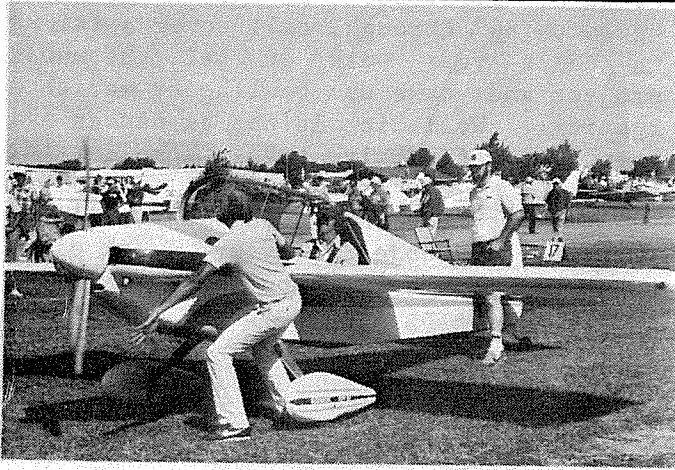


# SONERAI

# NEWSLETTER



Leaving Oshkosh 1987

It always starts on the first pull!

Hello Sonerai Builders and Owners

Welcome to the First Edition of our newsletter. With the demise of Monnett Exp. Aircraft and INAV Ltd. and therefore the end of the Monink and the INAV Ink, I've decided to get this newsletter going in order to try to keep everyone together and informed on these great little airplanes. This first paper will obviously be composed of my ideas on the Sonerai with the hope that it will generate a good response from you all and of course get your comments and perhaps arguments going. As a lot of you know I am from John Monnett's original Ch. 153 in the Elgin/Schaumburg Illinois area and therefore we tend to have quite a few Sonerai's flying or in the works. Most weekends five or more of us are in the air going to breakfast or on a raiding party to some other airport. We usually manage to all fly back together too. The Kenosha Airport Lunch at Ken Flaglor's hanger can draw 9 or 10 of us on a good flying day. So if you are flying a Sonerai I or II let us know how you are doing and if you're still building, well keep the faith and don't give up. They are a great little fun-to-fly machine that won't let you down if you take the time and effort to get them set up right. And that is going to be the theme of this first newsletter.

In the process of building propellers and flying around the Midwest I've talked to a lot of you Owners and one of the recurring problems is the lack of real basic info on the initial set up of the Sonerai for it's first flight and then the debugging of the initial problems that always seem to crop up. Some of these problems are relatively minor and are simply the result of an unfamiliarity with the workings of a Homebuilt aircraft compared to a production plane. In other cases there is a definite problem starting to develop that can be headed off at the pass with a little help.



Ken Flaglor's 1986 Fly-In

Pete Newkirk-Clyde Seager-Dave Rawlings and Cissy-Ed Sterba-Jim Wendal-Paul and Pam Seburn-Bob and Bobbie O'Day-Larry Pritchard-Fred Kiep

Many of the ideas that are going to come out are not mine and I'll try to give credit where due, however a lot of the material has just become common knowledge to those of us working with the Sonerai on a steady basis. So if you feel that I stole your Idea, be sure to let me know so everyone can get credit where it is due.

## Timing

Successful operation of a VW in an aircraft means getting it to run cool and all the time you are in the air. One of the factors some people don't think about that will greatly affect the cooling is the magneto or ignition timing. Let the timing get too advanced and you can have a melt down of all things aluminum. As a general rule the VW with a magneto is pretty happy with the timing set at 25 to 28 degrees BTC but this can be more difficult to achieve than it might seem. The prop hub on my engine has the 28 degree mark stamped by the Monnett people, but I know of quite a few people who have had to find TDC and the other marks on their own. It should be obvious that guessing on the location of the timing marks means that you are guessing on your timing. If you have lots of money that probably is fine but since you are building or flying an airplane that probably also isn't true anymore.

The timing marks should line up with the top split of the case halves. A small piece of sheetmetal can be cut to make this easier. Bringing #1 cylinder to TDC and rocking it back and forth with something stuck in the spark plug hole touching the piston is an OK method of getting it there-- but since the piston is not really moving for several degrees this is an approximate method at best. It is better to find a position about 20 degrees BTC and the same 20 degrees ATC with 0 TDC half way between the two other positions. Think about it, there are several ways to accomplish this objective. With TDC found it is a matter of moving over 25 to 28 degrees on the rim of the prop hub by finding the circumference of your hub ( $5" \times 3.14 = 15.70"$ ) and dividing by 360 degrees to get  $.0436"$  per degree. So 28 degrees BTC is  $28 \times .0436 = 1.22"$  on a 5 inch rim for 28 degrees BTC. Please mark this off in the proper direction!

Now for a real good check on your work, make sure that the ignition is off or that you have the spark plugs removed ( a real good idea ) and tuern the prop until the impulse coupling clicks or fires. It should have a 25 degree retard which means the click should occur just about at your TDC. If not, rethink the whole thing through, call over a friend to check your work or sell the whole project and take up bowling or marathon running. Well, it is not as bad as all that, but definitely needs some careful thought.

One other thing to remember while on this general subject-- your spark plugs need to be gapped at about  $.016"$  to  $.019"$  if you are using a magneto.



Dave Rawlings finding a spot  
at Oshkosh 1987



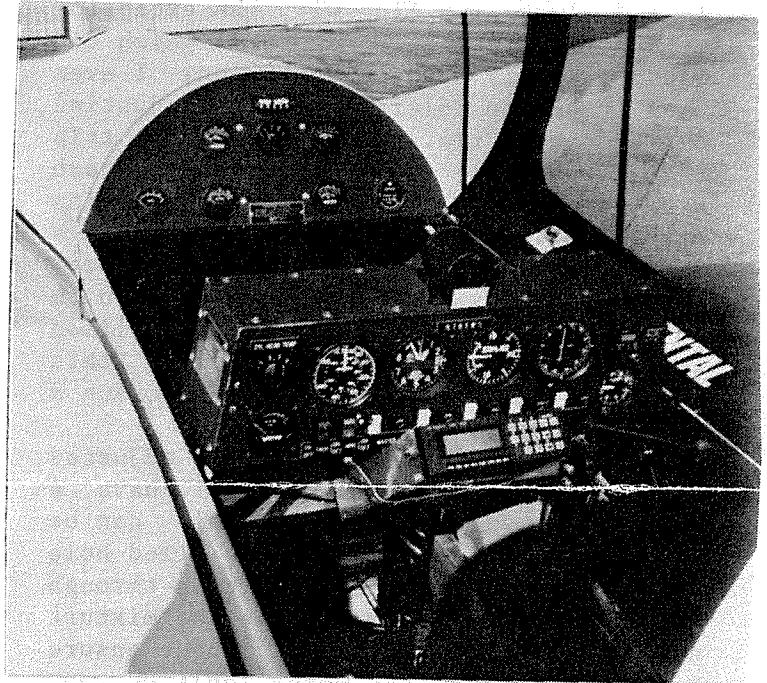
1987 North Central EAA Fly-In  
Bob Brown-Clyde Seager-Jim Wendal-  
Ed Hasch-Art Frank-Dave Rawlings

## Magnetos

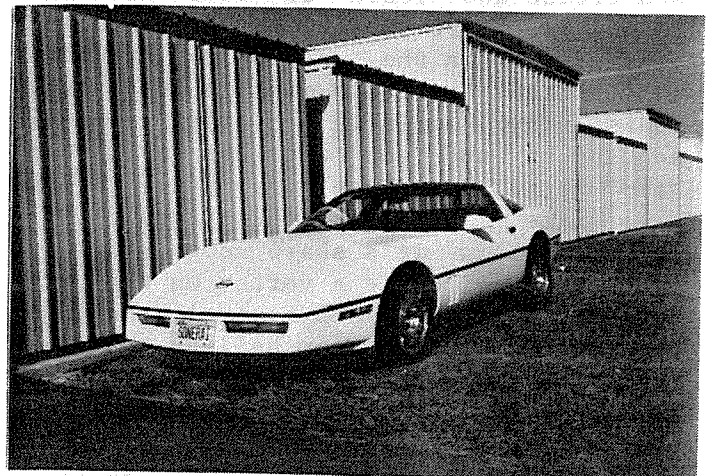
For those of you running the Slick magneto you've probably tended to ignore it because it has functioned well or learned to cuss at it for one of several reasons. I've had several friends go through a few awful weeks of rough running or hard starting that was blamed on everything but the magneto until it was the only thing left to check. First off a deteriorating mag will not always show itself as a solid miss while running.

In the most frustrating case you will tend to get erratic starting. About the time your arm is sore and you can't decide if the Posa is flooded or too lean, you will get a kick or two but it just won't catch. So you get all excited and start pulling that prop through faster and harder till you're all worn out again-- and not a hit, till you're ready to give up again. And of course there is always an Oshkosh size crowd watching and pointing as you and your friends get suckered in time and again. Well friends, we have found that the condenser wire in the magneto is prone to breaking off from stress caused in it's installation. You might also experience rough running while at cruise but not a solid miss. The points will be wearing out real quick also. Installing a new condenser is quite difficult without damaging that stiff wire on it's end. The foregoing is especially true of the newer 4216 or 4216R magneto. In the older 4016 mag, the problem was a very solid miss while at cruise that gradually increased in frequency until you were too nervous to fly anymore. This problem tended to be caused by the distributor in the magneto becoming loose and vibrating itself into dust which could cause carbon tracking, etc. My first mag, a 4016, lasted about 130 hours, the 4216R installed to replace it has operated fine ever since (475 hrs.) The people from Slick have been quite concerned about too tight cowlings getting their fine equipment too hot, so most everyone has put one or two 1" dia. blast tubes on them.

At Oshkosh a few years ago their comment upon hearing our complaints was to ask what temperature we were running our mags at? I told them I was too busy to look at my Stewart Warner Magneto Temperature Gauge while flying such a fast airplane. Give me a break!



Jim Wendal's very nice instrument panel

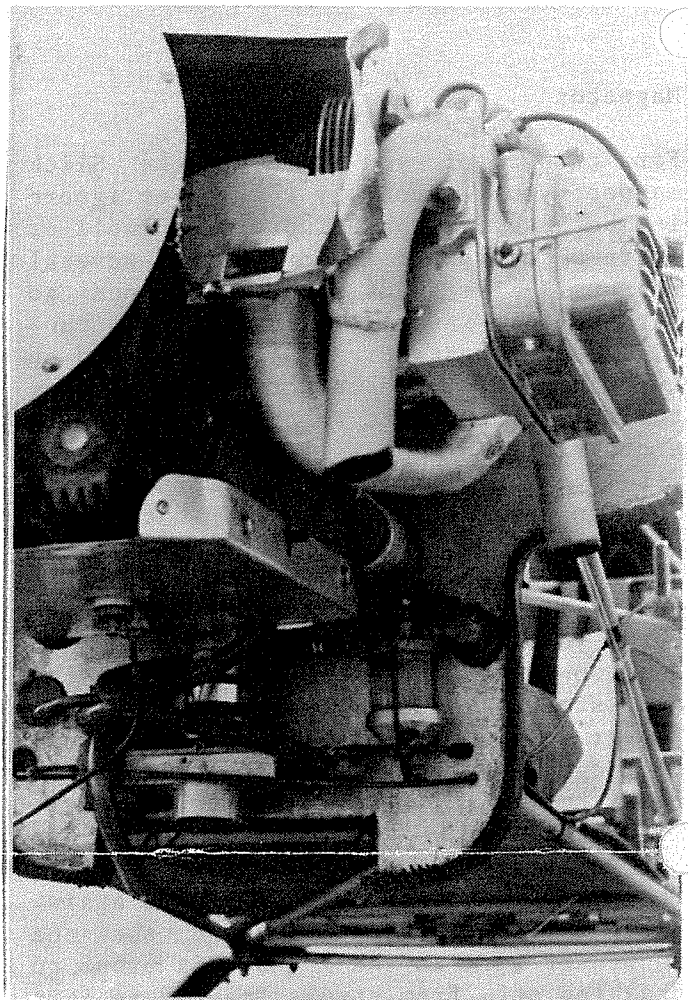


The standard Sonerai accessory

## CARBS

Most people flying a Sonerai with a VW also run the Posa type carburetor. Without a doubt it is simple, cheap and easy to install, but by the same token can be rather difficult to get adjusted. Personally in 1978 I put the darn thing in the manifold, set the #3 needle 9 turns out and fired that old 1850 up. It was pretty much that way until 1982 when I decided to install a mixture control. It had always run fine with the exception of a turned needle one time which did cause slightly erratic operation. I even took it out to Colorado with no adjusting during the trip. It was on this trip that I began to feel that the Posa carb was pretty much an altitude adjusting carburetor. At Walsenburg, Colo. on a rather warm day the idle was quite rich, but on takeoff and in flight it seemed to be normal. Ben Ellison of Ellison Throttle Body fame confirmed this apparent fact in talking down at Sun N Fun a few years ago.

When the standard Posa is adjusted properly for flight you will have a rather rich, lopey idle. This can be cleaned up with an idle air bleed hole drilled in the correct position through the slide. Trying to use the mixture needle to do this will just about ensure a too lean high end which won't do your engine any good. It should be obvious that the top end be correct for takeoff and cruise and learn to live with the idle. Please be careful if you decide to start filing on the needle in order to achieve the "perfect" mixture at cruise. It is very sensitive to this type of adjustment and you will not be able to "add" metal should you go too far. It is also quite important that the edge of the taper maintain it's sharp edge since we are trying to create a vortex on the back side of this needle to control the fuel flow. If you don't believe this try turning the needle about 30 degrees from it's correct position and see how the engine runs. This is why the modification is needed to make sure it doesn't turn.



## My general engine installation

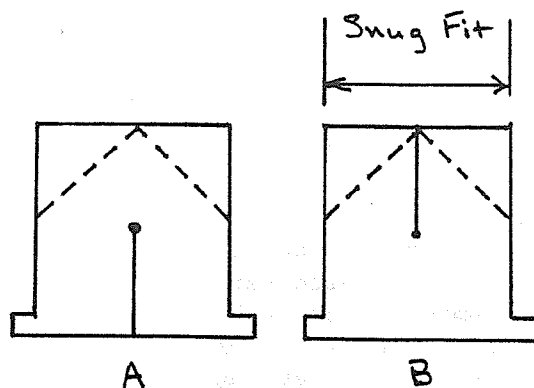
Just a quick word now about the need for carburetor heat and the posa as used on the Sonerai. Most of the people that I know do not have a separate carb heat set up. I know that it is recommended by the carb manufacturer, but we feel that we are already using carb heat since in our installation the hot outlet air from the cowling is being sucked into the carb. In effect we are always using carb heat. More on this in the future and how it relates to icing, octane, ram air and a few other items.



## Fuels

Since most of you will be flying with a VW engine in your Sonerai, this and most of the discussions will be slanted in this direction. Some of the arguments will not apply to Continentals or Lycomings in this airplane but I'd sure like to hear from you people on your experiences. Having said that and since we are mostly flying an automotive engine the thought seems to also run that you should therefore burn automotive fuel. Well I did that for a while and it seemed to run pretty well although the smell was different. However on a hot day and my second takeoff I had a substantial power loss just after liftoff causing a very slow climb out to altitude and a little soul searching as to the cause of the problem. A switch back to 100 LL from Amoco Premium has cured any problem that was there. That was several years ago and I haven't burned any auto fuel since then. Other people have reported erratic idling, surging in RPM, inability to maintain proper mixture, 600 degree CHT (read detonation) and sudden engine stoppage. Some of these characteristics have occurred to engines that have been running auto fuel successfully for quite some time. In many cases the problem seemed to occur in hot weather or on the second takeoff of the day as was my case. Yes I know that there are quite a few VW aircraft doing just fine on auto fuel, so it can be done. But it takes only one instance of 600 degree to destroy a good set of heads. It's your choice as they say.

Now for some of the reasons for this apparent problem. In talking to Mr. Ben Owen in the Tech. Counselors office up at Eaa Headquarters, he indicated that the auto fuel testing they did was either in high wing gravity feed aircraft or in low wing fuel pump type aircraft. He didn't know of any testing done with the very low fuel pressure used in our Sonerai's. It takes about 40 inches of vertical head to produce 1 psi of fuel pressure (go ahead, figure it out).



Intake manifold swirl plate  
... assemble A + B then bend  
all tabs in same direction to  
swirl fuel mixture and even  
cylinder E&T.

Courtesy ... Ed Hasch  
Algonquin, IL

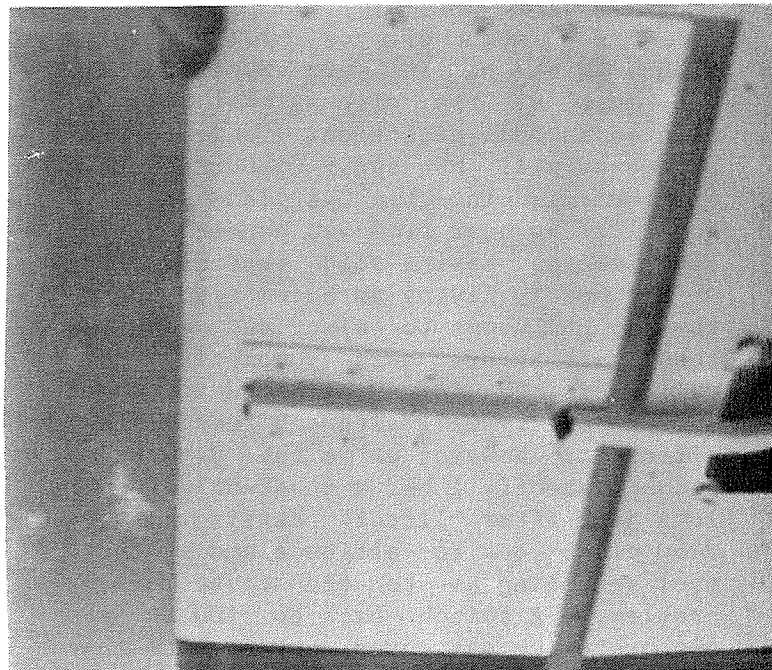
In our aircraft we only have 12 to 18 inches from the carb to a full tank which gives about 1/4 to 1/3 psi at the carb. The Posa carb needs this low pressure to operate correctly with the VW. But this also can cause a problem because auto fuel is substantially more volatile (evaporates more easily) than the 100LL aviation fuel. This volatility lets bubbles form more quickly in fuel lines, gascolators, angle bends or the aluminum Posa itself. The bubbles can lead to excessively lean mixtures as they pass into the carb which can cause the symptoms described before, especially the detonation from high temps. Of course the greater volatility means easier starting in cold weather.

So the problem stems from the combination of more volatile fuel, low fuel pressure, high OAT and engine temperatures and perhaps too many bends or aluminum parts. A blast tube on the gascolator doesn't seem to do much good. Any ideas on this subject will be greatly appreciated. In the mean time, may I suggest the use of 100LL until the airplane is sorted out and had a few hours on it. The less possible problems to deal with the better we all feel.

## BUZZ

Went out to Lake in the Hills Airport to fly my Sonerai up to Kenosha, Wis. for a lunch with Ken Flaglor and his Chapter members, but it had started raining rather hard as I got out of the car and didn't really let up until it was time to go home. So much for lunch in Wisconsin. But Ed Hasch was there doing a little maintenance on his Sonerai II LTS. It's been flying for about a year now and is generally debugged and running well, but Ed had had a rather interesting flight the day before. It seems that on takeoff the plane was a bit wing heavy on one side but not too noticeably; till he was later right in the middle of a rather steep 720 turn at about 140 mph when his control stick started banging side to side at a very quick rate! He could not hold it steady, but had enough sense to quickly chop the power. At 100 mph the plane was controllable but the stick still moved side to side at 1 to 2 cycles per second, traveling 2 to 3 inches each way. A quick return to the airport with a normal landing ( for Ed ) gave him a chance to get his heart beat back to normal.

A walk around of the machine came up with the answer that you all should have guessed---the right aileron counterweight had broken loose and was hanging in it's little fiberglass fairing under the wing. ( Ed obviously has the inboard /inside the wing counterweights.) The 3/8 " square tubing that holds the 20 oz. of lead failed just at the end of the weld on the attach plate. The photo should help for those of you unfamiliar with this newer type aileron counterweight position. Now, the interesting thing about all this is that this was practically the only part welded on the aircraft using the Heliarc welding technique. So Ed and I got into quite a discussion on the apparent advantages and disadvantages of this type of arc welding with it's rapid heating and cooling of 4130 steel and the fact that he didn't do any normalizing to the metal when finished. Ed felt that the metal at the break did appear crystalline in structure.



A clean break at the aileron shaft

We'd sure like to hear from you experienced Heliarc welders out there on this matter. The repair was to insert another steel tube inside the original with Gas welding and the resultant metal buildup it includes. The test flying went along just fine, but I'm sure that a slightly better look during those pre-flights will take place-- for him and me. Now for the really big question--- what if all that banging around had caused the other counterweight to depart? They say your thighs are black and blue for weeks, but you smile all the time because you are alive. Thanks for checking this out for us, Ed.



Your Newsletter man hard at work?

## ENGINES AND MISCELLANEOUS SONERAI PARTS

Great Plains Aircraft Supply Co. Inc has several needed Sonerai II parts available. They have cowlings at \$275.00 (plus \$15.00 crating fee), heat treated tailwheel springs at \$65.00 each and Sonerai spinners that fit a 2-1/4" thick prop. The spinners are (12") \$36.95, the front plate is \$23.70 and the back plate is \$16.60. In addition to these parts, Great Plains Aircraft can supply you with a completed engine, engine kits or individual parts to build your own engine for your Sonerai. They also have shrink fit prop hubs available at \$119.95.

Their engines have a Sonerai style intake manifold, 20 AMP alternator, oil cooler, starter and choice of ignition systems. To contact them write or call: Great Plains Aircraft Supply Co. Inc., P.O. Box 1481, Palatine, IL. 60078, or phone 312-359-6558. Their catalog is \$3.00.

### Sonerai Newsletter

Name \_\_\_\_\_

Street \_\_\_\_\_

City and State \_\_\_\_\_

Zip and Phone \_\_\_\_\_

Aircraft Model \_\_\_\_\_ SN \_\_\_\_\_

Engine Make and Size \_\_\_\_\_

Modifications to basic aircraft \_\_\_\_\_

Parts needed to complete project \_\_\_\_\_

Maintenance parts needed \_\_\_\_\_

Parts to sell \_\_\_\_\_

This First Edition of the Sonerai Newsletter is being sent to interested parties as a means of promoting our aircraft. Those persons wanting to stay on the mailing list should complete and mail in the info sheet. Cost for 4 issues on a quarterly basis is \$12.00. Publishing dates are the beginning of Feb-May-July-Oct. As you know our Newsletter is highly dependant on the input of the owners so please try to contribute if you can. Material need not be typed and drawings can be sketches.

PLEASE MAKE CHECK PAYABLE TO: ED STERBA

# Sonerai News

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