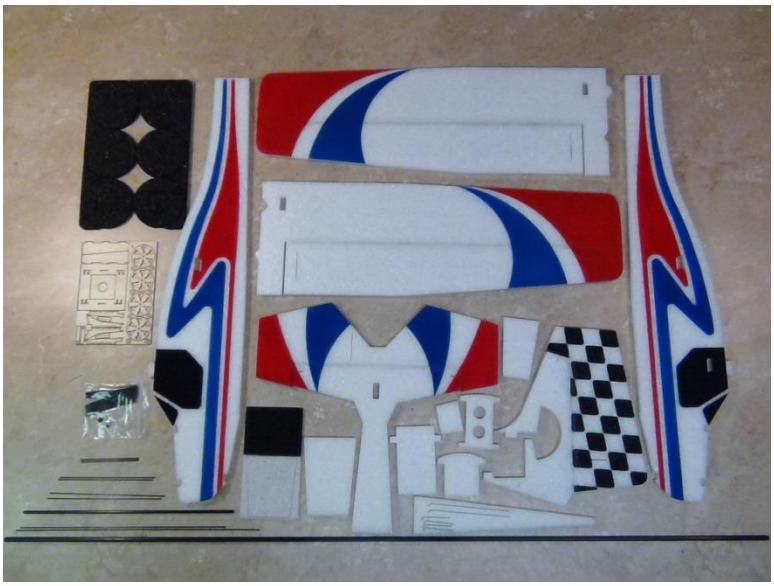
Highlander Construction Guide

Specifications:

- Wing span – 40”
- Length – 30 ”
- Wing area 312 sq. in
- Weight - (without battery) – 9 oz.
- Center of gravity is 2-1/4” from front edge of wing.
- Motor: 2208 – 1200 KV
- Prop: 9x5DD
- Battery: 800 mah to 1800 mah 11.1 V
- Speed Control: 18 or 20 Amp.
- 9 gram servos, 2 for ailerons, 1 for elevator.
- 5 gram servo, 1 for rudder.

Additional Items needed to complete kit:

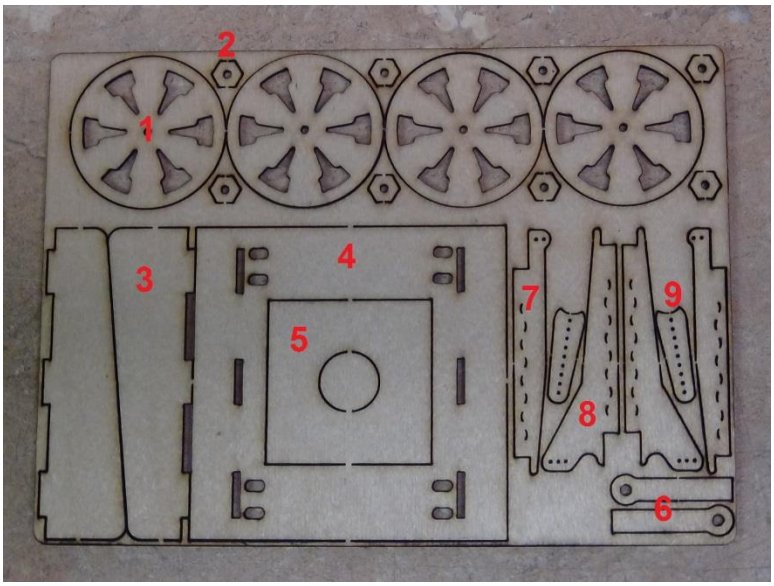
- Glue – Foam-Tac, and CA, (super glue)
- Velcro
- Servos
- Motor
- electric prop
- ESC
- Battery
- Paint



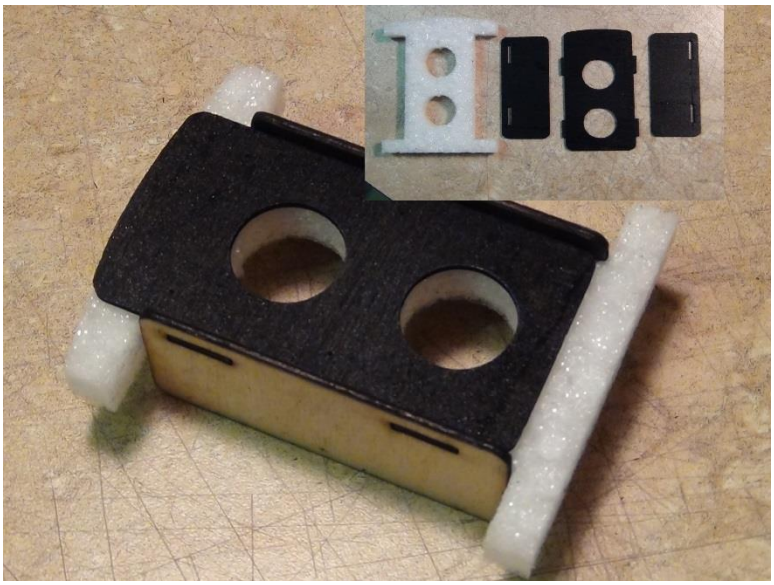
Kit contents should include.
-9mm laser cut EPP foam.
-6mm carbon tube wing spar.
-3mm carbon tube elevator spar.
-1.5mm carbon control rods and tail trussing.
-Plywood horns, motor mount, wheel rims, and landing gear base.
-Wire Z bends.
-EZ connects.
-Shrink wrap.

To start the build, take the two fuselage halves and glue the last half inch together. Make sure these a perfectly aligned and square to each other.

Now glue the two wing halves together, then glue the wing and tail spars into the provided grooves.



These are the plywood accessory pieces. Now is a good time to paint them if you want.
#1 – Rims for the wheels
#2 – Nuts to hold the wheels on. (only 4 are needed, but save the extra just in case)
#3 – Sides for the landing gear base.
#4 – Landing gear base.
#5 – Old Motor mount. (Do not use)
#6 – Control rod supports.
#7 – Aileron horns
#8 – Rudder and elevator horns.
#9 – Servo arm extensions.

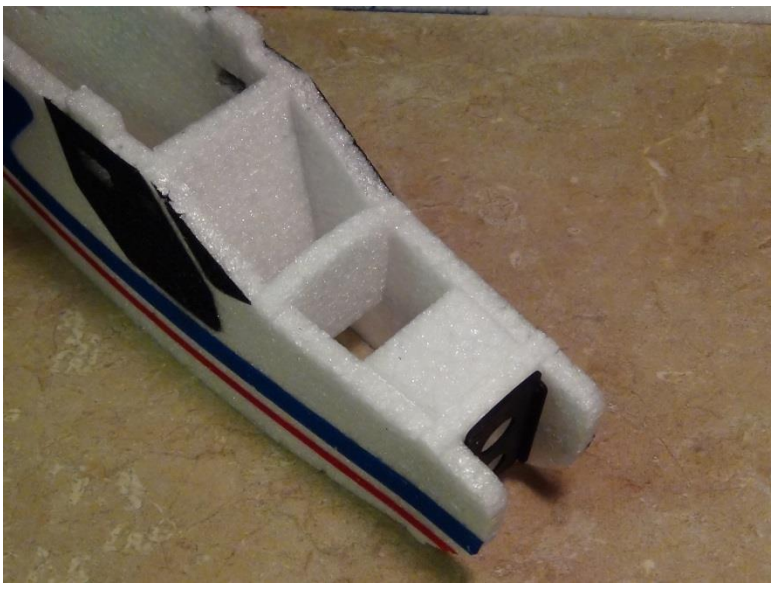


Glue together the plywood motor mount base, side pieces, and foam motor bulk head as shown.

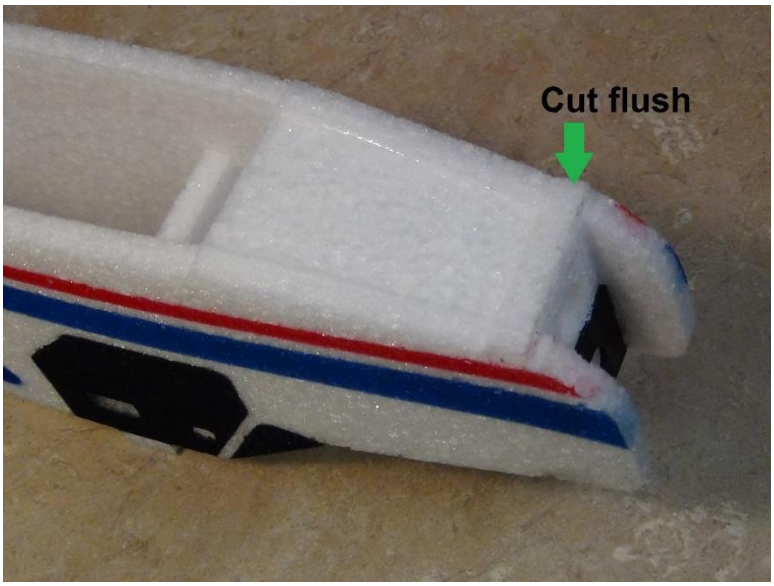
Enlarge the holes on the control horns with a 1/32” drill bit.
I recommend using the center hole on the rudder - elevator horns, and the top hole on the aileron horns.

Glue the aileron horns in slots provided.

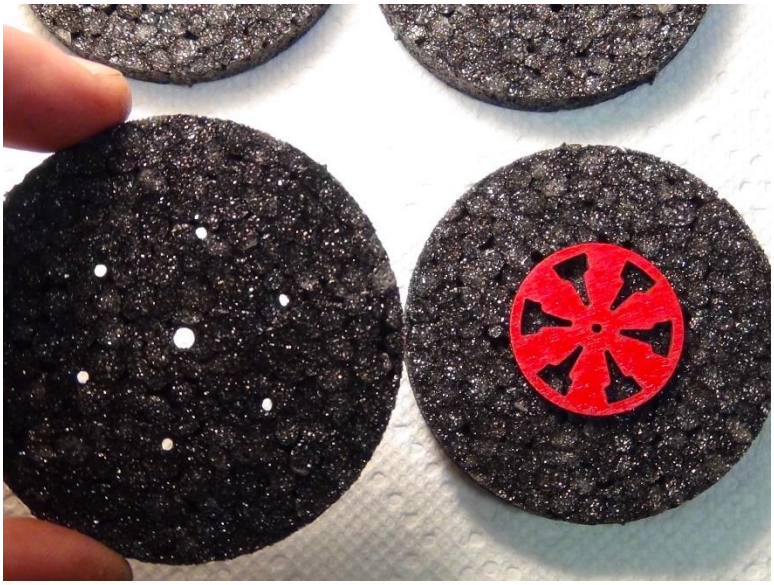
Glue the rudder and elevator horns in slots provided.



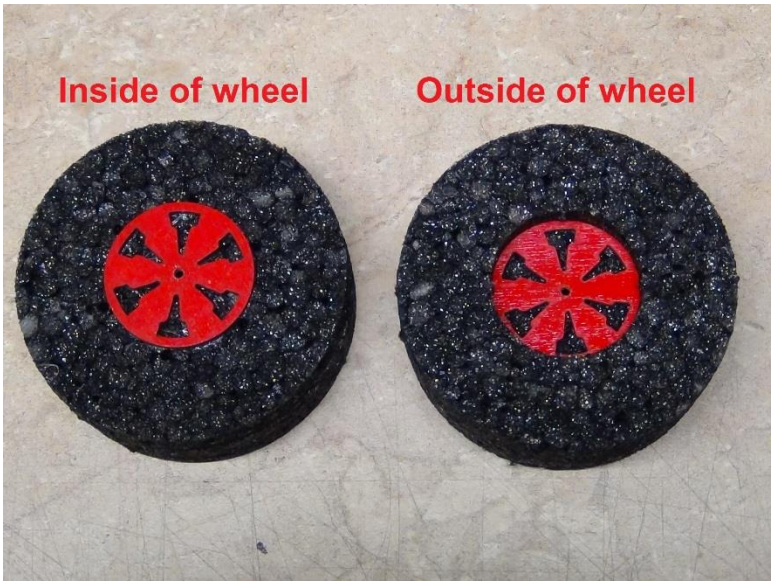
Glue in place the three bulk heads, and the top foam motor mount backer.
The tab in the window from the large bulk head can be colored black with a marker.



Glue in place the bottom foam motor mount backer.
Cut bottom of foam motor mount flush with bottom of nose.



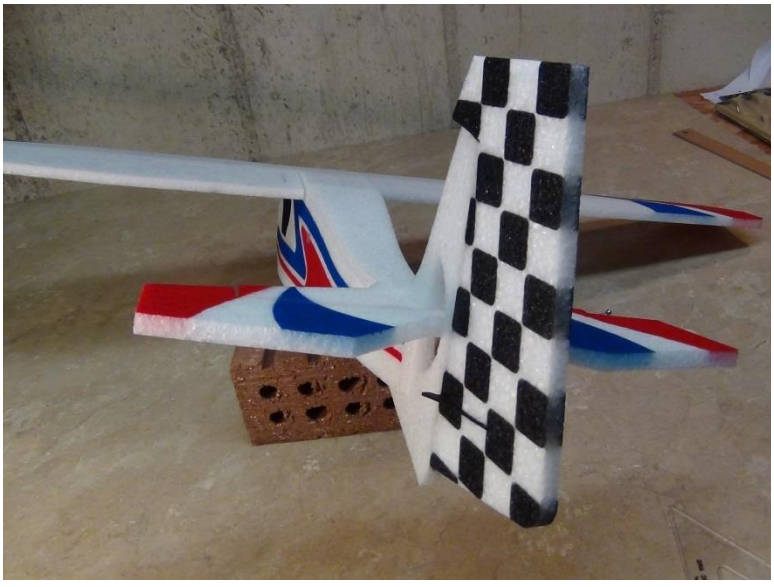
While the glue on the fuselage is drying, you can assemble the wheels.
Each wheel is made of 3 layers of black EPP, and 2 plywood rims.
2 with small holes to help center the inside rim.
1 with a large hole that goes on the outside and holds the outside rim.
Glue the EPP and rims together, keeping the pieces aligned and centered as much as possible.



Wheels should look like this when they are done.
Enlarge center hole in rim to easily spin on the .078 diameter wire.

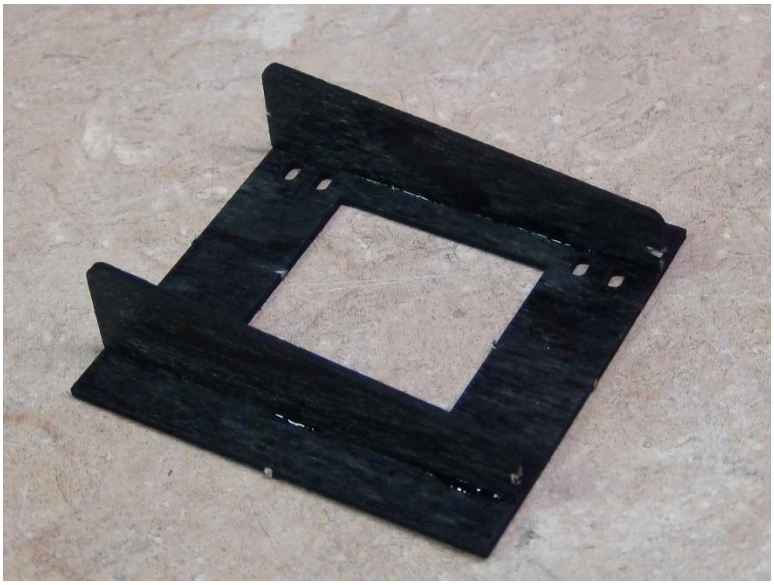
Now the main wing can be glued to the fuselage. Hold wing down with some weight for about 30 min until glue is dry.

Glue the fuselage top and horizontal stab in place. Keep it centered, and aligned with fuselage sides. Hold pieces down with some weight for about 30 min until glue is dry.

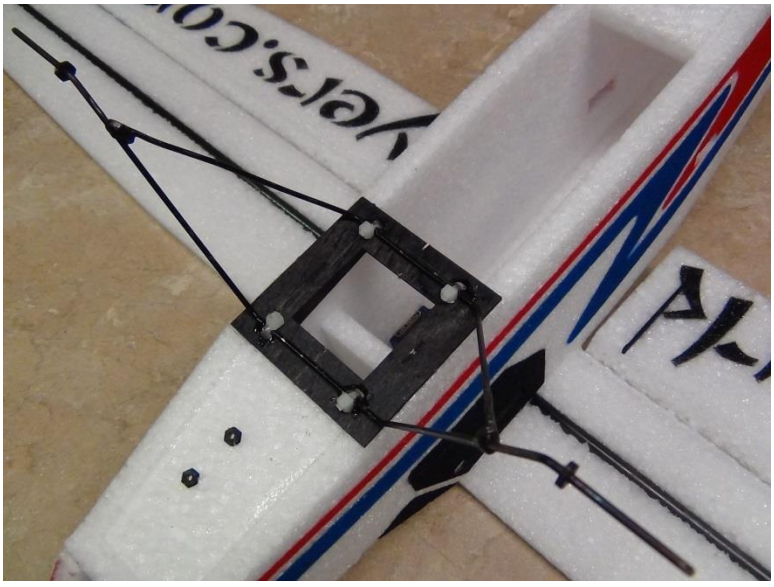


Glue vertical stab to fuselage, making sure it is centered and 90 degrees square to horizontal stab.
WAIT with trussing until AFTER control rods are attached.

Glue bottom of fuselage in place.

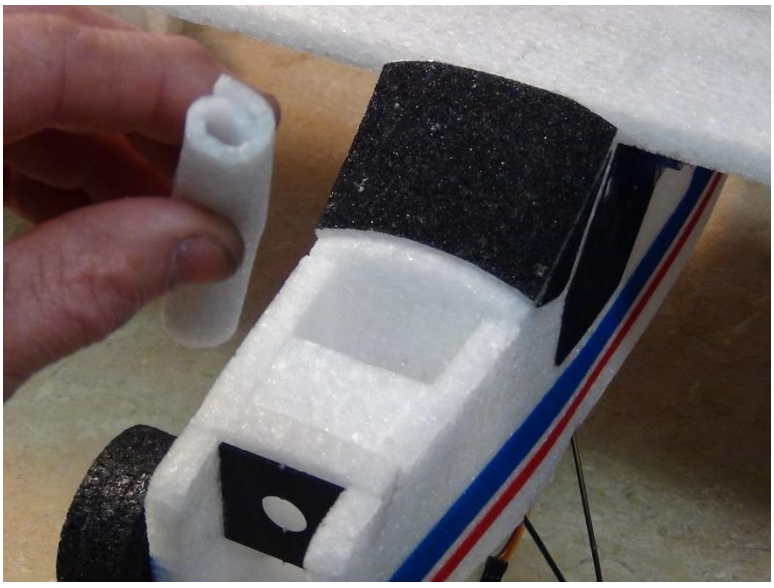


Use CA glue to attach sides to landing gear base.



Glue and clamp the landing gear base to the fuselage.
Once the glue has dried (30 min) attach the wire landing gear with Zip ties.
Add a small dab of glue to each Zip tie to keep the wire gear from moving.
The inside plywood nuts can now be CA glued to the wire.

Slide the wheels on the wire, and CA glue the outside nuts in place.

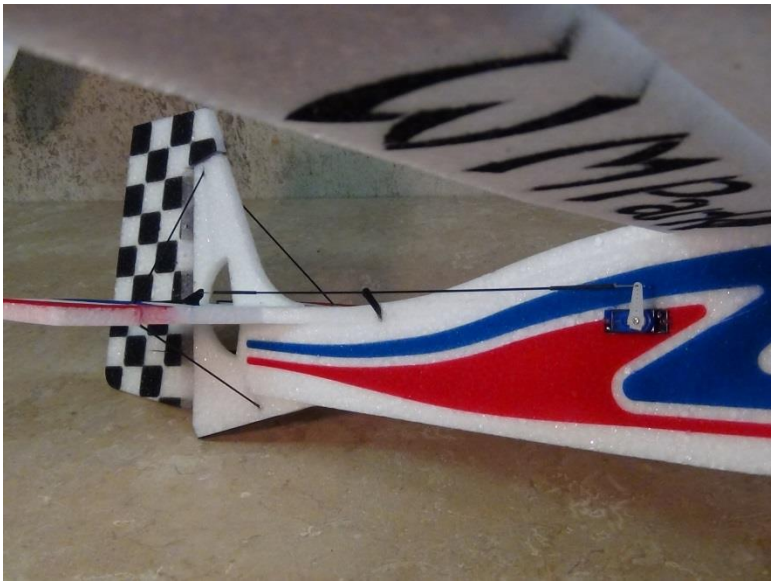


Roll the windshield and hood to help curve the foam. Apply a thin layer of Foam-Tac to the whole back side of the windshield and hood with a scrap piece of foam and let dry. (This will give it more strength to resist tearing). Now add Foam-Tac to the outside edges and glue in place.

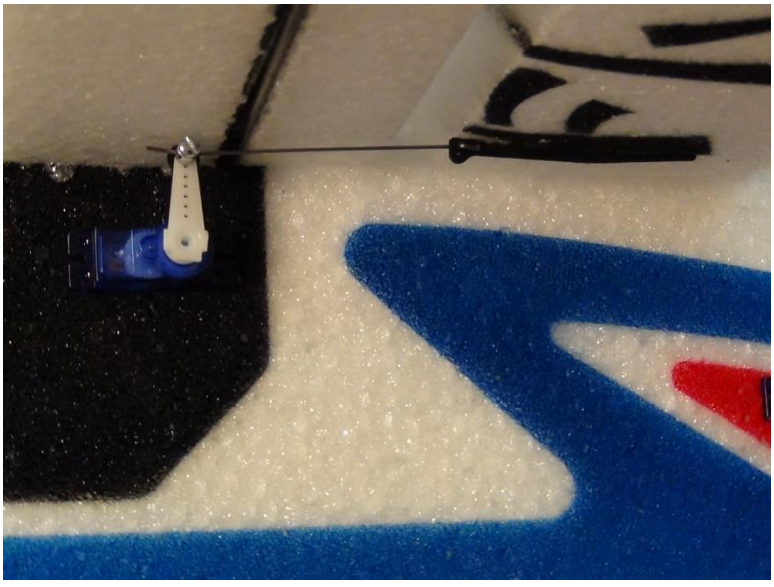
The wire control pieces can be easly attached to the carbon rods with Foam-tac glue and shrink wrap. The glue is flammable, so use a heat gun or hair dryer on the shrink wrap. The glue and shrink wrap can also be reheated to move and adjust the wire.

Don’t forget to add the control rod support before gluing on the Z bends.

To install the rudder control rod.
Glue the 5 gram servo in place with the control arm centered straight **down**.
Attach the control rod to the plywood horn. (center hole recommended).
Remove the servo arm and attach it to the control rod (end hole recommended).
Line up the arm with the servo and move the wire Z bend by reheating the glue and shrink wrap if needed.
Once the control rod and wire is the right length, the arm can be screwed to the servo. Note: do not heat the shrink wrap near the foam, it will melt!
Cut a slot for the rod support and glue in place.

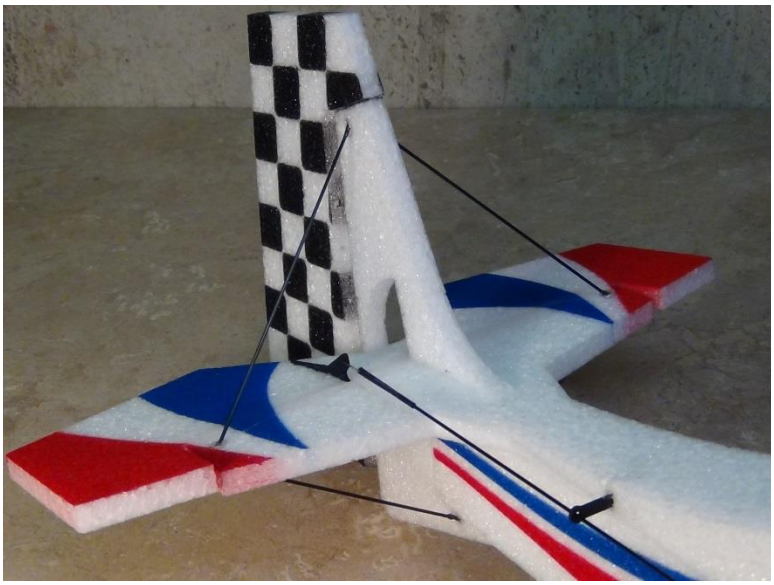


To install the elevator control rod.
Glue a 9 gram servo in place with the control arm centered straight **UP**.
Then follow the same steps as the rudder control rod.



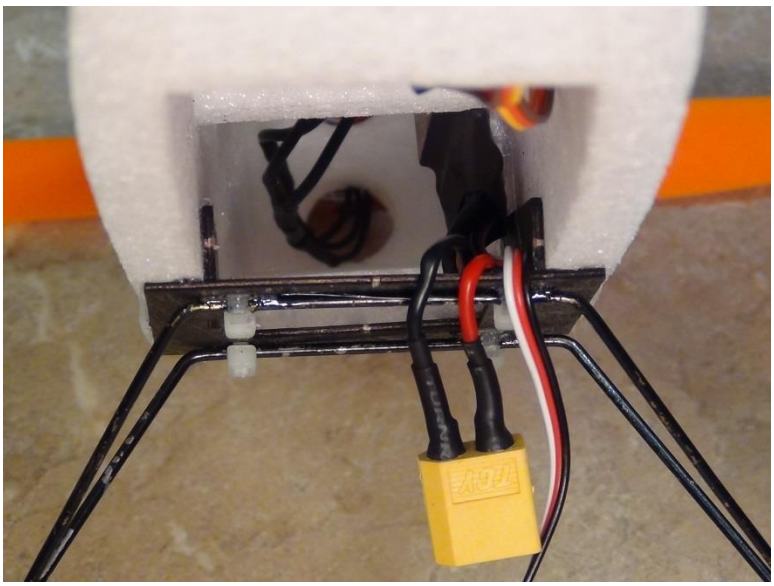
To install the aileron control rods.
Enlarge the end hole on a 9 gram servo arm and attach an EZ connector (drill a hole just large enough so that EZ connect turns freely), then glue the servo in place with the control arm centered straight up.
Attach one of the long Z bend wires to the plywood horn, and EZ connect as shown in the picture.

Now the lower trussing can be glue into the provided slots.
Also glue the flat carbon wear strip to the bottom of the tail.

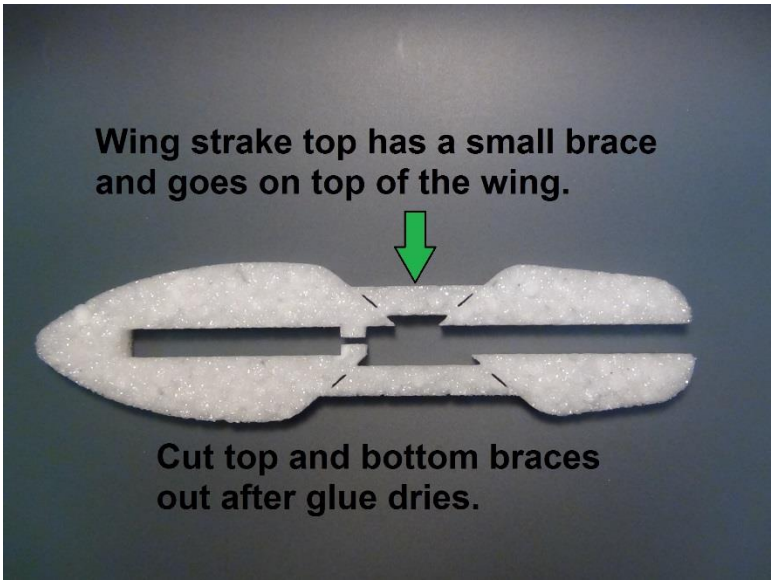


Glue upper trussing into provided slots.

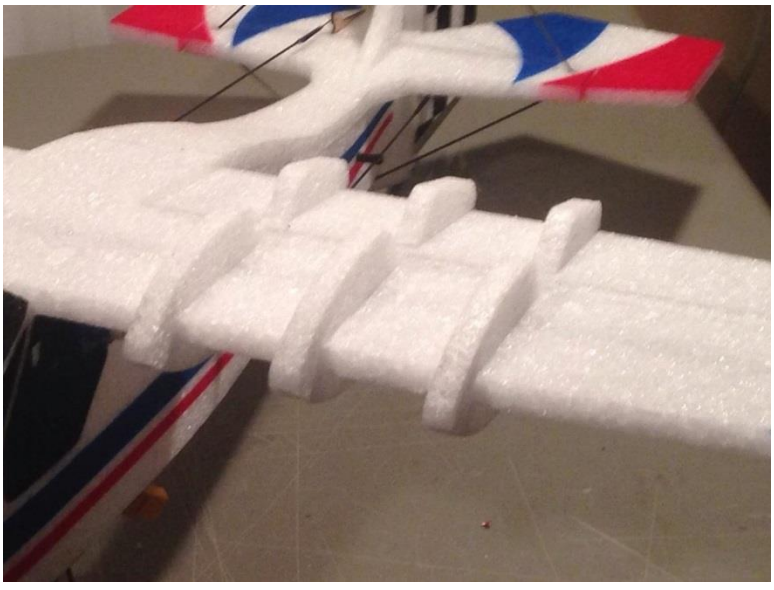
Solder bullet connectors onto ESC and motor wires.
Drill holes and attach motor to plywood motor mount with screws from the servos.
Check to make sure motor is spinning the right direction. Switch any two motor wires to change the direction.



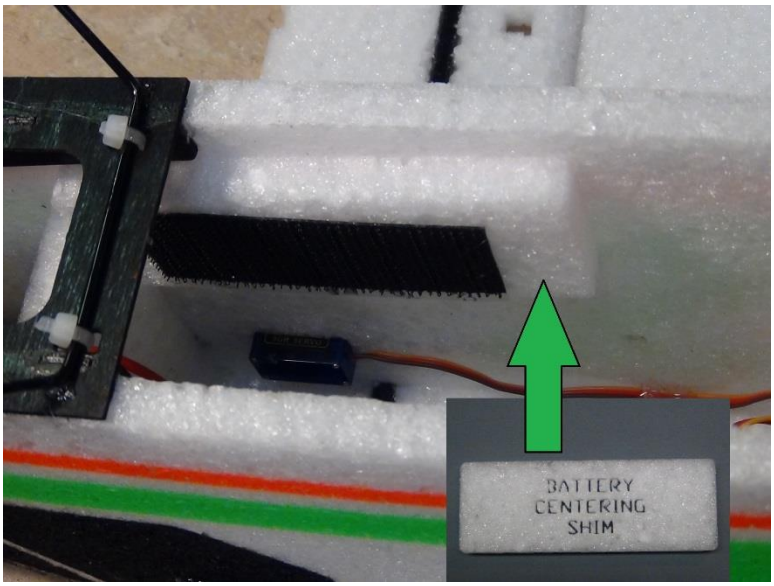
Run the motor wires through the hole under the motor mount, and Velcro the ESC to the inside of the fuselage.



Wing strakes can now be glued to the wings using the tabs and slots in the wing to line them up. Cut top and bottom braces out after glue dries.

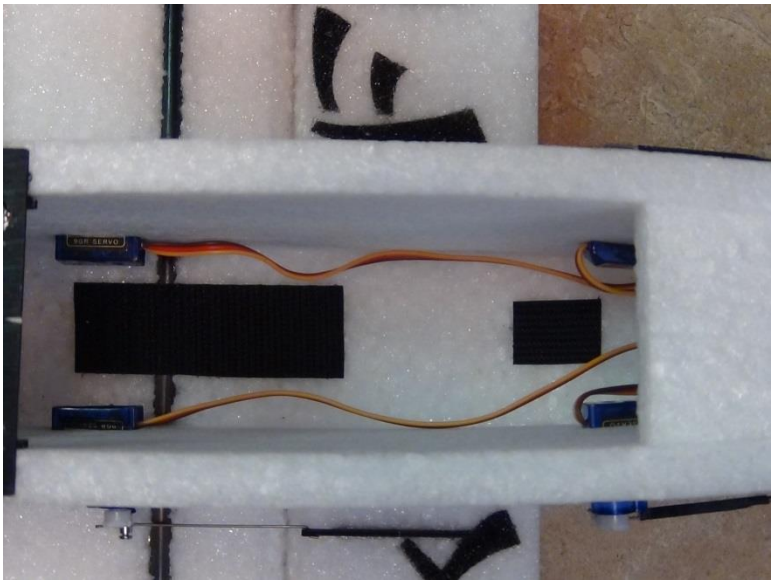


Strakes should look like this after braces are removed.



The battery can be attached down low near the landing gear (for beginners) or up high under the wing
(For more experienced flyers).

Using the battery centering shim down low makes the plane want to stay upright and easier to fly.



Attaching the battery up high under the wing gives the plane a higher center of gravity, which is better for inverted flight and acrobatic maneuvers.

For beginner and maiden flight, the control surface throws should be set at ½" both directions. As you get use to the plane, the throws can be increased. Always do a preflight check to make sure control surfaces are moving in the correct direction.

The build is complete.
Now go fly that Foamy!