

## Instruction Manual for the Marston 52" Pterodactyl

Thank you for purchasing this 52" Pterodactyl kit. It is unlikely that anyone else at your flying field has anything like this. It is truly a distinctive design, and yours will no doubt be different from mine, making it a one of a kind model.

This is not a beginner's kit, but it does not require expert building skills. The kit is fairly complete, and if you have built and covered a wood model before you should have no trouble here. Take your time, be careful and have fun with the build. You will need thin and medium CA to assemble the airframe. **Much of the gluing can be done by getting the wood in position first and then using thin CA which will wick into the wood joint. Be sure to dry fit pieces first before applying glue.**

This airframe requires some experience to fly, but if you have successfully flown a plane with ailerons, you should have no trouble at all launching, flying and landing this bird. The wing loading is very reasonable, and if set up properly there should be no surprises.

**This instruction manual is available as a PDF on line at [www.pteroworks.com/ptero\\_52.htm](http://www.pteroworks.com/ptero_52.htm). The photos in this manual can be enlarged for greater clarity in the PDF.**

Wingspan 52 1/8"

Length 31"

wing area 330 square inches - 2.29 square feet

weight RTF 24-28 oz. (with a 3s 2000 mah li-poly battery)

wing loading 11 oz/square foot

**Included in this kit:** 15 sheets of laser cut wood (all wood required), 65" x 36" rolled plans, front and rear carbon wing spars, 1/8" x 3/4" carbon wing locator, 1/2" aluminum wing locator tube, #6-32 x 2" nylon wing bolts and blind nuts, instructions.

Additional gear required: two small brushless outrunner motors with a kVa of about 1400-1500 rpm/v (Axi 2208 or equal), two 6 x 5.5 props, two 10-20 A ESCs, four mini servos (HS-45HB for tail and HS-65HB for ailerons) and a 2000 mah 3s Li-poly.

Requires covering material (Ultracote or Oracover recommended).



Thanks,  
Ron Marston

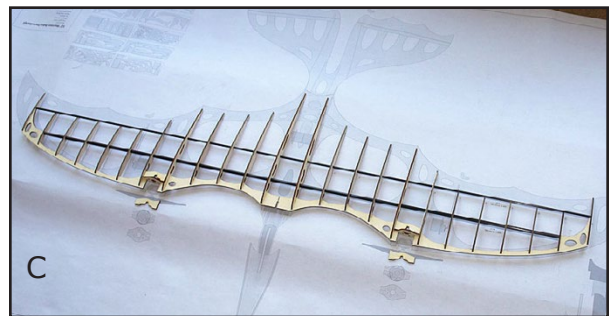
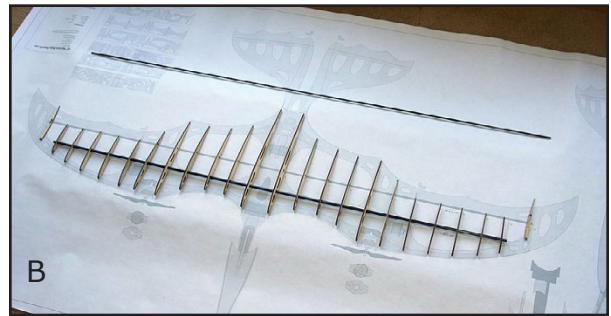
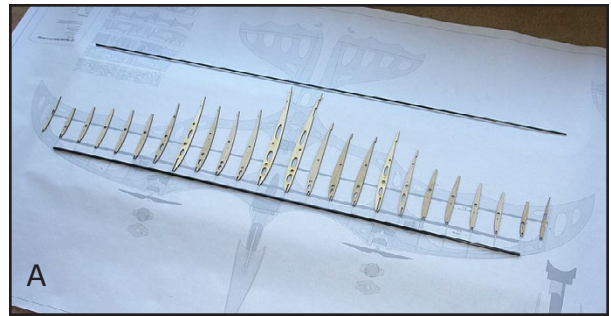
## Wing

1. Cut carbon spars to proper length.  
forward spar - .240" dia. **41.40"**  
rear spar - .156" dia. **45.40"**
2. Layout all ribs on the plans then carefully feed them onto the forward spar (.240").  
**Do NOT glue yet.** (B)
3. Carefully feed rear spar (.156") onto ribs. Spin spar as you push to facilitate feeding.  
**Do NOT glue yet.** (C)
4. Attach 4 leading edge pieces. Lay parts on plan to facilitate alignment. **Do NOT glue yet.** (C)
5. Glue doubler/connectors to leading edges at the motor area and at the center of the wing. Then glue motor mounts after ensuring the hole pattern will work for your motors. If necessary, use supplied blank motor mounts and drill appropriate holes for your motors. Check motor mount incidence angle for 0 to 1/2 degree of down thrust. (C)

Glue rib (12) in place on left and right sides of wing.

**Note: Any twist in the wing should be turned to create wash-out (trailing edge of wing at tip is raised compared to trailing edge at root).** (D)

6. Glue bottom trailing edge center ply strengthener along with balsa center bottom trailing edge.
7. Glue remaining bottom trailing edge balsa pieces to ribs. **NOTE: many of the wing sheeting pieces are different top and bottom. Top pieces are marked with a "T" and bottom pieces are marked with a "B".** Assemble with "B"s and "T"s facing inward to avoid having them show. (D)
8. Sand rough airfoil into wing tip pieces and glue to rib 12 on left and right sides. Sand about 5 degrees into face where it mates with rib 12 so the wing tips angle up slightly.
9. Lay wing on plans and ensure ribs are in proper position and that there is no twist in the wing. Use thin CA and **glue all ribs to the carbon spars and the leading edge pieces.**
10. Stack both screw tower pieces together and glue in place at center trailing edge where the screw holes are. Sand top to match rib 1 profile. (E)
11. Sand then glue top center trailing edge piece to ribs.





12. Glue remaining top trailing edge pieces to ribs. (F)

**NOTE: Wing sheeting is laser cut oversized to allow for sanding to a perfect fit. Soak sheeting in water for a few minutes first to ensure it conforms to compound curves.**

13. Glue bottom covering behind motor mounts. Check fit of motors first to ensure mounting clearance. Mount motors at this stage if necessary. (G)

14. Glue bottom leading edge sheeting. Sand sheeting pieces as necessary to get a good fit. (G)

15. Glue 1/8" x 3/4" carbon rod wing retainer into gap at center leading edge of wing. (H)

16. Check servo fit and glue in doublers for aileron servos. Glue or tape servos in place. Servo arms should extend out on the bottom side of the wing. Run wires for servos through forward holes in ribs and be sure to allow about 5" of wire extending out of the center of the wing. (I)

17. Run wires for motors through same forward holes in ribs as the servo wire. (note: see ESC wiring note on last page) (I)

18. Carefully sheet top of wing. Sand pieces as necessary to ensure a good fit. Soak sheeting in water to ensure sheeting conforms to compound curves. If you desire, cut access hatches into sheeting for servos. (J)

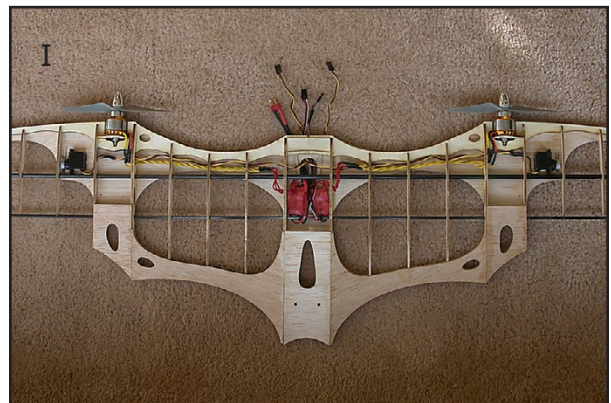
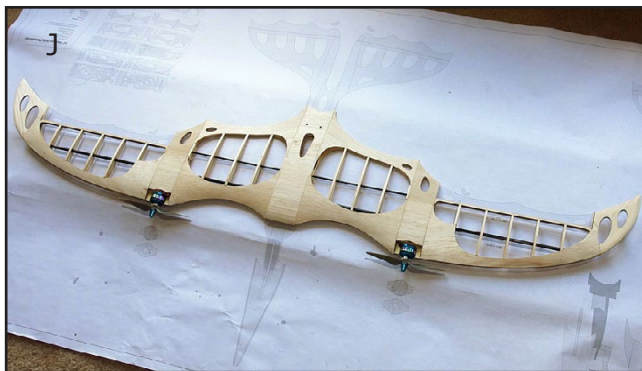
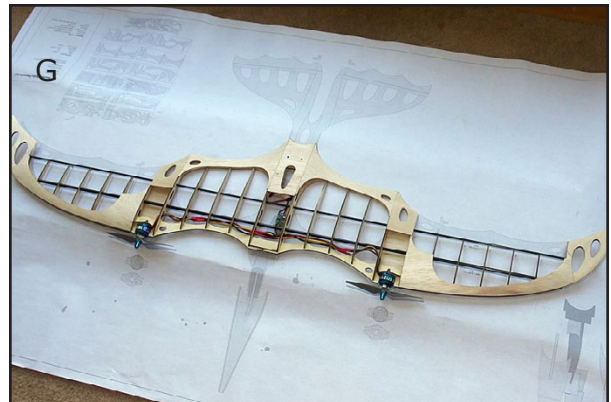
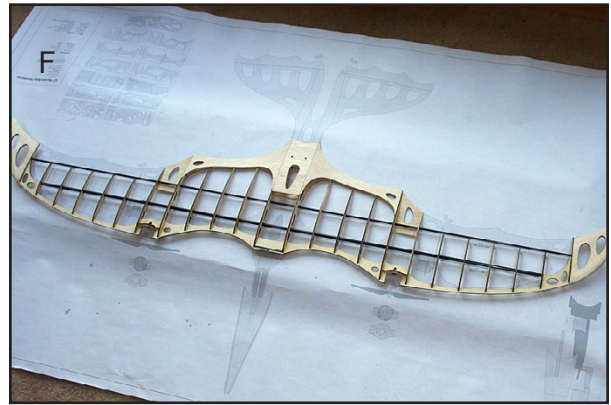
19. Glue balsa pieces to rear carbon spar where ailerons will attach. (J)

20. Use 3/16" wide balsa strips to cap all ribs, top and bottom. (J)

21. Use scraps of wood to fill gaps around motors, and anywhere else it's needed.

22. Sand and fill wing as necessary to make it pretty.

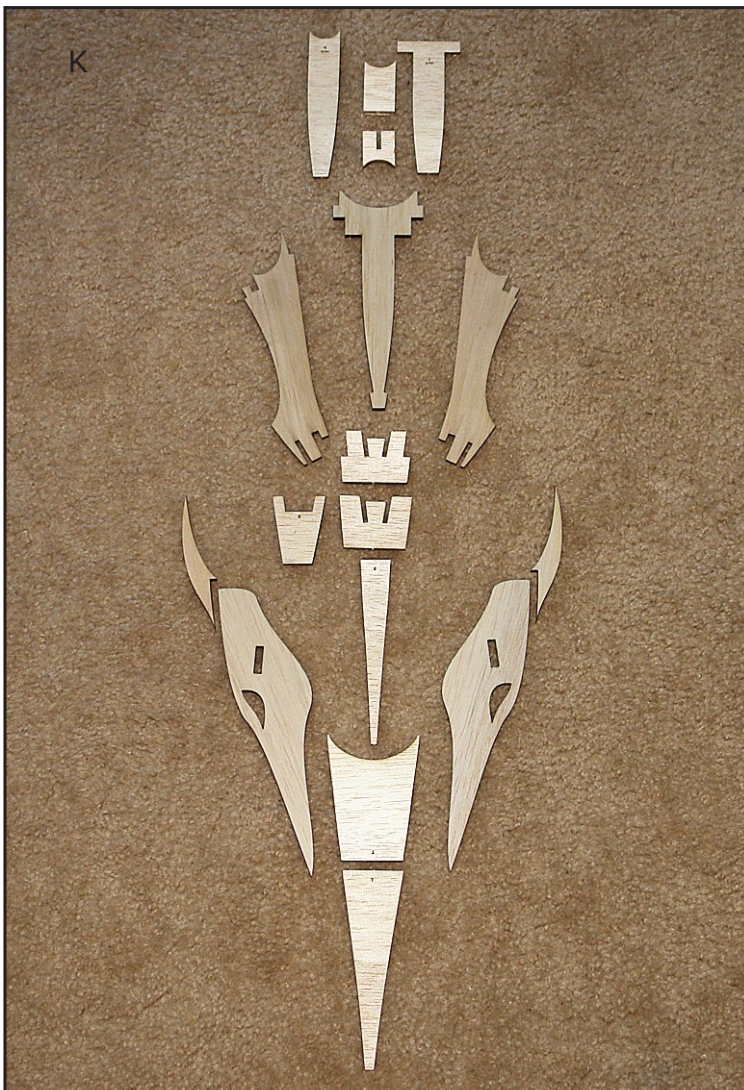
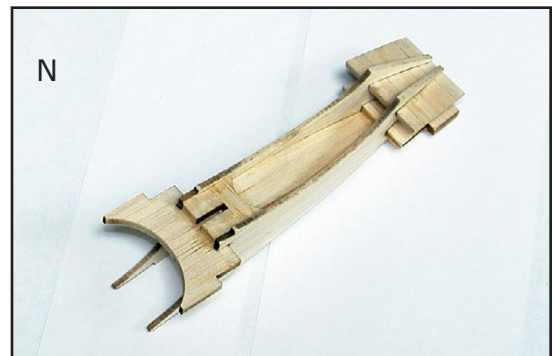
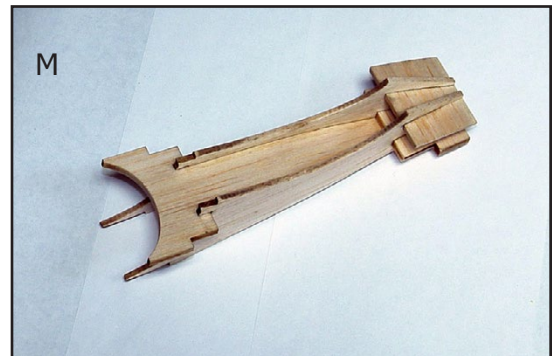
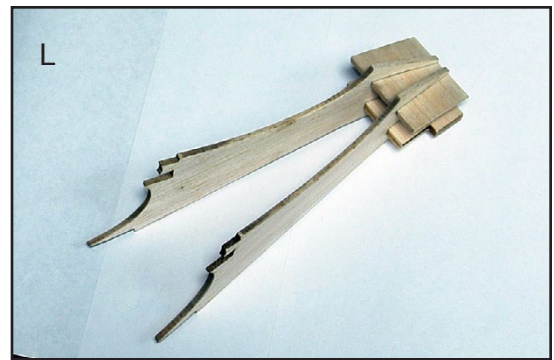
**NOTE: Spend time on the sanding - it can transform a mess into a thing of beauty!**





## Head and Neck

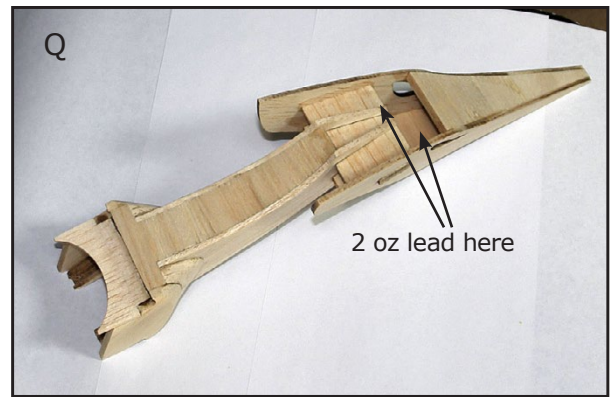
1. Carefully remove all head and neck parts from the balsa sheets and sand as necessary. (K)
2. Fit 2 head cross pieces to neck sides. (L)
3. Fit 3/16" center neck piece in-between neck sides. Hold assembly together and wick thin CA into joints. (M)
4. Fit top 3/16" center wing locator piece and glue with thin CA. (N)
5. Fit, sand and glue shoulder (3) pieces to neck assembly. (O)
6. Fit and glue top and bottom short-grain neck sheeting. (O)
7. Carefully fit shoulder pieces (1) and (2) together, sand angle and glue. Check fit with shoulder (3) pieces. (P)
8. Glue shoulder pieces from step 7 to neck base assembly.





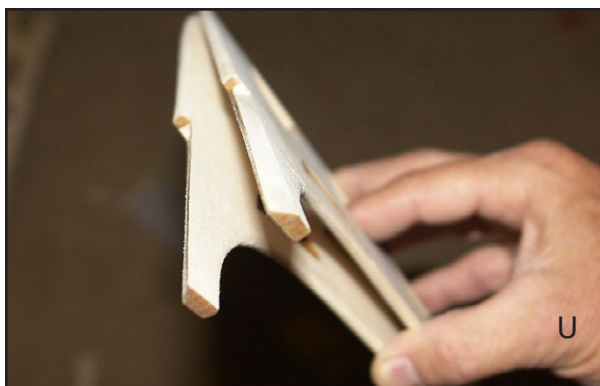
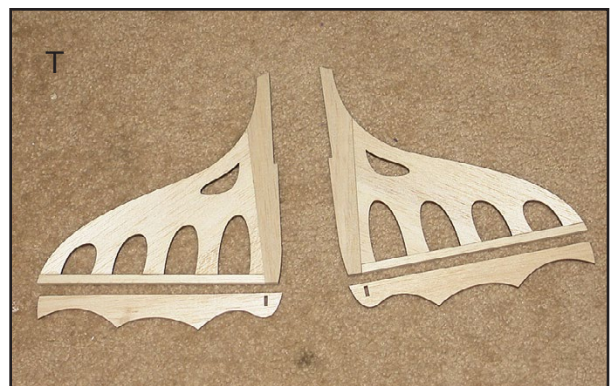
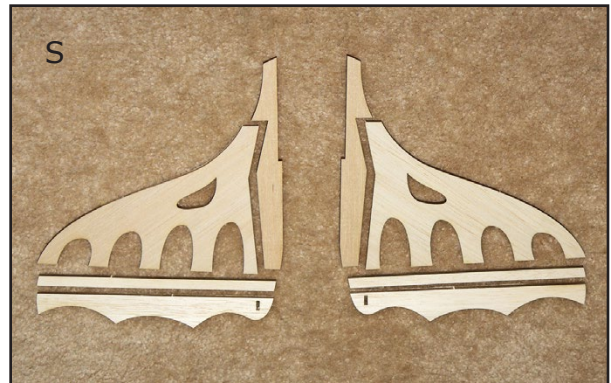
## Head and Neck (cont'd)

9. Sand diagonal angle into cross pieces that connect the head to the neck (from step 2) as necessary and fit and glue head sides to diagonal pieces. (Q)
10. Sand and fit bottom head sheeting. Glue in place with thin CA. (Q)
11. Glue about 2 oz. of lead in cross pieces in head before gluing top head sheeting in place. (Q)
12. Fit and glue top forward sheeting in place, then fit and glue top rear sheeting in place. (Q)
13. Sand assembly until pretty. (R)



## Tail

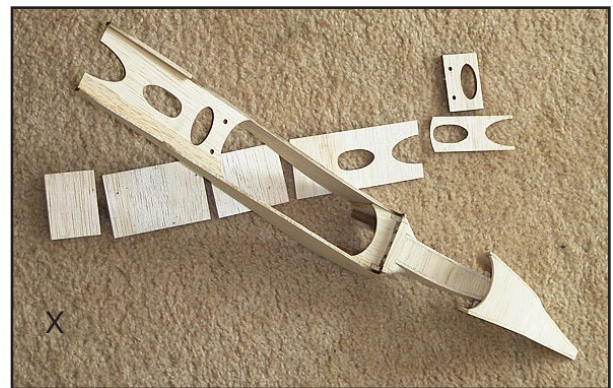
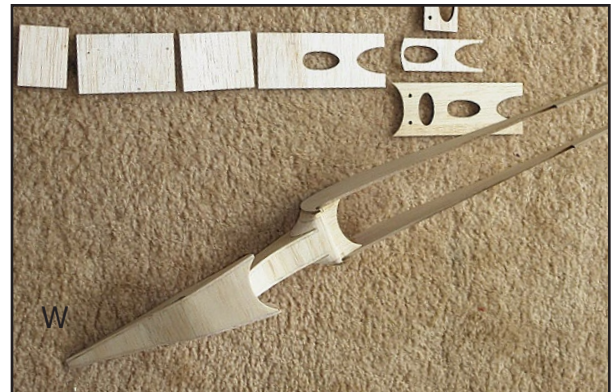
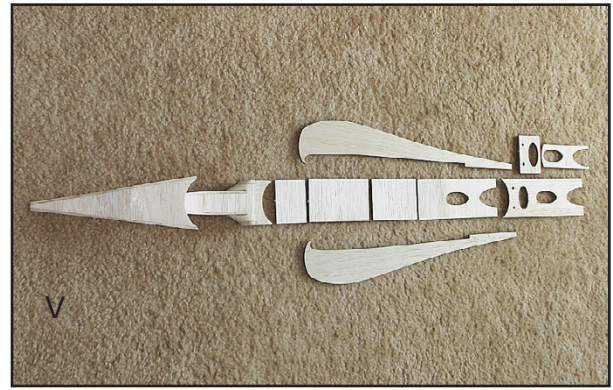
1. Carefully remove all tail parts from the balsa sheets and sand as necessary. (S)
2. Sand square all surfaces that will but-glue together.
3. Fit and glue base pieces to main tail pieces. (T)
4. Glue trailing edges to main tail pieces. (T)
5. Sand leading edges round, and taper trailing edges.
6. Sand or cut a 50 degree angle into the bottom forward bases where they will attach to the body. Be sure to keep track of which will be the left and right tail pieces. (U)
7. V-tail angle should be 108 to 112 degrees. Use supplied angle jig to set tail angle on body.
8. Sand assembly until pretty.





## Body

1. Carefully remove all body parts from the balsa sheets and sand as necessary. (V)
2. Fit and glue Head/Neck assembly to one side then the other of the main body. Check alignment against plans and make sure both sides of the body are square before gluing. (W)
3. Glue top rear (long grain) piece to the body sides, taking care to align the top of the surface flush with the top of the sides. (X)
4. Glue 3/32" center doubler to long grain rear piece from previous step. (X)
5. Fit and glue 3/16" screw hole doubler to under side of top rear piece. (X)
6. Fit and glue 3/16" thick rectangle pieces, starting with the shortest piece in the groove at the bottom of the shoulders to form the bottom of the body. Gently bend pieces to get some curvature to match the body. (Y)
7. Fit and glue 3/32" thick sheeting at the rear bottom of the body. (Z)
8. Sand or cut a 50 degree angle into the sides of the body at the top rear where the tail pieces will rest on them. Fit the tail pieces and sand until the angle and alignment are good, then glue tail pieces in place. Check with the wing in its saddle to ensure everything will be square. (Z)
9. Check fit of wing to body and alignment of bolt holes. Fit and glue #6-32 blind nuts under the wing screw down holes.
10. Sand assembly until pretty.





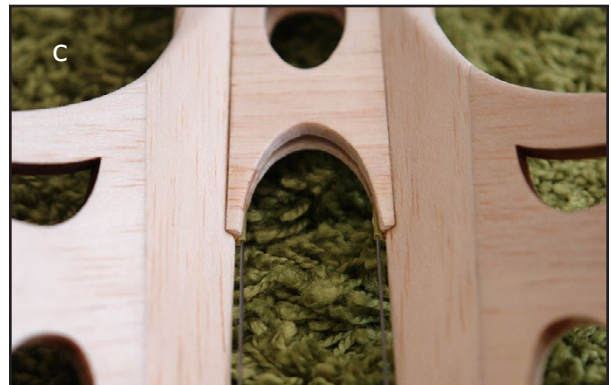
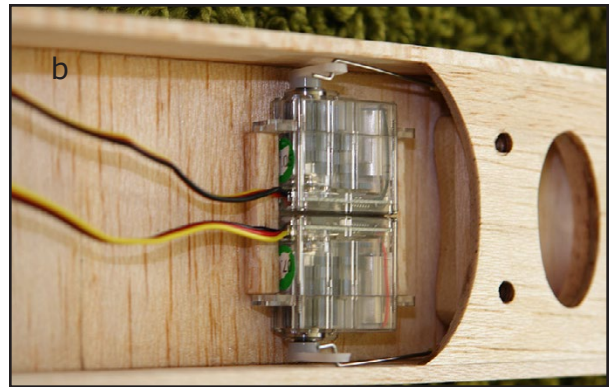
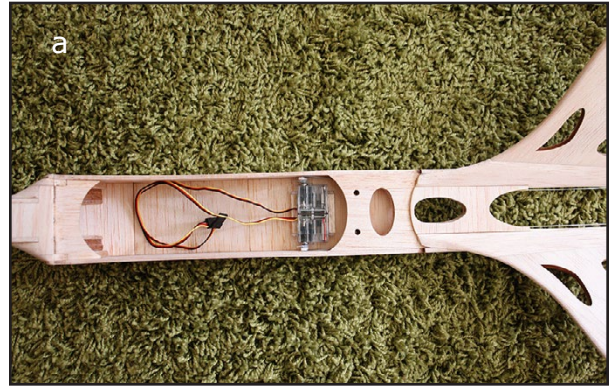
## Final Assembly

1. Sand ailerons and rudder-vators to a nice taper at the trailing edges. Also sand an angle where surfaces will attach to wing and tail to allow for downward deflection.
2. Glue supplied control horns into all 4 control surfaces. (This may be better to do after covering).
3. Check the fit of the wing in its saddle and sand if necessary.
4. Fit and glue 1/8" ID aluminum tube into notch in neck. Be sure it mates well with 1/8" carbon rod on wing and that the wing lays flat in its saddle.
5. Assemble horns for the head (don't glue to head until after covering).
6. Mount the tail servos in the rear of the body. Use small HS-45B or equivalent servos. Run the linkage out the rear of the body (see a, b, c).
7. Sand everything until pretty.

8. Cover the Pterodactyl. Allow yourself at least two days to do this. Go slow and take your time, you will be happy you did later. Because of the unique nature of this airframe, some parts of it will be a challenge to cover well. The neck and leading edge of the wing have compound curves. A trim iron will be helpful to cover these areas.

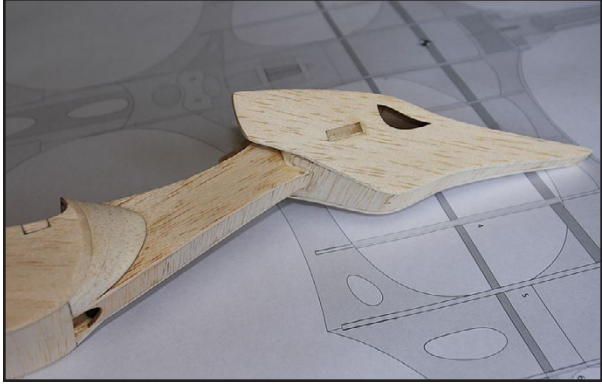
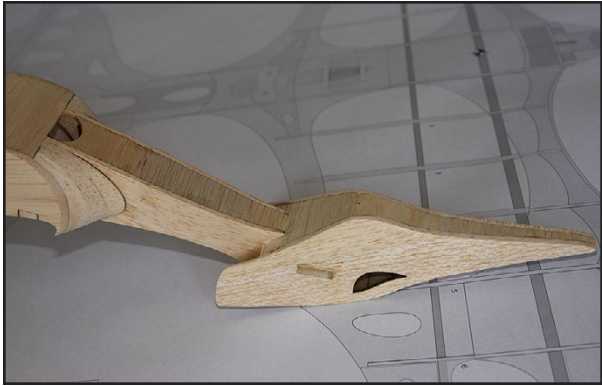
I STRONGLY recommend using Ultracote or Oracover or a similar stretchy material. I do NOT recommend using Monocote, as it does not stretch as well. Balsarite can be used to facilitate the adherence of the covering to the wood.

9. Cut two #6-32 x 2" nylon screws to proper length and use to secure the wing to the body.
10. Use a good lightweight hinge tape (like Graupner's) and tape the control surfaces to the airframe.
11. Hook up the servos to the control surfaces. Use .050"-.060" Z-bend wire for the ailerons, and something light-weight in a housing for the tail surfaces (rudder-vators).





Final Assembly pictures





## Flying the Marston 52" Pterodactyl

The Center of Gravity should be set to the center of the forward (.240" diameter) spar, plus or minus 1/8". Do not attempt to fly with the C/G outside of this range. One to two ounces of lead in the head will likely be required to achieve this. Even with the lead, the completed airframe should weigh no more than 28 ounces with a 2000 mah 3S Lipoly battery. The wing loading is in the parkflyer range, so you should have no surprises with the flight characteristics.

Control surface throws should be high for the ailerons and low for the elevator (rudder-vators). Set differential (more up travel than down) for the ailerons to about 50%. Aileron throw should be 3/4" - 7/8" up and 3/8" down, measured at the inside edge. You can set up spoilerons for shortening the landing, if your transmitter allows for it. Both ailerons should rise to about 3/4 of their total up travel. A small amount of down elevator compensation (about 5%) should be mixed in with the spoilerons.

Because the tail surfaces are short coupled (not very far behind the wing) the Pterodactyl does not need large elevator throws. Set the travel to about 1/2" up and 3/8" down. Use exponential of about 20% for smoother pitch control.

I recommend putting some clear packing tape on the belly to protect the covering during landings.

**NOTE:** When using two speed controls with BECs (Battery Elimination Circuits), be sure to disable **one** of them, by removing the red (positive) wire from **one** of the speed controller's receiver connector (see diagram at right).

Good luck, have fun and happy flying!

