



CONSTRUCTION

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The Trishula has a unique appearance while flying. The forward-swept-wing planform takes a little getting used to.



This shot of the model, just as it is starting its landing flare, shows how unusual it looks with its forward-swept-wing arrangement.

SPECIFICATIONS

- Wingspan:** 51 in.
- Length:** 56 in.
- Wing area:** 576 sq. in.
- Weight:** 87 oz. (w/ 4S 5000mAh LiPo)
- Wing loading:** 21.75 oz./sq. ft.
- Radio req'd:** 4-channel (aileron, elevator, rudder, throttle); retracts optional
- Power req'd:** 800W brushless motor
- GEAR USED**
- Radio:** Hitec Eclipse 7 Pro transmitter, Optima receiver, two HS-65MG aileron servos, two HS-82MG rudder/elevator servos (hitecrd.com)
- Motor:** E-flite Power 32 (e-flite.com); Castle Creations Edge 60 HV speed control and 10A BEC (castlecreations.com)
- Battery:** Pulse 4S 5000mAh LiPo (pulsebattery.com)
- Propeller:** APC 11x10 (apcprop.com)

almost uncontrollable model. It must be built correctly. So I'll assume anyone building the Trishula will have significant building experience, and I'll provide just a basic overview of the construction.

BUILDING THE WING

I used pink foam for the cores, and the templates

are shown on the plans. Cut them accurately with no washout (or wash-in). Using the templates, cut the dihedral 10 degrees per panel (yes, 20 degrees total). Remember to do this before cutting the core planform or the angle will not be correct. Also note the wheel wells need to be cut at odd angles to allow the wheels to "slip" rearward into the wells. Cut out the portion

of the wing where your retract or landing-gear mount blocks will be installed, and build up the mounts from hardwood and aircraft plywood using the templates on the plans. Install the bearers in the wing before sheeting the wing with 1/16-inch balsa. Also install the tubes in the wings for the aileron servo leads and retract wires. After sheeting the wings, install the

A radical forward-swept-wing design with great performance

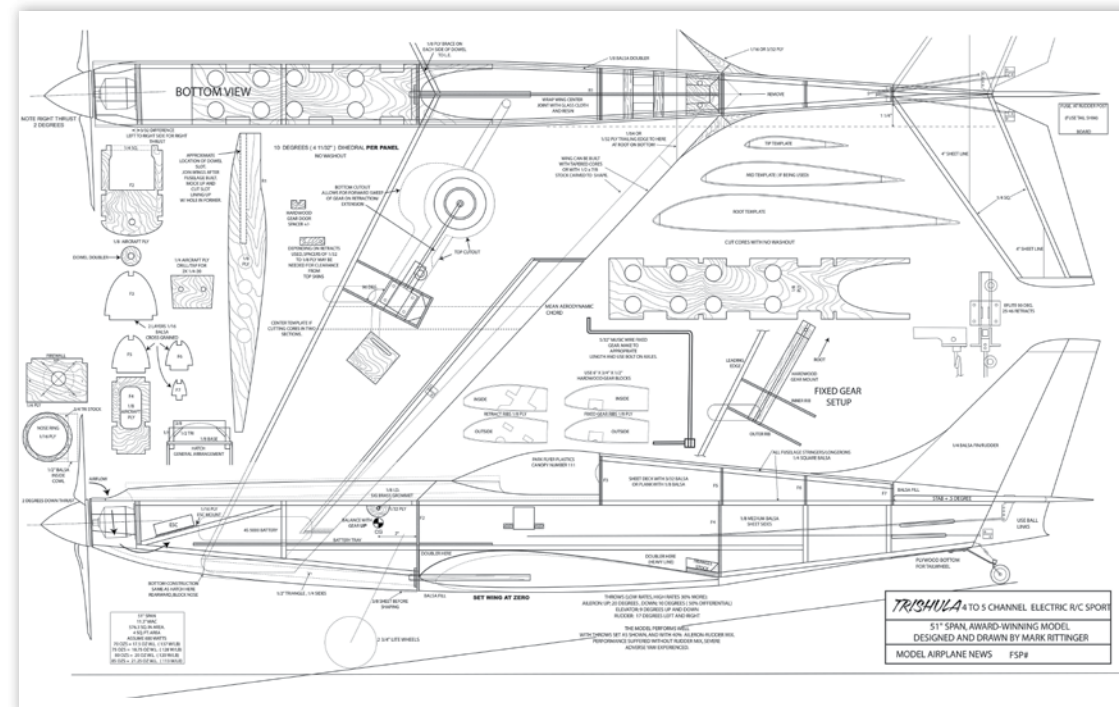
Trishula

Trishula is ancient Sanskrit for "trident," and after you see this model in flight, you'll understand why I gave it its name: The model looks like a flying pitchfork. I wanted this one to be really different. The model has 32-degree forward-swept wings (FSW) and retracts. With this odd planform, the retract geometry proved to be challenging, yet it seems to work just fine. The Trishula actually performs very well. My flying buddy, Keith Shaw, flew it at the Mid-America Electric Flies and was quite pleased with its performance.

Why use a FSW setup? Well, it's different, and the

wing has excellent stall characteristics and increased maneuverability. The drawbacks are the requirement for a very stiff wing to avoid aeroelastic diversion, better known as "wing twist." Because of this, I used a fully sheeted foam wing for increased torsional rigidity.

This is not a beginner's model in any sense. It uses some advanced construction techniques and must be built precisely to fly well. Any unevenness in the wings or misalignment can—and will—result in an



Trishula | X0518A

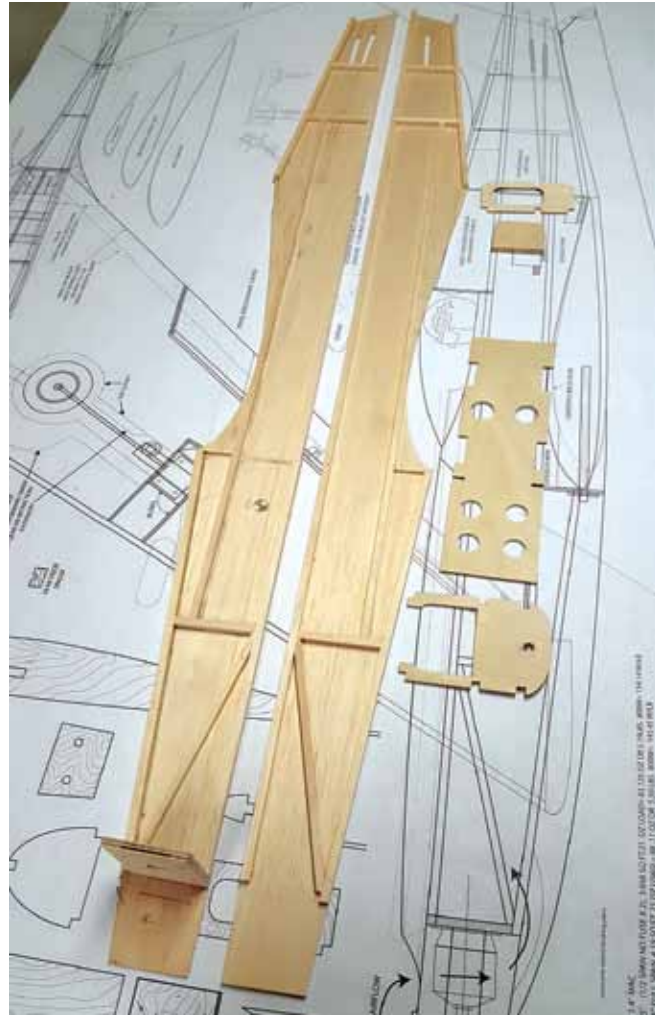
Designed by Mark Rittinger, the Trishula is a radical-looking, forward-swept-wing design that has great performance. It is not a beginner plane to build or fly. Using foam-core wings, the design has retracts and uses traditional model-airplane construction. Be sure to keep everything square and properly aligned and you'll have an amazing high-performance airplane. WS: 51 in.; L: 56 in.; Radio: 4-channel; Power: E-flite Power 32; LD: 3; 1 sheet; \$16.95



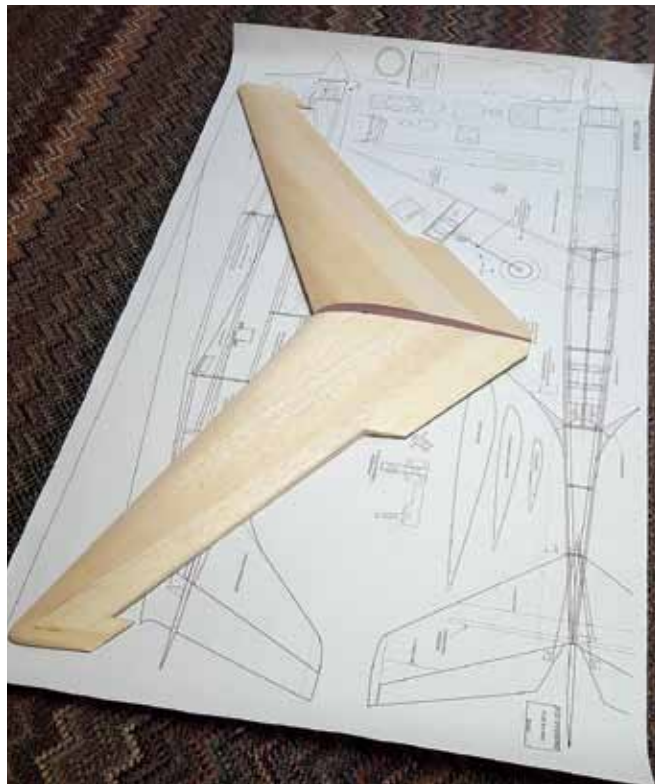
To order the full-size plan, visit AirAgeStore.com.



The wing cores for the Trishula are made out of pink foam. The airfoil templates are included on the plans.



The fuselage is a typical box structure using formers and sides.



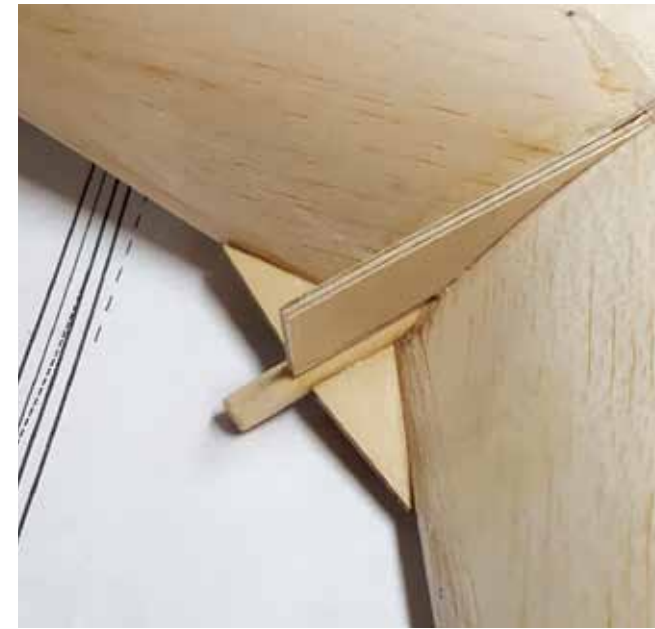
Here, you see the wing panels fully sheeted with balsa.



Before the wing panels are joined, glue the center rib into place.



The main retractable landing gear are shown in place in the wing panels.



Here, you see the alignment dowel in place in the center joint of the wing assembly.



This shows the tail surfaces and fairing block installed and shaped to blend into the turtle deck.

trailing edge and then join the panels with the center rib, and use a nylon or fiberglass glass-cloth center wrap to reinforce the glue joint.

BUILDING THE FUSELAGE

The fuselage is basic balsa and plywood and must be built straight and true. Build up the left and right sides using sheeting and square stock, then assemble the battery tray / bulkhead. Leave off the bottom front block until you fit the wing in place so that you can drill the alignment-dowel hole. The wing must be set at 0 degrees in the saddle. Again, ensure that it's all straight and the wing and stabilizer are at the correct incidences as shown on the plans. The prototype required some downtrim, so I corrected for this on the plans. I strip-planked my rear deck, but sheeting will also work.

Note that the right- and down-motor thrust is built into the fuselage; these are important. Because the center of gravity (CG) is actually forward of the wing root, I also used brass grommets in the fuselage at the CG location to help with balancing. Just slide a length of music wire through them, and add ballast as needed.



The basic fuselage structure is being assembled and placed on the wing assembly.

BUILDING THE TAIL

Sheet balsa is used for the vertical and horizontal stabilizers. The fin and rudder are a simple affair, while the horizontal stabilizer needs to be built with an outline of hard balsa square stock to help keep it from twisting during flight. The center joint must be strong as well. Be sure to attach the horizontal stabilizer at 1/2-degree positive incidence.

FINAL ASSEMBLY

Assemble the model after covering, again making sure that it's 100 percent in line and straight. Study the plans for incidental info such as tailwheel, wing mount, fillets, pushrods, gear doors, and gear mounting.

Balance with the landing gear in the up position, as it folds rearward on retraction and will move the CG rearward as well. My prototype



It's starting to look like a complete airplane. The fuselage sides have been joined at the tail, the turtle-deck sheeting has been applied, and the nose blocks have been installed and shaped.



Up on its gear, the Trishula is ready to cover.

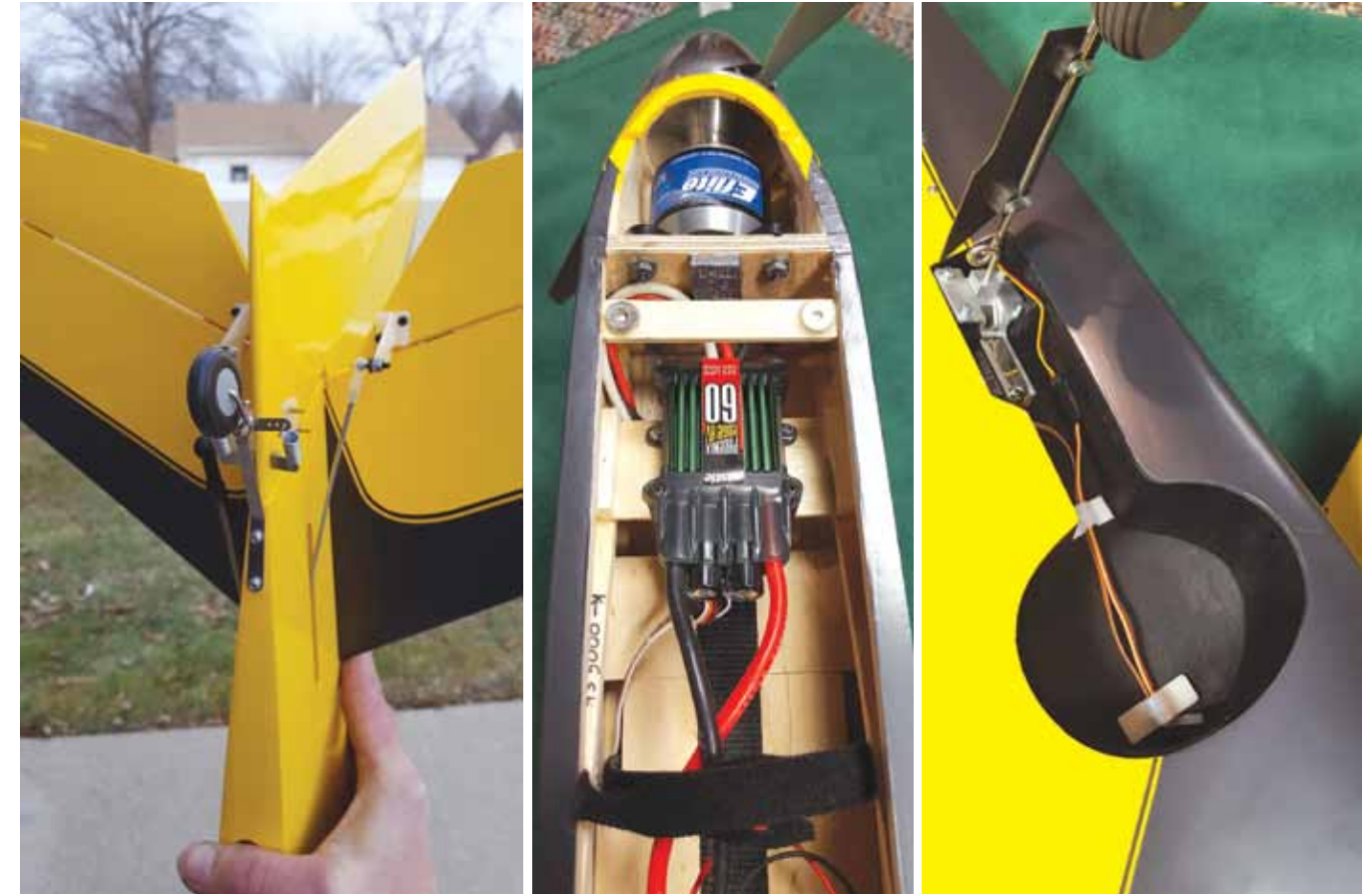
required the battery to be very far forward. Follow the plans for all throws and mixing on the aileron and rudder. I found that the plane doesn't fly nearly as well without the aileron/rudder mix. Make sure the landing gear and wheels clear the wing during retraction and extension. Setting up the wheels to be parallel when in the down position

should allow them to lie flat in the wing when retracted. I prefer to use a Castle Creations CC BEC 10A set at 5.5 volts to be sure that the retract gear have enough power. I used a Castle Edge 60 HV speed control and all Hitec gear, with an E-flite spinner and E-flite 25-46 90-degree electric retracts. With the indicated E-flite Power 32, an

APC 11x10 prop, and a 4S 5000mAh LiPo flight pack, power is almost 800 watts (used only for takeoff, really), as the design is clean and doesn't need much power once flying to really move—even at a weight of 87 ounces. Use some bright colors to aid in orientation. I used flat black and bright yellow MonoKote, and it has proven



Iron-on film is the quickest and lightest way to finish the model.



Above left: Here is a close-up of the tail linkages and the steerable tailwheel. Center: With the fuselage hatch removed, there's plenty of room to install any power system you choose. Right: For a finished look, the author finished the inside of the wheel wells and kept the wire leads for the electric retracts neat with stick-on wire clips.

quite visible in the sky even on overcast days.

IN THE AIR

Trishula is well behaved, and it tracks well with the long tail and wide gear. If all is set up properly, it should fly like any other hot sports model. It just takes some time to get used to its odd shape in flight.

Trishula gets airborne surprisingly fast, as it packs a lot of wing area (576 square inches) into its small span. Simply make a few test runs to get a feel for it. When you're comfortable, line it up into the wind and smoothly advance the throttle, and you'll be in the air quickly. Don't forget to retract the gear. Due to the FSW, the Trishula will essentially mush and sink during slow flight, with no violent tip stalls. Test it at a safe altitude after getting used to flying it slower and slower. Stall recovery is basically down-elevator to gain speed while advancing power.



The Trishula is a tail-dragger, so you have to pay attention with the landings.

HIGH-SPEED FLIGHT

Trishula really grooves and flies much like a sport-pattern type. It will take some getting used to the odd planform, but once you are confident, wring it out. It loves speed. You may find that it needs either down-thrust tweaking or some CG fine-tuning.

AEROBATICS

Trishula will do most basic aerobatic moves with the exception of knife-edge; it just wasn't made to fly that way. But you may even find

a few ways to exploit the FSW behavior to your own aerobatic advantage.

LANDINGS

Lower the gear at altitude to get accustomed to any trim changes associated with the odd retract movement. It does produce a slight wiggle in transit when lowering the gear because of the gear-door angle. It also eats up a lot of sky on final, so leave some juice in the pack for a wave-

off if needed. It will land straight once you get a feel for its speed and sink rate.

BOTTOM LINE

If you're looking for something really different but with nice handling, try the Trishula. I can pretty much promise you that it will be the only forward-swept-wing, retract-equipped electric tail-dragger at your flying field. If you have any questions, you can contact me at mrittinger70@hotmail.com. ✈