



LIL' EASY

**It's the
simple
things
that
count**

by RANDY RANDOLPH

THE FIRST "EASY" made its public debut in the May 1987 issue of *Model Airplane News*. It was designed to be an easy-to-build and easy-to-fly airplane for .40 to .50 4-stroke engines. It was a friendly sport airplane that would be ready to fly at a moment's notice. Although it was not intended as such, a number have been used very successfully in training programs around the country. Its lightness, coupled with its ability to stay in the air at relatively low air speeds, seemed to appeal to club flight instructors as well as to those of us who enjoy relaxed sport flying.

Lil' Easy is a scaled-down version of the big guy and is just right for engines in the .10 to .15 range. It is stout enough for the hot .20 4-strokes, but most of the flying done with those engines will be a waste of the power available because of all the reduced throttle operation. With the hot little Enya* 11-CX in its nose, the airplane is actually a little on the overpowered side.

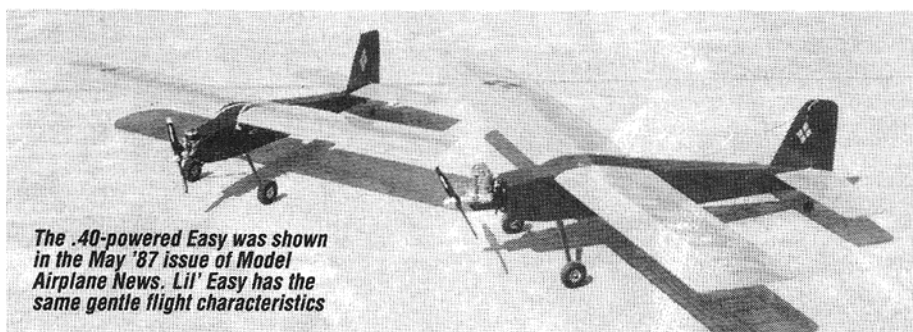
Even though Lil' Easy can be quick and aerobatic, when the power is pulled back, it becomes the same gentle airplane as its big pussycat brother. Slow flight is slow, and landings are very kind to the pilot. I know of no other airplane in its power range that has such a wide performance envelope.

This is a "plain vanilla" airplane, so it is an easy airplane to build. The slab sides, solid-sheet tail and semi-flat-bottom wing all contribute to its being quick to build. There is lots of room in the cabin area for almost any radio system and enough finger room to make it easy to install. If you have never built an airplane from magazine plans, this might be the one to try.

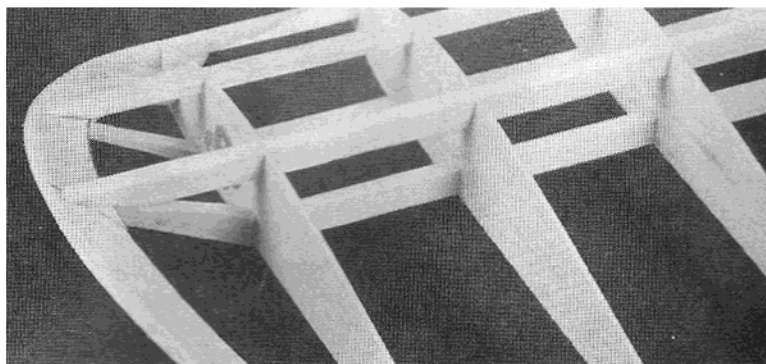
CONSTRUCTION

As a rule, the wings take more time to construct in any airplane, so they're a good place to start.

Make the ribs out of 1/16-inch balsa sheet. They can be cut out of a "printed sheet" made by tracing around a card-stock template onto the balsa sheet with a fiber-tipped



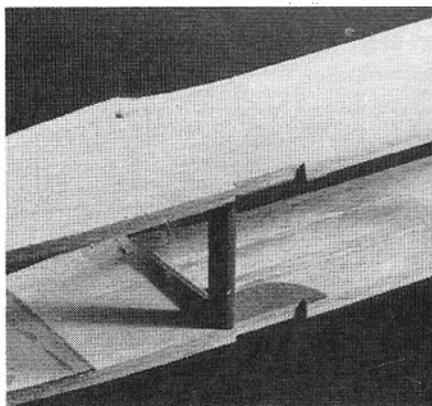
The .40-powered Easy was shown in the May '87 issue of Model Airplane News. Lil' Easy has the same gentle flight characteristics



Rounded tips that slant up to the top spar add a little something to an otherwise boring constant-chord wing. The small washer glued to the tip rib balances the wing laterally.

pen; or they can all be cut out at the same time by stacking balsa blanks together, tracing the rib pattern onto the top blank and then cutting all the ribs out simultaneously with a band saw or a jigsaw.

Trim $\frac{1}{16}$ inch off the top and bottom of four ribs, and enlarge the main spar notches to receive the dihedral braces. These are the center-section ribs. Cut the shear webs out of $\frac{1}{16}$ -inch sheet (notice the grain; it should run vertically). Strip the spars out of the appropriate sheet wood. (Use a straightedge and razor knife, or one of the available balsa strippers—depending on your choice of wood.)



A right triangle is handy when joining the fuselage sides. Notice the cutout for the landing-gear mount and the plywood doubler in that area.

The main spars should be cut out of medium-hard, straight-grain wood, and the other spars and the leading edge should be cut out of medium wood. The $\frac{1}{16}$ -inch trailing-edge sheet is also made of medium balsa, as are the $\frac{1}{8}$ -inch tip pieces (notice the grain in each of the tip pieces).

After covering the plan with wax paper, start to build the left wing by pinning the bottom main spar into place on the plan. Slip some ribs onto the spar, and use them to position the trailing-edge

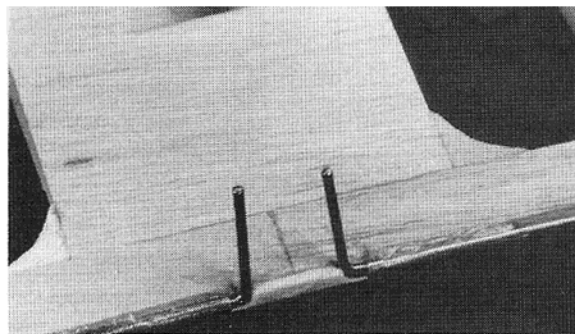
sheet so it will match any slight difference there might be between the length of your ribs and those shown on the plan. Pin the trailing edge into place and, starting with the second center rib, glue the ribs to the spar and to the bottom trailing edge.

When all the ribs and webs have been glued into place, add the top main spar. (Make sure that it is glued to the webs as well as to the ribs.) The front top spar and leading edge are added now, but don't add the top trailing edge sheet just yet; it will be installed after the wings have been joined at

the dihedral joint. Build the right wing in the same way.

The two center ribs are cut in half at the main spar and the two nose ribs are joined. The back half of each rib forms the aileron servo-well sides. Bevel the leading and trailing edges at the center to match the dihedral angle, and join the wing panels with the dihedral braces. Install the center ribs, then the front bottom spar and the top trailing edge, and sheet the center section. The sheeting goes between the spars, leaving the bottom of the servo well open. The tips are glued to the two tip ribs. (Notice that they slant upward to become flush with the top of the top spar stubs.)

The ailerons are made of $\frac{1}{4}$ x1-inch stock that's tapered to $\frac{1}{16}$ inch at the trailing edge. (Tapered stock can be bought, or square stock can be sanded to shape.) Two-inch pieces of aileron stock are glued to the trail-



The aileron torque-rod assembly is made of $\frac{3}{32}$ -inch music wire inside $\frac{1}{8}$ -inch brass tube. If thick Hot Stuff or UFO glue is used to anchor the tube to the trailing edge, there will be less chance of glue running into the tube.*

ing edge between the last two ribs and then sanded to blend into the tips.

Make the aileron torque rods by slipping brass tube over the $\frac{3}{32}$ -inch music wire then bending the wire to the shape shown. Note that there is a left and a right torque rod. Mark the position of the torque-rod arms on the trailing edge and, to give the arms free movement, relieve the trailing edge at these places by sanding with a piece of rolled sandpaper. Glue the brass tube into place on the trailing edge; be careful to avoid getting glue in the tubes, and check that the left one is on the left side, etc.

Hold the ailerons against the torque rods, and drill the leading edges to match the barbs on the end of the rods. To allow the torque rods to seat and to close the gap between the ailerons and the wing, slightly hollow out the leading edges from these holes inboard. The ailerons are mounted after they and the wing have been covered, using one of the thick Hot Stuff*-type glues to secure them to the torque rods.

The servo will be mounted on a plywood tray that is glued to scrap balsa risers at both ends of the servo well. Standard aileron

SPECIFICATIONS

Type: Sport plane
Wingspan: 48 inches
Weight: 35 ounces
Wing area: 405 square inches
Wing loading: 12.5 ounces/square foot
Power req'd: .10 to .20 2-stroke
No. of channels req'd: 2 to 4
 (ailerons, elevator, rudder, throttle)

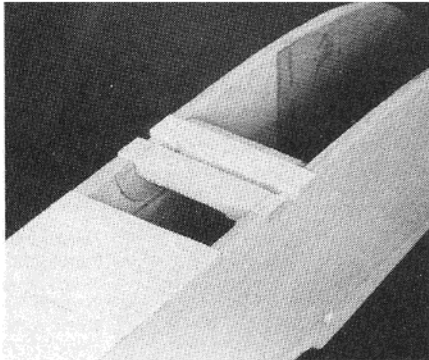
Features: simple, slab-side fuselage and constant-chord wing. This is a good project for first-time scratch-builders.

Comments: this design has a very wide flight envelope. It will land at a crawl with its 12.5 wing loading, and it will get up and go for fliers who love high-speed aerobatics.

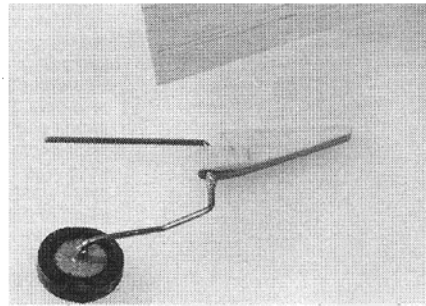
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hardware is used to connect the aileron horns to the servo.

The stab-elevator and fin-rudder are cut out of firm 1/8-inch sheet balsa. To help eliminate the chance of warping, cross-grain sheet is added to the tips. The elevator carry-through is a piece of 1/8-inch hardwood dowel. When the fin and stab tip have been glued into place, join the mating surfaces and sand the tip outlines to blend with the inner parts and conform to the shape shown on the plans.



The balsa sheeting is butted against the landing-gear mount, which extends 1/16 inch above the fuselage sides. The 1/2-inch plywood firewall doubler is visible here.



The tail wheel and tail-wheel mount are both homemade, but there are excellent commercially available substitutes. Note the rod exit in the fuselage side.

FUSELAGE

The fuselage sides are made of medium 3/32-inch balsa sheet. The doublers are also 3/32-inch balsa with 1/32-inch plywood triplers in the nose area. When the doublers and triplers

"With full power, almost anything you want to do can be done"

have been cemented into place, pin the two sides together and sand them to the same outline. While they are still pinned together, make a cutout for the wing saddle and drill the 1/4-inch holes for the wing-holding

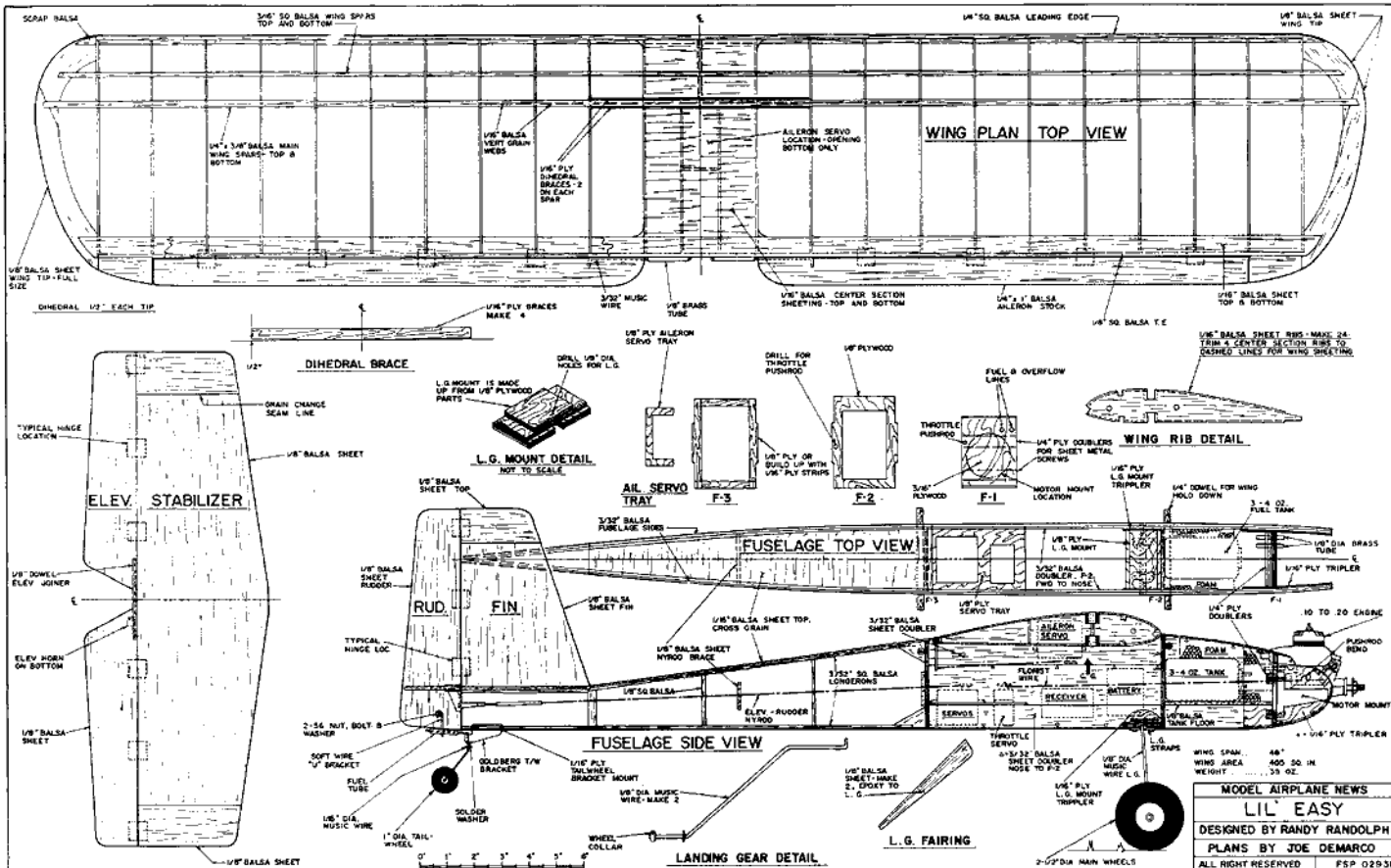
dowels (if you use that method).

Separate the sides and add the servo-mounting rails and those for the tank. Cut out and drill the firewall and the two cabin formers, and epoxy T-nuts onto the rear of the firewall for the mounting bolts. If machine screws will be used instead of bolts, glue 1/2-inch-wide strips of 1/8-inch plywood to the rear of the firewall where the T-nuts would have been.

Start to assemble the fuselage by gluing the two cabin formers into place on one of the sides. Check with a right triangle to ensure that the formers are perpendicular to the side. When the glue has dried, glue the other fuselage side to the formers, making sure that it is perfectly aligned with the first. Bring the tail halves together and glue them, then carefully glue the firewall into position.

Sheet the bottom of the fuselage from the back of the wing saddle to near the tail with 1/16-inch balsa (the grain should run across the fuselage). At the tail, the balsa is replaced with 1/16-inch plywood to take the tail-wheel mount. Build up and glue the landing-gear mount into place just behind the first cabin former. Install the Nyrod guides from the cabin area to the tail. Drill the Nyrod supports, trim them to fit between the fuselage sides, slip them over the

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Nyrods and epoxy them into place.

Epoxy the 1/8-inch-copper-tube fuel-feed and overflow lines and throttle linkage tube through the firewall, and install the floor in the tank compartment. Wedge the tank into place with foam, and connect it to the copper tubes with fuel tubing. Watch for and eliminate kinks in these lines. Finish the cross-grain sheeting and sand the completed fuselage.

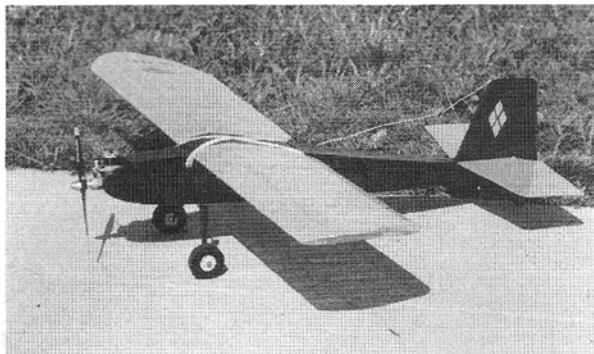
On my original, I covered the wings and stab with transparent MonoKote* and the fuselage and rudder with Coverite's* Black Baron Presto. If you're an old-timer who likes the look of doped silkspan, try Coverite's Micafilm; it's very light but strong. Whichever covering you choose, follow its manufacturer's application instructions. The original's aileron and elevator hinges were MonoKote, and Black Baron film was used on the rudder, but you can hinge the surfaces in your usual way.

Trim the covering away from the bottom center of the stab, which will contact the fuselage, and trim a 1/8-inch-wide strip off the center of the top to receive the fin. When the surfaces have been hinged, cement the fin to the stab and then the stab to the fuselage. Check alignment all the way.

Make the tail-wheel bracket out of 1/8-inch ply with 1/2 ply doublers on either side. Install the brass bearing, and bend the tail-wheel axle and steering arm while they're in the bracket. Trim a notch in the 1/6 ply tail-wheel mount and epoxy the mount into place. Bend the U-shaped tiller holder, and slip a piece of fuel tubing over the tiller before capturing it in the holder and attaching it to the rudder with a 2-56 bolt and nut.

Before installing the engine mount on the firewall, it is a good idea to paint the firewall with epoxy. When the engine has been mounted, attach the fuel line to the carb and the overflow line to the muffler, if pressure is desired. Run a piece of soft iron wire through the throttle Nyrod, and connect it to the throttle arm. A U-shaped bend in the wire at the arm offers a method of adjustment and relieves strain on the servo. Bend up the landing-gear legs, add the wheels, and hold them in place on the gear mount with metal brackets and small wood screws. The gear-leg fairings are 1/8-inch balsa, cut to shape, sanded, glued with Hot Stuff to the legs then covered to match the fuselage. Two-and-a-half-inch wheels look fine and work well on grass fields.

Before installing the radio, assemble the airplane and check the balance point. Move the battery pack and servos around until the plane balances at the point indicated on the plans, then install the radio to maintain this balance. Connect the elevator and rudder to the servos with Nyrods, clevises and horns.



Lil' Easy—a slab-side "stick"-type airplane for .10 to .20 engines.

Make a Z-bend in the throttle wire to engage the throttle servo. Check to see that everything reacts properly to the transmitter controls and, after a range check, the airplane will be ready to fly.

PERFORMANCE

Try some taxi tests first. Lil' Easy is very solid on paved runways and turf, and it should track with very little corrective rudder. For the first takeoff, use plenty of runway, and once in the air, let the speed build. Unless there are some undetected warps, any trim needed should be well within the limits of the transmitter trim controls.

At altitude, try a few power-off stalls to get the feel for landing. You will find that Lil' Easy will fly quite slowly with full control at minimum throttle. On the first landing, try to hold it off as long as you can, and it will settle in as nicely as you please.

With full power, almost anything you want to do can be done. With the balance point shown, snaps are tight yet comfortable; slips and knife-edge are easy; rolls are smooth, with little or no altitude loss—even without corrective elevator; inverted snaps and spins and all outside maneuvers are just about the same as upright ones. Lil' Easy is easy—and fun!

**Here are the addresses of the companies mentioned in this article:*

Enya Model Engines/Altech, P.O. Box 286, Fords, NJ 08863.

Hot Stuff; Satellite City, P.O. Box 836, Simi Valley, CA 93062.

MonoKote/Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826.

Coverite, 420 Babylon Rd., Horsham, PA 19044. UFO; distributed by Satellite City (address above). ■