

# SONERAI NEWSLETTER

JULY-AUG-SEPT 2002

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## **VINCE NICELY'S SONERAI IILTS**

*To say Vince's Sonerai IILTS is unique would be something of an understatement. In lieu of the a VW engine, Vince has installed a Rotax 582. The resulting weight and balance allows him to solo from the front seat. See more info about his machine elsewhere in the newsletter.*

### **IT'S OSHKOSH TIME!**

In a couple weeks, the event that highlights the middle of the summer (It does for me, anyway.) will be getting underway, and that, of course, is AirVenture Oshkosh 2002. It runs from Tuesday, July 23, through Monday, July 29. This is the 50<sup>th</sup> EAA convention, and a lot of things are being planned to celebrate the occasion. I hope you've made your plans to come.

I'm planning participate in the traditional way. My EAA Chapter 18 camping mates and I will go up to the site and stake out our campsites on the 15<sup>th</sup> or 16<sup>th</sup>. Then, I'll fly the Sonerai up on Saturday or Sunday, the 20<sup>th</sup> or 21<sup>st</sup>, and stay until the 28<sup>th</sup> or 29<sup>th</sup>.

As usual, there are several events planned that you might want to attend. The first, of course, is the Sonerai Builders Forum. It is scheduled for Thursday, July 25, from 1:00 to 2:15 PM in Pavilion

4. Be there, or be square. The Monnett Builders Party will be on Friday evening, the 26<sup>th</sup>, at 8:00 PM at the Sonex, Ltd. facility on the east side of Wittman Field (stop at the Sonex booth to let them know you're coming, and for directions if you need them). The Annual Homebuilders Dinner is set for Thursday evening, the 25<sup>th</sup>, at 6:00 PM at the Nature Center. This is a good time, with great food, cold beer, and interesting speakers. You need to buy a ticket for this, so get it at Homebuilder's Headquarters.

There are also a couple of other forums and workshops you might be interested in. John Monnett will be giving a forum on the new AeroVee 2002 VW conversion on Thursday, the 25<sup>th</sup>, from 11:00 AM to 12:15 PM in Pavilion 10. He also has two VW engine workshops scheduled. The first is on Thursday, the 25<sup>th</sup> at 1:00 PM and the second is on Saturday, the 27<sup>th</sup>, also at 1:00 PM. Both will be in the Engine Workshop, Building 20.

These, of course, only touch on the myriad of other forums and workshops you can attend. So, check out the program when you get there (or go to [www.airventure.org](http://www.airventure.org) before you get there).

Again, as is my tradition, I plan to spend the mornings standing around my airplane, so please stop by and say hello. You can bring your building problems and questions, too. With any luck, maybe we can solve them. See you there.

## SONERAI NEWS

- Sonex Ltd News: The new AeroVee 2002 VW engine conversion system is now available. This is a complete 80 hp, 2180 cc conversion. All you need to add is the baffling and exhaust system. Also, Sonex Ltd. is now the exclusive distributor for Jabiru Engines for the Sonerai Aircraft family. If you're interested, call Jeremy at 920-231-8297, (email: [info@sonex-ltd.com](mailto:info@sonex-ltd.com)), or go to [www.aeroconversions.com](http://www.aeroconversions.com).
- 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.
- Back Issues: Sonerai Newsletter back issues are available in two forms. A 3-1/2" diskette which contains most of the significant newsletter articles published by Ed Sterba from 1987 through 1995 is available for a mere \$10.00. 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, 1996, 1997, 1998, 1999, 2000, and 2001. If you want any of the above, send me a note requesting the ones you want and a check for the correct amount. The postage is included.

## FIRST FLIGHTS

*Two flights to report this time:*

- *On April 16, I got the following note from Ron Wright of East Peoria, IL: Hi Fred - Since I did not actually build the Sonerai ILL, about which I write and own, BUT am charged with its 'flight testing' program, I think its O.K. if I relate the following: I purchased this 1835cc HAPI V.W. powered aircraft from the a/c restorer (who did any outstanding job on the entire unit; and who had put about 15 hours of taxi and 'air' time on the unit before I purchased it). While, I think, I have considerable flying experience and over 1000 hours 'taildragger' time, I allowed myself to approach my 'first flight' of the Sonerai, with caution. I did ground taxi, at 4 different times, for a total of about 1 hour, to listen to and feel how this a/c sounds and moves, and to try to accept the fact that you cannot see straight ahead [over the nose] !! Well, the day came for me to 'get serious' and FLY the thing, but when I got to the airport, the wind was a steady 20 to 25 mph. "right down the 2400' grass strip". At first thought, I decided that it was too windy to attempt the first flight, then I rationalized that this steady headwind could be helpful for both the take-off and [eventual] landing!! So, WE [the Sonerai and I] made our FIRST 'first-flight' of 32 minutes - with the only thing(s) needing some tweaking being the trim [I had to hold too much back stick] and getting more air to flow thru the top mounted oil cooler. The 'in-air' wallowing and flaring 3' above the runway will improve with more 'testing'. This a/c flies and handles like nothing else I have flown, so far, and it will be a delight once I learn to be more gentile with the various control inputs. I do believe that this strong steady headwind allowed me an additional margin of safety on both the take off and landing phases. Thanks for allowing me to share this with you. Ron.*
- *On June 13, I got a short note from Dave Bilgri of Beaver Dam, WI: Dave stated that he had flown his Sonerai ILLTS with a Jabiru 2200, and now had 10 hours on it. Dave's airplane is unique in that it has segmented canopy similar to the World War II vintage trainers. He flies it from the front seat, also.*

*Congratulations to both Ron and Dave. Let's get those 40 hours flown off, and bring them up to OSH.*

## SUN-N-FUN 2002 REPORT

As most of you who have read my ramblings in the past know, I've been going to Sun-N-Fun for several years now. I've always used the excuse that I have to present the Sonerai Builders Forum, and maybe sell some subscriptions to the Sonerai Newsletter, as a reason to go. Also, as most of you know, I never seem to use the same mode of transportation to get there from one year to the next. This year was no different.

I had planned for several months prior to April to fly my trusty Sonerai IIL down again this year. I was going to hopefully accompany a group of American Champion Citabrias and Decathlons again, but it didn't come to pass. It wasn't that I wasn't ready. The Sonerai had a fresh change of oil, and both the 10 gallon main tank and the 6 gallon aux tank were full. I had all the charts. But the American Champion deal fell through. Keith, my hangar partner, couldn't get an airplane to fly, and I decided I didn't want to fly down and back alone. So, we opted to fly down to Tampa on Spirit Airlines out of O'Hare. As it turned out, that was probably a good thing. On the Thursday we would have departed, the temperature was about 23°F all the way down into Kentucky. I would have frozen my butt off. (Also, the weather in the southern half of the country was terrible during the last half of the event, which would have made flying home very challenging.)

We ended up flying down on Friday afternoon. That allowed us to be around on Saturday to watch the pandemonium of set-up. Keith and I helped our friend, Tom O'Neill, who works for Wag-Aero, set up the Wag-Aero booth, and I kibitzed with Steve and Linda Bennett as they were setting up theirs.

The whole Sun-N-Fun experience was a blast. The weather was great; sunny and breezy without being too hot, unlike the overbearing heat of last year. It didn't rain until after we left. There were lots of really nice airplanes, but no Sonerai's. I kinda felt guilty for not bringing mine down.

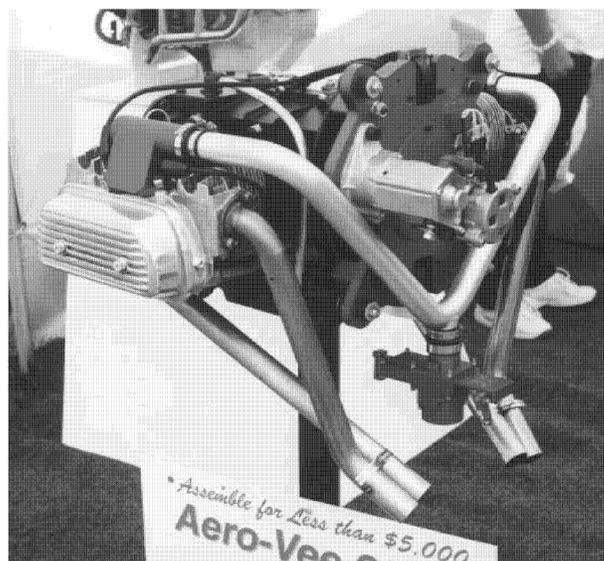
The Sonerai events, as usual, went pretty well. The Builders Forum had about 20 attendees, which wasn't bad considering it was at 9:00 in the morning. There were a bunch of good questions, which made the hour go much too quickly.



**Sun-N-Fun Sonerai Folks**

Steve and Linda threw their annual Customer Appreciation Picnic Monday night after the airshow, and it was, as always, a hit. The beer was cold, the brats, Polish, and Italian sausages were done to perfection, and the company was the best. We had a large group of Sonex builders, a somewhat smaller group of Sonerai folks, and some KR builders, too. Thanks, Steve and Linda, for all your efforts.

Several times during the week, I stopped by the Sonex Ltd. Tent to visit with John, Betty, Jeremy, and Pete. This gave me an opportunity to pick John's brains a bit about their new AeroVee 2002 2180 cc VW conversion. I am intrigued by it for the simple matter that he has eliminated the weight of the magneto by incorporating simple "dual" ignition, and replaced that weight with a starter. All this for a bare weight of 161 lbs. You just have to add exhaust, an oil cooler, and baffling. My engine, with the mag and no starter, all up, is 165 lbs. The possibility of putting a starter on my airplane is very tempting.



**AeroVee 2002**

Otherwise, I had a good week finding parts for my Wag-a-bond project. The Parts Mart was a veritable treasure trove this year. On the first day, I found a RH aileron with the fabric still on it for a mere \$20. They normally sell new for over \$600. It was in really good shape, too. I also found a set of rudder pedals from a Piper PA-20 Pacer, that I can adapt, for \$50, and a blank instrument panel. The only problem I had to solve was how to get the stuff home. The aileron was six feet long, which precluded taking it on the airlines. Luckily, a friend of mine from my home airport had driven down in his motorhome, and he volunteered to bring it back for me. The rudder pedal assembly came apart and just fit into the bottom of my duffle bag, while the instrument panel became carry-on luggage.

The last thing I agreed to spend money on, was  $\frac{3}{4}$  of Lycoming O-235-C1 in "kit" form, that my friend Tom O'Neill had just purchased. It was complete except for one cylinder, pistons, a cam, and exhaust valves. I got the whole thing for \$1000, and the parts are in excellent shape. And now comes the really scary part: buying Lycoming parts. Unfortunately, Lycoming prices are nowhere near as reasonable as VW prices. I've been really spoiled.

So, that was about it. Wednesday, Keith and I hooked up with Chapter 18 friend Fritz Jorgenson, who flew his 1959 straight-back, straight-tail Cessna 172 down, and drove over to Kermit Week's Fantasy of Flight for part of the day. And on Thursday, we left Tampa on the MD-80, flew back to Chicago. Another week well spent.

## SONERAI PERFORMANCE

By Vince Nicely

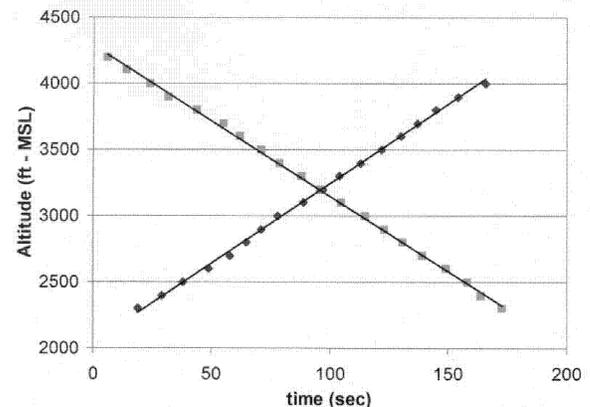
At the Sun'N Fun show you said you might feature some performance characteristics of my Sonerai II LST airplane in an upcoming newsletter. While I have previously sent you several kinds of information including pictures, the spring elevator trim and some performance data, I am not sure you have the latest data. So, I am including 5 graphs with this e-mail on the following pages of this word document.

The airplane is N6378U, which is a Sonerai II LTS, powered by a Rotax 582 liquid cooled engine with electric start and a reduction gearbox with 2.62 reduction ratio. The engine is rated as 64 horsepower at sea level. The propeller is a 62-inch Warp Drive 2-blade ground adjustable with their "variable speed" plan form. The total weight of the airplane with gear and pilot as tested is about 825

pounds. The tests were conducted at a mean density altitude of 4000 ft. The airspeeds have been calibrated over the whole range by using a GPS with attention to eliminating the effects of wind.

Figure 1 below illustrates how the various numbers were accumulated. Because the airplane has no VSI, the Block Altitude Method was used for measuring climb and decent rates. Figure 1 shows one run. I have installed a small recorder hooked to a microphone on my headset boom and controlled by a push-to-talk switch on the stick. With a stopwatch on my knee, I say the altitude and time at each 100-foot crossing. After transcribing the data into a spreadsheet, the rates are computed.

The data below were accumulated at an average density altitude of 4000 ft. The air was not completely calm, but most graphs have enough data to indicate the amount of uncertainty in the results reported.

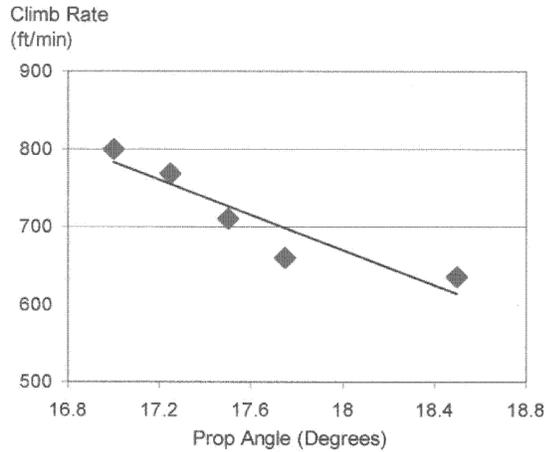


**Figure 1 Altitude vs Time for One Climb and One Glide at 70 mph and 17.75° Prop Pitch**

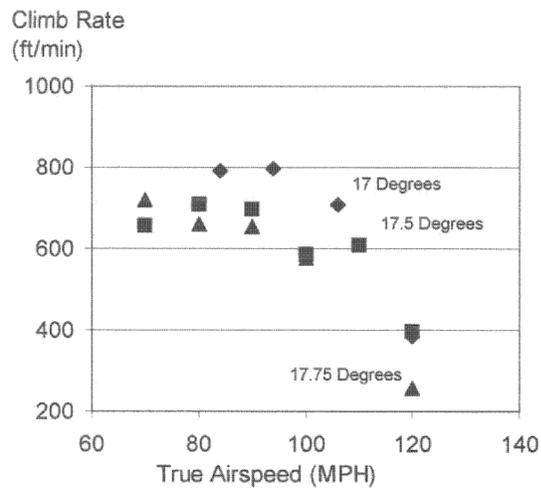
This airplane at 4000 ft density altitude has the best climb rate at about 95 mph true airspeed. Thus, one early item was to find how the propeller angle affects the climb rate. Figure 2 shows some data for this one speed. Figure 3 shows some data at various speeds and three propeller angles. The engine propeller combination has a full engine RPM with static airplane of about 6200-6400 depending on the propeller pitch. At full speed of about 135 mph straight and level it is about 6600 RPM.

Figure 4 shows the power-off decent rate of the airplane for various true airspeeds with the engine idling and again at an average density altitude of 4000 ft. I am confident that the decent rate with the engine off would be somewhat less, especially

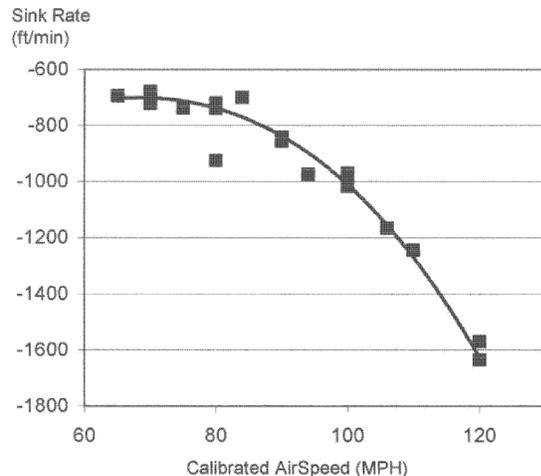
at the higher speeds, but that test will wait until we are a little more experienced.



**Figure 2 Climb Rate vs Propeller Angle at 94 mph TAS and Full Throttle**

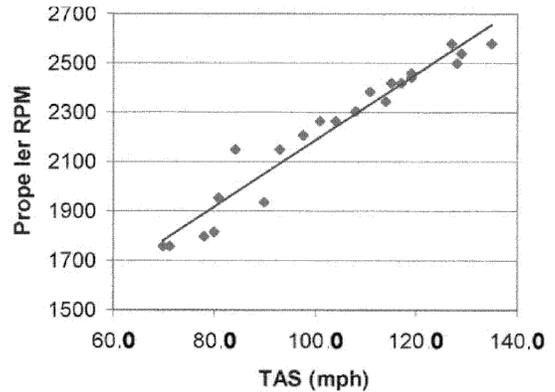


**Figure 3 Climb Rate vs True Airspeed for Several Propeller Angles**



**Figure 4 Sink Rate with Engine Idling vs True Airspeed**

Finally, Figure 5 shows how the engine RPM relates to the measured airspeed. While I am not sure what this means in any theoretical sense, it is a very nice operational result. In other messages I have posted, I have commented that the airplane will fly hands off with only throttle and rudder inputs for long stretches on a calm day. I will be continuing to collect some additional data as the summer unfolds.



**Figure 5 True Airspeed vs Propeller Speed**

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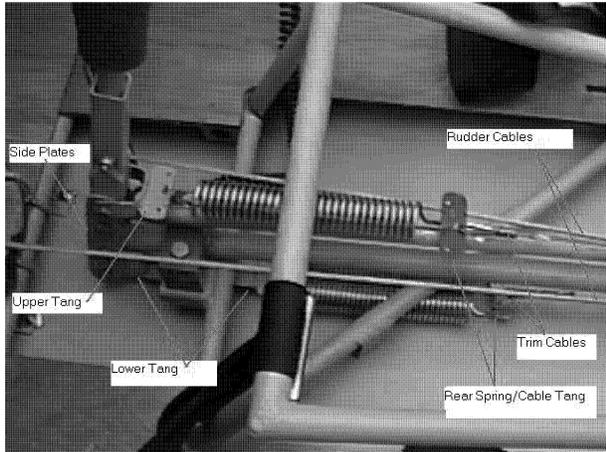
*Freditorial Comments:* As you can see, Vince has taken a very methodical and analytical approach to flying off the 40 hour test period on his airplane. That is really what the FAA-mandated test period is for, not just flying around in circles until the Hobbs reads "40." This kind of data is easy to generate, and can be used to determine the actual operating speeds ( $V_x$ ,  $V_y$ , etc.). For more detailed procedures, read the series of articles on flight testing by Ed Kolano in the last several issues of **Sport Aviation**.

**MY TRIM SYSTEM** by Vince Nicely

The idea here is to have springs attached to the control stick and to a Trim Control Arm. As you will see, the springs are under the front seat of my airplane because I fly it from the front seat. By the way, I have a nicely contoured seat bottom cut from a simple boat seat I bought. It is attached to the seat frame and was removed to get these pictures.

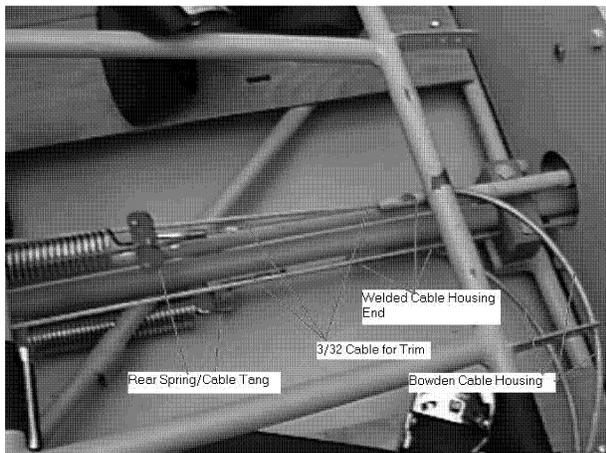
First, look at the picture labeled "Springs - Front Attach". In this picture, you will see that there are two tangs attached to the stick by a bracket on one end of each with bolts through the brackets and

stick. To extend the stick 1 inch below the bottom of the torque tube, I made two side plates for the stick and put one on each side. That saved me making a new stick. My belly pan is 1" below the bottom of the frame, so I put the lower springs (2 of them) in that space. Also, the lower bracket and tang are 1" below the pivot point and were made long enough to allow the springs to remain behind the frame cross member at all trim settings. The upper bracket is attached 2" above the pivot point on the torque tube so one spring attached there is equivalent to the two springs attached 1" below the pivot point.



**Springs - Front Attach**

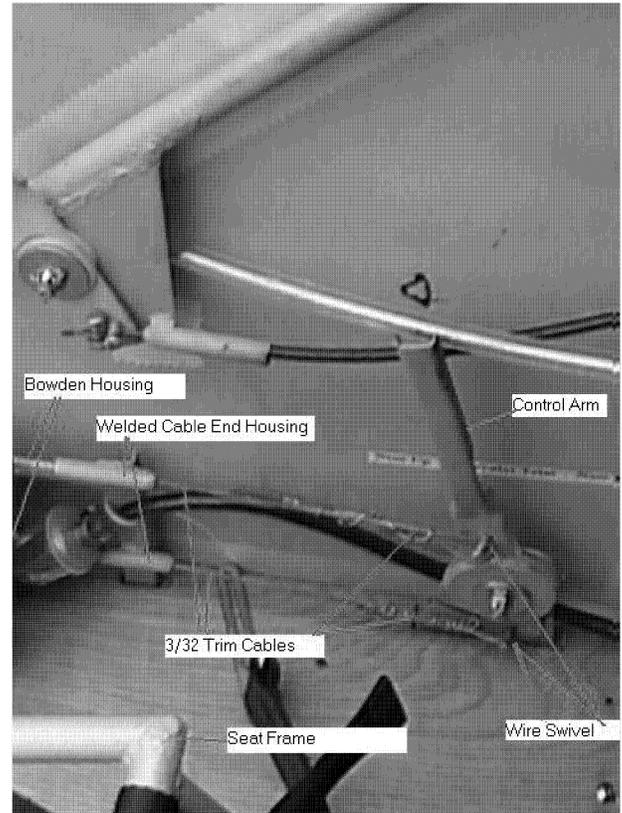
As you can see, the springs are healthy. They are in fact 1" diameter with the spring material being about 1/8" diameter. I bought the springs in 1 foot lengths and cut them to the 4" springs I wanted.



**Springs - Rear Attach**

Next, please look at the picture labeled "Springs - Rear Attach". Near the back of the seat, I welded two pieces of 5/16" OD tube and shrunk their front ends so they could act as a cable housing termination. One is welded to the bottom of the seat tube. The lower one is welded to an extension

welded to the frame cross member about 6 inches behind it. Both were sized to let a Bowden cable housing slide into it, but the end was shrunk to not let it pass through. For this application, I used 3/32" cable which is larger than needed but works nicely. As you can likely see in the picture, I made two tangs that attach the cable on one side and have 3 holes for attaching the springs on the other side. The cable goes through the Bowden housing to the Trim Control Lever.

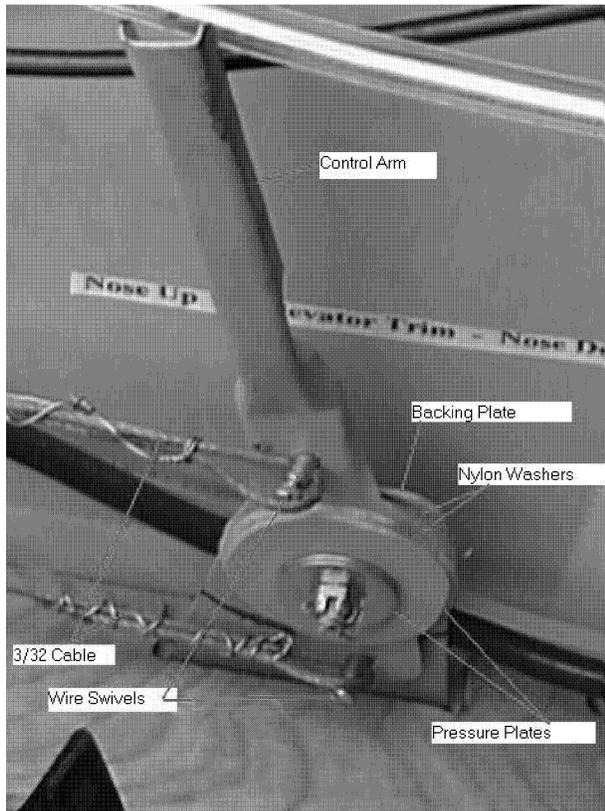


**Trim Control Arm**

Now, look at the picture labeled "Trim Control Arm". Here you see another set of cable termination fittings welded to a riser which is welded to the longeron. About 6 inches ahead of it, the longeron has another bracket welded to it that acts as the mounting plate for the control arm. The control arm is better viewed in the next picture.

The picture labeled "Control Arm Close-up" shows the design of the control arm. The arm itself was fabricated from sheet steel which I think was 0.035". The backing plate is somewhat thicker and again my notes are not here. Two things make this control arm work well. The cable swivel nuts provide a convenient attachment above and below the pivot of the control arm. They require very little space on the inner side. Note, the cable is folded back and loosely wired simply to provide a convenient storage for extra cable length and is

not part of the fastening. That let me have some extra cable for adjustments at first. The second part of this is the sliding attachment fashioned from nylon washers (specially fabricated) and the pressure plates. It can be adjusted so the friction is at a desired level to make it useable but it will hold the trim as set.



**Trim Control Arm Closeup**

Obviously, I designed and installed this system before I covered the fuselage. However, a few years ago, I added a very similar system to a different kind of aircraft by making the control arm end so it bolted to the floor and by using some soldered clamps to hold the spring end of the cable housings.

Well that's at least an introduction to my trim system. If any of you think you might like to use something like it, I would be happy to give more detail on materials, sizes, or whatever.

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## FLOYD SMITH'S TALE By Bob Barton

While I was building my Sonerai IIL, I came to the point where I needed to have some welding done on a couple of aluminum parts. Many times, I had passed by the Smith Welding Yard in our corner of town; thus it came to mind first. The gate was padlocked and the sign said nothing about hours of operation. But it *did* give a phone number.

Mr. Smith informed me that his yard was open only on weekdays, but (to my surprise) that he would meet me there in 15 minutes. Arriving at the Smith Welding Yard, I was reminded of a principle I had noticed before: when dealing with junkyards, *There is no such place as "Away"*. You can't throw anything *Away*. You are already there! It was just so at Floyd Smith's business. We were walking on *Away*.

Floyd was interested in the purpose of these odd pieces that I wanted welded. Now I have become somewhat shy about telling people that I need their help in building an *experimental, homemade airplane*. They tend to jump back, automatically flooded with visions of liability lawsuits. So I have learned to tell them that I am building "*an off-road vehicle*". I do mention that it is powered by a VW engine and will go 140 mph.

But I sensed an honesty in Floyd's demeanor, which allowed me to level with him...that what I was building was an airplane. Floyd's eyes turned slightly misty as he remembered what happened some fifty years before. In the early thirties, one of the publications like **Mechanics Illustrated** or **Popular Science** ran an article describing how to build a small, single-place airplane. And this captured Floyd's imagination.

At that time, Floyd was helping on the family farm, and he knew that Papa would not approve of him "frittering away" his time on such a project. So it was that Floyd set up a clandestine shop in an unused barn on their property. He obtained a motorcycle engine of the prescribed type, and carved a propeller for it, then proceeded with the construction of the fuselage framework...and had it almost completed, when Papa noticed a path through the weeds to the unused barn, and went down to investigate.

You have heard it said, "*Hell hath no fury like that of a woman scorned*". And that may be true, but the fury of a '30's patriarch whose authority has been bypassed, runs it a close second. Papa, saying he would not allow his son to kill himself in such an inane contraption, attacked, and demolished the framework with an axe handle.

This left the engine and propeller with no foreseeable future. Floyd bolted it on the backend of a wagon (which made a conveniently mobile test-bed), just to see if it would run. When it did finally start (it's often like this, isn't it guys?), the throttle was wide open. The wagon leaped into action and trundled down a slight incline, across a road, and into the ditch. Floyd later sold the engine to a young man, who's father took less interest in his son's welfare, and it is said to have successfully powered a homebuilt through the skies around Atlanta.

SEE  
YOU  
AT  
OSHKOSH

## 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.*

**TAPER PIN REAMERS 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.

**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)

For Sale: Revmaster 2100 w/ dual Bendix mag, starter, Revflow carb, oil cooler, prop (56x45), approx 400 hrs, came off KR-2, \$2000, Doug Evenson, dwevenson@cs.com, (706)327-4601(H), (706)888-4602(cell) (4/01)

For Sale: Sonerai IILTS (low wing, tri-gear, stretch) fuselage for sale. The engine mount is for Diehl accessory case, \$5500, but includes landing gear and hydraulic brakes – which is a \$6500 value. Call Steve at (402)493-6507 for more info. (3/01)

For Sale: VW Engine/Parts. Priced to sell complete – only \$600. or individually as needed. NEW: single port cylinder heads, 92 mm pistons & cylinders, valve covers, & x-casting. USED: engine case, 1835 cam, stock 69 mm crankshaft, & other misc. parts. Call after 7:00 PM. Dan Bernard, 785-483-6812 (4/01)

For Sale: Sonerai II Stretch fuselage, prebuilt spars, ailerons, Monnett ribs, fiberglass cowling, wing tips, & wheel pants, nosewheel, tailwheel, canopy, Great Plains 2180 w/dual ign., Diehl case, starter, no alt. or intake sys, some instruments. \$8000. Call Steve Garn, 336-877-0318 (2/02)

For Sale: Sonerai II Mid-Wing, minor ground loop damage, new prop, new cowlings, supercarb, 1850 EconoVee, all major parts. Pictures available email. \$2500. Jack Hall, 760-949-6999, jhhall6980@aol.com, Southern California (4/01)

For Sale: Sonerai IILS, fuselage and wings complete, on the gear, cowling, canopy, needs engine and prop. \$7500. Don Jester, 417-466-3013 (1/02)

Wanted: O-320 Lycoming, 150 hp, all accessories, dynafocal, mid-time or less. No prop strikes. Call Fred Ninneman, (816)353-1161 (2/02)

For Sale: Sonerai IIL. Fuselage welded, on gear, wings/aileron done, 2180 engine, no prop, cowling, canopy there but needs finishing, no instruments, lots of parts. \$4200/offer/trade. Eric Stadjuhar, (402)896-6352 or (402)669-0271, Omaha, NE (2/02)

Trade: For Sonerai I – Murphy Renegade Spirit, 532 Rotax, basic instruments, radio, intercom, 250

TTAF&E. Mike Hedglin, (308)385-0578 (2/02)

Wanted: Folding Wing Sonerai (in process OK). Joe Hearn, (352)628-1027 (3/02)

For Sale: Sonerai Parts. Complete instrument panel, Rand-Robinson 3-blade prop, Posa Supercarb, Slick Mag & harness, gascolator, 5-point harness. All new! Gary Harvey, (705)799-7448 (3/02)

For Sale: #68 Zenith Carb, \$75; Monnett X-casting, \$50; Monnett SuperVee prop extension ass'y, \$150; Monnett single-port intake manifold, \$50; Aero-Vee valve covers, \$25; 2" steel prop hub & plate, \$25. Jim Meier, (608)255-6773 between 8am & 5pm, or (608)849-9499 after 5pm (3/02)

For Sale: Sonerai II including welded fuselage, tail feathers, & controls, Team 38 (new) engine with oil filter, hydraulic lifters, Scat heads, Diehl case, alternator, rectifier, and starter, instruments: turn & bank, airspeed, altimeter, & tach, alclad to cover wings, factory ribs, cowl, fuel tank, spinner, canopy, gear, wheels, tires, brakes, wheel pants, wing tips, fabric, rivets, & plans. Joe Zufall, (307)358-0519, joz@wyoming.com (3/02)

For Sale: Sonerai II mid-wing, only needs paint and assembly, 1835 with dual ignition (Slick mag and Bosch 009). \$6500. Greg Buckley, (559)226-5992, [glibflyfun@cs.com](mailto:glibflyfun@cs.com) (3/02)