

### Thank You!

Thank you for purchasing this 80" Marston Pterodactyl short kit. It is highly 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.

### Obligatory Disclaimer:

This is not a beginner's kit. It is not a simple build, because it is not a simple airframe. It is what I call a "builders kit", meaning you should already have building experience under your belt. The instructions are as clear as I could make them, and if you use them in conjunction with the build pictures on the web site ([http://www.pteroworks.com/web\\_gallery/index.htm#1](http://www.pteroworks.com/web_gallery/index.htm#1)) coupled with your own ingenuity, you should have enough information to build a beautiful and airworthy Pterodactyl.

This airframe also requires some experience to fly. It is not a beginner's plane. If you have been flying for awhile, you should have no trouble at all launching, flying and landing this big bird. The wing loading is very reasonable, and the airfoil is fast but not unruly, and there should be no surprises.

Thanks,

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### Marston 80" Pterodactyl Additional parts list

- |    |   |                             |
|----|---|-----------------------------|
| 6  | 1/8" x 3/8" x 36" spruce sticks               | (spars)                     |
| 3  | 1/8" x 1/4" x 36" spruce sticks               | (misc. wing)                |
| 2  | 1/8" x 1/4" x 36" balsa sticks                | (misc. wing and body)       |
| 10 | 1/16" x 3/16" x 36" balsa sticks              | (rib caps)                  |
| 10 | 1/16" x 6" x 24" sheet balsa                  | (wing sheeting, sheer webs) |
| 4  | 1/8" x 4" x 24" sheet balsa                   | (misc. wing and body)       |
| 4  | 1/4" x 4" x 24" sheet balsa                   | (misc body)                 |
| 6  | 1" x 3" x 5" block balsa                      | (misc. wing, body)          |
| 1  | 1/8" x 6" x 24" lite ply                      | (misc. wing, body)          |
| 1  | 13/32" x 10" (3/8" ID) brass or aluminum tube | (for wing joiner)           |
| 1  | 5/32" x 4" (1/8" ID) brass or aluminum tube   | (for wing locator)          |
| 1  | 3/8" x 10" solid carbon rod                   | (wing joiner)               |
| 1  | 1/8" x 10" carbon rod                         | (wing locators)             |
| 2  | 5/16" x 24" carbon tubes                      | (body longerons)            |
| 2  | .007" x 3/8" x 36" carbon strip               | (inner wing cap spars)      |
| 3  | covering material rolls                       | (UltraCote recommended)     |

### Recommended Gear

- |                 |  |
|-----------------|--|
| six servos      | Hitec HS-81 for tail, HS-5125 or HS-125 for wing                                     |
| two motors      | Mega 16/25/3 or 28 mm dia. brushless equivalent 1800-2200 kVa 250 Watt (each) motors |
| two controllers | 25A each   |
| two props       | APC electric (6 x 5.5 to 8 x 6)  |
| BEC             | 5A BEC   |
| receiver        | 8 channels   |
| battery         | 3S 4200 mah (Li-Poly)  |

## Building Instructions for the 80" Marston Pterodactyl

### Wing

1. Prepare spars - 3/8 x 1/8 x 36" spruce  
Cut to length per plans. Glue .007 carbon strips to one side of inner pieces for added strength using CA or epoxy (highly recommended)
2. Prepare brass wing joiner tubes -        Use 13/32" x 5 1/2" for main joiner rod (3/8" x 10 1/2" carbon rod)  
  Use 5/32" x 1 9/16" for small locator rod (1/8" x 3" carbon rod)
3. Glue wing leading edge halves together with motor mount doublers using epoxy.
4. Glue reinforcing doublers to ribs 1, 2, 3, 4. *(see picture 2 on web site)*
5. Assemble ribs 1 - 4, brass wing joiner tubes, leading edge, and bottom inner spar, on the plans  
(notes: Do NOT epoxy brass wing joiner tubes until alignment can be checked with both wing halves. Rib 1 has a twin brother that has no cutouts for the spars. This should be glued to the other rib 1 after wing assembly to ensure a clean face the mating surfaces of the wing halves.) *(see pictures 2 and 3 on web site)*
6. Assemble ribs 5 - 8 to lower spar and leading edge. *(see pictures 4 and 5 on web site)*
7. Glue in top inner spar (carbon facing out.)
8. Thread a 1/8" x 1/4" spruce aft spar through ribs 1 - 8 and glue in place. (this is the curved one.)
9. Check alignment of right and left wing halves at this point, and epoxy all 4 brass wing joiner tubes. Glue scrap balsa "plugs" at the inside ends of wing joiners. *(see pictures 7 and 8 on web site)*
10. Glue bottom ply trailing edge to the assembled ribs (1 - 8). Don't remove alignment tabs from the ribs yet. *(see picture 8 on web site)*
11. Sand faces of root rib (rib 1) and check surface mating with spars in place. Glue rib 1 doublers in place and sand as necessary for a gap-less fit between wing halves.
12. Place wing halves back on plans and epoxy lower outer spar in place, using a piece of scrap 1/16" ply as a doubler, for added strength.
13. Assemble ribs 9 - 19 to bottom spar, leading edge, and trailing spar (1/8' x 1/4" spruce) on plans.  
(note: ribs have removable standoffs on their bottom trailing edge to help you build the wing true. Washout is built into the standoffs.)
14. Glue upper outer spar in place.
15. Glue wing tip pieces together. Use scrap balsa to build up thickness of wing tip where it mates with rib 19. Sand to match airfoil. Wing tips should have a slight (8 degree) upward angle.
16. Glue wing tips to wing.
17. Assemble ailerons (ply on bottom, balsa on top). *(see picture 17 on web site)*
18. Assemble flaps as per ailerons. *(see picture 16 on web site)*
19. Cut and glue sheer webs to both sides of inner spars, and trailing edge of outer spars. Use 1/16" balsa with VERTICAL grain direction (up and down). This is a tedious step, but it will dramatically increase the strength of the wing.
20. Epoxy 1/8" carbon rods on the leading edge of both wing halves, about 1/4" from rib 1, pointing forward, extending about 3/8" - 1/2" beyond leading edge. These are the wing locator pins for attachment to the body (fuselage). Surround with 1/8" scrap ply, and build up with scrap balsa as needed. *(see pictures 12 and 13 on web site)*
21. Build a "cradle" for your motors out of scrap 1/4" balsa *(see picture 14 on web site)*
22. Sheet upper leading edges with 1/16" balsa. Use plans to trace shape to be cut. Cut about 1/4" oversized. Soak balsa in water for 20-30 minutes first to get it pliable. Use the lightest balsa you have (hold it up to the light and see how transparent it is. Less density means more light will show through, which is good for this sheeting job.) There are some tricky compound curves to deal with here, but it can be done if you are careful!
23. Install servos, motors, and speed controls, before sheeting the bottom of the wing.
24. Sheet bottom of wing leading edge. Shape is same as top sheeting. Cut hole between rib 1 and 2 for wires.
25. Cap all exposed ribs with 1/16 x 3/16" balsa.

26. Cap all exposed spars with 1/16 x 3/8" balsa.

27. Sand until pretty!

Congratulations! The hardest part is done.

### Tail

1. The two tails (feet) are built from two pieces of 1/4" balsa that just glue together. Once the glue is dry, sand tail and rudder-vators down to achieve an aerodynamic profile.

2. Epoxy tail pieces to carbon longerons (5/16" x 25 1/4")

### Body

1. Glue the rear body spacer (1/4" balsa) to the assembled tail/longeron pieces, being careful to align the longerons to each other (they should be parallel), and careful to align the tails for the proper "V" (they should be at a 105 degree angle). Cut a piece of 1/4" scrap balsa for the forward body spacer. *(see build picture 25 on the web site)*

2. Glue body sides, and middle body spacer to longerons. *(see picture 26 on web site)*

3. Cut out from 1" balsa front outer "chest" pieces and glue to body sides. *(see pictures 27 and 28 on web site)*

4. Epoxy neck pieces to "chest" pieces, using 1" balsa in between. Carbon reinforcement of neck is recommended, either by gluing carbon strips or rods to the insides of the ply neck pieces. *(see pictures 29 and 30 on web site)*

5. Attach the head using 1/4" balsa and 1" balsa cut to size as needed. *(see pictures 29 and 30 on web site)*

6. Glue in top and bottom of head using 1/4" balsa. Sand to match curves of head profile. Plan on adding some lead to the head ( 1 - 3 oz.) to balance the plane.

7. Make a belly tray out of 1/16" ply to cover the bottom of the body. It should be removable to facilitate battery installation and removal. Add balsa to the body as needed.

8. Check fit of wing to body and sand as required. Drill 2 holes in upper "chest" area to facilitate the carbon wing retainers on the leading edge of the wing. Holes can be oversized, and brass tubes can be epoxied in place once the proper location has been established.

9. Drill 2 holes for the rear holding of the wing. Be sure the wing is properly aligned to the tail before drilling. Epoxy in 2 blind nuts.

10. Double check alignment and fit of everything.

### Covering

This is not the easiest airframe to cover, but if you use the right material and are patient, and have some covering experience, it will go smoothly. I do not recommend Monocote, because it doesn't stretch as much as Ultracote, and you need the stretch for the compound curves on this bird. Ultracote or Oracover are my recommendations. Please use transparent colors to show off all that hard work you did with the wood! You will need 3-4 rolls depending on your color choices. I always make the top and bottom different enough to see easily at altitude, to avoid getting mixed up while flying.

### Setting up and flying

The center of gravity is marked on the plans. Elevator throws should be fairly small, or you should use lots of exponential in programming your radio. Aileron throws should be much higher. Use as much up aileron throw as you gear will allow. It's a big wing. If you can mix some down flap into the ailerons, do it. Rudder throw can be greater than the elevator throw.

Flaps - will slow the plane down, but be sure to try them at a very safe elevation first. You may need to mix in some elevator compensation.

The Pterodactyl will fly pretty fast, especially if you are using brushless motors. I recommend keeping the speed and acrobatics to a minimum for the first few flights. Landings should be uneventful, as long as you have grass to land on. Keep the speed up when landing, and give yourself lots of room. It glides very well (when the flaps aren't down).

Good Luck!