

AS-VTOL **V1**



MANUAL V1.2

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UAV Parameters

1 – Dimensions

Span:1310 mm

Length:995 mm

Height: 160 mm
(without LG)

Recommended CoG:300 mm
(from Fuselage Nose)

2 – Weight

MTOW:3000 g

Print Weight:~1000 g

3 – Speed:

Cruise Speed:65–72 km/h

4 – Performance:

Calc. Flight Time FW–Mode:40 min.
(4S 5000mAh @65 km/h @3kg)

Deployment Time:<2 min.

Overview



AS-VTOL aircraft is full of versatility and flexibility.

With its modular design, it is easy to assemble and simple to maintain. Whether for free flights, FPV flights or aerial photography – this device is suitable for a wide range of applications.

The innovative tilt technology reduces the overall weight of the aircraft, which increases its performance and efficiency.

Thanks to the tool-less, detachable payload module, users can easily switch between a wide range of cameras and other optical devices to ensure they always have the perfect equipment for their application.

Required Accessories

1 – Propulsion (recommendation)

Motor:.....EMAX ECO II Series 2807 1300kv

ESC:SpeedyBee BLS 60A 30x30 4+1

Propeller:....Gemfan 7042

Battery:.....4S Turnigy 5000mAh 25C LiPo

2 – Tilt

Servo:.....2 pcs. EMAX ES09MD Digital 14,8g

Bearing:.....2 pcs. 4x9x4mm Ball Bearing [link](#)

Screw:.....2 pcs. M4x10

Horn screw:...2 pcs. M2x4

3 – Avionics:

GPS:Matek M10Q-5883

FCU:.....Matek F405-WING V2

4 – Control Surfaces:

Servo:.....4 pcs. 9G Micro Servo Motor [link](#)

Horns:.....4 pcs. Nylon Horns [link](#)

5 – Carbon Rods (*SP=Spars*)

Wings

2 pcs. 8x500mm (Main)

4 pcs. 5x250mm (SP 1/2)

2 pcs. 5x304mm (SP 3)

2 pcs. 3x265mm (SP 4)

V-Tails

4 pcs. 5x207mm (SP 5/6)

2 pcs. 3x210mm (SP 7)

VTOL Booms

4 pcs. 3x415mm (SP 8/9)

Tail-Fuselage

2 pcs. 5x207mm (SP 10/11)

6-Threaded Inserts

Landing Gears

4 pcs. M4 max. 6mm long

Fuselage

8 pcs. M3 max. 4mm long

7-Screws & Nuts

Landing Gears

4 pcs. M4x10mm

Latches

8 pcs. M2.5x12mm cylinder head screw

8 pcs. M2.5x14mm cylinder head screw

Servo Caps and Wing Latches

20 pcs. 2.9x9.5mm metal screws

Wing and Tail Latch Pivots

4 pcs. M5x8mm cylinder head screw

4 pcs. M5 nuts

Front Motors

8 pcs. M3x4mm

Rear Motors

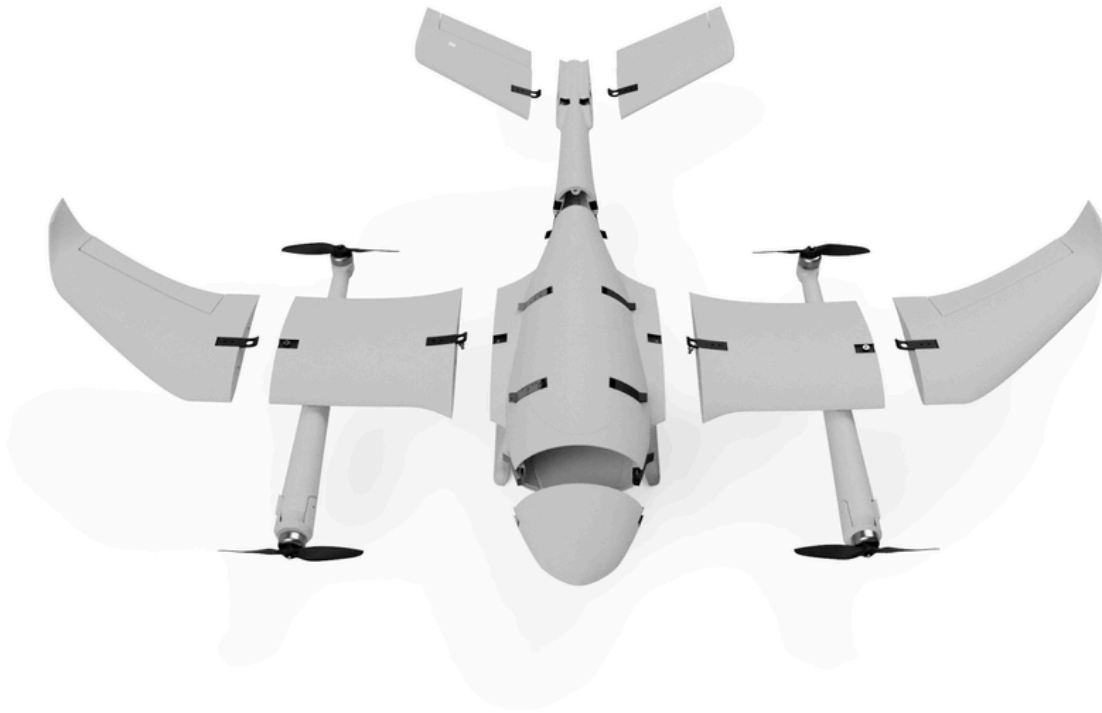
8 pcs. M3x8mm

FCU & ESC Holder

8 pcs. M3 threaded inserts max. 5mm long

4 pcs. M3x12+6 mm nylon spacer

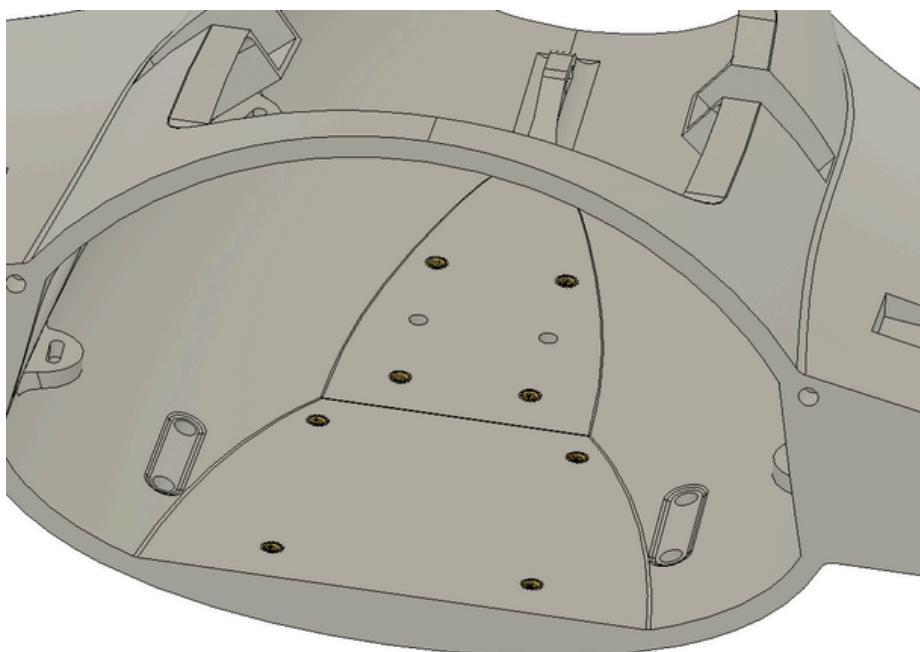
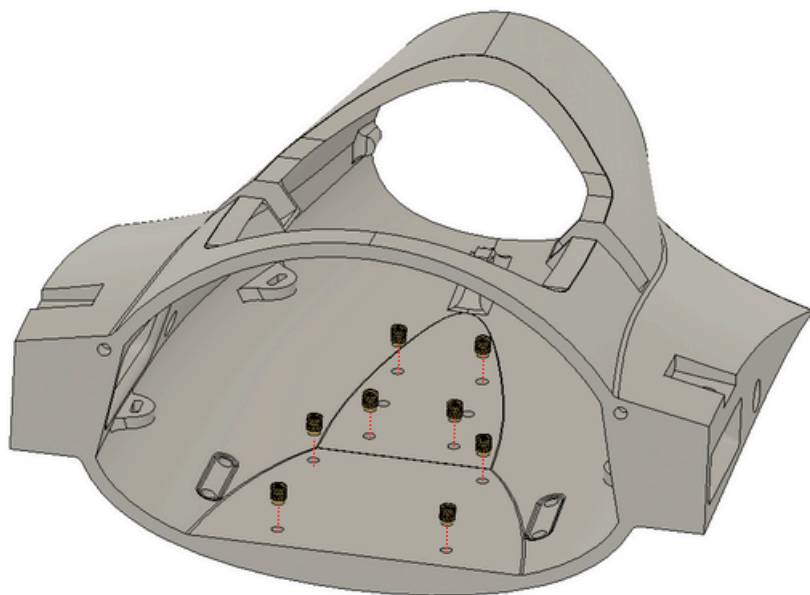
Build Instruction



Basic Tools

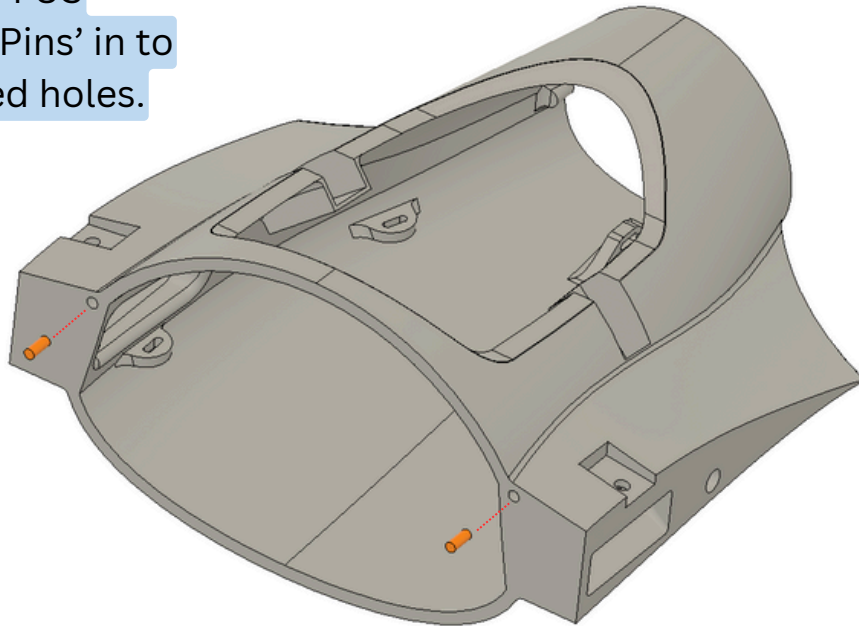
- Superglue Cyanacrylat
- Activator
- Screw Driver
- Scalpel

Fuselage Threaded Inserts

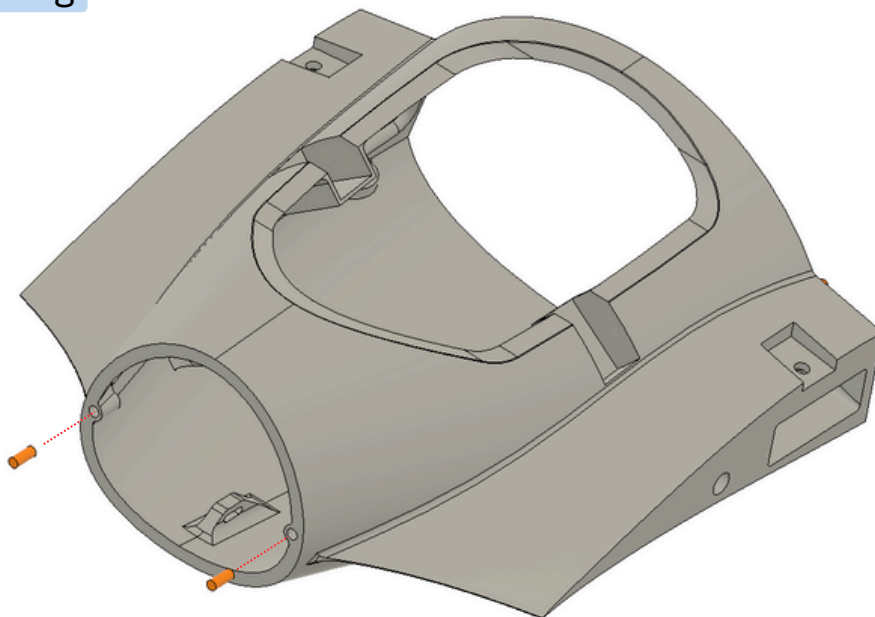


Fuselage Modules

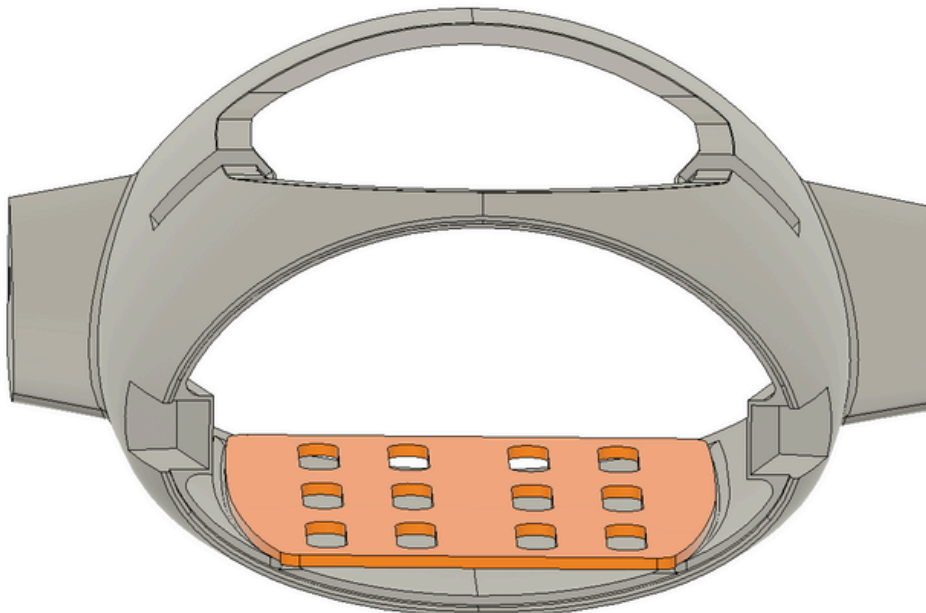
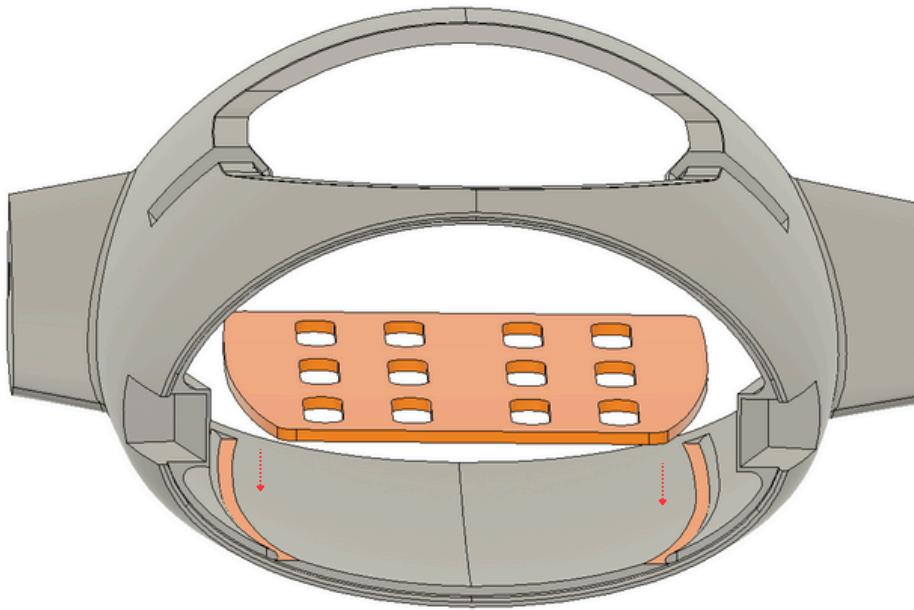
Insert 'FUS
Connector Pins' in to
the marked holes.



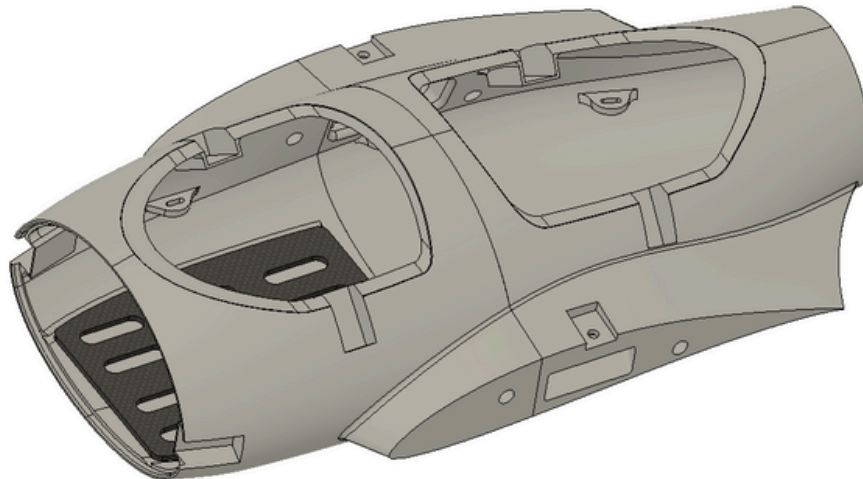
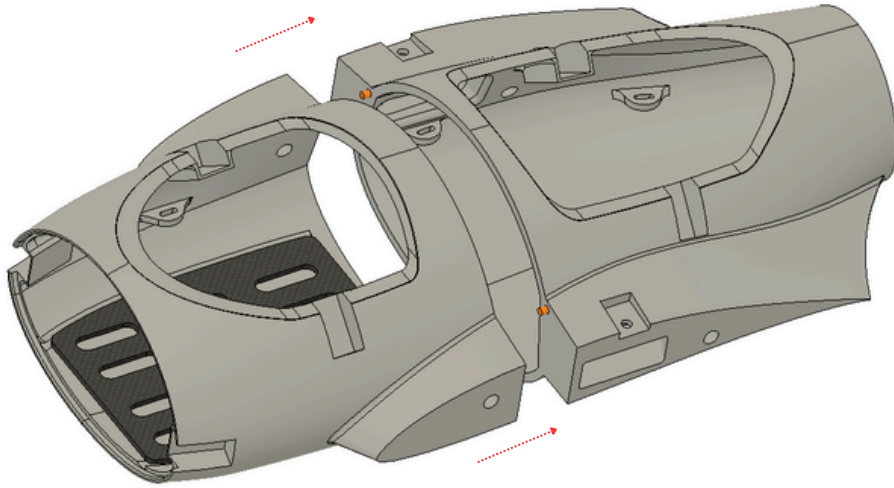
It is recommended
to drop glue in to the
holes for better
handling.



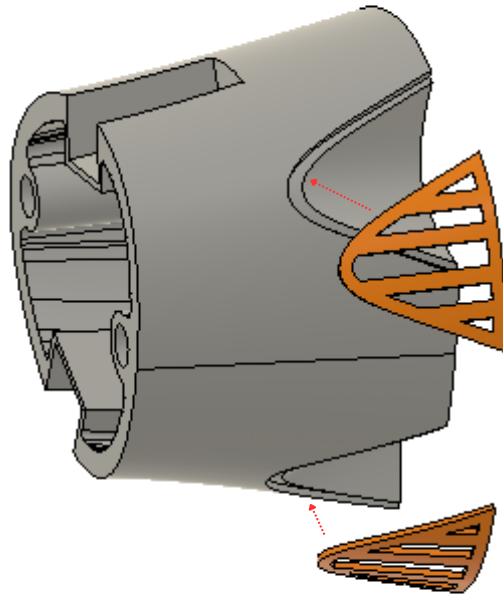
Put gently glue on the marked surfaces on FUS2 and press
'Battery Plate' on them until the glue dried.



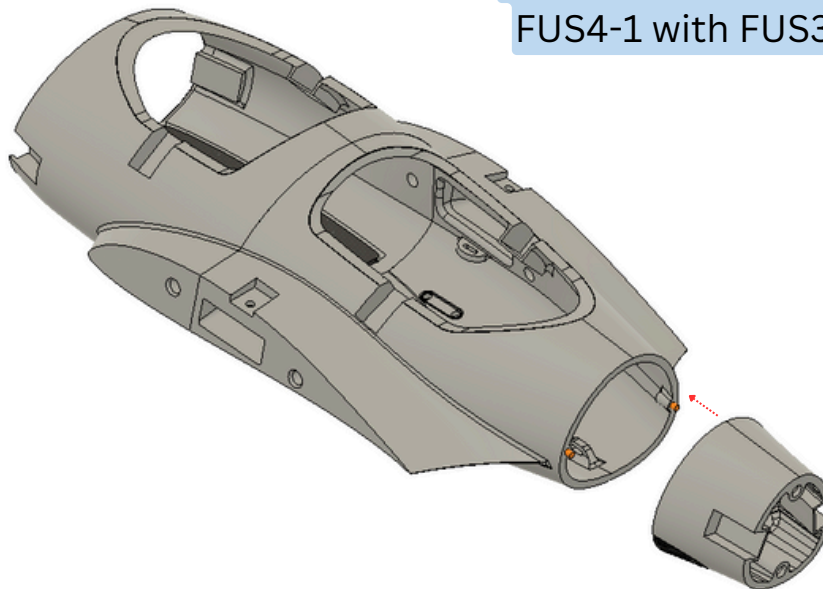
Put gently glue on FUS2 or FUS3 and connect them.



Put glue on the slots on FUS4-1 and press 'FUS4 Outlet' carefully, because they are very fragile. Repeat it on the other side.

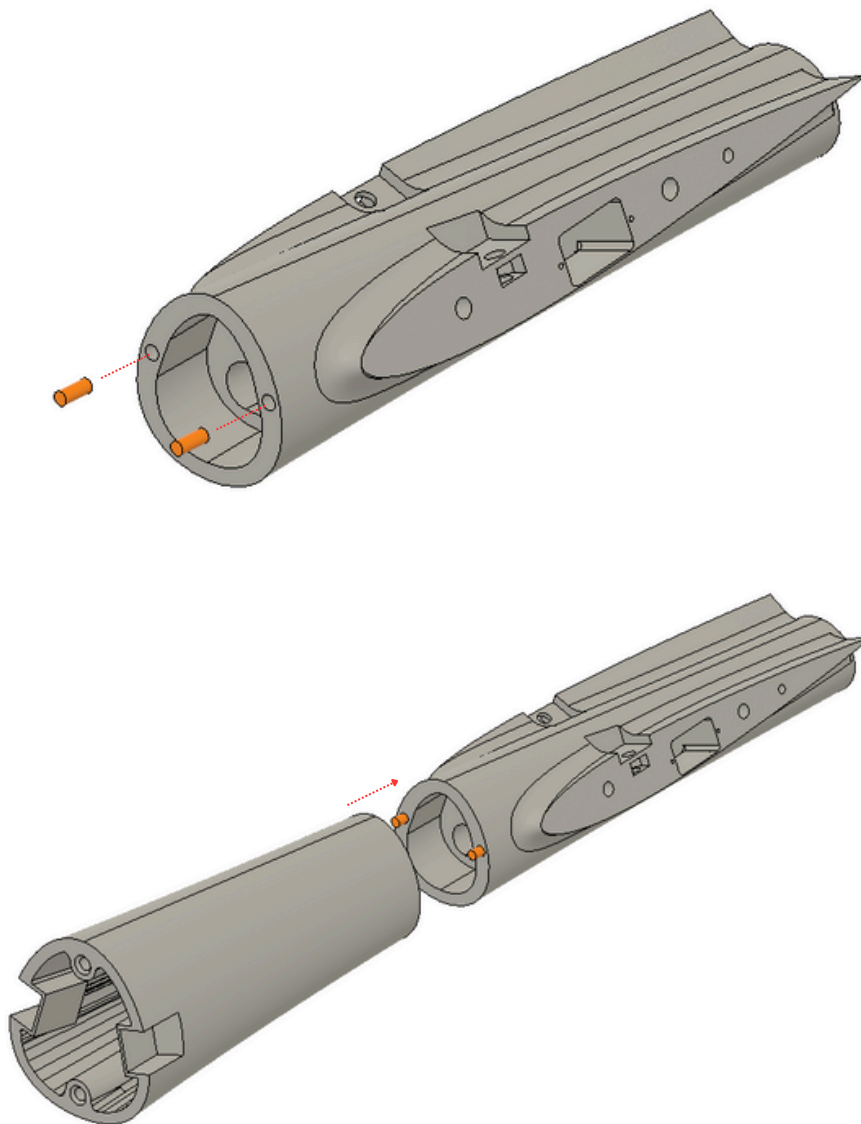


Use glue to connect FUS4-1 with FUS3.



Tail Modules

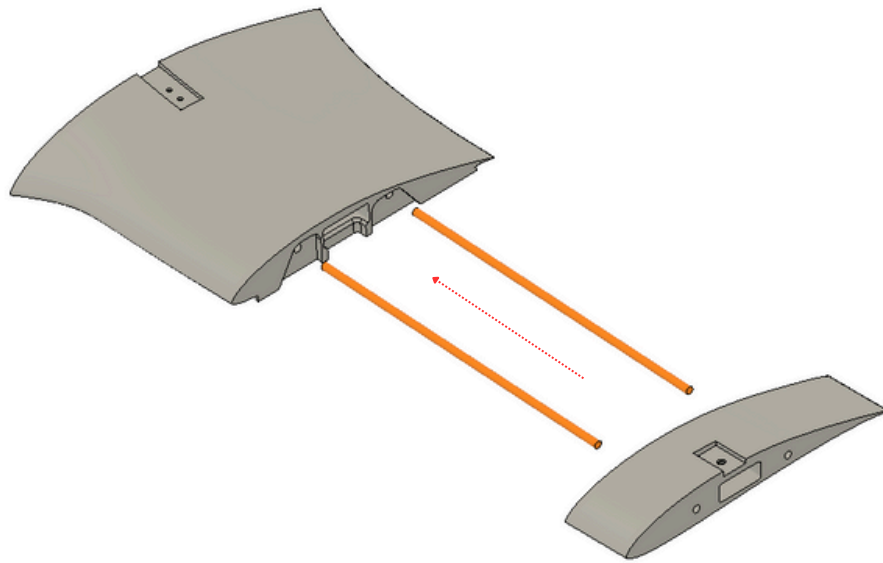
Insert 'FUS Connector Pins' in to the marked holes.
Then glue FUS4-2 and FUS5 together.



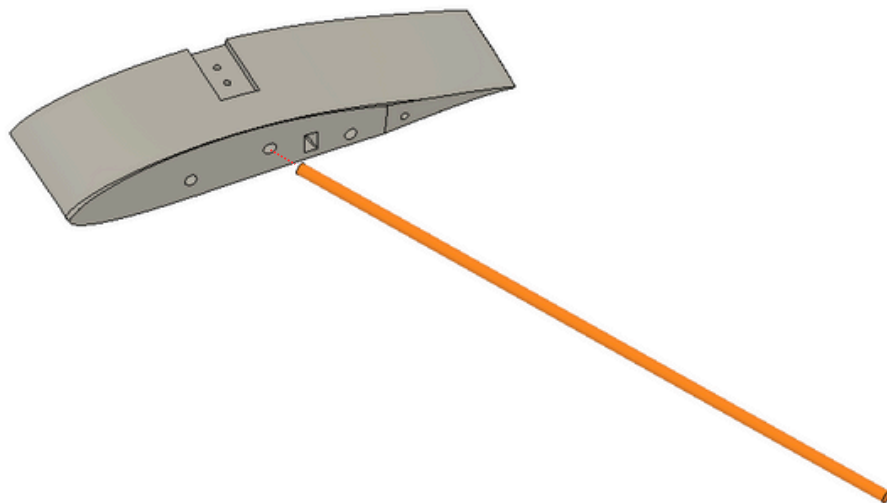
Wing Modules

Slide 'Spar 1' and 'Spar 2' in W1-1. Do **NOT** use glue for the spars. It is necessary that Spar 1&2 are detachable to assemble/disassemble the VTOL Booms. The rods act here only for alignment.

Use glue to connect W1-1 and W1-2.

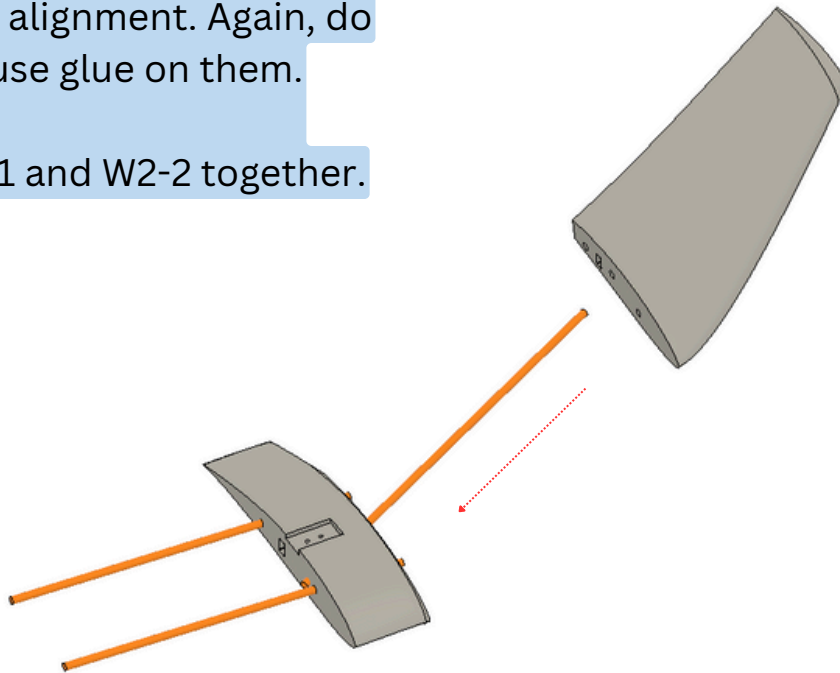


Slide 'Spar 3' in 'W2-1' or 'W2-2'.



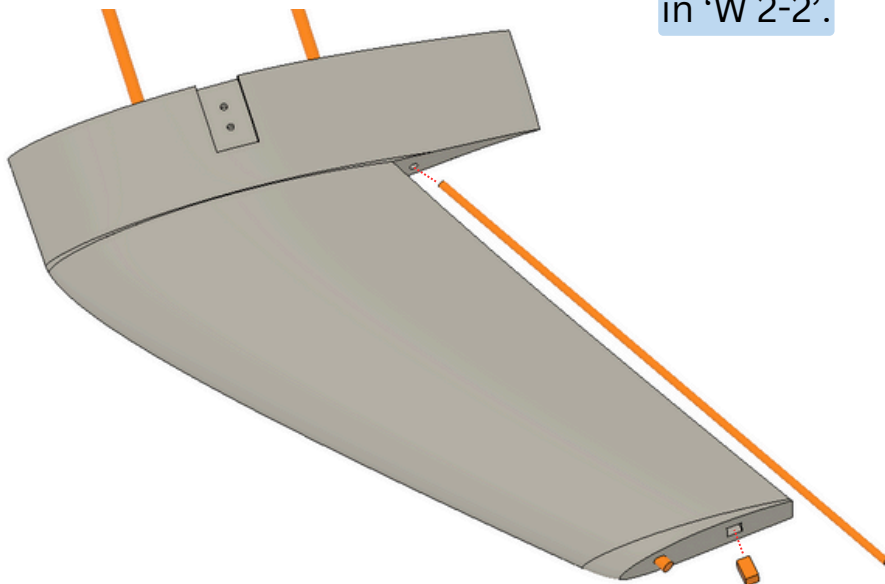
Slide 'Spar 1' and 'Spar 2' in 'W2-1' for alignment. Again, do **NOT** use glue on them.

Glue W2-1 and W2-2 together.

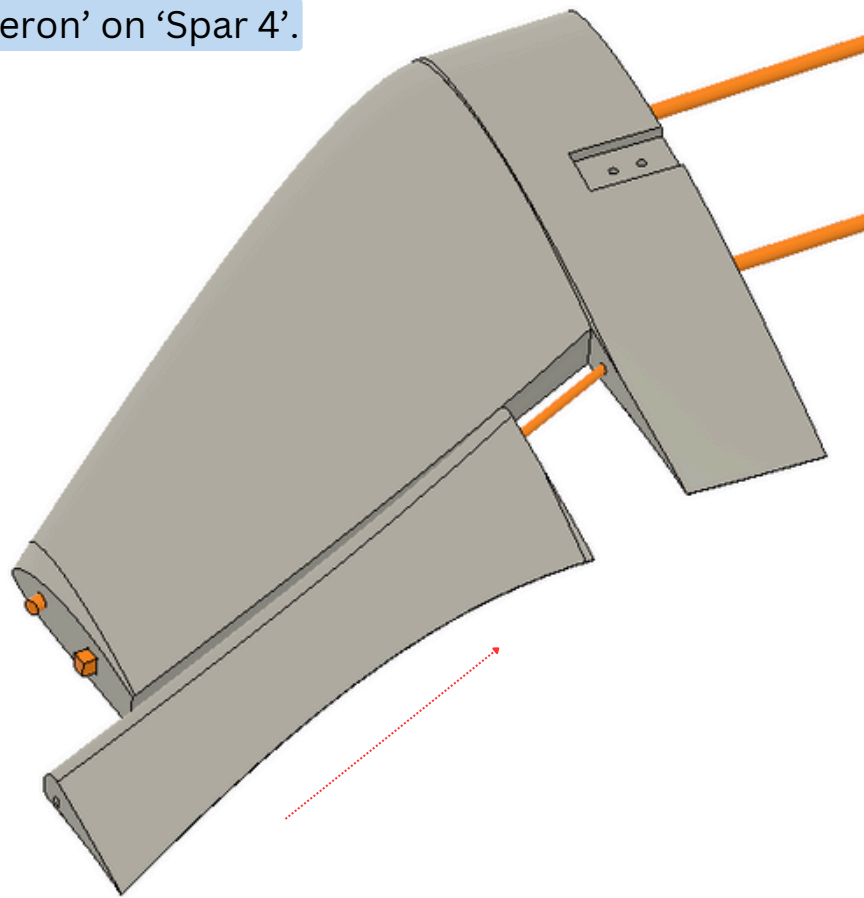


Slide 'Spar 3' in 'W2-1'.

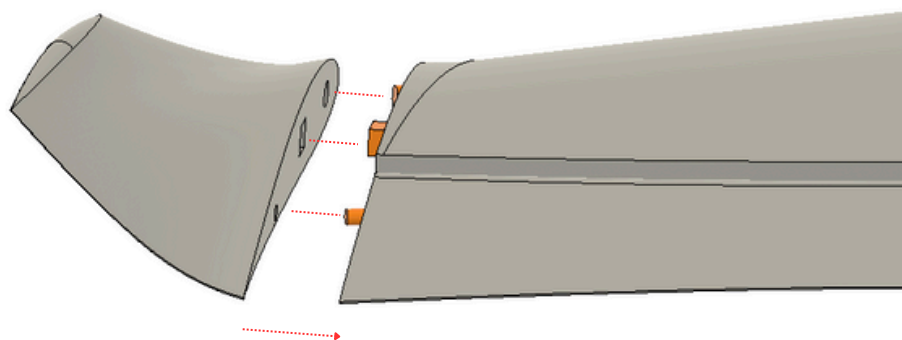
Then glue 'W3 Connector Pin' in 'W 2-2'.



Slide 'Aileron' on 'Spar 4'.

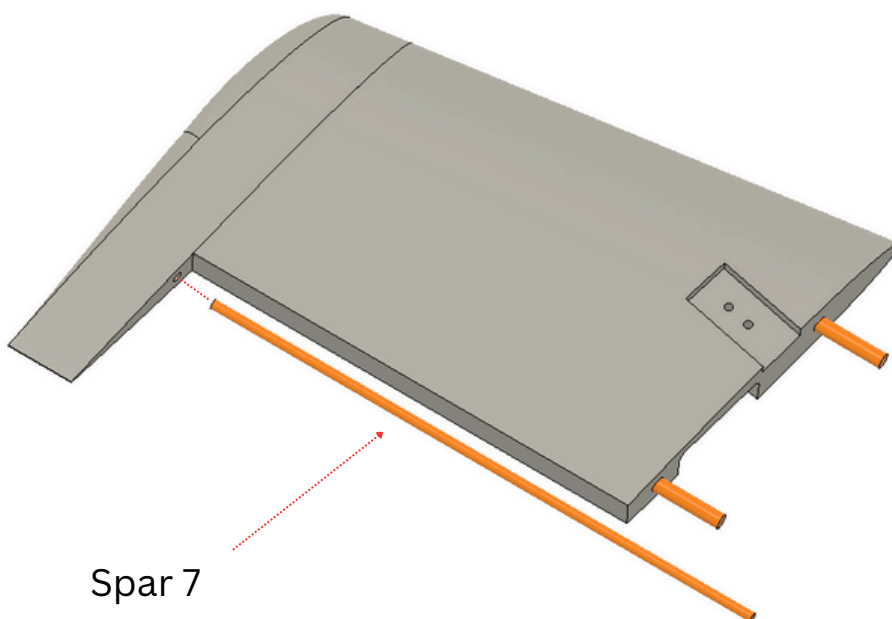
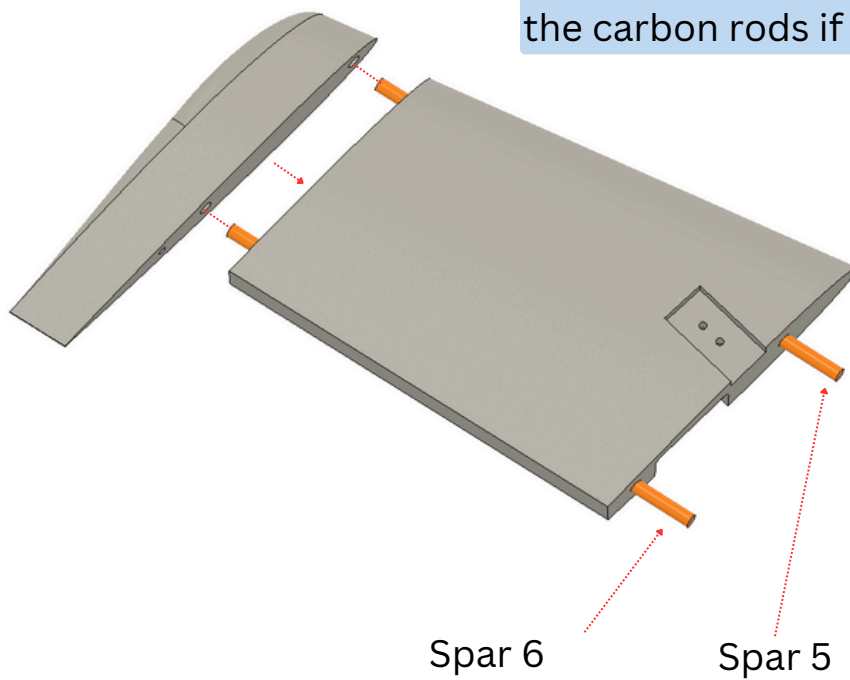


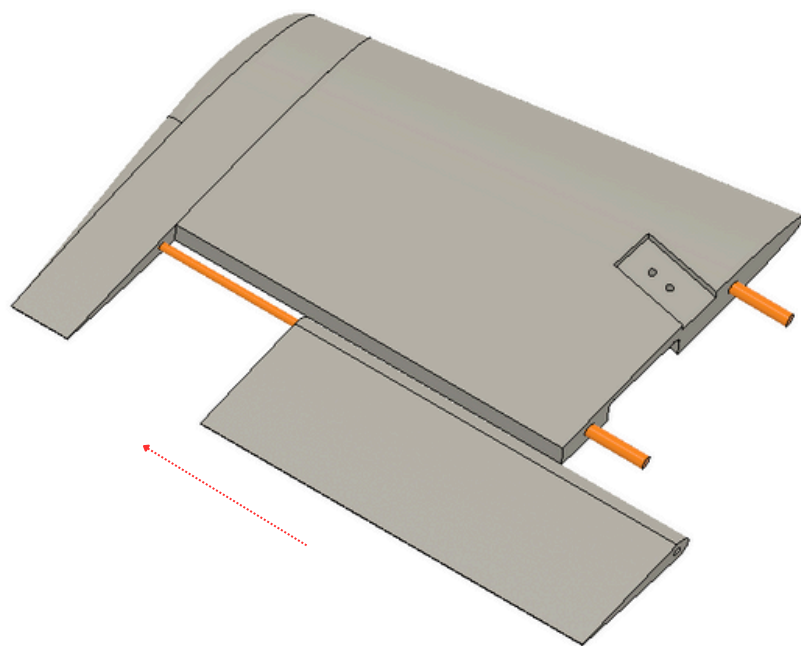
Glue 'W3' with 'W 2-2' together.



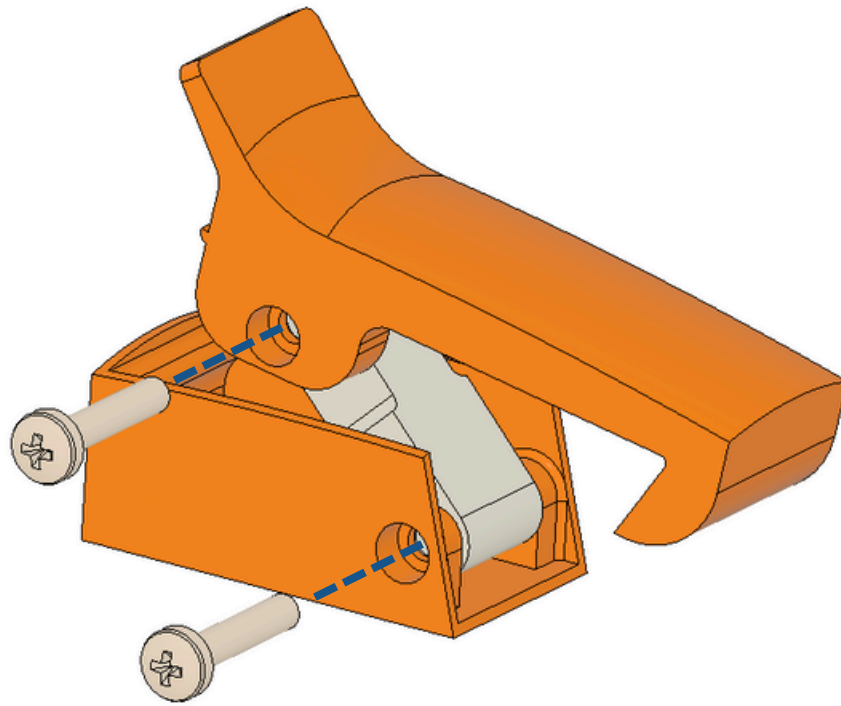
V-Tail Modules

Assemble the V-Tail similar to the wing. Here, you can glue the carbon rods if you want.





Latches



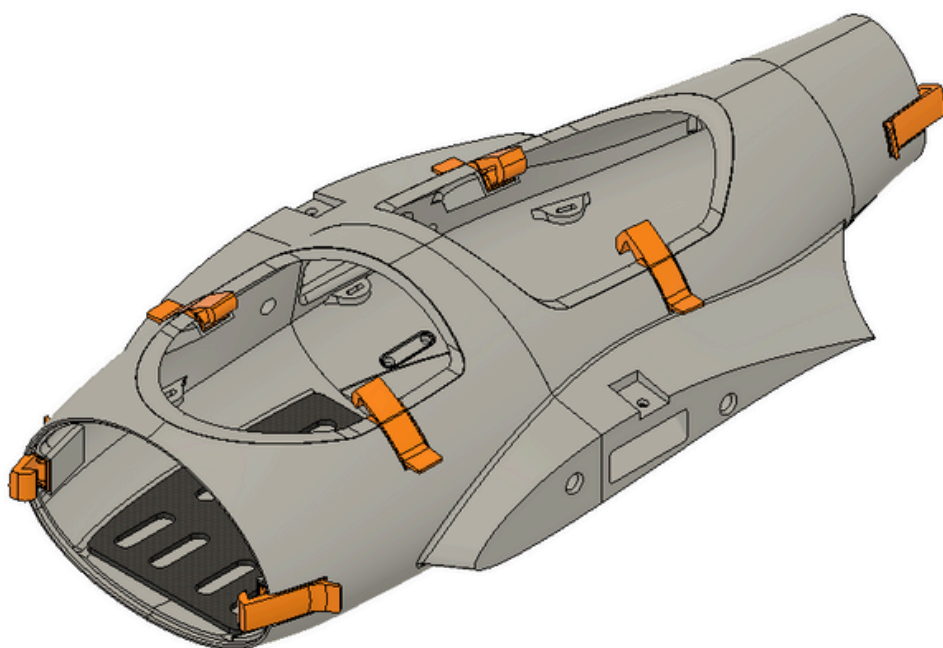
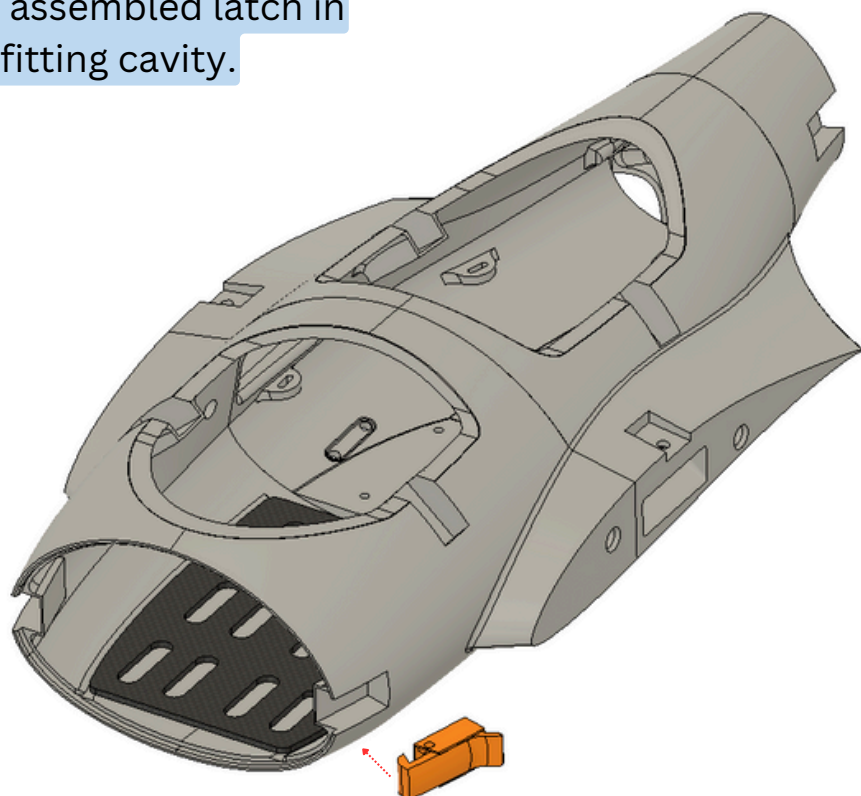
Insert the 'M2.5x12/14' screws in to the fitting holes and drop a small amount of glue on the feet side of the screws, so they do not fall out.

If there are no matching screws or the head of the screw does not fit into the hole, then you can also use PETG filament pieces.

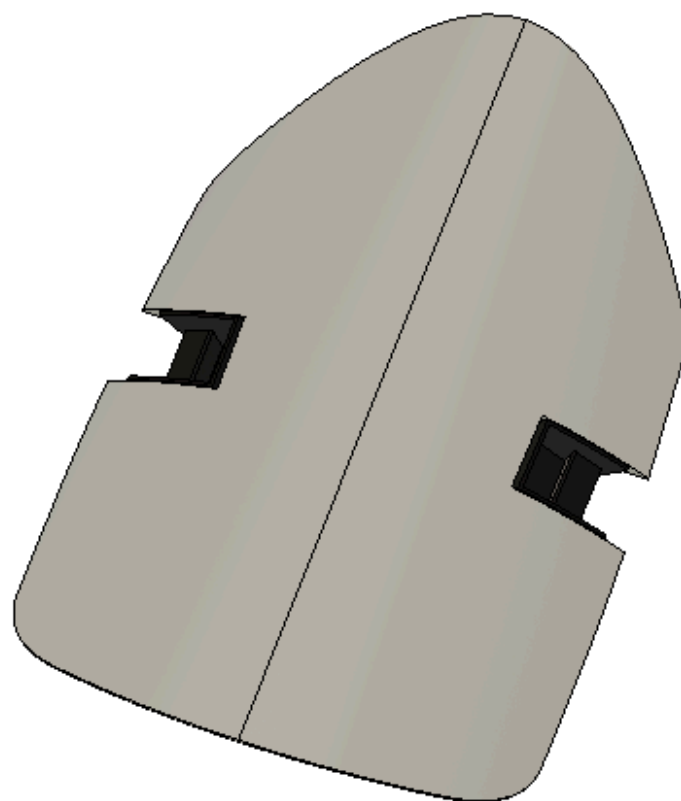
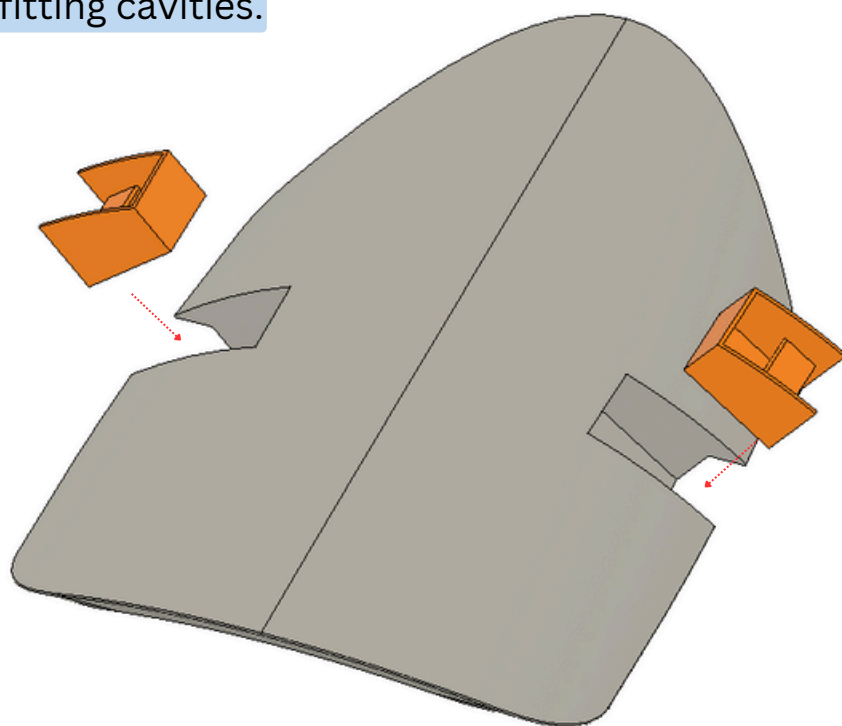
Take care, that the screw heads are sinked fully in the hole.

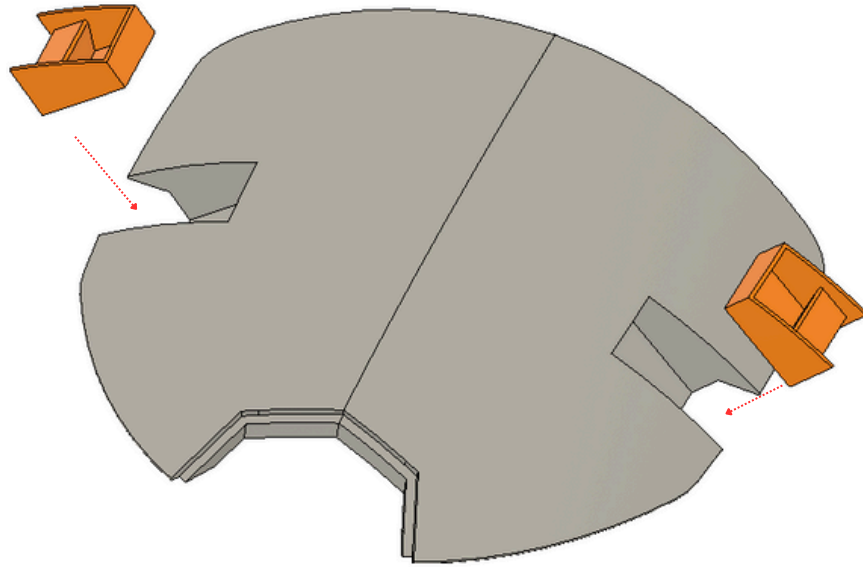
Attention, all latch parts should be movable.

Glue each assembled latch in the fitting cavity.

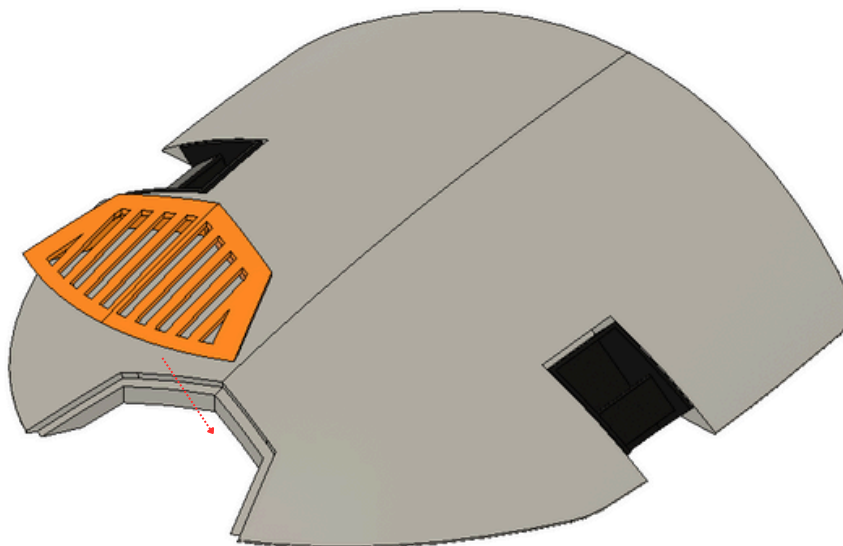


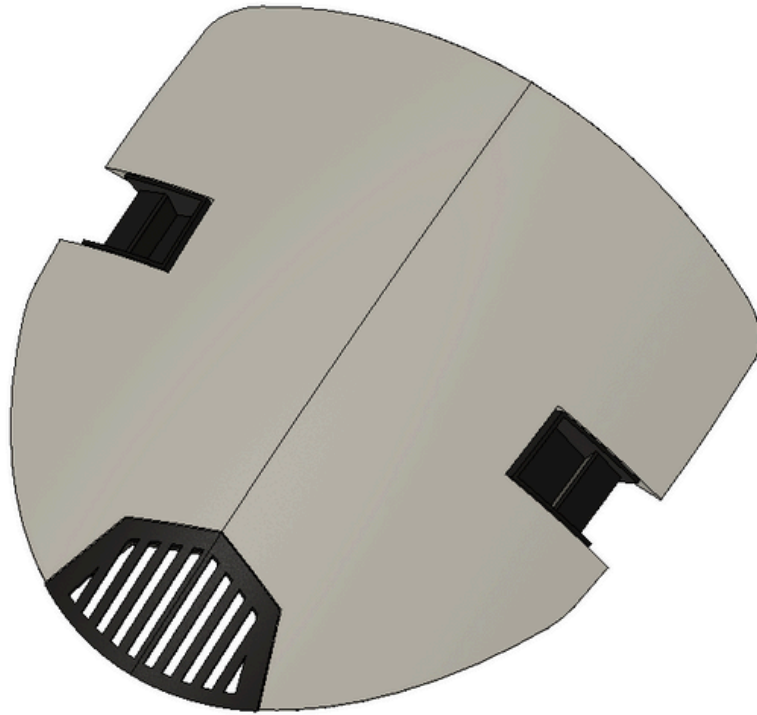
Glue the latch housings in the fitting cavities.

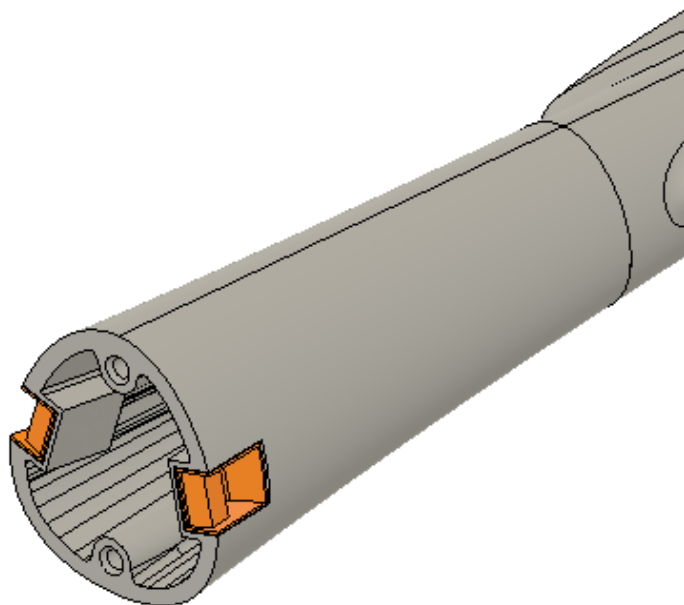
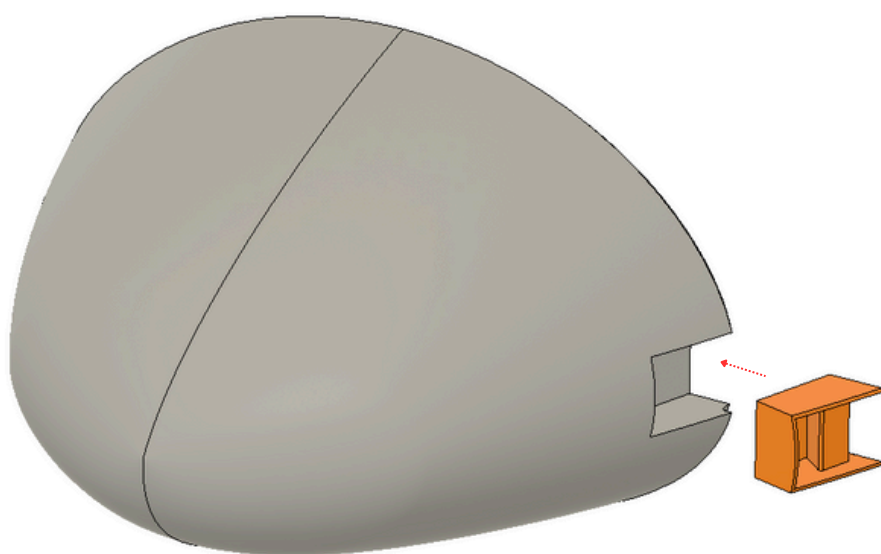




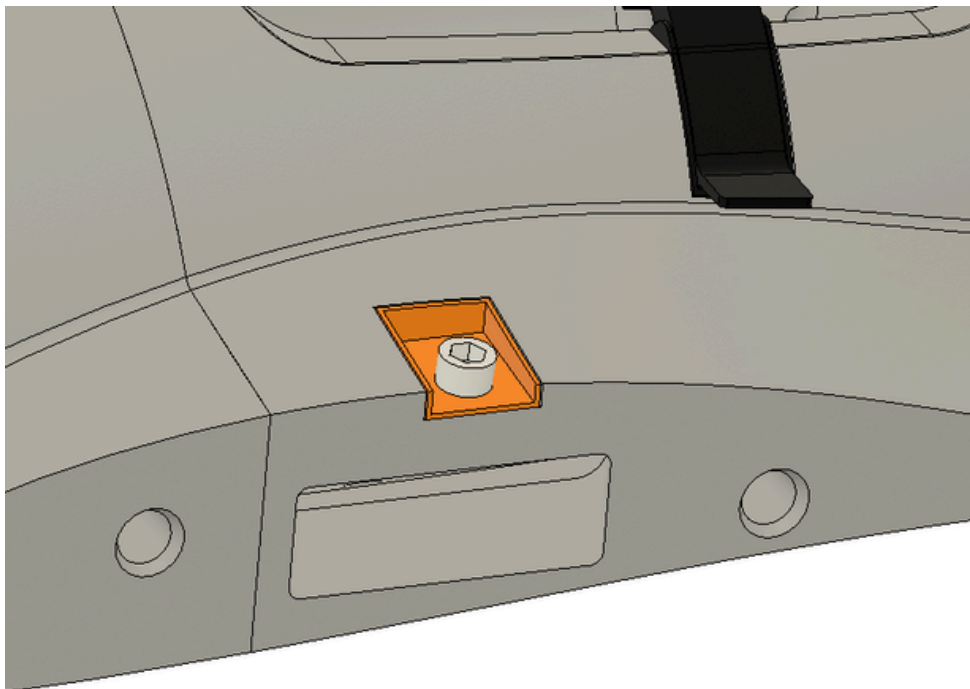
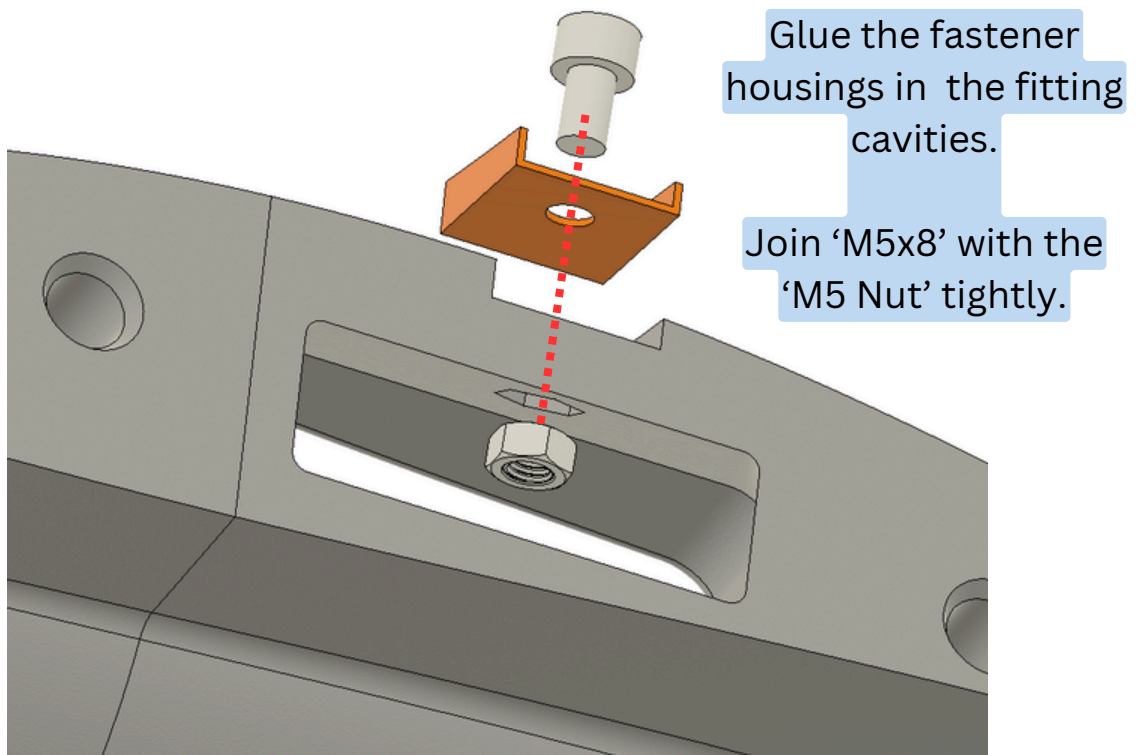
Put carefully glue on the slot on
'FUS2 CAP' and press 'FUS2 CAP
Inlet' gently, because it is very
fragile.





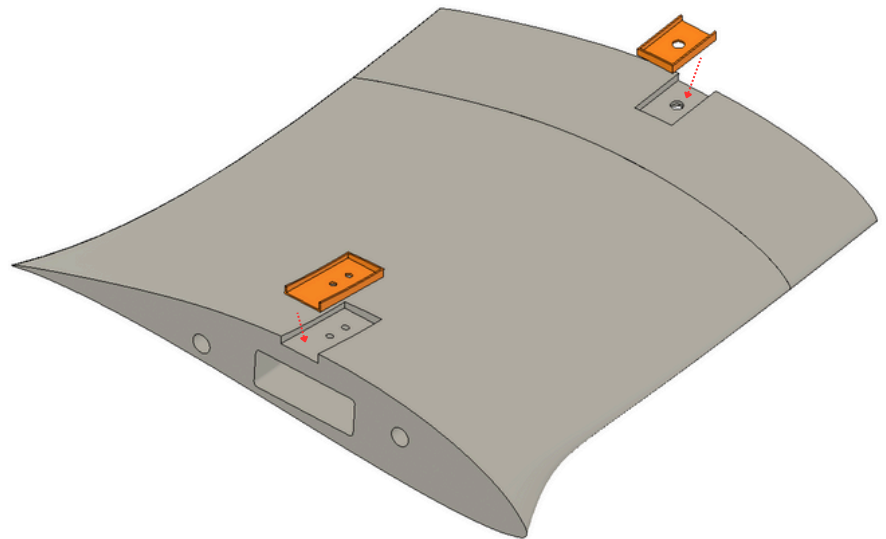


Wing and Tail Fasteners



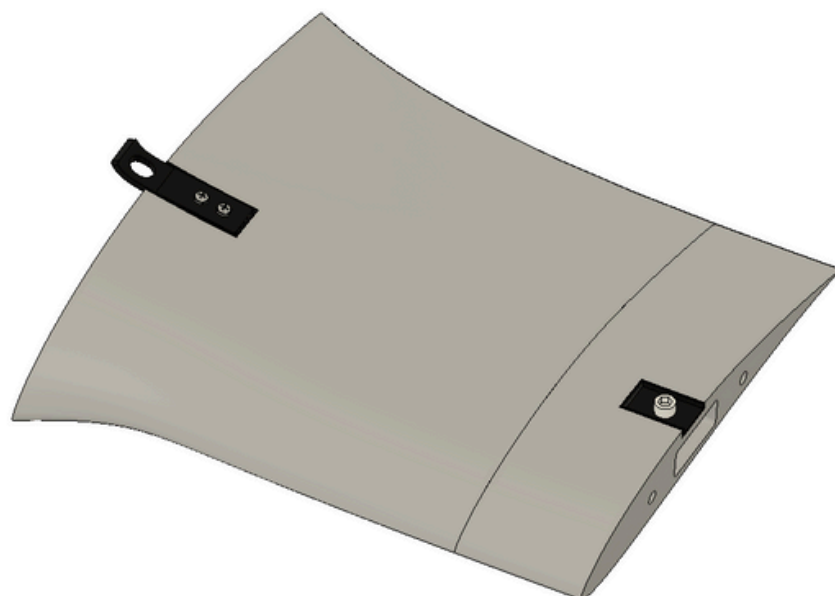
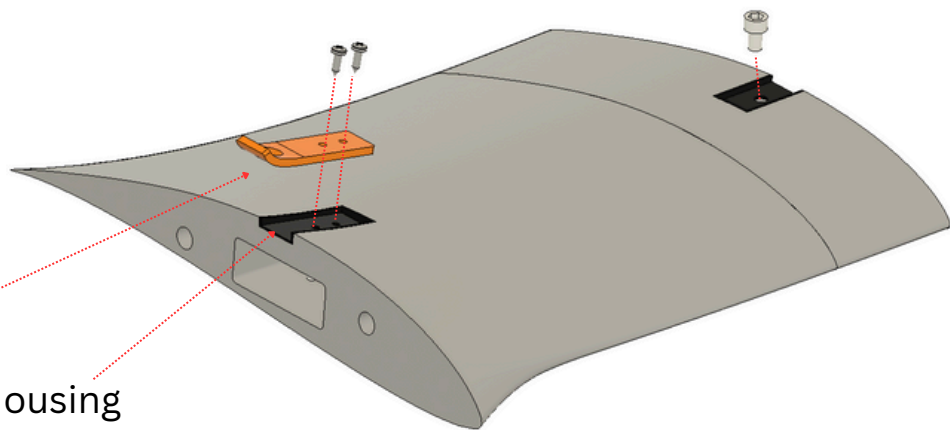
Glue the fastener housings in the fitting cavities.

Do **NOT** glue the snap fits on the fastener housings. Instead use '2.9mm x 9.5mm metal screws' to easy assemble/disassemble in case of any damage.

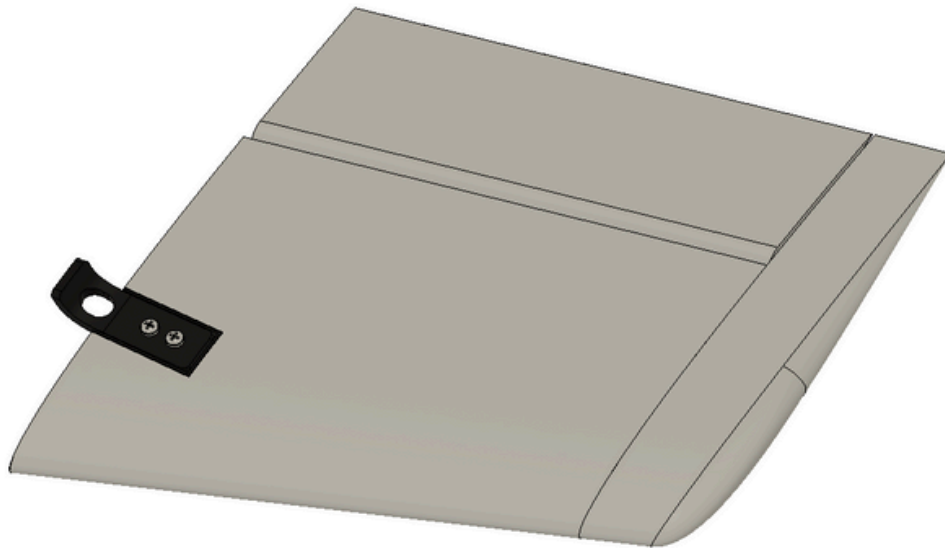
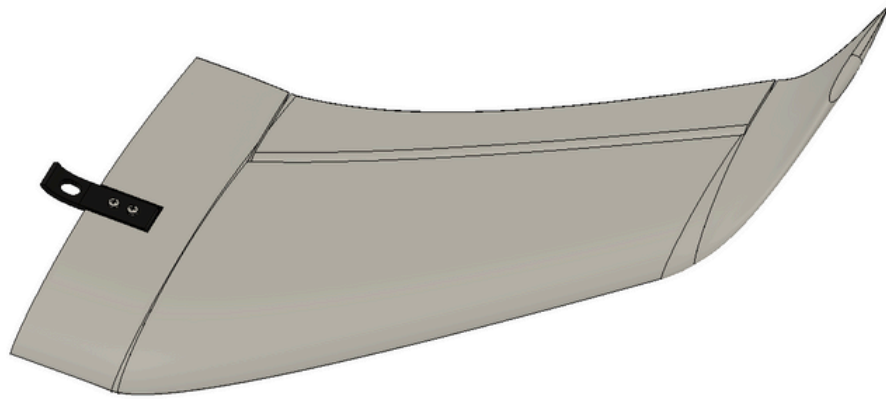


Snap Fit

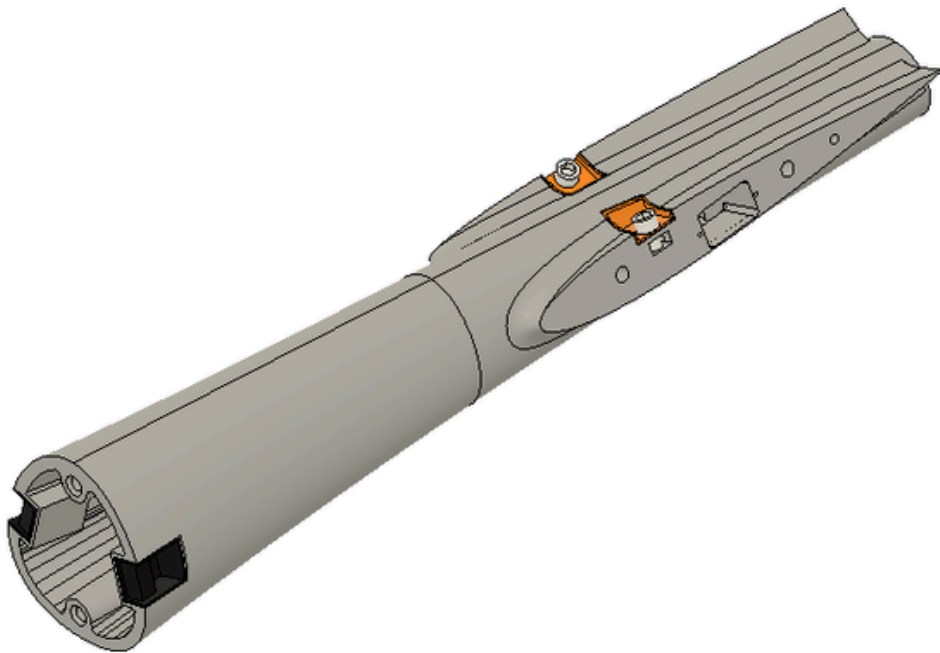
Fastener Housing



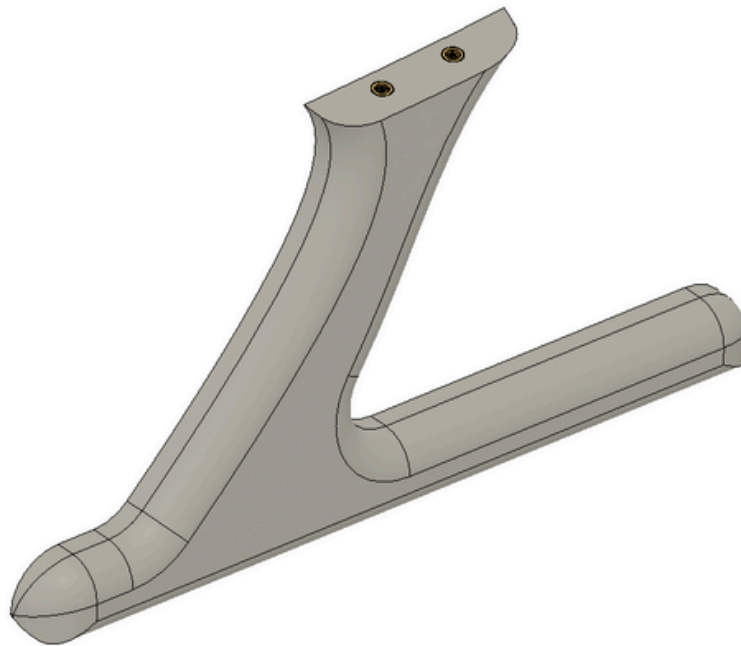
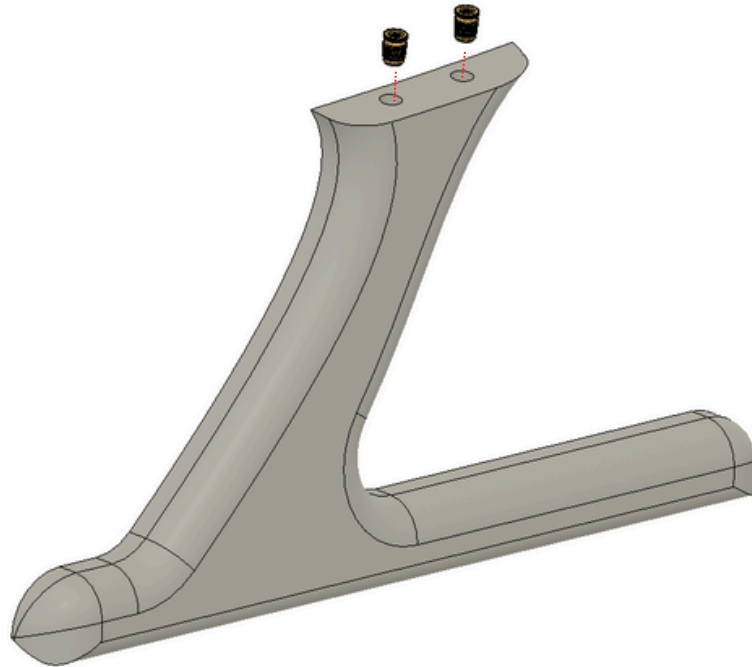
Repeat the same on 'W2' and 'VTail'.



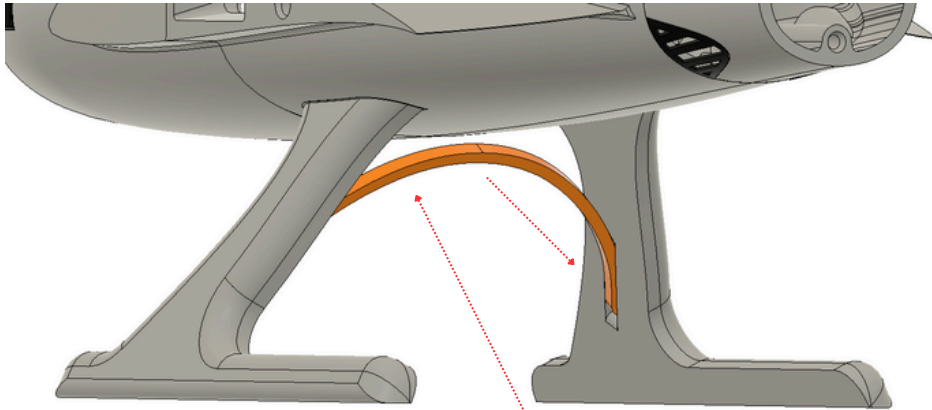
Assemble the fastener
parts on 'FUS5' similar to
the wings.



Landing Gear-A Assembly

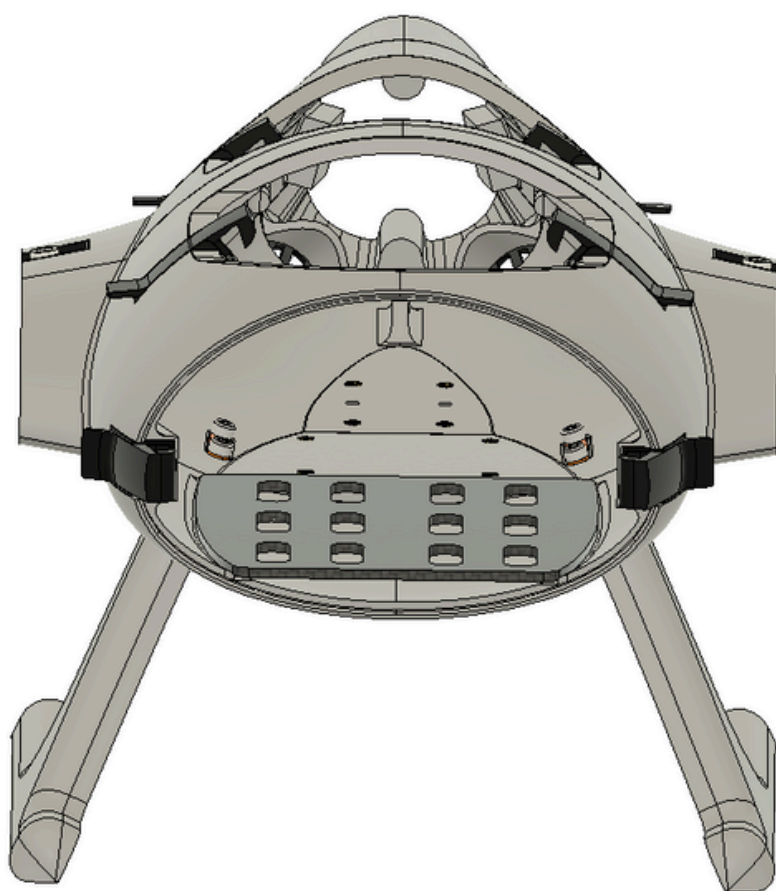




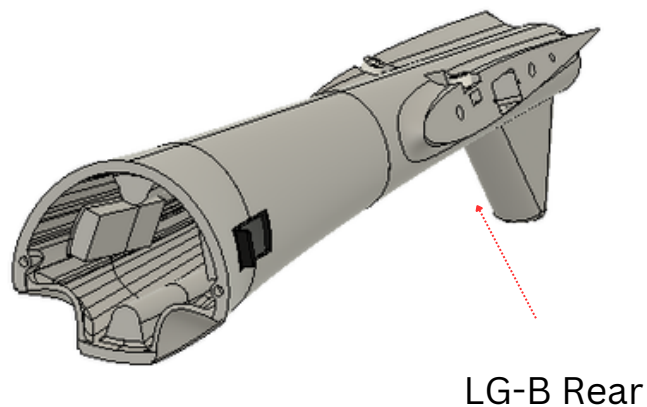
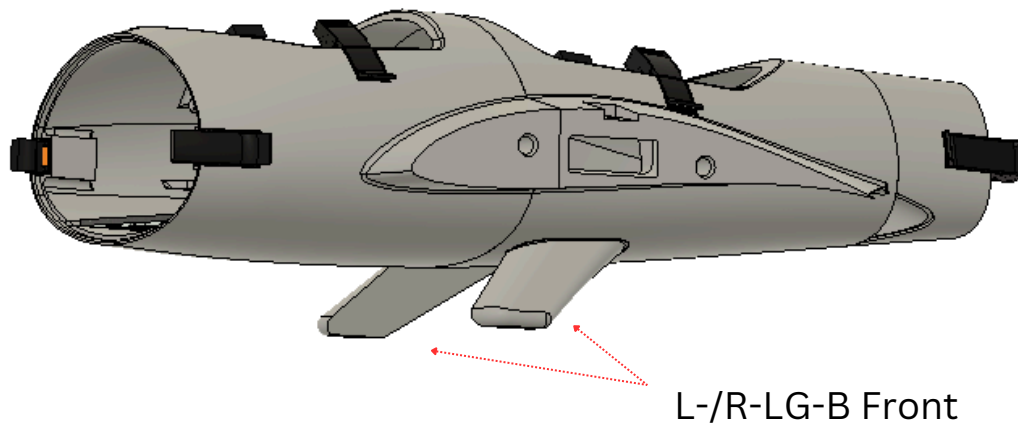


LG-A Reinforcer



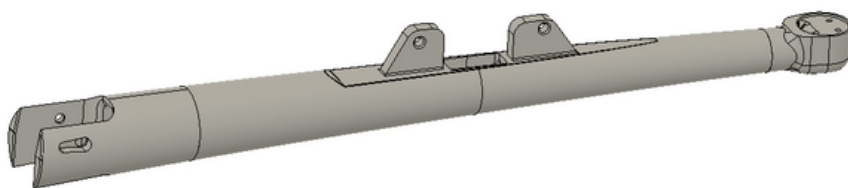
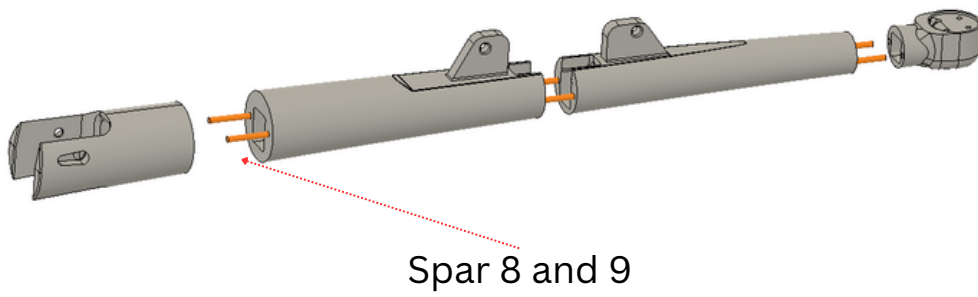


Landing Gear-B Assembly

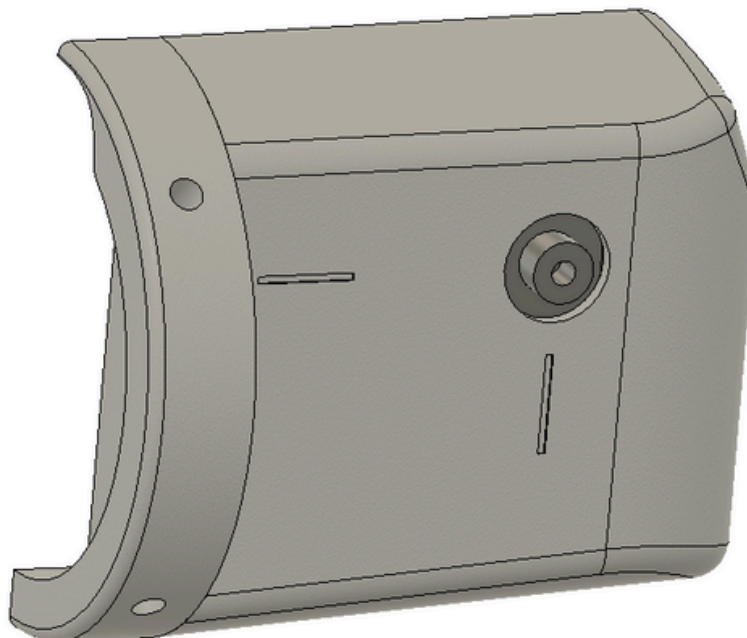
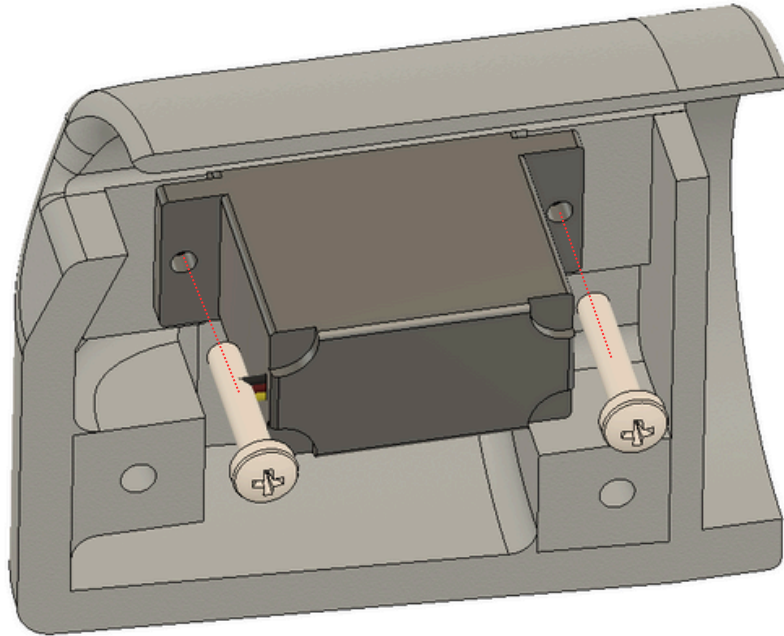


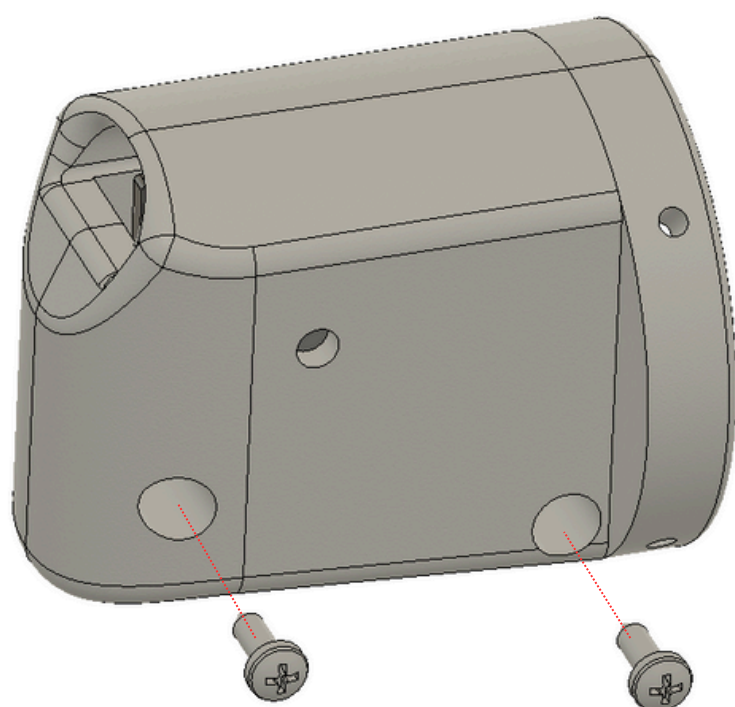
The assembly of LG-B is similar to LG-A. Use threaded inserts for the 'L-/R-LG-B Front' parts. Glue 'LG-B Rear' to the tail module. Try to center it underneath.

VTOL Arm Modules

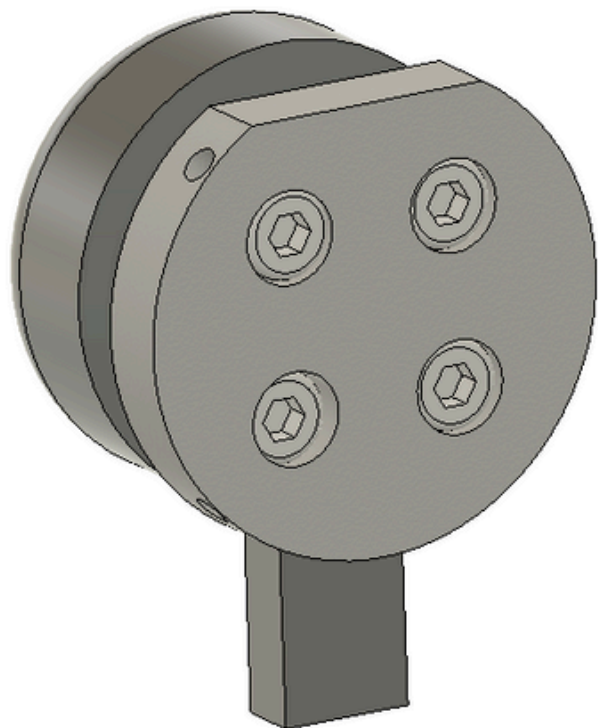
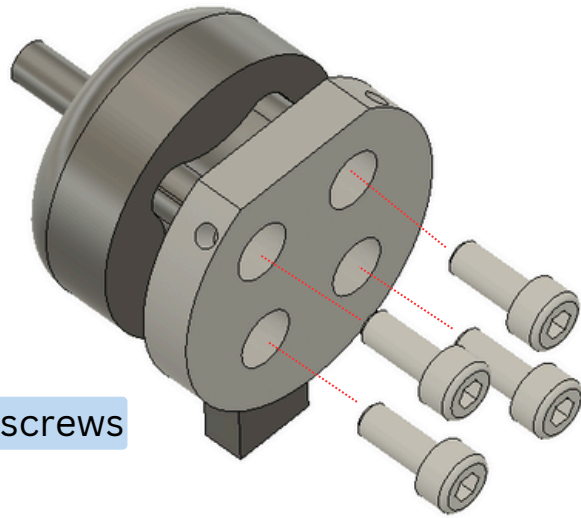


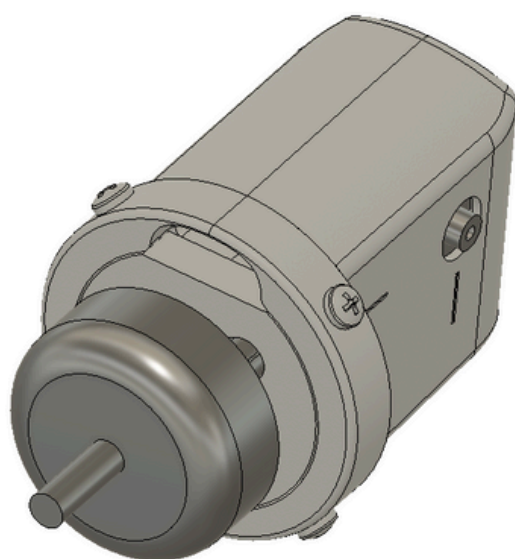
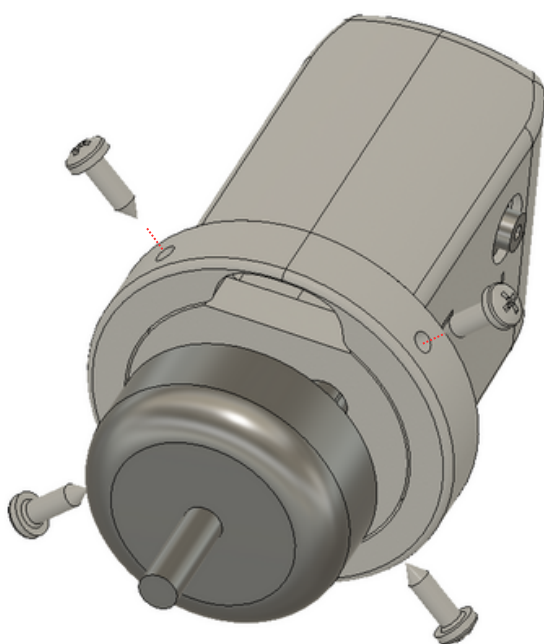
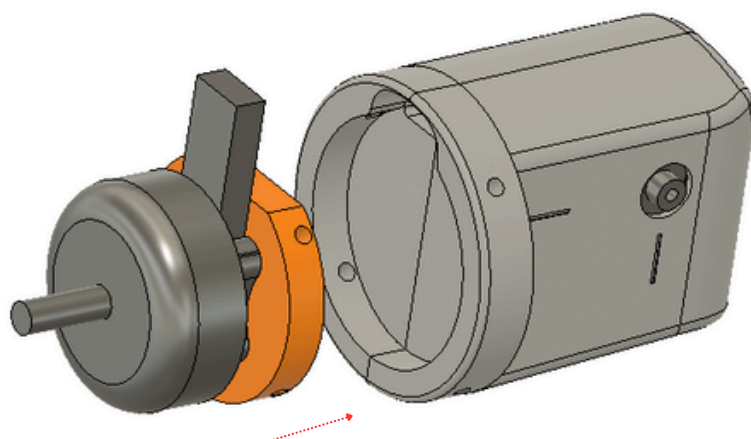
Tilt Mechanism & Propulsion

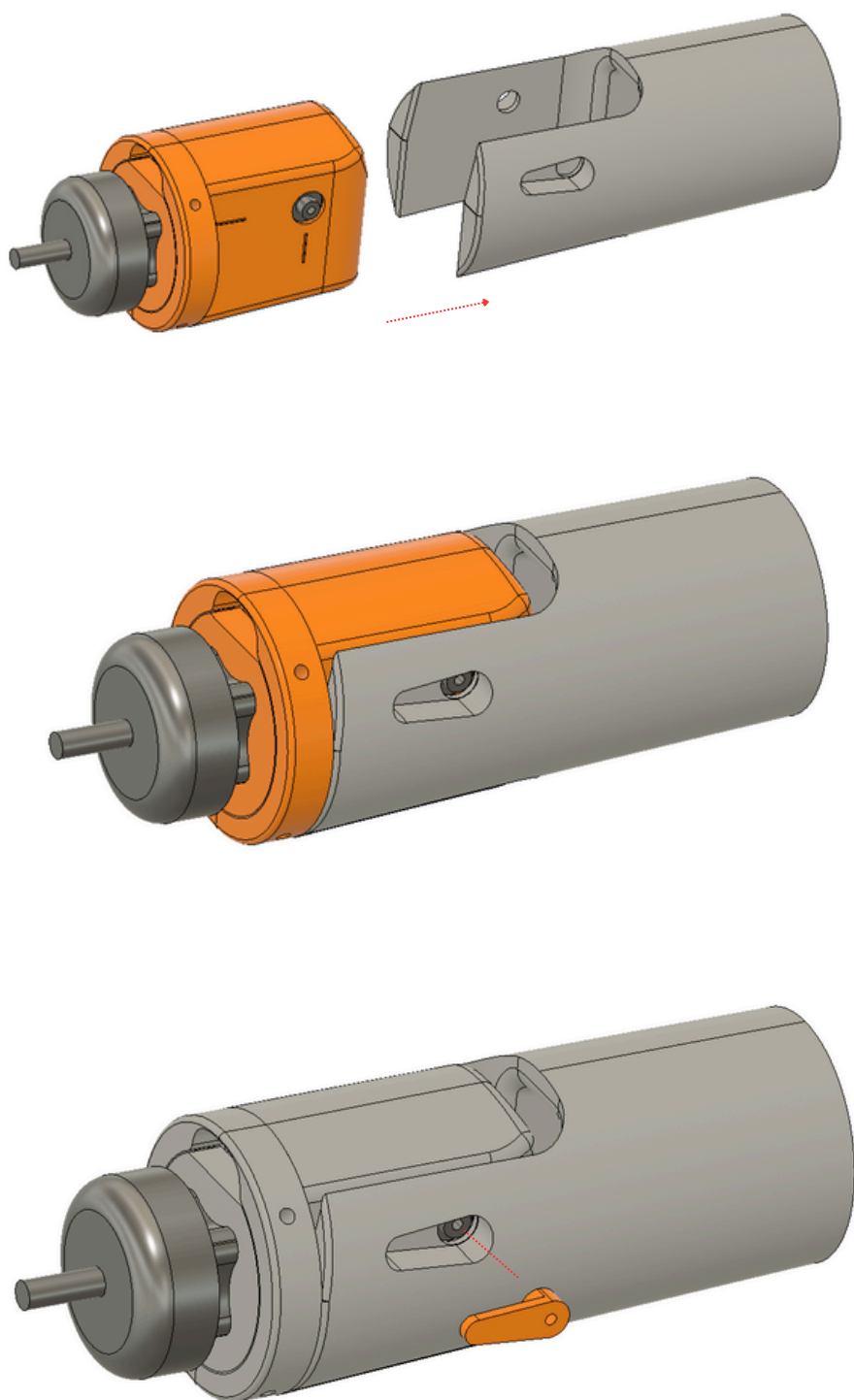


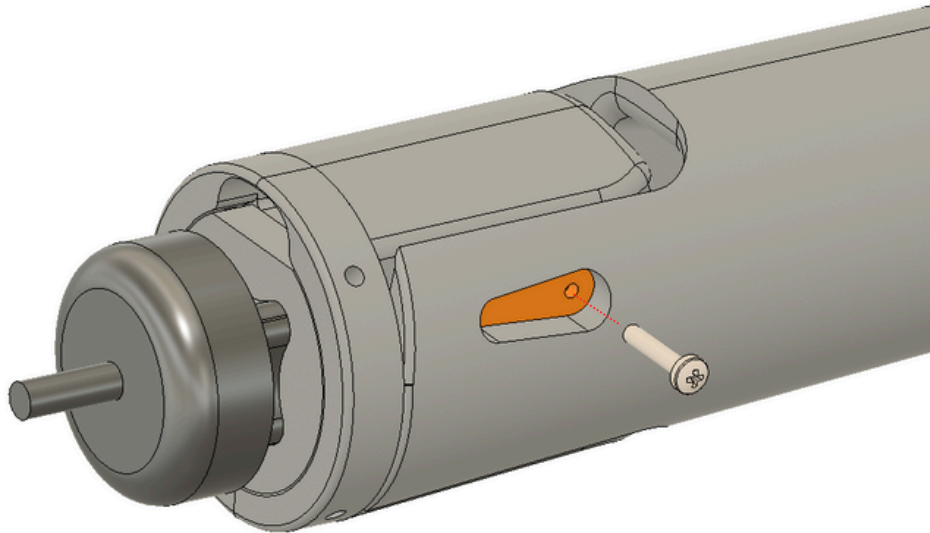


Use short M3x4 screws

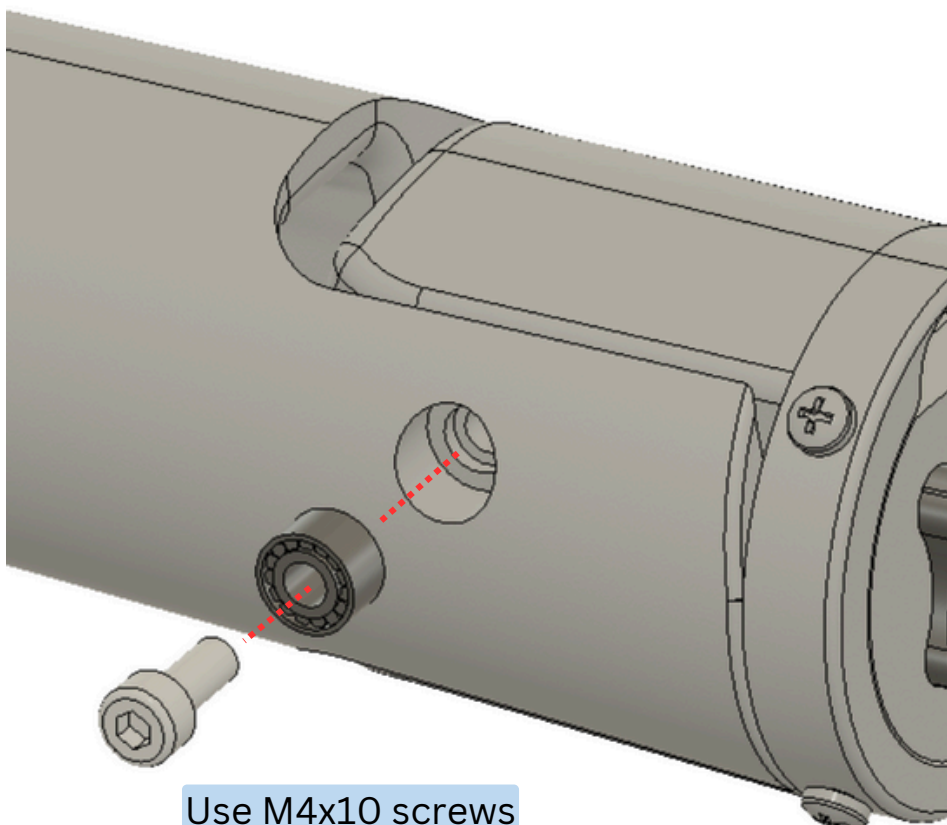




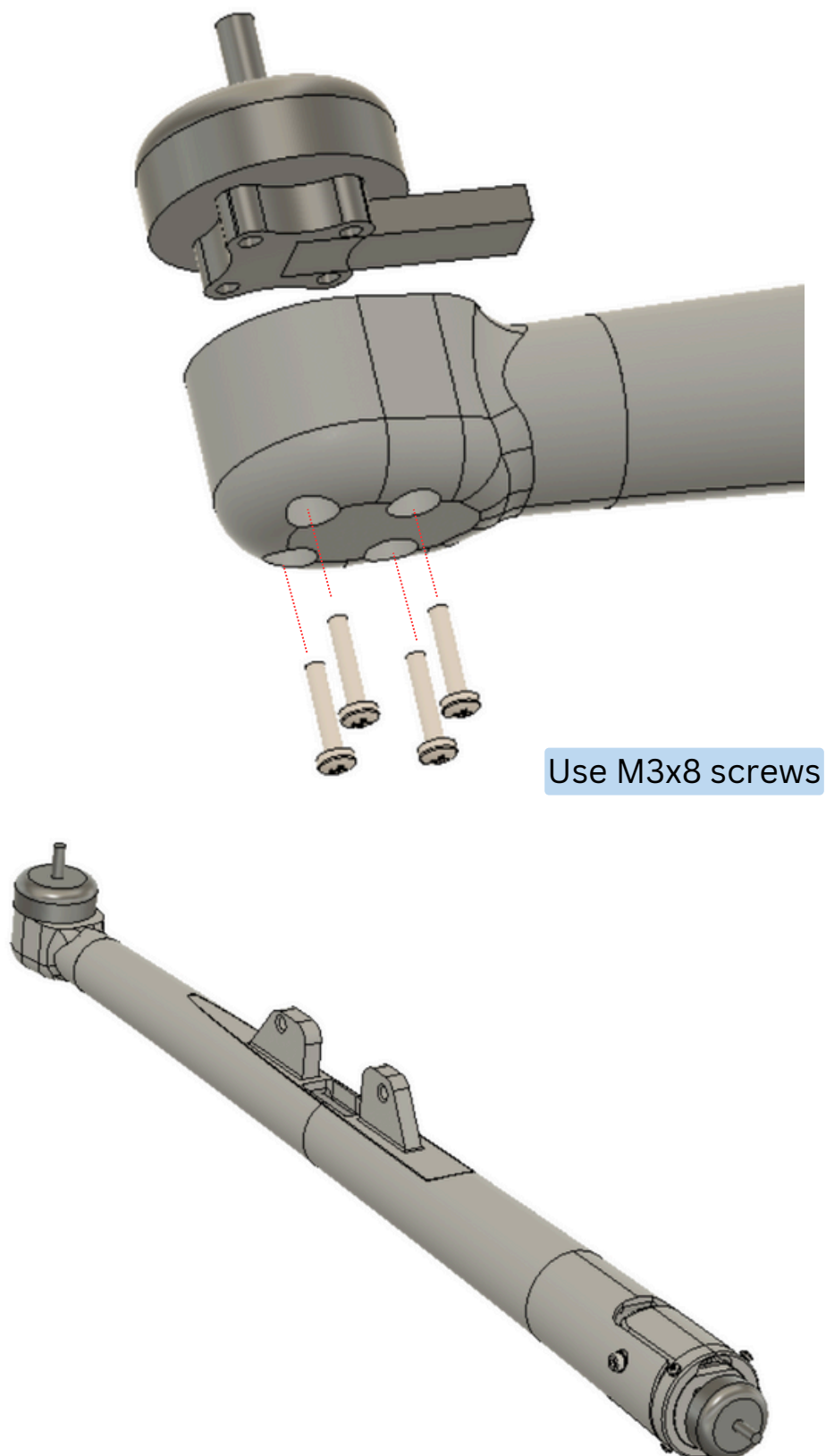




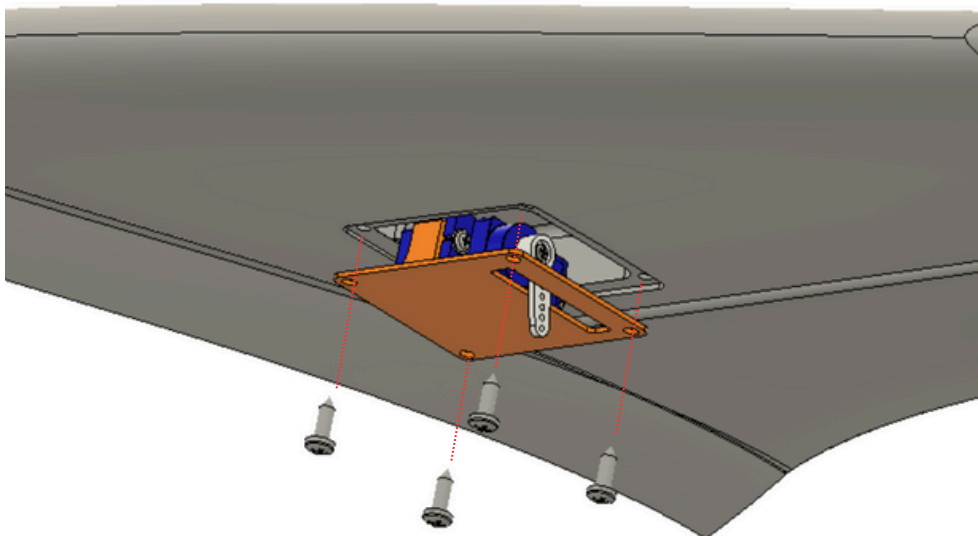
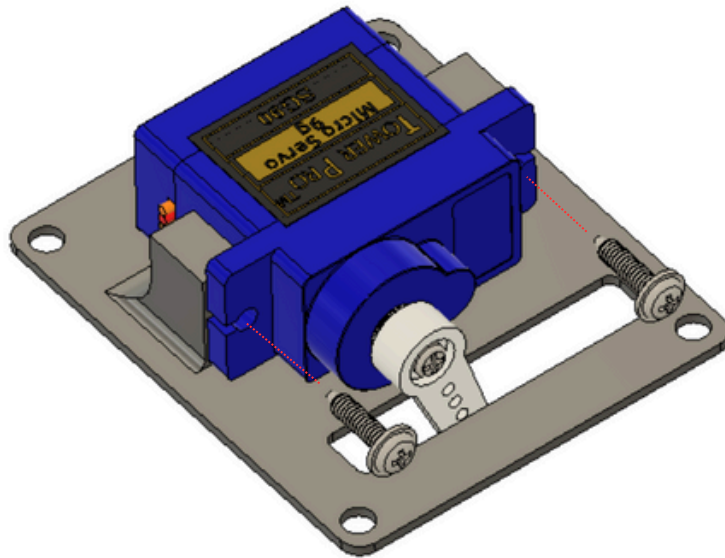
Use M2x4 screws

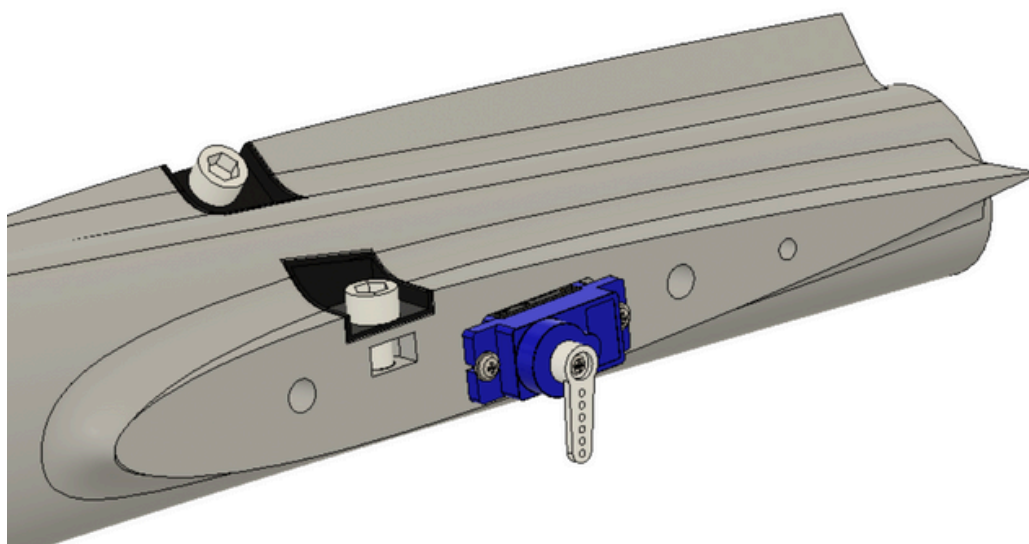
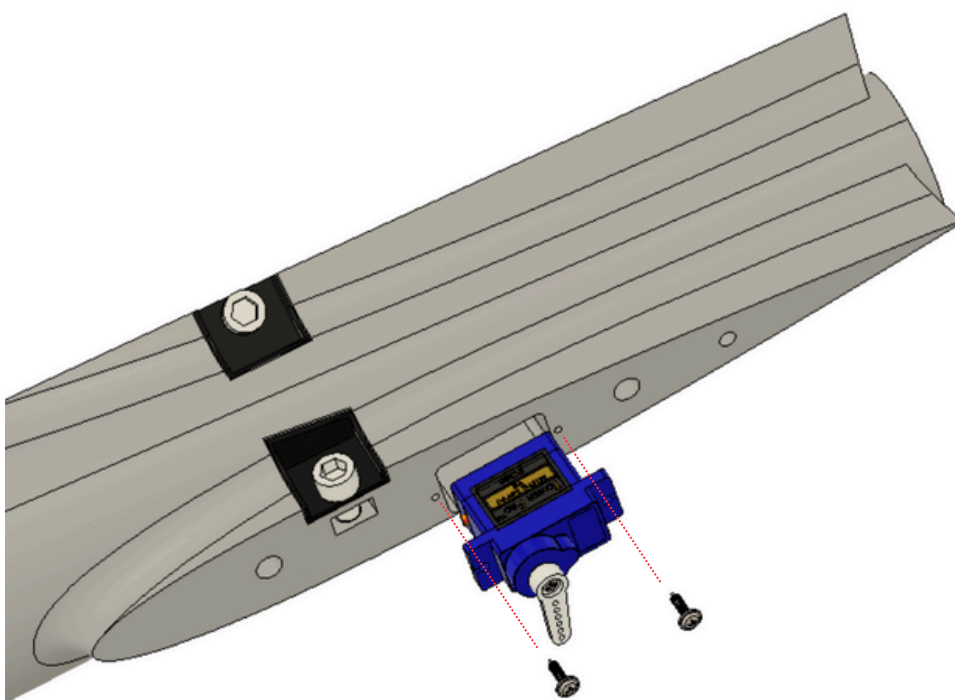


Use M4x10 screws

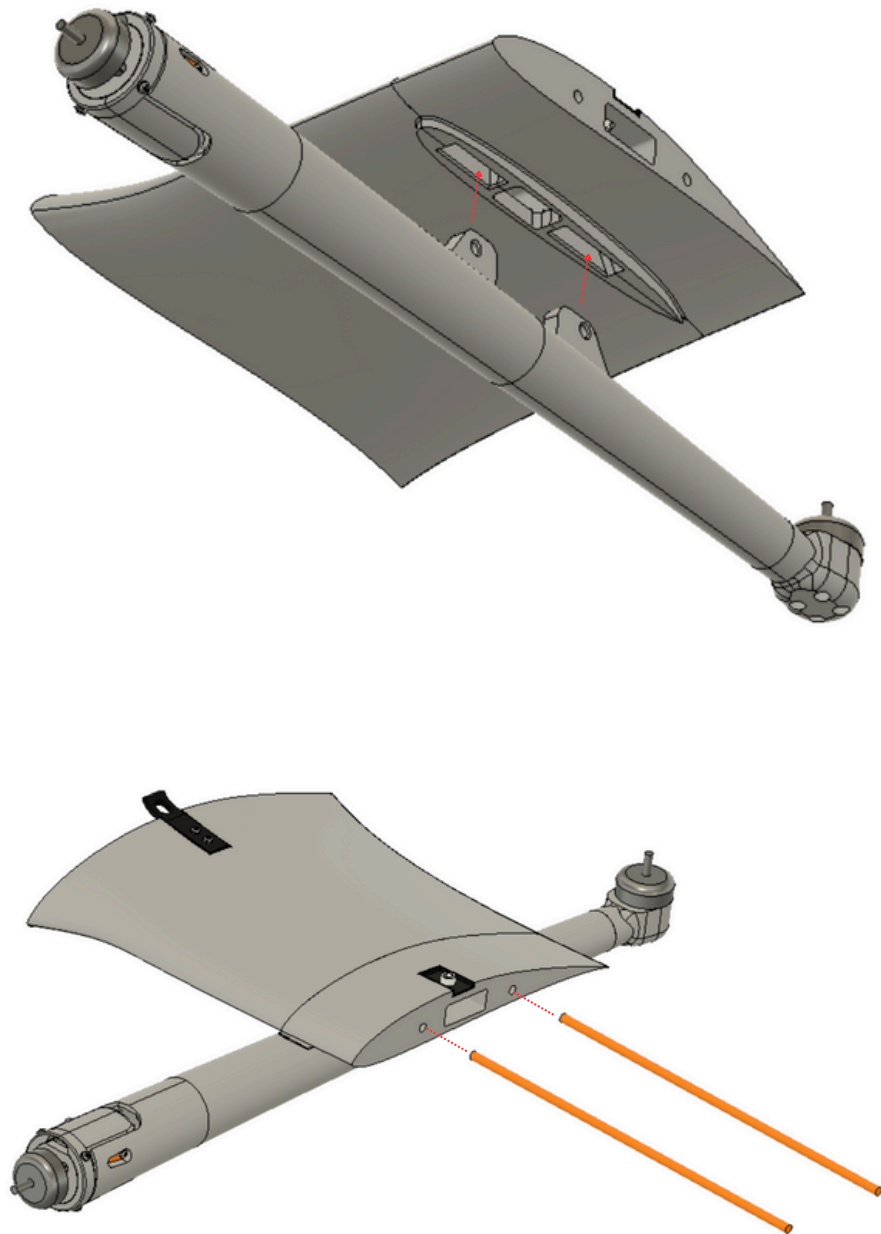


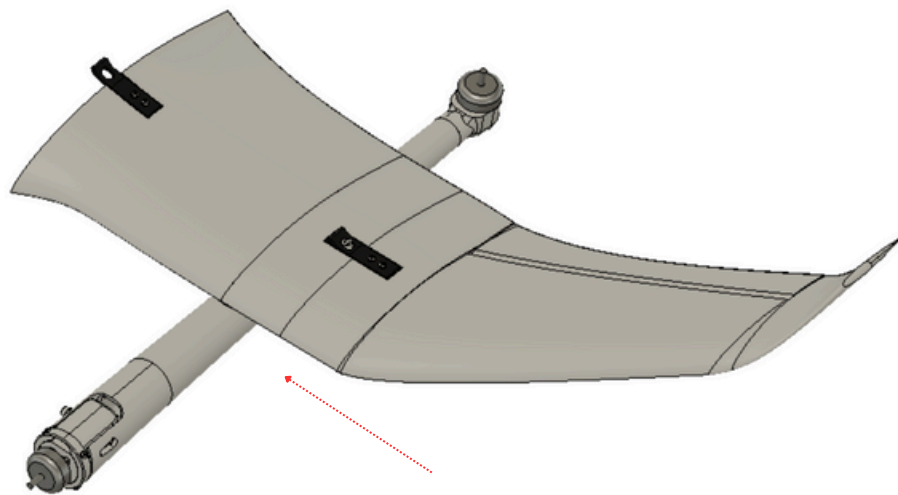
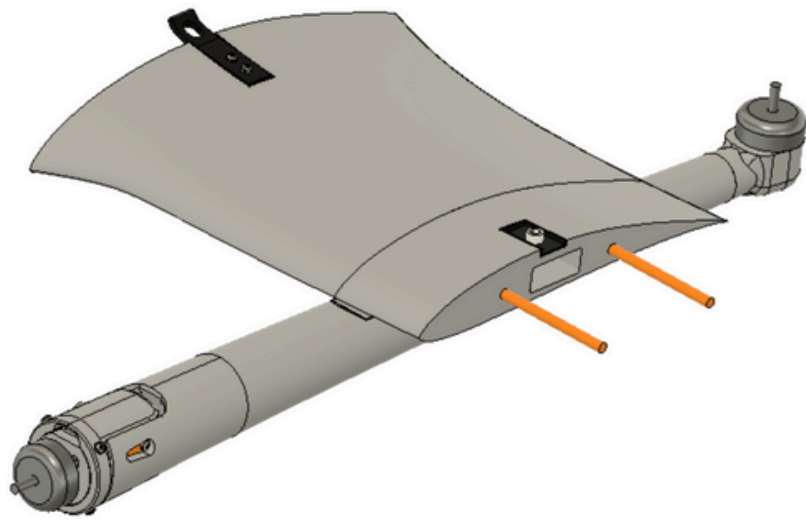
Servo Integration

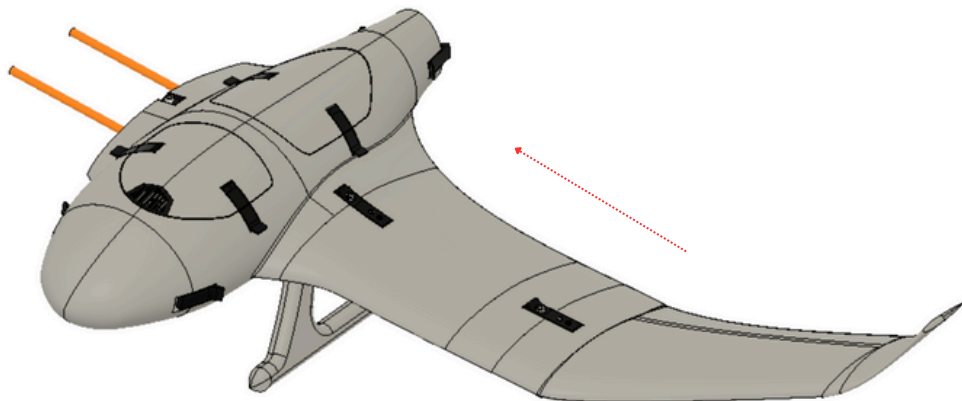
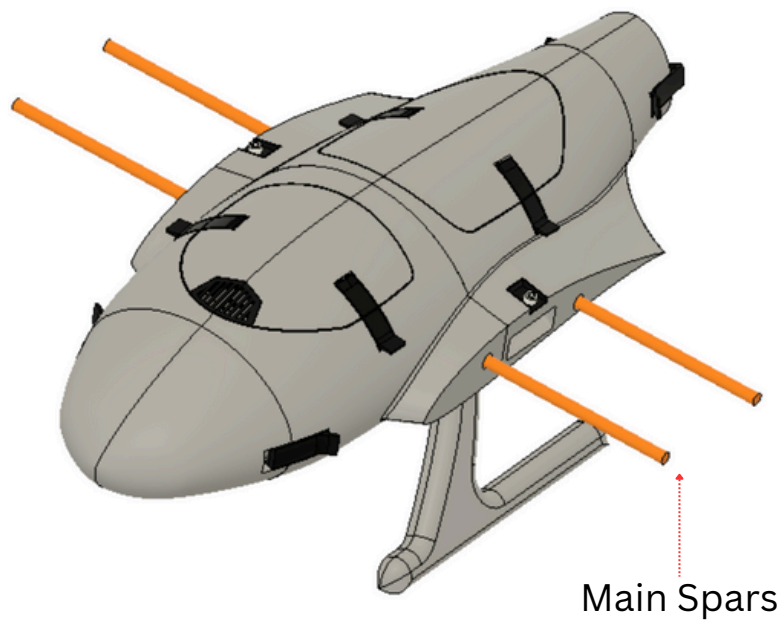


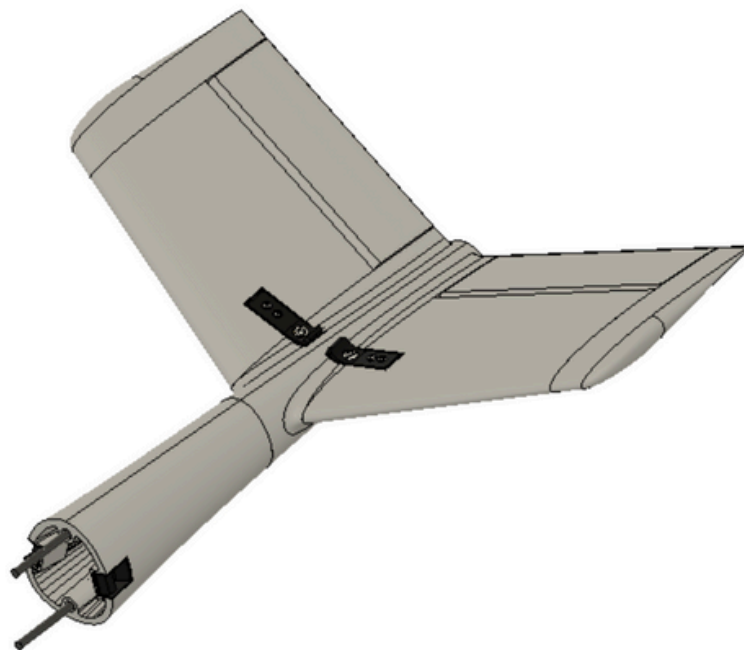
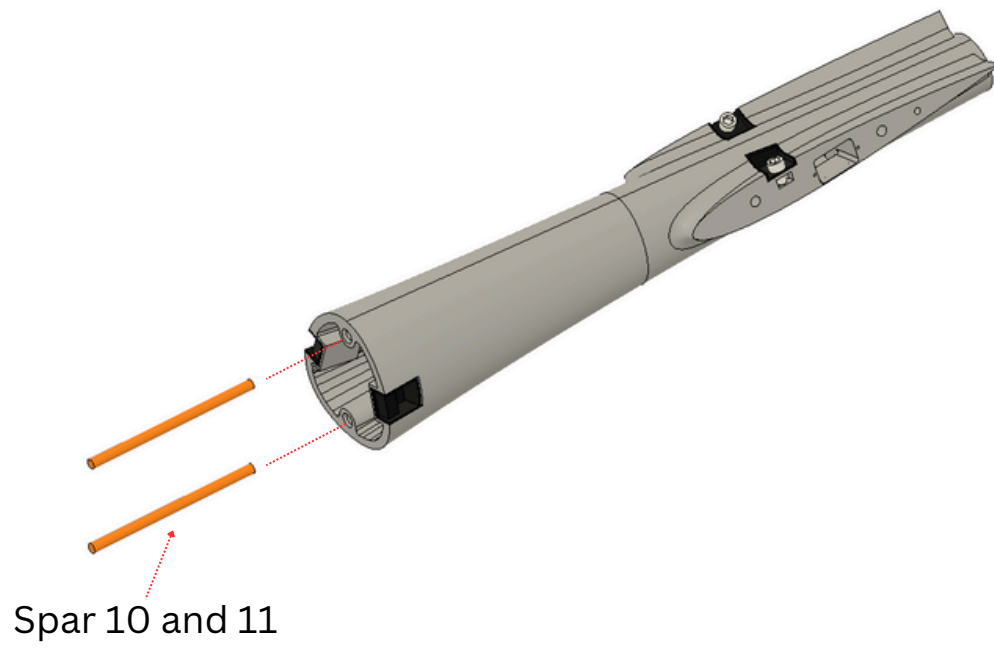


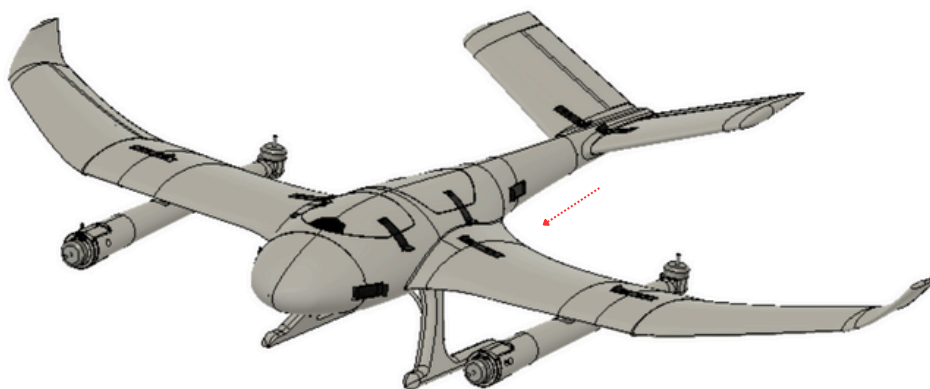
UAV Assembly







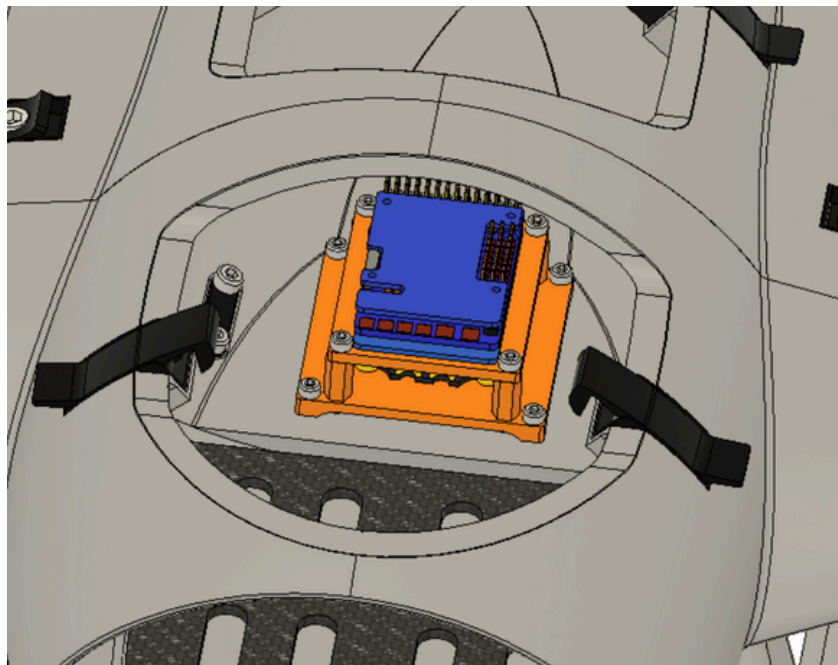
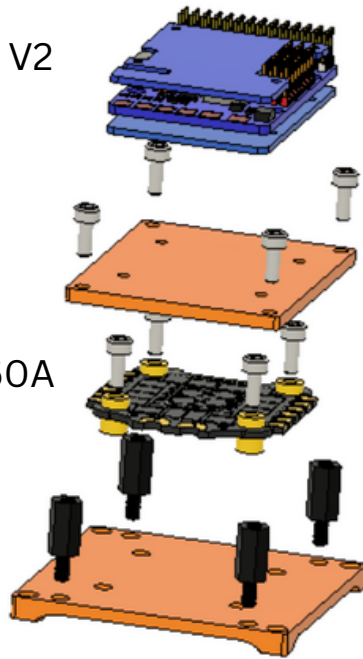




Avionics Integration

Matek F405 Wing V2

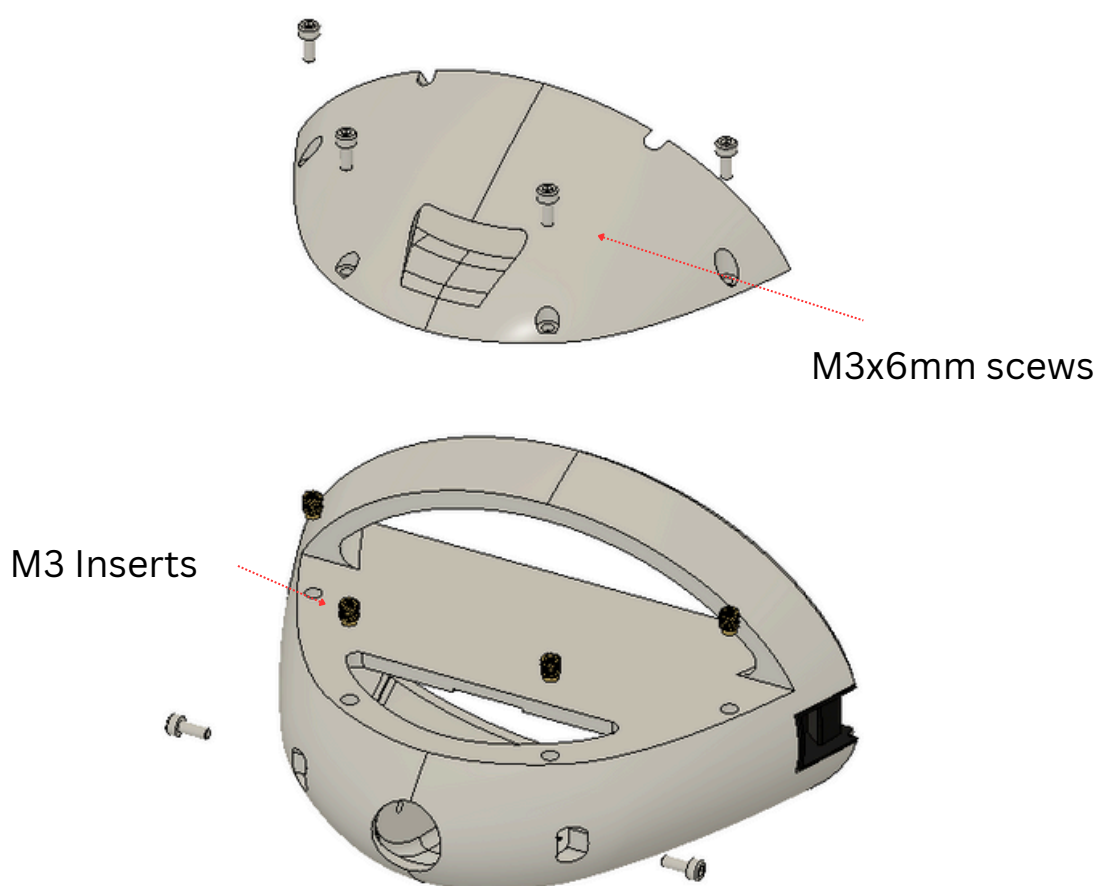
SpeedyBee BLS 60A



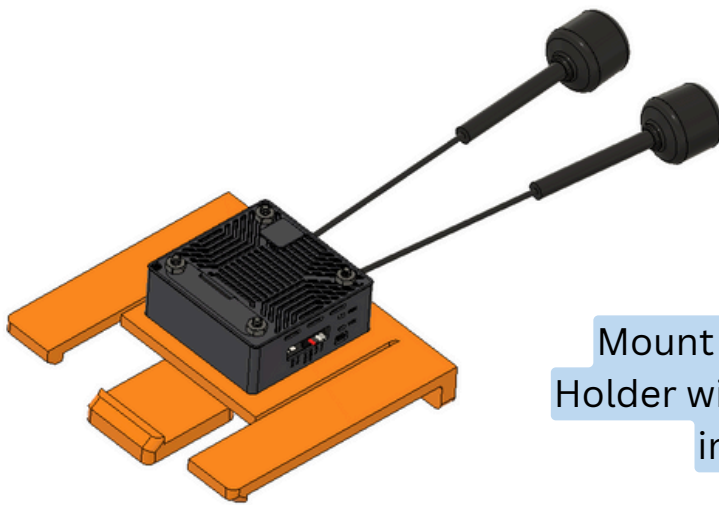
FUS1 Standard Version

There is a standard version of the FUS1 module for different FPV Systems. In the folders you will find ready to use parts for the WALKSNAIL MOONLIGHT and the AVATAR V2/HD MINI systems.

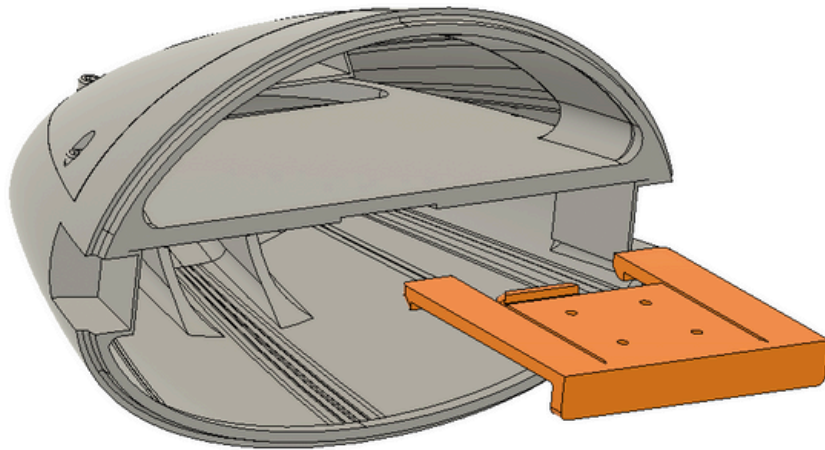
Anyway we will provide the STEP files for custom designs.



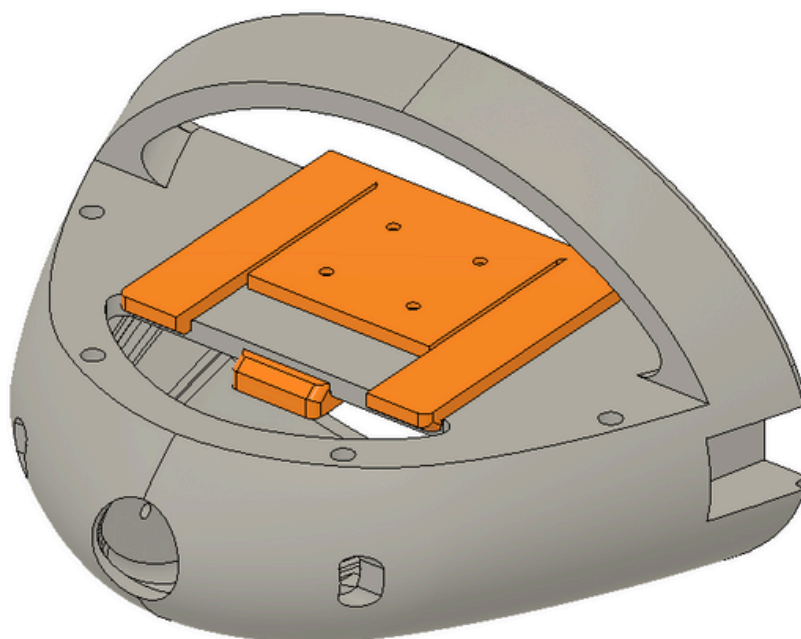
Use M3 threaded inserts to assemble the CAP on FUS1.
Fitting screws are M3x6mm.



Mount the VTX on the VTX Holder with the original screws in the package.



Slide the VTX Holder on FUS1. Pay attention to the slot guide on the underside.



Check if the VTX holder sits tightly on FUS1.



There are a 1 antenna version and a 2 antenna version of the CAP. Choose one of the two.

Part List

	Part	Quantity	Print Profile	Support
Fuselage	FUS1 Standard	1	A	-
	FUS2	1	A	yes
	FUS3	1	A	yes
	FUS4-1	1	A	-
	FUS4-2	1	A	-
	FUS5	1	A	yes
	FUS Connector Pin	6	B	-
	FUS2 CAP Inlet	1	B	yes
	FUS4 Outlet	1	B	-
	FUS1 Standard VTX Holder	1	C	-
	FUS1 Standard 1 / 2 Antenna CAP	1	A	yes

	Part	Quantity	Print Profile	Support
Wings	L-W1-1	1	A	yes
	L-W1-2	1	A	yes
	L-W2-1	1	A	-
	L-W2-2	1	A	-
	L-W3	1	A	-
	R-W1-1	1	A	yes
	R-W1-2	1	A	yes
	R-W2-1	1	A	-
	R-W2-2	1	A	-
	R-W3	1	A	-
	L-Aileron	1	A	-
	R-Aileron	1	A	-
	W3 Connector Pin	2	C	-
	L-Aileron Servo CAP	1	C	-
	R-Aileron Servo CAP	1	C	-

	Part	Quantity	Print Profile	Support
V Tail	L-VTail1	1	A	-
	L-VTail2	1	A	-
	R-VTail1	1	A	-
	R-VTail2	1	A	-
	L-Ruddervator	1	A	-
	R-Ruddervator	1	A	-

	Part	Quantity	Print Profile	Support
VTOL Booms	L-Boom1	1	A/B	yes
	L-Boom2	1	A/B	-
	L-Boom3	1	A/B	-
	L-Boom4	1	A/B	yes
	L-Cowling1	1	A/B	yes
	L-Cowling2	1	A/B	yes
	R-Boom1	1	A/B	yes
	R-Boom2	1	A/B	-
	R-Boom3	1	A/B	-
	R-Boom4	1	A/B	yes
	R-Cowling1	1	A/B	yes
	R-Cowling2	1	A/B	yes
	L-Motor Holder	1	C	-
	R-Motor Holder	1	C	-

	Part	Quantity	Print Profile	Support
Accessories	Battery Plate	1	B	-
	Avionics Plate	1	B	-
	ESC and FC Holder	1	B	-
	GPS Holder	1	B	-
	VTX HOLDER_xx	1	B	-

	Part	Quantity	Print Profile	Support
LG-A	L-LG-A	1	A	-
	R-LG-A	1	A	-
	LG-A Reinforcement	1	B	-
LG-B	L-LG-B Front	1	B	-
	R-LG-B Front	1	B	-
	LG-B Rear	1	B	-
	LG Washer	1	C	-

	Part	Quantity	Print Profile	Support
Latches	L-L1	1	C	yes
	L-LH1-L	1	C	-
	L-LH1-S	1	C	-
	L-L2	1	C	yes
	L-LH2-L	1	C	-
	L-LH2-S	1	C	-
	L-L3	1	C	yes
	L-LH3-L	1	C	-
	L-LH3-S	1	C	-
	L-L4	1	C	yes
	L-LH4-L	1	C	-
	L-LH4-S	1	C	-
	R-L1	1	C	yes
	R-LH1-L	1	C	-
	R-LH1-S	1	C	-
	R-L2	1	C	yes
	R-LH2-L	1	C	-
	R-LH2-S	1	C	-
	R-L3	1	C	yes
	R-LH3-L	1	C	-
	R-LH3-S	1	C	-
	R-L4	1	C	yes
	R-LH4-L	1	C	-
	R-LH4-S	1	C	-
	Latch Connector	8	C	-

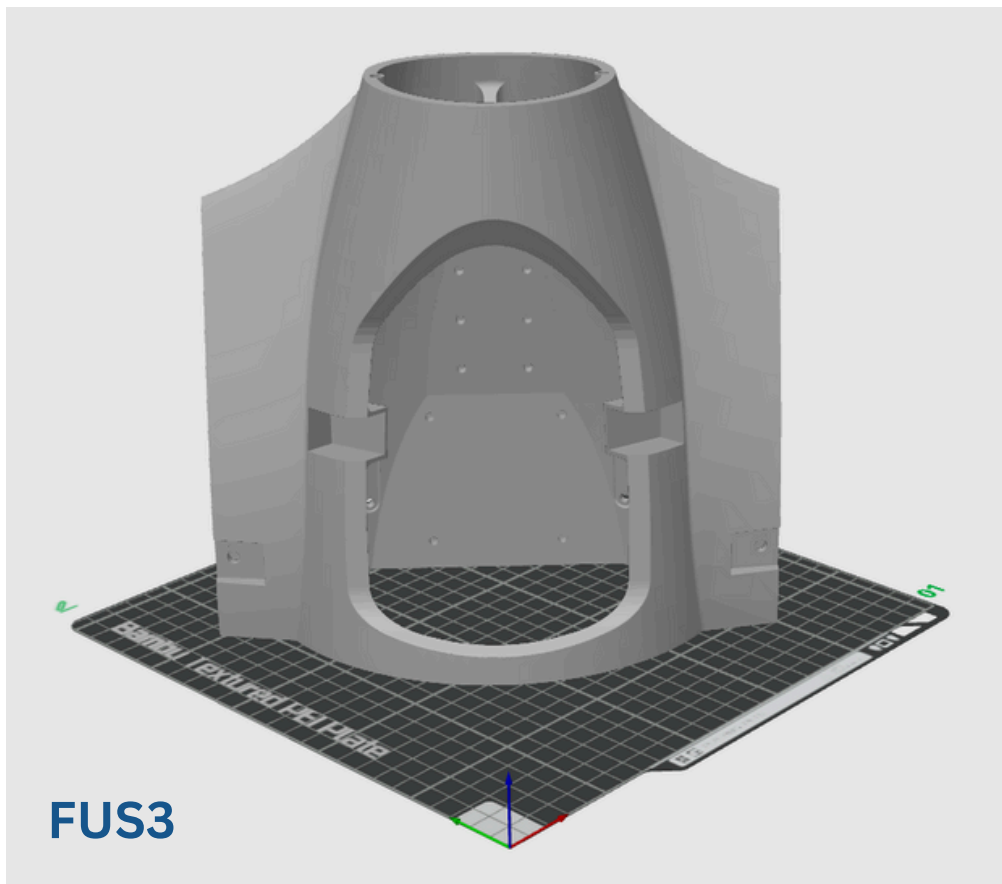
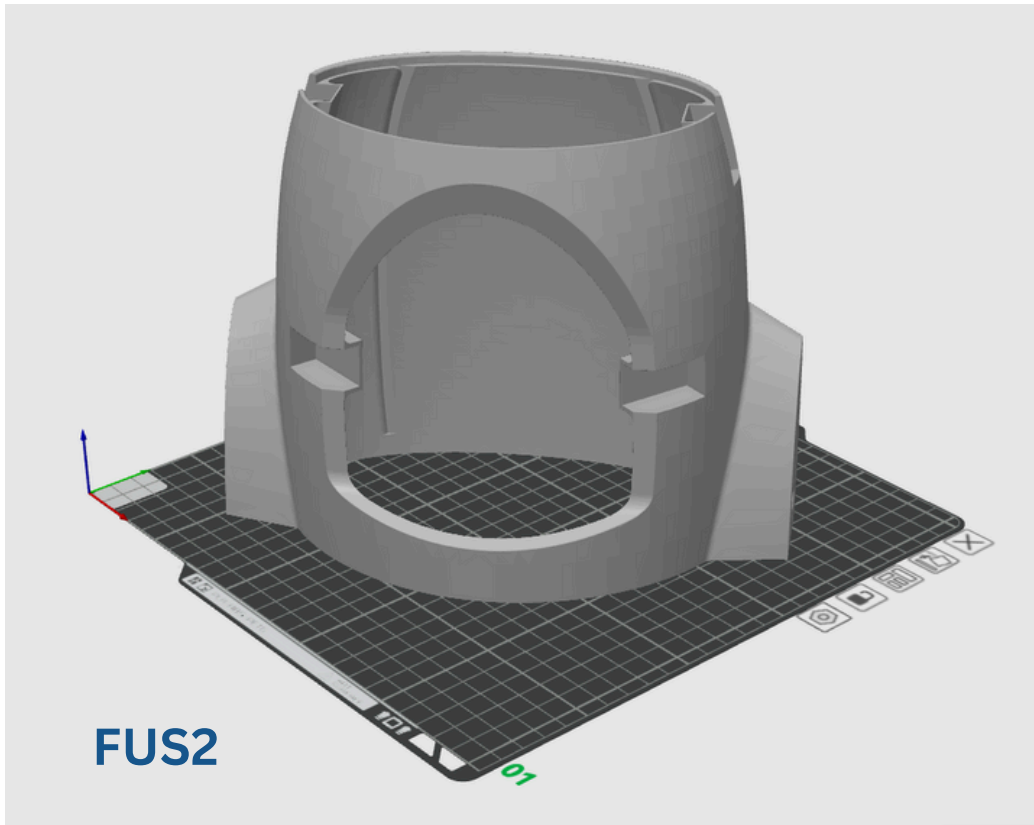
	Part	Quantity	Print Profile	Support
Fasteners	L-F1	1	C	yes
	L-FH1-L	1	C	-
	L-FH1-S	1	C	-
	L-F2	1	C	yes
	L-FH2-L	1	C	-
	L-FH2-S	1	C	-
	R-F1	1	C	yes
	R-FH1-L	1	C	-
	R-FH1-S	1	C	-
	R-F2	1	C	yes
	R-FH2-L	1	C	-
	R-FH2-S	1	C	-

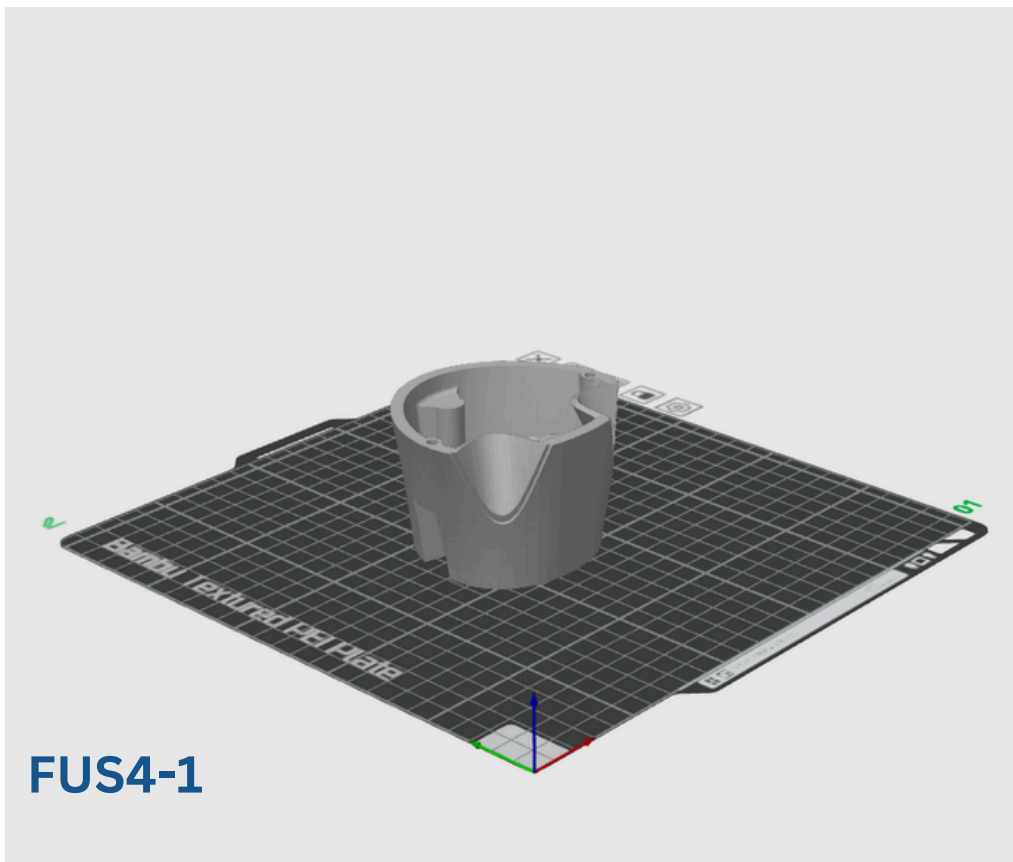
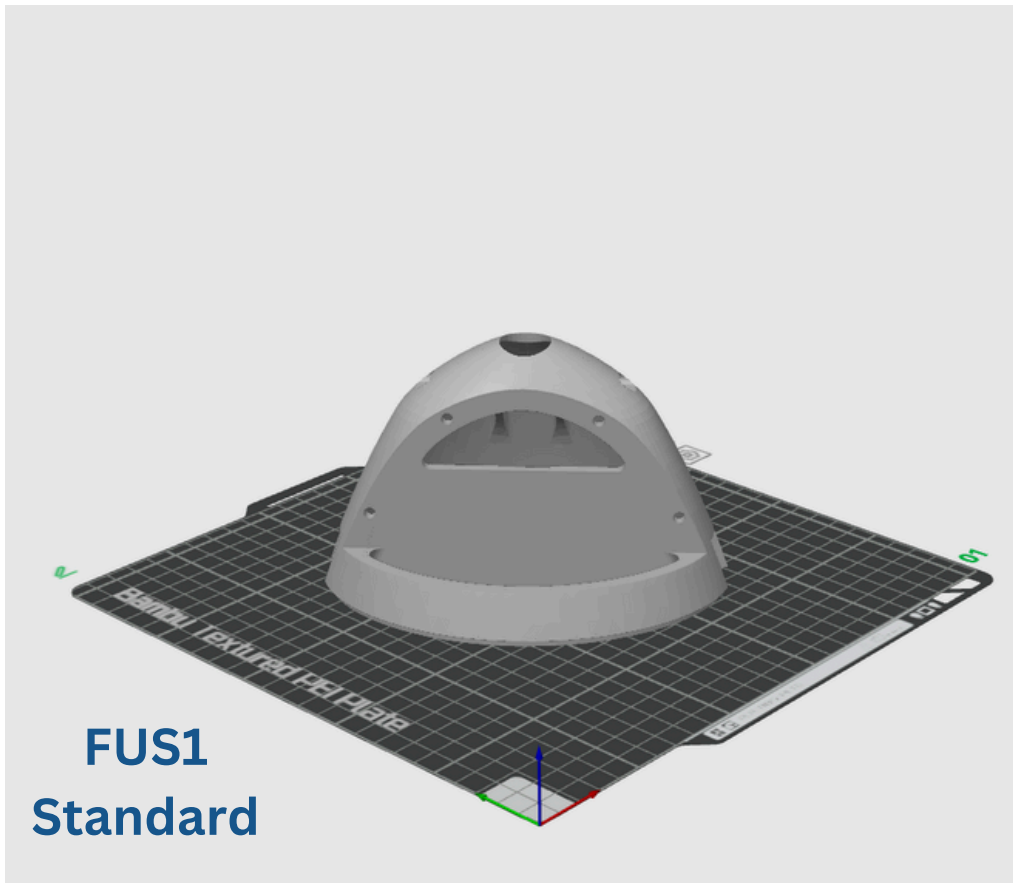
Print Settings

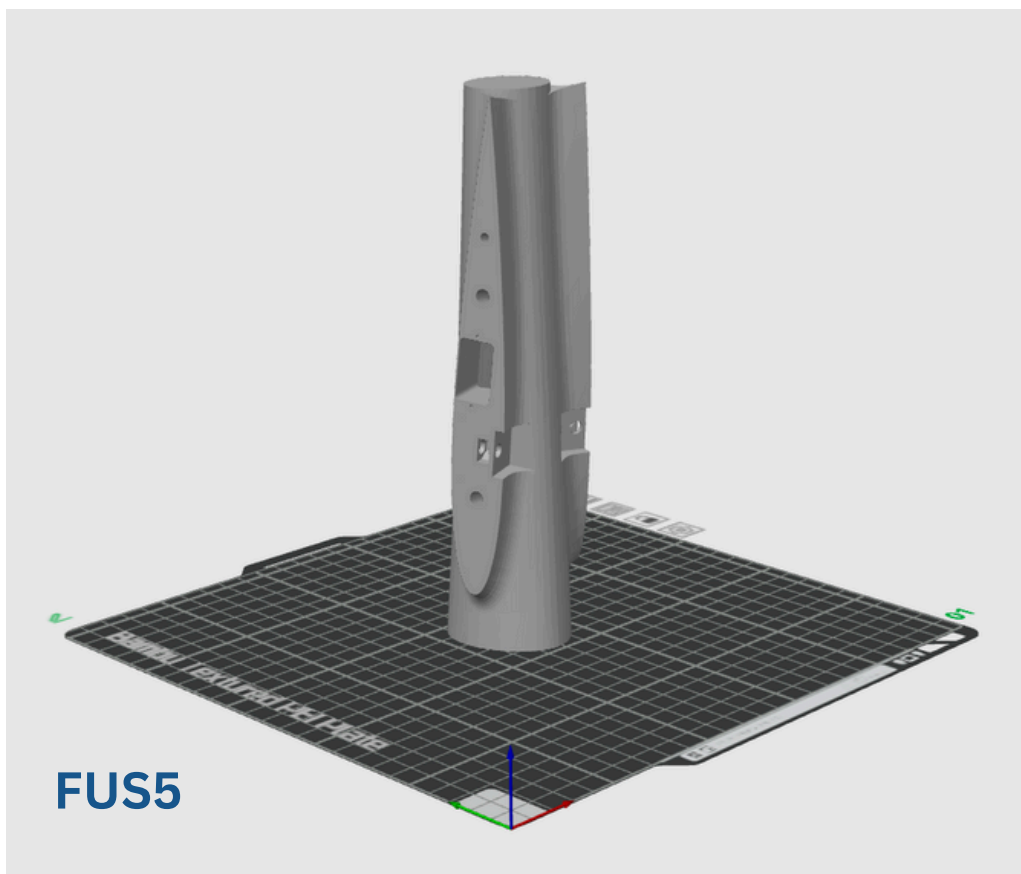
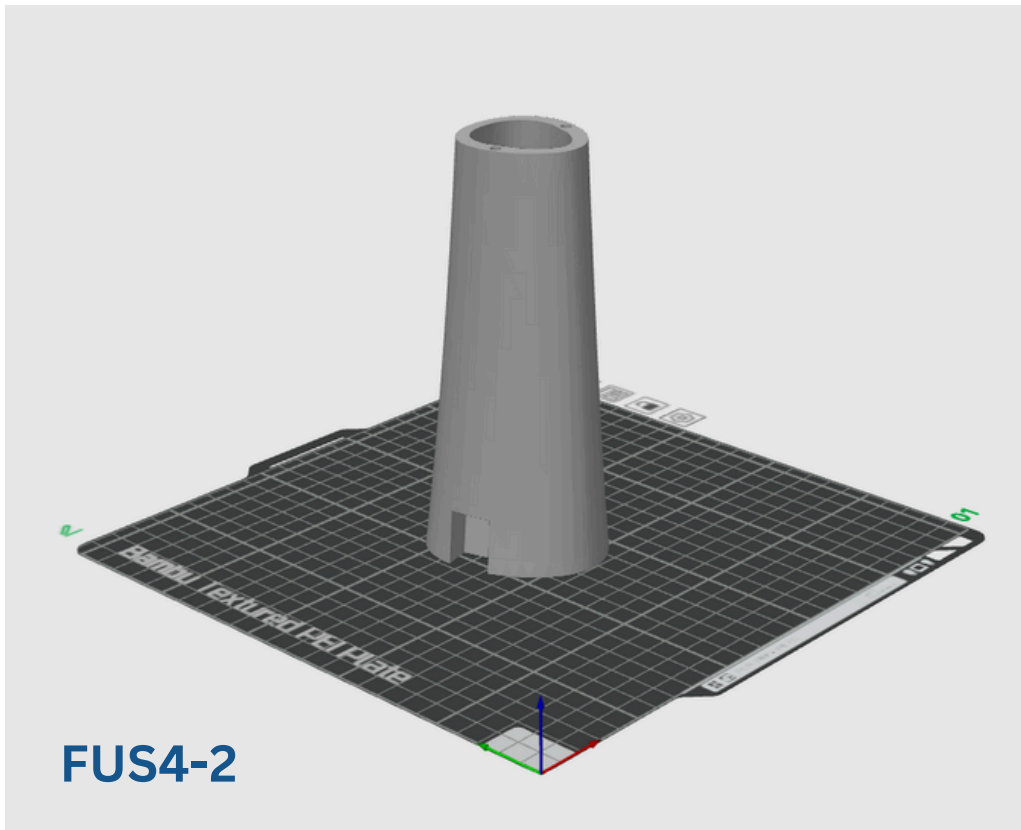
Part	A	B	C
Filament Type	LW-PLA	PLA	PLA (or other strong material)
Wall Loops	LW-PLA	1	2
Layer Height	0.2	0.2	0.2 or finer
Top Layers	2	2	5
Bottom Layers	2	2	3
Infill Type	Gyroid	Cubic	Rectilinear
Infill %	4	6	20
Intial Speed	default	default	30mm/s
Speed	default	default	30mm/s
Support only on build plate	yes	default	default
Support Top Z Distance	0.5mm	default	default
Support/Object xy Distance	0.6mm	default	default
Avoid Crossing Wall	yes	default	default
Filament Flow Ratio	0.6	default	default
Nozzle Temp	235 degC	default	default
Retraction Length	2mm	default	default
Z Hopp When Retract	0mm	default	default
Re-/Detractiton Speed	35mm/s	default	default
Redraiton When Change Layer	yes	default	default

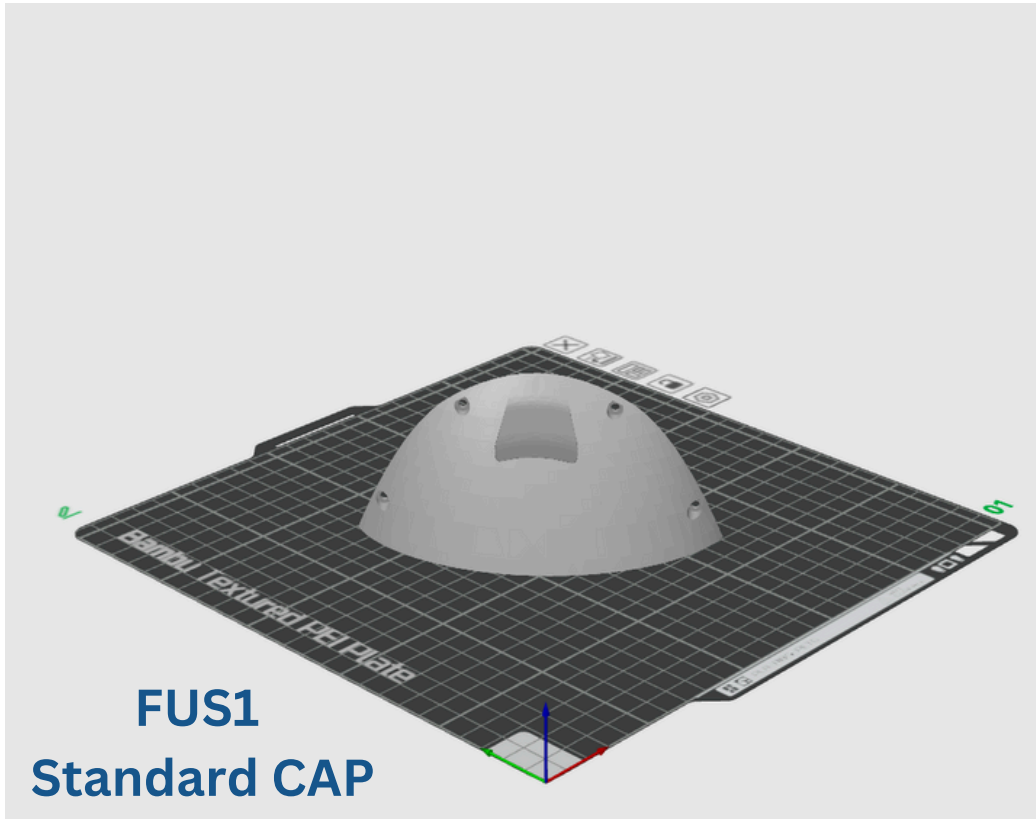
These settings are only recommendations. Filaments and 3D printers are very different. Moisture, hardness and other material characteristics can influence the results. You may therefore need to adjust the settings to your specific conditions.

We used printers from Bambu Lab and filaments from colorFabb.

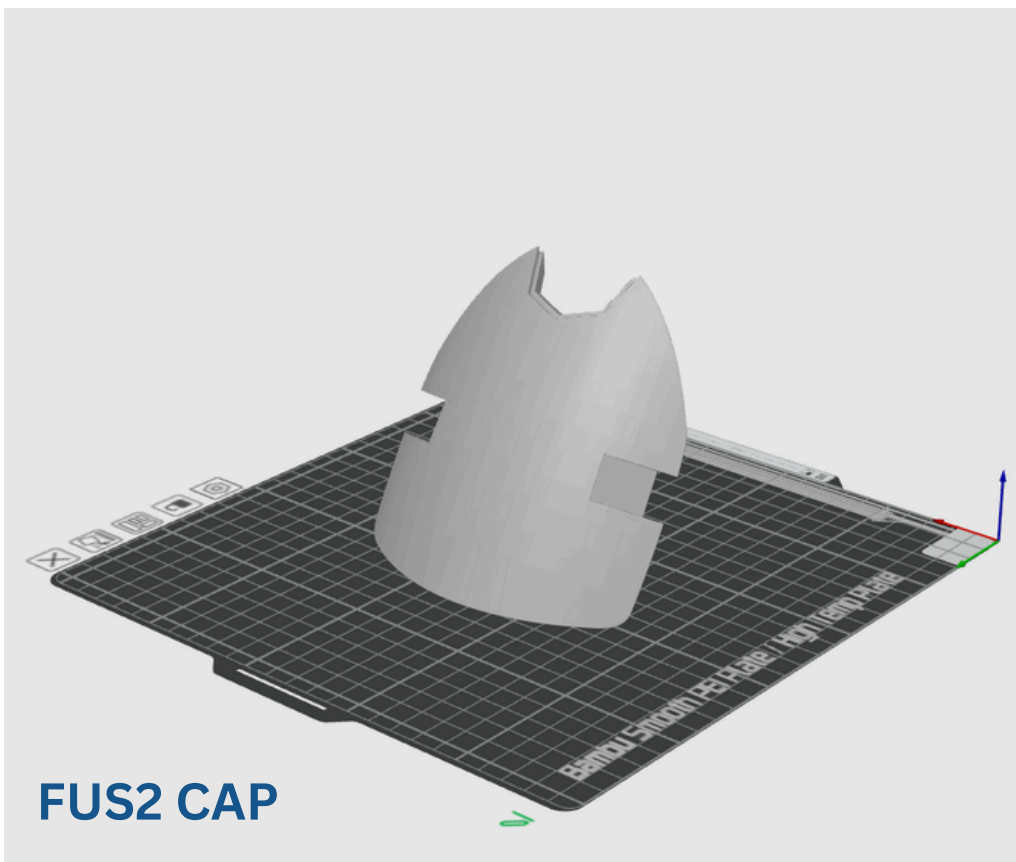




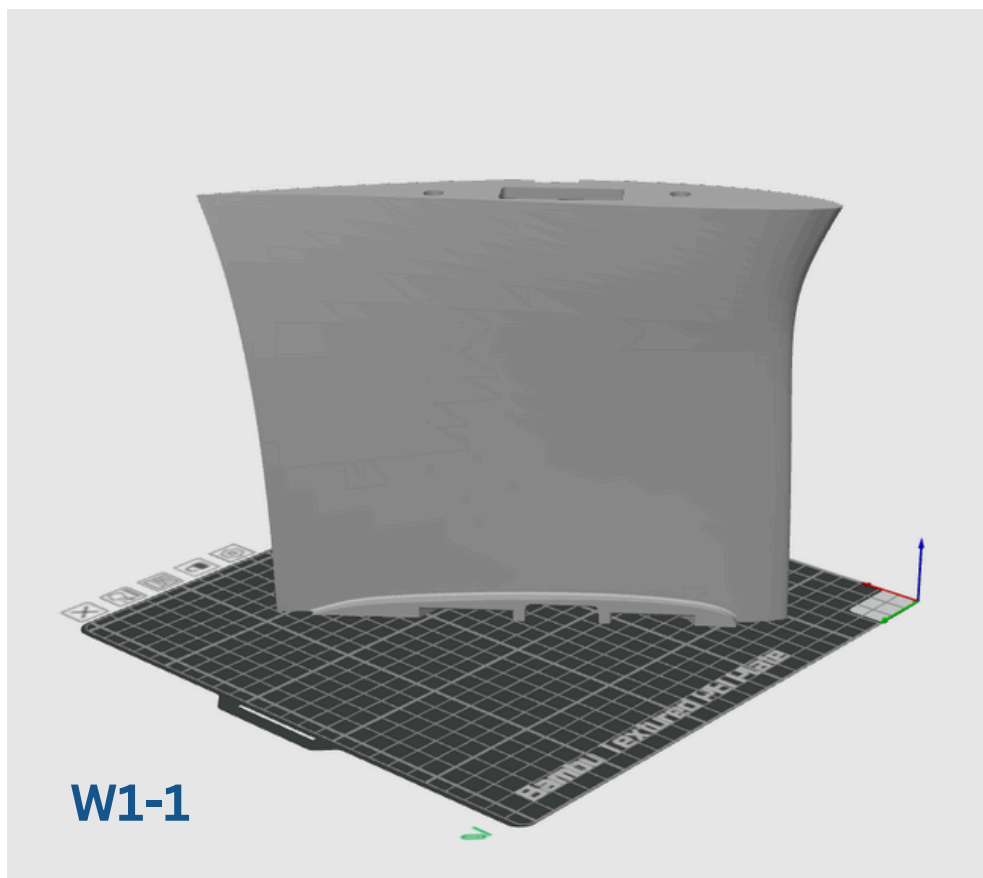
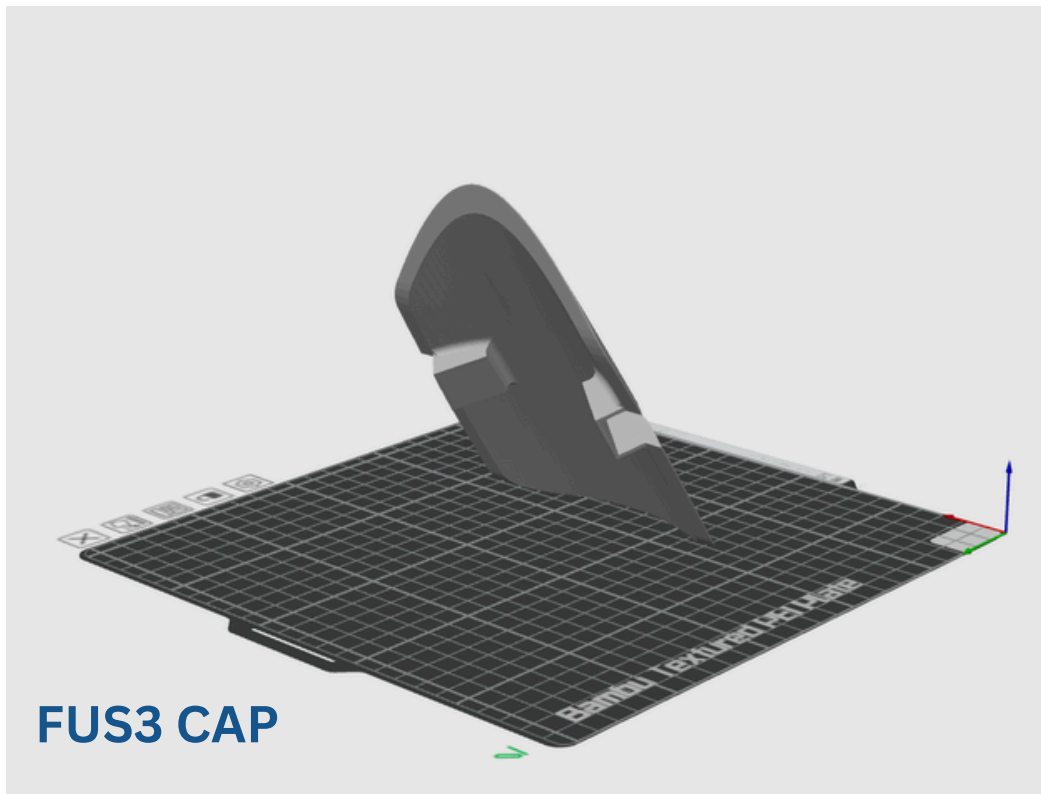


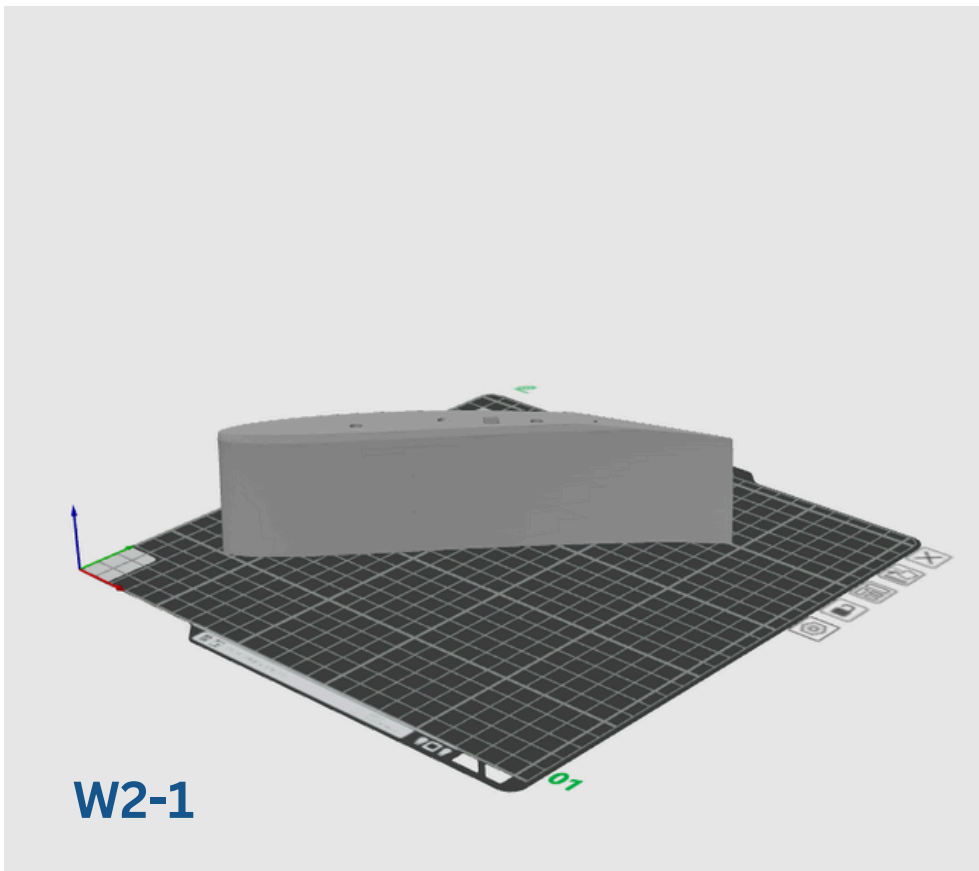
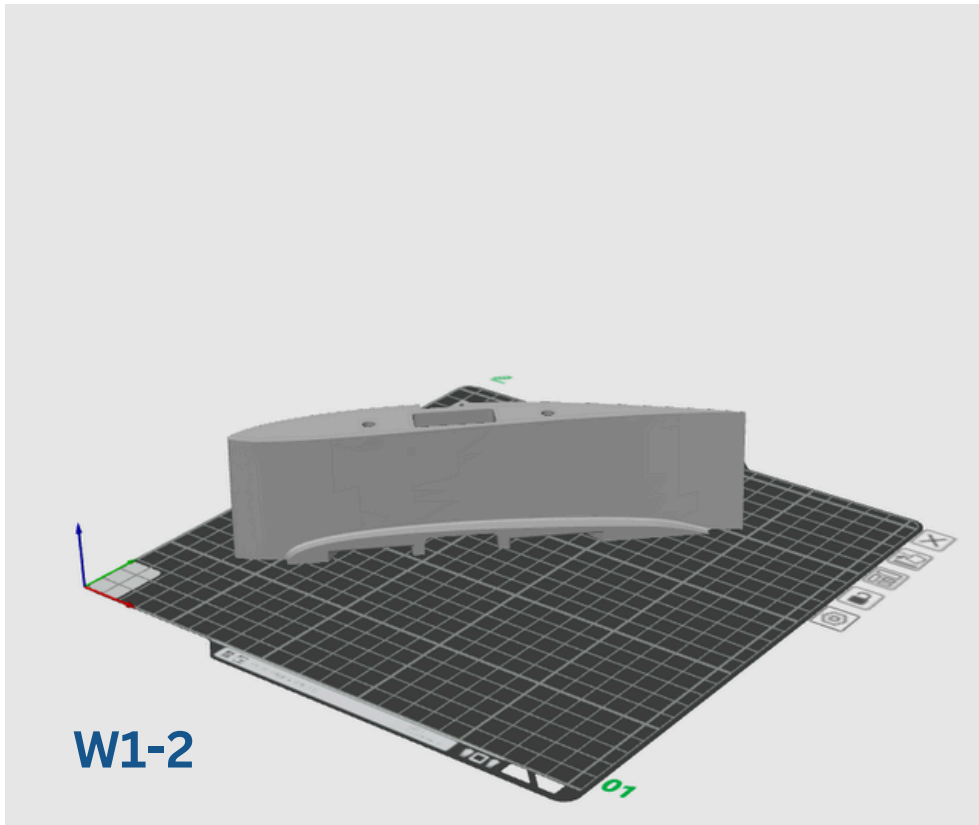


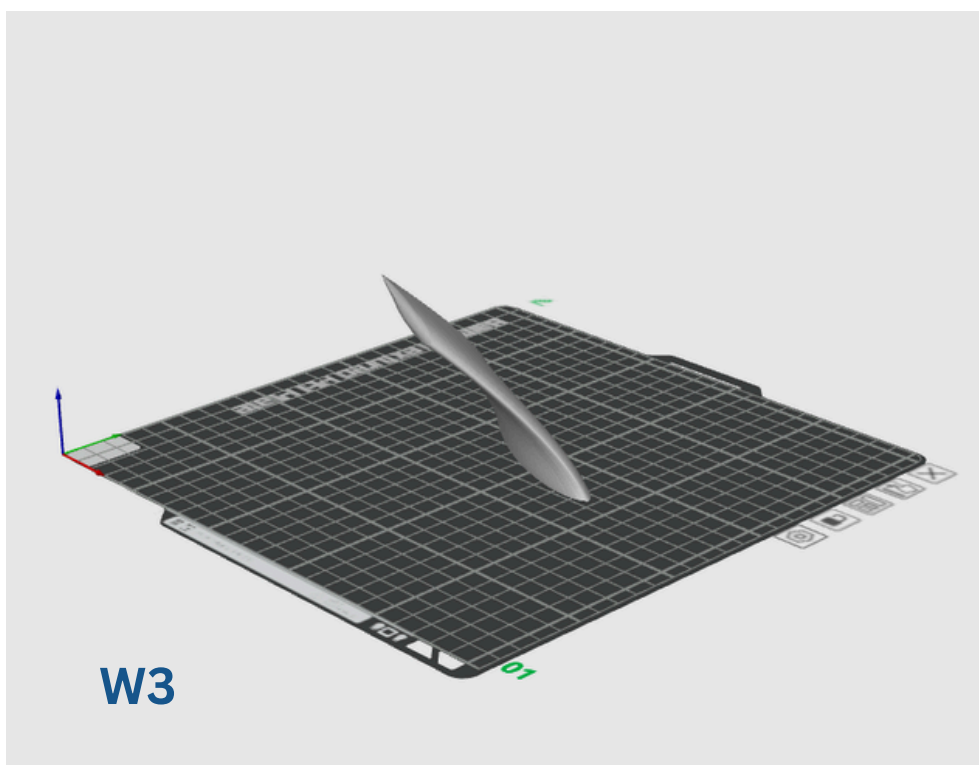
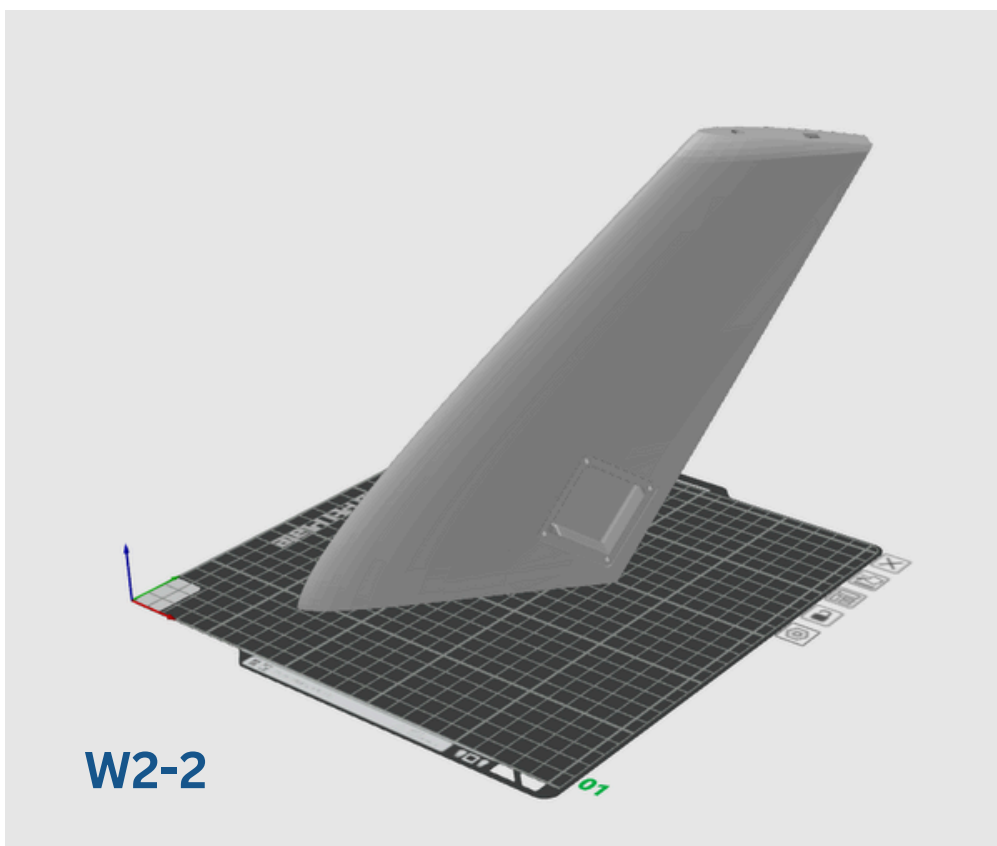
FUS1
Standard CAP

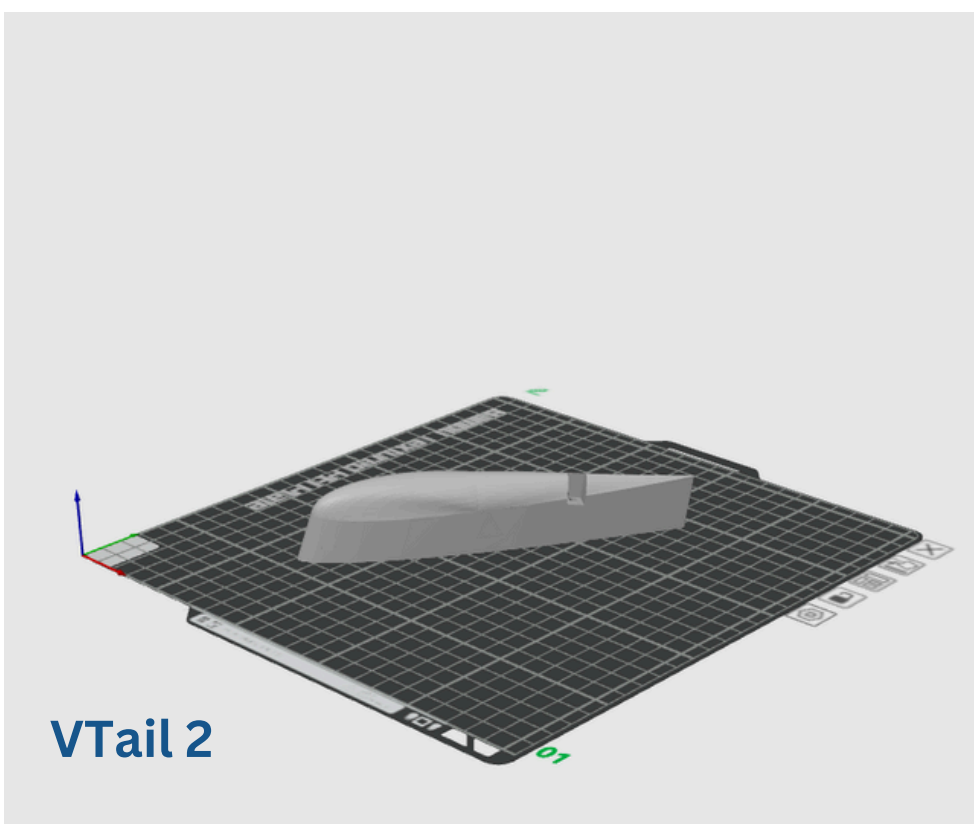
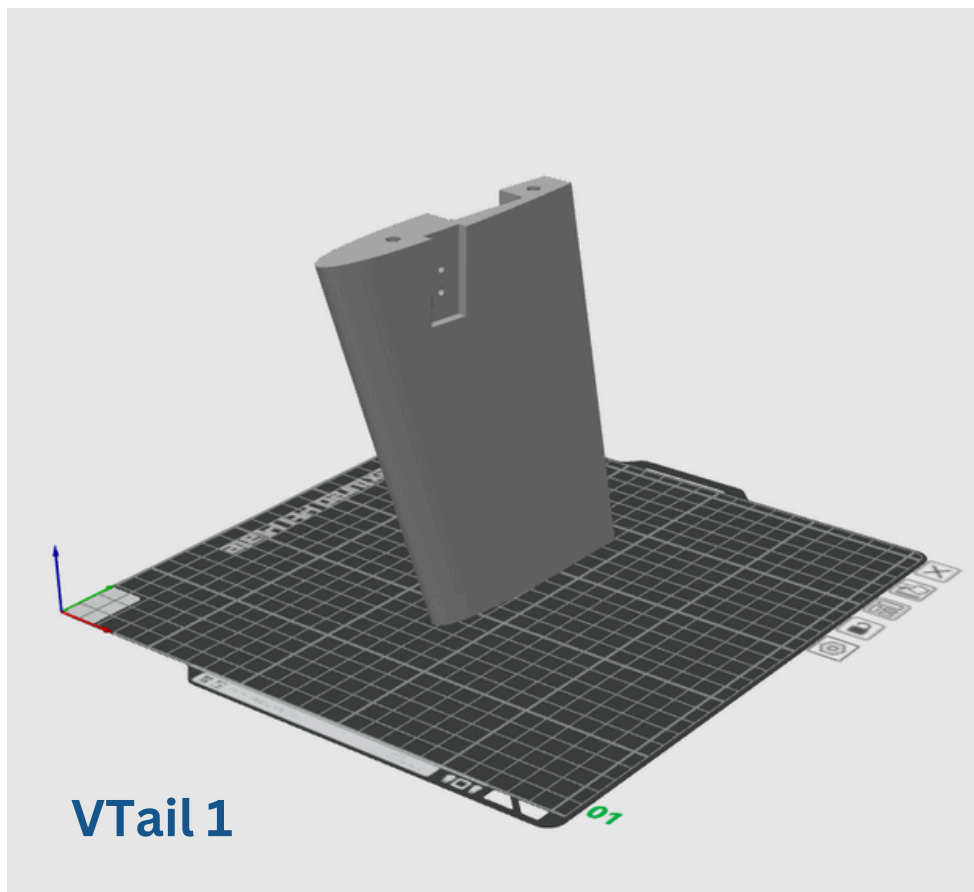


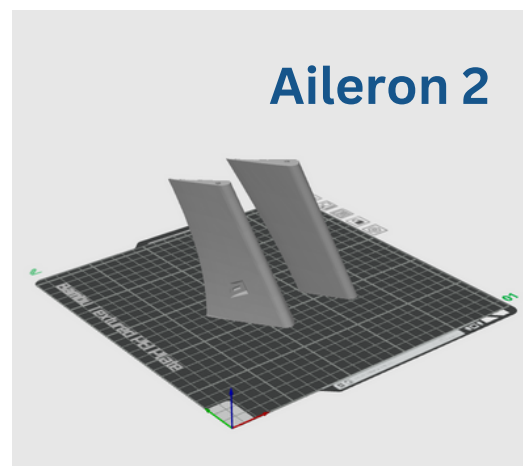
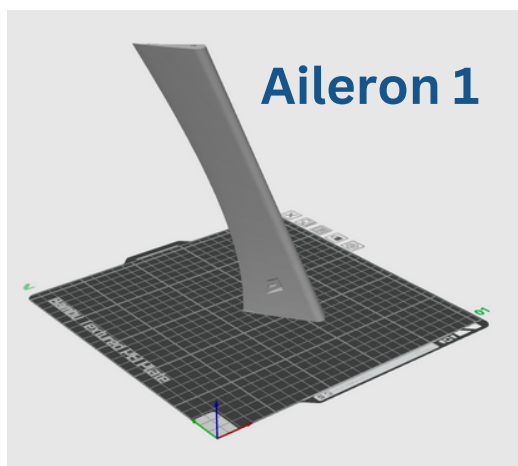
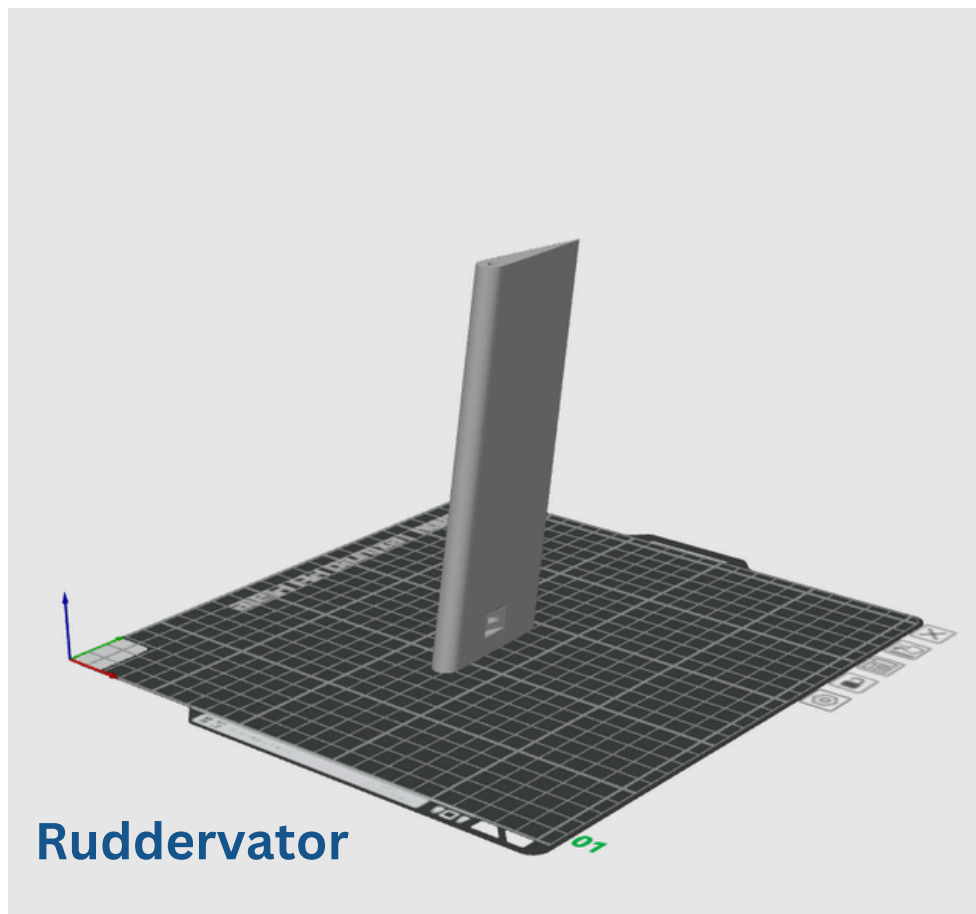
FUS2 CAP



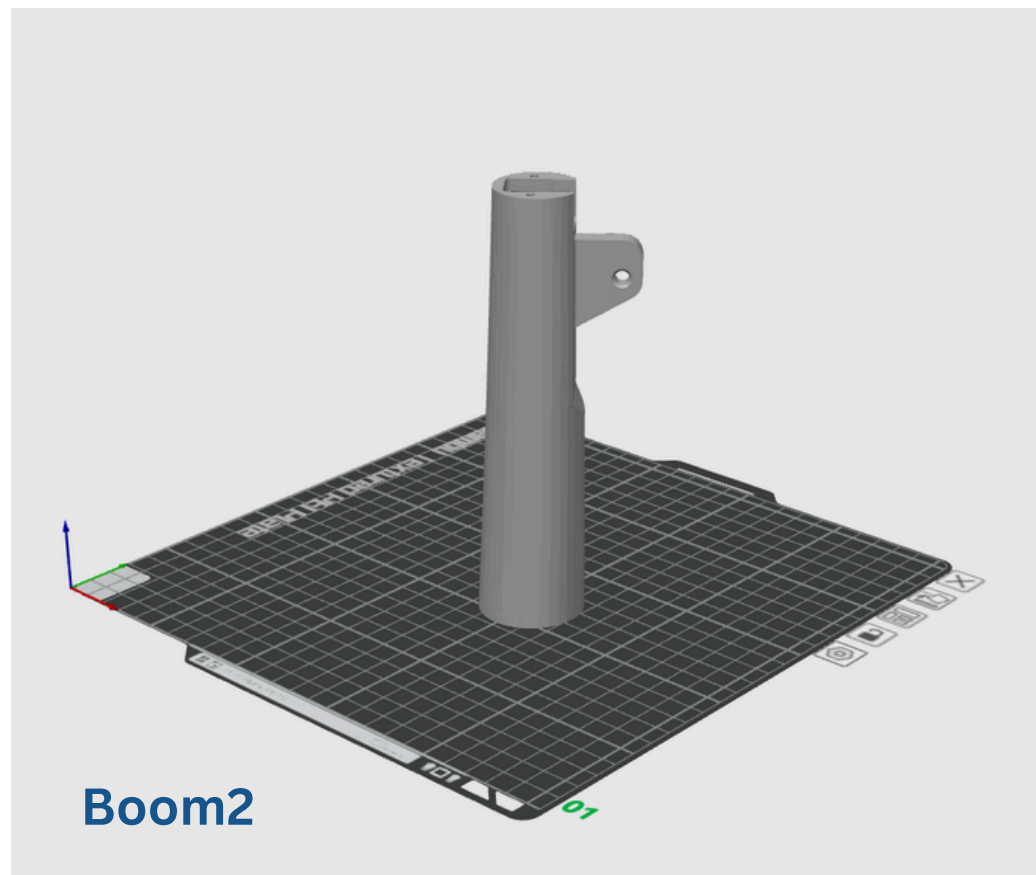
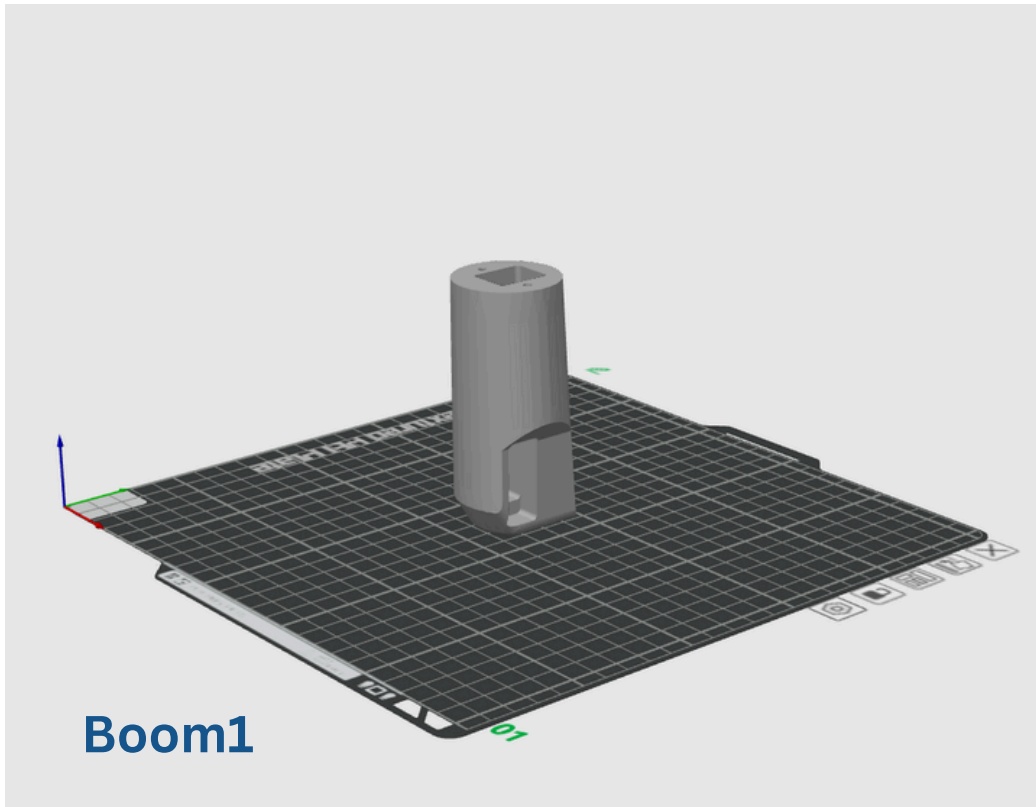


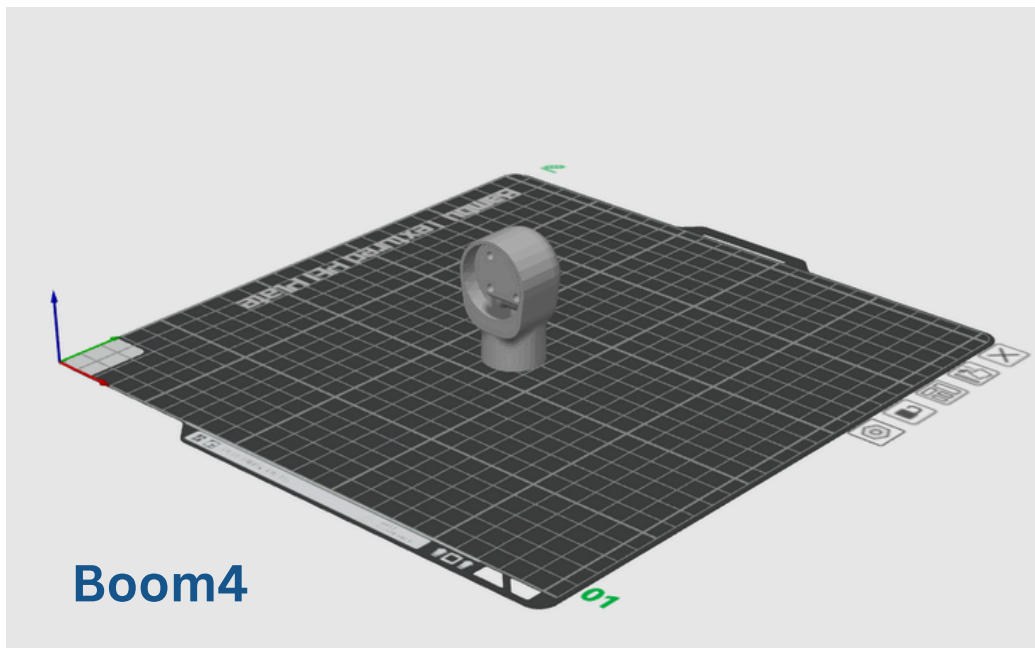


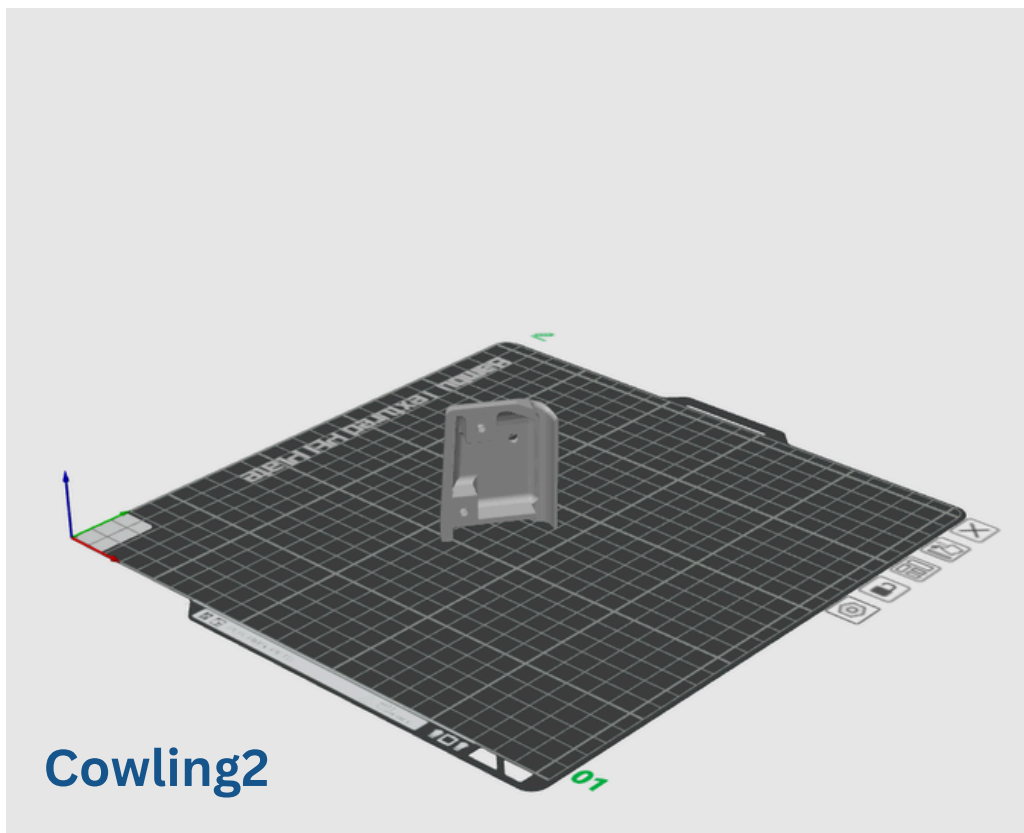
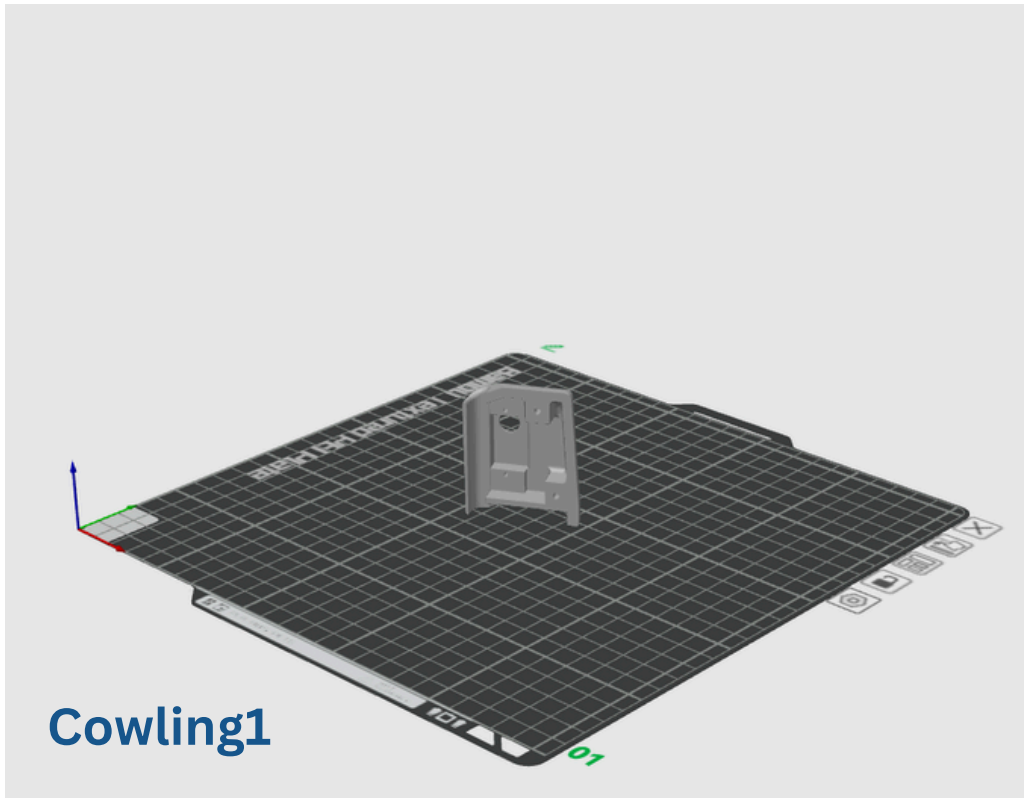




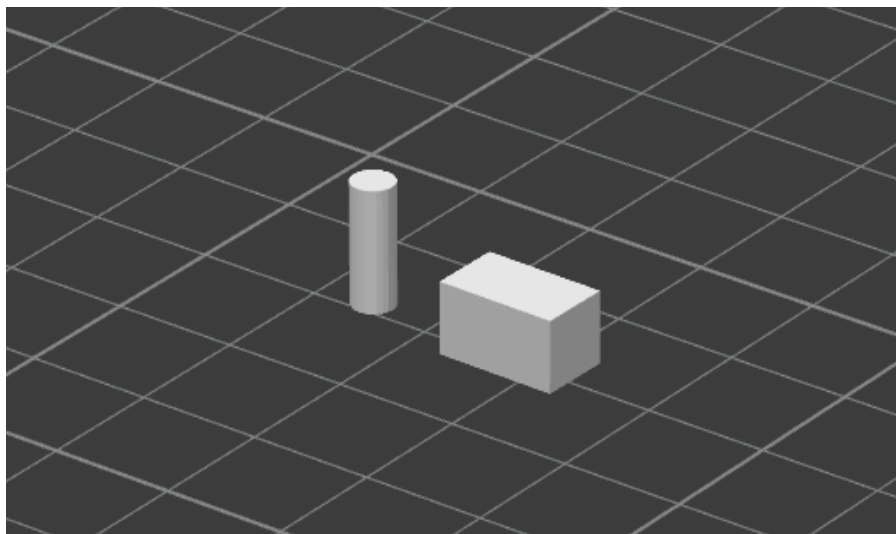
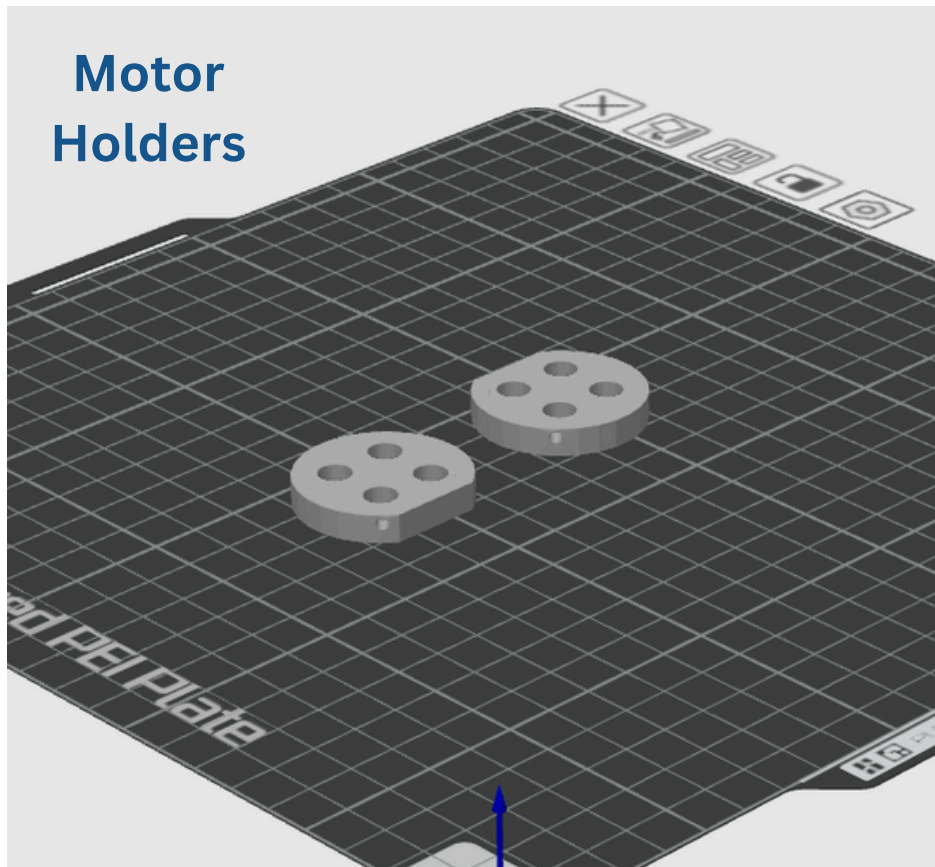
If you don't succeed to print the ailerons in one piece, so you can split them in two pieces with your slicer software. Anyway you can find the STEP files in the folders.





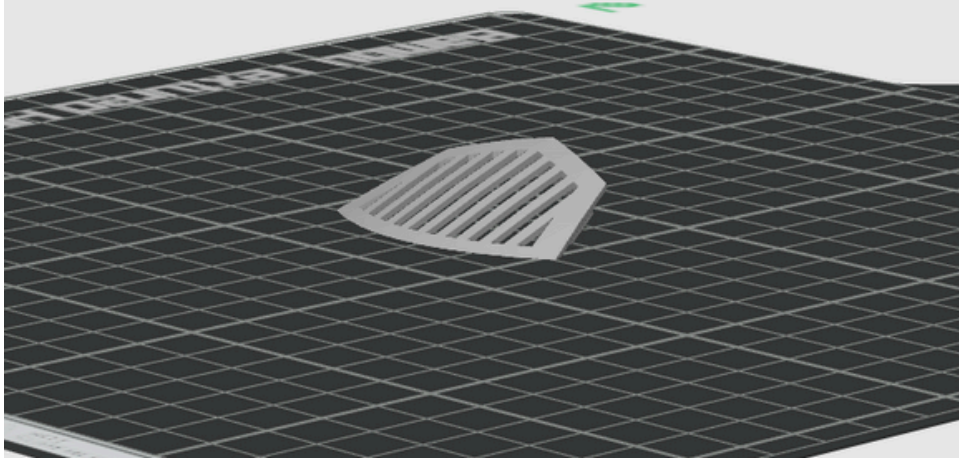


Motor Holders

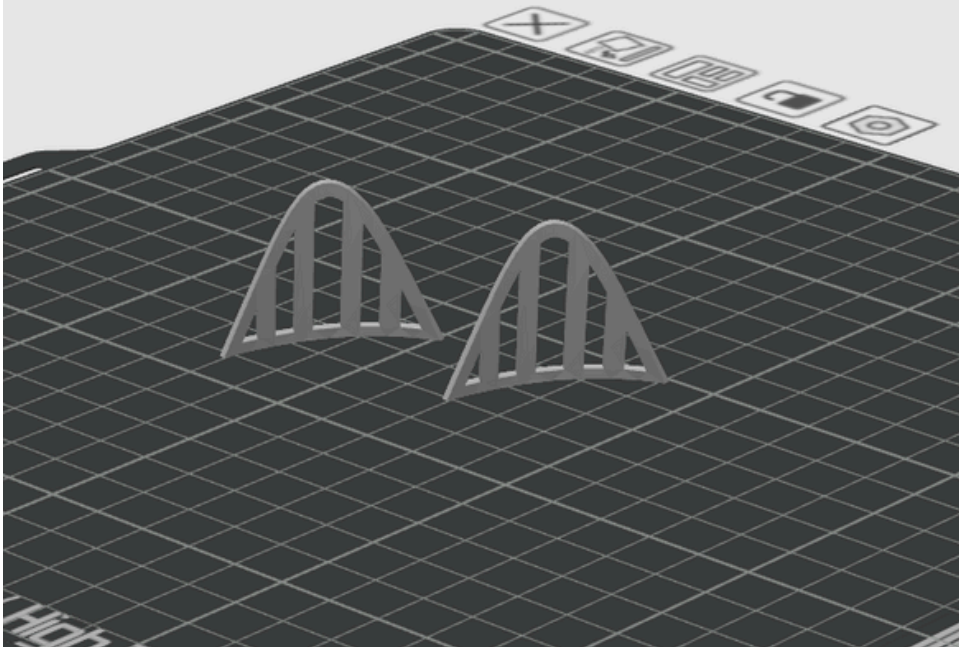


FUS and W3 Connector Pins

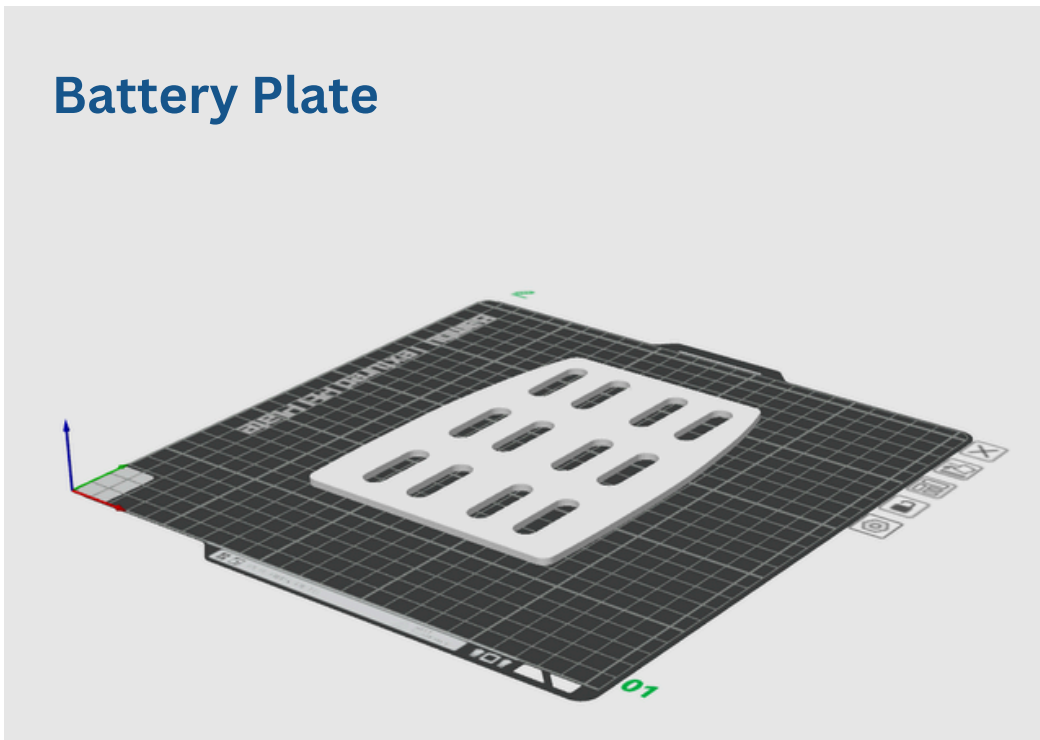
FUS2 CAP Inlet



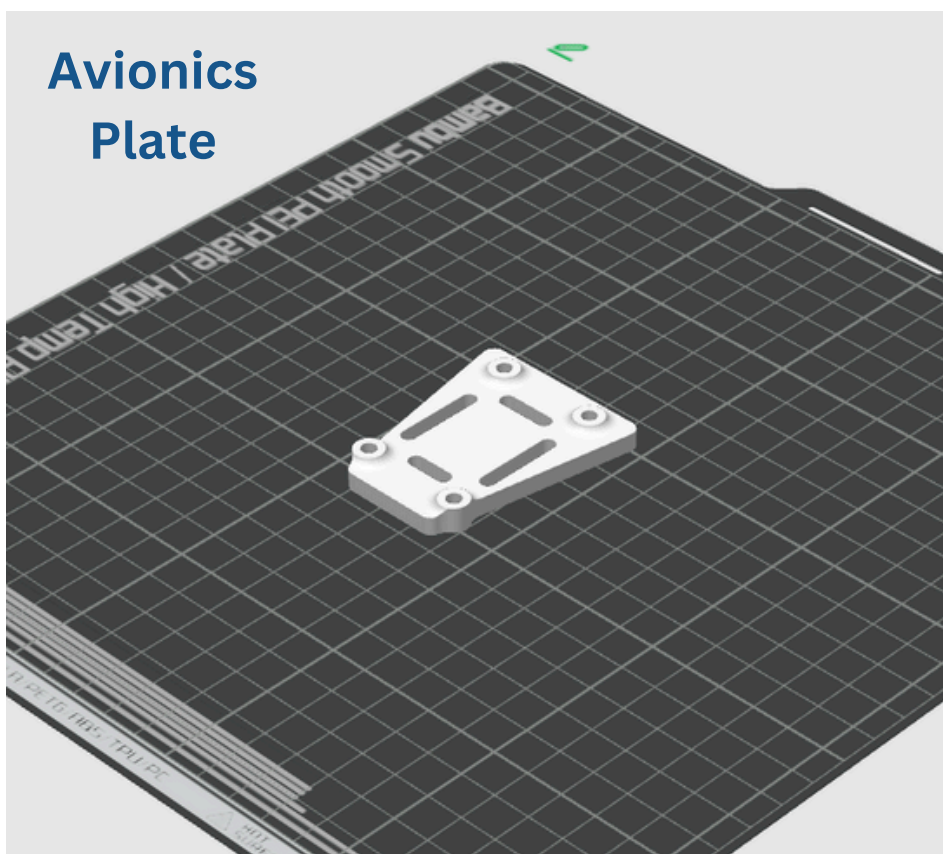
FUS4 Outlet



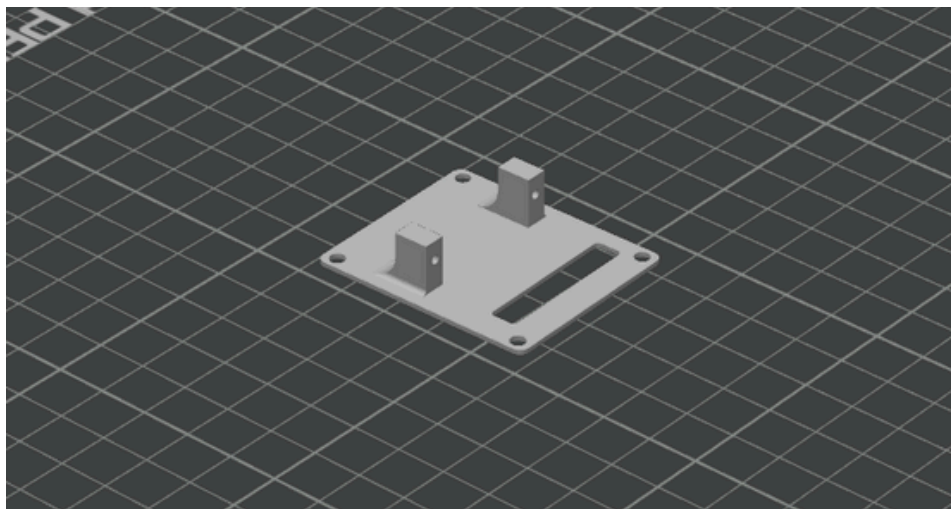
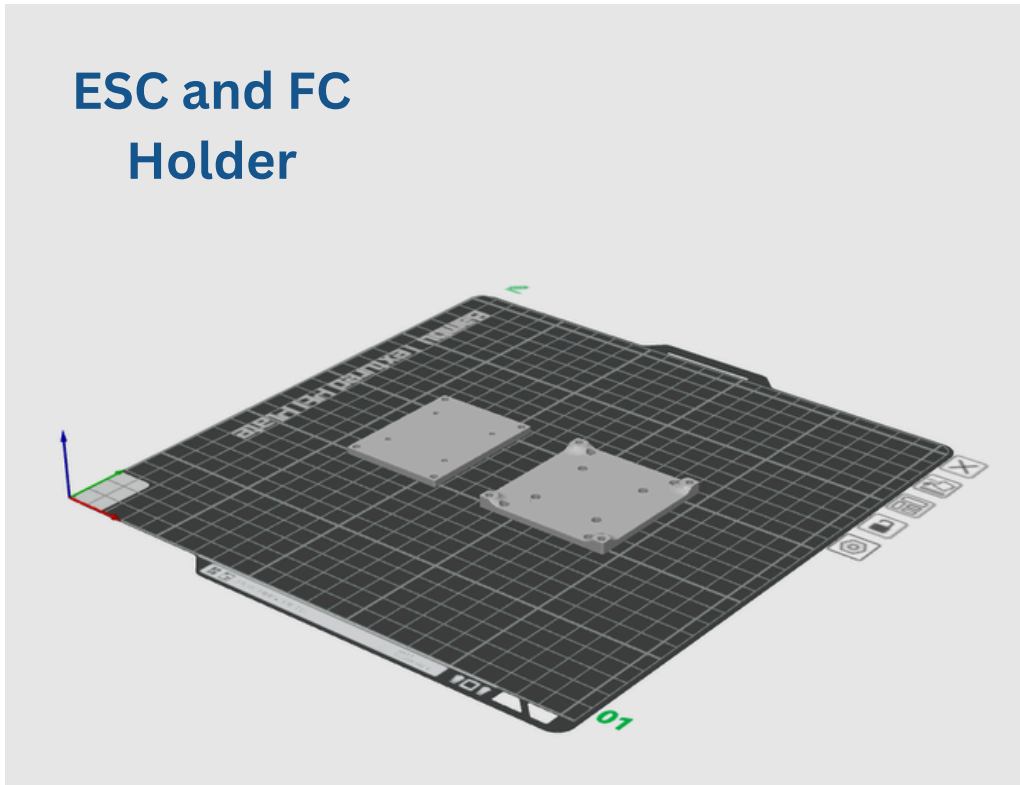
Battery Plate



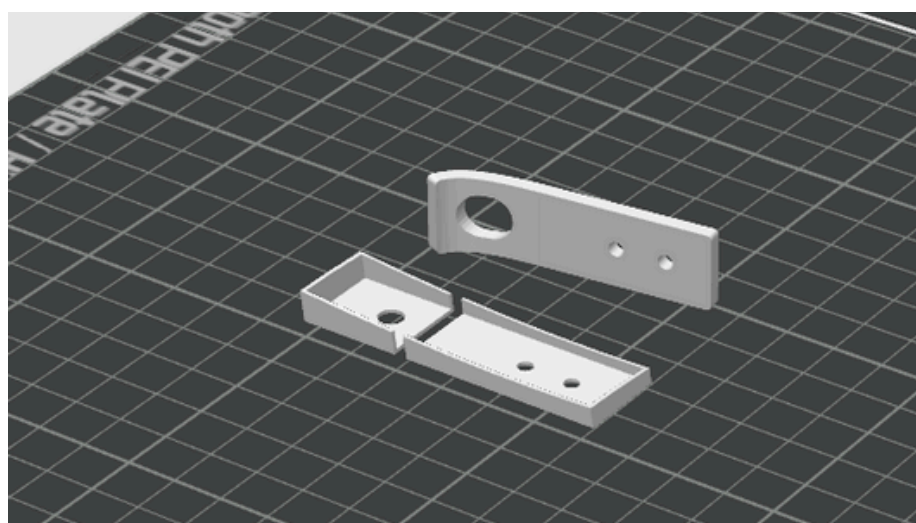
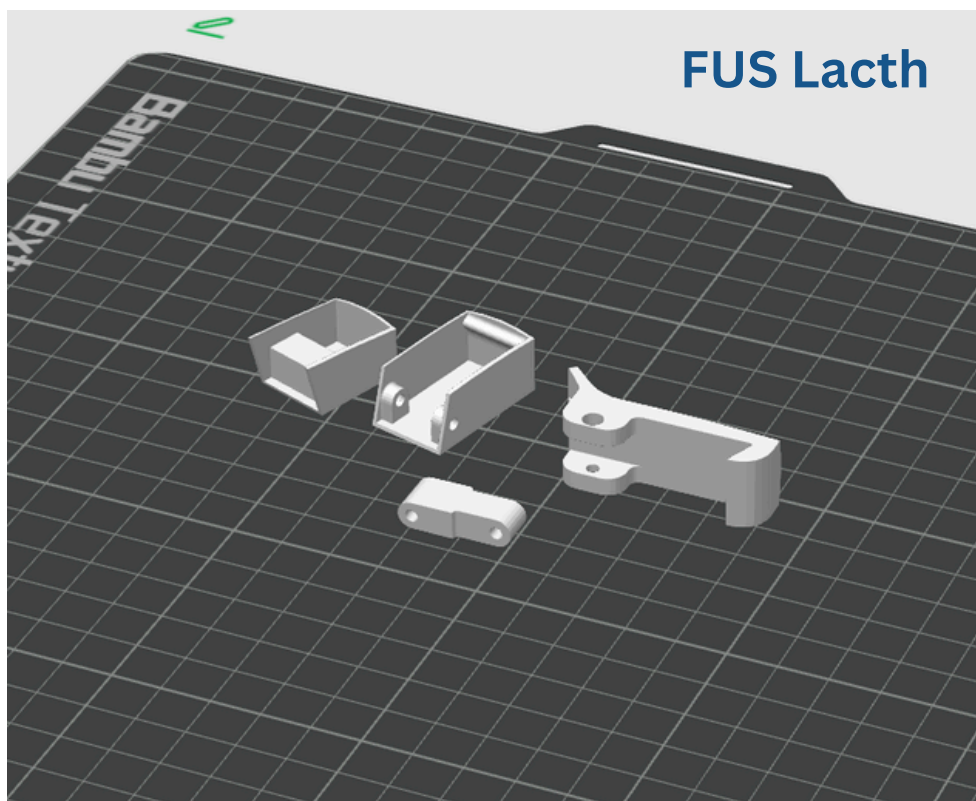
Avionics Plate



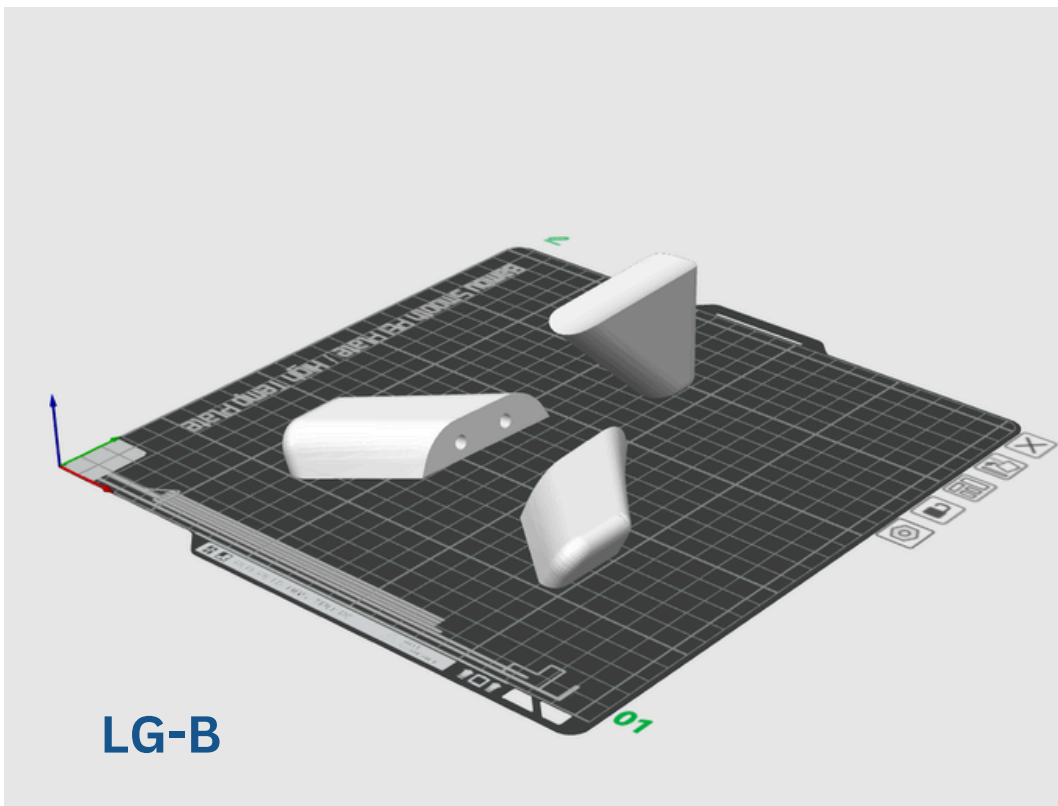
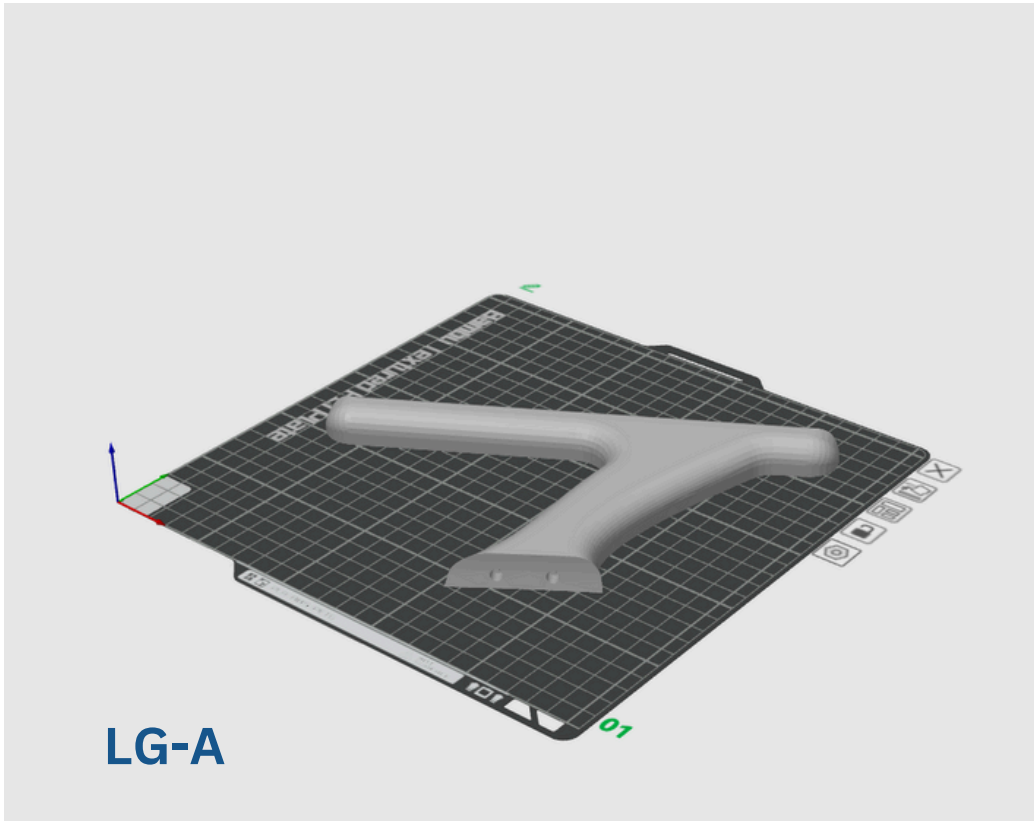
ESC and FC Holder

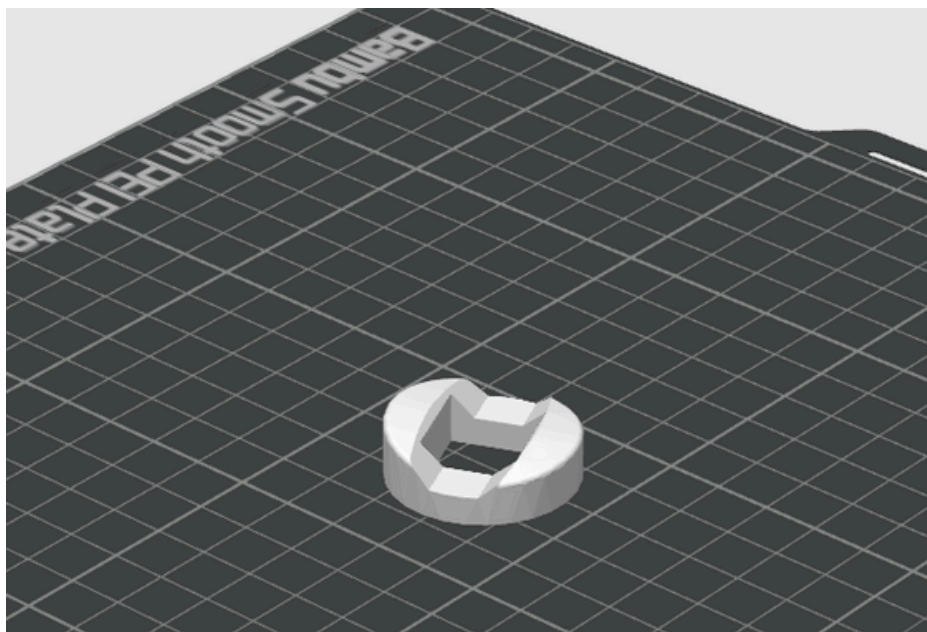
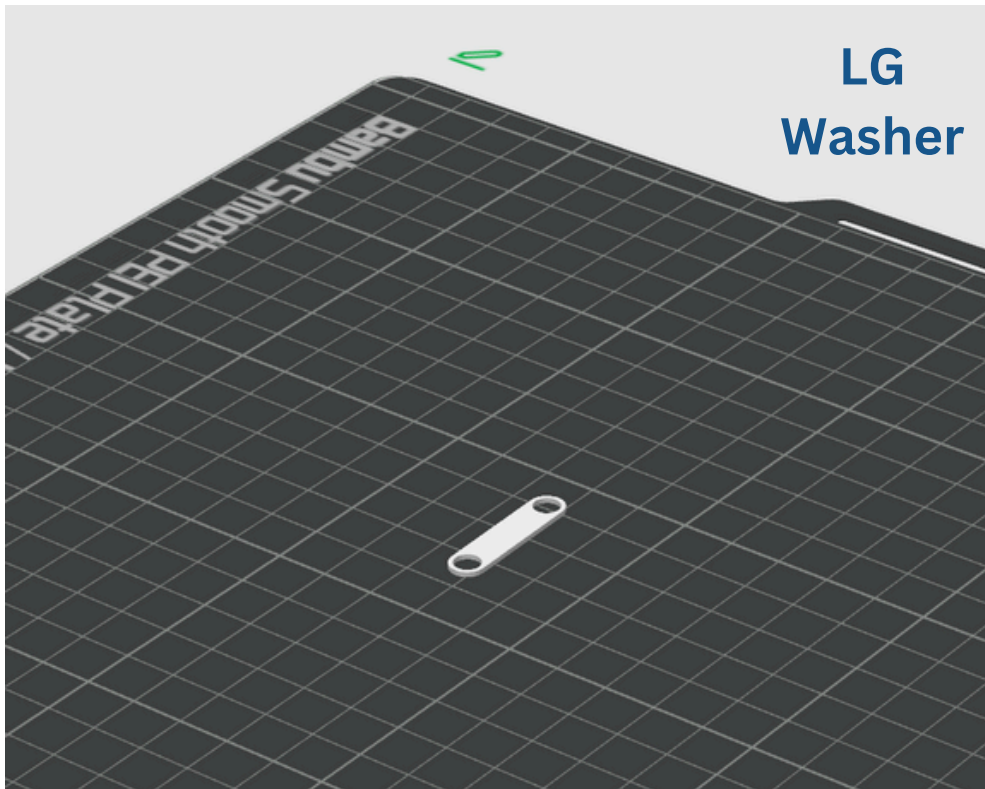


Aileron Servo CAP



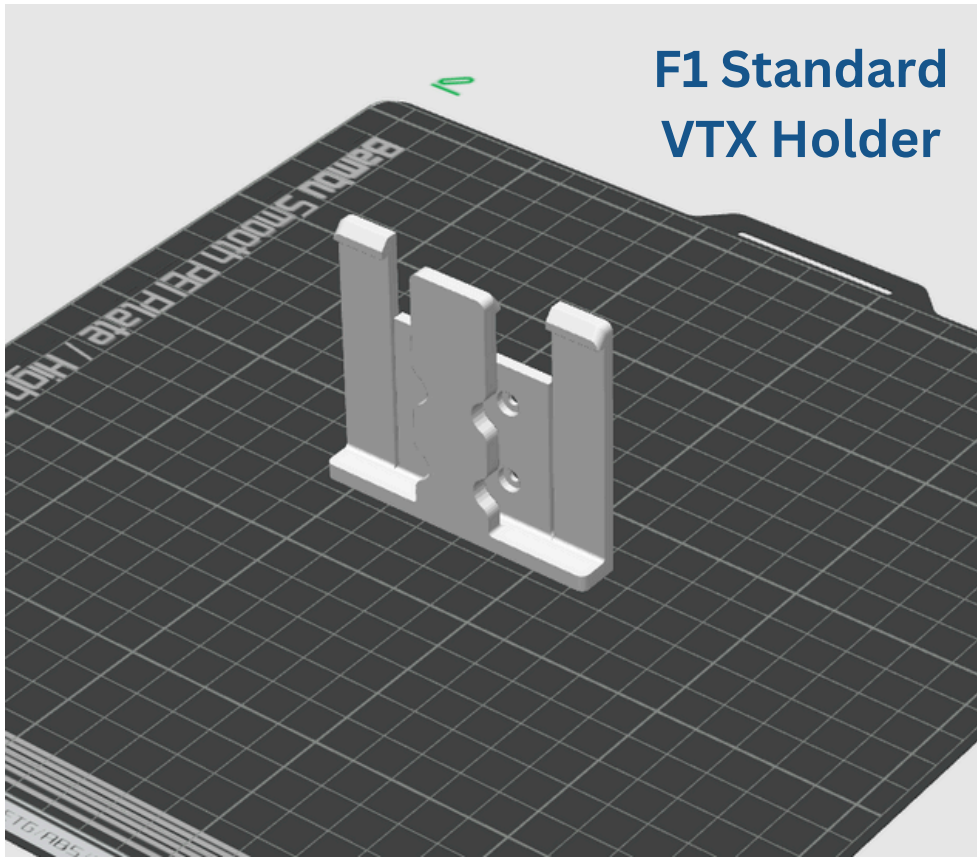
Wing Snapfit

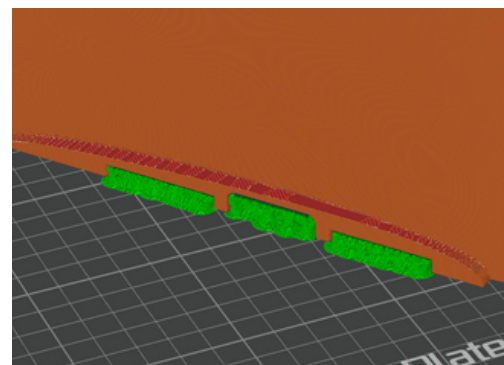
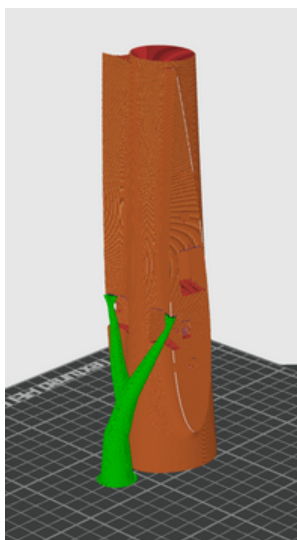
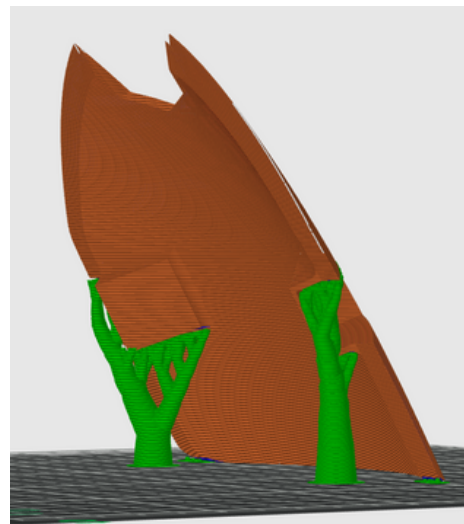
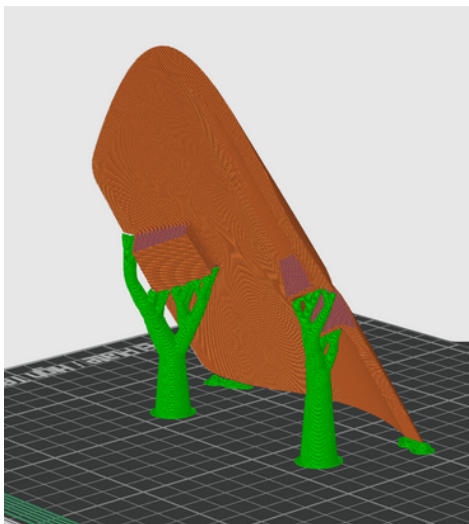
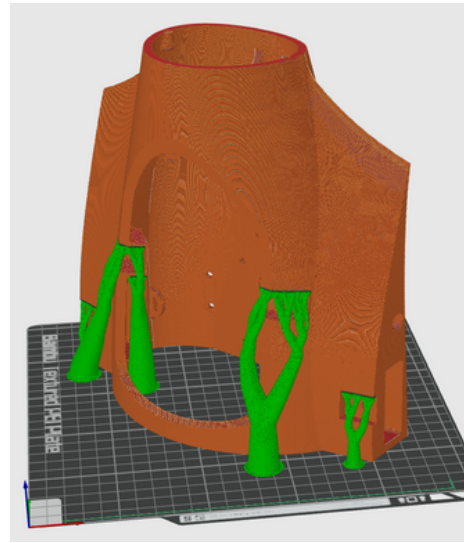
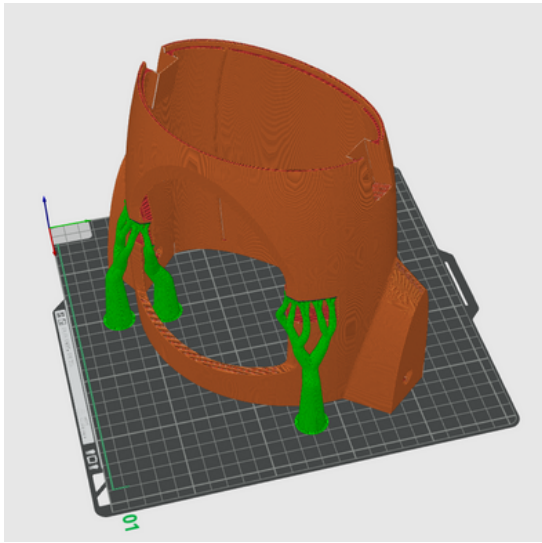




GPS Holder

F1 Standard VTX Holder





Depending on your printer performance it is enough to support only the vertical latch cavities (inner and outer sides). For this set manual support feature.

As desired, all overhangs can be supported.

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