

JETWORKS



Saab
Gripen
Parkjet



4.5th Generation Jet Fighter

Construction Guide

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Gripen History

The Saab JAS 39 Gripen (English: griffin) is a light single-engine multirole fighter aircraft manufactured by the Swedish aerospace company Saab AB. The Gripen has a delta wing and canard configuration with relaxed stability design and fly-by-wire flight controls. Various versions have been built, grouped as A-, C- and E-series.

Gripen A- and C-series are powered by the GE F404G engine (previously designated Volvo RM12) and the E-series is powered by the GE F414G engine, and has a top speed of Mach 2. Later aircraft are modified for NATO interoperability standards and air-to-air refuelling.

In 1979, the Swedish government began development studies for an aircraft capable of fighter, attack, and reconnaissance missions to replace the Saab 35 Draken and 37 Viggen in the Swedish Air Force. A new design from Saab was selected and developed as the JAS 39, first flying in 1988, delivery of first serial production airplane occurred in 1993, and entered service with the Swedish Air Force in 1996. Upgraded variants, featuring more advanced avionics and adaptations for longer mission times, began entering service in 2003.

To market the aircraft internationally, Saab formed partnerships and collaborative efforts with overseas aerospace companies, including, in 2001, BAE Systems. On the export market, early models of the Gripen achieved moderate success in sales to nations in Central Europe, South Africa, and Southeast Asia; bribery was suspected in some of these procurements, but authorities closed the investigation in 2009.

An updated and redeveloped version, designated Gripen JAS 39E/F but previously referred to as Gripen NG or Super JAS, began deliveries to the Swedish and Brazilian Air Forces as of 2019. The changes from the C-series to E-series include the adoption of a new powerplant, the General Electric F414G, an active electronically scanned array (AESA) radar, and significantly increased internal fuel capacity. As of 2020, more than 271 Gripens of all models, A–F, have been built.



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Designers Notes

There is something that I love about Swedish Jets, The Gripen being the latest in a fantastic heritage of radically different but very cool fighters!

Such a great profile in the sky with great pitch control and axial roll make it very agile and controllable in the sky.

Available as a 70mm, 64mm EDF or Pusher prop.

Can be made with or without 3D printed parts.



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-balloons 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!)

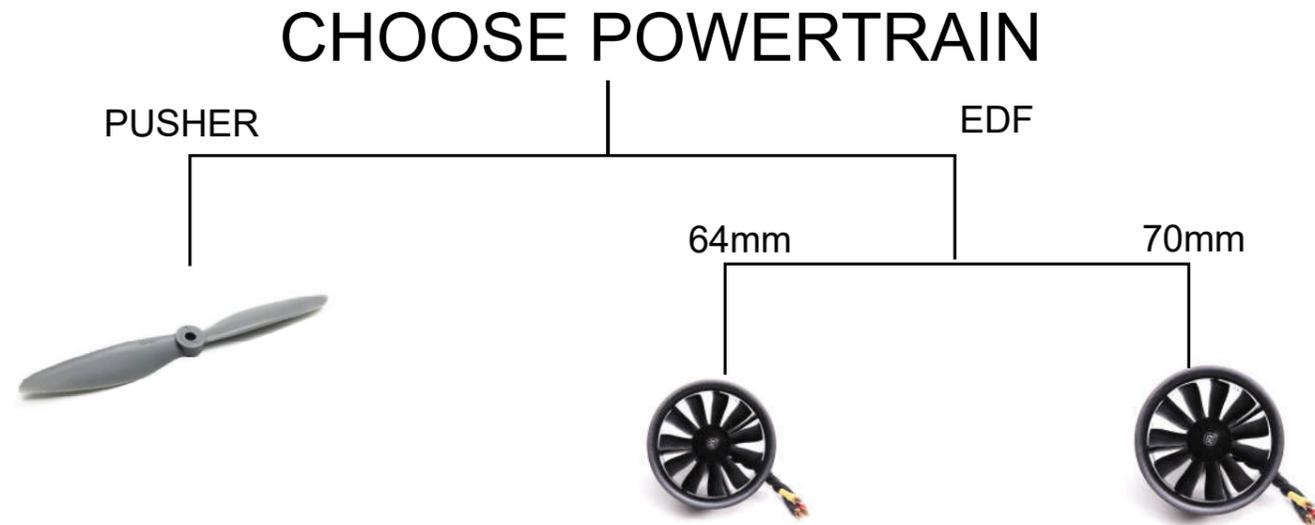
IMPORTANT Wherever the plans call for marking guidelines onto the depron, please ensure that you do otherwise it can cause problems later on. I suggest you use a Sharpie Fineliner to transfer the lines.

Glueing parts together.

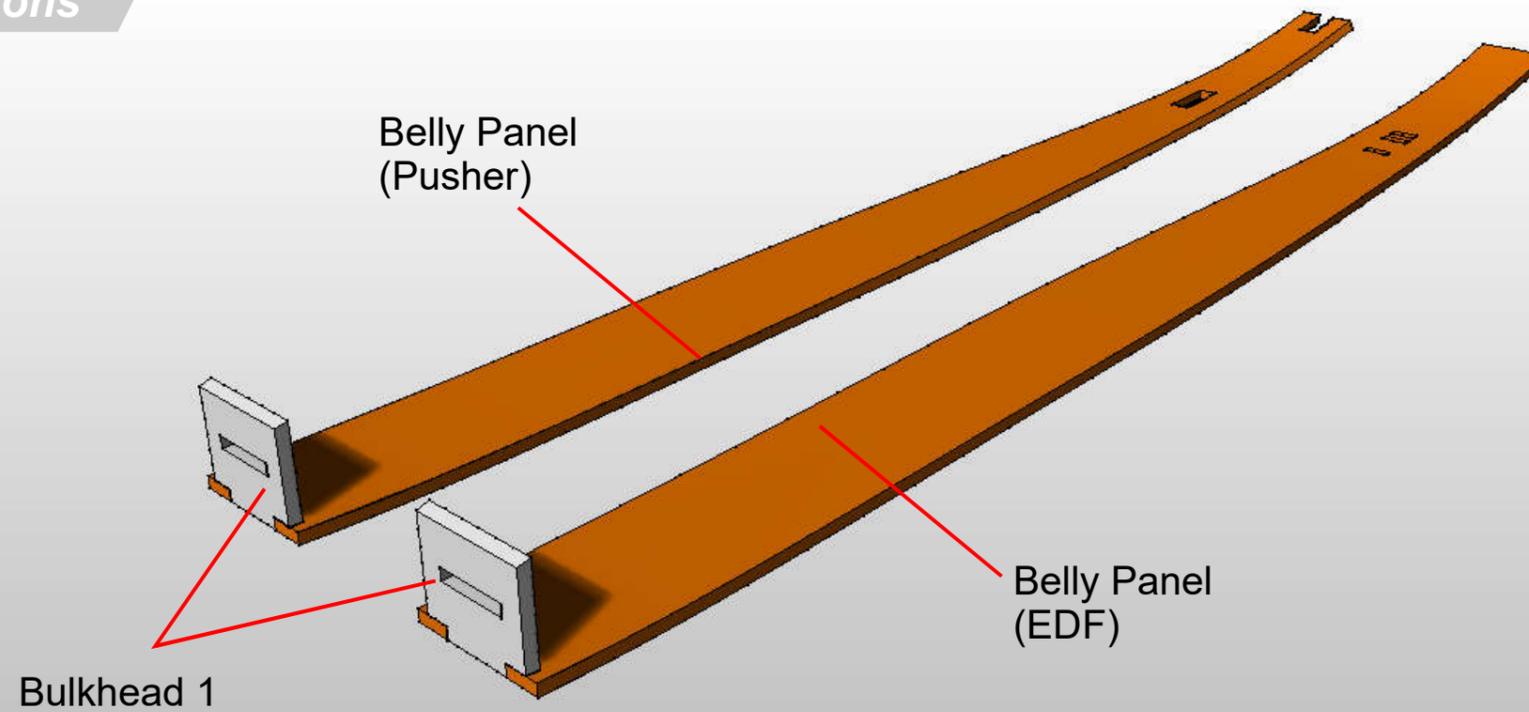
1. Ensure a really good fit - this will reduce the amount of adhesive used. The Bar Sander is a great tool for this.
2. Follow the adhesive instructions closely.
3. Use ordinary steel head pins to help keep the parts located whilst epoxy sets.
4. Use objects as weights such as paperweights to apply pressure whilst adhesive sets.
5. Use masking tape to apply pressure whilst adhesive sets. Also use masking tape to along the slots for the wing spars whilst gluing the carbon rod spars into the wings. This prevents the glue protruding and gives a nice finish.



Choose your preferred variant and its powertrain.



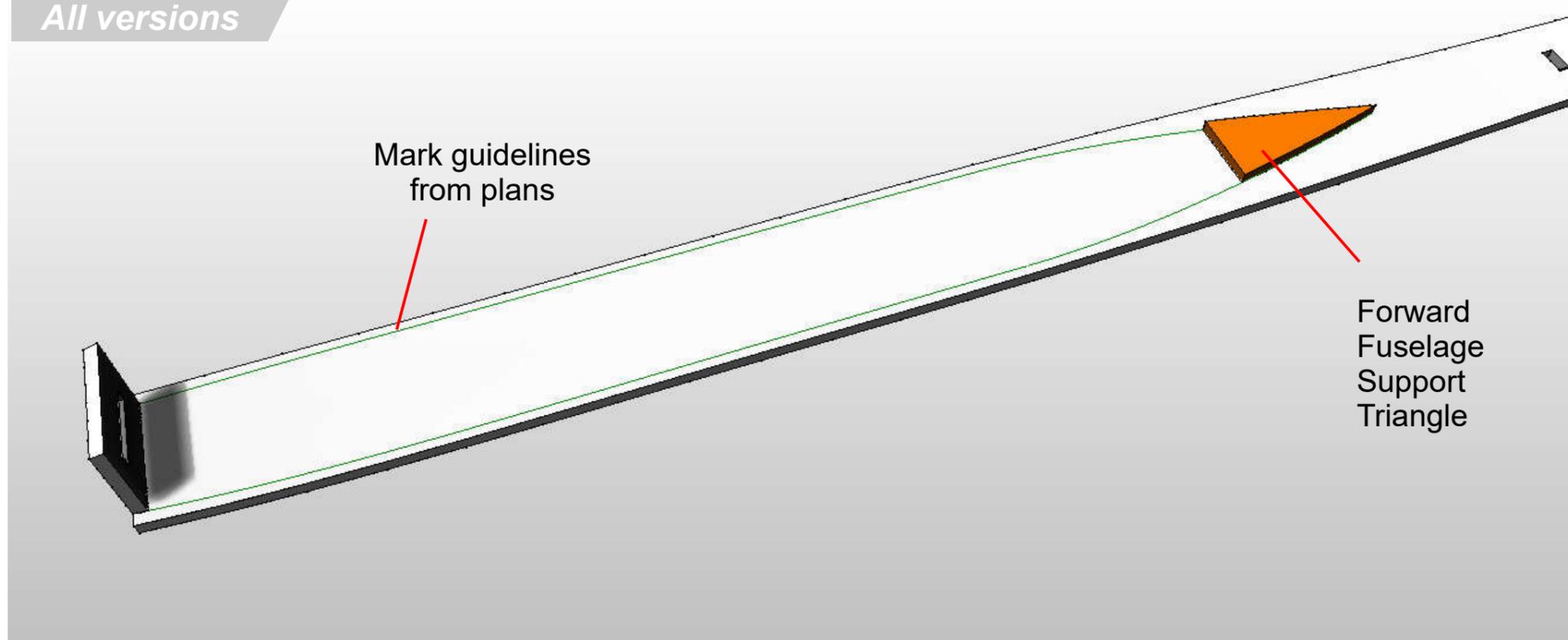
All versions



Glue **Bulkhead1** to the **Belly Panel**



All versions

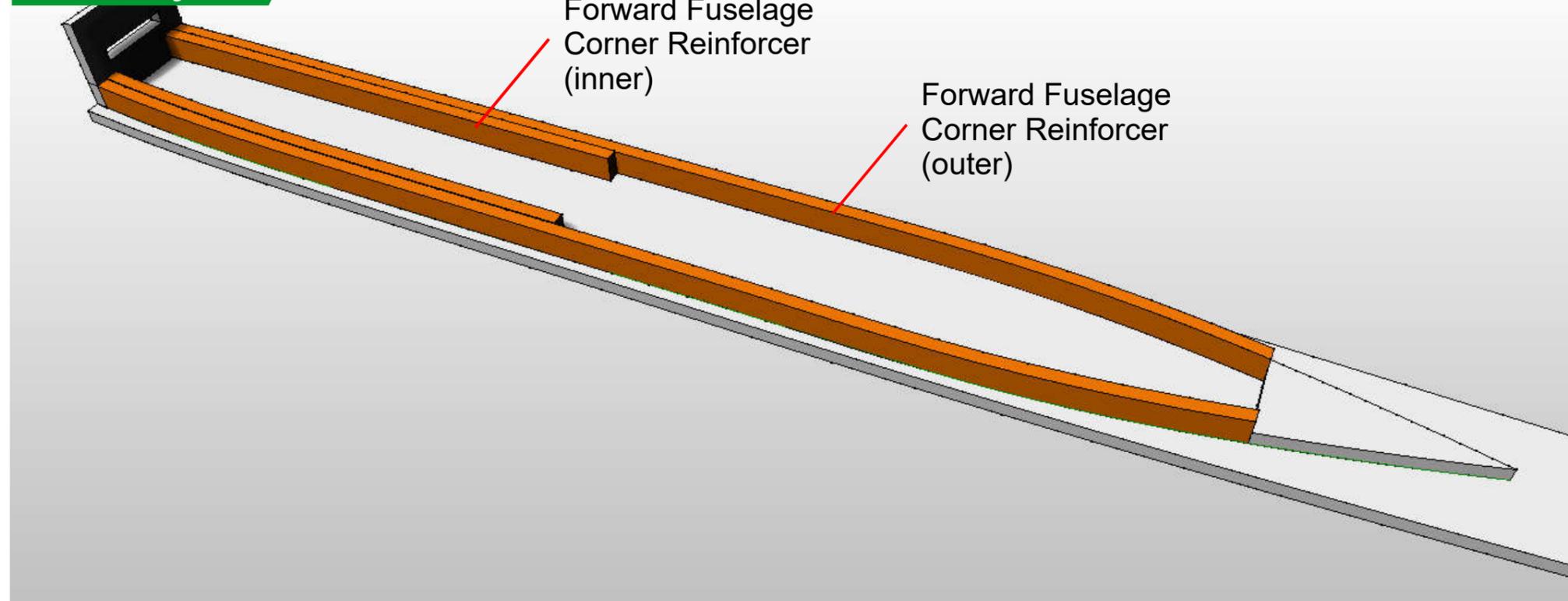


Mark the Fuselage sides guidelines from the plans onto the Belly panel.

Glue the **Forward Fuselage Support triangle** in place.



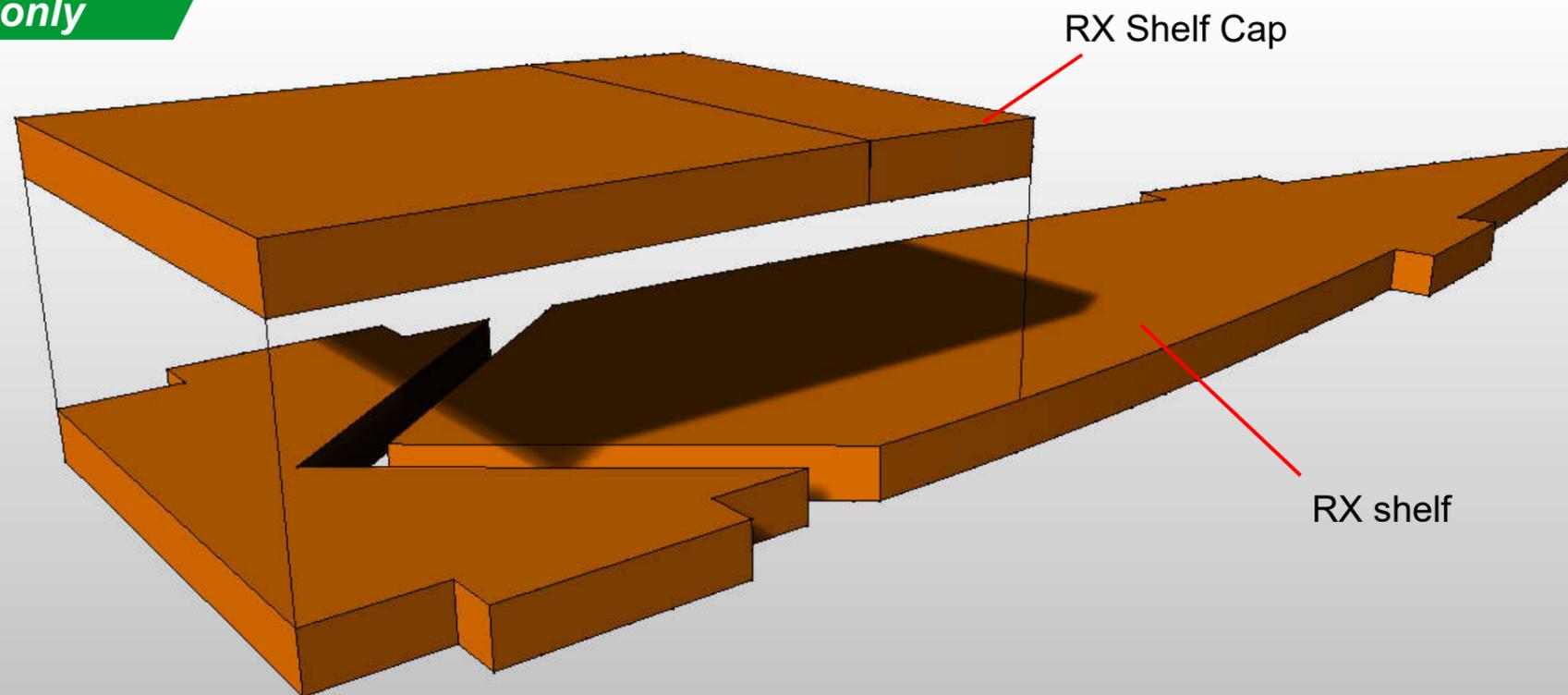
EDF only



Align the strips to the belly panel markings and glue both **Forward Fuselage Corner Reinforcers** in place.



EDF only



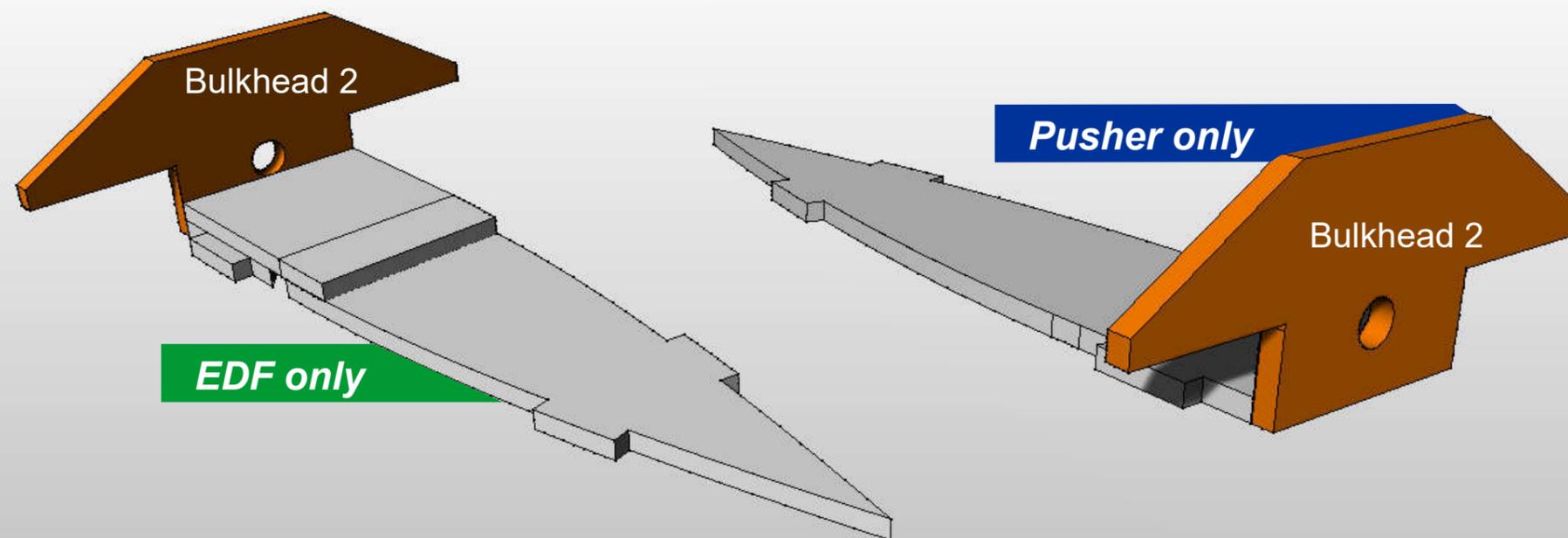
RX Shelf Cap

RX shelf

Glue the **EDF RX Shelf Cap** to the **EDF RX Shelf** leaving a 6mm 'Chevron' shaped gap on the RX shelf as shown. (This is to accept 2 mitred wing spars)



Glue **Bulkhead 2** the RX shelf assembly as shown.



Bulkhead 2

Pusher only

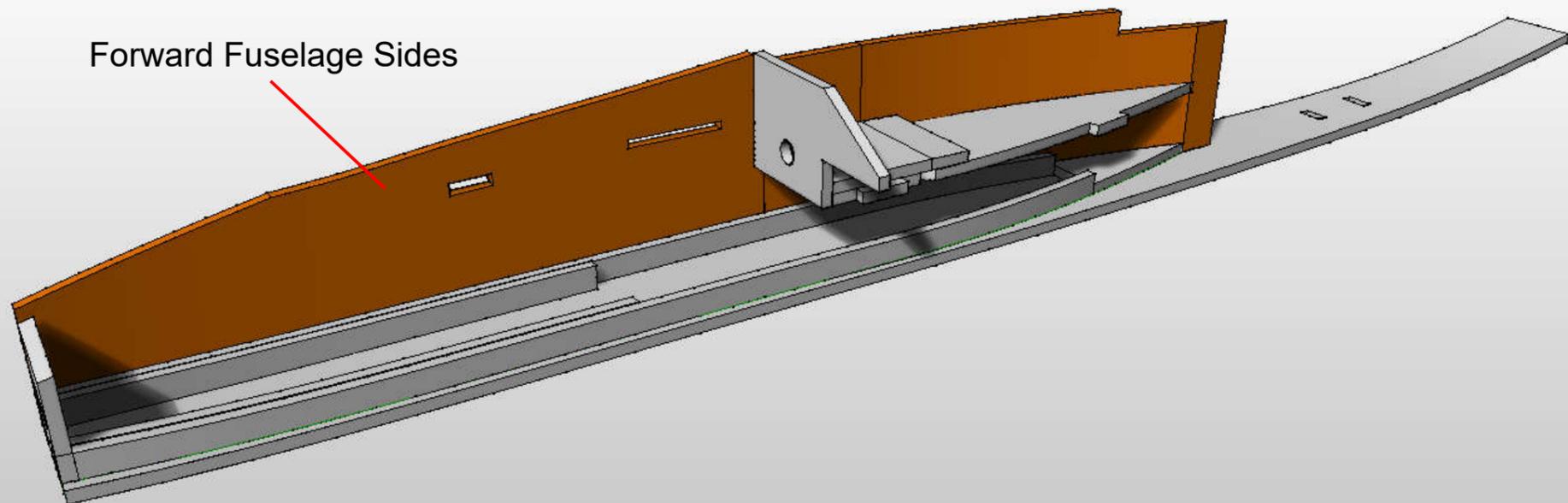
Bulkhead 2

EDF only



All versions

Forward Fuselage Sides

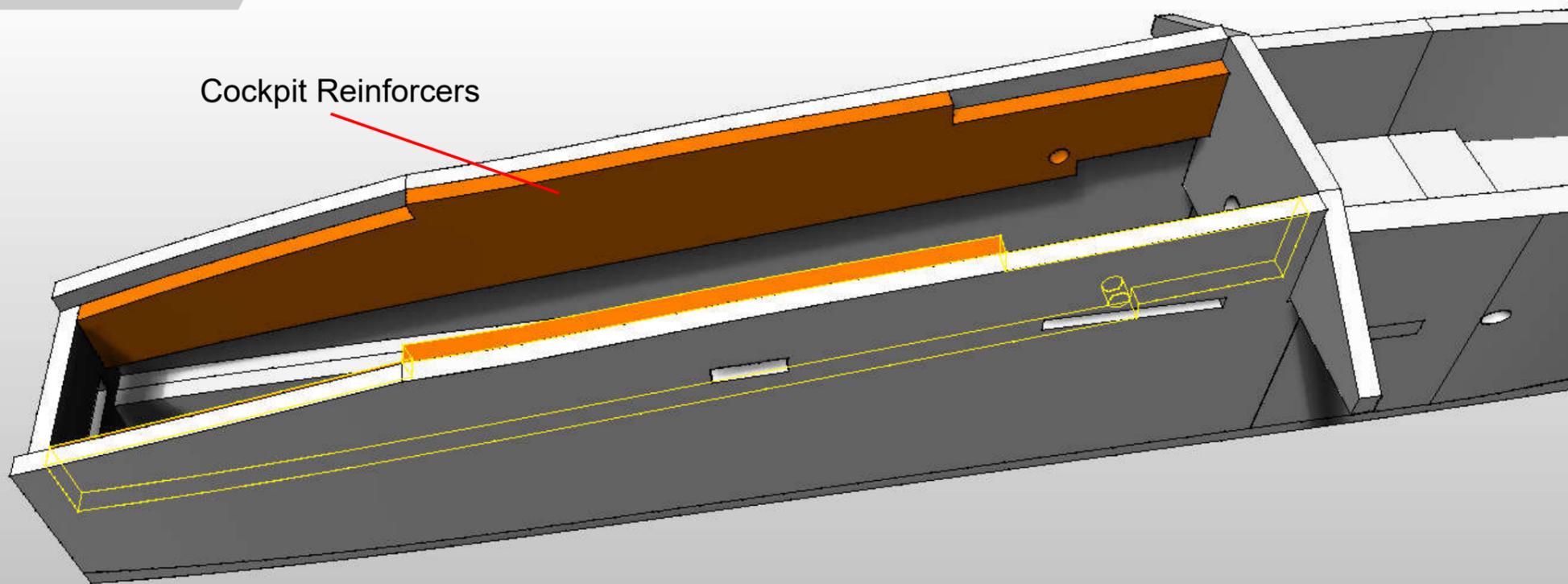


Pre-curve the **Forward fuselage sides** as shown and glue to the belly assembly, then glue the RX assembly to the sides in the slots provided.



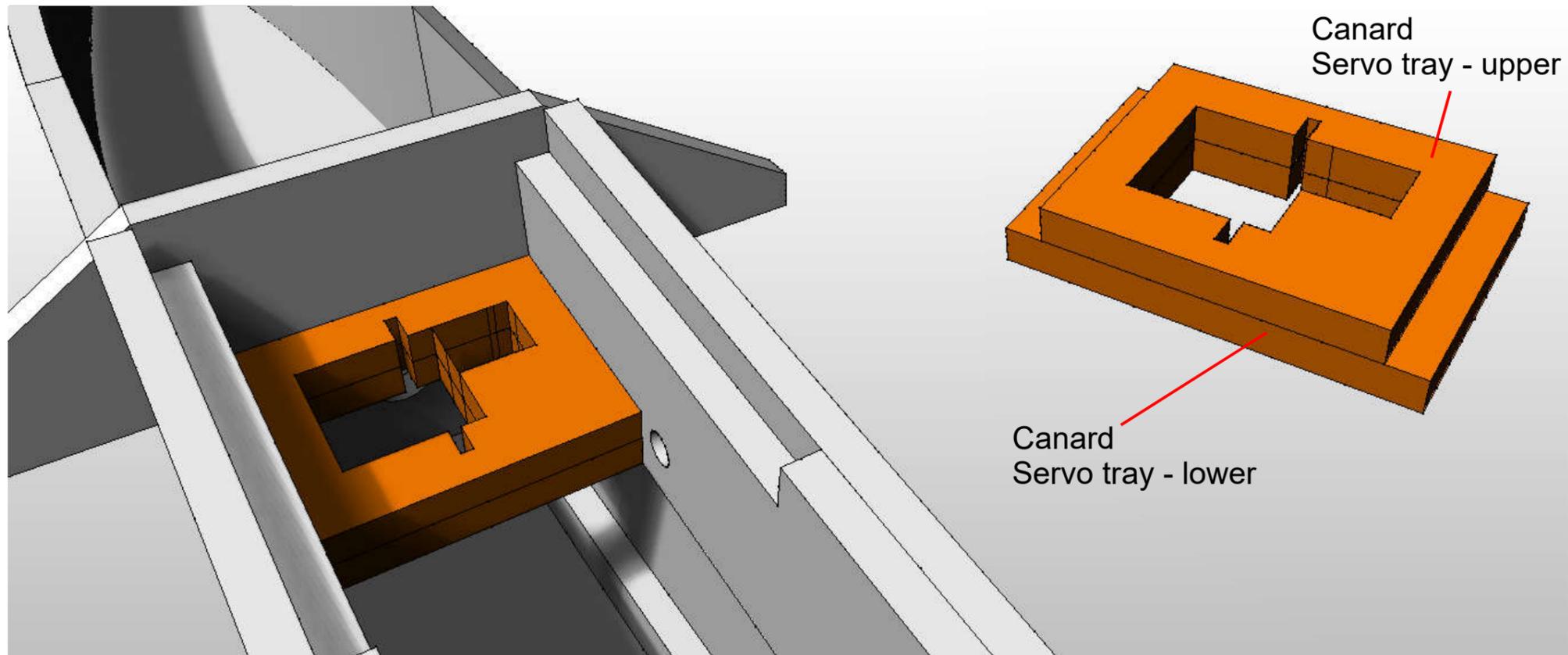
All versions

Cockpit Reinforcers



Glue the **Cockpit reinforcers** to the assembly as shown.



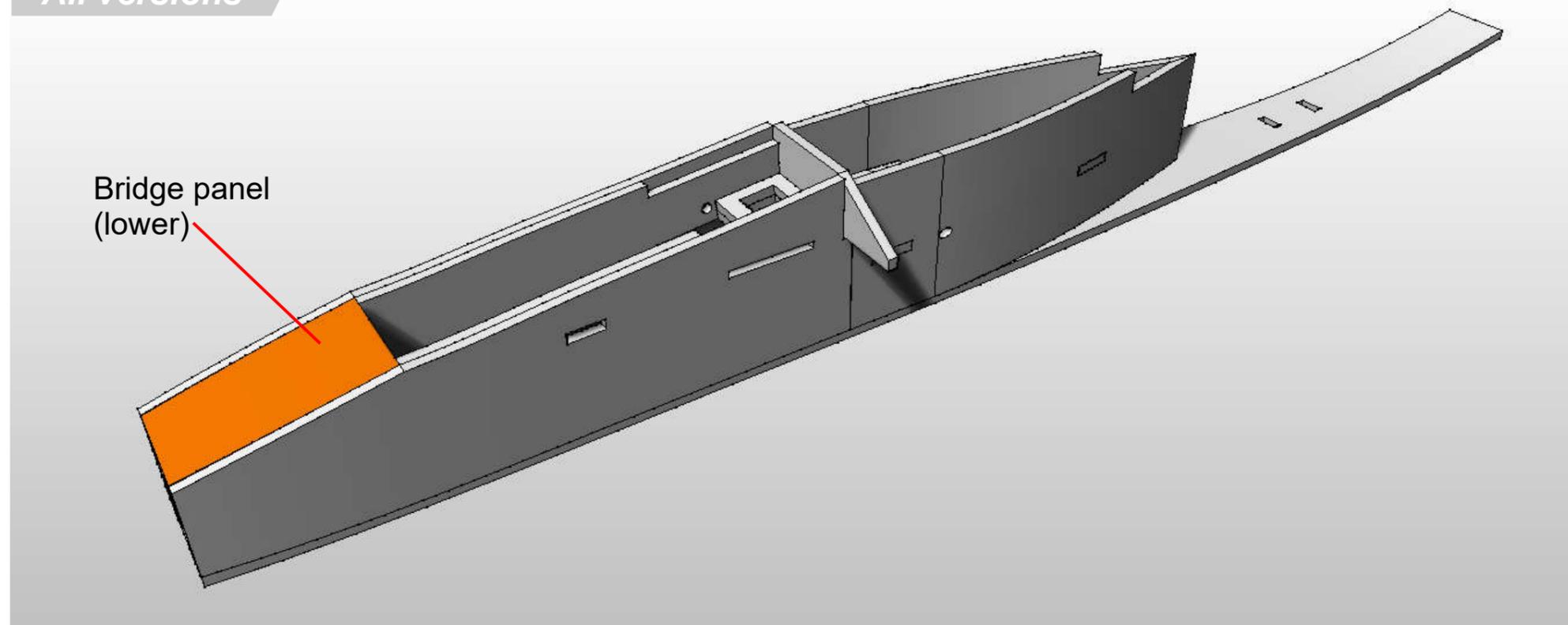


Glue the two parts of the **Canard Servo tray** together using UHU por.

Using Epoxy, slide it up into the recess made for it at the bottom of the cockpit reinforcers.



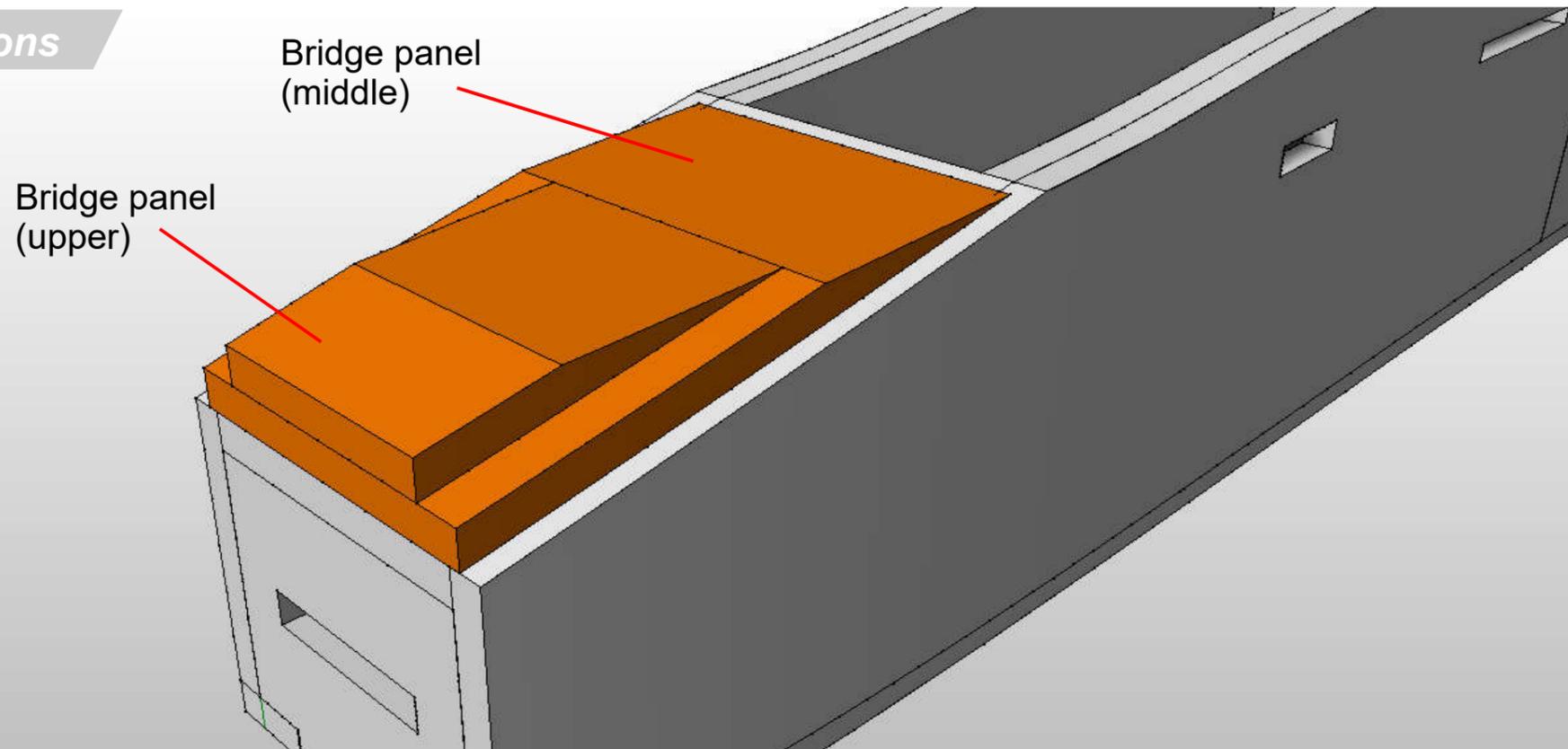
All versions



Glue the **Bridge Panel (Lower)** to the fuselage.



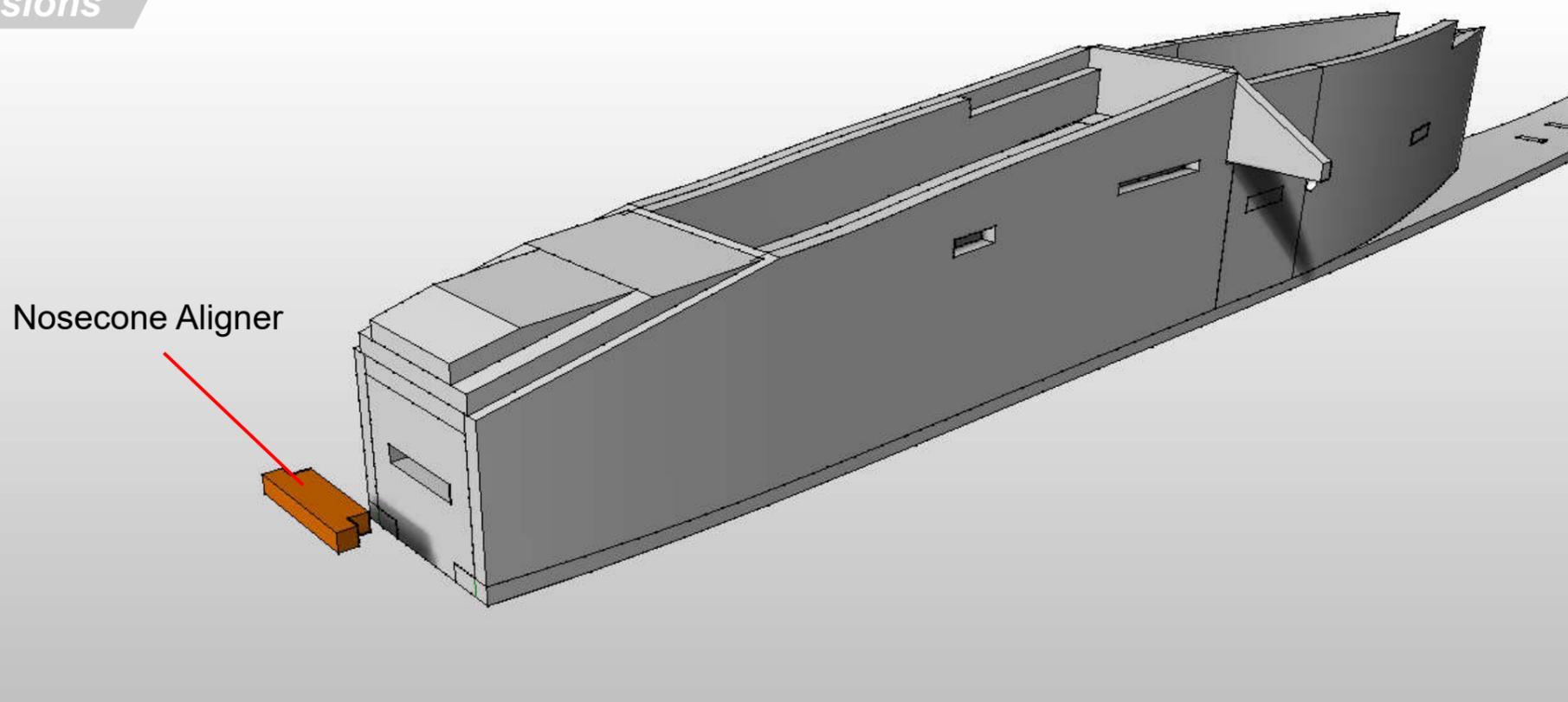
All versions



Glue the **Bridge Panel (middle)** and **Bridge Panel (upper)** to the fuselage.



All versions

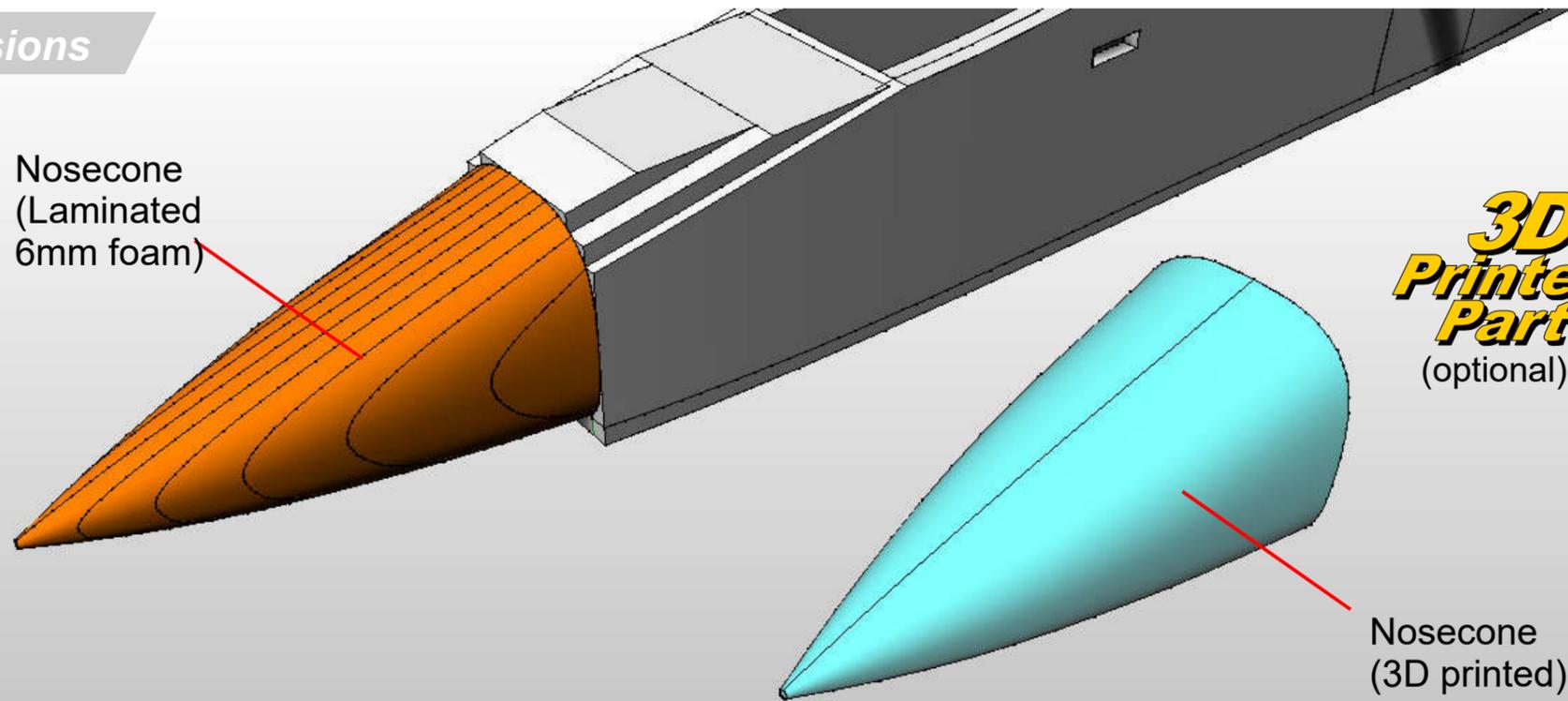


Glue the **Nosecone aligner** to the fuselage.



All versions

Nosecone
(Laminated
6mm foam)



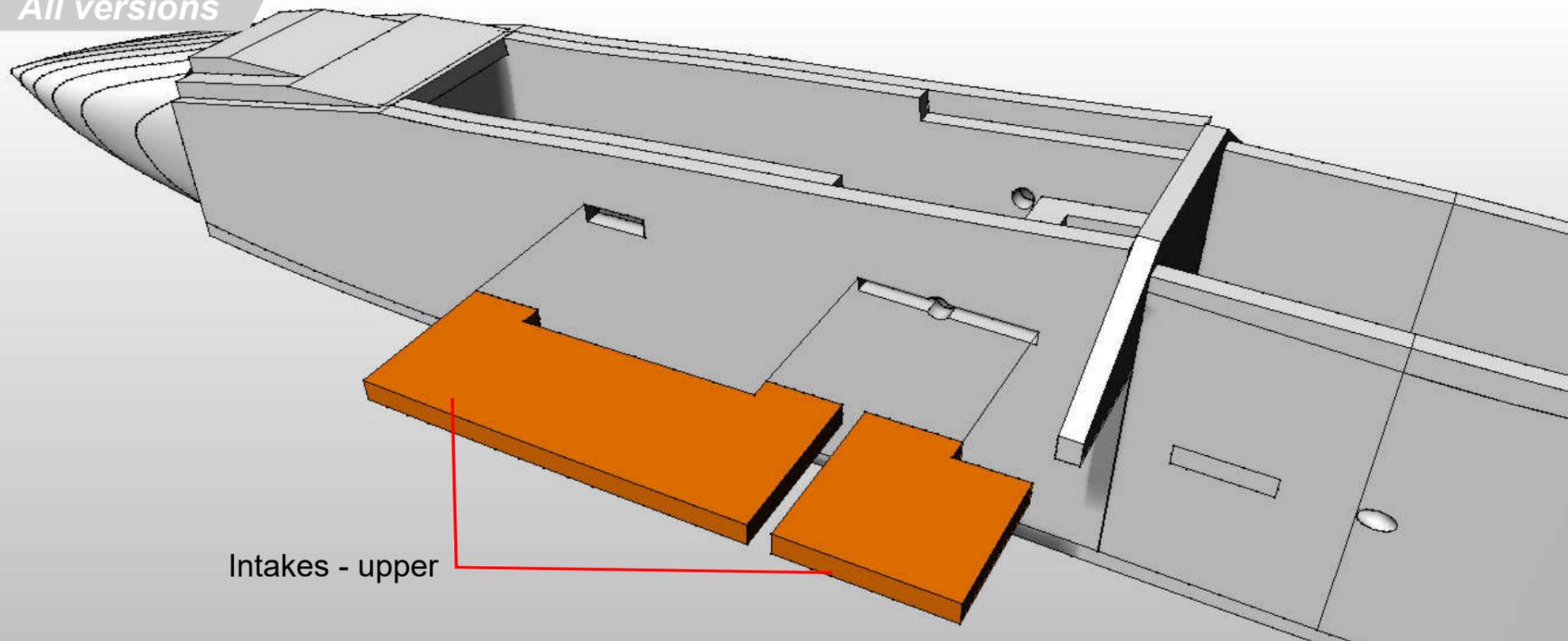
**3D
Printed
Part**
(optional)

Nosecone
(3D printed)

Glue the **Nosecone** to the fuselage using the aligner to position correctly.



All versions



Intakes - upper

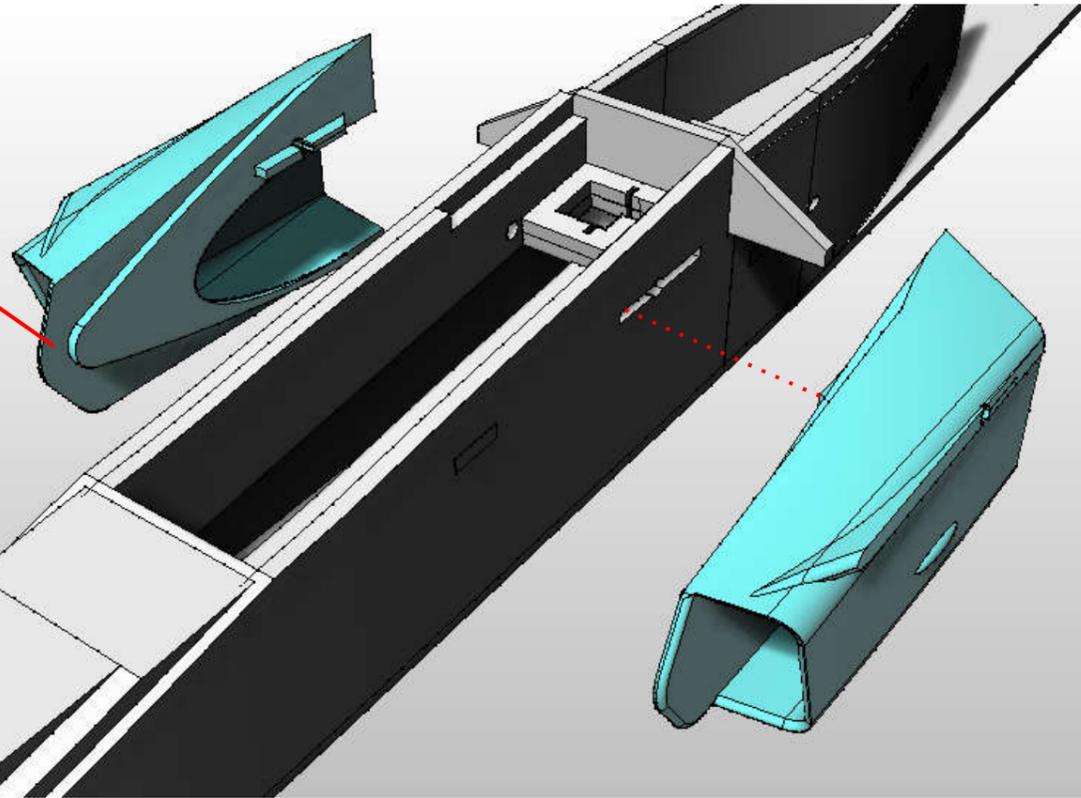
NON 3D PRINTED INTAKES

Glue the **Intakes (upper)** to the fuselage aligning to the triangular part of bulkhead 2.



Pusher only

Intake
(Pusher version)



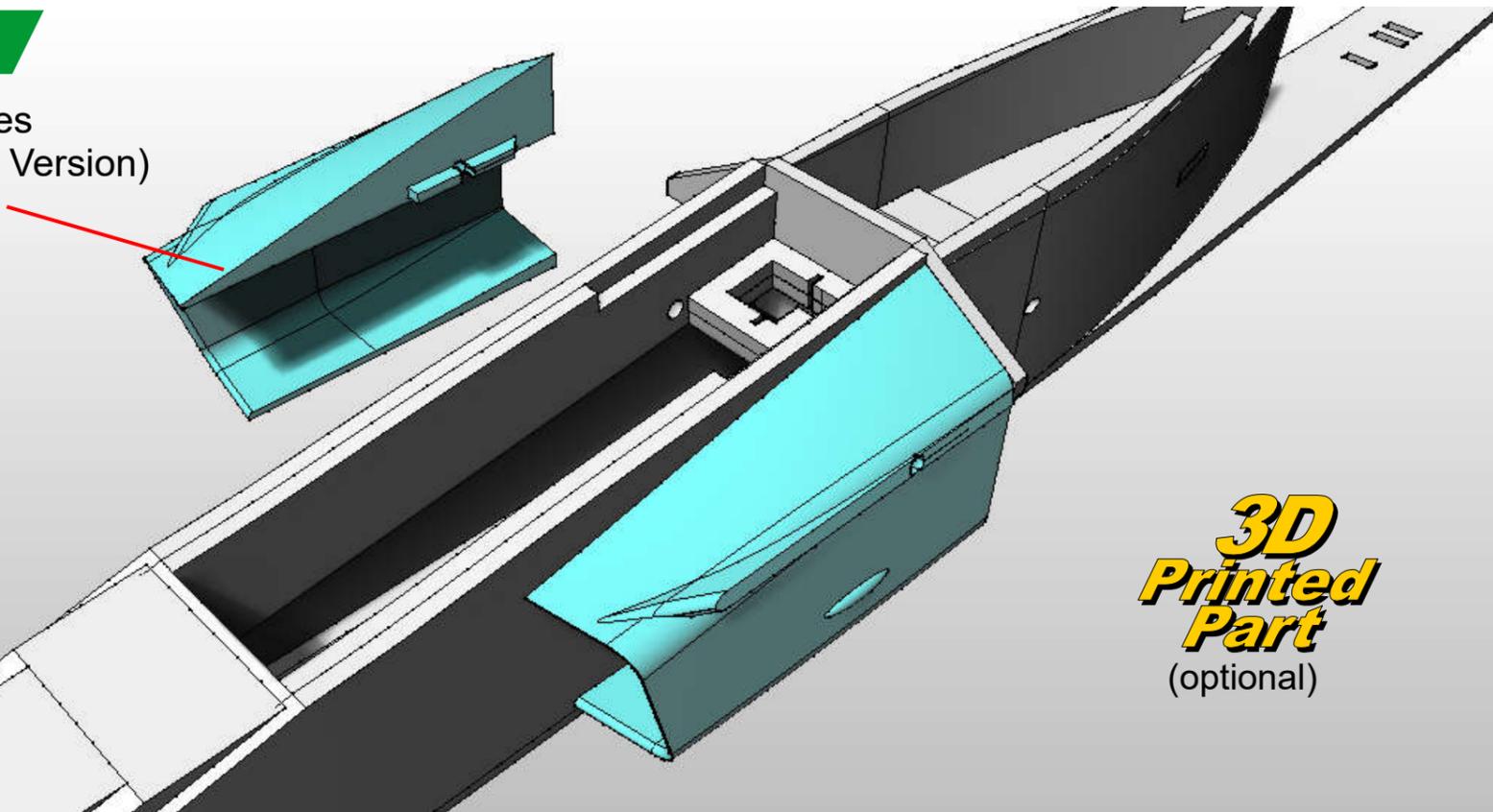
**3D
Printed
Part**
(optional)

Glue the 3D printed **Intake** to the fuselage using the aligner to position correctly.



EDF only

Intakes
(EDF Version)



**3D
Printed
Part**
(optional)

The EDF version has had the splitter removed to get the volume of air to the EDF unit.



All versions

aluminium tubes 7.14 x .355mm (9/32 x .014")

Aluminium tube
6mm Carbon spar

Aluminium Tube



NON 3D PRINTED INTAKES

Thread the carbon spar through the two aluminium tubes and position everything as per the image. Wrap masking tape around the carbon overlapping the ends of each aluminium tube by 2-3mm to prevent glue getting into the tubes.

Glue in place - using masking tape to help hold it in position while it sets.



All versions

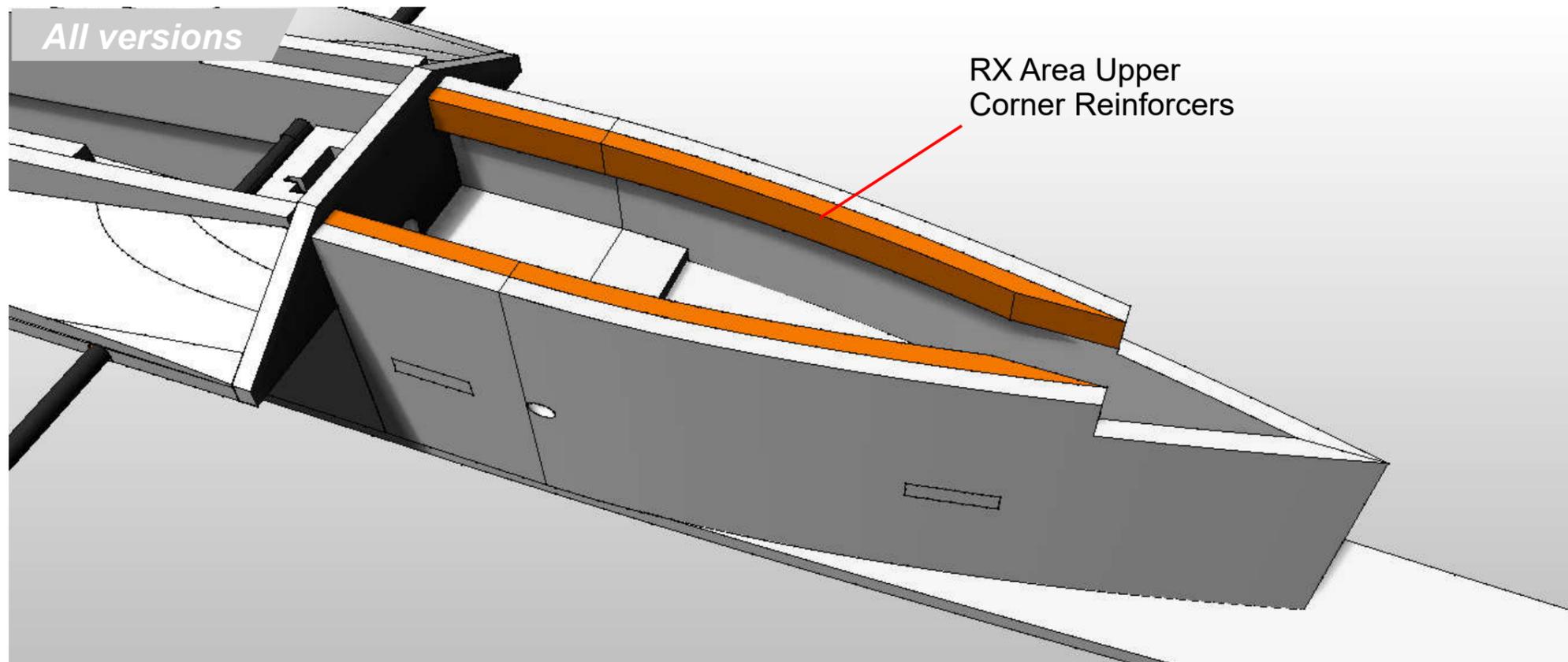
Intakes upper contoured pieces

NON 3D PRINTED INTAKES

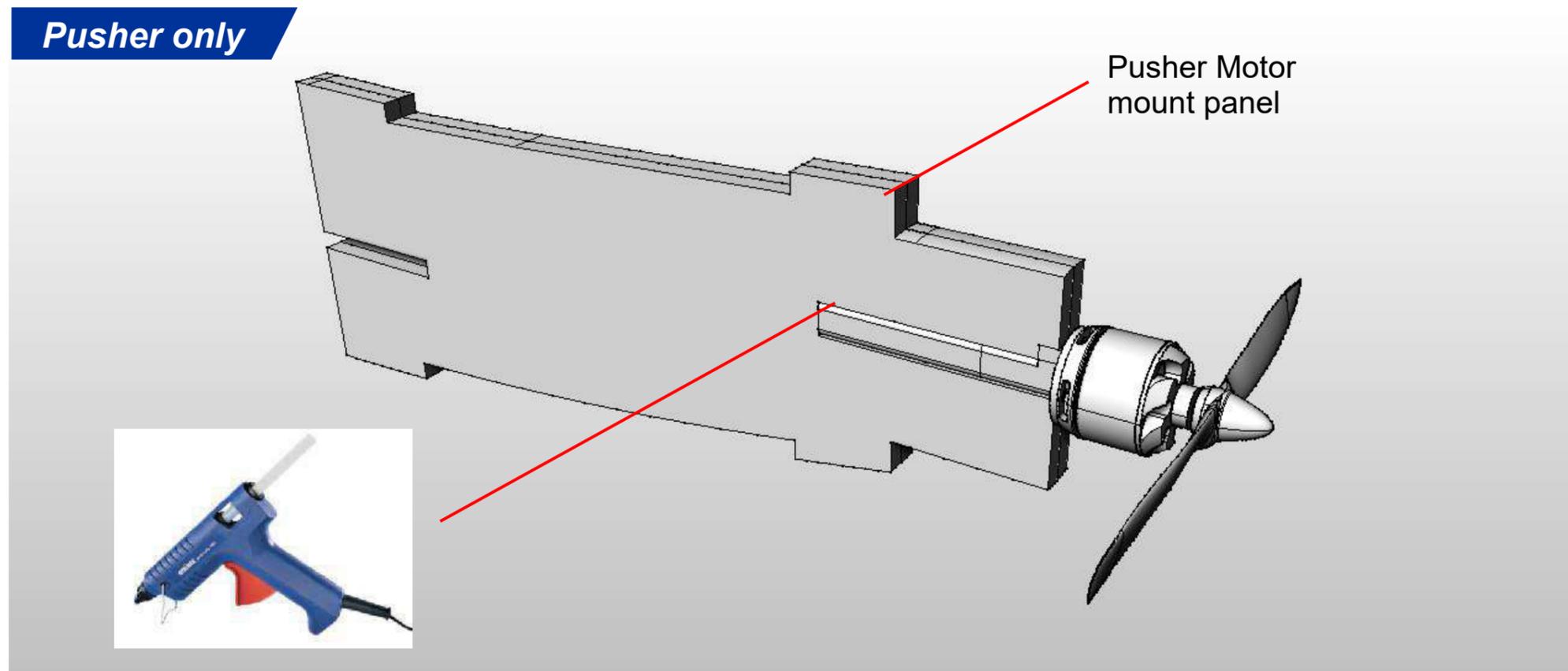
Glue the **Intakes Upper Contoured pieces** together and sand to shape.

Glue to fuselage.





Glue the **RX Area Upper Corner Reinforcers** to the assembly.



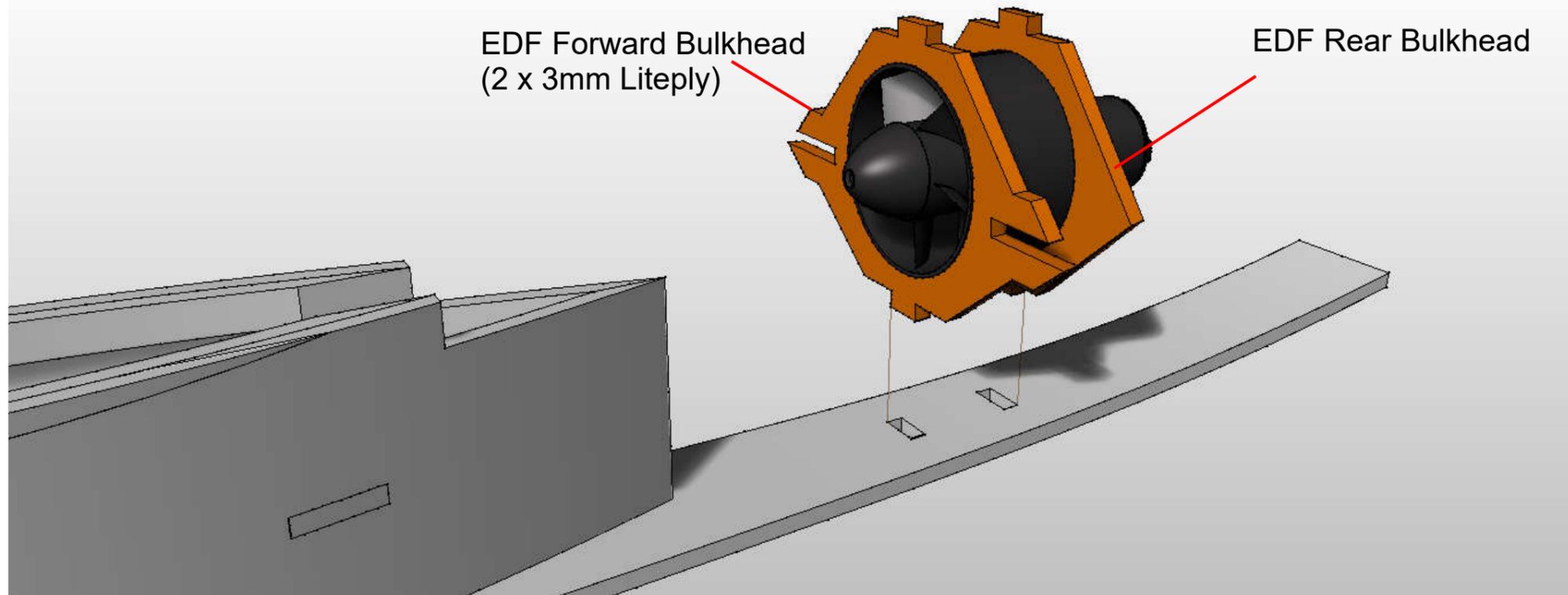
PUSHER VERSION

Glue the **Pusher motor mount panels** together using UHU por,

Glue the plastic stick mount into the slot using Hot Melt Glue.



EDF only

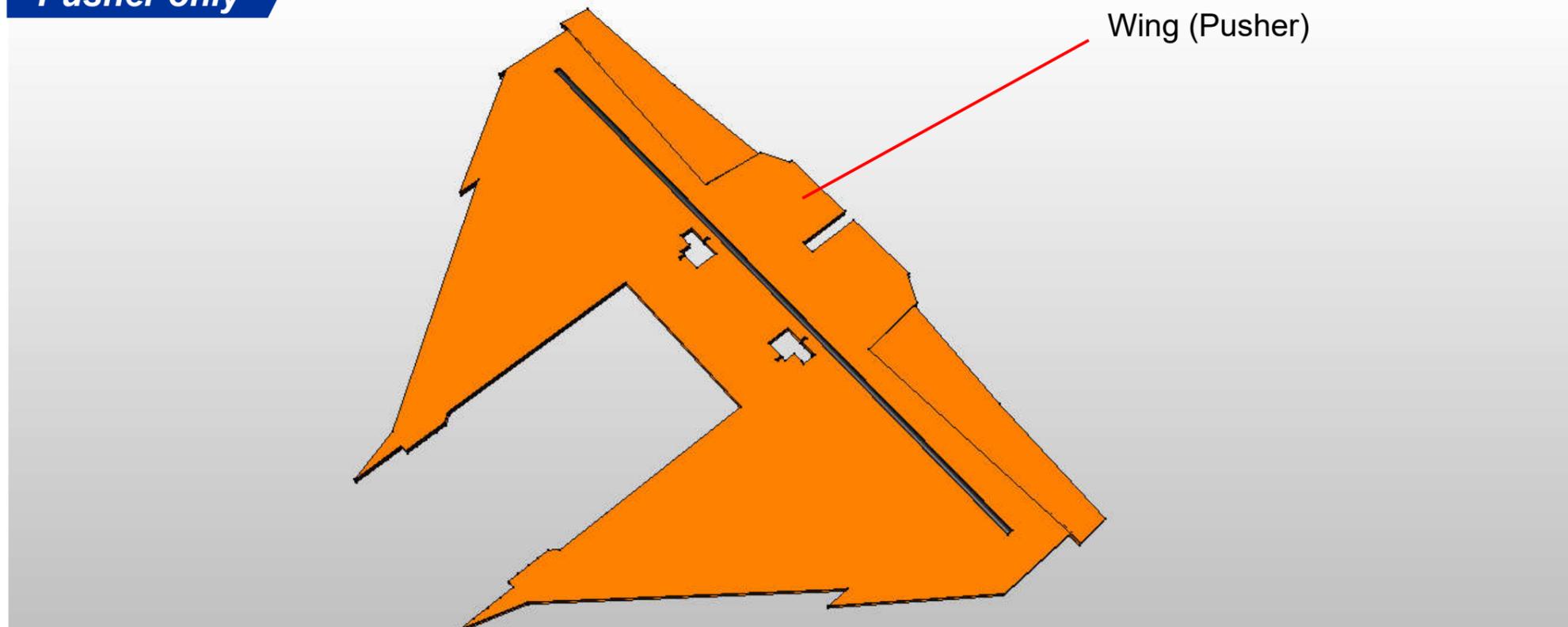


Trim the **EDF Bulkheads** to fit your EDF unit, then glue the bulkheads to the belly panel.

At this stage don't glue the edf to the bulkheads but leave it in.



Pusher only

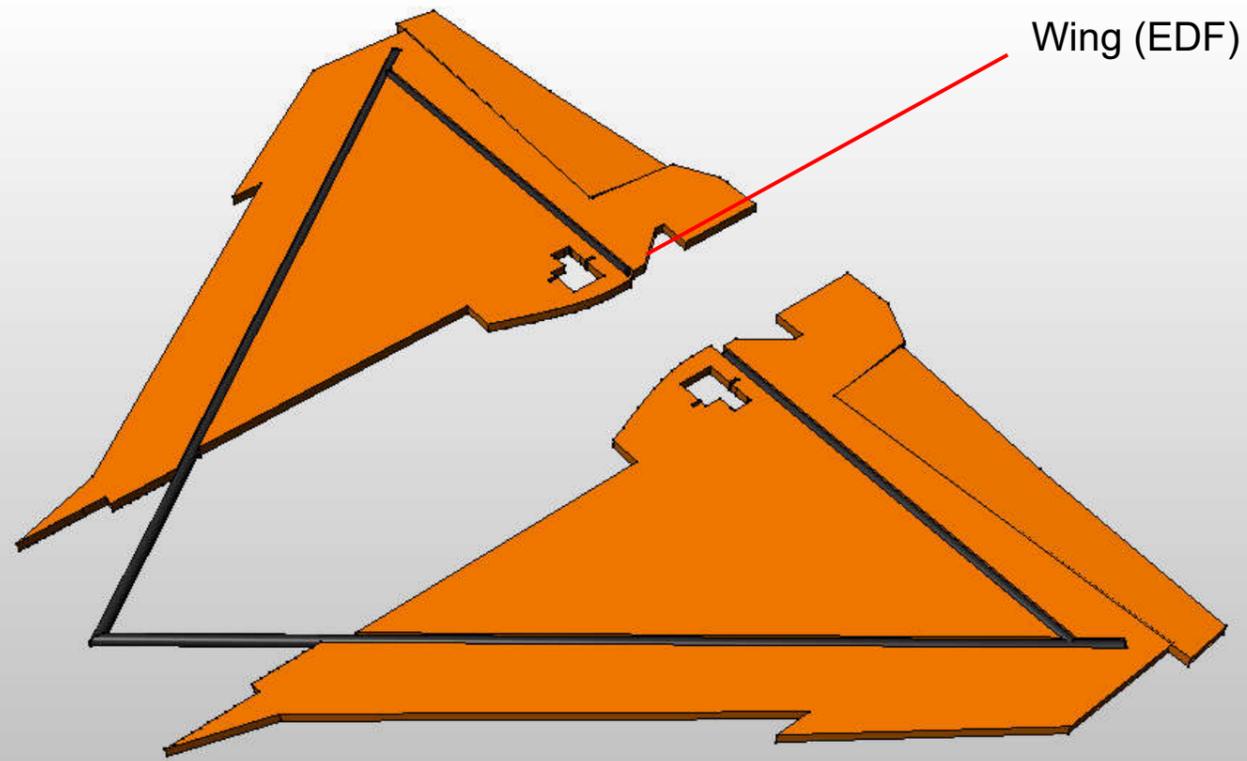


PUSHER VERSION

Glue 6mm Carbon spar into the **Wing** using epoxy and masking tape.



EDF only



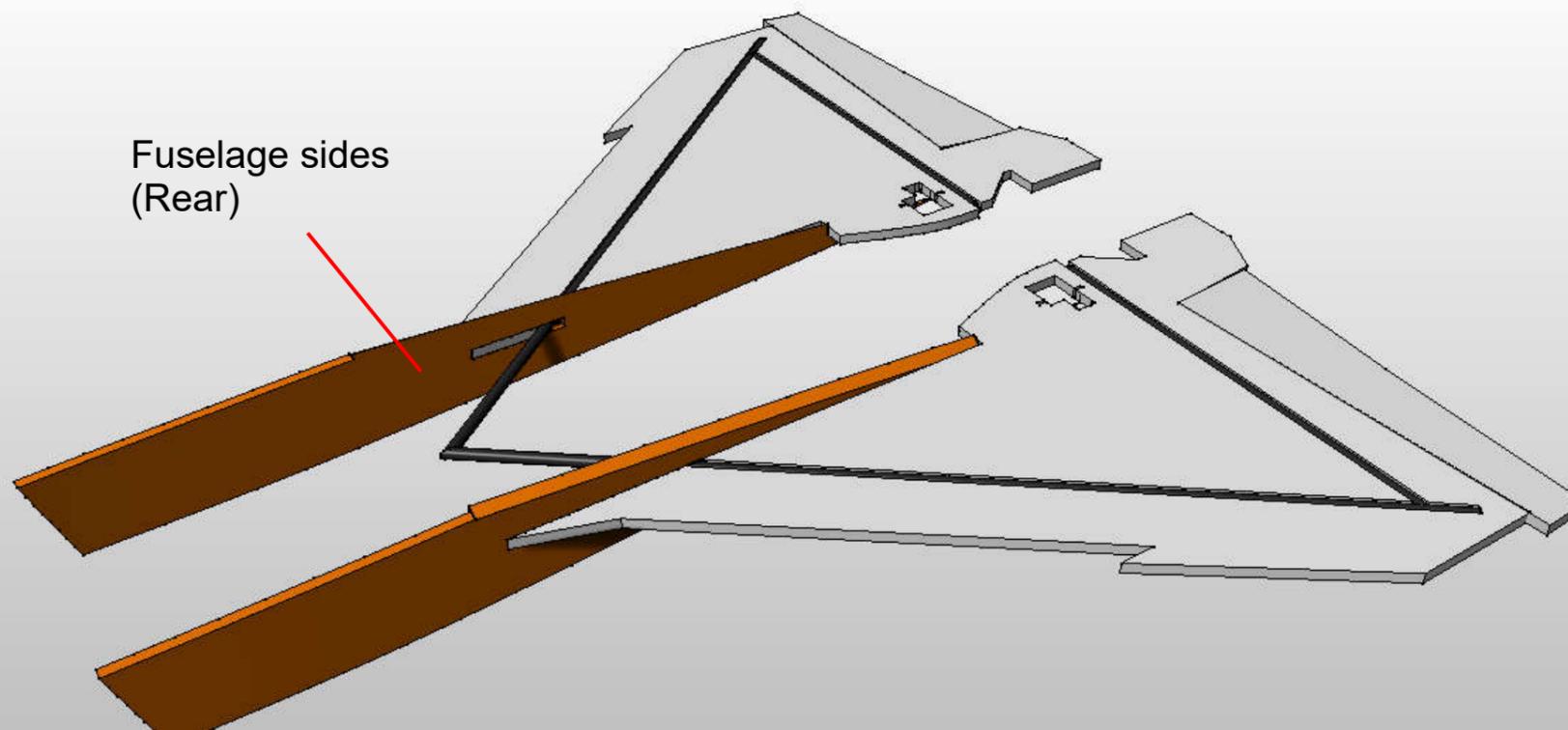
EDF VERSION

Glue 6mm Carbon spar into the **Wing** using epoxy and masking tape.

Ensure they are trimmed exactly to size and angle



All versions

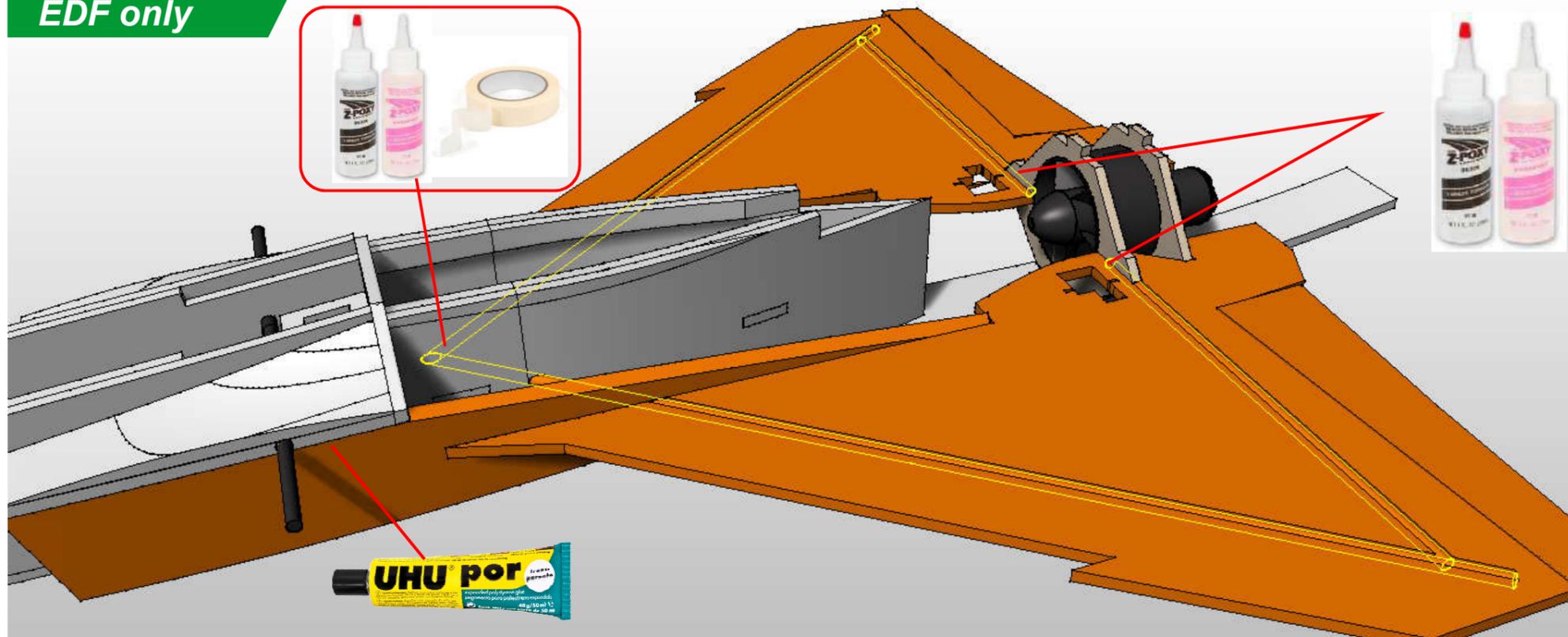


ALL VERSIONS

Glue the **Fuselage sides** (rear) to the tabs on the wing.



EDF only



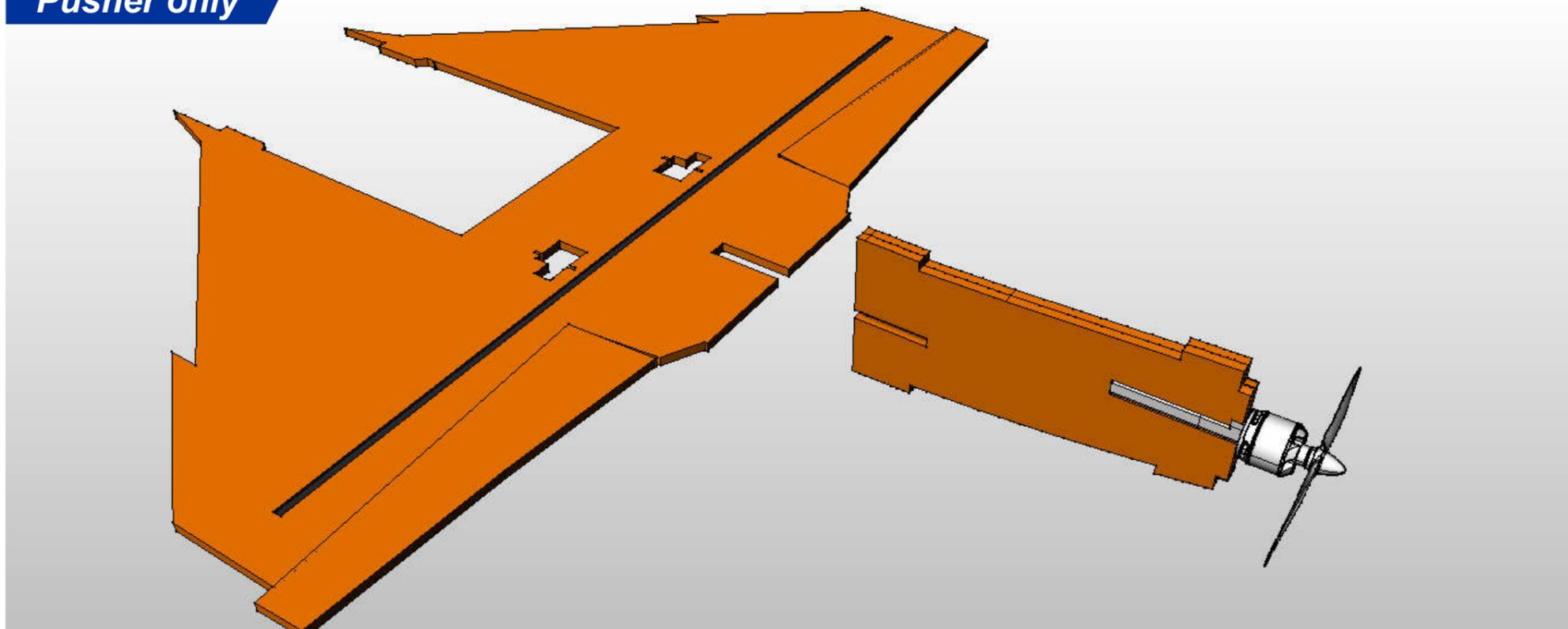
Put some masking tape under the RX tray to prevent epoxy spillage.

Dry fit first!

Coat the ends of the carbon spars with epoxy and slide the wings into the RX tray. Use UHU Por to glue the Fuselage sides (rear) to the forward fuselage at the Intakes.

Support the wings so that they remain horizontal while the glue sets.

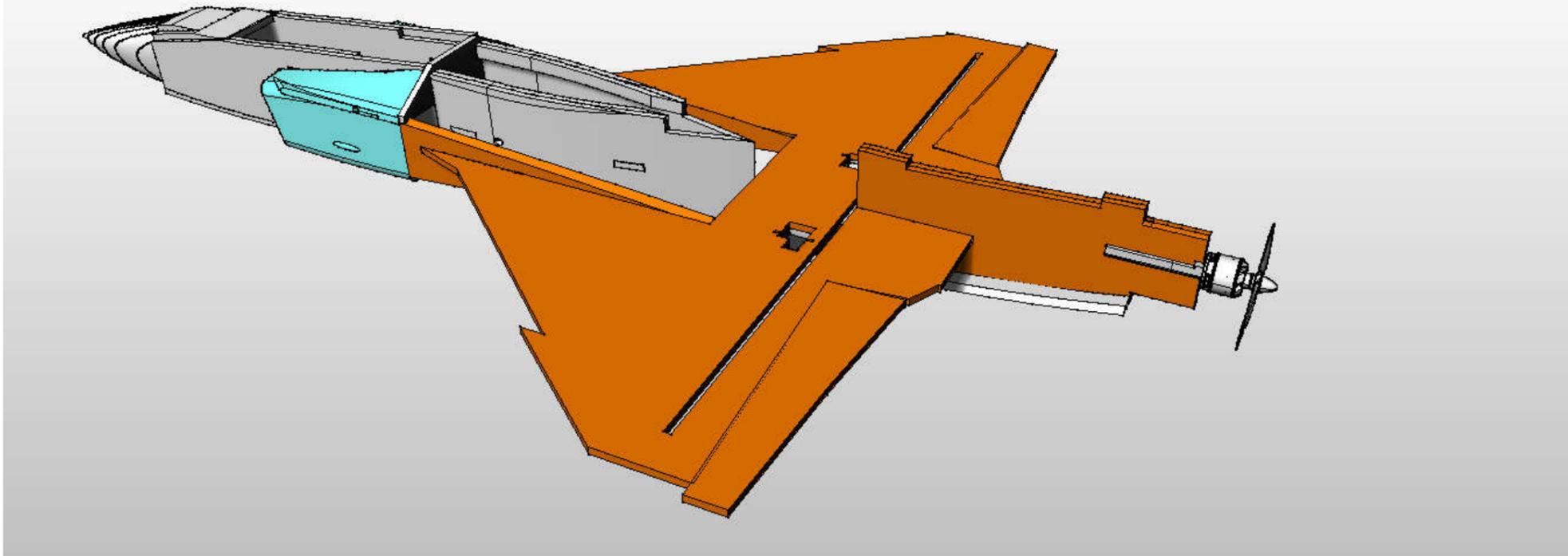
Pusher only



Glue the Pusher motor mount assembly to the wing using the alignment slots.



Pusher only



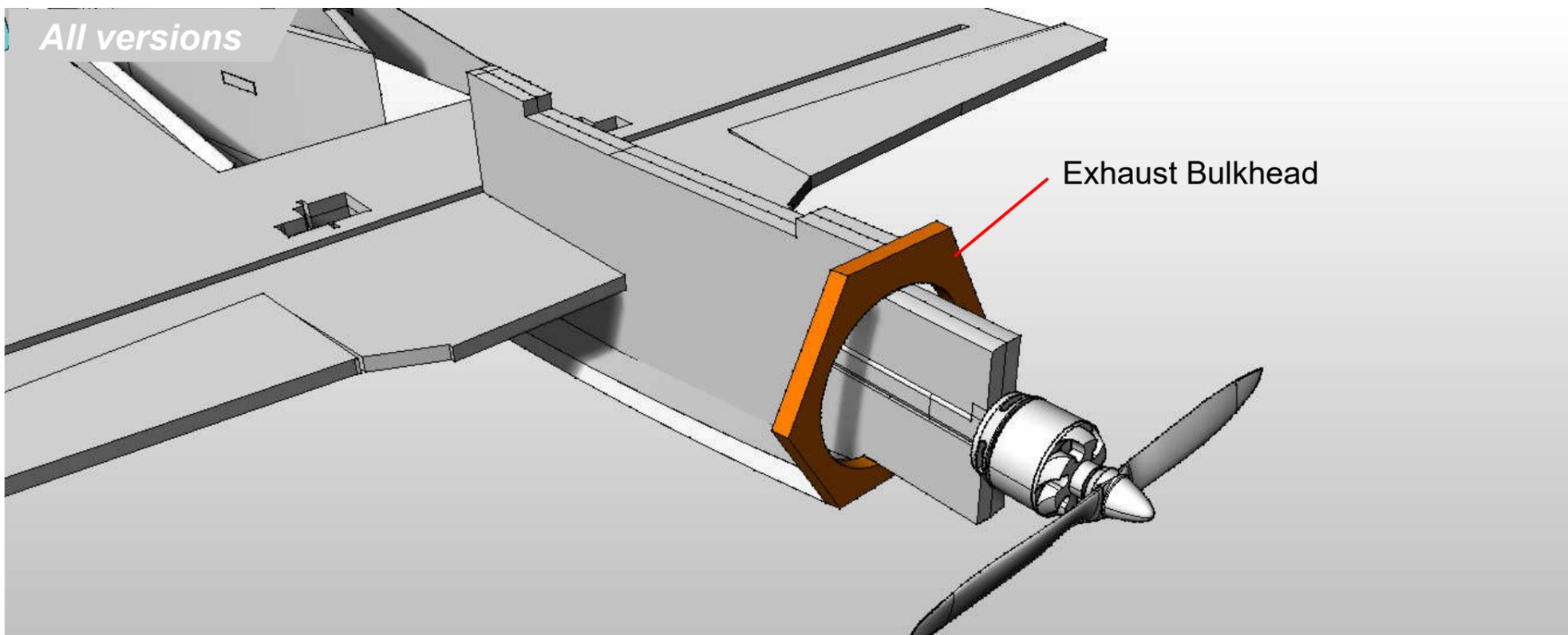
Use UHU Por to glue the Fuselage sides (rear) to the forward fuselage at the Intakes.

Glue the motor mount panel to the belly panel using the slots provided.

Support the wings so that they remain horizontal while the glue sets.



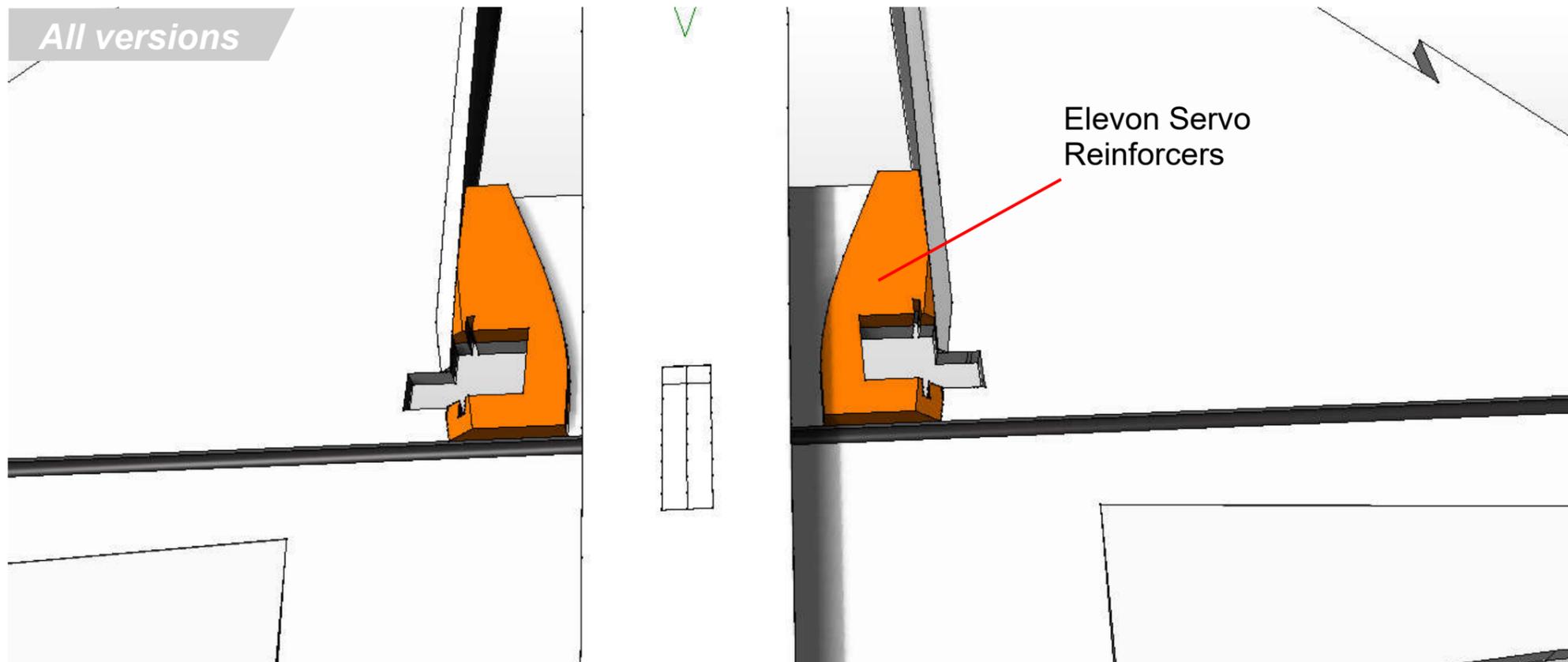
All versions



Glue the **Exhaust bulkhead** to the fuselage as shown.



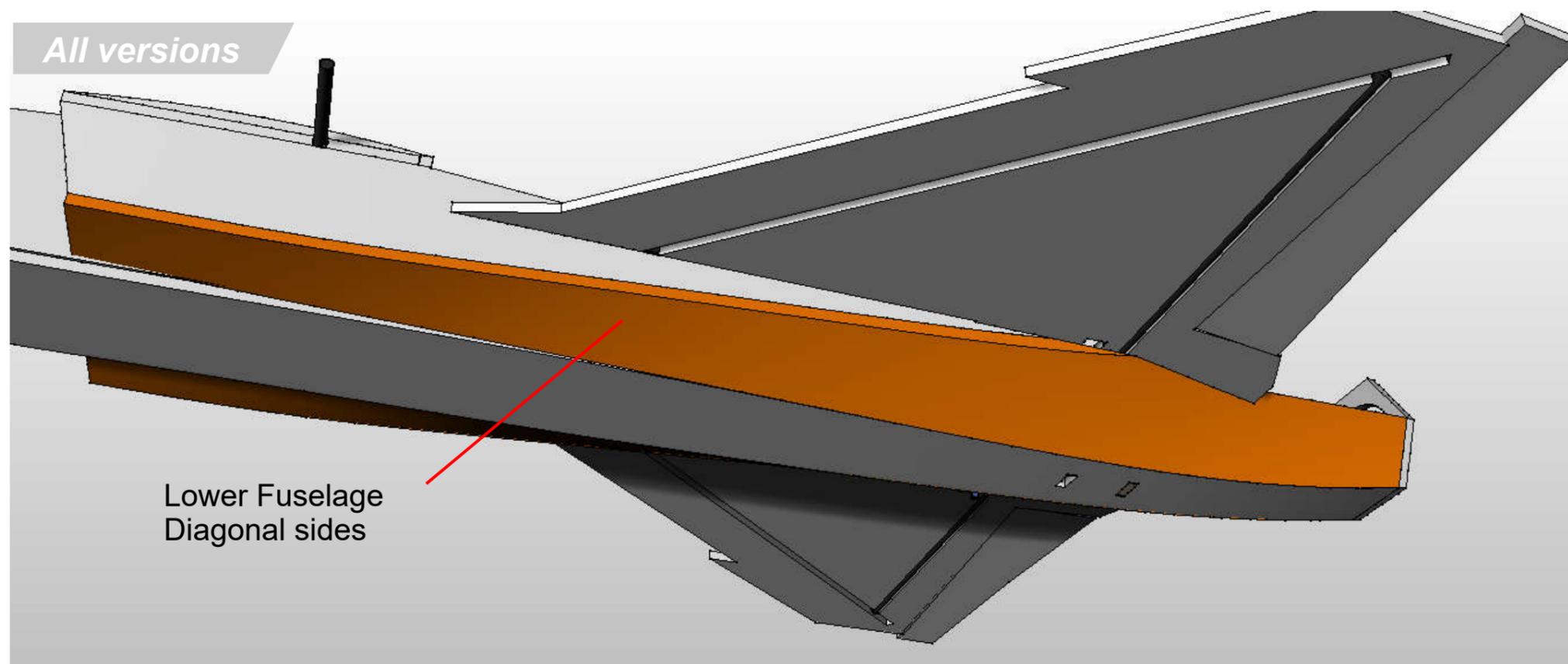
All versions



Glue the **Elevon Servo reinforcers** to the underside of the wing.



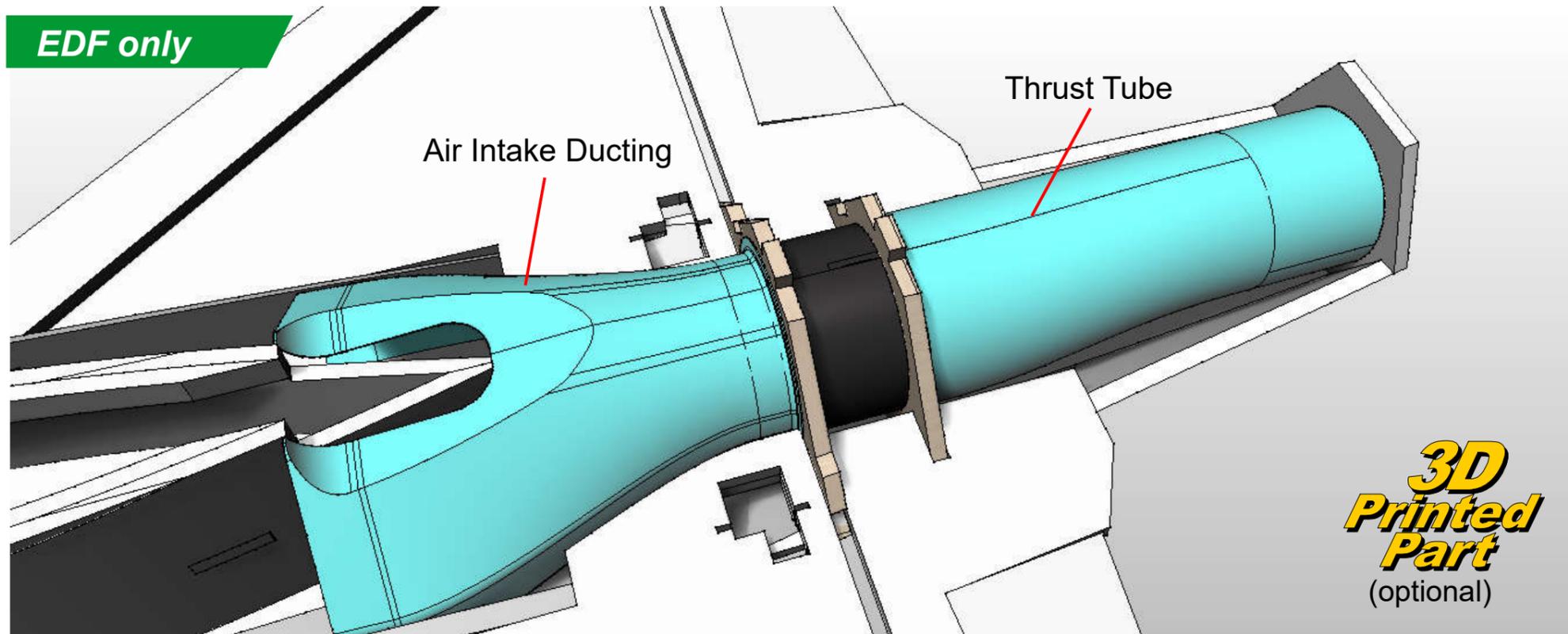
All versions



Twist and bend the **Lower Fuselage Diagonal Sides** until they fit really well. Glue in place.



EDF only

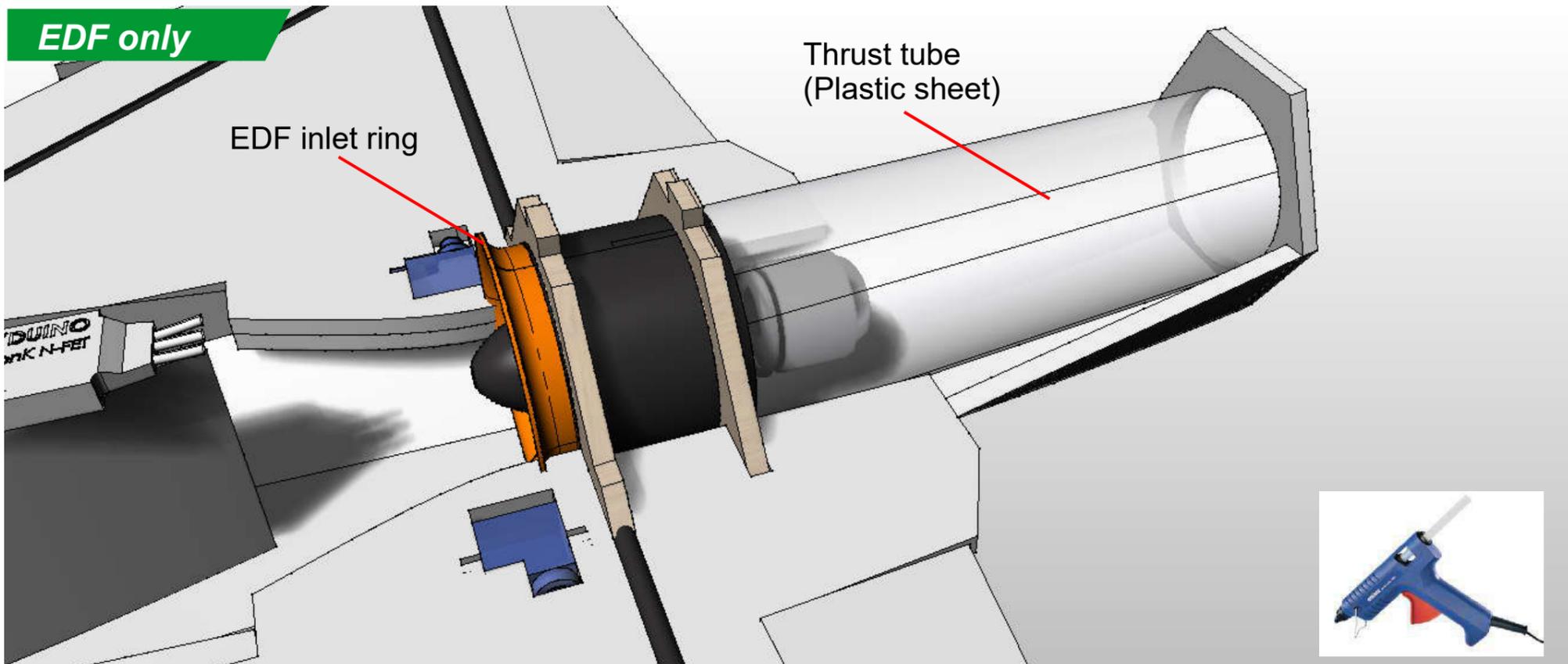


3D PRINTED PARTS

Glue either the 64mm or 70mm **Air intake ducting & Thrust tube** and glue into place.



EDF only



NON 3D PRINTED PARTS

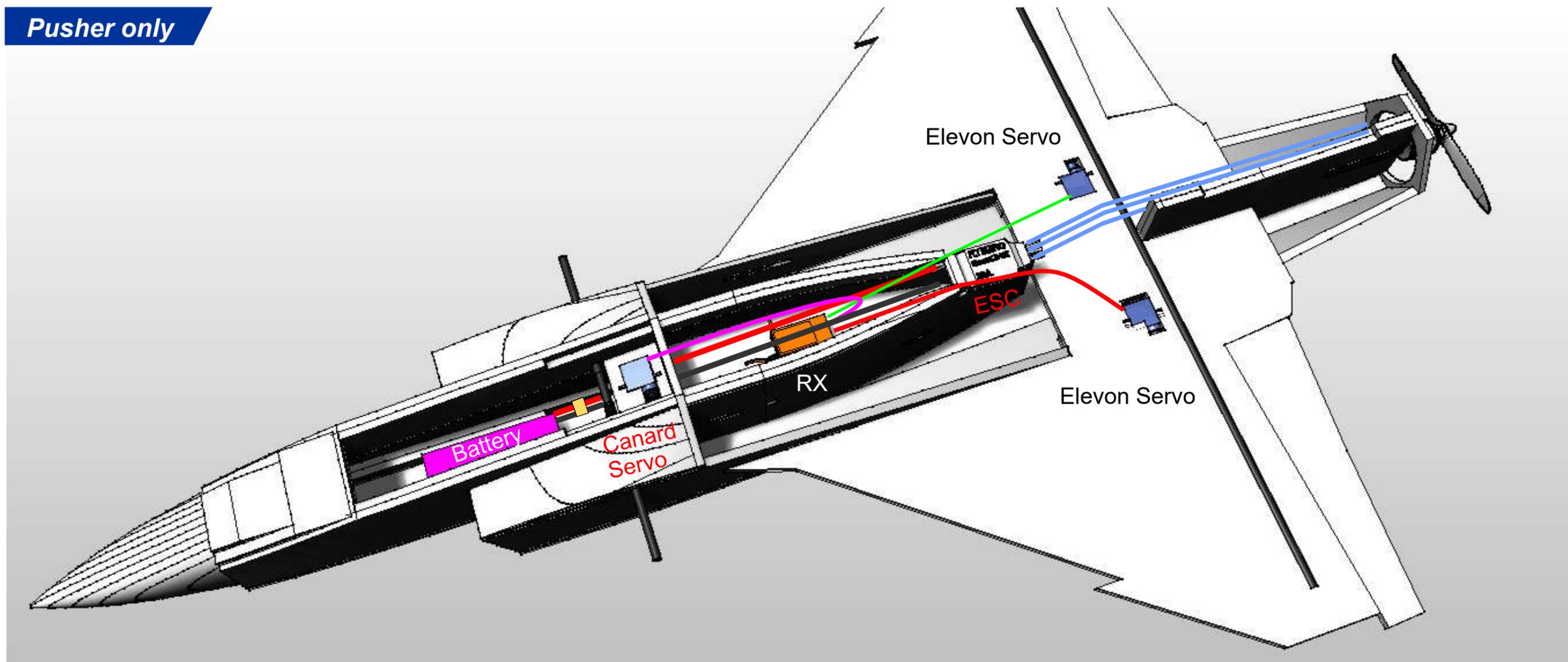
Ensure that the EDF inlet ring remains attached to the EDF unit.

Create a thrust tube to suit the EDF / Exhaust bulkhead using <math><0.4\text{mm}</math> plastic sheet Joined together using nylon reinforced tape.

Carefully tack in place using hot melt glue (without melting the Thrust tube) - test first!



Pusher only



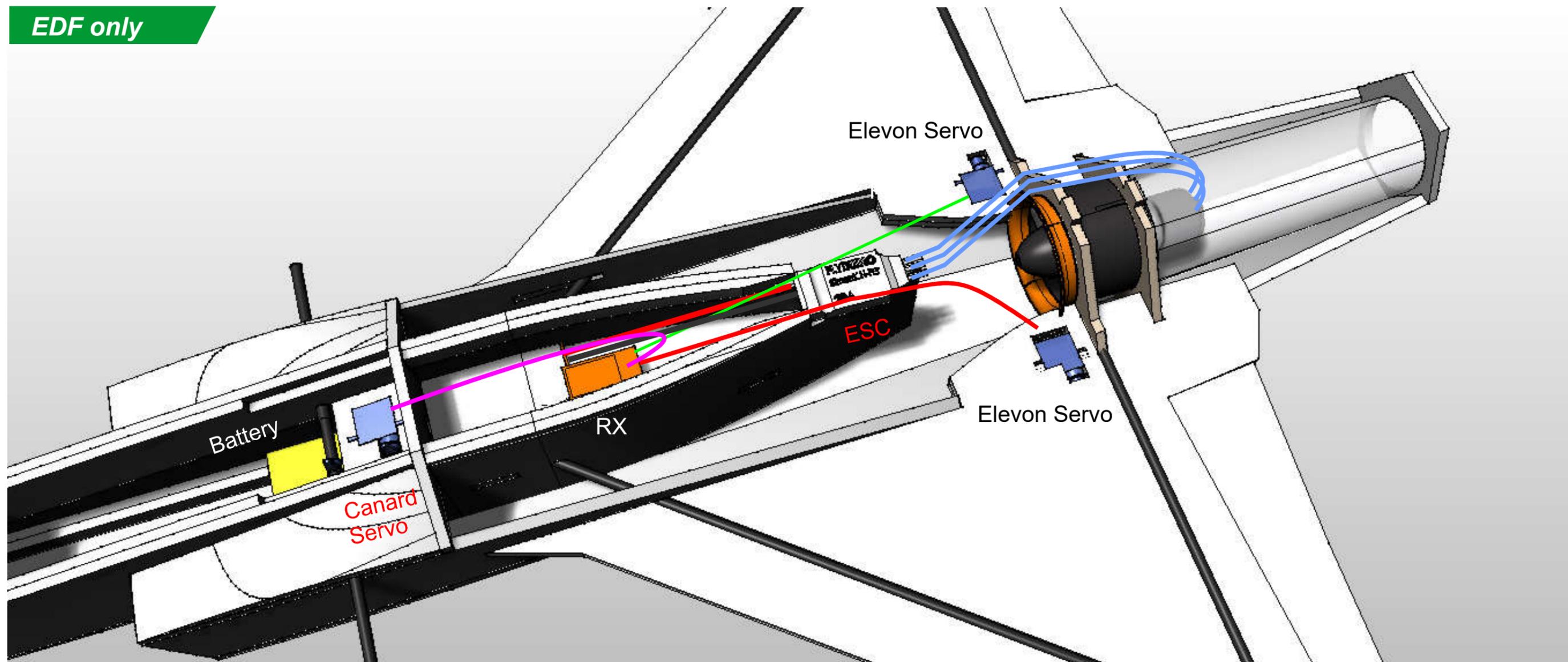
EDF VERSION :

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.

Run **all** servo cables to the RX, using servo extension cables and Y leads if required.

Once wired up, thoroughly test all electronics to ensure they function correctly, making sure there are no loose connections anywhere or dry solder joints.





PUSHER VERSION :

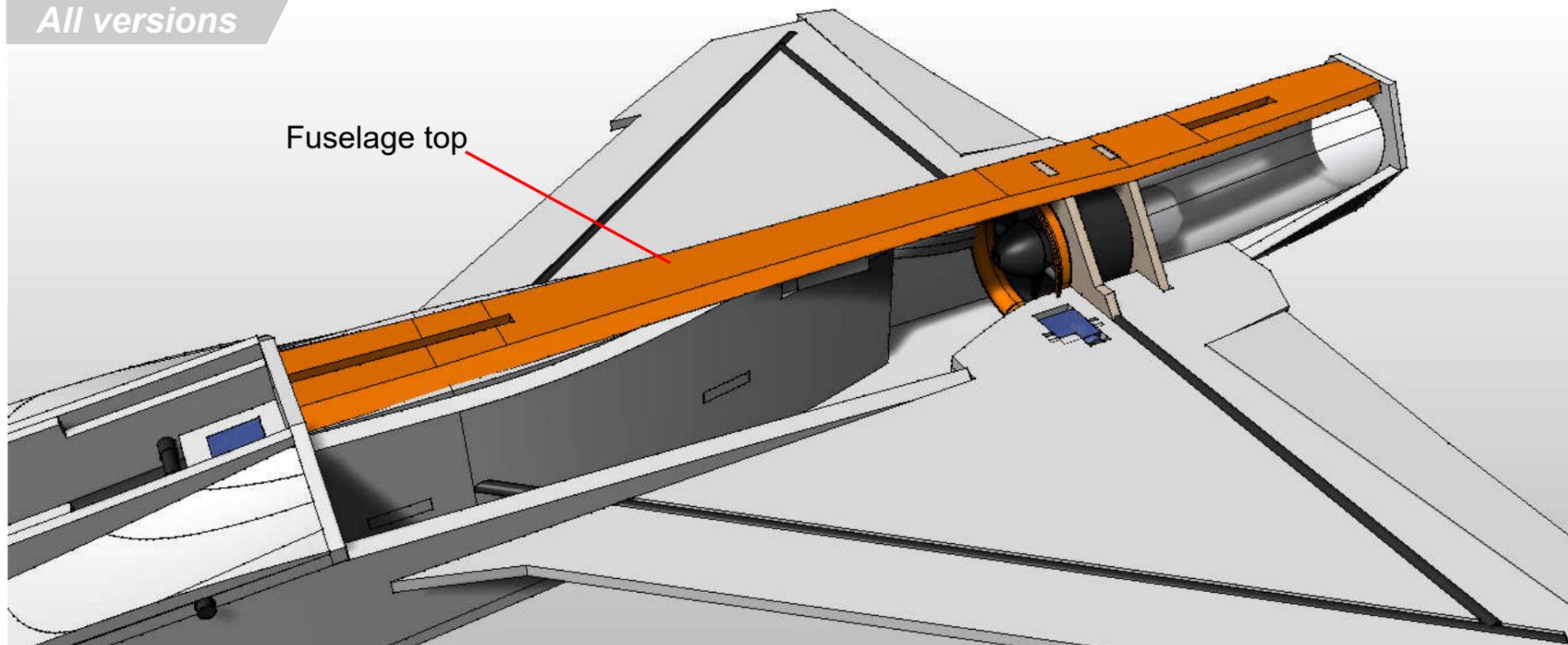
Run the ESC battery cables into the forward fuselage battery area to a battery connector. Run the Servo cable from the ESC to the RX.

Run **all** servo cables to the RX, using servo extension cables and Y leads if required.

Once wired up, thoroughly test all electronics to ensure they function correctly, making sure there are no loose connections anywhere or dry solder joints.



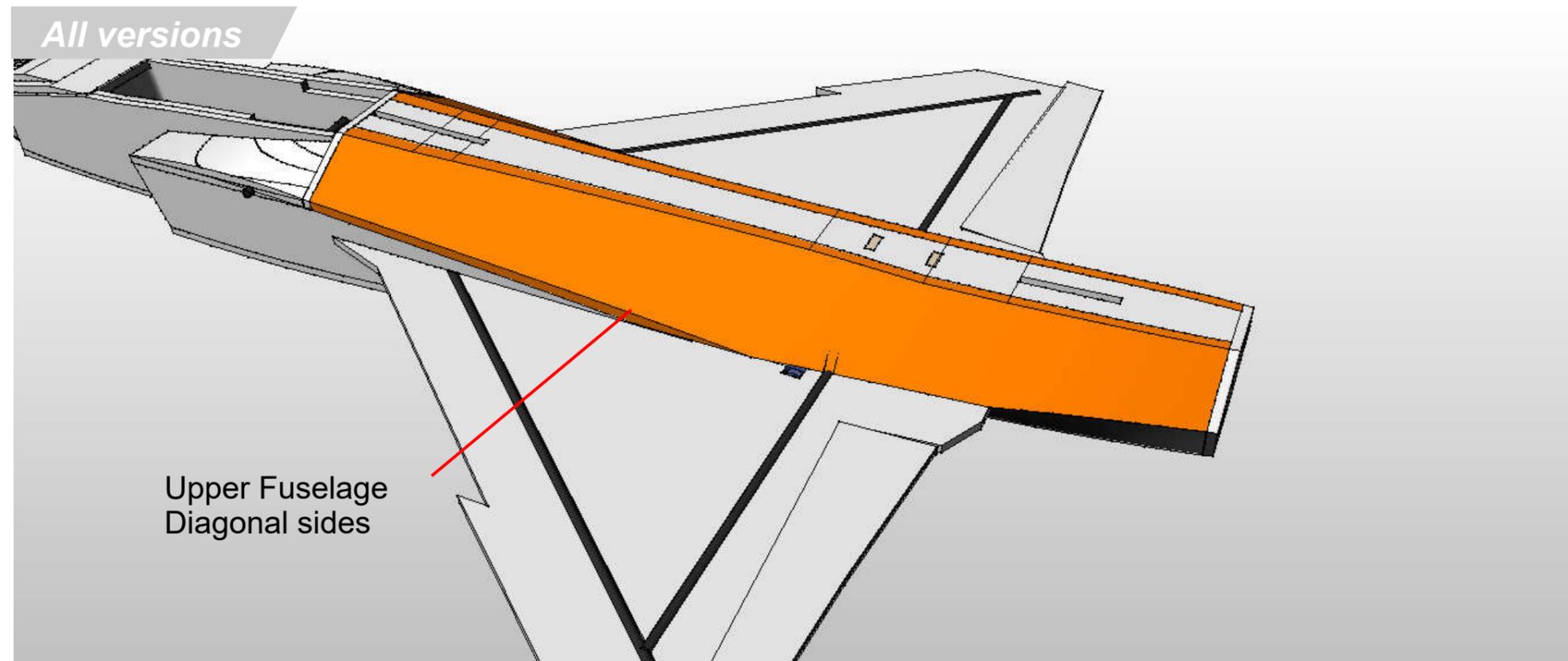
All versions



Glue the **Fuselage Top** to the assembly as shown.



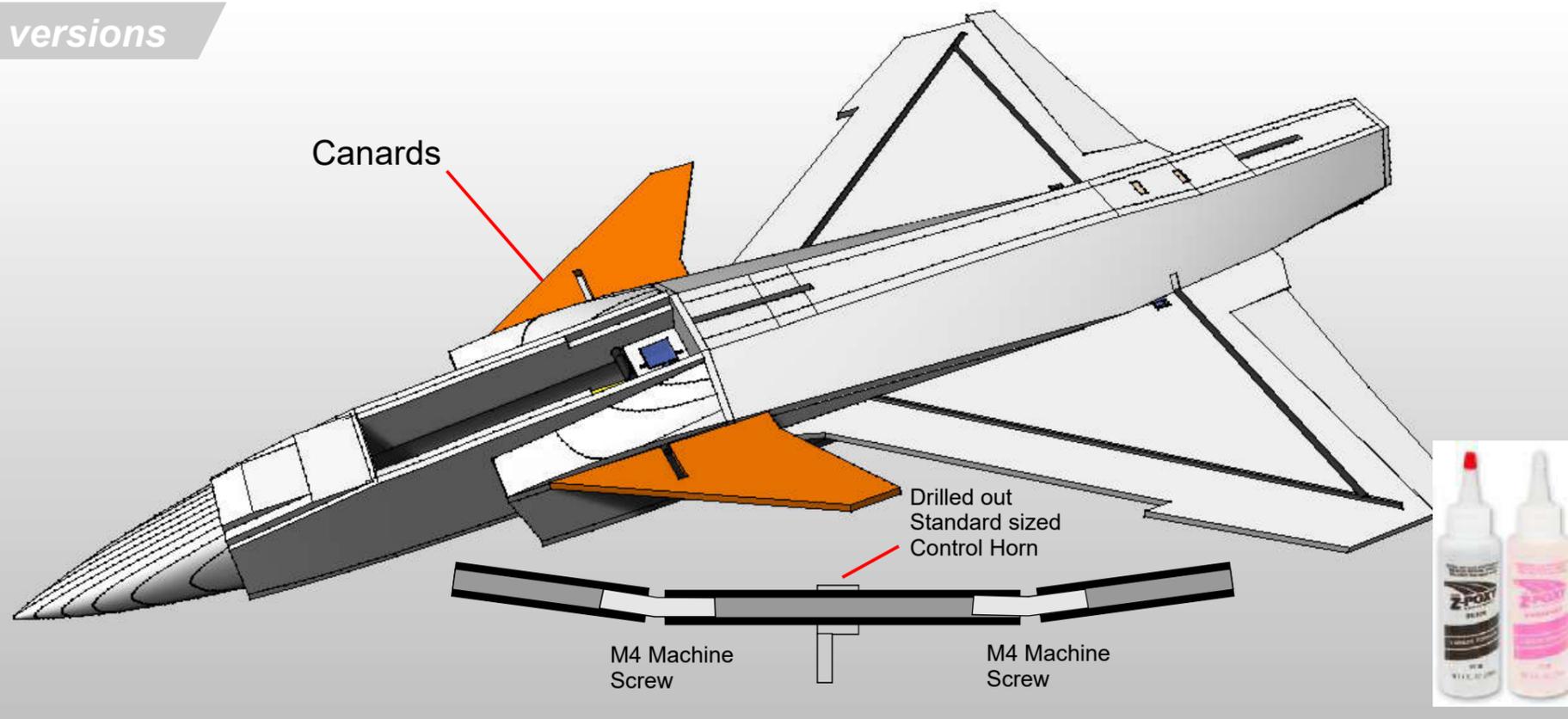
All versions



Twist and bend the **Upper Fuselage Diagonal Sides** until they fit really well. Glue in place.



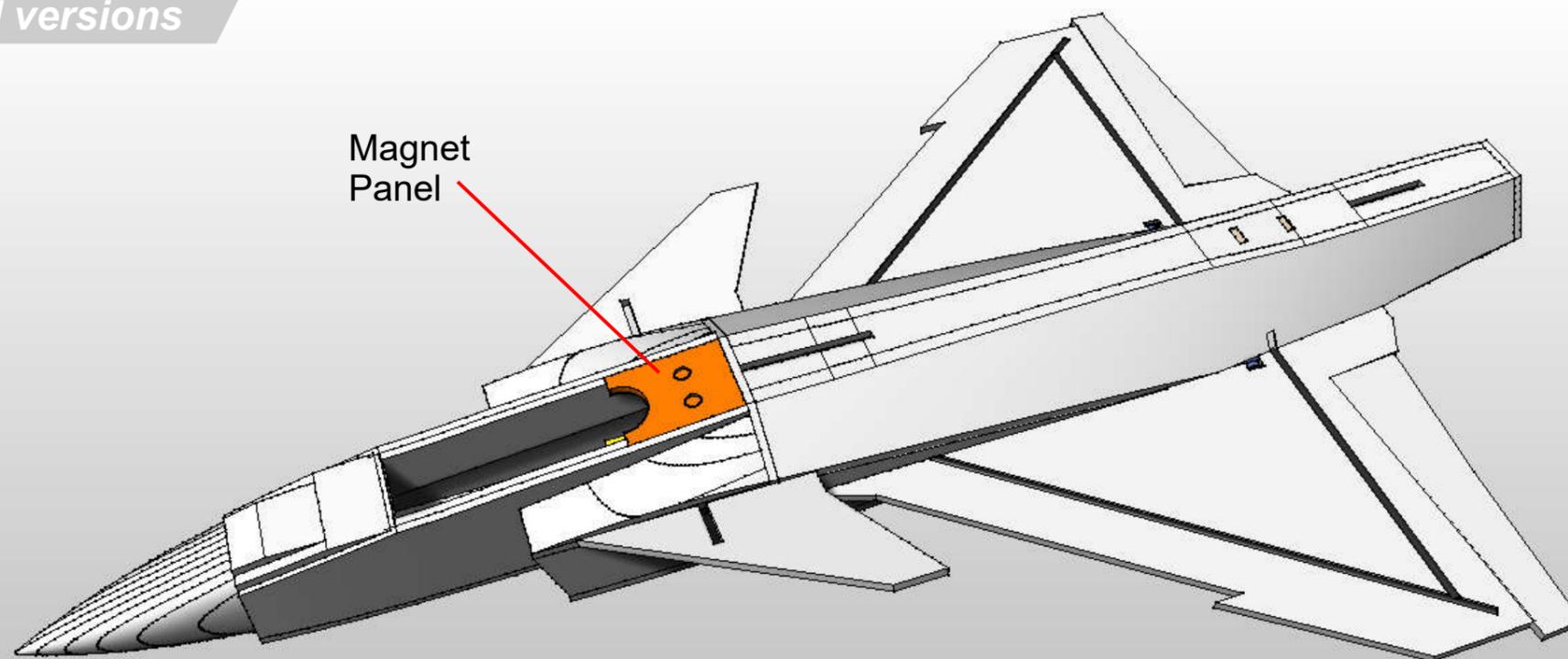
All versions



In order to create the correct Canard dihedral, Set the middle spar into the plane - with control horn in place. Glue the two outer carbon spar pieces together using two 4mm machine screws with the heads cut off. Bend the two machine screw to the correct angles (measure off the GA drawing). Glue together using epoxy to get a strong joint.

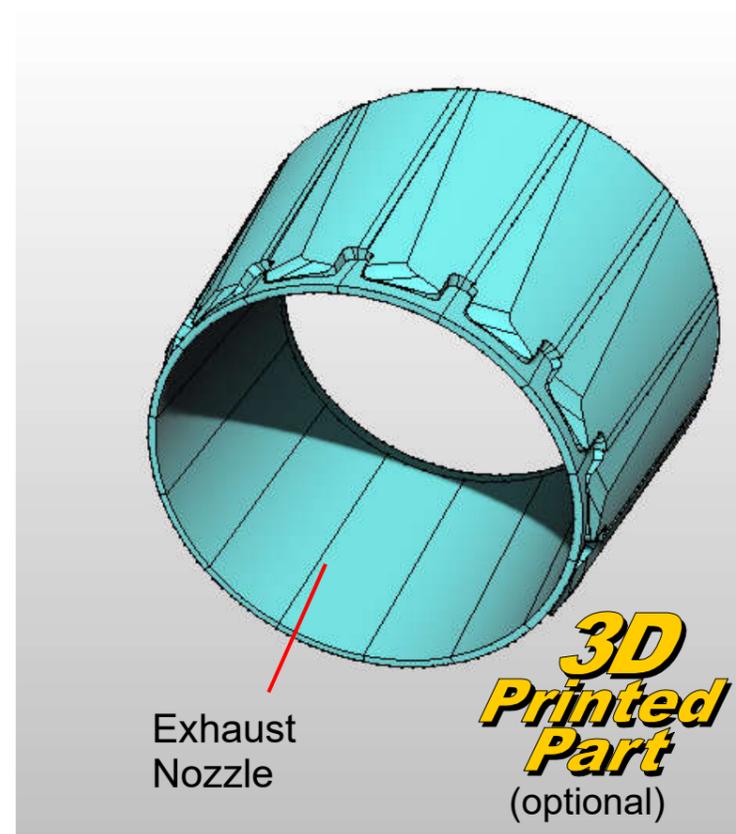
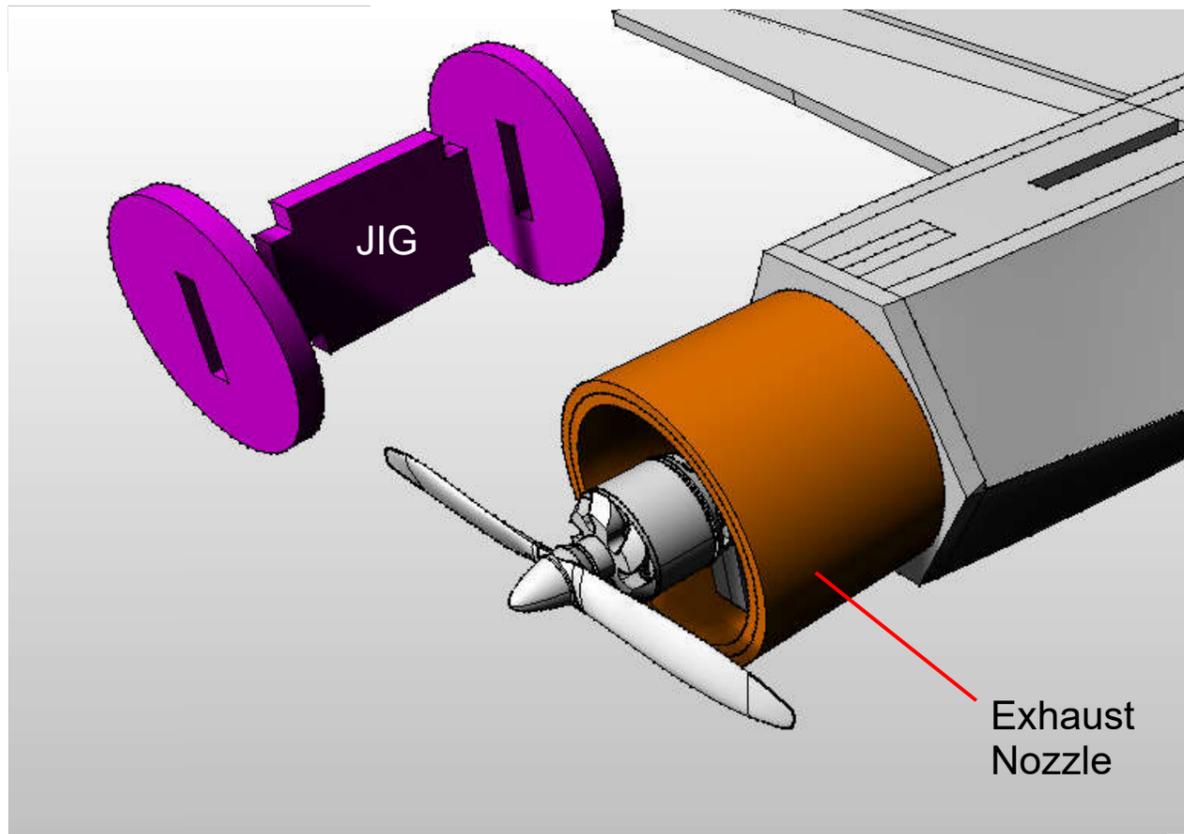
Carefully glue the **Canards** to the Carbon spars using epoxy..

All versions



Connect the Canards to the Canard servo and test thoroughly. Glue the **Magnet Panel** in place.





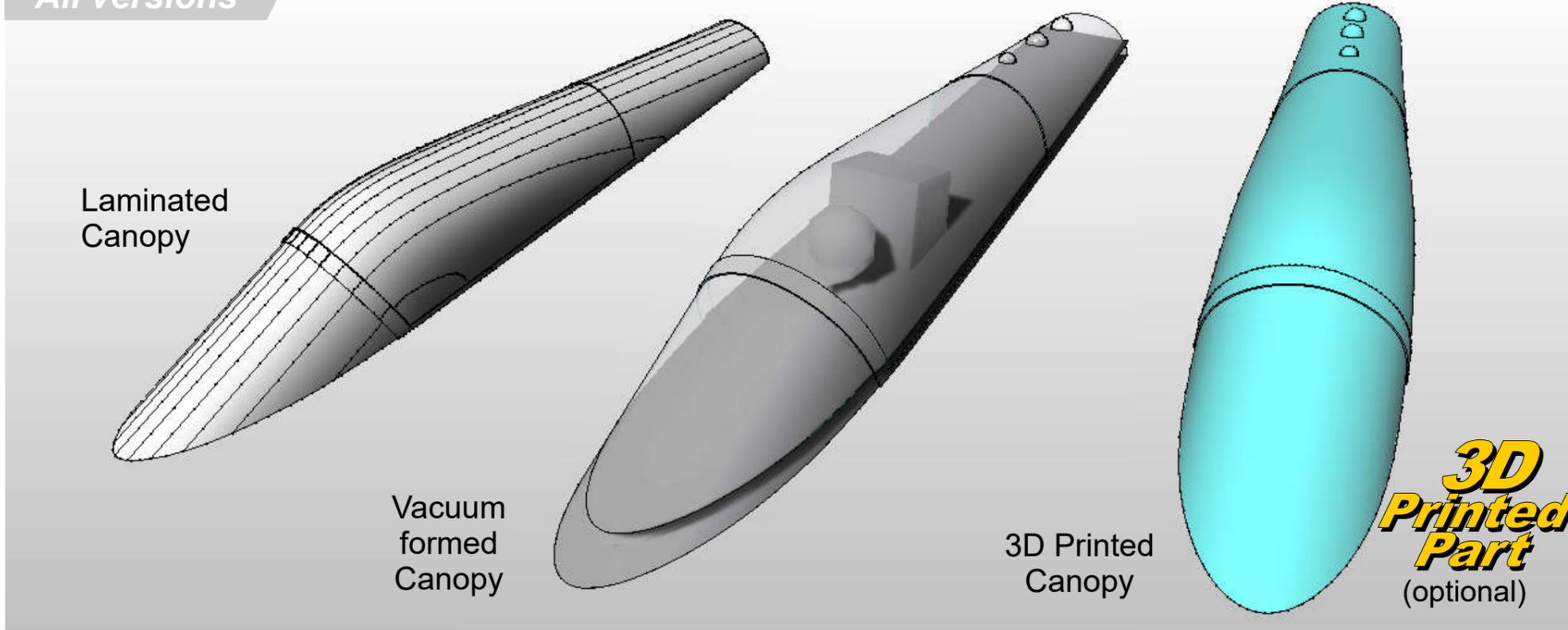
Fabricate your **Exhaust Nozzle** using two layers of 3mm foam sheet, using the construction jig.

Alternatively 3D print one instead.

Glue onto the fuselage.

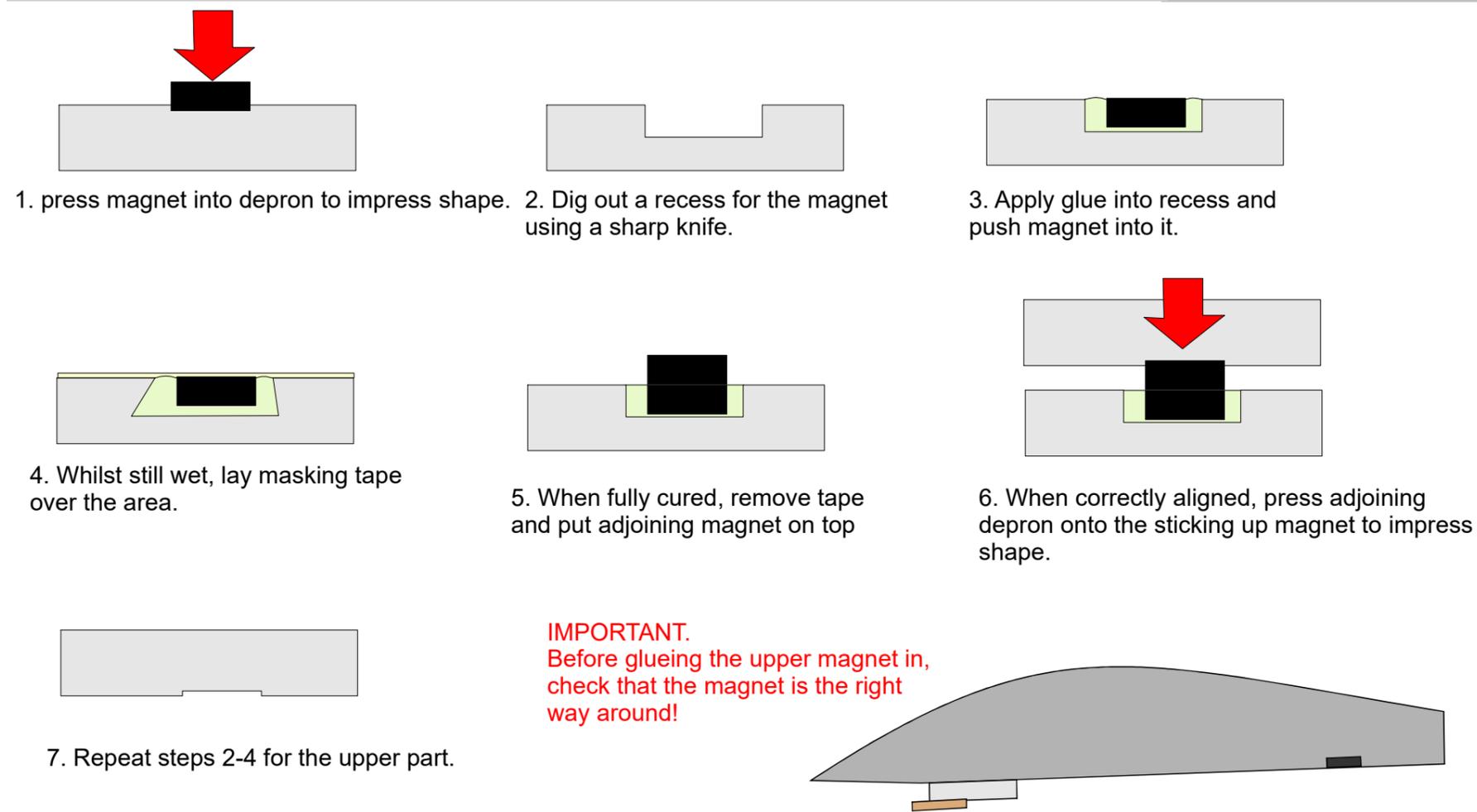
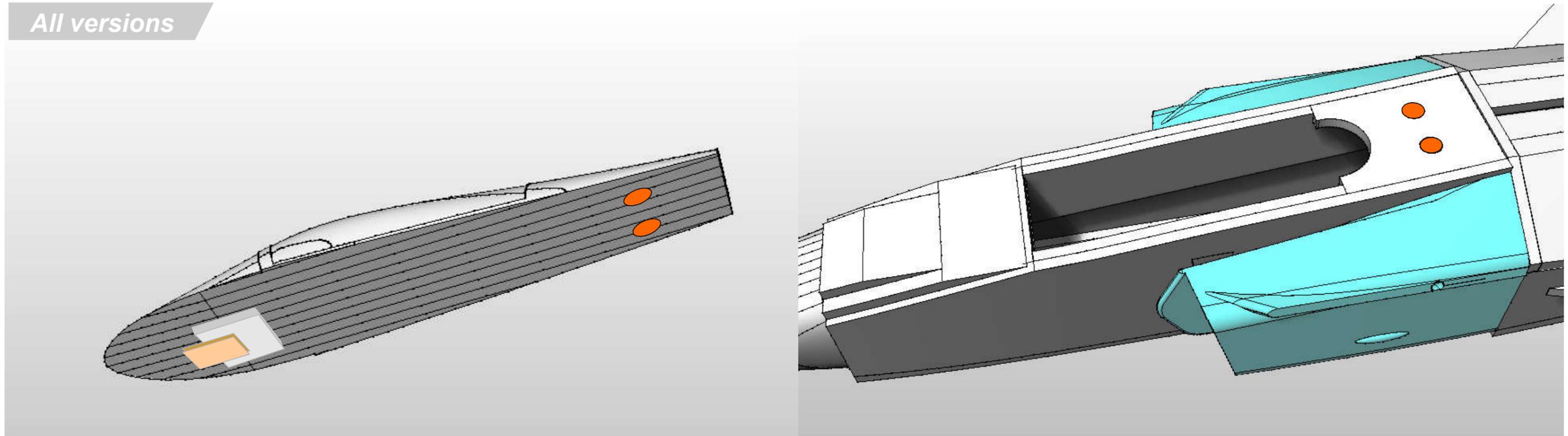


All versions



Prepare the **Canopy / Cockpit** either using laminated 6mm foam sheets, Vacuum formed with a constructed base/ cockpit or 3D printed - (Suggest Clear PLA)





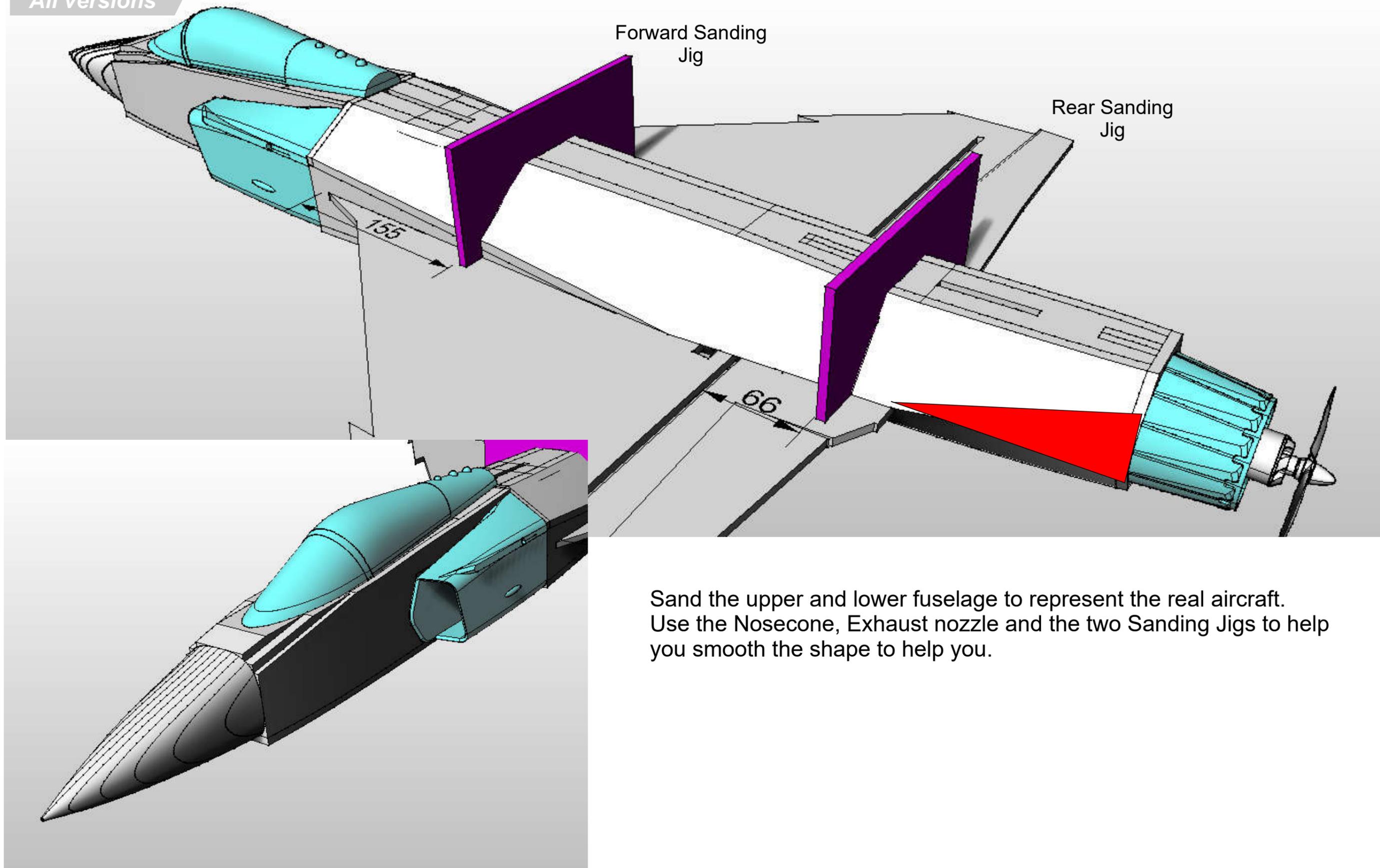
Build a tongue using a piece of scrap 6mm foam and 3mm liteply at the front of the canopy.

Attach the magnets to the magnet panel

Epoxy the magnets to rear of the canopy so that the canopy is removable but holds firmly in place when mounted.



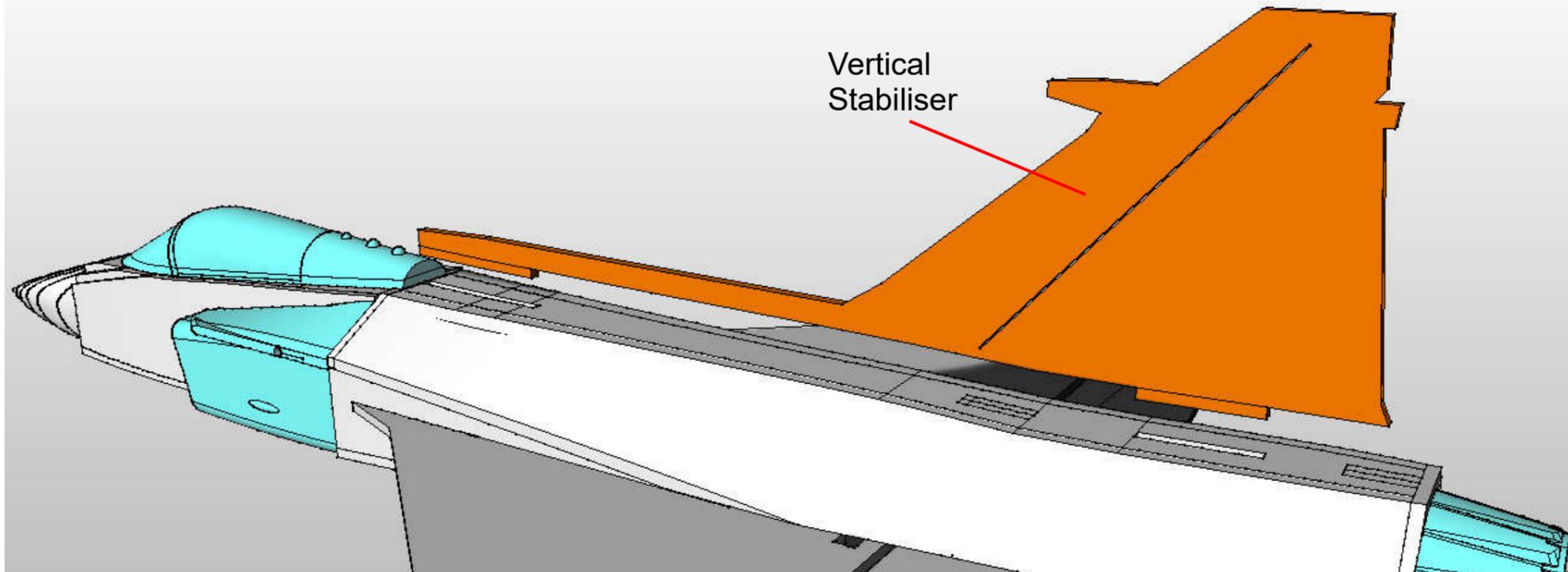
All versions



Sand the upper and lower fuselage to represent the real aircraft. Use the Nosecone, Exhaust nozzle and the two Sanding Jigs to help you smooth the shape to help you.



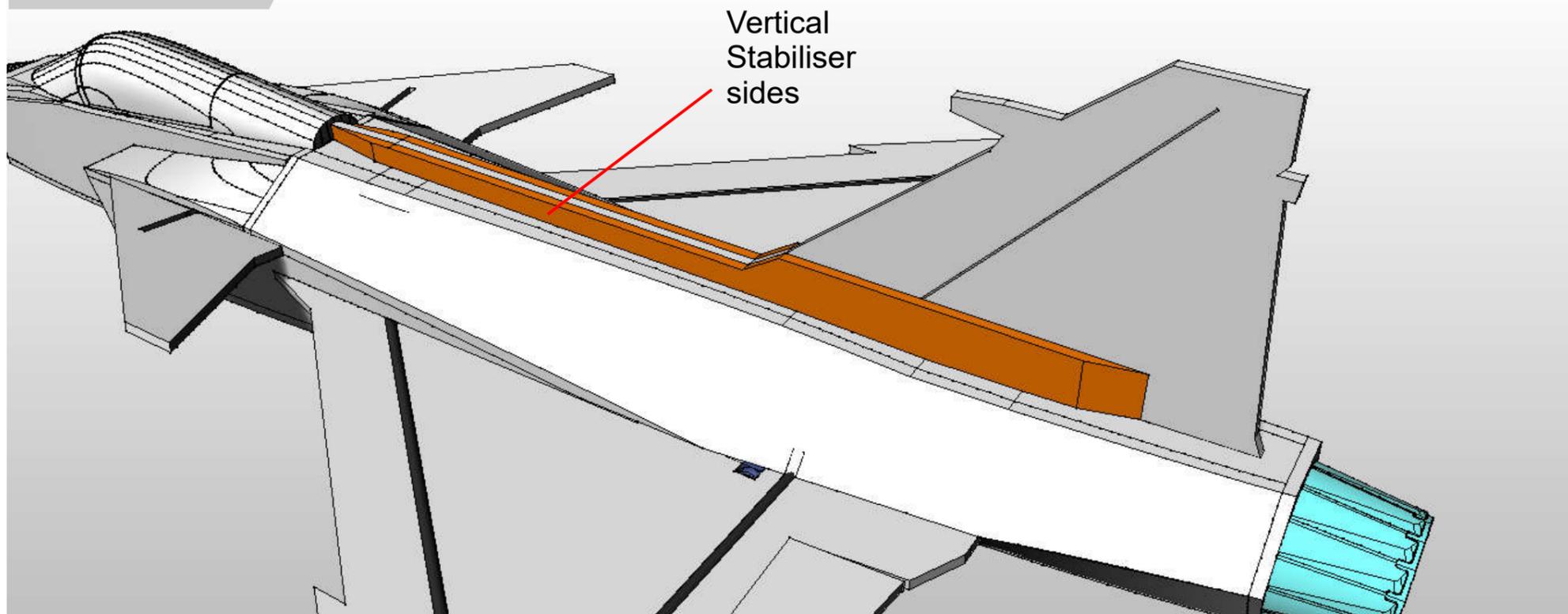
All versions



Glue a 6mmx1mm carbon strip into the **Vertical stabiliser** then glue to the fuselage.



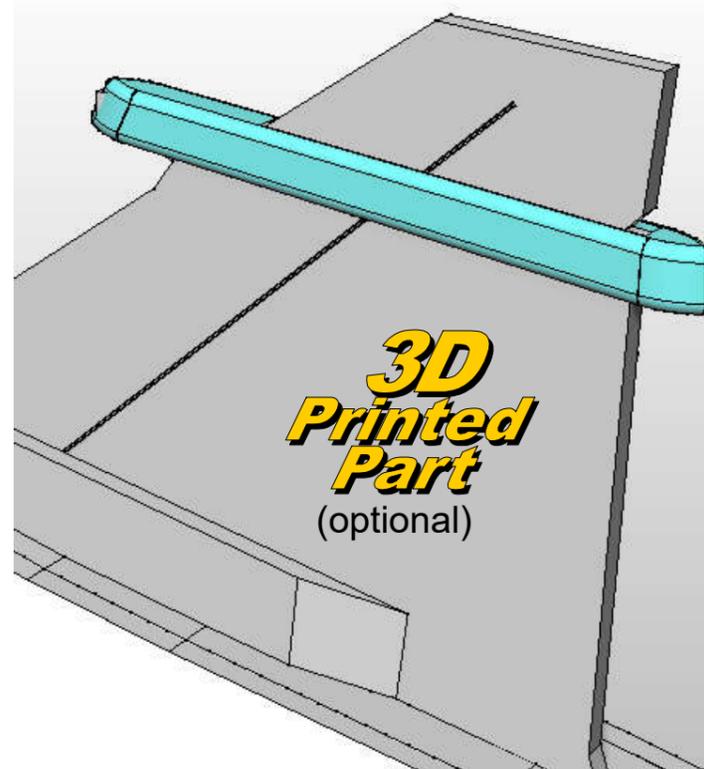
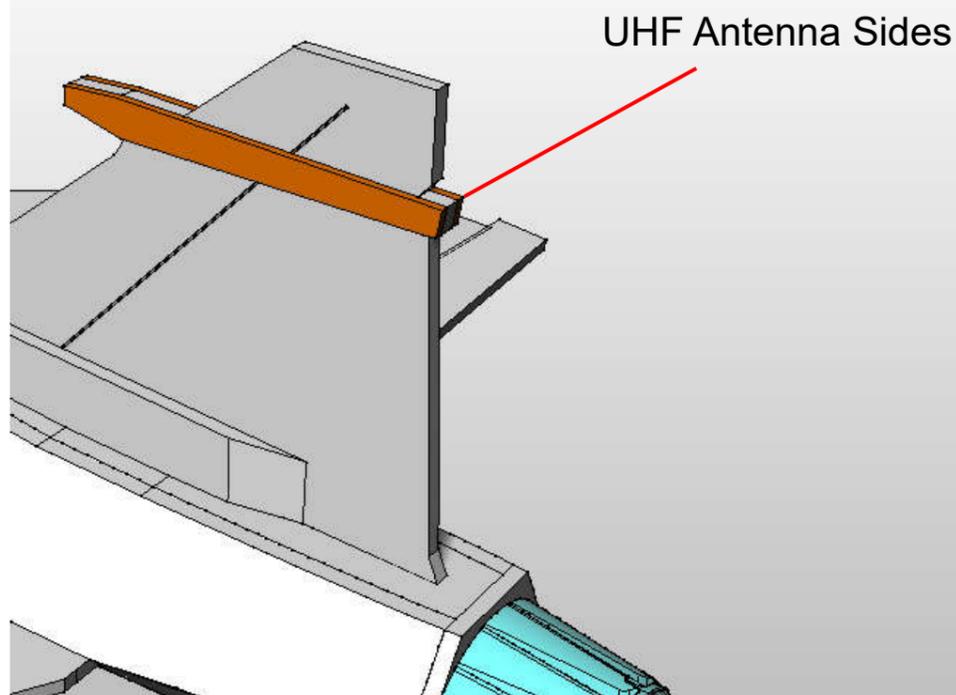
All versions



Glue the **Vertical stabiliser sides** to the vertical stabiliser.



All versions

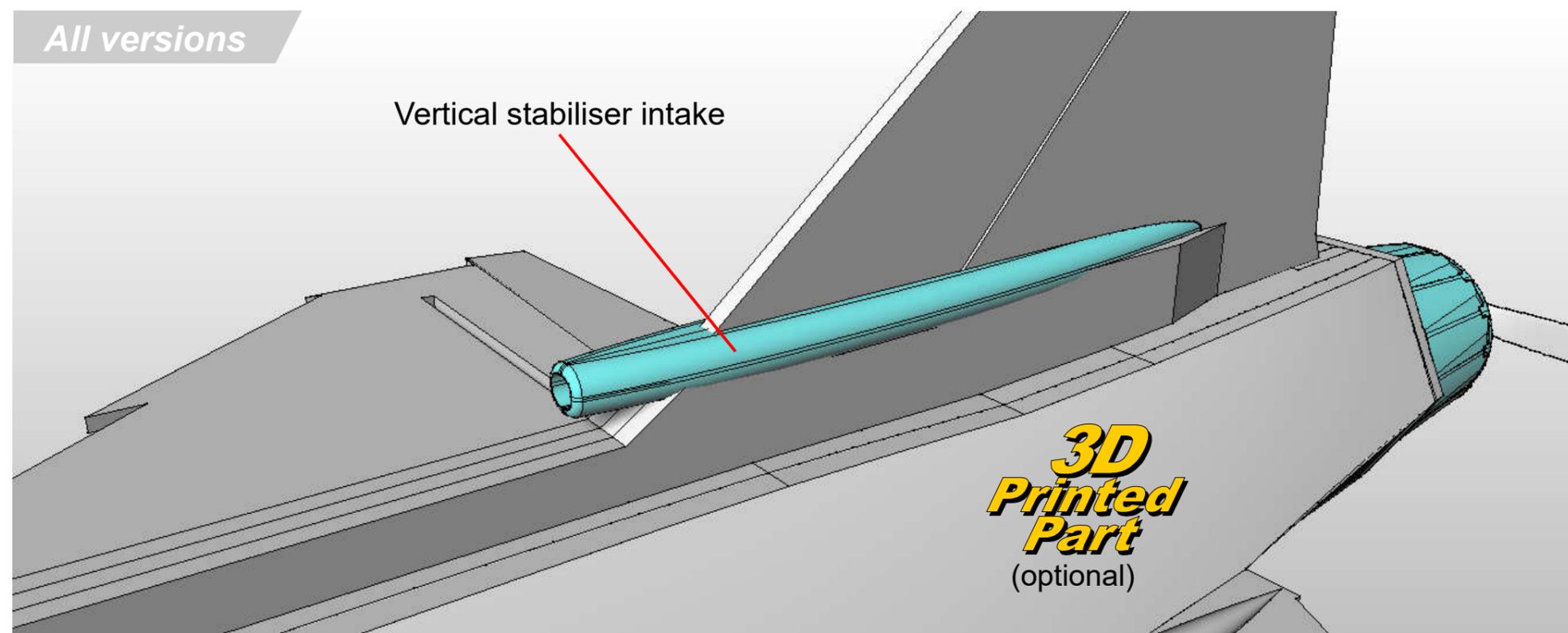


Glue the 3mm foam **UHF Antenna sides** to the Vertical Stabiliser.

Alternatively 3D print one.

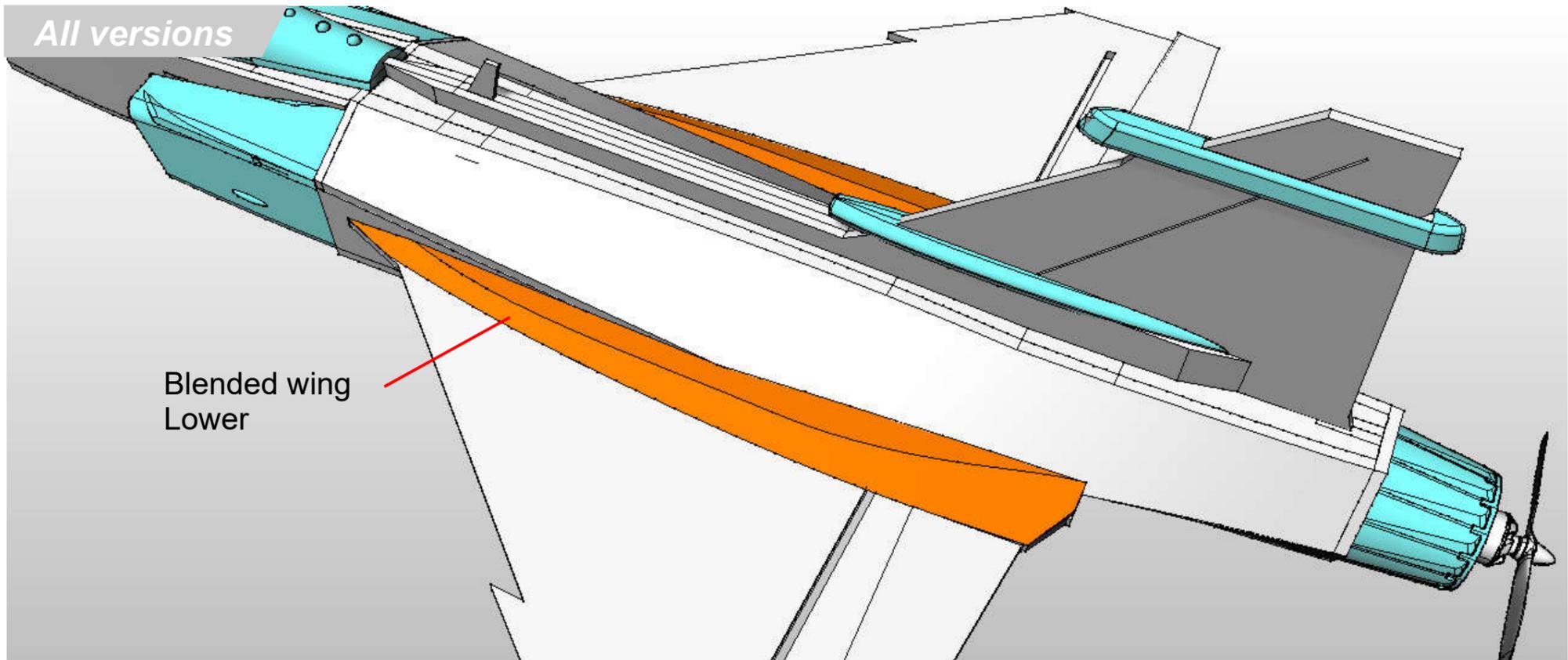


All versions

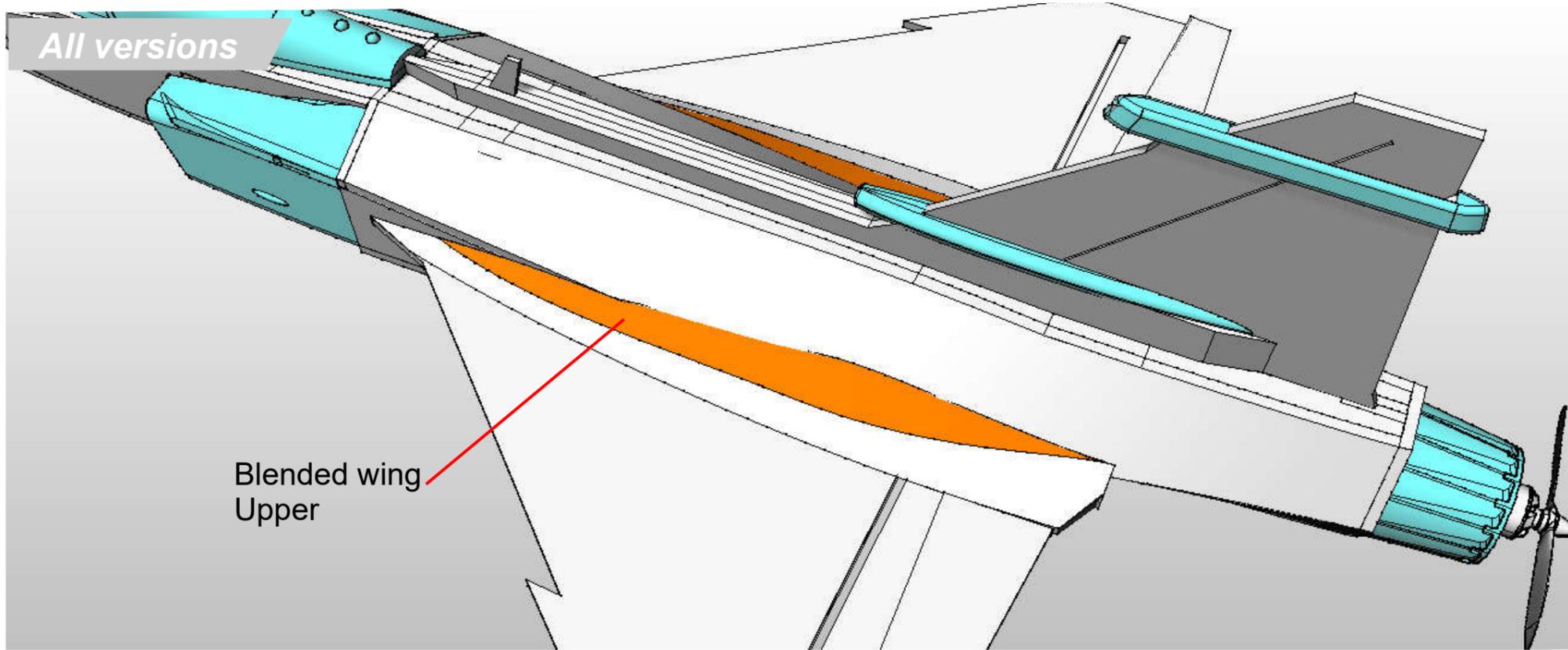


Either shape the foam to shape or use the 3d printed **Vertical Stabiliser Intake** and glue in place..





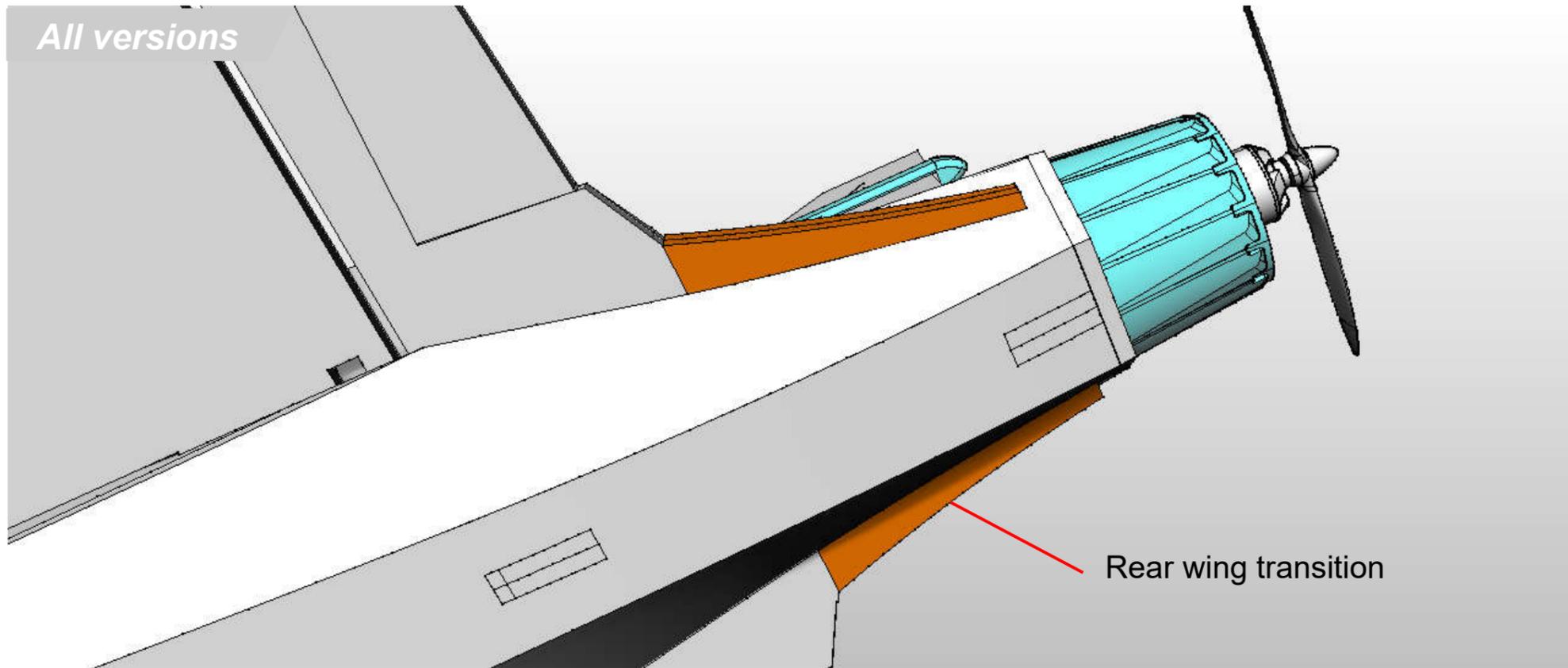
Sand to shape then glue the **Blended Wing Lower** to the fuselage.



Sand to shape then glue the **Blended Wing Upper** to the fuselage.



All versions

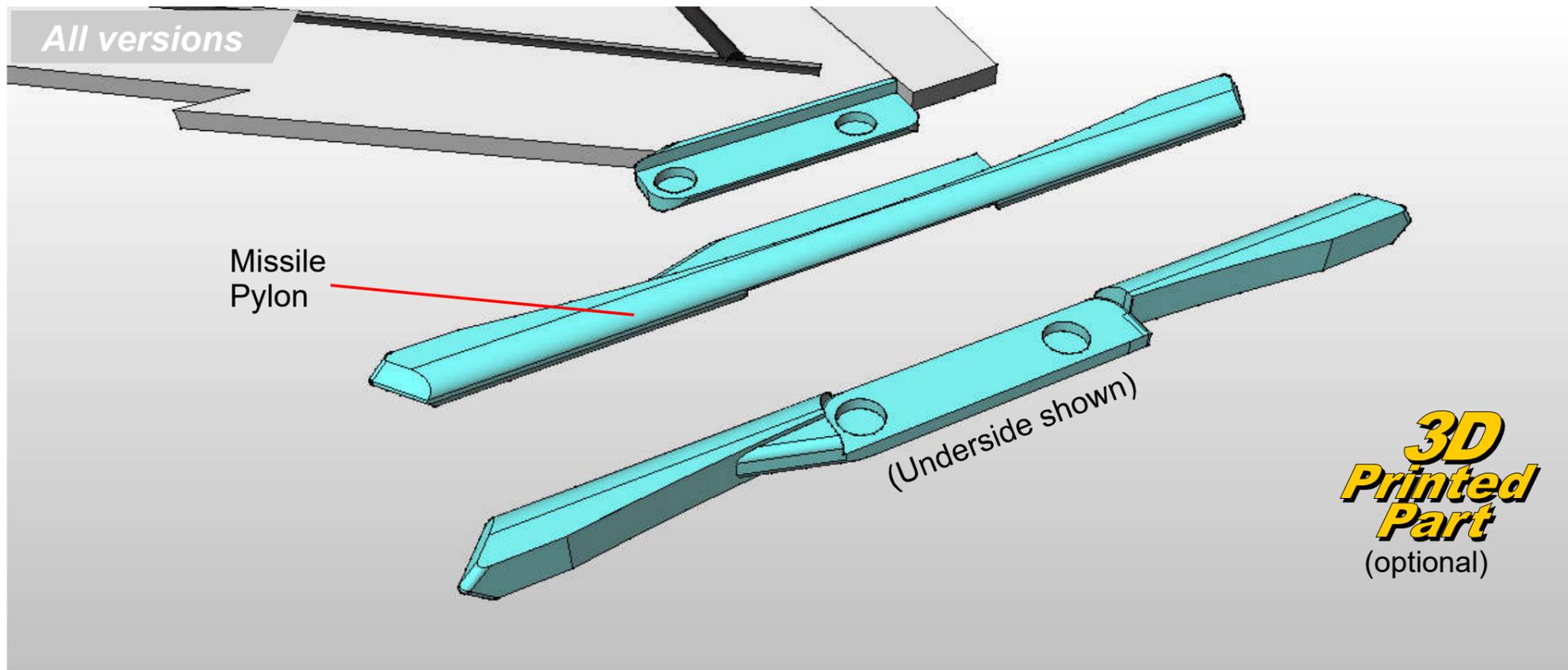


Rear wing transition

Sand to fit the **Upper and Lower Wing Transition parts**, Glue together then glue to the fuselage using a straight edge to keep the perfectly horizontal to the main wing.



All versions



Missile Pylon

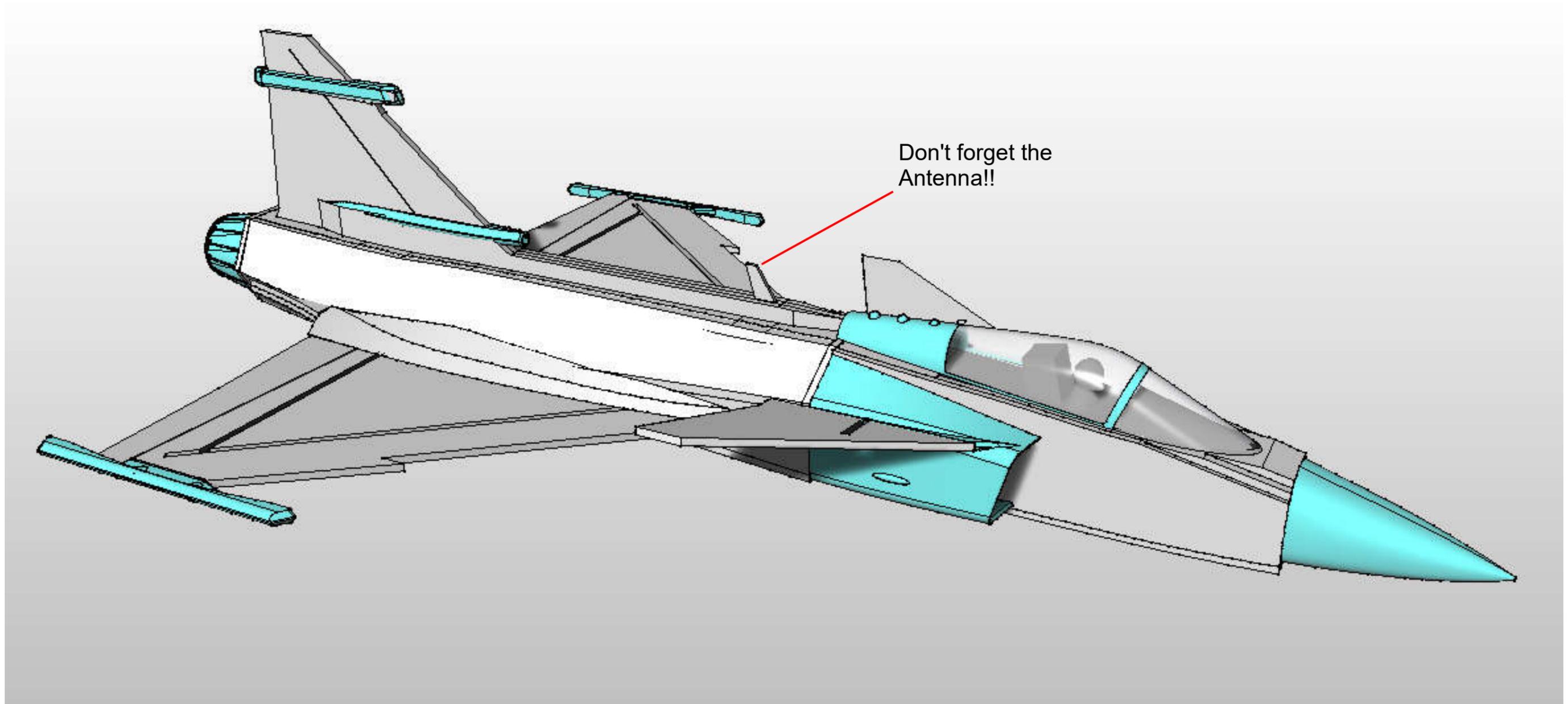
(Underside shown)

3D Printed Part
(optional)

Either construct the Wing pylon from Balsa or 3d Print one.

Use button magnets to hold the two pieces together.





Congratulations! Your Gripen is complete! Either fly it as it is, or go ahead and paint it.





Use images of the real plane to help you get the right scale details

Gripen

