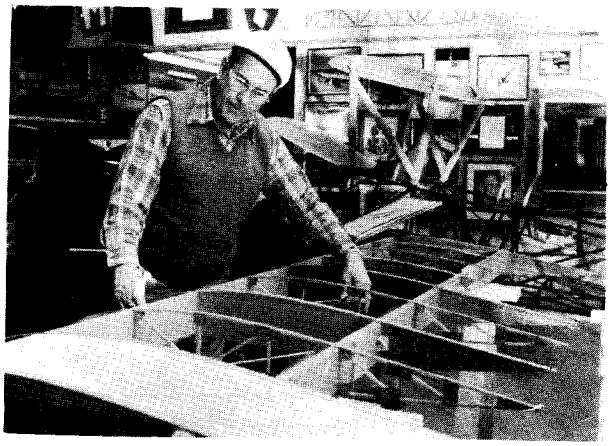
ACRO SPORT NEWS #11
& PROJECT SCHOOLFLIGHT APRIL 1985
P.O. Box 462 Hales Corners, Wisconsin 53130

ACRO SPORT EDITORIAL

BY PAUL H. POBEREZNY

BELOW: *Paul Poberezny works on his Acro Sport II.*



Working with hand and mind offers many challenges, especially in building an airplane.

This winter, I've spent a lot of time in my workshop. Two Acro II's and one Pixie are under construction--all are now on their gear. Hanging from the ceiling (with time yet to be found to work on them) are the fuselages of the Fokker triplane, a steel tube version of an SE-5 and a two-place Pixie. There is also another project underway...I found time to design a steel tube fuselage Primary glider--reminiscent of the days in high school when I rebuilt a damaged Waco Glider and taught myself to fly. I can still recall the smell of the hay as I was being towed aloft behind an automobile.

To make time even more precious, a Christmas present arrived in the form of a Hiperlight kit. The little staggerwing biplane is powered by the 37 horsepower Rotax engine.

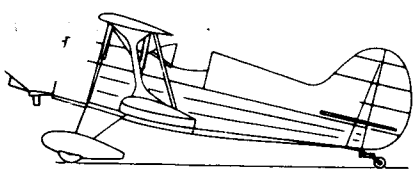
Thanks to some of our staff members who have been helping me, these projects have been ... ing along. The evenings and weekends that we work are most educational and enjoyable.

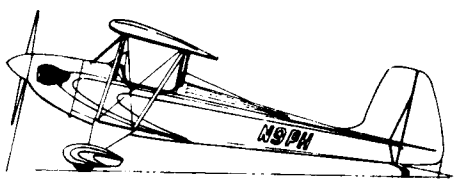
Some of our time has been devoted to preparing material for the 1985 EAA Convention workshops--preparing a nearly completed Acro II and Pixie for display and getting the materials to start a Pixie and an Acro II fuselage. Wing rib making, covering, etc. will be part of the educational workshops that will be going on during EAA Oshkosh '85.

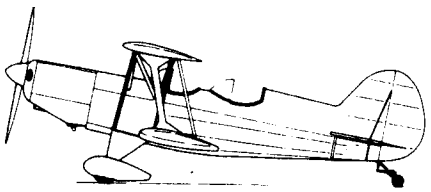
While working on the Pixie wing fittings we again learned a trick (one might call it that). To have perfect alignment between the hole on both the strut and the wing-to-fuselage cabane fittings can be challenging. We found it best to leave the bolt holes on the rear or backside fitting of the spar undrilled. This offers the opportunity for a perfect fit when hanging your wings and struts to the fuselage, while using the front spar wing fittings, the wing strut and fuselage cabane fittings as a guide.

Why is it that all humans are not perfect, especially designers and draftsmen? As in all drawings, some minor discrepancies in measurements may be found on the Acro and Pixie drawings. We have, with each printing, made the corrections that have been brought to our attention by builders. But, we must also remind ourselves that oftentimes we have misread a figure and found, only after the sound of the hack saw fades away, that the tube is too short. It's a bit different if it's too long!

Homebuilding on the national and, in fact, worldwide basis is on the increase. Little did I realize, some 33 years ago when I founded EAA, that this would happen. It cannot be entirely economics. Trade-A-Plane newspaper is still full of factory-builts for sale at a lower price than the cost of today's materials.







EDITORIAL BY PAUL POBEREZNY - CONT.

Maybe the seeds we planted years ago are now ripening and the creative ability of ... and women--hand and mind--again are challenged, but in even greater numbers than before. I would hope that interest in building your own airplane...your own personal wings...keeps on soaring upward so that many others may know the thrill of building and flying one's own creation.

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BELOW: This Pixie was recently completed by Jose Leao Saffer. Jose Leao is from Rio Grande Bo Sul, Brasil. Jose reports:

ACRO SPORT GALLERY

I am very glad to write you that finally I flew the Pober Pixie for the first time today. Really, it's a wonderful plane and it flew very well. I didn't need to make any correction! Wonderful, isn't it?

We began the Pixie construction in September 1983. I'm using a Continental 65 HP engine.

Thank you for this wonderful project that could give me conditions to fly it.

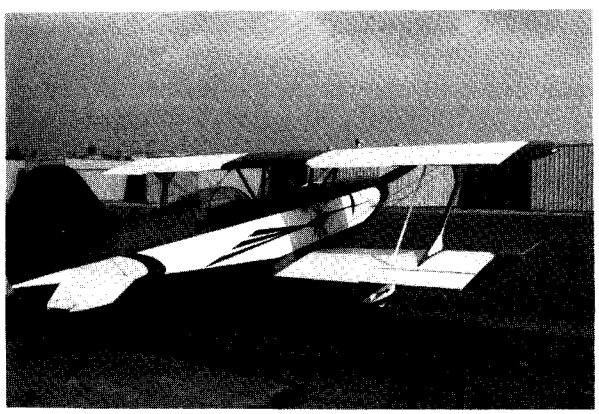
This is a photo of our Pixie. My Pixie is the only one in Brasil! Best regards,

Jose Leao Saffer

RIGHT: This Acro Sport II with full canopy was built by Maynard Engel and his son, Douglas. Maynard reports:

This is a picture of the Acro Sport II my son, Douglas, and I have just finished, N50MD. The first flight was December 2, 1984; it flies just great--a really fun airplane. This was built as per plans--the only change was a full bubble canopy (winters here on the East Coast are cold). The engine is a Lycoming 0-320 E2A, 150 HP, with a Sensenich 74 x 58 prop. Empty weight is 996 lbs. Our craft has the basic electrical system--radio strobe, etc. We have flown it 11 hours as of this date and hope to have the 25 hours flown off in time for Sun 'N Fun.

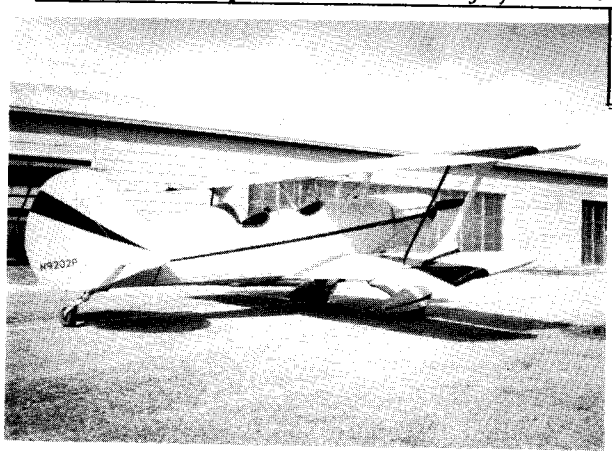
BELOW: This Acro Sport II was built by Jim Olsen. He reports:



The Acro Sport and I have been getting along well. To date, I have flown the airplane six times. Weather and work seem to interfere. As I discussed with you, the first time I flew the aircraft, it came off the ground at a steep angle. I now attribute that more to the pilot than the aircraft. I did not have that problem on the second flight with no adjustment to the aircraft. After the second flight, I adjusted the horizontal stabilizer leading edge upward ab... 3/8" and did not notice much change in characteristics of the aircraft. In flights after ...

.st flight, I have adjusted the rudder trim and the aircraft flies straight and level at 2400 RPM. I find this aircraft very controllable at low speeds and power-off stalls are docile. The controls are sensitive, but I did not have a problem adjusting. I utilized your suggestion to use less power during takeoff and this seems to work fine. Thank you for your help and I have enjoyed building and flying the airplane.

Jim Olsen
Arcadia, California



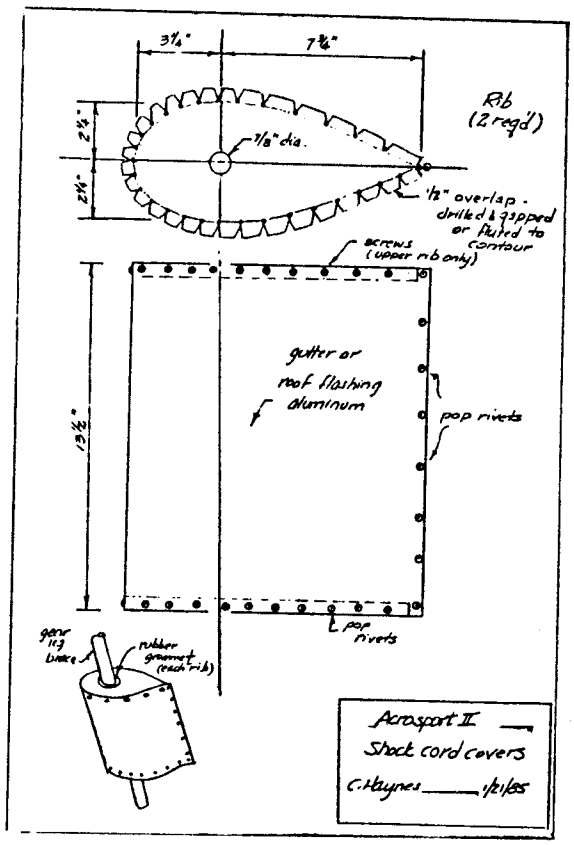
LEFT: Acro Sport II, N9202P, built by Charles Haynes of Tuscaloosa, Alabama. He reports:

FOLLOWING is a drawing of the shock cord covers for the Acro II. The basic dimensions came from a Super Cub and can be changed as necessary by the builder.

The 4-1/2" dimension on the rib width is important, since it provides scant clearance of the shock chord hardware while barely fitting into the landing gear assembly. The entire assembly can be pop riveted except for the upper rib. This one must be attached by screws so that the assembly can be taken apart for shock cord inspection.

N9202P was built in 1981 by John LaBelle (now President of Great Lakes Aircraft). It is powered by a HP Lycoming and performs adequately with two aboard. Total time is 400 hours on aircraft and engine. We installed a Navco Comm 10 Nav 11 last year and have detailed the aircraft extensively.

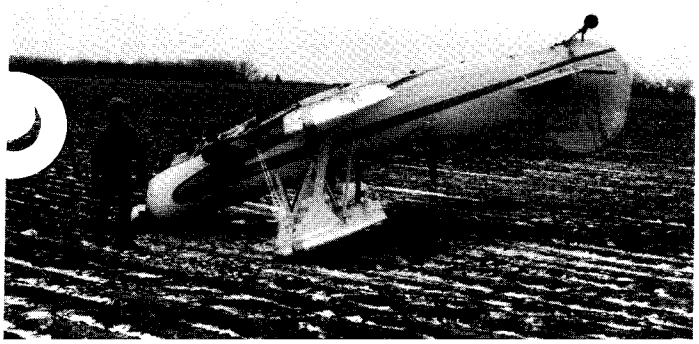
All in all, it is a fine aircraft that is docile enough for a low-time pilot.



SAFETY NOTE

This letter is in regard to my accident in N317DK--my Acro II. If I can save somebody else a problem, the following will be worth the effort.

I promised two half-hour rides and November 3 of 1984 seemed like the day to pay them off. We had a 5000' ceiling and 10 mile visibility that dropped to 3000' and 5 mile visibility off and on, but it was warm and I didn't hope for more 45° days this fall. I called my riders and scheduled to meet them at the



LEFT: Dave Kragnes' Acro Sport II with his son standing at the nose.

Dave had a mishap with his recently completed Acro Sport II. See his report for details.

SAFETY NOTE - CONT.

airport in 1/2 hour. I dragged out the Acro II and preflighted, including measuring the gas with a notched stick. The gas gauge is useless on the ground, so it's always my habit to dipstick the gas before flight. I remember reading it at 15-plus gallons (more than 15 but less than 17.5). As my 0-320 won't even use 10 in serious playing, I knew I had two hours on board. Well, I didn't. One hour and 10 minutes later at 1500' AGL (two miles from the airport), returning with my second rider, the engine quit. I tried to restart, but nothing doing. My first choice was a narrow gravel road with steep ditches--no thanks. Then a tar road that is heavily traveled by semis between two Interstates; again--no thanks. I thought I could make a hayfield, but the rate of descent with the prop--windmilling in an open biplane, no wheel pants and two people on board is something that only being there will make you understand. It soon became apparent that a harvested sugar beet field was my choice. If I went in with the rows, a water-filled ditch would shorten my rollout--so I turned crossway to the rows. At this point, I was up about 60' and I began to notice that the ground was reaching out to greet me at an impressive rate. My forward speed was way too slow. Choice #1: Push the nose down and hit nose down; or #2: Hope there was something for a flare and that the gear would hold. It didn't. When I pulled back, the airplane turned but didn't break its descent, or at least not enough for me to notice. We hit hard enough to tear fittings off the gear and that dug the nose in and we had just enough momentum and bounce to go over. I hung there in the belts thinking how much fun flying was and how proud I was of my piloting skills. At last, I remembered to put my hand up (down) so when I unhooked the belts I didn't fall on my head. I told the 12-year-old girl in the front seat not to unhook her belt until I could hold her up. There were no physical injuries at all and though she was on her first airplane ride, she soon thought of it as quite an adventure. Some day when she is sitt[illegible] in a big silver bird next to a very nervous first-time flier and the seat belt lights c[illegible] on in some mild turbulence, she can offer the comforting reassurance that she was in [illegible] crash once and it was no big deal.

I got permission to take it apart and move it home the next day. When we drained the entire fuel system, we got out less than two cups and as we found no leaks, I can only assume I mismeasured the gas. The first inspection showed no frame, wing, engine or prop damage.

How did the Acro II perform? Well, virtually 100 percent of the fuel is usable. If I had been on a hotter plane at that speed and at that level of excitement, it might easily have stalled and spun in. But the Acro II is wonderful in that regard. Any open biplane with a windmilling prop will need lots of nose down to maintain speeds--so that wasn't its fault. We hit hard and flipped over with no injuries to the people and really quite minor damage to the plane. If all I wanted was to repair and patch, $100 would cure all its ills. However, I never did like my bottom cowling or the cover of my bottom wings, so I may just recover the whole thing. As I told the GADO people (who, by the way, have been nice through the whole investigation), when I build, maintain and fly an airplane, everything is my fault. I hope someday to be the pilot that my Acro II deserves. It isn't easy to O.K. the use of my story; after all, that isn't the kind of fame we all seek when we have dreams of our handiwork getting national publication, even if it is a limited audience. However, if you feel it has some merit, I can calm my ego by saying "maybe I can prevent someone else from running out of gas". The nice photograph was by my friend Larry Haugen. He is building one of those silly RV-4s that only have two wing panels, but other than that, he's a nice guy.

David Kragnes

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ONE: Pixie builder Jim Anderson of Greeley, Nebraska, reports that he uses a sandbox frame over the ribs to give even pressure. He builds a box with an open bottom, covers the bottom with a loose screen and plastic and pours sand into the box. He then places the box over the ribs to give even pressure to the gussets and force them down onto the cap strips. Jim is using T-88 glue, which does not require a great deal of clamping pressure, but he has found this method quite effective.

TWO: Most Pixie and Acro builders are using small staplers. You should use the smallest staple possible for your application. Some office staplers that open will be quite effective as their staples are small and will not split the wood. Most commercial staplers are a little too heavy to go through 1/16" ply. Here at the EAA Museum we use the smallest stapler of an industrial type that Sears sells. Maybe your hardware store has a similar type to use; it wouldn't be a bad idea to take along some small cap strips and gussets to see how it works before buying it.

THREE: The Acro Sport II filler neck height is listed at 1-3/4" on the plans. This has been adequate for most installations. However, if you modify the line of the cowling, it may be necessary to have a longer filler neck. Kenneth Matthews found it necessary to have a 3-1/2" filler neck on his aircraft. This might be one of those that you would want to have a little longer and cut to fit later.

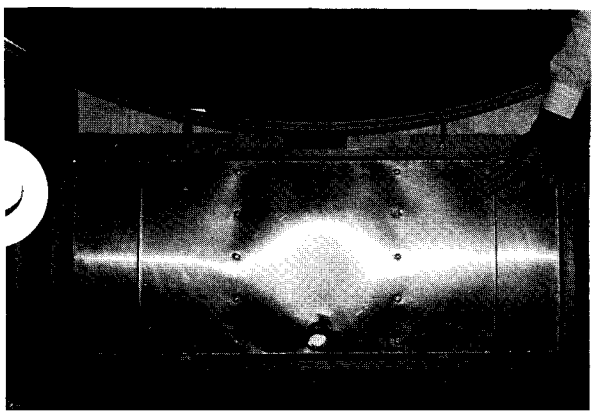
FOUR: Pober Pixie builder Bob Bell of Needah, Massachusetts, noted that the height of both cabanes for the Clark "Y" airfoil on the Pixie is 21". To get the proper 2° angle of incidence to the wing, it may be better to make the front cabane 22-3/4" up from the center line of the top longeron. This will give the correct 2° angle of incidence on the Pixie. The Clark "Y" airfoil used on the Pixie has a flat bottom line and this is the same as the 0° incidence line on this particular airfoil. Builders should set the incidence as the plans state at 2°.

FIVE: Several Pixie builders have asked the location of the thrust line in relation to the top longeron. The thrust line is 6" below the longeron on the Pixie on our prototype.

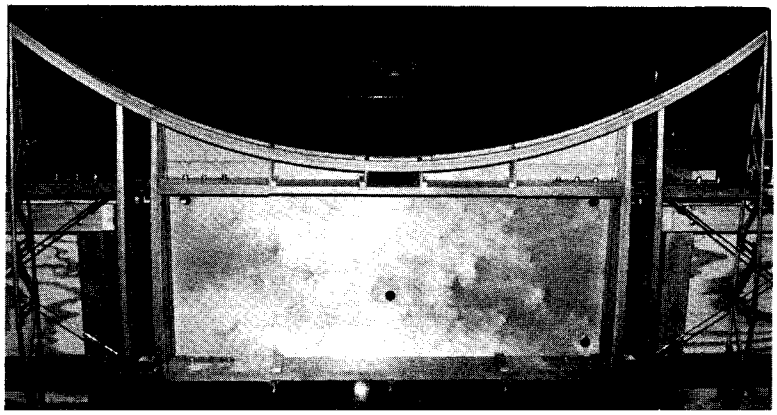
SIX: The center section tank for the Acro Sport II is in the experimental stage and has not yet been flown. It is made of .065 aluminum. This particular tank is approximately 45.5" long, averages about 4" in depth and 18" front to back. It has approximately 3273 cubic inches (231 cubic inches equals one gallon). This particular tank, then, is estimated to hold approximately 14.2 gallons and by actual measurement will hold 14.5 gallons.

The following pictures describe the tank. Acro Sport Inc. has no intention of preparing drawings for this tank. As the drag/anti-drag wires are eliminated, both the top and bottom of the center section are covered with 1/4" ply, as the following shows.

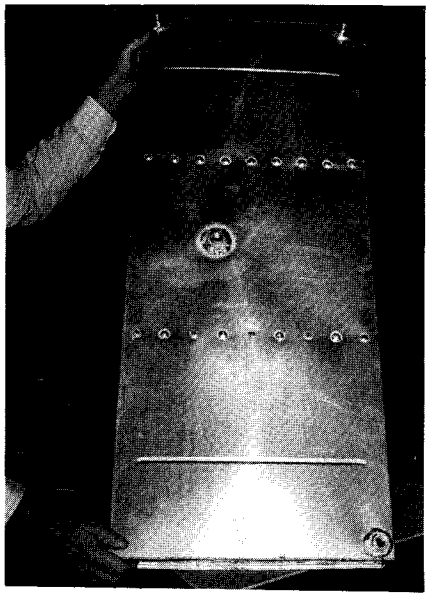
BELOW: The center section tank in place between the spars and the root ribs.



BELOW: Note--3/16" x 1/2" plywood corner braces, top and bottom.



TECHNICAL TIPS - CONT.



FAR LEFT: The top of the tank and the spot welds holding the tank baffling in place.

CENTER: The 1/4" ply covering in front of the center section top.

UPPER RIGHT: The bottom view of the tank and the four outlets provided.

Photos by Carl Schuppel

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THE ART OF ALUMINUM WELDING

BY DOROTHY "CARAT" AIKSNORAS

Before MIG and TIG were introduced in the early 1940s, the most common way to weld luminum was with oxygen and hydrogen. Hydrogen (the fuel) burns cleanly and is hot nough to bring aluminum to its melting point of approximately 1218°. Cleanliness in elding aluminum is of great importance.

Weldable Metals and Alloys

Pure aluminum - 1100
Aluminum-manganese alloy - 3003
Aluminum-silicon-magnesium alloys - 6053 061, 6063
Aluminum-magnesium-chromium alloy - 5052

Non-Weldable Alloys

Aluminum-copper-magnesium-mangamese alloys - 2017, 3014
Alclad - 2024

he Four Temper Categories Developed in 1954

1. Annealed (-0)
2. as Fabricated (-F)
3. Strain hardened (-H)
4. Heat treated (-T)

Miscellaneous Notes

T6 means solution heat treated, then artificially aged (will not harden back after welding).

T3 means solution heat-treated, then cold worked (will harden back in 90 days).

Welding Rods

Rod	Use on base metal
1100	1100, 3003
4043	4043, 6061, 6063
5154	5052, 5154, 6061

The diameter of the rod should be approximately the thickness of the material to be welded. Ordinarily, 1/8" diameter is suitable for welding any thickness up to 1/8".

Selection of Tip: A larger tip is used for hydrogen than for acetylene on any given gauge of sheet. As a rule of thumb, use a tip that is three times larger than you'd use for 4130.

Equipment Necessary: You will need an oxygen tank, a hydrogen tank, and two oxygen regulators. One of these regulators will have to be converted to fit the left-hand threads of the hydrogen tank.

Welding Glasses: Although watching aluminum welding with the naked eye is not damaging, the special pink didymium #4 glasses aid the welder in seeing his work.

Flux: Antiborax #5 is for cast and sheet aluminum, but #8 is best for sheet aluminum. Two parts of flux to one part of water will form a thin past. Flux left overnight should be stirred to take out lumps, since it tends to crystalize.

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BUYING & SELLING ACRO SPORTS & PIXIES

ONE: Mike Brown (Route 7, Allegan, MI 49010, Telephone 616-673-3677) is selling his Acro Sport II. This particular aircraft is finished in orange and cream. It was built in 1982 and has 85 hours total time on both airframe and engine. It uses 200 HP with a fixed-pitch propeller, has a smoke system, an Output 200 radio, canopy on the back and intercom. It also has inverted fuel and oil. It was the "Best Acro Sport II" at the 1983 Oshkosh Convention and also "Best Custom Biplane" at the 1983 MERFI Fly-In. Mike is asking approximately $25,000 for his airplane.

TWO: Charles D. Haynes (P.O. Box 255, Tuscaloosa, AL 35402, Telephone 205-345-0988) is selling his Acro Sport II. The plane is priced at $17,500; if anyone is interested, please contact Charles.

THREE: Frank M. Rogers (P.O. Box 1031, Florence, SC 29503, Telephone: Office--803-669-3232 & Home--803-609-9842) is looking for an Acro Sport II to buy.

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"TECHNIQUES OF AIRCRAFT BUILDING"

This book describes the building of an Acro Sport I and Acro Sport II with photographs of these aircraft. The "Techniques of Aircraft Building" is available from: ACRO SPORT INC., P.O. Box 462, Hales Corners, WI 53130 OR EAA, Wittman Field, Oshkosh, WI 54903-2591 at $6.95 plus $1.00 for shipping.

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NEWS NOTES

Cougar plans are now available through Acro Sport, Inc. Complete plans for the Cougar, a two-place, side-by-side aircraft usually powered by an 85-150 HP engine, are now available from Acro Sport, Inc. The plans, which cost $55, include full-sized wing rib drawings.

NEWS NOTES - CONT.

Wing fittings for the Pober Pixie are now available from Ken Brock Manufacturing, Inc. For prices and more information, contact Ken Brock--see ad at RIGHT.

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