

Introduction

A Competition-winning E2K pylon racer for intermediate to advanced pilots, anyone with a taste for speed and all who love smooth aerobatics.

Fast, precise, snappy, rock-solid in high-g turns and beautifully smooth through graceful aerobatics, nothing quite beats the arrow-like flying qualities of the JPS-3 E2K pylon racer. That's a recognised fact, for at the 2022 British National E2K Pylon Race Champs, JPS-3 designer and multiple pylon race champion, Paul Bardoe, flew this very design to victory.

Specification

Wingspan: 1016mm / 40"
Fuselage length: 737mm / 29"
All-up weight: 1022g

Recommended powertrain

- Radiant E2K Race brushless motor (RDNM3536)
- ZTW Beatles 80A brushless ESC (ZTW3080211)
- APC 8x8 i.c. propeller for hardcore pylon racing (APCLP08080)
- APC 8x8E Normal club flying (APCLP08080E)
- Radiant 4s 2200mAh 50C LiPo (RDNB22004S50XT60)

Recommended servos (three required)

- 3x Hitec HS-85MG 3.5kg (2212190)
- 3x Futaba S3150 3.7kg (FUT05102172-1)
- 3x Radiant RS-MS125-MG 3.5kg (RDNA0404)

Additional items required

Please note that glues, suitable radio control equipment, servo extension leads and some good-quality tools will be required to complete this model. Since the JPS-3 Racer is not a beginner's aircraft, these additional items are left to the discretion and experience of the builder.

Build tips

- Before commencing assembly, use a covering iron with a covering sock to carefully tighten any wrinkles that may be evident as a result of temperature changes during shipping.
- Always test / dry fit items before glueing.
- Ensure that no gaps are visible when attaching the control surfaces.
- When fitting control horns always make sure the pin hole for the clevis is positioned directly over the hinge line.
- Measure twice, cut once.
- Most importantly, enjoy the build!

Box contents

Before you start, please check that you have all the relevant pre-built parts and accessories listed below.

Pre-built and covered parts

1x Fuselage
2x Wing panels
1x Tailplane
1x Vertical fin

Accessories

9x Control surface hinges
3x Single control horns with bolts and nuts
1x Wing capture dowel
3x 5mm ply servo mounting blocks
3x 5mm ply servo mounting blocks (with lead slot)
1x 2.5mm ply servo base plate (elevator)
4x M3 14mm motor bolts
8x Self tapping screws (aileron servo hatch)
4x Metal clevises
4x Silicone clevis keepers
4x M2 pushrod
4x M2 nuts
1x M4 wing nylon wing bolt
1x Battery hatch tab
2x Wing spars
1x 440mm glass fibre pushrod tube

Please read these instructions fully before commencing your build

- 1. Insert the Mylar hinges into the pre-cut slots in the aileron and elevator control surfaces, as shown. You will need to use a knife to cut the film as the slots have been covered over. Make sure that exactly half of the hinge is pushed into the slot.



- 2. Hold the first control surface vertically before running thin cyano along each hinge line so that the glue wicks into both the balsa and the hinge. Repeat on the reverse side and then repeat the process again for the remaining control surfaces. Allow to dry.



□ 3. Insert the ailerons as shown. Ensure that each aileron is pushed as close to the trailing edge of the wing as possible, so there is no gap. Ensure, also, that the aileron is centred so it does not bind at either end.



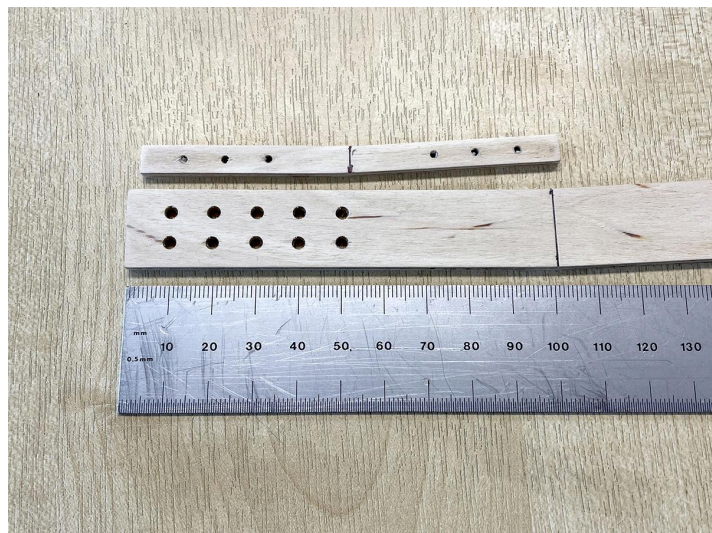
□ 4. Hold the wing as shown and, using thin cyano, wick the glue into the hinge and balsa in exactly the same way as you did in Step 2.



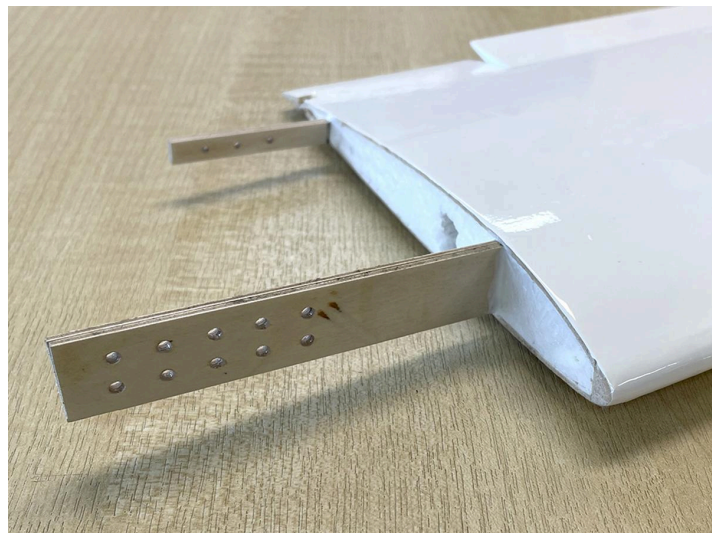
□ 5. Repeat procedure 3 and 4 for the elevator.



□ 6. Locate the two wing spars and mark the vertical centre line. Use a piece of sandpaper to remove any harsh edges that could cause damage when slotting the spars into the wing section.



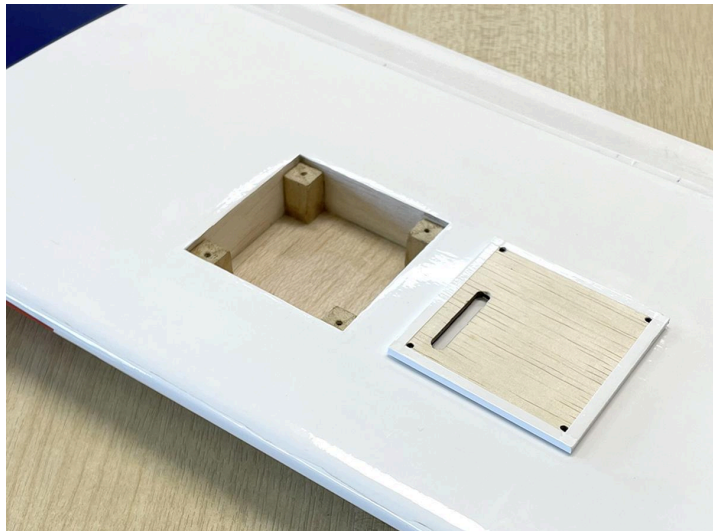
□ 7. Glue in position using white glue or epoxy ensuring that the spar is the right way up (dihedral, not anhedral). Make sure you use plenty of glue.



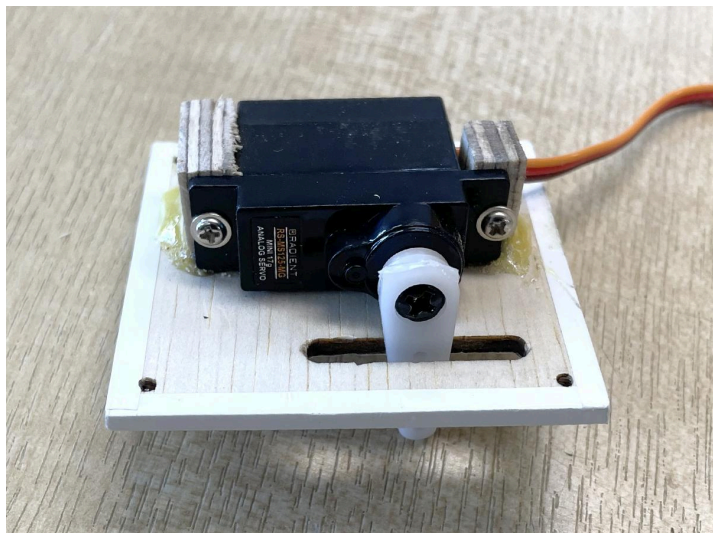
□ 8. Remove a small amount of foam and balsa on the topside of both wings to allow the servo lead to exit when the wings are glued together.



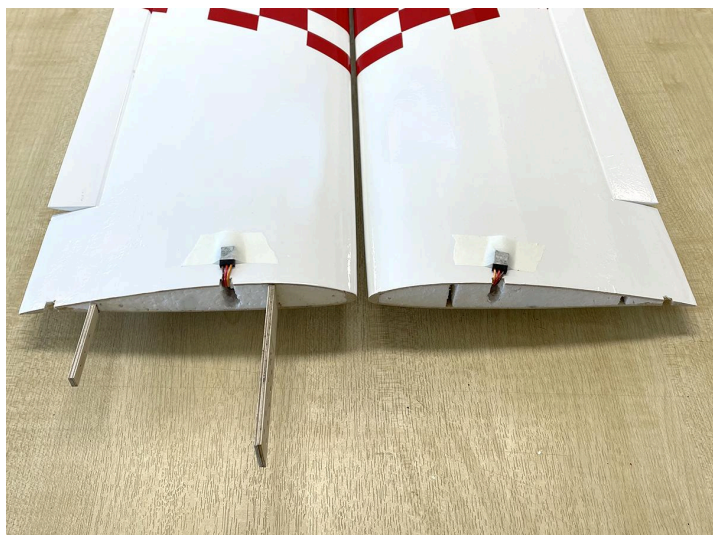
- 9. Locate the servo hatch on the underside of the lower wing and remove it.



- 10. Using the supplied servo mounting blocks (one of them with the servo lead slot) secure the servo as shown using 5-10 minute epoxy and two mounting screws. Make sure you centre your servo before attaching the servo horn. Repeat this process for both wings.



- 11. Use a spare piece of piano wire (not supplied) to draw your servo lead through the wing section, then temporarily tape it to the top surface.



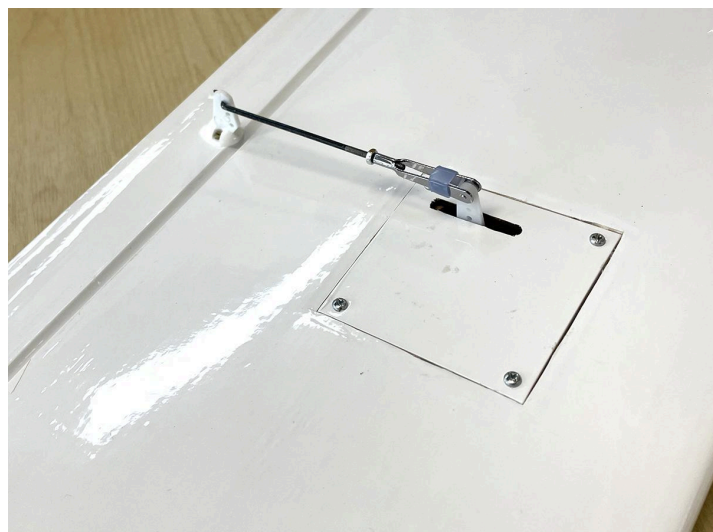
- 12. Install the servo hatch with the four supplied screws ensuring the servo arm is positioned rearmost (closest to the aileron and furthest from the centre-section).



- 13. Using two of the four M2 piano wire pieces, introduce a Z-bend to the non-threaded end then add a clevis, nut and keeper to the other. The pushrods need to be approx. 85mm long but with a margin of flexibility in length.



- 14. Ensuring your first servo and aileron are centred. Use the pushrod to position the aileron control horn so that the Z-bend is positioned over the aileron hinge point. Secure the control horn in place with the supplied screws. Repeat the process on the other wing.



- 15. Glue both wings together using epoxy or white glue. Don't be shy using the glue. It's also worth putting some glue on the root section of the other wing as well.



- 16. Glue the wing locating dowel into the belly pan and remove the film to reveal the wing bolt position.



NOTE: For hardcore pylon racers who want to survive the odd mid-air situation, this is the perfect time to introduce the added security of a wing bandage (not included). In this respect, take careful note of the contact points of the belly pan and wing so that you don't have problems when trying to fit it.

- 17. Align the wing and fuselage. This is very important to get the wing exactly right. Using the belly pan, sandwich the wing in place and tape the pan in position. Use a pen to mark the bolt position in the lower wing.



- 18. Using the marked positions on the bottom side of the wing, take a sharp knife, cut a small (bolt-size) square in the balsa sheet, then remove the foam below and, finally, cut another square of balsa from the bottom wing sheet. This will allow the 4mm wing bolt to pass through the wing section to the capture nut.



- 19. Put the wing and belly pan back on the fuselage and check to ensure that the wing bolt marries with the capture nut. When you're happy, remove the bolt and belly pan, apply glue to the contacting belly pan and wing surfaces, refit, secure with the wing bolt, and allow to dry.



- 20. Your wing should now be all one piece and complete.

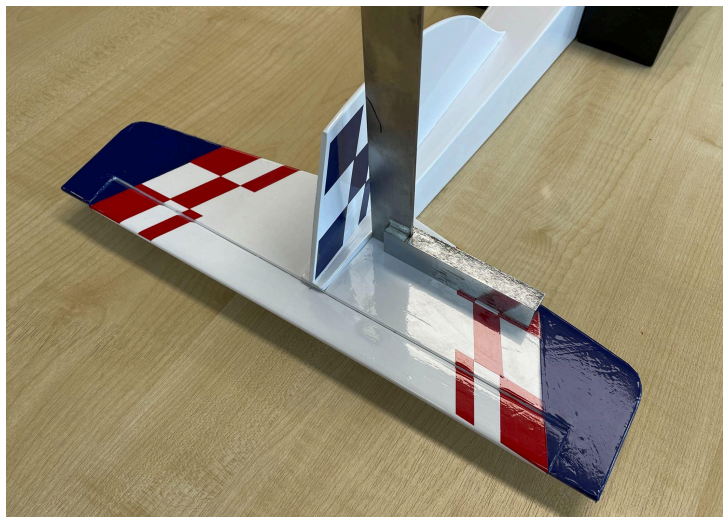


WARNING! In the next step, take great care not to cut into the balsa when removing the film as this could seriously compromise the structural integrity of the tailplane.

- 21. Locate the centre of the tailplane and spot mark it at the leading edge of the elevator. Dry fit the tailplane in the slot at the rear of the fuselage, making sure the mark you made is in the centre of the fuselage at the rear. To ensure the tailplane is square, fit the wing and measure from the trailing edge of the outermost point of the wing back to a specific point of your choice on the tailplane. Repeat this measuring process on both port and starboard sides until the measurements match. When you're happy mark the position of the fuselage sides on the tailplane (top and bottom). Using a knife, gently remove the film ensuring you don't cut into the wood on either side.

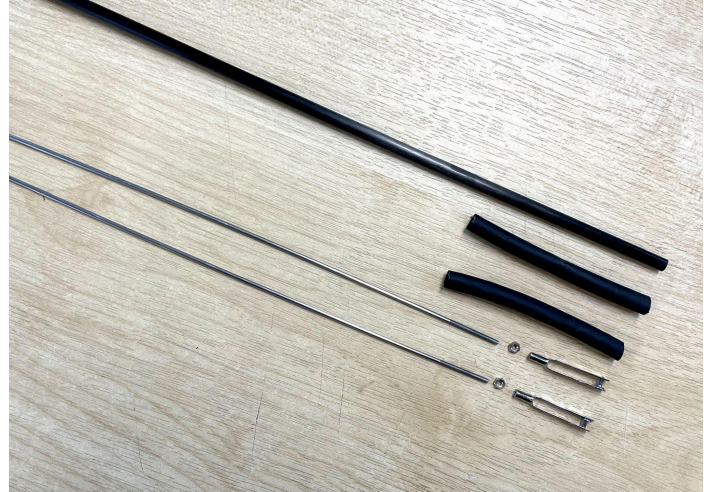


- 22. Slide the tailplane back into position and slot the fin in place. Mark the mating surfaces, as before, and remove the film where the fin will be glued to the fuselage. With the wing attached dry fit the tailplane and fin and look down the nose to ensure all is square. Adjust as necessary then glue the tailplane in position. Allow the glue to cure, fit the fin, check for alignment with a square, then glue in place.



- 23. Using the supplied items shown in Step A (below), follow Steps A – E and make the elevator pushrod. At the end of the process the pushrod should measure approximately 470mm from the elevator servo clevis pin to the elevator control horn clevis pin. It is always good to lay this all out on the bench first, to double check lengths, before you start cutting.

- A. Cut the central carbon elevator pushrod tube to a length of 278mm



- B. Measure 55mm from either end and drill a small hole through one face of the pushrod tube (not all the way through) to allow the 2mm piano wire pieces to hook into the tube.



- C. Measure 140mm from the threaded end of each piano wire piece and bend at 90°. Cut away the excess wire to allow just enough to enter the tube, as per image below.



- D. Insert the hook of the piano wire into the pushrod tube (as here), and secure on a skim of epoxy glue. Allow to dry.



- E. Slide the heat-shrink tubing over the piano wire and pushrod tube and heat to shrink and secure. Repeat the process on the other end and secure the 2mm nuts and clevis on the thread. Complete the final assembly of pushrod by adjusting to the required length of 470mm.



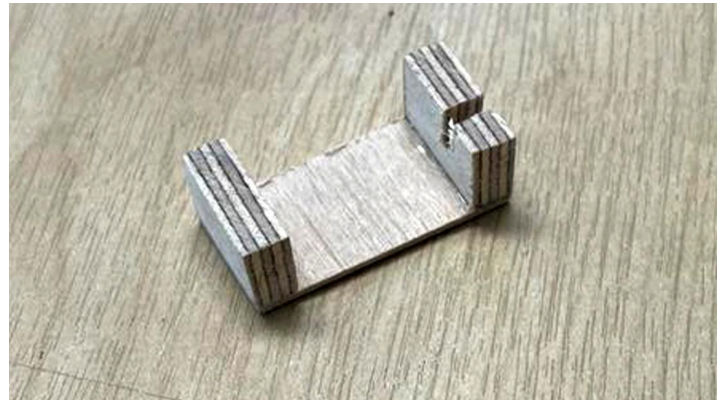
- 24. Before attaching the elevator control horn you need to remove the outermost hole.



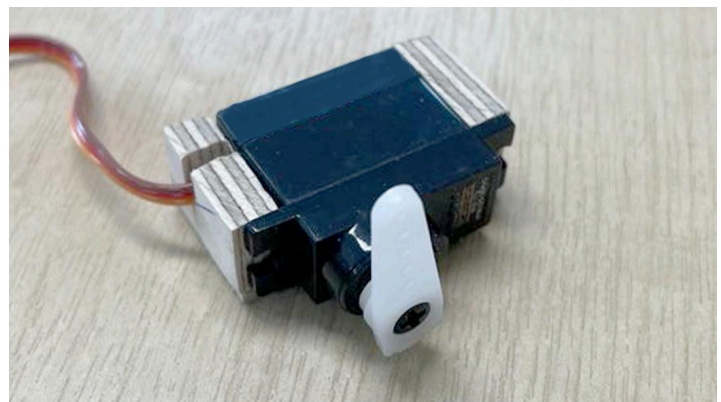
- 25. Using the pushrod to align the control horn on the elevator, mark the positions of the fixing holes whilst making sure that the pushrod is centralised down the fuselage. As before, make sure that the clevis attachment point is directly above the hinge line. When happy, secure the control horn using the 2mm bolts, backing plate and 2mm nuts. Cut off any excess thread that projects beyond the nuts and apply a small amount of glue to lock the nuts in position.



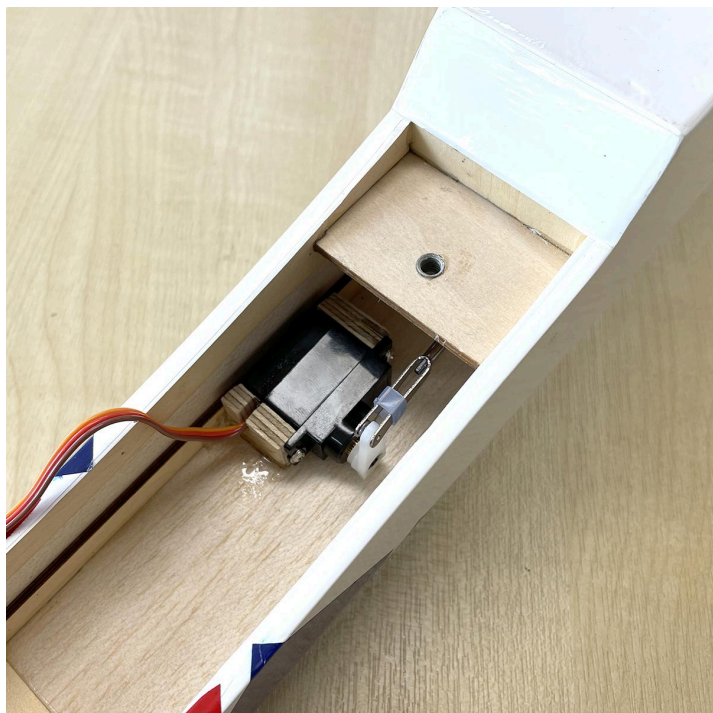
- 26. Using the two remaining and servo mounting blocks and base plate (elevator), glue together to make the elevator servo cradle.



- 27. Fit your servo as below ensuring the servo horn is centred. Make sure you drill a pilot hole for the screws or you risk splitting the wood.



□ 28. Attach the clevis of the elevator pushrod to the servo horn. With the servo horn in the centred position and elevator in the neutral position mark the position of the elevator servo assembly. When happy, fix the servo assembly into the fuselage with epoxy.



□ 29. Remove the covering over the holes in the firewall as per the image below. The pre-installed capture nuts are designed to fit the E2K Race-compliant Radiant 3536 1500KV motor (RDNM3536). If you wish to fit another motor with different hole sizes please just punch the capture nut out and drill new holes as necessary.



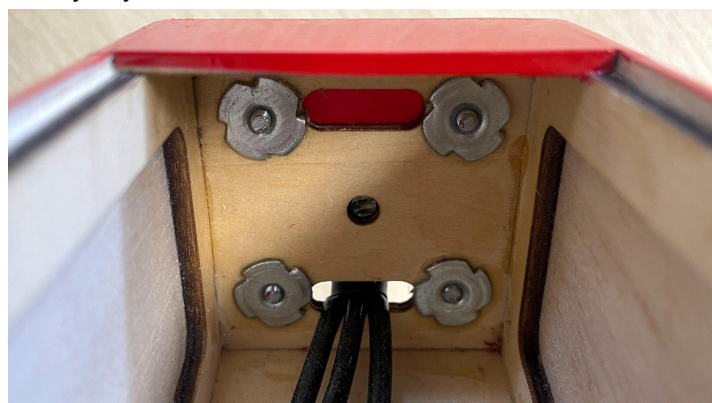
Warning: Before installing the motor of your choice we recommend you ensure nothing projects into the battery bay area. Bolts and motor shaft should be cut so as not to project into the battery area.



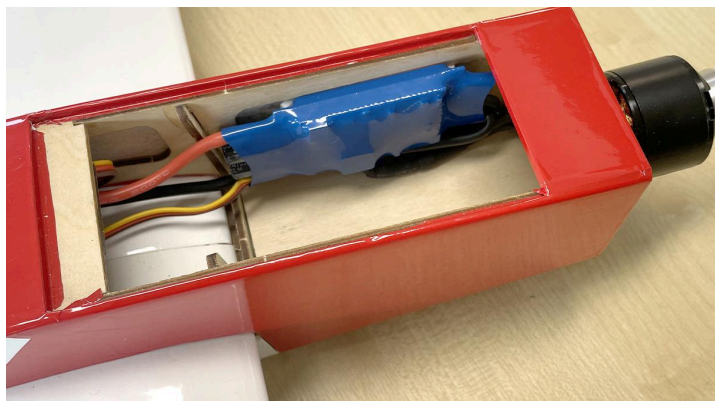
□ 30. Use masking tape to cover the motor and, using a dremel cutting disk, cut the rear of the shaft as below. This also needs to be done with the bolts that secure the motor.



□ 31. The motor is correctly installed when all potentially damaging projections have been removed from within the battery bay.



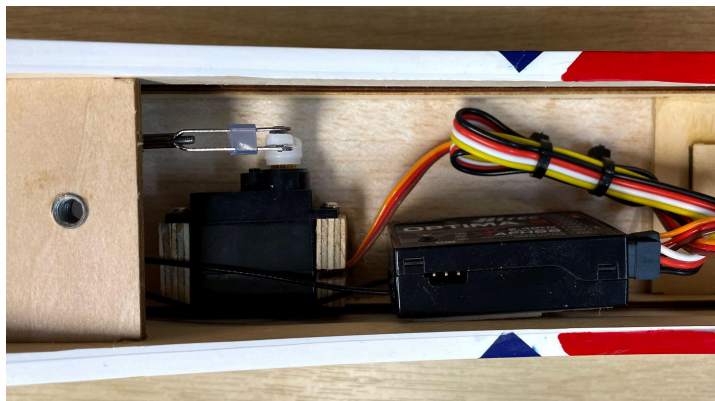
- 32. Install your ESC to the side wall of the fuselage. The battery is secured by hook and loop tape to the battery bay floor. In some cases a scrap piece of balsa / ply can be used to elevate the battery so as to clear the wing leading edge.



- 33. Remove the film on the hatch tab, as shown, and glue to the battery hatch.



- 34. Install your receiver, securely connect all wires and ensure your receiver antenna is fixed in a low RF noise area, i.e. away from the ESC.



Pre-flight set-up

Suggested control throws

Intermediate pilots

Aileron:	5mm each way
Elevator:	5mm each way
Exponential:	15 to 25% on all surfaces

Experienced pilots

Aileron:	10mm each way
Elevator:	10mm each way
Exponential	15 to 25% on all surfaces

Check the C of G (Centre of Gravity)

The C of G location, measured from the leading edge of the wing (nearest to the fuselage), is 40-45mm back. In order to obtain the correct C of G, move the flight battery inside the fuselage until you are happy, then secure it in place. If using the recommended Radiant motor and battery it should balance perfectly with the battery pushed up against the firewall.



IMPORTANT! For the first flight it is recommended that you use rate switches. For all surfaces set low rates to 75% of the suggested control surface movement. Once you're totally comfortable with the flying characteristics you can switch the rates off for 100% control surface movement.

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