



General Dynamics
F-16 Fighting Falcon
Parkjet

Photo © Mark Von Raesfeld



4th Generation Jet Fighter

Construction Guide

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Fighting Falcon History

The General Dynamics F-16 Fighting Falcon is a single-engine supersonic multirole fighter aircraft originally developed by General Dynamics (now Lockheed Martin) for the United States Air Force (USAF). Designed as an air superiority day fighter, it evolved into a successful all-weather multirole aircraft. Over 4,500 aircraft have been built since production was approved in 1976.

Although no longer being purchased by the U.S. Air Force, improved versions are being built for export customers. In 1993, General Dynamics sold its aircraft manufacturing business to the Lockheed Corporation, which in turn became part of Lockheed Martin after a 1995 merger with Martin Marietta.

The Fighting Falcon's key features include a frameless bubble canopy for better visibility, side-mounted control stick to ease control while maneuvering, a seat reclined 30 degrees to reduce the effect of g-forces on the pilot, and the first use of a relaxed static stability/fly-by-wire flight control system which helps to make it a nimble aircraft. The F-16 has an internal M61 Vulcan cannon and 11 locations for mounting weapons and other mission equipment. The F-16's official name is "Fighting Falcon", but "Viper" is commonly used by its pilots and crews, due to a perceived resemblance to a viper snake as well as the Colonial Viper starfighter on Battlestar Galactica which aired around when the F-16 entered service.

In addition to active duty in the U.S. Air Force, Air Force Reserve Command, and Air National Guard units, the aircraft is also used by the USAF aerial demonstration team, the U.S. Air Force Thunderbirds, and as an adversary/aggressor aircraft by the United States Navy. The F-16 has also been procured to serve in the air forces of 25 other nations. As of 2015, it is the world's most numerous fixed-wing aircraft in military service.

F-16 models are denoted by increasing block numbers to denote upgrades. The blocks cover both single- and two-seat versions. A variety of software, hardware, systems, weapons compatibility, and structural enhancements have been instituted over the years to gradually upgrade production models and retrofit delivered aircraft.

While many F-16s were produced according to these block designs, there have been many other variants with significant changes, usually due to modification programs. Other changes have resulted in role-specialization, such as the close air support and reconnaissance variants. Several models were also developed to test new technology. The F-16 design also inspired the design of other aircraft, which are considered derivatives. Older F-16s are being converted into QF-16 drone targets.

Designers notes

The F-16 has really nice handling characteristics. An Icon of the 80's I grew up with a great deal of admiration for this plane. Not the simplest to replicate in flat foam sheet, but with careful shaping, it is possible to get a decent looking parkjet.

With Optional 3D printed parts available to help generate the shape and increase durability, with both EDF and Pusher powerplant options, you can build this plane to suit your own flying style.

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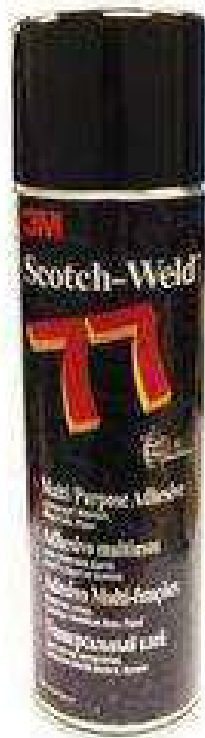
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Fighting Falcon

Page 2



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

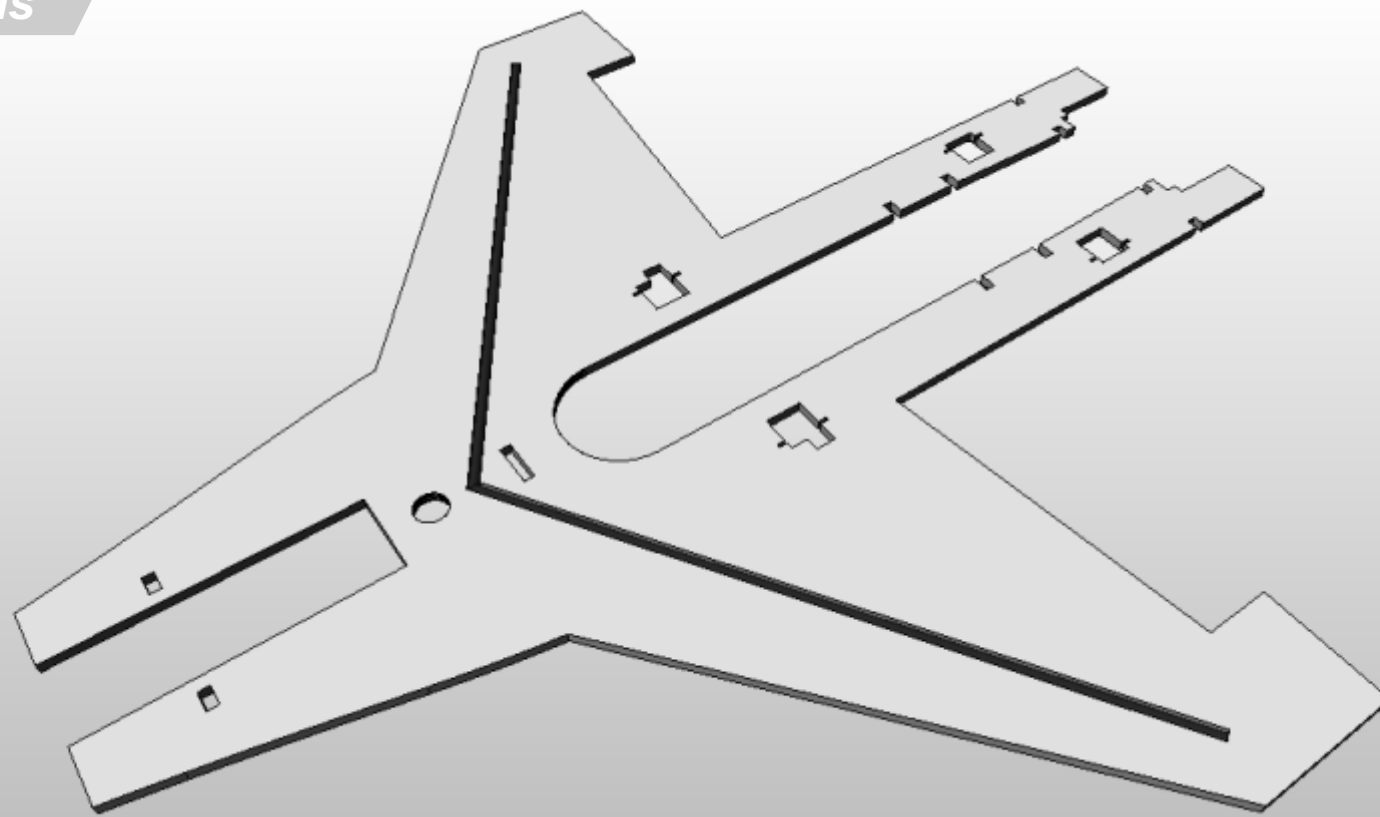
1. Print the plans,
 2. Cut around each part using scissors - allow a border of approx (1/4") 6mm
 3. Use either 3M spray mount or a very light coat of 3M 77 to the back of the parts and stick in an economical layout on the Depron foam.
 4. Using a safety rule and craft knife over a cutting mat - important!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



All versions

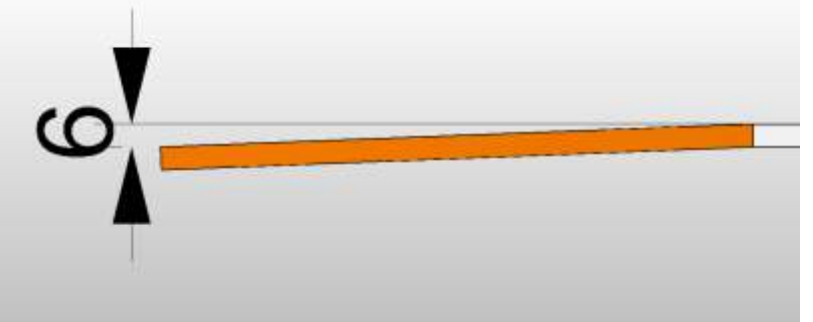
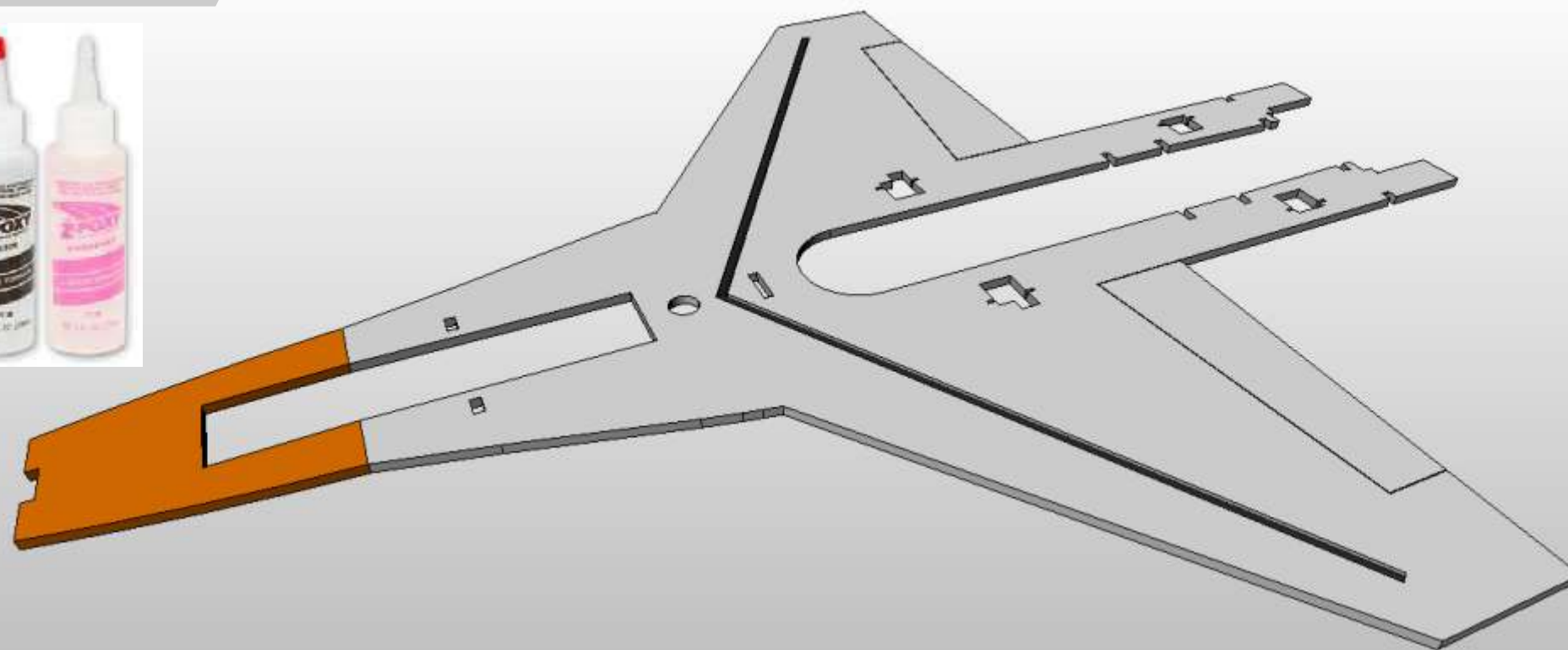


Epoxy the 6mm Carbon Tubes into the slot in the wing (part 1)

Using masking tape to prevent spillage, glue the carbon spar into the wing.

Put masking tape over the top of the joint and lay in a flat place, preferably with a weighted object such as a book to keep it flat while the glue sets.

All versions

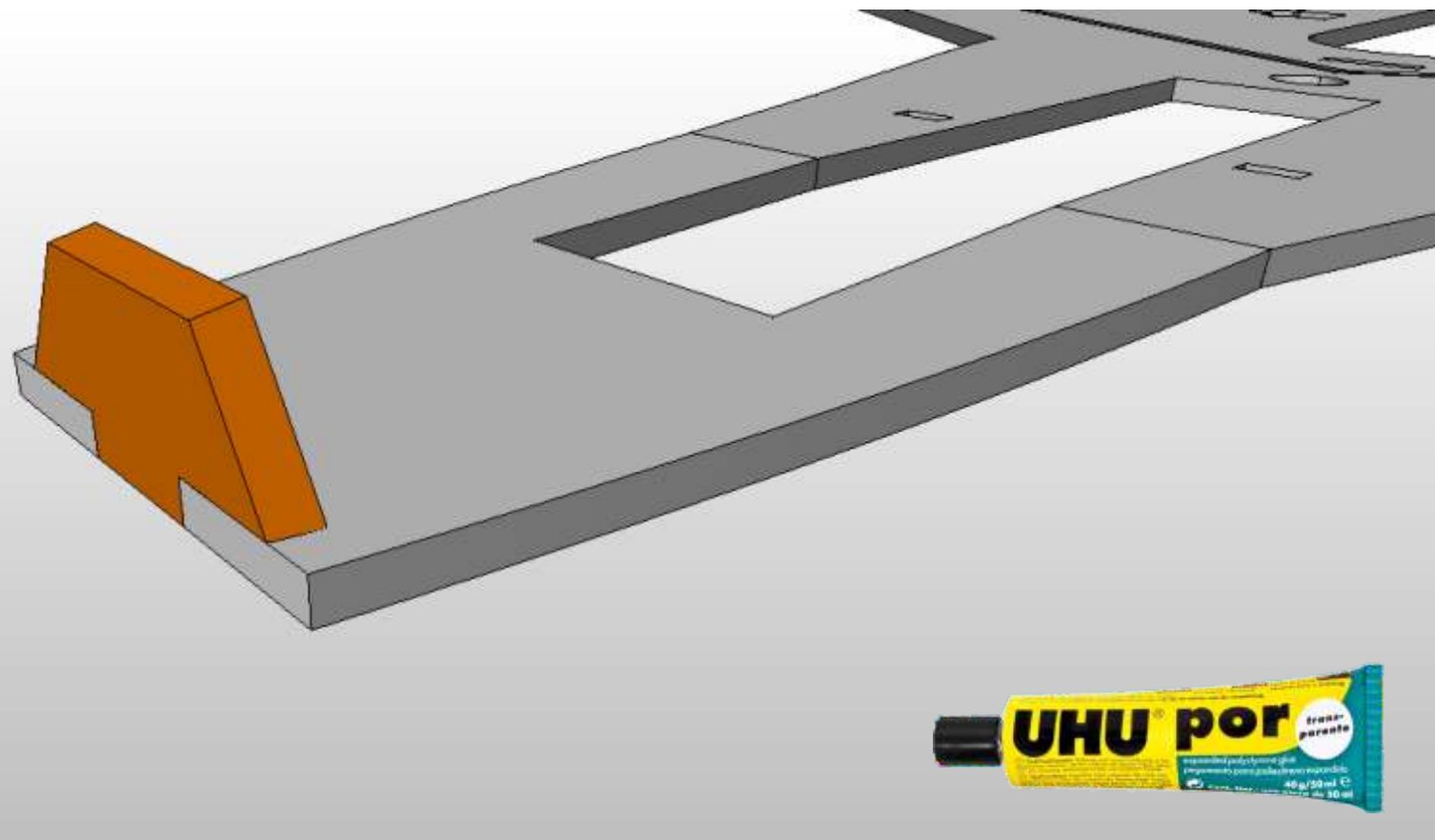


Glue the **Front fuselage former** piece (part 2) onto the wing at a slight incline.

(rest the wing panel on a piece of 6mm depron while the glue sets)

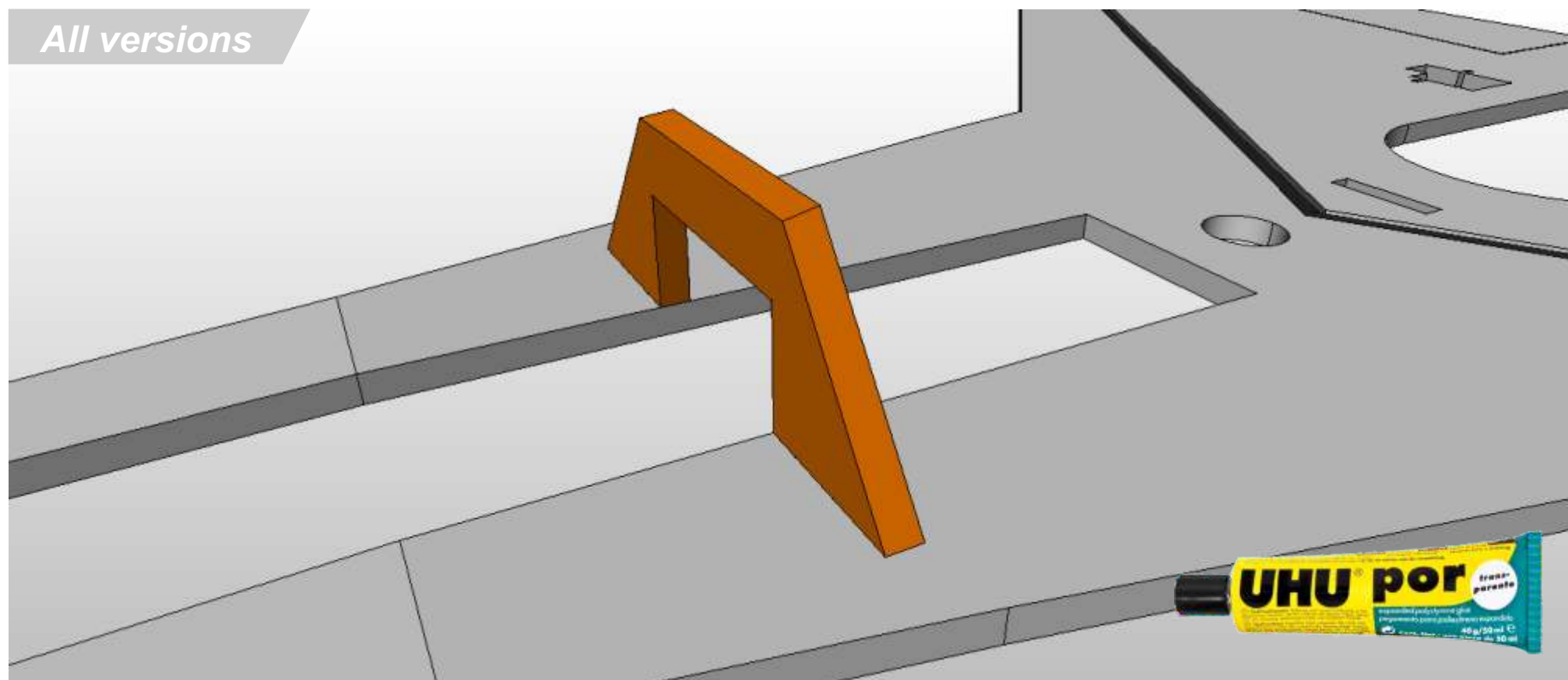


All versions



Glue **Fuselage 1** (part 3) onto the assembly in the slot provided.

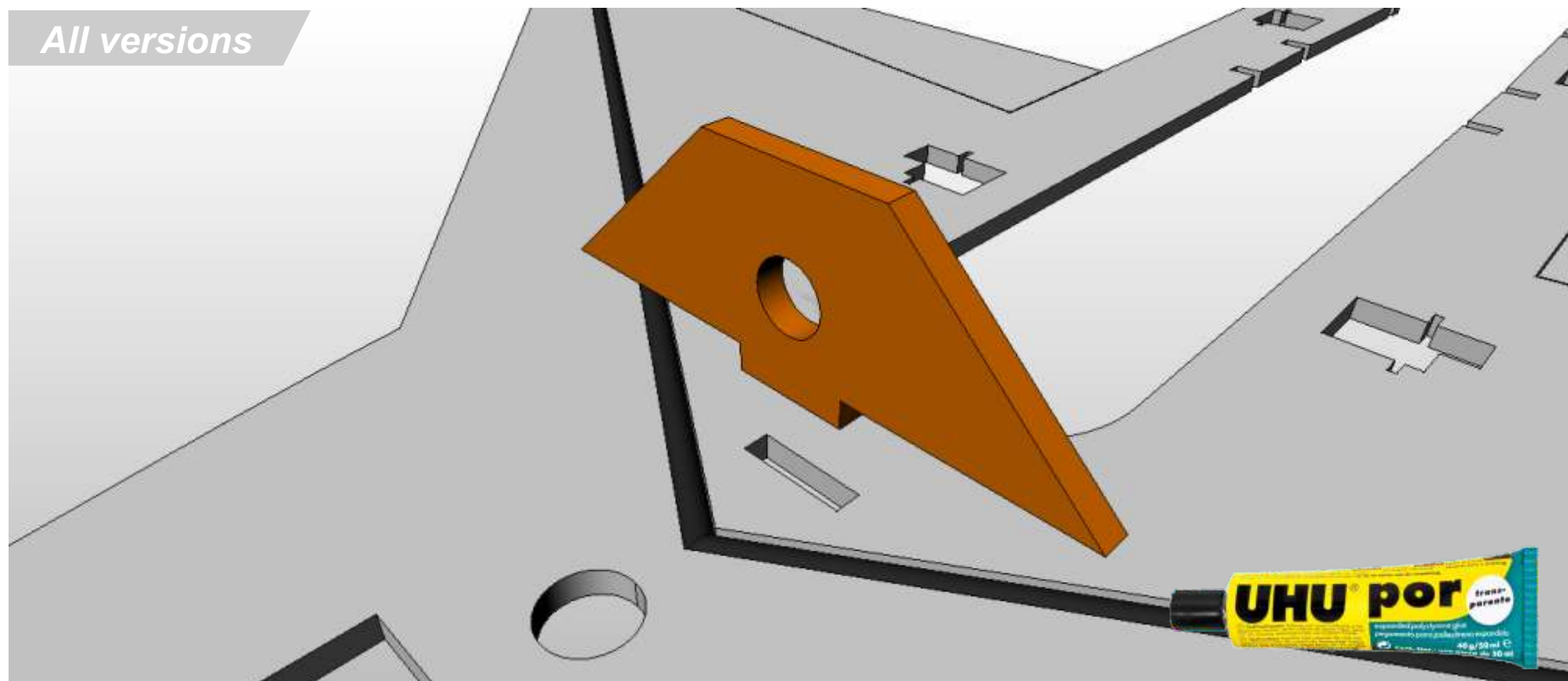
All versions



Glue **Fuselage 2** (part 4) onto the assembly in the slots provided

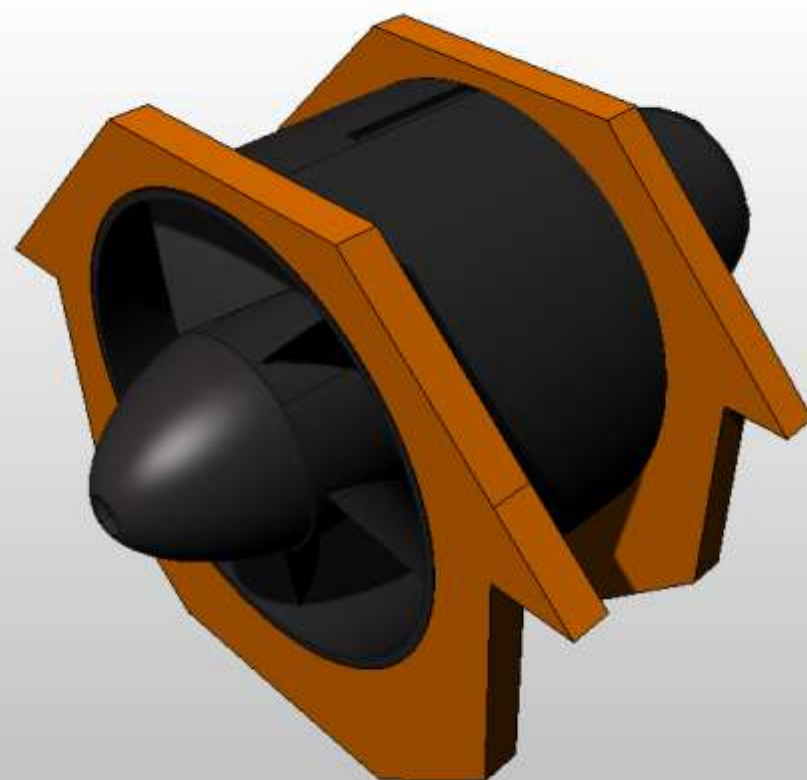


All versions



Glue **Fuselage 3 (part 5)** onto the assembly in the slots provided.

EDF only

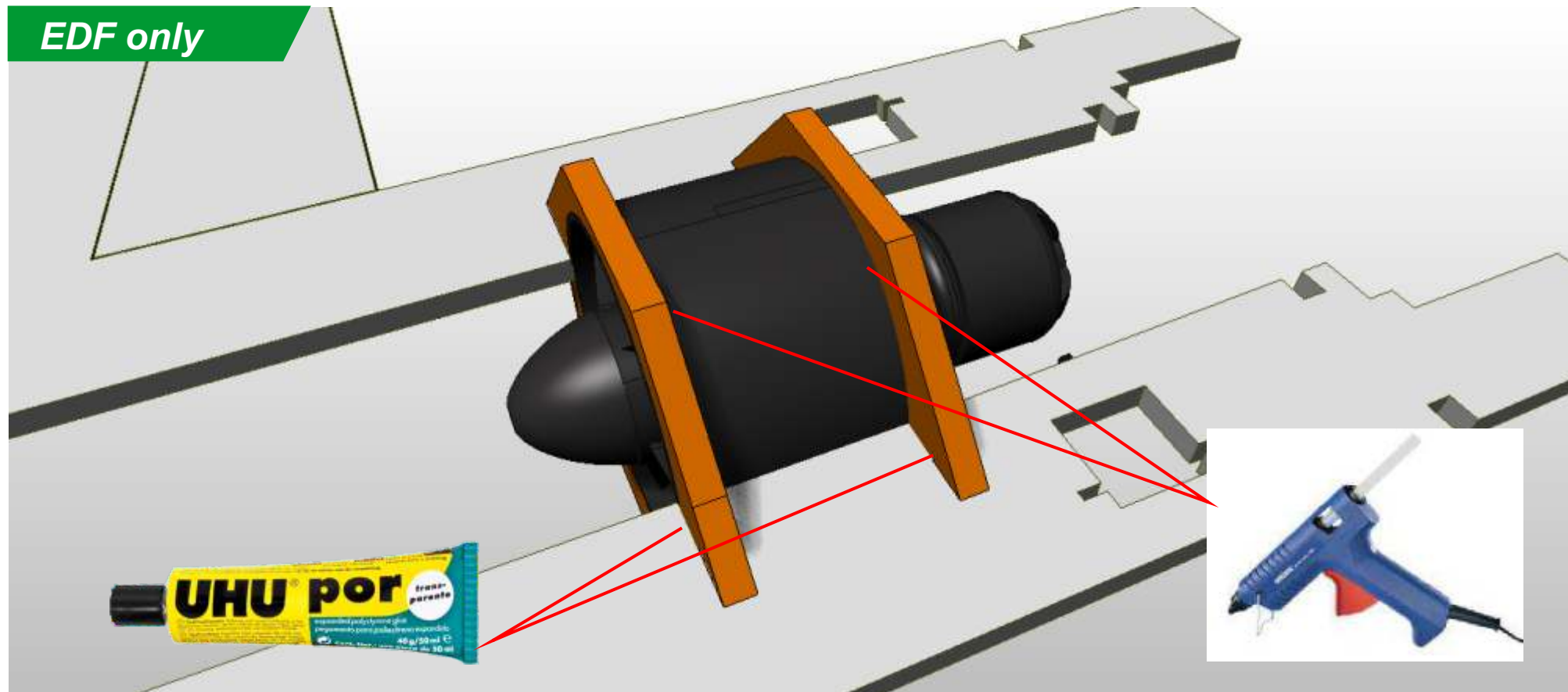


Cut front and rear **EDF bulkheads** (parts 6 & 7) to suit your particular EDF. You may wish to use liteply for these as they are a little fragile when not bonded to the airframe.

Do not glue at this stage.



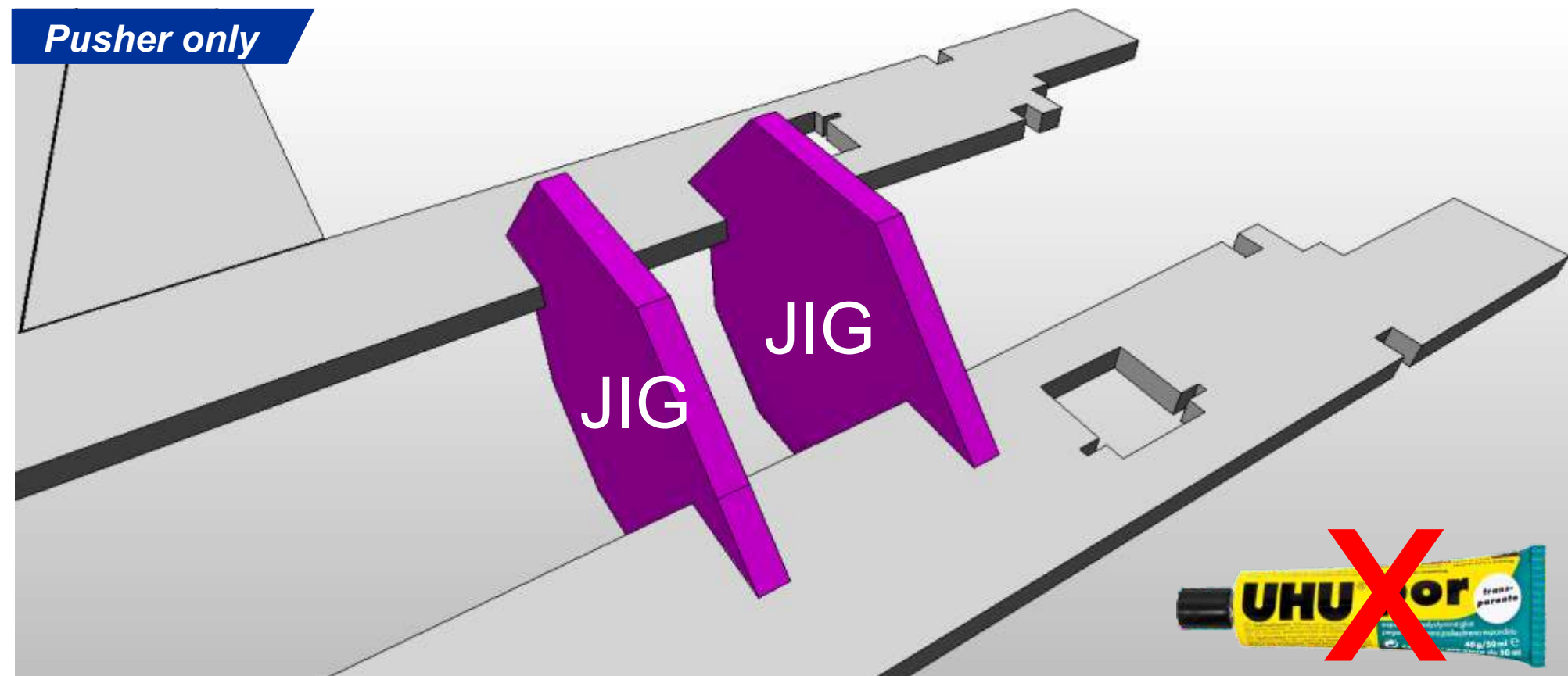
EDF only



Glue the EDF assembly into the airframe using UHU por.

Once the bulkheads are in place, then secure the EDF in place using either Hot-melt glue or Silicone sealant to reduce vibration.

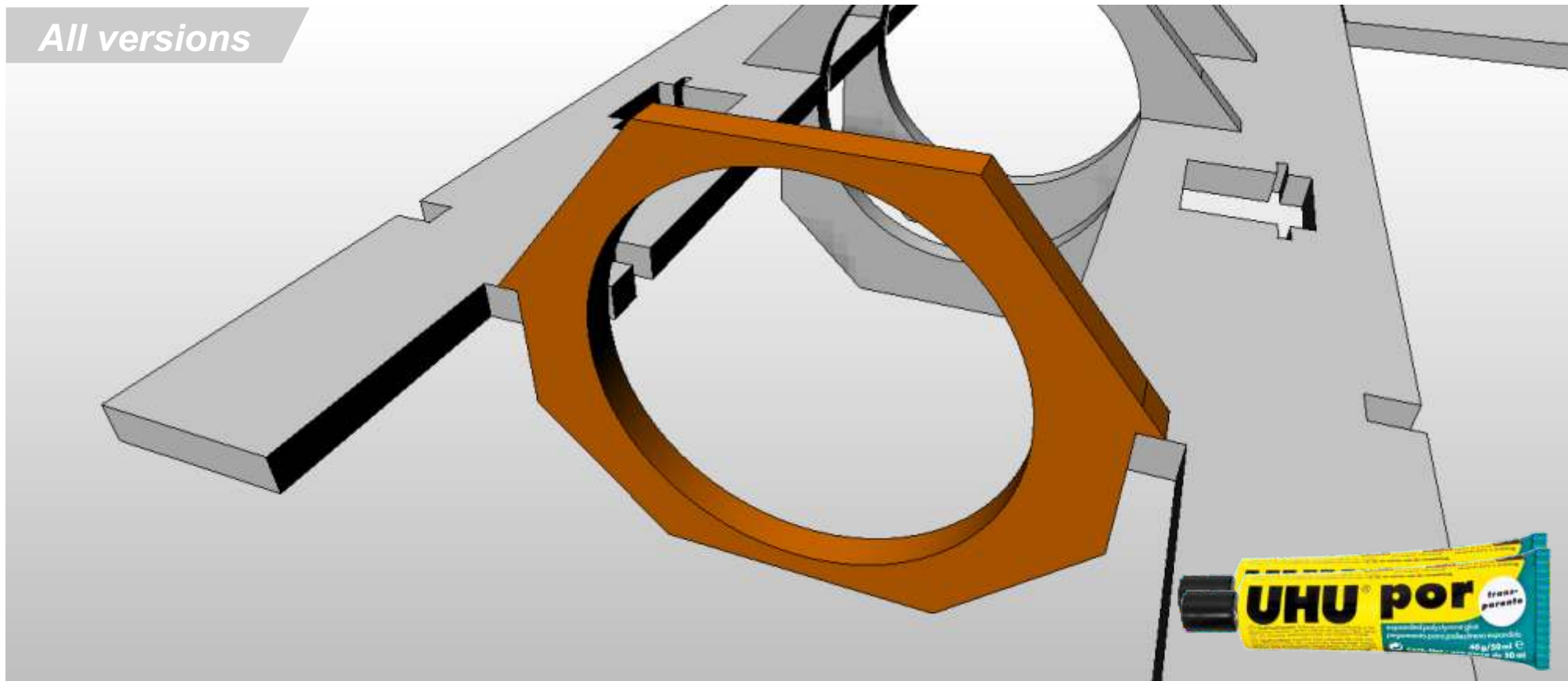
Pusher only



Pusher version - Create the **EDF Bulkheads** without the circular cut-out, to be used as location jigs - unglued to the assembly.



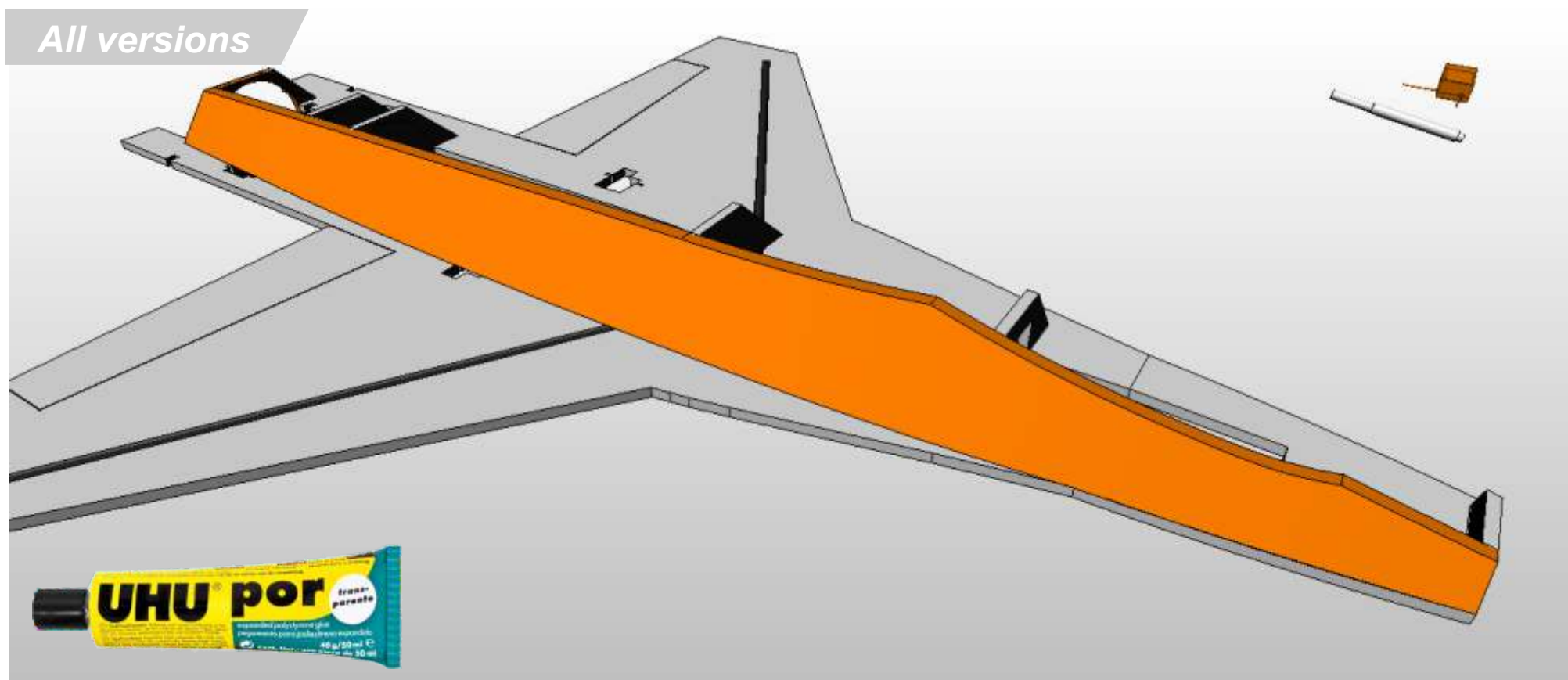
All versions



Install **Rear Exhaust bulkhead**
(part 8b)

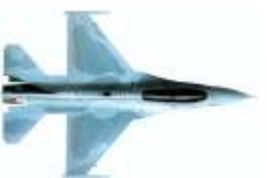
This is quite a fragile piece. You might wish to make this from 2x 3mm liteply instead

All versions

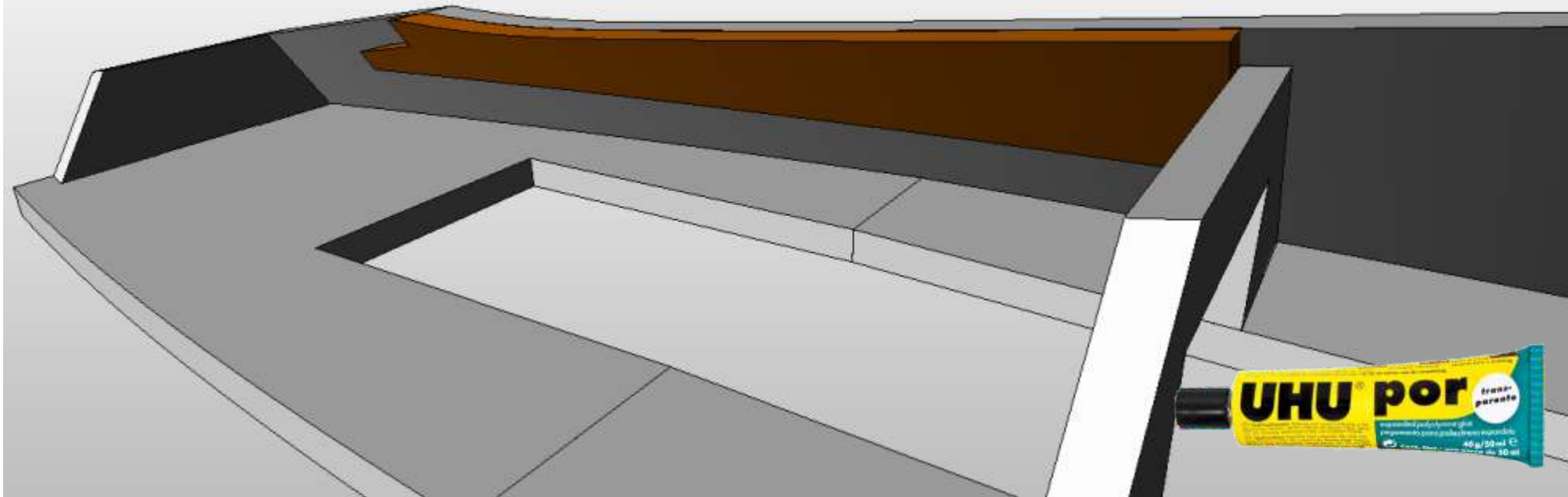


Stick the **Upper fuselage side**
(part 9) into place.

If you are building the Pusher version - do not glue to the the 'EDF bulkhead jigs.



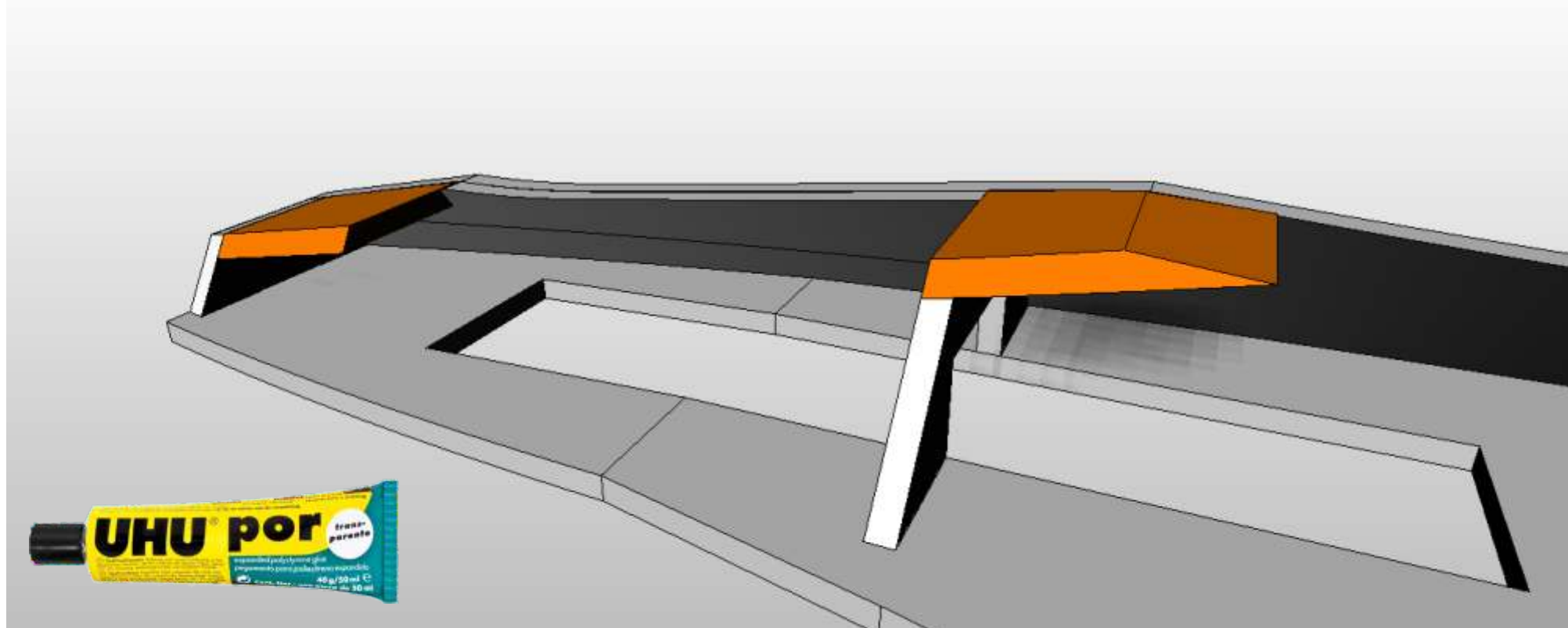
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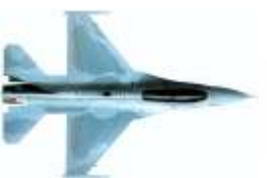
Stick the canopy side support (9b) onto the inside of the Upper fuselage sides.

Do this on both sides.

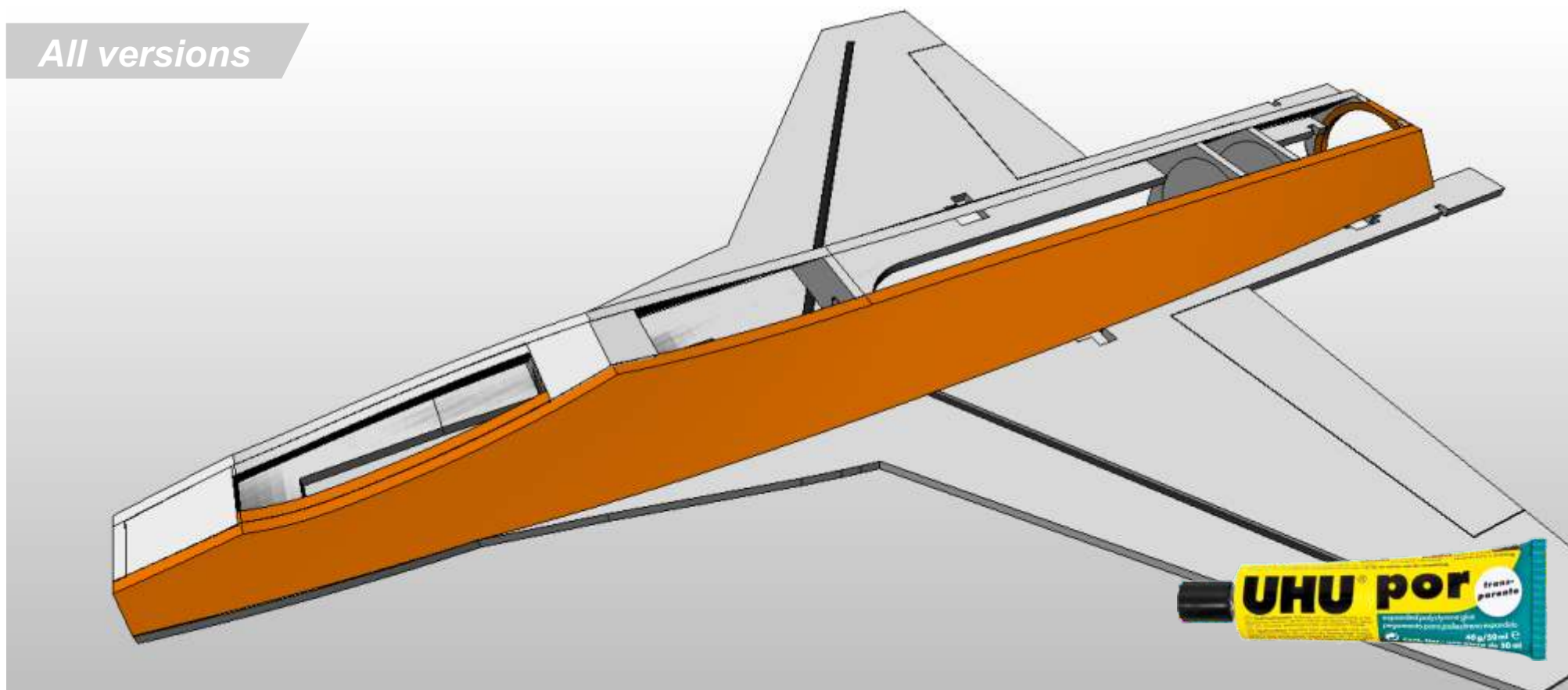
All versions



Then stick the **Forward Fuselage top (Lower support)** and the **Magnet panel** (parts 10 and 11) in place.



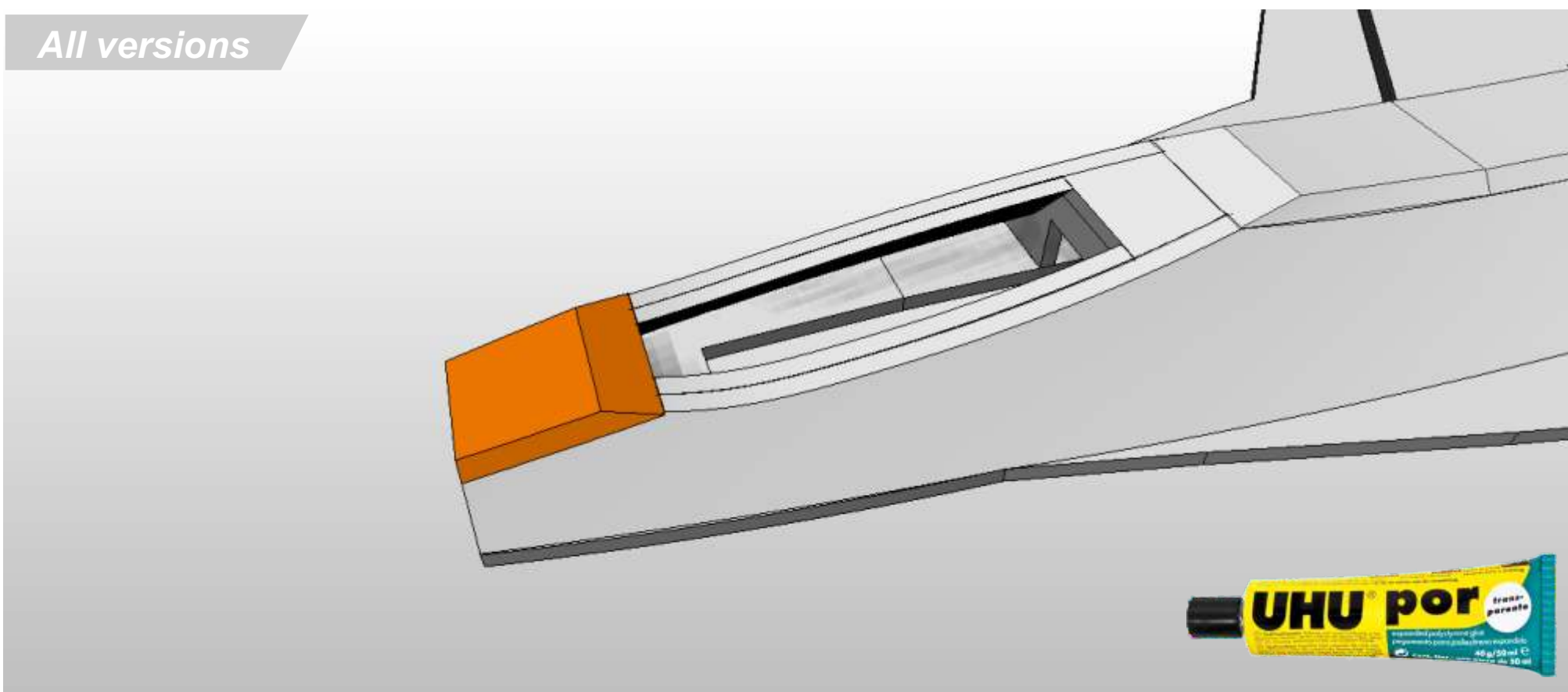
All versions



Stick the other **Upper fuselage side** (part 9) into place.

If you are building the Pusher version - do not glue to the the 'EDF bulkhead jigs.

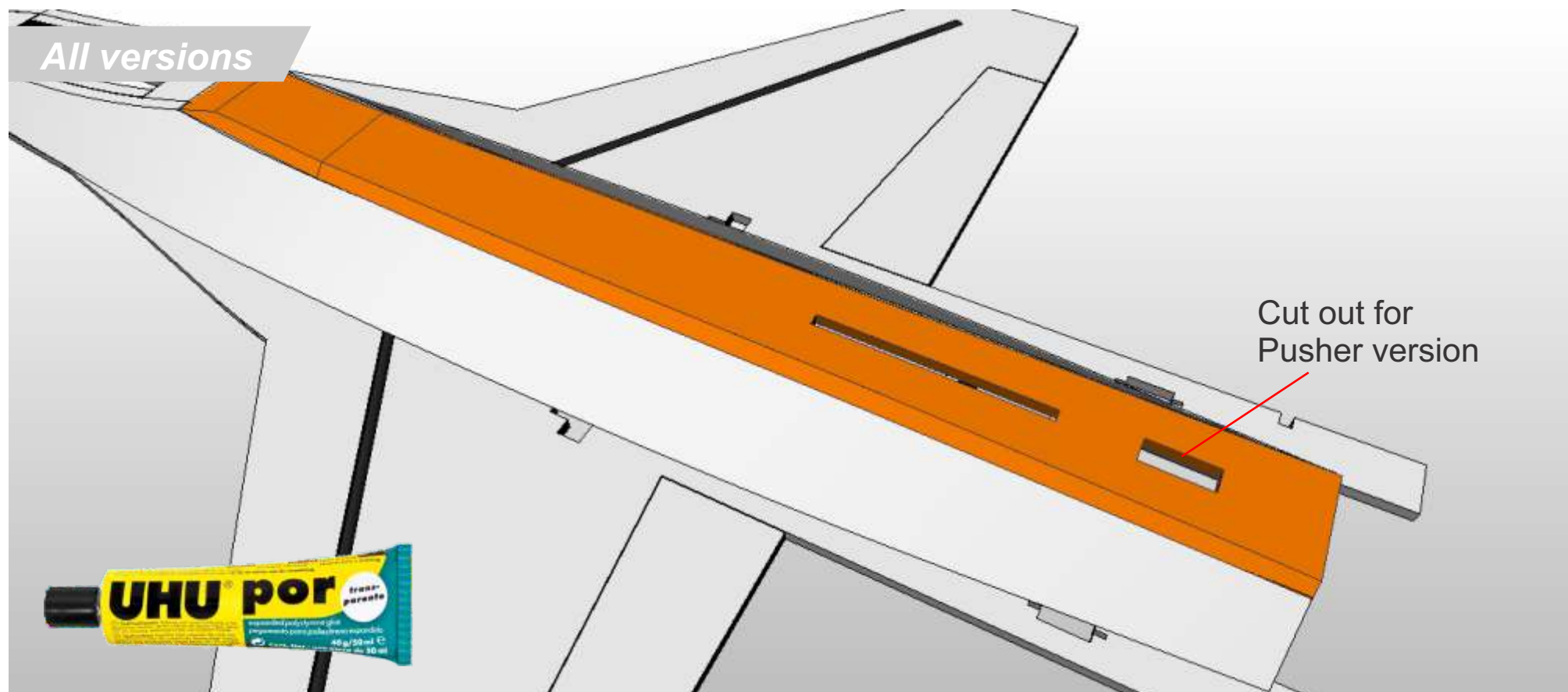
All versions



Glue the **Forward fuselage upper** (part 12) to the assembly.



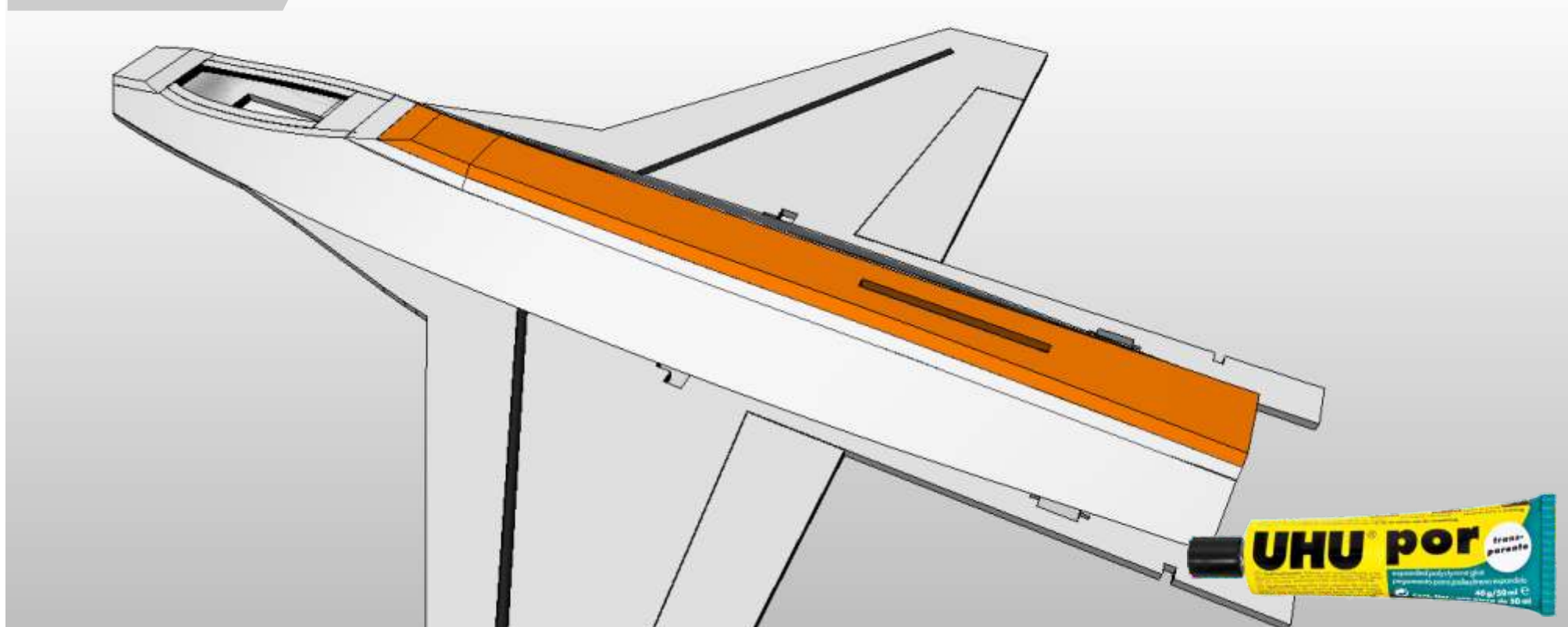
All versions



Glue the **Upper fuselage top (lower part)** - part 13 in place.

Pusher version - do not glue to the EDF Jigs.

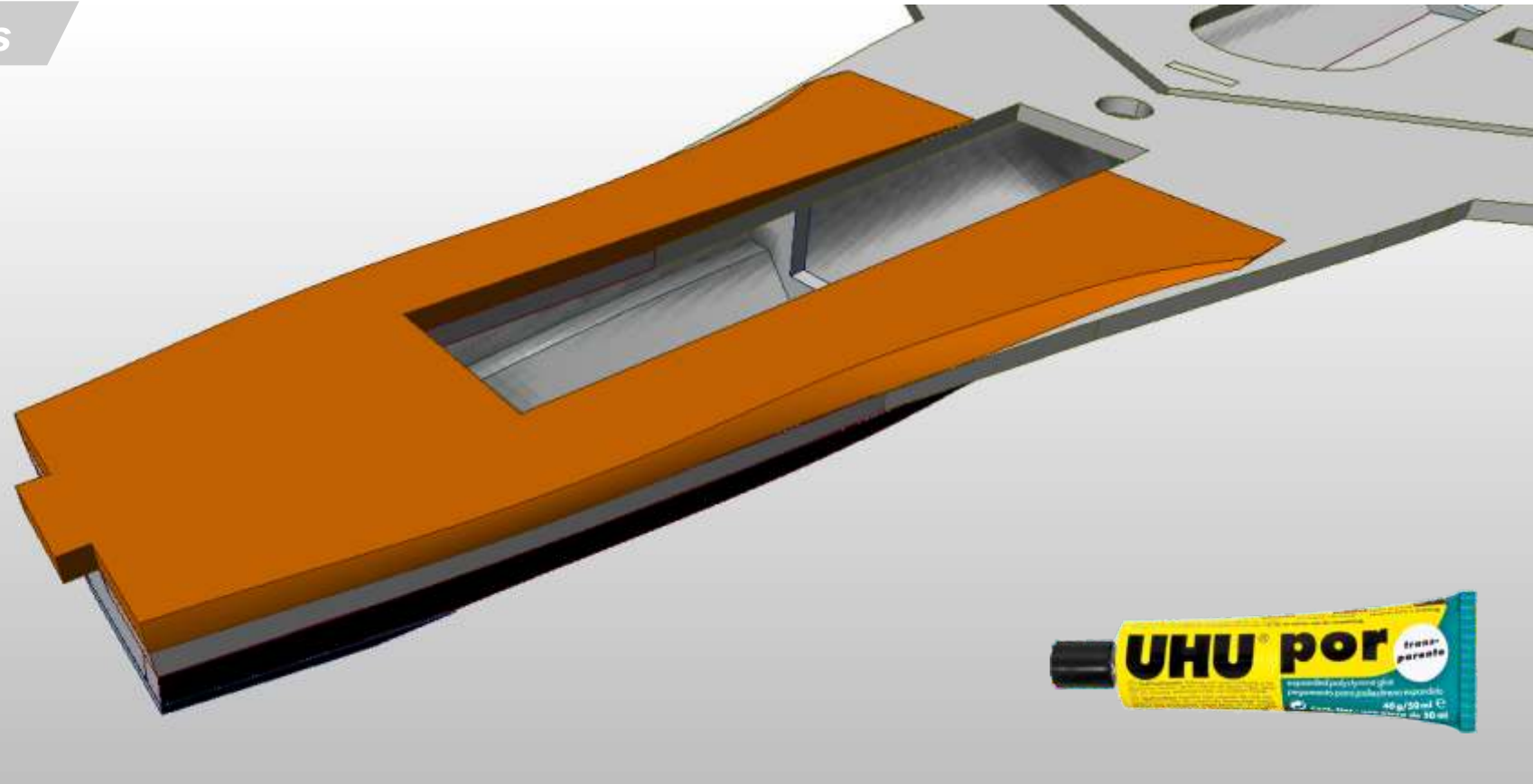
All versions



Glue the **Upper fuselage top (upper part)** - part 14 in place.



All versions



Carefully shape Part 15, sanding the tapering feathered edge to shape to fit the angled wing/forward fuselage former.

Partially sand the bevels on the edges - to be completed when the forward fuselage under-belly sub-assembly is complete.

Glue in place.

All versions

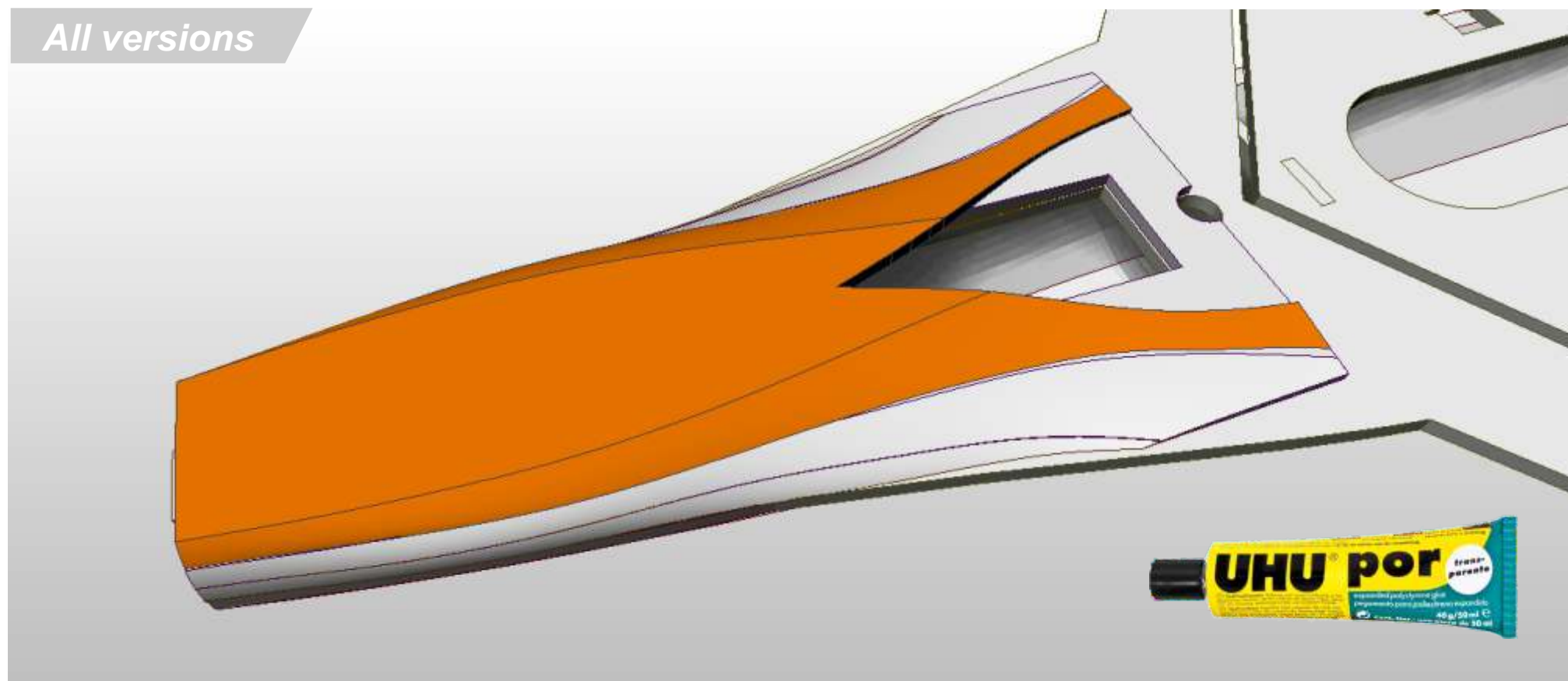


As per previous step, Sand and fit part 16.

Partially sand the bevels on the edges - to be completed when the forward fuselage under-belly sub-assembly is complete.



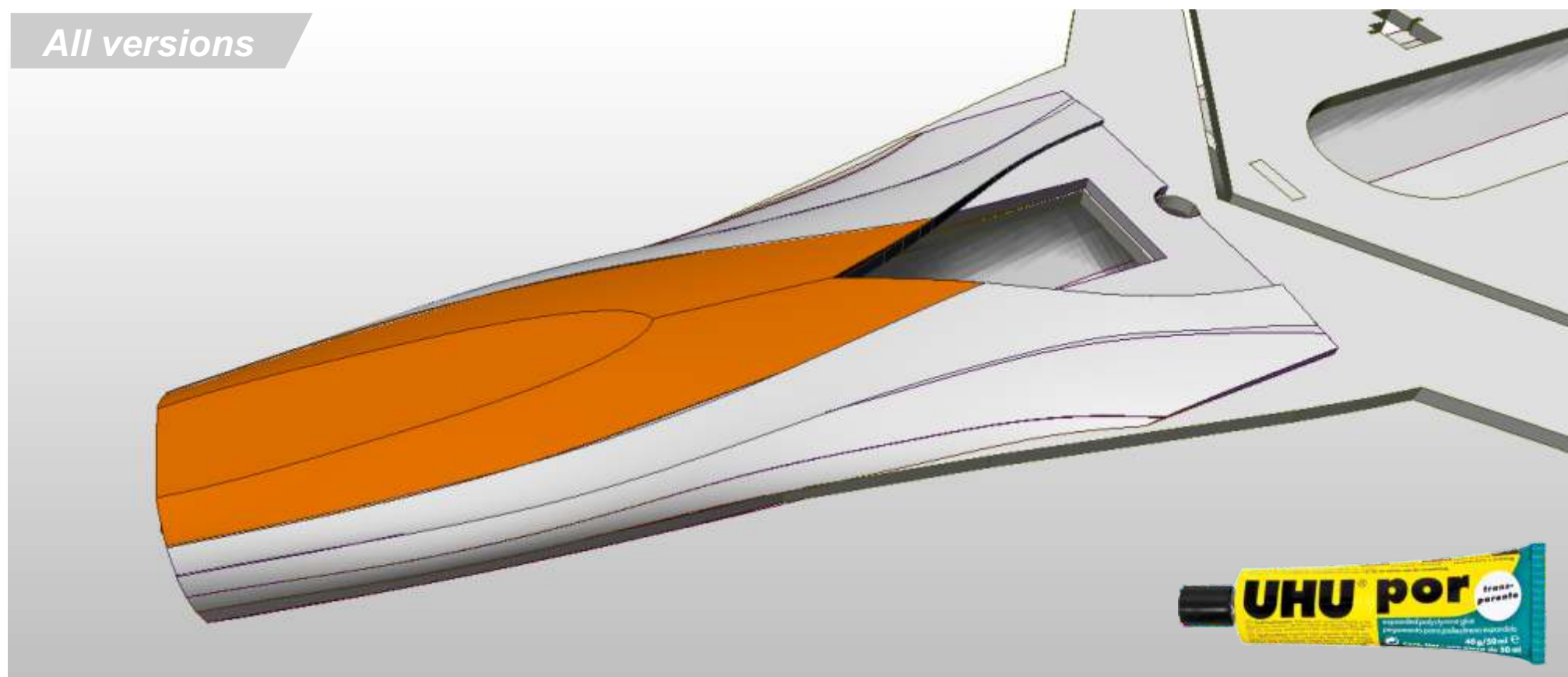
All versions



Fit part 17.

Partially sand the bevels on the edges - to be completed when the forward fuselage under-belly sub-assembly is complete.

All versions

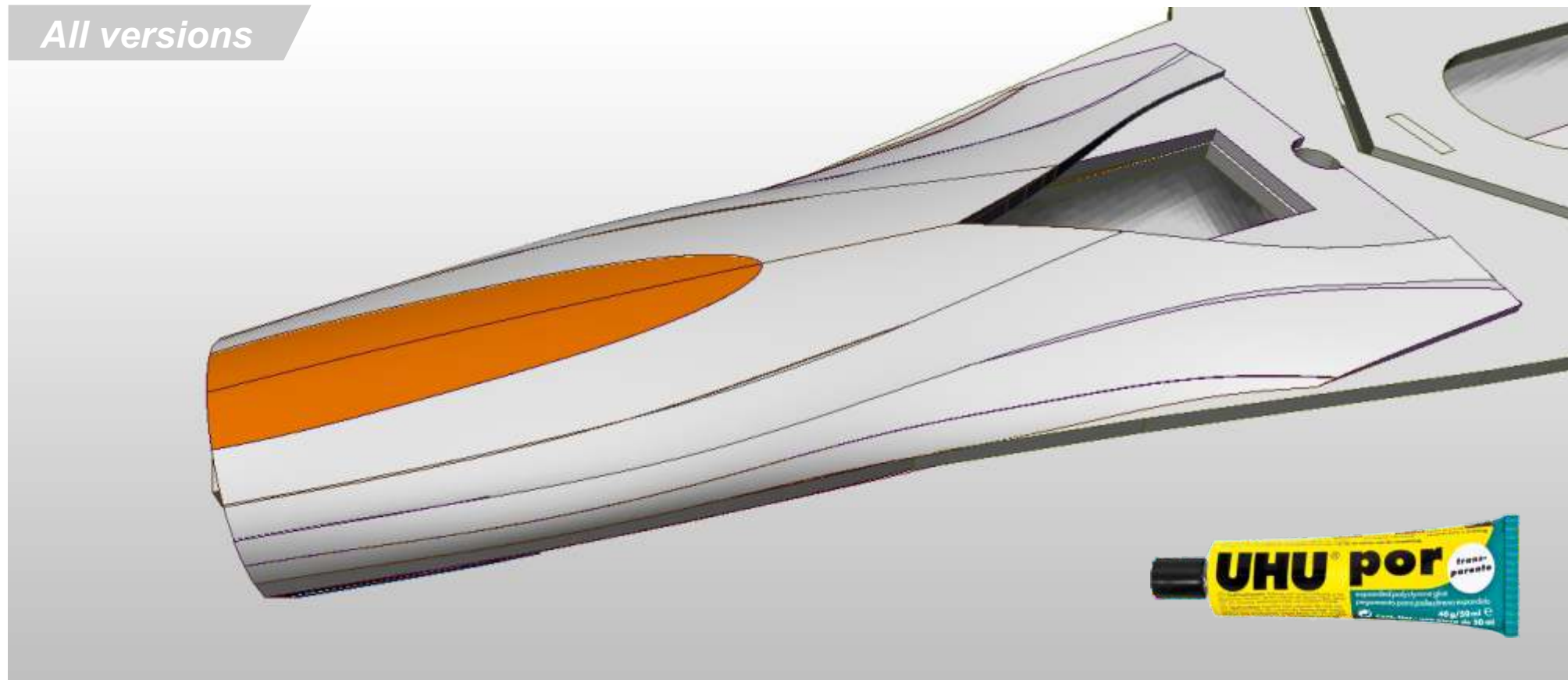


Fit part 18.

Partially sand the bevels on the edges - to be completed when the forward fuselage under-belly sub-assembly is complete.

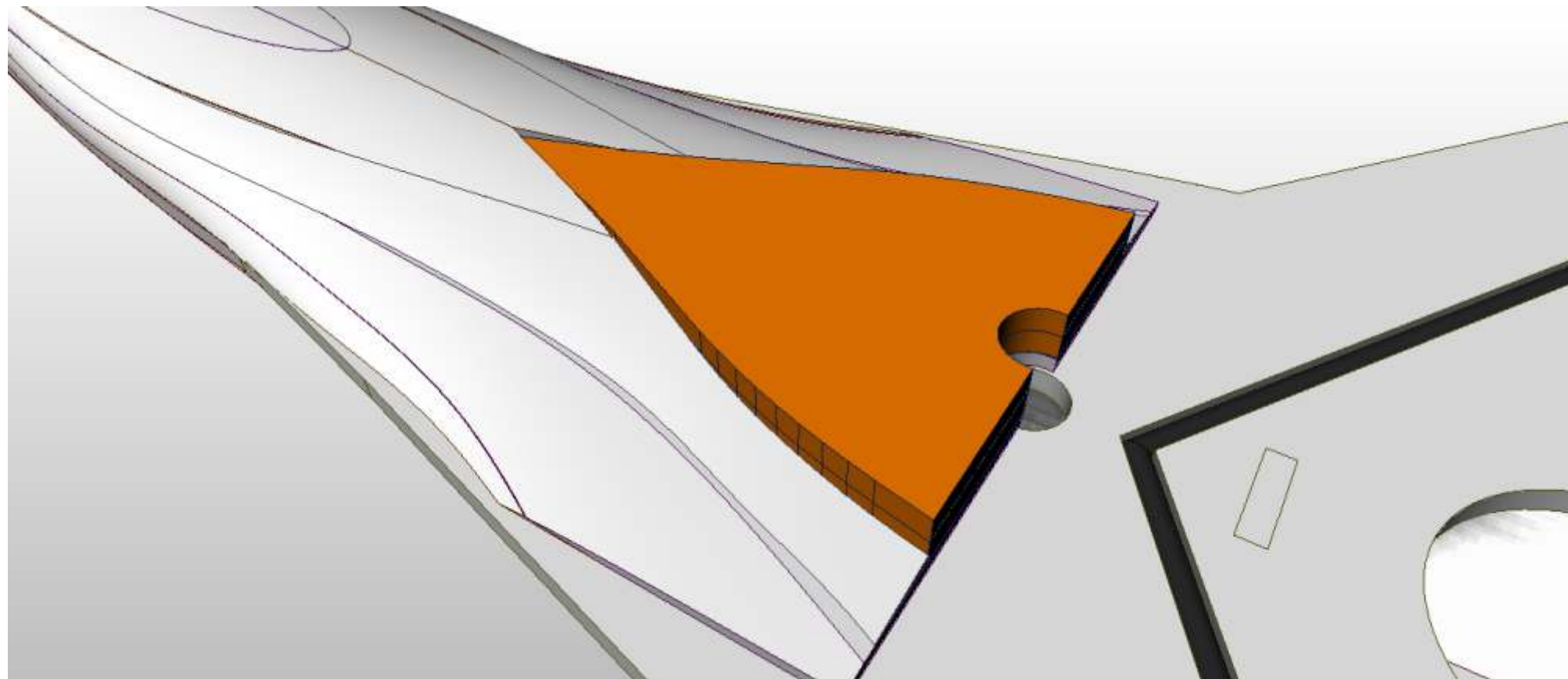
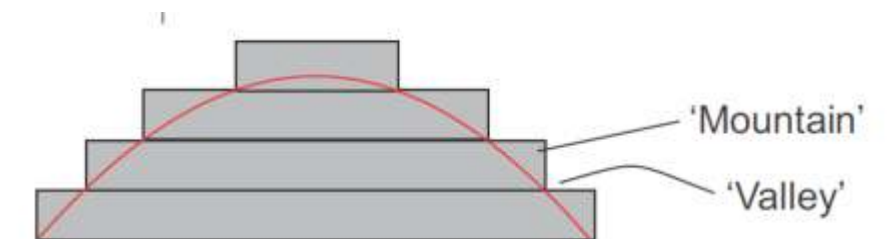


All versions

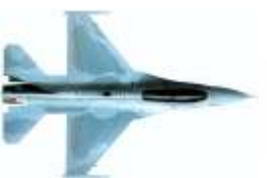


Fit part 19.

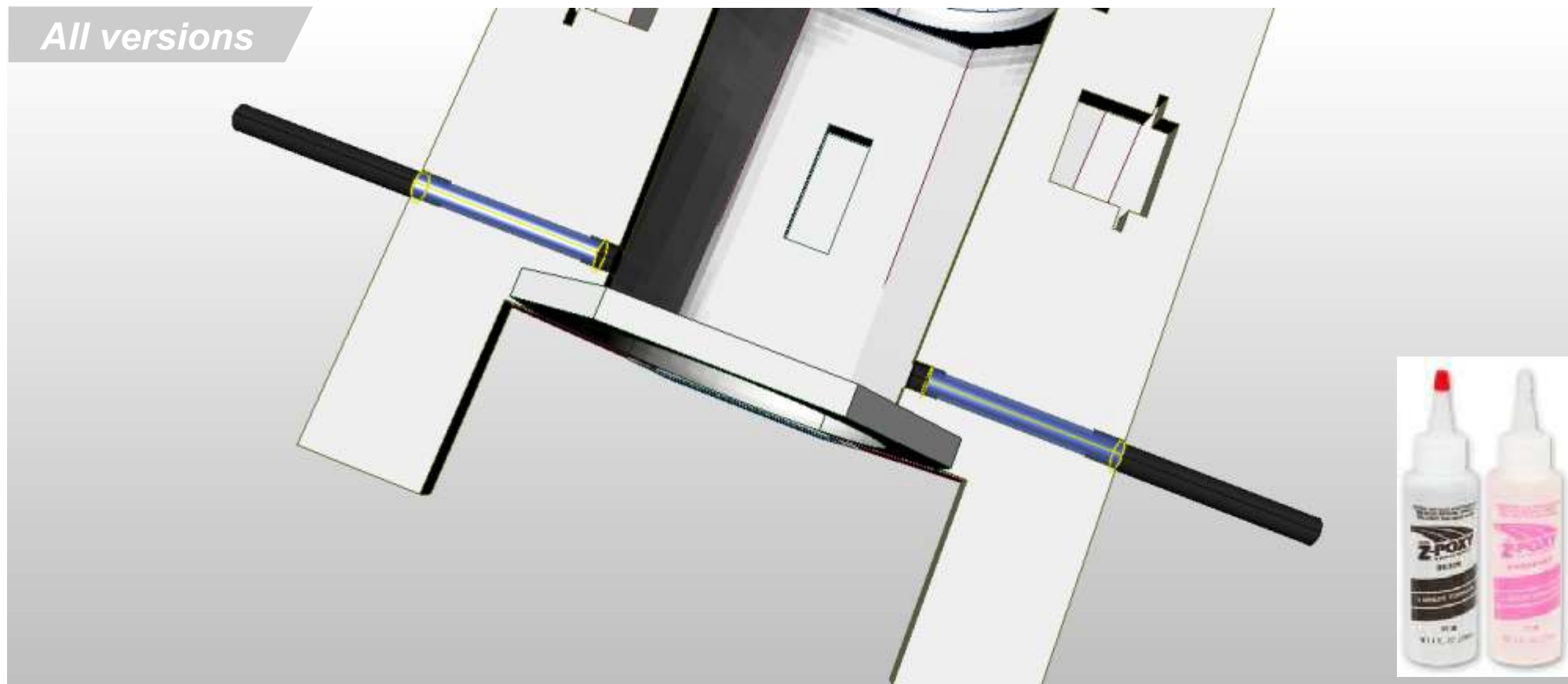
Carefully sand the forward fuselage lower belly into a smooth shape, sanding the 'mountains' down until the bottom of 'valleys' are met. When complete rub watered down spackling into the pores and sand smooth



Glue both splitter pieces (Part 20). in place and glue in place.

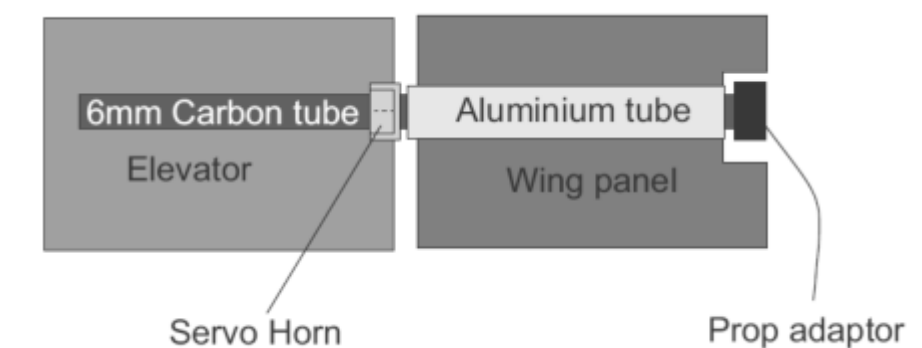
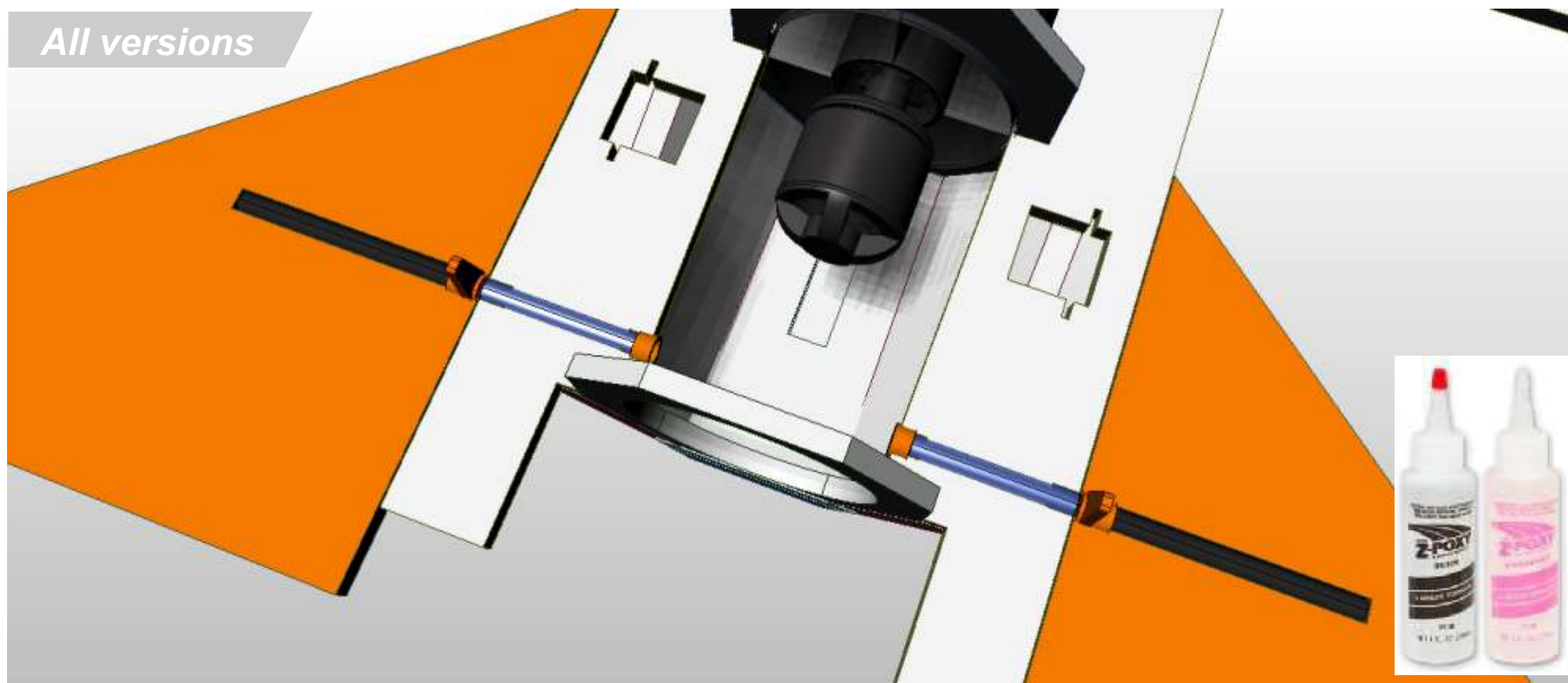


All versions



Where indicated on the wing panel, remove a channel and epoxy an aluminium tube (sleeve for the elevator shafts) into each side. Use a piece of carbon to keep them aligned.

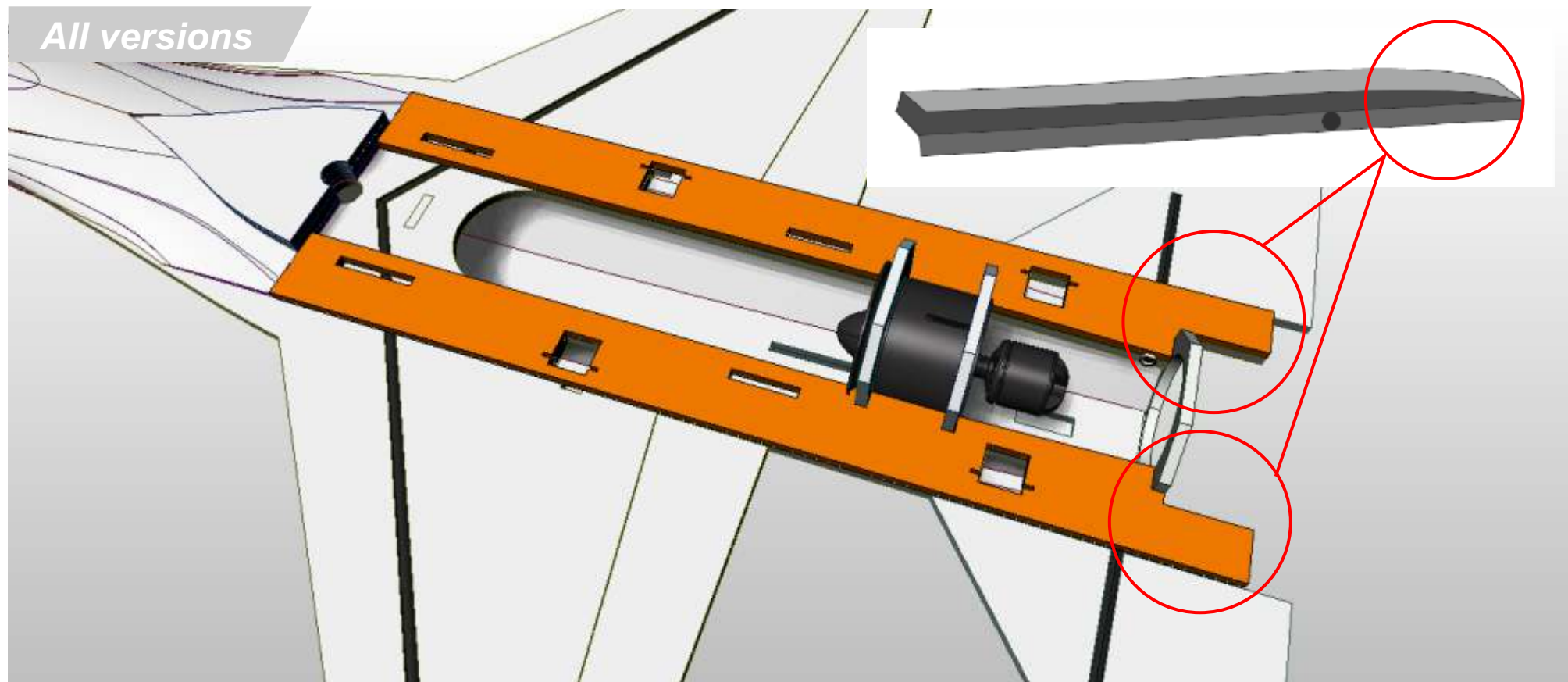
All versions



Glue the carbon rods into the elevators (Part 22) and use a standard sized servo arm drilled out, and prop adaptor drilled out to hold it in place and form the control horns.



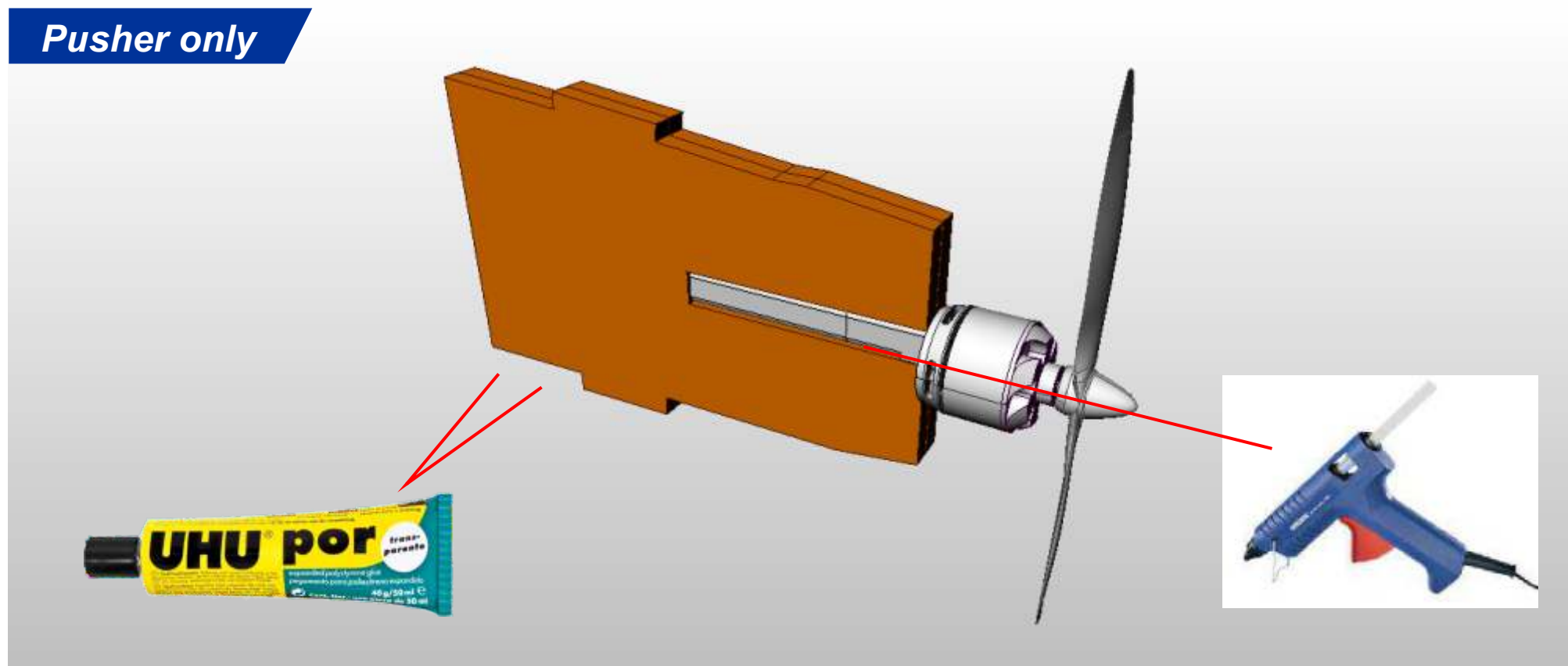
All versions



Glue the two bottom side pieces (part 21) in place.

Sand the rear as shown.

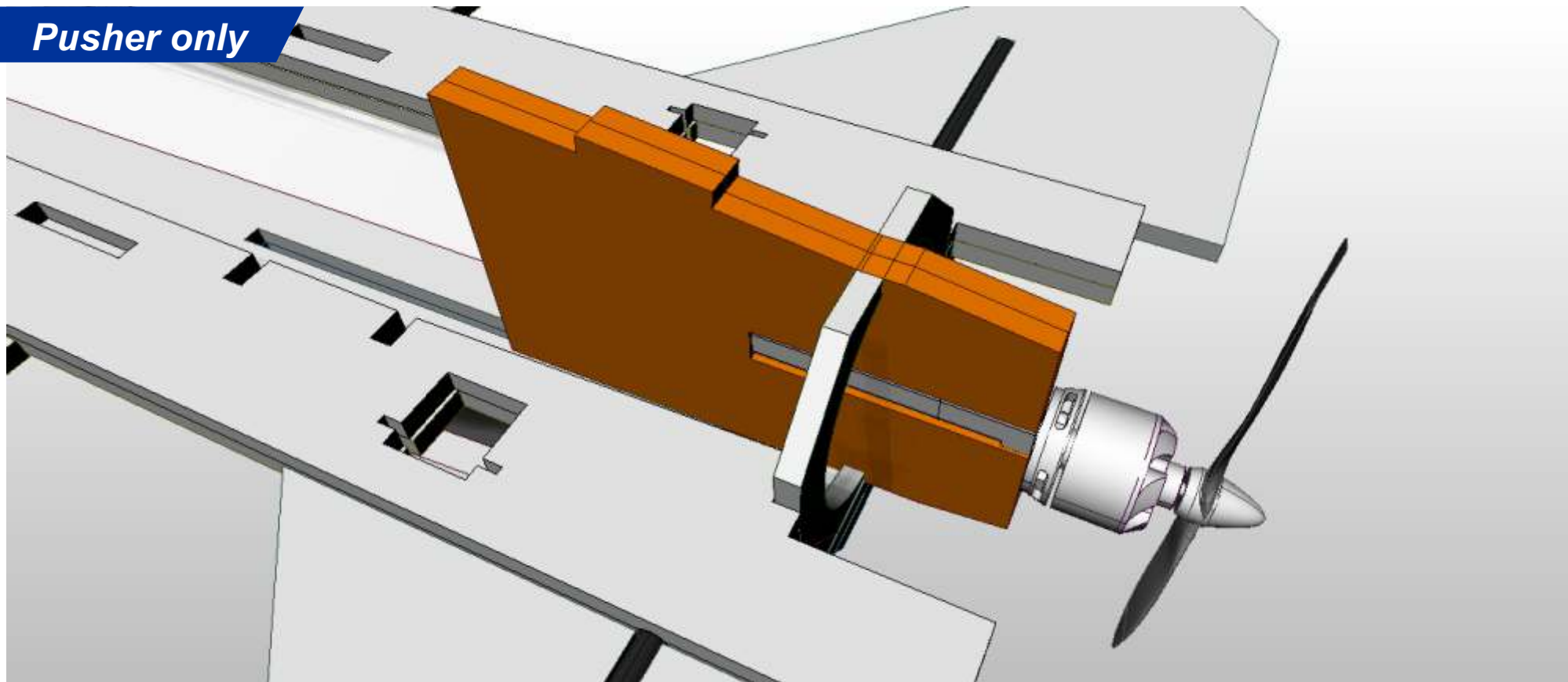
Pusher only



Glue the two pusher mount pieces together (part 23) and then glue the pusher stick mount into the slot using hot melt glue.

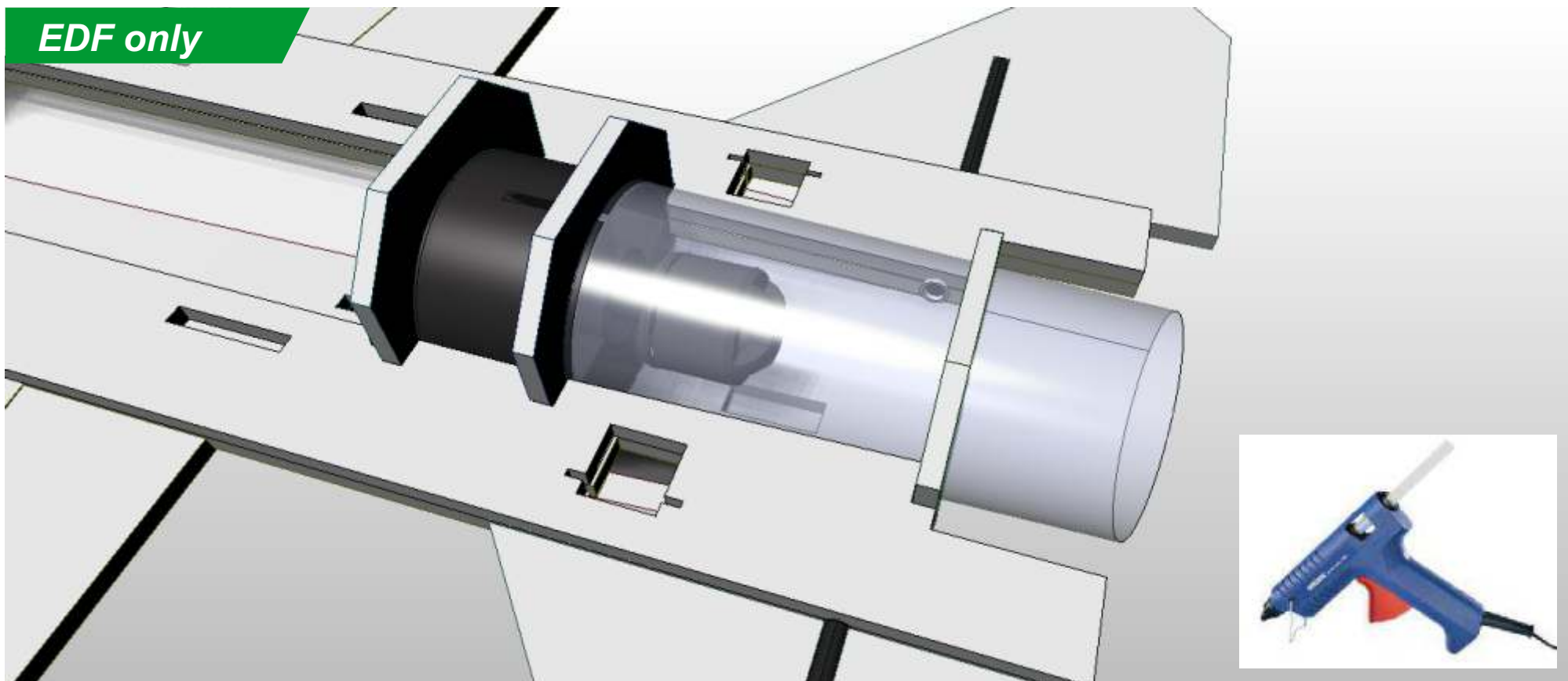


Pusher only



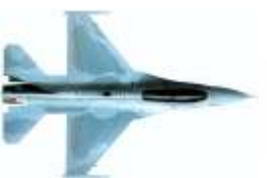
Trim away the EDF exhaust panel in order to make space for the motor mount (part 23) and glue into the slot prepared for it in the fuselage top.

EDF only

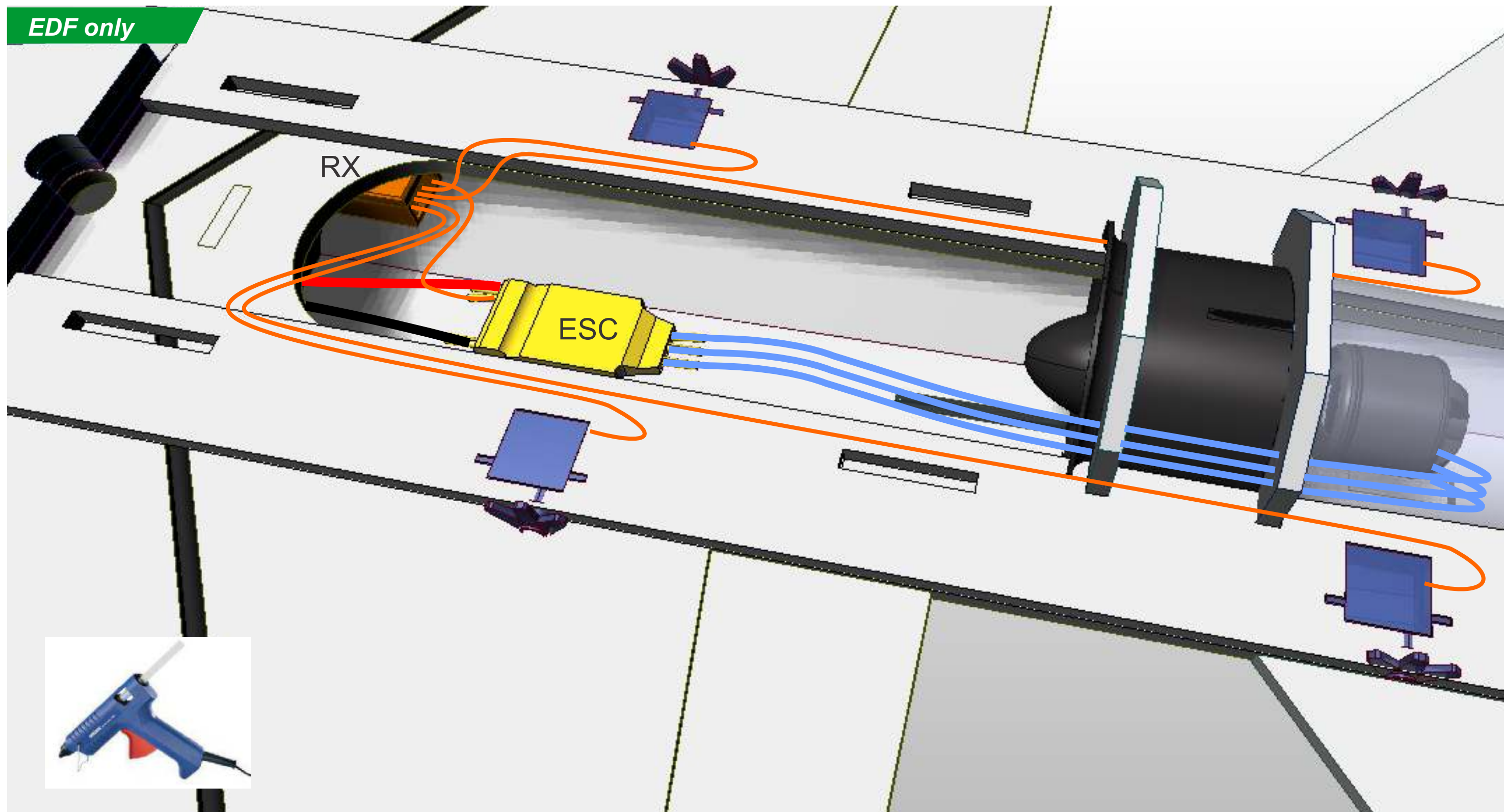


Prepare the thrust tube using <0.5mm plastic sheet, held in a tube shape using nylon reinforced tape.

Slide over the outer face of your EDF and carefully glue using Hot melt. Be careful not to melt the thrust tube. Test on scrap plastic sheet first.



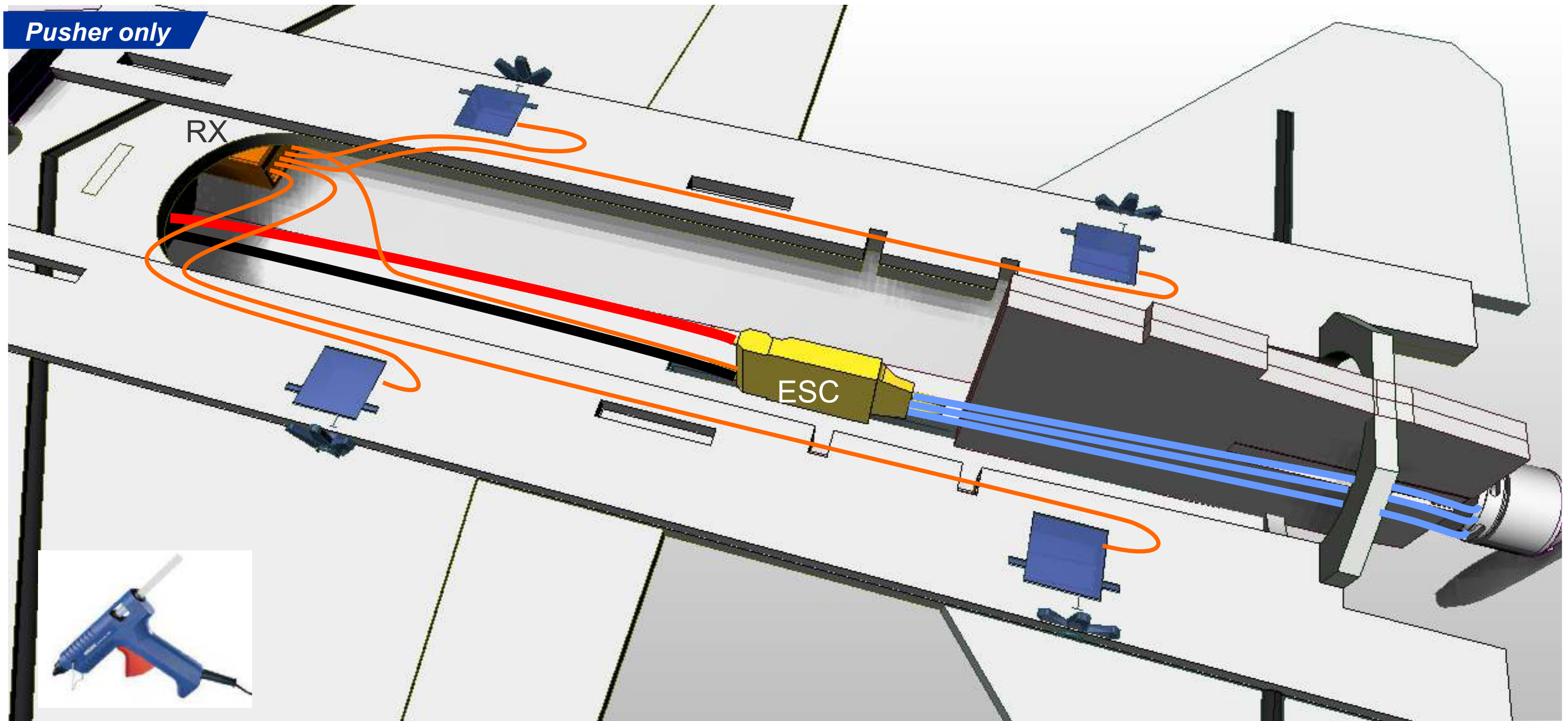
EDF only



Install all the electronics as shown. Solder and heatshrink all joints. Using Hot melt glue, glue the ESC AND RX to the wing and the servos in place.



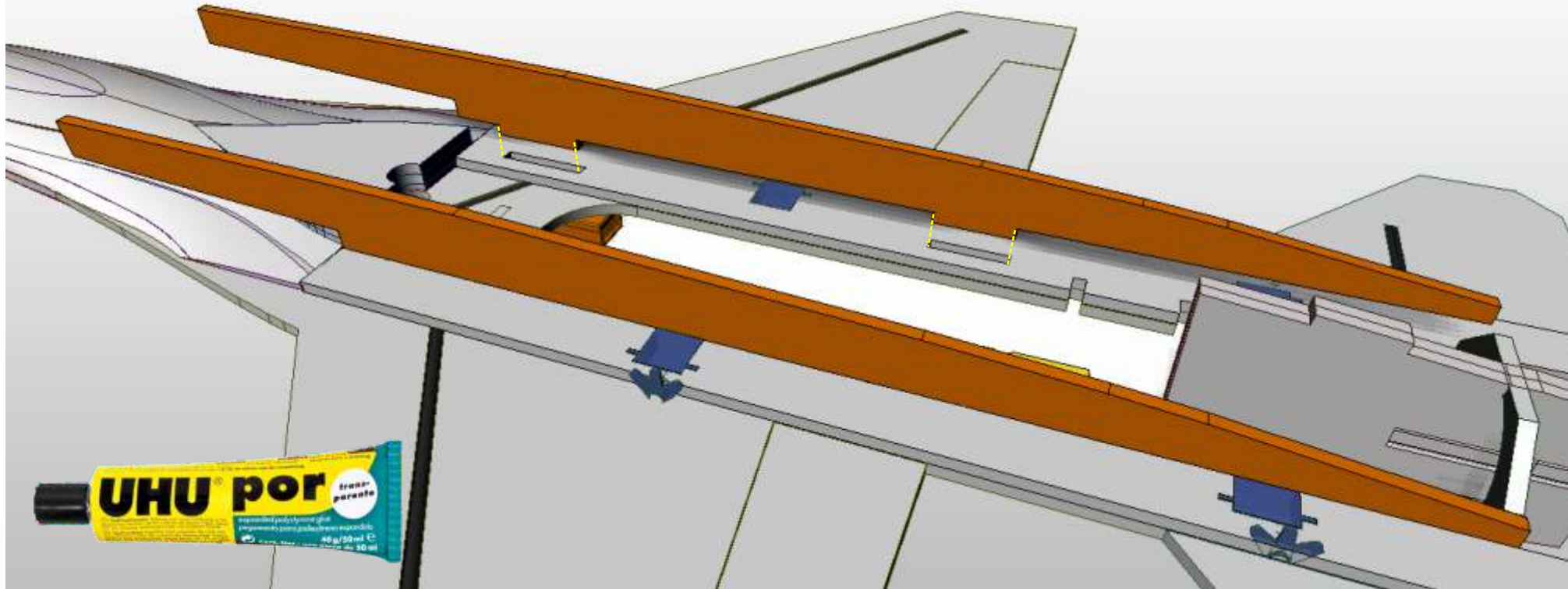
Pusher only



Install all the electronics as shown. Solder and heatshrink all joints. Using Hot melt glue, glue the ESC AND RX to the wing and the servos in place.

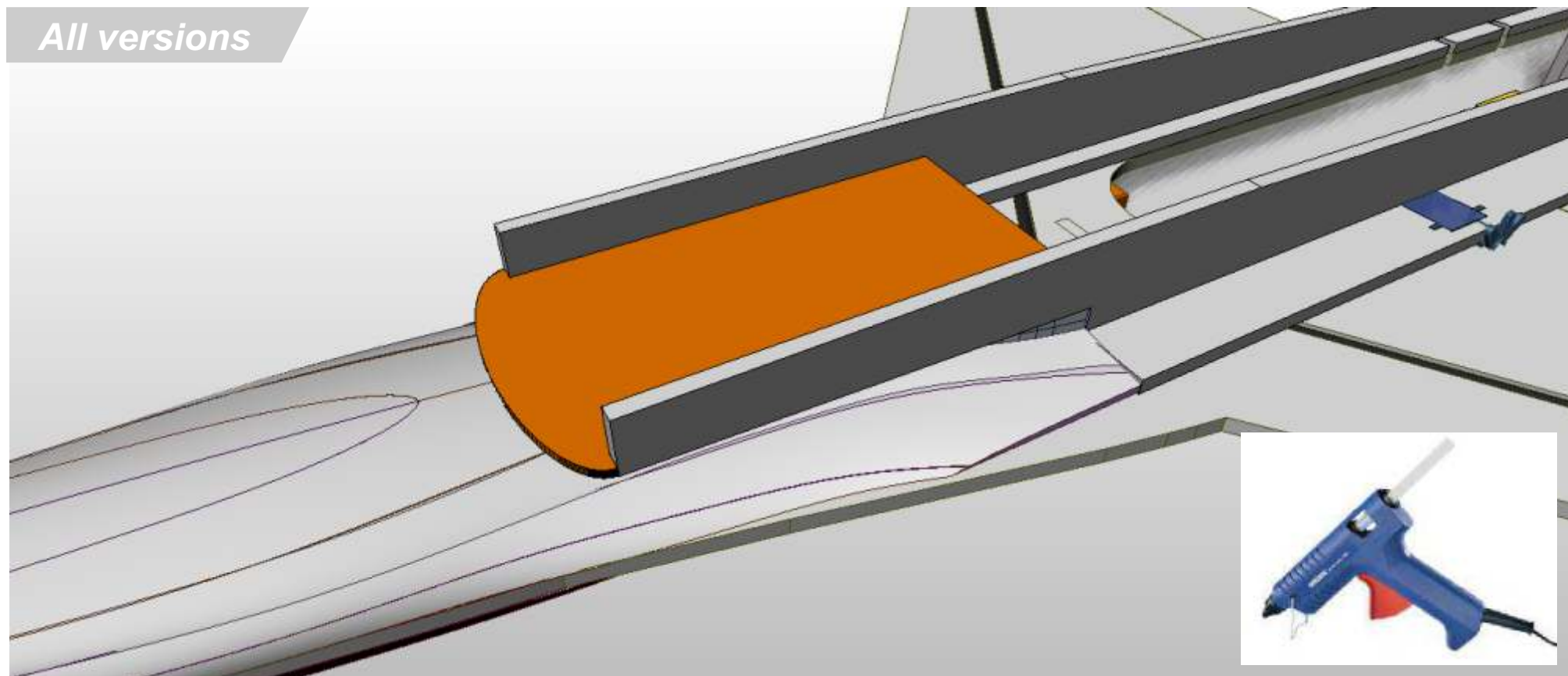


All versions



Sand the edges to shape, then fit and glue the lower side pieces (part 23) in place.

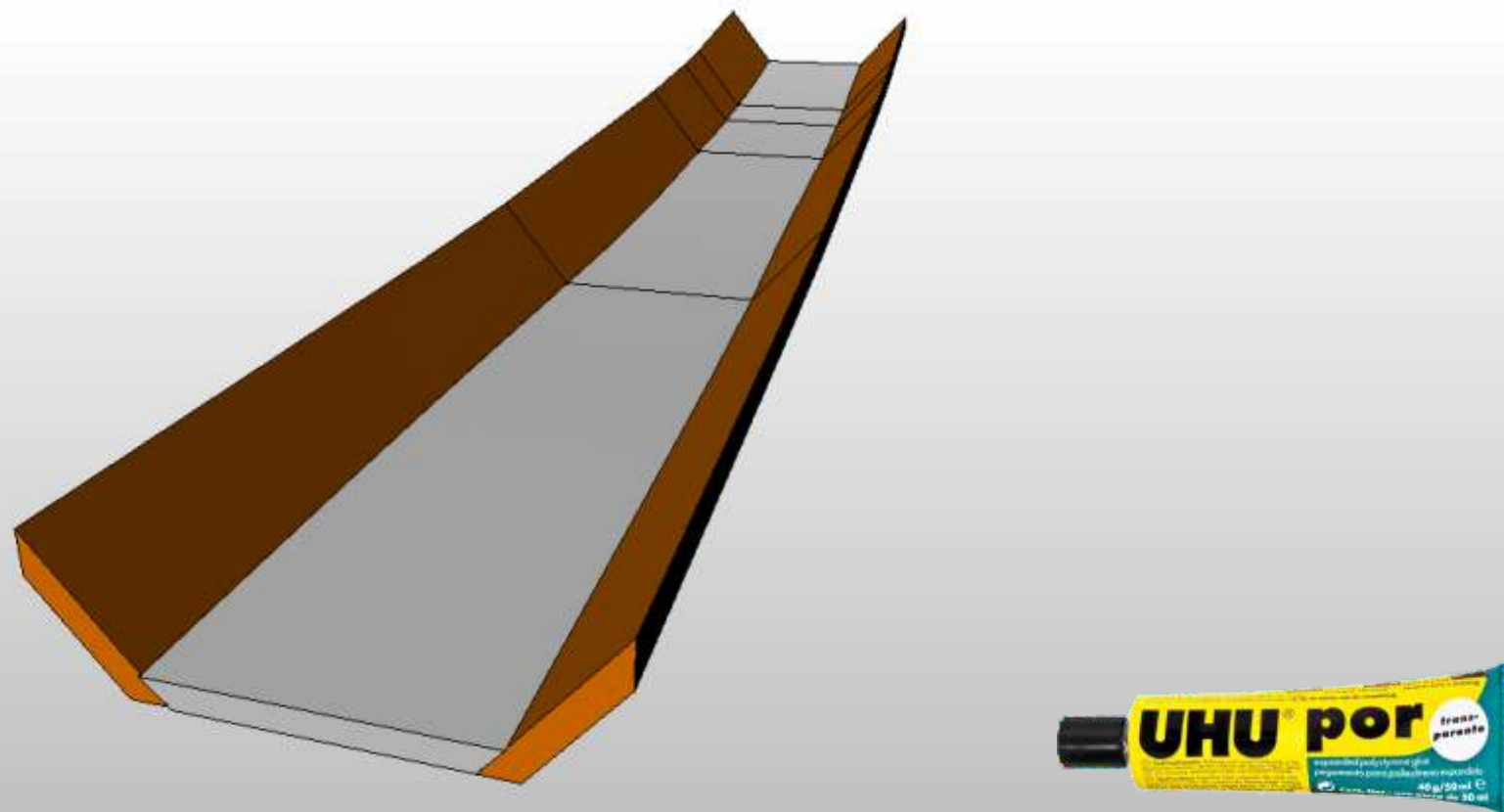
All versions



Glue the 3mm splitter piece in place



All versions



Sand the edges to shape, then glue the belly panels (Parts 24 & 25) in place as shown



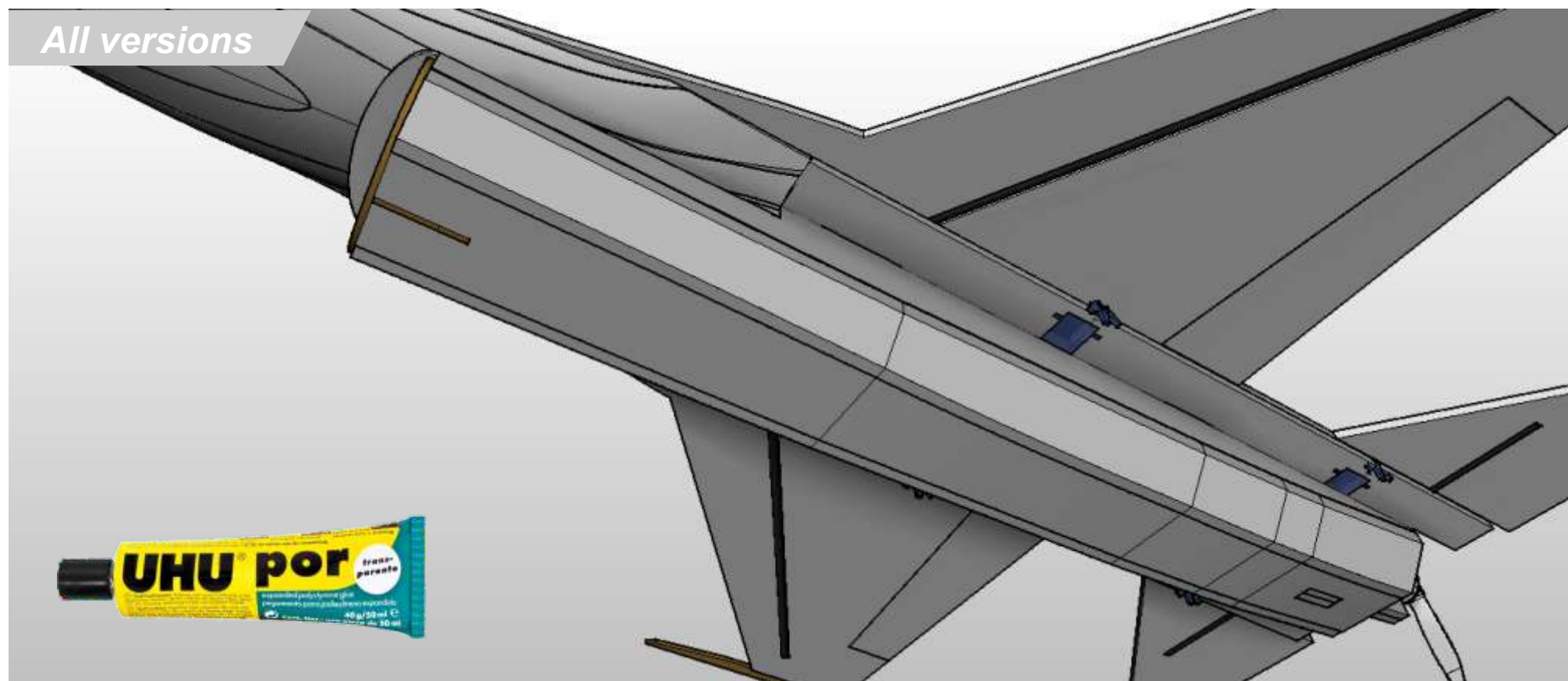
Skip this stage if you are planning to use 3D printed parts.

Before sticking the belly onto the aircraft, cut away the foam to epoxy the plywood air intake support piece in place. This is to help prevent the collapse of the air intake in the event of a hard landing.

Then Epoxy the air intake ring to the aircraft.



All versions

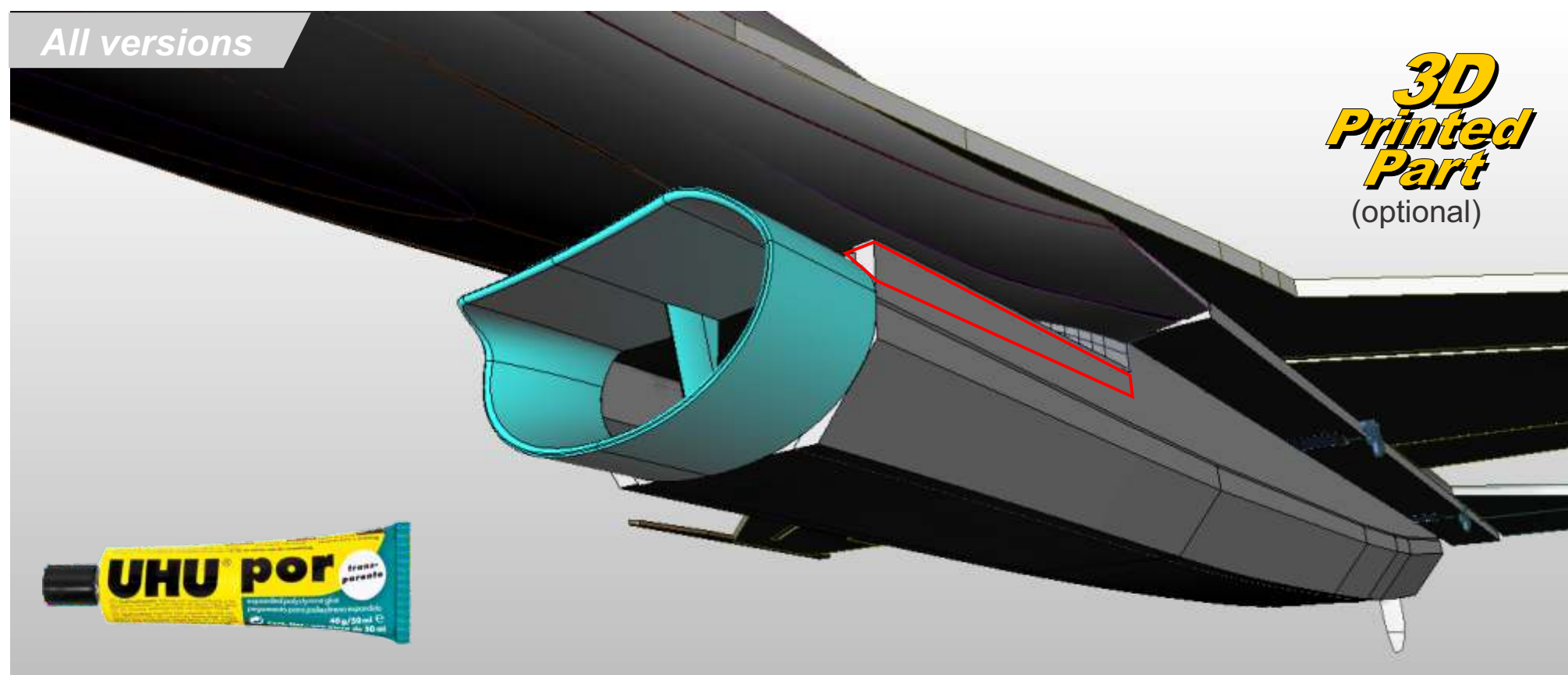


Trim away the slot to allow the liteply intake support to sit flush (non 3d-printed part only).

Glue the belly piece to the fuselage and use the shape of the wooden air intake as a sanding guide.

I recommend that this belly is coated with a 0.6oz woven fibreglass using Water based polyurethane varnish as a resin.

All versions



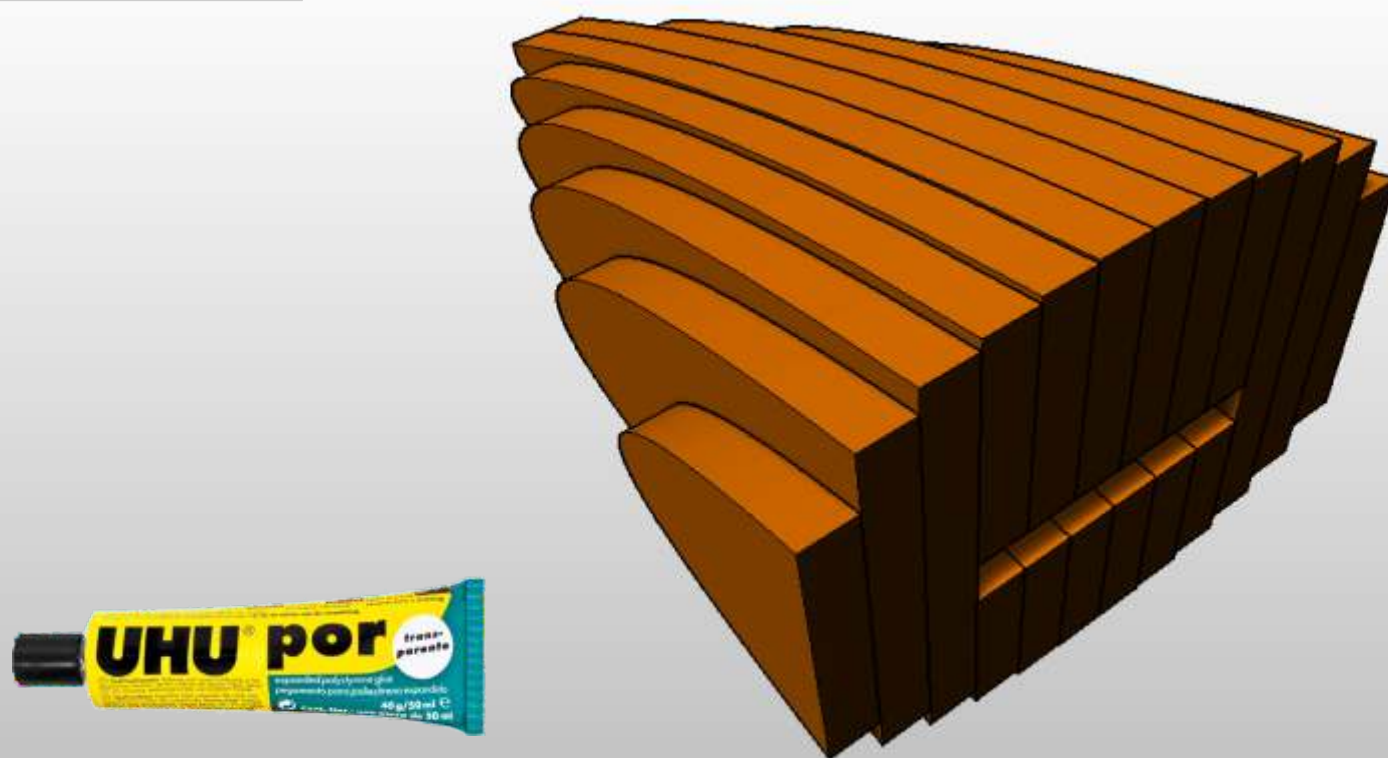
3D printed part only

Trim 30mm away from the lower fuselage/air intake, and glue the 3d printed air intake in place as shown.

Sand the edges marked in red to match the air intake.

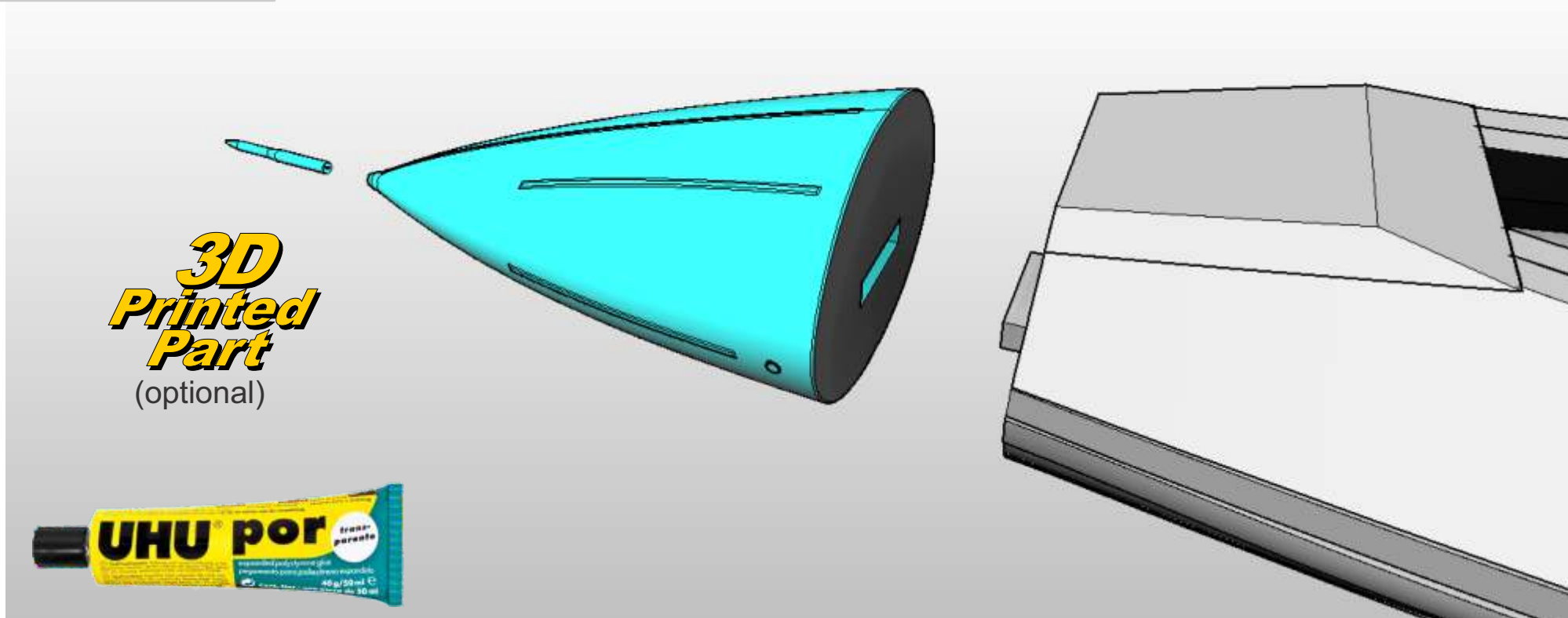


All versions



Glue the **Nosecone** pieces together as shown. Sand away the 'mountains' until the shape is revealed.

All versions

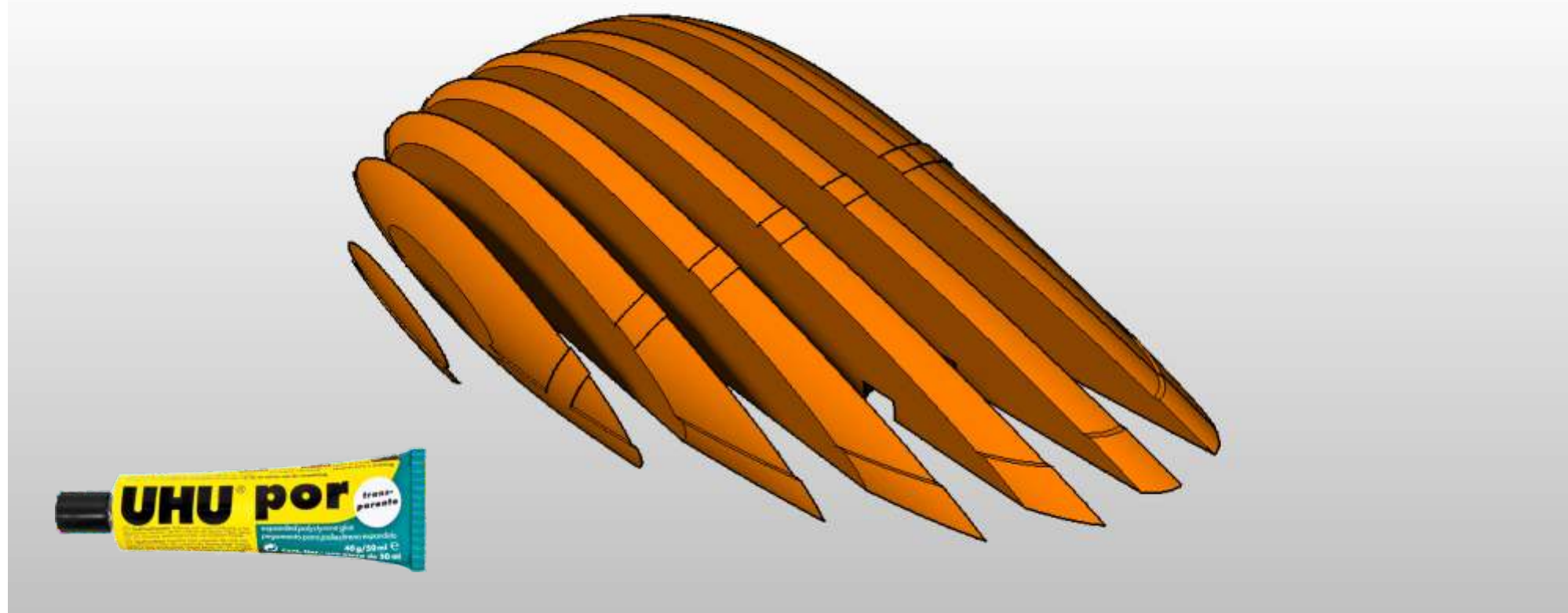


3D print the **Nosecone** accordingly.

Whether 3d printed or laminated foam sheet. Glue the Nosecone to the airframe.

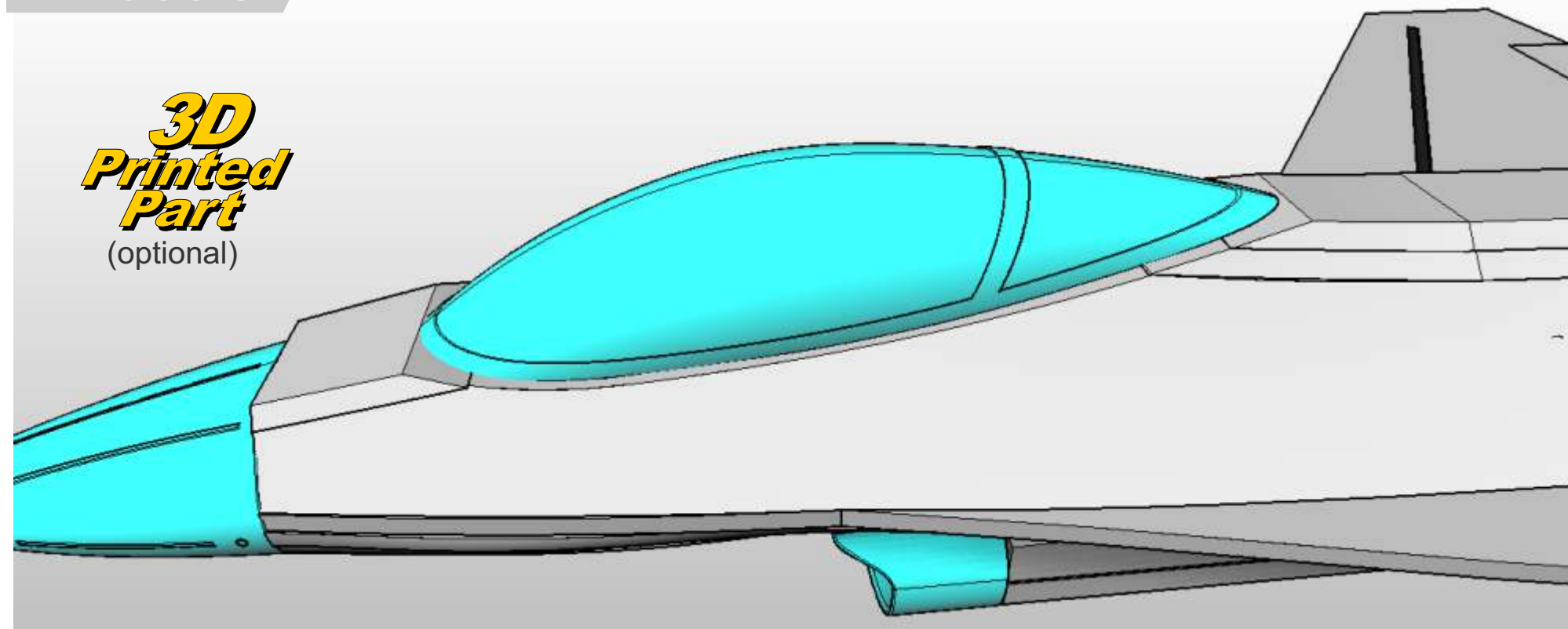


All versions



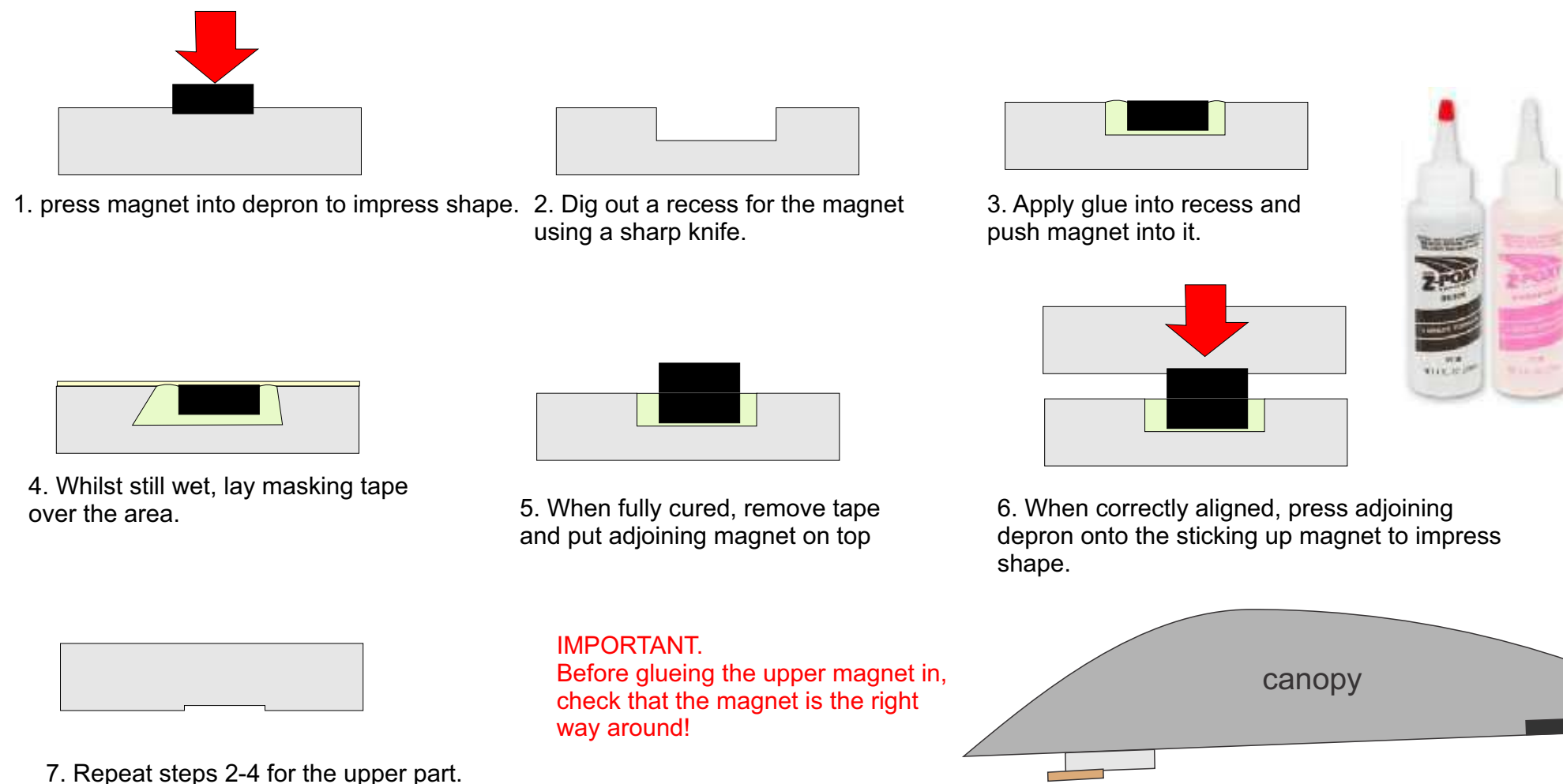
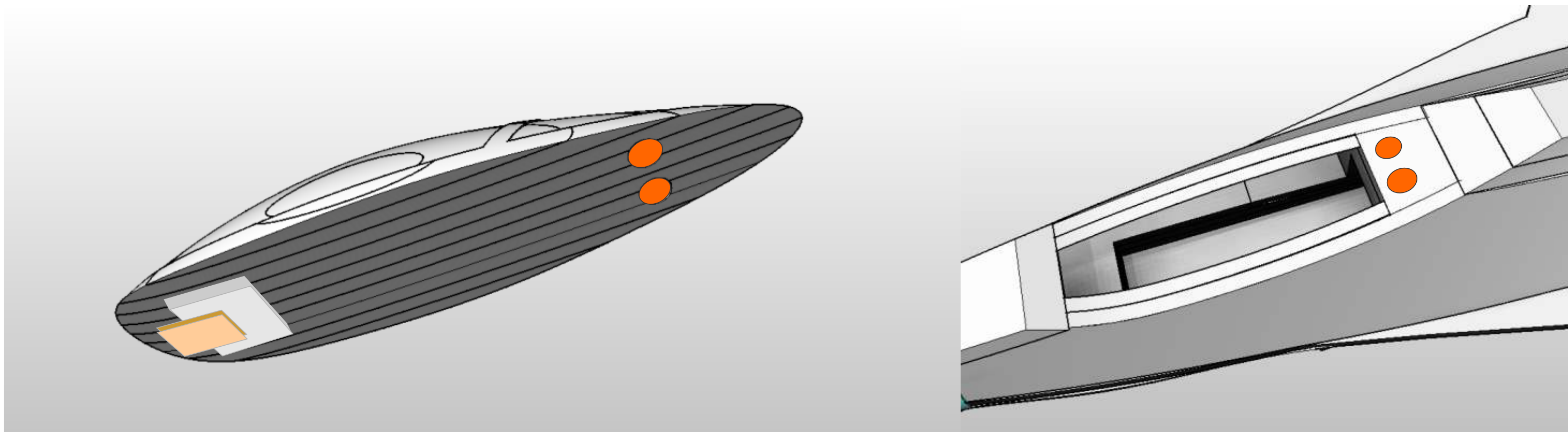
Laminate the **Canopy** parts and sand to shape using the 'Mountain & Valley method'.

All versions



Alternately 3D print the **Canopy** accordingly.

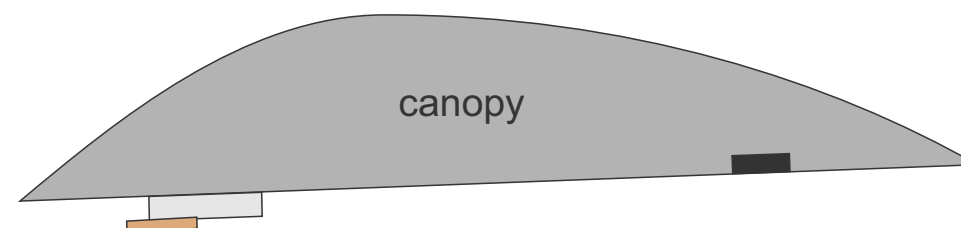




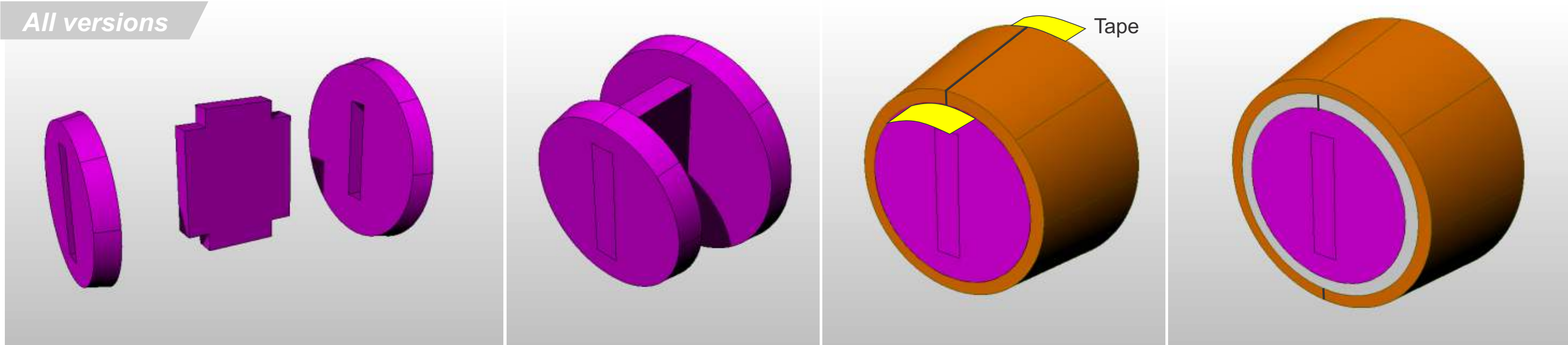
Build a tongue using a piece of scrap depron and 3mm liteply at the front of the canopy.

Attach the magnets to the magnet panel

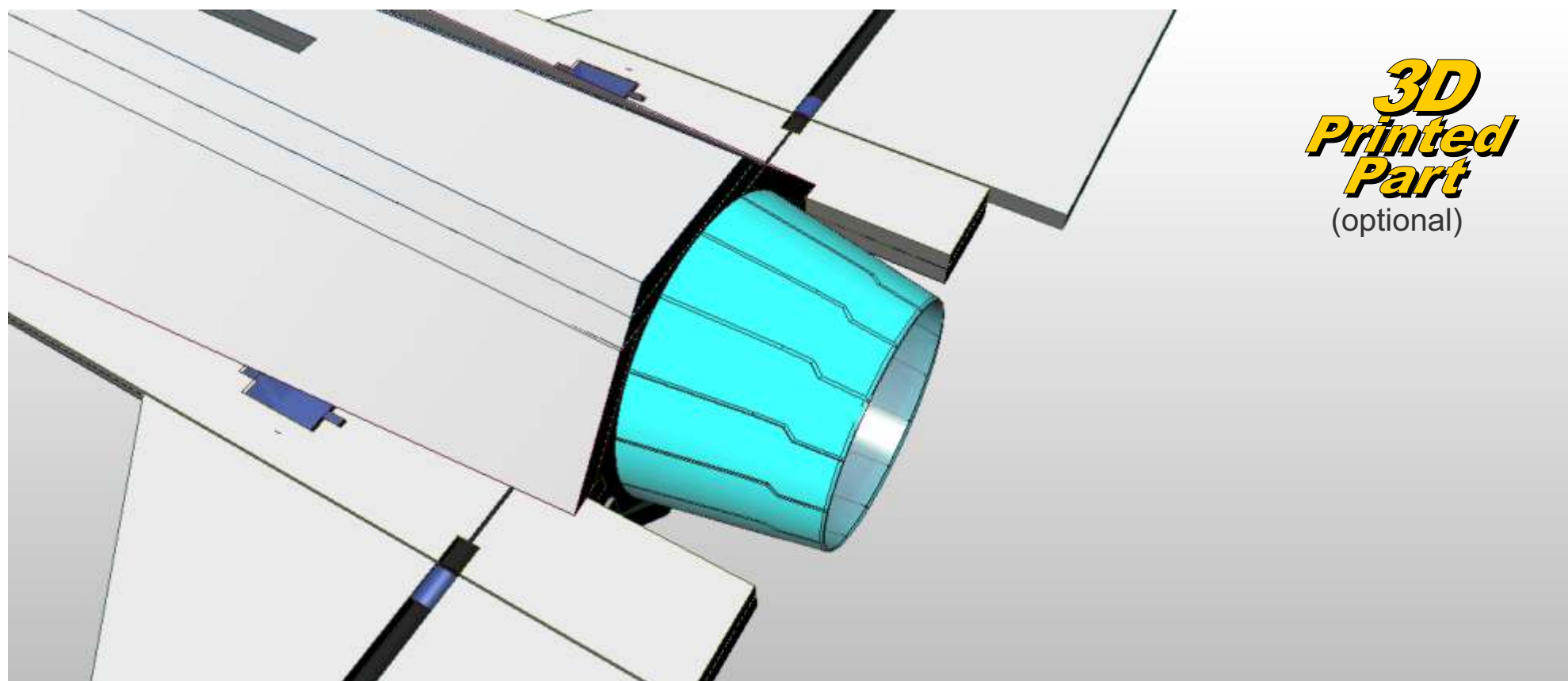
Epoxy the magnets to rear of the canopy so that the canopy is removable but holds firmly in place when mounted.



All versions



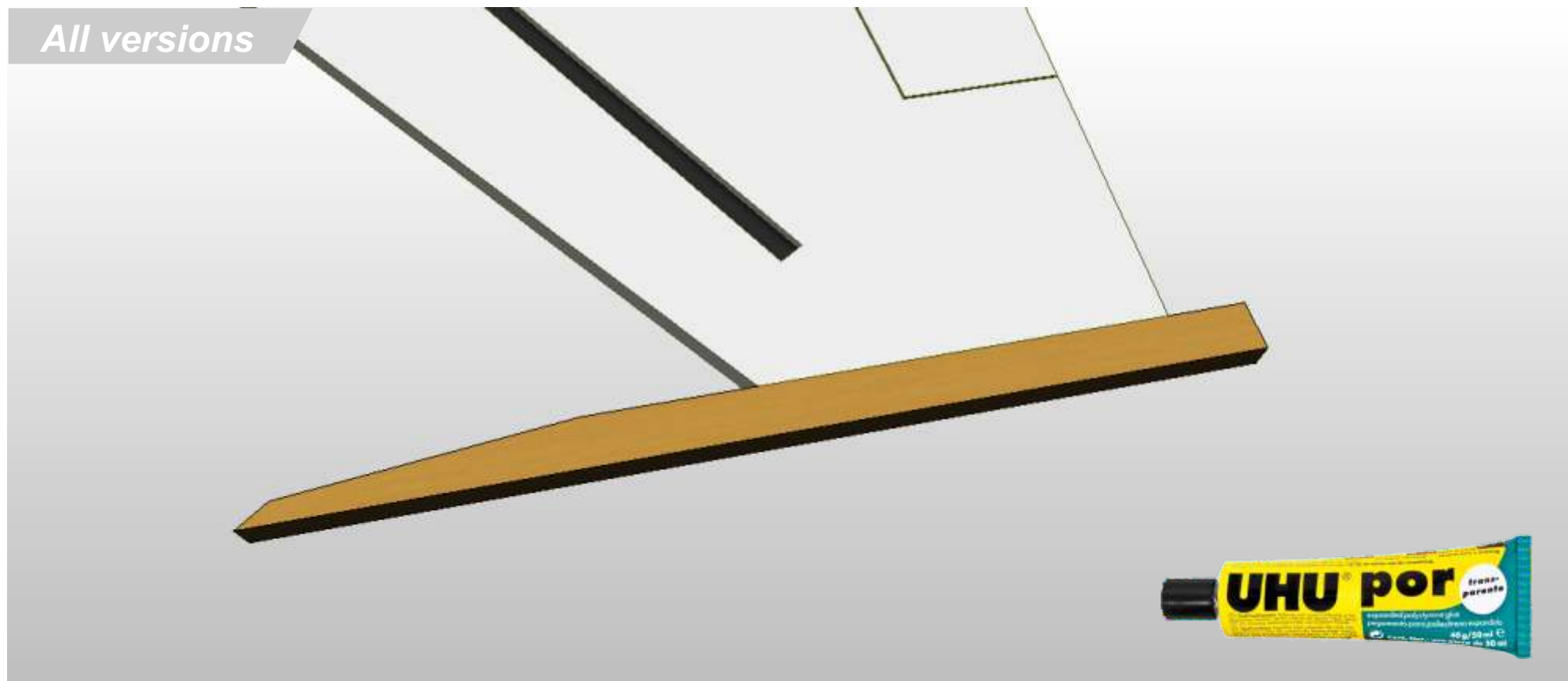
Assemble the tail-cone jig and glue together. Wrap 3mm depron around the jig, taping together on the side of the jig. Apply uhu Por to the visible side. Stick the outer 3mm depron in place. Trim and sand flat to the flat surfaces of the jig. Trim away areas that encroach onto EDF ducting or Pusher motor and stick to the exhaust bulkhead as shown below. Alternatively, create the 3d printable part below.



**3D
Printed
Part**
(optional)

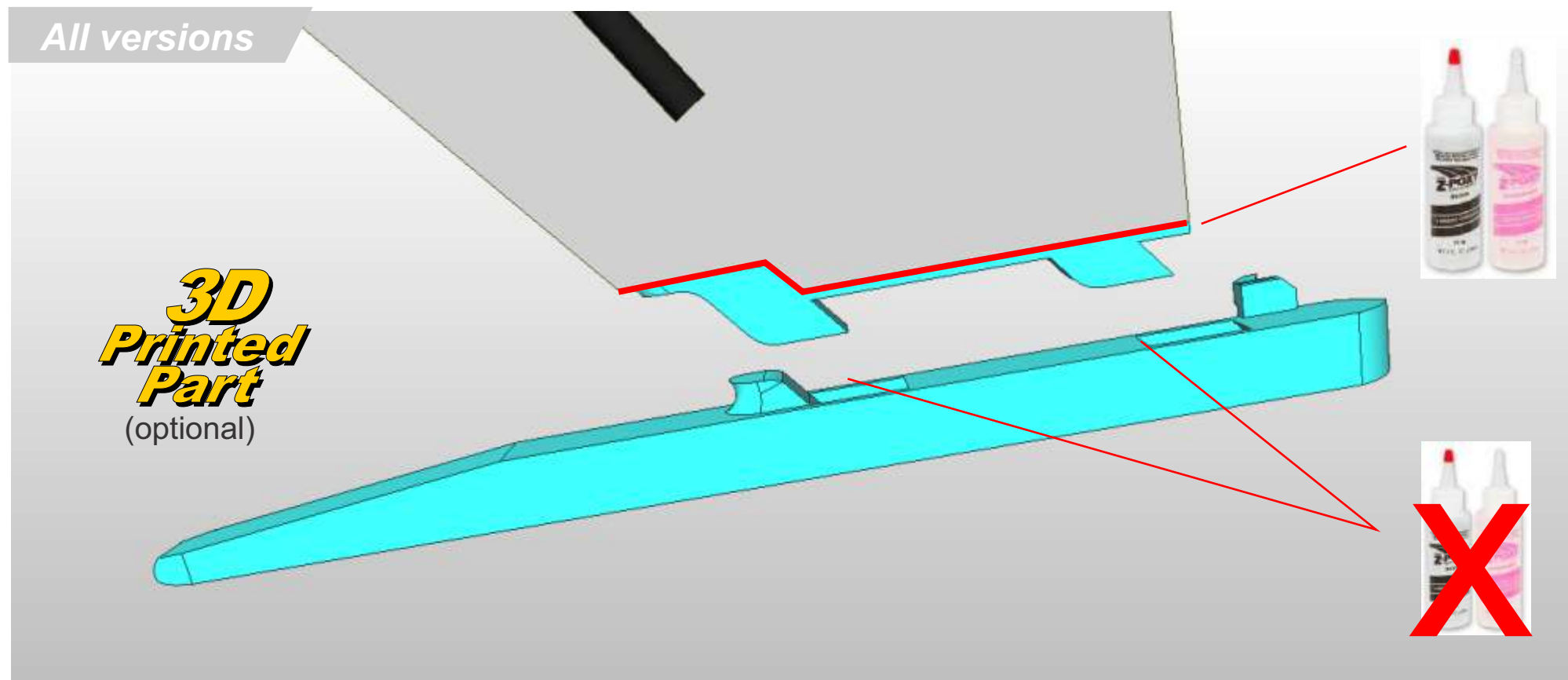


All versions



Cut 2 pylons from balsa and glue to the edge of the wing using uhu Por.

All versions



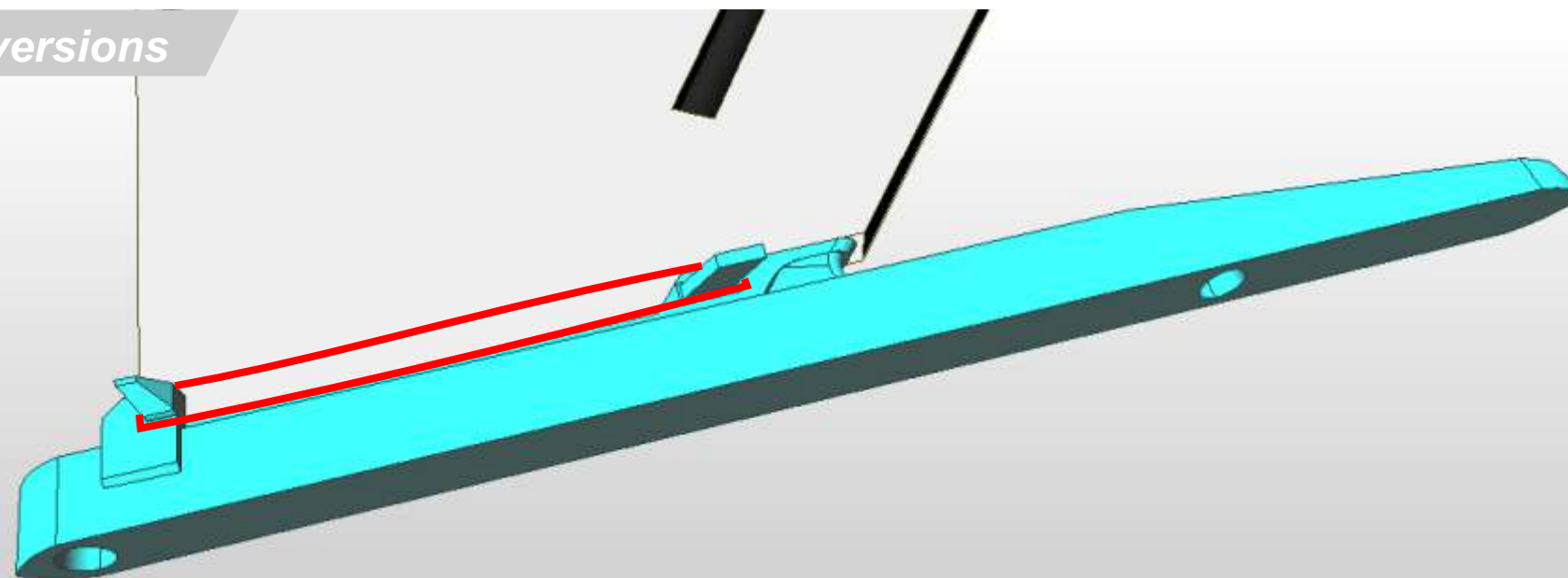
OPTIONAL : 3D Print out two pylon assemblies (mirrored), cut a notch out of the wing for the 'snag' protector and glue the wingtip mount to the wing.

This 2-part system helps to protect the model in case it is snagged or digs into the ground upon landing etc.

Ensure that the rubber band retaining hooks are on the underside of the



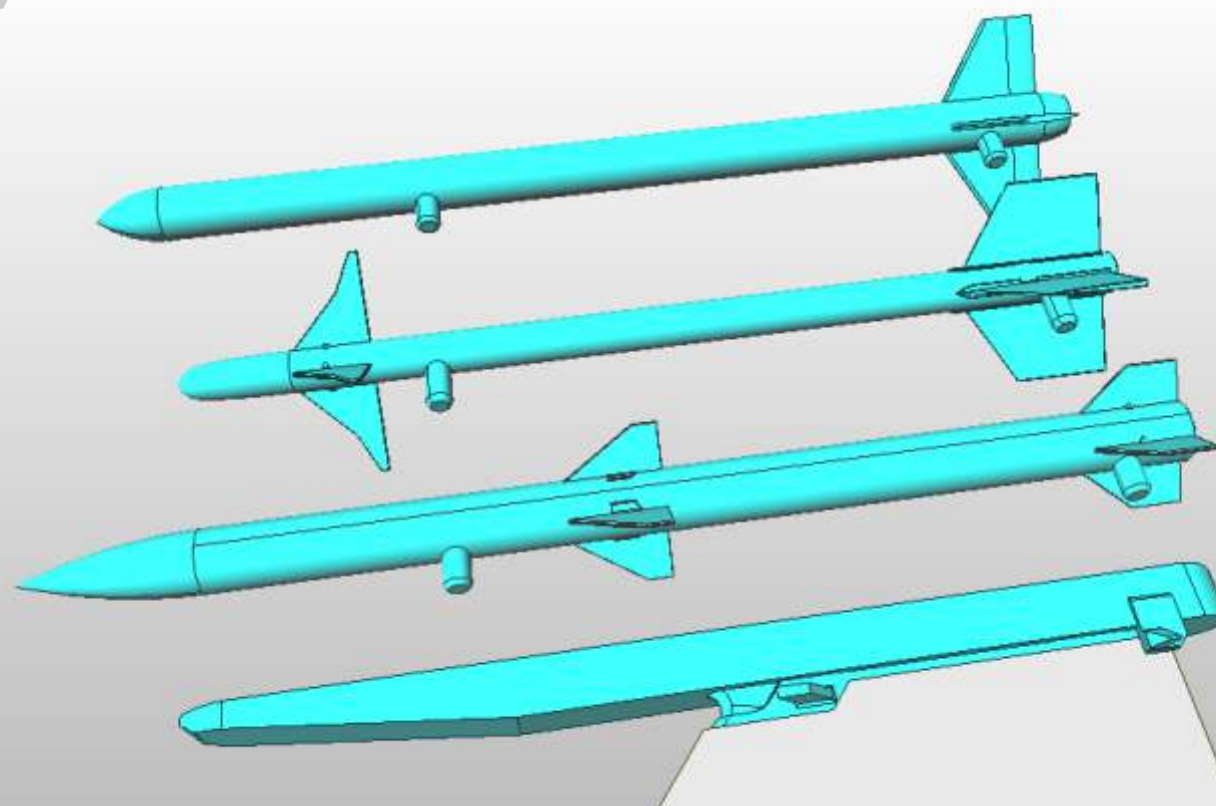
All versions



View from underneath

Using thin elastic, or a rubber band, attach the pylons to the wing mounts

All versions

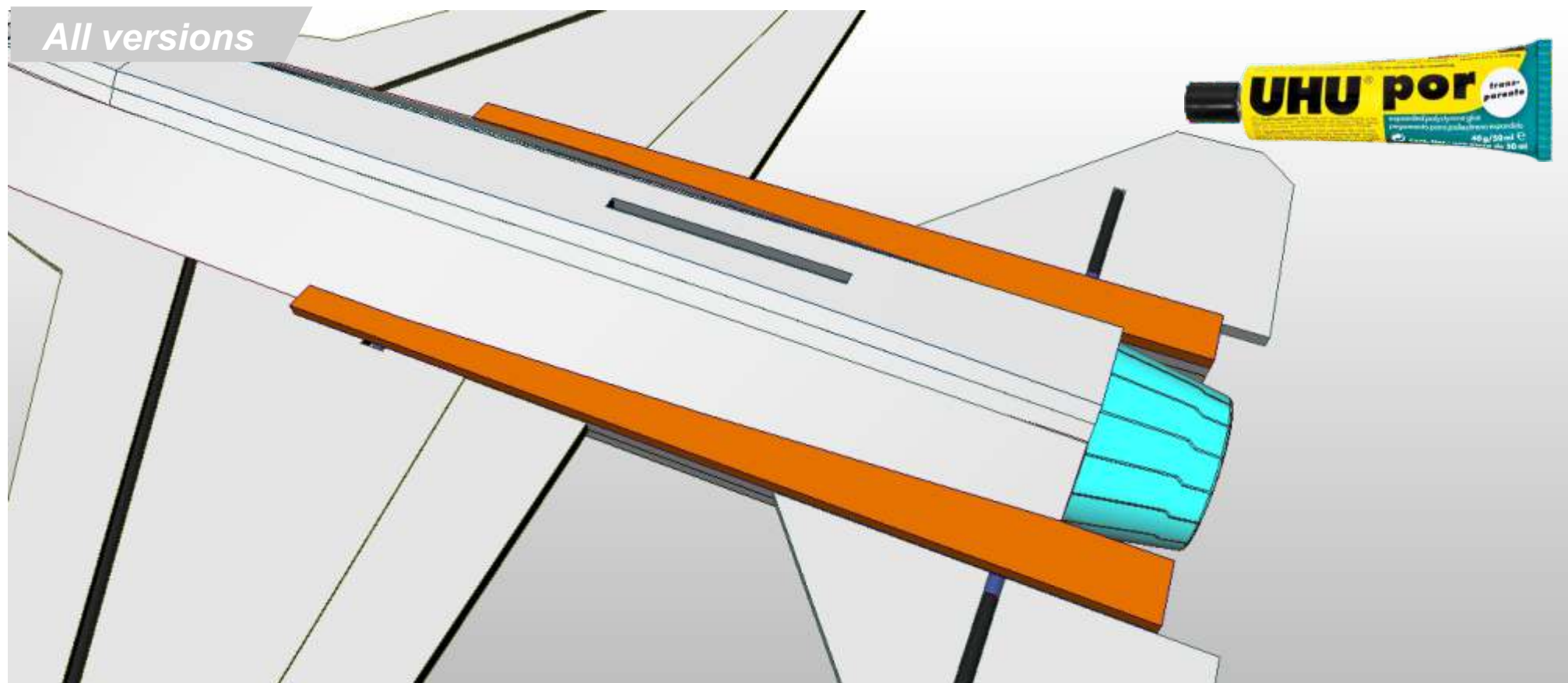


**3D
Printed
Part**
(optional)

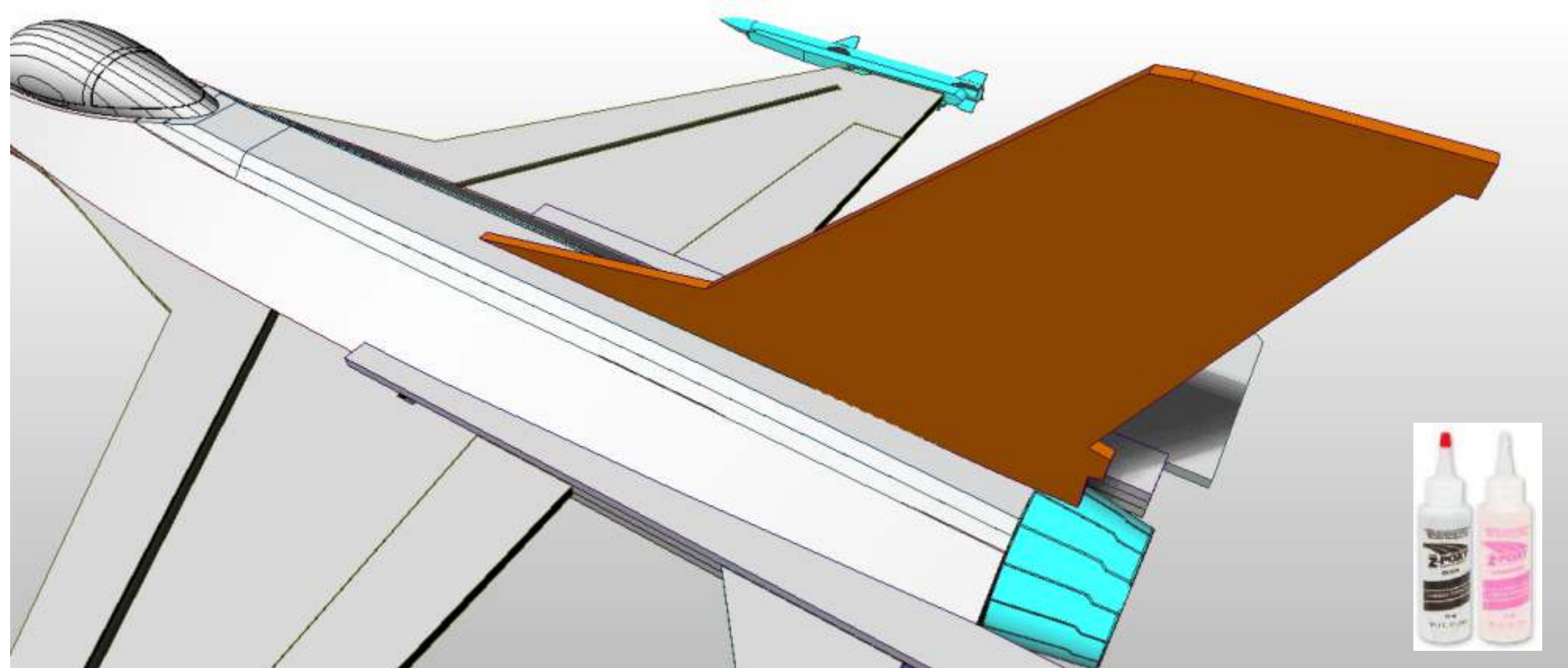
OPTIONAL : 3D Print a wingtip missile or pod and push fit to the pylons.



All versions



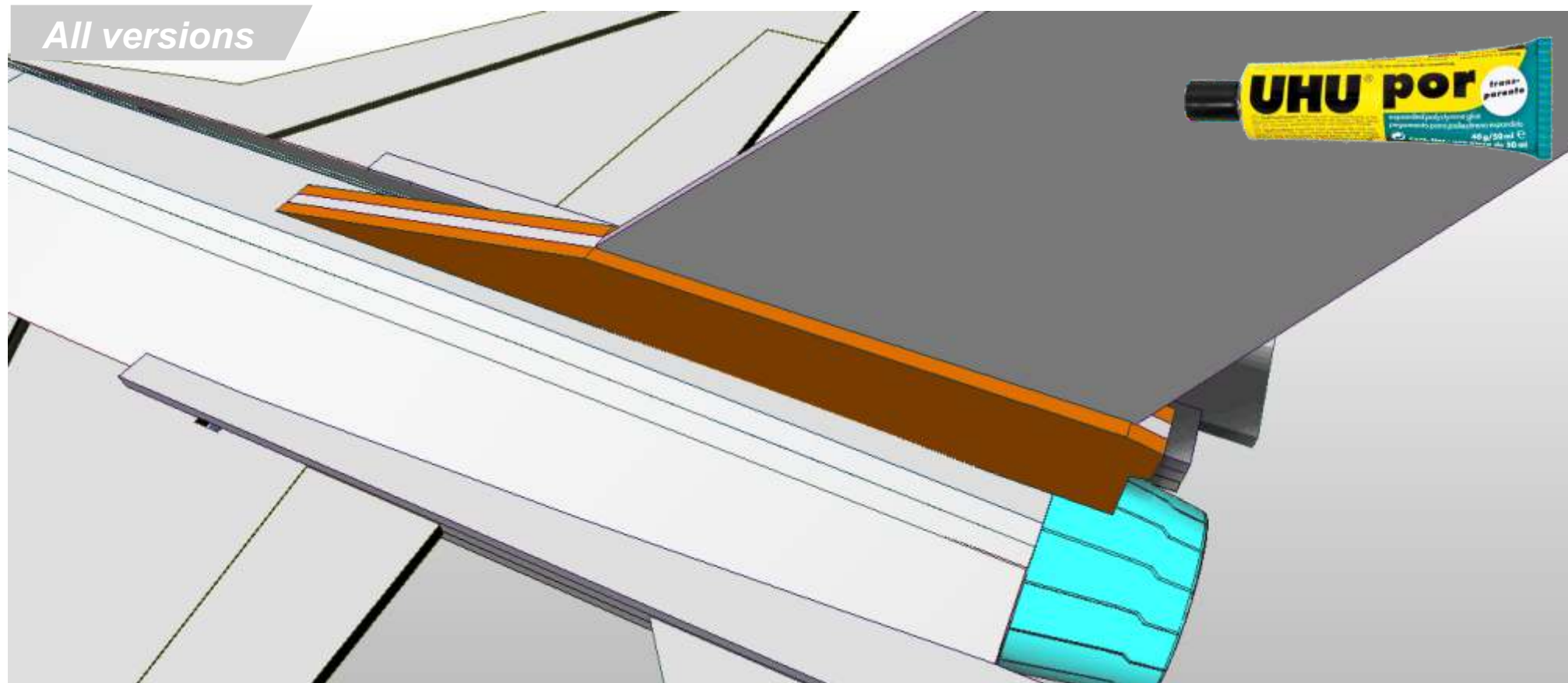
Test fit the **Upper fuselage side pieces** (Part 30), shape the top surface as shown below. Then glue in place.



Shape the upper fuselage rear to match the shape of the real F-16, then glue the vertical stabiliser in the slot prepared for it (Part 28)

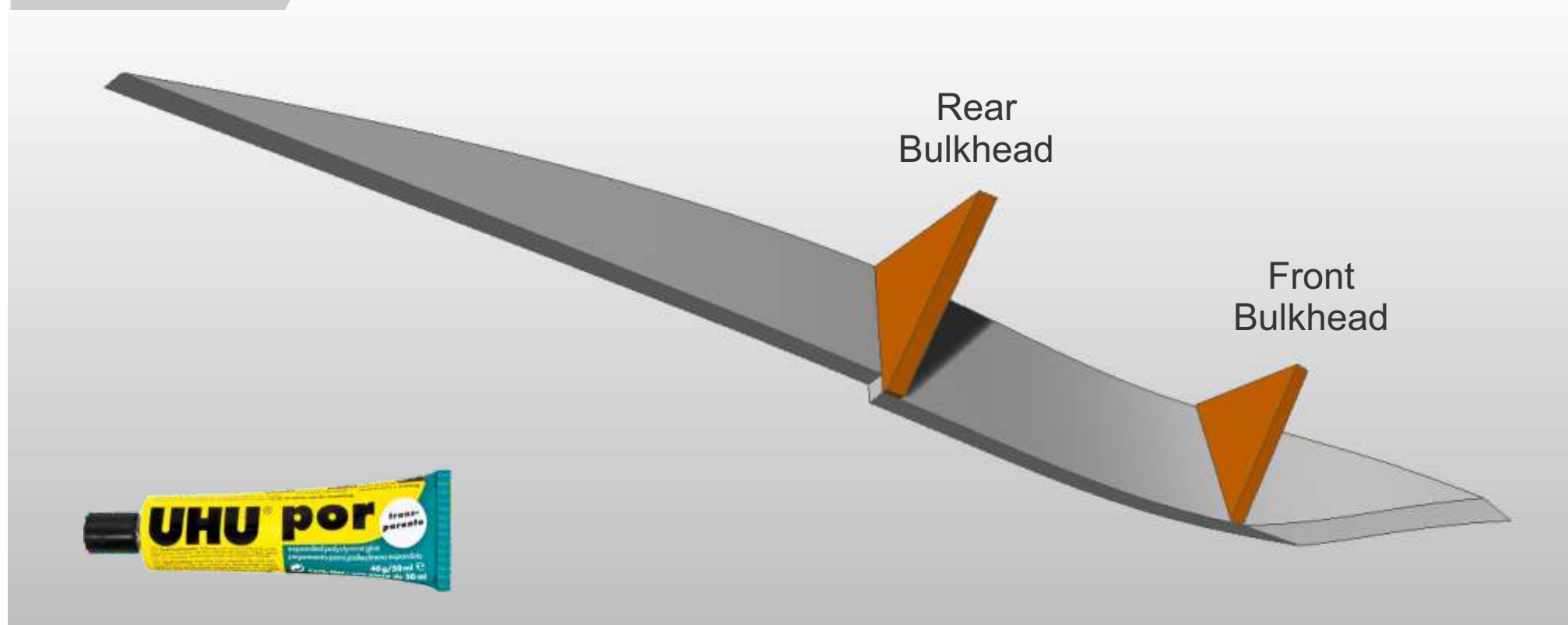


All versions



Glue the support pieces either side (Part 29)

All versions

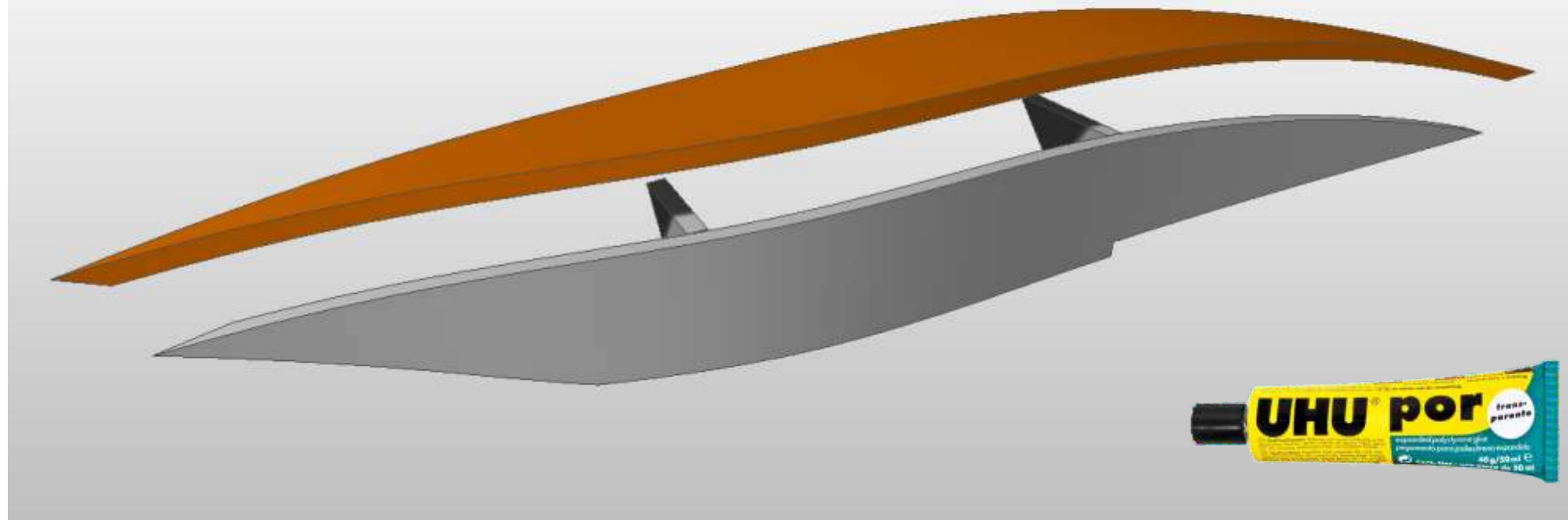


OPTIONAL CONFORMAL FUEL TANKS for Block 60 version.

Glue the triangular bulkheads in place as shown to the side of the tank. be careful to select the correct bulkhead.



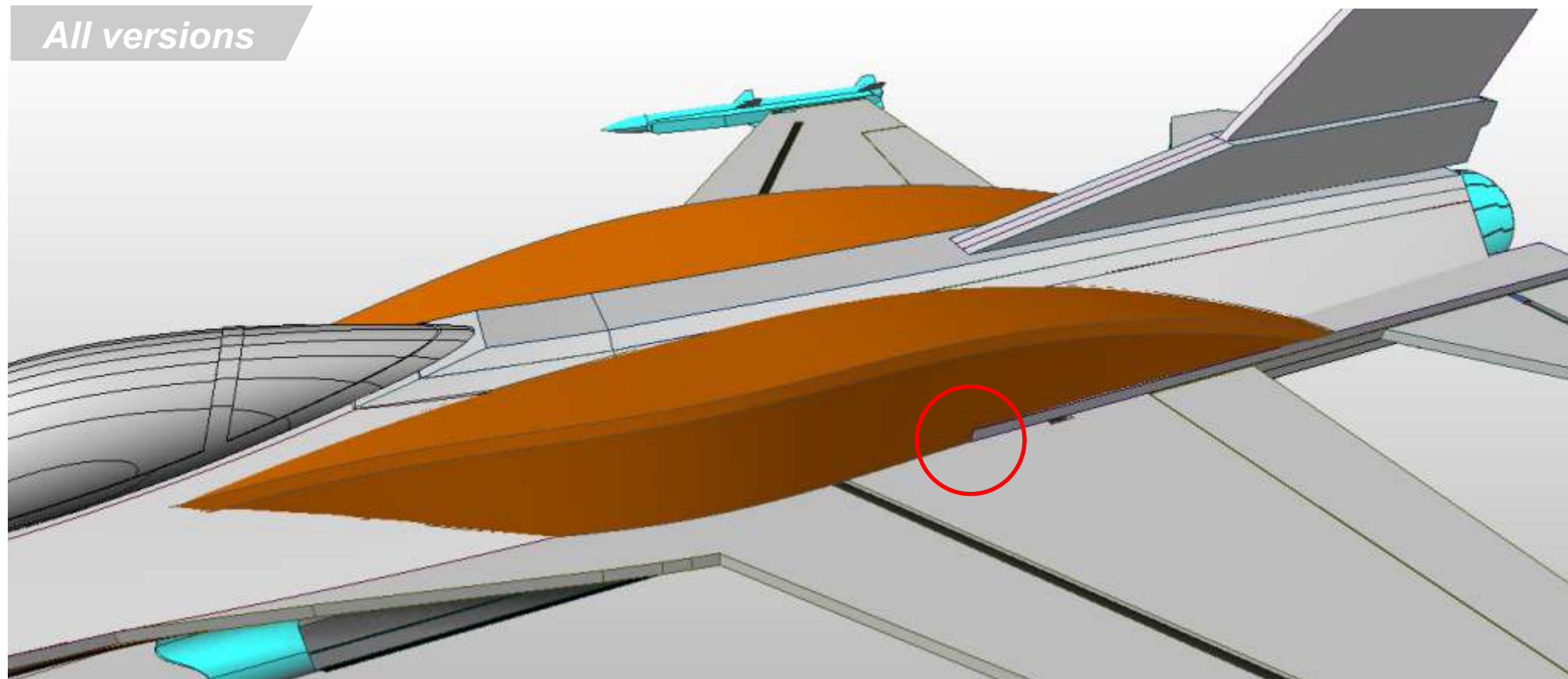
All versions



OPTIONAL CONFORMAL FUEL TANKS for Block 60 version.

Glue the top of the tank to the assembly.

All versions

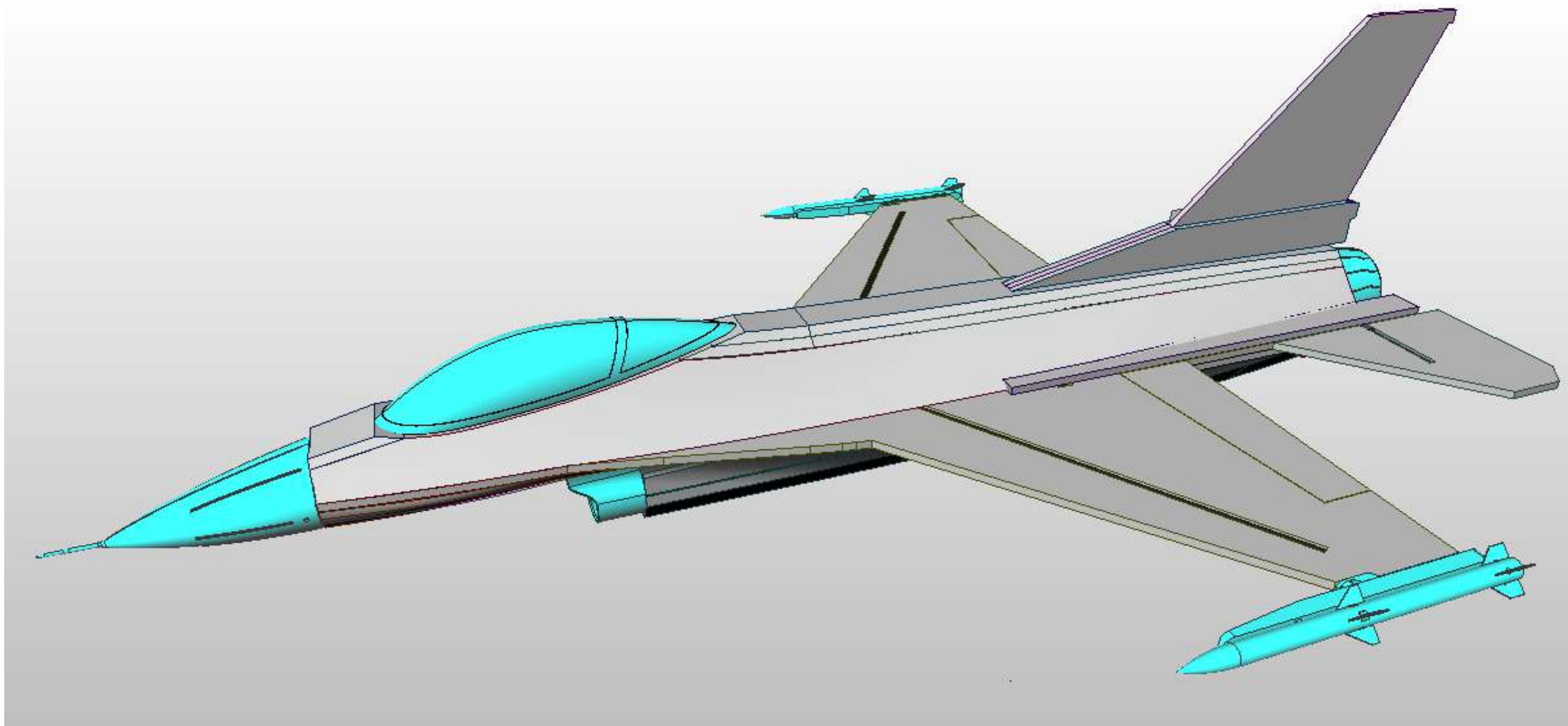


OPTIONAL CONFORMAL FUEL TANKS for Block 60 version.

Make the opposite fuel tank in exactly the same way (mirrored)

Glue to the fuselage, located as shown.





Congratulations your model is now complete! Either fly it as it is or finish it in a paint scheme of your choice!



Use Google images to help complete the final shaping of your plane. Use lightweight filler to help with the concave radii on the fuselage. There are lots of paint schemes to choose from - simply look on google images!!

