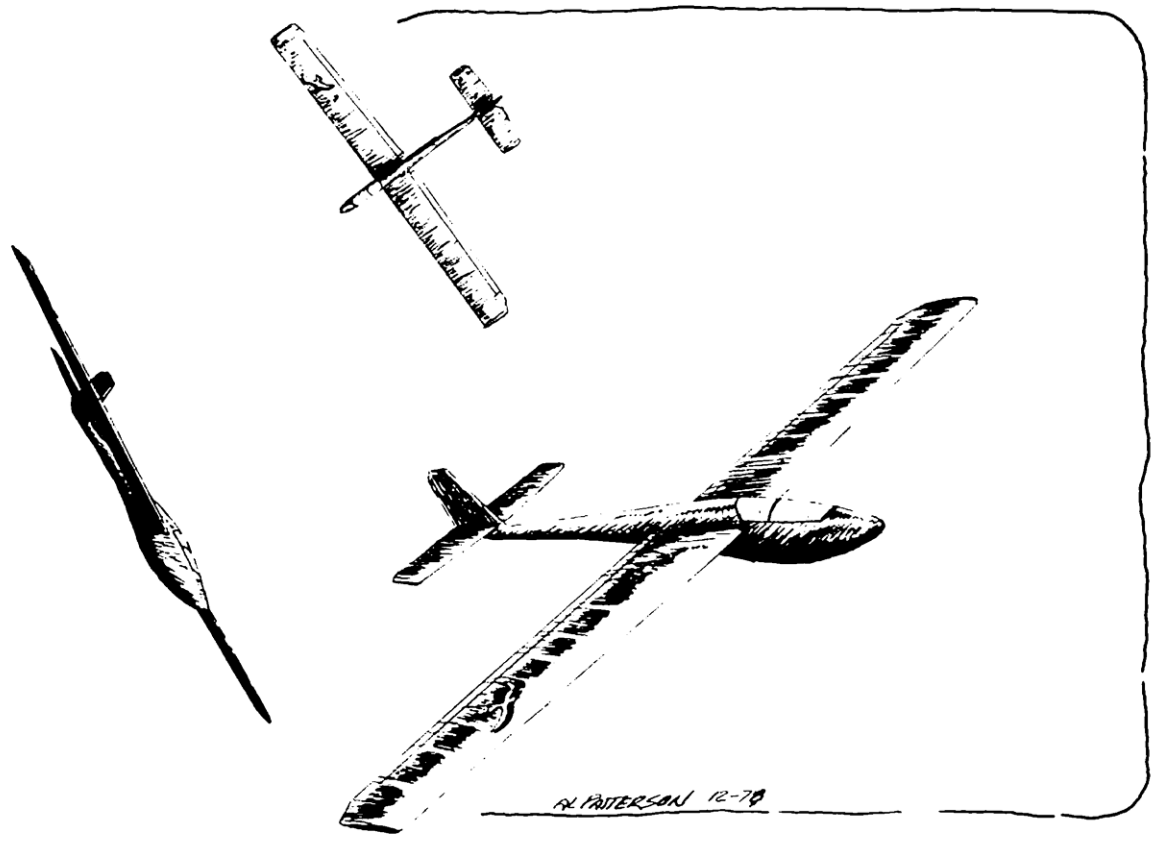


MYSTERY

By AL PATTERSON . . . MB's draftsman comes up with one of his own! A high-performance slope soarer for 2 to 3 channels.

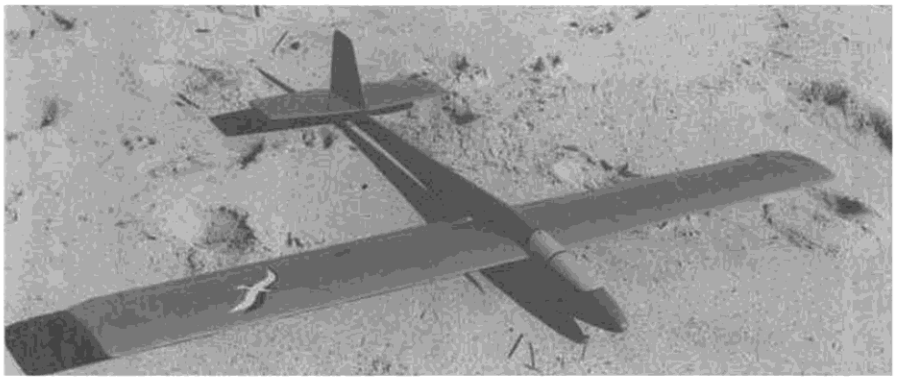
PHOTOS BY AUTHOR

• "Mystery" is the third in a series of slope gliders that I developed in 1975. The first, called "Magic", had a shoulder wing, a full-flying V-tail, and a simple box fuselage. It had more wing area than the Mystery and a rather short nose. I found it fairly maneuverable and fast. Although the shoulder wing, held to the fuselage with rubber bands, was forgiving in a hard landing, the aileron pushrods would inevitably break out of the side of the fuselage. I also found that V-tails were not really suited to precision aerobatics.

The second model, the "Mystic", had a plug-in mid wing, longer nose and tail moments, and a conventional tail. Although it had a box fuselage, it had many curves and looked similar to contemporary sailplanes. The aileron control linkage was changed to a bellcrank, mounted in the fuselage, that was hooked up to the servo and aileron pushrods. Voila! No more broken fuselages.

This same control system was used on the "Mystery", the third and last of the series. Basically a refinement of the Mystic, the Mystery has cleaner fuselage lines, a lower aspect ratio, less wing area, and an overall racier look.

It is very fast for its size and will perform most all aerobatic maneuvers, though possibly not as tight as some of the stunt types, but much more scale-like. I have had a lot of fun with this design and recommend it to anyone who likes high-performance slope soaring.



Al's "Mystery" is just the thing for those who like really high-performance slope soaring. Nicely rounded fuselage takes a little more work, but is worth it from an appearance standpoint.

CONSTRUCTION NOTES

Construction uses all standard techniques. The wings are all balsa and plywood, and quite conventional. The airfoil is a popular semi-symmetrical type with almost full strip ailerons. The fuselage is of monocoque construction. The rudder is fixed or hinged (optional), and the elevator is full flying.

Titebond was used throughout (except where noted). Other adhesives used include epoxy, contact cement, and Hot Stuff or equivalent.

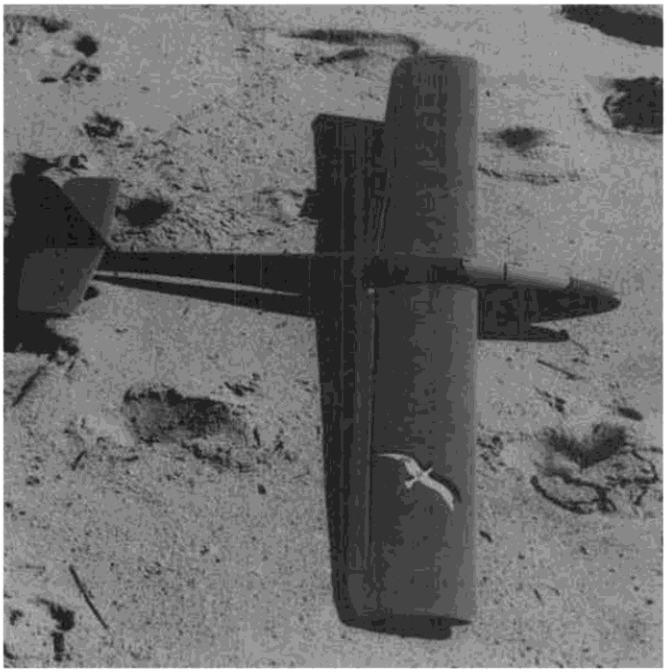
The construction notes presented here are not in a step-by-step form, as some building and flying experience is assumed. They are more of a fastening scheduled than a text for building technique.

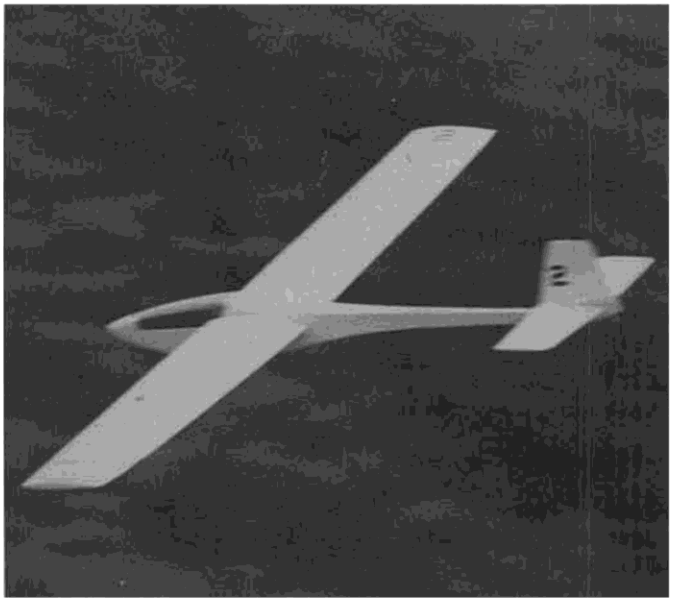
FUSELAGE

The fuselage is started by gluing up the ply doublers, making sure they are in identical positions. Now come the vertical grain doublers and stringers. Sides are now put together and positions of all bulkheads are marked.

Fuselage sides are now set up on bulkheads C and D, making sure the angles between bulkheads and sides are equal for both sides. Bulkheads A and B can now be added; and then bulkheads E & F.

Now comes the important part. Care must now be taken to make sure the fuselage comes out straight. Align fuselage over top view of plan and make sure





The "Mystic" (above), the second in Al's series of slope gliders, is similar to the Mystery (left) except for larger wings and a boxier fuselage. Photo taken at Bluff Cove, Palos Verdes, So. California.

it is straight over the centerline. When satisfied, glue sides at tail. Then carefully add bottom (note grain), starting at the nose, carefully checking alignment as you proceed.

When installing the tail piece, do not omit the skid, which is a shock absorber. It cuts down on tail damage on rough landings (use epoxy to secure).

Bellcrank assembly and aileron linkage should now be installed, as well as elevator pushrod. Install ply tripler. Drill for wing rod holes.

Put fuselage top on now. Bevel fuse sides and glue sides of fuse top in place. Sand top flat and glue fuse top on. Cut hatch out and add ply pieces HA, HB, HC. Hatch holddown is left to your preference. Install nose block.

TAIL

To begin tail assembly, make up two elevators (don't forget the gussets) and be sure to use hard balsa for the leading edge only. Make up the center piece. Shape parts and install aluminum tubing; be sure to reinforce the balsa in the area of the tubes with Hot Stuff (with wire rods out of tubes, please!). Assemble, using the two wire rods, and glue assembly to fuselage.

Make up the fin. Sand to shape and glue to elevator center piece and fuselage. Don't forget the hole for the rear wire.

WINGS

Begin the wings by deep notching the first six ribs for spar doublers and the first four for stub spars. Make up two spars and doublers only, as you need the other two for propping up the ribs so that they will have the proper angle for the trailing edge sheet. Notch and bevel the top (only) of the leading edge. Make sure all spars and edges used are straight (especially the leading edge); if they are crooked at all, steam and straighten them, as a bent wing or leading edge can result.

Pin down the bottom trailing edge sheet and aileron spar. Glue on the trailing edge stock at the tips at this time. Place the spar without doublers temporarily under ribs in front of the permanent position. Glue root and tip ribs in place and make sure everything is straight before adding the remaining ribs. All notches in ribs should line up on the spar line. Lay in the upper spar with doubler and stub spar. Add top trailing edge sheet, leading edge sheet, and sheet the root section.

Turn wing over at this point and make up lower spar and doubler. Install spar, stub spar, and all shear webbing. Epoxy all ply ribs to spars, and epoxy spars together at the root. Bevel bottom of the leading edge. Rough up the wing tubes with sandpaper and install. Glue in the ply block at root. Now you're ready to add all bottom sheeting. All that remains is to add tip and root caps (be sure to carve and sand to match contour of fuselage), and all cap strips. Now make up the ailerons from trailing edge stock and make provision for hinging. Ailerons should be made of very hard and stiff balsa, to prevent flutter at high

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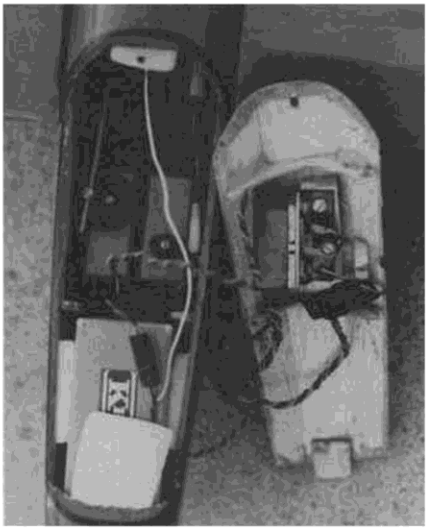
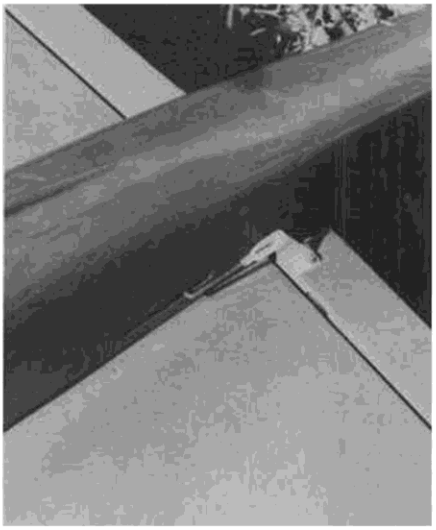
Bottom view of the tail shows the linkage to the full-flying tail. Long Goldberg horn used.



Radio installation. Switch is mounted in canopy, saves room in the fuselage.



Aileron linkage details. See text for Al's comments about bends in aileron pushrods.

speeds.

The hinge system I prefer is shown on the plan, but most any other system you prefer could be made to work. The two wing rods go through the fuselage and into each wing. They are approximately ten inches long.

FINAL ASSEMBLY

As for the radio installation, I'll leave that up to you. You know best how your radio fits (most any radio should fit entirely in front of bulkhead C). I will just say that all controls should move freely without binding. This is a high-performance plane and quick control response is most desirable.

A differential is not shown on the plan, but one could be installed. This or any other changes in controls should be incorporated during construction.

(At this point, I might mention the rather sharp bends in the pushrods shown on the plan. Some of you might be worried about excess flex. The ailerons needed the large bends whenever the wings pulled away from the fuselage in hard landings. To keep them from pulling through the fuselage, I found that if the rods were angled out to keep them straight, it would cause binding. So, to counteract the tendency to bend, I used the stiffest and largest diameter threaded rod I could find. If you're not comfortable with this system, go ahead and change it, but remember, you must have complete freedom of movement and no binding at all.)

To assemble your finished model, insert wing rods in their respective holes in the fuselage, and plug the wings onto them. The wings are held to the fuselage by placing one or two rubber bands on the cup hooks. This can be accomplished by pulling the rubber through with a wire hook. Plug tail on, and connect all clevises.

All controls should move smoothly and effortlessly, with no binding. The amount of movement is left to your preference and skill. It might be wise to start with a minimum for the first flights and then work up to the maximum.

FLYING

I must assume that you have flying experience, as this plane is quite fast and has a high stall speed. If you have not flown ailerons, I suggest you get some help from someone who has.

First of all, check your center of gravity. It should be within the range shown at mid-wing. For the first few flights, you might like to have the C.G. at the most forward position; then as you get the feel of the plane, you can move it back within the range, depending on how much sensitivity you want. Also, don't forget to balance it laterally as well as fore and aft. Check to make sure you have the proper washout. It is an absolute must, as tip stalls in a ship of this type can be disastrous. This may sound funny, but more new planes are wrecked because the controls are reversed. Please check to make sure they are hooked up correctly.

Assuming everything is right and the lift is good (never attempt a first flight in poor lift), give it the old toss. As the stall speed is high, keep it moving at all times until you get the feel. Fly cautiously and high at first, working into more speed and aerobatics as you learn the characteristics and your tuning progresses (i.e., washout, C.G., control movement, etc.).

You are now in possession of a simply-built, simple-to-repair, high-performance slope soarer. Good luck, have fun, and get hot! •