

# SONERAI NEWSLETTER

JAN-FEB-MARCH 2007

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## **MARK DEAN'S SONERAI IILS**

*This beautifully done orange and blue Sonerai IILS was built by Mark Dean, and is the first of five Sonerai II's currently under construction on the north island of New Zealand to fly. Mark has installed an 85 hp Jabiru 2200, and the performance numbers are exceptional. Mark called me several times during the construction for information and advice. I hope the phone bill didn't add significantly to the cost of construction. See more photos and Mark's article inside.*

### **CONFESSIONS FROM 2006**

First of all, let me be among the first to wish you all a happy New Year. I hope that 2007 is productive for you and your Sonerai project.

I thought you might like to hear a story about one of my Sonerai experiences from the past year. It is what I call my "dumb ass" story:

All year long, the trusty VW on my IIL has been a real pain in the butt to start. There were many times I had to pull her thru 15 to 20 blades just to get her to "pop". By mid-summer, it was getting really frustrating. I was reluctant to go anywhere because I didn't know if she would start for the return trip. A check of the spark from the magneto showed that I was getting spark at the right time, but it wasn't a "great" spark. Now magnetos don't throw huge sparks at start-up, so I thought I'd do

the cheap and simple thing first, and change the top spark plugs. I went thru at least three sets of plugs, trying different brands. No change.

I was reluctant to blame the magneto, since it only had about 250 hours on it, but several people suggested that the coil was going bad. Usually, I've gotten 400 to 500 hours out of a mag before it needed replacing, but I had access to a newer mag, so I installed it. It seemed to help a little, but the engine still did not start as aggressively as it used to.

Now about this time, a friend mentioned to me that he had occasionally started his engine using the secondary ignition, but you had to be really careful because it is timed at 28° BTDC, and can try to fire backwards if not propped aggressively. In my "infinite wisdom", I decided that it might be worth a try. So, on a Saturday in late August, I took the airplane out of the hangar, tied her down, gave her some prime, flipped on the master and the secondary ignition, and started propping. I tried to make sure that I snapped the prop thru as hard as I could, and low and behold, she started right up. I mean, like right now! There is no missing or stumbling like you sometimes get with the mag, just VROOM!

I was impressed. The secondary, because it's battery powered, throws a considerably more powerful spark, and that was definitely obvious. I shut her down, and tried again, and got the same results, almost instantaneous starting. I repeated the process twice more. A couple of times, the engine popped back a couple of blades. It was still a little scary. Anyway, I went flying and then put the airplane away.

The next day, Sunday, I flew along with Keith, my hangar partner, to Palmyra for breakfast. The engine started well on the secondary twice, but I noticed that my alternator was not operating. It wasn't putting out its normal 14 volts. So, when I got back to the hangar, I decided to remove the top cowl, start the engine, and probe the various connections with my voltmeter to determine where the problem was. (It turned out to be a bad pin connection in one of the connectors.)

Well, apparently when I start the engine with the top cowl off, I must stand in a slightly different position to keep from hitting my hand on the top edge of the lower cowl, because on the second or third pull, as I brought my left hand down, the engine back fired at just the right moment, and the trailing edge of the prop hit the tips of the index and middle fingers with a hell of a "whop". Keith, who was washing his airplane at the time, said

"that didn't sound good" and it wasn't. The impact had split the ends of both fingers open and they were bleeding pretty well.

Keith drove me to the hospital emergency room, where I got to spend an hour getting cleaned up, x-rayed, and sown up (3 stitches in the index finger, and 5 in the middle). Fortunately, the fingers got hit outboard of the last knuckle joint, so no bones were broken. I was really lucky, and felt really stupid for quite a while. I knew that it was dangerous, and stupid, to try hand-propping the engine with the secondary "on", but I was frustrated and a little desperate. It was a great opportunity to make the "dumb ass" move.

So, what's the moral to the story? Well, beyond the obvious of not doing really stupid stuff and listening to the wise voices in your head, it's listening to your friends. Several times during the summer, when I was cursing at the airplane for not starting, Keith asked me if the compression was OK. Of course, I always said that it felt good when I pulled the engine thru. Well, about a month ago, the engine started blowing a whole bunch of oil out the breather. Normally, the engine uses a pint in 12 to 15 hours, but it was blowing that much out in an hour.

So, it was time for a compression check. Cylinders 3 and 4 (the RH side), were both at 43/80. The compression WAS bad. After pulling the RH head and the two cylinders, I found that the top compression ring on #3 had broken into three pieces. It was time for a new set of cylinders.

An order for a set of forged 87mm slip-fit cylinders, and a new set of pushrod tubes and seals was placed. They arrived a week or so later, and are now on the airplane. And guess what, she now starts on the second or third pull, nearly every time. And the performance is much better. What can I say....

Be safe, and don't be a "dumb ass".

## SONERAI NEWS

→ Great Plains News: The 2006 issue of the **Beetle Flyer** is now out. See the article on Steve's new flywheel drive engine, and the new aluminum Nikasil cylinders that can reduce the weight of your engine by 10 lbs. Also, there are lots of sale items. If you don't have a copy, go to [www.gpasc.com](http://www.gpasc.com) or call Steve at 402-493-6507.

- First Flights: There has only been one report since the last newsletter. See Mark Dean's article elsewhere in the N/L.
- 2007 Fly-In Schedule:  
Here's a list of the big ones this year. Make plans now to go to the one nearest you, and show off your Sonerai:
  - USSAE, Sebring, FL 1/11-14
  - Sun-N-Fun, Lakeland, FL 4/17-23
  - SWERFI, Hondo, TX 6/1-2
  - Golden West, Marysville, CA 6/8-10
  - Rocky Mountain, Watkins, CO 6/22-24
  - Northwest, Arlington, WA 7/11-15
  - AirVenture OSH, Oshkosh, WI 7/23-29
  - MERFI, Marion, OH 8/25-26
  - Virginia, Petersburg, VA 10/6-7
  - SERFI, Evergreen, AL 10/5-7
  - Copperstate, Casa Grande, AZ 10/25-28
- Sonerai 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, money order, or PayPal (at the email address on the front page) for \$25.00. Postage is included.
- Back Issues: **Sonerai Newsletter** back issues are now available in three forms. The first is a CD which contains all of the complete newsletters published by Ed Sterba from 1987 through 1995 in ".pdf" format. It costs \$40.00. The second is a CD which contains complete copies of all of the newsletters published from 1996 through 2006, also in ".pdf" format. The cost is \$50.00. If you buy both CD's, the package price is \$75.00. 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 2006 (That's 50 issues!). If you want any of the above, send me a note requesting the ones you want and cash, check, money order, or PayPal for the correct amount. Postage is included.

## IT'S THAT TIME OF YEAR, AGAIN

I know, it's a bad time of the year, with taxes coming due and Christmas bills to pay, but it's time to renew your subscription to the **Sonerai Newsletter**. It's only **\$15.00** (yep, it's gone up a buck to deal with the past several postage increases, and increases in printing costs, but it's still one of the lowest priced newsletters around). So, before you throw it away, check the mailing label on the envelope. If it says "PD06", you'll

need to send me money. If it says "PD07", "PD08", or "PD09", you are good to go. As usual, I accept cash, check, or money order. Please make the check or money order out to "Fred Keip" and mail it to me at the address on the front cover. For those of you who don't wish to deal with the Postal Service, I now have a PayPal account. Use the email address on the front cover. And thank you for your support.

## HOW 'BOUT A FREE SUBSCRIPTION?

That's right. Here's a way to get a one year subscription for FREE. Just send an article along with photos of your airplane, and any innovations that you may have developed. When I publish your article, the following year's subscription will be on me. I'm really in need of airplanes to feature, like Mark Dean's airplane in this issue. And, of course, articles on anything Sonerai related are really appreciated. Send them to me via email or snail mail, in electronic or manual formats. I can work with them all.

For their contributions to the 2006 newsletters, I'd like to thank Mike Then, Dave Bubolz, Mark Thomas, Paul Mombourquette, John Stewart, Roger Godfrey, Ivan Martinez, Ed Schrom, Gordon Eslava, and Bob Barton. You guys will notice that you are now good through 2007.

## VW AIR RACING

Are any of you interested in racing your Sonerai? I'm not talking about Formula V, but rather cross-country racing. Jeff Lang is in the process of organizing a racing class for airplanes powered by VW engines. Tentatively, the first race will be integrated into the AirVenture Cup race that is run just before the EAA Convention each year. The race is normally run from Dayton, Ohio to Oshkosh with turning points at Rock Falls and Rockford, Illinois. Since the race distance is probably longer than most of our airplanes can handle, a stopping point at mid-course will be set up to allow refueling. To make all of this work worthwhile, Jeff needs to get commitments from enough people to set up the class. If you are at all interested, contact Jeff at [jeff@sonic-art.net](mailto:jeff@sonic-art.net), or go to this website and sign up: <http://vwairracers.proboards98.com/index.cgi>. We'll have more information in the next newsletter, so stay tuned.

## ALL ABOUT MARK'S ILS by Mark Dean

*Back in early December, Mark sent me a short video clip of his Sonerai ILS taking off and flying around the patch. We've been communicating by phone off and on for a couple of years, which always amazed me since Mark lives in New Zealand. And the phone calls were never short. I often wondered what they cost. Anyway, here's Mark's response to my request for photos and info:*

Hi Fred,

Her empty weight is 551 lbs including starter motor and battery, which is good for a "stretch" as she has a good full instrument set and radio. I guess the light weight of the motor helps. The motor's been dynoed on the bench at 85hp. I replaced the standard exhaust with a 4 into 2 into 1 which sounds awesome from the outside, but riding in it I think is just a little too noisy, as after 1/2 an hour gets a bit annoying, so I'm looking at some sort of light weight free-flow silencer. She was first flown and tested by a pilot with 4500 hrs and 400hrs aerobatic time, and usually fly's an RV-4 nowadays. He is also building a "stretch two" which should be finished around Jan/Feb. After a few hours in the plane, he is really pleased to have picked this plane to build, especially using a Jabiru. Climb is 1600 ft/min, and if you pull the stick back at cruise, she keeps climbing at 2000ft/min for quite a while. We got an average of 129 kts (148 mph) on the GPS after a back to back run, but with a passenger it's only 112 kts (128 mph) with a climb of 1000ft/min. As you can see from the clip she doesn't take long to get off the ground with just the pilot. Crosswinds don't seem to be a problem as you will never run out of aileron, and there is a more than adequate rudder. Luckily I didn't have to do any trimming to the ailerons or rudder as on the first flight he found she flies very true, and when he took his feet off the rudder, she still flew reasonably straight at only half a ball out. The only adjustment being to the stabilizer, it ended up about 1/4" up from the bottom of it's travel. When he stalled it, it just mushed down without feeling unstable, or trying to drop a wing. He's been rating me in it now, and so far I have found this airplane doesn't suffer fools, and if you can fly her accurately you will be rewarded with such a beautifully handling aircraft. But, get too sloppy and you will get bitten, as I found out when I first started flying her. I think I'm lucky to have such a good instructor! Hope this isn't too long winded.

*After receiving this info, I asked a couple more questions:*

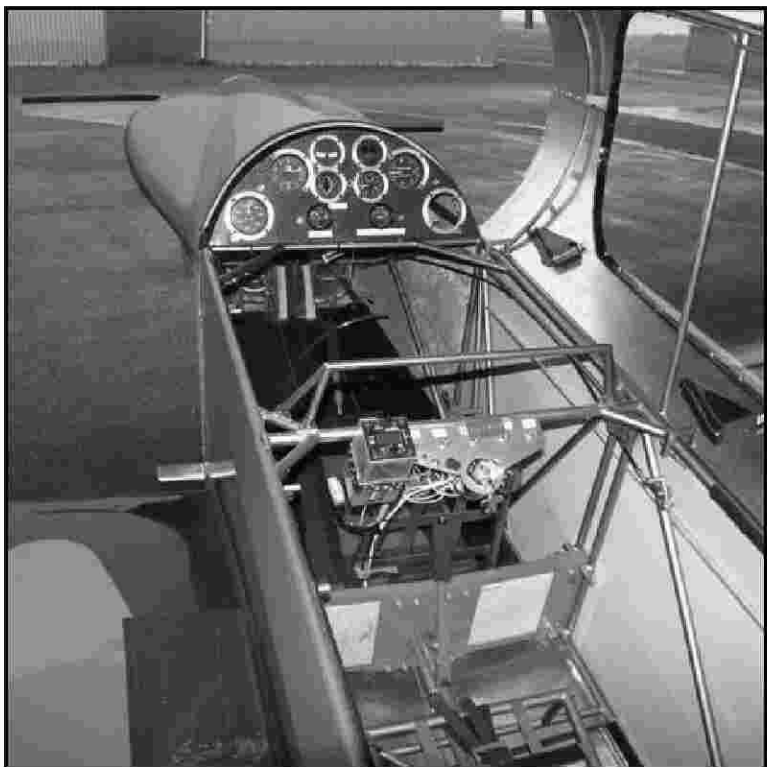
*Thanks for the words and the photos. Great looking airplane! Is the cowling a modified Sonerai cowling, since it's definitely not the cowling that comes with the Jabiru firewall forward kit? Also, has the engine been moved forward from the VW position? Here's Mark's response:*

Yes, the cowl started of as an original Sonerai cowl as there are 5 of us building. We all went shares in a cowl and then used it as a plug. We think the standard cowl with the cheeks gives the little plane character. We did have to alter it, though. We pushed it out around the sides where the pipes come out. As you can see in the photos, the cowling looks a little more curvey, and also we had to raise it slightly on the top front over the Jabiru cooling ducts, and we had to add close to 4" to the back of the cowling as we did have to mount the engine about the same amount forward for C of G. I can't quite remember the exact figures but I will sent you the drawing that we got from Jabiru of the engine mounts. We just copied the mounts from the drawing as the calculations we did ended up in the ballpark of their engine mount. The C of G ended up pretty good at 9 with me and 45 liters (12 gallons) and about 15.5 with me my wife and 40lbs baggage and 5 liters (1 gallon). Although the passenger seems to make bugger all difference, that worked out just fine which also meant that I didn't have to move the battery from just behind the firewall. That saved a few pounds with a lighter battery and shorter leads, do you have a battery with electric start, or start it by hand? Is it hard to start by hand?

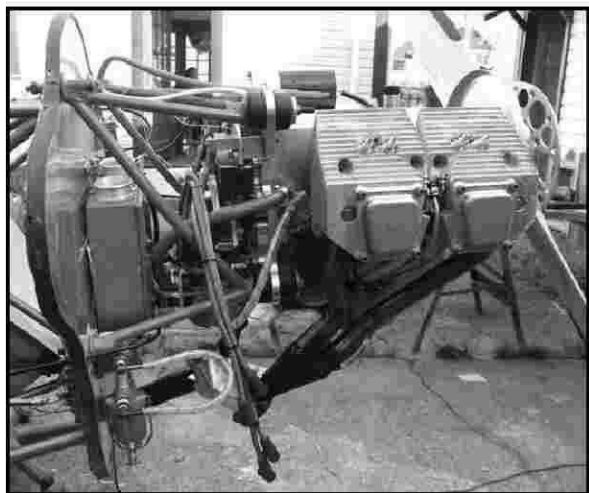
Mark Dean  
Palmeston North, New Zealand  
[mnwdean@slingshot.co.nz](mailto:mnwdean@slingshot.co.nz)



This is what it will look like after Mark passes you, only he'll be getting smaller and smaller.

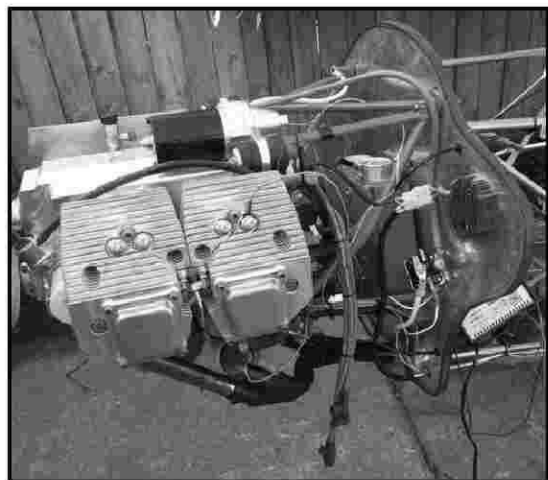


A very minimalist, light-weight cockpit with a well-equipped VFR instrument panel. The little black-faced box to the left of the rear panel is a Microair comm radio.



The RH side view of the Jabiru 2200 engine installation. Note the engine mount configuration and the 4-2-1 exhaust manifold.

Here's the LH side view of the Jabiru.. The compactness of this 85 hp unit is obvious.





## COOL "GLASSES" by Jeff Lange

*Back in early November, Jeff reported some of the performance numbers from his Sonerai I with its new 2110 cc VW and Prince prop, and they were impressive: like 174 mph TAS at cruise and 197 mph TAS flat out. (I hope to feature Jeff's airplane in an upcoming issue) His engine temps were also quite low, so I asked him for some specifics on his installation, and he sent the following tidbit:*

Hey Fred,  
You had asked about my baffles a while back. Here are the cool "tin" replacements I made and how I did it. I got the idea off of a KR2 website somewhere. The photo sequence should show all the steps necessary to make these lower baffles.

The idea of my entire cooling system is that no air will get thru the engine compartment without doing its fair share of work. I also removed my cowl flap with the FWF overhaul since it did next to nothing for me. One of my next experiments is to reduce the size of the inlets to reduce cooling drag further.

Jeff Lange  
Oshkosh, WI  
[jeff@sonic-art.net](mailto:jeff@sonic-art.net)



Photo 1  
Start with lots of masking tape

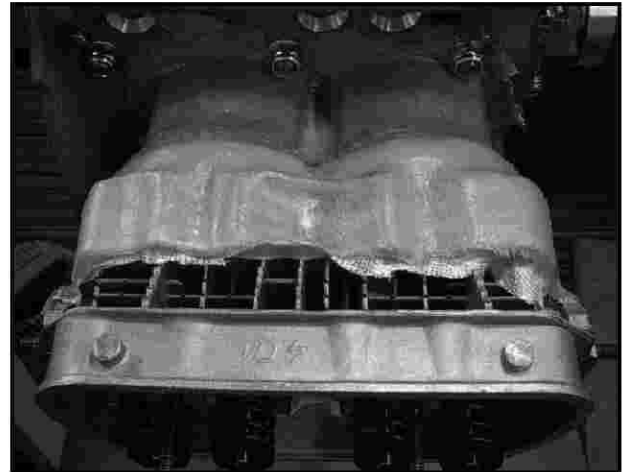


Photo 2  
Then, fiberglass and West Systems epoxy



Photo 3  
The rough product.



Photo 4  
The finished product - trimmed, painted and installed (retained with safety wire)

## MORE FAQ'S (FREQUENTLY ASKED QUESTIONS)

**Question:** What is the easiest, or best, process to use for welding up my fuselage?

**Answer:** There are three basic welding processes used to weld thin-wall steel tube fuselage structures, today. They are oxy-acetylene (or gas) welding, TIG (Tungsten-Inert-Gas, or heliarc) welding, and MIG (Metal-Inert-Gas, or "wire") welding. I don't think any one welding method is easier, or better, than the rest. I've always used oxy-acetylene because the investment in equipment was the most reasonable. A friend of mine has welded fuselages using both TIG and oxy-acetylene, and often prefers oxy-acetylene, in many cases, because he can get better access to a joint. He doesn't like MIG because it's too easy to lay down a nice-looking weld that doesn't have good penetration. That's not to say that MIG is bad. It just takes the development of the proper skills to get it right. Anyway, I guess it comes down to how much you are willing to spend on equipment, and what you feel the most comfortable with.

**Question:** What is the best technique for welding my fuselage so that when I get done it's still straight?

**Answer:** Back in the "good old days" when I was doing volunteer work at the old EAA museum in Franklin, WI, I was taught by Bill Chomo (who was the best gas welder I've ever seen) to weld the basic fuselage structure in a spiral pattern starting at the nose and ending at the tail. The spiral pattern tends to cancel out the welding distortions, so that the fuselage is reasonably straight when you're done. The spiral pattern goes like this: Start at the firewall station in one corner, say the upper right. Completely weld that cluster, then move to the upper left, and weld it complete. Then do the lower left, and finally the lower right. Next move back one bay, and weld the clusters in the same sequence (upper right, upper left, lower left, and lower right). Do that sequence at each bay until you're done. I've done two fuselages that way, and it works.

**Question:** Now, that I have all the clusters welded, I've found that the welding has bowed the lower longerons in toward the centerline of the fuselage. What's the best way to fix them?

**Answer:** Having the longerons bow towards the centerline of the airplane during welding is normal. All of the welding is essentially on one side of the longeron, so the shrinkage of the welds will draw

the longeron in. Heating the outside of the longeron at each weld joint to a bright red and allowing it to cool will pull the longeron back out some, but not all the way. What worked for me was to have the fuselage sitting on a pair of horses. Then, I sat on the floor half way between a pair of clusters, put one foot at each cluster, and grabbed the longeron halfway between and gently pulled the longeron outward to straighten it out. Actually, you want to go between 1/4" and 3/8" beyond straight so that when the fabric is shrunk, it'll pull the longeron back straight. It's really not as hard as you might think.

**Question:** I'm confused by the different allowable load factors and gross weight limits that are published for the Sonerai II's. Can you clarify them a little?

**Answer:** Simply put, the allowable g-load for the Sonerai II (all versions) with the modified-A, B, or S wing is inversely proportional to the gross weight of the airplane. The airplane is designed for +/- 6 g's at the 750 lb aerobatic gross weight. At 950 lbs gross, the allowable g-load is 4.7 g's (the FAA defined Utility Category load is 4.4 g's). At 1150 lbs gross, the allowable is 3.9 g's (the FAA defined Standard Category load is 3.8 g's). What it all means is that if you load your airplane to 1150 lbs, and go out and pull 3.8 g's, the stresses that the airframe sees are the same as doing 6 g aerobatics at 750 lbs.

## DIRECTORY 2006

ISSUE	TITLE	SUBJECT
JFM '06	Happy New Year	Misc
JFM '06	Renewal Time!	Misc
JFM '06	Looking for Some Help	Misc
JFM '06	My First Flight/Then	A/C Report
JFM '06	Fuel Tank Support Tube Fixture/Bubolz	Fuselage
JFM '06	My Fuel Tank/Thomas	Fuel System
JFM '06	Fred's Tailwheel Assembly	Landing Gear
JFM '06	Directory 2005	Misc
AMJ '06	Getting Ready	Maintenance
AMJ '06	Paul's First Flight/Mombourquette	A/C Report
AMJ '06	Azusa Wheels/Stewart	Landing Gear
AMJ '06	N772MT's Electrical Schematic/Then	Electrical
JAS '06	Going to Oshkosh?	Oshkosh
JAS '06	Back Issues Update	Misc
JAS '06	Roger Godfrey's 2 <sup>nd</sup> First Flight/Godfrey	A/C Report
JAS '06	SWRFI 2006/Martinez	Traveling
JAS '06	Offset Dimpler/Schrom	Wings
JAS '06	Jacking 'Er Up	Maintenance
OND '06	Oshkosh 2006 Report	Oshkosh
OND '06	Aerobatics in My Sonerai II Midwing/Eslava	Aerobatics
OND '06	FAQ (Frequently Asked Questions)	Fuselage
OND '06	FAQ (Frequently Asked Questions)	Engine
OND '06	FAQ (Frequently Asked Questions)	Controls
OND '06	FAQ (Frequently Asked Questions)	Fuselage
OND '06	Starting/Barton	Engines

# WANT ADS

*These Ads are provided as a service to you, the subscriber, and are free of charge. I only ask to be informed when the Ad is no longer valid, and needs to be removed. Thanks.*

**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!!

**WANTED:** Sonerai I complete airplane or well-along project. Solid

workmanship and light weight. Bill, [machouse3462@sbcglobal.net](mailto:machouse3462@sbcglobal.net) (2/06)

**FOR SALE:** Monnett Electro-X engine mount, \$150; alternator for Electro-X mount, \$25; GPASC Y intake manifold, \$25. Jordan Klein Sr., 352-288-6060, [jordan.sr@comcast.net](mailto:jordan.sr@comcast.net) ....(3/06)

**WANTED:** Misc Sonerai 2 Parts. Landing gear, Hydraulic brakes, Cowling, Fuel tank, 2180cc Engine, Tail wheel, Prop, Spinner, Wing spars, ribs. I am building a 2 Stretch. Tim Patterson [baja74vw@aol.com](mailto:baja74vw@aol.com) or 701-746-1312 (4/06)

**FOR SALE:** Sonerai IIL, TT316 hrs, TSTO 145 hrs, 1834 VW 60 hp @ 3400 rpm, A&P owned, always hangared. Must sell, \$8500 obo. Lycoming O-235-C1, runout and disassembled, \$2000 obo. Ken Christian, 660-263-7937. (4/06)

**FOR SALE:** Sonerai I project. Approx 80% finished overall, have most parts to finish except cover. For more info write to this address: Dan Maiott, 13152 Washburn Rd., Otterlake, MI 48464 with mailing address and phone. Would consider trade for Mini-Max project. Approx value \$3700 - \$4000 (4/06)

**FOR SALE:** Great Plains 1700 VW long block with 3 degree tapered prop hub, purchased new and never installed, \$1500.00. Also, 130 HP Subaru EA81 long block disassembled. Dual port heads, forged pistons, stainless steel valves, etc. All machine work performed by Ram Performance, \$3300.00. Russ Pratt, 9819 Skycrest Dr., Boise, ID 83704, 208-377-0244, [russ\\_pratt@fastmail.fm](mailto:russ_pratt@fastmail.fm) (1/07)



**Densil Baker's Sonerai II**

We reported Densil's first flight in the last issue, and here's a photo of the airplane.