

# ELECTRIC POWERED RC SCALE: THE KITFOX

An attractive, easily built, all-wood model of the popular two-place homebuilt, designed for the Astro 15.

BY LADDIE MIKULASKO

The full-size Kitfox came on the market as a kit in the mid-1980s and has since become a leader in the kitplane business. The demand for it just keeps growing. With its good looks, simple assembly and good flying characteristics, the appeal of this aircraft is not surprising.

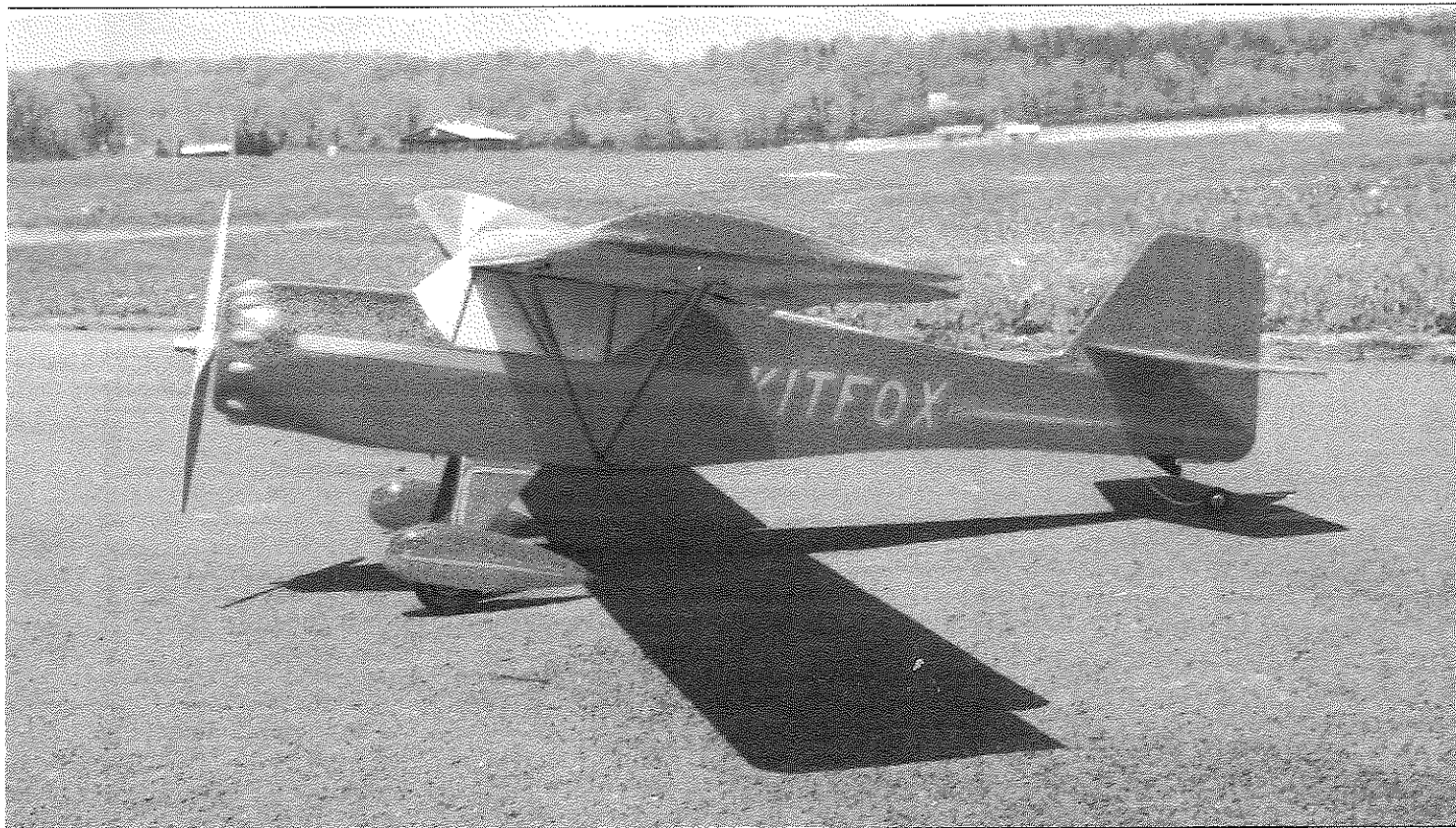
When I first saw a picture of the Kitfox I knew I wanted to build a scale model of it, but it was several years before I came across a three-view in the Czechoslovakian model magazine *Modelar*. Looking at the three-view, I formed a clear picture of how I was going to build it. The only decision I had to make was how large to make the model for an Astro 15 geared electric power system.

For the last several years I have been designing and building models for electric power, and the knowledge I have gained has helped me in determining what will work and what won't. The full-size Kitfox is a cross between an ultralight and a more typical homebuilt, and

was designed to be a relatively slow, easy-to-fly, relaxing plane. I wanted to keep these features in the model, so I went with a wingspan of 70 inches—close to the limit for the power available from the Astro 15 geared motor.

The plan was drawn up in short order. I kept an accurate outline on the whole model and tried to design it to be as simple as possible. For this reason the cabin area is sheeted with 1/16 balsa and the cowl is not removable. Access to the motor is through the front opening of the cowl. Again, for the sake of simplicity, access to the motor batteries is from the top, which requires removing the wing. I find this to be no big deal. Undoing the two wing screws and the two wheel collars holding the struts to the fuselage takes less than a minute.

The model went together quickly and easily and was soon ready to be test flown. I did not expect any major problems and



got none. The model took off beautifully and climbed nicely. In the air, the model is stable with all control surfaces being just right.

The rudder is very powerful on takeoff and in the air. The stabilizer and elevator surfaces are relatively small in comparison with the wing, but are more than enough to make the model stable in pitch. The model does very nice loops. The ailerons are sluggish, but are capable of rolling the model.

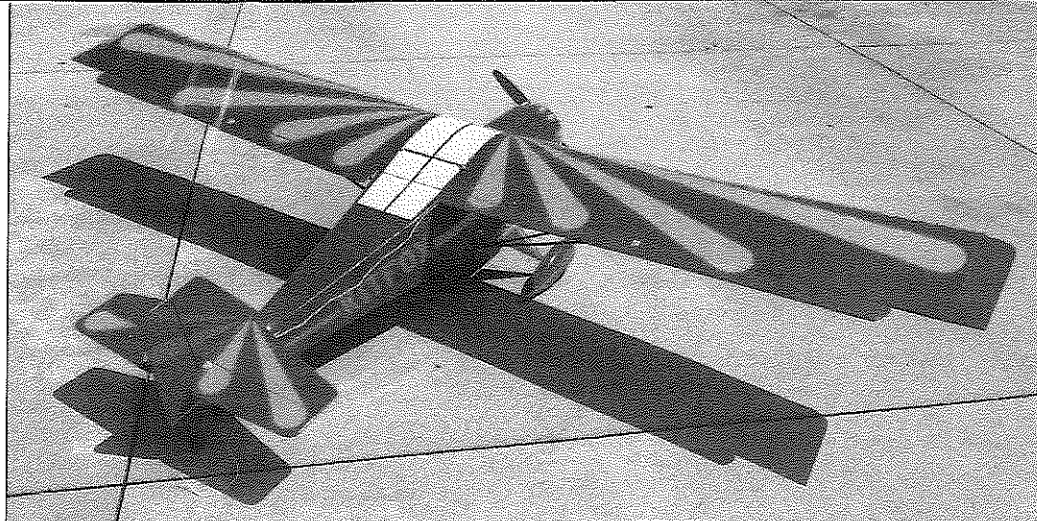
Because I like to fly in a scale-like manner, I don't like to roll the Kitfox; the full-size aircraft wasn't designed for rolling or flying inverted anyway. As expected, the glide ratio is good and the model can be flown for a considerable period of time at a low power setting because of its large wing.

Before you start construction, study the plan. Use the lightest balsa you can find, cut out as many parts as possible beforehand, and drill and cut out lightening holes in the plywood parts as shown. Be sure to use lite-ply and not regular birch aircraft plywood, it's much heavier!

### WING

Begin by cutting out all of the wing ribs. Note that the W1 ribs are shallower than the W2s to allow for the center section sheeting.

The wing is built in two halves, which will be joined later. To build the first half, mark the locations of the ribs on each of the spars. Slide all of the main ribs onto the upper spar. Pin the bottom main spar, rear spar and bottom trailing edge strip to the building board over the plan. Position all of the ribs and glue them in place. Glue on the top trailing edge strip. Glue in all of the false ribs



Author copied the colors and sunburst trim scheme of the original full-size aircraft. The only real deviation from scale was done for simplicity; the ailerons, instead of being the full-flying type suspended below the trailing edge of the wing as on the full-size ship, are instead hinged directly to the wing.

and the leading edge. Glue on the wingtip and its support gussets. Where shown on the plan, glue in the 1/8 plywood plates that hold the eyes for the wing struts. Punch holes in the ribs and install the aileron Nyrod tube as shown. Sand the wing panel and put it aside.

Build the other half of the wing to the same stage. Before you join the two halves together, pin the center section bottom sheeting to the building board. Pin the W1 root ribs to the sheeting and the building board. Place the proper size blocks under the wingtips to get the specified dihedral. Glue the plywood and balsa dihedral braces in place. Glue in the two hardwood blocks for the wing bolts. Glue the top sheeting to the center of the wing. Mark the location of the wing strut eyes onto the plywood plates and drill the 1/16-inch holes.

The eyes are made from 1/16-inch cotter pins or soft steel wire. The hole in the eyes should be 1/16-inch diameter. Insert the eyes into the holes in the plywood plates and bend the ends out so the eyes will not

come out under load. Use epoxy or thick CA glue to cement them in place.

### TAIL SURFACES

Cut the parts from medium-hard balsa and sand them to

#### ELECTRIC KITFOX

SCALE .....	1:5.33 (2-1/4"=1').
SPAN .....	70 inches.
WING AREA .....	598 square inches.
FLYING WEIGHT .....	72 ounces.
WING LOADING ..	17.31 ounces per square foot.
OVERALL LENGTH ...	38-1/4 inches.
POWER .....	Astro 15 geared on 12 cells.
RADIO .....	Four channels (ailerons, elevator, rudder, throttle).

your satisfaction. Bend a piece of 1/16 piano wire as shown to join the elevator halves together later.

### FUSELAGE

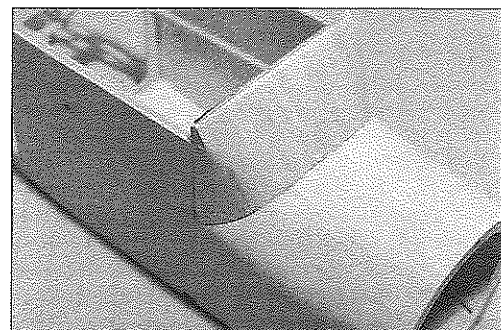
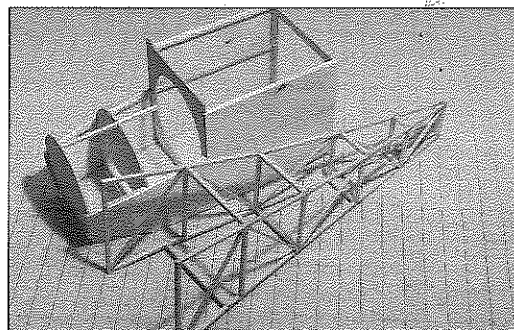
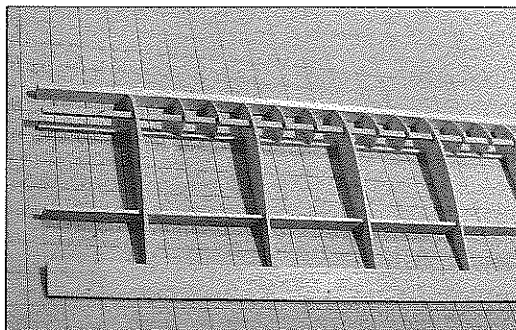
The fuselage is built in two sections; a front half up to former F4 and a tapered rear section.

Begin the forward section by gluing the 3/16 square longersons to the 1/16 balsa fuselage sides. Stand the sides upright and glue in formers F1 through F4. Make sure everything is square. Glue on the side window sheeting, the top nose sheeting between formers F1 and F3 and the bottom sheeting between formers F1 and F2.

Make the balsa/plywood motor mounting block to fit your particular motor mount; I used a SonicTronics adjustable mount with the motor secured by tie wraps. This is fastened to the wood mount with four self-tapping screws, then this whole assembly is glued to former F2, making sure the prop shaft is centered on the thrustline indicated.

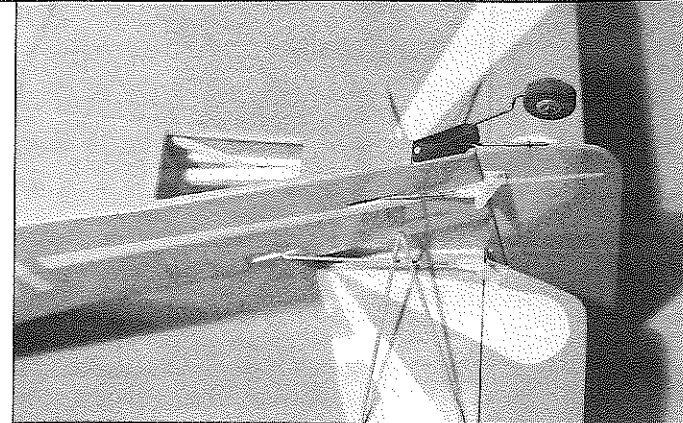
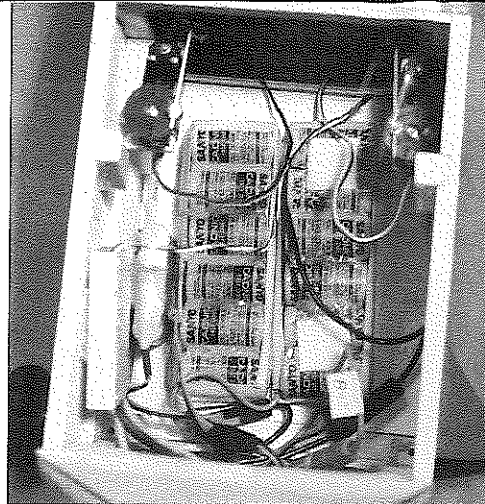
Drill the hole in the wing leading edge for the hold-down dowel. Place the wing on top of the fuselage so that the wing center section is right up against former F3. Drill a 3/16-inch hole through F3 into the two plywood dihedral braces in the wing.

The windshield is made from 1/16 balsa sheet with the grain



■ LEFT: Wing construction is pretty basic. Note that the upper main spar is positioned below the surface and runs through a rectangular hole in each full rib. Spars are spruce and the wing struts are functional, but you still might want to add shear webs between the spars for extra strength. ■ CENTER: Fuselage is built in two sections, front and back, then spliced together. ■ RIGHT: Rather than mess with clear plastic windows, the author quite sensibly chose to go with painted windows (light blue MonoKote, actually) and a stronger, easier all-balsa cabin. Seen here is the 1/16 balsa "windshield" after being glued in place.

Looking down into the interior, we see the twin six-cell 1400-mAH SCR NiCd packs that power the geared Astro 15. The excellent Sermos connectors are used throughout the system for best performance. Note that the rudder and elevator servos are mounted on the fuselage sides to give easy access to the batteries.



Underside view of the tail end reveals the cooling air outlet opening and clearly shows the stab support struts. These struts are functional—don't omit 'em! Note also how the tailwheel wire is cleverly connected to the rudder with a common cotter pin. Author used similar cotter pins for the wing strut connections as well.

running vertically. Make a paper pattern to fit your model, then transfer the pattern to the balsa sheet and cut it out. To prevent the balsa from splitting while bending, stick masking tape on the outside. Glue the canopy in place and remove the tape when dry.

Finish the forward fuselage section by gluing the landing gear blocks to former F3, gluing the bottom fuselage sheeting in place, and gluing the balsa cowl ring to former F1.

The rear section comes next. Pin the longerons to the building board over the plan and

glue in all of the uprights. Once both sides are made, stand them up and glue in the cross braces. Use squares to keep everything aligned.

Glue the front and rear fuselage sections together, then sand the fuselage to your satisfaction. Glue the center stringer to each side of the fuselage and also glue on the plywood plate that holds the tailwheel bracket.

Inside the fuselage, glue in the plywood plates and tapped hardwood blocks for the wing bolts. At the bottom, glue in the plywood plates that hold the eyes for the wing struts. Drill

the holes and insert the eyes, then bend the ends outward so they cannot be pulled out under load. Place a drop of glue over the ends.

The landing gear is made by bending 1/8-inch music wire as shown on the plan. Solder short 1/16-inch music wire braces to the landing gear to support the balsa landing gear fairings. Glue these to the legs with CA glue. Wrap the legs and balsa with thin fiberglass cloth and saturate with thin CA glue.

The tail wheel is mounted on a 1/16-inch music wire strut. The upper end of the wire fits

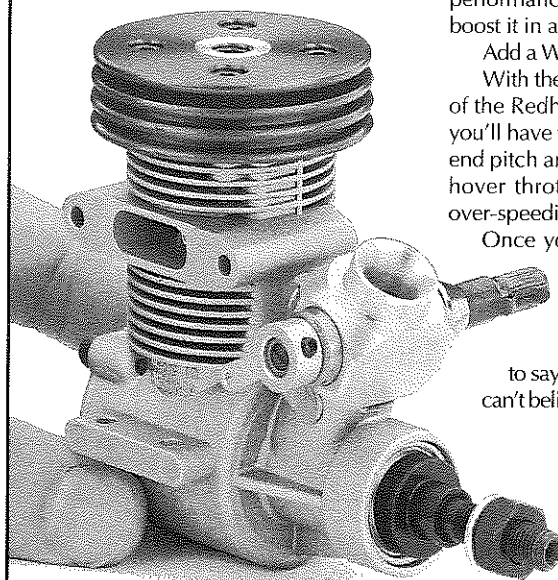
inside an eye at the bottom of the rudder.

The wing struts are functional and are made from straight grain 1/8x1/4 spruce. Round the corners. Glue them together at one end as shown on the plan. Make the grooves for the 1/16 music wire ends. Insert the wires into the grooves and wrap tightly with thread, but do not put any glue on the thread yet.

Bolt the wing to the fuselage. Feed the wire strut ends into the eyes on the fuselage and the wing. Carefully check the alignment to make sure there are no

*continued on page 83*

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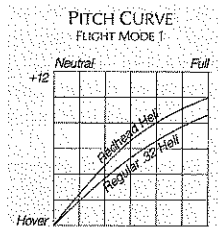
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warps in either wing half. If there are, just reposition the appropriate wire on the struts. Once satisfied, place just a drop of CA glue over the thread at each end of the strut.

Next add the jury struts to the main struts. Slide two short pieces of 1/16-inch I.D. aluminum tubing onto a piece of 1/16 music wire and bend it to the shape shown on the plan. Feed the ends into the eyes in the wing. The aluminum tubes should be resting on the strut. Wrap thread around the tubes and the strut and saturate all of the wrapped thread joints with CA glue.

Complete construction by gluing the fin to the fuselage. The stab will be glued in place after covering.

**COVERING**

I used MonoKote in the colors of the prototype—bright red overall and yellow for trim and lettering. The windshield and side windows are done in light blue.

Start with the fuselage. To get a nice fillet between the fin and the fuselage, first cut a strip of MonoKote and tack it inside the slot in the fin, then tack it to the front edge of the fin and to the fuselage sides. By carefully pulling and tacking the material, you will get a naturally curved fillet. Don't worry about small wrinkles, they will come out when the covering is shrunk. Do both sides. Before you proceed with covering the rest of the fuselage, shrink the MonoKote in the fillet area to make sure the fillet is wrinkle-free. If you're not satisfied, remove it and try again. This part done, go ahead and cover the rest of the model.

Trim pieces were cut from yellow MonoKote and applied to the base covering with the sealing iron set at a lower temperature than when shrinking the covering material.

Insert and glue the stabilizer into the slot in the fin. The struts supporting the stabilizer are functional and *must not be left off*.

Install the main landing gear and the tailwheel. On my model the wheel pants were fastened to the strut legs with clear silicone. After many flights, they are still in place.

Hinge and install the ailerons to the wing. Notice that the aileron servo is mounted at an angle so that the pushrod connector on the servo arm lines up with the Nyrod. Glue in the elevator and rudder servo rails and mount the servos. Hook up all of the flight controls and check their operation.

Install the motor batteries and check the balance. If necessary, reposition them to get the model to balance at point shown on the plan (1-5/8 inches back from the leading edge). With everything installed and tested, install the wing and struts. The struts are held to the wing and fuselage with wheel collars. *The wing struts are functional—do not fly this model without them!*

Good luck and may you have many hours of enjoyment flying your Kitfox. **MB**

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