

#151



For a conventional cabin monoplane the Cougar manages to look refreshingly different—not at all like the familiar Cubs, Aeroncas. Model has flown 38 seconds in 15-20 mph winds.

For rubber-powered Scale, this design is large enough to use scale-position framework and yet fly like a bird.

Nesmith Cougar

and cemented to a 1/4" sq. strip. This is cemented to the tail post. The side and bottom stringers are added now, but the top stringer is not attached until the wing center section is mated to the cabin top. Notch the stringers, where necessary, to maintain the right height above the basic frame. Cement in the hard 1/8" sheet rear motor peg mounts. Face these on the inside with 1/2" squares of 1/32" plywood. The 1/16" dia. landing gear wire strut can be bent to shape now. It is bound and cemented to the LG mount, and the whole assembly is glued to the front of the fuselage box. Make the hole for the 1/4" aluminum tubing strut socket in the proper place and glue the tubing in place.

Wing: The wing is built first in one piece, with the dihedral angle built in. After the center section is cemented to the top of the fuselage, the wing panels are cut loose.

Lay LE, bottom spar, and TE on the plan, and cement in all the ribs, except at the dihedral joints. Glue in the top spar, except at the dihedral breaks. When the framework is dry, prop up the tips to a dihedral angle of 1 1/2", leaving the center section flat, and cement the center joints at the LE, TE, and bottom spar.

Make two pairs of #1 ribs. Drill each pair for the locating dowels, while clamped together for accuracy. Put a 1/16" scrap spacer between the ribs in each set. This will be replaced later by two 1/32" plywood cap ribs. Cement these rib pairs in place at the dihedral breaks. Glue the locating dowels solidly to the center section rib (inside rib) of each set. Now finish up with the top spar.

The wide fuselage consists of only four long-erons and as many stringers. The removable wing panels butt against the cabin sides. The scale position wing ribs show clearly in this photo.

Theodore C. Russell

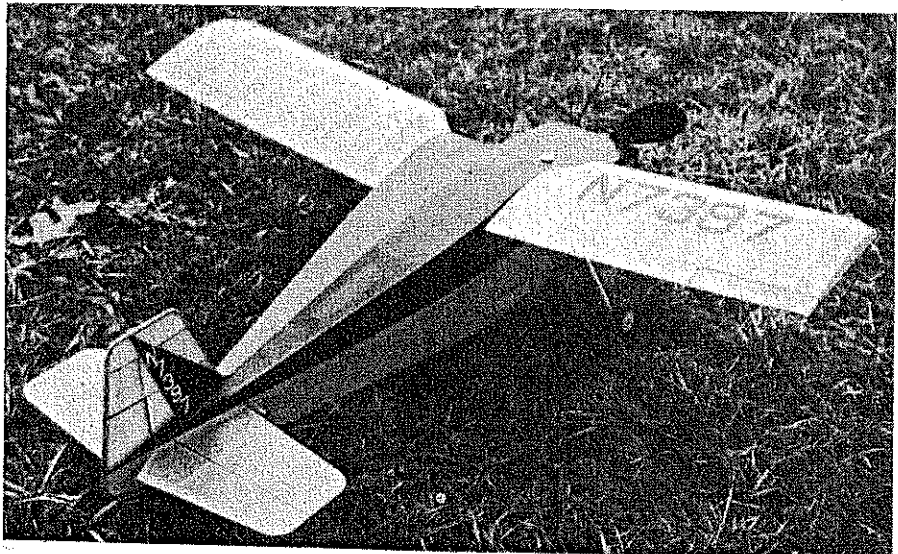
Construction

Fuselage: Construction begins by building two fuselage sides, then joining them with cross pieces. Note that the top of the fuselage is wider than the bottom. Short 1/8" sq. balsa strips are used as gussets to maintain the correct cross section, and are installed as the sides are being joined. (See reference cross sections on plans.) The tail wheel wire strut is bent, bound,

THE COUGAR, a two-seat home-built craft, designed and constructed by Robert Nesmith, is made to order for Rubber Power Scale events. The full-size Cougar is simply constructed, and the model follows the scale framework for top Scale Fidelity points. The ship possesses a fuselage length almost as long as its wing span. This means a long, powerful, motor can be used for an extended prop run. The fuselage is nothing more than a box with four stringers. The wings and tail surfaces have the scale number of ribs and duplicate the full-size spacing.

The prototype has taken a first at the 1971 Cleveland Junior Air Races, a second at the 1972 Junior Air Races, and a seventh at the 1971 Erie (PA) Model Aircraft Assoc. All Scale Meet. It should be pointed out that at the Erie meet, Flying Ace's rules were used. These rules give a 15-point bonus to low-wing ships, and deduct five points from a high-wing model. This 20-point handicap, together with no points for scale framework and rib spacing, was the cause of the low placing. At this contest the Cougar had three official flights of 35, 37, and 38 seconds in 15- to 20-mph winds. Normal flight times are about 45 seconds. The original weighs seven ounces, but could be built lighter.

A set of three-view drawings by James Triggs, and photos, including a color cover picture were in the February 1959, issue of *American Aircraft Modeler*. The model is 1/4 full-size, or 1 1/2" to 1' scale. The model spans 30 3/4".





A simple basic structure makes the model easy to construct. RC types—and others—should be encouraged to scale it up for their needs.

Make two wing struts of hard $\frac{1}{8} \times \frac{1}{4}$ " balsa, and groove them for the $\frac{1}{32}$ " wire insert. Cement the wire in place, and reinforce with a strip of silk.

Position the wings on the fuselage. When lined up at right angles to the fuselage centerline, glue the wing securely to the fuselage. After this dries, slip short lengths of $\frac{1}{32}$ " I.D. aluminum tubing on the

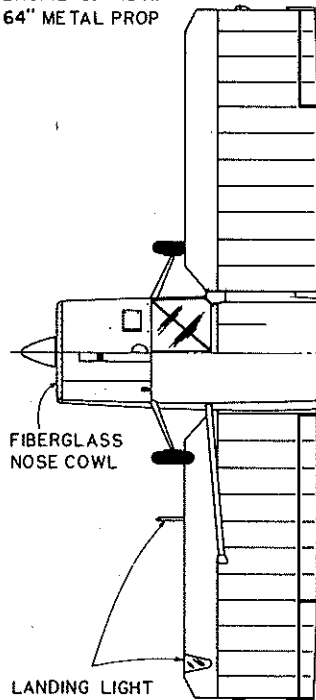
strut ends and set them in place. Hold in position with a rubber band through the fuselage socket tube. Cement the tubing at the strut end to the hard balsa mount in the wing. Be careful not to get glue inside the tubing. When the cement is dry,

remove the struts, and cut the wing panels from the center section. This method of assembly insures that the removable wing panels are at the correct incidence and dihedral angles after being cut free from the fuselage.

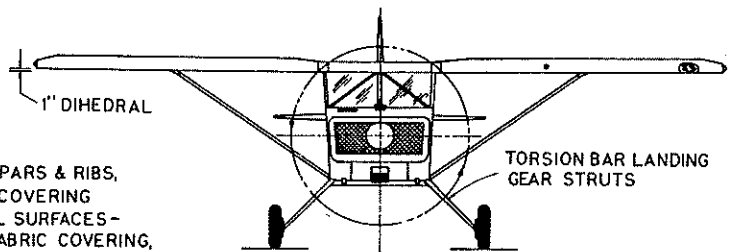
Sew the strut tubing to its mount and cement again to make it secure. Sand the LE's to shape and add the $\frac{1}{32}$ " sheet

Drawing for proof of scale.

WING SPAN - 20'-5"
ENGINE - 85-115 HP
64" METAL PROP



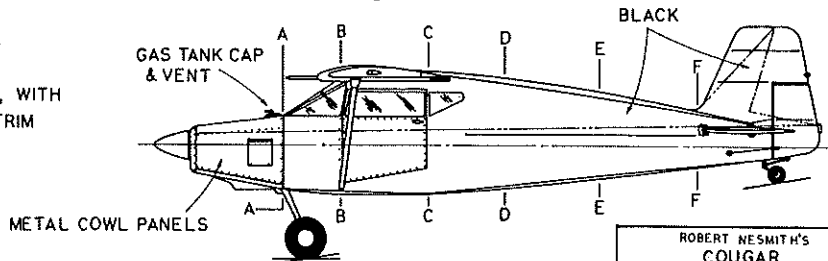
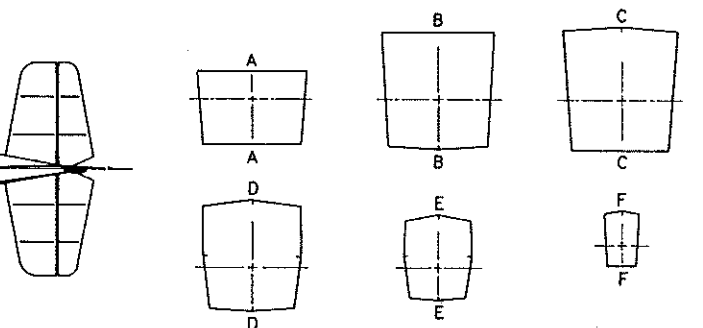
CONSTRUCTION
WINGS - WOOD SPARS & RIBS,
FABRIC COVERING
FUSELAGE & TAIL SURFACES -
STEEL TUBE, FABRIC COVERING,



THIS VIEW
TOP RIGHT
SIDE

THIS VIEW
BOTTOM RIGHT
SIDE

COLOR -
YELLOW, WITH
BLACK TRIM



ROBERT NESMITH'S
COUGAR
DRAWN FOR MODEL AVIATION
BY TED RUSSELL

Nesmith Cougar

balsa from the top spar forward. The 1/32" ply cap ribs should be added now at the tips, roots, and to the center section on

Finishing: Make sure the framework is sanded smooth, and dope with four coats of clear dope wherever the tissue will be attached. Cover with yellow Japanese tissue. Lay tissue in place, and fasten with a mixture of 50/50 clear dope and thinner. Apply this on top of the tissue, and work this through the tissue with your fingers, to adhere to the dope on the framework. Cover the top of the fuselage and center section with black tissue. If Japanese tissue is not available, use 00 grade Silkspan, dyed with Rit clothing dye before covering. When the entire ship is covered, the fuselage. Sand the entire wings smooth, and sand the outer ribs slightly to match the TE taper. Add the top fuselage center stringer from the rudder post to the center false rib 1B. Notch this rib to accept the stringer.

Tail Surfaces: The tail surfaces are built flat over the plans, using the wood sizes shown. After the frames are dry, cement 1/16" sq. balsa strips to each side as shown. Sand these strips to a symmetrical section. The only difference between the stab and fin is that the rudder section is cut free, and hinged to the fin with soft wire or aluminum strips for turn adjustment. The original had a fixed fin, but I recommend the adjustable rudder.

Nose Section: Make the front nose block from 1/16" plywood, with 1/4" sq. and 1/4 x 3/8" strips laminated to the front of the plywood. Add the 1/4" hard sheet balsa plug to the rear. Cut both the nose block sides and top from hard 1/4" sheet. Note that the right side is slightly shorter than the left because of the built-in right thrust. Cut the bottom piece from hard 3/8" sheet balsa. Cement the blocks together to match the fuselage box at the rear, and the nose block at the front. When dry, groove the back of the nose assembly to fit over the landing gear wire, and cement the unit solidly to the front of the fuselage. Make up a rounded nose button of hard, cross-grained, 1/8" sheet balsa and glue in place. Drill a hole at the approximate angles shown, and either bush with 1/16" I.D. brass tubing, or cement washers or eyelets front and rear of the nose block.

Propeller: Cut the propeller blank to shape, using hard balsa. Carve a spinner to shape shown, from a hard balsa block, and fit it over the prop blank. Mark the spinner position on the prop, and then remove the spinner, and carve the propeller blades from the marks out to the tips. Make about 3/32" undercamber in the blades. Glue the prop and spinner together. Bush the shaft hole with 1/16" I.D. eyelets inside 3/32" I.D. brass tubing. My original prop was freewheeling, but the blades were hinged to fold on hard landings. In flight, the blades are held straight by short rubber bands.

brush on one coat of clear dope. Now cut the license numbers, side fuselage, and rudder color patterns, from black tissue. Attach these in the proper positions with straight thinner. Brush two more coats of half dope, half thinner, on the fuselage and wings, and one coat on the tail surfaces.

Install the 1/16 and 1/8" cabin windshield dowels. Dope the 1/16" dowels silver, and the 1/8" dowels black. Make the windshield of heavy celluloid, and side windows of light celluloid. Use tissue strips over the balsa window framework. Add a black tissue strip to the center of the windshield, also.

Make landing gear struts of hard balsa. Groove the struts and cement to the landing gear wire. Reinforce with a strip of silk, and cover with yellow tissue. Also, cover the wing struts with yellow tissue. Make the air intake, cover with tissue, and mount in position. Make exhaust stacks, dope flat black, and mount. Line up the stab in the fuselage slot, making sure it is straight, and cement it in place. Cement the fin in position, again making sure it is straight.

Bend the prop shaft from 1/16" dia. wire, with a winding hook on the front. Put a flat washer, a ball-bearing washer, and another flat washer, between the propeller and the nose block. Make the wheels from hard 1/8" sheet, laminated cross-grain. Install bushings for the axles and fill the grain with sanding sealer. Dope the tires flat black, and the hubs yellow. Install the main wheels with soldered washers. (#0 brass washers from the model railroad department.) Cement the tail wheel directly to the wire strut. It does not revolve.

Put the wing struts in place with short rubber bands through the fuselage tube. Attach the wings with short rubber bands through the center section paper tube, and slip the wire strut ends into the tubing on the wings.

Make up a motor of six strands of Pirelli rubber, 20 to 24" long. Install the motor and check the model's balance. It should balance about 9/16" in front of the main spar. Add weight to nose or tail to get the indicated balance point. Mine took just a small amount of nose weight. Hand glide over tall grass to make sure there is no bad stall or dive. If there is, add weight at the appropriate place to cure it. Start with a few winds and slowly increase power. Shim the nose block for side- or down-thrust to keep away from a power stall. Use the hinged rudder for glide turn. Make final weight adjustments for a flat glide.

The original had a wide right power circle and turned to the left in the glide. It could probably turn to the right in the glide, too. If so, put a slight amount of wash-in in the right wing panel. You may have to use eight strands of rubber in windy conditions to punch through the turbulence and get altitude. The model is very steady in the wind.

Since the fuselage is almost as long as the wings, an abnormally long rubber motor can be used to obtain long power runs. Although the author did not use free-wheeling, he worked out rubber-loaded, hinged prop blades to avoid breakage.

