# VESPA

**Designed to fly crisply through both AMA and FAI patterns, this well proved design represents a unique balance of size, speed, power and performance in one trim little package. It is a thoroughly engineered project for 60 power.**

**By DARIO BRISIGHELLA**

**The model presented here has evolved** from prototypes which started with the idea of developing a smaller sized contest ship capable of performing not only the AMA pattern but also the FAI maneuvers which I prefer doing. The stability and grooveness required for this type of performance were to have one primary basis, *speed*.

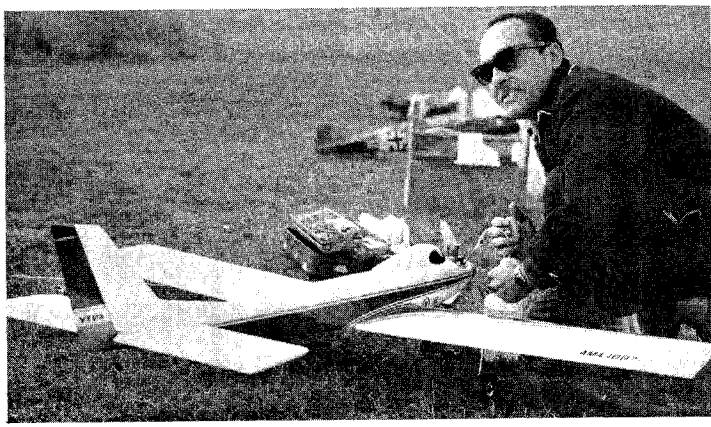
The original test bed for this theory was constructed to achieve speed first and performance later. An appropriate name for the first prototype (on a bare 580 sq. in. of wing area) should have been Skyrocket I, not Vespa I. The first flights were something to behold. This "spacecraft" had the ability (due to its speed) to be directed at most any attitude and maintain its heading and pitch until out of sight undaunted by wind direction or speed. Axial rolls appeared to be done as though on a string. Loops could be imposed one over the other with little or no correction required. In fact, its ability to do most maneuvers was quite amazing considering its size.

I was convinced that, if this speed could be maintained—or close to it with refinements—I could accomplish my original intentions. OK, it behaved like a streamline anvil with anything less than half throttle; as an example—landing approaches appeared to be full powered low passes which were abruptly aborted as the ship touched down on the runway.

While design work began on Vespa II, the little spacecraft was kept flying to conduct more experiments and to close the season. November and December were spent constructing Vespa II with many refinements throughout, and always maintaining one thought, retain this higher flying speed. I felt then, and now more so, why have a model "lugging" through maneuvers when with higher performance you can "fly" through them. Wing area was increased, airfoiled tail group was added, frontal area was reduced considerably, mainly due to the compactness of my Micro Avionic radio equipment and the availability of a slimline fuel tank.

Vespa II really took shape, and towards completion one thing plagued me: with the reduction in frontal area I now had this very large cylinder of my Enya .60 projecting above the fuselage. Trying many ideas, the final result is the present canopy location which not only detracts attention from the cylinder head, but also smooths the air flow around it. It now has become Vespa's trademark.

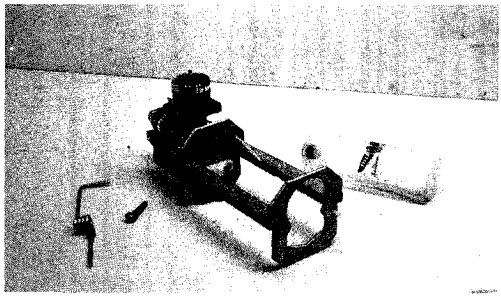
The month of January is not quite suited to test flying around Milwaukee, and I had to know how Vespa II would perform, so with Skyrocket I and Vespa II packed neatly into the trunk, we were off to the land of sunshine. After a few "orbits", hanging onto the controls of Skyrocket I, my thumbs were limbered up, reactions sharpened, I readied Vespa II. From a coral beach of Key West, Florida. Vespa II began to prove its worthiness. Most of the speed was maintained along with the grooveness of #1. The maneuvers which Vespa I lagged on, Vespa II did with ease, and now landings again looked liked landings, not like controlled crashes as with its predecessor. Not only was the construction of both ships justified, but it also rounded out a long awaited vacation.



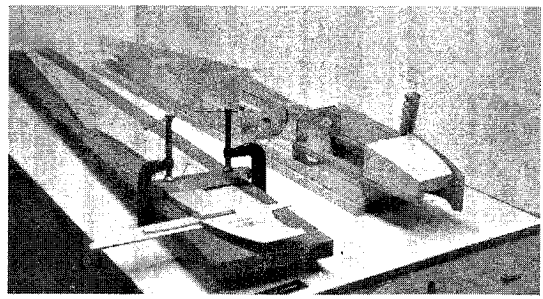
Dario fuels the sleek bird. Vespa is an Italian word for wasp—"winged insect characterized by having a slender body and well-developed wings."

Vespa II and the more sophisticated number "III" made their formal debuts at the 1966 Toledo Conference and Nats, at Glenview respectively with all the little details worked out. Here then is Vespa, series designation no longer required, as I feel it is no longer in the prototype stages, but rather a highbred with a balance of size, speed, power, and performance in one trim little package. I do not recommend that anyone attempt to fly it with reed equipment, even though someone may find a way to cram all the equipment in.

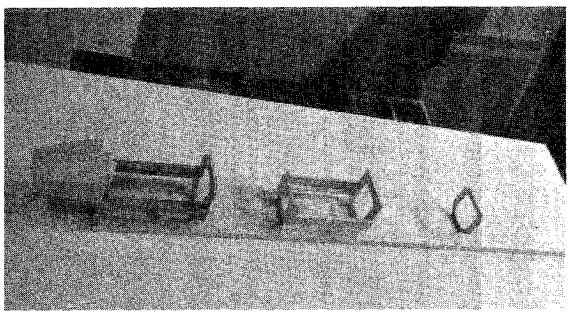
I owe most of the compactness, of course, to the Micro Avionics equipment I use, and



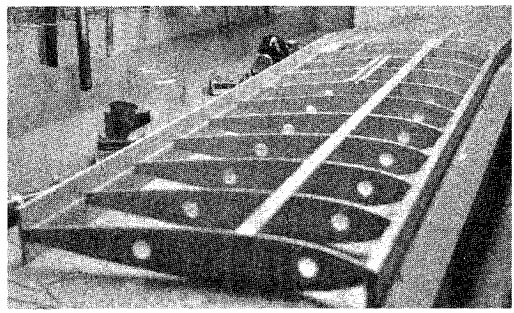
Motor-mount and forward ply bulkheads assembled—note position of nylon nose gear mount. "Slim" tank is recommended.



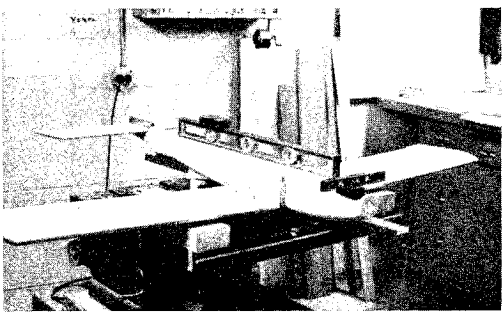
One fuselage side is shown here in process of assembly, the other as attached to parts in picture at the left.



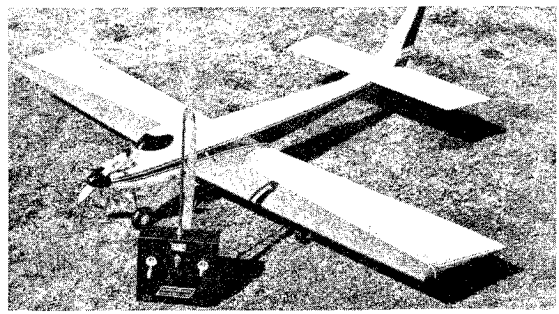
Parts and sub-assemblies shown here are mounted accurately on jig board prior to attachment of the fuselage sides.



Every builder has his pet trick for assembling a wing. This picture reveals how assembly is eased and accuracy assured.



The designer stresses precise check-out of alignment; here he uses spirit levels, two rulers—"flies right off board".



Vespa III with Micro Avionics transmitter used by designer. Note zero-zero setup and CG range given on plan above.

believe they (ship and radio) are well mated to each other. Both fast, reliable, responsive, and compact, each working in unison. After hundreds of flights on each of the two rigs I own, I really cannot find any faults. I am most impressed by the servos. With the CG in the rearward position, I am sure Vespa would be short lived in the hands of a rank novice, and should be flown with the most forward CG location until confidence is assured. The more advanced or expert should have no problems, as the ship is very groovy and responsive. With its smoothness of maneuvers, Vespa makes a real contest contender as well as an exciting Sunday ship for the discriminating sport flyer.

Construction notes will not be step-by-step as this ship is not intended for the novice; the qualified should have no problems interpreting the plans.

**Wing:** Construction is basically simple incorporating a few innovations which are designed to assure alignment, and will assist in maintaining a true straight structure. The use of oversized leading edge and trailing edge, along with sub L.E. and T.E., maintains the horizontal center line throughout the entire length of the wing panels. I prefer to begin wing construction in the inverted position so all landing gear components may be installed before the wing sheathing is applied. Use of a flat adjustable (for dihedral) building board or flat table top is a must.

Select good, straight-grain balsa for the L.E. and T.E. Carefully cement the sub L.E. and sub T.E. to these pieces. Use straight edge. With the ribs resting on a 3/32 shim and engaged with sub L.E. and sub T.E., horizontal alignment of ribs will be assured. I prefer to make all glue joints (other than the wing sheathing) with Elmers white glue. Aside from

cutting cement costs, it produces stronger joints. The oversized T.E. should not be trimmed away until the entire wing is completely sheathed and dried. The L.E. should be trimmed to allow sheating to be overlapped. The holes shown in ribs are for ventilating the cement used to apply wing sheathing. Use a contoured sanding block to assure L.E. radius is constant along entire length, most important for real performance.

Fiberglass the center section 6" wide (do not use celastic). The edges may be feathered by using Hobbypoxy "Stuff," applied with a spatula about 1½" wide. This should be done prior to covering the wing with silk, Silkspan, or E-Z Do Epoxy method—which ever you prefer. Hollow only left tip block as right panel should be slightly heavier than left panel. Use good straight grain firm balsa for the strip ailerons. Leave all edges sharp. In order to avoid any warping tendencies *do not* use any covering material other than dope or E-Z Do method.

**Stablizer:** Alignment of stab ribs may be accomplished by shimming the L.E. and T.E. of the ribs with 3/16 sq. balsa sticks; butt oversized L.E. and T.E. to ribs. Trim when dry, apply top sheathing. Invert, shim again under L.E. and T.E. Trim and cover. Apply soft tip blocks. The elevator horn should be made from coat hangar wire to allow parallel alignment. Epoxy in place. Do not round T.E. of elevator.

**Vertical Stabilizer and Rudder:** Components should be cut from C-grain balsa. After cutting components, glue joints with epoxy. Sand to airfoil shape as shown. Use pine or basswood insert for control horn mounting. Again do not round any T.E. edges.

**Fuselage:** Accuracy and squareness are equally important here so plot all center lines very carefully on both sides of the top block. All components will be installed directly to this block, so select a very straight medium hard ½ x 4 x 36" balsa block. The fuselage plan view should also be laid out on the working side along with the former locations. Using a 48" long block would eliminate the spliced addition to the block length. Epoxy the basic engine mount section together, using your engine temporarily bolted to the hard wood mounts, along with a square or triangle on a flat surface to aid alignment. Cement the three balsa nose blocks and shape sides before cementing entire unit to the top block. Cement the remaining formers to the top block add servo rails. Next install the ¾" diagonals to the top block; kerf cuts will help bending them at the tank compartment.

When cementing 3/16" doublers to the fuse sides, shim below the sides (3/16") at the front edge of the doublers and clamp the doubler down at a point approximately 2" rearward of the shim. When cement is dried, this will produce the approximate curve required in the sides. Add the ¼" sq. longerons and stab doublers. Pin and clamp the sides to the top block and formers. Be sure to install the ¾" T.E. stock behind the firewall former F-2. Complete the fuse construction as noted. Cut the dorsal slot through the top block on the center line before shaping the fuse to the cross sections shown.

With the wing and stab already constructed, alignment to the fuse should be made at this stage. Do not spare any effort here as these alignments will make the difference between a real performer and just another average flyer. The top block should be used as the zero degree base line and the engine mounts, wing and horizontal stab should be parallel to this base line. I use spirit levels and two rulers for these alignment checks and spare no effort checking and cross checking. This assures me of a ship that will fly "right off the board." Installing the nose gear steering arm and control cable clevis when the equipment is being mounted might be a problem, but a good long Allen wrench and a mirror sure help. Bear with it. The first time is the hardest.

**Finishing:** I do not like to have the tail group cemented in place until I am ready to paint the color coats; it makes wet sanding easier. For the stab and fin fillets try Sig's Epoxylite putty, really a fine product. Strong too. All my ships are silk covered and finished in Butyrate dope. Not the easiest way, but I am very proud of the end result. Apply two coats of clear dope before silking, then four more coats. The fifth coat is tinted slightly (light blue); four more clear coats on top of this. These really fill the silk grain. Allow adequate drying time between all coats. I then wet-sand the clear dope, using the tinted coat as a guide to prevent sanding through into the silk. It does not matter how many coats you put on—rather how well you take it off. I use #400 paper, and sand down just through the tinted coat. Three coats of pigmented dope for the base and trim colors, wet sand lightly with #600 paper, then hand rub with "Du Pont #606" rubbing compound, lastly apply a coat of Simonize paste wax. Lot of work, but "the means justify the end."

All set to burn up some sky? Vespa will be, but stay ahead of it because this airplane moves right along, and will respond very quickly. Trim for straight, level flight. Get the feel first, especially if you are used to a ship in the 750 sq. in. and over category. If your choice of engine happens to be an Enya .60, stunts like 90-degree pull-ups from level flight will show no signs of a skid in the square corner and four or five vertical rolls can be done. Work the pattern over a few times, AMA or FAI. I have not found any of these maneuvers which Vespa can not do smoothly. Spins do not require "everything be thrown in" to do; just come off the power slowly, hold level flight by adding up elevator until the stick is at the end, add full rudder (left or right), the break will be clean and even every time, up-wind or down.

Rolls should require little or no elevator at all. Try your four point rolls by picking up speed on entry, from a "split-S" just slightly nose high, little rudder movement should be required.

Swinging a 11-7-¾ prop and using Sig or Idle X fuel, the Enya .60 really delivers the power. It is reliable, idles well, is easy starting. I find turning the spray bar in one or two turns improves fuel draw for those long, steep pull-ups, and the slim tank keeps the fuel level at a more concentrated vertical location than the conventional 8 oz. tanks.

All things considered, the time and effort I have spent in developing Vespa has been very gratifying and certainly enlightening. I do not know of any other features I would like to incorporate into Vespa to improve its performance but, since nothing is perfect, I will keep looking. I hope you will build a Vespa and enjoy flying it, as much as I do. Tried all the larger multi ships? Try Vespa for a stimulating change. You do not need swept or tapered wings or stabs to impress the boys. Vespa performance will. See you at the flying field.

If you have any questions or problems producing the engine mounts or ailerons, please drop me a line.