

SONERAI NEWSLETTER

JULY-AUG-SEPT 2005

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RON WRIGHT'S SONERAI IIL

Here's another example of a Sonerai IIL that comes about as close to being perfect as you can get. Ron acquired this airplane from the original builder, and is now enjoying it greatly. Since the photo makes us all colorblind, the base color is cream with three shades of red trim. See Ron's article and more photos inside.

LOOKIN' FORWARD TO OSH '05

As I write this, there's just a little bit less than a month before the big shebang at Oshkosh (or as it is otherwise known: AirVenture 2005). In their infinite wisdom, the staff at EAA decided to move the start date up a day this year to Monday, July 25, so that the show will end on Sunday, July 31. So, adjust your calendars accordingly.

I'm actually looking forward to the event with more excitement than I usually do. That's because there

will be several unique airplanes to see that will be there only this year. Among them will be Burt Rutan's Space Ship One and White Knight, and his Virgin Global Flyer. Also promised is the P-38 "Glacier Girl", the B-29 "Fifi", the Eclipse 500, and the HondaJet. And of course, there will be Sonerai's. You are bringing your Sonerai this year, aren't you?

I assume that we'll be parked in the Auto Engine area near the Homebuilder's Headquarters at the north end of the Homebuilt area. It's a nice area,

with easy access to shade, food, drink, and portopotties. We should be able to park together, so it should be fun.

Of course, there are several events planned for the week:

- The "Sonera! Builder's Forum", Wednesday, July 27, at 1:00 PM in Pavilion 05.
- "VW Engine Workshop" by Steve Bennett, Monday, Tuesday, and Wednesday, July 25, 26, and 27 from 1:00 to 2:15 PM each day, in the Engine Workshop.
- "VW Engines for Sport Aircraft" forum by Steve Bennett, Tuesday, July 26, at 8:30 AM in Pavilion 04.
- "VW Conversions" forum by Steve Bennett, Friday, July 29, at 10:00 AM in the Replica Fighters Building.
- "AeroVee Engine and AeroCarb: Sport Pilot Power" forum by John Monnett, Thursday, July 28, at 11:30 AM in Pavilion 3.
- Homebuilder's Dinner, Thursday, July 28, at 6:00 PM at the Nature Center. This is a good meal, and an opportunity to get together and swap stories over a meal. You have to buy tickets for this at the Homebuilder's HQ, so get them early. They tend to sell out.
- Jeff Lange has offered to organize a "Sonera! Picnic" again this year, after a one year hiatus. As of this writing, it is tentatively scheduled for Thursday evening at Jeff's hangar on the NE corner of Wittman Field, and there will be a small fee. See me, Jeff, or Chad Stenson for details.

There are, of course, a multitude of other things to see and do, like the Fly Market, the Parts Mart, other forums and workshops, and AIRPLANES. So, stop by and say "hello". I plan to be there nearly all week.

SONERA! NEWS

- Great Plains News: For those of you who go looking for Steve and Linda in Building C at OSH this year, you won't find them there. They've moved to Building D. Go there and check out their new secondary ignition system that mounts on the front of the oil pump housing. Go to www.gpasc.com for more info.
- Sun-N-Fun 2005 Coverage: Since I didn't get there, and no one sent me anything about the event, and the Sonera!'s that were there, I

have no coverage of the event. Sorry. If someone would like to send a short story and some photos, I'd like to get it in the next issue. Thanks.

→ 2005 Fly-In Schedule:

Need a fly-in to go to? 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 Sonera!.

- 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

- Formula V Racing Lives: I recently received a copy of the newest issue of The V-Gram newsletter from Ed Fisher. The intent is to revitalize interest in Formula V racing. There is now a website at <http://www.formulav.com>, and attempts are being made to set a practice session. If you are interested in becoming involved, contact Ed at 330-856-7520 or raceairdesigns@hotmail.com.

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

- Back Issues: Sonera! 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 2004 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.

RON'S "NEW" SONERA! IIL by Ron Wright

Hi Fred - I'm forwarding some photos of a Sonera! IIL I purchased from a very meticulous builder [who wishes to remain 'un-named'] in late '03. By the

way, this is in response to your "Can I get a little Help here?" request in your J-F-M 05 Newsletter.

I have only flown this GREAT aircraft about 6 hours TOTAL [since the purchase date] due to my being involved in too many other a/c projects [during this time], and because I removed the existing POSA Super carb [from the Sonerai IIL] and replaced it with a new Sonex AeroCarb.

It has an 1835 cc HAPI VW engine with single magneto ignition and an electrical system, but NO starter, other than a "strong-arm" and way too many other 'refinements' to disclose here.

This Sonerai IIL, after an 8 year construction period, was completed in 1988 by a MASTER builder/painter/pilot. The builder made some "improvement/additions" to the original plans, as follows:

1. Raised and re-contoured the turtledeck to allow an aluminum extension fairing (attached to the aft canopy) to fit over the turtledeck when the canopy is closed, to eliminate the usual 'gap' between the canopy and the turtledeck.
2. Designed/fabricated/installed (d/f/i) a "jack-screw" horizontal stabilizer trim system with a pilot-operated trim wheel located below pilot seat on left side.
3. D/f/i/ extra air vents in lower cowling (below each cylinder bank) to provide additional air outlet to help cool cylinder heads.
4. D/f/i/ an 11 gallon capacity fiberglass fuel tank with internal vent line that is "open" in all aircraft attitudes, except while inverted!!!

5. D/f/i/ the Azusa mechanical brakes to provide FULL contact with the brake drums ... Better braking and reduced maintenance.

6. D/f/i/ a solid steel control arm to the tail wheel to eliminate tail wheel springs, giving positive/direct ground taxiing control.

7. D/f/i/ fresh air intake ports in the top cowling on each side to give GREAT cockpit cooling, and made a louvered outlet plate installed below left horizontal stabilizer, to allow for exit air.

8. D/f/i/ milled aluminum pillow blocks/bearings for elevator/aileron flight control system, making the JOY STICK feel like it is supported in a bowl of "Cool-Whip".

9. All flight controls feel "balanced" and "harmonized" This airplane is a DELIGHT to fly ;

10. The wings/rivets are "filled", making the wing surfaces glass-smooth;

11. The builders attention to construction and finish detail is OUTSTANDING.

The empty weight is 525 lbs. GPS airspeed : 125 m.p.h. at 3200 r.p.m. flying 2 - 10 mile [cross-wind] tracks at 1000' a.g.l. on an 80 degree day.

This airplane is a "DELIGHT" to fly, which I plan to do a lot of, this year.

See you at one or more of the upcoming "Fly-Ins", this year....

Regards,

Ron Wright
East Peoria, IL.





Pristine engine installation with plenum-style baffles, and a set-back stock oil cooler.

A well laid out instrument panel with the engine gauges on the right, and the flight instruments on the left. Also, note the set-back front seat back, providing more room for the front seater.



CANOPY INSTALLATION, PART 3

by James Gay

And here's the final installment of James' article on canopy construction. Enjoy...

Fabricating the Canopy Skirts:

The plans don't call out the skirt material, and builder's manual only specifies the thickness. Most builders use .025" thick 2024-T3 Alclad aluminum sheet. This is a good way to use any left over material if you've already built your wings. You could substitute 6061-T6 if you have some available. I should be strong enough. The Sonex makes extensive use of it in its structure to reduce costs. But, resist the temptation to use cheaper grades of aluminum such as 3003-H14. I experimented by fabricating a canopy trim strip with some, but found it to be too soft, and it wrinkle too easily. In defense of the softer grades, I did use it to fabricate my engine cooling baffles, empennage access panels, and the belly panel that covers the center section of the landing gear. However, these parts are closely fastened around their perimeters, and don't have to support anything heavier than their own weight. The Alclad material is much stiffer, and is better suited to this particular job. I purchased a 4' x 5' sheet of Alclad at \$15.00 per running foot (\$75.00 total) from a local airframe repair shop. The price was quite fair, considering that there were no shipping charges, and cash-in-hand made the state sales tax slip right under the table. Before I leave the subject of materials, I used an assortment of #6-32 and #8-32 Commercial Grade stainless steel machine screws and stop nuts. Yes, I know the "Party Line" is to use only aircraft-grade fasteners. In this case, the fasteners are far stronger than the materials being fastened. This is where "reasonable common sense" comes into play. We already use commercial-grade blind rivets in our wing construction.

Before you start cutting all that high-dollar metal, buy some brown cardboard template material to cut on first. Pay a visit to your local artist's supply store. The general arts and crafts type of places probably won't carry it. Look in the yellow pages. The stuff you're looking for is the cardboard used as a backing on legal pad, and in the old days, to stiffen laundered shirts if you ordered them folded instead of hung on hangers. It makes excellent templates, but has one drawback, it will expand and contract with the relative humidity.

I want to point out a few traps to avoid when making your templates: If you choose to put a trim strip over the rear of the canopy bubble, the lower

18" or so of the left side skirt/trim strip assembly swings across the front opening of the turtledeck. If the trim strip overlaps the turtledeck in this area, the interference will not allow it to open. I allowed a 3/8" to 1/2" overlap of the turtledeck on the top and RH sides, but transitioned to a 1/8" gap on the left side. Next, before you get the great idea of allowing the bottom edge of the skirts to hang way below the top of the longerons, perhaps with some thought of weather stripping the overlap, consider this: the RH bottom edge of the skirt must have enough clearance to allow the canopy assembly to be mounted/dismounted from the fuselage, while the LH side doesn't have this problem. I made mine the same on both sides, and just let it hang 1/8" below the top of the longeron to cover the gaps.

The longest edge of the cardboard sheet is not long enough to reach the front portion where the skirt bends to conform to the contours of the cowl joggle and the front of the bubble. Just make the rear portion of the templates as far as the cardboard reaches, then tape on another section to make up the shortage in length. This actually works to your advantage, since these front portions are tricky to make, and always require several attempts. It's nice not to have to remake the whole template if you make a mistake. Also, if the template length changes due to variations in relative humidity, the length can be adjusted at the taped joint. One last point: check your templates for this on the same day that you use them to lay out the aluminum. No joke, my templates grew about 1/4" longer on a wet day.

Now that you are ready to actually lay out and cut the skirts, try to use the two straight factory cut edges of the sheet for the bottom edges of the skirts. Lay down masking tape to mark the cutting lines on. Rough cut the pieces, leaving 3/8"+ extra material. Then, final trim the excess every place except the front curved portions. Leave about 3/16" to 1/4" extra here. The cardboard templates conform very easily, while the Alclad sheet is not so cooperative, and will require slow careful trimming as progress along the contour. Lay out and pre-drill all the 1/8" rivet and 5/32" machine screw holes. Do this on masking tape so it's easy to mark and erase. De-burr all the holes, and smooth all the edges, including the forward curved areas that will need trimming to fit. Sharp edges here can scrape your bubble through the Spraylat masking.

Before I get away from the subject of pre-drilling, when laying out the 1/8" rivet holes in the skirt, you may find (as I did) that the canopy frame rails are not exactly straight, due to slight warpage from

welding. It's perfectly acceptable to cheat a little. Lay down a strip of masking tape on the inside of the skirt, clamp the skirt in position, and draw two lines along the top and bottom edges of the frame rail on the inside of the skirt. Lay out your hole intervals square from the bottom edge of the skirt, and draw the lines upward through the double "cheat" lines. Locate the center points in between the "cheat" lines. If your frame rails aren't twisted up like a pretzel, the slight variations shouldn't be obvious, but check them against a long straight edge before you drill. This wouldn't be such a big deal if it wasn't for the fact that you only have a .277" wide area to center a .125" ID hole in. This assumes a 3/8" square tube with a .049" wall thickness (.035" wall is not available), .277" minus .125" = .152", divide this by two and you have .076", or a fat sixteenth up or down. Please excuse me for dragging out the math, but it is worth looking into. When you've got the rivet locations figured out, just drill them from the back.

Now, we are ready to fit the skirts in place, working each half separately. Clamp the skirt in exact position with spring clamps. Start by using the pre-drilled rivet holes as a guide. This is a good place to make a final alignment check. With a sharp bit (a new titanium nitride-coated bit works wonders on 4130), drill all the 1/8" rivet locations and Cleco as you go. Next, switch to your special 5/32" plastic bit, and using the pre-drilled holes as a guide, drill the machine screw holes in the bubble, inserting the screws as you go. After all the side holes are drilled, remove the skirt, deburr all the holes, paying special attention to the ones in the plastic, and then do the other side. With all the deburring done, Cleco both skirt halves in place (Cleco the bubble from inside as this puts less stress on the plastic).

It's "fun time", now. This is where you must painstakingly trim the front curved portions to the contours. Work slowly, don't get crazy and trim too much (easier said than done). The initial cuts can be made with aviation snips, but afterward I used my angle grinder with a Tiger Disc, just as on the plastic. Make the cut using only the pulling stroke. It works well, provided that you're careful. Pull some of the front Clecos if they don't let the sheet out far enough. Just make one stroke at a time, checking to fit after every cut. It's not as tough as I'd been led to believe, but you've got to watch what you're doing.

When joining the overlapping seam in the front, pre-drill two holes in the top skin, have someone match drill the holes while you hole the two skins in alignment. I added two aluminum tabs that rivet to the top of the skins, and center on the two machine

screws that fasten the front of the bubble to the sheet steel tabs welded to the front canopy bow. All these three tied together make the front of the skirt assembly rather rigid. If the front of the skirts fit less than perfectly, put a couple pieces of rubber trim channel on the top edges between the bubble and the aluminum. Besides sealing better, the rubber cushions the plastic and eliminates chafing.

Paint, Trim, and Canopy Skirt Windows:

It's a good idea to paint all the parts before riveting them together. Since I plan to use the Stits (Poly-Fiber) process on my fabric, I used Poly-Fiber alkyd enamel. My main color is Polar Gray, and for accents, Bahama Blue. Sticking with the same brand of paint will ensure a good color match with the fabric. Alkyd enamels have a very slow drying time, but don't have the health hazards connected with polyurethanes.

The rubber trim channel that I used is sold by Aircraft Spruce (p/n 05-01400), and was cemented around the edges of the skirts with Plio-Bond. Plio-Bond is thinned with MEK so I didn't use it on the two pieces of trim channel between the top front edge of the skirt, and the front of the bubble. The fumes could craze the plastic. Anyway, there is enough pinch between the two surfaces to hold them in place.

The next subject that I want to cover is about skirt windows. Some builders are interested in them, some are not. It's all about choices. Depending on how tall your skirts are, they do restrict forward visibility to some extent. My windows open a better view in the ten and two o'clock low positions. I plan to fly my Sonerai IIL in the Houston, TX/Gulf coast area with its high traffic volume. In other words, if the unseen VFR traffic doesn't get you, the hawks and the vultures will. Of course, I'm exaggerating (only a little). It's not that I'm flying bomber escort over the Ruhr valley, it just seems that was at times. While the visibility angle sounds reasonable, I got the idea from a Sonerai that I saw on the Internet, and I liked the way it looked.

To start, lay out the window openings on the skirt, although the shape is the builder's choice, I recommend a rectangular shape with 1/2" radius corners. Since you know to lay down masking tape to draw any lines on, I'll leave it out of any further descriptions of the work. Next, lay out the machine screw holes at least 1/4" back from the edge, and drill them first. Take a piece of the aluminum sheet at least 1" wider than the opening all the way around, and tape it inside the skirt, centered as closely as possible. Extra-large pieces make this part easier. Match drill and Cleco this piece, as this piece will become a flanged

doubler. Separate the two pieces, deburr the holes, and Cleco them back together. Now, with a 1" OD holesaw, drill the four corners of the window opening through both pieces. On the doubler piece, lay out the opening cut lines, and the flange bend lines, these should be about 3/8" outside the line of the machine screw holes. Then, draw a line 1/2" outside the bend line. The idea is to have enough material to make bending the flange easy. It gets trimmed down to 1/8" later. This flange adds stiffness to the doubler and hides the plastic edges. I clipped the corners on mine to make the flanges easier to work with. Take a pair of aviation snips and cut out the window openings on the skir and the doubler. Leave about 1/16" all the way around. Cleco the two pieces together, and file the opening edges to match. Check for straightness. A round file works well to blend in the corners. Separate the two pieces, cut the outside lines on the doubler if you haven't done so, and deburr all the edges. I went so far as to sand the openings to get them extra smooth. Bend all the flanges to 90°, rough trim them with snips, lay a scrap piece of 1/8" plastic against the flange, and sand down with a Tiger Disc. Stop when it hits the plastic.

Plastic sheet can be purchased cheaply by the pound as scrap material at specialty plastics outlets. Look in your yellow pages. This is also a good source for Novus polishes and scratch removers. These places usually custom-cut plastics for all kinds of jobs, and constantly have some fairly large pieces to unload. I don't think that I spent over \$5.00 on the all the material in my skirt windows. Draw your cut lines on the factory masking paper. The description of the doubler assumes an edge overlap of 5/8", and a 1/8" window thickness. I cut min out with a saw, and used a fly cutter to put a 3-1/4" ID hole for a snap vents, one on each side. If you smooth and polish the edges, especially those inside the vent hole, they almost seem to disappear.

Cost Control vs Safety:

One recurring theme in my articles is about saving money, and obtaining parts, material, and supplies on the cheap. And why in hell not? Who in his right mind wants to pay full retail? I find that half the fun in being involved with the building of my project is in the challenge of hunting down a great bargain. I really enjoy "scrounging". However, there are times when spending a few extra bucks is the best way to go, as there are many wise placed to bite the bullet, so to speak. If you booger-up a part when you make it, throw it out and start over. If the plans specify an expensive material, buy it. If you want to fasten a critical assembly, spring for new AN or NAS bolts and nuts. The list goes on and on.

A few years back, I bought Roy Adams' 1915cc VW conversion (see the Sonerai Newsletter, O-N-D '97) from another party who had bought the airplane but wanted to sell the engine only. After a close post-purchase inspection, new cylinder head, carburetor kit, new points and condenser for the magneto, and various new seals/gaskets, the engine ran very strongly, and started easily once I learned the drill. But one day I noticed a crack in the crankcase next to the oil pickup gallery. It wasn't a big crack. If the engine had been in my car, a dab of J-B Weld would have fixed me right up. Needless to say, the engine was torn down, thoroughly inspected, and overhauled to the tune of well over \$1000. Oddly enough, other than the crack, the case was in good condition, but was replaced with a new aluminum one. In fact, most of the engine parts were in serviceable condition, and were reused. The point is don't compromise safety just to save a buck. Use reasonable common sense. If I may quote the late Tony Bingelis, "Costs are a very real concern for most of us in this inflated economy, but never lose sight of the fact that the cost of parts or material must take second consideration to aircraft standards".

MIDWEST SONERAI GATHERING

OK, I've been talking about it for the past two issues. So let's do it. By that, I mean let's have a **Sonerai Gathering** at the North Central Old Fashioned EAA Fly-In at the Whiteside Couty Airport (SQI) at Sterling-Rock Falls, IL. The dates are Saturday, September 17, and Sunday, September 18.

I'd like to keep this very informal, since there are a lot of things to do at this fly-in. For example, there is a poker run and a flight rally. There are forums, an aero parts tent, commercial displays, good food, and lots of airplanes. I'm going to ask for a forum spot on Saturday so we can do a Sonerai Q&A.

There are several hotels in the area, and on-site camping is free. I also thought that if enough folks show up and stay overnight, we could do dinner somewhere in town Saturday evening.

For all the details on the fly-in, go to www.nceaa.org. It's a great website. And if you are planning to come, please drop me an email (or snail mail note) so I can plan accordingly. Thanks.

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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

SPECIALTY WELDING CAN SUPPLY YOUR COMPLETELY WELDED SONERAI FUSELAGE AND OTHER WELDED COMPONENTS. Contact Greg Klemp at *Specialty Welding*, W6461 County YY, Neshkoro, WI 54960, (920)293-8089 or (920)293-8007 (Fax)

RACEAIR DESIGNS IS AVAILABLE FOR YOUR FABRICATION AND RESTORATION NEEDS. Contact Ed Fisher, (330)856-7520, raceairdesigns@hotmail.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!!

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 (2/04)

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)

For Sale: Sonerai II with 8 total hours of flight time. It has been garage kept the entire time. It has a production date of Feb 1982. It has an air cooled 4 cyl. 70 hp Volkswagen engine. Engine has been turned over from time to time to keep it from seizing up etc. Charlie Barnes, cell # 469 853-6472 or email at tx-rmef-1@swbell.net (2/05)

For Sale: Revflow 32mm carb, complete with air filter and ram air tube. \$60US Please email Tony @ umgibso1@yahoo.com if interested. (2/05)

For Sale or Trade: Aerosport Quail. All metal, high wing, cantilever. 11 gal fuel in wing tanks. Cruise 105mph on 3.5GPH. Built in 1977, in storage 15 years. 450 ttaf, 44 hrs since VW rebuild. Easy entry, just raise the door and sit down. Tri gear. \$9,500, includes new GPSIII and IcomAR5. New slick mag. Lic till Oct. May take Sonerai2 original or project trade. Jack Cupp, Phoenix, AZ 85032 602-788-9117, jack@xoomup.com (3/05)



From Niel in South Africa: "Here is a photo of my newly restored Sonerai 2L. It took me just under 10 months and about 500 hrs to restore it. She flies beautifully. Empty weight is just under 600 lbs. I have a VW2400 type 4 motor with Toyota Camry self starter and dual ignition with a Delorto DHL40 carb, fed by 2 Facet fuel pumps. I had to put a 11lbs 18amp battery in the tail below the elevator to get the CG correct. The performance figures is as advertised and should do a little better once I have fitted the spats."