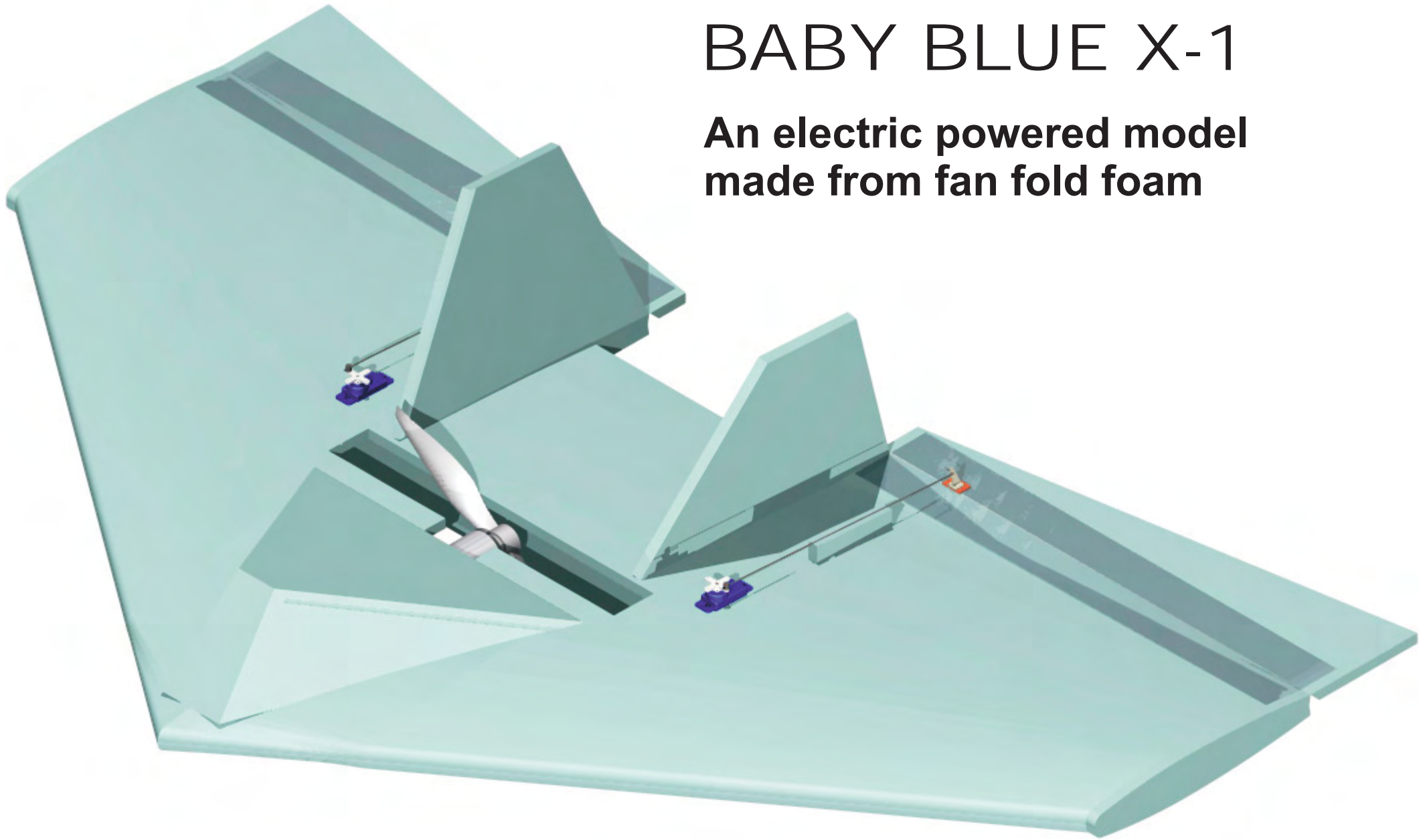


BABY BLUE X-1

**An electric powered model
made from fan fold foam**



**Designed by
Jack Pignolo**

**Plan by Paul Bradley
November 2011**

BABY BLUE X-1

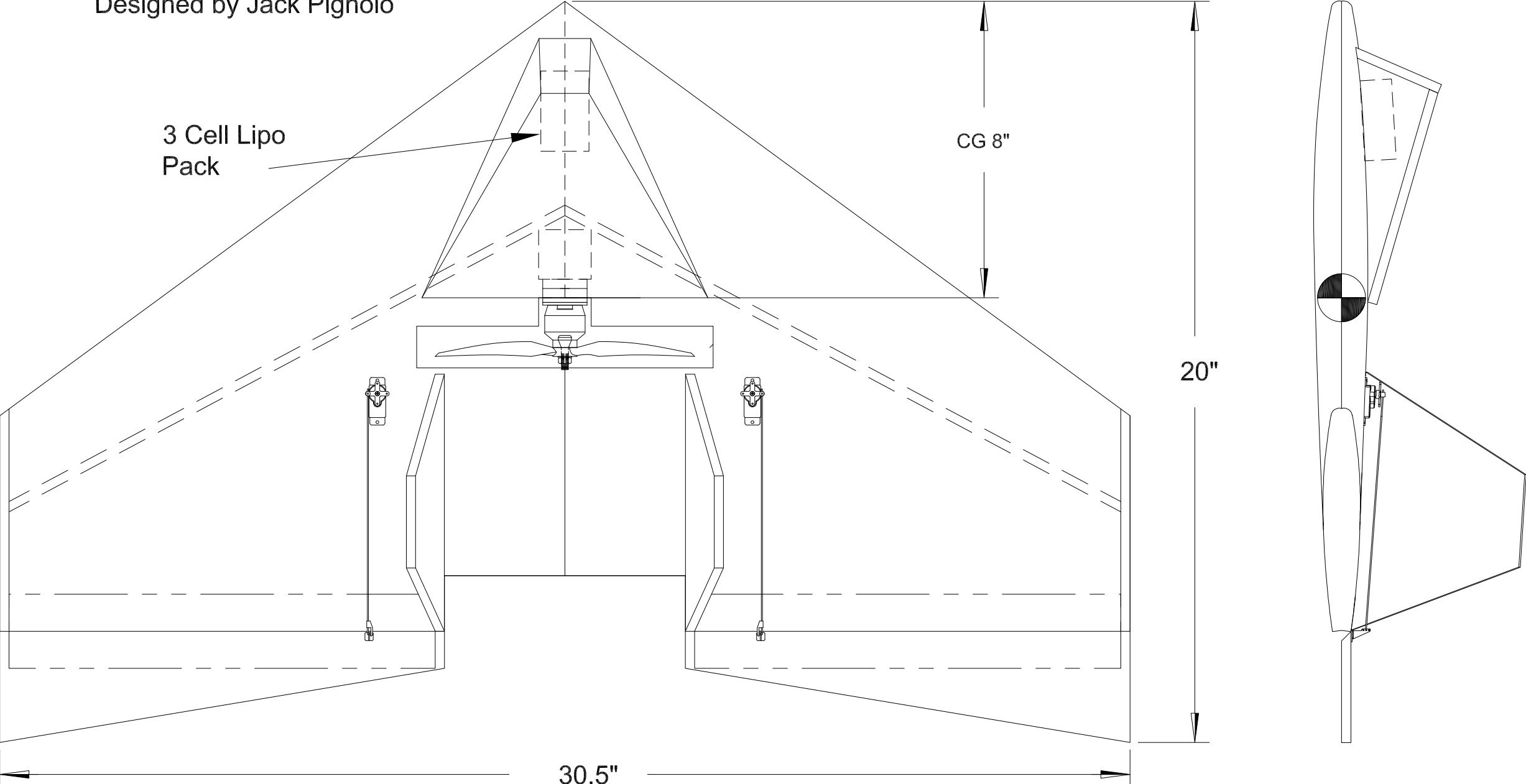
Designed by Jack Pignolo

3 Cell Lipo Pack

CG 8"

20"

30.5"



BB X-1 Assembly Guide

The model presented in this package is a fairly simple radio control model airplane built from fan fold foam used in the construction industry. The material is relatively cheap and can be purchased from home improvement stores. The goal of this model is to have an easy to build airplane that also uses inexpensive construction materials and associated radio control gear.

The prototype model used a low cost brushless electric motor from Hobby Lobby turning a 7x4 electric prop with a three cell 800 mah battery pack. You can use any motor that will produce at least 150 watts of power.

The materials needed to build a model from this plan are listed below:

1. Two sheets of joined fan fold foam
2. A small amount of 1/32" plywood
3. A small amount of 1/8" plywood or something similar like a paint stirring stick
4. Spray adhesive for holding the part templates during foam cutting
5. White glue or similar product - Gorilla White Glue is recommended
6. Motor - A brushless outrunner motor is suggested that can produce at least 150 watts of power
7. Prop - 7x4 electric
8. Prop adapter for the motor
9. At least a three channel radio system. A micro receiver is recommended.
10. Micro servos - two
11. Electronic Speed Control (ESC) with a Battery Eliminator Circuit (BEC) capable of at least 18 amps
12. Micro control horns - two

A model built from this plan package has a wing span of 30 1/2 inches with an overall length of 20 inches. The total flying surface area is 382 square inches. The total flying weight will depend on the materials used, the selected motor, and battery pack. The total flying weight should be in the range of 11 ounces.

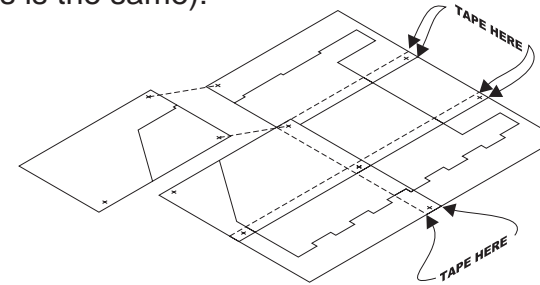
Please note that this model uses elevons for pitch and roll control. You will need a transmitter that provides an elevon mix function to be able to set up the controls for the BB X-1. If your transmitter does not support elevon mixing you will need to purchase an external V-tail mixer. There are a variety of sources and the units are not expensive. An Internet search will provide a list of the sources available at the time you are building this model.

General Assembly Notes

1. Printing and assembling the part templates.

Many of the part templates had to be printed on multiple sheets of paper to make sure all printers could be used to generate the templates. The largest paper size that all printers can handle are sheets 8 1/2" by 14" (Legal size in the U.S.). The pages of this package have been set up to print on that size paper.

For parts that are printed on multiple sheets, sheet alignment marks have been included. Place one sheet on top of another using the alignment marks. Tape the sheets together on each side. Cut the templates from the assembled sheets. An illustration is provided below (for a different model but the process is the same):



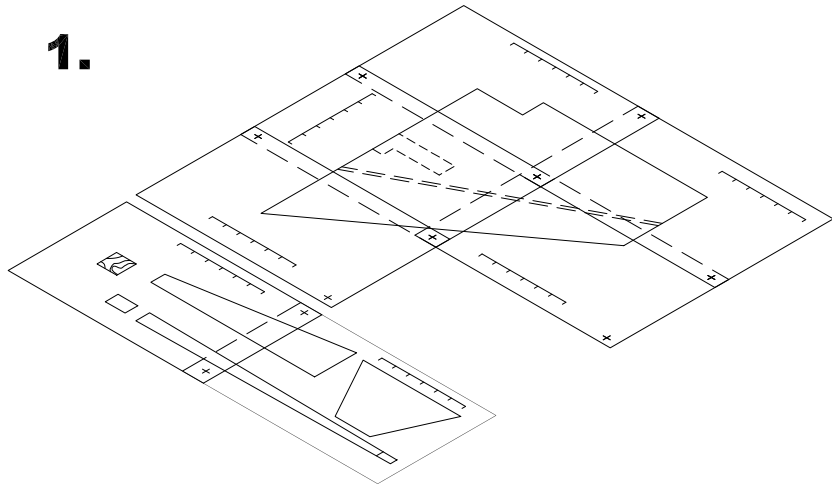
2. Fan fold foam comes with and without a plastic skin. If available use the type without any skin. The type with a skin will work just fine, but if a choice is available use the non skin type.

3. Clean the foam surfaces with alcohol before starting the project. This will remove manufacturing residue and will greatly improve glue bond strength.

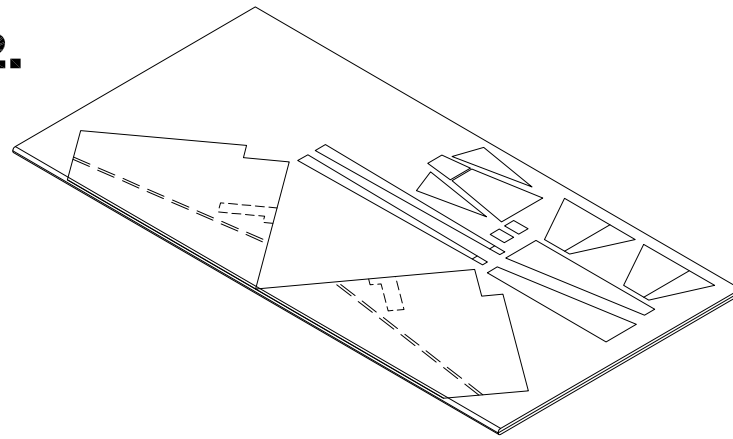
4. For the construction adhesive Gorilla White Glue is recommended.

The Designer.

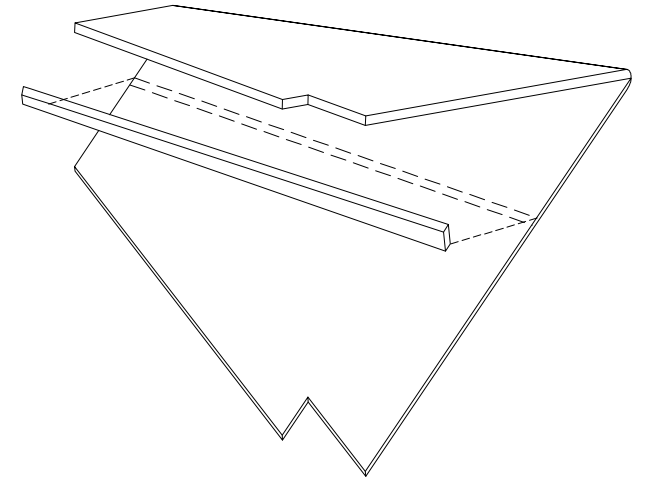
Jack Pignolo is affiliated with the Down East Soaring Club (DSC) of Topsham, Maine. He resides in the greater Houston, Texas area. He has a video of the BB X-1 flying available at <http://www.youtube.com/watch?v=7sj95jEoBVU>.

1.

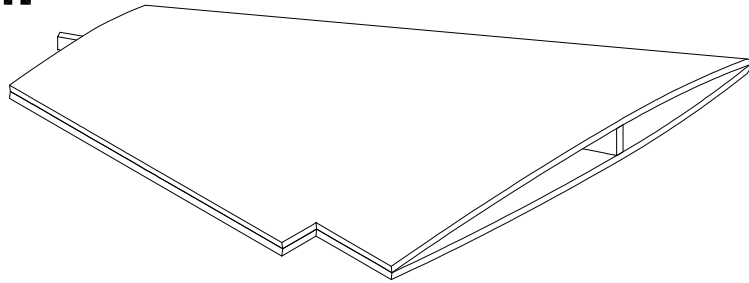
Assembly begins by taping the part sheets that are larger than a single printed page together. A guide has been provided to show how the part sheets are to be assembled.

2.

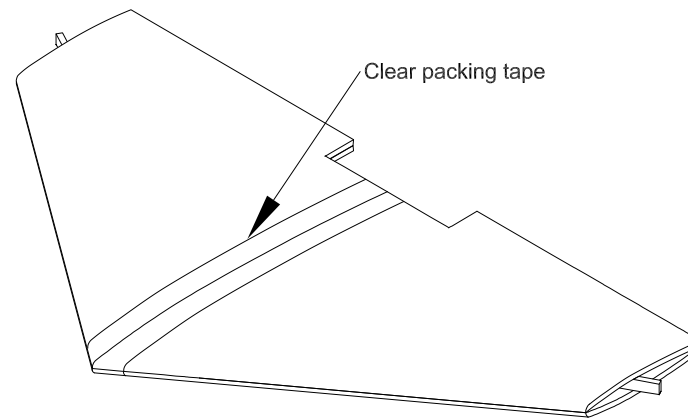
Cut out the individual part templates and place them on a set of folded foam panels. Spray adhesive (not contact cement) makes it easy to keep the part templates in place during cutting. Use the wing template to make each half as shown with the template leading edge on the fold line of the foam sheets. Cut the wing panels by cutting through both foam layers at the same time. Do not cut the opening for the motor and prop at this time. The other parts are cut after the wing panels using only one layer of foam.

3.

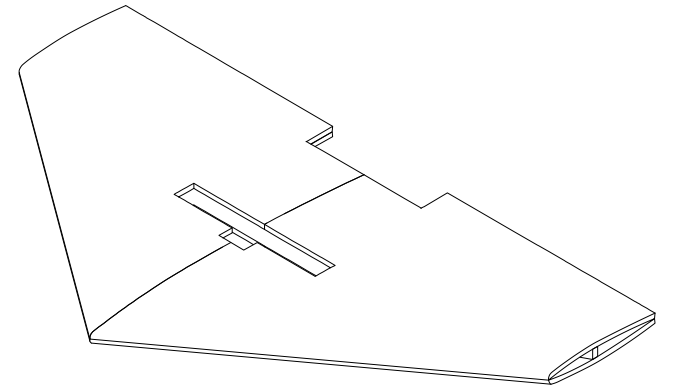
Mark on inside face of a wing panel set to show the spar location. Put glue on the spar edges and place the spar on the reference lines. The spar is longer than necessary to provide a handle for positioning.

4.

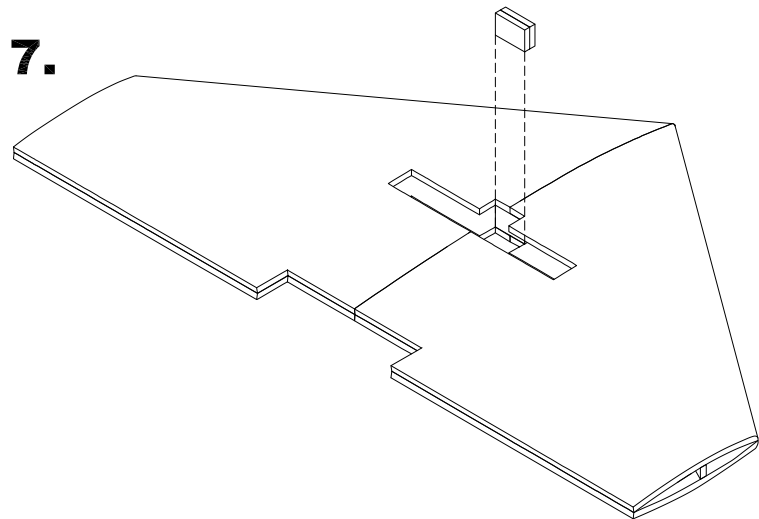
Place glue on the rear face of the wing panel set. Close the wing panel set at the rear. Use tape to hold the rear joint closed while the glue sets. Check to make sure the spar is vertical relative to the chord line. Adjust if necessary. Repeat for the other wing panel. Make sure the airfoil shape that is created with the top and bottom surfaces match as closely as possible on each wing panel.

5.

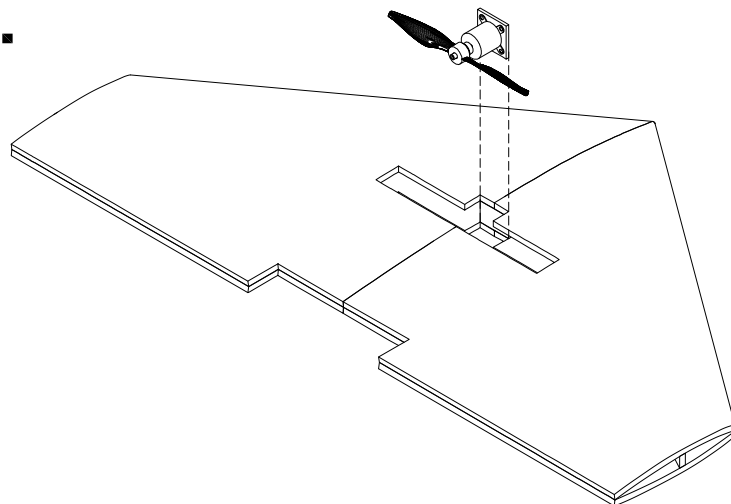
After both wing panels have been assembled, trim the spar halves so they are flush with the wing surface panels at the center. If desired some dihedral can be created by sanding the center of each panel so they will lay flat on your building surface when joined and the panels are laying top side down. This will produce 1/2" of dihedral at each tip. Apply glue to the facing edges at the center and join. Apply clear packing tape to the joint along the top and bottom.

6.

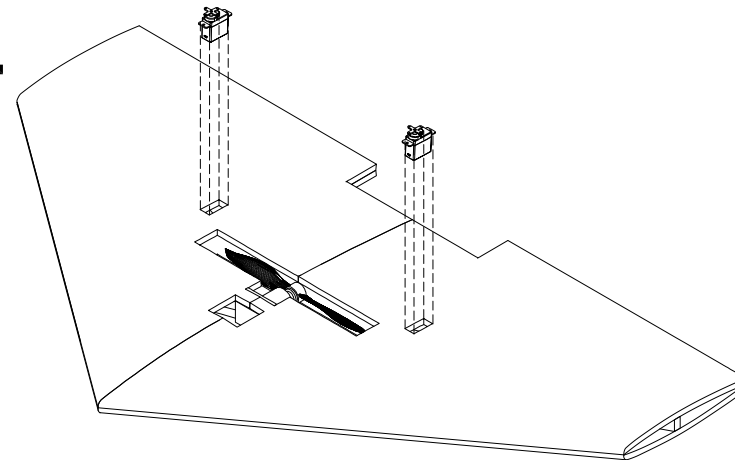
When the center joint glue has dried trim off the spar halves at the tip. Also cut the motor/prop opening in the center. This cut is made in both the top and bottom surfaces. Use the printed pattern to locate the cut.

7.

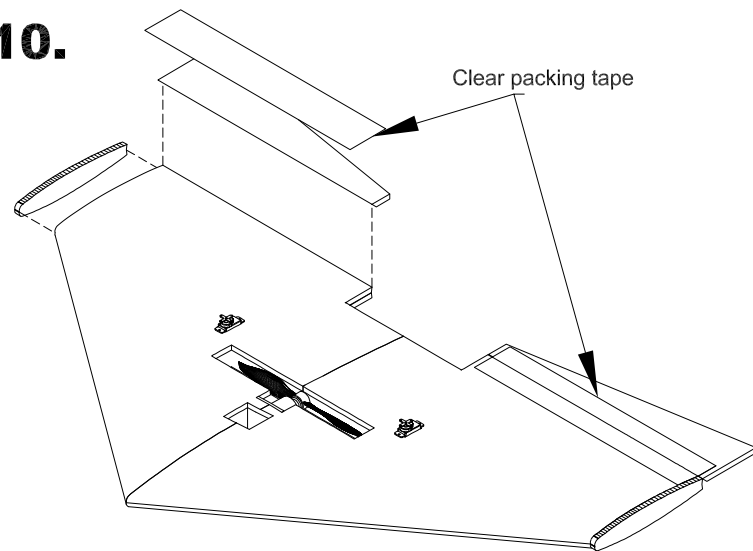
The gap between the top and bottom wing surfaces at the rear face of the motor mount area is filled with two layers of the 1/4" foam material. A pattern has been supplied for the filler block pieces.

8.

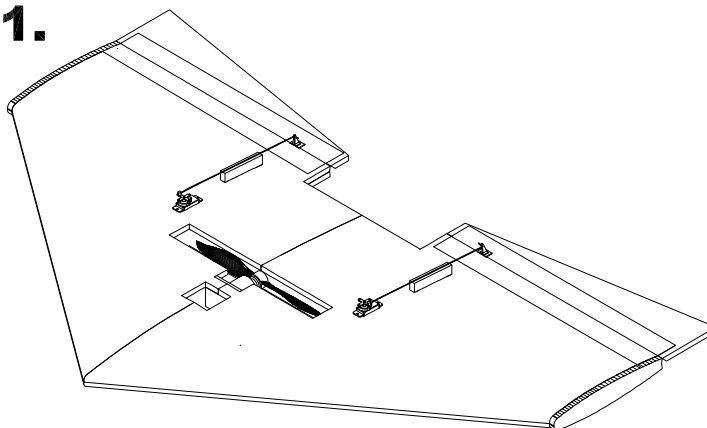
Using 1/8" plywood or another suitable material (paint mixing sticks are good) cut out a motor mount using the provided template. Attach the motor to the mount. Glue the assembly to the foam filler blocks and the top and bottom wing surface edges.

9.

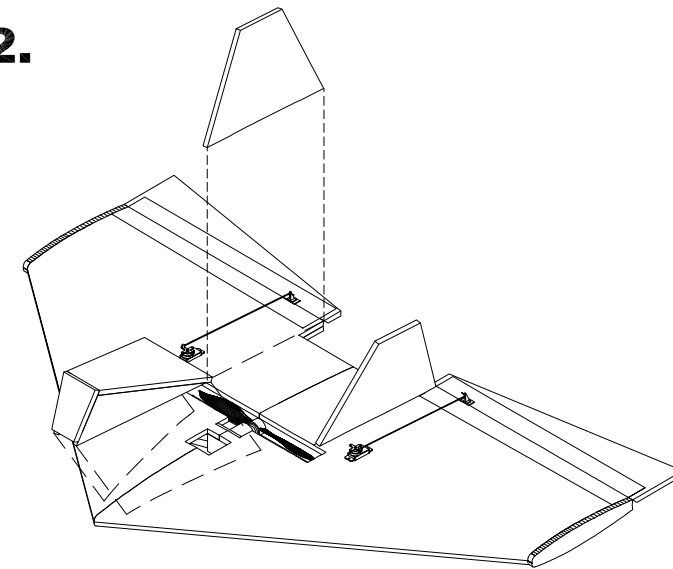
Mark and cut an equipment opening in the upper wing surface forward of the motor mount filler blocks and behind the spar. Mark the servo locations in the top wing surface. Cut openings that match the servos being used. Route the servo leads to the equipment opening.

10.

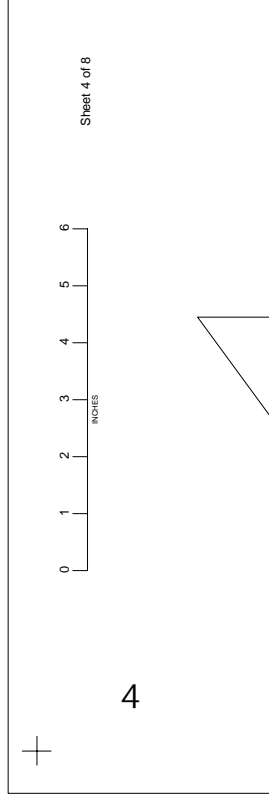
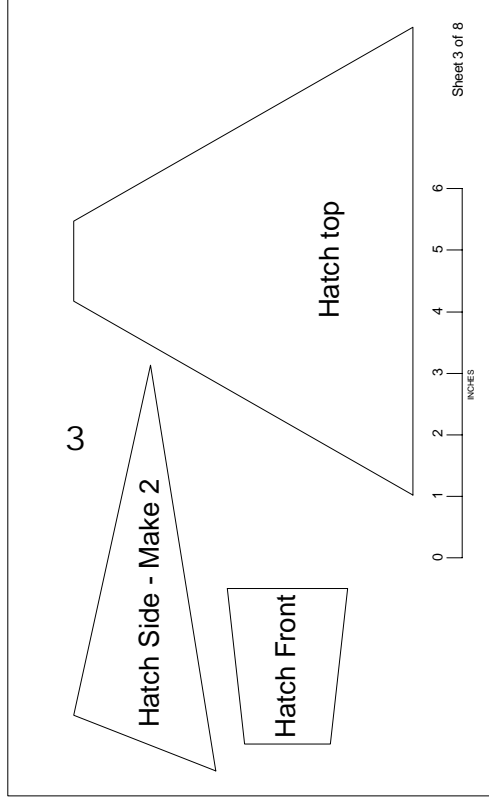
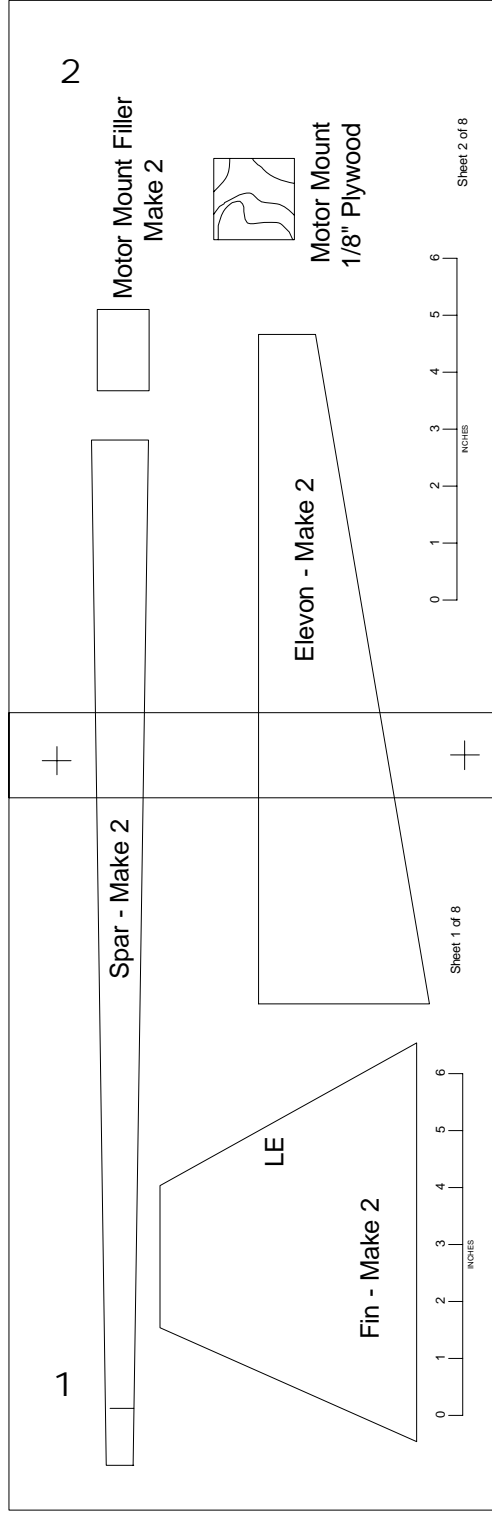
Use the assembled wing and trace around the tip profile on a piece of foam. Cut plates to close the wing tips. Glue them in place. After the glue is dry the tip plates can be sanded to match the wing surface profile. Cut a bevel on the leading edge of each elevon. Install the elevons using clear packing tape.

11.

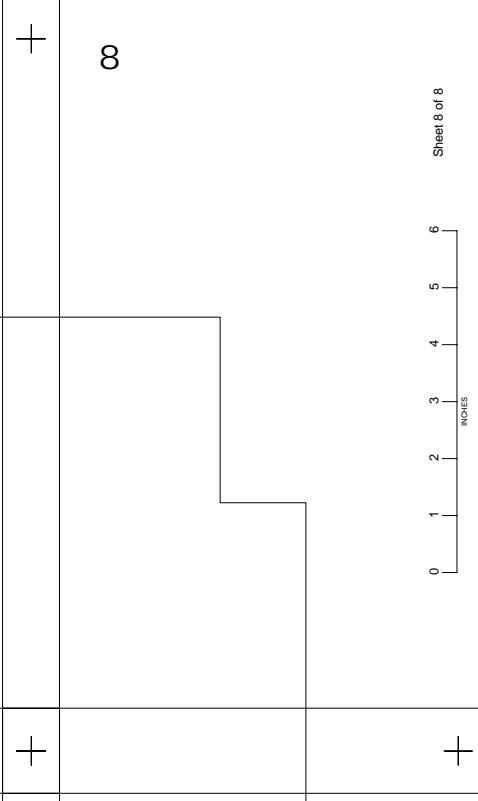
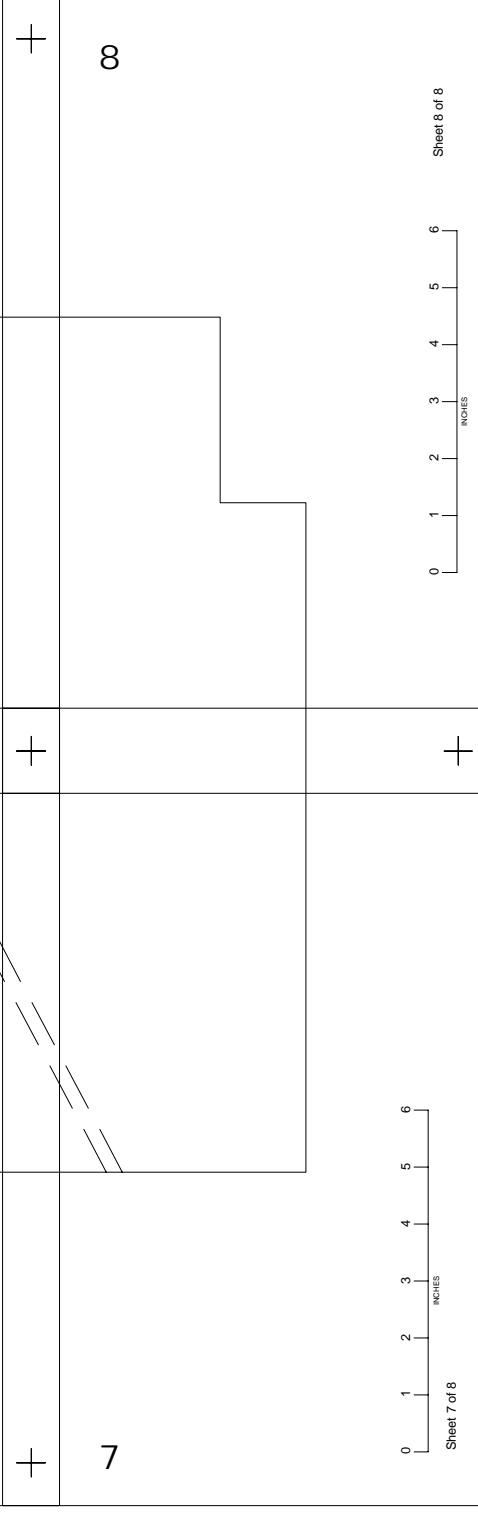
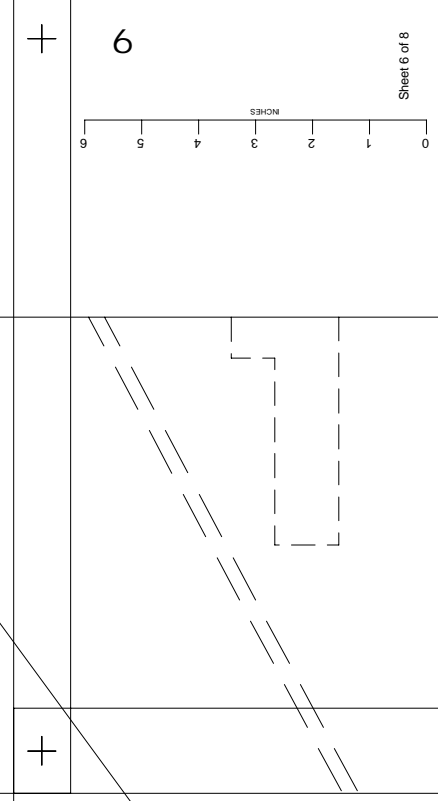
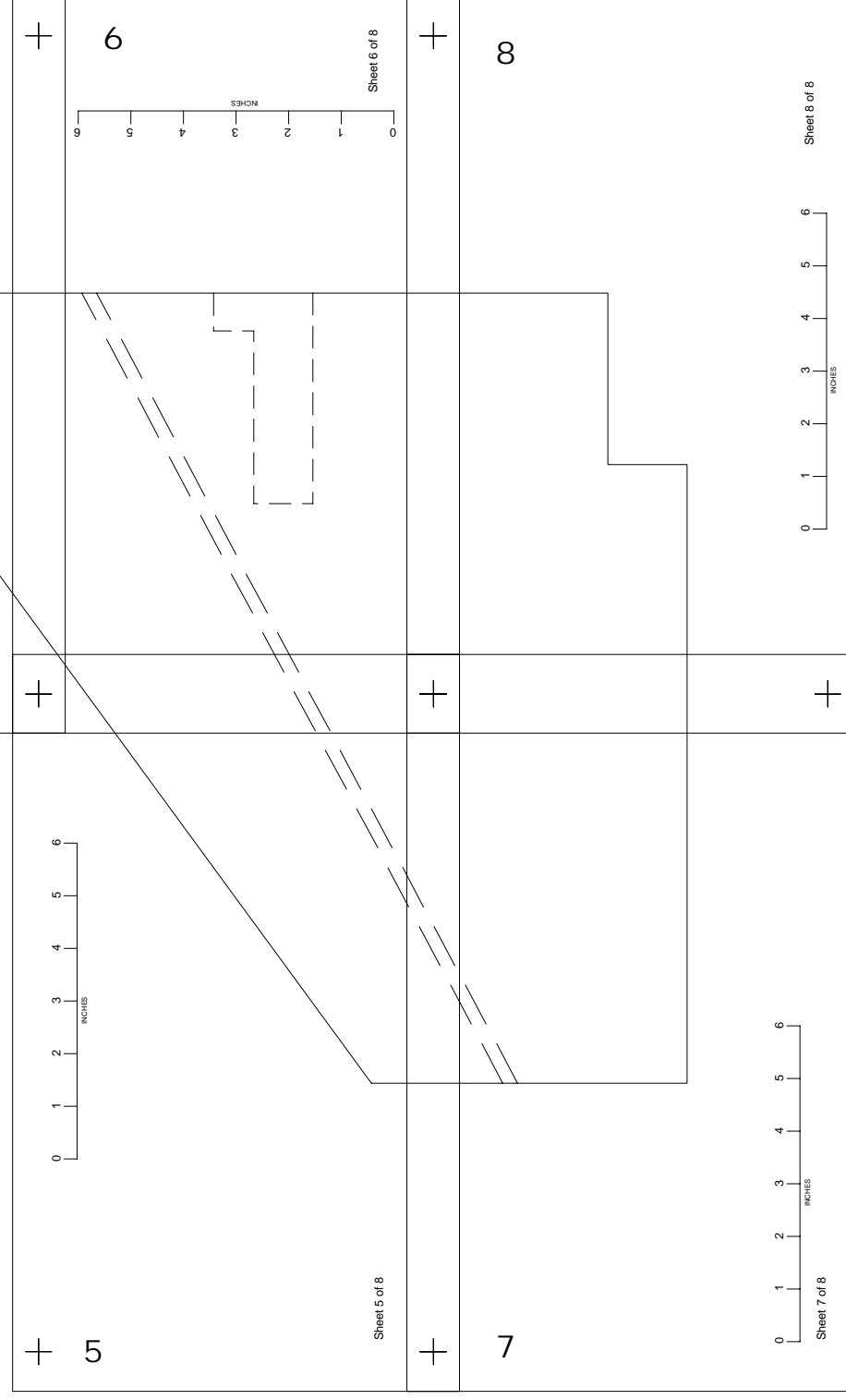
Install control horns on the elevons. Adding a piece of 1/32" plywood to the base area of each horn will add strength. Install the pushrods. Pieces of foam can be placed between the pushrods and wing upper surface to provide a place to mount a guide to help keep the pushrods from flexing. An alternative is to place a length of aluminum tubing over the pushrods before they are attached to the servo arm and control horn. The tubing is glued to the push rod to keep it from floating.

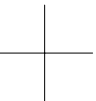
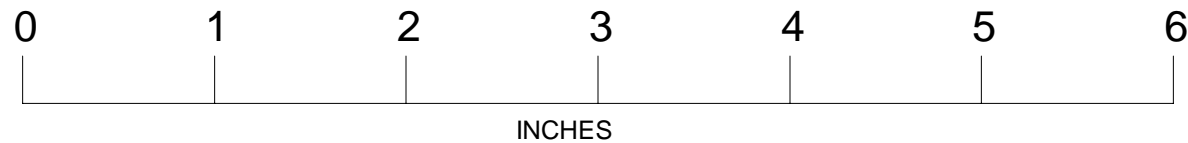
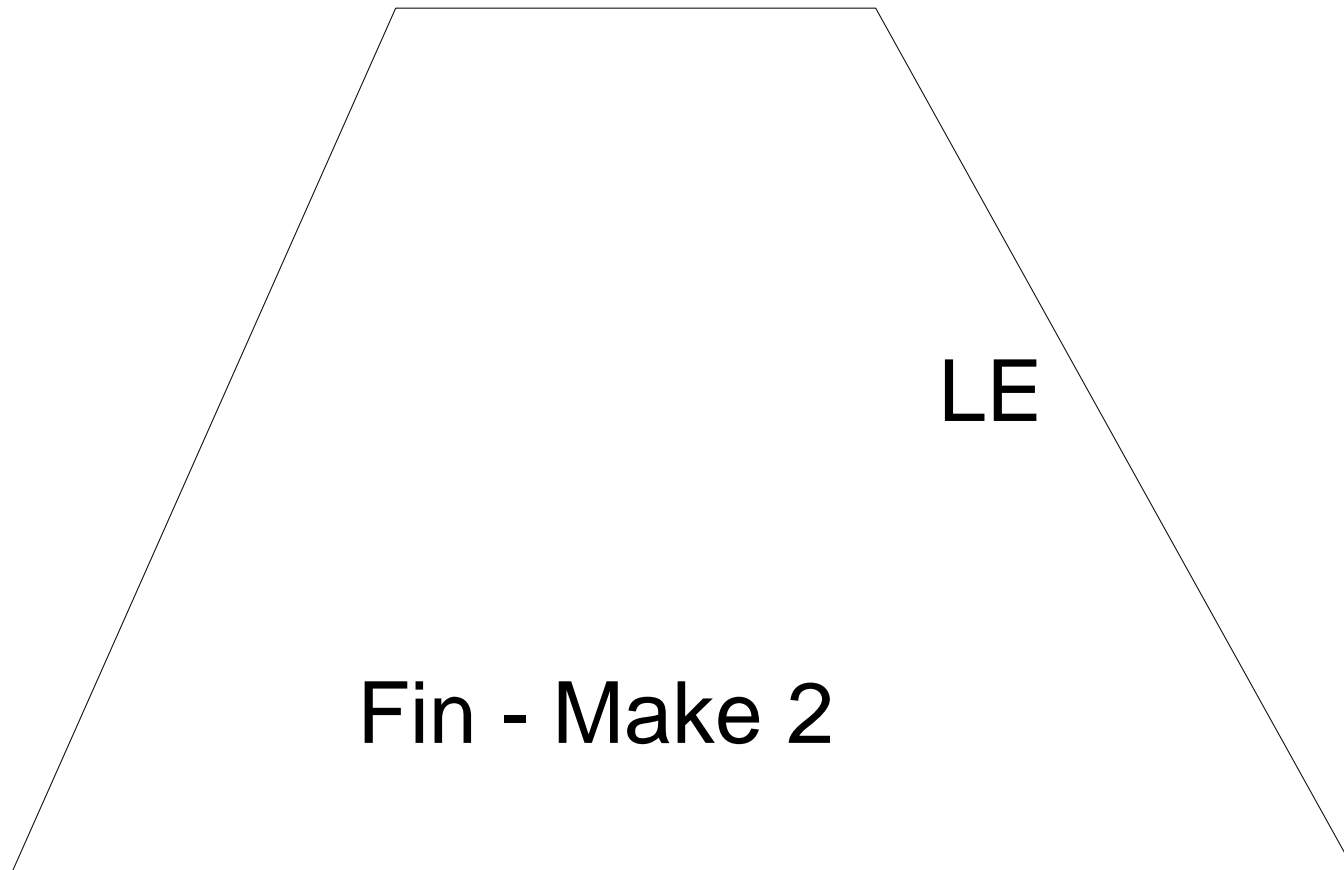
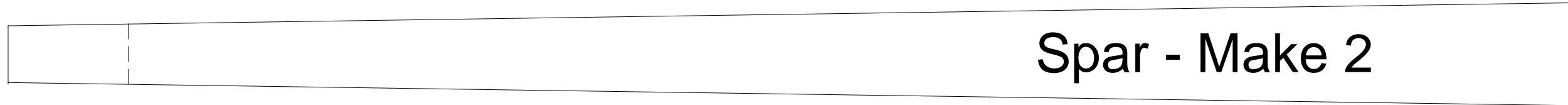
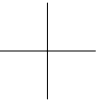
12.

Assemble the battery/equipment hatch. Use Velcro to hold the hatch in place. Velcro is also used to hold the battery pack. Glue the fins in place. They are slanted toward each wing tip by 10 degrees or so.



How the printed sheets fit together



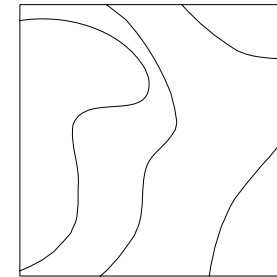




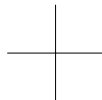
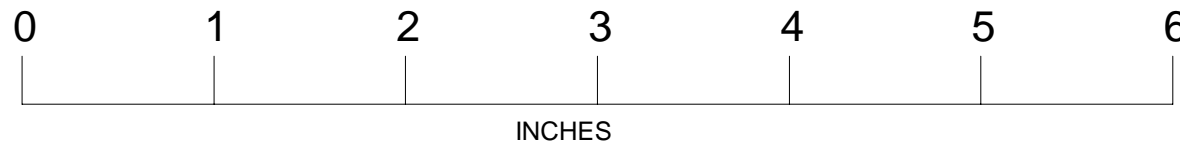
**Motor Mount Filler
Make 2**

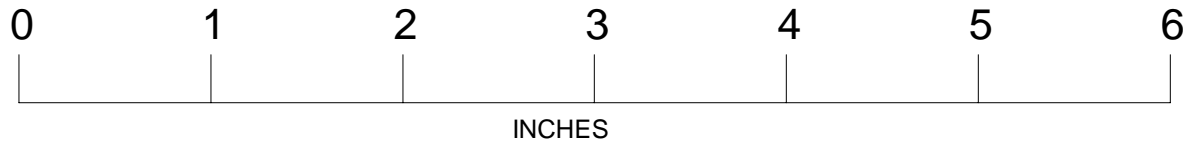
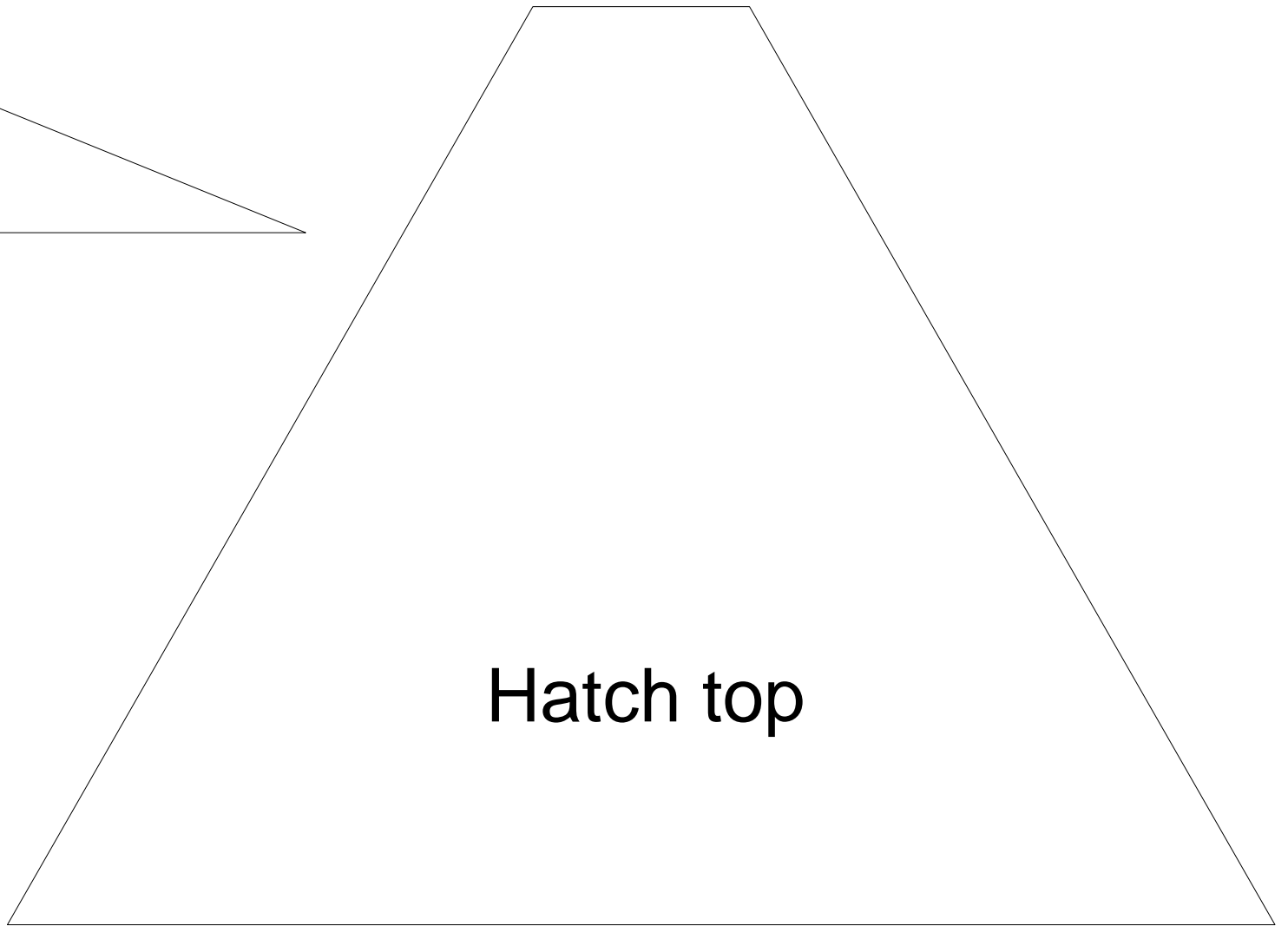
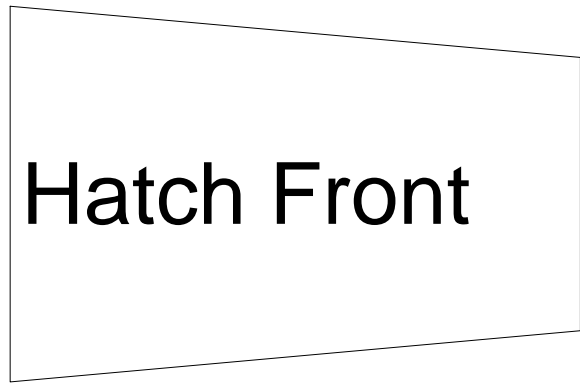
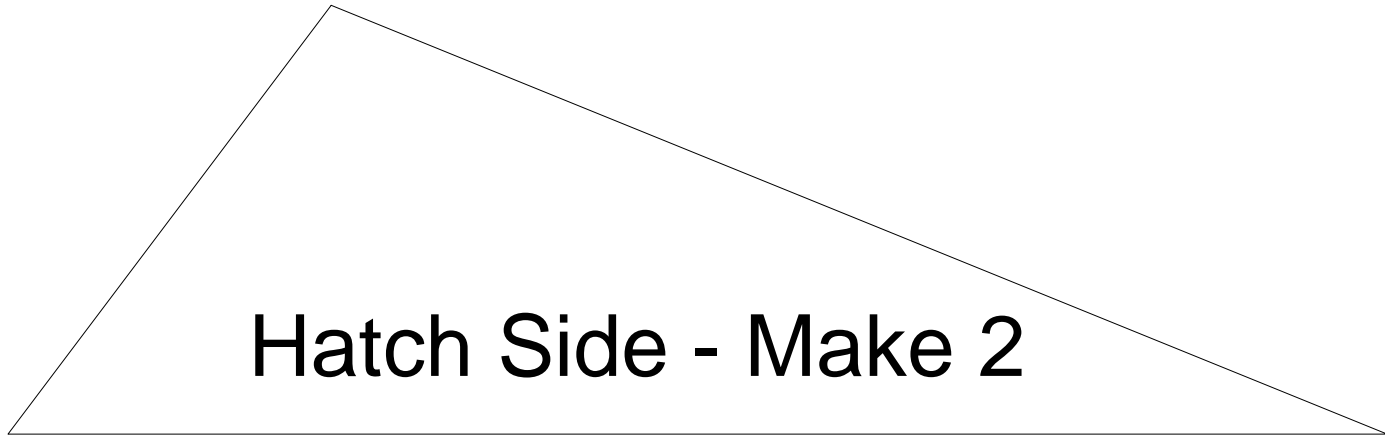


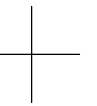
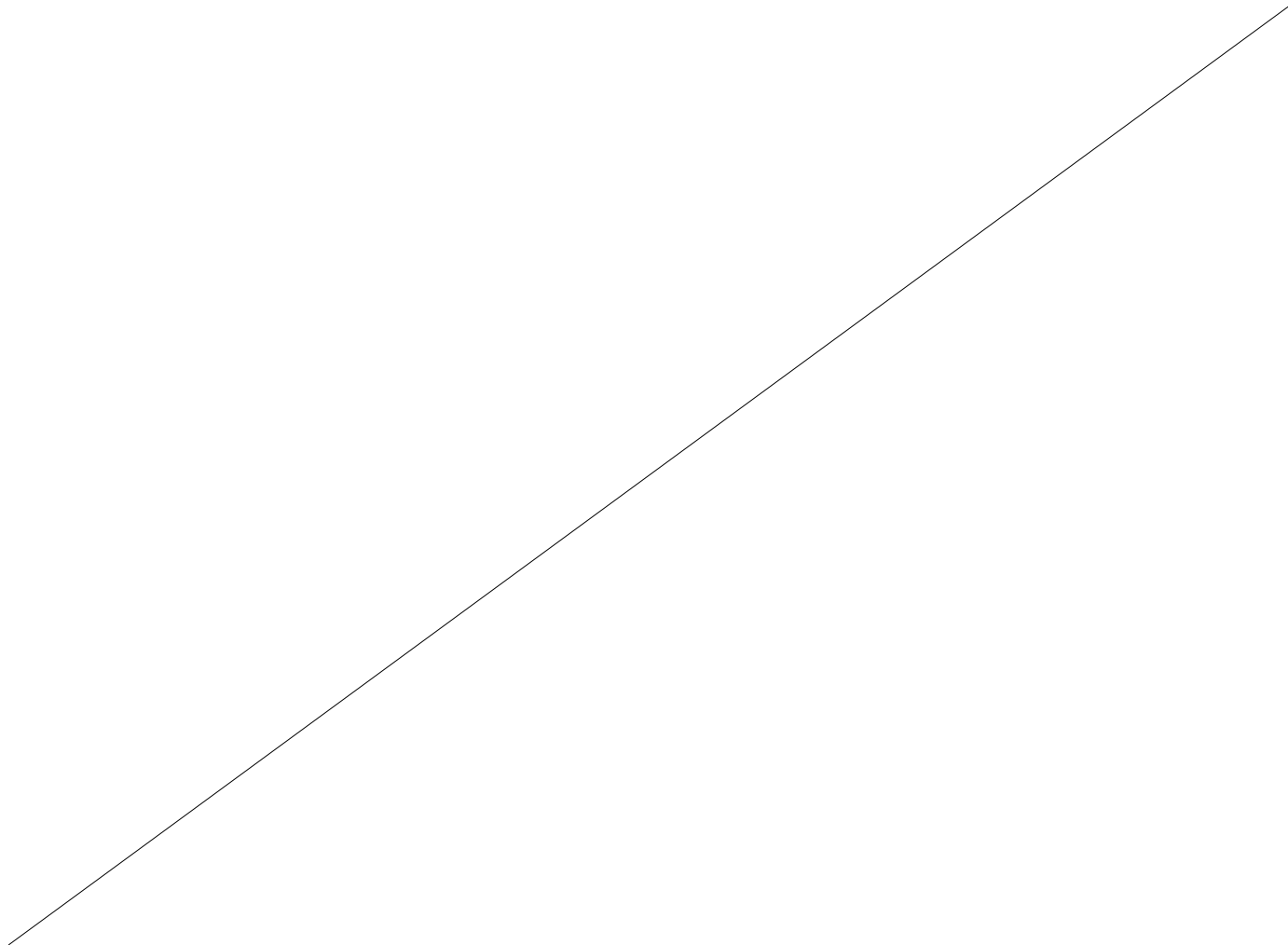
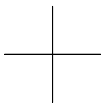
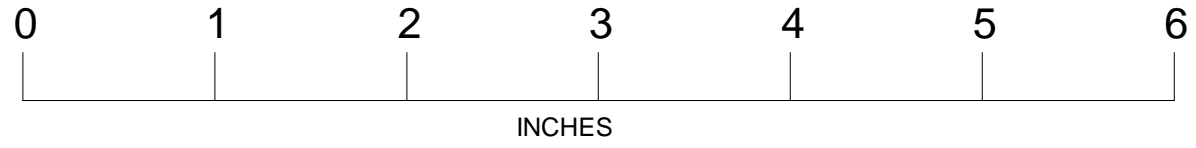
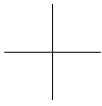
Elevon - Make 2

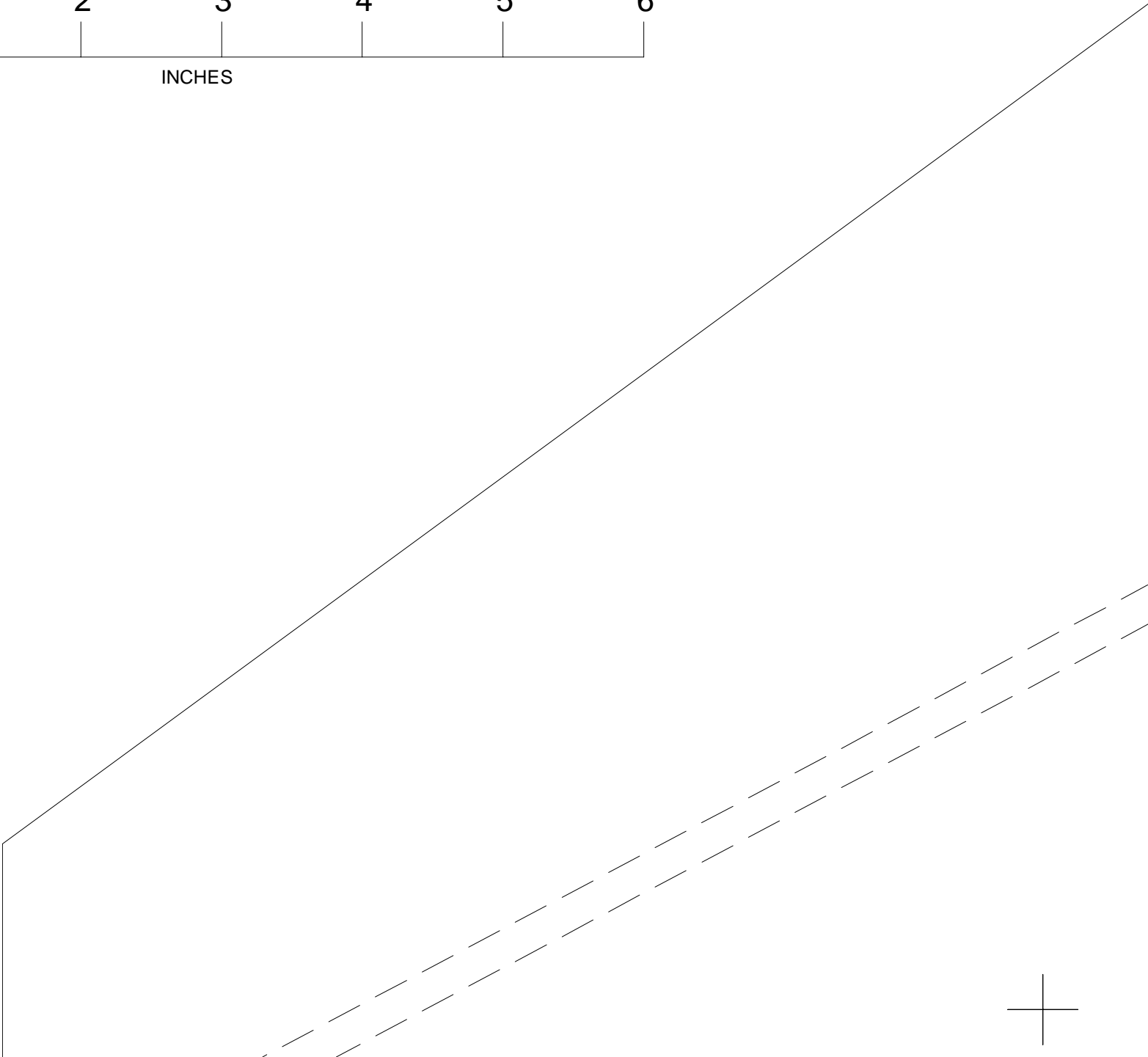
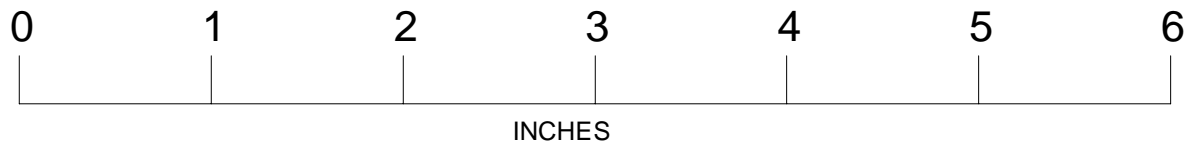
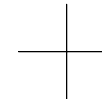


**Motor Mount
1/8" Plywood**

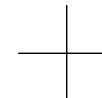


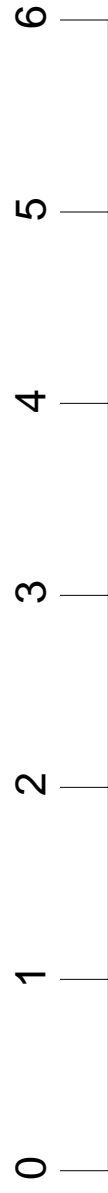
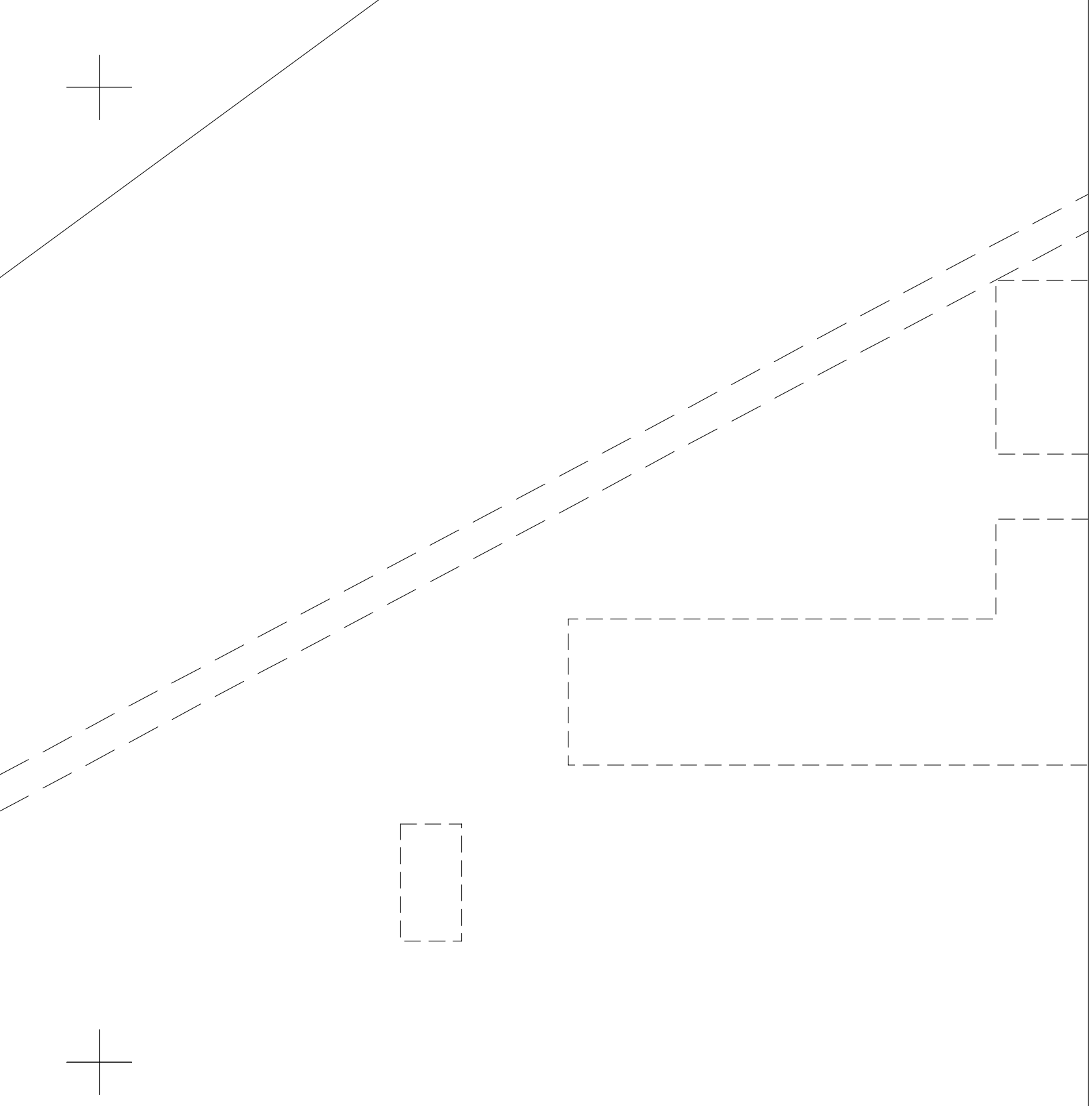


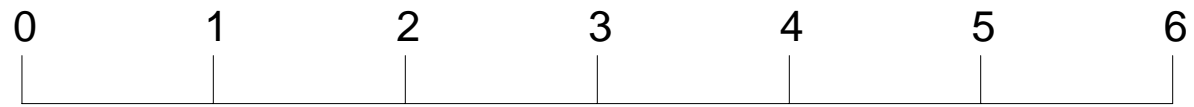
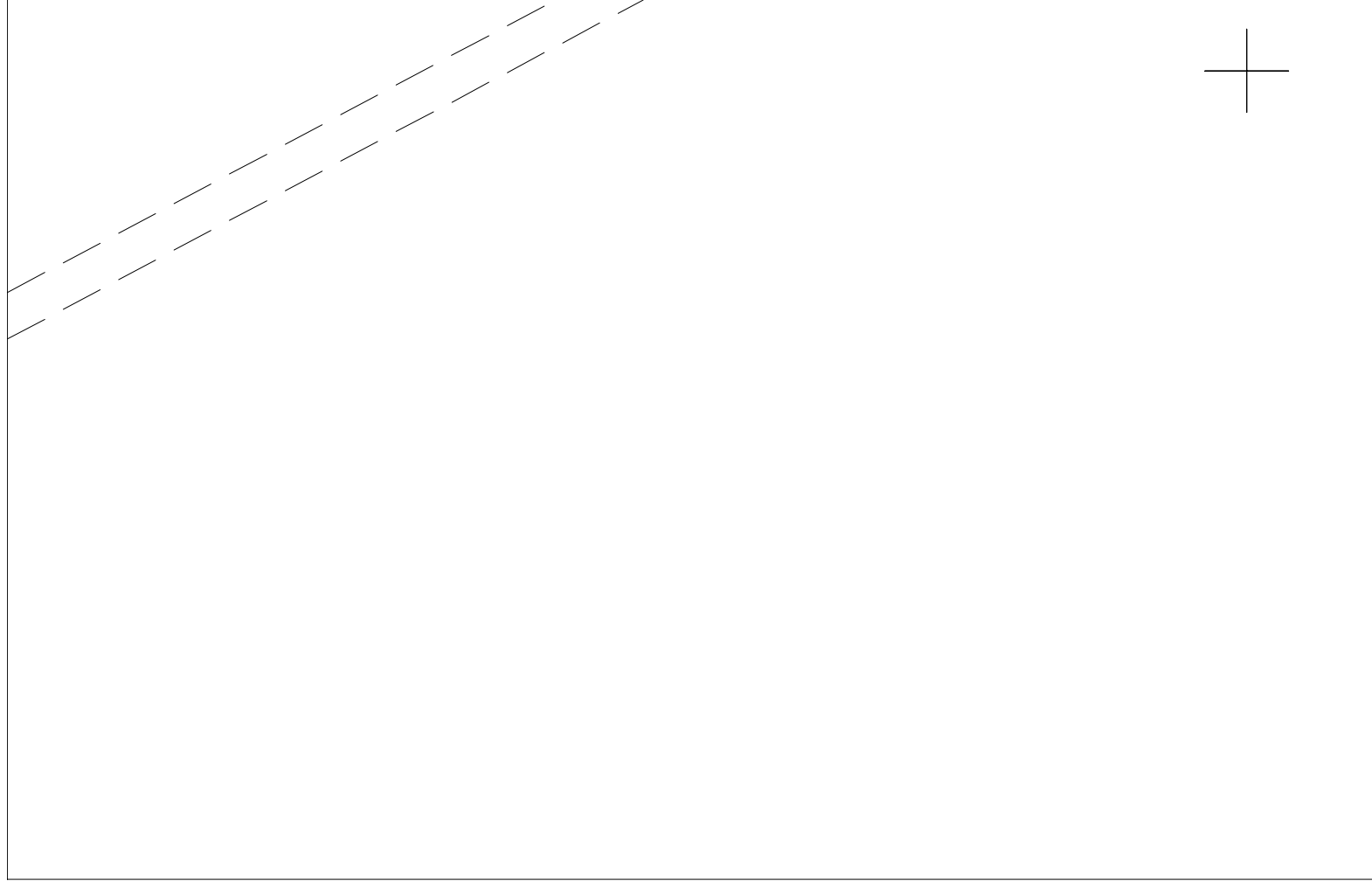
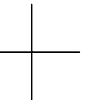
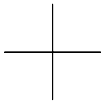




Sheet 5 of 8







INCHES

