

TOP NOTCH NAVIGATOR II



ASSEMBLY MANUAL

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BEFORE YOU BEGIN

A word about laser cut parts and adhesives.

There are three primary types of adhesives recommended for constructing your model. They are CyanoAcrylate (CA) in all viscosities, Aliphatic Resin Glue (carpenters glue) and Epoxy. CA is the primary adhesive to use however there are times when it is not the best choice. They are:

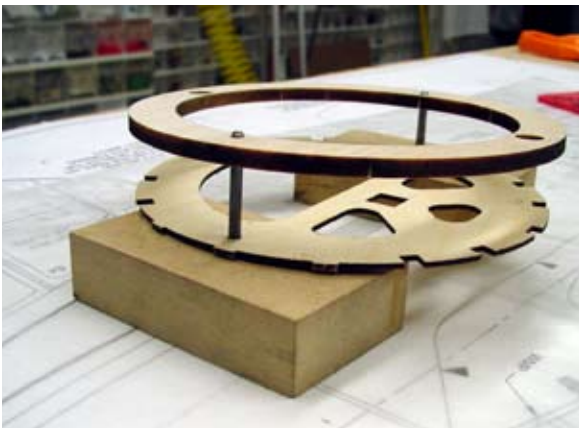
1. When you need more time to carefully position a part than a fast setting adhesive will allow.
2. When attaching plastic such as a windshield (Use Pacer formula 560 here).
3. When gluing laser cut aircraft grade plywoods. The microwave set adhesives used in aircraft grade plywood does not ablate well under a laser beam. As a result it burns the wood fibers near by leaving a charred edge. Fast setting CA adhesives do not allow time for the adhesive to penetrate this layer of char and bond to the wood fiber underneath. Use a slower setting adhesive such as Aliphatic Resin or for maximum strength use Epoxy on aircraft grade ply parts. Lite Ply's do not use this type of adhesive and do not suffer from this problem.

To apply thin CA I recommend the Dave Brown pipets available at your hobby shop. Be sure to stretch the end (pull it with a pair of pliers) to a thin applicator tip, as they are not supplied in this configuration and some folks don't know that you have to do this. No mention of this is made on the package they come in.

PIN REGISTRATION

A great shop technique introduced by Top Notch Products is the use of 1/8" piano wire pins to quickly and precisely position laminated parts such as fuselage doublers etc. Many of the parts in Top Notch kits utilize this method and are supplied with pinning holes. Take the time to construct two of these handy tools. Use two small hardwood blocks and two short lengths of 1/8" music wire. Round the ends for easy insertion into the parts.

Below are two examples of this technique as used in the Cessna 195 kit. On the left, two fire wall components are being assembled using the pins. Any time precision placement is required, this method is used. You will find the pinning holes are easily filled after completing the model. This method allows the use of fast setting adhesives such as CA because the parts cannot be out of register. In the photo on the right, landing gear components are being assembled with the pins. Precision placement of these parts is required to assure that the 1/8" landing gear wire will fit snugly into this assembly. In the background is the completed fire wall assembly.



Use a sheet of Wax Paper to protect your plans. When assembling flat sheets such as the stabilizer skins I recommend laying the parts on a sheet of parchment paper. Assemble the parts, apply thin CA and frequently lift the part and wipe up any excess CA from both the part and the paper with a piece of paper towel.

OK, LETS BUILD A TOPNOTCH NAVIGATOR II

Note:

Use the parts locator pages at the back of this manual to help find the parts, as you need them. Do not glue any parts until instructed to do so. Because of the notch and tab design, many parts must be moveable to allow for the installation of other parts. Remove parts from the carrier sheets as you need them, the carrier sheets will keep the parts from warping or getting lost. As you remove parts use a light swipe with sandpaper to remove the nubs left by the retainer breaks so that they do not interfere with the fit of the parts.

Wing Assembly

The wing is the only section of the model that is built over the plans in the conventional manner. The wing consists of four panels, two inboard sections (shoulder) and two outboard sections. They are assembled separately and then joined.

The wing tube openings are dash cut in both the ribs and the sheer webs and should remain in the parts until instructed to remove them.

SHOULDER SECTION

- 1 Locate WBP and WTE they must be pre-assembled. Use the register pins and laminate the two parts together. Note that WPB must be on top of WTE for the wing half you are working on.
- 2 Use the 1/8" x 1" x 1" pinning tabs to secure FLE to the building board as shown in the photo. Make sure that FLE is aligned with the plans and at 90° to the building board.
- 3 Locate SWB, observe the root end and slide ribs W2, W3 and W4 onto SWB in their appropriate slots.
- 4 Slide SWT down onto this assembly; next align SWB and SWT so that they are perfectly flush at the top and bottom and both ends. Tack glue at both ends. It is important that the sheer webs be flush to each other top and bottom or they will prohibit the spar flange from positioning correctly on the ribs.
- 5 Install FTE, check for alignment with the plans. Use two pinning tabs to secure it into position over the plans.
- 6 Install the WTE/WBP assembly into the slots in the trailing edge of W2 through W4 and into the slot in FTE.
- 7 Install and glue gussets WGA and WGB.
- 8 Glue all joints at this time. Take care to assure all parts are bottomed in their slots before applying glue. Run a thick bead of glue along the wing bolt plate (WBP) where it connects to W1, W2 and FTE.



The false leading edge (FLE) is secured to the building board by gluing pinning tabs to the standoffs and then pinning those to the building board. This will stabilise FLE and the pins will be outside the work area while under construction.



The ribs are captive in the sheer web assembly. The false trailing edge is added next.

NOTE:

It is important that rib W1 be perfectly straight and aligned with the plans. This rib will be the interface to the pylon and any misalignment or warping will leave a gap between the pylon and the wing. To this end, a fixture has been supplied to assure that W1 does not distort during the spar flange and sheeting installation. Until the wing tube is installed rib W1 is flexible and susceptible to being warped.

- 8 Assemble the W1 FIXTURE. This will consist of two 1/4" lite ply ribs either side of a 3/32" ply plate. Install three 1/4" x 1-1/2" dowels in the supplied holes. When inserted into W1, this fixture will keep W1 straight and flat until after the spar flanges, wing tube sleeve and sheeting have been installed.
- 9 Attach the W1 FIXTURE to W1 and then install the top spar flange (WSF). It is important that the flange fit snugly on top of the sheer web and is glued firmly along the entire length of the web and ribs. Use some weights to assure good contact. When the glue has set, you can remove the W1 fixture.



The assembled W1 FIXTURE is used to assure that rib W1 retains its correct shape while the assembly is being done. W1 must interface with the pylon and must retain the same profile.

In the following step you will be installing the bottom spar flange. To do this the assembly must be removed from the building board and turned over. Do not remove the pin tabs at this time. They will be used one more time to install the top wing sheeting.

- 10 Remove the pins and flip the assembly over. Install the bottom spar flange in the same manner as the top spar flange. Make sure the top spar flange is resting flat on the building board to support the weight until the glue has set.
- 11 Use the following method to remove the dash cut material from the ribs and sheer web where the wing tube sleeve will go. Complete the cut at the center of the dash cut section of the sheer web. You can then remove this material by just pressing on the center of the material where the cut is. Do this in the first three bays. Trim the tabs on the wing tube hole in each rib and then spin the plug out. You should now have the wing tube path clear to install the wing tube sleeve. Also remove the small bridge of material in the dowel slot between W4 and W5.
- 12 Insert the wing tube sleeve and mark the exact location where it exits W1. Trim it off at this mark and then reinstall it into the wing section. Glue the wing tube into the wing section. Use plenty of glue and run a bead of glue along every interface between the wing tube and the wing section. Sand flush with W1 any part of the sleeve that extends beyond W1.
- 13 Glue one W19 on each side of the sheer web between W4 and W5. This will provide a pocket for the dihedral dowel.
- 14 Flip the assembly right side up and secure it to the building board using the pin tabs along the leading edge. The trailing edge pin tabs on FTE can remain but do not pin them. Locate and install WBT onto WBP. This balsa doughnut will support the wing sheeting around the wing bolt hole. Plane and sand this to contour with the wing ribs so the sheeting will lay flush on top of it. Center it on the wing bolt hole.



All the dash cut material has been removed from the sheer webs and the ribs in preparation for the installation of the wing tube sleeve. The sleeve will now be installed and secured with a liberal application of Aliphatic Resin glue at all contact points with the wing. Note also that WBT has been installed on WBP and planed to contour with the ribs in preparation for sheeting.

In the next steps you will assemble and install the wing sheeting. The sheeting is supplied in five sections labeled A through E marked with a -T for the top sheeting and a -B for the bottom sheeting.

- 15 Assemble the wing sheeting consisting of Sheets A, B, C, D and E. Note that -T is for the top wing sheeting and -B is for the bottom wing sheeting. After removing the wing sheeting sections from the retainer sheets, using a small flat sanding block, lightly sand all the small bumps left by the retainer tabs flush with the cut edge for a good tight joint. Do not alter the cut edge, just sand them flush. You can use CA to assemble these parts but I prefer to use Aliphatic Resin as follows.



Place the parts on a flat surface and test fit to assure a good tight joint. Remove any nubs or material that prevent a kiss fit. While pressing the two parts together to close any gaps, run a strip of masking tape along the entire seam. Do this with each section until you have the entire wing skin assembled. Now flip the assembly over and move the joint to be glued to the edge of the bench and using the tape as a hinge, bend it back to allow running a bead of Aliphatic Resin glue the entire length of the seam. Now move the assembly back to be flat on the bench and drag a razor blade along the surface to scrap off all excess glue. Repeat this for each seam and set aside to dry. This will usually dry in less then five or ten minutes. When cured, remove the tape and sand both sides flat on the bench. Your seams will be invisible and very easy to sand, as there will be no excess glue to inhibit sanding and your joint will be stronger then the wood around it.

The shoulder section nearing completion with only the bottom sheeting remaining to be installed. FLE and FTE will now be planed to contour with the ribs in preparation for the bottom sheeting. Note that WBB has already been installed and planed to contour with the ribs. WBB will support the bottom sheeting at the wing bolt hole. Trim the sheeting at the edge of the ply WTE. WTE will define the trailing edge of the wing.

- 16 Plane the FLE and FTE to contour with the wing ribs, then pin the leading edge tabs to the bench to stabilize the assembly.
- 17 Use Aliphatic Resin glue to install the wing sheeting. Place the W1 FIXTURE in place on W1 before installing. Align the wing sheeting assembly so the slot on the outboard edge overlaps the wing spar flange and trace the outline of the opening onto the top wing spar flange. Avoid getting any glue in this area, as it will be used later to join the wing sections. The trailing edge must be glued to the last 1/2" of WTE as most of this area will be sanded away for final shaping of the wing. Use clothes pins about 1 inch apart to assure good contact. Use plenty of weight to force the wing skins into contact with the ribs. I use lead shot in plastic bags, but you can use sand bags, old magazines or anything that will conform to the shape of the wing.
- 18 After curing, remove the pins and snap off all the pinning tabs and standoffs from FLE and FTE and plane them to contour with the ribs. Put a pinhole in the sheeting from the bottom through the wing-mounting bolthole for later reference to its location. Now install the bottom sheeting in the same manner as the top sheeting. Be sure to have the W1 FIXTURE attached.
- 19 After the glue has cured, open up the wing bolthole. Push a pin through the hole in the top skin to locate the hole on the bottom. Start at the pinhole and work your way out to WBT on the top and WBB on the bottom. Sand the trailing edge to contour with the ribs and then sand the assembly perfectly flat at the W1 and W5.
- 20 Glue on the 1/4" leading edge and plane and sand to contour. This completes the basic construction of the shoulder section of the wing.

TIP SECTION ASSEMBLY

- 1 Once again, lay a straight edge over the plans and aligned it with the aft edge of FLE, use pinning tabs tack glued to the FLE standoffs and pins to secure FLE to the building board.



Tip section assembly underway with FLE firmly fixed to the building board and all except the end ribs captive in the shear web assembly. Next the ribs will be installed into the notches in FTE and the assembly will be glued to FTE. Note that the 1/8" dowel between W7 and W9 must be installed before adding FTE.

- 2 Use your pin register blocks to assemble W11 and W11-A and W12 and W12-A. Pay close attention to the polarity of these parts. W11-A and W12-A should face each other when installed in the wing.
- 3 Locate SW-B and slide each rib into its appropriate slot. Make sure the root end is the end with the dowel slot.
- 4 Carefully apply pressure to both sides (top and bottom) of the shear web assembly and apply a small drop of CA through the glue ports (elliptical holes in the shear webs). Move down the full length of the shear web. The two shear webs must be flush with each other on all four sides.
- 5 Install a 1/8" x 5" hardwood dowel into the holes provided in W7, W8 and W9.
- 6 Drop the trailing edge slots of each rib into the appropriate slots in FTE then move this assembly to FTE and install the leading edge tab into the appropriate notch in FLE. You may notice a discrepancy between the position of the parts on the drawing and the actual parts. Don't panic, the parts are correct and the plans can shrink and expand with the weather. Use the plans to make sure all parts are parallel with the parts on the plans. Make sure all FTE standoffs are flat on the building board.
- 7 Tack glue W6 and W17 to FLE.
- 8 While holding pressure against the rib assembly, add pinning tabs to the standoffs on FTE and secure them to the building board with pins.
- 9 Install and glue W5 and W18.

- ❑ 10 Install and glue FSB-I (inboard) and FSB-O (outboard) between ribs W7, W8 and W9.
- ❑ 11 Glue all joints: Be methodical so as not to miss any. Make sure all ribs are bottomed in their slots on FTE to assure correct alignment.
- ❑ 12 Install and glue the 1/32" ply trailing edge plate (WTE). Make sure it engages the slots at the aft end of each rib and is fully bottomed in the slots before gluing.
- ❑ 13 Install and glue the top spar flange (SF). Glue to all ribs and the entire length of the sheer webs. Use a straight edge or other means to apply pressure and assure it is straight and in good contact with the sheer webs.
- ❑ 14 In the next step, you will install the bottom spar flange, remove the pins and flip the assembly over. Do not remove the pinning tabs from FLE and FTE yet. Install the bottom spar flange in the same manner as the top spar flange.
- ❑ 15 Remove the small bridge of balsa in the dowel slot between W5 and W6 in the sheer web and then install W20 on both sides of the sheer web between W5 and W6.
- ❑ 16 Plane FLE to contour with the leading edge of the ribs in preparation for sheeting and then pin the assembly back onto the building board. Make sure that all standoffs are flat on the building board, as this will affect the washout if not perfectly flat.
- ❑ 17 Plane and sand the top edge of FTE to contour with the ribs. Then install wing sheeting panel H to the trailing edge. Note that panel H will butt the aft edge of ribs W7, W8, W9 and W10. Use clothes pin clamps along the trailing edge to assure good contact between panel H and WTE. Note that you will likely have some pinning tabs and pins under this sheet. Leave them in place; just make sure that the pinheads do not interfere with the sheeting. When it comes time to remove the assembly from the plans next, you will be removing all the tabs and standoffs so they will just snap off when you remove the wing assembly.
- ❑ 18 Test fit and then install and glue the leading edge sheeting (WLES).
- ❑ 19 Glue two AHB (aileron hinge blocks) at each hinge location to the inside of FTE. Use a piece of scrap 1/8" music wire to align them with the hinge holes in FTE. If you are going to use CA hinges you can omit this step.
- ❑ 20 Install and glue sheeting panel F. Panel F is supplied in two sections cut slightly oversized to allow for slight variables in construction. Trim this panel in the center for a snug fit to make a good seam.
- ❑ 21 Locate two servo plate mounts (SPM) and one servo plate (SP). Note that the screws used on the servo plate are flat head screws that will need to be countersunk into the servo plate. Determine the outside of the servo plate and countersink the six screw holes. Screw the servo plate to the servo plate mounts and then glue the servo plate mounts into the slots in W11-A and W12-A. Now remove the screws and the servo plate. This method will assure that the plate will fit correctly. Using some scrap 1/16" x 1/8" balsa, build up the servo



Wing sheeting panel H is installed using pins along FTE and lots of clothes pins along the trailing edge to assure a good bond along the trailing edge.



Leading edge sheeting being installed using a heavy straight edge to assure good contact between the sheeting and the spar flange. Ziplock baggies filled with lead shot conform to the airfoil and pins retain the leading edge.

plate mounts on the front and back to bring them up flush with the ribs. This will allow the covering to be attached later.

- 22 Install W21 onto rib W8. Note the correct orientation of these parts. These will provide additional bracing for the wing mounted floats as well as provide an opening for the float attachment system. They should be flush to the bottom of W8.
- 23 Install and glue the wing leading edge (LE) and when cured, plane and sand to shape.
- 24 Glue on the wing tip block and then carve to shape.
- 25 Cut two 1/8" x 1/2" sections of dowel and glue them into the 1/8" holes on W5 shoulder section. These will engage the like holes in W5 tip section and automatically align the two panels. Test fit the two panels and sand as necessary for a tight fit. When satisfied with the fit, install the 3/16" dowel and glue the two panels together.
- 26 Glue in the 1/64" ply spar flange joiners (SFJ) where the two spar flanges butt. Install one at a time to build up to 1/16" thickness.
- 27 Fiber glassing the joint is not necessary but some builders prefer to do this. If you decide to glass the joint with a band of fiberglass, do so after filling and final sanding of the wing.



The attach point for the wing mounted pontoon is shown here. The pontoon strut slides into the wing through the slots in W21 and hooks onto the dowel. The strut is retained by a single bolt through the strut and W8-B. W8-B is not installed into the wing until after covering.



The aileron servos mount to a 1/16" ply plate that is screwed to these servo mounting rails.



The wing tip block is glued on to W18 and then carved to shape. The 3-1/2° of washout is apparent in the finished wing.



The finished wing ready for some cosmetic touch ups and covering. The wing is attached to the model with the 3/4" wing tube, two 1/4" alignment pins contained in the pylon, and the wing hold down bolts.

This concludes assembly of the wing. Note: After covering use Epoxy to install W8-B in the pontoon slot at W8.

AILERON ASSEMBLY

- 1 Locate the aileron base (AB); locate all aileron ribs A1 through A9 and the aileron leading edge (ALE).
- 2 Pin AB to the building board and glue ALE to it. Note that the tabs are cut slightly high to stand proud of the sheeting. Remove some material from the bottom tabs so it will make good contact with AB. Use a straight edge to assure it is installed straight.
- 3 Install all aileron ribs into their appropriate notches in AB.
- 4 Sand ALE to contour with the aileron ribs in preparation to install the top sheeting. Note that much of the aileron leading edge will be removed to form the 22° angle for clearance for hinge movement. As a result, the taper will start about half way through the leading edge. See the photo.
- 5 Glue in the aileron horn mounting plate (AHMP) where indicated on the plans.
- 6 Install and glue in the aileron hinge mounting blocks (AHB-A through AHB-D) at each hinge location. NOTE if you plan on using CA hinges you may omit these blocks.
- 7 Using a plane or sandpaper, taper about the last 1/2" of the top sheeting (AS) on the inside. Now glue the top sheeting in place, assure good contact with the leading edge, ribs and trailing edge of AB.
- 8 Plane a 22° taper to the leading edge. Use the hinge holes as a guide to keep the taper centered.



Aileron ready for the top sheeting to be installed. All ribs, hinge blocks and horn plate installed. After the top sheeting is installed the leading edge is beveled to 22° to allow for surface movement.

This completes the aileron assembly.

PONTOON ASSEMBLY

First a note about bending wood: Given its preference, wood would much prefer to stay in the shape of a tree. It's up to us to use a little know how to shape it into whatever we decide to make of it. I will use the float sides (FLS) as an example here. We will be bending the sides beyond their structural limits when dry. So soak the sides before attempting to install them. Some builders like to use a mixture of ammonia and water. The ammonia allows the water to penetrate the wood fibers and make the wood more pliable so it can be formed beyond where it would normally break. I find the use of Windex with Ammonia to work just fine for this task. When you soak the sides, use plenty of liquid and allow it to saturate the part thoroughly. Lay the part to be softened on a piece of plastic wrap and spray it with Windex until the Windex no longer soaks into the wood. Then turn the part over and repeat this on the opposite side. Then lay another piece of plastic wrap over this to prevent it from drying out. Depending on the wood thickness and hardness allow from 10 to 30 minutes for the wood to soften. You can check the pliability of the part while still in the plastic wrap. When you are ready to install the part, use a piece of paper towel to blot the parts to remove any surface moisture but do not let them dry. If they do you will need to repeat the process. Note that CA will hold but will usually result in a poor bond on wet material as the adhesive will set as soon as it hits the moisture and will not penetrate very far into the wood. As soon as the part has dried, revisit the joints with another application of CA.

- 1 Locate and prepare for use, float formers FL1 through FL8 and the float keel FLC. Install all formers onto FLC but glue only FL1 and FL8, the remainder should float while installing the sides (FLS).
- 2 Install both sides at the same time to help keep the structure symmetrical. Remember that the formers are loose in the structure so keep it upside down while working with it so they don't fall out. Begin at the aft end and install the tabs from FL6 and FL7 into FLS. If you run out of fingers, a rubber band between FL6 and FL7 can be helpful. Glue FLS to FL6 and FL7, then pinch the aft end into position on FL8 and glue their.
- 3 Next, pull the leading edge into position on FL1 and glue there. Make sure all tabs are properly inserted and bottomed in the there appropriate notches in FLS when you do this. I recommend thick CA and accelerator for this task.
- 4 If there is any misalignment you can remove it by distorting the assembly back into the correct position and at the same time gluing the formers to FLC to retain the correct shape.
- 5 Trim the top and bottom of FLS to contour with the formers so the top and bottom sheeting will lie flat on FLS when installed and allow more glue land.
- 6 The bottom sheeting will require soaking the wood also. Sand an angle along the straight edge of FLSB to accommodate the angle at the keel. Lay FLSB onto the keel piece so it covers half of the keel. While holding it firmly against the keel apply CA from the other side along the keel. Work your way along the entire keel. After this has set, use finger pressure against the bottom sheeting to force it to conform to the convex shape of the formers and then glue it. Start at FL4 and work your way back. Then return to FL4 and work your way forward. Glue it along the FLS at the same time. Repeat this process for the opposite side.

NOTE

The material between FL1 and FL2 must make a compound bend that is difficult. In the event that your piece should crack, just continue on gluing the bottom on. Afterwards, cut a wedge of thicker scrap balsa and CA it into this opening.

- 7 The top sheeting is installed in the same manner except that you will need to apply aliphatic resin glue to all the formers first. Then install one side of the top sheeting with thick CA along the keel top. Then form the wood to the formers and glue along the sides to FLS with thin CA.



Pontoon parts ready for assembly. At the top are the pontoon pylon parts and below that the pontoon keel and formers. The built up pontoons will weigh about 1.5 ounces when finished, saving considerable weight over a solid wood carved pontoon.



Assembly underway, the pontoons are ready for the top and bottom sheeting. The top and bottom 1/16" sheeting will be installed wet for bending.



The finished pontoon and pylon assemblies ready to be glassed. The pylons are not attached to the pontoons until after glassing and then a small fillet is formed along the pylon and pontoon.



Pylons are assembled using the pin registration method.

- 8 Trim the top and bottom sheeting close to the sides and sand flush with FLS. Keep the corner at the bottom crisp for better water separation. You can round the top corner for aesthetic purposes.
- 9 Sand the front and back of the pontoon flat with the former and then glue on the front nose block and the back tail block. Rough carve to shape and then sand to final shape. Wrap a piece of sandpaper around a $\frac{3}{4}$ " dowel or similar object to shape the convex shape on the bottom.
- 10 The pontoon strut will slide down and straddle the pontoon keel. Do not install the strut until after shaping and covering. I recommend glassing the pontoon assembly when done to assure it will be waterproof. Use a sanding drum to round off the leading and trailing edges of the strut. When doing the final installation of the strut, make a fillet around the bottom of the strut between the pontoon top and strut. Note that the float nose block is supplied in as two blocks. Glue these two blocks together before gluing the nose block to the floats.

This concludes the pontoon assembly

STABILIZER CONSTRUCTION

- 1 The stabilizer is built on a 1/16" core sheet that is supplied on two pieces, (SC). You will need to assemble these two sections. Use the same gluing technique used on the wing sheeting to assemble the stabilizer core sheet.
- 2 When installing the rib sections make sure you have the ribs fully engaged in there slots and firmly pressed flat onto the building board. When completed, this structure will be as straight and true as the building board.
- 3 Install all rib sections on one side of SC.
- 4 When installing the leading and trailing edges it is important that the assembly be flat on the building board and that a tool such as a straight edge be used to press the leading edge into contact with the core sheet when applying glue. Sand any nubs from the parts to assure good contact. What ever shape the stabilizer is in when you glue it, that is the shape it will retain so keep it straight.
- 5 Install the trailing edge STE use thin CA here.
- 6 Install the two-piece leading edge SLE.
- 7 Install the hinge caps over the hinge pockets cut into the core sheet CS.
- 8 Assemble the stabilizer sheeting. It is supplied in eight sections and must be assembled like the wing sheeting was. You will end up with four sections of sheeting.
- 9 Flip the assembly over and install the remaining rib sections.
- 10 Shim up the trailing edge with some scrap 1/4" material and install the remaining trailing edge section.
- 11 Install the remaining leading edge sections.
- 12 Install the remaining hinge pocket caps.

- 13 The stabilizer sheeting is supplied in eight sections that will be assembled into four sections like the wing sheeting was. Assemble these sections and sand smooth while flat.
- 14 Shim up the trailing edge between the tabs to keep it straight. Run a liberal bead of thick CA along one half of the trailing edge. Then install one of the stabilizer skins. Make sure the tabs in STE are bottomed in the notches in the stabilizer skin (SS). Press the sheeting into contact with the trailing edge.
- 15 Flip the assembly over and while applying finger pressure at each rib, apply thin CA starting at about the center of the rib. Hold the assembly so the CA will trickle down the rib/sheeting interface all the way to the trailing edge. Do this at each rib. Then flip the assembly around and repeat this method to glue the forward section of the sheeting. Use enough CA so it will also glue the sheeting to the leading edge.
- 16 For the remaining side we will use a combination of CA and Aliphatic Resin to install the sheeting. Install only one half of the sheeting at a time to avoid the possibility of warping the structure. Apply Aliphatic Resin glue to all ribs and the leading edge of one half. Run a liberal bead of thick CA along the trailing edge and then install the sheeting. Use cloths pins along the leading edge and then weight the assembly lightly to assure contact of the sheeting with the ribs. Allow to cure and then repeat this process for the remaining sheeting.
- 17 Sand the ends flush to the rib S9 and then laminate the 1/4" tip blocks (ST) and glue them on. Carve and sand to shape.



Stabilizer assembly ready for the top sheeting to be installed. Note that all hinge point openings are laser cut for a perfect fit with the elevators. This core sheet construction builds fast in spite of having many parts and produces a very light, strong and true airfoil structure.

NOTE

The leading edge strake LRB is installed after the stabilizer is attached to the fuselage. If you are planning on using a film covering you may want to install it now.

ELEVATOR ASSEMBLY

- 1 The elevators consist of two 1/4" balsa parts laminated to a 1/16"ply core. Use the pin register method to assemble these laminated parts. Make sure that the parts are securely glued along the trailing edge, as this will become quite thin after shaping. Note that the hinge point openings have been cut into the ply core. After assembly when the hinge points are bottomed in these openings your hinge line will be in perfect alignment and the hinges will line up perfectly with the holes in the stabilizer. This makes hinging of these surfaces a simple matter.

NOTE

Before beginning the shaping process its best to bevel the leading edge for hinge movement clearance. If you have a band saw or small table saw this can be nicely done by setting the table to about a 22° angle and trimming these edges. If not, a plane will do the job nicely.

- 2 Locate and open up the hinge holes and the elevator torque rod hole.
- 3 Trim a channel into the leading edge from the torque rod hole to the inboard end to recess the torque rod. Test fit the torque rod but do not install it yet. The torque rod and hinges will all be installed at the same time.

NOTE

Most builders have their preferred method for installing hinge points but I will suggest a method I use and prefer. Before installing the hinges heat about a half-teaspoon of Vaseline in a small metal container. I use my sealing iron clamped in a vice and an aluminum bottle cap to heat the Vaseline. The liquid Vaseline should be about 1/8" deep. Bend each hinge to the full extent and dip the joint into the hot liquid. Allow it to penetrate the hinge, then bend it in the opposite direction and repeat the process to penetrate and coat the hinge joint. Then lay onto a piece of paper towel to cool. Note: While doing this take care not to get Vaseline on the barbed legs of the hinge points, they must be clean to accept the adhesive used to install them. The Vaseline will lubricate the hinges for a smooth action and prevent the possibility of any glue getting into the hinge and binding it.

To install the hinges I use a medium thick mixture of micro balloons and 30 minute Epoxy. This material will give me plenty of working time and it will fill any voids between the hinge and the airframe. Use a scrap piece of 1/16" music wire to line the hinge opening with the adhesive. Then coat the barbed ends of the hinge with the adhesive and install. If any adhesive is forced out of the hinge pocket, just wipe it away and then allow it to cure. Make sure the hinge point will bend at a 90° angle to the surface. Note that on the Navigator the hinge pockets are laser cut and when your hinges are bottomed in the pockets in the elevators your hinge line will be perfect. Therefore it is important not to remove any material (make it deeper) from the bottom of these pockets when opening up the hinge holes.

- 4 Trim out enough material from the stabilizer and rudder hinge holes to allow for the thicker center section of the hinge to clear and temporarily install the hinges. Temporarily install the elevator sections to the stabilizer. Draw a clear pencil line onto the elevator leading edges as a guide for shaping.
- 5 Remove the elevator sections and plane and sand to final shape.

The elevator section are not permanently installed until after the stabilizer has been attached to the fuselage and painting or covering has been completed.



Test fitting of the elevator torque rod in the elevator halves. This will be permanently installed after covering or finishing. The forward rake of the horn is offset by an equivalent offset on the servo arm for equal throws.

VERTICAL FIN AND RUDDER ASSEMBLY

- 1 The rudder is laminated from a 1/16" ply core and two 1/4" balsa sides. Use the pin register method to assemble this laminated component. Open the hinge pockets as you did on the stabilizer and elevator assembly.
- 2 Assemble the vertical fin core from three sections, VC-A, VC-B and VC-C. Note that VC-A is 1/16"ply.
- 3 Install and glue rib sections V1 through V5 into the core sheet assembly.

- 4 Install and glue the trailing edge VTE.
- 5 Install and glue hinge pocket covers VHC-1, VHC-2 and VHC-3.
- 6 Install and glue the leading edge VLE.
- 7 Use thick CA to install V6.
- 8 Flip the assembly over and repeat steps 3 through 7.
- 9 The leading and trailing edge will require planing down to the contour of the ribs. A narrow sanding stick is handy for this task.
- 10 Assemble the vertical fin skins from three sections for each side as you did the stabilizer and wing. Install and glue the 1/64 ply doubler V-LIN along the bottom of the sheeting.
- 11 When installing the fin sheeting, align the sheeting tabs on the trailing edge of the fin. Place the sheeting into position on the fin and then apply thin CA from the opposite side while applying finger pressure to keep the sheeting in contact with the structure.
- 12 To apply the remaining skin, apply Aliphatic Resin glue to the trailing edge and all ribs as well as V6. Place the skin onto the structure and use short strips of masking tape to secure it at the trailing edge. Then pull the sheeting flat and glue along the leading edge with thin CA. Lay the assembly flat and apply some weight to assure the sheeting remains in contact with the ribs while curing.
- 13 Sand the leading edge to contour.
- 14 Install the rudder and mark the leading edge as you did the elevators. Plane and sand to shape.



Vertical fin assembly ready for laser cut sheeting. The tab at the front engages the top keel and V5 will glue to former F15 for a solid aligned installation.

This concludes the vertical fin and rudder assembly.

CRADLE ASSEMBLY

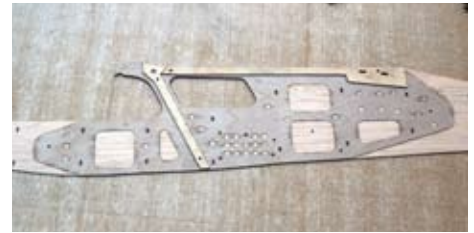
- 1 Locate the cradle base and the two end sections. Glue this assembly together and then use CA to line the end sections with the foam strips supplied. The two 1" wide side sections can be added to provide a convenient tray for small items during transport.

As you progress with the fuselage construction the fuselage will become an unwieldy structure, stable only when upside down or lying on its side. The use of the cradle will allow you to keep the assembly stable on the bench while under construction. After the model is completed it will be used for storage and transport of the model. Note that when your fuselage is placed in the cradle with former F5 at the front of the stand, F12 will be over the back of the stand and the fuselage will be level. You can use this feature when checking incidences Etc.

This concludes construction of the cradle assembly.

FUSELAGE CONSTRUCTION

- 1 The fuselage sides are supplied in three sections and must be assembled. Locate and prepare the three fuselage sections. Remove any retainer nubs by sanding lightly. The sections can be glued with thin CA.
- 2 Install and glue the three hard point disks (FGBHP) for the landing gear bolts.
- 3 Before proceeding, sand both fuselage sides flat. You may notice some material thickness changes between the assembled parts. This is normal even when the material is within spec so to insure a flat part and limit the need for filling later sand out any irregularities now. Vacuum the sides to remove all sanding dust.
- 4 Look the sides over and select a left and right side with the smoothest surface. Put a temporary mark on the outside of each fuselage side.
- 5 Locate and prepare the 1/64" ply fuselage doublers (FD). Most of the small glue port holes can be spun out with the tip of your Ex-acto knife. Lightly sand these parts after weeding (removing all the internal cuts) to remove any hanging fibers that may interfere with making good contact with the fuselage sides.
- 6 Install the ply fuselage doublers on the inside of the fuselage sides, use the forward and aft most pinning holes and your registry pins to locate the exact position of the doubler. Tack glue it at the front and back and then remove the pins.
- 7 Use a straight edge to press the doubler into good contact with the fuselage sides and apply thin CA along all edges and through all the glue port holes.
- 8 Glue the scab joint plate FCJ over the butt joint at the aft section of the fuselage sides. Keep this plate about 1/4" from both edges so as not to interfere with the stringers later.
- 9 Pin register wing saddle FWS into position and glue.
- 10 Pin register and glue FB into position.
- 11 Install and glue the stabilizer saddle doubler (SSD). Note the gap to allow for former F16.
- 12 Assemble the gear bolt plates GB-A and GB-B, pin register. Be sure to assemble a left and a right set. Install three #6-32 blind nuts into each assembly.
- 13 Install and glue the gear bolt assemblies to the fuselage sides, use pin registration. Set the fuselage sides aside for now.
- 14 Assemble F4 and F4-A, use pin registration.
- 15 The forward fuselage formers are pre-assembled before installing into the fuselage sides. This assembly will force the fuselage sides into square to insure that the sides are in alignment to the center line. Locate and prepare FDB, F1, F1-A, F2, F2-A and F3. Install F2 and F3 and then install and glue F1 and the F4 assembly.



The 1/64" ply doubler, wing saddle and ply fuselage brace installed. All use pin registration to simplify critical positioning of these components.



Above, the landing gear bolt plate assembly has been added with #6-32 blind nuts installed. Below, the stabilizer saddle doubler has been added.

- 16 Install and glue F1-A and F2-A.
- 17 Install and glue the top forward keel (TFK)
- 18 Place one fuselage side flat on the bench and install the forward former assembly make sure all notches are clear of material and the tabs can be bottomed. Glue F3 to the fuselage side.
- 19 Glue the remaining fuselage side to F3.
- 20 Place the fuselage assembly upside down on the bench and then pull the forward end snugly against F1, make sure the tabs are bottomed in the fuselage notches and then glue it.
- 21 Move from the front to the back and glue each former of this assembly and FDB to the fuselage sides.
- 22 Trim the aft end of the stabilizer doubler till it does not interfere with the fuselage sides when the tail section is pulled together.
- 23 Carefully align the two fuselage sides at the tail section and glue them together.
- 24 Locate and prepare all remaining formers.
- 25 The remaining formers are installed by applying thick CA and then tipping into position and then assuring that the formers are firmly in contact with the fuselage sides.



This nose section subassembly will force the fuselage sides into perfect alignment when installed and eliminate any chance of building a banana.

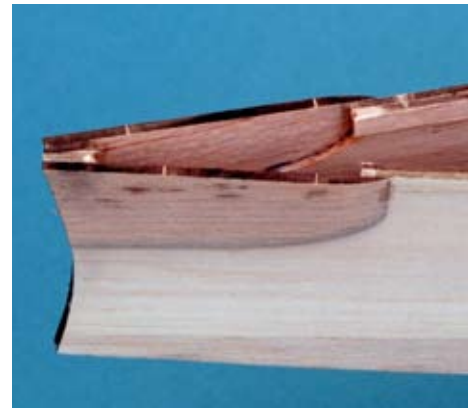


The fuselage assembly underway with the nose section subassembly and all formers installed as well as the wing bolt plate. Note that the fuselage sides will stand slightly proud of the former tabs to allow easier filling and sanding of the finished sides.

- 26 Install former F5 and F6.
- 27 Assemble F7 and F7-B, use pin registration.
- 28 Install F7.
- 29 Assemble the wing bolt plate WBP-A and WBP-B. Install two #1/4-20 blind nuts into the WBP-A side. Install and glue the WBP assembly into the fuselage assembly. Note that WBP-A will be on the bottom.
- 30 Install F9
- 31 Install F10.
- 32 Install all remaining formers F11 through F16. Note that these formers are marked for proper orientation.
- 33 Install and glue a 3/32"x 3/32" stringer into the corner notches of F1 through F6 on the bottom of the fuselage. Butt this stringer up against F6 below the notch for FSP.
- 34 Install a 1/8" x 1/4" stringer into the bottom corner notches of formers F11 through F16. Butt this stringer up against former F8 and glue to all formers and the fuselage sides. Taper the two stringers at the tail.

- 35 Remove the dash cut material at the tail section and install the EFB parts on each side of the fuselage. Taper these to a smooth leading and trailing edge.
- 36 Assemble the two sections of the bottom keel (FK). At the trailing end of the keel there is a notch. Glue two FKP pieces to the keel across this notch and then remove the material between the two lines. This will allow a slot for the water rudder shaft to exit the bottom.
- 37 Install the keel and glue it securely to each former. Assure that it is bottomed in each former slot.
- 38 Install a 1/8" x 1/4" stringer on each side of the fuselage between F11 and F15. Make sure it conforms to the shape of the fuselage especially between F14 and F15 where it sweeps up.
- 39 Use Epoxy to install F18 at the front of the cabin section. Test fit this part and note that it will engage a notch at the front and set flat against FB at the back.
- 40 Locate the 3/32" cabin brace wire with the flat steel wire clip.
- 41 Install the cabin brace with one #6-32 x 3/8" bolt and Nylock nut on the cabin roof (F18) and with two #4-40 eye bolts through former F4/F4-A. Use a #4 washer and Nylock nut on these eyebolts. Snug all nuts up and make sure that tightening these nuts does not distort the position of the cabin roof. This is a structural component and it will add rigidity to the wing leading edge attach point. When satisfied with the brace installation, tighten the Nylock nuts and then coat the eyebolt/cabin wire brace interface with Epoxy to insure it remains stable.
- 42 Assemble, install and glue F19.
- 43 Use Epoxy to install the 1/4" x 2" hardwood dowel to the F18/F19 assembly and then use Epoxy to add the F20 ply part on top of that.
- 44 Install and glue F21.
- 45 Use Epoxy or thick CA to install FSC. This piece will tie the ply wing saddle and the fuselage brace together.
- 46 Assemble two F20 sections, install and glue these to complete the cabin roof installation. Plane and sand to shape.

At this point you are ready to start installing the bottom hull sheeting. It is a good idea to revisit all former joints with Aliphatic Resin glue at this time while they are still completely accessible. Lay the fuselage on its side and apply a bead of glue to all fuselage side and keel joints. Then turn the fuselage assembly over and repeat this procedure for the opposite side.



This tail bulge will open up the tail section in the elevator control area and provide more space for the internal control linkage. All control linkages for the elevators and rudder are internal for water proofing purposes.



The cabin brace as supplied is fabricated from 3/32" music wire and a steel cable clip silver soldered together. The brace is a structural element and must be installed as indicated with the supplied hardware. After installation secure all contact points with thick CA or Epoxy.



The cabin roof is built up of laminations of balsa after installing the cabin brace and bolting in place. The ply plate at the bottom of this structure also holds the hardwood forward wing attach dowel.

- 47 Plane a slight bevel onto the aft fuselage sides at the bottom so the sheeting will lay flat on the side stringers and the side sheeting when installed.
- 48 The aft bottom sheeting is supplied in two sections and must be assembled before it is installed. Locate and assemble both aft bottom-sheeting sections.
- 49 Note that F7-B provides a shelf for the bottom leading edge sheeting to sit on. A small section of the sheeting will continue on past F7 to about half way between F5 and F6. This section of sheeting should be glued to the bottom of the fuselage side and then tapered to the fuselage side from F6 forward. The next part installed (FSP) will lay on top of the sheeting and provide a frame for the step sheeting. Begin installing the bottom sheeting by applying thick CA to former F8 and the shelf (F7-B). Place the sheeting on the fuselage and take care to line the sheeting up so it will split the bottom keel. Starting from F9 and moving aft, glue the sheeting to all remaining formers and the fuselage side.
- 50 Repeat this process for the remaining aft bottom sheet.
- 51 Trim and sand the bottom sheeting flush with the fuselage sides. Do not round this corner off, keep it crisp for better water separation.
- 52 Install FSP; glue the aft end behind F7 flush to the bottom sheeting.
- 53 The forward sections of bottom sheeting will require soaking to better conform to the forward formers. Wet the front half of the bottom sheeting and when flexible, place it onto the keel. Align the sheeting with FSP, later you will be adding vertical grain wood here and you want the bottom sheeting to allow this material to be at 90° or parallel with the fuselage sides. Glue the sheeting to the keel from the beginning of the step up to about F3. Starting with Former F3, begin forming the sheeting to the former and apply CA. Move on to the next former until done. Then go back and CA the sheeting along the keel and the fuselage sides. Trim and sand the sheeting flush with the fuselage sides when dry. Note that the sheeting will climb up and over the keel at the very front. Glue it in this position and then cut off the excess using the center of the keel as your guide. Repeat this process for the remaining forward bottom sheeting.
- 54 The bow sheeting will also require soaking prior to installation. Align the inside edge to the center of the 1/4" keel and flush with F4. Glue it to the keel first without attempting to form it to the formers. Then starting at the front and using the fuselage side as a trimming, guide form the sheeting around the formers and trim it at the fuselage side. Do only a short section at a time. When you have a good fit, glue it to the fuselage side and move back to repeat this procedure. Note that when you



Sheeting begins with the aft bottom sheeting and FSP is then installed over this. FSP will provide the top of the step sheeting a ledge to glue to. The bottom of the step sheeting support will be the forward bottom sheeting.



FSP and the forward bottom sheeting define the step outline shown here. All that remains is to create this neat step is to sheet these elements.



Sheeting of the step underway here. The step sheeting is sanded flat on the sides to fair in with the fuselage sides.

get to F3 the sheeting will bow out at the cabin end. Pull the sheeting down onto F4 and glue it to F4 then proceed from F3 aft to complete the installation.

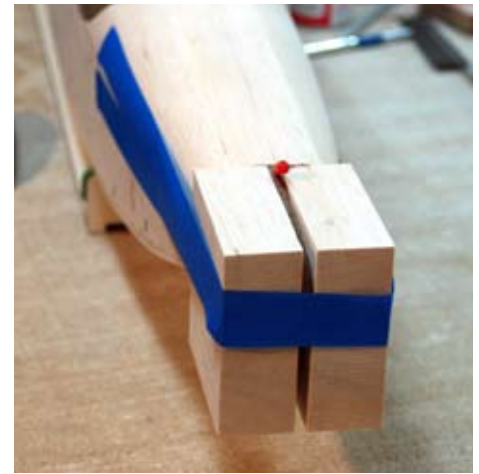
- 55 The nose block is supplied as a 1/4" laser cut profile core (NBC) with four balsa blocks glued up to form the nose block. The laser cut core will act as a guide while shaping the nose of the model. Glue up two sets of the 1-1/2" x 2" x 3-3/4" blocks to make two 1-1/2 x 4" x 3-3/4" blocks and then glue these to each side of the nose block core. Then glue this block assembly to F1 and carve and sand to shape. You can use a slurry of finishing resin and micro balloons to attach the nose block and at the same time fill any irregularities between the block and former F1.

Note:

Basic forming of the nose block is easiest to do if you shape the top and sides first. When shaping the concave section of the nose block, rough it out first with a sanding drum and then use a piece of sandpaper wrapped around a cylindrical object for finish shaping. I keep several 12" lengths of various sizes of PVC pipe in the shop for just such purposes but any cylindrical object of this type will work.

- 56 There are approximately 13 pinning holes on each side of the fuselage. If you are going to use film covering, these will be fine as they are however if you are going to glass and paint the model (recommended) they will need to be filled. A quick and easy way to do this is to use a piece of 1/8" square balsa. Spin the end of it between sandpaper to round off the corners. Then insert it into the holes and trim it off leaving about 1/32" proud of the surface. Then glue it with CA, When cured block sand it flat. The remainder of the tab notches can be filled with your favorite filler and sanded out. I used a new product call Elmer's Wood Filler for this. It is water based, bonds strongly and is easy to sand. This is a new formulation of an old product and is much improved. Note that there are two formulations of this product and the one you want advertises "Paintable + Sandable" on the package. The one that advertises "Stainable" is NOT recommended.

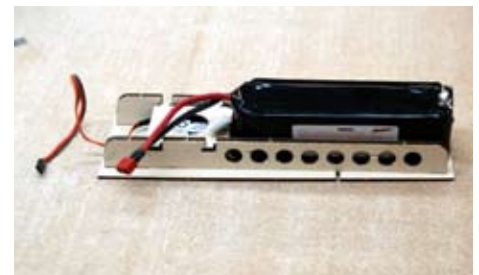
- 57 Assemble the battery tray and test it to assure it will work with the battery you have selected (electric version only). The battery tray is designed to hold the motor battery as well as a standard radio flight pack. Make any modifications you need and then install the battery tray. Note: In the interest of water proofing the model, no battery hatch has been designed into the model. Changing or charging the battery will require removal of the wing or charging through the power lead in the power pod.



The nose block glue up assembly is glued to former F1. A slurry of micro balloons and Epoxy is used to fill any voids between the block and F1 and assure a solid connection. The 1/4" center section provides a guide for shaping. While the shape is unique, it is not difficult to carve.



Nose block and cabin roof have been planed and sanded to final shape. All pinning holes and tab notches have been filled and sanded in preparation for glassing.



The battery tray is designed to accommodate the motor battery as well as a standard 4.8V radio battery. Check your system for fit before installing into the fuselage.

- 58 Assemble the landing gear brace consisting of FED, FGB-A and FGB-B. This assembly will fit into the notches at the top of the landing gear bolt plates to prevent any gear stresses from deflecting the fuselage sides. Use Epoxy to install this assembly.
- 59 Install two 1/8" x 1/4" x 4" basswood strips along the screw lines on the servo tray for additional material for the servo screws to bite. Then install the servo tray into the shoulders provided on formers F8 and F9.

UTILITY HANDLE ASSEMBLY

A handle has been provided to make working with the fuselage a little more convenient during the glassing, covering or painting operations. It is also handy for transporting the fuselage to the flying site. This handle will attach to the fuselage in the same manner as the wing.

- 1 Locate and prepare the handle components, they consist of two 1/4" lite ply parts and two 3/32" ply parts all labeled handle.
- 2 Use your pins to install a 3/32" ply part on each side of the 1/4" handle section.
- 3 Glue this assembly into the handle plate.



A utility handle has been provided to simplify some of the building processes. The handle mounts to the fuselage using the wing attachment system and is useful for transport as well.

FUSELAGE FINAL ASSEMBLY

Some modelers are averse to painting, I am too but I like painted models just slightly more than I dislike painting so I recommend glassing and painting any model if it is to be used on water. If you decide to paint the model, note that it is easier to glass the fuselage, stabilizer and vertical fin before the final assembly. If you decide to cover the model with a film covering you can now join the stabilizer and vertical fin to the fuselage but be sure to waterproof the entire fuselage structure before covering. Usually this is done with a product such as Balsa Rite or clear dope. For the purposes of the final assembly I will assume that the model will be glassed and painted. More on that later.



Above, the Utility handle is used to secure the fuselage assembly in preparation for glassing. This enables secure control of the fuselage without having to physically touch the fuselage assembly. This is handy for glassing and painting purposes.

Note that the elevator and rudder linkages are totally enclosed in the fuselage in the interest of waterproofing the hull. As such make sure they are not going to be able to come loose at any time later. Solder or CA the connections to the push rod when doing the final install of these components.

The rudder torque rod extends through the bottom of the fuselage to also actuate the water rudder. This will also be employed as the tail gear mount for land operation. The torque rod uses a 2-1/2" section of brass tubing as a bearing and water seal. The brass tube is filled with silicone grease to retard water entry and lubricate the torque rod. The brass bearing must be firmly fixed to the keel section in the slot in the keel provided by two FKP and FKP-B parts. This is easily accomplished by following these procedures.

- 1 Use a drill bit or small sanding stick to open up the slot in the bottom keel enough to allow the 1/8" brass tube to clear.
- 2 Test fit the stabilizer in the correct position. Adjust the saddles as necessary to assure it is level. Then test install the vertical fin with the rudder and rudder torque rod attached with the 1/8" brass bearing in place. The torque rod will extend through the bottom of the fuselage. You will need widen the slot in the keel to accomplish this. Let the brass bearing extend out the bottom of the fuselage about 1/8". From the bottom, use some thick CA to tack glue the brass bearing to the keel sides. Make sure it is secure.
- 3 Cut a small strip of waxed paper and cut a 1/8" hole into the center of it. Slide the waxed paper down over the torque rod and secure it with masking tape. Back up the entire piece of waxed paper with masking tape to support it in the next operation.
- 4 Flip the assembly over and remove the vertical fin and rudder and the stabilizer. The brass bearing should still be glued in place and solid. Mix up a batch of balloons and Epoxy and using a section of 1/16" wire, fill the entire keel slot on both sides of the brass bearing. When this has cured, remove the waxed paper and check for any voids. Fill as necessary. Trim or sand the brass bearing flush with the fuselage bottom.
- 5 Fabricate the rudder horn and silver solder it to the rudder torque rod. Use a Du-Bro ball link on the rudder horn to accommodate the angled linkage required. Fabricate your pushrod assembly and then install the rudder servo. Temporarily install and test the rudder linkage. The rudder servo linkage and rudder torque rod will be installed before the stabilizer is installed. Check that the stabilizer will fit down over the rudder torque rod if not, either trim back the rudder torque rod or open the slot in the stabilizer until it will fit down over the rudder torque rod.
- 6 When we do the final install of the rudder torque rod we want to pack the rudder torque rod bearing with silicone grease. This product is available in your home supply store plumbing department. It comes in a little plastic tub of about a half ounce and will last you many moons. To pack the bearing use the following method. With a toothpick put as much silicone grease in to bearing tube top as you can. Insert the torque rod and then remove it. Place more silicone grease into the tube. Use a piece of plastic bag held firmly against the bottom of the bearing tube and install the torque rod again. The idea is to have the air pressure force the silicone back up the bearing between the bearing tube and the torque rod. You will know when have succeeded when silicone grease exits the top of the bearing tube. Wipe all excess silicone grease from the exterior of the model. The silicone grease will form a watertight seal and also lubricate the torque rod and inhibit rust and corrosion.
- 7 Install the elevator servo and temporarily install the stabilizer and elevators to check the action. Remove the elevators and the stabilizer but leave the elevator torque rod and linkage in place. They must be installed before the stabilizer is permanently installed. A slight dogleg may be required to the elevator linkage to assure clearance of the rudder torque rod. Use a keeper on the stabilizer clevis, as these components will not be accessible without major surgery once the stabilizer has been installed.
- 8 Use Epoxy to install the stabilizer. Check that it is level, square and centered by measuring from the stabilizer tips to the center of the forward wing mount.
- 9 Use Epoxy and install the vertical fin. Note that V5 must be glued to former F16 for a strong mount.
- 10 Locate two RF pieces and glue them together. You will need to shape these to match the shape of the fuselage at the bottom and fair it into the rudder shape at the top. Open up a slot at the front of this assembly for the rudder torque rod clearance and then glue it in place.

PYLON ASSEMBLY

NOTE: The glow pylon and the electric pylon are constructed in exactly the same manner. The electric pylon parts are prefixed with the letter E and the glow pylon parts are prefixed with the letter G.

- 1 Locate the pylon sides (E-P1), in this case the electric pylon and the 1/4" balsa pylon core (EP-2).
 - 2 Install EP-1 onto the registry pins for the forward section and mark where the cable tunnel begins. This will aid in applying glue. Then remove the section of pylon core. Apply glue using the pencil line as a guide and then install the pylon core section. Apply a liberal amount of glue to the wing attachment hook area at the bottom of the pylon.
 - 3 Repeat this process for the aft section of the pylon core.
 - 4 Use the forward most and aft most pin holes and install the remaining pylon side (E-P1).
 - 5 Cut two 1/4" x 1-1/2" dowel pins, round the ends and then install them into the two 1/4" holes in the pylon so they protrude equally on both sides of the pylon.
- This completes assembly of the pylon.



The pylon will join the wings and support the power pod of your choice, Electric or Glow. Here one pylon side is pinned and the glue line marked.

KIT OPTIONS

Your Navigator can be flown off of land or water. It can be flown on Electric or Glow power and you can fly off of water with pontoons or sponsons. These options make the Navigator a well rounded model for just about any flying occasion. The following instructions are for the many options available for the Navigator. Keep these assembly instructions in the event that you purchase one of these options.

ELECTRIC POWER POD KIT ASSEMBLY

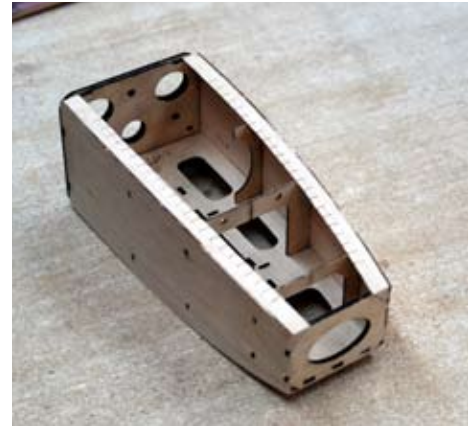
Note that the right thrust angle is built into the power pod firewall. This requires the parts to be installed in the correct orientation. Please follow the instructions explicitly.

- 1 Use the pin register method to assemble the firewall consisting of FW-A and FW-B. Place FW-B on the register pins with the label side UP. Apply glue and then install FW-A with the label side UP.
- 2 Install four #6-32 blind nuts into the firewall.
- 3 Glue the firewall assembly to the power pod base E-PPB with the B-side of the firewall facing aft and the label side of E-PPB facing UP.
- 4 Install and glue EP4 to the aft end of EPP-B.
- 5 Install but do not glue EP-1, EP-2 and EP-3. Note that these formers will snap in to position when installed. They will be permanently glued when the pod sides have been installed.
- 6 Install the 1/16" balsa sides, PS-L for the left side and PS-R for the right side.



Electric power pod framed up and ready for sheeting. The power pod will also contain the main power connect for the motor and the radio switch for easy access.

- 7 Cut two 9" long 3/8" and two 1/4" sections of triangle stock. Kerf cut the 3/8" stock to ease bending to conform to the pod sides. This will not be necessary for the 1/4" stock. Install and glue the 3/8" triangle in the top corners of the pod and install and glue the 1/4" triangle stock in the bottom corners.
- 8 Install and glue the bottom pod sheeting PS-B.
- 9 Install and glue the top pod sheeting PS-T
- 10 Glue on the pod tail block and carve to shape. When radiusing the pod corners, start at the front and match the radius of the firewall corners to insure that it will match the cowl.
- 11 Use a liberal application of Epoxy to install the pylon to the pod. Assure that all tabs on the pylon assembly fully engage all the slots in EPP-B. Form an Epoxy and balloon fillet along the pylon and the bottom pod sheeting.
- 12 Place the fiberglass cowl flat on the bench spinner side down and measure up from the bench 2-1/2". Trim slightly shy of this line and then sand the edge perfectly straight by laying a full sheet of sandpaper on the bench and moving the cowl over it.
- 13 Sand CR for a snug (not tight) fit into the back of the cowl. Note that the top of the cowl has a 3/8" radius and the bottom has a 1/4" radius. Do not glue it in just yet.
- 14 Install two magnets into the holes provided in the firewall. Use thick CA and keep the magnets flush with the surface of the firewall.
- 15 Cut two 3/8" lengths of 1/8" dowel and round one end slightly. Install these into the holes provided in the firewall. The rounded end should be facing forward and the dowel should protrude 1/8" above the surface of the firewall.
- 16 Place the cowl ring onto the dowels in the firewall and make sure it fits perfectly flush to the firewall. Remove glue or anything else that prevents a perfectly flush fit. Place two more magnets into the cowl ring and secure with thick CA and accelerator. Let this cure thoroughly before removing.
- 17 Remove the material for the motor and spinner opening in the front of the cowl.
- 18 Use Epoxy to glue the cowl ring into the cowl. Place the cowl ring in the cowl, lay the assembly flat on the bench and use a screwdriver to push the cowl ring flat against the bench. The cowl ring should be perfectly flush to the back of the cowl.



Above, 3/8" triangle stock has been kerf cut to facilitate bending and installed in the top two corners of the pod. On the bottom corners 1/4" triangle stock has been installed and the pod is now ready for the top and bottom sheeting to be installed.



The Top Notch Height gauge is used to mark the exact location of the trim line on the fiberglass cowl. The cowl is cut to about 1/32" from this line and then sanded flat down to the line before the cowl ring is installed.



The completed cowl assembly. The two 1/8" alignment dowels and four magnets provide a perfectly aligned and firm mount to the power pod. This method allows quick access to the motor as well as eliminates the need for unsightly retaining screws.



This concludes assembly of the electric pod.

LEFT, The completed electric power pod. The hatch is retained by a magnet for quick access to the battery connector and the radio switch. The dummy antenna serves only as a handle for the hatch.

GLOW POWER POD KIT ASSEMBLY

- 1 Use the pin register method to assemble GFW-A and GFW-B. Place GFW-B on the pins first with the labeled side up. Then glue GFW-A to it.
- 2 Note that the firewall is cut with holes to accommodate the Dave Brown 60 size engine mount. If you choose to use a different mount locate and drill the mounting holes now.
- 3 Install four #6-32 blind nuts from the back of the firewall assembly.
- 4 Glue GP-1 to the firewall assembly.
- 5 Glue GPP-4 to the GP-1 assembly.
- 6 Install but do not glue GP-1, GP-2 and GP-3. These will slide in from the sides and then snap into position when the bottom tab engages.
- 7 Note that the side sheeting is labeled for the left and right side. Install GPS-L on the left side and GPS-R on the right side.
- 8 Cut two pieces of 1/4" triangle stock and glue them to the bottom corners of the pod assembly.
- 9 Cut two pieces of 3/8" triangle stock and kerf cut them every 1/4" about 2/3rds of the way through to facilitate bending and glue them into the top corners of the pod assembly.
- 10 Glue GP-1, GP-2 and GP-3 to GP-1.
- 11 Before installing the bottom sheeting you may want to install your throttle servo and check the alignment of the linkage. After this you can install the bottom sheeting.
- 12 Before installing the top sheeting we will assemble the hatch and use it to align the top sheeting when installed. Glue GHC to GH. Note that GH is labeled TOP as well. Glue GHC to the opposite side of GH.
- 13 Cut two 1/8" dowels about 1/2" long and glue them into the holes provided in GHC.
- 14 Glue a 1/4" square piece of basswood to the inside of the firewall to act as a screw block for the hatch. Then drill it for two #2 x 1/4" sheet metal screws using the hatch to locate the position of the holes. Then temporarily install the hatch.
- 15 Install the two top sections of sheeting. Note that formers GP-1, GP-2 and GP-3 will extend 1/16" inboard of the top sheeting to support the ply hatch. Use the hatch as a guide and butt the sheeting up against the sides of the hatch.
- 16 Install and glue a magnet in each of the four holes provided in the firewall. Use thick CA and assure that the magnets are flush with the firewall.
- 17 Prepare two 3/8" lengths of 1/8" dowel. Round one end and glue them into the holes provided in the firewall.



Basic glow power pod structure ready for corner bracing and sheeting. Throttle servo and tank are also mounted in the pod.



The Top Notch Height gauge is used to mark the cowl exactly 4-3/8" back from the spinner ring. The cowl is then trimmed about 1/32" shy of this line and then sanded flat back to this line.



The completed glow power pod will hold a 12 oz. tank and the throttle servo. The throttle servo is accessible by a small hatch on the bottom. The top hatch is retained by two dowels and two screws. The radio switch can also be installed in the power pod.

- 18 Place the cowl ring onto the alignment dowels on the firewall and install a magnet into each hole provided in the cowl ring. Make sure that the ply cowl ring is flush with the firewall. Use thick CA to tack glue each magnet to the cowl ring taking care not to allow glue between the cowl ring and the firewall. Remove the cowl ring and then permanently glue the magnets to the cowl ring.
- 19 Prepare the cowl by placing it spinner side down on the bench and measuring up exactly 4-3/8" from the bench. Mark this location all the way around the cowl and trim to this line. Sand the edge flat and then install the cowl ring. Sand the cowl ring for a snug (but not tight) fit and then Epoxy in place.

This concludes the basic assembly of the glow power pod and pylon.

SPONSON KIT ASSEMBLY

- 1 Assemble the core sheet, comprised of two CPCS and one SPCTE. Note that you will be building a left and a right hand sponson. Be sure to assemble complimentary pairs in the following steps. SPSSA, SPSSB and SPSSC will form a pocket for the aluminum sponson mount. The area must be water proofed with epoxy resin while being assembled.
- 2 Using the register pins, install SPSSA to the core sheet. Observe a left or right position. SSPS will be on the bottom side of the core sheet.
- 3 Install SPSSB.
- 4 Use thinned Epoxy finishing resin to waterproof the areas indicated.
- 5 Install SPSSC.
- 6 Install bottom split ribs SP1-B through SP7-B.
- 7 Install the bottom spar SPSB.
- 8 Remove the joiner tabs on SPS1-B and SPS2-B.
- 9 Install the bottom leading edge SPLE-B.
- 10 Flip this assembly over and install the top split ribs SP1-T through SP7-T.
- 11 Install the top spar SPST.
- 12 Install the top leading edge SPLE-T.
- 13 Relieve the material at the trailing edge of SPSS-C to clear the sheeting that will be installed later. Use a straight edge between SP1-B and SP2-B to check when it has been lowered enough.
- 14 Sand or plane the leading edge top and bottom to contour with the ribs.
- 15 Assemble the bottom (SPSB, 3/32" balsa) and the top (SPST, 1/16" balsa) sponson sheeting and sand the outside surface smooth.
- 16 Glue a piece of 1/4" scrap balsa at the trailing edge between SP1-B and SP2-B. Taper this from SP1-B to SP2-B to fill at the trailing edge, otherwise there will be a gap at the trailing edge.



The sponson core sheet assembly ready for assembly.



The aluminum sponson mount pocket must be waterproofed with Epoxy resin. Here the resin has been tinted to show where this needs to be done. Do not omit this step.



A piece of scrap balsa has been installed between SP1-B and SP2-B and tapered to contour. Above this, the SPSS assembly has been tapered to clear the 3/32" bottom sheeting.

- 17 Install the top sheeting.
- 18 The bottom sheeting will require wetting to make the compound curves of the sponson bottom. Use plenty of cloths pins along the trailing edge and some scrap balsa to make sure it is secured to the flatted area of SP1-B and SP2-B.
- 19 Sand the root and tip flat.
- 20 Install the two tip sections SPTP and sand to shape.
- 21 Temporarily install the aluminum sponson mount and then install the root sponson root filler FPRF. This piece should be tapered to fit smoothly to the fuselage. Do this by test fitting the assembly to the fuselage.
- 22 Sand the leading and trailing edge to contour. Do not sand into the ply trailing edge (SPCTE).

LANDING GEAR KIT ASSEMBLY

- 1 Install the bolt on axles to the formed aluminum gear struts, install the wheels and then secure with a 5/32" wheel collar.
- 2 Refer to the detail drawing on plans sheet #1. File or grind a notch into one end of the 1/8" brass tube to allow the #4-40 x 1/4" bolt to contact the rudder torque rod when installed.
- 3 Clean the tail gear strut and the brass tube in preparation for silver soldering. Wrap the brass tube and the tail gear strut together with #22 copper wire. Install the 1/8" wheel collar over the notch prepared in step 2 and silver solder this assembly. To prevent solder from getting into the threads of the wheel collar you can remove the bolt and turn in a piece of scrap wood such as a toothpick. If any solder gets into the threaded area you can remove it by running a #4-40 tap through it.
- 4 Install the 1" tail wheel and retain it with a 3/32" wheel collar. Trim off any excess axle length.
- 5 To install the mains, remove the plug bolts and washers from the fuselage sides. Install the mains with three #6-32 x 1/2" button head bolts supplied.
- 6 To install the tail gear, remove the water rudder. Install the tail gear assembly and tighten the #4-40 x 1/4" bolt. You may want to grind a flat onto the rudder torque rod to prevent the tail gear assembly from slipping.



The landing gear kit will enable you to fly your Navigator II model from a grass or paved field. The correct toe in is already built into the custom aluminum gear struts.

This concludes the landing gear kit assembly.

The water rudder assembly is composed of two parts, a small sub fin to prevent snagging obstacles such as weeds and the water rudder itself. Assemble the sub fin and allow about 1/8" of room between the trailing edge of the sub fin and the rudder torque rod to allow for the rudder and tail gear assemblies. Epoxy this fin in place on the bottom of the fuselage.

The water rudder is assembled from three laminated parts and then the brass tube and wheel collar are Epoxied to it.

After painting or covering, the formed windows are installed from the inside with Pacer 560 canopy glue. The windshield is also installed with Pacer formula 560 canopy glue in the following manner.

- 1 Center the laser cut windshield on the fuselage in the position indicated on the plans, note that there is a small notch indication center on the windshield. Tape it in place and then tack glue it in the center only at the top and where it contacts the forward deck.
- 2 After curing pull the sides back along the fuselage and secure with masking tape. Apply pacer 560 Canopy Glue along the entire periphery of windshield. Use a liberal application to secure the windshield. Use a syringe or pipette to apply a liberal bead of glue to the inside of the windshield as well.

PART#	QTY.	SHEET	MATERIAL	SIZE
A1	1	2	BALSA	3/32 X 3 X 36
A1	1	47	BALSA	3/32 X 4 X 36
A2	1	2	BALSA	3/32 X 3 X 36
A2	1	47	BALSA	3/32 X 4 X 36
A3	1	2	BALSA	3/32 X 3 X 36
A3	1	47	BALSA	3/32 X 4 X 36
A4	1	2	BALSA	3/32 X 3 X 36
A4	1	47	BALSA	3/32 X 4 X 36
A5	1	2	BALSA	3/32 X 3 X 36
A5	1	47	BALSA	3/32 X 4 X 36
A6	1	2	BALSA	3/32 X 3 X 36
A6	1	47	BALSA	3/32 X 4 X 36
A7	1	2	BALSA	3/32 X 3 X 36
A7	1	47	BALSA	3/32 X 4 X 36
A8	1	2	BALSA	3/32 X 3 X 36
A8	1	47	BALSA	3/32 X 4 X 36
A9	1	2	BALSA	3/32 X 3 X 36
A9	1	47	BALSA	3/32 X 4 X 36
AB	1	15	BALSA	1/16 X 4 X 36
AB	1	17	BALSA	1/16 X 4 X 36
A-B	2	23	BALSA	1/16 X 4 X 36
ABS	2	54	BALSA	3/32 X 4 X 36
ABS	2	57	BALSA	3/32 X 4 X 36
AHB	16	58	BALSA	5/16 X 4 X 36
AHB-A	4	58	BALSA	5/16 X 4 X 36
AHB-B	4	58	BALSA	5/16 X 4 X 36
AHB-C	4	58	BALSA	5/16 X 4 X 36
AHB-D	4	58	BALSA	5/16 X 4 X 36
AHMP	2	49	AC PLY	3/32 X 12 X 48
ALE	2	58	BALSA	5/16 X 4 X 36
AS	1	5	BALSA	1/16 X 4 X 36
AS	1	18	BALSA	1/16 X 4 X 36
A-T	2	18	BALSA	1/16 X 4 X 36
ATS	1	50	BALSA	3/32 X 6 X 36
ATS	1	51	BALSA	3/32 X 6 X 36
B-B	1	11	BALSA	1/16 X 4 X 36
B-B	1	23	BALSA	1/16 X 4 X 36
BT	1	17	BALSA	1/16 X 4 X 36
B-T	2	16	BALSA	1/16 X 4 X 36
C-B	1	5	BALSA	1/16 X 4 X 36
C-B	1	23	BALSA	1/16 X 4 X 36
C-T	1	11	BALSA	1/16 X 4 X 36
C-T	2	16	BALSA	1/16 X 4 X 36

PART#	QTY.	SHEET	MATERIAL	SIZE
D-B	1	13	BALSA	1/16 X 4 X 36
D-B	2	16	BALSA	1/16 X 4 X 36
DG	1	43	BALSA	1/8 X 4 X 36
D-T	1	11	BALSA	1/16 X 4 X 36
D-T	1	14	BALSA	1/16 X 4 X 36
E-B	1	14	BALSA	1/16 X 4 X 36
E-B	1	24	BALSA	1/16 X 3 X 36
EC	2	1	AC PLY	16 X 12 X 48
EC	1	10	BALSA	1/16 X 4 X 36
EC	1	25	BALSA	1/16 X 6 X 36
EFB	2	44	BALSA	1/8 X 4 X 18
E-T	1	13	BALSA	1/16 X 4 X 36
E-T	1	24	BALSA	1/16 X 3 X 36
EV	2	30	C BALSA	1/4 X 3 X 36
EV	2	31	BALSA	1/4 X 4 X 36
F	2	19	BALSA	1/16 X 6 X 36
F	2	20	BALSA	1/16 X 6 X 36
F	2	21	BALSA	1/16 X 6 X 36
F	1	22	BALSA	1/16 X 6 X 36
F1	1	46	AC PLY	1/8 X 6 X 20
F10	1	45	L PLY	1/8 X 6 X 48
F11	1	45	L PLY	1/8 X 6 X 48
F12	1	45	L PLY	1/8 X 6 X 48
F13	1	45	L PLY	1/8 X 6 X 48
F14	1	45	L PLY	1/8 X 6 X 48
F15	1	49	AC PLY	3/32 X 12 X 48
F16	1	45	L PLY	1/8 X 6 X 48
F18	1	42	AC PLY	1/8 X 12 X 24
F19	2	35	C BALSA	1/4 X 4 X 36
F1-A	1	43	BALSA	1/8 X 4 X 36
F2	1	45	L PLY	1/8 X 6 X 48
F20	4	35	C BALSA	1/4 X 4 X 36
F20	1	42	AC PLY	1/8 X 12 X 24
F21	2	44	BALSA	1/8 X 4 X 18
F21-A	1	42	AC PLY	1/8 X 12 X 24
F2-A	1	44	BALSA	1/8 X 4 X 18
F3	1	45	L PLY	1/8 X 6 X 48
F4	1	42	AC PLY	1/8 X 12 X 24
F4	1	46	AC PLY	1/8 X 6 X 20
F4-A	1	42	AC PLY	1/8 X 12 X 24
F5	1	49	AC PLY	3/32 X 12 X 48
F6	1	49	AC PLY	3/32 X 12 X 48
F7	1	49	AC PLY	3/32 X 12 X 48

PART#	QTY.	SHEET	MATERIAL	SIZE
F8	1	49	AC PLY	3/32 X 12 X 48
F9	1	49	AC PLY	3/32 X 12 X 48
FB	2	49	AC PLY	3/32 X 12 X 48
FBS	1	48	BALSA	3/32 X 4 X 36
FBT-A	1	46	AC PLY	1/8 X 6 X 20
FCJ	2	38	AC PLY	1/64 X 8 X 48
FD	2	38	AC PLY	1/64 X 8 X 48
FDB	1	45	L PLY	1/8 X 6 X 48
FED	1	46	L PLY	1/8 X 6 X 20
FGB-A	1	42	AC PLY	1/8 X 12 X 24
FGB-B	1	42	AC PLY	1/8 X 12 X 24
FGBHP	8	49	AC PLY	3/32 X 12 X 48
FK	1	49	AC PLY	3/32 X 12 X 48
FKP	2	44	BALSA	1/8 X 4 X 18
FKP-B	2	44	BALSA	1/8 X 4 X 18
FL1	2	1	AC PLY	16 X 12 X 48
FL2	2	1	AC PLY	16 X 12 X 48
FL2	2	1	AC PLY	16 X 12 X 48
FL3	2	1	AC PLY	16 X 12 X 48
FL4	2	1	AC PLY	16 X 12 X 48
FL5	2	1	AC PLY	16 X 12 X 48
FL6	2	1	AC PLY	16 X 12 X 48
FL7	2	1	AC PLY	16 X 12 X 48
FLC	2	49	AC PLY	3/32 X 12 X 48
FLE	2	43	BALSA	1/8 X 4 X 36
FLE	2	43	BALSA	1/8 X 4 X 36
FLS	2	47	BALSA	3/32 X 4 X 36
FLS	1	52	BALSA	3/32 X 6 X 36
FLS	1	53	BALSA	3/32 X 4 X 36
FLSB	4	12	BALSA	1/16 X 6 X 36
FLST	4	60	BALSA	1/16 X 4 X 36
FS	1	50	BALSA	3/32 X 6 X 36
FS	1	51	BALSA	3/32 X 6 X 36
FS	1	52	BALSA	3/32 X 6 X 36
FS	1	53	BALSA	3/32 X 4 X 36
FS	2	56	BALSA	3/32 X 4 X 36
FSB	1	50	BALSA	3/32 X 6 X 36
FSB	1	55	BALSA	3/32 X 4 X 36
FSB-I	2	33	BALSA	1/4 X 3 X 36
FSB-O	2	33	BALSA	1/4 X 3 X 36
FSC	2	49	AC PLY	3/32 X 12 X 48
FSP	1	51	BALSA	3/32 X 6 X 36
FTB-B	2	36	L PLY	1/4 X 12 X 48

PART#	QTY.	SHEET	MATERIAL	SIZE
FTB-D	1	42	AC PLY	1/8 X 12 X 24
FTE	2	32	BALSA	1/4 X 3 X 36
FTE	2	33	BALSA	1/4 X 3 X 36
FTS	1	48	BALSA	3/32 X 4 X 36
FTS	1	55	BALSA	3/32 X 4 X 36
FWS	2	49	AC PLY	3/32 X 12 X 48
FWS	2	49	AC PLY	3/32 X 12 X 48
GBP-A	2	42	AC PLY	1/8 X 12 X 24
GBP-B	2	42	AC PLY	1/8 X 12 X 24
GUAGE	1	36	L PLY	1/4 X 12 X 48
H	1	14	BALSA	1/16 X 4 X 36
H	1	15	BALSA	1/16 X 4 X 36
H	2	27	BALSA	1/16 X 4 X 36
HANDLE	2	36	L PLY	1/4 X 12 X 48
HANDLE	2	49	AC PLY	3/32 X 12 X 48
HDC	1	45	L PLY	1/8 X 6 X 48
HER	1	42	AC PLY	1/8 X 12 X 24
HMM-P	2	45	L PLY	1/8 X 6 X 48
LEB	1	33	BALSA	1/4 X 3 X 36
NBC	1	30	C BALSA	1/4 X 3 X 36
NBC	1	34	BALSA	1/4 X 4 X 36
PM	4	1	AC PLY	1/6 X 12 X 48
PM-A	2	49	AC PLY	3/32 X 12 X 48
RC	1	1	AC PLY	16 X 12 X 48
RF	2	58	BALSA	5/16 X 4 X 36
RU	2	35	C BALSA	1/4 X 4 X 36
RU	2	43	BALSA	1/8 X 4 X 36
RU	2	48	BALSA	3/32 X 4 X 36
RU	2	55	BALSA	3/32 X 4 X 36
RUF	2	43	BALSA	1/8 X 4 X 36
S-1	2	44	BALSA	1/8 X 4 X 18
S1-B	2	47	BALSA	3/32 X 4 X 36
S2	4	17	BALSA	1/16 X 4 X 36
S3	2	5	BALSA	1/16 X 4 X 36
S3	2	17	BALSA	1/16 X 4 X 36
S4	2	5	BALSA	1/16 X 4 X 36
S4	2	17	BALSA	1/16 X 4 X 36
S5	4	5	BALSA	1/16 X 4 X 36
S6	2	5	BALSA	1/16 X 4 X 36
S6	2	13	BALSA	1/16 X 4 X 36
S7	4	13	BALSA	1/16 X 4 X 36
S8	4	13	BALSA	1/16 X 4 X 36
S9	4	13	BALSA	1/16 X 4 X 36

PART#	QTY.	SHEET	MATERIAL	SIZE
SF	4	1	AC PLY	1/6 X 12 X 48
SFJ	12	38	AC PLY	1/64 X 8 X 48
SHC	12	44	BALSA	1/8 X 4 X 18
SLE	4	34	BALSA	1/4 X 4 X 36
SM	4	36	L PLY	1/4 X 12 X 48
SP	2	1	AC PLY	16 X 12 X 48
SPM	4	42	AC PLY	1/8 X 12 X 24
SS	2	5	BALSA	1/16 X 4 X 36
SS	2	6	BALSA	1/16 X 4 X 36
SS	2	7	BALSA	1/16 X 4 X 36
SS	2	8	BALSA	1/16 X 4 X 36
SSD	2	50	BALSA	3/32 X 6 X 36
ST	2	30	C BALSA	1/4 X 3 X 36
ST	4	31	BALSA	1/4 X 4 X 36
STAND	3	36	L PLY	1/4 X 12 X 48
STE	2	34	BALSA	1/4 X 4 X 36
SWB	1	59	BALSA	3/32 X 3 X 36
SW-B	1	3	BALSA	3/32 X 3 X 36
SW-B	1	40	BALSA	3/32 X 3 X 36
SW-B	1	59	BALSA	3/32 X 3 X 36
SW-T	1	59	BALSA	3/32 X 3 X 36
SW-T	1	3	BALSA	3/32 X 3 X 36
SW-T	1	40	BALSA	3/32 X 3 X 36
SW-T	1	59	BALSA	3/32 X 3 X 36
TKA	1	49	AC PLY	3/32 X 12 X 48
TKF	1	34	BALSA	1/4 X 4 X 36
V1	2	2	BALSA	3/32 X 3 X 36
V2	2	2	BALSA	3/32 X 3 X 36
V3	2	2	BALSA	3/32 X 3 X 36
V4	2	37	BALSA	3/32 X 3 X 36
V5	2	39	BALSA	3/32 X 3 X 36
V6	2	1	AC PLY	16 X 12 X 48
VC-A	1	1	AC PLY	16 X 12 X 48
VC-B	1	9	BALSA	1/16 X 4 X 36
VC-C	1	9	BALSA	1/16 X 4 X 36
VHC-1	2	43	BALSA	1/8 X 4 X 36
VHC-2	2	43	BALSA	1/8 X 4 X 36
VHC-3	2	43	BALSA	1/8 X 4 X 36
VLE	2	34	BALSA	1/4 X 4 X 36
V-LIN	2	38	AC PLY	1/64 X 8 X 48
VS	2	9	BALSA	1/16 X 4 X 36
VS	4	26	BALSA	1/16 X 6 X 36
VTE	2	33	BALSA	1/4 X 3 X 36

PART#	QTY.	SHEET	MATERIAL	SIZE
W1	2	42	AC PLY	1/8 X 12 X 24
W1 FIXTURE	1	36	L PLY	1/4 X 12 X 48
W1 FIXTURE	1	42	AC PLY	1/8 X 12 X 24
W10	1	37	BALSA	3/32 X 3 X 36
W10	1	41	BALSA	3/32 X 3 X 36
W11	1	37	BALSA	3/32 X 3 X 36
W11	1	41	BALSA	3/32 X 3 X 36
W11-A	1	3	BALSA	3/32 X 3 X 36
W11-A	1	59	BALSA	3/32 X 3 X 36
W12	1	2	BALSA	3/32 X 3 X 36
W12	1	47	BALSA	3/32 X 4 X 36
W12-A	1	3	BALSA	3/32 X 3 X 36
W12-A	1	59	BALSA	3/32 X 3 X 36
W13	1	39	BALSA	3/32 X 3 X 36
W13	1	40	BALSA	3/32 X 3 X 36
W14	1	39	BALSA	3/32 X 3 X 36
W14	1	40	BALSA	3/32 X 3 X 36
W15	1	39	BALSA	3/32 X 3 X 36
W15	1	40	BALSA	3/32 X 3 X 36
W16	1	39	BALSA	3/32 X 3 X 36
W16	1	40	BALSA	3/32 X 3 X 36
W17	1	39	BALSA	3/32 X 3 X 36
W17	1	40	BALSA	3/32 X 3 X 36
W18	1	39	BALSA	3/32 X 3 X 36
W18	1	40	BALSA	3/32 X 3 X 36
W-19	1	28	AC PLY	1/32 X 4 X 30
W-19	2	49	AC PLY	3/32 X 12 X 48
W2	2	49	AC PLY	3/32 X 12 X 48
W-20	1	28	AC PLY	1/32 X 4 X 30
W-21	2	33	BALSA	1/4 X 3 X 36
W3	1	37	BALSA	3/32 X 3 X 36
W3	1	41	BALSA	3/32 X 3 X 36
W4	1	37	BALSA	3/32 X 3 X 36
W4	1	41	BALSA	3/32 X 3 X 36
W5	1	37	BALSA	3/32 X 3 X 36
W5	1	41	BALSA	3/32 X 3 X 36
W5	2	56	BALSA	3/32 X 4 X 36
W6	1	2	BALSA	3/32 X 3 X 36
W6	1	37	BALSA	3/32 X 3 X 36
W6	1	47	BALSA	3/32 X 4 X 36
W7	1	2	BALSA	3/32 X 3 X 36
W7	1	47	BALSA	3/32 X 4 X 36
W8	2	49	AC PLY	3/32 X 12 X 48

PART#	QTY.	SHEET	MATERIAL	SIZE
W8-B	2	49	AC PLY	3/32 X 12 X 48
W9	1	41	BALSA	3/32 X 3 X 36
WBB	2	32	BALSA	1/4 X 3 X 36
WBP-A	2	49	AC PLY	3/32 X 12 X 48
WBP-B	1	36	L PLY	1/4 X 12 X 48
WBT	2	32	BALSA	1/4 X 3 X 36
WGA	2	33	BALSA	1/4 X 3 X 36
WGB	2	29	BALSA	1/4 X 3 X 36
WLE	4	29	BALSA	1/4 X 3 X 36
WLES	1	19	BALSA	1/16 X 6 X 36
WLES	1	20	BALSA	1/16 X 6 X 36
WLES	1	21	BALSA	1/16 X 6 X 36
WLES	1	22	BALSA	1/16 X 6 X 36
WPB-A	1	42	AC PLY	1/8 X 12 X 24
WR	1	1	AC PLY	1/6 X 12 X 48
WR	2	33	BALSA	1/4 X 3 X 36
WSF-BOT	2	1	AC PLY	1/6 X 12 X 48
WSF-TOP	2	1	AC PLY	1/6 X 12 X 48
WTE	4	28	AC PLY	1/32 X 4 X 30

GLOW POWER POD PARTS LOCATOR

PART#	QTY.	SHEET	MATERIAL	SIZE
GCR	1	G2	AC PLY	3/32 X 5 X 24
GFW-A	1	G2	AC PLY	3/32 X 5 X 24
GFW-B	1	G2	AC PLY	3/32 X 5 X 24
GH-B	1	G1	AC PLY	1/16 X 5 X 31
GHC	1	G2	AC PLY	3/32 X 5 X 24
GH-TOP	1	G1	AC PLY	1/16 X 5 X 31
GP1	1	G2	AC PLY	3/32 X 5 X 24
GP-1	2	G1	AC PLY	1/16 X 5 X 31
G-P2	2	G3	AC PLY	3/32 X 6 X 21
G-P2	2	G4	BALSA	1/4 X 4 X 18
GP-2	2	G1	AC PLY	1/16 X 5 X 31
GP-3	2	G1	AC PLY	1/16 X 5 X 31
GPBS	1	G1	AC PLY	1/16 X 5 X 31
GPP4	1	G2	AC PLY	3/32 X 5 X 24
GPS-L	1	G1	AC PLY	1/16 X 5 X 31
GPS-R	1	G1	AC PLY	1/16 X 5 X 31
GPST-L	1	G1	AC PLY	1/16 X 5 X 31
GPST-R	1	G1	AC PLY	1/16 X 5 X 31

SPONSON PARTS LOCATOR

PART#	QTY.	SHEET	MATERIAL	SIZE
SP1-B	2	SP7	AC PLY	1/8 X 5 X 13
SP1-T	2	SP7	AC PLY	1/8 X 5 X 13
SP2-B	2	SP8	AC PLY	3/32 X 6 X 20
SP2-T	2	SP8	AC PLY	3/32 X 6 X 20
SP3-B	2	SP4	BALSA	3/32 X 4 X 36
SP3-T	2	SP4	BALSA	3/32 X 4 X 36
SP4-B	2	SP5	BALSA	3/32 X 4 X 36
SP4-T	2	SP5	BALSA	3/32 X 4 X 36
SP5-B	2	SP5	BALSA	3/32 X 4 X 36
SP5-T	2	SP5	BALSA	3/32 X 4 X 36
SP6-B	2	SP4	BALSA	3/32 X 4 X 36
SP6-T	2	SP4	BALSA	3/32 X 4 X 36
SP7-B	2	SP5	BALSA	3/32 X 4 X 36
SP7-T	2	SP5	BALSA	3/32 X 4 X 36
SPCS	2	SP4	BALSA	3/32 X 4 X 36
SPCS	2	SP5	BALSA	3/32 X 4 X 36
SPCTE	2	SP8	AC PLY	3/32 X 6 X 20
SPEB	4	SP1	BALSA	1/4 X 3 X 36
SPEF	2	SP1	BALSA	1/4 X 3 X 36
SPPS	1	SP3	BALSA	3/16 X 3 X 9
SPSB	4	SP6	AC PLY	1/8 X 5 X 13
SPSB	2	SP7	AC PLY	1/8 X 5 X 13
SPSS-B	2	SP8	AC PLY	3/32 X 6 X 20
SPSS-C	2	SP8	AC PLY	3/32 X 6 X 20
SPST	4	SP2	BALSA	1/16 X 6 X 36
SPST	2	SP7	AC PLY	1/8 X 5 X 13
SPTP	4	SP1	BALSA	1/4 X 3 X 36

ELECTRIC POWER POD PARTS LOCATOR

PART#	QTY.	SHEET	MATERIAL	SIZE
ECR	1	E2	AC PLY	1/8 X 4 X 20
EFW-A	1	E2	AC PLY	1/8 X 4 X 20
EFW-B	1	E2	AC PLY	1/8 X 4 X 20
E-P1	2	E3	AC PLY	3/32 X 6 X 24
EP-1	2	E1	AC PLY	1/16 X 5 X 10
E-P2	1	E4	BALSA	1/4 X 4 X 18
EP-2	2	E1	AC PLY	1/16 X 5 X 10
EP-3	2	E1	AC PLY	1/16 X 5 X 10
EP4	1	E2	AC PLY	1/8 X 4 X 20
E-PPB	1	E2	AC PLY	1/8 X 4 X 20
EPS-B	1	E5	BALSA	1/16 X 4 X 36
EPS-L	1	E5	BALSA	1/16 X 4 X 36
EPS-R	1	E5	BALSA	1/16 X 4 X 36
EPS-T	1	E5	BALSA	1/16 X 4 X 36

Control setup

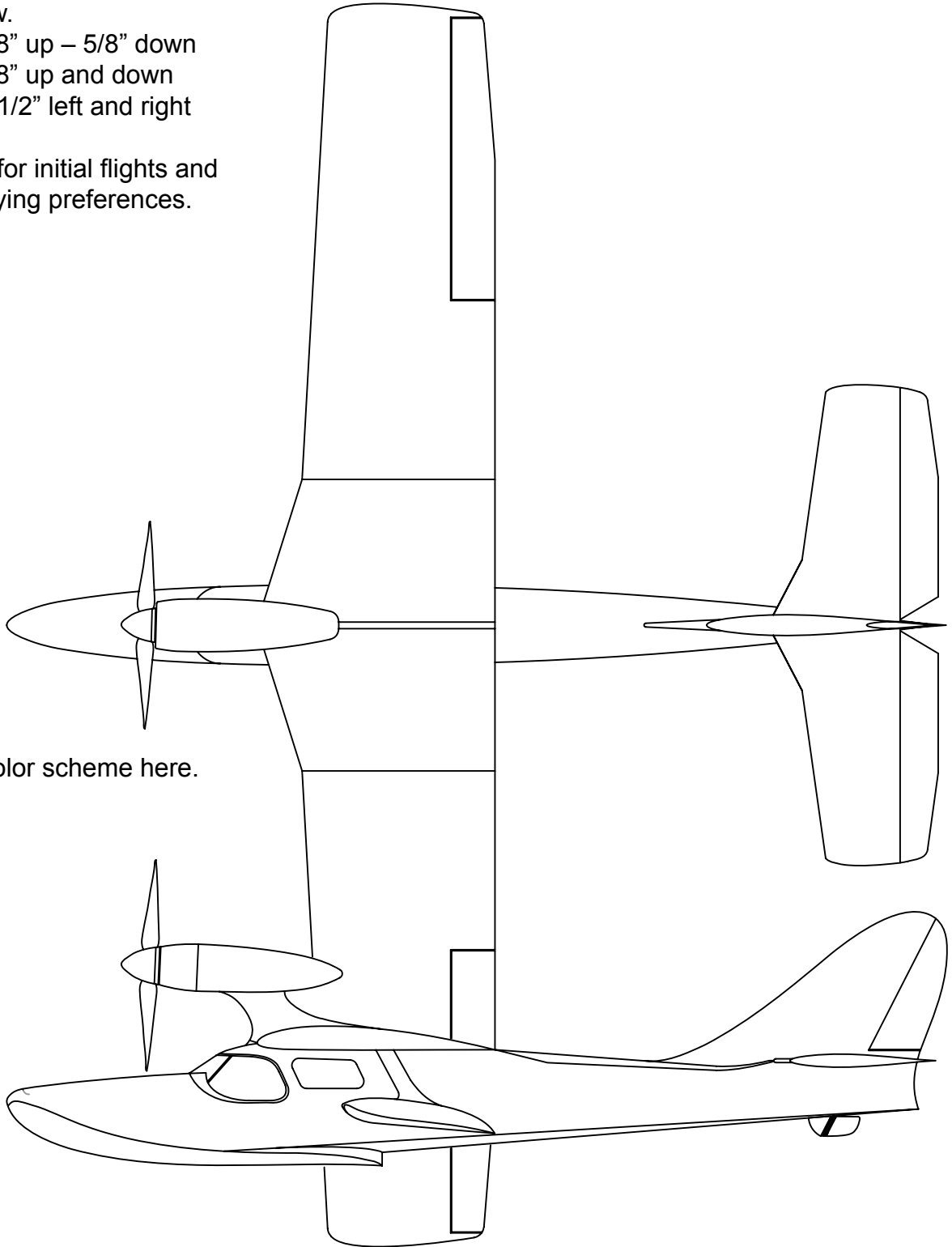
The ailerons should be set up with differential throw.

Ailerons 3/8" up – 5/8" down

Elevator 5/8" up and down

Rudder 1-1/2" left and right

Use this set up for initial flights and adjust to your flying preferences.



Work up your color scheme here.

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