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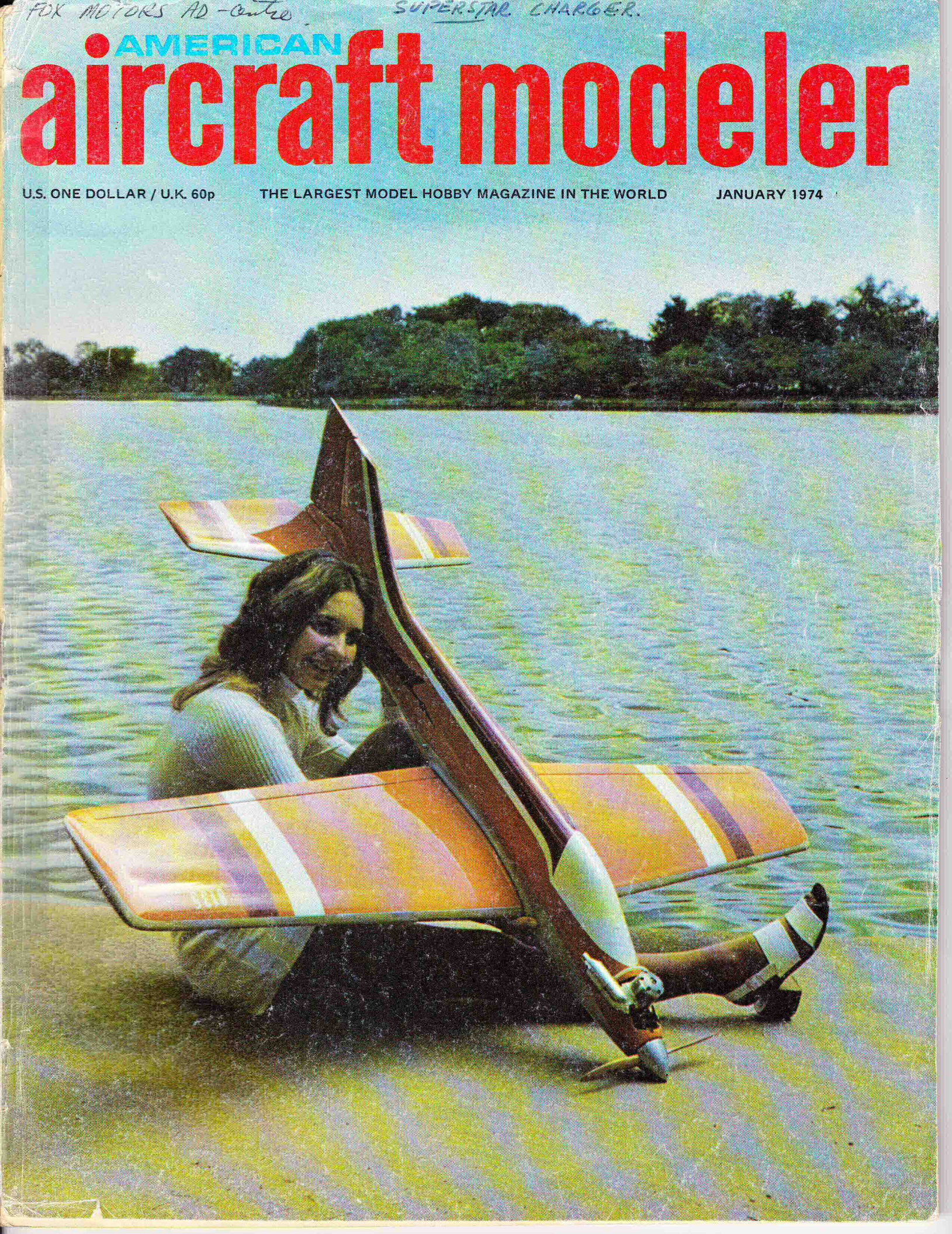

The Shrike

Bob Violett's Pattern ship brings something extra in style and a few innovations to aerobatic flying. And it's a sure winner.

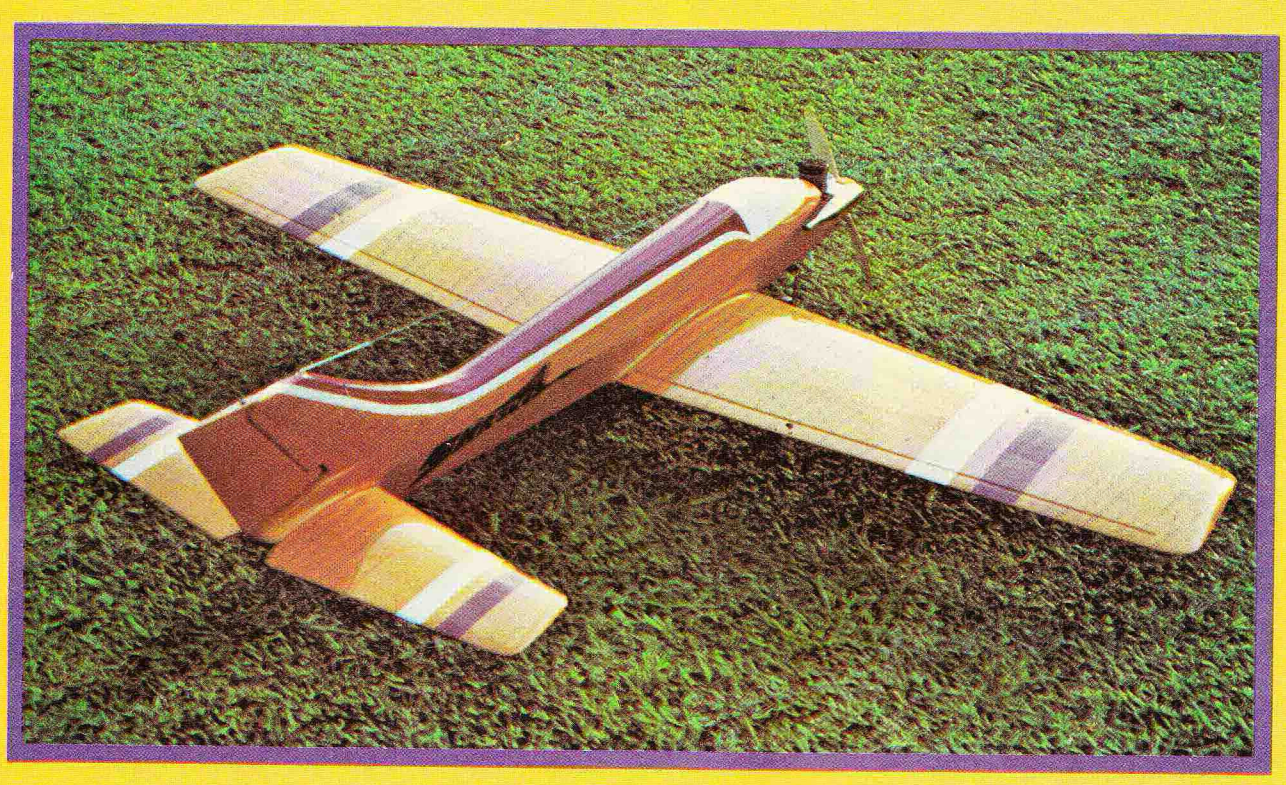

Photo by Fred Marks

Designing a model aircraft is a super challenge. To draft on paper and then transform into balsa, foam and fiberglass what one envisions is perhaps a model builder's fantasy portrayed. Certainly you have a dream machine that you secretly think about and picture zinging past an enthusiastic crowd admiring your genius. The Shrike is mine. This design represents an effort towards an aerobatic craft that has a little extra something in style and a few innovations.

It did not evolve from a long line of prototype airplanes. As a matter of fact, I've only designed and built two such airplanes previously: One is called the Virginian, and a modification of that is called Scorpio. They were little known outside the local area. Only the wing section of the Shrike bears any resemblance to these former aircraft.

So Shrike just happened one day at the drafting table. I'm in favor of stealing good ideas and improving on them. And if someone thinks that the profile

The Shrike

ABOVE: In the DCRC club, Bob is one of our most active fliers. His arrival at the field one day with the Shrike stopped everyone. This plane coupled with Bob's flying ability commanded the sky. It is fast and smooth and besides, he likes big maneuvers and low inverted passes (all within safe flying considerations). As Editor, I knew we had to have this project for AAM. There's magic about the way it flies and, if Bob goes Pattern flying with it, he's going to be a winner, too. RIGHT: To have the plane he wanted, Bob even had to invent and manufacture what's called the "Flying Fork." It is available from Violett Aero, 9176 Red Branch Rd., Columbia, Md. 21045.

looks kind of like Tony Bonnetti's machine, I'm proud because I always did admire and remember the image of that fine aircraft.

The canopy and nose section is sort of Super Star, so it's terribly difficult to be original these days. Pattern aircraft have just been around too long.

My competitive work in pattern flying has for the most part been confined to local area meets. Therefore, I'm no expert in this field. Next to pylon racing, the most fun I've had flying these toys has been attempts at formation flying with Jim Martin and his Banshee. We've worked at this enough to realize that it could be done quite professionally. It is certainly an airshow crowd pleaser, far better than pattern and possibly as good as racing.

One of the obvious design features of the Shrike is the low thrust line with the wing centerline just below and the stab just above. This simulates the good flying characteristics of a mid-wing airplane without the additional belly pan. The molded lip on the front of the wing saddle provides a solid wing mount and saves you from making the usual balsa fairing. The thick fin provides smoothness about the vertical axis as well as good rudder response. This is because it presents an airfoil to the relative wind instead of the usual thin slab. Sweeping the hinge line of the rudder doesn't seem to produce any noticeable elevator effect. The slow rolls are a thing of beauty and the figure M is surprisingly easy to accomplish.

Perhaps the flying stab is the Shrike's most controversial feature. An airplane operating with a flying stab has several aerodynamic advantages since the tail plane is actually flying through its various angle of attack changes instead of acting as a deflection and drag device.

Inherent characteristics of the flying tail are zero decalage trim available at your transmitter, minimum drag, smooth transition from slow to fast flight, and soft but positive control response. Their success in full-scale airplanes prompted me to go this route. All we really needed was a good device to activate it.

Bill Harvey and I put our heads together one night and tried every conceivable linkage we could think of. It appeared that the more complex the system got, the farther away from the desired product we drifted.

Simplicity gave birth to the Flying Fork as we dubbed it. At the risk of commercializing, let me explain why this is so good.

The unit is a Geneva mechanism that pivots from a different fulcrum than the stab itself. By locating this pivot point aft of the stab pivot, we achieved the desired throw reduction and gained aerodynamic and mechanical stability. A neutral stability condition exists if

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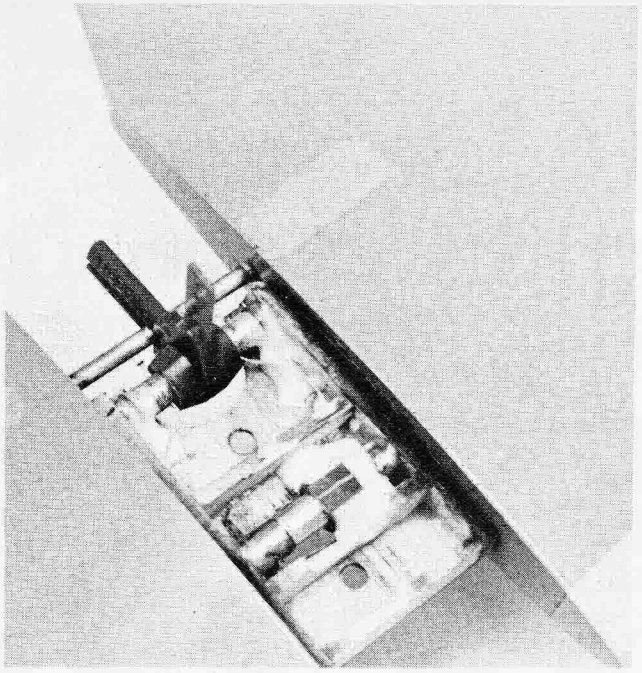
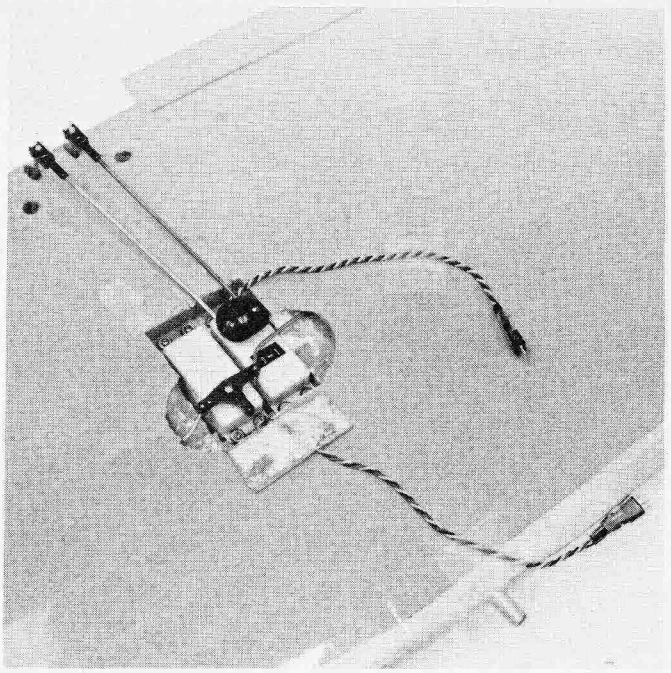
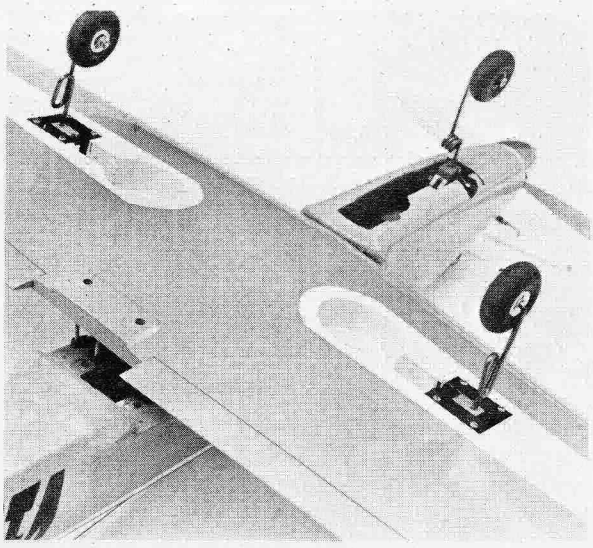
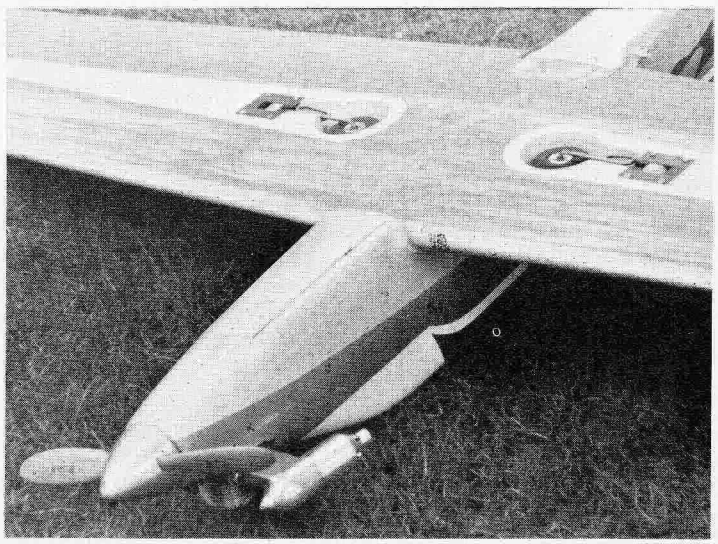




TOP LEFT: All-moving tail gives the plane its smooth elevator response. There are two tubes through the stab: The forward tube is the pivot; rear tube is for positioning for control. TOP RIGHT: Aileron and retract servos side by side in wing's centersection. LEFT: What good is a nosewheel door? About 15 mph. Apparently, it is an exceptionally high drag area on our models. Clean it up with a door. Wheel leg opens and closes it mechanically. BOTTOM LEFT: The Shrike, before the nosewheel door was added. Naturally, the plane uses Violett Aero retracts. BOTTOM RIGHT: Many engines have been on the model and all are excellent. Currently, a Ross powers the Shrike and a Sonic Systems actuator moves the retracts. Main wheel doors are not really needed because the area is outside the high speed prop wash.

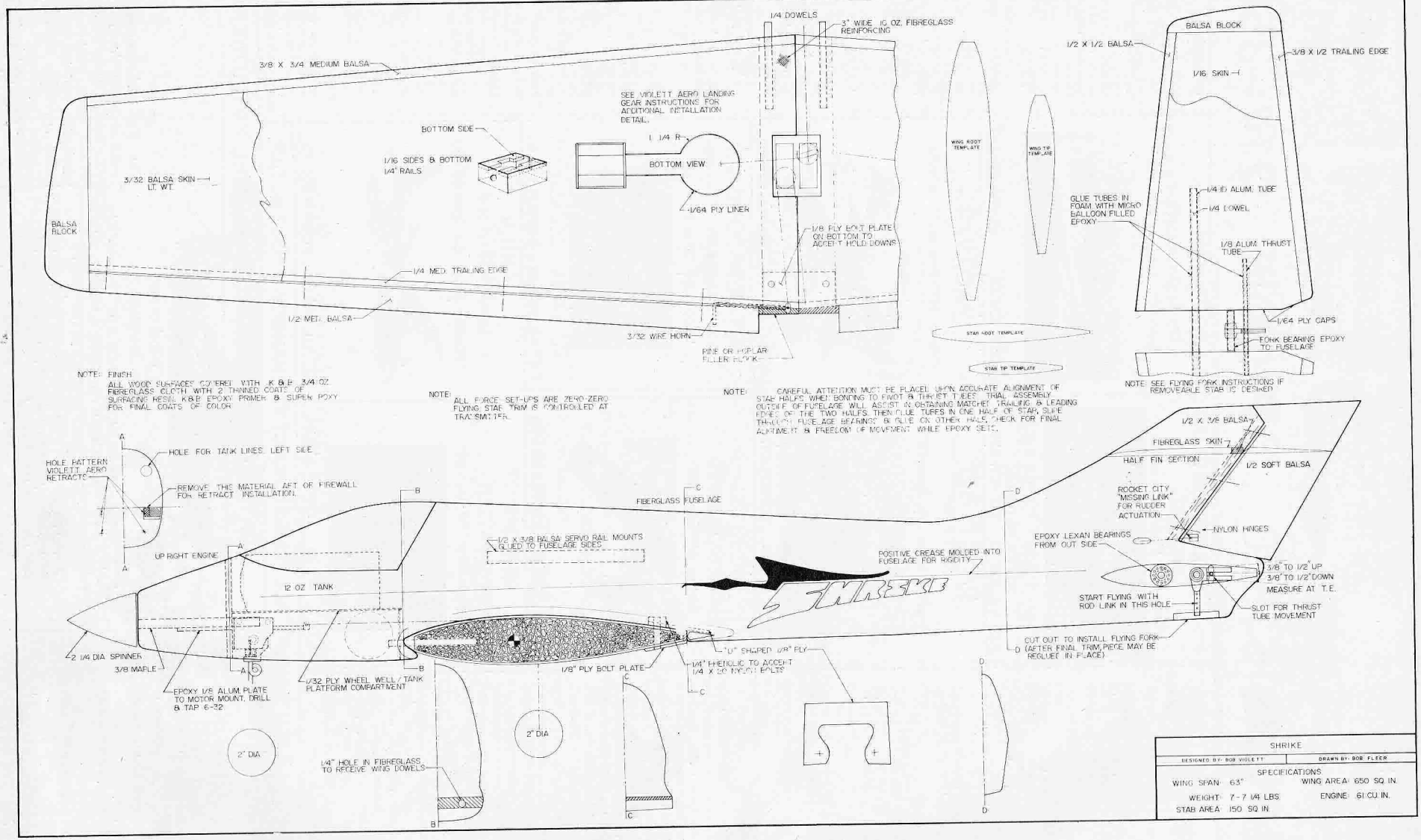
This airplane is designed to be made in fiberglass. It does not lend itself to easy balsa fuselage construction. The exclusive source for the Shrike fuselage is: T and L Glasflite, 20408 71st St., Sumner, Wash. 98390.





The Shrike

FULL-SIZE PLANS AVAILABLE--SEE PAGE 92



THE SHRIKE

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you drive the stab from the same point from which the stab itself rotates. This could allow a flutter situation to develop. The slot in the Fork allows the thrust tube to transverse its arc; its position relative to the fork pivot can also be varied. The unit is infinitely adjustable for many different applications, but the setup shown on the plans works best for the Shrike. Contrary to popular opinion, a stabilator is not an overly sensitive device; it is quite the opposite, in fact, when used with a reasonable airfoil section.

The stab on the prototype was made removeable. If you travel by air with your model, you can certainly appreciate this feature. The photo is somewhat outdated in that the lexan flange bearings are not shown. The unit pictured slides into a slot in the rear of the fuselage. The top and bottom of this slot is 1/16" plywood and the whole thing is through-bolted with ¼-20 nylon bolts. Better and simpler yet, put sleeves in one half of the stab to receive the pivot and thrust tube. A few set screws in this half of the stab will secure it. The first time you install a stabilator will be similar to your first experience with retracts. It takes a little familiarization, but the end result is worth it.

The most important step in assembling the unit is to be certain that both halves are perfectly aligned with each other; that is, the leading and trailing edges must match. The rear of the molded fuselage sports stab shoulders molded to accept the stab halves and provide bearing mounts.

At the other end of the machine, I decided on an upright engine with lots of room in the canopy for tank and other goodies. As I see it, the upright engine offers better lateral balance and airflow symmetry. It's easier to line up the carburetor with the tank and is obviously simpler to start and work on. Eventually, I see a rear exhaust motor with a tuned pipe (muffled, that is), housed in the canopy. The generous lateral area in front of the CG allows the knife edge capability necessary as to perform some of the maneuvers.

The airplane is pictured with an HP powerplant, but has since been used as a test bed for one of the original Ross 61 Schnuerle ported prototypes—much power available here. Cliff Telford will follow up with an article on the production version soon.

The wing is a very important part of any aircraft. Here I have chosen a 6400 series airfoil that progresses from 15% at the root to 17% at the tip. Concerning airfoils on model airplanes all I can say is that some do the job well and others just do it. This section works well and particularly good with the strip ailerons. Moderate sensitivity about neutral and a constant desirable roll rate are hard to achieve with some setups of strips. I hesitate to elaborate on all the reasons why, but this combination does work. Refer to Ron Chidgey's article for defer-

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THE SHRIKE

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ential setup. He knows what he's talking about.

The sleek flowing lines of the fuselage and vertical fin could be best accomplished by fiberglass molding. There is a positive crease running lengthwise just above the thrust line that gives rigidity to the fuselage, much like a fender line in an automobile. It allows the use of thinner material without sacrificing strength.

The most recent addition to the model is a nose-wheel door. I switched from 180° servos to a Sonic System pneumatic actuator and had ample power to open and close the door. It is simply hinged on one side and rubber band sprung closed. The wheel and strut push it open. The front edge is faired smoothly into the fuselage to prevent the air stream from opening it in flight. It's super simple and works great. Since I fly usually from grass fields, I feel that main gear doors would be too much trouble.

Construction

Construction is not much different from any other fiberglass and foam kit. Because it is capable of rather high speeds with the new more powerful engines and high nitro fuels, I gave a little more attention to areas that will show fatigue. Aileron and rudder hinges should be of the nylon pinned variety and pegged in place with round toothpicks and epoxy. The main landing gear installation using the 1/16" plywood box as shown is extremely durable. Cut a snug hole in the wing to accept it and epoxy on all five sides. This allows a lot of surface area to absorb the landing loads. With a couple hundred landings into a grass field, no signs of stress have appeared in this usually difficult area.

The wing is held in place by two dowels in the front that are actually stressed only laterally because of the molded lip that cups the leading edge. It is secured in the rear by two 1/4-20 nylon bolts that thread into a U-shaped plywood former that straddles both the sides and rear of the wing saddle.

I have tried about every finishing technique possible, but the latest and greatest has to be K&B finishing system. The K&B method has produced for me the easiest to apply, most durable and beautiful surface I have yet to achieve. The purple color will soon be available and the orange was mixed from three parts yellow to one part orange.

Flying

Lengthy discussion on how well it flies by one who designed it might lead you to conclude that I was prone to hyperbole. Quite briefly, it's as good as it looks, will do the whole bag of tricks, and is looked upon with much favor by other more serious pattern fliers who have tried it. The flying stab is a new experience and is particularly noted for extreme smoothness on takeoff and landings.

A Shrike is a bird, a missile or a number of other airborne things. The phonetic sound seems to fit the image of this model screaming down the runway at 120 mph two ft. off the deck. You'll like it—it's a real show-off machine. *(More on page 93)*

MARKS ON RC

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and went into the ground. The triplane is a tough old bird. Even though I never got the throttle back, damage was minimal.

The question was, why did it behave the way it did? Radio failure servo failure, structural failure, interference, or what? Once I used the aileron for the first turn the fun began. I couldn't control its direction—all it wanted to do was roll into a tight turn. Constant opposite aileron and up elevator kept it up until I finally lost it on one last wild spiral. It looked like an aileron servo failure at first, but once the shock was off and the testing began, the radio worked perfectly. In fact, for three straight hours it worked without a glitch. The only thing I noticed was that the power output on the aileron servo was a bit low.

Then, while inspecting a broken aileron, I found it! The torque tube assembly in the wing was binding. I reassembled the wing, and sure enough, the aileron did not center properly. Now the brain was finally in gear—things like leaving the plane locked in the trunk of the car all morning in the hot sun, the trunk seal leak that always lets in a bit of rain, the heavy rain of the day before and the poor design on the triplane aileron system—all came into focus.

The triplane uses wooden dowels at the end of an aluminum tube to transmit the torque to the aileron linkages. These wooden dowels run in plywood bearings. I worried about this when I built the plane so I put in a bit more clearance and finished the dowel bearing with epoxy. Until the crash, frequent