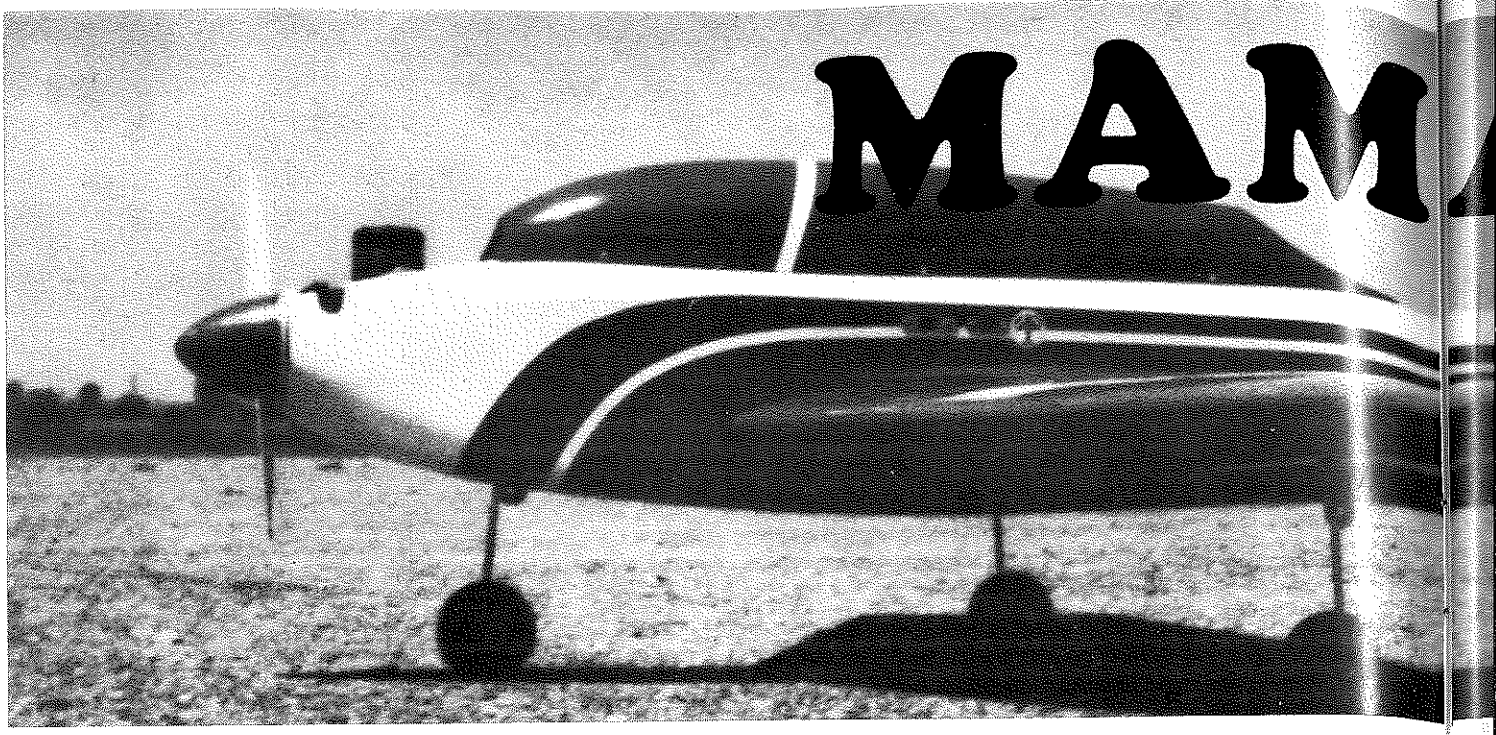
MAMA



By JOE BRIDI and DENNIS MILLIKEN . . . Joe designed this "biggie" to test the merits of a large pattern ship. Dennis built the prototype for Joe and wrote the construction part of the article. Flight tests were even better than expected. Careful wood selection and construction techniques required to avoid overweight.

• The "MAMA MIA" is a big aircraft, especially so for a pattern ship. However, don't let the name, or the size fool you.

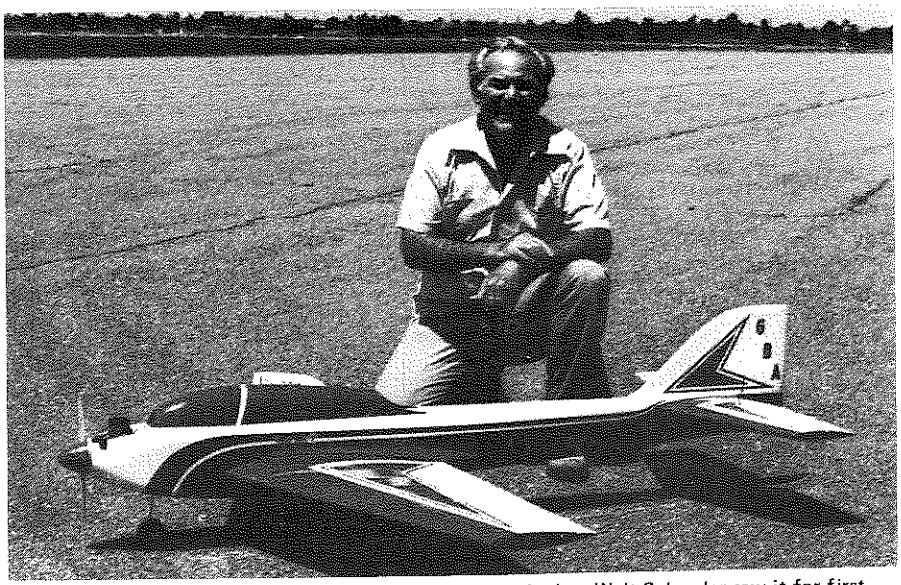
The design is capable of every maneuver in the FAI schedule (including the snap maneuvers), with clean, precise accuracy.

Even though it is a big aircraft, its flight characteristics are such that the 60-sized engine with tuned pipe used in today's pattern ships will do the job.

When I first observed Dean Koger flying the EU-1, I was impressed by its flight characteristics and ability to fly an accurate FAI pattern. This started me thinking about designing and trying out a larger size pattern ship to see what it would do, and indeed to see if the large size was the way to go.

During construction of the model, I soon had second thoughts about its size, and that its performance would not be up to my expectations. However, when we finally flew the "MAMA MIA" we were astounded by its flying characteristics.

Despite its size, it is an exceptionally easy handling aircraft, with good, clean, accurate, and precise maneuvers. Because of its size, we felt that the aircraft's speed would be on the slow side, thereby allowing us to set up our maneuvers in close. However, its speed was such that after several flights, we were out in our normal maneuver placement position (the 13% airfoil contributes to the low drag for a ship of this size).



GBA stood for "Great Big Airplane", but name changed when Walt Schroder saw it for first time and said, "Mama Mia!" It will not be kitted as each one would require hand-picked wood.

The prototype sported a Webra .61 rear exhaust with a Rossi pipe, and a Zinger 10-1/2x7-1/2 prop. This proved to be a winning combination, as the vertical maneuvers were clean, with ample available power.

Rolling maneuvers are good, with its best feature being rollouts on the Top Hat, etc. Double Immelmans and spins are a pleasure to do and watch. The snaps are slow and precise with aircraft heading easily maintained. With 975 square inches and 11 pound weight, the landings are a piece of cake.

With a plane of this size, it is important that care be taken to keep construction as light as possible in order not to go over the 11 pound, 3-1/2 oz. maximum weight limit (FAI). Our prototype model weighs exactly 11 pounds. A careful choice of balsa, retracts, and finish must be observed so as not to exceed the 11 pound weight.

K&B Super Poxy was used on the prototype, but some weight savings will be realized in Monokote is used.

In summary, we are currently building more MAMA MIAS because we feel that the model has excellent potential, on or off the contest circuit.

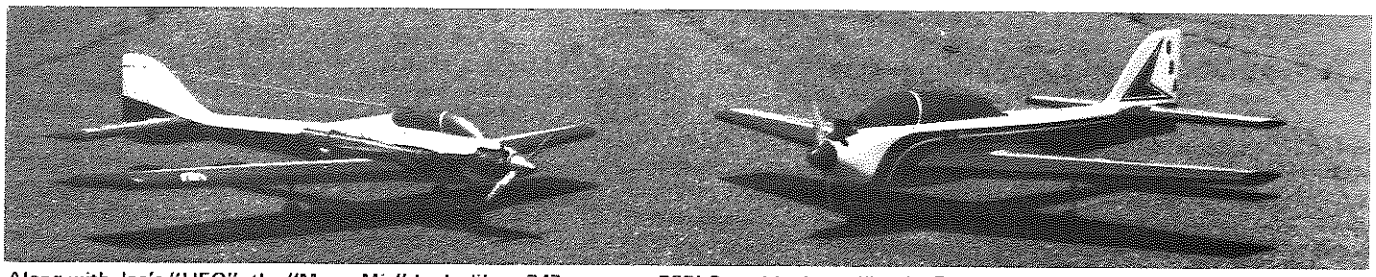
How did we come up with the name MAMA MIA? Build one . . . the name will be self explanatory!

BUILDING THE "MAMA MIA"

Keep in mind that this aircraft, due to its size and engine displacement, must be built as light as possible. The prototype shown in these photos weighed in at 11 pounds, complete with Webra .61 Speed, rear exhaust with mixture control, Rossi tuned pipe, Kraft Signature Series radio and Giezendanner heavy duty retracts.

Remember, a great deal of care should

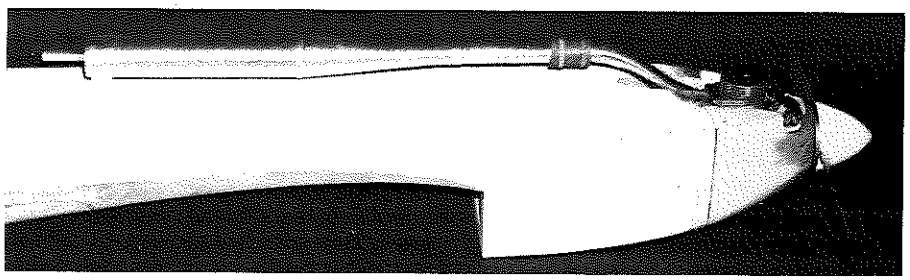
MAMA MIA!



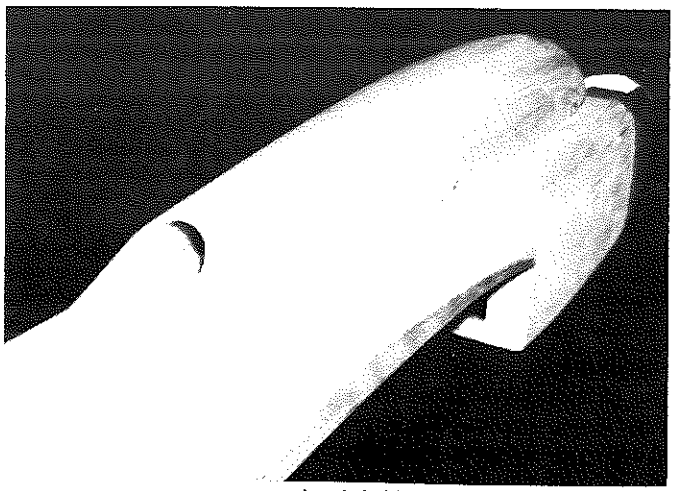
Along with Joe's "UFO", the "Mama Mia" looks like a 747 next to a 737! Surprisingly, unlike the EU-1, Mama Mia is quite fast in the air, but still extremely groovey. Airfoil is a bit thinner, by percentage, reducing frontal area.

be taken in the selection of the balsa wood. Plywood parts in this aircraft consist of a 3/8 firewall, 1/64 wing fillets, and two 1/16 fuselage doublers. The design of this aircraft calls for very little plywood, and the weight can be kept down.

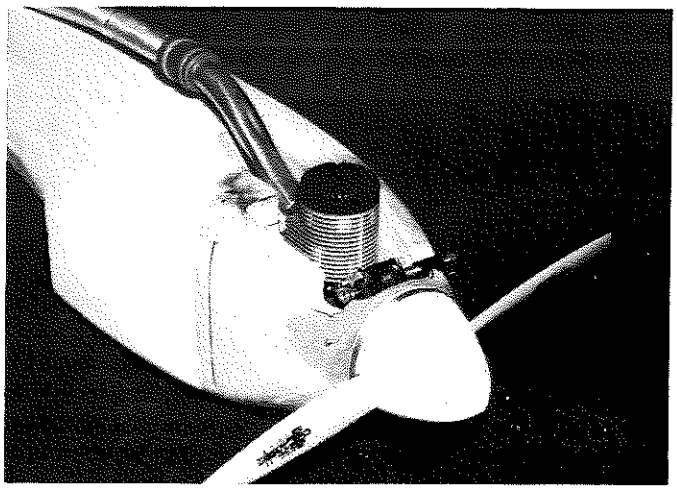
All materials, such as epoxy, glass cloth, and whatever glue you may choose, should be used sparingly if you intend to fly this aircraft in competition.



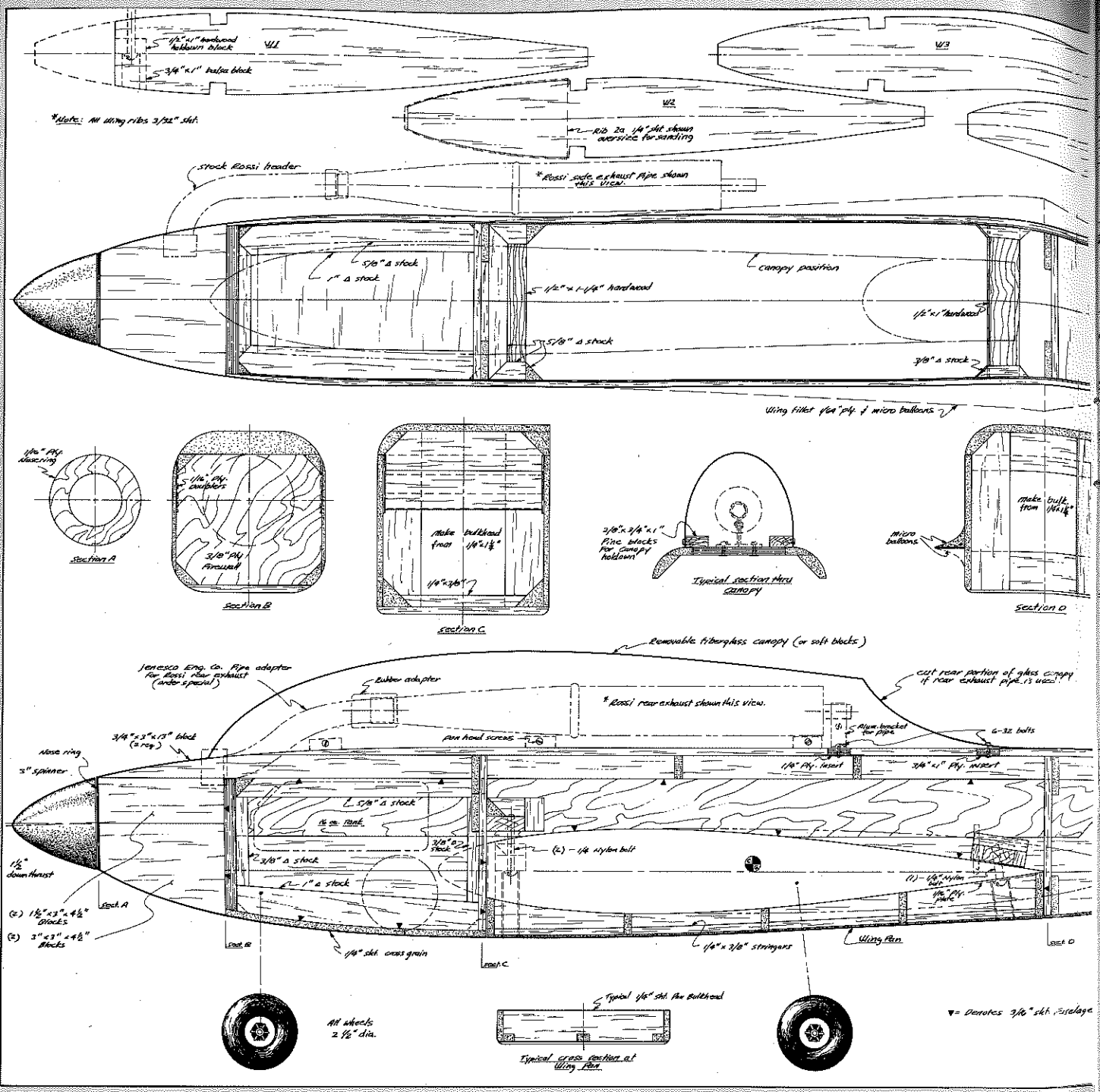
Side view of unfinished fuselage, showing Webra Speed and Rossi pipe installation. Side exhaust can be used, but is not recommended, for both appearance and additional drag.

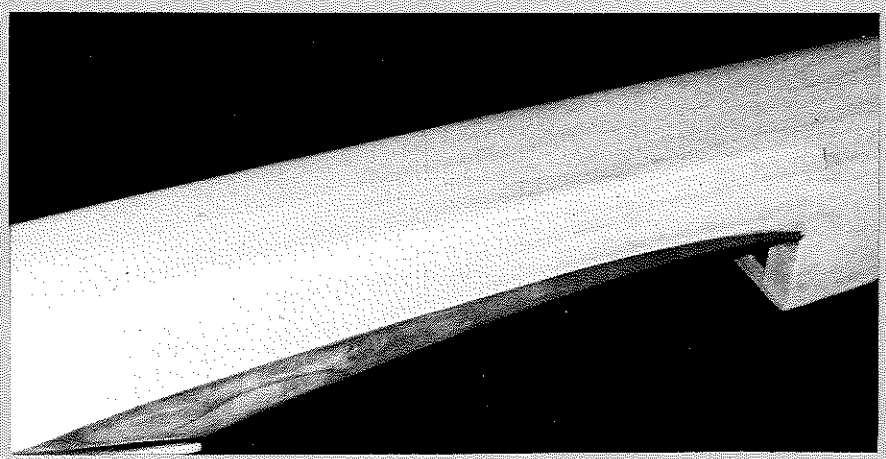


Hollowed balsa canopy covers pipe, is held on with wood screws for easy access. It could also be molded from fiberglass and cloth.



Close-up of engine and pipe installation. Note groove cut in fuselage-firewall joint to accommodate exhaust header.



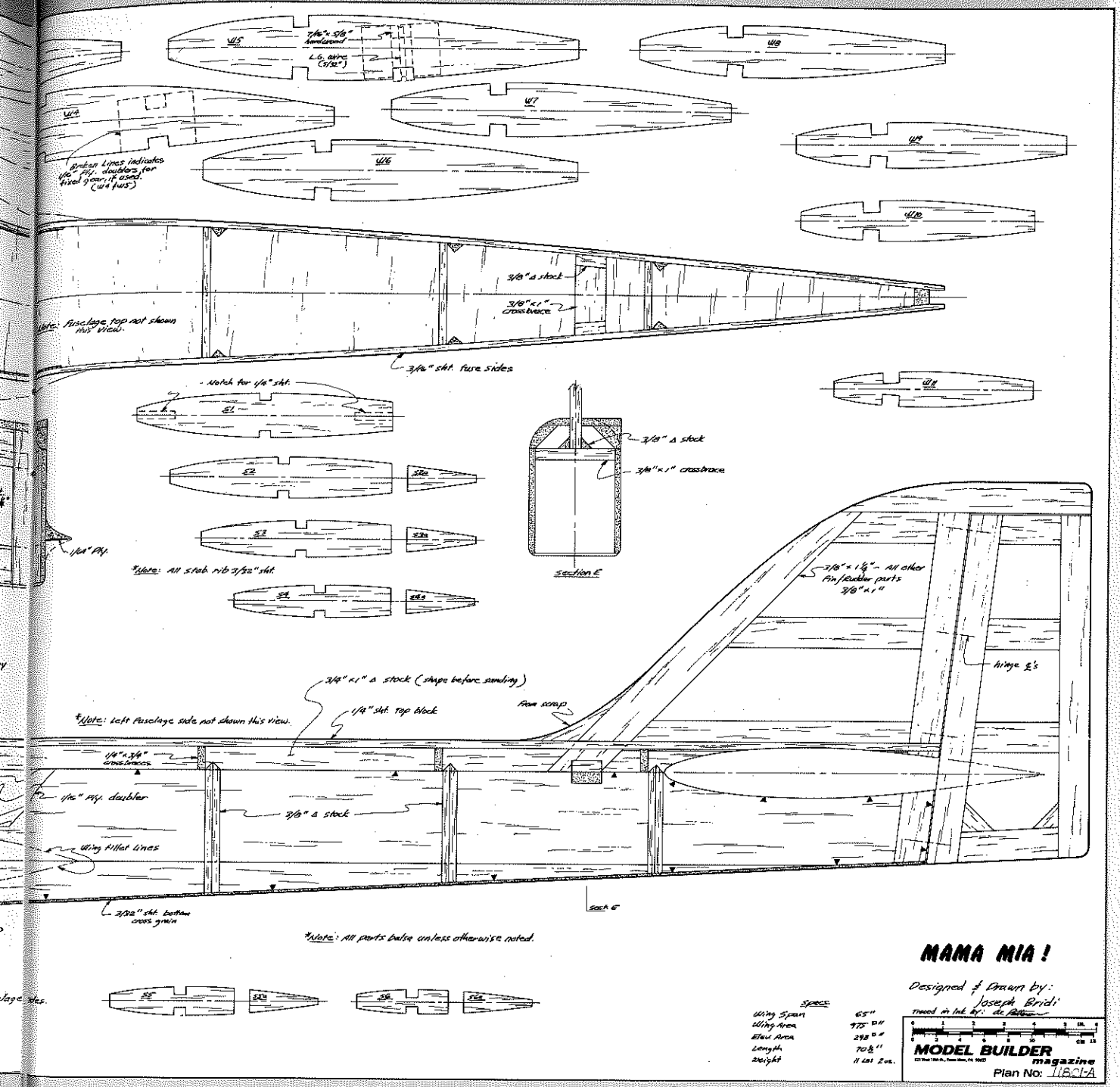


Neat wing fillet is made from thin plywood and micro-balloons. The fuselage is recessed into the wing to allow room for the landing gear in the retracted position.

WING

Ribs were cut from soft 3/32 balsa and sanded to exact size on plans. Wing is built one half at a time directly over the plans, starting with the 3/32x2 rear bottom sheeting pinned in place. The 3/8x1/2 bottom main spar is now set in place, shimming it up approximately 3/8 inch above the building board. All ribs can now be glued in place except for the No. 1 center rib, which is glued in place when the wing halves are put together. Glue 3/8x3/4 leading edge in place and let dry. Proceed with top rear sheeting and top main spar.

Remove wing panel from plans and place 1/16 shear webbing behind main spar and between all ribs; the grain must be vertical. This will ensure maximum strength to the wing and at the same



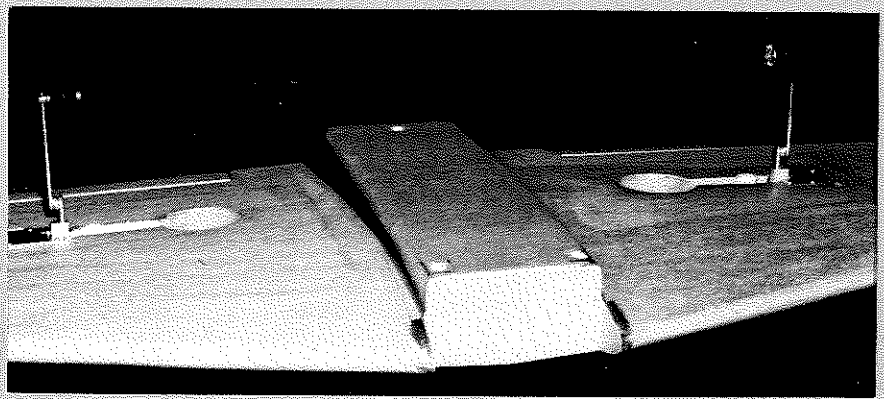
time will add very little weight.

Wing halves are assembled with 1-13/16 inches dihedral under each tip. A 1/2x1 hold-down block is now glued in place along with the top and bottom leading edge sheeting and capstrips. At this time, installation of fixed gear or retracts is accomplished. A 3/8 I.D. plastic tube was routed through ribs to wheel well so electrical connection was accessible. Center section of wing is glassed for added strength. Wing tips and ailerons may also be installed at this time. Center section of wing is left open and set aside until partial completion of fuselage.

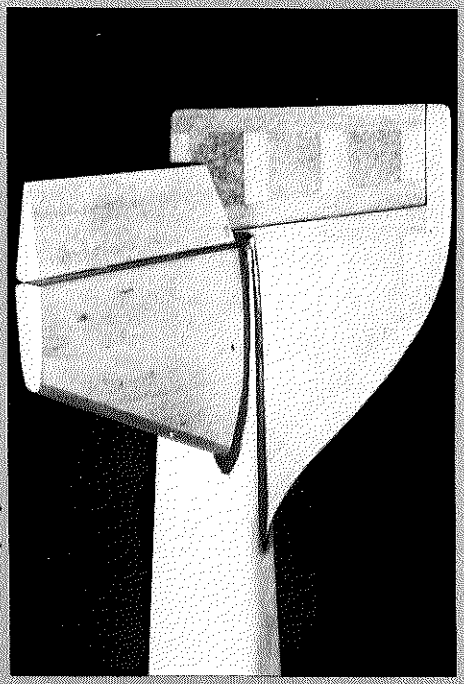
FUSELAGE

Cut 3/16 sides from equal hardness balsa. The 1/16 plywood doublers are installed along with the 3/4x1 triangle

FULL SIZE PLANS AVAILABLE – SEE PAGE 100

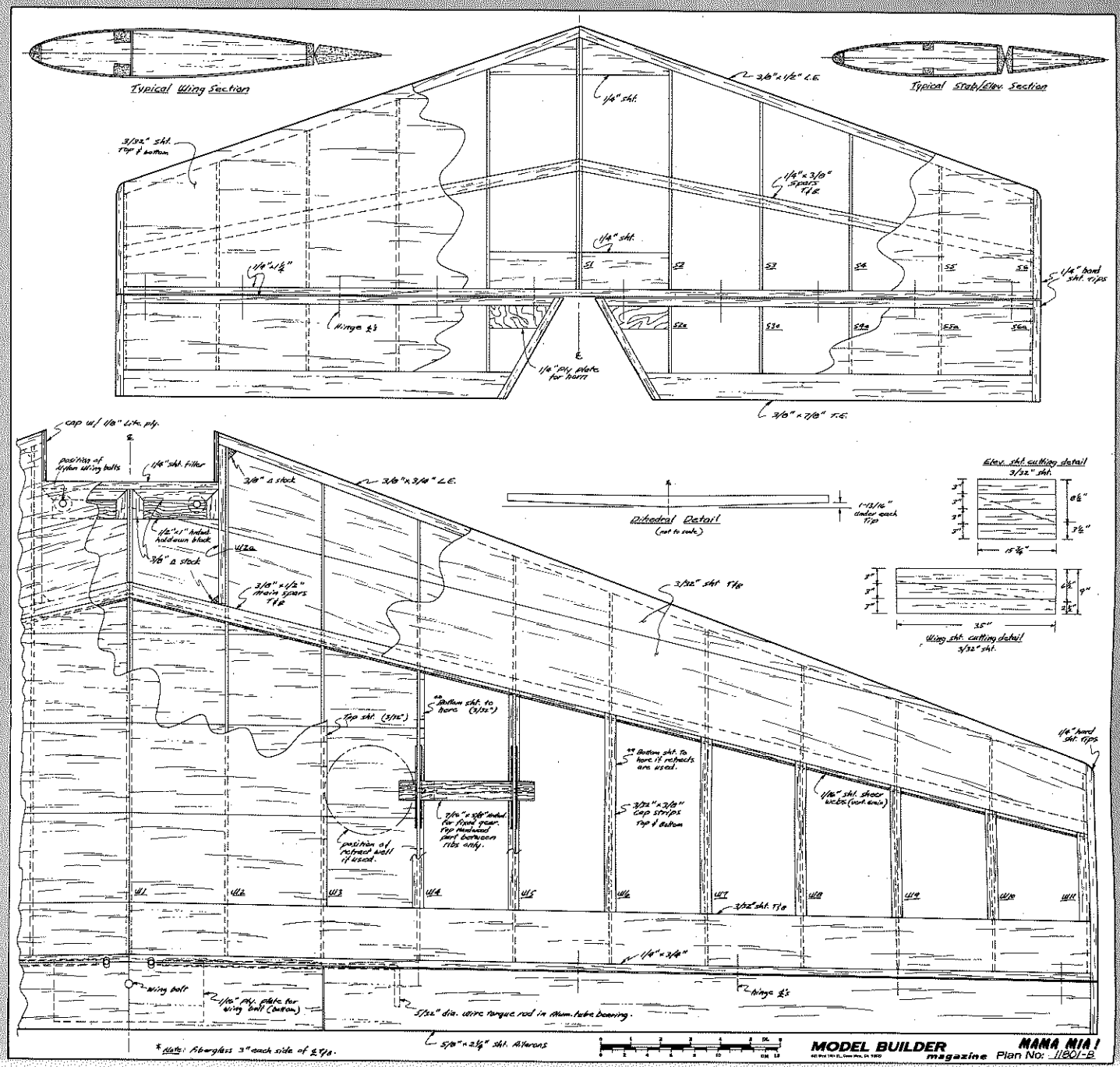


Center section of wing, showing filleted belly pan, hold-down screw locations, and Giezendanner retracts in extended position. Wing is built in two halves, joined at center later.

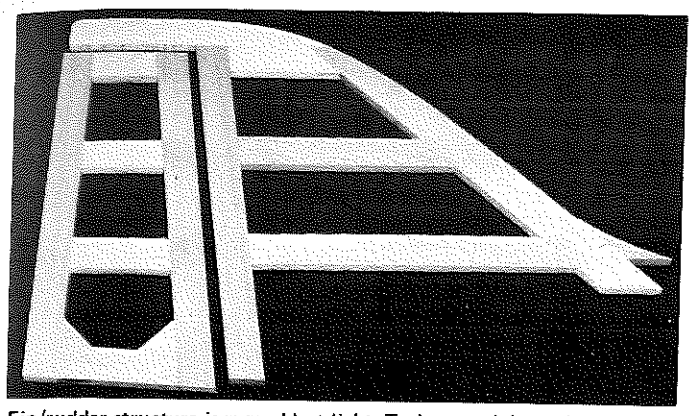


Completed tail section glued and filleted in place on fuselage. Fin/rudder covered with silkspan to keep down weight.

Inverted view of nose, showing Giezendanner retract gear installation. Note glassing of fuselage back to LG opening.



FULL SIZE PLANS AVAILABLE – SEE PAGE 100



Fin/rudder structure is rugged but light. To keep weight under 11 lb. limit, the use of ballast for tail-heaviness is to be avoided.

Designer, Joe Bridi (left), and Dennis Milliken, builder of the prototype, at Mile Square Park, during the first test flights.

stock. Also, the 5/8 triangle stock is glued to the top nose area and a 1-inch triangle stock is glued to the bottom.

The two balsa bulkheads are assembled and the 3/8 balsa vertical triangle braces are glued in place. We are now ready to assemble the fuselage, using bulkheads C and D. This is done directly over the top view of the plans in order to ensure proper alignment of tail surfaces. Tail section of fuselage is then glued together along with adding the 1/4x3/4 cross braces.

Engine is now mounted to firewall and epoxied in place (note 1-1/2° downthrust). Holes for fuel lines, throttle control and mixture control are now drilled. The 1/2x1-1/4 and 1/2x1 inch wing hold-down hardwood blocks are glued in place, along with 3/8 triangular supports. The 1/64 plywood wing fillet is now cut to shape and epoxied to fuselage. The wing is now put in place at 0° incidence on the fuselage, and the three nylon hold-down bolts installed. Belly pan can now be assembled to bottom of wing. Top and bottom fuselage sheeting can now be glued in place, along with the nose block. Nose of fuselage is sanded to shape.

Micro-balloons and K&B resin were used to form fillets around wing, fin and stabilizer. Nose is glassed one inch past the firewall for added strength. You will note in the photos that a groove is cut in top of fuselage at firewall to accommodate header pipe.

CANOPY

Canopy may be constructed of fiberglass, or carved from a block of light balsa, as on the prototype. The wall on the balsa canopy is 1/4-inch thick and is reinforced on the inside with fiberglass cloth and resin. Six wood screws secure the canopy to the fuselage, making for easy access to the tuned pipe. Side exhaust may be used on this model, but it is highly recommended that the through-the-canopy method be used for less drag.

FIN AND RUDDER

Fin and rudder are built directly over plans using 3/8x1-1/4 and 3/8x1-inch light balsa. Sand to shape and hinge rudder to fin.

STABILIZER AND ELEVATOR

The stab is built over the plans, much the same as the wing. Pin down the untrimmed 1/4x1/4 main spar and the 1/4x3/8 mid-spar, shimming it up to compensate for the thickness taper. Glue on the 3/8x1/2 leading edge. Remove from plans and sheet top and bottom with 3/32 balsa. As finished model was slightly tail-heavy, you might consider leaving out the 1/4x3/8 mid-spars. Stab would be plenty strong without them.

The 3/32 elevator bottom sheeting is pinned in place, followed by the trailing edge, leading edge and ribs. Top sheeting can be added before removing from plans. Just don't close in any pins with the sheeting!

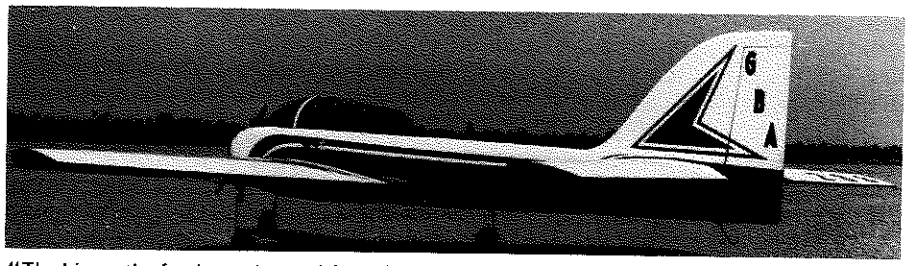
FINISHING

In order to keep the weight to a minimum, I chose the silkspan paper and dope method on the prototype.

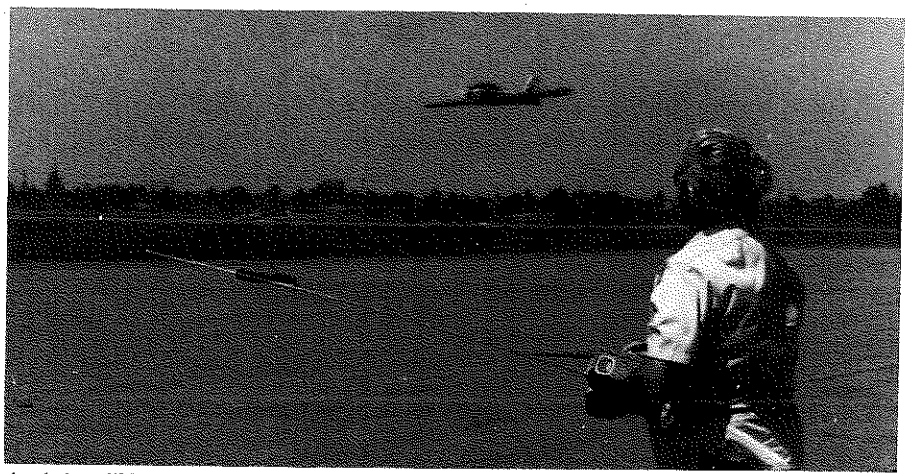
First the wood is sprayed with water to raise the grain. When dry, surface is sanded with No. 400 sandpaper. Four coats of nitrate dope are then applied and the structure set aside for two days. Medium grade silkspan paper, available at most hobby shops, is cut to shape, leaving two or three inches overlap around edges. Now mix 50/50 dope and thinner. Apply silkspan on the area to be covered and lightly spray with water, working out all wrinkles. Now apply 50/50 mix directly to wet silkspan and let dry. Trim edges and seal with dope.

Apply one more coat of 50/50 mix to surface; this will penetrate through silkspan and into dope on wood and give you a solid bond. In order to save weight silk is applied over silkspan, but only to open bays in wing and to built-up rudder and fin. The rest of aircraft is covered with silkspan.

Two coats of baby powder and dope are then applied by spraying or brushing. Brushing will require a considerable amount of sanding, so if you have access to a spray gun, use it. K&B epoxy primer was then applied, along with K&B gloss paint. •



"The bigger the feathers, the straighter the dart." We don't know who said that, but it's certainly appropriate in this case! Photo exaggerates, but the tail surfaces are very adequate.



Joe brings "Mama Mia" in for a low camera pass. This flight session proved need for a little nose ballast and the downthrust shown on plans. Watch for Joe at contests with this one!