

SONERAI NEWSLETTER

APRIL-MAY-JUNE 2005

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SCOTT PLISCHKE'S SONERAI III

Another Sonerai III has successfully taken to the air, and in my humble opinion, Scott's is also among the nicest looking Sonerai's ever built. It's a classic example of the kind of airplane you can build when you take your time, and properly tend to all the details. See Scott's article and more photos inside.

GOIN' TO SUN-N-FUN?

I wish I was. As I said in the last issue, I will probably not get to Sun-N-Fun this year, as things have conspired to keep it from happening. Back in February, I actually changed my mind and decided to fly the Sonerai down to Florida again. Keith, my hangar partner, and I decided to attempt to repeat last year's trip, but it wasn't destined to happen. He needs to be home early that week to deal with

some medical issues, and it turns out that I'm a wee bit cash strapped. So, I'll keep track of the goings on via AVWeb, and get a little maintenance work done on the airplane.

Anyway, for those of you who are going to be there, there are bunch of things you might want to look into. First, there are the forums:

- VW Engine Maintenance, Steve Bennett, Tues 4/12, 9:00 AM, Tent 5

- VW Carburetion Fundamentals, Steve Bennett, Wed 4/13, 9:00 AM, Tent 5
- AeroVee & AeroCarb, John Monnett, Wed 4/13, 11:00 AM, Tent 10
- Jabiru Engines, Phil Ainsworth, Wed 4/13, 1:00 PM, Tent 3
- First Flight in Your Homebuilt, Bill Bateman, Thurs 4/14, 10:00 AM, Tent 3
- VW Conversions, Steve Bennett, Fri 4/15, 9:00 AM, Tent 5
- Revmaster Engines, John Moyle, Fri 4/15, 1:00 PM, Tent 10
- AeroVee & AeroCarb Power to the Sport Pilot, John Monnett, Sat 4/16, 9:00 AM, Tent 8

There are a lot more forums. Check out the Sun-N-Fun website (www.sun-n-fun.org) before you go.

Second, Steve Bennett is running a VW Engine Assembly Workshop in the Engine Workshop Tent. It will be every morning from Tues, 4/12, thru Sunday, 4/17. If you are planning to build up your engine, stop by.

Third, someone posed the question as to whether or not Steve and Linda were going to have a picnic this year? Well, I've been informed that they are not having one this year, so you'll have an evening to go out to your favorite Lakeland restaurant.

And finally, don't forget to check out the Fly Market tent for all those goodies that you need, but don't know about yet (you'll know 'em when you see 'em). It's out by the Ultralight area, so it'll give you an opportunity to check out the "crazies" as well.

So, since I'm not going, and some of you are, I hope at least one of you will write a short synopsis of the fly-in, and send me some photos of the Sonerai's that show up. Thanks.

SONERAI NEWS

- ➔ Great Plains News: Steve and Linda report that their new water-cooled heads are being installed on Dave Rawlings' Sonerai II "Sporty" (and on Harry Teal's new Sonerai). Everyone is eagerly awaiting the test results. Go to www.gpasc.com for more info.
- ➔ 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

- ➔ Midwest Sonerai Gathering: I've contacted the sponsors of the North Central EAA Old-Fashioned Fly-In (see the schedule above), and they would definitely like us to have a *Midwest Sonerai Gathering* during their event. This is a fun two-day event, with forums, a fly market, good food, and an efficiency race. I'm still working on the details, and will have complete info in the next issue. 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 2004 in a ".pdf" format. The cost is still \$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.

SONERAI IIL N994SP by Scott Plischke

First, I'd like to congratulate Scott on the successful first flight of his IIL. Scott and I have talked a lot over the past several years while he worked his way through the building and finishing process, and as always I was happy to help. I think you'll have to agree that he did one hell of a nice job. For more detail photos of the airplane, definitely go to the website noted at the end of the article. Scott, I hope you can bring her up to Oshkosh, and show her off.

On February 11th 2005, Sonerai IIL N994SP took to the air on its maiden flight. That moment was the culmination of a life long dream to build and fly my own airplane.

Construction of N994SP started in March 1994 when I was 28 years old. I made good progress in the first few months of '94 but then a series of life events like marriage, fatherhood, and building a new house brought the project to a crawl. But I was determined to finish what I started so I continued to work on the Sonerai in the limited free time that I had. What began as an 18 to 24 month project ended up taking nearly 11 years to complete.

Like many Sonerai builders, I wanted to save money by doing as much fabrication as possible. I did the welding, covering, painting, and engine assembly myself. I even did my own upholstery using a household sewing machine. I did bend my 'do-it-yourself' rule and purchased some of the harder to fabricate parts like the canopy, cowling, landing gear, ailerons, spar blanks, and fuel tank. I also purchased the wheel pants after learning a valuable lesson while making my own fiberglass wing tips. I spent a month making the wing tips which saved a measly \$30. It wasn't worth the time and effort so I broke down and purchased the wheel pants.

Construction of N994SP was not without difficulties. I knew from other builders that a Sonerai II with a 2180cc Type-1 VW tended to be nose heavy. I decided to move the engine rearward one inch to alleviate the problem. This caused a chain reaction of fitting problems. The magneto then hit the fuel tank. The fuel tank was moved back but then there was not enough room for the instruments. The instrument panel was moved an inch back which then caused the canopy frame cross member to hit the altimeter adjustment knob. It was frustrating but eventually the dominos stopped falling. Despite moving the engine back an inch, the long Force-One prop hub and deeper Diehl accessory case caused a one inch gap between the cowling and spinner. I had to rework the front end of the cowl to close the gap.

On Jan 12, 2005, my Sonerai was issued a Special Airworthiness Certificate by the FAA. A week later, it was loaded onto a utility trailer and hauled to the airport. Several weeks of taxi tests were conducted to familiarize myself with ground

handling characteristics. I found N994SP to be quite nimble on the ground and when speed increases, the direct steering tailwheel becomes very sensitive to input. After about 5 hours of taxiing up and down the runway, I felt comfortable with the aircraft and my ability to control it. It was time to fly. I taxied into position, advanced the throttle, raised the tail at 40-45 mph, held the centerline then gently pulled back on the stick. She was flying! I circled the field for about 20 minutes before deciding to land. I was a little fast on final approach but the aircraft settled nicely into a 3 point landing.

Here are some specs on N994SP...

Engine:

- GPAS 2180cc Type-1 VW.
- Diehl accessory case with Slick magneto.
- No starter but flywheel installed.
- 7.5:1 compression.
- GPAS electronic secondary ignition.
- Ellison throttle body injector.

Propeller:

- Ed Sterba 54x48.

Airframe:

- Turtle deck raised 1 inch, vertical stab raised 3 inches.
- Airplane Plastics canopy.
- Epoxyglass canopy skirt.
- Polyfiber covering system through silver.
- Superflite's Superthane topcoat (Pepsi Blue, Insignia White).
- Painted surfaces wet sanded to 2000 grit then buffed with 3M products.
- B model wings.
- Wing tips custom epoxyglass.
- Wheel pants from Aircraft Spruce.
- Wheels and brakes 500x5 Cleveland with chrome discs.

Empty weight: 595 lbs.

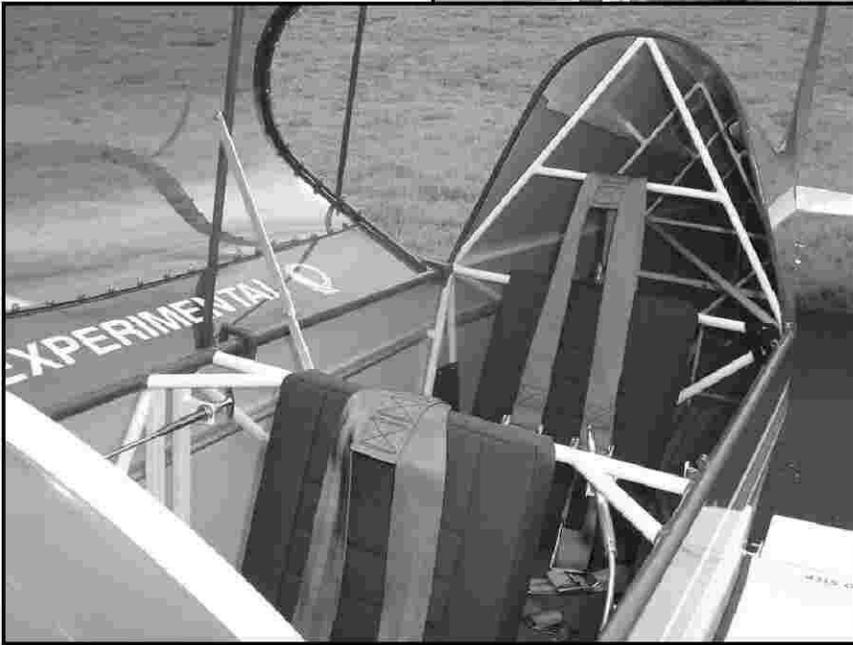
I uploaded a number of pictures and a movie of N994SP onto my EAA chapter's web site. You can view these by visiting <http://www.eaa267.org>

Scott Plischke
San Antonio, TX



Looks just as good on the LH side.

A neat, but full VFR instrument panel. Note the toe brakes.



Clean and light, with the set-back front seatback.

CANOPY INSTALLATION, PART 2

by James Gay

Here's the second part of James' article on canopy construction. I know I said in the last issue that this would be a two-part article, but I fibbed a little. It'll actually be a three-parter. Here's part 2.

Cutting the Bubble to Shape:

There are two sources for your acrylic plastic canopy bubble that I can think of off the top of my head. The first is Great Plains Aircraft Supply (402-493-6507 or www.gpasc.com). The cost is \$295 plus boxing and shipping. The second source is Airplane Plastics (937-669-2677). They offer two sizes; standard and extra large for the Sonerai II. They are available in clear, and green and smoke tints. The prices are rather high, about \$560 to \$750 depending on size, but I believe that they have a warranty policy that guarantees a half-price replacement should the customer damage the original within six months, but don't quote me on it. (Another source is *Todd's Canopies*, 954-579-0874, www.toddscanopies.com) The best source, however, is to find someone who is abandoning his project, and buy it at an even greater discount. A friend of mine sold me his Sonex/Monnett-brand bubble and two sets of seatbelt/shoulder harnesses for \$250 when he quit his Sonerai project in favor of a Sonex. It pays to keep your ear to the ground!

However much you pay for your bubble, it represents a sizable cash outlay, and as such should be kept as far from damaging conditions as possible. If you buy yours early in the project, store it at home in the air-conditioning, not at the shop. I stored mine for over a year in my back bedroom before starting this part of my project. And now the finished canopy is back in the same place. There is a masking compound that can be brushed on the bubble to keep the small nicks and scratches off of the surface. It's made by the Spray Lat Corp. (www.spraylat.com) and the product is called Sign Strip Blue, p/n Z5727. It can be found at sign maker's supply houses. Although this compound will peel off easily (the thicker the coating the better), the manufacturer strongly recommends that it not be left on over one year. The stuff is water soluble and non-toxic. And, oh yeah, it stinks like an old gym sock as it cures, but it goes away after a while. Any scratches that you do get can be rubbed out with Novus brand polishes and scratch removers. They really work.

My bubble was obtained in the raw state, that is, it wasn't cut from the sheet from which it was blown.

These edges should be reasonably parallel and square to the bubble itself; thus they are good reference points for laying out your center lines and cutting lines. Lay down masking to draw your lines on. Be sure to keep a permanent centerline by marking both the front and rear, and the sheet edge references will be lost once you start cutting the bubble away from the sheet. Use the flat area of the sheet as a reference to mark a cut line about 1/2" up for the surface. When you have measured the length required between the two canopy bows, lay out the rear bow cut line. Allow 2" more to trim later. Better yet, draw two lines, one where the canopy bow lays, and another 2" behind it as a cut line. Use this forward line as a permanent reference to lay out the final trim line after the bubble is mounted.

Contrary to the builder's manual, the best tool to cut the plastic is no longer a Dremel tool. It will work, but it is very slow, and around the flat portions of the sheet, it's really cumbersome. One slip could ruin your whole day. Instead, I switched to a Roto-Zip spiral cutting saw. If you don't want to spend \$70.00 or more on a tool to use only once, buy a cheaper import copy. I bought one on sale at Harbor Freight for \$20.00. It should last long enough to finish the job. The plastic material is reasonably soft, and you're only going to cut about 20'. This includes the rough cuts and the final trim cuts. Actually, I've had very good luck with mine. Buy the Roto-Zip brand bits used for Formica counter tops and the like. They cut through plastic like a hot knife through butter.

When all the lines are drawn, rough cut the bubble, staying 3/8" to 1/2" outside the lines. The bubble will be much lighter, and easier to handle when making the final trim cuts. The tool takes some getting used to, so practice your technique on the rough cut out. After the bubble is mounted solidly to the frame, and all the mounting holes in the rear bow area and the two mounting tab holes in the front are drilled, the excess material is then trimmed away. With the bubble off the frame, the edges can be smoothed out with a Tiger disc. This is a #80 or #120 grit sandpaper flap-type sanding disc, and sizes are available for 4-1/2" angle grinders. Although Tiger is a proprietary brand name, other brands are available at hardware stores. Sand the edges of the plastic on the pulling stroke only (not back and forth) using light pressure. When the majority of the roughness is gone, use an orbital palm sander with progressively finer grits, again using light pressure. Finish the edges by hand with #320 and #400 grit wet-or-dry paper. The smoother the edges are, the less likely they are to crack in service. And finally,

if after all your careful efforts you manage to put a short crack in the edge of the bubble, it's not a lost cause yet. I put a 1" long crack in mine before switching to the "Roto-Zip". Small cracks can be repaired with Weld-On #3 cement. It's water-thin, and will flow into the crack by capillary action. Apply sparingly to both sides of the crack with a syringe. Blunt the sharp point of the needle for safety. The cement is a real nasty chemical and you don't want it inside you if you accidentally stick yourself. The fumes aren't too good for you either. The repair to my bubble has endured a lot of handling without the crack growing any longer.

Mounting the Bubble:

The next part of the job is to mount the bubble to the rear bow and the front two mounting tabs that I spoke of in the Frame Fabrication section. I positioned my bubble with the inside of the forward edge flush with the back of the front canopy bow. The centerline mark on the rear of the bubble should be located over the central mounting hole in the rear canopy bow. This assumes that you have already drilled holes in your rear bow. If not, carefully lay out them out and drill them. You can use nylon stop nuts if you don't want to use all metal anchor nuts. Block up the front end of the bubble, and determine if there is enough head room for the front seat passenger. If, like some builders, you decided to eliminate the front seat, you will need far less headroom than someone else who wants to accommodate full-sized adults. This is something to figure out for yourself; tall enough, but not too tall. While blocking-up the front end, use the front centerline marked on the bubble to line up between your mounting tabs. When everything is centered, and lined-up fore and aft, to your satisfaction (are you real sure?), drill one hole in the rear end of the bubble to match the centerline and the central screw hole in the rear canopy bow. If your two front mounting tabs have the holes drilled, use these as a guide to drill two holes in the forward edge of the bubble. Try to allow about 1/2" edge distance on all the holes, front and rear. Use a cleco or a machine screw to anchor each of the three holes as they are drilled. These three holes will maintain alignment of the bubble while the remainder of the holes at the rear bow are drilled. At this point, there will be a lot of overlap behind the rear bow. Don't worry, this gets trimmed off later, when all of the holes are drilled.

While on the subject of drilling acrylics, don't use a regular drill bit without grinding a flat, blunt face on each of the cutting edges. The idea is to have a scraping action rather than have the normal sharp cutting edges dig into the material, causing it to crack. Drill at high rpm with light pressure. It also helps to use a wooden backup block whenever

possible. Any holes for machine screws should be oversized to allow for normal expansion and contraction due to temperature variations. A 5/32" hole for #6-32 screws, and a 3/16" hole for #8-32 screws should be OK.

Before moving on with the drilling of the rest of the holes in the rear of the bubble, there are many factors to consider. Due to variations in the shape between different manufacturers of canopies, and variations in canopy frame shape, the contour may not fit very closely. If you're one of the lucky few and yours fits exactly, drill the rest of your holes, trim off the excess plastic, smooth all the edges, and move on to the next step. But, if yours is like the majority, and the plastic bows out a little, use padded spring clamps to close the intervals to make the bubble conform. Work slowly and carefully, alternate drilling and clamping to either side of the original central screw hole. Fasten each new hole with a Cleco or machine screw as you go.

I was only able to use this technique as far as one hole on either side of center. I had a 2" gap in the remainder of each side. Since I was worried about trying to pull this much mismatch into conformity cold, I resorted to heat forming a joggle with a heat gun and a smooth wooden push block with a radius on one corner. If you ever heat-form acrylic plastic, remove any factory masking paper, masking tape, or Spraylat. This is very important. These can mark the surface of the plastic when it gets hot enough to form. I played the heat on an area about 2" forward of the rear bow, pushing down on the plastic to conform it to the bow. This procedure is more of an art than an exact skill. The only tips I can offer are: Don't get carried away with the heat. You can craze the surface of the plastic. Practice on scrap material to see how long it takes before this happens. Constantly try to push the hot plastic with the block; push, don't use a sliding motion. This will mark the surface. Point the radius of your block toward the front and don't push any place forward of the bow. Be patient, heat a little, push a little, and just let the heat do the work. If required, use spring clamps as you go. When the plastic cools to the touch, drill and anchor the rest of the screw holes. The plastic behind the bow will be real wavy. Soften these areas with heat, and use your fingers and several thicknesses of flannel to pinch them flat. If you've worked slowly and carefully, the result will be a reasonably symmetrical joggled effect. As weird as it appears from the rear, I like the extra headroom from side to side.

Next, trim the excess plastic from behind the rear bow, remembering the 1/2" edge distance. Most

builders will trim to match the turtledeck, leaving a small gap at the edges. I wanted a more finished look with less air leakage, so a trim strip was added to my installation, besides it covers up my less than perfect edges behind the rear bow. If you need to shim the rear of the bubble a bit taller, use thin rubber sheet between the plastic and the bow. This will also help to cushion the bubble from vibration. If you have to shim quite a bit, the misalignment of the screw holes may cause you to elongate them slightly with a file. A little larger is OK, as the drilled hole sizes that I quoted earlier are minimum sizes.

We'll fabricate the skirt and finish up the installation next time.

TO IFP by Dave Wilcox

I have two great friends from Germany that I got to know through work, Reinhold and Tony. They are engineers from MTU and both were here working at my company for about a year. Tony, is very interested in aviation. He earned his private license while he was here in 2003. Anyway, our work together has ended, but both of them loved it here in Arizona. Tony returned to visit his numerous American friends last month.

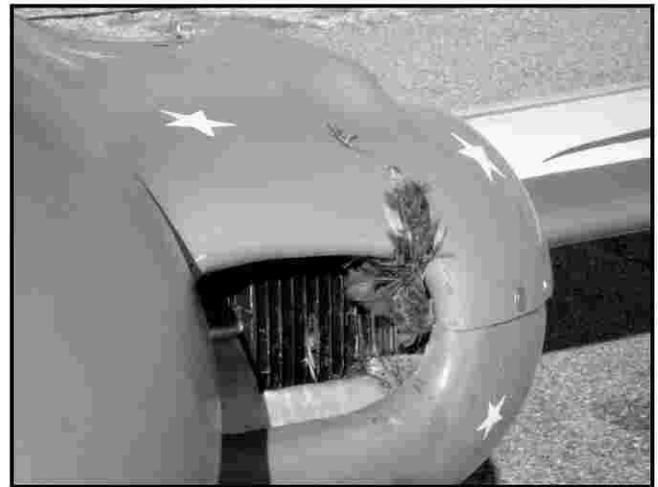
So for our short time together I planned an outing of what we both love to do, fly. A cross country to Laughlin. We departed early in the morning from Chandler, due west to keep south of PHX-B. After finally getting a little more airspace above, on the north end of the Estrellas, Tony seemed to have let loose of a little air himself. Sitting directly behind your passenger has certain advantages and disadvantages. I didn't think the moment needed discussion, but also didn't expect to be accused of it myself. Tony said, "Something smells bad." "No kidding" I replied. Anyway, my Sonerai has no lack of ventilation, and soon things were back to normal in the cockpit.

The conversation over the intercom improved and continued on to more interesting topics. We discussed America. Tony informed me that we do not have a "country" we have a "continent". The sights of the open spaces and the Harquahala ranges were very inspiring that morning. We talked a little about how Americans as a people are pretty independent until someone, shall we say... upsets us. Then we can get very focused. (by the way, I didn't vote for the incumbent). But all the same, we can look pretty intimidating to folks of other "countries" when we don't even mean to be.

Tony supposes that if Adolf Hitler had taken a flight from coast to coast across the US, he never would have ventured outside of Germany. Anyway, I think it's insightful to talk openly with Europeans.

On the ground in Laughlin... Taxied down the long hill. Parking has changed there. Used to be closer to the FBO. They've now closed down the main ramp to transient traffic. The old runway at the bottom of the hill is now the tie down ramp. Not bad, but a little more of a walk.

On close post flight examination by Tony, he discovered the source of the smell for which we had mutually accused each other.



Poor Tweety

We went to get on the boat to cross the river, but it was not operating due to low river level. When this occurs, a shuttle bus runs the same route every 15 minutes.

The buffet line was long, but still a good breakfast. Returned to the bus stop, which is also the boat dock, the river was up and the boat was running. Poor Tweety Bird was cleaned off of my airplane, and the return trip was less eventful.

A good way to spend a morning, for us at least, if not the bird.

WANT ADS

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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@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!!

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

For Sale: Lycoming O-145B2 65hp Engine Complete (everything included... bearings, exhaust manifolds, heat shields, dual mags, carb, every nut, bolt & hose clamp). Has been disassembled, everything looks to be in good shape, crank always stored vertically. Comes with Factory Lycoming Rebuild Manual and engine mount. \$400US + shipping. Please email Tony @ umgibso1@yahoo.com for pictures if interested.

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



Cassie de Castro, from Cape Town, South Africa, and his Sonerai II after his first flight with a new 1835 VW (formerly a 1700) on March 21, 2005