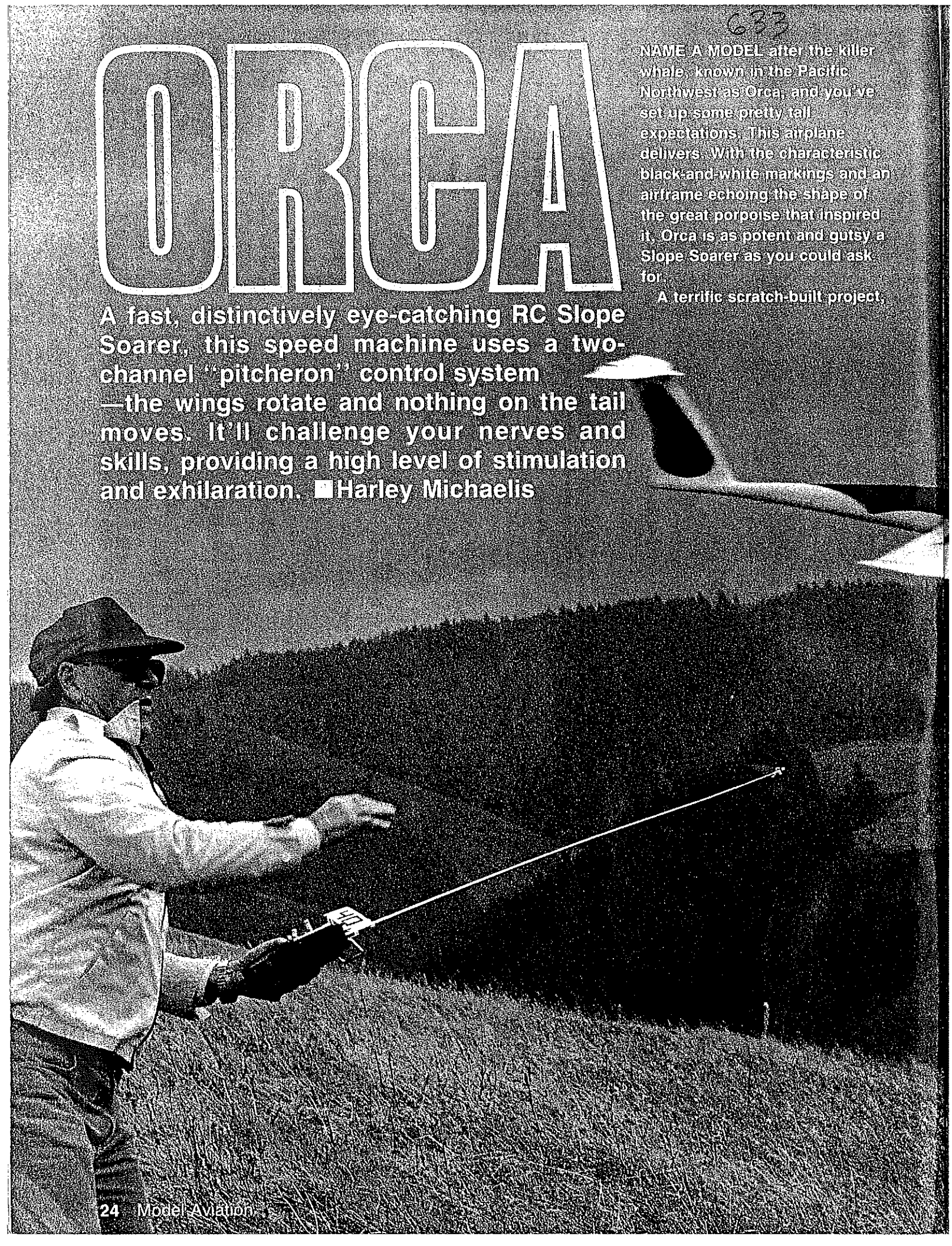
ORCA

A fast, distinctively eye-catching RC Slope Soarer, this speed machine uses a two-channel "pitcheron" control system —the wings rotate and nothing on the tail moves. It'll challenge your nerves and skills, providing a high level of stimulation and exhilaration. ■ Harley Michaelis

NAME A MODEL after the killer whale, known in the Pacific Northwest as Orca, and you've set up some pretty tall expectations. This airplane delivers. With the characteristic black-and-white markings and an airframe echoing the shape of the great porpoise that inspired it, Orca is as potent and gutsy a Slope Soarer as you could ask for.

A terrific scratch-built project,



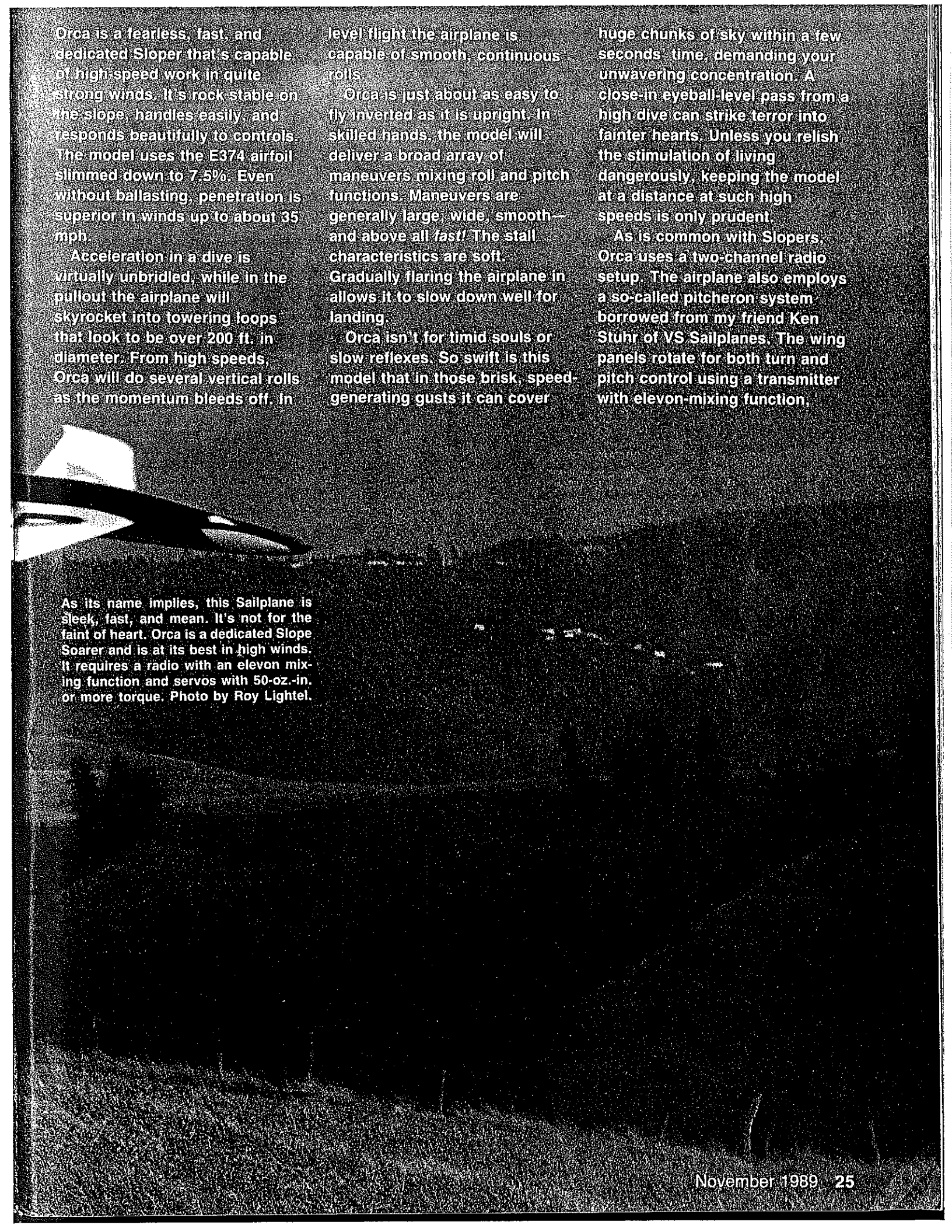
Orca is a fearless, fast, and dedicated Sloper that's capable of high-speed work in quite strong winds. It's rock stable on the slope, handles easily, and responds beautifully to controls. The model uses the E374 airfoil slimmed down to 7.5%. Even without ballasting, penetration is superior in winds up to about 35 mph.

Acceleration in a dive is virtually unbridled, while in the pullout the airplane will skyrocket into towering loops that look to be over 200 ft. in diameter. From high speeds, Orca will do several vertical rolls as the momentum bleeds off. In level flight the airplane is capable of smooth, continuous rolls.

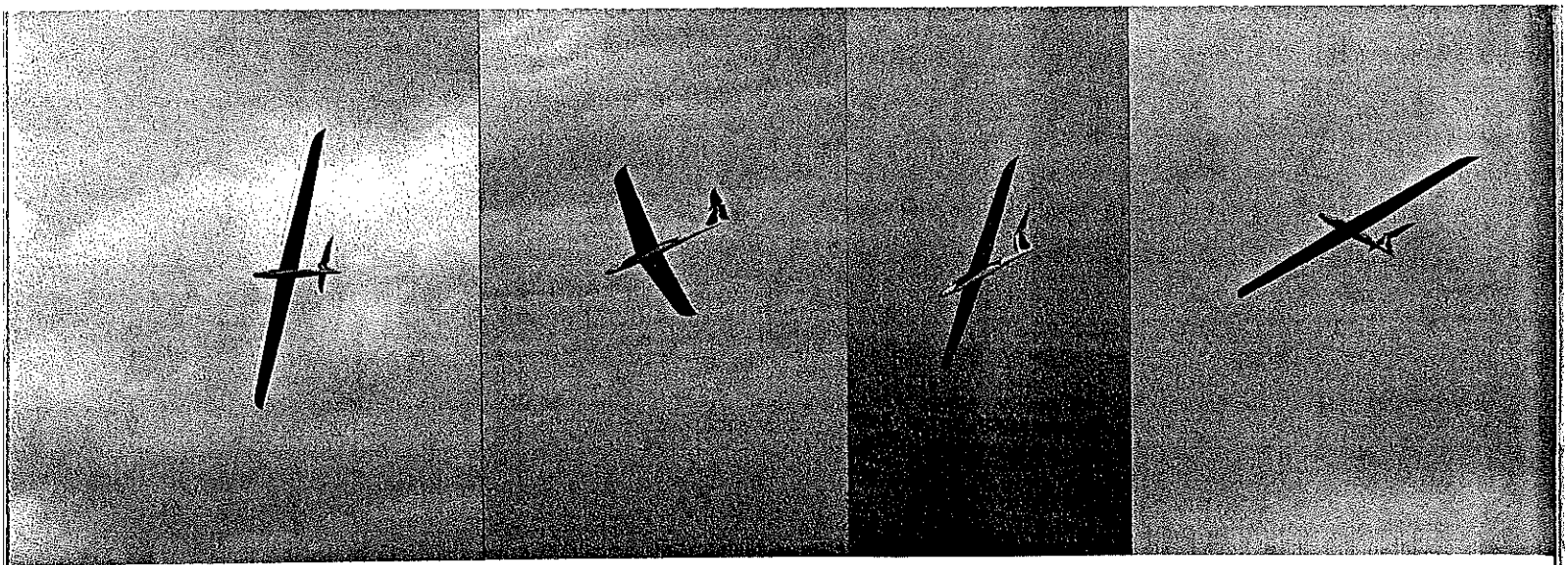
Orca is just about as easy to fly inverted as it is upright. In skilled hands, the model will deliver a broad array of maneuvers mixing roll and pitch functions. Maneuvers are generally large, wide, smooth—and above all *fast!* The stall characteristics are soft. Gradually flaring the airplane in allows it to slow down well for landing.

Orca isn't for timid souls or slow reflexes. So swift is this model that in those brisk, speed-generating gusts it can cover huge chunks of sky within a few seconds' time, demanding your unwavering concentration. A close-in eyeball-level pass from a high dive can strike terror into fainter hearts. Unless you relish the stimulation of living dangerously, keeping the model at a distance at such high speeds is only prudent.

As is common with Slopers, Orca uses a two-channel radio setup. The airplane also employs a so-called pitcheron system borrowed from my friend Ken Stuhr of VS Sailplanes. The wing panels rotate for both turn and pitch control using a transmitter with elevon-mixing function.



As its name implies, this Sailplane is sleek, fast, and mean. It's not for the faint of heart. Orca is a dedicated Slope Soarer and is at its best in high winds. It requires a radio with an elevon mixing function and servos with 50-oz.-in. or more torque. Photo by Roy Lightel.



This Sailplane moves so fast that it was a challenge for Roy Lightel to photograph. Even without ballasting it'll penetrate in 35-mph winds. Acceleration in a dive is awesome, and in pullout it blasts into 200-ft.-dia. loops and will do several vertical rolls as speed bleeds off. In skilled hands, it's capable of being put through a broad array of maneuvers by mixing roll and pitch functions. In speed-generating strong winds, Orca can cover huge chunks of sky in seconds, mandating the pilots' undivided concentration. It slows well for landing by gradually flaring it in.

while nothing moves on the tail. Ken has done a great deal to perfect this pitcheron concept. Positive and slop-free linkages provide the needed precision and reliability.

The fuselage is a ply box type contoured with added wood. The wing is made of ply-skinned foam. The fin is glued on between the slab sides; the stabilizer bolts on.

The prototype sports a really super finish, achieved by fiberglassing and spray painting. It'll dazzle your friends. Of course, a low-heat film could be applied to the wing, and that looks good too.

Built as detailed here and in the plans, Orca is a reliable, distinctive, eye-catching machine. Its capabilities will challenge your nerve and skills. This rugged Sloper offers a high level of satisfaction, stimulation, even exhilaration—punctuated by moments of sheer panic!

Construction. A parts pack is available. Further details are provided at the end of this article.

Fuselage. Cut two 2½ x 36-in. pieces from 1/16 ply for the fuselage halves. Position the pieces together, making sure that any bends run inward. Mark lines, as shown in the plans, at the 4-, 14-, 22-, and 29-in. points. Tack the pieces together using rubber cement or a similar adhesive, being sure that the top edges between the 14 and 22 marks are aligned.

Mark the slab sides, then cut and true the edges for a perfect match. Cut and attach 1/16 ply doublers just forward of the fin leading edge, then add 1/16 balsa rearward of the doublers as shown in the plan.

With the halves still tacked together, add a 1/8-in. balsa doubler to one side up to the 1/16 ply doubler, then add 1/16 balsa from that point to the tail end. After trimming to contour with the ply, repeat the process on the other side for matched sets.

Again with the halves still tacked, locate and drill holes for the main support tube, drive pin axle, and slots. Use sharp bits in a drill press with wood backing.

Fuselage outlines. These can be reproduced from sheet balsa patterns made as follows: Place a 4-in.-wide sheet of 3/32 or 1/8-in. balsa under the plans. With a sharp point progressively outline the slab side and outer side view lines. Cut along the points to make top and bottom templates. Use these to mark the profile of the woods to be added to the top and bottom of the slab sides. It is best to use thick pieces of balsa rather than laminations in order to avoid glue lines. These can be partially sawn through and cracked to fit the changing angles. The hatch block is used to make a female mold, and it may be a pine block.

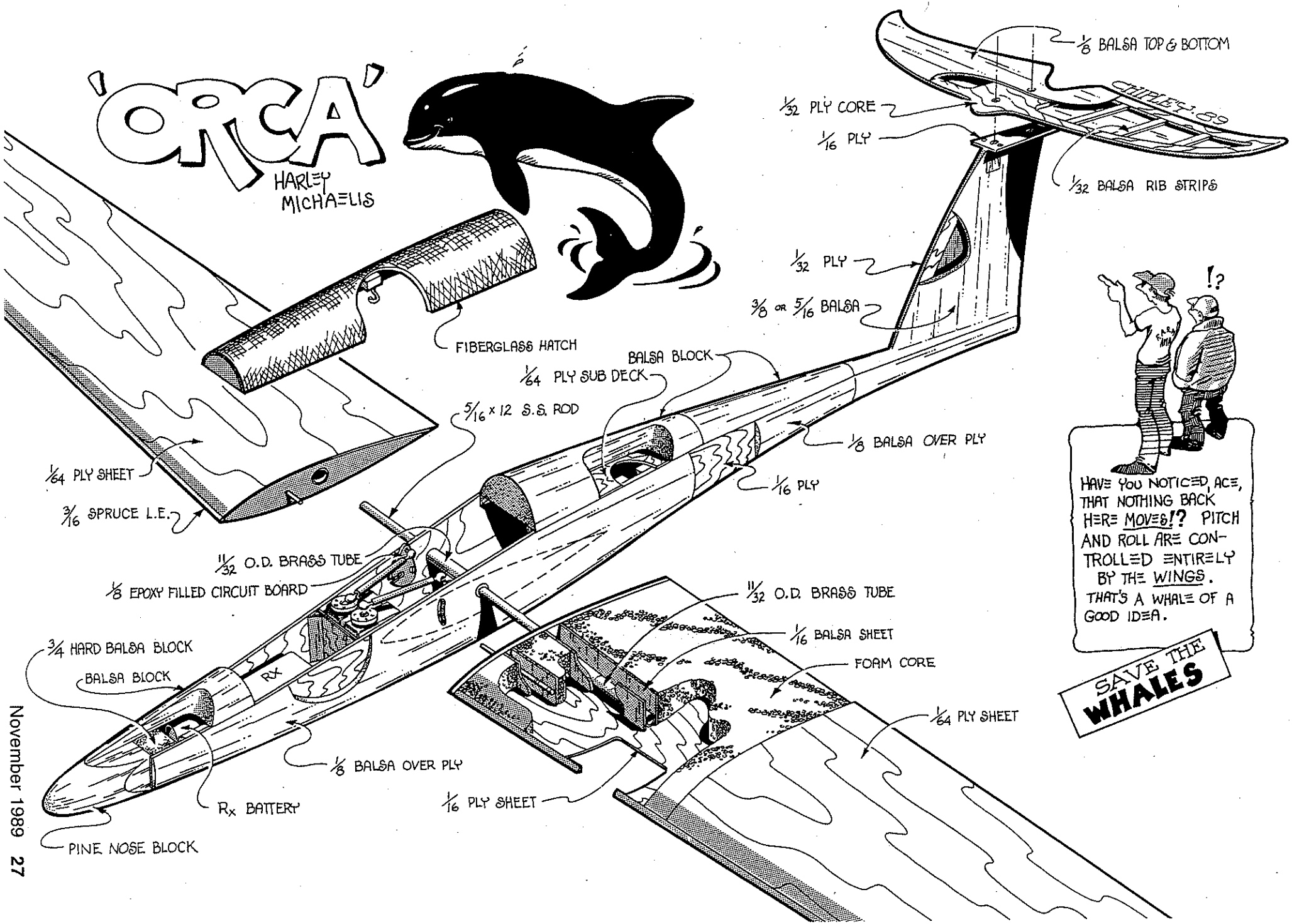
Check fit a 500 mAh battery pack, foam, and your receiver to see how much space is required. If necessary, move F1 forward for more servo space. Make sure the sides and formers are precisely aligned, or the panels will be askew. Add the inside nose block. Add triangular stock and the 1/32 ply bottom.

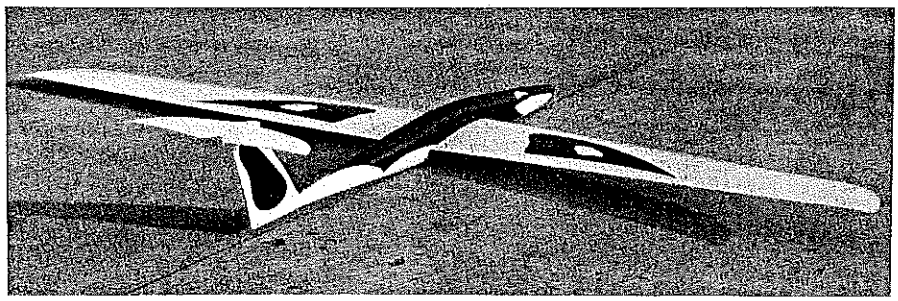
Fin. Use 5/16 C-grain contest balsa to keep the structure as light as possible. Shape to profile, and cut in the leading and trailing edge slots for the ply edging. Prepare spruce blocks for elevator mounting with the 4-40 inserts. Work the blocks to a 3/16 thickness, and center in the fin.

Glue the flat fin to one fuselage slab side. Align the sides for straightness with the fin clamped between. Glue a piece of 1/64 ply subdecking forward of the fin to retain this alignment. Apply a slower-setting glue to the other side, and clamp the fin in to prevent any built-in turn.

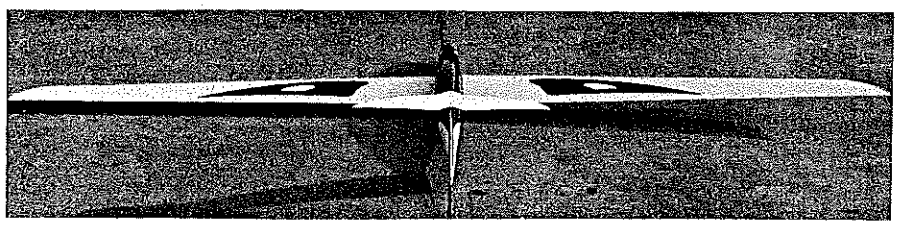
If any fin tilt is present, correct it by twisting the fuselage as you add the subdecking

The author's friend Roy Lightel posing with one of two identical Orcas. The shape, distinctive black-and-white color scheme, and pattern design is very reminiscent of its namesake, Orca, the killer whale. An advantage of having no moving control surfaces on the tail feathers is the freedom of design configuration that it allows, as can be seen with the "fish tail" stabilizer.

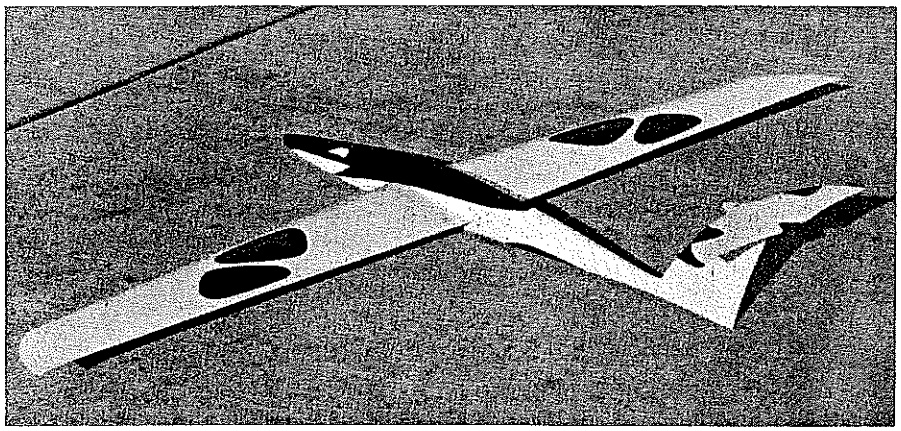

'ORCA'
HARLEY MICHAELIS
1/8 BALSA TOP & BOTTOM
CHIPLEY, CA
1/32 PLY CORE
1/16 PLY
1/32 BALSA RIB STRIPS
1/32 PLY
3/8 OR 5/16 BALSA
FIBERGLASS HATCH
BALSA BLOCK
1/64 PLY SUB DECK
5/16 x 12 S.S. ROD
1/8 BALSA OVER PLY
1/16 PLY
1/64 PLY SHEET
3/16 SPRUCE L.E.
11/32 O.D. BRASS TUBE
1/8 EPOXY FILLED CIRCUIT BOARD
11/32 O.D. BRASS TUBE
1/16 BALSA SHEET
FOAM CORE
3/4 HARD BALSA BLOCK
BALSA BLOCK
RX
1/64 PLY SHEET
1/8 BALSA OVER PLY
Rx BATTERY
1/16 PLY SHEET
PINE NOSE BLOCK
!?
HAVE YOU NOTICED, ACE, THAT NOTHING BACK HERE MOVES!? PITCH AND ROLL ARE CONTROLLED ENTIRELY BY THE WINGS. THAT'S A WHALE OF A GOOD IDEA.
SAVE THE WHALES



This view clearly displays the clean aerodynamic lines that make this Slope Soarer so fast.



This airplane could just as aptly have been named after a shark instead of a killer whale.



Orca's twin sister (brother), the author's other Sloper, identical except for pattern scheme.

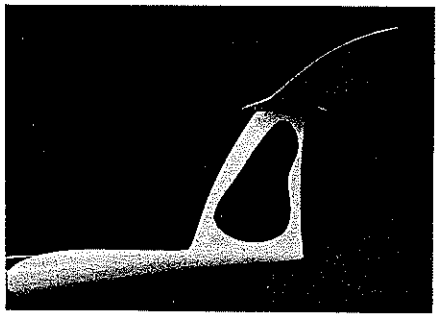
pieces. Keeping these pieces flat, attach them with slow-setting cyanoacrylate glue (CyA).

Divide the top profile template at the 4-in. and 14-in. lines. Use the template sections to mark the top blocks to profile, preparatory to cutting the wood pieces to be added. Blocks can be partially sawn through vertically to bend to the different angles. If you're laminating with layers, apply glue toward the fuselage centerline to avoid sanding problems. Place balsa crosspieces on the underside of the hatch block to key it. Fit the pieces so that a razor saw blade can be slipped between the hatch ends and adjacent pieces.

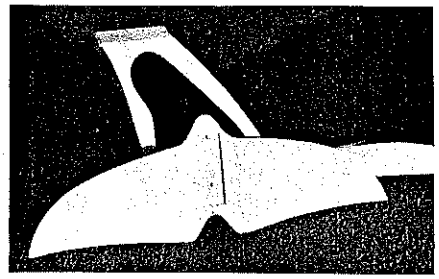
Shape the fuselage with the hatch block in place. It's best to contour the harder woods first, then blend in the softer pieces. Taper the fin to the width of the blocks and to a symmetrical section. Fillet and fill where necessary. Attach the stabilizer base.

The hatch block ends, adjacent fuselage surfaces, and horizontal edges of the opening will not be covered with cloth. Smear these surfaces with resin, applying heat to speed curing. The well-cured resin sands off in a white powder without clogging the sandpaper. Sand the whole thing to a precise block-to-fuselage fit.

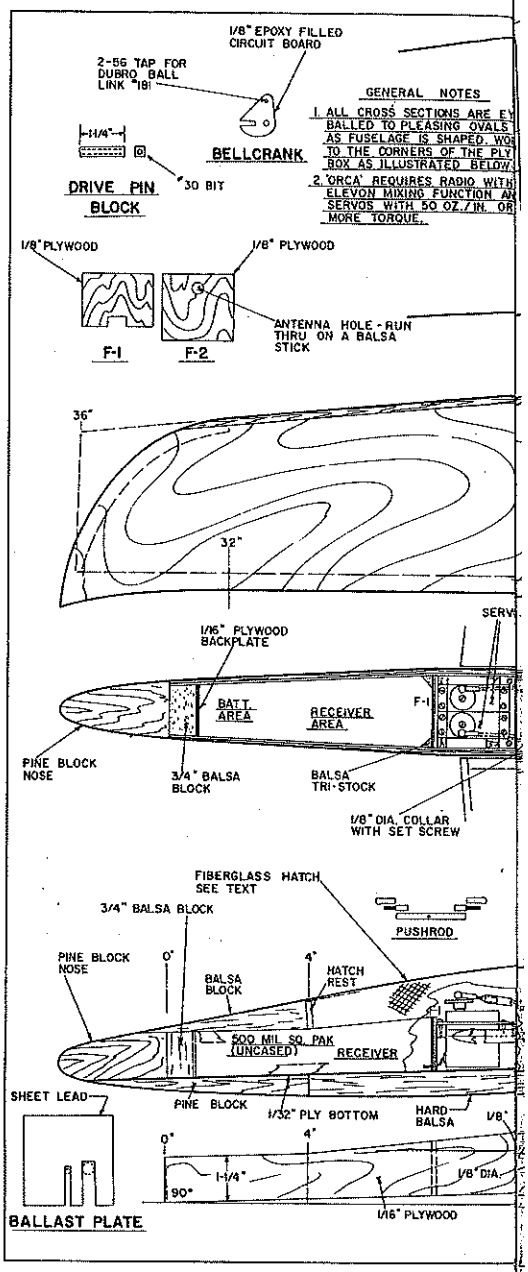
Fine sand. Where feathered edges spring up, apply CyA and press with plastic wrap.



This striking photograph of Orca's tail feathers demonstrates how the elimination of moving control surfaces opens up a whole new world of possibilities for the designer.

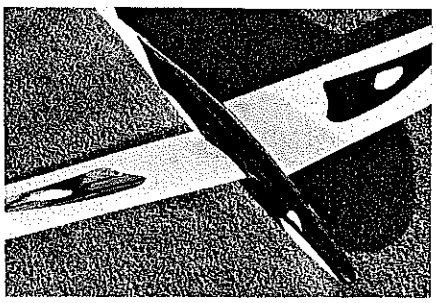


The disassembled stabilizer showing the bottom lamination cut out so that it installs with a flush fit over its base. It's made up from a 1/32 ply core with sheet balsa on each side.

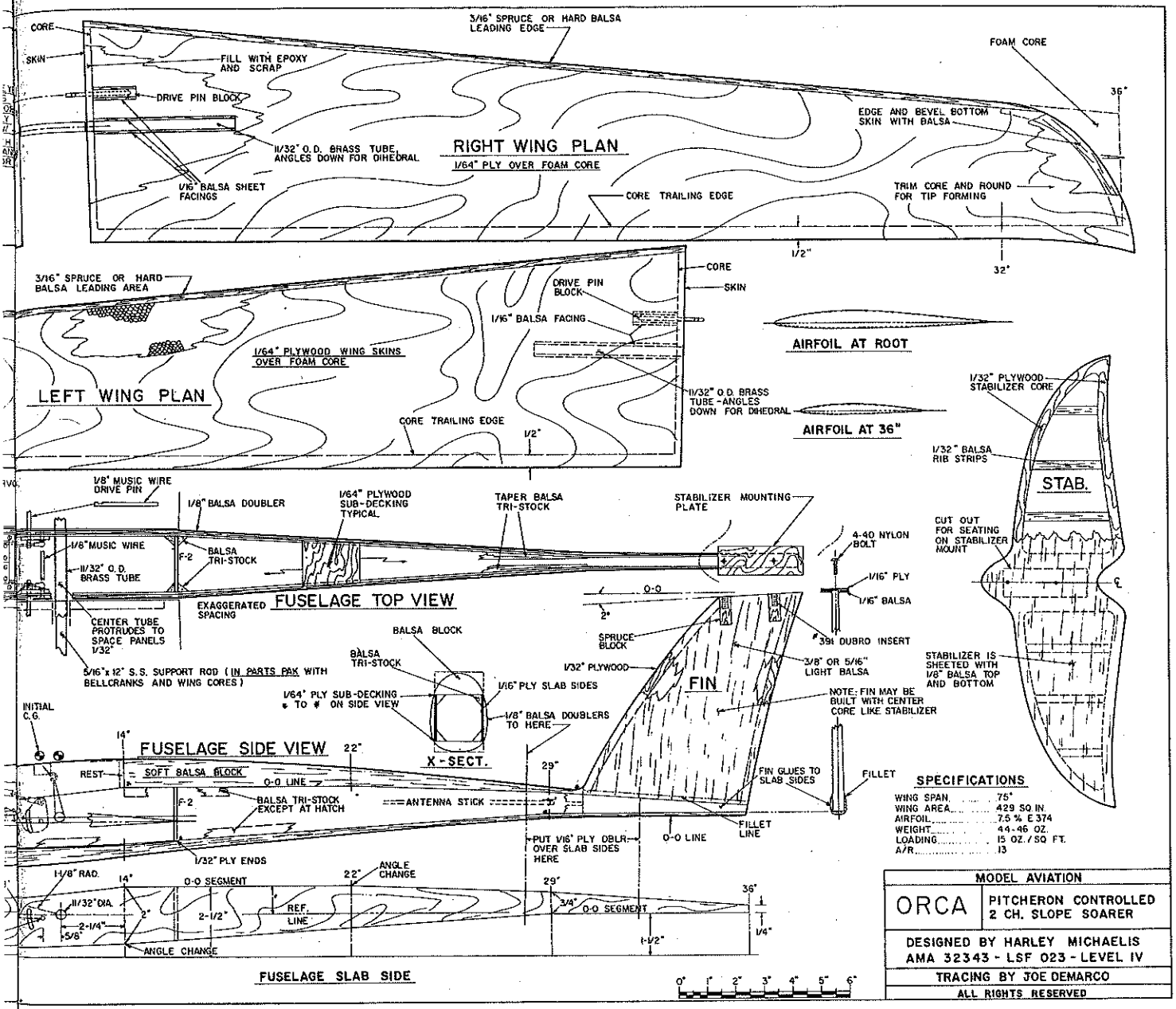


Fill cracks and other imperfections with Red Devil One Time Spackling, Model Magic Filler, or a similar product.

The hatch will be made later in a mold formed on the structure. Supplies you'll need are the original-product (yellow can) Simonize paste wax, PVA release agent, polyester resin, and medium and heavy



The wing panels rotate for both turn and pitch control. An exaggerated left turn is pictured here. The roll rate at higher speeds is blazingly fast. Dual-rate function is recommended for use at different speed ranges.

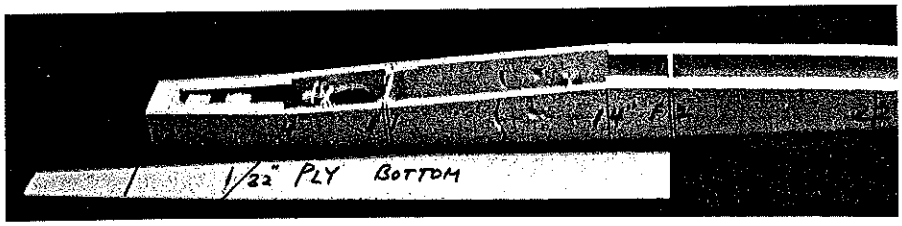


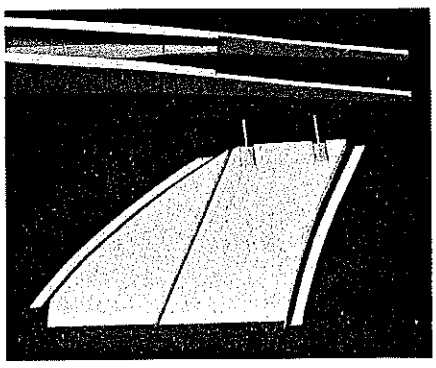
glass cloths such as those available from K&B.

Fiberglassing the fuselage. Make sure that all surfaces have been fine sanded. Test to determine how many catalyst drops will start the gel process for ¼ oz. of resin in 10 minutes, then mix batches in that proportion. Remove the hatch block, and lay up a single layer of K&B medium cloth on the block. Roll toilet tissue on it to sop up excess resin. While the resin is curing, apply two layers of medium cloth in the front belly area, bringing it up as far as the lower slab side line. Stagger the overlaps to minimize feathering work later. Sop up the excess.

Cut two layers of medium cloth to fit from approximately 1½ in. forward of the fin to the tail end. Fit the first layer to wrap up the sides over the filleted area, then overlap it with the second layer for easier feathering. Carefully smooth and feather the cloth after curing.

Cut additional layers of medium cloth to be applied in sections. Fit a third layer over the first two in the filleted area, apply heat to at least partially cure, then fit more cloth over the entire fuselage, up the fin, and under the stab base. Go down and around at the nose and behind the hatch. Always sop up the excess. To minimize overlapping of cured areas, which will have to be sanded





Left: The fuselage is constructed using 1/16 ply sides with 1/8-in. balsa doublers outside. The 1/32 ply bottom extends to the rear former. The 500-mAh square battery pack and the receiver fit ahead of the front former. Right: The fin edges are slotted for ply insets. At the top, Du-Bro 4-40 threaded inserts (illustrated by the long bolts) are set in spruce blocks. Nylon bolts are used to secure the stabilizer to the top of the fin.

glue the center core to the bottom with CyA, and trim to the core edges. Add the top, and shape to a symmetrical airfoil tapering toward the tips. Glass with light cloth.

It's exasperating to discover flaws after a final painting. You can avoid this situation by spraying on a very light, temporary coat of a cheap, white, quick-dry, high-gloss enamel. View the model in low-angle light to find defects. Fill larger flaws with more of the primer. Fill tiny pits with Zap, but wick off the excess with balsa shavings. Remove the temporary coat with acetone or lacquer thinner.

Fiberglass hatch. Outline the hatch with ⅛-in. trim tape applied 1/32 in. away from the hatch block on the fuselage, to allow for shrinkage. Apply a coat of wax and PVA to surfaces where the hatch block fits in; this will facilitate its removal later. When the PVA is dry, fit the block in place, then wax the block, the trim tape, and the fuselage a couple of inches beyond the tape edge. Lightly buff the wax, and apply PVA overall. Size one layer of medium cloth and four of heavier cloth so that the mold will extend about an inch beyond the tape.

In laying up the hatch mold, a laminating resin such as Evercoat No. 561 has an advantage over the K&B resin in that it cures to a tacky consistency which bonds the cloth to the surface. The K&B resin, however, may be used if desired.

Use the 10-minute gel rate, as before. Coat the protected structure with resin, and allow it to cure. Position and coat a light layer of glass cloth, then add four heavier ones in succession.

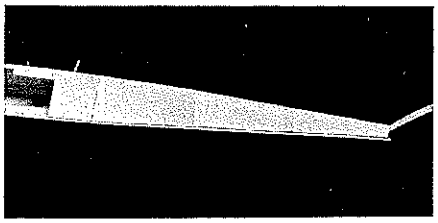
Carefully separate the well-cured mold and hatch block. Wash off the PVA. Sand the wax from the fuselage using fine-grit paper.

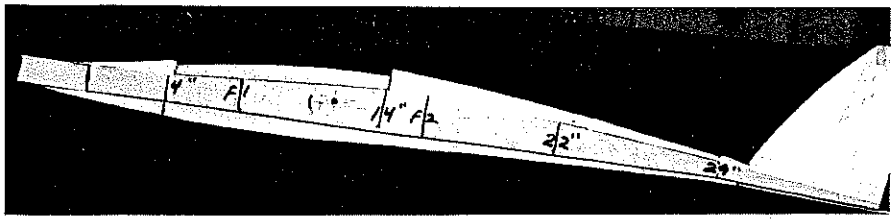
Wax and apply PVA to the mold. Brush on K&B or laminating resin. Progressively lay up one layer of medium cloth and two of heavier, applying K&B resin at the end so that it won't be tacky. After allowing this to cure, remove the mold, trim the hatch to the tape line, and fine fit it to the fuselage. Vertically position the hatch ends on ⅛-in. balsa, and mark them on the inside. These half-moon pieces make rests that are glued to the fuselage to key the hatch. Add a block with a small hook attached.

Wing. Ballast tubes are not used. As indicated on the plan, ballast plates of sheet lead can add over 2 lb. of weight.

Fit the main tube facings to extend to the core root, cutting the tubes themselves to extend ¼ in. beyond the root. Roughen the tube surface. Make sure the facings don't protrude above the core surfaces but fit snugly against the tubes. Epoxy in the facings.

To impart dihedral, angle in the tubes vertically between the facings, and adhere with Zap. Prepare wedge-shaped pieces of balsa to almost completely fill the space under and over the tubes, and liberally epoxy





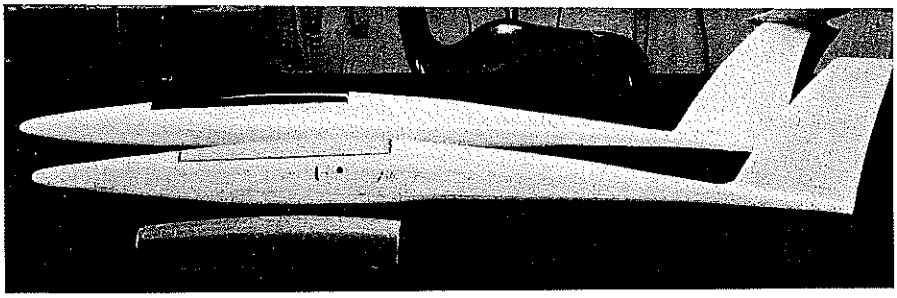
Left: The fin is glued directly between the slab sides, then 1/64 ply is added top and bottom behind the former to complete a ply box. Correct for any warping or tilting as the subdecking is installed. Right: Balsa wood is cut to rough shape and added to the sides for final shaping.

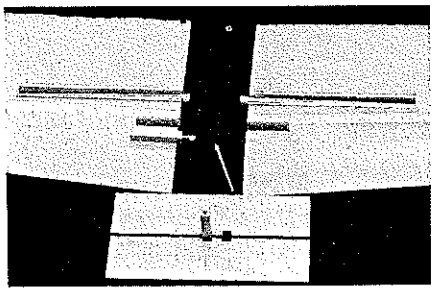
later, fit pieces together as neatly as possible and, when you can, trim the excess while the resin is still soft.

Allow all the wrapped layers to cure, then lightly smooth down the rough spots. Cut the cloth off inward in the area around the hatch block and opening edges. Block sand the edges of the hatch block and opening. Finish off the area around the extreme nose end with small pieces of cloth or additional coats of resin. Smoothing down can be done at this stage with fairly coarse sandpaper, such as No. 120, but take care not to cut through the cloth.

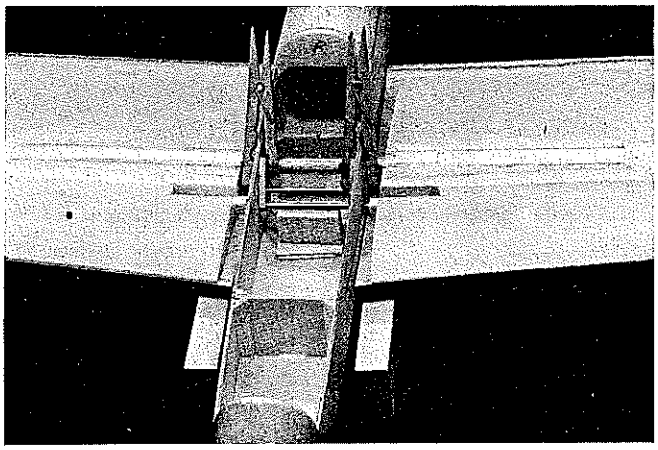
After rechecking the fit, remove the hatch block and apply a smooth, even coat of resin to all glassed surfaces. Allow to cure, then apply more resin wherever light reflects off the surface. Once the entire area is well sealed, proceed with wet sanding. Use a block with a heavier grit sandpaper to knock off the bumps, then go to a lighter grit paper such as No. 280. The idea is to smooth the surfaces flat until all the shine is gone, but in practice you can expect many small low spots.

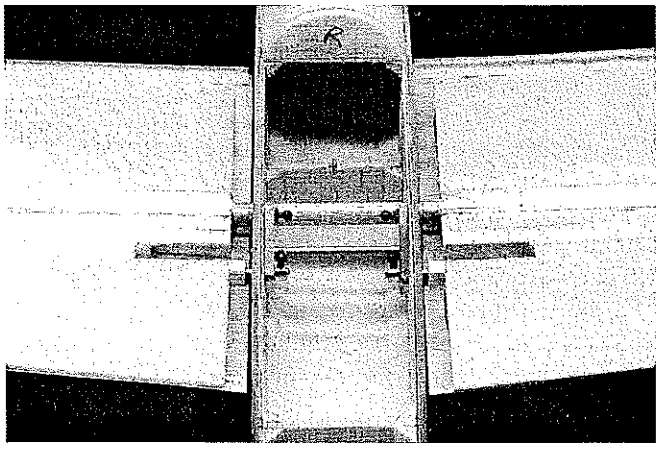
Fill in scratches and most of the remaining surface depressions with K&B brushing primer. This sands off in a powder when cured. Follow with more wet sanding, moving down to progressively finer grit paper—No. 600 or even No. 1200.



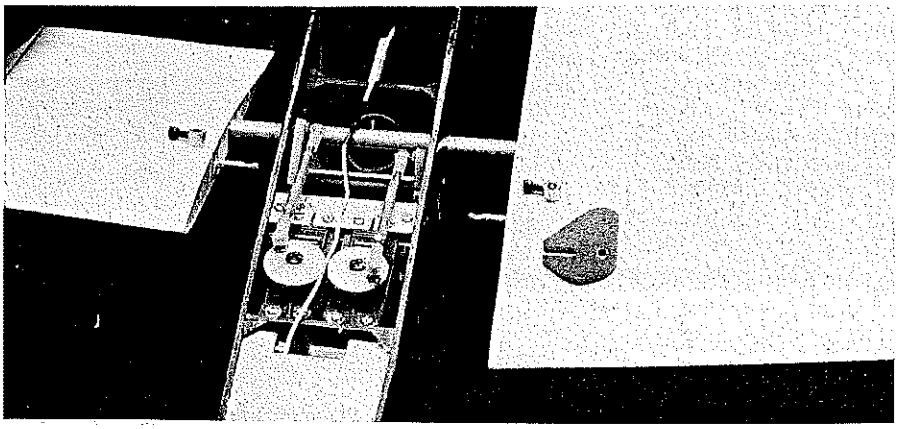


Left: The mold (in foreground) is made directly over the glassed fuselage. The hatch is made in the mold. A fillet between the fin and slab sides, gives a one-piece look. Right: Tubes are angled between facings for dihedral. Wedges, epoxy, and filler smooth things up. The jig in the foreground clamps to ¼-in.-sq. spruce for holding vertically in a drill press. The drive pins will be epoxied in these blocks after alignment steps.





Left: After the bottom wing skins have been installed, the wing panels and drive-pin blocks must be carefully aligned, as explained in the text. Refer back to this photo at that point. The top wing skin is installed only *after* all the alignment steps have been accomplished. Right: The drive pins must be located in precise lateral positions, as the text explains, so that the wing panels will also be in precise lateral positions.



Close-up of the installed servos, shown here in a left-turn position. After the top skins are installed, the opening at the root is filled in. Drive pins slip into slots in heavy-duty bellcranks. Hex-head screws in the collars seat in the drive pin notches to firmly secure the panels.

Stabilizer. Build as shown on the plan using lightweight balsa. Cut the bottom of the stabilizer oversize with an opening that will fit over the stab base. Use wick action to

them in. Fill and smooth to the core contour using Red Devil or a similar product. Drive pin blocks are installed later.

Wing skins. The cores in the parts pack are cut to the wing leading edge (LE), but they end ½ in. in front of the wing trailing edge (TE).

Use two 1 x 4-ft. sheets of 1/64 plywood to make the wing skins. Cut the bottom skins from separate sheets; align them with the core leading edge and extend them ¼ in. beyond the core root. Precisely mark the tip contour. On the inside, evenly feather the last ¼ in. of the trailing edge down to the bottom lamination. Trim and contour the core tip as a base for the top skin, leaving about ½ in. for balsa edging at the tip perimeter. Attach the bottom skins with epoxy.

Precisely made, heavy-duty, matching bellcranks, as provided in the parts pack, are essential. Open the ⅛-in. hole with a No. 23 bit. Gently tap in a ⅜-in. length of ⅛-in.-I.D. brass tube. This is a bearing to prevent wobble of the bellcrank on the wire.

Prepare the tube that goes across the fuselage to protrude 1/32 at either side. Similarly size the ⅛-in. pivot wire. Mount these items. Prepare ¼-in.-sq. by 1¼-in.-long spruce blocks with a center-drilled hole. A jig to hold the blocks vertically for a drill press can be made from pieces of ¾-in. lumber, with each piece notched ⅛ x ¼ in. Clamp in the blocks, and drill the holes.

Wing alignment is at 0-0 with respect to the fuselage under the fin. Place a straightedge under the fin, extending it to mark a 0-0 line in the wing area. This will be a bit off the airfoil chord line. Mount the wings, checking that the bottom wing skins are parallel to the fuselage sides with 1/32 clearance for rotation.

Cut a 4½-in.-long piece of ⅛-in. wire. Run it through the bellcrank slots, and add the drilled blocks. With clothespins, clamp the bellcranks upright in the neutral position. Block up the wing panels from the underside. Make another block ¾ in. thick to place under the long wire. When the long wire is pushed to this block, it squares the holes in the drive pin blocks with the main rod. Shim the ¾-in. block as necessary, so that with the panels at 0-0 setting, the long wire (and hence the drive pins) centers vertically in the arcs. Extend the arcs if necessary.

Rotate one panel so that the leading and trailing edges of the skin are parallel to the 0-0 line. Fit facings between a layer of foam and the block. With the wire pushed down, tack in the drive pin block using CyA or quick-set epoxy. Allow about ¼ in. between the outboard end of the block and the end of the foam slot. With the wire still down, align the panels to each other by eye and tack the other drive pin block in place.

Remove the wings and the wire. Secure the blocks. Size the drive pins so that, with the collars on, the other end will protrude 1/16 or so in the cut beyond the blocks. After mounting everything in place, push the bell-

crank against the slab side, then push the collar against the bellcrank for minimal clearance. Push the tube in the panel against the tube in the fuselage to check for 1/32 clearance with the skins.

To define the lateral location of each drive pin, make a cut in the drive pin end and epoxy in a scrap of spruce so that it butts against the end. Remove the panels. Rough up each pin and attach with epoxy, making sure that the notch faces up. Zap the pivot wire and the main tube in place. Add epoxy putty around the inside of the tube.

Cut the top wing skin to the extreme leading edge, extending it at the root to match the bottom skin and about ⅛ in. beyond the latter at the trailing edge and tip. Edge the bottom skin with balsa, beveling it so that the top skin will form a fine edge. Shape the foam inward as a rounded base for the top skin in the tip area. Join the top skins to the cores as far as the 32-in. mark.

When cured, invert the panel. Progressively wick-glue the skins together with CyA along the trailing edge to the 32-in. point, pressing with a straight stick only on the last ¼ in. of the bottom skin.

Wing tips. Experiment by pressing and lifting the tip skins together at various spots to find the optimal attach point before gluing. Aim for a nice line around the edge and a bit of washout in the raked tip. Wick join the tips with CyA, and trim the excess top skin.

Remove 3/16 in. from the panels at the leading edge, then add and shape the LE.

Fill in at the roots with scrap wood and epoxy putty, etc. Make sure the blocks and pins are buried in the epoxy.

Fiberglassing the wing. Prepare the panels for glassing by fine sanding, and wipe them clean. Cut light glass cloth to cover a panel in one piece wrapped around the leading edge. Position this piece on top with the excess extending forward.

Using a wide brush for quick application, smear resin everywhere except the area around the leading edge. Work from the center outward, and pull the cloth from both ends to smooth out puckers. Brush from front to back as well, making sure that the entire area is thoroughly wetted.

Slit the cloth where the tip curves. Use a roll of toilet tissue to sop up all the excess, eliminating the wet look. Clean the brush in acetone. Allow the resin to cure to the point that the panel can be handled, then invert it and follow the same procedure for the other side. Pull the cloth rearward to smooth it around the leading edge, and wrap the LE separately when the panel can be handled on its edge. Sand, recoat, and prepare for painting in the same way as the fuselage.

Painting. Finish sand, dust off, and tack all surfaces.

Choose a clean environment for spray painting and drying. If you own spray equipment, you probably already have a favorite paint. Durable epoxies such as those made by K&B adhere well to properly prepared

surfaces. A base of white yields a fine-looking finish when trim colors are added.

Among inexpensive discount store brands, the Dutch Boy fast-drying spray enamel, called "The Fresh Look," delivers a soft, fine, fan-shaped spray that does an especially nice job. Keep moving as you spray, and overlap as evenly as possible. Apply eight to 10 light coats a few minutes apart for good coverage. The Dutch Boy white enamel is No. 3725; the black is No. 3726. Wait five days as instructed by the manufacturer, then mask and add the trim color.

If the paint you've used doesn't prohibit it, well-cured surfaces can be worked to a deep sheen using a polishing compound and then waxed with Simonize. This step minimizes skin friction. It can be done with both the K&B and Dutch Boy enamels.

Use servos with 50-in./oz. torque or better, and mount them firmly. Size and adjust the connecting links so that the wing panels are at 0-0 alignment with the trim tabs set at neutral.

Initial flight testing. The first thing to check out is that the right wing moves up as the left one moves down for a left turn, and that both wings move up at the front with *up* elevator. If this isn't the case, correct the problem by switching the servo plugs.

Check that the model balances at the forwardmost point indicated on the plan and that the wing appears in 0-0 alignment. Make sure that bellcrank ball links are in an approximately vertical (straight up) position for similar motion each way.

A dual-rate transmitter works best. It should have good throw from the trim tabs. If you have dual rate, set the transmitter at the low rate, and adjust the wing motion for about ⅜ in. of both upward and downward elevator response at the trailing edge. You should have approximately ⅝ in. of movement on the high setting. Similarly, adjust the aileron movement for ¾ in. up or down stick response at the trailing edge on the low rate, and 1 in. or more on high. If you don't have dual rate, adjust the wing and aileron response as per the suggested low rate figures.

Find a *long* stretch of lawn grass, preferably with a rise or a knoll. Your first objective is to trim for level flight without worrying about the turn. Due to the long stabilizer moment arm, the pitch action is rather soft, though this allows you a brief moment to get to the stick. However, it's essential to jack the model up quickly to flying speed—or you'll have a 20-ft., one-second flight ending in a hard thunk. This is no time for timidity. Heave it straight out and a bit nose up . . . *hard!*

Adjust the trim tab as necessary for level flight, then mark the fuselage where it meets the wing trailing edge. Center the trim tab, and adjust the linkage for the marked spot. The goal is to have the wing as near to 0-0 in the neutral setting as possible for maximum penetration. If necessary, put a shim under the stab at the front or rear.

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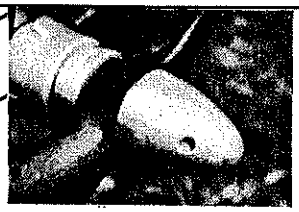

Orca/Michaelis

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The turns seem to be excellent without any differential. Check out the roll rate using small inputs at first. The amount of panel rotation present should make for smooth, steady turns. Excess rotation causes the rocking action typical of overcontrol and overcorrection.

At the slope, launch Orca aggressively in winds of 15 mph or higher. Things really start to get interesting when turbulence reaches 25 mph—and at gusts of 35 mph or better, full attention to business is required! After an hour of airtime you should be fairly confident flying the model when it is up a good ways. Keep the plane up high and far out when at high airspeeds—and hide your women and children when hot-dogging!

Experiment with the center-of-gravity farther aft for quicker response to pitch input; this will also flatten out any ballooning tendency. In heavier winds, experiment with ballast.

Soaring high aloft and resplendent in its black-and-white killer whale markings, Orca does its builder/flier proud.

The parts pack includes precision-cut blue foam cores, special bellcranks, and a 1-ft.-long $\frac{5}{16}$-in. stainless steel rod. Order from VS Sailplanes, 2317 N. 63rd, Seattle, WA 98103. Price including shipping is $24.95. For the airfoil coordinates, send a preaddressed, stamped envelope to Harley Michaelis, 26 S. Roosevelt, Walla Walla, WA 99362; enclose a loose, unglued 25¢ stamp to cover the photocopying costs.

Nats RC Aerobat./Verger

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rockets . . . ballistics. Now we have a West Coast Nats with a higher than ever entry level in FAI! What a turnaround (pardon the pun)!

Wednesday morning was the beginning of Expert, Masters, and FAI competition. Unlike Sportsman and Advanced fliers, these classes were to fly qualifying rounds and finals. No weather problems . . . startlingly clear skies . . . what more could you want? After Site 2 had completed its first round, it was learned that flying had stopped on Site 1 because of intermittent radio interference—affecting only the FAI line. A new term sprang into use: "lockout." I've heard of glitch, or hold . . . but lockout? Flying was delayed for a while to investigate, and after several hours the flying was called off until the next morning.

After much checking, investigating, and speculating, a decision was made by RC category director Betty Stream to continue. Several frequencies were changed and radios were swapped with the result that only a few minor isolated problems remained. Virtually everyone felt the correct decision had been made. Let's just call it "voodoo interference"!

Expert and Master were able to finish qualifying on Thursday; however, FAI still had one round to fly on Friday morning before the finals could be flown.