

# EAA ACRO-SPORT

The home-builders' aerobatic biplane that set the aviation world afire with its good looks and superb flight performance is now a basement project for the modeler. / by Robert Schultheis

**T**here's a little blue and white biplane sitting over on the north end of the field that you are going to flip over. The EAA has done it again." So spoke fellow flier Ken Hinkel at the Oshkosh 1972 EAA Fly-In.

With camera in hand I ran anxiously over to where it stood. What a sleek little bird, with one of the best looking paint jobs I'd ever seen. No checkerboards or upside down names. Just long smooth black and yellow slashes for

stripes over blue and white. I stood there, flying a model of that biplane in my mind. One week later the plans were drawn and I started building.

The EAA is most cooperative on pictures and three-view drawings, right up to the plans for the real thing, which are available from them.

The plane has rather slim wings (narrow chord), a fairly long nose moment and good tail areas. Try to keep the weight to six pounds, although mine is seven pounds and flies fine.

The nose is built right into the fuselage and then cut away when fitted to the engine selected. A little of the right front side of the cowl, back to F-3, is attached to the front block F-1. This is doweled and screwed on, thus completely eliminating a fiberglass cowl. The fuselage sides are 1/8"

sheet balsa with 1/32" doublers contact cemented to them. Former F-2 is really the front block, because the one-inch thick noseblock is removable. F-2 gets cut out, as does the 1/8" sheet side in front, to accommodate the engine used. This is done on the right front side, of course.

The sides are glued to formers F-3 and F-6B. This is done upside down, so that the top of the sides provides a straight edge from which to work. Then add F-7B and F-2. Draw center lines on all former pieces, as this facilitates their proper location with relation to the sides. The top of the side is also the thrust line. Now add F-2 and join the sides at the rear with the tailblock. Insert F-8, F-9, F-10, F-11, and F-12. Top rear turtledeck can be made two ways: 3/32" sheet over a 9/4" stringer or, as I did it (the lazy man's way), a 1/2" sheet from F-8 to F-10 rounded off.





From F-10 to the rear of the fin is 1/16" sheet beveled on its edges to provide a smooth fillet. The bottom is 3/32" sheet. I installed a Tatone mount on F-3 and blocked off the left side of the cowl below the engine to get better circulation around the head. This cooling of the engine is critical. Cut out enough cowl to get air around the engine head. The opening on the front right hand side of the cowl is cut out and lets air in. A rule of thumb is: Let at least twice as much air out as goes in. I can't stress this enough.

The landing gear was made from one piece of 3/32" thick T-6 aluminum bent to shape. The axle is of 5/32 wire which runs up to simulated shock absorbers. The gear could be made entirely of wire and strapped to the hardwood blocks. This would also be lighter. Wheel pants are Williams Bros. with a 1/4" balsa sheet around the wheel (tapered to 1/16 at the front and back) epoxied between the two halves. It's essentially a spacer to thicken the wheel pant, with a cutout for the wheel.

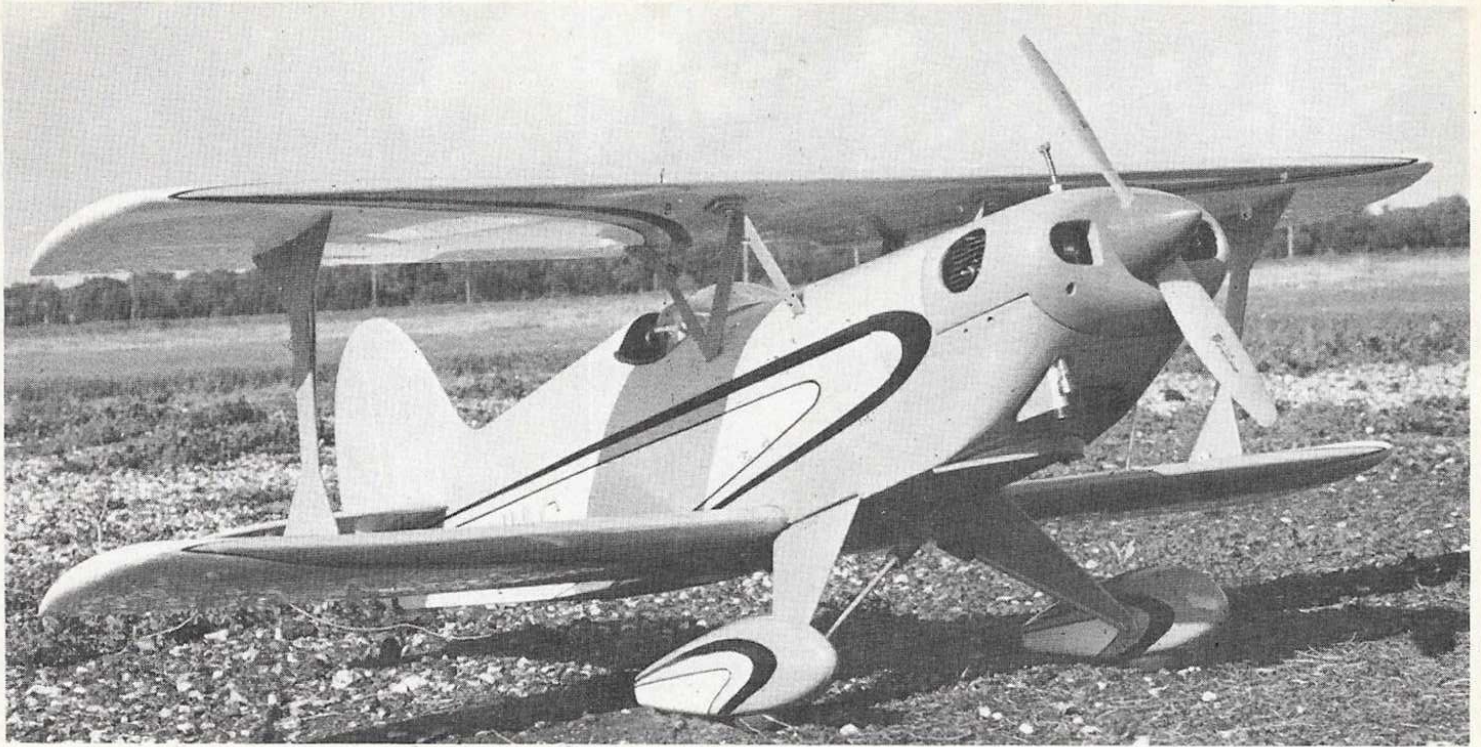
The cabane struts can be made two ways, either solid or as a strip. Bend up a sheet of 3/32" T-6 aluminum after laying out and cutting "N" struts in their proper location.

The second method is to use some 7/16 x 3/32" T-6 aluminum bent up to the sizes shown on the plan. Then add cross struts with pop rivets, or epoxy to form an "N."

The cabanes are bolted with 4-40 screws and blind nuts onto the 3/32" ply plate between F-5 and F-6. This ply plate is glued on top of the fuselage sides. Good alignment of the cabanes is assured because they are made and checked on a flat surface and then mounted on the fuselage. Shims may be added, if necessary, after flying to get proper trim. The interplane struts are made from 1/16" plywood, then sanded and sealed with Hobby epoxy. They are fastened to small brackets which are epoxied in the foam or built-up wing.

Their placement fore and aft in the wing is not critical ( $\pm 1/4"$  is good enough) but the spanwise location gives the proper slant to the strut between the wings. These struts are placed outside (toward the top) of the brackets and have a 3-48 blind nut pressed in them. This blind nut is located and transferred through the bracket. Use nylon screws, if available. They are strong enough for flying pressures but will shear off, saving the wings, if ever necessary.





The Acro-Sport's cowl is exceptionally clean, and is uninterrupted by the usual vagaries of an exposed cylinder head. The Du-Bro Muff-I-aire keeps things quiet, yet neat. The nose of a biplane gets lots of attention, so treat it with respect.

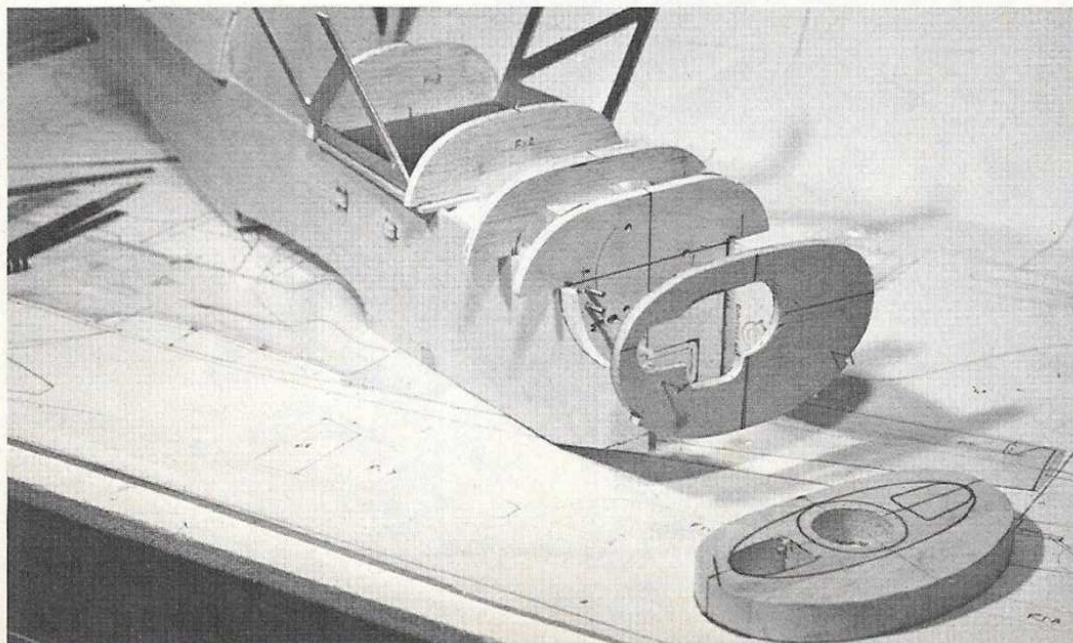
Now that the cabanes have been made and fitted, sheet and plank the fuselage. I used 3/32" sheeting on gentle curves, (top and bottom of fuselage, rear sides, etc.). Plank around the cheeks of the cowl with beveled 3/16" strips. The 3/16" can easily be sanded to the correct thickness. This is only a small area on each side of the nose. Blocks of balsa were used on the lower front nose. A sheet of 1/2" balsa on the lower center front blends in with the F-1 nose-block.

Use your own judgment on where to fill, because it's easier to see than to draw or explain. I still think this method of constructing the cowl is faster and cheaper than a fiberglass one, which could crack or chip. There is a semi-circular shield around the exhaust pipes on the real Acro-Sport. I simulated this with a piece of 3/8" balsa cut in a half-moon shape about 1/4" thick and glued on the bottom front.

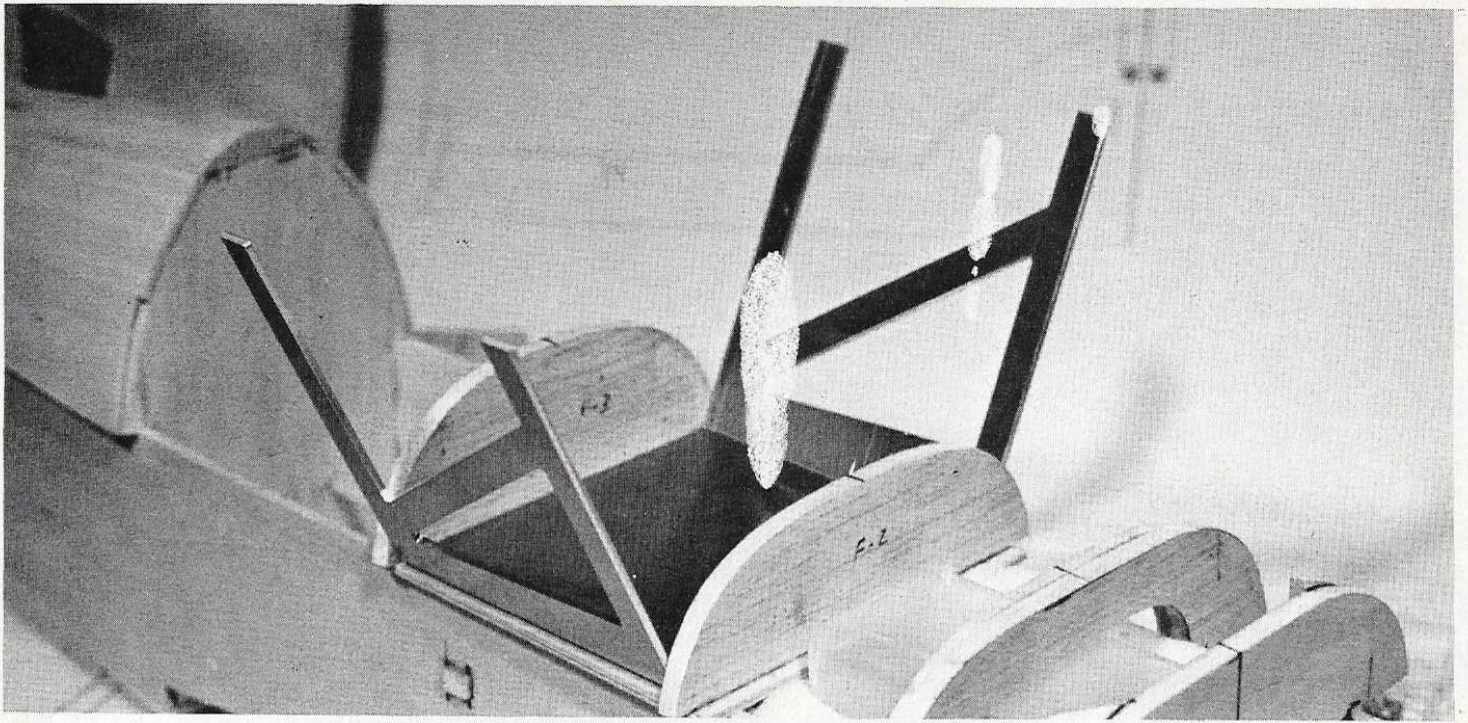
The fin, rudder, stab, and elevator are of soft 1/4" sheet. Hinges are Robart hinge points which give a scale-like appearance.

The windshield was cut from a 13" Sig canopy. It blends perfectly with the fuselage. The cockpit is edged with black 1/4" neoprene fuel line. This is slit and glued on. A 2" diameter spinner finishes off the nose.

The wings can be of conventional built-up ribs and spars or of the foam type. I chose foam, which is slightly heavier, but stronger for banging around. Foam wings are old hat anymore, so I won't spend much time discussing their construction, other than to say: Be sure to fiberglass at least a 6" wide band at the center section. Both wings are straight with no taper. The top one is flat, the bottom has 3/4" under each tip. Four 8-32 nylon screws hold the top wing to the cabanes. Two 10-32 nylon screws and a LE dowel hold on the lower wing.



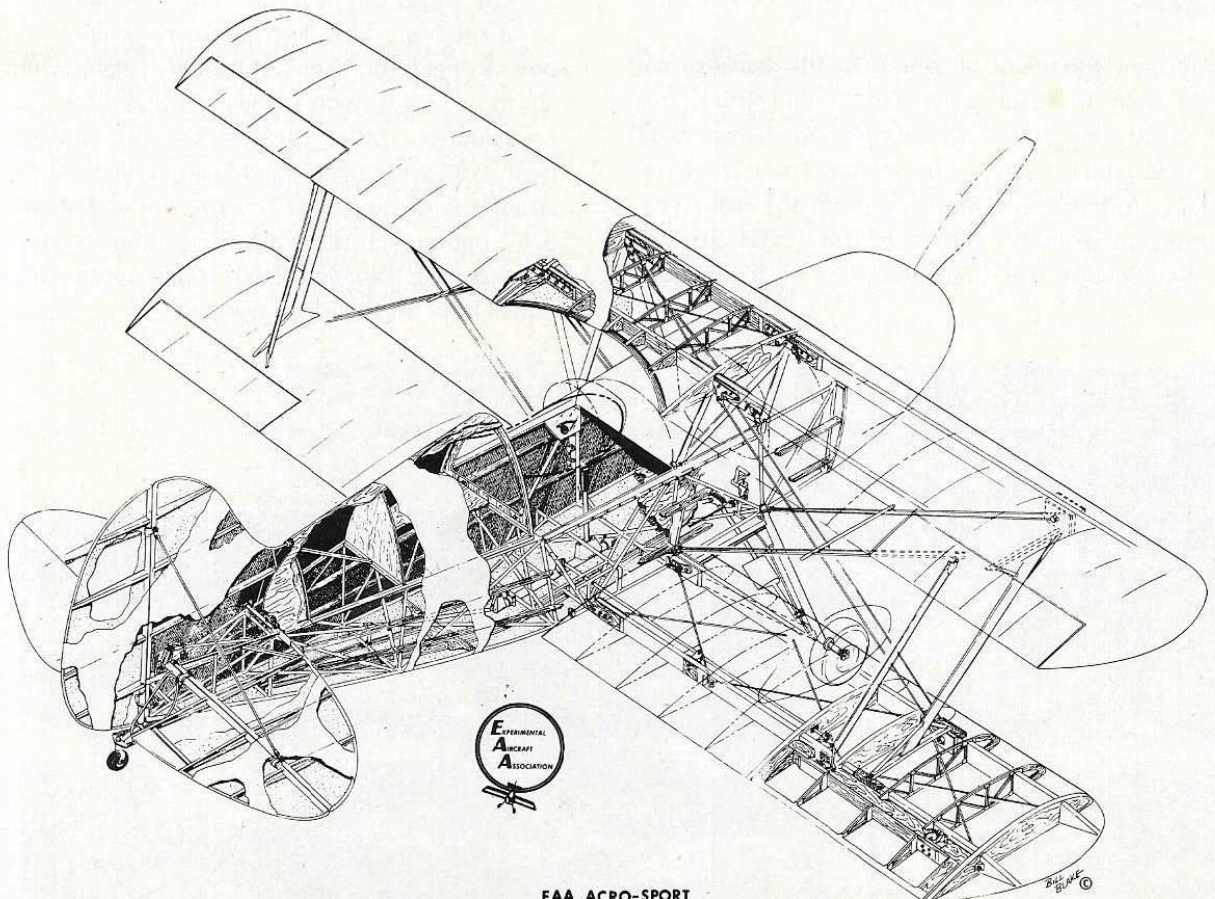
By superimposing partial formers on a box fuselage, the sweeping contours of the cowl can be fabricated with less effort than with fiberglass.



The bane of most bipes is the cabane "birdcage." The Acro-Sport simply employs an aluminum blank to get the job done.

By now you have spent some time constructing and you're ready to try all the parts for fit. I put the whole plane together, uncovered. Fit the interplane struts. Then, when satisfied, cover everything with light blue and white MonoKote. The aileron drive rods connect the lower and

upper wing ailerons. Use a Du-Bro Kwik-Link for adjustment on one end and a solder link on the other. I slipped this rod into a chrome-plated K&S 1/8" diameter tube, after applying some Silastic to the rod. Pushrods are your own option. Install the radio where you want it and



EAA ACRO-SPORT  
Cutaway of the model, showing both foam and built-up wing.



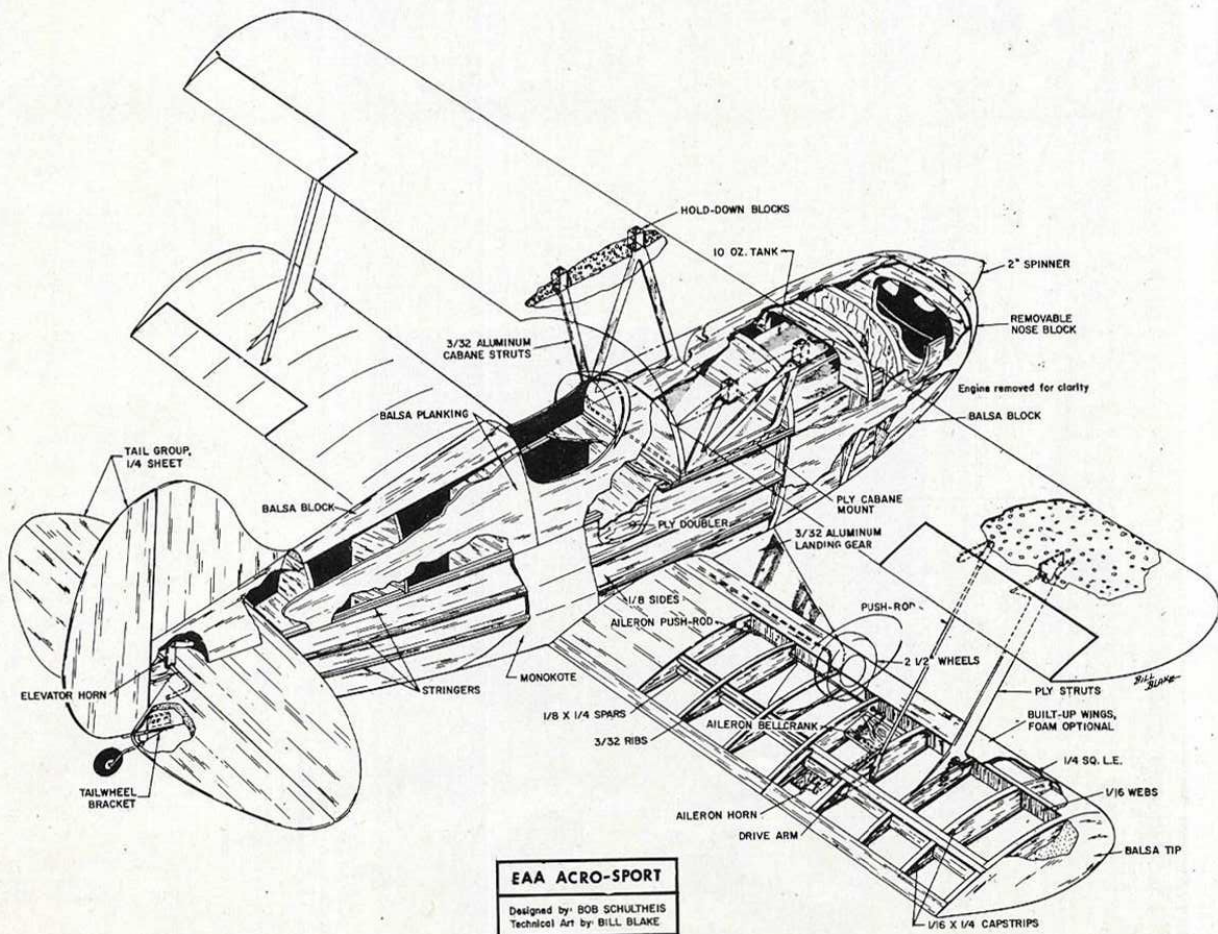
This view gives an excellent angle on those wings, which have a distinctively short chord.

you're set to fly.

Balance at or ahead of the CG shown and give the little bird a try. Add power slowly till the plane is moving, then get off the elevators and steer *gently* with rudder. She'll fly off nicely at half throttle. Once airborne and heading out,

pour the coals to her. This little biplane is truly something to flip over.

**Note:** The Acro-Sport placed a respectable fourth at Jerry Nelson's Bipe Contest this season, which speaks well of its potential in the new N.S.P.A. event.



**EAA ACRO-SPORT**  
 Designed by: BOB SCHULTHEIS  
 Technical Art by: BILL BLAKE

Cutaway of the full-scale Acro-Sport.