

Thorp T-18

This quarter scale version of a popular homebuilt design flies well with .60 power on a generous 780 square inches of wing/Tony Lombardo and Dom Palumbo

I received a call from Tony early one Saturday morning and before I knew it we were on our way to Long Island's Brookhaven airfield for a close up look at Al Creiton's Thorp T-18. Al is a good friend of Tony's, and had invited us out to see his latest homebuilt creation. I must admit that although I'd heard about the T-18 I couldn't visualize the aircraft, but as we drove to the field and Tony described it to me a bell went off and my mind flashed back to a two part article in *Sport Aviation* magazine (February and March 1977). I recalled that the T-18 was the first homebuilt ever to fly completely around the world—a 26,200 mile trip which took only 61 days.

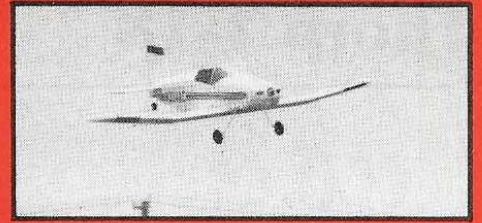
We got our first look at the T-18 as it was taxiing onto one of the aprons at Brookhaven. We were immediately impressed by its clean aerodynamic lines and a closer look only served to heighten our initial admiration of this fine aircraft. I guess the thought

of building an R/C model of this classic beauty must have entered both our minds about that time. Tony and I are ardent designers and builders of all sorts of R/C models and have been for many years. Watching the aircraft perform reinforced our suspicion that it would make an ideal subject for a Stand-Off Scale. Even as we watched Al put the T-18 through its paces we began to discuss the appropriate scale factor, engine size and construction techniques we would use, estimating dimensions and areas as we did our mental gymnastics. By the time we arrived back home that day we had the design entirely laid out in our mind's eye.

The T-18's dimensions are perfect for a one quarter scale model of .60 powered proportion. A considerable margin on the weight is afforded by the generous 780 square inch wing, but we knew that we had better design as light a structure as possible because of the very large fuselage dimensions. This prompt-

ed the use of foam board for many of the detail parts, including the fuselage sides themselves. There are several deviations from exact scale which were introduced for practical reasons. The T-18's bubble canopy is immense, and a quarter scale version would have been a problem, so the turtledeck was modified slightly and an open cockpit used as on the earlier T-18's. There are no flaps on the model simply because they're not needed. The full scale aircraft uses a stabilator pivoted about the 40% chord line, and while this could have been incorporated without much trouble, a conventional stabilizer was used instead. The area of the model's stabilizer was increased by about 10% to accommodate for the inherently less efficient pitch control. The airfoil used for the wing is the popular G-436, which has a flat bottom and excellent low speed characteristics with a very gentle stall. All other dimensions and details were duplicated pre-





cisely, making the model an ideal candidate for Stand-Off Scale competition. Its flight performance also makes it an excellent intermediate low wing design. Flight characteristics are discussed in depth after the construction details.

The Fuselage

Begin by cutting the 1/8" foam board full length sides. Cement 1/4" balsa doublers, 1/4" square longerons and stiffeners and 1/16" ply scabs at wing hold-down block locations as shown on the plan. Also cement the 1/2" balsa triangular stock behind the location of the firewall. Cut all formers from the specified materials. Note that formers F-2 and F-5 have a slight taper to accommodate for the curved fuselage shape, and that once the fuselage is assembled the sides will be parallel and square. Drill holes in F-1 for the throttle pushrod, engine mount (a side mounted .60 fits nicely within the cowl) and

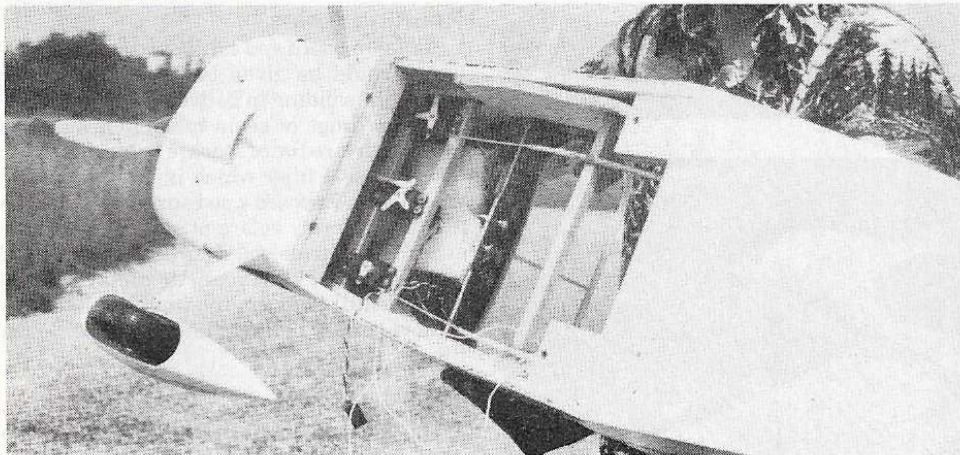
fuel lines. Bend the 5/32" dia. music wire main landing gear and position over F-2, using it as a guide to drill the holes for the J-Bolt fasteners. Also drill 1/4" dia. holes for the wing dowels as shown. Epoxy formers F-2 and F-5 between the fuselage sides insuring squareness to the centerline. Next, join the tail on center, squaring the sides to the building surface as you position the tail joint. Insert F-8, F-7, and F-6, along with 1/4" square cross-bracing top and bottom, in that sequence, allowing the epoxy to set after inserting each. Epoxy F-1 in position insuring that it is on center and square to the centerline. The turtledeck can now be sheeted and control linkage inserted for rudder, elevator, and throttle. Also install the tailwheel bracket at this time. Cover the low aft end of the fuselage with heavy cardboard. Use heavy cardboard to cover the top deck after fitting your fuel tank and then fuel proof the entire fuel tank compartment using

a coat of epoxy. Bolt the main landing gear to F-2 and then cement the chin block and cheek blocks in place. Shape the nose to the contour shown on the plan. The cowling is molded out of fiberglass. The "roll bar" and support strut are made of 1/4" dia. aluminum tubing. The roll bar is cemented into the pre-cut slots in the 1/4" side doublers. Fiberglass Master, P.O. Box 134M, Bayshore, N.Y. 11706 plans to make a fiberglass cowl and wheelpants available for this design if you wish to reduce building time.

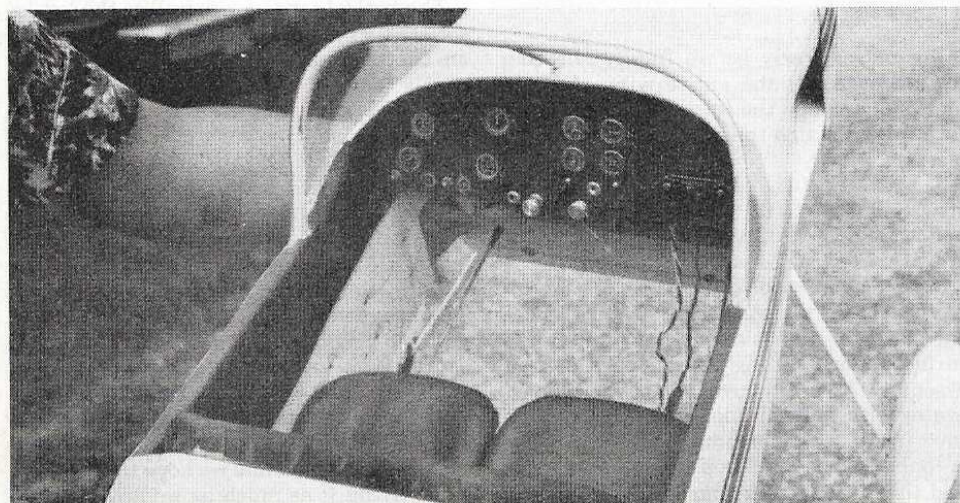
Wing Assembly

The flat bottom airfoil used on the model not only has exceptional low speed flight characteristics, but also makes wing construction possible without the aid of a jig. You simply must have an absolutely flat building surface however. The wing is assembled in three sections. The center-section is one piece and can be built over the plan as

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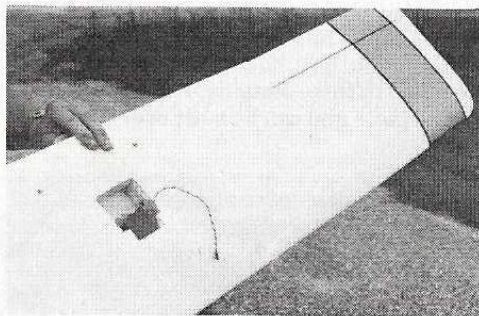
You've got about a half an acre inside to stash all the radio you want, any way you like. This cabin is roomy, accessible from above or below. Side by side style fuselage is quite wide, it makes it all easy. **At right:** Tony makes the wing servo plug-in connection. First flight coming up. Larry Davidson made the test flight. It's fast and responsive. **Below:** Cockpit interior. Upholstered seats slip out for access.



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The Thorp on final. Urban sprawl overtook this once thriving airport and only enough runway remains for an R/C to make it. The model looks realistic in flight. **Center shots:** Aileron servo is placed in wing center-section as on other aircraft. An electric starter turns it over. Try for a good reliable idle setting. **Bottom photo:** A minimum of curvatures to contend with. Nice molded cowl and set of pants is available.



is. Build in the dihedral braces while assembling the center-section and be sure to pick up the hole locations for the nyrod aileron linkage and drill holes in the ribs at these locations prior to cementing them in place. Left and right wing panels can also be constructed directly over the plan—simply reverse the rolls of the tip and butt. Again, be sure to drill holes as shown for the nyrods. It is advisable to sheet the entire top surface of each section prior to removal from the building surface in order to minimize the possibility of warpage once it is removed. Join the outboard sections to the center-section using 2" high support blocks under the tips with the center-section flat on the building surface. Insert the nyrods for aileron control and hinge the ailerons, making sure that every-

thing moves freely before finally sheeting the underside of the entire wing. Add tip blocks and shape the leading edge and tips carefully to match the outline shown on the plan.

The Tail Surfaces

Both the vertical and horizontal stabilizers are constructed using the same stock sizes of balsa wood. Build the skeleton directly over the plan and then sheet both sides one side at a time, clamping or pinning the surface to the building board at each stage of assembly. You may cover the rudder and elevator with light cardboard or your favorite covering material, or simply hog them out of 1/2" balsa sheet. Round off the leading edges and tip sections after completing assembly.

Final Assembly

Locate the wing over the fuselage insuring squareness and drill #7 holes through the wing into the hold-down blocks. Tap 1/4-20 thread into the hold-down blocks and open the holes in the wing to 1/4" diameter. Bolt the wing to the fuselage and cement the 3/8" contoured underbelly to the lower surface. Shape the underbelly to the matching fuselage contour. Align the horizontal stabilizer with the wing insuring the elevator hinge line is parallel to the wing trailing edge and that the stabilizer is centered precisely on the fuselage. Square up the vertical stabilizer with the horizontal, center it on the fuselage, and epoxy it in place. Landing gear strut fairings and wheelpants can be manufactured using streamlined aluminum tubing, balsa blocks, or fiberglass depending upon your particular preference. Our model was fitted with aluminum strut fairings and fiberglass wheelpants. You will note that the wheelpants used on our model differ from those shown on the plan. Those on the plan are duplicates of the wheelpants depicted in the scale three-view used for design, whereas the wheelpants on our model were those used on the T-18 version flown around the world.

Finishing Notes

All foam board and cardboard exterior surfaces should be given two coats of primer with light sanding in between prior to painting. Any dings or seam mismatches can be filled with a redmix spackle or similar filler (Do not use a filler which is not compatible with foam). Exposed wood surfaces should be filled completely before priming. Use whatever color scheme you desire, but get a high gloss finish for that realistic metal appearance. Install your engine and radio gear to achieve proper balance, and you're all set to fly.

Flying

The usual preflight checks should be made (that includes a range check with engine running and the plane held off the ground). Check that center of gravity location with an empty tank, tighten all the nuts and bolts, and insure free movement of all control surfaces as well as throttle linkage.

The typical tendency to pull to the left associated with taildraggers is to be expected on the take-off roll. Apply right rudder gently, easing off just prior to liftoff. The T-18 will lift itself off the ground when airspeed is right, so don't get impatient and try to force it up. The aircraft flew fairly fast with a Webra .61 and maneuvers were performed with a minimum of effort. Attempts to stall the aircraft were made at about 200 feet of altitude, and the stall was reasonable for this class of performance. The aircraft simply appeared to recover well once stalled, with no tendency to snap roll. This flight characteristic makes the aircraft suitable as a low wing intermediate machine with creditable aerobatic performance. All-in-all Tony and I were very pleased with this aircraft's flight performance and we hope that you will enjoy flying it as much as we have. 