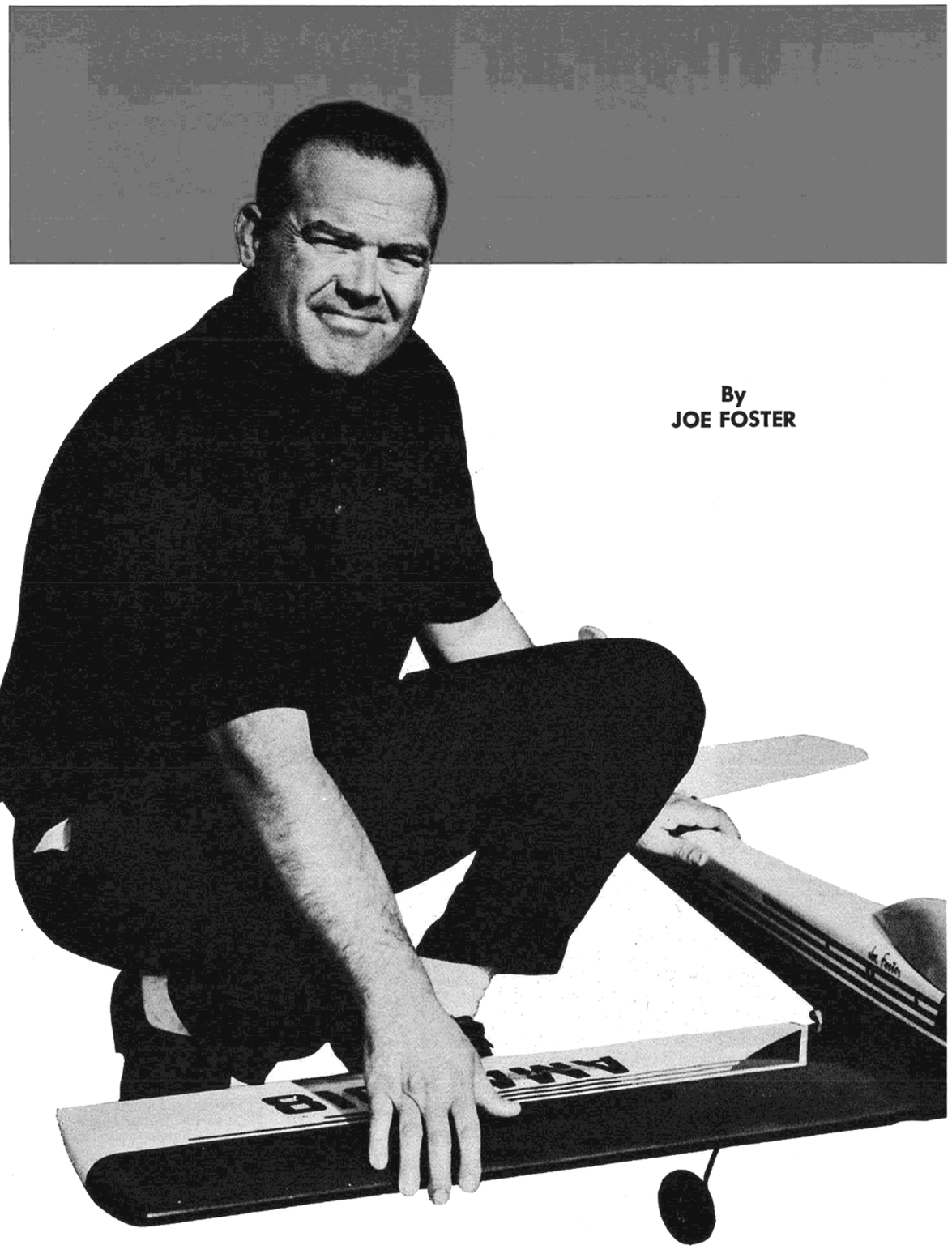


THE PATRIOT

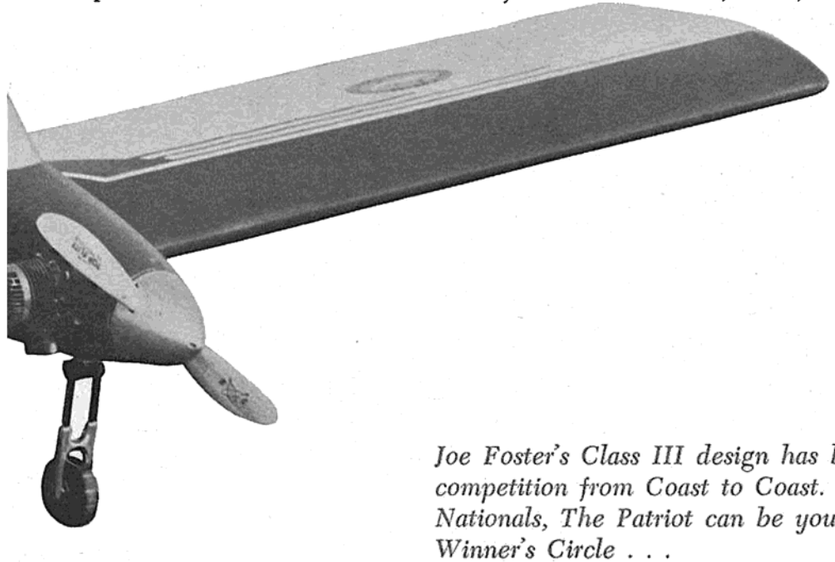
By
JOE FOSTER

THE Patriot design is an endeavor on our part to put together a ship that combines pleasing appearance with practical design features, such as a constant chord wing and other easy-to-build features.

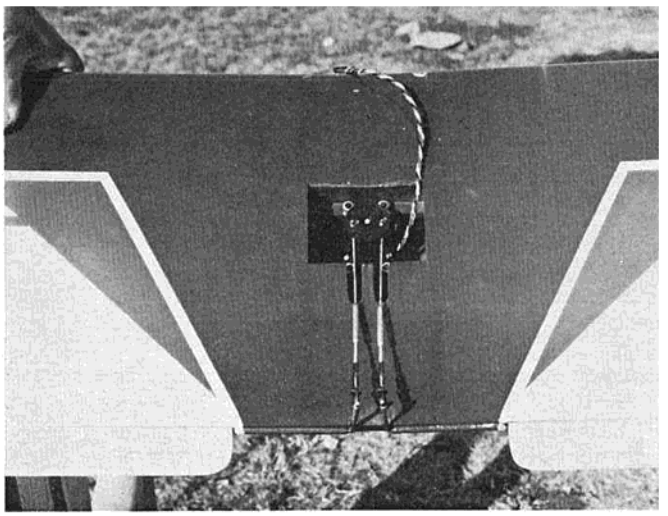
Contrary to a recent popular trend to design shorter tail and longer nose moment arms for proportional control, we are experiencing great success with our longer tail moments and higher aspect ratio wings. This type of design seems to absorb a little more power, but in turn, offers the extra smoothness about the pitch moment that we feel is an asset, and with the engines available today, a little more power is not hard to come by. To date, no one has been able to convince us that the small degree of added efficiency and faster roll rate of a tapered wing is worth the added building effort. Strip ailerons are also incorporated to lessen building time. A word here about our experience with the latter. Our first three attempts with 'strips' were very disappointing. We had a lot of trouble obtaining a smooth, positive response. We tried them larger, smaller, and tapered with equally poor results, finally learning that "flexing" was the problem. So, at this point, let me offer a word of caution. Construct your ailerons from very firm "C" grain wood and keep the slop out of the linkages for best results. In addition, we've learned that a little more than the conventional 60%-40% up-to-down differential of aileron movement is required to obtain a truly axial roll. The Patriot requires 9/32" up and 5/32" down movement.

The airfoil used in the wing is a result of three previous experiments tried on this design. It has a very smooth stall combined with good penetration which, in our opinion, is very desirable for proportional control flying. Our experience with some thicker sections on this ship evidenced smoothness in calm air, but left something to be desired in the wind. Thinner sections will cause the ship to sail at landing speeds. This is a design you will have no trouble landing in the circle. It has a good positive sink rate and yet will flare beautifully for smooth touch-down. And if necessary, you can drag one until the tail touches without dropping a wing. More dihedral was tried and found unnecessary. In fact, the latter lessened inverted flight performance along with smoothness of rolls. The amount called out offers a small degree of positive stability in a banked turn. This, we feel, is highly desirable. It is very difficult to make smooth turns with a ship that wants to increase its bank as it turns. The Patriot requires a small positive pressure to hold it into the banked position.

So far we have discussed our experience with the design equipped with proportional control. Actually, the ship started life as a reed job and was flown very successfully before we equipped it with the new Orbit proportional. The original, before modification, incorporated 3 degree of right thrust, a 20% thick airfoil with the high point at 35%, a more rounded leading edge and a smaller elevator. The installation of reed type servos, receiver and battery pack is not illustrated on the plan, so a short, written description may be in order. With rubber cement, glue a ½" thick piece of foam rubber to the back of the receiver and then to a piece of 1/16" plywood cut to fit upright against bulkhead 'C'-'C'. Depending on the make of receiver used, you will have to hollow the canopy for clearance. The plywood supporting the receiver may be held in position by rails for easy removal. Bonner servos can be mounted by bolting them to the fuselage sides. The battery pack should be mounted



Joe Foster's Class III design has been proving itself in competition from Coast to Coast. Sixth at last year's Nationals, The Patriot can be your entree to the Winner's Circle . . .



Upper left: View of engine installation. Note Johnson throttle installed on S.T. 60. Above: View of center section of wing showing installation of Orbit Proportional servo and linkage to ailerons. Left: Author and original prototype. Below: Full view of red, white, and blue Patriot.

in the canopy.

This ship may not be the answer to all your prayers, but if you like a machine that covers a lot of sky very smoothly and will do all the maneuvers, run, don't walk, to your favorite hobby shop, buy some sticks and glue and let's get started. Wait! One more piece of advice. When you select your balsa, leave that wood marked R/C for the guys who like 8 lb. airplanes; we'll use 8 to 12 pound 'C' grain for everything that is not called out 'hard' on the plans, and 4 to 6 pound contest balsa for stab and fin. We want the ship to weigh 6 to 6½ lbs. without fuel. We'll not bore you with too much detail of construction, because she's not hard to build.

Wing

The wing can be constructed on any of the commercial jigs with no trouble. We built ours in separate halves on a good flat board, blocking up the leading and trailing edges. Exercise caution when blocking in dihedral. Any airplane is only as good as the wing is true. Use good, hard, straight grained balsa for leading and trailing edges and spars. The rest of the construction is straight forward.

Stabilizer

The stab design shows a lack of imagination; however, it is easy to build and except for our insisting you use light wood, will offer no challenge.

Fuselage

The fuselage, as you will notice, does not offer you much extra room. In fact, we're so stingy with room, we put the battery pack in the canopy. Actually, the idea here is to bring the center of gravity up a little and get it as close to the thrust line as possible, along with making the cross section utilitarian. Start by cutting out fuselage sides as indicated by arrows on the plan. Use 3/32" sheet. Glue ⅜" forward, and 3/32" aft, hard sheet doublers, ½" triangular corner braces and side stiffeners in place as shown. The firewall section B-B and bulkheads, section C-C and D-D are glued in position to join the two sides. The soft ½" sheet balsa fuselage top is the only potential problem as it is hard to bend to fuselage curvature. We get around this by wetting the wood and warping it to fit. When dry, carve in the taper and glue in position. If this sounds like too much work, laminate two ¼" sheets together, gluing on one at a time. Cowling the engine is a carve-to-fit proposition and does not propose much of a problem inasmuch as the fuselage top and bottom form the backbone of the engine room. The steerable nose gear requires some machining. If you cannot make one, a 'Nelson' nose gear modified to fit, will work quite well. The wing saddle lends itself naturally to the use of 'Dzus' fastener wing hold downs, if the gum bands are too old fashioned for your taste. I'm going to try it on my next one. Radial mounting of the engine requires the adaptor plate shown on the plan. 5'40 flat head screws hold it to the engine.

Covering and Finishing

The fuselage is covered in the conventional way with silk, filled with three coats of dope and four sprayed coats of

(Continued on Page 68)

'Hobbypoxy' "Stuff" thinned to proper consistency and sanded each coat. Wing and stab are covered with 'Silkspan' . . . Yes, we said 'Silkspan' paper. Three coats of thinned nitrate dope and three coats of thinned 'Stuff', sprayed and sanded. Why do we use 'Silkspan' instead of silk? Our experience with silk sealed with butyrate dope is that unless the surface being covered is too heavy, it will warp and never stop warping. A true wing today is not a true wing three months hence; besides, it is half as much work, saves weight, and is almost as strong. Final color coats are of 'Hobbypoxy' to suit your own taste.

Flying

This ship, although fast, is not hard to handle, as it is stable at all speeds and has that groovy feel. You will find that it likes the larger more graceful maneuvers. Its high, power-to-weight ratio pulls it through the largest loops, vertical eights, etc., at a constant speed. The extra zip will get you through the pattern with time to spare. You'll find you have the extra time needed to fly farther out and make the larger turns sometimes needed to get the 'presentation' that is the difference between a 4 and a 5 point maneuver.

Spend a little extra time setting the ship up, and you'll take some of the work out of that first flight. Let's start with the C.G. She's not at all critical to C.G. shift, but we have found that for best all around performance, you should balance it within the limits called out on the plan. We did not show any push rods on the plan, as we feel you all have your own pet method. Whatever you use, make them stiff. You've all heard the woes of flexing push rods. Ours are made of ¼" square spruce. Take the extra care necessary to eliminate binds in the linkage, and at the same time do not drill sloppy or incorrectly sized holes. The latter will provide you with loose neutrals which, in turn, makes your ship difficult in level flight. While you are at it, check and tighten, if necessary, the neutralizing adjustment on your reed type servos if you use them.

The aileron throw for reed or proportional, as mentioned earlier, should be adjusted for 9/32" up and 5/32" down movement. This should give you a medium roll rate with no yaw.

The elevator throw for proportional should be adjusted with just enough up movement for a positive spin. Start with ½" up, and make final adjustments based on flight tests. For reed installations, we prefer less movement, approximately 5/16" up; however, this amount will require that you install a kick up device or an over-ride servo for extra up elevator, with low engine to get a spin. R.G.A. sells a very good over-ride system for 'Bonner' servos. We do not use a 'differential' elevator horn, and therefore down movement should come out the same as up, giving you the same sized loops, inside as well as the outside variety. Individual ships, however, vary in C.G. location, weight distribution, etc., and you may have to make an adjustment in up-down differential, to achieve the same sized inside and outside loops.

Double check your ship for proper wing and stab alignment, making sure that they are a 0 degree incidence. Check also for warps, steaming out any that might exist.

Try one of these birds. Build 'er true, and you'll have yourself a good contest machine or Sunday flier, as suits your preference.