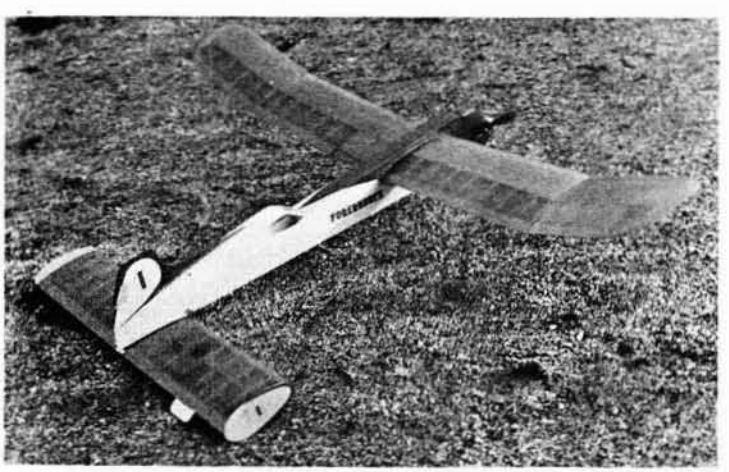
The Forerunner breaks away from the conventional pylon type contest design, and let s its performance justify the switch. Note the smooth, clean lines emphasized by the retractable landing gear. The completely cowled-in engine adds to the overall streamlined appearance. The model weighed a little less than 7 oz. with an .065 Royal Spitfire and about 5½ oz. with an .049 Cub. Two ships built by the author both went out of sight.

Class A or ½A free-flight with a laminar flow airfoil

by Paul E. Del Gatto

THE FORERUNNER



Construction is simple, the fuselage being built entirely of sheet balsa. Bulkheads are shown full-size on the plans to minimize the scaling-up job. The wing is built-up, with a sheet-balsa covered leading edge, to get maximum efficiency out of the high performance airfoil section. Note sub-rudders on the stab tips.

● Ever since the advent of Carl Goldberg's famous "Zipper," there have been very few changes in contest free-flight model design. It is true that tail moment arms have increased and there has been a trend toward larger stabilizers; but these are minor changes, brought about gradually by revisions in the A.M.A. rules and the greater amount of power found in today's engines.

But, during all this time, very little has been done in this country with respect to *airfoil* design. *We are still using the same airfoil sections that we were using fifteen or more years ago. despite the fact that the airfoil section is of primary importance in determining the extent of a model airplane's success!*

There's nothing wrong with pylon type models employing conventional

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THE FORERUNNER

(*Continued from Page* 13)

airfoil sections—but isn't it time for a lot less standardization of design and a little more originality, to obtain *improved* model designs?

The Forerunner is representative of some of our thoughts along free-flight lines. Into it we have incorporated what we feel is the most desirable force arrangement, without yielding to the pylon type of model. Contrary to popular opinion, it is not essential to have a pylon to design a good contest model.

To the novice this departure from standardization would appear to be the most unusual feature about the design. However, those who possess a fundamental knowledge of models will also note that the airfoil section is entirely different than what they have been using up to now.

Most airfoil sections adapted to model designs, with but few exceptions, have the highest point of the upper camber located somewhere between the 20% and the 40% station. However, with the P.D.G. 1608, the highest point of the upper camber is at the 60% station, as indicated by the "60" in the airfoil designation [The first number of the designation (1) is the series number, while the last (8) indicates the maximum thickness, which is 8% of the chord].

The model climbs much faster than models of comparable size and power, indicating that it has a very low drag value. Further proof of the latter can be seen in the glide, which is unusually fast but with a very low rate of descent.

Models of this design have been powered with engines from .039 to .090 displacement, though for contest flying at least an .049 is most desirable. With such a wide selection of engines to choose from, chances are you have one on hand that you could utilize for this design. Now let's get down to building.

CONSTRUCTION: The plans are drawn half-scale and the rib templates and fuselage bulkheads are shown full size to minimize the problem of enlarging the plans. In designing the model's structure we tried to achieve what we felt was a satisfactory compromise between streamlining, ruggedness and ease of construction.

Because of the liberal amount of balsa employed throughout, it is very easy to control the finished weight of the model through careful selection of the balsa used. The model shown weighs in at slightly less than seven ounces with an .065 Royal Spitfire; while another which went out of sight with an .049 O.K. Cub, weighed in at about five and a half ounces.

WING: When constructing the wing, as always, care should be exercised in attaining the desired curvature. This is the primary reason for utilizing thin balsa sheet on the upper camber, extending to the point of maximum camber.

The fuselage is constructed entirely of sheet balsa, simplifying the job of getting the model completed. The notching of the fuselage sides at the bulkhead locations will assist you in obtaining a more accurate alignment.

FINISHING: Our models were covered wih tissue for the ½A engines, and lightweight silkspan for the small A engines. If you feel that your model may be underweight using the engine of your choice, try covering it with double tissue, cross-grained. Or, if you are in the chips, use silk.

Since glow-plug engines were used in all of our models, we used Aero Gloss and Sta fuel-proof dopes. However, if you are satisfied with one of the other advertised brands, by all means use it.

ADJUSTMENT: Before testing the model, trim it slightly tail-heavy, with a shallow turn in the glide. The first power flight should then be made with the propeller on *backwards*, with approximately a six to eight-second motor run. By thus decreasing the propeller efficiency you can minimize the thrust of the engine until you have observed the flight pattern and made essential adjustments.

In conclusion, a few words about the rudder area. Because of the wide range in power-plants that the model will handle, it is impossible to give the exact rudder area for all engines. The rudder area shown, from experience, has proven satisfactory for engines of up to .065 displacement. If you are using a larger engine, be prepared to trim the rudder area down between flights. Excessive rudder area at high speeds can be noted by extreme sensitivity to rudder adjustments.

BILL OF MATERIALS
(Balsa unless otherwise specified)

4—1/16" x 3" x 36" (Medium)	Fuselage sides, top and bottom, wing sheeting
2—1/16" x 2" x 36" (Hard)	Fuselage bulkheads, wing ribs, stab ribs
2—3/16" x 1/2" x 36" (Hard)	Wing leading edge
2—1/16" x 3/16" x 36" (Medium)	Wing trailing edge
2—1/32" x 1/16" x 36" (Hard)	Wing spar, stab spar
1—3/16" x 3/8" x 36" (Hard)	Stab leading edge
1—1/8" x 5/8" x 36" (Medium)	Stab trailing edge
1—1/8" x 3" x 18" (Medium)	Main rudder, tip rudders
1—1/16" x 1/4" x 36 (Hard)	Wing support and other bracings
1—1/16" x 2" x 8" (Plywood)	Firewall, dihedral gussets
1—5/16" x 5/16" x 12 5/8" (Bass)	Motor bearers

Soft balsa blocks for wing tips; 1" diameter wheel; 1/16" diameter wire for landing gear strut; .049" diameter wire; 1/8" dowel; silkspan or tissue; dope, cement, fuel-proofer; .039 to .090 engine.

NEXT ISSUE!

In the February 1953 issue of FLYING MODELS, on sale about January 10th, you'll find complete plans and construction details for Don McGovern's "Frostbite," a 7' wingspan Class C free-flight model designed for use with skis or floats or wheels—wherever your fancy may lead you—and for sport flying, or radio-control use, or seaplane operation. Even though you don't build the ship, you'll find plenty of new hints and kinks to use on your own designs! Months in the making, this ship is well worth the consideration of every free-flight model enthusiast.