EPP 29” mid-motor ROSWELL Build Instructions

by Crashtesthobby.com

The Roswell is a fast, aerobatic super strong delta wing with great slow speed performance. We are using the same basic building techniques we use for our combat planes. This is a durable plane design. We are trying to keep it as simple as we can to make it an easy build and keep the weight down. Deltas can make sharper turns at slower speeds than comparable sized flying wings.

SPECS

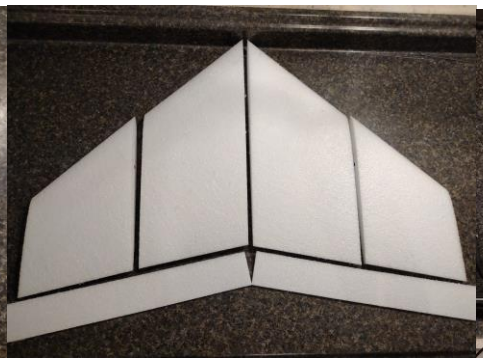
- Refer to the pictures above for visual reference.
- Center of Gravity is back 9” (23cm) from the nose of the plane which is slightly behind the prop in the pictures.
- Battery back 3.5” where the wing is thick enough to put a 1300 3S battery on its edge.
- Radio receiver and ESC slot is back 5.5” and 5” wide on the top of the wing
- Motor cut out 7.5” back on the top of the wing plus a 1.5” x 1” motor mount cut out in the middle. See pictures above.
- Motor cut out is 8” wide and 2” front to back
- Cut ¾” bevels top and bottom and front and back of the motor cut out to decrease wind resistance (Not sides)
- 20” Flat carbon spar is back 11” on slit on the bottom of the wing
- Twin wing tip fins preferred on mid-motor Roswell design
- Two tip coroplast fins centered so there is as much fin above the wing as below above the wing.
- Elevon Throws: 3/8” left/right and 3/8” up /down.
- Shown with 2812-1534kv motor, 7x6, prop, 30+A ESC, 2 mg90 servos,
- 1300 3S lipo battery, can be flown with 1000 -1800 mah 3S lipo battery
- Built with a shock cord, E-tape and laminate for strength.
- Target All-Up Weight: 16-22 oz. This build is 21 ounces ready to fly
- Lighter always flies better!!!!

EQUIPMENT NEEDED

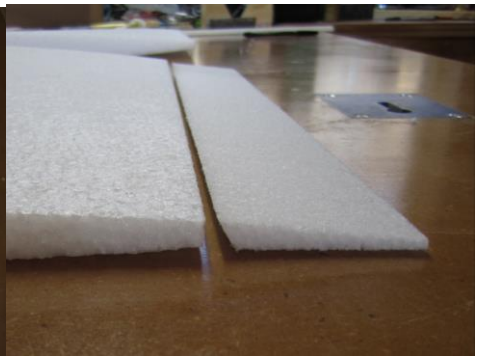
- Roswell kit, from CrashTeshHobby.com
- All electronics and accessories as desired (motor, props, esc, transmitter/receiver, servos)
- Low-temperature hot glue gun (and low-temp rated glue)
- Soldering iron and or long bladed box knife for cutting foam.
- Iron for applying laminate (clothing iron is preferred because it has a more constant temperature control)
- New Razor blade
- CA thin glue (baking soda optional)
- Metal straight edge
- Fine grit sand paper
- Electric drill, for Formica

FOAM PREPARATION

1. The Roswell cores are cut and shipped in 4 sections to beat international shipping rates.
2. Use low temp hot glue to match red dots to red dots and blue dots to blue dots.
3. Rub the EPP foam surfaces with another piece of EPP foam or shave the cores with a disposable razor to get the melted fibers off. Use your fingernail to pick off any stubborn fibers.


4. **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.

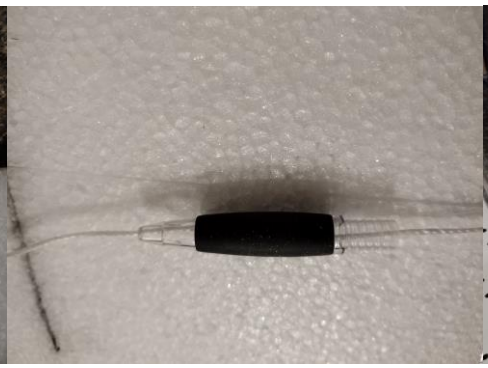



CARBON SPAR - There is a single 20” flat carbon spar that will be installed in the bottom of the of the wing

5. Measure 11” back from the nose, on the bottom of the wing, use your square and a pencil 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 a metal straight edge and new razor blade to cut a slit along that line, deep enough to fit the spar in on its edge.
7. Lightly sand the carbon spar and test it in the slot for length and depth of cut.
8. Putting a little baking soda in the slot will help to help set CA glue.
9. Press the flat carbon spar completely into the foam, and glue it into place with thin CA glue.





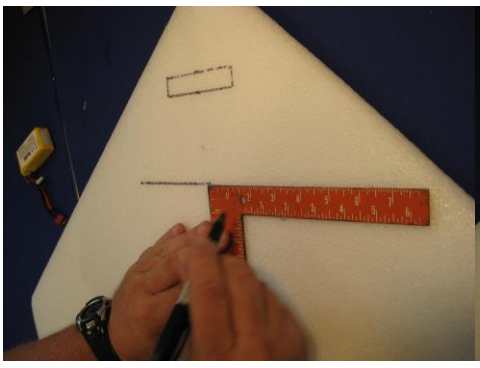
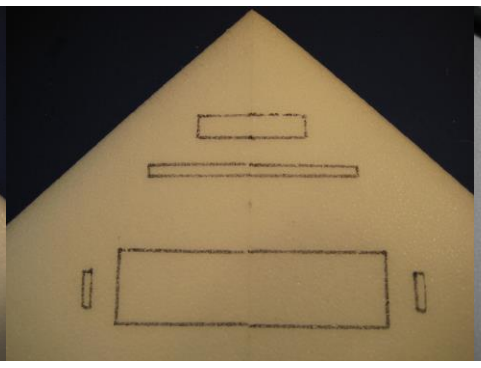
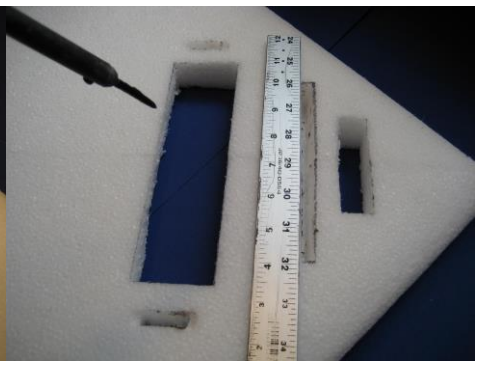


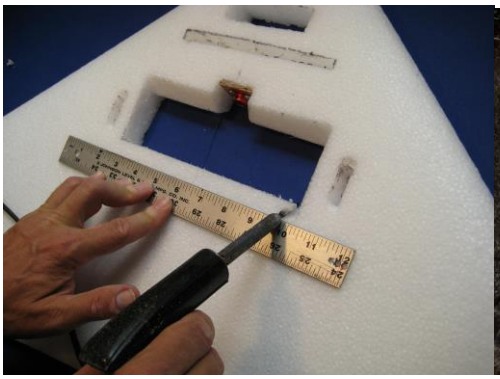

SHOCK CORD - The shock cord helps keep the foam from tearing in a crash.

10. Using a razor blade, cut a ¼" (0.5cm) deep slit around the entire perimeter (along the edge) of the wing.
11. Insert the shock cord, beginning with the center of the cord at the nose of the wing.
12. Keep tension on the cord as you work your way around the wing, so that it remains snug.
13. Use the lower body of a ballpoint pen or small Phillips screwdriver to guide the shock cord in to the slot.
14. Tie the loose ends of the cord together at the nose, so that the knot tucks into the slot.
15. Use Quick Grip, Goop or CA glue to glue Shock cord to secure the shock cord and let set.
16. If you use CA glue rub the shock cord in baking soda before inserting. Have adequate ventilation and avoid the fumes.

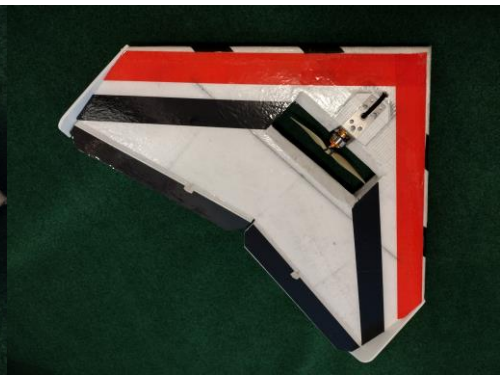
MOTOR, RADIO AND BATTERY CUT OUTS –

17. Draw outlines for all of the parts you want to install on the top of the wing before you do any cutting.
18. The battery will be on its side back 3.5".
19. The radio slot for receiver and ESC will be back 5.5" and 5" wide and 3/8" gap for receiver and ESC. Enlarge as needed.
20. The motor cut out is back 7.5" from the nose of the plane.
21. The motor cut out is 8" wide and 2" front to back with motor cut out in front of cutout.
22. Cut an extra 1.5" wide by 1" deep cut out in front of cutout for the motor, to center the prop in the slot.
23. Cut servo cutouts 1" to each side of the motor cut out.
24. Use a straightedge and soldering iron or a long box knife to make cut outs.
25. Cut or melt a ¾" bevel front and back on the motor slot for improved airflow.
26. You can make the beveled angle with a box knife and soldering iron and smooth it out with a hobby iron.
27. Note the bevel in the finished plane pictures.





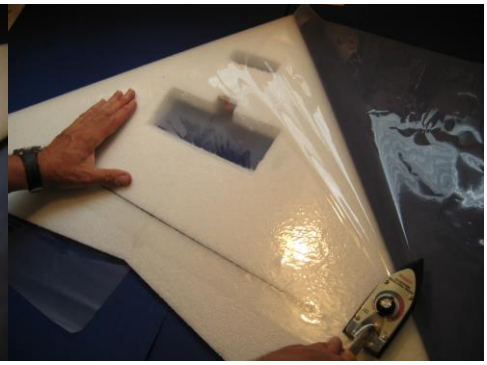


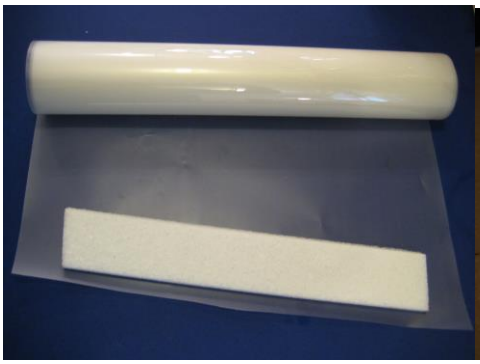
SCOTCH EXTREME TAPE –

28. Before you tape or laminate you need to install the Formica plate to the bottom of the wing to attach the metal motor mount.
29. You can find Scotch Extreme Tape at many office supply stores or on Amazon. Findtape.com also has a similar product.
30. Scotch Extreme Tape© will stick to EPP without a spray adhesive. It is lighter than many other reinforced tapes. It can hold up to 150 lbs of weight per inch. Fibers run in two directions (bidirectional) making it a fantastic hinging tape.
31. Extreme tape needs to be covered with laminate or it will yellow and dry, and come off in UV sunlight
32. Put tape top and bottom sideways across the front of the plane to reinforce the motor mount back 7" from the front of the plane to stiffen the nose of the plane. Put the E-tape over the Formica plate used for motor attachment.
33. Wrap a 2" (5cm) wide strip around the leading edge the entire length of the wing. (Picture from front mount build.)
34. Use a 1" wide piece of E-tape over the hinge line.



35. **UV shielded laminate is included in the kit to protect the tape and foam**
36. We prefer clothing irons to hobby irons because they have better temperature control.
37. Iron temperature is 180 F to 220 F. Start with lower temperature and finish at higher temperature.
38. 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.
39. Lay the piece of laminate over the wing, with the smooth (shiny) side of the laminate outward. Adhesive is on dull side.
40. Lay the laminate in position, and set it in place with one pass of the iron through the center of the length of laminate.
41. 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.



COVERING EPP ELEVONS – Cover the elevons with two layers of laminate to make them stiff (comparable to balsa wood). Elevons are thin so more heat sensitive. Start with a low temperature iron. We recommend watching some of the build videos to see the elevon process for Widowmaker on our website. https://www.crashtesthobby.com/widowmaker-instructions.html

A new installation method we have been recently using on smaller wings can be seen here: https://youtu.be/9yKSXZaCJb4
This is the method I have used on the new Roswell builds. In this method you create the hinge while laminating the wing and the elevon at the same time. In this method you put the 1" E-tape hinge tape on the top of the hinge line of the foam with a 1/8" gap between core and elevon then laminate the top of the wing including the elevon all at one time. Leave enough extra laminate behind the elevon to wrap the bottom of the elevon with the same laminate you use on the top. Then … Bend the elevon down on the hinge line and pin in place then laminate the bottom of the wing wrapping the laminate up around the folded elevon so it can still move and then iron the end upon the top of the wing. Watch the video. It's easier than it sounds.

42. **For the traditional hinge line construction where elevon is laminated separately from the wing:**
43. Cut a piece of laminate slightly wider than the elevons.
44. Wrap the elevon tightly in two layers of laminate.
45. Use your iron at low temperature 180 F to stick the laminate to the foam elevon.
46. Be careful not to warp the elevon. Begin at the center and work your way outward to avoid wrinkles.
47. Cut the extra laminate on the ends. Iron the laminate around the ends of the elevon.
48. Cut a piece of 2" bidirectional Extreme Tape into two 1" wide strips, the length of the elevon
49. Position the laminated elevon next to the trailing edge of the wing, leaving a 1/16" gap between the two pieces.
50. Attach the elevon to the wing with one 1" strip of Extreme Tape, on the top first.
51. Fold the elevon up and over, so it rests upside-down on the wing. Use the other 1" strip of Extreme Tape to over the hinge line.



52. Cut 2” wide strips of laminate the length of the elevon. Cover the 1” 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.
53. Flex the elevon both up and down and iron the seam until the elevon lays flat.

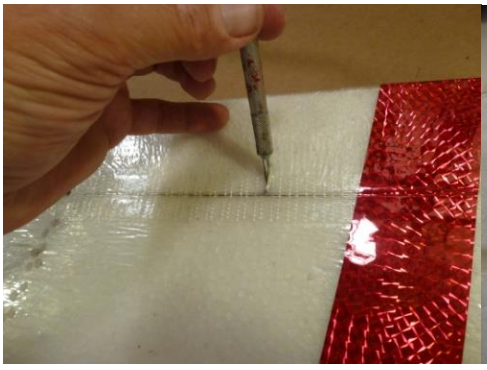
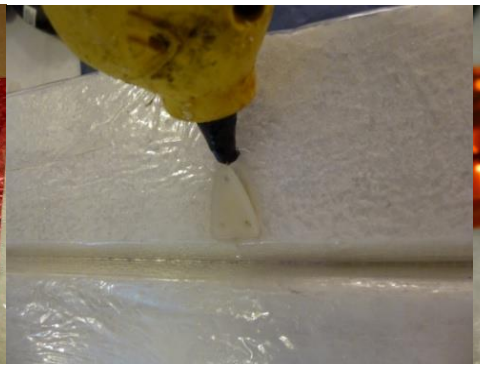
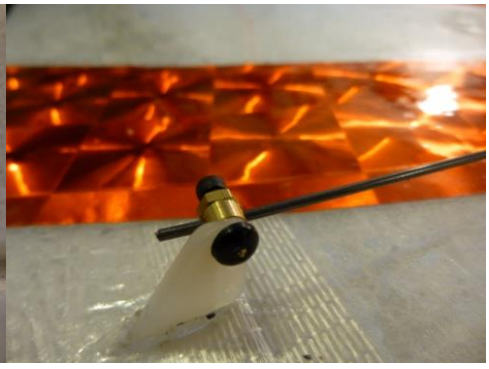
SERVOS, BATTERY, ESC, & RECEIVER — CENTER OF GRAVITY is back 9’ on the 29” Roswell.

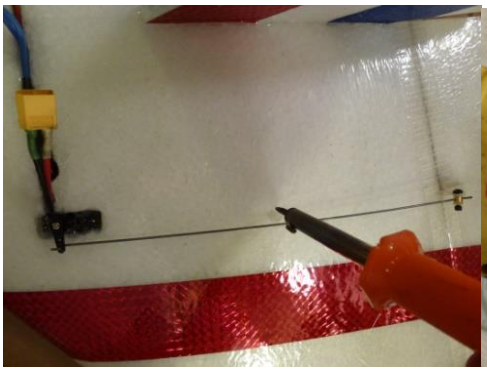
54. **Attach the motor to the metal motor mount:**
55. You should have already glued the Formica plate to the bottom of the wing positioned so the metal motor mount will hold the motor in proper position for the prop to spin in the slot. This should be done before taping and laminating.
56. Drill the Formica for mounting the motor mount plate.
57. **Make sure your screws won’t go into the battery slot!!!**
58. Attach the motor to the metal motor mount with the 3 mm bolts and lock nuts
59. Install your servos, battery, ESC, and receiver in the slots and cutouts
60. Plug in and bind your radio and make sure everything is working and your wires all reach.
61. All of the wires are tucked in the slot except the battery wire to the ESC and the ESC to motor wire connection.
62. Cut a razorblade slit from receiver to servo and press servo wires in and put clear tape or laminate over the top.
63. Hot glue the servos in place deep enough that the servo arms are barely above the surface of the wing.
64. The antenna on your receiver should be in a location that does not have it in a bundle of servo or ESC wires.

PUSH RODS AND SERVO HORNS

65. Use 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.
66. Use a box knife or Xacto knife to cut a slit completely through the elevon for the control horn.
67. Remove the extra tab that comes attached on the back of the servo horns.
68. 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.
69. Use hot glue along the base of the servo horn, and down through the slit, around the horn, to keep horn in place.
70. 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.
71. Attach the EZ Connectors to the servo horns with a pair of pliers.






72. 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.
73. Use your soldering iron to melt a hole at the halfway point of the pushrod. Use included staple in kit over pushrod to keep the pushrod from bending in compression.
74. Fill the hole with hot glue, and set the push rod guide (staple) in place.

FINS - **The Roswell won't fly well without fins.** The wing tips are cut with the proper fin angle for tip fins.

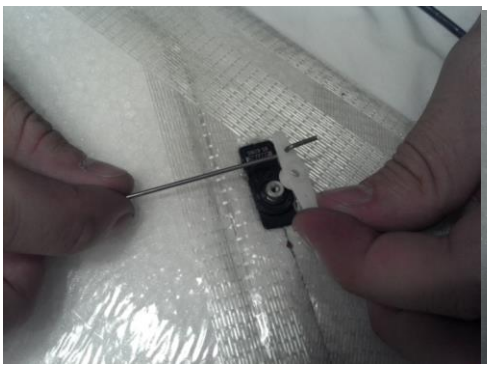
75. Two 9" coroplast fins come in the kit. Put the rounded corner down.
76. The best axel roll and glide comes with the tip fins out on the ends of the Roswell wing
77. Attach the fins with as much fin under the wing as over the wing.
78. We discovered that Quick Grip glue stick well to laminate.
79. Put glue on the end of the wing core and pin the fins in place and allow to dry. I leave the pins in.
80. Fins are behind the CG so double check CG after installing the fins.

BATTERY BAY – CENTER OF GRAVITY - VELCRO RETENTION STRAPS

81. Center of gravity is 9" back from the nose. Flying wings and deltas won't fly tail heavy.
82. Make sure everything is on the plane including pushrods, propeller, motor, rudder, and anything else that could affect the CG.
83. Sometimes I have to add lead weight to the nose to get a plane to balance. Deltas won't fly tail heavy.
84. Be aware of the screws coming up from the motor mount. Make sure they won't damage your battery.
85. I tape or Velcro battery in place so the battery doesn't fall out in inverted flight.

PUSH RODS & ELECTRONICS TESTING

86. 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.
87. Set your radio for delta mixing, elevon mixing, flying wing mixing or whatever your radio calls it.
88. 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.




89. 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

90. 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.)
91. 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 29" Roswell can be fast and maneuverable but it does well at slower speeds. 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.

LAUNCHING

1. **Launching from the tip is an art form.** 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.

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.**