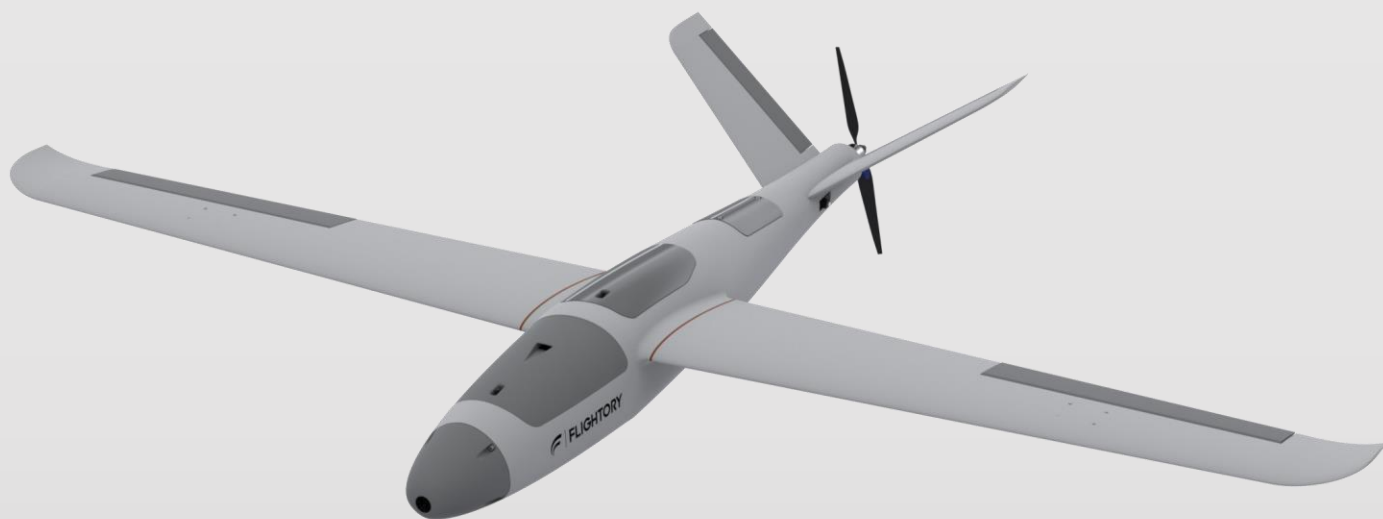




STORK

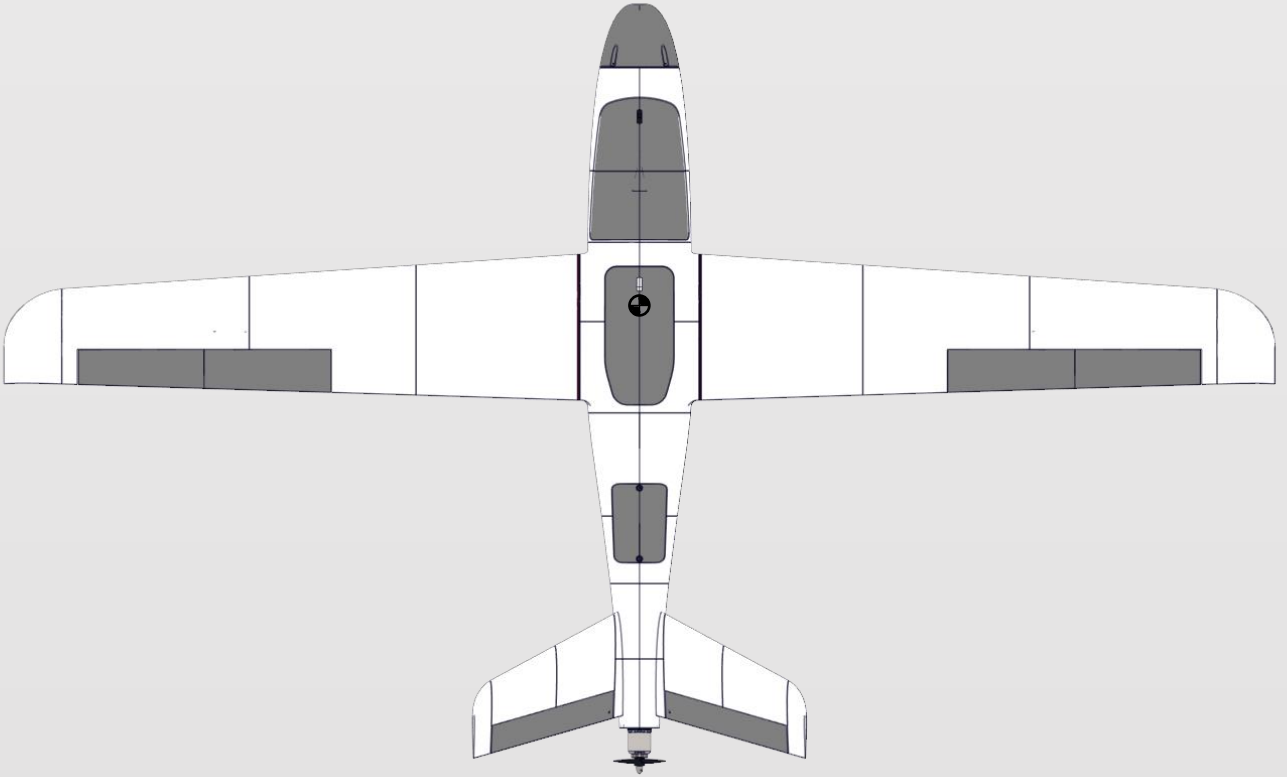


USER MANUAL

V.1

© 2023 Flightory by Szymon Wójcik All rights reserved.

General Aircraft Data



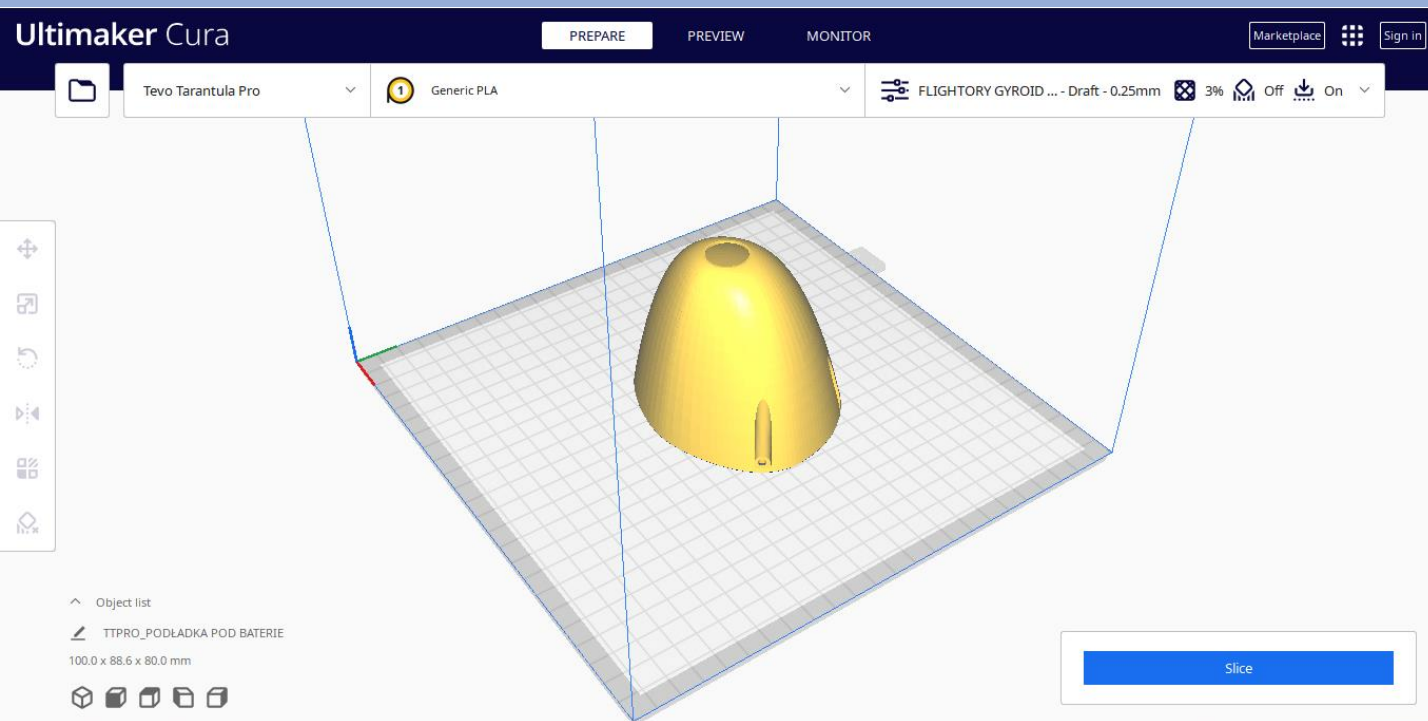
WINGSPAN: 1600mm
LENGHT: 950mm
CG: 65mm from leading edge
AUW: 1500g (Max 3000g)
Optimal Cruise Speed: 50-60 km/h

Stork is a stable aircraft designed for long range flying in a classic layout with push propeller and V-TAIL. The airframe is printed from LW-PLA with additions from regular PLA. Nose is adapted for standard size FPV cameras, servo mounts are prepared for standard 9-12g servos. I provide the nose file, fuselage section with engine mounting, hatches and wing with servo mounting in parasolid format. You can customize it if default geometry doesn't suit your needs.

Exploded view



Print Settings



Slicer software you need to use is Ultimater Cura. All elements from **LW-PLA** are best printed with ready-made settings prepared in a profile that you can download. Settings are prepared a standard 0.4mm nozzle. Download link is available on the Stork product page and on Flightory Blog. **Infill in this profile is set to 6%. For this project I recommend changing it to 3%, max 4%. This is sufficient filling**

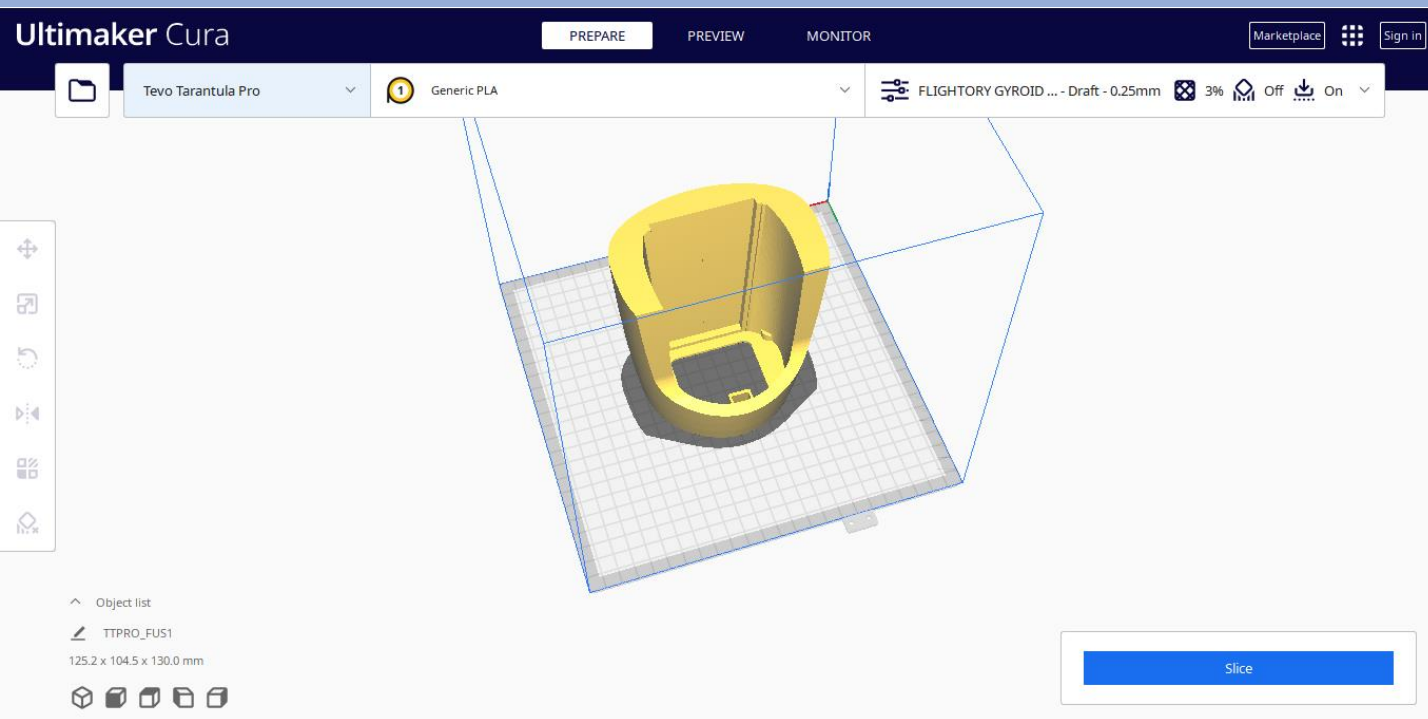
Main features of slicer LW-PLA profile

- layer height: 0,25 mm
- single wall 0,4mm thickness
- 3% Gyroid infill.
- Temperature: 235 degrees,
- flow 60%
- fan speed: 0%

The rest of the detailed settings are saved in the profile.

To print hard **PLA** or **PET-G** parts, use a default profile in CURA called **Draft**. **Layer height is 0.2 mm, infill is 20% Grid pattern**. Set the temperature around **220 degrees**. You can fine-tune these parameters to suit your needs and your printer.

Print Settings



All parts are suitable for printing on any standard printer with a small working area. I printed all parts on a 200 x 200mm area.

All elements can be printed without supports, but your printer may have a problem with some horizontal surfaces in some places. Depending on the effects, you may then consider turning on supports for some elements and cleaning the printed elements afterwards.

Reccomended RC Equipment

- Motor: 2830 1200KV Propdrive / 4108 620KV / 2814 900KV
- Propeller: 10x5 / 12x10 / 13x6.5
- ESC 40A
- Baterry: 4S Lipo or Lion from 3000 mAh to 21000 mAh
- Servos: 4x Corona 929MG Metal Gear or similar Micro Servos.
- Any Flight Controller (The prototype used a Pixhawk)
- GPS M8Q-5883 or similar

You can use your own configuration, of course. There is a parasolid motor mount file available in package. If you want to adapt it to different motor size then you can customize it.

Required accessories

ITEM	QUANTITY
12x650mm Carbon Tube (MAIN SPAR)	1
8x650mm Carbon Tube (SECOND SPAR)	1
8x380mm Carbon Tube (SPAR)	2
4x100mm Carbon Tube (VTAIL SPAR)	2
4x190mm Carbon Tube (VTAIL SPAR)	2
Thin CA Glue	20g tube
CA Activator	1 (optional but useful)
M3 Threaded Insert (Outer \varnothing 5mm, height 5mm)	18
M3 screw	18
Plastic M6x45mm screw	4
M6 nut	8
LW-PLA	1 roll
PLA	Small amount
Polyester hinge 20x25mm	14
Pen spring	2
Velcro strap	2
Servo extension cable	2 (optional)

PARTS LIST - FUSELAGE

PART	MATERIAL
FUS 1	LW-PLA
FUS 2	LW-PLA
FUS 3	LW-PLA
FUS 4	LW-PLA
FUS 5	LW-PLA
FUS 6	LW-PLA
FUS 7	LW-PLA
HATCH FRONT 1	LW-PLA
HATCH FRONT 2	LW-PLA
HATCH MIDDLE	LW-PLA
HATCH REAR	LW-PLA
NOSE	PLA
NOSE REINFORCEMENT	PLA
BATTERY PAD	PLA
INNER REINFORCEMENT (print 2)	PLA
FUS ROOT (print 2)	PLA
FIREWALL	PLA
LOCK 1 (print 2)	PLA
LOCK 2 (print 2)	PLA

PARTS LIST - WINGS

PART	MATERIAL
WING 1R	LW-PLA
WING 2R	LW-PLA
WING 3R	LW-PLA
WINGTIP R	LW-PLA
AIL R	LW-PLA
WING 1L	LW-PLA
WING 2L	LW-PLA
WING 3L	LW-PLA
WINGTIP L	LW-PLA
AIL L	LW-PLA
SERVO COVER R	PLA
SERVO COVER L	PLA
WING ROOT (print 2)	PLA
CONTROL HORN (print 2)	PLA

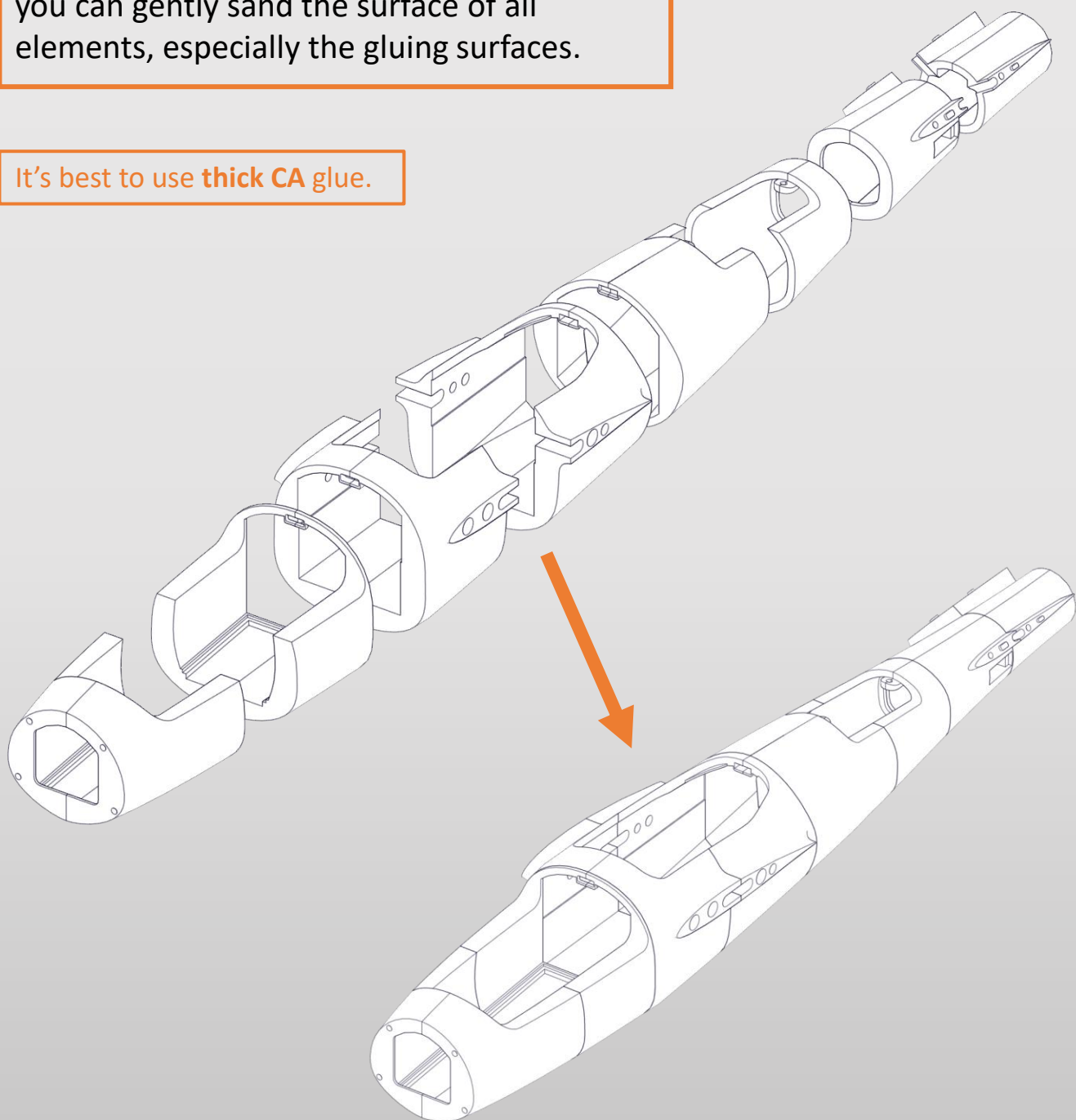
PARTS LIST - VTAIL

PART	MATERIAL
V TAIL 1R	LW-PLA
V TAIL 2R	LW-PLA
V TAIL 1L	LW-PLA
V TAIL 2L	LW-PLA
V TAIL RUDDER R	PLA / LW-PLA
V TAIL RUDDER L	PLA / LW-PLA
CONTROL HORN V TAIL (print 2)	PLA

Fuselage assembly

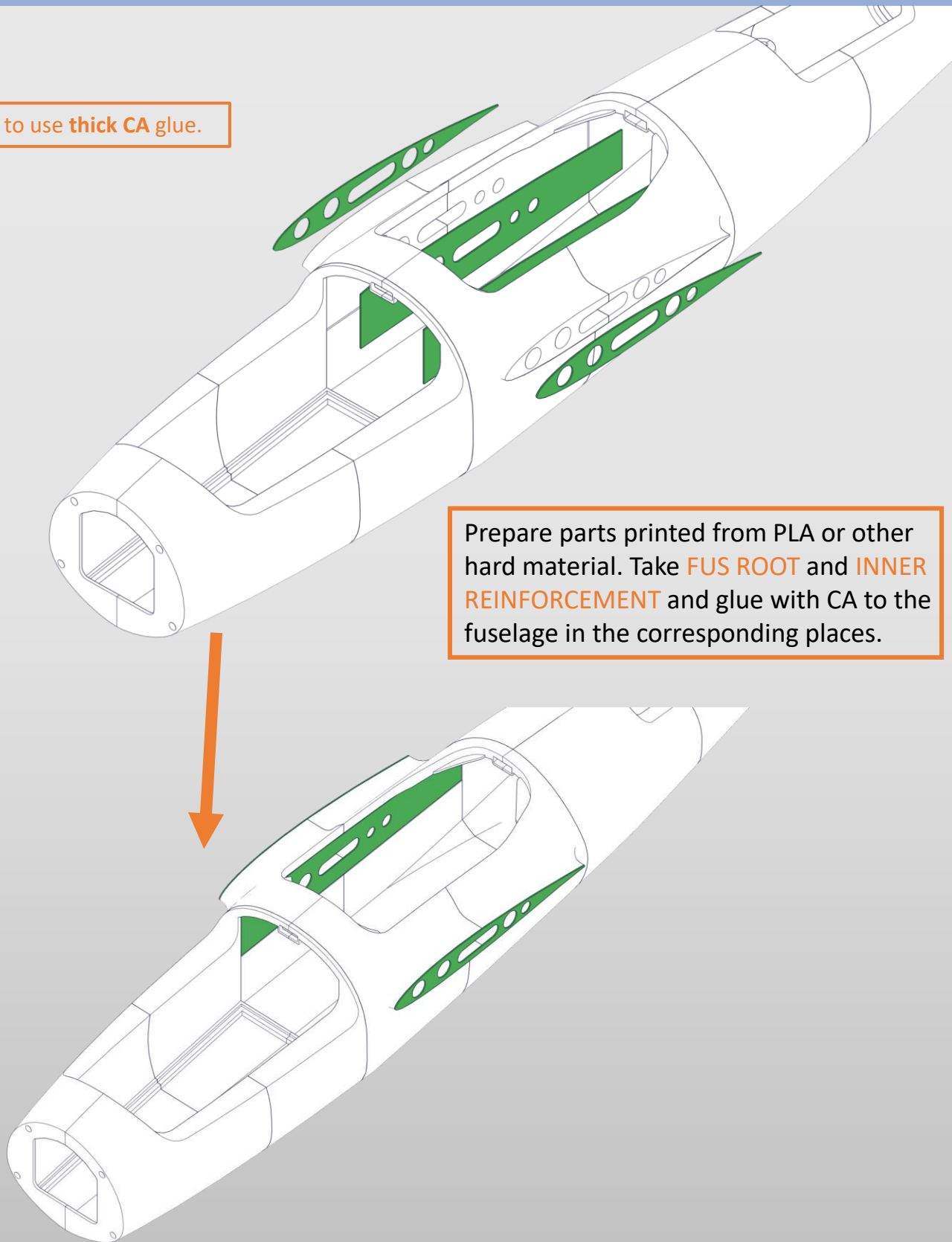
Prepare all fuselage segments. Before gluing, you can gently sand the surface of all elements, especially the gluing surfaces.

It's best to use **thick CA glue**.



Fuselage assembly

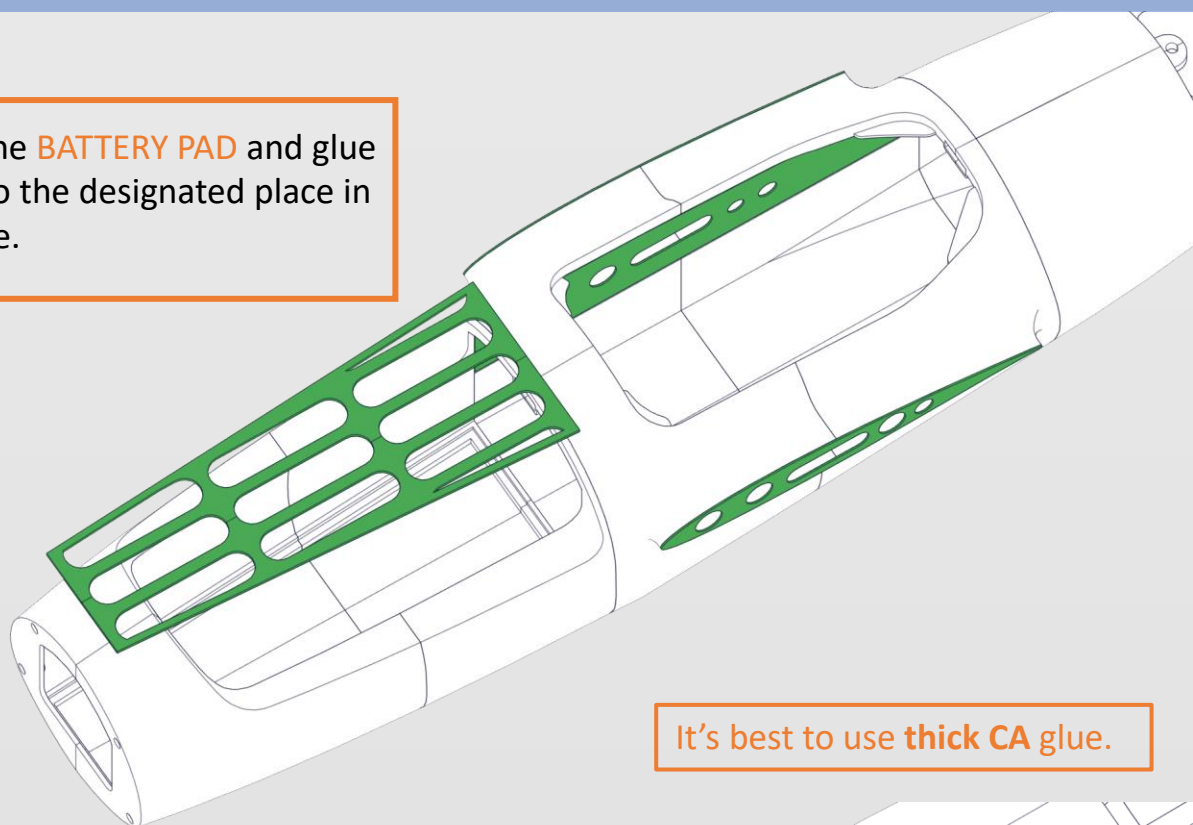
It's best to use **thick CA glue**.



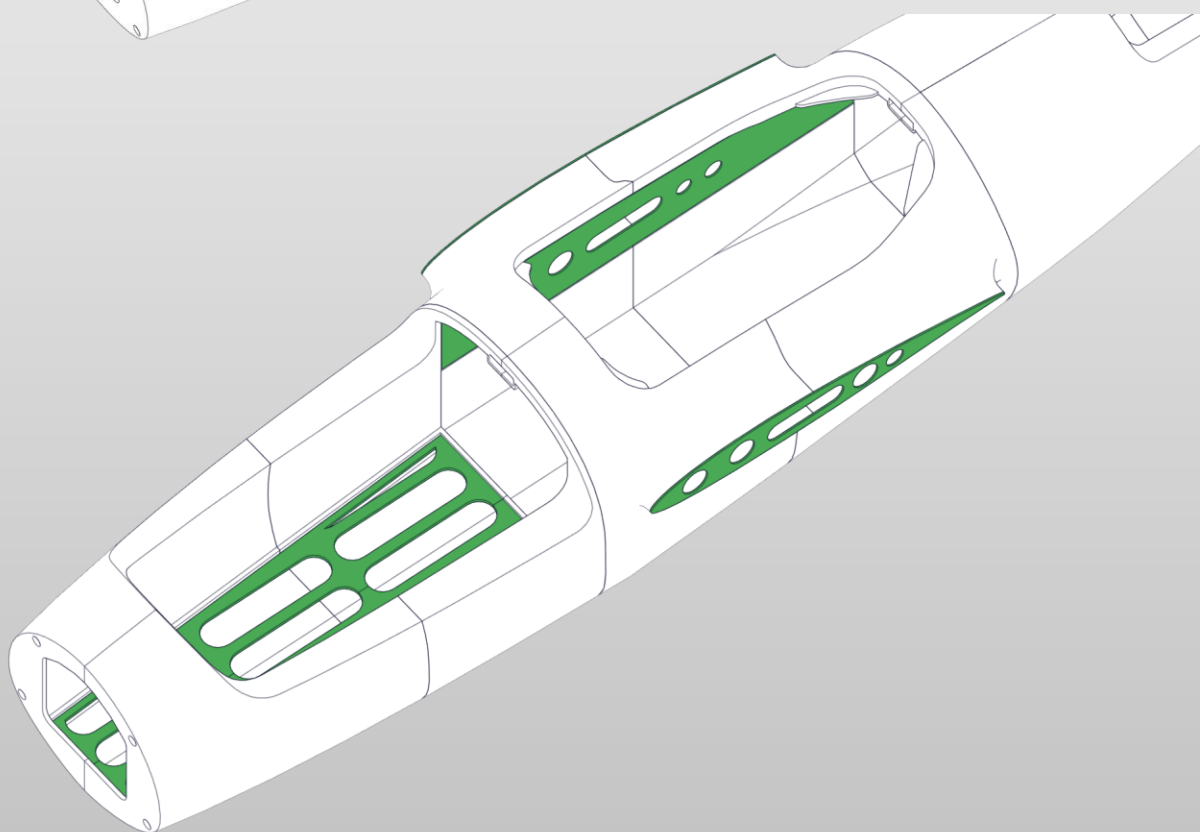
Prepare parts printed from PLA or other hard material. Take **FUS ROOT** and **INNER REINFORCEMENT** and glue with CA to the fuselage in the corresponding places.

Fuselage assembly

Now take the **BATTERY PAD** and glue with CA into the designated place in the fuselage.

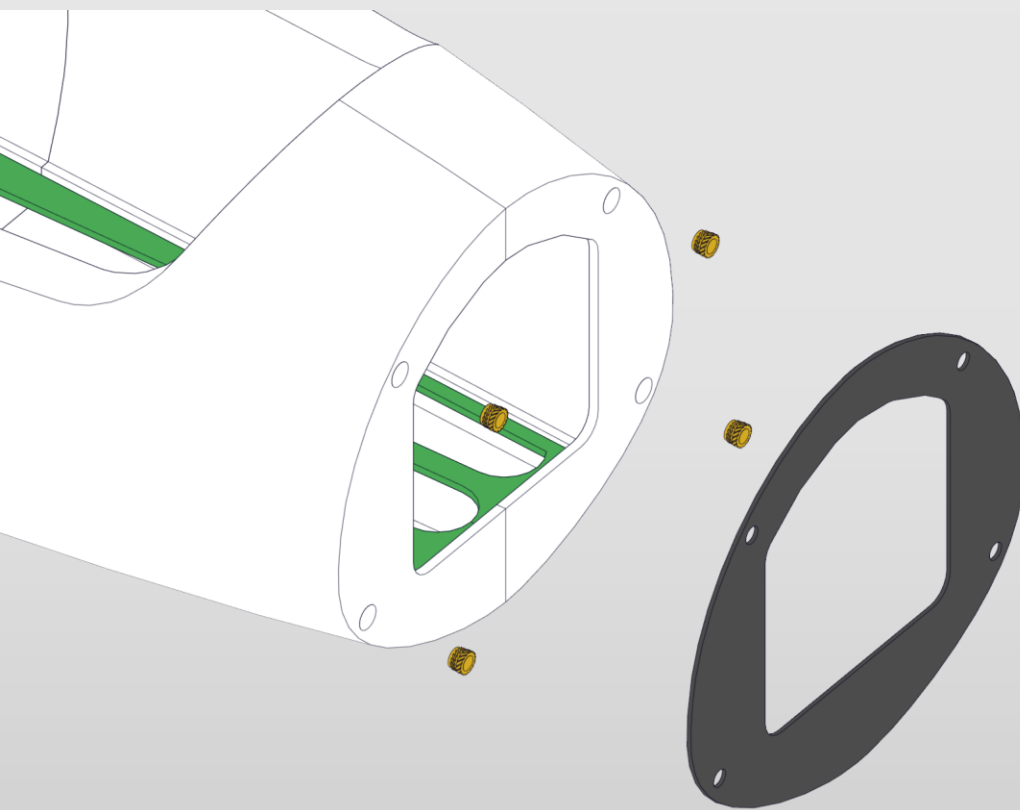


It's best to use **thick CA** glue.



Fuselage assembly

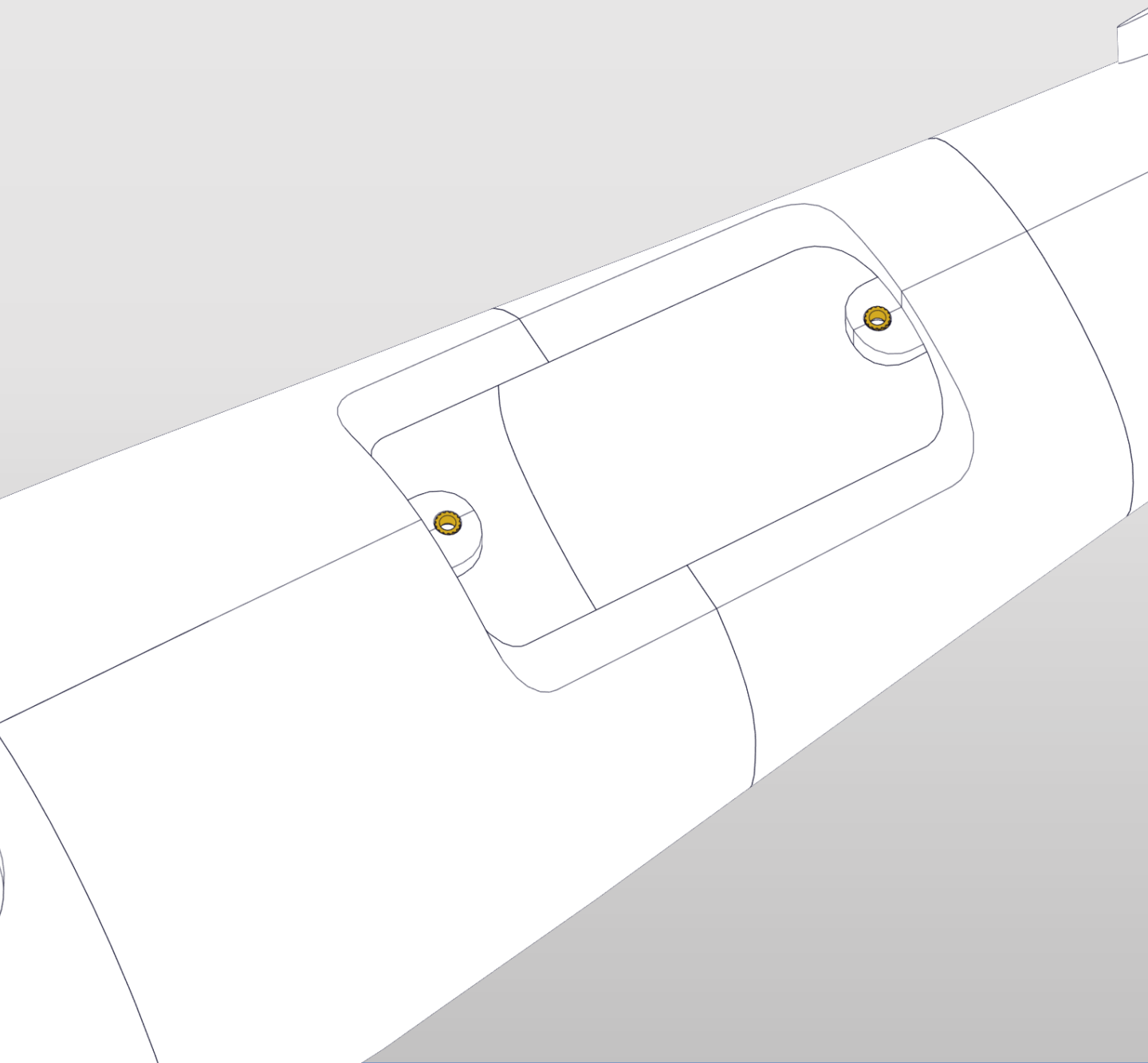
Now take M3 threaded inserts with an outer diameter of 5mm. Glue them into the designated places in the front part of the fuselage. You can use a slightly heated soldering iron for this. Then glue **NOSE REINFORCEMENT** printed from PLA or other hard material. This noticeably increases the strength of the nose when it is frequently unscrewed and prevents the threaded inserts from being torn out.



It's best to use **thick CA glue**.

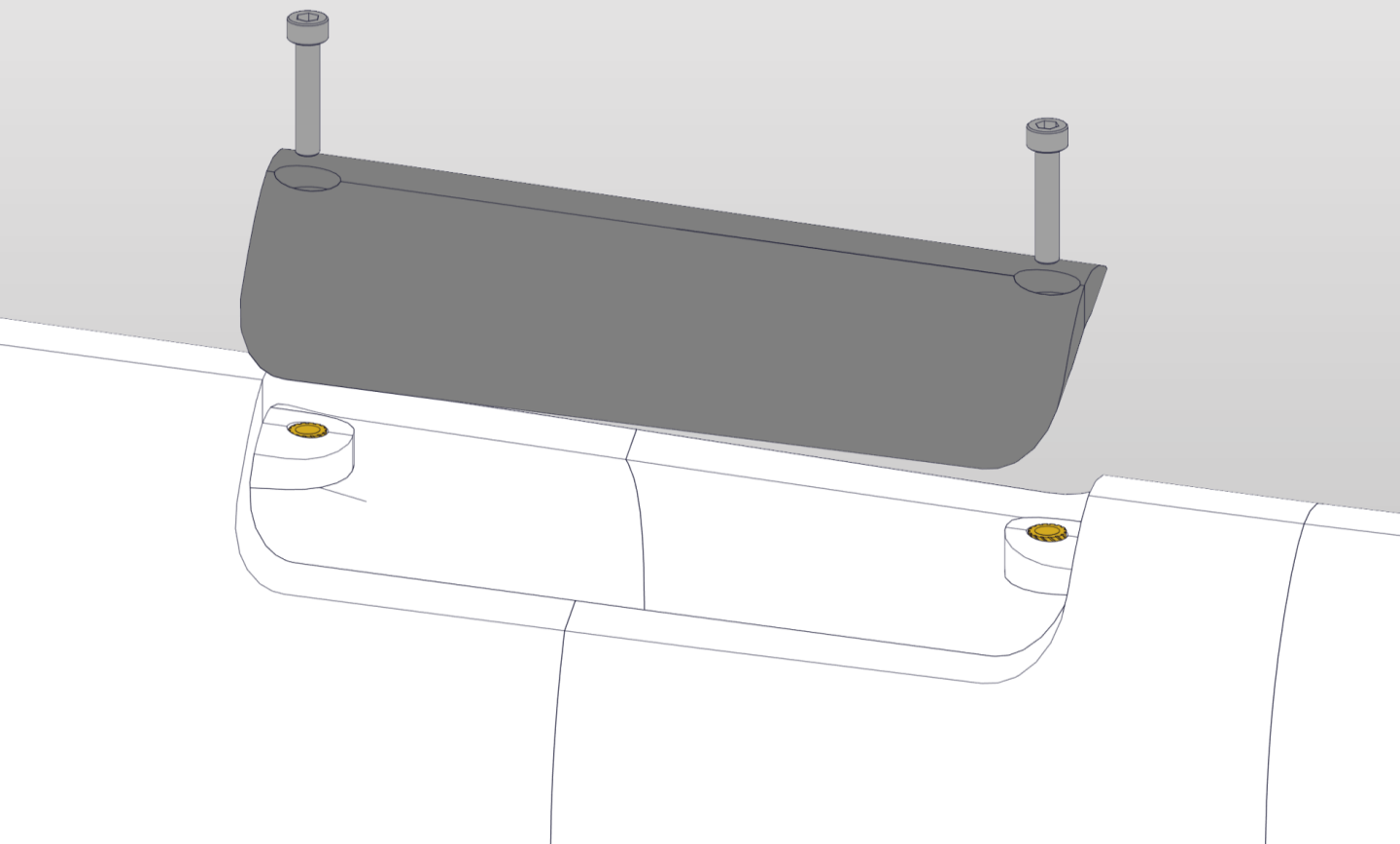
Hatches

Now glue the M3 threaded inserts in the same way into the hatch mount at the rear of the fuselage. This hatch will not be unscrewed often, it allows access to motor cables. You can mount a GPS on it, for example.

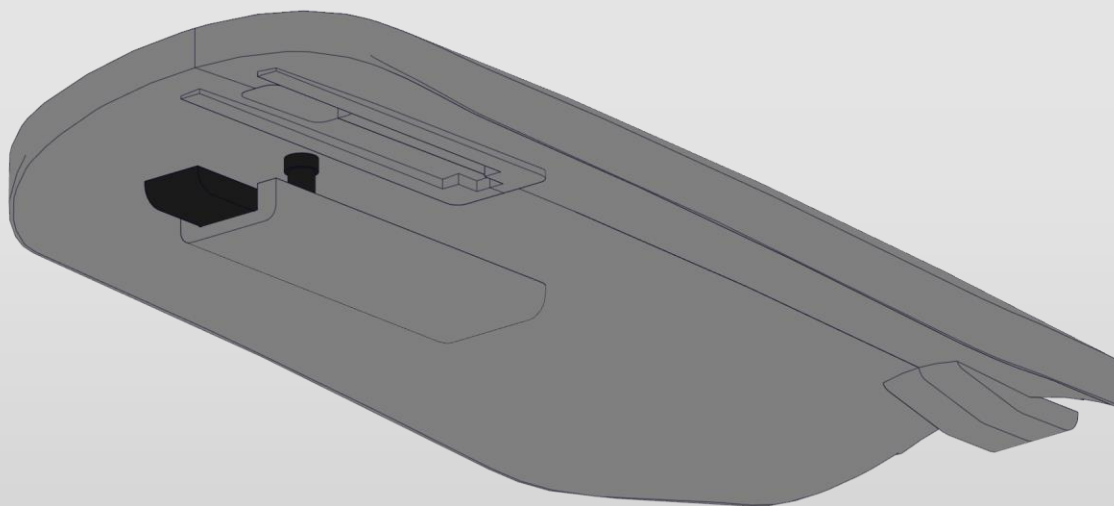
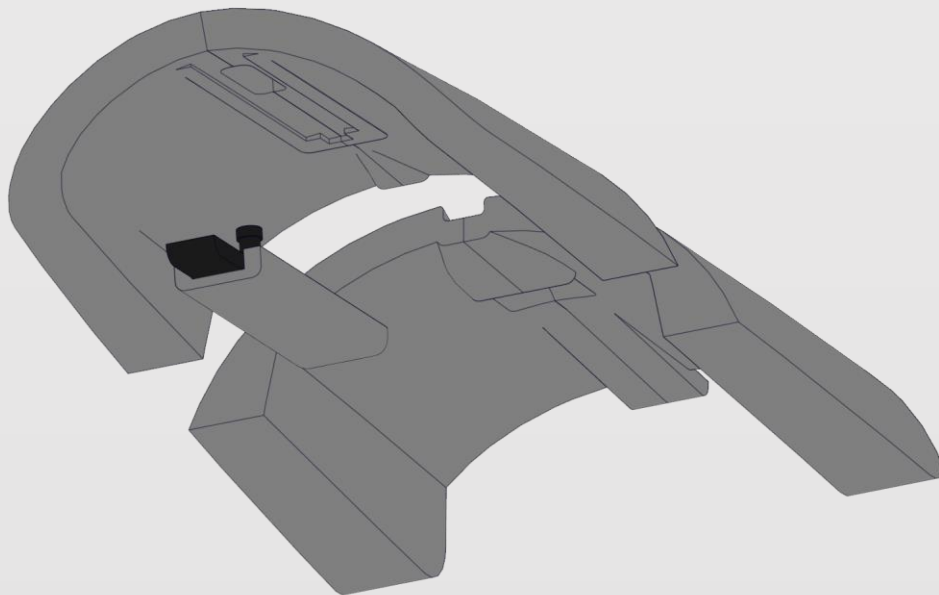


Hatches

Screw on the rear hatch with M3 screws.
You can put washers under the screws.

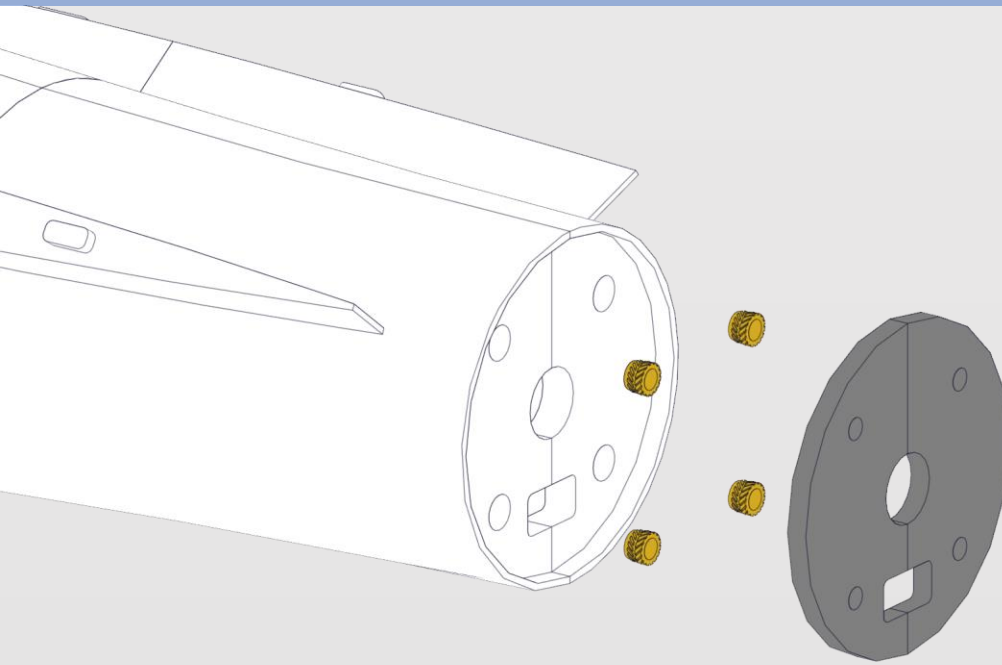


Hatches



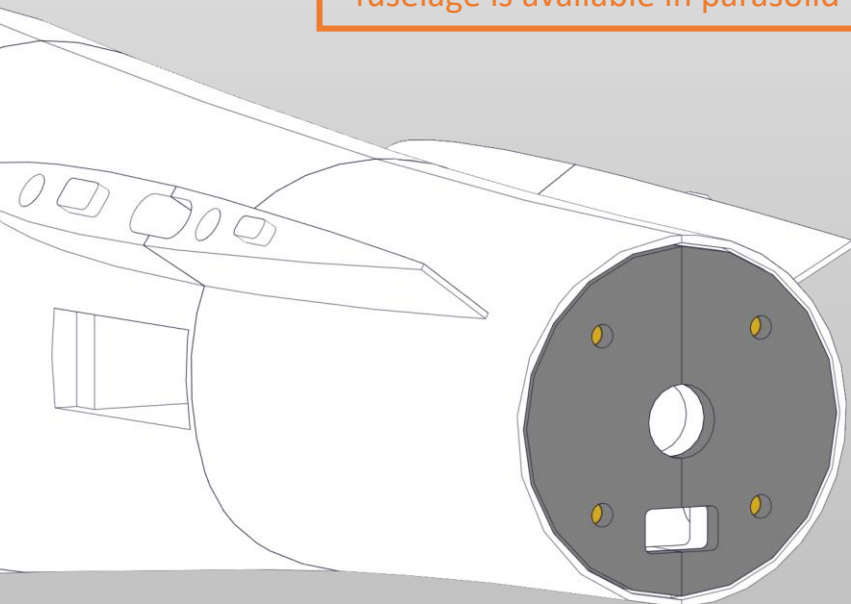
Now the installation of the front and center hatch. The front hatch consists of two parts. Simply glue it together with CA. On the inside of both hatches there is a designated place for **HATCH LOCK**. A small spring, such as from a pen, should be inserted into the lock. Glue locks into the hatches using CA, but carefully so that the glue does not spill and block the lock.

Firewall

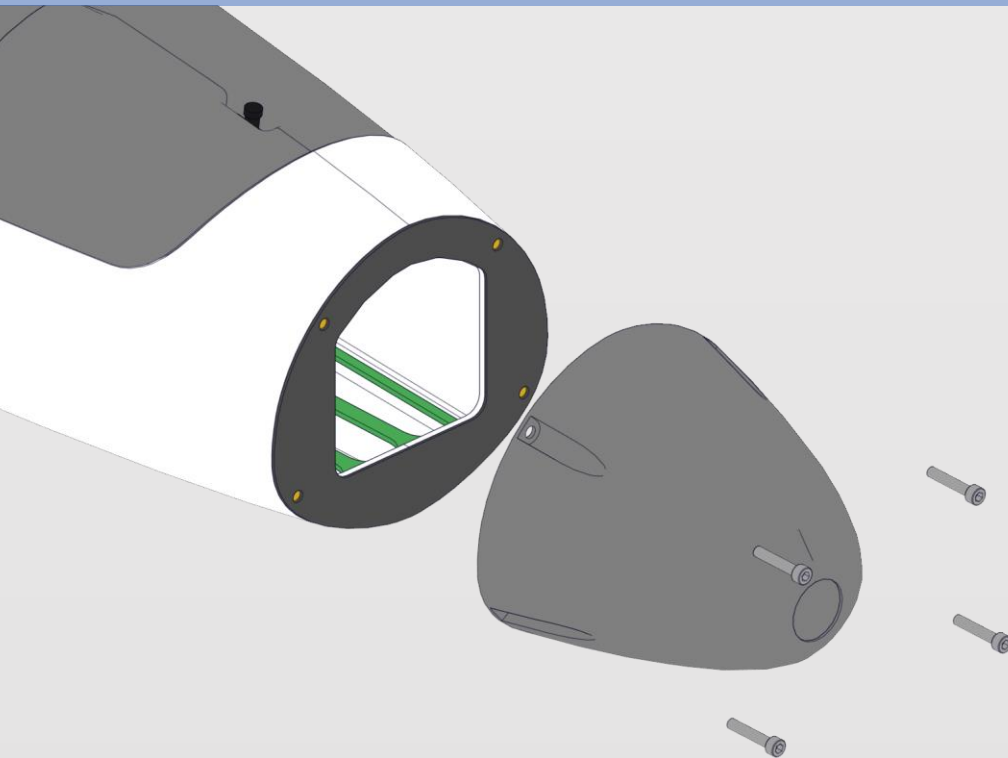


Now glue M3 threaded inserts in the rear of the fuselage for motor mount. Then glue **FIREWALL** printed from PLA or other hard material. This solution helps for easy installation of the motor and protects the threaded inserts from pulling out.

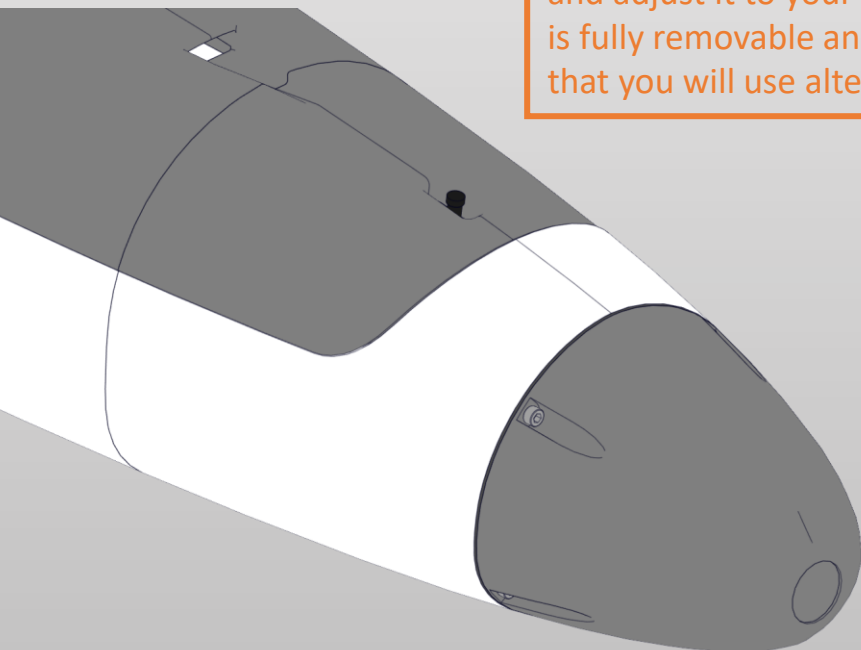
The mount is suitable for motors whose mounting screws are spaced on a circle with a diameter of 34mm. If you want to use a different motor you can adjust the mount. The rear part of the fuselage is available in parasolid format.



Nose assembly



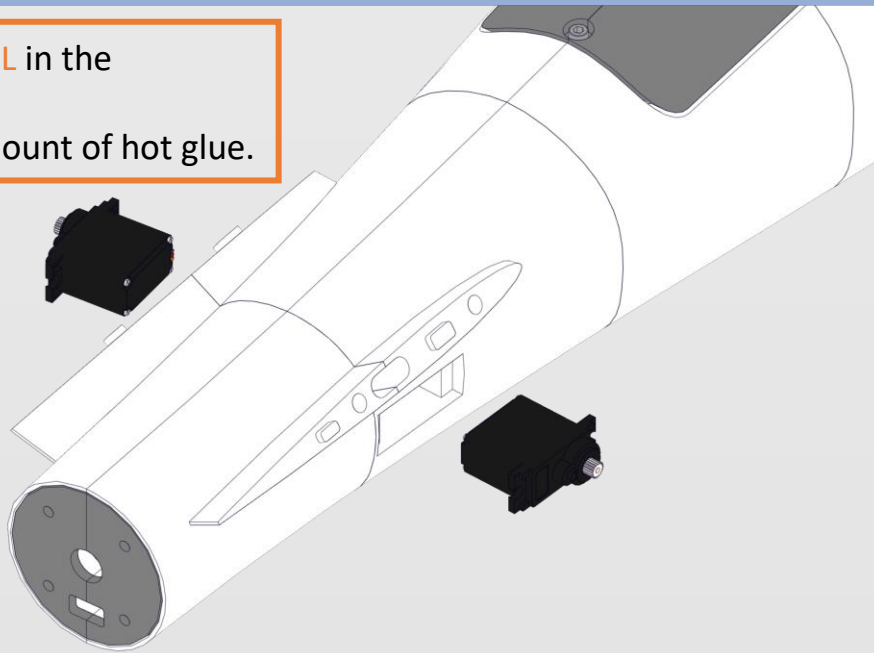
The nose can already be screwed on with M3 screws. I recommend printing the nose from PLA or other hard material. This is the basic version. **Nose is also available in parasolid format** So you can edit it freely and adjust it to your needs. As you can see, the nose is fully removable and you can have several types that you will use alternately.



V- TAIL

Now attach the servos to the **V TAIL** in the corresponding locations.

You can glue them with a small amount of hot glue.



Mount the V TAIL stabilizers. Use 4mm carbon tubes for reinforcement. You can lightly glue them with CA glue, but it is not necessary.

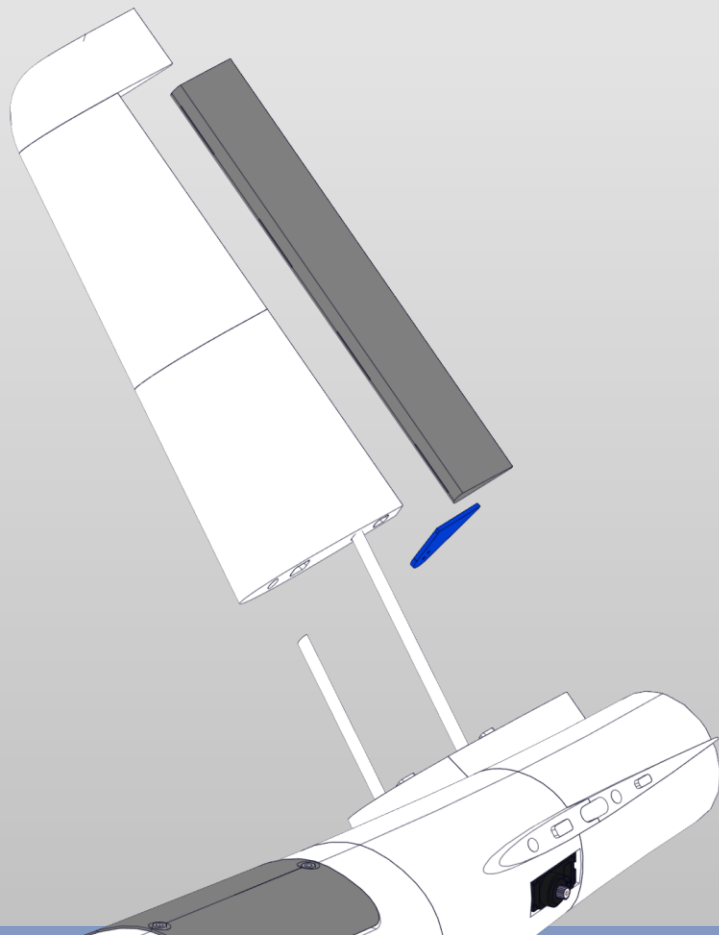
Glue stabilizers permanently into the fuselage also using CA glue. Rudders can be printed from LW-PLA or PLA.

I recommend doing it with PLA.

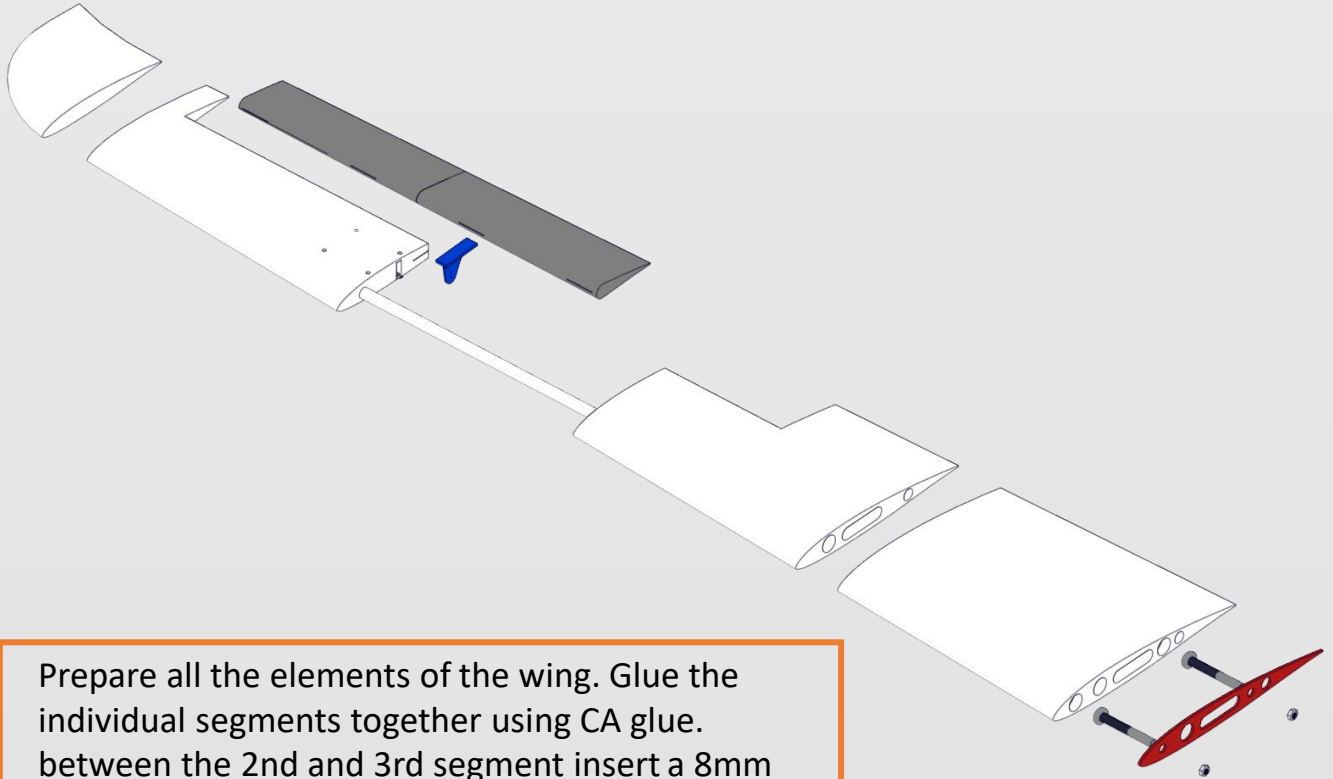
I recommend using 20x30mm polyester hinges. Such slots are prepared in the design. If there will be a problem with fitting the hinges, you can expand the holes with a sharp knife. You can also use hinges made of other materials or thinly print them from TPU.

Print control horns with PLA and glue it in the designated place with CA glue.

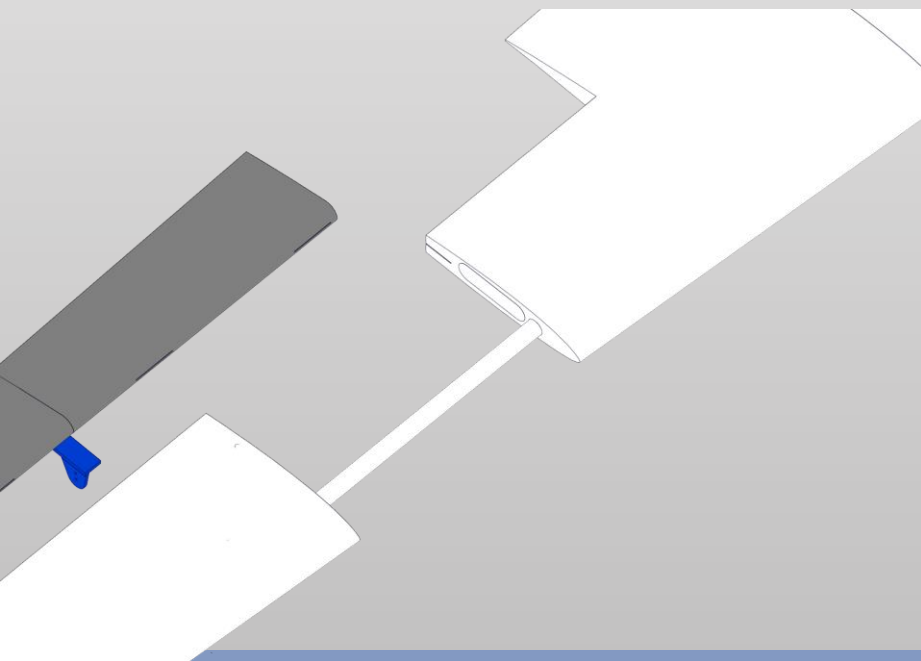
You can use any type of pushrods.



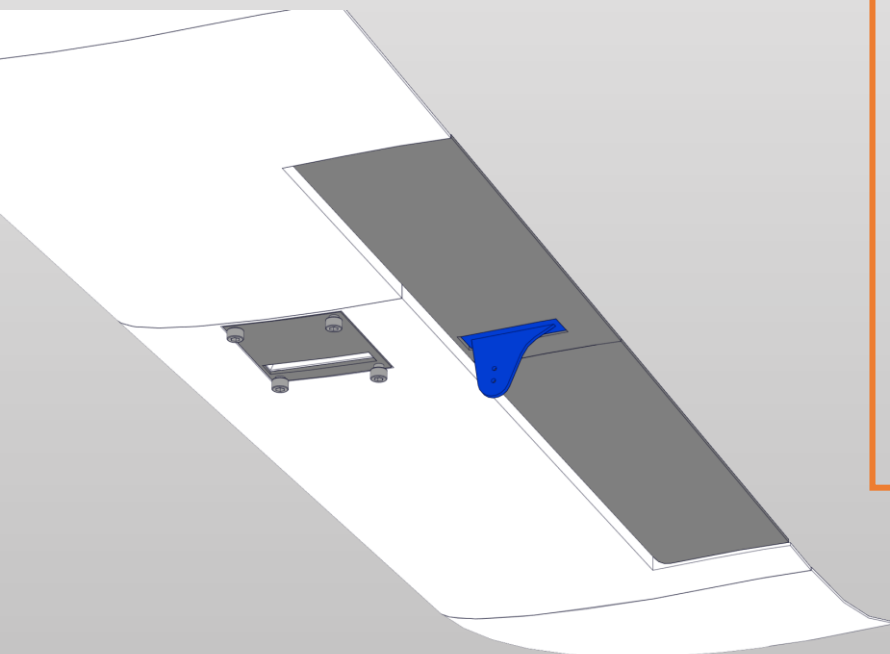
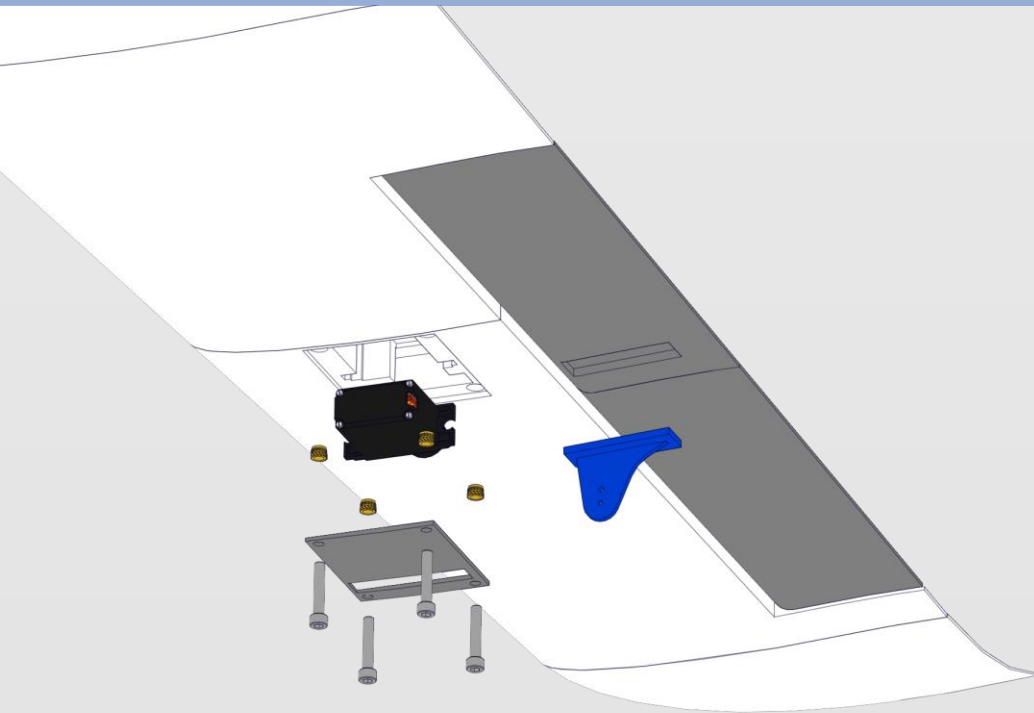
Wings assembly



Prepare all the elements of the wing. Glue the individual segments together using CA glue. between the 2nd and 3rd segment insert a 8mm carbon tube. You can lightly glue it with CA glue, but it is not necessary.

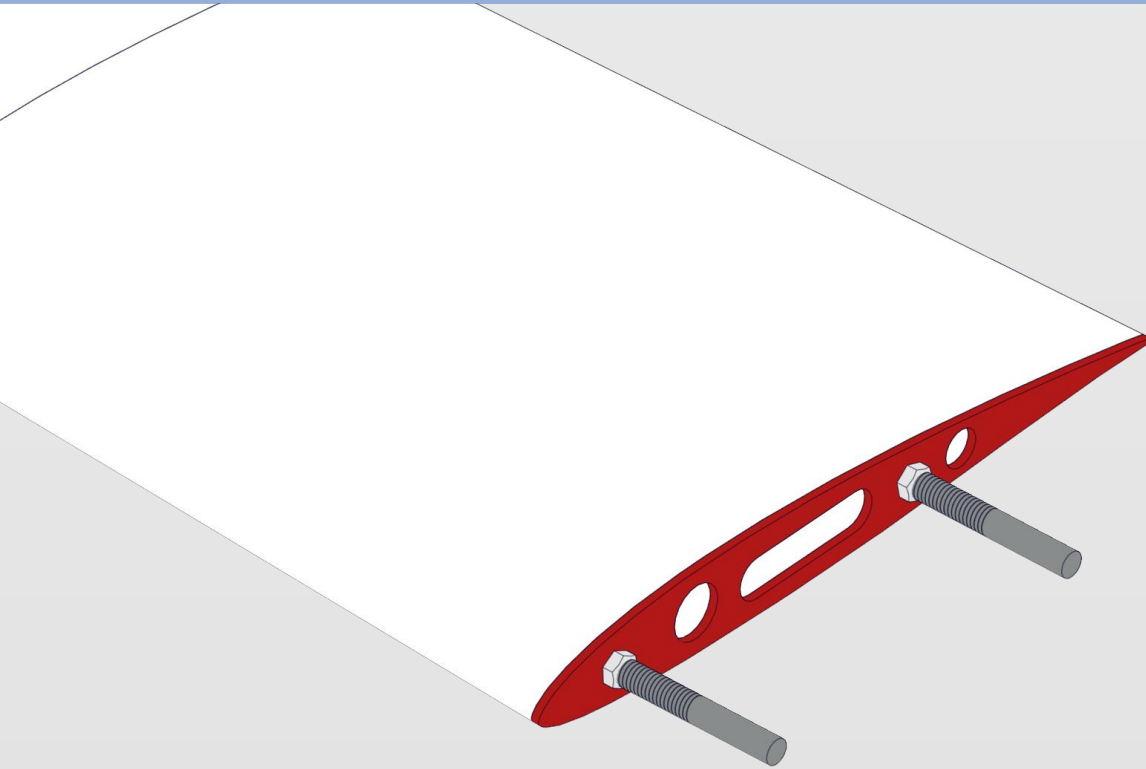


Wings assembly

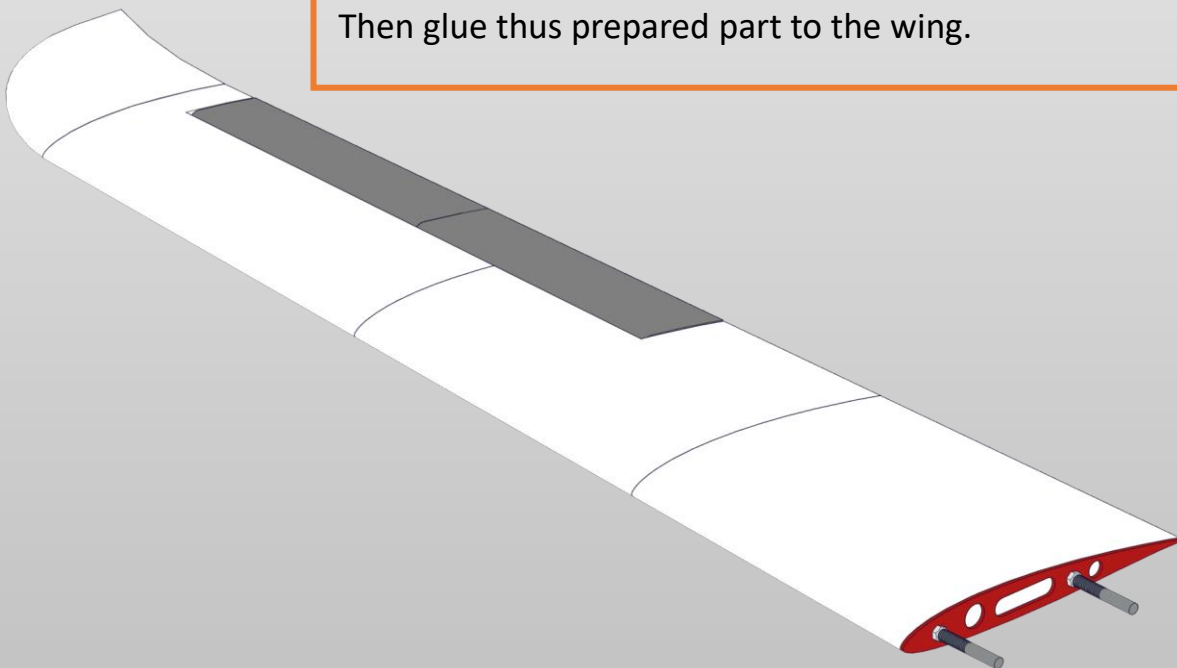


Now the installation of the wing servos. Glue the M3 threaded inserts. Before inserting the servo, attach a cable extender if the length of the cable is not sufficient and run it through the channel leading through the entire wing. You can glue servos using a small amount of hot glue, but it is not necessary. Just cover it with the servo cover and fasten it with M3 screws. As with the Rudders, do with the ailerons. Polyester hinges of 20x30mm are recommended. Use any pushrod you want.

Wing mount

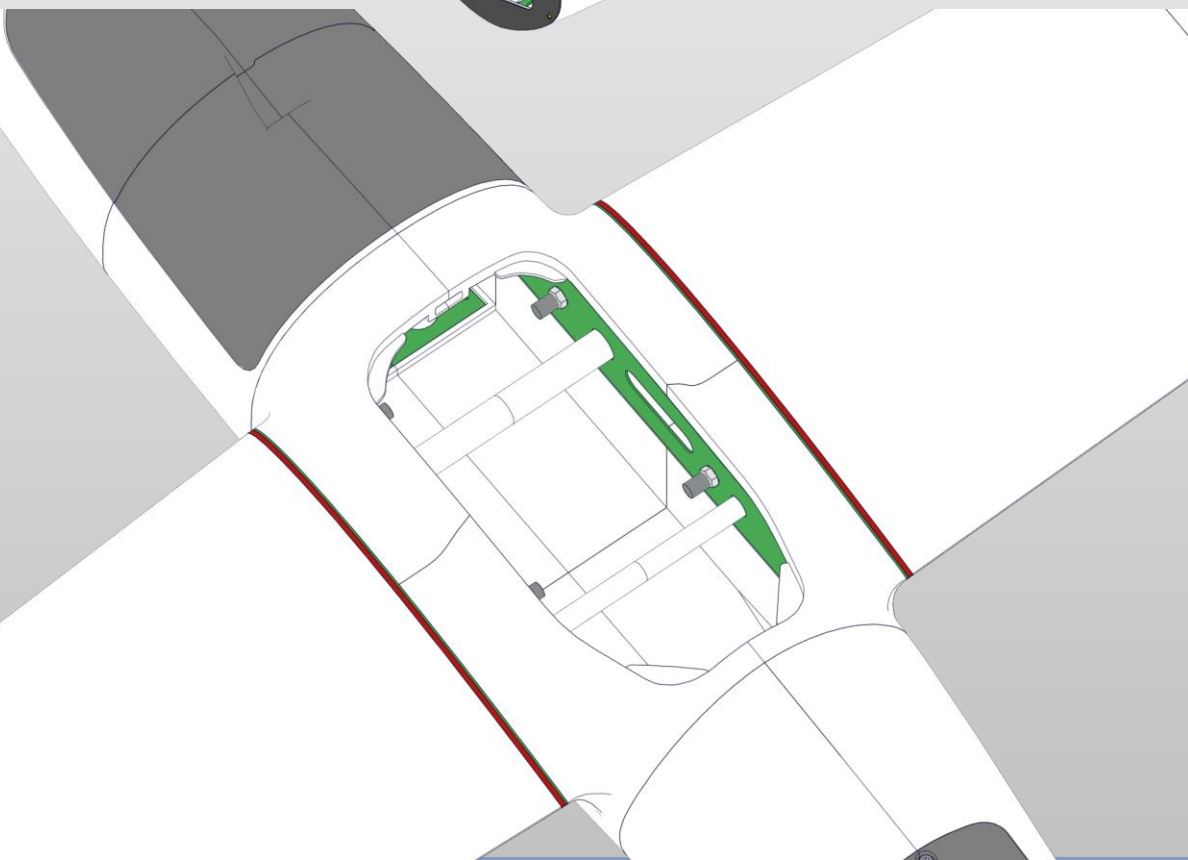
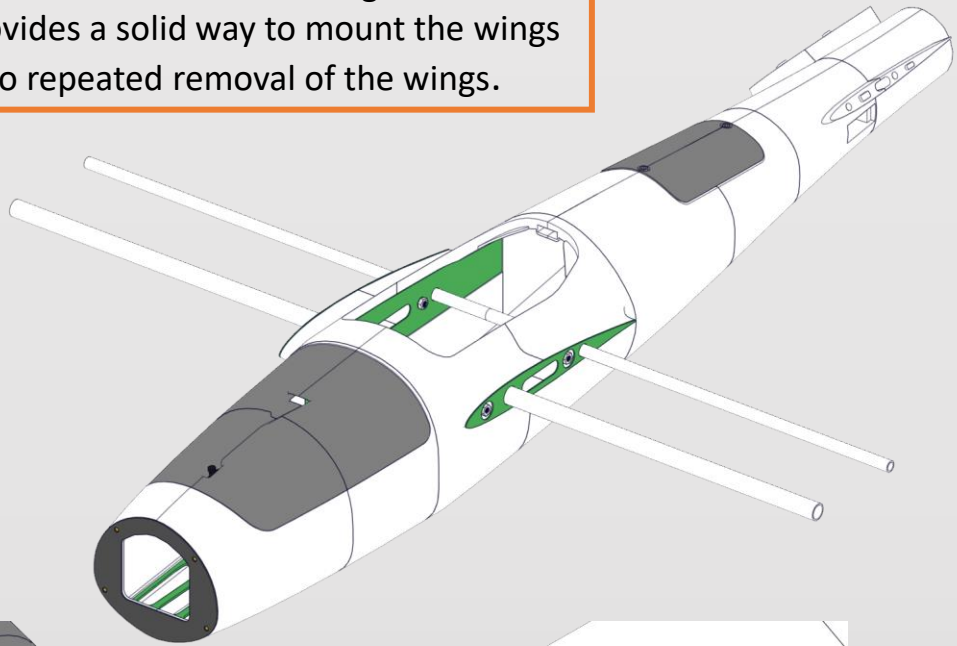


Take **WING ROOT** printed from PLA or other hard material and screw the plastic M6 screws as shown using nuts. Optimal length of the screws is 45mm.
Then glue this prepared part to the wing.

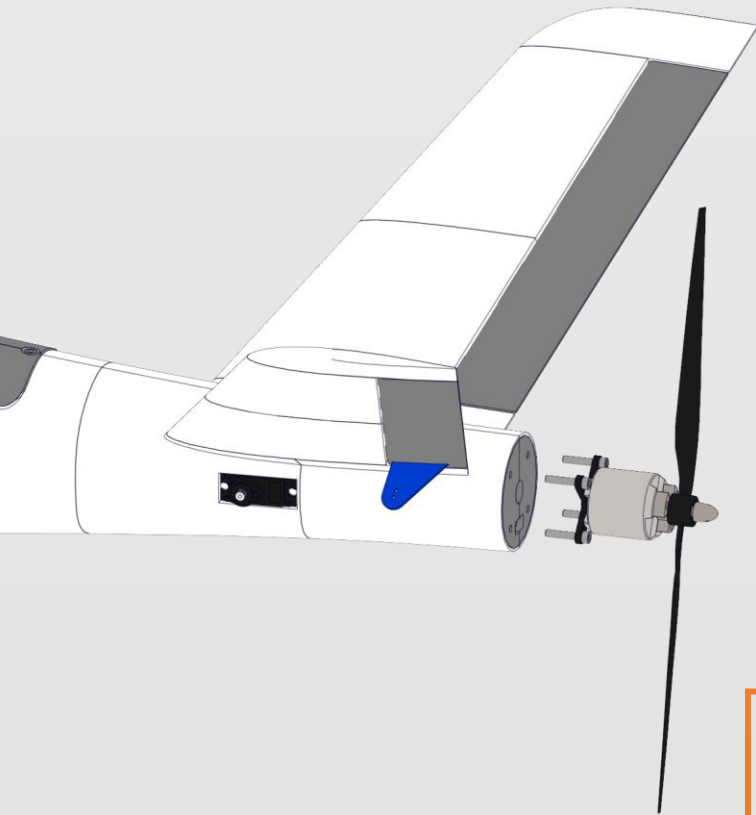


Wing mount

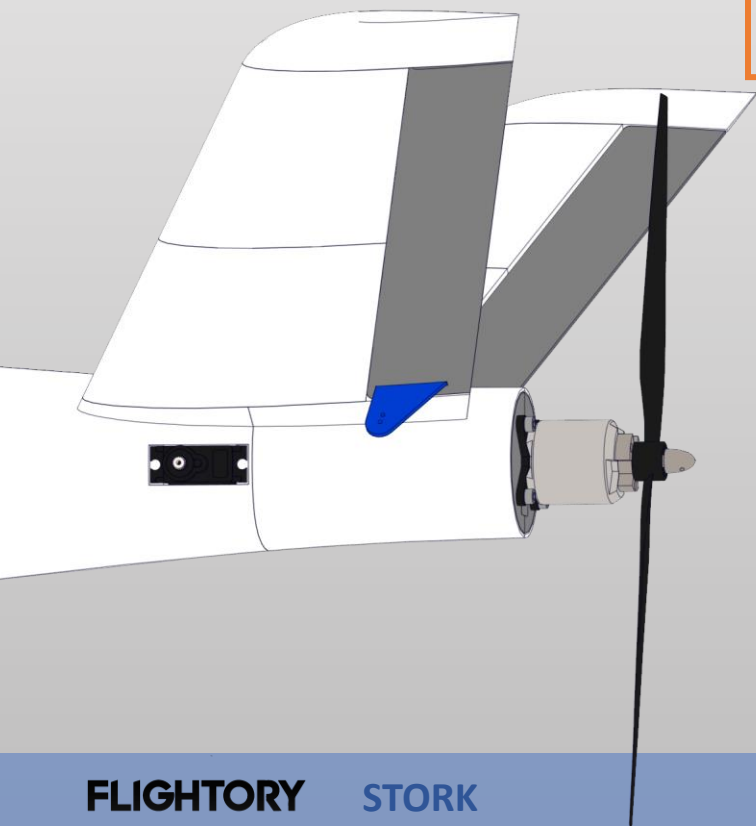
Insert carbon tubes with a diameter of 12 and 8mm in the corresponding places. Then insert the wings and push them to the fuselage. Screw the nuts to the plastic screws on the inside of the fuselage. This solution provides a solid way to mount the wings and is resistant to repeated removal of the wings.



Motor mount



Now screw the motor to the Firewall with an M3 screws. Route the engine cables through the hole in the bottom of Firewall. If necessary, extend the motor cables if they will not reach the ESC.



Electronics and preflight calibration



Arrange the hardware. Fuselage is very capacious and can accommodate all equipment. Use the Velcro straps to secure battery to the battery pad.

The best place for the flight controller is at the height of the wings. There is a flat surface to which you can stick the velcro or glue your mounts.

GPS can be placed inside the fuselage next to the FC or outside, e.g. on the rear hatch.

Use any FPV gear you want. If something needs to be adapted to your camera, vtx or antenna, look in the PARASOLID folder. There are parts that you can easily edit and adjust to your needs.

Before flying, make sure that the center of gravity is in the right place. The optimum position is 65mm from the leading edge. I do not recommend placing the center of gravity further back.

Test flights were performed with and without a flight controller. Manual flight is very stable. No trimming is required, rudders should be in neutral.

STORK

