

R/C Hand-launch Glider

FLINGER

By LARRY JOLLY . . . This is one R/C HLG that has style, performance, and a proven competition record. The author (right) is well-known among sailplane enthusiasts for his excellent glider designs. Build yourself a winning little "Flinger" HLG!



• Even before Olivia recorded "Let's Get Physical," quite a few Southern California glider guiders were throwing their gliders into low-level thermals. This phenomena grew to the point where several of these affected individuals would get together and have contests to see who could stay up the longest from a hand launch.

Before I became active in R/C hand launch, I couldn't see the attraction. After all, the weakest hi-start could get your sailplane five times as high as it could be thrown. Even after walking out to the parachute and back six times, you wouldn't be as tired and sweaty as you would be after a ten-minute workout with a hand-launch model. Did I say hand-launch model? Oh yes, it didn't take Dave Thornburg or Chris Adams long to figure out that they could throw a specially designed model much higher than a *Cirrus* or *Windrifter*. And as time went by, we saw *Sunbirds*, *Zephyrs*, *Tercels* and now the *Flinger*.

What's a *Flinger*, mister??? Well, a *Flinger* is a new generation hand-launch model. No, that doesn't mean that it dyes its empennage red and green, and has a safety pin through its nose, or that it sticks its nose in the grass every chance it gets. It is a model that was designed to be strong and yet light enough to give decent performance, and to take full advantage of its diminutive aerodynamics.

The *Flinger* is a little longer than most hand-launch models. Its wingspan is 57 inches. This yields a model with enough wing area to be super flyable and yet have enough aspect ratio to give a decent L/D. I know that free flight doctrine calls for a hand-launch model to have fairly low aspect ratio. This is because free flight models are designed for minimum sink and downwind journeys. R/C hand-launch models must have the ability to circle tightly, ride light air, and then penetrate home, or to the

next upwind thermal!

The *Flinger* has all of these virtues and uses them to her advantage. After flying my prototype *Flinger*, Michael Bame told me that he had just about given up on small models because of their apparent inability to cover ground. But the *Flinger* changed his mind. He was impressed with the way the model could dart across the sky from one thermal to another.

If you decide that you want to build a *Flinger* for hi-start or winch launchings, go ahead. Take it easy, you don't want to fold the wing. In fact, if you're a little heavy footed, I'd suggest that you change the spars from 3/32 x 3/16 to 1/8 x 1/4 spruce. This would help ensure against wing failure. Build *Flinger* to the plans and you won't have anything but fun! In fact, *Flinger* is the most fun sailplane I have ever designed. If you don't have a small radio, SHAME ON YOU!!! All of the manufacturers market small, "micro" airborne systems that work great! They are also very reasonably priced. Let's face it, that classic Citizenship and Heathkit GD 47 that you've been saving on the shelf are never going to come into vogue again.

So, order a set of *Flinger* plans from W.C.N. and get down to your local hobby dealer and check out his micro systems. Oh yes, while you're there, pick up the following materials so that you can start your *Flinger* when the plans arrive.

MATERIALS REQUIRED

- 4 — 1/8 x 1/8 x 30 Balsa longerons
- 2 — 3/32 x 2 x 30 Balsa fuselage sides
- 2 — 1/8 x 3/16 x 30 Stab and rudder outlines
- 1 — 1/8 x 3 x 24 Elevators and 1/8 gusset material
- 2 — 3/32 x 1/8 x 30 Stab and rudder ribs
- 5 — 1/16 x 3 x 30 Wing sheeting and fuselage sheeting
- 2 — 1/4 x 1/4 x 30 Balsa leading edge
- 2 — 3/16 x 3/4 x 30 Balsa trailing edge

- 4 — 3/32 x 3/16 x 30 Spruce spars
- 4 — 1/16 x 3/16 x 30 Balsa cap strips

You'll also need some scrap 1/16, 1/8 and 3/16-inch sheet balsa for the ribs and some 1/16 and 1/8-inch plywood for the various plywood parts. As for hardware, you'll need two small Sullivan cable-and-tube pushrod assemblies, some nylon hinge strip, and two paper clips, as well as the various building and covering materials. You'll also need a flat building board at least 30 inches long that will take pins.

I find it quicker and easier to construct a model from plans if I make a kit first. Cut the wing rib drawings from the plan sheet and glue them to 1/16 plywood to make the rib templates. Make the tip ribs by trapping five balsa blanks between the two plywood templates. Carefully sand the blanks to conform to the root and tip templates. When the shapes are correct, discard the plywood tip rib template and use the balsa blanks as templates for the five tip ribs. Now, make yourself a set of main ribs and tip ribs. Follow the plans to make sure you make enough ribs and that they are the right thickness. While you're at it, make two sets of ribs: you'll want to have two *Flingers*!

The wing leading edge can be made one of two ways. The proper method is to take a piece of 1/4 x 5/8 x 30 stock, and, using a table saw, split the stock with a 30-degree cut. Then, go back and put a 15-degree cut on the bottom of each piece, yielding two shaped pieces of leading edge material. However, the easier method, though not as accurate, would be to take two pieces of 1/4 x 1/4 and put a 15-degree angle on one side with a sanding block. This would give you the bottom angle of the leading edge, which is then glued in place and shaped after the top wing sheeting is applied. Use whichever method suits your needs.

Cut the fuselage sides from two medium pieces of 3/32 wood.

Cut the dihedral braces from 1/16 plywood, and the shear webs from 1/16 balsa.

BUILDING THE WING

If your building board is long enough, cut the wing panel drawings from the plans and build both right and left wings at one time. Start construction of the wing by pinning the bottom leading edge sheet, the balsa trailing edge, the center sheeting, and the bottom cap strips in place. Don't forget to block the bottom leading edge sheeting up to match the bottom rib contour. I use a piece of trailing edge stock.

Using a rib as a guide, glue the bottom spar in position. Using a shear web as a spacer between each rib, glue ribs W1-B through W1-G in place. Glue the top spar in position. Fit and glue the vertical grain balsa shear webs along the front of the spar. Now you may add the balsa leading edge.

If you used Hot Stuff, Zap, or Super Jet to build the center panel, it's now dry, so you can raise it up to 2-13/16 inches for the dihedral, and you can build the tip panel directly onto it.

Use the same sequence that you just used to build the center panel in making the tip panel. Make the tip dihedral braces from hard 3/32 balsa stock stripped to 9/32 width. The *Flinger* uses the "cross-your-heart method" for the dihedral brace construction. I like to cut a strip the full height of the brace, and also the full length. I then cut the proper angle to match the bottom spar, and have found that the excess fits nicely between the top of the brace and the bottom of the top tip panel spar. Glue the two braces and rib W1-H in place. Add the top sheeting and cap strips to the tip panel.

If you haven't already built the other wing half to the same point of construction that you now have this half, do so. When both halves are complete to this point, lay them over the wing plan to check that they will match up correctly. Raise one wing center panel up 2-5/8 inches and see if the two panels will form a good center joint. If not, carefully fit the offending panel with a sanding block. When you have a good fit, glue the panels together and add the two center plywood braces and both rib W1-A's. Now, add the top sheeting and cap strips to the center panel which is pinned to the board. When that panel is complete, pin the other panel to the board and give it the same treatment.

Remove the wing from the board and carefully shape the leading edge and finish sand the wing. Make the wing tips from a piece of 1/8 balsa and glue them in place along the centerline of the wing rib. Add the 1/16 balsa triangular braces and finish sand the wing tips. Glue the 1/32 x 1 x 1 plywood bolt mount in place on top of the wing. The wing is now completed except for covering and installing the leading edge dowel used

for wing attachment.

BUILDING THE FUSELAGE

Lay the fuselage sides on your build-

ing board, bottom facing bottom. This ensures that you build a left and right fuselage. Now mark the location of the plywood former.

Glue all the longerons in place. When dry, lift the fuselage sides from the building board and pin them together, longerons out. Now sand the edges, this ensures that both fuselage sides are the same. Don't forget to bevel-sand the longerons at the tail where they glue together.

Lay the airborne radio equipment you intend to use in the *Flinger* on the drawing. If your equipment fits easily, you may want to narrow the front former's width. Conversely, if your equipment is larger than that shown, make the former wider. Needless to say, the thinner the fuselage, the less frontal drag your *Flinger* will have. When you have the former cut to shape, notch it to accept the pushrods and whatever clearance for wires that you might require.

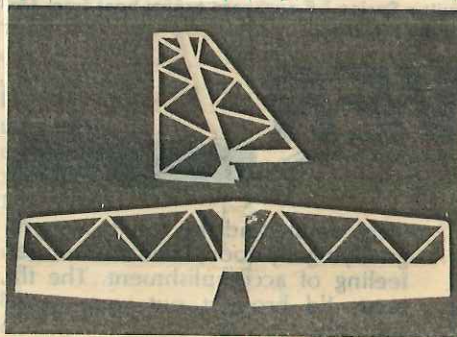
Place the fuselage sides right side up over the top-view of the drawings, longeron side in. Cut two pieces of 1/8 square balsa the same width as the former. Place the former, the two 1/8 x 1/8 balsa cross members, and the 1/8 plywood wing mount in position and pin the sides together at the tail. Check to see that everything lines up squarely. When everything is straight, hit it with the CA glue.

Cut the nose block from medium balsa and glue it in place between the fuselage sides, then glue the pushrods in place. I use Sullivan small cable assemblies. Make sure the outside housings are securely glued along the entire length of their run.

Glue the plywood floor and 1/16 top and bottom sheeting in place. Carefully tack-glue the canopy block in place. Now sand the entire fuselage to shape. The object is to blend the box fuselage into a pleasing shape with rounded, smooth contours.

TAIL SURFACES

Build the tail surfaces flat on the plan out of 1/8-inch thick materials. When the structures are dry, sand them to shape. Don't sand the surfaces too thin. You don't want them to flutter.



FINAL ASSEMBLY

Finish sand the entire airframe smooth. Place the wing on the fuselage and check the fit. If the fit is not good, add wood, or subtract it with a sanding block. Be careful that you don't change

the incidence angle. Carefully drill the 3/16 hole for the wing pin in the front former. Line the wing up on the fuselage squarely. Holding the wing carefully in place, drill through the front former into the wing with a long 3/16 drill. Glue the 3/16 dowel in place in the wing leading edge. Now put the wing in place in its mount. Make sure the wing is square to the fuselage. Drill through the wing's trailing edge and into the 1/8 plywood wing mount.

If everything looks good, open the hole in the wing to accept an 8-32 nylon bolt and tap the wing mount for the same. Check that the tail surfaces will line up squarely to the wing. If not, carefully sand the fuselage wing saddle with a sanding block.

Now cover the entire model with Super Monokote. Be careful with the tail surfaces. They are thin, but if you're careful, you can successfully cover them without putting a twist in them, so take your time. I use Rocket City Nylon Hinge Strip for hinges, but you can also use Monokote or tape hinges... take your pick.

Now is a good time to glue the plywood control horns in place. Make sure the horns line up with the pushrod exits.

Remove the Monokote from the stabilizer where it glues to the fuselage, and on the top where the rudder and fin glue to it. Align the tail surfaces with the wing and glue them in place.

MOUNTING THE RADIO

Make up some cross-members from plywood and balsa to mount your servos to. Put the receiver and battery pack in position and check the center of gravity. If necessary, rearrange the equipment or add lead to the nose to achieve proper balance. I use a 3/16 balsa former behind the receiver to keep it in place. It also keeps the fuselage from crushing from an over-zealous grip. Make up the pushrods as shown on the plans. Be careful that you have both the servos and control surfaces at neutral when you solder the connections in place.

The only trim adjustments you will have are on the transmitter. The rudder should move one inch each way and the elevator 1/2 inch each way. Make sure the batteries are charged, and let's head to the flying field!

FLYING FLINGER

Assemble your *Flinger*. Do the controls move in the right direction? Is the center of gravity correct? If everything is right, gently toss the model into the wind. Correct any trim problems until you get a flat glide.

Now, carefully launch the *Flinger* overhead and hard. The model should climb dramatically and transition into a gentle thermal-hunting glide.

You'll soon find that the *Flinger* will ride the lightest lift. With practice, you should be able to get 45 seconds to one-minute flights in dead air.

Good luck with your *Flinger*. I hope you enjoy your *Flinger* as much as I have enjoyed mine. Do be careful to warm up before a hand-launch session: you don't want to overdo it!!!