

THE COZY NEWSLETTER #13 • April 1986

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It is mandatory for all COZY builders to subscribe to this newsletter, as this is the only formal system we have for communicating plans changes and/or corrections, builder hints, changes in suppliers, and other information required by or of interest to builders. Builders will require newsletters from #4 on.

When writing to us with questions, please send along a stamped, self-addressed envelope if you wish a personal reply. Allow space after each question for the answer.

If you call, you can reach us most of the time on (602) 981-6401, which is both our office and residence number. If we are away, please leave your message on our answering machine, and we will return the call at our first opportunity.

The following prices are in effect:

Information kit

\$9.00

Newsletter, per year	5.00
Plans & Constr. Manual	230.00
Owner's Manual	15.00

We do not accept credit card orders because they constitute an additional cost and complicate our bookkeeping. We do accept personal checks and money orders.

Overseas orders for plans will be shipped by surface mail at no additional cost, but it takes 6 to 8 weeks. Airmail postage to Europe is \$35.00 extra, because the plans weigh 6-1/2 lbs.

Our computer has a limited number of spaces for your address. If yours is an unusually long one, please supply us with the shortest acceptable abbreviation. Our computer is programmed to print on the label after your name the newsletter expiration number, to remind you when it is time to renew. The number at the top is a file number important only to us.

ABOUT THE PLANS

When you receive your plans, please do the following:

1. Sign both copies of the license agreement (Chap. 1, p.4) and send both to us. We will assign a serial number (required for licensing), sign one of the copies and return it to you for your records.
2. Check the number of pages in each chapter against the number of pages listed under "Table of Contents". If any are missing, write to us for a copy.
3. Mark in all of the changes and/or corrections published in the newsletters.

There may be some things you don't understand on the first reading, particularly if you haven't started work yet. Don't immediately grab the phone. Usually when your construction reaches that point the instructions will become clear, if not on the first reading, at least on the second. Thank you for your compliments on the plans. We did try to give it our best.

WHAT WE HAVE BEEN DOING

There were three high priority items we wanted to accomplish in the last 3 months:

1. Complete the Owner's Manual,
2. Overhaul our engine, and
3. Get to "Sun and Fun"

We are pleased to report that we accomplished all three. We are particularly pleased that we finished the Owner's Manual. It is ready for pickup at the printers as of this writing.

We have not been able to find any significant difference in performance between the COZY and the Long EZ, if the small difference in empty weight is taken into account. This is based upon comparing the performance of our prototype with the Long EZ handbook values, which may or may not be

typical of actual Long EZ performance. However in 3 instances now we have been able to make direct comparisons. The first was in flying with Judge King in his beautiful Long EZ, with the same engine and the same propeller, and about the same gross weight. We flew on his wing at the same speed and exactly matched his engine rpm. The second instance was in the '84 CAFE 400, where our prototype was flown at a payload of 600 lbs plus gas, and there were Longs flown at both 400 and 800 lbs payload. The COZY's speed and mpg compared very favorably with the average of the Longs at 400 and 800 lbs payload. Most recently, at Sun and Fun, the Cozy raced against 4 Long EZs in the same horsepower class in an all-out, full throttle speed race. The Cozy (with two people on board) came in SECOND! We were beaten by Steve McCaskie in his super looking very light Long with an O-290 engine. We aren't making any apologies, because other pilots may have had similar problems, but on the first leg when I looked at my tach and saw that rpm was in excess of 3000 (we were still using our old prop) I pulled off some power, and also due to some confusion on our part as to where the first pylon was (actually it was only a grass strip, hard to see) we were a mile or two wide on our first turn.

As a result of these 3 comparisons, we feel quite confident in our conclusion that any differences, if they exist at all, would be very difficult to pinpoint exactly, because they are probably less than those due to builder and pilotage differences. Consequently, you will find that much of the performance data in the Owner's Manual is the same as in the Long EZ manual, adjusted for differences in weight. Of course there are differences in the weight and balance sections, pilot checkout sections, etc., due to the side-by-side seating. It is possible to be checked out in the front seat of a COZY, before soloing, where this is not possible (with full dual) in the Long EZ. Also, the manual goes into more detail in regard to determining the allowable range of front seat loading, and the need for ballast in the nose during solo flight by light pilots. The Long EZ Owner's Manual was used as a guide, but very carefully edited from beginning to end, and appropriate changes made.

As discussed in the last newsletter, we felt obligated to demonstrate an alternative to installing heavy O-320 engines (which we don't approve because of the additional weight), so we opted to do a top overhaul on our O-235, and increase the horsepower by raising the compression ratio to 10:1, plus a lot of other very specialized work designed to make the engine run more smoothly and efficiently. DO NOT interpret this to mean that we were not pleased with the way our airplane performed! We considered the performance to be exceptional with the O-235 L2C, and cannot understand why people who have never flown a COZY or other high performance airplane start out by saying they want to "improve" the performance, as though there were something wrong, or inadequate. So anyway, we decided to demonstrate what could be done with an O-235. Lycoming, by the way, does not recommend this modification, because they say it can cause detonation, if 100 octane fuel isn't used, or if the mixture is leaned too far, and burn a hole through the top of a piston. However, we relied on the advice of "High Performance Aircraft Engines" in Mena, AR, who have developed technology for optimizing engine performance for racing and acrobatics, and others, who say that a number of these conversions have been made without any problems, as long as the engine is operated correctly. A side benefit, of course, is that high compression engines burn less fuel. There is a 4% improvement in efficiency for each unit increase in compression. This results in more mpg.

The work we contracted for was to have high compression pistons installed with minimum gap rings, have the pistons and connecting rods absolutely balanced, and pistons modified for wrist pin oiling, and cylinders ported and bench flow checked. Cylinder air flow was balanced to 1-1/2% of each other

for every one hundred thousand valve lift, and volume efficiency increased from 66% to 82%.

During the course of this work, some problems were uncovered. Two of the cylinders had no taper, so the decision was made to chrome all 4 cylinders and re-hone them. Also, the exhaust valve stems were badly pitted from corrosion (probably because the engine was not run for several years prior to being installed in the Cozy), and had to be replaced, together with valve springs and guides. We also discovered that our Slick mags were the "throw away" 4000 series, which wear out after 700 to 1000 hours, and our engine had 1080 hours on it.

Our conclusion was that even though "topping" was a discretionary decision on our part, both mags were about ready to fail, and even worse, we were a candidate for blowing an exhaust valve, so our decision was appropriate and timely.

During the course of all this work we were told that the best kind of a used engine to purchase is one from a flight school airplane, which has been run every day, and not allowed to sit for long periods of time. Our mechanic said these engines can go for well over 2000 hours without requiring any major work. Breaking in a new or rebuilt engine is tricky business. Only the shortest of ground runups is allowed—just to check for oil leaks. No taxiing. I had to start the engine and takeoff immediately, and fly the first 2 hours at high power settings, full rich mixture, and carefully monitor CHT to avoid overheating and loss to temper in the rings. Oil consumption is high until the rings seat. How long that takes varies depending on whom you ask. We have about 25 hours on now and are still burning some oil. We are holding our fingers crossed, that oil consumption will drop further pretty soon.

We are told that we will not develop full power until oil consumption drops. The engine has loosened up some, however, and we are getting higher rpms with the same prop we were using before. So we have ordered a new 62 x 64 prop from Great American.

There are other things which can be done to increase horsepower. Increasing manifold pressure is an obvious route. Uli has relocated his air filter in the high pressure air aft of the carburetor. This location for the air filter would not only free up the firewall and avoid the 2-1/2 inch induction duct coming right down in the scoop, but also allow a ram air scoop (with butterfly valve) to be placed in front of the carburetor so that ram air could be used at high altitudes, by-passing filter. We haven't tried this yet—it is on our list of things to do.

SUN AND FUN

All of the engine work was completed barely in time to leave for Sun and Fun. As a matter of fact, we only had 3 hours of break in time on the engine before we left.

We left on Wednesday, March 12th, following a frontal system, planning to spend some time in New Orleans. Shortly after takeoff, I noticed #3 cylinder was cold, and began worrying that I might have a fouled plug or something else wrong. So we stopped at El Paso to investigate. After thoroughly checking everything, we found it was a shorted thermocouple probe. So we switched #1, which I knew was OK, to #3, so I could watch it, and took off again.

The stop delayed us, so we decided to overnight in Austin, TX, to visit friends, and save New Orleans for Thursday night. The front we were following was really doing a job in New Orleans. We flew under some very ominous clouds, and were jostled pretty hard. I could see a funnel extending part way to the ground. It looked impossible to get in, but the Lake Front tower told us it was relatively clear over the lake, so we went over the top and let down over the lake into the airport. A short time later Uli and Linda arrived in N52CZ. We drove into town, and had a very enjoyable evening.

The next morning was bright sun-shiny, with cumulous clouds. We took off first, and the Wolters second, accompanied by a friend in a Long, who wanted to fly a ways with us. We had Uli on climb out, but he had us later on at altitude. The Long couldn't keep up. It was really fun battling around between clouds with 2 Cozys. We made a gas and potty stop at Tallahassee. The front was stuck over Lakeland, but we were going to try to slip in under. Just when we were getting ready to take the active runway, our left brake failed. We were helpless! Uli and Linda decided to go on alone, and we radioed for a tow back to the hangars (a good mile). The master cylinder was dry, and we found a very small leak at the caliper. After tightening the fitting and refilling the master, we decided it was too close to dark, so we opted to stay overnight. The next day Lakeland was still closed in with bad weather, but it was moving slowly south, so we decided to try in the late afternoon. It got progressively darker as we approached Lakeland. It started to rain, and we could see a very violent thunderstorm, with lightning and a solid wall of water moving across the field. While we were deliberating what alternate airport to choose, we saw the ill-fated O-2 (which crashed a few moments later) pass under us. We landed at Bartow, 15 miles from Lakeland, hangared 22CZ, and called Uli and Linda for a pick up. The next morning, Sunday, the weather finally broke, and we flew into Lakeland.

Sun and Fun was delightful. It was nice to have 2 Cozys parked side-by-side. There were a number of Long EZs and Glasairs, one O-2, and no Dragonflies. The Velocity was parked near-by, and of course, it drew a lot of attention. Viewed close up, it does not bear much resemblance at all to the Long EZ, apparently on purpose (because we have an exclusive license). It will be a pre-molded kit airplane, in the \$20,000 range. Many people were interested in the Cozy and some decided to buy plans on the spot.

The Sun 60 race was scheduled for Wednesday. It is an all-out, full throttle, 60-mile, 3-pylon race. There were two classes for Long EZs, the first for less than 150 hp, and the second for 150 and over. We decided to enter the former and the Wolters the latter. We would be pitted against Long EZs, but we hoped to give them a good race for their money. Wednesday arrived, and as we were taxiing out in takeoff order, the Wolter's nosewheel tire went flat. Linda did a fantastic job of locating another tire and wheel, the necessary tools, and installing the new wheel, but by that time, the other planes were all airborne, so the race officials wouldn't let them start. So it was all up to 22CZ.

The planes were started at 20 sec. intervals (to make the job of timing easier) in the order of assumed speed, fastest planes first. As mentioned earlier, the first pylon was a little hard to find, 'cause it was only a grass strip, and we were a little off course. We didn't see anyone pass and we were catching up with 3 planes ahead, so we had high hopes when we crossed the finish line, but one of the Long EZs had us beat. But 3 out of 4 aren't all that bad! At least I felt vindicated in saying that the Cozy is just about as fast as the Long. This was Shirley's first experience racing, since my Varieze racing was done solo, and she thought it was a lot of fun. There were a lot of planes in the sky, particularly when

we returned to the field to fly past the finish line at full power, and there other traffic in the pattern, including ultra-lights, fortunately no close calls.

Uli and Linda didn't lose out altogether, though, because their Cozy was awarded "Best Finished Airplane." All in all, we were very pleased with Sun and Fun, and had a good time at the awards banquet.

The flight home was uneventful. Barely a cloud in the sky all the way. Again, we stopped in TX to visit friends, and we got back in good time in spite of strong headwinds.

Several other things are worth mentioning about the last 3 months. We have had a steady stream of visitors and house guests. We enjoy them thoroughly, but it does cut into the amount of work we can accomplish. Also, the 800 ft addition we are making to our house (art studio for Shirley and shop for me) is coming along nicely. Even though it was all contracted out, it has still required supervision. We hope it will be completed in a month or so. Then I will be able to unpack my glass and epoxy, and have a place to work (besides the office).

Most places we go, most people seem to confuse the Cozy with the Long EZ. We have to do a lot of educating, especially tower operators and also the general public. We have fancy decals on our airplane, "The COZY", as do Uli and Linda. They suggested other builders would like to do the same, so we had the art work and diecutter made up, and a sample quantity printed in 4 colors, black, dark brown, cardinal red, and royal blue. They are 4" x 14" and look great on the nose, fuselage sides, and even winglets. They are \$5.00 ea, while the quantity lasts. If they are real popular, we will have more made.

This pretty well brings us up to date on what we have been doing. The weather here in Arizona has been exceptionally nice, and the temperature in our pool is now back in the tolerable range, so we have been sneaking a dip now and then in the middle of the day. After 33 years in MN, we feel we owe it to ourselves.

REPRESENTATIVES

We announced in our last newsletter that Uli and Linda will become our representatives in Europe, after their return. They will carry a number of sets of plans over there with them, which can then be mailed locally. They have become our very close friends. They are not only very warm and delightful people, but they both are very exceptional craftspeople, and have built one beautiful airplane. It won the Grand Champion award at Kerrville, and Best Finished at Sun and Fun. They have been showing their airplane around the country, and it appears on the cover of Feb.86 ***Sport Aviation*** as well as inside many other aviation magazines.

We thought the account by James Lawrence in April 86 ***Homebuilt Aircraft*** of the Scottish grandfather and grandson standing on a windy knoll, watching for Uli to fly over on his planned trip across the Atlantic, was particularly touching. Uli and Linda are truly ambassadors of goodwill wherever they go, and have done so much to raise the COZY into a place of prominence. We hope we speak for all of you in wishing them "Bon Voyage". We will be very proud to have them represent

us. They have indeed set a standard of excellence for all of the rest of us to emulate. Let's see more prize winning airplanes!

OTHER BUILDERS

We received this note in the mail in February:

Birth Announcement

Born on Feb. 17, 1986 at 10:45 am to Merle Musson and Lucy Ackley, another airplane, COZY N 86LM. Weight: 878 lbs. empty, 1500 lbs. gross. Engine: O-235 Lycoming, 115 hp. Capacity: 3 people or Lucie and Merle and their golf bags and luggage. Range: 8 hrs or 1200 miles, or whenever Lucie's kidneys give out. Grandparents: Varieze N76LM. Godparents: George and Ina Pierce, without whose help it would have been a difficult birth indeed. Lucie hopes that this is the last birth she will have to witness! Sorry, no passengers for 40 hours.

Congratulations Merle and Lucie!

There are several other builders trying to fly before Oshkosh 86: Ken Francis, Al Yarmey, and Jack Wilhelmson, to name 3. Lon Cooper is going to build us another trophy, so come on guys, don't spare the elbow grease in finishing, cause that's where all that work pays off: If you aren't satisfied that it meets high standards, do it over!

UNAUTHORIZED DISTRIBUTORS — BUYER BEWARE!

Weldtech is NOT an authorized distributor. We see they are advertising O-235 and O-320 mounts for the Cozy. They have never purchased plans from us, asked for design information, subscribed to our newsletter, or submitted any parts to us for our approval. They even say they have a "c.g. improver" for O-320 engines, which positions the engine 1" farther forward than on the O-235 mount. These people don't know how dangerous this is, or don't care as long as they make a buck at someone else's expense. The O-235 mount we show in the plans positions the engine 1-3/4" farther aft than on the Long EZ to allow use of an oil filter and also optimize c.g. You must NOT hang an O-320 on this mount. If you insist on using an O-320 against our recommendations, you MUST move it 1-3/4" closer to the firewall, and it would also be prudent to put additional braces down to the lower longerons. This is just one example of the risk involved in dealing with unauthorized distributors.

INSURANCE

You are aware that insurance companies are either increasing premiums or refusing to insure, based upon claims history and astronomical awards granted by juries. This is true in medicine, day-care centers, businesses, and also in aviation. RAF has investigated the statistics and found that the accident record of experimental aircraft is not good, in fact it was really bad for some so-called canard designs, which are actually tandem-wing designs (not the Varieze, Long EZ, or COZY). Even the record of the largely stall-immune EZ types was not as good as one would expect for 2 main

reasons:

1. Low flying/buzzing/acrobatics. 3 out of 4 fatal Long EZ accidents were from this cause. Apparently because Burt tried to design a stronger and safer airplane, some people think they can fly recklessly without getting hurt. This is the reason we have rated the COZY in the "normal" category, in which acrobatics, as defined by the FAA, are not allowed. We think the best way to impress people is to build a pretty airplane and to fly it safely and economically.
2. Engine/prop related accidents are the next worst cause. If you use a certified aircraft engine, as we recommend, and install it properly, it should be just as safe as it is in a factory-built airplane. Good wooden propellers, properly installed should actually be safer. If you have any doubts about your installation, please have an A & P inspect, or an FAA designated AI approve the installation, as would be required of certified aircraft.

The two main causes of accidents are under your control. Collectively, you will determine what the safety record of the Cozy will be. We want all of you to build safe airplanes and to fly them safely. Not just for your well-being, but for all of us.

VORTILONS

The reason why the Varieze, Long EZ, and COZY are said to be practically immune to stall-spin type accidents (a T-18 bit the dust at Lakeland for this reason) is that if correctly built (correct airfoils and angles of incidence) and correctly operated (within the correct c.g. range), the canard reaches the angle of attack which gives the maximum lift several degrees before the main wing reaches its stall angle. Consequently, it is not possible to raise the nose high enough in either straight and level flight or in a banked turn to lose airflow and lift on the main wings. This is not an absolute guarantee, however. Builder differences or c.g. errors could reduce this safety margin, so you must test your own airplane under all anticipated conditions of loading and c.g. to verify that it behaves as it should. You should be aware that the canard incidence on the COZY is GREATER than on the Long EZ, to compensate for the additional fuselage width. Do NOT use Long EZ templates when setting incidence on your COZY!

When RAF introduced the R1145MS canard airfoil for the Long EZ, it was capable of lifting the nose higher and closer to the stall angle of the main wing. Consequently, they made it mandatory to install vortilons on the main wing, to provide an additional safety margin at high angles of attack. Vortilons were optional with the GU canard.

There has quite recently been reported a Long EZ with GU canard airfoil, apparently constructed according to plans, but flying over gross (c.g. position not known) that was able to induce a main wing stall at full aft stick. RAF is therefore making it mandatory to install vortilons on all Long EZs, regardless of canard airfoil. They are said to have no disadvantages, other than the effort of making and installing them, but improve rate of climb, particularly at aft stick.

Although we know of no problems with any of the 3 COZYs now flying, safety is of prime importance to us so we are making vortilons a MANDATORY design change. See [DESIGN CHANGES](#) and [this link](#) for details.

SUPPLIERS

1. Alpha Plastics has been purchased by Mr. Ralph Bradshaw and moved to Houston TX. Ralph is a personable young man with a degree in Chemical Engineering (as do I) and with previous experience working with and selling composite materials. He has agreed to supply only approved glass cloth (Hexcel) and epoxy (Applied Plastics) and foams and says he will try to maintain the same reputation for service as Ira Hale. The new address is:

Alpha Plastics • 8734 Daffodil • Houston, TX 77063 (713) 780-0023

2. Some of you have expressed dissatisfaction with the quality, service and fit of cowlings purchased from our authorized supplier, Quality Aircraft Components. We have discussed this matter with Larry Fitzgerald, and he agreed that it would be logical to transfer this business to the same supplier who supplies parts for the Long EZ, namely Larry Lombard and Michael Dilley, who have now organized their operation under the name of Feather Lite. Their address remains the same as before:

Feather Lite • P.O. Box 781 • Boonville. CA 95415 (707) 895-2718

We want to thank Larry Fitzgerald for coming to our rescue when others did not seem interested, doing the best job he was able, and for being a staunch supporter of our program. We are arranging for new molds to be made, and we hope you will be satisfied with the new supplier.

SHOPPING

1. From Co-Z Dev.
COZY decals, black, brown, red, & blue ... \$5.00 ea.
2. From RAF, Bldg. 13, Mojave Airport, Mojave CA 83503
Moldless Construction (book) \$14.50
VHS and Beta tapes
 - Moldless Construction \$59.95*
 - Weight & Balance \$59.95*
 - Both above as set \$99.95**plus \$4.00 postage
Complete Guide to Rutan Aircraft (book by Don and Julie Downie) 13.95
Canard - A Revolution in Flight (book by Andy Lennon) \$17.95
High Performance Rudder Plans \$18.75
3. From Debbie Iwatate, 400 S.41st Ave, West Richland, WA 99352
 - Forward mounted brake plans \$20.00
4. From Ayton & Co., 4061 Via Pavion, Palos Verdes Estates CA 90274
 - Panel mounted warning system (Oil pressure, Canopy, Wheels, Battery) \$139.50
 - Premolded NACA air scoops \$24.00
5. From Gene Zabler. 48 Robin Hill Drive, Racine WI 53406

- Light weight nose wheel fenders \$37.50
- 6. From Custom Tops, PO Box 55386, Tulsa, OK 74155-1386
 - Short sleeve COZY T-Shirts \$6.50*
 - Long sleeve COZY T-Shirts. \$8.50*
 - COZY golf shirts \$9.50*
 - COZY hats (brown or beige) \$4.00*
 - COZY wind breaker jackets (dark blue) \$35.00*
 - *Plus 10% postage

T-Shirts are light blue, yellow, or tan, S, M, L, XL, XXL
Golf Shirts are light blue, yellow S, M, L, XL
- 7. From Electronic Embroidery, 41R Colgate Dr., Marietta OH 45750
 - A wide selection of well-made flight jackets, sweaters, caps, flight bags, and brief cases embroidered with a picture of the COZY. Write for prices.

BUILDER HINTS

Some of these are condensed from *CP 47*.

1. You must have perfectly flat bottoms on your elevators. Lay a straight edge chordwise across the elevator bottom. There should be contact from the tangent point on the torque tube to the trailing edge as shown in the correct example below. If your elevators are not flat, or look like the INCORRECT example, your elevator will try to float trailing edge down in flight. As a result, you will find yourself pushing forward on the stick at cruise speed, and probably not have enough trim authority to trim off this force. This is normal at very high speeds, but should not be true at cruise speeds. Incidentally, the top surface must be concave (curved in), or your elevators will try to float up at high speeds, which will have the effect of further increasing speed.
2. Your control surfaces must be balanced as per plans, after painting, to prevent flutter. Flutter is a resonant vibration of the flying surfaces, set up by unbalanced control surfaces. Incredibly high forces are built up almost instantaneously which, if not stopped, can destroy the lifting surface, with fatal consequences. Do not accept anything less than perfection in this area, and test your completed aircraft for flutter (wearing a parachute) per Owners Manual. Two cases of flutter are known to have occurred in EZ types, in both cases due to unbalanced control surfaces.
3. Balancing ailerons. Some builders find that the 3/8" steel rod imbedded in the leading edge of the aileron is not sufficient to balance the aileron, in spite of their best workmanship. If you anticipate this problem, you may substitute a portion of the steel rod with aluminum tubing of the same O.D., and then fill it with lead shot and epoxy, as required, to balance after painting.
4. Don't taxi your COZY with the wings off and canard on. Incredible as it may sound, a Long EZ builder did this at high speed (to get across the airport), and the nose took off. He ended up upside down with serious damage to his airplane, his body, and his pride. Reminiscent of a Navy pilot, years ago, trying to take off with wings folded.
5. Fire extinguishers. Small halon extinguishers are available at very reasonable prices. Halon is the only extinguisher which can be used in case of fire in the confines of the cockpit. Electrical fires are not common, but if one ever occurs in flight, without a way to extinguish it, you have very little chance. Try shorting a #22 wire (not in the airplane, please) and see the

amount of smoke and fumes generated by burning insulation. Leaking brake fluid can be ignited by hot brake discs. If this happens on the ground, without an extinguisher available, there would be no way to extinguish the flames, and you could lose your entire airplane. Halon extinguishers are available from aircraft supply companies. Mounting one in your cockpit within easy reach is very cheap insurance. Not a bad idea for your automobile either.

6. Cold Feet. Even though the cockpit of your COZY can be quite warm in cold temperatures at altitude, due to the insulation provided by composite construction and the "greenhouse" effect, it is difficult to completely eliminate a draft around the feet from the elevator torque tube clearance holes in the side of the fuselage. A poorly sealed wheel well can also contribute. "Moon" boots, the common after-ski boots, are available at many stores (K-Mart, etc.) for \$15.00 - \$20.00. A pair of these boots and wool socks will allow you to cruise at OATs of -10°C for 2 or 3 hours without discomfort. Try 'em, you'll like 'em!
7. Crosswinds. It has happened to us quite frequently that a tower will give us a crosswind or even downwind runway when a perfectly good runway into the wind is available. Although perfectly safe landings can be made in crosswinds (if you are aware of the direction and mentally prepared to use rudder and aileron to compensate), a tower usually will not refuse to grant you an into the wind runway if you specifically request it. Remember, you are responsible for the safe operation of your aircraft, not the tower. Many controllers assign runways for their convenience in monitoring traffic, with little regard for pilots. It is your prerogative to select the runway of your choice, and you can help impress a few basics on controllers by exercising this prerogative. Sometimes incorrect wind direction is broadcast by ATIS. Always check the windsock at the field.
8. Fuel Flow Indicators. They are very popular (we don't have one yet). They display gph and gallons used, time remaining on present power setting, and fuel remaining. Some work better and are more reliable. RAF has tested several types and heartily recommend the Alcor with a Flow Scan flow transducer.
9. Dip Sticks. On some Lycoming engines they are too long to fit under the cowling of a COZY. You can purchase a shorter one, or shorten the one which is too long. The important thing to remember is to shorten the stick and the tube it is in exactly the same amount. Start by shortening the stick. Drive the retaining pin out of the cap to free the stick. Shorten it the required amount at the top, and prepare the new end for refastening exactly like the old end. Assemble the stick in the cap and reinstall the retaining pin. Now you must remove a section from the center of the plastic tube exactly the same length. Repair can be done one of 2 ways:
 1. Obtain a coupling from your plumbing shop of the same material (probably ABS) of same ID as the tube OD. Splice with the recommended cement (Clean all debris and excess cement from inside the tube before reinstalling in engine). Then safety tube.
 2. Attach the 2 halves of the tube together temporarily with Hot Stuff or 5 min. (be sure both ends are square to minimize glue joints). Clean and sand outside with 40 grit. Cut a BID glass tape 4" x 16" wet it out with epoxy and wrap around tube. Then wrap with peel ply and pull tight. After cure, remove peel ply, paint with black hi-temp paint, screw back into engine and safety wire.
10. Oil Cooling. We have no reverse air scoop at the air outlet of our oil cooler. We run in the 180 - 200°F range in the summer, and have to block off part of the outlet in winter to avoid too cold a temperature. If your oil temperature runs too hot, check for cowling leaks. Cooling can be increased by installing a reverse ram scoop (suction, not pressure) at the cooler outlet. Dick Rutan discovered that it is most effective if placed ahead of the air exit, not over it.

11. Cylinder Cooling. The cooling baffles shown in the plans are more extensive than for the Long EZ, and should provide very adequate cooling with fairly uniform temperatures between cylinders. The secret is to prevent any air from getting through the engine, except in between the fins, and to utilize the maximum fin area. In our prototype, #4 cylinder, closest to the firewall on the right side, runs the hottest. This is because the air entering the scoop piles up at the rear of the cowl and passes thru the aft cylinders preferentially. Also, the induction line coming from the air filter to the carburetor may restrict airflow to #4 cylinder. Uli relocated his air filter and carb heat valve behind the carburetor, under the oil sump. This freed up the firewall, increased his manifold pressure, and improved cooling on #4 so that it is no longer the hottest cylinder. This is on our list of things to do.
12. Caution - Brake Failure. The plans call for the use of NYLON NYLAFLOW brake lines, which are used in all RAF designs and require very little maintenance. There are a few important details which require care to avoid potential brake failure. If you have a leak of fluid after a period of hard braking, it is even possible to have a brake fire. This would have serious consequences. Do not take it lightly! First of all, NYLON is damaged by sunlight. Store it in the dark, and after it is installed, paint it black. Don't roll your airplane into the sunlight without paint over the tubing or wheel pants to protect it. Secondly, heat can soften the NYLAFLOW and allow it to expand under pressure, and possibly even burst if the heat is excessive. For this reason, it is very important to route brake lines as far as possible from the brake disc. Keep in mind that under heavy braking, the disc can get very, very hot. This heat radiates toward the gear leg, (which must be insulated with several layers of fiberfrax siliconed to the strut) and if the brake line passes between the strut and the disc, you have set yourself up for a potential disaster. The brake line must pass inboard of the strut, which keeps the strut between the disc and the brake line. In addition, it is recommended that you insulate the brake line with fiberfrax. Cut a long narrow strip, 5/8" wide, apply silicone to the fiberfrax, and wind it around and around the brake line until it is covered from where it exits the trailing edge of the strut to the fitting on the caliper. A little tape will hold it in place. Slip a piece of heat shrink tubing over the whole thing and shrink it down over the fiberfrax. Wrap with aluminum foil to reflect radiant heat. To help dissipate the heat resulting from heavy braking, cut vent holes in the wheel pants at the highest point. This will allow hot air to rise out of the wheel pant, drawing in cold air to cool the hot discs. The plans call for making a conduit for the brake line in the gear strut using soda straws taped together. If you do this, it is a simple matter to replace brake lines, should this ever become necessary.
13. Caution - Control System Stiffness. It is extremely important to have absolute freedom of movement in the pitch control system. The hinges in the canard must be in absolute alignment. If there is any stiffness, it must be corrected. It is also important to have absolute freedom in the lateral (roll) control system. Tight bearings will spoil the nice flying qualities of the COZY. Attention to detail will really pay dividends. Lubricate all bearings and, among other things, make sure that the CS-132L belhorn cannot contact the bottom of the wing.
14. Caution - Electric Fuel Pump. Be sure to use the proper pump with a maximum of 6 to 8 psi. A float type carburetor cannot handle the high pressure pumps found on fuel injected engines. A 15 to 28 psi pump will flood a normal carbureted engine and shut it down. The small square shaped 'facet' electric pumps sold by Wicks, Aircraft Spruce and Brock are all fine and are set to limit below 6 psi.
15. Caution - Breather Hose. It must be clear. This is critical. Do not allow the breather hose to kink or fold onto itself. Keep all curves smooth and the radius of bends as large as possible.

Insert a "stretched" 5/8" door spring inside the hose to avoid any possibility of kinks. If the breather becomes plugged, pressure inside the case will blow the main seal ahead of the prop, pump most or all of the oil overboard, and the engine will seize!

16. Caution - Prop Damage. Pusher aircraft are more prone to prop damage than tractor types. Anything loose left on top of the engine, cowling, or wings will go through the prop when you start the engine. This applies to wrenches, nuts, washers, screws, safety wire pieces, etc. Rocker cover screws, exhaust nuts, etc. can work loose and go thru the prop. Make sure that everything in the engine compartment is tight and safetyed wherever possible. Double check everything before reinstalling the cowling, and you will get excellent utility and life out of your prop.
17. Is your shop too cold in winter? Dr. Smith suggests acquiring an oil filled, electric radiant heater. There is no open flame, and the surface temperature is no hotter than a steam radiator. He puts the heater near his new layups, makes a tent over both with an old quilt, and says he gets a good cure in 24 hrs without running up a large utility bill.
18. Fuselage side cutouts. If you don't wish to make the fuselage side cutout in the back seat, and prefer to use this space for a little more fuel, you may do so. Notch rib R-23 top and bottom, fore and aft, and BAB top and bottom, both ends, and install a solid tank bulkhead at F.S.76 (Chap 21,p.7). You will also need to relocate the drain valve in the tank bottom alongside the fuselage so it is at the lowest point when parked nose down. This change will move the fuel tank c.g. slightly forward and will be beneficial to weight and balance.
19. Engine temperature gauges. Oil temperature and low end of CHT can be checked in boiling water at 212°F. High end of CHT and low end EGT can be checked in boiling ethylene glycol (386°F), glycerin (550°F) or linseed oil (600°F), but be EXTREMELY CAREFUL not to burn yourself or to ignite any vapors. Best to do it in a safe place before installing in your airplane.
20. Trailing edges of control surfaces and aileron cutout. Jim Krug suggests Hot Stuff to avoid the bumps caused by tacks or staples.
21. Lead content of Av Gas. 100LL contains 1-1/2 to 2% tetraethyl lead. Straight 100, 3.9 to 4%. The latter tends to foul plugs faster. Leaning the mixture while taxiing (but not takeoff) and before engine shutdown is said to minimize fouling. Also, plugs with platinum electrodes are less prone to foul.

WEIGHTS

Jim Krug has sent in the following:

Wings, prior to aileron cut out

but with 2 antennas installed in each, 40 lbs ea.

Upper winglets plus 14 ft. of coax cable, 5 lbs.3-1/2 oz.

Lower winglets, 1 lb. 1 oz ea.

Canard end of Chap. 10, 16 lbs. 14 oz.

PLANS CORRECTIONS / DESIGN CHANGES

- After finishing your airplane, install vortilons per this newsletter. This is a MANDATORY design improvement. See [this link](#) for details.

- Chap 1, pp2 & 4. Change Co-Z address to 2046 N. 63rd Place, Mesa, AZ 85205 (602) 981-6401.
- Chap 10, p6, Fig 48. Should read Sec AA, Chap 10, p8. (thank you Brian McKiernan)
- Chap 16, p6, Fig 4. Bushing is CS-17, not CS-15. Jin Krug advises that Brock does not make CS-15 in both a right and left hand. It makes a neater installation to have one of each. They can be converted by drilling out the rivets and reriveting the flanged bearing on the opposite side.
- Chap 17, p3, CZPT-1. Change 1.2" to 1.5" (thanks Jim Krug)
- Chap 21, A-14, Rib R45. This rib has a little too much curvature on the top side, which will make it difficult to blend the strake airfoil into the wing airfoil without having a slight hump. Change the top curvature of R45 to match R23.

LETTERS - (A few selected at random)

10/20/85

Dear Nat,

Here is my license agreement and \$5 for an additional year's subscription to the newsletter. I have my fuselage near completion, and have really enjoyed my time building the COZY.

Yours truly,
William Ouzt

10/28/85

Dear Nat,

I would like to thank you and your wife Shirley on the tremendous work done making the COZY design and making it available. Enclosed is a money order for 3 years subscription to the newsletter and an information kit. We are planning to work first on the metal parts and then start construction of the fuselage next fall.

Once again, thank you for the COZY design.

Yours truly,
Jacques Genest

11/25/85

Dear Nat,

I'm a structural Engineering graduate of the U of Iowa 1952, about your days At Minnesota. I have been living in Calif the last 20 years and am currently an enterpreneur like yourself. I just finished a real estate development project in April and decided to do something in the homebuilt field. I've been traveling around the country looking at homebuilts, visited Oshkosh, reading everything in sight visiting EM chapters and after this period of time must say your redesign of Rutan's Long EZ, the COZY, is the best on the market.

I'm anxious to build a COZY. Please send me the plans, 1 years newsletters, and all old newsletters.

Enclosed is \$240. Thanks.
Congratulations again on a good project.

Sincerely,
Robert L Hudson

10/24/85
Dear Nat,

It was good to talk to you at Oshkosh. Shortly after returning home, I began construction and am now putting the bottom on the fuselage. If I'd known how much fun building was, I would have undertaken something like this years ago! I'm sure my enthusiasm has a lot to do with your excellent plans and instructions.

One question before I skin the outside of the fuselage -- I've noticed the step on you aircraft and Uli's was retractable. Could you send a sketch or describe it in the newsletter?

Thanks,
Dr. Curtis Smith

11/14/85
Gentlemen,

As a relative newcomer to the homebuilt aircraft scene, I was favorably impressed by the number and quality of the Rutan designed EZs that I saw at various fly-ins. The major drawback of these, as I saw it, was the limited cockpit and panel space. When I saw your design and read about it in the Fall 85 issue of Sport Pilot, I just knew you had a winner. I am now considering a COZY project. Please send me your Information Kit and Newsletter. A check for \$14 is enclosed.

Yours truly,
Bob Misterka

1/15/86
Dear Nat,

Just realized that it has been almost a year since we started our COZY and therefore time to renew the newsletter. Enclosed is a check for that.

We have made reasonable progress considering outside events that have slowed us down. We have the fuselage 3/4 complete and now starting on the center section spar.

I am still well pleased with your COZY plans and have found no problem understanding them. Also, have no other airplane I would rather be building than the COZY. I feel that says a great deal for the soundness of the COZY design approach.

Hope to see you at Oshkosh again this year.

Sincerely,
James Spencer

P.S. My daughter Sherry is co-builder and the real expert in laying up glass.

2/4/86

Dear Nat,

I'm happy to hear you are coming to Sun and Fun this year. I know there is a lot of interest in the COZY down here.

You will be happy to hear I am going to use the O-235 L2C after all. You finally convinced me. The only problem I've had is time. I've been working seven days/ wk, 12 hours/day. No aircraft building that way. Enclosed is a check for \$10 for a two year newsletter renewal. Your drawings and newsletters have been fantastic.

Keep up the good work.

If I can get off, I'll see you at Lakeland.

Sincerely,

Don C. Skinner

2/4/86

Dear Nat and Shirley,

Just a quick note to pass on the endorsed check plus a few remnants from the bottom drawer, to cover another 2 yrs subscription.

I had another back seat fly of a Long a short while ago, but it just reinforced my first opinion last Aug., that the back seat is no place for a practicing pilot. I was very upset when I found that Long EZ plans were no longer available, but now, of course, so happy that they were not. Mid February sees a Long check out, and a builder here has indicated he might get me to do his test flying, as he is not really current. I would really like this.

Sorry to hear you've been ill, Shirley, but Nat tells me you are well now.

Kind regards,

Ross Blanchard

3/28/86

Dear Nat,

Please send me a set of plans and newsletter. I was going to build a Long EZ and have a set of Long EZ plans, but I like the side-by-side. I hope to start building within a month. I do body work for a living and hope to build a class "A" Cozy.

Thanks,

Ken Ashley

VORTILONS (MANDATORY per PLANS CHANGES/CORRECTIONS in this Newsletter)

PHOTO GALLERY

Will Chorley made all these metal parts himself. Aren't they beautiful?

Daniel Hedricourt's Cozy fuselage in assembly. One of many Cozy projects in France.

Ken Francis' Cozy almost complete. Hope we see your beautiful Cozy at Oshkosh '86!

Marc Pichot's Cozy #20 during fuselage assembly. Good work, Marc!

Morgan Dean's Cozy #108 fuselage during assembly. Good work, Morgan!

Ken Francis' Cozy instrument panel. Doesn't it look great?

This newsletter transcribed to HTML by [Gene Traas](#).