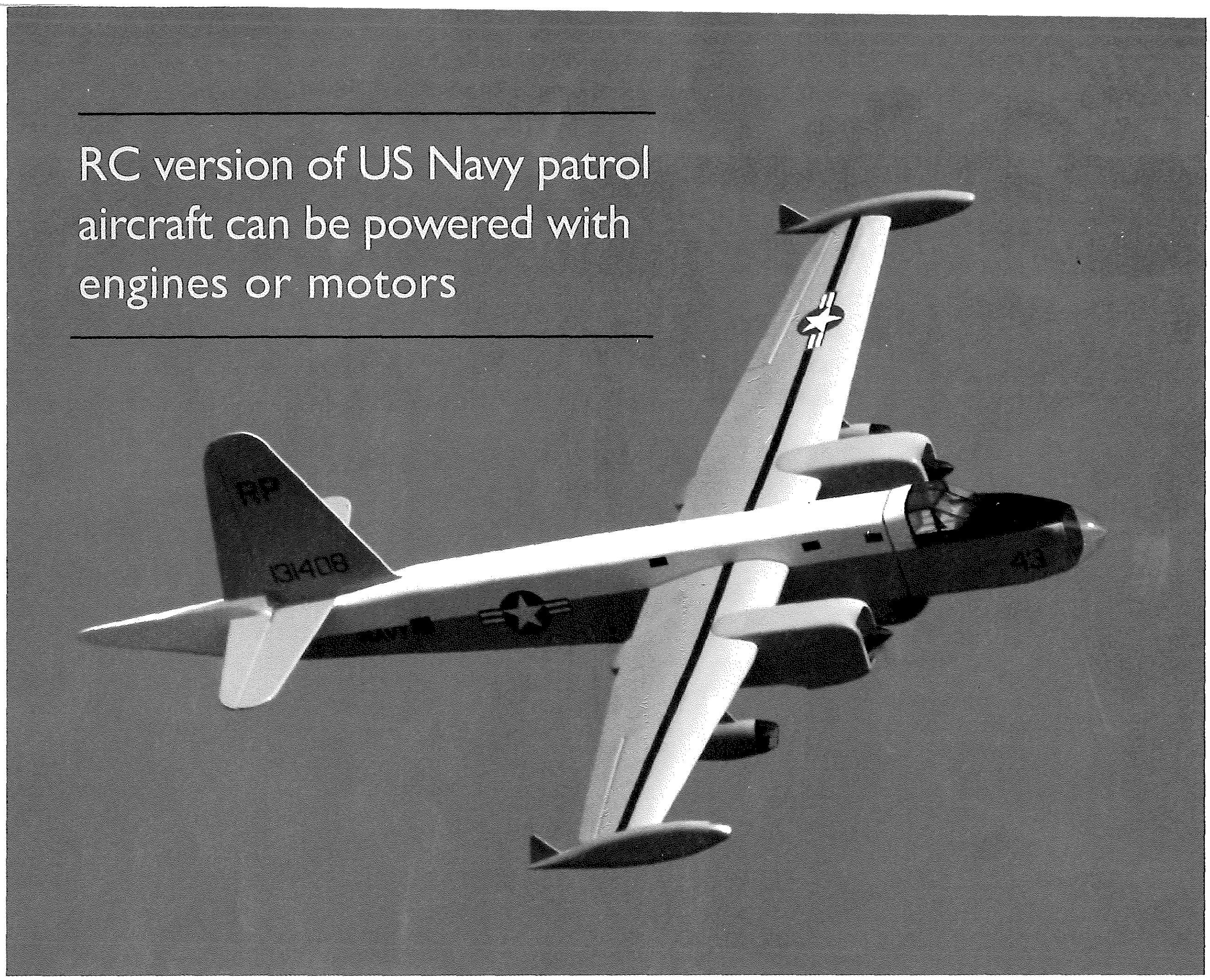


Lockheed P2V Neptune

by Gary Fuller

DURING THE FIRST part of the Cold War, the P2V Neptune was the US Navy's primary long-range, land-based, antisubmarine patrol aircraft. Designed in 1944 as a replacement for the PV-1 Ventura and the PV-2 Harpoon, the Neptune's versatility ensured that it would remain in service for a long time. Its last use in combat was by the Argentineans against the British during the fight over the Falkland Islands.

The Neptune is still being used, to fight forest fires in the United States. With the installation of a mad boom on the tail, the addition of a pair of jet engines, and many other minor modifications, the later versions of the Neptune bore little resemblance to the early production P2Vs.

I have always had a soft spot in my heart for historical airplanes that are seldom modeled. The Neptune's straightforward lines ensure a good-flying model, yet the mad boom, radomes, jet engines, and various other components give it considerable character that would make it unique at the flying field.

I didn't want an all-out competition-quality Scale model, so to simplify it I used an easy-to-build box type of fuselage that is not much different from what most trainer-type aircraft have. The engine nacelles are also the box type, with the bottom left open so you don't have to mess with any finicky landing-gear doors. The nacelles are glued to the wing with some glass cloth for reinforcement.

The inboard section of the wing is fully sheeted and the outboard section of the wing uses typical D-tube construction. The jet engines and wingtip fuel tanks are balsa blocks carved and sanded to shape. The wing is mounted to the fuselage with a joiner tube so the model can be disassembled for transport to and from the flying field.

I wanted to make the Neptune as large as possible yet economical to build and fly, so I decided to build it with an 80-inch wingspan. Power was to be a pair of O.S. .25 engines, but I was bitten by the electric bug during the time I was building the model.

While researching motors for a future project, I realized that I could easily mount electric power plants to my Neptune with no major rework. I was in the process of covering the airplane when I decided to make the change to electric power!

I used a pair of MaxCim MaxN32-13Y motors direct drive spinning APC 10 x 5E propellers. The motor controllers are MaxCim Maxμ35D-21. I used 2000 mAh Kokam Li-Poly batteries wired 3S2P, for a total of 11.1 volts and 4000 mAh for each motor. That easily gave me a flight time exceeding 10 minutes with the motors throttled back and more than adequate power to take off from a grass field.

The retractable gear is the standard size, and normal modeling techniques are used to build the Neptune. If you have never built a model from plans, this should not be too difficult—especially if you have a few kits under your belt.

Since this is not really a beginner's airplane, I won't go into much detail in the construction notes. I did not take any great pains to keep the weight down on my Neptune, I did not use contest-grade balsa, nor did I cut lightening holes in any of the sheet balsa. However, I am quite sure that if you used contest-grade wood and other weight-saving techniques, you could shave some weight from your Neptune.

CONSTRUCTION

I started my model by cutting all the parts and assembling them like a kit. If you have never built from plans, I recommend the following.

To accurately cut the small parts from wood, cut the parts from the plans and then lightly spray the backside of a paper cutout with contact glue. When it has dried for approximately 10 minutes, to a light tack, place the paper shape for the part on the wood, and then cut the wood using a band saw or a jigsaw. Remove the paper after you have cut the part.

To cut more than one of the same part, do the same thing as in the preceding and then lightly spray both sides of some scrap paper with contact glue. Sandwich this paper between as many sheets of wood as necessary for the number of parts required. Cut the stack of wood with a band saw or jigsaw. Once the stack is cut, separate each piece and remove the paper.

If you have never done this, try it on scrap wood and paper first. I have found that some brands of contact glue won't work because they are too tacky. I use carpet and headliner glue that comes in a spray can and is available in auto-part stores. A good alternative is Elmer's school glue stick; it works as well without the mess.

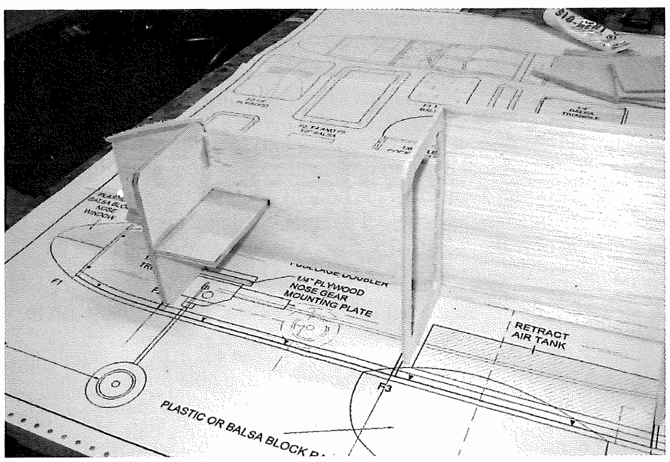
Fuselage: The fuselage sides are too long and wide to cut from a single sheet of balsa, so you will need to splice some sheets together. I like to have the vertical splice where the wing doubler will reinforce the joint. Be careful with the sides until the doublers are installed. I like to lay the fuselage sides next to each other top to top as I glue on the various parts; that way I won't make two left or two right sides.

Start the fuselage by gluing the 1/4 balsa triangle stock to the sides as shown on the plans. Glue the doublers for the wing and forward fuselage to the fuselage sides. Glue formers F2 through F5 to one fuselage side, and then glue the nose-wheel mounting plate to F2 and the side to which F2 is glued.

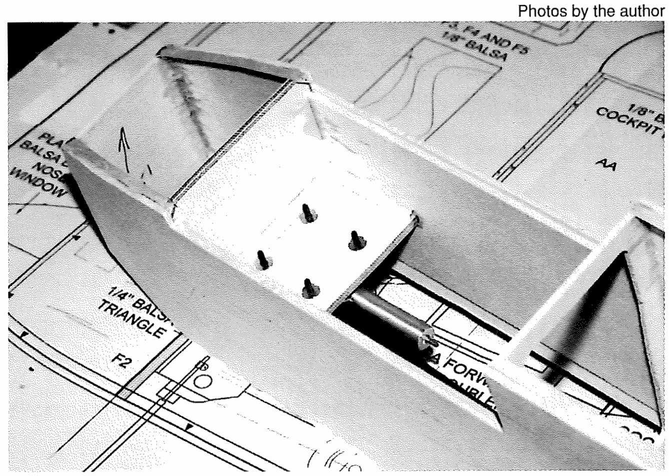
Glue the 1/4 x 3/8 balsa side stiffeners in place as shown on the plans. Once the adhesive has dried, join the fuselage sides. I did this by standing the side with the formers up on its bottom and then placing the other side in place. Once I was satisfied with the fit of the other side, I glued it to the formers.

I joined the forward end of the fuselage by weighting the fuselage to the table and then using some clamps to draw the ends together until former F1 would fit. I checked the alignment of the fuselage and

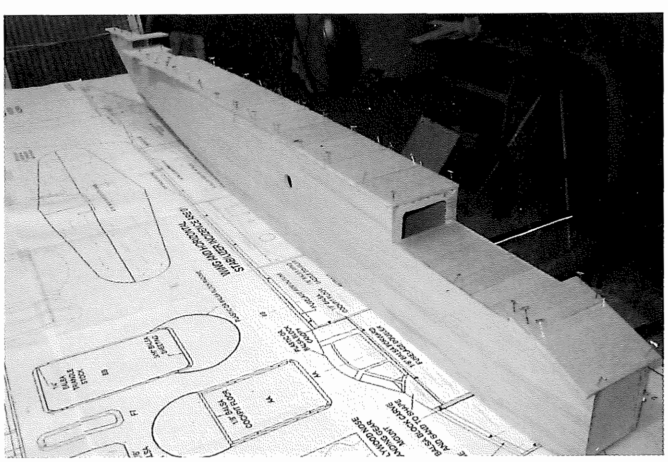
Photos by the author



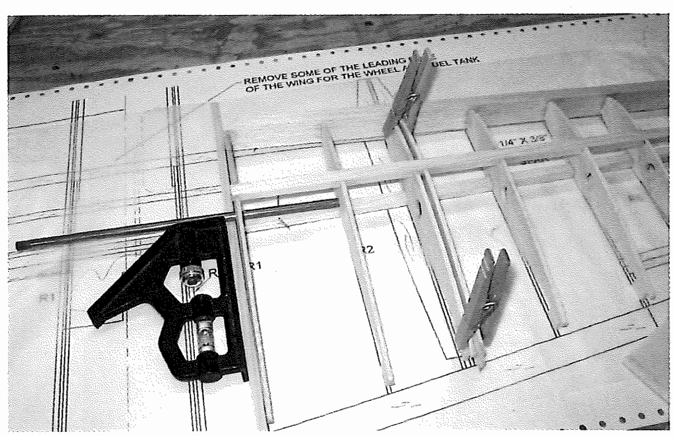
On right fuselage side you can see 1/4 balsa triangle stock, forward fuselage doubler, formers F2 and F3, and nose-wheel mounting plate installed.



Forward fuselage after joining the sides. This is a good time to mount nose gear. Nose-wheel mount has been reinforced with 1/4 balsa triangle stock.



Upper fuselage sheeting is being installed. Author used Ambroid glue here so the glue joint will be easier to sand when shaping top of sheeting. Many T-pins hold sheeting in place as glue dries.



Carpenter's square and sharpened brass tube are used to cut slot for 1/4 plywood dihedral brace. One of R3 ribs has been glued to spars using R3 angle guide; other R3 rib is being glued to spar using 1/8 scrap wood to set distance between them.

adjusted until it was straight, and then I glued F1 in place. I joined the aft end of the fuselage in the same manner.

Glue the 1/4 balsa triangle to the nose-gear mount as shown on the plans. Mount the nose gear to its mounting plate with 4-40 screws and blind nuts. Glue the 1/8 plywood hatch mounting plate in place as shown on the plans. Install the 1/8-inch cockpit floor.

Sheet the top and bottom of the fuselage with 3/16 balsa, glued on so that the wood grain is crosswise to the fuselage sides. Set the fuselage aside.

Wing: Pin the 3/8 x 1/4 lower inboard spruce spar to your worktable. Glue an end cap of 3/32 balsa scrap on the outboard end of the wing-joiner socket tubes. Glue the 1/4 plywood doublers to R1B. After the glue has dried on the cap, slide the R1 ribs and R1B rib into place on the wing-joiner tube socket; don't glue the ribs to the joiner socket yet.

Space the ribs on the tube, place them on the lower inboard spruce spar, and glue them to the spar. Glue the ribs R1C to the spar, and make sure the ribs are perpendicular to the spar vertically and longitudinally. Insert the forward 1/4 square spruce spars and the upper 3/8 x 1/4 spruce spar, and glue the ribs to the spars.

Glue the 3/8 balsa LE to this part of the wing. Sand the inboard

Lockheed P2V Neptune

Type: RC Sport Scale

Wingspan: 80 inches

Wing area: 622 square inches

Flying weight: 10 pounds

Wing loading: 37 ounces/square foot

Length: 73.25 inches

Power: Two .25 glow engines or two MaxCim MaxN32-13Y direct-drive motors

Fuel tank: Two 6-ounce Sullivan slant tanks (glow)

Battery: 11.1-volt 4000 mAh Li-Poly (for electric version)

Radio system: Five channels

Construction: Balsa and plywood

Covering/finish: MonoKote, LustreKote paint

spars and the LE flush with the outermost R1C rib.

You will need to cut the R1C ribs for the 1/4 plywood dihedral brace, I did this by using a 1/4-inch-outside-diameter brass tube that was sharpened at one end. I used the tube to cut holes in the R1C rib at the dihedral brace's location, using a carpenter square as a guide.

After the holes were cut, I used a file to finish the slot in the ribs for the dihedral brace. Glue the dihedral brace to the ribs and the spa after you are satisfied with the fit.

Carefully pull the wing-joiner socket tube from the wing and rou it up with 80-grit sandpaper. Reinsert the socket tube in the wing an glue it to the ribs. Glue some scrap balsa between the socket tube an the 3/8 x 1/4 spars. Sheet the top of the inboard section with 3/32 balsa.

Once the glue for the sheeting has dried, remove the inboard portion of the wing and set it aside.

Start the outboard section of the wing by pinning the lower outboard 3/8 x 1/4 spruce spar to the plans. Glue the R2 and R4 throu R10 ribs to the spar. Position the R1 and R3 ribs on the spar, but do not glue them in place yet. Place the upper 3/8 x 1/4 spruce spar on th ribs and glue it to the R2 and R4 through R10 ribs. Also glue the 3/8 balsa LE to these ribs.

Using the R1 rib angle guide, glue rib R1 to the upper and lower spar and the LE edge. Using the R3 rib angle guide, adhere one R3 r to the spars and LE. Use scrap 1/8 balsa as a spacer between the R3 ribs, and glue the other R3 rib to the spars and LE. Glue the 1/4 balsa TE to ribs R5 through R10.

Sand the spars and the LE flush with R1, and then, using the sam method you used for the inboard section of the wing, cut the slot for the 1/4 plywood dihedral brace in ribs R1 and R2. Sheet the top of th outer wing with 3/32 balsa, as shown on the plans.

When the sheeting is dry, remove the outer section from the building board and fit it to the inboard section of the wing. Once you are satisfied with the fit, glue the outer wing section to the inboard section. I used a wood block to prop up the wingtip while the glue dried.

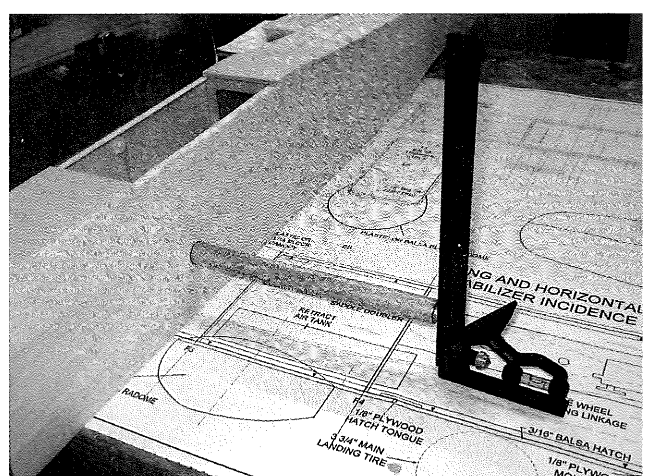
Sheet the bottom of the wing with 3/32 balsa. The inboard section and the outboard section are done separately, and the part that is not being sheeted is blocked up to prevent the wing from warping.

I tried to sheet as much of the bottom of the wing without cutting off the building tabs as I could. I did that by gluing the edge of the L sheeting to only the 3/8 balsa LE first. After the glue dried, I wet the sheeting to make it easier to bend, applied glue to the ribs, and then placed the wing back on the worktable right-side up and weighted it until the sheeting dried.

Once the wing is sheeted, glue the 1/4 balsa TE in place, and then sand the LE and TE to match the airfoil. Drill a hole for the 3/8-inch-diameter antirotation pin, and glue the antirotation pin in place. Drill and tap the hole for the 1/4 x 20 nylon wing-mounting bolt.

Repeat this whole process for the other wing. Build the ailerons.

Final Assembly: Go back and align and install the wing-joiner tub



Make both ends of wing-joiner tube same height above table wing will be square to fuselage from the top.

socket in the fuselage. Flip the fuselage upside down on the worktable and secure it so it won't move. Glue one of the 1/8 plywood joiner doublers inside one side of the fuselage.

Rough up the outside of the joiner tube socket with some sandpaper, and insert the socket into the fuselage. Slip the other 1/8 plywood joiner doubler onto the socket as you insert it into the fuselage, but don't glue the socket or the doubler to the fuselage yet.

Insert the joiner tube into the socket so it is centered in the fuselage and an equal length of the tube extends out of the fuselage on either side. Measure the ends of the joiner tube to the worktable. Sand the hole in the fuselage that does not have the plywood doubler on it so that both ends of the joiner are an equal height above the work surface. Use a carpenter's square to square the joiner tube to the fuselage sides also by sanding the hole without the doubler.

When you are satisfied that the joiner tube is square to the fuselage side, block the joiner tube so that it cannot move, and then double-check to make sure the joiner tubes' ends are an equal height above the work surface. Glue the plywood doubler and the joiner tube socket to the fuselage side. Glue the other end of the joiner socket to the other side of the fuselage.

The wing-joiner tube I bought was too long for the wings, so I ended up cutting approximately 6 inches from it. I set this short piece aside; it will be used to align the wings to each other as the nacelles are mounted.

Slide the wings on the wing-joiner tube so that they fit snugly up against the fuselage sides. Adjust the wing so that it is at 0°. Place the 1/8 plywood doubler on the antirotation pin and carefully adhere the doubler to the fuselage side, being careful not to get any glue on the antirotation pin. Use the same technique to glue the 1/8 plywood wing-mount bolt doubler to the fuselage side.

The engine nacelles are identical to each other except for the landing-gear mounts. The nacelles are built like the fuselage, so I won't go into detail about the method used to construct them. Just make sure that you build a left and a right one.

The method I used to align and mount the nacelles to the wings should work if you plan to use electric or glow power. Because I decided to go electric after my Neptune was nearly completed, I will describe the method using glow engines.

You will need a roughly 3-foot section of aluminum angle, which you can get in most hardware stores. It is used to hold the engines in alignment with each other when you mount the nacelles to the wings. Cut off approximately a 6-inch piece of the aluminum angle.

Mount both wings to the short scrap piece of the wing-joiner tube. Slide the wings together as close as you can without letting the antirotation pins interfere with each other. Clamp the 6-inch angle to both wings' TEs to keep the TEs aligned to each other.

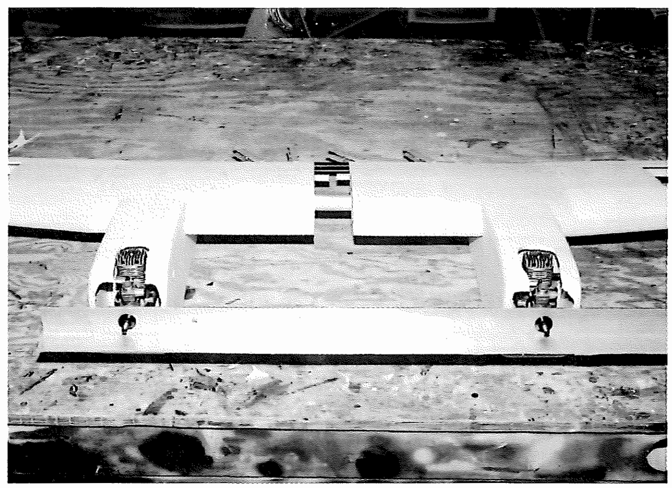
On the finished model, the centerlines of the nacelles are 8 5/16 inches from the sides of the fuselage. Because the fuselage will interfere with this method of mounting the nacelles, you will need to compensate for the absence of the fuselage.

Measure the gap between the root ribs of the left and right wing, and then add that amount to the 16 5/8-inch measurement. If the gap is 2 inches, the total will be 18 5/8 inches. On your aluminum angle drill two holes on center 18 5/8 inches apart. The diameter of the holes will need to fit the prop shaft of the engines or motors you plan to use.

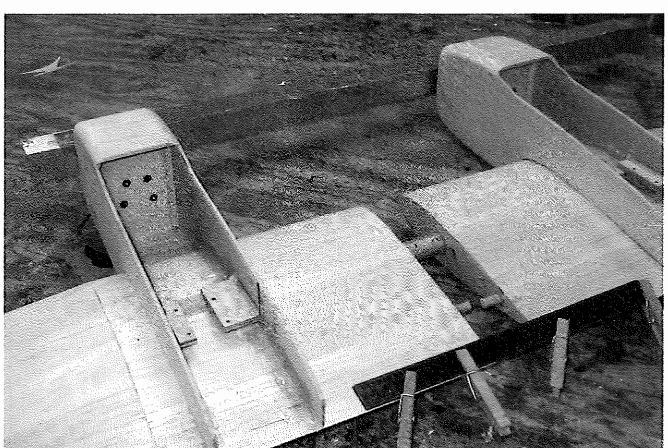
Mount the engines to the nacelles, and then, using the prop shaft of each engine, bolt the engines to the aluminum angle in the holes you drilled. At this point the engines are aligned to each other. This is important. The nacelles don't really need to be aligned to each other, but the engine thrustlines do.

Place the wing in the wing saddle of the nacelles, and adjust the wing in the saddles so that the inside side of the nacelles are approximately 6 9/16 inches from the edge of the wing root. Do not adjust the gap between the wings. If you measured accurately, both nacelles should be that length from the root rib.

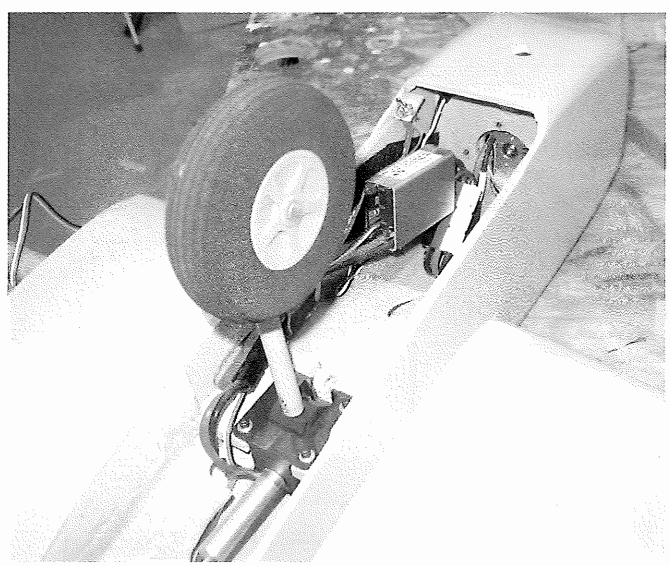
Measure the distance from the wing LE to the aluminum angle at the dihedral break on both wings. Adjust this distance so that the measurement is the same on both wings. Check the engine upthrust/downthrust line in relationship to the wing's incidence with an incidence meter, and sand the nacelles' saddles so that the thrustline is 0°.



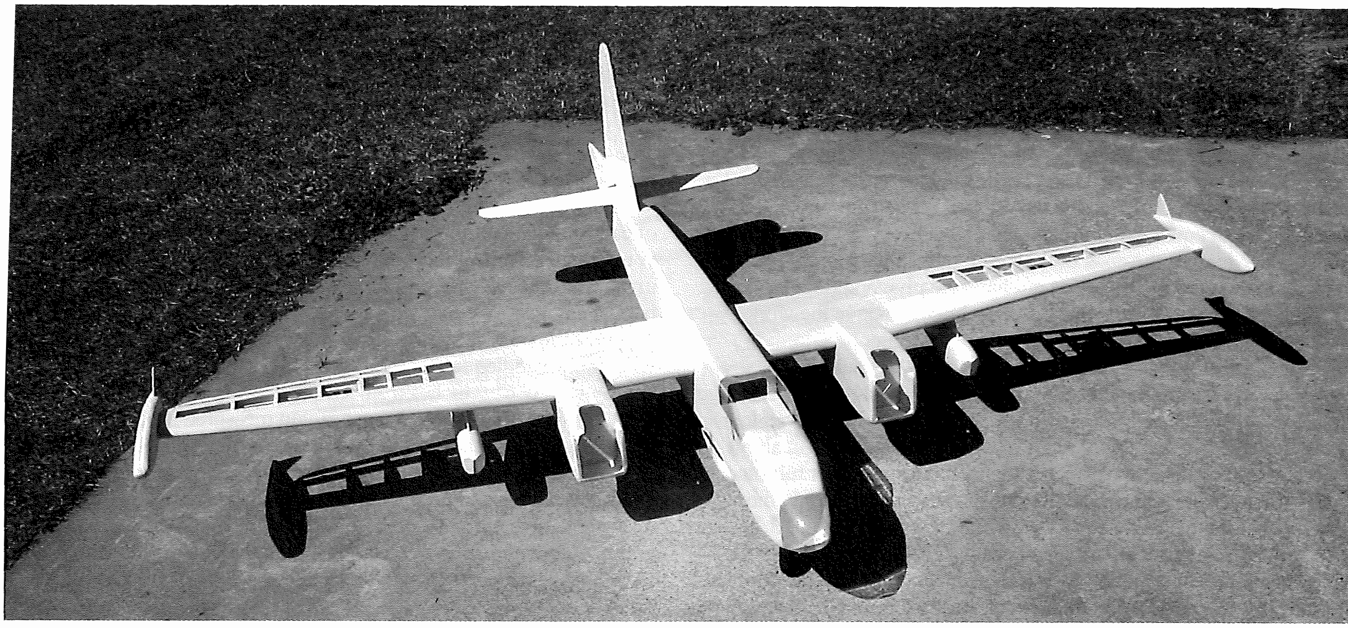
Aluminum angle bracket is used to hold engine nacelles in alignment to each other while nacelles are glued to wing.



Clothespins hold TE to 12-inch steel rule to keep them aligned to each other while nacelles are being fitted to wing.



Engine nacelles are built in same manner as fuselage. For simplicity's sake there are no gear doors. Bottoms of nacelles are left open.



The P2V Neptune's completed framework is ready for covering. This model features extremely clean workmanship!

Full-Size Plans Available—see page 183