

# ***JETWORKS***

*FLIGHT SCHOOL*



***CADET***



Ailerons and Rudder only teaching the 'Bank and Yank' method of flying

T tail elevator increases the vertical centre of lift increasing stability.

Jet-like styling

Durable double thickness foam cockpit area is bump resistant.

Simple box construction is easy to make and repair.

Pusher prop protected from botched landings

Wingtip dihedral helps to 'self-right' the aircraft aerodynamically.

3D printable parts (optional) increase build speed and are easy to replace in an accident.

High wing utilises the keel effect to help keep the aircraft stable.

Removable undercarriage for taking off from hard surfaces

## Designers Notes

The Cadet is designed to introduce builders above 12 into the world of scratchbuilding RC Aircraft.

Designed to be stable, durable and a gentle, predictable flyer, it uses simple building techniques to help new pilots to start their air adventures.

Designed to take either a micro (2-3s) or 200 series racing quad motor (3s-4s) the performance is limited to the cell count of the batteries. By choosing the lower cell, it is a gentle performer. Choosing the upper cell, gives it a great turn of speed - for more experienced flyers only!

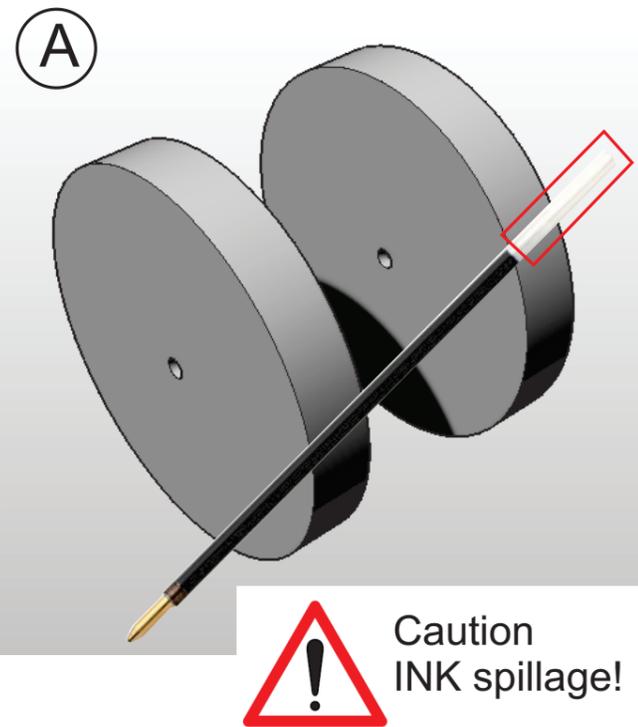




Caution. Building a Radio Controlled Plane has some hazards.

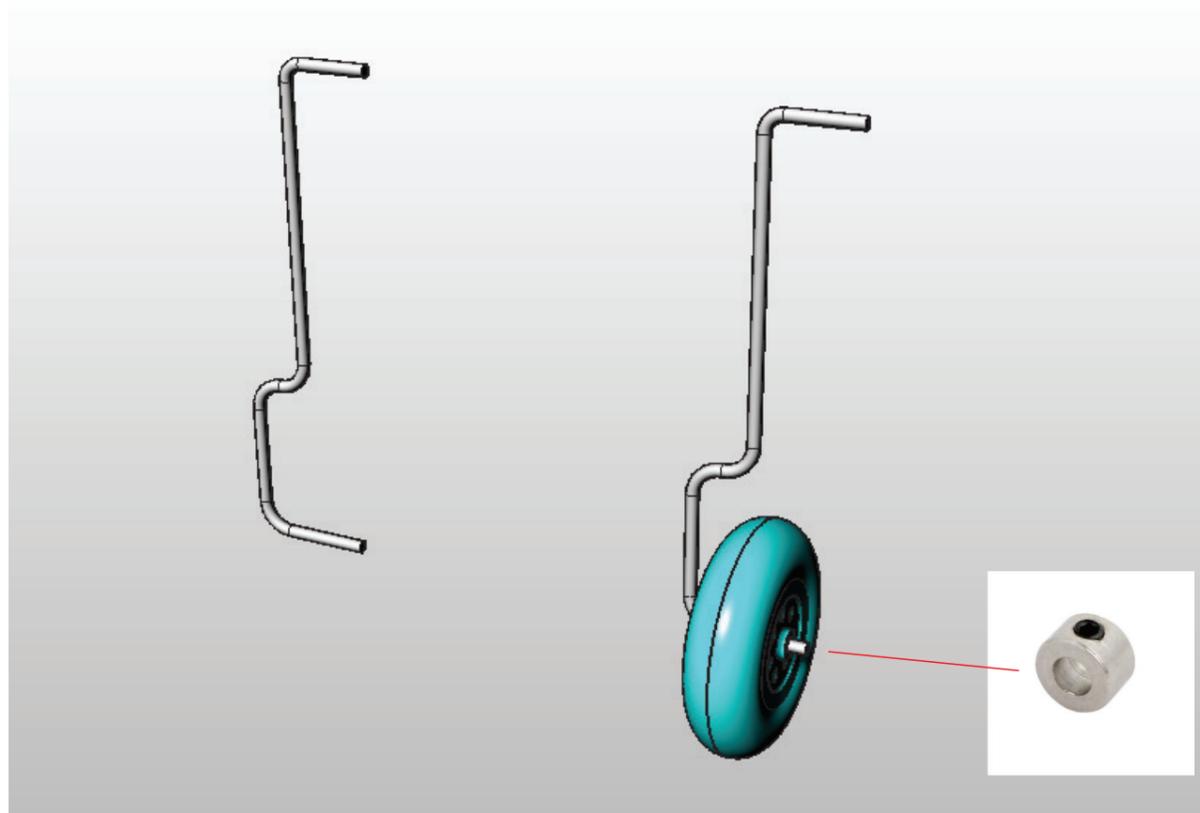
If you are under 16 - we recommend you ask your parent/guardian to supervise you whenever you see this symbol.

All versions



Choose how you want your 40mm Nosewheel :-

- a) 2 pieces of foam sheet glued together with a plastic tube inserted on centre. (try using part of a pen) ✓
- b) 3d prints glued together with Superglue Gel
- c) Purchased foam wheel.



Using Pliers, cut up a coat hanger and bend to shape to match the plans.

Slide the wheel in place.

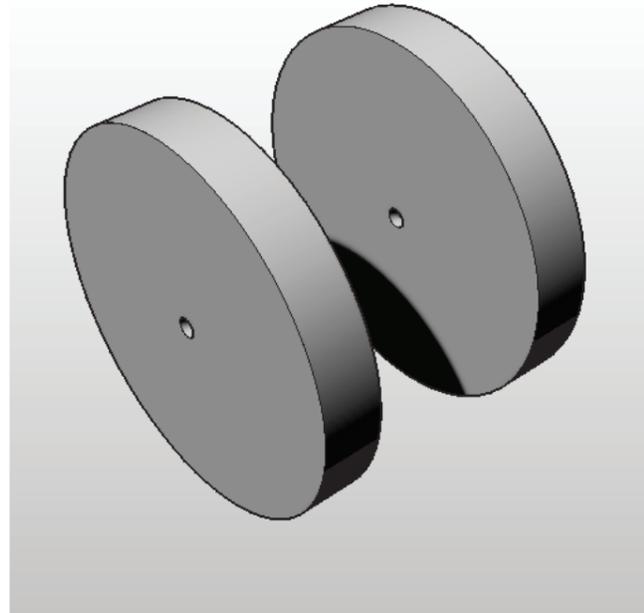
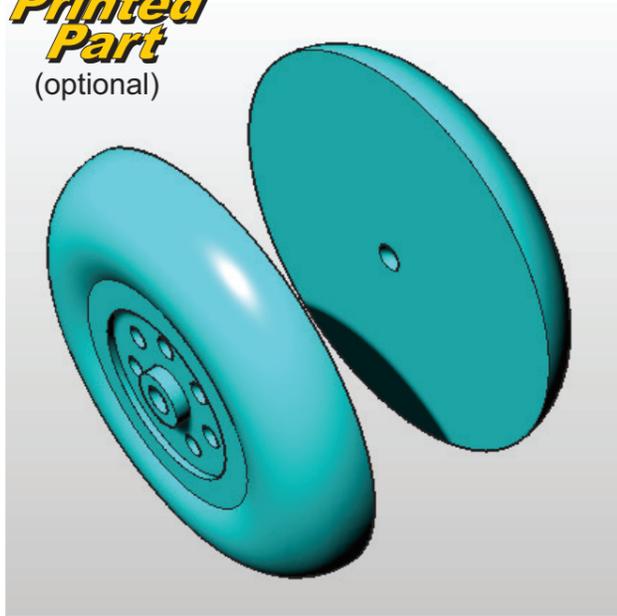
Use either :-

- a) A piece of plastic tube superglued to the shaft to prevent the wheel from coming off. (GLUE AFTER FITTING TO AIRCRAFT)
- b) a purchased 'Landing gear stopper' to match your hangar



All versions

**3D  
Printed  
Part**  
(optional)



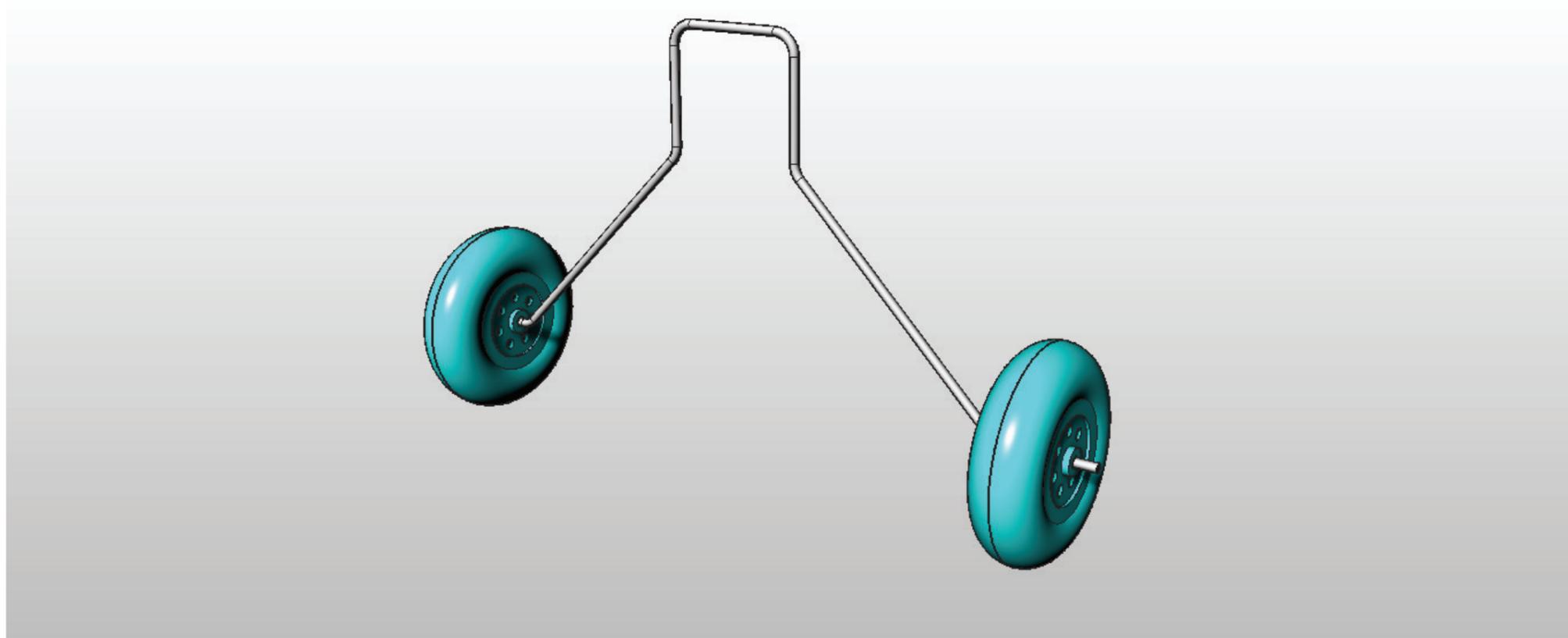
50mm

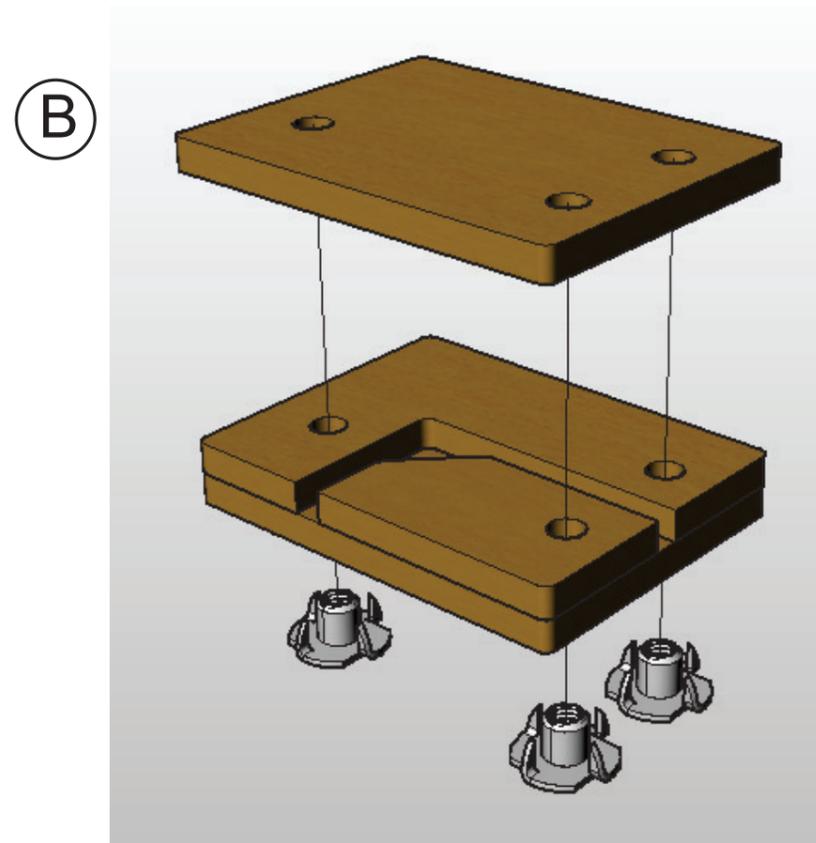
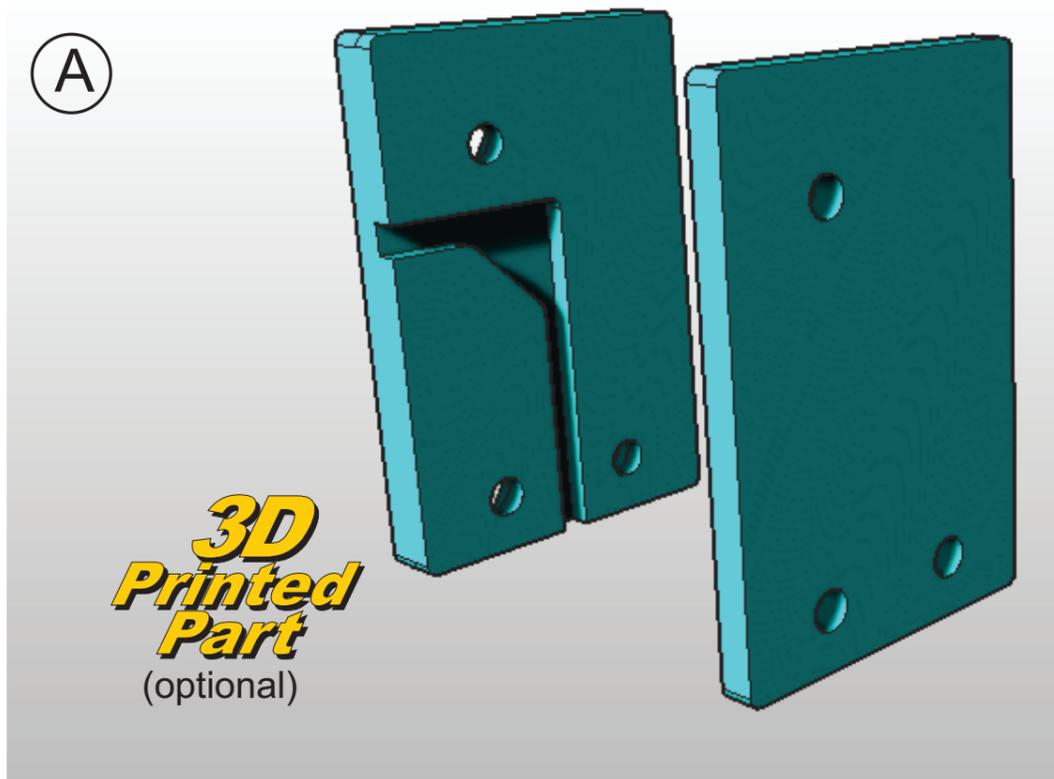


Create the rear landing gear exactly as you created the front gear and secure the wheels in place as per the forward wheel.



Caution  
as previous page.



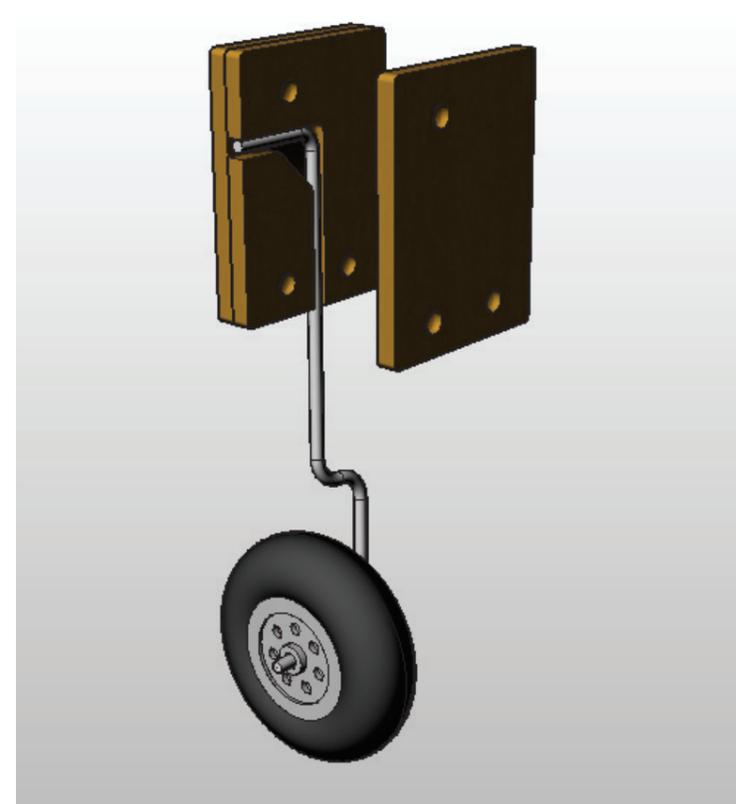
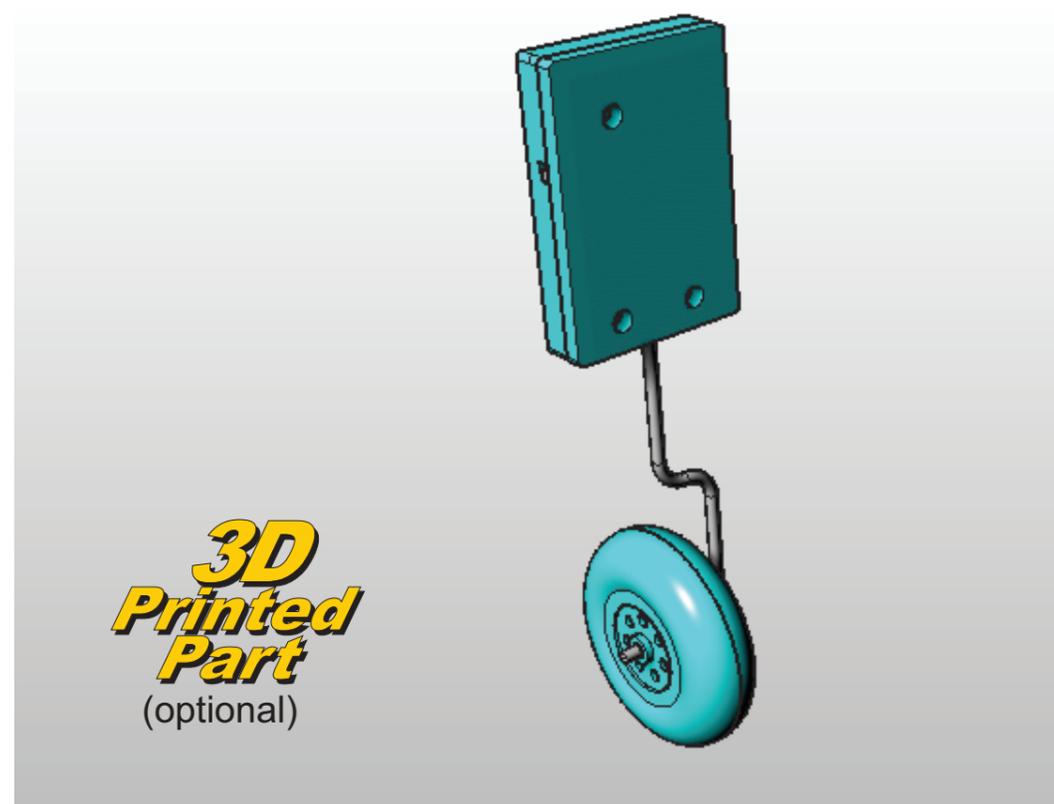


**Nosewheel brace**, Choose Either :-

- a) 3d printable
- b) 3mm lite ply.

If you wish to have no landing gear, then you can omit this stage completely.

If you wish to have non removable Landing gear you can simply glue the parts together around the strut.

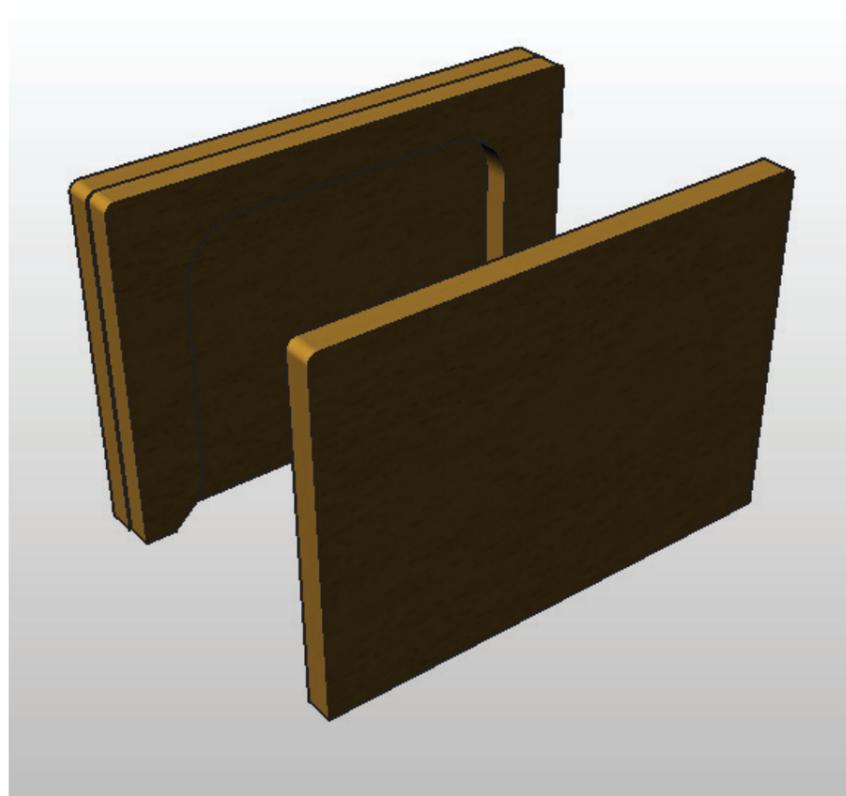
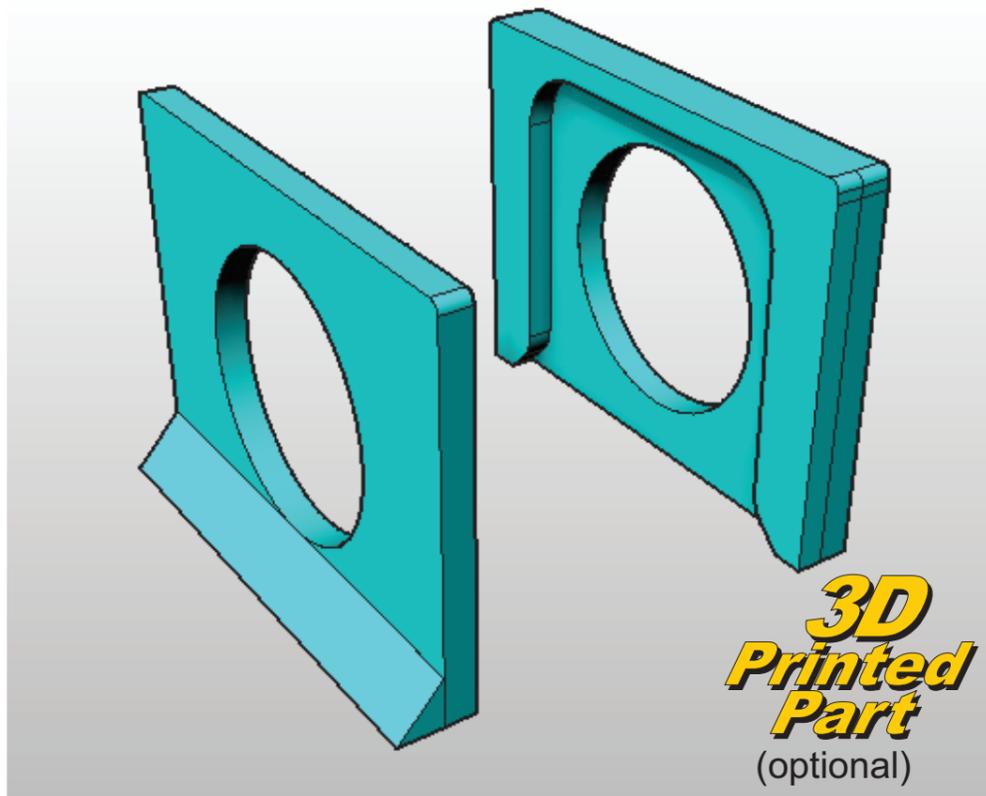


If you wish to have **Removable Landing gear** :-

- a) 3d Printed version - superglue three M3 nuts into the slots on the rear.
- b) Lite ply version - Drill and knock the three M3 T-nuts into the lite ply rear.

Use three M3 x 10mm machine screws to hold the brace together.





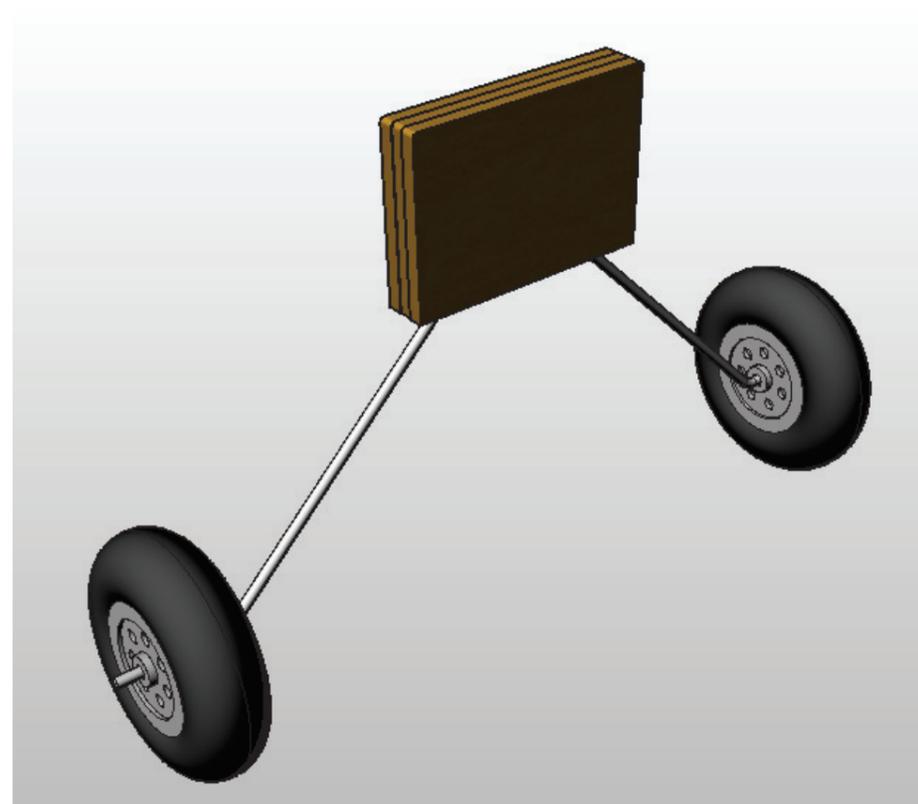
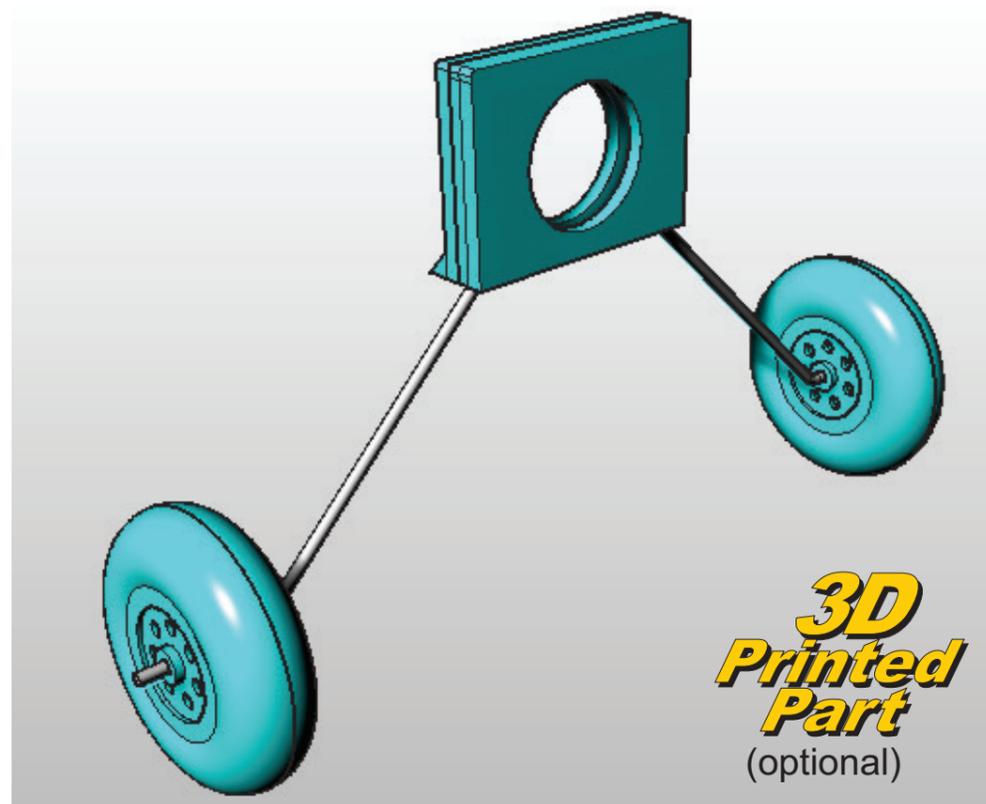
Create the **Rear Landing Gear Brace** by either :-

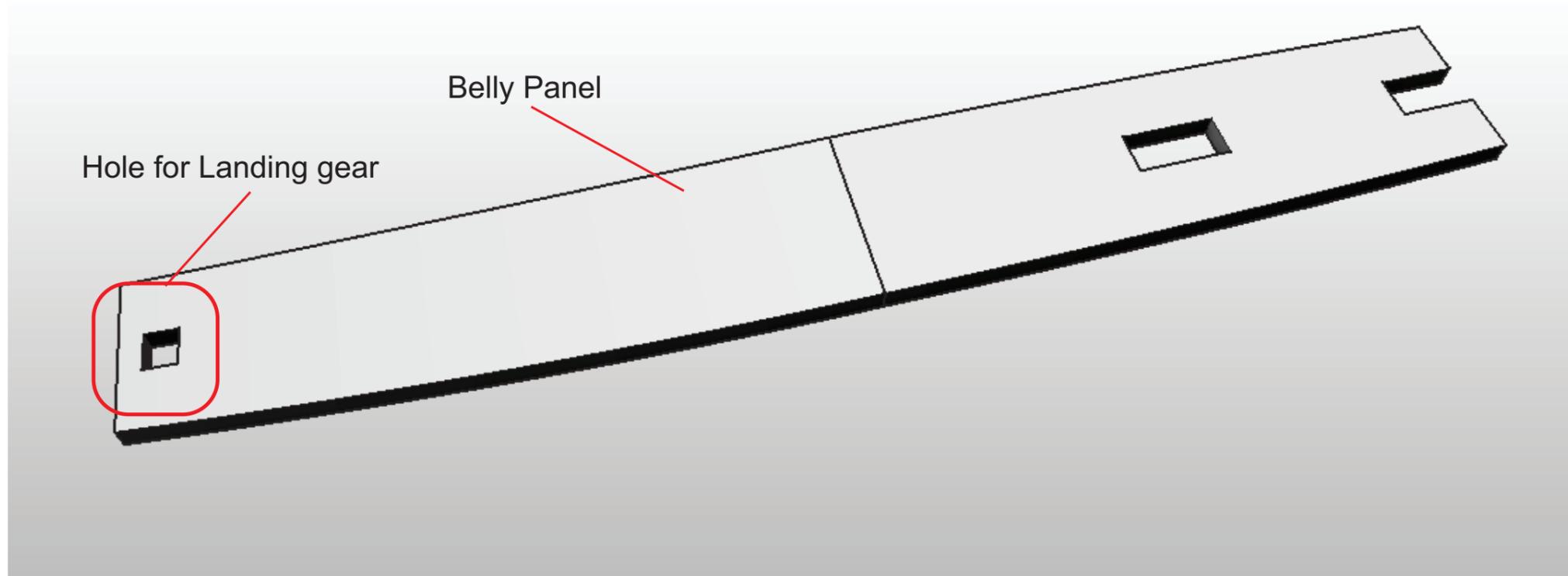
a) 3D printed parts glued together using Superglue Gel.

b) 3mm Lite ply glued together using Superglue Gel. You may wish to sand down the middle part to match the thickness of your strut wire before you glue it together.

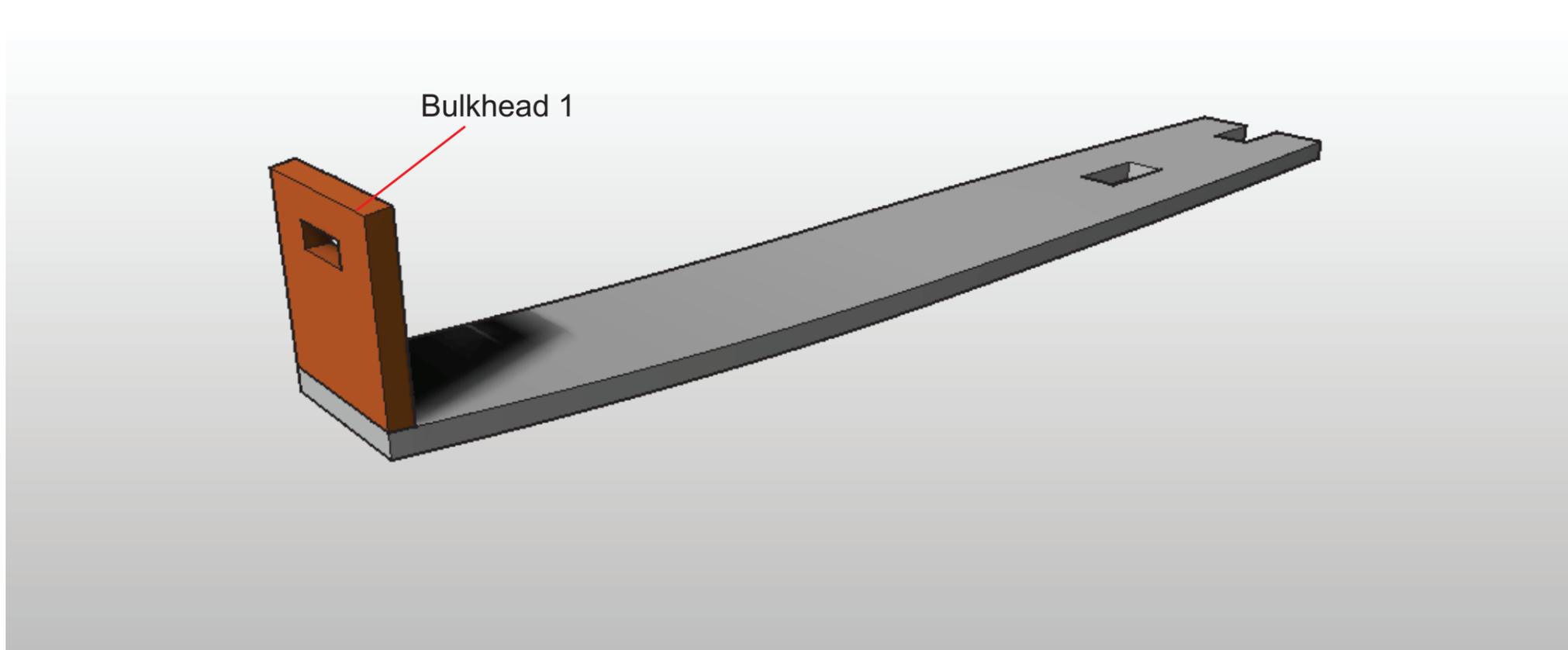
The Landing gear should be held in place using friction, and can be removable if desired.

This part is optional. If you don't want Landing gear - you can skip this stage.



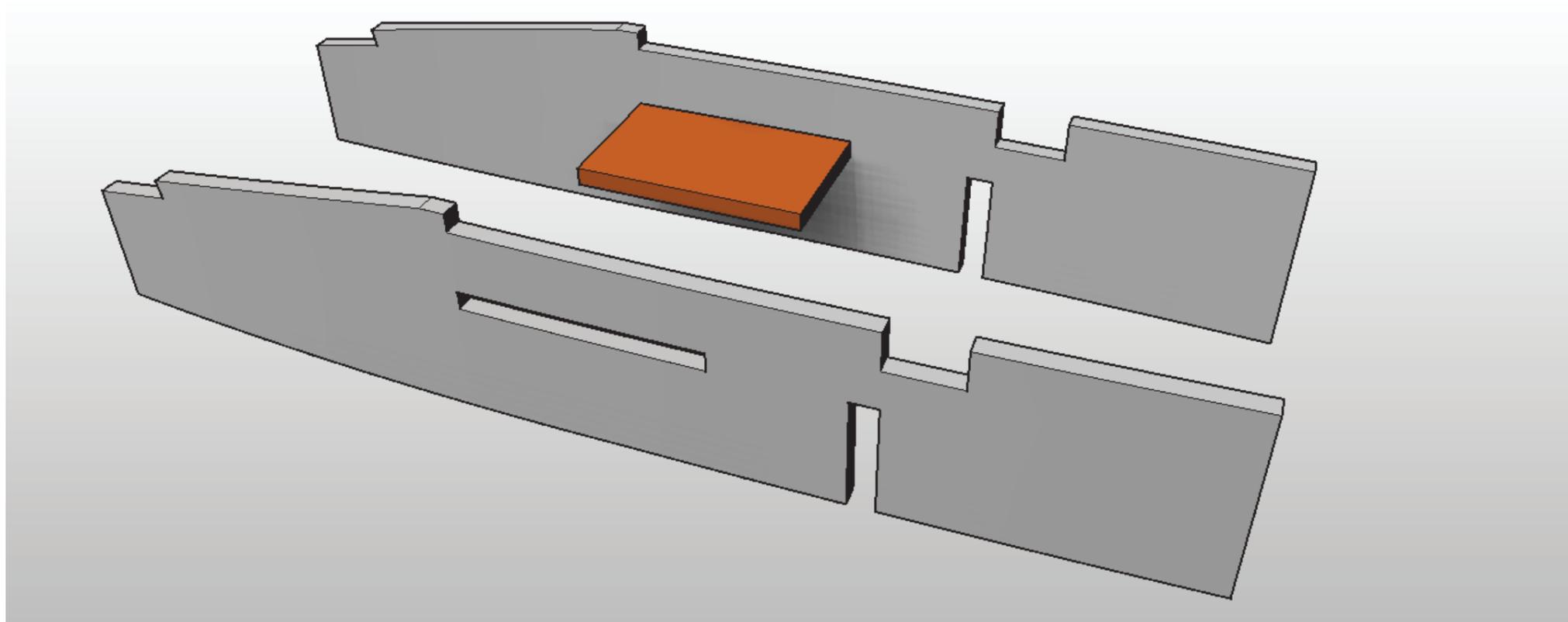


Cut out the **Belly Panel** - you can leave out this hole if you don't want landing gear.

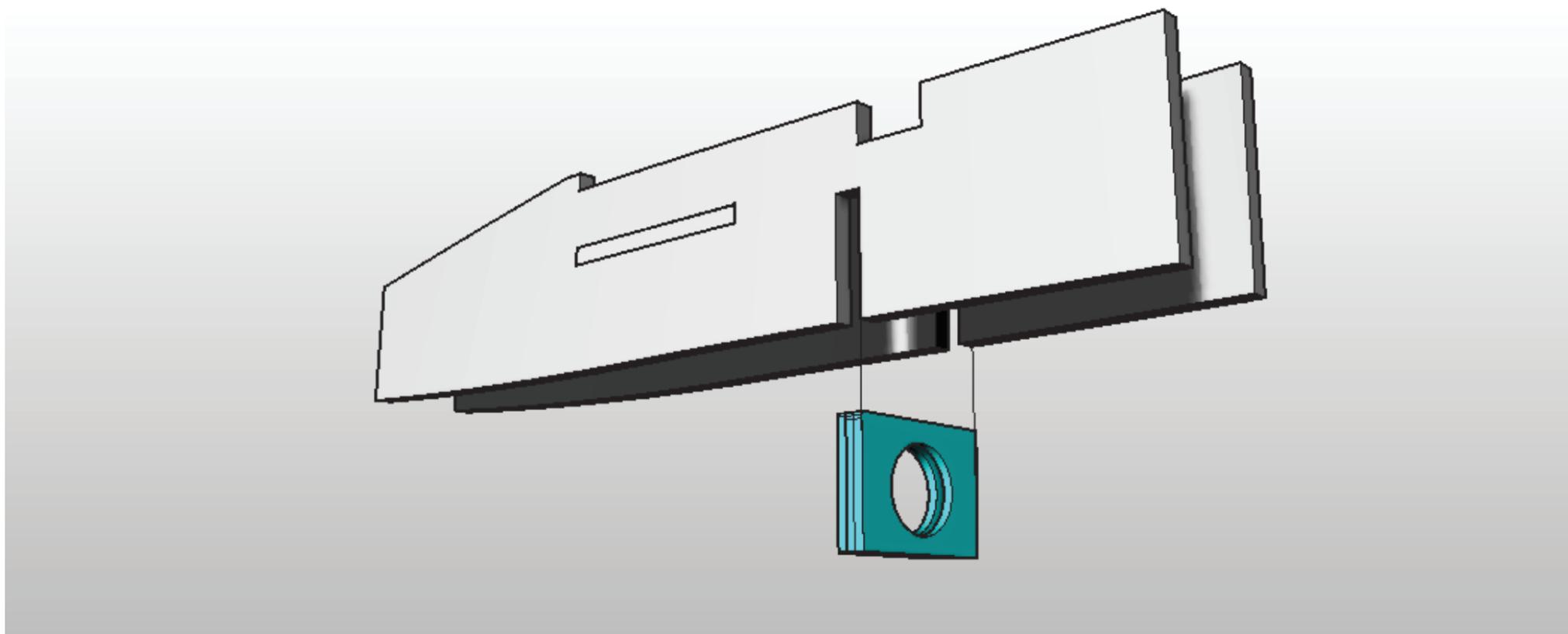


Glue **Bulkhead 1** to the belly panel.





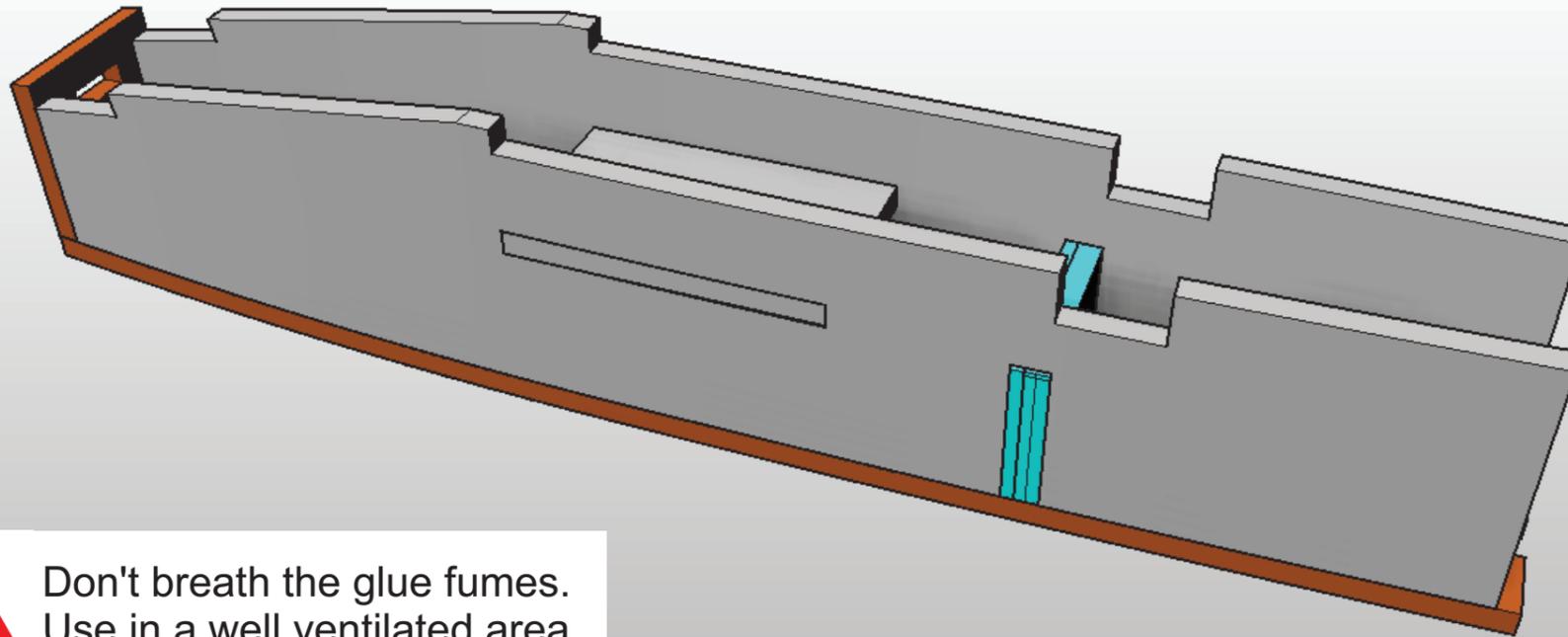
Slide the **Receiver Shelf** into both slots within the **Inner Fuselage Walls**



If you are using Landing Gear, then slot your brace into the slot as shown. You may need to widen the slot a little if you are using the 3mm Liteply version



Glue the two assemblies together as shown.

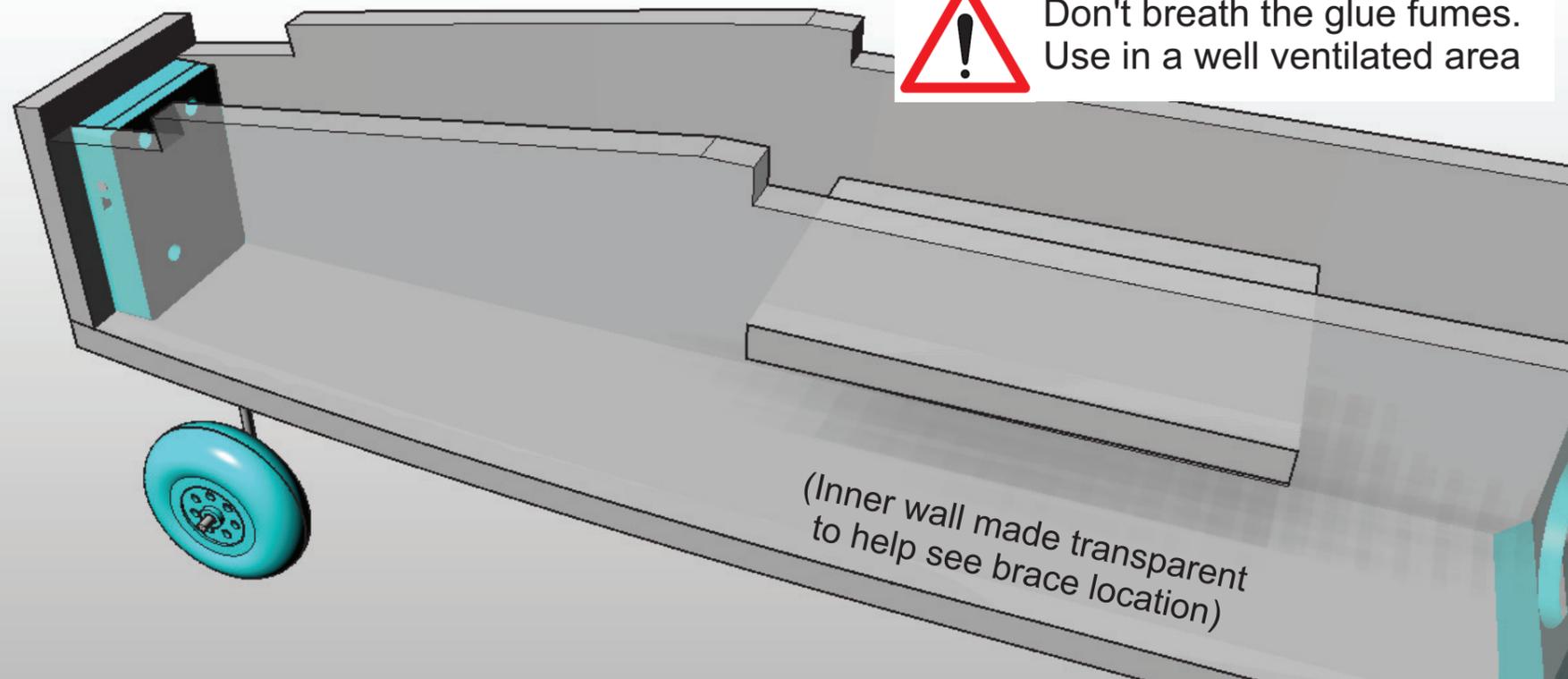


Don't breath the glue fumes.  
Use in a well ventilated area



If you are using Landing Gear, then glue the forward brace onto the bulkhead.

Remove the wheel to thread the forward strut through the hole. Replace the wheel.

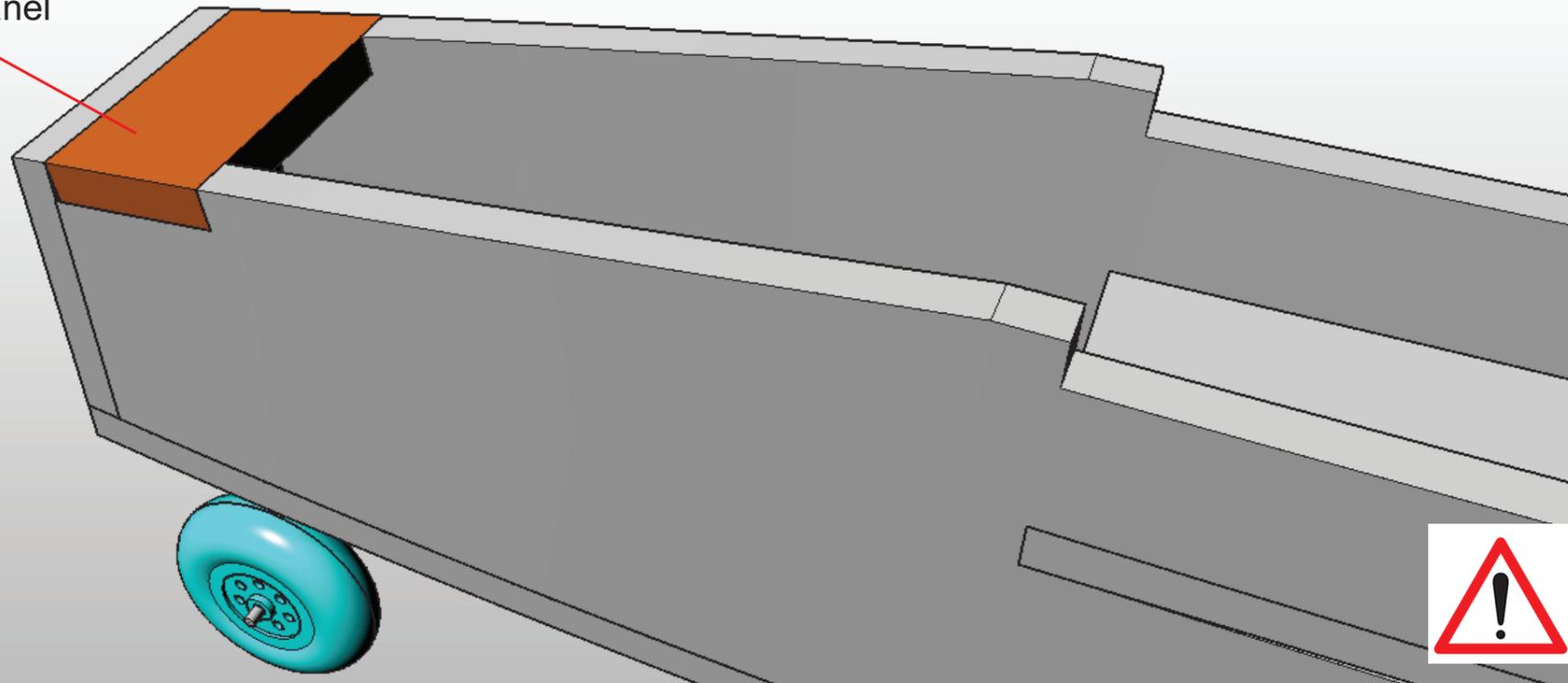


Don't breath the glue fumes.  
Use in a well ventilated area

(Inner wall made transparent  
to help see brace location)



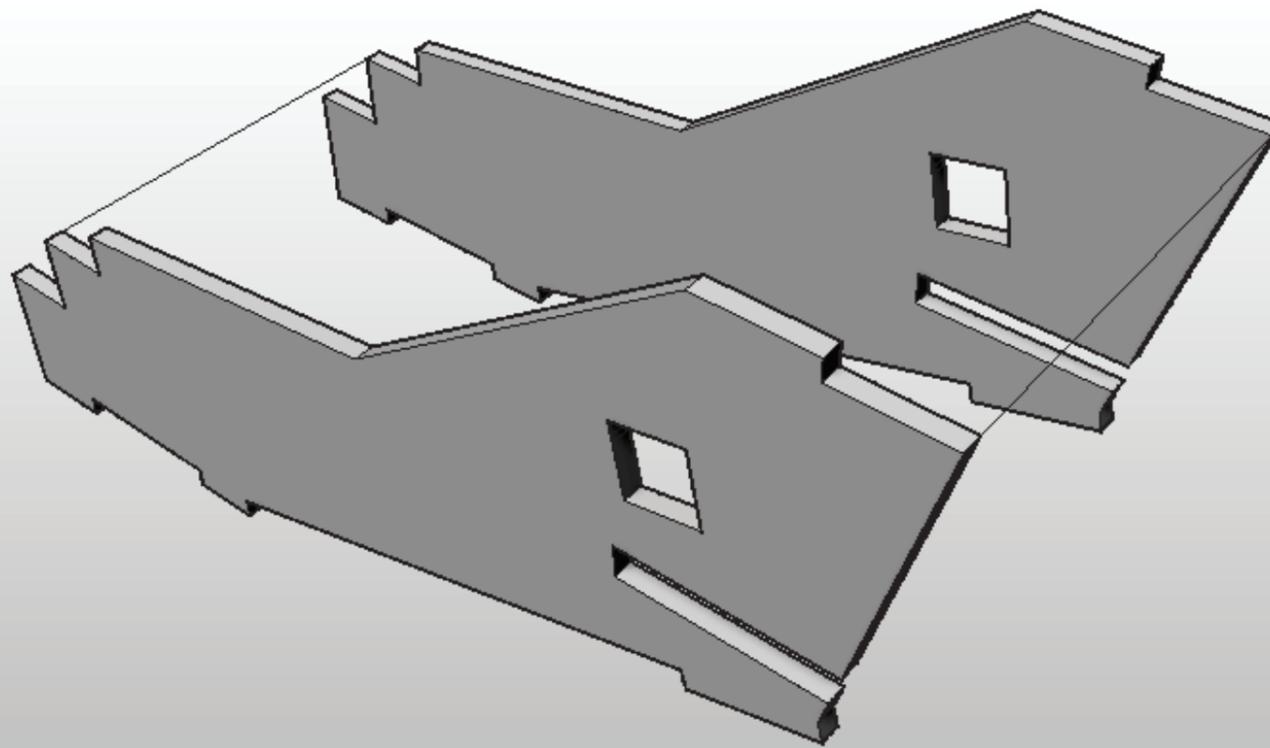
Bridge Panel



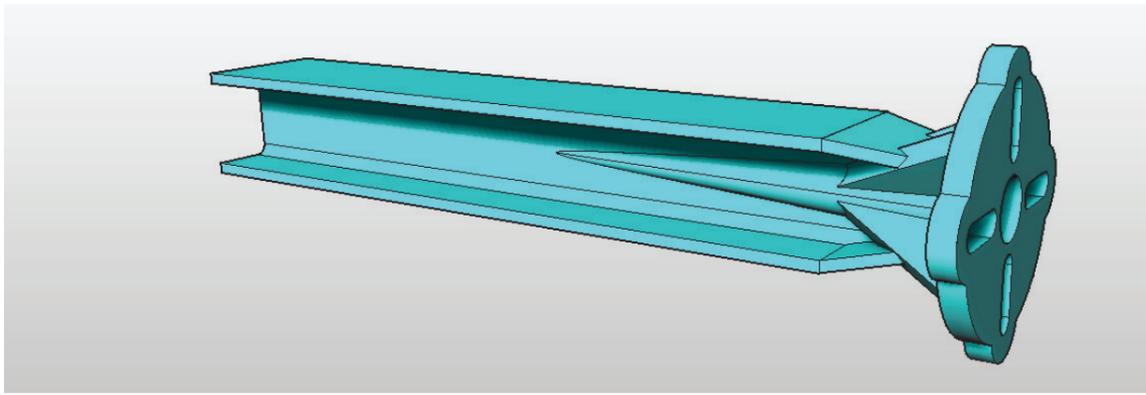
Glue the Bridge panel to the assembly



Glue the two pieces of the Vertical Stabiliser together

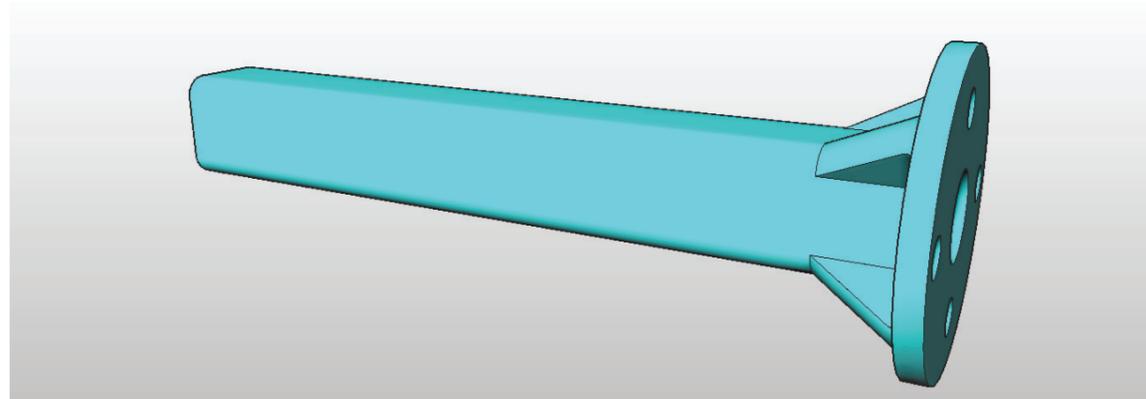


(A)



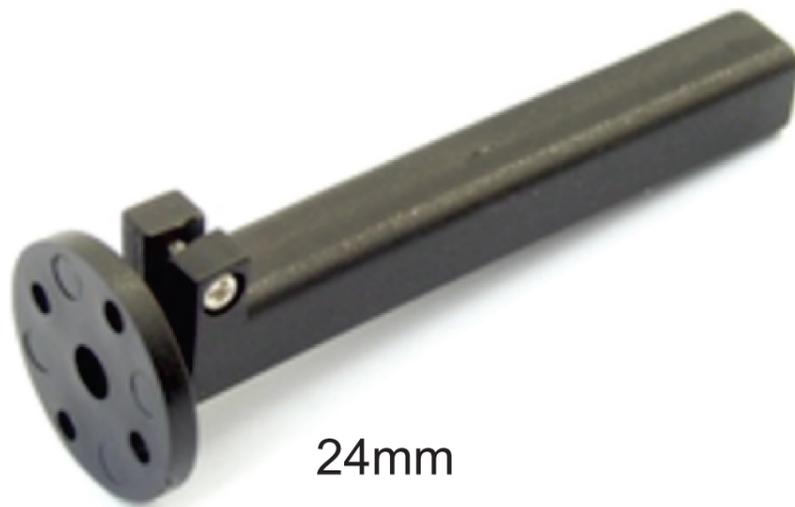
**3D  
Printed  
Part**  
(optional)

(B)



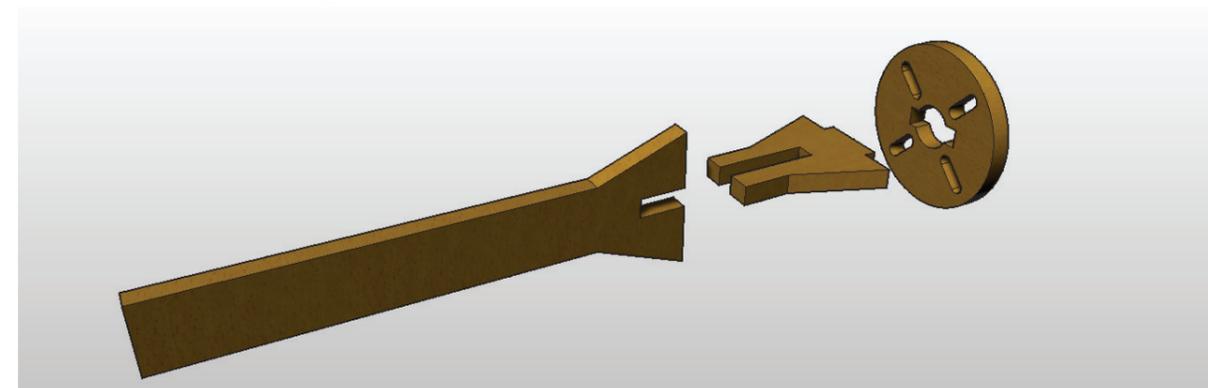
**3D  
Printed  
Part**  
(optional)

(C)



24mm

(D)

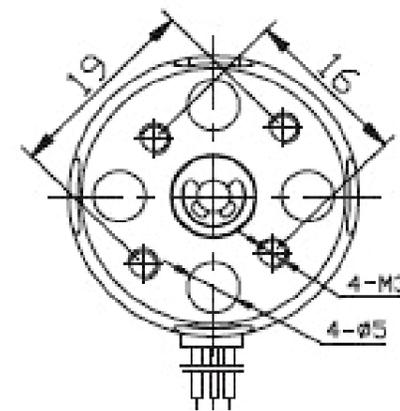


Prepare the motor mount for your Cadet! Choose either:-

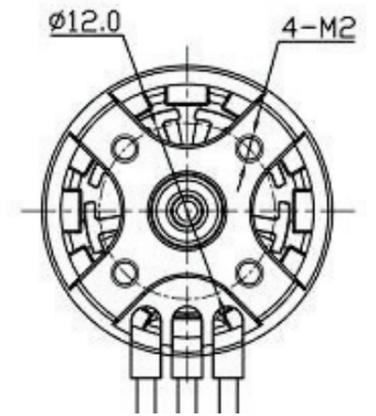
- a) 3d Printed Micro quad mount
- b) 3d Printed 200 quad mount
- c) Purchased Nylon Stick mount (for 200 series only) - try Ebay
- d) Lite-ply mount glued together using epoxy adhesive.

Attach your chosen motor to your motor mount using machine screws that match the motor. Ensure that the screws are not too long that they might go too deep into the motor and damage the motor.

For the Lite ply version - drill the fixing holes as per the motor types below.

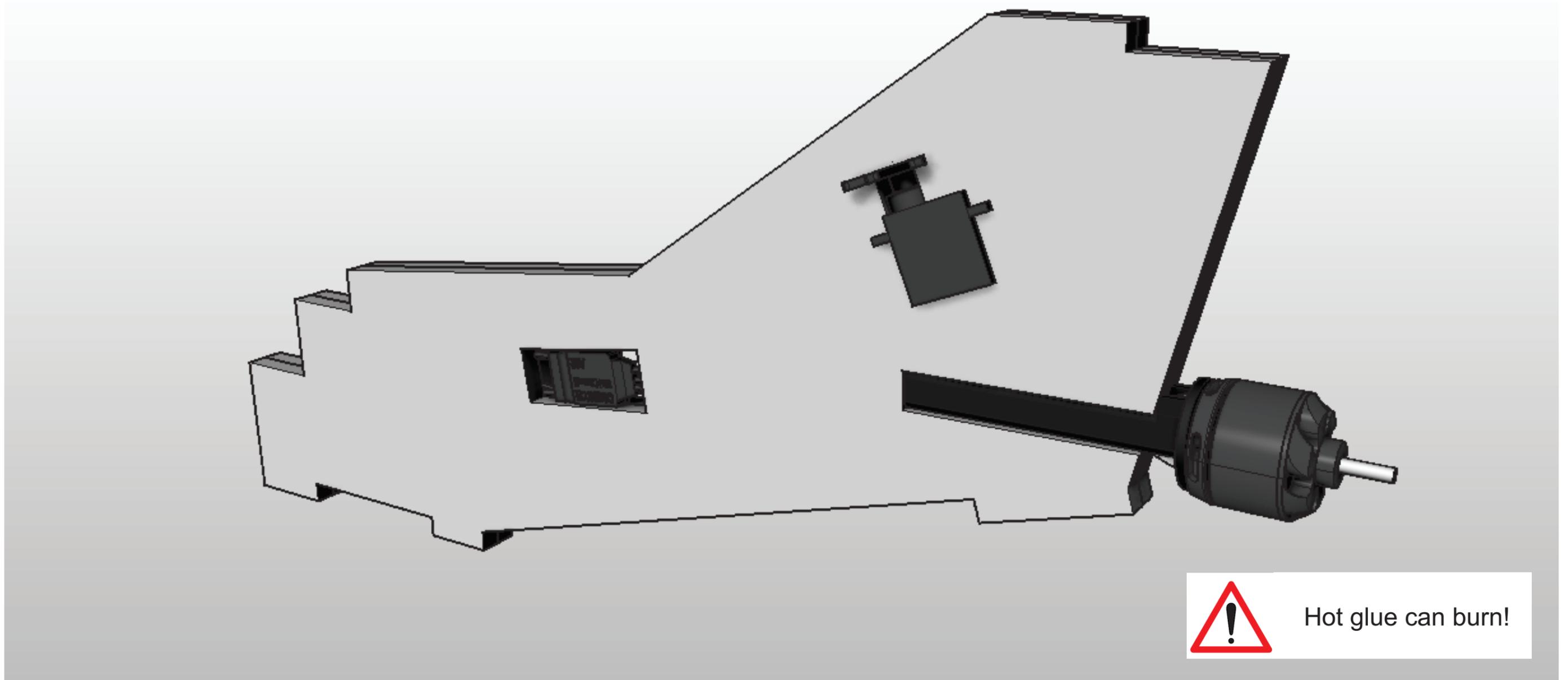


200 series  
QuadCopter motor



Micro  
QuadCopter motor



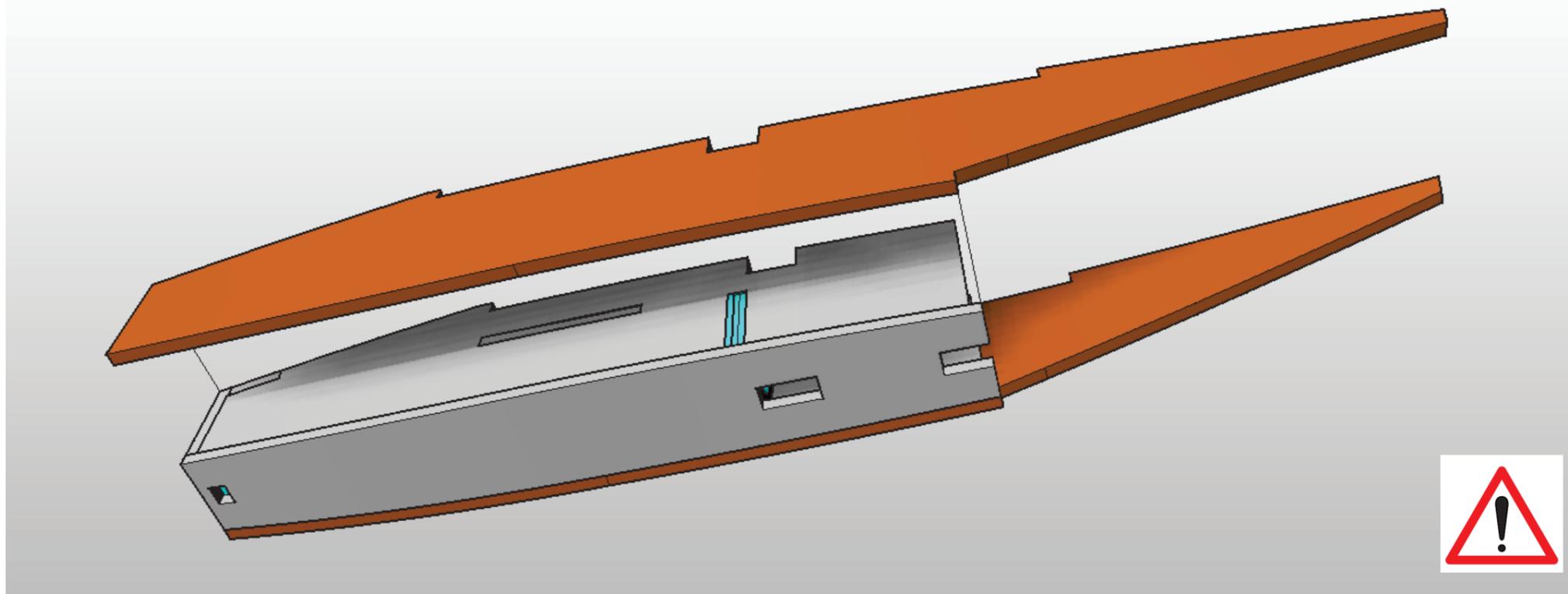


Using Hot melt Glue, fix the motor mount into the slot as shown - ensuring it is straight. Start with a few drops of glue to hold it in location, then run a bead all down the four edges.

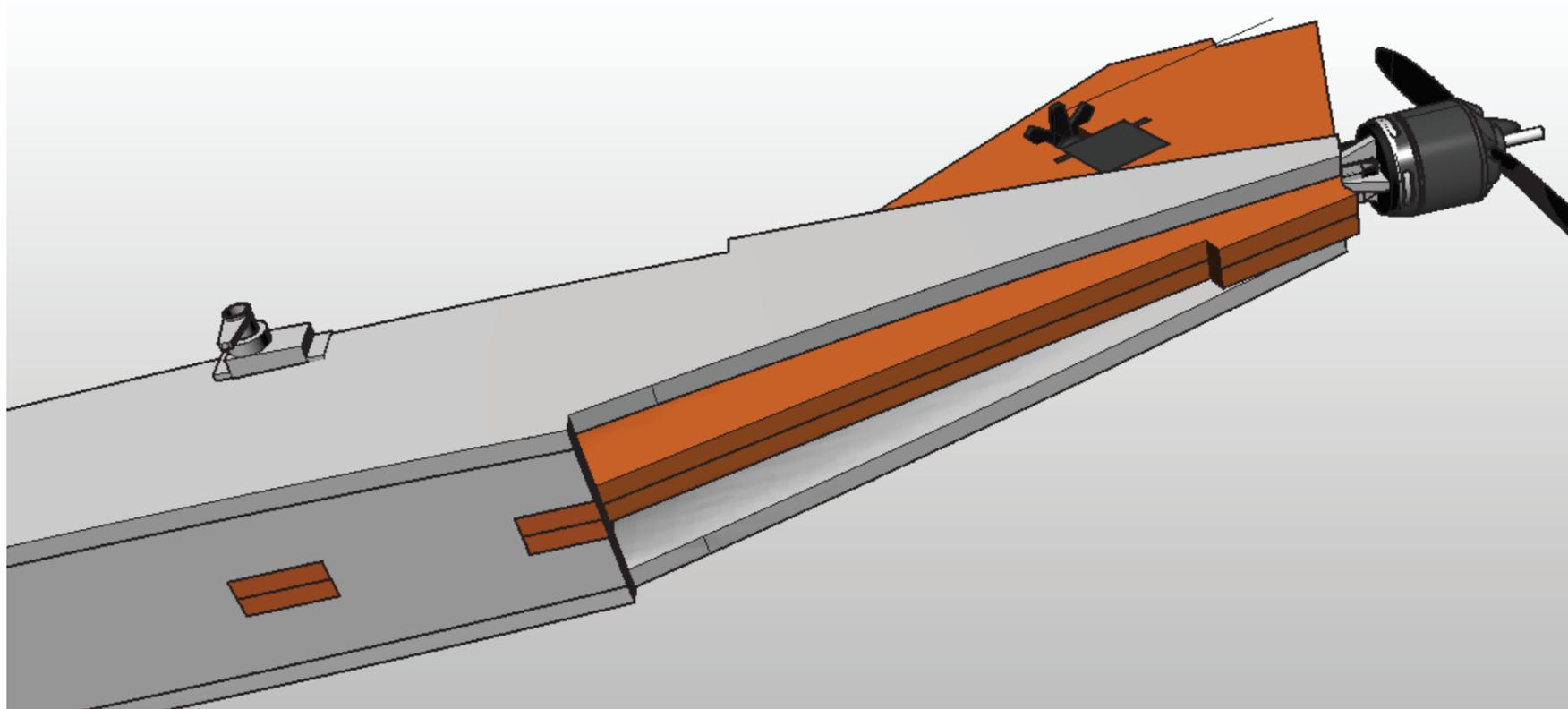
Dry fit (do not glue) the servo into the slot, and leave there until all the electronics are working and you can establish the centre position.

Glue the ESC (Electronic Speed Controller) over the hole as shown to help with cooling.

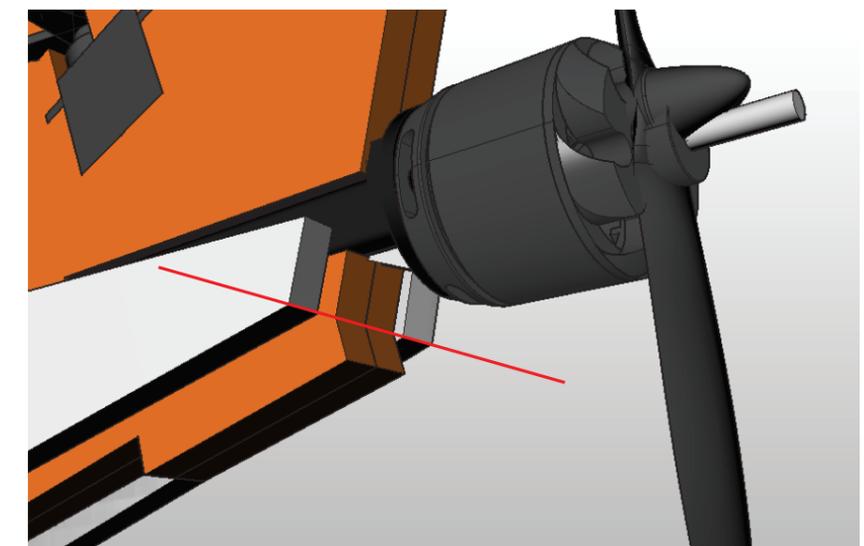


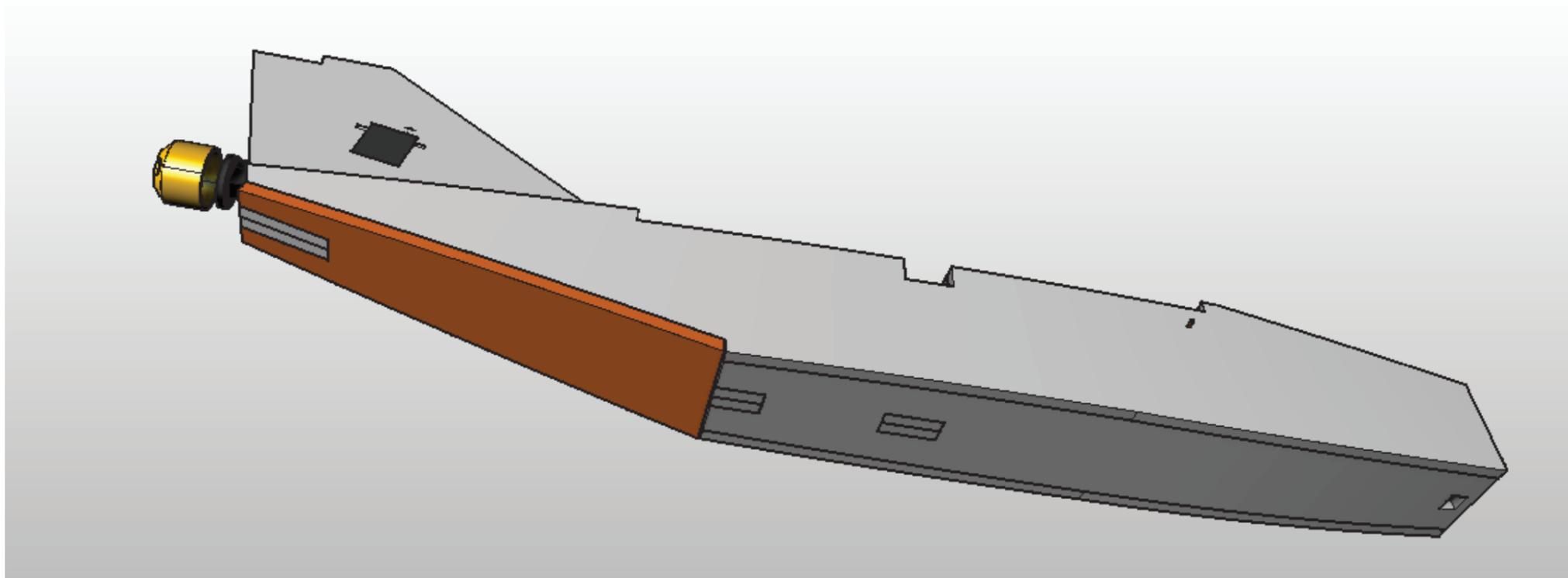


Glue the **Fuselage sides** onto the assembly carefully aligning to the corners as indicated.

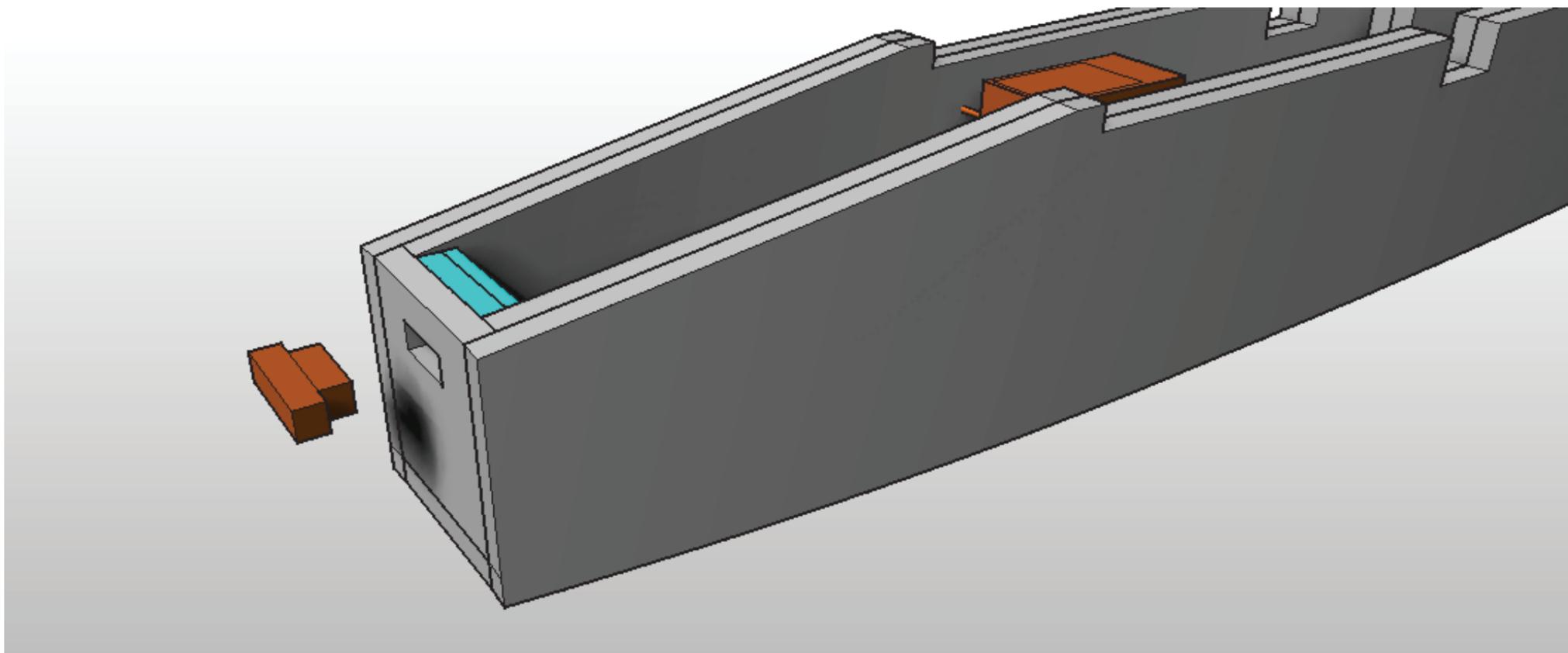


Glue the Vertical stabiliser into the fuselage using the tabs to locate it. (opposite) Align the Vertical Stabiliser with the Fuselage Sides as indicated below.



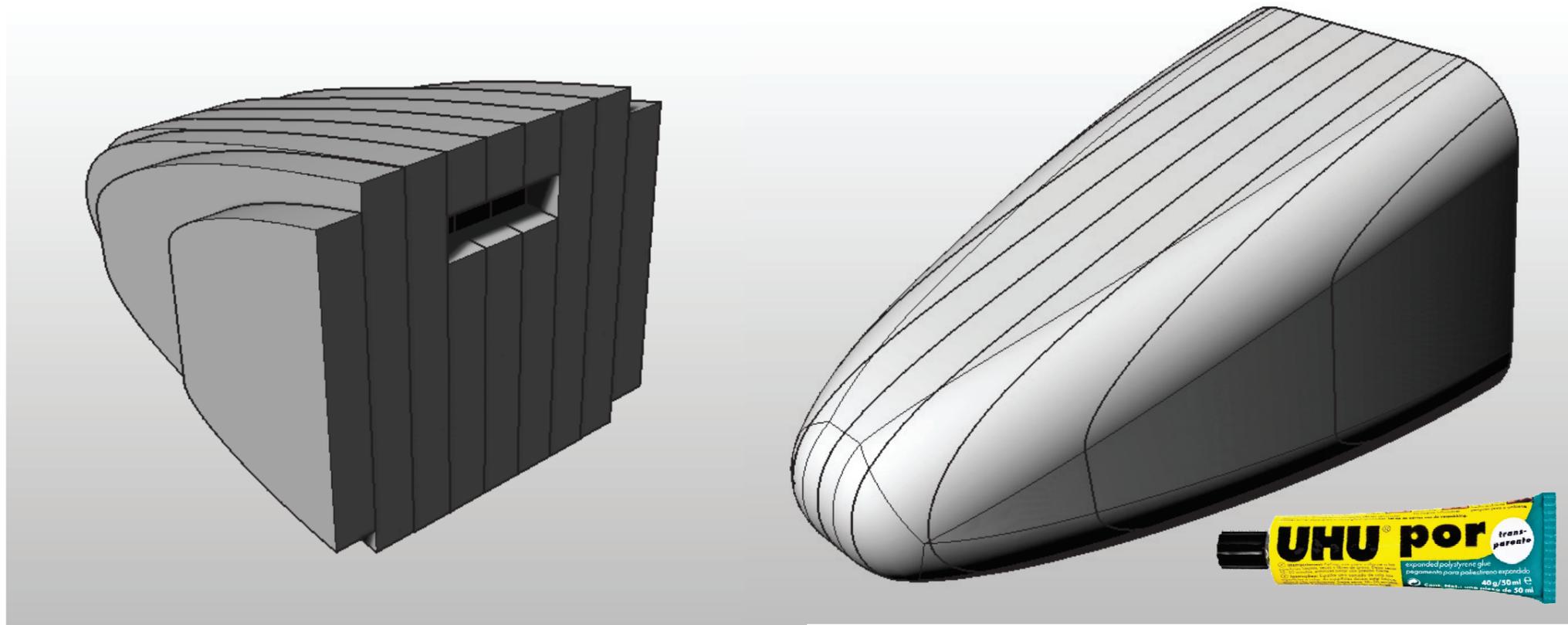


Glue the rear belly panel onto the assembly, bending the fuselage sides to match its shape.

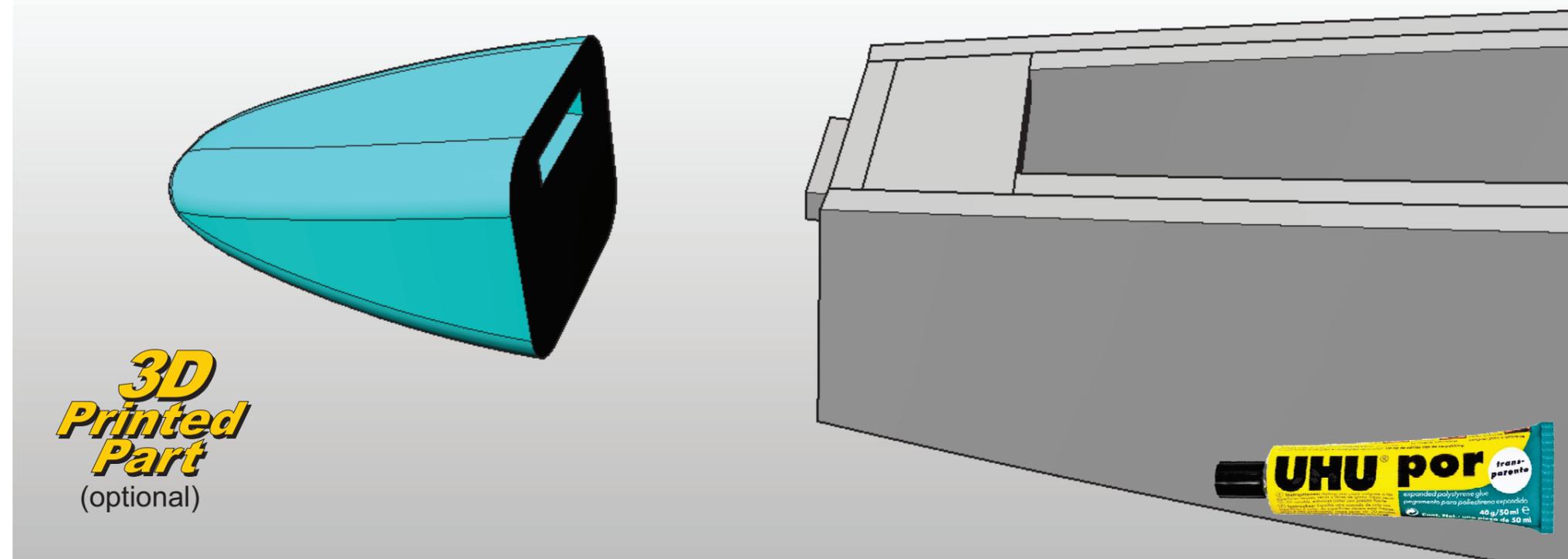
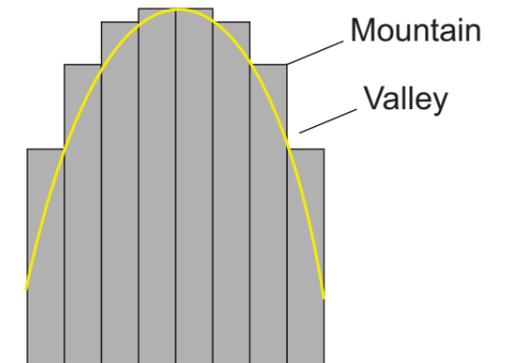


Glue the nosecone aligner to the assembly.





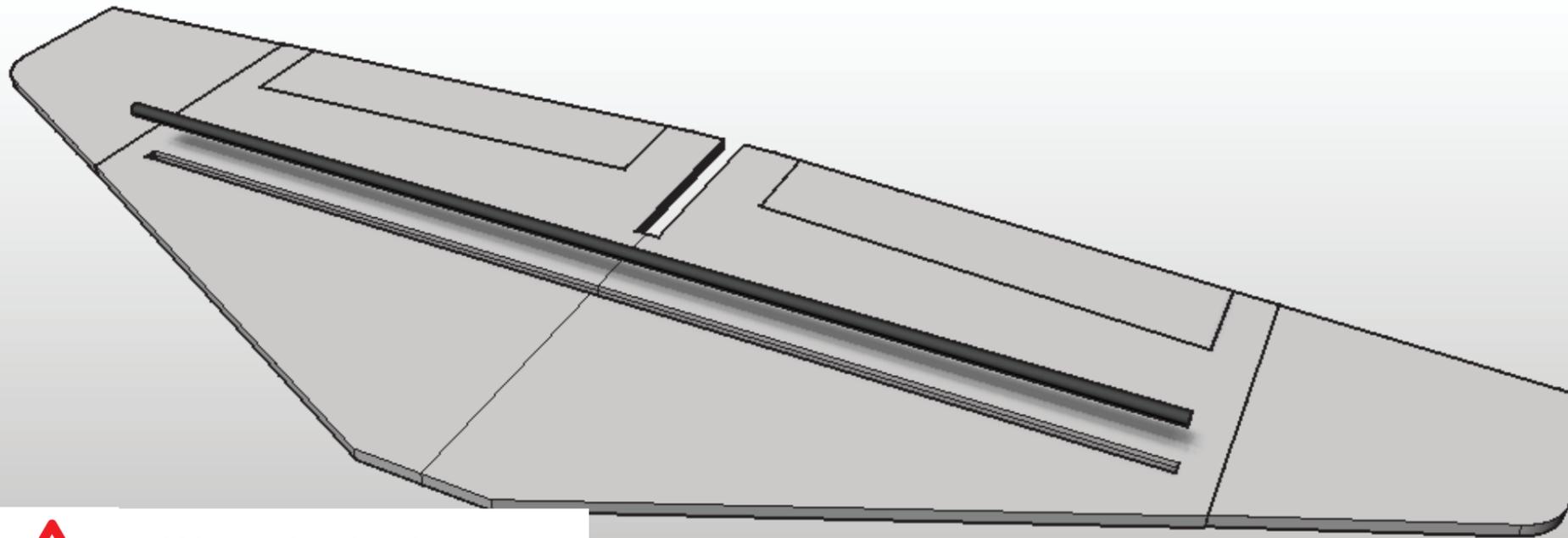
Create a nosecone block from the plans and sand the 'mountains' until there are no 'valleys' as shown



Alternatively, 3D print a nosecone using 0.5% wall and zero infill.

Glue to the fuselage, aligned using the nosecone aligner.

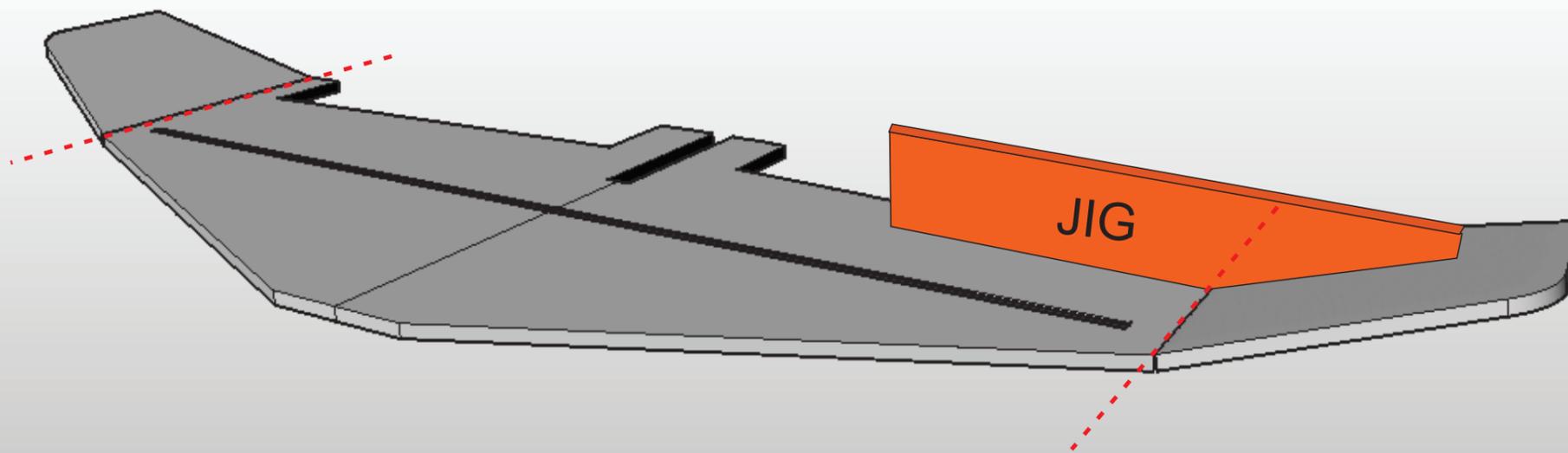




Wear plastic gloves.  
Epoxy irritates the skin

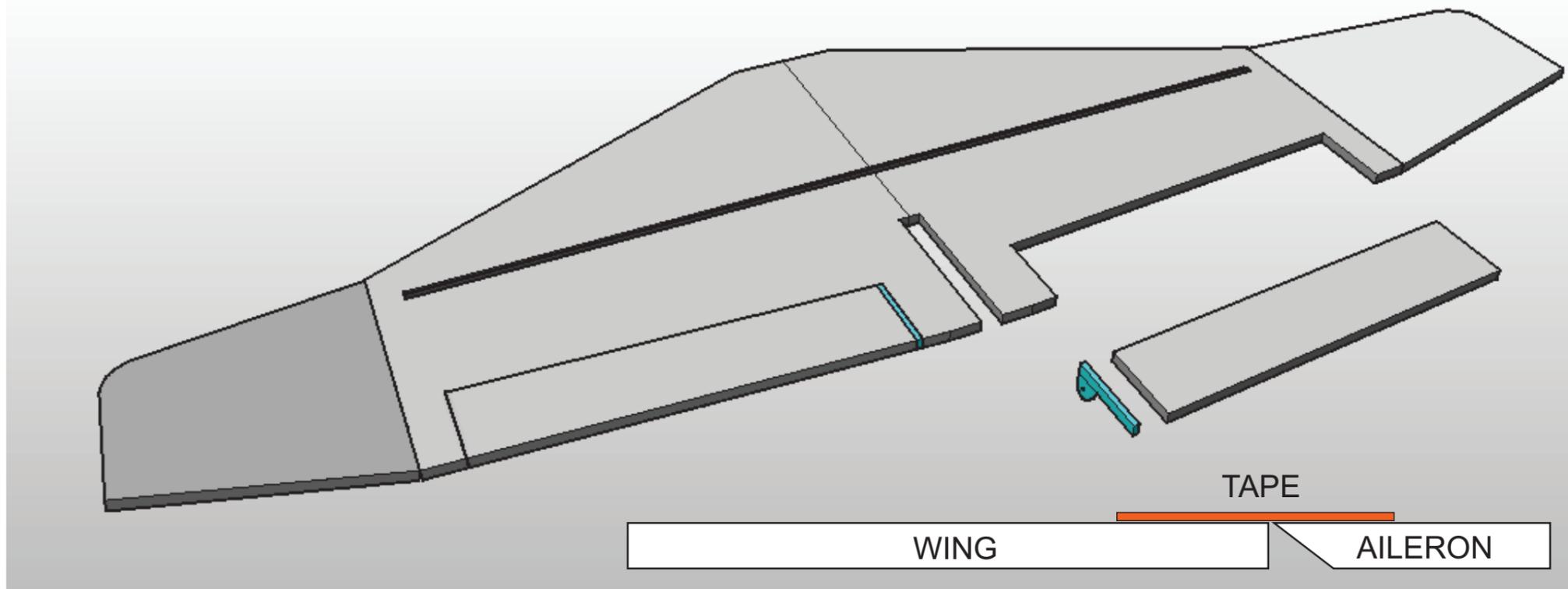
Cut a 6mm Carbon tube to length and glue it into the wing slot using epoxy.

Use masking tape top and bottom to help get a good finish while the epoxy sets.



Cut the crease line with a sharp knife, sand or cut a slight angle along the edge, then hot melt the wingtip to match the angle of the jig.





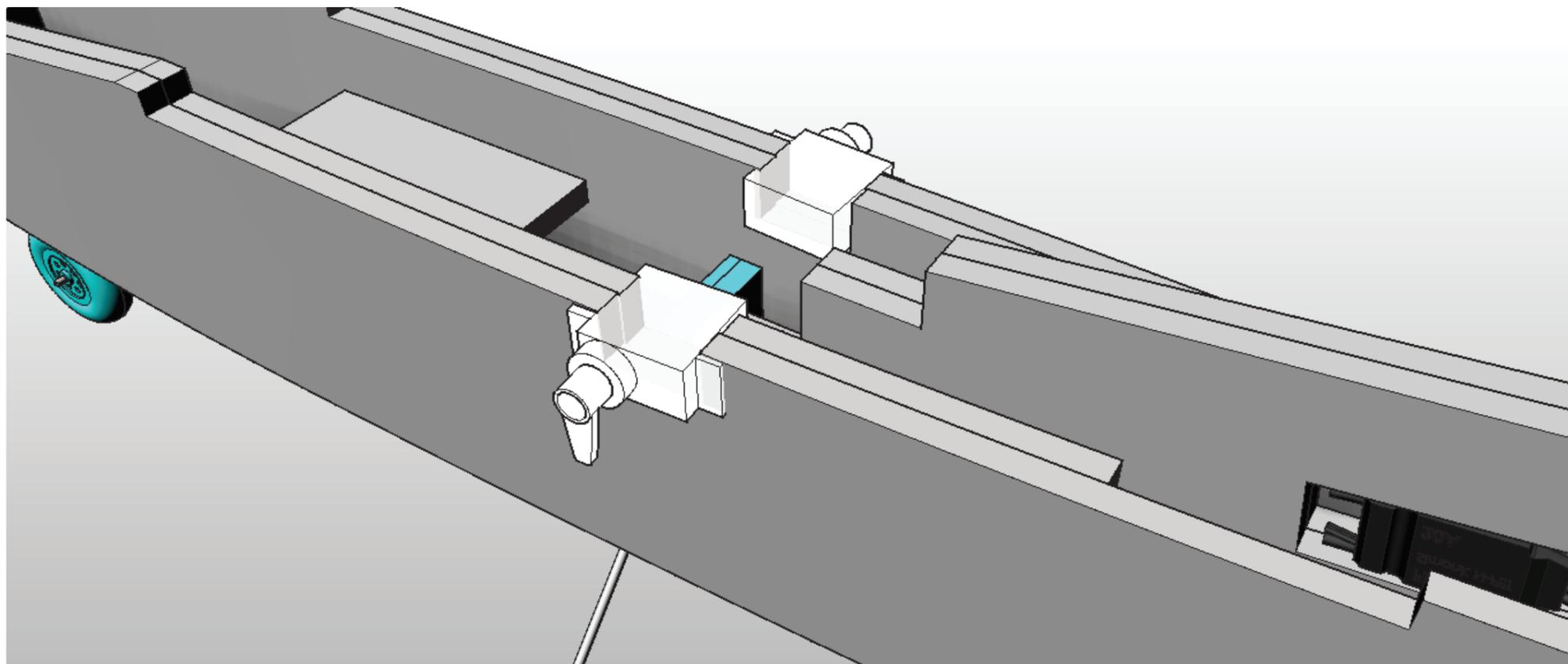
Cut an angle on the leading lower edge of the aileron.

Use either :-

- a) Thick Parcel tape
- b) LeukoSilk medical tape
- c) Scotch Giftwrap tape (purple)

Tape the ailerons to the wing.

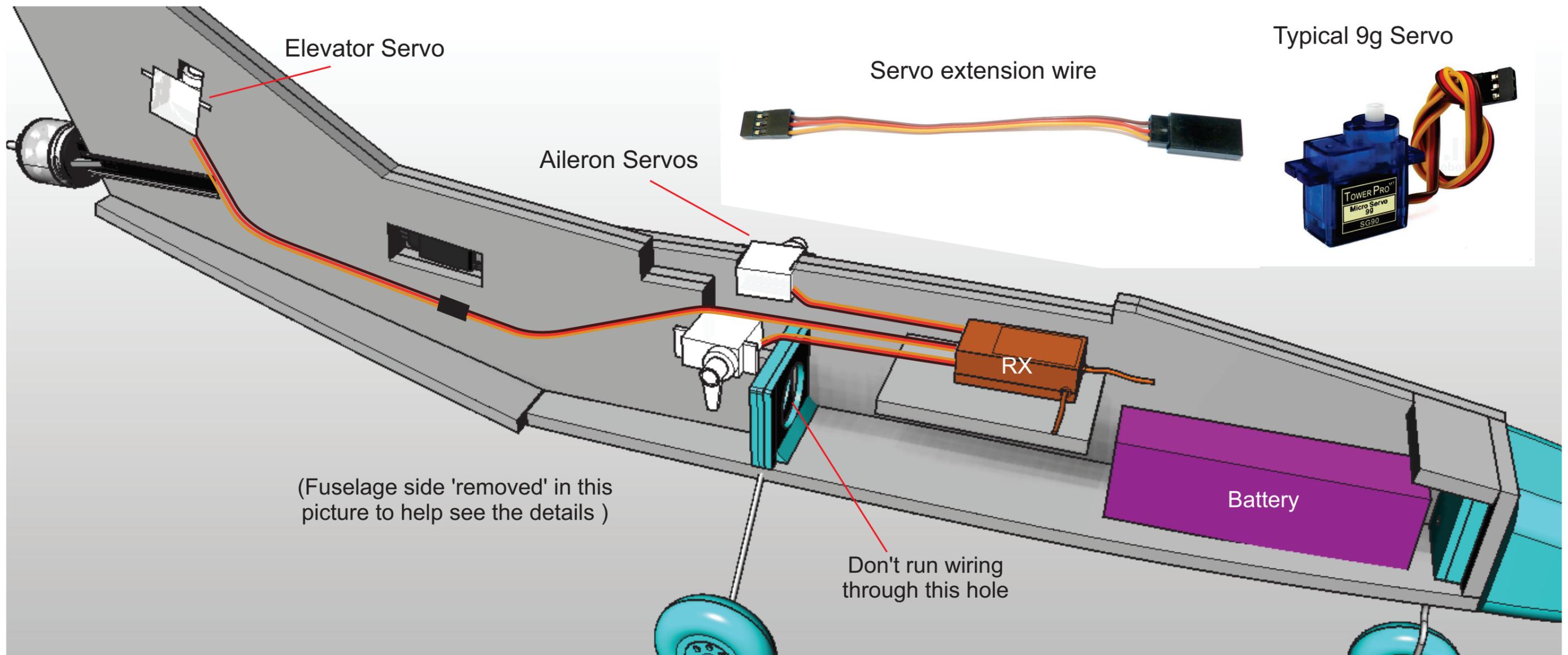
Using Hot melt glue - glue the control horns to the inside edge of the ailerons - Trimming short the aileron if needed.



Adjust the foam sheet to fit your chosen brand of servo, so that the top face of the servo is aligned with the top of the fuselage.

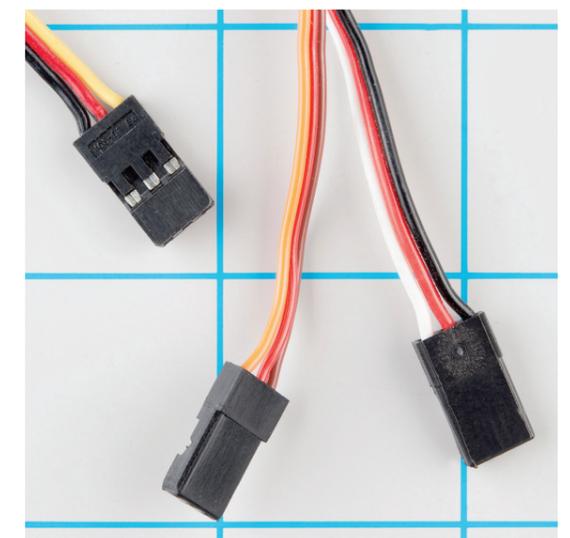
Glue the aileron servos in place using hot melt glue.





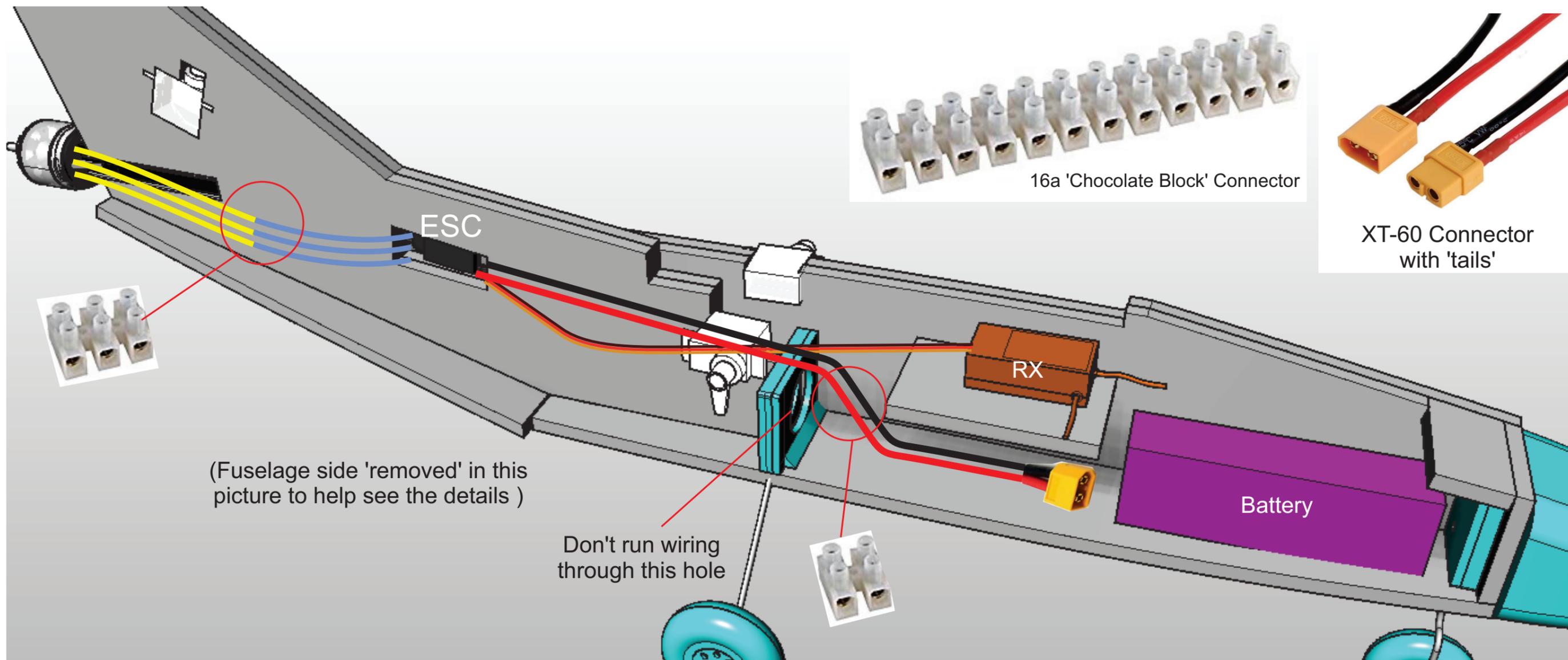
Connect the servo wires into the correct channels in your radio receiver (known as 'RX') - you will need a 20cm extension wire to reach to the elevator servo.

Make sure that the servo is fitted into the receiver pins the right way around. Usually the receiver will indicate + and -. Servos usually have wiring in three colour schemes but black/brown is - and red is +



Servo wiring colours





Connect the three motor wires into three terminals of the 'choc block' connector, and also the Electronic Speed Controller (ESC). Ensure a robust connection.

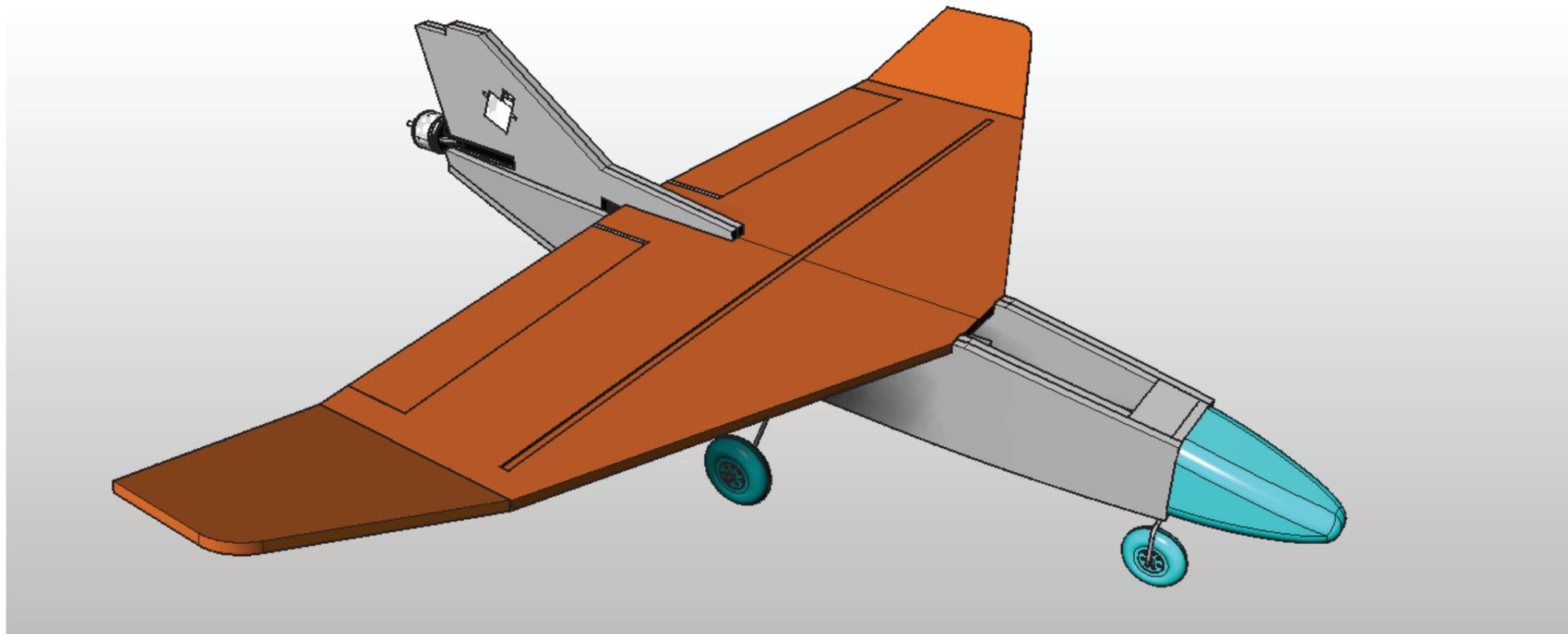
Connect the servo wire from the ESC into the 'throttle' channel of your Receiver (RX)

Connect the XT-60 Cables to the ESC power cables using two terminals of the 'choc block' connector. Ensure a robust connection.

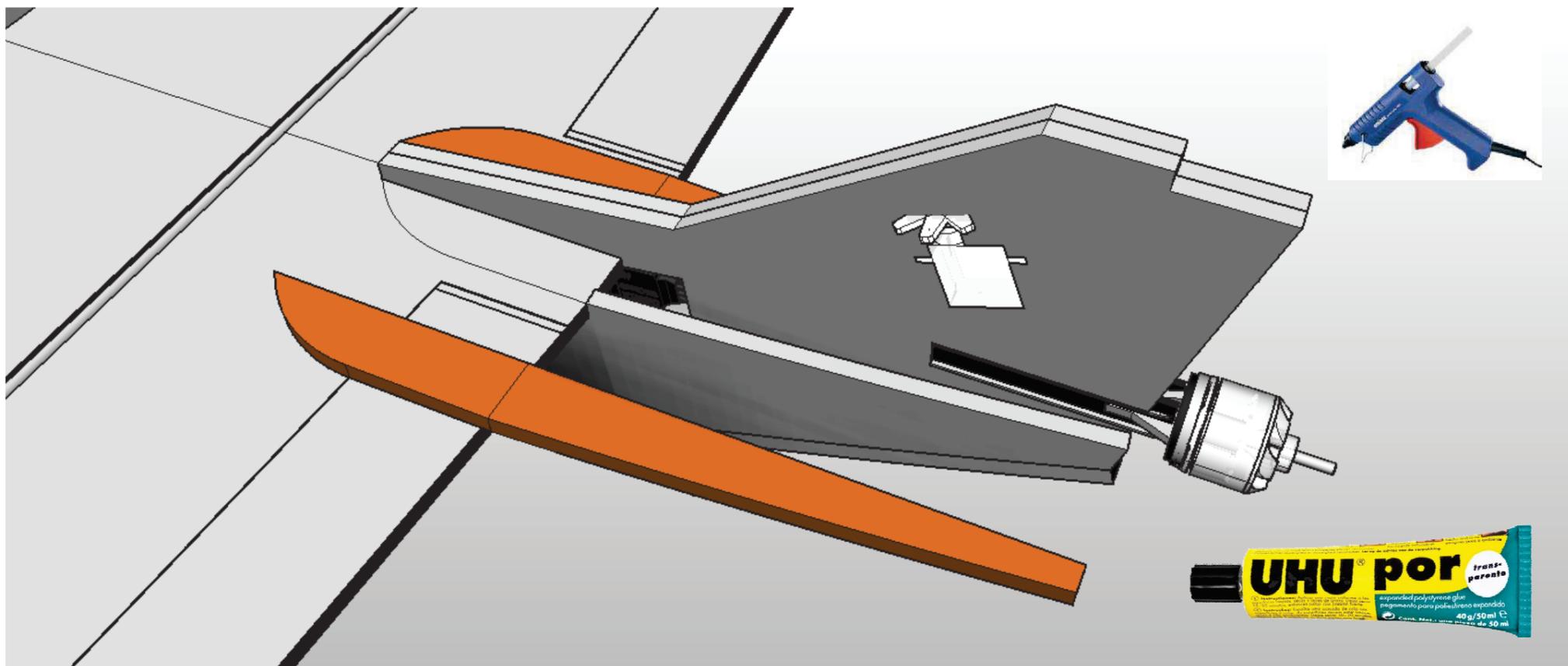
Plug in your battery and then follow your Transmitter/Receiver binding process to bind your radio and RX together.

Check that your servos are working correctly and are operating the right way. Check your motor is spinning the right way to match your propellor - if not, swap any two cables from your motor to the ESC.





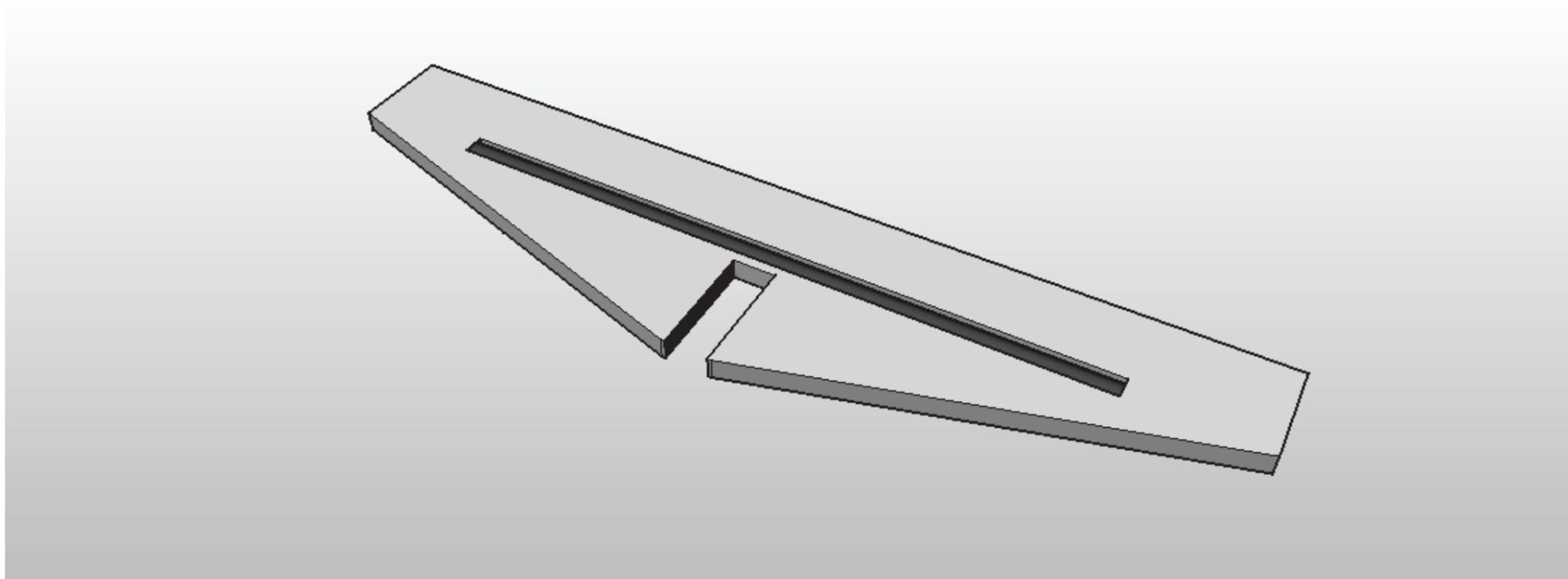
Glue the wing onto the fuselage.



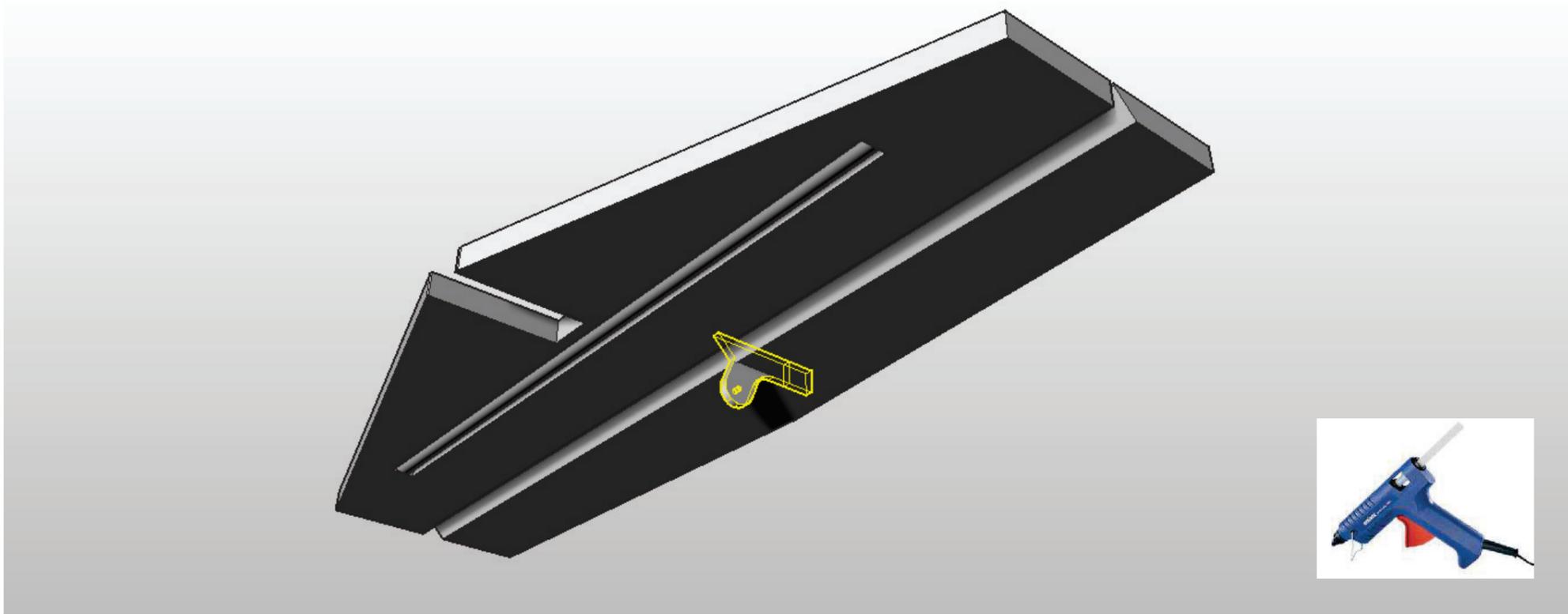
Glue the upper fuselage cover onto the fuselage, make a notch for the servo wire to pass through.

Make sure your servo arm is sticking out 90 degrees when your transmitter is connected, then glue the servo in place using hot melt glue. - you may also need to remove a little foam to allow free travel of the servo arm.





Cut the carbon horizontal stabiliser spar and glue in place exactly as per the wing.

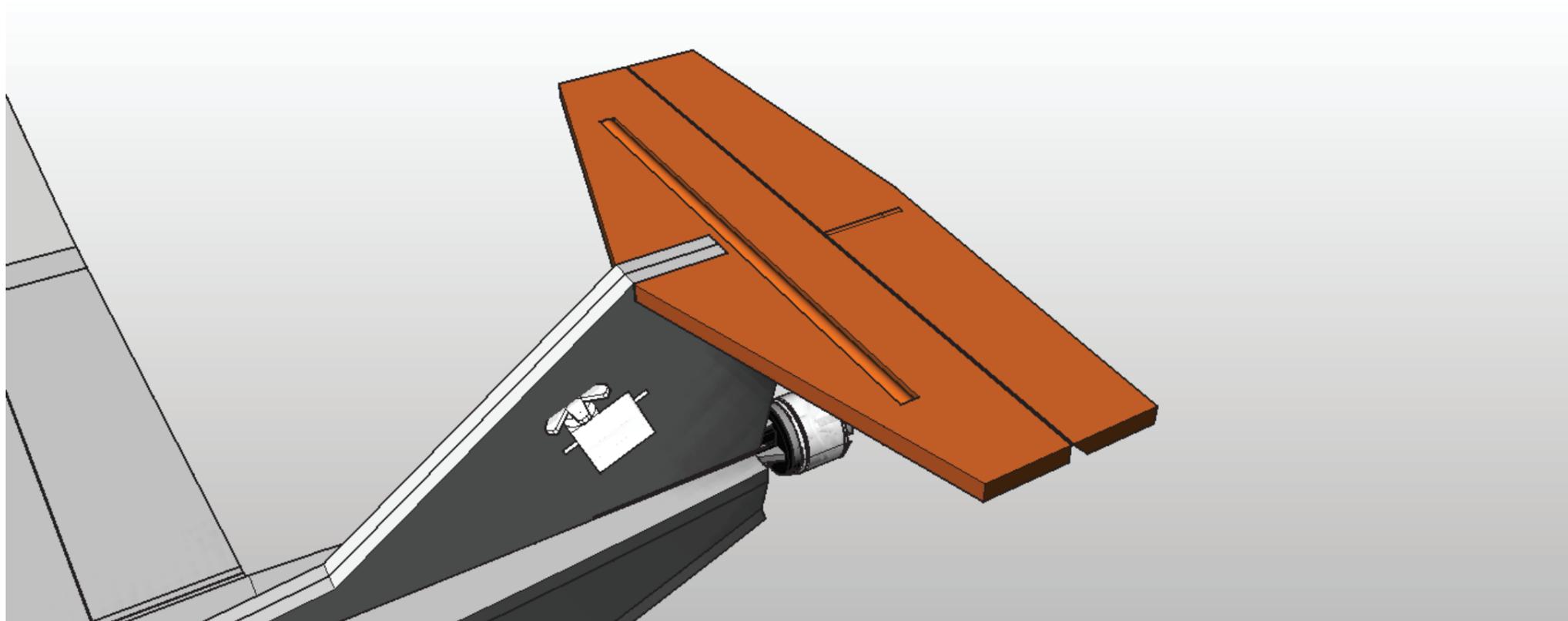


Chamfer the elevator and attach to the horizontal stabiliser using the same tape as used on your ailerons.

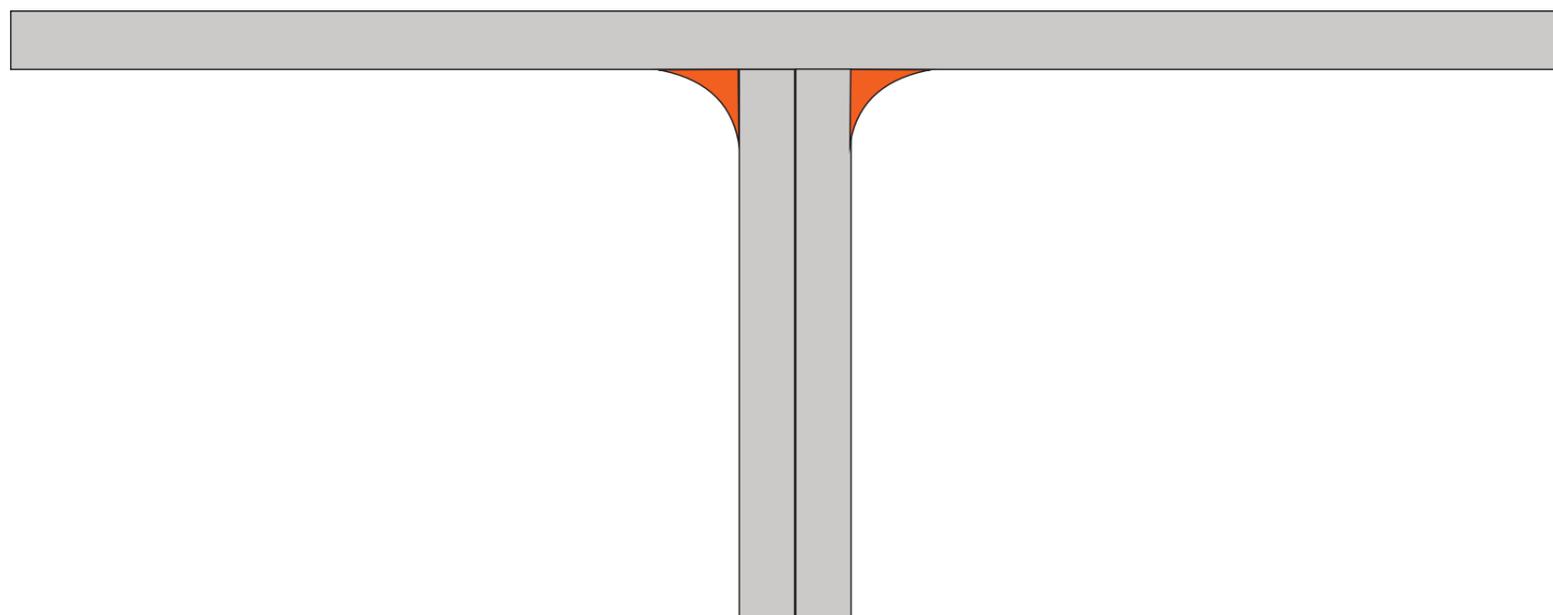
Carefully trim away a section of the elevator to attach the control horn - which should be aligned with the elevator servo horn.

Glue in place.



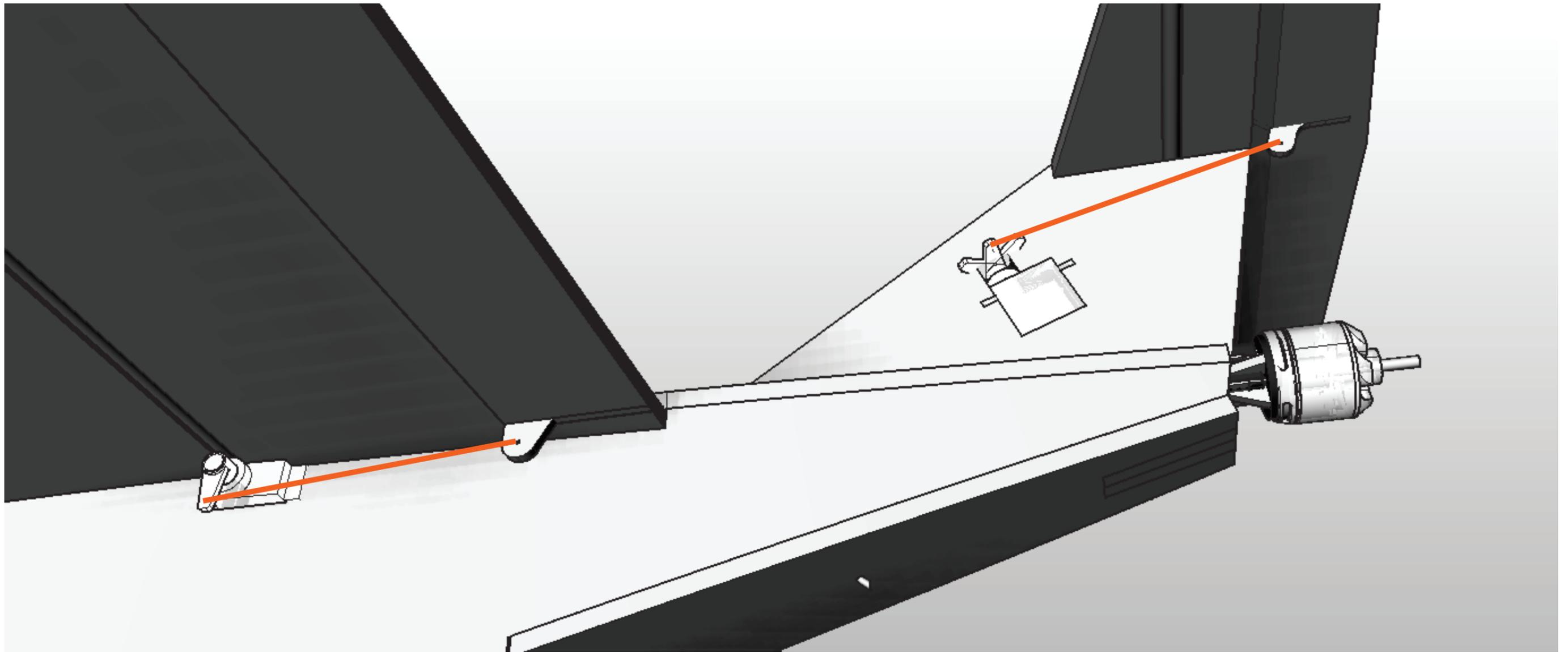


Glue the mating surfaces and fit the Horizontal stabiliser assembly to the plane using hot melt glue.



Run a bead of glue along the each inside corner of the tail as shown, then run a pencil down it to get this shape before the glue cools.

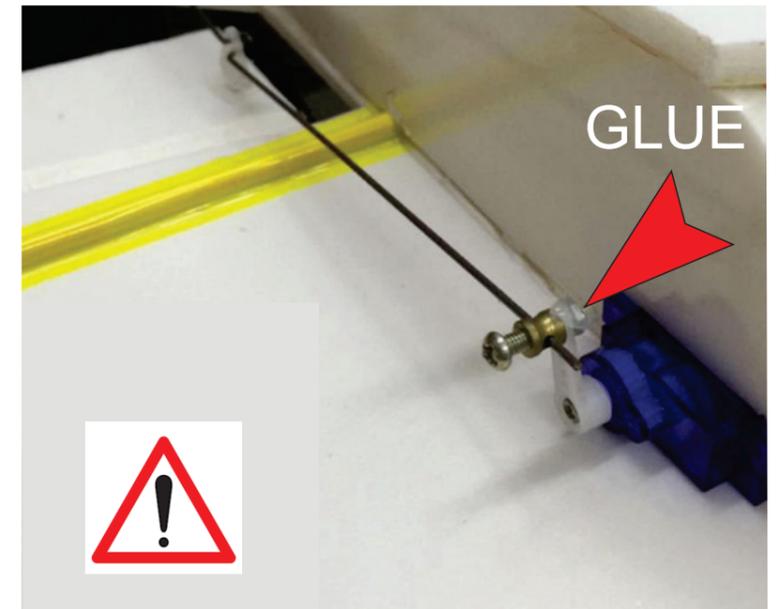


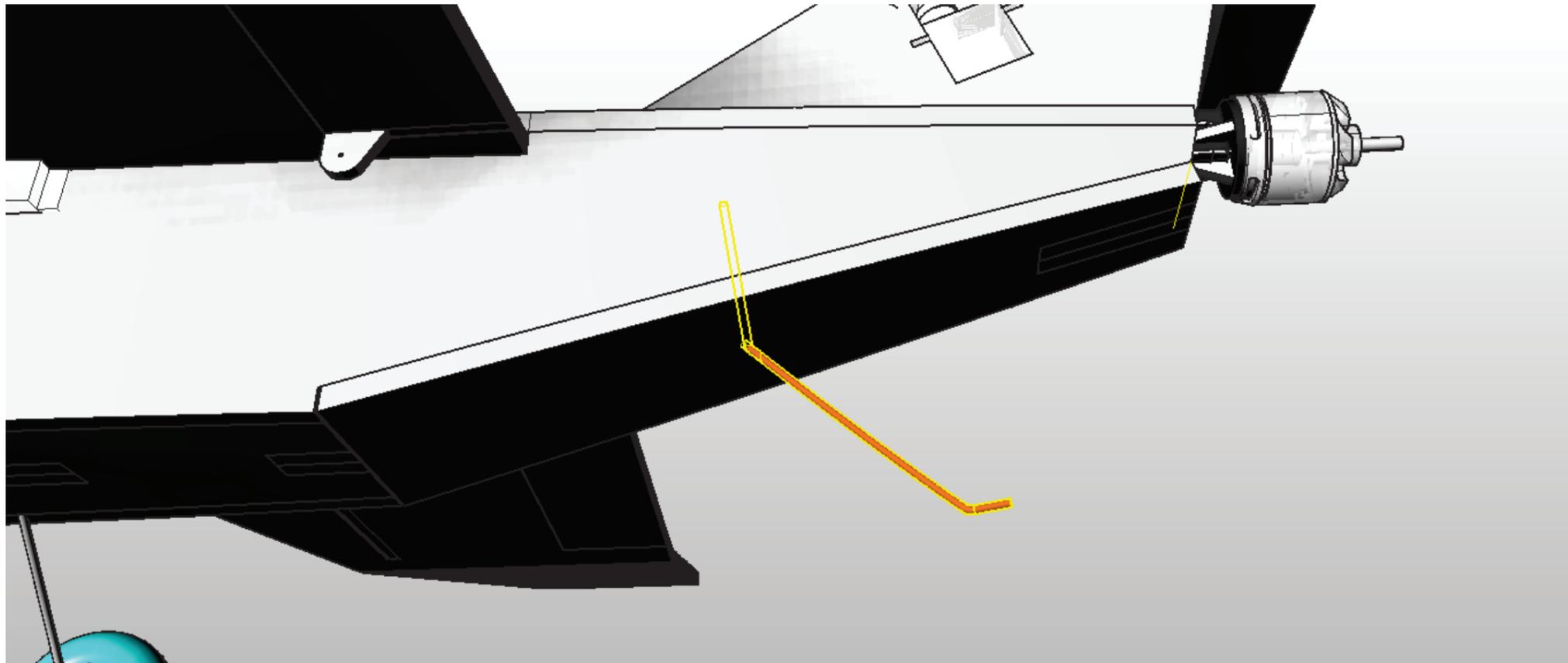


Using pliers, bend a 1.5mm piano wire to have a 'Z' bend as shown. Drill the control horns to be able to accommodate it without any slop.

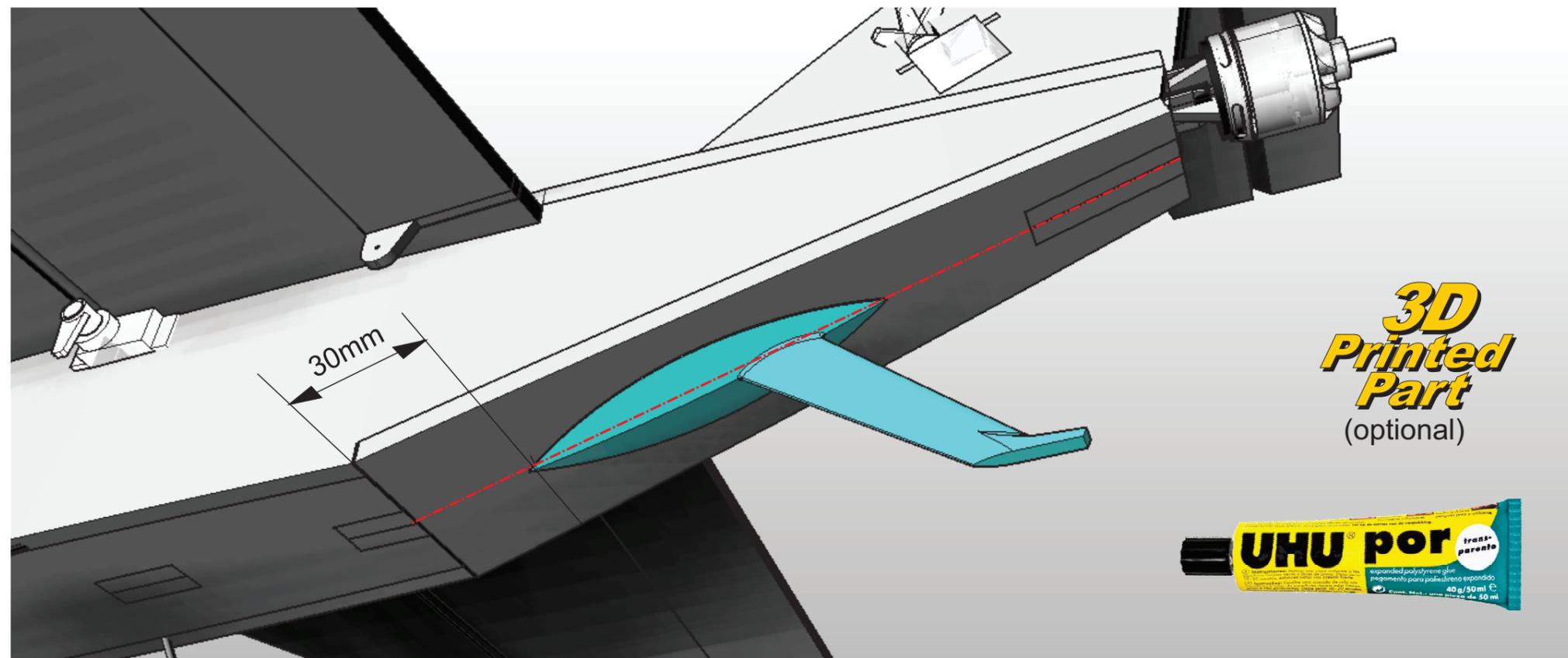


Drill your servo horns (choose a hole on the horn towards the middle) to be able to accept the Linkage Stopper, allowing them to rotate but ensure no slop. Tighten the nut until it allows no slop, then put a drop of Superglue Gel onto where the thread protrudes from the nut. - this will prevent it from coming loose.



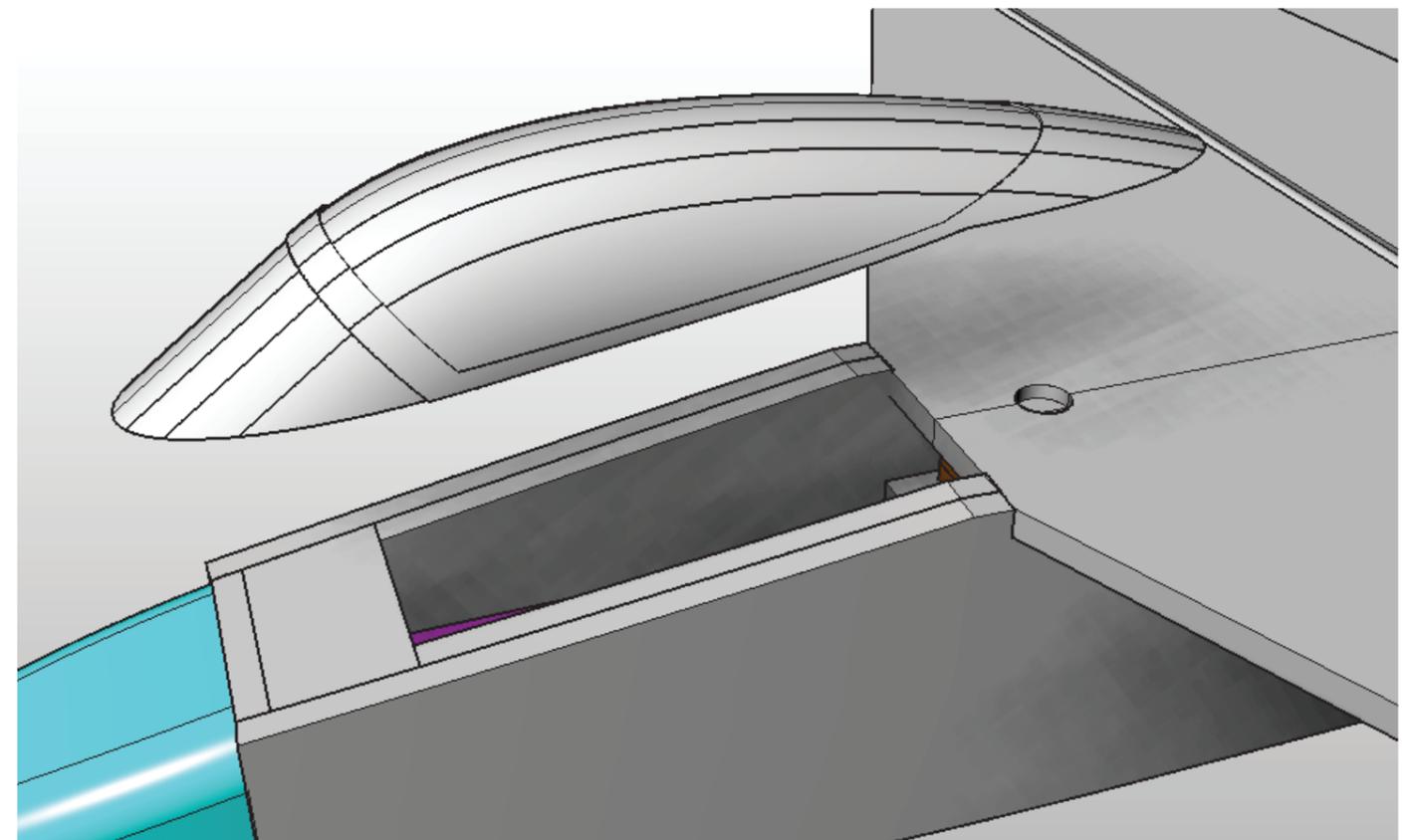
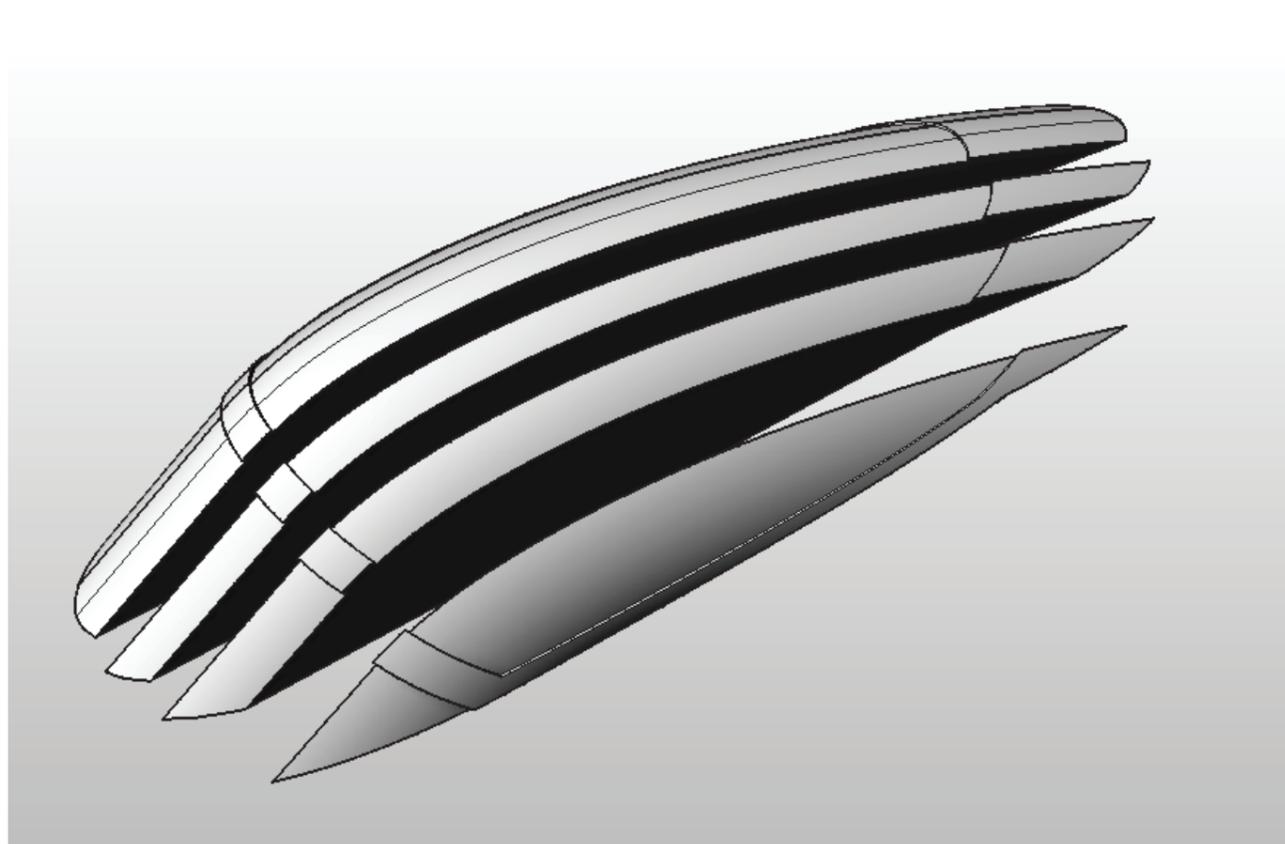


Drill a hole as indicated on the rear belly panel and using epoxy, glue the prop protector in place.



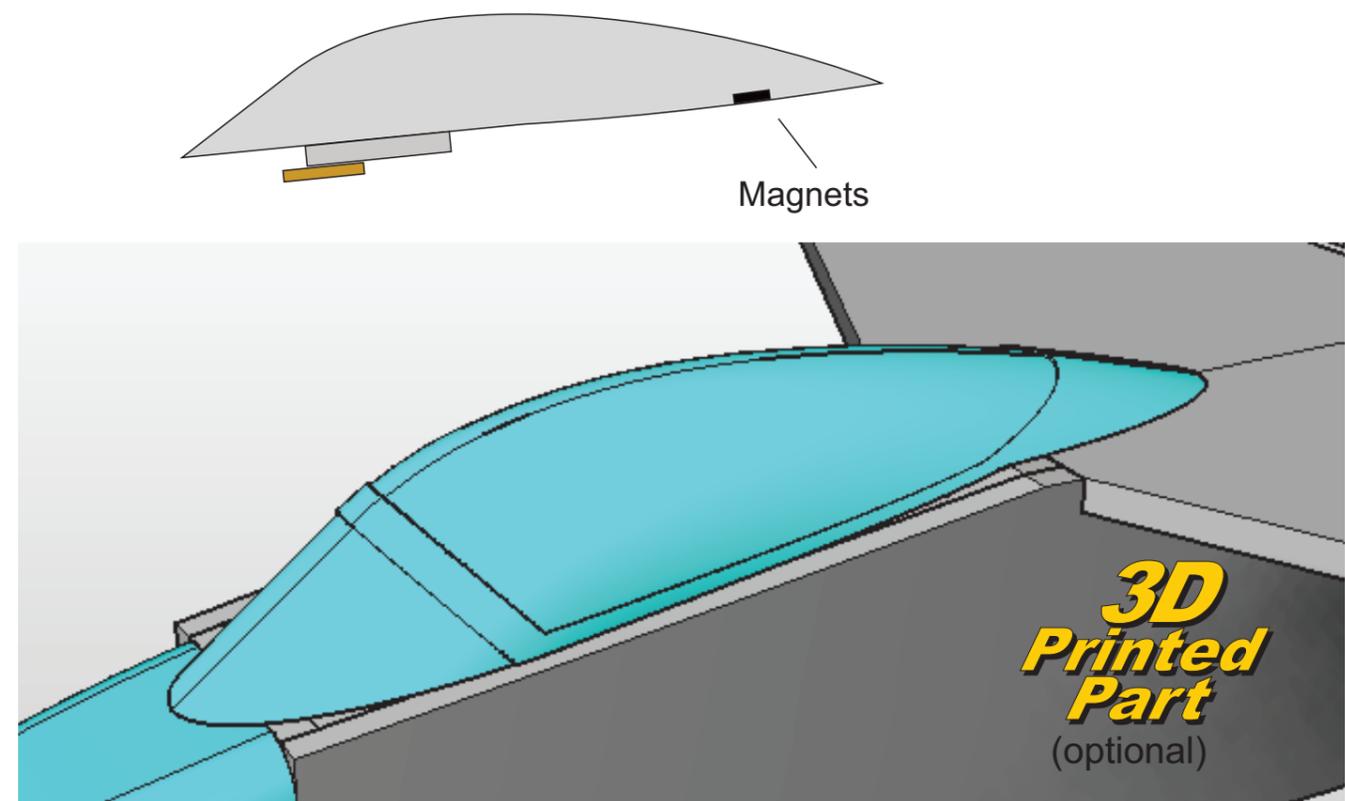
Alternatively, 3d print the prop protector and glue in position on a marked centreline, 30mm from the forward edge of the rear belly as shown.

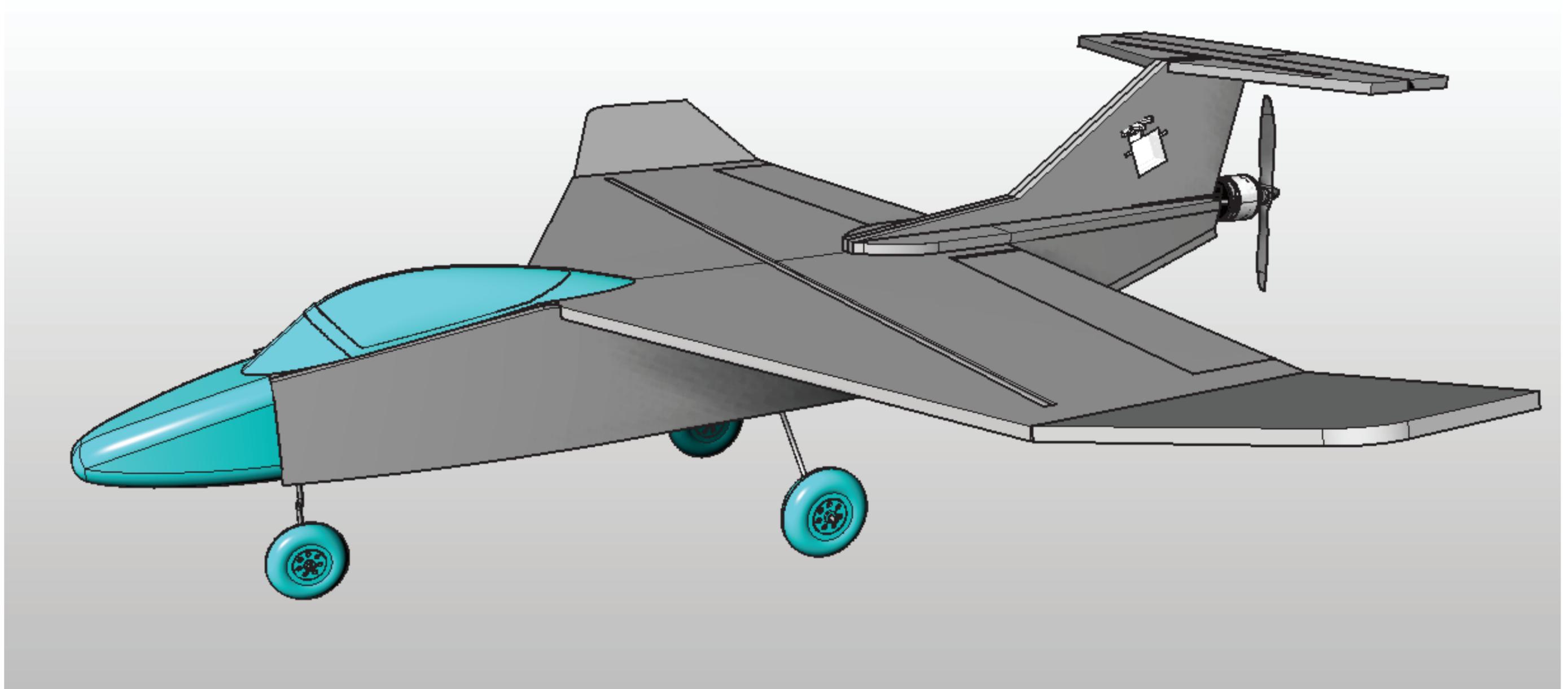




Create the canopy in the same way as the nosecone, or 3d Print one and add magnet as shown. Create a tongue from a scrap piece of foam sheet and lite ply

- 
1. press magnet into depron to impress shape.
  2. Dig out a recess for the magnet using a sharp knife.
  3. Apply glue into recess and push magnet into it.
  4. Whilst still wet, lay masking tape over the area.
  5. When fully cured, remove tape and put adjoining magnet on top
  6. When correctly aligned, press adjoining depron onto the sticking up magnet to impress shape.
  7. Repeat steps 2-4 for the upper part.
- IMPORTANT.**  
Before glueing the upper magnet in, check that the magnet is the right way around!





Congratulations, your model is now complete.

Either fly it as it is, or go on to paint it and add decals.

