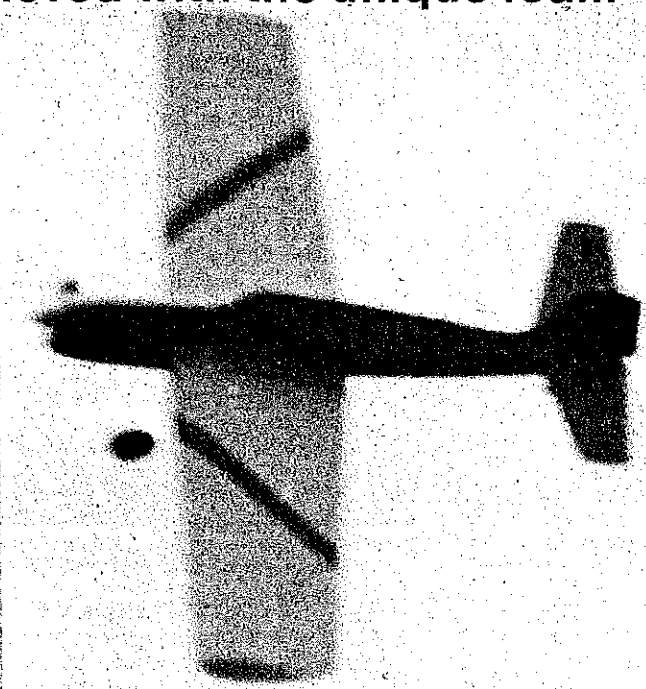
This sport Control Line profile model is one with a difference: it really looks like the full-size prototype from many views. Even with the model's big fuselage, the correct balance point can easily be achieved with the unique foam-core structure. ■ Phil Cartier



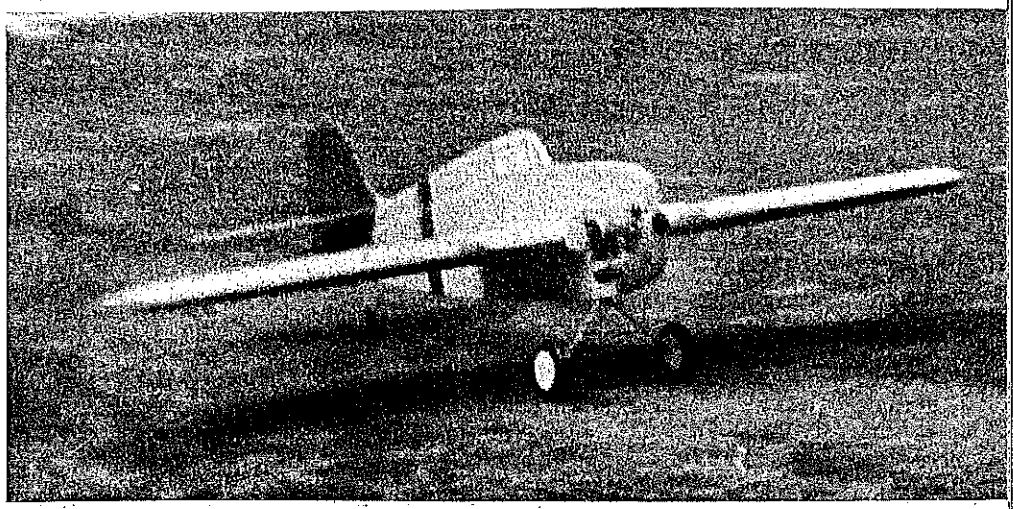
WILDCAT PROFILE

AS ONE OF THE MORE formidable aircraft that dominated the Pacific theater in World War II, the Wildcat needs no introduction to the dyed-in-the-wool modeler. Built by the Grumman Aircraft Corporation in the late Thirties and early Forties, the planes—also known as F4Fs—became the backbone of the U.S. air-war strategy in the Pacific, and were also used by the British as land-based fighters in the Mediterranean campaign. Although the Japanese planes had an edge in performance, it was the Wildcat, with its ruggedness and stamina, helped along by good tactics, that ultimately carried the day.

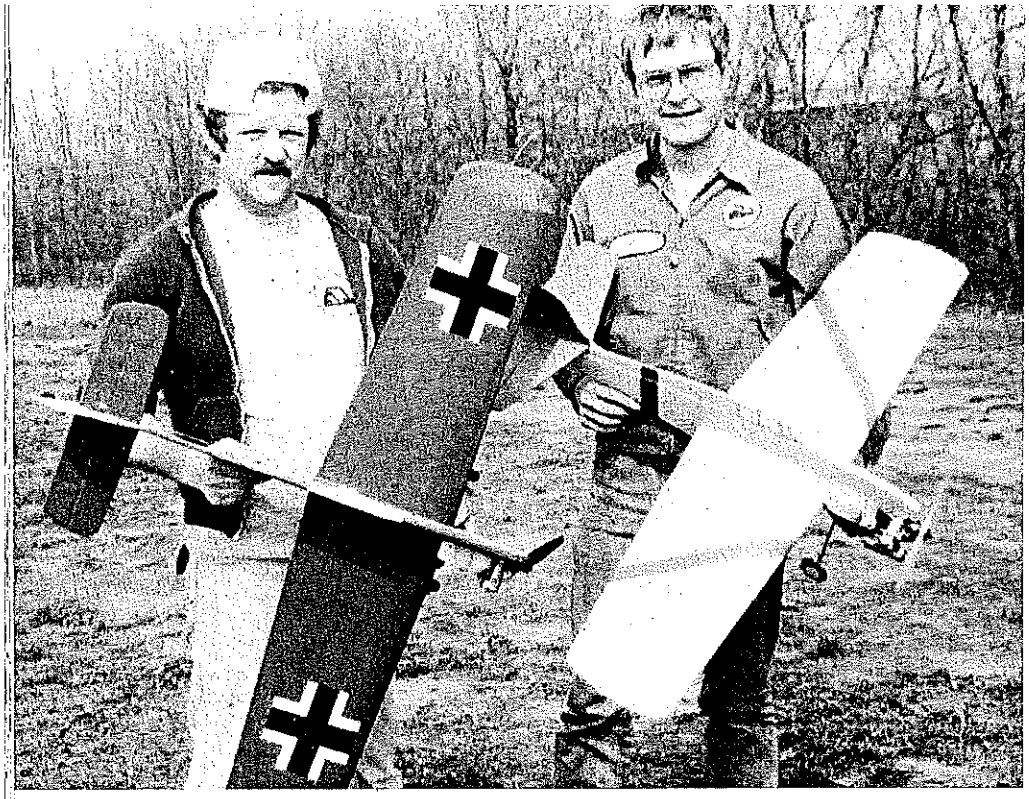
This model captures the ruggedness and good flying characteristics of the Wildcat in a nice-flying profile model. It makes use of several new building techniques I've developed over the years to produce a very realistic, scalelike model.

The Wildcat features composite foam construction. The fuselage combines a half-inch foam core, balsa sides, and plywood reinforcing. It comes out light and strong, with all the weight concentrated up front where it's needed for strength and balance. With its near-scale outline, the fuselage really captures the tubby, aggressive looks of the full-size plane.

The wing uses foam cores, suitably trimmed down. These are readily available (for example, from The Core House, 760 Waltonville Road, Hummelstown, PA 17036). Also, the wing has double covering. A layer of silkspan provides some ding resistance and hides the characteristic foam texture. Our prototype was finished with low-temperature plastic covering, but several other finishing and covering methods will give the wing the same durable, easy-to-maintain finish.



Top Left: The Wildcat at the bottom of an outside loop. Due to its low weight, it can do a respectable aerobatics pattern, having placed in a couple of local contests. Top Right: Up on its wing tip, the Wildcat seems to be rounding a pylon turn. Above: The to-scale fuselage profile gives the model very good ground handling characteristics. With the high landing gear, it can even do a respectable touch-and-go without throttle control.



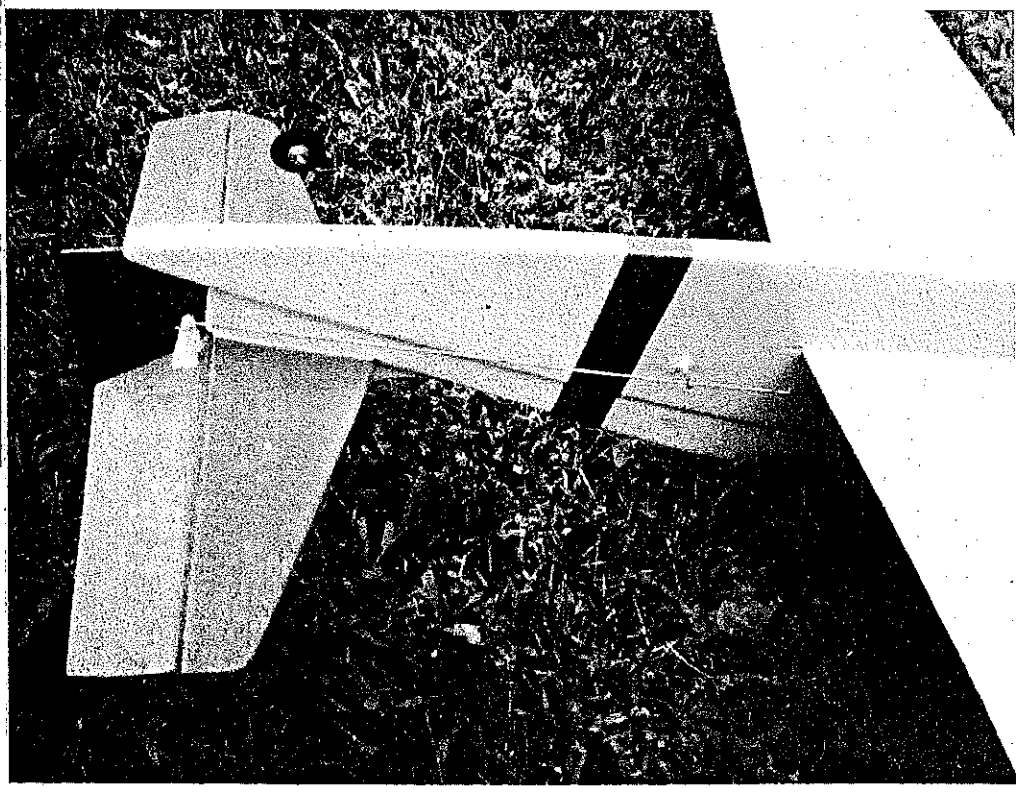
Gil Reedy (L) with his Focke Wulf and our author with his Wildcat prepare for a battle that never took place in real life. Planes like these can put on a great mock combat simulation.

Despite its size, the Fox .35 (even with the added muffler) provides more than enough power to haul the tubby Wildcat profile fuselage through aerobatics as well as dogfights.

Since working with foam composites involves some pretty unusual construction, I'll try to detail some of the tricks and pitfalls in building this Wildcat.

First off, glues and finishes can be a problem. Rule out old-fashioned model cement, dopes, and newfangled instant glues—they'll all dissolve the foam. Instead, use a medium- to slow-cure epoxy (15- to 45-minute pot life) for all closed joints and high-stress areas: the front of the fuselage, the wing/spar joint, and the landing gear mount. Use a water-based aliphatic glue such as TiteBond or Pica's Glueall for wood-to-foam joints such as the spars and trailing edges of the wing. For large-area foam-to-wood joints, contact cement like 3M-77 or a mixture of epoxy and microballoon filler works well.

Begin construction with the wing. After cutting or obtaining the cores, trim them to shape using a sharp knife or a hot wire cutter. Use a slicing and sawing motion with the knife to prevent tearing. Use a flexible straightedge to mark the tip all around the core where it is to be trimmed. Glue the trailing edge in place and hold it with masking tape. I find it helpful to plane the trailing edge to a rough triangular section before gluing it in place. Leave a little excess length at the root to overlap the root rib and trim the trailing edge flush with the tip. Add the tip rib and wing tip, using masking tape to hold them until the glue dries. (I use a lot of masking tape when working with foam. It works great for holding parts while the glue dries.)



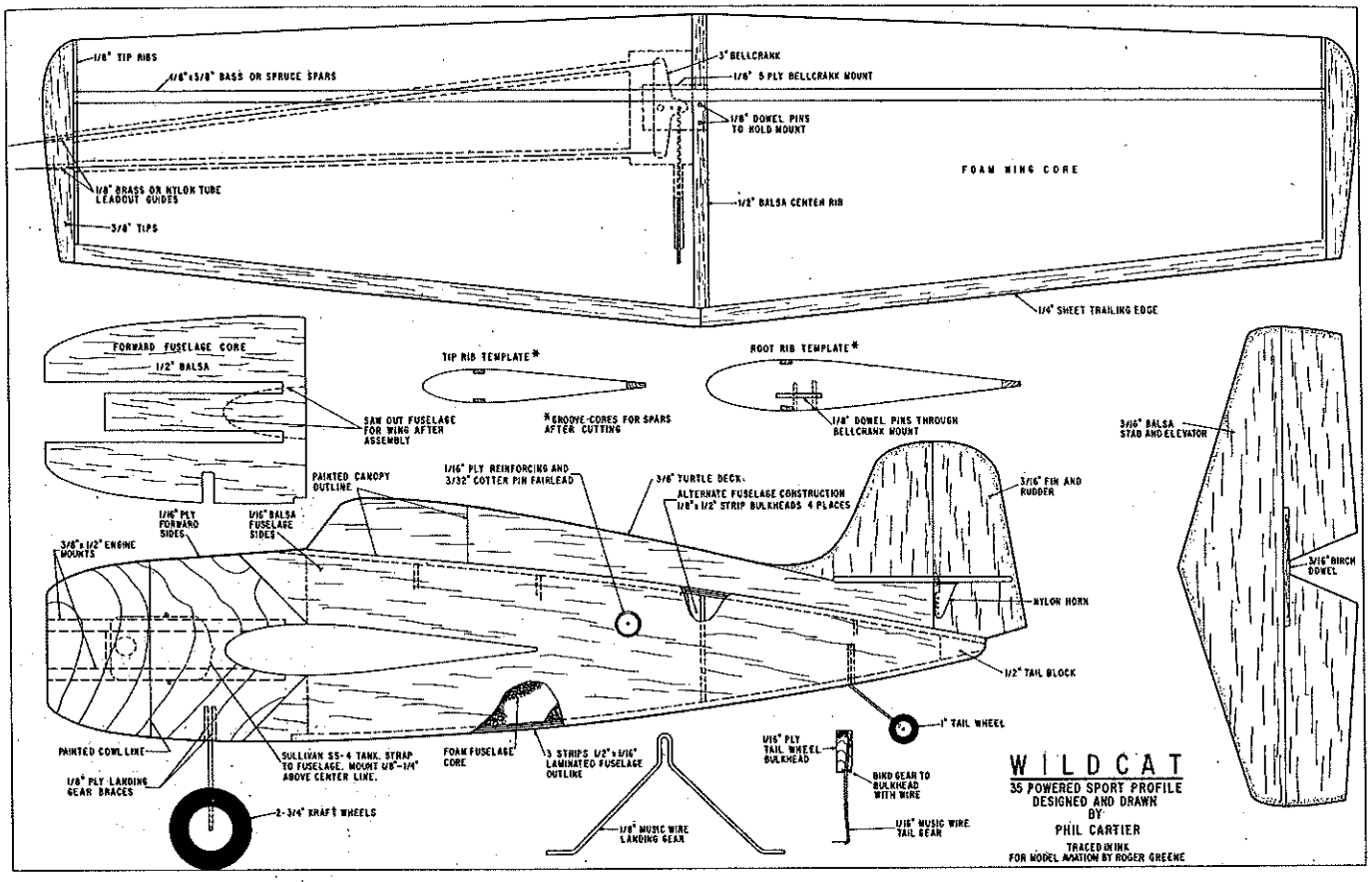
A cotter pin through the foam-core balsa-sheeted fuselage keeps the pushrod in place. Using traditional profile construction techniques, the model would come out tail heavy.

Cut out the center rib from half-inch balsa. Slot it for the bellcrank mount and glue the mount in place. Drill a couple of ⅛-in. holes into the bottom of the rib through the bellcrank mount. Pour in some glue, and then tap in pieces of dowel to secure the mount. This procedure forces the glue into the wood for a really strong joint.

Mount a three-inch bellcrank on the platform. Make sure it swings freely; then add the lead-outs. I use the crimped-tubing method for control lines outlined in the AMA rule book; 1/32-in. solid music wire lead-outs will work, too. Use a sharp knife and saw to cut a cavity in the root of the left panel to clear the bellcrank.

Trial-fit the wing panels, root rib, and spars together. Everything should fit snugly before gluing. The spars should be embedded in the foam so that they are either flush or just slightly inset. It is very difficult to trim the spars down to foam and get a flush joint that won't show through the covering. When you are satisfied with the fits, glue everything together and hold with masking tape. Before the glue dries, sight along the leading edge and make sure it is straight. If necessary, gently bend the wing straight and let it dry.

After the wing dries, carefully sand it to shape. I use a large 3 x 12 sanding block with 80-grit paper for rough shaping. Use very light pressure and vacuum off the dust



frequently to prevent tearing out pieces of the foam. The foam cores themselves should require little sanding. Most of the sanding—and it really isn't much—is needed to shape the balsa pieces to the foam. Sand the wing again with 120 paper, and finally with 240 paper for a smooth finish.

Finishing. Seal all the bare wood with a coat of polyurethane varnish. Urethane varnish is great for composite construction because it doesn't attack foam. Sand the varnished areas to knock down the grain, and then cover the wing with medium silkspan. Wallpaper paste works best for this. Mix up a cup or so of paste. Cut the silkspan to shape with a half-inch of excess all around. Dampen it lightly so it expands. Slobber a thick, even coat of paste on the wing and smooth the silkspan in place. It should overlap on the leading edge for extra reinforcement.

Hang the wing up by its lead-outs to dry. After a day or so, sand it smooth and trim off any rough edges with a razor blade.

Several methods work equally well for final finishing. For one technique, cover the wing with a second layer of silkspan. Seal the surface with varnish, then put on the final colors with a paint like Pactra Formula U. This finish almost equals sheeting the wing with wood for sturdiness. Another method—covering the wing with Solarfilm or other low-temperature plastic covering—is quick and dirty. As a die-hard Combat flier, I used this method. The silkspan hides the texture of the foam and provides a sturdy base for the plastic film. This technique works well for a sport plane because it is fast and durable.

A couple of hints may be in order. Foam is relatively soft and flexible, so go easy when sanding. It is much easier to sand some excess off than to fill in an area that was sanded too deep. Use light pressure, particularly when sanding wood down to match the foam. Too much pressure from the sanding block presses the wood into the foam, causing the sandpaper to cut away the foam on either side of the wood. Let the paper do the cutting, and vacuum the dust off frequently.

Try to fit the wood parts as close as

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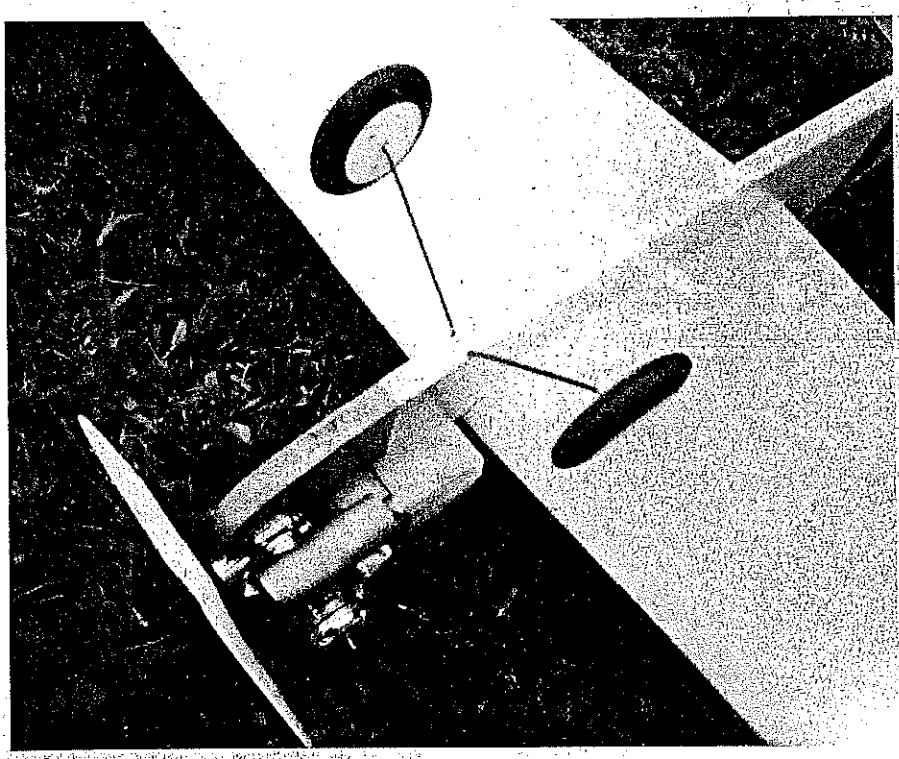

The simple wire landing gear is not necessary (especially when flying from grass), but it protects the fuselage underside from dings. Wire is sandwiched in Lite Ply for reinforcement.

FF Old-Timers/Haught

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the original size and performs as well as it looks. Dick says it's the equal to the Stratostreak which dominates many .020 meets. The Kerswap won the SCAMPS annual last November with six maxes! Many modelers asked Dick for plans, so he has made them available for five bucks. The plans come with a sheet of construction and trim notes. Timer!

Clarence Haught, 3226 Honeysuckle Dr., Coeur d'Alene, ID 83814.

Wildcat/Cartier

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possible before gluing them to the foam. Be especially careful fitting the spars so that they are flush with the foam. The better the parts fit before assembly, the better the final finish will be. After the first layer of silkspan, use spackling compound to fill in any dents or unevenness. The filler will be completely hidden by the second layer of silkspan or by the plastic covering.

The fuselage uses unique construction, too. The plans show the foam core design used in the prototype. Be forewarned. A standard profile fuselage of half-inch balsa won't work. It will be much too heavy, and all the weight will be in the tail. The foam core fuselage is pretty easy; but if you'd rather, you can use half-inch-wide strip formers instead of foam to build up the aft section of the fuselage. Making the laminated outline may be a bit tricky, but it can be done; and the result should be similar to the foam core—a big, light, strong, scale-like fuselage.

The foam core fuselage has three basic parts: the composite balsa/foam core and the two sides. Start with the core. Cut the forward section from half-inch balsa and install the engine mounts. Also, cut the slot for the landing gear. Following the outline, carefully cut the foam part with a sharp knife, a saw, or a hot wire. Glue it to the balsa piece and add the tail block. When it is dry, add the laminated outline: three layers of 1/16 x ½-in. balsa. Use masking tape to hold the outline pieces in place while the glue dries. The outline should be a little wider than the foam so that it can be sanded down.

While the core is drying, assemble the fuselage sides. Glue the forward piece of 1/16 ply to the balsa sides. The balsa sides can be pieced together using one piece of standard 3 x 36 balsa per side.

When the core is dry, use a large sanding block to smooth its sides and bring the laminated outline down to a uniform thickness. The simplest method of assembling the fuselage is to use slow-drying epoxy mixed with microballoon filler in the ratio of two parts glue to one part microballoon filler. Spread an even coat on the sides (remember, right and left) and then laminate the fuselage. Use masking tape to hold the sides aligned and lay the assembly on a flat floor or board. To provide uniform pressure over the whole fuselage, lay books, magazines, or concrete blocks on the assembly.

I went all-out for lightness and used three different glues: epoxy, aliphatic, and spray contact cement. I masked off the forward fuselage and about a quarter-inch around the outline on both the core and the fuselage sides. Both the foam and the matching section on the sides got a coat of contact cement. The balsa part of the core and the ply part of the sides got a coat of the epoxy/microballoon-filler mixture, and the laminated outline got a bead of aliphatic glue. I saved a little weight by substituting contact cement for epoxy. However, it is considerably trickier to use three different glues at once.

When the fuselage is dry, trim any excess wood off the outline. Add the turtledeck from 3/8-in. balsa, and the whole thing can be sanded and rounded to shape. Locate the wing position on the fuselage and saw it out. Trial-fit the wing and trim, where necessary, to get a good fit.

The landing gear plugs into the slot in the forward fuselage. Sandwich the wire between two pieces of 1/8-in. ply. Glue the assembly in place with epoxy. This type of mount is plenty sturdy for normal landings—and even some pretty ferocious bounces. However, you can substitute bolt-on-gear or whatever suits your fancy. I flew the prototype for a while without any gear. It flew great; but the bottom of the fuselage

got too beat-up from landings, so I added the gear.

The rest of the plane is pretty much standard construction. The tail surfaces are simple sheet balsa. The elevators are joined with a piece of birch dowel. I find this easier than trying to drill the elevators and fit a wire joiner.

Hook up the controls after assembling the plane. Working from the plans, locate and cut out a ⅛-in. slot for access to the bellcrank. Put a Z-bend in the end of the pushrod and snap it into the bellcrank. Cut the pushrod to length and add a clevis for connecting to the control horn. The pushrod needs a support. Snap a small cotter pin over it and glue the cotter pin into the fuselage midway between the wing and stab. The plans show a small circular patch of plywood to support the cotter pin and prevent it from working loose.

The best part of any new project is flying it. Before going to the field, though, carefully check your Wildcat over for warps. Small warps can be eliminated by twisting the wing and re-ironing the covering. If it's your misfortune to get a big warp, saw partway through the trailing edge on the scale aileron outline and bend in a little trim tab.

A Fox or OS Max Stunt is plenty of power for the Wildcat. Use a muffler. They aren't expensive, and this plane may need the nose weight. The Wildcat should balance just ahead of the spar, as shown on the plans. Adjust with nose or tail weight, if needed. Then, go out and fly it.

I think you will find the Wildcat an excellent flier. The large tail and relatively long fuselage make it very steady. But, haul on the controls and you get immediate response.

Most Control Line planes in the past were designed with tails that were too short and too small, making them jumpy and hard to balance correctly. The Wildcat doesn't have those problems. Actually, the only quirk I've found comes from the big fuselage. On a breezy day, the wind will tend to push the plane on the upwind side of the circle. If the plane is straight, it just sort of slides sideways a bit. It's no problem once you know what to expect, and a small price to pay indeed for the chunky good looks of a real Wildcat.

CL Scale/Boss

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able insight where the hobby—and particularly Scale—is concerned.

"On these pages are some pictures of my 1985 Open-class, Precision Scale, Nats-winning P-38J 20 Lightning known as YIPPEE! The airplane is bright red and the YIPPEE! name on the nose and under the wing signifies that this was P-38 number 5,000 to come off the assembly line during the 1940 war years.

"The model features operating flaps, throttle control, operating oil cooler doors, and full lighting system (including instrument panel and retracting landing light). Complete nose armament with firing 20mm cannon (firecrackers) can be viewed with the compartment doors in the open position. Full shock-absorbing landing gear and opening canopy and side windows complete the operating items. Ignition to the glow plugs is through jacks located in the rear of the turbo-superchargers.

"The airplane took 3,500 hours to complete and is scratch-built from my own plans. It is powered with two ST .46 G21-series engines and has a fuel-shutoff option incorporated. The airplane has a 60-in. wingspan and weighs 10.5 lb. I chose to build this particular model for Precision Scale because the P-38 is my favorite WW II fighter and also because a multi-engine airplane is a plus in Precision Scale because of the bonus points.

"I am asked from time to time, 'What is the best airplane to build for the Scale event?' Of course, that's a very open question, and I always reply, 'Build an airplane that will parallel the rules for a particular Scale event.' For example, a multi-engine airplane would be appropriate for the Precision Scale event because of the point bonus.

"However, Precision Scale demands detailing of the model—no maybe about it. Remember, the model is judged at close range, and details such as panel lines, rivets, and screws are highly visible. Full cockpit detail with as much intricacy as possible is also mandatory.

"I fully realize that this type of commitment requires a lot of time, imagination, discipline, and patience. If you can manage to get through all of that, I assure you the personal satisfaction is overwhelming when you have completed your model.

"I mentioned time as being one of the factors in building a Precision Scale model because you can spend as much as two, three, or more years in the construction process. This is especially so if