

THE TWISTER

BY HANK STUMPF • PHOTOS BY CHARLES STUMPF

(Right) Author poses with his Twister. Large wing and strong, light structure are the keys to spirited performance. (Below) The Twister on the runway center stripe at the Cape Coral, Florida, municipal model flying field. Classic U-control stunt ancestry is clear in this view.



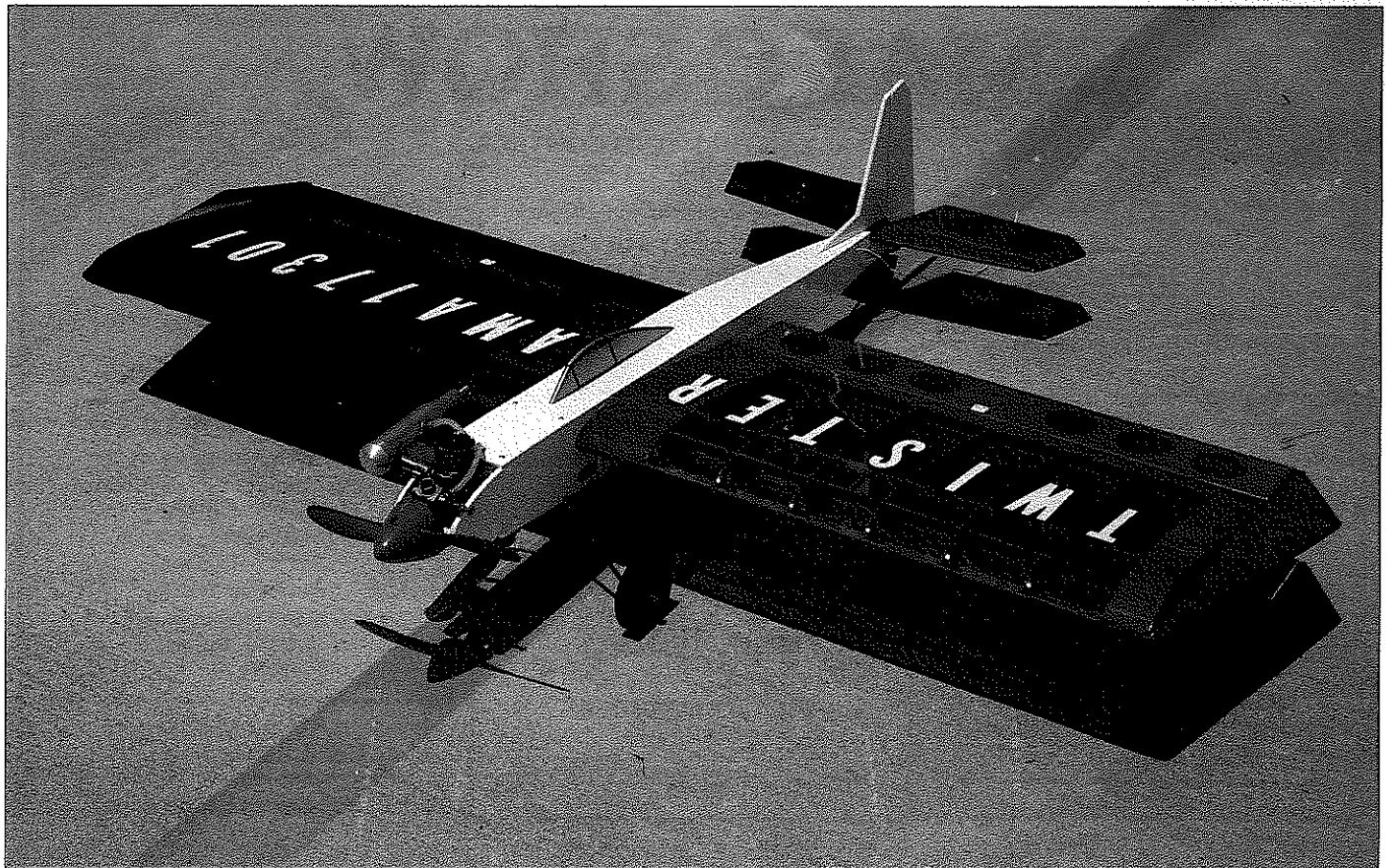
Not too many years ago, you could go to a fun-fly with your favorite sport model and expect to do well. How times have changed! The age of specialization has taken over and you now need a plane designed for maximum maneuverability to have an edge in these events.

These new fun-fly models clearly owe their origin to the golden age U-control stunt planes of the mid '50s, such as Jim Saftig's Zilch, Bob Palmer's Chief and Hal DeBolt's All American, to name a few. These stunters all featured large area symmetrical airfoil wings mated to a simple lightweight fuselage and tail. All were able to perform the pattern rapidly in a very small airspace.

The Twister is one of the new generation RC fun-fly stunters with the features of these U-control greats. Its maneuverability will amaze your friends and confound the competition. It can turn on a dime and give you nine cents change. All you

have to do is set the control surface throws to match your desired adrenalin level. With large surface throws it's a real tiger, but it can also be rigged to be quite docile with small throws. I suggest you start flying with relatively small throws until you are familiar with the plane, and then increase the throws to the level of performance you prefer. Because of its low wing loading, low weight and aerodynamic configuration, the Twister can perform typical fun-fly tasks in about half the time of more conventional models.

Like its U-control ancestors, the Twister is constructed in one piece. Due to its compact size, it fits easily into this author's Ford Escort hatchback. Construction is straightforward, using balsa, spruce, Lite Ply and aircraft plywood to complete a strong, light structure assembled from a small number of large parts. No gingerbread construction here!



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10F3

CONSTRUCTION

Because of the way this model assembles, it is recommended you start with the fuselage. Cut the fuselage sides from 3/16-inch medium hard sheet balsa.

formers F1A, F1B, F2A and F2B to the fuselage sides using epoxy glue. Be sure everything is squared up before the epoxy sets. Next install formers F3 and F4 and glue the sides together

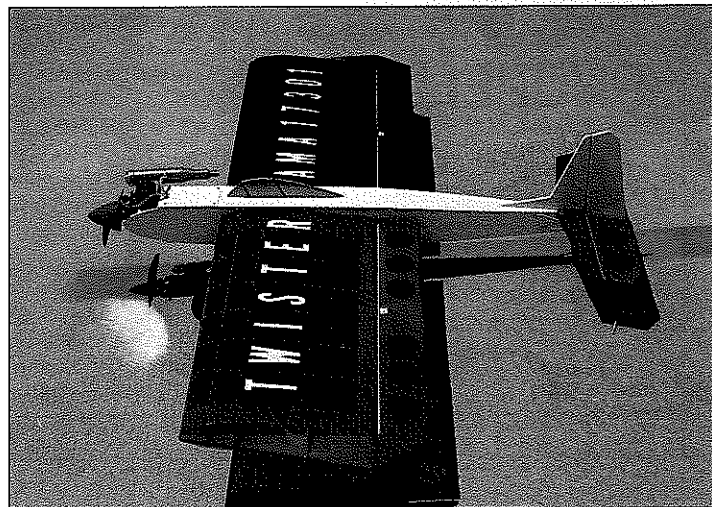
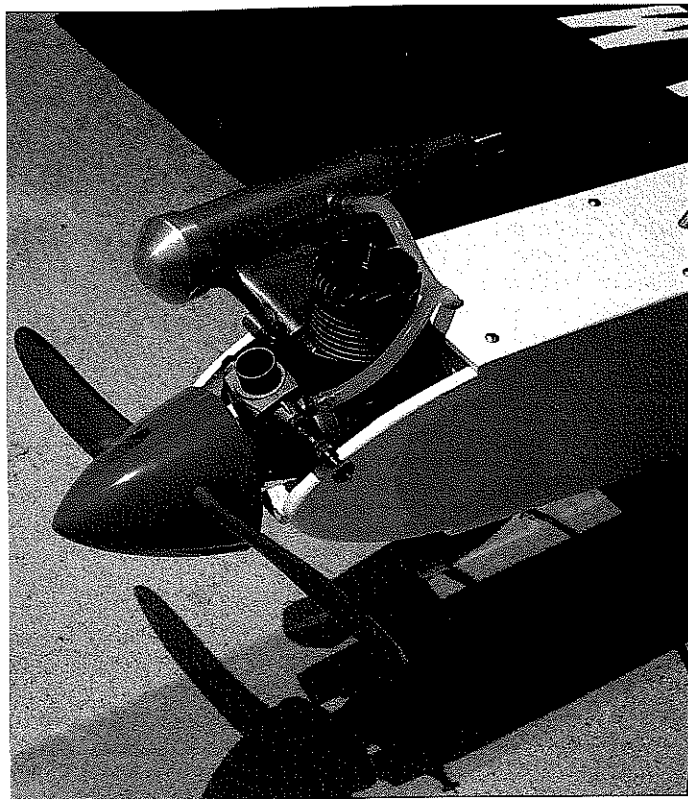
to make a plywood rib template of the W1 rib and cut all 18 to that size, and then trim 3/32-inch off the outside of eight of them to make the W2 ribs.

The span of the wing (less tips) is exactly 48 inches. Your local hardware store or lumber yard can supply a 5/16-inch diameter, 48-inch long dowel for the leading edge. Finding 48-inch long balsa for the spars

Once you have all the pieces ready, assemble the wing by pinning the lower 3/8-inch square spar to a flat building surface and gluing the ribs in place. Be sure to set the ribs 90 degrees to the building surface. A simple scrap balsa template will help.

Do not glue the two center W2 ribs at this time, just fit them in place. Next glue on the dowel leading edge and the upper 3/32-inch balsa trailing edge sheet. Once the glue is dry, you can continue the wing assembly by installing the top

(Left) The engine installation, fuel tank hatch, fuel line and muffler pressure line show up here. This is the well-used O.S. Max-H 40 engine used during initial flight testing.



Try to match the hardness of the two sides so they will bend evenly to form the aft fuselage. Cut out the slots for the wing leading edge, spars and trailing edge to permit installation of the completed wing later. Also be sure to make the 1/2-inch diameter holes just aft of the main spars to permit passage of the aileron servo cables from the wing into the fuselage. Cut out all the remaining fuselage formers, engine mount and landing gear pieces.

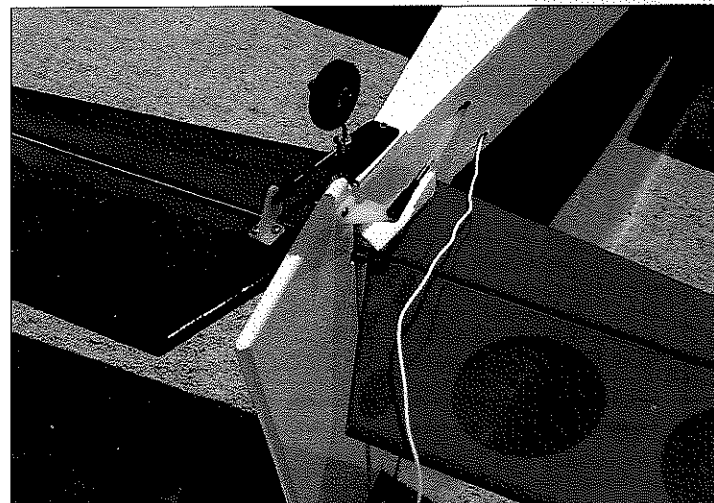
Assemble the engine mount plate M1, doublers M2 and

at the tail. Install landing gear mount formers L1 through L7 and the 1/4x3/8 spruce servo mount rails, also using epoxy glue.

Trial fit your servo tray and servos in the fuselage and mark the location of the rudder and elevator pushrod sleeves on former F3. When holes for the sleeves have been made in F3 and F4, install the sleeves in the fuselage as shown on the plans, using epoxy glue. If you want to run your receiver antenna wire inside the fuselage and out the tail, now is the time to install a third sleeve for this purpose. This routing was used on the original Twister, and provides a neat installation with no radio problems.

At this point, set the fuselage aside until you have completed the wing structure and cut out the tail pieces.

Start the wing by cutting out all 18 ribs and the tips. You may find it advantageous



(Top) A view from above shows the lightening holes in the ailerons and elevator, the patriotic color scheme and the silver profile canopy. (Above) Here is how the rudder and elevator pushrods are installed. Also, note the antenna wire exiting from the aft fuselage. See text for details of antenna routing.

and trailing edge pieces is not so easy. You will probably have to use 36-inch long pieces and splice on the extra length. Use epoxy glue on the splices and alternate the splices, i.e., if you put the lower spar splice on the left side of the wing, put the upper spar splice on the right side, etc.

3/8-inch square spar, the 1/8x1/4-inch turbulator spars, the lower 3/32x1-inch trailing edge sheet and the 1/4x3/8-inch trailing edge cap strip.

Now trial fit the fuselage between the two center W2 ribs and glue them in place to match the fuselage width. Complete the wing structure by installing

TWISTER

DESIGNED BY HANK STUMPF

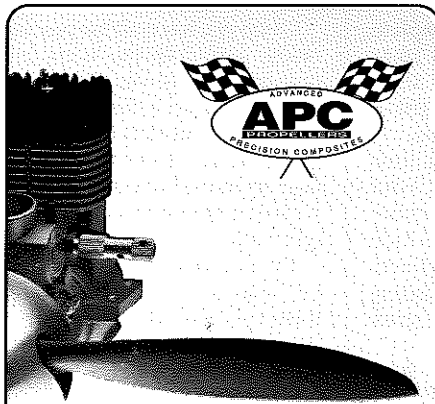
A four-channel fun-fly model for .30-.50 cu. in. engines.

Specifications—

Length: 37 in.
Wing Span: 53-3/8 in.
Wing Area: 710 sq. in.
Weight: 4-1/8 lbs.

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9.5x4.5; 10x3, 4, 5, 6, 7, 8, 9, 10 \$2.29
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REVERSE PITCH PUSHER:

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COMPETITION:

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11x10, 11, 12, 12W, 13, 14;	
12x9, 9W, 10, 10W, 11, 11N, 11.5, 12, 12N, 12.5, 13, 13N, 14; 12.5x9, 10, 11, 11.5, 12;	
12.5, 13; 13x9, 10 \$7.95
13.5x9, 10, 12.5, 13.3, 14; 14x6, 8, 10, 12, 13, 13.5, 14; 14.4x10.5, 12, 13, 14.5x14N; 15x8, 10, 11, 12; 16x8, 10, 12 \$12.95

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3/32-inch sheet on the wing center section and tip ribs. Finally, install the 1/8-inch plywood aileron servo mount plates, the wing tips and wing tip gussets.

Cut the dorsal, fin, rudder, elevators and ailerons from 1/4-inch sheet balsa. The lightening holes in the elevators and ailerons are best cut with a two-inch diameter hole saw. If you don't have a hole saw, a scroll saw can be used. Bend the elevator joiner from 3/32-inch diameter wire as shown on the plans, drill and notch the elevators to fit the joiner and epoxy the joiner in place.

Sand all surfaces smooth and round the edges. You are now ready to hinge the surfaces. I strongly recommend Granite State No. 610 Iron-On Gapless Hinges. This hinge is easy to apply, requires no cutouts in the surfaces and produces improved aerodynamic efficiency, because it is continuous and gapless. If you prefer conventional hinges, use a type that can take abuse, such as Du-Bro No. 117 Nylon Hinges with a metal hinge pin. The ailerons require four conventional hinges per side, three hinges per side on the elevator and three hinges on the rudder. Limit your surface gap to 1/32-inch when using conventional hinges.

Take the completed wing structure and slide it into the slots in the fuselage sides until it is in the correct position. Draw the wing rib centerline on the fuselage sides first, to help get the wing properly aligned. Use CA glue to attach the wing to the fuselage. Fill in the slots in the fuselage sides with scrap 3/16-inch sheet. Next install the 1/8-inch sheet fuselage top panel. Make the top panel from one piece with the grain running lengthwise. Lastly, install the 1/8-inch sheet bottom panels and the 1/8-inch plywood tailwheel bracket mount.

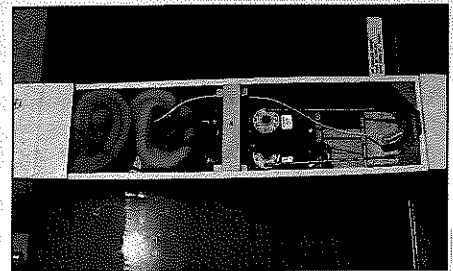
Sand the fuselage lightly and complete the basic airplane assembly by installing the tail assembly, the fuel tank hatch and the radio compartment hatch.

Bend the two main landing gear struts from 5/32-inch diameter piano wire to match the pattern on the plans. Install the struts with metal or nylon straps and wood screws after covering the model. To keep weight down, use lightweight wheels such as Dave Brown Lite Flight 2-3/4 inch diameter wheels. Install a Du-Bro 40 size tailwheel bracket on the plywood mounting plate and put a 3/4-inch diameter wheel on the wire strut to complete the job.

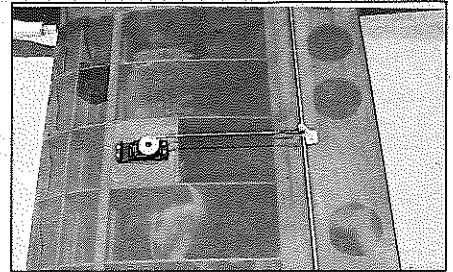
Coat the fuel tank compartment, engine mounts, firewall and fuel tank hatch with epoxy resin and sand smooth. Before covering, sand the entire structure smooth.

The model is covered with iron-on film. With so many brands and colors available, choose the type and colors you prefer. The original Twister is covered with MonoKote, transparent red on the left wing and horizontal tail and transparent blue on the right wing and horizontal tail. The fuselage is white with a silver profile canopy trimmed with black striping tape.

The Twister was first flown with an old,



Looking into the radio compartment, from left to right, are the battery pack, the receiver (both wrapped in foam), the throttle servo and the rudder and elevator servos. Note the antenna wire routed into a tube in the aft fuselage.



An underside view showing the details of one aileron servo, pushrod and control horn. This model requires two aileron servos, one in each side of the wing.

but potent, O.S. Max-H 40 engine. Later on, a Magnum GP .40 engine was installed to see if the flight performance was noticeably reduced by a sport type engine. The results indicate that sport engines have plenty of power to pull this plane around. The four-ounce Sullivan fuel tank is installed in its compartment and held in place by a 1/8-inch plywood cover attached by four wood screws. This tank may seem small, but you will find it is plenty large enough for fun-fly events.

An Airtronics Vanguard PCM radio was installed in the original model. In spite of the small fuselage with the wing passing through, there is more than enough room for standard size radio components if you follow the arrangement shown. The rudder, elevator and throttle servos are mounted on a plastic servo tray which is secured to the spruce servo rails with wood screws. The receiver and battery pack are wrapped in foam and installed in the locations shown. To complete the radio components installation, you will need two aileron servos, one in each wing with a "Y" cable to connect them to each other and to the receiver.

FLYING

Before flying, check the balance of your completed Twister. The CG should fall within the range indicated on the plans; if not, add weight to the nose or tail as required to get the CG in the correct range. Set all surfaces at neutral and adjust them for moderate throws for the first flight. Check for smooth operation and range check your radio.

The original Twister flew fine and required just a little down trim on the first flight. Takeoff roll is short due to the low weight and large wing area. Good luck with your Twister! **MB**