the NG10A strut or shock strut takes all the load in compression and dumps this load through the NG50 weldment into the NG-14 spacer and AN4-41A bolt. See page 13-2 (Long-EZ, Section I). The worm and worm gear see zero load at this point.

If your airplane has shown signs of the nose gear handle trying to wind down on a rough runway, you need to check that your mechanism does indeed go over center and perhaps rig up some sort of a friction device at the instrument panel, behind the gear handle. If you are unfortunate enough to strip a gear, you can save the day, by turning the gear 180° and using the other half. This trick only works once though.

#### LONG-EZ MAIN GEAR ATTACH

The AN6-80A bolt should be torqued to a value of 275 inch/lb. Care should be used to assure that the nut does not bottom on the threads. If this occurs, it is possible for the loads to gradually cause this 3/8" bolt to elongate the holes in the aluminum extrusions. If

you bought your extrusions from Brock, you will note that they have flanged, steel bushings pressed into the aluminum angles, these steel bushings are available separately from Brock and are an excellent idea. If your AN6-80A bolt appears to be too long, simply add an extra washer or two under the head and under the nut to make certain that the nut is clamping down on the extrusion and LMGA tube. Of course, the general rule here is that you need two threads protruding beyond the nut.

The new Roncz 1145MS canard. Hotwire templates A and B are supposed to be identical. A few builders have reported that Template B is slightly larger than Template A. We have checked a bunch of plans here at RAF and have found this to be true in a few cases. We believe this must be due to paper shrinkage or offset printing variation. In our checking we have found Template A to be more consistently correct and we advise you to use A as the master, clamp A and B together and file them both as a pair down to be identical to Template A.

Ralph Gaither, Safety Officer for the Navy and a high time VariEze pilot, reports what he considers to be a possible flight safety problem for pilots using a product called Thermeeze Tape (high strength ceramic tape). He purchased this product from Sport Flight in Florida. Ralph installed this tape per the instructions, to his exhaust pipes (this EZ already had over 800 hours of flight time). Within 100 hours the cowl was burned completely through in close proximity to the ceramic tape. In addition the tape crystallized broke down to a powder and generally fell apart into the cowl.

Ralph is very concerned that with this condition and the use of carburetor heat, some of the powdered ceramic tape could be ingested into the engine, possibly causing engine stoppage. In addition to this, Ralph noticed no benefit whatsoever to the operation of his engine.

RAF has never recommended this tape or any other similar material. If you are using it, we suggest an immediate, careful examination of the tape before next flight. Sport Flight has been informed of this problem.

#### DEFIANT BUILDER HINT

Virtually every Defiant builder to reach this stage has had problems fitting the canard between the forward firewall (F.S. 47) and the F.S.57 bulkhead, due to the structural buildup plies and individual tolerance build up. Rodie Rodewald ended up cutting his F.S. 57 bulkhead out completely and reinstalling it at F.S.57.3. He says this eliminated the problem. He also recommends building the forward canard attach tab (see Page D-26) so that it is about 1/2" longer than shown on this page (longer being towards the bottom of the page), then drilling the mounting hole through the F.S.47 firewall bulkhead at W.L. 47.9 instead of W.L.48.2 as shown. He says this made the whole job a snap, and talking to Johnny Murphy, he agrees. We have looked at his suggestion closely and believe it is a good one and recommend any builder who has not got this far to follow this suggested hint as outlined above.

#### DEFIANT PARTS WEIGHTS

While we have had Burt's N7BRA down for re-engine modifications, we took the opportunity to weigh a few parts. These are presented purely as a reference, you should not necessarily throw your parts away if your are not exactly the same, but you should be somewhere close.

Main wing, winglet with aileron mounted, finished through white paint - 93 lbs.

Canard, no elevators, finished through white paint (includes NAV antenna) - 81 lbs.

One elevator with balance weight, finished through white paint - 8 1/2 lbs.

One aileron with hinges, no pushrod, finished through white paint - 8 lbs.

## NON RECOMMENDED PROPS

We recently heard from an EZ builder pilot who was using a non RAF recommended prop and after only 22 hours of operation, upon noticing a new feeling or vibration, closely examined the prop and found compression failures in the wood about 8 to 10 inches out from the spinner on the forward face of on both blades. Remember, most times you will get some type of warning before the prop really lets go. Pay attention. Any new noise or vibration should be investigated. We are becoming more and more advocates of the so called "multi-laminate" Canadian maple wood props. In our experience these props are stronger and allow more torque to be applied to the prop bolts without crushing the prop hub. We have routinely used 300 inch/lb of torque on the 3/8" prop bolts found on Lycoming O-235 and Continental O-200 with these props with no problems at all. Caution: Do not use more than 220 inch/lb of torque on the older style four or five laminations of birch type props. Also, remember to check the prop bolts quite frequently, particularly when the prop is new.

The following is an incident report from VariEze builder/pilot and Defiant builder, Emerson Grooters of Norway. It concerns the failure of a propeller and points up the importance of selecting a good reliable prop. If you want to experiment with untested or unusual props, do yourself a favor and follow the Formula one racing guys lead, install a safety cable on your engine. This is at least a 1/8" aircraft cable that ties the engine to the airframe. If you lose a prop blade, and don't get the engine shut down in time, the engine could come loose from the firewall.

"During testing of a new wood prop which I intended to use for some altitude and speed records, the prop failed with multiple fractures in the root area of both blades - forward face. The prop was not one recommended by RAF, however, I think that there may be a good point here for everyone - that is, just because you have a wooden prop don't think that it will automatically work with your aircraft/engine combination. I had 2.15 hours on the prop when I retorqued the bolts prior to an altitude test of the aircraft, my RR O-240 powered VariEze. I took off, climbed to 10,000 feet and checked various power/cruise settings for about 25 minutes. I then climbed direct to 20,000 feet and started full throttle cruise test prior to further climb. At about 107 KIAS and 2700 rpm I noticed an increase in vibration from the engine. The vibration was not severe; however as it was a change from the norm, I cancelled my next planned step to 25,000 feet, reduced power to about 1/4 throttle and descended for landing. Total flight time 1.25 hours and total on the prop, 3.40 hours. On landing I saw the cracks in the prop. I was also glad that I had just had my chute inspected and repacked, even though I hadn't had to use it.

Last summer, my wife and I stopped to talk to another couple about their new beautifully executed homebuilt. They were both dead about 15 minutes later in a crash resulting from losing most of a prop blade. It was a one piece wooden prop recommended for their type aircraft - not a RAF type. I mention this because, just because you have a nice looking wood prop does not mean that you are home free. Also any change from the normal operating conditions of your aircraft should be fully investigated as soon as possible. A precautionary landing may be inconvenient and take a little time but it could save your aircraft and yourself.  
Emerson Grooters"

## FOR SALE

Lycoming O-235-C, 760 hours total time complete with accessories. \$2300.00

Contact: Herb Peterson  
327 Carol Road  
New Lenox, IL 60451  
815-485-8036

Continental O-200, zero since major. Sell outright or trade for Lycoming O-235.

Contact: Ben Buente  
8250 Maple Lane  
Evansville, IN 47711

Defiant Engines. Lycoming T10-360-A1B turbocharges give sea level power to 15,000 feet. These are brand new engines, prefer to sell as a pair. \$26,000.00 or \$14,500.00 each.

Contact: David Record  
916-459-3533

Defiant or Viggen engine: Lycoming O-360-A1D, disassembled with new valves, pistons, alternator and oil pump. Magnafluxed and yellow tagged jugs, carburetor, prop governor and 12 v starter. \$6000.00. Also a few instruments available.

Contact: Bill Campbell  
619-868-6218

Lycoming O-235-L2C as removed from a Cessna 152 (no damage). 1880 total time since new. Includes additional case for mechanical fuel pump. \$2400.00

Contact: Dan Mason  
213-390-3444 - office  
213-202-1882 - home

Long-EZ builder Jim Schultzman has come across a pure silicone rubber canopy seal, that is without doubt the finest we have seen. It comes with its own adhesive, simply pull the protective tape and stick it down. It is a 'V' shaped extrusion that is normally part of a larger shape. Jim has set up a system to cut off the relevant 'V' shaped piece, so it can be used on an EZ canopy.

Contact: Jim Schultzman,  
2638 Westwood Drive  
Las Vegas, NV 89109

Antennas for composite aircraft. VOR/Localizer Glideslope antennas, marker beacon, comm and Loran antennas.

Contact: Antenna Dynamics Inc,  
1251 W Sepulveda Blvd  
Suite 268  
Torrance, CA 90502  
213-534-1090 Ext-22

Plans for forward mounted brake cylinders. This is the method pioneered over 8 years ago by the late Ed Hamlin and proven by many VariEze and Long-EZ builder/flyers. Debbie Iwatate (Long-EZ N455EZ) has written an excellent set of instructions on how to accomplish this. All she asks for a copy of this set of plans is a few dollars to pay for postage. We think it would be nice if people would send her \$10.00 to cover printing, postage and handling plus a few bucks for the effort she has put out.

Contact: Debbie Iwatate,  
400 South 41st Ave  
West Richland, WA 99352

Defiant nose gear - M20 Mooney 4 donut older style. \$275.00

Contact: Lynn Burks.  
213-698-5441

Ian Ayton's gear/canopy warning device - as recommended by Mike and Sally. A really neat, small self contained unit which is easy to install, that causes the warning light to flash and the buzzer to buzz intermittently - makes it hard to ignore.

Contact: Ian Ayton  
213-375-9269

## WANTED

Help! Our VariEze project is stalled. We need someone to complete it for us for a share. 75% complete.

Contact: H.C. Alsop  
145 South 2 East  
Downey, ID 83234  
208-897-5259 or 897-5314

## SHOPPING

Herb Sanders recently sold his company 'Sport Flight' which is the recommended source for the VariEze O-200 exhaust system to John Queener, a Long-EZ builder. John will continue the name 'Sport Flight' and the new address is, 22267 Powell Road, Brooksville, FL 33512. The phone is 904-797-1874

## PRE-FABRICATED COMPOSITE PARTS

Lombard's, a facility based at Boonville, California airport, (a 3000 foot paved community strip just one valley west of Ukiah) was built during the summer of '84 and spring of '85. When the Rutan contract became available (spring of '85) the facility was not quite completed but parts needed to be manufactured. A few



customers were inconvenienced from that shift as work on the building became a second priority and spooling up the business took precedence. Just as work got into full swing, Rutan Aircraft made the announcement of their intentions to discontinue plans sales. This created panic among some builders who sent in orders. About the same time, Oshkosh also created interest and orders.

To the good fortune of Lombard's, Michael Dilley joined up from RAF about the time Lombard was going bald (from pulling hair) and assisted in forming "Lombard's".

A bit about Michael: In the early '80s he became intimately involved in the construction of the Rutan designed Amsoil Racer. After its completion he signed on at RAF working during the finishing mode of the Grizzly. By the time the Grizzly was flying, Burt had catalyzed the Solitaire design. Michael assisted not only with construction of that model, but also in drawing plans and handling the builder support program. He is building a Long-EZ in his spare time!

Larry Lombard, also of Lombard's got his first composite experience by building VariEze N15LL with his wife Janet in Sacramento ('78). Larry also worked on primary flight structures of the Amsoil Racer and hired on at RAF about mid-way of the racer completion. His first year at RAF was working on Grizzly, then onto construction and through first flights of Solitaire. After another two years working with Quickie Aircraft at Mojave, he shortened his Sacramento commute by over two hours after moving to Boonville. N15LL has logged well over 1300 hours and really likes the low wind and density altitude of the California north coast.

#### PARTS

Lombard's is manufacturing all parts to Rutan's specifications of materials and workmanship. We are continually up-grading the quality of parts when possible. For instance, Kevlar cowls are now being made with more Kevlar and less glass using epoxy and not polyester. Landing gear are also manufactured with the same time-proven materials and techniques that RAF intended. We have been able to trim some weight from the 500 x 5 wheel pants. In early September, Lombard's purchased molds (see photo) from Ray Latslaf, a Long-EZ builder to provide an improved fit of the nose cover and strut cover.

Ray also developed a new NG30 cover that should reduce cockpit airflow and dirt in the retract mechanism. This cover is \$19.95 and is a prefabricated version of the cover built and recommended by Mike Melvill on N26MS. Ray did a fine job of refining these parts for the Long-EZ as I am sure all the builders who install the new parts will attest. We owe him a "thanks".

We have been building new molds for the Defiant main gear which are 4 inches shorter and smoother than the originals, saving the builder the trouble of cutting the gear as well as allowing a more aerodynamic strut. They will go into service this week. (October 14, 1985).

#### PRICING

From the demand for parts created by the change over of suppliers and our desire not to hold up builders projects, we agreed to supply all parts at 1984 prices and sell the cowls, wheel pants, strut cover, sump blisters, nose wheel box and cowl inlet direct to the builders. After building some parts and pricing the materials we found we could hold the price on most items. Those that have to increase are the VariViggen cowl halves (from \$129.50 to \$139.00). We are however, able to DROP the price on two items, the Long-EZ main landing gear (from \$344.00 to \$324.00) and the nose gear (from \$61.70 to \$55.00). This reduction is possible from a better source of supply of materials.

#### REBATE

For our customers who have already purchased their Long-EZ main and nose struts from Lombard's, a \$20.00 rebate will be applied to a Long-EZ Kevlar cowl set OR leading edge fuel strake kit. We appreciate the business!

#### NEW PRODUCTS

We are pleased to announce three new products to our line.

1. Pre cut foam cores, Long-EZ (new canard or GU) at \$99.50. Wings and winglets to follow soon at \$779.00
2. Long-EZ bulkhead kits at \$655.00.
3. Long-EZ leading edge fuel strakes and bulkheads at 4499.00
4. NG-30 cover at \$19.95.

Our future plans consist of shortening the lead time on orders as well as developing new products. First on our list of product development is the Defiant parts. We are currently working on leading edge strakes and cowls for fixed pitch or Hoffmann constant speed props. These cowls will fit both O-320 and O-360 engines. Wheel pants are on the drawing board and we are looking at the possibility of tooling the Defiant from the longerons up. This would be an expensive part but eliminate many of the problems associated with building several pieces (instrument cover, canopy frame, turtleback and both upper cowl halves) allowing a smoother flow of lines. Please drop us a line if you would be interested in this part, we will only develop it if we receive some positive feed back from the builders.

The Solitaire molds are in our shop and we have had some requests for parts. Unfortunately this presents both a challenge and a major problem. In order to build the fuselage halves for a Solitaire, we would have to build a larger oven and set up with pre-pregs and honeycomb cores. To make purchasing these materials feasible we need a run of several ship sets. Anyone with a set of Solitaire plans that is considering building one of these fine ships should contact us at Lombard's so we can organize a run of Solitaire kits, since we are not planning a second run in the near future.

Lombard's is open 8 to 5, Monday through Friday and being stationed on an airport, we invite drop in visitors.

Michael and Larry"

Contact Lombard's at P.O. Box 781, Boonville, CA 95415  
707-895-2718

Editor's Comment - Larry and Michael are really building a fine Kevlar cowl. Their Long-EZ cowl complete with stiffening ribs weighs just 12.5 lbs. The layup schedule consists of one ply of BID on the outside (to allow for any sanding during finishing), two complete plies of Kevlar BID and a thin glass ply on the inside. The matrix is Safe-T-Poxy, which allows a builder to tailor the cowl to his airplane using a heat gun. To our chagrin, we have discovered that the so called Kevlar cowls manufactured for our builders previously consisted in fact of only one skimpy ply of Kevlar, the rest being fiberglass matt in a matrix of polyester. (Dupont does not approve Kevlar and polyester). We are shocked to find this out, it is too late to do anything about it, but the fact is that the new Lombard's Kevlar cowlings are an enormous improvement over any previously available. Larry and Michael are doing an excellent job up in Boonville and we at RAF encourage you to support them, both are ex RAF employees, both are composite experts, we heartily recommend Lombard's for your prefab needs.

#### LICENSE TO BUILD RAF AIRCRAFT

Those of you who are active builders know that your purchase of plans from RAF, entitles the holder to apply for a license to allow him to construct one aircraft from the purchased set of plans. Plans sold without the license indicate that the purchaser has obtained the plans for the purposes of using as a book or educational material to learn fabrication or design processes but not to build an airplane of this specific design.

In the past, RAF has accepted transfer of that license from the original purchaser to a second party when that transfer was requested by the licensee and the license was transferred. However since this summer, current agreements specify that RAF support only those who are previously licensed to build the RAF designs and we

cannot issue further licenses for any further production of the designs. In order to provide the best possible service to those licensed to build the aircraft with the remaining funds available for support we must insist that the support be limited to only those who are legally building the aircraft ie; those who have obtained a license to build one of the designs from RAF.

We are aware that there are instances where people are fabricating an EZ without a license from RAF. If those people have gotten information or authorization to do so from one of the licensees it must be made clear as to what the licensees' responsibilities are. Keep in mind that the individual that has obtained a license to build a Long-EZ for example, has the permission of RAF to copy the RAF prototype Long-EZ for one airframe. He is the aircraft manufacturer and he is using certain design information purchased from RAF as well as other design information that he has generated himself or obtained elsewhere. There is no such thing as a conformal amateur built aircraft since there are no official conformity drawings accepted by the FAA or anyone. The FAA thus assumes that each aircraft is indeed a new type and does not have to conform to specific drawings or manufacturing processes. The drawings and manufacturing processes to be used on each airplane are totally the decision and right of the homebuilding manufacturer.

Now if you, as a licensee, wish to discontinue your project and sell it to someone, the new buyer is dealing with you, the licensed manufacturer, not with RAF.

RAF's responsibility is to support the individual that has the license, not a third party. Thus keep in mind that if you are selling a project, don't expect that RAF can or will provide builder support to the person buying your project. That responsibility rests with you the manufacturer. You are then effectively licensing the third party to produce an airplane of which you own all manufacturing rights. It is strongly suggested that if you do sell a project, either a completed airplane or a partially built airplane or a set of plans, that you contact an attorney and have him draw up an agreement between yourself as manufacturer and the new party whom you are authorizing to build an airplane and be certain that the agreement provides you with some release or indemnification from liability should that aircraft ever be completed and flown. Keep in mind that you are ethically obligated and responsible to the person who has trusted you for that information and that he may need continuing support to allow him to operate the aircraft safely. If you own a license from RAF, RAF will provide the support to you, however, it is your responsibility to pass that on to the individual that you have your own agreement with.

Refer to the adjacent diagram. In order for us to provide adequate support to those that have the legal right from us to manufacture the design, we must deal only with the licensee. Keep in mind that if you sell your plans, you are not merely selling someone a library book. You are authorizing them to build an aircraft and warranting the information. You ethically should promise to them that you will follow up whatever support is needed in the future to allow them to safely operate any aircraft built from the design information you have sold them.

Many people do not realize the responsibility that maybe attached to providing an agreement or license for someone to build a design based on information provided in the sale of plans. We do and that is why we intend to maintain our policy of providing to those licensed to build the aircraft any safety information that may come up in the future as a result of operational experience indicating any modification required or revision in the operating limitations.

This is why we at RAF intend to continue to provide the support necessary to allow a conscientious homebuilder to have the information at his disposal to build and operate a safe aircraft. The support role is not an easy task, it is one that involves many facets. Communication with the builder, continued testing of required modifications, follow up communication with the operators to determine if safety problems exist, accident investigation to determine if a cause is something that could be common to more than just the one aircraft, etc. The costs of maintaining all these activities have been extremely high, thus we have had to

seek out other jobs and activities for the personnel involved. We anticipate that the support will be limited to those items relating to safety of operation and to provide those licensed to build the aircraft.

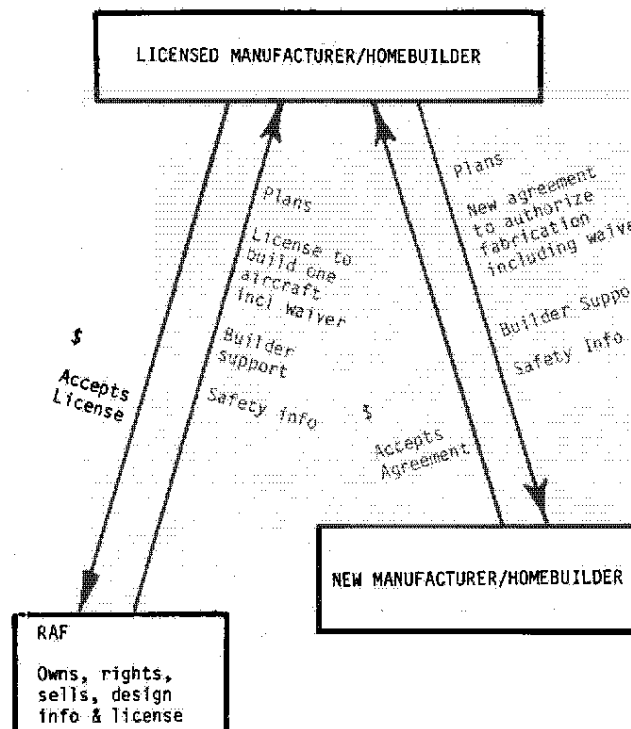
#### Join EAA

Membership in the Experimental Aircraft Association Inc. is \$30.00 for one year, \$54.00 for 2 years and \$84.00 for 3 years. All include 12 issues of Sport Aviation per year. Junior Membership (under 19 years of age) is available at \$18.00 annually. Family Membership is available for an additional \$10.00 annually.

Make checks payable to EAA. Address all letters to EAA.  
WITTMAN AIRFIELD  
OSHKOSH, WI 54903-2591  
PHONE (414) 426-4800  
OFFICE HOURS:  
8:30-5:00 MON - FRI

#### SURVEY OF ACTIVE BUILDER/FLYERS

RAF needs to determine those projects which are currently active since a large number of the early construction projects and the early aircraft are no longer active. This updated list will provide a more concise and correct accounting of those qualifying for builder support so that RAF can do the most thorough job possible providing support in the future. If you have been licensed to build a RAF homebuilt and your project is currently under construction or currently flying, it is imperative that you fill out the form and mail it to RAF. In this way we will have the information available to update your status and provide you with the necessary support without the dilution of many inactive projects. This form is not intended to provide for the transfer of license agreements between the licensee and others, only to update us with the status of the activity of your licensed project.



#### WHAT HAPPENS, IF YOU SELL YOUR PROJECT OR YOUR PLANS?

Note: The licensee, not RAF, is responsible to the new manufacturer. If you sell a completed aircraft, you may be liable for any manufacturing flaws. If you sell a partially completed aircraft, you may be liable for any flaws in your work. If you sell your project, or even just your plans, you are ethically responsible to provide builder support and to pass on safety information.

Circle aircraft type VV VEZ LEZ SOL DFT

Name \_\_\_\_\_  
Address \_\_\_\_\_  
\_\_\_\_\_ Zip \_\_\_\_\_  
Phone # \_\_\_\_\_

Fill in  
the date

\_\_\_\_\_ Plans Bought  
\_\_\_\_\_ License agreement # \_\_\_\_\_ obtained  
\_\_\_\_\_ Started construction, materials obtain from \_\_\_\_\_

\_\_\_\_\_ Construction complete requiring \_\_\_\_\_ man hours  
\_\_\_\_\_ First flight, piloted by \_\_\_\_\_  
\_\_\_\_\_ To today's date, total hours flown \_\_\_\_\_

Details on your aircraft (if available now)

N Number N \_\_\_\_\_ Type Engine \_\_\_\_\_ hp \_\_\_\_\_  
Type propeller \_\_\_\_\_ Type wheels and tires \_\_\_\_\_  
List avionics \_\_\_\_\_  
Electric system \_\_\_\_\_ starter? \_\_\_\_\_  
How many pilots have flown in front seat? \_\_\_\_\_  
Empty weight \_\_\_\_\_ lb. Heaviest weight flown \_\_\_\_\_ lb  
Most common cg flown \_\_\_\_\_ in. Furthest cg flown \_\_\_\_\_

If not built to plans, list modifications/improvements:

Have modifications proved to be desirable \_\_\_\_\_  
Have they been tested through the full envelope, (weight, cg,  
speed) \_\_\_\_\_  
Would you recommend modification to others? \_\_\_\_\_

Your flight data: Fastest level speed \_\_\_\_\_ mph/kt  
Highest altitude \_\_\_\_\_ Longest flight \_\_\_\_\_ nm/min  
Has your aircraft ever been damaged \_\_\_\_\_  
Describe \_\_\_\_\_

Have you updated all CP recommended modifications? \_\_\_\_\_  
Does the owners manual adequately prepare you for safe operations?  
If not, what should be done? \_\_\_\_\_

Does your aircraft perform to the owners manual  
performance? \_\_\_\_\_. If not, what is different \_\_\_\_\_

Requirements for RAF support so far

	During building	During flying
Number of letters	_____	_____
Number of phone calls	_____	_____
Number of visits to RAF	_____	_____

Number of letters \_\_\_\_\_  
Number of phone calls \_\_\_\_\_  
Number of visits to RAF \_\_\_\_\_

If your project was sold, list

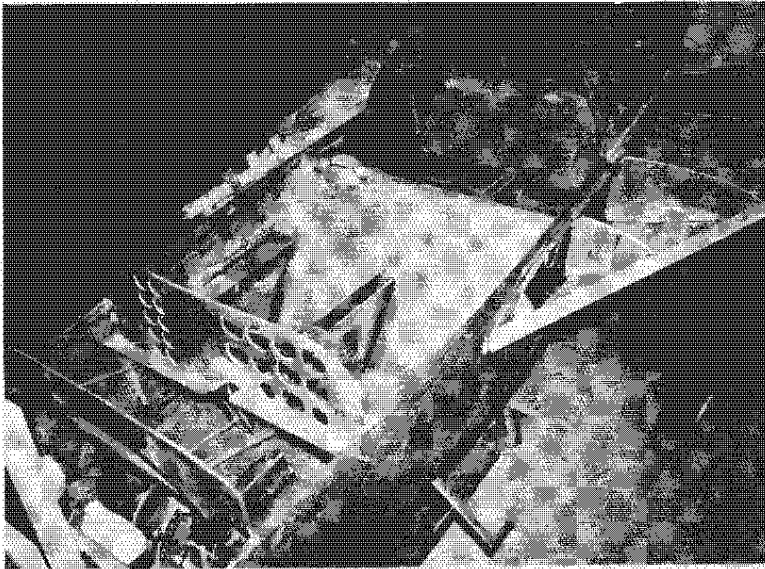
Date \_\_\_\_\_ sold to \_\_\_\_\_  
address \_\_\_\_\_  
% built \_\_\_\_\_ flying \_\_\_\_\_ hours \_\_\_\_\_

What do you like about your airplane? \_\_\_\_\_

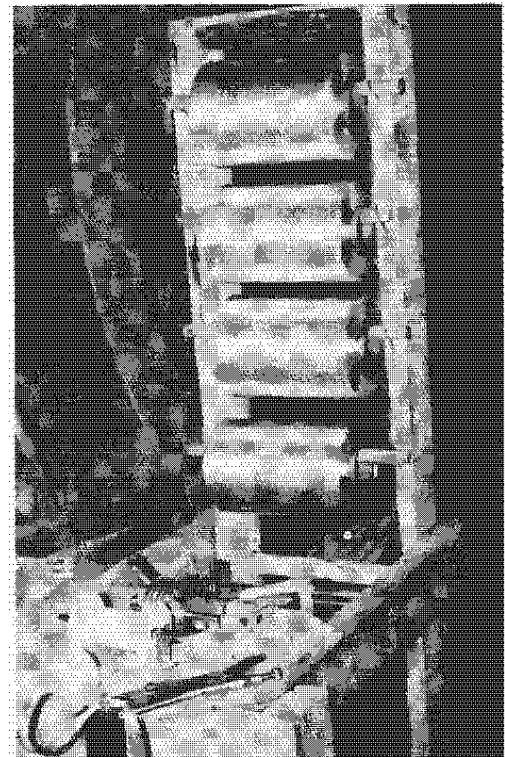
Dislikes \_\_\_\_\_

Note: If you have two license agreements for two aircraft, (ie:  
VariEze and Long-EZ), please xerox this form and fill out both.

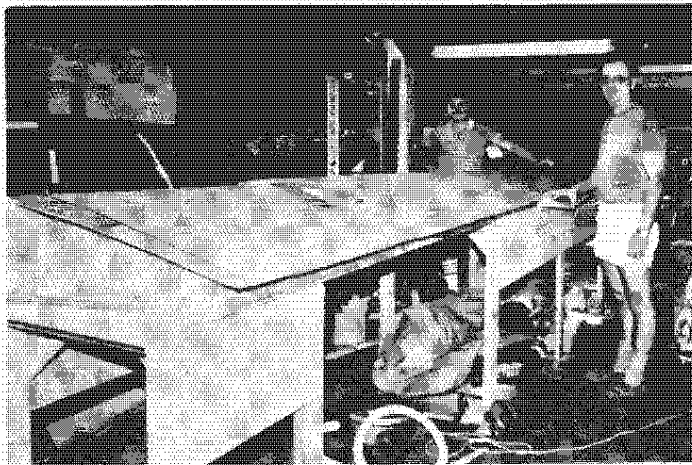
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Byrdell Mathew's Defiant project is really coming along. Byrdell is now working on engine mounts; essentially all composite structure is complete.



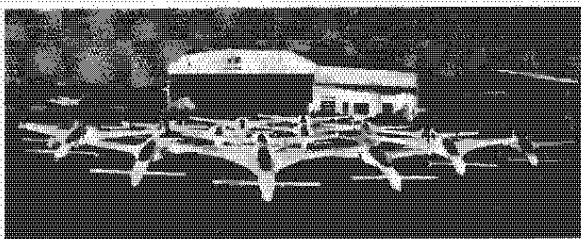
Emerson Grooter's set up for his Defiant spar cap.



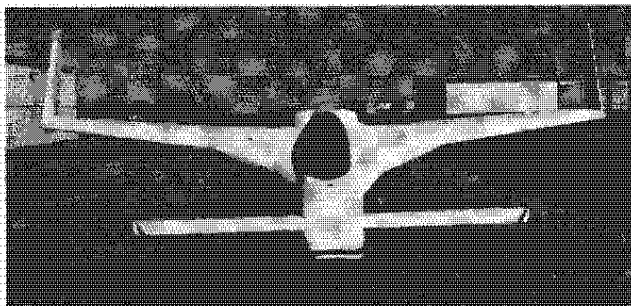
Charles Simms and his son with their Defiant project.



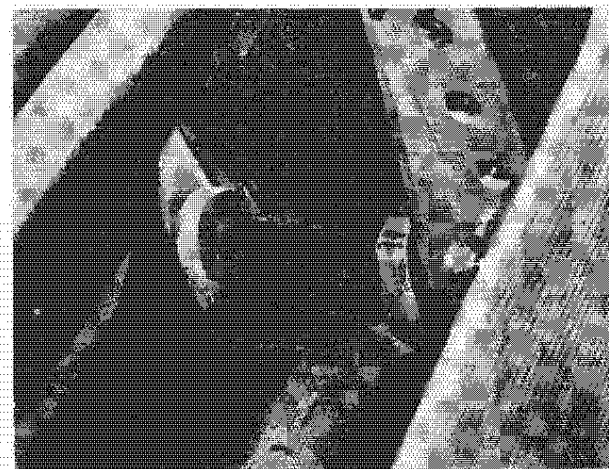
Charlie Gray carving foam on his Defiant.



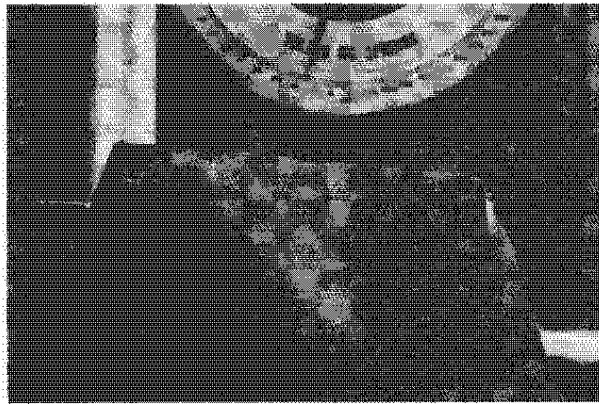
17 Ezs flew in to Davenport, Iowa. Arnie Ash organized this get together and over 70 people flew/drove in.



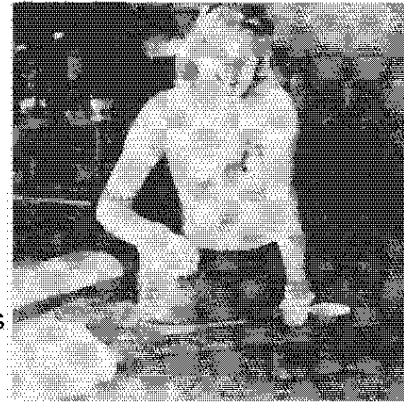
David Maygard of Wichita, Kansas recently completed this excellent example. He calls it the "Wichita Express".



Shirley Brandt sent in this shot of her Long-EZ main gear attach. This is how it should look. Very nice work Shirley.

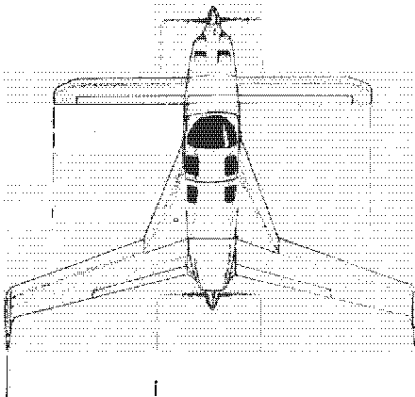


Larry Lombard,  
Michael Dilley  
and Jamie  
Ferretti, the  
folks at  
Lombard's,  
Long-EZ Kevlar  
cowling, both  
halves with  
stiffening ribs  
weigh 12.5 lbs



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Building 13, Mojave Airport  
Mojave, CA 93501**

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**TO:**

**October '85**

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**CP 46**