



Mike Brinker hand launches the lightweight Race 87 version of the Kingcobra.

KINGCOBRA

RELIVE THE EXCITEMENT OF POSTWAR RACING

by Mark Rittinger

Bell Aircraft Corporation's unique mid-engine P-63 Kingcobra was a descendant of the Bell P-39 Airacobra. The Airacobra lacked a supercharger, limiting it to low-altitude work. Although effective for strafing and ground targets, the P-39 suffered in engaging a flying enemy. Bell went back to the drawing board and modified two P-39Es into P-63s.

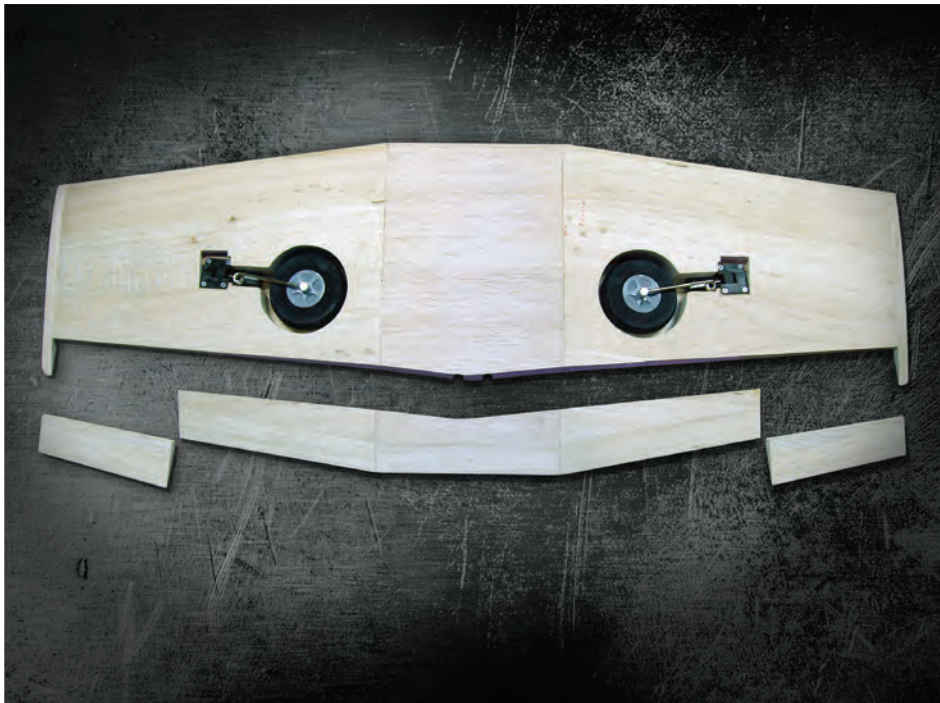
Although the P-39 and P-63 looked similar, the Kingcobra was significantly larger, with an extra 4.3 feet of wingspan and an extra 2.5 feet in length. It also had a new laminar flow airfoil, metal-covered ailerons and elevator, full flaps, a four-blade propeller, and a two-stage supercharger.

With a top speed of 426 mph, it was one of the fastest aircraft of its time. Add in the cannon's firepower, and it was also deadly. The Kingcobra and the Airacobra were also the

only Allied fighters of World War II with a cockpit forward of the wing.

Following the war, there was a surplus of wartime aircraft. A leftover fighter could be bought for \$1,500 and some still had full fuel tanks! With the return of air racing in Cleveland, many chose to "hot rod" WW II fighters such as the P-51, P-39, P-38, Corsair, and the Kingcobra. Several carried garish, but easily seen, color schemes. I like the odd types, so I decided to do an electric-powered Kingcobra in several versions.

The plans show a stock P-63 with retracts or a hand-launched version without gear. I built the Tucker Flying Red Horse with E-flite electric retracts and the Race 87 flown by A.T. Whiteside at the Cleveland Air Races, as a 4-pound hand-launched model. Both fly well, but the lightly loaded Race 87 is more fun than the high loading of the Red Horse.



The TE was cut away from the wing to add the aileron torque rods on the Tucker variant. Servos in wing panels would also work.

Wing

The source of lift is a foam wing, sheeted or sheeted and capstripped with $\frac{1}{16}$ balsa. There is a flat center section and two outer panels with dihedral. Have your cores cut with $\frac{3}{16}$ -inch washout at full span. Cut aileron servo troughs if using two aileron servos. Cut retract wire troughs if using retracts.

Hand-Launched Version

If you are building the hand-launched version, cut the center section from end to end across the front and rear of the hand-hold area, and then cut

out the hand-hold portion. Add the $\frac{1}{16}$ plywood vertical spars from end to end, and glue it together. Sheet the hand-hold area and the entire center section with $\frac{1}{16}$ balsa and set aside.

I advise sheeting the front third of the wing and capstripping the rest to save weight. Cut the servo pockets if using two servos, run a string through the trough for the servo leads, and sheet the front wing portion and capstrip the wing with $\frac{3}{16} \times \frac{1}{16}$ balsa.

There are many versions of the racer including a "pinball target" (manned flying target for gunnery practice) World War II fighter. If you want a smooth-flying warbird that builds quickly, order a set of plans and follow along as I build a seldom-modeled fighter.

Equipment

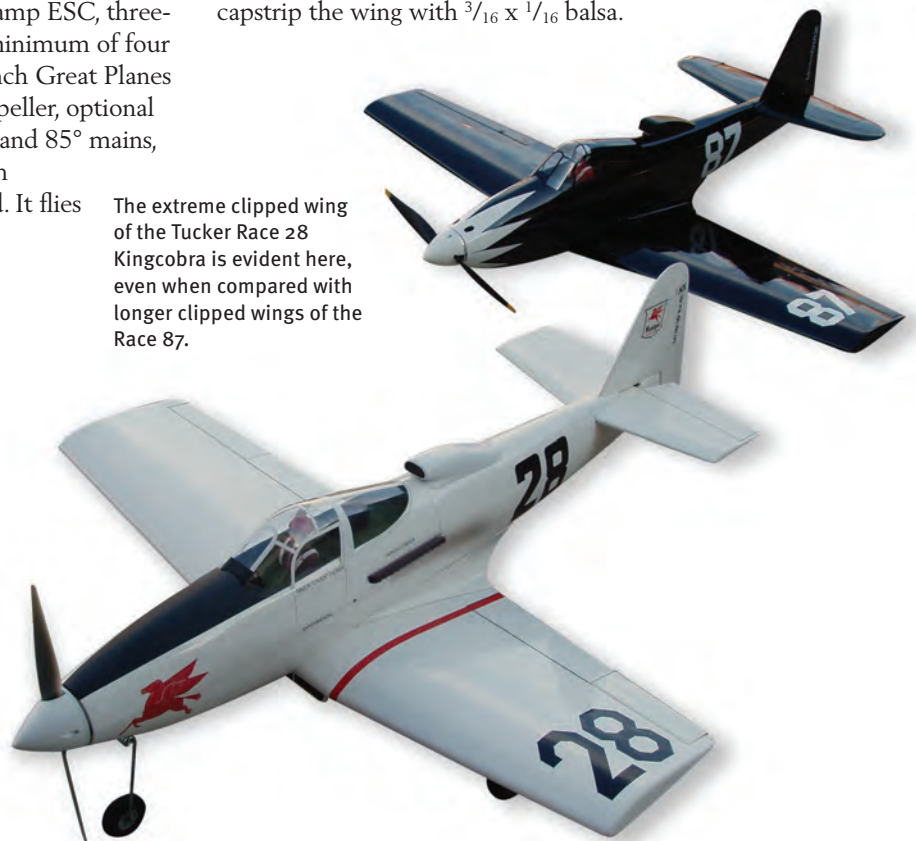
You'll need an E-flite Power 32 motor, 60-amp ESC, three-cell 5,000 mAh 30C battery, a radio with a minimum of four channels (five if you are using retracts), a 3-inch Great Planes electric spinner, a 14 x 10 or 15 x 8 APC propeller, optional E-flite .25-.46 electric retracts with 90° nose and 85° mains, and a 2 $\frac{1}{4}$ -inch nose wheel and 3 $\frac{1}{2}$ -inch main wheels. No fancy computer radios are needed. It flies well without any mixing or exponential.

Building

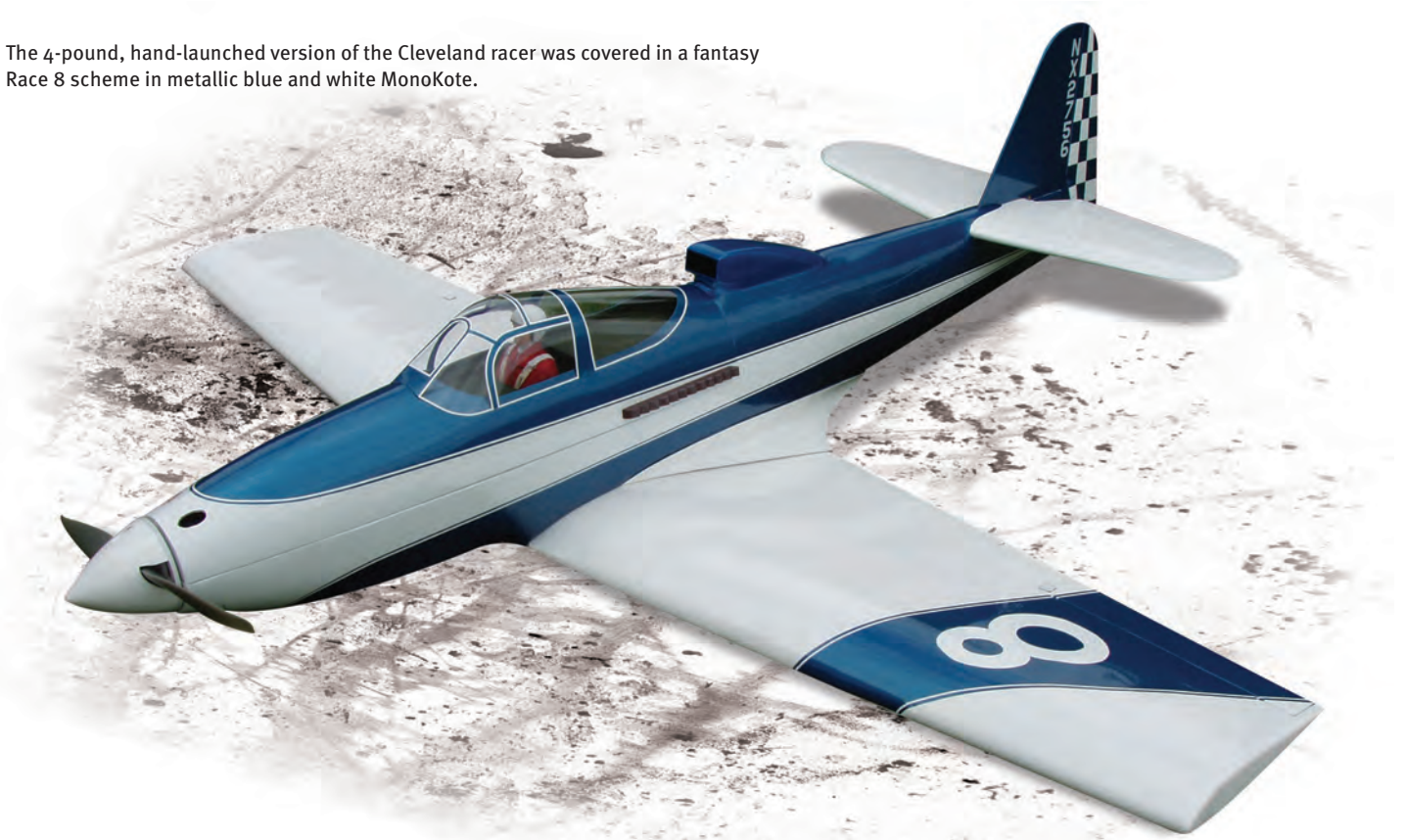
Although the Kingcobra is not hard to build, it is not a beginner's model. This will not be a step-by-step instruction, but more of an overview. Decide which variant or model of the Kingcobra you want to build and whether or not you are using an undercarriage. Undercarriages add weight and complexity, but they are neat to fly with.

Hand launching the 4-pound model is easy with 125 watts of power per pound, and it flies right out of your hand. I can easily hand launch mine, despite its considerable size. It helps having the deep, large handholds under the CG. The choice is up to you.

The extreme clipped wing of the Tucker Race 28 Kingcobra is evident here, even when compared with longer clipped wings of the Race 87.



The 4-pound, hand-launched version of the Cleveland racer was covered in a fantasy Race 8 scheme in metallic blue and white MonoKote.



Add the $\frac{1}{4}$ LEs and $1\frac{1}{4}$ TEs, and add wingtips if using a full span. Sand the wing to shape. Cut the ailerons from the core and face them with $\frac{1}{8}$ balsa and bevel. If using one aileron servo, cut along the torque-tube line on the plans, and make torque rods from $\frac{1}{8}$ music wire and tubing. Install them and reposition the TE.

Sand or cut the dihedral angle into the root ends of the outer panels and glue them to the center section with slow epoxy. Make sure that they are perfectly aligned using an incidence meter. Wrap the joints with two layers of $1\frac{1}{2}$ -ounce cloth and resin and sand smooth.

Do not yet add the locator pins to the LE. Make two servo hatches from $\frac{1}{16}$ plywood and fit them over the pockets. I installed the servos on the hatch, and then screwed the hatch to hardwood mounting blocks installed in the wing. You can also add a plywood wing-attachment screw plate. You can “clip” the wing and add the plain tip according to the version you are modeling.

Retract Version

Using the same foam cores as the hand-launch version, cut a trough in the cores for retract leads and aileron servo leads, at least 1 inch apart. Cut the wing cores where the retract bearer ribs of $\frac{1}{8}$ aircraft plywood go.

Build a retract bearer assembly for each panel from the ribs and the $\frac{1}{2}$ square spruce. Pay close attention to the angles on the plans so that the wheels are straight ahead on the ground, yet lay flat in the wing when retracted.

Glue the assemblies back into the cores and replace the foam section that goes in front of the retract unit. These have

proven to be incredibly strong. Cut the wheel wells from the cores and line with $\frac{1}{16}$ balsa. Cut out the aileron servo pockets and add hatch mounting blocks to them.

Sheet the center wing section with $\frac{1}{16}$ balsa. Run a string for servo leads through the trough. Run a string through each outer panel trough, and sheet the panels with $\frac{1}{16}$ balsa. Add the $\frac{1}{4}$ balsa LE and $1\frac{1}{4}$ balsa TE, and the wingtips if using them.

Cut the sheeting off of the servo pockets and cut off the ailerons. Face the ailerons with $\frac{1}{8}$ balsa and bevel. Sand or cut the root of the outer panels to the proper dihedral angle. Glue the wing panels to the center section with slow epoxy and make sure both sides match using an incidence meter.

If you are using a single aileron servo, cut off the TE, bend up the music wire and tubing torque rods, and glue the TE in place after installing them. Wrap the dihedral joints with two layers of $1\frac{1}{2}$ -ounce cloth and resin and sand them smooth. You can also add a plywood wing-attachment screw plate. You can “clip” the wing and add the plain tip according to the version you are modeling.

Fuselage

The fuselage is not as difficult as the plans make it appear. The only tricky issue is the firewall, which sets above the thrustline. There are two firewall choices. The rear firewall is used for the retract-equipped version, offering clearance for the retract unit. It could also be used with the hand-launched version.

The forward firewall on the plans is a simpler option that I used on the hand-launched version. Both perform well. Another

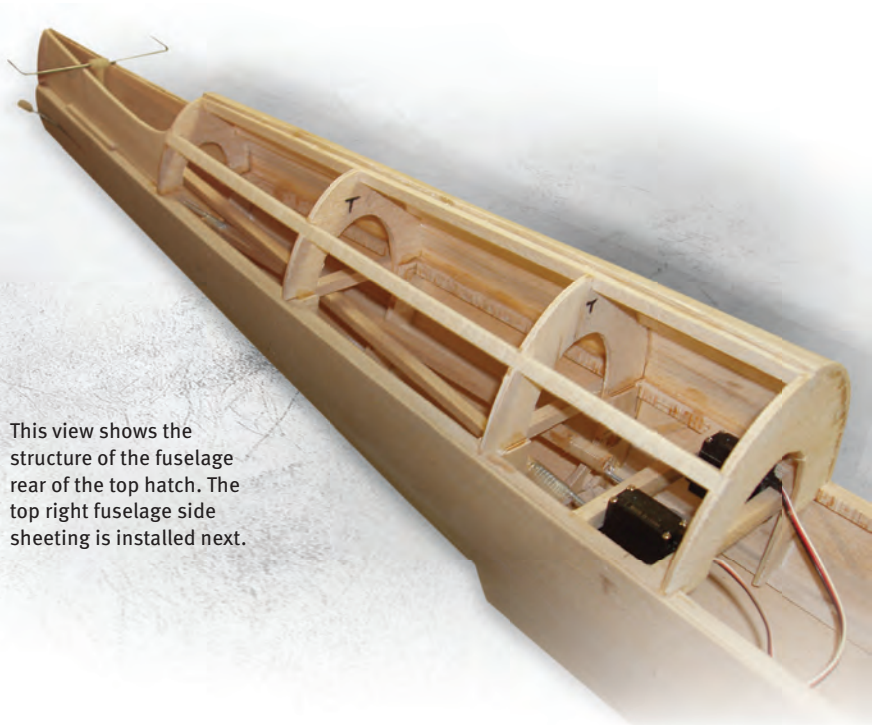
option would be a $\frac{1}{4}$ plywood front firewall and reversing the motor shaft to mount it, although I have not yet tested the setup.

Laminate the former material from two cross-grained layers of $\frac{1}{16}$ balsa. Cut out all of the formers and build up the bottom of the fuselage upside down on your building board. Using evenly matched $\frac{1}{4}$ balsa thrustline stringers, build a frame on which to attach the formers.

Add the crossbraces and glue all of the lower fuselage formers except the $\frac{3}{16}$ plywood firewall to the longerons. Use a temporary balsa firewall until the fuselage is off the board.

After the formers are in place, add the $\frac{1}{8}$ balsa gussets to all but the firewall. Now add the remaining stringers and laminate the front ones. Laminating the stringers from four pieces of $\frac{1}{16} \times \frac{1}{4}$ balsa makes them hold their shape better.

Add the plywood wing hold-down mounts and tap them for wing nylon bolts. Add the doublers to F4. Now make a paper template for the fuselage sheeting and cut the soft $\frac{3}{32}$ balsa sides to size. Because you are bending wood, hard or medium balsa won't work well.



This view shows the structure of the fuselage rear of the top hatch. The top right fuselage side sheeting is installed next.

The fuselage's lower section is sheeted from the thrustline stringer to the wing saddle and then cut to fit behind F8 to the keel on the rear section. Forward of the wing, the sheeting only goes from the thrustline to the side stringer, and the lower nose portion is planked with $\frac{1}{4} \times \frac{1}{8}$ balsa and sanded smooth. The doubler on F4 is for gluing planks to. Refer to the photo for help.

By using 48-inch long wood, the sides can be sheeted using one piece for each side. Wet the outside of the fuselage sheeting with hot tap water, and it will start to bend on its own.

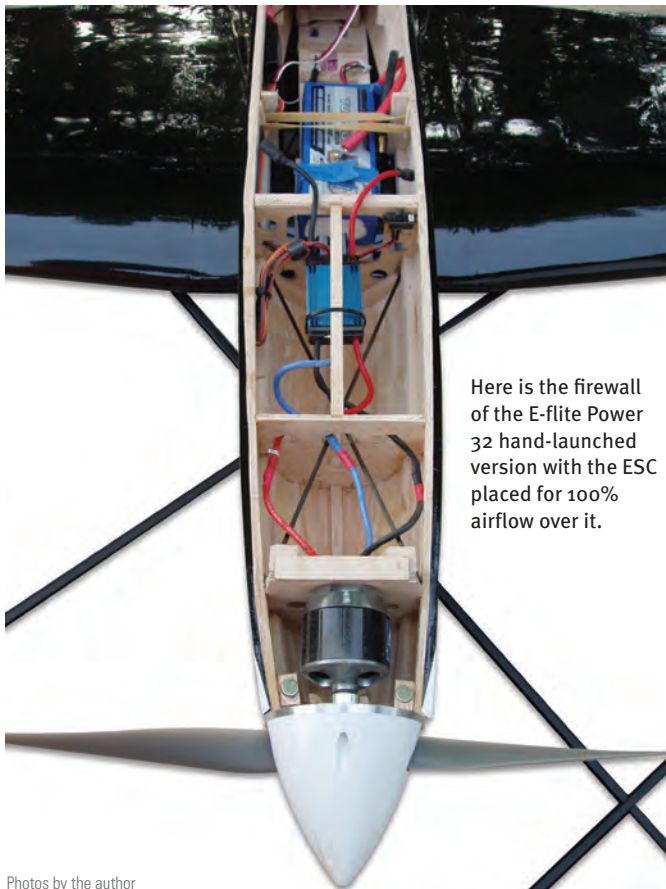
Glue the sheeting to the thrustline stringer using medium to slow CA and use aliphatic glue on the rest of the stringers and formers. Carefully bend the sheeting to the wing saddle area and hold it in place using CA.

Bend the rest of the section to the keel and glue it to the keel. Move to the front and glue the side stringer and the formers (except the "fake" firewall). Repeat for the opposite side and then plank the lower front section.

Add the $\frac{3}{32}$ hard balsa wing saddle doublers. Let it dry overnight and then remove it from the board. It should be stiff. Remove the balsa firewall and carefully fit the $\frac{3}{16}$ -plywood firewall and gussets. *Note the right thrust* and remember the plan shows the *bottom* view. Add the $\frac{1}{2}$ square retract bearers if you are using them. You can also cut the area open for the gear and wheel.

Now move to the top. Make the pushrods and place them in the fuselage (or at least get them fitted). Add the F8, F9, F10, F11, and the stabilizer mount doublers. Add the keel and side stringers and sheet the rear top section with soft $\frac{3}{32}$ balsa.

Using the fuselage as a guide, build up the hatch using the $\frac{1}{4}$ square H formers and planks and sand it to match the fuselage. Cut out the canopy area, test-fit the canopy, and make the carburetor scoop from block balsa.



Here is the firewall of the E-flite Power 32 hand-launched version with the ESC placed for 100% airflow over it.

Photos by the author

KINGCOBRA

SPECIFICATIONS

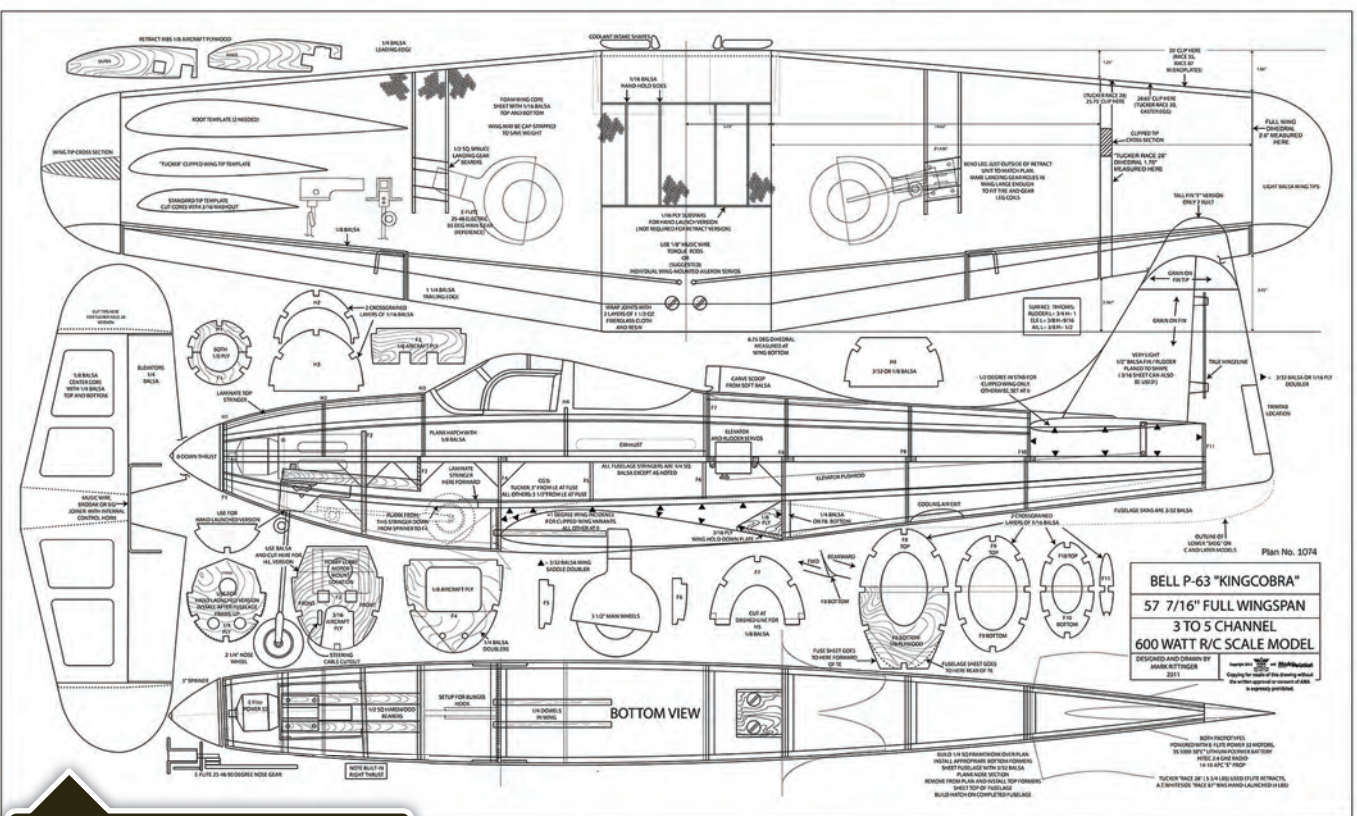
Type: Semiscale warbird
 Skill level: Intermediate
 Wingspan: 57⁷/₁₆ inches
 Length: 49 inches
 Weight: 4 to 5.8 pounds
 Construction: Balsa and plywood
 Finish: Iron-on covering

MODEL DETAILS

Power system: E-flite Power 32 motor; 60-amp Pro switch-mode ESC (54 amps being pulled static); Castle Creations BEC
 Retracts: E-flite .25-.46 electric retracts with 90° nose and 85° mains
 Propeller: APC propeller with Great Planes electric spinner
 Radio system: Hitec Eclipse 2.4 GHz conversion with Optima 6 receiver
 Wheels: Dave Brown Lite Flite wheels



The completed framework of the hand-launched airplane is ready for film covering. Simple framework with no landing gear keeps it lightweight.



Purchase these plans at www.ModelAviation.com/kingcobra.

Empennage

The fin and rudder can be made from 1/2-inch light balsa and sanded to shape, or simply made from 3/16-inch sheet balsa. Both have flown well, but the thicker one gets a slight edge in appearance.

The stabilizer is laminated from 1/8 balsa core and 1/4 light balsa top and bottom and sanded to the airfoil shown on the plans. Elevators are 1/4 sheet balsa sanded to shape. Fit the stabilizer to the fuselage at 0° for a mild clip to full span and -1/2° for extreme clipped wings as on the Tucker.

The End in Sight

Seat the wing in the saddle and sand it to get it to 0° for a mild clip to full-span version, with 1° positive for the extreme-clipped version. Drill the wing to fit the locator pins with it in place, through the wheel well in the nose, or by marking it from the inside and drilling after removing the wing.

Drill holes in the wing for the mounting bolts and build up the wing fillets from soft 1/16 balsa sheet using paper patterns. Make a light plywood battery mount and glue it to the wing.

Finishing

Cover the model in film, glass and cloth, or even Doculam and paint. There is a lot of wing area, so a few extra ounces will not be critical.

Covering the parts now is easier than doing so after assembly. Double check the incidences, and epoxy the tail to the fuselage, being sure all is absolutely true. Hinge all of the surfaces and hook up the pushrods. Make sure there is an air inlet in the nose and an exit twice that size in the rear. Install the canopy and pilot.

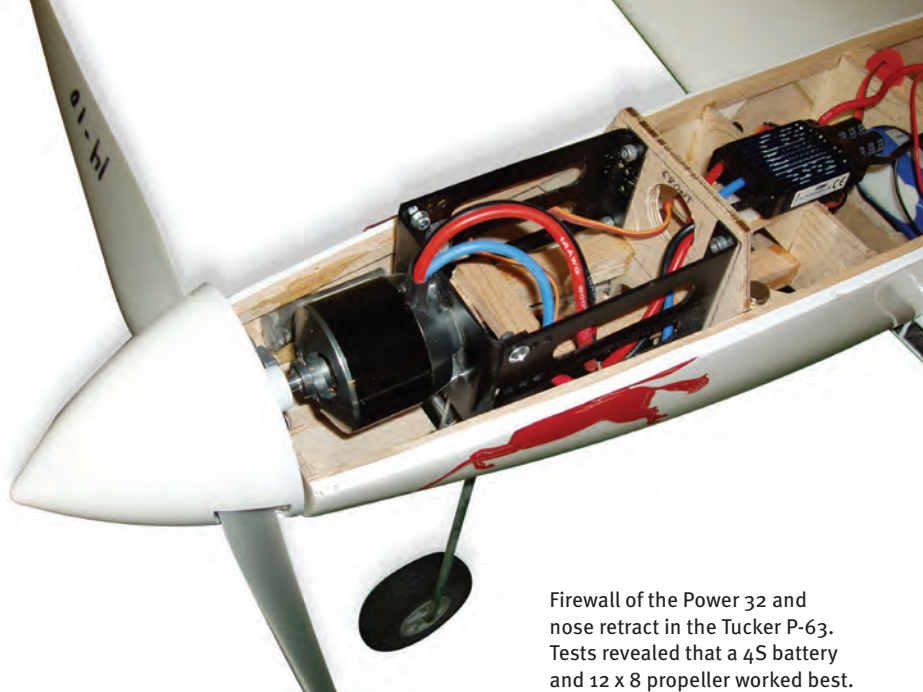
Add the radio equipment, motor, and ESC, bolt in the retracts, and bend up the gear legs. Install tires and a battery to check gear operation and radio function (leaving the propeller off while setting up the radio). Check your version's CG and mark the battery position accordingly.

Weigh the model and brag about how lightly you've built it! My Race 87 with the mild clip weighs 4 pounds ready-to-fly, with a three-cell 5,000 mAh 30C LiPo, and a wing loading of 19.76 ounces per foot. The Tucker Race 28 is 5.8 pounds with a wing loading of 31.6 ounces per foot.

Committing "Aviation"

Take a few pictures of your new beauty then head to the field with a freshly charged battery. Check the radio range and control surface deflection and amounts (shown on the plans). It would be a shame to lose such a gorgeous aircraft because you're in a hurry.

Run a wattmeter to ensure that you aren't over-amping or damaging components. If all is good, have a helper launch the model (for the hand-launched version), slightly



Firewall of the Power 32 and nose retract in the Tucker P-63. Tests revealed that a 4S battery and 12 x 8 propeller worked best.

nose-up at roughly three-quarters power.

For the model with landing gear, check tracking before trying a takeoff. Take off with full power into the wind, and it will start to lift on its own at speed. When you're in the air, trim it out, make a landing "at altitude," check the stall, then come in and check all of the connections before going up to wring it out. As always, safety first! Install a new battery and go tear up the sky!

This durable Kingcobra will stand out among a plethora of ARFs. It will perform well and handles great. It flies well inverted and is aerobatic for a warbird. After it is trimmed to your liking, it will fly as smoothly as you are able to pilot it.

As with any of my designs, I am happy to help a builder with any questions he or she may have. My email is listed at the end of this article. I have canopies available as well.

Now get to the local hobby shop, buy some wood and gear, and get a Kingcobra in the air. Long live the king ... Kingcobra that is! 🛩️

—Mark Rittinger
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SOURCES:

E-flite
(800) 338-4639
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Castle Creations
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www.castlecreations.com

APC
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