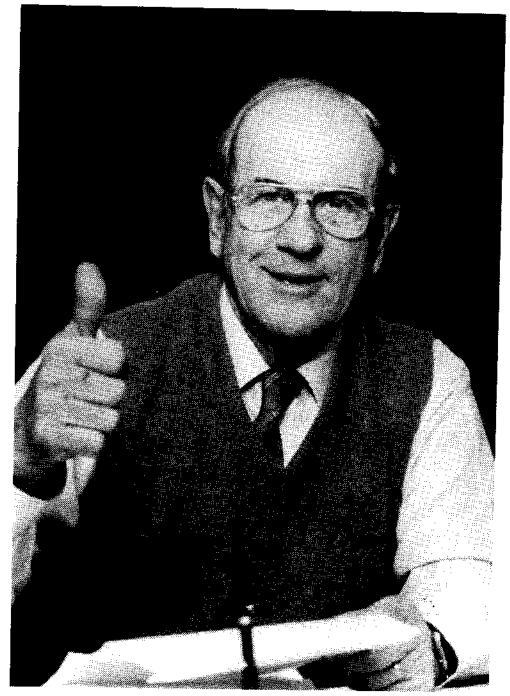
ACRO SPORT NEWS #10

& Project Schoolflight January 1985

P.O. Box 462 Hales Corners, Wisconsin 53130

ACRO SPORT EDITORIAL

by Paul H. Poberezny



ABOVE: Paul H. Poberezny in his office at EAA Headquarters.

Dear Fellow Homebuilders:

We are starting out a new year with an all-time-high of aircraft construction by individuals ranging from the high side of the ultralights (or light planes) even to some with jet aircraft on the drawing board. However, many of us are still staying with the basics: wood, tubing and fabric. I would like to mention that if you haven't seen the premiere issue of the EAA's LIGHT PLANE WORLD, the publication that I'm sure all of you will enjoy, I strongly suggest you consider receiving it. It has been extremely well received and is very reminiscent of sport aviation of the '60s with a lot more how-to-do articles and information pertaining to homebuilding.

At this year's EAA Convention, great emphasis will be placed upon our workshops. Tony Goetz, the maintenance supervisor at our EAA Weeks Research Center, will act as chairman and we have many fine programs in the making. This year, we will continue our work on the Pober Pixie and also hope to have the Acro II that is to be powered with the O-235 Lycoming ready for display and assembled less covering. The Pober Pixie project under the guidance and direction of Robert E. Stagner will again be an attraction. We are appealing for volunteers to aid in this most educational program. In fact, we'd like to get another fuselage and some wing ribs started as an ongoing annual project. I would suggest that you contact Bob at 1911 Fernwood, Poplar Bluff, Missouri 63901 or call him at the following numbers: home - 314/686-1969; work - 314/785-9651 extension 24.

We hope to see a number of Pixies and Acro Sports at this year's meet and I'm sure that Acro Sport again will be presenting awards for the best of the three designs. We would like to hold an Acro Sport and Pixie forum again this year and would like to have several moderators to help answer building questions, techniques, etc. We would also appreciate any photographs for LIGHT PLANE WORLD, SPORT AVIATION and ACRO SPORT Newsletter. My best wishes for the coming year to all you aircraft builders!

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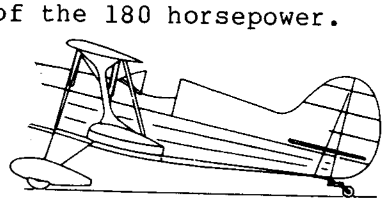
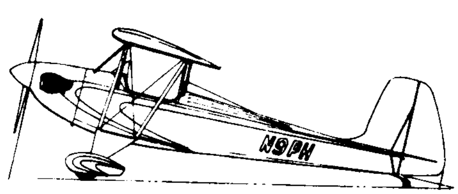
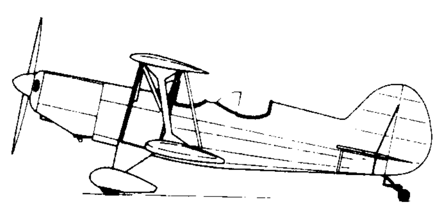
ANOTHER ACRO SPORT II FLIES!

By: Builder DANIEL QUEBEDEAUX of RT 1, Box 501, Arnaudville, LA 70512, 318/754-7524 after 7:00 p.m. As of now, I have only 19.5 hours but I've had no real problems with the plane. There were no bad habits, no re-rigging needed. I only need a rudder trim because of the 180 horsepower.







I'm not aerobatic proficient, but a friend took it up to test my inverted oil system (He flew inverted, slow rolled it, and looped without using over 2400 RPM. All systems worked properly in the inverted attitude. We're waiting on better ceilings and hotter days to get up and wring out the aerobatics.

I'm waiting to install my canopy and wheel pants after my 25 hours.

This was my first homebuilt. I had no help, only opinions, then I'd go from there. As an Ag pilot, I gained some fabric experience and tubing and engine work. I feel I've built a good quality showplane. I'm satisfied with it.

Here is a bit of my personal background: Born and reared in South Louisiana on a small farm, graduated in 1966; Commercial welder since high school, tour in Vietnam in 1969-71; After Vietnam, I was tired of walking so I took up flying; Private pilot in 1974, Commercial pilot in January 1975, crop duster in August 1975; I do welding work in the winter and fly ag work in its season - Ag flying is my basic flying; I hold Commercial S.E. and M.E. land and S.E. seaplane Ratings; No instruments, I have to see where I'm going!

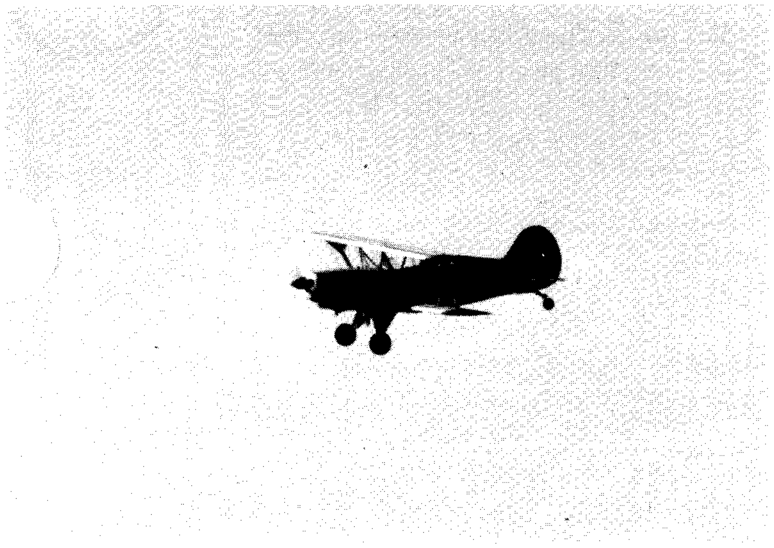
My most-asked question by others was why I started such a project? I wanted to prove to myself and others like me that even if society thinks little of us, there is plenty of talent to be found in "ordinary guys". Have patience, work hard, seek information and don't ever give up!

ABOVE: What goes up, must come down! And it did, in one piece! It's still working.

LEFT: Clear the runway!

LOWER LEFT: Increase that power, boy!

BELOW: Man, the tail is up, what next?!



ABOVE: Look here, it flies! How do I get it down?

RIGHT: Safely back in the hangar . . . praise the Lord!

Specifications

FAA Final inspection and certification - September 11, 1984; First Flight - September 14, 1984; Comments - Wow! Great! Beautiful!; Total hours of testing to date - 19.5; No bad habits, no re-rigging, rudder trim needed for 180 HP; Empty Weight - 1056.5#; Left Wheel - 495.5#; Right Wheel - 488.0#; Tail Wheel - 73.0#; 7.5# heavier on left side, reason I figure is - oil cooler and lines with undrainable oil, wing walk on left, baffles and air hoses, all controls and cable on left, wobble pump and line with drainable fuel, fuel vent lines and brackets, sky writers package (extra pump on left).

Engine

Lycoming IO-360B4A 180 HP; Prop - Sensenich 76-E-M8-0-56; Smoke oil and sky writer system by Homsley; Basic electrical system - battery behind rear seat; Construction started - April 1, 1981; Completed - October, 1984; 3 yrs. 5 months (approximately 3,500 to 4,000 hours). Stits process throughout; Colors are Ag Cat Yellow, Juneau White, trim in Cruiser Orange and Elsinore Brown; Rear sliding canopy and wheel pants.

Performance To Date

Inverted flight, slow rolls, loops, no problems; Indicated air speeds are - 115 mph @ 2350 RPM, 120 mph @ 2400 RPM, 125 mph @ 2500 RPM; Fuel usage - 7.5 gal. @ 2350, 8.5 gal. @ 2400, 9.0 gal. @ 2500 and above; Empty Weight C.G. - 63.5"; Most forward C.G. - 68.74"; Most Rearward C.G. - 74.24".

Cost

Last count, $25,000 invested in materials only, everything is new, no seconds. Engine is "0" reman. from Dick Waters. Inverted fuel and oil from Christens, oil and fuel lines all stainless steel wire braid, all 4130 frames were blasted, primed with epoxy chromate and finished with enamel paint, all aluminum was washed in 310 alkaline cleaner, etched with Aluma-Dyne E-2310, and coated with Aluma-Dyne-2300 conversion coating before priming with Stits Epoxy chromate metal primer. All aluminum interior was painted with Stits Poly-tone semi-gloss. Exterior was done with Poly-tone and top coated with Stits Clear rothane enamel A0-100.

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ACRO SPORT I - N118DM
By: DAVE MARSINO
66 Columbus Avenue
Closter, NJ 07624

Dave Marsino reports: The cold weather has curtailed my test flying. There are a few adjustments on the wing washout still to be done. As you know, the project was started July 11, 1980 and first flight was October 30, 1984. The tail brace, as mentioned in Issue #5, works perfectly. The engine is an O-290D of 125 HP turning a 72 x 52" metal prop. Cruise so far is 115 MPH indicated at 2300 - 2350 RPM. Empty weight is 849 lbs. and empty weight C. G. is 58.3 from the front face of the prop. The aircraft has a full electrical system with full interior installed. The battery is behind the seat. There is no inverted system installed. Approach speed is 80 with landing at 65 - 70 MPH. I used an 11" mount and the weight on the ta wheel (empty) is 39 lbs. Thanks, B for all the help; the airplane is beauty and I love it! Just for the record, I ordered a set of Acro II plans.

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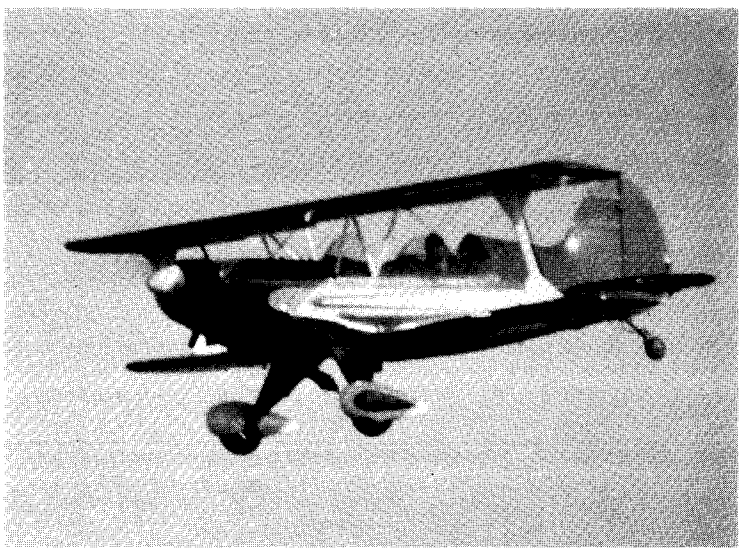
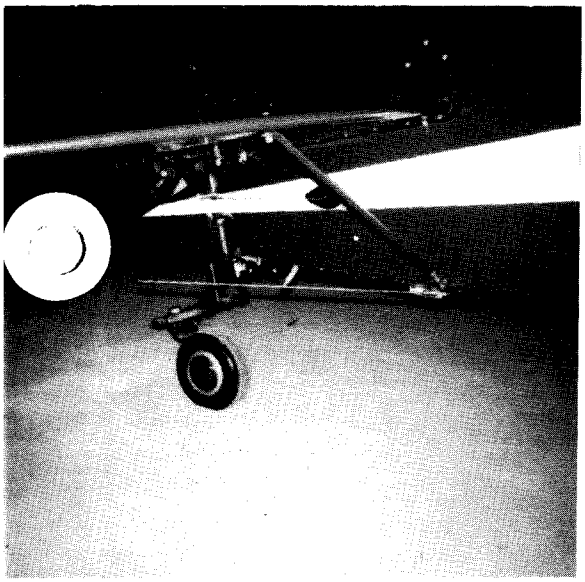
ACRO SPORT II - N3791H
By: ALBERT "BUD" GORES
6948 Breber Drive
Burlington, WI 53105

BELOW: N3791H on a fly-by.

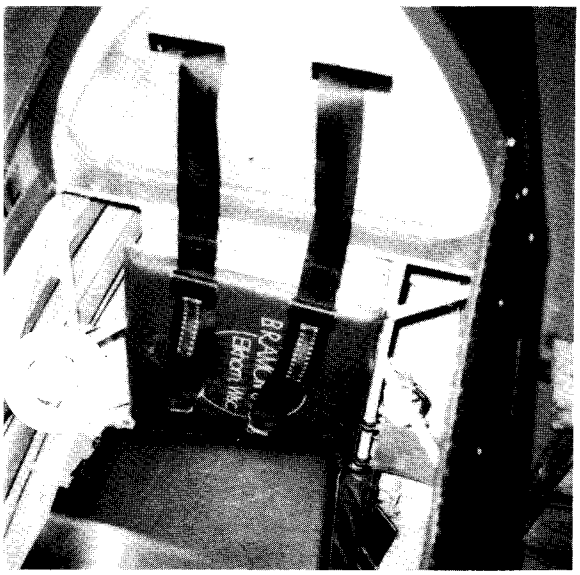


BELOW: Bud Gores in the cockpit of his beautiful Acro II.



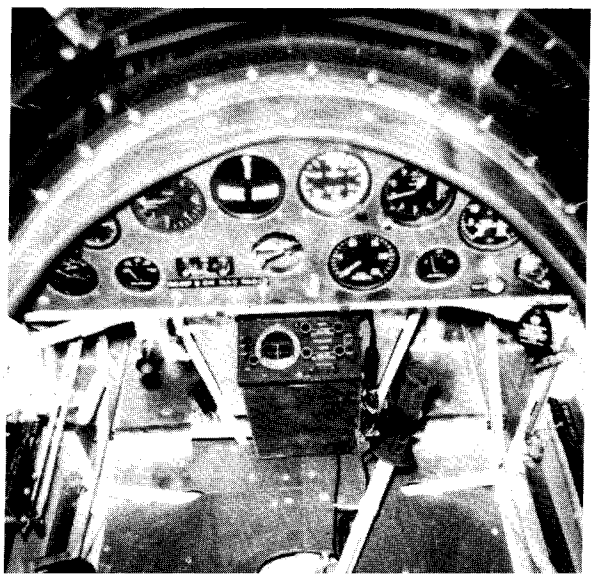
ABOVE: *Omni Antenna.*

BELOW: *Hand holds.*

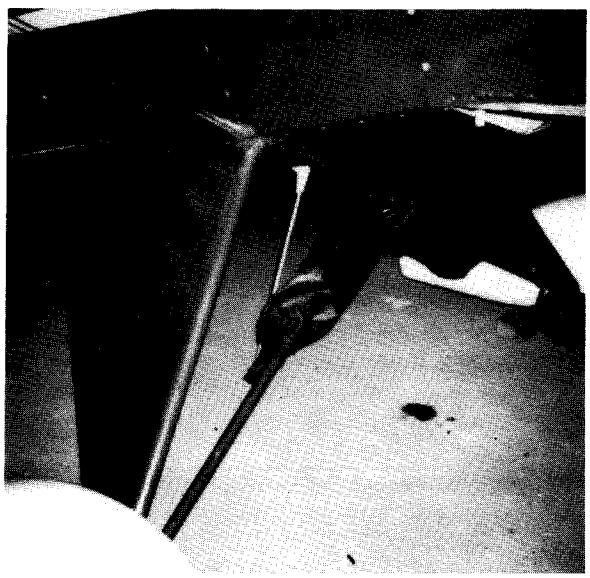


Lycoming 0-320A2B 150 HP powered. The prop is a Sensenich 74 DM 6-0-60 but has been shortened about 2 inches. Empty weight is 1048; Gross weight is 1520. Battery is 28 amp; Gell Cell mounted behind the rear seat and is on a raised mount to allow the elevator control tube to pass below it. There is a full electrical system - starter, generator, nav. lights and rotating beacon. A Genave Alpha 200B is installed on the rear of the front seat and a Sigtronic intercom is panel mounted. A push to talk switch is on the rear stick and 2 Telex headsets complete the radio system. The aircraft has an Acra Line inverted oil system, a PS5C Carb., 15 psi aerobatic fuel pump (manual) and a Dukes 15 psi aux. boost pump. The engine is equipped with a primer and it works extremely well in starting the engine. The pitot tube is mounted on the lower left wing. There is a canopy for the rear seat and a front hole cover. The ELT and the Omni Antenna are mounted on the access cover to sta. 7 and sta. 8. The broad band antenna for communications is mounted on the belly of the aircraft between the wheels. A manifold heater comes into the front seat. To help exit the rear seat, two hand holds are installed from the sides of the seat to the diagonal tube from the top of sta. 5 to the bottom of sta. 4 (see picture). Full flooring installed in cockpit areas. Cleveland Brakes. Wheels and tires - 600 x 6. Flight characteristics are normally good. It is not as fast as I thought it might be. IAS at cruise is 92 Knots; Stalling speed about 45 knots (hard to read my airspeed at that slow speed); Stall is not good, no stall strips installed and the aircraft does not break clean out of the stall but just sits there, nose high and mushes down. The tail of my aircraft is heavy - at 74.75 pounds; this is noticeable as you run down the runway and want to lift the tail; it is also noticeable if you want to move the aircraft on the ground by hand; however, it is super on ground handling and taxi characteristics are great - this airplane handles great on the ground. The aileron control is good - it really is effective on that control.

BELOW: *Radio and Instruments.*



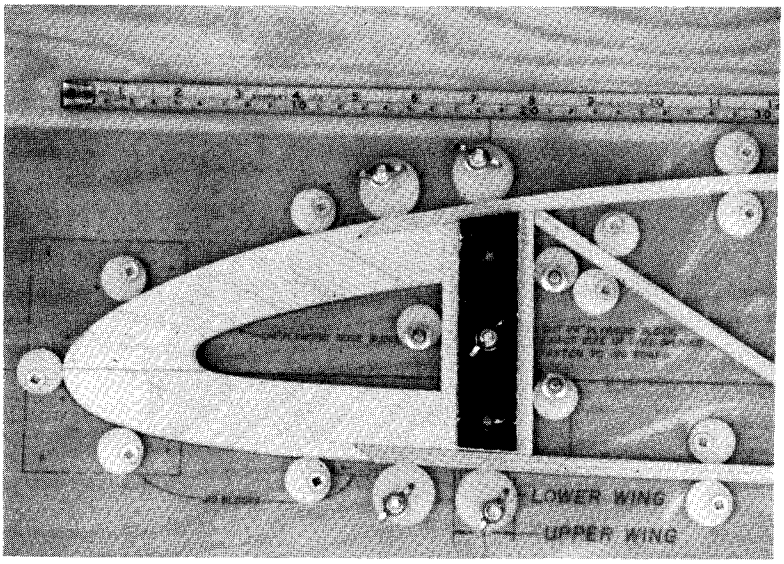
BELOW: *Broad band antenna for com.*



I think care should be exercised in the installation of the windshields and in t canopy if you are tall. I am 74 inches tall and I do not have a lot of head room insi the cockpit with the canopy installed. I also get into the slipstream with my head a little bit without the canopy installed.

Modifications of the rear seat could also be done to give more room to tall people when wearing a chute. The chute pushes you forward and is very uncomfortable. The ability to exit the aircraft in an emergency would appear difficult with a chute on as you are really packed in tight. I am sure you would not give a lot of thought to that if you had to get out, however.

EDITOR'S NOTE: Bud, I know your static system is off. Do some runs on a known course - 2 way as I believe your cruise is much higher. Also, I'd suggest a different chute, although I know it's costly. IAC members can purchase the 350 Safety Chute (Security Parachute Co.), Item #473, direct from us at $774 (a savings of $86) with adjustable air cushions, seat and back. *

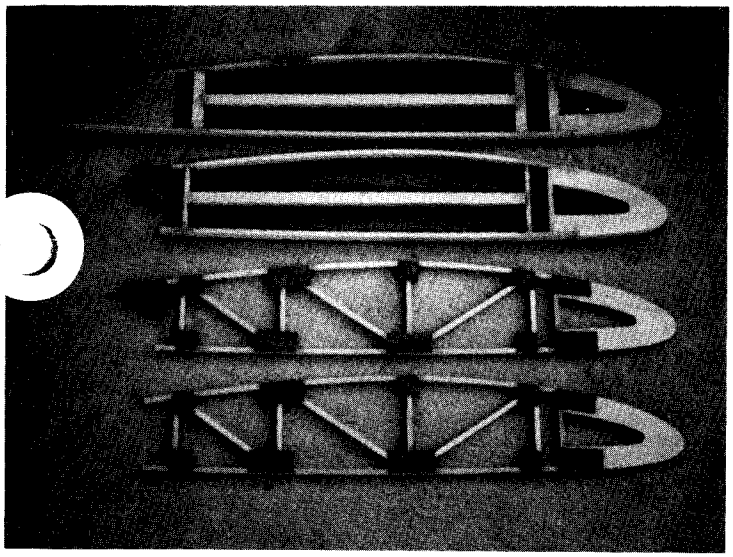


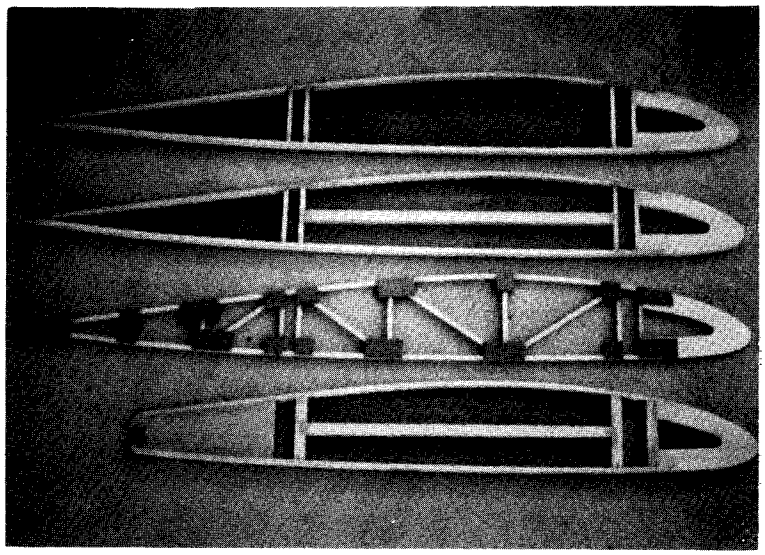
ABOVE: The wing rib jig on D. Geoff Anderson's Acro II.

D. GEOFF ANDERSON'S ACRO II
307 Main Street, Box 812
Brownsburg, Quebec
CANADA J0V 1A0

Thought I'd drop you a note on my Acro II project, plans #616. Progress is slow due to arrival of son #1; but to date, all ribs for upper wing are complete, ailerons assembled, elevators and rudder ready for welding and many of the numerous small, steel parts cut a shaped. I've been at it 2 years now b can only afford to spend about 150 hou per year - so maybe by the turn of the century?! Still - I really enjoy building this aircraft - my second. The first was a Taylor Monoplane. The Acro II plans are extremely well drawn and detailed and I think the newsletter is a great idea.

I've enclosed a few photos of my upper wing ribs - one of each type - and a photo of my rib jig which has some features you may like to pass onto other builders through the newsletter: On my Taylor Mono project, I recognized the problem of the accumulation on jig components which would eventually make fitting and removing ribs difficult. With the Acro II, instead of the usual wooden blocks, I have used 3/4" and 1" diameter hard nylon rod cut into 1/4" thick discs for the 3/4" and 1/2" thick discs for the 1". These have been drilled and countersunk eccentrically so that they can be rotated to align perfectly with the drawing - placed under a piece of Melinex drafting film on the jig board. The larger 1" discs are positioned at the spar blocks and held with wing nuts on 1/4" bolts. These are left loose while assembling the glue covered strips into the jig. They are then rotated and due to the eccentricity, lock the cap strips snuggly against the spar blocks and nose piece to give an accurate spar opening. The spar blocks are made of aluminum and held on dowels in the jig. This method of assembly and choice of nylon and aluminum allows quick and easy cleaning of the jig after each 3 or 4 ribs have been made. It also means that by thoughtful positioning of the discs, they can be adjusted to allow all the types of ribs to be made in the same jigs, i.e., different thickness of spar blocks c be slipped over the dowels and the nylon eccentricity simply rotated to allow for the





position of the spruce strips held against the spar block. The same goes for the compression ribs - just remove a few discs and swing others to hold the 5/8 sq. spruce.

Anyway - before I get too longwinded - I hope this might help someone. Incidentally, I use Aerolite 306 glue which flakes off the nylon beautifully.

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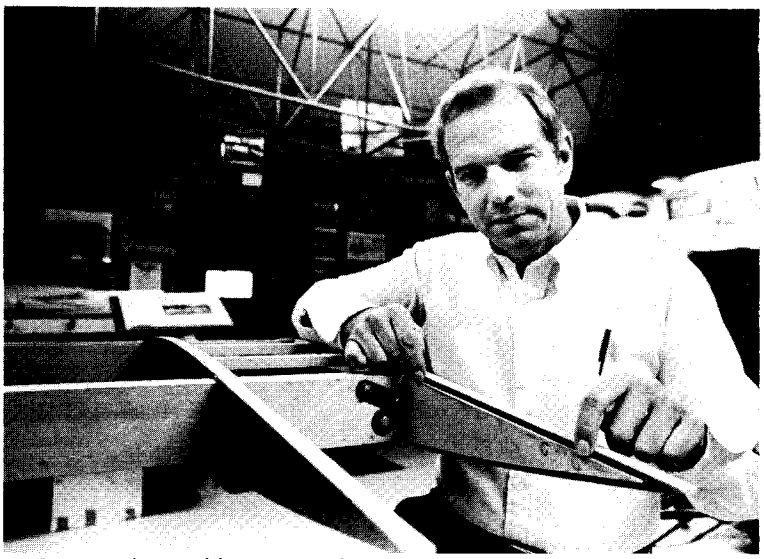
WORKING ON PAUL POBEREZNY'S ACRO SPORT II

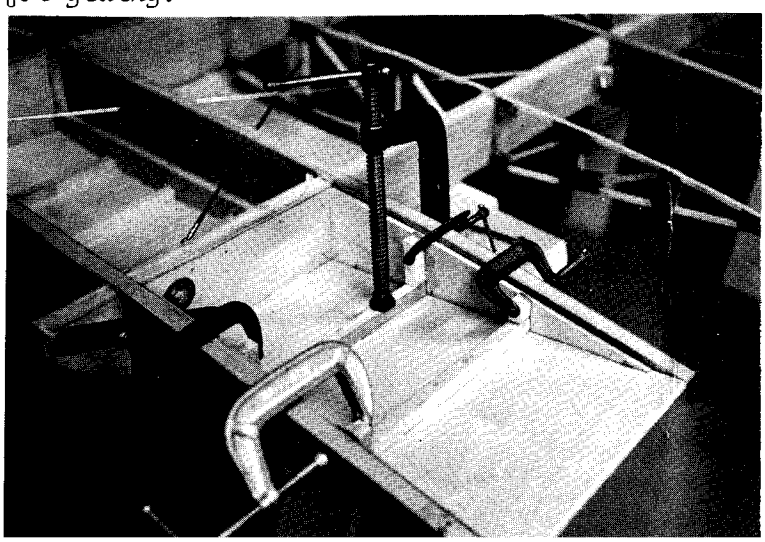
The pictures below show the process involved in cutting and fitting the pieces for the wing walk area. All pictures do not include the final plywood piece on the underside of the wing from the trailing edge to the front of the rear spar. That piece is particularly important because it bears the compression load of the weight of a person standing on the upper surface.



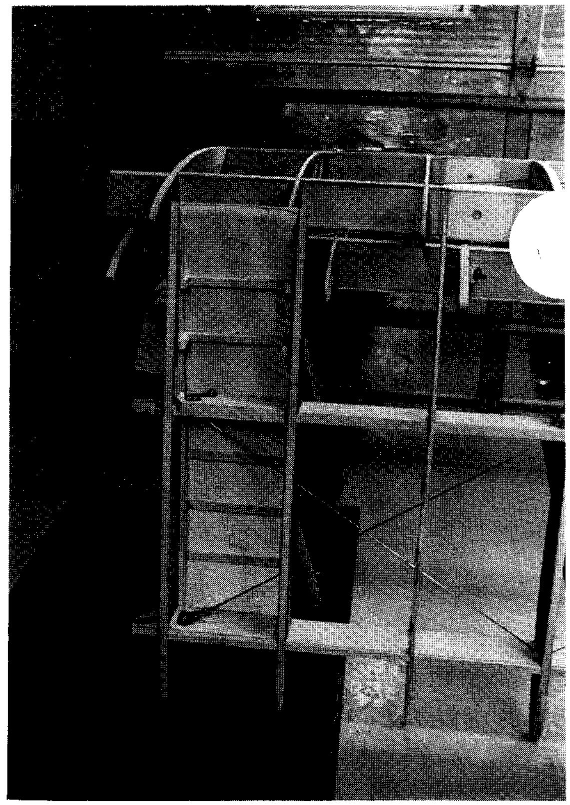
ABOVE: The editor & the plywood part he carefully made to support the plywood skins.

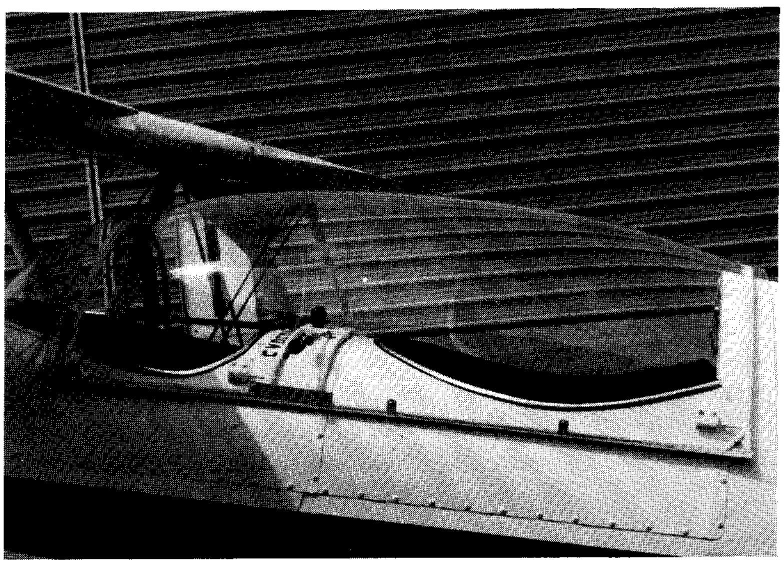
BELOW: Wing upside down - showing bracing back of rear spar.

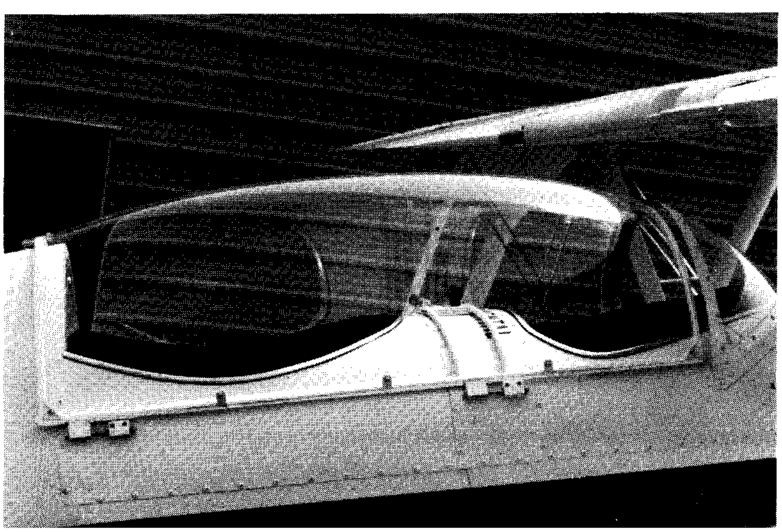
BELOW: Clamping wing walk braces in place for gluing.



RIGHT: Showing the bracing for the wing walk area.







STEVE BLAKE & HIS ACRO SPORT II - N68SB

In the closeup pictures, the canopy is shown in its unlocked rearmost position. The canopy is permanen attached on its right side and its side is locked by two pins that slide n and out of nylon blocks. Moving the canopy forward automatically engages these pins on the left side. In addition, the forward edge of the canopy slides under a 1/2" lip at the windshield. To keep the canopy from sliding to the unlocked position in flight, there is a lock in the center area just ahead of the pilot. This lock is nothing more than a 1/4" pin with a spring that proceeds from the center of the aircraft straight out through the plexiglass. The pin terminates with a red knob for locking and unlocking the canopy from the outside. To control the pin from inside the aircraft, a 3/4" aluminum rod has been formed into a grip on the locking pin. To operate opening the canopy from the locked position, the following sequence is performed: 1) Pull locking pin to the left; 2) Slide canopy rearward to the unlocked position; and 3) Lift up the side of canopy until it hits the mounted on the upper wing center sect.

reclose: 1) Lower canopy; 2) Slide canopy forward to engage pins on left side of aircraft; 3) Pull locking pin to the left; 4) Slide canopy further forward so that locking pin can engage; and 5) Release locking pin - spring will move it to the locked position.

The canopy was purchased from AIRCRAFT FACTORY in DAYTON, OHIO. The frame was formed from 1/2" .035 4130 tubing. The nylon mounting blocks are nylon and were obtained from AIRCRAFT SPRUCE.

The canopy really accents the lines of the aircraft and should help to extend the flying season.

Steve Blake, 3122 Riverstream, McHenry, IL 60050

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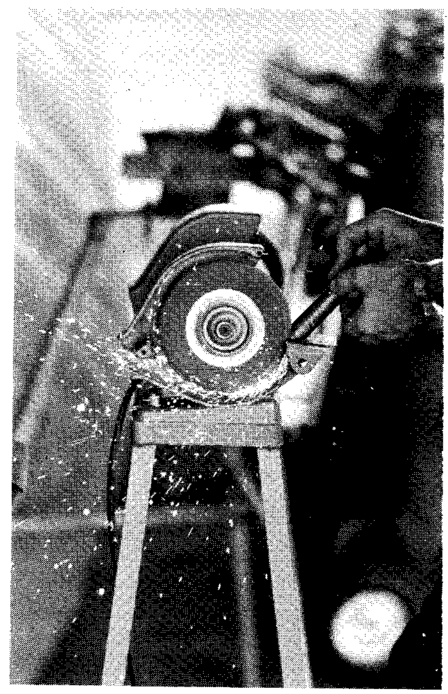
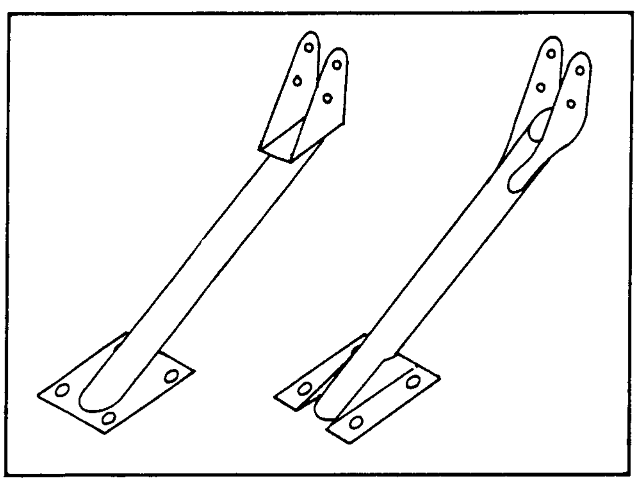
PROPER WELDING TECHNIQUES

The photo to the **left** shows practice welding on clusters and should give you an indication of what a good cluster should look like. The appearance of the weld is not nearly as important as the penetration and proper build-up of material. These welds can also be sawed through to determine their quality which is a good idea before you start the final welding on your project. The picture to the **right** shows a grinding wheel being used to shape the ends of tubing to fit properly in a cluster. The grinding wheel is first dressed with a stone to present a round surface for grinding tubes. It's the quickest way we've found at the EAA shops.



BELOW: Left = incorrect; Right = correct.



In welding, welds should be placed in shear (as the "correct" example here is) and not in bending (as the "incorrect" example is). This particular part is an example of a modified aileron spade support; please see ACRO SPORT NEWS Issue #6. Fred Cailey of IAC does their Technical Tips column and reports there have been several failures at the low end of this spade support on Pitts'. The correct example is one idea of how the welds could be properly loaded. A good example of a similar joint that is properly loaded is the elevator horn assembly as used on the Acro Sport II.

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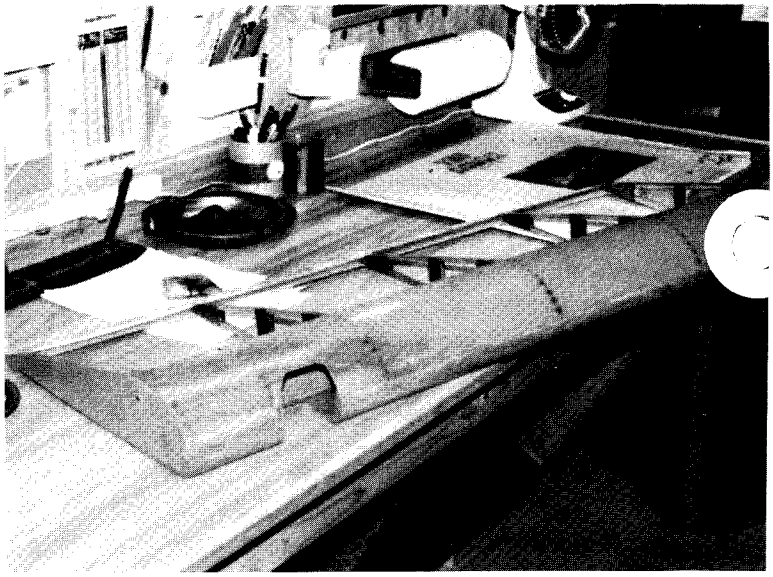
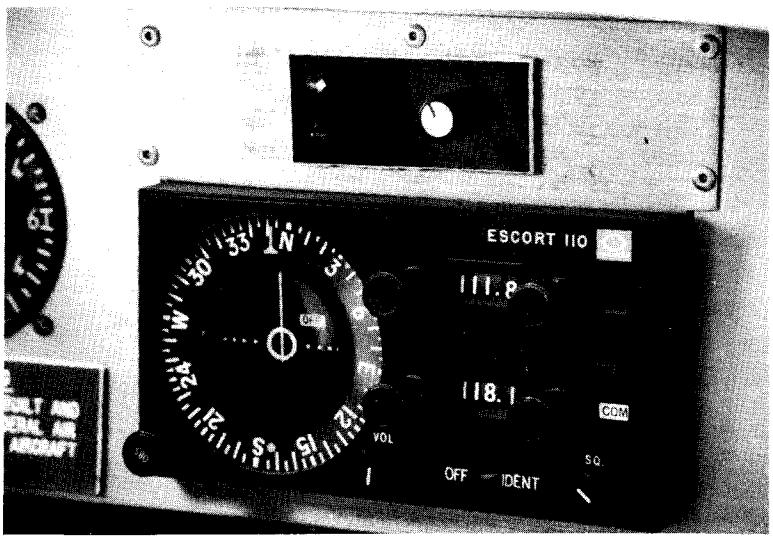
HINTS & TIPS FOR THE BUILDER



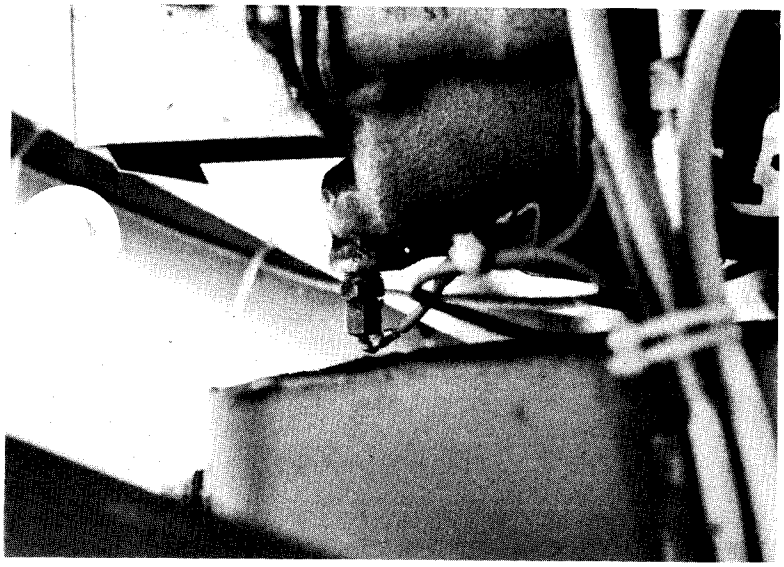
ABOVE: *Tony Hohenwalde's ailerons for his Acro II.*

ONE: The aileron on the Acro Sport II has been a source of problem for some builders. Actually, the prototype ailerons were built to the plans and fit the aircraft well without any serious modifications. However, we then determined that some builders were having interference with the leading edge of the aileron and the flying/landing wire pins. As the aileron area was more than adequate, we shortened the ailerons on subsequent sets of plans which eliminated the problems for most builders. Some builders solved the problem of interference by cutting the leading edge away, where others solved the problem by moving the aileron back slightly and cutting about 1/4" off the trailing edge, then re-attaching the trailing edge. Some builders have had problems with it while others have not. We would suggest that builders with the wings and older ailerons should assemble the aileron to the wing with the older ribs and see if you can't make them fit. Practically everyone who has tried to do this has succeeded. If I were the builder, I certainly wouldn't scrap the old aileron ribs. I would go ahead and assemble them to make them fit. This seems to be what builders are doing with a great deal of success. It is also possible to move the trailing edge on the wings back slightly and to shorten the old ailerons by cutting a small portion off the trailing edge.

TWO: One of our builders put in a crossover exhaust stack on an Acro Sport I. Unfortunately, the hot exhaust was aimed at the bungee chords. The excessive heat caused the bungee to snap on landing; the pilot heard the bungee pop on landing. The pilot believes that if he had stayed on the asphalt that the wing tip would not have dragged, but he eased the airplane over onto the grass to see if he could minimize damage. He received minimal damage to the tip of the low aileron and the fiberglass wing tip. He's been able to fill and repair this quite successfully. He has ordered and cut new stacks for the airplane. The builder reports that the airplane "lands like a little Baby Cub" and that "nothing controls and flies like the Acro Sport". The builder is Fred Caravetta of Coral Gables, Florida. He has built one of the prettiest Acro Sports that I have seen. His aircraft is pictured in ACRO SPORT News Issue #1. He owns a number of aircraft; but as he says, nothing compares to the Acro Sport I. Fred's recommendation to any flier with a similar problem is to stay on the runway rather than rolling over onto the grass.

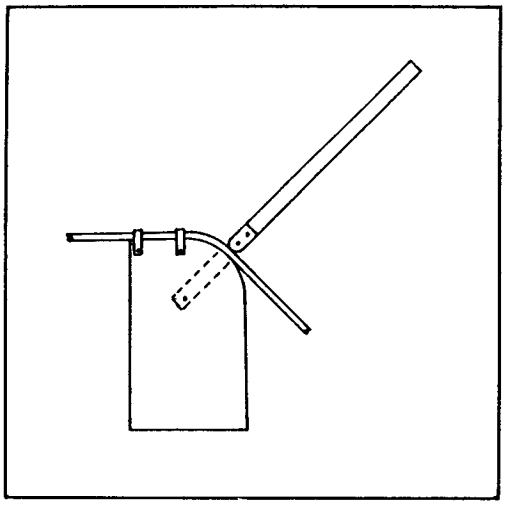


THREE: H_2O detector: In the photograph to the **left** (above the Escort 110) is the small panel with a water detector. The water detector was developed by Richard W. Brown, V.P. Research & Development, Aquatrol Corporation, 2258 Terminal Road, St. Paul, MN 55113, telephone 612/636-3950. The second photograph shows the water detector pick-up which can be located in the carburetor bowl, the gascolator or the fuel tank. Actually, you can locate a sender in all three locations and have a switch to switch them if you'd lik



Dick won the Avco Lycoming Safety Award for 1984 for this suggestion, and I understand the device will be marketed through Wag-Aero. It really works well and will detect water in the fuel quite readily. You might contact him or Wag-Aero for further information on the device.

FOUR: From builder Ray Ramos of Denver, Colorado, comes this tip for the Acro II, which also applies to Acro Sport I and Pixie. He suggests you mount the engine mount tubes in the cluster before welding the cluster together. We have had other builders that have failed to mount the engine mount tubes in the cluster before welding the cluster together. Then you have to very carefully drill and file a hole out for the engine mount bushings in the front clusters, which is a tedious procedure.

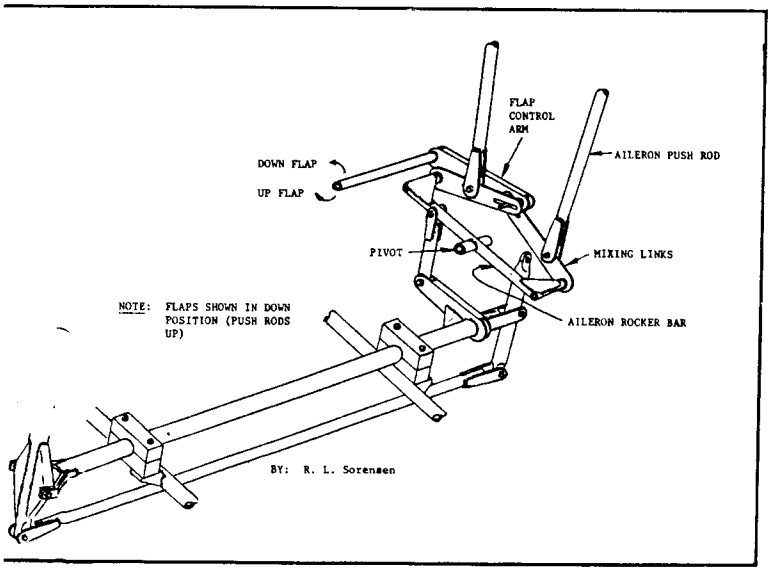


FIVE: The drawing at the **right** shows a very simple method for making a tube bender and comes to us from Acro II builder Lee Farnsworth. He is correct - this tube bender is both simple to build and quite satisfactory. However, it's also possible to use a conduit bender that you can rent from the hardware store, which works great on rudder, fin, horizontal stabilizer and elevator tubes.

SIX: The following is the degree of angle between the front gear leg and the axle. Pober Pixie = 128-1/2°; Acro Sport I = 135° 42'; Acro Sport II = 135° 25'.

SEVEN: Sensenich has developed a wood prop for the Acro Sport II; it's a W74EM. This is not a type-certificated propeller, but the cost is approximately $570, available from Sensenich dealers. The weight is approximately 10 lbs. Sensenich's contact is Ed Zerker, telephone 717/569-0435. The propeller is laminated birch with epoxy leading edge and also comes with a repair kit.

EIGHT: For your information, the propeller weight of the Hartzell constant speed used on some Acro Sports I & II is approximately 74 lbs. The weight of a metal Sensenich 76 x 56 is approximately 33 lbs.



NINE: From builder and good friend Jim Burris - an easy way to remove fabric that's stuck to wood that you want to take off is to use your iron and set number in the 200 - 400° range and use the heat on it to melt the dope. You have to be very careful with this method: don't get things too hot!

TEN: Proposed Pixie Flaperons by R. L. Sorensen - see diagram at **left.**

HINTS & TIPS FOR THE BUILDER - Cont.

ELEVEN: Fuel Line Inside Diameters - To complete your fuel installation, it is best to do a test to see approximate gallons per hour that you can obtain in gravity feed through your fuel tank on any of the three aircraft. This should be done in the three-point position for peace of mind. One of the problems is that off/on fittings are generally the narrowest item in the fuel line inside diameter. To date, we have had no problems with fuel lines on our aircraft when they are installed as the plans show.

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NOTE: POTENTIAL PURCHASER OF AN ACRO SPORT II: Frank M. Rogers (P.O. Box 1031, Florence, SC 29503, Telephone: Office - 803/669-3232 & Home - 803/609-9842) would like to purchase a 180 HP powered Acro Sport II.

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UNTIL NEXT TIME...BEN OWEN, EDITOR, Acro Sport News, EAA, Wittman Field, Oshkosh, WI 54903-2591.

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