JA-37 Viggen Parkjet

Construction Guide

By Craig Clarkstone

Viggen History

The Saab 37 Viggen ("Thunderbolt") is a Swedish single-seat, single-engine, short-medium range combat aircraft. Development work on the type was initiated at Saab in 1952 and, following the selection of a radical delta wing configuration, the resulting aircraft performed its first flight one 8 February 1967 and entered service in 21 June 1971.

The Viggen holds the distinction of being the first canard design to be produced in quantity. The Swedish airforce needed a high quality all weather fighter, able to take off and land on short strips. The system builds on using regular roads as landing/take off strips spread out around the country, making it harder for an enemy to defeat the fighters on the ground. The first delivery to the Swedish airforce was the year 1979 and the last one 1990. The Viggen is built out of aluminium, honeycomb-elements and titanium-reinforcements. Totally 329 Viggen were built, 149 of then are JA37´s.

Many of the functions in Viggen are automated, to help the pilot and so he can work comfortably. Examples of this are the automatic cannon. Once the pilot has his target locked on radar, the aircraft will steer itself so that every round will hit its target. The cockpit in Viggen is a relaxed environment; automatic throttle helps the pilot to keep an optimum speed, altitude and angle at short and steep landings.

The Viggen has a unique reversing system built in, which helps it to keep the landings under 500 meters. It also results in that the pilot can go backwards with his aircraft without any external help. The Tornado and Viggen are the only tactical fighters in the world equipped with this system. The rear landing gear is very wide, which gives the aircraft more stability on the ground

Designers Notes

The Ja-37 Viggen really captured my imagination as a teenager. I really liked the funky lines and amazing camoflage scheme. I came to realise just what a clever aircraft this was and how advanced it was for its age.

The model is lots of fun to fly and is one of my favourite, it looks great in the air, and handles amazingly well. Its ability to fly slowly at high angles of attack, has enabled me to even fly backwards with the wind. Fast, Agile and versatile.

Its low wing means that it is susceptible to being affected by side winds a little, and also can catch on the ground, so I suggest reinforcement to the leading edges of the wings.

I hope you enjoy building and flying this one as much as me!

If you enjoy this design please help me to fund my next project and send a donation for $10 to Paypal address :-

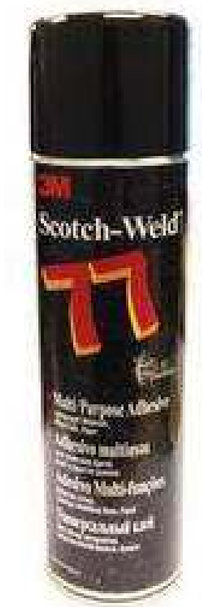
clicketyclarkstone@gmail.com

Thank you! and happy flying.

Craig :)

Construction

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

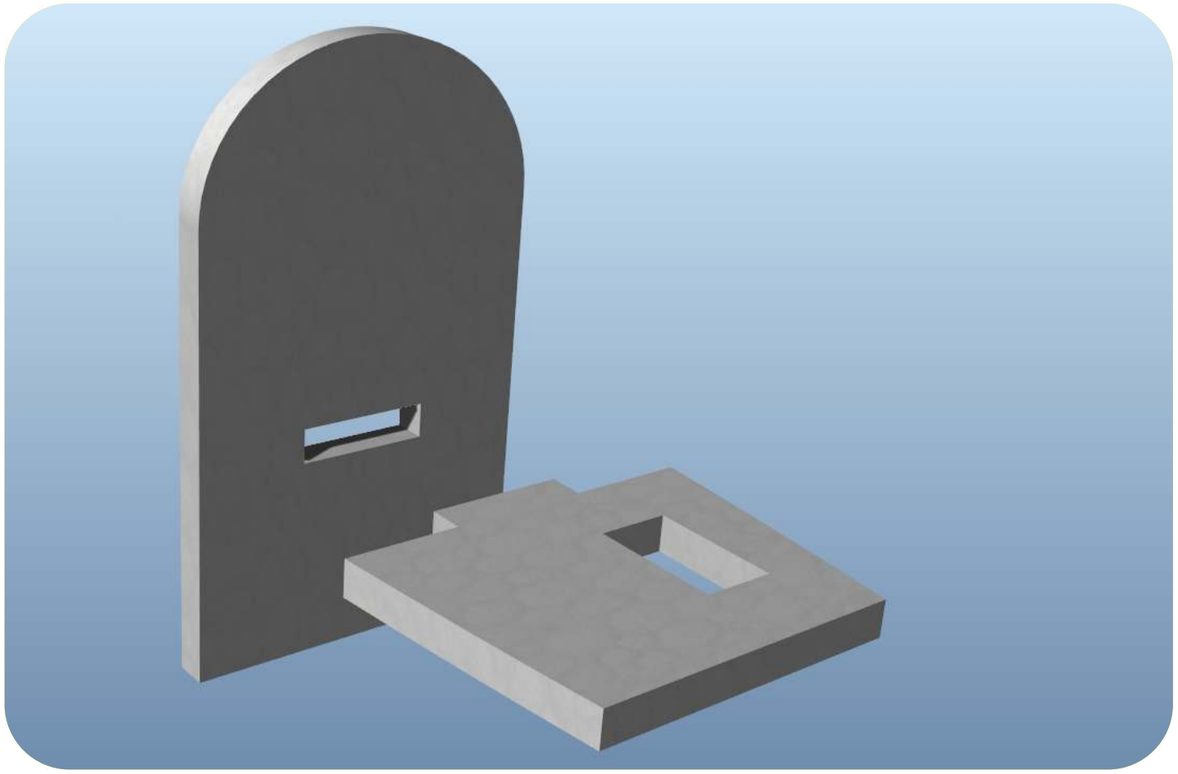
> For leading edges, hinges, general strengthening
- 3M Gift tape (Purple - not green one!) - I prefer lightweight plastic hinges.

> For decals
- Coloured parcel tapes (strips taped to waxed paper & cut out)

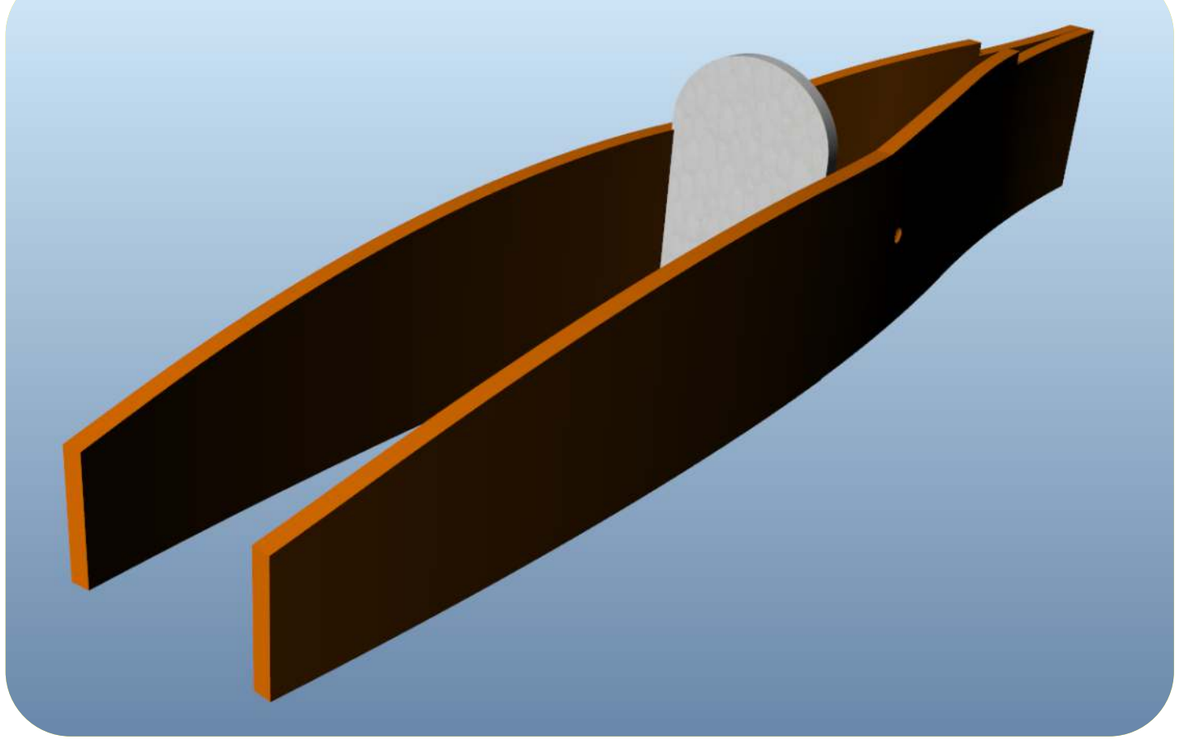
Cutting parts
1. Print the plans,
2. Cut around each part using scissors - allow a border of approx (1/4") 6mm
3. Use either 3M spray mount or a very light coat of 3M 77 to the back of the parts and stick in an economical layout on the Depron foam.
4. Using a safety rule and craft knife over a cutting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

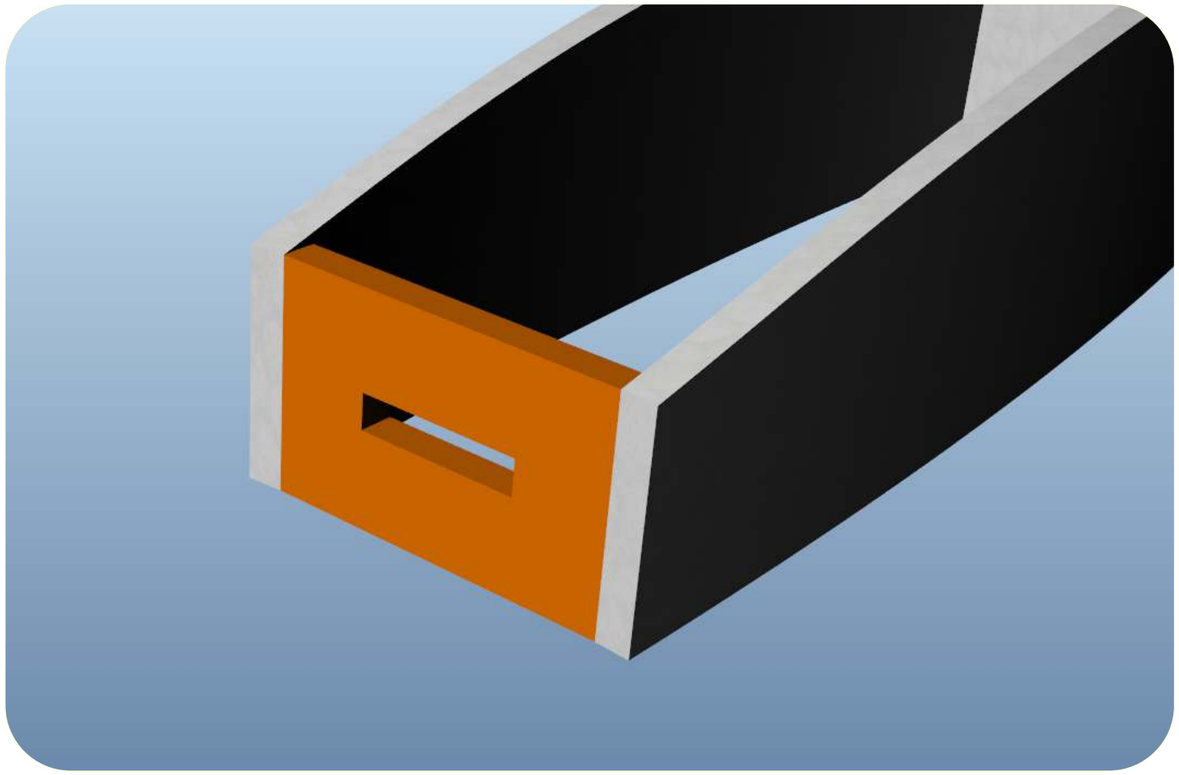
Glueing parts together.
1. Ensure a really good fit - this will reduce the amount of adhesive used. The Bar Sander is a great tool for this.
2. Follow the adhesive instructions closely.
3. Use ordinary steel head pins to help keep the parts located whilst epoxy sets.
4. Use objects as weights such as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



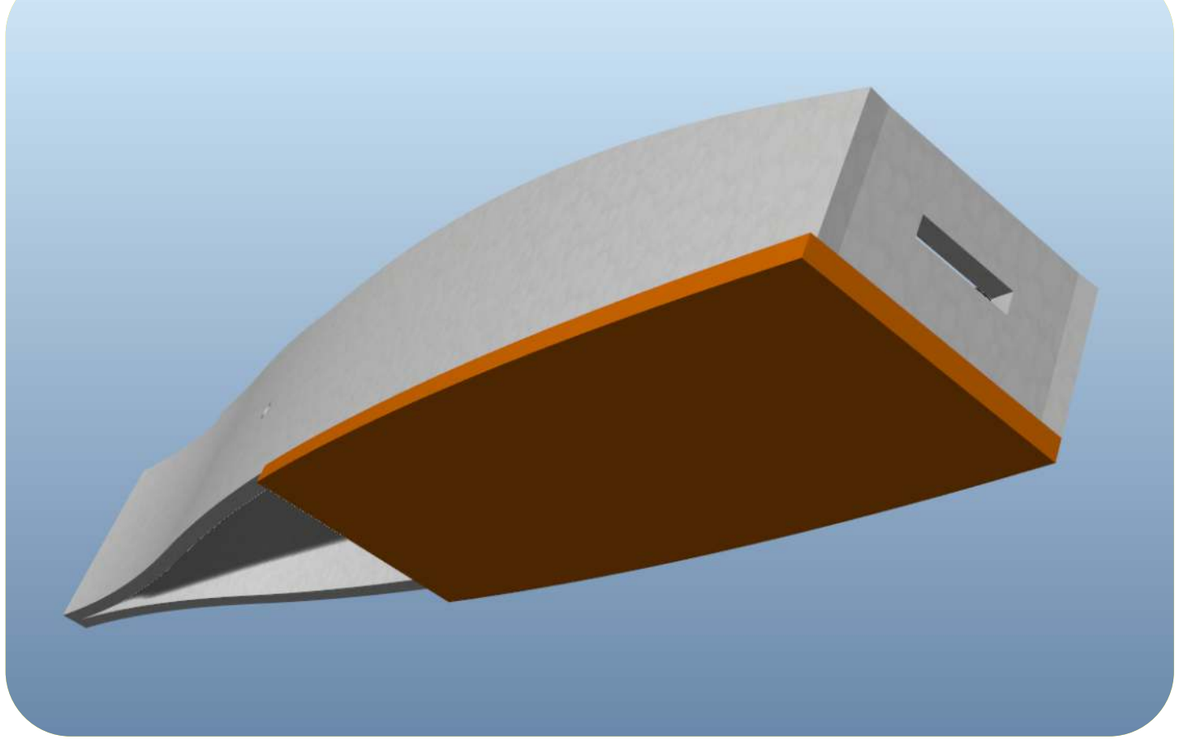
Glue bulkhead 2 and the Canard servo tray together.



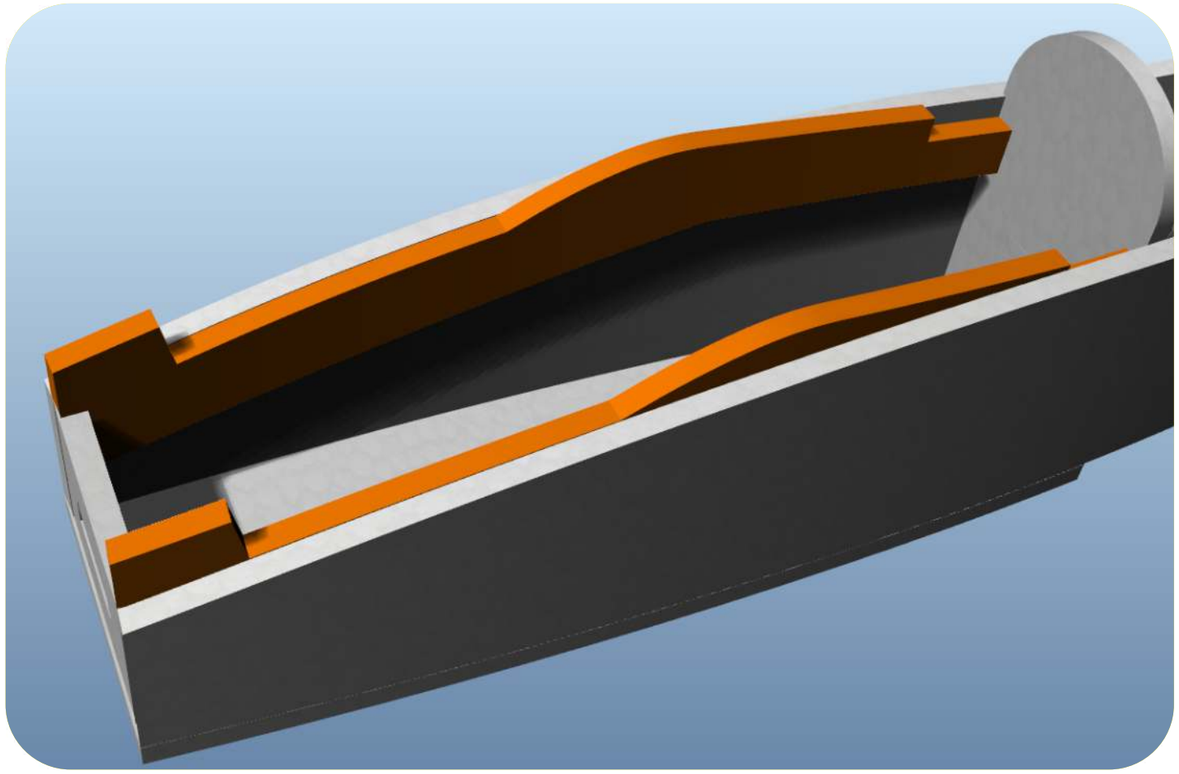
Shape the Fuselage sides and glue together as shown.



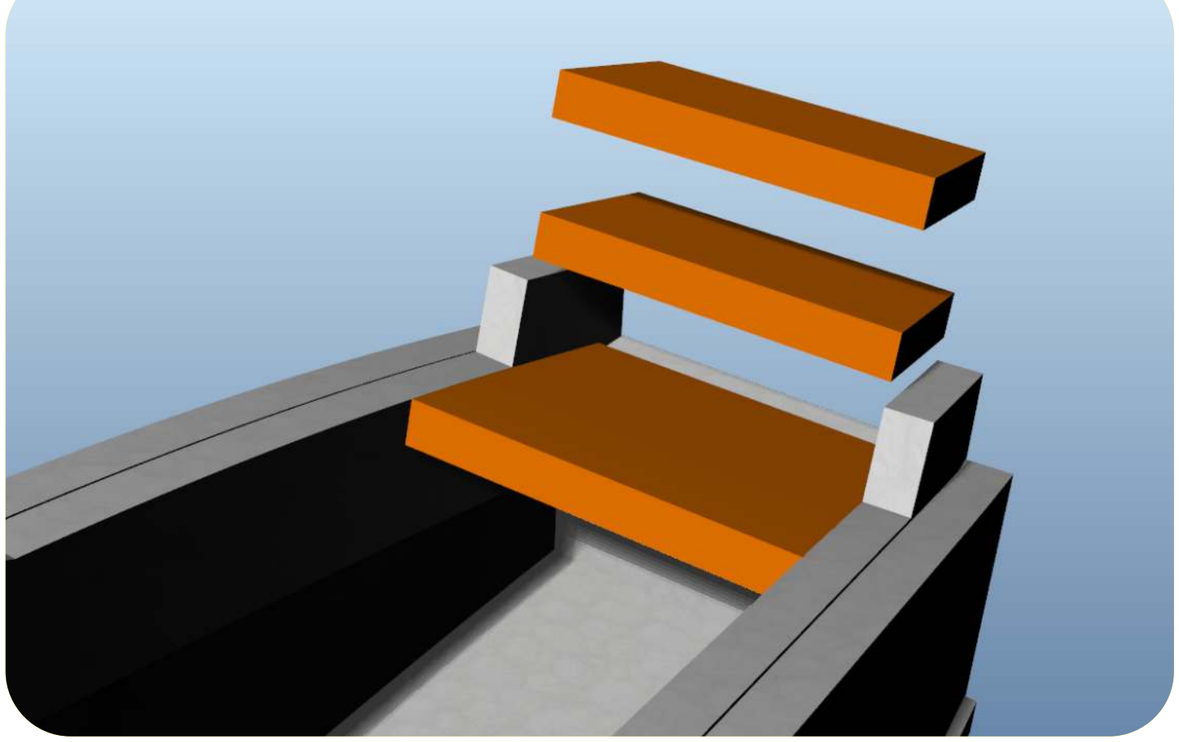
Attach Bulkhead 1



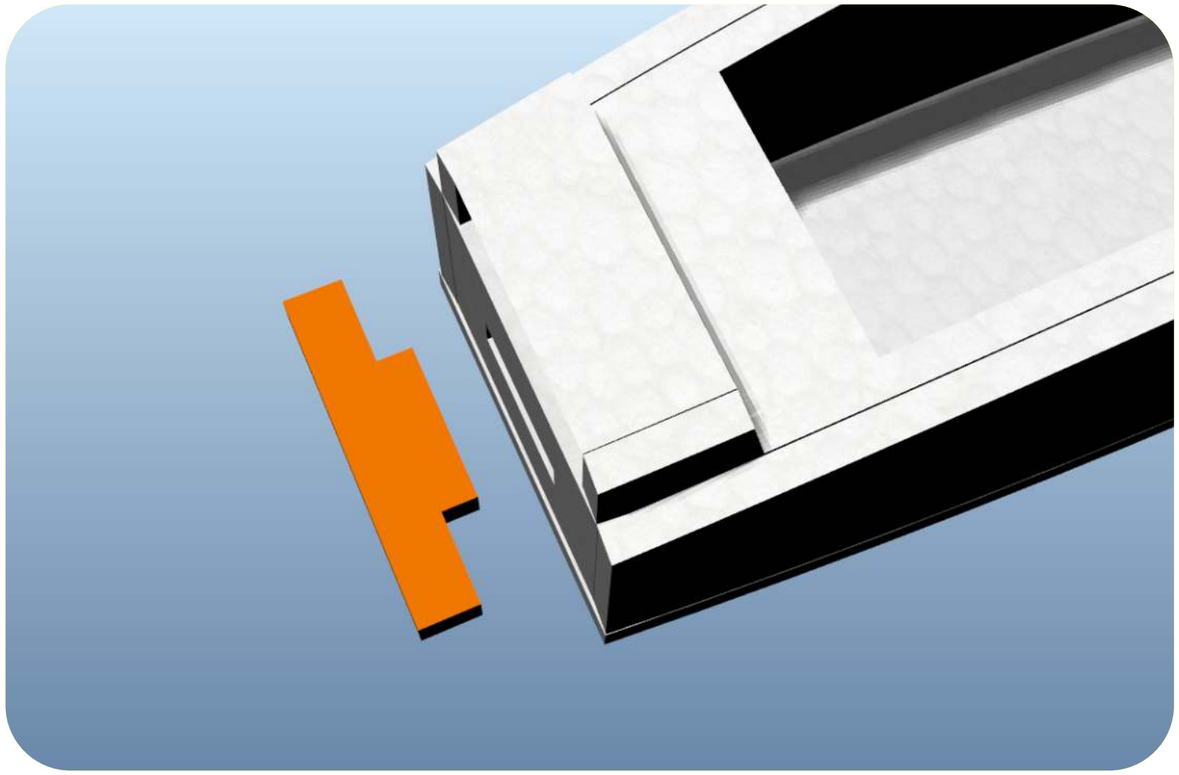
Attach the forward fuselage bottom



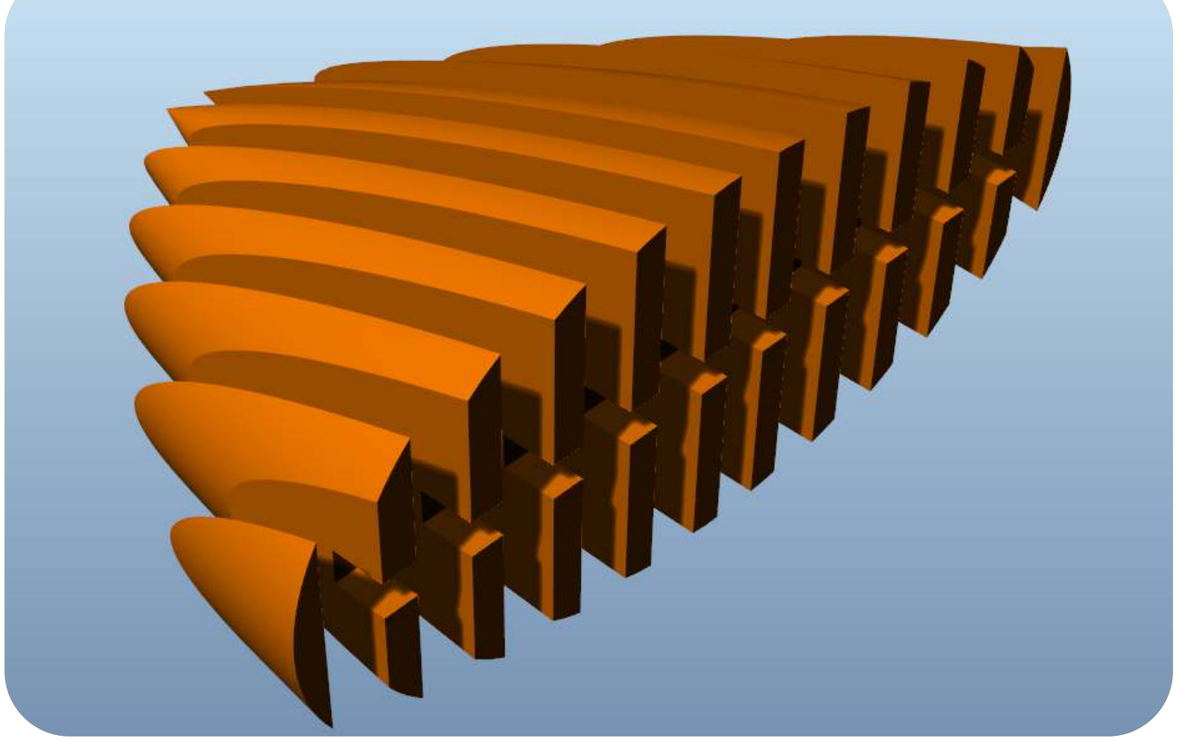
Glue the canopy side supports on



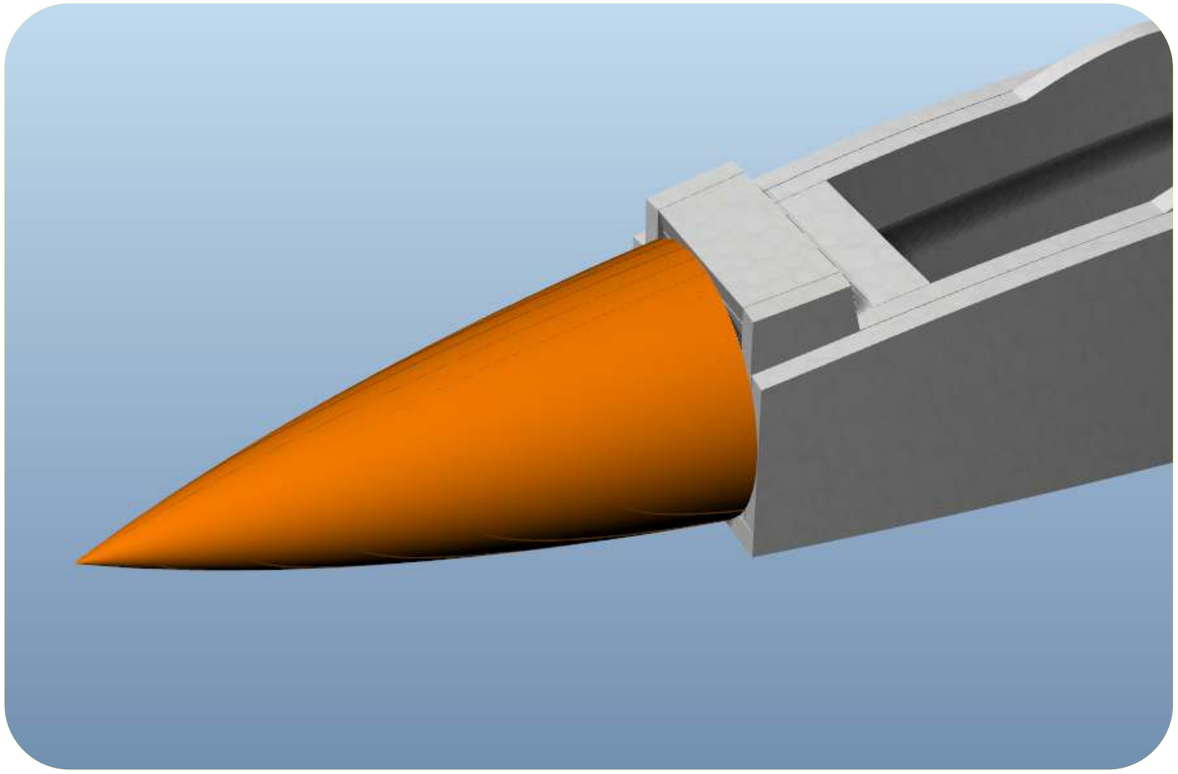
Glue the canopy forward support, and ‘Bridge’ pieces. These are to be sanded to shape when the forward fuselage assembly is ready



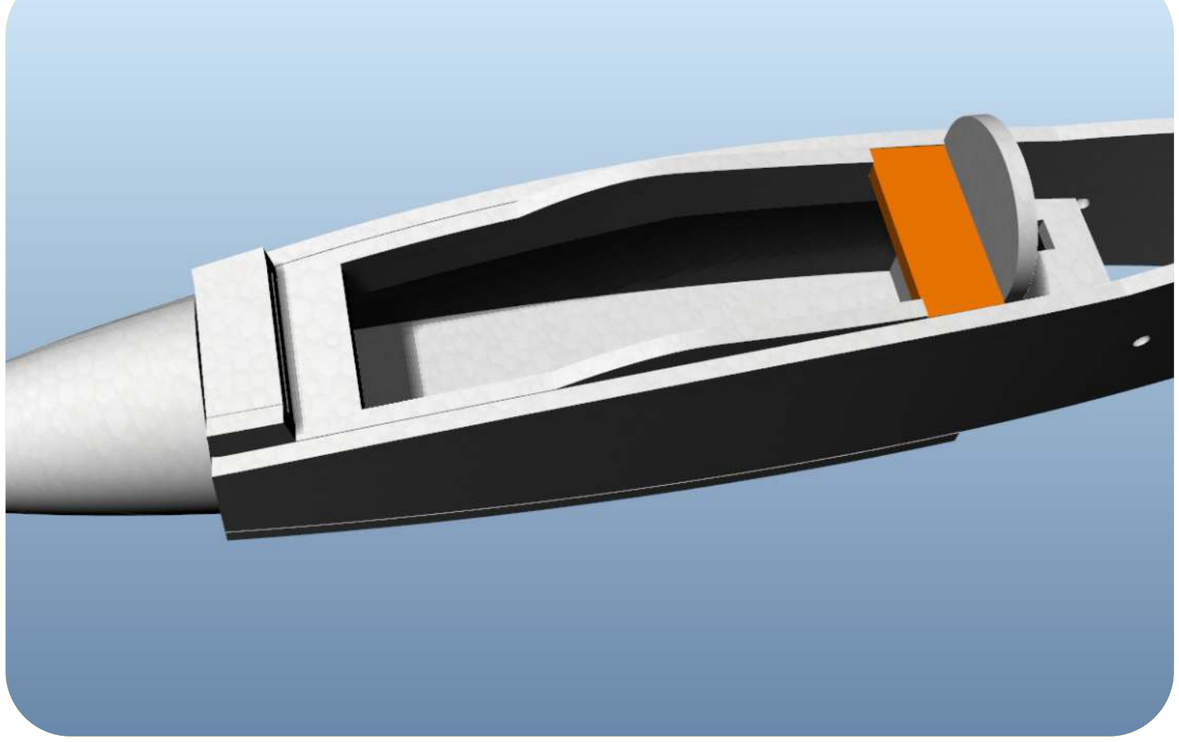
Glue in the nosecone alignment piece



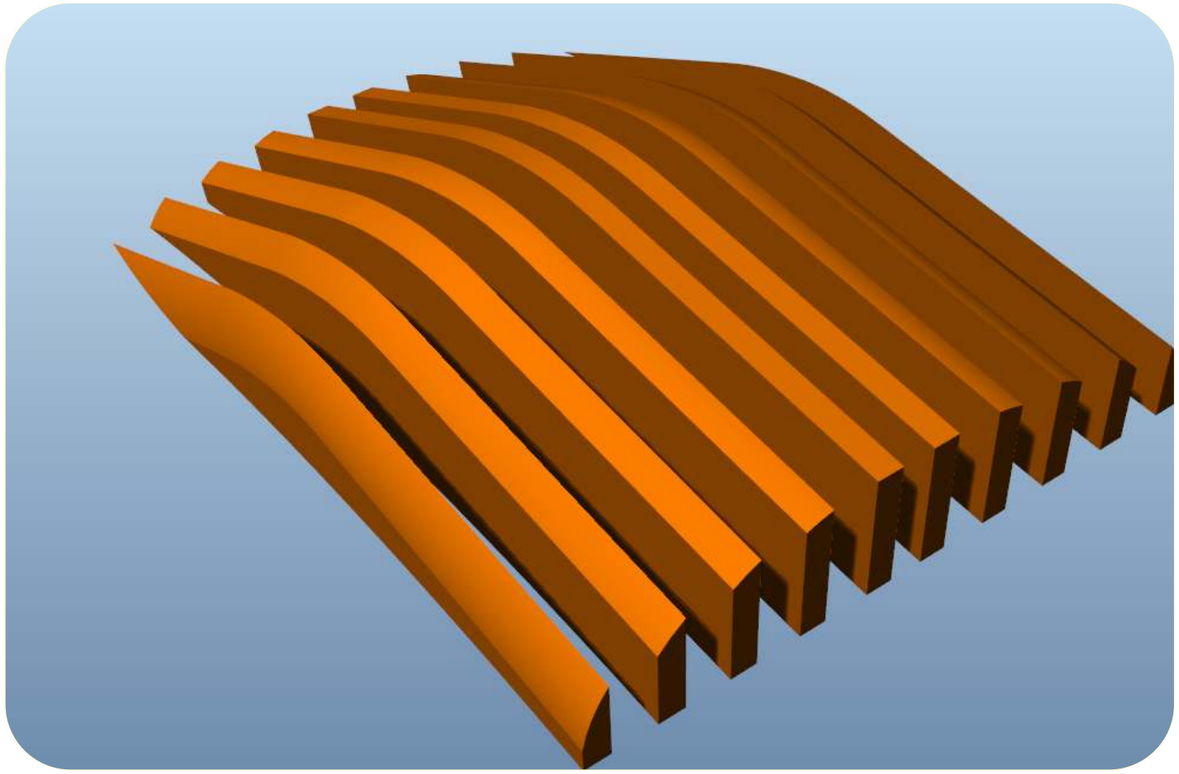
Glue together the nosecone and sand to shape.



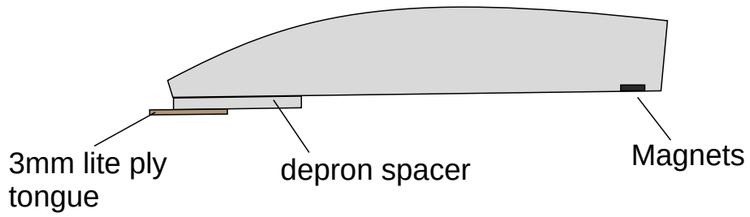
Glue nosecone onto the assembly



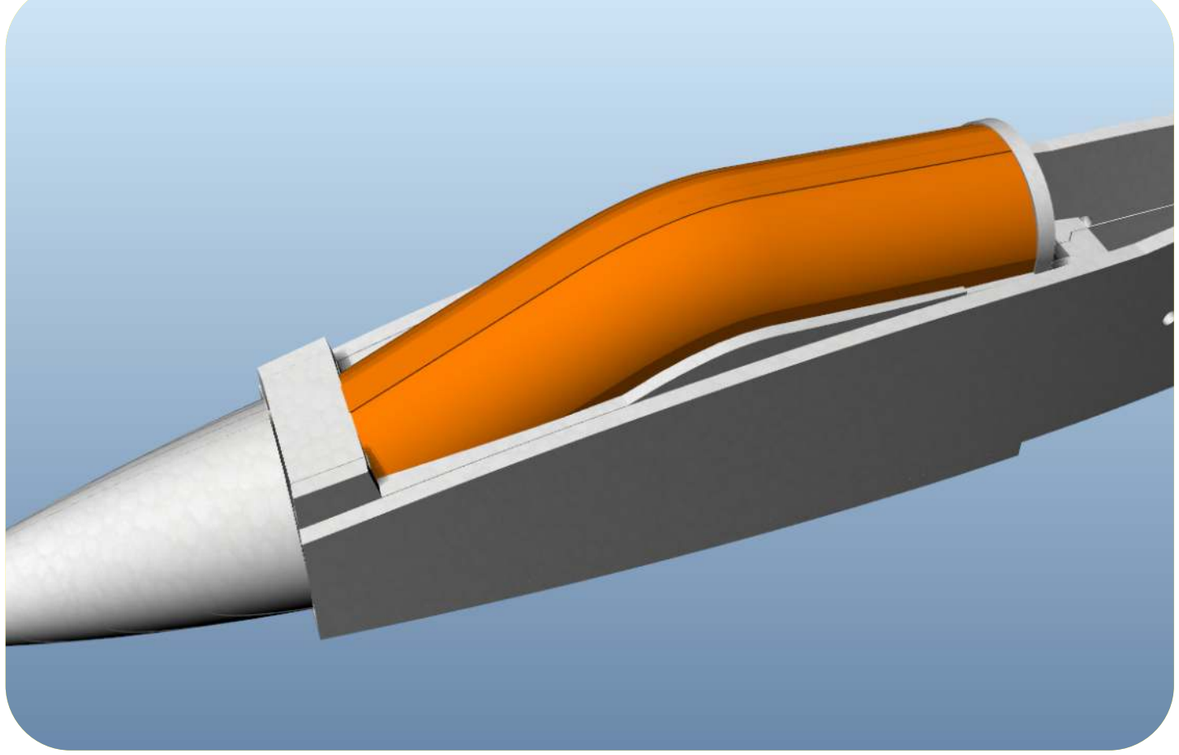
Glue the canopy magnet tray in place



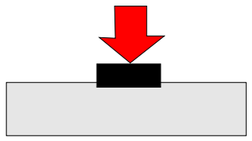
Glue together the canopy pieces and sand to shape.



Create a 3mm lite ply lip at the front end, and 2 rare earth magnets at the rear end..



Rare-earth Magnet attachment process



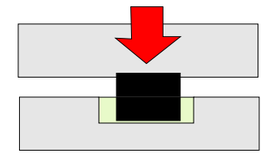
1. press magnet into depron to impress shape.

2. Dig out a recess for the magnet using a sharp knife.

3. Apply glue into recess and push magnet into it.

4. Whilst still wet, lay masking tape over the area.

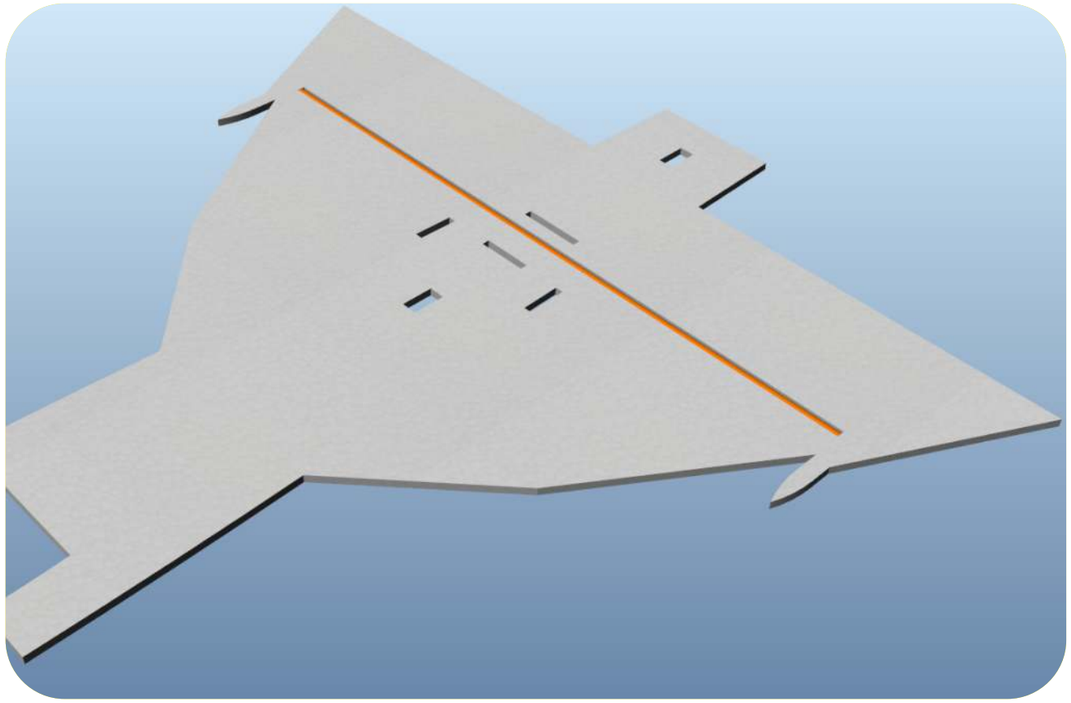
5. When fully cured, remove tape and put adjoining magnet on top



6. When correctly aligned, press adjoining depron onto the sticking up magnet to impress shape.

7. Repeat steps 2-4 for the upper part.

IMPORTANT.
Before glueing the upper magnet in, check that the magnet is the right way around!

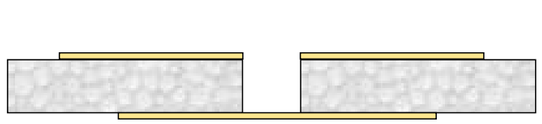
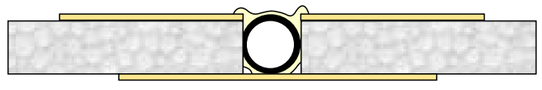
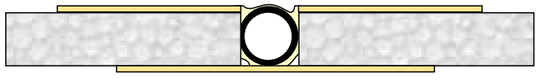
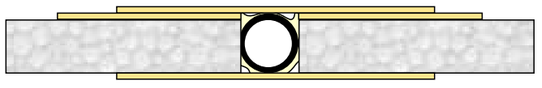
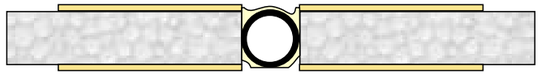
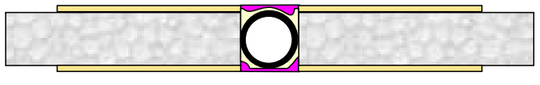
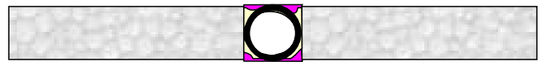


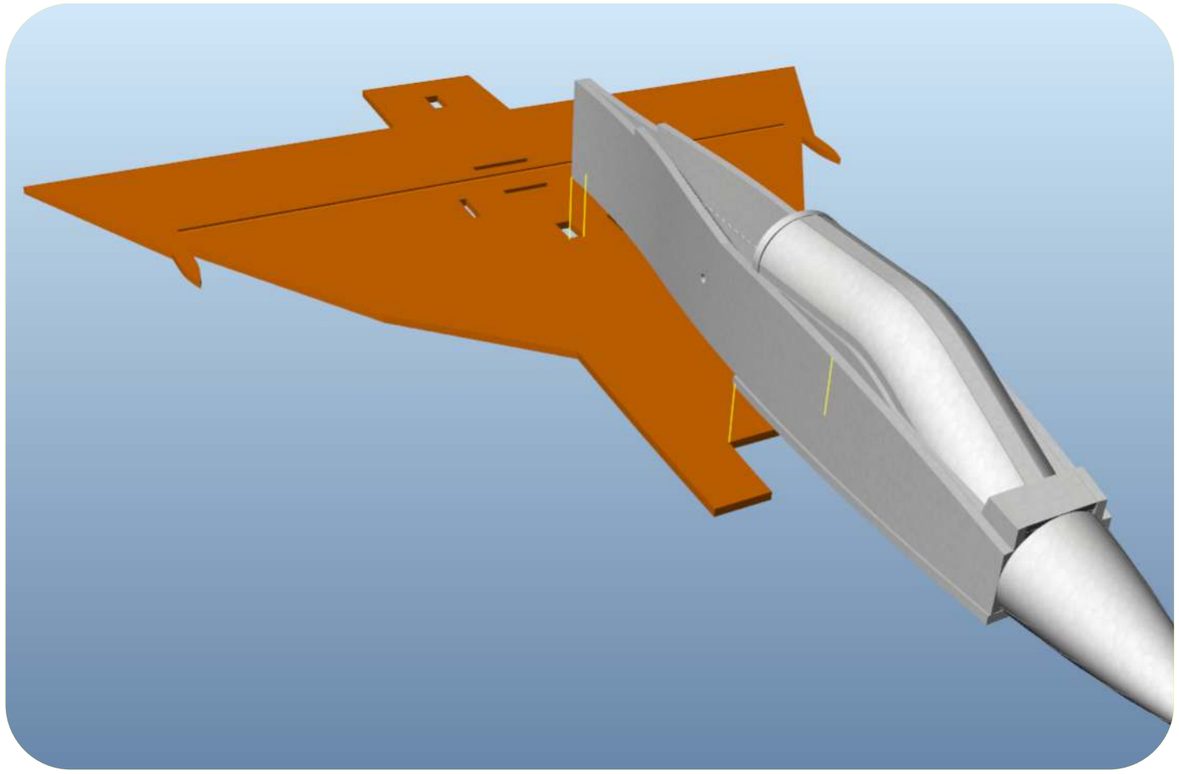
Glue 6mm Carbon rod into the Wing using Epoxy mixed with Micro Balloons.

For extra protection to the leading edges, pre-shaped balsa could be glued on at this stage.

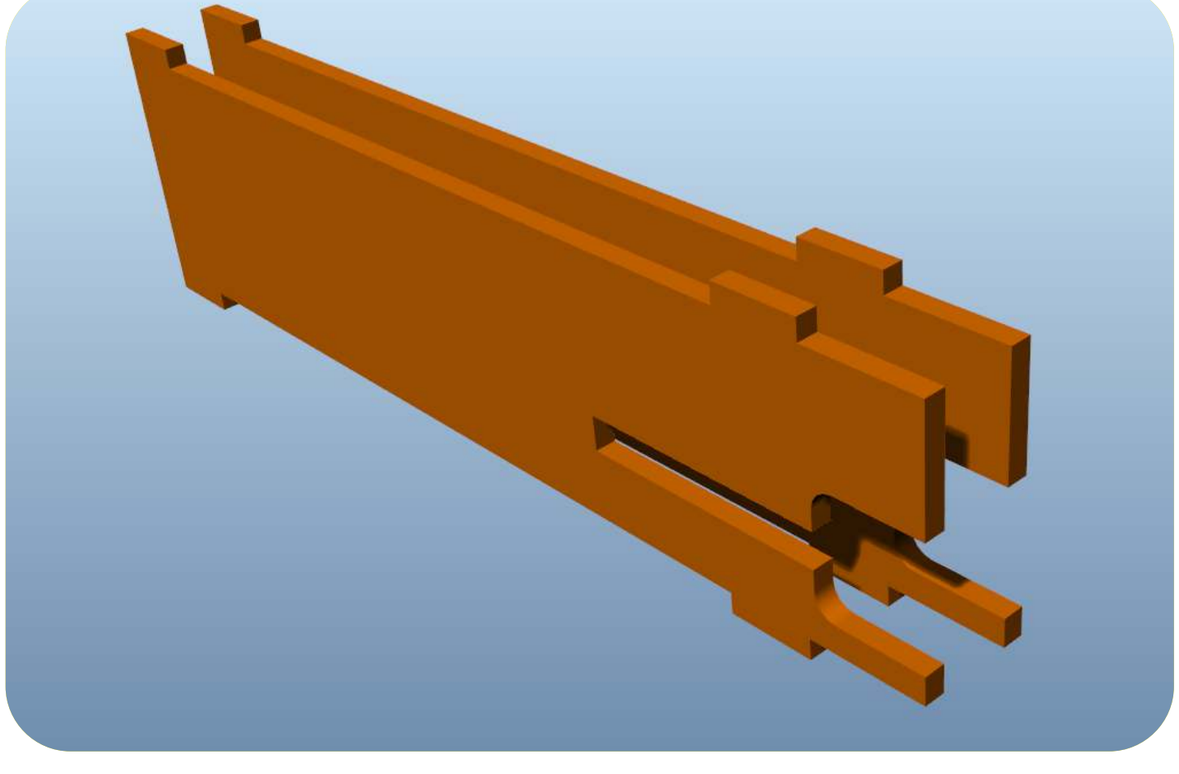
NOTE : if using 5 minute epoxy, do not attempt to do both spars at the same time - (learned from experience!)

Gluing Carbon rod into depron.

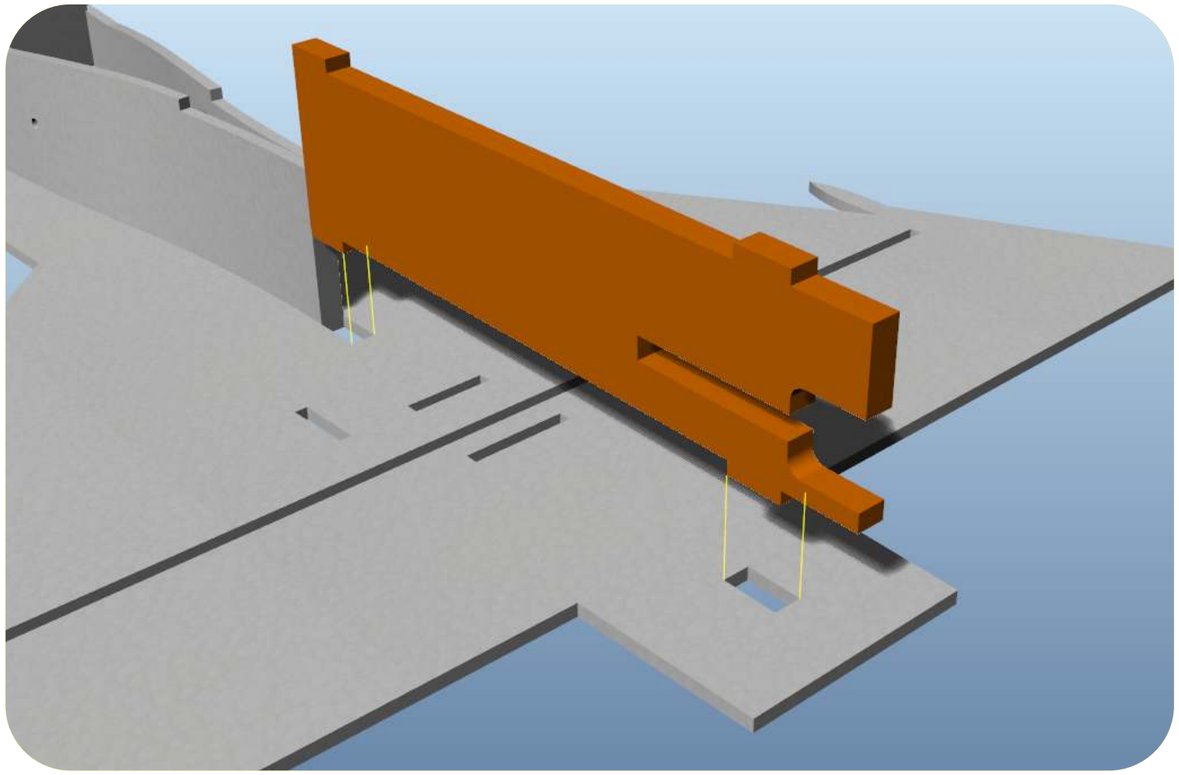
1. Apply masking tape as shown. 	2. Mix Epoxy with micro-balloons and apply to carbon rod. 	3. Spread epoxy mix evenly all over the rod. 
4. Slide rod into position. Take care not to detach lower masking tape. Do this on a flat surface. 	5. Whilst the mix is still fluid, Scrape excess epoxy away. 	6. Apply masking tape to help smooth-out bumps. Place on flat surface with large books on top and leave to set (fully) 
7. Remove all tape and apply fresh tape as shown. 	8. Fill using lightweight filler, gently using spatula to achieve a near-flat surface.  When the filler has set, gently sand flat using a purpose made sanding block - be careful not to sand through the masking tape.	9. Remove masking tape to leave a near-perfect finish. 



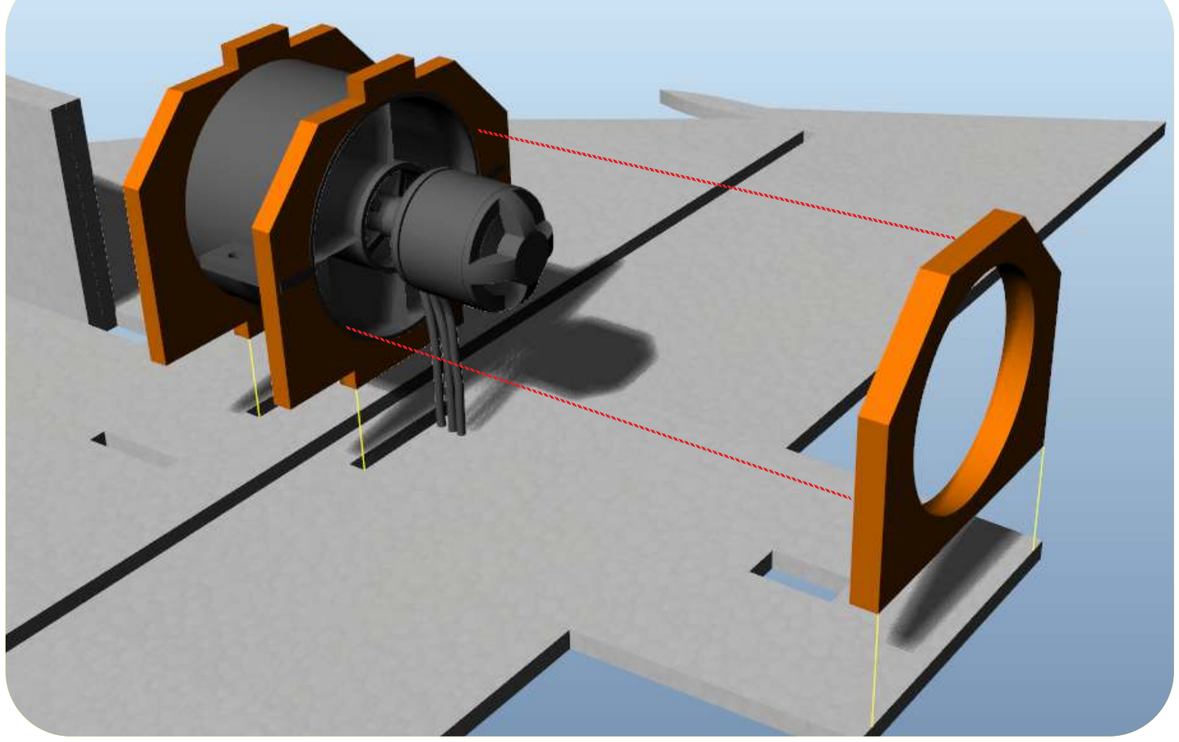
Align and glue the wing to the assembly.



PUSHER ONLY
glue the 2 pusher motor mount pieces together.



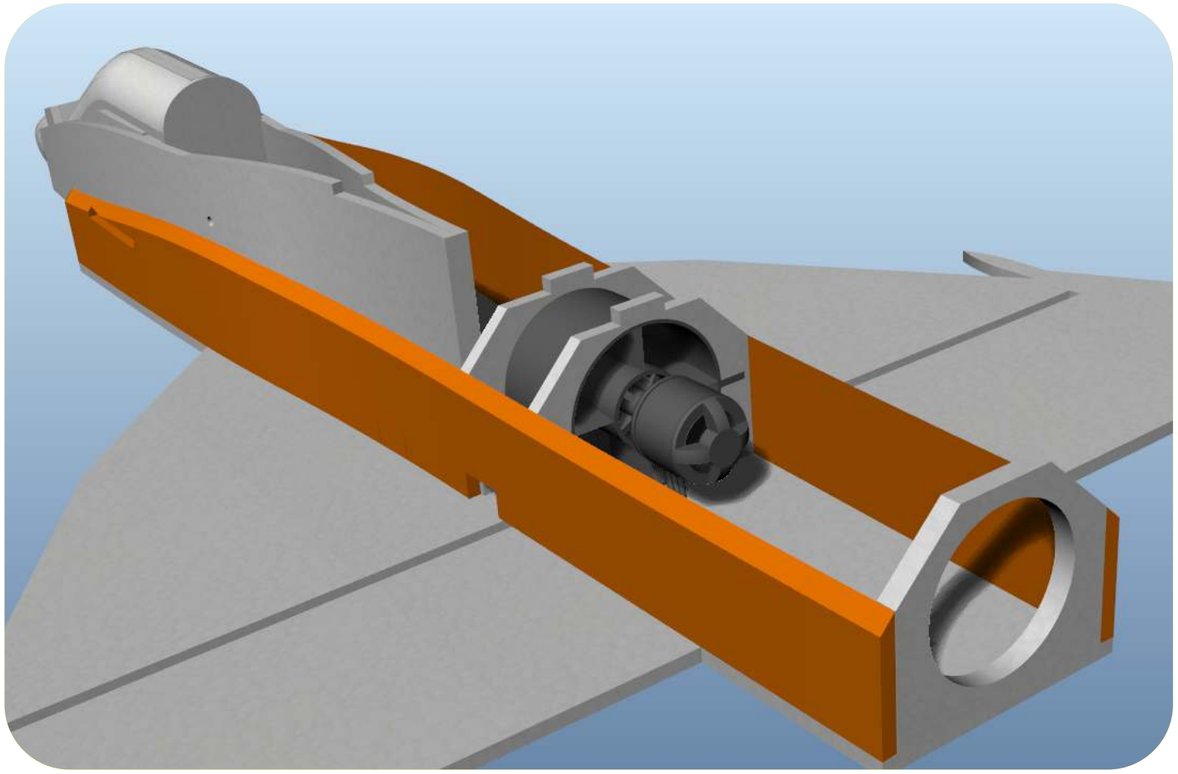
PUSHER ONLY
Glue the motor mount onto the assembly. Use Epoxy on the forward edge to allow for placement with the contact adhesive against the wing.



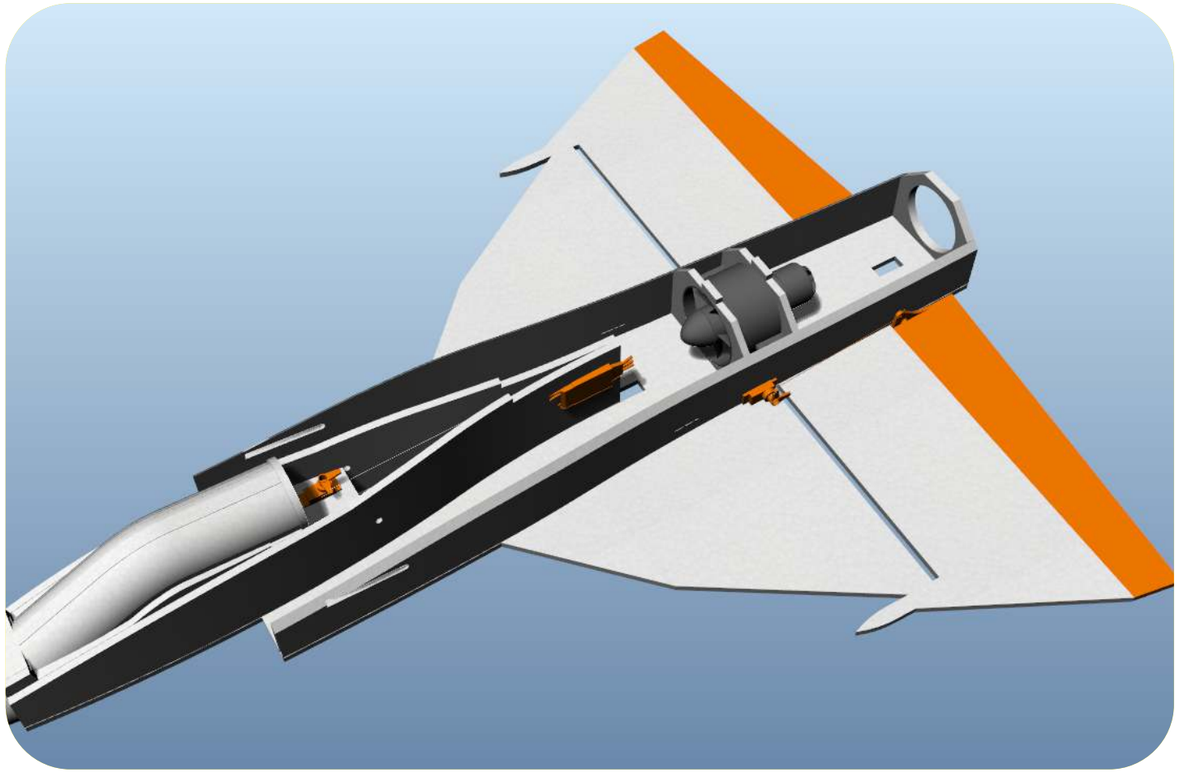
EDF ONLY
Mount your EDF unit into the two support bulkheads and glue to base along with the exhaust bulkhead..

Use Hot melt to secure the EDF to the depron.

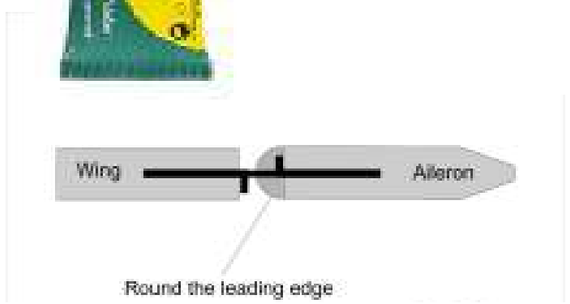
Create a thrust tube to sit between the EDF and the rear exhaust bulkhead using .5mm plastic sheet.

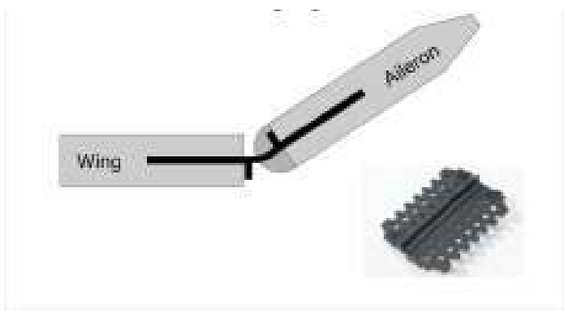


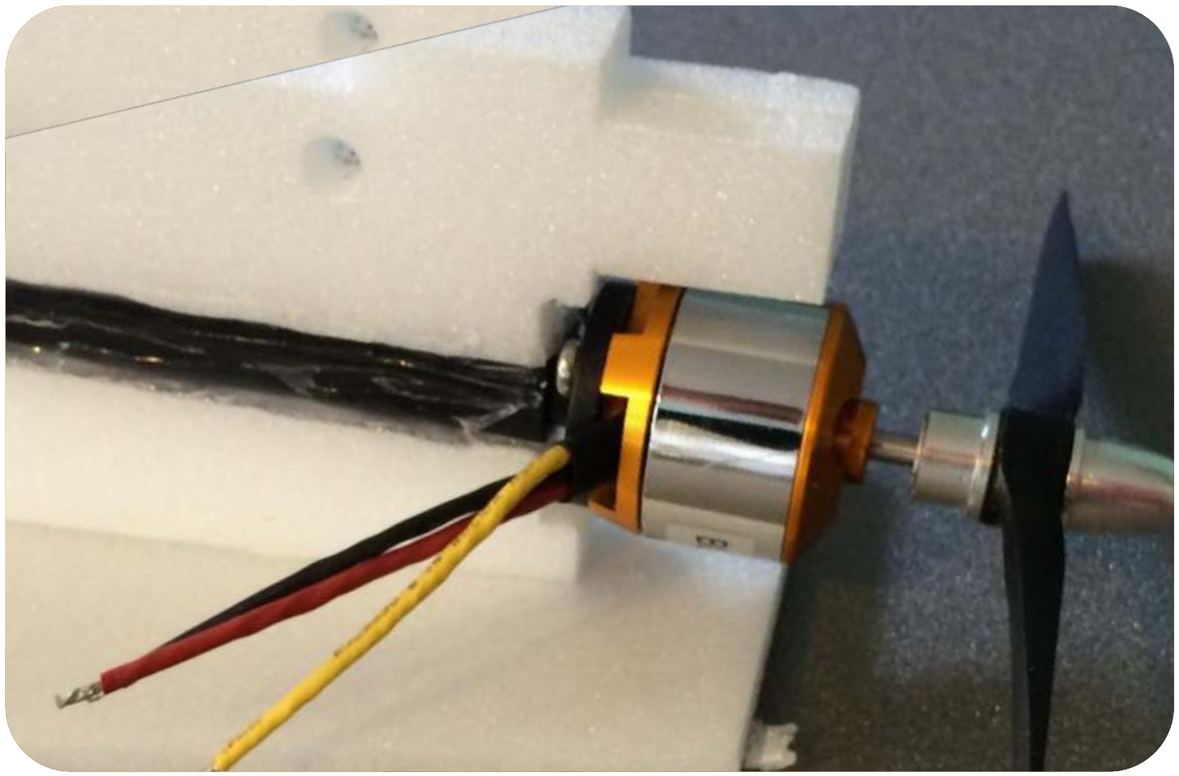
BOTH VARIANTS
Glue the outer fuselage sides onto the model.



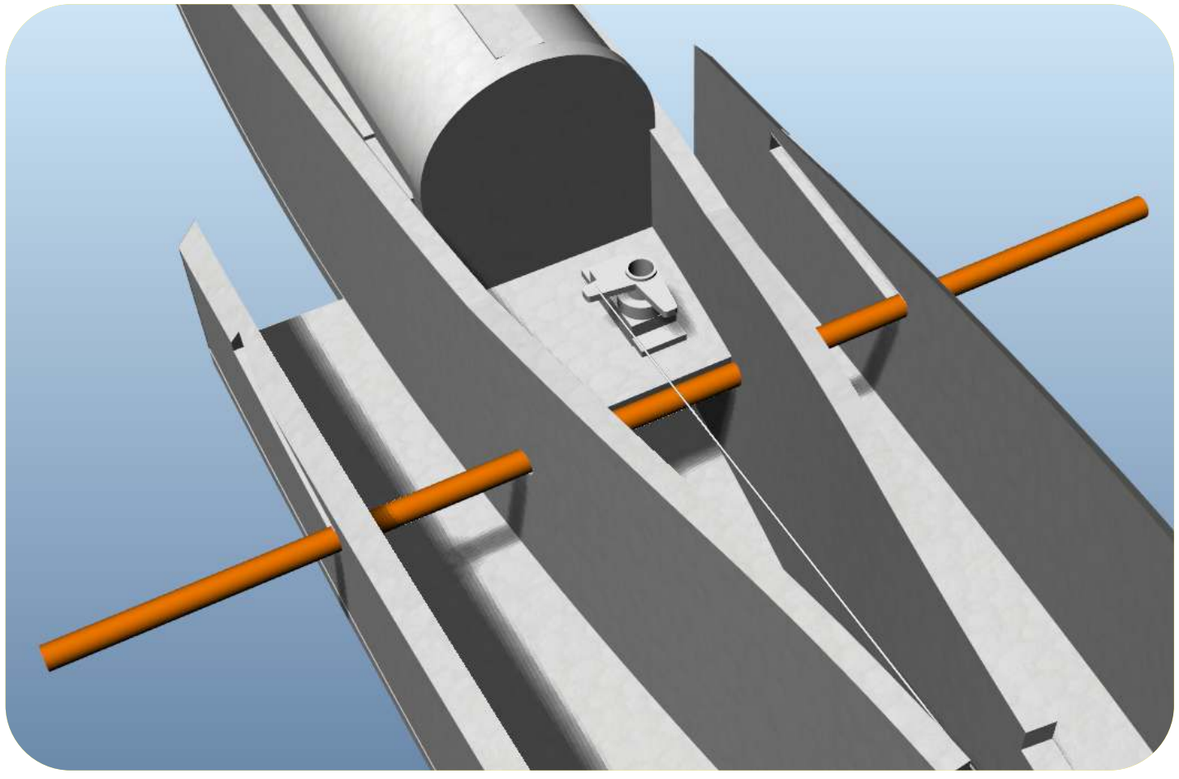
Connect the Elevons, servos, and RX gear



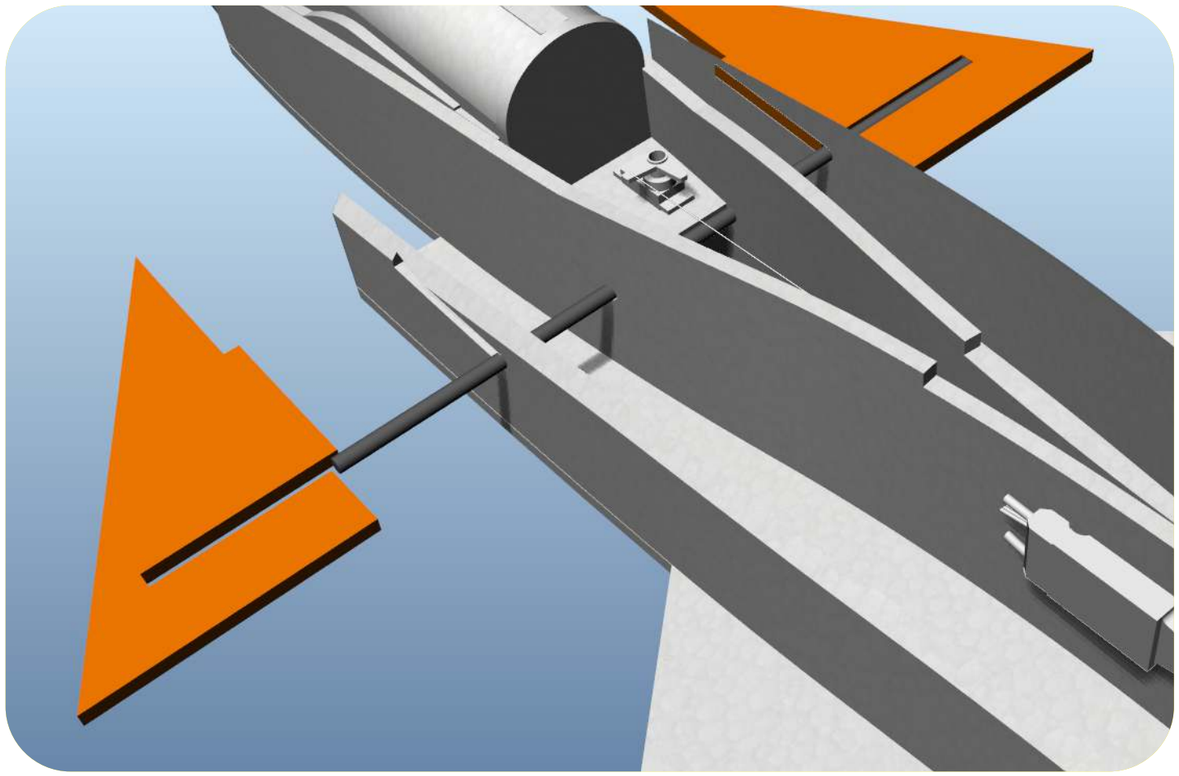




PUSHER
Mount the motor to the plane using a plastic stick mount.



Fix the canard support tube in place using epoxy

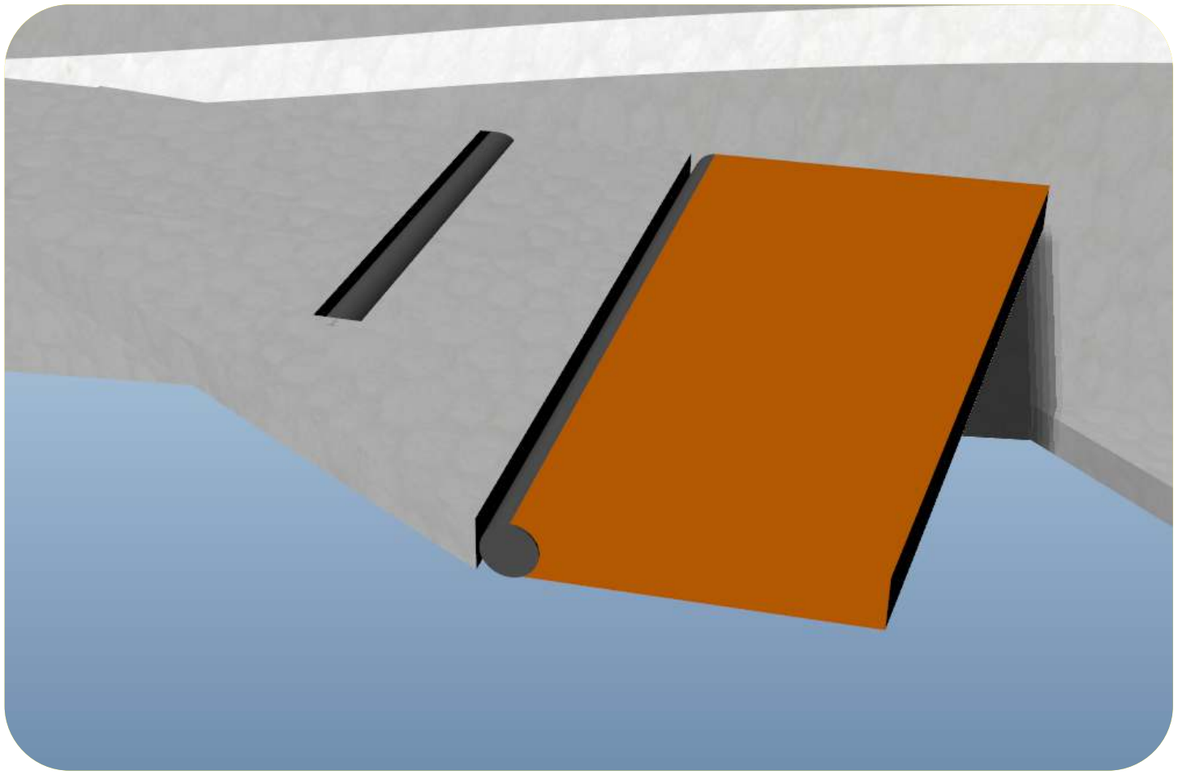


Slide the canards in place using epoxy.

Epoxy in place two lengths of aluminium sleeve to contain the 6mm carbon tube.

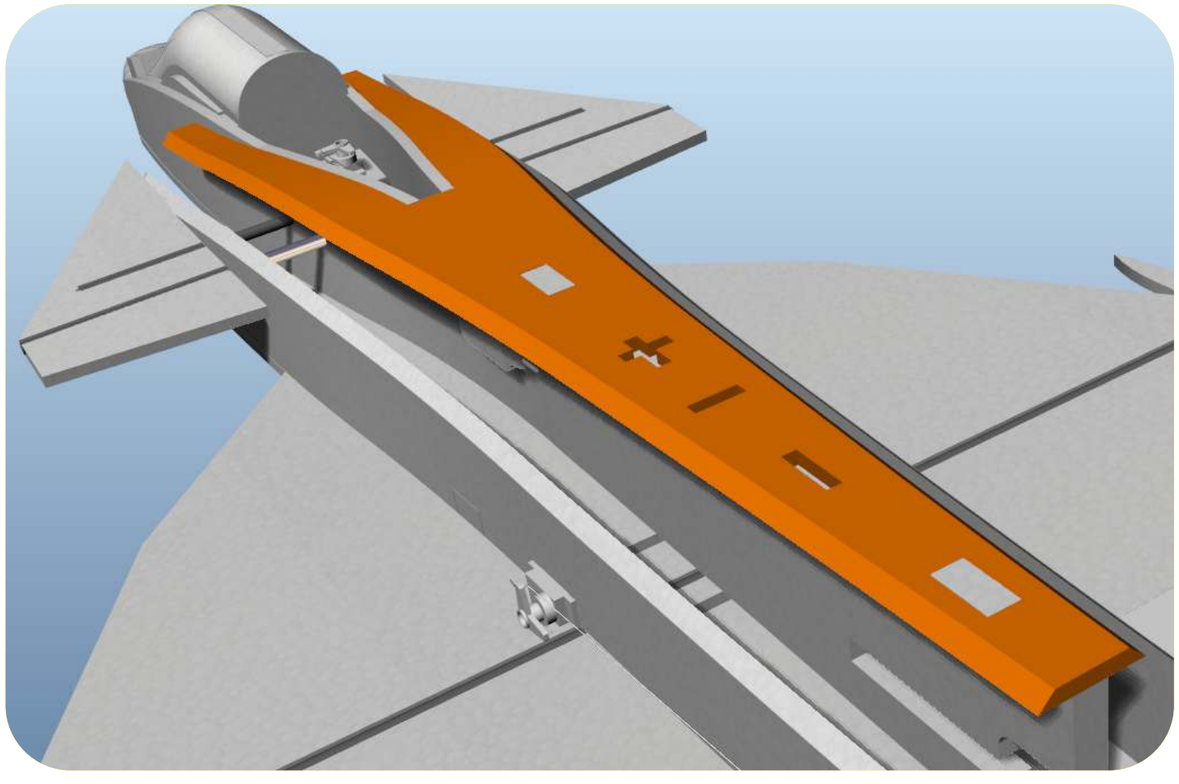
Using a drilled out standard servo and drilled out prop adaptors (to prevent sideways movement) assemble the canard shaft as shown.

Don’t glue the 6mm shaft to the canards. It needs to move freely.

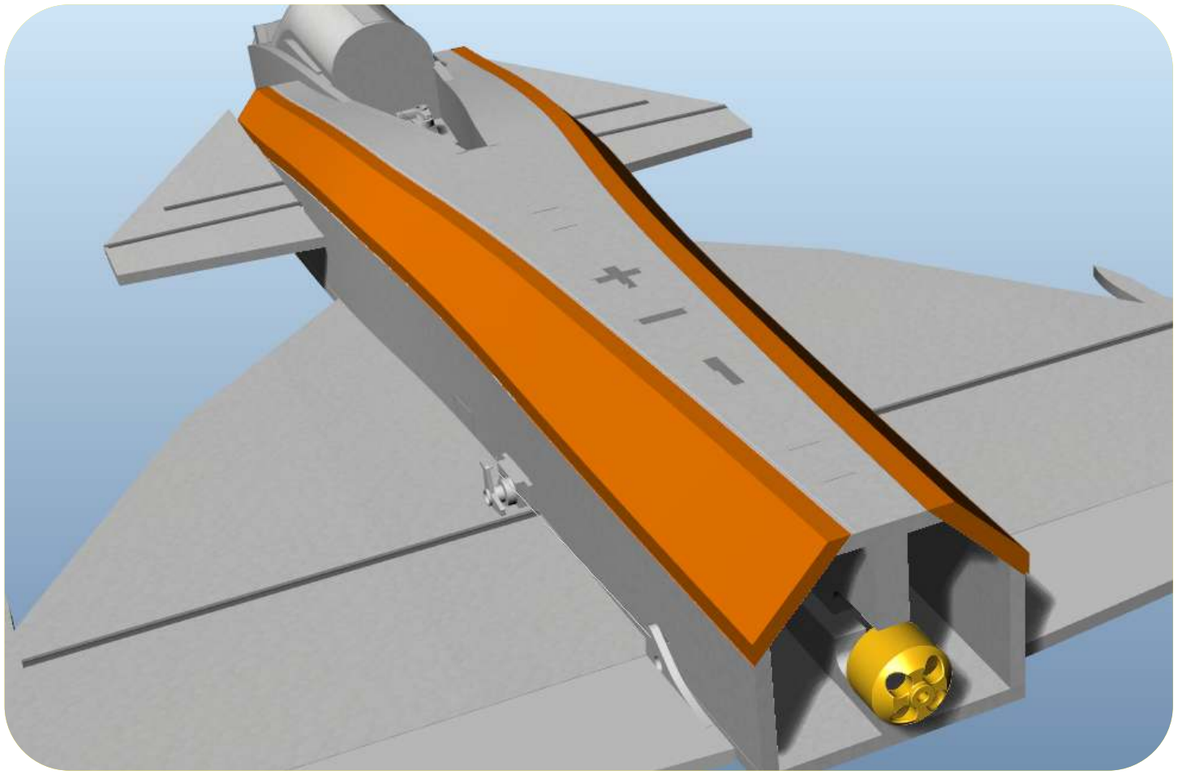


Recess the forward edge of the canard elevator by dragging a 6mm carbon tube along the edge until the depron has deformed.

then glue in place using epoxy using masking tape to keep the glue from touching the non moving part

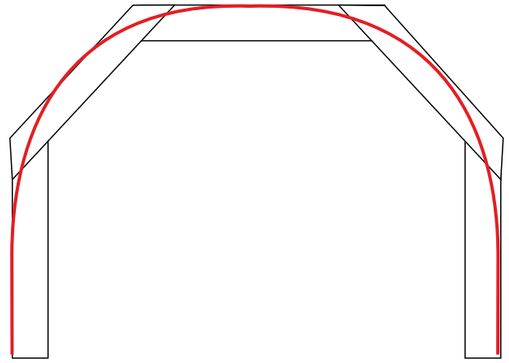


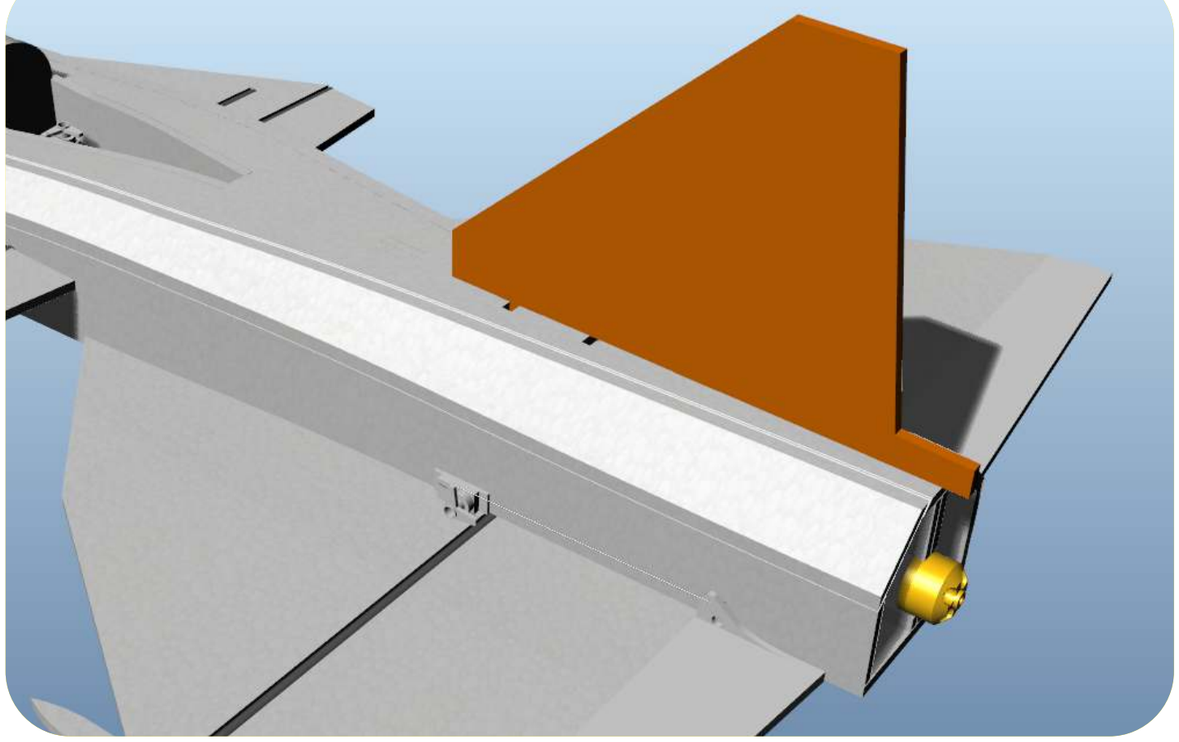
Glue the fuselage top in place using UHU por.



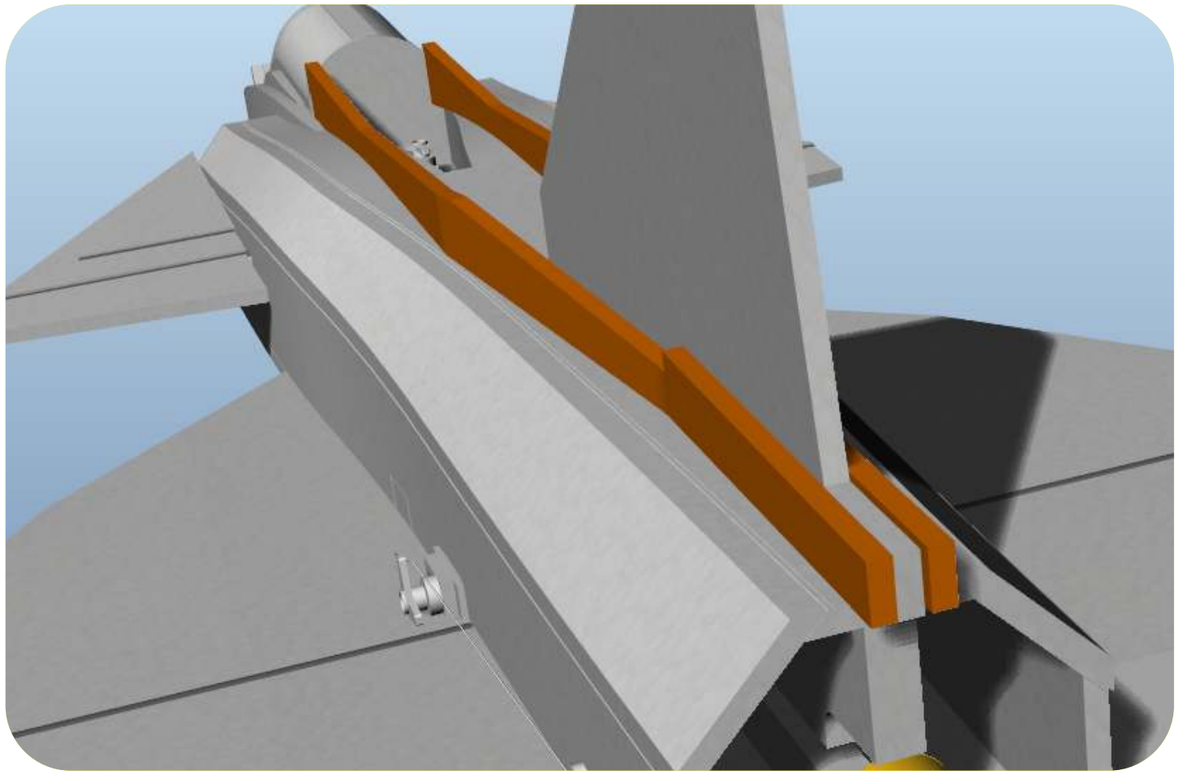
Glue on the angled fuselage sides.

Sand to shape as shown below.



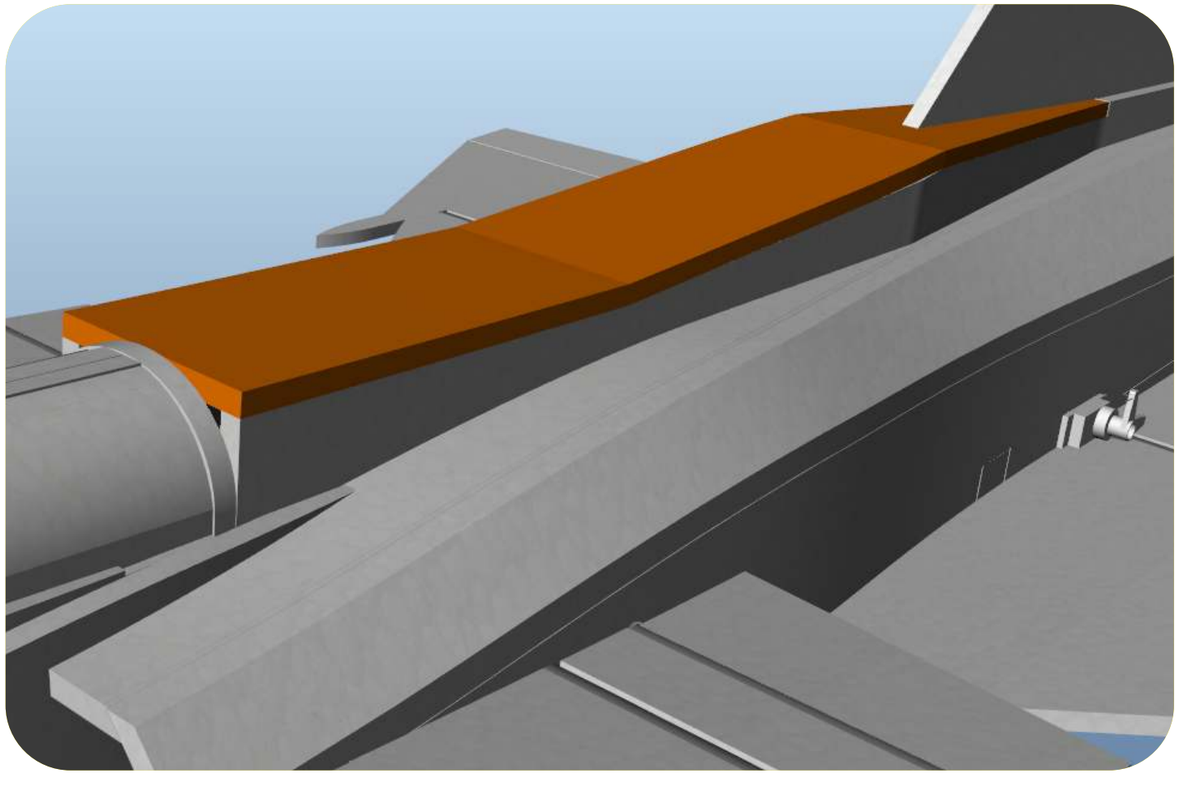


Glue the fuselage top in place using UHU por.

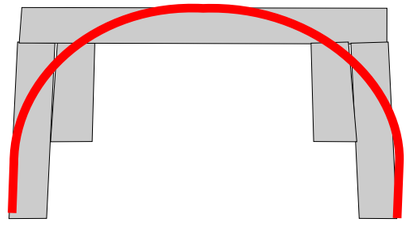


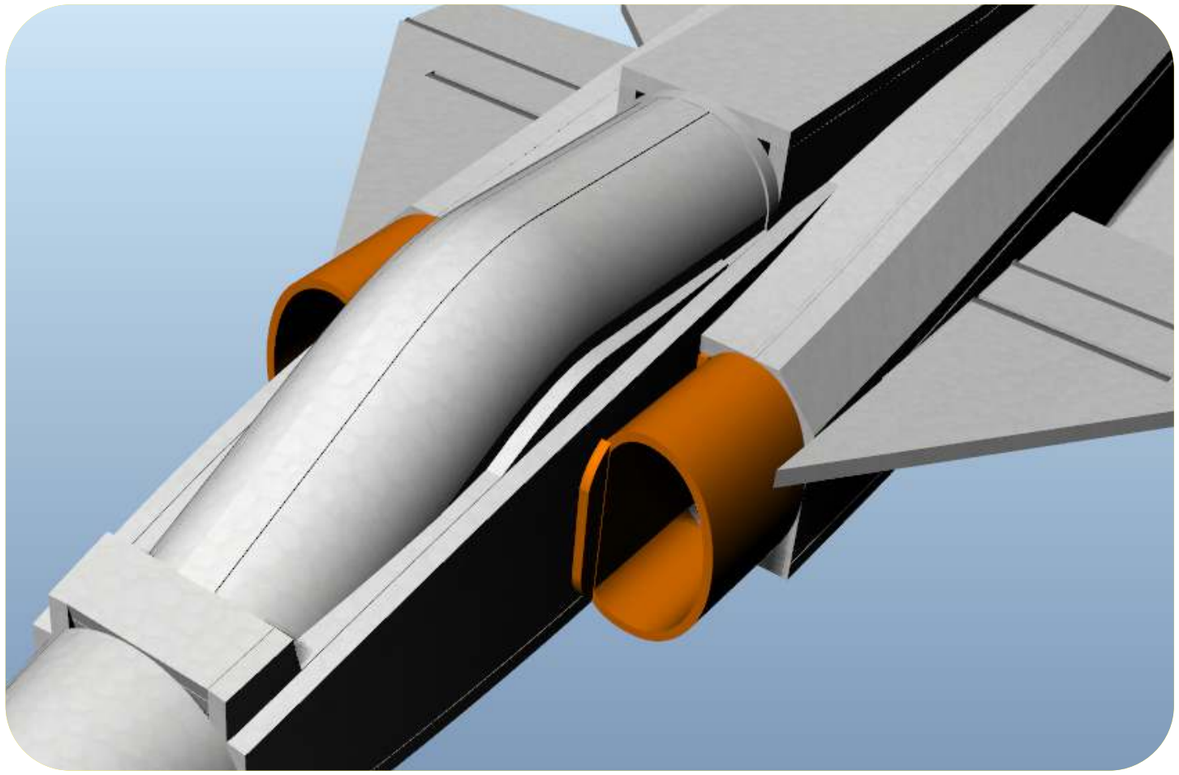
Glue on the angled fuselage sides.

Gluet 10mm corner support strips as shown along the length of the turtledeck.



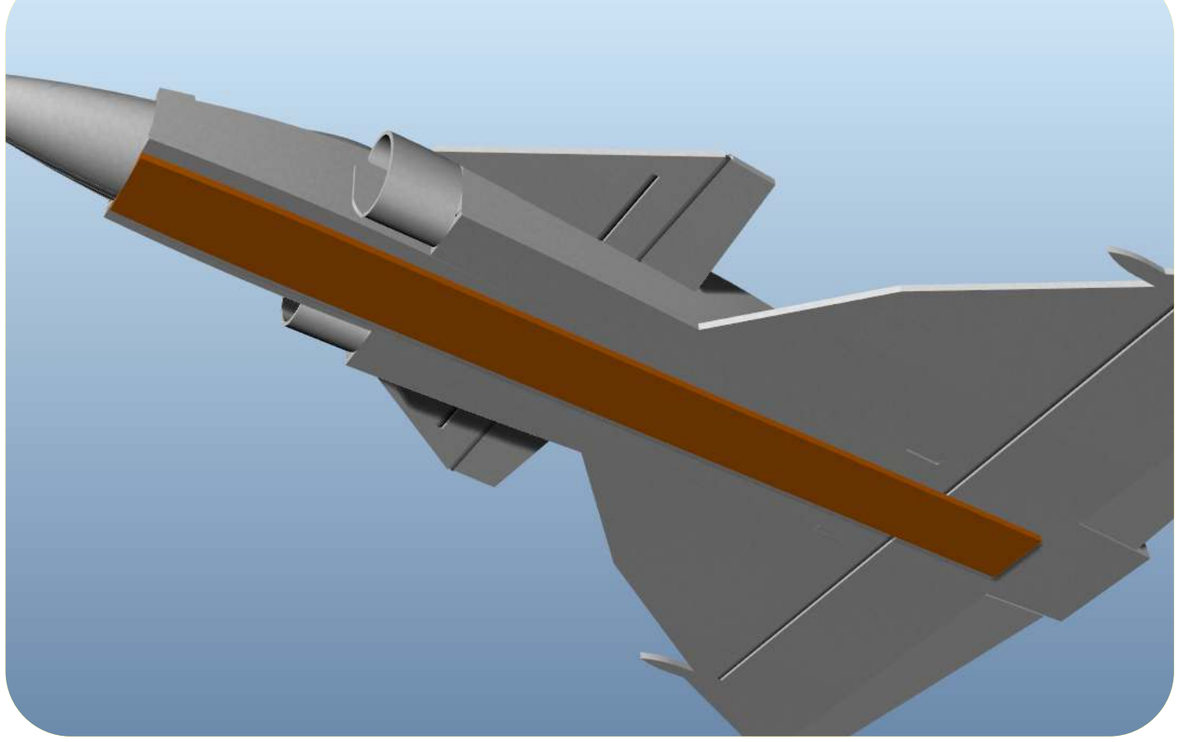
Fit the top of the turtledeck in place and sand to shape to match the canopy.



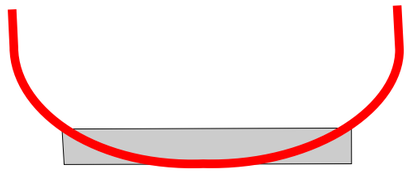


Form 3mm depron to the correct shape and glue to the airframe to create the air intakes.

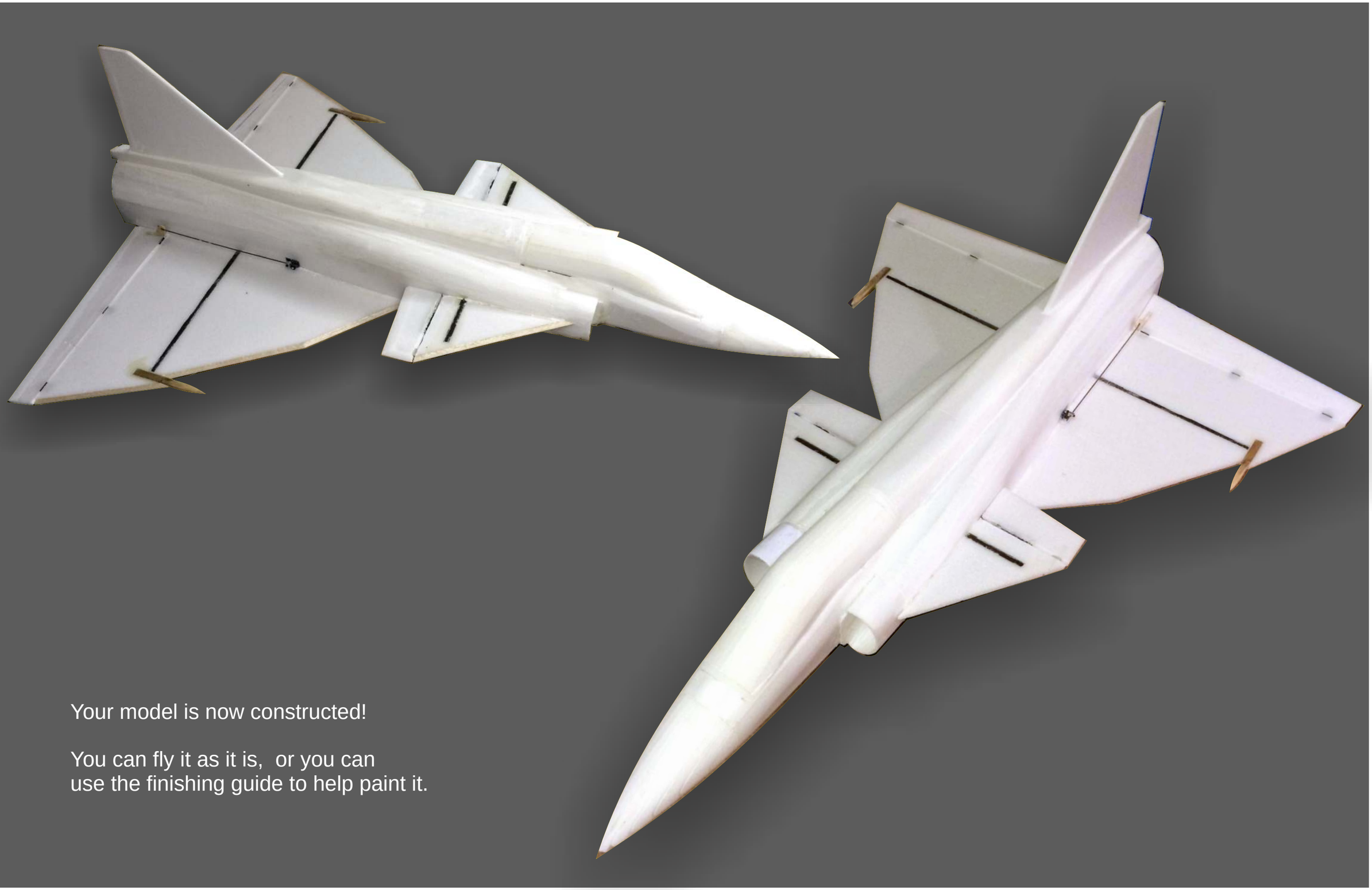
EDF :- you may need to add cheater holes on the underside of the belly to maximise thrust. Please check thrust levels before and after installation.



Shape the belly strip to to something like this, that is part of the shaping of the forward fuselage



Use photo’s to help shape
Your model to represent
the real plane



Your model is now constructed!

You can fly it as it is, or you can
use the finishing guide to help paint it.