

Bob Hahn's graceful West Coast Soarer . . .

R. C. SOARER . . . LI'L "T"

by Dale Willoughby

► Once in a while an individual sees a model, be it a beautiful smooth-flying multi ship, a spectacular scale version of a real aircraft, or a sleek high performance glider and he wishes he had conceived the design. Such was the author's thoughts when he first witnessed flights of Bob Hahn's "Li'l T" (contracted from Little Tee).

The Li'l T has consistently shown that it is one of the best slope soaring designs to fly at the California site of the "Harbor Slope Soaring Society." Six months after I had seen the first flights, I spoke to Bob Hahn about making this easily built design available to other slope soaring fans. Bob is an aerodynamicist working at Douglas Aircraft and at present is concerned with the design of the Global Transport C5-A recently proposed by President Johnson. With very little free time available, Bob took time to draw the plans, but declined to write the construction article. Then Ira Achey, a professional draftsman at Lear Sieg-

The tow aloft. An instant after release, Bob's hand makes for the Orbit 10 Transmitter for a correction if need be to the flight path. This thermals and gliders is wonderful summer fun.



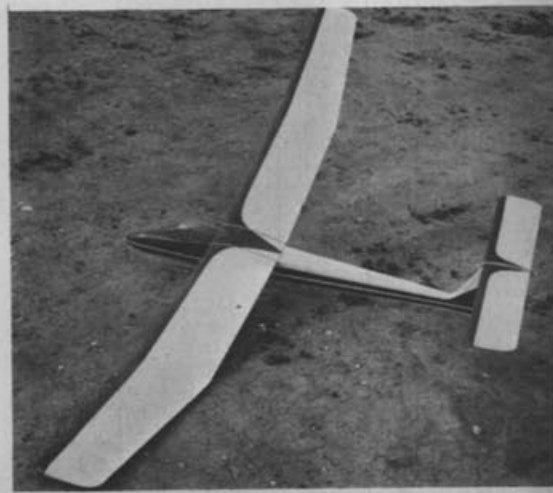
5 minute test hop. Off a 60 foot bluff with a wind striking the face of the hill. Must be a thousand other such sites about the nation, it is hard to figure why others don't try it too. This is Bob Hahn and original, off & soaring.

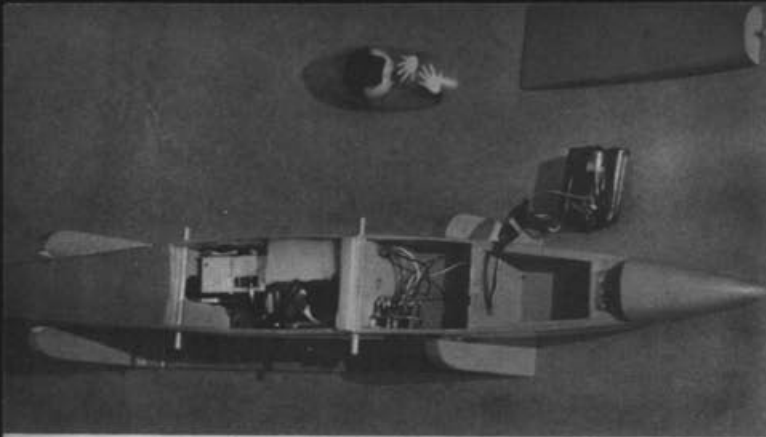


Nose to the grindstone. (Ooooh, that's awful!) Fuselage balanced to display inner space area. Servo installation comes next, then top sheet.

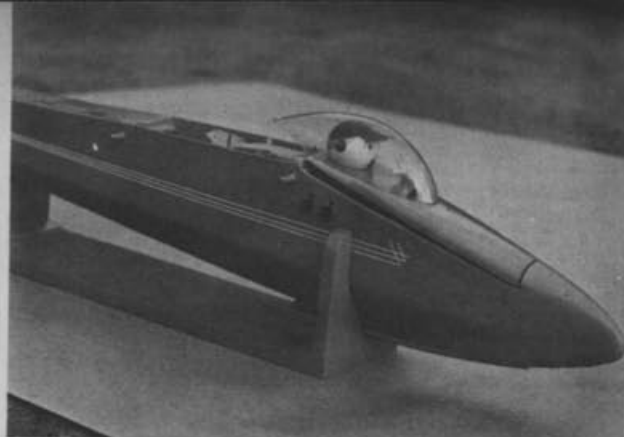


Li'l "T" Number Two and builder, Ira Achey. He found it to be fast glider to go together.

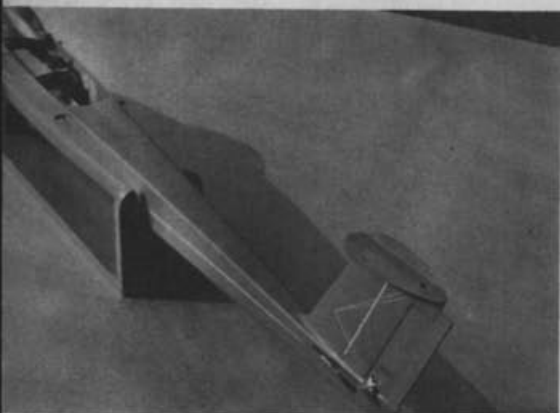




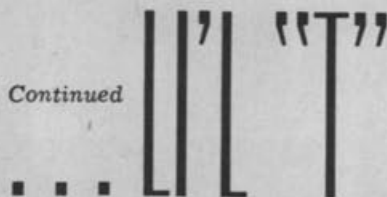
Sun in your eyes? Fly hands-off as per our panicky passenger. This shot of Bob's craft displays interior decor. Batteries, switch, an Orbit 10, one Bonner Transmite servo. Note lead shot nose ballast.



A sleek nose and optional canopy adds interest to this fine flying design. International orange (nitrate) with white Trim Tape adds a festive touch. Use of the stand is encouraged to protect the finish.



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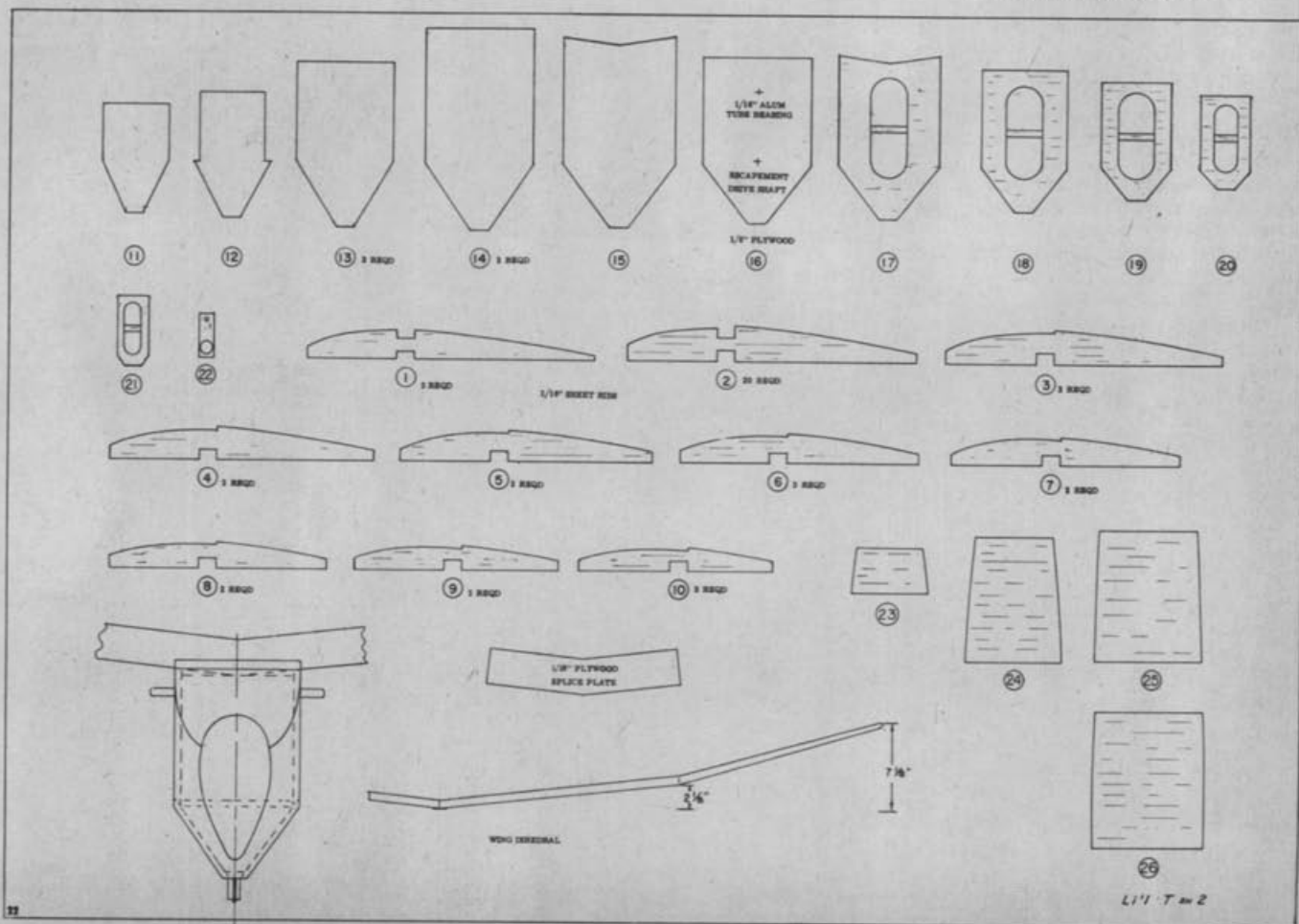


Rear shot shows streamlined stab platform, the hole permits fastening stab with rubber bands. Added rudder area has been incorporated on the plans. Fine slope soaring, thermal sensitive.

ler, Inc., of Anaheim (and a model builder) stepped in and volunteered to ink the plans. Ira saw the ease in building this design, offered and decided to build the "Li'l T." It is his aircraft that appears in the construction photos, while the original ship was shot as the completed version. You could call this article a three man effort!!

With a sheet balsa box for the fuselage, an all sheet balsa stabilizer, and a flat bottom wing section, this design represents the ultimate in simplicity and ease of building. Many of the actual construction hints appear on the plans, even notes for finishing, and for that reason, detailed building instruc-

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L'I'L "T" SOARER

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tions are not really necessary. Slice out the formers, except #16 which is $\frac{1}{8}$ " plywood, from hard $\frac{1}{8}$ " balsa and the wing ribs from $\frac{1}{16}$ " C-stock. In cutting the fuselage sides, notice that each side takes two pieces and the bottom section is trimmed at an angle before cementing, so as to butt properly against the side. We found the Razor Plane to be ideal for this trimming job. Formers marked #23 through #26 are $\frac{1}{8}$ " balsa for the floor of the fuselage and are cemented cross-grain inside between the formers before the bottom sheeting is cemented. Also notice the $\frac{1}{8}$ " sheet balsa on top is as wide as the fuselage, so the sides should be cut accordingly. The nose block is a piece of 3" x 3" x $1\frac{1}{4}$ " hard balsa with the grain running parallel to the fuselage. The hatch cover is of medium soft balsa and measures 7" x 1" x $2\frac{1}{2}$ ". The small balsa block at the rear of former #22 should have both lengths of tubing inserted (if rubber is used) and the block tapered prior to cementing. For greater strength, the top fuselage sheet is notched for the $\frac{1}{4}$ " sheet fin, rudder and sub-rudder. Prior to completing the fuselage the decision must be made as to what receiver/escapement/servo combination will be installed, so plan accordingly. After the installation of the torque/pushrod, sand the entire fuselage smooth, silk it and apply dope in your favorite color scheme. Follow the suggestions furnished on the plan for a really attractive glider. Bob Hahn used International Orange nitrate dope with white Trim-tape.

When assembling the wing be sure that you center the gussets at the trailing edge and don't leave them out!! Of course, the wing should be built on a flat surface. Although the plans show

$\frac{1}{4}$ " x $\frac{3}{8}$ " leading edge, a standard $\frac{1}{2}$ " x $\frac{1}{2}$ " shaped leading edge by Sig Balsa can be used providing it is trimmed to shape and the airfoil section retained. Likewise Sig also sells shaped trailing edges and if the $\frac{1}{4}$ " x 1" size is used, it will add about 13 sq. inches area to the wing.

The secret of the strength of the wing is two $\frac{1}{4}$ " x $\frac{3}{8}$ " x 36" hard balsa spars, plus the use of good firm $\frac{1}{16}$ " sheet for the leading edge. The top spar is not cut into two lengths, but where the dihedral break occurs, a small "V" is cut about half-way through the top spar, removing enough balsa to permit the necessary bend without breaking. Fill the break with a generous fillet of cement or white glue. Sand and fill the pores of the balsa with a good sanding sealer and sand it back with 320 wet or dry silicon grit sandpaper. Silk it or use the newer Royal Products Silron.

The stabilizer is built up of strips of light balsa (four to six lb. stock) as shown on the plans. We recommend that the bottom sheet be cut to include the tips and the soft balsa tip be cemented on top of the $\frac{1}{16}$ " sheet for a rugged stab. If the balsa you have chosen is soft and spongy and likely to sag after a couple of coats of dope, strengthen it internally by using soft $\frac{1}{16}$ " sheet set on edge, criss-crossed into a truss type structure. However, go easy on the cement and strengthening, for weight at the tail takes a lot of compensating ballast at the nose. The stab is not silked for this very reason.

Trimming this glider for maximum performance is easily accomplished by adding lead shot to the ballast box in order to balance the glider at the C.G. point shown on the plans. When balanced, cover the ballast box with a small sheet of celluloid. Steam all warps out and permit no turn on the glide. Try the first test glides *without*

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the radio turned on. A straight flat glide of about 15 to 1 ratio is ideal, and can be achieved with this design.

No mention of radio installation has been made, but Bob used the usual method of wrapping the receiver and batteries (batteries in the nose), in foam rubber and tucking them in the proper compartment to achieve the balance required.

I know some sharp-eyed individual will note the added rudder area shown in the photos of the finished ship. It was found in flight tests that the original glider had insufficient rudder area to turn a real tight circle, so a strip of $\frac{1}{8}$ " balsa was added. However, the plans incorporate this change and show the right amount of rudder area, whereas the fin area was reduced.

Though not shown on the plans, we recommend the use of the stand shown in the photos. Cut from $\frac{1}{2}$ " lumber, with the inner section lined with foam rubber or nylon rug strips, it provides a good measure of safety for the glider, both while being transported and while at the flying site.

If you have difficulty with this design, or have questions concerning slope or thermal soaring techniques, send them along with a self addressed stamped envelope (legal size) to Dale Willoughby, R/C Editor, Flying Models, 14695 Candeda Place, Tustin, Calif. 92680. ●