JETWORKS

Martin Seamaster

Pondjet

Photograph shown is the real aircraft.

Navy Seaplane Bomber

Construction Guide

P6M-2 Seamaster History

The Martin P6M SeaMaster was an experimental strategic bomber flying boat built by the Glenn L. Martin Company for the United States Navy. Designed with tip tanks that doubled as floats on the water, an all-flying "T" tail and a rotating bomb bay—pneumatically sealed against seawater in the P6M.

Early tests of the XP6M-1 in 1957 version showed that the engines were mounted too close to the fuselage and scorched it when afterburners were used, leading to angling the engines outward in later aircraft. Flight testing was initially successful, but a control system fault destroyed the first prototype with the loss of all aboard. The first pre-production YP6M-1 was completed in 1958, but the J71 engines were unreliable and the aircraft had spray ingestion problems at higher gross weights, which affected takeoffs in ideal conditions only. The P6M-1 also had a serious control deficiency due to porpoising under some trim settings. These deficiencies resulted in the P6M-1 program being cut.

A revised design, the P6M-2, was rolled out in early 1959. Changes included new, more powerful Pratt & Whitney J75 engines, a refueling probe, improved avionics, and a canopy with better visibility. A buddy refueling drogue kit had also been developed to fit in the bomb bay. Three had been built by summer 1959.The P6M-2 was an impressive aircraft; its Mach 0.9 performance "on the deck" could be equaled by few aircraft of the time. The aircraft were heavily built, with the skin at the wing roots over 1” thick. It had some severe compressibility effects above Mach 0.8. The problems were identified as being caused by the larger engine nacelles required for the J75s. There were also problems on the water, including a tendency for the tip floats to dig in under certain situations, and engine surges. These problems were eventually solved.

In August 1959 6 months before going into service, the program was canceled. The P6M was significantly over budget and behind schedule and competing with aircraft carriers for funding. The Navy had also developed the ballistic missile submarine. In the age of the ICBM, the manned bomber had become an expensive and unreliable nuclear weapon delivery system. The P6M program had already cost $400 million and could no longer be justified.

Martin tried unsuccessfully to sell to the civilian market, with a version called the SeaMistress but there were no takers, and the company soon abandoned the aircraft business entirely to focus on missiles and electronics.

Designers Notes

Chosen by Tobias Gaus the winner of the Jetworks 2022 competition, The Seamaster was the last of the great military seaplanes and makes an impressive and unusual Model RC plane to own.

Even though it could potentially fly well with 64mm EDF’s, I deliberately chose to incorporate twin 70mm, to give extra power to help get it onto the plane and out of the water. Once airborne the aircraft can be throttled back for gentle scale-like flight.

I chose to give the aircraft hull a slightly wider and flatter planing surface, along with a deeper hull step to help break through the higher relative viscosity of the water at this scale. To assist I also lowered the exhaust outlet and angled the thrust line to coincide closer to the estimated CG/VCG, to help reduce high thrust pushing the nose down. I also increased the size of the elevator control surfaces to give it greater authority in getting into the air, and also to give the pilot greater pitch control.

Happy flying.
Craig

Before you start.

Adhesives
> For the majority of construction :
- UHU Creativ for Styrofoam (also called UHU POR)
- 3M 77 Spray adhesive.

>For wing spars and motor mounts :
- Epoxy. (5 and 15mins cure times are the most convenient) micro-baloons can be added to reduce weight.

> For servo's / and quick grab :
- Hot melt glue gun - Caution if the glue gets too hot it will melt foam - test first!

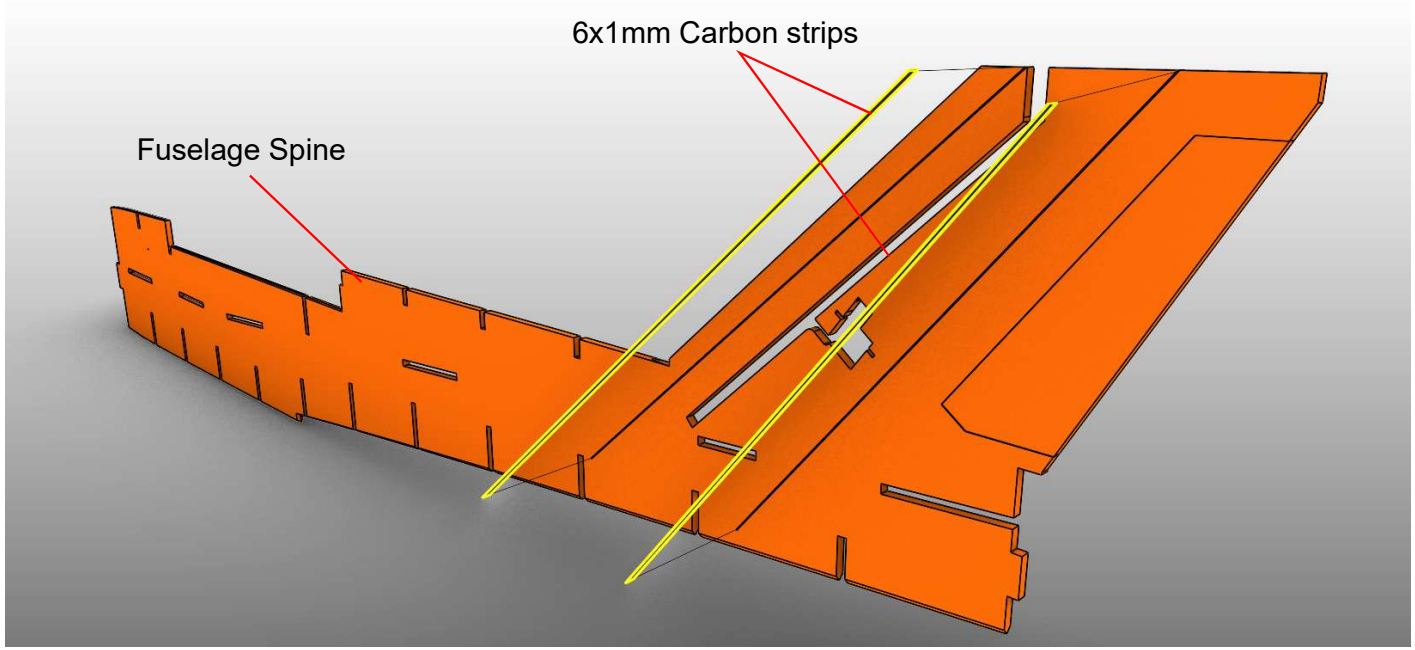
Tapes
> For holding parts tightly together whilst glue sets
- Low tack masking tapes

> For leading edges, hinges, general strengthening
- 3M Gift tape (Purple - not green one!) - I prefer lightweight plastic hinges.

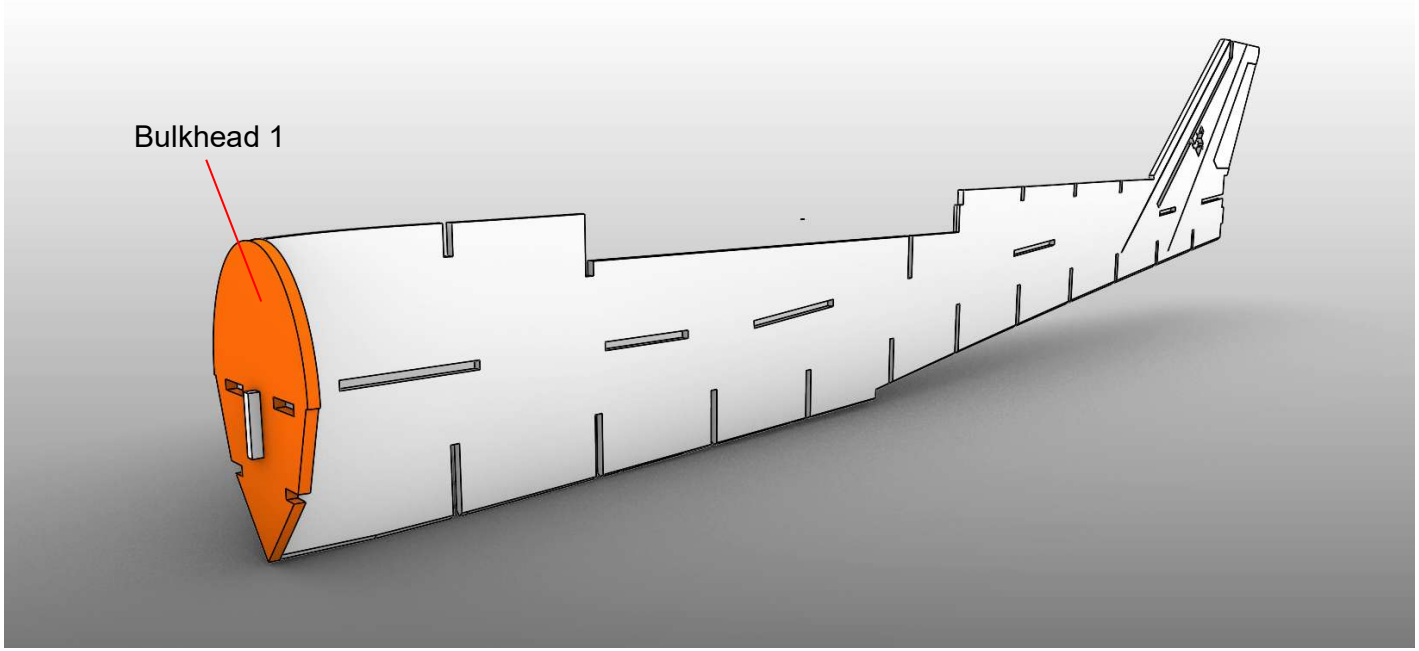
Cutting parts
1. Print the plans,
2. Cut around each part using scissors - allow a border of approx (1/4") 6mm
3. Use either 3M spray mount or a very light coat of 3M 77 to the back of the parts and stick in an economical layout on the Depron foam.
4. Using a safety rule and craft knife over a cutting mat - important! use a fresh blade otherwise it will drag and spoil the foam. (I find the stanley knife perfect) make the straight edge cuts, then the curved parts freehand.
5. Once the parts are cut-out, keep the template stuck to the part until just before needed to help identify the parts.
6. After use, I find it helpful to keep all the used tempates in case replacement parts need making. (the glue eventually dries and they don't stick together!)

IMPORTANT Wherever the plans call for marking guidelines onto the depron, please ensure that you do otherwise it can cause problems later on. I suggest you use a Sharpie Fineliner to transfer the lines.

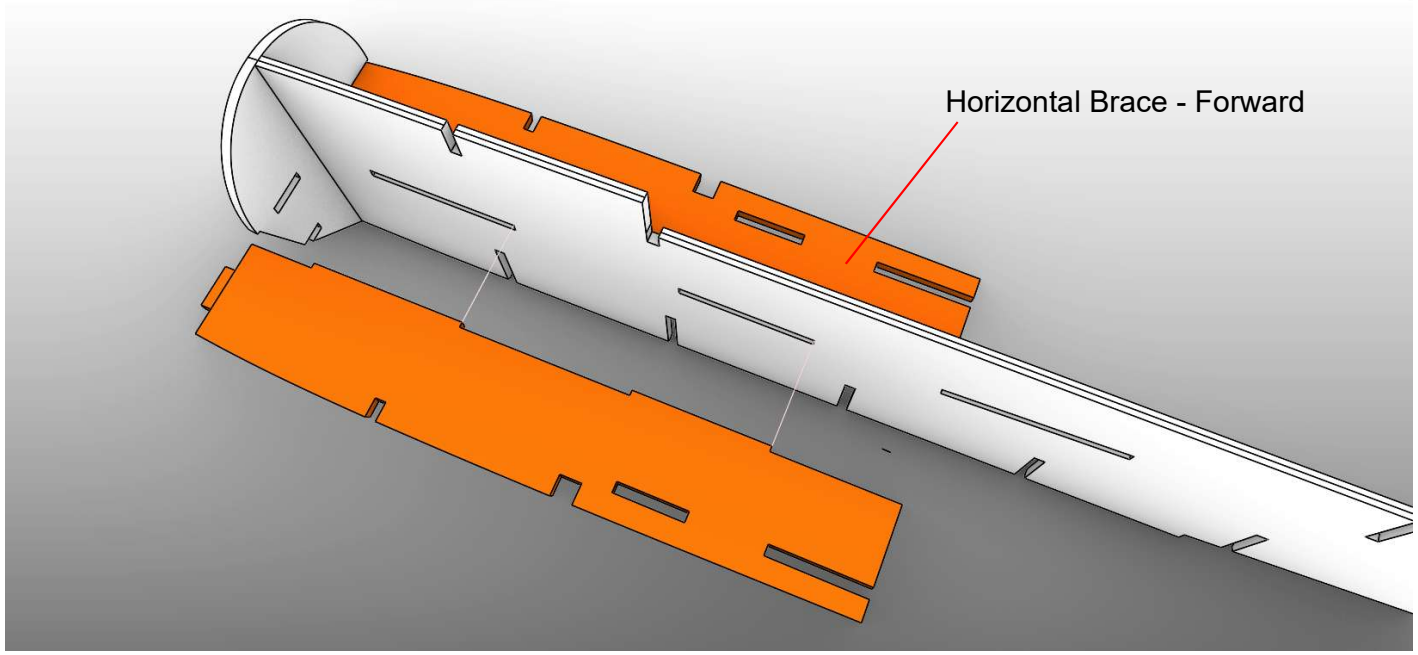
Glueing parts together.
1. Ensure a really good fit - this will reduce the amount of adhesive used. The Bar Sander is a great tool for this.
2. Follow the adhesive instructions closely.
3. Use ordinary steel head pins to help keep the parts located whilst epoxy sets.
4. Use objects as weights such as paperweights to apply pressure whilst adhesive sets.
5. Use masking tape to apply pressure whilst adhesive sets. Also use masking tape



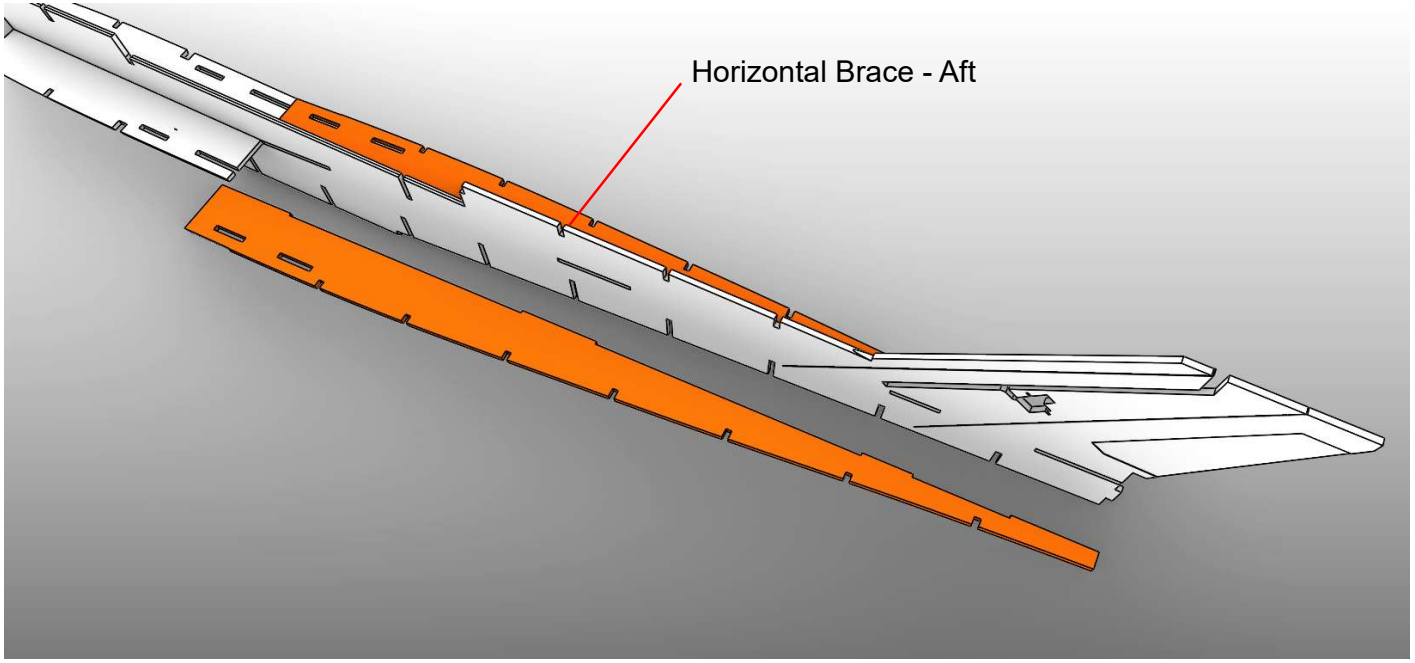
Using Epoxy, Slide two 6x1mm Carbon strips into the two slots on the vertical stabiliser area of the **Fuselage Spine.**



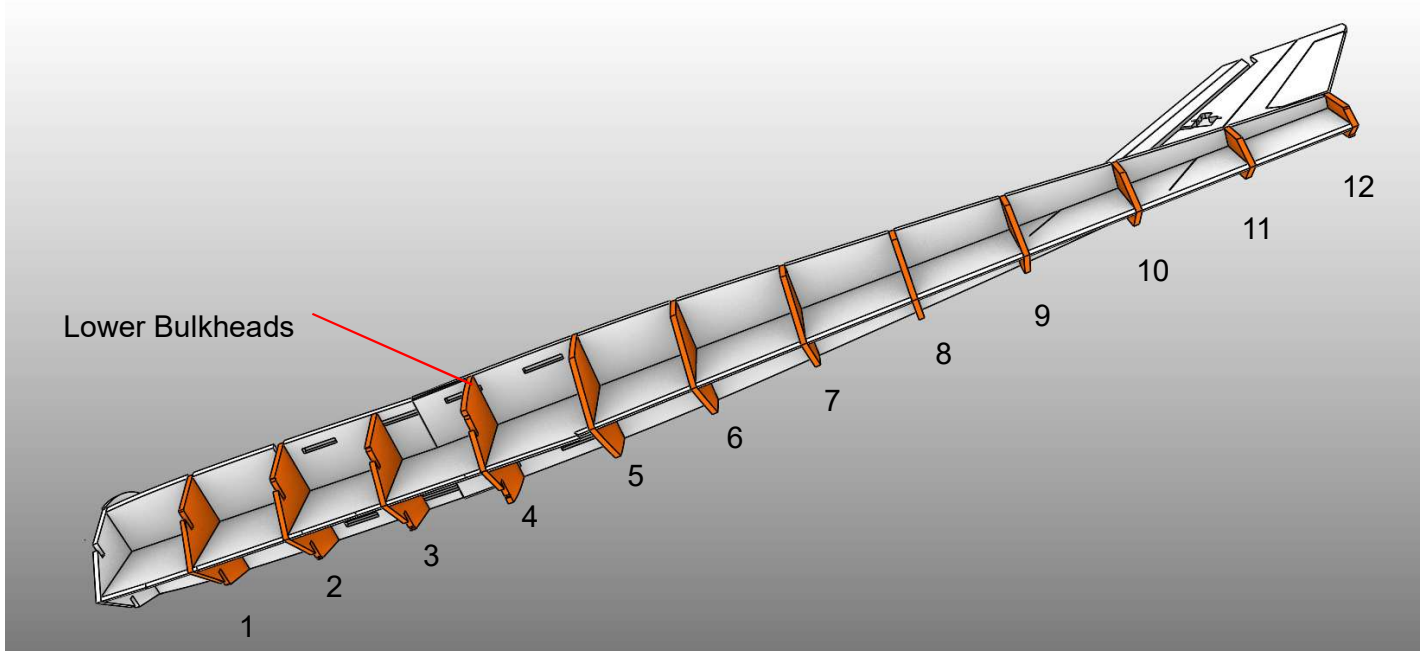
Glue **Bulkhead 1** onto the Fuselage Spine.



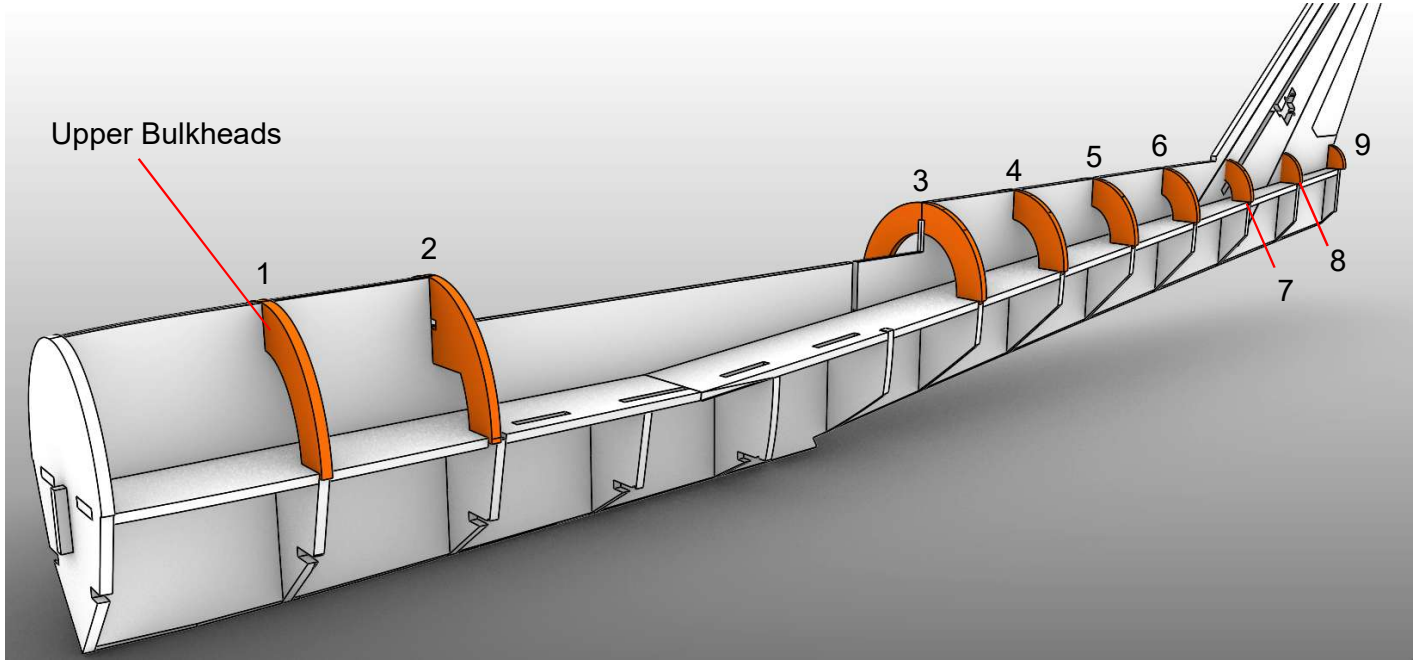
Glue the two **Horizontal Braces - Forward** onto the Fuselage Spine.



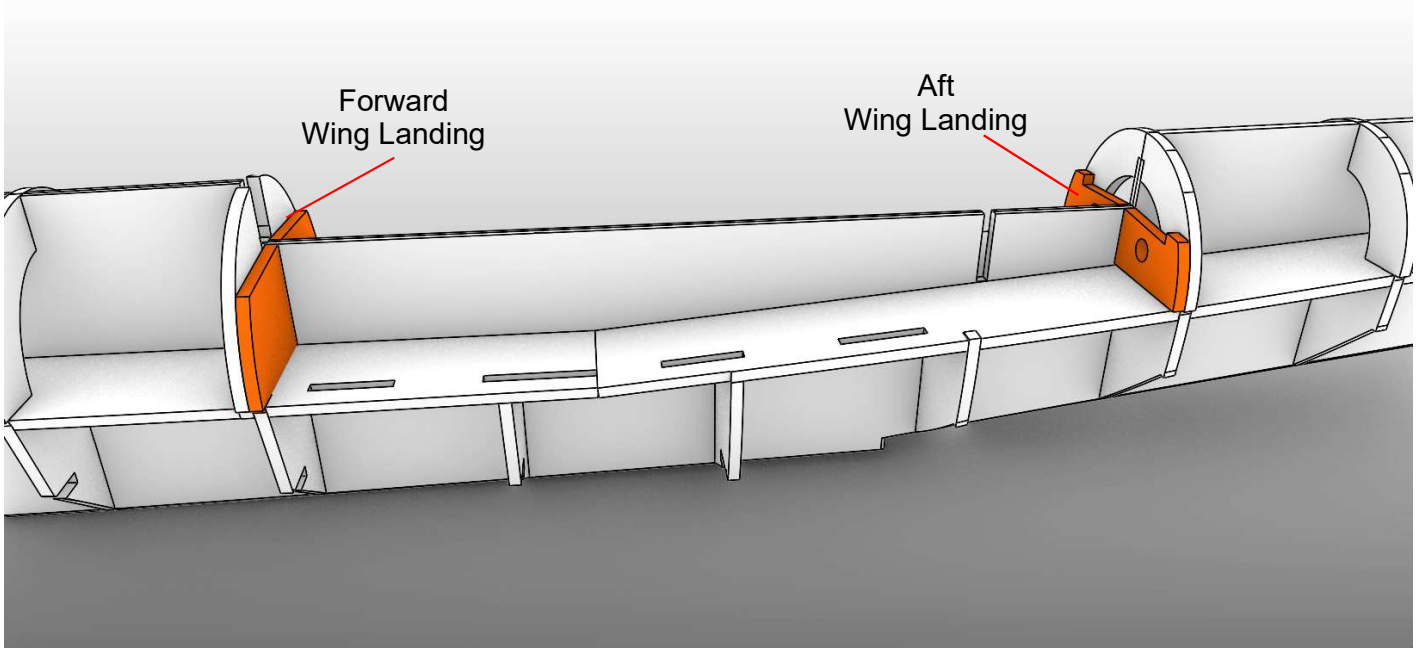
Glue the two **Horizontal Braces - Aft** onto the Fuselage Spine.



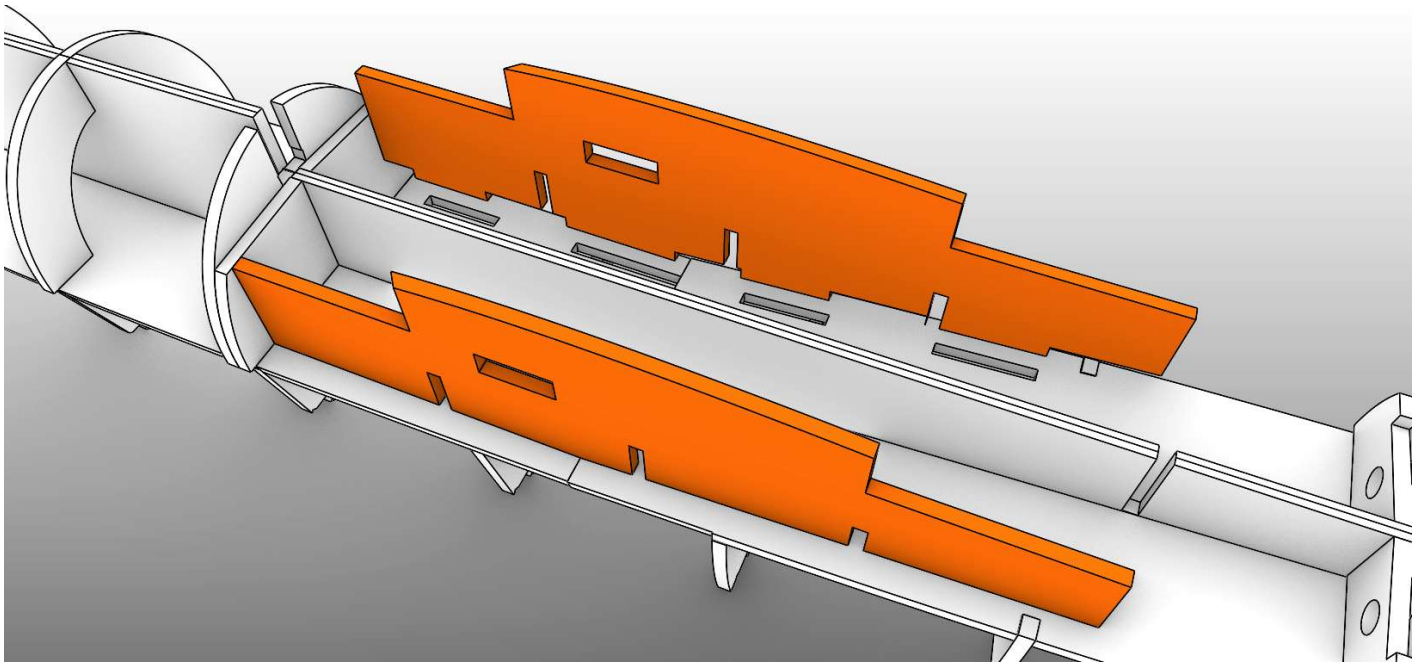
Glue the twelve **Lower Bulkheads** onto the assembly.



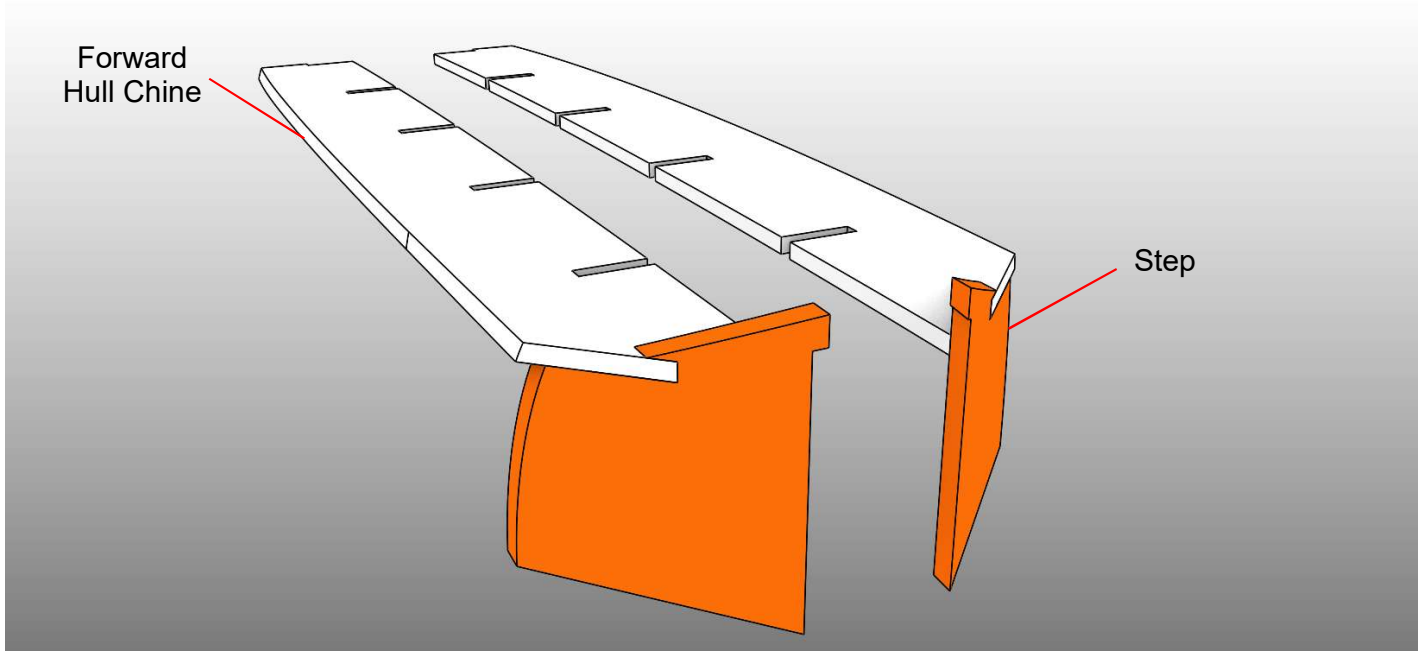
Glue the nine **Upper Bulkheads** onto the assembly.



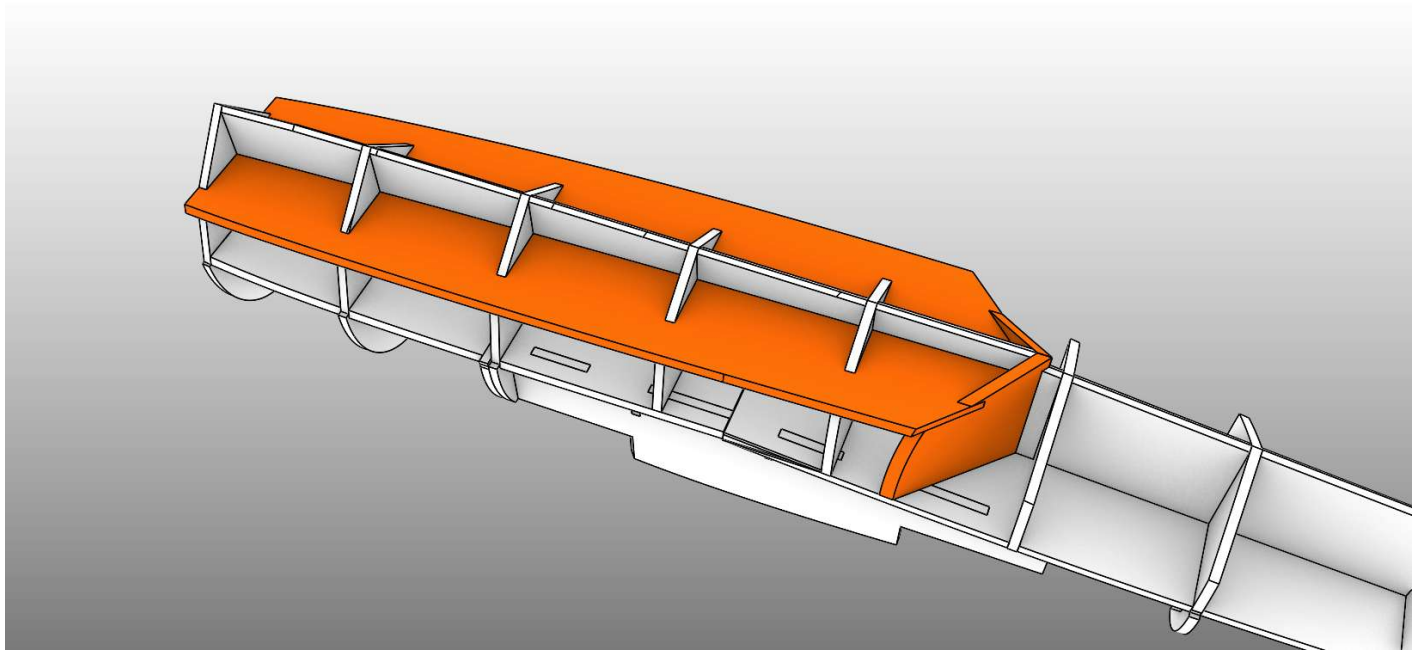
Glue the **Forward** and **Aft Wing Landing** parts to the assembly.



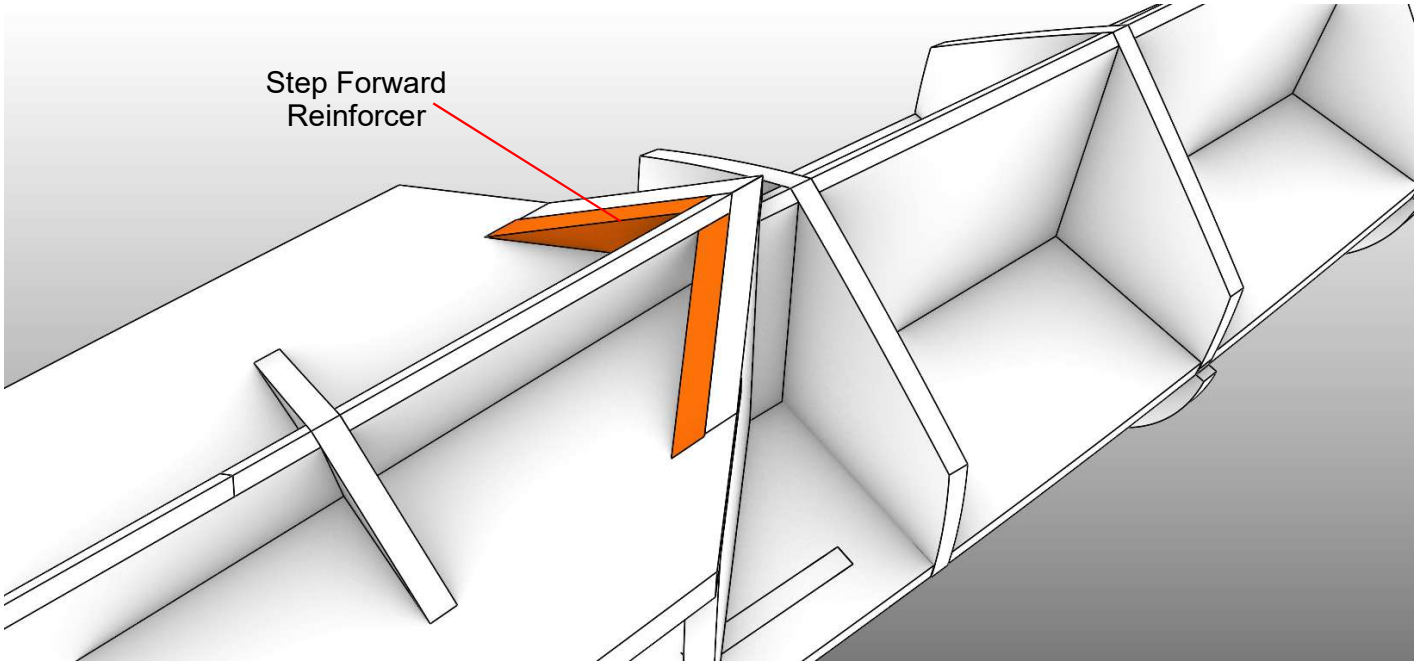
Glue the two **Battery Bay Sides** onto the assembly.



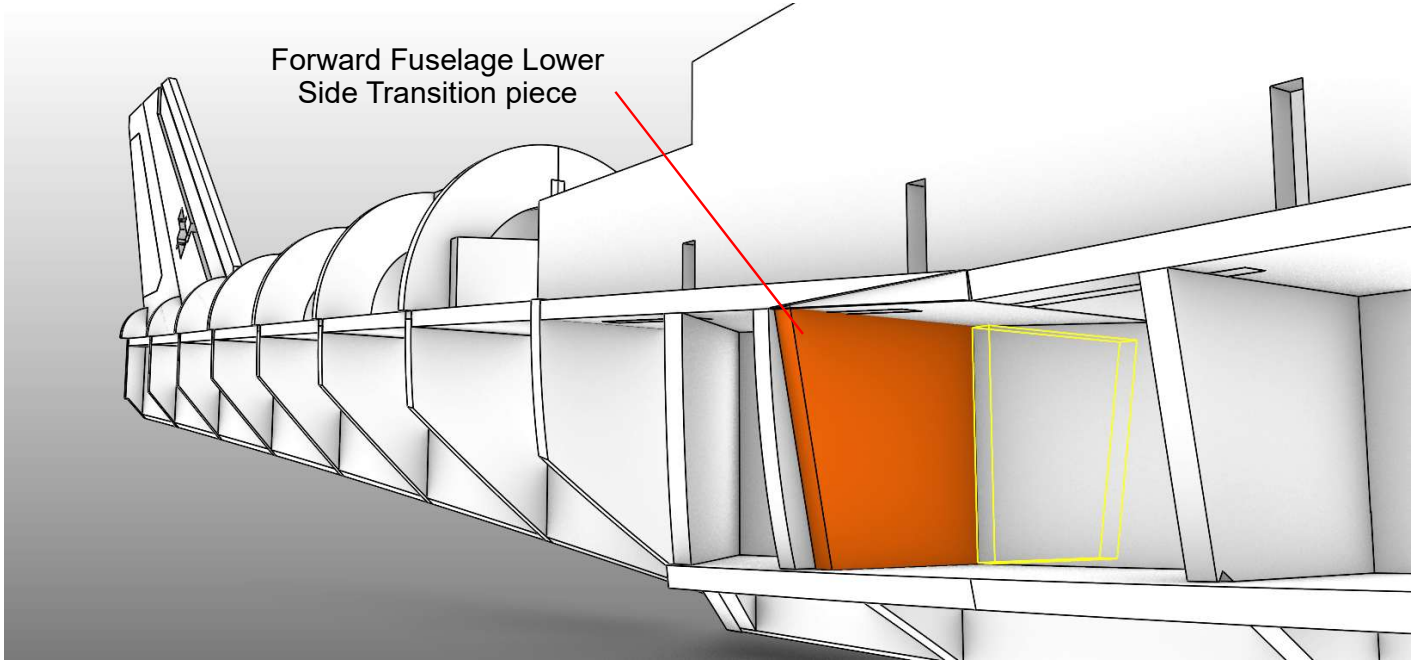
Glue the **Forward** and **Aft Wing Landing** parts to the assembly.



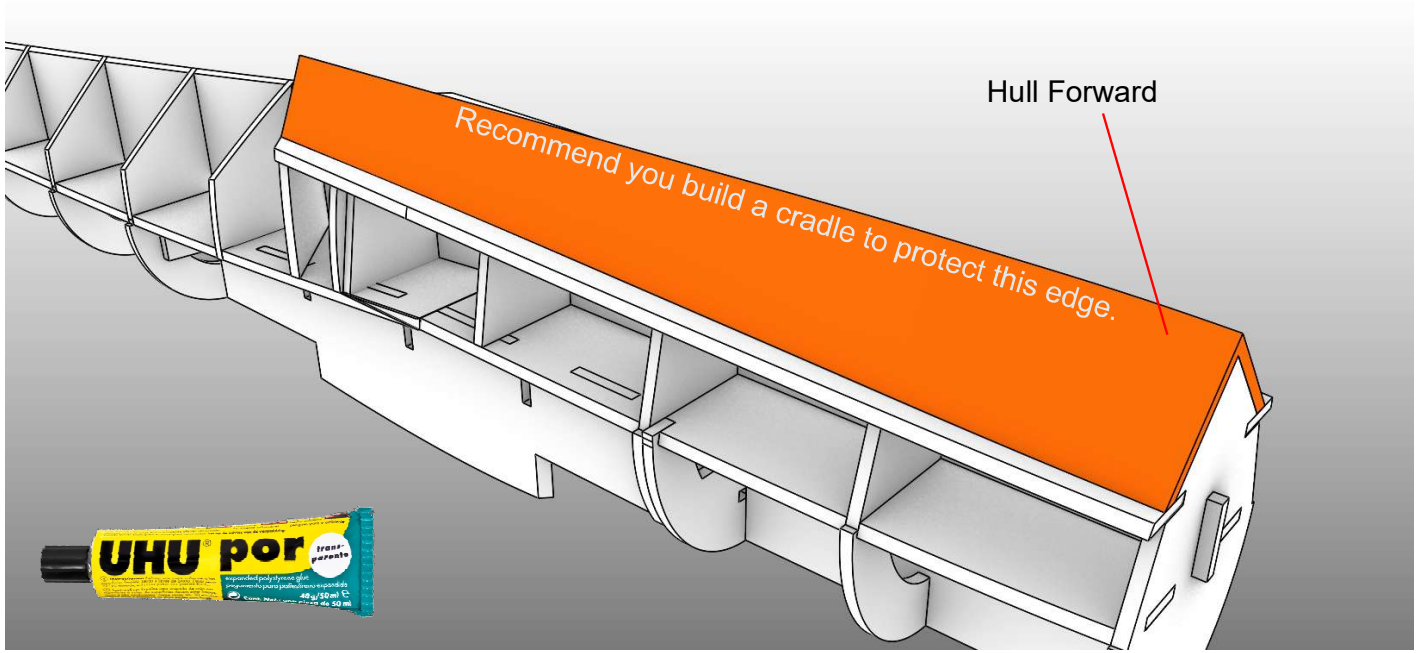
Glue the two assemblies together.



Glue the two **Step Forward Reinforcer** parts to the assembly.

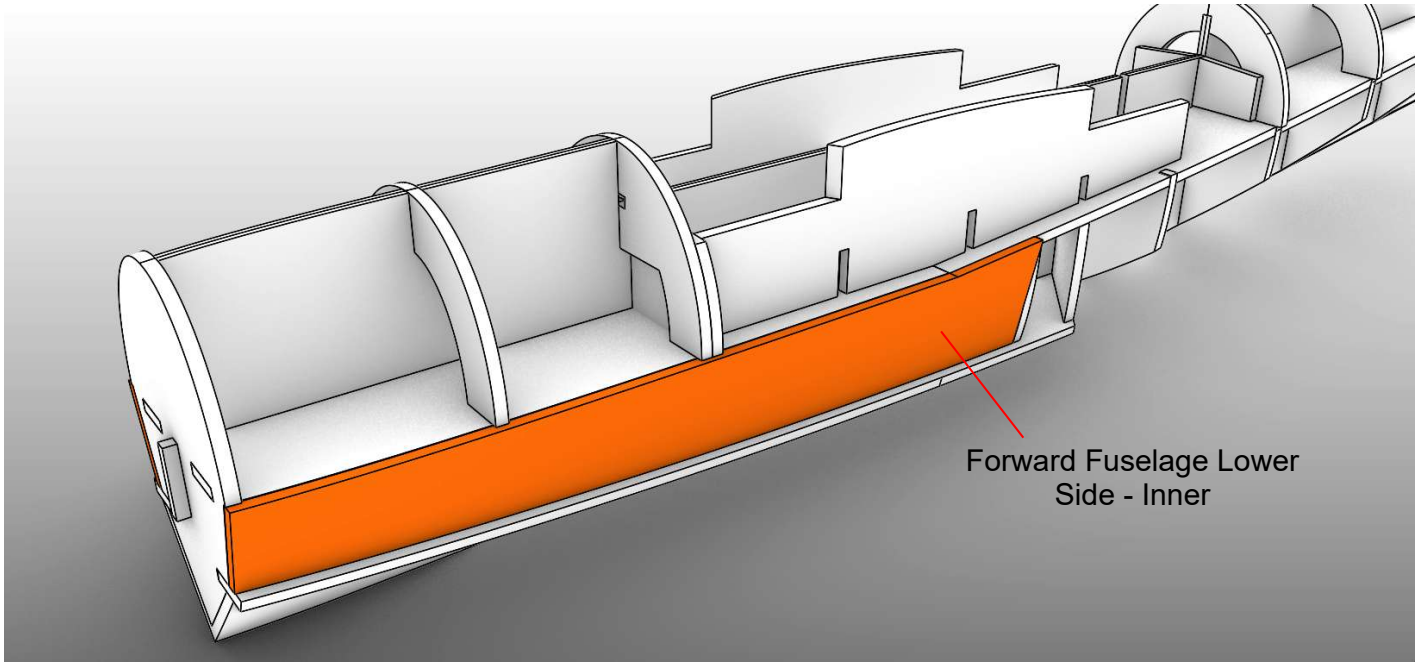


Glue the two **Forward Fuselage Lower Side Transition pieces** to the assembly.

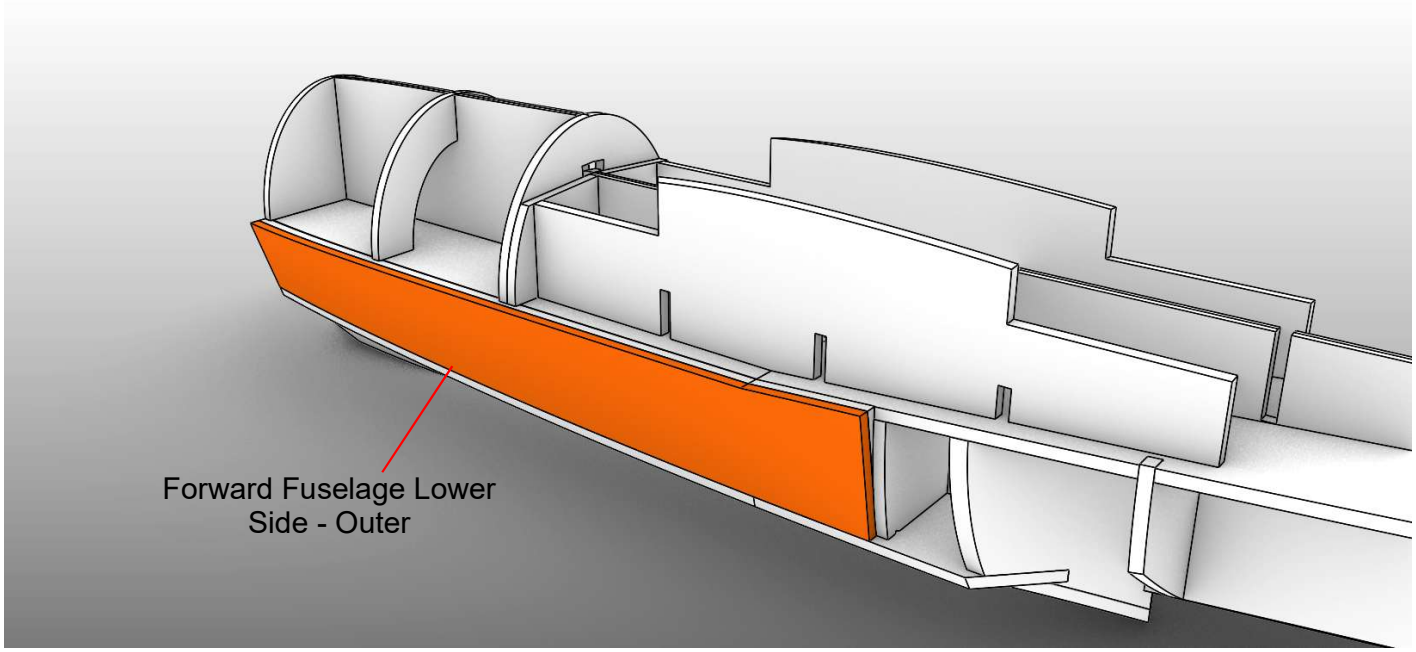


Glue the two **Hull Forward** parts onto the assembly.

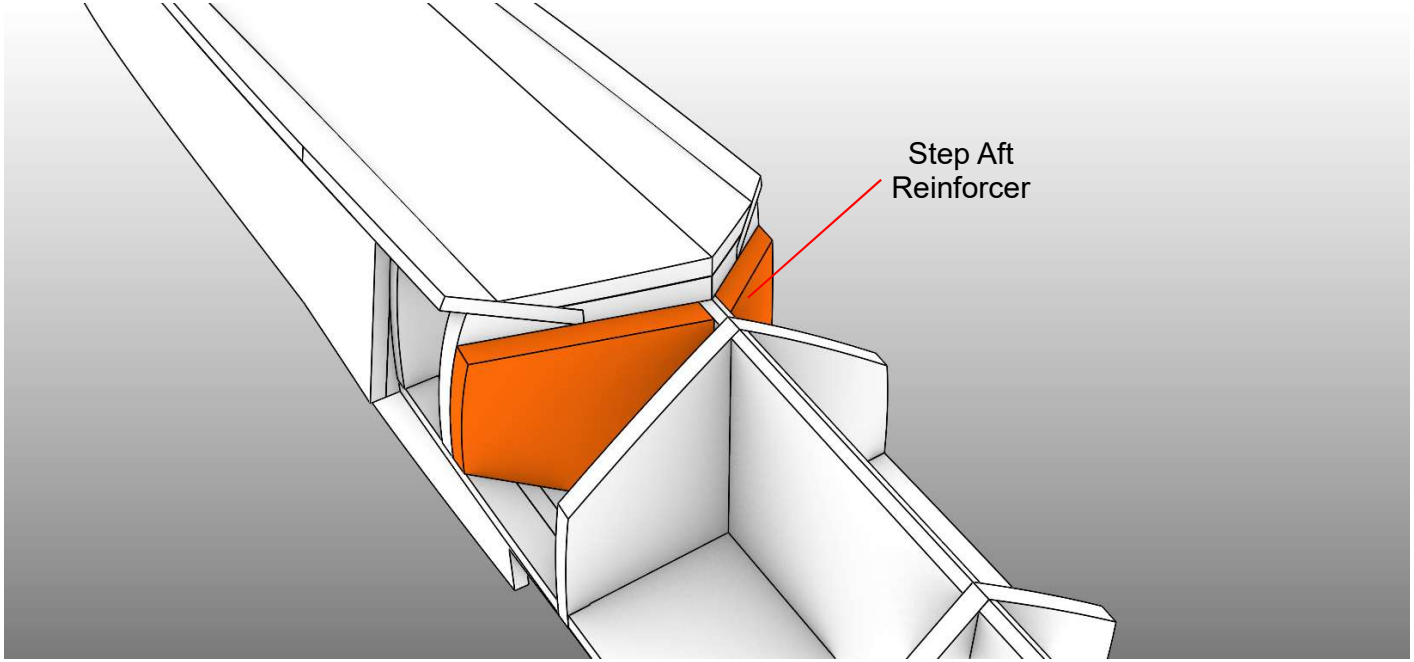
I recommend you glue the two touching edges along the keel line using epoxy with added microbaloons.



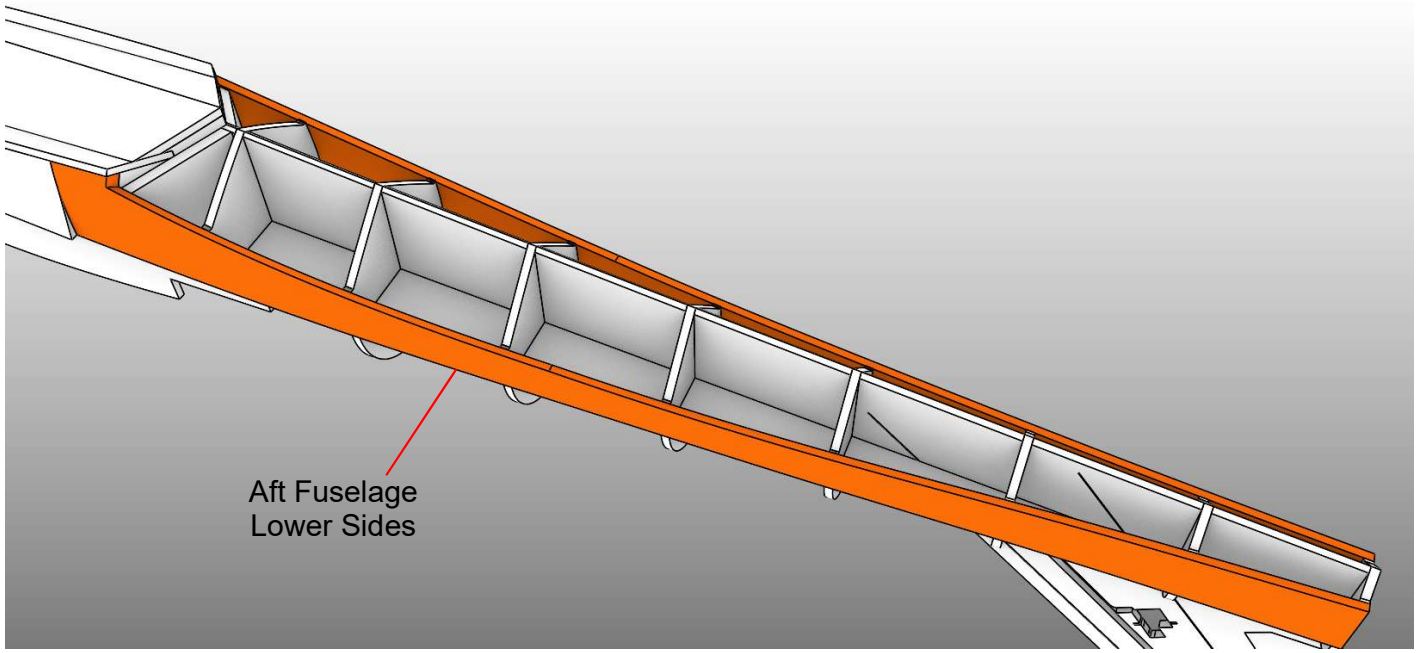
Glue the two **Forward Fuselage Lower Side - Inner** to the assembly.



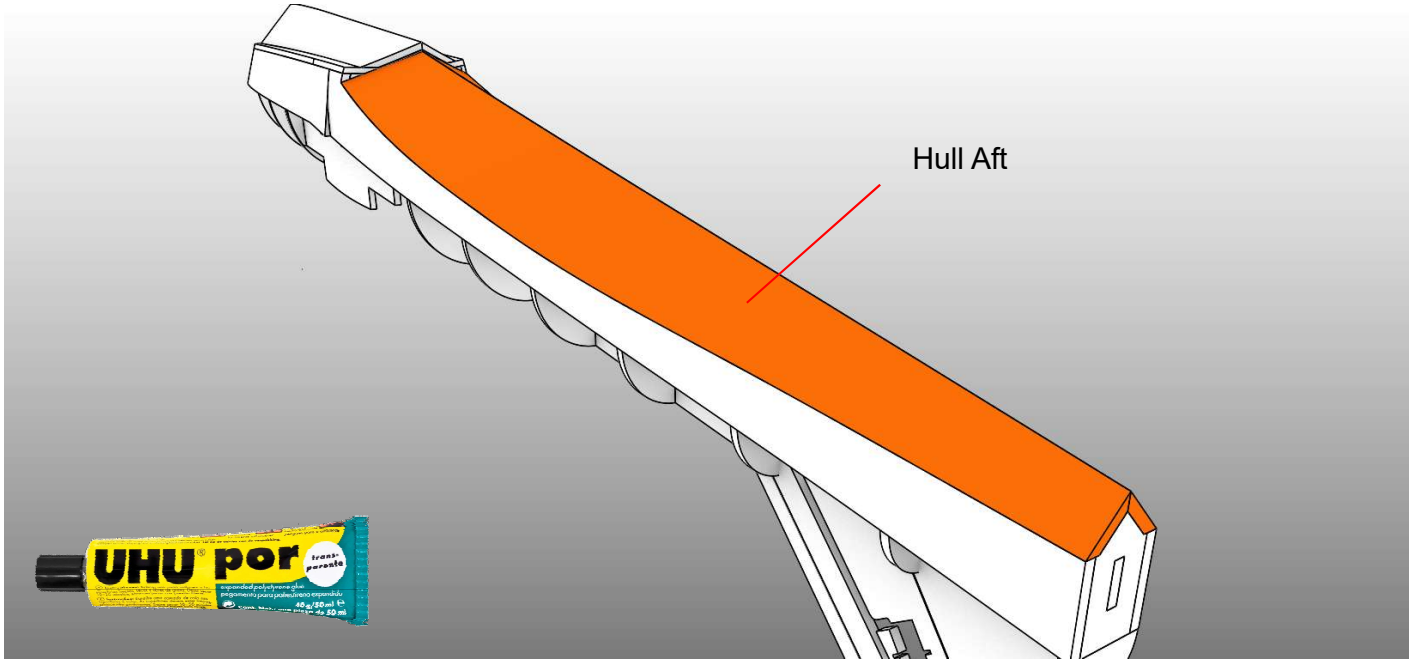
Glue the two **Forward Fuselage Lower Side - Outer** to the assembly.



Glue the two **Step Aft Reinforcer** parts to the assembly.

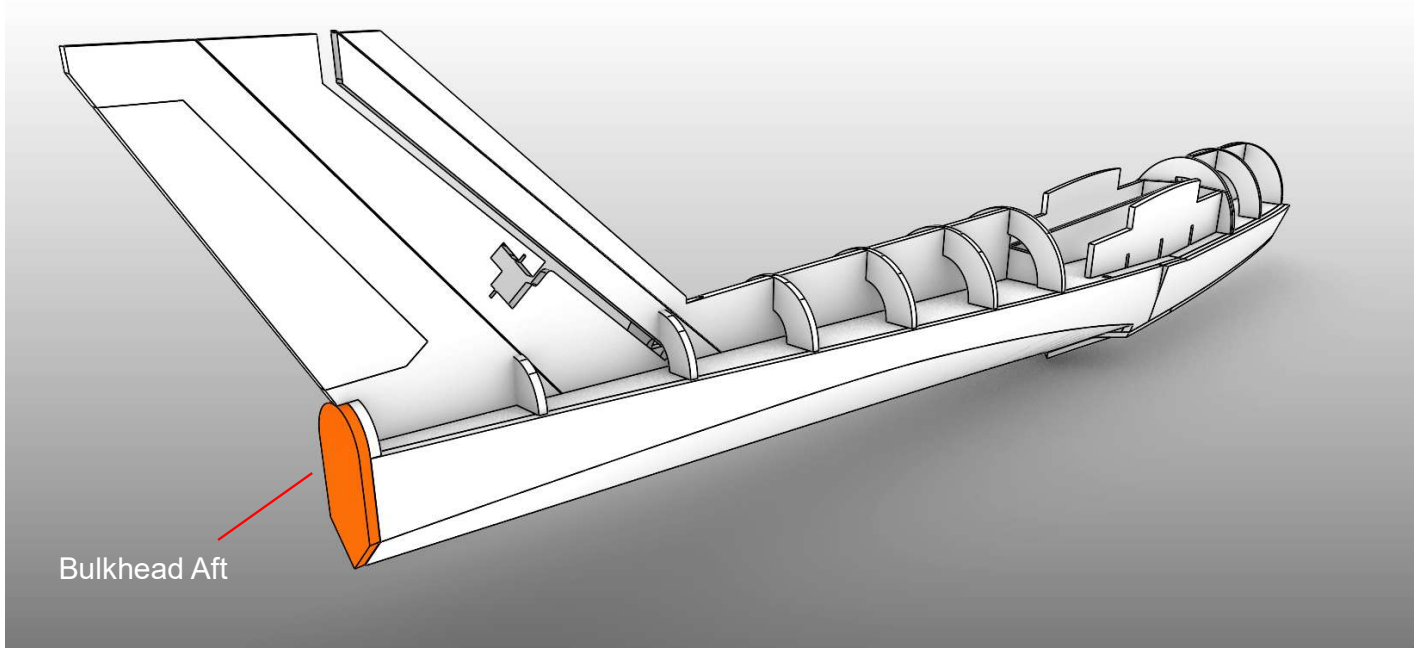


Glue the two **Aft Fuselage Lower Sides** to the assembly.

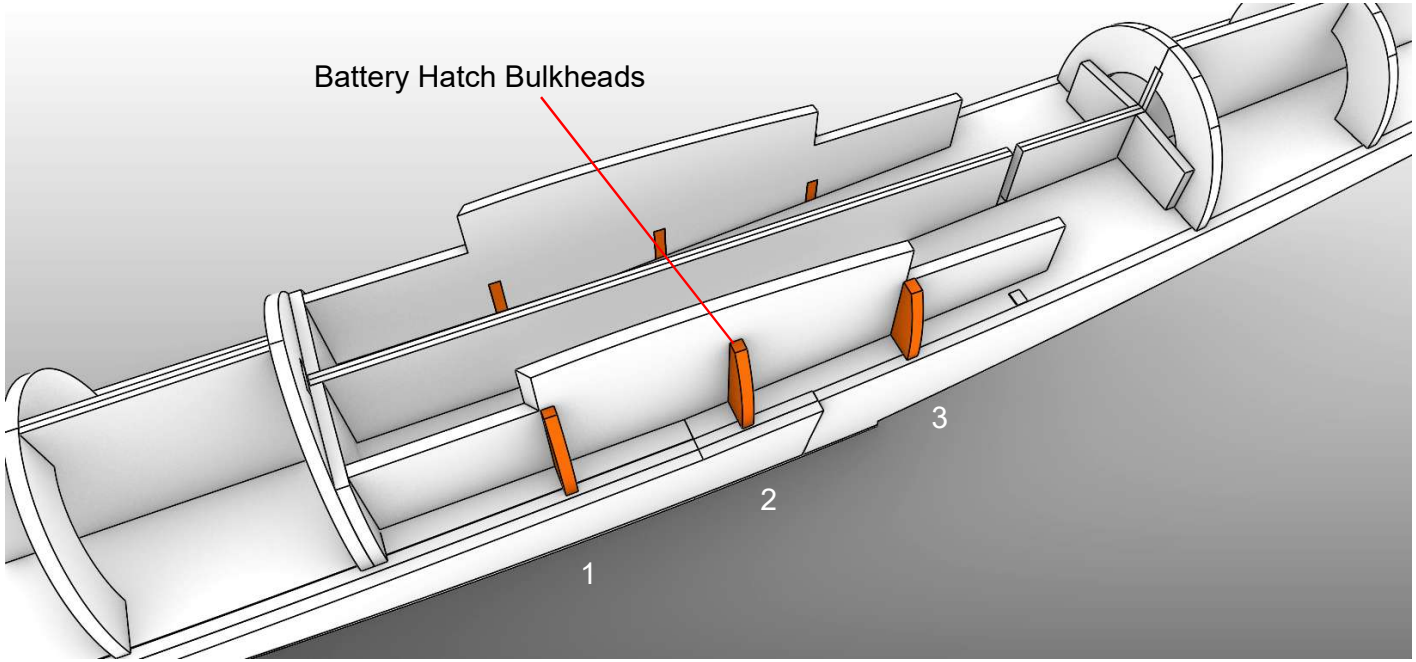


Glue the two **Hull Aft** parts onto the assembly.

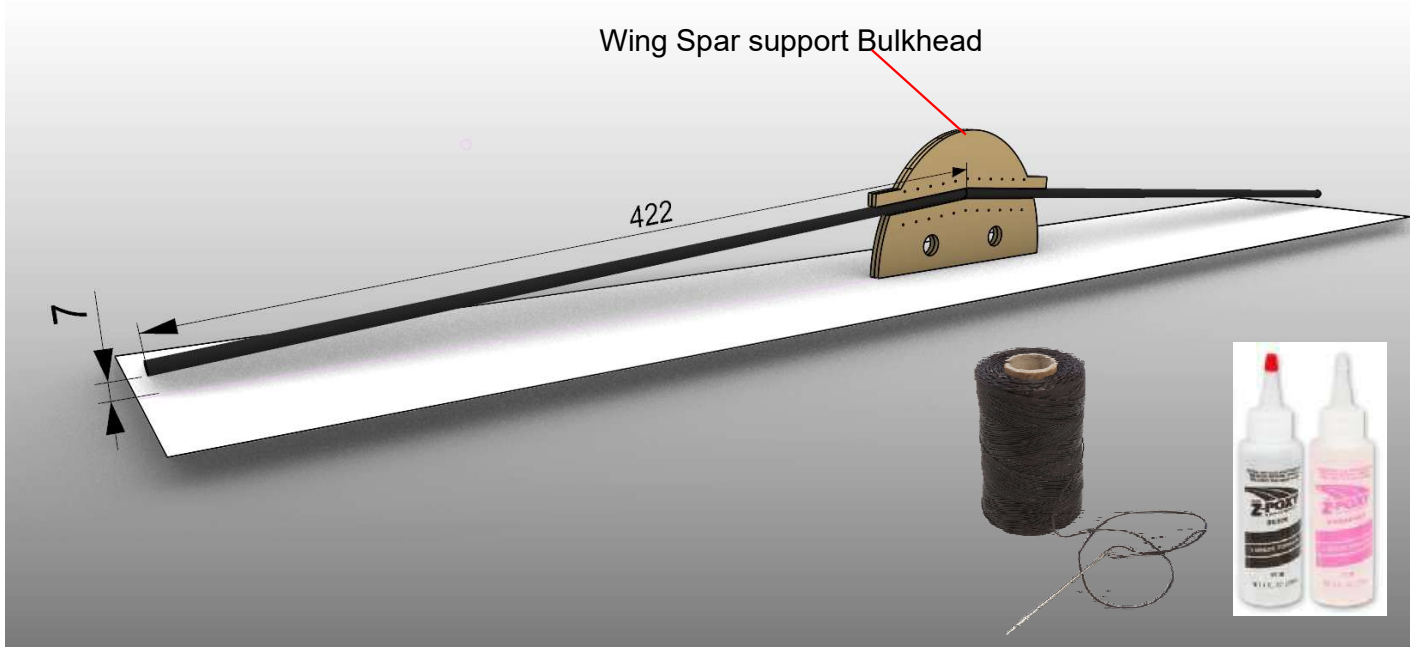
I recommend you glue the two touching edges along the keel line using epoxy with added microbaloons.



Glue the **Bulkhead Aft** to the assembly.

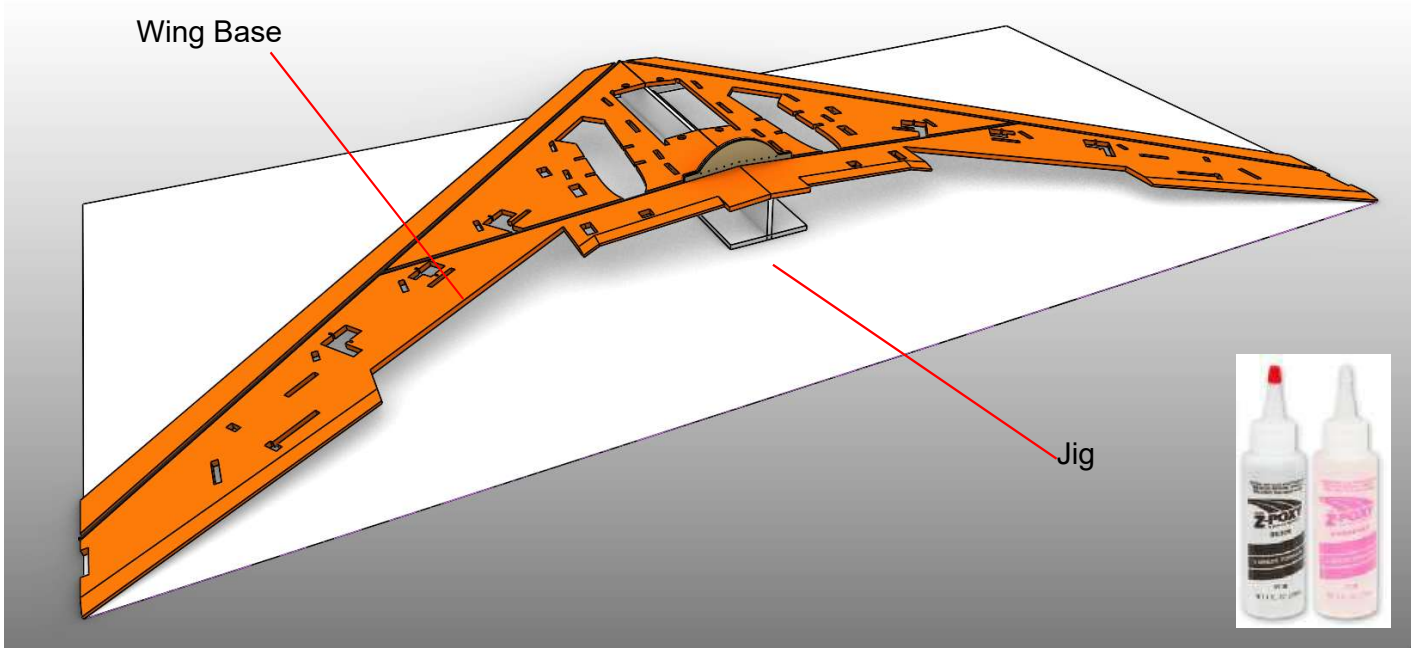


Glue **Battery Hatch Bulkheads** onto the assembly (Both sides).



Glue the two 422mm carbon spars into the 2x liteply **Wing Spar support bulkhead**, ensuring the correct angle as shown.

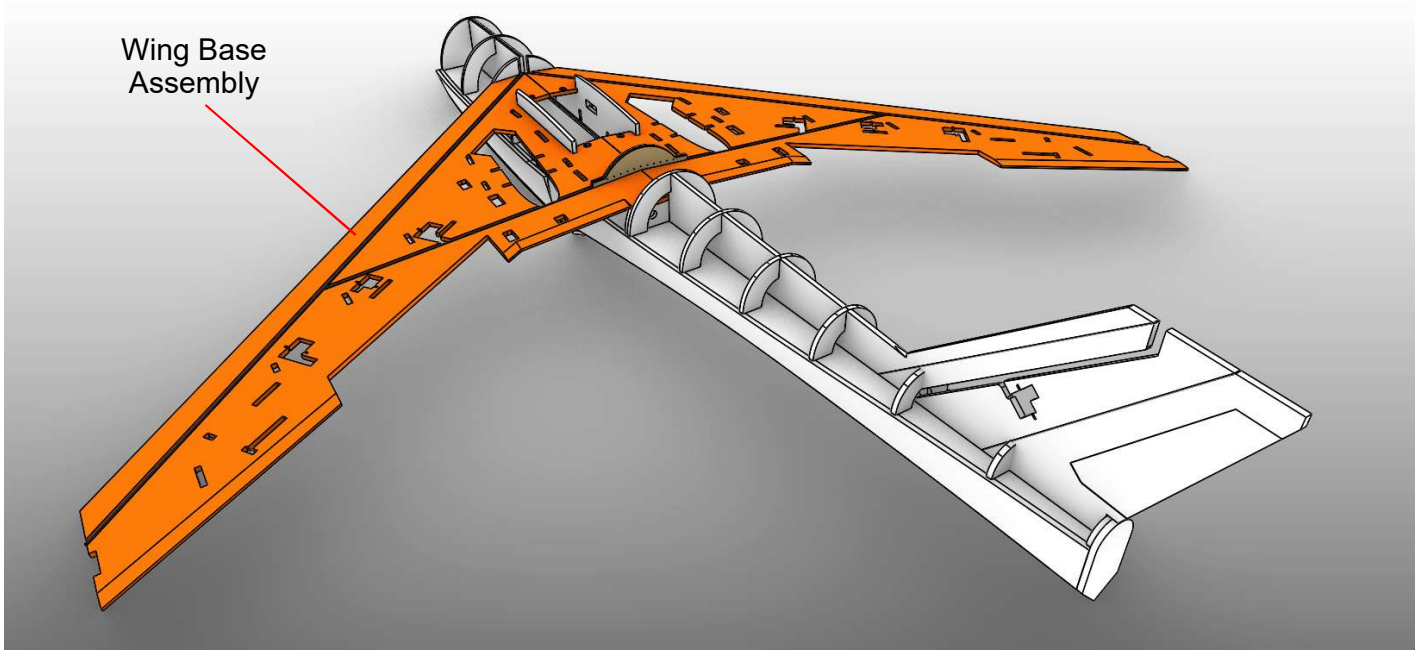
Once set. Drill multiple holes in order to thread high strength nylon thread around to tightly 'clamp' the joint. Once complete, apply Epoxy over all the thread to secure it in place.



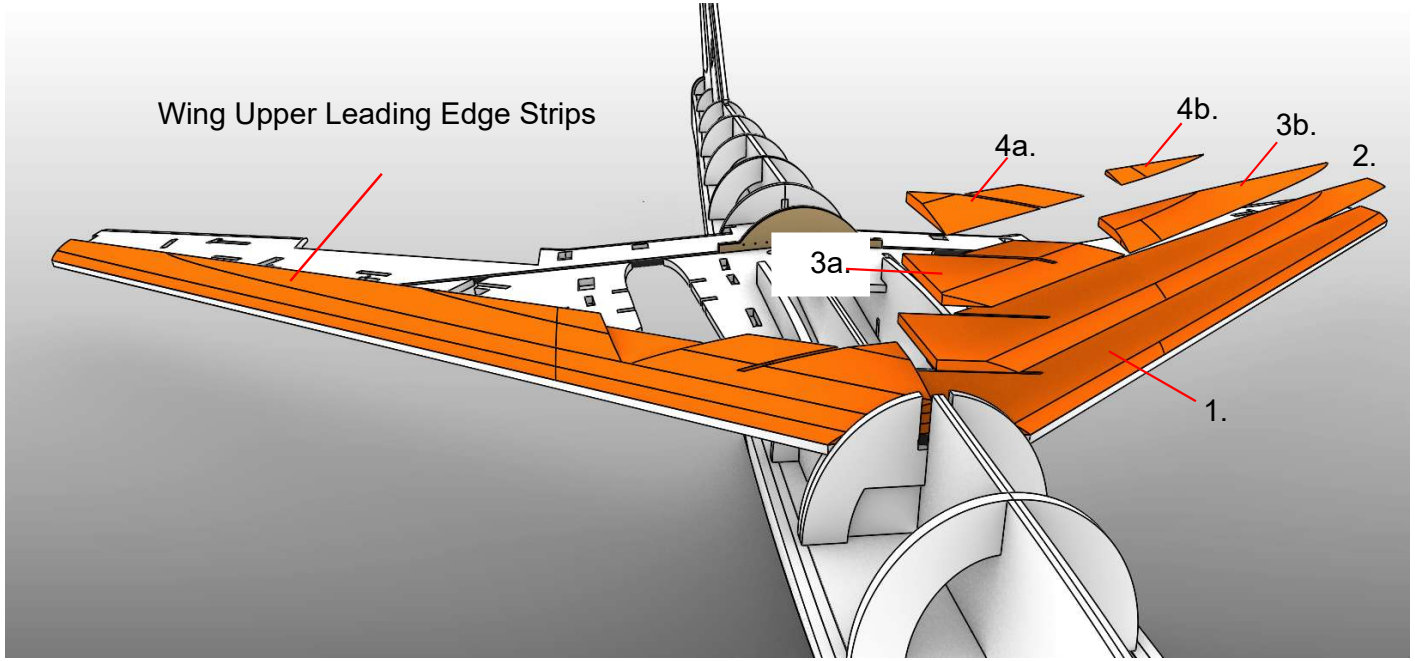
Glue the forward Carbon spars into both sides of the **Wing Base**, using masking tape, epoxy and heavy books to hold them flat.

Using the jig, lift the middle of the two wings as shown. Using epoxy, glue the **Wing Spar Support Bulkhead i**nto the wing assembly.

Once set, run a 25mm strip of 0.6oz fibreglass all around the depron-depron wing joint, using WBPU as the resin, brushed into the fibreglass.

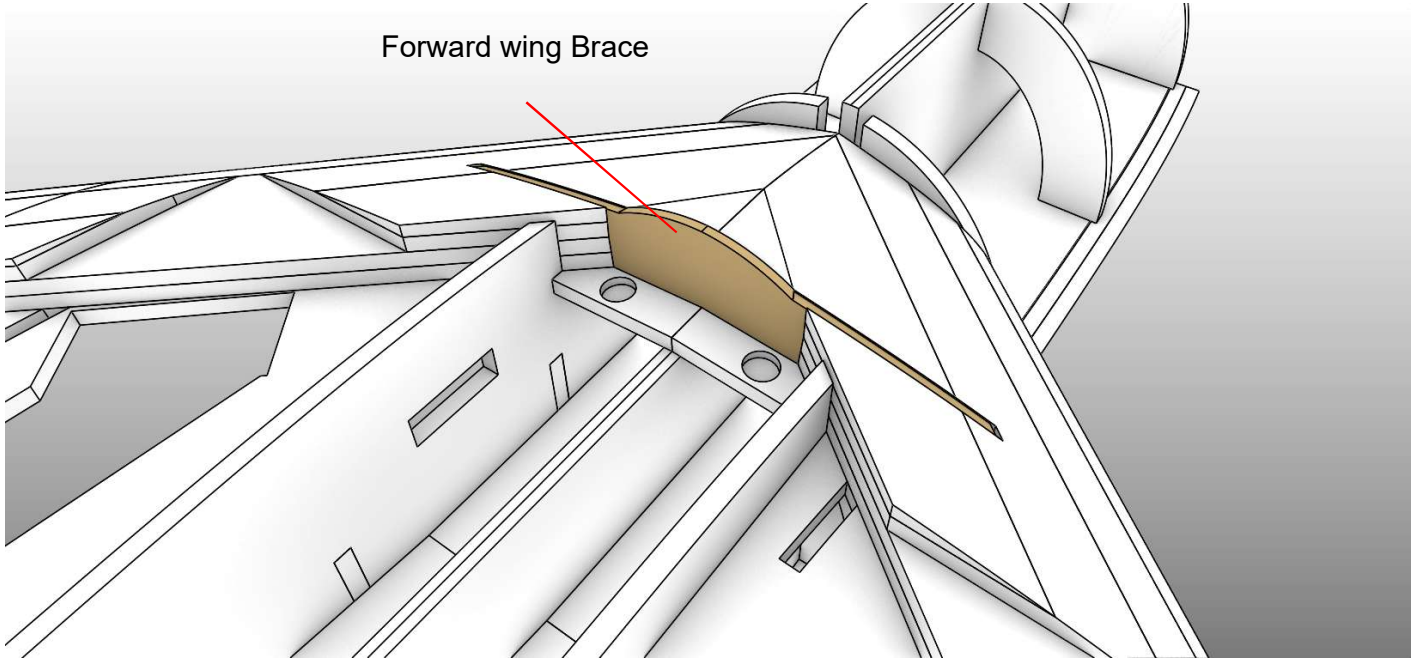


Attach the **Wing Base Assembly** to the fuselage. Use UHU Por on Contact surfaces, and Epoxy of sliding surfaces to help ensure a good connection,

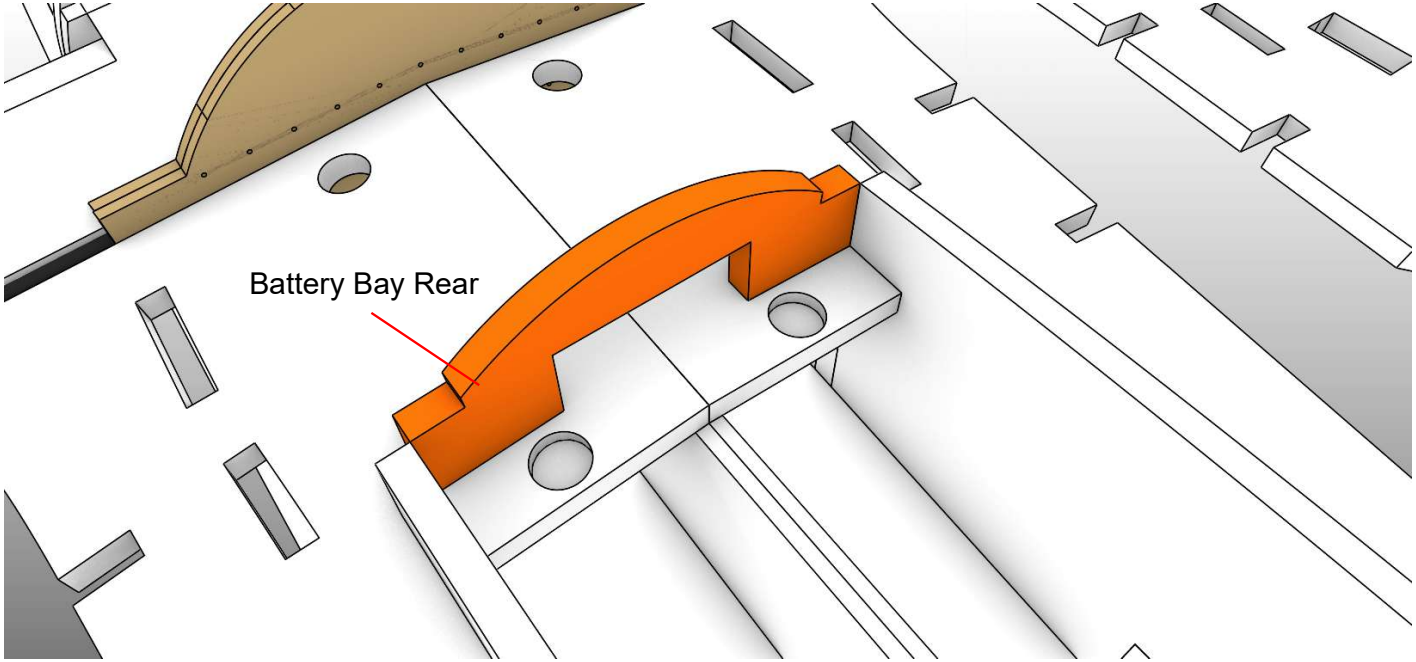


Shape the **Wing Upper Leading Edge Strips**

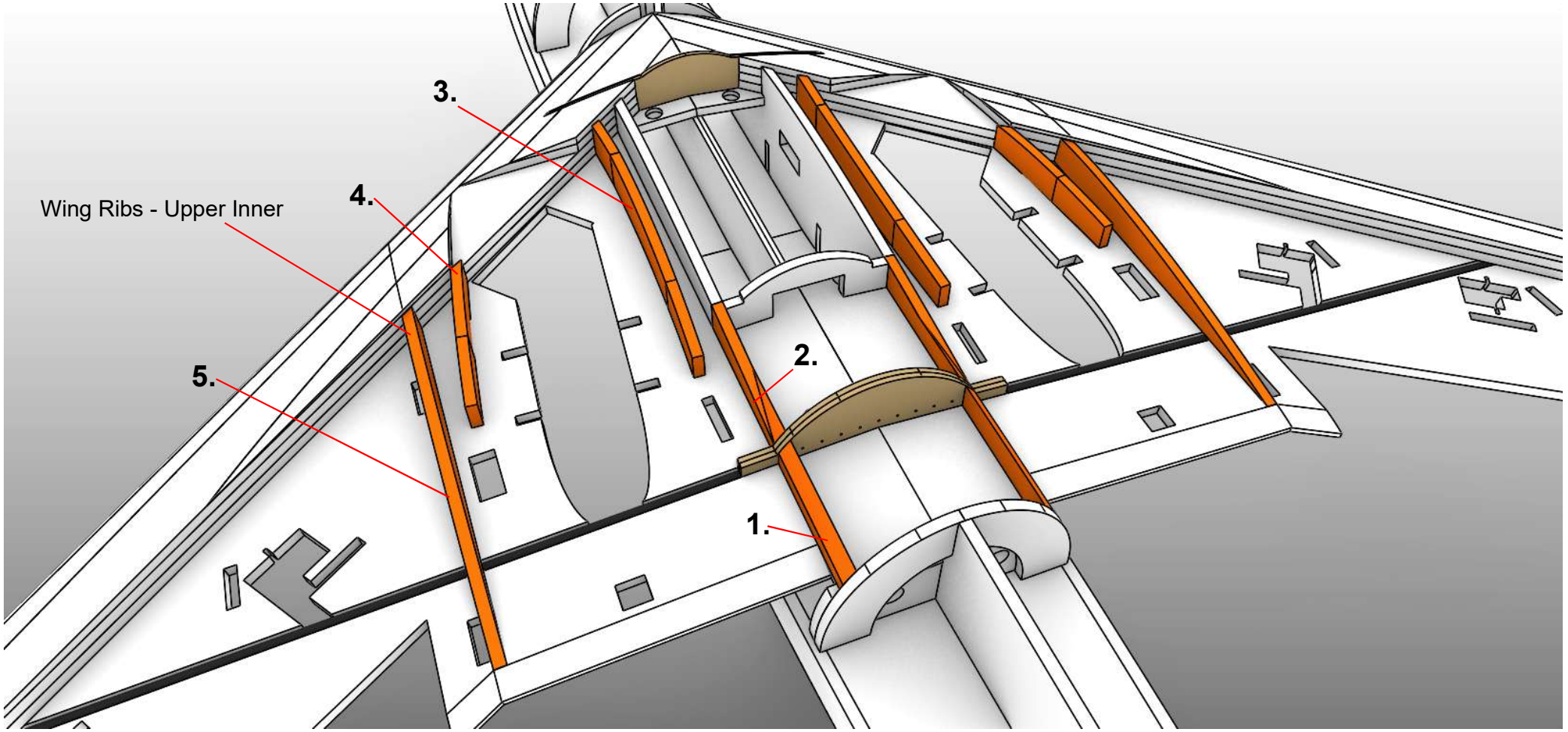
Glue to the assembly.



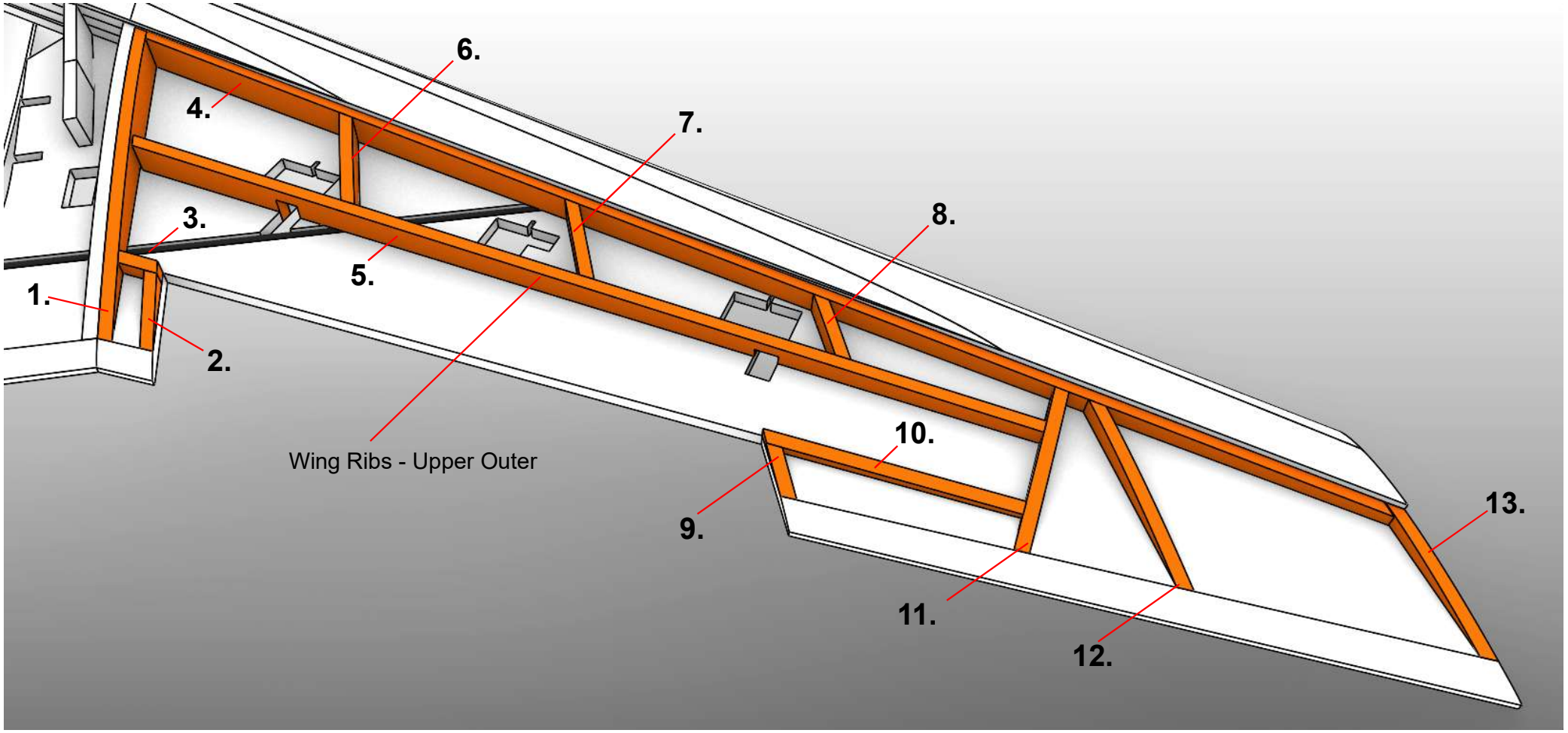
Glue the **Forward Wing Base** into slots in the Wing using Epoxy. Ensure a good connection,



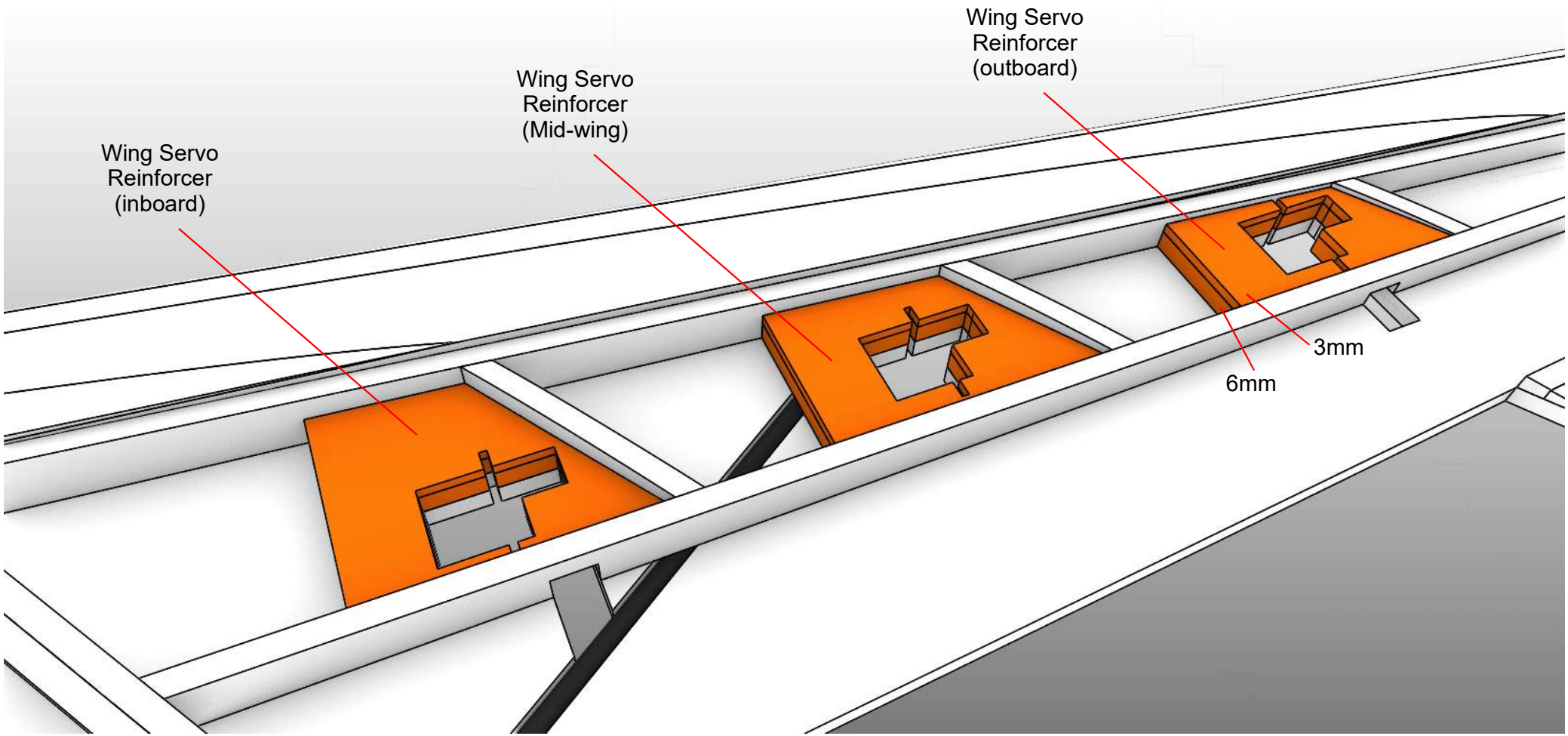
Glue the **Battery Bay Rear** to the assembly, aligning edge to edge as shown.



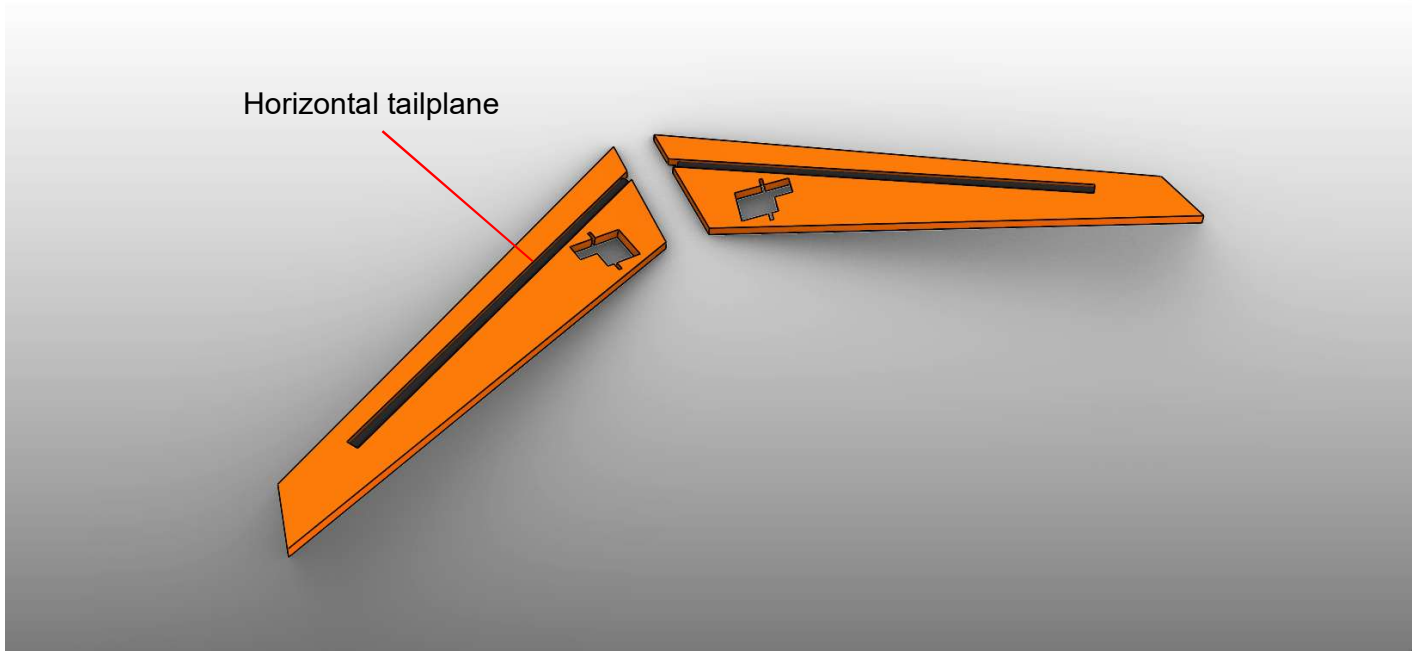
Glue the **Wing Ribs - Upper Inner** into the wing as shown (both wings), curve 3 & 4 over the edge of a table



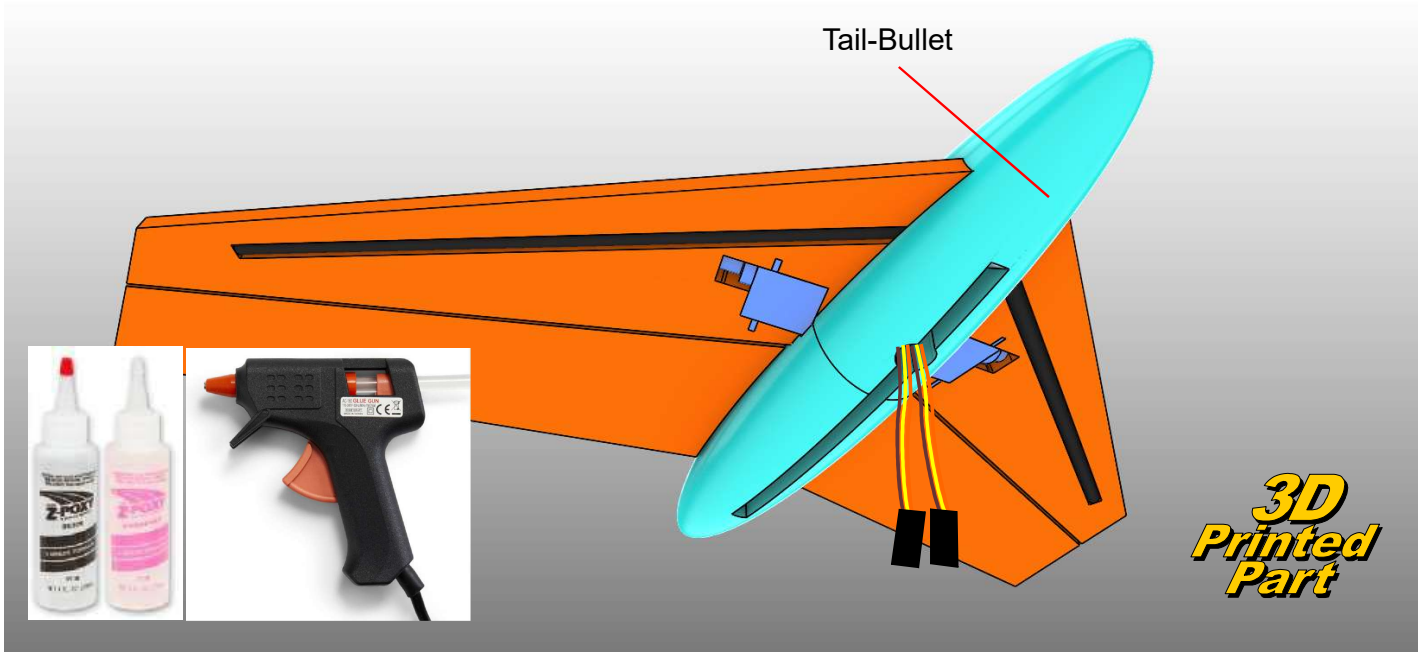
Glue the **Wing Ribs - Upper Outer** into the wing as shown (both wings).



Glue the **Servo Reinforcers** into the wing, first 6mm then 3mm foam shown (both wings).



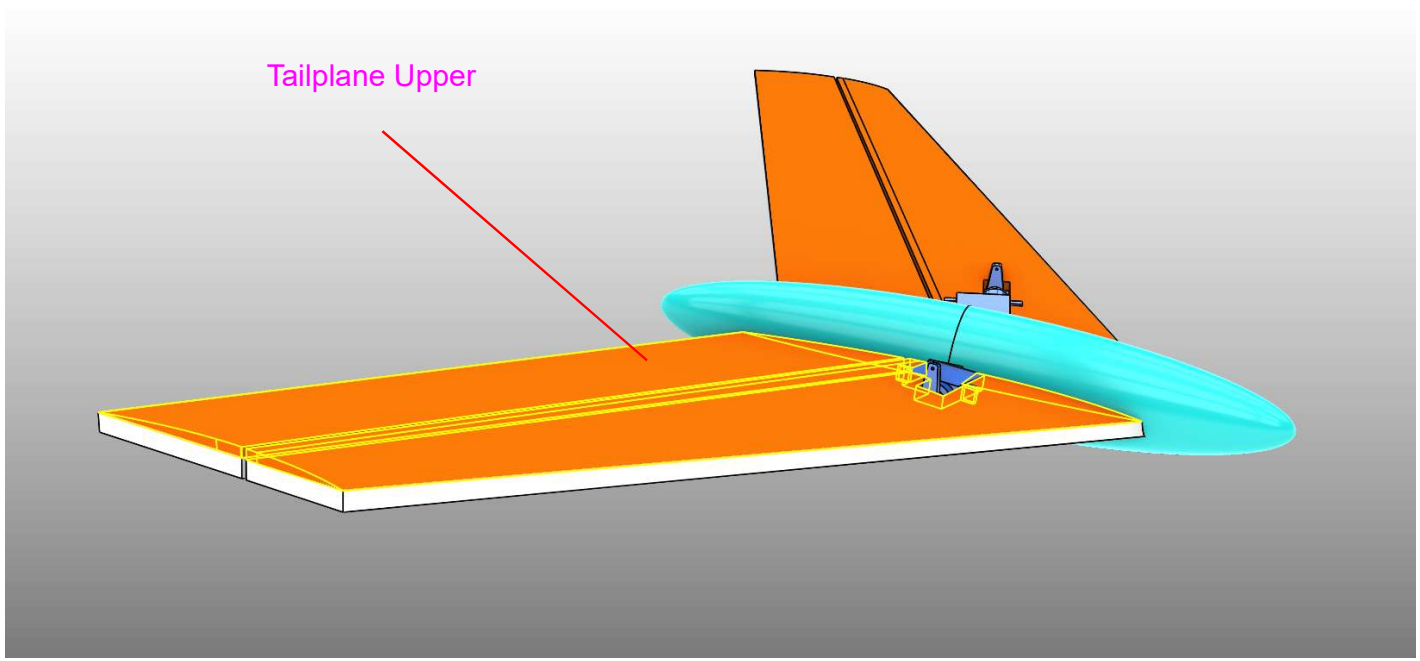
Glue the 6mm carbon tube/spars into the **horizontal tailplane** parts as shown. Use masking tape to hold the glue & spar in place while the glue sets.



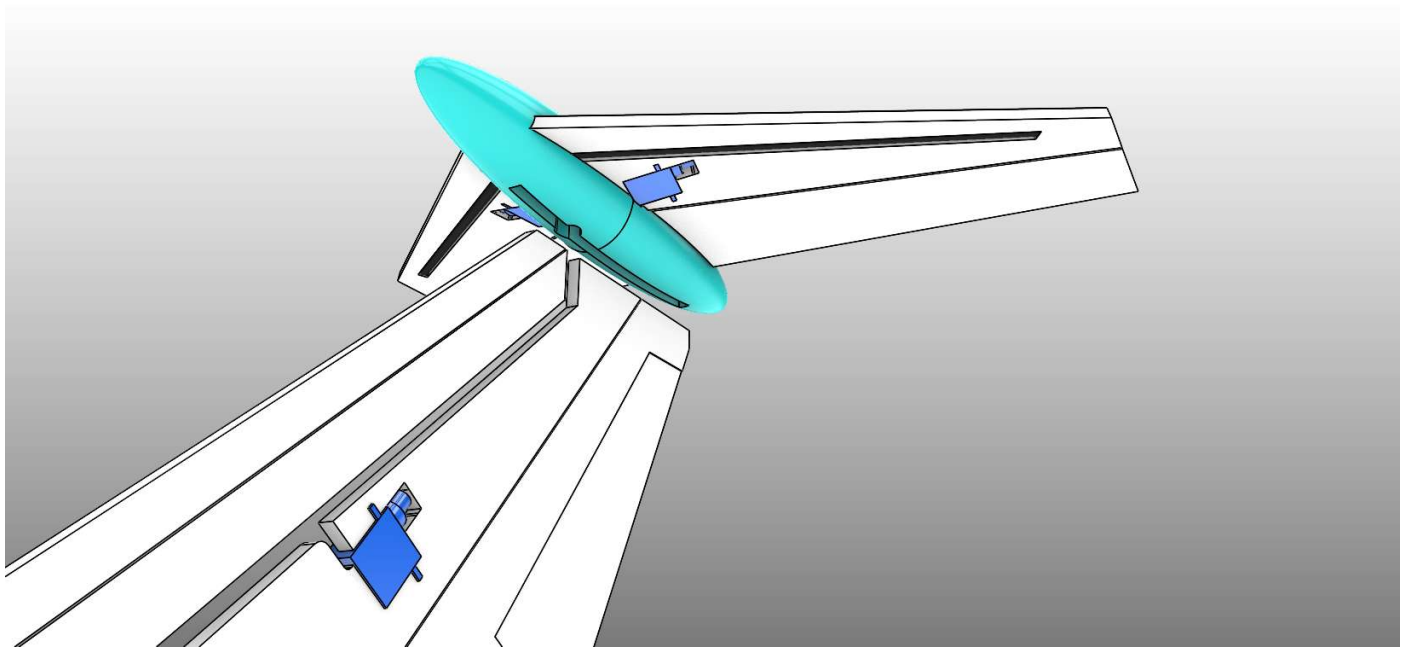
Glue the servos into the tailplane using hot melt glue. Ensure the servo lower face is flush to the underside of the tailplane (sticks up at the top).

Trim the channel for the servo wires to exit through the foam below the servo. Run the wires through the 3D printed **Tail-bullet.** Glue the wings into the bullet using epoxy (sparingly)

Using hinges, attach the horizontal stabilisers to the tailplane.

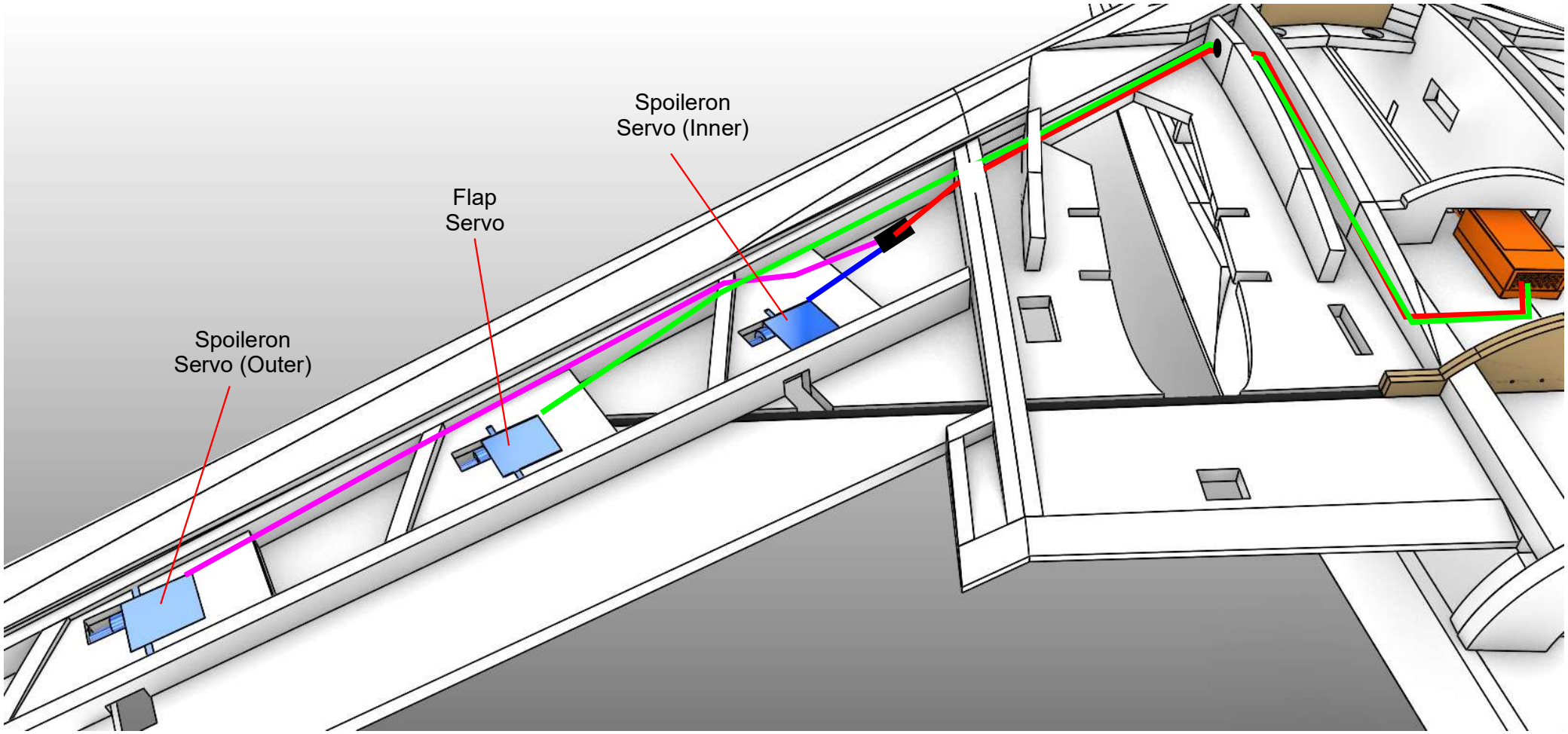


Sand to create the airfoil shape and then glue the **Tailplane Upper** to the tailplane assembly.

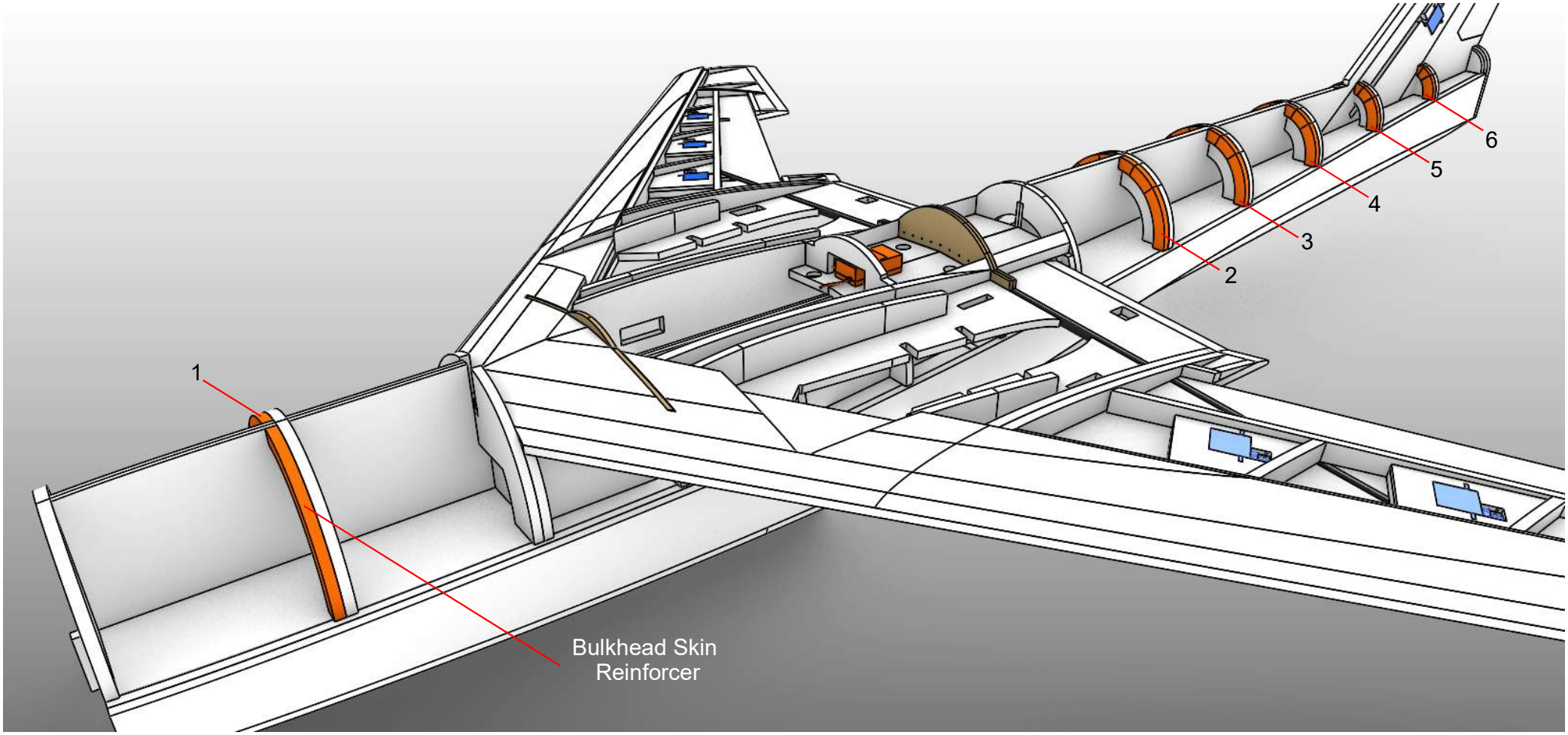


Glue the tailplane assembly to the fuselage, running the servo wires down into the cable channel within the vertical stabiliser.

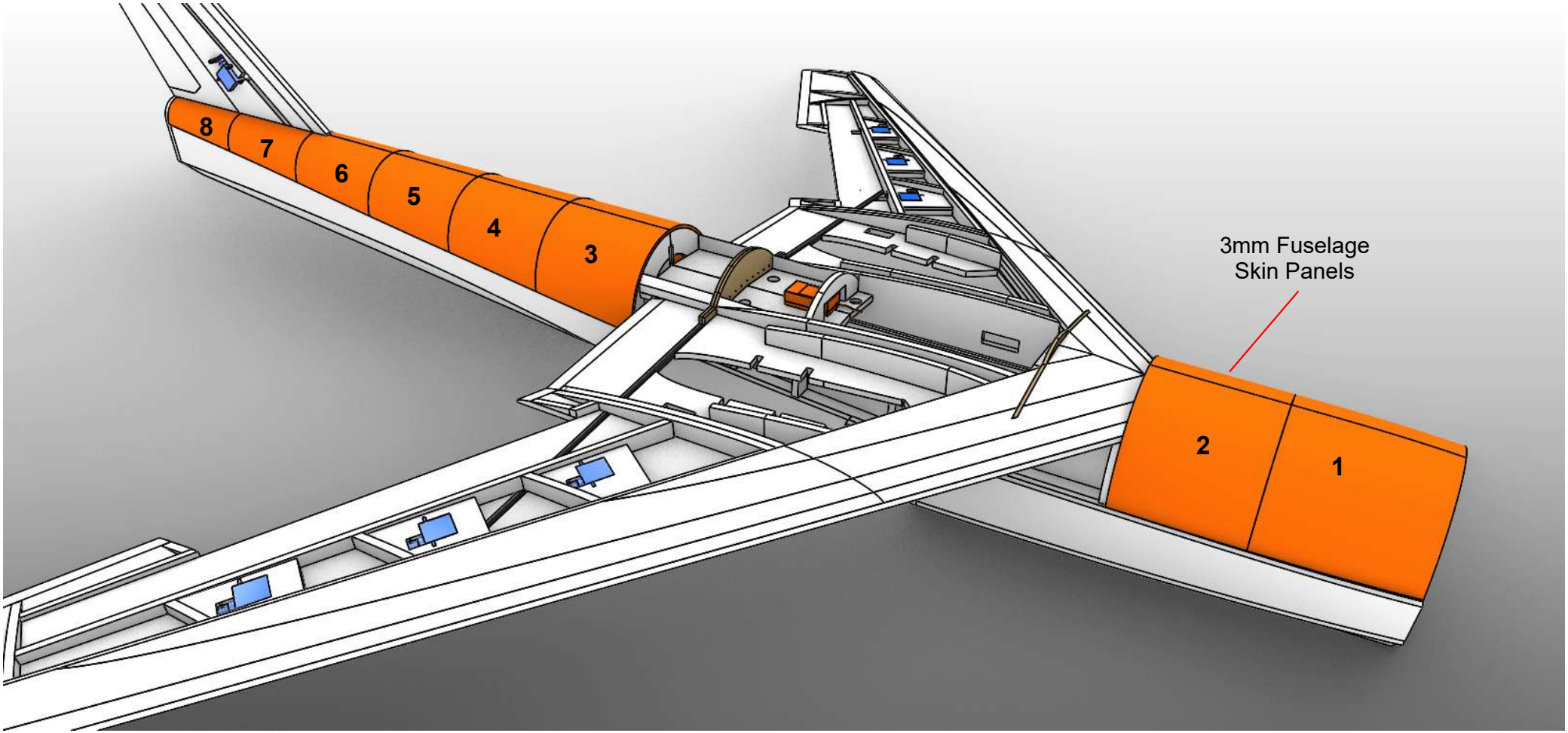
Extend and run the Elevator and Rudder Servo wires down the fuselage and into the RX area



Glue the wing servos to the wing assembly using hot melt glue. Run the Spoileron cables into a Y splitter to be able to drive both servo on a single channel (If preferred). Cut holes/slots in ribs as required for the cable runs.

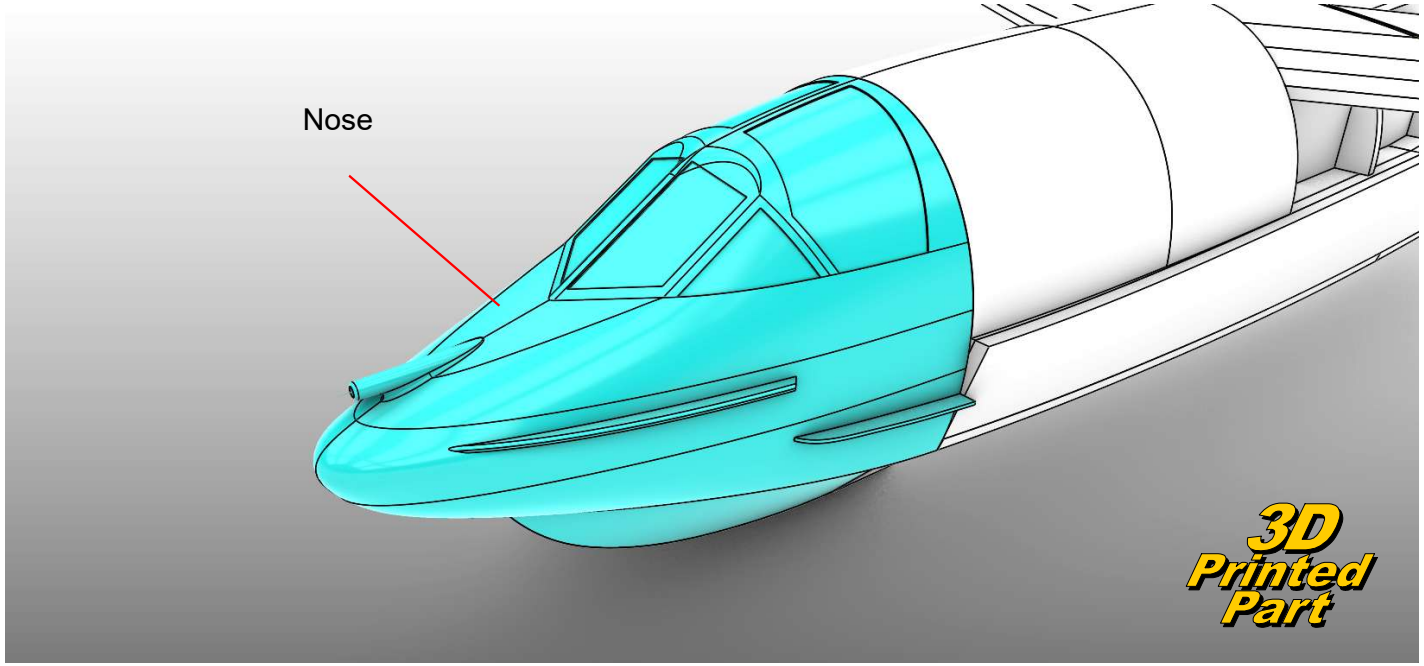


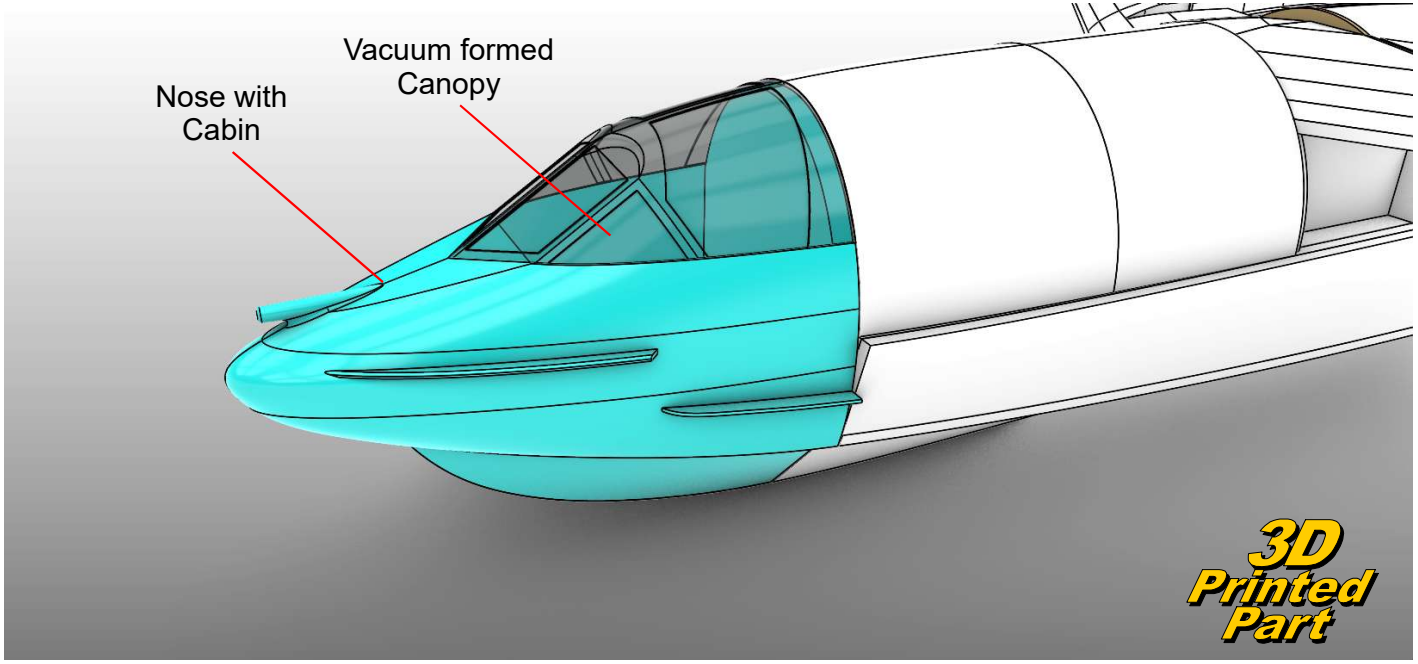
Glue the **Bulkhead Skin Reinforcers** to the assembly.



Cut these specific **3mm Fuselage skin panels** oversized and adjust to make a good-tight fit.

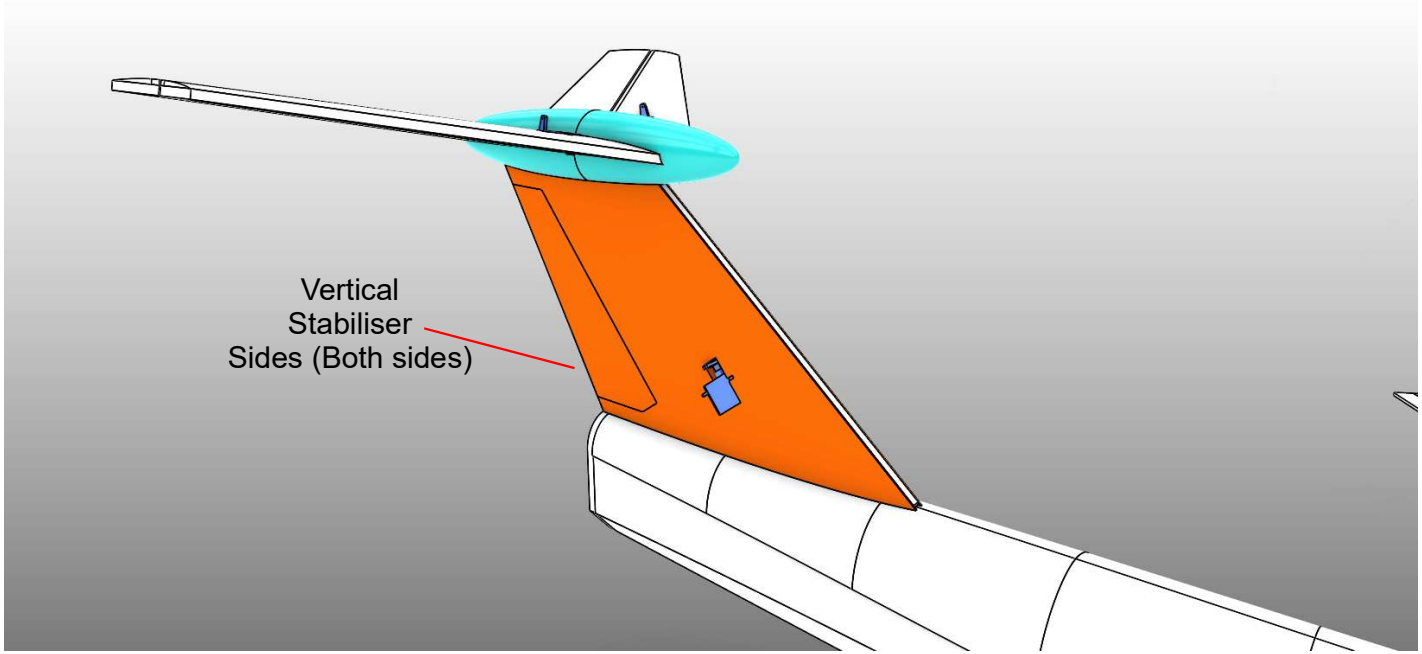
Glue to the assembly.



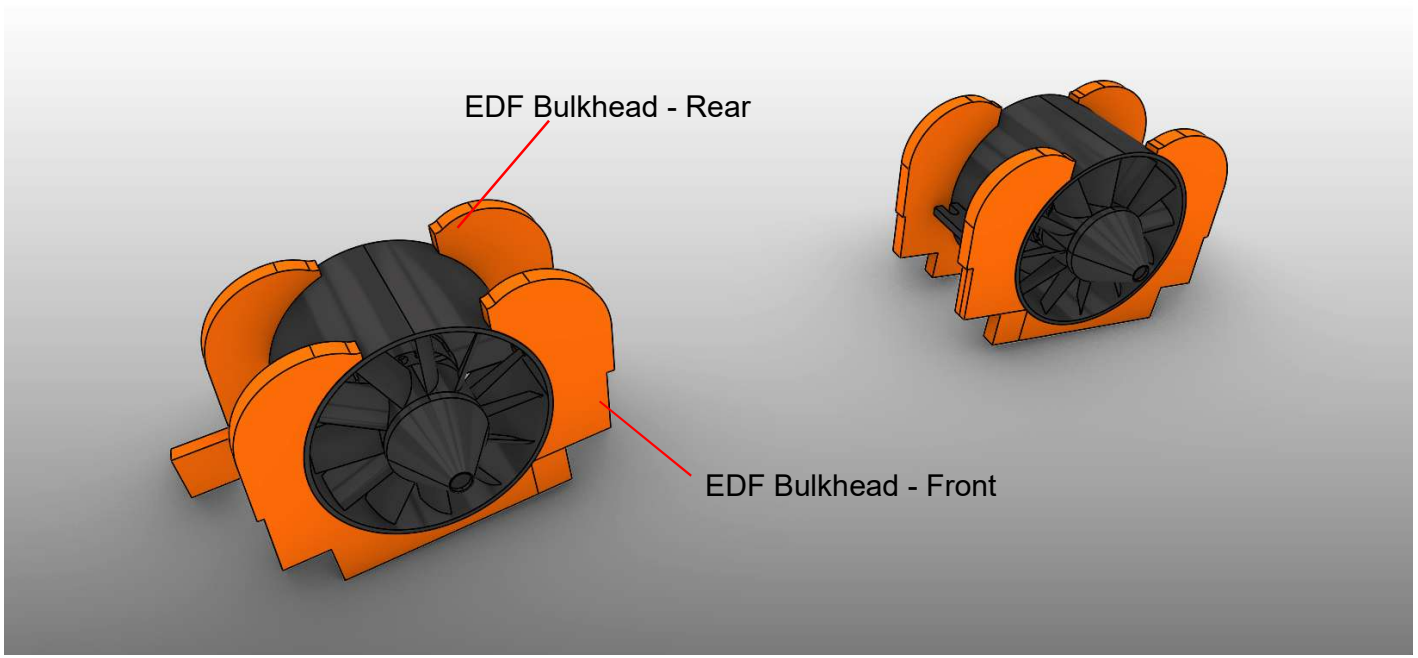


3D print either the full **Nose** or the **Nose with cabin** and vacuum formed canopy.

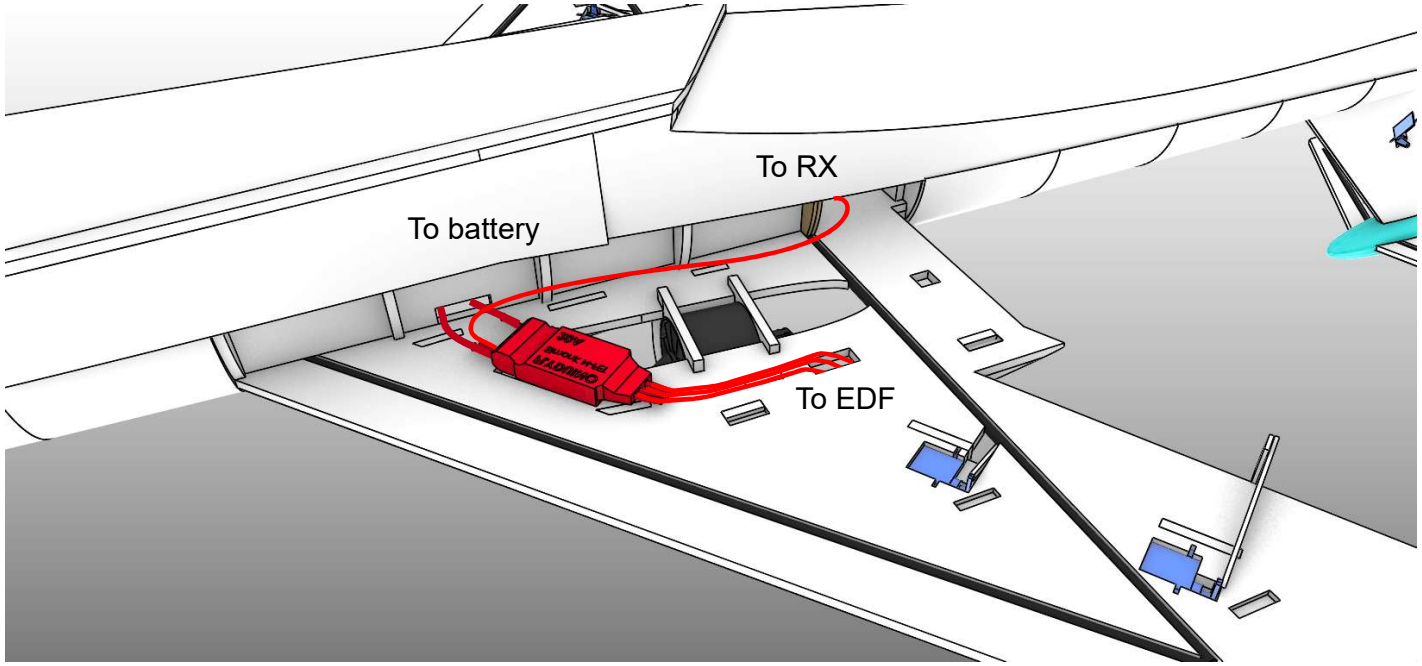
Using the location tab, glue onto the fuselage



Cut and shape both sides of the **Vertical stabiliser sides** with an aerofoil shape as indicated on the plans. Cut out the hole for the rudder servo and stick the fuselage.

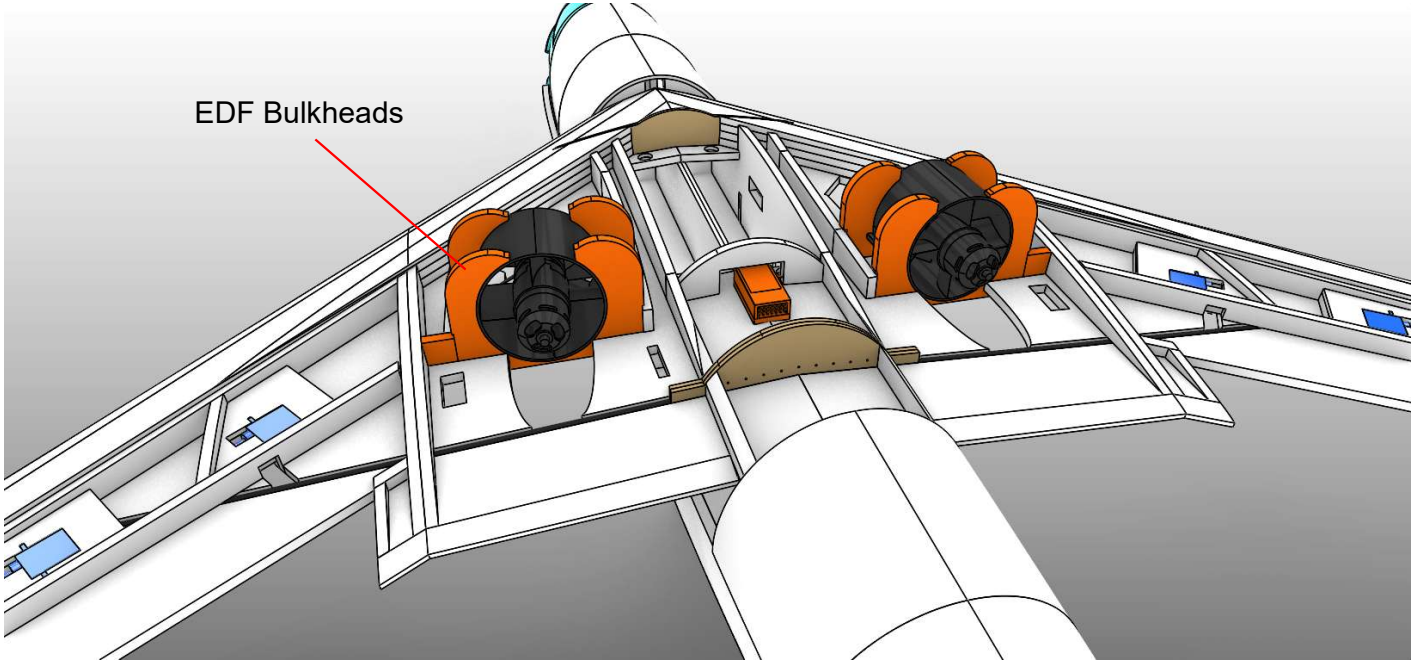


Trim the Forward and Aft EDF bulkhead to suit your chosen EDF and dry fit to the EDF units.

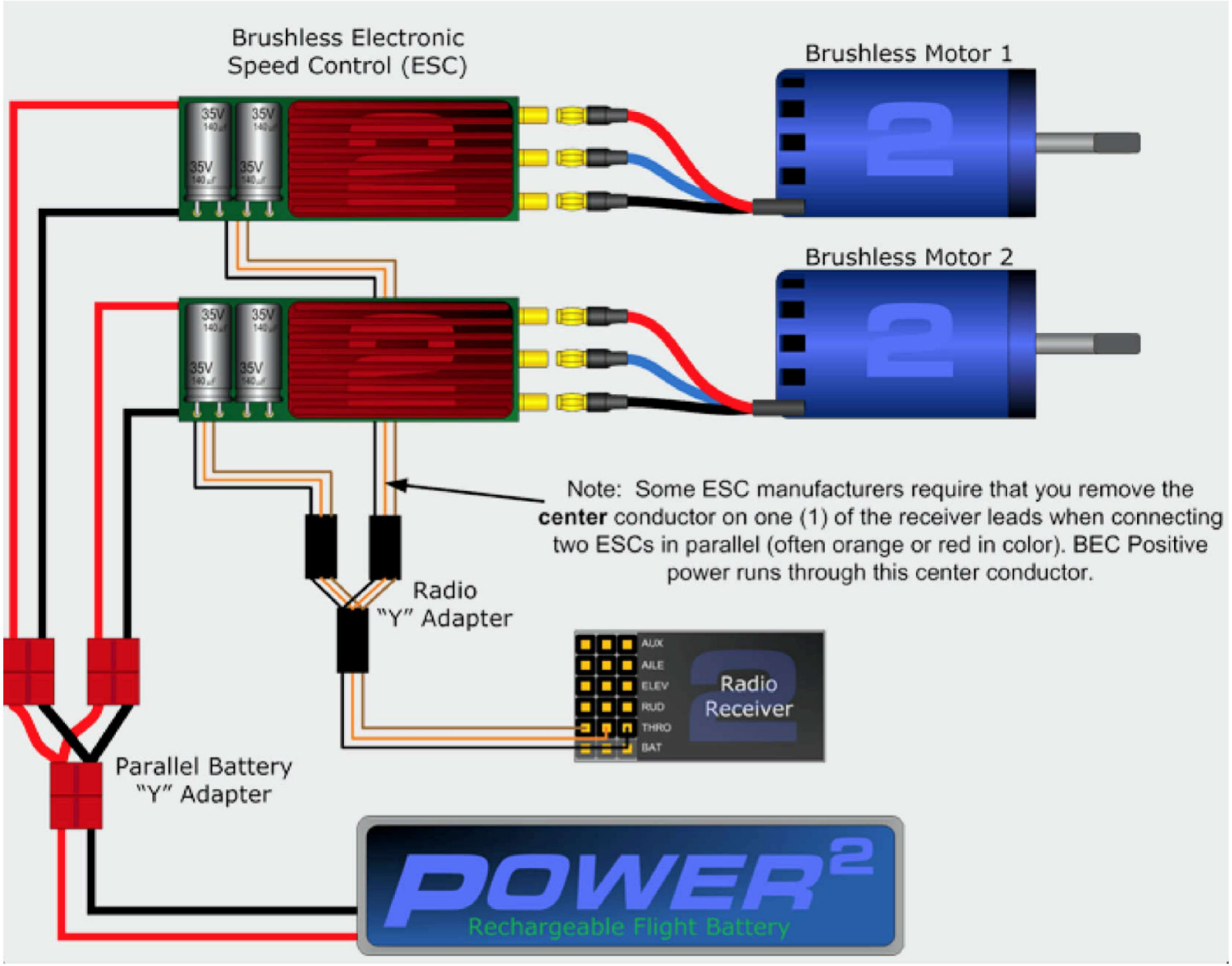


Temporarily tack the ESC in place on the underside of the wing base as shown, align to the forward edge of the EDF cut-out. (Both sides).

Check that the forward



Dry fit the **EDF Bulkheads** to the fuselage. To be glued in place at a later stage.

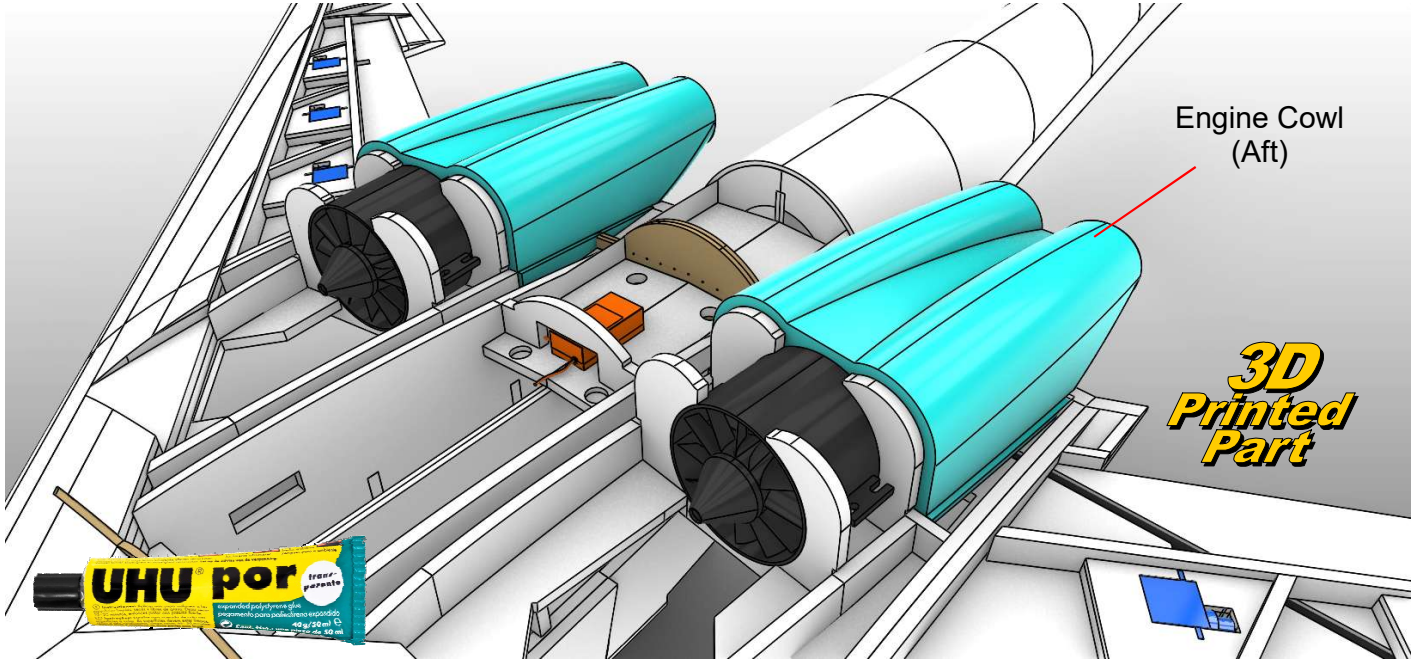


I found this image on the internet - I am not sure who created it, but it is a clear diagram of how to set up a single battery / twin motor setup.

Remove the Battery Y adapter for twin battery installation

For a single throttle channel - Be sure to investigate with your RX manufacturer whether you need to have a single or can have dual power feeds from your ESC's. If in any doubt, remove one red wire terminal from the ESC and tape it to prevent it touching anything.

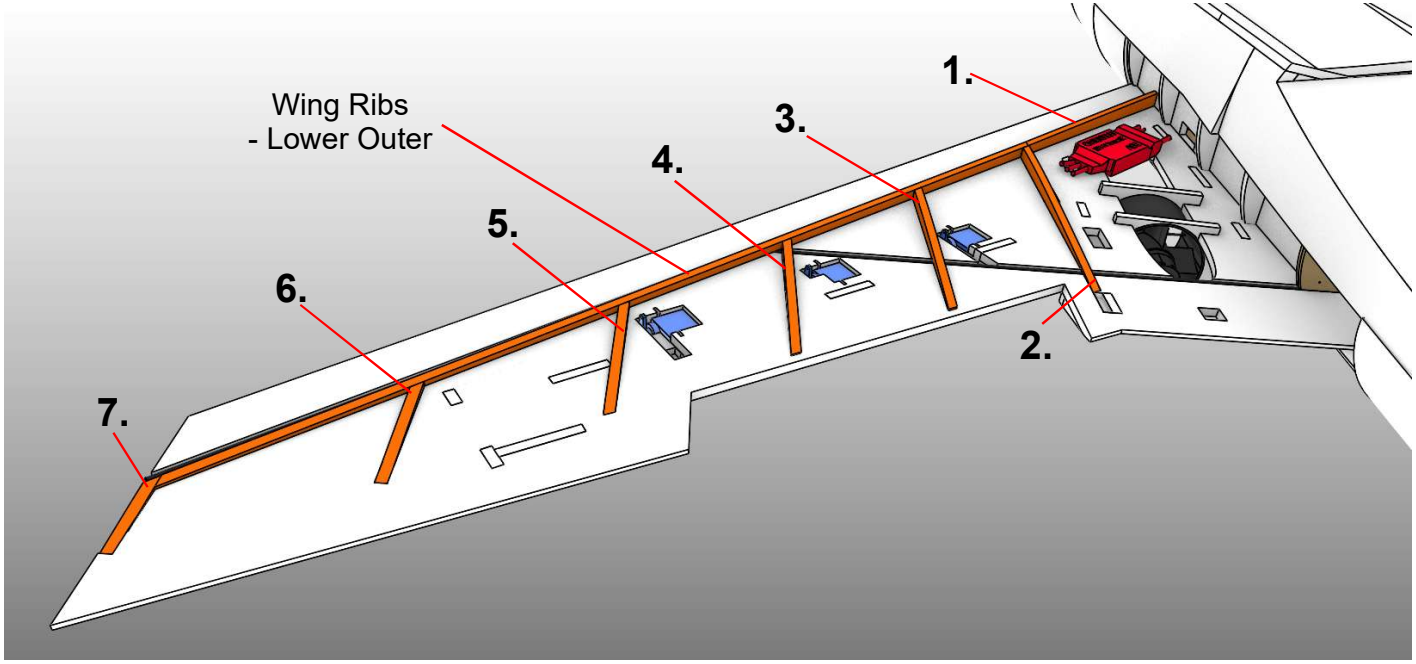
Alternatively use two linked channels for your throttle control, so you can fine tune the synchronisation of both units to prevent uneven thrust across the wings.



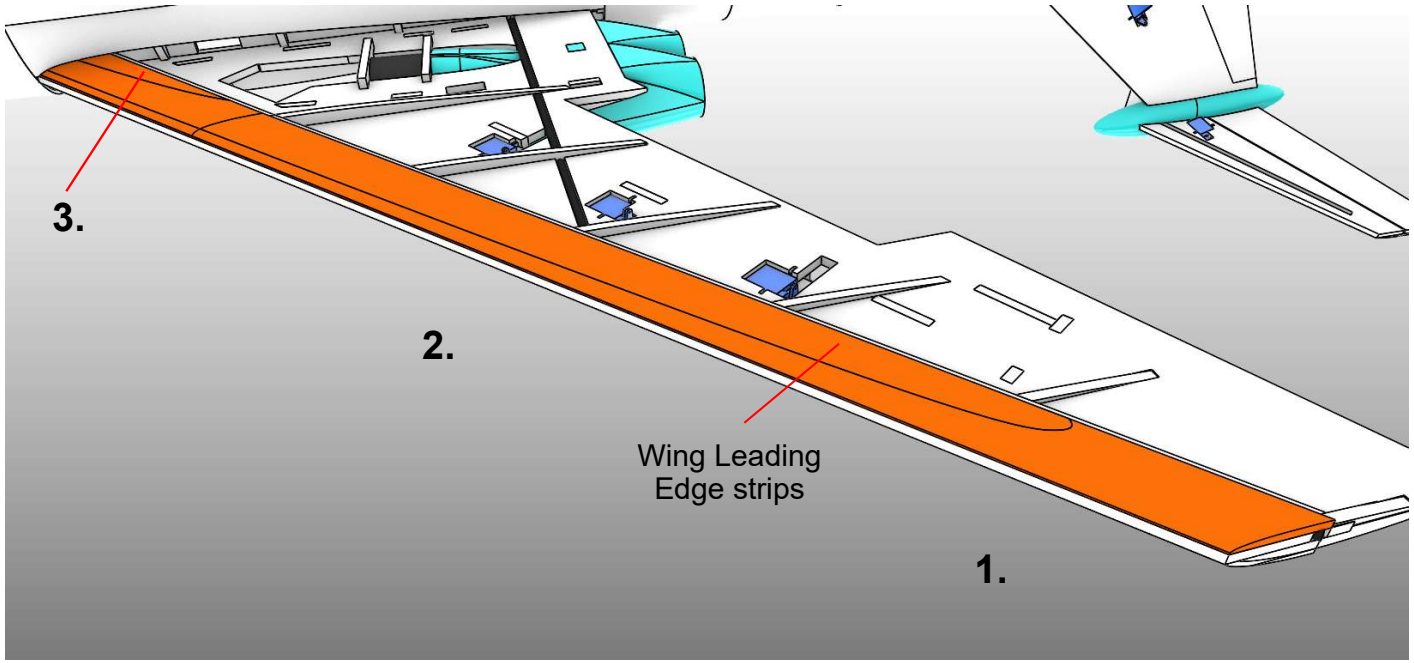
Using a soldering iron, make a hole in the **Engine Cowl (aft)** for the EDF motor wires to pass through, rotate the EDF unit to help the motor wires align to the hole with minimum drag.

Ensure that the EDF unit is aligned well to the Engine Cowl, adjusting the depron if necessary, then Glue the bulkheads in place using UHU Por.

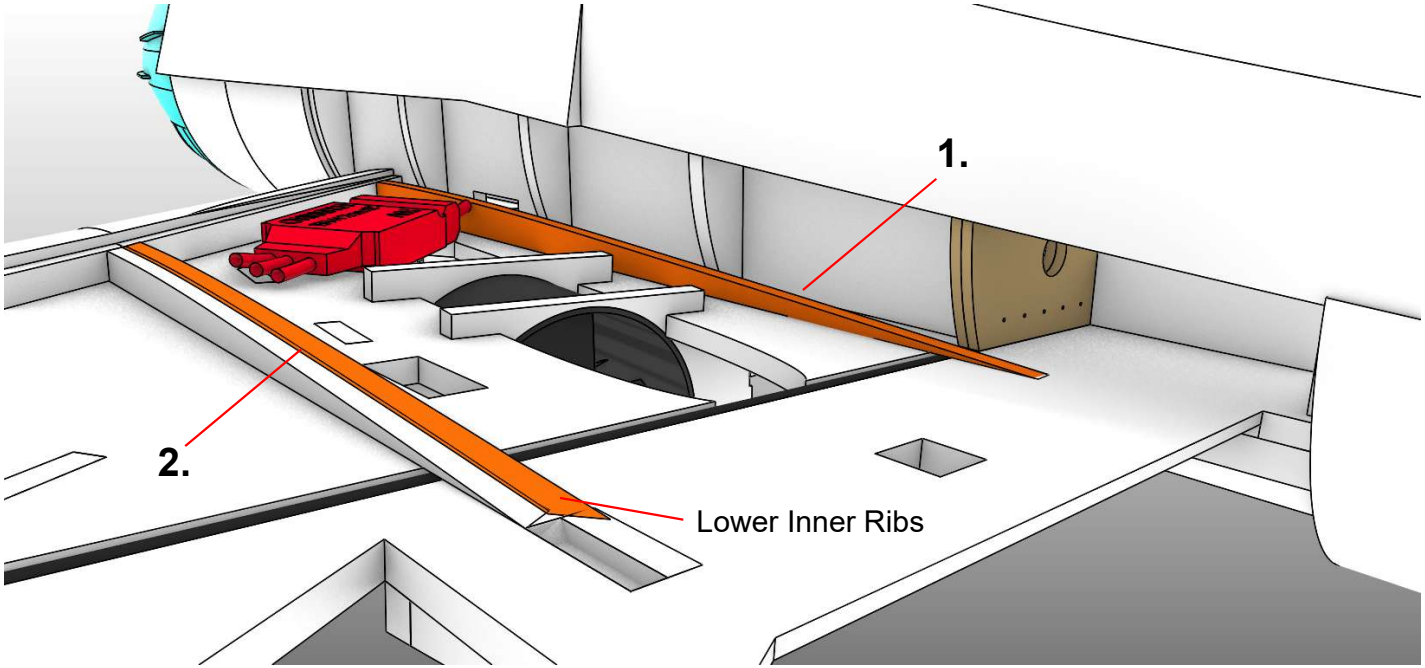
If your EDF unit protrudes forward of the forward EDF bulkhead, measure this excess distance and choose a version of the Engine Cowl Aft that accommodates the extra length.



Glue the **Wing Ribs - Lower Outer** into the wing as shown (both wings).

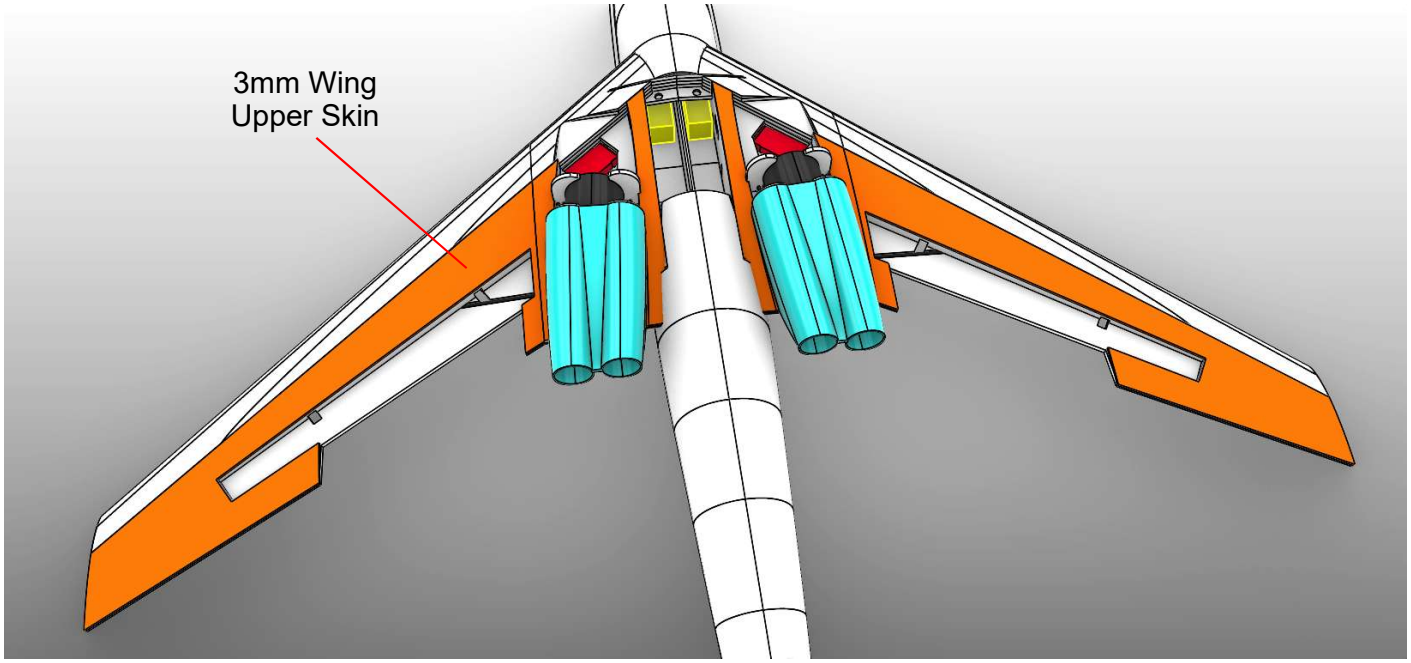


Attach the **Wing Leading edge Strips** to the Underside of the Wing base in the same way as the top side. (Both Sides)

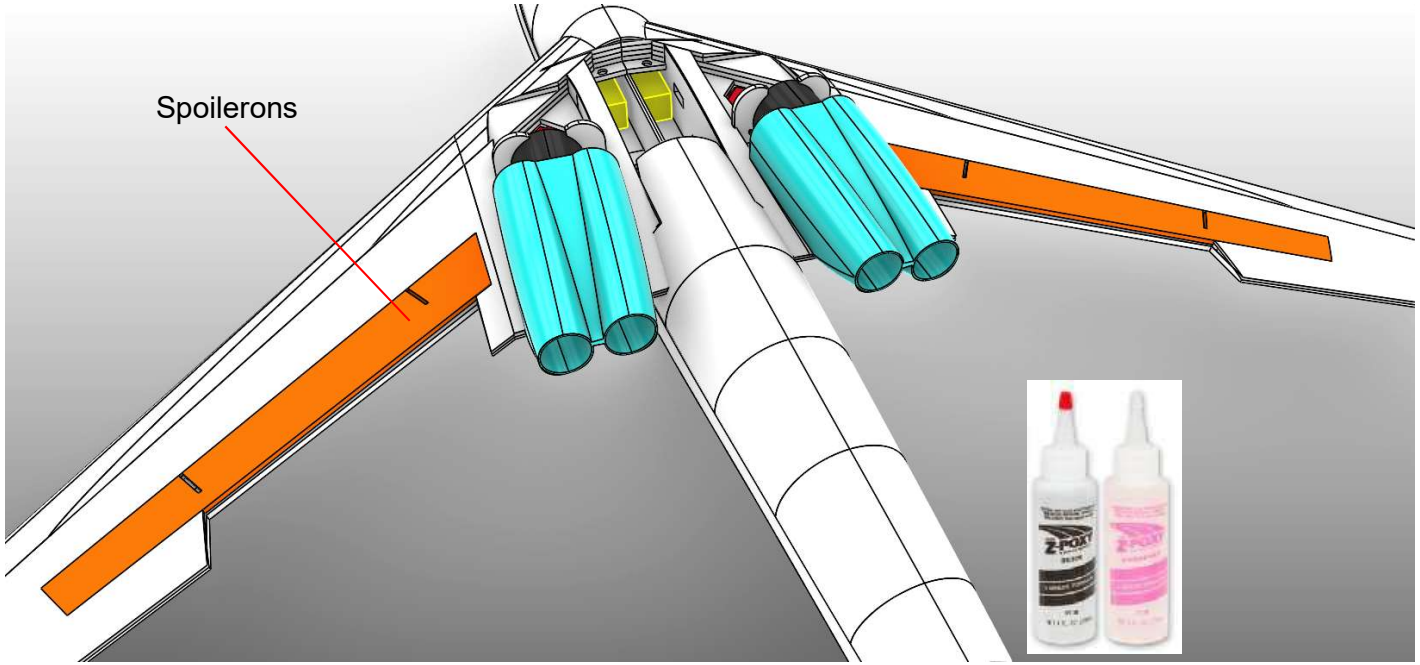


Glue the **Wing Ribs - Lower Inner** into the wing as shown (both wings).

Trim Rib 1 around the ESC cables so the cables can pass through.



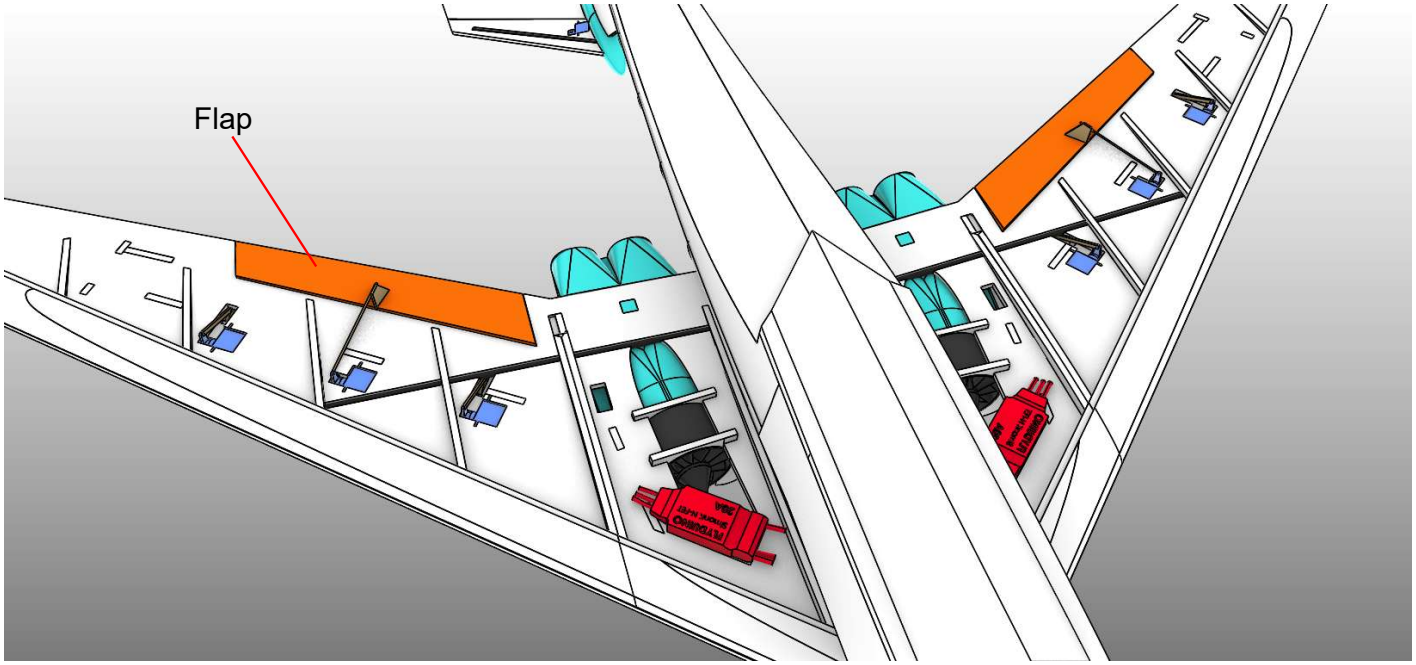
Using a flat sanding block, gently sand the ribs to create a good surface to bond the skin to. Glue the **Wing Upper Skin (3mm)** in place as shown.



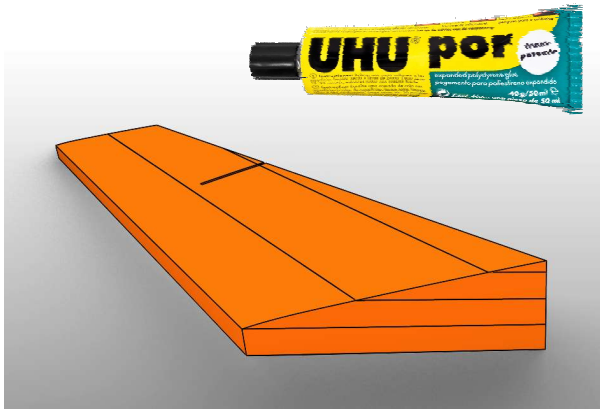
Glue the control horns into the Spoilerons using epoxy. Attach the Spoilerons to the wings using hinges.

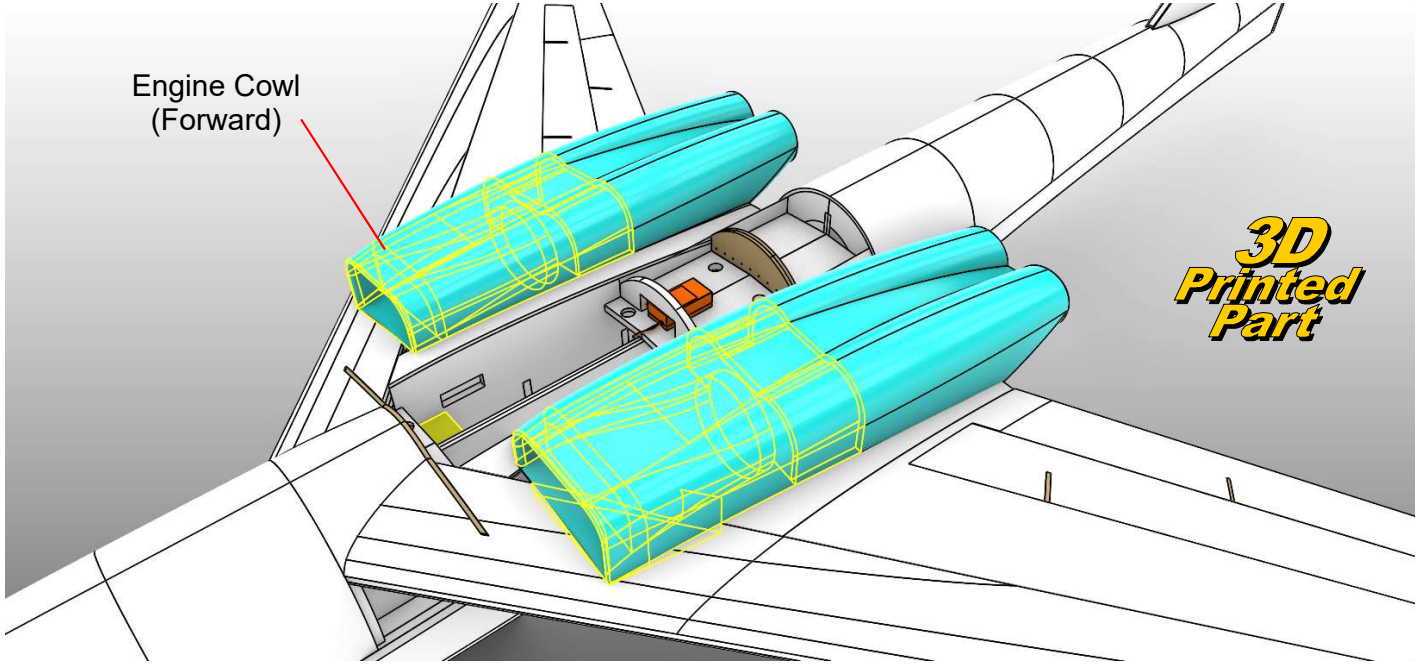
Cut and sand down the Servo horns in order to allow them to move freely within the wing.

Using Stainless wire to make 2 identical Z bend Pushrod arrangements to connect the control horns to the two servos. If the depron is obstructing its path, then use a cylindrical needle file to make a path.



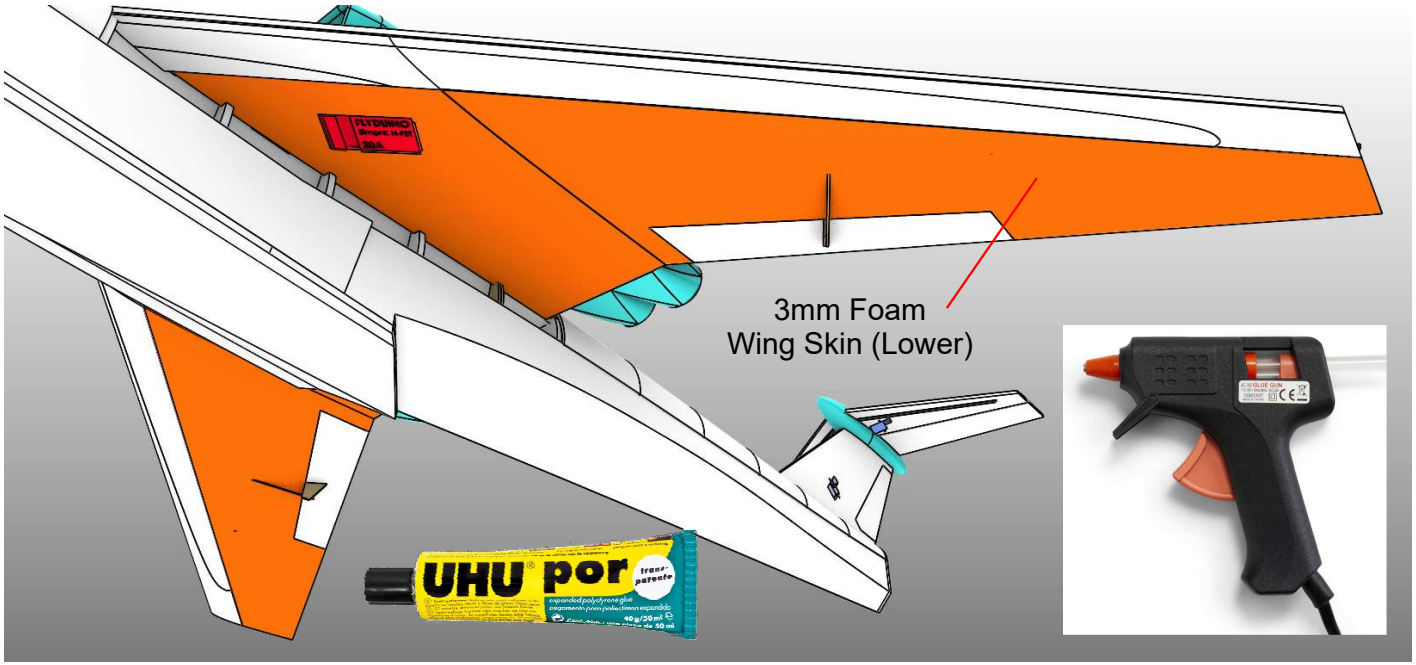
Create the **Flaps** using layers of depron and sand to shape. Attach the **Flaps** to the fuselage. Hinge along the bottom edge. Unsure a good connection.





Choose the correct size Engine Cowl for your EDF, and align well to the EDF intake (Inlet ring removed)

Glue the Engine Cowl onto the assembly.



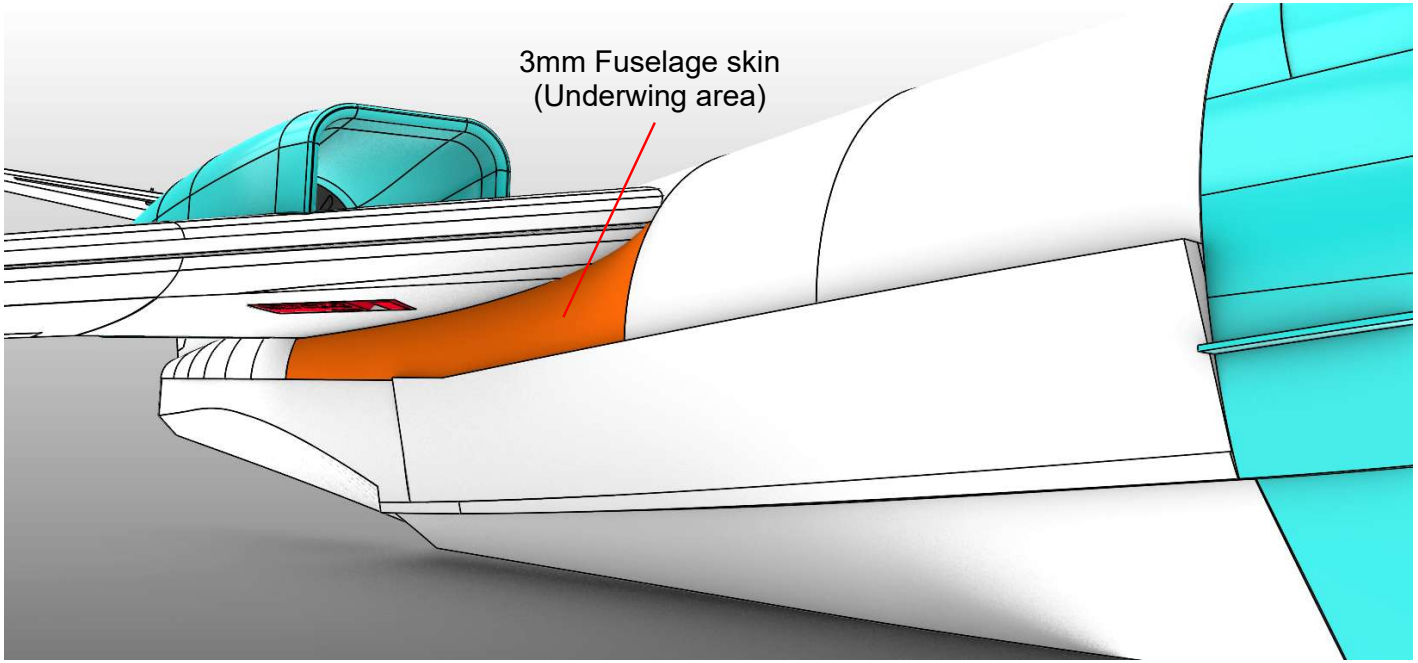
Sand the inside trailing edge of the **3mm Lower wing skin**, so that it feathers out according to the plan.

Carefully position the ESC and trim the 3mm tightly around it so that it lies flush on the outer skin

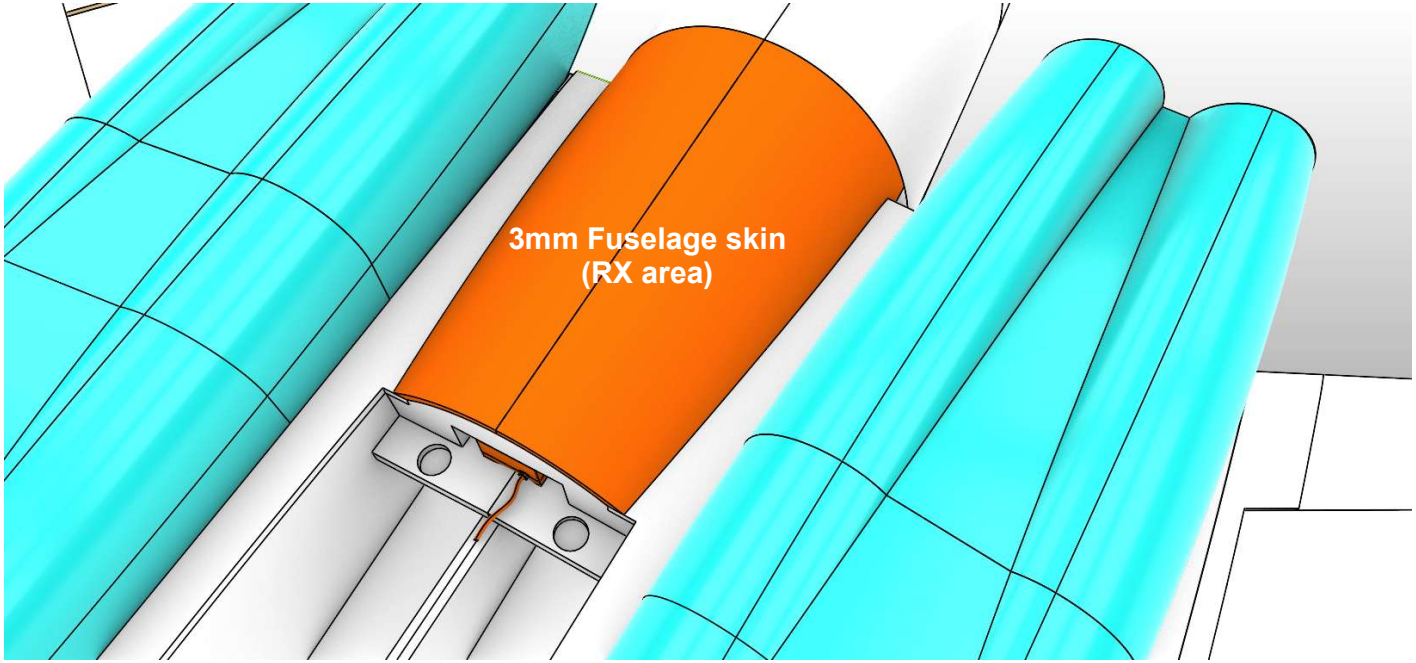
Hot glue the ESC to the Wing base structure.

Glue the **3mm Lower Wing Skin** to the fuselage.

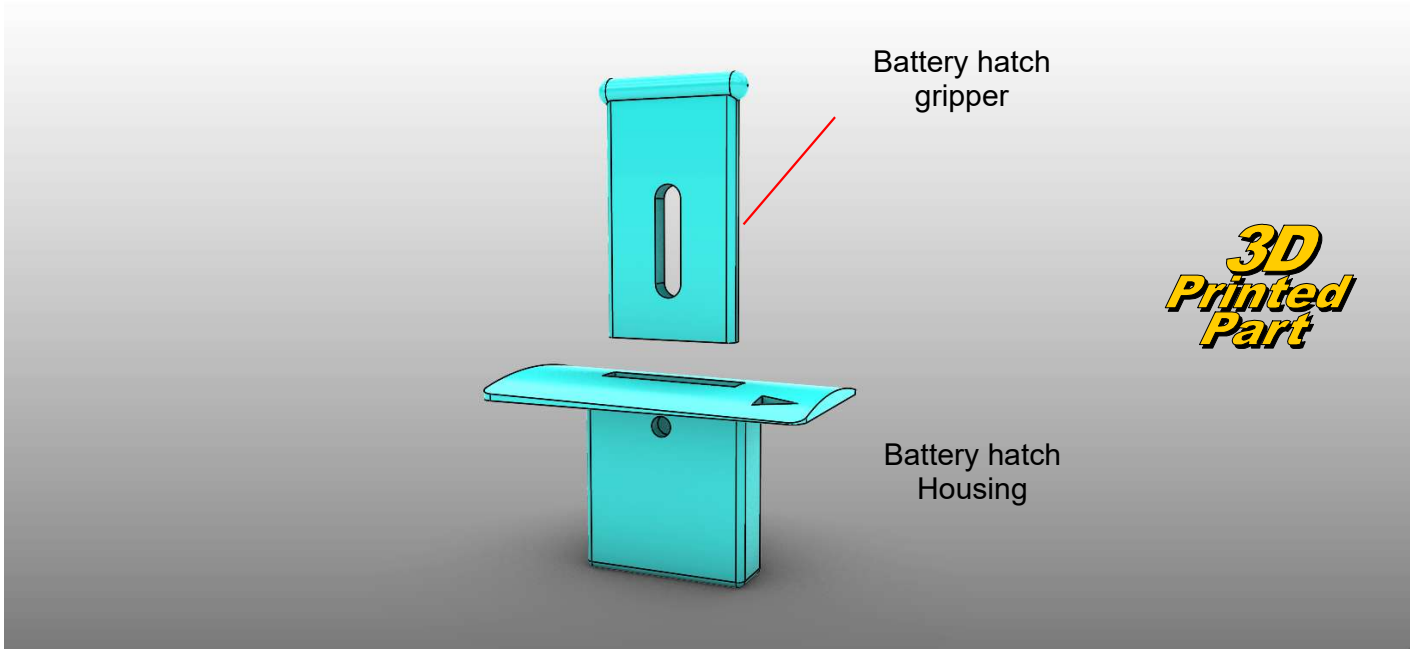
Use Silicone sealant around the ESC and 3mm foam to seal against water.



Glue the **3mm Fuselage skin (Underwing area)** to both sides of the aircraft.



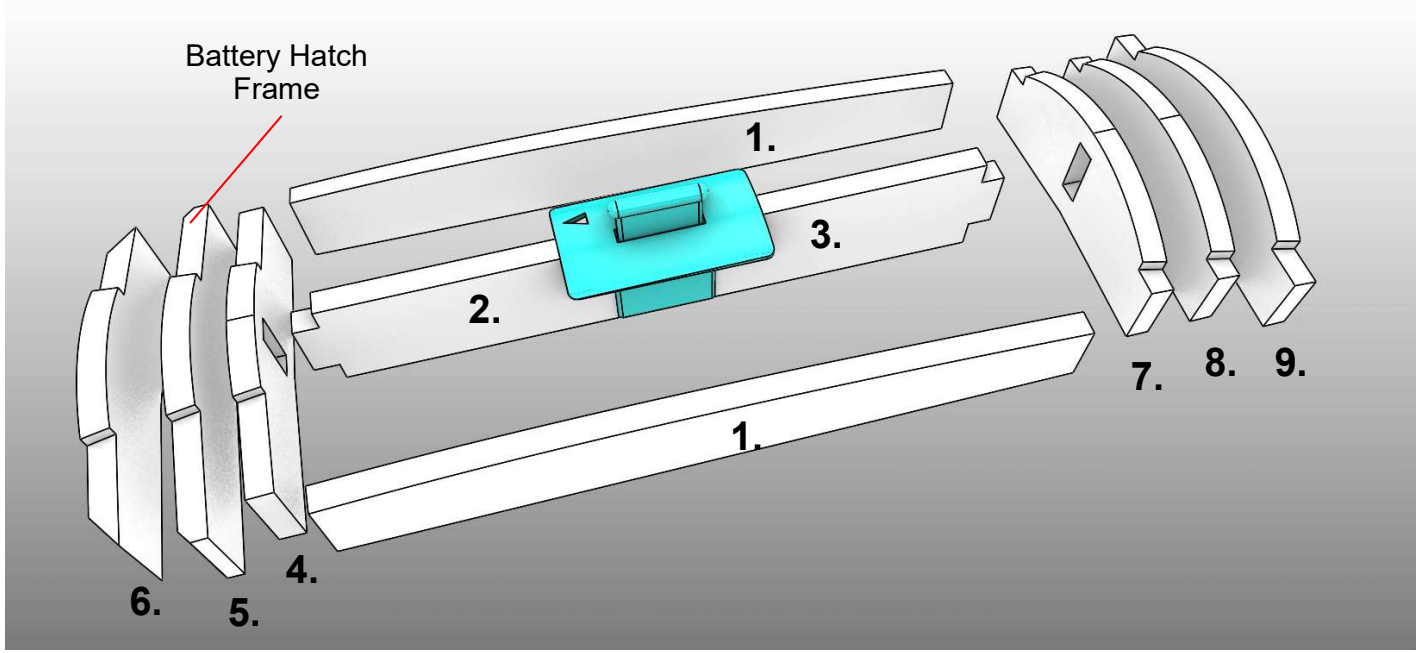
Glue the **3mm Fuselage skin (RX area)** to the aircraft.



Assemble the 3D printed Battery hatch handle mechanism.

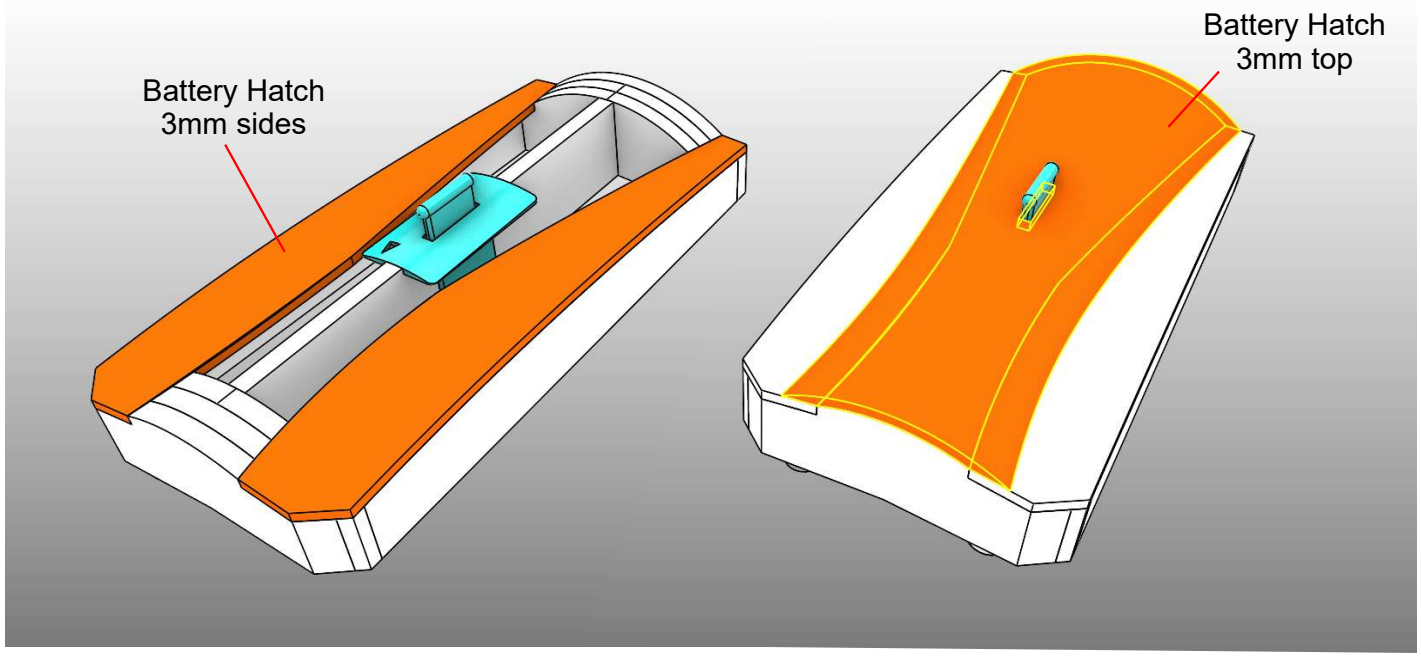
Slide the **Gripper** into the **Housing**.

Use a 3mm machine screw and Nylock (Stainless steel) to screw through the Battery hatch housing to retain the gripper.



Assemble the **Battery Hatch frame** and glue together using Uhu POR.

Glue the Battery hatch handle into the central part using epoxy.



Glue the **3mm Sides and Top** onto the Battery hatch assembly.

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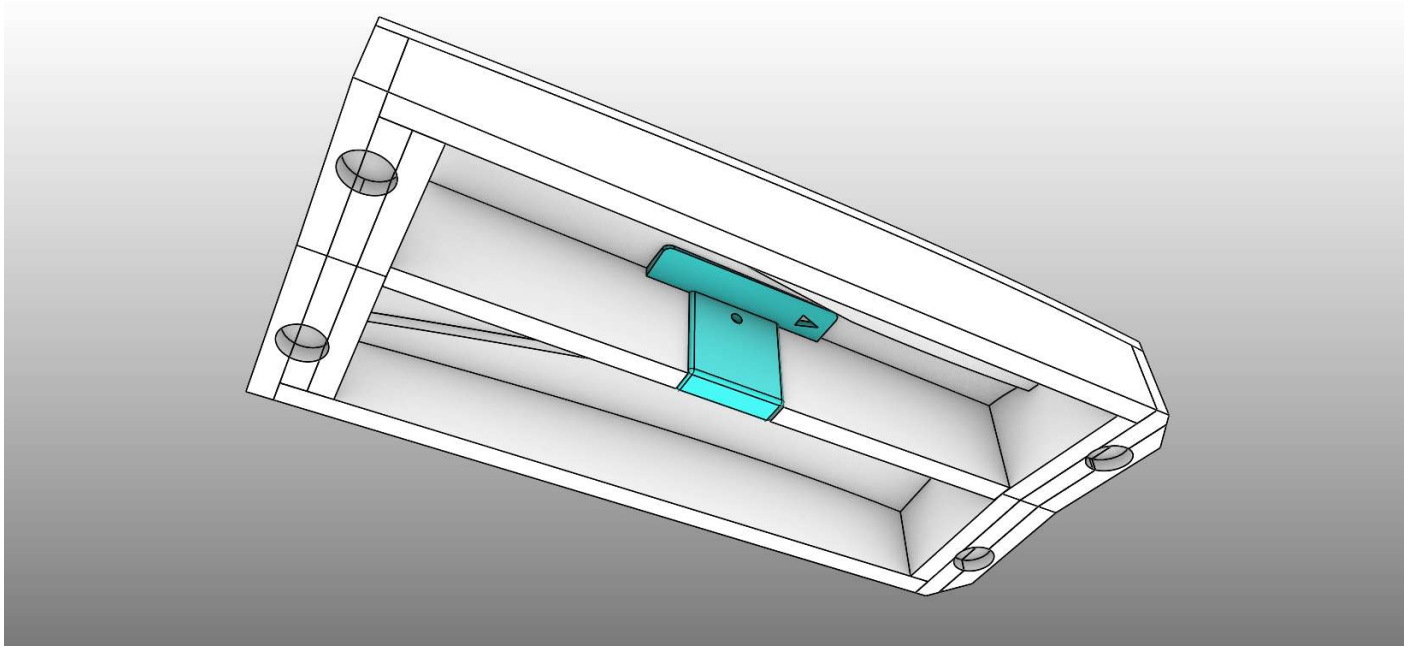
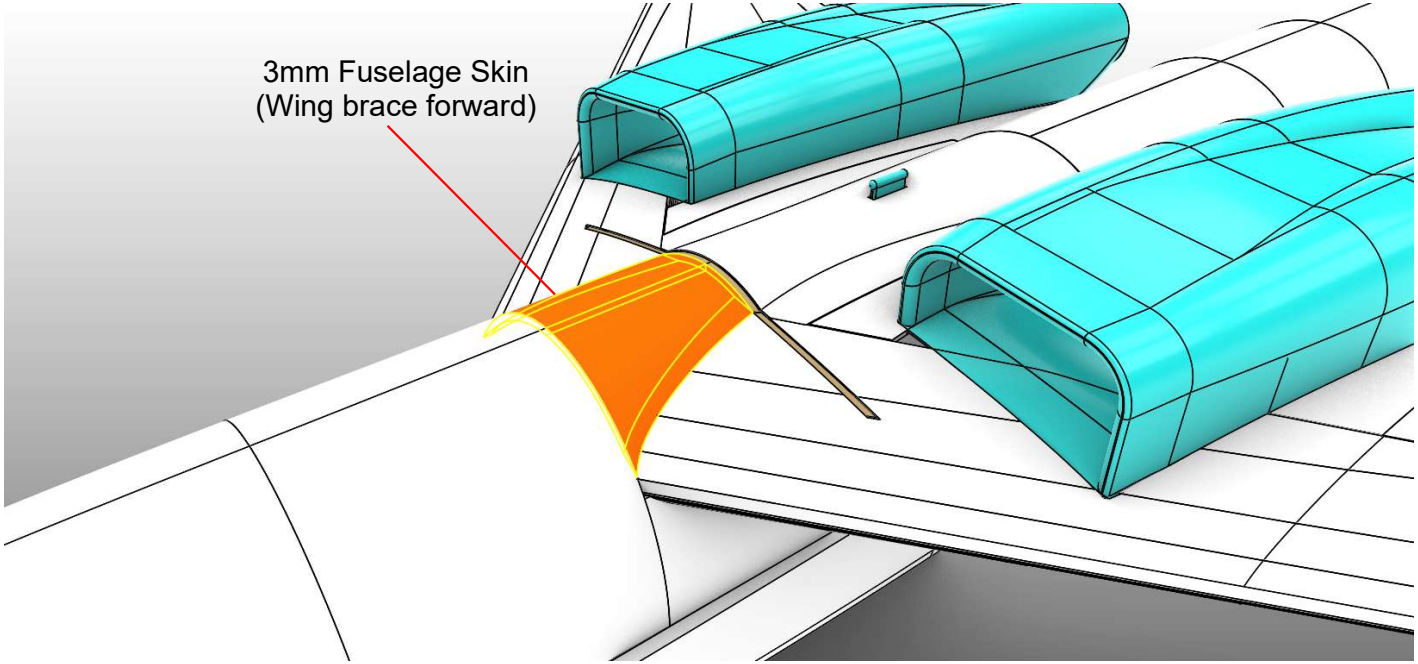


Trim away space for 4 x button magnets to align with the magnets in the airframe. Glue them flush using Epoxy.



Glue the **3mm Fuselage Skin - Wing Brace Forward** onto the airframe.

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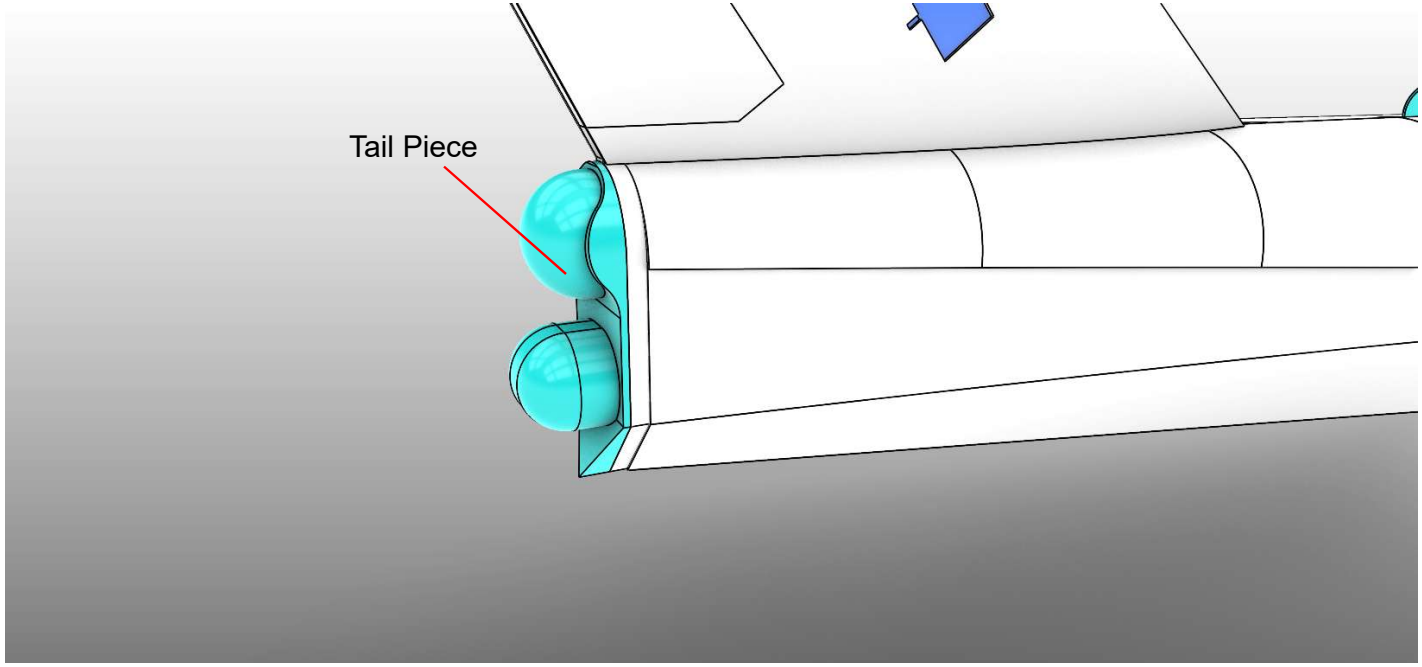
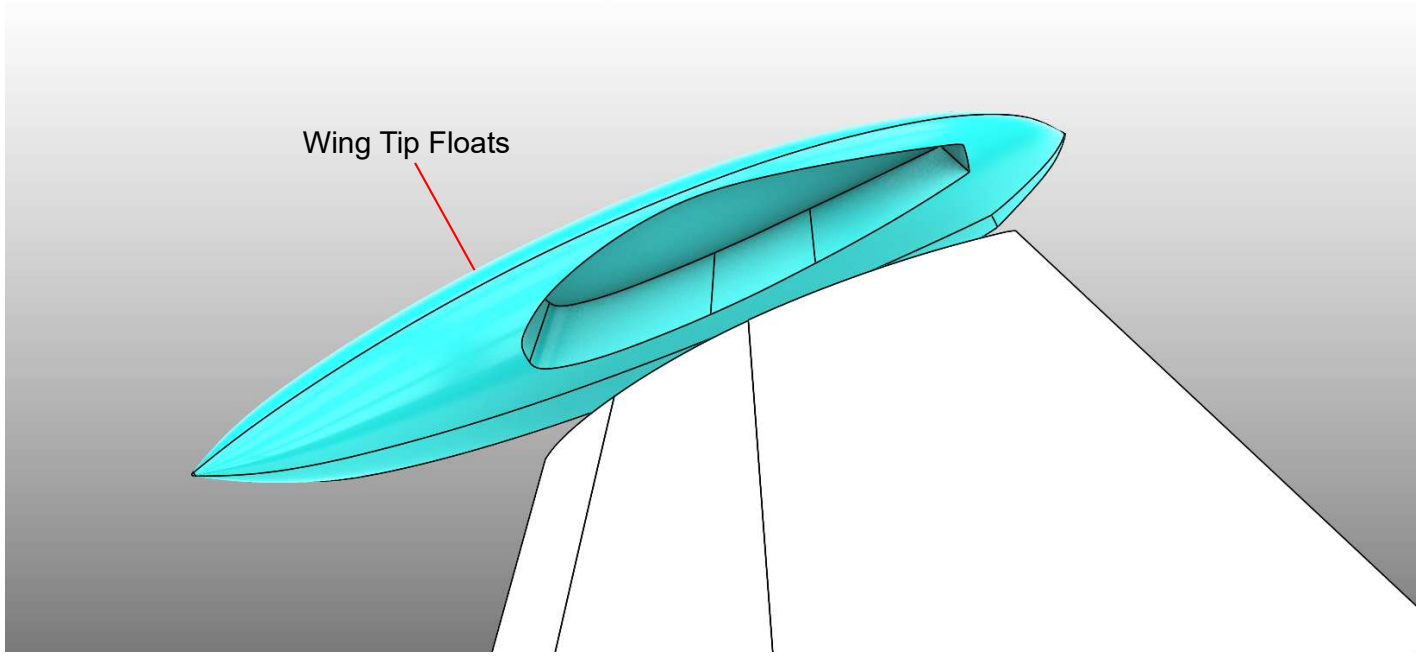


Glue the **Tail Piece** onto the end of the fuselage



Glue the **Wing Tip Floats** onto the Wing Tips.

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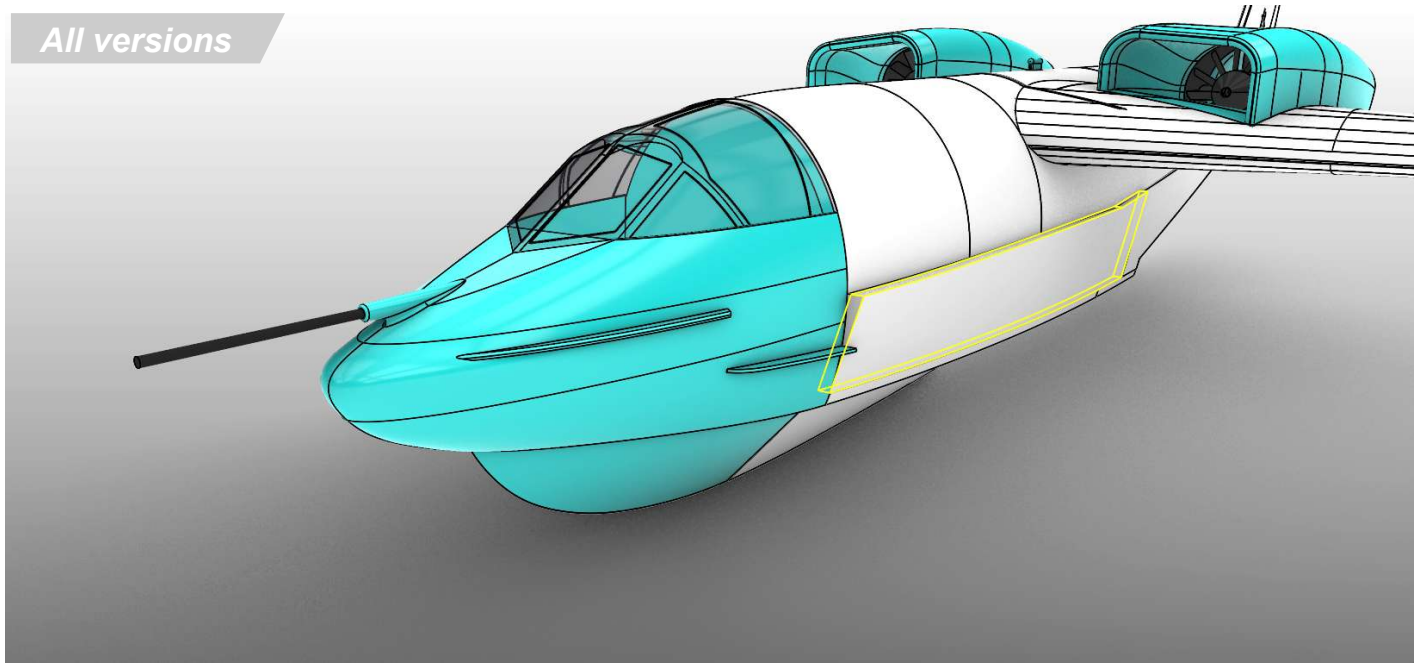
All versions

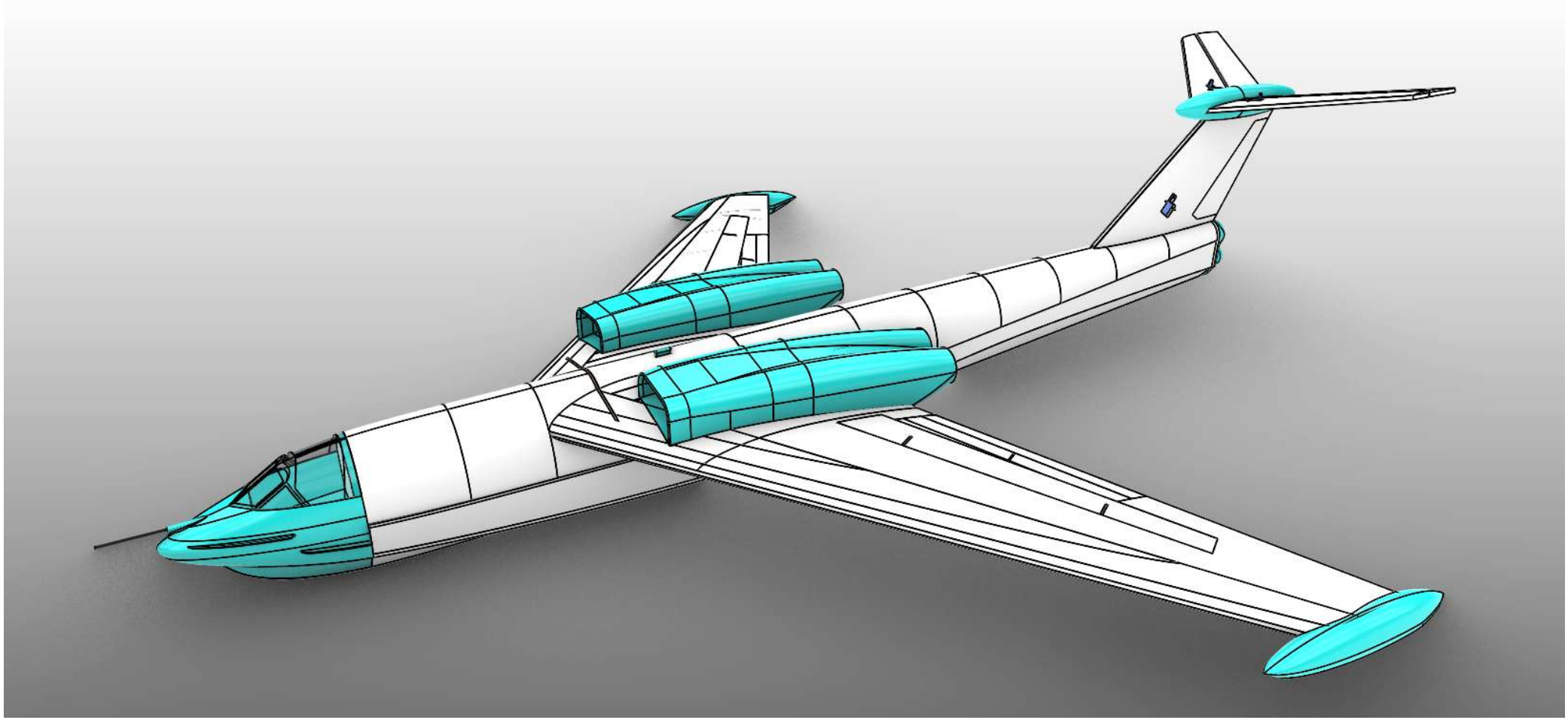


Sand the protruding lower side panel flush to the surrounding shape. (Both sides)

Glue in the refueling probe (3mm tube) into the nose.

All versions

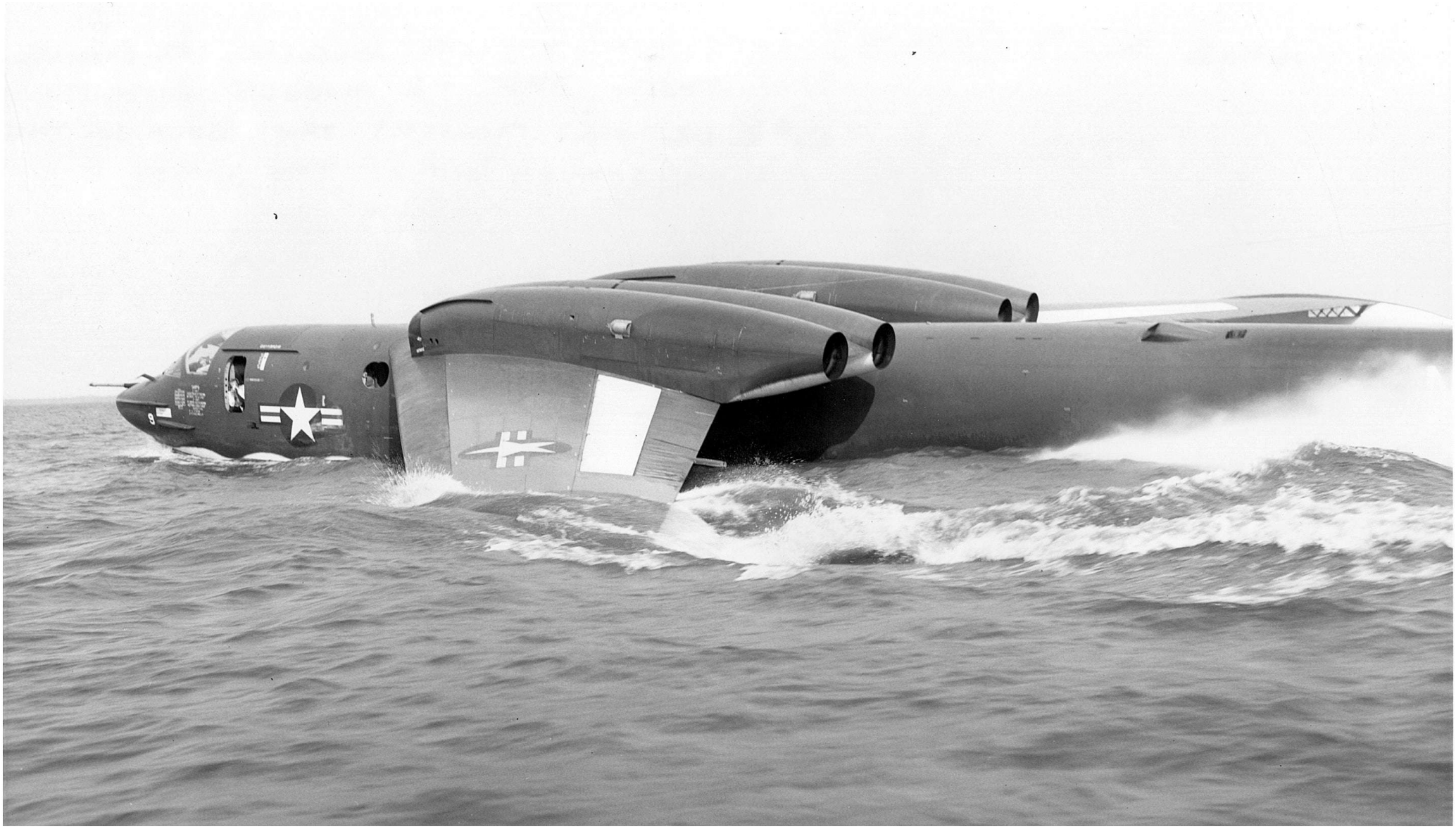
On the wing, Tailplane and Vertical stabiliser, sand the edges of the wings to give a smooth rounded appearance to help airflow.



Congratulations! Your model is now complete.

Remove leaks into the hull, by using lightweight filler in all cracks and crevices. Once fully dried, I recommend you apply thin strips of 0.6oz fibreglass on the fuselage to help to protect the depron . Use Water Based Polyurethane varnish as ‘resin’. Mask off the keel of the forward hull, and paint several coats of epoxy to harden up the hull against damage.

Either fly it as it is, or finish it further - look at www.jetworks.online for finishing guides.



The internet is full of images of the Seamaster. Use them to help finish and detail your model.