The Flying Flea becomes...

Flea Flight

By Roy Clough Jr.

Have your hamburgers and fly them too—their trays that is! This little electric freeflight builds from meat tray foam.

Funny how some things turn out better than you have any right to expect. I mean considering where it all started, so I've got to tell you a story:

Way back in the '30s, in the days when FLYING MODELS was FLYING ACES and Phineas Pinkham and Phillip Strange vied for attention with rival aeromodel-fiction magazine *Air Trails'* hero Bill Barnes, an absolutely loveable little airplane burst on the scene. The brainchild of Henri Mignet, a clever French designer, *Le Pou du Ciel* captured the hearts of model airplane fans and home-builders everywhere. English speakers quickly transliterated its name, literally, "Louse of the Heavens", to "Flying Flea."

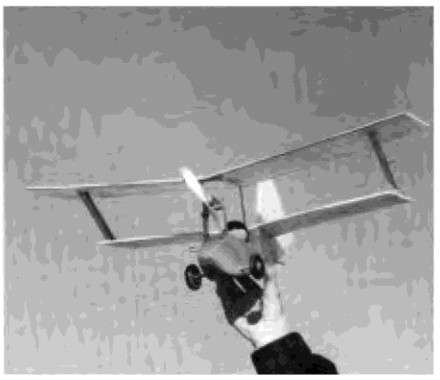
I had to have one.

At fourteen, nothing is impossible. Working only from magazine three-views I quickly sketched out how I'd go about building my own *Flea*. A trip to the sawmill up the road for basswood, spruce and plywood left me broke. Then, with no pocket money for movies or soda fountains in the near future, I had plenty of time to start building.

Designer-builder Mignet had written a comprehensive book detailing exactly how to go about duplicating his wonderful machine. To me this was an unaffordable luxury. I

Flea Flight at a glance

Wing span top	22⅞ inches
Wing span bottom	18 inches
Fuselage length	11⅞ inches
Total wing area	163½ square inches
Wing chord, top and bottom	4 inches
Finished weight	3 ounces
Wing loading	2.2 ounces per square foot.
Motor required	HiLine Mini 6 or equivalent
Power required	3 to 4 110 mAh cells



In this right side view you can see the two charging jacks on the side of the fuselage **(at left)**. To "switch" the motor on, one lead from the motor is placed over the rear jack to complete the circuit. Besides rounding the leading edge of the wings and a slight taper sanded into the trailing edge, the wing is essentially flat. The considerable dihedral is more noticeable in this head-on view **(above)**. Despite its unusual planform, the plane is exceptionally stable.

could sure as heck build model airplanes that flew. Something big enough for me to buzz around in was just a matter of nailing and gluing bigger sticks together until they matched the three-views!

My version of the fuselage was pretty much boxed in when disaster struck. It came in the shape of one of my Dad's buddies from WW I naval aviation days. Pete occasionally stopped at our garage on The Daniel Webster Highway. He would drink near-beer from the cooler with the big chunk of ice floating in it and reminisce with Dad about F5L and HS2L flying boats. He showed immediate interest in my project. Flattered by his attention, I dragged out my sketches and rattled on. I didn't shut up until I noticed he was looking very serious and biting his lip.

"What do you figure to use for power?"

I told him a friend was loaning me an Excelsior motorcycle engine. Somebody had already fitted it with a propeller hub for an iceboat. I'd mount a surplus prop from Carl Ort's York, Pa., warehouse or whittle one out by hand. Pete shook his head. He turned to my Dad and said, "That damned thing might even get off the ground. If it does it'll either spin or tuck under. Make the boy take an axe to it."

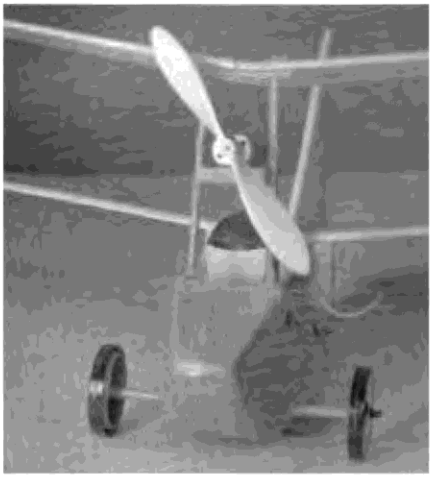
Well, got to tell you. When my Dad said "knock it off," you *knocked* it off. So much for the great *Flying Flea* project. A couple of years later—after *le Pou* had dug a few graves across Europe—by tucking under just as Pete had warned, I felt better about Dad's judgment.

Still, the beautiful simplicity of Henri Mignet's concept always lingered somewhere in the back of my mind. Once in a while I'd get the *Flea* hots and make a few sketches of alternate wing and control arrangements that retained the basic "right" look of that cute little original *Flea*. One day in the 1980s, looking at a picture of an *Easy Riser* hang glider I was inspired.

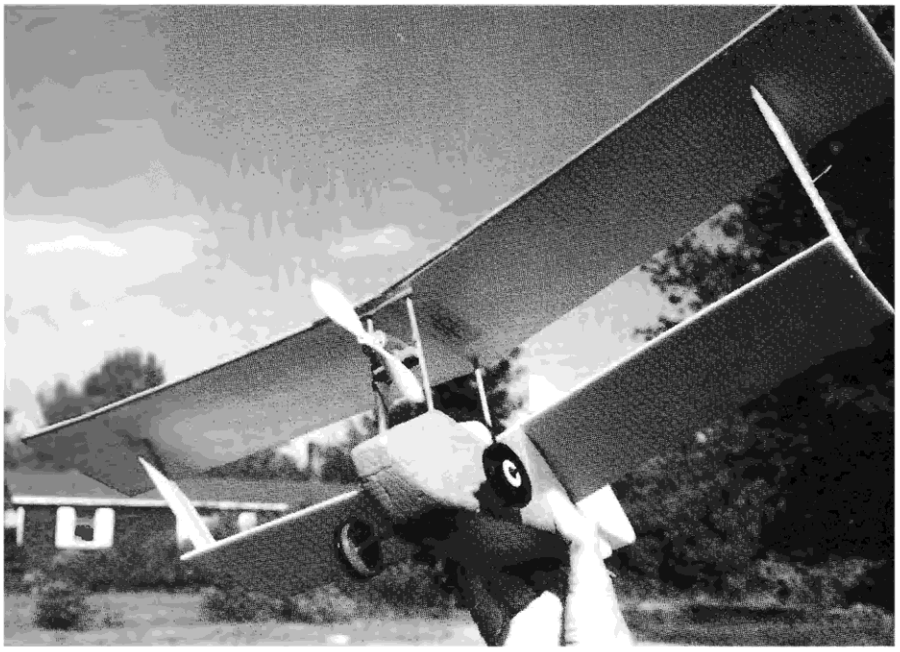
Those of you who build biplanes are familiar with the usual practice of rigging a degree or two more incidence into the lower wing. This differential, called "decalage," helps the tail surfaces balance out biplane thrust and drag forces.

If however, we give a biplane considerable stagger, and reverse the usual decalage so that the lower wing operates at a negative angle to the upper, then the normal pitch-down moment can be nullified and a "tailless" biplane becomes possible.

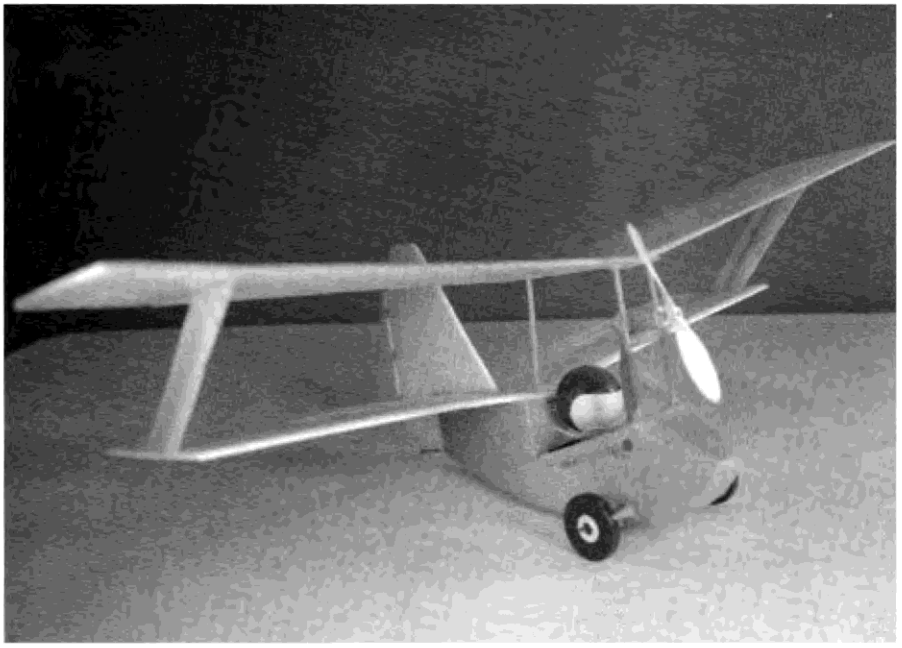
With this in mind, I sketched out a *Flea* look-alike and assembled a non-flying model to see how it felt in three dimensions. I used light and strong styrene foam deli trays to build my little mock-up. A couple of control line model wheels were just the right size. Their weight was unimportant. It wasn't supposed to fly anyway. The finished job looked rather cute. I made a mental reservation to get at it someday, set it atop the

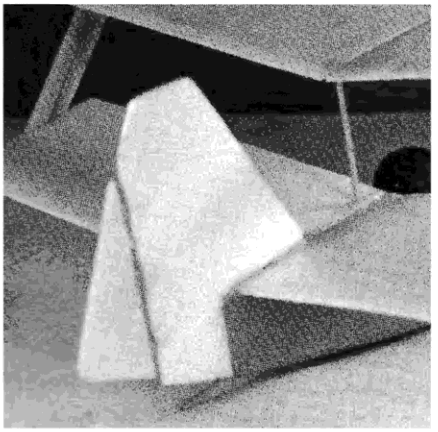


Power can come from a HiLine Mini 6 motor, or from one of Ken Bassett's little motors swinging a 6-inch plastic prop available from HiLine **(above)**. If any thrust angle is required for trimming, the motor mount can be tilted to the required setting. To help form the curvature of the bottom front end **(at right)**, the inside surface of the sheet needs some triangular kerfs to allow the piece to bend more easily. They can be carefully cut in with a single edge razor, or they can be sanded in with a fine triangular file.



Flea Flight





Before you finally glue the rear top wing cabane strut in place **(at left)**, test glide the plane and use the strut to adjust the model to a power-off, straight-ahead glide. Once you get that, glue the cabane in place. Lots of ways to set an adjustable rudder **(above)**. Use aluminum hinges from soft drink cans, or some bell wire. Tweak the tab for a climbing counterclockwise turn under power. The tail skid is a teriyaki skewer.

bookshelf in my study and forgot it.

A couple of years later, the roof leaked. Clambering around asphalting and nailing down shingles, I contemplated the gentle downward sweep of my back yard. When I went in out of the heat for a drink, I picked up the *Flea* ship, hefted it, and decided the heavy wheels made it balance about right. Why not? I took it up to the roof and not expecting much, gave it a toss. Straight as an arrow, it glided the hundred-foot length of my back lawn.

Well, it was no longer a mock-up, but a gliding model. If I swapped the weight of those heavy control-line wheels for an electric motor and battery, it should fly just great. I did, and it did.

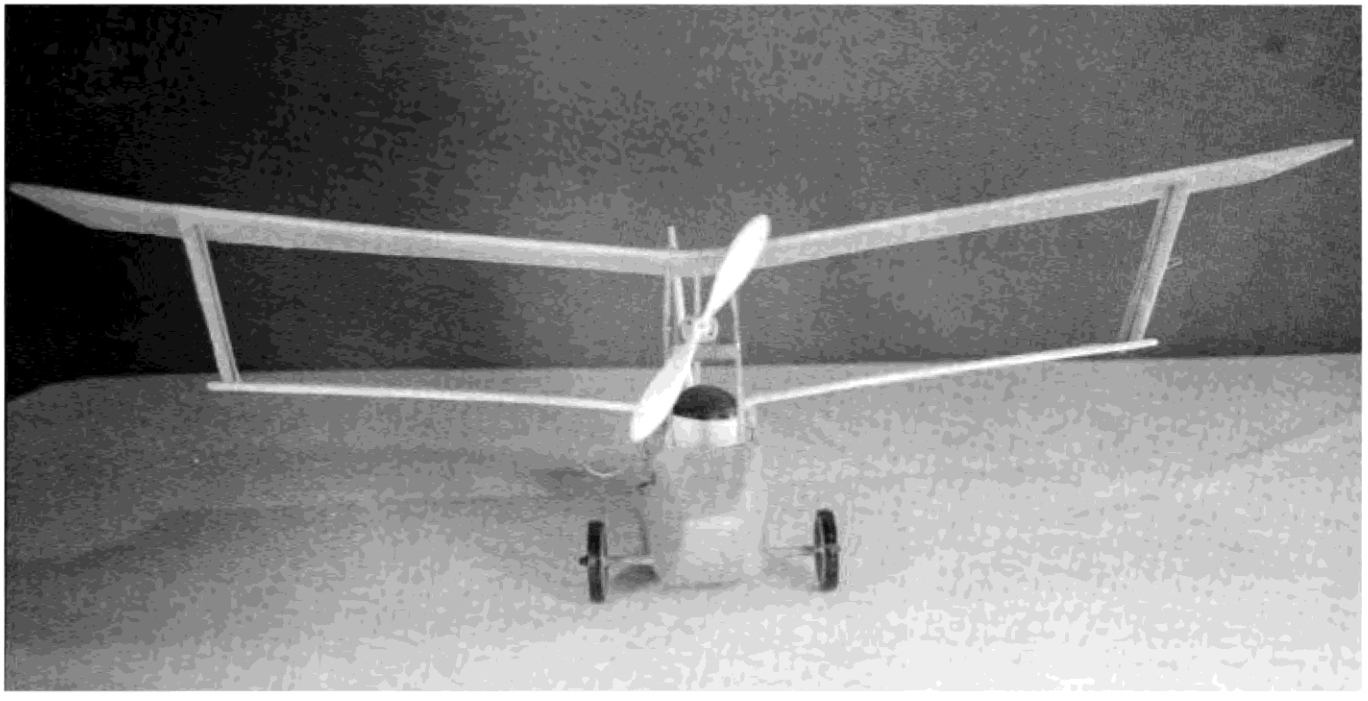
Construction

Plans are pretty well detailed. That leaves mainly tips for "how-to." Deli tray material is universally obtainable with your next pound of hamburger. You can wash used trays carefully, or maybe get a few clean ones for a smile and a thank you at your supermarket meat counter. Trays come in several sizes and colors. Size codes like ("10S") are often molded right in the center of otherwise smooth, flat areas of the trays. If this bugs you, razor-cut out the numbers, overlay the hole on the smooth part of another tray, and cut a plug to fit. Color can make interesting color schemes with contrasting triangle, square, diamond or circle patches.

If you are the patient type, epoxy, or some of the new "tacky" craft glues will do the job, but odorless CyA, which will not melt styrofoam, is neater and faster. When you need to splice between two pieces, say for a wing, you can get a rock-solid joint by using a strip of 1/32 balsa in the seam and wicking in CyA.

There are many small electric motors that will fly this 3-ounce, one square foot wing area plane. Use a battery of two to four 75–110 mA cells.

Adjust for good straight-away glide, with just a hint of mush, power off, by moving the rear top wing cabane strut up or down before gluing it solid. Give the battery small charges at first. Tweak the rudder tab until, with a full charge, the plane climbs steadily in hundred-foot counter-clockwise circles.



Aliphatic or epoxy glues can hold everything together, but the foam compatible, odorless CyA adhesives will really speed building.