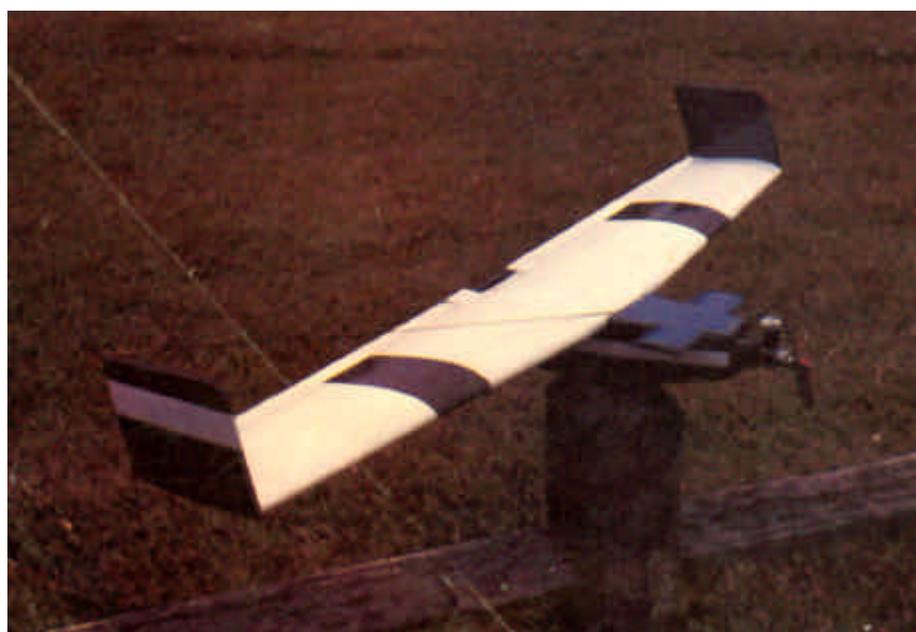




Dave Pastor displays his $\frac{1}{2}$ A RC cutie. He used a sliding servo tray for operating the strip elevens but notes that mechanical mixers will work just as well. Construction is super simple.



Big Picture: There's no trick photography here. It really is a snap of the Willit in flight. Above: Wide stripes on the upper wing surface of the completed model help with orientation when it is in flight. The small forward stabilizer? We don't know if the plane would fly without it.

This RC airplane is an interesting change of pace from more complex and conventional subjects. A Cox Black Widow engine, Ace Pacer foam wing, two-channel radio, two sheets of 1/8-in. balsa, covering film, and a few hours of your time are the main ingredients. Carefully remove the center pages for the full-size plan. • Dave Pastor

THE CALIFORNIA rain kept falling, and the snow pack was approaching 30 ft. in the mountains. The skiers were in their heaven, and I was looking for a project to take my mind off the weather. It had to be something that I had not done before, something unusual. The result was the Willit, an inexpensive model that can be built in just a few hours.

Let me answer the inevitable question, one that I've been asked many times, "Will it fly?" Yes! And the Willit is a fun model to fly. A Cox Black Widow .049, with the fuel pickup relocated to the bottom of the tank, pulls it along at a good pace with sufficient power for most maneuvers. It is very stable. After getting used to the strange configuration, you will find that you can trust it not to surprise you. It goes where you point it.

FUSELAGE CONSTRUCTION. The only curve that will be cut, with the exception of the hatch, is the wing saddle; make a template of this area out of cardboard. Lay out the fuselage sides, bottom, F3, and F4 on a sheet of 1/8 x 3 x 36 balsa. Cut a second balsa

Wiiit



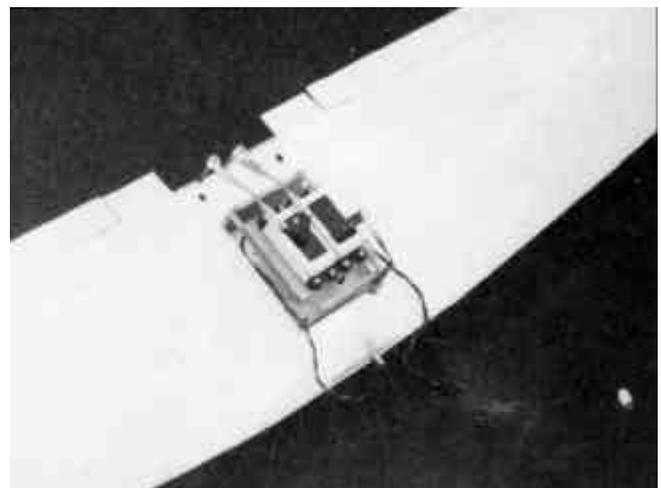
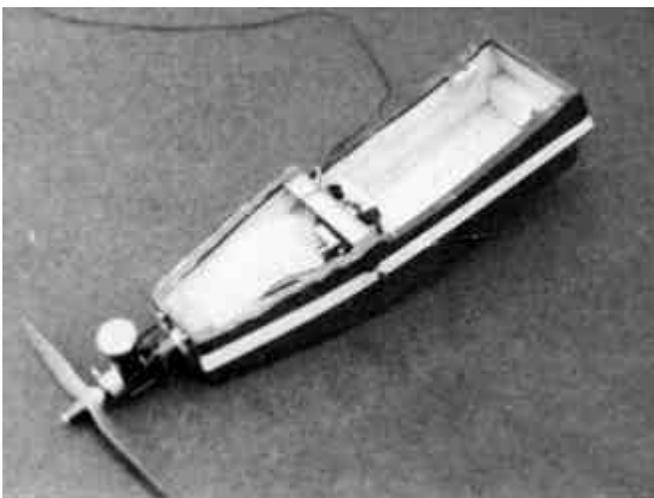
sheet of that size in half, and edge-glue it to make a 1/8 x 6 x 18 sheet. The top hatch, vertical stabilizers, and wing saddle doublers will be cut from the 6-in.-wide piece, taking care to orient the grain properly. What is left will be used for the canard doublers and the cross-grain front bottom fuselage sheeting. Do not trace or cut out the canard hatch at this time.

From a piece of 1/8 ply, cut out F1, F2, and the hatch hold-down pieces. Cut two pieces of 1/8 sq. balsa for the fuselage bottom corner fillers and two 3/8 x 3/8 x 1/8 hardwood blocks that the wing hold-down screws will go

into.

To assemble the fuselage, first glue the 1/8 sq. fillers to the fuselage bottom and the wing saddle doublers to the fuselage sides. When dry, glue the fuselage sides to the bottom and F2 and F4 between the sides. If this is done as one step, fuselage alignment will be correct.

Wet and/or steam the fuselage sides forward of F2. Pull the sides together, and clamp F1 into position at the front. Let this dry, then glue F1 into place. Follow with short pieces of 1/8 sq. balsa for additional support, and add the front and rear hatch hold-



Left- Completed fuselage, wing and top hatch removed. The antenna is strung to one of the vertical stabilizers when the plane is assembled. Rear bustle was necessary to clear the elevon pushrods, though the drawing shows a simpler design allowing sufficient clearance. Note silicon seal around the hatch area. Right; From the underside of the wing we see details of the elevon linkage and the sliding servo tray.

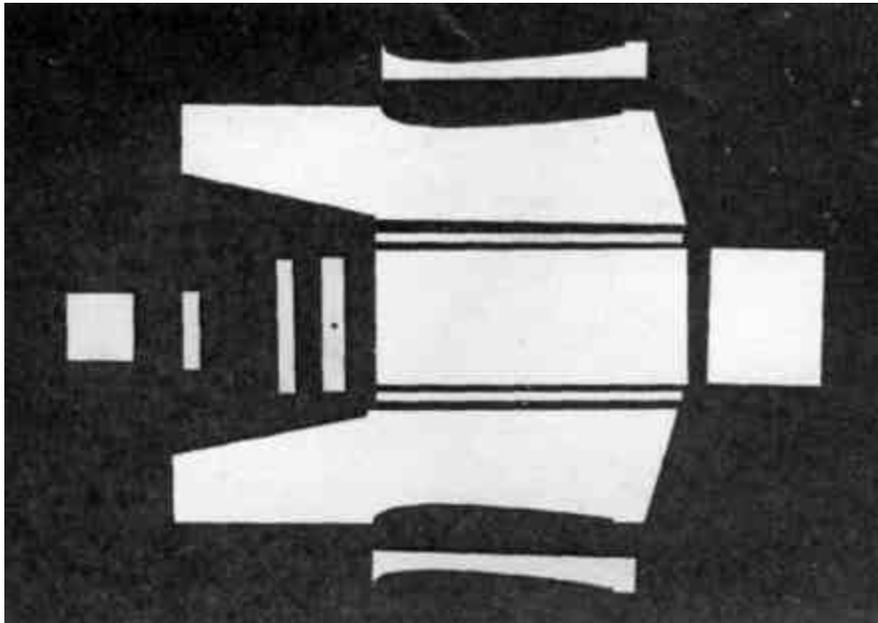


All you need for this one is a two-channel radio setup. It hand launches easily, and if you mount the prop horizontally as it begins to come up on compression, it will help save the prop on landings.

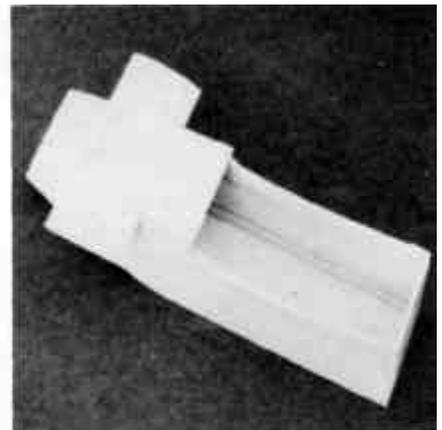
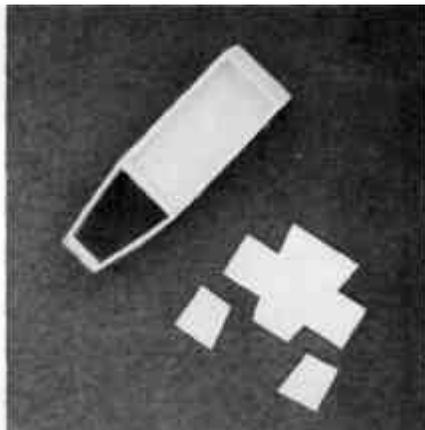
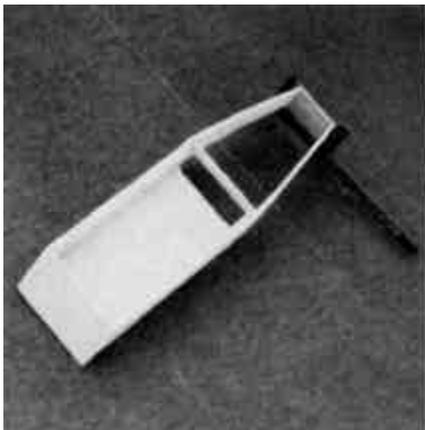
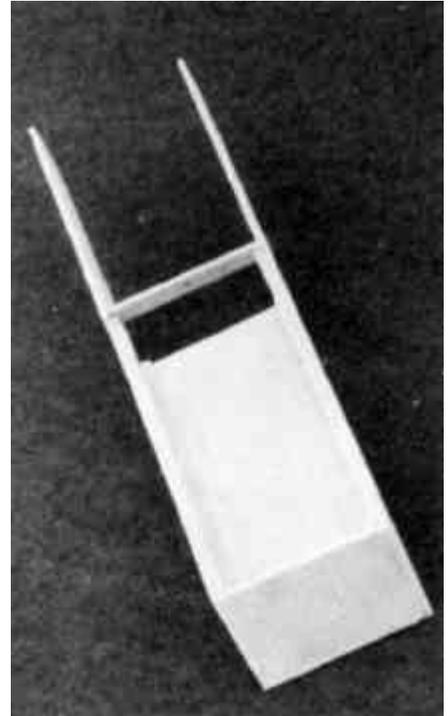
down plates. Lay the fuselage upside down on the wide sheet of balsa, and trace the exact hatch curvature. Remember, the grain of the balsa runs across the fuselage. Finish the hatch, add the cross-grained balsa under the forward fuselage, and mount the wing hold-down blocks. The fuselage is now complete. No, I didn't forget F3. The sole purpose of F3 is to keep your radio from coming in contact with the servos. Place this former wherever it is needed during your radio installation.

The fuselage can now be covered and the firewall area fuel-proofed. I suggest a lightweight heat-shrink covering. Cover the underside of the hatch. This will give it added strength and prevent warping.

Wing. The Ace Pacer wing kit consists of three foam pieces (one constant-chord center section and two tapered wing panels) cut to the proper length, grooved for the spar, and trimmed for the trailing edge stock. Tapered
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Above: All of the pieces necessary to build the fuselage. As is usually the case when building from plans, it's best to cut out a "kit" of parts right at the start. Right: First step of assembly. The fuselage sides, bottom, F2, and F4 have been assembled with proper alignment.



Left: Wet the fuselage sides ahead of F2, pull together, clamp the firewall into place, and allow to dry to form the front of the fuselage. Center: With the firewall and hatch hold-down plates glued on, the hatch outline can be traced from the sides and cut out. Forward elevator is part of the top hatch; doubters are glued to the bottom, and then it is carved and sanded to an airfoil shape. Right: Fuselage ready for finishing.

Willit/Pastor

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aileron stock is also included with the kit.

Assemble the foam wing with 5-min. epoxy; using white glue, attach the spar and the trailing edge stock. When dry, trim the trailing edge stock flush with the wing panels.

Place the wing on the fuselage. When you are sure that it is properly aligned, hold it in place with rubber bands. Insert a 1/8-in. drill through the hole in F2 and, turning it with your fingers, drill a hole into the foam wing.

Cut a piece of 1/8-in. dowel, and make sure that, when in the wing, it will fit into the hole in F2 (now is the time to find out, not after you mix the epoxy). Once it fits, epoxy the dowel into the foam wing. While the epoxy is hardening, hold the wing in place with the dowel in the hole. Reinforce the dowel-wing joint with a scrap of fiberglass cloth and epoxy.

With the wing held in position, carefully mark, then drill, the mounting screw holes through the wing and mounting blocks with an 8-32 tap drill. Remove the wing, and tap the blocks. A few drops of cyanoacrylate (CyA) glue will harden the threads in the block. Be sure to follow this step with the tap again to remove the raised (and hardened) fuzz. Enlarge

the holes in the wing to accept a piece of outer Goldenrod (or other tubing) that will fit closely around the 8-32 nylon screws. Epoxy a piece into each hole to keep the wing from being crushed when the screws are tightened.

Determine how you are going to operate the elevons. I used a sliding servo tray. Mechanical mixers will work just as well. Make the appropriate cutout in the foam wing, and use epoxy to attach the servo-mounting pieces to the wing.

Lay out the aileron stock *upside down*. Remember, the neutral position is when the elevons follow the curve of the *bottom* of the airfoil. There will be no aileron stock between the fuselage sides. The stock between the fuselage and the tapered panel seam is fixed and is used as the aileron linkage bearing support. From the seam to the wing tip is the elevon.

Bend and install the strip aileron control rods as you would for any strip aileron installation. Position the horns to obtain the straightest pushrods. To keep the wire from breaking out of the small aileron stock, I add a small piece of 1/32 ply, top and bottom, on each elevon where the hole is drilled. Use your favorite hinging technique.

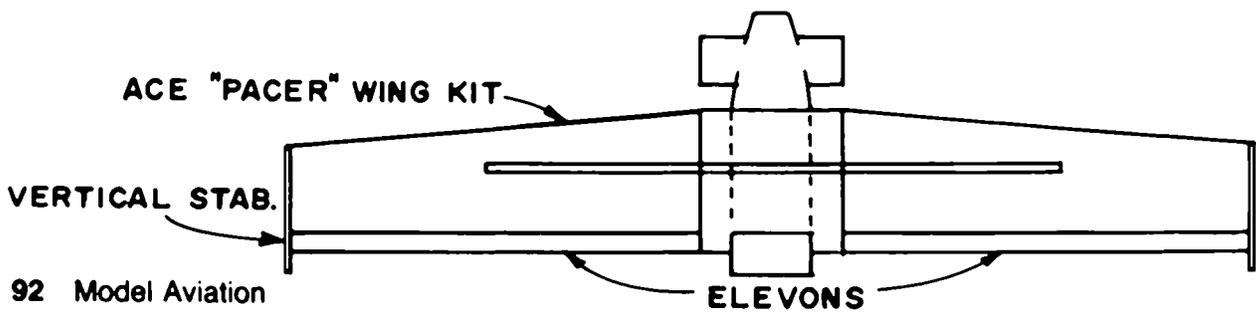
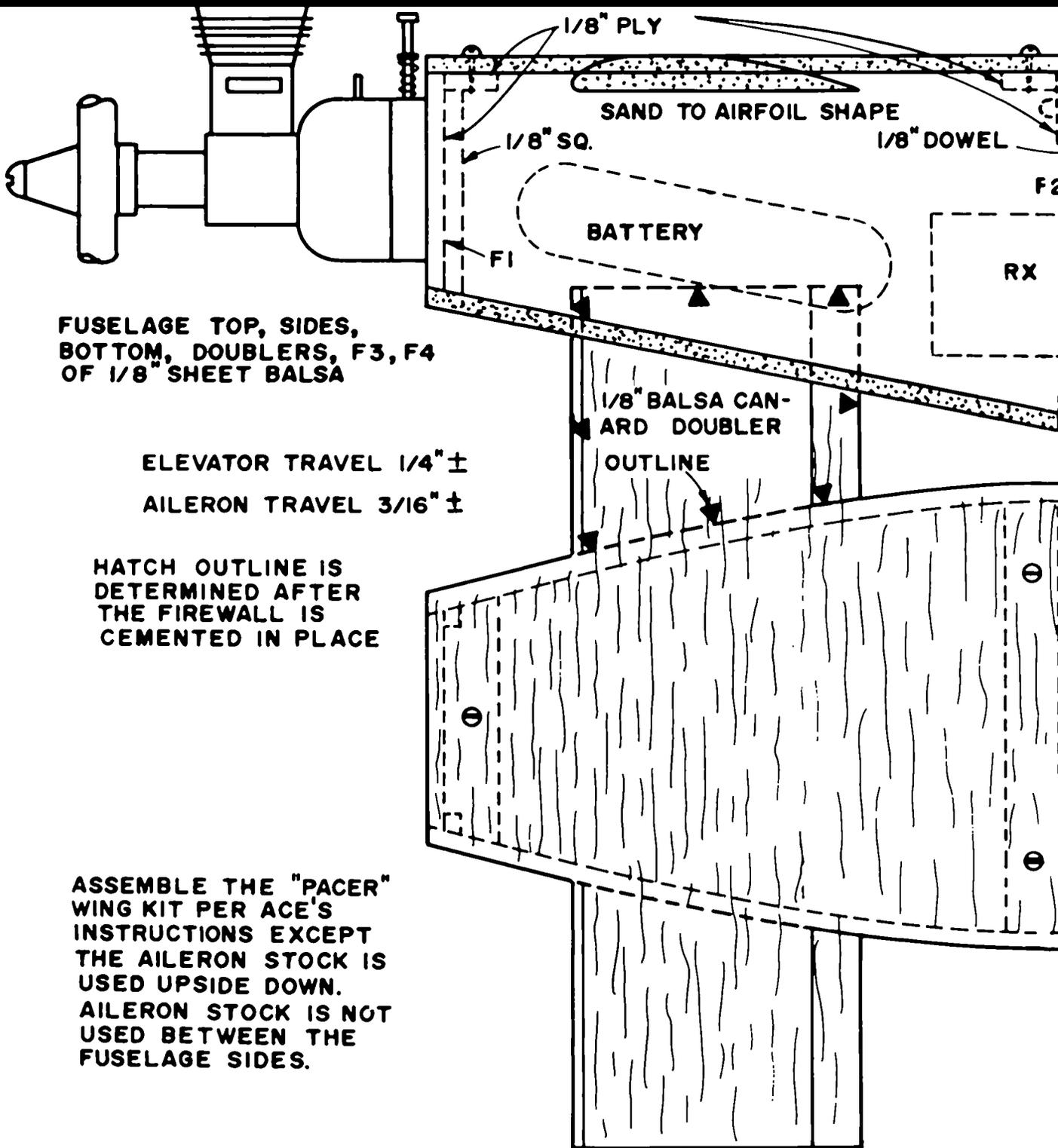
Cover the wing with a low-temperature covering film directly over the foam. Cover the rudders, and attach them.

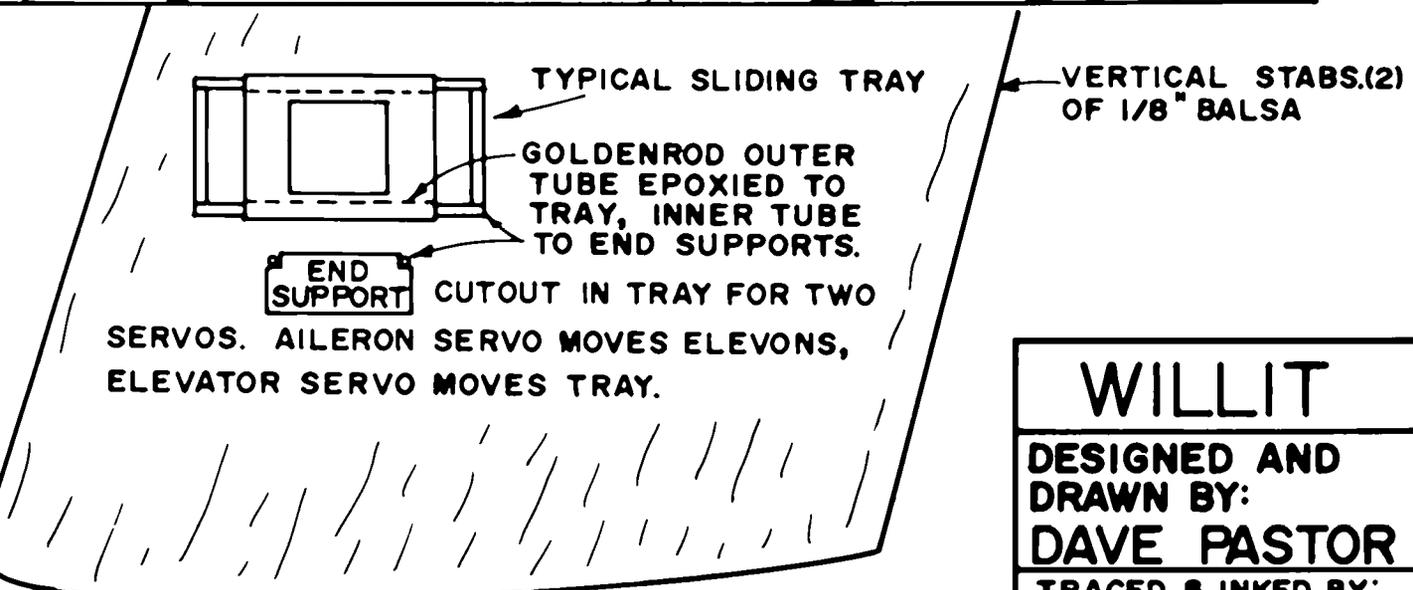
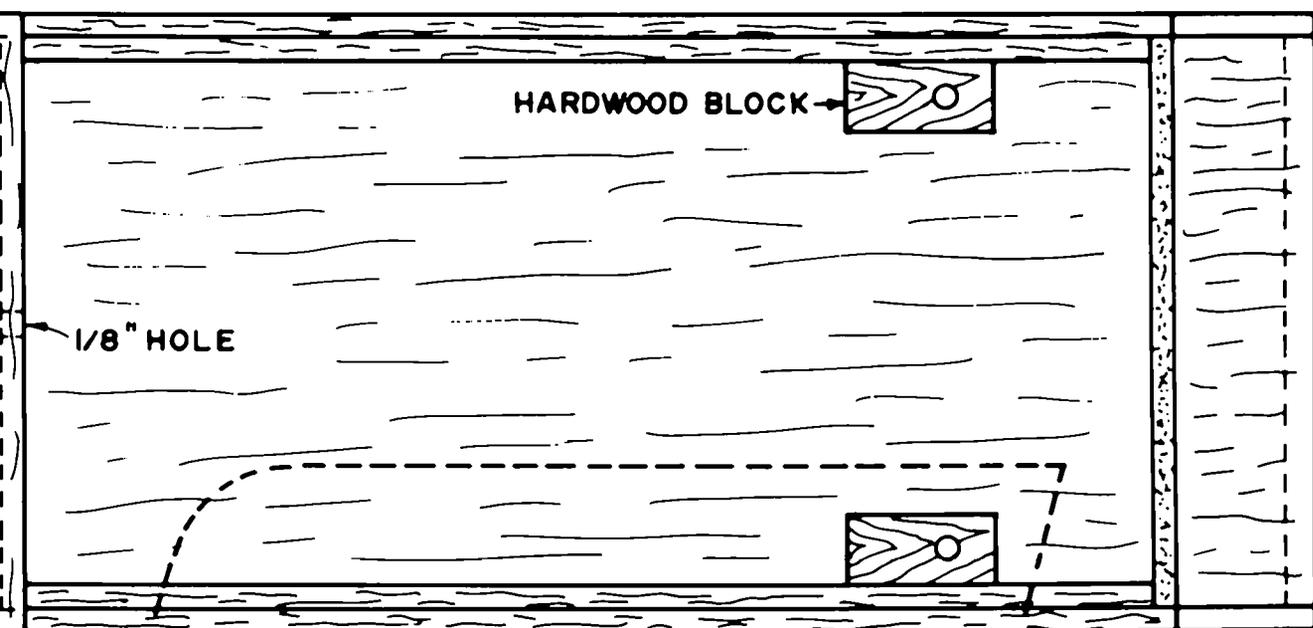
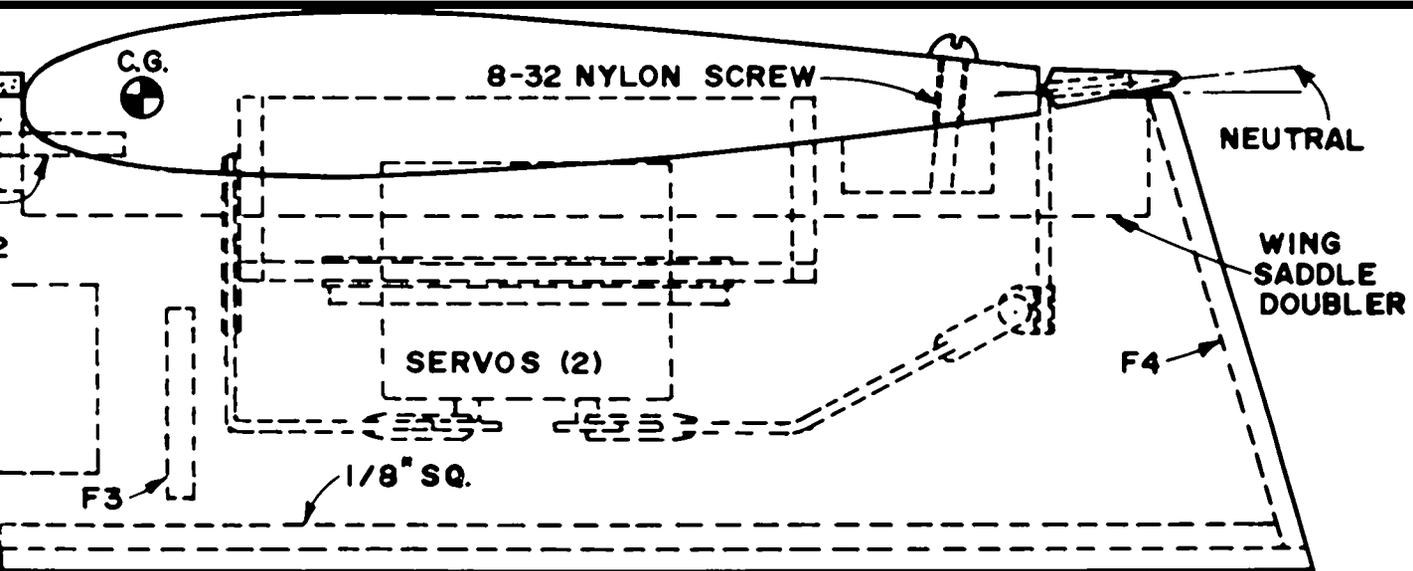
Final assembly and checkout. Go back to the fuselage, and glue F3 as far to the rear as is practical. This former's sole purpose is to keep the receiver and associated cables from fouling the servos.

Mount the servos and hook up the radio. Adjust the elevator throw for $\pm 1/4$ in. and the ailerons $\pm 3/16$ in. Check to see that all combinations of elevator and aileron control are free of binding. Screw on the engine. Put the receiver and battery into the fuselage with as much lightweight foam as necessary to keep them in place.

Mount the wing, and check to see that the aileron horns do not touch the rear of the fuselage with full-up elevator and full aileron deflection. Check the center of gravity (CG), and move the radio as necessary to get the balance point in the correct place. Do not use ballast unless absolutely necessary, since only 1 oz. of additional weight is an increase of more than 5% in the total model weight.

The flight characteristics are similar to a normally-configured model. The one thing that is definitely not normal is Willit's appearance in the air. Be prepared for an audience—and for praise for your piloting skill from those who think that flying wings are touchy





WILLIT

DESIGNED AND DRAWN BY:
DAVE PASTOR

TRACED & INKED BY:
DICK GLEASON 1984