LOW BUCK, EASY-BUILD A-10

Starting the engines is easy. The leads exit the nacelle from the rear and are out of the prop's way.

TANK BUSTER

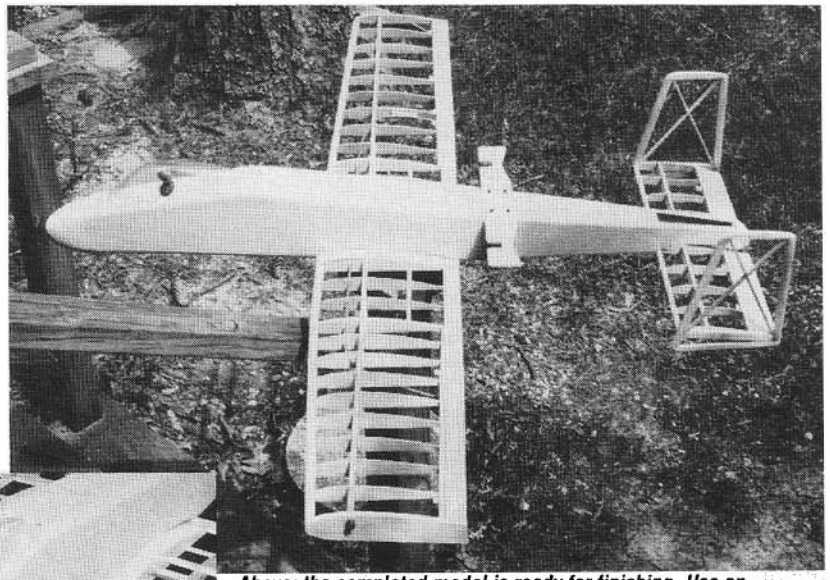
by JOHN KIDD

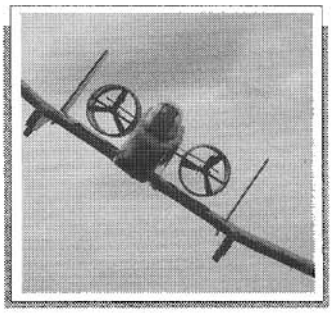
"WHAT IN THE world are you doing?" This time, she knew I had flipped. I had just awakened from a night's sleep and, still lying in bed, I was holding my hands up to form a small circle.

According to my ever-patient and understanding wife, I had been saying "That's it" all night in my sleep. And that's how it all began.

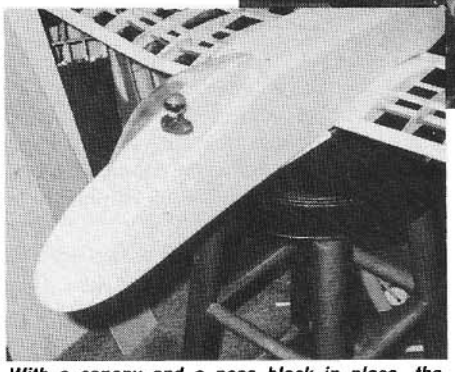
That night, I had dreamed of building and flying an R/C A-10. Now, maybe I had been watching too much CNN (at the time, the Gulf War was cranking up); or maybe I had watched too many "Wings" episodes; or maybe my wife was right: I really *had* flipped! At any rate, the dream seemed real; and besides, having an R/C A-10 would be great. And when I began to give it some thought, it almost seemed workable.

DESIGN CONTEST WINNER **4TH PLACE**



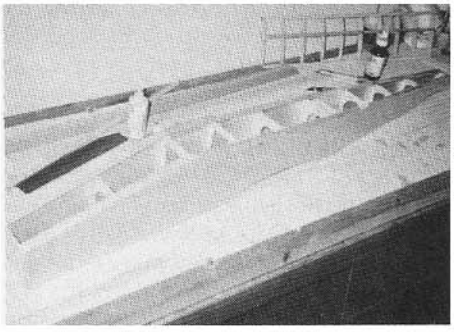


A-10



With a canopy and a nose block in place, the fuselage definitely has that "tank-buster" look.

Above: the completed model is ready for finishing. Use an iron-on covering to save weight. Below: the nearly completed fuselage—needs only nose and tail blocks and top and bottom sheeting.

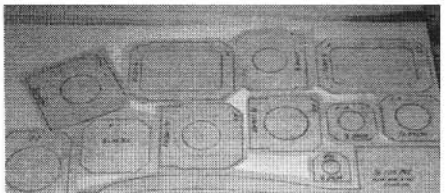


SPECIFICATIONS
Type: Sport scale
Wingspan: 56 inches
Length: 45 inches
Weight: 40 to 48 ounces
Wing area: 459 square inches
Wing loading: 13.8 ounces per square foot
Power req'd: Two Cox TeeDee .049 or .051 1/2A engines
Fuel capacity: 2 ounce (single tank)
No. of channels: 2 (aileron, elevator)

Features: take your flying field by storm with this 1/2A A-10 twin that uses enclosed, "ducted fan"-like propulsion units. Featuring a box fuselage and simple, built-up wings, this model of the A-10 Warthog is extremely affordable, easy to construct and easy to fly. Power is provided by two Cox TeeDee engines (housed in two-liter soda bottles) turning 5x3 propellers that have been cut down to 4 inches in diameter. Unlike many twins, this model will fly stably with one engine out. The interchangeable power pod is bolted to the fuselage (larger engines can be mounted for still hotter performance). A generic 9-inch WW II-style canopy is used to cover the pilot, and olive-drab MonoKote makes it look authentic.

This being my first attempt at designing and scratch-building, I knew I really had an education ahead of me. First, I had to gather as much information about the Fairchild A-10 (Warthog) Thunderbolt II as I could. A trip over to New Orleans to some of the bigger hobby shops seemed in order.

After picking out the appropriate Squadron/Signal publication, plastic models and some other information, I asked about the feasibility



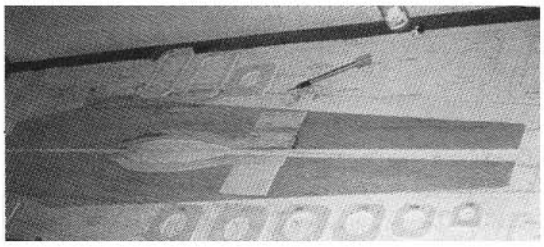
To save material (and reduce waste), first lay out all the parts templates on the wood.

of such a project. With a quick glance, "Sounds ambitious" was all the man said! Talk about lack of enthusiasm! The mission was obvious: this plane had to be built! And even when the prototype was being built, the low snickers from the "experts" showed their disbelief. Nevertheless, the plane was built and won fourth place in the *Model Airplane News* 2nd Annual Design Contest. So there! The moral of the story? No matter how many unenthusiastic, disbelieving "experts" come your way, press on! Believe!

BUILDING THE A-10

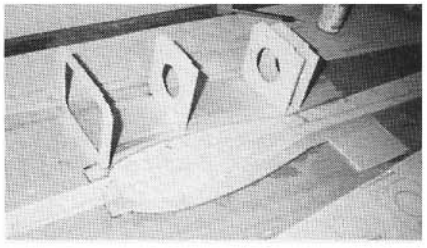
One of the first obstacles was choosing the engines. I knew I wanted a small, light, simple model. The economics of building a full-blown, two-fan, twin-engine, snarling, fully loaded A-10 with retracts and flaps made it out of the question. We had just had a new addition to the family, and though my wife is patient and understanding, she isn't crazy. It became apparent that one of the Cox* TeeDee series would be the best choice for this application. For a small, light, inexpensive means of propulsion, the Cox TeeDee engines are hard to beat.

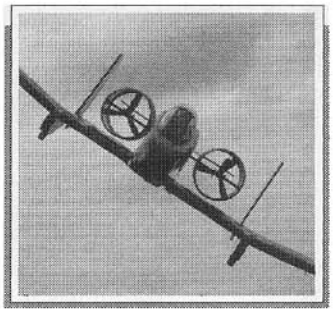
The next apparent problem was the construc-



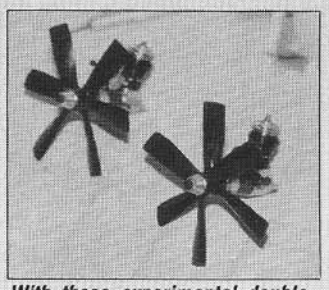
Left: the fuselage is simple box construction with sheet sides. Make a left side and a right side.

Right: a lite-ply doubler at the wing saddle increases strength. Make sure you install the formers square to the fuselage sides.

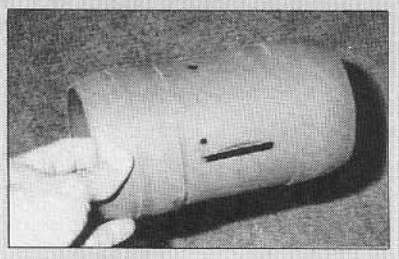




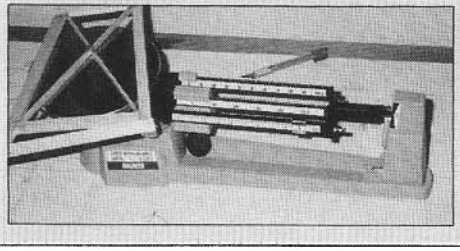
A-10



With these experimental double-prop setups, the model needed .09s for additional power. Standard .049 engines with 5x3 props work well.



The completed engine nacelle is made of plastic soda bottle parts that have been glued together with Zap-a-Dap-a-Goo.



It's very important to keep weight down aft of the CG. Select your wood carefully.

tion of the "jet" housings. At first, I experimented with large beer cans. These proved to be heavier than I had imagined and, after a few tests, they were dented and worn. I tried rolling my own balsa, but it was too fragile. I needed something more flexible and durable. Have you ever noticed that if you turn a two-liter soda bottle on its side, it looks like a "jet" engine housing? Was that the answer? With a little reinforcement, I thought it might work. And besides, if it wears out, the supply of replacements is almost endless. After these problems had been worked out, I really got serious.

The A-10 is extremely easy to build. Its fuselage is a "box" construction with an angle here and there. The wing is built in three parts using a typical balsa construction.

Before you start, there are a few things to consider. Use the lightest balsa possible. I took the time to weigh two "identical" pieces of balsa. One piece was lighter in color, had less grain and weighed 35 grams; another was darker, had more grain and weighed 72 grams! It's imperative that you use light balsa—especially on the fuselage sides and wing ribs. The target weight, with engines and radio installed, is 2 1/2 pounds. The lighter, the better. Now, let's get specific....

THE WING

The wing is built in three segments, and you start with the center one. Begin by laying down the 1/4-inch-square spruce spar and the 1/4x1/8-inch balsa brace. Cut out and position the bottom sheeting, and glue it to the spars. (The entire aircraft is constructed using CA glue.) Position the trailing edge, and glue it to the bottom sheeting. When making your center wing ribs, use the "stack-and-cut" method; the R-1s are slightly smaller to accommodate the 1/16-inch balsa sheeting, but the others are all the same.

Determine where your flexible pushrods will go, and drill the hole for them while the ribs are stacked. This will save you a lot of time later. Put the ribs into place and glue them. Glue the leading-edge balsa to the outside ribs. Glue the front of each rib to the leading edge, making sure they're correctly aligned.

Now position and glue the top spruce spar, and then glue in the spruce servo rails for your aileron servo. Position the 1/16-inch-thick balsa vertical webbing and glue it into place, then glue the top sheeting into place. Cut out and glue in the 1/8-inch-thick balsa gussets. That's it for now.

Let's move on to the outer panels, which are built much like the center section, but there's no sheeting. Pin the bottom 1/4-inch-square spruce spar into place. Position the 1/4x1/2-inch balsa trailing-edge spar in the proper place. You'll notice that the outer wing ribs are of different sizes, so cut them out two at a time, stacking two pieces of balsa (one cut will produce ribs for both outer wing panels).

Drill holes for the flexible pushrod. Position the appropriate ribs, and glue them to the spruce spar and the balsa trailing-edge spar. Be sure to position R-3 so that the outer panel will show 10 degrees of dihedral. If the bottom of R-12 is raised 3 inches, the angle will be roughly 10 degrees.

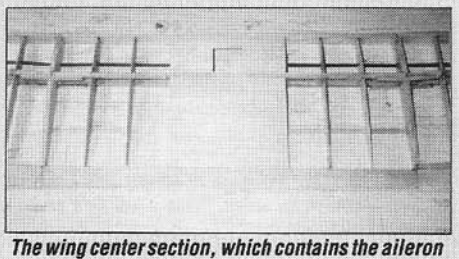
Next, glue the small piece of trailing-edge stock into place, as shown on the plans. Glue the top spruce spar into place. Glue the leading edge to the outer ribs. Notice that on all sections of the wing, the outer ribs are made out of 1/8-inch balsa instead of the 1/16-inch balsa you used for the inner ribs. Properly align the leading-edge balsa with the ribs and glue it into place. Cut out the balsa aileron and attach it with your favorite hinge. Don't *glue* the hinges at this time. (They'll be glued into place after the wing has been covered.)

The wing tips are extremely simple. Position a piece of 1-inch balsa trailing-edge stock on the end of the R-12 so that the thicker part faces downward. Glue it into place and sand it to shape. Let the piece of trailing-edge stock extend to the back of the aileron.

Cut the wing-tip plate out of 3/32-inch sheet balsa, but don't glue it to the end of the wing panel at this time. It's easier to do this after the wing and tip have been covered. Be sure to install 1/16-inch balsa vertical webbing, and glue 1/8-inch sheet-balsa gussets into the four corners.

To join the wing sections, first put the center section on a flat surface. Next, cut out the 1/8-

The horizontal stab is easy to build and is assembled over the plans. Elevators are connected with wire.



The wing center section, which contains the aileron servo, has been sheeted. Note that the ribs at the dihedral joints are made of 1/8-inch-thick sheet balsa while the rest are 1/16inch thick.

The wing tip is made up of trailing-edge stock with the thick part facing downward and a balsa tip plate added.

A-10 MATERIALS

- 3—1/4x1/2x36 balsa
- 1/4x1/4x36 balsa
- 2—1/2x3/4x36 balsa
- 2—1/8x1/4x36 balsa
- 1/4x3/8x36 balsa
- 1/4x1x36 balsa aileron stock
- 3/8x1 1/2x36 balsa aileron stock
- 1" trailing edge balsa (36")
- 3—1/2x36 triangle balsa
- 2—1/4x36 triangle stock
- 6—1/16x3x36 balsa sheet
- 1/8x3x36 balsa sheet
- 1/4x3x36 balsa sheet
- 2—3/32x3x48 balsa sheet
- 3/32x3x36 balsa sheet
- 3—1/4x1/4x36 spruce
- 2—1/8x12x24 lite-ply
- 1/32x6x12 plywood
- 1/4x36 wood dowel
- Sig 9" WW II canopy (no.WC-809)
- Split elevator control horn
- Williams Bros. jet pilot (1" scale)
- 2—1 3/4" Dave Brown Lectra Lite form wheels
- 3x3x12" balsa block
- Sullivan SS-2 (2 oz.) fuel tank
- 2 Cox TeeDee .051 engines
- 2 Cox 5x3 3-blade props. (Cut down to 4")
- 2 Cox prop spinners and screws
- 4—2-liter soda bottles (with plastic base)
- 2 rolls MonoKote
- 2 Sullivan flexible pushrods
- Sullivan semi-flexible pushrod
- 2—1 1/2A control horns
- 10 small hinges
- 4—4-40x3/4 socket head bolts, washers and blind nuts
- 8—2-56 x 3/4 socket head bolts, washers and blind nuts
- Formula-U spray paint (to match MonoKote)
- 1 foot 1/2A fuel tubing
- 4 small wood screws (1/2")
- Bottle of CA
- Tube of Zap-a-Dap-a-Goo glue

inch-thick plywood dihedral braces. Under no circumstances should you use lite-ply for this. Granted, it might work, but don't take the chance. Regular 1/8-inch plywood will add very little weight and is much stronger.

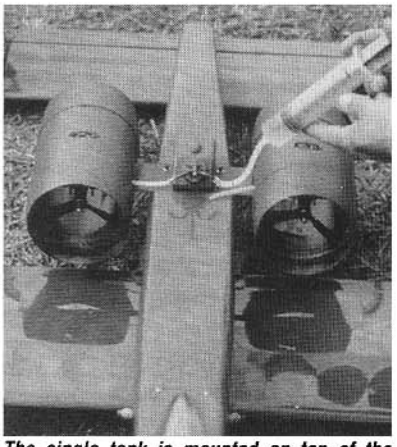
Now that the center section is in place, position one of the outer wing panels so that there are 3 inches of clearance under R-12, between it and the workbench. Sand and glue together both W-3 ribs from the inner and outer panel. Glue the dihedral braces into place. (This isn't the place to be light with the glue. Be sure the bond is tight.) Attach the other panel in the same way. After the wing has been constructed, sand the leading and trailing edges to shape.

After the wing has been sanded, install the aileron servo. Go ahead and fit the inner pushrods and control horns. Remove the servo and cover the wing and wingtips with your favorite iron-on covering. Most of the A-10s that fly over my area are in olive-drab camo. I covered the model with regular olive-drab Coverite's* MonoKote. Take your pick. After you've finished the covering, glue the wingtips into place. Now install the servo, the pushrods and the control horns.

THE STAB

The horizontal stab uses 1/4-inch-square hard-balsa spars. Start by laying the bottom spar and trailing edge into place. Once again, the ribs are identical, so stack and cut. Glue the ribs to the bottom spar and trailing edge, and glue the top spar into position. Attach the leading-edge stock to both 1/8-inch-thick balsa outer ribs. Align the assembly with the leading edge, and glue all the inner ribs to it.

The elevator is the split type and uses a center-mounted control horn. Cut out and position the elevator halves, and fit the hinges and the control horn. Don't glue the hinges in yet. Sand the leading and trailing edges to shape. Go ahead and glue the control horn to the elevator halves; cover the the elevator and stab with MonoKote; and install the hinges.



The single tank is mounted on top of the fuselage for unrestricted access. No pressure is used.

VERTICAL FINS

The vertical fins are made out of 1/4x1/2-inch and 1/4x1/8-inch balsa sicks and built directly over the plan. Be sure that they're identical. Sand and round their edges, and then cover them with MonoKote. Easy enough!

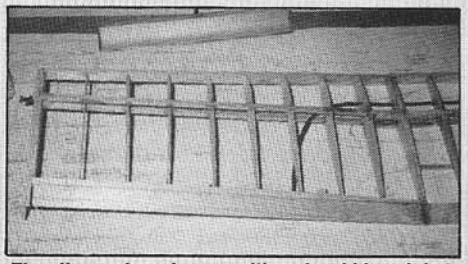
WHEEL WELLS

The wheel wells are built to resemble the appearance of an airborne A-10 with the wheel retracted. Both are made of a 5/8-inch-thick balsa core covered by 1/32-inch-thick ply outer skins.

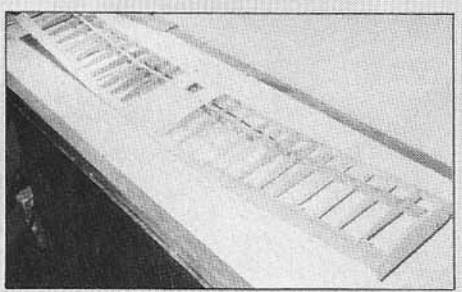
Fit the wheel and axle inside the well. Now, using 1/32-inch ply, make two axle holders, which are nothing more than small squares of ply with a central hole that fits the axle. Place the wheel, axle and axle holders inside the wheel well. When they've been positioned properly, glue the axle holders into place inside the 1/32-inch ply outer skins. Don't hesitate; it's easier than it sounds. Once the wheels have been installed, cover the entire assembly in the appropriate color. After covering them, glue both wheel wells to the wing. They were designed to relieve some of the wear and tear of repeated belly landings.

FUSELAGE

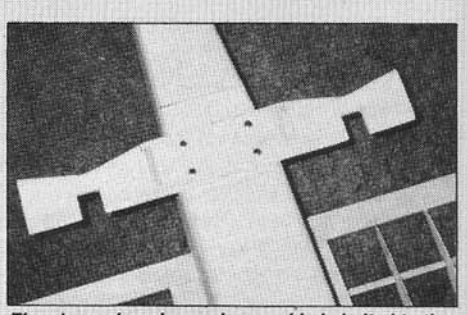
The fuselage is typical box construction using balsa and lite-ply. Start by laying out both 3/32x4x48 fuselage sides. Cut the pieces to the plan outline. You'll notice that you'll have to add a small triangular piece of 3/32-inch balsa



The ailerons have been positioned and hinged, but they shouldn't be glued in until the wing has been covered.



The completed wing is ready to cover. The wing-tip plates will be attached after the wing has been covered.



The plywood engine-pod assembly is bolted to the fuselage top. Blind nuts are installed in a plywood plate on top of the fuselage.