■ BY SCOTT HARTMAN

A TRULY ELECTRIFYING MUSTANG!

Simple construction, easy handling and spirited performance combine in this semi-scale P-51, the latest project to emerge from the workshop of talented electric designer Scott Hartman. Can be flown with anything from an 05 can motor to an Astro 15.

Scott has taken some liberties with the scale outlines in the interest of simplifying the structure, but there's no doubt that it's a Mustang. Although definitely not a trainer, the model has no bad handling characteristics and should pose no problems to those comfortable with ailerons.

Warbirds have always been favorites with modelers, and the Mustang is in a class all its own. There's something about the airscoop and tapered wing that gets modelers excited. I designed my electric P-51D to be larger than the typical seven-cell model because I fly from a relatively tight vacant lot about a block from my house, and the large size allows it to take off and land in a relatively confined area. It's a medium size model of 48-inch span with 418 square inches of wing area.

The model will fly with most geared seven- to 12-cell systems. Prototypes have been flown with an Astro 05 on seven to nine cells, however the structure is big enough for a geared Astro 15 and 12 cells if you choose.

The Mustang is more aerobatic and climbs faster than a similar sized seven-cell direct drive sport model. The model takes off in about 20 to 30 feet, climbs out at about 30 degrees, and will do consecutive loops and rolls from level flight. The model spins extremely well and stops immediately when the controls are released. It will fly inverted but will not do outside loops with the systems tested.

One prototype was powered with a geared Astro 05 with nine cells and an 11x7 Master Airscrew Electric Wood propeller. This combination provides even more power. By flying with nine cells the pilot can throttle back for long easy flights, or he can run it fast for some high-powered aerobatics. In this case the flying weight was kept down to 51 ounces by using micro servos and a BEC speed controller. The seven-cell prototypes weighed about 47 ounces with a BEC speed controller—a couple ounces more if a receiver battery is used. Remember, keep the weight down for best performance!

A couple of improvements have been made since the original construction photos were taken, In the area of the landing gear and wing mount-

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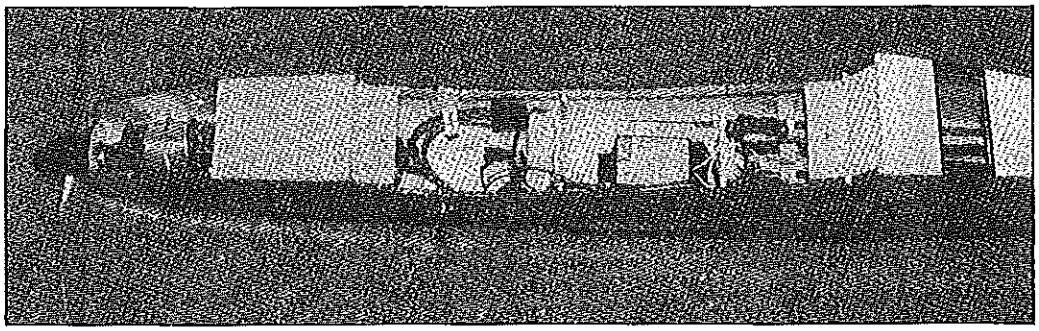

Bottom view with the wing off and the flight battery removed reveals the internal details. Note that the motor compartment is completely open on the bottom for excellent cooling and access to the motor and gearbox—in this case, a 19-turn "Pocket Rocket" ferrite car motor equipped with a 3.5:1 Master Airscrew gearbox. Receiver and servos are Airtronics, and the speed control is an Ace R/C Smart Throttle. Note that the black bottom stripe area just aft of the wing has been left open to act as an outlet for battery cooling air.

ing. They were made to reduce weight and to use a dowel-and-bolt wing hold-down. The plans have been revised accordingly.

CONSTRUCTION

Use light grade balsa unless noted. I normally cut out all the wood parts to make a kit before starting construction, and use medium thickness CA glue and accelerator for all wood joints.

FIN/RUDDER

Build the tail surfaces using light balsa stock. The two halves of the elevator are joined with a small piece of dowel.

FUSELAGE

Make the two fuselage sides and glue on the doublers between F2 and F6. Glue the two 1/8 square balsa sticks to the top of the fuselage sides (stopping at F2). Glue the 1/8 sticks on the formers. Glue F3, F4B and F5A to the right fuselage side. Tack-glue F2 and F6 to the right fuselage side, approximating the angle shown on the plan. Add the 1/16 balsa spacer at the tail. Glue on the left fuselage side starting with F3, F4B, and F5A. Glue on F7 at the tail. Add F5B. Align the fuselage and add the bottom sheeting, stopping after the scoop. Finish gluing the areas that were tack-glued.

Add the 1/16 balsa false floor between F2 and F4B. Fabricate the motor mount. Note that the triangle stock goes on the bottom and that the installation is set up for right thrust. Install blind nuts using CA glue. Glue the motor mount in place; the mount may need to be raised or lowered, depending on the motor used. Add the nose doublers. Test fit the motor and install F1. Add F4A. Install the top fuselage stringers. Slide the canopy floor between the stringers and glue it in place, then trim the stringers from the canopy area. Fit and glue the 3/32 plywood rear wing hold-down plate into the notches in the wing saddle doublers. Add the 1/2-inch triangle stock.

WING

Cut out the 1-1/4 inch wide trailing edge pieces, feathering the edge to allow the top and bottom to fit together per the airfoil cross-section. Pin the trailing edge sheeting and bottom spar to the plans. Glue ribs R8, R7 and R6 on first. Pin the balsa spar at the aileron location using R1 and R5 as a guide.

Glue on ribs R1 through R5. Glue on the wingtip. Tack-glue the dihedral brace to the bottom spar. Add R9, using scrap 1/16 stock to raise the rib to the proper location. Glue the rear half of R10 and the balsa dihedral brace to the wing (angle the rib to allow for the dihedral). Glue on scrap 1-inch T.E. stock between R9 and R10. Add the front half of R9, the top trailing edge sheeting, the top spar, and the 3/16 square leading edge. Tack-glue the front half of R10 and the 1/4-inch wide leading edge piece to the wing.

Add the balsa sheer webs. Install the mounts and doublers for the aileron bellcranks. Make the landing gear blocks. Raise the wing half for the proper dihedral and build the other wing half the same as the first. Finish gluing the dihedral brace to the spars after the proper dihedral has been established. Add the landing gear blocks, doublers and 1/4-inch square spruce pieces.

Glue the 1/4-inch sheet balsa and 1/8 lite-ply pieces behind the leading edge piece. Sand the assembly to the contour of the ribs at R9 and R10. Glue the top sheeting to the top spar and leading edge. Attach the sheeting to the ribs by gluing from the underside of the wing.

Cut the top and bottom aileron sheeting from light balsa, feathering the trailing edge to fit as per the aileron cross-section. Pin the bottom sheeting to the plans and glue the sub-ribs and plywood aileron horn brace in place. Add the top sheeting. Remove the aileron from the plans, sand the front and glue on the front sheeting. Build the second aileron for the other half the same way.

Install the aileron bellcranks and wire pushrods. I normally use a simple angle bend in the wire to attach them to the bellcrank. When satisfied with the installation, put a drop of Lock-Tite or CA on the nuts to keep them from coming loose.

Sheet the center of the wing where the battery sits with 1/16 medium to hard balsa. Trim the trailing edge sheeting at the center section to fit the fuselage. Glue the 1/32 plywood rear bolt doubler plate to the outside of the wing. Sand

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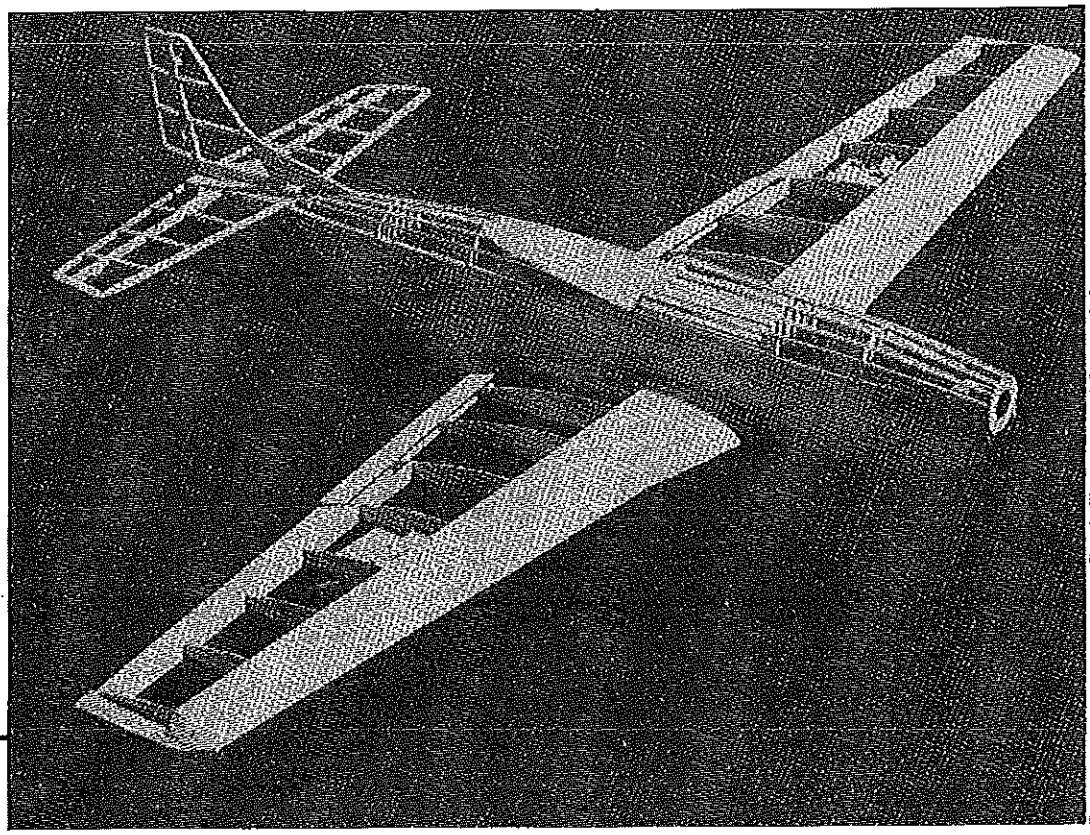
The uncovered framework photos accompanying this article were taken by Randy Smithhisler of Puyallup, Washington, who built one of the prototype Mustangs from Scott's preliminary drawings. This photo illustrates the model's basic, straightforward design and construction.



MUSTANG *cont. from page 47*

the fuselage wing saddle to fit the wing. Align the wing in the saddle, then drill through the wing and wing plate. While the wing is still in alignment, drill F3 for the front dowels, then glue the dowels into the wing. Install the 4-40 blind nut and glue it in place. Install the 4-40 bolt and lock nut in the wing. Sheet the remaining bottom center section of the wing. Install the triangle stock between F2 and F3, then redrill the holes for the dowels.

Bolt the wing to the fuselage and trim the scoop sides to match the fuselage sides. Glue scoop sides S1 and S2 to the wing. Sheet the scoop and install the plywood doubler in the area of the wing hold-down screw. Sheet the lower front of the fuselage between F2 and F3. Fill in with scrap and sand to shape the area between F3 and the leading edge of the wing. Sand the leading edge of the wing to match the airfoil.

Sand the entire model prior to covering.

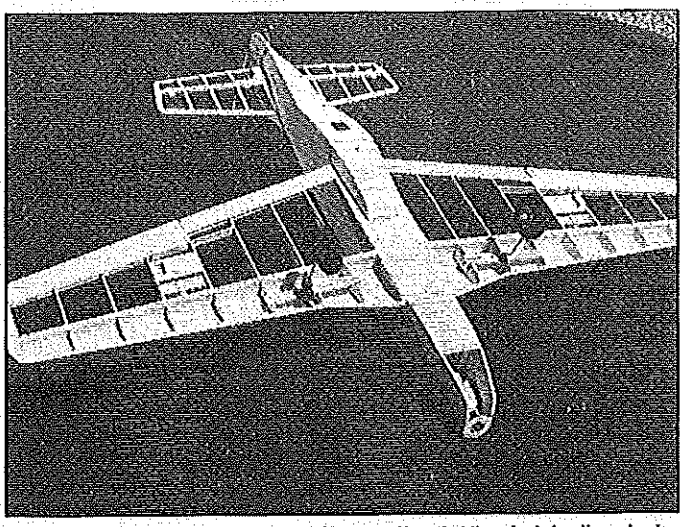
COVERING

The prototype model was covered with olive drab and dove gray MonoKote—easier to see than the more traditional

HARTMAN'S ELECTRIC MUSTANG

Designed by Scott Hartman

WINGSPAN ..... 48 in.
WING AREA ..... 418 sq. in.
FLYING WEIGHT ..... 47-49 ounces with seven-cell power system.
WING LOADING ..... 16.2-16.9 oz./sq. ft. (seven cells).
CONSTRUCTION ..... Balsa, spruce, plywood.
RADIO ..... Four channels (ailerons, elevator, rudder, throttle). Lightweight micro system and BEC-equipped speed control recommended for best performance.
POWER ..... Geared Astro 05 or geared 05 can motor on seven to nine cells, or geared Astro 15 on 12 cells.



Underside view of Randy's ready-to-cover Mustang. Note that the wing's leading edge is sheeted on the top only. If you fly exclusively from a soft grass field, consider leaving the gear off and hand-launching for even more spirited flight performance.

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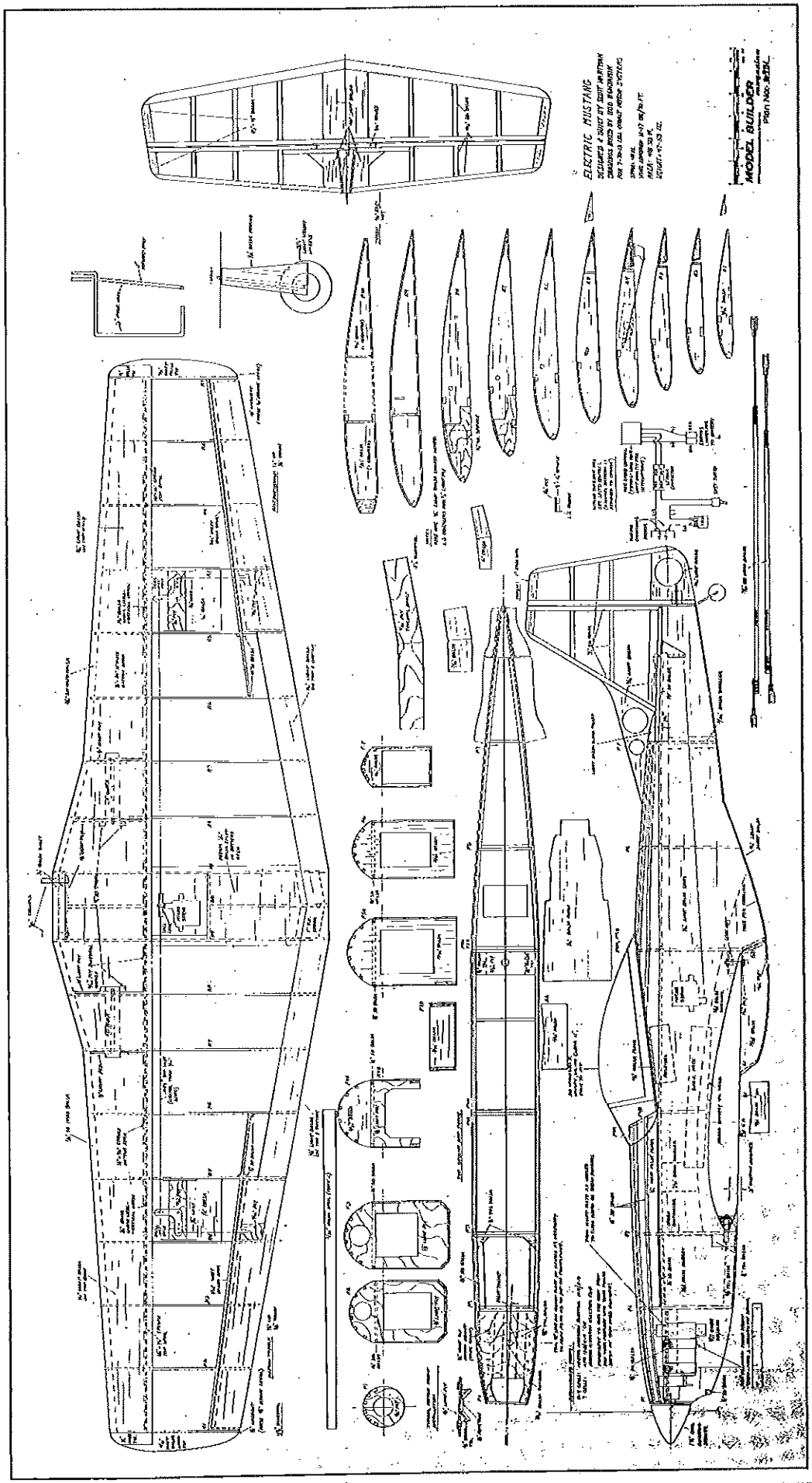

aluminum. Decals were from a Midwest .40-size Mustang. The rudder was done in red MonoKote, the white stripes on the wing and tail are 1-1/2 inches wide, the black stripes on the wing are 1-1/4 inches wide, and the white and black stripes behind the wing are 1-1/2 inches wide. Two-inch white letters were used on the fuselage, 1-inch yellow numbers on the rudder. The landing gear strut fairings were covered with MonoKote and attached using silicone adhesive.

POWER SYSTEM

Two of the more powerful seven-cell systems used in our prototypes were the Astro Flight geared 05 and the 19-turn "Pocket Rocket" car motor with 3.5:1 Master Airscrew gearbox. I've found that the airplane flies best with larger diameter props such as the 12x8 Master Airscrew Electric Wood prop. At higher altitudes or at warmer temperatures the model flies best with 11x8 or 11x9 APC types. The Pocket Rocket system will last longer if you use these latter 11-inch props, because the motor is not loaded down as much.

Installing the Master Airscrew gearbox on the car motor is easy. Install the pinion and capacitors on the motor per the manufacturer's recommendations and adjust the motor's timing about 1/8 to 1/4-inch clockwise as viewed from the rear of the motor. Break-in the motor per the manufacturer's recommendations, noting the proper motor rotation. Install the gearbox on the motor, taking care to get the proper gear mesh. The mounting screws, prop adapter set screw, and pinion should be secured with Lock-Tite to prevent slippage.

Use nothing smaller than 14 gauge high-flex wire for minimal power loss. I recommend Sermos connectors as they offer low resistance and allow the user to connect packs in series when charging.

FLYING

The Electric Mustang has no bad handling characteristics and will even take off from grass fields if you use 3-inch wheels and hold some up elevator to keep from nosing over. Since large propellers produce a fair amount of torque, expect to use some right rudder during takeoff.

Flight speed is spirited, but not overly fast. The model will loop and roll from level flight. The landing speed is slow and the stall is predictable. You should have little trouble flying it if you are competent with allerons, however, the model is not a trainer.

I normally fly a mixture of full-throttle aerobatics, low-speed touch-and-goes and fly-bys, and power-off spins. Flying this way normally gives me flights of 4-5 minutes on 1400-mAH SCR cells.

Be the first at the field to have an electric Mustang. Build it light and fly electric! ***MB***