

Martin P4M-1



MERCATOR

By FRANK LASHEK and CAL SMITH

This Navy patrol bomber scales down into a fairly simple twin-engine control liner

■ A little-publicized phase of Naval operations is long-range patrol work. The smaller fighters and anti-submarine attackers may have more roar and zoom, but prominent in the background is the big solid patrol plane. It's not the fastest aircraft in the Navy but it can fly for hours on end through all kinds of weather to seek out and photograph an approaching enemy, sow mines and be a watchdog over the nation's sea approaches.

Martin's P4M-1 fulfills all these functions admirably. Naval aviators who fly it claim it to be more trouble-free than most. It has no bad habits, and although patrol flying can be grueling the P4M makes the job less so.

The Mercator is a big airplane spanning 114 ft. and is 84 ft. long. Though pretty conventional in appearance, there are a few surprises under that blue paint. She's not a twin-engine aircraft. Those big nacelles house both prop and jet engines. Two 3250 hp Wasp Majors turn the props and two Allison J33 turbojets deliver 4000 lbs. thrust each. Able to cruise at a comfortable 200 mph for 3000 miles, the prop and jet combination boosts speed to over 350 mph when additional speed is needed. The jets are also used for take-off when heavily loaded.

The Mercator normally carries a crew of nine men. There is ample armament. The nose and tail turrets carry 20-mm guns. The top turret has 50 cal. guns. The large bomb bay is fitted for carrying mines primarily. Search radar and long-range electronic equipment enable the big ship to fulfill its reconnaissance missions.

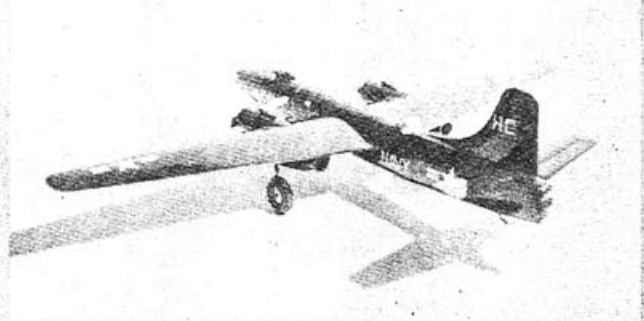
The twin-engine model fan will find the Mercator a real natural for building and flying. There are lots of straight lines to make the job easier and the size is not unwieldy.

Scaled at 7/16 in. = 1 ft. from factory three-views, the model has a span of 49 7/8 in. and a length of 37 5/8". The original model was patterned after the prototype XP4M-1; however, the plans incorporate a few changes made in production aircraft which won't bother the flying qualities. Changes from prototype are: Fin and rudder are enlarged, tail turret is extended, wing has flat center section with dihedral outboard of nacelles. The original had straight dihedral.

It would be fine if every model could be scaled down exactly with everything a miniature duplicate of the big aircraft. Such is not always the case, however. Props, wheels and other little items don't always match sizes avail-



To facilitate good flying with reasonably sized props, nacelles have been moved outboard 5/16 in. to permit prop clearance. Gear was extended.



Although fuselage looks quite streamlined, because of straight top it is constructed with little difficulty. Top half is built first on crutch, planked.

able commercially. So some allowances must be made with some deviation from scale in the interest of better and easier building. The Mercator has a few deviations from scale, which we hope won't make anybody mad: Nacelles are moved outboard 5/16" to permit prop clearance at fuselage. The landing gear is extended 1" to allow more prop clearance above ground. The size of nose wheel is increased from 1 3/8" dia. to 2" dia. for better ground handling.

The original model weighed in at 4 lbs. even, with ignition O&R .23's turning 9/6 Top Flite props. The ignition system weighs 7/8 oz., so flying with glow engines would save some weight. K&B .19's are shown on plans; props should be 9/6 Top Flites cut down to 8 1/2" dia.

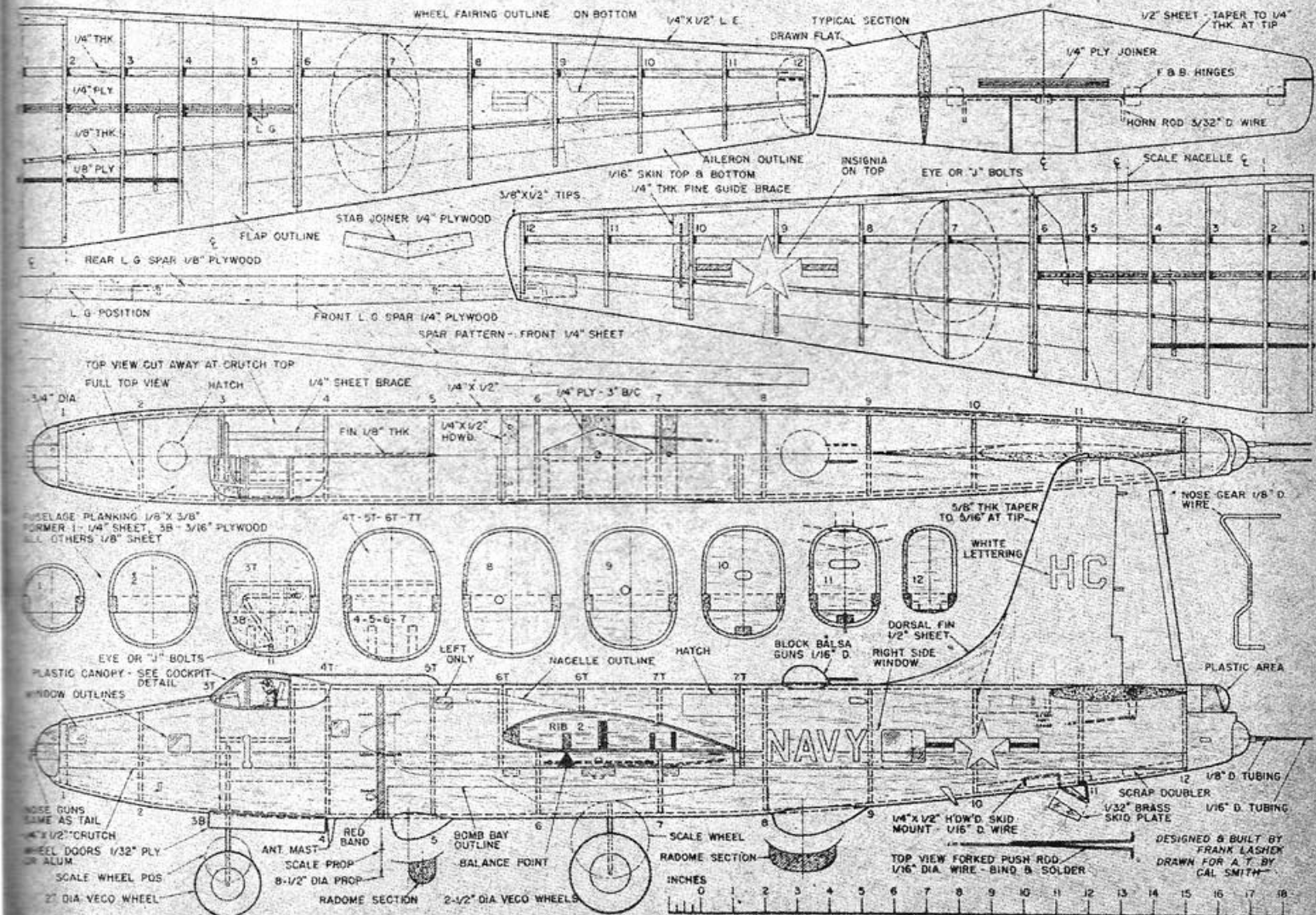
Construction is conventional throughout. Fuselage is crutch and former with strip planking. Wing is built up with sheet planking. Tails are solid sheet and nacelles are hardwood, balsa block combination. The original model had wing removable from fuselage for ease of transportation, but this feature need not be built in if you prefer a one-piece model.

Construction can be started with fuselage. The crutch is laid down over the top view and the top section of the formers are cemented in place. The lower portion of each former can serve as a crosspiece between crutch or 1/8" x 1/2" or 1/4" x 1/2" strips can be used instead. Note that formers 4T-5T-6T-7T are duplicates of each other with minor variations over wing center section. Plank top portion of fuselage with 1/8" x 3/8" strips. Make provision for removable section

between formers 6T and 7T if wing is to be removable.

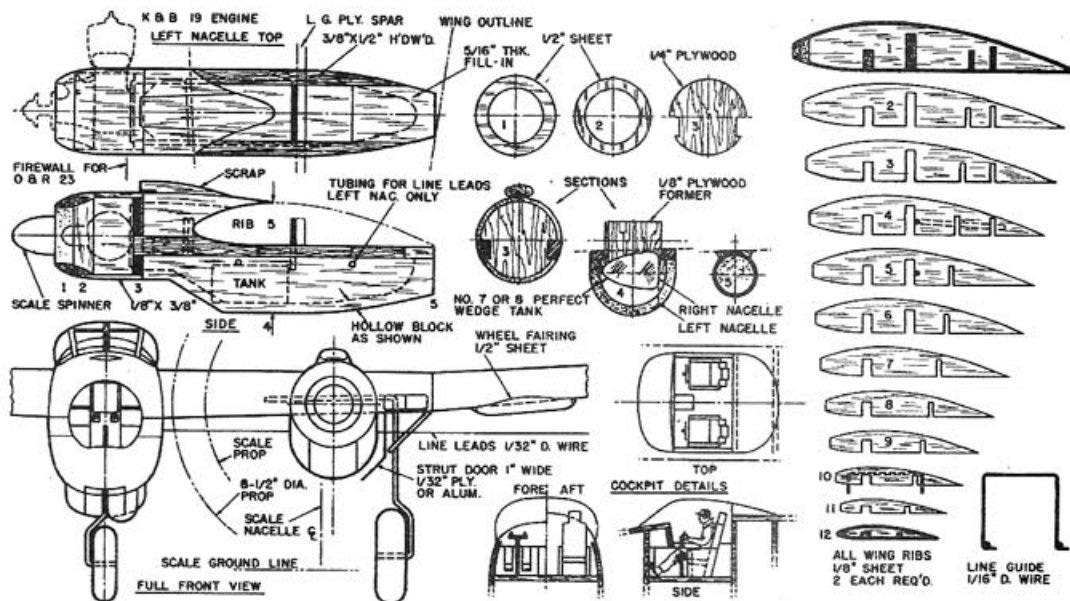
When planking is complete, the structure can be taken up from workboard. Make horizontal tail surfaces now. These consist of 1/2" sheet tapering in thickness to 1/4" at tips. Carve symmetrical airfoil section. Note separate control horns on each elevator. Stabilizer and elevators are joined with F&B hinges. Stabilizer halves are joined with 1/4" plywood joiner. Stab should be fitted in place on fuselage, carve planking to match lower curve of stab. Cement 1/4" plywood bellcrank mount to bottom of crutch between formers 6 and 7. Make up forked pushrod and join to bellcrank and elevator horns. Check for good free elevator action before proceeding with fuselage construction. Remedy any trouble now, before fuselage is closed up for good.

Proceed next with bottom portion of fuselage. Install cockpit floor before adding former 3. Add 1/4" x 1/2" hardwood strips across crutch for wing hold-down nuts if desired. Bend nose gear to shape and install on plywood former 3 before putting former in place. Add lower formers along entire fuselage. Don't forget wire skid and 1/4" x 1/2" hardwood mount. Complete planking of lower fuselage. Tail turret is carved from block balsa, nose turret can be carved from block or simulated with clear plastic toy ball or rattle if proper size is obtainable. Cockpit canopy is not available commercially so one of proper shape will have to be made. Dorsal fin, fin and rudder are carved from sheet and cemented in place on fuselage top. Note front part of fin extends down behind former 10. Rudder is offset to right about 1/2".



DESIGNED & BUILT BY
FRANK LASHK
DRAWN FOR A.T. BY
CAL SMITH

**MARTIN
MERCATOR
P4M-1**



Wing construction can be tackled next. Cut out the ribs from $\frac{1}{8}$ " sheet. Make balsa spars to pattern shown. Build wing over plan one half at a time. Note dihedral break at rib 6, so build center section flat first, then lift up and build outer panel flat over plan. Plywood landing gear spars serve as wing panel joiners and these can be installed when wing panels are joined. Bend main landing gears to shape and install on plywood before slipping into place in wings. Wings are planked with $\frac{1}{16}$ " sheet, use $\frac{1}{8}$ " wide sheet if obtainable. Wheel fairings are cemented in after planking is done.

Engine nacelles are next. Structure is built up around two $\frac{3}{8}$ " x $\frac{1}{2}$ " hardwood strips glued to the bottom wing surfaces. These strips are carved to match bottom wing curve. A $\frac{1}{4}$ " plywood firewall is glued across the front of the hardwood strips. Plywood formers are glued across bearers at wing leading edge and $\frac{1}{4}$ " plywood landing gear spar. Vibration is quite a problem with wing mounted engines, so don't spare the glue (Weldwood) and gussets when joining these parts. Top and bottom of cowlings are block balsa carved to shape and cemented in place. The K&B .19 can be radially mounted using K&B radial mount disc. Front portion of cowling is two layers of $\frac{1}{2}$ " sheet with $\frac{1}{8}$ " x $\frac{3}{8}$ " planking. Two lengths of $\frac{1}{8}$ " aluminum tubing are placed across left nacelle for line lead passage.

This completes the wood working. Cockpit details are furnished for those interested in dressing up the model inside. There was no accurate information available for the cockpit, but the detail is drawn to proper scale size. Seats can be built up from sheet and throttle console made of block. Instrument faces would be slightly less than $\frac{1}{8}$ " in dia.

The contest-winning finish on the original model is no accident, because its main ingredient is elbow grease. Finishing procedure is this: Bare wood is sanded smooth and given two coats of clear dope, then lightly sanded. Lightweight tissue is then clear doped over entire model. Give tissue two more coats of clear dope, sand lightly. Duco auto primer is next applied, either sprayed or brushed. Build up about four or five coats, whatever it takes to fill pores and grain marks. Sand with finishing paper dry, then wet finishing with 400 grit. Then spray final color, wet sand between about three coats. Rub down final coat with rubbing compound, follow with Simoniz Kleener. Wax after decals and final details are in place.

Add final details such as wheel doors, radomes, turret and windows. Insignia and lettering can be decals. Windows are simulated with aluminum dope. Guns can be aluminum or brass tubing. Be sure model balances at point shown. Add ballast as needed. Model flies well on 70 ft. wires, and will fly on one engine after becoming airborne.

Some scale fans favor ignition and gas-oil operation to eliminate fuel-proofing problems. The original Mercator used O&R .23's with relay in circuit to cut both engines together; this eliminates single engine problems. Use fiber or plastic bellcrank with line leads insulated to carry juice to relay. Battery for relay power is carried at handle with on-off switch. Use insulated flying wires. Ignition batteries are carried in fuselage between former 5 and 6, four pencils are used. Coil and condensers are in each nacelle behind firewall.



Midnight Blue dope is applied over auto primer to develop prize-winning finish. Full size construction plans are available. Data on these may be obtained from Hobby Helpers or "AT."

