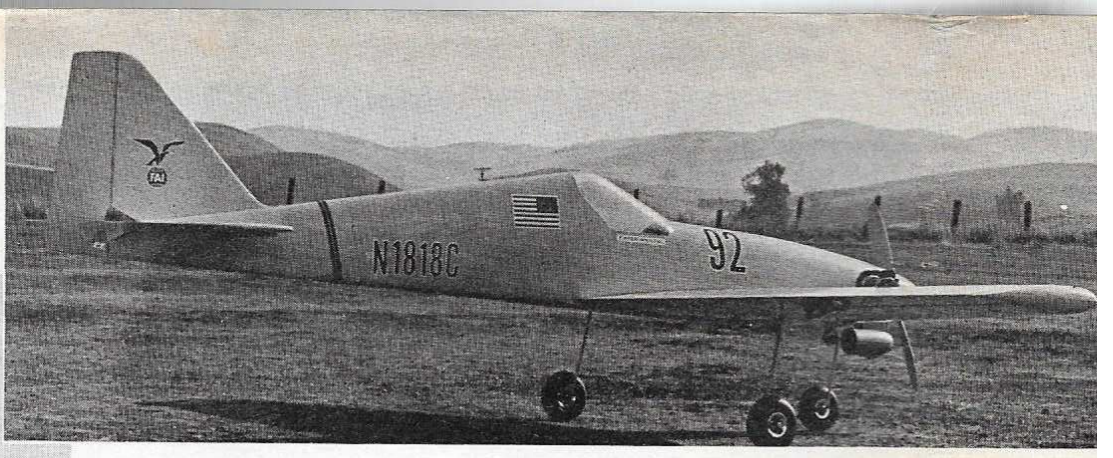

Scimitar

Distinctive-looking stunt ship designed for constant high-speed and positive tracking through maneuvers.

JOE FOSTER

SCIMITAR was designed with one basic thought. That was to try to solve a design deficiency that is prevalent in many of the small, high-speed stunt ships that are flown these days. This problem is the apparent difficulty high-speed airplanes have in tracking through the most basic maneuvers, such as loops, Immelmann turns, etc. We feel that this problem is created, at least in part, by small aerodynamic flaws that are exaggerated at high speeds.

How many ships have you seen that would track through three consecutive inside and outside loops without correction? I have flown only two. In the past we have always rationalized that some hidden warp was the culprit, even though we took great care to check the trueness of the flying surfaces and fuselage. A close examination of the flying characteristics of these crooked flying machines revealed that the heading was being lost at one spot in a loop. This was not the constant change of heading that would result from a warp. We concluded that some aerodynamic nonsense was taking place when the airplane reached a certain speed and attitude.

For example, I am sure you have seen many ships that wiggle in straight and level flight at a certain speed, or that wiggle when they are in a banked turn, or at certain headings relative to the wind. These are all exaggerated cases of the same aerodynamic flaw that will cause a seemingly unexplainable heading change at the top or bottom of a loop. It is our opinion that it is the uneven flow of air over the top of the fuselage, and its effect on the fin, that causes the wiggle and the resultant tracking problems.

To resolve this deficiency we incorporated into the Scimitar design, three fairly obvious features. First, our wing leading edge is highly swept back. In our opinion, this improves the directional stability at all speeds. Second, we used a streamlined turtle-back fuselage design. This was done to smooth out the flow of air as it moves across the fin. Third, we kept the entire configuration as streamlined as possible, within practical limits.

Our first flights with Scimitar were very satisfying. We found that, not only had we accomplished our goal of correcting the wiggle and greatly improving the tracking problem, but we had derived two additional very desirable flight characteristics. The ship flies at a constant speed through the pattern maneuvers. This, along with its smoothness, gives it a very graceful appearance in the air, even though it is very fast. Additionally, Scimitar exhibits practically no visible dynamic overshoot about the roll axis. She does beautiful, constant-speed rolls with only a whisper of elevator correction, and stops rolling the instant you release the

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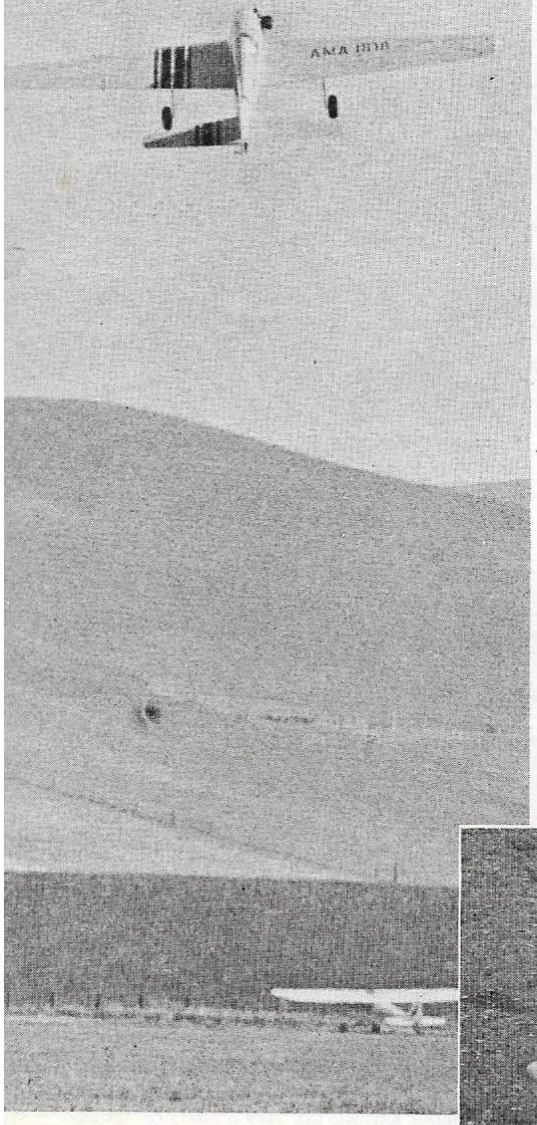

Unusual planform and Rivets-like appearance is result of engineering to correct flying problems of other stunters. Handles gusty weather like hot knife slicing butter.

Scimitar

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aileron stick. That's a big help.

You will notice when you examine the airfoils closely, that the percentage of thickness progresses in reverse from the tip to the root sections. It's an NACA 0012 at the root and an NACA 0018 at the tip. This airfoil progression, plus the high percentage of taper, requires a foam type of construction to make it practical to build. Incidentally, wing cores and, we think, completely assembled wings, can be purchased from Foam Crafts, P. O. Box 336, Campbell, Calif. 95008. We can highly recommend the quality and accuracy of their wing cores. Construction is not difficult and, because most of you who would take on a project of this type are experienced modelers, we will not go into laborious detail.

The fuselage is a good place to start. We used the crutch method of construction which makes it almost impossible to build a fuselage that is not true. Start with a flat board to build upon. Pin the ½ x ¼" crutch longerons to the plan so that the nose end hangs slightly over the end of the building board. This will make it possible for you to install No. 1 plywood bulkhead without removing the crutch from the plan. Our objective here is to construct the entire lower half of the fuselage without removing it from the building board. Glue the ⅛ x ¼" cross pieces and the No. 1, No. 2, No. 3, and No. 4 plywood lower bulkheads into position. Cut the doublers from ¼"-thick sheet, warp them to conform to the fuselage side curvature, and glue them into position. The ¼"-sq. bottom longerons now can be fitted with the uprights and glued into position with the bottom cross pieces. The lower box now is ready for its sheet covering.

When the assembly is thoroughly dry, remove it from the building board and install all the top bulkheads. Sheet cover the turtle deck and plank the forward portion of the fuselage back to the No. 4 bulkhead. Epoxy the lower engine mount to the cowl block and glue the block to the fuselage. The engine, bolted to the lower mount, will act as a jig to hold the upper motor mount and cowl block in position while the glue dries. Now the cowl sides and fillets are installed.

The nose-gear mounting is self-explanatory and works quite well. The fuel tank is a 12-oz. "Taurus" tank put out by World Engines. The canopy is from Rivets and can be obtained from K&K Fiberglass, Campbell, Calif.

The tail surfaces are quite typical and need no explanation, except use lightweight wood throughout and keep them as light as possible.

The wing is of foam-core construction. Many good articles have been written de-

scribing in great detail how to do it. If you have not yet tried a foam wing, we suggest you dig up one of these articles. The one thing you must do before you proceed with the wing is to predetermine your wing-servo mounting. The plan does not detail any radio gear installation because most of the popular radios on the market today require different servo mounting techniques, and the servos all seem to have different outputs and amounts of throw.

The important thing is to predetermine which set of holes in the wing bellcranks you will use to get the desired aileron total movement shown on the plan. This movement will give you a medium roll rate. The differential of up-to-down aileron movement can be obtained in two ways. If you use the wheel drive on your servo, you can attach the pushrods on each side of center. If you use the linear outputs on your servo you will have to install 60-degree bellcranks

in the wing instead of the 90-degree bellcranks shown on the plan. We prefer using the wheel servo output because this gives a great deal of adjustment latitude, so that you can obtain the roll rate and aileron differential you prefer. Use whatever hinge you have the most experience and good luck with. We have always had success with nylon two-piece hinges. I like them because you can disassemble the control surfaces for finishing.

Finish the ship to suit yourself. We have always used the Hobbypoxy No. 2 finishing method with great success and we find it to be as durable and light in weight as any we have tried. However, we do not recommend that you use any epoxy paint without good spray paint equipment.

The total weight, dry, should be right at 6 lbs.

Oh, yes, it does look like the low-tail *Rivets*, doesn't it?
