

# THE ULTIMATE BIPLANE FOR FF RUBBER SCALE

**With all the RC Ultimate bipes being flown throughout the country, it's about time the free flighters had one too. This modern design has all the right moments for a good flying rubber scale model. Might make a good CO<sub>2</sub> job as well.**

**BY PATRICK TRITLE**

When the first RC Ultimate biplane kits burst upon the scene a few years back they took the market by storm. My kit was the second to leave the local hobby shop and the first to return framed. I hung it in the shop for display and to maybe help sell a couple more kits. The first thing that happened was that someone offered me more than I could turn down, so I sold it. Later on, I had the opportunity to fly one, and was duly impressed by the stable, steady feel of the airplane, and immediately began to regret selling mine.

In the meantime, my modeling pendulum had swung back to the early roots of my modeling career—rubber power. At the same time, the direction of my interest was again migrating back to scale, which it always does, and I again began thinking about the Ultimate. There are lots of RC kits and plans out there, a couple of CL plans are available, but nothing for FF rubber. It seemed like the time was right.

Rather than get too carried

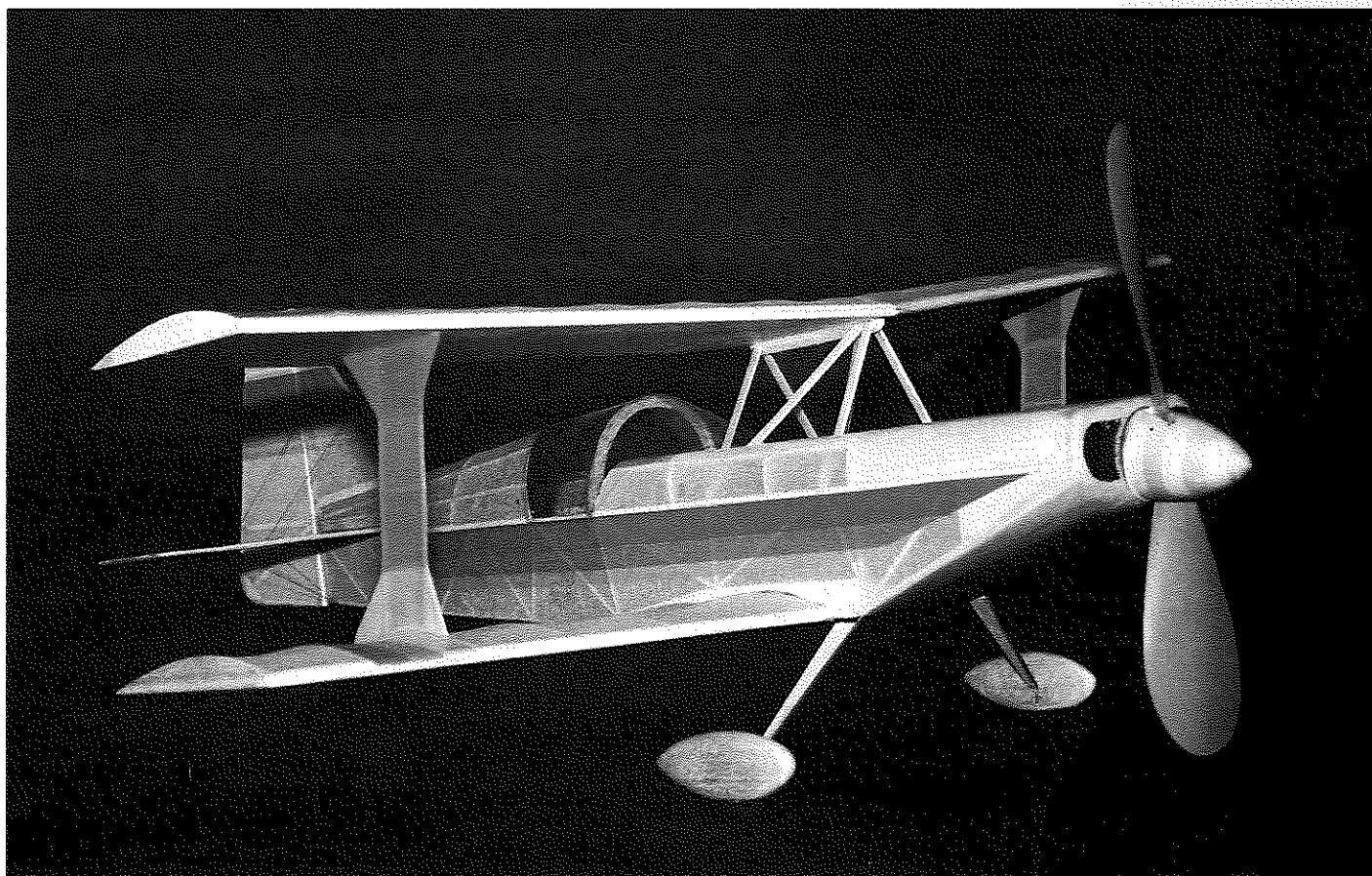
away with a hard-core scale project, I decided to keep construction as simple and light as possible in hopes of producing a durable sport scale model for the weekend flier.

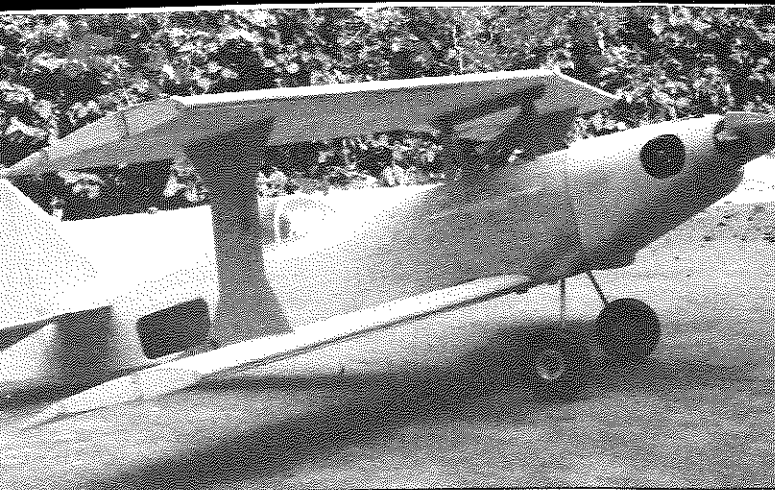
The basic airframe design is a simple stick-and-tissue format. Wing construction utilizes main and sub spars and sliced ribs to keep the weight down, as well as built-up I-struts for further weight savings. The overall outline is not intended to be true to scale, and the horizontal stab has been enlarged for added stability. Though not totally accurate in outline, it's definitely an Ultimate.

## CONSTRUCTION

Start by building up the vertical and horizontal stabilizers. When the glue has dried thoroughly, remove the frames from the plan, sand all the edges round and set them aside.

The wings go together next. Pin the leading and trailing edges to the plan, followed by the 1/16 square rib bottoms. Add the main and rear spars,





Ready for covering and paint, this view shows off the Ullimate's straight lines and simple construction. Note also the experimental short landing gear, which probably improves the ground handling a bit but doesn't look as good as the longer gear.

and cabane strut mounts in place; add triangle stock (not shown on the plans) between the bottom surface of the strut mounts and the inside of the fuselage. Add top formers F-1 through F-4.

Install the three hardwood landing gear support blocks with epoxy. (The horizontal piece is slotted for the landing gear wires; don't drill the vertical blocks yet.) Add the

3/16 balsa bottom section aft of the firewall. Add the triangle stock gussets at each side of the firewall.

Install the front and rear wing support hardwood blocks and triangular blocks. (Use epoxy for all wing attach-

ment structure.) The rear ends of the fuselage may now be pulled together and B-3 and B-4 installed. Be sure the rear fuselage joint is vertical; this is where bananas are born and bananas we don't need! Fit and install the filler block at the rear joint and install the cockpit floor.

Add F-5, F-6 and an extended F-5 from the front face of the vertical F-5 at an angle down to the cockpit floor; this becomes the

when satisfied, drill the plywood supports and install 4-40 blind nuts on the bottom of the supports. Minor rebending can be done as required.

Being sure to maintain the 3-5/8 inch dimension shown on the plan, install the diagonal braces with #3 self-tapping screws. Recheck the strut attachment hardware for tightness—this is your last chance, so get it right!

Install the forward 1/4 square top stringer. The top 1/16 skin is now added in pieces, working from the top edge of FS-1 to the center of the top stringer. Plan a joint at a point about midway between the struts and work to that point from the front and rear. Slot the skin for strut clearance as required.

Sheet the turtledeck, going all the way back to the tail post. Slot the sides and top for the stab and fin. Install the cowl supports and the engine mount. With the engine installed, cut the required cowl openings and fit the cowl. A Tatone Pitts type muffler adapts well to the area below the fuselage section inside the cowl. The chrome extensions are neat and give a more mellow sound.

### WINGS

The upper and lower wings are identical with the following exceptions:

1. The lower wing incorporates the aileron torque rods and the aileron servo.

*continued on page 67*

rear support for the canopy. Install the 1/4 square top stringer. Plank the bottom from B-2 aft to the rear end with soft 1/8 balsa (cross grain); the section forward of B-2 will be fitted following wing installation.

Form the four cabane struts from brass or aluminum; the prototype used K&S brass strips from the local hobby shop. Align them carefully, and

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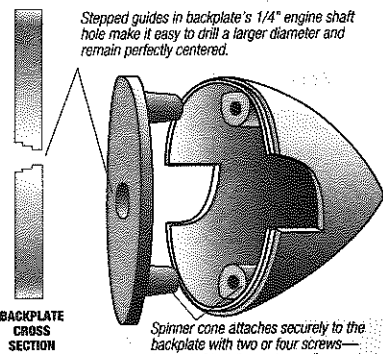
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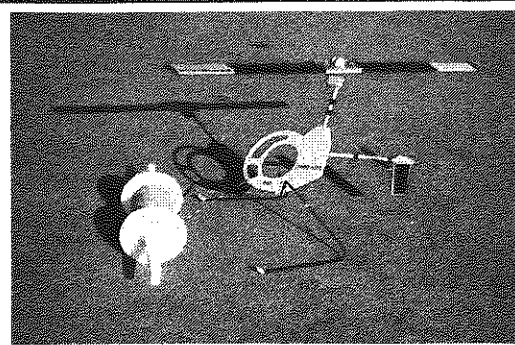
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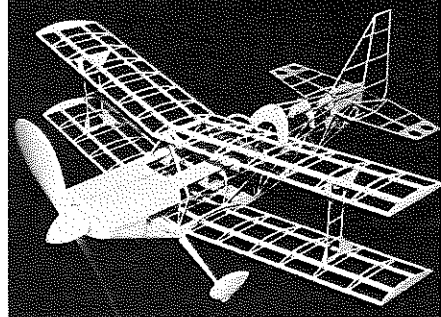
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Bare bones shot reveals the model's light framework—even the I-struts are built up. For best flight performance, the model should weigh no more than about 75 grams.

longerons tend to bow in if the tissue is pulled too tight. Three coats of thinned dope provide an adequate finish at minimum weight.

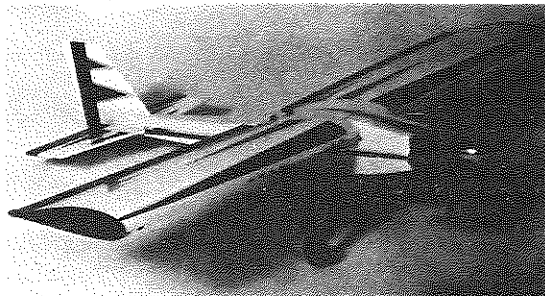
Final assembly begins by gluing the vertical and horizontal stabs to the fuselage. It won't hurt to offset the rudder 1 degree to the right in the initial setup; you'll need it in flight. The bottom wing incidence takes care of itself if the leading and trailing edges are fitted flush with the fuselage bottom. Check the wings for warps and straighten any you may find, then add 1 degree of washout to the lower right wing. Glue the top wing to the center saddle and add the left I-strut first, then the right I-strut, being careful to maintain the 1 degree washout.

The wheel pants and landing gear fairings can go on next, followed by the canopy. Adventurous types can vacuum form one, or simply do as I did and make a forward canopy bow and form the canopy from two flat pieces of .003 sheet acetate. While you have the acetate handy, cover both sides of the cabane struts, which will help stabilize the glide significantly.

The noseblock on this airplane is my own design and has proven to work quite well. Start by cutting a 1/4-inch long piece each of 1/2- and 3/4-inch diameter dowel and glue them together, maintaining proper centering. Then drill a 1/16-inch diameter hole in the block at an angle of 2-1/2 to 3 degrees and mark the block at the bottom-most angle; that will be the location for the 1/32-inch music wire indexing pin. Using the hole as a guide, fit the block into the nose and drill six equally spaced holes from the 180 to the 270 degrees point. Glue the 1-inch long wire index pin into the noseblock. Bend the rubber hook from .032 music wire, turn the spinner from laminated 1/4-inch balsa discs, and assemble the 9-inch prop to the hub. This airplane likes a lot of down and a fair amount of right thrust to fly, and this adjustable block allows several combinations of both for trimming.

Power is a 26-inch double loop of 3/16-inch flat and a single loop of 1/8-inch flat FAI tan rubber. With the rubber in the model, add noseweight to arrive at the CG shown on the plan. Add or remove weight to achieve proper glide. Start at low winds and make trim adjustments as needed for a fairly tight left-hand climb, followed by a right-hand glide. My airplane is a little

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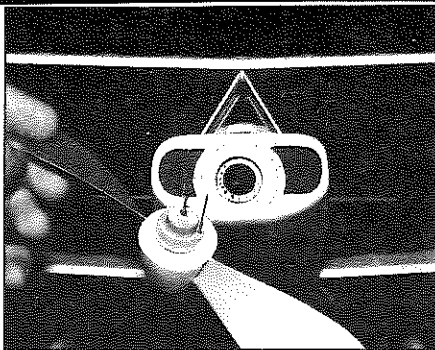


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For precise thrustline adjustments, the prop shaft is offset at about a 3-degree angle in the round noseblock; the noseblock is then fitted with an indexing pin which can fit into any of several holes around the perimeter of the hole in the cowl, allowing a number of different side/downthrust combinations.

finicky about the launch and likes to start at about 5 degrees nose up with only a gentle push to get started. With a good launch, the climb is gradual and nose high. Transition to glide is gentle and predictable.

I hope your Ultimate brings you as much enjoyment as mine has. In the RC market, Ultimates are everywhere. Let's hope the rubber market catches on as well. Hmmm . . . how about a Peanut Ultimate. . . or Pistachio? **MB**

## ULTIMATE RC continued from page 63

2. The lower wing has three ribs at the centerline; the upper wing omits the center rib to allow for the plywood mounting plate.

3. Upper and lower wings are shown in the same plan; the right side depicts the lower wing and the left side the upper.

4. Both wings are flat (no dihedral) and may be assembled in one piece.

Edge-join the bottom sheets; note that they extend full chord and from the root to the tip. Pin the bottom sheet on the plan and mark the locations of the spars and all ribs.

Install the spars on one side. Slide a sheet of waxed paper under the centerline and pin down the opposite bottom wing skin. Be sure the centerline joint of the bottom sheets is true and at the correct angle. Once satisfied with the joint, apply cement and weight it down until dry. When dry, install the spars on the other side. With the bottom skin held down firmly, use a strip of aileron or T.E. stock to raise the bottom skin at the leading edge to match the curve of the R-1 ribs and install them, along with the R-2 and R-3 ribs.

Using a rattail file or other suitable tool, make the cutouts for the leading edge in the ribs; a file may be worked through several ribs at once, giving a straight line. The slots must allow the dowel to seat against the bottom skin. Once fitted, carefully cut the dowel to length with the proper bevel on each end. Install the leading edge, assuring a good glue joint against the bottom skins and at each rib. Sand the rib/leading edge joint and ribs back to the

*continued on page 73*

## HAVE YOU TRIED FULL-SCALE ?



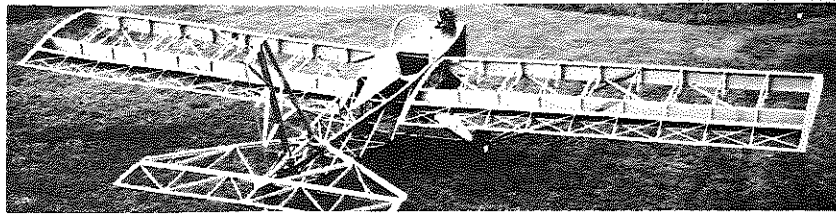
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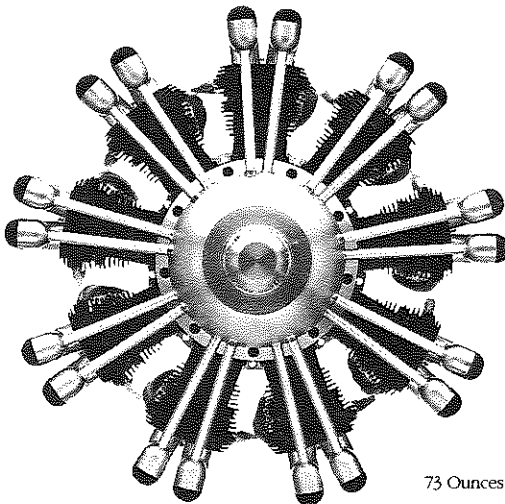
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