

SAVAGE LIGHT
INDUSTRIES

F-106 DELTA DART

Construction Guide



Savage Light Industries

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F-106 DELTA DART

You should read this construction guide completely and study the plans to become familiar with all of the assembly steps before you begin construction of the model. There may be some differences between what can be seen in the photos and what is seen on the plans and in the kit pieces. The plans and parts set contain the most recent revisions.

You should not remove any of the laser cut parts from their sheets until you are prompted to do so in this guide. Some of the pieces are small and easily lost while others are delicate and easily broken. When you are ready to remove a part, do not simply break it free. Instead, use a narrow razor chisel to dice the sprues holding the part.

You may use whatever glue that you are comfortable with to build this model. Cyanoacrylate (CA) glue was used for most of the construction on the prototypes. Carpenter's wood glue and CA was used to glue the wing sheeting to the wing ribs. Medium-set epoxy was used to join the fin to the fuselage and slow-set epoxy was used to join the wings to the fuselage.

For parts of the construction and/or assembly of the prototype that required alignment over the plans, the plan was taped to the underside of a large sheet of glass which is then placed on a flat building surface. The wing spars, ribs and/or assembly jigs were glued directly to the glass. If you want to use another method, make sure that the parts and/or jigs can be securely attached to the building surface.

While all laser cut parts are labeled with their part number, a large portion have also been etched with alignment marks and building hints to help you correctly orient the part during construction. An arrow etched onto a part indicates that the arrow should point to the centerline of the model. The word "front" etched onto a part means the "front" should be toward the nose.

There will be differences in density and grain making balsa sheet stiffer or softer. Carefully inspect the wood prior to construction and separate them according to their intended usage. Use the stiffest wood for the flat portions of the fuselage and save the softer and more flexible pieces for the round portions. Of the 3/32" fuselage sheeting, select the lightest and softest piece for the hatch sheeting as these are lightly built and easily warped.

The exception to this is the 1/16" wing sheeting. For the wing, you'll want to use the stiffer pieces on the section of the wing ahead of the spars so that the wing sheeting doesn't "cup" between the wing ribs giving the wing the the so-called "starved horse" look.

This construction guide shows the fuselage sheeting being applied section by section. If you'd rather plank the fuselage with strips of wood, feel free to do so. If you do use the sheet method instead of planking, be careful when sanding so that the rounded lines of the design is preserved. The 3/32" sheeting is thick enough to do this as long as you're careful.

This model was designed to use the most 70mm tractor fan units as well as the WM400 pusher fan and brushless motor and speed controller. You can use NiCad, Nimh, or Lipo batteries for the motor batteries. We recommend the use of a separate receiver battery pack for maximum safety and reliability. We also recommend the use of metal-gear servos for the same reason.

While the model was intended for use with Jet Hangar International Mini Retract units, you can substitute any brand including the Electric Jet Factory mini units or any other mini units. If you substitute the JHI units you might have to make up new landing gear mounting plates as these were designed specifically for the JHI units.

This kit does not include the landing gear struts or the wire from which they're made. You'll need to obtain 1/8" music wire or whatever size will fit into your retracts and bend them to the proper shape shown on the plans. Do not use soft foam tires as they will dramatically increase the rolling resistance even to the point of preventing the model from taking off the ground. Instead, select moderately firm wheels which will minimize the rolling resistance and allow the model to accelerate quickly.

Wing Construction

- 1. Even though this is the wing construction section, the first thing you'll want to do is build the vertical fin. Fit together and glue R1, R2, R3, R4 and R5. Lightly sand the edges, then glue together the pieces over sandwich wrap to make the vertical fin. When dry, set it aside.

Now you can begin the wing construction.

Cut from their sheets, two W2 and two W3, two MG2 and two MG3. Glue MG2 to the inside face of W2 and MG3 to the inside face of W3 using the alignment marks on the ribs. Make sure to make a right set and a left set. (Photo 1)

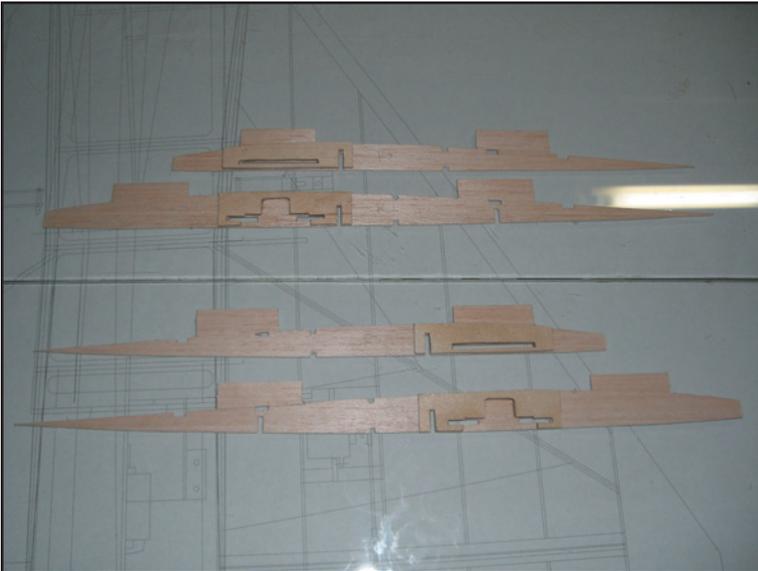


Photo 1

- 2. Cut from their sheets four MG1 main landing gear mounts. Press a 2-56 blind nut into each of the 1/8" holes and secure them into place with a little bit of glue. (Photo 2)

Using the templates on the plans, make up the wing skins. Make sure to make the top wing skins a little larger to allow for the camber of the wing. You'll need to make two skins, a front and a back, for the top and bottom of each wing panel.

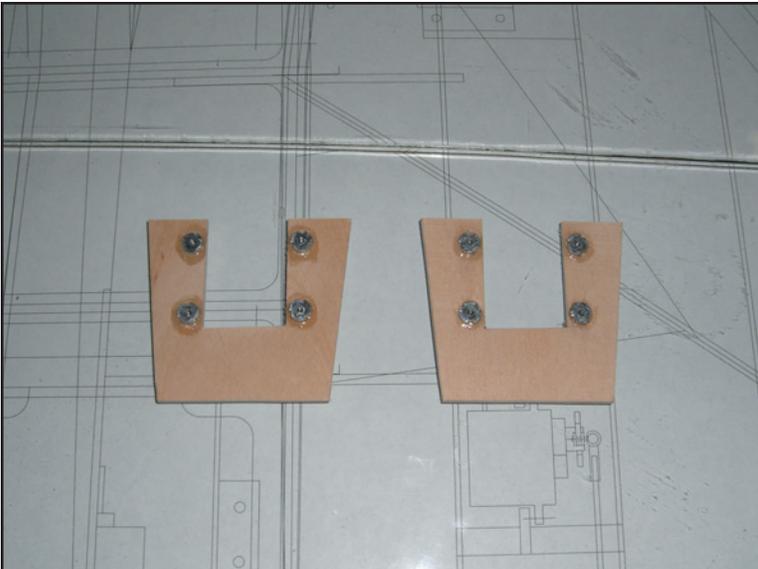


Photo 2

- 3. Fit, but do not glue W1B, W2 and W3 together with WS1, WS1 and MG1. Align these over the plans and tack glue them down to the pane. Do not glue these pieces together yet. (Photo 3)



Photo 3

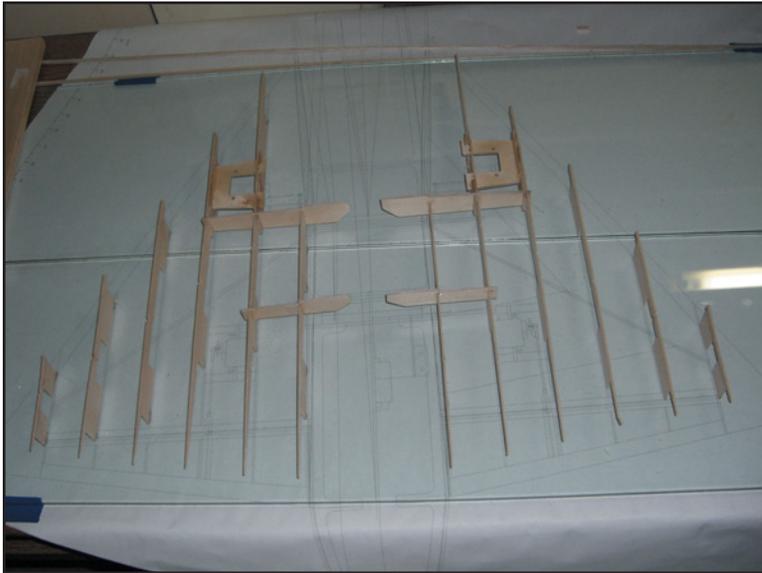


Photo 4

- 4. Align the remaining wing ribs (W4, W5 & w6) over the plans and tack glue them to the pane. (Photo 4)

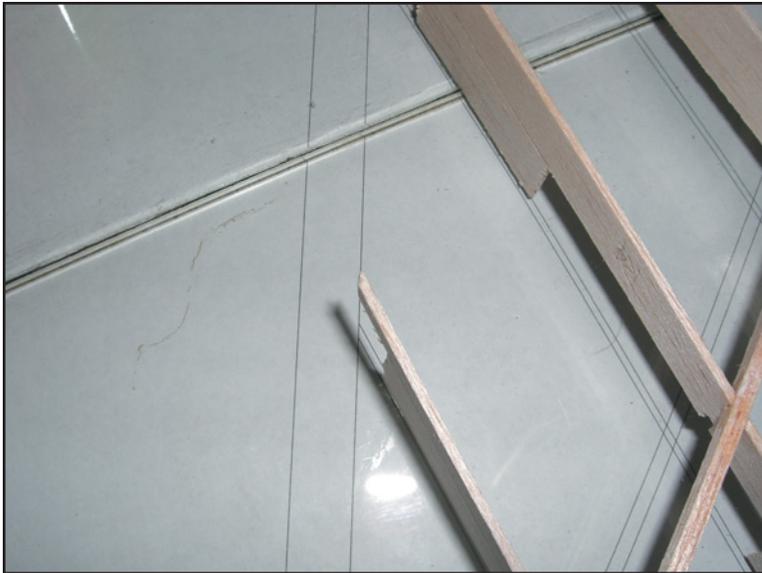


Photo 5

- 5. Carefully sand the leading edges of the wing ribs to match the placement and angle of the leading edge stock. (Photo 5)



Photo 6

- 6. Measure and draw a line 1/16" from the edge face of the leading edge stock that will be facing the wing ribs. (Photo 6)

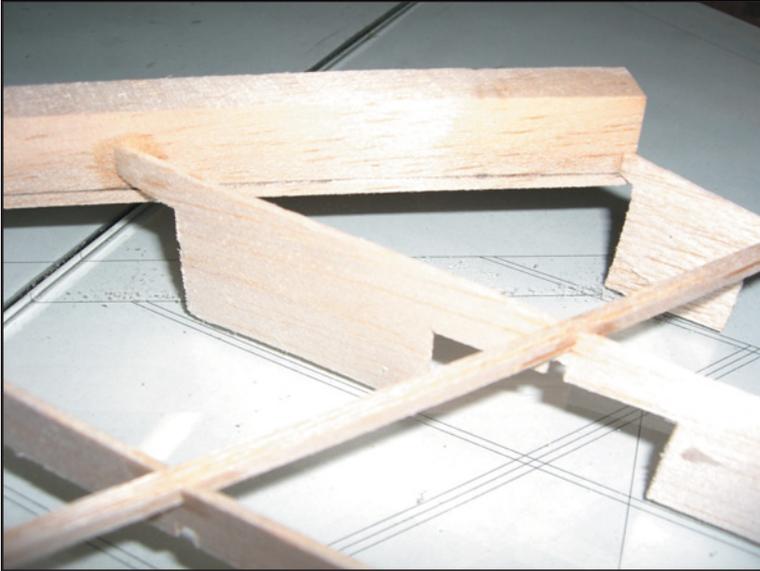


Photo 7

- 7. Align the leading edge stock to the wing ribs so the line is even with the tops of the ribs and tack glue it into place on all the ribs. (Photo 7)

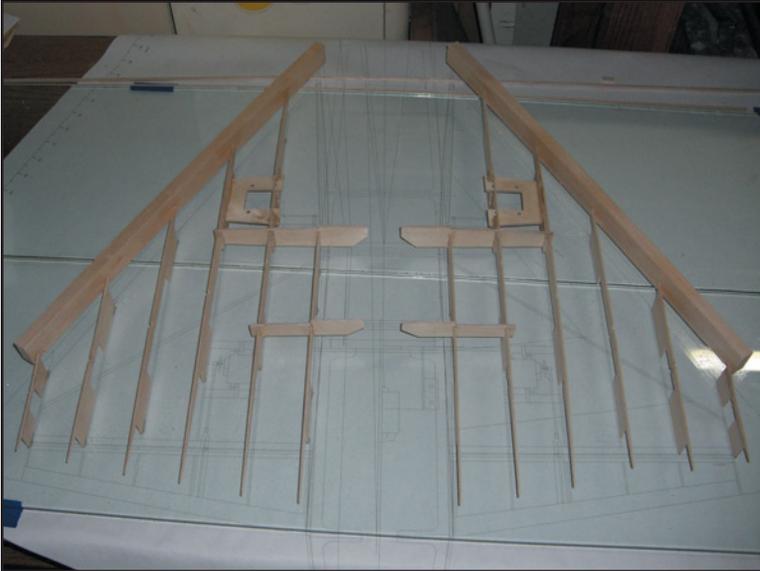


Photo 8

- 8. Glue together W1B, W2, W3 and WS1, WS2 and MG1. (Photo 8)



Photo 9

- 9. Align and glue W1F over the plans, then tack glue it to the pane. Glue W1F to WS1 and the leading edge stock. (Photo 9)



Photo 10

- 10. Glue the 1/8" spars into the notches in the wing ribs. (Photo 10)

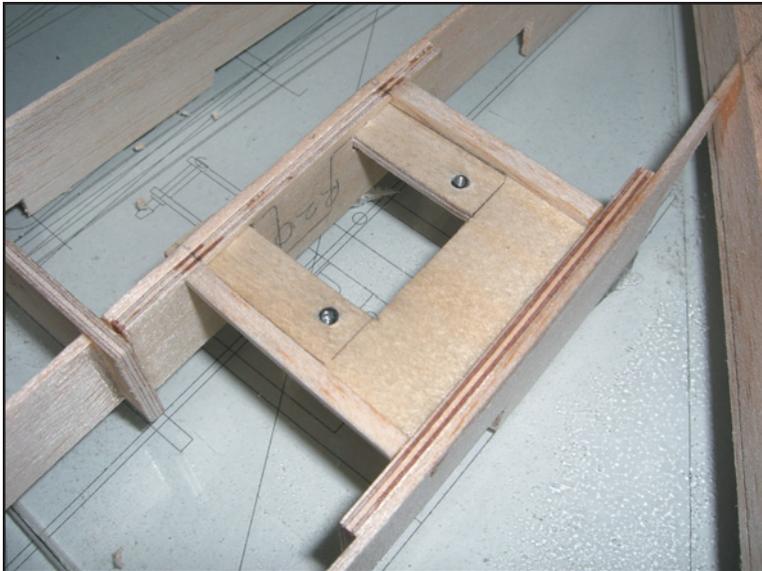


Photo 11

- 11. Cut some scrap to fill in the area between the main landing gear mount (MG1) and the bottom of the wing ribs. (Photo 11)



Photo 12

- 12. Glue the front wing skins to the bottom of the wings. (Photo 12)



Photo 13

- 13. Glue the back wing skin to the wings. Use some sort of weight to push the wing skins down onto the ribs. Make sure the trailing edge is straight. Make any adjustments before the glue dries. (Photo 13)



Photo 14

- 14. Once the glue is dry, remove the wings from the building board and cut the building tabs from the tops of the wing ribs and sand the top of the ribs smooth. (Photo 14)

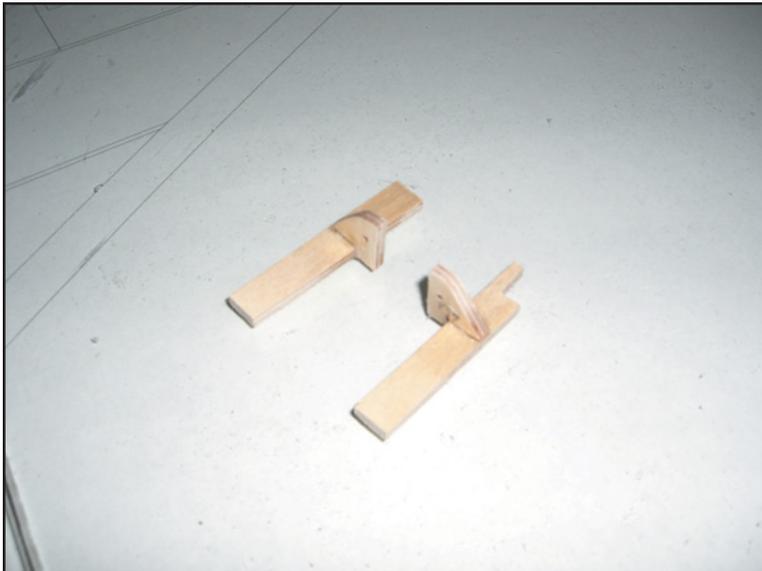


Photo 15

- 15. Cut from their sheets two SM1, two SM2 and four SM3. Drill a small hole in each SM3 for your servo mounting screws. Run the servo mounting screws in and out of the holes to cut 'threads' in the wood. This will make it easier to mount the servos later.

Glue these together to form the servo mounts. Make sure to make a right and left set. (Photo 15)



Photo 16

- 16. Glue the servo mounts into the wings. (Photo 16)

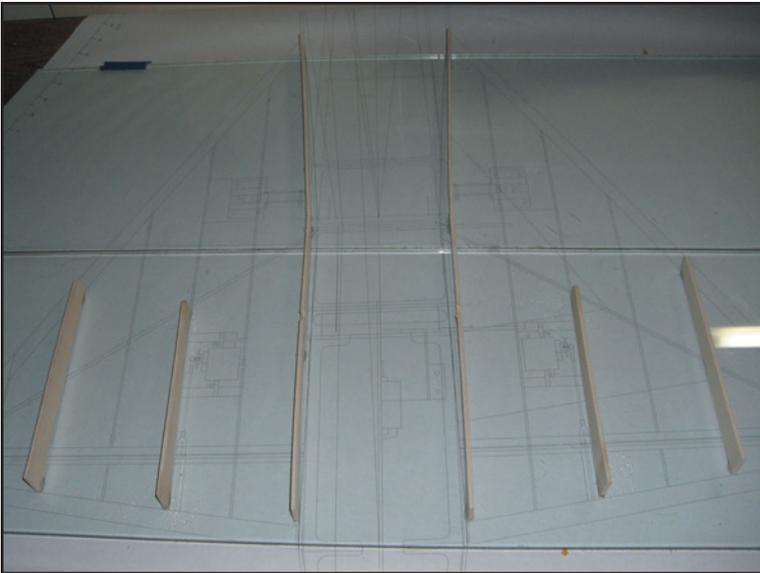


Photo 17

- 17. Align over the plans and glue to the pane the wing jigs, WJ1F, WJ1B, WJ2 and WJ3. (Photo 17)



Photo 18

- 18. Place the wings into the jigs and align them over the plans then tack glue them to the wing jigs. Glue the 1/8" spar into the notches in the tops of the wing ribs (Photo 18)



Photo 19

- 19. Cut and glue scrap 1/16" balsa shear webs with the grain running vertically to the back of the 1/8" spars and to the wing ribs.. (Photo 19)



Photo 20

- 20. Glue the top front wing skin to the leading edge stock, wing ribs and 1/8" spar. (Photo 20)



Photo 21

- 21. Glue the rear wing skin to the 1/8" spar and wing ribs. Use masking tape to keep the trailing edges of the wing skins straight while the glue dries. (Photo 21)

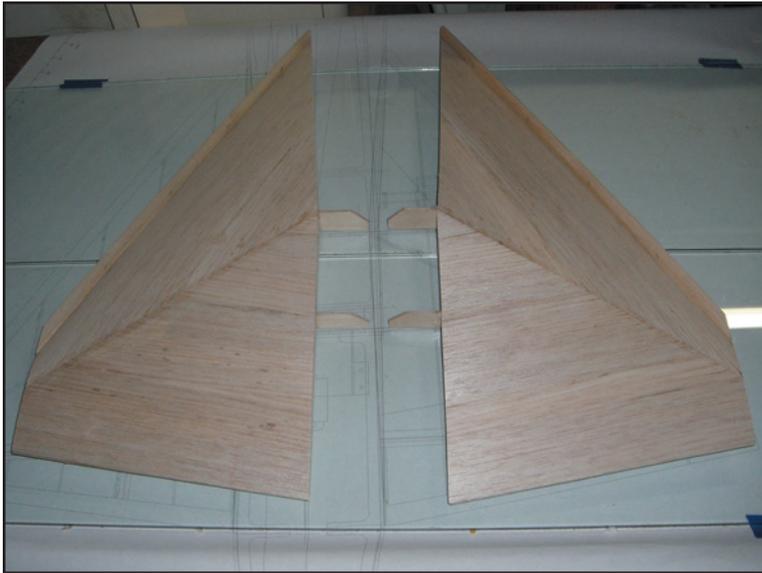


Photo 22

- 22. Pop the wings free from the pane. Cut and sand the leading edge stock and wing sheeting so they are flush with the root and tip ribs. (Photo 22)

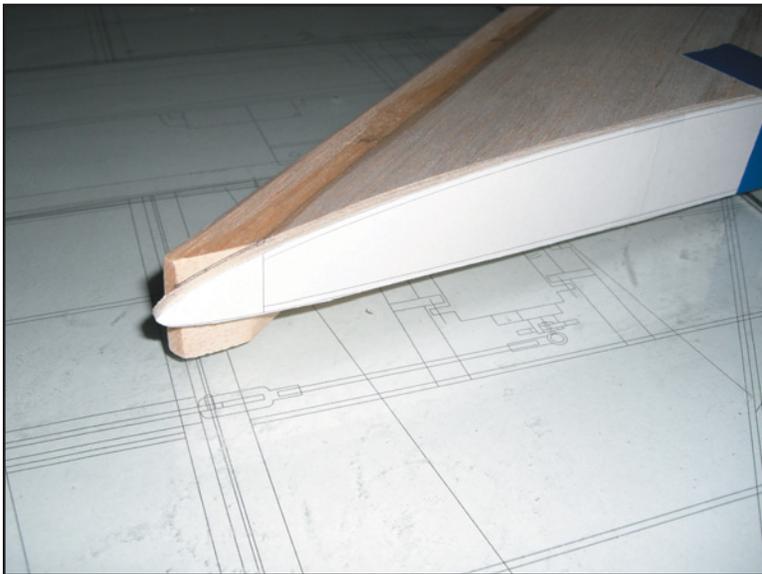


Photo 23

- 23. Tape the Root Rib Template so it is even with the wing root rib then trace the leading edge profile onto the leading edge stock. (Photo 23)

NOTE: The builder cut *his* leading edge stock too short and needed to patch it later on. Don't make the same mistake.

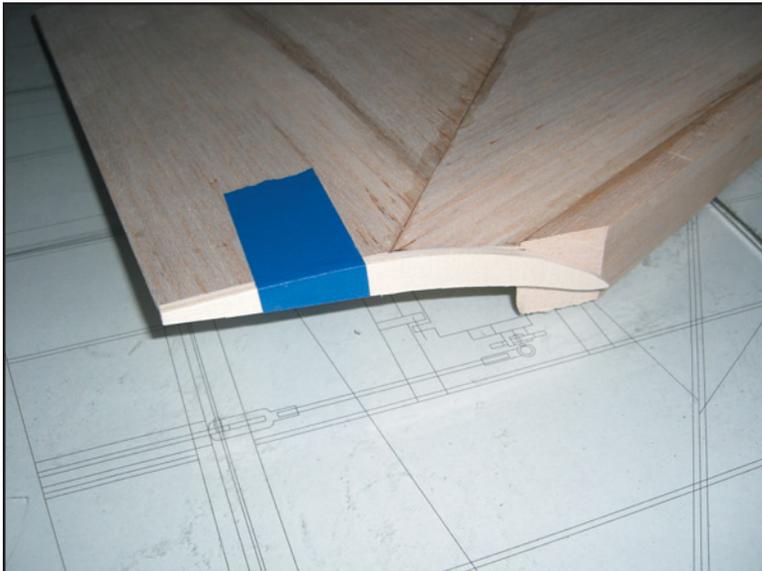


Photo 24

- 24. Tape W7 to the tip rib and trace the shape of the leading edge onto the end of the leading edge stock. (Photo 24)



Photo 25

- 25. Mark the leading edge stock to indicate the centerline of the root rib leading edge. (Photo 25)



Photo 26

- 26. Mark the leading edge stock to indicate the centerline of the tip rib. (Photo 26)

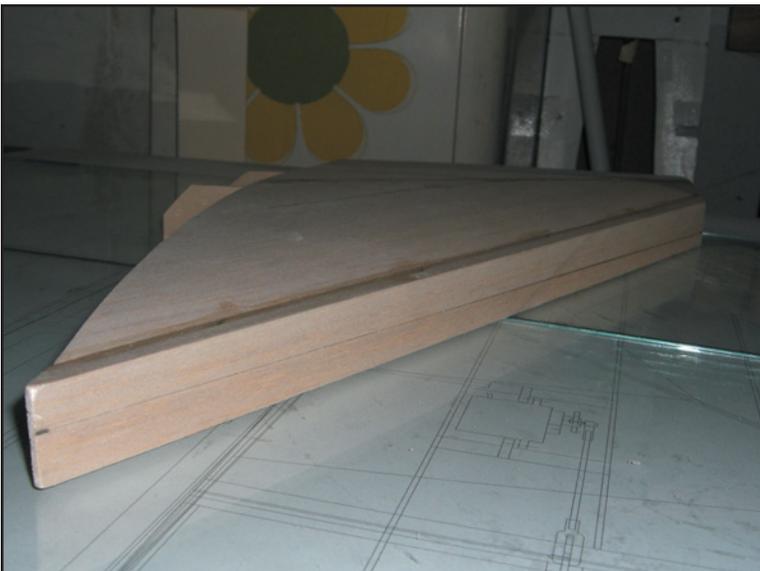


Photo 27

- 27. Remove the Root Rib Template and W7 from the wings and set them aside. Draw a line between the two marks to denote the centerline of the leading edge. (Photo 27)

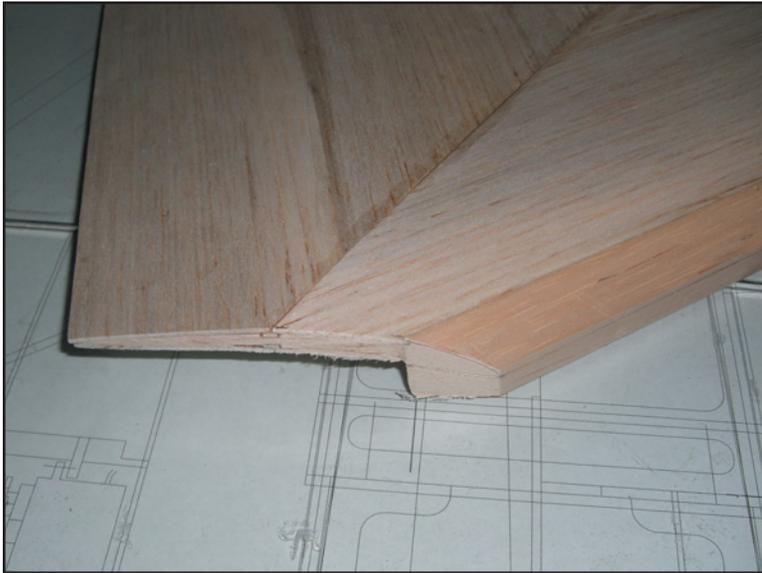


Photo 28

- 28. Use a razor plane to shape the top half of the leading edge to match the lines you just drew. (Photo 28 & 29)

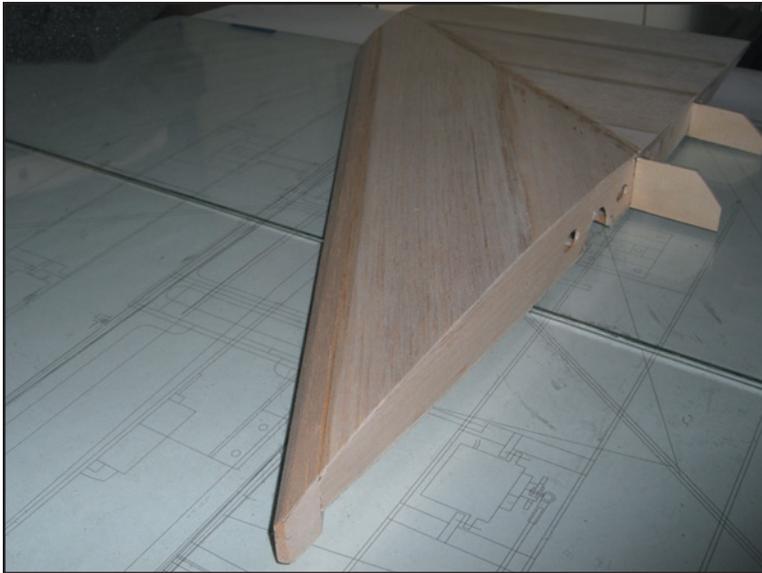


Photo 29



Photo 30

- 29. Stick down some masking tape on the underside of the wings so one edge is even with the glue joint between the leading edge stock and the wing sheeting to protect the wing sheeting while you shape the underside of the leading edge stock. (Photo 30)



Photo 31

- 30. Using a razor plane, sandpaper and a rotary tool, shape the leading edge stock to match the lines you just drew. (Photo 31)

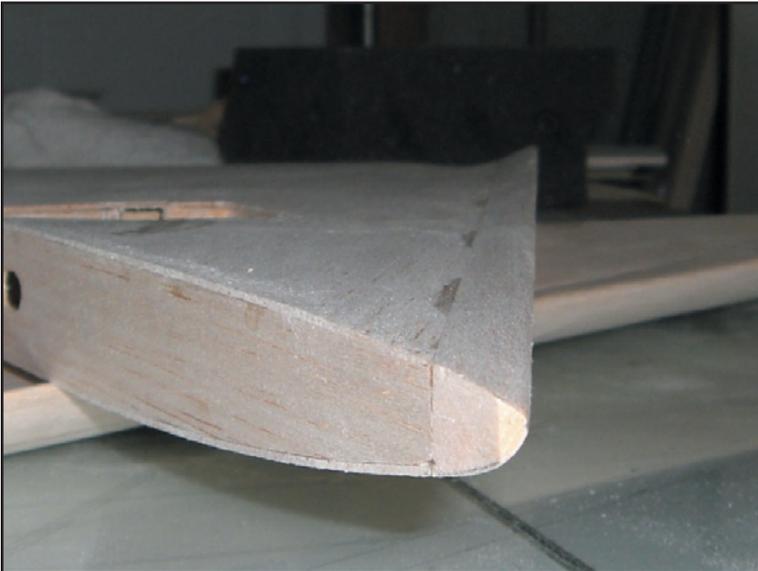


Photo 32

- 31. Sand the leading edge stock and wing sheeting to their final shape. Use the Root Rib Template and W7 as sanding guides so you don't sand off too much wood. (Photo 32 & 33)



Photo 33



Photo 34

- 32. Sand the wing sheeting so it is even with the trailing edges of the wing ribs. (Photo 34)



Photo 35

- 33. Glue the 1/8" x 1/2" balsa trailing edge stock to the wings. Once the glue is dry shape the trailing edge stock to match the upper and lower surfaces of the wings. (Photo 35)

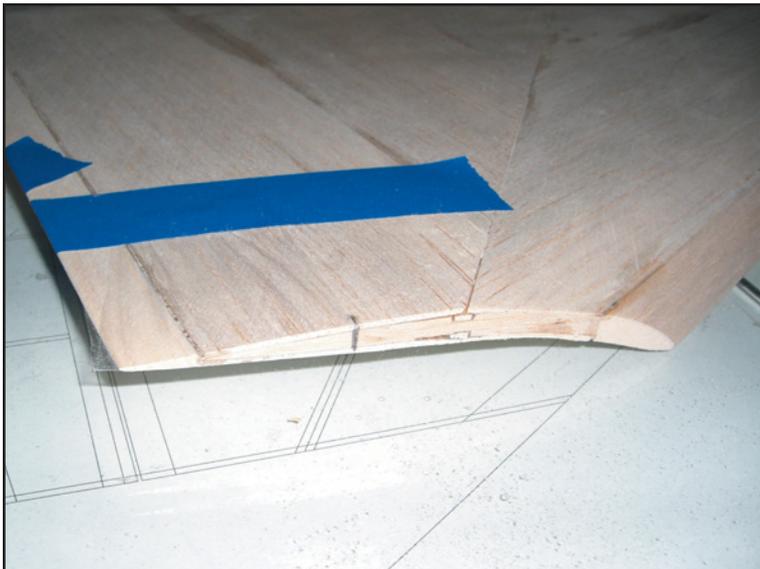


Photo 36

- 34. Draw a line on the tip rib that is even with the trailing edge of the forward elevon spar. Tape some plastic sandwich wrap so the forward edge is even with this line. (Photo 36)

Note: The sandwich wrap will act as a parting layer keep the tip rib from sticking to W7 when you are ready to cut the elevons free from the wings.



Photo 37

- 35. Glue W7 to the tip ribs. Glue W8 to W7. (Photo 37)



Photo 38

- 36. Once the glue is dry, remove the tape and the sandwich wrap from the wings. Use a razor plane and sandpaper, shape the top of the wing tip to match the leading edge profile. (Photo 38)

NOTE: To obtain the correct profile, shape from the leading edge to the trailing edge. If you shape the wing tip from the trailing edge to the leading edge the trailing edge 'curl' will be the wrong shape.

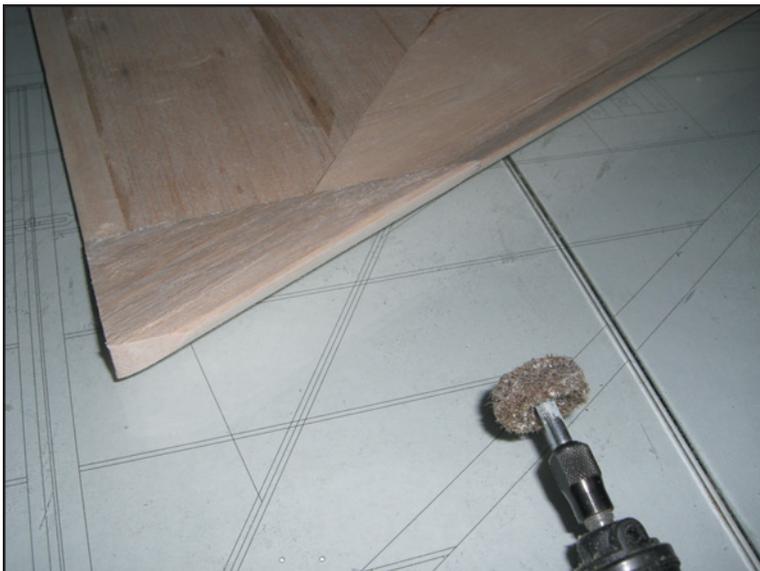


Photo 39

- 37. Use a rotary tool to rough shape the underside of the wing tip working from the leading edge to the trailing edge. (Photo 39)

- 38. Once you've obtained the correct rough shape, use progressively finer grades of sandpaper to refine the wing tips. You should end up with something like this. (Photo 40, 41 & 42)



Photo 40



Photo 41



Photo 42



Photo 43

- 39. Measure and mark the front and back of the area on the top of the wings to be removed for the elevon spars. (Photo 43)



Photo 44

- 40. Do the same for the bottom of the wings. (Photo 44)

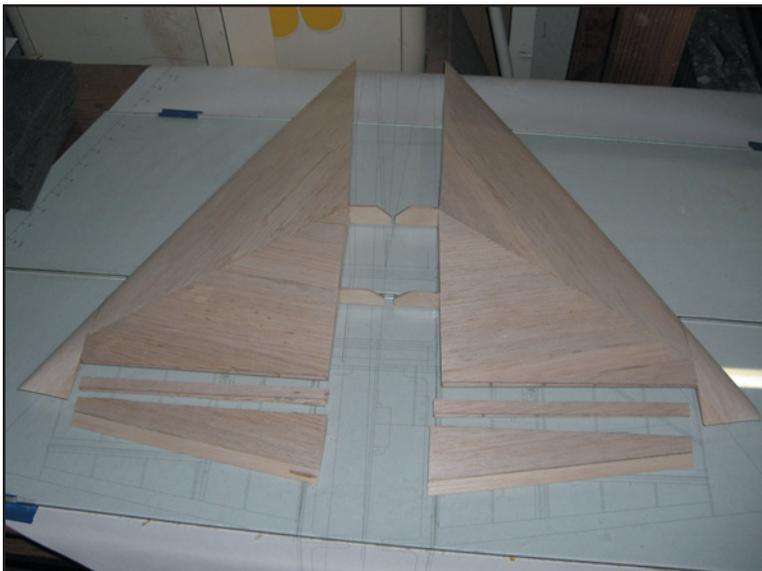


Photo 45

- 41. Using a hobby knife, metal ruler and razor saw, cut the elevons free from the wings. (Photo 45)



Photo 46

- 42. Cut the elevon control horn doubler from soft balsa scrap and shape it so it fits into the elevons on the inboard side of W3 and glue it into place. Make sure it's flush with the leading edge of the elevon sheeting. Cut and glue the 1/2" x 1/4" balsa elevon spars to the wings and elevons. (Photo 46)



Photo 47

- 43. Use a razor plane and sandpaper to shape the elevon spars so they're flush with the tops and bottoms of the wings. (Photo 47)



Photo 48

- 44. Cut the elevon servo pockets out of the bottom of the wings. If you're using retract, cut the retract pockets out of the bottom of the wings, too. (Photo 48)



Photo 49

- 45. Cut four 1/2" lengths of 1/2" balsa triangle stock. (Photo 49)



Photo 50

- 46. Glue each one of these triangle stock pieces to the bottom of the servo mounts, SM3. Shape these so they're flush with the outlines of SM3 (Photo 50)

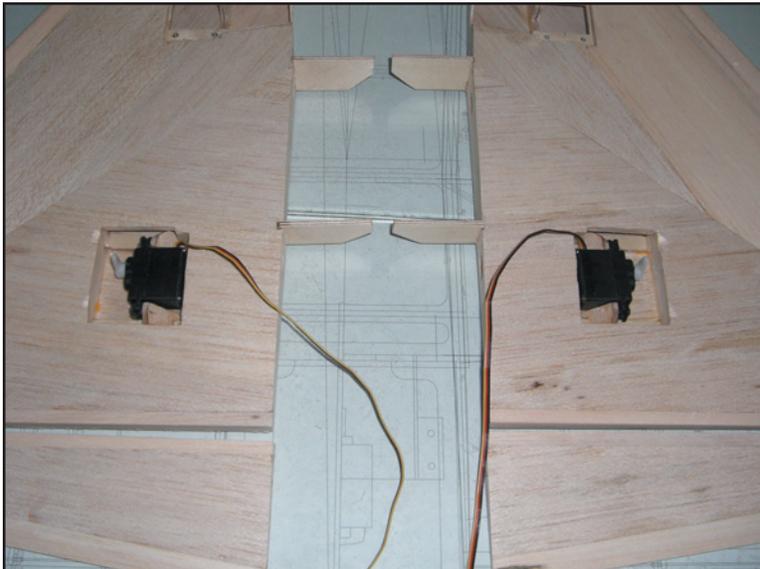


Photo 51

- 47. Mount the elevon servos. Make sure to open a path for the servo wire through W1B and W2. (Photo 51)

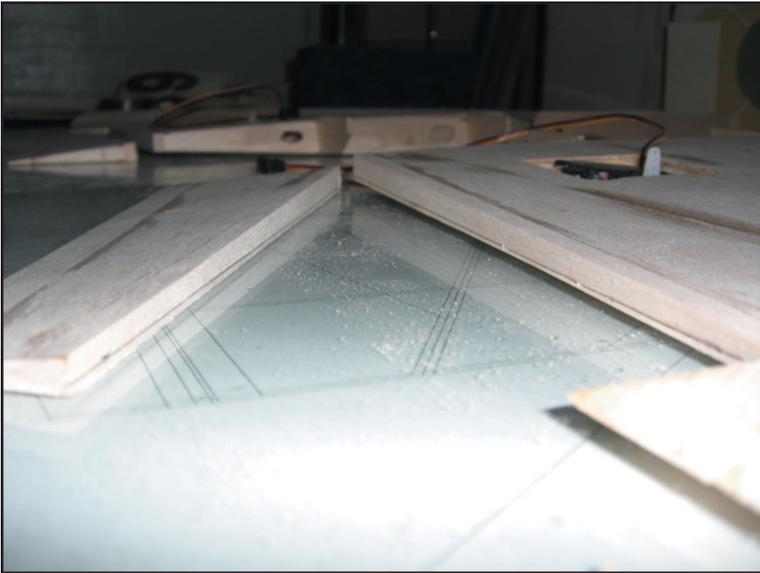


Photo 52

48. Draw a line 1/16" from the tops of the wing and elevons for the elevon hinge slots. (Photo 52)



Photo 53

49. Mark the position of the elevon hinges on the bottom of the wings and elevons. (Photo 53)



Photo 54

50. Use a hobby knife to cut the hinge slots. Fit, but do not glue the hinges to the wings and elevons. (Photo 54)



Photo 55

- 51. Bevel the bottom of the leading edge of the elevon spar. You will only need to bevel enough to get 3/4" of travel up and down. (Photo 55)

NOTE: Do not bevel the wing elevon spar. Leave that square.

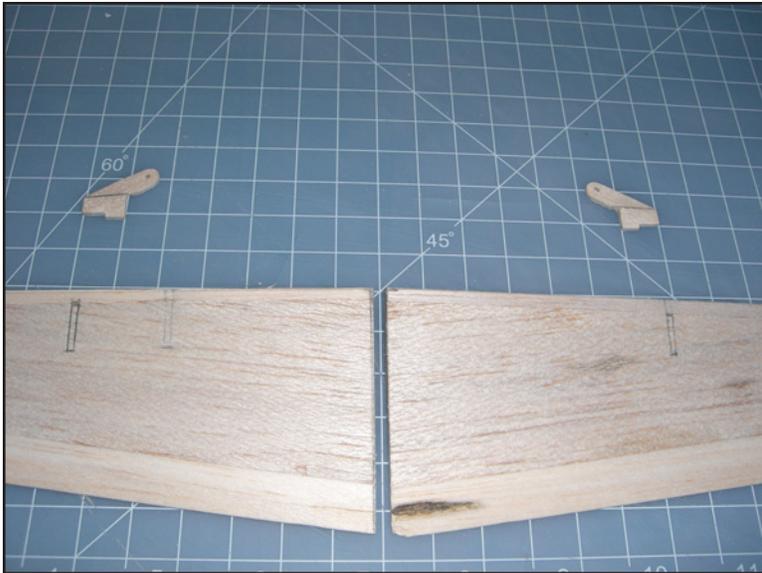


Photo 56

- 52. Mark the location of the control horn slots. (Photo 56)



Photo 57

- 53. Use a hobby knife to cut the control horn slots and fit the control horns to the elevons. When you're satisfied, glue the control horns to the elevons. (Photo 57)



Photo 58

- 54. Slip the elevons onto the hinges so it mates with the wings. Make up the elevon linkage. (Photo 58)



Photo 59

- 55. This completes the wing construction. Set the wings aside until you're ready to start joining them to the fuselage. (Photo 59)

Fuselage Construction

- 56. Assemble the main fuselage jig from 1/8" lite ply. Align the jig over the plans and tack glue the jig to the pane. (Photo 60)

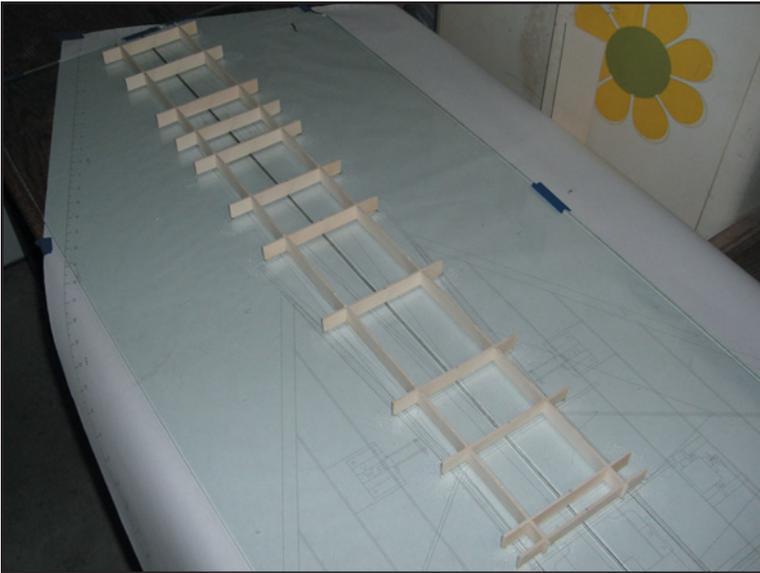


Photo 60

- 57. Use a straight edge to make sure the main keel K1 is straight. Tack glue K1 to the main fuselage jig. (Photo 61 & 62)

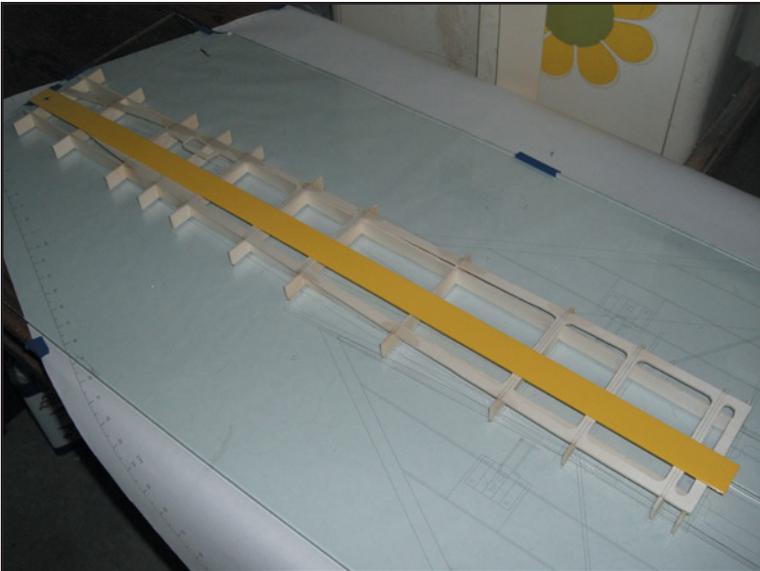


Photo 61

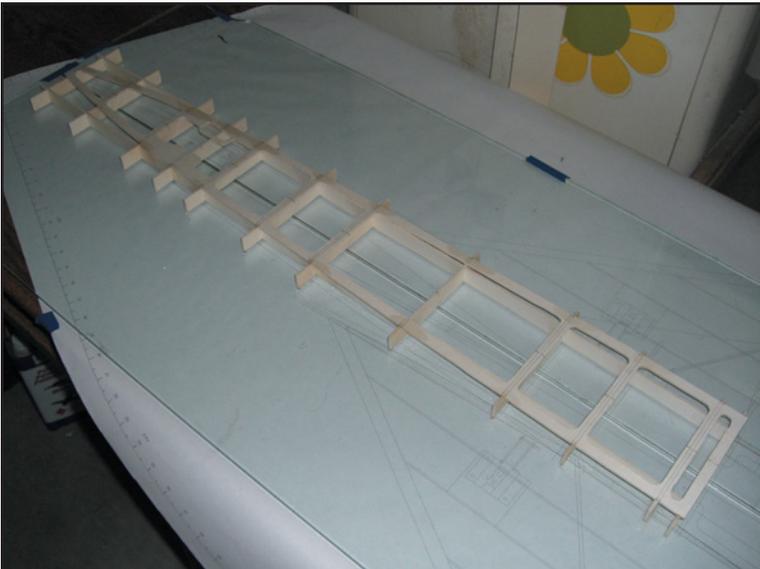


Photo 62



Photo 63

- 58. Align K2 over the plans and tack glue it to the pane. (Photo 63)

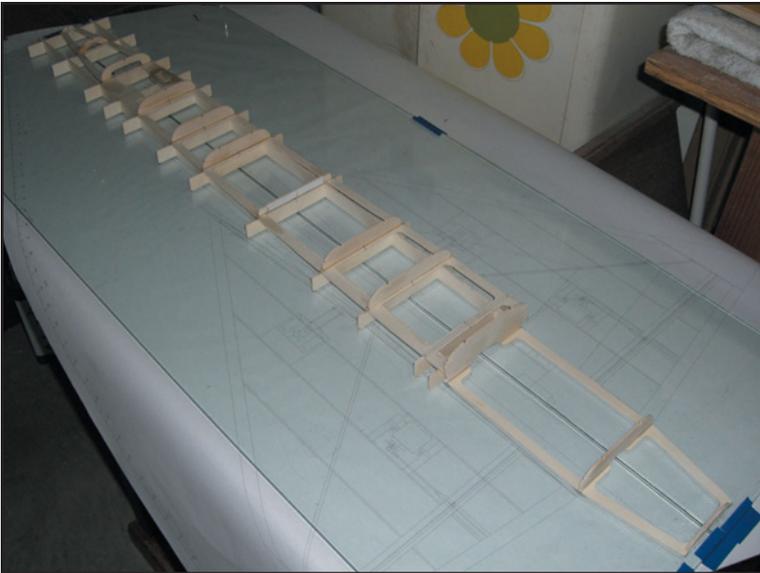


Photo 64

- 59. Glue bulkheads B1B, B2B, B3B, B4B, B5B, B6B, B8, B9B to K. Glue B10B to K1 and K2. Glue B11B and B12B to K2. (Photo 64)

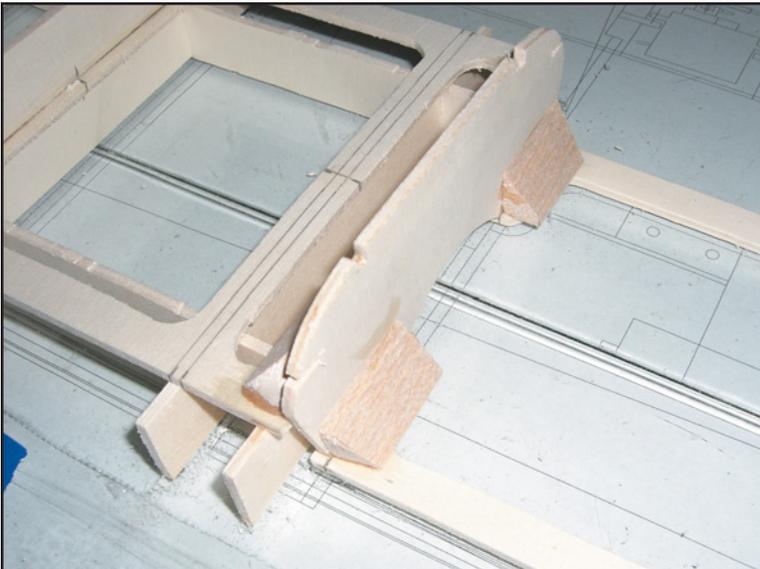


Photo 65

- 60. Glue 1/2" balsa triangle stock to the back of B10B and the bottom of K2. (Photo 65)



Photo 66

- 61. Glue 1/2" balsa triangle stock to the front of B10B and the bottom of K1. (Photo 66)

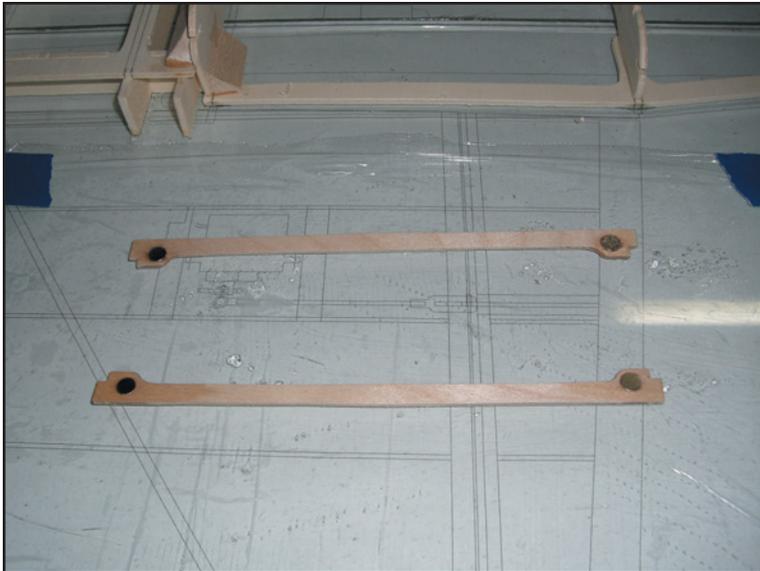


Photo 67

- 62. Tape some plastic sandwich wrap to the pane. Working one pair at a time, place the hatch rails for the gear hatch, battery compartment hatch and fan hatch on the plastic wrap.

Press a 1/4" x 1/16" magnet into the 1/4" holes in the rails and glue the magnets to the rails using thin CA. (Photo 67)

NOTE: the glue will stick better to the magnets if you use some fine sandpaper to scuff the edges of the magnets before you glue them into place.

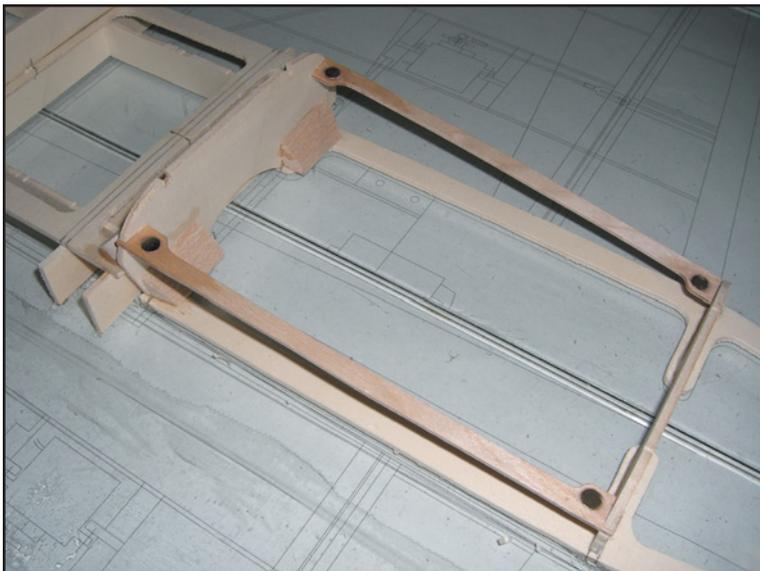


Photo 68

- 63. Place, but do not glue the hatch rails into their respective slots in the bulkheads. The next series of photos will document the construction of the fan hatch. (Photo 68)

NOTE: The nose gear hatch and battery compartment hatches are constructed in the same manner, so photos of these hatches being built will not be shown.



Photo 69

- 64. Place some plastic sandwich wrap on the hatch rails. Stick a 1/4" x 1/16" magnet to each of the magnets glued in the hatch rails trapping the plastic wrap between them. Gently pull the plastic wrap taut between the magnets. (Photo 69)



Photo 70

- 65. Gently press the hatch base plate over the magnets so they remain aligned with the magnets in the hatch rails.

Center the hatch rails and base plate to the bulkheads. Fold the plastic wrap away from the bulkheads and glue the hatch rails to the bulkheads.

Make sure the hatch base plate is still aligned with the hatch rails and glue the magnets to the hatch base plate. (Photo 70)

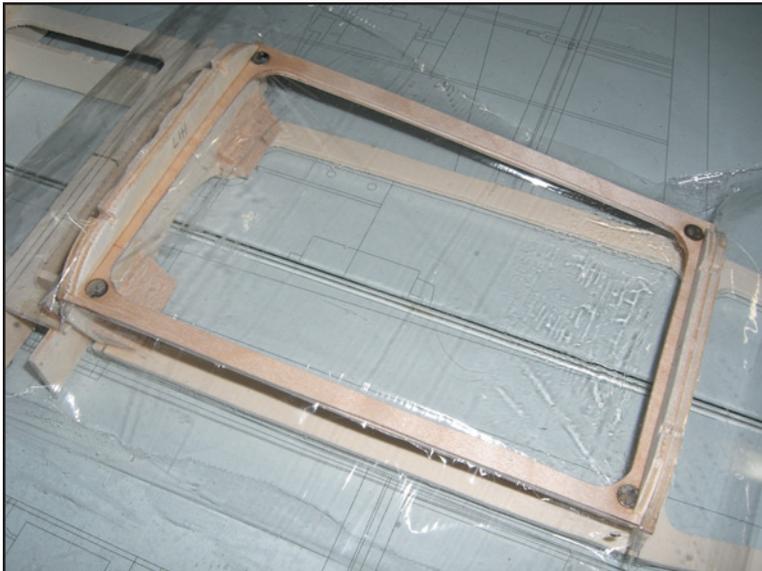


Photo 71

- 66. . Align and glue the hatch formers to the hatch base plates. (Photo 71)

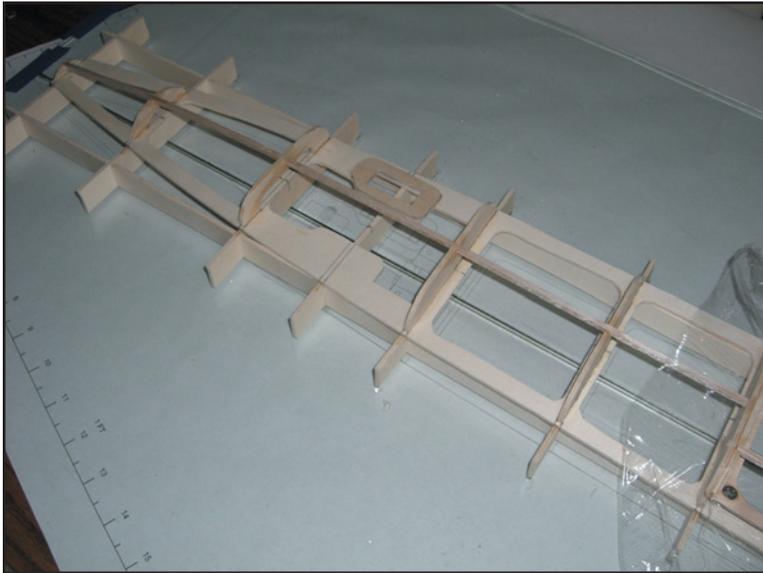


Photo 72

- 67. Glue 1/8" stringers in all the notches in the bottom bulkheads and hatches. (Photo 72, 73, 74, 75 & 76)



Photo 73

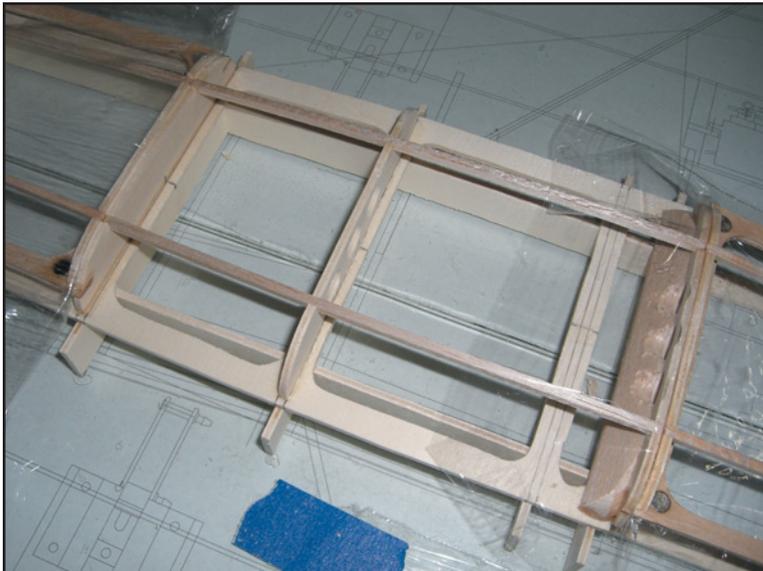


Photo 74



Photo 75

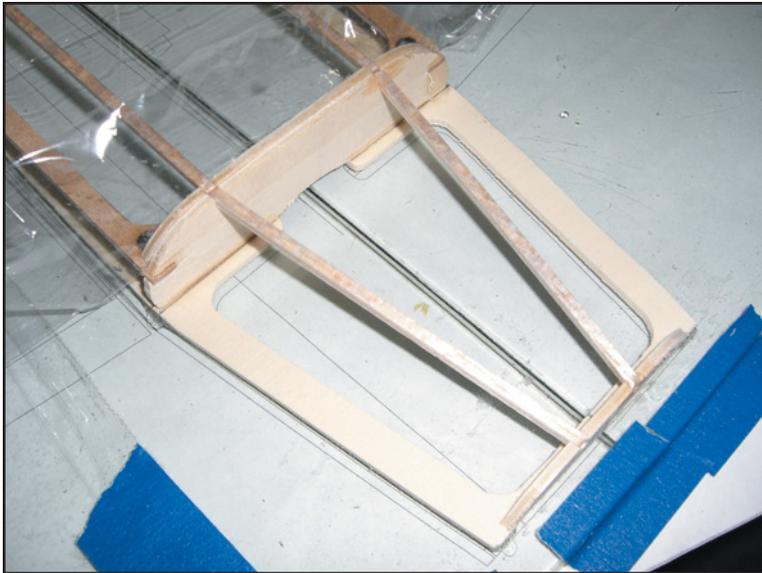


Photo 76

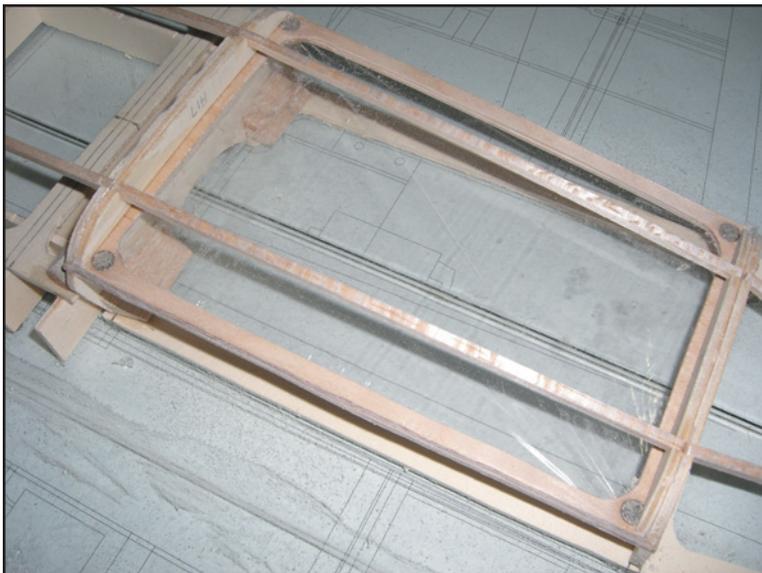


Photo 77

- 68. Use a high-speed rotary tool to sand the edges of the hatch rails and hatch base plates so they're flush with each other.. (Photo 77)

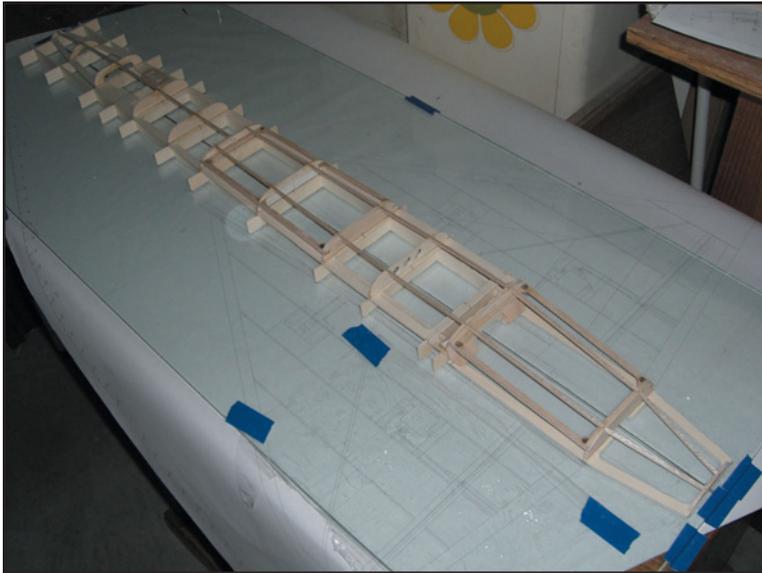


Photo 78

- 69. Do the same for the battery compartment and nose gear hatches. (Photo 78)

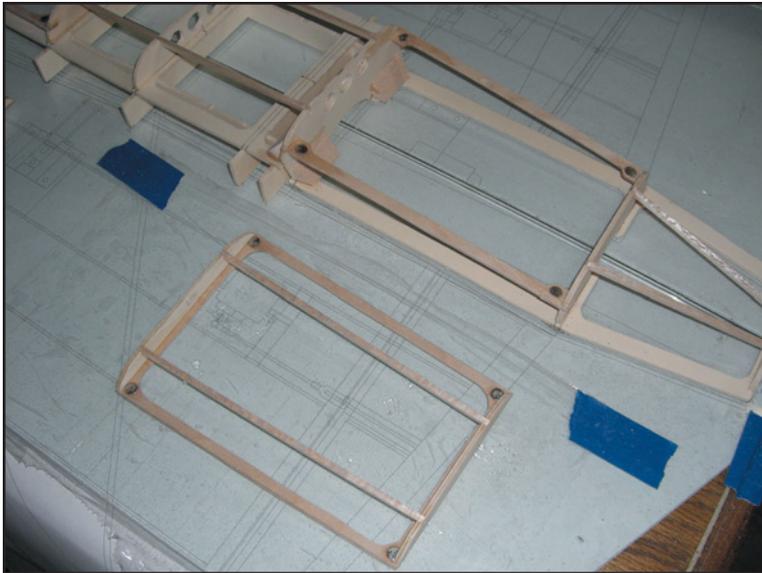


Photo 79

- 70. Gently remove the hatches. (Photo 79)

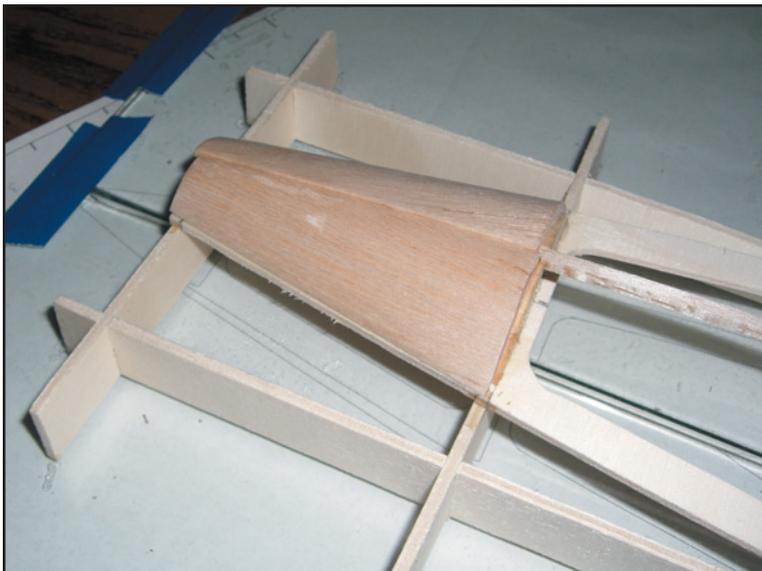


Photo 80

- 71. Using 3/32" contest balsa sheet or strip plank the bottom of the fuselage. (Photo 80, 81, 82, 83, 84 & 85)

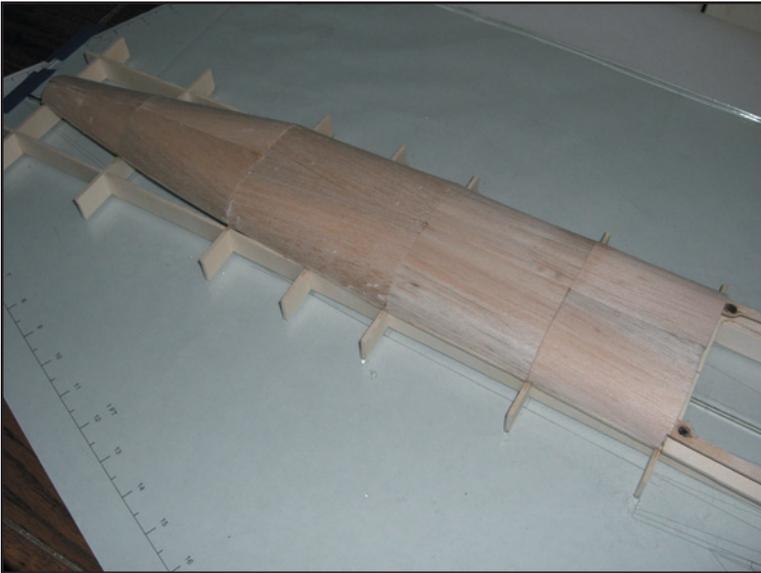


Photo 81



Photo 82

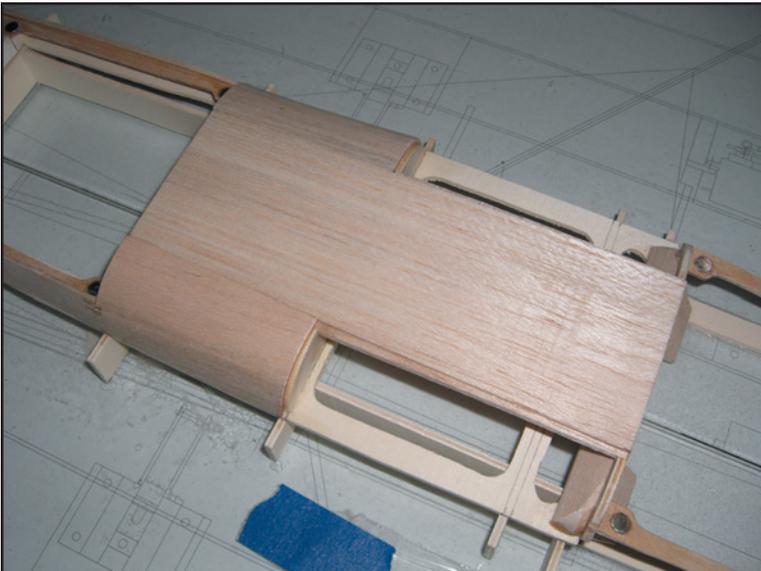


Photo 83



Photo 84



Photo 85



Photo 86

- 72. Trim the fuselage sheeting so it's flush with the hatch rails and bulkhead faces. (Photo 86)



Photo 87

- 73. Place some plastic sandwich wrap on the hatch rails and stick the hatch down. Gently pull the plastic wrap taut. (Photo 87)



Photo 88

- 74. Using 3/32" contest balsa sheet or strip plank the hatches. (Photo 88)

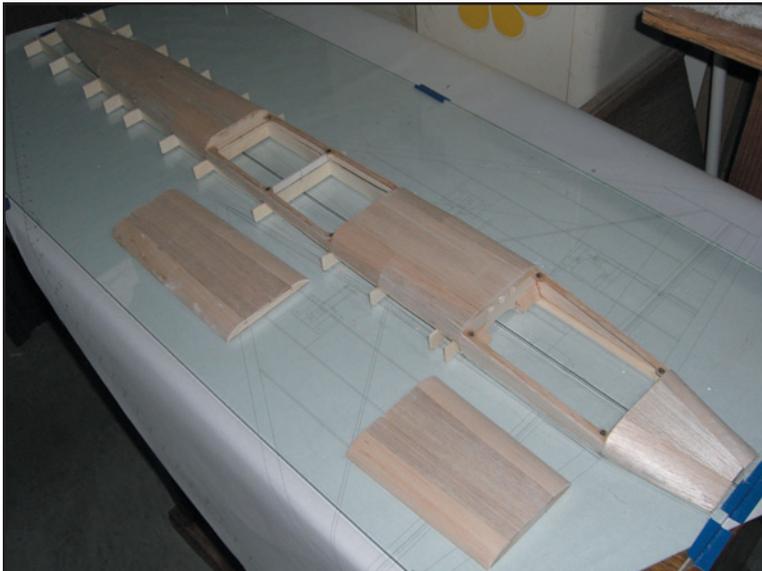


Photo 89

- 75. Remove the hatches from the fuselage. (Photo 89)



Photo 90

- 76. Carefully remove the fuselage from the fuselage jig and pane. (Photo 90)

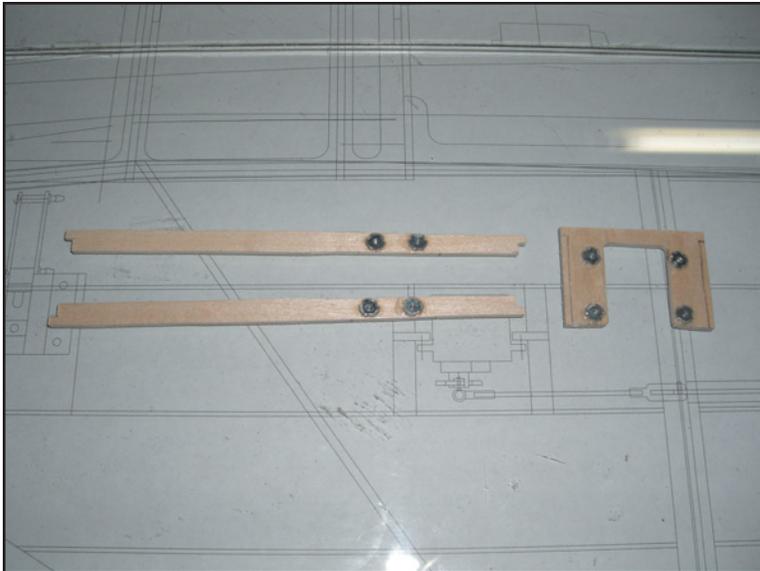


Photo 91

- 77. Press 2-56 blind nuts into the holes in the nose gear doubler NG1 and the two fan mounting rails FM1. Carefully glue them to secure them in place. (Photo 91)

Align NG1 and glue NG1 to K1.

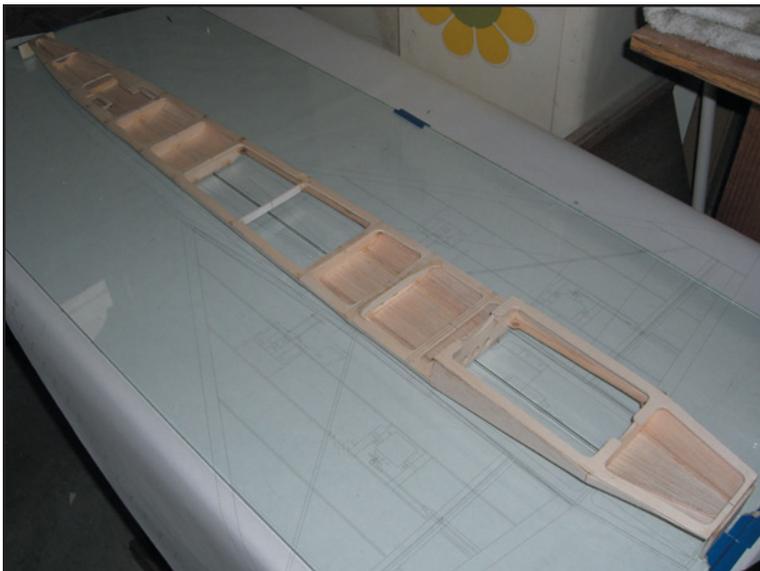


Photo 92

- 78. Align the fuselage over the plans. (Photo 92)

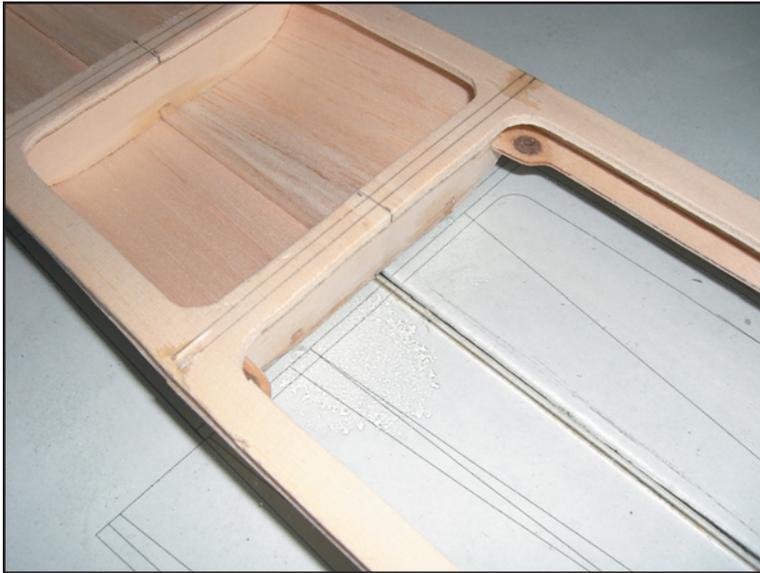


Photo 93

- 79. Tack glue the fuselage to the pane in the hatch opening bulkheads. (Photo 93)

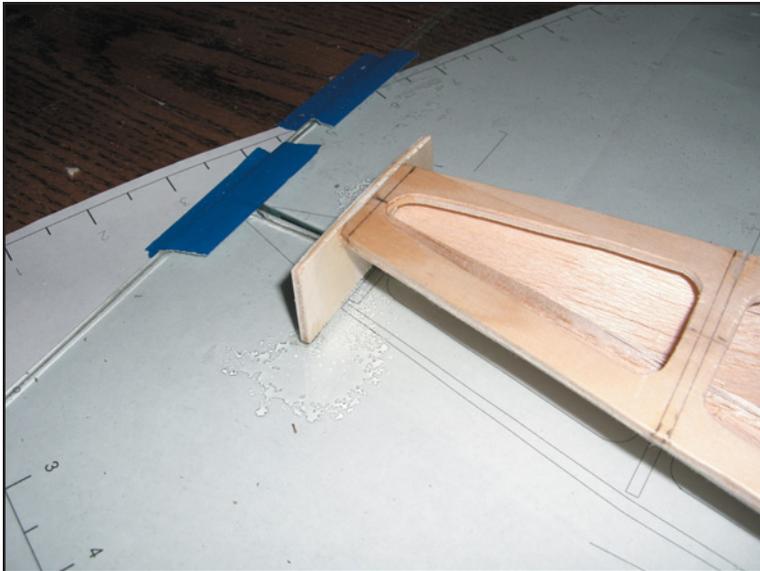


Photo 94

- 80. Place a piece of scrap 1/8" lite ply so it's flush with the front of B1B and tack glue it to the pane. Use a ruler to make sure the top of K1 is level and square, then tack glue K1 to the scrap ply. Do the same with B12B. (Photo 94)

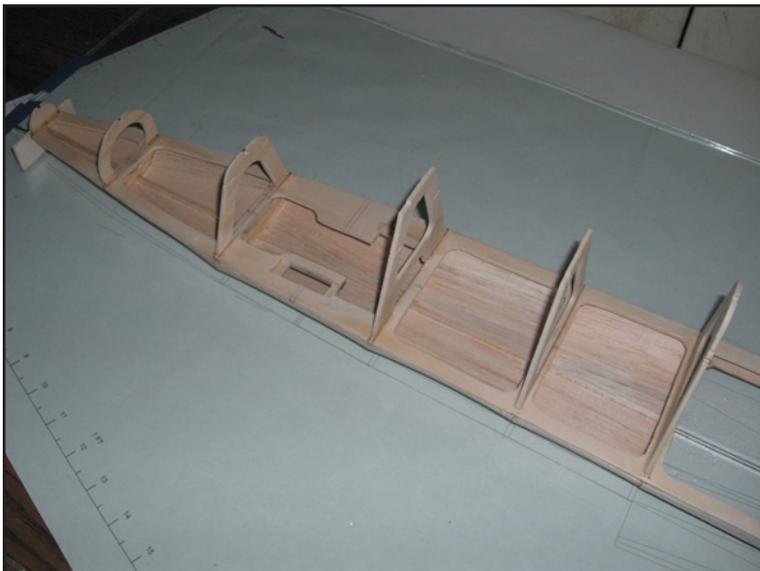


Photo 95

- 81. Use a square to align and glue bulkheads B1T, B2T, B3T, B4T, B5T and B6T to K1. (Photo 95)

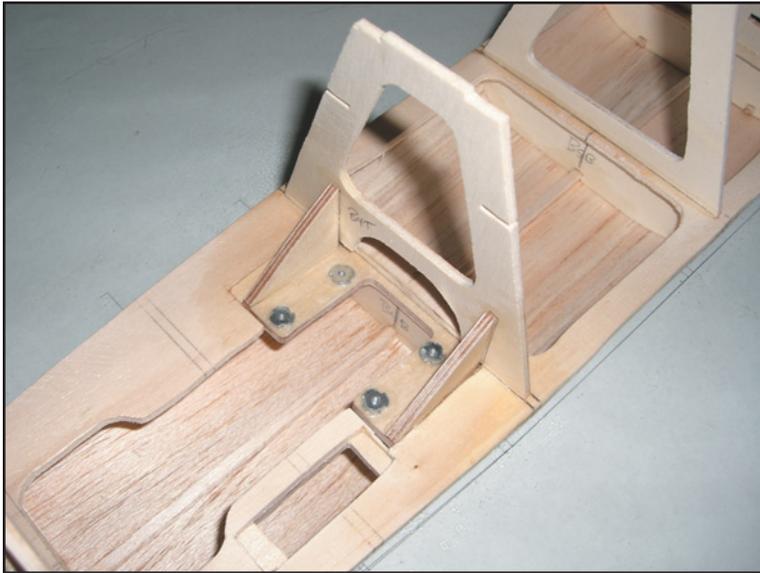


Photo 96

- 82. Glue the gussets NG2 to the top of NG1 and the front of B4T. (Photo 96)

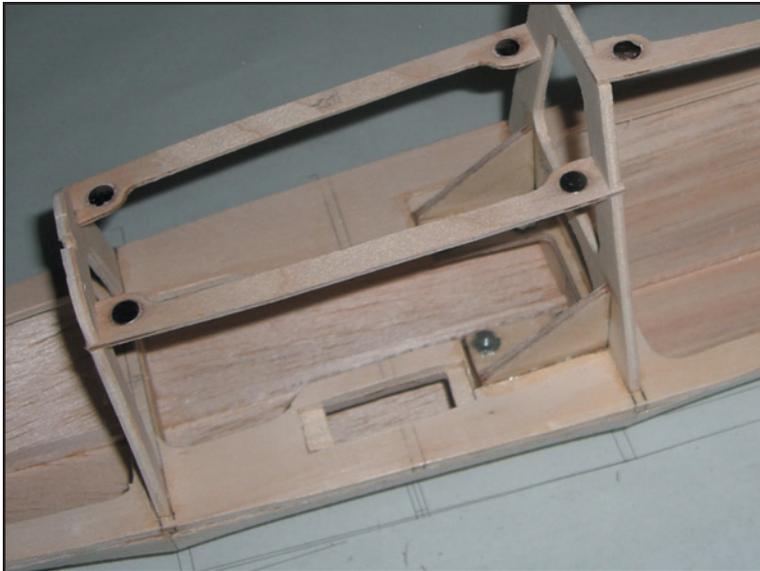


Photo 97

- 83. Glue two cockpit rails C1 into the slots in B3T and B4T. (Photo 97)

NOTE: Please ignore the magnets and extra rails, plastic wrap and masking tape shown in the following photos. This series of photos show an earlier design that featured a cockpit hatch. Due to poor access to the internal components (“like working on a ship in a bottle”) this hatch was moved to the belly of the airplane for easy access to the roomy fuselage.



Photo 98

- 84. Glue the instrument panel C2 to the two cockpit rails. Glue a 1/8" balsa stringer into the notches in bulkheads B1T - C2 and B4T - B6T. (Photo 98)



Photo 99

- 85. Sand the cockpit rails and stringer flush with the bulkheads. Use 3/32" contest balsa to sheet or strip plank the nose section between B1T and B6T. (Photo 99)

NOTE: Be sure to leave an 1/8" overhang when you sheet between B3T and C1 to simulate the instrument hood.

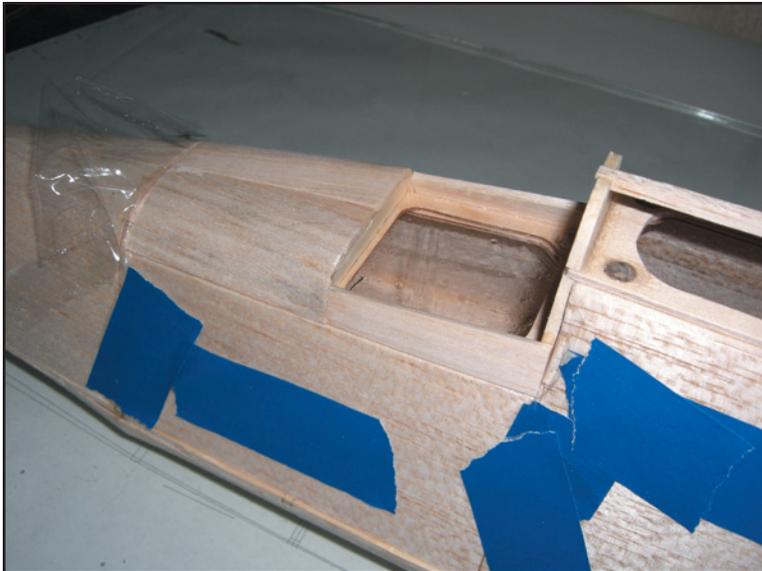


Photo 100

- 86. Glue cockpit sides C3 to C1 and B4T. (Photo 100)

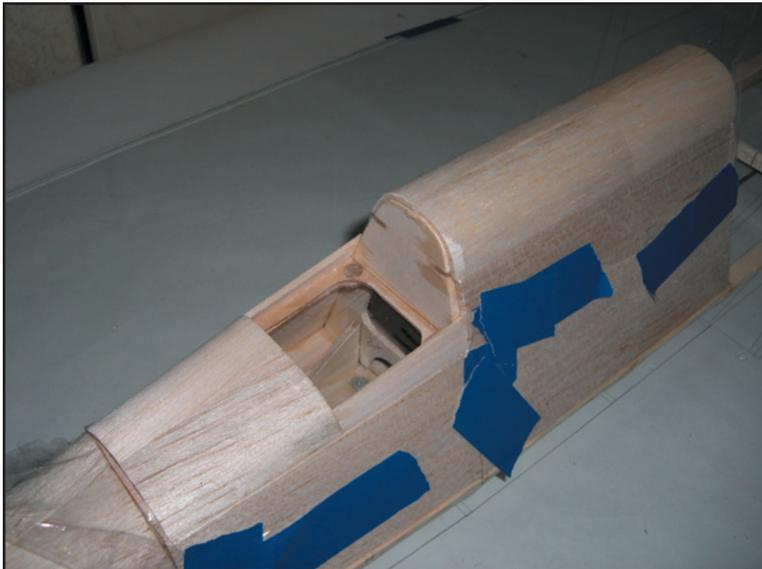


Photo 101

- 87. Finish sheeting or strip planking the the fuselage turtle deck between bulkheads B4T - B6T. Be sure to leave a lip on B6T for the rest of the upper fuselage sheeting and the inlet duct walls. (Photo 101)

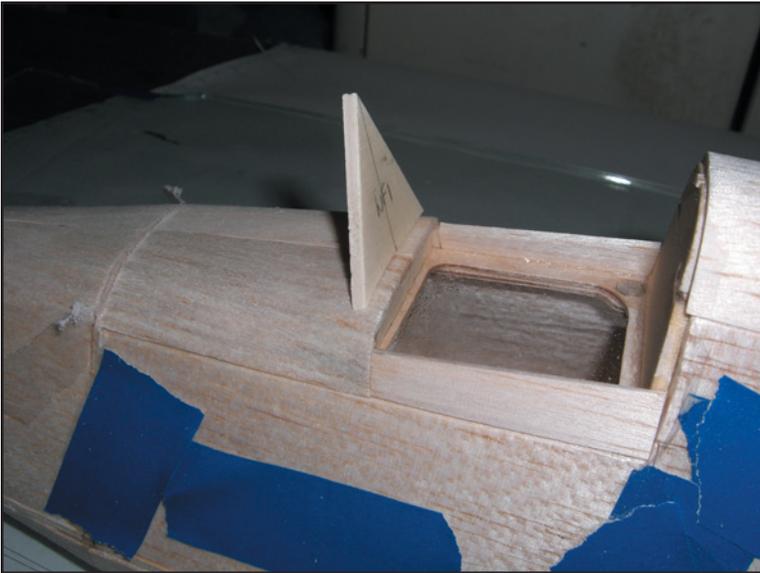


Photo 102

- 88. Align, center and glue the windscreen frame C4 to the instrument hood. Make sure to angle it forward to match the plans. (Photo 102)

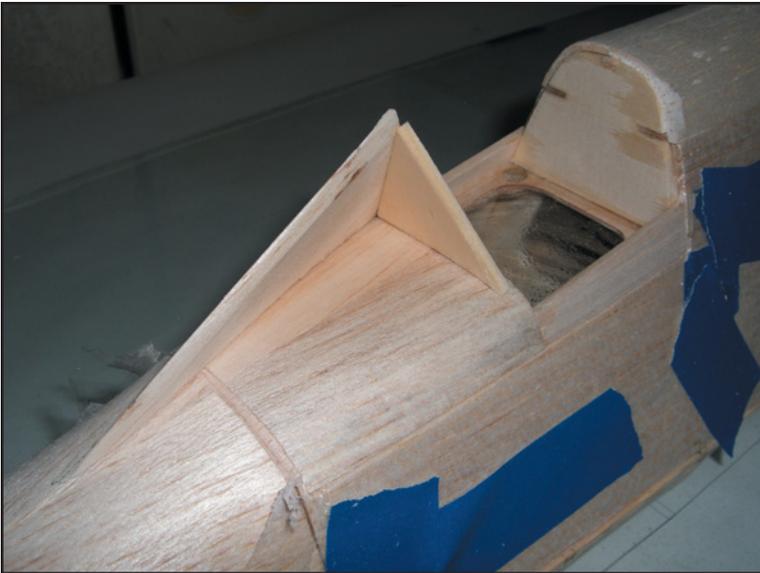


Photo 103

- 89. Bevel the inside leading edge and lower edge of the 3/32" balsa windscreen pieces so they form a tight joint. (Photo 103)

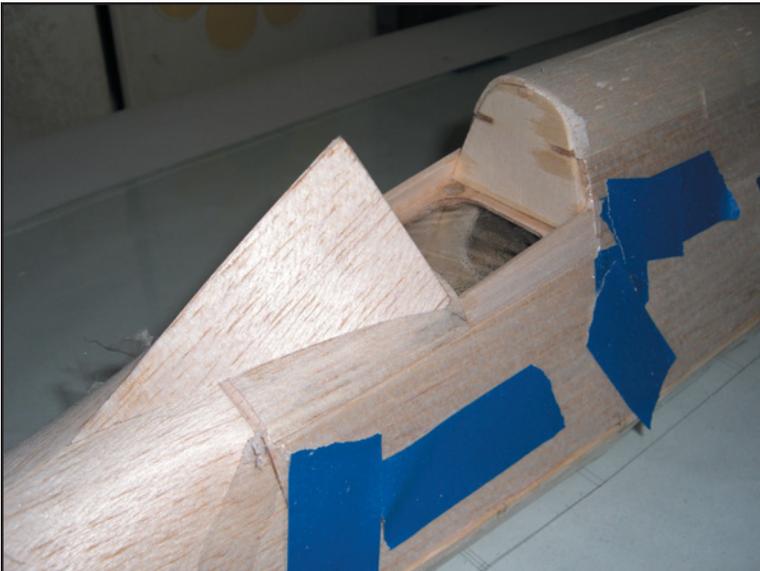


Photo 104

- 90. Glue the windscreens C5 to the windscreen frame and forward fuselage. (Photo 104 & 105)

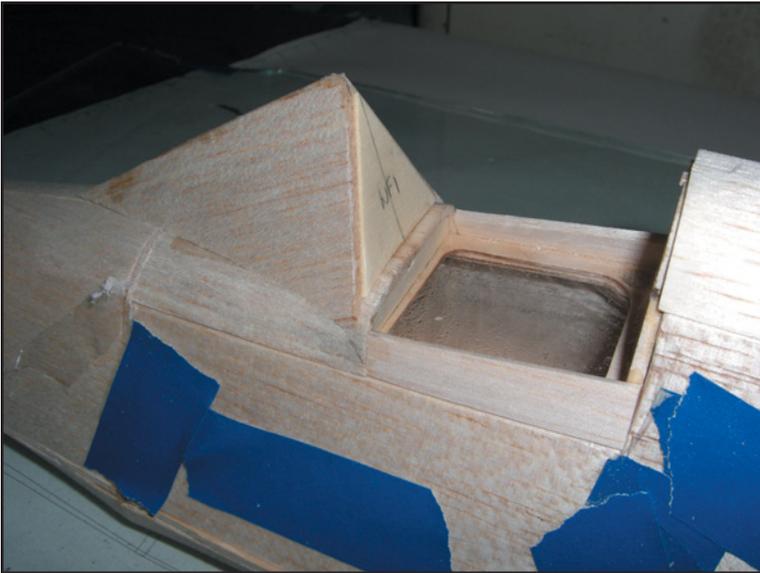


Photo 105

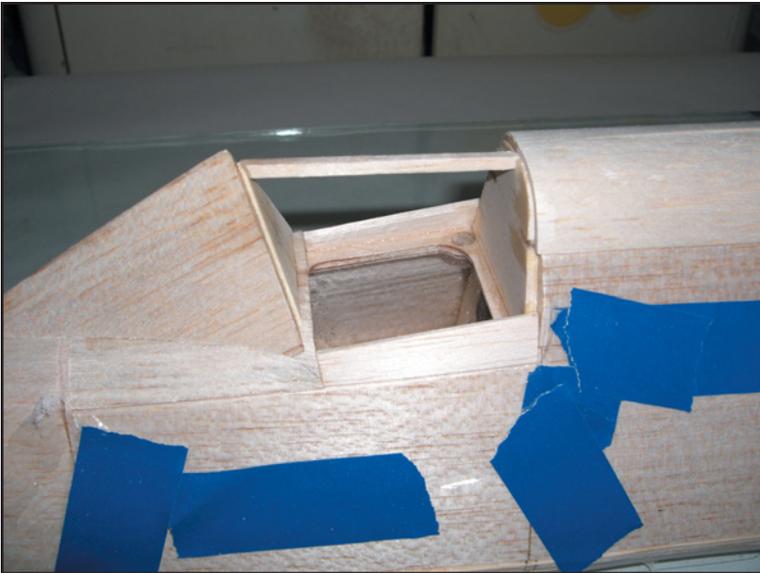


Photo 106

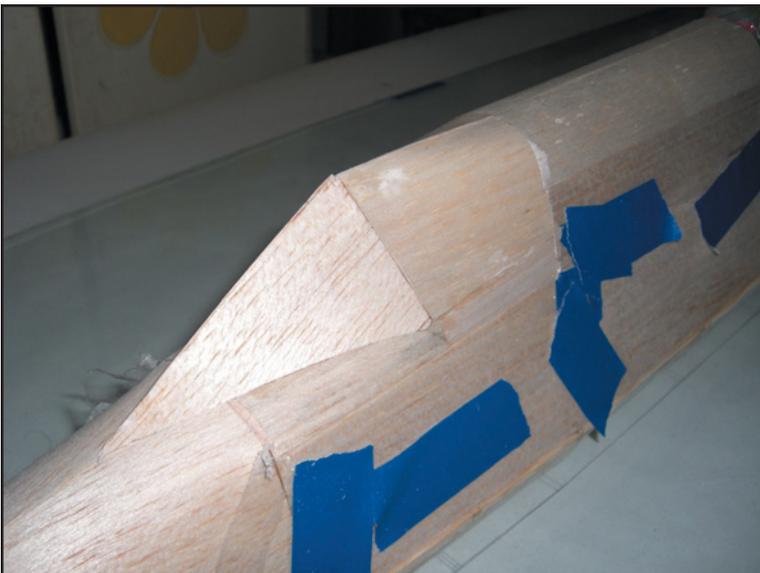


Photo 107

- 91. Glue a 1/8" stringer between the top of C4 and B4T. (Photo 106)

- 92. Fit and glue the canopy pieces C6. (Photo 107)



Photo 108

- 93. Use sandpaper to round the top joint between the windscreen and canopy. (Photo 108)

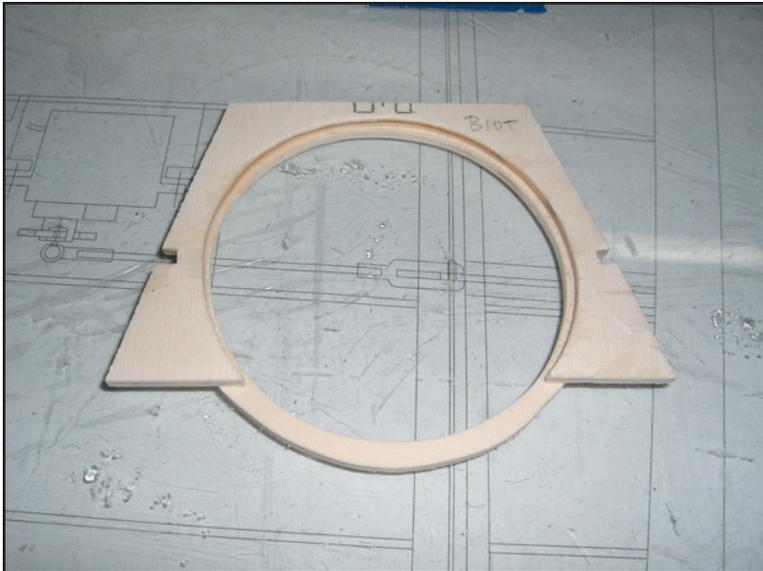


Photo 109

- 94. Glue the fan doubler FD1 to the front of bulkhead B10T. (Photo 109)



Photo 110

- 95. Decide how you want to retain the flight battery. We prefer to use a combination of self-stick Velcro and One-wrap. The fuzzy side of self-stick Velcro is stuck to the top of the battery tray BT1. (Photo 110)

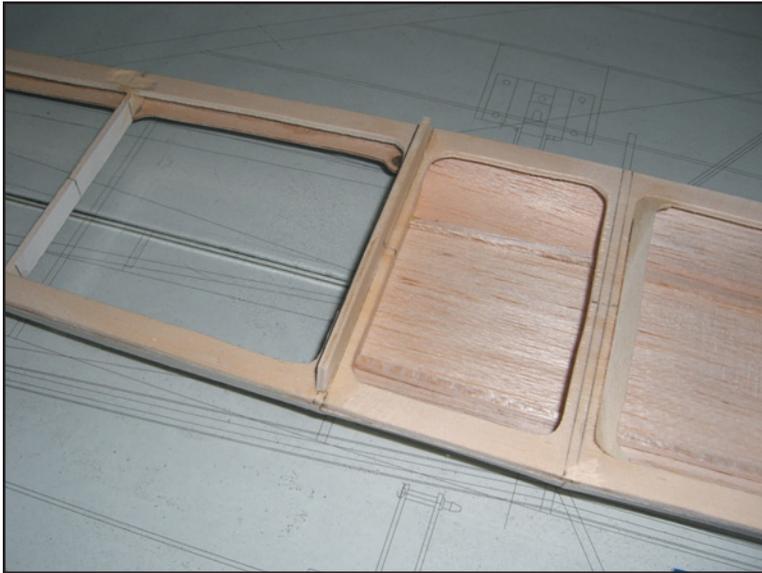


Photo 111

- 96. Glue BT2 to K1 over bulkhead B8. (Photo 111)

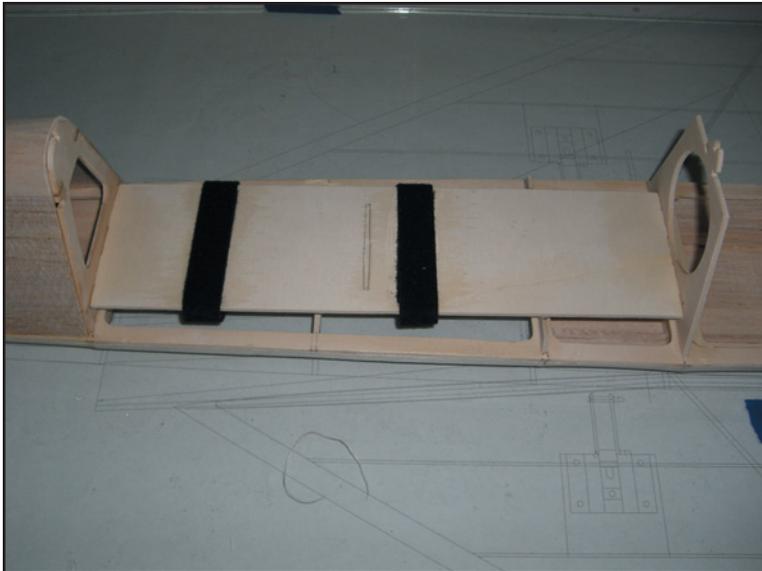


Photo 112

- 97. Apply medium-setting glue to the top of BT2. Slip BT1 into the slots in B6T and B9T. Align and glue B9T to K1. Glue BT1 to B6T and B9T. (Photo 112)



Photo 113

- 98. Glue bulkheads B10T, B11T and B12T to K2. (Photo 113)

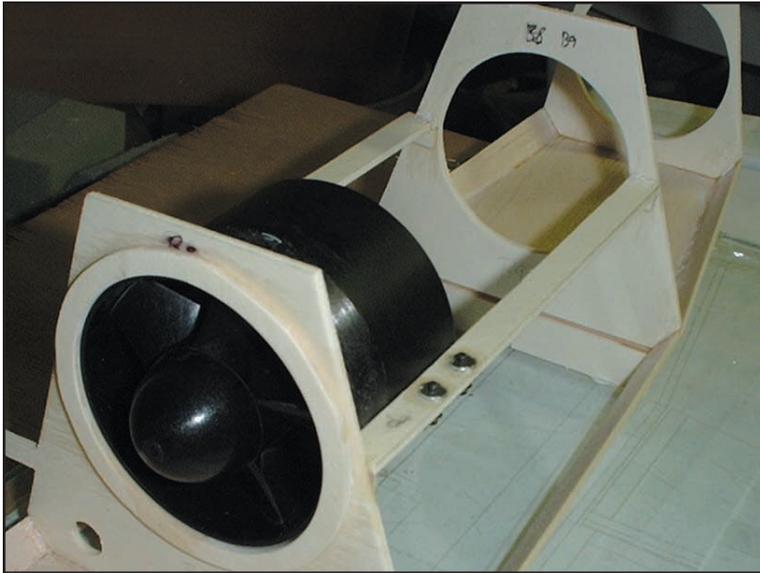


Photo 114

- 99. Slip the fan mounting rails FM1 into the slots in bulkheads B10T and B11T, but do not glue them in yet. Slip the fan into the hole in B10T so the front of the fan is flush with the glue joint between FD1 and B10T. (Photo 114)

NOTE: The model shown in photos 114 and 1135 were taken of the original F-106 prototype. These photos are used here only to depict the installation of the fan mounting rails and aft inlet duct.

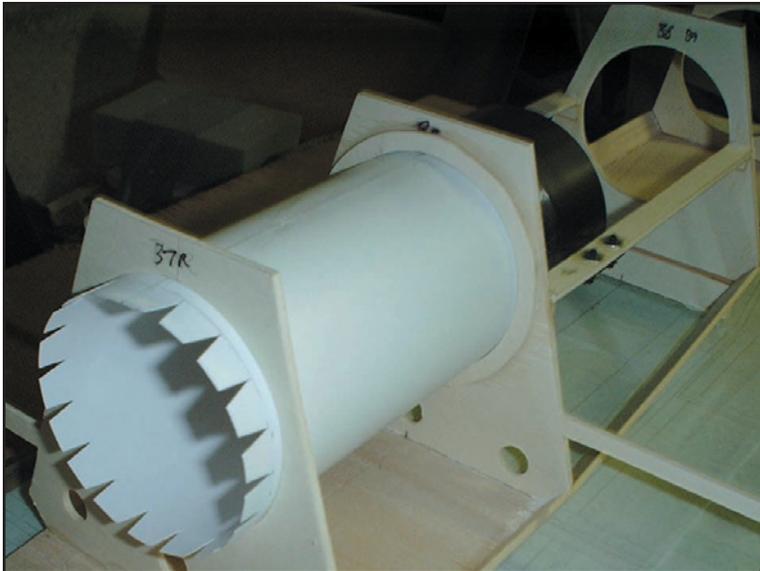


Photo 115

- 100. Cut the aft inlet duct from 100# smooth Bristol paper using the template provided on the plans. Pre-curl the duct by dragging it across the sharp corner at the edge of a desk or workbench. Fit it into the holes in FD1 and B10T. The aft edge of the duct should be flush against the front of the fan unit to form a smooth transition. When you're satisfied, glue the duct to B9T and FD1. Glue the fan mounting rails to B9T and B10T. Once the glue is dry, you can remove the fan and set it aside. (Photo 115)

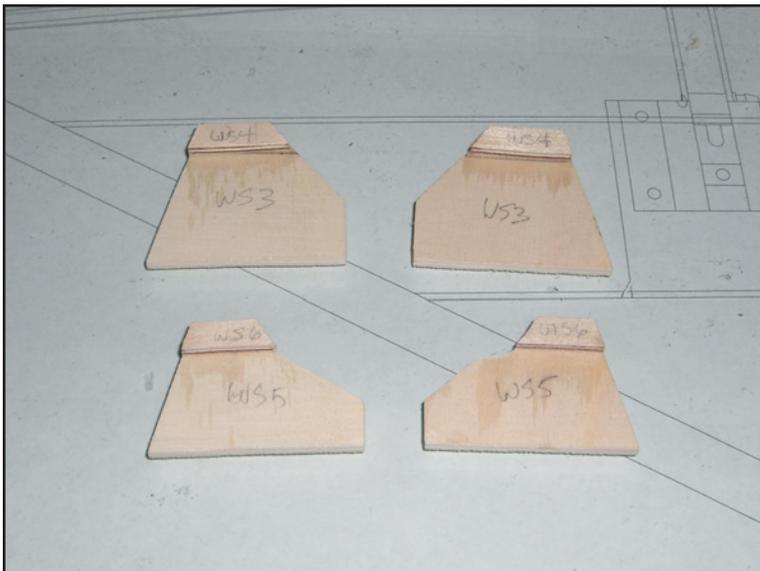


Photo 116

- 101. Glue front spar doubler spacer SD1 to the front spar doubler SD2 and the rear spar doubler SD3 to rear spar doubler SD4. Make sure to make one right pair and one left pair. (Photo 116)

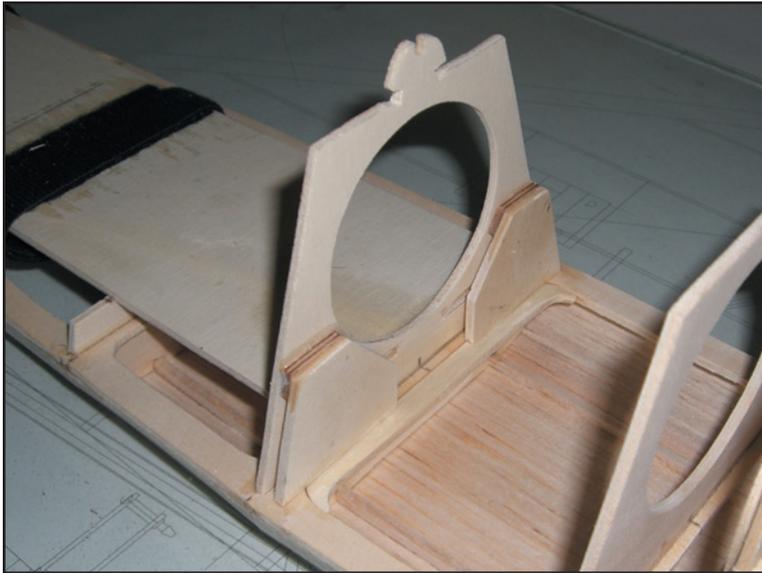


Photo 117

- 102. Use a piece of 1/8" birch ply scrap as a temporary spacer and glue the front spar doublers to K1 and the back of B9T. Be careful so you don't accidentally glue the temporary spacer into the spar pocket. (Photo 117)

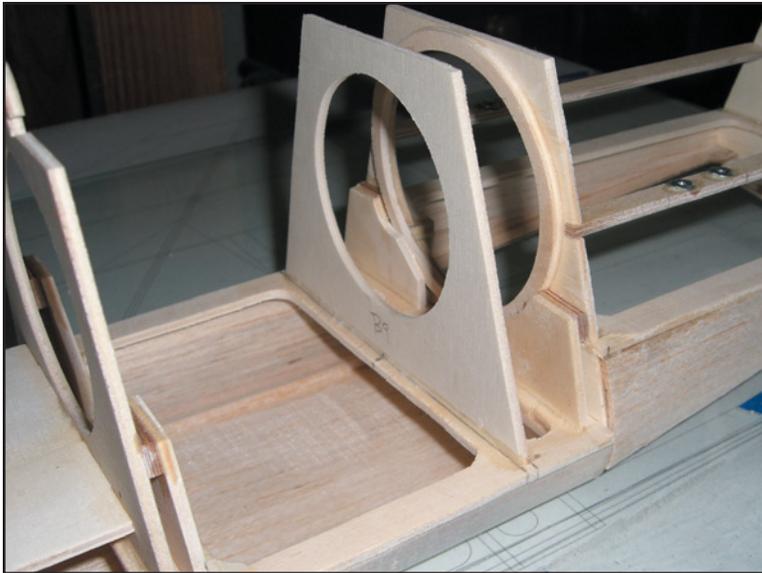


Photo 118

- 103. Use a piece of 1/8" birch ply scrap as a temporary spacer to glue the rear spar doublers to K1 and the front of B10T. Be careful so the temporary spacer doesn't get accidentally glued inside the spar pocket. (Photo 118)

NOTE: The photo depicts an extra bulkhead between B9T and B10T. This bulkhead was deleted from the final design. Please ignore it in these photos.



Photo 119

- 104. Carefully slip the wings into the spar pockets to make sure the spars slide easily in and out.. Remove the wings and set them aside. Photo 119)

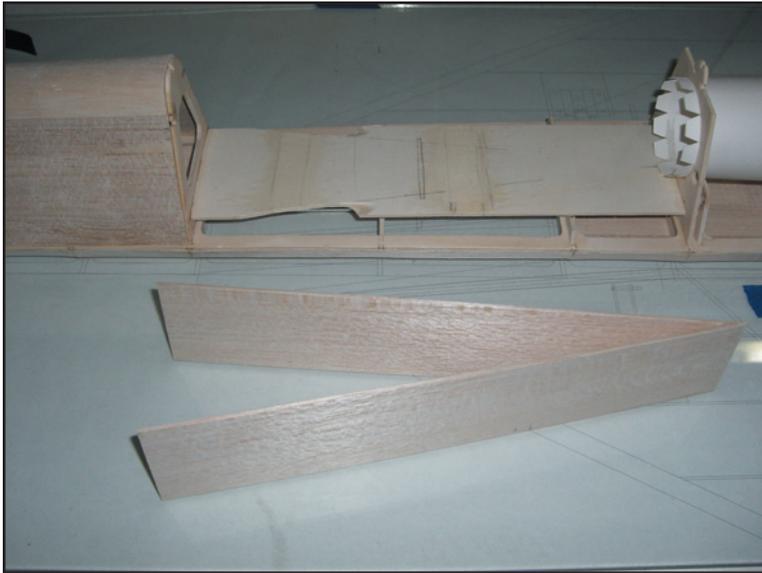


Photo 120

- 105. Bevel the inboard trailing edges of the inlet walls I1 to form a trailing edge that is $\frac{3}{32}$ " thick. (Photo 120)

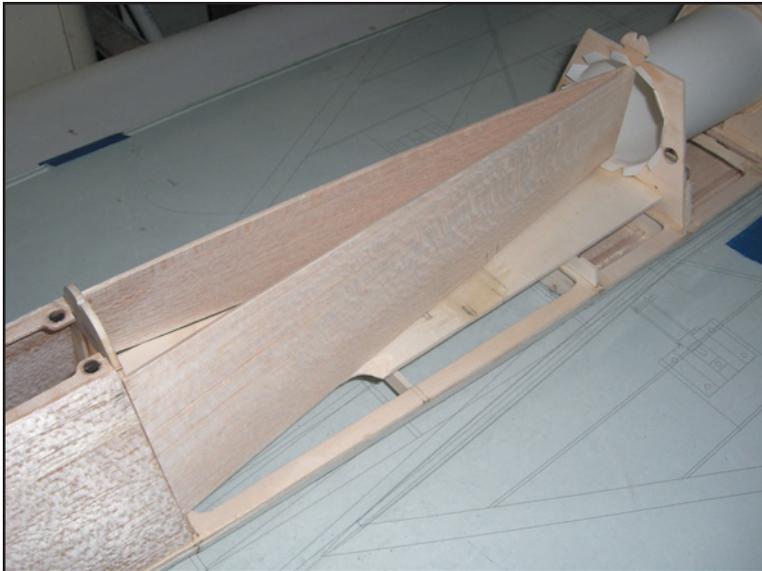


Photo 121

- 106. Carefully bend the 'petals' of the aft inlet duct outward so they won't get damaged as you build the forward inlet ducts. Fit the inlet walls I1 between B6T and B9T. The bottoms of I1 should be $\frac{7}{16}$ " above the top of K1. (Photo 121)



Photo 122

- 107. Finish the inner face of the inner duct walls. Do not finish the top and bottom edges. The Bristol paper ducts will be glued to the top and bottom of the duct walls and this needs to stay bare, unfinished balsa. Glue the inner duct walls I1 to B6T and the aft inlet duct.

Glue a $\frac{11}{32}$ " wide strip of $\frac{3}{32}$ " contest balsa sheet to the top of K1 between B6T and B9T. (Photo 122)



Photo 123

- 108. Glue the inlet bottom I3 to the top of the 3/32" balsa strip between B6T and B9T. Make sure this piece is perpendicular to the fuselage side. When in the proper position, it should be angled up away from the building table. It should not be parallel to the building table. Be sure to leave a 1/32" gap between I1 and I3. (Photo 123)

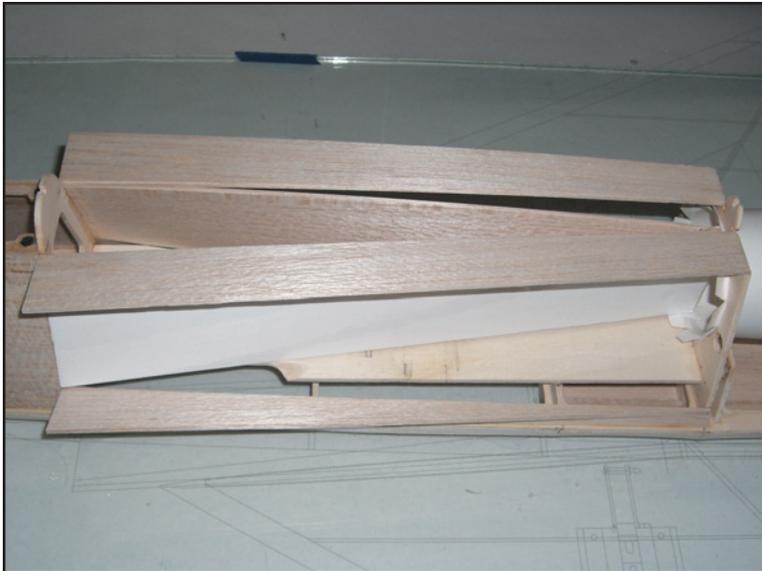


Photo 124

- 109. Glue the inlet top I2 to B6T and the top of B9T. Be sure to leave a 1/32" gap between the bottom of I2 and the top of I1. This piece should also be perpendicular to the fuselage sides. Also make sure to leave a lip at the aft end of I2 for the rest of the upper fuselage sheeting. (Photo 124)



Photo 125

- 110. The inlet top and bottom should have enough clearance to allow the 100# Bristol paper inlet duct to slip between the two pieces. (Photo 125)

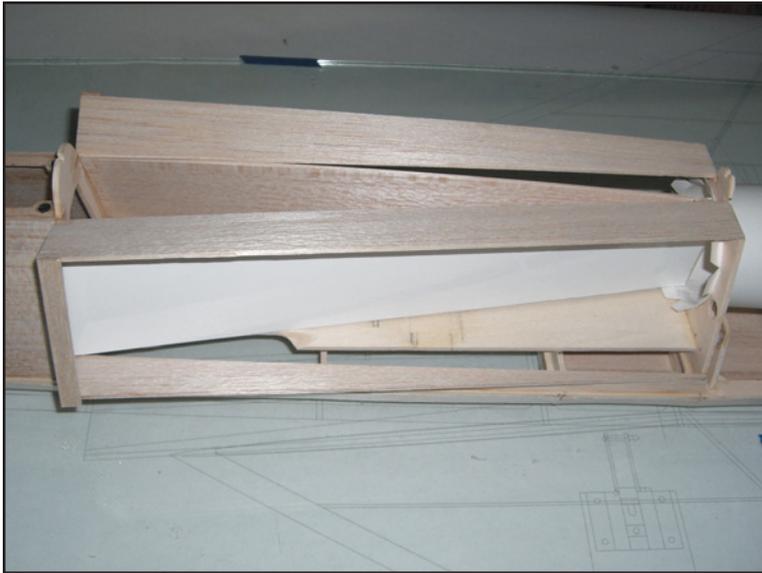


Photo 126

- 111. Glue a 1/2" wide strip of 3/32" scrap balsa to the front outboard edges of I2 and I3 so they remain secure while you install the paper inlet ducts. (Photo 126)

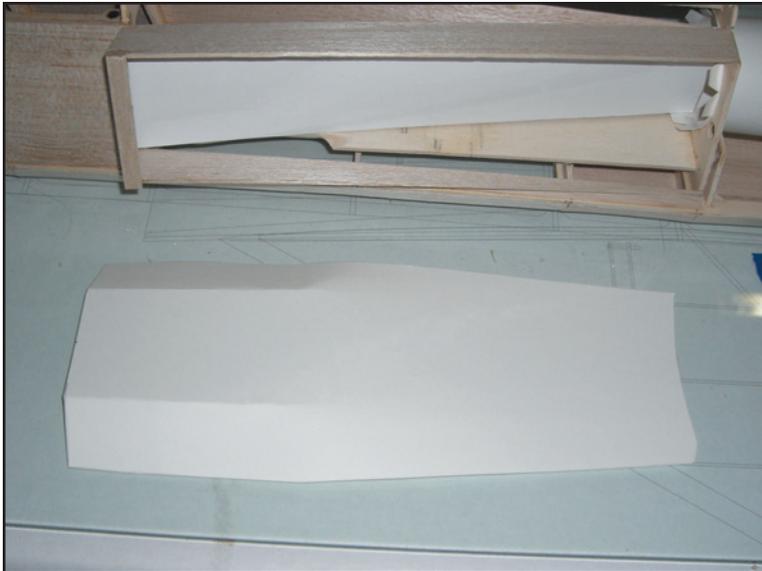


Photo 127

- 112. Cut the forward inlet ducts from 100# smooth Bristol paper using the templates on the plans. Fold the front on the dotted lines shown on the plans. Curl the back of the inlet duct by dragging it across the sharp edge on the corner of a desk or workbench. (Photo 127)

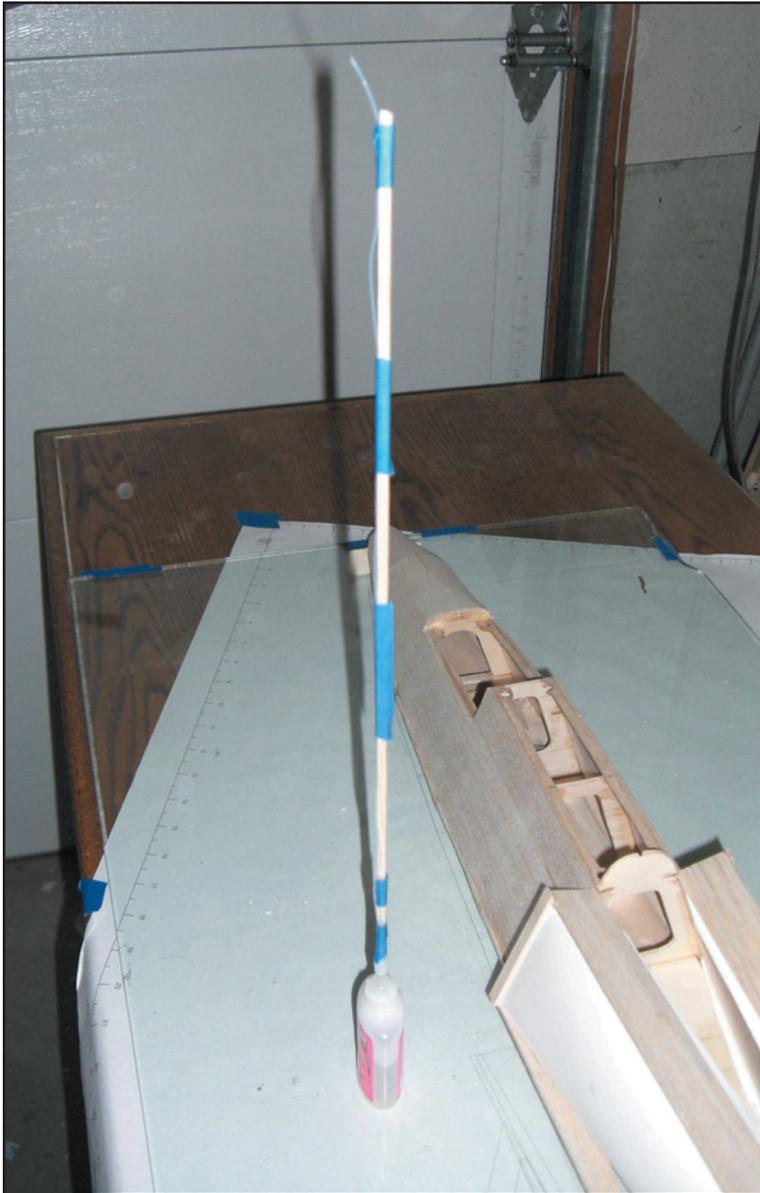


Photo 128

- 113. Make a long applicator tip using some scrap 1/8" balsa square strip, some teflon capillary tubing and some masking tape. (Photo 128)

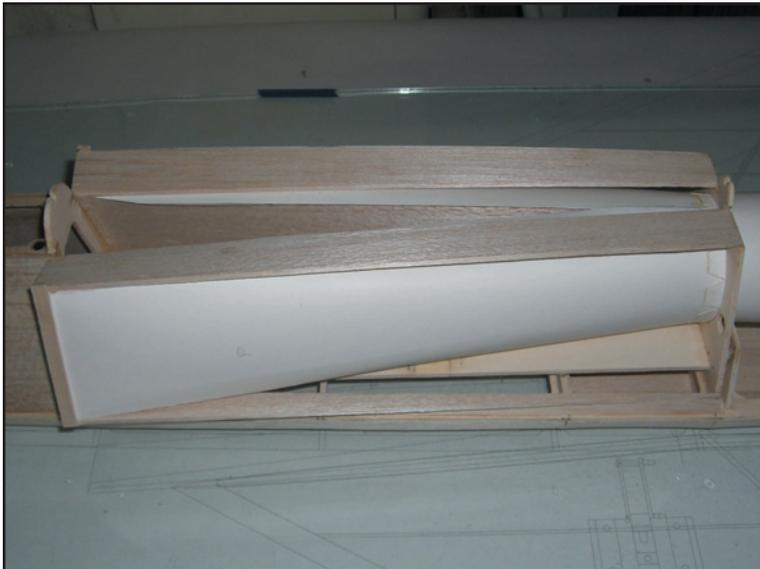


Photo 129

- 114. Fit the inlet ducts into place so they fit tightly against the fronts of I2 and I3 and the inside of the aft inlet duct. Work slowly and carefully to make sure the duct doesn't slip, then glue the 'petals' of the aft inlet duct to the forward inlet duct.

Use the custom applicator to glue the paper inlet duct to the balsa inlet wall. Work a couple of inches at a time to make sure the inlet ducting is glued to the inner wall along its entire length. Work on the bottom corner first, then glue the top. (Photo 129)



Photo 130

- 115. Cut the inlet doubler from 100# smooth Bristol paper. Fold and curl the inlet doubler to match the shape of the inlet. (Photo 130)

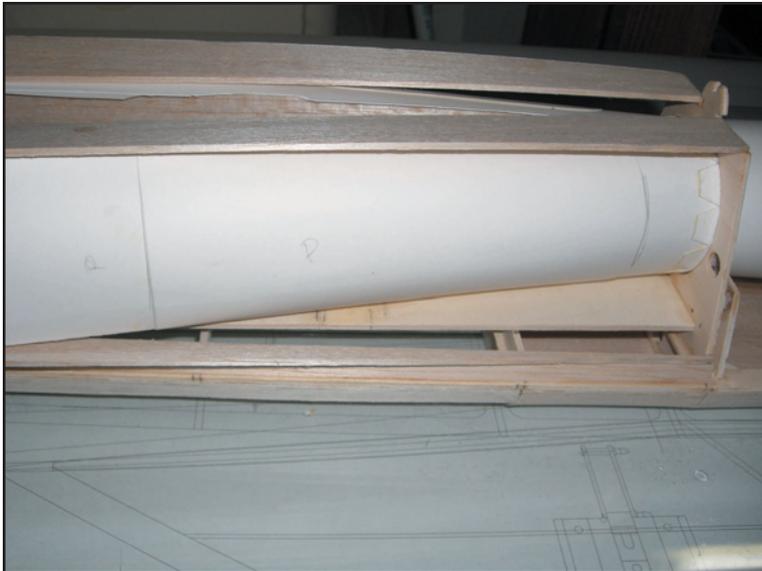


Photo 131

- 116. Coat the inside of the inlet doubler with carpenter's or white glue and press it into place on the inlet duct. (Photo 131)

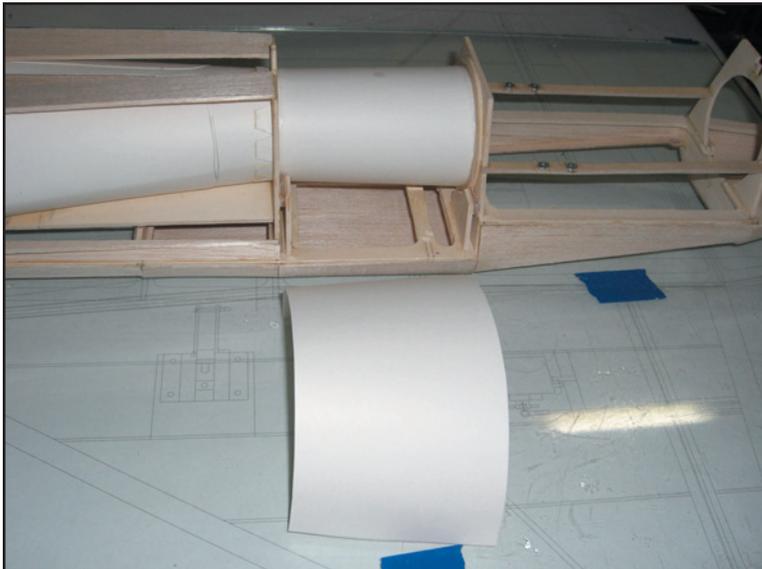


Photo 132

- 117. If you're planning to fly with a power system developing more than 800w, then you should cut out and apply the inlet tripler and cut out a doubler for the aft inlet duct from 100# Bristol paper. (Photo 132)



Photo 133

- 118. Coat the inside of the aft inlet doubler with carpenter's or white glue. Wrap it around the aft inlet duct and rub it down to get a good glue joint. Temporarily tape it into place until the glue dries. (Photo 133)

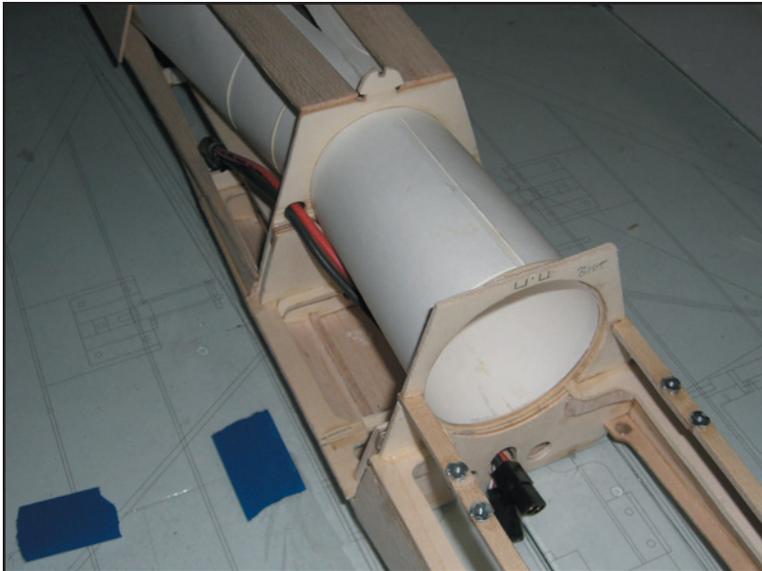


Photo 134

- 119. You should decide now where you want to place the speed controller and route whatever wires you need through the fuselage now. Be sure to route any servo and/or receiver battery extensions at this time, too. (Photo 134)



Photo 135

- 120. Use 3/32" contest balsa to sheet the outside of the inlet ducts. (Photo 135)

NOTE: The photo shows two pieces of balsa sheeting. This was done on the kit prototype only for power system testing. This area can be sheeted with one piece of wood.



Photo 136

- 121. Glue fuselage side piece FS1 to the top of K1 between B9T and B10T. (Photo 136)



Photo 137

- 122. Glue fuselage side pieces FS2 and FS3 to the top of K1 between B10T and B11T and between B11T and B12T. (Photo 137)



Photo 138

- 123. Glue two 1/8" balsa stringers into the notches in the tops of B11T and B12T. Bend the stringers down and glue them to the back of B10T. (Photo 138)

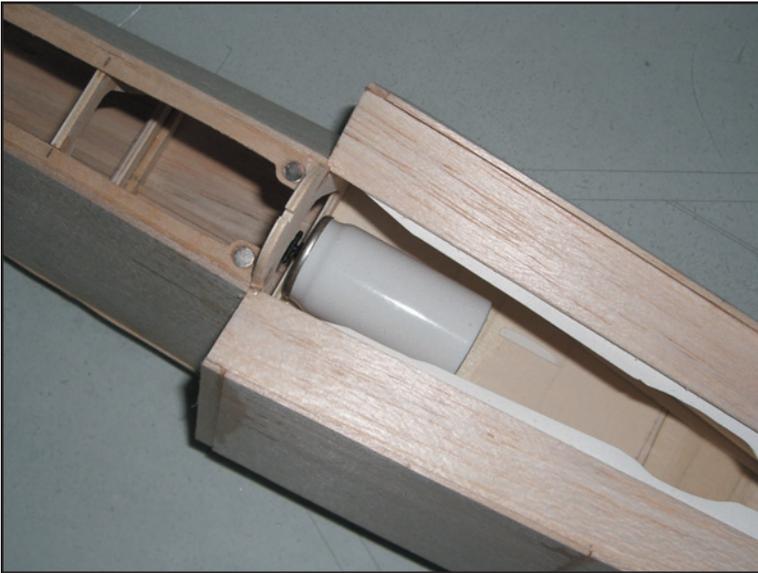


Photo 139

- 124. A good place to mount the retract air tank is above the battery tray BT1. Stick a piece or two of velcro to the top of BT1 and a matching piece to the side of the air tank. (Photo 139)



Photo 140

- 125. Cut a 1/4" x 12" slot in a piece of 3/32" contest balsa. Apply medium-setting glue to the tops of B9T, B10T, B11T and B12T and to the tops of the 1/8" stringers and the tops of FS1, FS2 and FS3. Align the slot in the top sheeting and press it into place. Use masking tape to hold the top sheeting in place. (Photo 140)



Photo 141

- 126. Fit the vertical fin into the fin pocket and make sure the fin is plumb. Make any necessary adjustments to the fin pocket. (Photo 141)

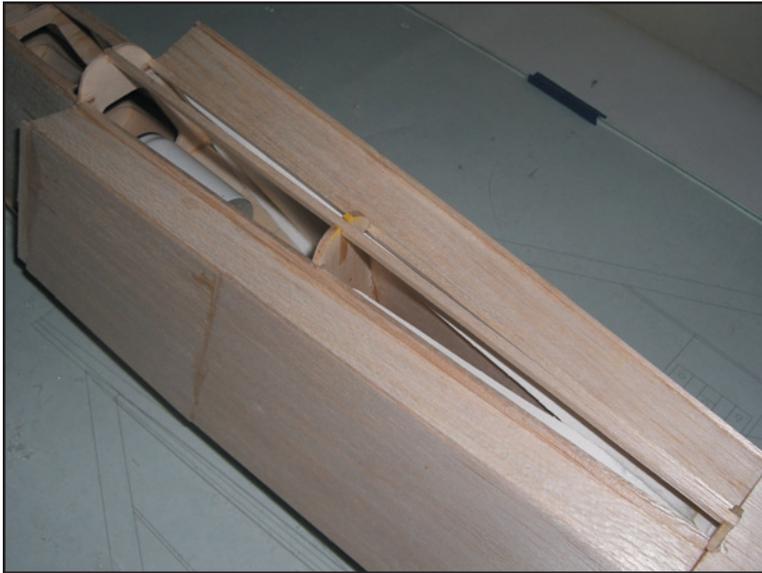


Photo 142

- 127. Fit and glue B7 into place between the inlet inner walls I1 and into the slot in the battery tray BT1. Carefully cut notches into the paper ducting so B7 is flush with the insides of I1. Glue a 1/8" stringer into the notches in the tops of B6T, B7 and B9T. Glue 1/8" stringers into the notches in the sides of B6T, B7 and B9T. Glue the side stringers to the tops of inlet ducts I2. (Photo 142)



Photo 143

- 128. Use 3/32" contest balsa to sheet or strip plank the turtle deck between B6T and B9T. (Photo 143)



Photo 144

- 129. Glue the top and bottom inlet lip pieces I5 and I6 to the inlet ducts. Make sure to align the inner face of these with the inner walls of the ducts. Any extra should be on the outside where it's easy to sand away. Glue the side inlet lip pieces I7 to the front of the inlet duct and between I5 and I6. (Photo 144)

NOTE: In this photo the top inlet lip piece I5 is incorrectly angled downward. This piece should follow the lines of the top inlet I2.



Photo 145

- 130. Fit, but do not glue the inlet ramp I8 between I5 and I6. Remove I8 and sand the trailing edge so it forms a smooth transition to the inner duct wall. Round the front so the incoming air has a smooth transition into the inlet duct. Glue I8 into place. (Photo 145)



Photo 146

- 131. Sand the bottom of the 1/2" soft balsa fairing block F2 so it matches the profile of the top of the aft fuselage. (Photo 146)



Photo 147

- 132. Use a razor plane and sandpaper to round the tops and sides of the aft fuselage fairing block. Align the slot in this block with the fin pocket in the top of the fuselage and glue the fairing block to the top of the fuselage. (Photo 147)



Photo 148

□ 133. This completes the basic fuselage construction. Since the next step is joining the wings and fuselage, you should finish sand the entire fuselage now. Sand the inlet lips airfoil-shaped so they form a venturi into the inlet ducts. (Photo 148)

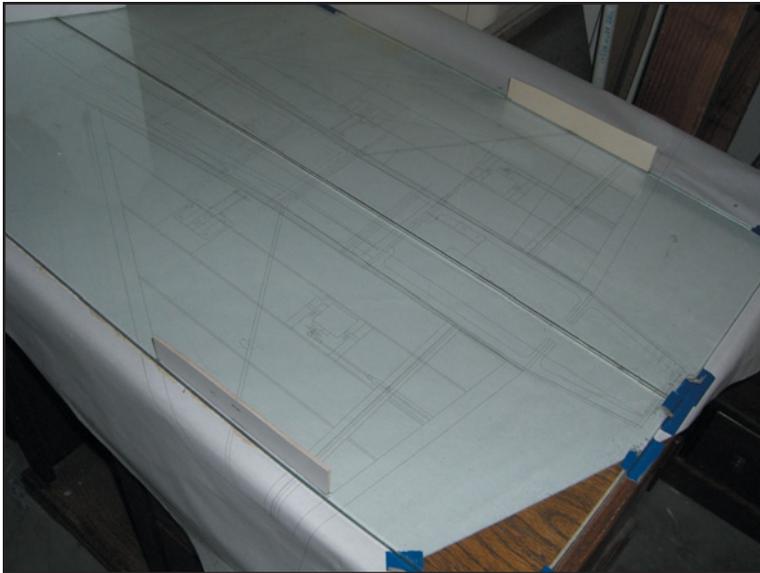


Photo 149

□□ 134. Align the wing assembly jigs WJ4 over wing ribs W5 and glue them to the pane. (Photo 149)



Photo 150

□□ 135. Slip the wings into the spar pockets in the fuselage. Place the fuselage/wing assembly into the wing jigs and align them over the plans. (Photo 150)



Photo 151

- 136. The basic wing incidence is established by the bottoms of the wing spars resting on the top of K1. Because of cutting or assembly errors, the wings may not have the exact same incidence. Use a scrap piece of 1/8" balsa square to measure the leading edge at the root ribs of both wings to make sure they're equal to each other. The leading edge of the wing should meet the fuselage at the spot just below the lower corner of the inlet ducts. (Photo 151)



Photo 152

- 137. Use the 1/8" balsa square to measure the trailing edges of the wings at the elevon spars. (Photo 152)



Photo 153

- 138. Also measure the wing tips at the elevon spars to make sure these are equal, too. (Photo 153)



Photo 154

- 139. Shape the soft balsa fuselage filler blocks to fill the gaps between the wings and fuselage sides. Because these are non-structural, they only have to be deep enough to fill the gap once the excess wood is removed. (Photo 154)



Photo 155

- 140. Make filler blocks for the remainder of the gap at the top of the wings. (Photo 155)



Photo 156

- 141. Weight the fuselage down to the building table and the wings into the assembly jigs. Glue the filler blocks to the wing root only. Do not glue them to the fuselage yet. (Photo 156)

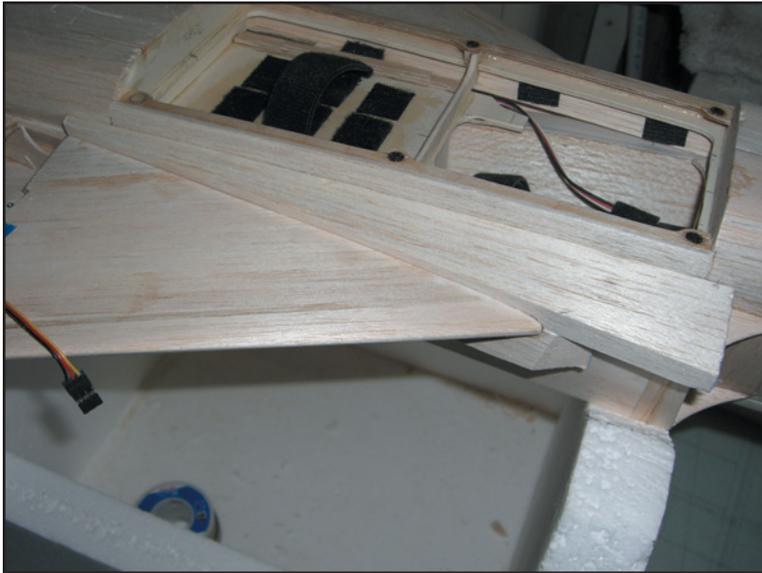


Photo 157

- 142. Flip the fuselage over and make filler blocks for the bottom of the wing. Glue these filler blocks to the wings only. Do not glue them to the fuselage at this time. (Photo 157)



Photo 158

- 143. Slide the wings off the fuselage and shape the filler blocks to match bottom of the wings. (Photo 158)



Photo 159

- 144. Shape the filler blocks to match the top surface of the wings. (Photo 159)

The next step in the assembly process is permanently joining the wings to the fuselage. Before proceeding, locate and cut any access holes in the wings and fuselage sides for servo wires and air lines.

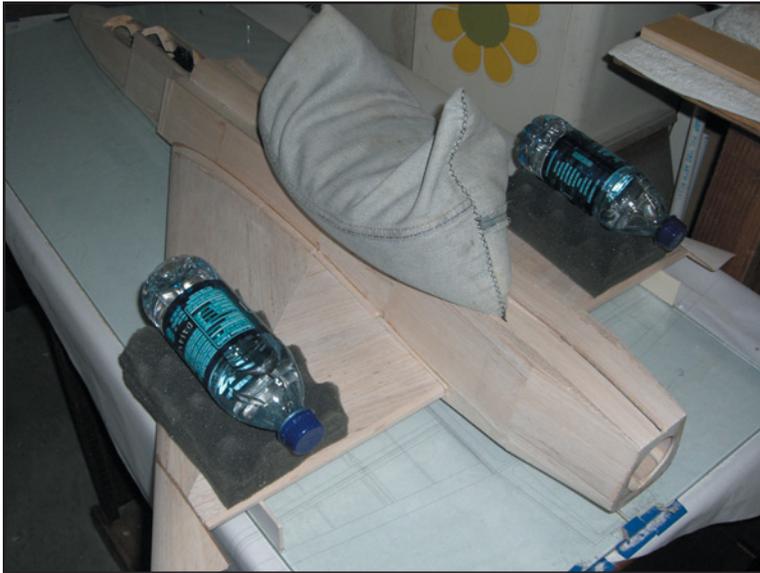


Photo 160

- □ 145. Align the fuselage over the plans and weight it down so it can't move. Working one side at a time, mix some slow-set epoxy and put a thin coat inside the spar pockets and on the wing spars. Slip the wings into place and weight them into the wing assembly jigs. Use thin CA to glue the wing filler blocks to the fuselage sides. Use the 1/8" balsa measuring stick to make sure the wings are aligned with each other. Make any necessary adjustments now before the glue sets up. Leave the wings and fuselage to dry overnight. (Photo 160)

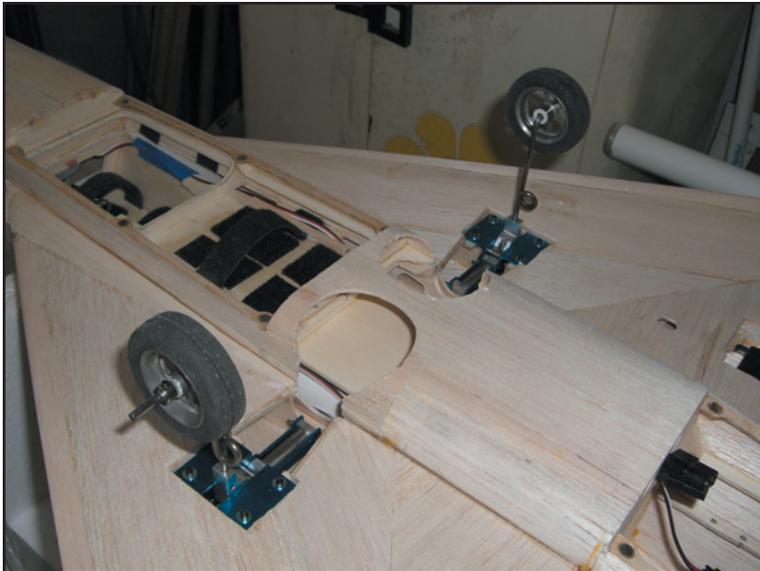


Photo 161

- □ 146. Bend the main landing gear struts and attach the wheels. Cut the wheel well openings in the bottom fuselage sheeting between B8 and B9B. You will probably also need to cut the sides of K1 to allow the wheels to fully retract. (Photo 161)

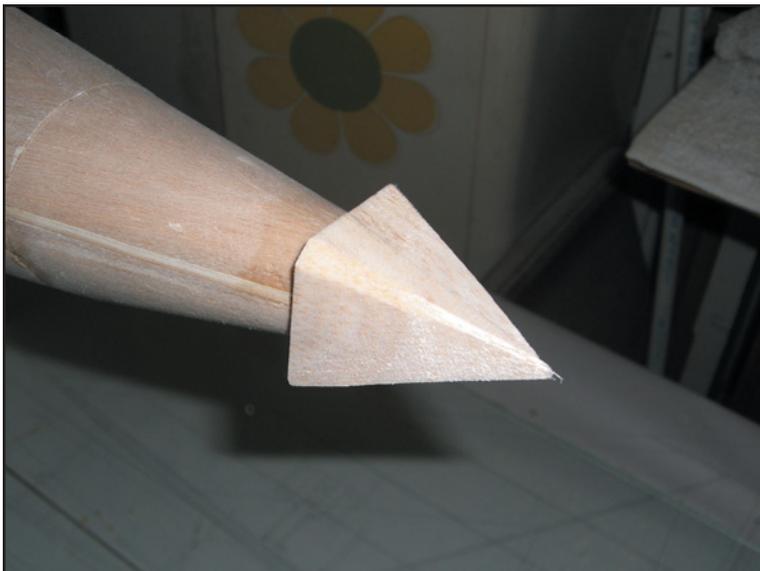


Photo 162

- 147. Glue the nose blocks to the front of B1. (Photo 162)

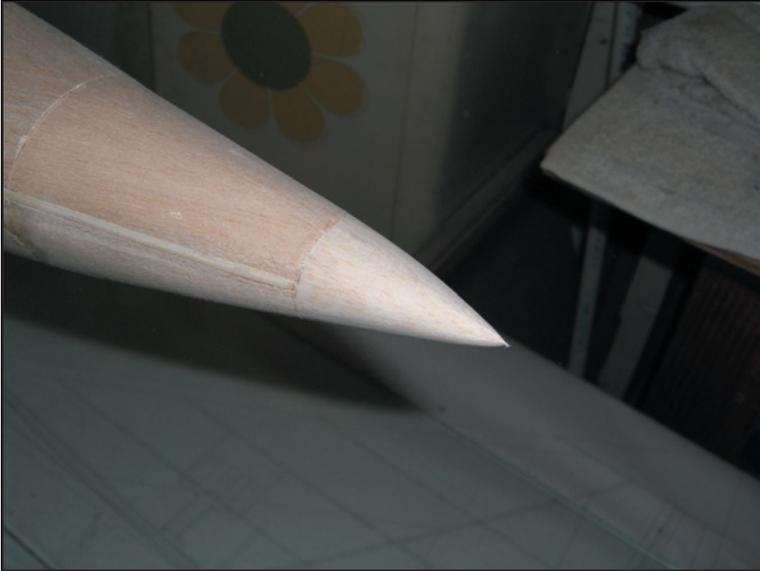


Photo 163

- 148. Shape the nose block to match the profile of the nose. (Photo 163)



Photo 164

- 149. The vertical fin may be streamlined or left flat with a rounded leading and trailing edge. If you're going to streamline it, mark where the vertical fin mates with the fuselage and only streamline the fin above this point. Once you're ready, slide the vertical fin into the pocket. Align the fin so it is straight and square then glue it into place. (Photo 164)

This concludes the basic construction of the model. It is now ready for final installation of all radio and landing gear support equipment. Once this is complete, move on to the finishing stage.

Finishing

Sand the entire model smooth. The F-106 can be finished using a number of different methods. Since the entire model is sheeted, the model can be covered with a plastic film or it can be painted. If painted, then the balsa grain would first have to be filled using either a light sanding filler and/or a lightweight fiberglass job.

Control Throws

Ailerons, measured at the T.E. of the elevon root rib:

High rate: Up & Down - 1/4"

Low rate: Up & Down - 3/16"

Elevator, measured at the T.E. of the elevon root rib:

High rate: Up & Down - 5/8"

Low rate: Up & Down - 1/2"

Balancing and Flying the Model

The model must be balanced before attempting flight.

Failure to properly balance the model will most likely result in the destruction of the model. The model should be balanced upright on a balancing stand. The plans show a CG range of 22% to 24.5% of the MAC. This translates into a location 3-1/32" to 3-1/2" forward of the front face of B10T. If the model doesn't balance within this range, try moving the internal components, such as the flight and/or receiver batteries until it does balance within this range. The initial test flights were flown at 22.5% and the CG was progressively walked back to 24.5% over successive flights.

The original prototype was flown as a 3-channel bungee launched model with 350w of power. This updated version can also be flown with a similar low-power system. The prototype used a 5-channels with retracts and has flown with up to 1100w of power. The performance is spectacular, but my recommendation is to go with a 650w power system. This will push the F-106 to 95-100 mph and give it spirited, jet-like performance.

It's a good idea to perform a radio range check with the fan motor off and again with it running at full power. Double-check the control throws and direction. If you installed retracts, you'll also want to do some taxi-tests to make sure the model is tracking straight and that the retracts work every time. Once you're ready, put a fresh charge on the receiver and flight packs and pump up the retracts. Set the control throws on low rate for the first flight. Line the model up at the threshold and smoothly roll on the throttle. Because the model doesn't have a rudder, the nose wheel steering will only be effective during the first few seconds of the take-off run.

Don't be tempted to alter the scale nose-down ground stance as the model has no problems rotating off the ground for take-off, even at the forward CG limit. On a smooth surface, the model accelerates quickly and lifts off in 150-200 feet. Once at take-off speed, apply gentle backpressure and the model should rotate and rise smoothly off the runway. You can raise the landing gear at any point, or even just leave them down for the first flight. Once airborne, concentrate on flying the model to a safe altitude where it can be trimmed for level flight.

In flight, the model is smooth and steady. Because of the short wingspan, it can be sensitive on the roll axis, so don't go beyond the recommended throws until you've gotten used to the model. It is very stable in pitch and goes where you point it, but is also very maneuverable and accelerates well with application of power. It really likes to be flown through large, jet-like maneuvers. The model has no bad habits in high-alpha flight. You raise the nose and it slows down. The higher the nose, the higher the drag. At the same time, it's a very clean design, so lowering the nose will

allow it to pick up quite a bit of speed. Be aware of this characteristic when landing. The model lands best when you keep nose up slightly and use power to control the descent rate. If you lower the nose to lose altitude, it will pick up speed quickly and you'll probably overshoot the touchdown zone.

When you're ready to land, bring the model to pattern speed and altitude. The gear can be lowered at any time. Some pilots like to perform a gear pass on the upwind leg of the pattern to visually verify that the gear is down and locked. When the model is on the downwind leg of the pattern and abeam of the touchdown zone, reduce power to 1/2 to 3/4 throttle to begin a descent. Hold the model in a level flight attitude throughout the remainder of the pattern with the elevator and control rate of descent with the throttle. The model is lightly loaded for a jet, so it's capable of remarkably slow flight. At about 3 feet off the runway, reduce power to idle and the model should begin to slow to landing speed. Raise the nose to a landing attitude to flare and touch down on the mains. If you keep the nose in the air after landing, you can use the big delta wing for aerodynamic braking, and it looks pretty cool, too.

Perform a thorough post-flight check to make sure that no problems have cropped up during the first flight. Once you're satisfied that everything is in order, you may fly the model again. Take your time to get to know the model's handling characteristics. It is a very forgiving and stable model that's fun to fly and should present you with no surprises. Plus, it's a real attention-getter.

Congratulations! You're now a Six-Shooter pilot!

Materials Required for Construction

Below is a list of materials which are required for construction, but not included in the kit.

- 1/8" music wire or equivalent for landing gear struts
- 2 - 2" wheels for the main landing gear
- 1 - 1-1/4" wheel for the nose landing gear
- 1/8" wheel collars or equivalent wheel retainers
- 20 - 2-56 T-nuts to mount the fan units and retracts

Various wood screws to mount the servos, retracts and fan unit.

- 1 - 70mm tractor or WM400 pusher fan unit.
- 1 - Brushless motor capable of producing 600-800W of power.
- 1 - Brushless speed controller capable of producing 600-800W of power.
- 1 - 10 to 12 cell or equivalent motor battery pack capable of supplying the required amps of power draw

- 2-56 pushrods
- 2 - Dubro 1/16" ball joints

4 to 6 channel radio system capable of mixing ailerons and elevators (elevon/ailerons/ailervator) or an external elevon mixing unit.

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