Black Star

By MICHAEL SAPONARA. . .Having never seen a swept-wing, Vee-tailed model, the author decided to design one. The result is a fun flyer with foam wings and an .049 engine for radio control.

• I enjoy building and flying swept-wing models. Vee-tailed models are rather rare, but even more rare is a Vee-tailed swept-wing model. Well, as you guessed, I decided to design just such a model, the "Black Star." In all my years of modeling, I don't think I ever saw a swept-wing model with a Vee-tail.

Whenever I show a picture of the Black Star to people, they invariably say that the model is one of the nicest they have seen. I hope you agree and decide to build the Black Star.

You may remember a model I presented in this magazine about a year ago called the Viking. That model used the Ace foam wing also, and I cautioned not to use a reed-valve .049 engine because not enough lift was created to keep the plane in the air. That plane used about 2/3 of the Ace constant chord wing, and it was for this reason the plane would not fly with the reed engine. Black Star uses the full constant chord wing, which adds about 25 square inches, and thus allows the plane to fly with the less

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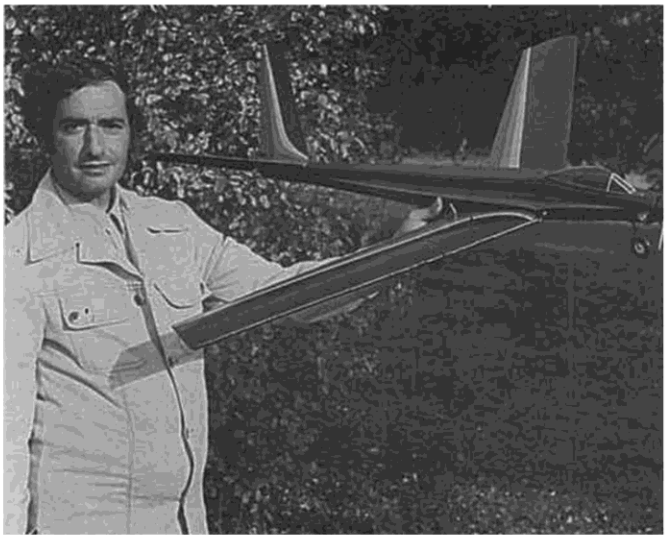
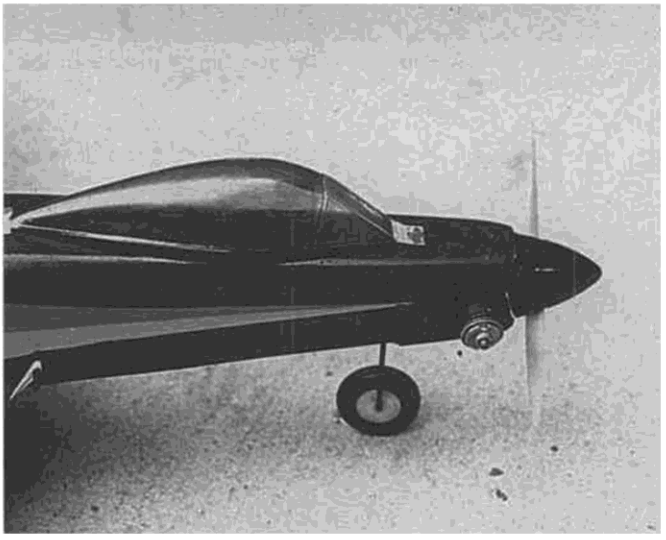


Author/builder with his sleek black beauty. The use of ready-made foam wings from Ace R/C makes construction easy.



Power for the Black Star is an .049 engine, with the author's preference leaning toward the Cox Black Widow or the Dragon Fly.

expensive reed engines. I would recommend using either the Black Widow engine or the best .049 engine for the money, to me, the Dragon Fly.

Don't be turned off by the Vee-tail, although you will need a mixer to produce turns or pitch control. The model is very easy to fly and can be flown by a rank beginner.

Let's get to building.

THE FUSELAGE

Start by cutting out the two fuselage sides. Next, using white glue, glue the 3/8 triangle stock to the fuselage sides. Be sure to make one right and one left side. Now cut out the fuselage formers. Glue F-2 and F-3 perpendicular to the fuselage using five-minute epoxy. Now glue the other fuselage side to F-2 and F-3. Now install F-1, F-4 and F-5 using five-minute epoxy. It is time now to install the main landing gear and the plywood braces. Finally, add the top and bottom sheeting.

Now carve the top edge of the fuselage round and sand with medium-grit sandpaper. Add the triangle firewall reinforcement and the 3/32 balsa doublers. Next, cut out the hatch from 1/8-inch plywood. Finally add the 1/8-inch dowels. This completes the fuselage.

THE WING

Start by cutting 5/16 inch off the trailing edge of the two tapered panels and the one constant chord section, bringing the trailing edge thickness to 1/4 inch. Because the wing molds don't match perfectly, it is necessary to sand the wing's root and tip sections smooth using medium-grit sandpaper. Now cut out four trailing edge fillers from 1/8-inch balsa; see plan. Glue two together making them 1/4-inch thick.

Next, take the constant chord wing panel and draw the wing sweep angle on the bottom of the wing; refer to the plans. Using a coping saw, cut out the sweep angle. You should now have a right and left wing section. The plans show the right wing section full size; the left side is a mirror image of the right side. Glue the trailing edge filler to the right and left side of the constant chord sections.

It is now time to glue the constant chord wing sections to the tapered wing panels. Using the balsa trailing edge as a straight edge, line up the trailing edge of the tapered section with the trailing edge of the constant chord section. They should mate. Satisfied that they do mate, lay down a piece of waxed paper so the wing panels won't stick to the building board and mix some five-minute epoxy and spread it over the root section of the tapered wing. Now join the tapered section to the constant chord section using the balsa trailing edge to align the trailing edges of both panels. Failure to do this will result in misalignment. Repeat this operation for the other two wing panels.

It is now time to glue the balsa trailing edge to each of the two wing panels. Spread white glue on the trailing edge of the foam wings and line up the balsa trailing edge with the contour of the wing. Use pins to hold the balsa trailing edge in place. Repeat this for the other wing panel.

Next, it is time to cut the sweep angle of the balsa trailing edge at the root of both wing panels using a razor saw. Also square off the wing tips by cutting off the balsa trailing edge that extends beyond the wing tip. The dihedral of the wing is two inches for each wing panel. The two inches is from the building board to the bottom surface of the wingtip. Follow the instruction sheet included with each foam wing. Using five-minute epoxy, glue the two wing panels together. Now cut off the pointed tip at the center of the wing. Refer to the plans. Sand the pointed tip area that was cut off round so it blends in with the contour of the leading edge of the wing. This completes the construction of the wing.

THE VEE-TAIL

Cut out the two stabilizer sections from 1/8-inch balsa. Hinge the stab sections using nylon reinforcing tape. Next, lay down a piece of wax paper and place one stab section on it. Mix up some five-minute epoxy and spread it on the other stab. Now, using the dihedral gauge let the second stab rest on it and form the 110-degree angle with the stab resting on the board. Refer to plans for this operation.

FINISH

You may finish the model any way you like, but remember, keep it light. I finished my model by giving all balsa surfaces two coats of clear dope. I sanded between coats with #300 wet or dry sandpaper. Next, I used Pactra's Formula-U black polyurethane paint. Only one coat is necessary. Finally, I trimmed the model with red, orange, and yellow paint.

RADIO INSTALLATION

Du-Bro and other manufacturers make mixing units suitable for this model, follow directions supplied with these units. For some of you this might be the first vee-tail plane you have encountered, so I will briefly describe how the vee-tail works.

With the plane in front of you and you at the rear of the plane, to make a left turn the left stabilizer must have the elevator down while the right stabilizer must have its elevator up. If this doesn't make much sense, visualize the left stabilizer in the vertical position. It now becomes clear that down elevator is *left* rudder. The right stabilizer, if made vertical, is in the up position; its elevator, which is also *left* rudder. For a right turn, the elevator positions are reversed. A vee-tail model is not the most efficient way to turn a model because when we are asking the model to turn we are also feeding in up and down elevator at the same time. To see this, put the left and right stabilizers in the horizontal position. For a left turn, the left stabilizer's elevator is in the down position while the right stabilizer's elevator is in the up position. Since a vee-tail is neither horizontal or vertical, but in between, it does both. That is, turn and up-down at the same time. When both elevators go up what they are doing, in reality, is feeding in left-right turn plus up.

(Suggestion: Don't try to figure it out; just believe it and go flying! wcn)

FLYING

Always fly on calm days, if you don't chances are you will lose the model. Make sure that the surfaces are going in the right direction. This is especially true if your radio has servo reverse. The model must be hand-launched. Run into the breeze and throw the model straight and level. •