VECTOR

VECTOR/ vekt (r) - a course or compass direction of an airplane. A quantity, such as a force or velocity, having direction and magnitude. A line representing such a quantity.

As for aerobatics, the Vector will do them all. Designer's favorite is a double snap roll on top of a loop. If you want to fly from point A to point B and have fun in-between, try a Vector.
By Vince Bobrosky

After flying the Vector and discovering how precise its movements were, this seemed like an appropriate name for my new design. I had a few other names in the back of my mind, but, after the first flight, Vector was the obvious choice.

The first flight was on a Sunday at one of our club picnics. I arrived early with the Vector, not yet named, and old reliable, the classic Aeromaster biplane. I put the bipe on the flight line and the Vector in the shade under our shelter. A few of the guys were already at the field, and the Vector drew their attention. We talked about it some, but I opted to fly the Aeromaster to warm up and loosen the old thumbs.

A few more of the guys arrived later, and we analyzed the Vector some more. They assured me it would fly just fine, and they tried to build my confidence with positive comments. But still, the Vector sat in the shade. My excuse, "W-e-e-ell, I don't think I have enough pictures of it yet and, besides, my wife wants to see the first flight." I don't know about you, but it seems my wife will always join me at the flying field when I have a new plane to test fly. I really don't know what she hopes to see, the first flight go without a hitch, being nothing more than some procedure turns to check things out, or something more exciting, for her, anyway.

The afternoon proceeded on and I took some more pictures of the Vector. Finally, my wife arrived with the picnic basket, lawn chairs, and the family dog. We unloaded the car, chased the dog off the field, and headed toward the flight line.

By this time I had done a range and vibration check on the Vector. I double checked everything else out again and topped off the fuel tank for the first flight. I fired up the O.S. .45 and rolled out onto the field. I did a few high speed taxi runs to check out the ground handling. Everything looked good! I shook myself into position for the take-off and turned to my wife, who gave me an encouraging smile. I pointed the Vector into the wind and advanced the throttle. The speed built up quickly. She was tracking as if on rails. The tail was up and flying and, as I eased back on the stick, the Vector was airborne.

I flew straight out, gently gaining altitude and made a gradual right hand turn to clear the field. Everything felt great. I lined up to make a high pass over the field. As I came overhead, I held the transmitter in one hand over my head and yelled out, "Look --- it flies!" The Vector flew hands-off the entire length of the field.

I proceeded to loop, roll, and do some slow speed testing, all on the first flight. All I had left to do was land this thing. The wind was probably a steady 10 mph. The Vector didn't mind at all. She came in very steadily and settled down without any problems. I taxied to the pit area and shut the engine down.

What a great feeling it is to see your creation fly. And fly it did. So much for

ABOUT THE AUTHOR

Vince Bobrosky is 29 years old and has been building and flying model airplanes since the age of 9. Most of his early activity was in 1/2A Control Line, which he had designed and built several of his own designs. He also was involved in some free flight.

His R/C venture started in 1978 and from that date, has flown many different types of airplanes. Vince prefers to scratch build and finds it less expensive and a much broader range of subjects to choose from.

Vince's main interest now is in gliders, sport scale, and all types of sport airplanes. His interest also involves full size aircraft, spending the last four year's vacation time at the Oskosh E.A.A. Fly-In along with his wife.

He holds a comprehensive BA Degree from Illinois State University. He works for Eureka Co. as a designer of components for Eureka Vacuum Cleaners.

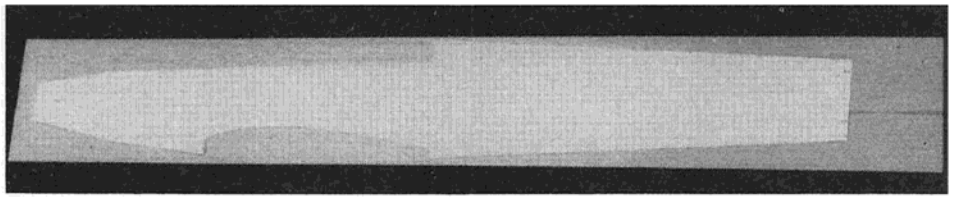
VECTOR
Designed By:
Vince Bobrosky
TYPE AIRCRAFT
High Performance Sport
WINGSPAN
55 Inches
WING CHORD
10¼" (Avg.)
TOTAL WING AREA
563¾ Sq. In.
WING LOCATION
Low Wing
AIRFOIL
Symmetrical
WING PLANFORM
Swept Leading Edge
DIHEDRAL EACH TIP
3/4 Inch
O.A. FUSELAGE LENGTH
45¾ Inches
RADIO COMPARTMENT SIZE
(L) 11¼" x (W) 3" x (H) 3¼"
STABILIZER SPAN
21¼ Inches
STABILIZER CHORD (incl. elev.)
6⅛" (Avg.)
STABILIZER AREA
131 Sq. In.
STAB. AIRFOIL SECTION
Symmetrical
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
4½ Inches
VERTICAL FIN WIDTH (incl. rud.)
8⅜" (Avg.)
REC. ENGINE SIZE
.40-.50 Cu. In.
FUEL TANK SIZE
10 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Ail., Throt.
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa and Ply
Wing ..... Foam, Balsa and Ply
Empennage ..... Balsa
Wt. Ready To Fly .. 88-92 Oz. (5½-5¾ Lbs.)
Wing Loading ..... 22.4-23.5 Oz./Sq. Ft.

bragging, let's start building a Vector. Study the plans and read over the construction details before you start building.

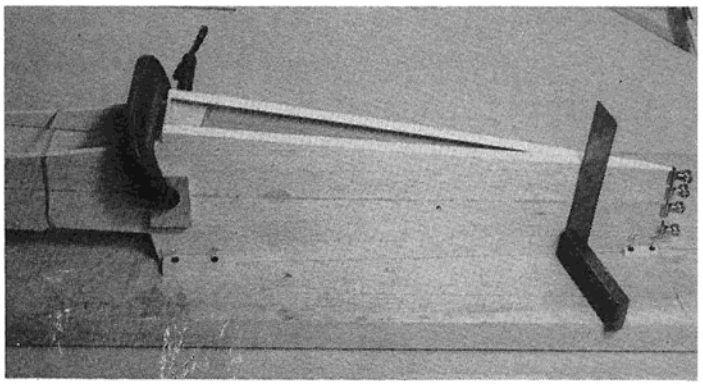
CONSTRUCTION

Fuselage:

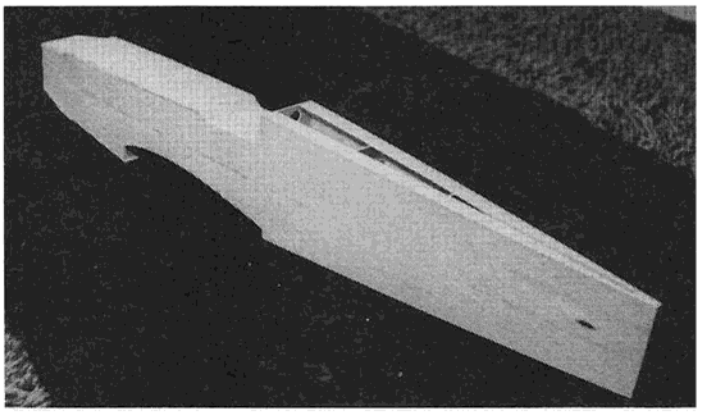
This is the most time consuming part of the construction, so we will start here and get the fuselage out of the way. The structure is fairly basic; however, care must be taken to keep everything straight.



Fuselage side pattern shown positioned on 3/32" balsa sheet.

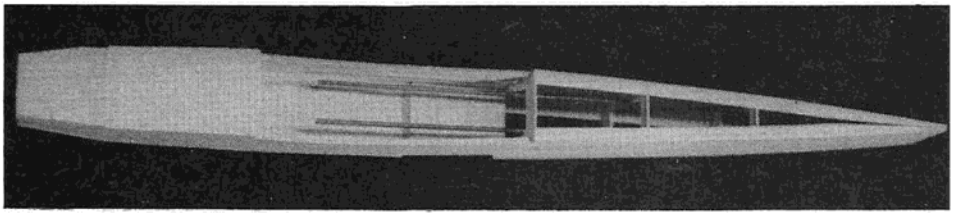


Tailpost being glued in. Note fixtures to hold fuselage sides in place while glue dries. Also use of square to check fuselage sides.



Fuselage ready for top and bottom sheeting.

The fuselage sides are made from four 3/32" medium hard balsa sheets, two sheets 3" x 48" and two sheets 4" x 48". Glue the 3" wide sheets to the 4" sheets to form two pieces 7" wide x 48" long. Either make a template of the fuselage side or trace the shape onto one of the 3/32" balsa sheets. For tracing, you can use carbon paper or darken the back side of the plans with a soft pencil in the area to be traced. The darkened triangles on the plans define the outline of the fuselage sides. Cut the sides out using your favorite method. Make sure both sides are exactly the same. I put one side on top of the other and used small pieces of double-sticky tape to hold them together. Then I sanded the edges to match each other. Once satisfied with the shape, carefully separate the two sides and remove the pieces of double-sticky tape. Place the sides on the plans and mark the former location on the inside of them using the location marks indicated on the plans. Draw lines from the top to the bottom of the sides indicating their position. **Be sure that you have a right and a left side.** Also trace the location of the horizontal stabilizer cut-out on the outside of the fuselage sides.



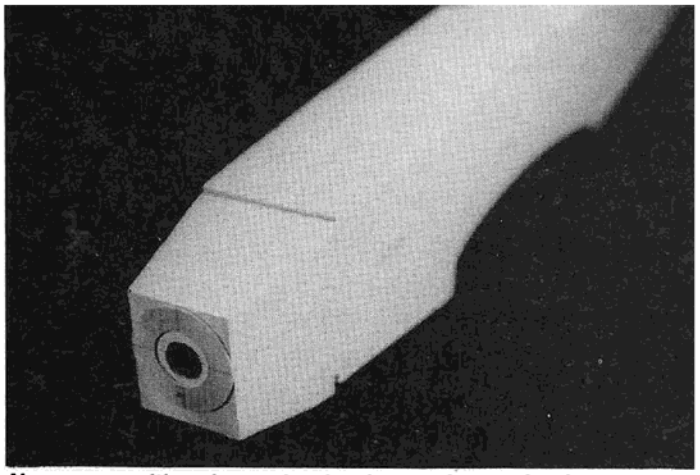
Fuselage bottom view showing outer pushrod tube installation.

Glue the 1/2" and 3/4" triangular stock to the top and bottom of the fuselage sides. Also glue the two 3/32" x 1/4" balsa cockpit floor side braces in place.

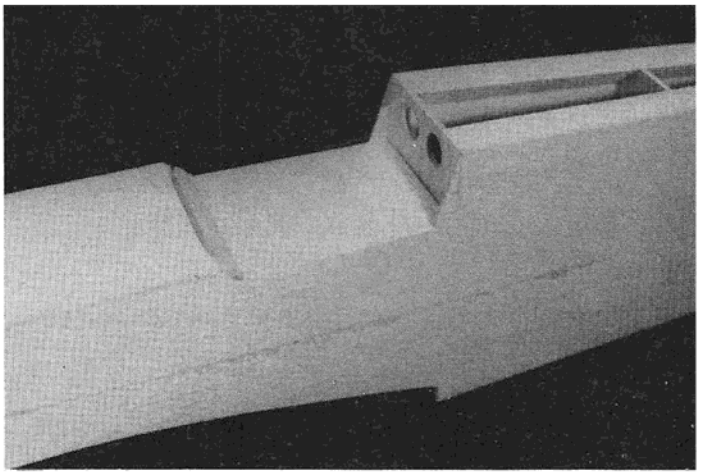
Cut out the 1/32" plywood fuselage doublers. I would suggest making a proper size template of the doubler from thin cardboard or paper to insure a good fit. Use 45 minute epoxy to glue the doublers in place. While this is curing, cut out the 3/32" balsa wing saddle and stabilizer doublers, then epoxy them in place.

Transfer the former location to the triangular stock. This will make it easier to line up the formers during assembly.

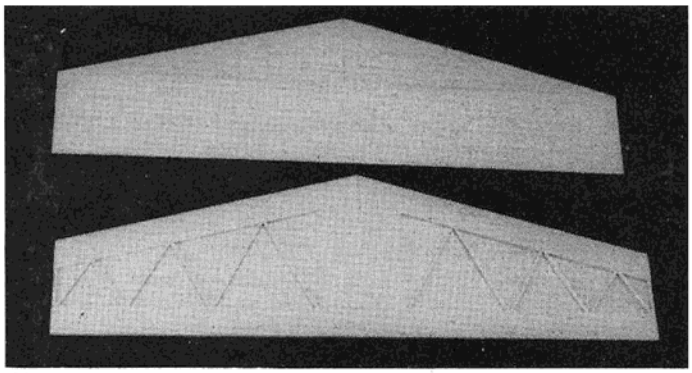
Cut out all of the formers, the firewall, and the spinner ring. Mark the vertical center lines on all of the formers to aid in alignment during construction. Check the formers for a proper fit on the fuselage sides. Glue



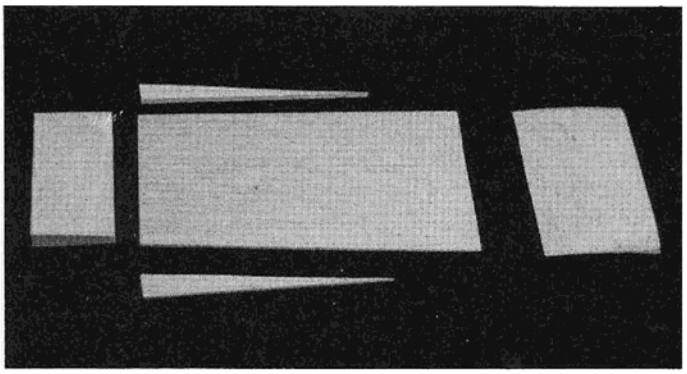
Nose area, with spinner ring in place, prior to shaping.



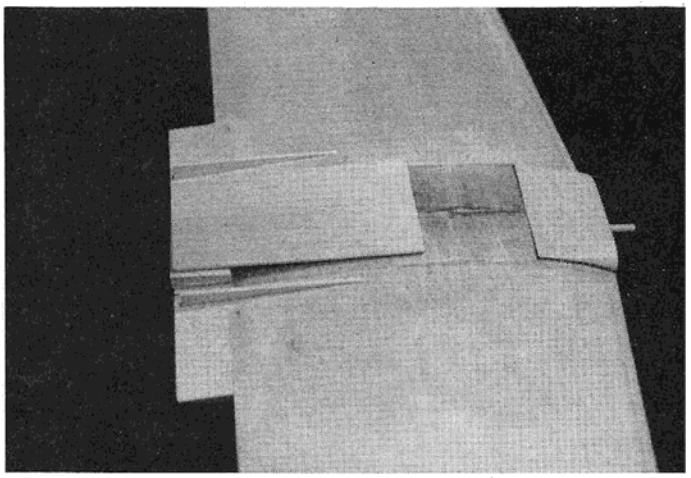
Fuselage cockpit detail.



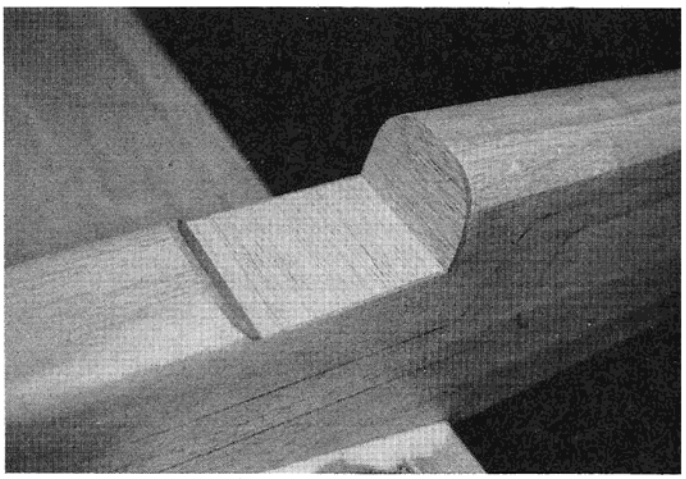
Horizontal stabilizer construction, prior to gluing top sheeting in place.



Wing fairings ready to glue in place.



Wing fairing pieces. Note that the front fairing has been roughly shaped to match the fuselage.



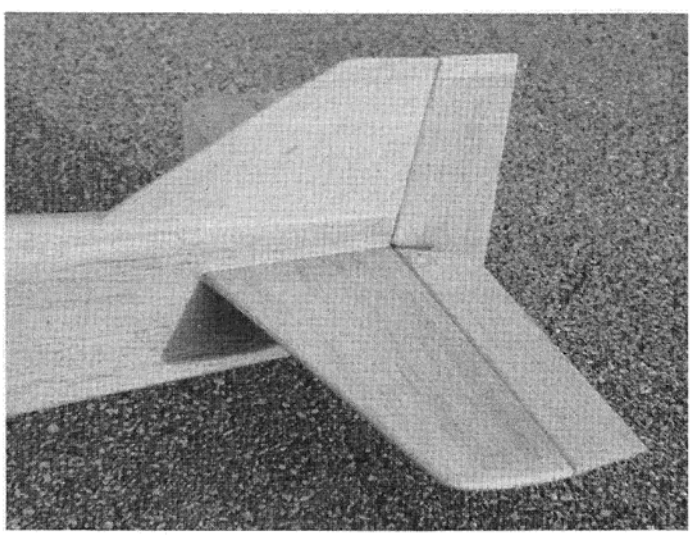
Cockpit area of completed fuselage.

the 1/8" x 1/4" balsa cross braces to formers F-5 and F-6. Drill the holes in the firewall for the fuel lines, throttle cable, and your engine mount. The firewall shown on the plans has the engine centerline indicated on it. Work from this point when installing the engine mount. Install the blind nuts for the engine mount bolts. I like to put some epoxy around the blind nuts to secure them in place. Be careful not to get any epoxy in the threads of the blind nuts.

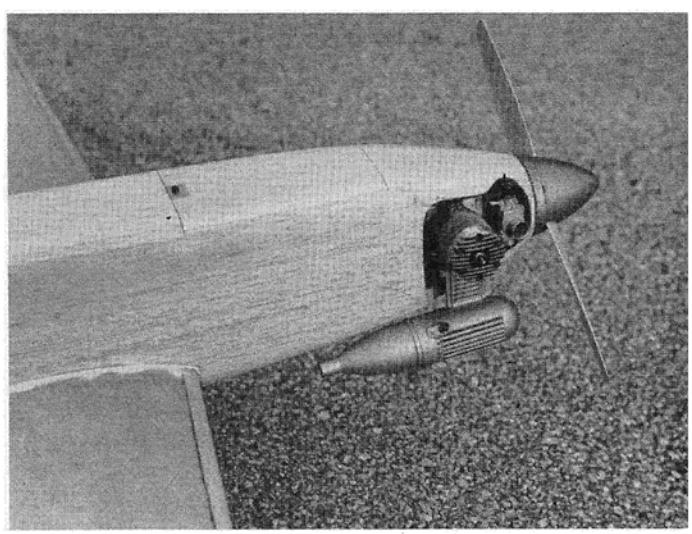
Glue the tailpost to (one) of the fuselage sides. Taper the triangle stock at the rear of the fuselage so that the sides can be pulled together (see top view of fuselage on the plans). Clamp the sides together at the tailpost, but do not glue them together at this time. Turn the fuselage upside down over the plans. Glue in F-4 and rubber band F-2, the firewall, in place to help clamp in F-4. Be sure that the formers line up over the centerline on the plans. Jig the fuselage as necessary to hold everything in place (see photo).

When the glue dries at F-4, unclamp the tailpost and spread the fuselage sides apart and glue in F-5 and F-6. Now you can rejoin and glue the sides together at the tailpost. It is important that the sides meet and line up exactly at the tailpost. Be sure that the formers still line up over the centerline on the plans. Check that the sides are perpendicular to the building board also. Correct any misalignment now before the glue dries.

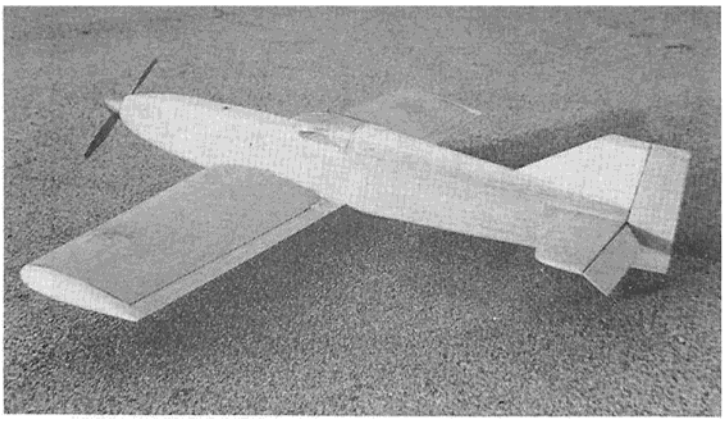
When all this has dried, glue in F-3 and F-4 using 45 minute epoxy. Pull the fuselage sides together at the nose and glue in F-1. It will be necessary to



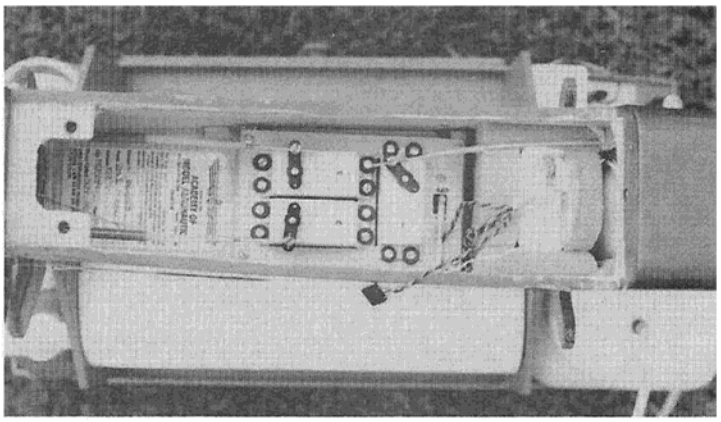
Close-up of tail feathers shows very small fillets as described in article.



O.S. .45 side mounted in completed fuselage.



Completed Vector ready for covering.

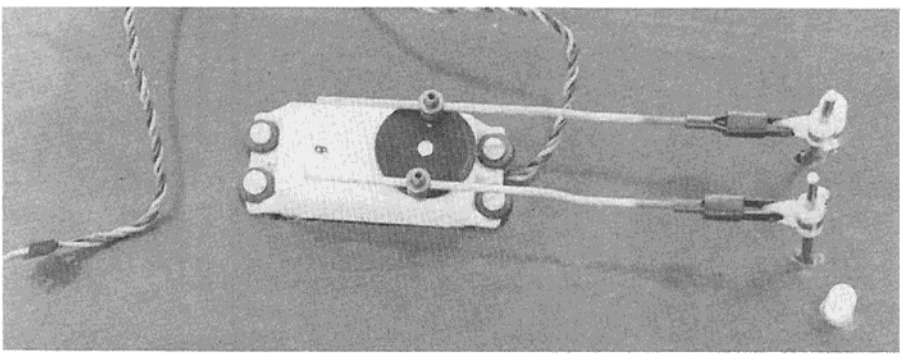


Radio installation shows plenty of room.

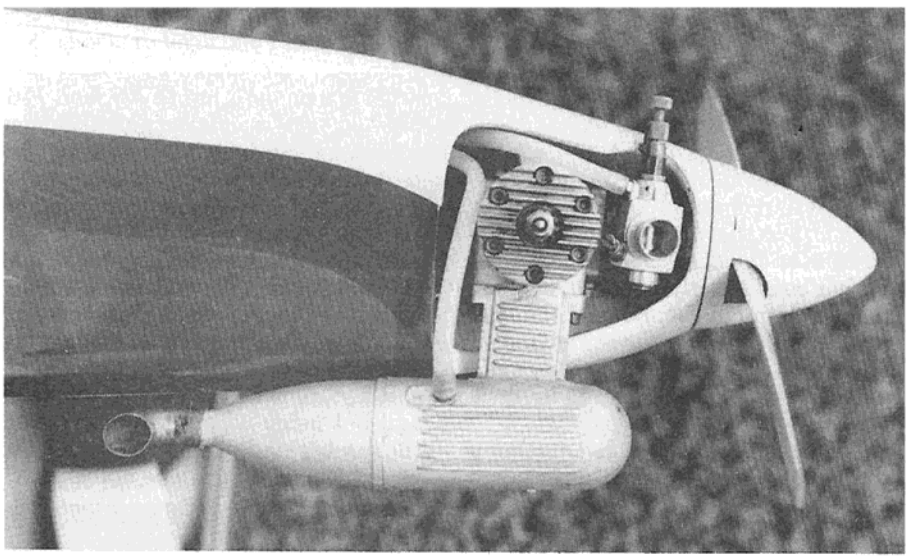
angle the ends of the triangular stock next to the firewall to allow the sides to be drawn together. Glue in the 3/8" triangle stock around F-2 and F-3.

Glue on the top and bottom sheeting, forward of the wing cut-out. **Note:** If you wish to make a removable hatch, only tack glue the 1/4" balsa hatch in place with Zap. Also glue on the 3/32" balsa cockpit floor.

Before gluing on the rear fuselage sheeting, install the outer pushrod tubes for the elevator and rudder. Cut notches in F-5 and F-6 to glue the outer pushrod tubes into. Cut the exit holes at the rear of the fuselage for the pushrod tubes. I have found that a short length of brass tubing sharpened at one end makes a good drill bit for drilling the angled exit holes. I usually twist the tubing between my fingers to drill the holes. Once you have the notches made and the holes drilled, take the outer pushrod tubes and roughen up the areas where they meet F-5, F-6, and where they exit the fuselage, using coarse sandpaper. Slide the tubes into position and epoxy them in place.



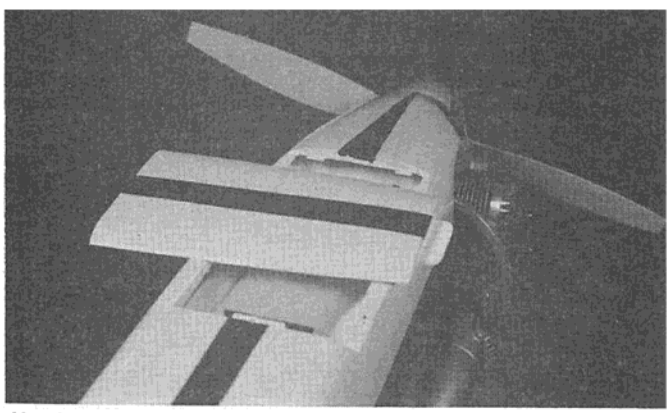
Aileron servo installation.



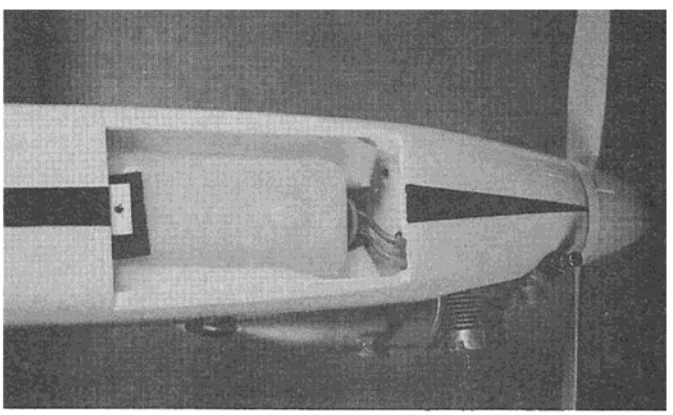
Completed fuselage showing close-up of engine.

Glue on the top 1/8" balsa sheet and the bottom 3/32" cross grain balsa sheeting. When the top and bottom sheeting have dried, sand the sides flush with F-1 and glue on the 1/16" plywood spinner ring.

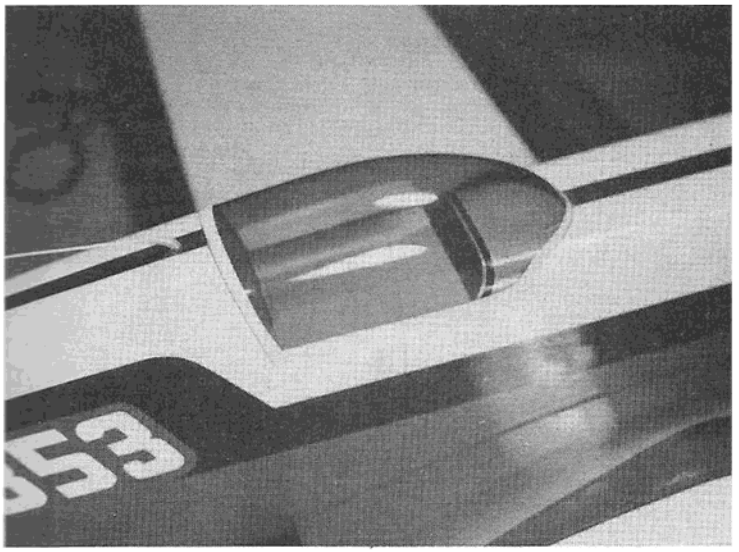
Locate and cut out the slot for the vertical fin. Cut out the fuselage sides



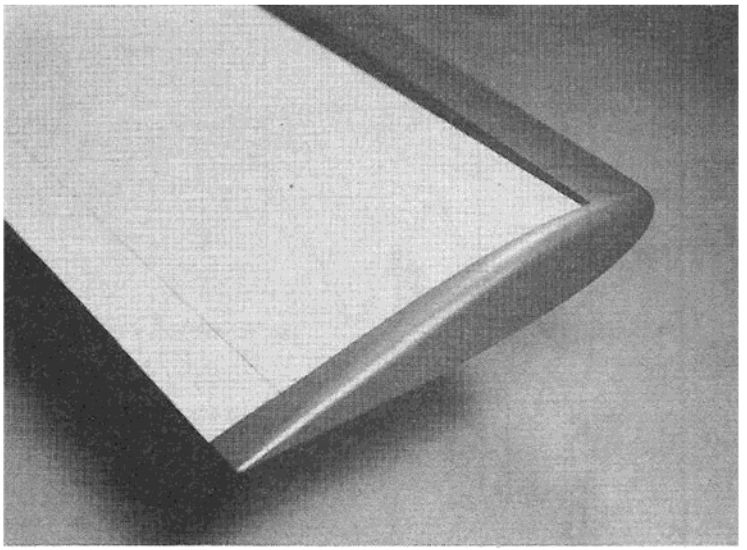
Hatch removed. Note the 1/16" plywood hatch tongue locators on underside of hatch opening.



Fuel tank installation.



Canopy installation on finished model. Note painted frame around edge of canopy to hide glue joint.



Wing tip detail.

where the horizontal stabilizer will be inserted.

Sand the entire fuselage to shape. The cross sections of the formers on the plans will show the fuselage contours.

Once the fuselage is sanded to the desired shape, you can make the 3/32" balsa cockpit front and back pieces and glue them into place.

If you are making a hatch, carefully separate the 1/4" balsa hatch piece from the fuselage. Measure back 5/8" from the front of the hatch and draw a line across the hatch at this point. Cut along this line and glue the 5/8" piece back on the fuselage where it came from. Cut out the area in the hatch for the 1/4" plywood insert. Glue the 1/16" plywood tongue to the front of the hatch. Locate and glue the 1/16" plywood locators to the underside of the 5/8" wide fuselage piece. Epoxy a piece of hardwood to F-3 where the 4-40 hatch bolt will be. When that cures, drill a hole in the 1/4" plywood insert for the 4-40 hatch bolt. Set the hatch in place and mark the bolt hole location on the hardwood piece on F-3. Drill a hole in the hardwood piece for the blind nut. Insert the blind nut from the bottom of the hardwood piece. Put a small amount of epoxy around the blind nut to secure it in place.

Make the 1/4" plywood wing bolt blocks and epoxy them into place. Do not drill them yet for the wing bolts. This will be done when the wing is completed.

Cut a large hole in the center of the right side of the engine cowl area. Gradually enlarge the hole to accommodate your engine installation and removal.

Empennage:

Cut the six pieces of 1/16" balsa horizontal stabilizer sheeting to shape. Use three pieces of 1/16" x 3" medium balsa 20½" long. Take one of the pieces and prepare it to make the four leading edge sheeting pieces. Do this by marking a line through the center from top to bottom. Draw a line from the lower left corner to the top of the centerline. Then draw another line from the lower right corner to the top of the centerline. Cut along these lines to form the four triangular shaped sheeting pieces. Glue these pieces together to form the top and bottom sheeting.

Cut the three pieces of 3/16" x 1" balsa to length for the leading and trailing edges. Cut the 3/16" x 3" center section piece to shape also.

Position the leading and trailing edge pieces on the plans and mark the location of the ribs on them. Lay the bottom sheeting on a flat surface and glue the leading and trailing edge pieces and the center 3" wide piece in place, using Slo-Zap. A water base glue will cause the sheeting to warp and epoxy is too heavy. Cut the pieces of 3/32" x 3/16" balsa to length to form the ribs. Glue them in place using the location marks on the leading and trailing edge pieces. Using Slo-Zap again, glue the top sheeting in place. Weight the assembly down and allow it to thoroughly cure before removing from the building board.

While the stabilizer is curing, make the elevator halves. I used Sig 1/4" x 2" balsa rounded edge elevator stock.

Bend a piece of 3/32" music wire to form the elevator joiner. Prepare the elevator pieces to accept the joiner by drilling and grooving them in their proper location. Roughen up the joiner with sandpaper or a file and epoxy it into place. Be sure that the elevator assembly lays flat and that the hinge line is straight.

Make the two 1/16" plywood inserts for the elevator control horn. These will prevent crushing the balsa when the horn is tightened down. Position them on the elevator where the control horn will be and mark their location. Cut this area out a little bit deeper than 1/16". The extra depth will allow for glue as well as some adjustment to get the height of the plywood flush with the surface of the elevator. Use wood glue or epoxy to glue the plywood pieces in place.

Now that the stabilizer assembly has thoroughly cured, remove it from the building board and glue on the 3/8" x 1/2" balsa tip pieces. Sand the stabilizer to the shape shown on the plans.

The fin and rudder are made from 1/4" x 3" and 1/4" x 1/2" medium balsa pieces. Cut out the shapes as indicated on the plans. Note the direction of the grain on the fin.

Position the two 1/4" x 3" fin pieces together as shown. Sand the edges to make sure that they fit together without any gaps. When satisfied with the fit, glue the two pieces together. Next, glue the 1/4" x 1/2" balsa piece to the top of the fin. Again, be sure that the edge is straight before gluing the top piece on.

Glue the 1/4" x 1/2" balsa pieces to the top and bottom of the rudder. Sand the taper in the rudder as shown on the plans.

Cut out a piece of 1/4" plywood for the horn insert and tail wheel wire support. Cut out the area in the rudder where the plywood piece will go. Sand a taper in the plywood piece to match that of the rudder. Glue the plywood piece in place. When the glue has dried, drill a 3/32" hole for the tail wheel wire, and groove the plywood for the nylon bearing on the tail wheel assembly.

Cut all the hinge slots in the horizontal stabilizer, elevator, fin, and rudder.

Wing:

For those who wish to cut their own foam cores, the root and tip templates are shown on the plans. They are

divided and numbered for reference when cutting. Use 1 lb. to 1¼ lb. density polystyrene expanded bead foam. Wing Mfg. Co. has foam blocks available as well as cutting bows, contact cement, and sheeting material. If you have never cut a foam wing before, give it a try. It is really quite easy.

Once you have your wing cores cut, glue the 1/8" x 1" balsa leading edge pieces and the 1/4" x 5/8" balsa trailing edge pieces in place. Also glue the 1/8" balsa tip plates on. I use Elmers Wood Glue for gluing the balsa pieces to the foam. Use masking tape to hold the balsa pieces in place until the glue dries.

When the glue has dried, sand the balsa pieces flush with the foam cores. Follow the curve of the airfoil when sanding the leading and trailing edge pieces flush.

Cut out the areas in the foam cores for the landing gear blocks. Use the dimensions shown on the plans to locate the cut-outs. Make the cut-out perpendicular to the surface of the cores. Assemble the landing gear blocks by gluing the anchor blocks to the main gear blocks. When the glue cures, sand the grooved side of the blocks to match the curved surface of the airfoil. Insert the blocks into the cores to check the fit. The blocks should be flush with the cores and follow the contour of the airfoil. When satisfied with the fit, epoxy the landing gear blocks in place.

Vacuum the cores thoroughly to remove any sanding residue. Set the cores aside in their blocks for safe keeping. Cut the 1/64" plywood wing skins to shape. Cut the sheets a little bigger than the cores. Sand the wing skins very lightly on the back sides with 320 grit paper. Use a tack rag and wipe the back side of the sheets to remove any sanding dust. Put reference numbers on the back side of the sheets and corresponding numbers on the cores. Use these numbers to get the correct wing skin on the correct side of the core. You are now ready to apply the wing skins to the cores. I have used various glues and double sided tapes for applying wing skins to foam cores. The double sided tapes are fast and they seem to hold pretty good, but they are more expensive than most glues. Sig's Core Bond is my favorite adhesive to use. It is lightweight when dry and it makes a permanent bond; also, it cleans up with water. Apply an even coat of the Core Bond to both the foam cores and the wing skins. Let the adhesive dry as recommended by the instructions.

Lay the sheeting on a flat surface. Select the correct core, and line up the trailing edge on the skin. Slowly roll the core toward the leading edge until it is fully contacted to the wing skin. Repeat this process until the four skins have been applied. Lay the wing panels on the flat surface and smooth the skins down with your hands to be sure that they are completely stuck down. I then run a small bead of Zap along the leading and trailing edges where the wing skins meet the balsa pieces. This permanently secures the skins to the balsa so there is no chance that the skins will raise in these areas.

Put the covered cores back into the block from which they were cut. Then set this on a flat surface. Weight the block down and let it set overnight. Make sure that the block is straight and square. This will insure that the covered cores will remain straight until the adhesive completely sets up.

When the adhesive has set, remove the wing panels from the block and trim the skins flush with the balsa pieces. Glue the 3/8" x 1" balsa leading edges in place. Also glue the balsa wing tip blocks in place. Hold these in place with masking tape until the glue dries. Once dry, carve and sand the leading edges and wing tips to the shape shown on the plans.

Sand the dihedral angle into the wing panels by propping the tip of the panel up 3/4" and sanding the end of the core perpendicular to the working surface. After you have the correct angle sanded at the center section, file a notch at the leading edge for the 1/4" dowel rod. Do this to each wing panel. The notch should equal half the diameter of the dowel in each panel. Use the location of the dowel shown on the plans at the wing center section cut-away, on the fuselage side view, to locate the dowel notch. I like to do this now, because after the wing halves are glued together it is difficult to drill the hole due to the hardened epoxy at the center seam.

Now, epoxy the two wing panels together. Once again, prop each panel up 3/4" under the tips for the proper dihedral. Use a piece of 1/4" dowel to clear the epoxy out of the wing dowel hole. You don't want to glue the dowel in place yet. Be sure that the wing panels are aligned with each other at the center. Insert pins in the leading and trailing edges to hold the panels together until the epoxy cures. Let the epoxy thoroughly cure before removing the wing from the building board.

Shape each aileron from a piece of balsa 1/2" thick by 1¼" wide and about 27" long. Before you cut the angle on the front of the ailerons to allow for control surface deflection, cut off a correct length from each shaped aileron piece for the center section trailing edge. Glue these center section pieces to the back of the wing panels. Now carve the front of the remaining aileron stock to the proper angle to allow for the downward deflection of the aileron.

Make up the 3/32" music wire torque rods for the ailerons. Be sure to make a right and a left torque rod. Remember to slide the brass tubing over the torque rods before you make the final bend.

Cut the slots for the torque rods into the wing trailing edge. Insert the torque rod assemblies into the slots to check for proper movement and placement before gluing them in place. Roughen the brass tubes on the torque rods. Smear a film of Vaseline on the torque rods where they exit the brass tubes. This will keep the glue from getting in these areas and binding up the torque rods. Now epoxy the torque rod assemblies in place.

Position the ailerons to the wing and mark the location where the torque rod hole will be drilled. Drill the torque rod holes in the ailerons. Mark the location for the hinges and cut the hinge slots.

Cut out the areas in the bottom of the wing skins for the landing gear legs. Drill a 5/32" hole for the landing gear leg in the hardwood gear blocks at the anchor block end. Bend the landing gear legs from 5/32" music wire as shown on the plans. Make a right and a left gear wire. Check their fit in the blocks and, when you are satisfied, locate the landing gear strap positions and mark the location for the screw holes. Drill the pilot holes for the strap screws.

Apply the 3" wide fiberglass cloth tape around the wing center section. I tack the tape down using small drops of Zap located as needed to hold the tape in place. Then coat the fiberglass tape with 45 minute epoxy. I spread the epoxy out on the tape and warm it up with a heat gun so it will penetrate the tape more thoroughly.

When the epoxy cures, cut out the servo opening in the wing and glue in the hardwood mounting blocks.

Assembly:

You should now have a completed fuselage, wing, and tail feathers. Glue the vertical fin into the fuselage. Line the fin up with the back end of the fuselage. When the glue has dried on the fin, insert the horizontal stabilizer and check its alignment with the fin and the fuselage. When you have the stabilizer lined up, put some reference alignment marks on it and slide it out of the fuselage. Now put glue on the stabilizer and slide it back in place using the reference marks to line it back up. After this has dried, put a very small fillet around the fin and stabilizer where they meet the fuselage. I used Sig Epoxolite to make my fillets. To control the size of the fillet I put a strip of masking tape on the surfaces to be filleted. As for the Vector tail surfaces, I put the tape about 3/32'' away from the intersection of the surfaces. Then I glob the Epoxolite on at the joint and drag it along the fillet area with a proper size radiused piece of hardwood to form the fillet. When the fillet looks smooth and even, carefully pull the tape off. Smooth the fillet edges by dipping your finger in water and gently rubbing down the fillet until the edge, where the masking tape was, is gone. Very little, if any, sanding will be necessary for a nice looking fillet.

Position the wing on the fuselage and check the incidence. It should be a positive 1/2 degree. This means that when the horizontal stabilizer is setting at zero degrees that the center of the wing leading edge should measure about 3/32" higher than the center of the trailing edge. Take the measurement on the wing next to the fuselage side, or if you have a Robart incidence meter, use it to check for the 1/2 degree positive incidence. If the wing doesn't check out right, modify the wing saddle as necessary. Once you have the wing fitting correctly, accurately center it on the fuselage. Measure from each wing tip to the tail end of the fuselage. Adjust the wing until each tip measures the same amount from the end of the fuselage. Also make sure that the wing and the horizontal stabilizer are parallel with each other when viewed from the rear of the fuselage. When you are satisfied with the position of the wing, you can locate where the fairings go on the bottom of the wing. Also locate where you need to drill the hole in F-3 for the 1/4" wing dowel. Remove the wing and drill the hole in F-3. Insert the dowel into the wing and place the wing on the fuselage. Check to see if the wing still lines up properly. Make any necessary adjustments and then epoxy the dowel into the wing. Next, glue the fairings in place on the wing. When the glue has dried, sand the fairings to match the fuselage contours.

Position the wing on the fuselage, making sure that it is properly lined up, and drill pilot holes for the 1/4" x 20 wing bolts through the rear fairing and into the plywood wing bolt blocks. Be sure that you drill at the correct angle. Tap the holes in the plywood blocks for the wing bolts. Now enlarge the pilot holes in the rear wing fairing, as needed, to accept the Vortac captive wing bolt bushings. You will need to reduce the diameter of the flange on the bushings so that they will fit within the rear fairing. When you have the bushings fitting properly, glue them in place with Zap.

Trim the canopy as shown on the plans. Tape a piece of 120 grit paper on the fuselage front deck under the canopy. Position the canopy in place on the sandpaper and slide it back and forth until you get a good fit with the front deck. To make the back of the canopy a better fit to the fuselage, I held the canopy in place and warmed the back area up with my heat gun until it conformed to the fuselage shape. Be careful not to get the canopy too hot.

Cut the slots for the hinges, if you haven't already done so. Temporarily hinge the elevator and rudder in place. Make up the inner pushrod tubes for the rudder and elevator. Leave some extra length on the pushrod at the radio compartment.

Assemble the fuel tank and bend the brass tubes to reach the holes in the firewall. I used a Sullivan RST 10 ounce tank. I had to bend the brass tubes up and over to exit through the firewall and clear the engine mount.

Radio Installation:

Before you begin your radio installation, temporarily install the control surfaces, if they aren't already. Also install the engine and fuel tank. Bolt the wing in place and check the balance of the plane. Determine the approximate location for the radio gear to achieve an acceptable balance point.

I used a '79 series Tower Hobbies radio that has been updated to one of the new frequencies. The servos are KPS 15s. These are big servos, and they fit in the radio compartment easily, so just about any radio should fit. I like to install my servos on a plywood tray. Whether you use a plywood tray or a pre-molded plastic one, install your tray using hardwood rails that span the width of the fuselage. These hardwood rails help strengthen the fuselage in the radio compartment area, so they should be used.

Install your aileron servo and make up the pushrods as shown on the plans. Also make up the throttle cable. I like to use Du-Bro E-Z connectors on my servo wheels. They make for easy adjustments when setting your radio up. Just be sure to tighten the locking screw down securely.

Wrap your battery and receiver in a plastic wrap for fuel protection and then in foam rubber for impact and vibration protection. Be sure to use a good quality "rubber" foam. Mount the switch as per your specific radio installation.

Connect the pushrods to the servos. Plug everything in and check for proper control movements.

Finishing:

Final sand the entire model. I use 600 grit wet-dry paper for my final sanding. Fill any surface dings also. My Vector is covered with Super MonoKote. The smoother the surface under the covering is, the better the MonoKote will look when it is applied.

After everything has been covered, glue your hinges and control surfaces in place. Remove the fuel tank, the engine, and the engine mount. Fuelproof the fuel tank compartment, the engine compartment, and the bottom of the hatch. I used K & B Super Poxy paint for a fuel proofer. It will take two or three coats to achieve a good fuelproof finish. Paint right up over the edges of the MonoKote where it tucks under the hatch, into the hatch area, and around the engine cut-out. This will give you a good fuelproof front end. I also fuelproof the edge of the MonoKote at the wing saddle and on the wing at the front and back of the fairings.

Make the wing saddle seal using silicone adhesive. Cover the center section of the wing with plastic wrap. Use masking tape to hold the plastic wrap in place. Run a bead of silicone on the wing saddle and then bolt the wing in place. Allow this to set up overnight. When the silicone has set up, remove the wing and trim the silicone to the fuselage sides using a sharp razor blade.

Glue the canopy in place. I have been using a glue that I found in a local hardware store. It is called Urethane BOND, and is made by Dow Corning. It comes in a one fl. oz. tube. This glue has a medium setting time and achieves maximum strength in 24 hours. It sticks to anything, is very durable, and remains flexible. It has

worked quite well for holding my canopies on. It will only take a small bead of the glue to do the job.

Bolt your engine in place, install the fuel tank, and hook everything up. Add your landing gear and wheels to finish things up.

Flying:

Before you get carried away, double check the C.G. Check the control surface throws also. I would suggest that you start with the following surface deflections: elevator — 5/8" up and 5/8" down; aileron — 1/4" up and 3/16" down; and rudder — 1¼" left and 1¼" right. Note the use of differential aileron deflection. If everything checks out, do a range check for your radio. Also do a vibration test for your radio installation. For this, you will need two helpers. Start your engine and have your helpers gently grasp a wing tip apiece and hold the airplane above the ground. Advance the throttle and observe the controls for any erratic movements. Correct any problems before attempting to fly your new plane.

Once everything checks out correctly, you are ready for the first flight. There is nothing tricky about the Vector. However, do some various speed taxi runs to get the feel of the ground handling qualities. Take-offs will be no problem. The tail will come up easily and when flying speed is reached, a little back pressure on the stick will put her in the air.

The Vector is a fairly clean airplane, so get it slowed down when you begin to set up for a landing. With a little wind blowing, I have been able to slow the Vector down to almost a standstill before touchdown. It will hang in there and finally drop in without falling off on a wing tip. This is due to the airfoil used on the Vector. The root is a 17.3% thick symmetrical airfoil with a high point at 40% of the chord. Th tip is an 18% thick symmetrical airfoil with a high point at 30% of the chord. Also, the leading edge is fairly blunt, having a 3/8" radius. With this arrangement, the tip will stall last and the stall will be gentle. It has proven to work quite well on the Vector.

As far as aerobatics is concerned, the Vector will do them all. One of my favorite maneuvers is a double snap roll on top of a loop. Snap and spin type maneuvers are very predictable. Knife-edge flight is good, but not as good as I had hoped for. Slow speed flight is excellent, with full control right down to the stall.

If you want to fly from point A to point B and have some fun in-between, try a Vector. Happy Flying. □