



H O O K E R

This .60-.61 powered Hooker, with its swept-back wing, has been used extensively as a club trainer and in fun-flies for the Ft. Worth Thunderbirds Club.

BY CHUCK CUNNINGHAM

The Hooker is a fun airplane. She is easy to build, easy to transport and, best of all, a dream to fly. There is nothing complicated about the Hooker; the swept wings are easy to construct, and the fuselage goes together fast and simple.

Swept wing designs have been around for a long time. It has been proven over the years that by sweeping the wings aft, a tremendous amount of stability can be achieved, and yet the roll rate does not suffer as it does with excess dihedral.

Swept wing models such as the Hooker are quite at home in Fun Fly type contests. She can take off in almost no distance, spin either way at most any throttle setting (either normal or flat spin), roll as fast as you want, loop in a tight radius, and yet come in for landing just about where you want. With swept wing aircraft you can make either a greased-in landing, or rack back and fan down like a 747 coming home.

The Hooker has been used extensively to train beginning fliers; they also find her very easy to handle. Two things aid the Hooker's

ability to fly so gently. First, the tip plates contain the airflow over the wings and, second, the simply made diamond section airfoil of the horizontal stab keeps the aft end of the aircraft flying much longer than does a flat plate of balsa.

Swept wing designs have been flying here in Texas since the early Sixties, dating back to the Sweeper design by Bernie Haire and Edd Alexander. Pattern aircraft swept wings were pioneered by Don Lowe, and they too have withstood the test of time. If you really want to enjoy a superb flying, easy to build, non-scale-like anything, airplane, then grab your trusty X-Acto knife, stack of balsa, and pot of glue, and get started. You won't be sorry.

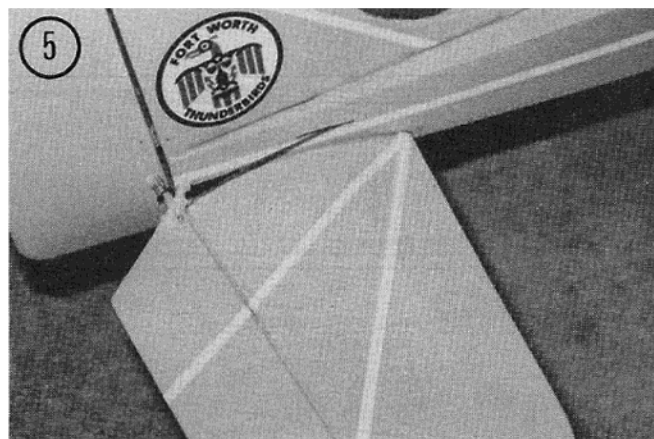
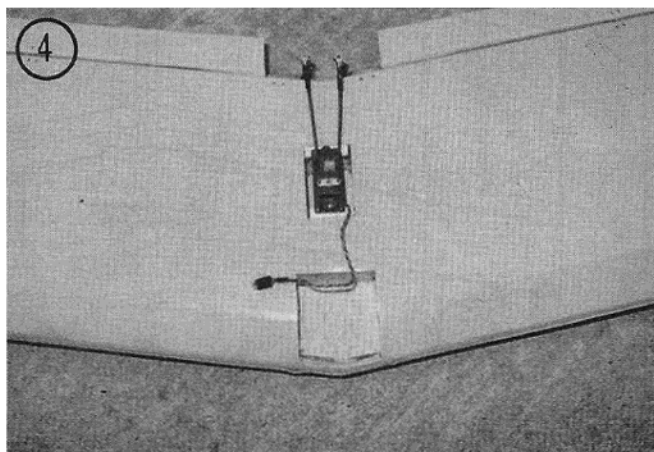
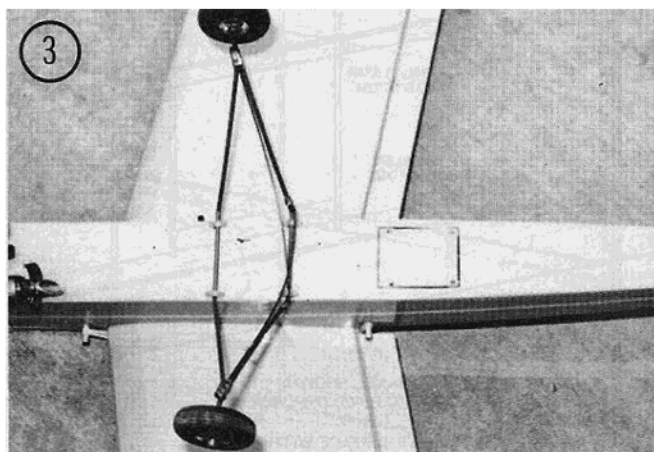
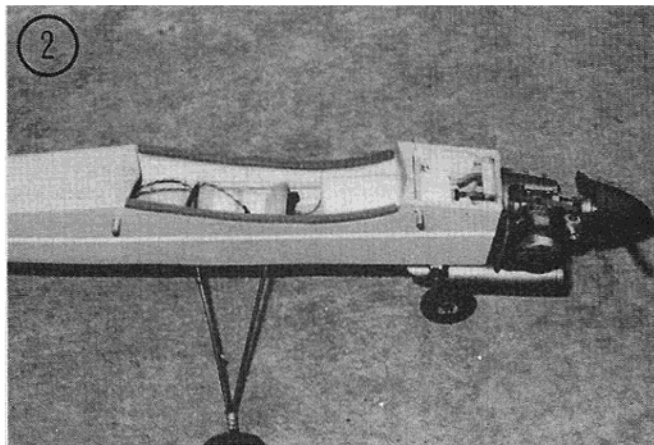
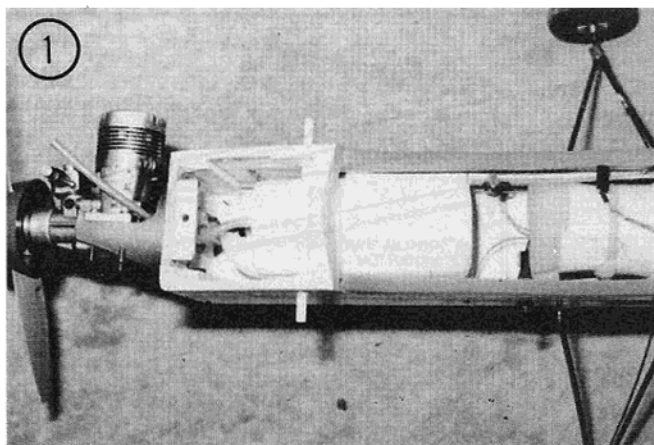
CONSTRUCTION

The best way to begin this, or any other model that you want to build, is to first study the plans and to read the construction article over a couple of times. You can "kit" all of the pieces before starting, or do like I do when scratch building --- start working on the fuselage and, then when you're committed, build the wings and then the tail

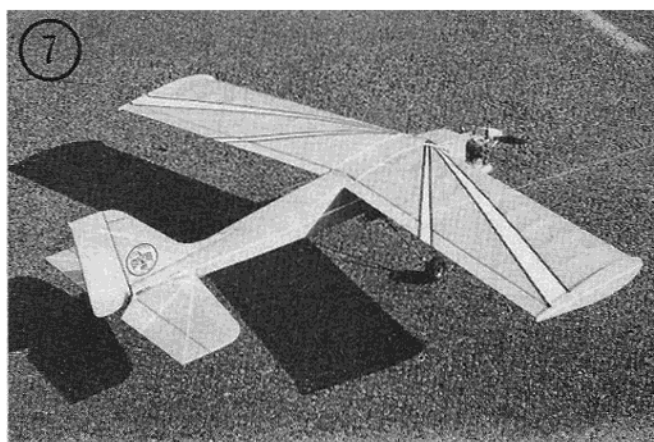
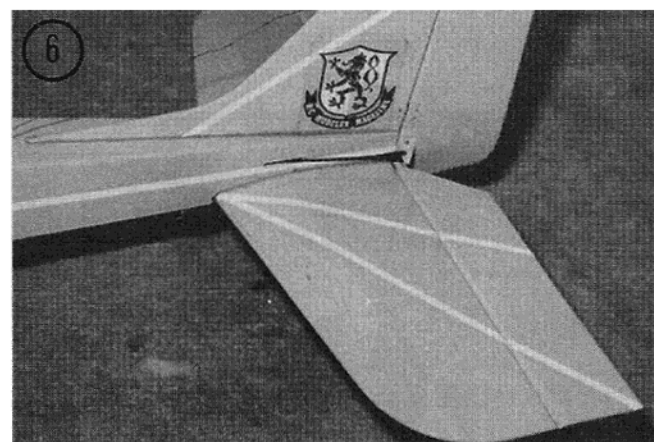
feathers. No matter how you start, it will go very quickly. The prototype used Hot Stuff Super T throughout, but you can use Titebond and epoxy, or a combination of all three types of glue. Get out your fine point felt marking pen and let's get started.

Fuselage:

Carefully draw one fuselage side on a 1/4" x 4" x 48" piece of balsa. Double check that you have everything drawn correctly. Draw in the location of the firewall (this piece will be the right side, so be sure and mark the firewall to give you the needed right thrust. Examine the top view on the plans. When you have drawn everything to your liking, and you're sure that the wing saddle is correct, with the proper amount of incidence as shown, pin the first side to another piece of balsa of the same size and strength. Cut the two sides out at the same time, using a sharp X-Acto knife and, a good straight-edge. Cut the wing saddle out with either a knife or on a jig saw. Leave the sides pinned together. Turn over and again mark the former locations on the



#1 Wing and hatch removed showing 12 oz. Kraft tank to feed the Enya .60 up front.
 #2 With side mounted engine and muffler hanging below, helps keep fuel residue to a minimum on clean up.
 #3 Removable servo hatch on bottom for access to servos.
 #4 Aileron servo installation and leading edge cut out to clear large Kraft fuel tank.
 #5 Elevator pushrod makes a straight run to servo, note the eye grabber club decal.
 #6 Rudder pushrod also makes a straight run to servo making a more positive action for control movement.
 #7 Photo shows the swept back wing and tip plates on the 'Hooker.'



outside of the bottom piece. Draw in everything carefully, again noting that the piece that you are drawing on will be the inside of the left side, so mark the firewall location to give the required amount of right thrust.

Cut the bulkheads and cross pieces from the portion of wood left from making the fuselage sides. You can build the top hatch in two pieces from leftover wood stuck together with Hot Stuff. Draw a center mark on the bulkheads and on the back side of the firewall.

Right now is the easiest time to drill all of the holes in the firewall for the radial engine mount. You can mount the engine upright or on the side like the original. You must plan ahead for the nose gear bracket and engine mount bolts so that they do not interfere with each other. I found that on the prototype, using a CB mount turned sideways, one of the mounting holes lined up exactly with the Goldberg nose gear bracket. If you like to use a glass filled motor mount, then you can drill a hole in this mount to serve as the nose gear bracket. The choice is yours, but figure it all out on the firewall, drill all holes, and install all blind nuts before you go any farther with construction. Keep the thrust line in the same location no matter how you mount the engine.

Install the 1/16" plywood doublers for the wing dowels, the long pieces of 1/4" x 3/8" spruce, and the servo rails to each side before you glue the fuselage side together.

Next, pin the formers to the top view of the plans with the centerline of the formers exactly over the centerline in the top view. Line up with a drafting square, or a square block of balsa. Run a bead of glue on one side of each former and pin one side piece in place. If you're using white glue, you can make adjustments; if you're using Super T, better hurry with the adjustment, you've got a little time, but not much. Whoops, forgot to mention that you're building the fuselage right side up on the plans, with the bottom of the fuselage contacting the building board at all points. Now, glue the second side to the bulkheads. Glue in the firewall doublers and then the firewall.

So far, everything should be perfectly lined up. Make sure that everything is dry, then bring the tail of each fuselage side together and glue, but make sure that they join exactly over the centerline of the plan. Hold them in place with clothespins. If you have been careful, you will have taken the first step toward building a good flying aircraft — perfect alignment. Install all of the aft end cross braces and the top sheeting from the wing saddle to the tail. Remove the fuselage and install the bottom sheeting. Do not cut out the hatch for the servos until after you have finished sanding.

Install the cross brace in the wing compartment to keep the battery in place. You may want to build in some wire clips to pass a rubberband across the battery to keep it from moving around. More on balance later. Set the fuselage aside and build the wings.

Wings:

First, you must build the wing ribs. Note that there are eighteen 3/32" thick ribs and four 3/16" ribs. If you use the bandsaw method of cutting out ribs be sure to build up the stack with the 3/16" ribs located in the stack at the same location in the wing. If you're cutting out ribs with a razor knife, then when you build the stack for final

Saran Wrap don't you?). Use the lower rear 1/4" square spar as a rib block. Pin this spar to the plans just ahead of the normal rear spar location. Check the wing rib, setting on the spar block and slipped over the main spar. If the center of the leading edge slot is exactly the same height from the building board as the center of the trailing edge of the rib it is correct. If not, adjust the spar block until this is correct. Mark this location on the plans so that you can build the second wing panel exactly the same. Glue all of the ribs in place on the main spar, pinning them to the spar block.

Next, install and glue the top main spar in place then the leading edge spar, the leading edge, and the aft spar. Notch and glue the trailing edge piece in place as well as the extra pieces that help to brace the trailing edge and the hinges. Remove from the building board and glue the bottom aft spar in place. Set this wing panel aside, turn the plans over and build the left wing panel in exactly the same way. Make sure that you block the wing ribs exactly the same.

When both wing halves are finished, and you're sure which is the right wing panel and which is the left (it's a good idea to mark them while under construction because it's hard to tell after each is finished), pin the right wing panel to the plans, and block up the trailing edge exactly as you did when building the left panel. Now, position the left panel in its correct final location and block it up exactly the same. Take a square and measure that the leading and trailing edges of the center section and both tips are exactly the same distance from the building board. When you're sure of this, glue the two wing panels to each other.

When this glue joint is dry take a razor saw and cut out the slots for the wing center section braces. You can make these braces from 1/2" x 1/2" pine or spruce, or you can make them of two pieces of 1/4" x 1/2" plywood laminated together to make a 1/2" x 1/2" spar. When this is dry, remove the wing from the building board, turn it over and install the bottom braces in the same manner. I used epoxy for this, as I had a few gaps to fill up between the main spars and the braces. Make sure that all of this is done well, as this is the entire joint method.

Now, build the servo well on the bottom and then the tank well also on the bottom of the wing. You will have to make two false ribs to go on either side of the tank well, and then remove the center ribs. Due to the forward location of the wing, the tank must nestle inside the leading portion of the wing. Line this well with scrap 1/8" balsa. Do not install the tip plates until after the wing is covered.

Tail:

All of the tail feathers are simply made from 1/4" sheet balsa, except that the horizontal stab has the addition of two ribs on the top and two on the bottom. The top ribs are spaced to go on either side of the fuselage, while the bottom ribs are spaced to go on each side of the 1/4" wide sub fin. Make sure that you cut the slot in the

THE HOOKER

Designed By: Chuck Cunningham

TYPE AIRCRAFT

Fun-Fly & Sport Flying

WINGSPAN

60 Inches

WING CHORD

11 1/4"

TOTAL WING AREA

710 Sq. In.

WING LOCATION

Shoulder Wing

AIRFOIL

20% Symmetrical

WING PLANFORM

Constant Chord — Swept

DIHEDRAL, EACH TIP

None

O.A. FUSELAGE LENGTH

48 Inches

RADIO COMPARTMENT AREA

(L) 12" x (W) 3" x (H) 2 1/4"

STABILIZER SPAN

24 Inches

STABILIZER CHORD (incl. elev.)

7 1/2" (Avg.)

STABILIZER AREA

180 Sq. In.

STAB AIRFOIL SECTION

Diamond

STABILIZER LOCATION

Bottom of Fuselage

VERTICAL FIN HEIGHT

10 Inches

VERTICAL FIN WIDTH (incl. rudder)

7" (Avg.)

REC. ENGINE SIZE

.60 to .61 Cu. In.

FUEL TANK SIZE

12-13 Oz.

LANDING GEAR

Tricycle

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rud., Elev., Ail., Throt.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Balsa & Ply
Empennage	Balsa
Wt. Ready To Fly	92 Oz.
Wing Loading	18.7 Oz./Sq. Ft.

sanding make sure that the ribs are in the correct location. Also mark your stack so that you always know which is the top side. I usually draw a line down the main spar slot with a marking pen. This way you can't mix up tops and bottoms, which is much more important than you may realize.

Pin the lower spar to the plan (of course, you do cover the plans with waxpaper or

horizontal stab, and that you extend the vertical fin down to fit inside of this slot. This makes for a very strong tail section, one that will withstand the "rudder launch" that is so typical of some helpers. Cut a slot in the top of the fuselage to accept the vertical stab. Install the spars top and bottom on the horizontal stab, tapering out to the tips. The covering material will form the airfoil, simply and easily. Do not be tempted to cut lightning holes in the tail section, it's a bit hard to get the C.G. far enough aft as it is with the short nose.

Finish:

Sand all of the parts of the structure and then cover with your favorite material. I like to use MonoKote and Trim MonoKote, with striping tape, but then I'm just a bit lazy when it comes to finishing. Make sure that the top of the wing looks different from the bottom; it's tough to tell at a distance which is which. Be sure to seal all hinge gaps with MonoKote strips unless you build your hinge lines very tight.

Landing Gear:

Bend the landing gear 1/16" wire from 5/32" wire as shown on the plans and solder together. You may want to add cross braces to the main gear. The main gear is held to the fuselage with Goldberg Mounting Clips and wood screws. You might want to use bolts and blind nuts if you fly from a grass field. Make sure that the 1/8" ply landing gear plate is securely glued to the fuselage sides and to the spruce main brace.

Radio Equipment:

Install the radio equipment using your favorite method. Try to locate all servos in the aft servo well. The battery, because the weight is needed aft, is located behind the receiver. Be sure to secure it in place with bulkheads and rubberbands.

Balance:

This is most important on any aircraft. Balance exactly as shown on the plans. If you need to add weight to the tail to bring to the correct location, then do so. Use Prather Stick On Weights installed on the underside of the fuselage. If you need to add nose weight, which I doubt, then add weight to the inside of the tank compartment. You can hold the front hatch in place with any convenient means, rubberbands or nylon screws, but make it removable for easy servicing of the fuel tank and nose gear. Always balance the finished aircraft without fuel in the tank.

Flying:

Set up the controls with 3/4" up and down elevator, 1" right and left rudder, and 3/8" up and down aileron movement. You will find that the elevator movement is very effective and, with continuous input of up elevator on landing, you can slow the Hooker down, nose high, gear just reaching for the runway. You may want to go to more throw later, but I have found these amounts to be best for my style of flying. Generally, flying the Hooker is much easier than most aircraft since she is so very forgiving.

When you're ready to make the first test flight, make sure that all trims are at neutral, and that all control surfaces are set at zero. Check over your radio installation one more time to be sure you didn't forget to put the screws in the servo arms, and that everything looks secure. Fire up the engine and taxi out to the runway, point her nose into the wind, and let her roll. Rotate slightly for a gentle climb-out, grab about 75' of altitude, then make a gentle left turn. Everything working okay? Great, now sit back, relax and enjoy flying the Hooker---I know that you will like her.

Random Thoughts: The original Hooker is powered with a Webra Speed .61 engine, but you do not need this much power. Any .60 engine will do the job, as will some of the smaller engines. I know that she would fly fine on a .40 but would not be as responsive. The finished Hooker, without fuel, should weigh between 5 1/4-6 pounds. Anything heavier than this and you've been building with lead rather than balsa. Side mounting the engine gets the main part of the engine weight way down low, which adds to the stability even more. You will also find with a side mounted engine that the top of the aircraft remains clean, but boy, does the bottom ever get loaded with goop! Props depend upon your choice of engine, but I have used both 11/7.5 and 12/6 with good results. I like the 11/7.5 on the Webra Speed as it will really let out and run on this prop. You needn't worry about brakes or flaps on this aircraft because landing speeds are so slow that the roll out really isn't very much. The Hooker handles windy days with ease; the low profile and lack of dihedral keeps her from blowing about the sky, and landings in 25 mph winds can be made with a roll out of two or three feet or less. You really must try a swept wing, especially one with tip plates. This set-up opens up a whole new world of flying. The airfoil is 20% thick and the aircraft tends to fly at a pretty constant speed through everything.

Good Luck and Good Flying with your Hooker. □

**From
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