

JAVELIN

By Bill Winter/John Hunton

Photos By Bernie Stuecker

Introduction

You know your airplanes, so run these numbers by: a new piped K&B .40: a span of 42-5/8", a gross of 4 lbs. 15 oz., and a wing loading of 17.67 oz./sq. ft. Doesn't compute? Yes, it does. For starters, the delta wing provides an area of 644 sq. in. The ultra short-coupled canard "tail" adds another 125 sq. in. and, since it is set at a positive angle of incidence, it is a lifting surface, unlike conventional stabilizers which normally provide a down-load for pitch stability. Include the foreplane area, and the loading drops close to 15 oz./sq. ft. For less fiery performance, we found a plain bearing O.S. .40 to be quite satisfactory.

Obviously, with the K&B, it goes like a scalded cat, climbs like a monkey, yet it behaves. It is quite stable due to the nature of the delta and stays where you put it. Roll is anything you crave; let up on the stick and rotation stops like a razor slash. Take-offs are short, landings smooth, though a tad faster. It is safe to fly in any maneuver; there are no X-ship quirks. But ask yourself one question before taking the leap. Do I know myself to be a capable pilot? This plane is on the small side, can be quite fast, and covers a lot of ground quickly, perhaps more so than other airplanes in your log book. Of course, its slotted canard/wing arrangement, with a delta's resistance to



Bill Winter holding his prototype delta canard design. Model tested with both the O.S. and K&B engines.



Javelin is a compact model, transportable fully assembled in a subcompact. Note black nose ring extension, the only thing to be added to adapt from the plain bearing O.S. .40 to the K&B 4050.



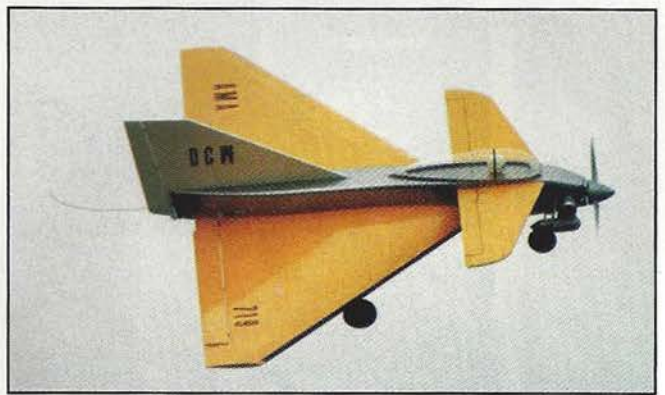
Javelin has plenty of wing area packed into a small space. Model flies normally in pitch but has reactive roll control because of the low aspect ratio. Note elevons on mainplane as well as elevators on the foreplane. Rear elevons are mechanically mixed for roll control.



LEFT: K&B 4050 is a potent power plant perfectly matched to the Javelin for exciting performance. Racing type engine with tuned muffler. High-end power is very good. **RIGHT:** John Hunton approximates angle of climb at take-off. Model has excellent low velocity controllability and stall characteristics.



LEFT: Javelin at point of take-off. Take-off tracking is excellent. Landings are made at a higher angle of attack than normal. Leave plenty of room for your first landings, it will take a while to learn to slow the model down. **RIGHT:** The delta/canard during fly-by. Model has excellent low speed flight characteristics, yet is capable of very fast flight. Can near hover in a light breeze. Get used to unusual configuration slowly, keep model in close until you are used to it.



dropping a tip, and affinity for high angles of attack means that it probably has a greater speed range -- high-to-low ratio -- than anything that you have owned. So you can always throttle down and come off the pipe.

Important, choice of power plants. The lower range is a plain bearing .40; the top, a ball bearing piped .40. The former provides performance beyond any trainer type .40 airplane. So powered, the Javelin is in the performance category. With the piped .40, the Javelin is for qualified pilots.

It will take off and fly without being on the pipe. Then, if you throttle back a bit, it will come off the pipe (if you need a breather). Incidentally, Javelin will climb vertically on the piped engine, and can do four rolls while doing so — then it comes off the pipe. The instant speed is restored, it goes back on the pipe.

Javelin is not an off-the-top-of-the-head design. It is the third of three progressive, related designs, the first of which was the successful pusher canard Q.E.D. The second was a double delta pusher, that is, a 60°/45° single surface. Solid experience with these two craft pointed the way to the

ultimate of the trio: the Javelin. A few points of interest:

The Javelin is a 4-channel aircraft and has elevators on the foreplane, elevons on the mainplane, rudder/steering, and throttle. That is a lot for your money. Those having more exotic radios can replace the sliding servo tray with two servos for the elevons and, thus, take advantage of various mixing and movements. Be sure not to exceed the specified control surface movements — notably on aileron — and don't second-guess the C.G. position. All servos are in the fuselage as well as a mechanical mixer tray to drive the elevons, and by an auxiliary short pushrod, the foreplane elevators.

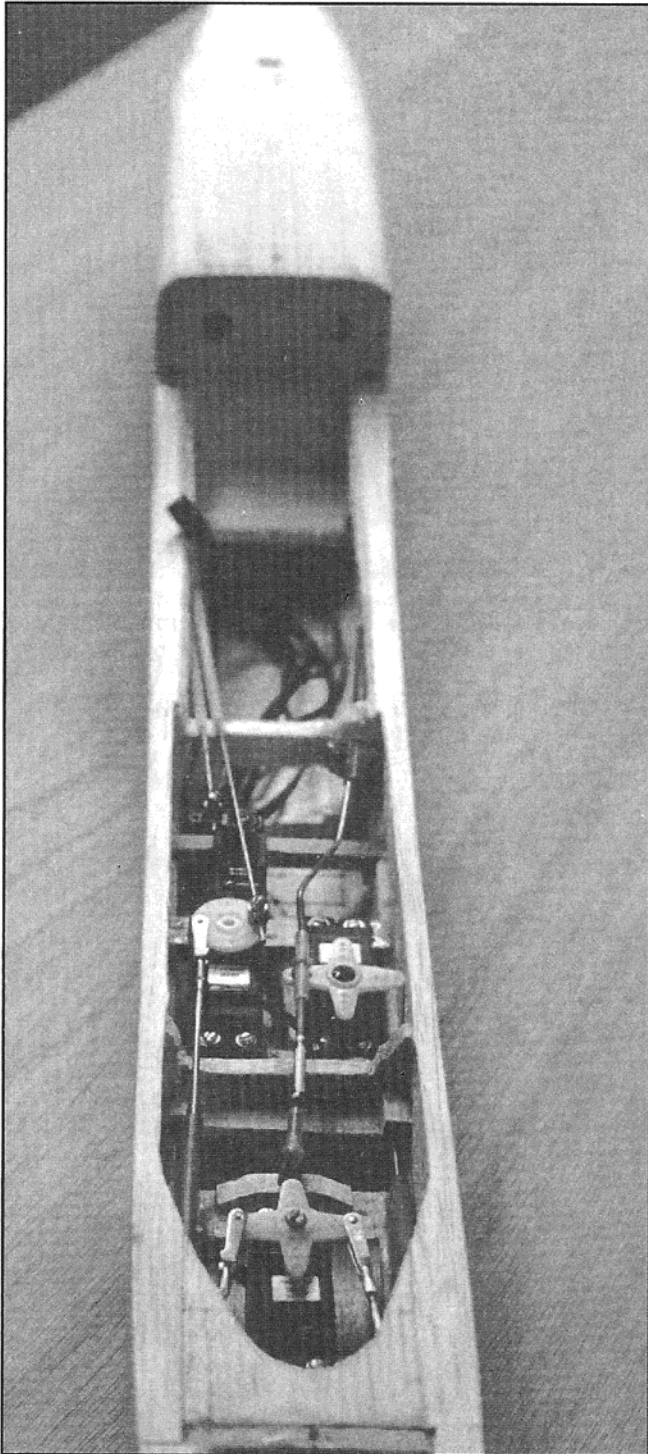
The delta wing is special. Its geometry, with bottom surface rising to tips, provides effective dihedral. Seen from the back, the dihedral is visible along the trailing edge. The trailing edge rises from the centerline, which also governs the incidence angle of each rib section.

The blending of a canard configuration with a full delta alters the aero-genetic code. It allows delta good stuff, with modified delta traits to allow normal landings, and



Bill Winter holding his prototype with John Hunton who flight tested the model and drew up the plans.

so on. This is a well-tested machine. It is a small airplane with big performance. Just fly it like anything else -- but with respect. (Flight test comments appear after construction notes)



Bottom of fuselage showing partially completed fuselage and servo installation. Mechanically mixed elevon servo is nearest one, sliding tray for elevon function.

CONSTRUCTION

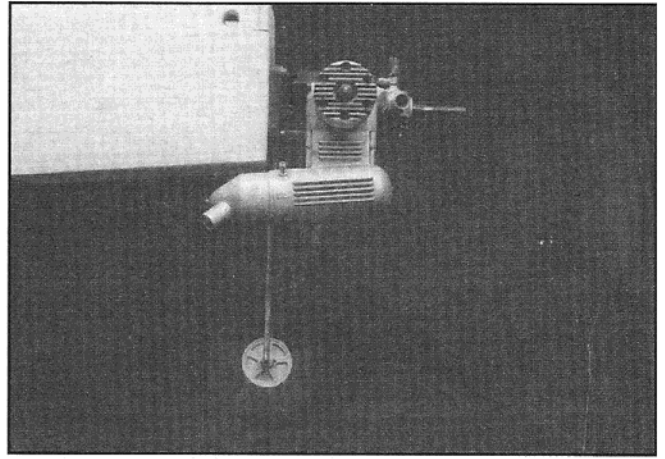
General:

Balsa sizes are shown on the plans and are not generally given in the text. When you order your balsa, specify light wood except for the wing skins, which are medium (if you used a cubic foot of 8 lb. balsa, the model would weigh 8 lbs. without anything else). The 1/4" sheet used in the fuselage should be in the 4-6 lb. range. Recommended glues are Titebond (easily sandable and for relatively slow-drying applications) and CA (cyanoacrylate for quick adhesion) in both thin and medium

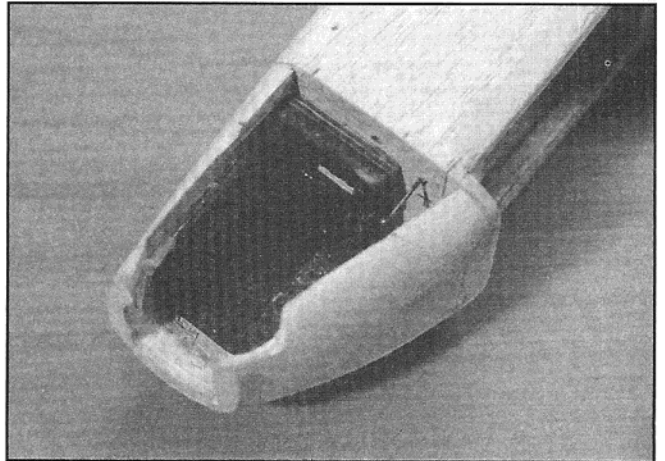
grades, and 30-minute epoxy.

Fuselage:

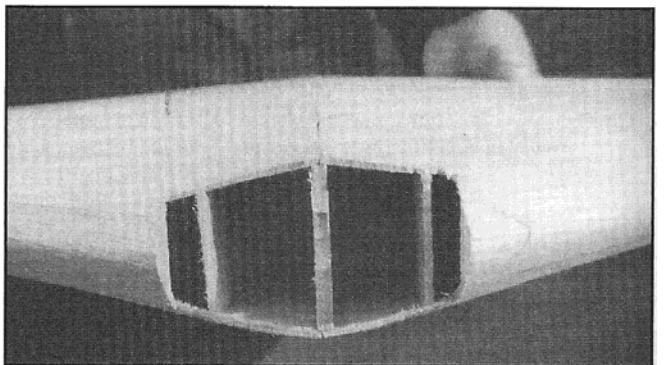
Assemble the two side profile pieces as rectangles 35" x 5". Butt joint as required. Plans show 4" butted to 1". Pin down the wider pieces over wax paper, then run a thin bead of slower CA over the joining edge of the narrower piece and push it against the wide piece, holding it with pins. The rectangle length allows 1/8" waste at both ends for truing up. Remove the pins and sand both sides of the blanks with fine paper on a block. With a square and a soft pencil, mark



O.S. .40 plain bearing engine installed. The O.S. provides lower power but still snappy performance.



Engine compartment. Install nose wheel then fill in triangular fairing. Same mount fits both O.S. .40 and new K&B 4050. For K&B, a nose ring must be added behind spinner.



Wing is built to the front point, then the front is partially removed to add dowel hold-down assembly. Low aspect ratio wing is light. Top of wing is flat, bottom tapers up.

off the rear edges of all bulkhead locations. Carefully note that the fire wall position is to be marked different on each side to produce the correct amount of right thrust. Identify a right and left side. Make a thin cardboard pattern of the wing cutout and accurately scribe with a pencil around the areas to be removed. Draw the straight-line edges of the side profile with a straightedge, allowing for later addition of the top and bottom pieces, etc. When the sides are joined later, the section marks will be the inside surfaces of the sides, so be sure in

Continued on page 157

drawing all indicators that one side is marked left and the other right.

Pin the blanks together and true all edges to identical outlines. Place a sheet of sandpaper on the workbench and slide the paired sides back and forth with a milling action. Part the sides, then taper the aft ends for joining later. Cut top rectangles from 1/4" x 3" sheets as follows: 6-1/8", 5-15/16", and 19-3/4" long. These parts comprise the removable canopy section, fixed section immediately aft of it, and the main top sheet to the rudder post. Sand each to exact plan dimensions and mating end slopes (there is additional length allowed for sanding). Scribe the top fuselage outlines on the long aft piece. Cut this piece and the wing cutouts in the sides to the outside of the line with your Dremel jig saw (or available tool). If an X-Acto No. 11 blade knife is used, be sure that the cut is precisely perpendicular to the wood. Make repeated light cuts. Allow extra wood for tolerance, to be trued afterward.

Cut the forward bottom part slightly over length from 1/2" balsa and sand the ends to the required length and angle. Do not install yet. Prepare the plywood foreplane seat outline and remove the unwanted interior area as shown with a jig or coping saw.

Note the materials and details of each

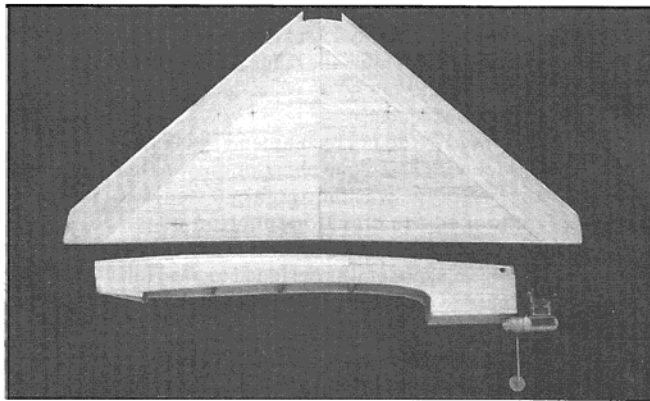
6 and 7 which force those stations to their proper rectangular cross sections. During assembly, check frequently with a triangle for trueness.

Coat the free side of the fire wall with epoxy and pull the nose sides in to make good contact with the left side of the fire wall approximately 1/16" forward of the right side for proper side thrust. Next, temporarily install the engine and engine mount to the fire wall.

To install former 1, check the type of spinner you will use and make a temporary centering support for the nose ring former which will provide proper spinner clearance (approximately 1/16"). Pull the sides together using a large clamp and pieces of plywood to spread the load and protect the sides. Things will go easier if you soak the front sides in hot water for 15 minutes. Sturdy pieces of balsa sticks can be used for clamps by placing them vertical to the fuselage sides, then rubber band around them across the fuselage top and bottom. True the fronts of the sides with a sanding block, then glue the plywood ring former in place. Trial fit, then glue the foreplane mount in place. Install the 3/4" thick top nose block. Leave the entire bottom of the fuselage open for installation of all servos, pushrods, and R/C equipment.

Check that the servo mounting rails are suitable for your equipment, and cut them out. Glue to the inner faces of the fuselage sides where shown. Be sure that the bottoms of your servos clear the fuselage top sheet; if not, gouge out the sheeting for clearance.

bulkhead and assemble all to the exact required widths (do not install yet). Drill required holes for pushrods, blind nuts, and engine mount. The engine mount used had holes for the nose wheel strut, but because



Fuselage and wing assembled. Fit wing accurately to fuselage at this point. Add strips of tape to the wing, color with lipstick, fit to fuselage, and remove portions where lipstick shows up. Technique is used by gunsmiths to fit stocks to rifles.

the mount is turned on its side, similar holes (5/32" dia.) must be drilled sideways through the stock mount.

Coat the front face of the fire wall with epoxy and allow to set. Trial install engine and nose gear (engine will be removed before final nose shaping and will be reinstalled after fuselage has been finished).

Note that the sides of the fuselage run parallel from just behind section 2 to section 5. Also, note that the fire wall is

Du-Bro linkage items are shown. A mini-servo is shown for the throttle; substitute, if necessary. To assist in lining up the pushrods, draw routing on the outside of the fuselage, push a pin through to mark hole positions, etc. Drill holes to start the sheath openings through the sides, then work the slots with a thin, round file or piece of music wire, or a drill bit held in the fingers. Don't glue anything until the servo support crosspieces are trial fitted, along with all servos and linkages. Before final assembly, solder the two clevises (shiny type) at the elevon servo arm -- do this outside the airplane.

Details of the servo tray are given. Movement of the elevator stick moves the tray fore and aft. This allows for simultaneous inputs from the elevator and aileron sticks. Note that a pushrod extends forward from the elevator servo to the foreplane elevators as well as to the sliding tray. If your radio has sufficient channels, you may wish to substitute your own mixed servo arrangements to eliminate the sliding tray, but that requires an additional servo (one for each elevon). Be sure that the controls are rigged so that the elevons go up when the foreplane elevators go down.

Note: We do not recommend flying this model with foreplane elevator only. After the prototype was thoroughly tested, we unhooked the elevator function of the coupled elevons. Pitch control became marginal. This model was designed to use both foreplane elevators and coupled elevons (working in opposition).

sloped for down thrust as shown. The typical triangular corner pieces run between formers, not through them. Check section drawings.

Pin down the **left** side of the fuselage (looking forward) and trial fit, then glue on formers 3, 4, and 5. Use a small triangle to check that each former is at 90° to the side. Repeat the process with the fire wall (former No. 2) at the correct angle for down thrust (following this process properly will create the approximate correct amount of right thrust for the engine when the right side is glued in place).

Lay a straightedge along the exposed edges of the formers, and trim any that need it to prevent gaps when the other side is installed. Coat the mating edges of all formers, except for the fire wall, with Titebond (for time) and install the right side. Use epoxy for the fire wall. After this assembly has cured completely, pin the long aft section of the top sheet to your workbench and glue the assembled sides in place from the front of the top sheet to former 5, without pulling the sides together at the rudder post. After this subassembly has cured, pull the sides together at the rear so that the shaped top piece provides accurate alignment for the sides. Attach the remaining free top parts to the assembled sides with CA for instant capture. Install formers

Cut out and glue in place, aft of section 7, the block for the wing hold-down bolt, but do not drill the bolt hole yet.

At this point, set the fuselage aside and make the wing so that it can be trial-fitted for precise dowel location before the fuselage is closed in. After drilling for the wing dowels, continue with the fuselage as follows:

Install the triangular corner reinforcement pieces. Press the curved parts into the side contours where required, or cut slit wedges into the diagonal faces of the triangles to assist placement, if necessary.

Prefit the bottom nose sheet and drill to clear the nose gear wire, but do not glue on yet. Install the fuel tank and as much plumbing as can be done at this stage. Remove the engine, tank, and mount, install the remaining triangular parts, then coat the inside of the engine and fuel compartments with epoxy. Drill a drain hole in the engine and tank compartment bottoms. Remove any projecting pushrods or the switch. Round off fuselage corners per section views by rough sanding or with a razor plane. Note foreplane seat and canopy area and avoid over-rounding in these areas.

Mark the centerline of the top rear fuselage sheet and cut holes for fin attachment tabs.

JAVELIN

Designed by:

Bill Winter

TYPE AIRCRAFT

Sport Canard

WINGSPAN

42-5/8 Inches

WING CHORD

15-1/4 Inches (Avg.)

TOTAL WING AREA

650 Sq. In.

WING LOCATION

Low Wing

AIRFOIL

Semi-Symmetrical

WING PLANFORM

Delta

DIHEDRAL, EACH TIP

0

OVERALL FUSELAGE LENGTH

41-1/2 Inches

RADIO COMPARTMENT SIZE

(L) 20" (W) 2-1/2" (H) 2"

FOREPLANE SPAN

24 Inches

FOREPLANE CHORD (inc. elev.)

5-3/4 Inches

FOREPLANE AREA

138 Sq. In.

FOREPLANE AIRFOIL SECTION

Flat

FOREPLANE LOCATION

Shoulder-Front

VERTICAL FIN HEIGHT

8-1/4 Inches

VERTICAL FIN WIDTH (inc. rud.)

12 Inches (Avg.)

REC. ENGINE SIZE

.40 2-Stroke

FUEL TANK SIZE

8 Ounces

LANDING GEAR

Tricycle

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rud., Elev., Throt., Elevons

C.G. (from L.E.)

6-1/8 Inches (At Fuselage)

ELEVATOR THROWS

1/2" Up — 1/2" Down

AILERON THROWS

1/2" Up — 1/2" Down

RUDDER THROWS

1" Left — 1" Right

SIDETHRUST

1-1/2" (Right)

DOWTHRUST/UPTHRUST

2°

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa & Ply

Wing Balsa, Ply & Hardwood

Empennage Balsa

Wt. Ready To Fly 79 Oz. (4 Lbs., 15 Oz.)

Wing Loading 15.0 Oz./Sq. Ft.

Canopy/Foreplane Hatch:

Cut out the canopy base from 1/4" sheet (match to your particular canopy shape if required). Trial fit the canopy to the base by gently sanding the wood to match the canopy slope around the perimeter. The mount will be glued (later) to the top of the built-up fairing block which is cross sectioned to fit on top of the foreplane between sections 2 and 3. This fairing "block" is assembled as detailed from two 1/4" balsa triangular pieces, a 1/4" sheet plate, and reinforced with two 1/2" triangle corner pieces. The assembly is nominally 6-1/8" long, 3" wide, 3/4" thick at the rear, and 1/4" thick at the front.

To fit and contour the canopy hatch, lay

1/4" thick spacers on the ply foreplane mounting plate to allow clearance for the canard. Place wax paper over the top fuselage opening, mount the canopy assembly in place, then shape to the fuselage with a sanding board. Remove the hatch.

When the foreplane is finished, position it in accurate alignment and carefully mark the outline of the canopy hatch assembly on the fuselage (assembly floats free aft of section 3). Set aside.

Foreplane:

The basic foreplane blank is 21" long with a center chord of 6" and a tip chord of 2". It is butt-jointed from two 3" wide sheets. Selection of proper balsa for the foreplane is very important because of the aerodynamic loads that this surface will take during maneuvers. Use firm, straight grained balsa for the full-span sheet and the leading edge reinforcements. Use medium-to-light balsa elsewhere. Pin down the full-span portion and butt-glue the sheeting joint. Note that the trailing edge is notched out for the elevator joiner dowel so that the elevator joiner is not offset when the elevator is actuated. Note the grain direction of the tip pieces. Butt-glue them on. True the leading edges of the assembly with a straightedge or a sanding block over the edge of your workbench, then install the 1/4" sq. leading edge parts. Round off the leading edges.

Assemble the two elevator blanks and connecting dowel piece snugly against the rear of the main surface with a strip of wax paper between them and the foreplane. Pin all parts down accurately. Use Titebond on the dowel joint. After it is cured, pick up the work, then taper-sand one side of the elevator assembly with a sanding board. Shape the elevator hinge line as shown on the plans.

Mark locations of the foreplane hold-down screws on the assembly. Pin the foreplane assembly over the plywood foreplane mount. Drill 1/16" dia. guide holes for No. 8 self-tapping sheet metal type mounting screws. There are four such screws to hold down the removable foreplane (for tank access) and two in the canopy assembly. The plastic canopy will be attached to its base frame with six No. 2 sheet metal screws. After installing the screws, remove them and strengthen the holes with CA. Temporarily install the hinges and elevator horn, but remove them until covering is complete. Robart hinge points were used on the prototype, but plastic hinges may be substituted. See detail.

Fin and Rudder:

Noting grain directions, assemble the fin surfaces as you did the foreplane; however, there is no leading edge strip. Dry-fit the rudder hinges and check the fuselage fit. Fin tabs should be snug.

Wing:

The wing is built inverted with the top diagonal spar flush with the workbench. Since the forward cutout which butts against the fuselage is not made until the wing structure is otherwise complete, the leading

edge pieces are extended and taper-joined at the centerline.

Measurements are given with each rib outline for elevation of the trailing edge from the workbench. Note that there are top and bottom auxiliary spars which are interrupted at the intersection of the diagonal main spars. A short 1/4" sq. doubler bridges this cut at the main spars.

Cut out the ribs, trimming the leading edges and edges of the diagonal spar notches at 45°. Remember that there are left and right-handed ribs, so trim ribs and cut notches accordingly. Laminate the two center ribs and cut the lightening holes. Note that there is an "inner" and "outer" leading edge. The 1/4" thick inner one is installed while the frame is on the board. This part provides for easy attachment of the leading edge sheets. The outer leading edges are installed after the frame has been skinned. Both of the leading edge pieces taper span-wise; the inner edge from 1-3/8" to 3/8" at the tips. All leading edge pieces are 30-1/4" long to start. Use a straightedge to mark and cut out the inner leading edge from a single sheet of 2" wide balsa. All leading edge pieces as well as skinning sheets require straight mating edges. To true the edges, clamp each piece down along the bench edge, then trim using a straightedge cut, or sand with a block.

The wing can be built in two halves to be joined later, or if your bench is large enough, build the entire wing at once. Begin assembly by pinning down the top diagonal spars. Lay the auxiliary spars in place and lift these up into place with balsa wedges, where necessary, after the ribs have been placed. Pin the trailing edges in place on the jig pieces. Check for alignment with a straightedge. Locate ribs with a small triangle to set each rib at right angles to the board. If fits are snug, use CA; otherwise, fill with a wood sliver where necessary and then glue.

Install the bottom auxiliary spars and the landing gear blocks. Check trueness of the installed rib leading edges with a straightedge and trim slightly where necessary. Pin the inner leading edge in place. At the center rib, it should be roughly 3/4" off the bench and 3/32" off at the tip. Avoid force fits. If gaps occur, fill with a shaved sliver and glue.

Drill landing gear wire holes in the hardwood blocks. Cut out plywood rib doublers, check fit, then install. Lift the wing assembly from the bench. Join the center section if built in two halves. Slope-sand top and bottoms of the inner leading and trailing edges to match rib contours. True all ribs with a sanding block so that the balsa skin will lay flat. Rub a straightedge over the ribs to read high spots and sand lightly without losing the airfoil shape.

Pin the bottom leading edge 4" width sheet on one wing panel. Apply thin CA through the open side of the panel. Start the sheet at the mid-point of the diagonal spar to allow a land for the remaining sheeting. The sheet should extend slightly beyond the

inner leading edge part and will be trimmed later. Repeat for the other panel. Add the remaining sheeting, being sure that all butt lines are closely fit and flush with the wing surface.

Trim and block-sand the inner leading edge flat, then install the outer leading edge with Titebond and let dry overnight. The outer leading edge can be laminated from 1/4" sheeting. It tapers from 1-1/2" at the root to 7/16" at the tip. Mark with a pencil and straightedge, then cut outside the lines. Plane or sand carefully to proper shape.

To skin the top of the wing, repeat the process, but use Titebond slow-drying glue as you pin down the skins on all ribs, spars, and edges.

To cut the wing as shown at the apex, precisely mark cut lines parallel to the centerline with a flexible rule or strip of wood. Make cuts with a No. 11 blade by making light passes. Cut through the leading edges with a razor saw. Leave about 1/16" extra wood around the opening for safety.

Cross sections and assembly details of 3-5/8" wide apex cutout are given. Block-sand the opening to final size. Insert the 1/4" balsa (3" x 3-5/8") block. Scribe its rear face to match wing curvature, cut to shape, and glue with Titebond. Block-sand its top and bottom edges to flow into the wing shape. Repeat the process with the 1/8" ply lamination. Do not drill the dowel holes yet. Face both sides of the open cut with 1/4" sheet.

Add the two-piece trailing edge center section blocks and sand to conform with the airfoil. Cut recessed grooves for installation of elevon linkage sheaths. Cut notches to allow for full movement of the link arms. Install the linkages with epoxy, being careful to glue sheath only (a drop of oil on the wires may help prevent adhesion). Install the 1/16" plywood bottom piece at bolt-hole location, crack to match bottom dihedral. Add wingtip trailing edge blocks and tip strips, then sand entire wing to final shape.

Assemble elevons by first pinning down the bottom sheets at the bench edge, then add the leading edges away from the bench edge. Install ribs and elevon arm blocks (positioned to suit your particular linkage), then sand this assembly to tapered shape and install the top sheeting. Groove the elevons to accept the linkage and drill for the elevon arm. Block-sand the leading edge to proper taper; drill and make cutouts for hinges. Reinforce link holes with CA and redrill. Trial-fit elevon linkages and hinges, then remove for covering.

Fit the wing to the fuselage before installing the hold-down dowels. While the rib profile on the fuselage will be fairly accurate, the inside will have to be tapered and shaped to fit the wing. Run masking tape along the top of the wing where it will meet the fuselage and coat the tape with lip-stick. Seat the wing, remove it, and trim away the material which is marked with lip-stick. Repeat the same process until the wing is seated and level.

With the wing accurately mated to the fuselage, drill a 3/16" dia. hold-down hole

through the wing and the rear ply mounting plate; remove the wing and drill wing alone with 1/4" dia. clearance bit. Tap the hole in the plywood mounting piece for the 1/4"-20 nylon hold-down screw. Realign the wing on the fuselage and attach with the mounting bolt.

Drill wing mounting dowel holes from the front, through the already drilled holes in the former and through the ply and balsa pieces of the wing. If the drill angle is awkward, mark the holes, remove the wing, and drill. Temporarily, install the wing dowels and trial-fit the wing. If the fit is not precise, open up the wing holes carefully with a round wood file. When satisfied, fill the wing holes generously with epoxy, place wax paper over the front of the wing, reposition the wing, then insert dowels through the former and wax paper into the wing. Allow to set completely.

Remove the wing and finish the bottom of the fuselage, gluing on the bottom block, shaping same, etc. Be sure nose wheel strut hole is located properly.

The main landing gear is shaped from 1/8" dia. music wire. Cut long to allow for bending. Make bends using a vice, hammer, etc. (Hint: file a small notch in the vice jaws to provide a small radius to prevent breaking the wire at the bends.) Trial-mount the landing gear and temporarily install the mounting plates. Check alignment and symmetry of the landing gear wire. Remove before covering wing.

Covering/Painting:

On the prototype, we used 21st Century films by Coverite for the wings and foreplane, and 21st Century spray paints for the fuselage and fin. Prepare all surfaces by sanding with a block to true up. Touch-up curves with folded sandpaper. Follow film covering instructions accurately, but generally try to pull film tight enough during adhesion to minimize the amount to be shrunk.

The 21st Century spray paints are easy to work with and give excellent results. Apply primer and sand between coats until grain is filled. Apply another coat and wet-sand with fine paper. Apply a thin coat of color and wet-sand again to expose any remaining blemishes, prime out, wet-sand, then apply color coats. The 21st Century finishes are easy to work with and give great results.

Final Assembly:

Follow the same alignment steps as in prefinal assembly, only this time, glue the parts in place. Install the R/C gear, linkage, engine, and engine mount. Hook up fuel tank plumbing. When installing the nose wheel, check incidence against the plans to obtain proper take-off angle. Install the antenna full-length per the plans.

It is critical to make the model balance where indicated. Use ballast, if necessary. Also check side-to-side balance and correct with tip weight, if necessary. Check for free control movements of the indicated amounts.

Flying Notes By John Hunton

The Javelin has been designed by Bill Winter to provide a performance type sport model which is easy to build, yet can provide a much wider flight envelope than a typical trainer. With a plain bearing O.S. .40 FP, it flies just fine. With the new K&B 4050, the Javelin is truly exciting. We found that a good match for the K&B's tuned muffler was a 10 x 6 APC on 15% fuel. A 9 x 6 sounds good, but is not a proper match for the plane.

While the Javelin has the speed of a racer, it has excellent stall and low velocity performance, and this provides you with a very wide range of capabilities. Javelin will not bite you if it is yanked off the ground too soon. The only aspects that you must watch carefully are its appearance, its low aspect ratio, and its speed. When flying this model, consider yourself a fighter pilot. You cannot daydream or take your eyes off the ship.

Appearance? Yes. This is a tail-first model (canard) and any unusual planform takes time to get used to in the air. You must color the bottom dark, the top light, and the vertical stabilizer brightly. Stay away from colors that tend to blend with the sky such as light blue or white (blends in on humid, hazy days). Silver on the wings is a challenge. Bright reds, oranges, chrome yellow are typically good. Bill Winter chose a dark, but bright red for the bottom, and this seems to help. These things will help, but mostly keep the model close, until you are used to how it looks in the air. Once up, reduce power as needed and get familiar with the feel of Javelin during simple maneuvers, such as Figure Eights. Use smooth stick "pressures" until you sense that you are checked out.

The low aspect ratio wing inherently has more sensitivity to roll than a longer wing. While a snappy roll rate is exciting, it can take some time to get used to. You may want to reduce the motion by one hole to start with.

The Javelin is fast when you are at high throttle, particularly with the K&B 4050. The model can get out of your visual range very quickly, so again ... keep it close. I find myself doing Figure Eights in close, until things settle down and get trimmed out, then I am ready to rock and roll. Javelin can take off and climb out without being on the pipe. Loops are fine and can be made tight. Javelin will fly inverted. It is nice and stable in slow flight, although, when flying slowly, you must depend more on the rudder for control. Stalls are generally just mushes. Javelin has a high enough power-to-weight ratio to fly itself out of a stall.

One basic thing to keep foremost in mind is that with this, or with any fast model, safety becomes a much more important issue. If a model going fast hits something or someone, it will cause much more damage to the object and itself than a slower model because of mass effects. Your preparation and safety procedures must be increased in direct proportion to the speed of the model. Use a checklist. Do your range checks. This fast model will be flying much farther from you than a slower trainer type, and it is smaller.

A word about the K&B 4050. This is a racing-type engine and it is capable of producing 1.8 horsepower when using the proper fuel and propeller combinations. The resonant muffler, however, adds some complexities to engine operation. When the engine comes into resonance on the tuned muffler, it requires a richer fuel mixture than at mid-range. This means that, at normal idle mixture settings, the engine will be rich. This problem can be mitigated in two ways. Change the carburetor to a part number 5970 which has a smaller bore than the stock carburetor, or with the stock carburetor, if your engine runs too rich at maximum lean idle, just remove the offset head idle adjustment screw and turn the idle barrel further lean until you get reliable idle.

We also found that the engine will come up to resonance easily when first started cold (be prepared for a quick take-off); otherwise, you will have to take off at a lower power output.

While we recommend a 10 x 6 specifically, it is permissible to make your initial flights with a 9 x 6 APC type prop. With this prop, the engine will come up to resonant rpm on the ground and be easy to set. After getting the engine set up, we went to a 10 x 6 for more disk area and better performance. The 10 x 6 is far superior in aerobatics and vertical maneuvers. The 9 x 6 lowers performance.

If you want performance, you will find Javelin to be fully satisfying and quite capable.

