

SONERAI NEWSLETTER

JAN-FEB-MARCH 2005

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JOHN AVENT'S SONERAI IIL

Here's John's recently completed and flown IIL powered by a Jabiru 2200. The airplane is painted light gray with red trim. See John's first flight report and more photos inside.

1000 HOURS AND ICE, HMMM...

This issue begins my ninth year as the editor and publisher of the **Sonerai Newsletter**. Wow, how time flies... I don't think I ever expected to be doing this task for this long, but it continues to be fun, and the few bucks that I make on it help pay for avgas and parts. What more can I ask? It's also fun supporting you guys in your Sonerai building endeavors. How many more years can I do this? We don't want to go there...

I've got to tell you about a couple of things that happened since the last newsletter. The first

happened on Sunday, November 14. I flew the 20 miles or so to Palmyra (88C) for lunch. Palmyra has a nice grass runway, and a little restaurant a couple blocks from the airport that has pretty good food. The lunch was good, and the weather was nice for November, and on my way back to Burlington, the Hobbs meter on the panel clicked past 1000 hours. A minor accomplishment, I guess, but I wonder how many homebuilt airplanes are out there that will ever see that many hours? My Chapter president said, "...and you did it the hard way", meaning that I don't fly a lot of long cross-countries, and fly maybe 50 to 60 hours a year. Anyway, I felt pretty good about it.

The second event happened just two weeks ago. On Saturday, December 18, I had my first encounter, ever, with airframe icing. Although it was a brief encounter, it was a still little unsettling. The weather was typical mid-December Wisconsin weather. It was cold (right a 32°F) and cloudy with ceilings at about 1600 to 1700 feet agl. I decided to go out and warm up the oil, and blast about the countryside a little because the Sunday weather was going to be nasty. (I don't know about you guys, but I need to have a flying fix at least once a week, or I start suffering withdrawal, and get grumpy.) I figured, if nothing else, I could do a few takeoffs and landings.

After taking off, I headed east because the ceilings were a little higher out there, and then headed north to fly over my house, which is about 12 miles away. As I passed over my house, the ceiling had dropped some and I noticed a little bit of mist collecting on the front of the canopy. My immediate thought was "MIST!! That's not good. It's too cold out here!" Over the next minute or so, as I set course back to the airport, the mist collecting on the front of the canopy turned solid, and translucent. I couldn't see through it. As I headed back, I decided to drop down to pattern altitude, to try to get into warmer air, but I continued to pick up ice. By the time I got back into the pattern, the canopy had a swath of ice that was about 10" wide and 2" high right across the front, where I look out to line up on final.

I flew the approach a little high, so that I could slip down to a landing and keep the runway in sight until I was close enough to see it on either side of the ice. The landing was uneventful. When I got back to the hangar and shut down, I found a thin layer of rime ice on all of the leading edges as well as the tip of the spinner, and the tips of the wheel pants.

I always thought that icing was the concern of the IFR guys, and as long as you stayed out of the clouds, it wouldn't be a problem. How wrong I was. After this I'll check the icing forecasts before I go out flying on a cloudy and damp winter day.

SONERAI NEWS

- Great Plains News: The December 2004 issue of the **Beetle Flyer** is out. If don't have your copy yet, go to www.gpasc.com, and have a look. There's information on their new water-cooled heads, the new Diehl case with the

Sonerai motor mount locations, and lots of stuff on sale until January 17.

- 2005 Fly-In Schedule:

Here's a list of the major regional fly-in's around the country. Be sure to go the one nearest you, and show off your Sonerai.

- Sun-N-Fun, Lakeland, FL 4/12-18
- SWRFI, Hondo, TX 5/13-15
- Golden West, Marysville, CA 6/3-5
- SAA, Urbana, IL 6/10-12
- Rock Mountain, Watkins, CO 6/25-26
- Northwest, Arlington, WA 7/6-10
- OSH, Oshkosh, WI 7/25-31
- MERFI, Marion, OH 8/26-28
- NCEAA, Rock Falls, IL 9/17-18(?)
- VA State, Petersburg, VA 9/17-18
- SERFI, Evergreen, AL 10/7-9
- Copperstate, Phoenix, AZ 10/6-9

- Sun-N-Fun 2005: In all likelihood, yours truly will not be attending the event this year. I've decided to go somewhere else with the airplane this year, maybe a museum tour to take in the AirForce Museum and the Air and Space Museum. So, I need someone to provide an article about the event for the July-Aug-Sept issue. Any volunteers?

- Midwest Sonerai Get-Together: You'll notice in the calendar above, that I've included the North Central EAA Old-Fashioned Fly-In at the Sterling-Rock Falls Airport in September. It's a fun two-day event, and I would like to propose that we have a Sonerai gathering there at the same time. I haven't worked out the details yet, but if you're interested in coming, please let me know.

- Sonerai Wing Construction Manual: It is now available. There are 18 pages of text, 85 photographs, and 12 drawings, as well as a complete materials and a tools list. If you would like your own personal copy, sent me cash, check, or money order for \$25.00. Postage is included. (The manual is now included with the plans, so you new plans holders already have it.)

- Back Issues: **Sonerai Newsletter** back issues are now available in three forms. The first is a 3-1/2" diskette which contains 209 of the newsletter articles (text only) published by Ed Sterba from 1987 through 1995. It costs a mere \$10.00. The second is a CD which contains complete copies of all of the newsletters published from 1996 through 2003 in a ".pdf" format. The cost is \$50.00. And finally, there are also hardcopy back issues for \$3.50 each. I have the last two issues from 1994, and all of the issues from 1995 thru 2004 (That's 42 issues!). If you want any of the above, send me a note requesting the

ones you want and a check for the correct amount. Postage is included.

IT'S RENEWAL TIME!

It's January. So, that means it's time to renew your subscription to the **Sonerai Newsletter** again. Be sure to take a look at the mailing label on envelope this issue came in. If it says "PD 04" and you want to continue receiving this fine collection of wit and wisdom, please send me money. (If it says "05" or "06", ignore the rest of this article.) The subscription rate is still \$14.00 (US funds) per year. So, make your check or money order (cash is acceptable, too) out to "Fred Keip" and send it before you forget. That way you won't miss a thing. And thanks again for your continued support.

E-MAIL UPDATE #7

Here's a list of the e-mail addresses from my subscribers list that I've been supplied to date:

Gary Bailey..VA (IILS) gbailey@nato-va.com
Bob Barton GA (II) rabarton@mindspring.com
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Eddie Weathersbee SC weathersbee@netzero.net
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Ron Wright IL (IIL) sonerairon1@netzero.com
Robert Yonge FL (II) goosechrt@aol.com
Gary Zahn WI (IIL) gzahn@vbe.com

If your address isn't here, or has changed, send me an email with the update.

CAN I GET A LITTLE HELP HERE?

I know you get tired of me saying this, but here goes: **Please send me stuff that I can publish in this newsletter!** Photos of your airplane, finished or not, are greatly appreciated, (I'm running out of good ones for the front page. Send a set of photos along with some detail info about your machine, and I'll make it the featured airplane.) Articles are even more appreciated. You don't have to be a great writer, nor do you have to write lots of words. As your editor, I will correct any spelling errors and embellish where necessary, so you don't need to worry about that either. You can type them up on your computer, and send them on diskette, or via email. Or just hand write them, stick them in the snail mail, and I'll computerize them. Either way works for me.

As an incentive, when you send an article and I publish it, you'll get the next year's subscription of the **Sonerai Newsletter** for free. For their contributions to the 2004 newsletters, I'd like to thank Mark Elyea, Bob Schwarz, Chris Kalishek, Tommy Warren, Al Bertelmann, Bob Barton, Ivan Martinez, and Dave Wilcox for their input. You guys will notice your subscriptions have been renewed.

JOHN AVENT'S FIRST FLIGHT

Congratulations, John! I borrowed the following report from John's posting on the Yahoo Sonerai_Aircraft group site, and asked him to send

some photos. I've always thought the Jabiru 2200 would be a great engine for the Sonerai.

After 17 years of frequently interrupted construction, my Sonerai IIL (registered as an "Avent Special" due to the Jabiru engine) N102AV has flown! First flight was 12/2/04, and lasted 45 minutes. Second flight was today (12/4) and lasted 1 hour 30 minutes. It flies great and the engine (Jabiru 2200) is running strong. Flying conservatively, I have seen level indicated airspeed of 130 mph (no wheelpants). Indicated airspeed at pre-stall (just starting to feel some buffeting) is ~50 mph. I have not measured climb rate yet, but it does climb well.

I am experimenting with the incidence on the horizontal tail, as the plane gets increasingly "nose heavy" with increasing speed. I am also getting some carbon monoxide in the cockpit, so I'm working on the firewall sealing some more. It seems to be a little "loose" in yaw, and will gladly fly along at quite a sideslip with very little force on the rudder pedal. I had extended the nose to account for the lighter weight of the Jabiru, so I may need to increase the size of the vertical fin.

I had not flown taildraggers for a long time, so I recently checked out in a Champ. The Sonerai does not fly like the Champ (no surprise there), but that was the only plane within a reasonable distance (still 2 hours drive) that I could find.

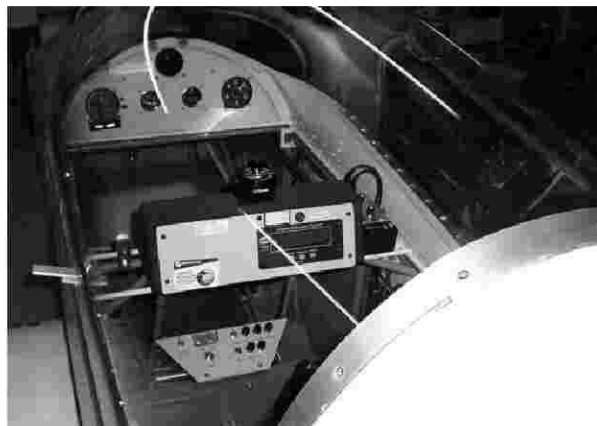
To those of you who are still building or thinking about starting to build, let me say that it is worth all the effort. This is the most fun, responsive aircraft I have ever flown. To borrow the line from the old commercial, "Try it, you'll like it!"

John Avent, Trenton, SC
Sonerai 2L / Jabiru 2200
N102AV

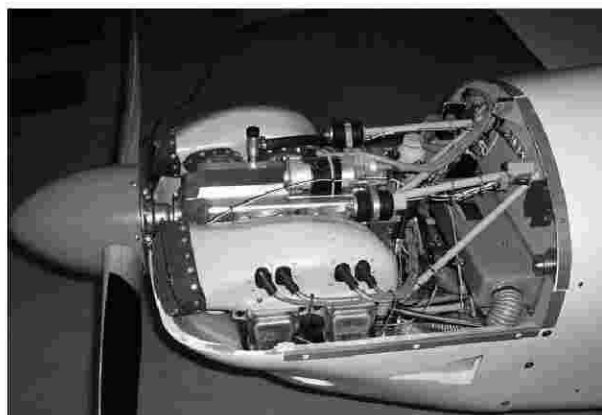
More photos:



Front View Showing the Cowling Set-Up



The Semi-Electronic Cockpit



LH Side of the Engine Compartment



RH side of the Engine Compartment

CANOPY INSTALLATION by James Gay

As promised a few issues ago, my goal is to provide several articles detailing the construction of the fuselage, canopy, tail surfaces, carry-thru, and controls. This is a somewhat daunting task, and I want to thank James Gay for coming to my rescue. Back in the Jan-Feb-March '00 issue, he provided a detailed article on fuselage construction. Now,

he's put together an article on the biggest pain-in-the-butt task in building an airplane, and that's canopy construction. His article is a long one, so I've broken it into two parts. Here's Part 1:



James' Completed Canopy

As of May this year ('04), I've spent six months working on my canopy assembly. So I saw an opportunity to share some of my experiences, trials, and tribulations with my fellow builders. Our editor, Fred, regularly solicits for articles from among the readership with an inducement of a free year's subscription, but there is another benefit to consider. There are not that many Sonerai BUILDERS, perhaps due to the fact that "scratch building" has become passé with the rising popularity of "some assembly required" kits, where all the wrinkles are neatly ironed out, and the end result is a factory-like, cookie-cutter product. Also, we are scattered all around the country (and the world), so social visits to each other's shops are impractical.

We learn from mistakes and successes, our own as well as other's. In the last seven years since I've started my airplane project, I've picked up many great ideas and innovations from other builders as well as from articles in our Newsletter. I have also come up with some of my own small changes in some of the secondary assemblies (within reasonable common sense and safety). This is what makes each Sonerai unique.

Reader/builder written articles are like short visits to another man's shop without traveling any farther than your mailbox. In addition, since our Newsletter only comes quarterly, I'll bet that the majority of you would like to see a bit more thickness to the newsletter itself. Brother Fred can't do it all by himself. He has to edit and publish, too! Now that I've hopefully motivated my fellow readers and riled-up the kit assemblers, I'll step down off my soapbox. Seriously, I look forward to hearing from y'all, especially from you readers outside the United States. If you have

questions, rebuttals, constructive comments, or idea contributions to the following article, please direct them to Fred for publication. Again, let's hear from you.

Canopy Frame Fabrication:

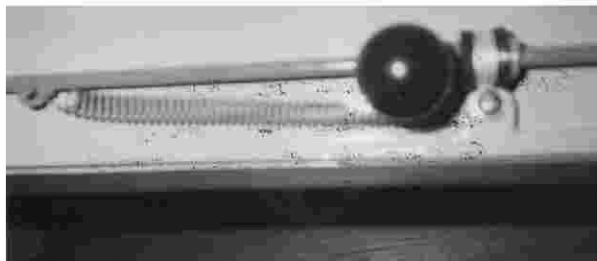
My frame differs in some areas from the one shown in the plans. The turtleneck bow and the rear canopy bow are 2-1/2" taller for more headroom. I used the same radius shown in the plans, only the center point was raised. The rear canopy bow has an aluminum face with an attached cushion, as this will feel much more comfortable to the pilot's head than the steel support tubes, especially in the event of turbulence or an accident. The through holes used to fasten the Plexi-glass bubble have #8-32 MS-21047-08 all metal anchor nuts tacked to the inside of the rear canopy bow. The front and rear cross-braces are made of 5/16" round tube, as I ran out of 3/8" square tube. The frame is rigid enough, but I think that the 3/8" square tube would be stouter. The rear cross-brace tube was moved aft 6" to clear my rear instrument panel. My hinges were modified slightly to allow a greater opening angle, although the starboard skirt flexed considerably when fully opened. To reduce the stress on the skirt and the bubble, I epoxied a 1/8" thick Micarta shim to the throat of the center hinge to reduce some of the opening gained with the modification. It's easier to decrease the opening angle by a few degrees than attempting to increase it after everything is welded solid.

I have some tips for fabricating the basic frame: When using the cockpit area of the fuselage as a fit-up jig (as described in the Builder's Manual), don't tack the frame rails to the longerons. This only boogers them both up. Instead use radiator-type hose clamps. They also work well for fitting up the hinge and latch bushings. The clamps take a lot of abuse, so plan on throwing them out when you're done. Check the squareness of the frame rails by measuring from corner-to-corner. They should measure the same distance within +/- 1/16". If not, loosen the clamps and adjust as required. Tack in the front instrument panel bow. The angle on mine worked out to be inclined 20° forward. I welded up my canopy frame and front instrument panel supports months before buying the cowlings, and all the angles fit exactly. (You pay your money and you take your chances.)

Next, tack in the two cross-braces, one in front about 1/4" aft of the front face of the front bow (*The front cross-brace can be eliminated without affecting the structural integrity of the frame. Fred*), and if you have no rear instrument panel, put the second one at station #47-7/8" approximately. The

rear canopy bow should be fit-up square to the length of the rails. If you are working off a set of Low-wing plans, you'll notice that the turtledeck bow is inclined 1" aft, measured at the top of the bow. This allows greater edge distance for the screws fastening the bubble to the rear canopy bow. If your turtledeck is already welded-out at 90°, as on the Mid-wing plans, the Builder's Manual recommends that 4130 sheet steel tabs be welded to the rear bow to gain more edge distance. Face them forward and fit them flush with the top of the bow. .035" thickness should be OK.

After tacking all the main components of the frame, unscrew all the hose clamps, and weld/stress relieve away from the fuselage. Fabricate and weld the hinge parts as sub-assemblies. These can be fit-up to the main frame after clamping it back into place on the fuselage. Just tack them up, unclamp the frame, and weld the hinge assembly away from the fuselage. Follow this drill every time new components are added to the frame. Try to do as much welding away from the longerons as possible. They will warp somewhat when welding on the hinge and latch bushings, and these locations will have to be finessed back into alignment by heating with a torch. Remember, this is a "cut to size, beat to fit, paint to match" situation. Don't worry if every little thing isn't absolutely perfect. If the frame hinges smoothly and it looks good, it is good. Once the canopy skirts are in place, most of the frame will be hidden, and if you "painted to match", the little that shows will blend right in.



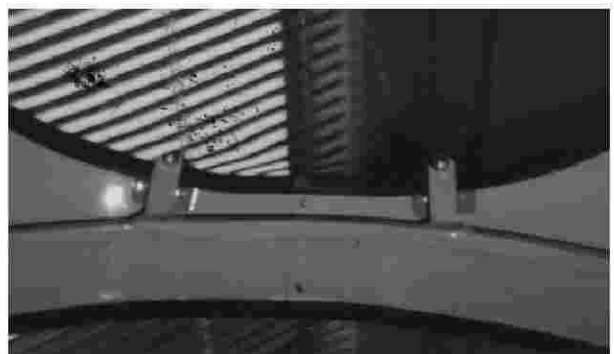
Latch details showing the support bushing and return spring

My canopy latching system is fairly close to the plans, except that I made my bushings slightly longer for more strength, and my plungers, made of 1/4" O.D. "cold-rolled" steel round bar, protrude 1/4"+ past the last bushing when fully engaged. Common cold-finished round bar stock (usually type 1018) has a yield strength of 70,000 psi, a tensile strength of 85,000 psi, and is easy to weld. The plans specify "cold-rolled", and this is probably what they are talking about. It's the grade I used. 4130N isn't necessary or even desirable.

I did make two embellishments to my latch system. I put two plastic ball-type knobs on the latch connecting rod for a better grip. These are available in some hardware stores for about \$3.50 apiece and they usually have a female 1/4"x20 UNC thread.

The other thing I did to improve the latching system was to put two 1/4" I.D. x 1" long Nylon bushings (also found in some hardware stores), on the connecting rod that the plunger's arms are welded to. I built up the O.D. of the bushings slightly with electrical tape to give more "bite" to the rubber cushioned Adel clamp that goes around it. The size is 1/2" or the O.D. of your bushing. I made two .063" thick steel mounting tabs to suit, and welded them to the inside of the port frame rail to screw the Adel clamps to. All metal anchor nuts tacked to the backside of the tabs will make it easy to service in the future. This set-up supports the latching rod assembly without reliance on the outside handle bearing on the slot in the skirt to hold it in position.

When fabricating the latch rod assembly, make all three plungers separately, and use them to align the latch bushings while tacking them on the frame rail and longerons. After tacking the bushings in place, tack the long connecting rod to the three plungers, roll the plunger arms slightly to line them up with the connecting rod, and trim the plunger arms as required. Just "eyeball" everything into alignment. I tacked an AN3 washer to the connecting rod and drilled a hole in the rear Nylon bushing mounting tab to connect a reasonably strong spring to help hold the latch plungers closed.



Front Bubble Mount Tabs

You will have to weld two tall mounting tabs to the inside of the front canopy bow to fasten the inside front of the bubble. Mine are 2" tall x 1/2" wide x .035" thick, and are centered 5-1/2" apart. If you want to install them now make them extra tall with

the idea of trimming them down to adjust the height of the front of your bubble to suit.

In the next issue, I'll detail the rest of the process.

James Gay III, Houston, TX

FOLLOW THOSE PLANS by Ivan Martinez

Freditorial Comment: When I published the article in the Oct-Nov-Dec '04 issue about my "conversation" with John Monnett about what constitutes a Sonerai, I asked for comments. I got a few. And here is the first:

Way back in 1988 when the choice to build an Experimental was made, the Sonerai II filled all my requirements. A partially completed Sonerai ILS fuselage, the plans and some assorted parts were purchased from a divorce-bound first builder.

It was my original intention to stay close to the plans. Research was made into VW power, and the 2180 or 2600 was chosen. In the beginning, progress on the project was limited to the fuselage and all welded parts. Progress was slow (I also had other interests). At the same time that work continued on the fuselage, I was researching other engine options and reading about alternate airfoils. A change was made to go with a Continental A65 and a used engine was purchased. An airfoil change was also made, and the Ribblett GA37U-415 selected.

I will not go into why I chose to make these major modifications. This is a very divisive and volatile subject. I am NOT trying to add fuel to the fire and that is not the point of this article. This article is about what happens when you make major modifications. Not including the obvious changes, both major modifications set off a "domino effect" of other changes not foreseen at first.

ENGINE DOMINOES: 1. Factory cowling front re fabricated. 2. Motor mount rebuilt. 3. Factory aluminum tank modified. 4. Weight & balance tail ballast additions. 5. Instrument panel moved back 2".

AIRFOIL DOMINOES: 1. All wing parts had to be scratch built (no buying ribs, ailerons, wing tips etc from Great Plains.) 2. Moved wing forward 2" (weight & balance / extra elevator force correction. This change caused all kinds of problems related to the aileron mixing and torque tube mechanism and elevator mechanism.) 3. Spar box had to be redesigned. 4. Paid \$400.00 to an aeronautical

engineer to look over and approve changes to the wing construction. 5. Added 12" Hoerner wing tips yielding 6 more sq/ft of wing area. 6. Tail feathers modified to symmetrical air foil to add extra authority to elevator (because of extra lift and coefficient of moment from the new air foil and extra wing area.)

I am sure that there are other dominoes that I forgot about. It took me 15 years to finish N567JM. There are other not so major modifications to my experimental not mentioned in this article. They added to the build time also. I estimate that it took me twice as long to build my airplane because of the engine and airfoil change,....and the dominoes. ALL my changes fulfilled my design goals. What those goals were are not in discussion here. What is important is that my airplane, what ever you call it, behaves much like a Sonerai ILS. It also looks like a Sonerai. I fly with other Sonerai and we have made comparisons. Save yourself years of build time and follow the plans. DON'T MODIFY.

An important related topic: Some Sonerai builders are upset that I have called my Experimental a "Sonerai." It was not my intention to mislead. I just didn't think about it and called it so. Later, I tried to change the name but the FAA said it was too late. Now when asked, I call it an "experimental based on the Sonerai".

DIRECTORY 2004

ISSUE	TITLE	SUBJECT
JFM '04	Looking Forward to 2004	Misc
JFM '04	It's Time to Renew	Misc
JFM '04	Input Needed	Misc
JFM '04	Thinking About Sun-N-Fun	Sun-N-Fun
JFM '04	E-mail Update #6	Misc
JFM '04	Mike Frost's Sonerai ILS in Pictures	A/C Report
JFM '04	Cylinder Head Tester/Elyea	Engine
JFM '04	A Simple Engine Preheater	Engine
JFM '04	Alternative Landing Gear Attachment	Fuselage
JFM '04	Directory 2003	Misc
AMJ '04	Sun-N-Fun's A'comin'	Sun-N-Fun
AMJ '04	New Back Issues	Misc
AMJ '04	A Few Thoughts on Auto Fuel/Bertelmann	Operation
AMJ '04	Building & Installing the Main Spar	Fuselage
AMJ '04	Carry-Thru Box	FV
AMJ '04	Formula V Update/Kalishek	Cockpit
AMJ '04	An Instrument Panel Variation/Schwarz	Tall Tales
AMJ '04	What do Aerodynamicists Do?/Barton	Oshkosh
JAS '04	Oshkosh Preview '04	A/C Report
JAS '04	Erik Jonsson's First Flight	A/C Report
JAS '04	CW Crane's First Flight	A/C Report
JAS '04	Gordon Eslava's First Flight	A/C Report
JAS '04	Goin' to Sun-N-Fun (The 2004 Version)	Sun-N-Fun
JAS '04	Cockpit-Released Tail Hook/Martinez	Controls
OND '04	Oshkosh Wrap-Up	Oshkosh
OND '04	An Oshkosh "Discussion" (And Editorial Comment)	Commentary
OND '04	Drew's Sonerai II	A/C Report
OND '04	SWRFI '04/Wilcox	Traveling
OND '04	Tommy's Baffles/Warren	Engine

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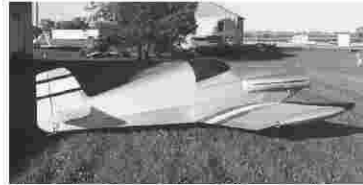
TAPER PIN REAMERS & WING RIB LIGHTENING HOLE FLANGING DIES FOR FREE LOAN. Brown & Sharp #3 and #5 for AN386-3 and AN386-5 taper pins. \$150 deposit, shipping one way ~ \$5. Free loan for 14 days, \$2 per day after that. David E. Wilcox, 517 E. Saratoga St., Gilbert AZ 85296. dwilcox@ispwest.com

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RACEAIR DESIGNS IS AVAILABLE FOR YOUR FABRICATION AND RESTORATION NEEDS. Contact Ed Fisher, (330)856-7520, raceairdesigns@aol.com. Over 30 years experience in dope, fabric, welding, and sheet metal. Numerous awards including 1991 and 2004 Oshkosh Grand Champion Ultralight. No job is too big or small. Need a

fuselage welded? Give Ed a try!!

(2/04)



For Sale: Sonerai II, 98% complete. Built as low-wing using Sonerai IIL plans as a guide. 1835 VW w/ SuperVee prop hub, oil cooler, & HAPI UltraCarb, Sterba prop. This airplane was 1-2 months from completion when the original builder was killed in a motorcycle accident. Current owner doesn't have the time to finish. \$4,500. Allen Bruggink, (262)335-6459, albrug@hnet.net

(1/04)

For Sale: Gyrocopter (Benson-type) with Brock seat tank, metal tail, extended mast for Rotax or your choice. Offset gimbal head with rotor blade bar. Needs rotor blade and engine. Otherwise assembled, on gear with Brock joystick control and wheels. \$1950. Fred Ninneman (816)353-1161

For Sale: Sonerai II, built 1981, 200 TT, Revmaster 2100S. Will deliver for expenses. \$10,000. Also, a complete HAPI 1835 with Zenith carb, \$3,000. Bob Jorgenson (435)678-3436, bobl@sisna.com

(2/04)

For Sale: Sonerai II project. Ready for cover. S-wings, on the gear, fiberglass turtledeck raised for taller pilot, built for Continental A65 which is included (basket case). \$5,000 invested, will take \$2,500. Kurt Schafer, (807)274-1766, wkos@jam21.net

(3/04)

For Sale: AeroConversions Aero Carb ACV-CO2, 29mm for 1835 VW, new, never installed. \$300. Dick Bonney, (727)733-9273

(4/04)

Wanted: Sonerai II mid-wing or low-wing taildragger, preferably with a 2180 VW. Bob Campbell, 112 Chestnut Street, North Reading, MA 01864

(1/05)

