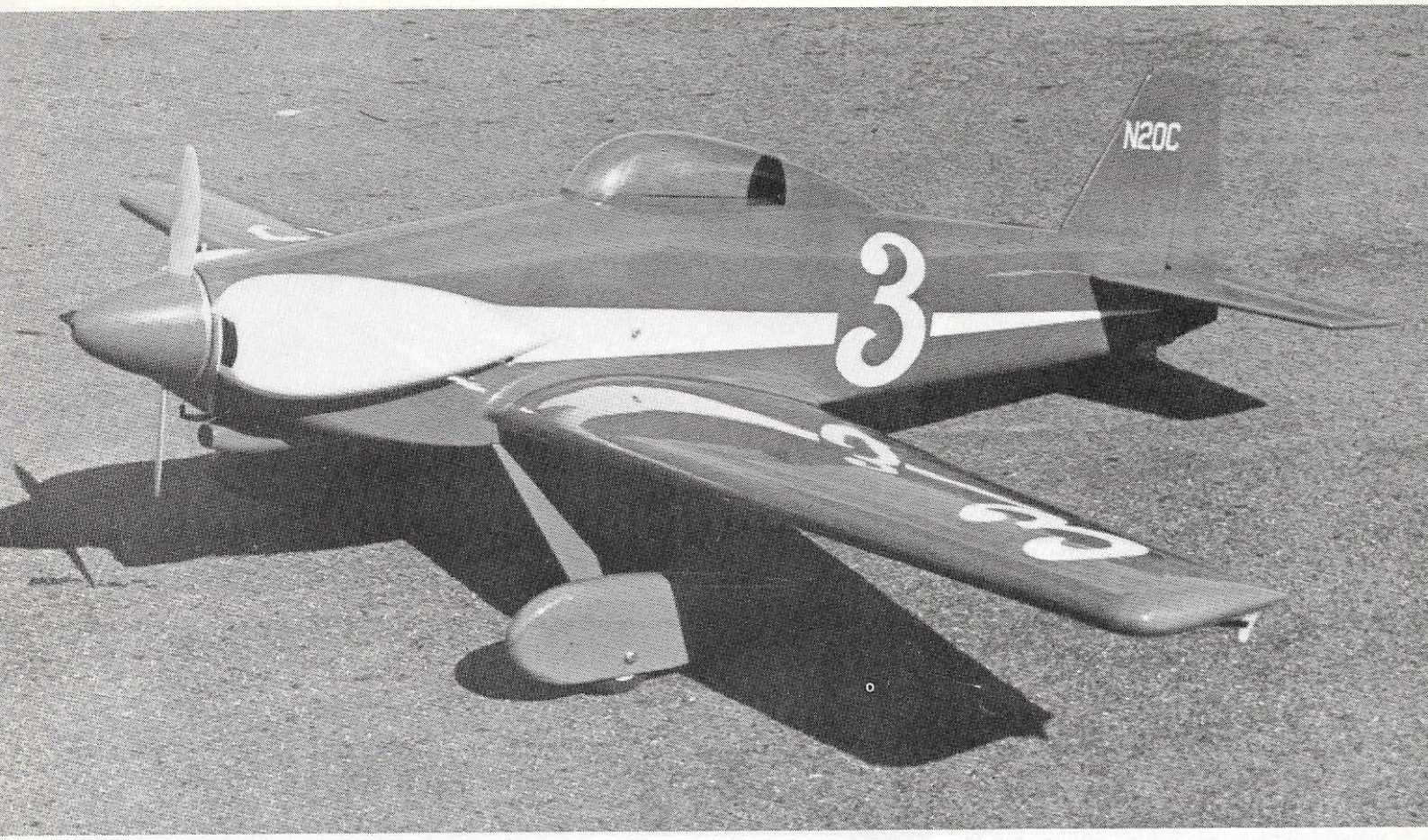
Miss Cosmic Wind



PHOTOGRAPHY: DAN REISS

Miss Cosmic Wind

This is a pylon racer that's not for pylon racing. Put .60 in this one and you've got a great and different Stand-Off Scale project for next season/**Dan Reiss**

With the advent of R/C Formula I racing, many of those pretty little Goodyear racers have been brought to the forefront once again and most of them have plenty of potential as good subjects for a sport-scale R/C ship. Their proportions are just about excellent to yield a stable and fine flying model and those cheek cowls are a natural to hide any .60 size engine with provisions for more than adequate cooling. The wide assortment of sparkling color schemes will certainly bring a few moments of critical acclaim from any scale judge's scanning eye. My interest in the Cosmic Wind was sort of initiated by a great looking Controline kit that Berkeley made during the early 50's. I was just about getting ready to build that kit when I got started in R/C and proceeded off in a different vein. Needless to say, the R/C equipment in those days barely controlled a Free-Flight much less anything of this nature, so I progressed through the excapements, reeds and finally the modern day proportional radios. All it took was going to the Reno National Air Races a few years, where the Cosmic Winds still race, and my interest was kindled once again. With the radios available and a little expertise picked up over the years, I decided it was time to make my own Cosmic Wind. So here goes!

Wing Construction

Start with the wing first. Cut out the foam cores with the supplied templates. Glue on the ¼" X ½" balsa trailing edge and sand it to shape. Use some masking tape over the foam

to protect it while you're sanding the balsa. Cut out the recess for the ¼" X 1" balsa hinge support and cement it in place. Make sure it is level with the top surface of the wing. Install the aileron bellcrank at the wing tip as shown on the plans. Make up the aileron pushrods to suit your needs and put them in place. Sheet the wing with 1/16" balsa. This is best done by making up a veneer large enough of butt joined 4" sheets to cover both the top and the bottom. Use a good grade of contact cement and wrap the skin around the leading edge, wetting it a little to soften the wood. Wilhold makes a latex contact cement that is absolutely fantastic for this use. It has a holding power that must be tested to be believed and it has an indefinite open time. Being a latex, I apply it with a roller and clean up with water later. It costs about $8 a gallon at your local lumber yard. That might sould like a lot, but you can sheet what seems like an infinite number of wings since so little of it is necessary. I've had a can around for about three years and the stuff is still as good as new. Once the wing is sheeted, trim off the excess. Cut a small slot in the wing skin at the bellcrank where the pushrod to the aileron will protrude. Temporarily locate the aileron control horn in position and bend up a Du-Bro Kwik Link and rod with a "Z" bend in it to go into the bellcrank. Check for a good fit and the correct length and make sure you can get the pushrod in and out of the bellcrank through that slot in the skin. When you are satisfied you can remove the pushrod and lay it aside until you're practically finished with the airplane. Make a mark on the bellcrank mount to indicate when the bellcrank is perpendicular to the pushrod to the aileron. Glue on the wing tips and sand them to shape.

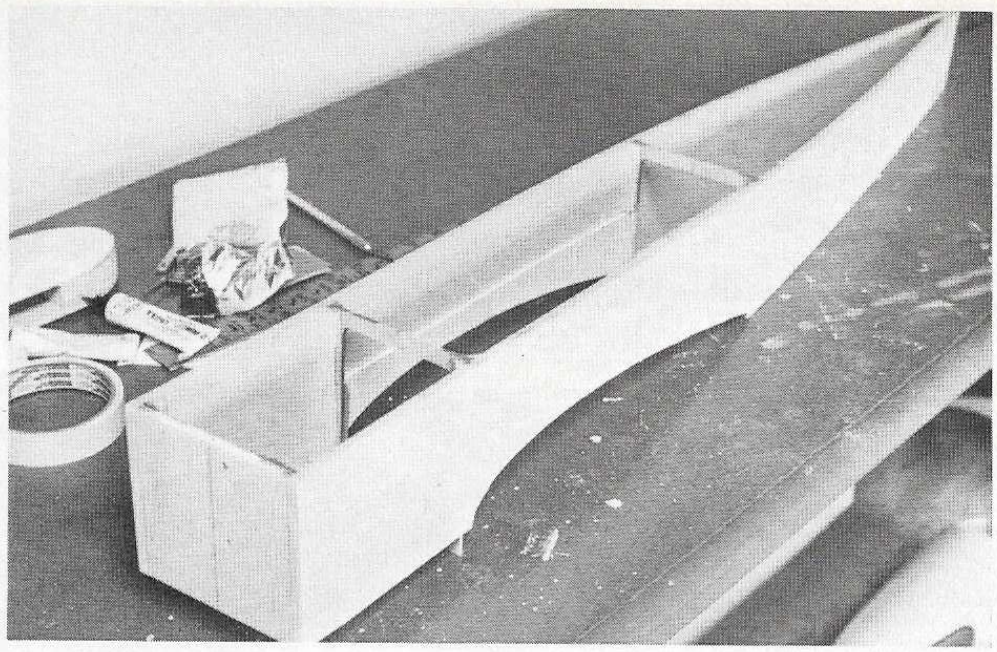
Cut out the ailerons and sheet all of the exposed edges with 1/16" sheet balsa. Check the ailerons for a proper fit, sanding them where necessary. Epoxy the ⅛" plywood aileron horn mount in place.

Make a groove along the chord line at the root of each wing panel where the ¼" diameter wing dowel will go. Epoxy the wing halves together, leaving that groove as clear as possible. Cut out the foam for the aileron servo. Epoxy in the ⅛" plywood rear wing dowel support and the servo mount. Solder the aileron pushrods together with whatever linkage you need to get to your particular servo. You can check your centering by peering through that slot by the aileron bellcrank and making sure it is lined up with the mark you previously made. Now, some work needs to be done on the fuselage.

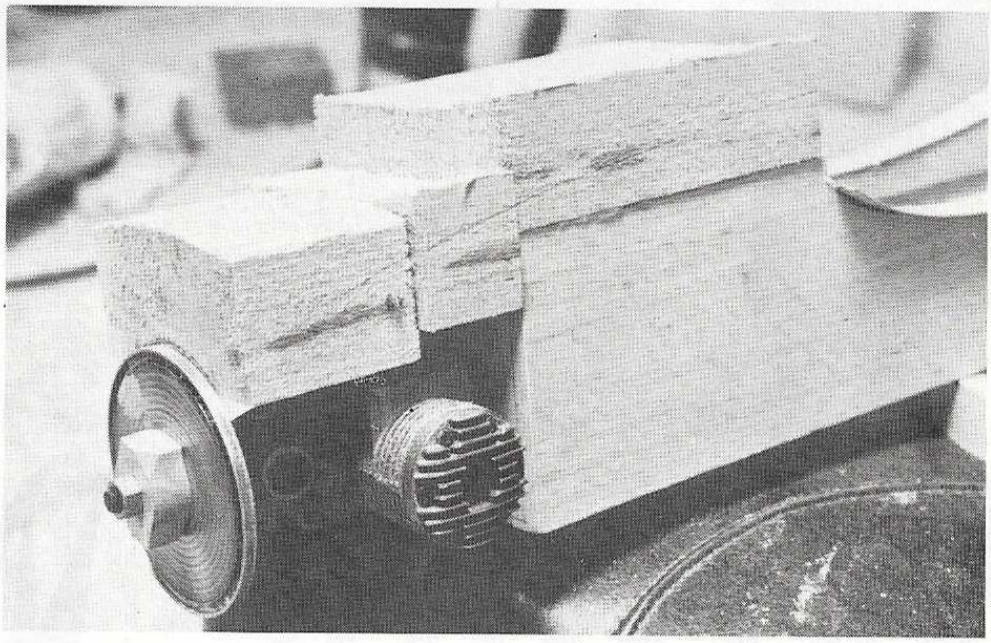
Fuselage Assembly

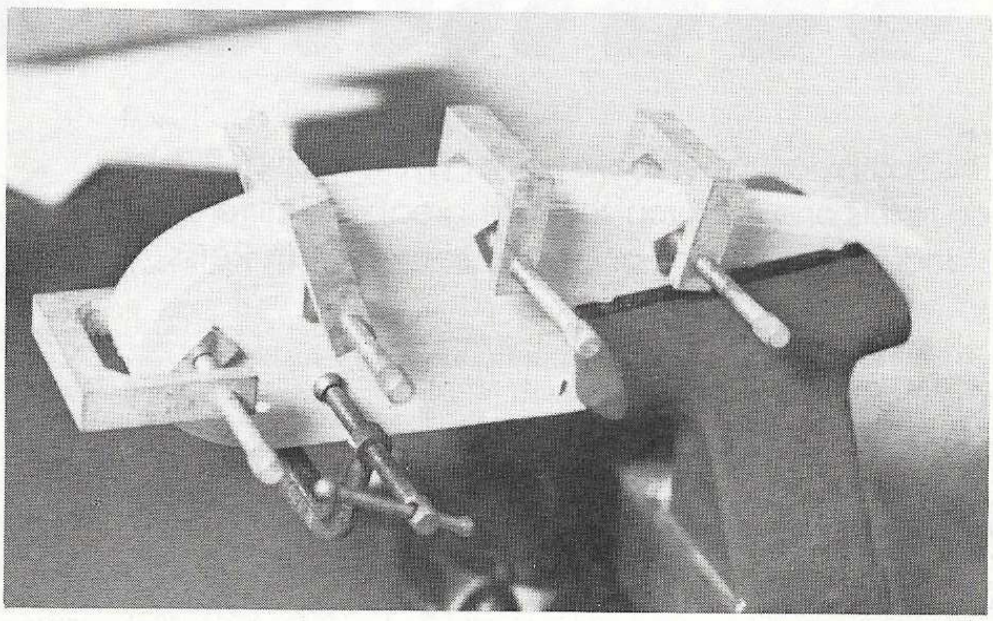
Cut the sides from ¼" sheet balsa. Although the plans don't show it, I did put in a little right thrust and some down thrust. This can be easily done by cutting the right hand side and ⅛" shorter and angling down both sides an ⅛". Glue on the ¼" and ½" triangular support pieces and the ⅛" plywood doubler. Cut out F-1 from ¼" plywood and F-2 and F-3 from ⅛" plywood. Glue the fuselage sides together, constantly checking the alignment. When dry, glue the tail end together, once again, checking the position.

Remove the center portion of the wing leading edge and trailing edge as indicated on the plans. Place it in the wing saddle and sand it and the saddle where necessary to get a good fit. Cut out the wing fillet support from 1/32" plywood with the grain running

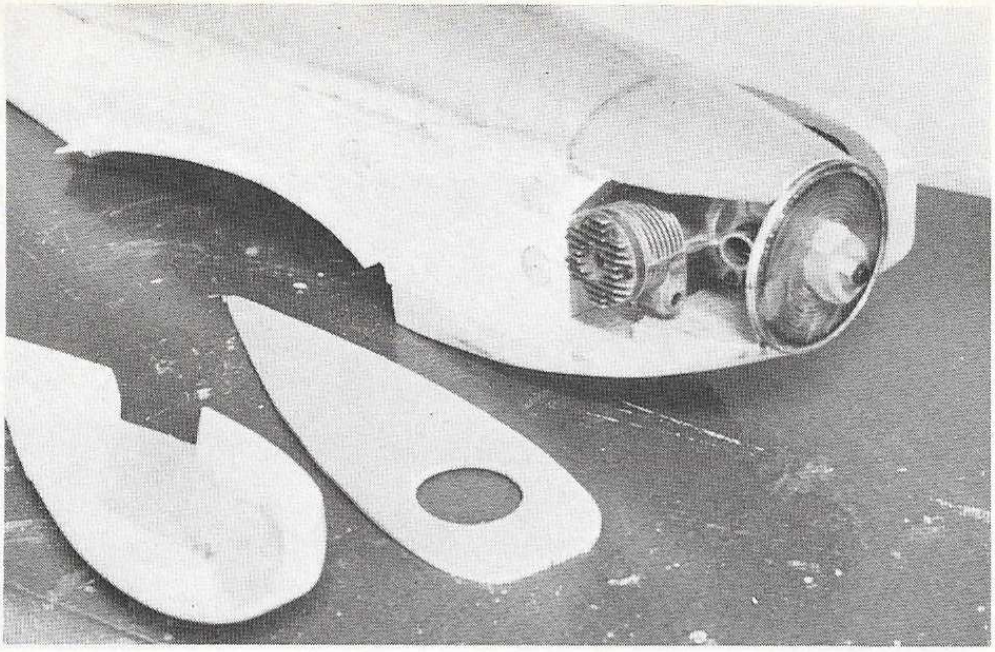


The fuselage sides and formers assembled. Try for matched sheets from the same log, they'll bend equally. **BELOW:** Blocks of balsa in position to carve up a front end. Dan uses a retired engine for the fit.

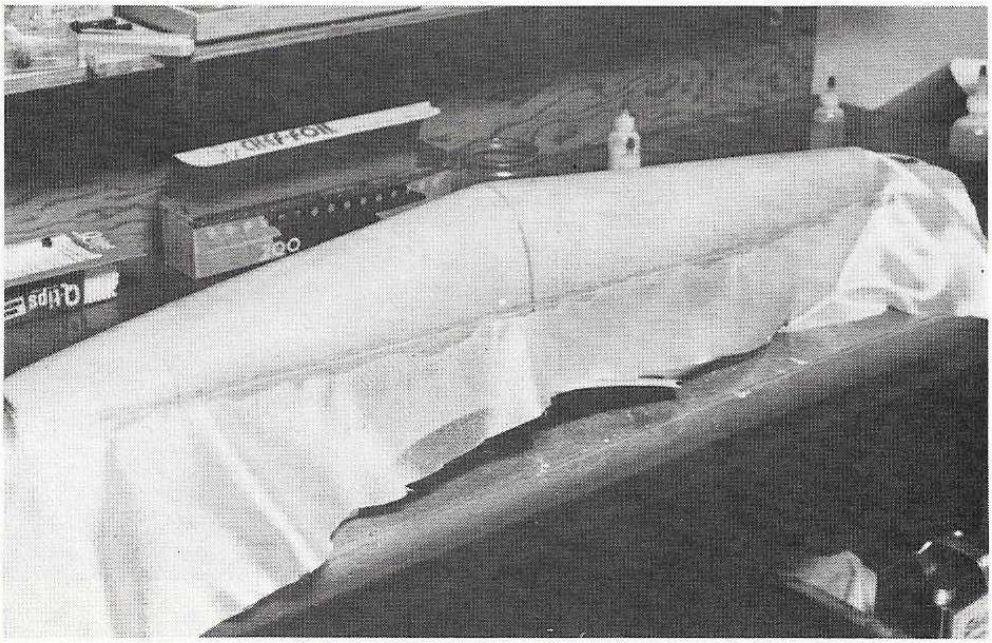


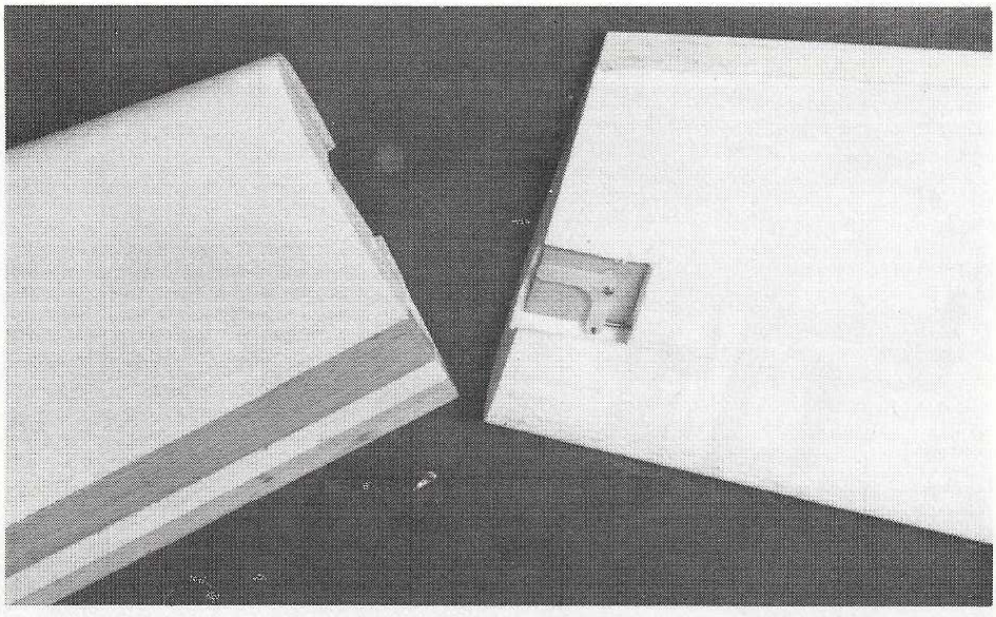


Laminating up the wheel pants. Note use of model sized "C" clamps. Or weight down with books. Your pants must not bind on the tire, try for enough inner clearance for bits of mud, debris of the field.



You're now up to the rough sanding of the forward cowling. In foreground, the right cheek cowl blocks. **Beneath:** Turtle deck is of Pro-Foam, carved and sanded to shape, then covered with 4 ounce fibreglass.





Both wing tips (top and bottom) seen with cut-out for aileron 90 degree bellcrank. Aileron in this case hasn't been cut away from the main structure. This is done after the wing is sheet covered.

perpendicular to the fuselage. Glue it in place, using the wing to mold it to shape until the glue dries. Recess the wing leading edge to receive the ⅛" front wing dowel support. Drill out the hole for the ¼" diameter wing dowel using that pre-cut groove as a guide. Epoxy in the wing dowel and the front wing dowel support. When cured, shape up the leading edge of the wing and wrap the dihedral joint with 3" fiberglass tape. Epoxy in the ⅜" X ¾" maple fuselage wing dowel support to the front of F-2. When cured, and with the wing still in position drill from the bottom of the wing through the screw blocks. Make the entry in the bottom of the wing very accurately and be sure that you are drilling perpendicular to the bottom of the wing. Use a 5/32" diameter drill for this. Open up the holes in the blocks with a 3/16" diameter drill and tap them for ¼-20 wing screws. Also open up the holes in the wing to about 5/16" diameter. Cut out the wing screw supports from ⅛" plywood and drill a ¼" diameter hole through them to provide a tight fit around your nylon wing screws. Place the wing on the fuselage again and realign it. Mount the screw supports on the screws as if they were washers. Spread epoxy on them and screw them into the blocks through the wing. Check your alignment once again and make sure it's right before the epoxy cures. When cured, remove the wing.

With the fuselage as it is, it's a good time to lay out your radio installation. I used Sullivan's Gold'N Rods for the rudder and elevator pushrods and their cable pushrod for the throttle control. The necessary support structures were utilized to interface the pushrods to my Kraft KPS-15 servos. I mounted a derelict K&B .61 engine to a Kraft radial mount and screwed this to the firewall. A Kraft 11 ounce tank was fitted and the fuel line holes drilled in the firewall and checked. After everything was checked out, I removed the servos and tank, but left in the engine to assist with the shaping of the nose. Glue on the ¼" balsa sheet fuselage bottom behind F-3 with the grain running crosswise. Cut the foam top piece to its profile view and glue it in place. Use a foam like Pro-Foam that's easy to sand and isn't attacked by any resin you plan on using later. Cut cross slots in the foam and glue in FT-1, cut from ⅛" sheet balsa, FT-2, cut from ¼" balsa and FT-3, from 1/16" balsa. Screw the spinner backplate on to the engine and block in the nose around the engine in front of F-1. Have the grain running fore and aft. Mark the spinner outline on the balsa and remove the engine if it's one you care about. Coat the inside of the fuselage between F-1 and F-2 with resin to protect it from any seepage. Add the balsa blocks forward of F-2. Mold the wing fillets from microballoons. When everything is dry, start sanding. The foam sands rather easily and if you have chosen your balsa properly that should be easy to shape also. When you're through, coat the foam with four ounce fiberglass cloth and resin. An indentation about 1/32" deep and ¼" wide cut in the balsa that borders the foam will help by recessing the cloth to the same level as the wood. Fill any imperfections in the fuselage with microballoons and sand again. One more coat of resin on the cloth will certainly help. Cut the cheek cowls from large blocks of soft balsa. The right hand one should be ⅛" thinner because of its plywood mounting. Sand them to shape. Hollow the left one for light-

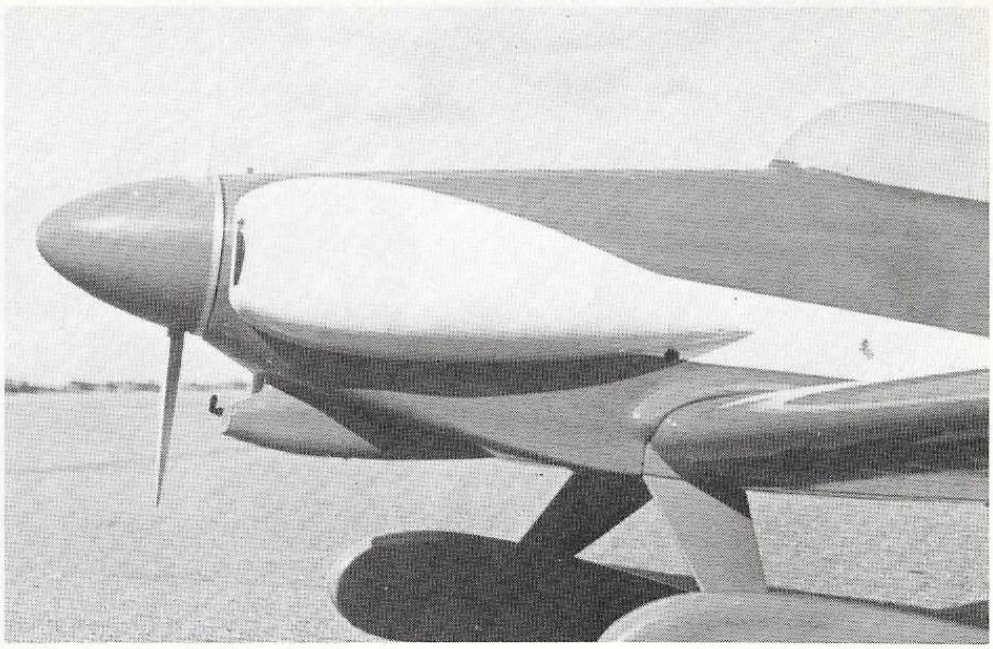
ness and the right one to allow for the flow of engine cooling air. Coat the air duct in this one with resin. Cut the ⅛" plywood cowl backing to shape and open a circle in it to receive the cylinder of your engine. Coat the inside of this piece with resin and attach it to the balsa part of the right hand cheek cowl. When cured, tack glue it to the side of the fuselage with the side that faces the fuselage and nose blocks covered with wax paper. Fill these gaps and complete all the contours with some more microballoons. When cured, sand to shape and mark the position of the firewall on the cowl plywood. Remove the cowl and cut it off completely at this line, dividing it into two pieces. Permanently glue the fixed portion to the fuselage. Epoxy four small pieces of maple motor mount wood in the four corners around the engine to act as screw mounts for the removable cowl. The best locations will be determined by your particular engine. The pieces should be flush with the removable cowl's surface. Tack glue the engine cowl to these blocks and drill through both with a 1/16" diameter drill. Open up the plywood in the cowl to clear a #4 sheet metal and the balsa to clear the screw's head. Tap the blocks with a #4 sheet metal screw and you now have one of the neatest ways around to completely enclose your engine but yet have the cowl removable for easy access. While you're at it, cut all the holes required for the glow plug, muffler mounting screws and needle valves. You might also need some for the fuel line fill and muffler pressure line. The left hand cowl gets about the same treatment, but it is just permanently attached. Microballoons are used once again to fill any gaps and to obtain the final contours. The air scoop is just sanded to shape and glued on.

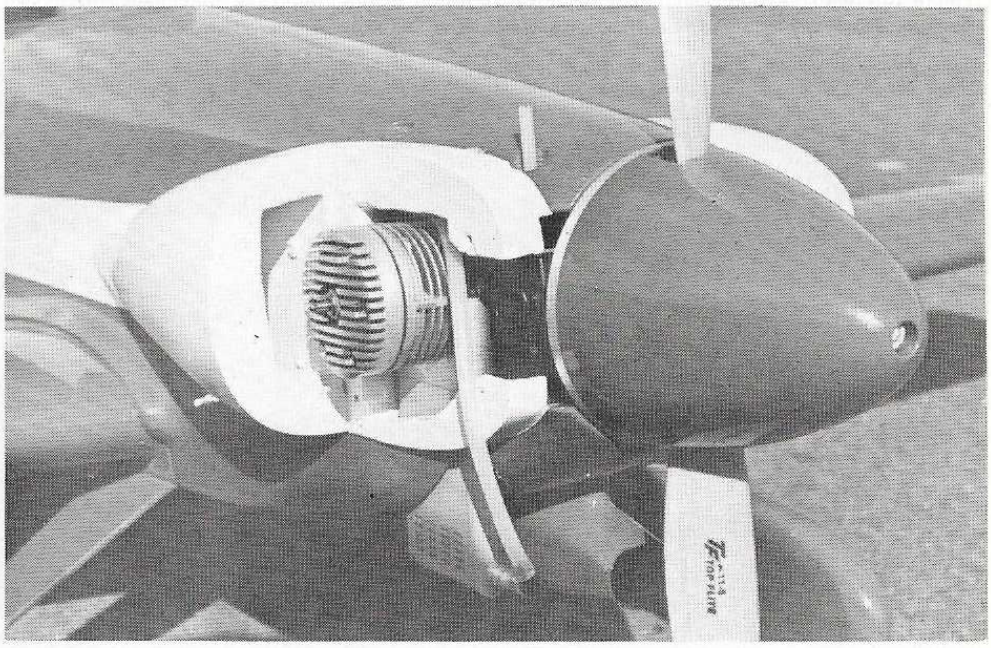
The wing needs to be finished by putting on the landing gear mounting plate. Screw the wing on to the fuselage. Make up a sanding block the width of the plate, 2½", and begin sanding a flat on the bottom of the wing where the plate is located. When you think that you just about have enough removed, tack glue the mount on and the Hallco gear. Put the plane on a flat surface and measure the distance to each wing tip. Obviously you want it to be equal to each one so aim for that as your work proceeds. When you have it right, epoxy the mount in position and, once again, use a liberal amount of microballoons to make up the difference.

Tail Structure

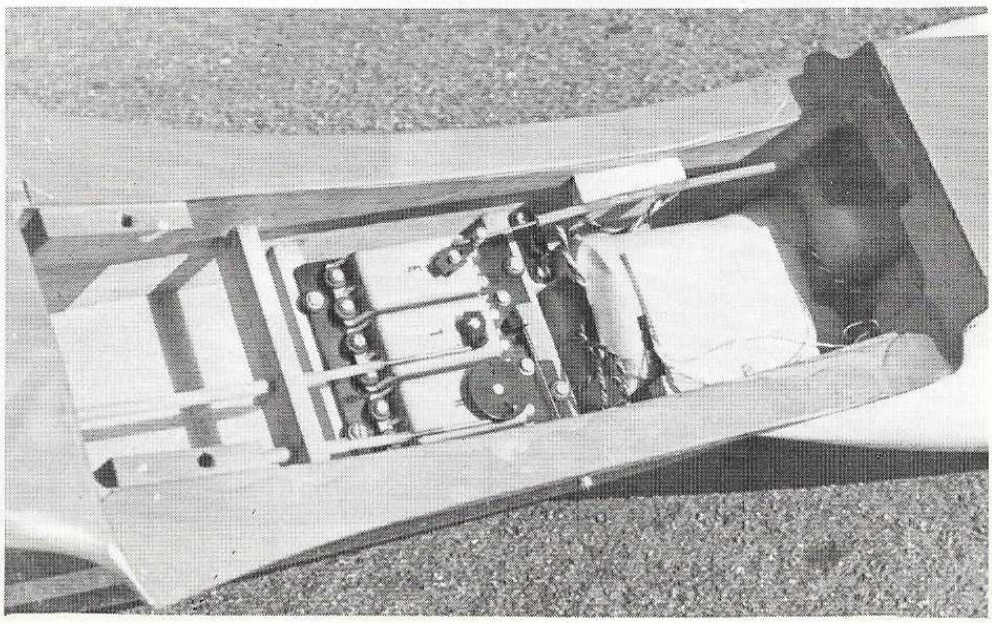
Cut out the tail surfaces from ¼" medium-hard balsa sheets. Cut the elevators in one single piece and leave them joined together until you have the ⅛" diameter wire connection epoxied in place. Sand all the pieces to a pleasant looking airfoil shape and complete the hinging process as they are. It's really easier if it's done now. Epoxy both the ⅛" plywood horn mounts in place.

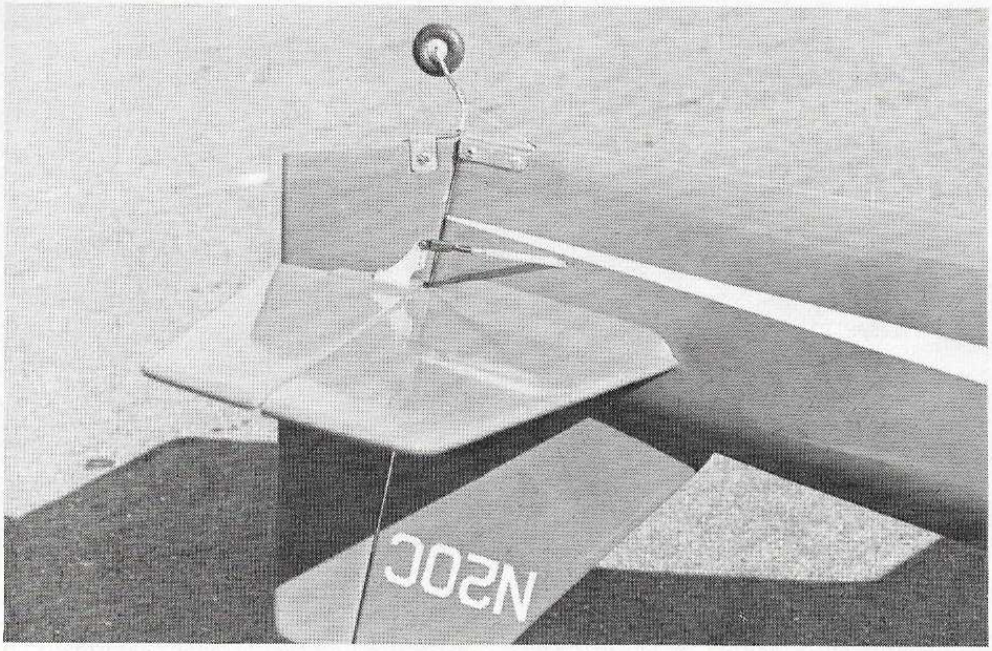
Screw the wing on to the fuselage. Epoxy the horizontal stab in place using the wing as your reference and making all the measurements from it to the stab. Epoxy on the ¼" triangular stab supports. Cut the empennage blocks from soft balsa and sand them to shape. Epoxy them to the vertical stab making sure that the stab is perpendicular to the surface it is on. Epoxy the assembly to the horizontal stab checking the alignment constantly before the epoxy cures. Fill any remaining gaps with microballoons.



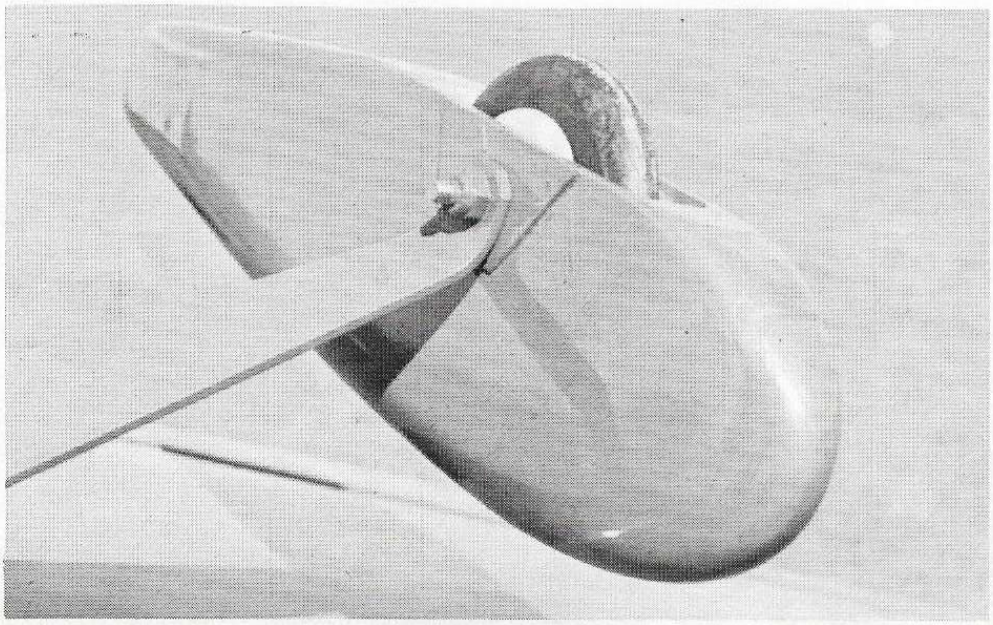


Cowl removed. Veco .61 running on pressure tap from a Slim-Line muffler. Midwest P-51 style 3½" dia. spinner. **Top photo:** Of four Cosmic Wind variations, this one is our favorite, designated "Little Toni". **At bottom:** Those are the larger Kraft KPS-15's. Battery is next to the receiver. 11 oz. Kraft tank.





Aileron hook-up at each wing tip. This is a standard feature of Dan Reiss designs. Works well with foam wings. **Top:** Tail assembly details. Royal Products metal tailwheel bracket is the most durable for heavy models. **At bottom:** Detail of the wheel pants and Hallco gear. Kraft racing type (slim profile) wheels.



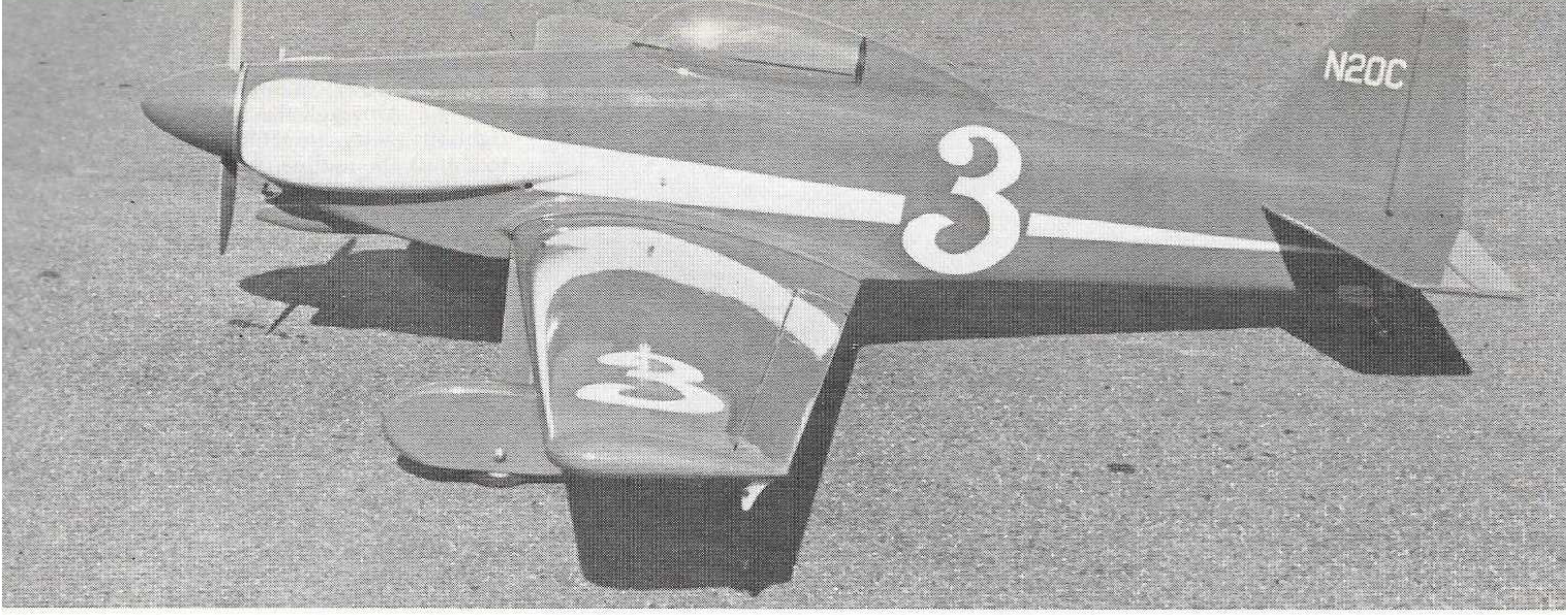
I used a Sig 14" canopy to simulate the full size one. Although the shape isn't exactly right, it's pretty close. Once you have it fitted, mark the outline on the fuselage at its location. Remove that portion of the turtle deck that's enclosed within the lines and sheet the exposed foam with 1/16" sheet balsa. Finish off the enclosed area with surfacing resin and paint it with black poster paint. Resin on the canopy holding it in place with masking tape until the resin cures. When cured, cover the entire canopy with masking tape, leaving the lower ¼" border exposed. Feather this area in to the fuselage with some more microballoons.

The wheelpants are a sandwich of 1" balsa in between two sheets of ⅛" Sig Lite Ply. Cut all the pieces to shape and glue them together. Final carving and sanding follows. The wheels themselves are Kraft Slimlines drilled out to receive the axles. The axle assemblies are soldered pieces of K&S tubing and brass sheet as shown on the plans. Care must be taken when soldering the axles together while on the wheel hubs to prevent melting the hubs. Use pieces of 1/64" plywood to act as an insulator.

Now that everything is built, it's time to make it look pretty. Go around the entire ship with lots of sandpaper and microballoons a couple of times until you're sure there isn't a rough spot left. Put on two coats of K&B Surfacing Resin, trying to make a little go a long way. Press as much of it as you can into the wood as you spread it out as far as possible. Sand these two coats with 180 aluminum oxide sandpaper. Next, spray on a coat of K&B Primer. Sand this with #220 paper. By the way, if you ever get caught short of K&B Thinner, Deft makes an excellent substitute. It is called Epoxy Reducer and is available from their chemical coatings division in Irvine, California at about $5 per gallon. Once the primer is on you can complete the hinging of the surfaces. Next, comes the color. There were four Cosmic Winds built, I think. Little Toni, Minnow, Ballerina and Miss Cosmic Wind numbered 3, 4, 5, and 6, respectively. For some reason Little Toni has always been my favorite so I chose that color scheme. It was red with cream trim. I'm not too sure what the others were so I won't speculate. I sprayed on a coat of K&B Red. I didn't feel like going to the trouble of mixing a cream color so I used white for the trim. This wasn't such a bad idea as it gave me the opportunity to use Sig's solid white decal sheets to cut out all of the numbers and letters. Otherwise, had I used a cream color, a rather tedious masking job would have been in order. I didn't have the expertise to free hand the "Little Toni" on the fuselage nor the "Cosmic Wind" on the vertical stab so I left them off.

The Last Details

Not much more left to do but install your radio, engine and various pieces of hardware. A lot of models have been "crashed" even before they have gotten off the ground just because of a poor radio installation. Follow the manufacturer's directions to a "T" and you'll never regret it. My Kraft airborne unit fit in with plenty of room to spare so I made liberal use of foam and routed all my wires as neatly as possible. During the first flight I discovered a couple of things. First, the wheelpants didn't stay in position but rotated around the screw holding them on. I had thought that the friction provided by the compression fit against the



axles would hold them steady but it didn't. Pieces of snadpaper fitted here and there didn't help either so I had to resort to that spring. I is bent from .047 dia. piano wire and secured by an additional nut on the axle screw. About ½" of penetration is required into the wheelpant at the end of the spring with a right hand bend and a left hand bend depending on the side it is on. The second item was that the landing gear had a bit more spring in it than desired for an airplane of this size and weight. If I didn't kiss the plane on to the ground just right, a violent series of bounces would result. This was cured by installing a crossbrace from one side of the landing gear to the other at the position shown on the plans. I had to bend up a couple of aluminum tabs to secure the crossbrace to the gear. The crossbrace was made up from a couple of Du-Bro Kwik Links.

Flying Notes

Finally, the moment of truth has come. Start up the engine and taxi her out. Line up into the wind and hit the throttle. The tail will lift immediately and it might take a little bit of backpressure to keep her level. You'll find that it will require very little rudder correction to keep her tracking straight. Once you have enough speed lift her off and climb gently to altitude. If you have built her straight and have the C.G. as shown, the plane should fly practically "hands off". Mine flew "right off the board" and handles like a dream. It's performance is almost like a pattern ship with myself being the limiting factor. Don't be afraid to really wring her out on the first flight as the plane has virtually no bad habits and is inherently stable. Landings are a breeze. Although the plane has a high wing loading, over 30 ounces per square foot, its stability and ease of handling convert this potentially tedious moment into one of pleasure. With a 5 to 10 mile per hour wind you can land this plane at practically a stand still and yet controll her all the way to touch down.

If I sound overly enthusiastic, I'm not! The plan is just that great to fly. I find myself playing "Goodyear Racer", racing around imaginary pylons just for the fun of it. Although the plane isn't fast, it's no slouch. If some of the fellows at the field had a couple of these all jazzed up in different colors I'm sure it would be a gas racing each other. I hope you'll have as much fun with yours.