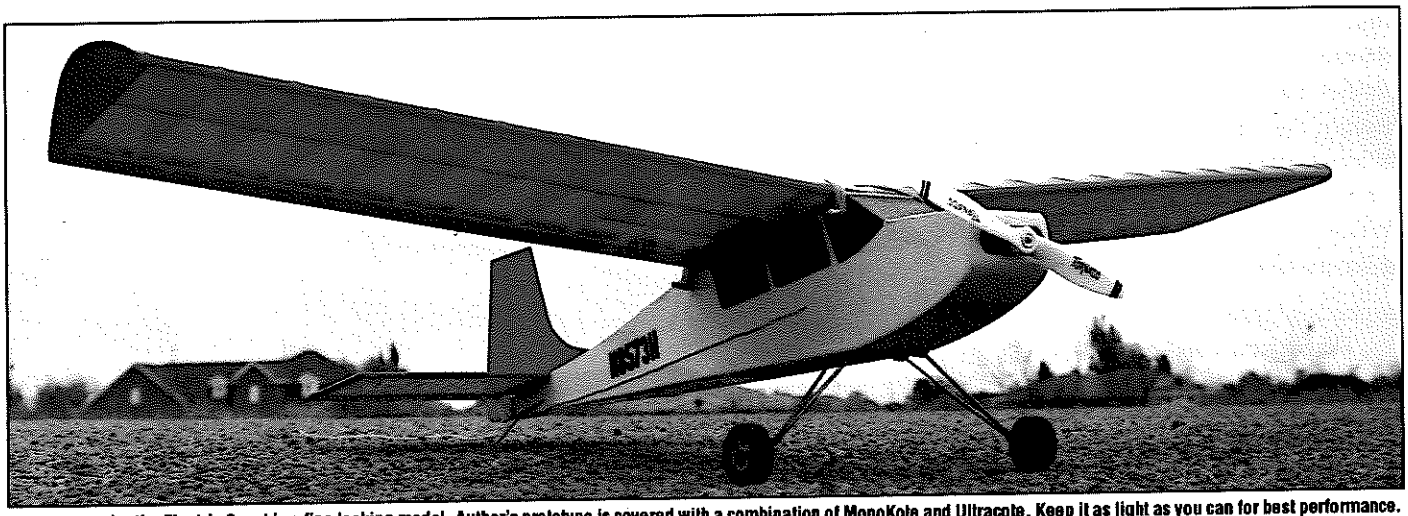
BY SCOTT HARTMAN

THE ELECTRIC SCOUT

Noted electric designer Scott Hartman is back with yet another good-flying model, this time a simple rudder/elevator sport trainer for six- or seven-cell power systems.



From any angle, the Electric Scout is a fine looking model. Author's prototype is covered with a combination of MonoKote and Ultracote. Keep it as light as you can for best performance.

Imagine being able to fly a sporty high-wing electric model at the local schoolyard or vacant lot. I've been doing this for the past several years with good results.

Many times during my flying, fellow gas modelers have shown an interest in electric but didn't want to have to invest in the kind of small, lightweight radio system best suited to electric models. The Electric Scout is designed to bridge that gap. The ideal weight appears to be around 44 ounces, however it flies fine with standard-size radios at an all-up weight of 48 ounces. A flying weight of 44 ounces or even less is easy to achieve when using micro servos and a small receiver battery or BEC-type speed controller. The main difference is that the heavier model climbs slower and glides a little faster.

If you look closely you can see the influence of several other electric designs. I recently built a Bob Kopski "Revolt," which I used to carry a small camera for aerial photos. I was impressed with its ability to carry a fairly big payload, so I used the wing and tail incidence based upon his design. The Scout's airfoil is a relatively thick flat-bottom section based on Mitch Poling's "Seagull" design. This airfoil is one of the best I've used for general slow-and-easy flying.

The Electric Scout is nominally a seven-cell design intended to fly on inexpensive ferrite magnet motors such as Great Planes' "Gold-Fire" motor with an 8x4 APC or Tornado propeller. It has been flown with Sanyo SCR packs from 900 to 1400 mAH capacity. I personally prefer the 1400 cells as they provide a longer motor run. The smaller cells should be used if your model is on the heavy side, or if you want to try catching a thermal or two.

The first few flights were over 6 minutes with a seven-cell battery, a full-size receiver, two standard servos, a speed con-

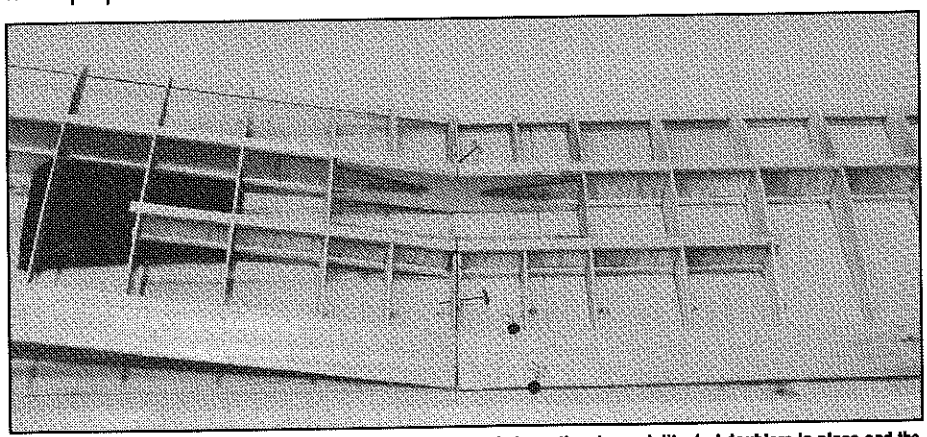
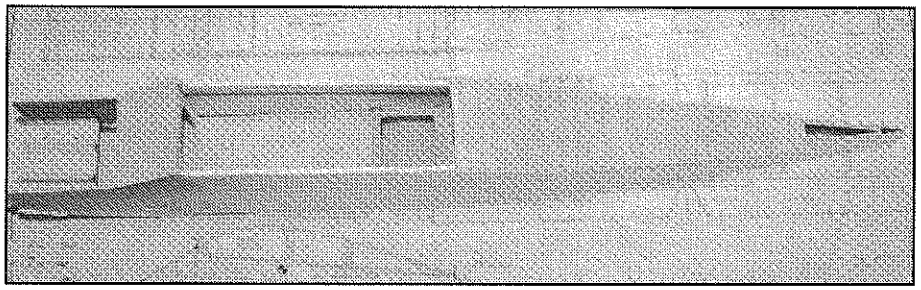


Photo of the framed-up wing before the center section is sheeted shows the plywood dihedral doublers in place and the short center rear spar. Spars are 1/8x1/4 spruce with 1/16 balsa shear webs.

troller, and a receiver pack aboard. The model took off from a dirt road in about 20 to 30 feet. I reduced the power after it reached about 200 feet of altitude. Some power was added when doing loops and rudder rolls. The motor ran about 5 minutes by reducing power when not needed. It glided surprising well in spite of the extra radio weight. The glide can add more than a minute to the length of the flight. The model flared nicely and touched down lightly on landing.

We later tried flying this same model on six cells, but found the climb rate to be too slow for comfortable flying. This same model was later flown with a lighter airborne system and six cells with good performance, although there appears to be no advantage over seven cells. The flying weight should be less than 42 ounces when flying on six cells.



The Scout's fuselage is a simple box structure built mostly of 1/16 sheet balsa, with doublers in the wing saddle and nose areas only. An intermediate sheet balsa floor separates the cabin area into upper and lower compartments—the servos, receiver and speed control go on top, the motor batteries below.

So, if you've ever thought of building an electric model but don't have a small radio, consider trying the Electric Scout. Its high-lift wing flies well even when flying at around 48 ounces with a full-size radio; if you have a small, light radio the model flies even better. Try the Electric Scout and enjoy some easy, relaxed flying!

THE ELECTRIC SCOUT

Designed by Scott Hartman

TYPE	High-wing taildragger, all-wood construction.
WINGSPAN	48 in.
WING AREA	396 sq. in.
FLYING WEIGHT	40-48 oz.
WING LOADING	14.5-17.5 oz./sq. ft.
OVERALL LENGTH	33-1/4 in.
POWER	Six- or seven-cell electric.
RADIO	Three channels required (rudder/elevator/throttle).

CONSTRUCTION

Begin by cutting out all wood parts to make a kit. I used medium to hard balsa for most sheet pieces and hard balsa sticks. The prototypes used CA glues for all wood joints.

Tail

Pin down the plans on the working surface and cover them with waxed paper. Pin and glue the dorsal fin to the front of the vertical tail surface.

Build the horizontal stab out of 3/16-inch thick balsa pieces as indicated on the plan. Build the elevator by pinning the two halves to the plans and gluing the 3/16-inch dowel in place.

Fuselage

Mark the locations of the doublers and formers on the fuselage sides. Glue the 1/64 plywood doublers to the sides. Glue on the 3/32-inch thick landing gear doublers over the top of the plywood doublers. Glue on the 3/32 doublers at the top of the fuselage. Glue the 1/8 square balsa sticks to the tail. Glue a piece of 1/8 square balsa to the top of F3. Glue F2 and F3 to the right fuselage side. Remove the side from the plans.

Make F1 from 1/8-inch lite-ply and drill the holes for the blind mounting nuts. Push the blind nuts into the lite-ply and add a bead of glue around the outside edge to prevent them from coming out. Glue the 3/8 triangle balsa stock to F1 to fit the motor (see section view on plan).

Glue the fuselage sides together at F2 and F3. Glue F1 between the two sides. If you use a physically smaller motor such as an Astro Flight 05, F1 will have to be raised; a small piece of sheet balsa should also be added below F1 to support the motor mount. Glue the 1/8 square sticks on top of F1 and between F2 and F3. Attach the 1/8 lite-ply landing gear plate.

Install the 3/32 hard balsa floor on top of the 1/8 square sticks between F2 and F3. Install the 1/8x1/4 mounting rails to fit your servos, then cut out the balsa between the rails and test fit the servos.

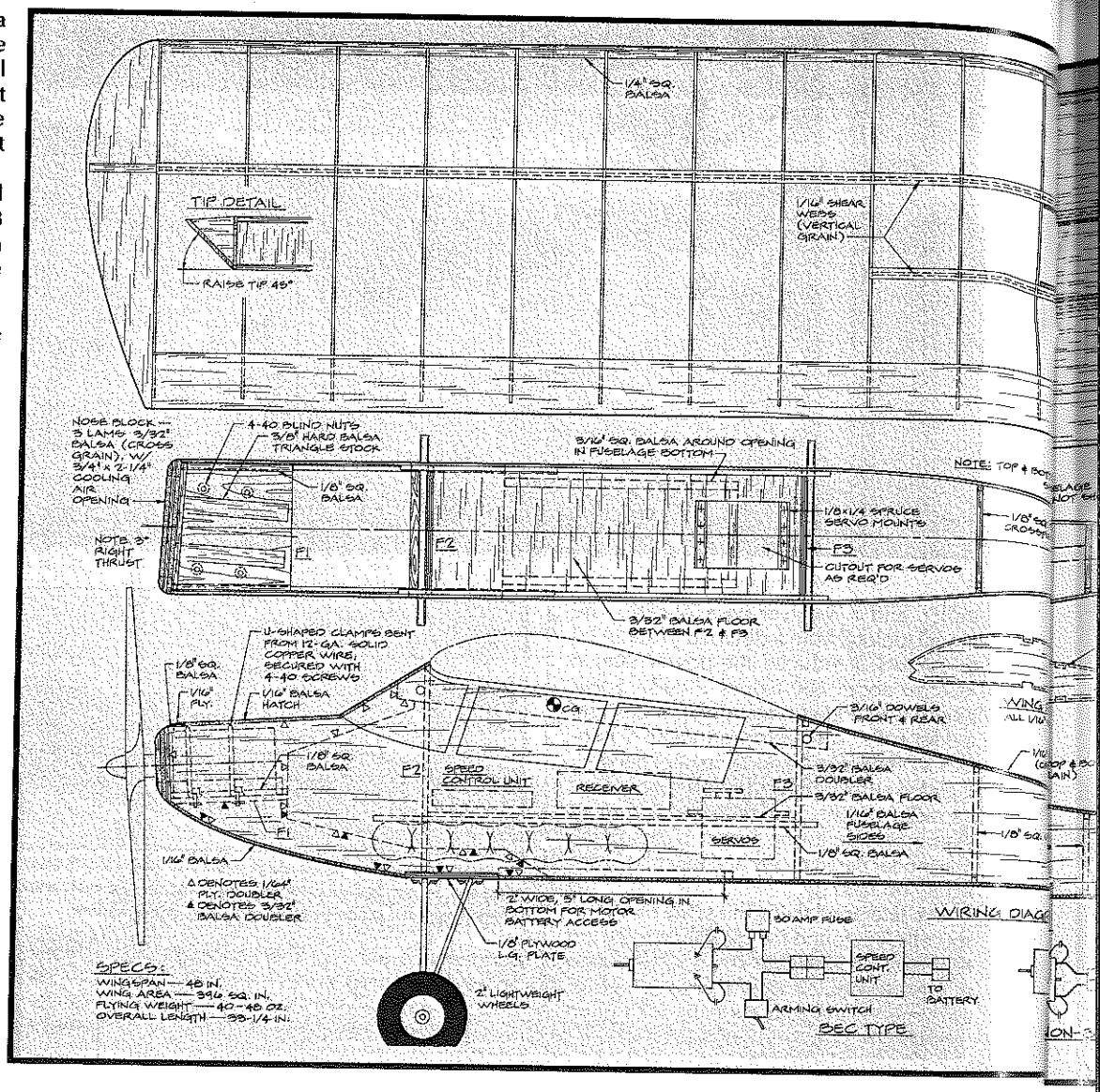
Glue the two sides of the tail together and install all of the 1/8 square balsa crosspieces. Trim the nose of the right-hand side about 3/16-inch to match F1. Sheet the bottom of the fuselage, the windshield area and rear half of the fuselage with 1/16 light balsa.

Install the 1/8 square balsa stick at the nose between the fuselage sides. Glue on the 1/2-inch wide piece of 1/16 plywood at the nose. Tack-glue the 1/16 balsa hatch to the nose and sand the edges flush with the sides. Use a sharpened piece of brass tube to drill the holes in the fuselage sides for the wing mounting dowels, but don't glue the dowels in place until after the covering has been completed.

Fabricate the nose block by gluing three pieces of 3/32 balsa sheet together to form a 9/32-inch thick block. The grain should alternate to make "balsa plywood." Glue it to the nose of the fuselage and sand the nose to shape. Finish up by making an oval-shaped cooling air opening in the nose block, 2-1/4 inches wide by 3/4-inch high.

Cut a 2-inch wide, 5-inch air exit hole in the bottom of the fuselage behind the lite-ply landing gear plate. Reinforce the hole with 3/16 square balsa sticks. Plan out the installation of the motor and radio components.

Sand the vertical stab and hinge the rudder. (I used 1-inch pieces of iron-on hinge material.) Hinge the elevator the same way.



Wing

Lightly sand the edges of the 1/16 balsa trailing edge pieces with a sanding block so that they make a good fit. Position the left wing spar and bottom trailing edge on the plans using a couple of ribs to align. Glue the R1 and R2 ribs to the bottom spar using the 90-degree alignment template. Use a piece of scrap 1/16 balsa to temporarily raise up the R3 ribs during construction.

Glue on the first two R3 ribs. Glue on the center rib using the angled side of the template to allow for dihedral. Install the top spars, checking for alignment before gluing. The middle section of the R3 ribs will later be removed, so use only a small amount of glue in that area. Install the top trailing edge sheeting using slow CA glue. Glue on the leading edge.

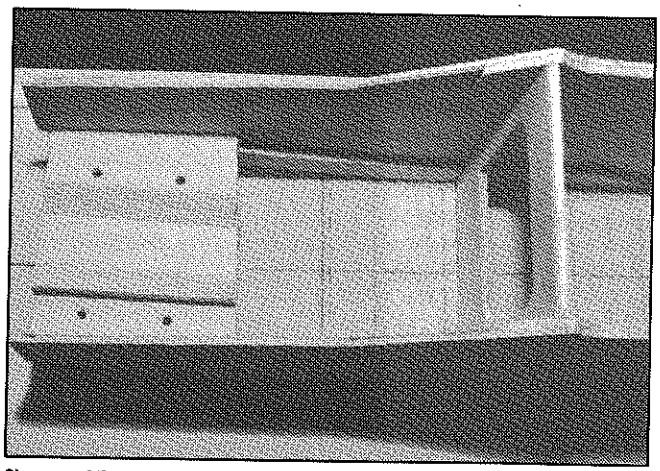
Build the right half of the wing the same way.

Install the 1/16 shear webs between the top and bottom spars. Trim the spars at the center section for a good fit. Remove the middle section of the R3 ribs, but don't throw them away. Pin down the right wing panel and block up the left wing panel to 4-1/2 inches. When satisfied with the alignment, open the joint and apply glue, close the joint and allow to dry thoroughly.

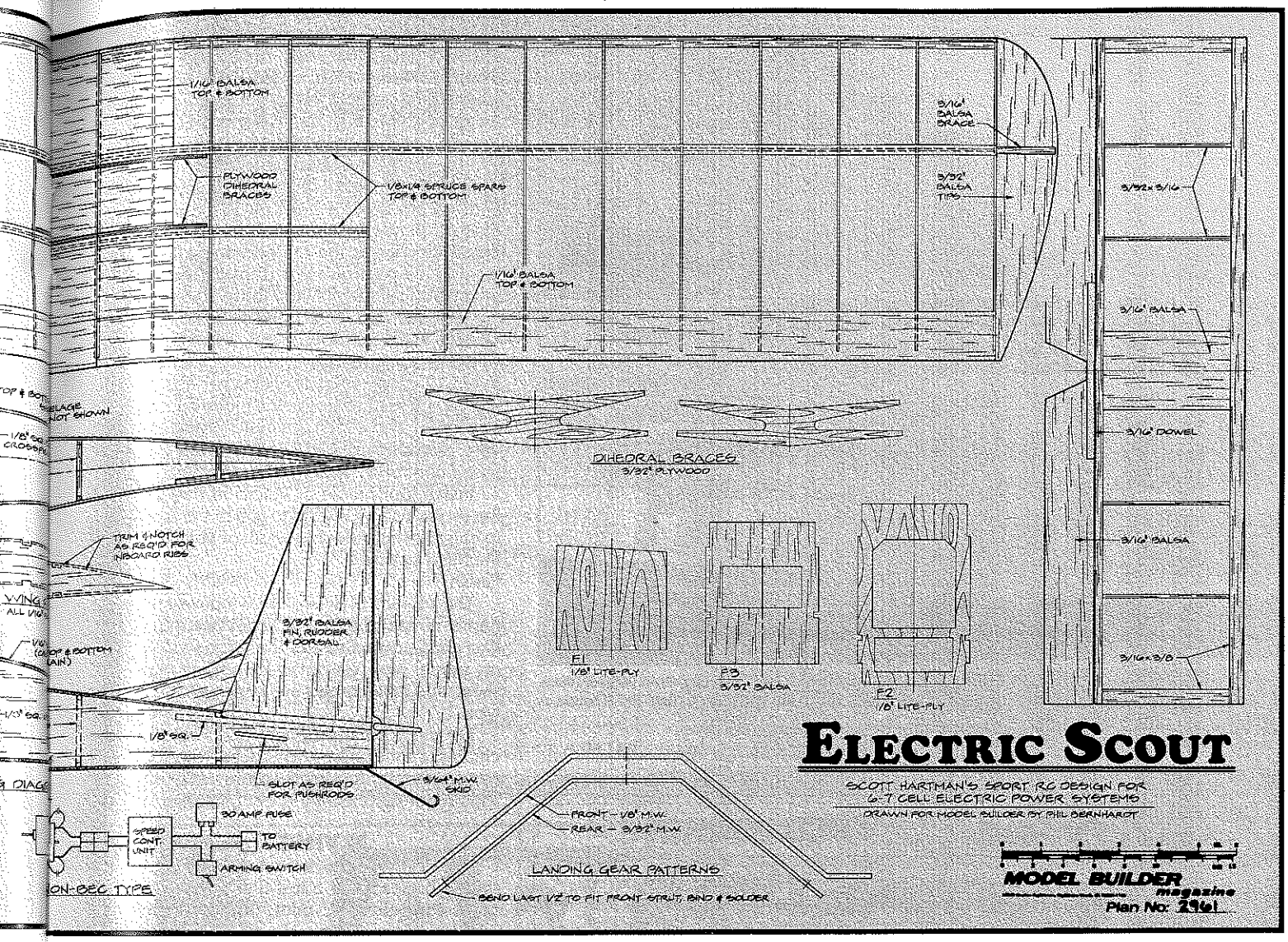
Glue the plywood dihedral braces in place. Trim the edges of the R3 rib center pieces you removed and glue them back in place at the center of the wing. Sheet the top and bottom of the wing center section. Glue on the wingtips at a 45 degree angle. Install the 3/16 balsa brace and sand the tips as required. Round the leading edges of the wing using a coarse sanding block.

Covering

Sand all parts using a sanding block and sandpaper. Start with 100 grit sandpaper and finish up with at least 150 grit sandpaper; for a better finish, sand down to 400



Close-up of the partially completed nose. The motor mounting plate (F1) is 1/8-inch lite-ply with balsa triangle stock glued on top to stabilize the motor. Note the built-in right-thrust.



ELECTRIC SCOUT

SCOTT HARTMAN'S SPORT RC DESIGN FOR 6-7 CELL ELECTRIC POWER SYSTEMS

DRAWN FOR MODEL BUILDER BY PHIL BERNHARDT

MODEL BUILDER magazine

Plan No: 2961

or 600 grit sandpaper. Clean all parts using a tack rag and/or a vacuum cleaner.

The prototype model was covered with Ultracote on the fuselage and MonoKote on the wing and tail surfaces.

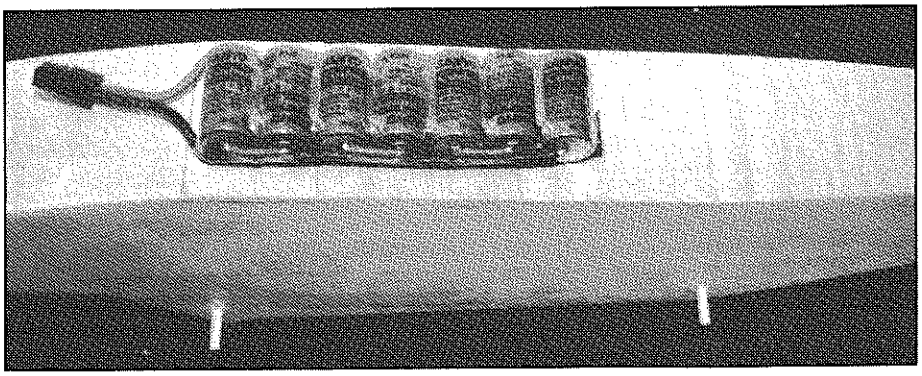
Landing Gear

The gear is made of 1/8-inch wire in the front and 3/32-inch wire in the rear. The wire parts should be pinned to the building surface to hold them in proper alignment prior to soldering. Clean the wire thoroughly, wrap copper wire tightly around the joint, and solder (be sure to use flux). Tape the finished landing gear in place on the fuselage and secure it with nylon landing gear clips and screws.

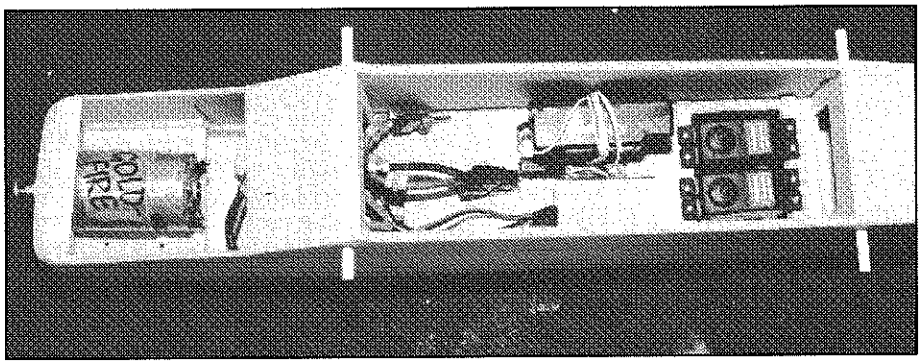
Remove the covering where the tail skid attaches. Bend and glue on the tail skid using CA glue and fiberglass cloth.

Motor/Radio Installation

Use Velcro to mount the receiver, speed controller and radio battery in the fuselage. Wire up the power system using 14-gauge high-flex wire, a 30-amp fuse, spade lugs, arming switch, and Sermos or Astro connectors. The plan shows wiring diagrams for both conventional and BEC-type speed



After the top and bottom of the fuselage are sheeted, a 2x5-inch opening is cut into the bottom for installation and removal of the motor battery. The pack is held to the bottom of the intermediate sheet balsa floor inside with Velcro.



A peek inside the fuselage reveals the Futaba receiver and S-148 servos in place; the bottom of the servos protrudes down into the motor battery compartment. Motor in the author's model is an inexpensive Great Planes "Gold-Fire" 05, held in place with a couple of U-straps bent from heavy-gauge copper wire.

controllers.

Cut 1/16-inch wide slots for the rudder and elevator pushrods. Build up the pushrods using 3/16 square hard balsa sticks, threaded rod, 1/16-inch wire at the servo end, thread, and CA glue. Leave about an inch extra of the 1/16-inch wire to allow for adjustment in pushrod length. Install a long control horn on the elevator and a short control horn on the rudder. Make Z-bends for the servo attachment, install clevises at the tail end and attach them to the control horns. Turn on the radio and adjust the elevator throw to about 3/8 inch each way and the rudder throw to about 1 inch each way.

Make a pair of motor mounting clamps out of 12-gauge solid copper wire. Attach some foam seating tape to the motor mount area on F1 and attach the motor using the wire clamps and 4-40 bolts. Install the speed controller, switch, and propeller.

Install four pieces of Velcro in front of the servos using CA glue to attach the tape to balsa. Install a double width of Velcro to the flight batteries.

Finish

The addition of details like windows and numbers make the Electric Scout look more like a full-scale aircraft. The windows on my model were cut out of MonoKote trim sheet, and the numbers are 1-inch stick-on type.

Do the normal pre-flight checkout including a thorough range check with the motor running. Turning the motor on or off should not significantly affect the range.

FLYING

If everything checks out, your model should be ready for a test flight. If you're not a competent RC pilot, find someone who is and have him make the first flight.

The Electric Scout is capable of most rudder/elevator maneuvers. To do a loop, apply some power and pull back on the elevator stick. Ease up on the elevator after the loop has been completed. Rudder rolls are a little harder. I normally apply some power, dive the model a little, pull the nose up some, and apply full rudder. When the model is upside-down, some down elevator is added to keep from losing altitude. The controls are brought back to neutral after the roll is completed.

When full power isn't needed the motor should be throttled back to extend the motor run time. When the batteries are about exhausted and the motor starts to slow down, it's time to land. Cut the throttle and make your landing approach. When the model is about 10 feet off the ground I normally cut the power completely and glide in. Just before the wheels touch, apply up elevator to flare the model.

I hope you have as much fun with this design as I have. Electric models, because they're so quiet, make it possible to fly in areas that would otherwise be off limits to engine-powered models. Have fun flying electric! ***MB***