# Dave Platt Models T-28

## BUILDING INSTRUCTIONS

Let's make a start by tackling the wing. It's probably going to be smoother sailing if you cut out all the needed parts -- the ribs, etc. -- from sheet balsa and plywood before gluing anything. It's frustrating to keep having to suspend assembly to cut out more parts.
One thing I want to impress on you most strongly is that the center 1/4" plywood dihedral brace *must* be made from top-quality stock. And no nicks or scratches, either ! This is because when you look at the wing center-section engineering you'll notice that, as on the full-size T-28, the leading edge is interrupted by the nosewheel well, and the rear beam is of little structural value in the lift direction. We can't even rely on the skin to provide "monocoque strength", because this requires a *complete* skin, and in this case we have a lot of that cut away for the main gear wells. All of this means that the main spar -- and this ply brace - carries the whole wing and thus the whole airplane. I'm not trying to alarm you; the wing engineering is adequate to the task. I just want you to be careful.
With that said, and our pieces cut out and ready, let's get on with making us a T-28.

1. Onto the 1/4" ply brace, glue both bottom 1/4" sq. spars. Laying this assembly on the wing front view on the plans, mark the positions of the ribs.

2. Lay some waxed-paper on the left wing plan. Put the left side of the spar assembly in position and hold with some weights. Don't put pins through the spars.

3. Glue all of the left-panel ribs onto the spar. Notice that all the ribs are upright (perpendicular to the spar) except W-1 and W-3. These ribs lean outwardly; make a small template from scrap to ensure the correct angle.

4. Into the appropriate rib slots, slip the L.G. unit rails and parts W-19 thru 24. Add W-17 and 18.

5. The L. E. and T.E. spar can now be attached.

6. Transfer your waxed-paper to the right wing plan and rock the wing over till the right spar is laying down on the plan. Support the left wing framework, and proceed to construct the right wing to the same stage as the left.

7. With the basic wing panel structures now in place, add the following items : the aileron and flap bellcranks, pushrods, and the three servos. Glue in the flap and aileron hinges. Add the full-depth blocks between W-2's and W-3's, and between W-5's and W-6's. Next, glue the wing dowels into the W-18 pieces. Do not drill the ply mainspar brace, but use balsa or ply scrap pieces around this joint to get a strong job.

8. Aileron time. Fashion the 1/2" aileron L.E.'s to approximate depth. Make the slots for the hinges. Thread the 1/16" wire through the hinges , and noting the 1/16" balsa shims to space the wire, glue the wire to the L.E.

9. Flip the wing upside-down. Lightly tack or pin a 1/16" strip of balsa, about 1/4" - 1" wide, to the underside of the wing T.E. to represent the eventual wing skin depth. Now glue the aileron bottom skins to the aileron L.E., ensuring a continuing airfoil section from the wing. Turn the wing right side up and glue in all aileron ribs, and the aileron horn.

10. At this point, connect the aileron linkages and drive the ailerons with the servo, using your radio. Make any adjustments needed to get good movement.

11. When all is satisfactory, glue the top skin and aileron T.E.'s on. Shape the L.E.'s round. Remove the temporary strips from the wing.

12. The flaps are made in identical fashion to the ailerons. The flap root block will be shaped to its final angles after the wing can be fitted to the fuselage, to ensure a close fit. Meanwhile, leave the flap root a little overlong.

13. Drive the flaps with the radio. Adjust for about 40° or so down travel.

14. Landing-gear time. Thread the cylinders of the main gear units thru the holes in W-6 and 7. Drill #36 holes in the gear rails using the unit itself as a guide. Tap the holes 6-32 and screw the units in place with 6-32 x 3/4" socket cap screws.

15. Assemble the basic metal oleo leg into the 4° angle fittings, then the whole into the elbow-block of the unit. See the instruction sheet that comes with the L.G. package. Assemble the wheels into place, but save the molded cosmetic fittings until the final finishing process.

16. Connect air tubing to the cylinders, and make the joint to the connectors per the diagram on Plan Sheet 3. Using a "breadboarded" dummy circuit representing the fuselage components., test the main leg retraction sequence.

17. The bottom of both wings may now be skinned with 1/16" sheet. It is not necessary to jig the wing at this time -- the panels will remain flexible until the later addition of the upper skins lock in the proper washout.
Consult the Finishing Booklet for tips about sheeting.

18. When the bottom panels are skinned, mark & cut out the L.G. openings. Put the wing aside for the time being.

Since we are going to need a completed stabilizer/elevator assembly halfway into the construction of the fuselage, we'll get those items done next.

19. Make the elevator horn from 1/8" music wire and 1/16" thick brass sheet. Braze (or true silver-solder) the joint . A soft-solder (soldering iron) joint will *not* do here.

20. Thread the stab. ribs onto the 1/4" sq. spar in the correct order, but don't glue them yet. Make the 1/8" sheet T.E. and glue the ribs to it. Then, glue the L.E. in place. Center everything carefully; this is a symmetrical airfoil. Now, you can glue the ribs to the spar.

21. Slide the hinges in place. Notice that you'll need to insert the elevator horn during this stage. Glue the hinges firmly. Pack with scrap balsa as needed to get a solid bond. Sheet the stab. with very light 1/16" balsa top and bottom. Add tip blocks, carve and sand to shape.

22. Shape the elevator L.E.'s to top view. Slot for hinges. Assemble the L.E.'s onto the elevator horn and slip the 1/16" wire hinge pin in place. Glue when correct.

23. Now add the elevator root blocks, tip blocks, and all of the ribs, centering everything on the L.E. The elevator skin runs from the inside edge of Rib 3 to the outside edge of Rib 10, the root and tip blocks are the full depth of the airfoil.

24. Sheet the elevators, trim level, and finally add the T.E. Sand everything smooth and put the tail aside until it's needed.

FUSELAGE

In building the fuselage, you have an initial choice to make. Let me explain :

There are two quite different methods that will work very well to make the T-28 fuselage.

1. You can divide the formers in two along a line at the bottom edge of the crutch, and then assemble the top half of the fuselage. This is done upon the crutch directly over the plans. You now add the

   bottom halves of the formers and the rest of the parts once the top half is lifted from the plan.

2. The method I like best, and use, is the one that closely resembles the manner in which full-size aircraft are built. This is : the formers are all left whole. The crutch pieces are lifted above the bench to a sufficient height for the deepest former to clear (in this case, 4-1/2" or so). All support

pieces are tack-glued to the bench, rather like scaffolding. The formers, engine mounts, tank-box parts etc. are then positioned and glued at the appropriate time. The pushrods are added prior to skinning.

So; the choice is yours. For less-experienced modelers, Method #1 is possibly the easiest to deal with. For seasoned builders, Method #2 gives the best end result because nothing has to be cut and re-glued. Whichever way you go, remember that some components are order-critical. This means you need to put them in at the right time, or you'll find it akward to insert them later. Among these : the Robart air tank and the rudder/elevator pushrods. We'll give a stage-by-stage sequence for Method #1.

25. Cut all bulkheads in two along a line at the bottom of the 3/8" sq. crutch pieces.

26. Pin the two crutch peices to the fuselage plan view supported by 1/2" deep scraps of balsa. You will need this 1/2" space when you add the motor mounts because of their downthrust.

27. Glue F-1 and F-2 to the crutch. Add the motor mounts and the tank box base. Next, glue the tank box sides in place, and lastly the tank box top.

28. Now glue to the crutch all formers F-3 to F-10. The cockpit floor is next, followed by the console sides, console ledges and cockpit sides. See cross-section of F-5 on plans.

TIP Keep in mind as you do these sequences that it's a wise idea to only pin the parts together at first. When the parts fit well together "dry", you can glue them permanently.

29. Glue F-11, 12 and 13 to crutch. Now the cockpit lips and rear platform can be added.

30. Glue F-14 thru F-20 to crutch and add the stab. saddles and the 1/4" x 1/2" spine.

31. Lay the completed stab/elevator assembly on the stab. saddles. Adjust one saddle or the other by sanding lightly until the stab. will lay dead-level to the workbench. Put the stab. aside.

32. Make the elevator pushrod and insert it thru the formers. Trim any holes that "rub" the rod. You can use an ordinary 5/16" birch dowel for the pushrod, with a nylon kwiklink at each end or, if you prefer, you can go to a carbon-fibre-type pushrod.

33. Glue the tailpost F-20 to the crutch. Notice that this piece leans back at a 3° angle. Make a scrap template to get this angle right. Slip the lower two rudder hinges into place -- glue the bottom one to the crutch.

34. At this point, the drama cranks up, as we will get the fuselage skin on the assembly we've got so far. You can use 1/8" light sheet stock glued widthwise and lengthwise to go all the way from F-1 to F-20 and from the middle of the crutch up to the cockpit lip. The section from F-13 back to F-18 above the rear platform has a tighter curvature, and is better strip-planked with 1/8" x 1/4" strips.

35. While you are skinning the upper fuselage, the upper of the two rudder hinges that you placed in Stage 33 can now be blocked in and glued firmly.

36. Trim the skin level at the cockpit lip, rear platform, and the front face of F-13. Now the block behind the canopy is tacked on. Make a card or thin ply template to the drawing of this junction on Plan Sheet 2, and tack it to the angled front face of the block. Shape the block; then remove it. Hollow it out to save a bit of weight, then glue it properly.

37. Hook the elevator horn to the pushrod and test-fit the stabilizer assembly. Check that it is level to the bench in front view, and also perpendicular to the fuselage centerline in plan view. When all is perfect, glue permanently.

38. On the full-size T-28, there is a section between the two elevators, the same airfoil as the elevators, that is fixed to the fuselage. Shape this from light balsa block. This block will have a groove in its leading edge to fit over the elevator horn and center hinges. Now glue in place atop the fuselage.

39. The vertical fin can now be erected while the assembly is still held down on the plan. Start by

shaping a small block to fit on the stab against the rear of F-18. Glue rib V-1 in place, then glue V-8 to F-20. Add the leading-edge, then the rest of the fin ribs V-2 thr V-7.

40. Slide the upper two rudder hinges into place and glue firmly. Sheet the fin both sides with light 1/16". Add and shape the tip block.

41. Make a light 1/16" core for the dorsal and glue in place. Then, add light 1/4" pieces each side. Shape to the somewhat concave cross-section shown on the plan. Blend the dorsal to the fin with a mix of polyester resin (K & B) and micro-balloons. Attach and glue the fiberglass dash hood.

This completes the first half of the fuselage construction. You can now lift the assembly thus far from the plans. Have a coffee-break and then we'll get to the bottom half (the easy half).

42. Install the completed service panel to F-1 with four screws. Thread the leads thru the holes in F-2, 3 and 4.

43. Support the top half of the fuselage upside-down and roughly level. A good item to help this is a cheap foam cooler cut to suit. Glue the bottom half of F-1 in place.

44. Dry-fit, and when satisfied, glue the wheel well sides, F-2, F-3, F-4 and the nosegear beams. The nose unit is screwed to two plates which then attach to the beams. The plates serve two purposes: one, they take up the width to the beams which have to be spaced wider than the wheel well, and two, they serve as breakaway plates. In the event of a <u>really</u> bad landing (yes, I know, you never do one that bad) they will break, saving your airframe and LG unit from damage. The plates are glued or screwed to the beams. See sketch on Plan Sheet 1.

45. Position and glue the bottom halves of formers F-10 thru F-20. Slide the Robart air tank in place after hooking a length of air tubing to it. Use scrap foam to buffer the tank. Make and slide the rudder pushrod in place.

46. Glue the keel in place. Lay a long straightedge into the corner cutaways of F-20 to check that the fuselage corner pieces will fit properly. Make any adjustment needed by trimming or shimming. Glue the corner pieces in place. Trim these pieces to follow the fuselage contours.

47. Install the rudder & elevator servos between F-9 and F-10. Glue F-5 thru F-9, fill between F-7 & 8 for the wing mount block.

48. At this point, before the bottom is skinned, you can install all the rest of the radio components, the air switcher etc. Steering is provided by two small servos attached to the front of F-1, connected to a tiller arm on the noseleg.

49. Connect air lines, servo leads etc. from switcher and receiver to servos & service panel. Install the motor servo to the side of the tank box.

50. Make the engine plate; screw the engine to it. Install plate, hook throttle arm to engine servo output. Make and install the noseleg. Test <u>all</u> radio components. When everything works properly, skin the lower sides and bottom with 1/8" sheet. Attach & carve the tail block to shape.

51. The cowling has to be cut away on its sides to allow the molded exhaust plates to be attached. Fix the cowl next. On the original prototype model, the lower 1/3 of the cowl was attached by brackets & screws to the LG rails and F-1. The top 2/3 of the cowl was made removeable to service the model, this cowl part being replaced after the engine is started and idled back.

52. Making the rudder is simply a repeat of the method used for the flaps, ailerons, and elevators.

53. Try fitting the wing to the fuselage. When right, make the small fillets on the fuselage per the method described in the finishing booklet.

54. Lastly, install the cockpit interior kit and dummy engine. The canopy will be placed after the airframe is glassed.

With the model now framed up, and the mechanical parts all working, you're ready to begin the covering and finishing process. At this point, I'd say you're about halfway to a flyable model. For the rest of the fun, consult the finishing booklet.

## SUPPLEMENTAL INSTRUCTIONS -- GAS ENGINE INSTALLATION

The modification to a gas powerplant can be made when the fuselage is quite far along.

Cut the motor beams off at their front ends level to the tank box. You will need to assemble and install the fuel tank (or tanks) at this time. Due to the radial mounting of the typical gas engine, the entire tank will not later be removeable. However, you will nevertheless be able to service the tank plumbing if you ever need to, by unscrewing the cap and withdrawing the pipes.

Make the new firewall (part GM-1) shown on the Plan Sheet 4 from top-quality 1/2" ply. Don't use household-grade material. If 1/4" is the thickest good ply you can find, laminate two pieces together. Glue this part on the front of the mounts/tank box. Run a couple of screws into the hardwood beams as shown. As an added defence against vibration, apply some fiberglass cloth to the tank box/firewall area.

Make the motor mount (part GM-2) from 1/2" (or two 1/4") ply and mount the engine to it. This assembly is now screwed to the firewall.

Note If the plug is too snug against the cowling top, there are a couple of things you can do to try getting the engine to fit inside better. One would be to drop the thrustline; about 1/8" should do the trick and not show. Or, you could drop the rear end of the engine while maintaining the crankshaft center at the cowling opening (less than scale downthrust).

Thank you for purchasing the Dave Platt designed Trojan T-28 produced exclusively by Belair Kits. Please note, these original instruction were written by Dave and used in his own kits and are a good basis for building your model, but may include historical references. Please use them in conjunction with your own experience and modern building materials or methods.

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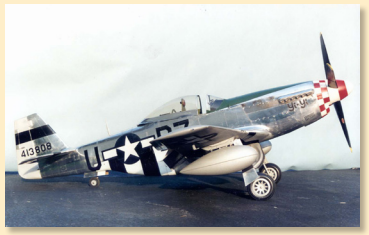

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