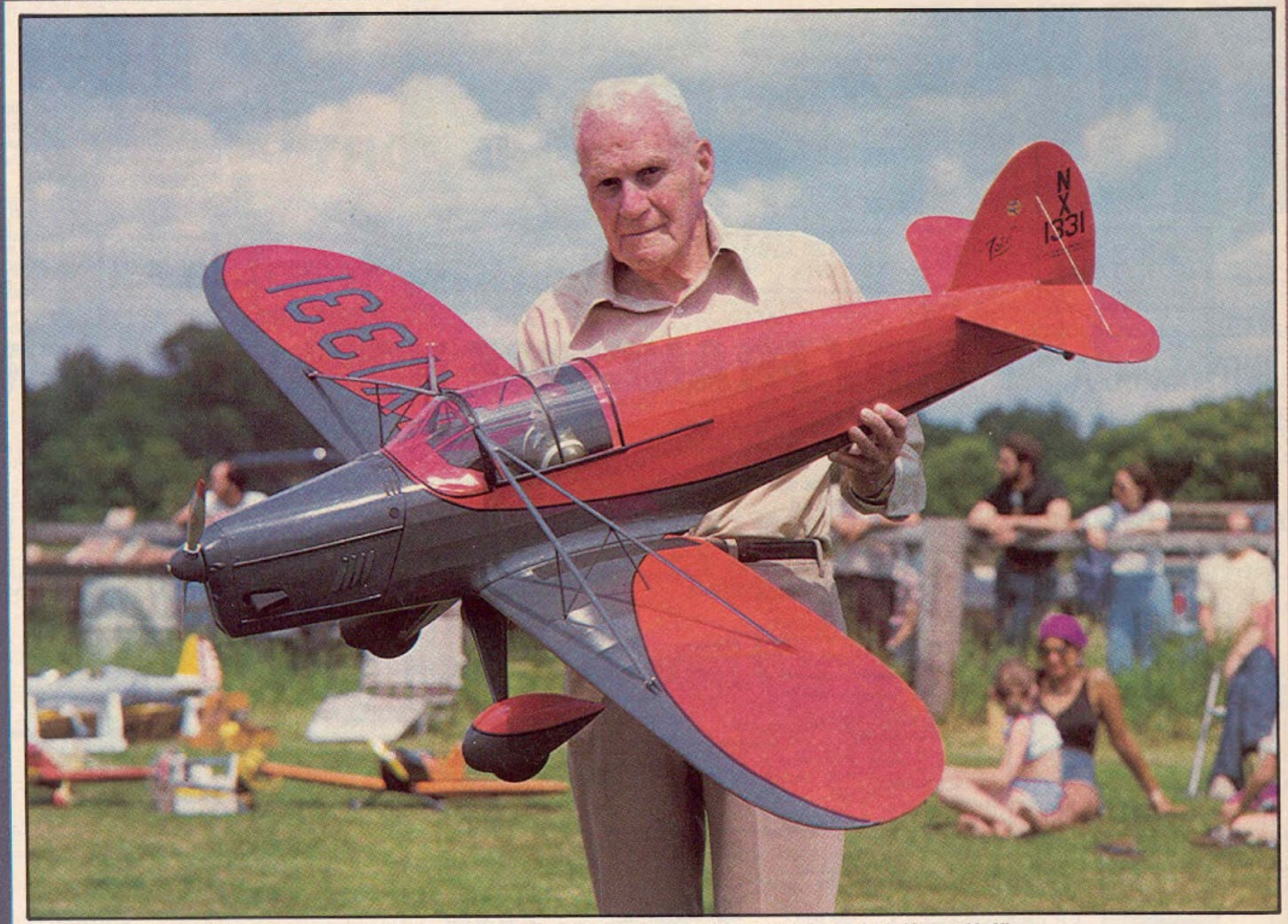

Howell W. "Pete" Miller, designer of the Gee Bee Zeta, with the 1/5 Scale Zeta designed by Henry Haffke.

GEE BEE ZETA

A SPORT SCALE MODEL FROM A FAMOUS RACING HERITAGE

By Henry A. Haffke

Here is a part of the story of the Zeta by Howell W. "Pete" Miller, chief Aeronautical Engineer, Granville Bros. Aircraft Inc., Springfield, Massachusetts.

The design of "Zeta" was laid out in late 1936 and construction was started thereafter in 1937. Several local pilots who flew from the Springfield Airport mentioned the need of a small aircraft which could be built and sold at a reasonable cost. Construction of the aircraft was completed during 1937. On December 11, 1937, Mark Granville test flew the airplane from Springfield Airport. He reported excellent characteristics in all flight conditions. After that, the airplane was flown by about 15 of the pilot-stockholders.

Due to the increase in material's cost, it was decided not to apply for C.A.A. certification, although all proof-testing, design and engineering stress analysis were completed. Romie Lambert had stored the Zeta in his barn. Several years had gone by and the unpaid rental charges accumulated. We then, on advice of our attorney, turned "Zeta" over to Romie for unpaid rent. Incidentally, the rent amounted to more than the construction costs of "Zeta."

In 1978, some interested parties set up a meeting in Springfield for anyone interested in preserving the history of the aviation happenings in the early

ABOUT THE AUTHOR

Henry A. Haffke was born in Springfield, Massachusetts, and grew up about a mile from the old Springfield Airport where the Granville Brothers built their Gee Bees. As a young boy, he spent many evenings watching the activity at the airport.

Seven years ago he decided to build a model of one of the Gee Bees which were built so close to his childhood home in Springfield. The first Gee Bee that he designed and built was the Senior Sportster Model Y.

After a lengthy search, he luckily located Bob Granville, one of the famous Granville Brothers who had designed and built the real Gee Bees. Bob supplied the photos he needed and also color documentation and the Model Y became a familiar sight among the winners in most Eastern scale meets. Henry's association with Bob Granville netted him much previously unknown facts about the Gee Bees and his interest in these colorful aircraft of the past intensified.

Henry decided that he would write a book which would tell for the first time, the real story of the Granville Brothers and their Gee Bees. Since building his first Model Y seven years ago, Henry has designed and built models of most of the Gee Bee Aircraft. All have been big contest winners and more are planned for the future as time permits.

days of Springfield. Included among the attendants of this meeting were members of the staff of the Springfield Museum of Science. Romie Lambert was willing to donate the "Zeta" which he had so lovingly cared for all these years. It was in immaculate condition and only needed to be polished.

So there it hangs today, for anyone to see. It is a beautiful thing as it hangs there in the museum. Remember, this 45 year old airplane is exhibited in its original fabric and paint just as it was rolled out of the Gee Bee plant in 1937.

The "Zeta" was such a beautiful aircraft that I couldn't resist doing a model of it. It had excellent proportions for a model and, since it had been very aerobatic, it seemed a good bet that the model would also inherit its fine flying characteristics. With the help of Pete Miller and Bob Granville, I obtained a fine collection of photos of the Zeta.

With all this documentation, I was able to do a very accurate rendition of the Zeta. I had several other Gee Bee projects under way so did not have time to start another, but my good friend Joe Gallagher (who had built two previous contest winning Gee Bees from my drawings) agreed to build the first one. I designed the model in 1/5 Scale at his request and as soon as I had the pencil drawings done, he started on the model. He had it finished in a short time and it was test flown by our chief test pilot supreme, Sid Clements, who has tested most of my designs. Sid reported excellent flying characteristics and we had another winner.

It was flown in five contests during its first season of flying and took three first places, a second, and a third. Its first win was at the Northern Connecticut Fly In where we went specifically so that Pete Miller could see it fly as his home is only a short distance from the site of that contest. Pete was thrilled to see a model of his creation fly using radio control and this was the first time he had ever seen a model flown by R/C. To top everything off, the Zeta was awarded first place in the event which had our entire crew very pleased.

CONSTRUCTION

The model is not difficult to build and everything is pretty normal. The landing gear is a little different from most aircraft as the main landing gear struts emerge from the fuselage centerline with an outboard shock strut connected to the wing center section. Other unique differences in the Zeta, is the wing strut arrangement. The wing struts were attached to the windshield bow structure which gave a lot of strength to the real craft and, even though not needed on the model, it would be a shame to omit it as this is part of the Zeta's character. These struts were made from streamline aluminum tubing which was assembled together with epoxy. It is plugged into a tube installed at the windshield bow and the other end is bolted to brackets built into the wing.

Fuselage:

Make up two fuselage sides of 1/8" x 48" sheet balsa. The basic sides are shown on the plans with arrows. Note that the rear end beyond F-9 is raised to support the stabilizer. Mark each side for bulkhead locations. Cut all bulkheads from the proper material as shown on the patterns. Locate engine mount on F-2 and drill for mounting bolts. Also drill holes for fuel lines and throttle linkage. Cut out the two oval shaped holes for the cooling tubes. The cooling tubes are made from cardboard tubes on which Coverite is rolled. Trim the oval holes to fit the tubes.

Next, assemble all bulkheads on the basic sides after marking stringer locations on each bulkhead. It is best not to cut stringer notches until after assembly to assure straight stringers.

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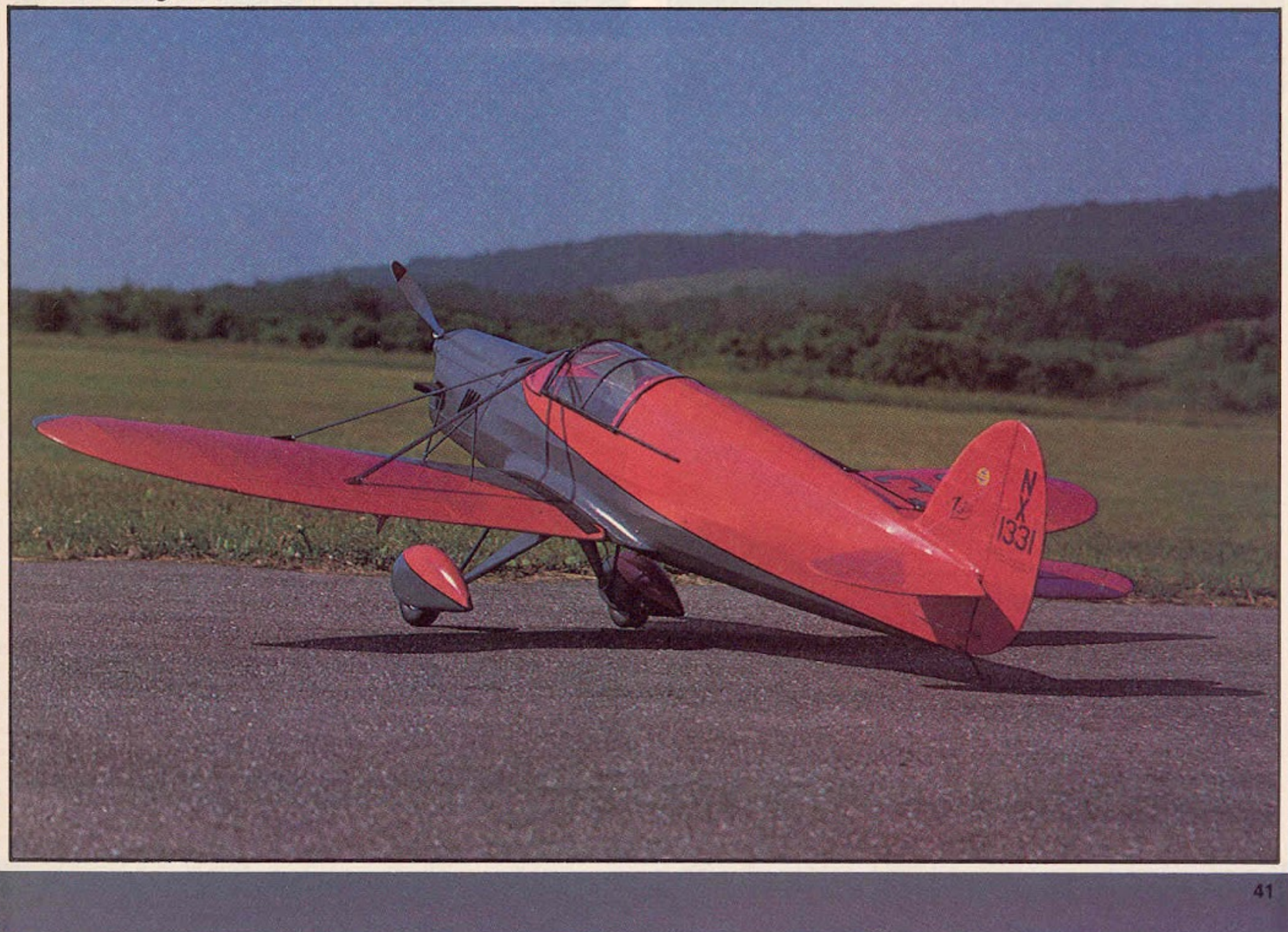
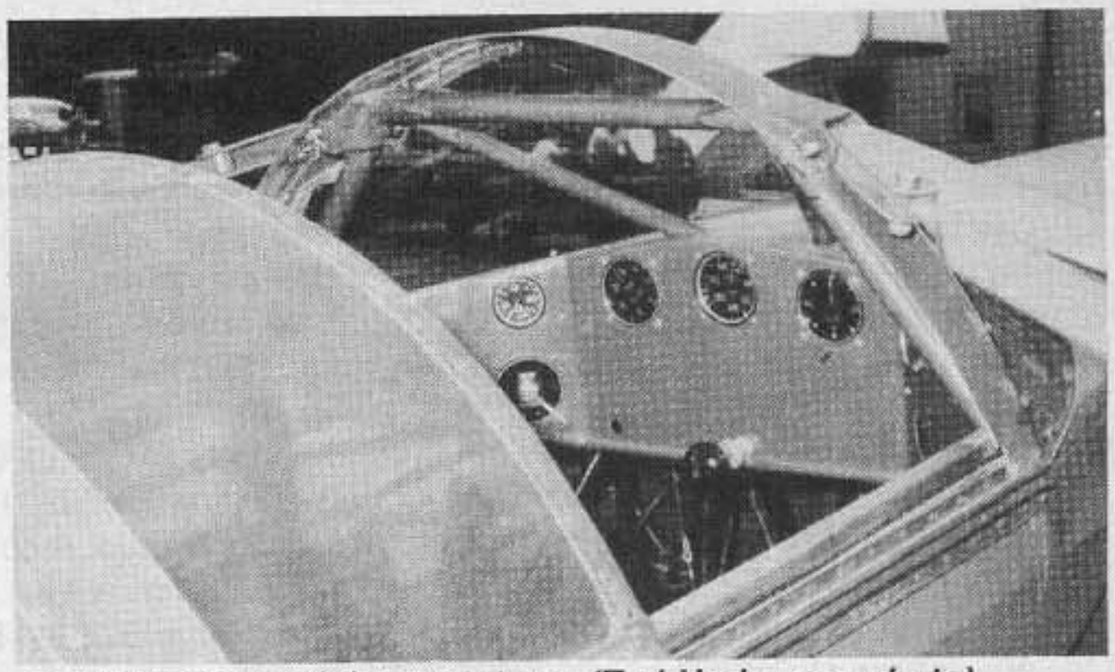
The Haffke designed Zeta model.



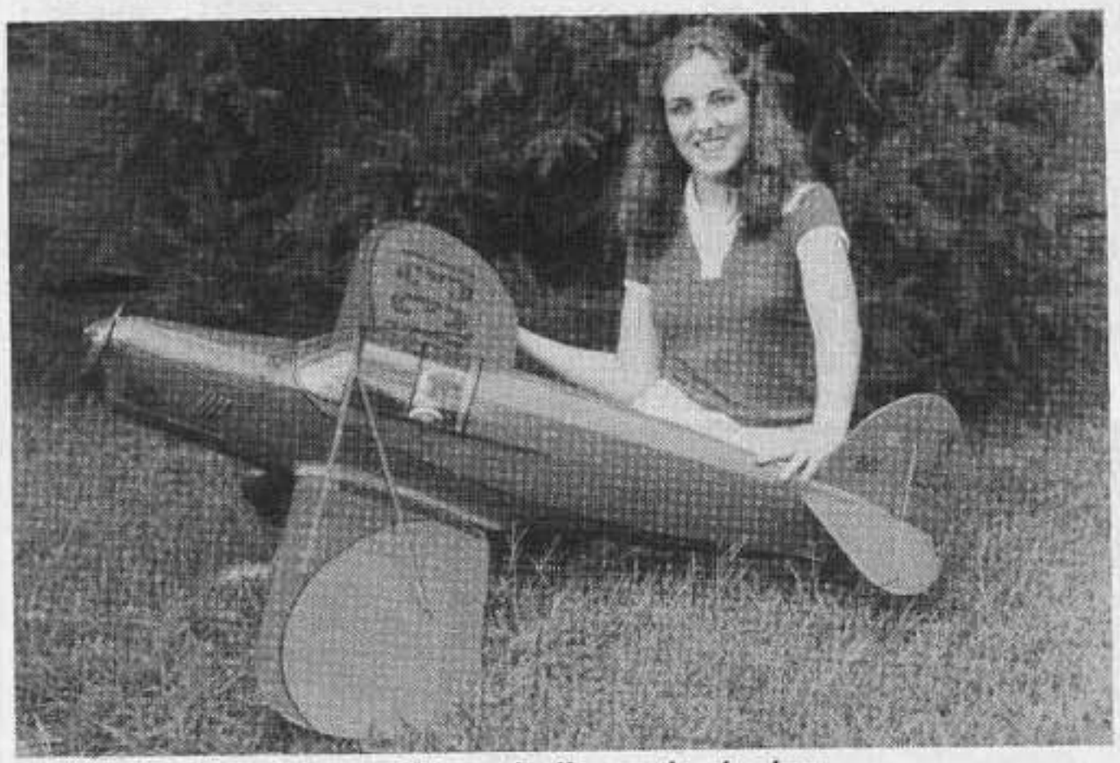
Factory roll out photo of the Gee Bee Zeta.



Cockpit details of the prototype. (Ted Hodgeson photo).

Mark Granville touches down following a test flight.

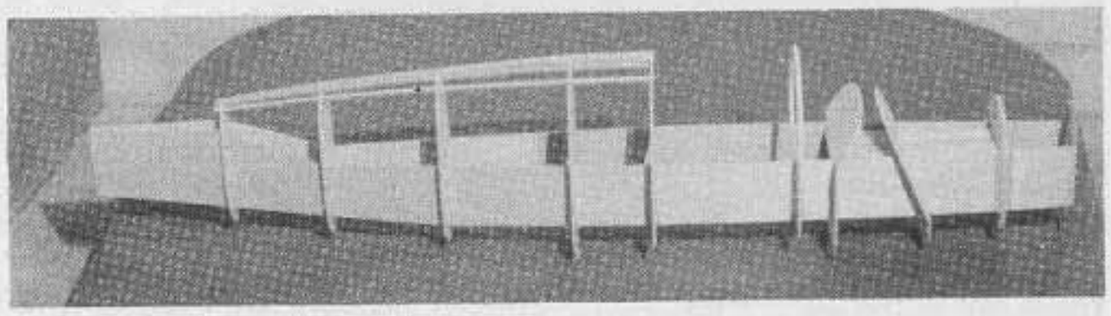
A most realistic view of the Zeta model.



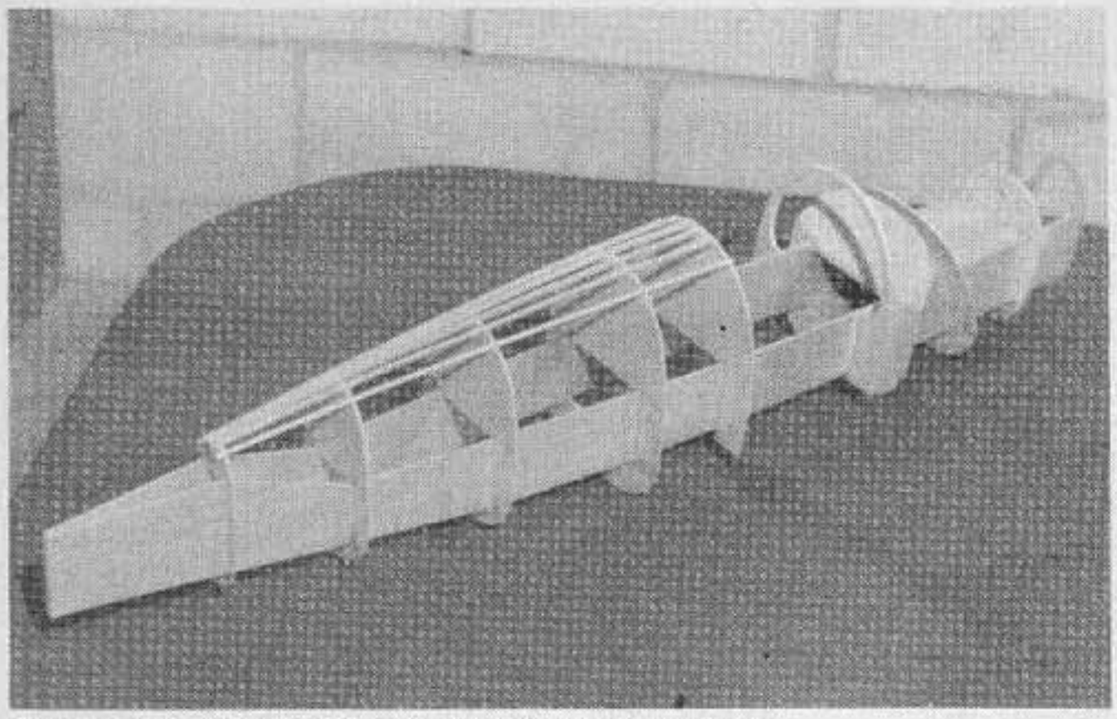
Karen Haffke shows off her dad's scale design.

Henry Haffke, Dotti Miller, and Pete Miller back up Joe Gallagher and his Zeta after winning the Northern Connecticut Scale Fly In. The first contest for the model.

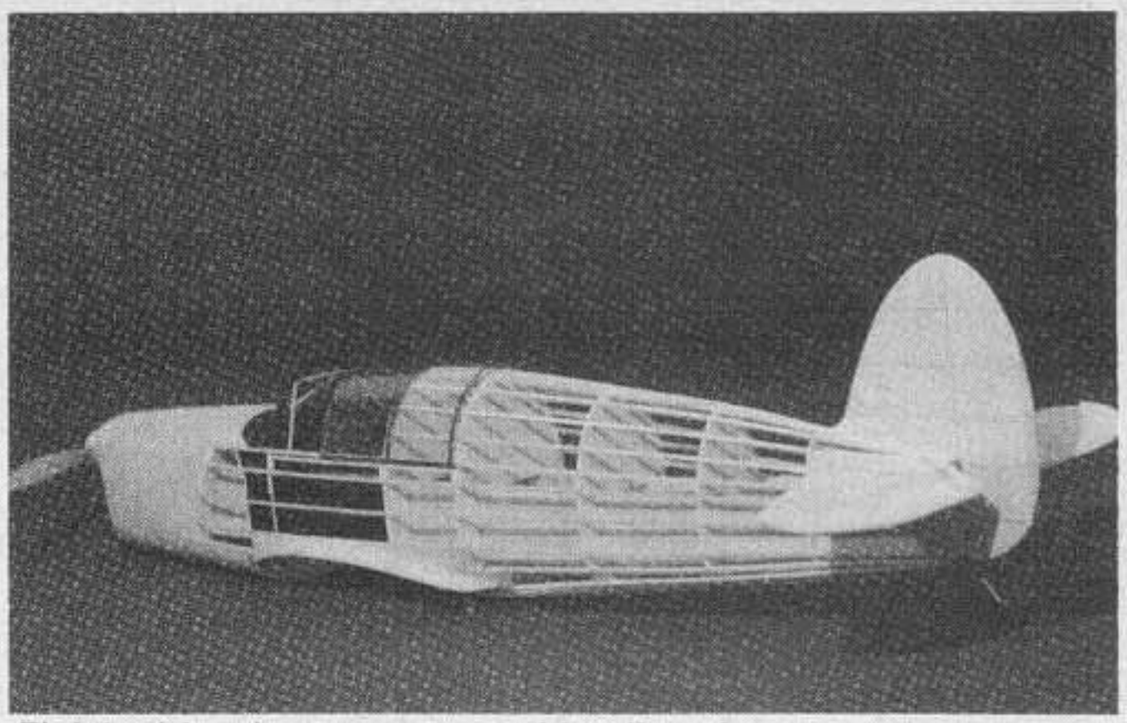
Model in flight at the Bealton Scale meet. (John Preston photo.)



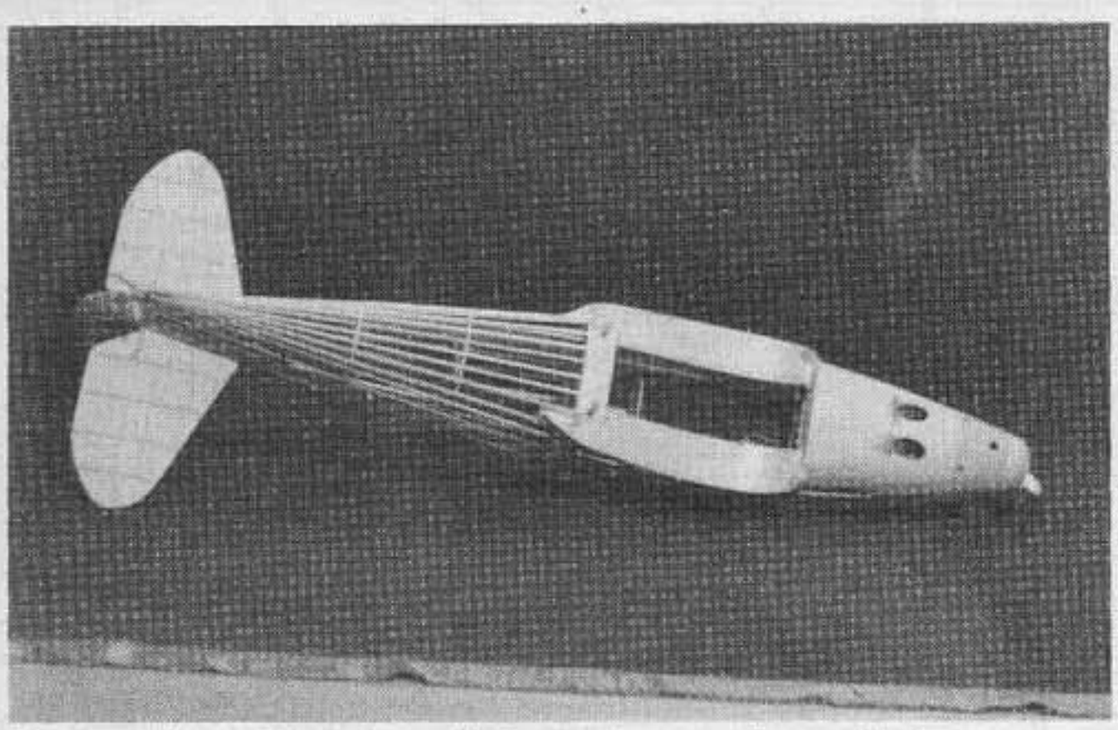
Basic fuselage structure.



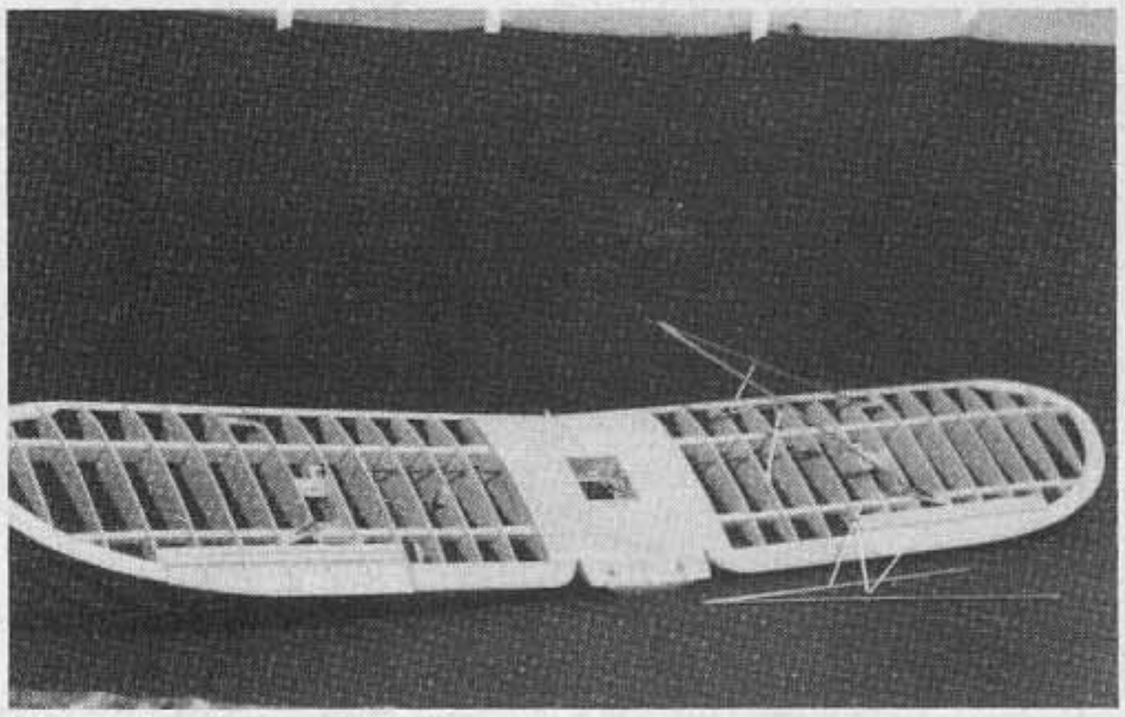
Rear angle shot of basic fuselage structure.



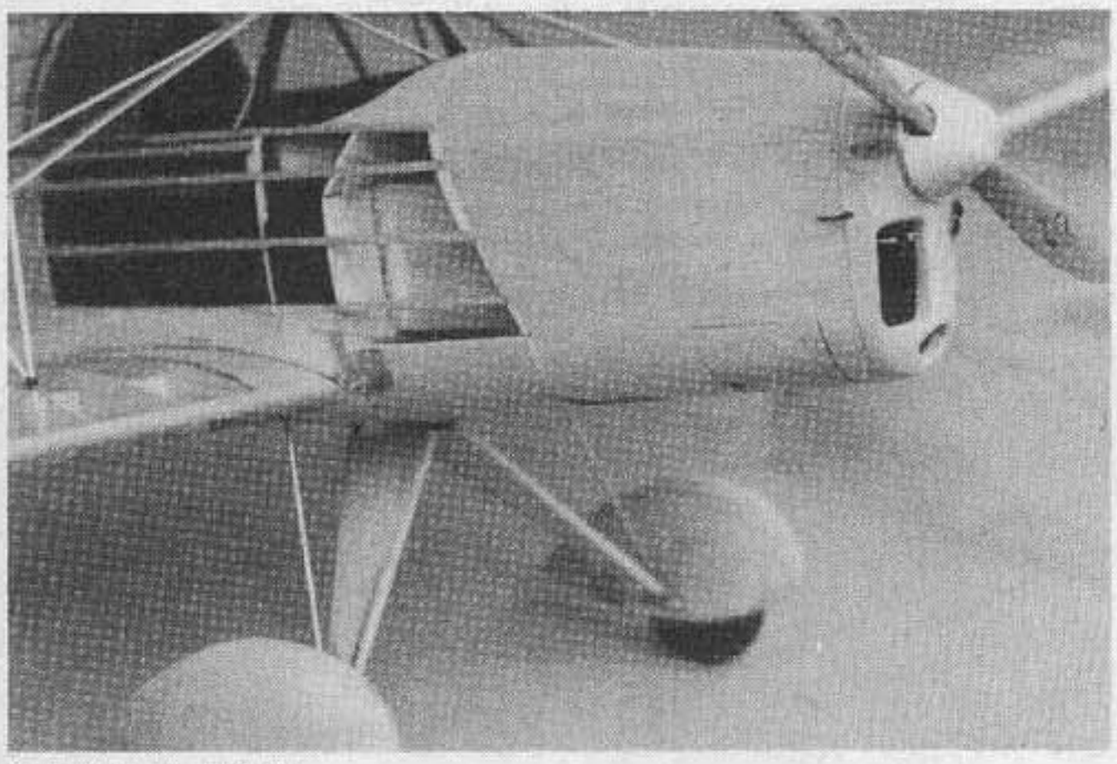
Finished fuselage structure with tail surfaces.



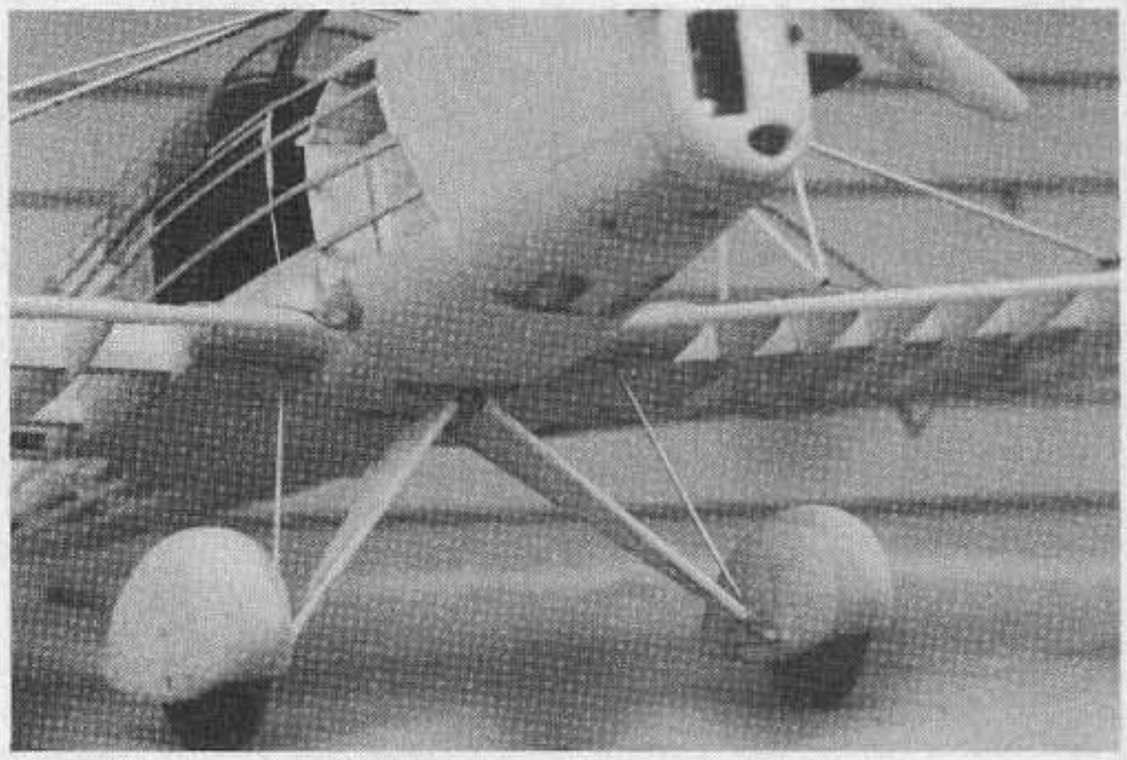
Bottom view of fuselage. Note engine cooling outlets.



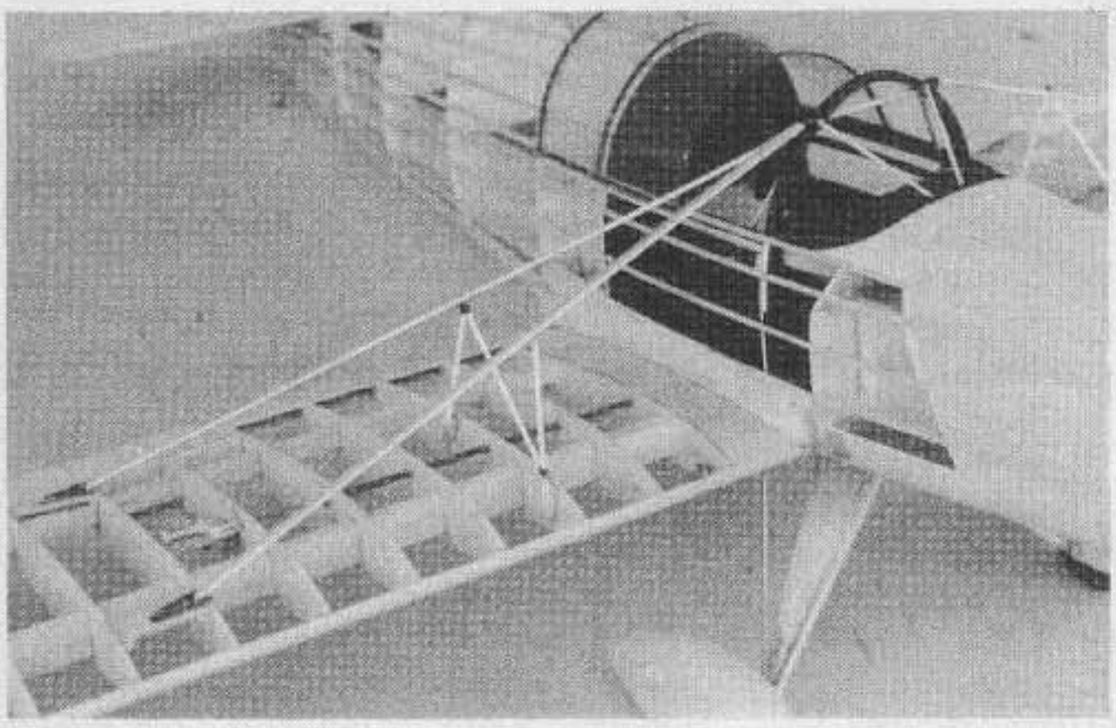
Wing structure and struts.



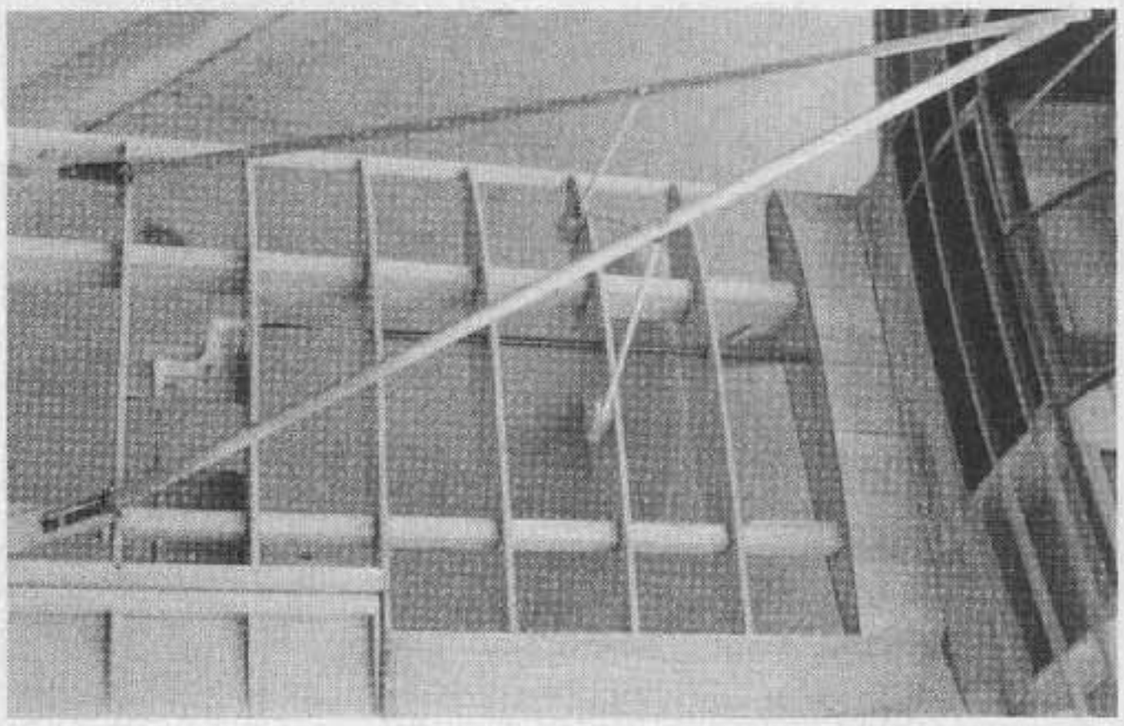
Front end details.



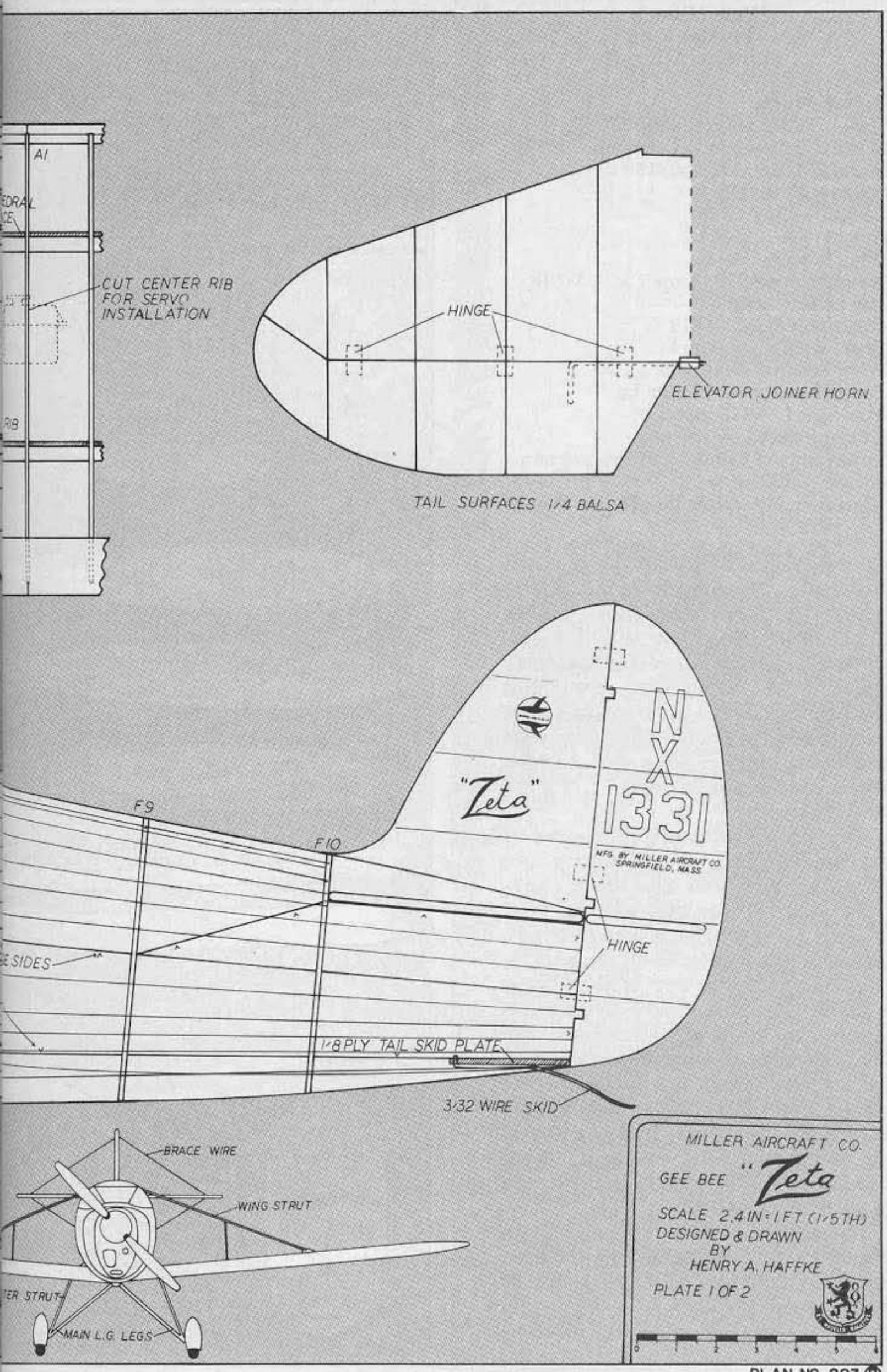
Landing gear installation.



Strut details. Note fillet construction.



Aileron control installation can be seen in this photo.



PETE MILLER'S GEE BEE ZETA

Designed By:
Henry A. Haffke
TYPE AIRCRAFT
Sport Scale (1/5)
WINGSPAN
72 Inches
WING CHORD
12 Inches
TOTAL WING AREA
820 Sq. In.
WING LOCATION
Low Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
2½ Inches
O.A. LENGTH
52 Inches
RADIO COMPARTMENT SIZE
(L) 10" X (W) 3" X (H) 3½"
STABILIZER SPAN
22 Inches
STABILIZER CHORD (inc. ele.)
7" Avg.
STABILIZER AREA
130 Sq. In.
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
12 Inches
VERTICAL FIN WIDTH (inc. rud.)
7¼" Avg.
REC. ENGINE SIZE
.60 Cu. In.
FUEL TANK SIZE
12 Ounce
LANDING GEAR
Conventional
REC. NO. RADIO CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.
BASIC MATERIALS USED

Fuselage	Balsa, Ply & Hardwood
Wing	Balsa, Ply & Hardwood
Empennage	Balsa
Wt. Ready To Fly	**140 Oz.**
Wing Loading	**26.6 Oz./Sq. Ft.**

between F-4 and F-7. Mount the wing hold-down block against F-7 and notch into the saddle doublers. This completes the fuselage structure except for the wing fillet which must be fabricated after wing is installed.

Wing:

Cut out ribs of appropriate material, test fitting spar cut-outs as you cut each rib. Make spars and trim rear spar tip as shown on drawings. Mark rib locations on spars and slide one set of ribs on spars for left panel. Support spars on a spacer block between rib C and outer rib B and between ribs A-1 to keep bottom of ribs clear of building surface. These blocks can be of any size so long as they keep bottoms of ribs above the building surface. 3/4" sq. or 3/4" x 1" would be a good size. Install bellcrank plate in ribs B-1 before gluing them on the spars. Ribs can now be glued onto the spars. Weights on the spars at the spacer block locations will assure a straight wing structure while the glue dries. Add the leading edge and the 1/2" x 1" aileron block between ribs A and C.

The wing tip is added next. Install the ply strut mount plates and the bass strut mount blocks. Glue the 1/8" trailing edge sheeting on the top of the center section but do not cut out the cut away area at this time. Install the balsa filler block between the two outboard A-1 ribs. Tack glue the 1/2" x 1" aileron leading edge to the aileron block and glue the 1/8" aileron base to the aileron leading edge. Add the top and bottom half ribs to the aileron. When the left panel is completely dry, the panel can be removed from the spacer blocks. The bottom trailing edge sheeting can now be added and the landing gear block

can be glued between ribs A-1 and A-1.

The right wing panel can now be built in the same manner as the left panel, but the right panel is assembled upside down over the plans on the spacer blocks. Make sure you install all ribs with the bottoms up on the right panel spars. The bottom trailing edge sheeting is glued in place on the right panel and the landing gear block is installed before the wing is removed from the spacer blocks.

When this structure is dry, it may be removed from the spacer blocks and the ply strut mount plates and bass strut mount blocks can be added to the top of the right panel. The top trailing edge sheeting can also be added to the structure at this time, and the balsa filler block is added between the two outboard ribs A-1. Build the aileron as in the left panel.

When this panel is completely dry, the two panels can be joined with the dihedral braces. Glue the braces in place in one panel and, when completely dry, fit the other panel in place making sure the spars, leading edge and trailing edge, all line up properly. Trim as necessary to assure a good joint. Then glue the other end of the dihedral braces to the other wing panel and support the tips in a square position until the glue is completely dry.

The center section is now sheeted with 3/32" balsa between the outboard A-1 ribs. When sheeting is completely dry, the cut-out in the trailing edge can be removed and shaped. Trim and sand the entire wing. When final sanding has been completed, the ailerons are cut free and finished. Ailerons are hinged and the actuating linkage is installed. Wing is now ready for covering.

Wing Fillet:

Using 1/8" sheet, fill in the area between the lower fuselage stringer and the wing saddle. Install a 1/16" ply wing saddle base with cross grain width-wise. This base is 2½" wide and should be installed with the wing mounted in position while the glue dries. This will assure a good wing to saddle mating. The fillet is now formed using your favorite fillet material. With wing in place, glue formers 4-A and 7-A in place on bottom of wing structure. Add the landing gear blocks to the wing center and sheet the underside area with 1/8" balsa, between 4-A and 7-A.

Landing Gear:

Bend the front and rear legs to shape using 5/32" wire. The outer strut is bent of 1/8" wire, and the fairing brace is formed of 1/16" wire. Assemble these parts installing them in the landing gear blocks and bind the parts together with copper wire and solder. Make leg fairings of balsa using two thicknesses of 1/8" balsa

Pete Miller's
Gee Bee Zeta
(Full Size Aircraft)

Power Plants
Model Z-1 Menasco B-4 (95 hp)
Model Z-2 Menasco C-4 (125 hp)
Model Z-3 Menasco C-6 (150 hp)
Span — 30 ft.
Length — 21 ft. 8 in.
Height — 6 ft. 8 in.
Wing Area — 140 ft.
Weight (Model Z-2) Empty — 1,087 lb.
Pay Load — 240 lb.
Disposable Load — 613 lb.
Gross Weight — 1700 lb.
Wing Loading — 12.1 lb. sq. ft.
Power Loading — 12.8 lb. hp
Max Speed — 145 mph
Cruising Speed — 127 mph
Initial Rate of Climb — 975 ft. per min.
Range — 590 mi.
Specs from letter from Pete Miller, Dec. 10, 1979.

sandwiched around the leg wires. Make wheel fairings of specified size balsa laminated together. Clamp laminations tightly until glue has dried completely. Carve and sand to shape. A 1/8" ply support wire mount can be imbedded in the inboard side of each fairing. 3½" wheels are used with a wheel collar on each side to hold wheel centered in fairing.

Wing Struts:

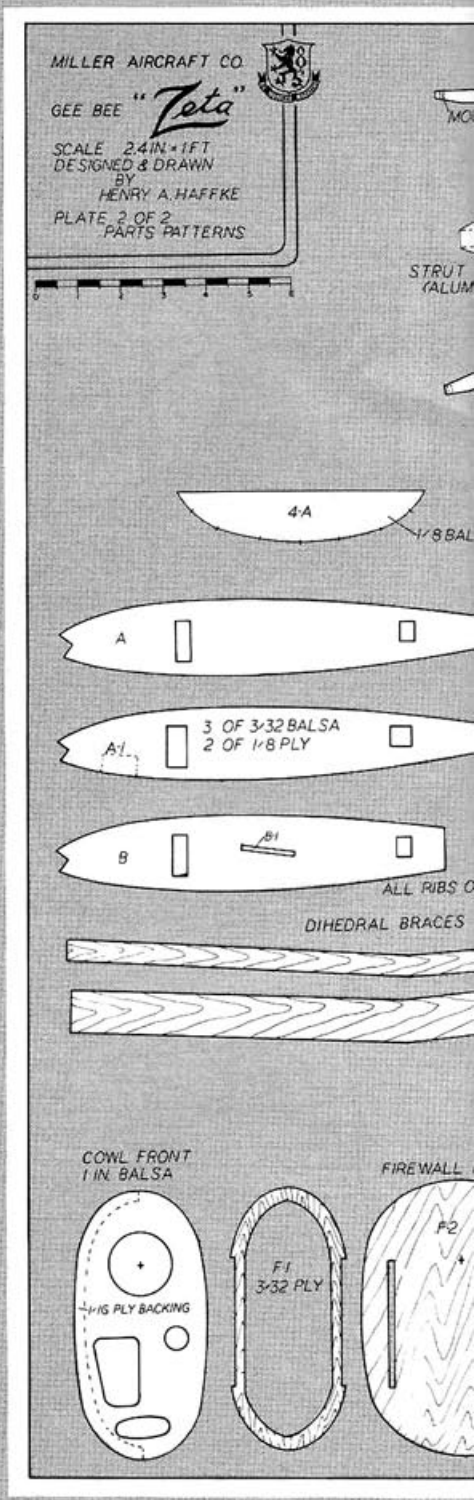
The wing struts are fabricated of streamline aluminum tubing and 3/32" wire. Epoxy the strut parts together. A length of brass or aluminum tubing across the windshield bow serves as a mount to plug in the upper end of the struts. Four strut mount brackets are made of aluminum or brass sheet and are screwed to mounting plates in wing. Lower strut ends are bolted to the strut mount brackets with the N struts plugging into drilled holes in the wing mounted bass strut mount blocks.

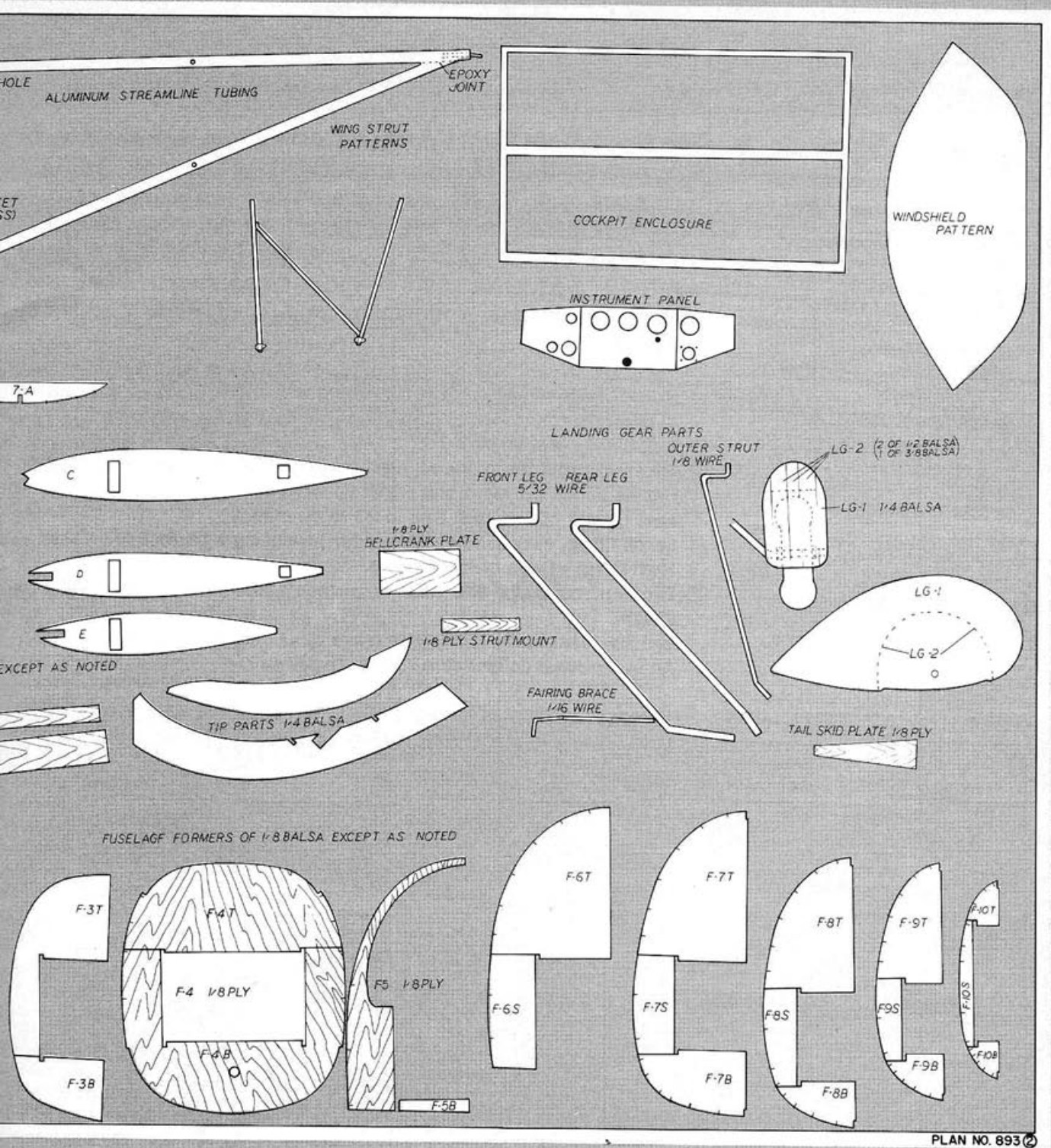
Radio Installation:

Mount servos in cockpit area with receiver and battery in forward area under windshield. Use pushrods or well-braced Ny-Rods for hook up to control surfaces, making sure all surfaces operate in the correct direction.

Finishing:

After final sanding with fine sandpaper, give the entire aircraft a coat of Balsarite and cover the model using Super Coverite. The prototype model was painted with Randolph Butyrate dope, so the following procedure was followed: Three coats of thinned (50-50) clear were brushed on the entire model. It is important to brush on these initial coats to get good adhesion. Initial coats must penetrate through the Coverite and bond to the adhesive backing for best results. Spraying these first coats will not accomplish this and you could find later that the masking may lift the base coats of finish. After the base coats are brushed on, the color coats may be sprayed with no trouble. Two coats of orange-red were sprayed on the entire aircraft and then the trim was masked off and two coats of charcoal grey were sprayed in the trim areas and registration numbers. Randolph Sunset Red was lightened with a little yellow to make the orange-red color, and white was mixed with black to get the charcoal grey color. After all markings were hand done, the entire model was sprayed





with two coats of clear. If you have done your painting at normal temperatures and humidity conditions, you should have a beautiful finished model with a very realistic looking fabric finish. If you want more of a gloss, you can rub the finish out with polishing compound.

Flying:

If your Zeta has been built with no twists in the wing and tail surfaces, and it balances where shown on the plans, it will delight you with its flying characteristics. It is a tail dragger, so the normal tail dragger procedures should be followed. Apply power smoothly, keeping a little back pressure on the elevators until it gets rolling. Then you can release the back stick pressure and let the tail come up. A little more roll on the mains and it will lift off with the slightest amount of back pressure on the stick. Once in the air, it will do anything you ask it to. Like its full scale counterpart, it is very aerobatic and will perform any of the normal aerobatic maneuvers. It handles as well inverted as it does upright. Its limitations are dictated only by the pilot's flying skill. Landings are very normal with no vices. It slows up nicely for landings so no problems should arise.

The Zeta will give you a model that will really turn heads at a gathering of modelers. It is very attractive, a little different, and practically unknown. The Zeta has been a consistent contest winner and if you will be flying yours in contests, I will be glad to assist with good documentation as I have many original photos of the craft as well as other material. Write to: Henry A. Haffke, 1038 W. Elmer Rd., Vineland, New Jersey 08360. □