ACRO SPORT NEWS #14
& PROJECT SCHOOLFLIGHT DECEMBER, 1985
P.O. Box 462 Hales Corners, Wisconsin 53130

PAUL POBEREZNY

If you don't believe there is a Santa Claus --- who helped us put wings on our dreams? Who spent long hours over the drafting board and working at welding, woodwork, etc., in the shop to design the Acro Sport I, Super Acro, Acro Sport II and Pober Pixie?

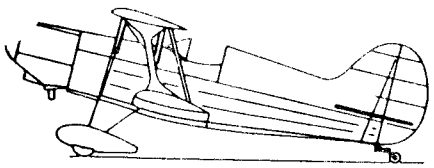
Who test flew these airplanes and made them all successes?

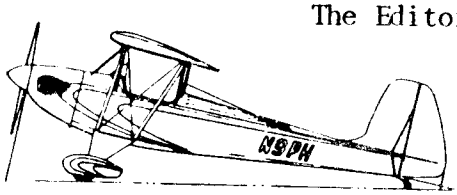
How do we get to all be members of this fine organization of fliers and builders? Who made it possible for us?

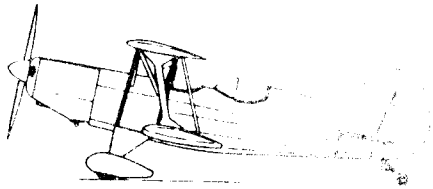
Who has made numerous trips to Washington, D.C., to insure our continued right to build and fly? Who is it that is out now speaking and talking to groups, promoting the cause of sport aviation? Who made this organization --- this EAA with all its events, Oshkosh Convention, Chapter fly-in's a success that never ends?

He would never say it, but yes, Virginia, there is a Santa Claus!
We wish this EAA Santa Claus many blessings in the new year from all of us at Acro Sport and the Acro Sport builders around the world. May you and your families also enjoy the blessings of this holiday season and may the new year bring everything you hope for.

The Editor







HISTORY ON ACRO SPORT & PIXIE AIRCRAFT

The Acro Sport single-seat airplane was an idea of Paul Poberezny's to replace EAA biplane plans sold by the Foundation. The principle purpose for designing the plans was to prepare a good set of plans for promotion of aviation education under EAA's Project Schoolflight -- building airplanes in the schools. The idea was to prepare a set of plans that were very simple to build for either the students or the first time individual builder. In addition, the aircraft were designed from the outset to have stable and forgiving flying characteristics both in the air and on the ground. For this reason, the Cub-like landing gear was chosen and a wide landing gear stance selected. For the same reason, the gear was positioned far enough back on the fuselage to allow for proper directional stability on the ground as a taildragger aircraft.

The Acro Sport I was designed from the onset as a dual purpose machine to be powered with lower horsepower engines of 100 horsepower or up for sporting use and to be able to be powered with an 180 horsepower engine for aerobatic flight. To improve the longitudinal stability, the Munk M-6 airfoil, same as is used on the Pitts aircraft, was selected. After consultation with Curtis Pitts and with his approval, certain other hardware items were copied from the Pitts such as aileron hinges and control stick, etc. However, the aircraft was a totally new design. Construction was originally begun by taking an old EAA biplane fuselage and cutting it to improve the pilot's seating capacity. After much work with this original fuselage, it was scraped and a totally new fuselage was designed. Tail surfaces of the EAA biplane had proved quite satisfactory and are a very close copy on the Acro Sport I. No other component is essentially the same.

Aircraft construction was started on the airplane in the EAA shops in Franklin, Wisconsin. The prototype's first flight was January 11, 1972. From the onset, the plane performed well and was ably demonstrated by aerobatic pilots such as Bob Heuer, Bob Davis, Paul Poberezny and others. When similarly engined, its vertical penetration was found similar to the Pitts Special and other one seat biplanes, although the Acro Sport I has considerably more wing area.

Due to the success with this airplane, a second prototype was built to proof the plans and also to install a larger 200 horsepower engine. This second prototype flew on March 28, 1973, with a 200 horsepower 0-360 Lycoming and a slightly modified airfoil using the NACA 23012. Other than the increased horsepower improving the performance of the airplane, the 23012 airfoil on what is known as the "Super" Acro Sport gave a slightly improved outside performance. There is a slight buffet in the last 270 to 350 degrees of an outside loop with the original prototype and the M-6 airfoil, whereas this is eliminated with the 23012. Both aircraft otherwise perform essentially the same. A third prototype was completed with a 100 horsepower engine and successfully test flown.

The paint scheme seen on the Acro Sport I and Pober Pixie and the yellow scheme on the two-place Acro Sport are the design work of the Editor in Chief of SPORT AVIATION, Jack Cox.

The Acro Sport I found immediate success and many plans were donated to the schools, approximately 200 sets. As the EAA museum had also been selling the Heath Parasol plans and had run out of them, it was decided to upgrade and update this airplane. The basic design was taken and used for the Pober Pixie. The Pixie has a much enlarged fuselage for today's larger people, uses basically the same wing as the Heath Parasol, but is powered by a Volkswagen engine. It was designed to the "normal" category of G-loading

and is not an aerobatic machine but an aircraft for fun-flying at very low speeds. It uses the well known Clark "Y" airfoil which is very simple to build. It has been variously powered by Monnett, Limbach and Continental C-65 and other engines. The design was started in January, 1974, and the first flight took place in July, 1974.

As there were many requests for a two-place version of the Acro Sport I, the design was started on it in 1976 and construction in 1977. The aircraft was completed July 9, 1978. From the onset, it has proven to be just a bigger cousin of the Acro Sport I and due to its second seat capability has become easily as popular an airplane as the Acro Sport I. It makes an excellent aerobatic trainer and has the same forgiving flight characteristics for handling in the air and on the ground. For the original test flight, the upper wing was set at a lower angle of incidence than the lower wing at the suggestion of a well known designer. This is an old method that supposedly increases total lift. However, it was necessary to set both wings to 1-1/2 degrees of incidence after which no further corrections were necessary.

As of this writing, there have been over 1200 sets of Acro Sport I and Super Acro Sport supplements sold. There are in excess of 50 of these airplanes flying with many hundreds more still under construction. There have been approximately 700 sets of Pixie plans sold with about a dozen flying at this time. Many more are under construction by individuals and schools. There have been over 800 sets of Acro Sport II plans sold, and at this writing there are approximately 26 flying with many hundreds more being built.

The Acro Sport I has proved its original design concept as a sporting and aerobatic machine with a dual concept with low horsepower as a sporting aircraft and higher horsepower as an aerobatic airplane. It has been flown in aerobatic competitions while still retaining its easy to fly characteristics.

he Pober Pixie has received wide acceptance as a fun flying aircraft with excellent ground observation and vision. It is also very economical to build and fly as all the three in the series are. The Acro Sport II can out perform most of the two-place biplanes with equal power and is the least expensive to build of any of them.

The firms of Wag Aero and Wicks Aircraft Supply both supply kits for the Acro Sport II at this time. Stits supplies covering materials for the entire line. Information packets are $5 each on any of the airplanes available from Acro Sport, Inc., P.O. Box 462, Hales Corners, WI 53130.

We have recently added the Cougar two-place plans and the Corben Junior Ace plans to the Acro Sport line up. We feel that these would make a significant addition to the plans that we sell. See Cougar and Tailwind information on the back page.

Thanks to all who helped in the construction of the Arco Sport, Bill Chomo, Bob Ladd, Carrot Top, Colin Soucy, Phillipe VanPelt, Steve Dawson and all those who helped build the prototype aircraft. In addition, we would like to thank those Acro Sport II pilots who have demonstrated the airplane; Bud Judy, Bob Davis, Bill Barber and anyone I may have missed!

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DISCLAIMER

BILL NEELIN FLIES HIS ACRO SPORT II AUGUST 5, 1985

Bill Neelin has flown his Acro Sport II, CG-WTN. First flight was on August 5, 1985. He says the empty weight is 1,085 lbs., very close to what we have published in the newsletter. He expected the top longeron to be level in level flight but it is not. He knows that his wing incidences are within 1/2 degree of 1-1/2 degree up or very close to that. In addition, he put an incidence meter on the top longeron in flight and found that it is flying at approximately 2 degrees nose up. This added to the wing incidence would mean that the wing is flying at approximately 3-1/2 degrees nose up. Has anyone else done this measurement?

He reports that the Acro Sport II tracks "gorgeously" on the runway, but it has a bad shimmy in the Maule tailwheel. In attempting to fix this he has shortened one spring and has balanced the tailwheel. These all helped but did not completely cure the problem. He is thinking seriously of following a suggestion of a friend to take the tailwheel out and buy a Scott! He said there was a Tiger Moth in the hangar that had a similar problem until they balanced the tailwheel and that cured this on the Moth, but balancing has not completely solved this on the Acro Sport II.

Bill reports that his airplane has no canopy and he feels the air speeds are fairly close as the front canopy is covered. It has a 200 hp engine and a constant speed propeller. At 5000' pressure altitude it cruises at 75% at 123 mph IAS, 65% at 119 mph IAS and 55% at 115 mph IAS. He says his horizontal stabilizer is level with the top longeron as the plans indicate and the trim is very close to dead center at cruising speed. The airplane stalls at 50 mph indicated.

He said on the initial flights his top cowling panel wanted to oil can in presumabl' from this pressure from the center section down. He has strengthened this somewhat. H has a slight heat problem and the oil temperature is a little high.

Bill would like to know if anyone has observed the fact that when the ailerons are rigged in trail on the ground that they are pushed down to about 1/4" from the trailing edge on the upper wing in flight and the bottom ones appear to be coming up slightly in flight. I told him that I believe that most builders are rigging the ailerons with the trailing edge level with the trailing edges of the wing on the ground and not changing them in spite of their flight setting. I further explained to him that the Munk M-6 airfoil on the Acro Sport I and Acro Sport II has a slight reflex up on the trailing edge and that wind pressure may be attempting to blow this down. Does anyone else have any further information on this?

Congratulations to Bill on successfully flying his airplane! How about sending us some pictures of your airplane, Bill?

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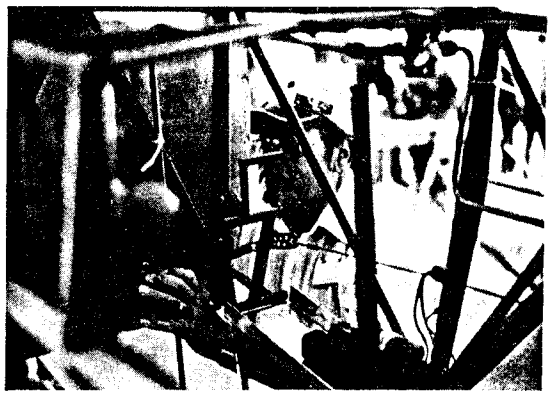

PIXIE BUILDER M. JOHN LEITUS OF ROARING SPRINGS, PA, WORKS ON THE PIXIE IN THE STITS TENT AT OSHKOSH '85.

MATERIALS AVAILABLE FROM EAA

If you would like to know how many manuals and videotapes are available from EAA, please drop me a line and I will be happy to send this information on to you. I had one of our Acro Sport II builders who was very pleased with the tapes that we have on welding and mentioned that we should say something about these tapes available from EAA in the ACRO SPORT NEWS. His quote? "Hurray for the tapes!" They were a great help to him and may be of some help to you too if you have access to video play back equipment.

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ACRO SPORT II WITTMAN STYLE STRAP GEAR

Several of our builders have asked for additional information from the two builders of Acro Sport II's that have used Wittman type gear. We don't yet have a drawing available that would show how they have done this, and we know that considerable strengthening of the lower longeron is necessary to take out the bending forces this type of gear introduces into the lower longeron. Some engineers believe that the steel gear is the only gear to use as it is somewhat stronger than aluminum and can take more punishment. This is true. However the steel gear will weigh considerably more than aluminum strap gear will. These modifications are not approved by the designer as we haven't tested them on our aircraft, and as you can see are being tested by the two builders below. The following table may be of some assistance:

	ELENBAAS Acro Sport II	WINDHAM Acro Sport II
Aircraft flown	Yes	No
Who built the gear	Elenbaas	Metal Masters
Type of aluminum	7075-T65	2024-T6
Dimensions at fuselage longeron	4" x 1"	6" x 7/8" (.875)
Area at longeron	4 sq. in.	5.25 sq. in.
Dimensions at the wheel	2" x 1"	3" x 7/8"
Area at the wheel	2 sq. in.	2.625 sq. in.

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MISCELLANEOUS NOTES

There is a gentleman flying a Varieze by name of Fred Thompson out of Los Angeles who has an 0-200 in his Varieze with C-85 pistons. I checked with Teledyne Continental on the swap and they said yes it is a possible swap or "hotrod" of the 0-200. It does raise the compression ratio and he has a special flat prop on the engine enabling it to turn in the 3300 - 3400 rpm range in cruise. According to information we have, this engine has been run for "hours on end" at this rpm. In fact, the owner/builder maintains that this Varieze can keep up with 150 hp Lycomings in cruise. It is not necessarily a modification that would be recommended for longevity of the engine, but it shows what can be done if you are building up engines out of parts. It might be possible to build up an 0-200 out of components for a very ultralight Acro Sport I for aerobatic use. A combination of high horsepower output and light weight might make the airplane very nimble indeed. This combination could also be used in a Cougar to increase its cruising speed. A friend of mine who owned the "Shoestring" Racer had an 0-200 in his Cougar and it could cruise at 150-155 indicated at about 3000' AGL without much trouble. Of course, he had used a lot of drag reduction modifications on the cowling and the wheel pants, etc. Also, in discussing this with some of the Continental people, they wanted to remind me that all Continental engines had their timing moved from 28 degrees before top dead center to 24 degrees before top dead center. This was in a service bulletin around 1976 or 1977 on their engines to accommodate the 100 low lead fuel.

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BUILDER COMMENT

I got a letter from Chuck Gerow of Malone, New York, with some specific questions that might be of interest to all. His first question, "What are the fore and aft CG limits for the Acro Sport II?"

As the wing cell is the most important part of the airplane when determining CG loading, CG limits using the leading edge of the lower wing as a reference are: empty, 8.08" forward of the leading edge lower wing for the prototype and loaded from 3/4" forward of the leading edge to 5" aft of the leading edge. These are fairly tight limits and geometrically are approximately 18.7% to 32% of the geometric aerodynamic chord, obviously a movement of about 5-3/4". These limits can be slightly exceeded and are the limits we did use for the prototype airplane. Due to the extremely large horizontal stabilizer and rudder, we haven't heard of anyone yet who has had any trouble with CG limits or flying light pilots or extra heavy pilots in the rear cockpit, etc.

The adjustable cabanes on the prototype Acro II were used as indicated in the previous history remarks. If you can jig up the center section cabane at 1-1/2 degrees up as the plans indicate without using these adjustable forks, it will be less complex and lighter.

By the way, in going through my weight and balance calculation, I see some calculations for putting a Continental R-670 on an Acro Sport II that indicate that even with moving the engine back against the fire wall as far as possible that the CG forward moves about 5.2" ahead of the old CG and the aft CG moves about 5.6" ahead of the old. What this means is that it is not possible to install a Continental R-670 on the Acro Sport aircraft without some redesign or relocation of the wing cell. In addition, the excess weight of the engine would reduce the allowable G-load by .6 G. All in all, we find this a "don't recommend" for a Continental R-670 or any of the other large radials. There is another problem with installing large radials on small biplanes and that is that you can't see around the cylinder heads and it makes visibility a great deal worse from the cockpit.

Back to Mr. Gerow's questions, "The landing gear seems to be built extending downward at a 90 degree angle to the lower longeron." That statement is basically correct although of course the lower longeron and the top longeron are not parallel. We never did work the vertical height of the landing gear out as it really isn't necessary on the Acro Sport II. Quite frankly, we have always discouraged modification of the aircraft or use of engines we felt unsuitable.

Regarding the center section tank, we have not yet flown the aircraft with the center section tank, but so far we assume that the modifications previously mentioned in the newsletter to put in a center section tank will at least leave the center section as strong as the original with the drag/anti-drag wires. However, we have not flown this configuration and frankly will not advise it to anyone until we have flown an aircraft with the center section tank built and flying. It may or may not have any effect on the aerobatic capacity of the aircraft.

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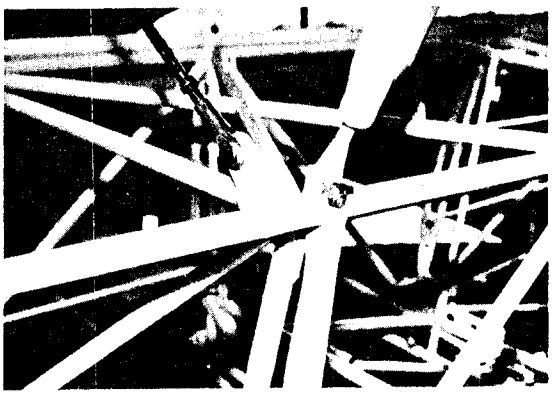


ACRO SPORT II ROLL WIRE FITTING AND CENTER SECTION CABANE. OPTIONAL ADJUSTABLE FITTING DETAIL.

ACRO SPORT TRADING MART

MAYNARD & PATTY INGALLS
18385 Castle Ridge Drive
Morgan Hill, CA 95037

Call Fred at 408/637-5425
Maynard at 408/778-5167

1980 Acro Sport I N41HD. Very clean, low time, 0-320 Lycoming PS5C, Christen oil, electric start, gel-cell, security chute, D/K headset with helmet. Best offer over $15,000.

KIM A. KOVACH
31435 Alabama
Livonia, MI 48150

313/421-7589

Acro Sport I parts. Absolutely flawless and high quality construction. All ribs, 4 ailerons, ready to cover, all spars, center section ready to cover, landing gear, many control system parts, pre-bent leading edges, fuselage to upper wing "N" struts, some flying wires for "flat wing".

A.W. "BUD" LEONARD
103 Roycroft Drive
West Seneca, NY 14224

Call 8-5 at work: 716/824-6571

Bud would like to purchase a partially completed Acro Sport II. He says if you have a partially complete Acro Sport II you wish to sell you can call him collect at the given number at work.

JOHN BRENNAN
9 Shaughnessy Blvd.
Willowdale, Ontario
Canada N2J 1H4

John is interested in a partially completed Acro Sport II that he would like to buy. He is also interested in a 200 hp engine. Drop him a note at the given address.

BOB CALLIS
4613 Young Farm Court
Montgomery, AL

205/279-6847

Bob has 2 drag/anti-drag wires, new, still in their package for an Acro Sport II and he will sell them at $20 each.

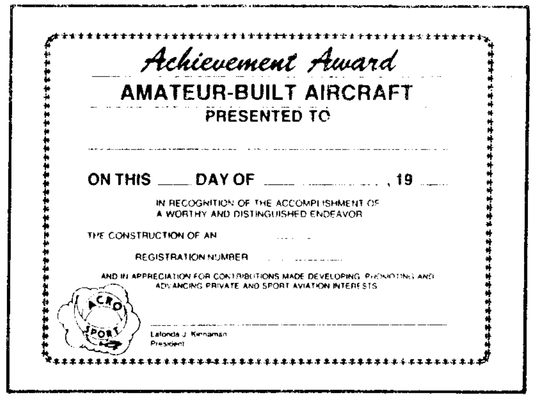
CHARLES D. HAYNES
P.O. Box 255
Tuscaloosa, AL 35402

205/345-0988

Charles has an Acro Sport II, N9202P, built in 1981 by John LaBelle. It is powered by a 150 hp Lycoming. Total time over 400 hrs. on aircraft & engine. He had a Navco Comm 10 and a Nav 11 installed last year and they are asking $17,500.

ACHIEVEMENT AWARDS

Achievement awards are available from Acro Sport, Inc. It is represented here, reduced in size, but the normal size is 8-1/2 x 11. If any of you builders who have completed aircraft would like to get a signed copy of the Achievement Award, please write to Acro Sport, Inc., P.O. Box 462, Hales Corners, WI 53130. and give name, address, zip code, type of aircraft and N number for these awards. Of course, these awards are for the Acro Sport I, II, Pixie, Cougar and Corben Jr. Ace aircraft.


Achievement Award

AMATEUR-BUILT AIRCRAFT

PRESENTED TO

ON THIS ____ DAY OF ________, 19 ____

IN RECOGNITION OF THE ACCOMPLISHMENT OF A WORTHY AND DISTINGUISHED ENDEAVOR

THE CONSTRUCTION OF AN

REGISTRATION NUMBER

AND IN APPRECIATION FOR CONTRIBUTIONS MADE DEVELOPING, PROMOTING AND ADVANCING PRIVATE AND SPORT AVIATION INTERESTS

Lafonda J. Kinnaman
President

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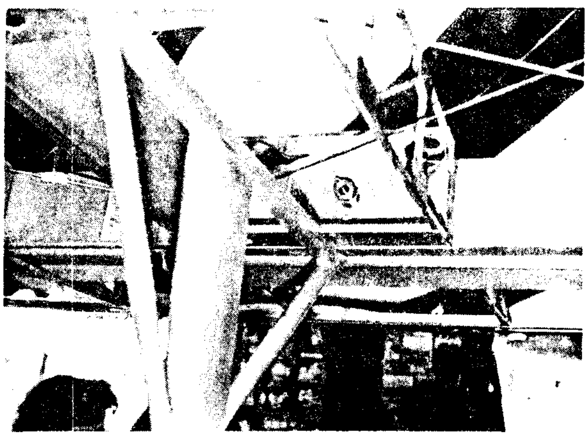
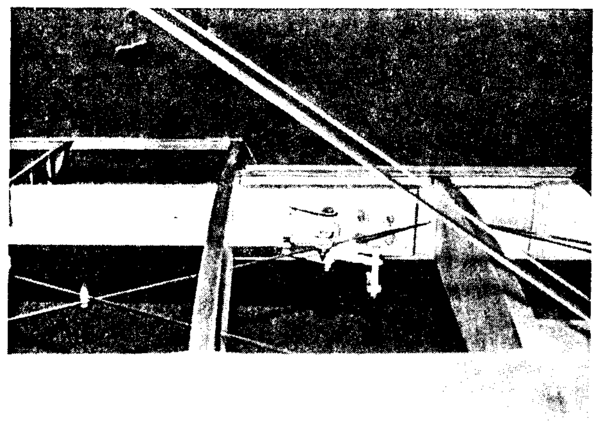
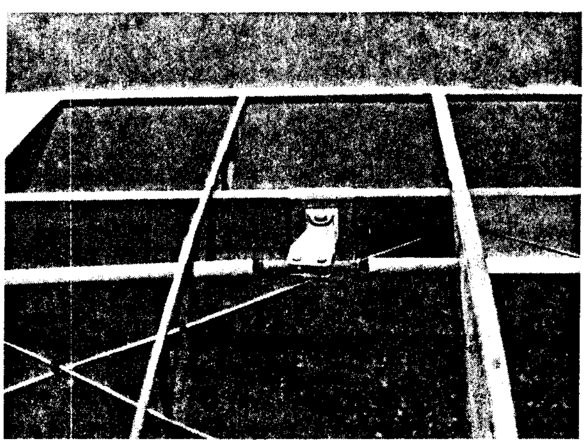


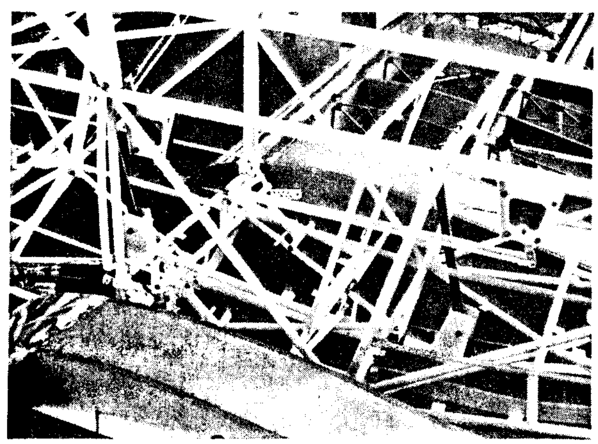
Acro Sport II showing "I" strut end and flying wire pin installation on the front face, rear spar.



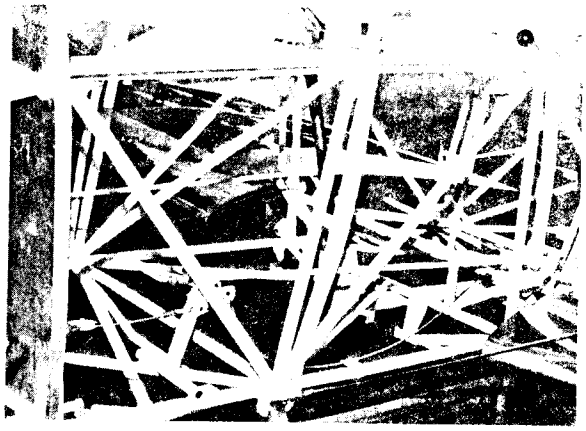
Acro Sport II lower wing showing bellcrank and drag/anti-drag wire assembly detail.



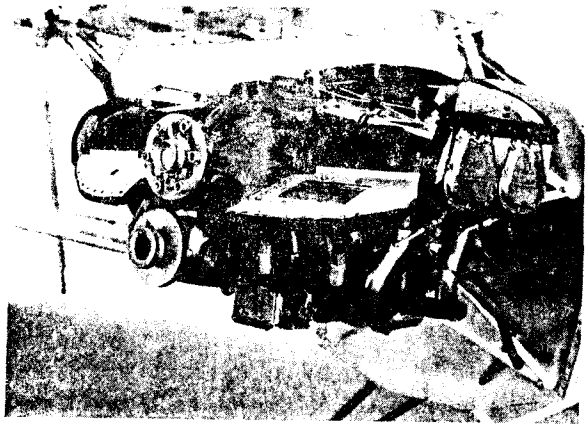
Acro Sport II lower wing idler assembly detail.



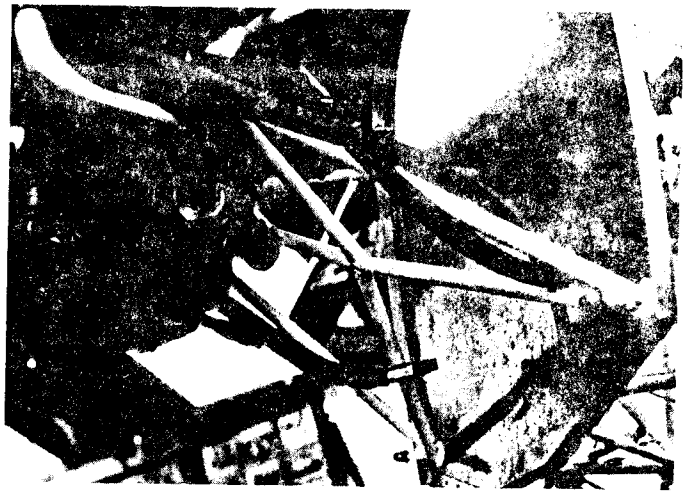
Acro Sport II cockpit detail.



ACRO SPORT II FRONT COCKPIT TUBING DETAIL.

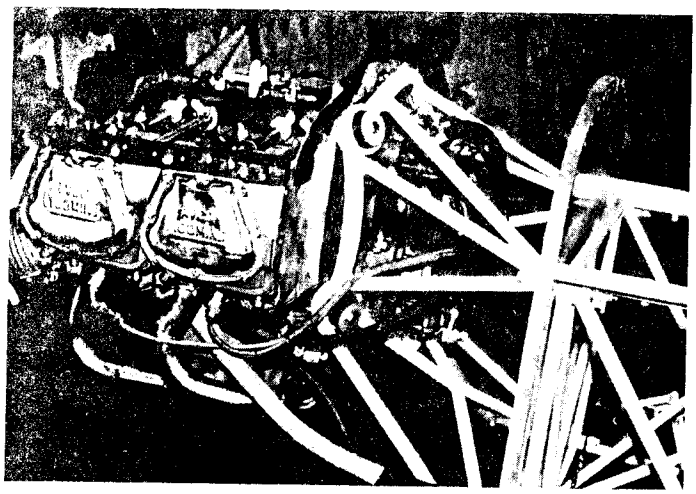


O-360 ENGINE -- MOUNTS, OIL COOLER, ETC.



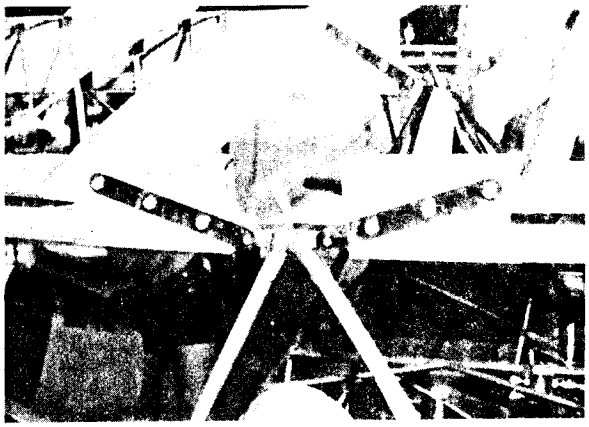
ACRO SPORT II LOWER ENGINE MOUNT DETAIL.

ACRO SPORT II UPPER ENGINE DYNAFOCAL MOUNT DETAIL.

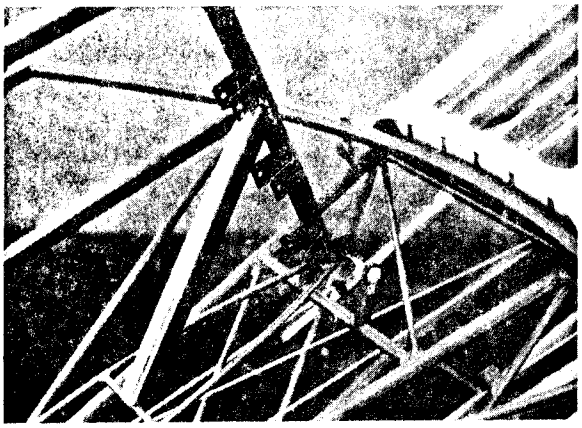


ANNOUNCEMENT: Dear Acro Sport, Pixie etc. builders. Due to a number of factors, this will be the last Acro Sport newsletter. For those who have subscriptions remaining, you'll receive the Technical Counselor news which is published 6 times a year. You'll find many fine articles that will be helpful to you with your aircraft construction activities.

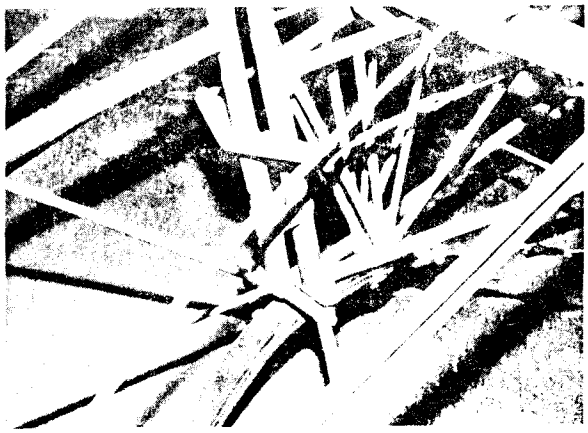
We have enjoyed bringing Acro Sport News to you. We have received excellent feedback from those who have benefitted from this fine publication. I want to thank all of you for the input you've provided and your support. Have a happy Holiday Season. Sincerely, Ben Owen, Editor



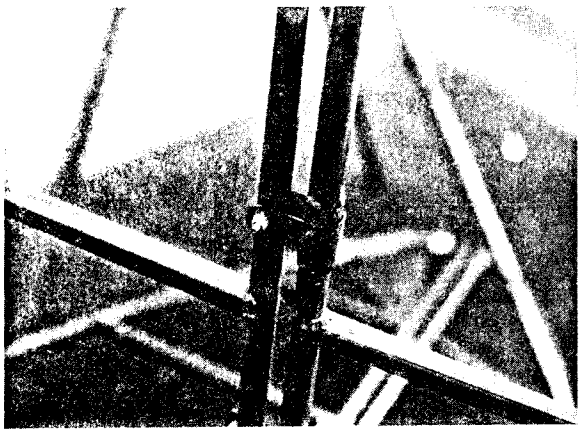
This overall view of the Pixie wing center section shows the general arrangement.



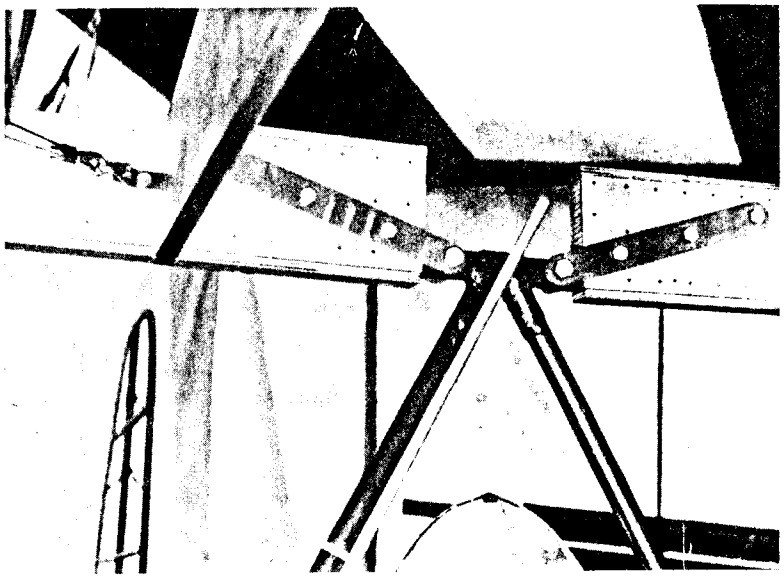
This photo shows the fin leading edge, root rib and fin bracing.



This shows the Pixie tail spring with an added brace of 1/4"x.028".



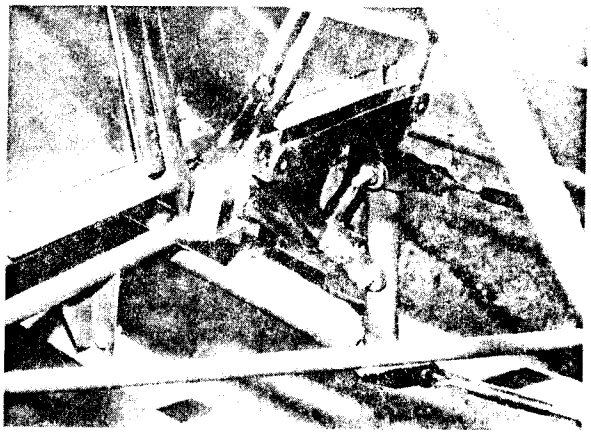
Pixie tail group detail, usual hinge strap detail, Rosette weld on the strap.



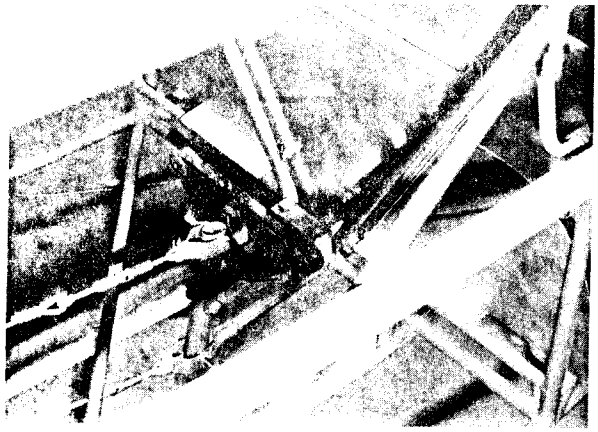
This picture shows the wing cabane, wing attach fittings 1/8" birch plywood plates, the slot for the "I" bolt attach fitting, the between rib cap strip, the top of the spars.

Pixie detail of the turtle deck stringers.

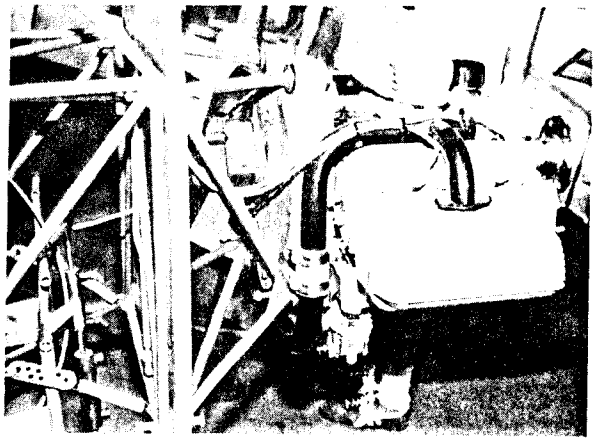
Pixie aileron actuator detail including elevator cable.



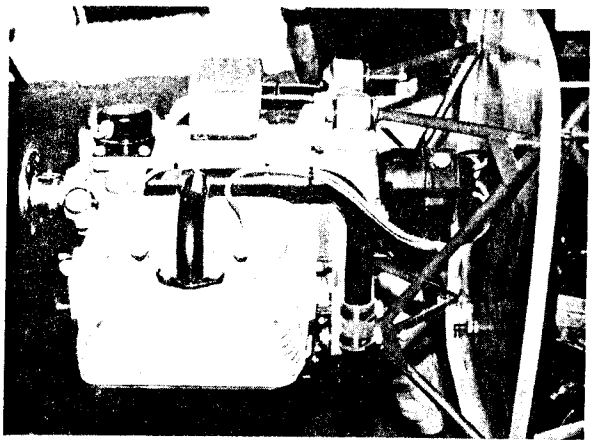
More Pixie aileron actuator detail.



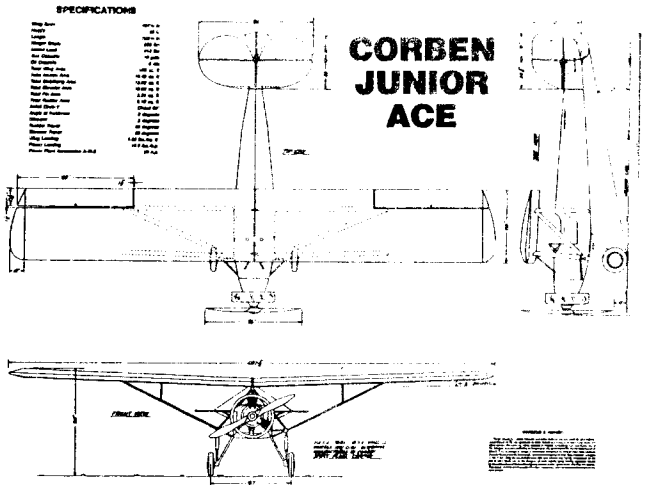
Pixie Volkswagen engine installation with HAPI engine mount.



HAPI Volkswagen engine mount.



Pixie mount detail.



The Corben Junior Ace information packet is $5.00, and the plans are for sale at $60.00.

The Corben Junior Ace is a large size airplane with a total wing area of 168 sq. ft. With its wing area and the Clark Y airfoil, it is able to stall very slowly. Performance will vary depending on the engines installed.

COUGAR PLANS AVAILABLE

Cougar plans are now available through A Sport, Inc. Complete plans for the Nes Cougar I, a two-place, side-by-side airc usually powered by an 85-150 HP engine, are sold for $60.00, which includes full-sized wing rib drawings and folding wing plans. Information packet - $5.00.

Order plans for the Couger & Corben Jr. Ace from:

ACRO SPORT, INC.
P.O. Box 462
Hales Corners, WI 53130