JETWORKS

Eurofighter TYPHOON MAXX

Photograph shown is the real aircraft.

3D Printer Required

+ Landing Gear
+ Aerofoil wings
+ Detailed Cockpit

150% Parkjet size

90mm EDF JET

9mm Foam Req'd

Multi-Role Fighter

Construction Guide

Eurofighter History

Arguably the best 4th Generation Aircraft in the world, The Eurofighter Typhoon is a twin-engine, canard-delta wing, multirole fighter. Designed and is manufactured by Alenia Aermacchi, Airbus Group and BAE Systems.

The aircraft's development effectively began in 1983 with a multinational collaboration among the UK, Germany, France, Italy and Spain. Disagreements over design authority and operational requirements led France to leave the consortium to develop the Dassault Rafale independently.

The first prototype of the Eurofighter made its first flight on 27 March 1994. The aircraft's name, Typhoon, was adopted in September 1998; the first production contracts were also signed that year.

The Typhoon entered operational service in 2003. The type has entered service with the Austrian Air Force, the Italian Air Force, the German Air Force, the Royal Air Force, the Spanish Air Force, and the Royal Saudi Air Force. The Royal Air Force of Oman and the Kuwait Air Force are export customers, bringing the procurement total to 599 aircraft as of 2016.

The Eurofighter Typhoon is a highly agile aircraft, designed to be a supremely effective dogfighter in combat. Later production aircraft have been increasingly better equipped to undertake air- to-surface strike missions and to be compatible with an increasing number of different armaments and equipment including Storm Shadow and the RAF's Brimstone. The Typhoon saw its combat debut during the 2011 military intervention in Libya with the Royal Air Force and the Italian Air Force, performing aerial reconnaissance and ground strike missions. The type has also taken primary responsibility for air- defence duties for the majority of customer nations.

Designers Notes

The Typhoon Parkjet is a popular Jetworks model, a great handling and agile aircraft. I have been approached multiple times to make a version with undercarriage, so here it is! the first of the MAXX range.

Limited to one EDF size with landing gear, flaps and aerofoil it is an impressive model at any flying field.

It's a good idea to be conservative with the throws on the model as its control surfaces don't need much to control it. most of the elevator control comes from the elevons - the canards don't contribute much.

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.

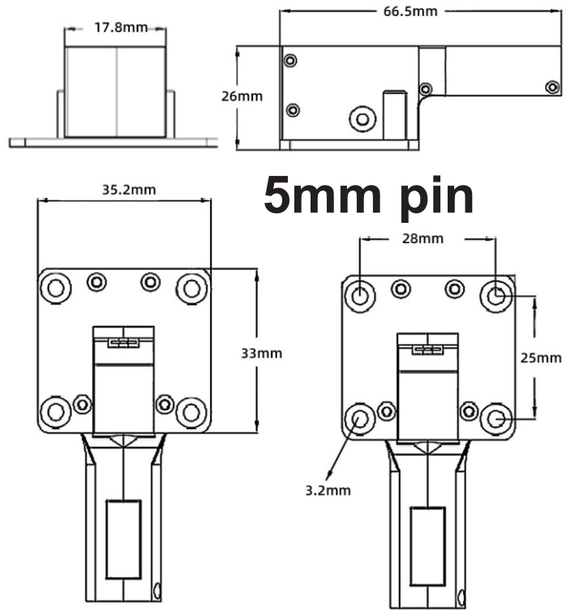
Cutting parts
1. Print the plans,
2. Cut around each part using scissors - allow a border of approx (1/4") 6mm
3. Use either 3M spray mount or a very light coat of 3M 77 to the back of the parts and stick in an economical layout on the Depron foam.
4. Using a safety rule and craft knife over a cutting 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

Landing Gear

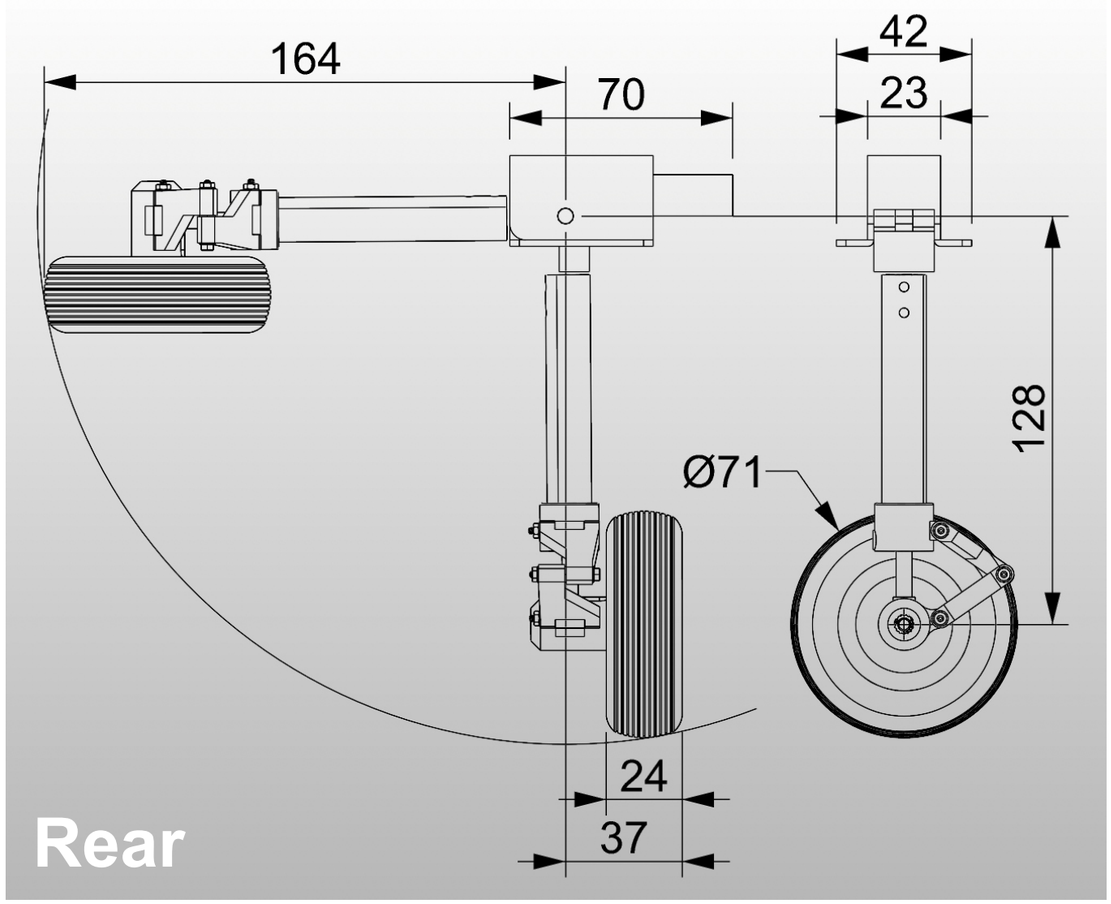
You can either construct your own Landing Gear with 3D printed components and off-the shelf components or choose ready made landing gear, below are the dimensions that this Typhoon model has been optimised for.

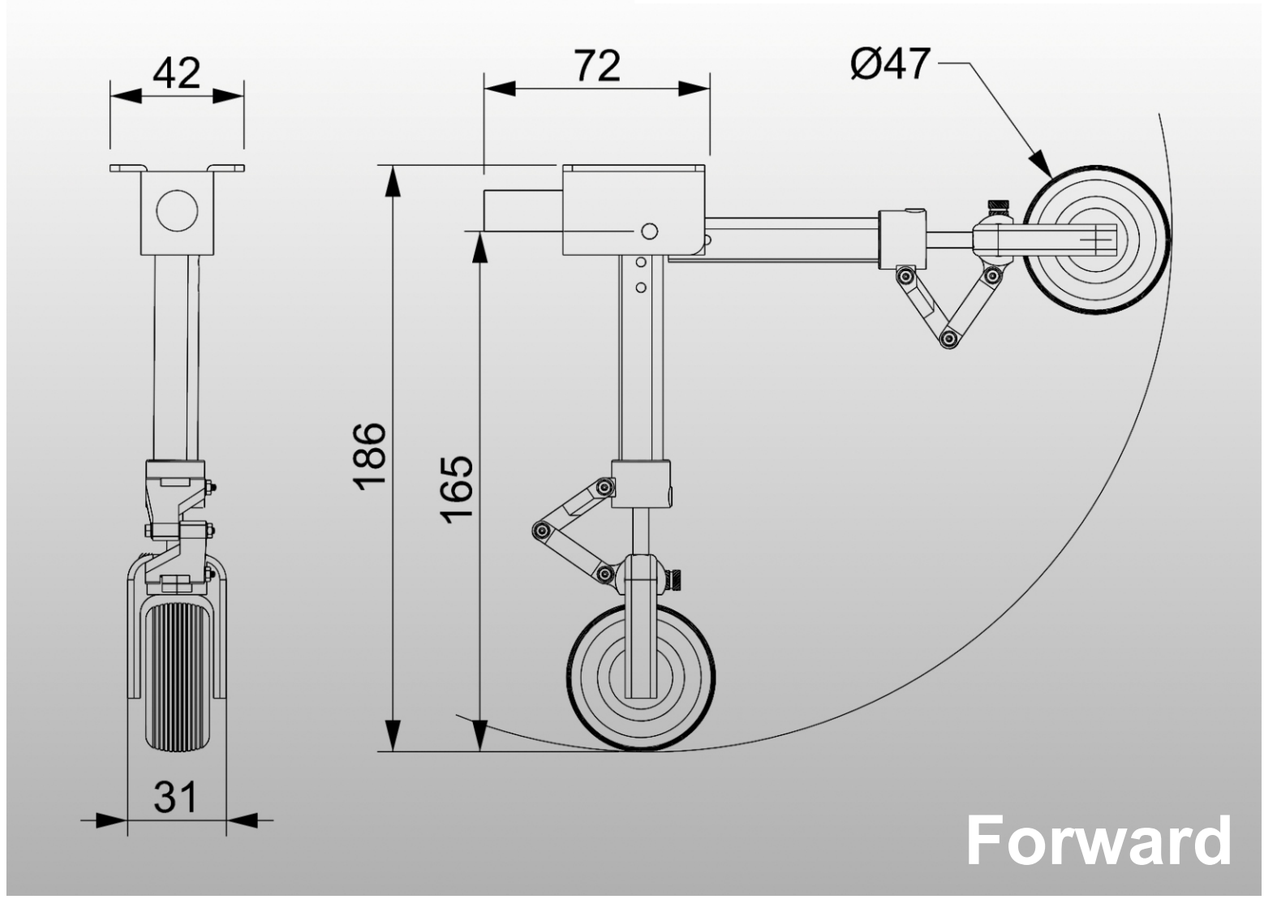


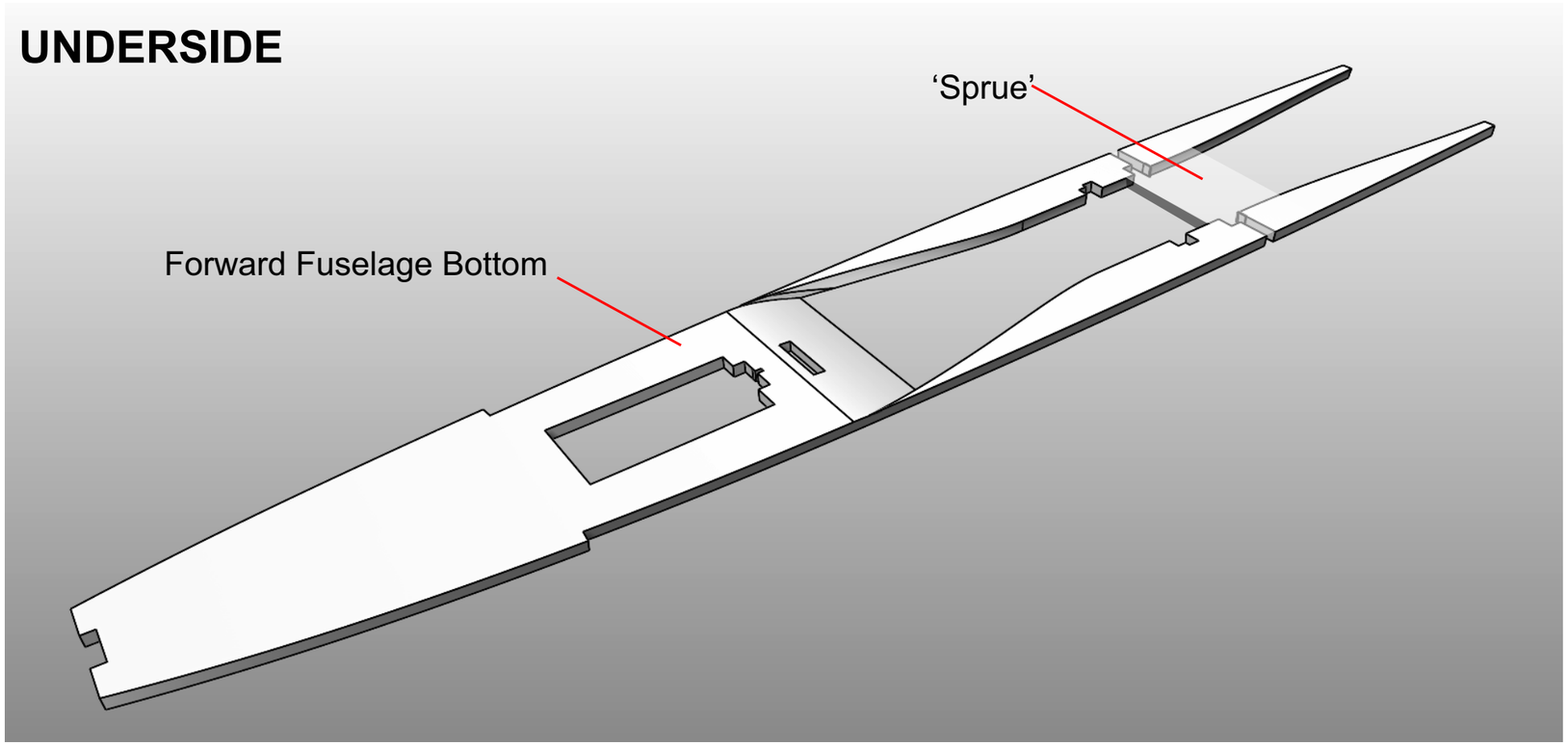
Please note :

- The forward landing gear, it is a narrow slot, and should not be longer than the 165mm indicated on the drawing.

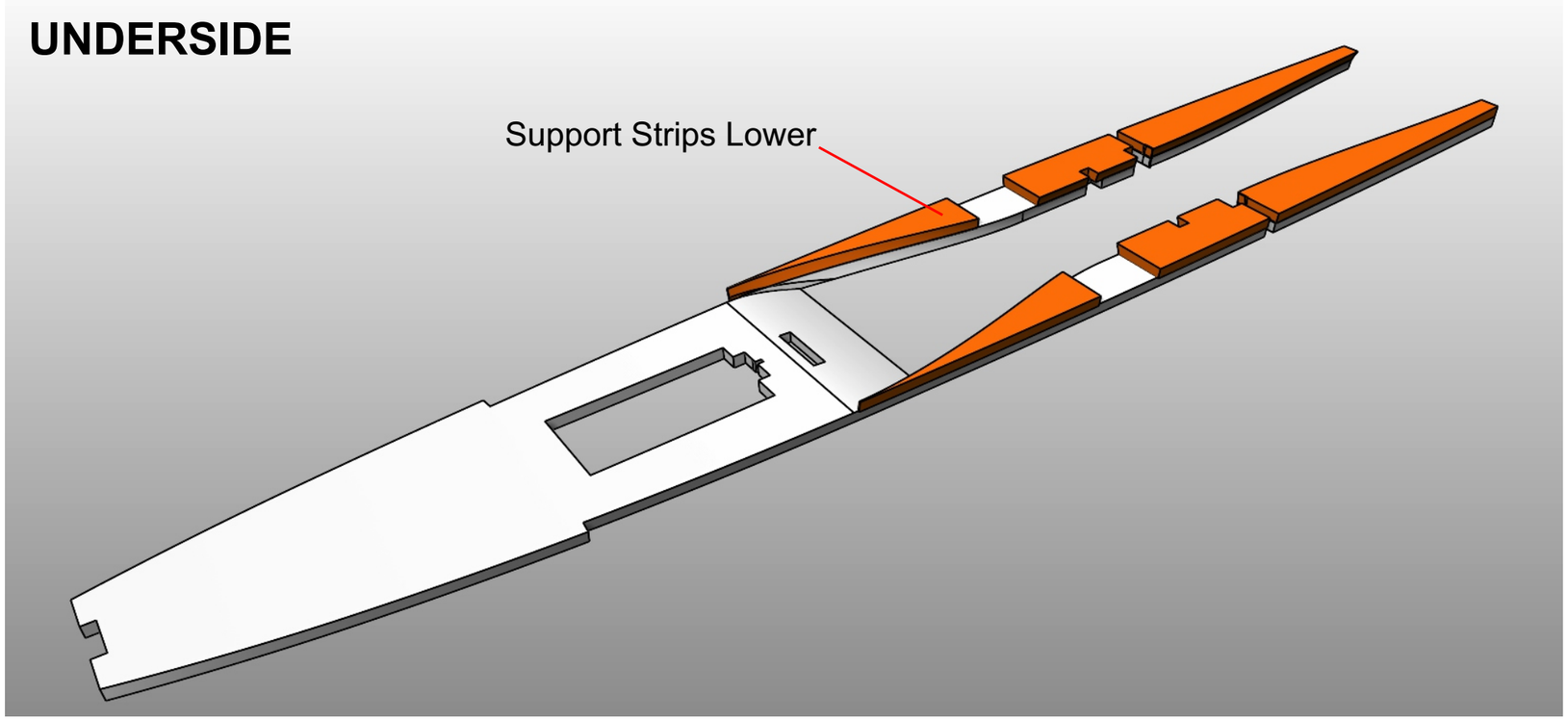
- The rear landing gear wheel position is at the optimum position to miss the EDF inlet duct and also fit into the fuselage shape.



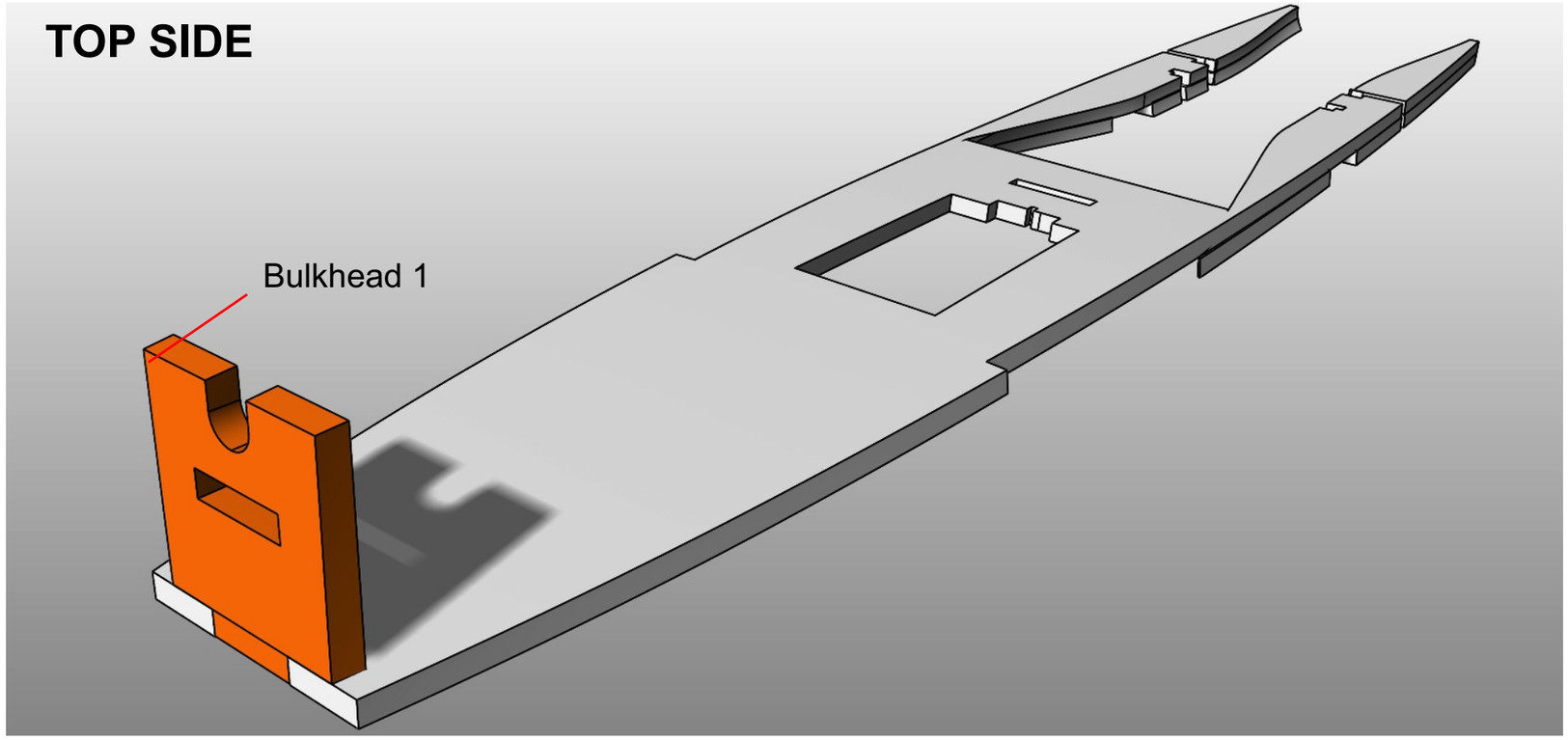




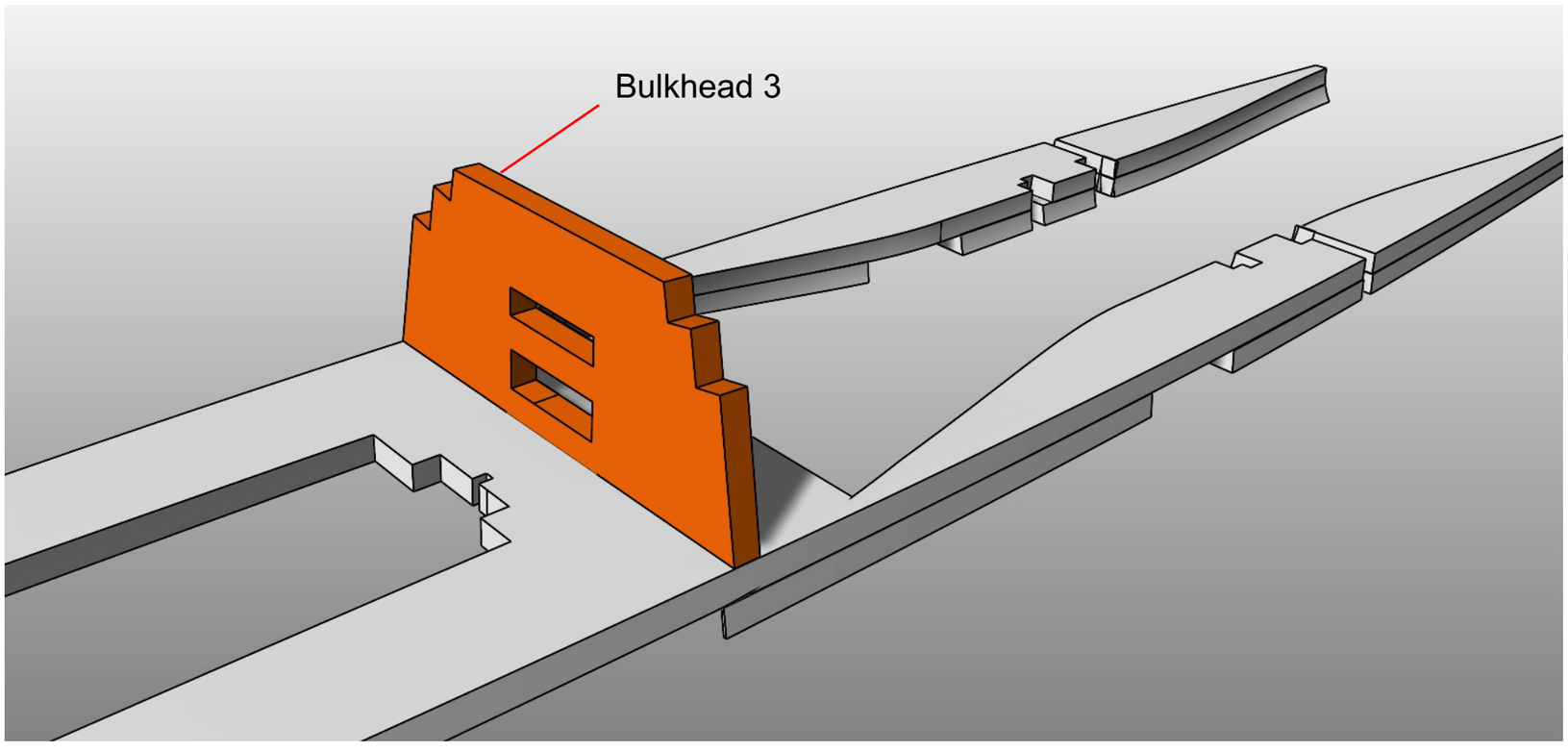
As the **Forward Fuselage Bottom** is such a delicate shape, I suggest you create 'sprues' from the foam sheet to hold the parts together until the model gains some strength.



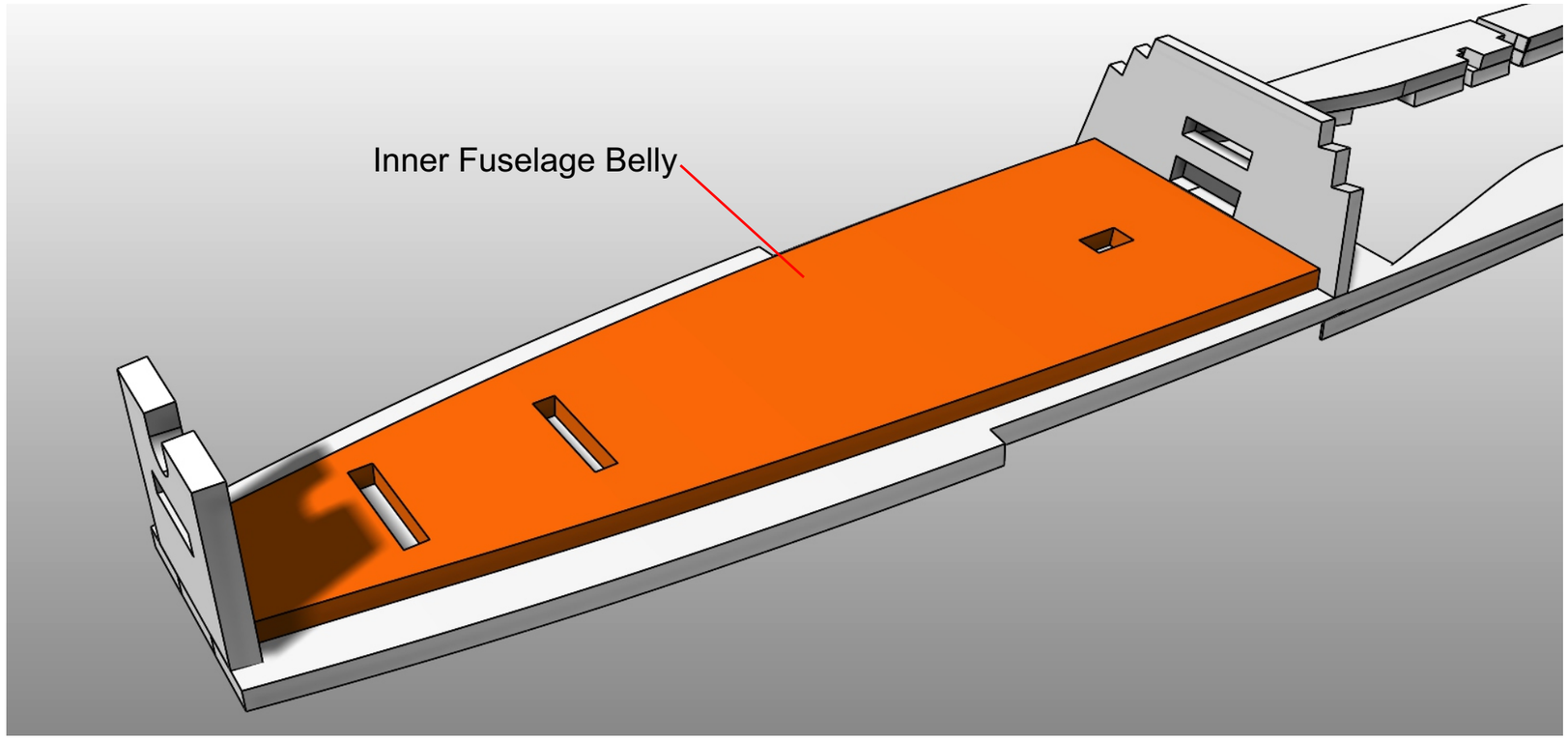
Glue the **Support Strips Lower** to the Forward Fuselage Bottom.



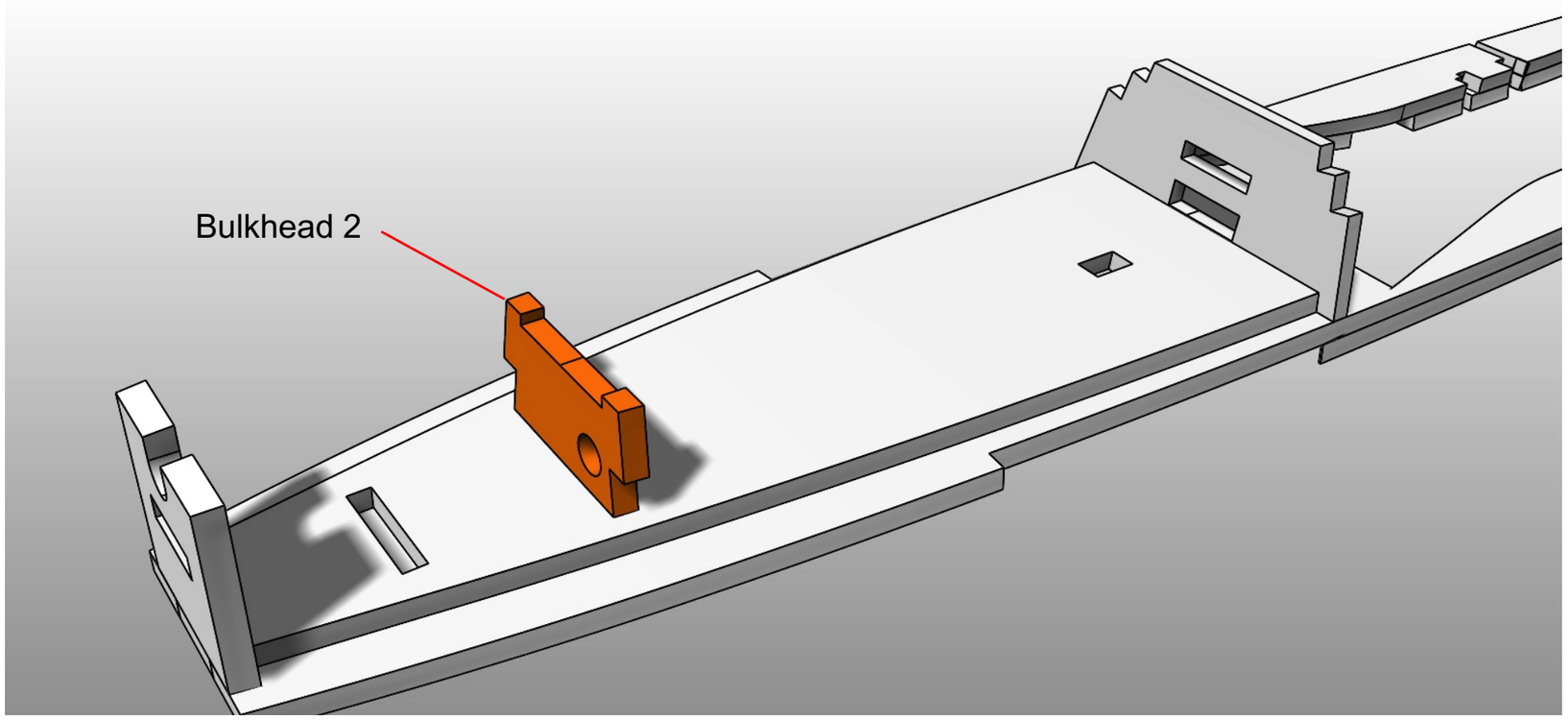
Glue **Bulkhead 1** to the assembly.



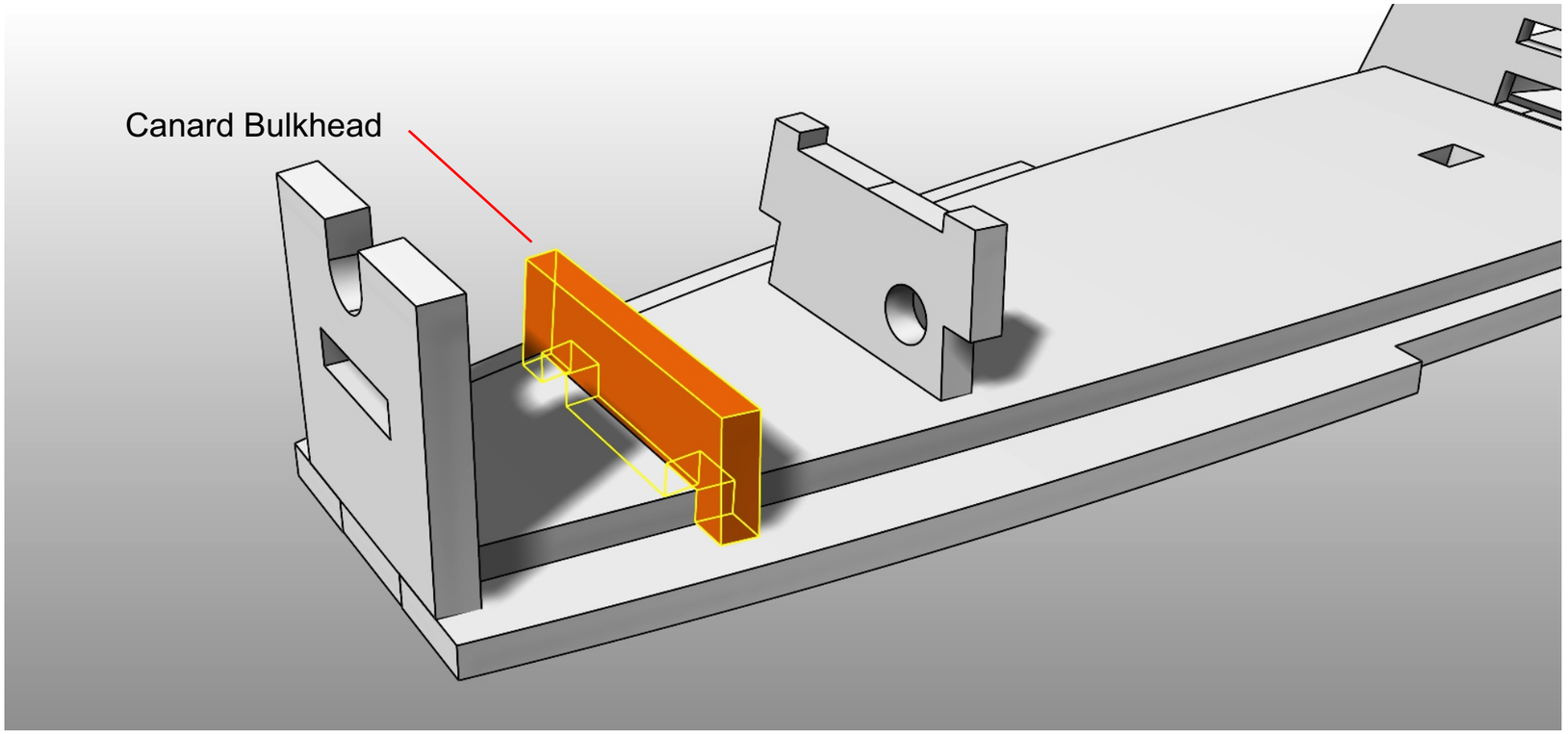
Glue **Bulkhead 3** to the assembly.



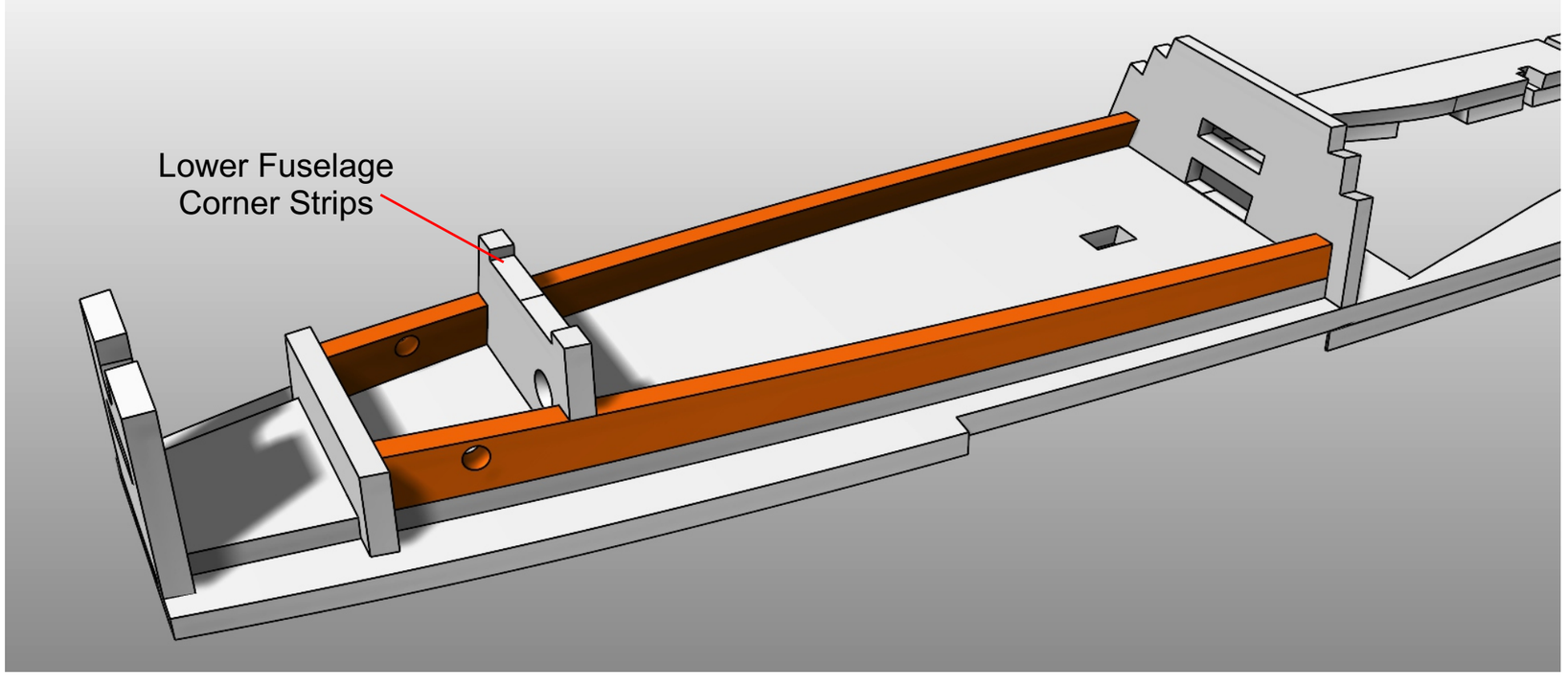
Glue the **Inner Fuselage Belly** to the assembly. Ensure it is centrally aligned



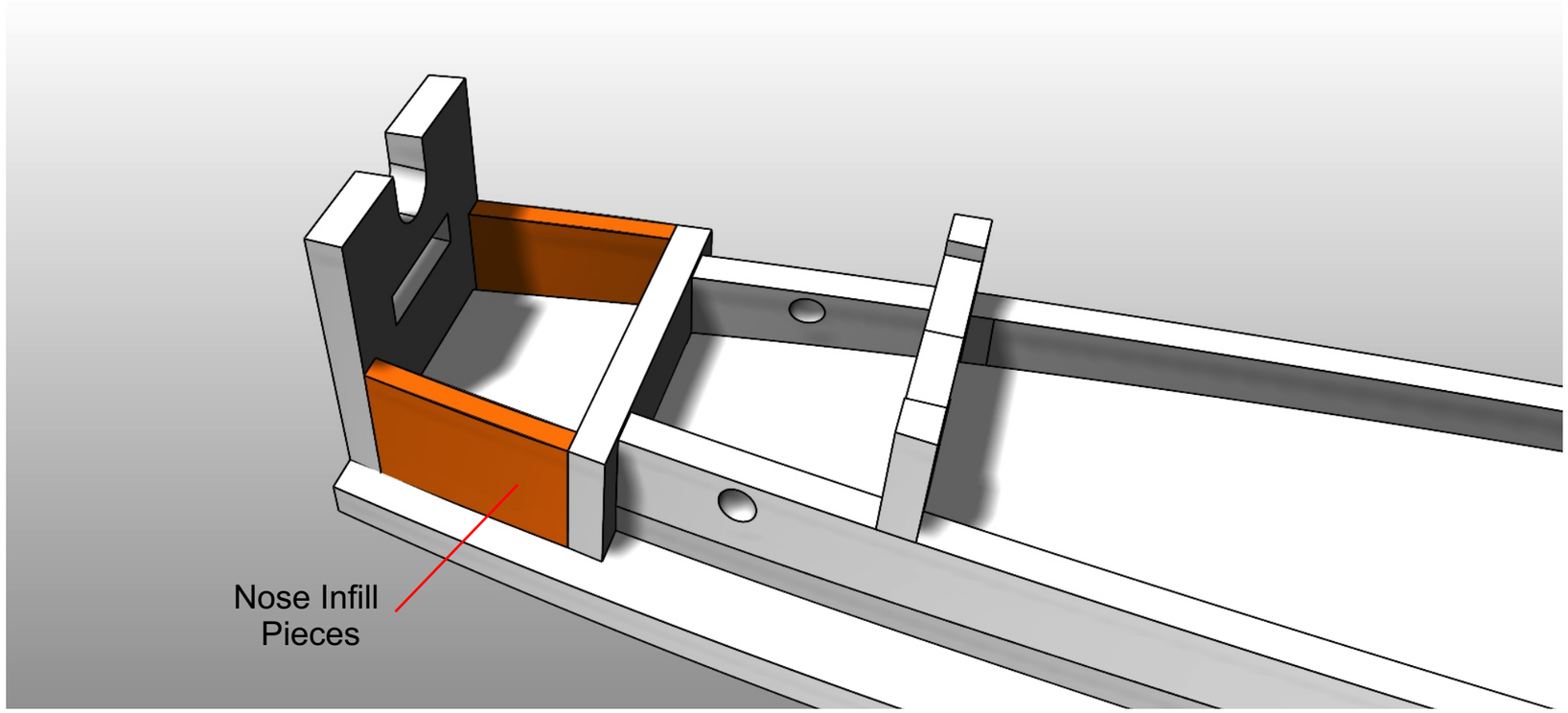
Glue **Bulkhead 2** to the assembly.



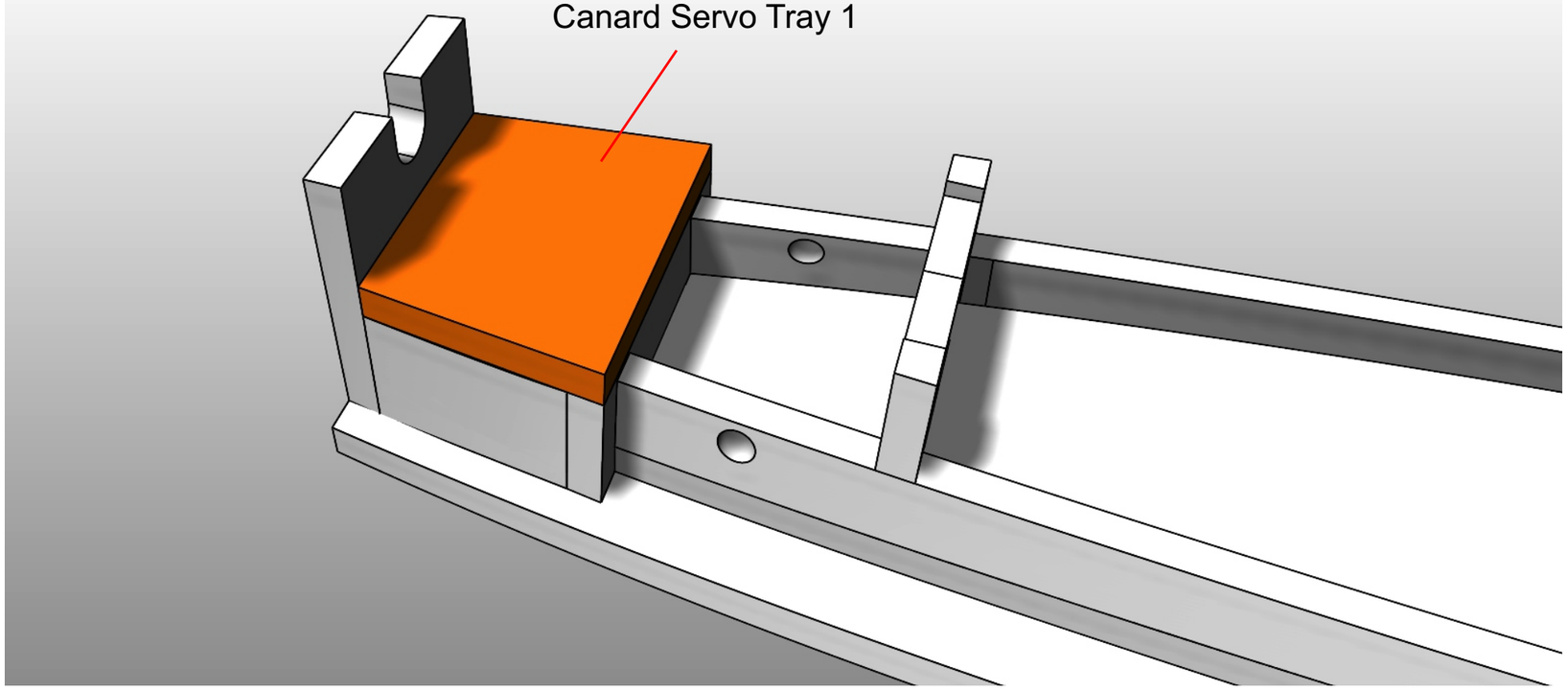
Glue the **Canard Bulkhead** to the assembly.



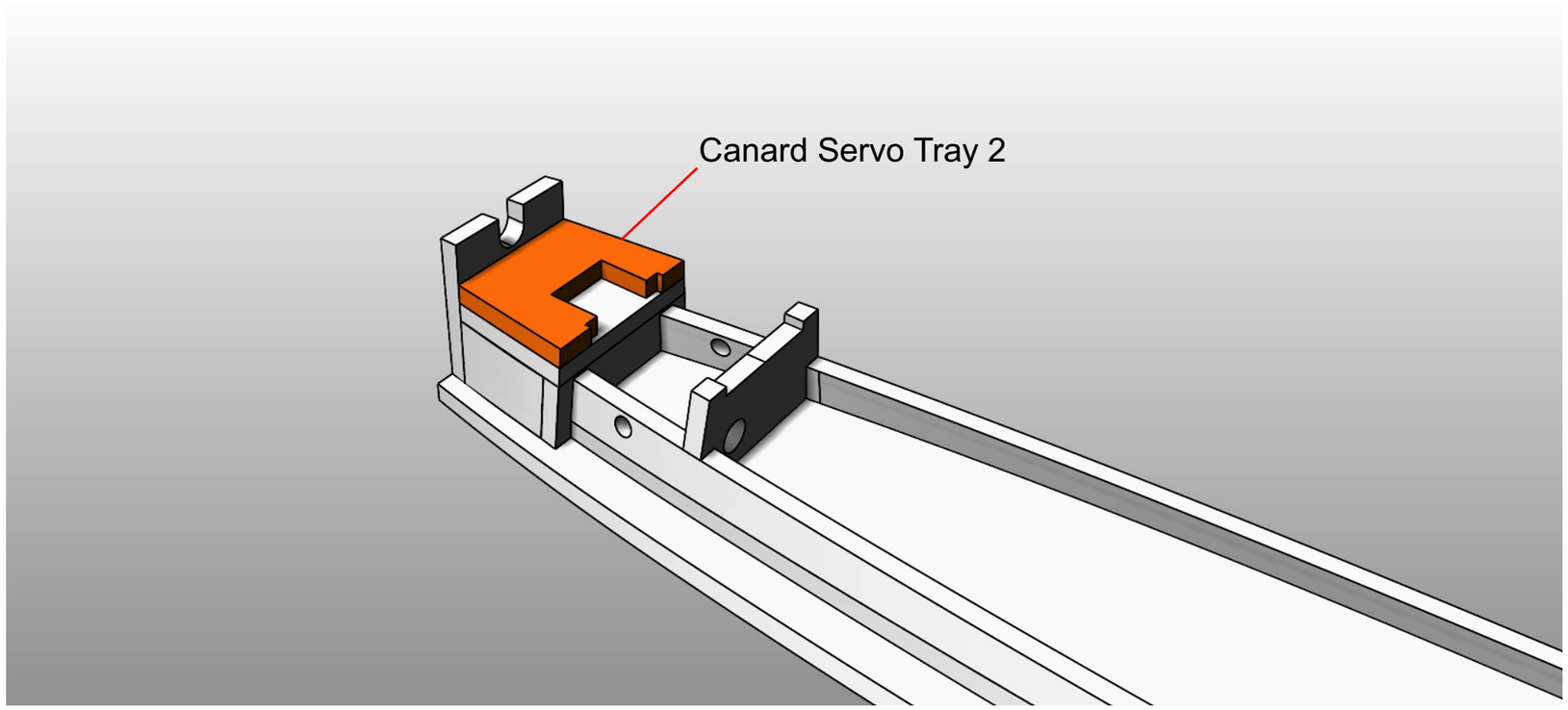
Glue the two **Lower Fuselage Corner Strips** to the assembly.



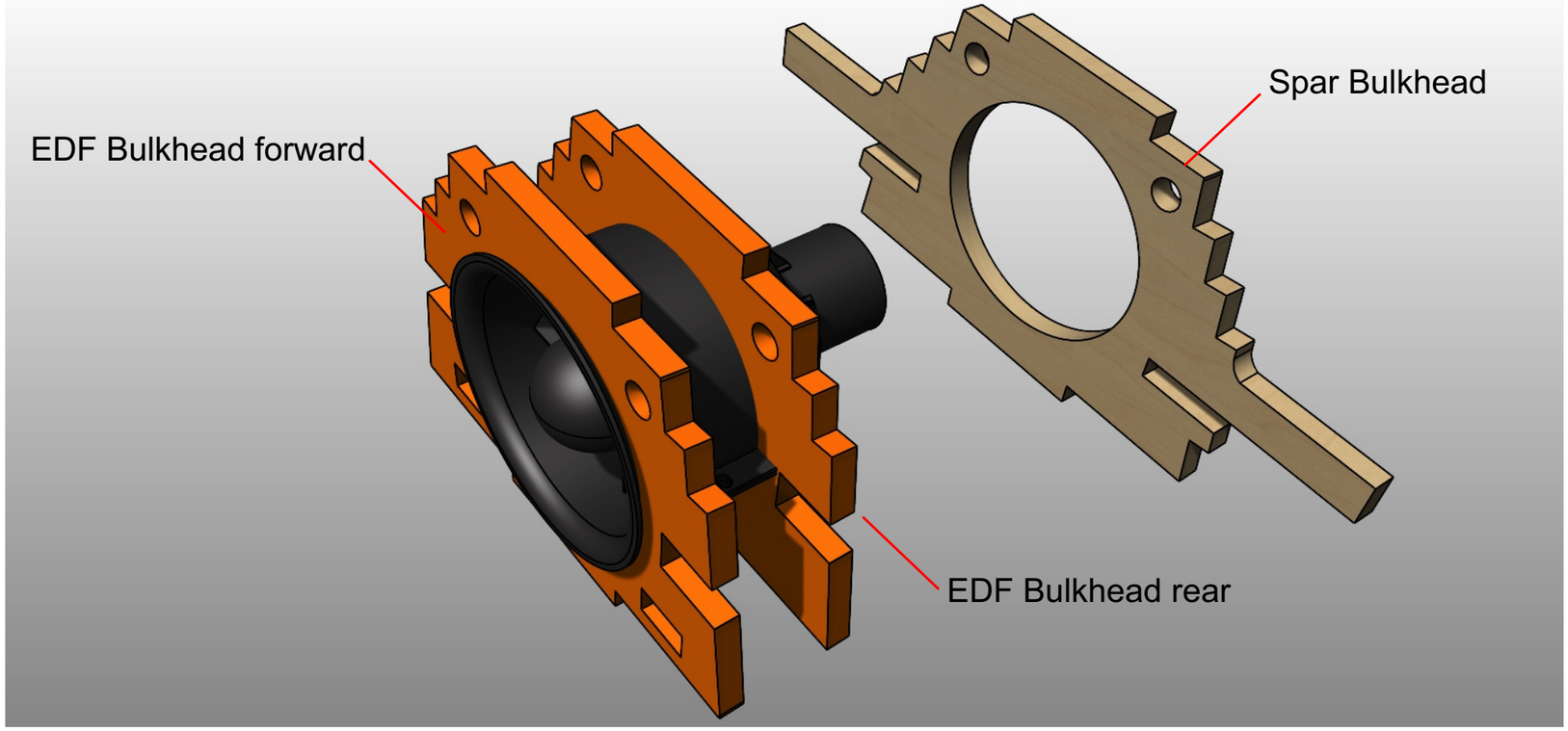
Glue the two **Nose Infill Pieces** to the assembly.



Glue the **Canard Servo Tray 1** to the assembly.

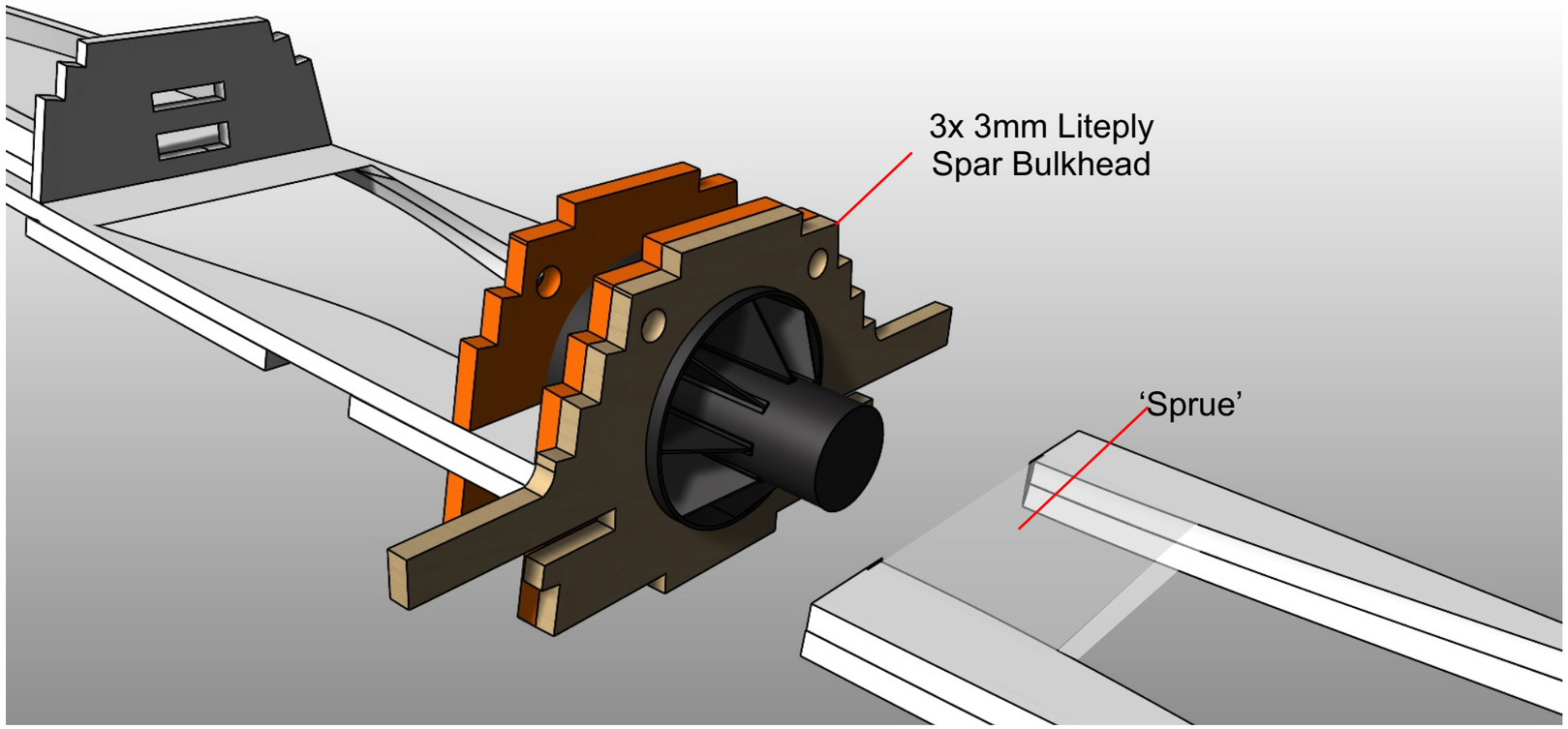


Glue **Canard Servo Treat 2** to the assembly.



Laminate 3x3mm lite ply Spar Bulkhead pieces together using epoxy.

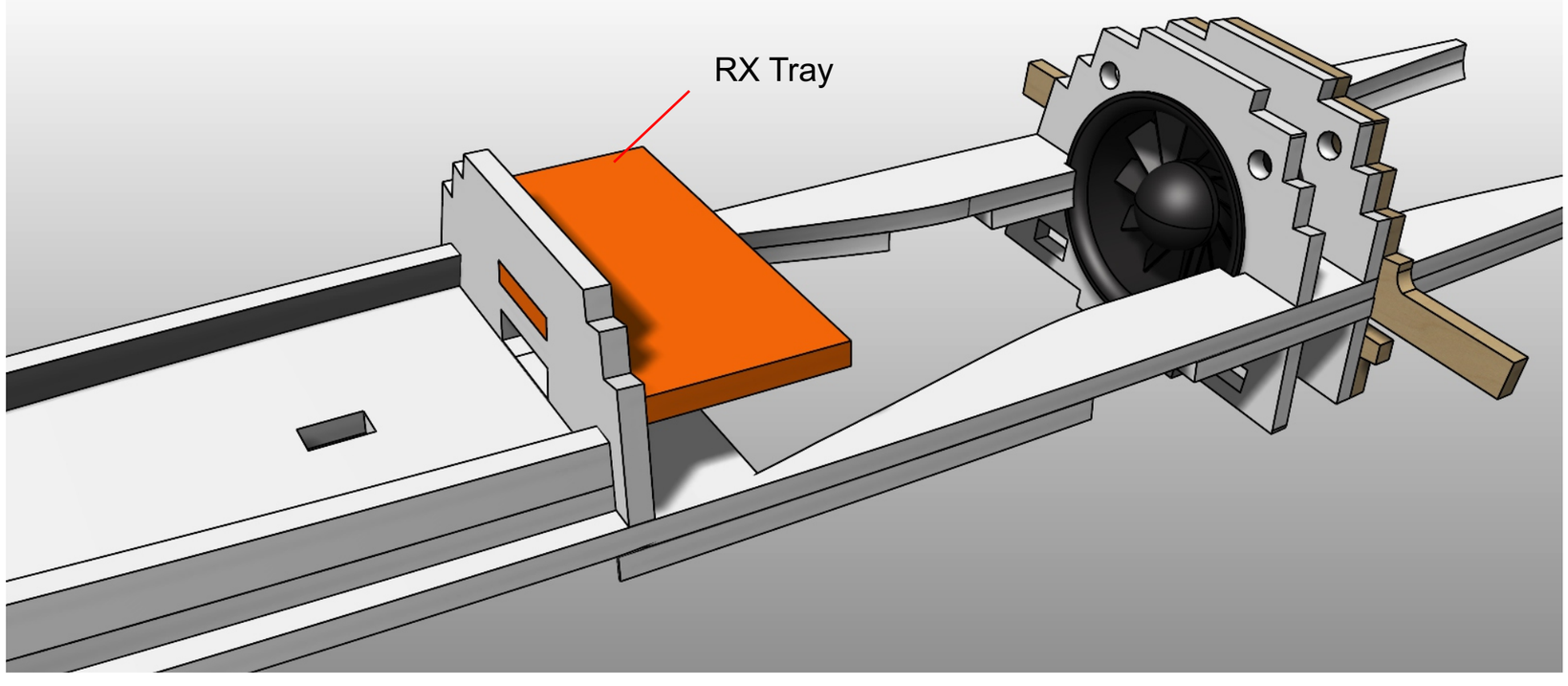
Fit the **EDF bulkheads** to fir your chosen EDF Unit.

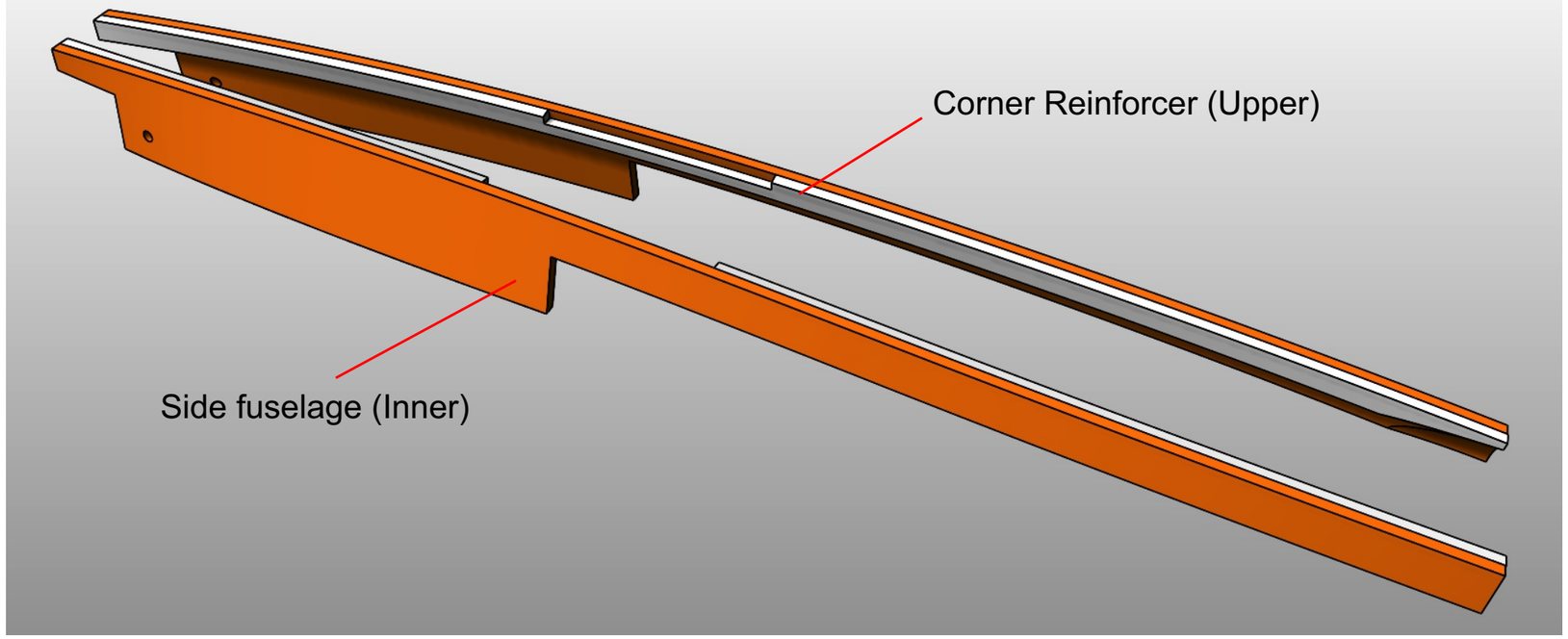


Glue the EDF bulkheads to the assembly using epoxy.

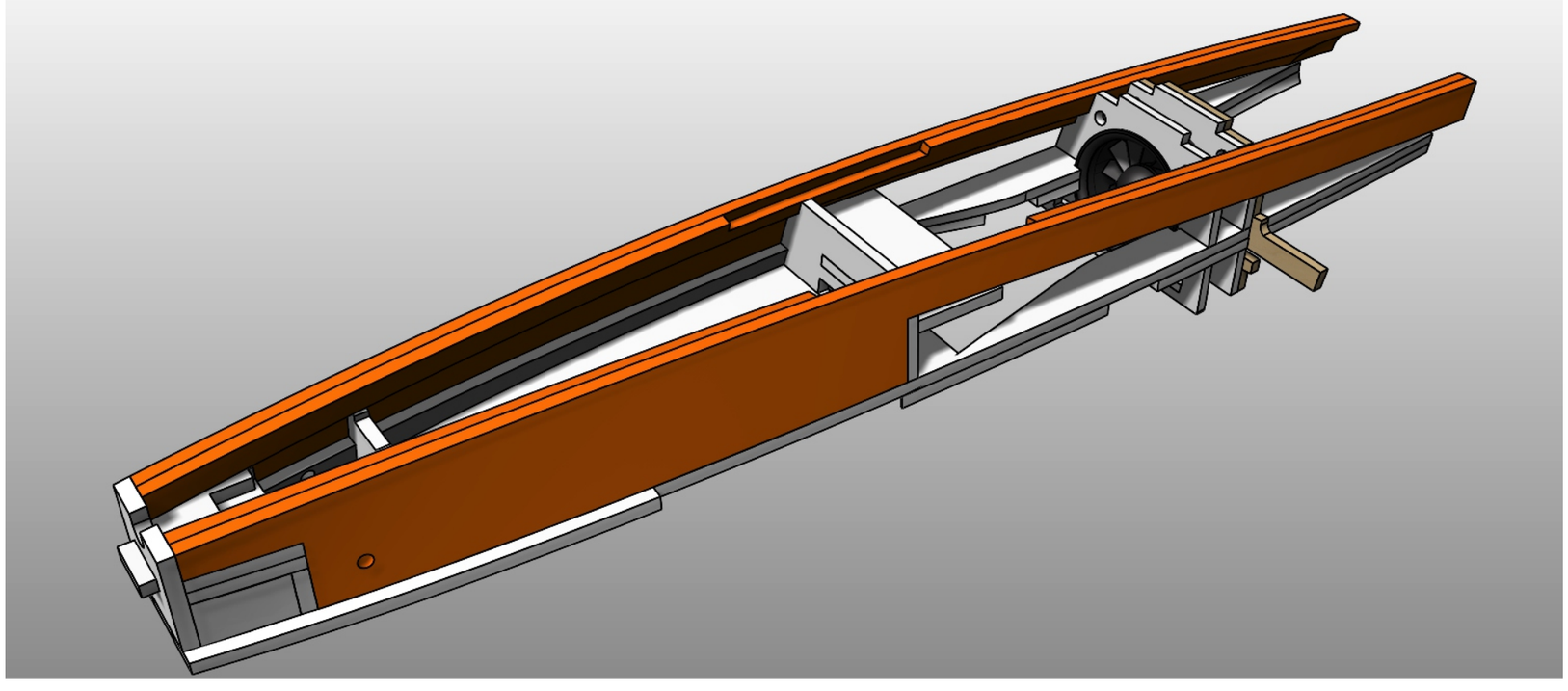
Separate the fuselage into two pieces, and glue the spar bulkhead to the rear EDF bulkhead, using UHU por.

Glue the **RX Tray** to the assembly.

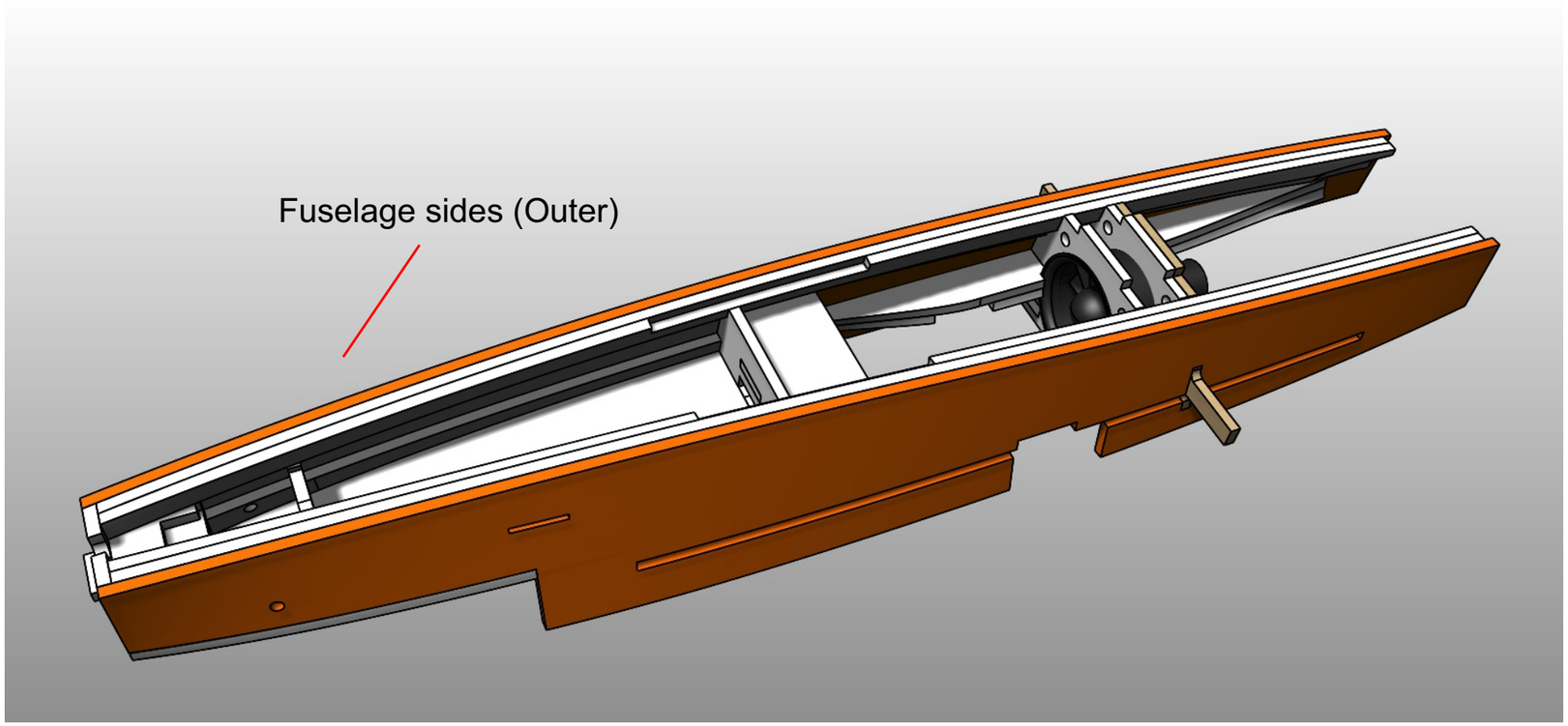




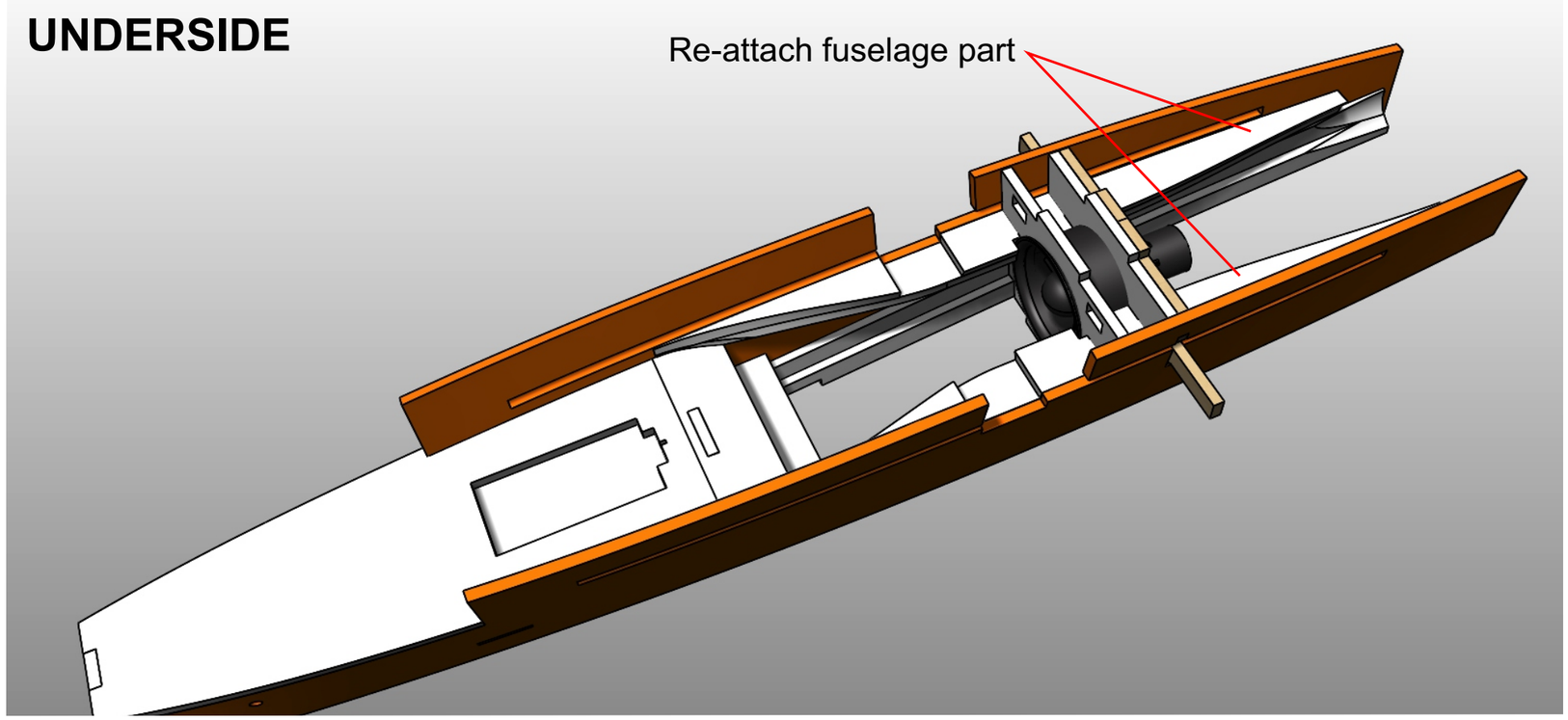
Glue the **Corner Reinforcers (Upper)** to the **Side Fuselage (Inner)** as shown.



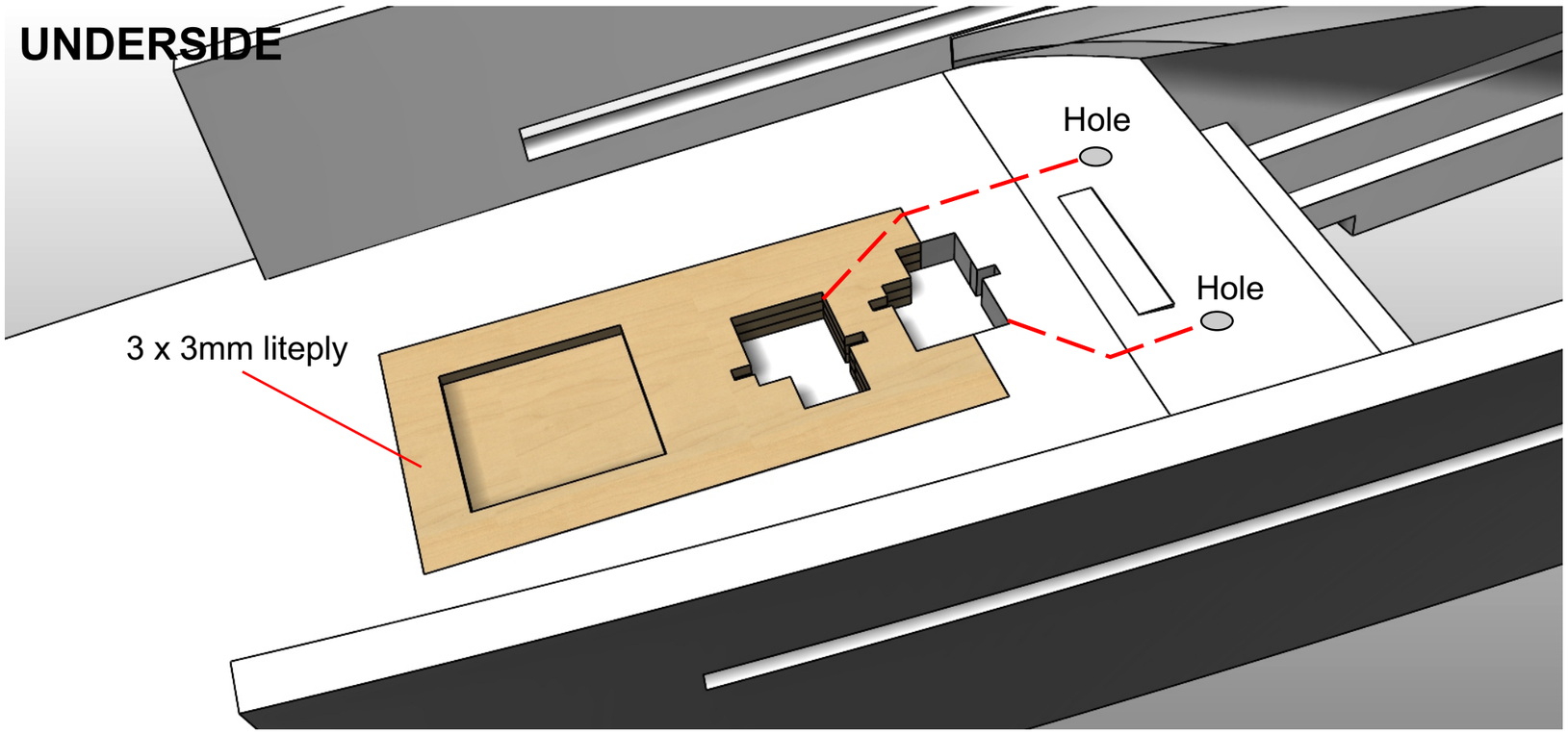
Glue the two assemblies together to match this image.



Glue the **Fuselage sides (Outer)** to the assembly.

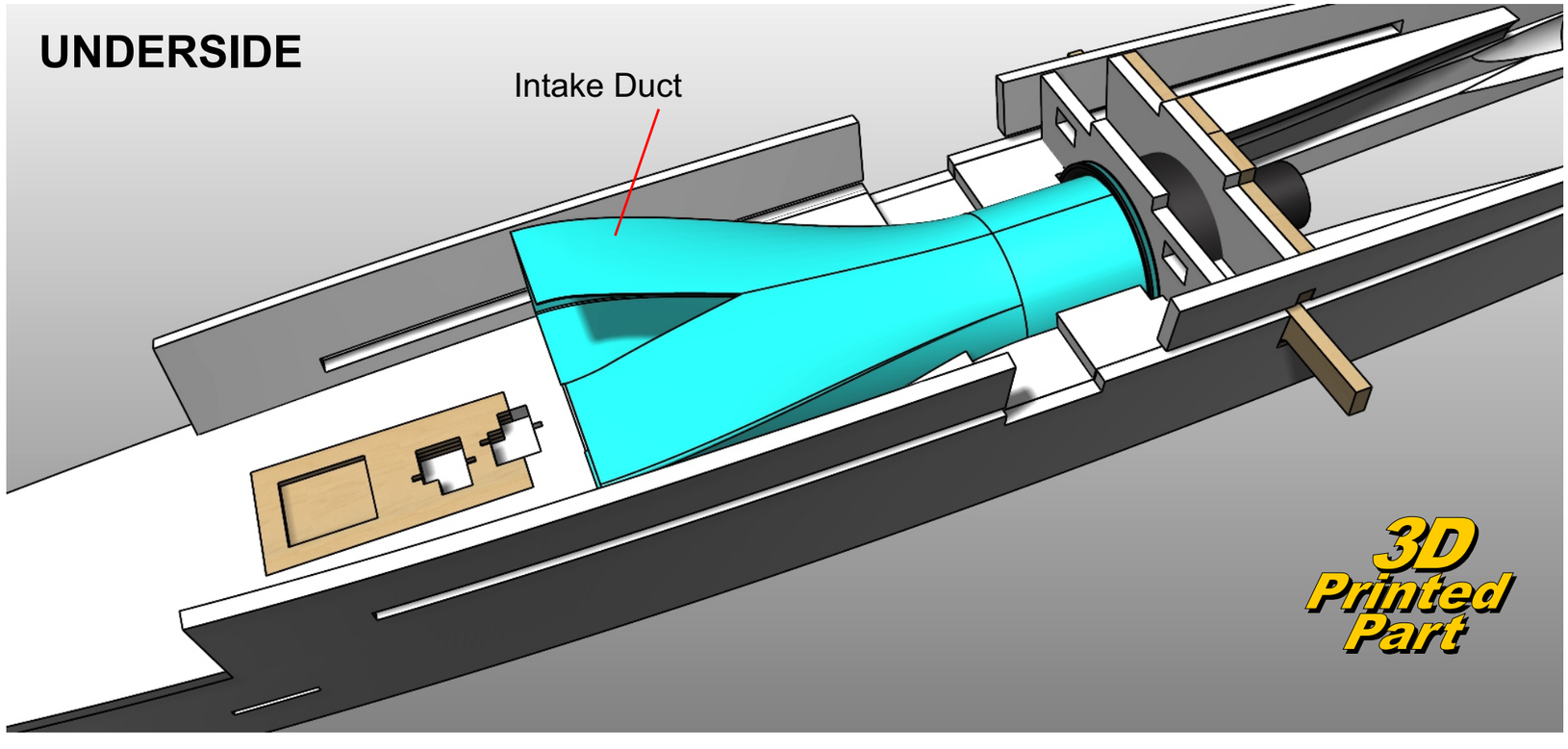


Reattach the lower fuselage part to the assembly, aligning just below the wing slot on the Fuselage sides (Outer)



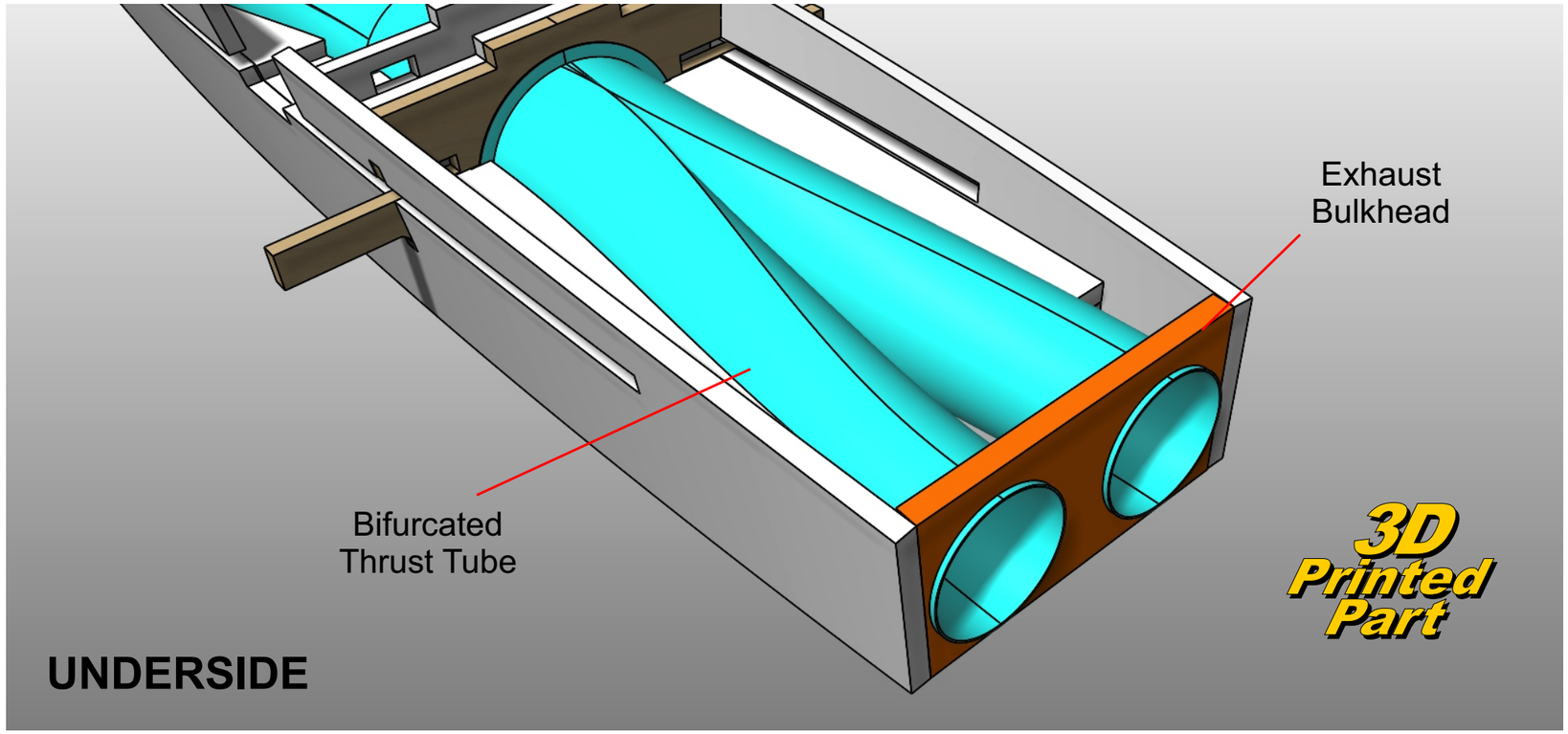
Glue the 3 x liteply forward landing gear reinforcers together and then into place.

Using a dremel or similar cut a couple of channels from the Servo cut-outs towards the RX tray as shown.

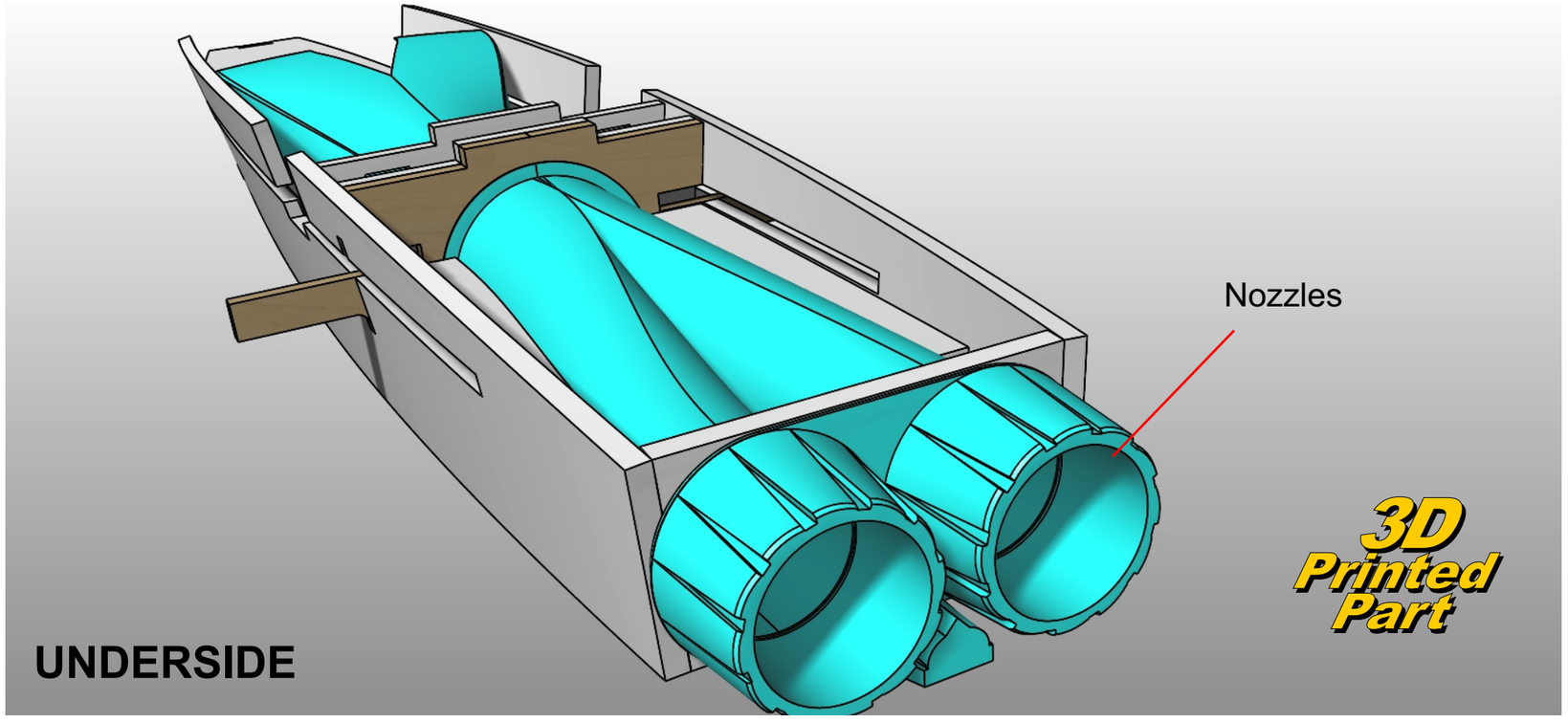


Depending on whether your EDF unit has a removable intake ring (Bellmouth) or not, either leave the flange on the 3D printed **Intake Duct** or carefully trim it off using a sharp knife so that the intake duct touches the intake ring.

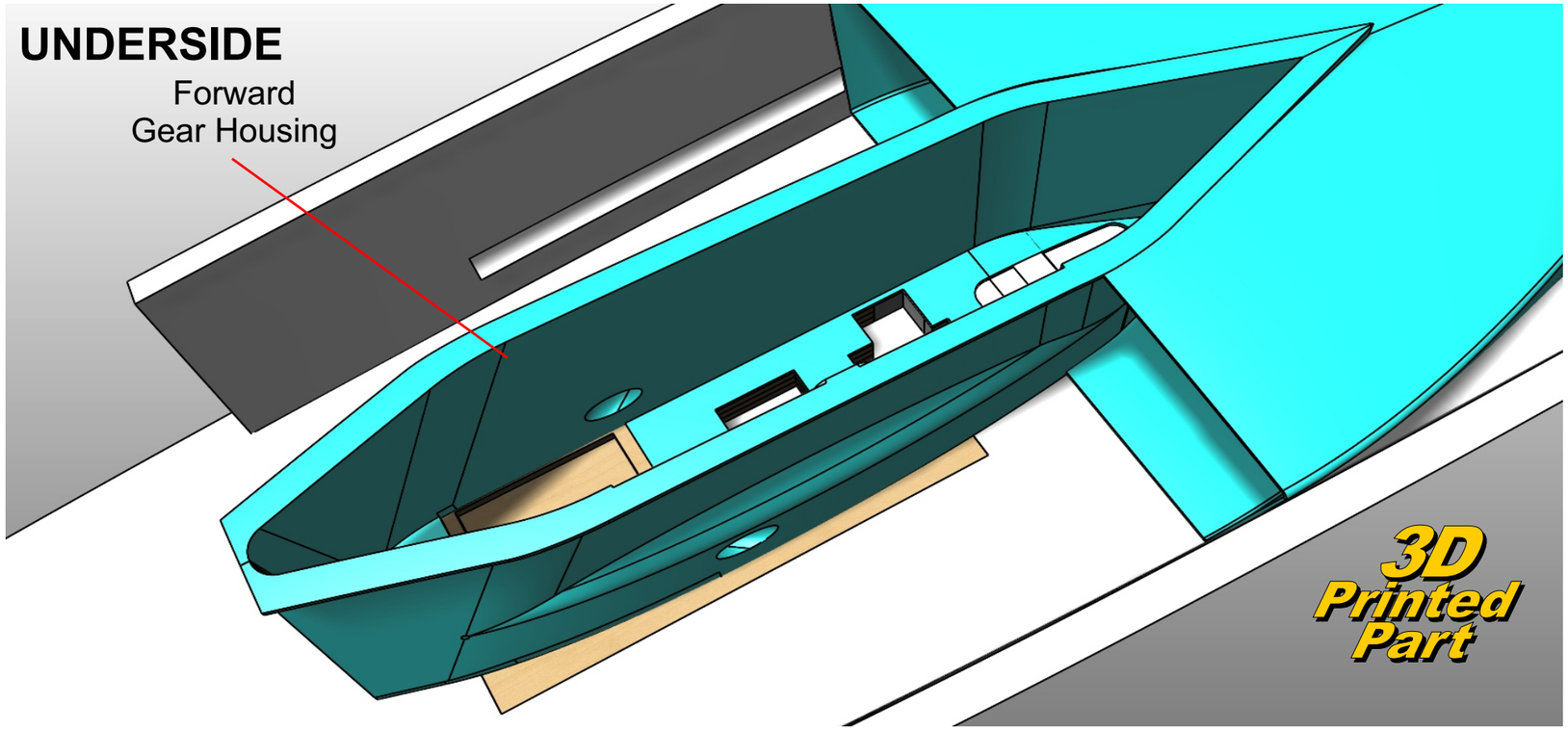
Ensure the Intake duct is well glued to the foam as the suction by the EDF can cause the ducting to collapse if not secured well.



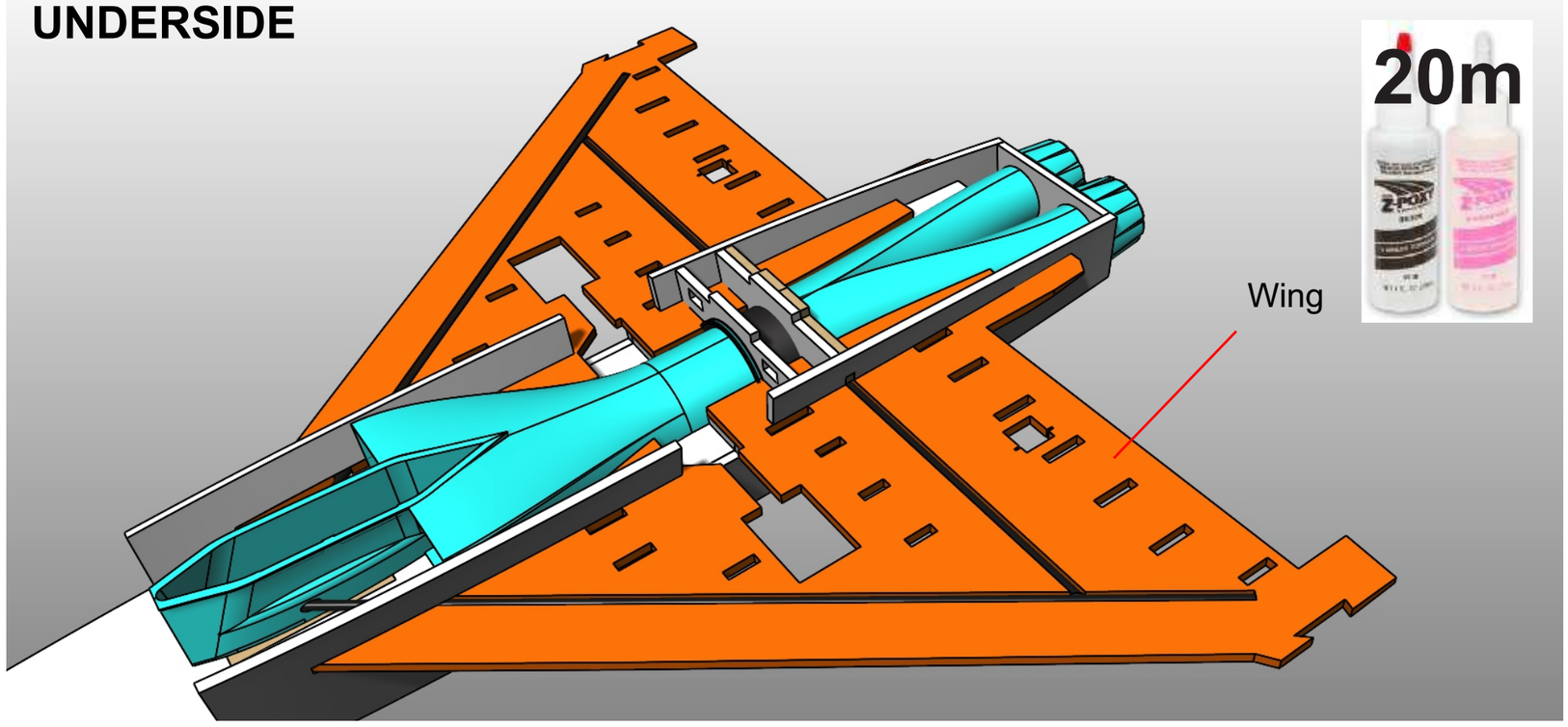
Using a soldering iron, make a hole in the **Bifurcated Thrust tube** for the motor wires to exit. Glue the Thrust tube in place as shown, along with the **Exhaust Bulkhead**.



Glue the **Nozzles** to the assembly.



Glue the **Forward Gear Housing** to the Fuselage. Using markings from the plan to ensure accurate positioning.



Create matching wing supports - such as two piles of matching books laid flat.

Use Low-tack masking tape under all spar glue slots to prevent dribbles.

Slide the wings into the fuselage using 20m epoxy on all mating surfaces and leave supported. (clear up all dribbles)

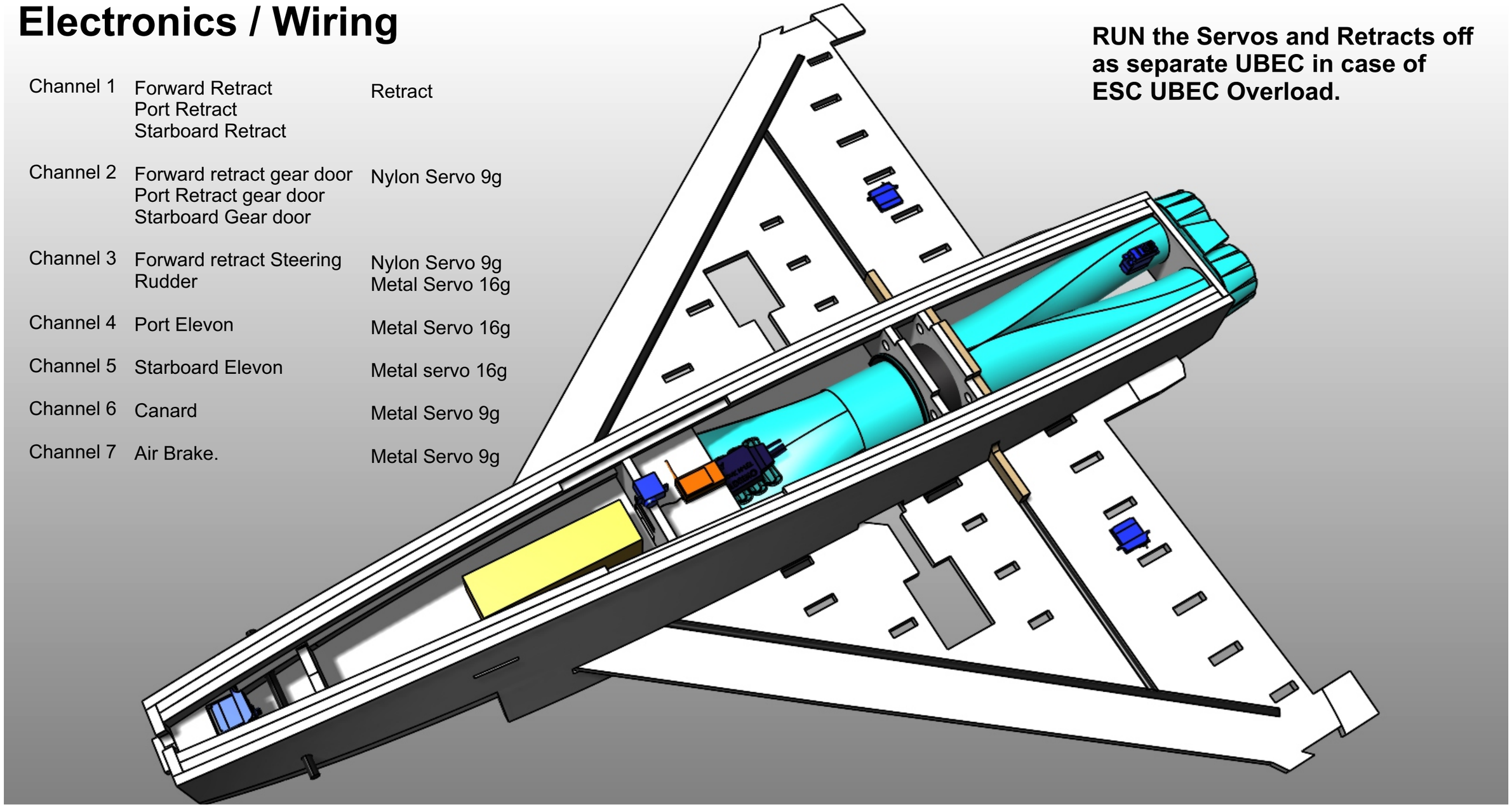
Meanwhile glue the rear transverse 9mm Carbon Tube Spars in place.

Once complete, slide the diagonal 9mm spars into the slots, terminating the forward ends into the 3D printed Forward gear housing as shown.

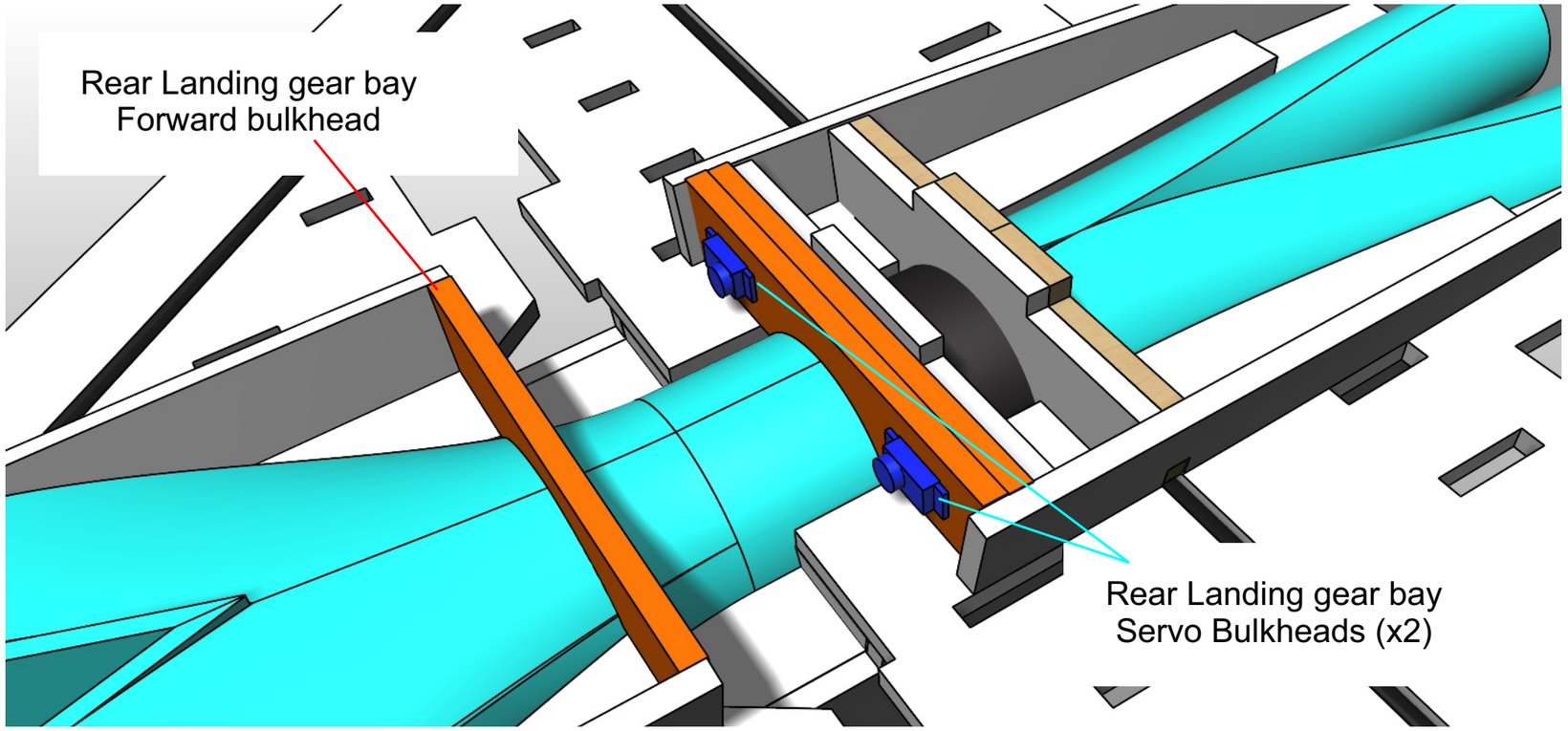
Electronics / Wiring

Channel 1	Forward Retract Port Retract Starboard Retract	Retract
Channel 2	Forward retract gear door Port Retract gear door Starboard Gear door	Nylon Servo 9g
Channel 3	Forward retract Steering Rudder	Nylon Servo 9g Metal Servo 16g
Channel 4	Port Elevon	Metal Servo 16g
Channel 5	Starboard Elevon	Metal servo 16g
Channel 6	Canard	Metal Servo 9g
Channel 7	Air Brake.	Metal Servo 9g

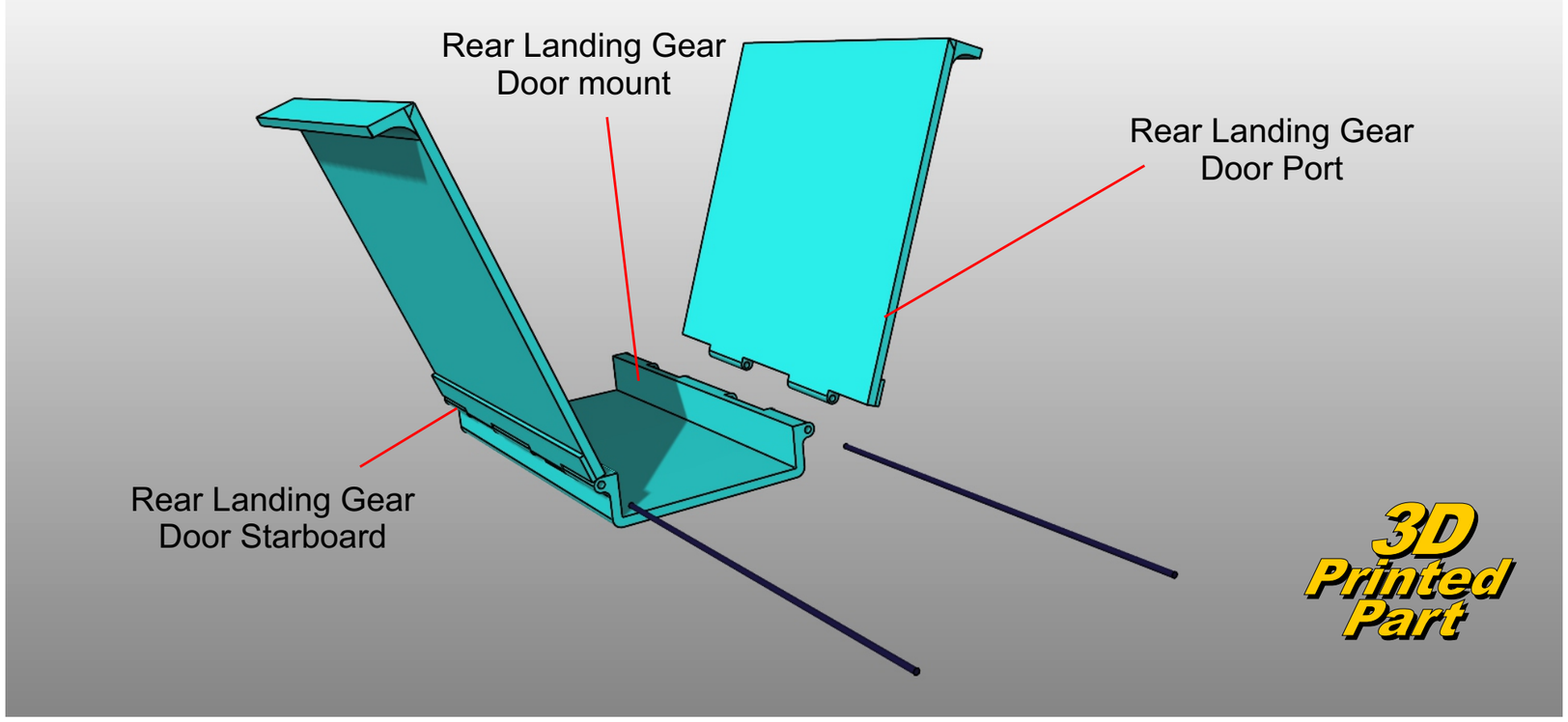
RUN the Servos and Retracts off as separate UBEC in case of ESC UBEC Overload.



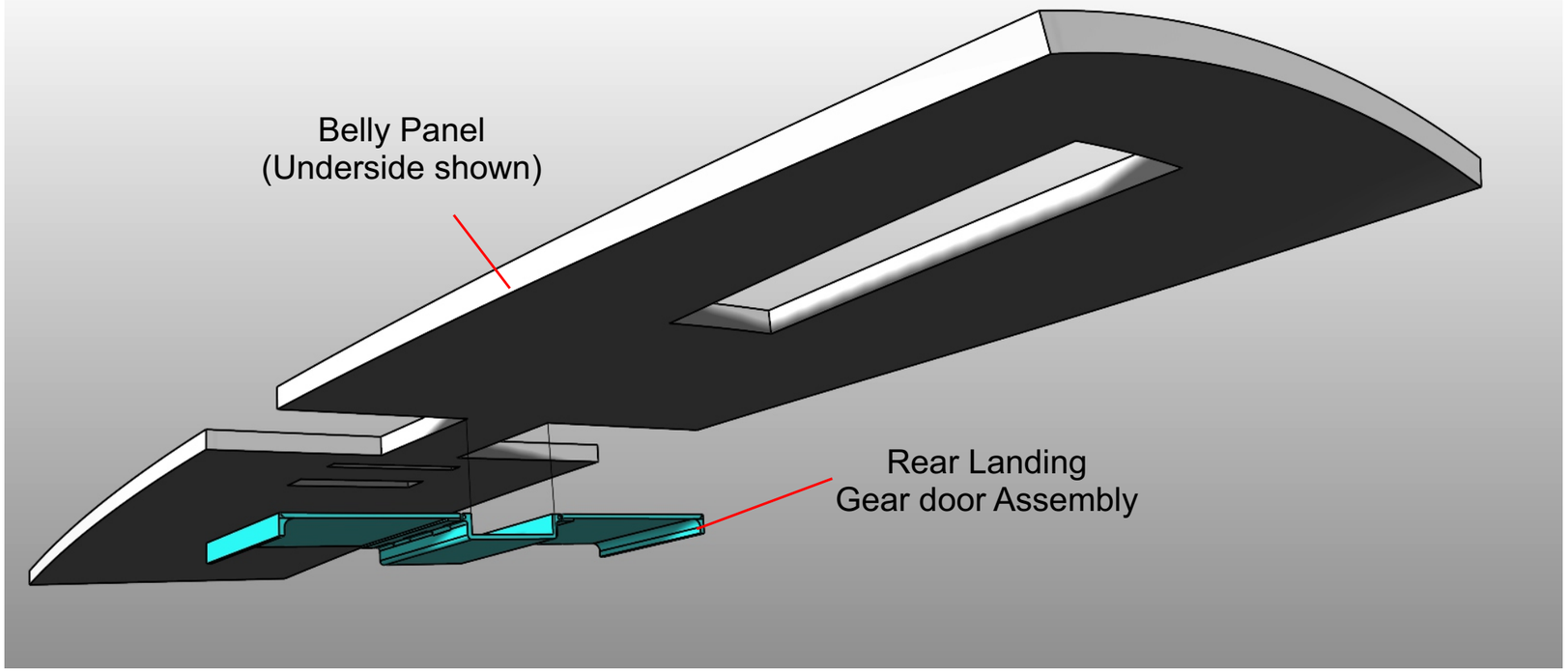
Run **all** servo cables to the RX, using servo extension cables and Y leads if required. Cut slots in the bulkheads to pass the cables through.
- Connect the motor cables to the motors and check they are spinning the right way around.
- Run the ESC battery cables into the forward fuselage battery area to a battery connector. Run the Servo cable from the ESC to the RX.
Once wired up, thoroughly test all electronics to ensure they function correctly, making sure there are no loose connections anywhere or dry solder joints.



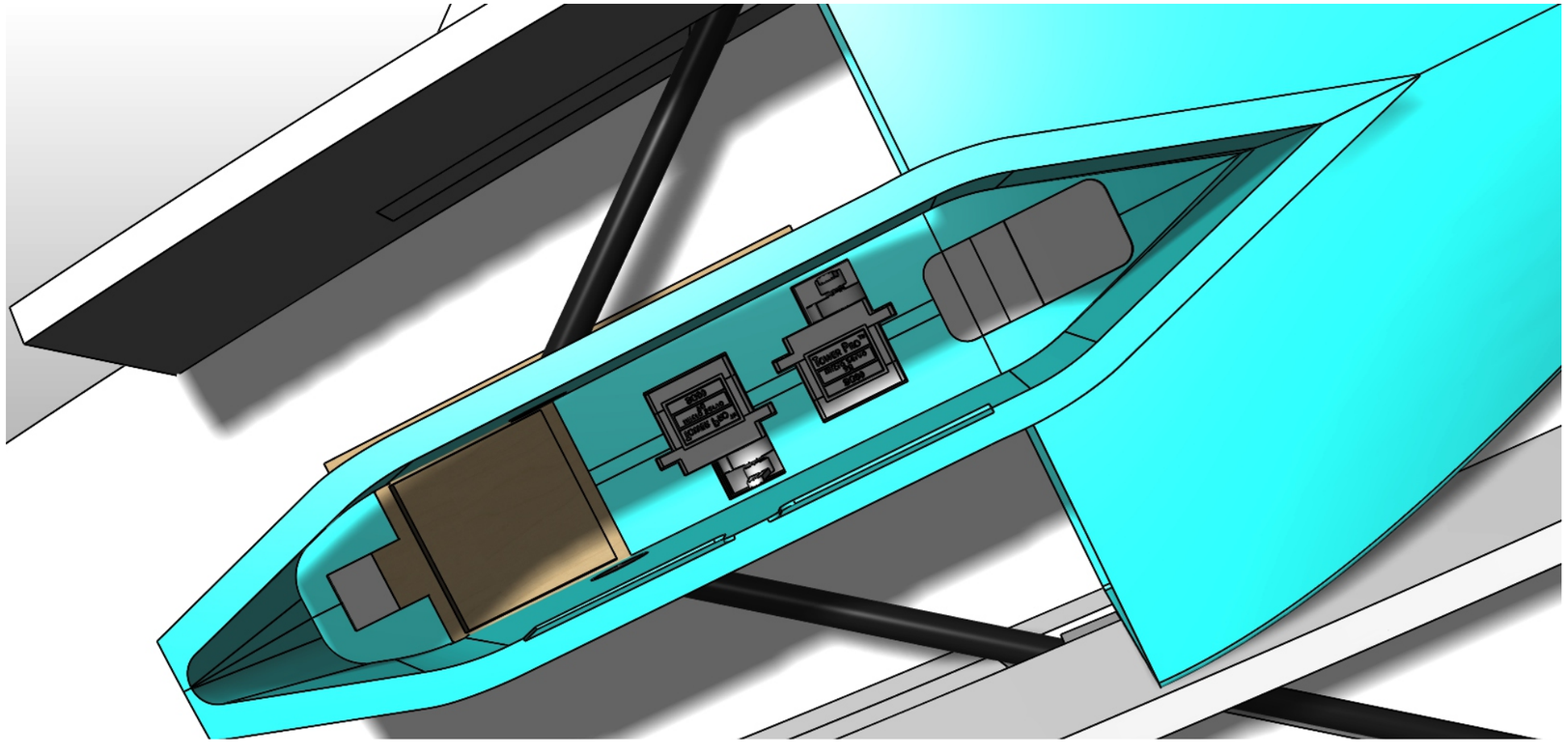
Glue the **Rear Landing Gear Bulkheads** in place, Run the Servo cables up to the RX making holes in the foam where required



Thread the three parts of the **Rear Landing Gear doors** together using 1mm piano wire.

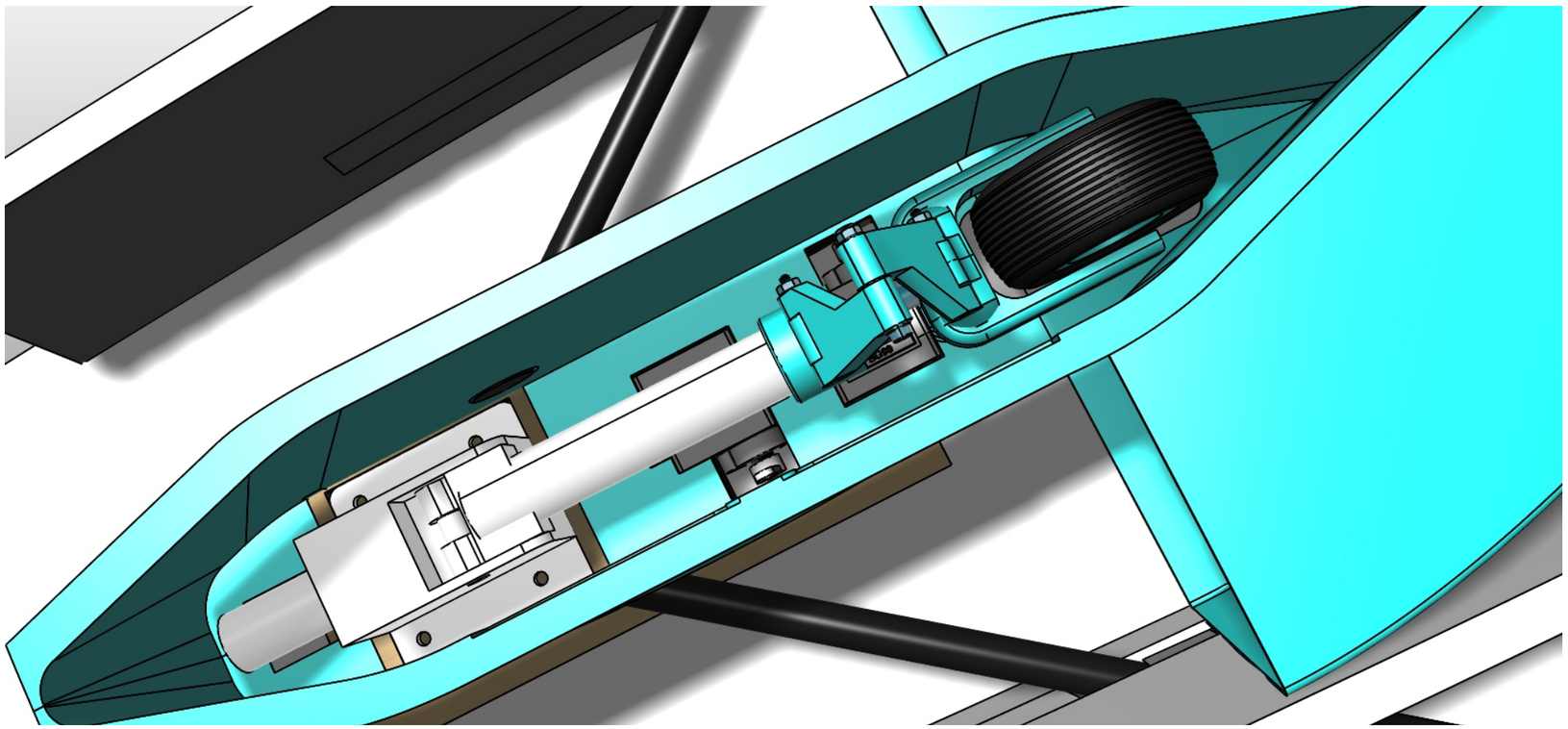


Glue the Rear Landing Gear door Assembly to the underside of the **Belly Panel.**

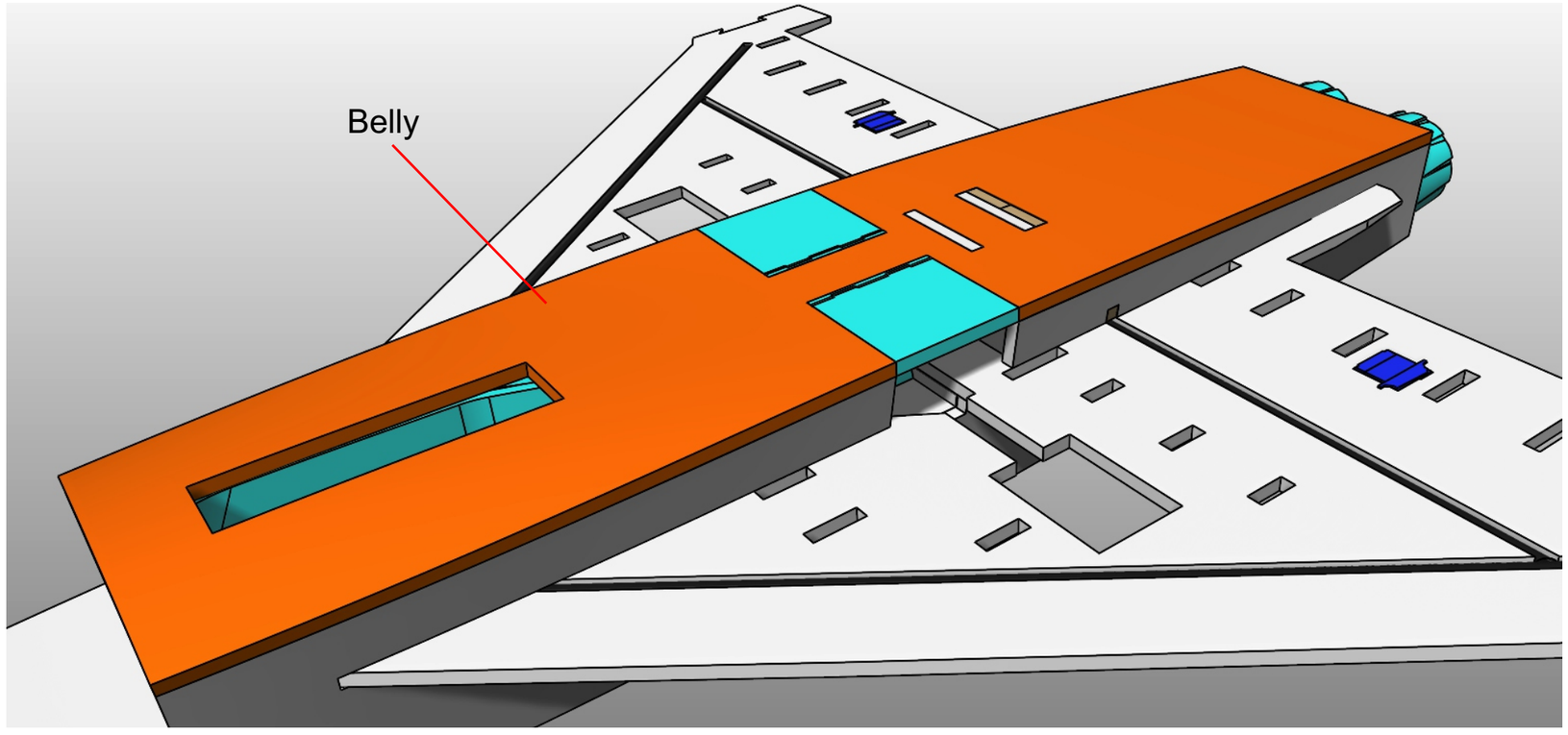


Prepare the servos for operating the steering (Port) and the Door opening (Starboard).

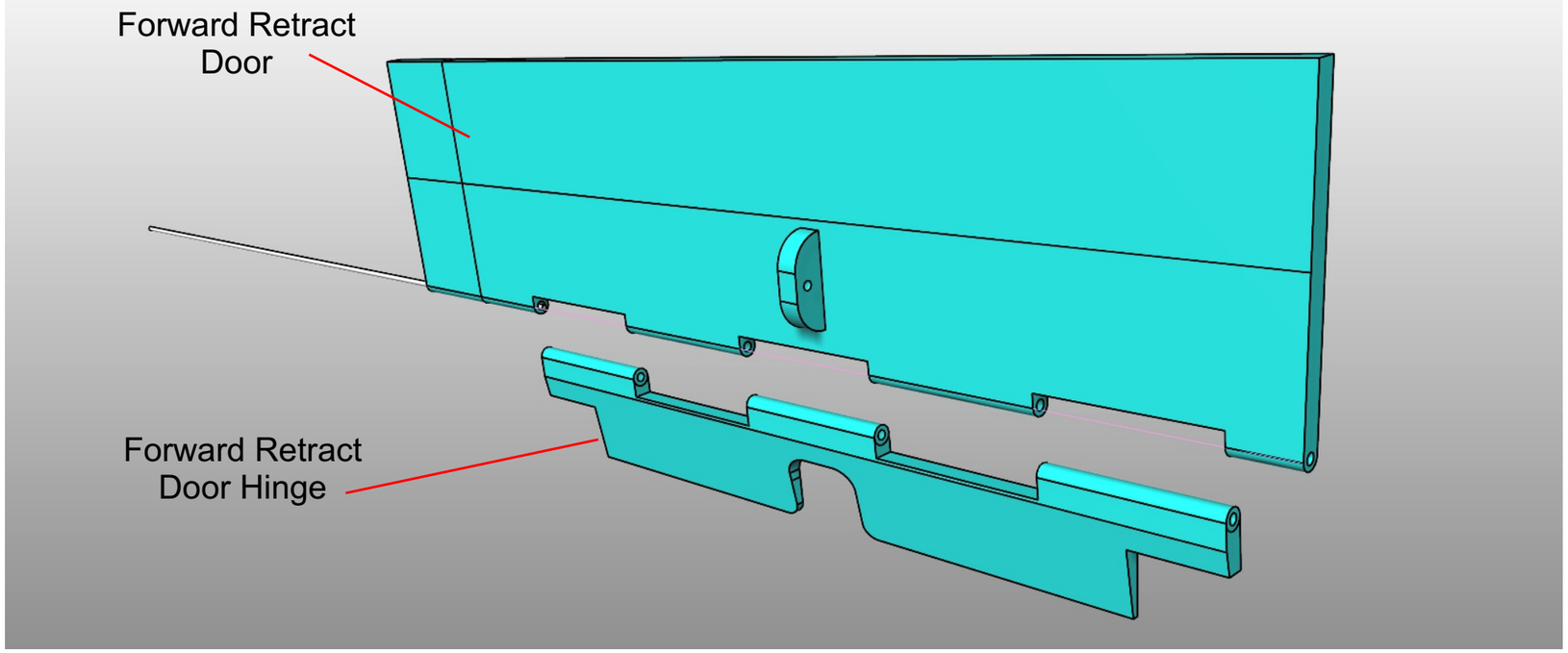
This needs to be done ahead of the retract going into the housing as it is so narrow.



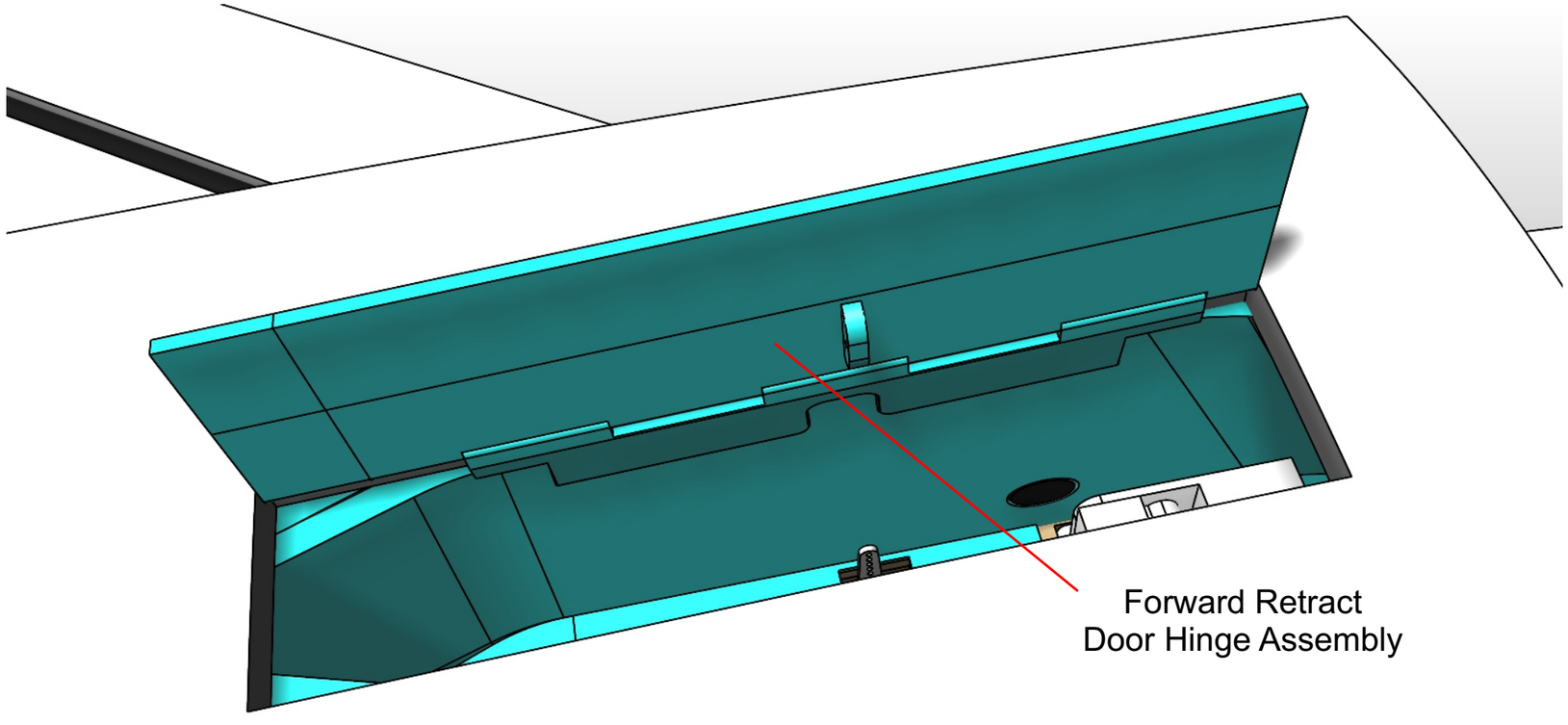
Fit the **Forward Retract** and connect the steering servo (link not shown) - test ato make sure it operates freely



Sand the fuselage belly flat to the correct angle to mate with the **Belly** piece. Glue the **Belly** on.

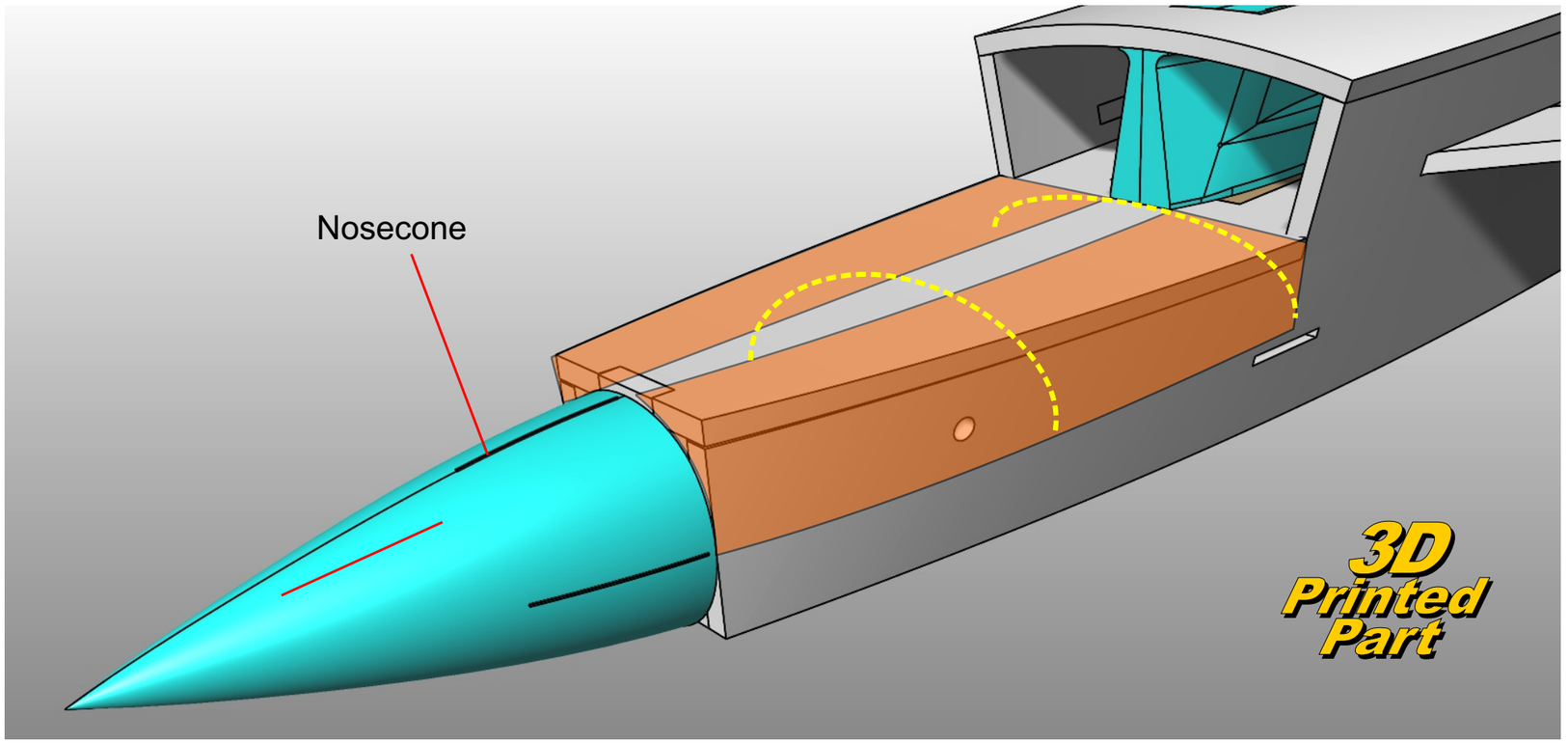


Thread the two parts of the **Forward Retract Door assembly** together with 1mm piano wire.



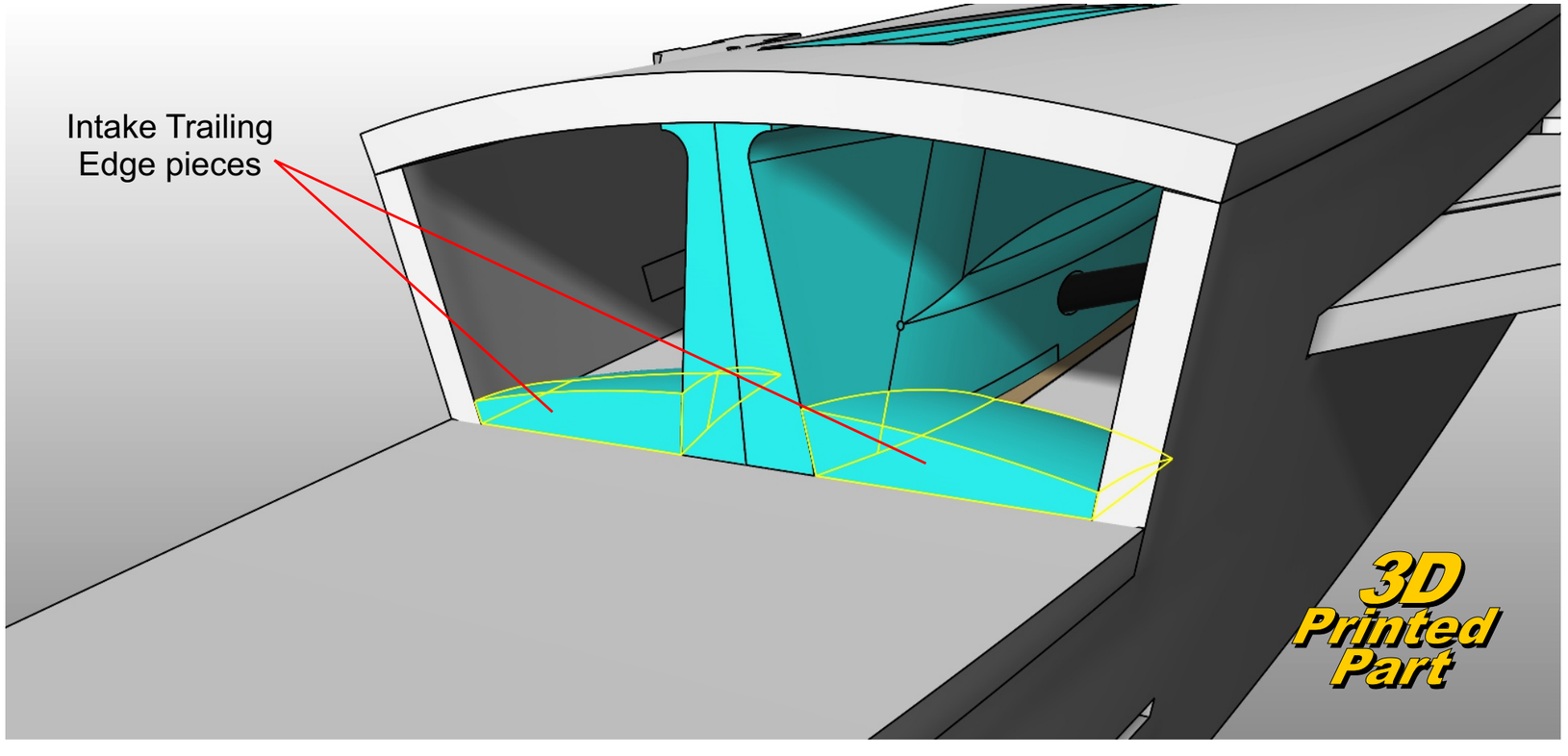
Glue the **Forward Retract Door assembly** to the Fuselage, using the indicated shape on the Forward Gear housing.

Connect the door to the servo and test the operation.

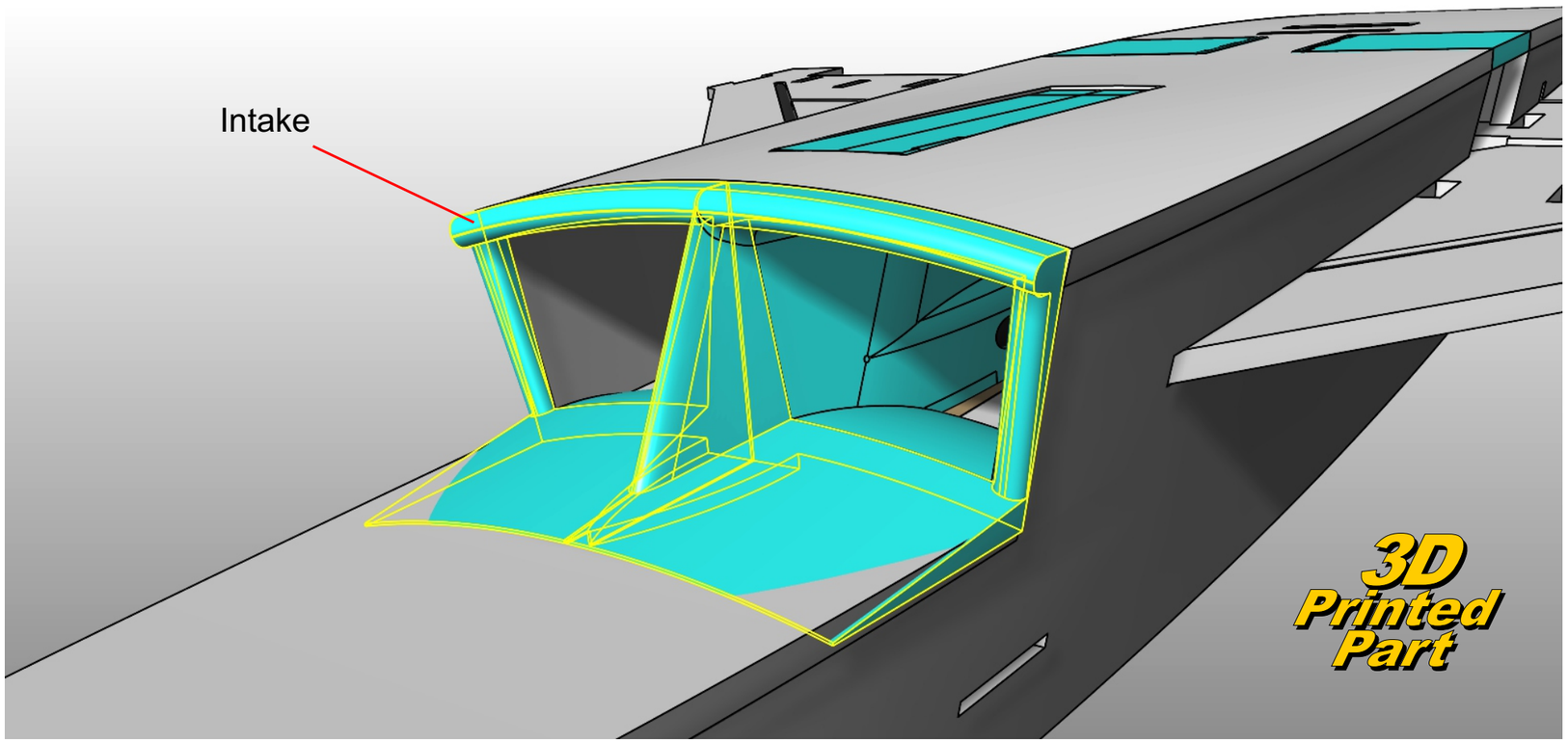


Glue the **Nosecone** onto the fuselage with the ‘hole’ to the top.

Using the Jigs, follow the contours of the nosecone and jig to shape the fuselage under the cockpit area.

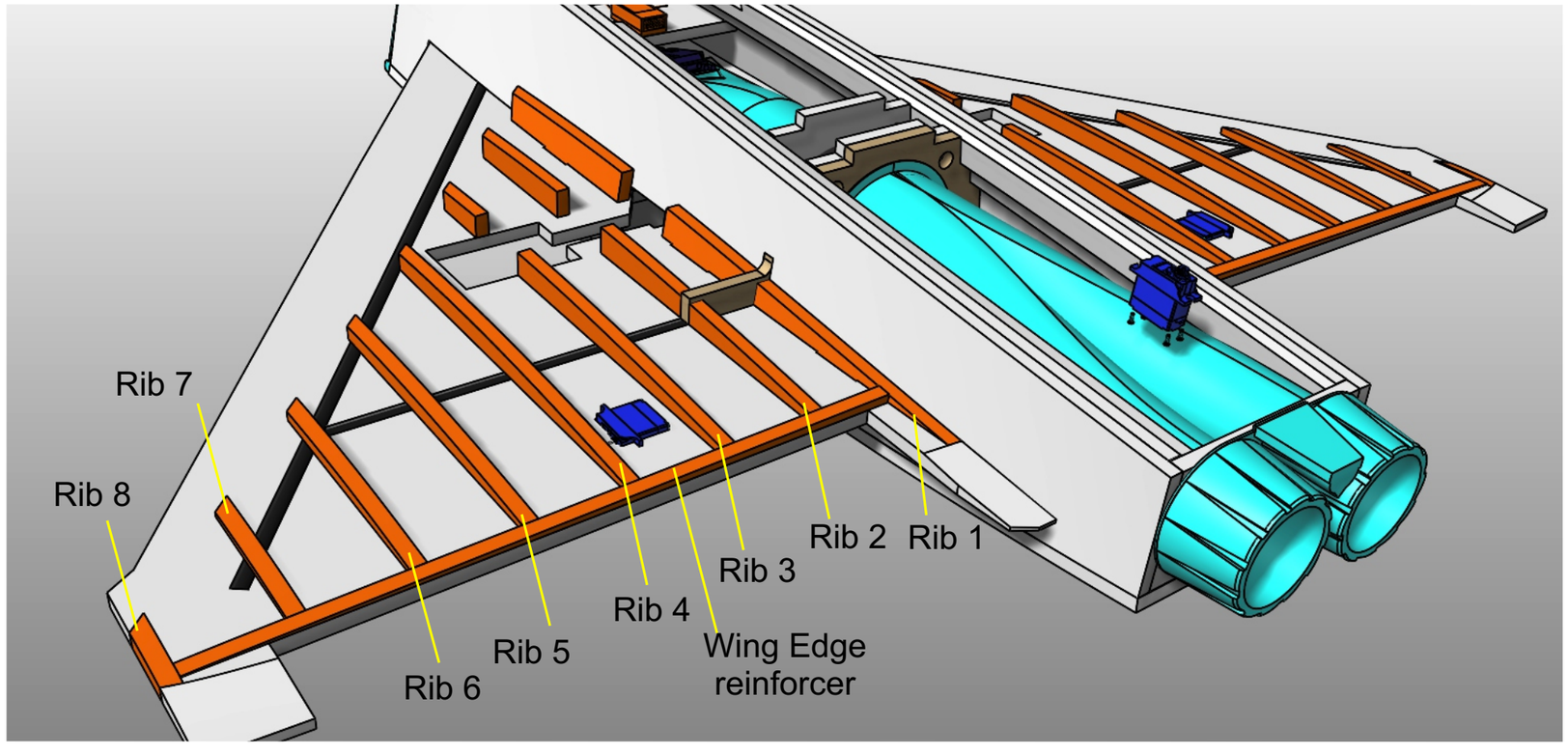


Glue the **Intake Trailing Edge Pieces i**n place as shown

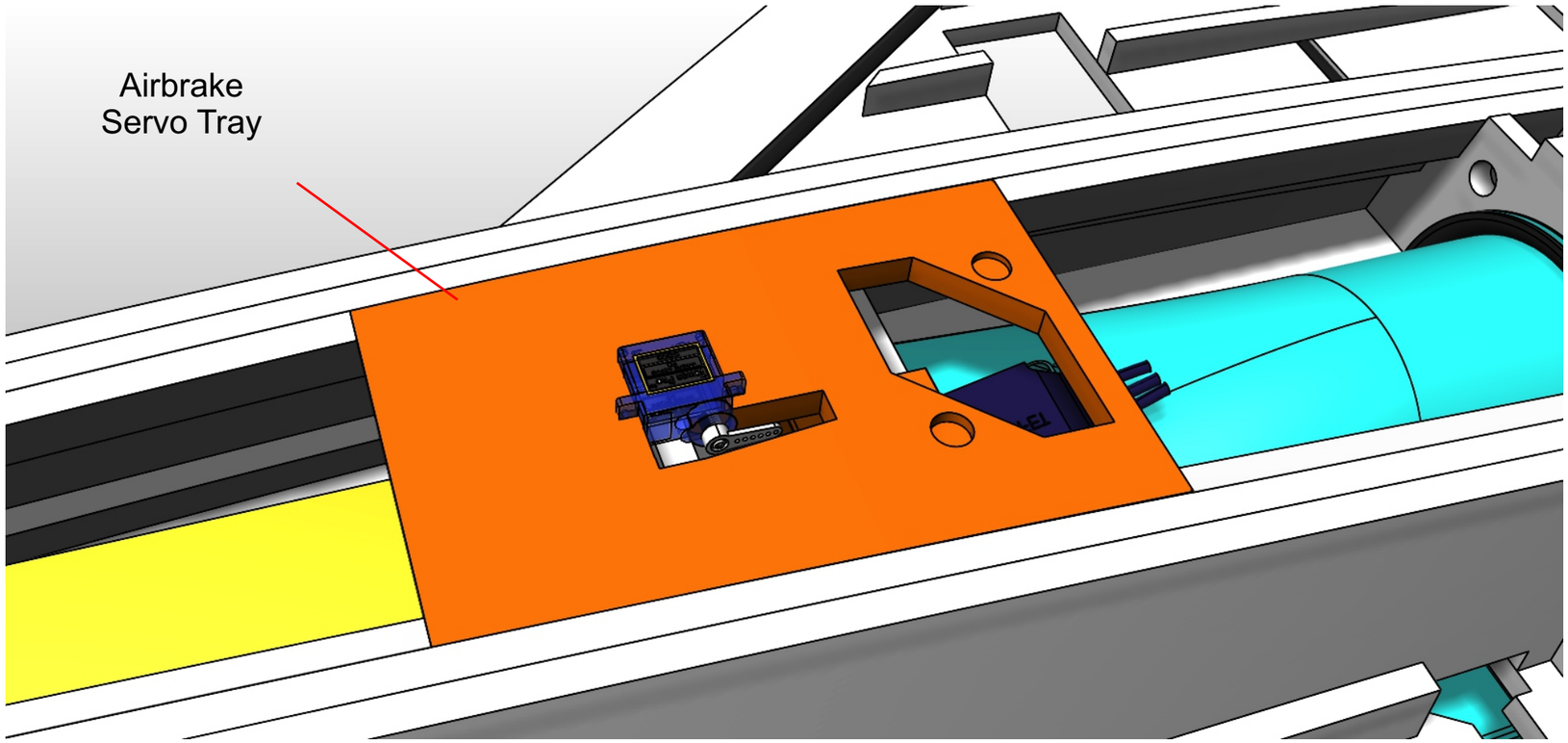


Glue the **Intake** to the assembly.

Look carefully at photo's of the real Typhoon to see how to sand the fuselage blend to get the right shape,

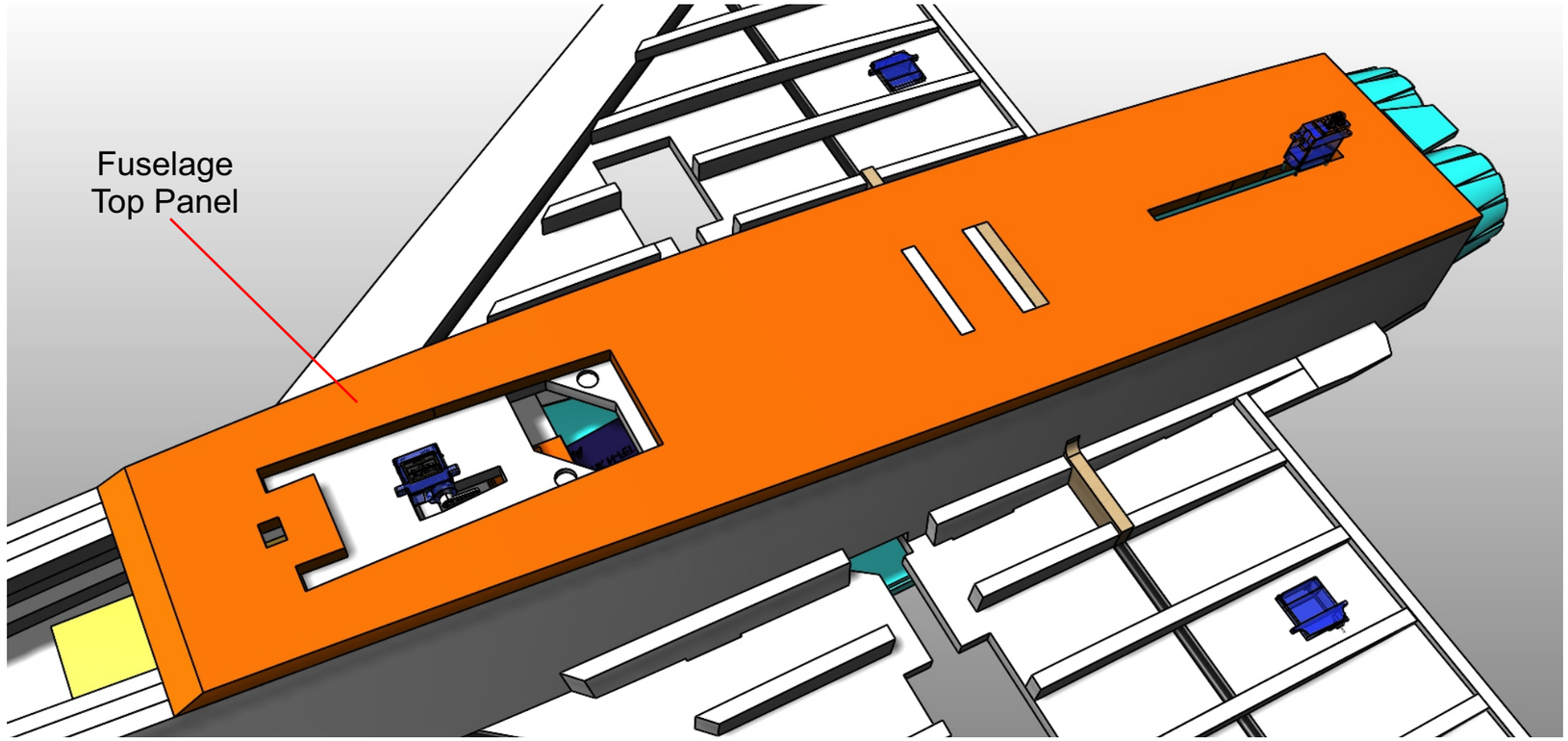


Glue all the **Wing Ribs** into the wing as shown.

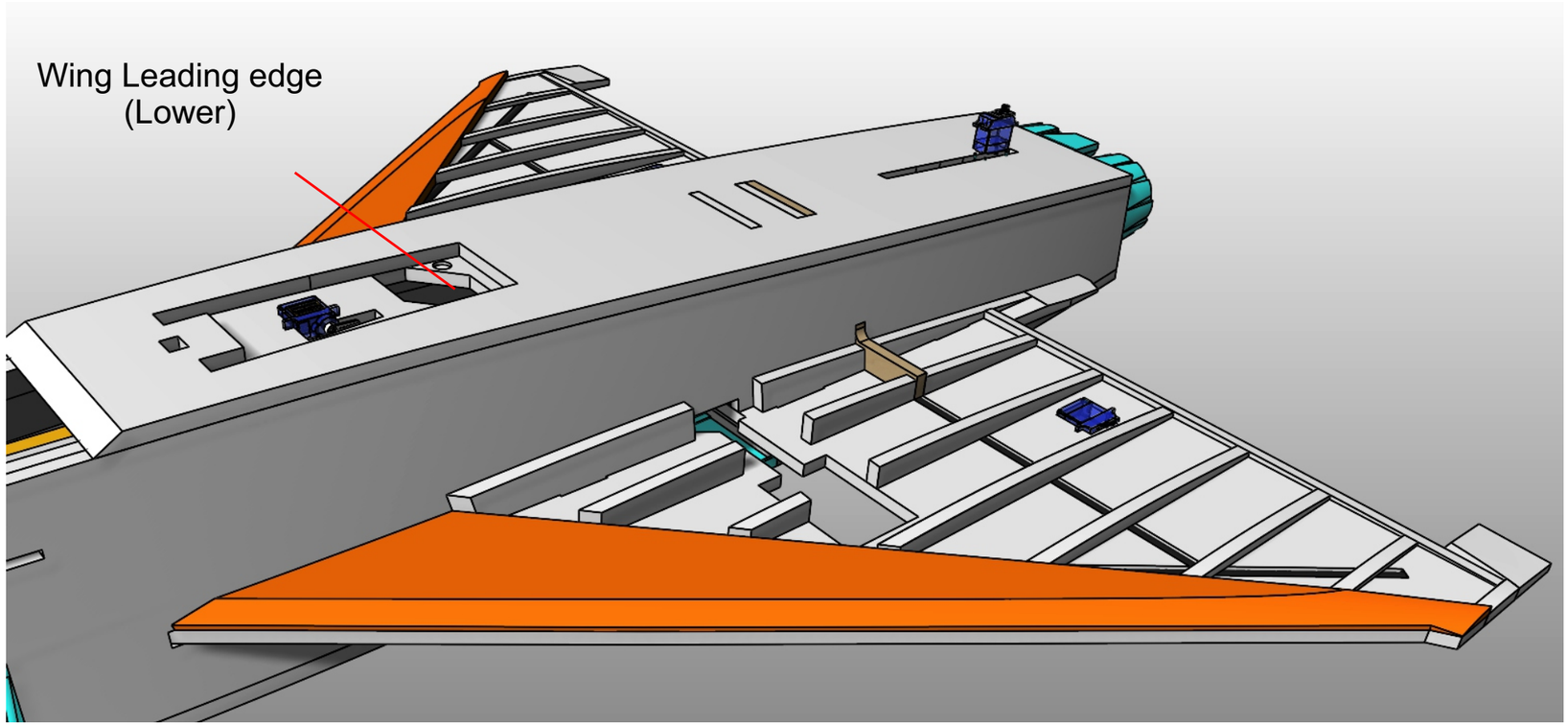


Glue the **Airbrake Servo Tray t**o the fuselage in the rebate prepared for it.

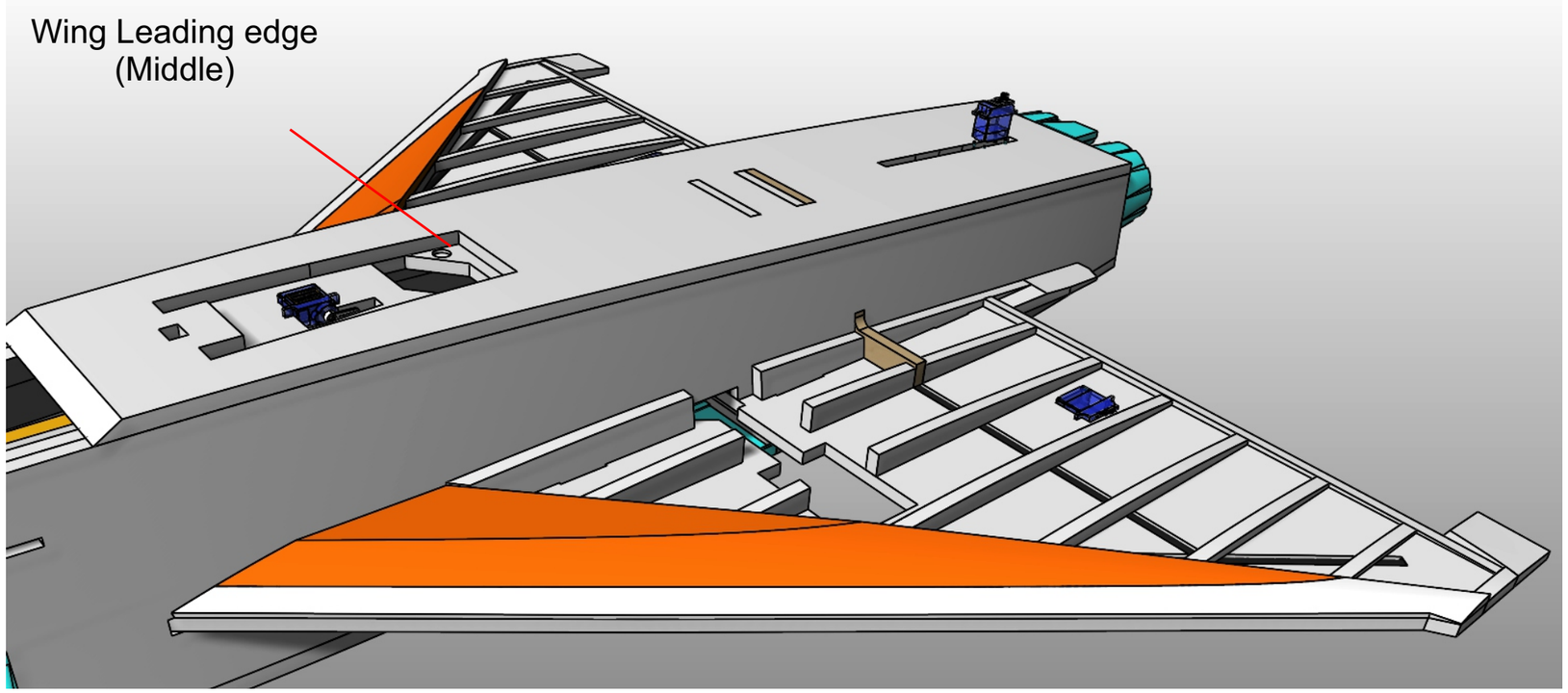
Epoxy magnets into the pockets to hold the RX access lid in place (later in build)



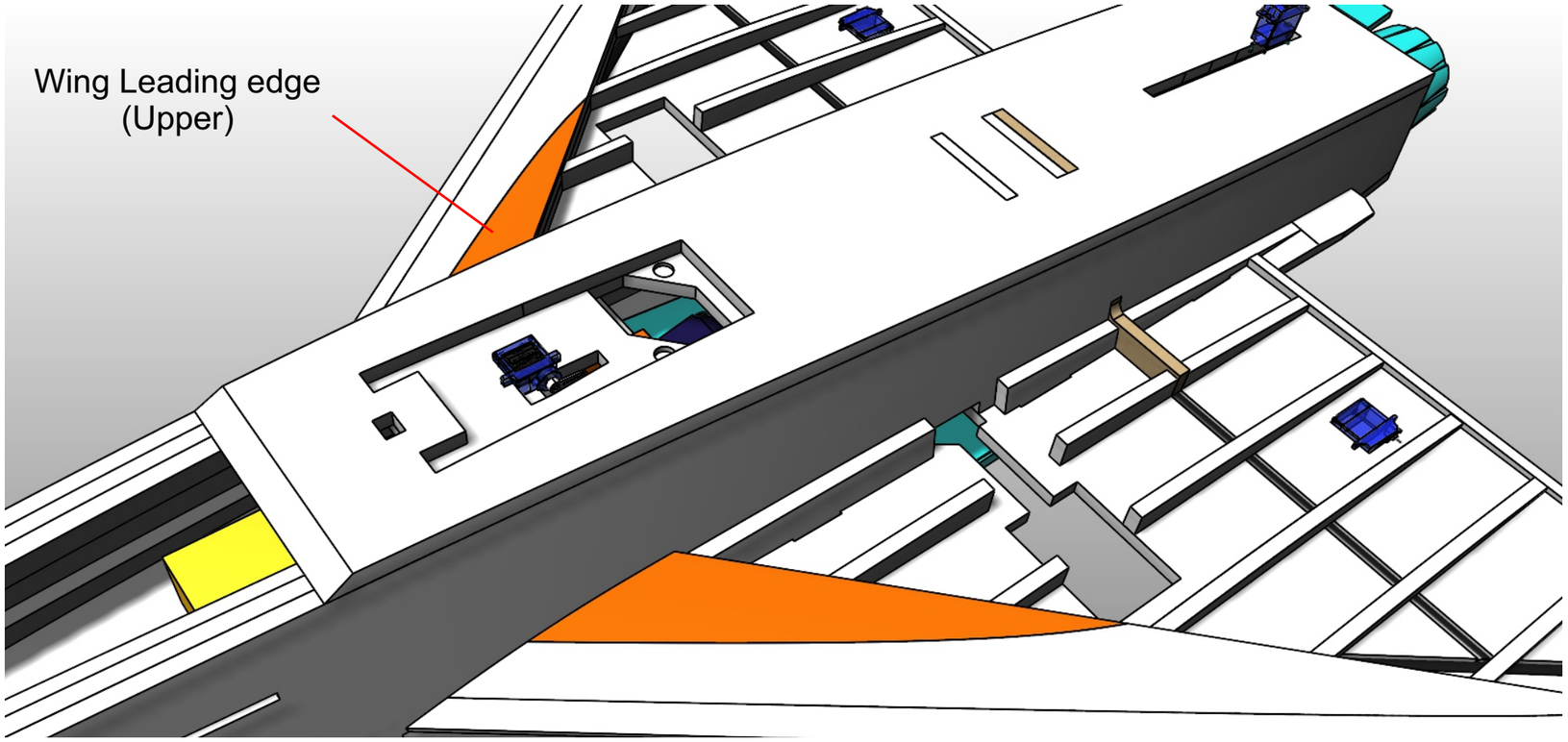
Glue the **Fuselage Top Panel** in place as shown.



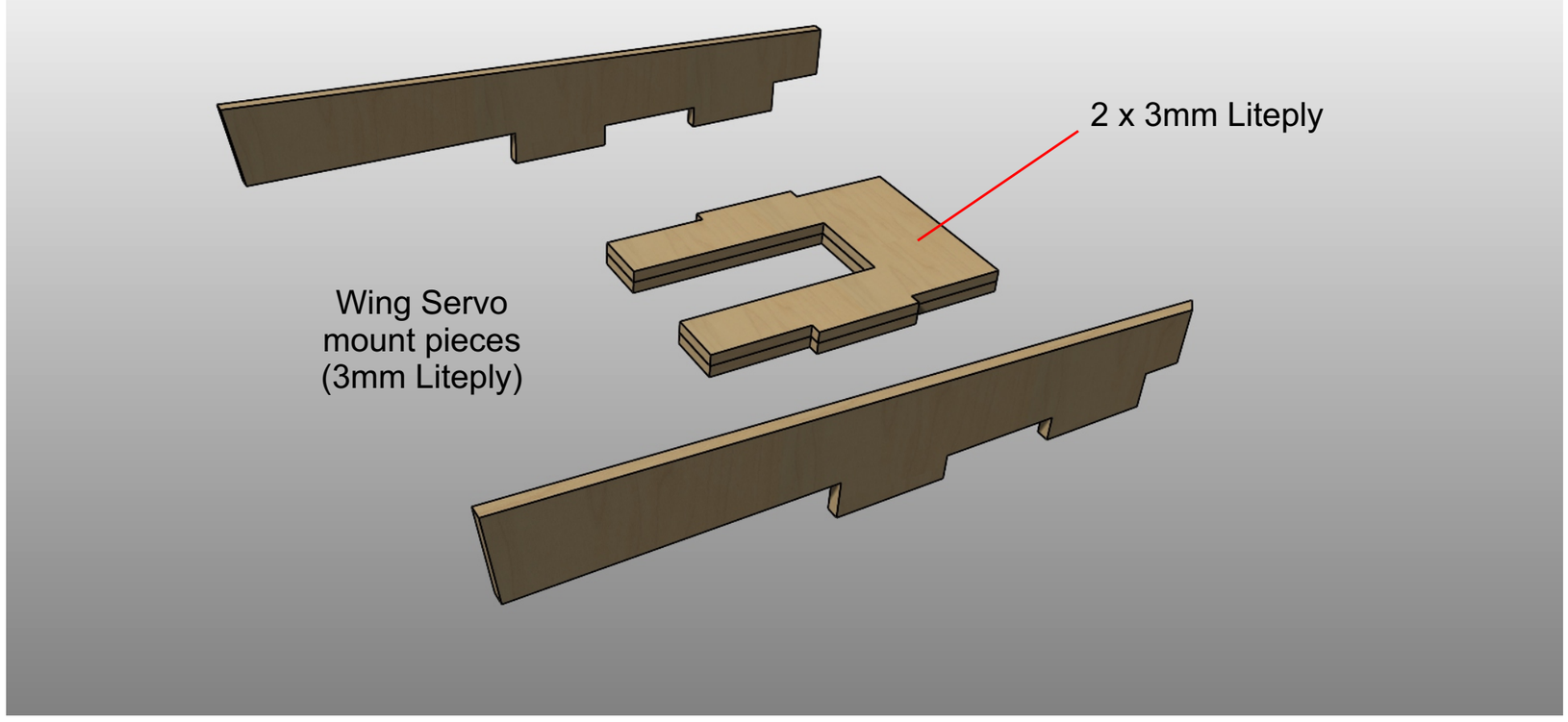
Glue the **Wing Leading Edge (Lower)** to the wings as shown,



Glue the **Wing Leading Edge (Middle)** to the wings as shown,

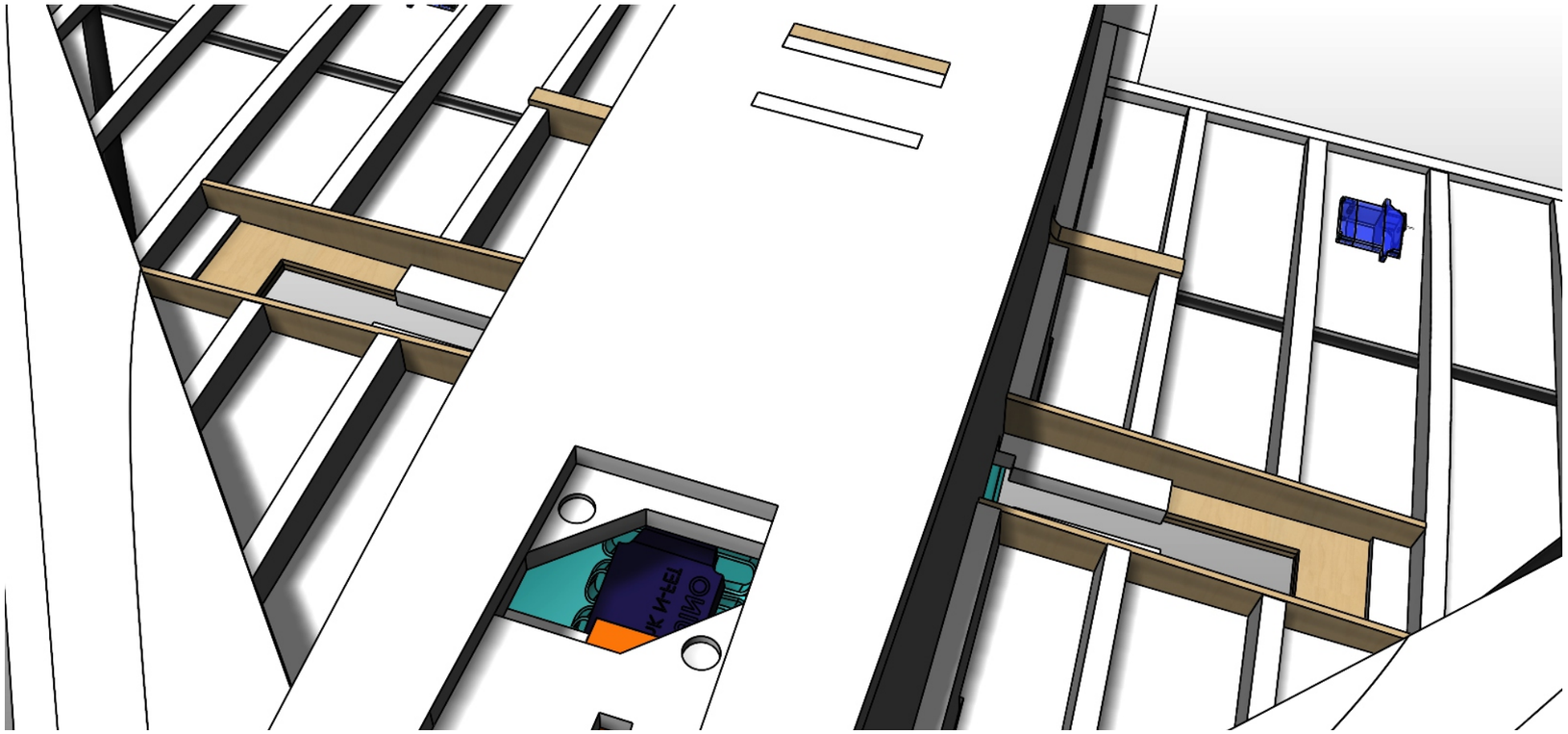


Glue the **Wing Leading Edge (Upper)** to the wings as shown,

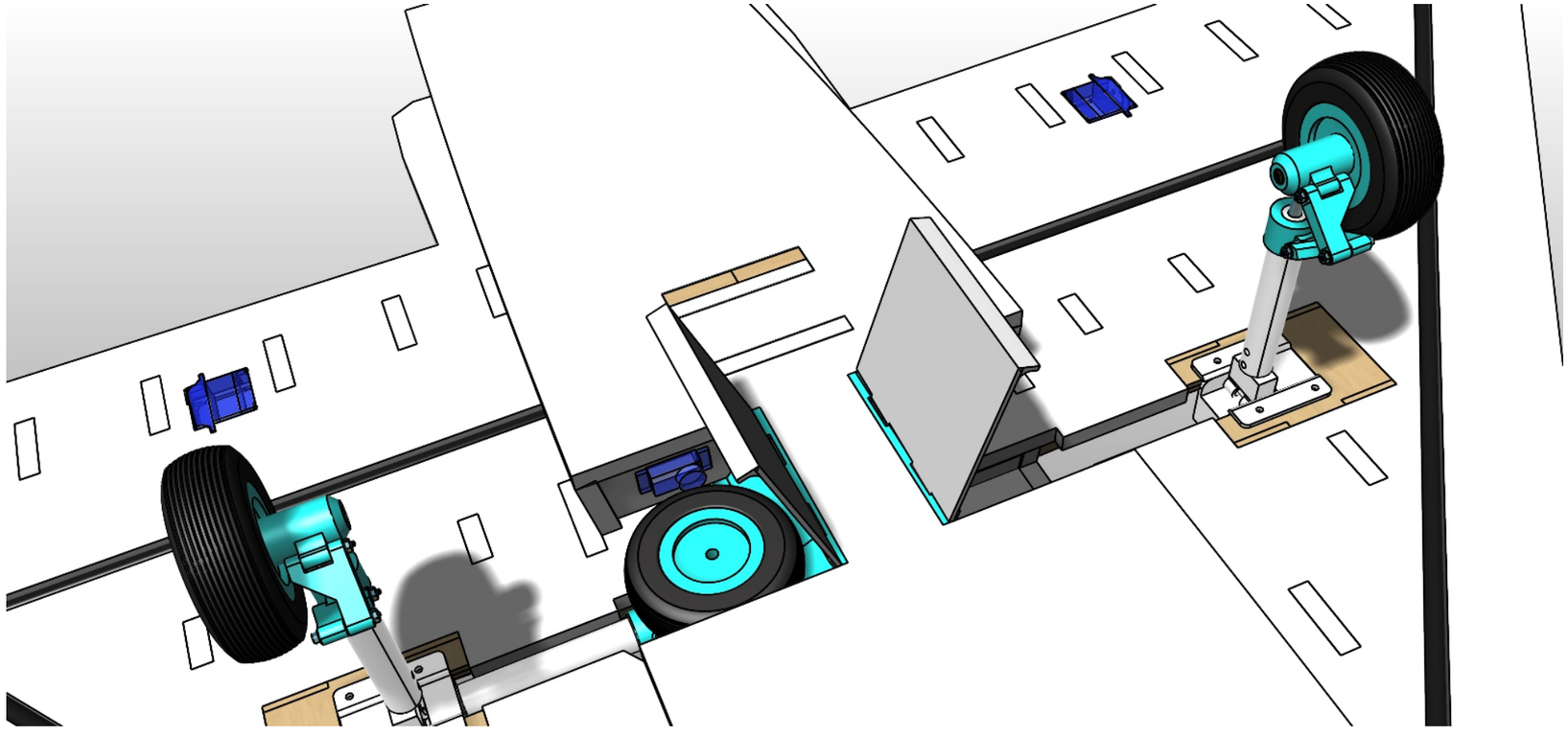


Glue the **Wing Servo Mount pieces** together using Epoxy.

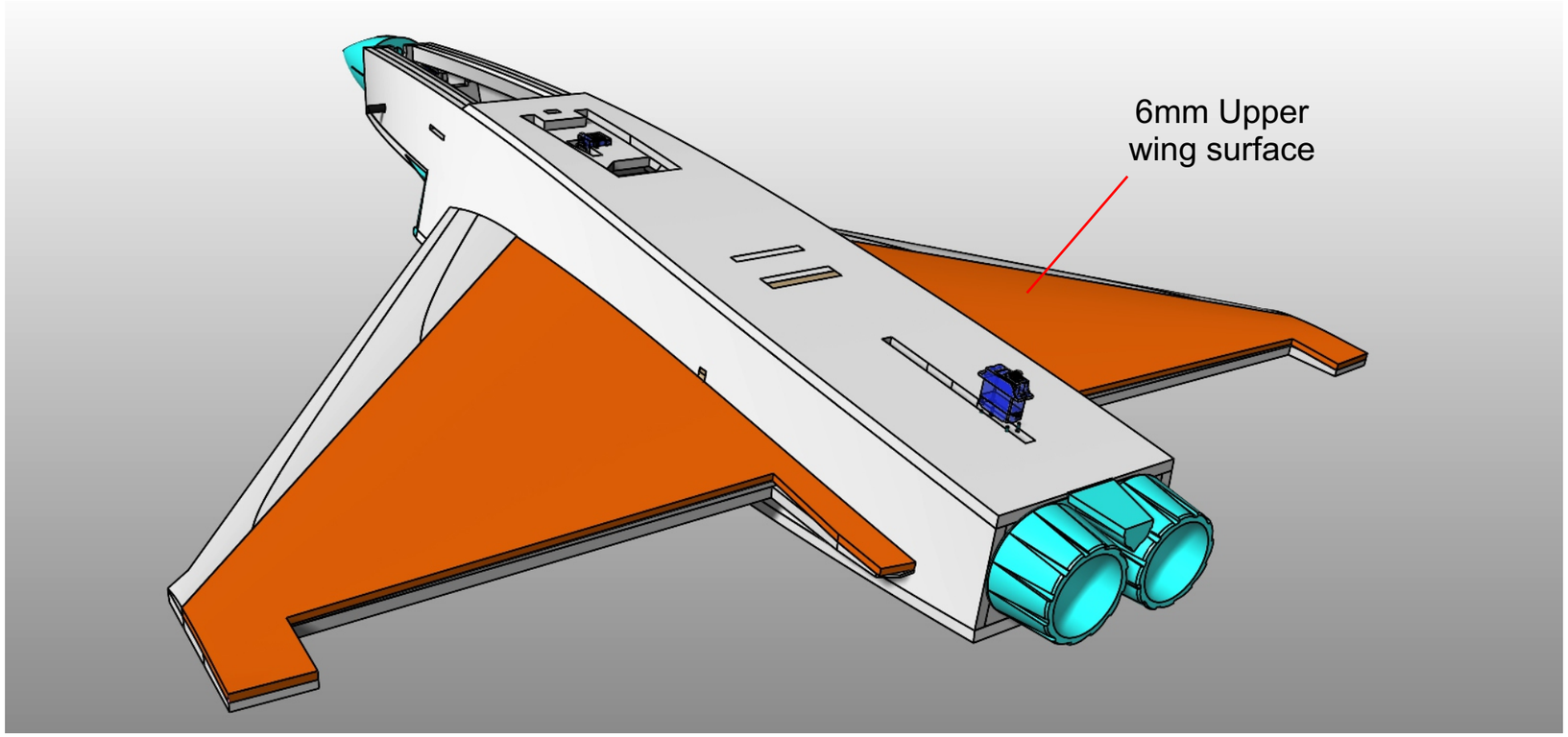
Make a handed pair - one for each wing.



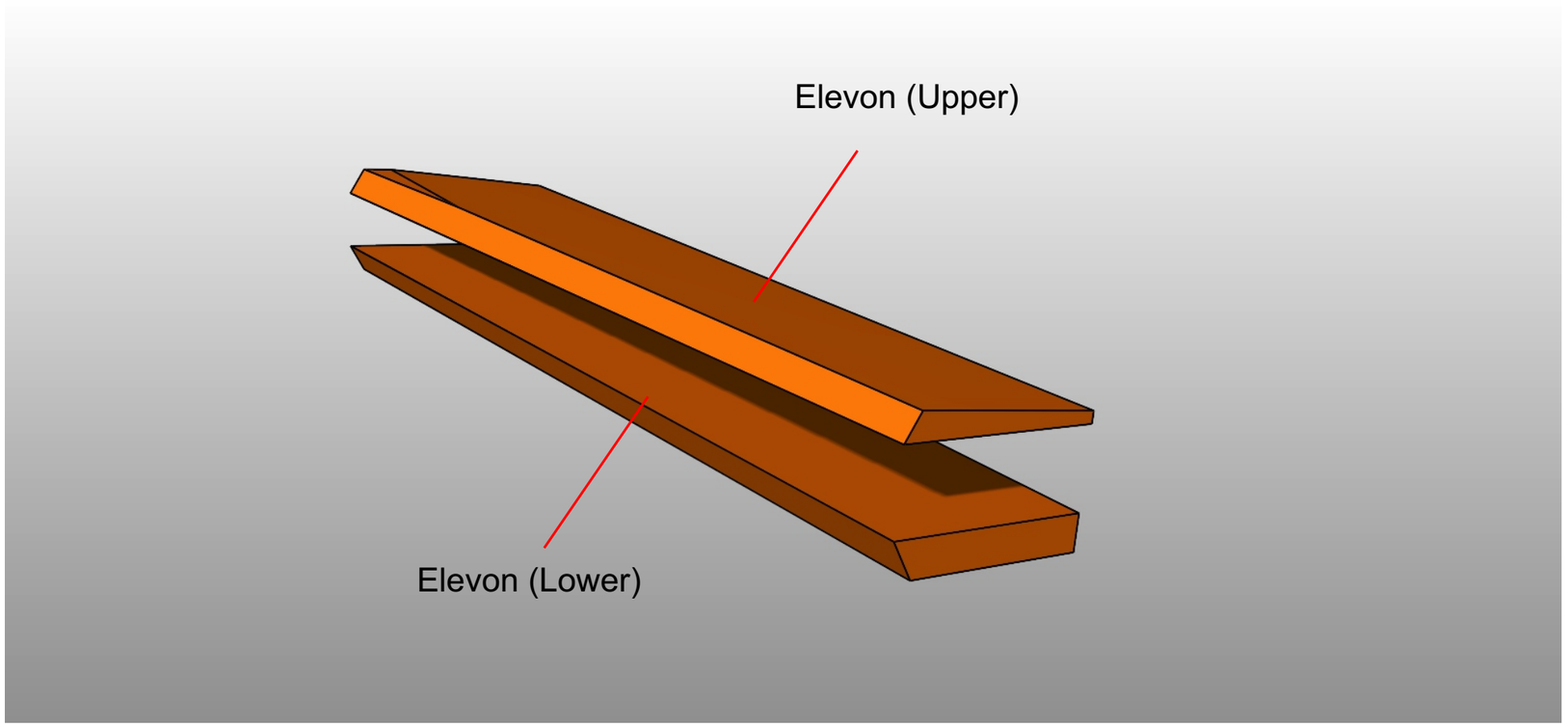
Glue the **Plywood Retract Mounts** to the wings with epoxy, ensuring a good bonding to the surrounding components.



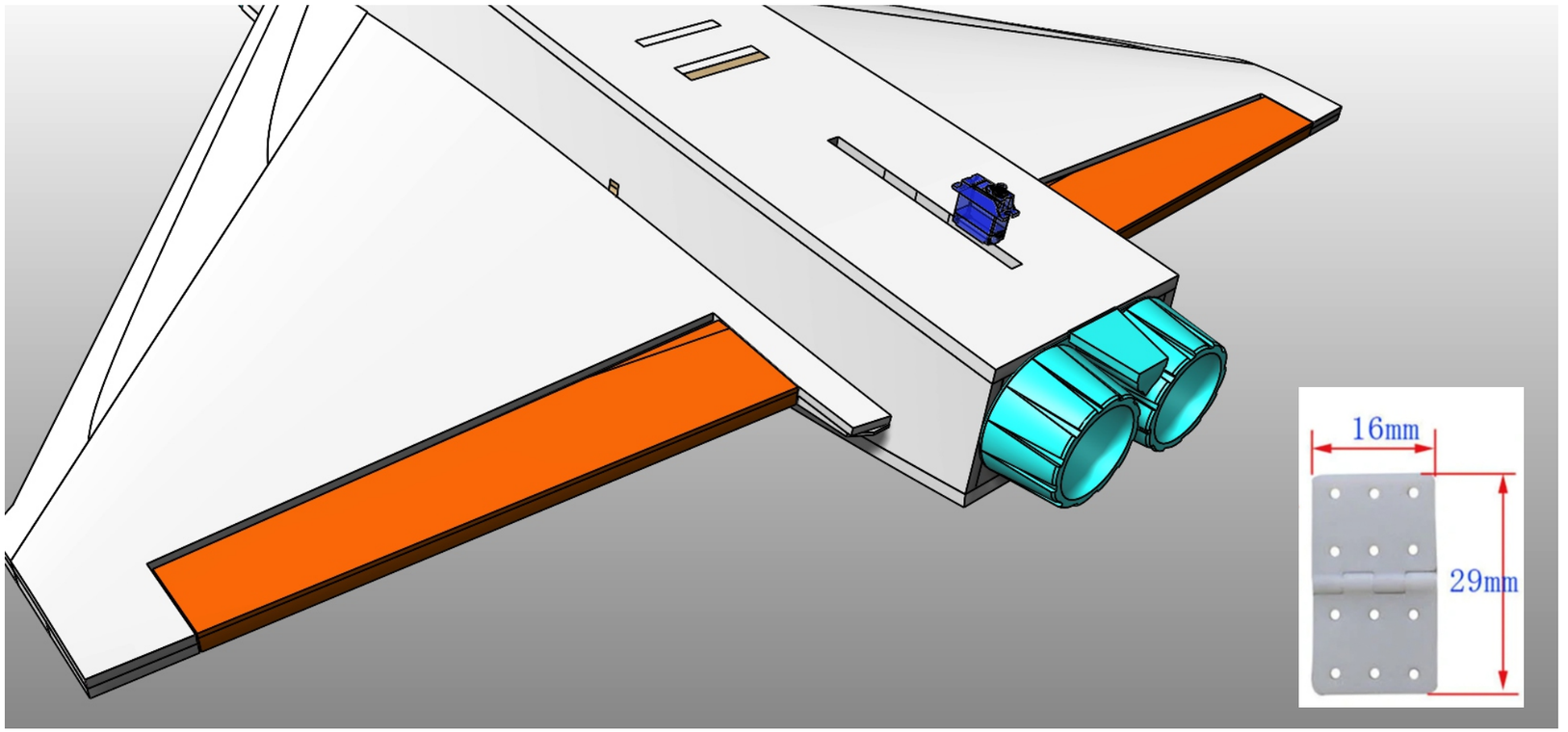
Connect the Rear landing gear to the Assembly and test.



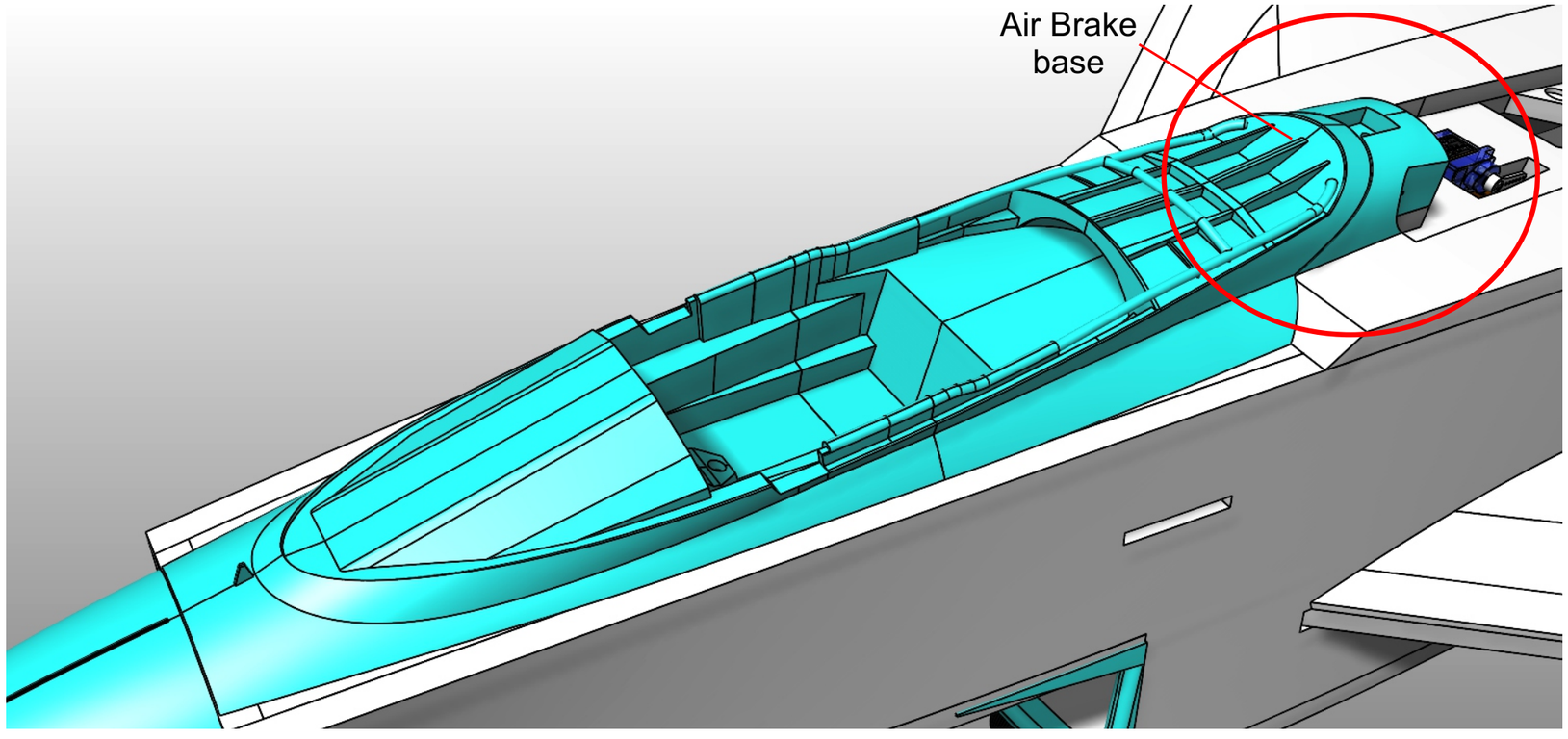
Run a sanding block over the ribs to ensure a really good surface to attach the **6mm Upper Wing Surface** to the assembly.



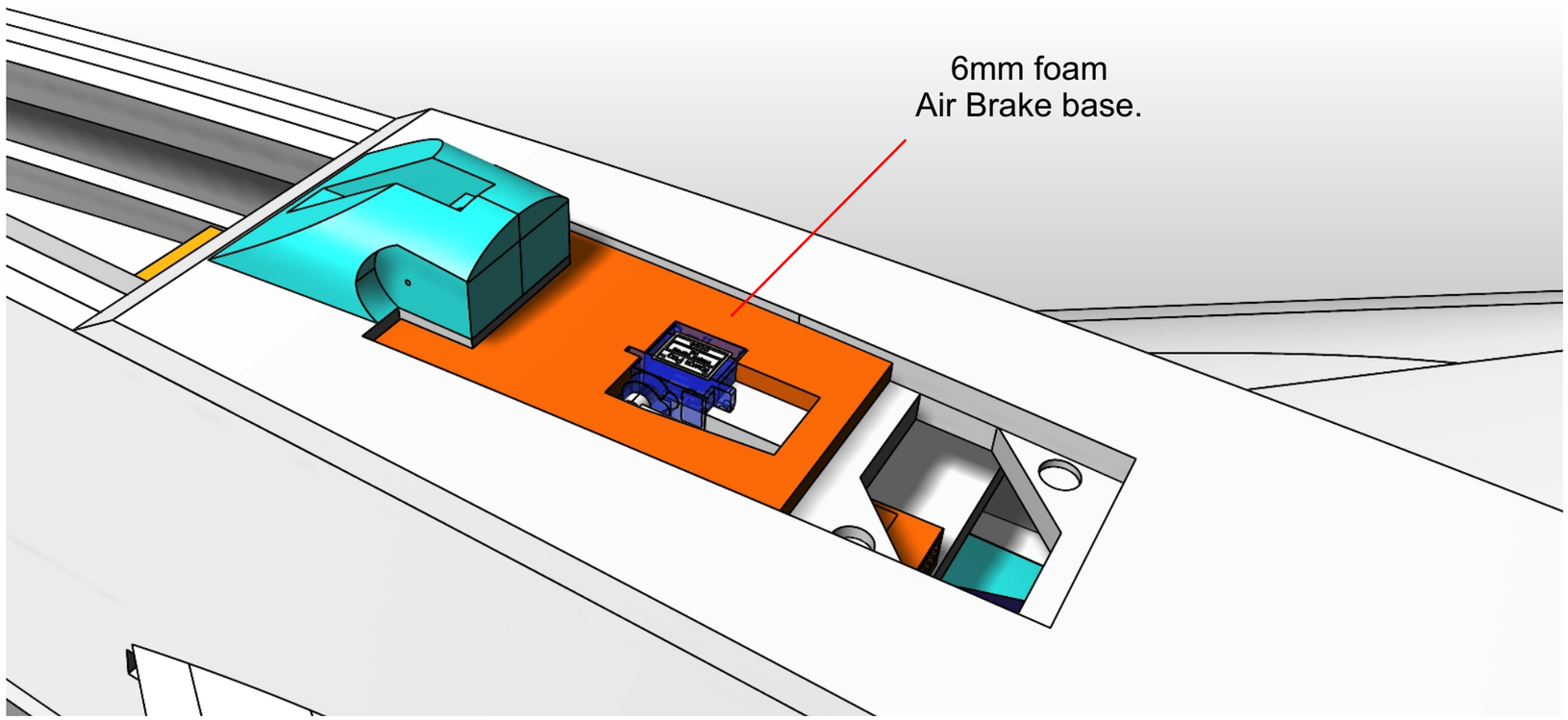
Glue the upper and lower Pieces of each Elevon assemby together



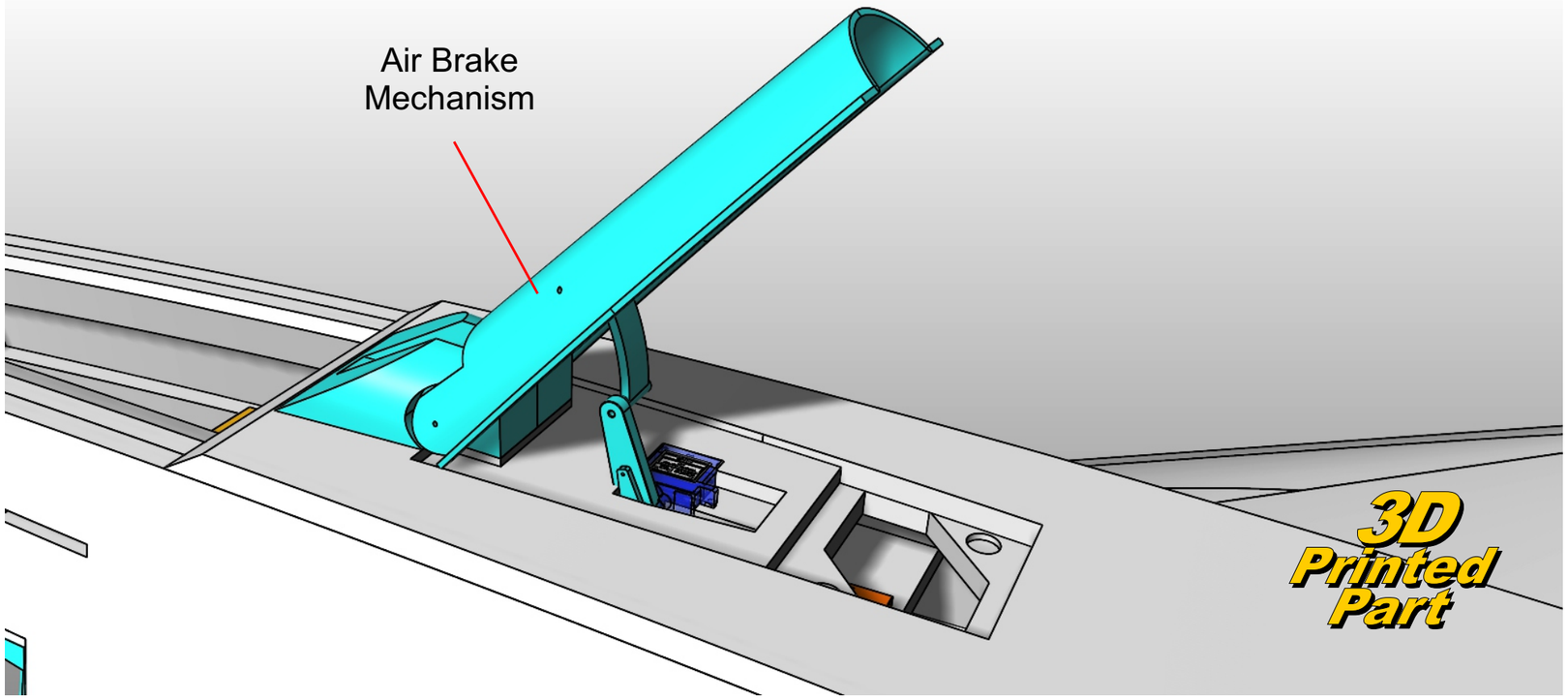
Using strong plastic pinned hinges, attach the elevons to the airframe.



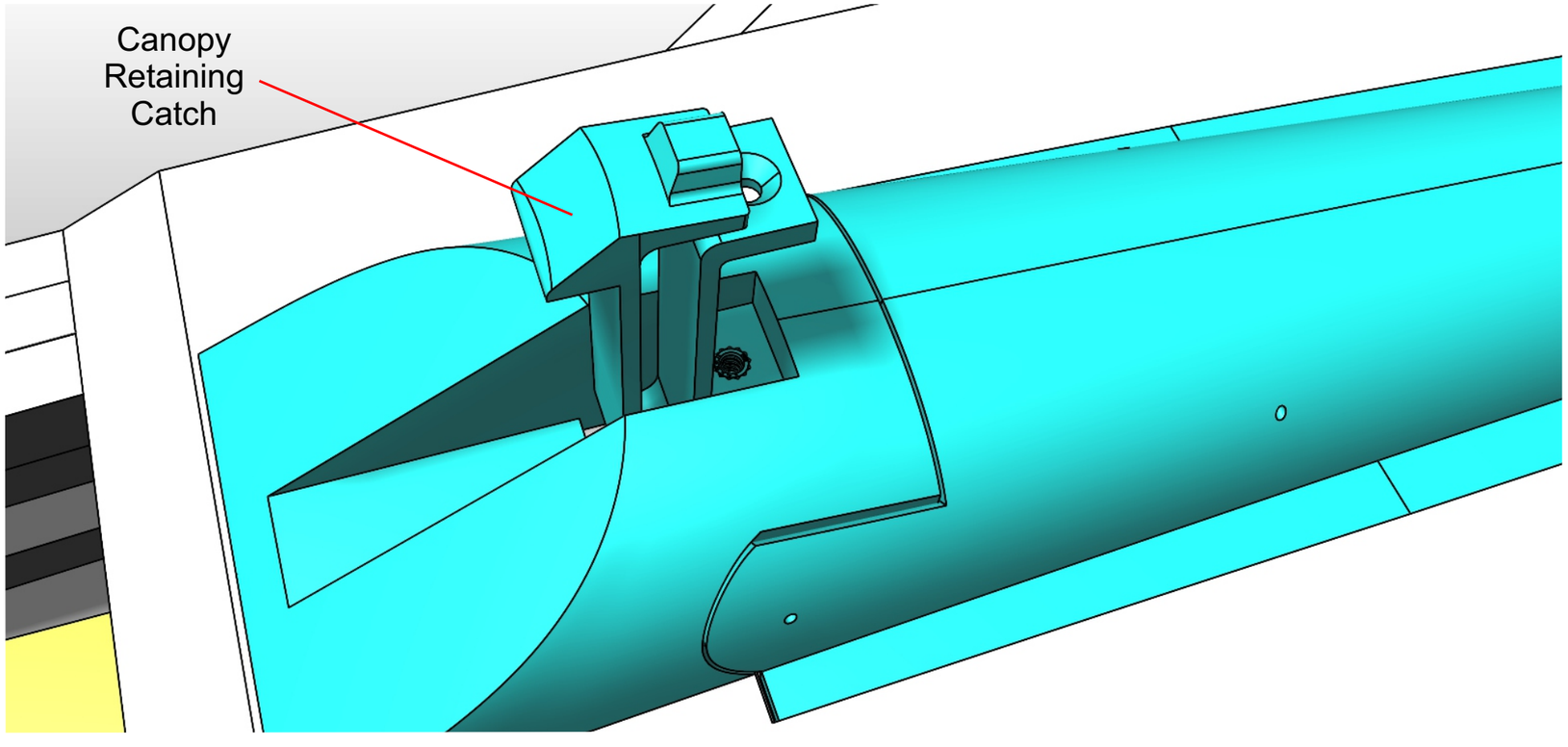
Use the cockpit as a spacer to help position the **Air Brake base.** Glue the air Brake base to the Fuselage as shown,



Glue the **6mm foam Airbrake base** onto the Fuselage as shown.



Assemble the Air Brake Mechanism and connect the servo arm to the servo. Test and adjust.

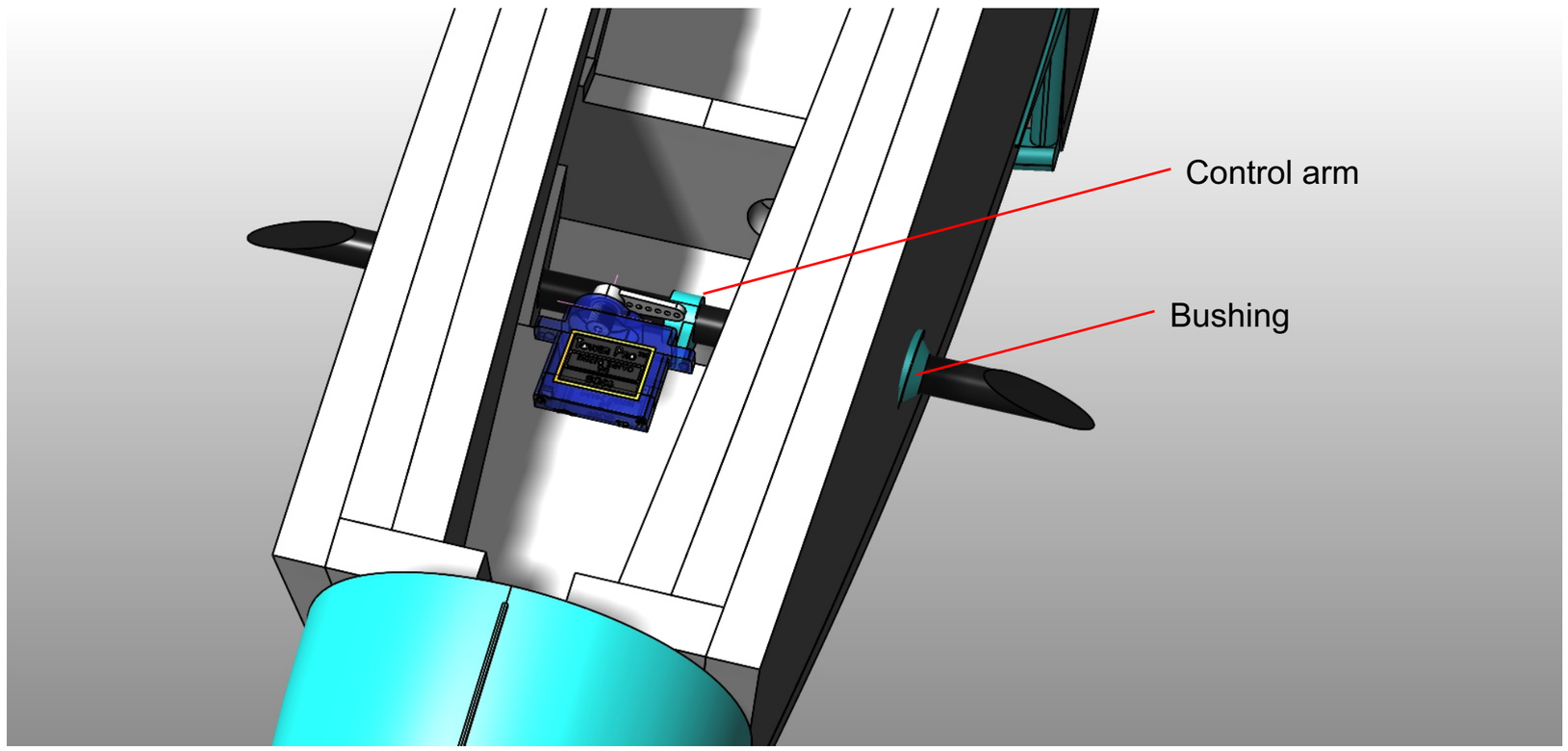


Using a soldering iron fit the 3mm Brass insert into the airbrake base.

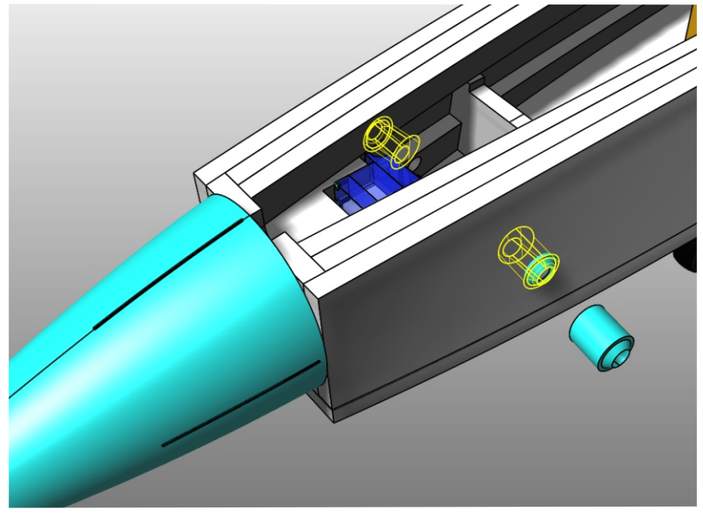
Slide the **Canopy Retaining Catch** into the hole, and attach using a 3mm countersunk machine screw.

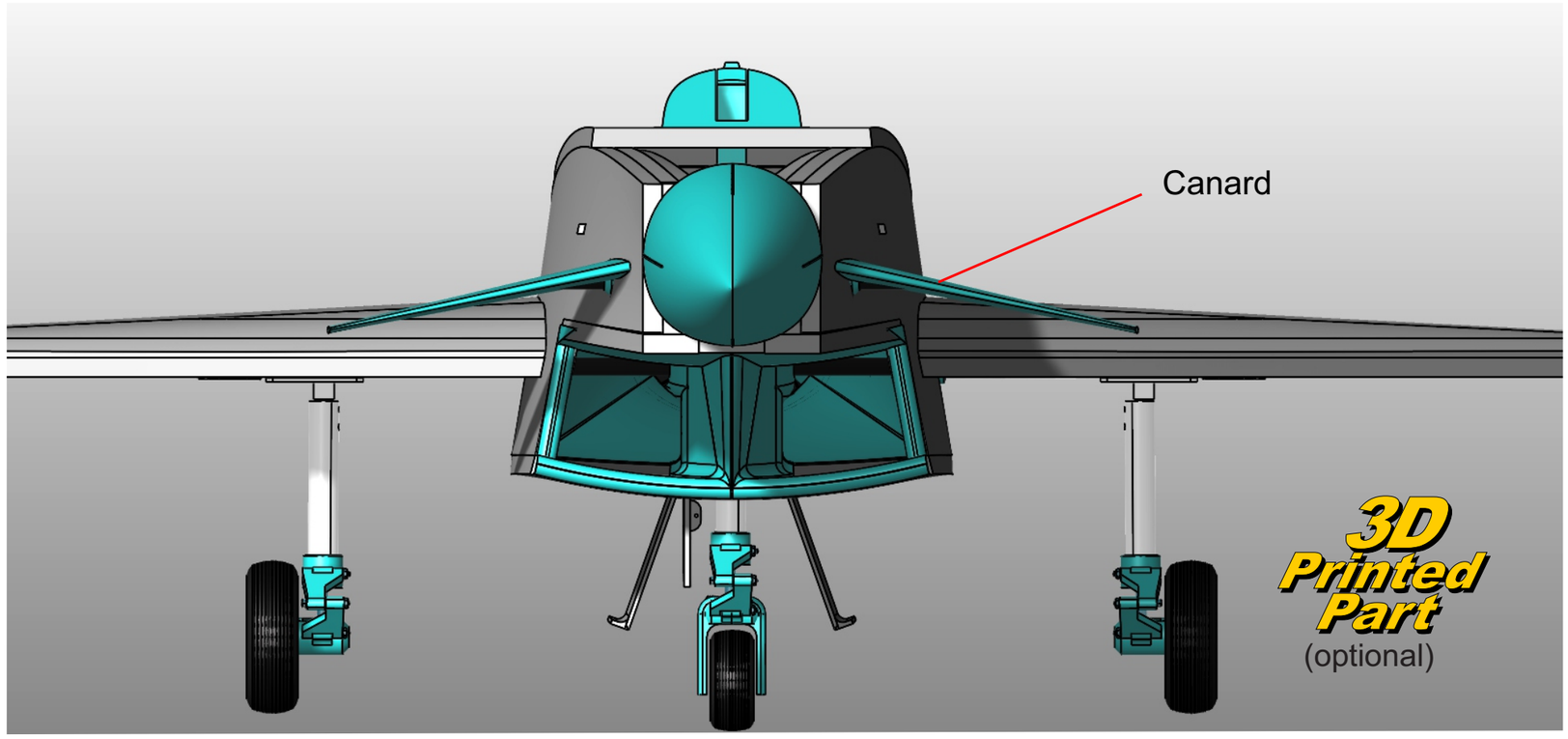
Below :

Assemble the Canard spar mechanism.

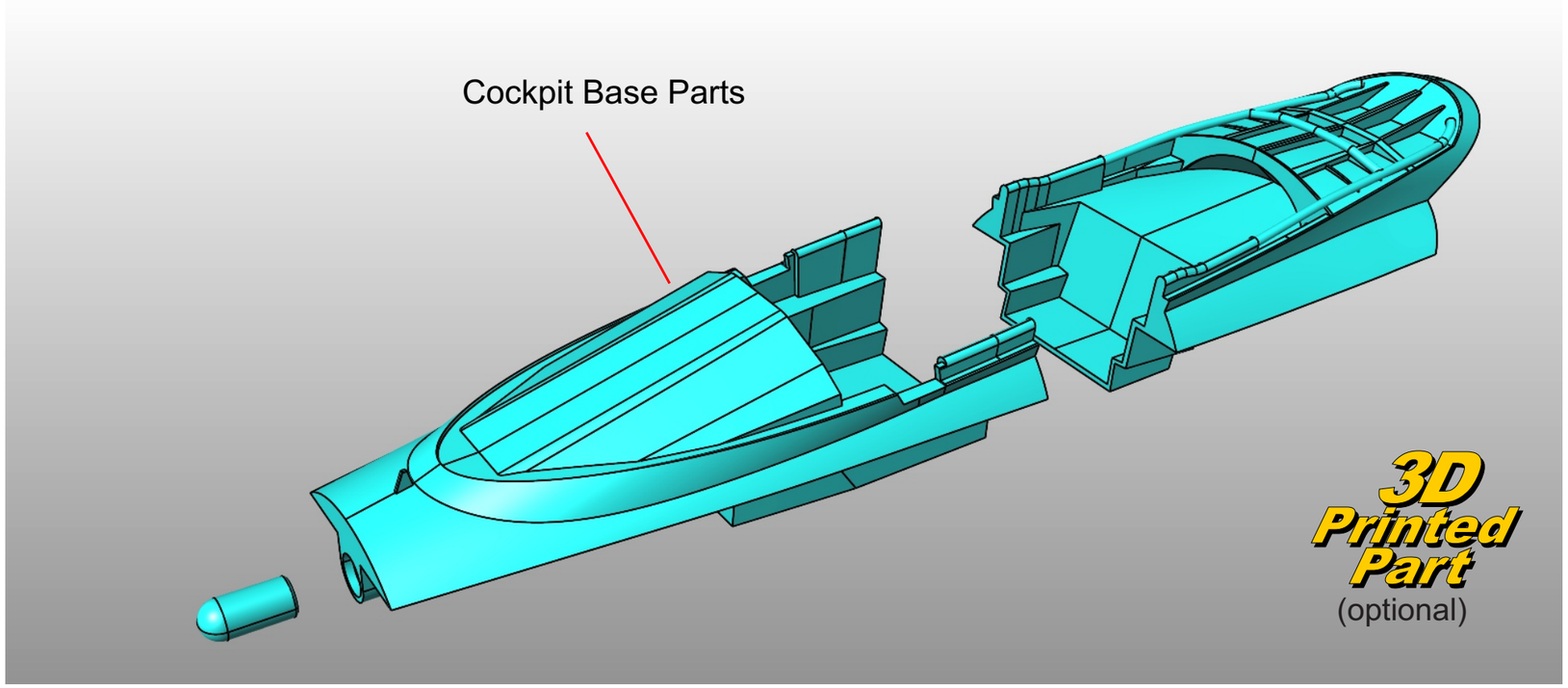


Position the Canard Bushings and glue into place using epoxy. Attach the 3D printed arm to the 9mm carbon Spar, and connect to the servo using piano wire.

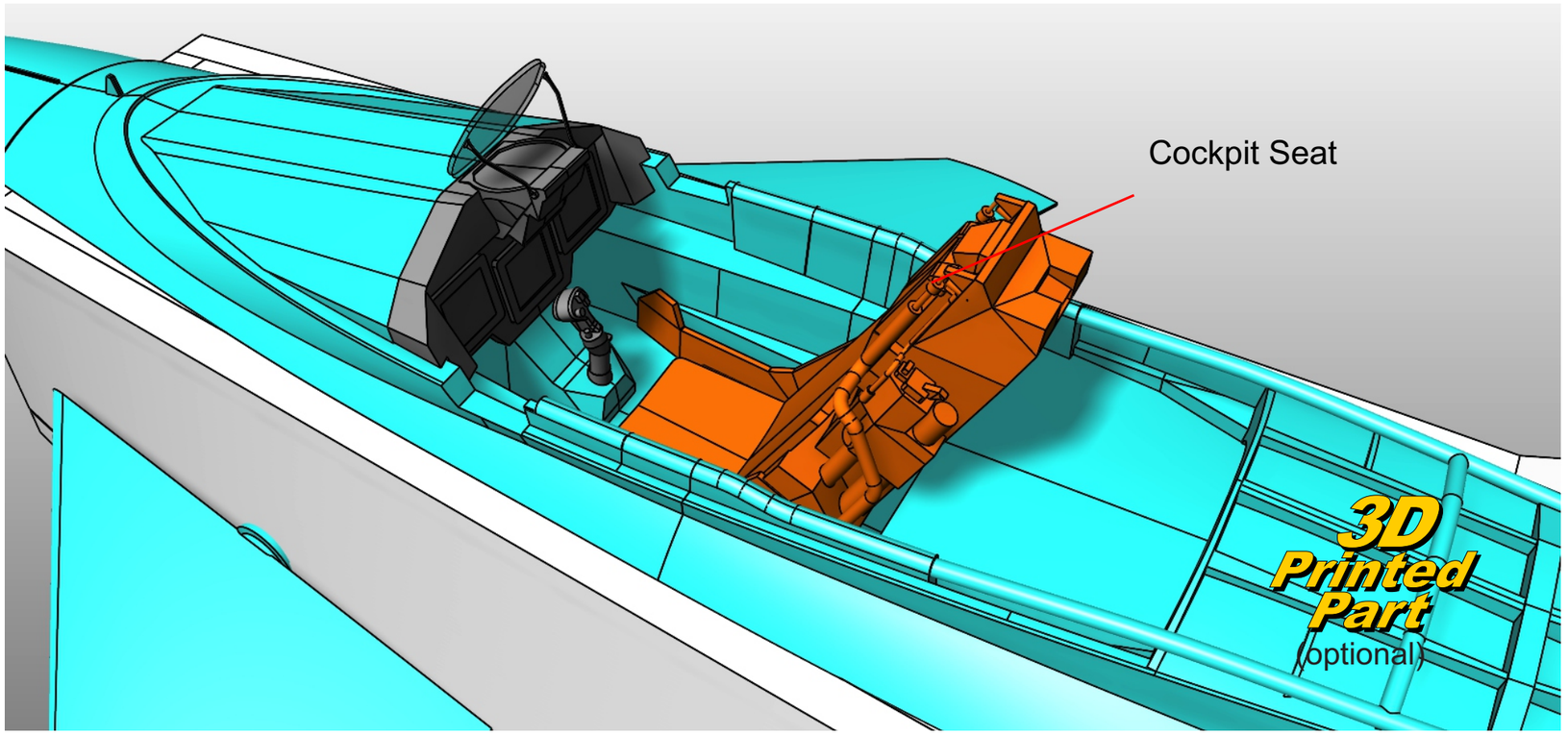




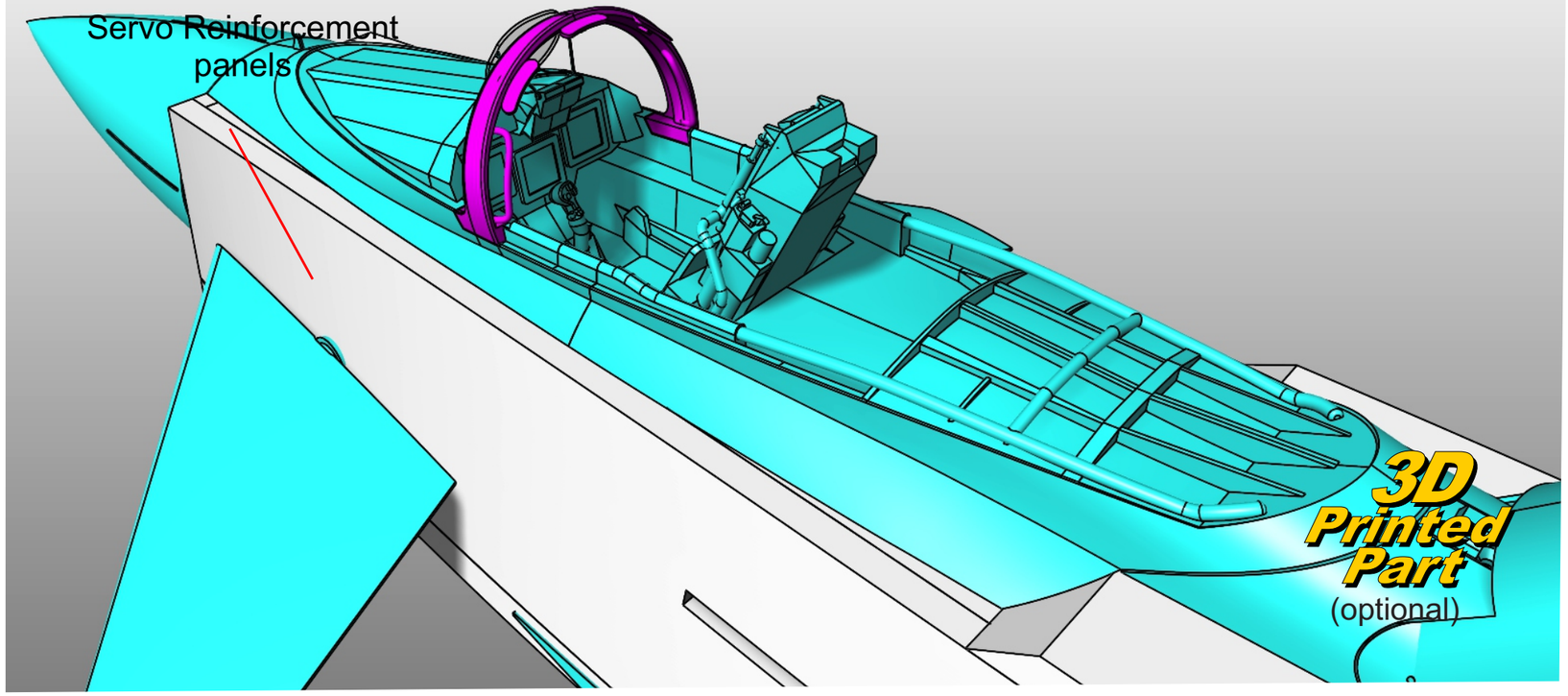
Epoxy the **Canards** onto the Canard Shaft.



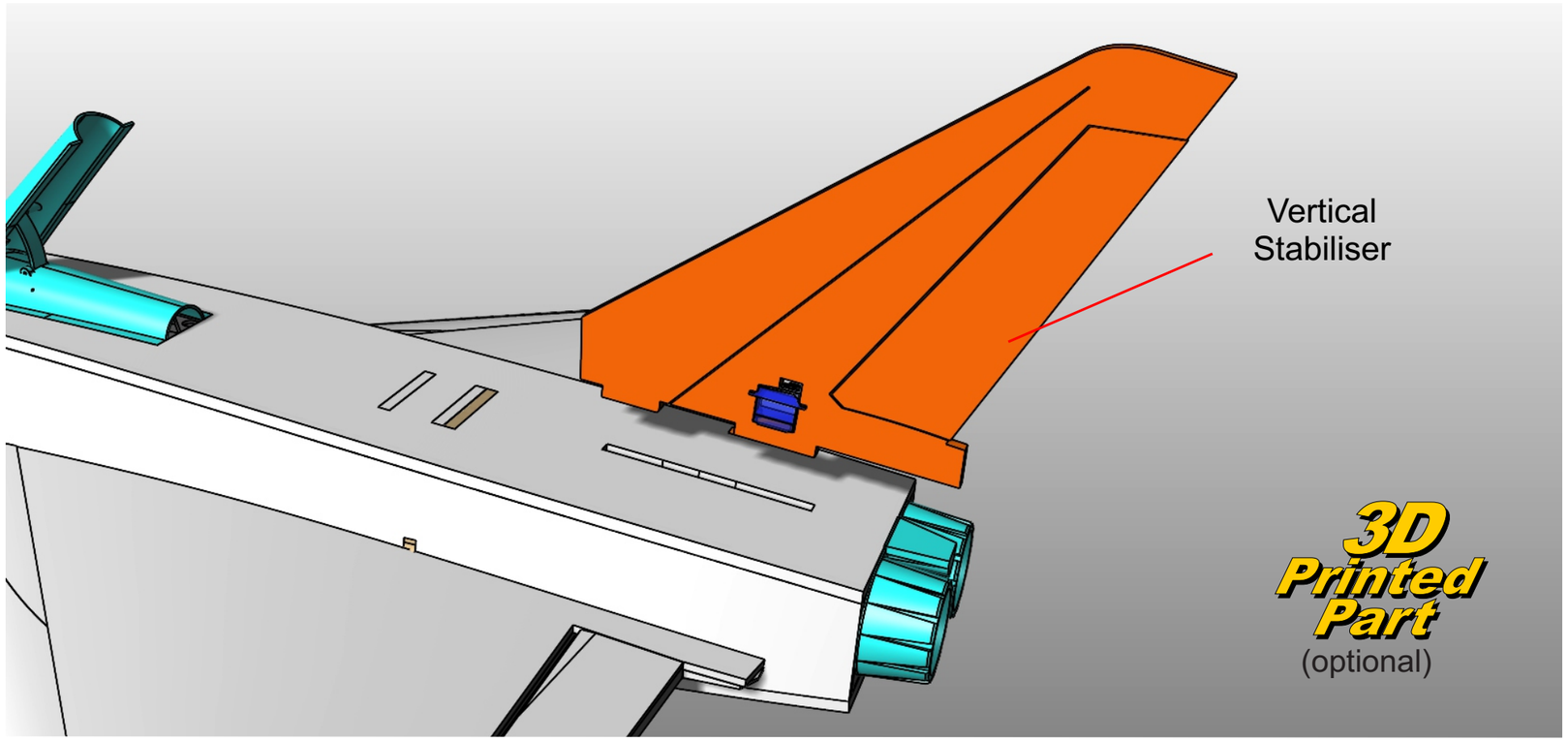
Assemble the **Cockpit Base Parts** as shown using CA Gel Glue.



Glue the **Cockpit seat** into the Cockpit Base,

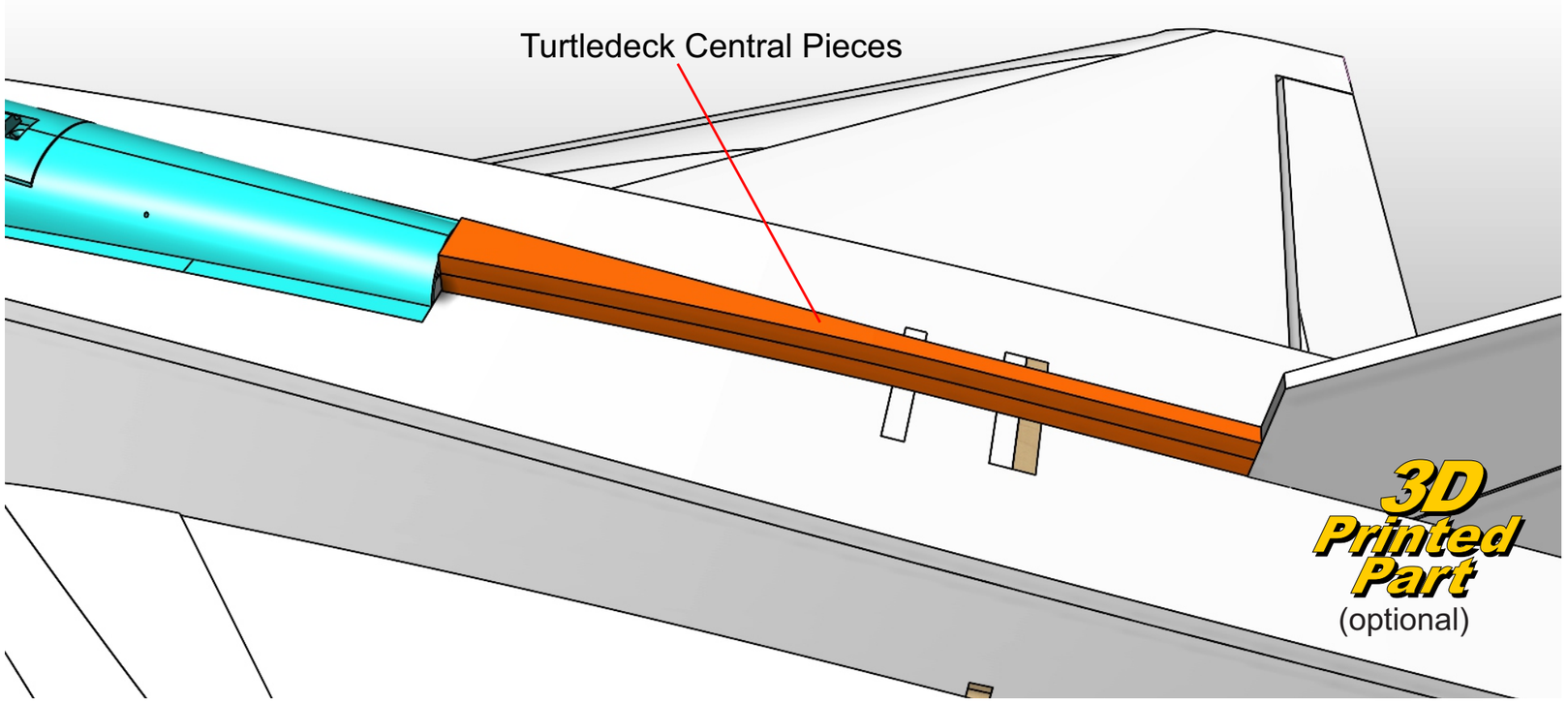


Glue the **Cockpit Ring** into the Cockpit Base,

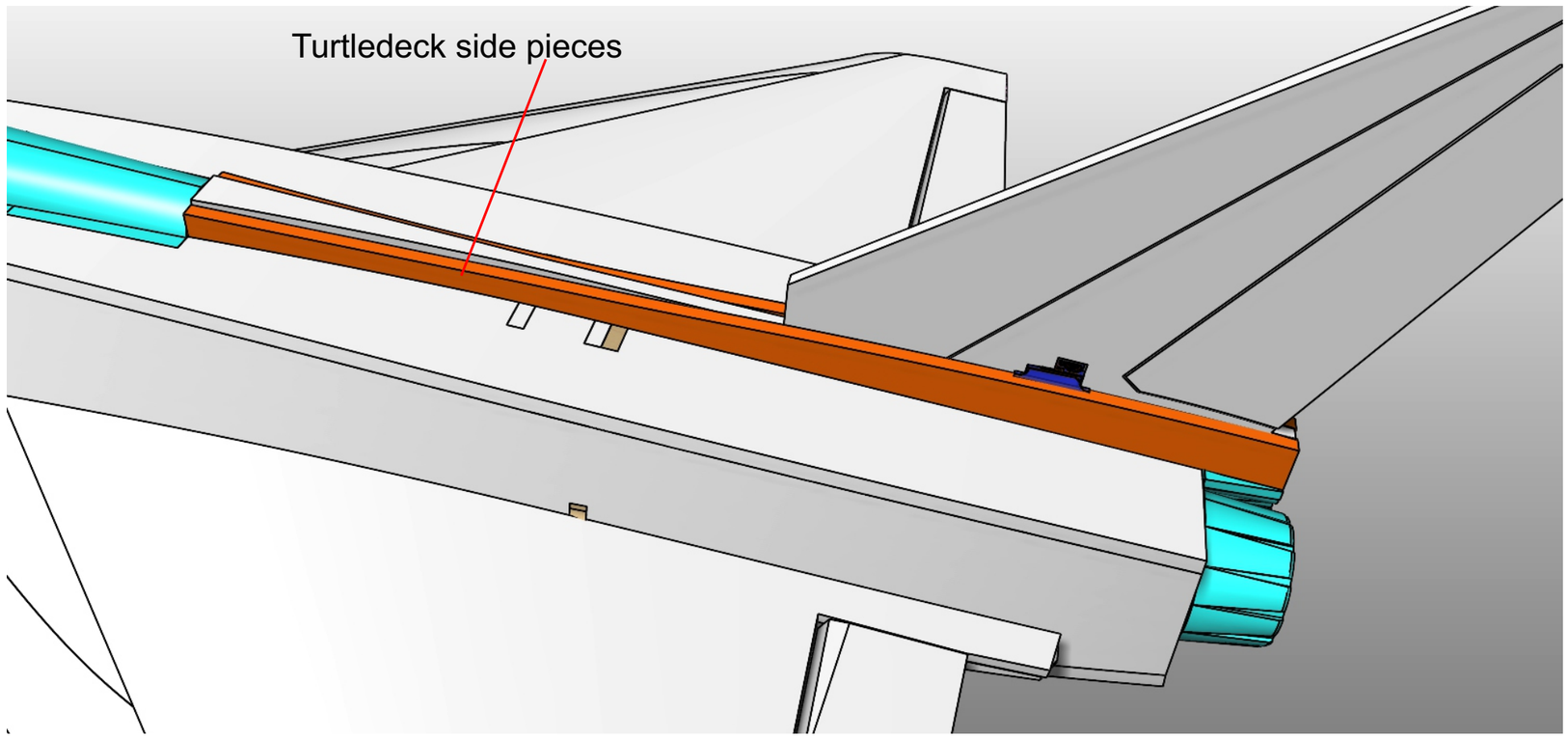


Set a 1 x 6mm Carbon spar into the vertical stabiliser. Hot Glue the Rudder servo into the vertical stabiliser and connect to the rudder.

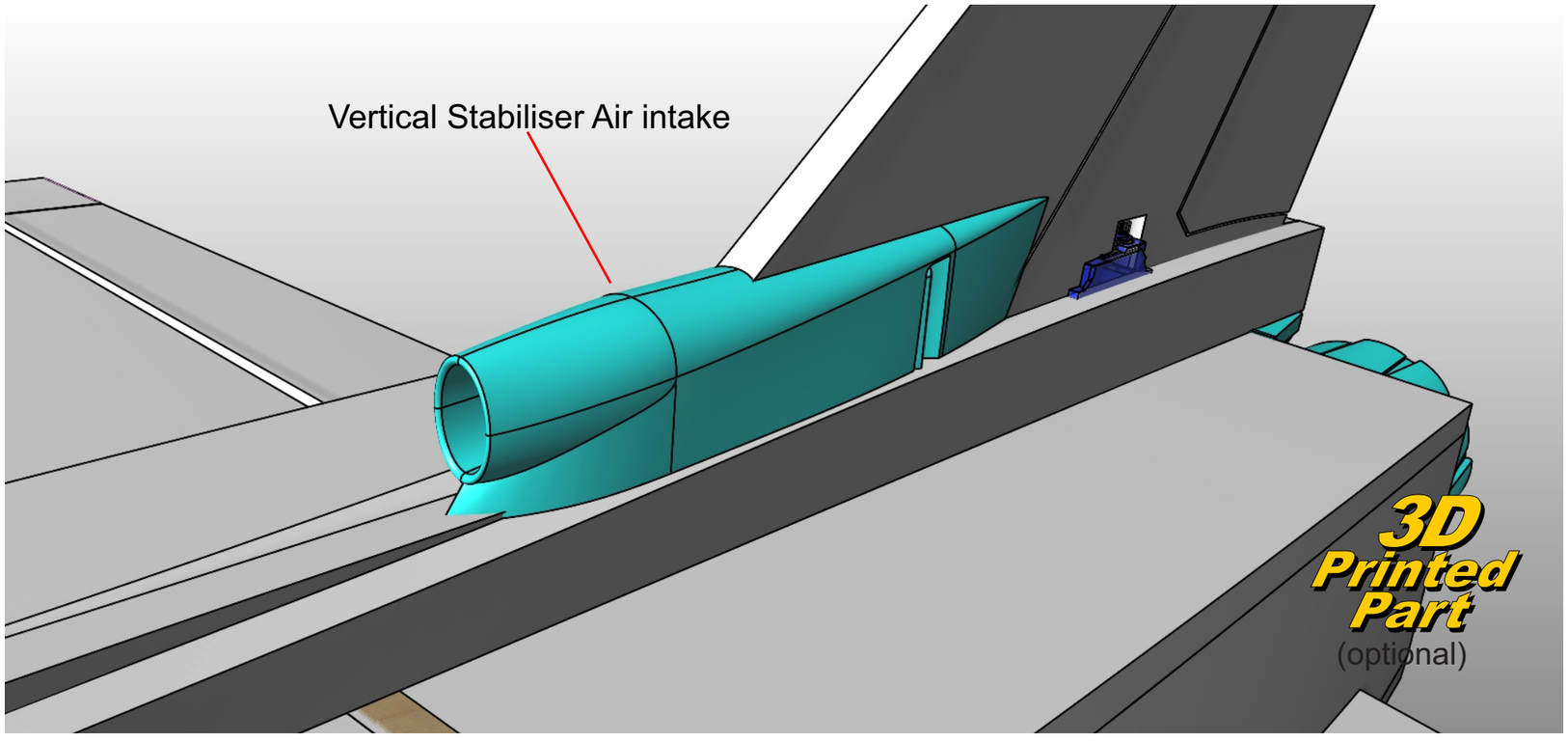
Glue the Vertical Stabiliser to the fuselage using epoxy.



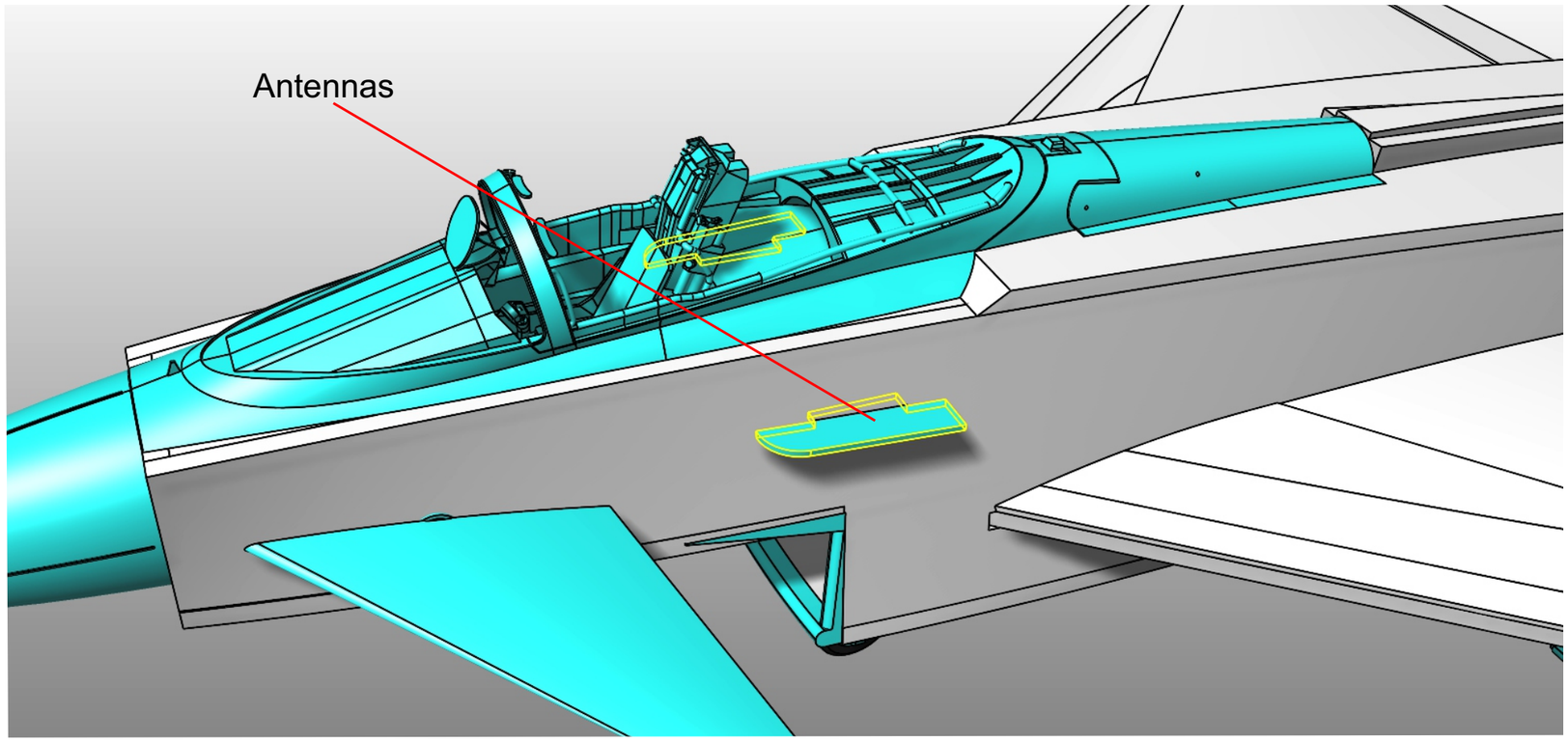
Glue the **Turtledeck Central Pieces** to the Fuselage top panel.



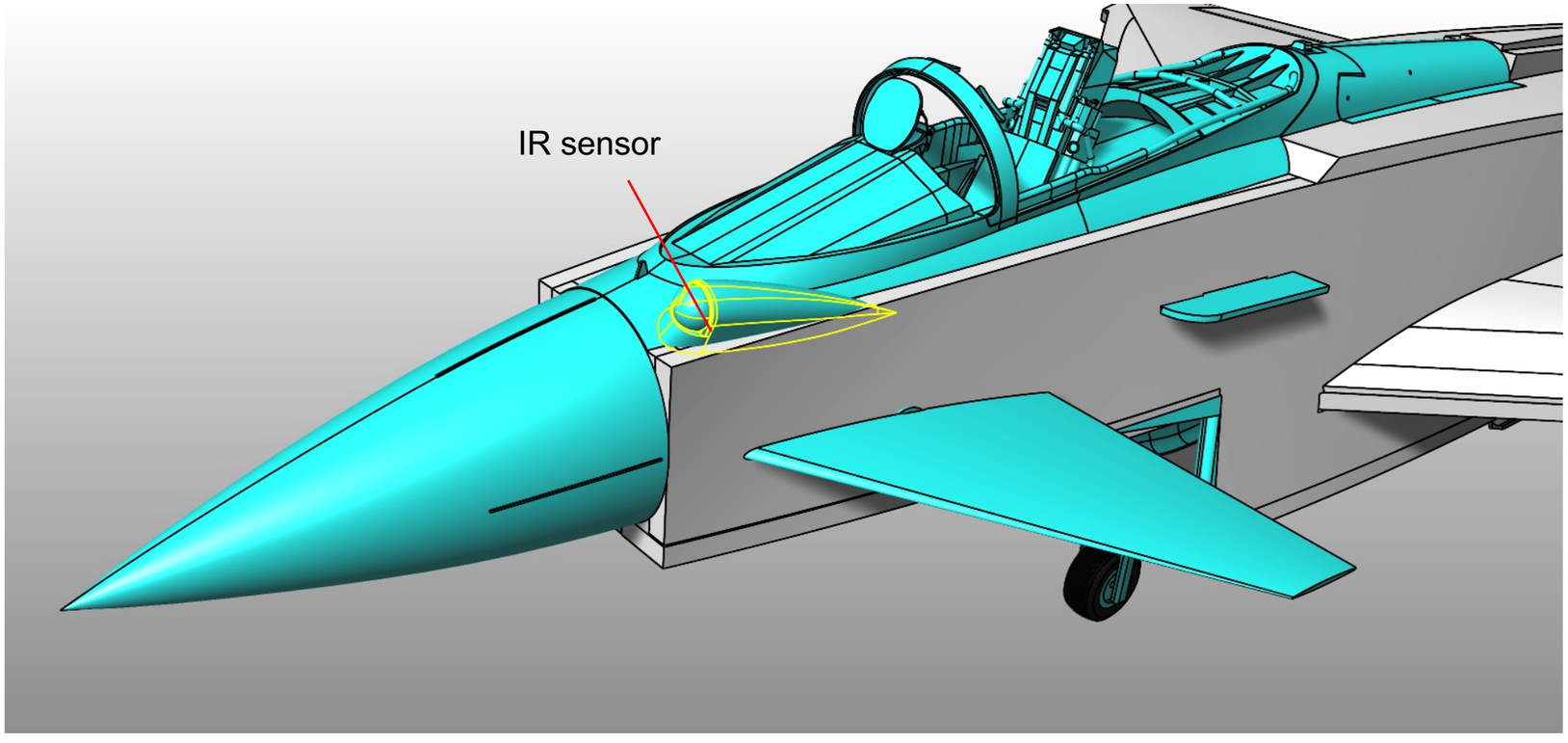
Glue the **Turtledeck sides** to the Turtledeck central pieces as shown.



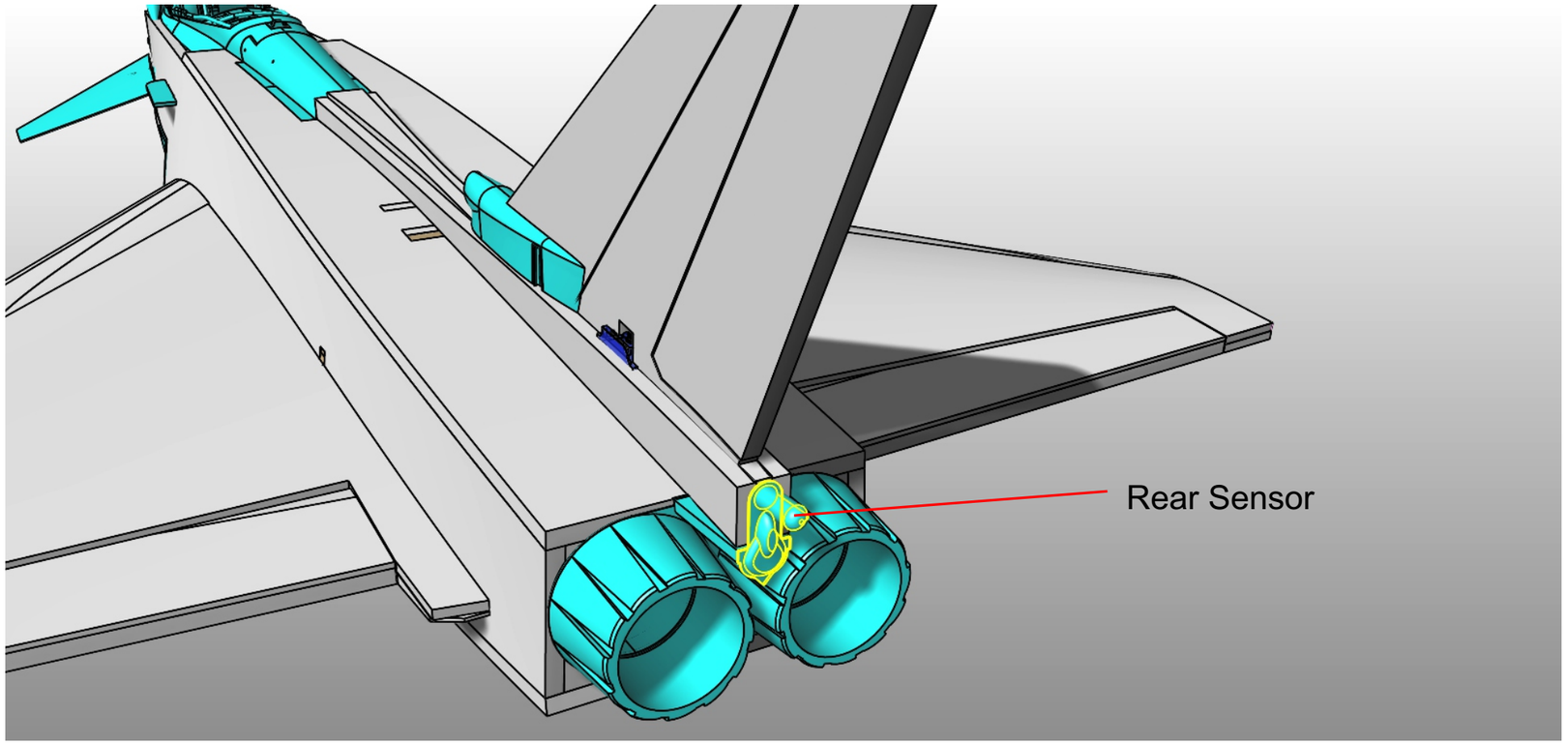
Glue the **Vertical Stabiliser air intake** to the assembly.



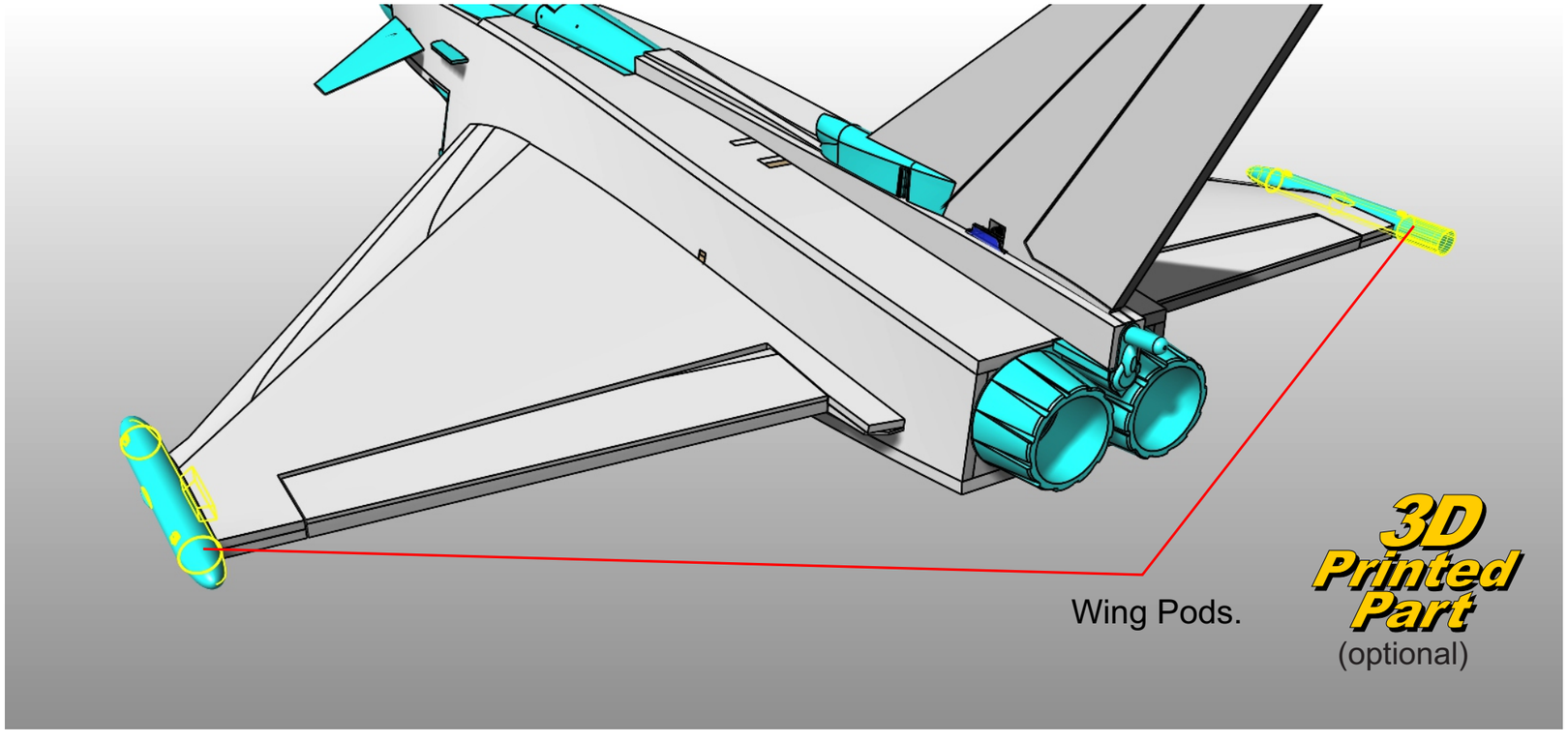
Glue the **Antenna's** onto the sides of the fusalage as shown.



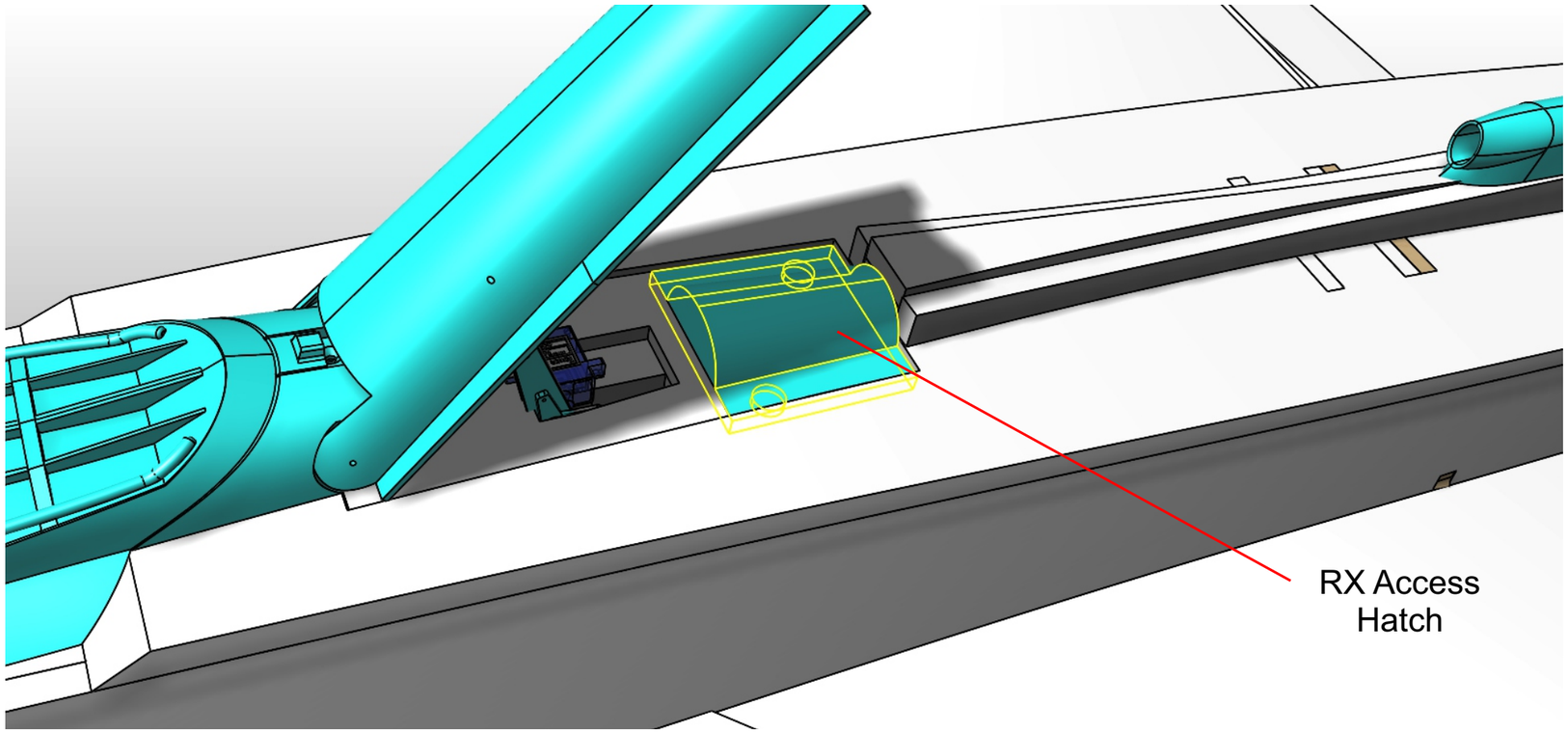
Glue the **IR sensor** to the Cockpit - but not to the foam fuselage.



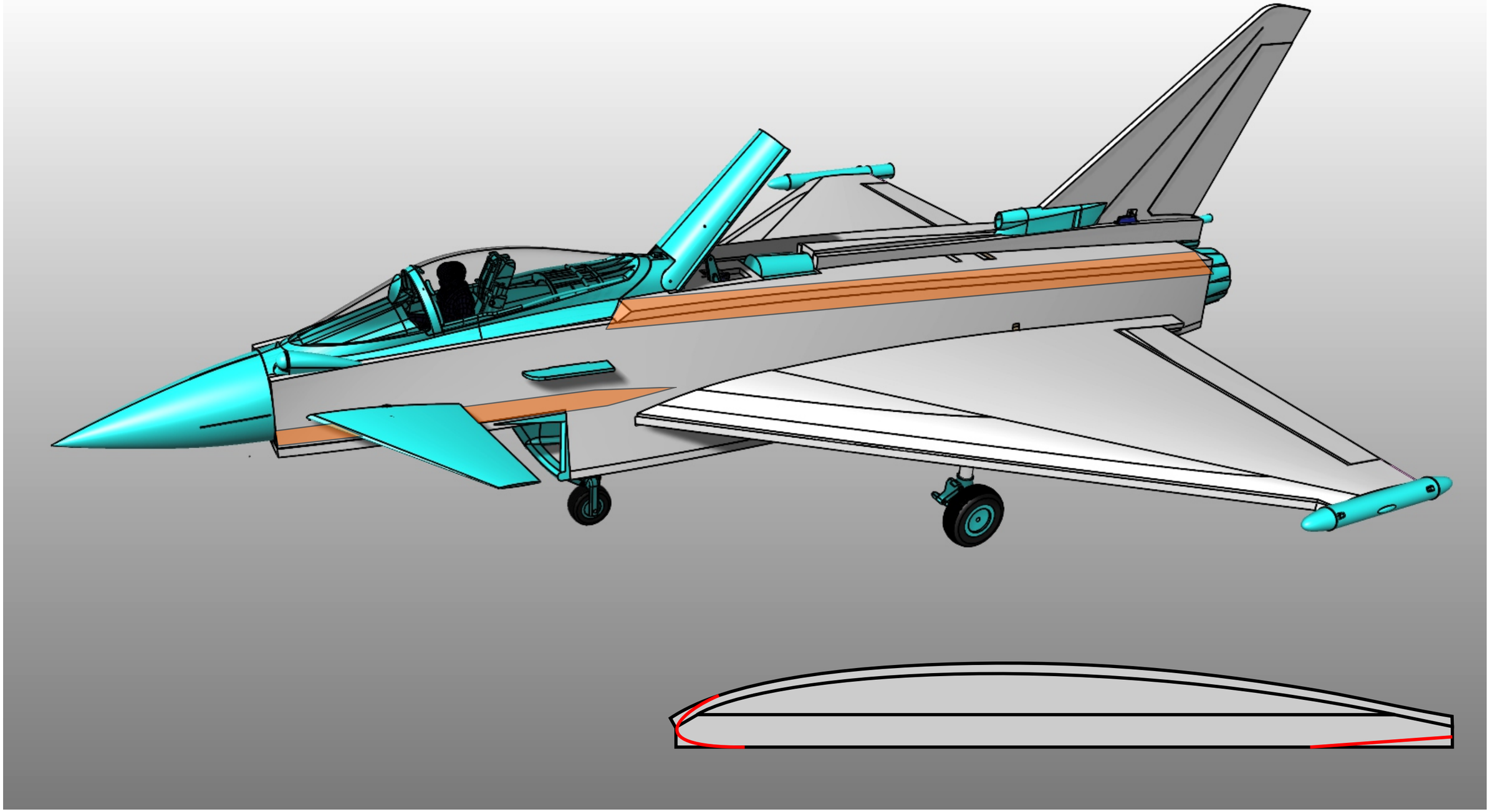
Glue the **Rear Sensor** to the assembly,



Sand the receiving surfaces and then Glue the **Wing Pods** to the wing tips.

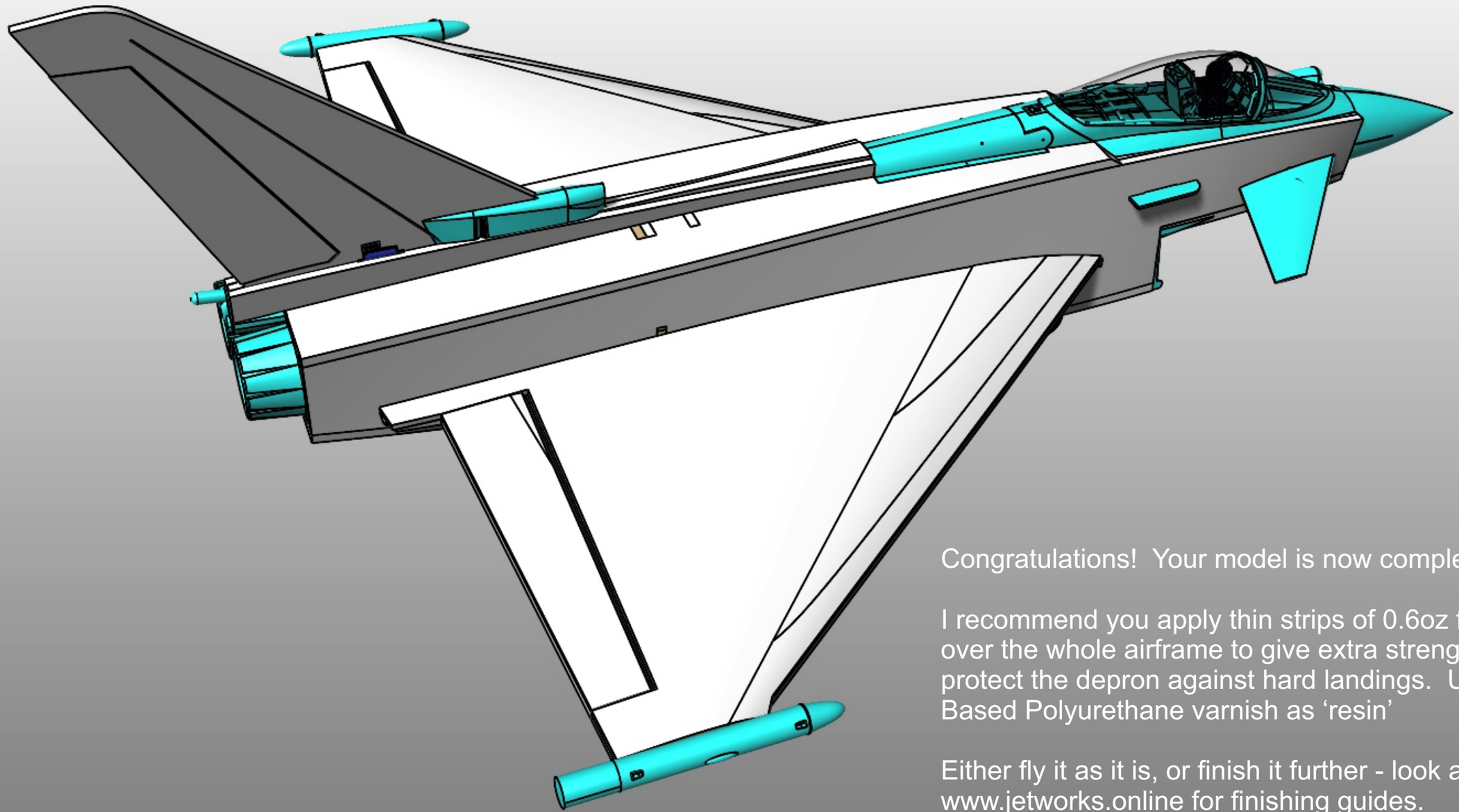


Attach the **RX access hatch** to the assembly using magnets.



Sand the airframe to represent the real aircraft.

Sand the wing airfoil as per the image :-



Congratulations! Your model is now complete.

I recommend you apply thin strips of 0.6oz fibreglass over the whole airframe to give extra strength and to protect the depron against hard landings. Use Water Based Polyurethane varnish as ‘resin’

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 Typhoon. Use them to help finish and detail your model.