EAM

Electric Aero Modeling USA

C-130 Hercules

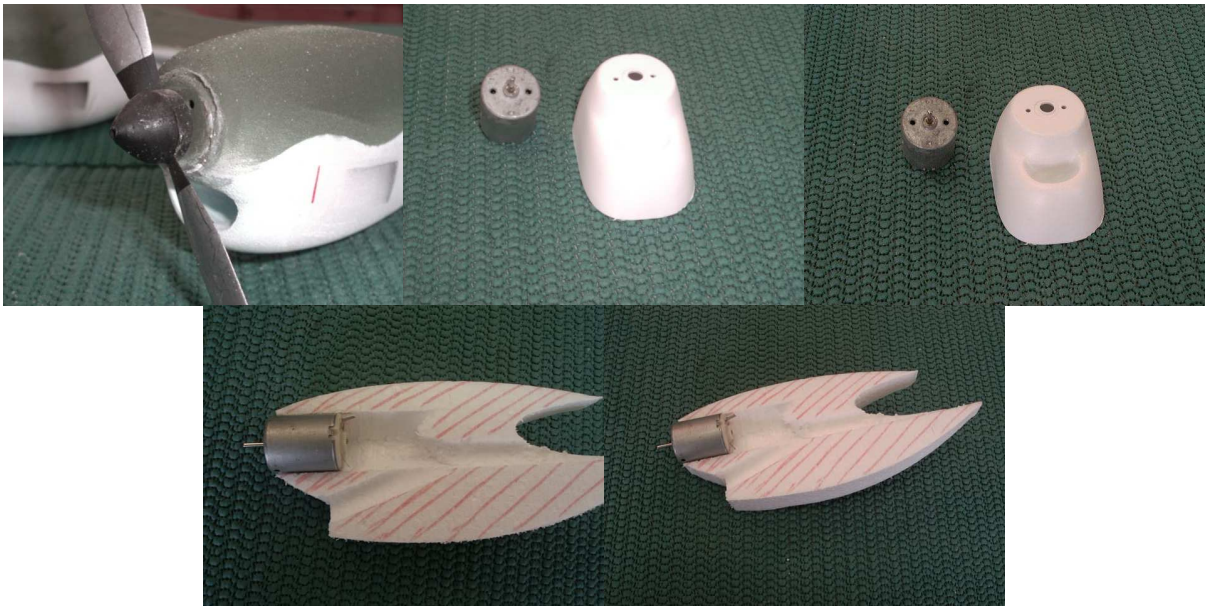
Thank you for you purchase of our C-130 kit I sincerely hope you will enjoy building it and flying it as much as I have. Keith Sparks, the original designer of the kit has done an outstanding job of making an easy to build and easy to fly scale model of one of the most recognized aircraft in history. We at EAM will do all that we can to ensure you building and flying of our C-130 will be one of the best.

A quick word about glue :

I have found that in many cases Pro Bond or Gorilla glue (polyurethane glue) is excellent for building EPS foam planes. A word of caution though, this type of glue will expand so when using it you must allow for this.. Mineral spirits can be used to clean of un-dried glue as rubbing alcohol can be used to wipe off excess epoxy, as with both it is better to wipe it off while its wet vs trying to sand it off after it dries, usually damaging the foam.

The original C-130 had no nose cone on the engine nacelles. They were made to ease the construction process. You have the option to omit the nose cone to lighten the plane. However the nosecone is strong enough to mount the motor directly to it if you choose. Special care must be taken to align the nacelles if this option is used. If you want some cooling air to pass through your motors, use your ½ inch razor hole saw to cut a hole from the engine inlet to the back of the motor. The air will enter through the back and exit through the small holes in the front. This modification is not really needed. But any air flow for free can't hurt.

Note: only two of the mounting methods above can have this option. See the cut-away photo for clarification.

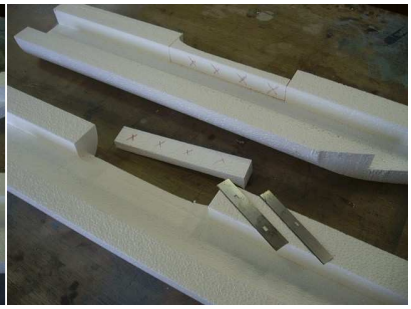


If your plane will carry a battery pack larger than 6 oz. you must install the servos aft of the aft landing gear plate to allow the battery pack to sit further back. We have flown this plane on a 500 mah pack for 6 min at ¾ throttle.

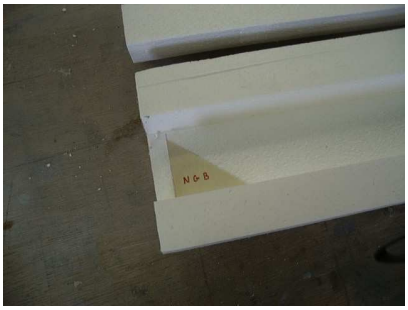
Flaps can be added by cutting another slot, adding a torque rod and servo. However you will seldom use them unless the plane is flown on a dead calm day or a large battery is used. An additional servo may be used to open the back door to drop stuff. Photos are not available of this plane. When testing the spar to see what the plane would carry; it broke carrying a 12 oz. battery pack during a relatively high "G" turn. This is **not** a stunt plane.

Let's get started!!!

1. Trim the wing saddle. Use a wallpaper-scrapping razor, available at any home improvement store.

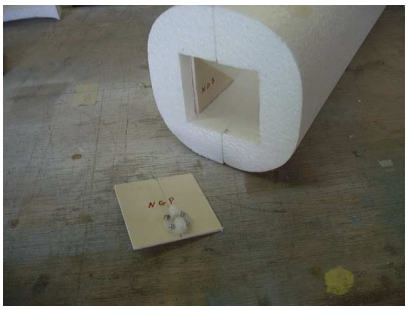


2. Epoxy the nose gear braces (NGB) ¾ inch aft of the front of the fuselage. **We have included a nose gear assembly supplement to cover the assy of the tandem nose wheel in more detail.**



3. Use the nose gear hardware to locate the nose gear wheel well, then cut the well out. Make the well slightly oversized and angled to allow air to pass through the nose wheel well for battery cooling.

4. Lightly sand the fuselage halves at the bond joint area with a sanding bar. Epoxy halves together using masking tape to hold them together until the epoxy cures.You may prefer to locate and mount the servos as well as the nose wheel before you epoxy the halves together
5. Using the sanding bar, lightly sand outside of the fuselage before installing wheel wells.
6. Attach the nose gear hardware to the nose gear plate and then epoxy it to the nose gear braces.

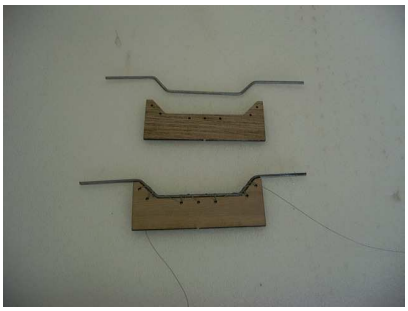


7. Measure back 12 ¼ and 14 ¾ from the nose. Then cut the main gear slots with a hack saw blade. (Use the fuselage seam to ensure that the gear plates are 90 degrees to the fuselage.) Cut until the blade appears through the fuselage floor.

8. Use 180 grit sandpaper, folded in half to widen slot for the gear plate.

Note: A piece of 1/16 balsa between the folded sandpaper as a last step will produce the correct size slot.

9. Bend the main gear to match the main gear plate. Then lash them in place with a Kevlar type fishing line or equivalent. Next lock them in place with CA adhesive.



10. Temporarily install the nose gear.

11. Put the wheels on the main gear (hold them on with tape so they will stay in place while you work.

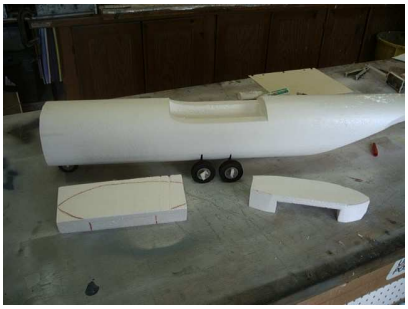
12. Apply epoxy to the slots and install the gear. Put the model on a tabletop and adjust the main gear plates so the fuselage sits level.

Note: Use a stick across the wing saddle for a leveling tool.

13. Check the wheels to see that they spin freely.

Note: Some of the fuselage might need clearing so the wheels will spin as close to the gear plate as possible. Next use the pattern to trim the side view shape of the wheel well fairings.

14. Cut out the wheel wells much like you did the wing saddle. (Save the cutout)

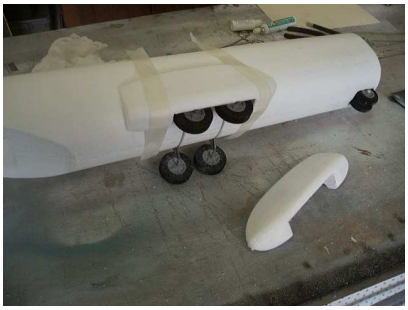


15. Sand the wheel well fairings to shape with 180 grit sandpaper.

16. Trim the axles to the outside of the wheel.

Note: The wheel well fairings hold the wheels on the axles.

Epoxy the wheel well fairings in place.



17. Cut the wheel well cutouts to clear the gear plates, then epoxy them in place. Sand them to match the wheel well fairings.

18. Cut some scrap foam ,from the wing beds, into strips and fill the main gear grooves, sand flush.

19. Measuring from front edge of the wing saddle, make a mark 2 inches and 7 inches. Draw a line across the fuselage. Then draw 2 more along the length using the inner wall as guide.

20. Use a Xacto blade to get the hatch cut started. Then finish the cut with a wallpaper-scraping razor. Along the length of the fuselage angle the cut inward a little this will prevent the hatch from being pushed into the fuselage when installed. Note: place the Xacto blade only part of the way into the handle to get a deeper cut.

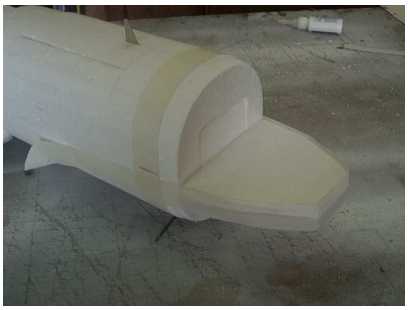
21. Wrap tape around the front of the fuselage. Sand a slight step in the fuselage to accept the nose cone. Note: a slight taper will ease installation.

22. Trim the clear nose piece and white radome to size

23. Glue the Radome into place.

24. Mark the tape where cockpit floor will be, then remove the nose cone.

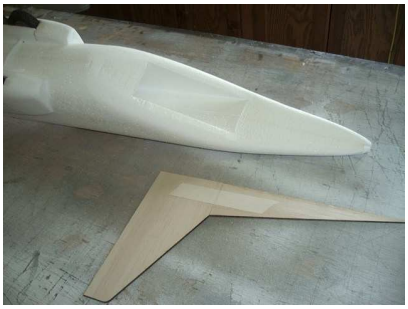
25. Use scrap from wing beds to fill the void in front of nose gear plate.



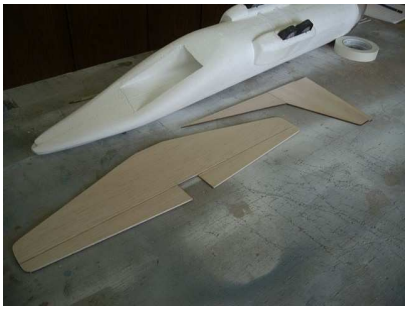
26. Use the pattern to cut the cockpit floor and epoxy in place.
27. Test fit the nose cone to the fuselage. Sand away any part of the cockpit floor that contacts the nose cone.
28. Add any cockpit detail that suits you, and then paint.
29. Scuff up the inside of nose cone where it meets the fuselage. Then epoxy in place.
30. Tape off the windows.

31. Rough sand the joint between the nosecone and the fuselage, then add Onetime spackling with a playing card.

32. Assemble the vertical fin. Hinge the tail feathers by cutting the hinge material into 1/8 inch strips. Use a Xacto blade to form the slots then CA in place. Make the crossover wire on the elevator from a section of the push pull wire. Use CA to bond it to the inner edge of the elevators.



33. Epoxy the horizontal stabilizer in place.



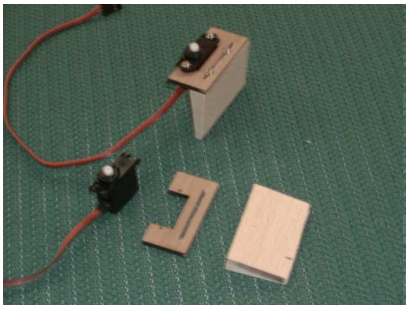
34. Use a hack saw blade to cut a groove for the vertical fin. Adjust the slot as you did for the landing gear plate. Then epoxy the vertical stab in place.

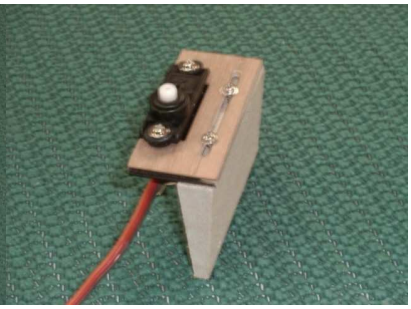
35. Sharpen a section of clothes hanger, then align it between where the control horn will be and where it will exit the fuselage. Push it into the fuselage, aiming for the center of the fuselage until it exits the fuselage ceiling. Remove the wire, then install the control rod sheathing.

36. Do the same for the elevator on the opposite side that the rudder push rod is located.

37. Cut the tubing over the aft landing gear plate.

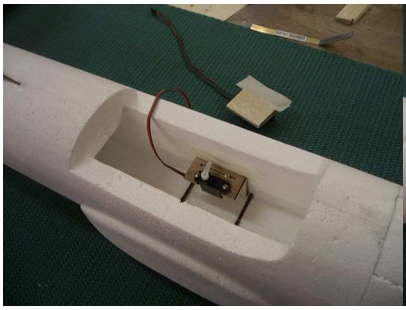
38. Assemble the servo racks, <u>with the servo installed.</u>

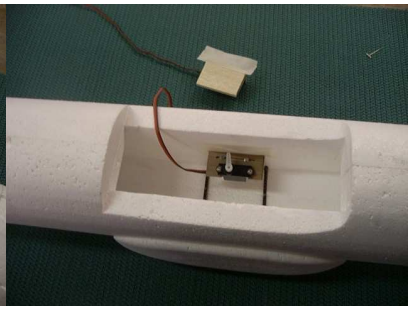




39. Protect the joint between the servo mount block and the adjusting rail with tape.

40. Glue assemblies in place in the fuselage between the landing gear plates, then remove the protective tape.



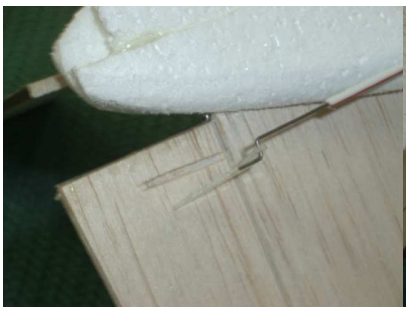


41. Make “z” bends in the control rods and slide them into their sheathes and attach them to their servos.

42. Use a heated wire to clear the foam in the ceiling of the fuselage where the pushrods enter the inside of the fuselage. This is done to relieve any bows in the rods so they will slide easier. Use a little epoxy to hold them in place.

43. Hook the servos to the radio and center the rudder and servos.

44. Hold the control horn on the bottom of the elevator where it will mount, grip the control rod where the rod crosses the hole in the control horn. Make a “z” bend there. Cut off excess control rod.

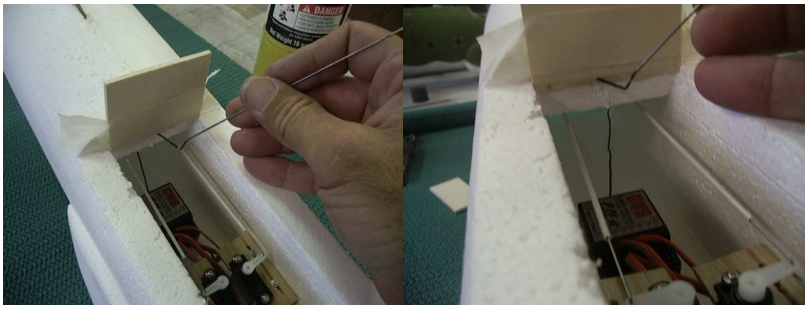


45. Put the control horn on the “z” bend; then hold the control horn against the control surface. Use an Xacto knife to make a shallow cut along the surface using the horn as a guide. Release the horn. Now make another shallow cut parallel to the previous cut. Pick out the balsa between the cuts to form a slot for the control horn. Put CA into the slot and with the control horn still on the “z” bend; bond the horn in place. Note: when the ca cures add some more to form a fillet to the bond.

46. Hook up the radio again and check the movement of the control surfaces. Then use your hand to add a little resistance to the control surface and move the servos. Check to see if the control rods bow in the fuselage. If they do, support them to prevent this condition.

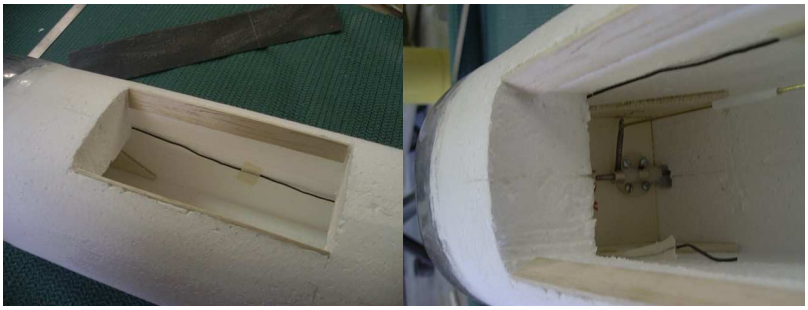
47. Install the receiver with double backed tape to the fuselage floor. Use tape to attach the antenna wire to the walls of the fuselage. Run the antenna wire to the back then all the way to the front. Note. For better range the antenna should trail behind the airplane. The method above has been tested at 200 yards without problems.

48. Bend a piece of 1/16 music wire to the shape of the cutting wire pattern. Tape the wing mounting plate across the back of the fuselage flush with the wing saddle. This will form a slot-cutting guide.



49. Heat the 1-inch end of the cutting tool and melt a slot into the fuselage. Note: heat wire until it is red hot. Allow it to cool until the red is gone, and then begin the cut.
50. Cut another slot for the front mount. Note: the slot for the front mount must be made at the same level as the bottom of the wing.
51. Epoxy the wing mount plates in place.

52. Epoxy balsa strips to angled edge of the hatch hole. Use the hatch to apply clamp pressure. This step will make the hatch hole appear cleaner as well as raise the hatch for a flush fit in the next step.



53. Sand the hatch flush with the fuselage. Add spackle to any imperfections in the hatch.

54. Cut a slit with the Xacto knife, epoxy the VHF antenna and hatch handle in place.

55. Assemble the nose gear and install it using the collett to set its height. Clear the fuselage to allow the wheel assembly to turn left or right.

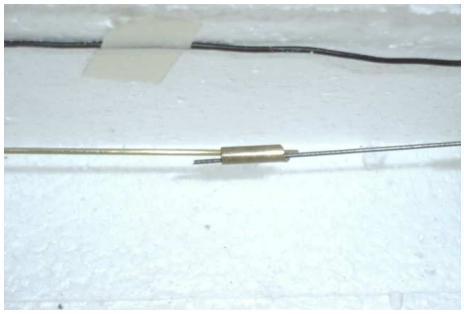
56. To make the tiller, take the 4-40 threaded rod and hammer one end flat. Drill a hole to accept the nose gear rod.

57. Install the tiller with the collet and tighten so the wheel can turn in both directions. This step is easier to do using an offset pair of needle nose pliars. Note: If the flat side of the tiller winds up in the wrong position, remove it and grind off some of the end to allow it to turn a little more.

58. Make a “z” bend in the brass rod and install it in the tiller. Make another “z” bend in the wire you cut off from the tail feather controls, install it in the rudder servo.

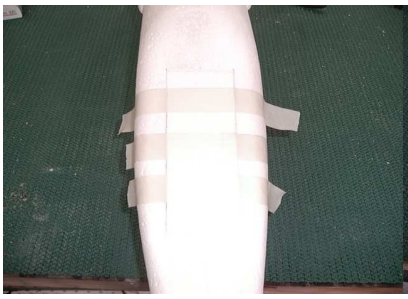
59. Slide the sheathes (tubes) over the rods then put both rods in the brass coupler. Lay the plane on its side, allowing the rods to lie naturally. Use the hot wire to form slots in the fuselage wall, epoxy scrap balsa into the slots. Allow it to cure.

60. With the plane back on its wheels, use CA to attach the sheathes to the balsa. Note: Allow enough room from the wall to solder the steel rod, brass rod and coupler together. But keep it close, to ease the battery installation. (¼ inch clearance will be sufficient)

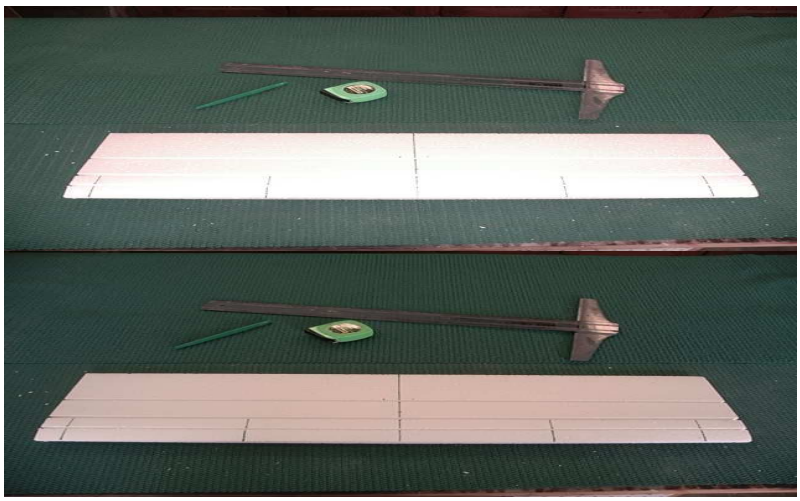


61. With the radio on, and the wheels set straight, solder the coupler to the two rods. Note: Protect the fuselage floor with card stock or an equivalent in case solder drips.

62. Epoxy the back door in place and hold with tape until it cures. Sand flush, tape the nose cone off and paint with primer. This will ensure that foam safe paint will stick to the plastic nose cone.



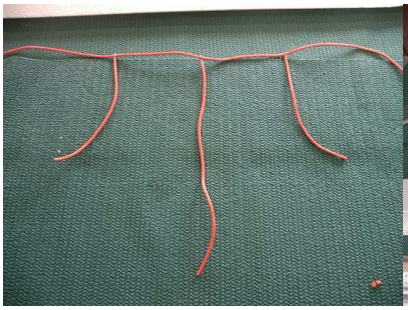

63. Mark the wing as follows: Centerline (use a "T" square). Slot close to the leading edge slot is #1, the next one back #2 and then #3. Draw lines from the#2 slot to the leading edge, 5 ½ inches from the centerline, this is the inboard motors centerline and then again from 11 inches from the centerline. This is the centerline for the outboard motors. Make 2 marks at slot #3, ½ inch off the centerline.

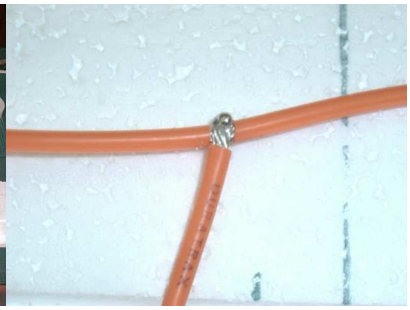


64. Bond the outer wing panels to the wing center section. Hold together with tape, allow the bond to cure with the wing flat on the table; top side down. Note: The wing panels might be slightly different in size compared to the center section. Nothing is perfect, it's easy to fix, for now match the upper surfaces.

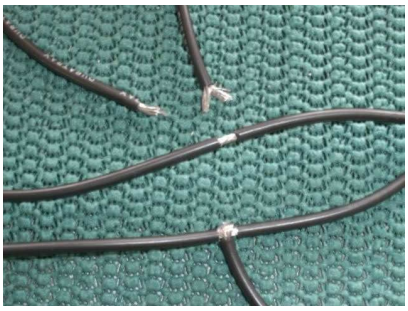

65. Splice the 3/8 x 3/8 inch balsa leading edge together,
66. While that sets up; use a sanding bar to sand the leading edge to approximately ¼ inch. It's ok if it's a little over size.
67. Bonding the leading edge to the wing is a big job and you might consider using 30 min. epoxy, it can be done with 5 min. if you are fast. Have tape strips ready on the edge of the table and make a reference mark on the balsa leading edge and the wing. This will save time.
68. Apply epoxy in a wiping motion with your finger along the leading edge. If you see a gloss on the foam that's enough epoxy, avoid applying too much. Tape the leading edge in place working from the center out. Note that the leading edge is a little wider at the center section, so split the difference with the balsa strip. Allow wing to set up, flat on the table, bottom side up.


69. Sand the balsa leading edge to a point matching the shape if the wing. In the center section area some foam will have to be removed in order to blend the two together. Then dull the point to form a round leading edge. Note: there wont be much left at the tips. The balsa does offer a little strength to the wing but its main job is to be a “bumper”.
70. Sand the entire wing with 180 grit sandpaper on your sanding bar. Remove any wire cutting marks, as well as wing panel differences, if any. Sand the edge of the trailing edge until it is 1/16 inch thick. Also sand the wing tips to shape.
71. Cut one of the 6 foot wire sections to 39 inches. Then cut 2 lengths of what is left over to 9 inches. Fold the 39 inch section in half and mark the halfway point. Lay the wire into the #2 slot in the wing and align the mark with the centerline. Next mark the wire at the lines for the inboard motor locations.

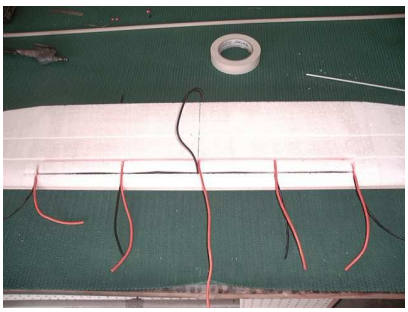




72. Strip the wire at the marks made while it was in the wing. Soldier the 9 inch sections to the outside striped sections and what's left goes on the striped section at the center. Repeat this step for the other section of wire in slot #1.

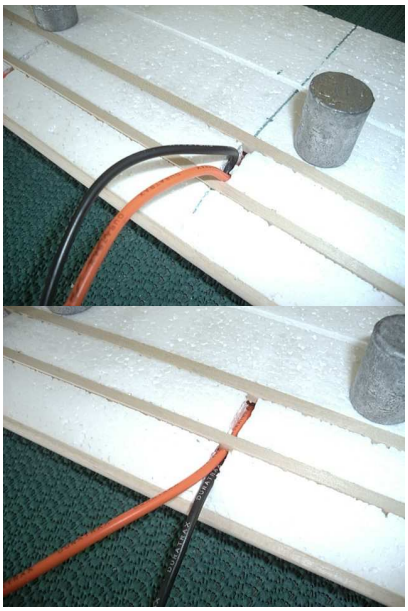


73. Use the cutting wire you made in step 48 to melt slots from the leading edge to slot #2 at the motor center lines. And at the center line melt a slot between slot #1 and #2.



74. Lay the harnesses in their slots. Note: the wires at the centerline point toward each other.

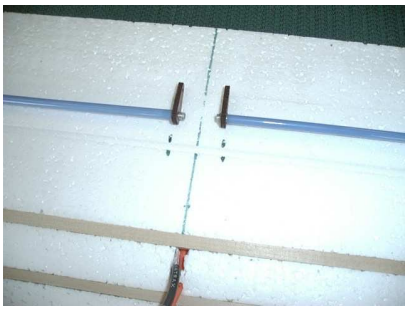
75. This step is easy if you mix the epoxy then pour it into a sandwich bag (cheaper bags have no pleats to deal with) put a pinhole in the corner of the bag and use it as an applicator. Apply epoxy to the walls of the slot #1. Then insert the 26 inch 3/16 square hardwood cap strip over the wire harness, push it down to as flush as you can get. Make certain the wing remains flat on the table.



76. Epoxy the ¼ square hardwood spar over the other wire harness and into the #2 slot. Again, keep the wing flat on the table. Add scrap foam to the slots that go between slots #1 and #2.

77. Lay the wing, bottom side down; mark ailerons for cut out. Draw a line 1 ½ inch long on the outer wing panel, ½ inch out-board and parallel to wing panel /center section joint. Draw another line from end of the last line to the tip of the wing, 1 inch from trailing edge. Use new razor ans straight edge to cut ailerons free.

78. Sand the tips of the aluminum tubes to give CA something to bond to, then CA torque arms to one end of the tube. Slide the plastic torque rod bearing over the torque rod, then CA the other torque arm to the other end of the tube. Note: avoid getting CA into the bearing by applying the CA to the outboard portion of the arms only. A little rotation will work the CA into the joint. Also be sure that the arms are in the same position by laying them flat on the table.

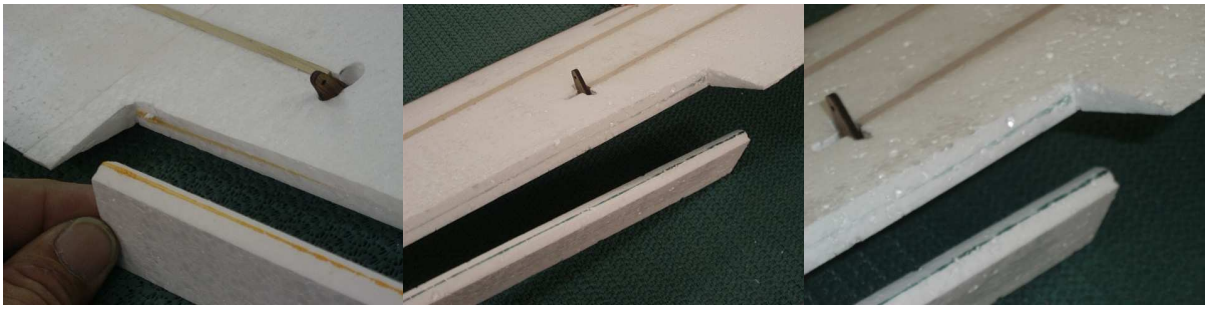


79. Place the completed torque rod assemblies on slot #3 with one of the arms over the marks made ½ inch off the centerline. Mark location of the arm at the other end, and then remove the torque rods. Use the hot wire to melt clearance slots for the arms. **Use caution at the outboard slots not to go through the wing,** work slowly with a cooler wire than before.

80. Test fit the torque rod assemblies in the slot for freedom of movement, ¾ inch from one extreme to the other is enough.

81. Bond the 3/16 balsa cap strip over torque rod assemblies. Avoid getting epoxy on the bearings by not applying glue 1 ½ inches from the ends of the slot.
82. To sand the "V" shape into the aileron you must support trailing edge with a straight edge and hold it at the same time. The good news, with 180 grit on your sanding bar this won't take but 5 to 7 strokes.

83. With the wing flat on the table transfer the aileron centerline to the wing. Use a highlighter pen and lightly run it down the "point" on the "V" you sanded on the aileron. Quickly, before it dries, press it against the wing with both parts flat on the table.



84. To hinge the ailerons, cut the hinge material long way into 1/8 inch strips. Use Xacto blade to cut a slit in the ailerons. Then rock the blade from side to side to open up the slit. Space them evenly and be sur to put one right at the tip. Making a mark where they are, will make them easier to find later. Now dip the tip of the cut hinge material in epoxy and push them into the slits, wipe off any excess.

85. Place the ailerons in their intended position and use a pencil to mark the their locations.
86. Cut slits in the wing as you did in the ailerons, dip the hinge tips in epoxy and install. Don't forget to wipe excess.

87. Make “Z” bends to the left over wire and install them in the torque arms. Lay them on the wing toward the ailerons with the torque arms in the neutral position (straight up). Use the control horn to locate the position for the second “Z” bend over the aileron, then make bend. With the control arm on the “Z” bend and the other still attached to the torque arm; mark the location for the control arm on the aileron. Use Xacto knife to make the slot for the aileron control arm and epoxy in place. Note: **Do Not Use Hot Wire To Make This Slot.**

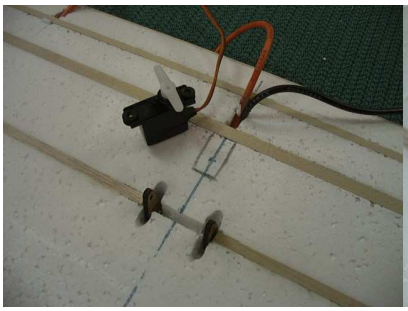


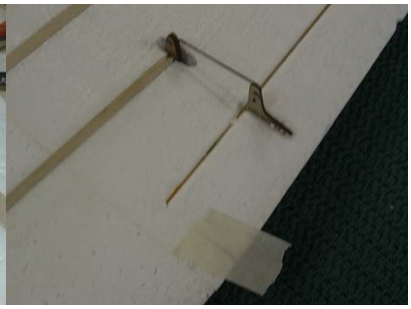

88. Use servo to trace its intended position over the centerline just aft of the spar. Use Xacto knife to cut out the servo well.

89. Use scrap wood to make aft mount. Cut a slot for it and epoxy it in place.

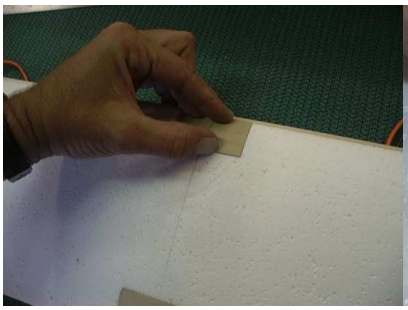
90. Install the servo and make “Z” bends and attach them to the inboard torque arms.

91. Transfer the wing centerline to the top of the wing. Use a pencil, a water based pen might bleed through your paint at the finish.



92. Cut the 1/32 aircraft grade ply in half. (Cut with grain) Draw a centerline on both parts across the grain of wood. These parts are the wing hold-down plates.
93. Epoxy hold-down plates to the wing, aligning centerlines. Note: Use your hands for clamp pressure on the forward one so it will match the curve of the wing (tough it out, it’s only 5 minutes)



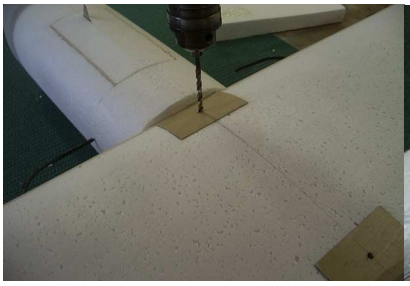

94. Place the wing on the fuselage; align the wing centerline with the fuselage seam. Measure the wing tip to the rudder hinge line at the base. Make them even. Drill pilot holes ¾ inch from the leading and trailing edge. Remove the wing.

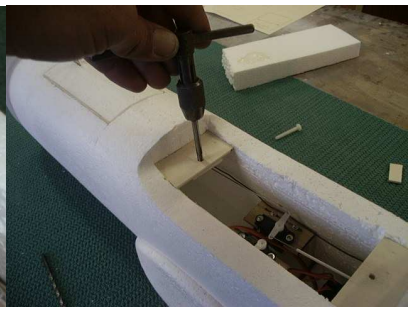
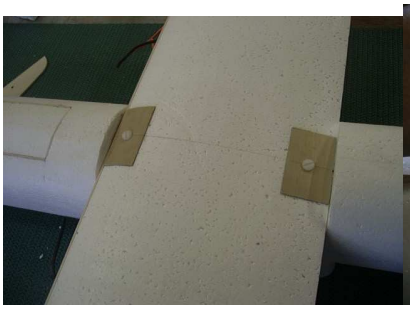
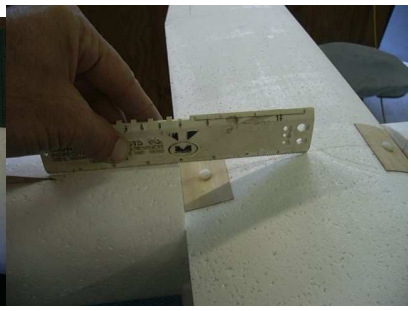
95. Bond scrap light ply plates to the bottom side of the holes then re-drill. Tap the holes and harden the threads with CA and tap them again.

96. Final drill the holes in the wing (to size of the screws). Install wing to the fuselage.

97. Use the wing beds to mark the portion of the fuselage that's over the wing. Place the bed on the wing in position and press down so the screw will leave a dent, lift off and pick out enough foam to clear a space for the hold down screws. Put the foam back in position and transfer the shape of the fuselage to the foam with a pencil. Remove and sand to the line.

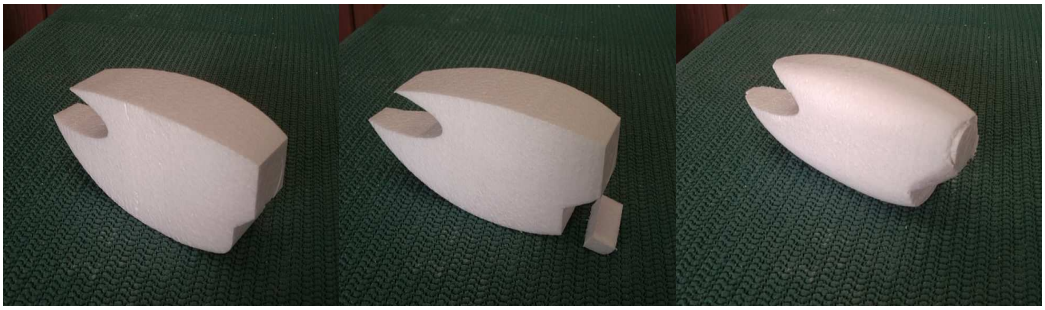
    I know it's a pain but you gotta do it.



98. Remove the screws and epoxy the foam to the wing. Back drill the holes for the screws. Sharpen a ½ inch brass tube on the inside using Xacto blade by scraping away the material. Now you have a "1/2 inch razor hole saw". Use it to final cut the holes for the wing hold down screws.
99. Install the wing again and final sand foam flush with fuselage. A little spackle here will fix any mistakes.

100. Trim the engine nose cones and keep them handy.



101. Cut off ½ inch of the “chin” or engine inlet from the foam nacelle to make room for the nose cone inlet. This foam was put here in case you wanted to omit the nose cone.

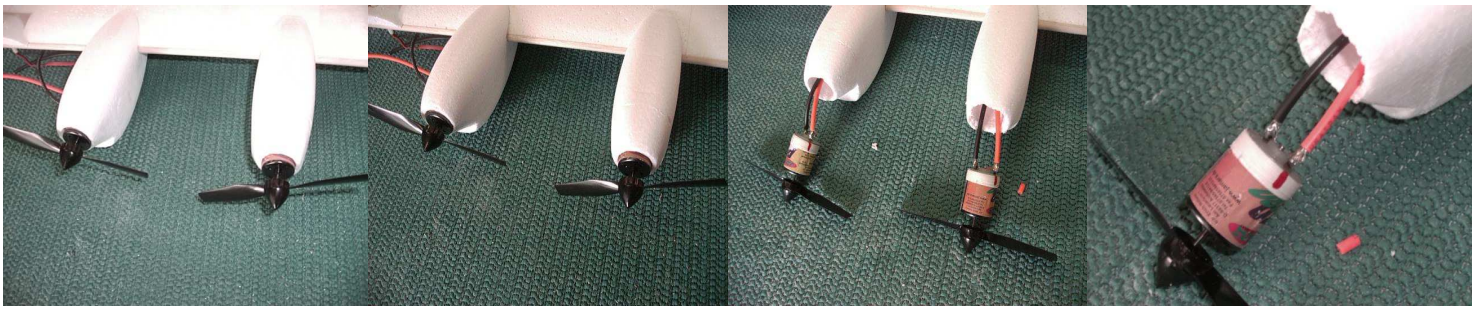
102. Sand the corners off the engine nacelles. Keep an eye on the area around the circle that makes the motor mount so you don't sand it too thin. Test fit the nose cone frequently. You are looking for a snug fit.

103. Use tweezers, needle nose pliers, or forceps to pick out the foam from the pre-cut "motor mount hole". It's about 3 inches deep. Next use your ½ inch razor hole saw to cut a hole at the bottom of the motor mount hole. Cut all the way through. It should come out where the engine nacelle contacts the bottom of the wing and centered. Keep going to form a slot for the wire about 2 inches. Note you will need a stick to clear the saw hole of debris.

104. Temporally install the engine nacelles to the wing test their fit and make adjustments if needed. Use 30 min. epoxy to bond all the nacelles or 5 min. epoxy to bond them two at a time. Either way, be good to your self and take your time. Use tape to hold them in place until the epoxy cures.

105. Cut masking tape into strips ¼ x 15 inches and wrap it around the back of your motors.
106. Lightly install your props and test run the motors using a "d" cell. Mark your motors lead to ensure proper wiring later

107. Solder the motors to the leads hanging out of the nacelles. Be careful with the soldering iron. Just a touch will ruin the foam. Put the motors in the nacelles giving them a twist as they go in. Test run the motors to check that they all turn the proper direction. Use two "d" cells; do not use the flight pack. It will fly right off the table.



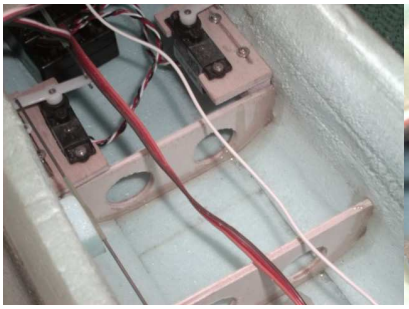
108. Pull the motors out until the tape shows then cote the motors sides with silicone all the way around. Then push them in as you did before. Wipe off the excess silicone

109. Check the motors for alignment by comparing the props to each other in both directions, from the side and the top. When you are happy with the alignment allow it to set up over night.

110. Drill oversize holes in the nose cone and use two small dabs of silicone to attach the nose cone to the nacelle. Install the props.

110. On the bottom of the wing put a drop of epoxy 2.10 - 2.25 inches from the leading edge just out board of the inboard engine nacelles. Allow it to set. This is your CG points.

111. Install the motor speed controller and battery, attach the wing to the fuselage and find the drops of epoxy on the bottom of the wing and lift the airplane there. Adjust the motor speed controller and battery so the airplane sits level on the epoxy "bumps". Make a mark at the back of the battery and bond a scrap piece of foam for quick reference when installing the battery pack.
Rub a little epoxy into the foam where the battery will sit, allow it to cure and then install the Velcro patch there to hold the battery in place during flight.



THE END