36” ROSWELL and 29” Roswell*2 by Crashtesthobby.com

The Roswells are quiet, fast, aerobatic super strong delta wings. We build these planes using the same technique we use for our combat planes. The nose mount motor decreases the sound and increases the performance. Prop savers protect the propellers. The 36’ Roswell glides well and is often used for a trainer. Deltas can make sharper turns at slower speeds than comparable sized flying wings. The swept back Roswell-2 flies faster and has a higher roll rate. Deltas are sensitive to CG and elevator. Central rudders work better than fins on the tips.

SPECS

- 36” Roswell - Center of Gravity: 7.25” (18.5cm) back from the nose of the plane.
- 29” Roswell-2 – Center of Gravity back 9” (23cm) from the nose of the plane.
- Popular mid-motor build is also possible on 29” Roswell if CG is correct.
- Flies better with central rudder or rudders (not on tips of wings.)
- Elevon Throws: 3/8” left/right (1 cm)
- Elevon throw 1/4” up /down. The Roswell is elevator sensitive.
- 2812 motor, 7x6, prop, 25+A ESC, 2 mg90 servos,
- 1000-1800 mah 3S lipo battery
- Target All-Up Weight: 16-22 oz (gm)
- Lighter always flies better!!!!

BUILD NOTES – quick summary

- E-Tape back 6” (16cm)on nose, use 1” (2.5cm) E-tape for hinge, laminate entire plane, two layers on elevons.
- **36” Roswell** - Install the battery on an edge back 3.5” (2.5cm) from original nose of the plane and install radio in a slot that is 10” wide and back 5.5” from the nose of the plane. Flat Carbon spar back 12” (30.5cm).
- **29” Roswell** - Install the battery on an edge back 6” (21cm) from original nose of the plane and install your radio in a slot that is 10” wide and back 8” and from the nose of the plane. Flat carbon spar back 12” (30.5cm).
- Put the arms of the servos to the outside edge of the slot to increase the distance between the horns.

EQUIPMENT NEEDED

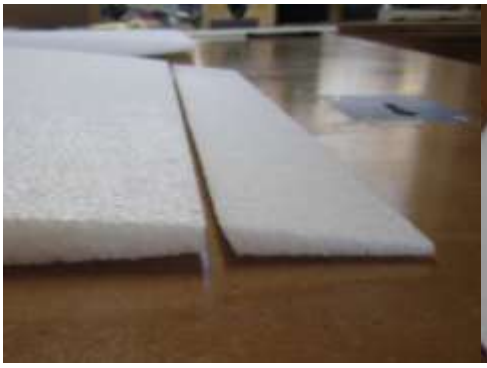
- Roswell kit, from CrashTeshHobby.com
- All electronics and accessories as desired (motor, props, esc, tx/receiver, servos)
- Low-temperature hot glue gun (and low-temp rated glue)
- Metal straight edge
- Pliers
- Fine grit sand paper
- Side cutters, or snips (must be flush on one cutting side)
- Adjustable razor blade
- Philips head screwdriver
- Electric drill
- Iron for applying laminate (hobby iron is preferable, but clothing iron may be used)
- Velcro strip

FOAM PREPARATION

1. Rub the EPP foam surfaces with another piece of EPP foam to get the melted fibers off. Use your fingernail to pick off any stubborn fibers.


The 36" Roswell has a straight trailing edge. The 29" Roswell-2 is swept. The 29" wing is faster and more aerobatic but the narrow wing experiences more prop torque on take off until it is up to speed. This means it needs a faster launch.

2. **Cut the elevons to length.** Lay one elevon behind the wing section, and line up the inside edge of the wing with the edge of the elevon. Make sure the angled front edge of the elevon is pointing upward.



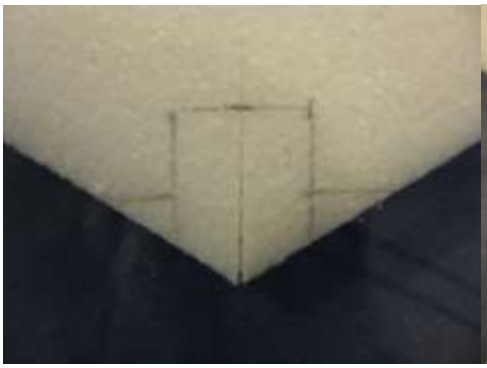
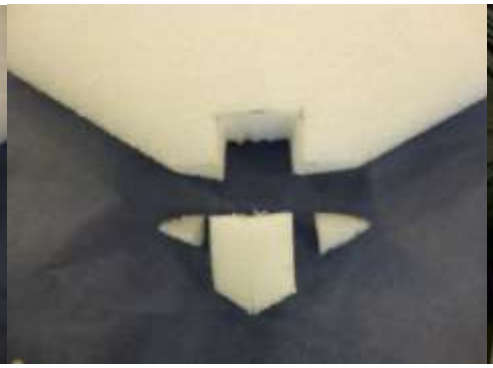
3. Cut your elevons to length. The inside edge of the elevon will be in a straight line with the inside edge of the wing section. If you are building the 29' Roswell-2, the inside edge of the elevon will be at an angle to the inside edge of the wing section.
4. Glue the wing halves together with low-temperature hot glue, Gorilla Glue, or Shoe Goo.


CARBON SPAR - There is a single flat carbon spar that will be installed in the bottom of the of the wing

5. Measure 12" back from the nose, on the bottom of the wing (on both Roswells), and use your square and a pen to mark a line across the wing at that point, extending 10" out either side from the center. This is where the flat carbon spar will be installed.
6. Use your straight edge and razor blade to cut a slit along that line, just deep enough to fit the spar in on its edge.
7. Lightly sand the carbon spar
8. Put baking soda in the slot to help set CA glue
9. Insert the flat carbon spar completely into the foam, and glue it into place with CA glue.



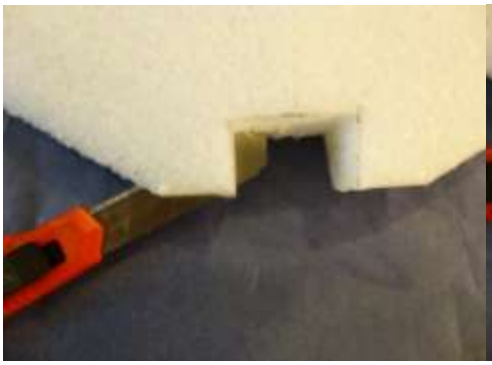
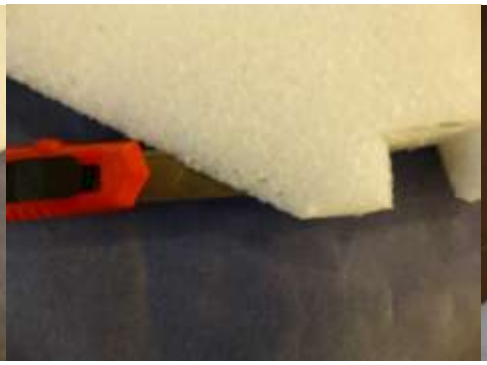
MOTOR CUT-OUT & MOUNT - The front mount motor variation is quieter, faster and easier to build. Traditionally this plane has been built as a midmotor plane but since we started laminating it is harder to get the CG correct with the midmotor design.


10. Before cutting the motor cutout, measure and mark the CG of the plane. The 36" Roswell CG is back 7.25" and the CG on the 29" Roswell is back 9" from the nose of the plane. Put a mark on the bottom of the plane to be used later with radio installation.
11. The base of the motor will be back 2" from the front of the plane.
12. The 2812 motor and mount fits in a cut out 1.5" wide
13. The foam is also cut 1" back from the nose of the plane to give prop clearance but still provide motor protection.
14. Cut the foam for motor with a box knife or razor blade.
15. Shape the Formica motor plate
16. Use a low temp hot glue gun to glue the Formica to the bottom of the plane. (same side as spar)
17. Apply the glue to the foam (not the Formica) first or it will cool too quickly.
18. Motor will be added after Shock cord, Extreme Tape and lamination.

SHOCK CORD - The shock cord helps keep the foam from tearing in a crash.

19. Using a razor blade, cut a ¼" (0.5cm) deep slit around the entire perimeter (along the edge) of the wing.
20. The foam next to the motor is cut deep enough the shock cord can still be pulled tight and not interfere with the motor (see pictures). The foam in the front will reattach when you glue and tape the leading edge of the wing.


21. You can glue the shock cord with CA glue and baking soda or Gorilla glue and water.
22. If you use Gorilla glue moisten the shock cord with water. This will help it react with the Gorilla Glue later.
23. If you use CA glue cover the shock cord with baking soda before inserting.

24. Insert the shock cord, beginning with the center of the cord at the tail of the wing, so that the loose ends end up at the nose. Use a Philips Head screwdriver or similar tool to push the cord into the slot. Keep tension on the cord as you work your way around the wing, so that it is snug, and all slack moves towards the loose ends at the nose.
25. Keep the wing on your flat working surface when tightening, so the cord does not warp the wing.
26. Tie the loose ends of the cord together at the nose, so that the knot tucks into the slot. Squeeze Gorilla Glue in along the entire slot. Don't use too much glue, since it will expand as it reacts with the water.
27. If using CA glue, place baking soda in the slot first to speed up curing (unless you have already coated the shock cord with the baking soda), then glue the cord in. Make sure you have adequate ventilation and beware of the fumes.

SCOTCH EXTREME TAPE - You can find Scotch Extreme Tape at many office supply stores or on Amazon.

28. Scotch Extreme Tape© will stick to EPP without a spray adhesive. It is lighter than many other reinforced tapes. It can hold up to 320 lbs of weight per inch. Fibers run in two directions (bidirectional) making it a fantastic hinging tape. It is available at many office supply, hardware, and postage stores. Extreme tape needs to be covered with laminate or it will yellow and dry, and come off in UV sunlight. It makes the Roswell the toughest delta you can build.
29. Put tape top and bottom sideways across the front of the plane to reinforce the motor mount back 6" from the front of the plane to harden the nose of the plane.
30. Cut 1" (2.5cm) wide strips of Extreme Tape and put them over the flat carbon spar both top and bottom on the plane.
31. Wrap a 2" (5cm) wide strip around the leading edge the entire length of the wing, folded equally over the top and bottom of the wing.



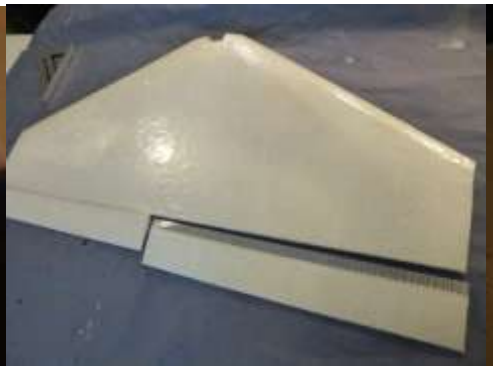
UV PROTECTED CLEAR LAMINATE - is Included in the kits. It protects the foam from moisture and dirt and adds a lot of strength. It protects the Extreme Tape that is sensitive to UV light.

32. Cut four pieces of laminate and cover one half of one side at a time. Cut the ends of the laminate so that they will overlap the bottom of the wing by about 1". Make sure the sides of the laminate overlap the center line by about 1", and extend past the tip of the wing enough to cover the end.
33. Lay the piece of laminate over the wing, with the smooth (shiny) side of the laminate outward.
34. Lay the laminate in position, and set it in place with one pass of the iron through the center of the length of laminate.
35. Iron the laminate down by working from the middle to the edges, using short strokes to keep wrinkles out as much as possible. Laminate directly over the Formica plates, and make sure to wrap around and seal the edges of the wing.
36. Repeat on other side of the wing, and then on the bottom of the wing, wrapping the edges of the laminate up and around to the top of the wing.



COVERING EPP ELEVONS – Cover the elevons with two layers of laminate to make them stiff (comparable to balsa wood).

37. Cut a piece of laminate slightly longer than the elevons.
38. Place one of the elevons under one long edge of the laminate.
39. Use your iron to stick the laminate to the foam elevon.
40. Be careful not to warp the elevon. Begin at the center and work your way outward to avoid wrinkles.
41. Fold the laminate over and continue ironing until the elevon is completely covered with two layers of laminate.
42. Cut the extra laminate on the ends of the elevon to fold over neatly. Iron the laminate around the ends of the elevon.
43. Repeat process with other elevon.

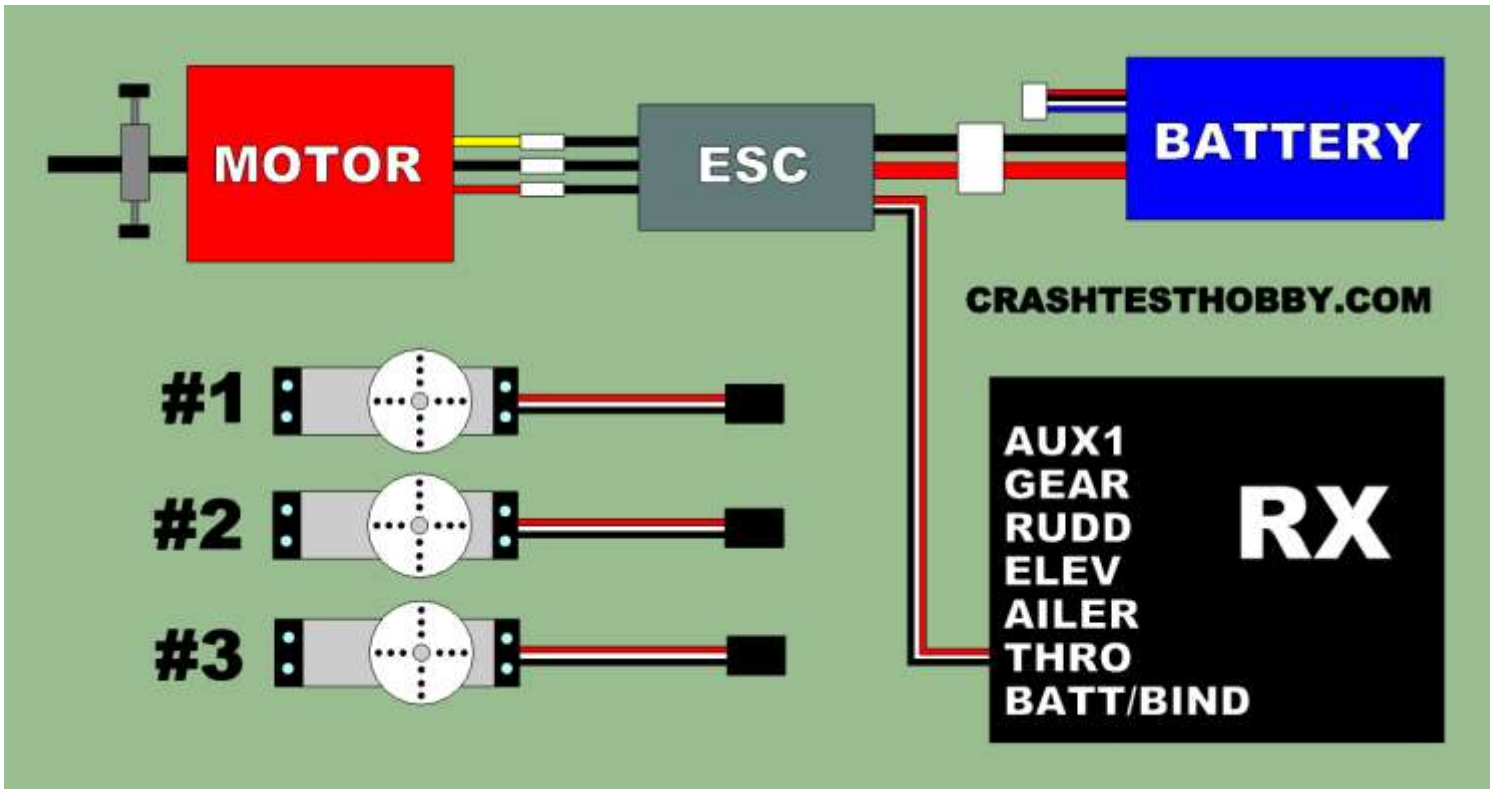




HINGING THE ELEVONS

44. Cut a piece of 2” Extreme Tape into two 1” (2.5cm) wide strips, the length of the elevon
45. Position the laminated elevon next to the trailing edge of the wing, leaving a 1/16” gap between the two pieces.
46. Attach the elevon to the wing with one 1” (2.5cm) strip of Extreme Tape, on the top first.
47. Fold the elevon up and over, so it rests upside-down on the wing. Use the other 1” (2.5cm) strip of Extreme Tape to over the hinge line.



48. Cut 2” (5cm)-wide strips of laminate the length of the elevon. Cover the 1” (2.5cm) strips of tape you just placed, top and bottom, and iron the laminate in place. Make sure, as you iron, that the elevons end up flat and flush with the wing, not bending up in places. If they seem to be pulled in places, reheat the area with the iron, and lay an object over the elevon to keep it flat as the laminate resets.
49. Flex the elevon both up and down and iron the seam until the elevon lays flat.
50. Repeat on other elevon.

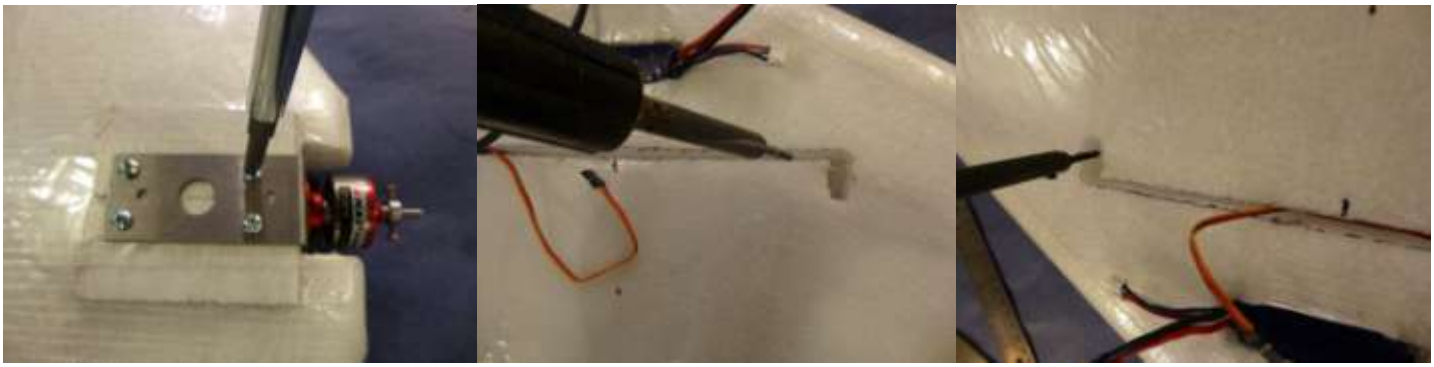


SERVOS, BATTERY, ESC, & RECEIVER — CENTER OF GRAVITY

Before creating bays for your servos, battery, ESC, and receiver, you want to make sure the wing's center of gravity (CG) will be correct—in other words, that the wing balances front-to-back at the proper point, so it will fly well. We base measurements for the CG on the original nose of the plane that was 2" farther forward than the back of the motor cut out. In the original pictures we mounted the battery and moved the radio but it is easier to install the radio, servos, and pushrods at a given location and adjust the CG by moving the battery.

Remember the CG is back 7.25' on the 36" Roswell and the CG is back 9' on the 29" Roswell-2.

51. Attach the motor to the metal motor mount with 3mm bolts and lock nuts or 256 bolts and locking nuts.
52. Drill the Formica plate with holes for mounting the motor mount plate.
53. Using 6x1/2 metal screws screw the metal mount to the Formica plate.
54. Put a thumbtack on the bottom of the plane where you want the CG so that when you turn the plane over you can locate the exact point.
55. Turn your plane right-side up, and lay out your servos, battery, ESC, and receiver on top of the plane where you want them to go. Keep in mind which leads need to connect, and where the extra wire will go.
56. Cut a 10" slot that is 1/4" to 3/8" wide to mount the receiver and ESC in with a servo on each end.
57. Empty space in the wing weakens the wing. Make sure you have a tight fit for the ESC and receiver.
58. Batteries and ESCs get hot with use. Don't enclose them completely or seal them off with tape so there is no air flow around them. The foam is a good insulator which is not good in this case.



59. All of the wires are tucked in the slot except the battery wire to the ESC and the ESC to motor wire connection.
60. EPP foam does not cut well with a dull blade.
61. Use a box knife or (my favorite) a soldering iron to melt compartments for the servos, slightly smaller than the servos themselves, to keep them in tight. If they are loose in the holes your plane won't be controllable.
62. Measure and cut out servo holes at each end of the slot that are deep enough that the top of the servo is at the surface of the wing.
63. Hot glue the servos in place deep enough that the servo arms are barely above the surface of the wing.
64. Use your soldering iron to melt slots for the rest of the electronics (you can also use a razor blade to cut the edges, then pliers to pluck out the foam in the center). Keep the dimensions so that the electronics fight snugly.
65. The ESC motor wires may not be long enough to reach the motor so you may need to make an extension.
66. The antenna on your receiver should be in a location that does not have it in a bundle of servo or ESC wires.

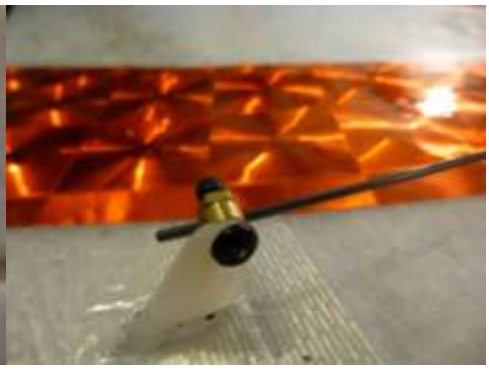
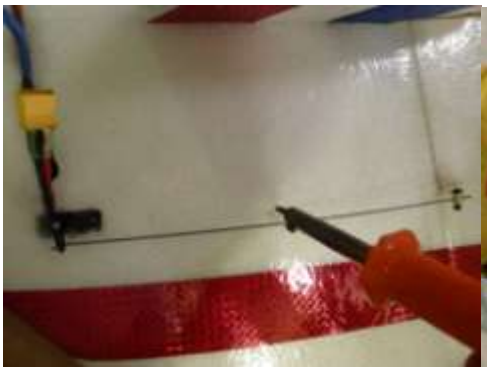
<u>A PROP SAVER</u> allows the prop to fold down when the plane lands. Adjust the prop saver so it barely pokes through the prop.

<u>PUSH RODS AND SERVO HORNS</u>

67. Use your square or the push rod to measure directly back from the hole in the servo arm, and place a mark on the front edge of the elevon.
68. Use a box knife or Xacto knife to cut a slit completely through the elevon for the control horn.
69. Cut or melt a hole in the laminate so the glue will hold the horn in place.
70. Remove the extra tab that comes attached on the back of the servo horns.
71. Push the servo horns up through the bottom of the elevon so that the base is flat against the bottom of the elevon and the holes are on the top of the wing over the hinge line.
72. Use hot glue along the base of the servo horn, and down through the slit, around the horn, to keep horn in place. As the hot glue cools.
73. Make sure the horn is facing straight forward. Your horns should point towards the servos, and the front of the horn should be directly over the elevon hinge.
74. Attach the EZ Connectors to the servo horns with a pair of pliers.



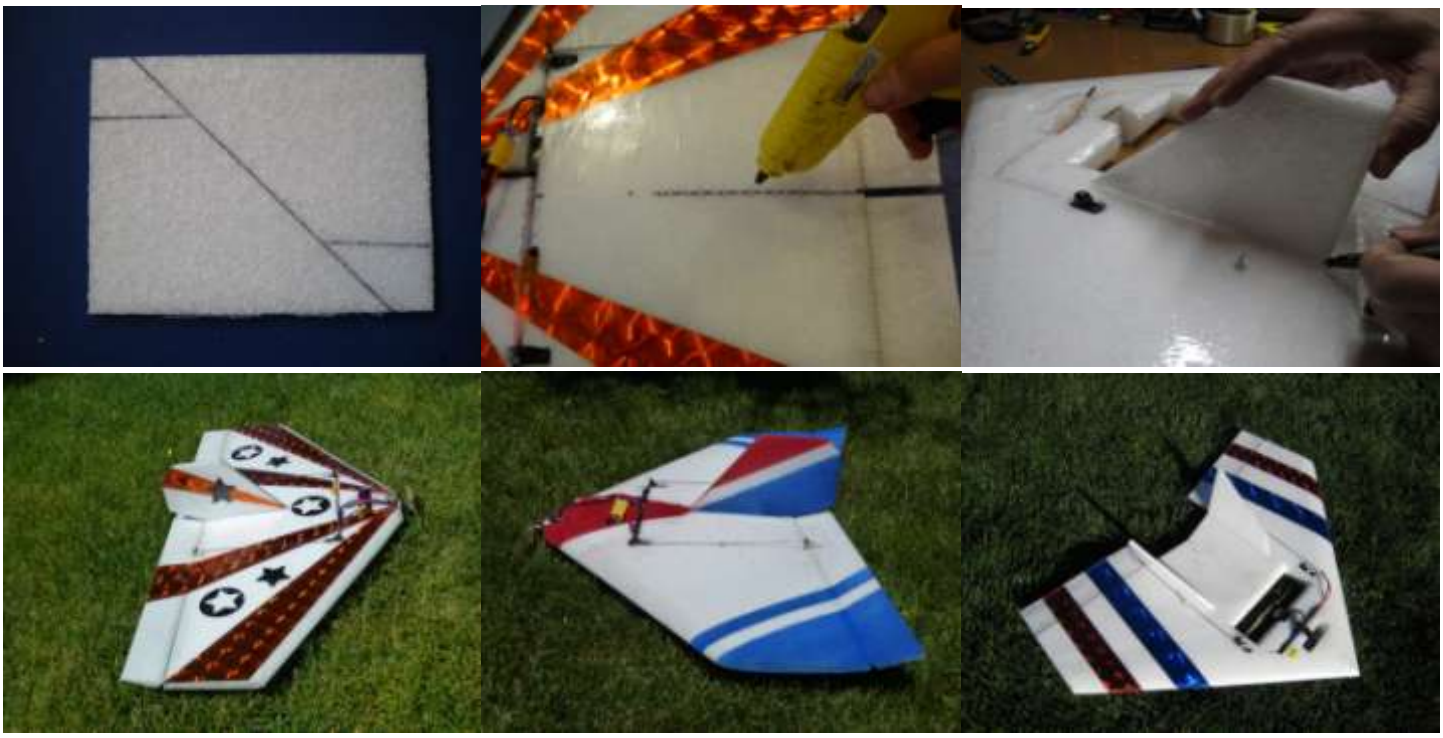



75. Remove the servo arms, slide the push rod through the hole in the servo arm, and place the end of the push rod through the EZ Connector, then set the servo arm back on the servo. You may have to drill the servo arm for the rod to fit.
76. If the distance between the servo and the elevon is long enough that the push rod might flex, mark a spot on the wing about halfway between the servo and the elevon, directly underneath the push rod.
77. Remove the push rod, and use your soldering iron to melt a hole at the mark you just made. This hole should be wide enough and deep enough that the push rod guide (the metal staple included in the kit) can sit in it, and extend just over the push rod. This guide is important to keep the pushrod from bending in compression.
78. Fill the hole with hot glue, and set the push rod guide (staple) in place. Hold it there while the glue dries.

FINS - **The Roswell won't fly well without a center fin or twin center fins.**

79. They need to be behind the prop and as far back on the delta wing as possible to give the maximum stability.
80. You will notice that I have a single fin on the two Roswells used for the instructions that go as far back as the back edge of the elevons. I have used twin fins many times on these designs but they need to be back on the far edge of the center of the wing especially on the 36" Roswell.
81. Make sure they won't interfere with your pushrods.
82. Take the small rectangle piece of foam, and use a ruler and pen to draw out a design of how you want your fins to look like.



83. Use your straight edge and razor blade to cut the fins the shape you would like
84. Hold the fins on the wing, where you would like them to go.
85. Use the soldering iron and your straight edge to melt a very shallow slot for the fin. Exposing the foam will allow the glue to better bond with the fin. You can also punch a row of holes along the line that will hold the glue and attach the rudder so it won't come off.
86. Hot glue the fin into the slot you just melted, and hold it in place (usually at a slight slant outward) until the glue sets. You may find it useful to cut a scrap of foam or other material at the angle you desire, and use it to hold the fin in the exact position.
87. Repeat for second fin on other side of the wing (if two are used), making sure to hold it in place at the same angle as the first, while the glue sets.

BATTERY BAY – CENTER OF GRAVITY - VELCRO RETENTION STRAPS

88. Make sure everything is on the plane including pushrods, propeller, motor, rudder, and anything else that could affect the CG of the plane.
89. Position the battery on the top of your plane and position it so the plane balances on the CG. Your battery will be on its edge with a side facing forward. This protects the cells from damage in a forward impact that can sometime mushroom the cells in the battery.
90. Be aware of the screws coming up from the motor mount. Make sure they won't damage your battery.
91. Draw an outline of your battery where it balances the plane.
92. Cut a hole in the foam that is smaller than the battery so the battery is on its edge, side facing forward and tight in the hole.
93. To hold the battery the receiver and ESC in place during flight you can install a 1" wide Velcro strap available at many hardware stores.
94. The Formica plate on the bottom of the plane may be in the way so many flyers glue the Velcro in the bottom of the battery slot with a thin piece of cardboard or plywood glued over it to help hold it in place.
95. If your battery is back farther in the wing, which is common with the Roswell 2, you can cut two slit out the bottom of the plane. One is in the middle of the radio slot where the ESC and receiver are located. The other is on the far side of the battery cut out so the Velcro will go over the wiring in the slot and the battery and hold them in place. Feed the Velcro through from the bottom and latch it on top of the plane so the battery is easy to change.
96. On some planes I just use a piece of clear packing tape, that sticks well to the laminate making sure to not block all the air flow that cools the battery or ESC and change it between flights..

PUSH RODS & ELECTRONICS TESTING

97. Consult the instructions for your Tx/Rx set to properly bind the two together, and then connect the servos and ESC into the proper channels on your receiver.
98. Set your radio for delta mixing, elevon mixing, flying wing mixing or whatever your radio calls it.

99. Many use manual mixing that is described on our website for the Spectrum DX6i radio.
100. Make sure servos are moving the right direction. Sometimes you have to trade which servo is plugged into the aileron and which is plugged into the elevator on your receiver to get the right mixing to fly the plane.
101. Remove the servo arms from the servos. Connect all electronics, including a battery, but for safety purposes, make sure you do not have prop attached to your motor at this point. Turn on your tx and allow the servo gears to "center" themselves.
102. Slide the push rod through the hole in the servo arm close to the center of the servo. The Roswells have big elevons and don't need much throw or they won't fly.
103. Slide the end of the push rod through the guide, and into the EZ Connector on the elevon. Then re-attach the servo arm to the servo, so that the arm is perpendicular to the push rod.


104. With the EZ Connectors still loose, center the subtrim function on your tx.
105. Put the servo arms back on the servos so they are perpendicular to the push rod.
106. Let the EZ Connector slide over the push rod as you lift your elevon such that the angle of the elevon is 1/8" higher than the angle of the back of the wing.
107. Once in place, tighten the set screw on the EZ connector.
108. Use snips to trim off excess push rod.
109. Repeat on other elevon (as close to the same angle as possible).
110. **We often see Roswells that have too much movement in the elevons. The elevons on the Roswell are huge so they don't need to move very much to get a lot of reaction or even stall of the plane. The Roswell will loop tight with only 3/8" movement in the elevator function of the elevons. The aileron function is not as sensitive but a surprising high roll rate is possible especially on the Roswell 2.**
111. Set the wing on a flat surface, and hold a ruler vertically next to the trailing edge of each elevon. Use your tx to set the throw (range of movement) on the elevons to 3/8" (1cm) up and 3/8" down. Make sure your stick movement translates to the proper up/down on your elevons:

STICK UP	Both elevons down	NOSE DOWN
STICK DOWN	Both elevons up	NOSE UP
STICK LEFT	Left elevon up / Right elevon down	ROLL LEFT
STICK RIGHT	Right elevon up / Left elevon down	ROLL RIGHT

112. Test the throttle and make sure the motor is turning in the correct direction. If not, unplug two of the three connectors between the motor and the ESC and reverse them. Try again. (Be sure your prop is not attached, for safety purposes.)
113. It's always a good idea to have someone else double check your work. Field test and range check your equipment, then launch, trim, and enjoy!

FLYING NOTES

1. Each plane design has its own personality. The 36" Roswell is gentle and glides well. The 29" Roswell-2 is fast and maneuverable. If the Roswell is tail heavy you will find you will be consistently trimming the plane and the plane will be hard to control on launch. If the plane is nose heavy you won't be able to pull the nose up when the plane is gliding and will have to have low throttle to get your plane back to the field.

2. If you have too much movement in the elevons the plane will stall at low speed. This has been a very common problem for first time delta flyers. This is very obvious when you are trying to launch at low speed. I tell builders to put the control rod close to the center of the servo and at the tip of the horns on the elevons to maximize leverage.
3. We have also noticed that with the exact same set up the 29" Roswell-2 is more sensitive to prop torque than the 36" Roswell. This is mostly seen on takeoff when the Roswell-2 may turn to the left until it is up to speed.

LAUNCHING

1. **Launching from the tip is an art form and hard for many new flyers.** In the videos you see us launch our flying wings holding the plane by a wingtip while swinging it forward. We are actually setting the plane on the air without Frisbee spinning the plane. If you spin the plane at all the outside wing will have more lift because it is moving faster and the plane will roll the opposite direction and hit the ground. If you have any trouble, launch from the center of the plane with fingers on each side of the motor and toss the plane at the horizon. Don't throttle up till your hand is clear of the propeller.

The most common problems we see are:

2. **CG too far back.** Flying wings will not fly tail heavy. A good sign you are tail heavy is you can't control the plane or the plane won't stay trimmed. When you try to loop the plane will roll over. Add weight to the nose to see if the problems resolve. It is not uncommon to need an extra oz or two of lead depending on how light you build.
3. **Too much movement in the elevons** so the plane stalls on launch as you pull up on the elevator. Our planes have huge elevons to decrease drag so they don't need as much movement in the elevons as planes with small elevons. This is a very common problem!!!! May be combined or confused with tail heavy airplane symptoms.
4. **Loose servos in the foam, linkages and push rods that flex, and poor leverage with push rods not installed per plans, elevons are too soft and twisting.**

We design our planes to use inexpensive motors, ESCs, batteries and servos to save you money and keep you flying.

- If you are learning and want a slow easy flyer or a great night flyer try our Albatross.
- If you want a thin powered airfoil that can slope and glide try our Widowmaker.
- If you want to fly the **TOUGHEST PLANE ON THE PLANET** you need an Assassin.