Jerry releases the Duckie for a good Hi-Start launch. Note all that West Coast territory in the background; makes us urbanites envious.

PIERCE DUCKIE

Better Known As SWK-Mk1

• The "Pierce Duckie." Funny name, isn't it? But by any measure, this is one of the most successful and highest performing sailplanes in the country. On September 2, 1974, the Pierce Duckie flew to a new World Cross-Country Distance record (27.2 miles) on the first attempt in the morning, and in the afternoon, it flew 31 miles because where we landed I was eight miles off course.

The airplane is essentially a cooperative effort by Eddie Slobod, Bill Watson and myself. It began life as a 60" Slope Soarer, the Rubber Duckie. Bill Watson and I picked the airfoil for the Rubber Duckie from NACA report #460. We wanted a section that would have a wide speed range, have the ability to carry a load, be a reasonable performer, inverted, and have a very gentle stall. The Rubber Duckie was an unqualified success, and after I had a 39-min. thermal flight, Bill cut a pair of constant chord center sections to go with the standard Rubber Duckie wing cores.

About this time, Eddie Slobod was testing his new Pierce 970, and I convinced Ed that we should make the new 120" semi-symmetrical wings with a prototype Pierce 970 fuselage. While we did not doubt that the model would perform well, it was smaller than an all-out cross-country sailplane should be, and so while we felt that valuable information would be obtained from this configuration, we didn't expect it to break any records.

The first flight was made on a Wednesday afternoon at a nearby college. The winds were 10 to 12 mph, but the plane climbed out beautifully and surprised me with its ability to penetrate upwind.

The following Saturday, we headed for Palmdale, and at 12:00 I got away on my first flight. One hour later and 15 miles out, Eddie's car overheated and stopped in a place I came to know much better. On a map, Lovejoy Butte is only a steep hill jutting up 600 ft. in the middle of the desert, but I came to know it as a giant hand that reached out to deny my glider passage. In three weeks I totaled 90 miles and 10 hours in the air, but never got past Lovejoy Butte.

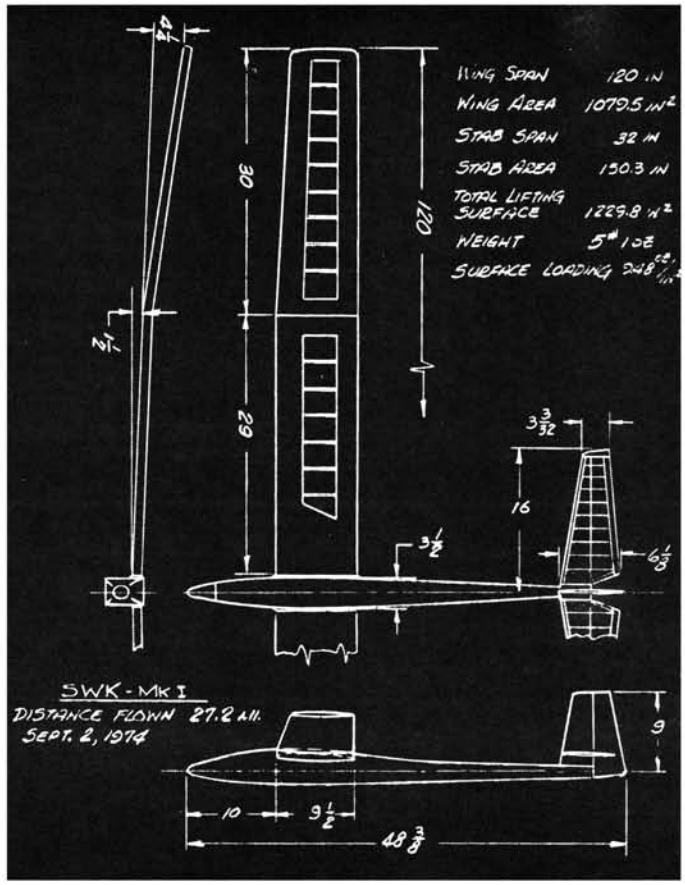
I decided to move north in the valley, 11 miles, and west, 35. The next time out was September 2. The first launch was at 10:45, and we set out almost immediately. This flight is normally just a warm-up for the good conditions that occur around 12:00. Sure enough, about 11 or 12 miles out I was down low and looking for a place to land. I hit lift just above some power lines and climbed out again. From there on, I never circled and was never below 500 ft. The landing was right on target.

After lunch, I returned to the launch site, set a new goal and started again. By now it was 2:00 p.m., and the sky was booming. Ten minutes after launch, the glider was at the extreme limit of visibility, and I had full down trim set in to try to keep the model in sight. Normally this trim setting yields 37 to 40 mph, but our ground speed told me that I was in a 20+ mph headwind. Still, it wasn't too bad until about 15 miles out when the wind changed 90° to a crosswind blowing the wrong way!

Now the fun began. In an effort to stay on course I kept passing up thermals until finally it was either land or drift downwind.

Fine sailplane, with an unusual name, set a new World Cross-Country Distance record of 27.2 miles in 1974. It's a cooperative project headed by the author and is a functional soarer for all purposes.

Author poses proudly with the Duckie and his RS transmitter in front.



BY JERRY KRAINOCK

So I drifted downwind. For the next 16 miles I was never over 500 ft. I encountered turbulence so strong that it snap-rolled the glider. At one point the glider was about a mile away in a vertical spiral dive because I hit the turbulence and got crossed up. Finally, a 70 mph race down the freeway found the car at an "off" ramp and the glider overhead. An open field was found in "Beautiful Downtown Rosamond," and the crew convinced me to land. It was a fitting end to a great day.

If you wish to join me in this fine madness, grab some balsa and your building board and read on.

FUSELAGE CONSTRUCTION. Begin by cutting out the parts that go into the fuselage. You might find it helpful to trace all the parts on .005 transparant mylar (available at drafting supply houses). Then cut the mylar patterns out with scissors. This saves the plans, and you always have the patterns should you ever want to build another model.

Mark the former locations on the inside of the fuselage sides. Place the right-hand fuselage side on the plan and pin in place. Cement F3, F4 and F5 in place taking care to see that they are perpendicular. Cement the left fuselage side to F3, F4 and F5, carefully checking with a square to see that the left side is exactly over the right side. When dry, remove from work board and ce-

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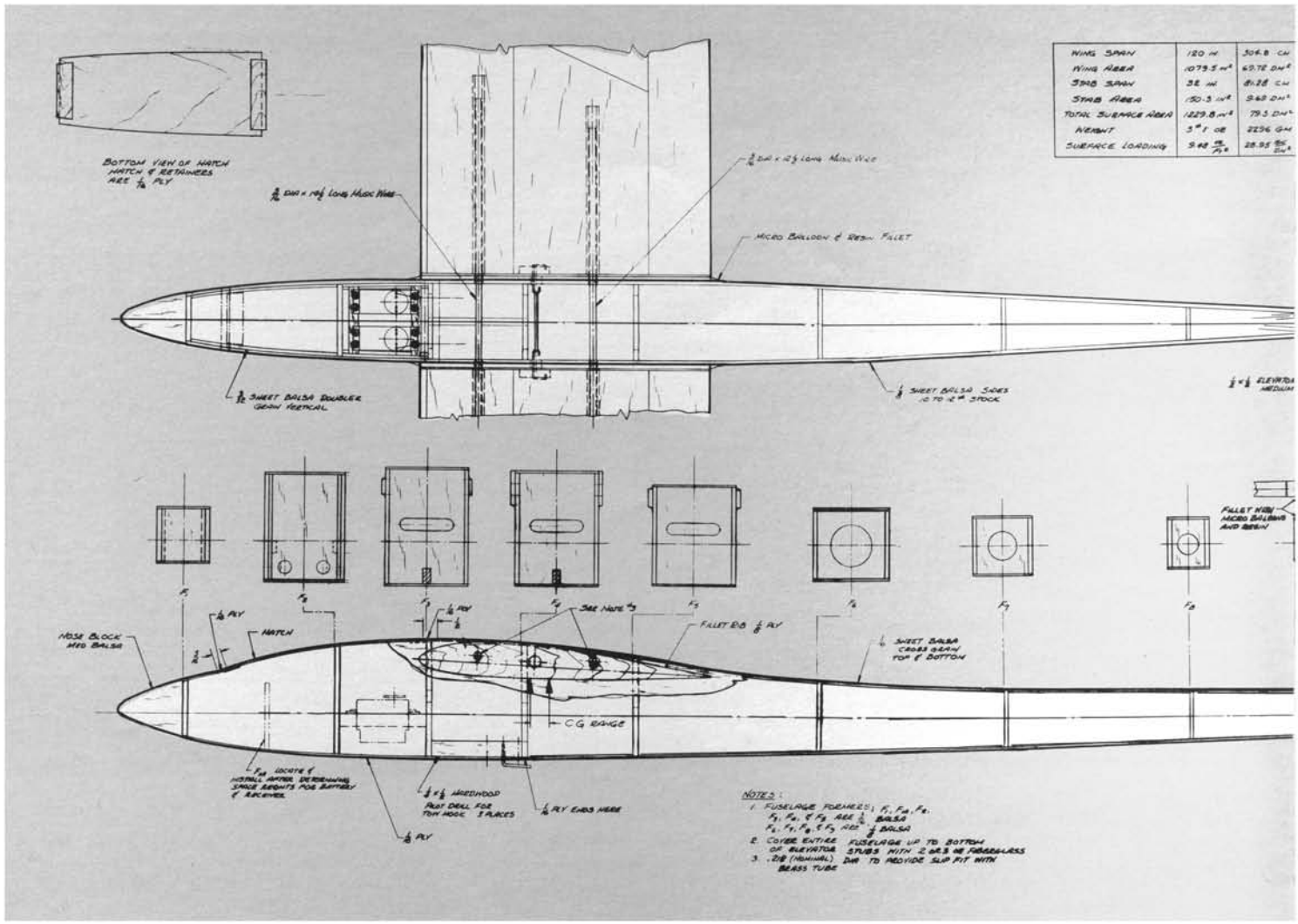
Was team effort. *(L/R)* Paul Scibetta, Bill Nibley, author, Ed and Paul Slobod, Tom Osborne.



WING SPAN	120 IN	304.8 CM
WING AREA	1079.5 IN²	69.72 DM²
STAB SPAN	32 IN	81.28 CM
STAB AREA	150.5 IN²	9.62 DM²
TOTAL SURFACE AREA	1229.8 IN²	79.3 DM²
WEIGHT	3 LB 1 OZ	2256 GM
SURFACE LOADING	9.48 OZ/FT²	28.95 GM/DM²

PIERCE DUCKIE (SWK-Mk1) . . . CONTINUED

ment 1/8" ply fillet ribs in place using the holes in the ribs and the fuselage sides to line them up.

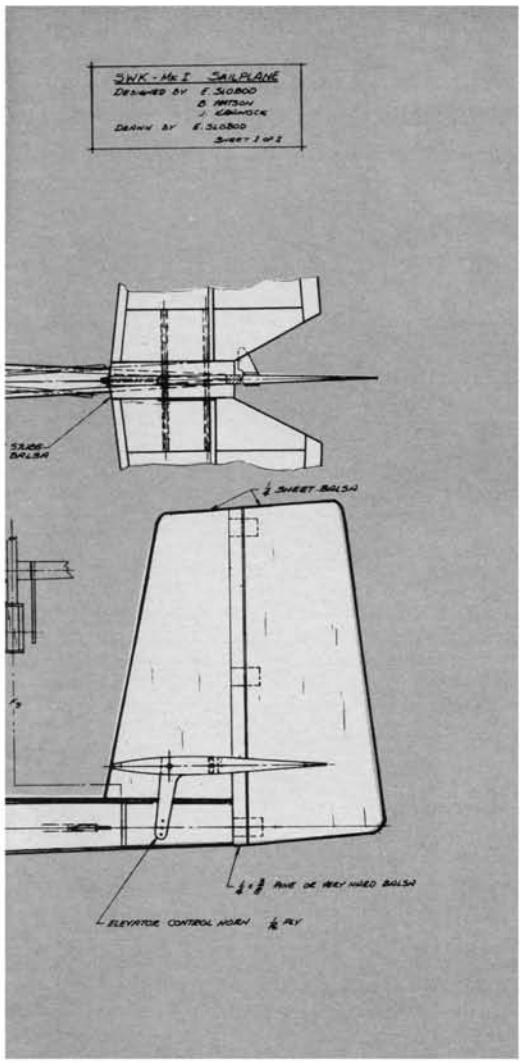
Pull the sides together to cement in F1. Hold with rubber bands, tape or clamps until dry. Do the same at the aft end of the fuselage. Glue in F6 to F9. Determine the spaces you will require to install your radio gear and relocate F2 if required. Do the same with F1a. Install the servo rail supports, servo rails, etc., at this time. Glue in tow hook block after pre-drilling at the locations shown. Cover the fuselage bottom with 1/16" ply from F1 to the middle of F4. Cover the remainder of the fuselage bottom with 1/16" balsa with the grain running crosswise.

Install the push rods outer sleeves and epoxy at each former location after routing. Cable push rods are strongly advised and keep the bends to a minimum. Epoxy 1/16" ply strips to the top of the fuselage. The location and widths are noted on the plans. Finish sheeting the top of the fuselage using 1/16" balsa with the grain crosswise.

Make the hatch and hatch retainer strip of 1/16" ply and epoxy together. When dry, fit it to the fuselage by bending the hatch to insert. Glue on the nose block. When dry, sand the entire fuselage and shape the nose

Jerry checks out tow connection prior to release. Quite a grip he has on the transmitter.

Bringing the Duckie home after its long flight. Note



block. Round off the corners but not too much. Epoxy the pine rudder post to the aft end on the fuselage taking care to see that it is vertical. When dry, add the fin.

Now carefully locate the position of the stab stubs (½" x ½" balsa) and cement in place. When dry, contour to match the stabilizer profile. Round off the leading edge and top of the fin.

Cover the entire fuselage with 2 oz. or 3 oz. fiberglass including the fin up to the stab

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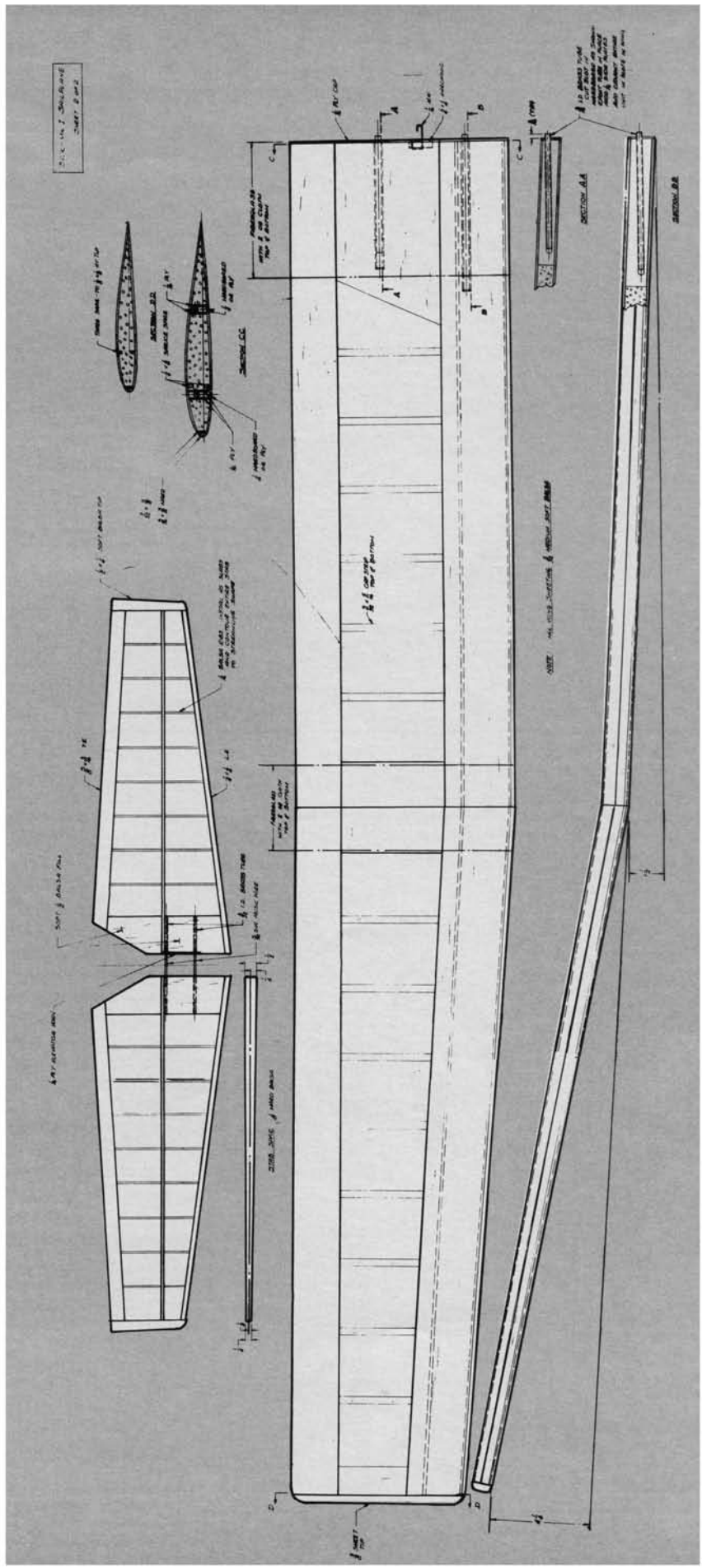
the dust devil stirred at Jerry's feet.



FULL SIZE PLAN AVAILABLE . . . SEE PAGE 84

PIERCE DUCKIE

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stubs. After its dry, sand smooth and apply a second coat of resin. Cover the fin and rudder with tissue or Silkspan; give them several coats of nitrate dope. Now sand the fuselage, fin and rudder with 400 grit wet or dry paper to make it smooth.

Carefully drill and slot the stab stubs for the stab wire and tube. Make the foward hole slightly oversize. Slip a piece of 3/32" wire through the tube and sight from the top and rear to see that the wire and tube are square in both the horizontal and lateral planes. Move the tube around in the oversized hole as required. (Note: a light coat of petroleum jelly will prevent the wire from being epoxied to the tube.) Install the rudder hinges. We used strips of .005 mylar, but you can use your own favorite type of hinge.

Build up the fillets around the wing rib and the stab stub to rudder junction with Micro Baloons and resin. Sand to smooth contours. Finish with Hobbypoxy or Super Poxy.

STABILIZER CONSTRUCTION. Stabilizer construction is straightforward, but requires some care in aligning the tubing. Note that the stab halves taper from ½" to ¼" and that the cross section is streamlined and symmetrical, so shim the leading and trailing edges the appropriate amounts. The stabilizer horn is made from 1/16" ply or phenolic resin and cemented to the recess in the left stab half.

WING CONSTRUCTION. Wing construction begins with cutting your cores. If you don't cut cores yourself, cores for this wing are available from Hi Johnson Model Products, 11015 Glenoaks Blvd., Pacoima, California 91331, or Bill Watson, 6701 Orion Ave., Van Nuys, California 91406.

Start by gluing on the soft 3/32" x ⅜" leading edge and the ¼" x ⅛" spars in the slots. You can use white glue for the leading edge, but you have to use epoxy for the spars. Foam doesn't breathe, so white glue will not set up well. While waiting for this to dry, you can begin preparing your wing skins.

Pin dmwn a leading and trailing edge piece of sheet material over your plans with a 3/16" overlap at each edge. Now take more sheet wood, and cut and sand pieces to fit between them in the appropriate areas. Put tape over all the seams and turn it over. This is where Hot Stuff comes in.

Run a little Hot Stuff down a seam and then start sanding across the seam lightly. The dust from the sanding will help fill any gaps you may have left. When you have completed one side, turn the skin over and repeat the process. When you have all the skins prepared in this manner, you are ready to mount them.

Make up your receiver blocks for the wing rods out of ¼" ply, white pine or hard board. Epoxy the brass receivers and 1/16" ply sides in place and cut out the appropriate areas in the foam core. When the receiver blocks are dry, epoxy them into the cores making sure to maintain proper alignment. Now carve the leading edge caps to match the top and bottom contours. The wing cores are now ready for skinning.

Take the completed wing skins and place them over the wing cores very carefully. Now take a felt-tipped pen and draw on the inside of the open area where the cap strips will go. Now you know exactly where to put the contact cement. I used Wilhold Green Contact Cement, but if you like something else, fine.

Put one coat of cement on the foam and let it dry (I use a 39¢ roller and a small pan to put on cement); then put a second coat of cement on the foam and a coat on the balsa skins. When they are dry, you are ready to mount the balsa skins.

Get someone to help you put the skins down. Cover the cores while they are resting in one side of their block. Tear off a length of waxed paper long enough to cover the whole wing, but leave ¼" showing at the leading edge. Now, using the ink marks on the foam, line up the sheet and then press down the leading edge. I use another 39¢ roller here to roll down the sheet uniformly, while my partner slowly draws the waxed paper from beneath the wing skin. Normally, I cover one side of a panel at a time, and I start on the bottom sides.

Make your 3/32" x 5/16" cap strips from scrap left over from the wing skins. When all the cores are skinned, take your cap strips and begin. A helpful tool at this point is a spacer 2½" x 3" with a right angle across the bottom. Starting with a main panel, work in from the dihedral break and use the spacer to line up the caps with the trailing edge. When you finish, glue on the 3/16" x ⅜" leading edge pieces. When these are dry, carve and sand them to their final shape.

Either sand or use a radial arm saw to cut the proper angles for the dihedral break, and join the panels with 5-Minute epoxy. Put 1/16" ply ribs on the ends of the wings and the ⅜" sheet of the tips. Now sand everything smooth. Use 2 oz. fiberglass cloth for the glass work on the wing butts and the dihedral breaks. When this is sanded smooth, the wings are ready to cover. Use dark colors on your wings and tail surfaces because pastels will fade out at a distance.

FLYING. This sailplane is different to trim because of its airfoil and swept tip. The CG should be set initially at 45% and the stab incidence at 0°. If any gentle stalls develop with this trim, gradually increase the positive incidence in the stab. For desert flying. I use enough positive incidence in the stab so that full "up" trim and slight back stick are required for best climb.

If you are planning to use the model for cross-country flying, then your next step is to go to the country for some trim flights. With the sailplane in the air, set out in your chase car, across the wind, and check the model's ground speed with the elevator trim set at neutral. Your speed should be 29 to 31 mph in level flight. If it's not at least that fast, you need ballast.

The Pierce Duckie will not climb as well as a Grand Esprit of similar wing loading, so don't expect it. My experience with this glider has shown that the climb increased as I moved the CG back to its present location, but if you go much farther aft, brutal tip stalls will result. This sailplane will be about 25% faster than our example Grand Esprit, so get used to flying it in bigger circles than you normally do.

The Pierce Duckie will be very competitive in FAI and AMA competitons if you will add a spoiler setup or possibly flaps. ■