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COZY NEWSLETTER #46
July, 1994

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THE AEROCAD CONNECTION

We have been asked what the relationship is between Aerocad and Co-Z Development. Aerocad is a custom shop which was organized by Jeff Russell and his father Greg Russell. Jeff was one of our 3-place Cozy builders. Jeff started making components for the Mark IV for other builders while his father was building a Velocity kit. In the process, they got the idea of making "fast build" pre-fab kits for the Mark IV, but redesigning the fuselage so the aft end was similar to the Velocity. They obtained a license agreement from us allowing them to use our Mark IV design for their commercial purposes, but it requires them to call any component which is not made strictly in accordance with plans either a "substitute" Mark IV component, if it is interchangeable with the plans component, or by a different name if it is not interchangeable with components made from the plans. Their fuselage top, bottom, and cowlings, which are substantially different from the Mark IV plans, will be called an "Aerocanard". They exhibited their "Aerocanard" fuselage plug at Oshkosh, and the first molded parts this year at Sun & Fun. We understand their intention is to build an "Aerocanard" airplane themselves using their "fast build" Mark IV parts and redesigned fuselage so they can flight test it and exhibit it at airshows. They have agreed to provide builder support for those components which require new assembly instructions. The fact that we have a license agreement with Aerocad does not mean that we have approved or tested any of their design changes or exercise any control over their activities. It is our policy to refrain from recommending any design changes (particularly structural) which we have not tested in a flying airplane.

WHAT WE HAVE BEEN DOING

The biggest event this last quarter (not counting visits by relatives) was our trip to Sun & Fun. Usually, flying across the southern US this time of year, there is at least one storm front between Arizona and Florida; but this year we really lucked out. Not only were there no fronts, but it was actually severe clear all the way from Arizona to Florida, both going and returning. On the way out (Thursday, April 7) we refueled in Austin, TX (Texas is a big state!), and then elected to stop overnight in Tallahassee, FL. The next morning (Friday, April 8), we flew down to Lakeland, parked N14CZ in the row reserved for Cozys, picked up our rental car, and drove to Orlando to visit **Mike and Jerry Pinnock**, and see their Mark IV, the flrst builder- built Mark IV to fly. We also had a chance to visit **Bill Walsh's** Mark IV project. The next day (Saturday, April 9), we drove back to Lakeland, waited for Vance and Lynn Atkinson to arrive in their Cozy, and then checked into the condo we were sharing with them and the Wilhelmsons. Also on Saturday, **Mike Pinnock** flew his Mark IV down from Orlando and parked it next to ours.

Sunday evening was the big Cozy banquet at the Red Barn. We had to share a banquet room with another group, so we didn't get an accurate count of Cozy builders, but it was a bunch! The food was good, and everyone had a great time!

All told, we had 12 Cozys at Sun & Fun, which included 3 Mark IVs! The 3rd Mark IV was Chuck Larson's, from Avon Park, FL, which arrived on Monday. Chuck had just finished flying the time off. Actually, another Mark IV almost made it there. Dave Higgins (also from Florida) showed us a picture of his Mark IV, which was in Miami, ready to be signed off to take its first flight (some of you in other states better get busy. Florida now has 3 Mark IVs flying!). One of the interesting things which happened was that one of our builders, **Sid Lloyd** was interviewed by the Orlando newspaper and local TV station in front of our airplane, with his fiancee, Mari. During the interview, an airplane flew low overhead trailing a banner which said, "Marie, will you marry me? Sid" Mari looked up, saw it, and became completely unravelled, as Sid slipped a ring on her finger.

Jack Cox, Editor of Sport Aviation, apologized for not getting pictures of our plans model Mark IV at Oshkosh ast year, an wanted to make sure he got us to go on a photo flight at Sun & Fun. Sport Aviation always takes such great air-to-air pictures, we wanted to be sure to accommodate him. So we showed up for the briefing on Thursday at 8:00 AM. We were the 6th or 7th airplane scheduled, and were instructed to listen on the ground on the air-to-air frequency for our time to take off. We did, and were told to rendevous with the photo plane at 11,000 ft, 20 miles north of Lakeland on the 14 deg. radial. We joined up on the photo plane and the shoot went perfectly. It was a beautiful morning, the air was still, the sky was blue, and white clouds provided the background. We were shot from almost every angle; we are anxious to see how the photos turned out, and hopefully will be able to borrow several slides and have enlargements printed.

We left Lakeland on Friday, a day early, to fly down to Naples to visit my cousin and her husband. In our sightseeing, we included an airpark just east of Lakeland, which we had visited about 15 years ago. There were a few more houses! Sunday morning, except for some clouds in Florida, it was clear across the southern US, so we headed for home. As we overflew Lakeland, we heard a Glasair on our fiequency who had just departed Lakeland and was planning to land at Tallahassee for refueling. We

flew on to Baton Rouge, LA, to refuel. After we were home again, we heard the same Glasair on our flight following frequency headed to College Station, TX, to refuel. We flew on to El Paso, called in 5 miles our for a landing, and that pesky Glasair called in saying he was 4 miles out, and landed just ahead of us. On the ground, we discovered that the Glasair was Dace Kirk's, from Falcon Field, in Mesa. We both refueled and headed for Mesa. Dace had a Glasair IH RG, with and IO-540 and constant speed prop. He was probably 30 mph faster than we, but because he was burning 13 gph (compared to our 8 gph), he had to make an extra fuel stop, so we both got home to Mesa in about the same elapsed time (I keep telling people that what you pick up in speed with retractable gear, you lose in extra fuel stops). We have less than $25,000 in our 4 - place Mark IV. I'm sure he had many times that in his 2-place Glasair. We returned from southern Florida in less than 10 flying hours in one day. We think that's pretty darn good!

A week after our return, we made a 2-day trip to Las Vegas, met for dinner with the Glynns, the Cullins, and Bud Guderian, all Cozy builders, and then looked at the Cullins Mark IV project, and Bud's Cozy project. Both were doing excellent work. We returned home in time to participate in the composite workshop at Williams Gateway Airport (a de-commissioned AFB just 5 miles away) sponsored by Aircraft Spruce and Kitplanes magazine. Mark IV builders Herb and Jane Peterson came over from Albuquerque for the occasion, and while they were visiting, we started making their turtleback, and sent it back with them in the jig for them to finish.

Cozy Mark IV plans sales have been steady, and as of this writing, we have issued 335 serial numbers.

ANOTHER CANARD WATER LANDING

It was never known with certainty what would happen if a canard-type aircraft, with fixed main gear, would have to land in water. The concern was, of course, that the drag of the main gear might cause the nose to dive into the water and that the airplane might float half-submerged, but upsidedown, and the occupants would have difficulty escaping. This concern was somewhat relieved a couple of years ago when a Varieze went down in the water off southern France, remained upright, and floated. There has been a more recent incident with a Long EZ. It happened during Sun & Fun. A group of canard aircraft flew down to the Bahamas for a couple of days. On the way back, one of the Long EZs experienced engine trouble, about 5 miles out of Great Harbor Cay, while still at low altitude. Unable to make it back to an airport, the pilot had to decide between a rocky coast vs. the water off-shore. He chose the latter. With nosegear down, and landing brake down, he touched down as slowly as possible. Apparently when the main gear touched, the nose submerged, both sides of the canard broke mid-span, the canopy broke, and the Long EZ bobbed up to the surface and floated top-side up. The pilot and passenger had minor bruises, but otherwise were unhurt. A small boat, from a cruise ship anchored nearby, came out and towed the Long EZ ashore. The pilot and passenger were taken to a hospital for checkup, and then returned to New Orleans, sans airplane. We got this story second and third hand, and hope the details are correct. If correct, this now makes two successful ditchings of fixed-gear canard aircraft.

OUR SUMMER SCHEDULE

My sister, Lee Parlee, has again agreed to come down here this summer, while we are away, to house-

sit, answering the phone and the mail. If we are able to get ready in time and it looks like the weather might cooperate, we would like to go to the Arlington fly-in, in the state of Washington July 6 to 10, and then the Duluth fly-in July 15 to 17, and then to Oshkosh. So get your builder questions in early, because Lee might not be able to answer them.

OSHKOSH'94

We are planning to be at Oshkosh '94, and hope to see as many of you and as many Cozy 3s and 4s there as possible. It will be our 22nd year! We have scheduled a Cozy builders forum for Saturday, July 30, 1:00 pm, tent #3. **Rex and Barbara Pershing** have taken over the Cozy dinner arrangements at Robbins. It will also be on Saturday, in the evening at 6:00 pm. They have reserved the large banquet hall which can accomodate up to 100 or so people. Dinner this year will be family style, choice of beef, ham, or chicken (or all 3). Cost will be $10.50/person. The Pershings said we might even have some entertainment.

In a chance conversation with Tom Poberezny last year, he mentioned that the EAA museum was planning to build a new wing just for prototypes of experimental designs, and would sure like to have our original 3-place Cozy. We agreed to donate it to the EAA, and our friends, Gene and Carol Davis, who are building a Mark IV in Globe, AZ, have offered to fly it there.

MISTAKEN IDENTITY?

Got a call today from Cozy builder Alex Strong, in CA. He said a while back he got a call from an FAA agent, who started to ask him all sorts of questions about his Cozy, N306AN. He wanted to know when it first flew, and where it had been. Seems like a canard type aircraft, which looked like a Velocity, but had the registration number of N306AN was heavily loaded and ran off a runway in Florida after landing, some time in February. The pilot fled with the cargo. Through the registration number, they tracked it down to Alex Strong's Cozy in California. The FAA is trying to figure out who the real owner and pilot was. This explains why somebody thought a Cozy had been picked up for drug-running. Apparently, composite airplanes are popular in some businesses because they don't have a big radar signature. And, apparently, someone borrowed Alex's N number.

WINDOWS WALLPAPER

Cozy builder Steve Blank D.D.S. at 1544 S.E Floresta Drive, Port St. Lucie, FL 34983 (407) 337-3377, sent me a disk with a picture of a Cozy which appears on my screen every time I boot up "Windows". It is really neat, and I recommend it. He writes: "I have designed a color picture of a COZY climbing out with runways below, green fields, and blue sky. I used the BIT Map Graphics mode (*.BMP) common to Windows users. I use the design as "wallpaper" with my windows program. Everytime I boot up, I see a COZY! It will also display with CompuShow (CSHOW). Send me $2 and either a 3.5" or 5.25P disk. I will edit the N Number on request, and return the disk with a COZY! I find it encouraging to see

a Cozy flying!"

Another builder (I'm sorry I lost his name) sent me a disk with a picture of the Cozy from the 1990 EAA calendar that he had scanned in. I also have it on my hard disk as a wallpaper alternative. Please let me know who you are so I can give you credit also, and thank you!

FIRST FLIGHTS

1. Jim Edwards, in Prescott AZ first flew his 3-place Cozy N151JE at 6:30 AM May 15, 1994. We are awaiting a more detailed report and pictures.

2. David Higgins, 1411 SW 87th Terrace, Pembroke Pines FL 33025 first flew his Cozy Mark IV on May 11, 1994. He showed us a picture at Sun & Fun, and it looked beautiful. It weighed in at 1050 lbs. That's more like it! We are awaiting a detailed report and pictures.

3. Mike Doering first flew his 3-place Cozy N154MD on September 18,1993 (see letter below).

4. Marc Pichot first flew his 3-place Cozy F-WFMP on February 27, 1994 (see letter below). He built most of it in the US while he was an attache in Washington DC, and then shipped it to France to finish it.

May 6, 1994
Dear Nat & Shirley,

The first flight for Cozy N154MD was September 18,1993. It was of course exciting, but very predictable, with the Cozy flying as anticipated. Since the first flight we have logged fifty wonderful hours of flight time. The performance of the plane is as advertised.

A few of the modifications to N154MD include the 0-320 Lyc, Ellison throttle body, B & C lightweight starter and battery, two blade Performance propellor, Light Speed Engineering electronic ignition system, electric nose gear and landing brake.

Enclosed is a check for the newsletter and some photos of our Cozy. At the present time my wife and I are in the negotiating stage of building a Mark IV, but at this time with no children left at home, justifying the need for a 4-place is rather difficult. It is hard to get away as much as we'd like with the jobs that we have, but we are looking forward to seeing you and other friends in the Cozy family soon.

Thanks so much for the plans and your help on the Cozy.

Mike Doering
Tipton, CA

April 13, 1994
Dear Nat and Shirley,

To say the least, I was a little surprised when, after 2 hours taxing F-WFMP at increased speeds, with only a light back pressure on the stick, to once more fly the canard, I had a "strange feeling", FMP was at 60 kts choosing the freedom and promptly leaving the runway straight ahead!

So we went together, of course, in the pattern, engine 0-235 C2A roaring at 2700 rpm altitude 1000 ft, gear down. After reduction to 2400 rpm, down wind, speed was better than 120 kts. Oil temp went to 220 deg., pressure was correct, and CHTs were around 450; a little bit hot for a first flight! After reduction, gear still down, 1500 rpm, 90 kts in the leg, then final at 80, idle and the canard lower dm the horizon, I heard KISS! KISS! just after the numbers!, tears in the eyes. Marie-Madeleine was on the radio following the little steps in the air of the 'newborn'. So was my only first illegal Cozy flight!

Next day, Friday February 28, with the presence of the authorities, I flew FMP as well as the day before for 20 minutes, gear up, and we ended by baptizing her with champagne! Maximum rpm at runup is 2600, due to the use of a low pitch prop from Aymar-Demuth, reaching quickly 2700 in climb. Empty weight is 965 lbs. Max. ROC at takeoff is better than 1500 fpm at Mimizan Airport (50 ft. high, 3400 ft. long). I use no more than a third of the total length to be airborne. Due to very bad weather conditions on the Atlantic coast, I was unable to fly her for 3 weeks, and on the 5th flight, I forgot to crank down the landing gear. After kissing lightly the planet with the main gear, I released the pressure on the stick and .... the nose went down to the runway. I stopped in 25 meters! Oh, my poor plane! Oh, my pride! Ridiculously, the alarm light was still on, smiling at me and the horn was making a nice ding- dong!

Once out of FMP to evaluate the wreckage, I grabbed the gear handle, downed the gear, and taxied her to the apron. I did not notice, at the end of this flight, either the sonalert or the light! I was completely involved in my aeronautic nirvannah and I forgot the check list.

.... So, after 2 weeks and minor rework under the nose, FMP was ready to fly again with a big red light just nearby the gear crank and a very unpleasant two tone buzzer installed. Now at rpm reduction, reaching 1800 rpm, the buzzer and the light remind me of my mistake, or worse, my fault. Otherwise after 6 hours and 21 landings, to be good for me FMP needs for landing a slight pitch trim authority improvement.

I have changed the oil filter at 5 hours, checked everything I could, mounted the wheel pants, the spinner, and now she cruises at 2500 rpm more than 130 kts at 1500 ft and 10 deg C. FMP flys quite level hands off, a little part of the ball is screwed left. Anyway, I know my plane is not perfect, so I have to improve her a bit by debugging. As an example, when giving her full throttle for takeoff, the behavior is to the left, so I have to make little corrections until I reach 40 kts., then it is perfect.

FMP is sleeping every night outdoors on the apron, as "my" club, which has the only hangar on this airport, doesn't want to see any aniateur aircraft sitting near their Cessnas. This club is going to lose a member flying at least 30 hours a year on their spam cans and as it is not so easy to find flying members right now due to the cost of one hour of flight (around $100 on C172), and as the year average is around 16 hours for one pilot, too bad for them! Anyway, I am concerned with corrosion in this area located at 15 km from the Atlantic ocean.

By the way, I have noted when flying in turbulence, a canard tip deflection of around 2 inches (positive and negative), maybe more, so as I am not accustomed really with the aircraft, I would be very pleased if through the newsletters I can know if it is normal or not, compared to a conventional aircraft, as I was surprised to see a such important deflection. Turbulence was more than 'moderate' as they say in the

weather services. With all my thanks and friendly regards to you Cozy people.

Mam Pichot
Mirmzan France

Editor. If I recall correctly, RAF statically tested canards to a 12" deflection at the tips without failure. Nevertheless, one should slow down to below 'maneuvering' speed in turbulence.

EMPTY WEIGHT

We have noticed a disturbing tendency, both in the weights of completed airplanes wtuch are reported to us, and also from inspecting projects under construction, for 3-place Cozys and Mark IVs to end up with an empty weight much greater than intended. This really hurts performance, and these builders will never know how much better their airplanes would have flown, had they been more careful. **Burt Rutan** used to say: "If you are wondering whether or not to install something in your airplane, throw it up in the air, and if it comes down, it is too heavy!" This is just as true today. We need to drive home this point! Uli Wolter (Cosy Europe) has noticed this tendency too. Some of his builders have ended up with Cosys 200 lbs. or more overweight! He published an article in his last newsletter which we shall paraphrase here.

HEAVY or LIGHT?

That is the question! How do you build a super light Cozy? Well, it is fairly easy if you build exactly according to plans and are careful and conscientious. Make sure all your foam cores are nice and straight and sanded smooth before glassing. Fill in all voids with pieces of foam instead of micro. You should use a minimum amount of slurry. Mix it thick and squeegee off the excess. Keep your layups just wet enough to wet out the glass sufficiently, but not too wet, being careful that it is not too dry. This requires that the resin be at the prescribed working temperature or warmer, and often the judicious use of a hair dryer while squeegeeing off any excess. Using Peel ply holds the fibers down so they will not soak up excess resin like a sponge, and is a less expensive alternative to vacuum bagging, and almost as good. Remember, the strength is in the glass, not the resin. Do the best possible job in preparing the foam before glassing, so you will not have to do a lot of filling during finishing. When you fill over the glass, use the thickest (least resin and most microspheres) micro possible, and get the contours right before priming, and then use the least amount of primer and finish paint. Install just enough instruments and avionics to be able to fly safely. There you have it-a nice light Cozy directly off the assembly line.

What? You want to make changes? This is where your airplane starts to get heavy. So you want to install a lot of gadgets so you can fly around showing off you airplane. Many builders want to personalize their auplanes. Lets take a look to see what can happen. As a first time builder, you might think that in some areas you should add another layer of glass, or more epoxy, or at least another BID tape, or a wider tape, just to make sure it is strong enough, or filling gaps in the foam with micro instead of foam. You can save HOURS of sanding, just by taking the time to check the wings and other surfaces to make sure that everything is straight and smooth before glassing (try using a straight-edge to check

the foam before glassing) Or do you charge ahead, thinking "Oh, I can smooth it out later with micro". Well you can, but it adds weight and makes finishing a lot more work. Cosy builder Dietmar Bartling calculated that if you have only 1 mm of micro all over a Cozy (this is easy to do), it will add about 48 lbs. of weight to an airplane! Always take the time to build light! The time you take in the early stages will be more than made up in the finishing stage.

The moral is that the weight you save with more conscientious building will enable you to use more instruments in and decoration on your airplane. However, many builders try to pack more and more "goodies" in their airplanes, the longer they work on the project. One builder inspires the next, to install devices, instruments, and avionics, which cannot be utilized effectively by most pilots. Just to name a few: Full IFR panel with dual nav/com, ADF, Loran, GPS with moving map, auto pilot, electric blowers for instrunent cooling, electric trim, electric nose gear retract, electric nose lift, electric landing brake, extra landing, taxi, and recognition lights, stereo intercom with built in CD-player, full nose gear doors, remote lock-unlock for ballast and access compartments, remote fuel selector and fuel gages, extra fuel tanks or sumps, complete upholster jobs with carpets, arm rests, side panels, headliners, etc., fancy aluminum instrument panels with removeable inserts, heated pitots, variable pitch propellers, maybe even automobile engines, and the list goes on and on. Don't misunderstand this. We have added a couple of the above that we could have got along without (and should have). Everyone has different preferences. As long as you safely stay within the approved c.g. range and do not exceed the maximum gross weight, it is your choice whether you prefer to fly a lightweight high-performance sportplane, or would be more comfortable in a luxurious bomber. But do yourself a favor. Build it light first!

ENGINES KITS BY SUPERIOR?

In Newsletter #45 we mentioned that Superior Air Parts was considering marketing an 0-360 engine kit. They had just finished tooling up to make cylinders, and the only parts left that they did not already manufacture were crankcases and crankshafts. We talked to them at Sun & Fun, and called them just recently for the latest news. They said that the 0-360 cylinders were currently undergoing certification tests (being nm in an engine) and that they were planning to start work on crankcases next. We are sure hoping that they can produce a kit for a reasonable price!

AUTOMOBILE ENGINE CONVERSIONS

There seems to be a lot of interest in converting automobile engines for aircraft use, at least we get asked about it quite often by people interested in building a Cozy Mark IV. We are not engine experts, but we have collected articles on a number of different conversions, and thought it might be interesting to see how they compared to the 180 hp 0-360 Lycoming in areas that we consider to be important. We ruled out two popular engines, the Subaru Legacy (130 hp @ 5,000 rpm) and the Mazda 13B (150 hp @ 5,500 rpm) for lack of sufficient power. The Subaru SVX, the Buick V-8, and the Ford 3.8L V-6 all seem to be rated at around 180 hp at 5,000 rpm, so we selected these for comparison.

Weight -- Lycoming lists the dry weight of the 180 hp 0-360 AlA at 290 lbs. This dry weight includes the carburetor, two Bendix mags, ignition harness and two sets of plugs, tach drive, cylinder baffles, starter, and alternator. Using the Ellison throttle body and the light weight starter and alternator reduces

this weight by 18 lbs. to 272 lbs. If we add a fuel pump, primer, oil filter, oil pressure relief valve, prop extension, oil cooler and hoses, we have to add back 16 lbs, which brings the 0-360 back to 288 lbs. installed.

Cozy Mark IV builder Bill Spreuer sent us weights for the Subaru SVX engine. With the same accessories, plus PSRU (propellor speed reduction unit) and radiator, he showed the weight at 335 lbs. Adding 2-1/2 gals. of coolant brings the installed weight to 356 lbs.

Aircraft Spruce's literature for the Buick V-8 (now manufactured by Rover) with their Belted Air Power PSRU, the same accessories and 2-1/2 gals. of coolant lists the installed weight at 366 lbs.

Jerry Schweitzer, in **Contact Magazine**, Issue 17, lists the installed weight of the Ford 3.8L V-6 at 393 lbs. If we subtract 12 lbs. for the vacuum pump and motor mount, which he included, and add 21 lbs. for 2-1/2 gals. of coolant, we get 402 lbs. on a comparable basis. To summarize:

Engine	Lbs.	Hp	Rpm
Lycoming 0-360 AIA	288	180	2700
Subaru SVX	356	180	5000
Buick V-8	366	180	5000
Ford 3.8L V-6	402	180	5000

The weight disadvantage becomes even worse when you consider that it would be necessary to add weight in the nose to offset the extra engine weight, the net result being an appreciable loss of payload.

Reliability -- This can be a very controversial subject with emotional arguments on both sides. Auto engine buffs will say that aircraft engines are based on old technology, and modern auto engines are much more reliable. They point to tests by auto makers of 600 and 800 hours on some test engines at high rpms and power settings without exceeding wear limits, and the superiority of electronic ignition and fuel injection system or auto engines.

On the other hand, aircraft engine buffs will point out that aircraft engines deliver rated power at a much lower rpm, which favors less wear and longer life, and eliminates the complications of PSRU'S. They will also say that there is a long history of thousands of aircraft engines running for 2000 hrs. between overhauls, under all sorts of field conditions, under the close scrutiny of the feds.

Unfortunately the installation of auto engines in airplanes has not been as thoroughly engineered as in cars, nor has the application in airplanes been as thoroughly tested as in cars, and it will take years before there is any statistically significant evidence that the claims made for auto engines in airplanes are valid. So it gets down to a question of how you assess the odds and where you want to place your bets. For our part, we have nothing against auto engines. They are indeed reliable in cars. But we have the obligation to our builders to recommend what we consider to be the best solution to powering a Cozy, and then only after we have demonstrated it ourselves and are able to instruct our builders on the installation.

Cost -- Most people don't realize it, but the installed cost of a well-engineered automobile engine conversion would probably run from $6,000 to $8,000 which is in the same ball park as a mid-time

aircraft engine, but the resale value of run-out auto engines would be a lot less. The money spent on an auto engine conversion should probably be considered to be an expense (unrecoverable), whereas money spent on an aircraft engine should be considered to be an investment (recoverable). If depreciation over the life expectancy of an engine is taken into account, the aircraft engine would probably be the cheapest to operate.

Installation -- As near as we can tell, there would be no way to fit either a V-6 or V-8, with a belt-type PSRU and radiators inside the existing cowlings of a Mark IV. The cowling would have to be much larger, would create more drag, and, we think, look rather ugly. The Subaru SVX (a flat, horizontally opposed, 4-cylinder) with a Ross planetary PSRU, might possibly fit, if there is also enough room inside the cowling for the necessary radiators and ducting.

Summary -- Aircraft engines offer the advantages of lower weight, less bulk, less complicated installation, and a long history or reliability (in airplanes). If all costs are taken into consideration, including depreciation, we believe they would also be least expensive to operate.

BUILDER HINTS

1. Our suppliers do not always pick up all the changes and/or corrections we make in the bill of materials. To save time and expense exchanging things, review any changes you have made to your listing with them before ordering.

2. In flaring the tubing used for fuel lines, do not use a 45 deg. automobile flaring tool. AN fittings require a 37 deg. flare. If you cannot borrow one from your local EAA chapter, Wicks sells a 37 deg. aircraft flaring tool for $62.17.

3. The man who designed and supplies the electric nose-lift for canard type airplanes is Bill Oertel, 3216 Broco Lane, Norco CA 91760-1817. Phone (909) 734-7569. We understand the cost is $1,100 plus shipping.

4. We have been advised that the hardner for the new epoxy resin, Epolite 2427, is not compatible with the old Safety Poxy hardner, so the hardner container in the dispenser should be thoroughly cleaned and flushed before switching to the new hardner. Also, the container should be kept covered to keep moisture out.

5. **Keith Spreuer** advised that he has a turtleback jig for the Mark IV he can lend to anyone who wishes to borrow it. His address is, 840 Chamberlain Pl., Escondido, CA 92025 (619) 745-2218.

6. Steve Blank suggests: Buy cheap 100% polyester (or Nylon) cloth (peel ply) by the bolt and cover all layups with it. First test a sample piece to make sure no additives are present that may cause removal to be difficult. I find that I do not need to add extra resin to wet out the polyester, just stipple and use a hair dryer. I make it a habit to strip the polyester the next day, so none is left by mistake. This eliminates the need for a lot of sanding, and dust breathing. All layups look and feel smoother.

Editor. We did this extensively on our plans model It saved weight and sanding.

MARK IV CHANGES/CORRECTIONS

FOR SALE

1. Cozy builder **Dr. Curtis Smith** invented a little gem of a ratchet which locks the nose gear up or down. It is still available for $38, which includes postage and packaging. No need to call, just send check or money order. This little device should be considered a 'must' by all 3 and 4-place Cozy builder/flyers. Once you have flown with it you will wonder how you ever did without it. Allow several months lead time. Contact: **Dr. Curtis Smith**, 1846 Sextant Dr., Worden, IL 62097 (618) 656-5120.

2. Fuel sight gages, $35.00 per set including postage. Vance Atkinson, 3604 Willomet Ct., Bedford, TX 76021-2431 (817)354-8064.

3. Rebuilt aircraft instruments, much less expensive than new, guaranteed. Contact: Howard Francis, 5631 S. Crows Nest Rd., Tempe, AZ 85283 (602) 820-0405.

4. Cozy builder, **Bill Walsh's**, has arranged a source of tee shirts (sweatshirts available on request) which come in various colors but only adult sizes. They have a detailed picture of the Cozy or Cozy Mark IV. The Cozy name is printed above. Bill is also working on other Cozy items, such as jackets, caps, pins, and cups. The shirts are available at $9.95 plus $1.50 shipping and handling.Orders for 2 or more are sent 2-day priority Make checks out to Linda Walsh, PO Box 160884, Altamonte Springs FL 32716. (407) 695-3543.

5. Roncz canard for Mark IV, brand new, 1/4" thick lift tabs, ready to trim to length. Includes torque tubes and elevators. $1490.00. Contact Dennis Oelmann (319) 232-0018.

6. Cozy Mark IV counted cross stitch (needle point) kits to make caps ($5.99), tee-shirts ($7.99), or framed pictures ($8.99). Chart also available ($4.00). Send $2.50 S/H with order or SASE for more info to: Carolyn Cullen, 9456 Mast Drive, Las Vegas NV 89117.

7. **Wayne Lanza** makes a number of very nice goodies for the 3 and 4-place Cozys. He has an electric speed brake actuator kit with all the parts needed for installation, with instructions for $250. His latest creation is a switching and breaker panel for the Mark IV (see picture in last newsletter). It is similar, but not identical to the one we had made for our plans model. It is located at the top of the panel, which is the best location for appearance and access to the electrical system. Wayne is using the highest quality DC switches (they are hard to locate) and circuit breakers, and pre-wires the panels, making the rest of the electrical system installation very EZ. Cost is $375. We really appreciate Wayne's contribution, and heartily recommend his products to you. Contact him at: 9425 Honeysuckle Dr., Sebastian, FL 32976 (407)664-9239.

8. Aerocad has requested that we put a note in this newsletter that they wish to either borrow or purchase a plans-built Cozy Mk IV fuselage tub which matches the standard, plans cowlings and turtleback, and which is dimensionally accurate. Apparently they are planning to make a mold and offer a pre-fab Mk IV fuselage tub. If borrowed, they would fill with micro and prime to achieve a paint ready finish, and the only charge would be for freight. If interested, contact: **Jeff Russell/Aerocad inc.**, 1445 Crater Lane, Yadkinville NC, 27055 Phone (910) 961-2238.

WE SHALL REMEMBER

We were saddened to learn that one of our Mark IV builders, John Carr, age 70, who lived in Canada (Box 623, Iroquois, ON, K0E IK0) and wintered in Florida, died suddenly of a heart attack on May 13, 1994. He is survived by his wife Colleen. We had talked to John many times on the phone, and feel very badly that he is no longer with us.

LETTERS

Feb. 22, 1994
Hi Nat,

Please include us on your list of active Mark IV builders. My family and I are spending this unusually brutal Wisconsin winter in the basement building our Mark IV fuselage. We're currently finishing up the build-ups for the main gear and we hope to have the sides out of the jigs in a few days. Our trial fitting of the bulkheads looks good so far.

One of the highlights of building is the fine people you meet. Please put Chris Esselstyn at the top of the list. Chris lives in the area and we had the chance to go out to visit him and his rebuilding effort. He is repainting his interior and incorporating a few mods to his Cozy during our winter break. The help he provided, together with just being able to see a completed project, was great. I look forward to talking more with him, as well as meeting other Cozy builders.

We're proud of our project and welcome the opportunity to talk 'Cozy' at any time. If any other builders want to talk about their projects, please give me a call. As a sidenote, our van license plate is 'Cozy IV', so look for it at Oshkosh this year!

Daryl Lueck
414-761-0467

March 24,1994
Dear Nat,

We are still progressing slowly on Chap. 4. Everything is going smoothly so far. We have been using the new Epolite 2427, which seems to work very well, and has almost no smell. I was skeptical of composite construction until I performed a test of my own this winter. I was worried that the epoxy

would get brittle in our cold N. Dakota weather, so I took the airfoil section that I made with the practice kit and left it outside on a night when it was -30 deg. F. The next morning I wailed on it with a hammer. There was not effect! No cracks or dents or anything. If that airfoil had been made of aluminum, it would have been destroyed.

We just made contact with another Mark IV builder in Grand Forks, and are glad to have someone to compare notes with. Well, stay warm down there!

Mark Hewitt
Grand Forks, ND

March 22, 1994
Dear Nat,

Just a note to say that my hat is off to you for the superb flight testing you performed on the Mark IV. It's a shame that not enough designers are conscientious and honest enough to test their designs and report the results to the world. We Cozy builders are sure blessed that you are a designer with both technical skill and integrity. I'm proud to be associated with this group of Cozy builders led by a designer such as yourself.

May God bless your efforts. Thank you for your fine designs.

Bob Talir,
Florissant, MO

March 25, 1994
Dear Nat,

My progression on my Mark IV has been very slow to date due to the starting of a new business, raising rheas (S. American Ostrich). But in a few months I should be back at full production on the plane and flying in the next three years. The work you did on the Mark IV's c.g. was great. I have read all the articles on it. It just shows how well the Cozy is made.

Greg Zannini
Lumberton, TX

March 21, 1994
Dear Nat,

Just a short letter to touch base and order an owners manual. Since we talked last I have purchased a used 0-320. Though bargains are rare, I feel I got a decent buy. It has a mere 288 hours SMOH. I avoided engines without log books. This engine has a history of relatively routine maintenance and yellow tags verifying a competent overhaul.

After bolting the engine on, I began concentrating my efforts on contouring. Thus far I have progressed from the pitot tube back to the turtleback, except for the bottom. After I receive and install the engine cowlmg, I will be ready to turn the fuselage over and finish the bottom.

One tip I would like to share is the method I used to leak test the fuel tanks. When the time came to test, I didn't have an altimeter on hand, as I suspect others don't. I did have a few feet of clear plastic tubing which fit over the vent line perfectly. I partially filled the tube with water and blew in enough pressure to give a differential water level of about a foot. After a couple of hours I checked it and verified that the tank was leak-free, from the vent line to the fuel selector valve. Of course, I checked the other tank; and left the manometer for a couple of weeks, with the same result. I also installed a pair of Vance's fuel sight gages. I hope to see you and lots of flying Cozys at Sun & Fun.

Michael Davis
Elizabethtown KY

March 23, 1994
Dear Nat,

1 have purchased all of the materials to complete my fuselage. I have finished two of the bulkheads so far. Your plans are pure joy to work from! 1 spent several months searching for which "kit" built airplane I was going to build, before I decided to build your "plans" built airplane. Now I feel like part of a family of Cozy builders and owners. It has been a long, cold winter up here in Maine, plus I am building a new home (and big new workshop!), so progress has been slow.

On a recent business trip to Dallas TX, I stopped in at Cleburne Aviation to look at a Cozy Mark IV project that has been advertised for sale in Kitplane nmgazine. I would say the plane is about 3/4 finished. The workmanship is far from what my standards would call top notch. They are asking $20,000 as is. Hoping to make it to Oshkosh this summer for the first time.

Gary Dwinal
Lisbon, ME

March 25, 1994
Dear Nat and Shirley,

I continue to look for a better kit to build than the Mark IV ... I haven't succeeded yet! I review the December issue of Kitplanes religiously each year to keep abreast of the latest kits and critiques of existing kits. I am impressed vath your dedication to this plane and feel much more comfortable building it after reading each newsletter. If things work out, I will be visiting you within the year to meet you and pick up a set of plans.

Lwq Thomas
West Jordan, UT May 5, 1994
Dear Nat,

How fast the past year has gone! With 5 months of construction behind me, I am ready to glass and install the fuselage floor. Enclosed is a check for the newsletter and owner's manual. I would also like to thank you for the information and support you supply on this wonderfull and enjoyable project.

Ken Gimblet
Lawrence, KS

April 25, 1994
Dear Nat,

Enclosed is a check for 4 years of newsletters, which I consider buy a bargain. I look forward to reading each issue in order to glean any pearls of wisdom which can be of assistance in my Cozy 3 project, which is in its 6th year. Some of the changes I have incorporated so far are the MK IV nosegear fork and wheel arrangement, 0-320 engine and mount, and removable instrument cover.

The only remaining major structures are the strakes, after which will be instrument purchase and installation, including a GPS nav system. Once again, let me express my sincere appreciation for your ongoing dedication and support to a true amatuer like myself.

Brian McKieman
Brandon Manitoba

May 5, 1994
Dear Nat,

Enclosed is a check for another 2 years of excellent newsletters. My MK IV #104 is coming along. After having gotten engaged in front of your airplane at Sun & Fun, I have just moved mto an apartment in a hangar at a local airpark and moved my project into it. A lot more room! Mari and I plan to be married in Sedona November 6th, so this is a busy year! I should have the wings completed in a month, but will wait to cut out the ailerons and rudders until after they are finished and primed. It's really exciting to see the Cozy on its gear with the main spar on and the fimlage top on. I can easily envision it flying now.

I am Vice President of our local EAA Chap. 774, and am organizing a Young Eagles Day. Thanks for a great set of plans and for the opportunity I have had to meet a great set of people through building the Cozy.

Sid Lloyd
Waller, TX

April 18, 1994
Dear Nat,

My Cozy #501 project has been gathering dust for a couple of years (since I escaped aerospace and joined the ranks of those who actually work for a living in general aviation). I was working at Sun & Fun and managed to escape my booth in building A long enough to take a tour of the Cozy row. That was all it took! Seeing the MK IV glistening with morning dew reawakened the dream! The motivation is back where it should be and micro dust will soon be covering all corners of the garage once again.

Doug Jones
Orlando, FL

April 18, 1994
Dear Nat and Shirley,

Thought I'd send you a picture of our place here in Yermo, CA, some 150 miles from LA and 150 miles from Las Vegas, in the desert. We finally completed our hangar next to our mobile home so our Cozy is now at home with us. I had her at the Daggett/Barstow Airport for a year while we were building our hangar. Now I am putting wheel pants on; I was told that it would increase her speed by a lot. We still plan to come out and see you as soon as the weather improves. In the meantime, thanks for all the help and advice. It is a pleasure to build and fly a very beautiful plane.

Alex Strong
Yermo, CA

April 20, 1994
Dear Nat,

It's been awhile since I have written to let you know what is going on in the upper midwest. My Cozy 3-place has been performing in its usual very excellent way, even though I don't get a chance to fly it as much as I'd like. It's been a wonderful way to meet some very interesting people. Since last summer, I've been working with several builders. Tim Merril, from Ft Atkinson IA is doing the finishing work on his Mark IV, and will be at Oshkosh this year if all goes well. The Merrils have been really making a family project out of the building. Debbie, his wife, has been getting her hands in the goo while Tim is gone during the week. Along with their 2 teenage sons, Jerrimie and Oliver, their progress has been excellent. It's great to see a family working together like diat.

I've also had the opportunity to get to know a young fellow ftom the Chicago area, Doug Koster,who needed some help building his MK IV. We have been working together for over a year, and have become the best of fnends. His MK IV is of Todd Morgan quality. Doug says he'fl also be on the flight line this year. This is really exciting to see such nice examples of the MK IV.

I've been busy myself installing a retractable landing gear in a once fixed gear Velocity. This gave me the opportunity to see the way a Velocity was put together, oppossed to a MK IV, and to determine which aircraft were better, lighter, and stronger. Well, here's my opinion for what it is worth. I feel the MK IV is a better airplane because it's much lighter when finished, around 260 lbs. on the same hp and passenger configuration. It's much simpler. I don't feel that the weight and complexity of a retractable gear on a canard aircraft is worth the expense for the little speed gained. Although it's kind of impressive to see the wheels come up, you can't see em when you're flying. And for the extra risk involved (no wheels) I wouldn't do a retract in a canard design. Keep it simple!!!

Dennis Oelmann
Waterloo, IA

April 20, 1994
Dear Nat,

Hi from South Africa. Building has been slow but positive. I've had the hard luck of getting many wrong parts from suppliers. I have three to four half completed components under construction while waiting for the right parts to finish. I decided to tackle the canard. Hot wire cutting went well, with minor trimming and filling. Joining went without problems as plans were a great help. Neat trick with dowels! When I got to the spar caps, guess what? I can't get three inch tape anywhere in S.A. at a reasonable price. What to do? Use rovings? After hours of fiddling with dowels, pipes, nails and

rovings, I made a "cap machine". It consists of thirty bobbins wound with rovings (another winder does that trick). The rovings are fed through three tiers, ten on each level. At these points I fitted fishing rod eyes for smooth feeding. At the output I used nails to make a combine feed point. It's cheap and it WORKS! I have almost 30 lbs. of roving on this first load - so I'm monitoring the amount used as I go. A handle is clamped on the end of the rovings, and I simply pull the handle to the appropriate point, leaving cutting space, lay a weight on the handle. I wet from the center outboard, place a second handle-clamp across the rovings and cut. The second clamp becomes my next pulling handle.

The effort worked. The "machine" plus 15 km of roving cost me $92 US, excluding shipping, 100% duty, and 14% VAT. Get the picture? I find the 18 oz roving wets out a little easier than the tape. I can really pack the rovings in and I don't have to remove cross threads. If anyone wants more details, let me know. Thanks so far for all your assistance.

Rego Burger
Woodlands, S.A.

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