

set-up for our operation because it's light and the 2-stage blower gives us the kind of power we need. Into that case we fitted a dash 114 crankshaft, which is a special heavy duty shaft built in the late stages of World War II for use in some stripped down, very fast Mosquitos used to chase German Buzz Bombs. The engines were fitted with nitrous oxide injection systems for short bursts of extra speed, so the crankshafts had to be very beefy. They're similar to the dash 9 crankshafts but, we feel, stronger. The dash 9 and 114 cranks were end oiled, but we changed ours to side oiling — with a secondary oil pump added to provide extra pressure. The head and (cylinder) bank assemblies are off the 624 and 724 series Merlins, which were post war transport engines used on airliners like the Canadair North Star, a modified DC-4 with four Merlin engines (imagine the sound of that!). We also use the heavy connecting rods made for these transport engines. The 624s were made to pull 80 inches for take-off (remember, the Mustang was limited to 61 inches for take-off) and to run for long periods of time at high BMEP — normal cruise was something like 1800 rpm and 40 inches. The banks and heads were really beefy and well cooled, so that's why we used them. We are also using the .42 to 1 reduction gear assembly off a 500 series engine, which was a post war commercial Rolls Royce used in airplanes like the Spanish Messerschmitts and the Italian Fiat G.59. We had to go to that gearing — a stock Mustang used .479 gears — to keep our prop from going supersonic at the forward speeds we hope to achieve. We don't use the stock aftercooler — we use water injection for induction cooling. The supercharger is turned upside down, as is the carb, to create a downward induction system.

"The engine will make horsepower. It will stand a lot of overboost and a certain amount of over rev — but making it reliable under those conditions is the trick. We think it can live at racing power all day long — which is far above what we will have to use at Reno. When we try for the world speed record, however, we will have to run it hard. I want to put the record at 525 mph (currently 499) — that's my goal and we're going to have to pull a lot of power to do it.

"Here at Reno we had the ADI jetted so that we were getting an 85 degree induction temperature — and we didn't want to exceed that. We were over 430 mph at that setting, so we limited our qualifying run to 3200 rpm and 80 inches — which gave us the third fastest speed at 435 mph. Had we decided to

(Continued on Page 22)

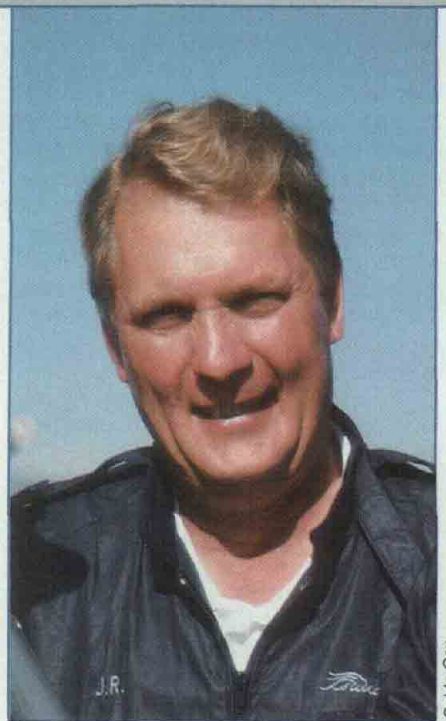
JOHN SANDBERG

*"I want the world's
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How did a project like the Tsunami ever get off the ground in the first place? Unlike the NASCAR and CART auto racing series, there is no money to be made in Unlimited air racing. There is only the one week per year at Reno during which the heavy iron is raced, and, as yet, there are no big time sponsors picking up the total expenses of any racing team. The prize money offered is a mere token when compared to the expenses of putting a competitive Unlimited on the race course at Reno. So, why do they do it? The only plausible answer is that men race airplanes for the pure love of the sport. That love may come in different forms for different participants — the race pilots, for example, obviously have a different perspective than the owners and the crews that support them on the ground. For some, it's a technical challenge, for others the thrills, excitement and notoriety are the motivating forces. For still others, air racing is the ultimate outlet for tremendous competitive drives. It is a highly complex, technically sophisticated endeavor . . . the tallest mountain they have not yet climbed. For most of the participants who show up each September at Reno, it's probably a combination of all of the above.

John Sandberg fits into a number of these grooves, but his love of airplanes and flying stands out most prominently. He is also competitive, but not so overtly as others. Whatever it is that drives him to succeed is almost totally self contained, hidden to most by a low key, easy going nature.

A native of Minneapolis, John grew up there and joined the Air Force soon



Golda Cox

after graduating from high school in 1950. He became an aircraft mechanic courtesy Uncle Sam and was an instructor of mechanics at Sheppard AFB in Wichita Falls, TX when he sustained a back injury that resulted in a medical discharge. Returning to Minneapolis, he worked for a time as an automobile mechanic, was married, and, in 1955, moved to San Francisco to go to work as a mechanic for United Airlines. Significantly, he was working on the big radial engines that were in use on transport aircraft at the time and worked his way up to powerplant trouble shooting on the Pratt & Whitney R-2800. After a few years, however, he moved his family back to Minneapolis and went to work for an auto dealership during the day while at night he attended the University of Minnesota studying engineering. In 1959, he went to work for a local firm that built mechanical control systems for the aerospace industry . . . and discovered he had a special knack for designing miniature and sub-miniature gear trains. In 1961, he and two friends started their own firm called Astrotech — which was a competitor of his previous employer. This was the period before solid state controls — a time when watch-like mechanical systems did the work microchips do today. In 1965 the Astrotech principals went their separate ways and John formed his own company called Metal Masters.

Metal Masters started out as a general machine company and ultimately moved into the closed loop control systems field. When the electronic control age came along, John was able to transfer his expertise in metals and

miniature drive component design to the computer field. Today, Metal Masters is a major supplier of drive spindles for disc drive units for customers like Control Data, Digital Equipment and others.

That is one side of John Sandberg . . . but, obviously, there must be another because, as yet, private flying has not had a mention. For that we have to re-dial our time machine — back to the early 1950s. John had grown up airplane crazy like all the rest of us, but also shared the common problem of not having the money to learn to fly. He finally managed to scrape \$300 together, however, and bought a PT-23. An airline pilot friend taught him to fly in it and he earned his Private license in the ol' Fairchild. He sold that airplane when he moved to California to go to work for United but soon bought a Taylorcraft and, later, a Mooney Mite. This started a life-long pattern of buying, flying and selling airplanes so that today John comes about as close to being a guy who has owned one of everything as you'll ever meet . . . and lots of some.

In the mid-50s he began buying surplus SNJ-5s at Litchfield Airport near Phoenix . . . buying them for \$805 each, then selling them for \$1700 to an outfit on the east coast that was exporting them to Spain. Although he thought he was making big bucks at the time, John looks back wistfully on the experience today.

"At the time, we could have bought Bearcats for the same price as the T-6s — they were just melting them down. You'd look at them and they'd scare you because you knew they were all engine and burned all kinds of gas . . . and with gas at 25 cents a gallon, who could afford it!"

Nothing changes, folks. The number gets bigger, but the relationship stays the same.

Really into what would later be called Warbirds, John kept at it.

"I bought a derelict Hellcat in northern Minnesota, at Fergus Falls, worked on it for a summer getting it ferriable then flew it out. I'd never been in one before, but had been flying BT's and T-6's so it was no big deal. I rebuilt the airplane and it now belongs to the Confederate Air Force. Later, I bought a T-28 at Flying Cloud airport in Minneapolis, kept it for a while then sold it back to North American when they were doing their refurbishing deal.

"At one time, while I was working as an automobile mechanic . . . and had a wife and two kids . . . I had a P-51, a Hellcat and a T-28 sitting on the line. I was working three jobs at the time besides working on the airplanes. I picked

up the Mustang in Madison, Wisconsin. It had been sitting there for quite a while — a guy had financed it and lost, so I offered the finance company \$5,000 — and flew it away. I fixed it up and ultimately sold it. That was in about 1964.

"Once I got into business, I had a lot of different airplanes — a Pitts, a Mong, a cabin Waco and all sorts of twin engine stuff: Lockheed Lodestars . . . I owned three of them at the same time . . . MU-2, Baron, Duke, Cessna 310s, Seneca. Then, finally, I bought a Bearcat. I flew that for a while, sold it, and in 1969 I bought a Kingcobra which we brought out to Reno to race, starting in 1971. I've owned a P-51 we raced for a couple of years and then sold it to Gary Levitz and I have another one being rebuilt now. I've owned an F-86 and own a T-33 now. I have letters of authorization to fly all these airplanes but I'm still a Private Pilot. I'm also an A&P and an AI."

Then there's also the matter of JRS Enterprises. In 1970, at the suggestion, of all people, of the local FAA office, John started an engine overhaul business. His early experience with radial engines and the work he had done rebuilding his Warbirds put him in a unique position. Just about the time the warbird hobby was beginning to get up a head of steam, most of the established engine shops were switching over to jet engines or were concentrating on Lycomings and Continentals for general aviation aircraft. Few were interested in the older radials and, particularly, the old liquid cooled jobs, the Allison and Rolls Royces. There was a need, the FAA told him, for a small shop specializing in these antique powerplants and with his background, he seemed to be the perfect candidate for starting such a business. John agreed and that's the way what is now known as JRS Enterprises got its start. A certified repair station, the firm specializes in World War II era engines.

"When we first started, we did a lot of

1820s for the ag planes and helicopters. We've done a lot of 2800s, also. We pretty well keep away from 1340s and 985s because so many people do them. Basically, our niche is the Warbird industry. We build most of the Confederate Air Force engines, we do a lot for the Canadian Warplane Heritage, the Yankee Air Force and, of course, the EAA Foundation."

Indeed, John has been very supportive of the EAA Foundation over the years. He donated the engine for the Spirit of St. Louis replica for its commemorative flight around the U. S. in 1977, as well as the engine for the Stinson SM-8A that accompanied it. JRS Enterprises has rebuilt engines for the Foundation's P-64, the XP-51, T-28 and DC-3 . . . and has done all the engines for the B-17. Two Allison for the P-38 are in the firm's shop now. In all cases, the work has either been donated or done at cost, which has been a tremendous boost to the EAA Museum's program to keep a few historically significant aircraft in flying condition to demonstrate during the Oshkosh Convention and on other selected occasions.

"I've been very happily involved with EAA for many years," John says, "and I think it's the best aviation organization in the world. It has good leadership and good direction.

"In fact, there's a lot of EAA type philosophy behind the Tsunami. I'm a Private pilot — I've never seen the need for any other license — and I want the world's speed record for piston engined airplanes to be held by a Private pilot. That's why I'm going to fly it in the record attempt. Always in the past, the records have been held by military pilots or airline pilots or commercial pilots. The biggest percentage of pilots have always been Private pilots — mostly sport pilots. I want this record, which today in the space age is really a sporting type record, to be held by a Private Pilot."



John Sandberg