ACRO SPORT Newsletter

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EDITOR: Ben Owen
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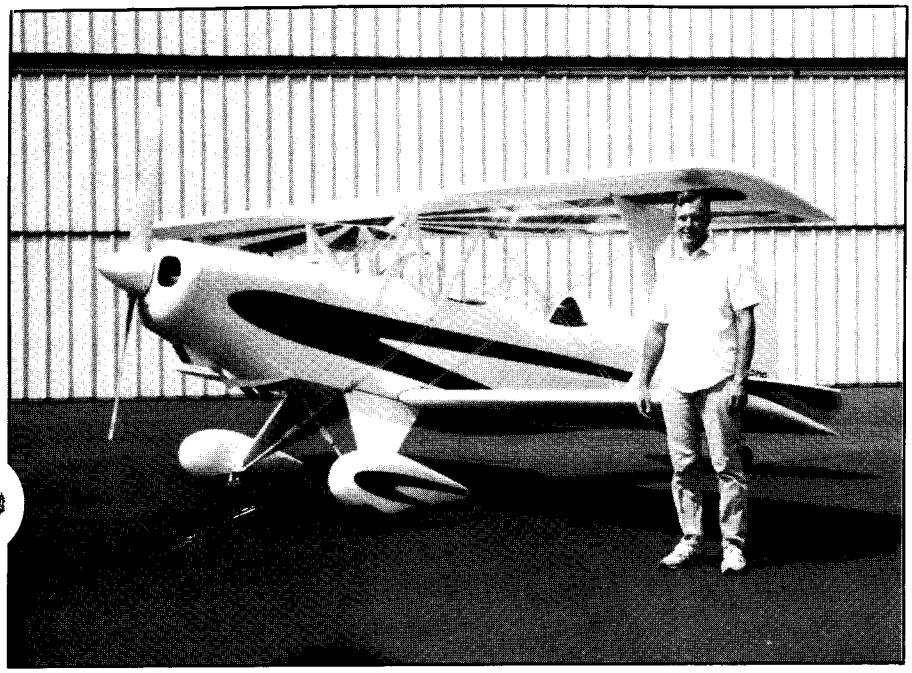
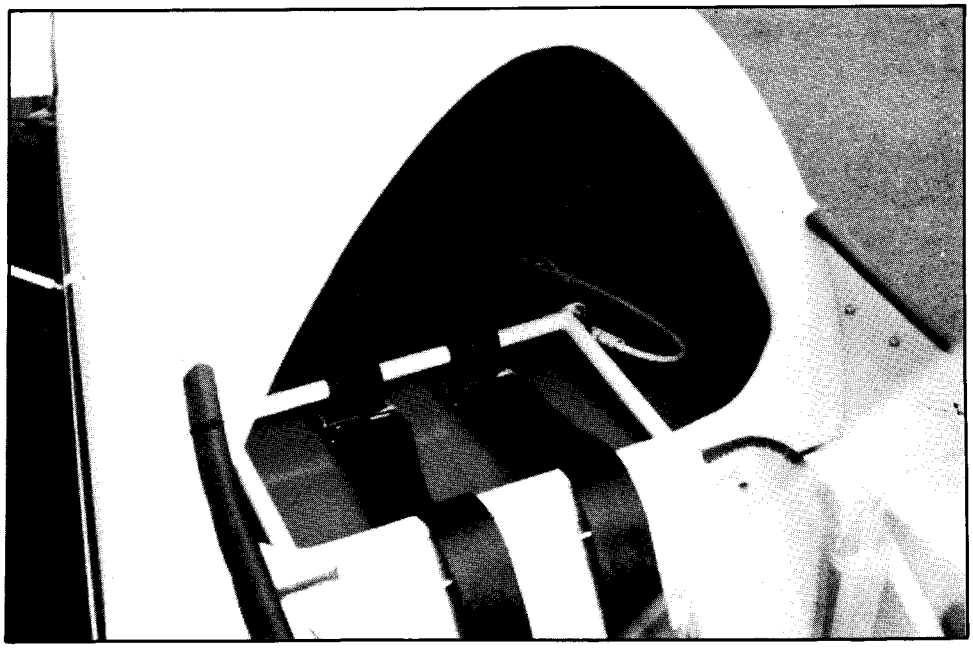
DON BAKER'S — BEST A.S. II — OSHKOSH '88



Don Baker and his Acro Sport II.

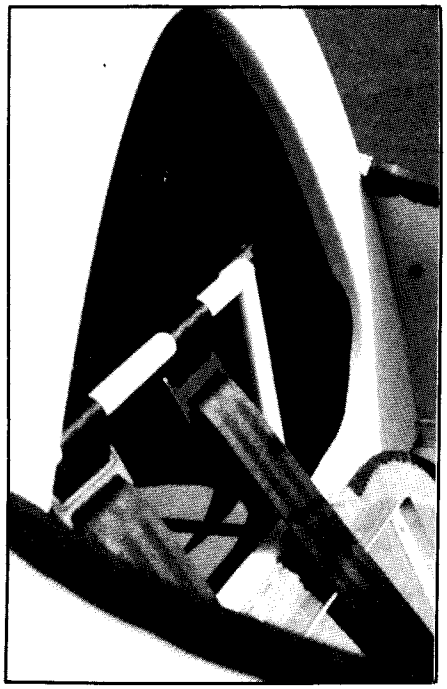


Don's belt support in the collapsed position to use the turtle deck.

From Don Baker, 2733 Whippoorwill, Elida, Ohio 45807

Dear Ben,

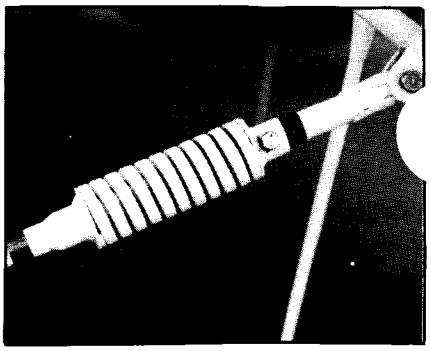
Well, it has taken me a while to answer your letter but I have more to tell now. And thanks for allowing me to talk at the Acro Sport Forum, I enjoyed it.



Belt support in the upright position.

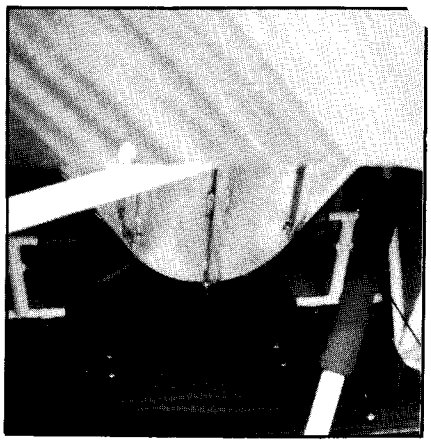
Prior to my first flight I had the cylinders honed and the valves lapped and installed new rings. During the first 3 hours of running, the engine seemed to not be performing right. It sounded different, tachometer only gave me 2100 rpm, and oil was fouling the plugs. At the time these things seemed normal, (new prop and just overhauled cylinders). Well, first flight was June 15, 1988, and was eventful! Lift-off was in about 500 feet trailing a smoke trail. I had no indication of airspeed until at a cruise attitude and then it was only 60 mph. I had a heavy wing wanting to roll to the right. And the tachometer would only indicate 2200 rpm full throttle in level flight. Also oil temp went to 245 degrees. Landing was UN-eventful. For the next 3 hours of flight time, the oil consumption, oil temperature, and rpm problem stayed with me. We finally removed the cylinders again and installed new oil rings, that took care of the oil consumption problem. The high oil temperature and low rpm stayed with me. The high oil temperature would limit my flight to about 15 to 20 minutes. It was discovered that my new tach was reading 300 rpm low at 2000 rpm, indicating 1700 rpm. This was solved by installing a $10 used tach found at Merfi (Marion, Ohio). Still the oil temperature problem existed, it turned out to be one that seemed to haunt me. All kinds of things were tried, and finally a new 8 rib Stewart Warner oil cooler was installed. The old cooler was a Harrison and about the same size as the SW 6 rib. The new cooler has solved the problem and my oil temperature is now running about 180 - 190.

I now have about 24 hours on my Acro II. Here are some of the numbers of my Acro. Take-off is in about 350 feet. Best rate of climb speed is about 85 mph, and rate of climb is 1400 rpm. Best glide, if there is such a thing in a bi-plane, is 75 mph at 850 rpm. Approach to landing is at 90 mph. At cruise rpm of 2350 rpm I am indicating 120 mph. At full throttle rpm of 2600 rpm I am indicating 140 mph. The stall at idle is not really a stall but more like a mush. My stall warning comes in at just less than 50 mph. At that point with full aft stick it just mushes with good control using rudder. Landings were a different ball game. Being used to my Citabria's over the nose visibility it took some getting used to the lack of it in the Acro. Final approaches are done carrier style. Just a wide descending turn ending about 200 feet from the fence at about 50 feet altitude. By doing it this way I find I can always see the runway and I will be aligned with it when I have to switch to peripheral vision for the flair and landing. If you line up on the runway centerline a half mile out, you will not see the runway again until you get out of the airplane or if you drift off centerline. Just a little power is carried down to touchdown, maybe 1000 rpm. Tailwheel first landings are easy to do, but this is not the best attitude to land in. You don't want to try to float the airplane down the runway and squeek-em on. The best landings I have had have been by carrying the power right to touchdown, using the elevator to slow the sink rate so you get a nice soft, but firm touchdown in the 3 point attitude. At the instant of touchdown add a little forward stick to keep the tail light and bring the throttle to idle. Once you are on the ground and have cut the power, the airplane slows down quickly. As the aircraft slows down, bring in full aft stick and concentrate on ground handling. Ground handling of the Acro II is very easy, it has no bad habits except when a tailwheel shimmy kicks off both springs. (You have a handful with any taildragger when that happens). So far, I have done steep turns, chandelles, lazy 8's, rolls, and hammerheads (and a few other undocumented maneuvers).



A coil spring Don used on his airplane.

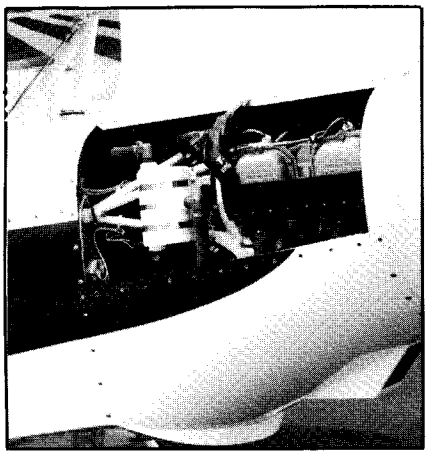
Morning, afternoon and evening delight. That's my Acro Sport II. I enjoyed building it, I love flying it and I like to talk about it. The rest of the time I just like thinking about it. I started the project in the spring of 1981, with a desire pent up since I was a kid. I must say that the airplane is appropriately named. It is a good acro plane and it is gentle enough to be an excellent sport plane. It may not be an unlimited aerobatic competitor but it will keep me busy learning maneuvers for some time to come. It is pretty "short legged" because of the 180 horse engine and only a 22 gallon gas tank, but I think this is a good feature: You get to land a lot so others can admire it too - a helluvan ego boost.



In this photo the tank ends can be seen to have right angle supports to keep them from flexing.

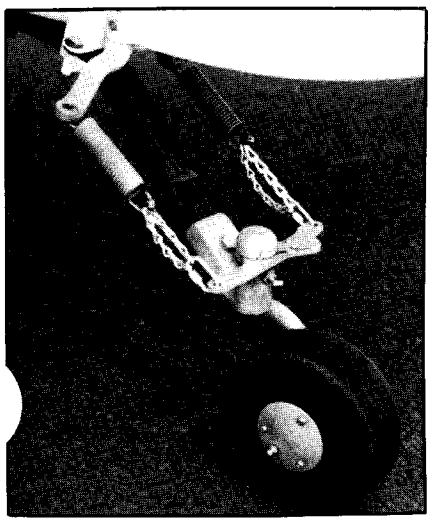
Oshkosh '88 was the first time I had flown there, the other two times, '81 and '83, I drove in.To do it in your own home made airplane is just about as good as it gets. It was quite an experience to be on the question answering side of the fence rather than the asking side as previous years. The most asked qu - tion was "What are those flying wire wing fairings." The answer is — alligato clip insulators, Mueller number 74. They are available in red, white, yellow, blue and black.

Now lets talk about N122DB. Construction was finished in December of 1986 and due to the winters in Ohio, I decided to catch up on other projects to keep me busy until spring. It was licensed on May 4, 1987 with no squawks from the FAA. N122DB, by the way, stands for single engine, two wing, two seat. All materials and components, except the engine, were new. I planned on doing some aerobatics and I wanted the peace of mind that new materials gives me.



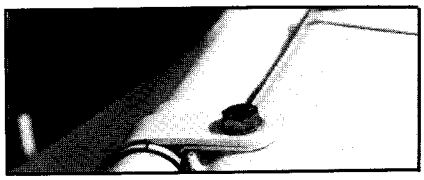
A cowling shot of Don Baker's Acro II.

Ground handling and landing characteristics of the Acro are excellent, cross-wind or gusty, grass or asphalt. The first flight was with prior tail wheel time limited to an hour in a Stearman, an hour is a Cessna 140 and a half hour in a T-Craft and Citabria. Next was taxi runs in the Acro. I made 10 or 12 passes down the runway with the tail down then with the tail up to get the feel of it. On the 16th of May, it all felt good, the weather was nice so away we went. It was a perfect first flight and it landed beautifully. No problems and no trim or re-rigging was or has been necessary. Jigging accuracy really pays off here. It looks much nicer without washers under the I struts to fix rigging problems.



Tailwheel detail of the Baker Acro II.

In less than 10 hours airframe time I decided that it was time to try some aerobatics — mild stuff at first. I figured me and the Acro would learn together. I am not recommending that you teach yourself aerobatics. That decision is entirely yours, but I have found it to be more rewarding. It is a slower way of learning because you work up gradually rather than doing everything in one or two days. I started with slow rolls around a point (barrel rolls are still more difficult for me to do). Inverted flight was next, followed by loops, cuban eights, Immelmans, spins (upright) point rolls and hammerheads. Bill Thomas has the best book I have read on aerobatics, "Flying for Fun". He tells you where to look, how to correct errors, etc. and it really works well. I have not yet tried snap rolls partly because I hear the plane does not snap well and partly because of my hollow crank engine. Hammerheads are my favorite. They are about 800 feet tall with an entry speed of 120 to 125 mph and are easy to do. Just like Bill Thomas says, watch the wing tip and when it takes about 3/4 inch to one inch of aileron deflection to hold it, then it is time to kick the rudder. It works every time. I highly recommend his book which is advertised in Sport Aerobatics.



This photo shows the split bushings he used on the controls.

I have limited pullups to 5 Gs so far and probably will never get good enough to compete, but who knows for sure? I will tell you one thing, it is impossible to go anywhere in this plane without throwing in some rolls and loops along the way. Truly an "Acro-Sport". The airplane is very forgiving during aerobatics. It is capable of doing all the maneuvers I have done with entry speeds of 120 to 125 mph and level flight with the 180 hp engine. Higher entry speeds generally make the maneuvers taller and easier to do.

I have not experienced any aileron or slave strut flutter problems. I made up my slave struts with outboard incidence in order to put an aerodynamic preload on the strut. With zero incidence the strut would be prone to flutter since any free play would be aggravated into flutter by lift reversals. The incidence approach eliminates the need for attaching welding rod, etc. to the strut to "stall" it out for flutter control

Details of N122B are as follows:

Engine: Lycoming IO-360-B1B, 180 HP.
Prop: 76 by 56, metal.
Oil system: Christen Inverted with extended oil sump mod.
Electrical: Starter, alternator; battery is behind pilot.
Radios: Terra COM and LORAN, removable in 20 seconds.
Weight: 1007 lbs, w/o radios. I don't like radios.
Tail wheel: 67 lbs, empty, level.
ROC: 1500 fpm, me only, standard day conditions.
T/O run: 400 to 500 ft.
Cruise: 115 mph, 75 percent power, no canopy.
Grins: ear to ear.
Finish: Stits HS90X, Poly Tone all over, un-rubbed.
Finish: 51 lbs all fabric, paint and primer.
A/C TT: 100 hours as of 8/22/88.

I built N122DB pretty much per the plans. Specific deviations were spring L/G shock struts rather than bungee cords, an electrical system, removable bronze bushing tail surface bearings and horizontal pull shoulder straps. Detail photographs of these changes are shown. I have also removed the front brake pedals to prevent the passenger from mashing the brakes on a spooky landing. Only a non-pilot passenger would do such a thing. Right? You can over power him on anything else, but not the brakes. It hasn't happened yet but why take the chance?

The springs used on the shock struts are the (only) ones sold by Aircraft Spruce and Specialty. The landing gear was pulled in slightly by shortening the struts and about half of the spring travel is used sitting on the ground at one G. The shock bottoms out at about two Gs according to my trigonometry. This change added two pounds to the airplane empty weight.

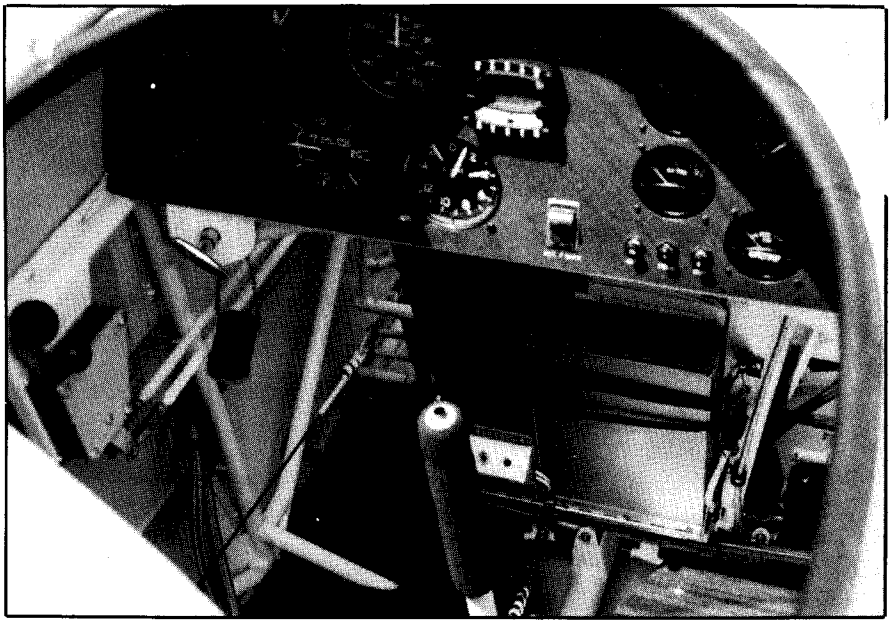
The tail surfaces are hinged with replaceable bronze bearings similar to the Eagle, etc. The bearings were machined from bronze motor bearings to make a channel for the hinge strap to lay in. They were then cut in half lengthways with a thin saw. The two piece hinge strap is made from 4130 and bent to fit in the channel machined on the bearing OD. The forward bearing half is riveted to the forward hinge strap piece. The rear bearing half floats in the rear hinge strap piece. Both hinge strap pieces are drilled for the 1/4 inch hinge

attach bolt. This is a rather complex way of making the hinge but I engineered it after all the welding was done on the tail surfaces. If I had it to do over I would make them like the Christen Eagles.

The rear seat shoulder strap mount is hinged so that it can be folded down for access to the baggage area. The restraining pull force is transmitted to the airframe via 1/8 inch aircraft cables connected to each top longeron with a 1/4 inch bolt through a welded fitting.

The only problems so far have occurred during the second year of operation. They were an Aeroquip 601-10 hose failure, hard hot start problems, and the recommended action is to avoid the pretty stainless steel braided 601 hose and use 303 like Pitts does in all fuel and oil lines. I talked to Herb Anderson in Afton about this, his experience is invaluable. The difficult hot start problem was in the magneto vibrator and has been corrected. The tank crack was probably vibration fatigue and it occurred in the middle of the back panel. I talked to Curtis Pitts (Ben Owen helped me here) and he said the tank ends should be bulged an inch or more with air pressure then reinforced with several, vertically oriented, one half inch U channels welded to the back panel of the tank. This was done and so far seems to be working well. The bulging really seems to make the tank more rigid and I would recommend that it be done if your project is still under construction.

An extremely good source of reference material for this type of aircraft is the "Technical Tips Manual" Volumes I, II, and III. These are available from IAC. You should join IAC just to get the technical information and safety information these people publish in the Sport Aerobatics magazine even if you never intend to do aerobatics or compete. Both the 601 hose problem and the fuel tank cracking problem are covered in volume II and are apparently not new problems.



Don Baker's instrument panel.

There is a wealth of information out there if you look in the right places.

I taught myself wheel landings this spring and now I use them almost exclusively. They allow better visibility over the nose on roundout and flareout and seem to give consistently nicer landings than three point landings. I use about 1500 to 1700 rpm all the way to touch down and 85 mph on final. A touch of down elevator is needed right at touchdown to kill the lift and nail it on the runway. I also like wheel landings because you are all set up for a go around if needed and there is less wear and tear on the tail wheel. On three point landings, the Acro slows and settles quickly in the three point attitude and, therefore, requires more concentration to get consistent greasers. Just a touch of throttle helps here to slow the settling while maintaining the three point attitude. This is especially true when heavily loaded on hot days.

If you have any questions about the Acro Sport, I would be happy to give my assistance. Just drop me a line at the above address. Above all, keep on building, you are going to love the Acro II. Happy building and happy flying, morning, afternoon and evening!

EDITORS NOTE: Don has done some inverted spins in the Acro II. I believe he may be one of the first to have don this. He says he makes sure that h keeps the ailerons neutral and that if he leads slightly with the rudder, it is a heck of a lot better than leading with the elevator because it appears to slow the rate of the spin. Don says it recovers better inverted and is a "polite" spin. He enters from the inverted position and with 3 to 4 turn spins, it takes less than a 1/2 turn to recover. He is wearing a chute! The aircraft is also equipped with a 28 amp hour gel cell to avoid spillage.

Don has a sketch of the modification to the shoulder harness. The reason for modifying the shoulder harness in this fashion is that a direct pull over the top of the shoulder blades is easier on the spine in the event of a sudden stop. It fails somewhat in the inverted position of helping to hold the pilot down on the seat but is a safer position. It may help eliminate submarining in the event of a sudden stop. Copies of this are available from EAA Headquarters, but were too detailed to copy for the newsletter. There is no charge for this one sheet sketch.

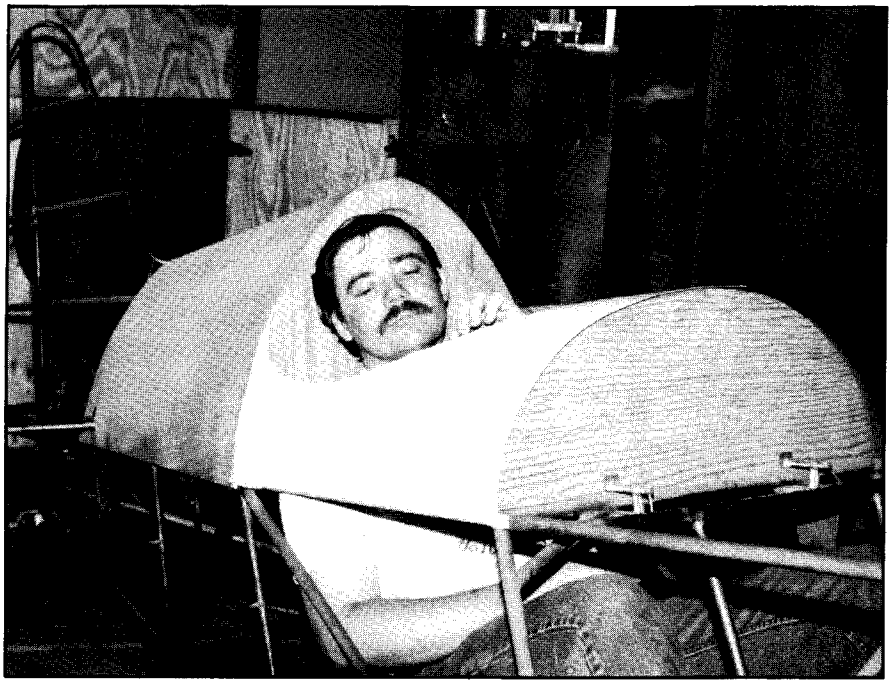
Our condolences to Don Baker anc family in the loss of his father. Don's father passed away during the '88 EAA Oshkosh Convention. This is the reason Don missed the Acro Sport dinner presentation.

CONGRATULATIONS TO 1988 ACRO SPORT I AEROBATIC PILOTS

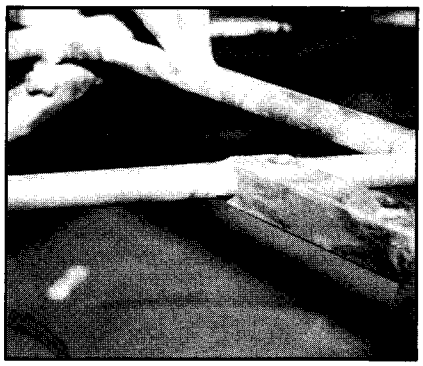
OKIE TWISTOFF REGIONAL — June 3-4, 1988
Stillwater, OK.
FOURTH PLACE BASIC CATEGORY:
Jim McCormick, Richardson, Texas
Acro Sport I, N797F
1988 SPORTSMAN STANDINGS:
14th of 254
Blane Schroeder, Victoria, Texas
76th of 254
John Willkomm, Kenosha, Wisconsin

Acro Sport II by Neil Sidders Technical Counselor in Monroe, Louisiana

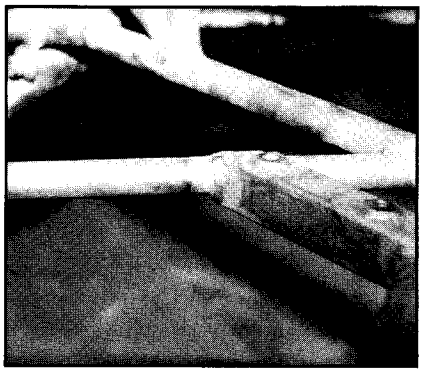
Here Neil is fitting cardboard for his cockpit area.



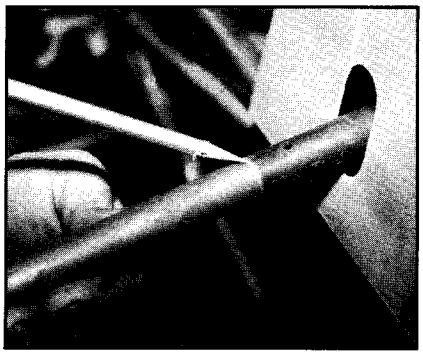
Welded assembly showing fit.



Welded assembly after welding.

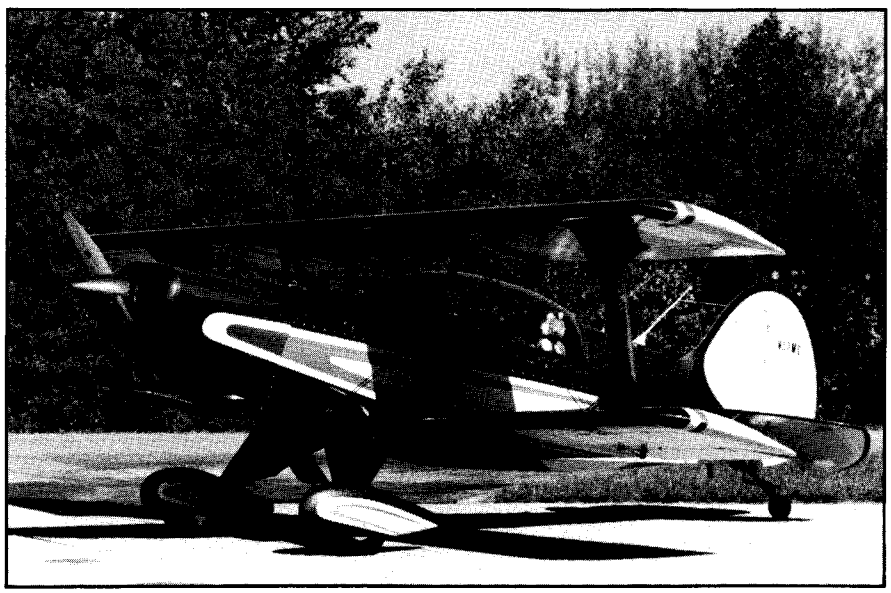


Note from Neil. He states that on sheet 17 of the plans and zone B5, the conical mount, if built as shown, the shaft center line will be 5/8 inch below the top longeron center line. If you want the shaft center line to be level with the top longeron center line, the 5 inch dimension should be changed to 5 and 5/8 inches and the mount adjusted accordingly. Neil is using an O-320 engine.



The photo at left shows the sub spar butting up against the front carry through tube.

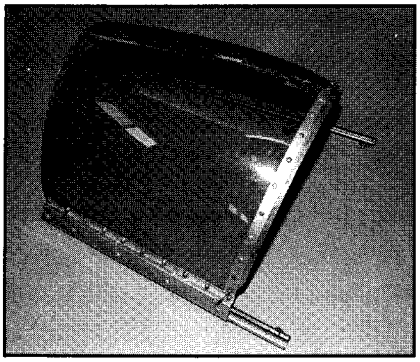
Maynard Engel's AS II



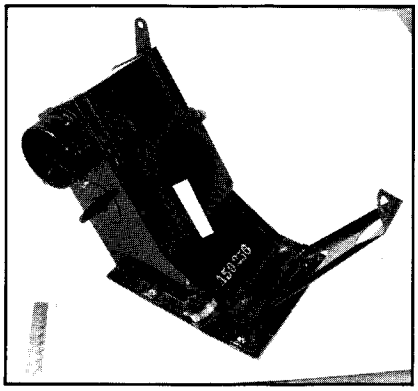
Maynard G. Engel, 317 S. Black Horse, Road, Parkesburg, Pennsylvania 19365 built and flew this nice Acro Sport II in 1987. He reports:

We had beautiful fall weather which Nancie and I took advantage of. There have been no problems with the Acro Sport to date. We won another trophy at the East Coast Fly-in, for which we were thrilled. We had a surprise at the East Coast Fly-in . . . saw another Acro Sport taxiing in and discovered that it was the plane built by Dave Blanton and is now owned by Tom Wolf and his brother, who are based at Doylestown, PA. Upon leaving, we were talking to Larry Stengel, who owns a Sport Wing. We decided to take off in formation. Larry's wife Jenny was taking a lot of pictures while the two Acro Sports were in flight.

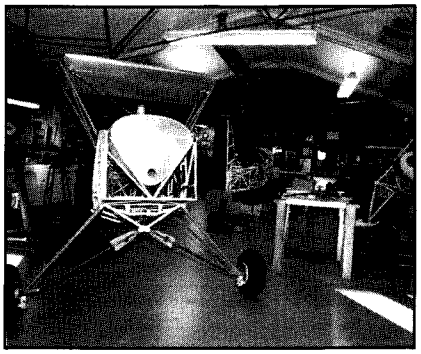
Photo Gallery



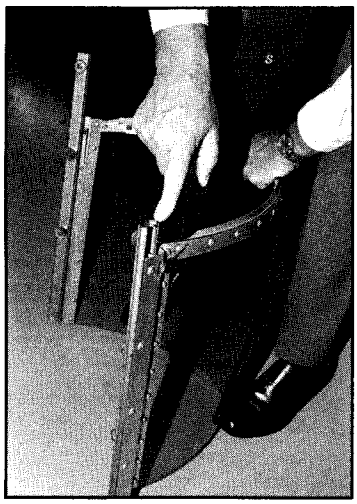
The rear cockpit canopy in the Acro Sport II off the aircraft showing the rails and the outside tab release.



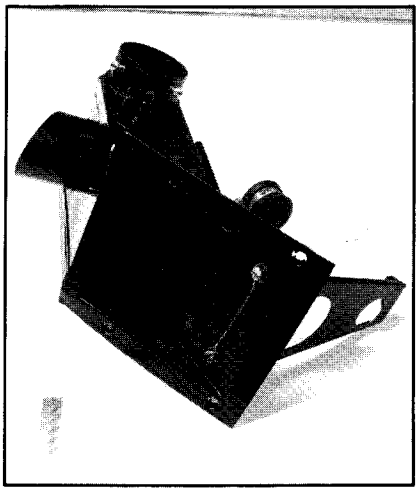
Prototype Acro II carburetor heat box from the top down.



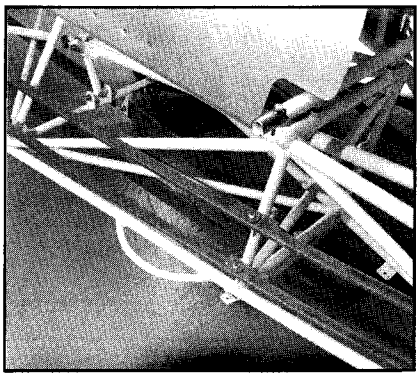
Prototype Acro II under rebuild in Paul's shop. Also visible to the right is a Corben Jr. Ace and another Acro Sport II fuselage.



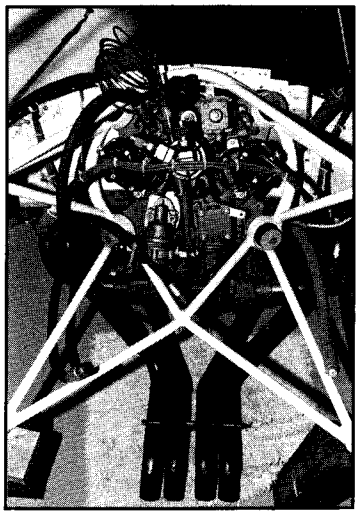
Prototype Acro II canopy slide rails come from the cabinet making industry and are drawer rails.



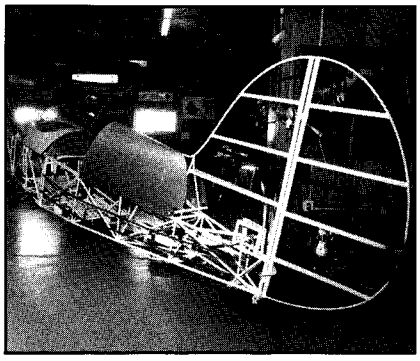
Acro Sport II carburetor heat box front view.



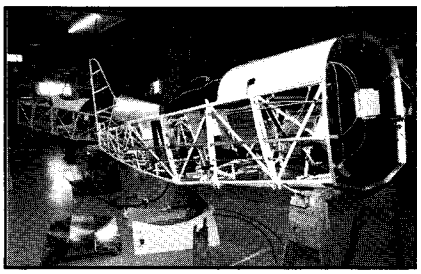
Prototype Acro II detail in the area of the front horizontal stabilizer brace.



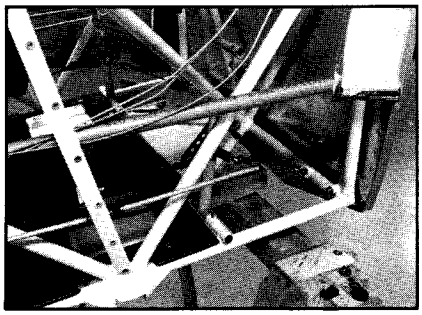
The Acro II prototype engine off the airplane. Rear view showing baffling, some wiring detail and detail of the exhaust system.



Prototype Acro II tail section.



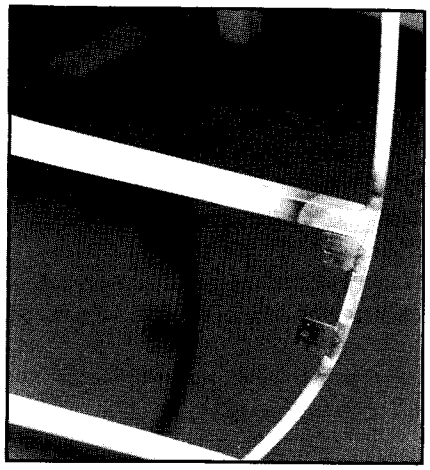
Acro Sport II right front view showing some firewall detail. The aircraft is completely rebuilt and going back together.



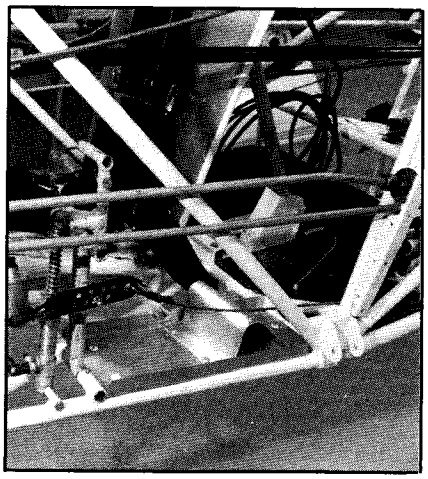
Acro II rudder pedal area showing the old style closed loop rudder pedal cable location and the engine breather tube.

OFFER TO PURCHASE — ACRO SPORT II

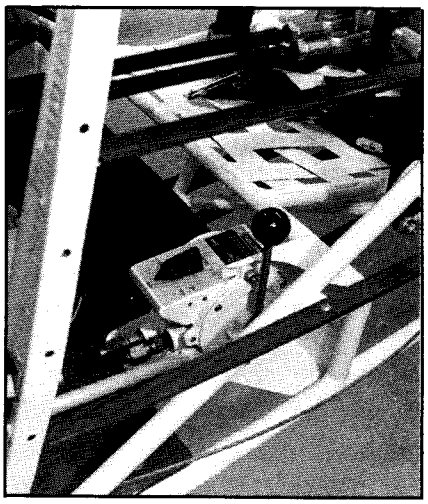
EAA member William A. Johnson, 103 Huntington Road, Dalton, Georgia 30720 (telephone ?) would like to buy an EAA Acro Sport II ready to go, complete. He would also consider a Pober Pixie or Acro Sport I.



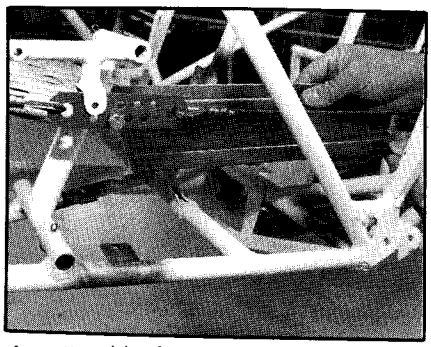
Brackets Paul welded on the Acro II rudder for future trim tab.



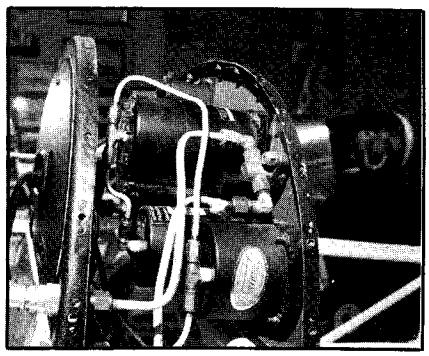
Front seat detail and rear brake detail for the Acro II.



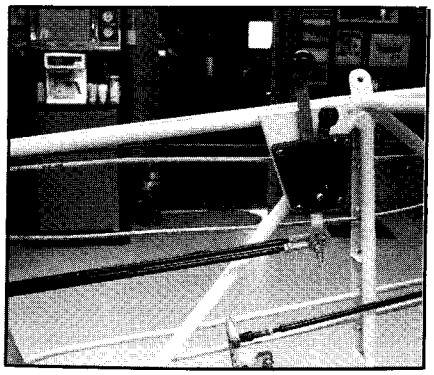
Christen wobble pump/fuel selector/filter.



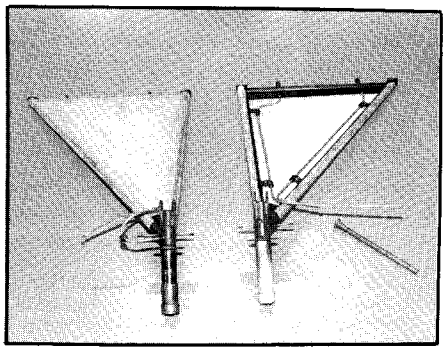
Acro II rudder foot trays. Note new brackets welded on.



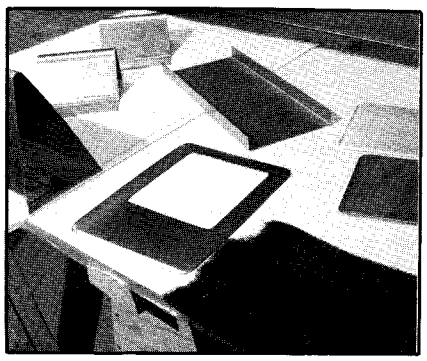
Instrument panel — rear on the Acro II.



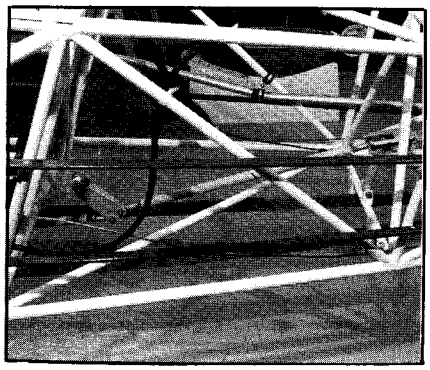
Acro II throttle and mixture quadrant.



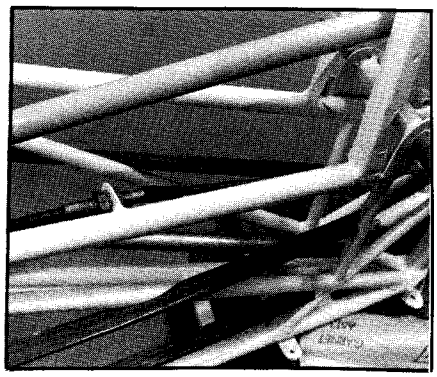
Acro II landing gear showing position of vent tubes and brake line. Note two bending spring to right.



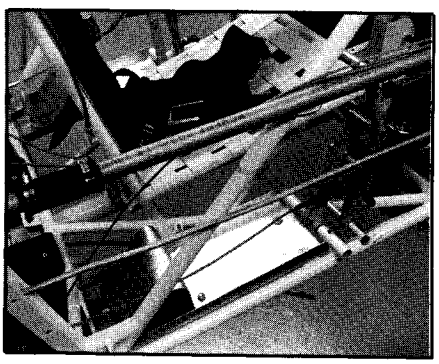
Cockpit floor aluminum covers end up with a very fine scotch—brite finish.



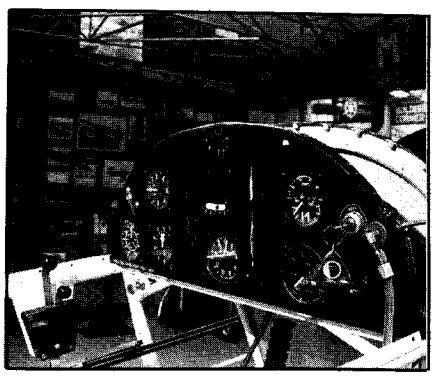
Detail in the rear of the Acro II seat.



Trim tab on the Acro II push/pull cable bracket.



Cockpit detail showing location of rudder pedal tray and protective bracket for the aileron push/pull.



Acro II rear instrument panel.

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