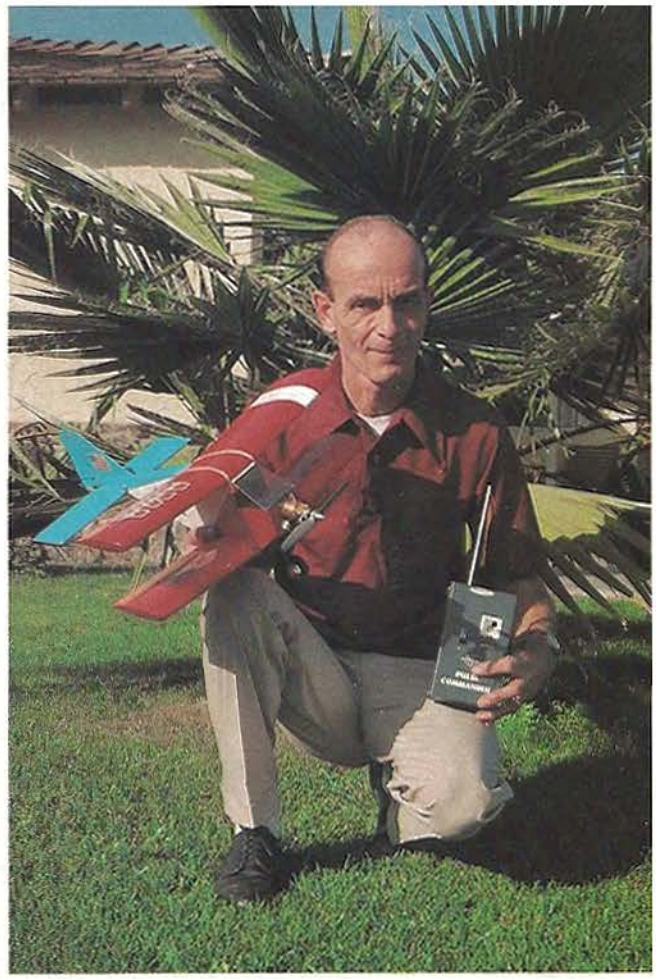
Rollin' Foam

A Peppy Hi-Performance Rudder Only Biplane That Flys Like A Demon.

BY RICHARD ERICKSON
PHOTOS BY DICK FISH



The Rollin'-Foam was designed around the Ace constant chord foam wing, one half of the panel for the upper wing and the other half for the lower wing. This measures up to a 17½" span, .049 powered type of exciting rudder-only fun. Rollin'-Foam shapes up to flyability with no compromise, with simple, but strong, construction which has been proven in two years of flying with the original prototype. With all of its wild aerobatic flying, doing maneuvers I haven't yet named, it has only the usual minor dings and dents. One of its best accomplishments is a full roll on top of a loop. Rollin'-Foam has lived up to its name and design parameters time and time again, and rudder-only has never been so much fun! She climbs out quickly between shennanigans, ready for the next flip of the rudder, and a show-off it is! The glide back home after the engine quits is somewhat like a pigeon with a cardiac arrest — fast but predictable — a Grand Esprit it ain't! So, with a Cox Golden Bee or Black Widow Engine, 6 or 7 bucks worth of wood and miscellaneous pieces, the dependable Ace Pulse Radio as always, R/C flying with only a flapping rudder makes for hours of fun and pleasure. Join us and have a ball.

ROLLIN'-FOAM
Designed By: Dick Erickson

TYPE AIRCRAFT
Rudder Only — High Performance
WINGSPAN
17½" (both wings)
WING CHORD
5⅝ Inches
TOTAL WING AREA
194 Square Inches
WING LOCATION
Biplane
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL, Each Tip
1⅜" (both wings)
O.A. FUSELAGE LENGTH
19½ Inches
RADIO COMPARTMENT AREA
(L) 7½" X (W) 2" X (H) 3"
STABILIZER SPAN
11-9/16 Inches
STABILIZER CHORD (incl. elev.)
4 Inches
STABILIZER AREA
46 Square Inches
STAB AIRFOIL SECTION
Symmetrical
STABILIZER LOCATION
Bottom of Fuselage
VERTICAL FIN HEIGHT
3⅞ Inches
VERTICAL FIN WIDTH (incl. rudder)
4 Inches (Avg.)
REC. ENGINE SIZE
.049 cu. in.
FUEL TANK SIZE
Cox Tank Mount
LANDING GEAR
Single Strut
REC. NO. OF CHANNELS
Single (Pulse)
CONTROL FUNCTIONS
Rudder Only
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa and Ply
Wing	Foam and Spruce
Empennage	Balsa
Weight Ready-To-Fly	16 Ozs.
Wing Loading	11.9 Oz./Sq. Ft.

CONSTRUCTION

The fuselage is the typical balsa box, strong and easily built. Cut out the sides from 3/32" "C" grain balsa, noting from the plans the "splice line" for 3" wide stock. Pin the sides down, gluing along the splice line, then cut out the 3/32" balsa doublers for the wing saddles and glue in place. Be certain that the cut-outs for the upper and lower wing saddles, plus the stab saddle, are true to the plans. This is always important with any airplane, especially a rudder-only ship. The flight trim depends on these being right 'cause there just "ain't no elevator!"

Now the 1/8" square longerons, or stringers, and uprights are glued in place, also the 1/8" x 1/4" pieces up front. Note that the right fuselage side is 1/8" shorter at the firewall in order to provide the proper side thrust. Complete the fuselage sides with the 1/8" x 1/4" actuator slide rails, using a piece of 3/32" ply for proper spacing of the actuator mount.

While the sides are drying, the three fuselage formers can be made up; the firewall (F-1) and F-2 are 1/8" ply. Former F-3 is 1/8" balsa with the wood grain as shown. Glue two 1/8" square stiffeners along the front of F-3 as shown. Bevel sand the top and bottom edges of F-1 and F-2 so they match the side view. Drill the firewall for the engine blind nuts, noting that they are offset to the left of center to allow for engine side thrust. I always bolt the engine in place with the blind nuts just touching the barbs — then, push some epoxy around under the nuts and let it "soak" for a few minutes. Then tighten the screws tight to pull the blind nuts in the rest of the way. When the epoxy has cured and the engine is removed, the screws will always line up perfectly.

Bend up the single strut landing gear from 3/32" diameter wire. Lay it on former F-2 and trace around its outline with a pencil. Now drill twenty (20) 1/16" holes on this outline as noted, then bind the landing gear to F-2 with soft copper wire. Epoxy liberally and it will never come loose.

Remove the completed fuselage sides from the plans and pin them together back-to-back. Block sand their outlines until both sides match each other, especially at the wing and stabilizer saddles. Pin the right fuselage side back down again and epoxy in formers F-2 and F-3. Before the epoxy sets up, lay the left fuselage side down over the formers and check with a small square that the two sides again match each other when assembled. Epoxy the left side to formers F-2 and F-3 and re-check again with a square. The right fuselage side should be 1/8" shorter at the firewall than the left side, also, when checked this way.

After the epoxy has cured, the firewall (F-1) and the 1/8" x 1/4" cross pieces can be epoxied in place. Cut or sand the fuselage sides where they meet at the rear until they are 1/8" wide as seen in the top view. Glue together along with the 1/8" square rear cross pieces and the 1/8" x 1/4" doubler along the top of F-2.

Build the rudder torque rod from 1/8" square hard balsa or spruce and .045" wire. Bend up the front yoke per the side view with a small "hook" shape where it engages the actuator. Cut out the 1/16" ply torque rod plate, drill a 1/16" hole where shown, and slip it over the front yoke. Now bind the yoke to the torque rod with heavy thread and coat the wrapping with glue. The rear wire can then be wrapped and glued to the torque rod assembly leaving the wire straight at the rear until later on. Drill a 1/16" hole in the rear of the fuselage to allow the completed torque rod to be slipped through.

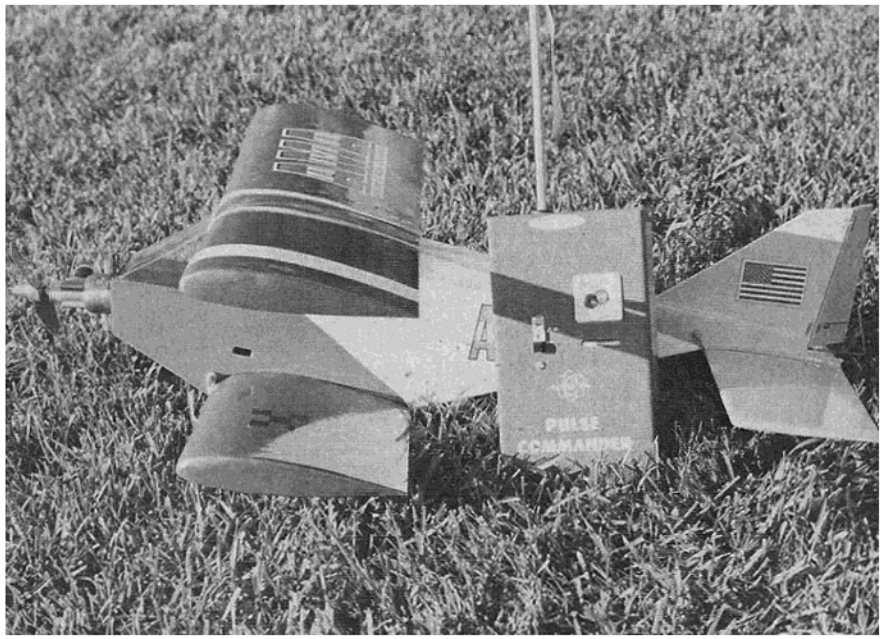
Cut out the actuator mount from 3/32" ply and drill all the holes in it as shown. Sew the actuator to the mount with heavy thread and a needle, then coat the thread with glue to hold the actuator firmly in place. Install the 1/18" square actuator board stop between the actuator slide rails where shown and trim the stop ends slightly for a tight fit. Slide the mounted actuator up into place from the bottom and engage the torque rod front yoke. Glue the torque rod plate to former F-3, being sure the torque rod lines up with the actuator as seen in the side view and that it also is in line with the actuator when viewed from the bottom. This may seem like a lengthy procedure but it is important for a true-no-bind hook-up.

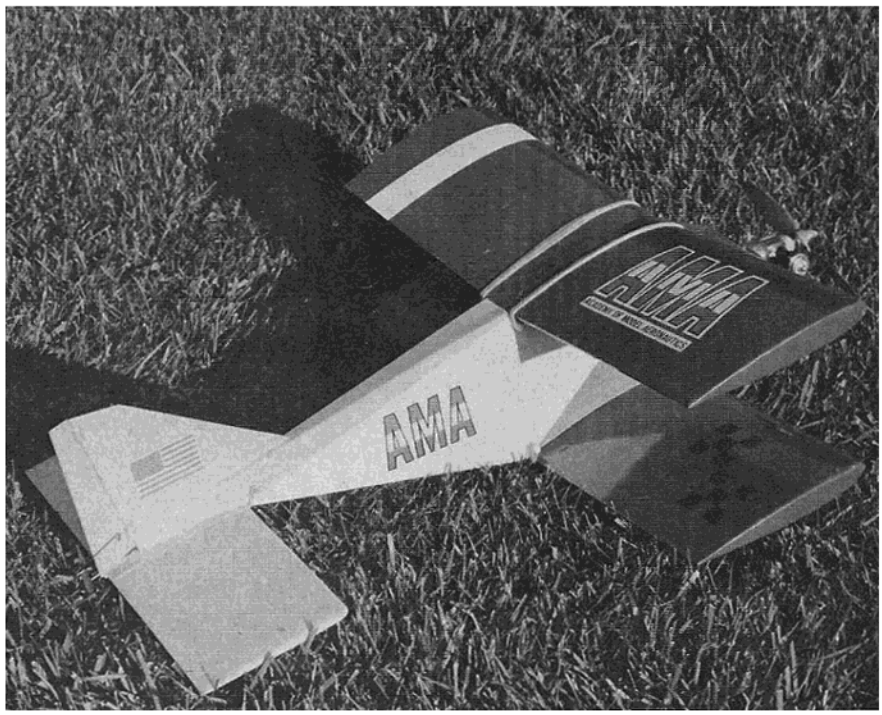
The fuselage upper and lower sheeting can now be installed, noting wood grain direction. A 2" long score cut on the center of the first lower sheet will help it blend with the angle of F-3. With the sheeting completed, the fuselage can be sanded. Leave the four corners fairly blunt or with very little radius.

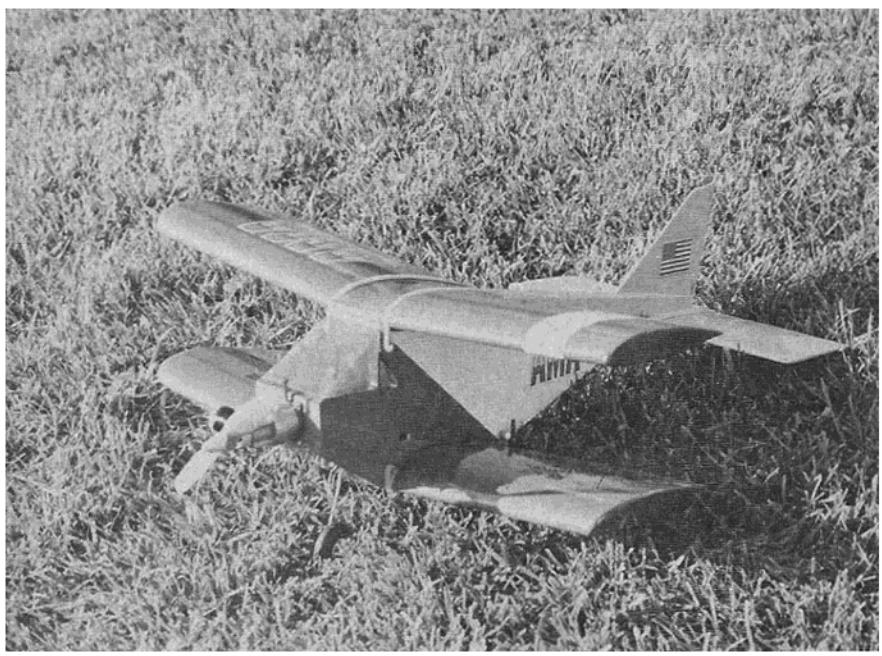
Cut out the stabilizer saddle from 1/32" ply with the exposed wood grain span-wise for easier bending when glued in place. Epoxy a piece of 1/16" wire to the top of the sabilizer saddle piece as shown in the top and side view. Cut a "V" groove along the bottom of the fuselage to clear the wire, then glue the saddle in place being careful not to get any glue on the torque rod since it runs very close to the saddle.

Cut out the fin and rudder from 3/32" "C" grain balsa, noticing the splice line for 3" wide balsa. Radius sand the leading edge and tip slightly. Leave the rear edge of the rudder blunt as shown on the rudder cross section. Glue the fin in place, but leave the rudder off until the model is doped or covered, then it can be sewn in place with a Figure 8 type stitching as is common with rudder-only. Bend up the rudder yoke from .020" wire as shown on the plans. The rear of the yoke can be carefully opened or closed to provide the proper width for the torque rod so there is no bind at the end of the actuator travel.

The stabilizer is built up from 1/32" balsa sheet, 1/16" ribs and the 1/8" square leading edge. The stabilizer tips are from soft balsa. Cut out the 1/32" sheet to outline — if using 3" wide stock, the sheeting will have to be spliced as shown. Pin the lower sheet down over the plan with a piece of 1/8" square directly under the leading edge as an assembly support.



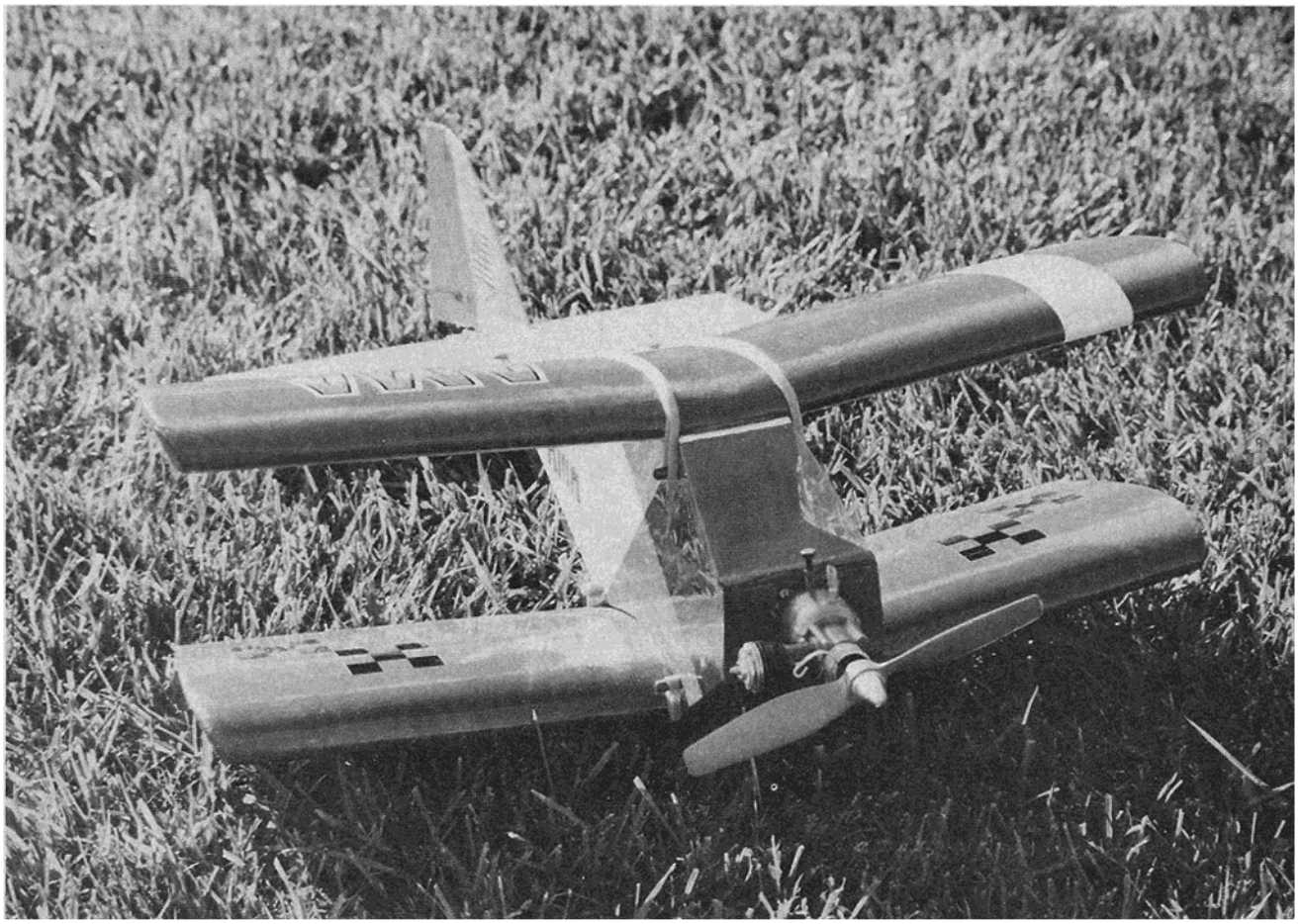


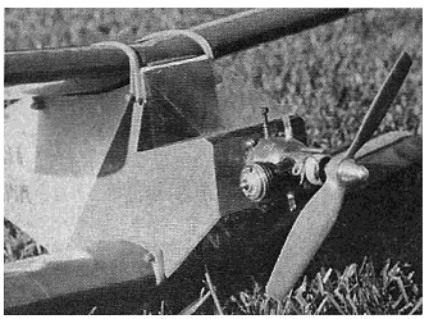


Cut out the ribs, pin and glue in place, and the ribs will conform the lower sheeting properly. Work from the center of the stabilizer out to the tips. When this part of the assembly is dry and the pins are removed, the top sheeting is glued on, using rubber bands stretched over the top at each rib station between pins along the leading and trailing edges. The tips are glued on after the stabilizer is removed from the board and the completed stabilizer can then be sanded. Cut out the tail skid from 1/16" plywood and epoxy in place.

Very little work is involved to build the wings using the Ace constant chord foam panels. Measure and cut each wing panel in half and block sand for the proper dihedral. To check this, pin the left wing half down along the trailing edge then block up the right half until a good fit is achieved at the joint and the dihedral is proper. The dihedral is measured along the top surface of the wing and 2" back from the leading edge. Now the two halves can be epoxied together after punching a series of small holes in the dihedral joint. After the epoxy has cured, remove the joined wing panel from the board and block sand the trailing edge until a piece of 1/8" square spruce fits up as flush as possible. Cut the spruce to length and epoxy them in place using flat rubber bands. When ready, the wing and spruce can be block sanded flush — a sharp trailing edge is not necessary. Cut two pieces of regular or lightweight silk 3" wide and 12" long for the upper wing; 3½" wide and 12" long for the lower wing. Glue one end of the silk to the bottom of the trailing edge spruce with any quick drying glue, being careful not to get any glue on the foam. When the glue has set up, wrap it around the wing and back to the trailing edge and glue again. Dampen the silk with water and let it dry. Mix up a good batch of #2 Hobbypoxy and rub it into the silk until it is saturated. Keep turning the wing over and over again until the epoxy settles down without running. When cured, the reinforced center section can be block sanded lightly to remove any bumps or fuzz. Draw a "sanding line" along the bottom surface of the wing tips as shown. Now sand in the tip shape outline, then sand the tip angle, sanding between the tip outline and the "sanding line" — the angle will come out correctly.

The wings can be covered with Solarfilm or Hobby Shack's Flite-Kote, since these materials are compatible with the foam as they need less heat to apply and shrink without melting the foam. I have built several rudder-only designs using the Ace foam wings with this procedure and have never had a wing failure of any kind which





ROLLIN' FOAM

BILL OF MATERIALS

2) 3/32'' x 3'' x 36'' ''C'' grain balsa
2) 1/32'' x 3'' x 36'' balsa
1) 1/16'' x 3'' x 36'' balsa
1) 1/4'' x 1/4'' x 8'' soft balsa
1) 1/8'' x 1/4'' x 36'' balsa
2) 1/8'' x 1/8'' x 36'' balsa
1) 1/8'' x 1/8'' x 36'' spruce
1) 6'' x 12'' x 1/8'' ply
1) 1'' x 4½'' x 1/32'' ply
1) 3/16'' x 12'' dowel
1) Ace constant chord foam wing
1) .045 x 12'' music wire
1) 3/32'' x 6'' music wire
1) .020 x 3'' music wire
1) .062 x 2'' music wire
80 sq. inches silk
1) 4'' x 7'' .010 celluloid
4) 2-56 blind nuts & bolts
1) 1⅜'' wheel

Miscellaneous

3/32'' wheel collar
Heavy thread for torque rod
and rudder hinges
Soft copper wire
1/8'' x 1'' dowel

includes some pilot error maneuvers that ran out of sky.

Well, now that we are on final with this creation and some ''stick time'' is not far away, we might as well finish things up. Cut out a windshield template from light cardboard and trial fit in place. The windshield looks like an upside down ''U'' with square corners. Trace the template after it is folded out flat on a piece of .010 celluloid, cut it out and install to the fuselage. I use Hot Stuff for attaching windshields or canopies — just pin in place and apply the Hot Stuff, a drop at a time, along the edge until sealed in place. Finish the fuselage with your favorite method. I have used MonoKote and Solarfilm exclusively. Their cost, ease of repairs and practicability, have no equal with me. Bolt on the engine, install the radio gear and check its operation. Be sure the rudder is pulsing right and left with no binding. Slip on a 1⅜'' diameter wheel to complete the landing gear which is strictly complimentary on this airplane. It also makes it easier to start the engine, sitting on the ground between flights, etc. Check the C.G. and correct if necessary. Grab the transmitter and the few essentials necessary and let's go flyin'.

Flying:

Trimming out a rudder-only is as important as any type airplane. Be sure the wing, stab and engine thrust angles agree with the plans. I don't test glide rudder-only airplanes, the short time in the air from a hand toss have too many variables. Run the engine just a little rich for the first flight; get some altitude and steer it around until the engine quits. The glide should be trimmed first — work for a glide that gets it down smoothly with no stalling. This is accomplished by shimming the stab 1/32'' positive or negative until the proper glide is achieved. Fly it again and, while under power, Rollin'-Foam will climb steadily in a straight line or gently turn without stalling. If not, change engine up or down thrust, (down if it stalls, up if the climb is too slow). Side thrust is changed only if the model flies to the right or left under power but flies straight in the glide.

Rollin'-Foam has a touchy rudder but that's what this design is all about. The glide is fast, but predictable. A barrel roll in the glide you say? Just snap in full rudder and watch, your wish is its command.

My Rollin'-Foam has been a ball to fly — this type of rudder-only has been my thing after progressing through a number of single channel airplanes. While I have a Brand X screaming Eagle .60 powered handful of balsa and MonoKote, rudder-only is my preference.

Try this one, you'll see what I mean. □

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