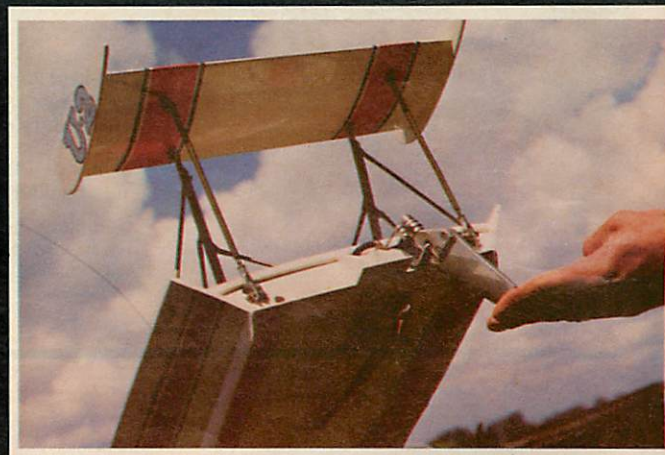
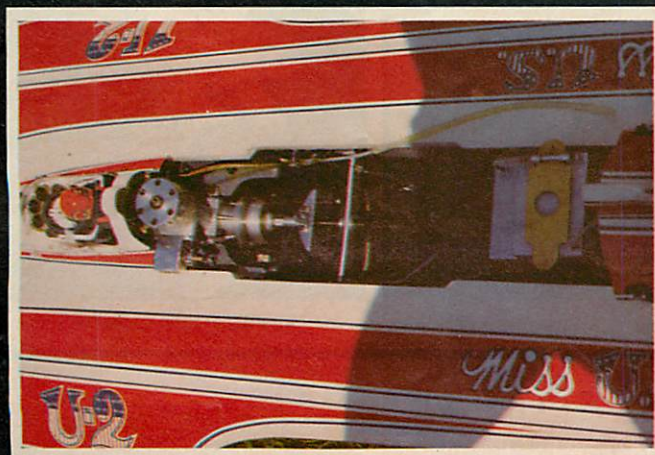
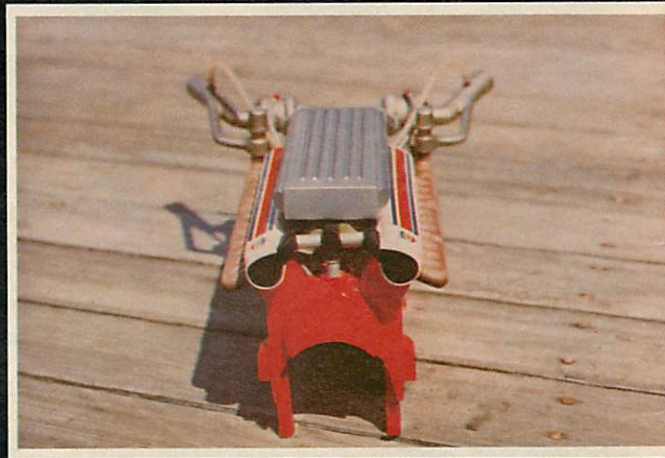
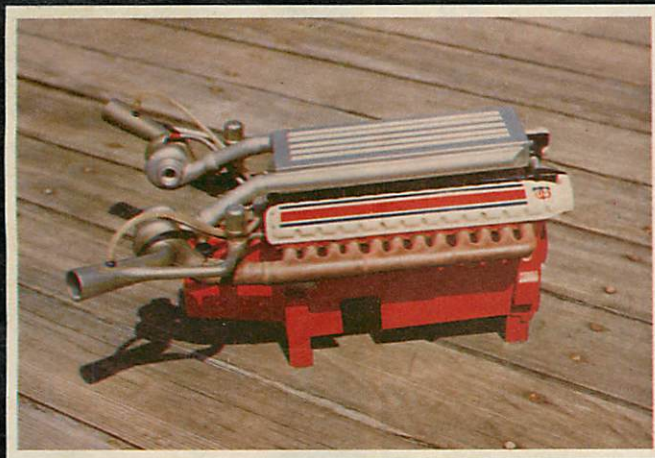
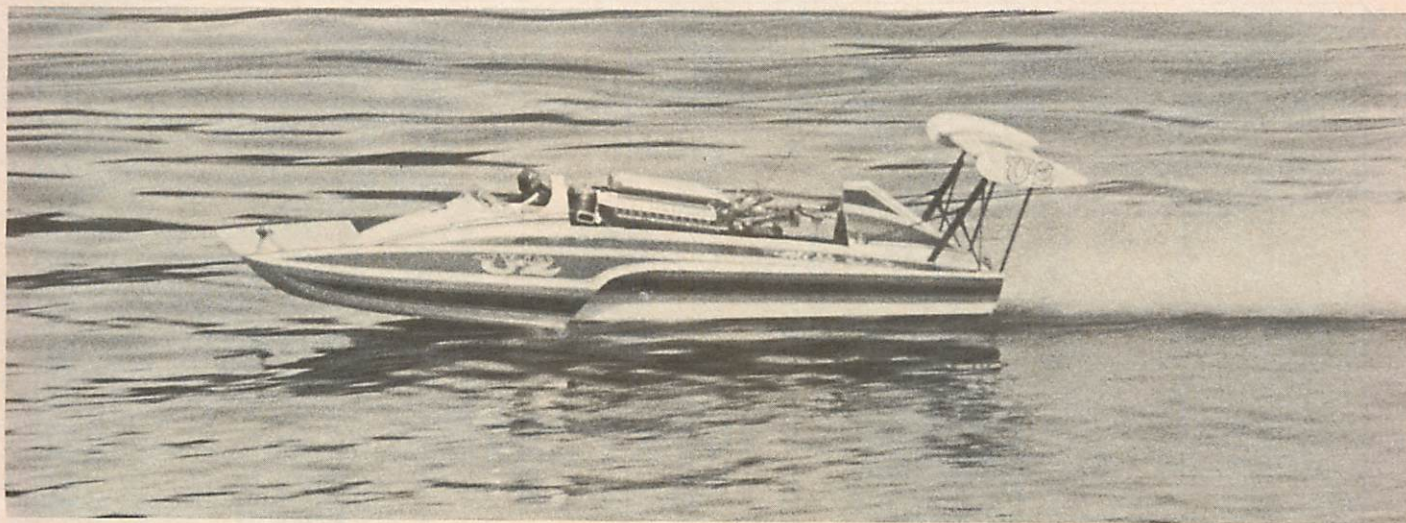


THUNDERBOAT!

A Standoff Scale model of the "MISS U.S."
Unlimited Hydroplane

by DON BOKA





INTRODUCTION

• Miss U.S. as presented here is a $\frac{1}{8}$ size ($1\frac{1}{2}" = 1'$) standoff scale model of the 1976 Gold Cup winner owned by George Simon of Detroit and driven by Tom D'Eath. The real U.S. is probably one of the most beautiful unlimiteds in competition, and one of the unluckiest as well. As a new boat in 1974, she showed great potential but was plagued by problems; the big problem being at Seattle's Gold Cup Race when a minor oil fire, which race officials hesitated to extinguish, resulted in U.S. burning to the water line. A fantastic rebuilding job brought out an even better U.S. for 1975. Although still not up to taking all the marbles, she won the Detroit race and set some records. In 1976, with her Bi-Centennial paint job, Miss U.S. came into her own, and George Simon at long last got his Gold Cup after 23 years of effort. But the black cloud still followed and reared its ugly head in September of 1976. The pit crew was allowed to take her for an easy test ride as a reward for an outstanding season. The ride ended with the U.S. blowing over on Lake St. Clair, causing severe damage to the hull. She has since been purchased by Bernie Little and added to his famous "Budweiser" fleet.

My first version of U.S. carried the real one's jinx and would not get up on plane despite every change I tried. The hull was scrapped and a new one built with many bottom changes and saw many test runs wearing only two coats of Hobbypoxy white primer. Changes were made, although few were required and performance is excellent. The hull corners well and if you build this model, note the rudder shape and angle as well as the skid fin. Do not alter the rudder or it will nose dive on turns. Much time was spent on the rudder and it is critical. The horizontal tail is set at a slightly positive angle to keep the nose down at full throttle; reworking the prop for a bit more lift would also accomplish the same thing. An OS 65R SR with .375"

bore K&B carb and homemade exhaust throttle, plus an Octura 2.2 prop is a good combination for this boat.

Launching U.S. is a bit different than the javelin throw of an outrigger. Idle down low, set gently in the water, prop in, nose out, give slight push, tail will rise, accelerate gently, and away she goes. Once up, she will stay up even if slowed down. It will corner well, but if pushed too hard, will flat spin or hook, so drive it as though you were in it.

Miss U.S. won the 1977 Toledo R/C Show for "Best R/C Scale Hydro." At the 1977 Detroit Mini Gold Cup Race, I overslept and missed the scale judging and was told the trophy "was saved for U.S.," too bad I wasn't there! I got revenge by waking up in time for the 1978 race and beat 20 some other boats for the "Concours" trophy, and third place in racing as well!

BUILDING THE HULL

Begin construction by building the jig; $\frac{3}{4}"$ particle board works fine. Laminate $\frac{1}{8}"$ ply sponson doublers to bottom of hull sides, laminate 8 & 8A, cut bottom hull stringers to length—note stringers overlap at bottom bend of bulkhead 7. Score bottom and crack for bend at 7. If motor mount bolt holes are different than those shown on the plans, relocate holes in $\frac{1}{4}"$ ply to suit mount used. Mark bulkhead locations on tunnel bottom and test fit all parts. Use slow drying epoxy to glue all bottom stringers to hull bottom, slide bulkheads into hull sides, cover jig with wax paper, set hull bottom on jig followed by bulkheads and hull sides. Align stringers before epoxy sets. Make sure stringer is in the corner of the hull side and bottom is in place; masking tape will help. Weight and clamps will hold it to the jig until epoxy sets.

Put a strip of masking tape on both sides of aluminum engine mount and bolt to ply mount pads. (Tape allows for paint thickness later in the game.) Center mount assembly in hull and epoxy in

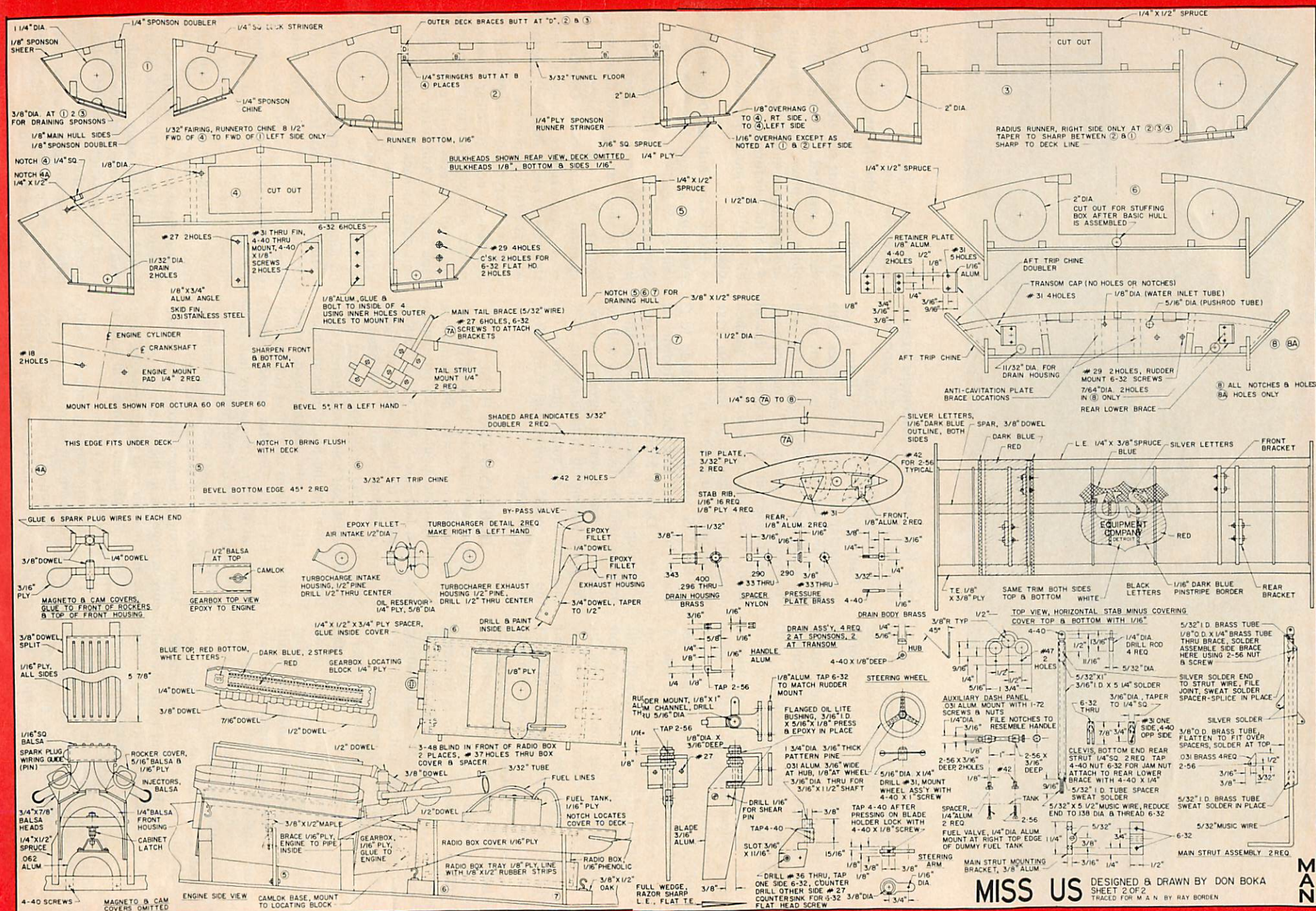
place. Add sponson sheer, chines, deck center and side braces, top stringers, tail mount, bulkheads and bulkhead #7A; weight, clamp and tape as necessary. Main tail struts can be added just before deck is installed. Glue tapered pine nose block in place, and fiberglass strips around engine mount floor, and bulkhead 4 & 5 for reinforcement. Glue and screw all hardware-mounting backup plates in place.

Block sand hull to shape using 80 grit paper on a large block, or use a belt sander. Sheet sides of sponsons. Note: Sponson sheer extends past bulkhead 4 on top; trim end of sponson sides to match sheer at top and flush with 4 at bottom. Bevel the side sheeting and sheet sponson bottoms. Note: Overlap at outer edge. Add runner stringers and sand stringers to blend flush with sponson bottoms at front of sponson.

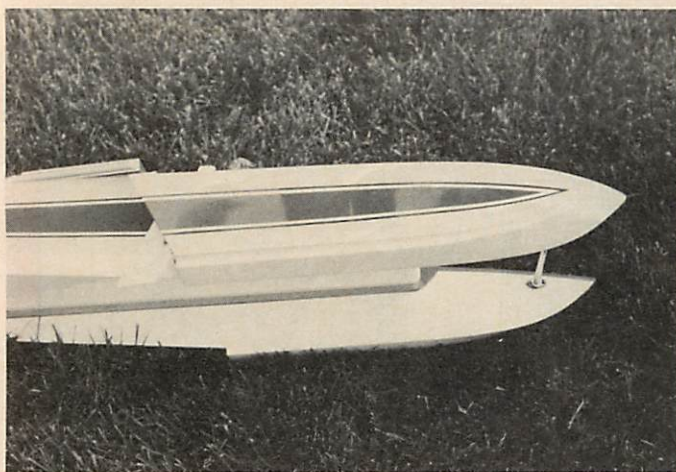
Paint everything in sight with a good brushed-on coat of clear epoxy. Sand runner stringers, fit runner sheeting, coat inside of runners with epoxy glue and tape in place. Add water over-board tube and glass to backside of bulkhead 4. Install engine and driveline. Note: Wedge strut to get proper shaft angle. Wedge mounted in reverse on inside of hull so backing plate and mounting bolts line up.

Install radio box tray and radio box. $\frac{1}{8}"$ dia. brass is used for water inlet tube; a 3" length of tube is epoxied through transom with $\frac{3}{8}"$ outside hull and the rest inside of hull. (It is a tight fit back there and it is easier to slip a rubber tubing on if you don't have to reach all the way to the rear when the boat is finished.) A 2" length of $\frac{5}{16}"$ tube is epoxied flush with outside of transom, G&M pushrod seals or small rubber plugs with a hole punched in the center (used on automotive wheel cylinders to protect threaded brake line attachment holes during shipping) can be glued over tubing inside of hull to keep rudder pushrod opening fairly dry.

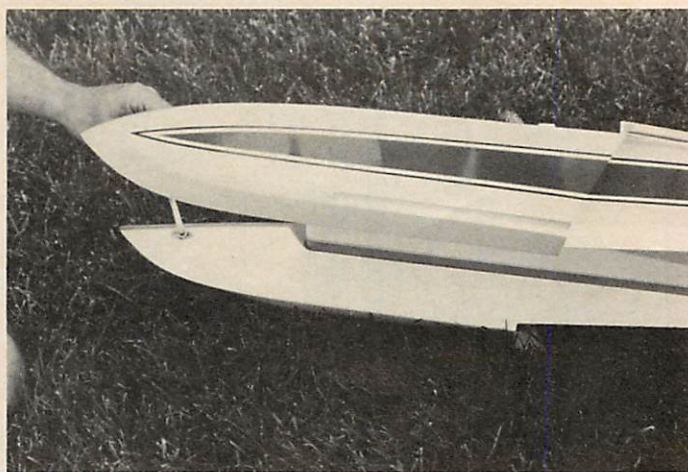
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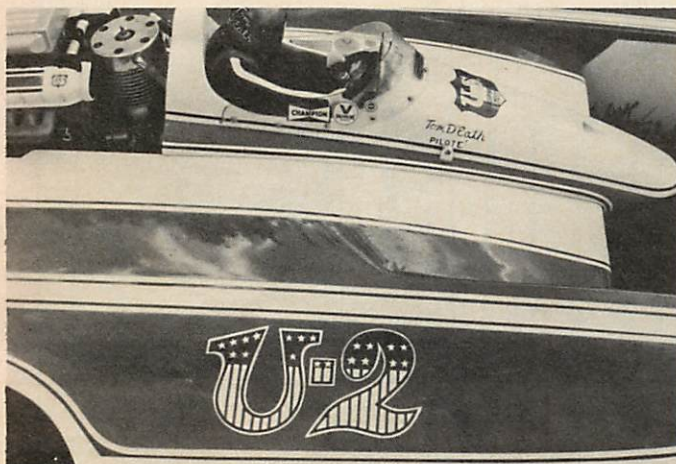




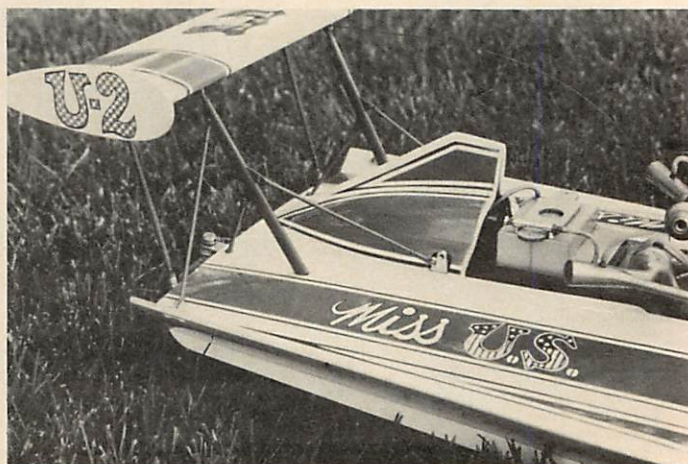
There's a difference between the chine on the right sponson . . .



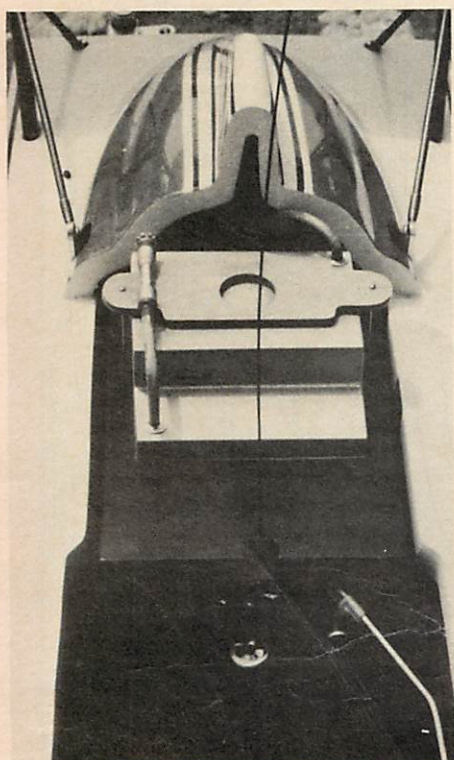
. . .and the one on the left, which isn't full length.



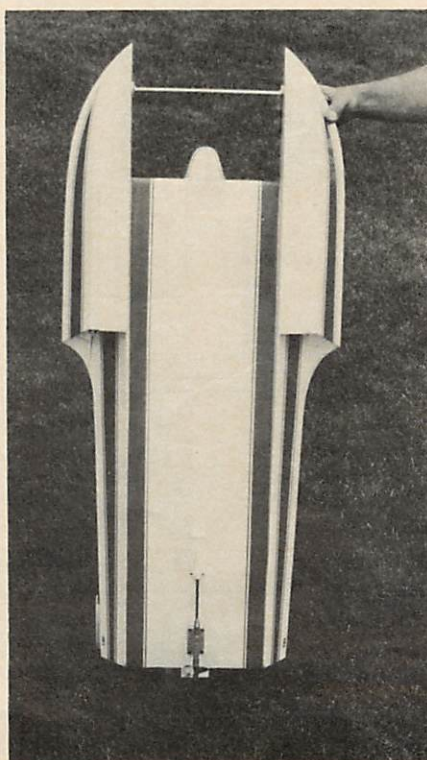
Driver figure started out as a Williams Brothers military pilot, with helmet modified, arms and lifejacket added.



The "birdcage" wing mount is fabricated from brass tubing, bolted together with model railroad hardware.



Dummy fuel tank fits over radio box.

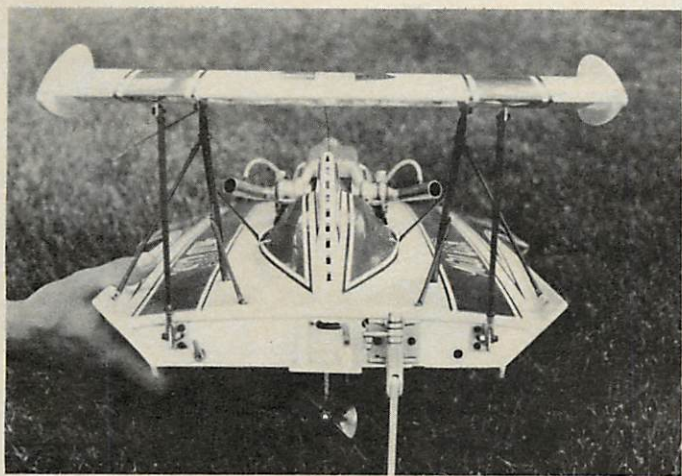


Yes, you have to paint stripes on bottom.

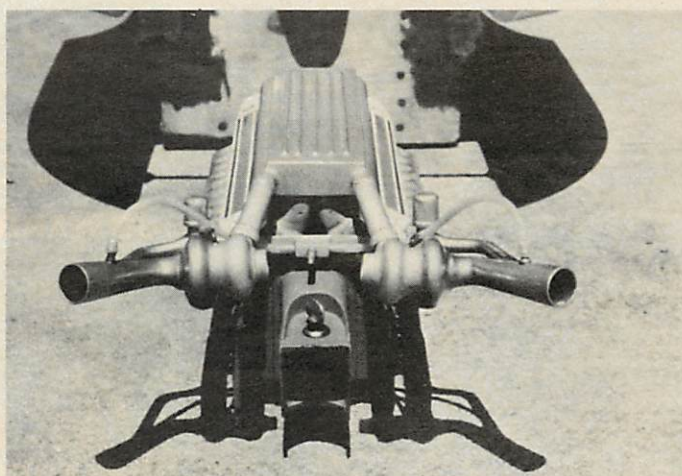
Before sheeting deck, install all hardware and set up all linkages, make sure hardware backup plates are glassed and screwed in place so they stay put forever (?). Check entire hull, and make sure stuffing box is glassed thoroughly inside and out. If you are not using hull drain plugs, make sure hull outside of main hull sides will be watertight when deck is applied or else you will have water trapped all over the place. If you use the drain plugs, be sure to cut enough notches in bulkheads so water can get to the drains. I keep the sponsons as a separate compartment from the main hull just in case a plug rattles out.

Glass a 2"x5" piece of thin Hobby-poxy cloth to the floor under the flywheel for protection if you start engine with a rope. Be sure all wood has a good coat of clear epoxy to keep wood from acting like a sponge.

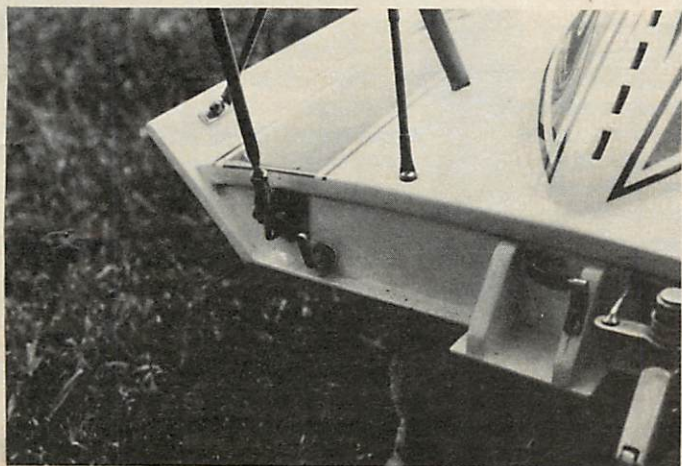
Install $\frac{1}{32}$ " wire main tail struts using Loctite and elastic stop nuts, locate holes for braces in deck and drill $\frac{3}{16}$ " hole in deck. Slide deck sheeting over braces and draw pencil line around outline of deck slightly oversize. Seam deck at hull centerline, slit deck through at top inner



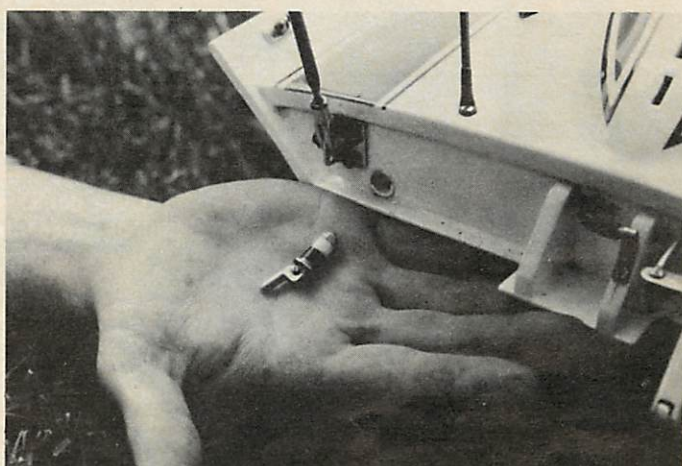
Rear view shows vented tail fin, cavitation plate with water pickup, rudder location and details of wing mount structure.



Rear view of the dummy engine showing turbocharger details. Engine is held in place by wingnut-style camlock fastener.



Drain plugs are suggested for the hull. Don made his own . . .



. . . as described in the text. Toggle latches hold them in place.

sponson edge from front of hull to bulkhead 3 and bend center portion of deck down to bulkhead 2. After trimming to rough size, coat inside of deck sheeting completely with epoxy, coat all bulkheads, stringers etc. with epoxy and slap deck in place, holding with spring clothespins and masking tape and weights until completely dry. Repeat for opposite half of deck. Keep the boat in the jig for all this deck business to keep hull from twisting.

When epoxy is dry, trim excess wood from deck and fit rear trip chines and doubler (rear hull sides). The doubler fits above deckline at rear and makes a tail-fin. Hold a piece of $\frac{3}{32}$ " ply in place at rear hull side deckline and trace outline of deck to it, put it aside 'til rear trip chine is installed; this will be the doubler. Fit rear trip chine in place, it goes under deck from 4 to 5, flush with deck around 6, and above deck after that and rearward. Place doubler on inside of rear trip chine where it fits above deck and mark top and rear outline of rear trip chine on doubler and cut to fit. Glue to inside of trip chine. Doubler makes tail fin look nice and thick as well as rein-

forces rear area for mounting of side strut brace. Add anti-cavitation plate and braces at rear of hull.

Sand everything smooth. Fill seams, gaps, boo-boos, with microballoon-epoxy mix. Let it dry thoroughly, then sand it and fill it 'til all is super. Add reinforcements under decking aft of 4 to keep edge of deck from splitting. Fillet area between tail fins and deck and sand smooth. Drill and tap holes in deck for rear lift ring, front strut brace, and rear strut brace.

RADIO BOX

The waterproof radio box is made of phenol fiber (circuit board available from radio supply houses) the type without the copper surface. The box I use is large: $3\frac{1}{8}$ " wide, 2" high, and $5\frac{1}{4}$ " long, for a Kraft Gold Medal radio using two servos for rudder and one for throttle. G&M Models waterproof pushrod ends are used on servos and on/off switch. The top of the box is a flange $\frac{1}{4}$ " wider and longer than the box; $\frac{1}{16}$ "x $\frac{1}{4}$ " vinyl wing seating tape is used as a seal. The lid is $\frac{1}{16}$ " clear plastic held in place by K&S brass channel all the way around and re-

tained by rubber bands wrapped around the box in both directions. Antenna mount is a 2-56 bicycle spoke nipple soldered to a brass bracket bolted to the front center of the box. Antenna is .032" music wire bound and soldered to a 1" piece of 2-56 bolt, minus head. A jam nut on the bolt locks antenna to mounting nipple. Small hole drilled in radio box allows entry of antenna wire to receiver, with two prongs of a deans plug serving as receiver disconnect plug. On/off switch has long handle to protrude past radio box cover front, top of radio box cover is notched for access to remove and replace antenna. Servo mounting ears are cut off and servos held in place by double-sided foam tape. Extra space in box is filled with sponge to keep components from rattling around, just don't pack too tight. Epoxy works well as adhesive for box construction and sealing antenna lead-in wire; roughen surfaces before gluing for good adhesion.

BIRD CAGE AND HULL FITTINGS

The bird cage tail support is quite well detailed on the plans, but a bit of explanation will be helpful. The mainstrut

(Continued on page 112)

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YACHTING NEWS

drawback is that the model yachts have to share the lake (see photo). Happily, we did not sight the other tenants. Weather ranged from light airs and reasonable temperatures to too much air (the event was ended about halfway through the second day), and there was a tornado alert in town on Saturday night—but no tornado!

The Golden Triangle Model Yachting Association always holds this event in January as a come-on for those of us who live in hard-water country—the entries were from as far away as Rhode Island. Twenty-two boats registered and 19 finished, with Buddy Black, the class founder, topping the field; Bill Hayes, our host, finishing second, 2 points behind; and John Jennings 1/4 point behind him in third. This will mean more when you know that we sailed 20 some-odd heats, and that the difference between places in a heat is one point—except that there is a 1 1/4 point difference between first and second place. Also present were Bert Lott, now retired from United Airlines, whose Air Transport license is in the mid-100s, and who is further distinguished by having won the Bamberger Trophy for model airplanes in the 1910s-20s (some of you New Yorkers and Jerseyites should recall). Bert and I both had a bad year medically and didn't sail much but finished 7/8. He was chagrined; I was delighted! The East Coast 12 has a hull length of 58", mast height 72", and an all-up weight of 24-25 lbs. The model is sailed also in Canada, England, Scandinavia (Sweden, I think), Australia, and Bermuda. We hope and expect it will be the first internationally recognized one-design sometime soon.

The mail just brought the winter issue of the AMYA Quarterly Newsletter, which reminds me to remind you to join. Send \$10 dues to: Executive Secretary, American Model Yachting Association, 11913 Ferina St., Norwalk, CA 90650. And remember that I'll do my best to answer questions at 7628 Dunston St., Springfield, VA 22151. SASE please. Good sailing!

MISS U.S.

(Continued from page 43)

is bent to shape and bolted to the hull (after the hull is ready for decking) using 6-32 bolts, flat washers, and elastic lock nuts as jam nuts against the threaded mounting brackets. Use Loctite as well. This will later be inaccessible so make sure it won't come loose. Before installing strut, slip the brass tube spacer and splice over strut, silver solder end in place, file joint to shape and solder spacer and splice in place. File sides of end flat so outer strut oval tube will slip over it. This is 3/8" o.d. brass tube flattened between two pieces of wood in a vise to obtain oval cross section. After installing deck, the oval tube can be installed after soldering two strut brackets to it. Solder oval tube only at top, fill entire opening with solder. Maintain 1/16" clearance between tube and deck; Sta-Brite silver solder works well for this. Drill 1/8" hole in oval tube and solder 1/8" tubing in place for side brace mount. The rear strut is built the same as main strut except the outer tube is round. The clevis attaches to the bottom and uses a 4-40 brass nut drilled #36 and retapped to 6-32 as a jam nut for the clevis. (A 6-32 brass nut is too large and looks funny.) The strut braces are 1/8" dia. music wire

with flattened brass tube ends.

The lengths of the braces are as follows, but I suggest measuring your own way as they may vary from boat to boat:

1. Front Brace (Bracket & lift ring to front of mainstrut) 4 3/4"
2. Side Brace (Side brace bottom bracket to top side of main strut) 4 3/4"
3. Rear Brace (Top rear of deck to rear of mainstrut) 2 1/4"

These measurements are the 1/8" music wire without the ends. Solder end to music wire and determine length, cut off with Dremel cut off wheel, slip on end, bolt in place with 2-56 bolts and solder loose end. Dress all solder joints. Ends can be bent to required angle.

When doing the final assembly, make all bolts tight and use Loctite, cut off excess bolt length. Any loose joints here will cause the tail to rattle and break loose. Nylon 4-40 bolts might work to join tail to struts and provide shear point in the event of a flip. I haven't tried it yet. The nose brace is a piece of Ford round radio antenna, 1 9/16" dia. Actual nose bar is oval in shape but I couldn't find anything that is strong enough. It is held to the brackets with 3-48 set screws.

Steering wheel is carved from pattern pine, notched in three places at the backside, and spoked center is epoxied in place. Notches are filled with epoxy/microballoons and sanded to shape. Wheel is bolted to dash with 4/40 bolt. Auxiliary upper dash panel holes are drilled and Tatorne 1 1/2" scale gauges (1/2" dia.) are fitted before panel is cut to outer dimensions. Don't know what gauges are used on real U.S. so the 2 outers are head temperature, center is tachometer. Bolt in place with 1-72 nuts and bolts. Some of the hull brackets require backup plates, i.e., front bird cage brace and lift ring, transom mounted rear lower brace, nose brace and rudder. Use 1/8" aluminum backup plates cut and tapped to match mounting base. Drill hole in center of plate for small screw to hold in place, epoxy and screw in place and add a piece of fiberglass cloth as insurance that it doesn't fall off when part is removed.

TAIL, RUDDER AND SKID FIN

Tail is built like an airplane wing. Cut out ribs and drill 1/8" ribs for brackets. Slip ribs on 3/8" dia. dowel spar, add notched leading and trailing edges, cut 1/16" ply bottom skin to fit and glue together. Clamp trailing edge to table top leaving front half hanging over edge. After glue has dried, cut slots in bottom skin for mounting brackets and install brackets with 2-56 bolts, nuts and washers. Fill around slots with microballoons so brackets exit neatly. Add top skin, sand to shape and add tip plates.

The rudder is self explanatory. I tried to get a realistic appearing unit while re-

taining the shear pin blade feature. Make up $\frac{1}{8}$ " aluminum rudder back-up plate to mount inside of transom and screw and glue into place. Tap plate inside of transom and screw and glue into place. Tap plate 6-32 to mount rudder bracket. Skid fin is self explanatory, it could be mounted with a steel bolt on top and nylon on bottom for shear pin effect.

The hull drains are a nice option as they allow easy draining of the hull and allow the sponsons to air out and not rot. Cut out and file parts to shape, radius and cut handle as shown, attach handle to body with 2-56 bolts, slide pressure plate in place, cut piece of large black fuel line approximately $\frac{1}{4}$ " long and slide over body, add spacer and retain with 4-40 elastic stop nut. Tighten nut so fuel line expands enough that drain plug stays securely in drain housing when handle is flipped up. Handle should lock securely in up position, if not, alter front edge of handle so it goes slightly past up position. Housing is epoxied into hull as close to bottom of hull as possible, roughen o.d. of housing and file circular groove around it for good retention when glued. Remember to put drain plugs in before launching or be prepared to retrieve quickly after engine stops. It will fill up fast at rest.

REMOVABLE TURBOCHARGED ALLISON ENGINE

Building the dummy engine is not as difficult as it may appear and it attracts all kinds of attention if it is done well. The radio box and tray should be built and fitted before the deck is installed. Once the deck is on, the radio box cover is built out of $\frac{1}{16}$ " ply, the dummy fuel tank can be added later. Note the $\frac{1}{2}$ " x $\frac{3}{4}$ " x $\frac{1}{4}$ " thick ply spacers at the front of the cover. These reinforce the cover for the 3-48 front hold down screws as well as space the cover away from the tray for clearance for the radio box rubber band hold downs. The notch at each rear side of the cover locates cover to the deck, these may require some widening to make cover easily removable. The crankcase and gearbox are built of $\frac{1}{16}$ "

ply, add the spruce engine legs, add the $\frac{3}{8}$ " x $\frac{1}{2}$ " maple front catch mount and install front catch—which is a small cabinet ball friction unit from hardware store. The aluminum catch mount is bolted to bulkhead #5, the $\frac{1}{4}$ " ply gearbox locating block is glued to front of radio box cover and the camlock fastener is mounted when everything is aligned. Silver solder a small brass ear to camlock screw slot to aid locking it. Now let's make the Allison look real!

Cut heads and rocker covers from balsa, use $\frac{1}{8}$ " dia. sanding drum in drill press, or small round file, to cut all those notches in rocker cover, then glue $\frac{1}{16}$ " ply base to rockers. Drill twelve $\frac{1}{4}$ " dia. x $\frac{1}{4}$ " deep holes in side of each (remember you need a right and left) head. Cut twenty-four $\frac{1}{4}$ " dowels about $\frac{1}{2}$ " long for headpipes, step down $\frac{1}{2}$ " dowel as shown for collector pipe, bevel headpipes with large round file to roughly fit collector pipe, glue headpipes into head, add collector and align all parts.

When dry, use microballoons and

epoxy for fillets between pipes and to simulate pipe flanges at heads, keep wetting finger to shape fillets and no sanding will be necessary. Balsa injectors are cut to front view shape from $\frac{3}{4}$ " x $1\frac{1}{2}$ " x $5\frac{1}{8}$ " balsa, then glued to $\frac{1}{16}$ " ply, $\frac{3}{4}$ " x $6\frac{1}{2}$ ". Cut away $\frac{1}{8}$ " space between each injector without cutting through $\frac{1}{16}$ " ply base and you end up with them all lined up ready to install after you round the corners slightly. Do not glue on to engine yet. Add balsa front housing and balsa fairing to top of transmission. Glue $\frac{1}{16}$ " ply on top of engine where heads and injectors will fit. Glue on heads minus rocker covers, give engine rockers and injectors several coats of white primer, sand with 360, paint engine bright red, rockers white, injectors light grey. Build plenum box and add dowels to sides, cut out two of each piece of turbo-charger and oil reservoir, drill centers of each with $\frac{1}{2}$ " drill and carve to shape, glue and fillet as shown. Remember make a right and left hand turbo! Glue $\frac{1}{2}$ " dowel pipe to front of turbo exhaust housing; when dry, add

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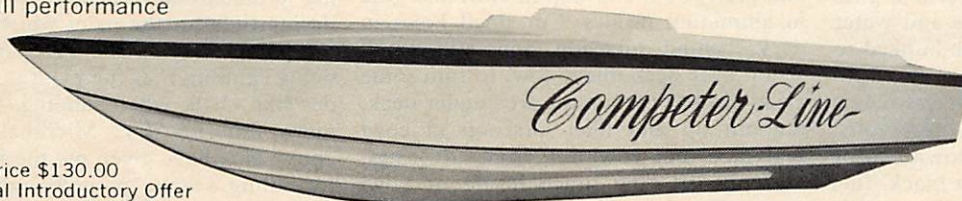
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this to end of collector pipe, add by-pass valve, drill $\frac{1}{2}$ " pipe slightly for a good fit, make up tapered outlet pipe and $\frac{1}{4}$ " dia. by-pass pipe. These pipe joints are filleted and carved to resemble bent pipe. Add injectors, plenum box and $\frac{3}{8}$ " dowel between plenum and turbo intake. All dowel joints except outlet pipe and by-pass are wrapped with small strips of file card $\frac{1}{8}$ " wide and epoxied in place to simulate a clamped joint. Mask off engine and collector pipe and prime turbo setup and plenum. Sand and paint silver. Rocker covers, cam covers and magneto are silver. A slight bit of Pactra copper can be added to Hobbypoxy clear and sprayed on turbo exhaust and pipes to simulate heat discoloration; silver Rub 'n Buff (from hardware store) rubbed on top of turbo set-up and shot with clear to simulate chrome. Dark brown with 50% red Pactra added to Hobbypoxy clear/flat-hardener mix is brushed over head pipes and collector pipe. Airbrush spots of same mix—except use tan instead of dark brown—to simulate oxidation. Look at exhaust manifold on a car for ideas on this coloring. Paint stripes and emblem on rockers.

Add $\frac{3}{32}$ " tubing to outlet pipe, use small clear fuel line to simulate water outlet tubing, other end of fuel line goes to "Tee" at rear of crankcase and water outlet from real engine can be hooked to it! Twenty-gauge wire can be used to simulate oil lines from rear of crankcase to top center of turbo oil reservoirs. Dummy fuel tank and hold down can be added. Radio box cover is flat black, fuel tank aluminum, hold down is natural wood color. Dummy fuel lines can be added to tank. Shoot entire engine with clear. "Dry-spray" head pipes and collector with flat clear.

COWLS AND DRIVER

Front and rear cowls are built of styro-foam carved to shape. Front cowl foam is cut to top and side profiles, $\frac{1}{8}$ " ply rear bulkhead is contact cemented to rear of foam and foam is sanded to shape. Cover bulkhead with strip of masking tape so it can be removed later and glass cowl with one layer of mat and one layer of Hobbypoxy "Easy Does It" cloth; it doesn't itch when you sand. I used Hobbypoxy Formula 2 glue for entire boat and cowls. When glue is dry remove foam (dig it out or pour thinner on it), remove bulkhead and glue it as shown on plans. A piece of $\frac{1}{8}$ " ply is used to form underside of cowl nose. Sand cowl smooth, add dashboard, cockpit floor, and $\frac{1}{16}$ " ply cowl insides between floor, bulkhead, and dash. Trim bottom edge of cowl to rough fit to deck, use 3-48 bolts through the cowl floor with 3-48 blind nuts under deck to hold cowl down. (Locate bolts to clear driver.) A $\frac{1}{4}$ " dowel is glued to top front of deck and locates into a piece of $\frac{1}{4}$ " ply glued into cowl to hold front of cowl to deck. Put strips of masking tape on deck under cowl area, bolt cowl in place and using a thick mix of microballoons, fill cowl to fit deck. When dry, sand 'til it is nice and pretty. Cut airscoop in cowl and glue in aluminum insides. Cut small holes in deck behind airscoop and add small scoop over deck under cowl to ram some clean air into carburetor area under deck. Smooth up and fillet airscoop in cowl real nice, cut cowl for front lift rings, add ply lift ring brace inside of cowl (brace fits above lift rings).

Driver is made from $1\frac{1}{2}$ " scale Williams Brothers military pilot. Add chin guard to helmet, using thin cardboard epoxied in place and blended in with

microballoons. Add balsa block to torso to make body longer, carve arms and hands, mold life jacket and added body parts with microballoons, sand to shape. Driver's suit is flat dark blue, life jacket flat orange, helmet gloss orange, gloves grey. Face mask is thin clear plastic dyed black. Windshield is bolted in place with 0-80 nuts and bolts (hobbyshop HO train item). After dash, steering wheel, windshield, and cowl are completed, driver is glued and screwed to cockpit floor (don't want to lose him). The two gauges in dashboard are manifold boost.

Rear cowl is more fun; it has a vented tail fin. Cut bulkhead, tail fin sides, and $\frac{1}{8}$ " square spacers. Glue spacers neatly to one side of tail fin, add other side and spread slightly to fit slots in bulkhead, add tail fin cap. Cut foam blocks to fit both sides of tail fin and carve to shape. Cover vented area of tail fin with $\frac{5}{32}$ " wide piece of masking tape long enough to cover vented area only. Glass entire cowl and tail same as front cowl except do not cover bulkhead with tape, glass it in place. When good and dry, remove foam blocks, and sand to shape, sand carefully over vented area to remove fiberglass from taped vents, remove tape and you got a nice clean vent job on the tail fin. Patch up boo-boos and fit rear cowl to deck and glue in place, reinforce with strips of cloth on inside of cowl. Rear cowl could be made removable like the real one if you like, it is up to you. Cut opening in sides of cowl for main strut brace/lift ring. Before permanently attaching rear cowl, be sure radio box cover fits—as well as anything else back there—because it is real tight quarters.

PAINTING

Any good paint job is time consuming so allow plenty of time to paint Miss U.S. I had good results with Hobbypoxy epoxy paints for many years and used them for Miss U.S. All paint, thinners and glues mentioned in this article are Hobbypoxy unless noted otherwise. When cleaning the model between coats of paint, use Hobbypoxy thinner. I have tried many other paint prep solutions and most leave a residue that causes "fisheye" in the paint, so wash only with thinner prior to each coat. I prefer to use 280 and 320 grit silicon carbide dri-lube paper for all but the final clear coats—when I switch to #600 wet or dry used wet. Most sanding problems are caused by insufficient drying time for the paint which results in the paint clogging the sandpaper due to being "gummy." If the paint doesn't powder like chalk when sanding, then allow more time to dry. Microballoons and epoxy glue have given me the best results for filling seams, pinholes, and gouges. Fast drying glue for small areas, slow drying for large areas. The more microballoons in the mix, the easier it sands.

Sand the bare hull thoroughly with 280 paper. Fill all imperfections with

microballoons and sand your heart out. Paint will magnify flaws, not cover them. Give entire model a heavy coat of white undercoater after using air hose, vacuum cleaner and tack rag to remove dust. Boat can now be test run, if desired; afterwards wash thoroughly with detergent (Mr. Clean or Tide) and follow with a washing with thinner. Sand with 360 paper; if grain still shows, give another coat of undercoater and sand thoroughly, also fill any previously unseen flaws with microballoons and continue to sand.

Shoot first coat of gloss white, I prefer a light "tack" coat followed immediately by a wet coat. Sand lightly with 320 dry paper, if it looks good follow with a coat of clear; if not, repair bad areas and spot in paint and follow with a coat of clear. Sand clear lightly with 320 to remove orange peel and dirt. Each coat of paint should be lightly sanded with 320 to improve paint adhesion, and hull thinner-rinsed prior to masking.

Now shoot the red trim. I spray one or two color panels at a time so the tape can be pulled almost immediately. Excellent break lines can be had by using Scotch 471 Vinyl tape in 1/8" width. If any red overspray gets on the white just wash off with thinner after paint has dried; that is why the clear over the white. Paint the blue trim, like the red, a few panels at a time.

The name "Miss U.S." and "U2" are done by laying wide tape over the area and cutting out area with #11 X-acto to the outermost outline of letter or number and spraying white. Remaining colors can be done one at a time with vinyl tape. Liquid masking film works well too. The 62 little stars are a ball and are best left for the last to delay insanity. Use .030" acetate about 1"x3" for a star stencil, cut out a single star in the center of stencil, make star slightly over-size. Lay 1" wide piece of masking tape over blue field of star and mark star outlines on tape with sharp pencil. Use sharp #11 X-acto blade to cut out stars, begin cut from tip of star and cut towards center. Dry-spray white into cut out areas and carefully pull off tape. When all trim is complete, areas that bled through tape can be repaired by carefully scraping away excess paint with sharp #11 X-acto blade. Lightly sand all trim edges with 600 paper used dry to remove ridges, spot in any bad or thin edges. The trim color coats need not be heavy coats of paint, just enough to give solid color.

Give model several healthy coats of clear, wet sand lightly between coats with 600 . . . a scrap of soap in the water bucket aids the sandpaper in gliding over the paint smoothly. Give a final healthy coat of clear, wait about a month and carefully wet sand with 600, rub out with DuPont white compound and polish with a good paste wax. The Binks Air Brush with "B" tip, or Badger Model 200-1 at 30 pounds pressure is fine for trim. The

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Binks Model 15 touch up gun with 78x78 SD tip at 40 pounds pressure is fine for large areas. All trim on the model is paint except the "Champion" and "Valvoline" emblems on the windshield, which are decals.

In closing, I would like to thank my brother, Dale Boka, and a good friend, Claudia Stankiewicz, for their efforts in the photographic aspect of this article. The young lady holding U.S. in all the pictures is my 12-year-old daughter, Kathy, whom I must thank for holding the 15 pounds of boat and not complaining, too much, during the photo sessions.

SOARING NEWS

(Continued from page 34)

jects, at speed, with your wing leading edges from time to time. This often crushes them and can easily tear through the entire wing if the object you hit is a wire or post. To minimize such damage, use this leading edge recommended by Peter. It consists of a piece of 1/16" or 1/8" plywood as wide as the leading edge is deep, running the entire length of the wing. It is set "on edge" as can be seen in the drawing, and glued to the rib noses. After the plywood joint has set, glue pieces of balsa above and below the ply strip to complete the structure. Sand and shape the leading edge as always to make a finished wing. You will find that potential wing damage is reduced by this method, but it is far better—when possible—to avoid hitting the object altogether!

Here's something I haven't tried yet, but I've seen it recommended in several different places. (Therefore, I don't know who should get the credit. The idea sounds good, though.) Buy some polyes-

ter coat lining material for covering your next model. This is obtainable at less than fifty cents a yard in most fabric, discount, and five-and-ten-cent stores, etc. Using thinned dope, adhere a panel of this material to leading and trailing edges, root and tip ribs of a wing, for example. Then, using your shrinking iron, make the material taut. You'll have to experiment with the heat to get it just right. Finally, "fill" the weave with thinned dope—several coats should be plenty, and I'd start at thinning about fifty/fifty. Users say that this material is stronger and lighter than silk or nylon. It is obtainable in white, off-white (eggshell), and colors. I'm planning a see-through structure, just like the old pre-war gliders, where every rib shows through when the sun gets behind the wing. This should also make a good strengthening covering for fuselages too, instead of fiberglass and resin, because of its lighter weight.

One more suggestion before leaving the subject of hints to help builders: try using a dowel of birch set into the leading edge of a wing. It gives a nice, rounded nose shape and adds strength—much in the manner of plywood. For a big sailplane, fiberglass arrow shafts could be used. Dowels in various sizes are obtainable at hardware stores and building supply houses. I've seen 'em from 1/16" up through 3/4" in steps of 1/16th, and lengths of 36" are common. Incidentally, the 1/8" variety makes nice stiff control rods or pushrods which will run inside nylon guides cut from pieces of Nyrod outer sleeve material. Your wires can be added to the dowel ends by wrapping with thread and epoxying them in place.

CORRESPONDENCE

Raja Sabri Khan is an engineering stu-
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