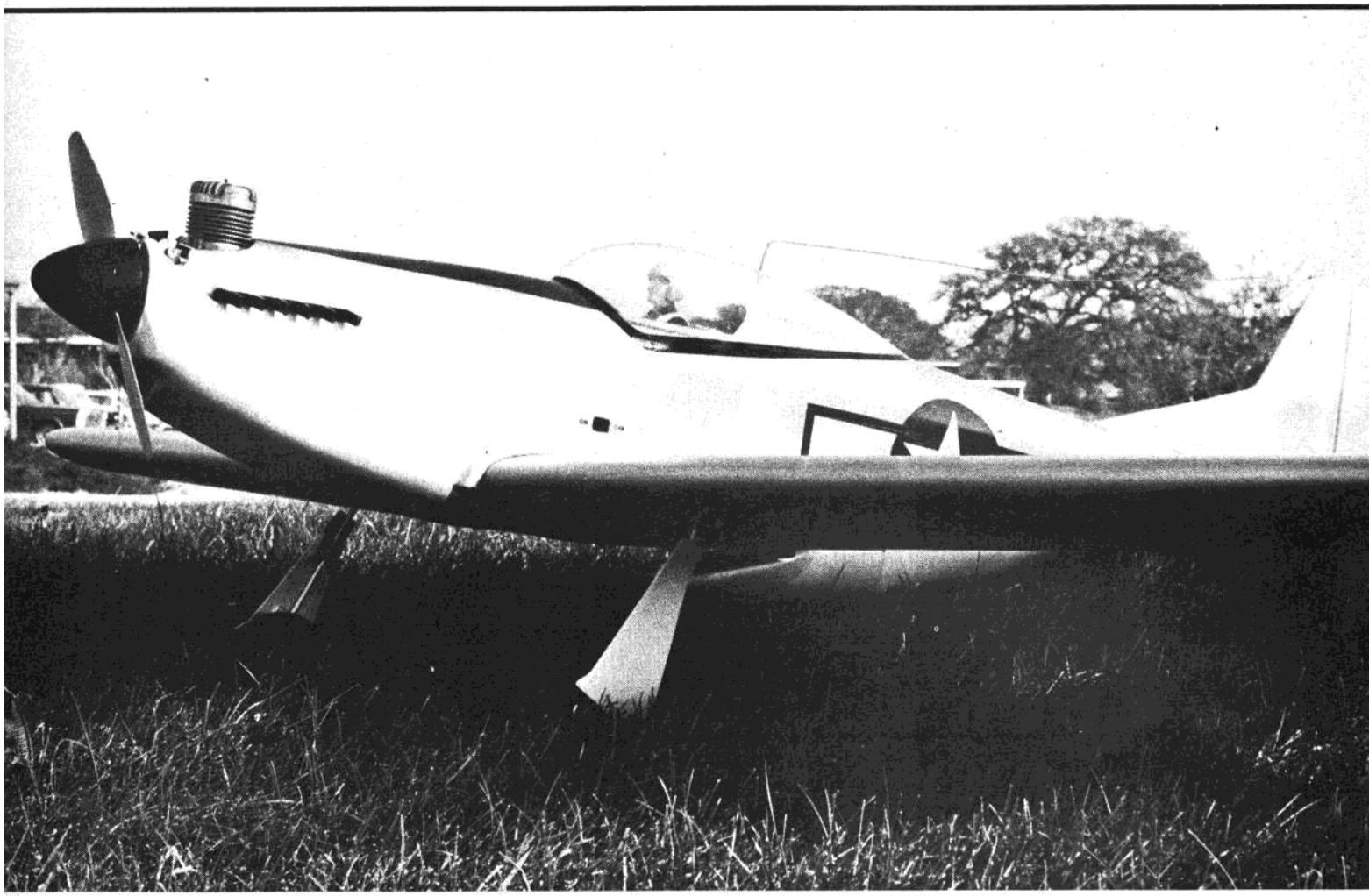
Mustang

Unmistakably a P-51, this stretched-out semi-scale performs well with adequate power. Ready-to-fly wing works fine.



DICK CARMAN

OH NO, not another P-51! But tell me —at that last air show when you saw that sleek Mustang profile poised for flight, didn't you check to see when the flying demonstration would start? And later—that's a V-12 firing off now. Look, the tail is up. More speed. It's off! A slow roll on takeoff—those loops and four point rolls are so smooth, and now a victory roll. It must be getting ready to come in, those long main gears stretching for touchdown.

Weren't you helping fly that bird? I was. I always wanted to build that airplane and, when I did, I wanted it to fly well, as well as look scale. Plenty of P-51 kits were available, but I decided to build an almost scale Mustang using the Lanier wing. It is one of the best pattern airfoils around, with its tapered, square-tip look. When lightly sanded with #400 wet paper just enough to break the gloss and given two light coats of Hobbypoxy silver, the first Mustang wing took shape.

I've built three of these airplanes. Each came in at a different weight and each had its individual flying characteristics. The first ship used an old Lanier Bronco horizontal stab covered with 1/16" sheet. It was so tail heavy that the airplane required a ½ lb. lead brick in the nose to balance. Dry weight was pushing 7¾ lb. but, surprisingly, only the vertical maneuvers indicated it was heavy. In silver paint and military markings, it was a sweet-flying airplane. The Lanier wing didn't seem to be bothered by the extra weight. The second model used a home-cut wing, same airfoil and span. It weighed 6½ lb., no more foam stabs!

The model I now fly has a wider, deeper fuselage and a flat, built-up horizontal stab. No difference in takeoff or flying qualities between a stab with airfoil or this flat stab are evident. The flat one makes it easier to get the incidence correct. A 66-in. wingspan was used on this model, which weighs 7 lb. dry. The Lanier wing does well up to about 7 lb.; at 7¾ lb., the landings are a bit warm but not unreasonable. The 66-in. span allows the flier to choose his landing speed, and the speed through maneuvers looks more scale.

Construction

Fuselage construction for this airplane is the most time-consuming step, so this area was simplified but without losing scale appearance. Familiar slab side and plywood doubler techniques are used, along with ¼" sheet for the cowl and radiator. Cut both sides from ⅛ x 4 x 48" medium balsa. Contact glue the 1/16" plywood doubler from the nose to just beyond bulkhead F4. Since a 4" width is not quite wide enough for the full fuselage depth, two pieces at the leading and trailing edge of the wing cutout must be added. Glue ⅛ x ¼" strips along the top and bottom edge of the rear section and reinforce the sides with a few diagonal pieces. Add a 3/32" sheet balsa doubler to the last 8" of tail section.

Cut all bulkheads: F1 and F2 out of ¼" plywood; F3 through F7 from 3/32" or ⅛" balsa; C1, C2, R1, and R2 from 3/16" or ¼" balsa. Pre-drill F1 for the radial mount to be used and F2 for the wing dowels. Cut one ⅛ x ¼" strip to the same width as F5, F6, and F7; and a larger ¼" block the same width as F4. Cut off a ¼ x ⅜" tail post, F4, and its ¼" piece. Glue F1 into its location, and hold in place with masking tape. While the glue is still wet, be sure everything is square and true. Finish by gluing F5, F6 and F7 with bottom cross strips at the location indicated. Hold with masking

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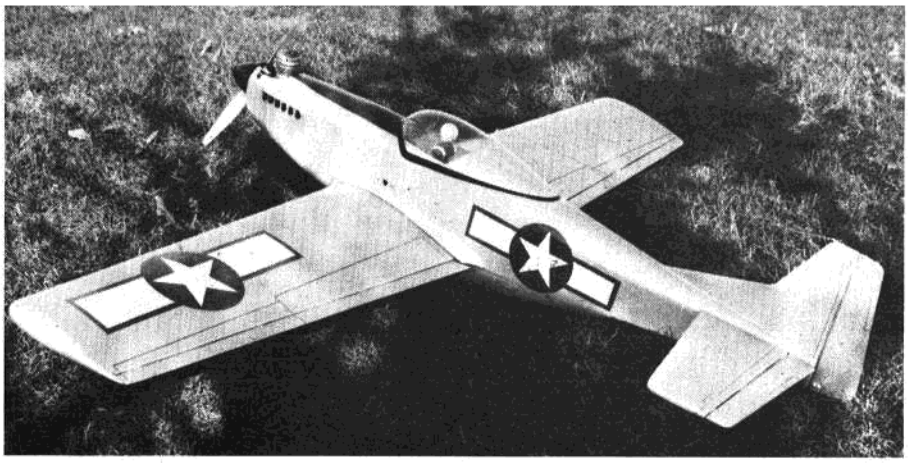
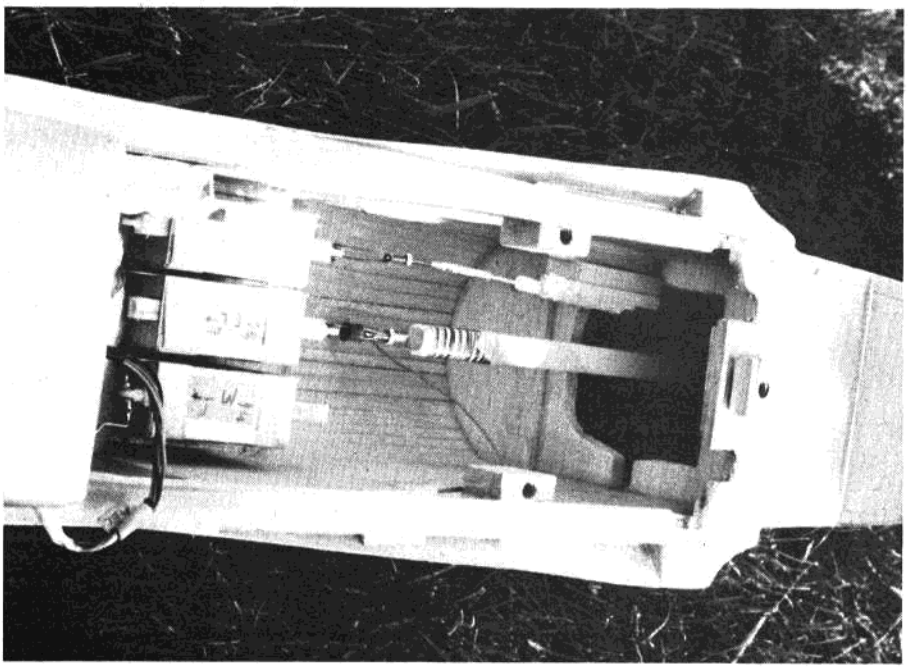
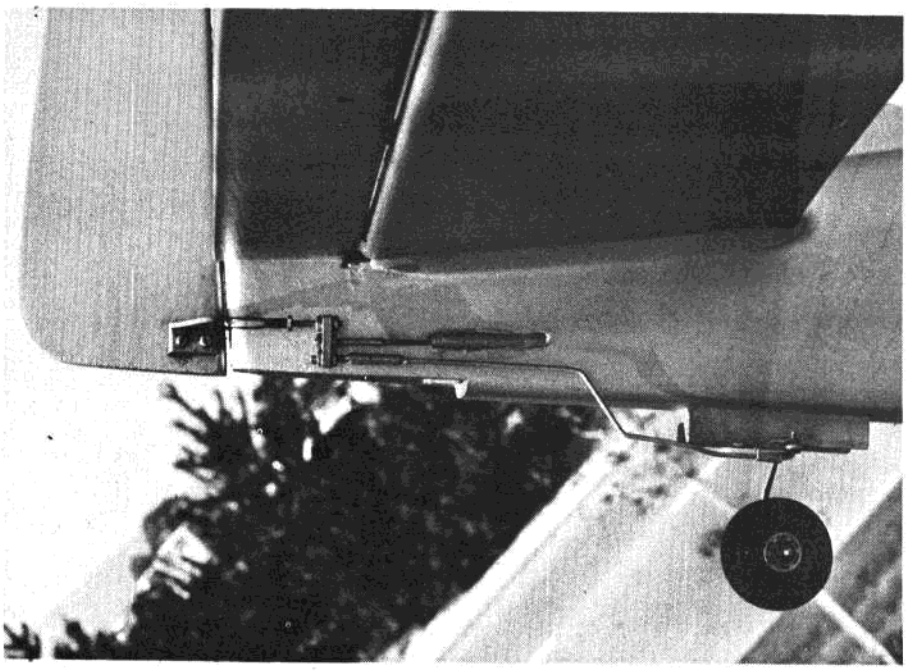


The Mustang is quite distinctive. Airscoop, ink lines, and tail quickly identify aircraft.



Lots of room inside for an old PCS. Note mounting of plywood wing fillet for appearance only. Wing mounting screw blocks and belly scoop attach block also are shown.



Semi-remote tail wheel steering is clever. Phenolic or ply coupler from servo pushrod to rudder and wheel is held to threaded pushrods with nuts on each side.

tape until dry. Bulkheads are placed into the fuselage to a depth indicated by a dotted line on the plans.

Plank the bottom rear with 3/16" or ¼" soft balsa. Cross-grain the first 6 or 8" to prevent splitting. Bevel F3 and glue into position by using a straightedge from F7 forward to achieve the correct angle. Turtleback is made by trimming ⅛ x ¼ x 22" strips to a taper of ¼" at F3 to ⅛" at F7. These are cut at an angle so that they will fit with a minimum gap as the rear deck is formed. Allow these strips to go beyond F7 to form a part of the vertical stab fillet.

Start at top center and glue, pin, and glue, until finished. The structure ends up strong but light. Finish by gluing F1, F2, C1, and C2 in place. Engine and mount must be selected now in order to position F1 at the proper location. I put in a little right thrust and downthrust here. Use 3/32" plywood strips on both sides of F1 and at key slot for F2. Use epoxy at these two bulkheads. Glue in R1 and R2.

To avoid knocking off R1 and R2, start planking the radiator first. Cut and piece the sections for the radiator out of ¼" soft to medium balsa. Build and glue as one complete unit, remembering that it will be separated later at R1. Building it as a one-piece structure makes it easier to shape and sand. Separate the front section to finish the detail work, such as holddown screw, dowel, etc. The cowl, which also uses ¼" sheet, goes fast. Rough cut the bottom nose block and extend it under the wing cutout as shown. This enhances the profile appearance.

A ½" thick block is glued to the nose and reinforced on the inside with triangle strips. Use a 2¾" spinner mounted on the engine, and in the plane, to determine where and how to shape the nose. A 6-in. block plane is a great help for shaping nose, cowl, radiator, and rear section. The more excess removed now means less sanding later. Close attention to the photographs or to a set of 3-views helps in shaping the bottom nose section.

Wing fairings are made from balsa and 1/32" plywood. With the wing in the cradle and wax paper between, glue the forward balsa piece and plywood fairing in place; hold with masking tape. When dry, remove the wing and glue ½" long triangle pieces under the 1/32" fairing to reinforce it. Put the wing back in cradle and glue the rear balsa fairing block in place.

Exhaust stacks are made from 5/16" diameter dowels, ⅝" long and sanded to a 45-degree angle; equally spaced and glued at a down and rearward angle onto a ⅜ x 4" piece of 1/32" ply. When gluing to the fuselage, also butt-glue a 1/16 x 3/16" strip along the top of the stacks at the fuselage.

The tail wheel assembly uses 3/32" wire into a ⅜ x ¾" hardwood block with doors made of 1/32" ply. Copper-clad printed circuit board material is used for the control horn and is soldered to the tail wheel wire. The linkage hole should be located ¾" from center. Position the assembly to be directly under the leading edge of the horizontal stab.

Build the horizontal stab framework, using 3/16" stock, including tips. The

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full span spar uses 3/16″ square spruce. Sheet top and bottom with 3/32″ soft balsa and keep flat until completely dry. Vertical stabilizer, rudder, and elevator are cut from soft ¼″. Taper these with the plane to about ⅛″. Install a Top Flite elevator horn, and glue both horizontal and vertical stabilizers onto the fuselage. Make fillets from balsa or leather to add strength.

A standard Lanier wing or a homecut wing may be used. Strip ailerons were used, but some faking is done after painting. Gear mounting blocks centerline is located 2½″ back from the leading edge as measured at the wing root. I prefer 4 to 6 degree dihedral. Main gears use 3/16″ diameter wire and are 5¼ to 5½″ long from wing to axle. The axle bends inward, allowing wheels to be on the inside of the pants. Use 3/32″ plywood for pants and mount to the gear with brass strips screwed into spruce blocks. When correctly positioned, tack solder the brass to the wire gear.

The familiar torsion type gear is used. Bend the wire so that the wheel axle is directly under the leading edge of the wing when the wing is in its flat flying angle (see plans). This location is important because takeoff and landing qualities are determined by location of wheels.

Finishing Details and Painting

An engine mounting backplate may be made of 1/16″ copperclad epoxy p.c. material; 6-32 nuts are then soldered to the copper. If elastic stop nuts can be found, use these instead to prevent the screw vibrating loose. Tail wheel linkage is somewhat unique since the wheel is located under the leading edge of the stabilizer and not at the tail post. Spread the stress of the nylon wing bolts on the wing by gluing a ⅝ x 1 x 1/16″ piece of plywood over the ¼″ hole in the wing. It acts as a large washer.

Paint as desired. However, silver paint and military decals make the airplane look more majestic. After painting, I drew a 1/16″ black outline of the scale elevators, rudder, ailerons, flaps and trim tabs with India ink and a regular drafting pen. This ink is easy to work with since mistakes wipe off easily with a damp rag.

When finished, spray the entire aircraft with a light coat of clear Hobbypoxy to protect the India ink and to keep the silver from smearing. Use decal proof over the ink instead of spraying with clear.

A standard Sig 16-in. canopy is trimmed to the proper outline. Black paint around the canopy helps give it a Mustang bubble appearance. Place a pilot in the cockpit and epoxy the canopy in place.

There's plenty of room for fuel tank, batteries, receiver, and servos, just keep in mind CG location (which is measured with an empty tank). It is just under 30% but can be moved. However, I have no trouble dropping the ship into a spin, and the elevators are very relaxing yet effective. The antenna wire is taped along the fuselage and exits via a nylon tube behind the pilot.

Flying

Some effects which occur on takeoff are similar to those on the full-size ship. I refer to the prop pitch differential before the tail comes up and torque. The tail dragging effect is great on the Mustang because of those long gears.

Takeoffs are not difficult. Handle the rudder and throttle just right and the ship will track right down the centerline. Try holding about 10 degrees right rudder, ease in some power, and the tail will pop up. Back off a little on the rudder and come up to full power. Stay off that elevator during the above sequence, keep right pressure on the rudder until the plane is eased off. There is no nose wheel to break loose; when ready to pull, just a little elevator will start it flying.

Landings also use a little different technique. Don't drag it as with a trike gear. Just line the ship up, let it come. Ease it onto the deck and get off the elevator as soon as it is down. If it seems the plane is running out of strip, slowly pull the tail down and ground speed will drop fast. On a touch and go, hold a light rudder before punching the throttle. With plenty of side area, the ship will hold the 90-degree points with ease; the same is true with slow rolls. A knife edge uses only 50% rudder; full rudder will start it climbing until speed drops off.