

# sonerai



(Photo Courtesy John Monnett)

## The Race To Oshkosh

By John Monnett (EAA 15941)

410 Adams Street  
Elgin, Illinois

**S**ONERAI IS A racer, a racer indeed in the classic form. But it participated in a race much different than that of chasing around a pylon. The race was a mythical one, imagined and participated in only by a few apprehensive, yet determined individuals. The race was fought against time — the race to Oshkosh '71.

The plane and the race were conceived just after, if not during, the Oshkosh Fly-In of '70. My wife Betty, my friend Vance Graeber, and I had just finished my first homebuilt, the "Mini (subtitle censored!)". The "Mini" was an extremely modified version of a small, controversial, all metal, low-wing that was all "pop riveted". It flew well and I had only a few small problems with it. The "Mini" got in and out of our 1800 ft. grass strip well, partially due to the respectable take-off performance and brick-like glide -1200 to 1400 ft./min. power off. It was definitely not an airplane to have a power failure in.

I was beginning to realize the potential of the VW engine for airplanes. I have always had a love for the classic Formula One racers, (I stopped building a "Midget Mustang" to start on the "Mini"), yet, I realized the wide open field of the Formula Vee. Back at the '68 Fly-In, I attended Steve Wittman's forum on the Formula Vee. Those in attendance seemed more than enthusiastic about the class, and the restrictions seemed to make sense, but in '70 no one except Steve Wittman had a racer going. After working on the "Mini" and trying to come up with some modifications, I still was not satisfied with the design. I knew after completing the "Mini", I would have to build

another VW powered airplane and try to incorporate the many ideas I was mulling around. My dream of a Formula One Racer would come true in the form of a Formula Vee.

The night we returned from Oshkosh '70, the new airplane was beginning to take form in my mind. I knew I had to build this airplane right away — by the next Fly-In, Oshkosh '71. It would not be an easy spare-time task! I would work as a High School art teacher by day, as a student working on my Master's Degree two nights a week, and as a frenzied airplane builder the remainder of my time. You might wonder how a guy gets away with talking about building an airplane, let alone another one by the next year. There is no answer except to say you have to be lucky enough to be married to someone who goes along with you 100% — well, at least 99%. You know she's special when she can do that — put up with countless visits from well-meaning helpers, kibitzers, coffee drinkers, and night owls . . . all while pregnant and working as a kindergarten teacher.

SONERAI (Son-er-ai) has a name that is meant to be unusual. It developed from playing with words; sun-ray, sonic-ray, SONERAI. (Connoting something fast, I know!)

The SONERAI was designed with some very specific requirements and features in mind. First, it had to meet all P.R.P.A. regulations for Formula VEE, some of which are: 75 sq. ft. wing area, ample cockpit size for a

170 lb. pilot, minimum visibility requirements, 500 x 5 tires, 1600 cc VW engine turning the prop at crankshaft speed, and 6 G's demonstrated stress. Second, it had to have metal wings and a tube fuselage. When it comes to wood working, I am totally inept, so wood was not considered. Third, I wanted a plane that could be built with a minimum of different sizes of material, within reason, and use simplified techniques in construction. Fourth, it had to have folding wings and a simple, inexpensive way of transporting it on the highway.

With these ideas in mind, I started drawing the first sketches of the plane. I believe the "Spitfire" is one of the most beautiful airplanes ever built and I could not resist putting the elliptical tail on the SONERAI. The first drawings even showed a low-wing configuration with elliptical fiberglass tips.

The final description of the SONERAI reads:

The SONERAI is a midwing, sport plane, racer designed to meet all P.R.P.A. Formula Vee racing requirements for 1600 cc. Volkswagen powered airplanes. It uses a minimum of different sizes of easily obtainable materials to reduce the cost without hampering the integrity of the design. The wing is all aluminum and is composed of two panels that fold alongside the fuselage enabling the SONERAI to be towed tail first on its own gear. The fuselage and tail surfaces are of standard chome-moly tubing construction using primarily two sizes of tubing. All aluminum sheet used is .025 Alclad except for the spar webs. The cowling is all fiberglass and the fuselage and tail surfaces are fabric covered. The landing gear is a modified truck spring with 5" go-cart wheels.

I met Dwight Dende, a 727 driver for United, while flying the "Mini" out of our strip. He had just completed rebuilding an Aeronca Chief and was very interested in building a homebuilt. After a few flights in the "Mini", he was sold. We started talking about a joint effort. I showed him my plans for the Formula Vee. We were sure we could build two airplanes faster and cheaper together than we could separately, so we made an agreement to build two identical racers and split the cost.

I spent a few hours of my Thanksgiving vacation laying out the fuselage truss and jig. The following week we got the tubing, 500 ft. of  $\frac{1}{2}$ " .035 and 100 ft. of  $\frac{3}{4}$ " .035. From the first cut tube on, each time we added a part we mumbled, "It's starting to look like an airplane", and we tried to sit on it or in it. We probably had close to 50 hours on it before we flew it!

By the end of December, we had the "fuse" trusses built, had built the tail surfaces, ordered the aluminum, and started the spars. Time really began to fly. It's murder to try and meet deadlines. Imagine, we actually thought we could design, build, and fly two complete airplanes in eight months time!

January brought the bubble canopies, landing gear legs, the completion of the spars, and wing folding parts. The rib blanks were cut out and we began forming the ribs.

During February, we built the wing jig — big deal! It involved two vertical 2 x 4's the length of the spars apart. It featured what Dwight called the "Stainless Steel Laser". Stainless safety wire was stretched between the 2 x 4's and through locating holes in the ribs to line them up. I suppose we could have used a "String Laser" also. After the jig, we began assembling the four wing panels.

In March, we were still assembling and fitting the skins. The latter part of the month was spent riveting the skins on.

Then came April 7th and Little John, my son. (Another homebuilt by-product of Oshkosh '70.) Progress on the airplanes came to a screaming halt. I got a checkout on crib repair and diaper changing! However, the cry from the shop out back gained our attention again quickly. There were only four months left until Oshkosh!



(Dick Stouffer Photo)

Oshkosh at last! John Monnett taxis in culminating a frantic 11 month period in which he designed, built and test-flew his Formula V racer/sport plane. Only 8 months were consumed in the actual building process. An art teacher, John also designed all the decals and his personal logo.



(Photo Courtesy John Monnett)

SONERAI's front office. Like most midget racers, the cockpit is small, but is adequate for all except real heavyweights. The battery-powered transceiver and headphones are necessary since the aircraft is now hangared at a controlled field.



(Photo Courtesy John Monnett)

Super-slick fiberglass cowling of SONERAI. John will offer nose bowls and cowls for builders of his plane. The landing gear shown is a truck leaf spring which will be replaced with an aluminum version.

By the middle of May, we had the engines and the simple prop extensions. The engine mounts, canopy frame, instrument panel, fuel tank, control links, and front end metal all followed in quick order. It was almost time to tear another page off the calendar — a small pleasure in itself considering the calendar in the shop.

June was on us. There was no way we were going to complete both airplanes. I was teaching summer school so there were only nights and weekends left. Dwight finally

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## SONERAI . . .

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convinced me that we should complete my plane by working on it alone. We could build the planes cheaper together but not as fast as we thought. Shortly, we had the pre-cover inspection done. We had it covered in a week. Then we finished riveting the skins. The engine was installed on my plane and we proceeded to try and start it. It was a simple procedure — it only took forty-five days!!

After the first couple of days of trying to start the engine, we gave up and went ahead getting the cowl finished. We tried again. The engine sputtered and ran for about 15 seconds — just enough time for that someone (who exists in every neighborhood) to call the local authorities. The police were very pleasant. They insisted on a demonstration so they could determine the noise level themselves. We could barely get it started again. Saying we should try to keep it down, the police left us totally frustrated. Total logged time 30 seconds! I said, "Darn, heck, phooey, shucks" and hauled the SONERAI over to Vance Graeber's for its final paint job.

At Vance's, July brought more endless hours of midnight oil, racing the clock, and there was the completed SONERAI — the world's fastest static display. About the 15th of July, we finally licked the problems with the engine. It took changing the manifold, carb, and fuel flow but we got it running. A quick call to the local GADO and we had the date for final inspection. By this time, I might add, I was a total wreck. My friends were threatening to send me to the "looney bin" — Elgin State Hospital is a block away from us.

On a 95<sup>th</sup> day, July 20, 1971, just eight months after we started, I flew the SONERAI. It was truly a different airplane than the "Mini". The take off was slightly longer and the landing much slower (50 mph). There is a fantastic feeling flying an airplane that gives you solid responsive feel in the air. When the throttle is pulled back, there is no tendency for the plane to become a brick. The deceleration is slow and the glide ratio is very good. Remember, SONERAI weighs 700 lbs. flying, has about a 9 lb. wing loading, and is very clean. Any apprehensions I had about it being competitive, were quickly dissolved. The first flight went well except for an extremely sensitive elevator which was easily corrected by changing the linkage. Dwight flew the second flight. He was in the cockpit the minute I got out. He almost missed his United flight out that afternoon waiting to fly our little one. A drunk followed that evening.

On July 29, two days before Oshkosh, I was flying a test flight out of our strip when I lost power on take-off. It was too late to shut down. I was just able to get her off. About a half-mile off the end of the strip is a row of trees with a few spaces about 18 feet wide. I had to pick one. I will attest to the SONERAI's slow flight characteristics. I was only indicating 60 mph but I managed to get around and make a landing.

Needless to say, we towed SONERAI to Oshkosh. We put it on static display while we worked on the engine. Another carb change seemed to help and the F.A.A. was kind enough to give us permission to fly it. After several flights, Dwight noticed a burning smell in the cockpit. It turned out to be the magneto drive coupling that had broken into sixteen pieces. It must have been the reason for the power loss since SONERAI has only one magneto. (The couplings need some thought as I ground one up in my "Mini" also.) A new part, found in an old dusty Oshkosh magneto repair shop, got us back in the air again to enjoy the remainder of an exciting week!

Is it worth racing against time to make Oshkosh? Just one trip around the fly-by pattern is worth it all!! To add to the great sense of satisfaction, SONERAI was lucky enough to win awards for "Best Formula Vee" and "Most



(Photo Courtesy John Monnett)

Home, James! SONERAI's wings tuck back against the fuselage fitting neatly in the space between the leading edge of the stabilizer and the wing trailing edge. John has towed the plane over 4,000 miles without incident.



(Photo Courtesy John Monnett)

Skinning SONERAI's wing — just a full-chord wrap-around of two sheets of aluminum. This is certainly one of the simplest and quickest wings to build.



(Photo Courtesy John Monnett)

Breathes there a homebuilder who can resist the temptation to get in a little hangar flying at the end of a long evening's work?? Obviously not John!

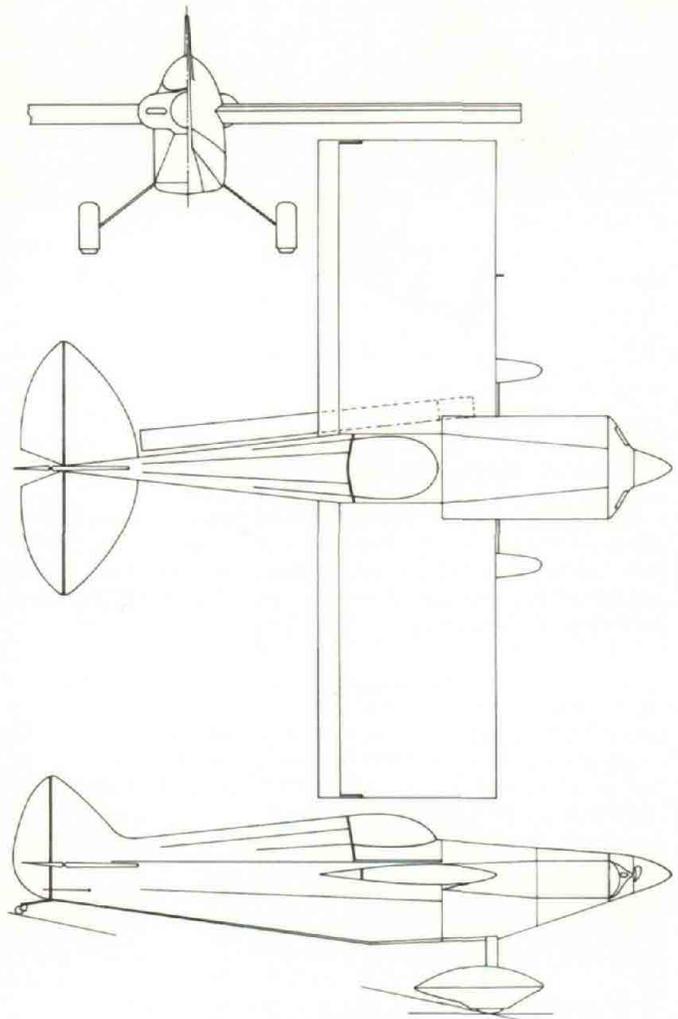
**Outstanding Contribution to Low Cost Flying".**

Most of our time since Oshkosh, has been spent working on the plans for the SONERAI, finishing its test program, installing a new cowl and baffles. In October, SONERAI was on display for two weeks at the University of Illinois. Greg Erikson and I have put together a slide and movie presentation on the construction and flying of SONERAI that we present to Chapters and interested groups within our area.

What's next? Oshkosh '72 will see both SONERAIs and a good start on my new "Brand X" Formula Vee Racer.

**Sonerai Specifications**

Span .....	16 ft. 8 in.
Length .....	16 ft. 8 in.
Height .....	.5 ft.
Engine .....	.1600 cc. V.W.
Fuel Capacity .....	.11 gal.
Empty Weight .....	440 lbs.
Gross Weight .....	700 lbs.
Wing Area .....	75 sq. ft.
Cruising Speed .....	150 mph at 75%
Landing Speed .....	50 mph



were waging their fateful battles over Europe . . . and burning their profiles into the minds of children as the lines of "the plane I'm going to have someday".  
The old order changeth.

Jack Cox  
Editor-In-Chief

*EDITOR'S NOTE: Since the completion of this article, John has become extremely interested in the possibilities offered by the Kiekhaefer two cycle engine. With characteristic energy, he has already laid out a couple of very attractive designs around the approximately 80 pound powerplant. He will conduct a workshop at Oshkosh this year on his Sonerai and new designs. It should be very well attended.*

*At 28, John Monnett is an eloquent answer to those who ask where the young people are in aviation - and, particularly, EAA. No one can doubt the ability and enthusiasm of mechanically-minded young Americans - look what they have accomplished in the hot rod and custom car areas. What apparently has been lacking in aviation are exciting, attainable goals . . . such as Formula V. These sleek, fast little craft provide the proper image for young men - those born when Spitfires and Me. 109s*

# LETTERS TO THE EDITOR

Dear Paul,

AC is again interested in sponsoring prizes and awards to the first three winners in the categories of Amateur Built and Antique for the 1972 AC/EAA Flight Rally.

Our proposal is to award the following:

AMATEUR BUILT — 1st Place - \$250.00 and trophy; 2nd Place - \$125.00 and trophy; 3rd Place - \$75.00 and trophy

ANTIQUÉ — 1st Place - \$250.00 and trophy; 2nd Place - \$125.00 and trophy; 3rd Place - \$75.00 and trophy

Thank you for your help in this matter, and we look forward to seeing you later this summer.

Don Thoreson  
Director, Aviation Sales  
AC Spark Plug Division  
General Motors  
Flint, Michigan

Dear Paul,

There has been over the past year in both your and David Scott's articles considerable space given to the problems faced by general aviation, our continuing battle for a reasonable portion of the air space, and present pending and proposed legislation that would seriously hamper, if not completely strangle, general aviation below the corporate level. This is not meant to be a criticism as, in my opinion, SPORT AVIATION is the finest publication of its type I have been privileged to receive.

On this very thought, I would like to present this suggestion. The excellent articles published monthly in SPORT AVIATION reach virtually only the members, so let's make every congressman and every senator a member. This could be done by letting each Chapter subscribe to one or more memberships and present these memberships to their various federal legislators as a gift subscription. In order to forestall the possibility of some of the legislators receiving more than one membership and others being missed, subscription donations could be mailed directly to EAA Headquarters and, by using a check-off list, the EAA could distribute the memberships among the federal legislators from that district. Of course, we could not hope that 100 percent of those receiving the publication would read it, but because of the high

quality of the magazine I am quite sure that simple curiosity would cause a goodly number to take a look and conceivably become more keenly aware of the role of general aviation and the Experimental Aircraft Association in particular.

Jerome F. Sears, Jr.  
EAA 42050  
P. O. Box 427  
Port Hueneme, California

