

[\[Newsletters\]](#)[\[Cozy MKIV Information\]](#)[\[Prev\]](#) [\[Next\]](#)

# COZY NEWSLETTER #38

## July, 1992

### Table Of Contents

- [WHAT HAPPENED TO APRIL?](#)
- [WHAT ABOUT SECTION II?](#)
- [WHAT WE HAVE BEEN DOING](#)
- [RETRACTABLE MAIN GEAR](#)
- [OSHKOSH `92](#)
- [SUN AND FUN](#)
- [KANSAS CITY FLY IN](#)
- [COZY ALTITUDE RECORD](#)
- [MARK IV LANDING GEAR ATTACH](#)
- [MARK IV CHANGES/CORRECTIONS](#)
- [BUILDER HINTS](#)
- [FOR SALE](#)
- [FIRST FLIGHTS](#)
- [LETTERS FROM BUILDERS](#)

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[Newsletter Info.](#)[Subscription Info.](#)[Authorized Suppliers](#)

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### WHAT HAPPENED TO APRIL?

We have been accused of falling behind on our newsletters because there was no newsletter dated April, 1992. If you recall, you received newsletter #36 in January, and newsletter #37 in April, but we goofed and dated both of them January, 1992. Please change the date on newsletter #37 to April, 1992!

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### WHAT ABOUT SECTION II?

Before finalizing section II there were dimensions we needed and ideas we wanted to try and prove, and templates that needed to be proofed, all of which required that we finish the plans model first. We probably could have tried to guess, but we didn't think it would be ethical to publish Section II before we had actually proofed it by doing it ourselves. Not everyone operates this way, but we do. We appreciate your patience and will give this our top priority after Oshkosh.

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### WHAT WE HAVE BEEN DOING

The last 3 months we have been working as hard as we could on the plans model Mark IV, hoping to get it completed in time to fly off the hours and fly it to Oshkosh. If we have been asked once, we have been asked 50 times if we will finish in time for Oshkosh. We aren't making any promises, but it looks good.

After building the strakes and fitting the cowlings, we removed the wings so we could turn the fuselage upside down for finishing. Instead of rotating it longitudinally (like a roll) we decided to rotate it laterally (like a loop). This was accomplished by bolting timbers to the center spar and supporting the fuselage on saw horses placed under these timbers. It was a little bit scary to turn the fuselage over this way, but with the help of several friends, it went smoothly and safely both times. What can be said about finishing, except that it is hard work which seems to go on forever. Once the finishing is finished, and the airplane painted, it is easy to forget what hard work it was. We are very fortunate to have a neighbor, Steve Bandusky, who had avionics expertise from McDonnell Douglas, and who volunteered to help on the avionics and electrical. Wouldn't have stood a chance of finishing except for Steve. It is a good thing we put 1" x 1" electrical conduits in on both sides because we filled them up with wires. We lost track of how much aircraft grade TFE wire we bought.

We designed a switch and circuit breaker panel along the very top of the instrument panel, using the new MB1 (Snap Action) circuit breakers because they were so compact. What we learned in checking out the electrical system is that the MB1s will not withstand a direct short. They only provide a limited amount of overload protection. We destroyed two of them by accidentally shorting them out and had to have replacements shipped blue label. By way of contrast, we checked AMF (Potter Brumfield) and Klixon (Texas Instruments) and found we could short them out without damaging them and we could reset them as soon as they cooled. The MB1s seem to be little better than a fuse, but an awful lot more expensive. We wouldn't use them again!

Cozy builder Gene Davis continued to come down from Globe to help 1 day per week. When we remounted the engine, installed the prop hub extension, and started to install baffling, it became obvious that we didn't have enough clearance above the engine, and an excess clearance below. So we called Mike Youngblood at Brock Mfg. and asked if he could make us another mount, exactly like the first, but with the engine 1" lower. He agreed and in a few days we had a new mount. It solved that problem, but there was a new problem—he had made 5 mounts from my original drawing which now were no good and I would have to buy. That's part of the fun of being a designer! You have to deal with the FAA both in Oklahoma City and also locally. Oklahoma City assigns the N numbers and does the registering. The local office does the inspecting and certifying. Both of these offices lost our paperwork, which we had to resubmit. To get a radio station permit, you have to deal with the FCC, and it seemed impossible to get them to send me application form 404. I had to request it four times. I finally received the application, and in about another week, 3 more arrived. The FAA MIDO office was too busy to impact our airplane. So the Flight Standards office agreed to do the job. However on the appointed day, the inspector had taken ill and was out of the office for a week. Fortunately there was a local DAR (private inspector approved by but not employed by the FAA) who agreed to perform this service, naturally for a fee. So it was that we finally passed our inspection.

We were pleasantly surprised when we did our weight and balance. Empty weight (sans spinner and wheel pants) was 1029 lbs.!! This was 21 lbs. lighter than the prototype. We were worried that it might be more, because the plans model is slightly larger, and we had been in such a hurry and might not have been careful enough.

There were a few glitches at the airport. We had an intermittent radio problem which we eventually

tracked down to a faulty BNC connector. Then, when we filled the fuel tanks with IOOLL, the plastic sight gages both cracked and sprung leaks. We had to drain about 30 gal. of fuel and remove the defective gauges. Fortunately I happened to have a set of Wes Gardner's gauges, which weren't quite as pretty, but an awful lot more robust. We noticed that the fuel pressure gage was pegged at 16 psig, and finally realized that the wrong fuel pump was supplied with this engine. We had to buy a new 6 psig fuel pump and install it. After that the fuel pressure gage became erratic and it had to be replaced as well.

Our engine had been newly topped and had chrome cylinders, so we were really concerned about breaking it in properly. We limited the run-ups on the ground in accordance with the recommendations in newsletter #31, and skipped the taxi test altogether—we just towed it to the end of the runway, started the engine and took off.

Our first flight was on Friday, July 3, 1992. Cozy Mark IV N14CZ performed beautifully, but after flying nothing but canard aircraft since 1978, we didn't expect anything less. We have Electronic International's Ultimate Scanner, and of necessity, the first few nights were devoted to checking engine operation and progress of break-in. The highest CHT was on #3, and we solved that by installing some baffling inside the lower cowl, to divert the air up toward that cylinder. Also, oil temperature was too high, at 230 deg. F. We brought it down to under 200 by installing a little fence in front of the oil cooler outlet. All temperatures are now very good; we don't know how much of this is due to engine break-in and how much is due to the extra baffling, but we are very pleased.

On one of the first flights, during the holiday weekend, the cute little alternator we had installed on our vacuum pump pad failed. We couldn't find anything wrong electrically, and continued flights conserving battery power and recharging the battery on the ground until we could fix the problem. First thing Monday morning we called Bill Bainbridge and had him ship us one of his light-weight, belt-driven, 40 amp alternators red label. It arrived on Tuesday, and that afternoon and the following day were devoted to making the switch. We discovered the first alternator had failed because the plastic drive gear broke. We feel much more comfortable now with one of Bill's belt driven units in the customary location.

We are making progress with our check-out. Radios and mode C work well, Auto pilot (Navaid) seems to be working well. There is a problem with our electric gyros which we haven't had a chance to run down yet. To date we have flown off about 10 hours. It is interesting and worth mentioning that the one thing which has performed perfectly is the airplane. With the exception of the fuel gages, all of our problems were either in the engine compartment or behind the instrument panel.

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## RETRACTABLE MAIN GEAR

We have had a few inquiries recently about retractable landing gear, probably because 2 different individuals have been advertising retractable gear for the Cozy. One would pivot the gear inside the fuselage and retract it outboard into the strakes, and the other would pivot it at the outboard wing attach points and retract it inboard into the strakes. In either case, a major redesign of the structure would be required to compensate for the structure which would have to be removed. Neither of these individuals has actually installed retractable gear in a Cozy, or even owns a set of plans for that matter, so a builder would have to do his own redesign and development, and couldn't expect much in the way of technical support. We do not approve of people advertising a product which they have not proven in the

application recommended, and so advised these individuals. Why aren't we excited about a retractable main gear? Here is our value analysis:

**Pro:**

1. It would increase cruise by an estimated 10 kts.
2. It would look nice in the air.

**Con:**

3. A retractable gear couldn't possibly be as strong.
4. There would be a loss of airframe structural integrity
5. Building cost increase estimated at \$4,000 to \$6,000.
6. Building time increase estimated at 500 to 1,000 hrs.
7. Loss of fuel capacity estimated at 20 gal. (2/5 total cap.)
8. Added weight of gear plus structural changes
9. Less reliability - could collapse from either mechanical or metal failure.
10. Severity of failure - much greater with retractable gear.

It would seem that the increase speed and efficiency would be more than offset by the loss of fuel capacity, which would require more frequent landing to refuel. That leaves appearance to justify the weaker more complicated gear, the compromise in airframe structure, the added cost, the added build time, lower reliability, and increased severity of failure. We could not in good conscience recommend or even approve a design change with such a poor benefit to cost ratio! We believe that the simplest solution is always the best, particularly in homebuilt aircraft!

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## OSHKOSH `92

We have made arrangements for accommodations (camper in the woods) and transportation (a VW convertible) for Oshkosh `92. We don't know whether we can arrive early to reserve a row for Cozys on the flight line like past years (any volunteers?) cause we may be in a last minute panic to get our hours flown off the Mark IV.

The Cozy dinner will be on Friday night, July 31, 6PM at Robbins, like last year. We reserved for 60 people. It will be on a first come, first serve basis. Last year we had an overflow crowd and they set up extra tables. See ya there!

The Cozy forum will be Saturday Aug. 1, 1-2:15 PM in tent #3. We wish to encourage builders to participate, so you won't have to listen to us the entire time.

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## SUN AND FUN

Vance Atkinson gave us a report on Sun and Fun 1992. There were 5 Cozys there-no new ones. Vance

took first place in the canard class with a speed of 214.18 MPH from a standing still start on the ground, so you know his TAS had to be a lot faster. He got a nice walnut plaque. He said he beat a Velocity and a bunch of EZs. He said the air was very lumpy and Lynn cracked her head on the canopy at least once. Vance got to meet and talk to a Cozy builder-friend of ours from France, Andre' Soria. Andre' is almost finished with his Cozy.

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## KANSAS CITY FLY IN

Vance reported 4 Cozys (Atkinson, Francis, Russell, and Esselton), 2 Quickies, 1 Defiant, and a whole bunch of Variezes and Longs attended. Vance won best exterior, and Chris Esselton won best interior. Terry Schubert lost his alternator and went home with no electricity. Mike Melvill was there and talked freely. RAF was being sued again, and won again.

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## COZY ALTITUDE RECORD

The Cozy altitude record, until 5/5/92, was held by Vance Atkinson at 23,000ft. Mike Green established a new record of 25,530 ft. on 5/5/92. He said he did it with a tired 0-320 D2J with 2750 hrs since new.

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## MARK IV LANDING GEAR ATTACH

We have noticed that we have only about 1/8" clearance between the main gear strut and the gear access panel at the closest point (the inside corner of the NACA scoop), which may or may not be enough at gross weight or landing impact loads, and certainly does not provide an allowance for builder variability. One fix would be to use a larger radius in the bottom corners of the scoop, which would increase the clearance without hurting function. A better solution, we think, would be to mount the gear just slightly higher in the fuselage. We are recommending that the attach points be raised about 3/16". This can be done at any time prior to enlarging the "BA" holes in the bulkheads to 5/8" by plugging the "BA" holes and redrilling them 3/16" higher. We also caution Mark IV builders to hold accurately the 0.75" spacing shown in Chap. 9, p.4, Fig. 21, and on M-9.

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## MARK IV CHANGES/CORRECTIONS

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## BUILDER HINTS

1. Engine mounts have #51 holes drilled in each tube segment to relieve pressure during welding. A few drops of linseed oil should be inserted in each of these holes with a hypodermic needle, and

then each hole should be plugged with an AN535-0-4 drive screw. Order a few extra because they break easily.

2. Covering the edges of hot wire templates with copper foil tape makes them easier to use.
3. Wherever possible bolts should be oriented with heads up or heads forward.
4. Some of the RAE fast epoxy catalyst has the wrong mix ratio by volume printed on the label. It says 7 parts resin to 3 parts hardner, but should read 4 parts resin to 1 part hardner.
5. Aircraft Spruce lists Rutan UND cloth (made by Hexcel) as 6.0 oz., but should be 7.02 oz.
6. For control sticks we used a couple of "delux joystick controllers" made by SVI for Atari video games. They were inexpensive, already had a good push button switch installed, and easily modified to fit. The base, which wasn't used, had a spare push button switch.

## FOR SALE

1. From Vance:
  1. Slick 4251 impulse mag 600TT, new points & condensor, & harness \$125.
  2. 12V electric T & B (needle & ball) including Cannon plug \$50.
  3. 12V electric turn co-ordinator including plug \$125.
  4. Aircraft Spruce metal spinner drilled and cut for Great American 0-320 prop. \$125.
  5. Fuel sight gages. Clear bubble with white background. \$30 per set.

Contact Vance Atkinson, 3604 Willomet Ct., Bedford, TX 76021-2431 (817) 354-8064.

2. Plans for the 3-place Cozy. My son wants to help me build, but is suggesting we work on the Mark IV instead of the 3-place. Glen Wiser, (805) 871-7254.
3. Lyc 0-235 C2C, TT 2086, TSCMOH 400, with mags, starter, carburetor. \$4,000. Marv Bishop (505)522-1251.
4. Cozy project #523, complete thru Chap. 7 with materials thru Chap. 8. All news letters, plans updated, tools, epoxy pump and extra items. Lost job, no income, must sell. \$750. Quality workmanship. Bill Petty (713) 920-1944.

## FIRST FLIGHTS

4/27/92

Dear Nat,

Enclosed is a photo of Cozy 59CZ which first flew 4/20/92, five years and ten months after I started.



The engine is a 0-235 L2C 118 HP with a Warnke prop.

Since I am a very low time pilot (90 hrs.) I was a bit nervous about being a test pilot, so I prepared by taking a spin training course in a Pitts S-2B and did what the Cozy manual and the FAA flight testing of homebuilt aircraft handbook said.

After about 20 high speed test runs with nosewheel lift offs and all control and radio squawks resolved, I was ready to go. The tower cleared me for takeoff. I told them it was a first flight and they were very helpful as well as professional.

I advanced to full throttle and at 65 to 70 kts I was flying. I was flying my own Cozy! Almost six years in my garage, covered in epoxy, micro balloons, fiberglass, aluminum, and plexiglas, and putting up with people asking me is that an ultralight, a boat, or a real airplane? But I digress. The landing was uneventful as have been subsequent flights.

Thanks again for your help over the years. This is truly a great airplane and it is so easy to fly! See you at Oshkosh!

Jeff & Sharon Glynn

6/14/92

Dear Nat,

I am pleased to finally relate that N83PC has finally taken to the air. This Cozy is somewhat unusual as I indicated in a previous letter, published in the Cozy newsletter, in that it was first a Long EZ and was subsequently converted to a Cozy. The job is finally done after 4 years and maybe 1500 hours of labor. Originally it was supposed to take 6 months and a few hundred hours. Oh well, so much for estimates!

I used the same wings, center section spar, strakes, landing gear, engine and elevators. I had to build a new fuselage shell and canard and put it all together. One major factor in the work taking four years (besides having to work once in awhile), was the necessity to remove all the paint from the airframe parts (since it was not finished particularly well the first time) due to the feather fill used previously flaking off in many areas, and to refinish the entire airframe. This meant chipping off every square inch of paint (fortunately featherfill does not adhere well to fiberglass), but made for a tremendous amount of work. Anyway, it was finally done and the airplane taken to the airport in early March. While this was all happening, I started on a new project which would shortly require a major move back to an isolated island in the western Pacific, Truk Atoll (now known as Chuuk Atoll). While we were packing to move, I finished preparing the aircraft, now at the airport, to fly. The well-known Johnny Murphy of Merritt Island, FL did the honors as DAR for the FAA and on May 2, 1992 N83PC made its first flight around the circuit. The time was flown off over the next 10 days, with all the usual sort of minor squawks found and fixed, and on 9/11/92 I headed west from Tallahassee, FL, for CA.

I made stops at Galveston and El Paso, arriving finally in lovely Burbank, CA after having survived the dreaded Los Angeles TCA. Flying time was about 15 hours and was a memorable experience, fulfilling the dream of flying my own plane across the USA. A few days later, N83PC was disassembled and packed into a standard 20 foot long ocean shipping container along with a great deal of other stuff packed all around the parts of the airplane. For those of you who have ever wondered, I provide the following photograph to verify that an intact Cozy fuselage will fit, albeit awkwardly, into standard

shipping container. I had thought we would probably have to remove the tires and possibly the axles to get it in, but neither proved to be necessary. I built a support for the right wheel to nest on, so with the left wheel on the floor of the container, the weight of most of the fuselage was resting, although at an angle, on main gear. The wings were packed one on top of the other on the floor and the canard was similarly positioned beneath the fuselage. The engine was removed, still attached to the engine mount, and stored prop end up, secured to the side of the container. The shipment is in transit as I write and I will let you know how the plane fared and went back together at a later date.

There will soon, I hope, be a Cozy flying in the middle of the western Pacific. I will be using it in my marine research work, particularly for taking aerial photographs, as I installed a camera hole beneath the right hand seat.

Thanks for producing a great set of plans for an excellent airplane. I am planning to produce a more detailed account of converting the Long EZ to a Cozy and hope to publish it in Sport Aviation. If any Cozy owners or builders have questions, please write or drop by.

Sincerely yours,  
Patrick Colin

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## LETTERS FROM BUILDERS

4/3/92

Dear Nat,

Since I last talked to you, I have finished the strakes, completed the inside including painting, installed parts on the firewall, installed the fairing on the canard, installed the engine and all controls. I am now working on the cowling. If all goes well, Cozy #86 should be flying in 3 to 4 months. At present I have just over 2000 hours of work time invested. Thanks for a great plane and support! Good luck with the Mark IV!

Charles Nunnelee

4/12/92

Dear Nat,

Work is continuing on my Mark IV. I am now finishing up mating the bulkheads to the fuselage sides. I am hoping to complete installing the landing gear attach bulkheads this week and pull it out of the assembly jig.

After talking to another builder, I decided to remove my table legs and replace them with one foot tall legs for the assembly process. It cost well under \$10 for the 2x4s for the short legs and took about 1-1/2 hours to build and attach them. I feel it was well worth the effort in easing assembly.

I am continually surprising myself with the small amount of fitting required to mate the parts. I have made a real effort to stick to a tight tolerance on everything. While this takes a little extra effort, it



seems to pay big dividends in ease of assembly.

I am looking forward to me Cozy dinner at Oshkosh this year. I am planning on arriving on Wednesday and spending a full week at Oshkosh. We have a cabin on the east shore of Lake Winnebago, so, unlike others, my accommodations are guaranteed.

Nat, I want to think you for giving me the opportunity to build this plane. Since starting construction in October, it has been a continual source of pleasure and satisfaction.

Best Wishes

[Dick Finn](#)

4/7/92

Dear Nat,

Enclosed is a photo of my Cozy with wheel pants and spinner installed. I'm still planning on Oshkosh this year. I plan on leaving (Alaska) on the 23rd and attending the Cozy banquet. Any good looking single ladies going to be there? (Ha!) A buddy of mine has an RV-6 and we will be flying formation to the show. Should be a lot of fun. Look forward to seeing you and your wife there along with all of the other Cozy drivers.

Take care,  
Dave Petrosino

4/18/92

Dear Nat,

All sorts of small frustrating problems have been delaying the light-off of this engine in Cozy #008. The latest I feel should be passed on as a potential hazard, particularly if it occurred in flight. I fabricated and installed sight gages in 1986 before closing the strakes. The material used was acrylic tubing acquired from Spruce. It is still recommended in their catalog for use for sight gages.

Recently I put a gallon of gasoline in each tank and planned to zero out my electronic gage in the instrument panel. The following day the hanger reeked of gasoline. There was about a half inch of gasoline on the right rear floor. The sight gage on the right side was cracked in two places--one extended completely around the tube. The left gage had a small crack just above the fuel level and wasn't leaking. This crack subsequently propagated the full circumference.

Wicks' catalog listed a clear rigid PVC tube suitable for gas, oil, etc. In talking with several local plastic distributors who carry PVC tubing, I found none that stocked in small enough diameter. In our discussions I quickly learned that acrylic is not compatible with gasoline and will crawl and crack similar to my experience. I called Spruce and passed on the above so that they could investigate further.

As soon as I get the tanks closed up I hope to finally get to see if the engine will fire up. My wife claims that I'm a perpetual builder rather than attempting to get airborne. She could be right considering when I started this project.

I have a suggestion for the Cozy builder who hasn't acquired or fabricated CSI24. Adding about 1/4" to the radius between the center of rotation and the AN3 bolt holes would provide a better equalization of aileron adjustment.

Very truly yours,  
James L. Krug

4/27/92  
Dear Nat,

Enclosed please find my subscription fee for your newsletter. I am sending a three year fee based on today's rates, but if you find a need to raise your fee in the future, please don't hesitate to let me know, and I will gladly forward the balance to you.

I really look forward to your newsletters. They inspire and motivate me. It's also great to see that you care enough, and believe enough in your work to take the time to do so.

All of our conversations and correspondences have been positive, polite, learning and motivational. Thanks Nat!

Harry E. Lamson

4/29/92  
Dear Shirley and Nat,

Hope our letter finds you both in the best of health. As you know, Helen and I live in Michigan and fly out of Midland-Barstow airport. Yesterday the weather was just beautiful so we decided to take our Cozy for a little pleasure flight. We headed north and passed over the Big Mac bridge, the world famous Mackinaw Island, and landed at Sault St. Marie. A distance of about 180 miles by air and approx. 250 miles by car. Visibility was in excess of 50 miles at 7500 ft. and the eagles perch we had, presented a spectacular view that can best be appreciated from the air.

We spent nearly four hours at the Clarion Kewadin Hotel and Casino, and after our lunch and gambling losses, we figured we went through a ten dollar bill. At one time we were actually a hundred dollars ahead, but you've heard that story before.

Our return flight took us over Harbour Springs, Lake Charlevoix and down the west side of the state. We landed back at Midland-Barstow at 5:30PM and had been gone for a total of only 7-1/2 hours. Our total flight time was less than three hours and we used \$29.70 worth of fuel (18 gals. 100 LL). We drove our loran crazy as we did 360 degree turns over Mackinaw Island and checked out the ice still clinging to the shore line around Drummond Island. This was truly a pleasure flight we took on the spur of the moment because of excellent weather.

In the past three years, Helen and I have chalked up 514 hours on our big/little airplane. Many things needed fine tuning that first year, but since then, our Cozy has been literally trouble free and has performed like many a big plane wish they could. We certainly are fortunate that we chose to build the plane we did.

Again, we wish to thank you both for your dedication towards making a truly great airplane available to us. We also want to encourage all the hard working builders out there, to continue and complete their projects. The time, expense and effort are all well worth it!

Sincerely,  
Walt & Helen Suminski

4/22/92  
Dear Nat,

Enclosed is my contribution to another year of excellent newsletters. Cozy Mark IV serial #104 is coming along. I spent all of December turning my garage into a workshop and started building bulkheads Jan. 1. I try to get in about 100 hours per month. So far, I'm up to Chap. 7 and will have the fuselage exterior glassed in a few weeks.

I joined my local EAA chapter and they have helped a lot with encouragement and advice. I will be attending Oshkosh and hope to meet other Cozy builders and take lots of pictures. Maybe I'll even be able to talk a Cozy driver into a ride. I used to fly Pterydactyl ultralights and have my private license so I'm eager to see how my Mark IV will fly!

Also, Yodaire is providing a beefier set of Cozy rudder pedals than Brock. Do you recommend these? Thanks for a good set of plans. So far, most things have been very straight forward, though I'm finding that it takes longer than I thought.

[Sid Lloyd](#)

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[\[Prev\]](#)[\[Next\]](#)

[\[Newsletters\]](#)  
[\[Cozy MKIV Information\]](#)