

SONERAI NEWSLETTER

OCT-NOV-DEC 1997

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(AFTER 6 PM CST)



JIM HARDY'S SONERAI I

OSHKOSH '97 REPORT

For those of you who didn't make it to Oshkosh this year for the EAA Convention festivities, you missed a really great time. The weather, which was warm and sunny most of the week, was the best that I can remember in the 20+ years I've been going to the event. I was there from the Monday before it started until the following Monday, when I got to chase a thunderstorm home. I tried to spend about half of each day hanging around the airplane, and enjoyed talking to many you.

We had eleven Sonerai drivers show-up with their airplanes during the week that I'm aware of. There was a rumor of another one but I didn't find him. They were as follows:

Chuck Stottlemeyer	IIL	N59CS
Roy Adams	II	N610BS
Fred Keip	IIL	N99FK
Jon Hubbell	IIL	N94TL
Richard Bowie	II	N113RB
Fred Flynn	II	N86FF
Jim Meier	II	N93ST
Lou Novak	IIL	N38NL
Jim Phillips	II	N63JP
Kevin Woolridge	II	N10GX
Dave Patterson	I	N88FV

The Sonerai events all went pretty well. The forum Thursday evening was very well attended for an evening forum, and there were lots of good questions. I hope it was valuable to everyone. The Saturday noon Back Porch Gathering was pretty sparsely attended, and was interrupted by the B-2 and SR-71 fly-bys. And finally, the 25th Anniversary

Bash at John and Betty Monnett's Hangar Friday night was a really great time for everyone. There was good food, good drink, and best of all good conversation with new and old Sonerai people alike. I'd like to thank John and Betty for all of us Sonerai-ophiles for everything.

Otherwise, with all the stuff to look at, I found that the one new airplane I was really attracted to was John's new Sonex and particularly the 80 hp Jabiru engine on its nose. I tried really hard to convince the Jabiru guys to provide an engine on long term loan for me to try in the Sonerai, but they wouldn't give in. What was really interesting was their statement that next year they are coming out with a 125 hp six cylinder engine that will weigh 175 lbs complete. Imagine that in a Sonerai. Wow!!!

FIRST FLIGHTS

- Don Archangeli from Saginaw, MI reported to me at Oshkosh that his Sonerai IIL had flown for the first time just prior to his departing for the convention. Doug Dodge of One Design fame flew it and the flight went well. Don was, of course, anxiously awaiting his return home so that he could fly it. Congratulations, Don. (How about a photo and note on how it's going?)

- Jim Hardy called to tell me he flew his Sonerai I on September 6. He then followed up with a photo (see the front page) and the following note: "I bought s/n 0080 Sonerai I project in December '91. The project was started back in 1972 and signed off for flight by the FAA on Aug 28, 1997. 25 years after the project was started, and 25 years after the design was introduced. As you could imagine, it has a long, and sometimes comic, history. The first flight of N72133 was on 9/6/97. It's easy to see why the design endures. Great fun, fast, inexpensive (under \$7000) flying machine. Everything is as per plans, no electric, no nothing. Keeping it light (479 lbs empty), it performs well on the intended 1600cc VW engine. I can't really say exactly how many hours were spent on the project, but I now know why other builders always make room to thank their spouses! Thanks Marcia." Jim lives at 106 Newton, Valley View, TX 76272, 940-726-3424.

LOOK MA, I'M A GLIDER PILOT! or OIL'S WELL THAT ENDS WELL

By Danny Kight

After 280 happy hours in my Sonerai IILT "Miss Mary", it happened...an honest to goodness, non-simulated, total engine failure. On the morning of May 10, I was preparing to fly to a neighboring airport for a Young Eagle rally. The weather was clear but cold, about 40°F.

My normal "starting dance" is to preflight the plane but leave the tail tied down and the brakes locked, since I hand prop it. I prime the engine, check ignition off, pull the prop through several blades, make it hot, check the throttle position, then flip the prop until it starts- usually 3 or 4 blades does it. With the engine idling smoothly, I verify oil pressure, and untie the tail. Then I walk around to the front of the wing. Before stepping into the cockpit, I look on the ground under the engine to make sure nothing is leaking. This habit has saved my bacon (and the engine) on two previous occasions. On this day, however, a friend offered to untie the tail for me. Grateful for the offer, I started the engine and immediately climbed in the cockpit. Had I taken that final glance, I would have seen the stream of oil pouring from under the cowling.

In the cockpit I put on my harness, turned on the radio and loran and checked in with flight service. Winds were favoring runway 17, so I released the brakes and taxied the short distance to the hold short line. During the runup everything was in the green, so I announced my intentions to aviate, turned onto the runway, and opened the throttle. Passing 60 kts, I eased back on the stick and lifted smoothly into the clear morning air. Speed stable at 70 kts and most of the runway behind me, I turned left, paralleling the intersecting runway 5/23. Just before I made the turn I thought, "This would be a really ugly place for an engine failure!", since there is nothing but trees and a small gully straight ahead. Thirty seconds later, on course and climbing, I was about 1/2 mile from the airport at 800' thinking what a beautiful day it was, when the engine made a strange laboring sound and abruptly stopped! Strangely enough, my first response was not shock or panic, but disbelief. "Hey, it's not supposed to do that!" The adrenaline kicked in a split second later as I realized THIS IS NOT A DRILL! I lowered the nose and set up for best glide. The airport was still within easy gliding distance (man, what a beautiful sight!), so I turned directly for runway 23 and considered pressing the mike button to declare an emergency. I also considered the

paperwork that would be involved, the possible cost of calling out the emergency crew, and the probability of seeing my face on the front page of tomorrow's paper with the accompanying article about "those home built death-traps". I pressed the button. Instead of "MAYDAY", I declared that I had made a slight change of plans and was landing on runway 23. Lined up on final, looking past the inert piece of Ed Sterba's handiwork on the nose, the only question left was, "do I put it on the numbers like I usually do, or do I land long so I don't have to push it as far?" Silly question. The landing was a squeaker and I coasted to a stop just beyond the runway intersection close to the terminal building, ala Bob Hoover. Nobody was watching. I announced that 622DK was down and clear. Flight service thanked me and told me to have a nice day. Right.

When I climbed out of the glider, I finally saw what the problem was. Oil covered the entire belly, wheel pants, rear fuselage and tail. What a mess!

My engine is an 1835 cc with full flow filter and cooling. The oil goes from the pump through 3/8" lines to a Fram PH46 filter (mounted on the air baffle beside the Zenith carburetor) to the firewall mounted cooler, then back into the front of the engine. The leak was easy to spot. The gasket around the filter had blown out, causing the engine to bleed to death.

As I mentioned, this was actually the third time I have had trouble with the oil system on this engine. The first two I caught on the ground. Two winters ago I cranked the engine and the oil cooler blew out. Hmmm...must have had a weak spot in it. I replaced it with a new one and everything was fine until last winter when I cranked it up one cold morning. Another cooler in the scrap heap. All right, all right, it's not the cooler, it's the system design. Too much back pressure on the cooler. I rerouted the oil lines to the current configuration of filter first, then to the cooler, then back to the engine. I also switched from 30W to 10W-40 oil. Problem solved. Right.

This time I talked to everyone I could find about VW oil systems and why I am still having this problem. Steve Bennett recommended eliminating the filter and changing the oil more often. That would cut some back pressure, but I hate the thought of running any engine without a filter. A very knowledgeable friend and longtime VW mechanic told me to check the oil pressure relief plungers. He said he has seen many coolers blow in the winter, especially when an aftermarket pressure relief kit is

used. He said the stock VW plungers are ground to the correct size, but the aftermarket plungers use cheaper steel and are cadmium plated. The thickness of the plating is not controlled very closely, and some can end up too large. The spring in the kit is also stiffer, which raises the oil pressure above stock. When the engine is first cranked, especially in cold weather, the plunger can hang in the bore momentarily. This combined with the cold, thick oil can cause a pressure spike that blows the cooler (or filter gasket).

Since the problem is much more common when the weather is cold, I checked the coefficient of thermal expansion for the carbon steel plunger and magnesium alloy case. It all makes sense. The steel expands/contracts 6.7 micro inches/inch/degree F while the magnesium expands/contracts 14.5. This means that as it gets colder, the bore contracts twice as much as the plunger. If it is already a close fit, the plunger sticks, effectively plugging the oil pressure relief holes.

Back in the shop, I disassembled the engine and removed (you guessed it) the aftermarket kit I had installed when I built the engine. I replaced it with stock VW oil pressure relief parts. Then I started assessing the damage to the rest of the engine.

Amazingly enough, the Force One hub bearing was the only thing seized up in the engine. The hub cleaned up OK. The crank was miked and was OK. The main and rod bearings showed minor signs of distress and were replaced. While I had the innards strewn around the shop, I also replaced the connecting rods since there was a little bit of slop on the top end. Precision balanced, rebuilt rods for a VW are \$9 each from NOPI in Atlanta (800-277-6674). In fact the entire rebuild--- rods, bearings, seals, gaskets, oil plungers, oil lines, fittings, vat cleaning, repainting the case, and new engine mount bushings cost me about \$175. I love telling this to the guys flying Lycomings! Last weekend, I reassembled everything and broke in the new bearings by orbiting the airport for an hour at 3000 ft. I'm happy to say that everything works like it should.

OK, so what can we learn from all this? First, the plane has EXPERIMENTAL written on it for a reason. Although it is similar to other Sonerai's, every plane is still a hand-built one-of-a-kind piece of machinery. Learn as much as you can about your particular bird. It may well save your life. Second, use all the resources you have. I thought I had figured the problem out on my own the first two times. Third, all that emergency training really does pay off. I was

cool and focused because I was prepared to handle a dead stick landing. Well, OK, being within gliding distance to the airport helped a lot too.

A fellow recently asked if I was scared of my airplane. "No", I said. "I always respect it, but I'm never scared of it." Well, almost never.

*Freditorial Comment: Thanks, Danny. Great story! As a VW engine affectionado, I have collected several manuals and catalogs over the years that contain a wealth of valuable information that will be useful to anyone using these engines. One of the best is the **Gene Berg Enterprises Catalog and Technical Manual** (call them at 714-998-7500). The information in this book is the result of 30+ years of testing and experimentation by Gene Berg on all type 1,2, and 3 engines, so what he says is based in fact. He raises one important point about full-flow oil filter systems on VW's that we all need to consider. They must be capable of operating at full pump output pressure. Depending on the size of the pump, it is capable of producing from 125 to 300 psi. It is this pressure that your oil filter (and oil cooler, if plumbed downstream of the filter) must deal with. Granted, there will be line losses and such in the system, but the pressures are much higher than what is indicated on the oil pressure gauge. Gene only recommends the Fram HP1 filter, as it is the only one designed for these pressures. All other automotive filters are not.*

Secondly, I question the wisdom of running the oil cooler in the same loop as the filter. It is possible in cold weather that the oil will never get up to proper operating temperature. The VW engine was designed to bypass cold oil around the filter until it was warm enough to require cooling. This means that a remote cooler should be plumbed into the top of the engine to take advantage of the engine's bypass ability.

My own personal philosophy on my engine installation is based on my experience with my 1972 VW Super Beetle and my belief in the KIS principle. First, I think the cheapest and most reliable oil filter is to change the oil every 20 to 25 hours. I drove my Super Beetle for 12 years and put 167,000 miles on it, never had to split the case, and did its only top overhaul at 105,000 miles. It never had an oil filter. The oil was changed religiously every 3000 miles, and 25 hours on a car is equal 1,250 miles at 50 mph. Besides, how much does a fully plumbed oil filter system weigh? Secondly, I don't like hoses. They provide too many places for oil to leak from, particularly given the high vibration environment of an

airplane. That's why my oil cooler is bolted to an adapter plate on top of the engine, where it can use the engine's bypass capability.

Now, I realize there are many different ways to make things work on our little airplanes, and I'm not saying one was is right and the other is wrong. My goal is to present alternatives, so you guys can make intelligent choices, and have safe, reliable airplanes.

SECONDARY IGNITION

One of the significant things I've learned while building and flying my Sonerai IIL is that as you get older, you get more mortal. I can remember when I first started building how I was going to do all of these aerobatic things with the airplane. How I was going to do a full blown flutter testing series. All that great, risky stuff. Then, when I got her done, I was hit with the realization that it was my butt sitting in the seat, and it could very easily get busted if I wasn't really careful.

The same goes for my philosophy on the engine configuration. Early on, system redundancy was not extremely important. Even though factory certified engines have dual ignition systems, a single magneto on the Sonerai was good enough. Everybody else was flying their Sonerai's that way. And I flew that way for over ten years. Well, after ten years I was beginning to realize that the "mortality factor" had increased again, and I was getting less and less comfortable flying with a single mag, particularly over those areas where emergency landing fields were few and far between. It probably didn't help either that I kept hearing all those stories of mag failures on Continentals and Lycomings.

So, this past spring I bit the bullet, and called Steve Bennett at Great Plains Aircraft Supply to order his fixed-timing secondary ignition system. After a couple of weeks of patiently waiting, the box of parts arrived and I was pretty much ready to go. This is a really simple system to install, and can actually be done in just a few days, once the heads are drilled. It consists of a custom-made aluminum distributor body which mounts in the distributor hole on the VW crankcase. (This, of course, requires the installation of the VW distributor drive assembly. It just drops in.) Inside the distributor body are two hall-effect sensors which control a pair of dual-output ignition coils. The hall-effect sensors are basically switches which pass current until a small magnet passes near the sensor. While the magnet is near the sensor, the

current is shut off, and once the magnet moves away the current turns back on, making the sensor act like a set of points. The only other parts in the system are four spark plug wires and four NGK 10 mm spark plugs. Of course, I had to add an ignition switch and some wiring to connect the system into my electrical system.

As I said, it was pretty easy to install. First, it was necessary to disassemble the top end of the engine so that the heads could be sent out to have the second set of spark plug holes machined in. I chose the 10 mm size to keep the holes as small as possible. 14 mm holes are also available. Steve had me send the heads to a machine shop in Illinois for the work, and they turned them around in less than a week. The holes are milled into the bottom side of the head, making the plugs accessible from the bottom side of the engine. There is no need to remove any covers or baffling, only the bottom cowl.

Once the heads were back on, the next step was to install the distributor. This requires the installation of the stock VW distributor drive, and it just drops into place. Just follow the instructions in Steve's engine assembly manual. Then, I had to drill and tap the engine case for a #10-32 set screw to lock the distributor in place. Once that was done, I installed the distributor, and set the timing per the instructions. (You'll need a twelve volt test lamp to set the timing.) One of the problems I ran into at this point was that the top of the distributor body interfered with my top cowling by about 1/4". Fortunately, there was enough room in the top of the distributor to allow me to machine it down so that it would fit. (After I told him about it, Steve told me that future ones would be made lower.)

The two dual-output coils can be mounted almost anywhere they will fit. The only concern is that the spark plug wires reach. I mounted mine on the firewall just above the magneto box. I had to make four 1/4" I.D., 3/4" long tube spacers and use four AN4-16A bolts.

All that was left, then, was to wire the system into the airplane's electrical system. It needs a 12 volt supply, and a simple on/off switch. Take a look at Roy Adams' wiring schematic elsewhere in this issue for the connections. Of course, it wasn't really that simple for me. All of my electrical switches are on a panel mounted to the front of the spar carry-thru box in the rear cockpit. It, of course, was not large enough to add another switch, so I had to make a new switch panel. Not a big deal. It just took a little extra time.

So, how does it work? Let me just say that I'm extremely pleased. First of all, the engine runs noticeably smoother at all speeds. Second, it puts out more power. As a matter of fact, I've recommended to Steve that he advertise the system as a "Poor man's turbocharger." If you happen to be a skeptic, here are some real numbers: Without the secondary ignition turned on, my airplane at 2500' msl, with an OAT of 65°F, and 25" of manifold pressure will turn at 3200 rpm and cruise at 128 mph. When the secondary is turned on, at the same altitude, OAT, and manifold pressure, the engine turns at 3400 rpm and cruises at 132 mph. This is repeatable and true throughout the range of operation. What I do now is cruise at 24" of manifold pressure, which gives me the original 3200 rpm and 128 mph. I get the same performance with slightly less fuel burn and less wear-and-tear on the engine. One other thing that I have noticed is that the EGT's are lower while the CHT's have remained about the same. This implies to me that I'm now getting a more complete fuel burn in the cylinder.

What does it all mean? Mostly, I'm finding that the airplane is more fun to fly, because I don't worry as much about mag failures. Redundancy is good! My "mortality factor" had been reduced a little, and I got a performance increase with it. What more could you ask for?

A LETTER FROM ROY ADAMS

Finally got the Sonerai back in the air today, after spending a year and a half building a new engine. Thought I'd share some thoughts with you.

After I found a crack in the old case, I bought a new universal (Brazil) case, and started ordering parts. I was running 92 mm cylinders, but the local VW hot rodder pointed out that 94 mm cylinders have a thicker wall, and have been more durable for him. Seemed reasonable, so I bought those. If using 94mm, you'll also need chrome-moly 8 mm studs.

Steve Bennett, at Great Plains, said he uses counter-weighted cranks on the stroked engines, but not the 69 mm standard stroke ones. It seems to me though, that anything to reduce vibration should add to the life of the engine, so I bought a CW crank from SCAT Enterprises (Redondo Beach CA Phone 310-370-5501) This is a stock VW crank, with welded counter-weights. They also suggested their C20 camshaft, which I bought, along with performance lifters.

I had fairly new dual port, dual plug Mosler heads, so we just cleaned those up, added stainless-steel valves, and SCAT bolt on rocker shaft kit. This eliminates the chance of a stock clip breaking, which I have had happen before. If the stock clip breaks, the rocker slides sideways, and the pushrod comes adrift. Result, one dead cylinder.

Just when I was wondering where to turn for help next, I ran into my friend, Jon. Jon has an A&P ticket (I don't), and used to fly a G4 all over the world for Coca-Cola. He's now working for a machine shop, building Harley-Davidson's for rich Yuppies.

Jon, and his boss magna fluxed all the ferrous parts, re-built my rods, blue-printed and balanced all the goodies. The SCAT crank was supposed to be balanced already, but was way out of balance. Good thing we checked it.

Then I assembled the parts, and hung the engine on the airframe, thinking my work was about over. Boy, was I wrong.

I had never been happy with the left front exhaust pipe. It was tortured to come out of the cowling in the right place, and was causing that cylinder to run rich. I knew I was losing power, and wanted to fix this. I bought a set of Great Plains pre-welded stub exhaust pipes, and installed these. I then closed up all the old exhaust openings in the cowling, and cut new ones to fit. The left front stack required a "bump-out" in the cowling, which was easily done by covering stack with modeling clay, to a uniform 1/2 inch thickness, and laying wetted out glass over the clay.

The next problem was the prop didn't have enough clearance with the bump-out. After discussing this with Ed Sterba, I had a machine shop turn a 1/2 inch thick prop spacer of aluminum. This has an opening in rear to match prop hub, and a 2.75 inch protrusion in front, to fit a matching opening in prop. We just put the existing prop in a milling machine, and bored this hole to accept prop spacer.

Turned out the old (52 inch dia. X 44 inch pitch) prop turned at 3,200 rpm static, so Ed built me a new 54 X 48 prop, and just bored a matching 2.75 inch hole to fit the spacer.

Steve Bennett said my engine crack might have occurred because I had an oil cooler mounted on brackets, hung below the engine, and connected to the block with hoses. Steve thinks maybe the resulting vibration could have cracked the case. I know that everyone who saw this crack, on the

bottom of the case, said they'd never seen one there. In any case, Steve sold me an adapter, to allow the oil cooler to be mounted on the top of the new engine.

After one brief test hop, I have two problems:

- 1) Although the engine ran up to 3,000 rpm static, as soon as I started the take-off roll, the rpm dropped to 2,800 rpm. After I reached climb speed, it picked up to 2,900 rpm. I've always heard it's counterproductive to go full power, with brakes locked, on a short field take-off, because the prop cavitates. I think maybe this may be my problem. As soon as you roll forward, the prop enters undisturbed air, and rpm drops back to its true value.
- 2) I had closed off the air intakes slightly, to make the baffling easier, and to try to cut cooling drag. I was pleasantly surprised to see my CHT was only 350°F on climb-out. However, The oil temp was slowly climbing throughout my flight. Even after leveling out at 2,000 AGL, over the airport, and reducing to cruise, it kept slowly climbing. After it got to 220°F, I reduced power, and landed.

So, after all that work, I still have a couple of problems. Guess that's why they call it "Experimental". When I get some of these bugs worked out, I'll write again.

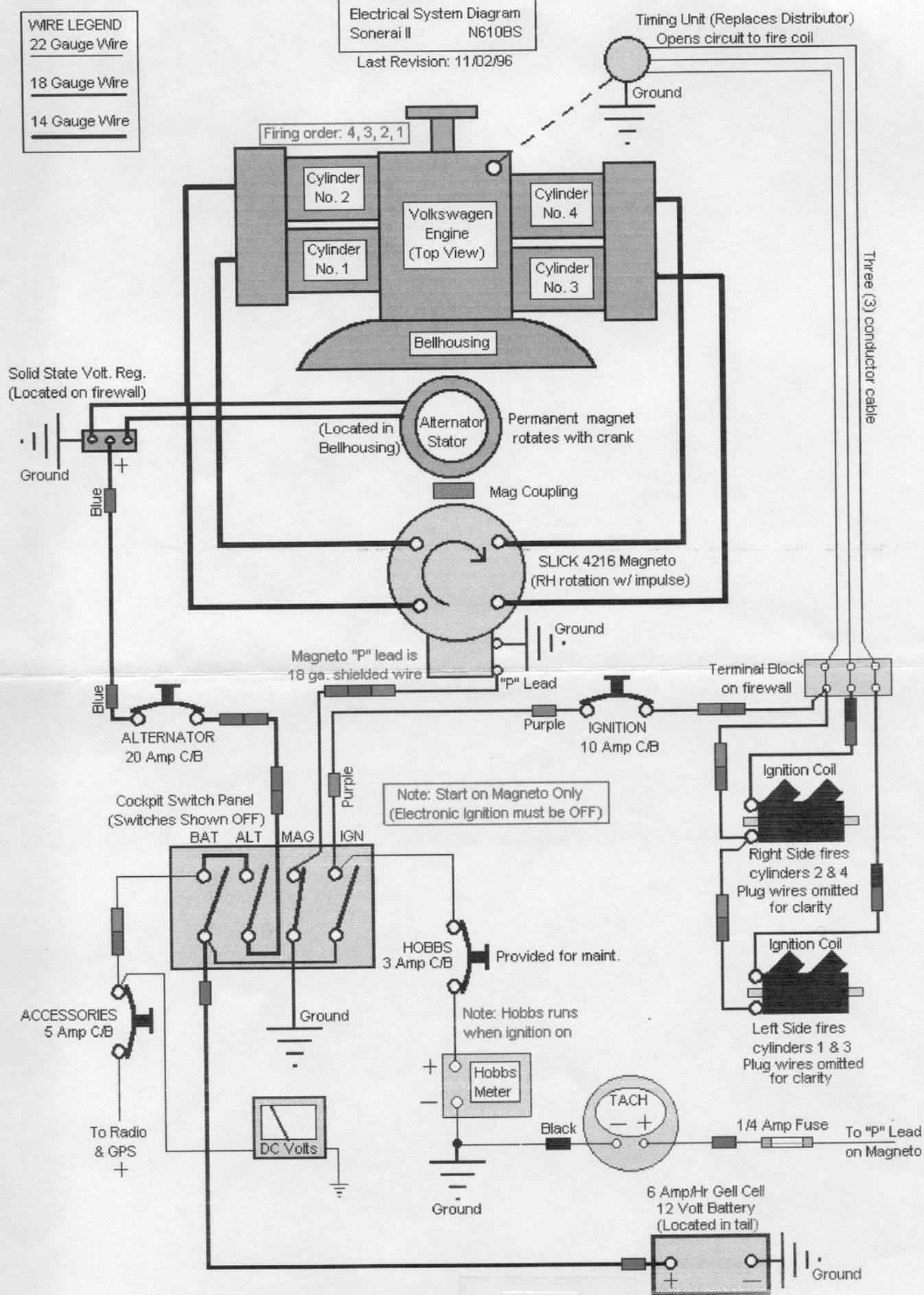
I'm sending some photos, and a drawing of my electrical system. I've made so many changes to this old airplane, I thought it wise to document some of this, so a few years from now, I can refresh my memory. I wrote a Flight Manual to carry on road trips, or in case I come to my senses, and sell this crate.

See ya' at OSH, Roy Adams, Fayetteville, GA

Freditorial Comments: Great letter, Roy. Thanks for the input. This just verifies my philosophy that states: "A Sonerai (make that any experimental aircraft) is only 100% complete when it sold or scrapped." As far as the rpm reduction that you see on take-off, this is a common effect seen with high pitch fixed-pitch propellers. The propeller is not cavitating. You can only cavitate in a liquid. What is actually happening is that a large portion of the propeller stalled when it is not moving forward. As the airplane starts to move forward, the propeller gradually becomes unstalled and is better able to absorb the engine's horsepower. Therefore, you see the drop in rpm as the engine gets loaded up.

WIRE LEGEND
 22 Gauge Wire
 18 Gauge Wire
 14 Gauge Wire

Electrical System Diagram
 Sonerai II N610BS
 Last Revision: 11/02/96



WANT ADS

For Sale - Sonerai I, 4 Hrs T.T., less Engine. \$3,900
Jim Jaeger, Box 438, Kewaskum, WI 53040, (414)626-2611

For Sale - Set of Enginetics brakes with 5" wheels. \$175.00
Dick Foster (515)287-2554

Air Schank Going Out Of Business Sale - New and used Sonerai parts, Engine parts, Tools and hardware, New and used instruments. Call or write for 5 page list.
Bob Schank, 35 Clarence St., Belleville, MI 48111, (313)697-7057 after 5 pm.

For Sale - 1600 VW engine, 0 TT. Disassembled - all new parts. Complete engine. Mexico universal AS41 case, Case inserts. Case machined for Great Plains Force One Prop Hub. Has Force One Hub Parts. Dual Port Heads. Forged counter weight balanced crankshaft. Balanced pistons and rods. Pauter performance cam. Horz oil cooler and adapter plate. \$2100
Bob Schank, (313)697-7057 after 5 pm

For Sale - Limbach 1700 Engine.
Don Brinkley, (414)335-6519

For Sale - Sonerai II midwing, Supervee cowling, Sterba prop, 2100 engine w/ Revmaster prop ext. Also 4016 Slick Mag w/ 100 hrs, and misc. instruments.
Eddie Eiland, 1350 Thunderbrook, De Soto, TX, (214)230-8475

For Sale - 1 Type 3 Supercase by Claudes Buggies, 1 forged crankshaft w/ hub and prop extension, 2 cyl. heads w/ S.S. valves, 1 set NPR piston rings. All for \$500.00
(217)935-5345

Wanted - Variety of good used or new Sonerai parts: cowling, canopy, 5/8" landing gear, spinner, S wing kit. Also interested in a Sonerai III project.
Mike (219)534-2900

For Sale - Sonerai III, A&P built, Dual ign., hydraulic toe brakes, wing mod., much more, AeroVee 2020 w/ 60 hrs.
Russ Larson (406)857-3304

For Sale - Sonerai I fuse. and flt. controls, complete except cover. Wings complete and skinned, 1600 VW rebuilt, SuperVee casting, spinner and prop, L.G., most everything else.
John Ricchio (847)413-4962 or (708)447-0448 evenings.

For Sale - Sonerai I kit, welded fuse., wing kit, cowl, canopy, gear, wheels and brakes. \$2000
John Dialogue (801)571-3063

For Sale - SoneraiII bubble canopy, smoked brown, complete with latches, etc. \$300 (US)

(613)632-9601 home, (514)437-6129 work

Wanted - 5/8" landing gear and fuel tank for Sonerai II.
Jerry Campbell, 722 N. Main, Aberdeen, SD 57401, (605)225-8675

For Sale - Sonerai III, 275 TT, 1834 HAPI, Aerobatic tested, light damage. Must sell \$3750
(309)944-2366 weekends

Wanted - Sonerai engine, instruments, and airframe parts.
Gene Cook, 114 Imperial Ave., Friendswood, TX 77546

For Sale - HAPI motor mt., Bosch starter, Alternator, 3" prop ext, ignition switch, tailwheel assy., taper pins, #8 pin reamer
Greg Jannakos, 994 Vineyard Circle, Stone Mtn, GA 30083

For Sale - Sonerai III fuselage approx. 85% complete. Sticks, rudder pedals in, tail feathers on. \$850.00
Bill Waters (770)466-2464

Wanted - Sonerai prewelded or tacked fuselage with tail feathers. Also, landing gear kit.
Joe Burr, 4098 Eddystone Dr., Cincinnati, OH 45251 (317)827-7195

Wanted - Cont. A65 taper shaft prop hub and professionally welded fuselage for Sonerai (set up for Cont.) Also, I have Bendix mag rotors to correct the S-20 AD. For Sale - Cont. A75-8, 300 SMOH.
John McLaughlin, 25839 Tallwood Dr., North Olmstead, OH 44070 (216)734-5578

For Sale - Revmaster 2100D with prop, all acces. included, starter, alternator, oil filter, carb, eng. mount. \$3975.00
Len (616)676-9711

Wanted - Early style Monnett SuperVee motor mount (not x-mount), 32mm Posa Supercarb w/ needles, AC42 sparkplugs, broken tapered rod tailspring.
Dave Patterson, N 3280 Hwy 146, Fall River, WI 53932

For Sale - Assembled wing spars w/ mod parts, nose rib blanks w/ holes cut. \$900 invested, will sell for \$500.
Frank Dwelley (860)653-7106

Wanted - Monnett Super Vee prop hub extension assembly and magneto/engine mount unit. Please call with price and condition of available parts. Mike Smith (601)324-2801 Daytime

For Sale - 1700 VW Engine. Posa super carb, mag, shielded ignition, Sonerai motor mount, alternator. Sonerai II landing gear complete with wheels, axles, and pants. Gas tank, all flight

instruments, stab. Complete. Prop, spinner and more. Wm. Ziegler, 2 Theresa Ann Court, Albany, NY 12205 (518)869-0137

Taper Pin Reamers For Rent - Brown & Sharp #3 and #5 for AN386-3 and AN386-5 taper pins. \$1.00 per day for both reamers, \$150 deposit.
David E. Wilcox, 517 E. Saratoga St., Gilbert, AZ 85296, (602)231-5824,

For Sale - 1992 Sonerai III, 300TT, dual ignition, electric start, new tires, brakes; has S-mod, basic VFR instruments. Not a show plane, but well built and flies great. \$6000.00 firm. Also have new in the box Bendix/King KX99, Garmin GPS-90, intercom. Dennis Barnette, (601)256-9767 or e-mail at dennis1@mail.tsixroads.com

For Sale - VW remanufactured block, late model, line-bored .010 under, case savers, etc. \$250.00; Rare Sonerai I Rattray cowling, straight cheek, firewall and engine mount to match. Buyer pays freight & crate. \$450.00 Elliot Willoughby, (502)477-2466

For Sale - Sonerai II project, Monnett's N22MX. Disassembled, new Ceconite fabric, 1835 cc engine, prop, spinner. Ready for filler coat, paint and final assembly. 200 hrs TT. Located 20 miles west of Atlanta. (770)949-7789 or DonaldTurner@worldnet.att.net

Wanted: Sonerai IIIS completed and flying, with 2100 engine. Contact Ed Collins, (916)873-4400, or write 261 Chandler Dr., Paradise, CA 95969, or email BEIDMAN@AOL.com

Wanted: Single-port Sonerai intake manifold, Zenith or Ellison Carb, 12" spinner assembly.
Steve Prosser, (702)436-0245 after 3 PM Pacific

For Sale: Sonerai II kit. Welded airframe with tail feathers, flight controls, and gear. 1835 cc VW with Electro-X mount (10 amp alternator), 4016 Slick Magneto, Posa carb, propeller, spars finished, Super-Vee cowling, fuel tank, most instruments. \$2750.00 OBO Zeke Zechini, (703)707-1949(work), (703)830-1046(home), or mark.zechini@lmco.com

For Sale: Complete Sonerai II kit. Fuselage and tail welded, some instruments, all parts to complete except engine and paint. \$3800.00
Ed Torbett, (815)895-3888

Wanted: Any Sonerai parts to help add to Sonerai/KR-1 Museum, tax deductible. Call or write: Tom Hall, 3503 N. Marwin Ave., Springfield, MO 65803, (417)833-6513

For Sale: Repairable Sonerai III, \$2500 w/new canopy. R.S.Wilkes, 11 Schwartz Dr., Ottumwa, IA 52501 (515)682-9692