

PLANE PRINT ABRAMS P-1 EXPLORER



NOTE: Slicing only works with CURA!



You can find the STL data at www.planeprint.com

PRINTING THE PARTS – PRINTING PROFILES

You may wonder why this 3D model is exclusive to CURA?

The most important thing with small RC model airplanes is always the **size to weight ratio**. The lighter a model is, the better its flight characteristics and also the flight time is significantly increased.

With our **unique design process**, we manage to offer weight-relevant parts in a **true 1-wall printing** process for both the outer skin and the filling. This allows us to save weight while maintaining the necessary stability.

Here we show you how to make adjustments from a standard CURA profile.

For this model we need only 4, easy to create profiles.

It is important to follow the instructions from PLANEPRINT.com to slice the part correctly.

However, it can be useful to perfect your 3D printing by making some additional settings depending on the printer and filament used.

For slicing all Planeprint models, four profiles have to be created in Cura:

PROFILE P1_fullbody
PROFILE P2_hollowbody
PROFILE P3_surface
PROFILE P4_flex

You can find the description at www.planeprint.com/print

IMPORTANT FOR THE 1-WALL-PRINT!

In order to print airfoils of the lowest possible weight with high stability, it is necessary to print with only one wall line (Nozzle 0.4 mm). Decisive here is the adhesion between the layers! To achieve this, you must print at a much higher temperature than normal. As a **guideline**, 230 ° C is a good starting point. The parts-cooling fan should be set to 0% or a maximum of 20%. Since not every printer works the same, it may be necessary to make small adjustments to these settings.



The development of a complex, airworthy RC flight model to express on any standard 3D printer is a very complex and extensive process. Therefore, we appeal to your fairness not to forward the STL data you have acquired to third parties. Our STL files are provided with indelible copyright watermarks that can be verified at any time.

Thank you for your understanding and have fun with your PLANEPRINT MODEL!

PROFILE P1_FULLBODY PLA or Tough PLA

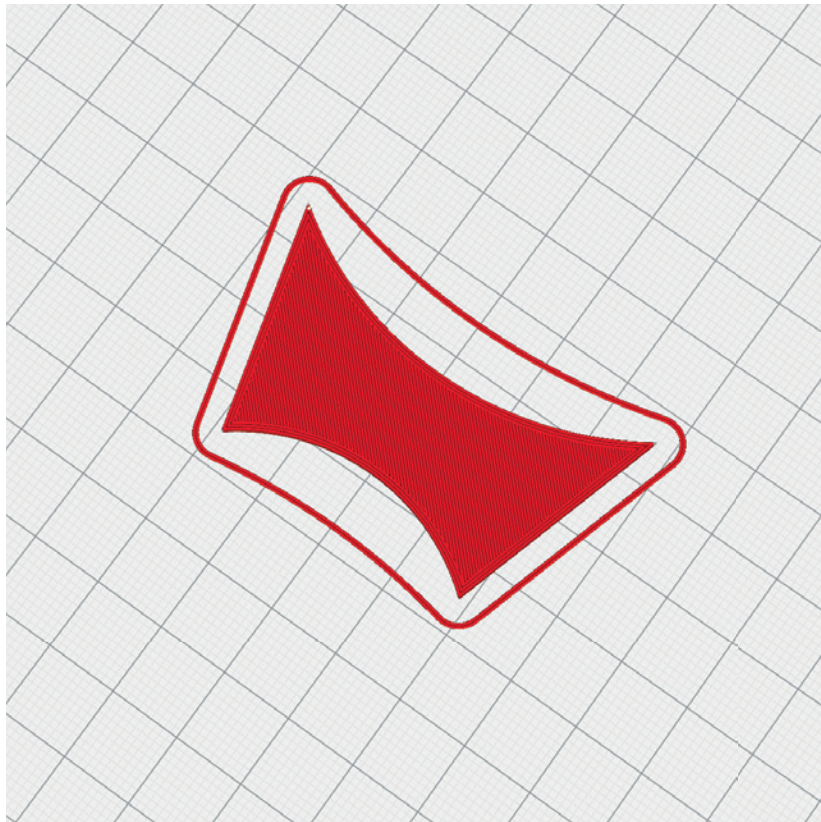
The following parts must be sliced with the PROFILE P1_FULLBODY.
Please note the additional settings for the individual parts!

Bottle finder_P1_Abrams.stl

MATERIAL PLA or PLA+, Weight: ~ 1 g

ADDITIONAL SETTINGS

None required

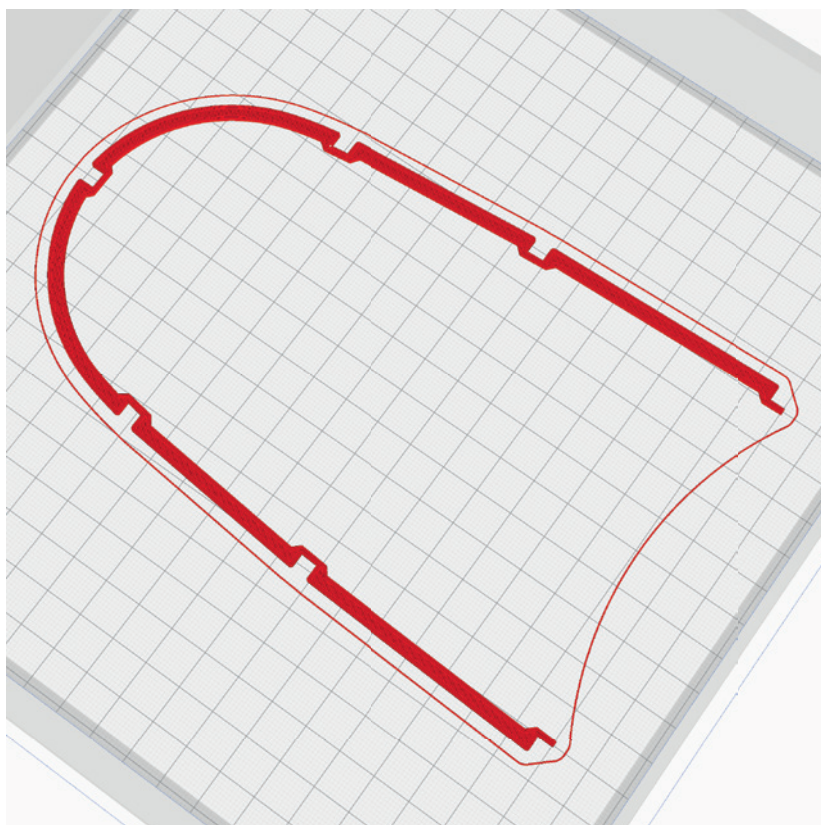


Canopy 1 strat_P1_Abrams.stl

MATERIAL PLA or PLA+, ~ 3 g

ADDITIONAL SETTINGS

None required



PROFILE P1_FULLBODY PLA or Tough PLA

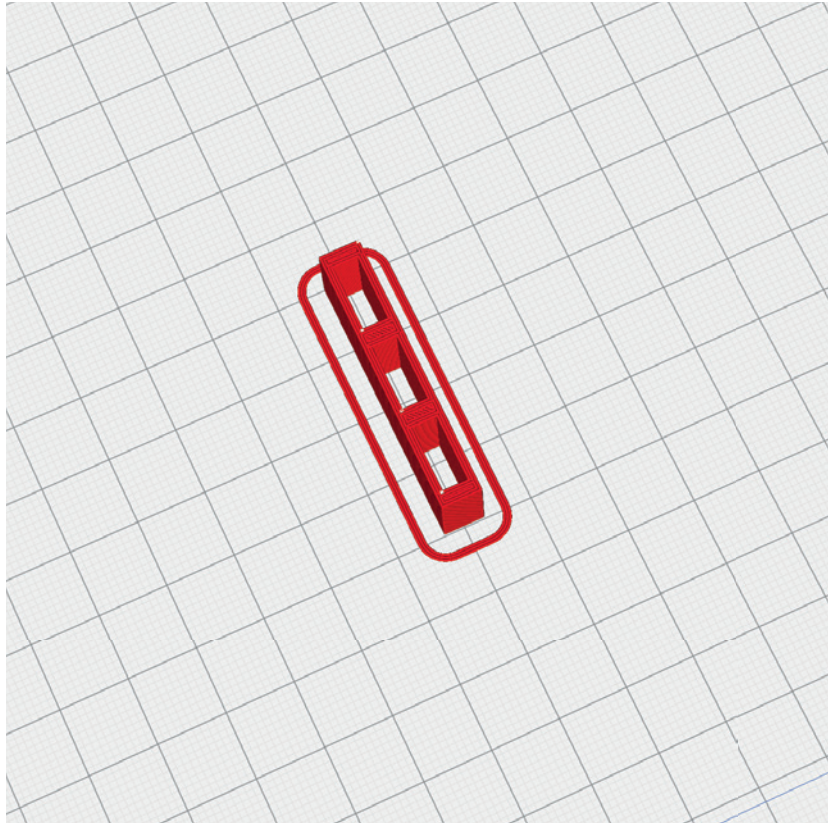
The following parts must be sliced with the PROFILE P1_FULLBODY.
Please note the additional settings for the individual parts!

Controller mount_P1_Abrams.stl

MATERIAL PLA or PLA+, ~ 2 g

ADDITIONAL SETTINGS

None required

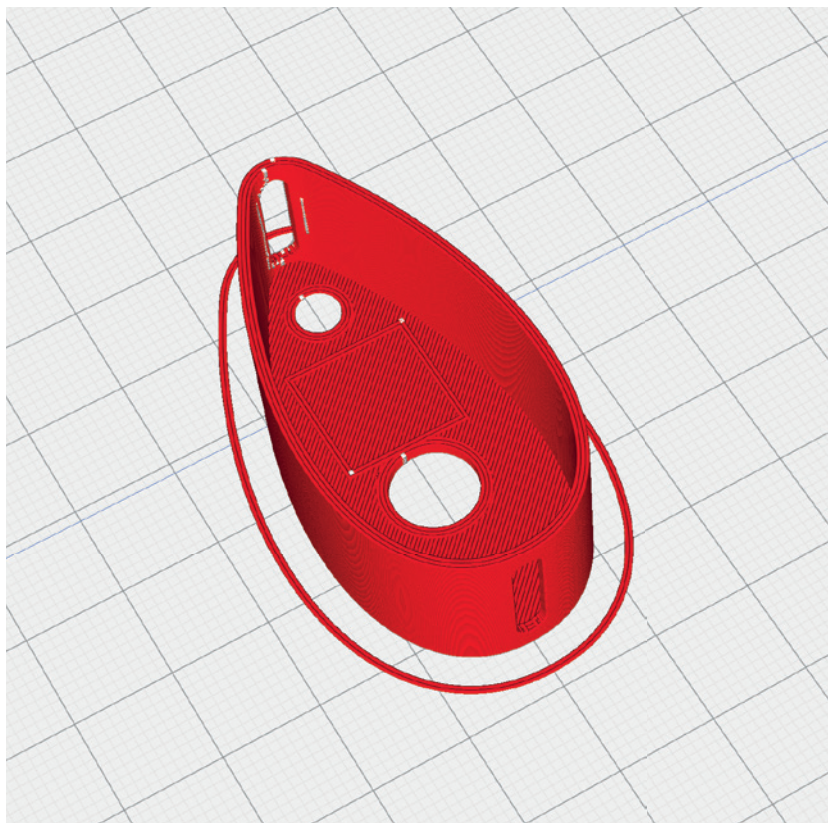


Gear 1_P1_Abrams.stl

MATERIAL PLA or PLA+, ~ 3 g

ADDITIONAL SETTINGS

- Print this part twice



PROFILE P1_FULLBODY PLA or Tough PLA

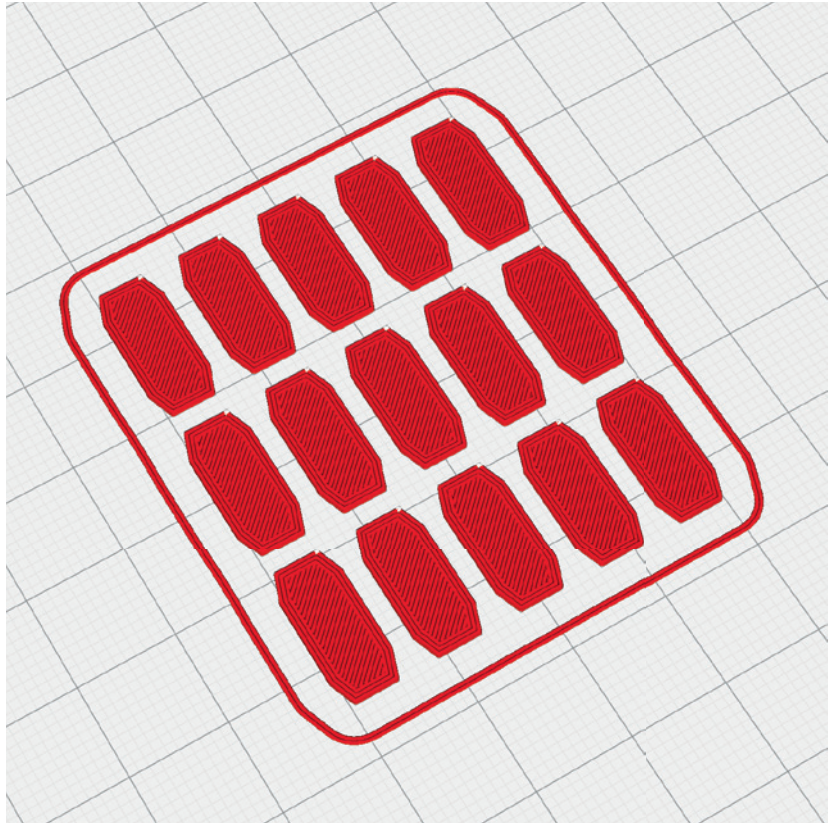
The following parts must be sliced with the PROFILE P1_FULLBODY.
Please note the additional settings for the individual parts!

Interconnects_P1_Abrams.stl

MATERIAL PLA or PLA+, ~ 1 g

ADDITIONAL SETTINGS

- Print this part twice

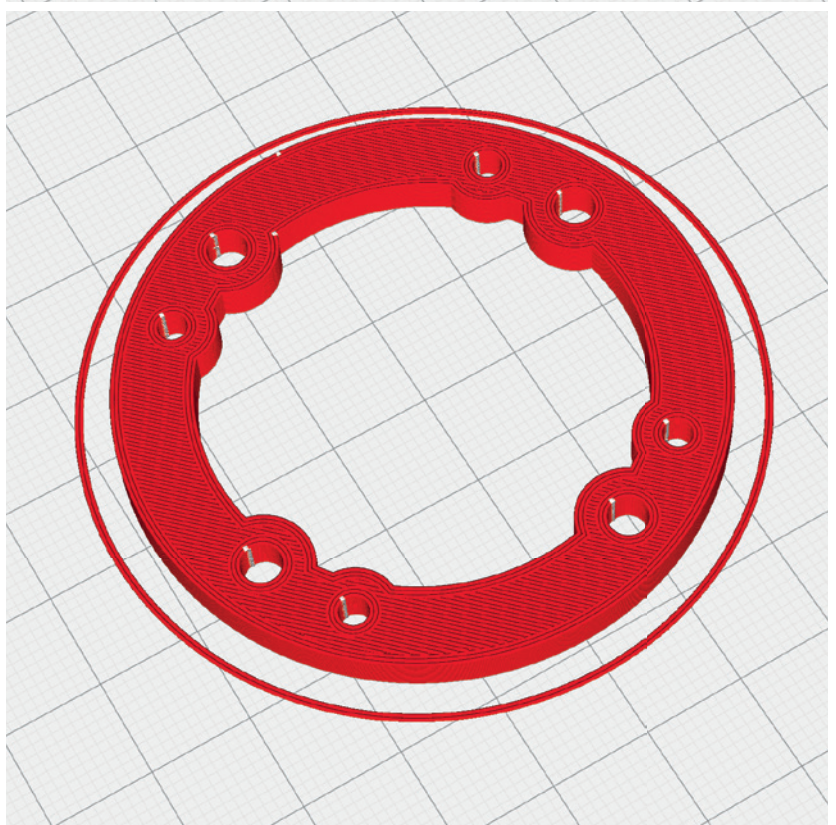


Motormount 1 48mm_P1_Abrams.stl

MATERIAL PLA or PLA+, ~ 6 g

ADDITIONAL SETTINGS

If 48 mm does not fit use:
Motormount 1 customizable_P1_Abrams



PROFILE P1_FULLBODY PLA or Tough PLA

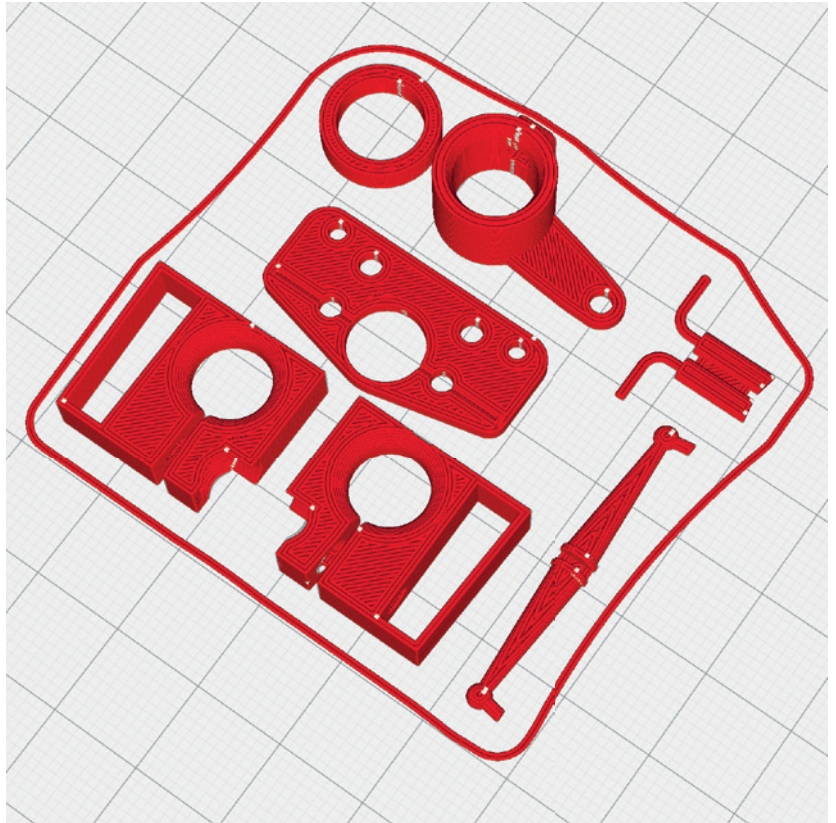
The following parts must be sliced with the PROFILE P1_FULLBODY.
Please note the additional settings for the individual parts!

Parts_P1_Abrams.stl

MATERIAL PLA or PLA+, ~ 5 g

ADDITIONAL SETTINGS

None required



Springs_P1_Abrams.stl

MATERIAL PLA or PLA+, ~ 5 g

ADDITIONAL SETTINGS

None required



PROFILE P1_FULLBODY PLA or Tough PLA

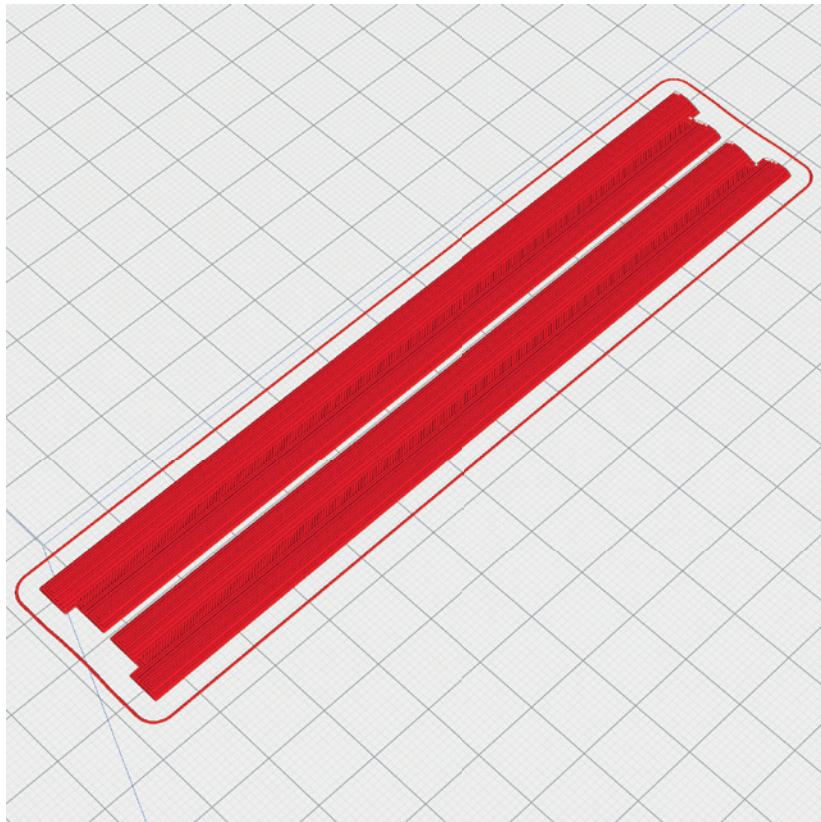
The following parts must be sliced with the PROFILE P1_FULLBODY.
Please note the additional settings for the individual parts!

Strats_P1_Abrams.stl

MATERIAL PLA or PLA+, ~ 4 g

ADDITIONAL SETTINGS

None required

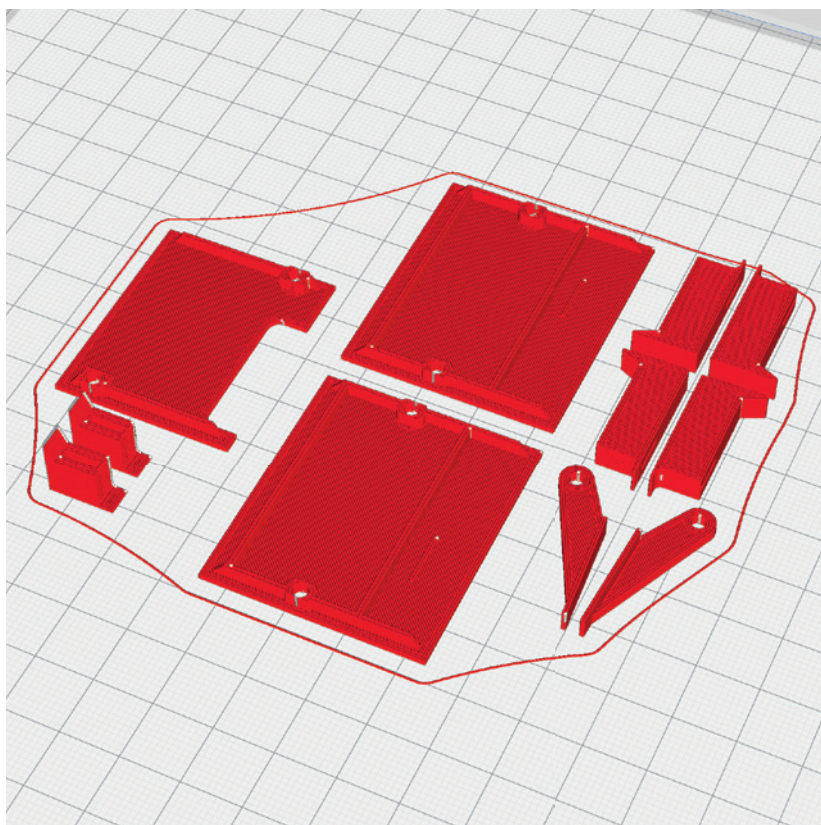


Servocovers_P1_Abrams.stl

MATERIAL PLA or PLA+, ~ 12 g

ADDITIONAL SETTINGS

None required



PROFILE P1_FULLBODY PLA or Tough PLA

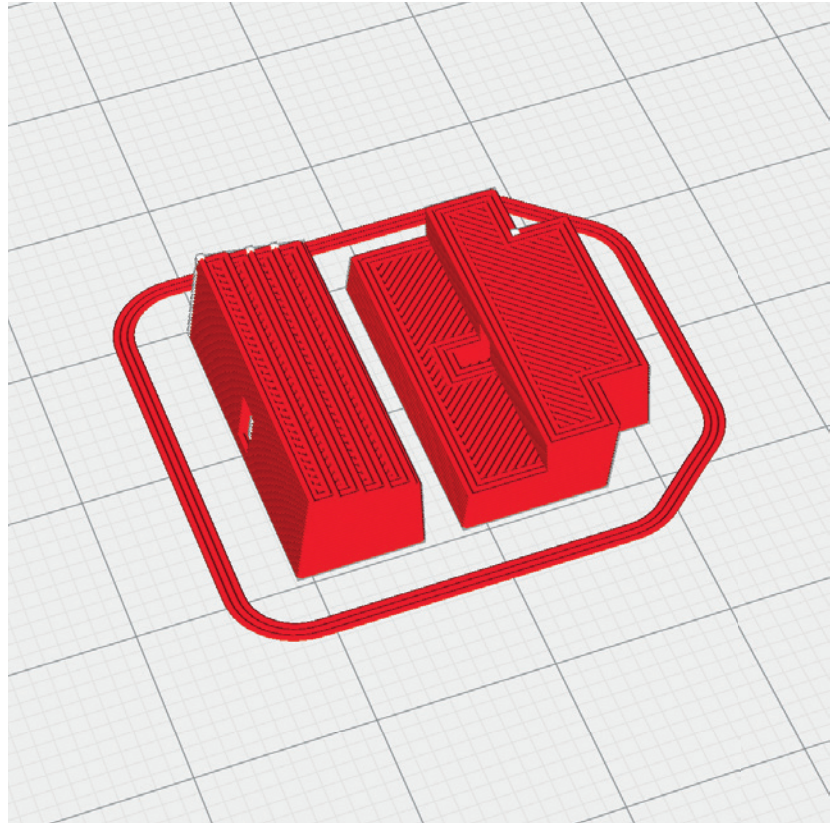
The following parts must be sliced with the PROFILE P1_FULLBODY.
Please note the additional settings for the individual parts!

Servomount rudder_P1_Abrams.stl

MATERIAL PLA or PLA+, ~ 2 g

ADDITIONAL SETTINGS

None required



PROFILE P2_HOLLOWBODY Light-Weight LW-PLA

The following parts must be sliced with the PROFILE P2_HOLLOWBODY.
Please note the additional settings for the individual parts!

Gear 2_P2_Abrams.stl

MATERIAL LW-PLA, ~ 27 g*

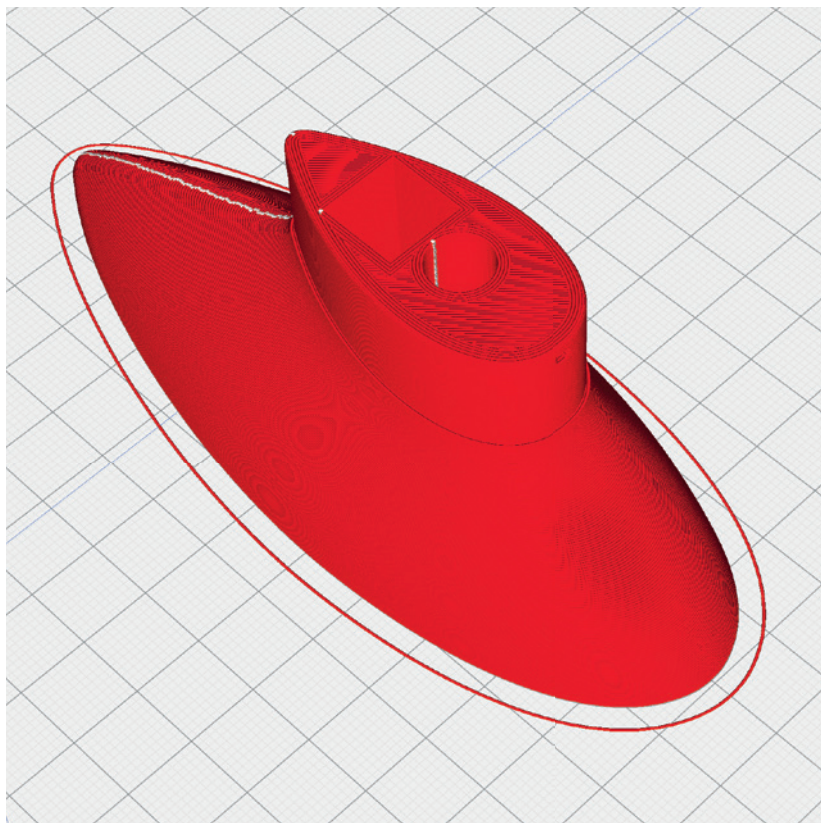
*Display in Cura. The actual weight is 15 grams

ADDITIONAL SETTINGS

- Print this part twice
- Wall Line Count: 3
- Top Layers: 4
- Bottom Layers: 1

We recommend printing this part from Lightweight PLA, if you still want to print it from PLA, please use these settings:

- Wall Line Count: 2
- Top Layers: 2
- Bottom Layers: 1



Gear 3_P2_Abrams.stl

MATERIAL LW-PLA, ~ 20 g*

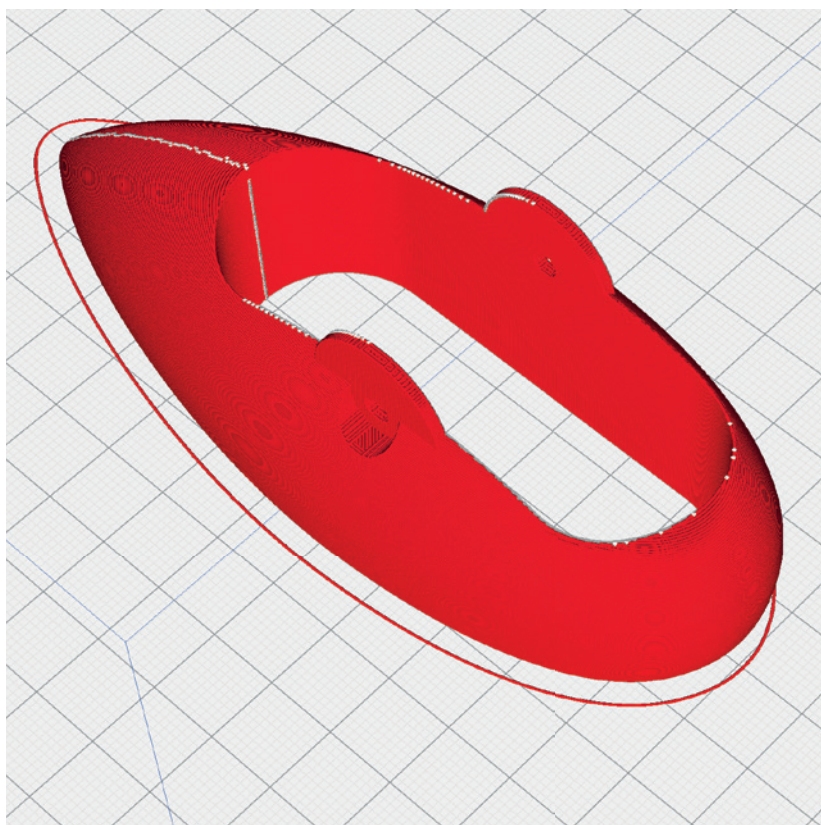
*Display in Cura. The actual weight is 10 grams

ADDITIONAL SETTINGS

- Print this part twice
- Wall Line Count: 3
- Top Layers: 2
- Bottom Layers: 1

We recommend printing this part from Lightweight PLA, if you still want to print it from PLA, please use these settings:

- Wall Line Count: 2
- Top Layers: 2
- Bottom Layers: 1



PROFILE P2_HOLLOWBODY PLA or Tough PLA

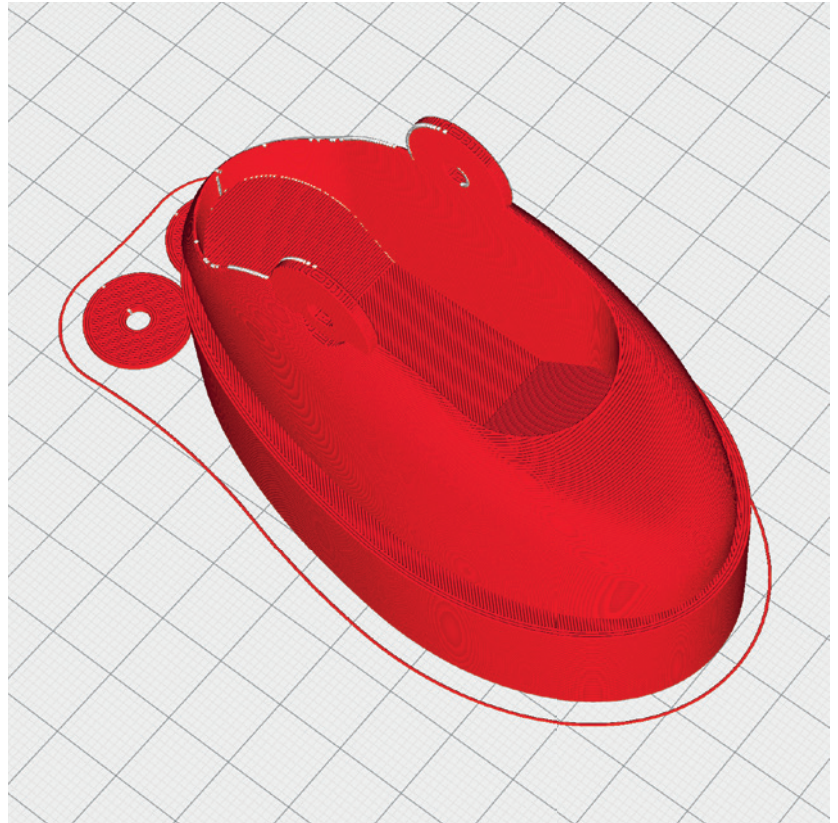
The following parts must be sliced with the PROFILE P2_HOLLOWBODY.
Please note the additional settings for the individual parts!

Gear front_P2_Abrams.stl

MATERIAL PLA or PLA+, ~ 29 g

ADDITIONAL SETTINGS

- Wall Line Count: 2
- Top Layers: 2
- Bottom Layers: 1

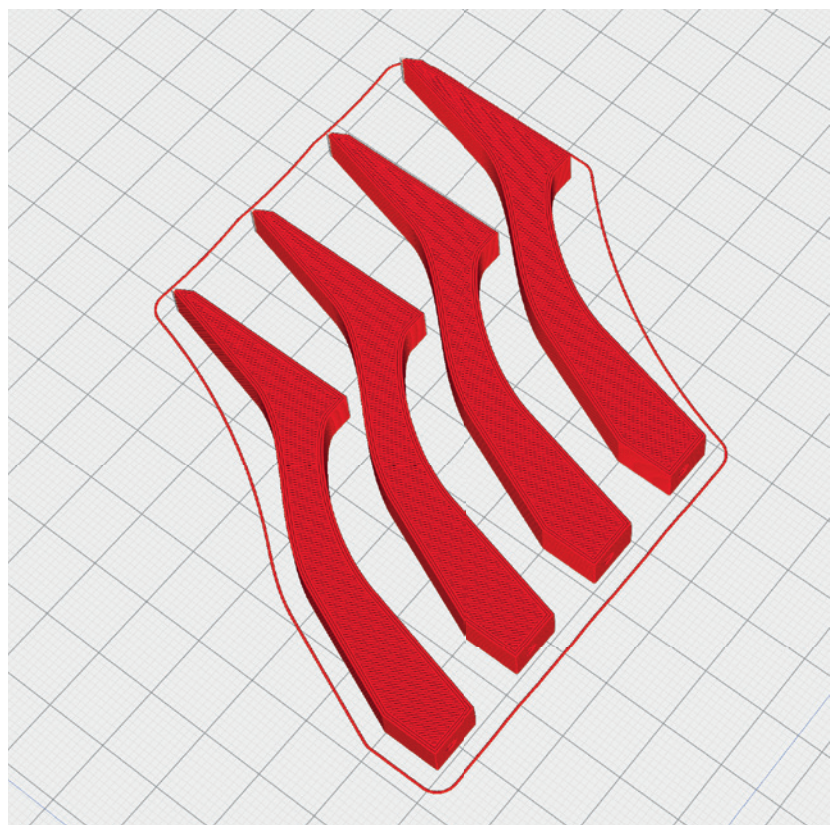


Motormount 2_P2_Abrams.stl

MATERIAL PLA or PLA+, ~ 9 g

ADDITIONAL SETTINGS

None required



PROFILE P2_HOLLOWBODY PLA or Tough PLA

The following parts must be sliced with the PROFILE P2_HOLLOWBODY.
Please note the additional settings for the individual parts!

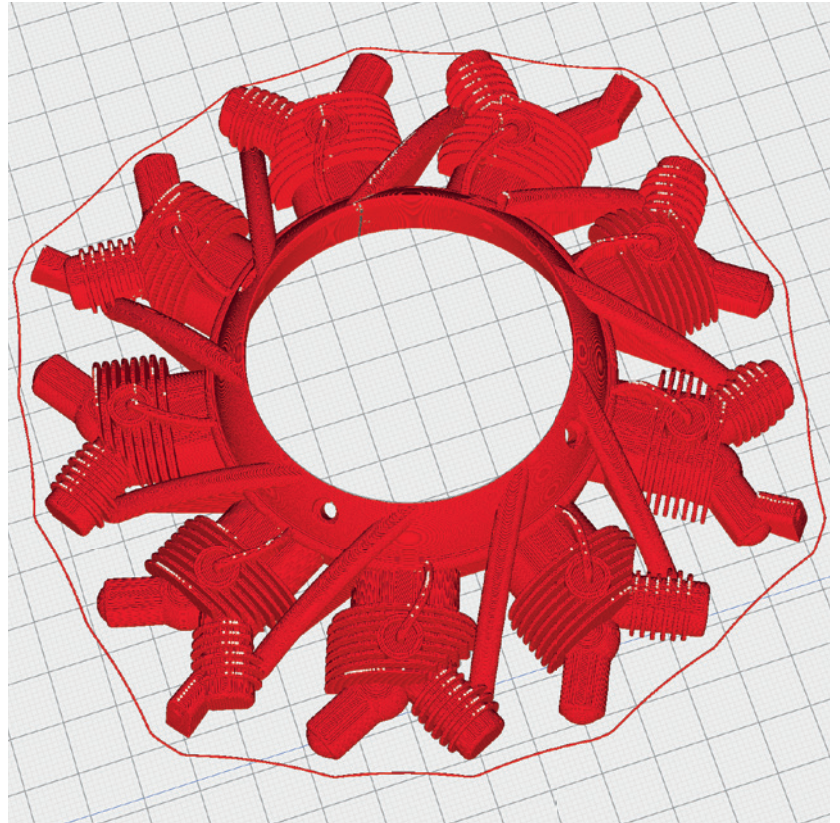
Radial Engine_P2_Abrams.stl

MATERIAL LW-PLA or PLA, ~ 43 g

ADDITIONAL SETTINGS

- Wall Line Count: 1
- Bottom Layers: 1

We recommend printing this part from Lightweight PLA!

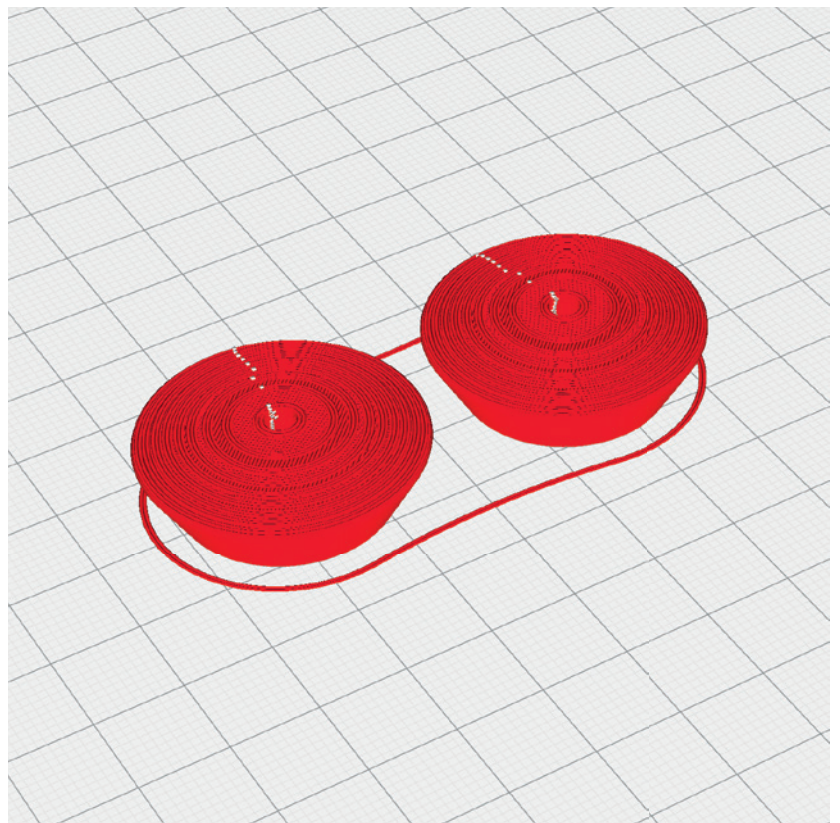


Rim front_P2_Abrams.stl

MATERIAL PLA or PLA+, ~ 5 g

ADDITIONAL SETTINGS

None required



PROFILE P2_HOLLOWBODY PLA or Tough PLA

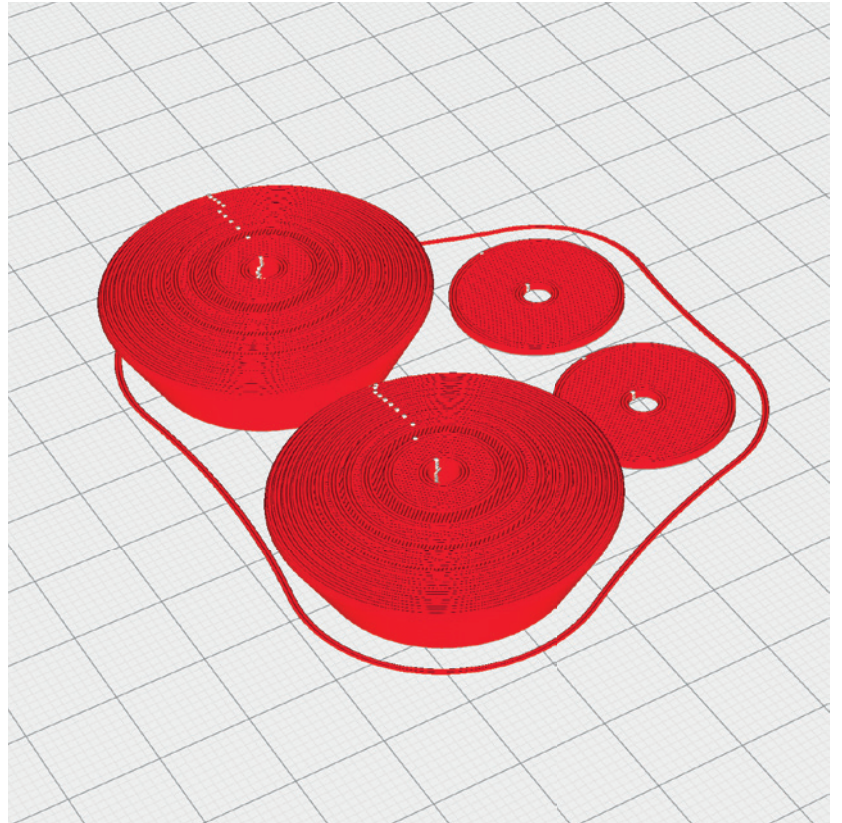
The following parts must be sliced with the PROFILE P2_HOLLOWBODY.
Please note the additional settings for the individual parts!

Rim_P2_Abrams.stl

MATERIAL PLA or PLA+, ~ 8 g

ADDITIONAL SETTINGS

None required



PROFILE P3_SURFACE PLA or Tough PLA

The following parts must be sliced with the PROFILE P3_SURFACE (1-wall-print).

Please note the additional settings for the individual parts!

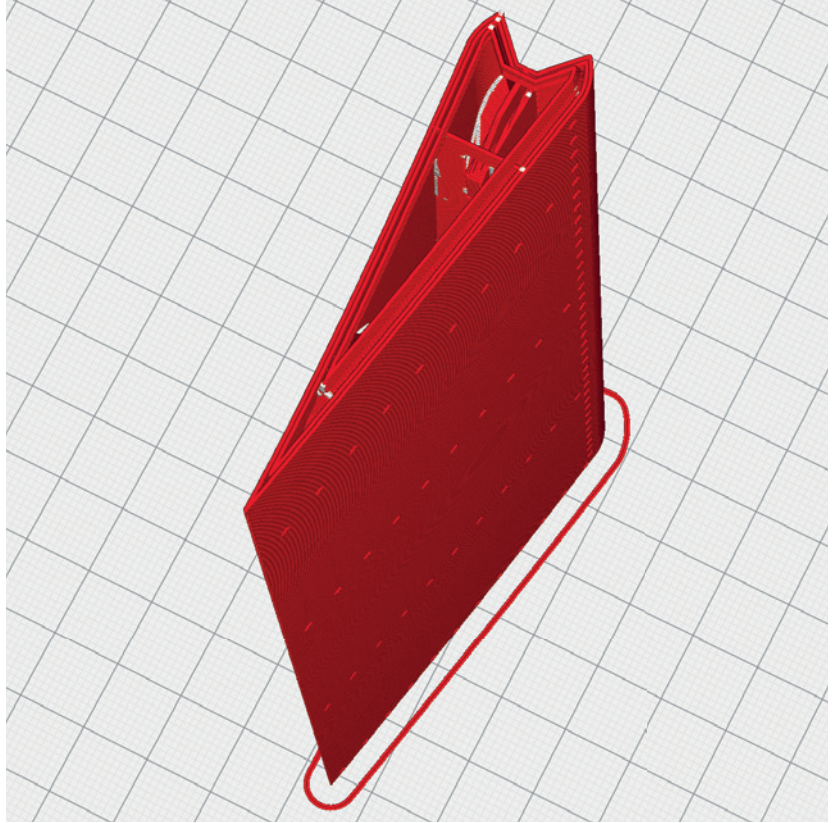
PLEASE NOTE In profile P3_SURFACE, there should not be more than one STL on the buildplate at the same time, otherwise slicing errors can occur! Depending on your printer, a brim may not be required.

Aileron 1-left_P3_Abrams.stl
Aileron 1-right_P3_Abrams.stl

MATERIAL PLA, ~ 16 g

ADDITIONAL SETTINGS

None required

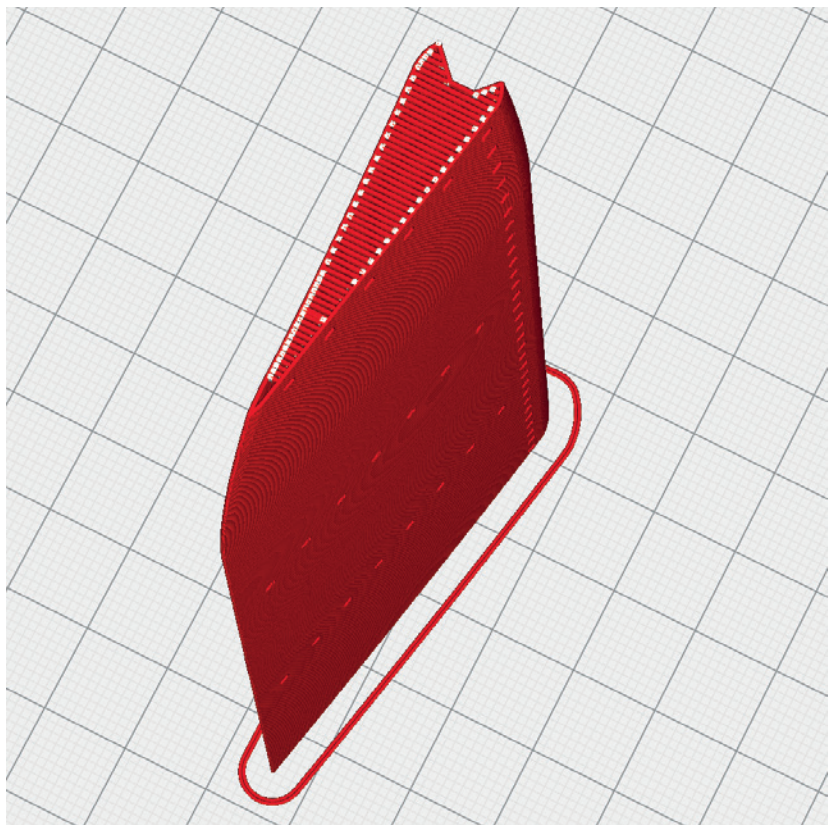


Aileron 2-left_P3_Abrams.stl
Aileron 2-right_P3_Abrams.stl

MATERIAL PLA, ~ 10 g

ADDITIONAL SETTINGS

None required



PROFILE P3_SURFACE PLA or Tough PLA

The following parts must be sliced with the PROFILE P3_SURFACE (1-wall-print).

Please note the additional settings for the individual parts!

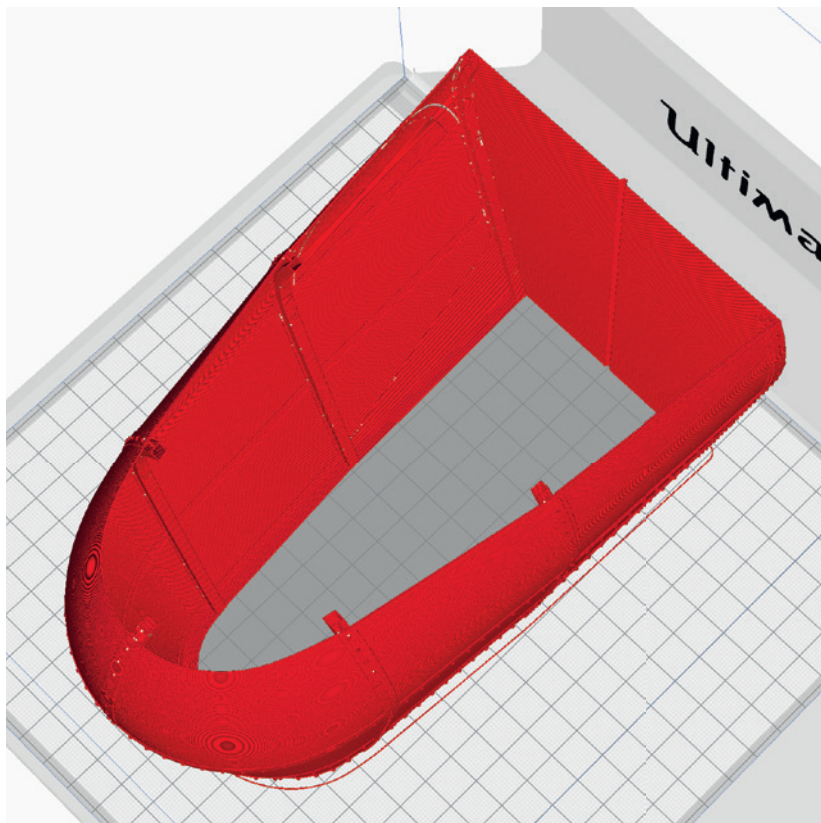
PLEASE NOTE In profile P3_SURFACE, there should not be more than one STL on the buildplate at the same time, otherwise slicing errors can occur! Depending on your printer, a brim may not be required.

Canopy 1_P3_Abrams.stl

MATERIAL PLA, ~ 46 g

ADDITIONAL SETTINGS

None required

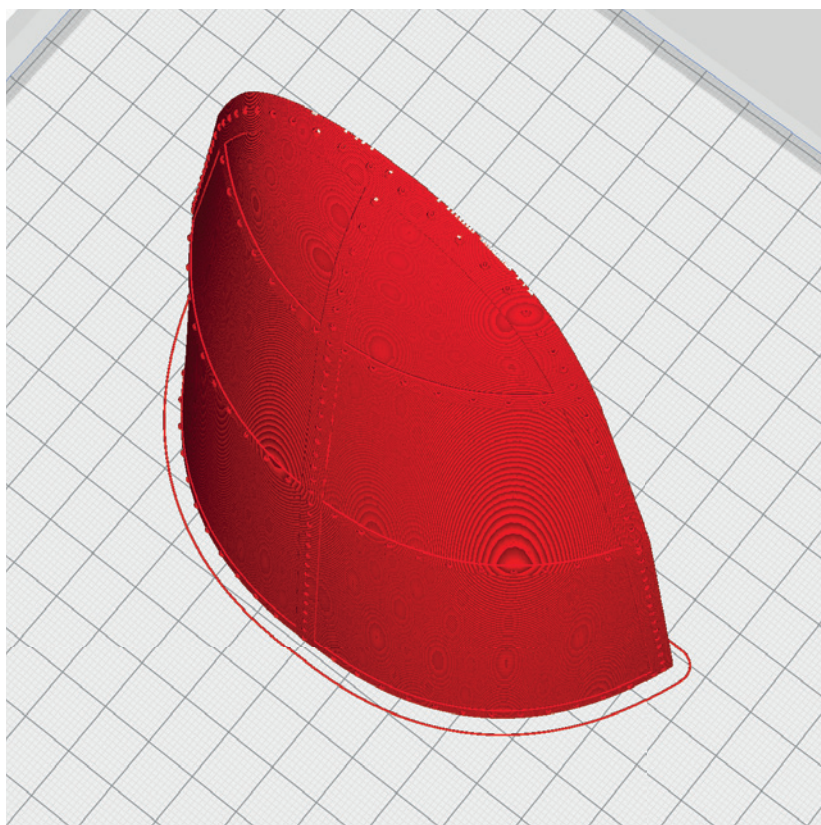


Canopy 2_P3_Abrams.stl

MATERIAL PLA, ~ 22 g

ADDITIONAL SETTINGS

None required



PROFILE P3_SURFACE PLA or Tough PLA

The following parts must be sliced with the PROFILE P3_SURFACE (1-wall-print).

Please note the additional settings for the individual parts!

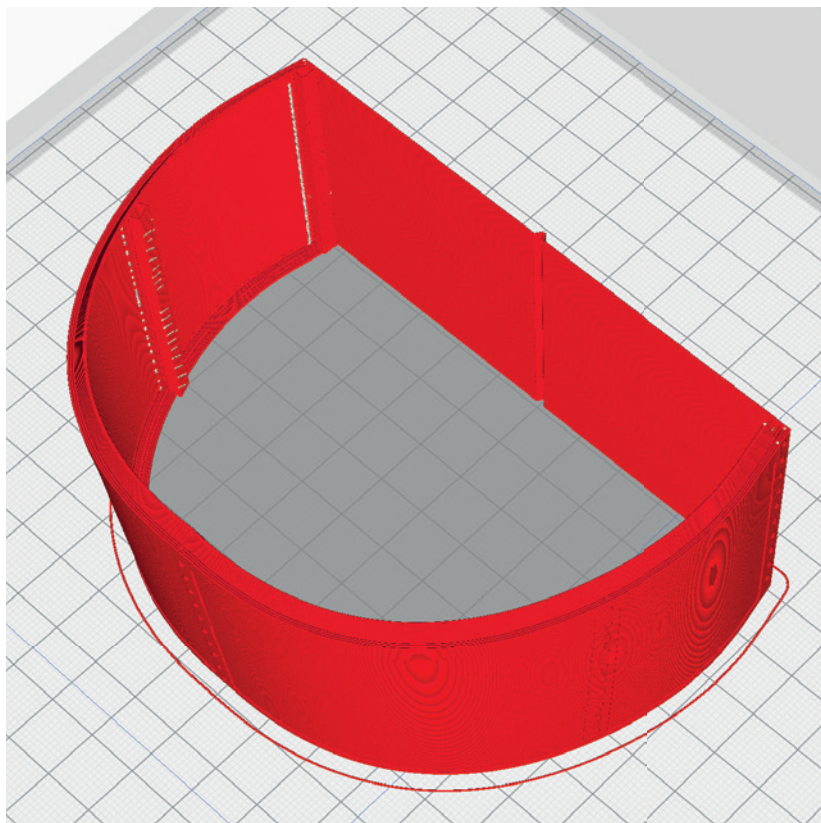
PLEASE NOTE In profile P3_SURFACE, there should not be more than one STL on the buildplate at the same time, otherwise slicing errors can occur! Depending on your printer, a brim may not be required.

Canopy 3_P3_Abrams.stl

MATERIAL PLA, ~ 14 g

ADDITIONAL SETTINGS

None required

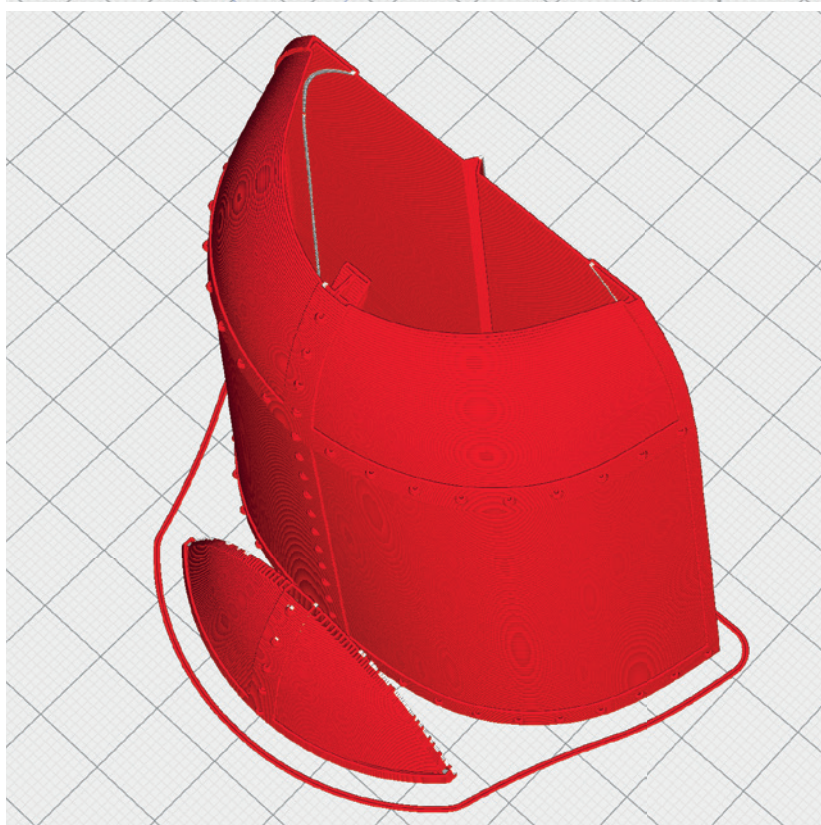


Canopy 4_P3_Abrams.stl

MATERIAL PLA, ~ 9 g

ADDITIONAL SETTINGS

None required



PROFILE P3_SURFACE PLA or Tough PLA

The following parts must be sliced with the PROFILE P3_SURFACE (1-wall-print).

Please note the additional settings for the individual parts!

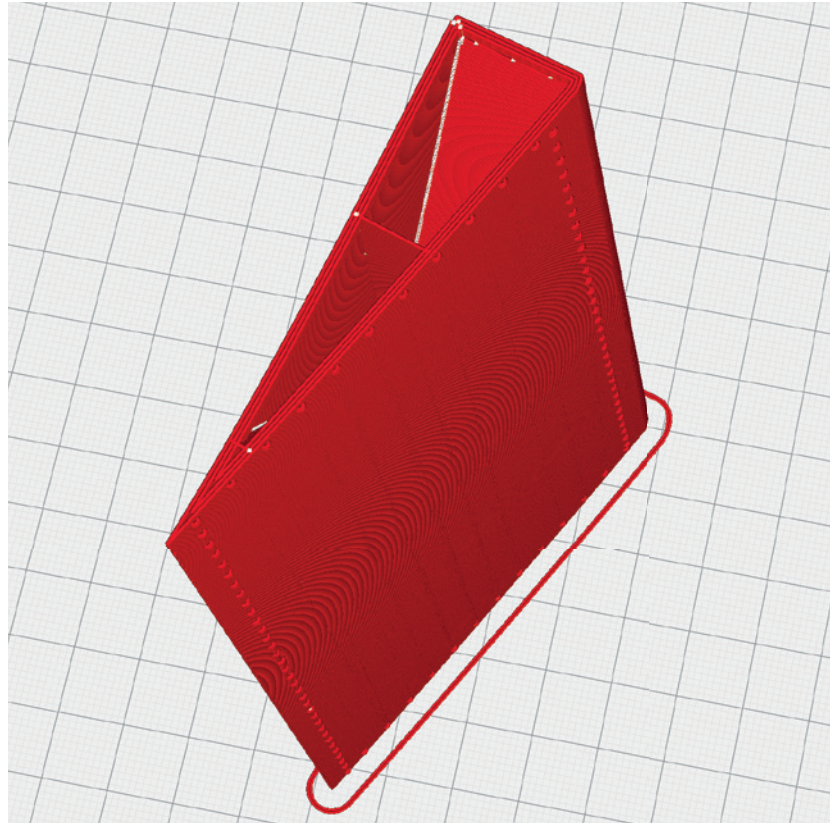
PLEASE NOTE In profile P3_SURFACE, there should not be more than one STL on the buildplate at the same time, otherwise slicing errors can occur! Depending on your printer, a brim may not be required.

Fakeflap-left_P3_Abrams.stl
Fakeflap-right_P3_Abrams.stl

MATERIAL PLA, ~ 17 g

ADDITIONAL SETTINGS

None required

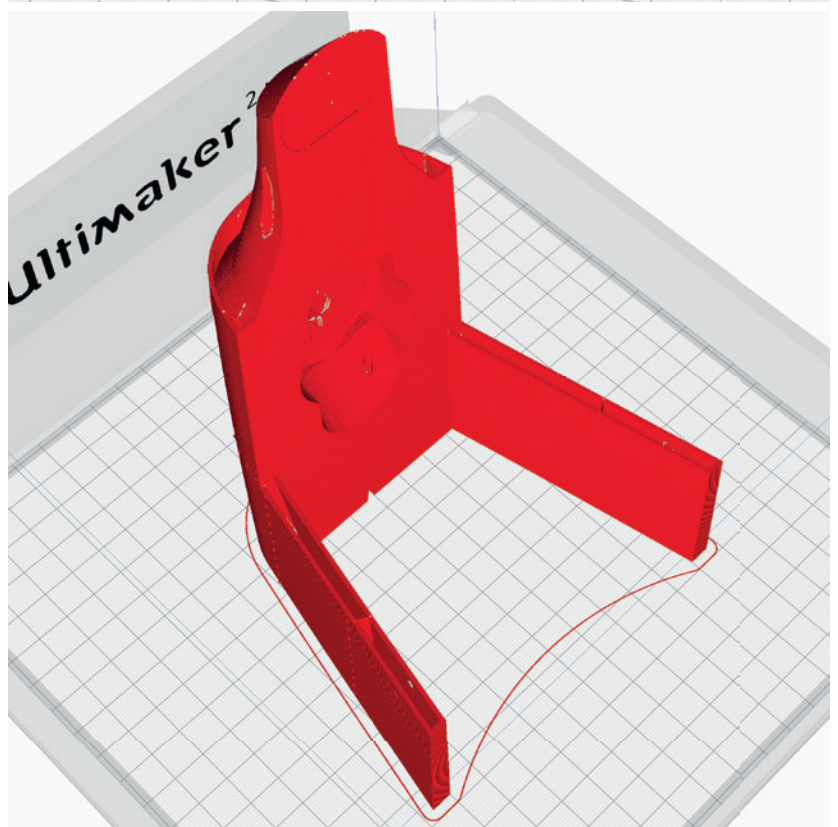


Fuselage 1_P3_Abrams.stl

MATERIAL PLA, ~ 44 g

ADDITIONAL SETTINGS

None required



PROFILE P3_SURFACE PLA or Tough PLA

The following parts must be sliced with the PROFILE P3_SURFACE (1-wall-print).

Please note the additional settings for the individual parts!

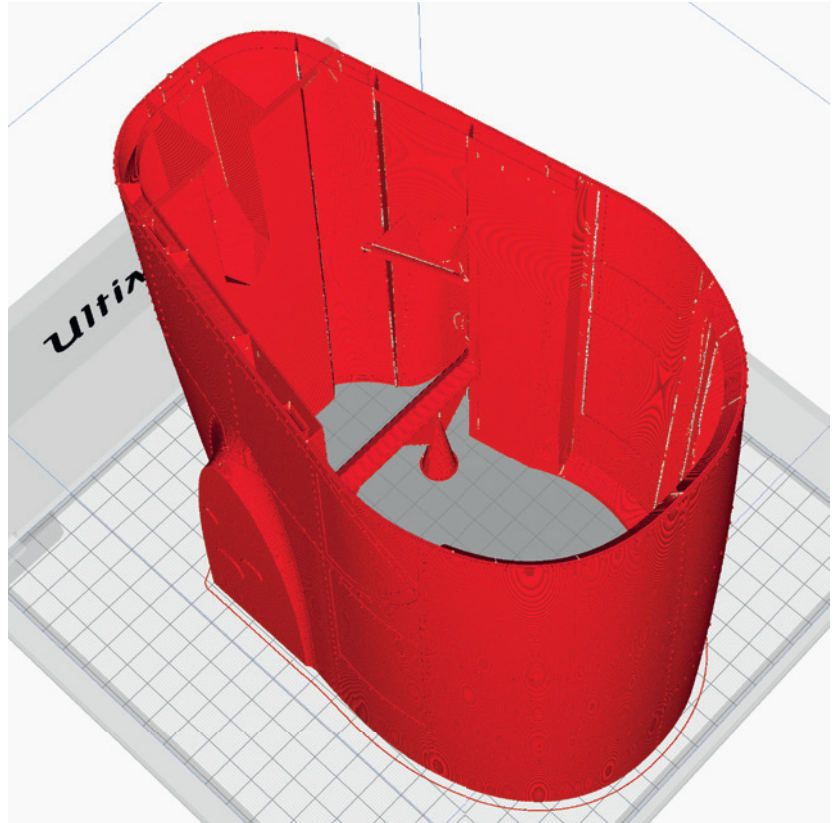
PLEASE NOTE In profile P3_SURFACE, there should not be more than one STL on the buildplate at the same time, otherwise slicing errors can occur! Depending on your printer, a brim may not be required.

Fuselage 2_P3_Abrams.stl

MATERIAL PLA, ~ 95 g

ADDITIONAL SETTINGS

None required

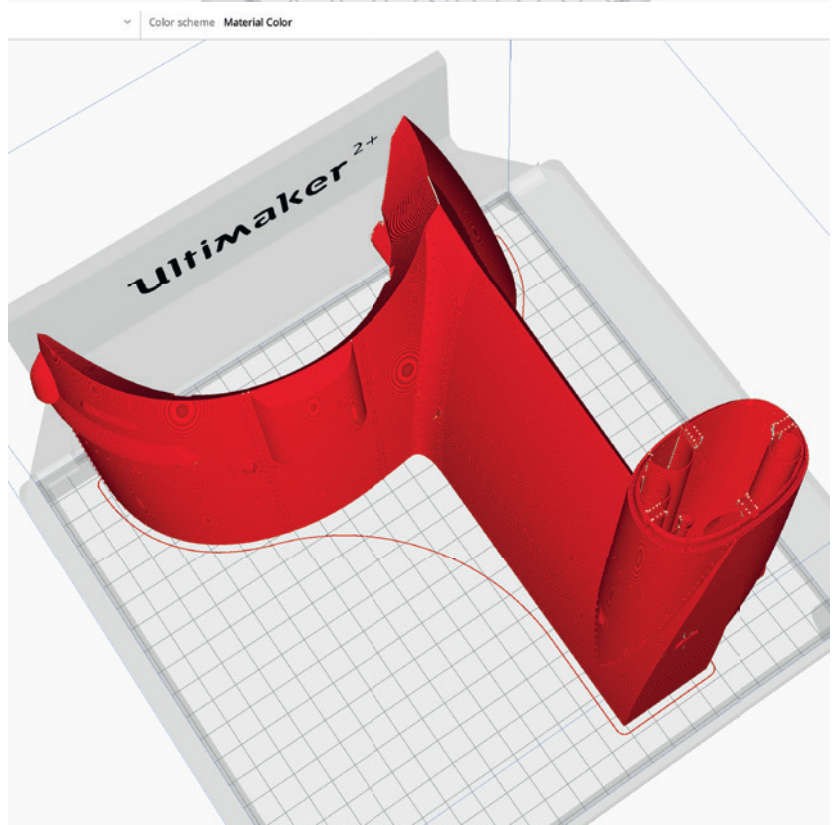


Fuselage 3-left_P3_Abrams.stl Fuselage 3-right_P3_Abrams.stl

MATERIAL PLA, ~ 84 g

ADDITIONAL SETTINGS

None required



PROFILE P3_SURFACE PLA or Tough PLA

The following parts must be sliced with the PROFILE P3_SURFACE (1-wall-print).

Please note the additional settings for the individual parts!

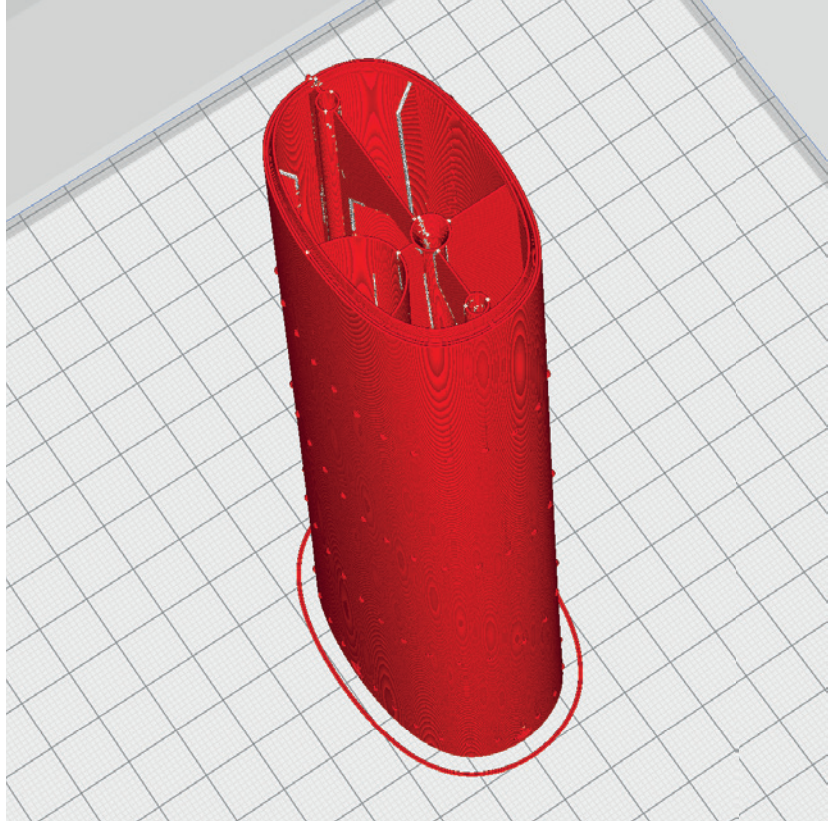
PLEASE NOTE In profile P3_SURFACE, there should not be more than one STL on the buildplate at the same time, otherwise slicing errors can occur! Depending on your printer, a brim may not be required.

Fuselage 4-left_P3_Abrams.stl
Fuselage 4-right_P3_Abrams.stl

MATERIAL PLA, ~ 28 g

ADDITIONAL SETTINGS

None required

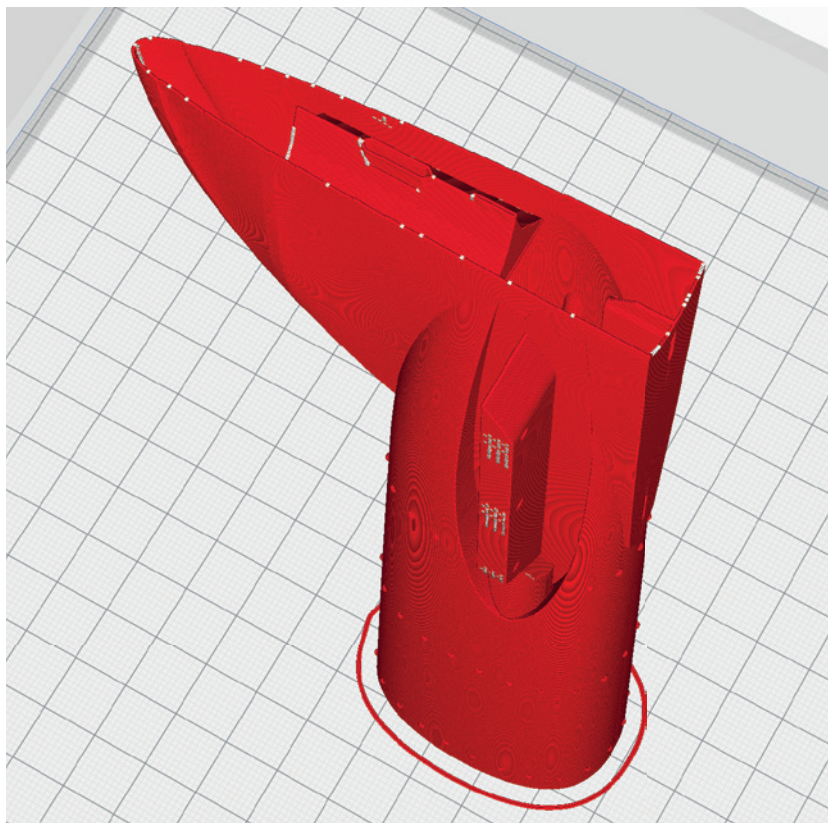


Fuselage 5-left_P3_Abrams.stl
Fuselage 5-right_P3_Abrams.stl

MATERIAL PLA, ~ 20 g

ADDITIONAL SETTINGS

None required



PROFILE P3_SURFACE PLA or Tough PLA

The following parts must be sliced with the PROFILE P3_SURFACE (1-wall-print).

Please note the additional settings for the individual parts!

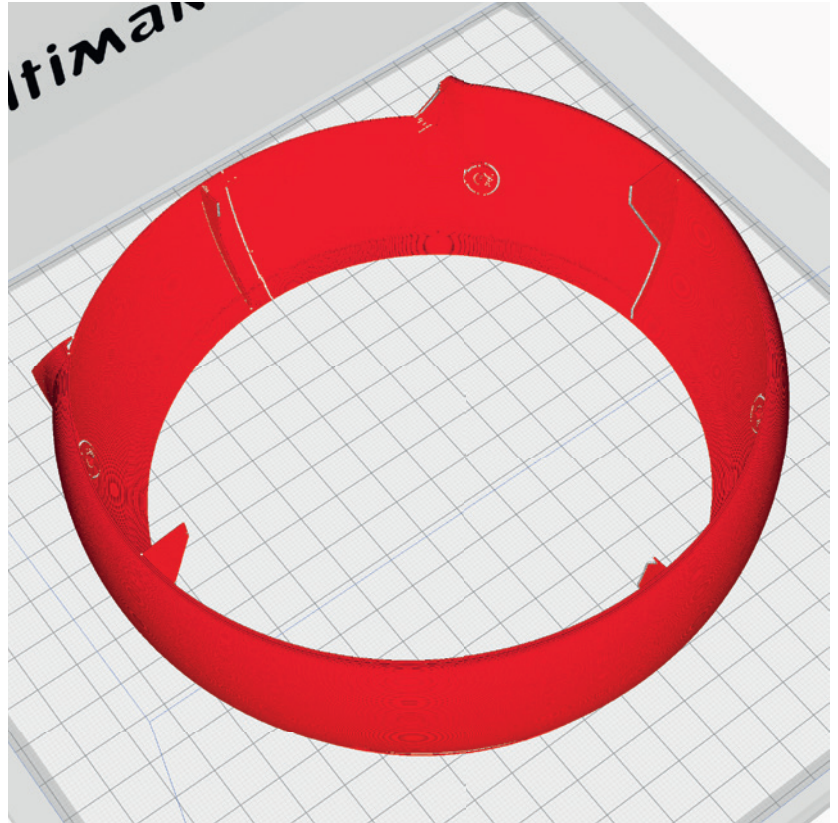
PLEASE NOTE In profile P3_SURFACE, there should not be more than one STL on the buildplate at the same time, otherwise slicing errors can occur! Depending on your printer, a brim may not be required.

Ring_P3_Abrams.stl

MATERIAL PLA, ~ 16 g

ADDITIONAL SETTINGS

None required

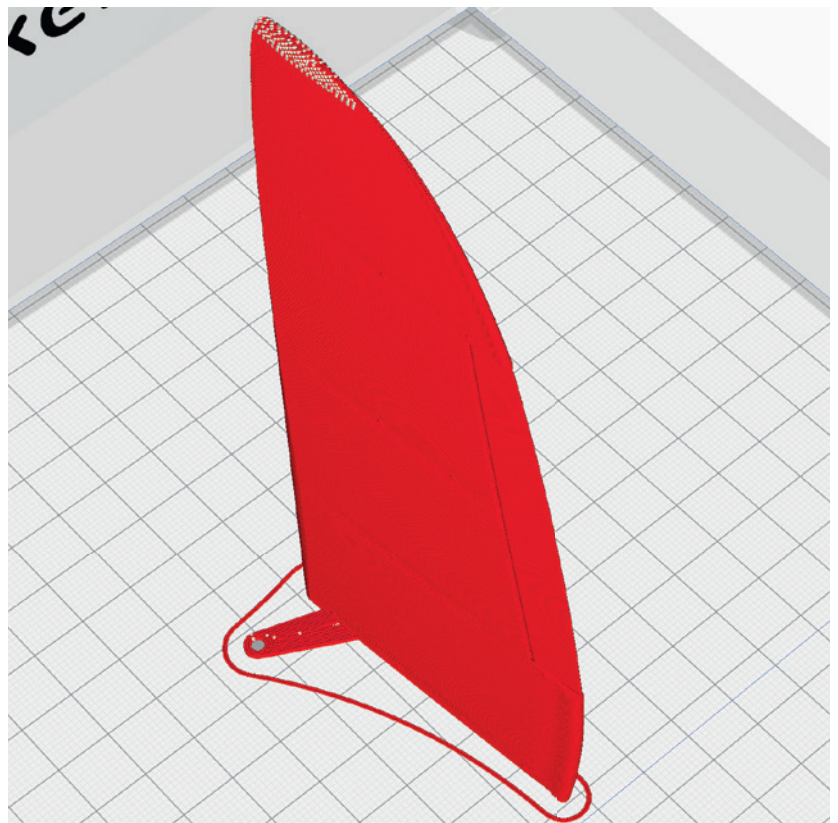


Rudder 1-left_P3_Abrams.stl Rudder 1-right_P3_Abrams.stl

MATERIAL PLA, ~ 10 g

ADDITIONAL SETTINGS

None required



PROFILE P3_SURFACE PLA or Tough PLA

The following parts must be sliced with the PROFILE P3_SURFACE (1-wall-print).

Please note the additional settings for the individual parts!

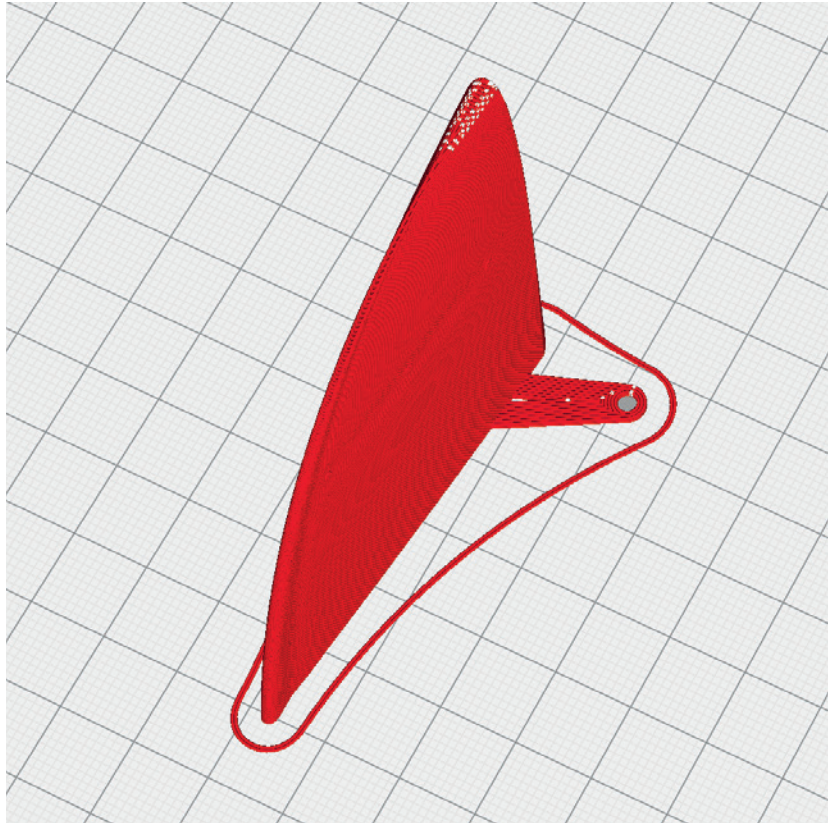
PLEASE NOTE In profile P3_SURFACE, there should not be more than one STL on the buildplate at the same time, otherwise slicing errors can occur! Depending on your printer, a brim may not be required.

Rudder 2-left_P3_Abrams.stl
Rudder 2-right_P3_Abrams.stl

MATERIAL PLA, ~ 4 g

ADDITIONAL SETTINGS

None required

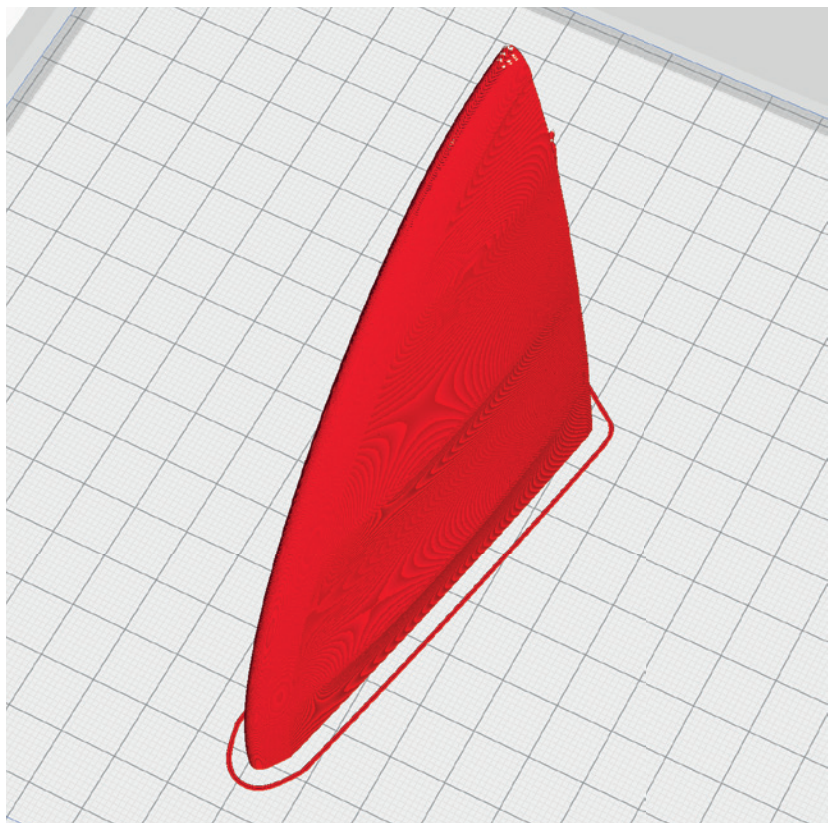


VS-left_P3_Abrams.stl
VS-right_P3_Abrams.stl

MATERIAL PLA, ~ 10 g

ADDITIONAL SETTINGS

None required



PROFILE P3_SURFACE PLA or Tough PLA

The following parts must be sliced with the PROFILE P3_SURFACE (1-wall-print).

Please note the additional settings for the individual parts!

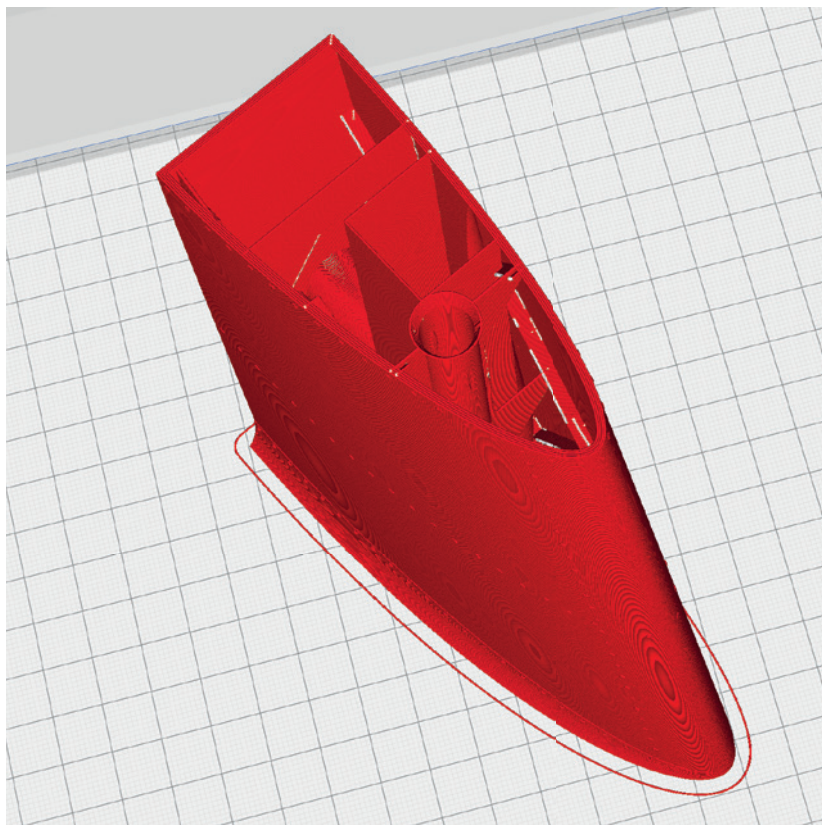
PLEASE NOTE In profile P3_SURFACE, there should not be more than one STL on the buildplate at the same time, otherwise slicing errors can occur! Depending on your printer, a brim may not be required.

Wing 1-left_P3_Abrams.stl
Wing 1-right_P3_Abrams.stl

MATERIAL PLA, ~ 32 g

ADDITIONAL SETTINGS

None required



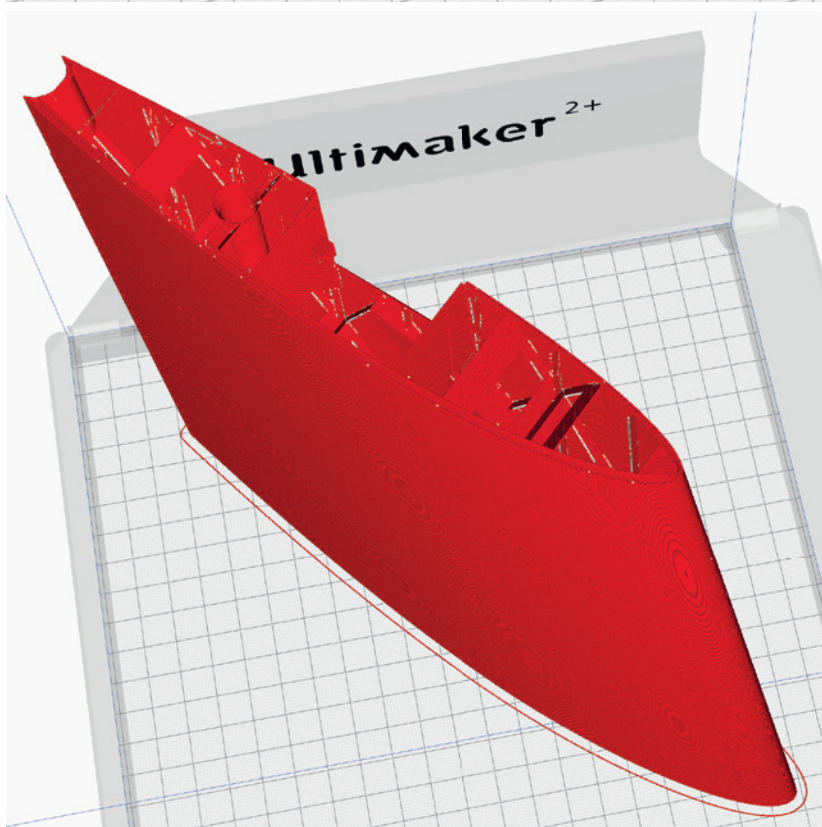
Wing 2-left_P3_Abrams.stl
Wing 2-right_P3_Abrams.stl

MATERIAL PLA, ~ 87 g

ADDITIONAL SETTINGS

left: • Z Seam Position **Back Left**

right: • Z Seam Position **Back Right**



PROFILE P3_SURFACE PLA or Tough PLA

The following parts must be sliced with the PROFILE P3_SURFACE (1-wall-print).

Please note the additional settings for the individual parts!

PLEASE NOTE In profile P3_SURFACE, there should not be more than one STL on the buildplate at the same time, otherwise slicing errors can occur! Depending on your printer, a brim may not be required.

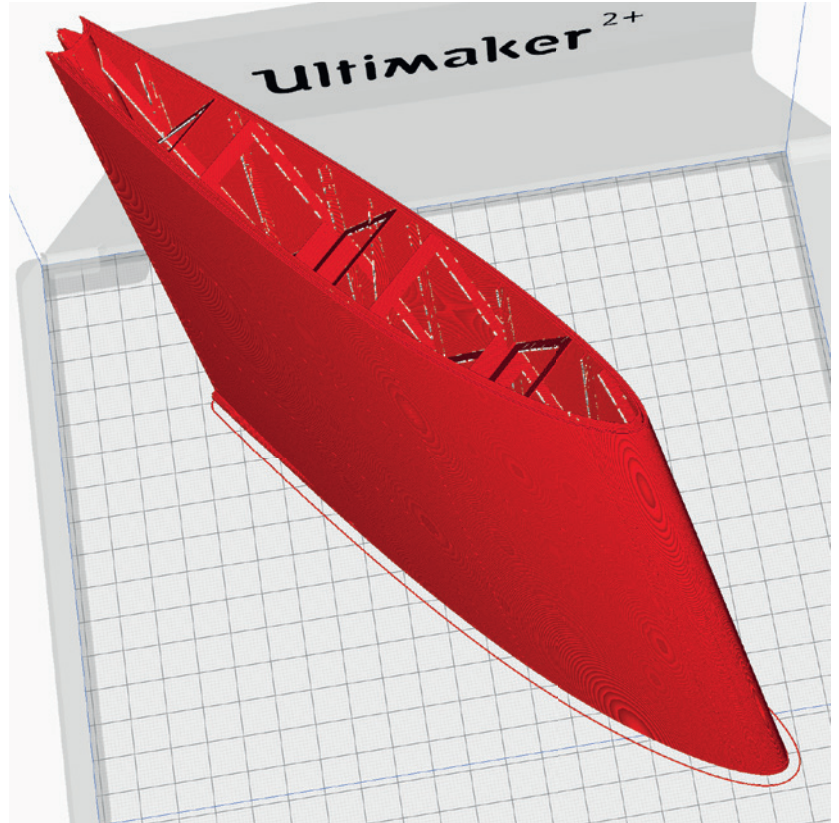
Wing 3-left_P3_Abrams.stl
Wing 3-right_P3_Abrams.stl

MATERIAL PLA, ~ 64 g

ADDITIONAL SETTINGS

left: • Z Seam Position **Back Left**

right: • Z Seam Position **Back Right**

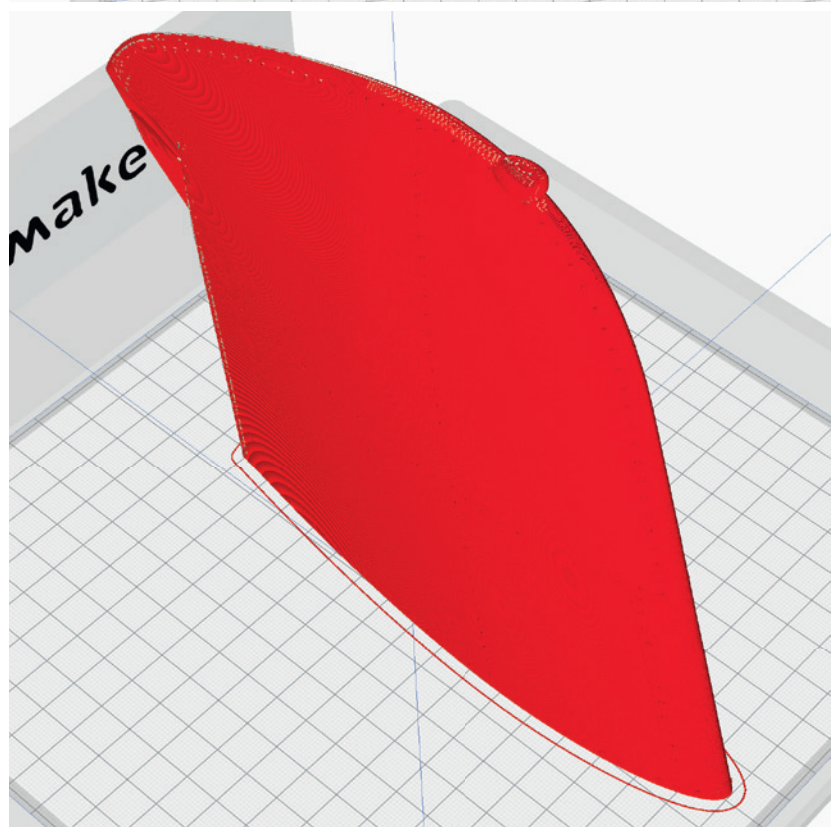


Wing 4-left_P3_Abrams.stl
Wing 4-right_P3_Abrams.stl

MATERIAL PLA, ~ 37 g

ADDITIONAL SETTINGS

None required



PROFILE P3_SURFACE Light-Weight LW-PLA

The following parts must be sliced with the PROFILE P3_SURFACE (1-wall-print).

Please note the additional settings for the individual parts!

PLEASE NOTE In profile P3_SURFACE, there should not be more than one STL on the buildplate at the same time, otherwise slicing errors can occur! Depending on your printer, a brim may not be required.

We strongly recommend printing this part with LW-PLA, this way no lead is needed in the front. Stringing occurs in the inner, because with LW-PLA the retract is switched off. However, this is not a problem and does not need to be removed.

Elevator-left_P3_Abrams.stl
Elevator-right_P3_Abrams.stl

MATERIAL LW-PLA, ~ 12 g*

*Display in Cura. The actual weight is 7 grams

ADDITIONAL SETTINGS

- Retract 0 mm
- Setting Profile3_Surface
- Flow 60 % or less
- Higher nozzle temperature

The optimal weight and sufficient strength is achieved with 60 % flow. Increase the temperature until the wall thickness is 0.4 to 0.5 mm. (We print at 250° and 60% flow).

We strongly recommend printing this part with LW-PLA, this way no lead is needed in the front. Stringing occurs in the inner, because with LW-PLA the retract is switched off. However, this is not a problem and does not need to be removed.

HS-left_P3_Abrams.stl
HS-right_P3_Abrams.stl

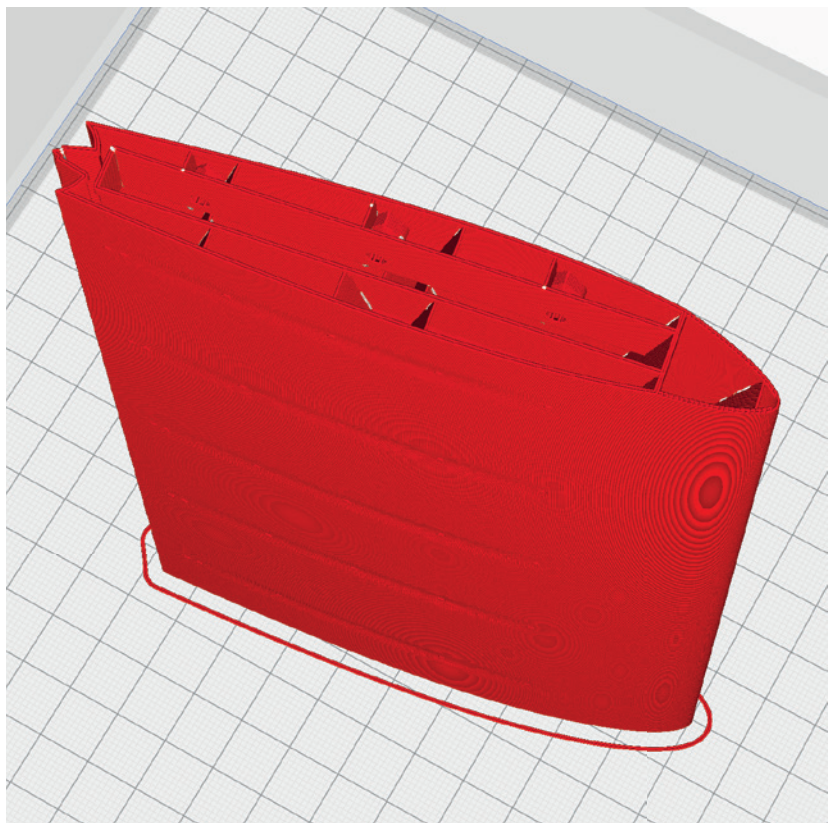
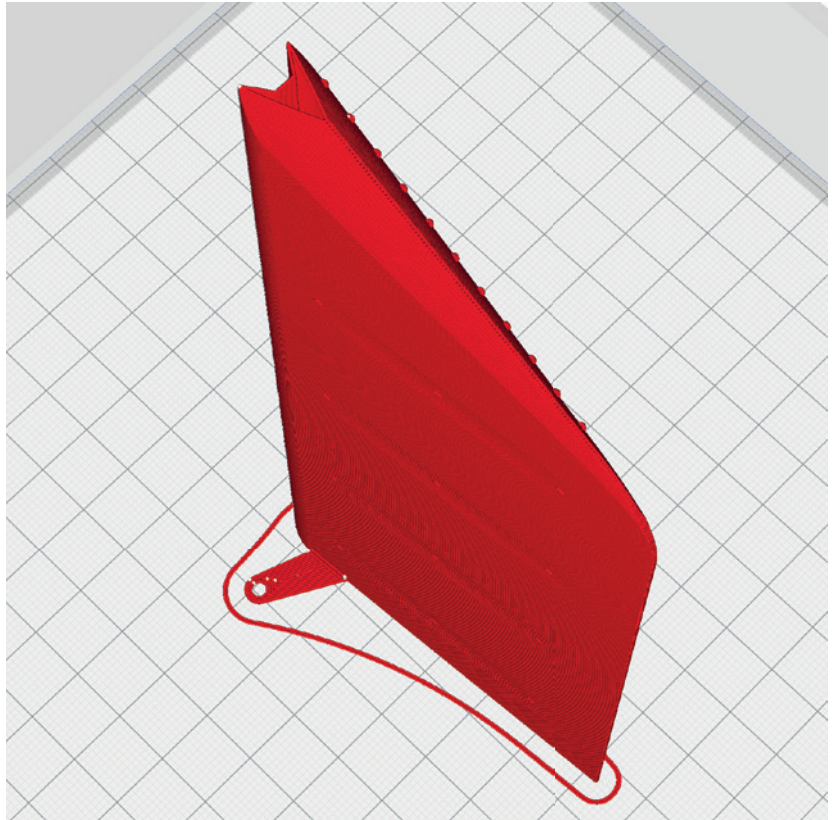
MATERIAL LW-PLA, ~ 31 g*

*Display in Cura. The actual weight is 16 grams

ADDITIONAL SETTINGS

- Retract 0 mm
- Setting Profile3_Surface
- Flow 60 % or less
- Higher nozzle temperature

The optimal weight and sufficient strength is achieved with 60 % flow. Increase the temperature until the wall thickness is 0.4 to 0.5 mm. (We print at 250° and 60% flow).



PROFILE P4_FLEX TPU A95 and VarioShore

The following parts must be sliced with the PROFILE P4_FLEX.
Please note the additional settings for the individual parts!

We recommend printing the tires with the LW-TPU VarioShore to obtain super light and soft wheels.

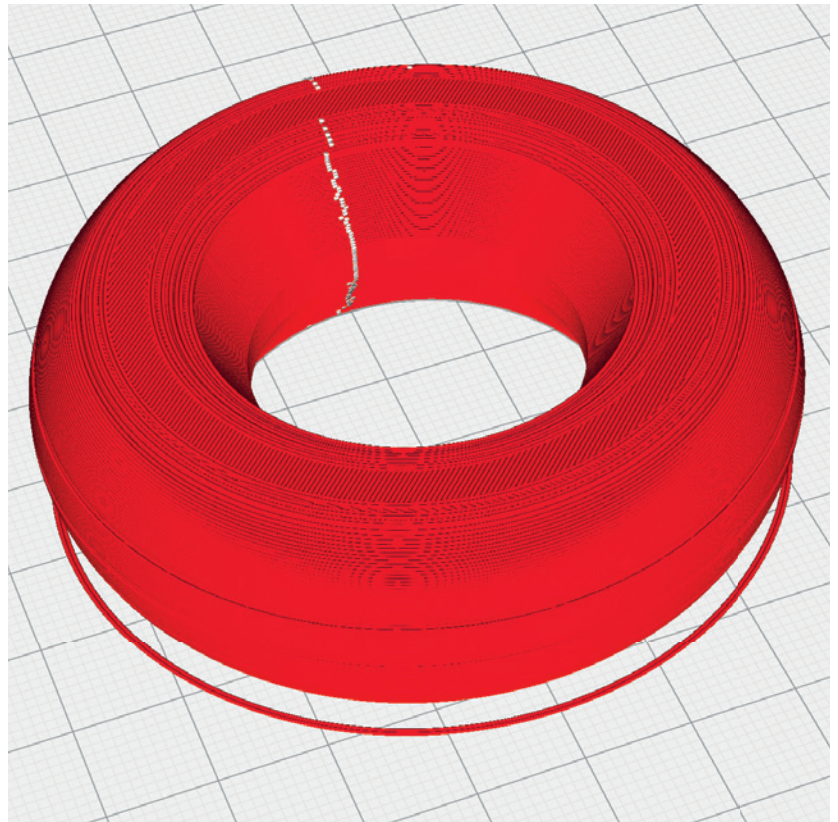
We print with 60% flow and 240°.

Tire main_P4_Abrams.stl

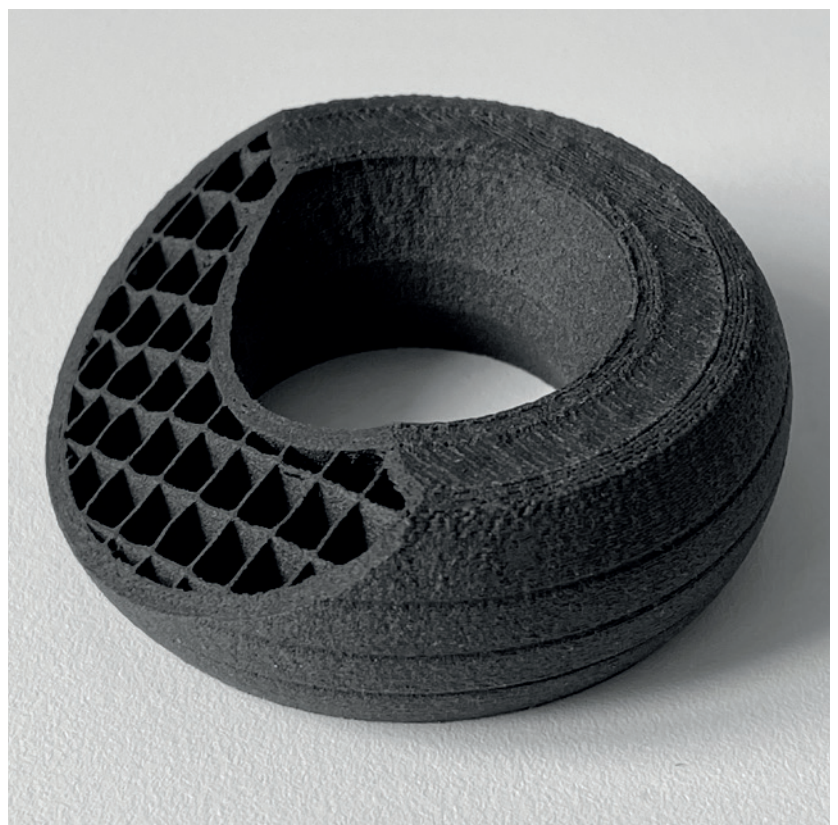
MATERIAL TPU VarioShore, Weight: ~ 8 g

ADDITIONAL SETTINGS

- Wall Line Count: 4
- Top Layers: 4
- Bottom Layers: 4
- Infill Density: 15 %
- Infill Pattern: Grid



View in cross-section printed with Colorfabb VarioShore LW-TPU.



PROFILE P4_FLEX TPU A95 and VarioShore

The following parts must be sliced with the PROFILE P4_FLEX.
Please note the additional settings for the individual parts!

We recommend printing the tires with the LW-TPU VarioShore to obtain super light and soft wheels.

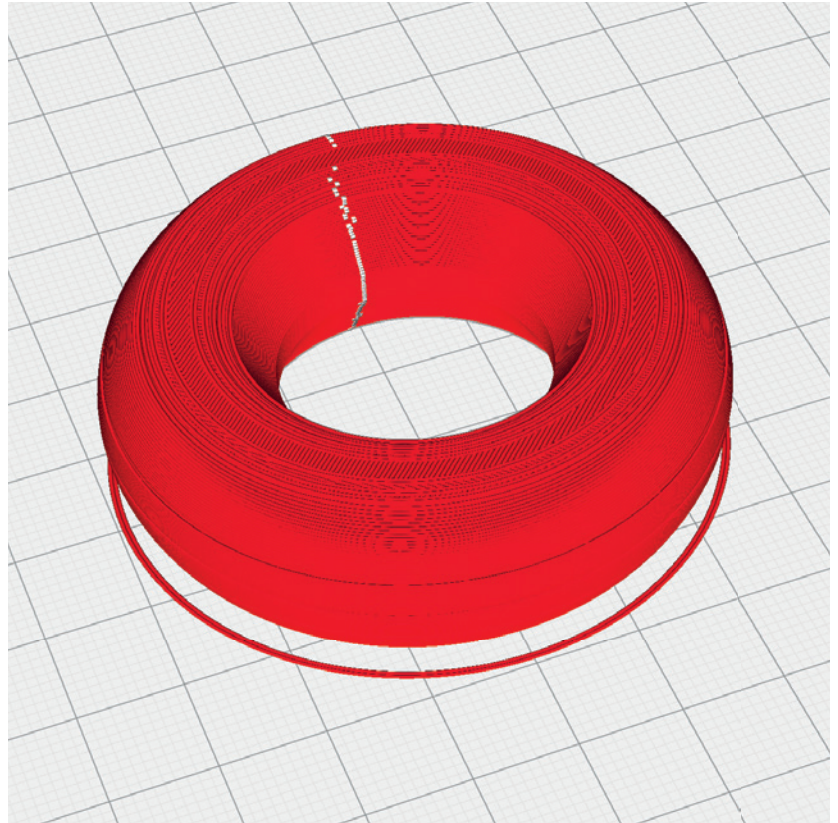
We print with 60% flow and 240°.

Tire front_P4_Abrams.stl

MATERIAL TPU VarioShore, Weight: ~ 5 g

ADDITIONAL SETTINGS

- Wall Line Count: 4
- Top Layers: 4
- Bottom Layers: 4
- Infill Density: 15 %
- Infill Pattern: Grid



Hinges_profile4_sg.stl

MATERIAL TPU ~ A95, Weight: ~ 1 g

ADDITIONAL SETTINGS

None required



Required accessoires

Filament

To get a true to original look, we recommend to use white or gray filament and to paint the parts afterwards with spray paint in silver or aluminum. This is how our prototype is made.

- normal PLA about 800 grams
- LW-PLA about 100 grams (recommended)
- TPU (A95) about 5 grams
- LW-TPU Colorfabb VarioShore about 100 grams (strongly recommended for tires, but it also works with normal TPU)

Materials

- some tapping screws (simply search for: M2 flat head tapping screw assortment) →
- Grub screw Ø3mm, 1 piece
- Allen screw Ø3*10mm, 2 pieces (with allen key)
- Metal screw 3*35mm with self-locking nut, 3 pieces
- CA super glue (liquid and liquid medium)
- CA activator
- Carbon tube Ø8mm*1000mm (inside 6mm), 2 pieces
- Steel wire Ø0.8mm*1000mm (or Ø1mm for the servo linkages), 3 pieces
- self-adhesive Velcro tape and velcro strap
- Overhead foil (or binding cover of scripts, office trade)
- Servo cable extension 250mm, 2 pieces
- Servo cable extension 900mm, 2 pieces
- Spray paint can alu or silver, 2 pieces
- Cable extension for the motor (The distance between controller and motor must be extended by about 100mm – **Attention: do NOT extend the distance between battery and controller!**)
- small Rod connection, 6 pieces



Tools

- Cutter knife
- small Philips screwdriver
- Drill Ø1.5mm, Ø2mm
- needle-nose pliers

RC Components

3S-Setting (Like our Abrams from the official Planeprint video)

ENGINE Hacker A30-10XL or comparable motors.
You can also use any other motor that fits a 12x6 propeller!

PROP 12x6 APC or comparable

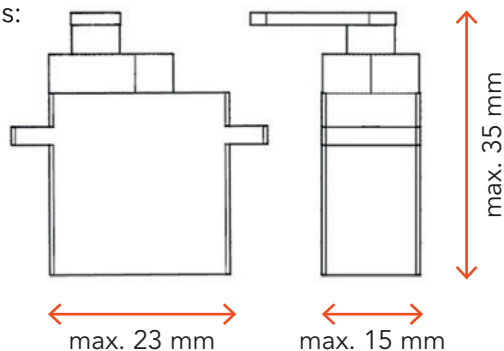
BEC-CONTROLLER 80 A (must fit the engine!)

RECEIVER 5 Channel

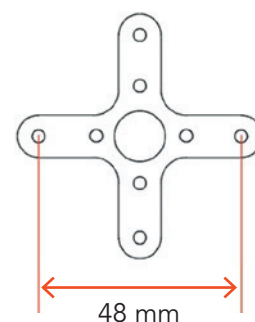
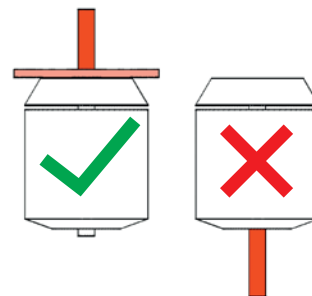
BATTERY 3S Lipo, 2700 MaH
(The battery should have a weight of 200 to 230 grams)

SERVOS 3 pieces like Hitec HS-5055MG or comparable

Maximum dimensions:

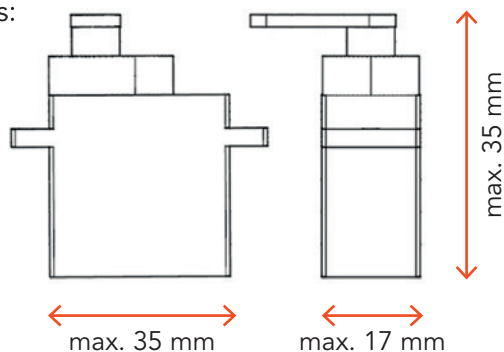


Pay attention to the position of the motor shaft

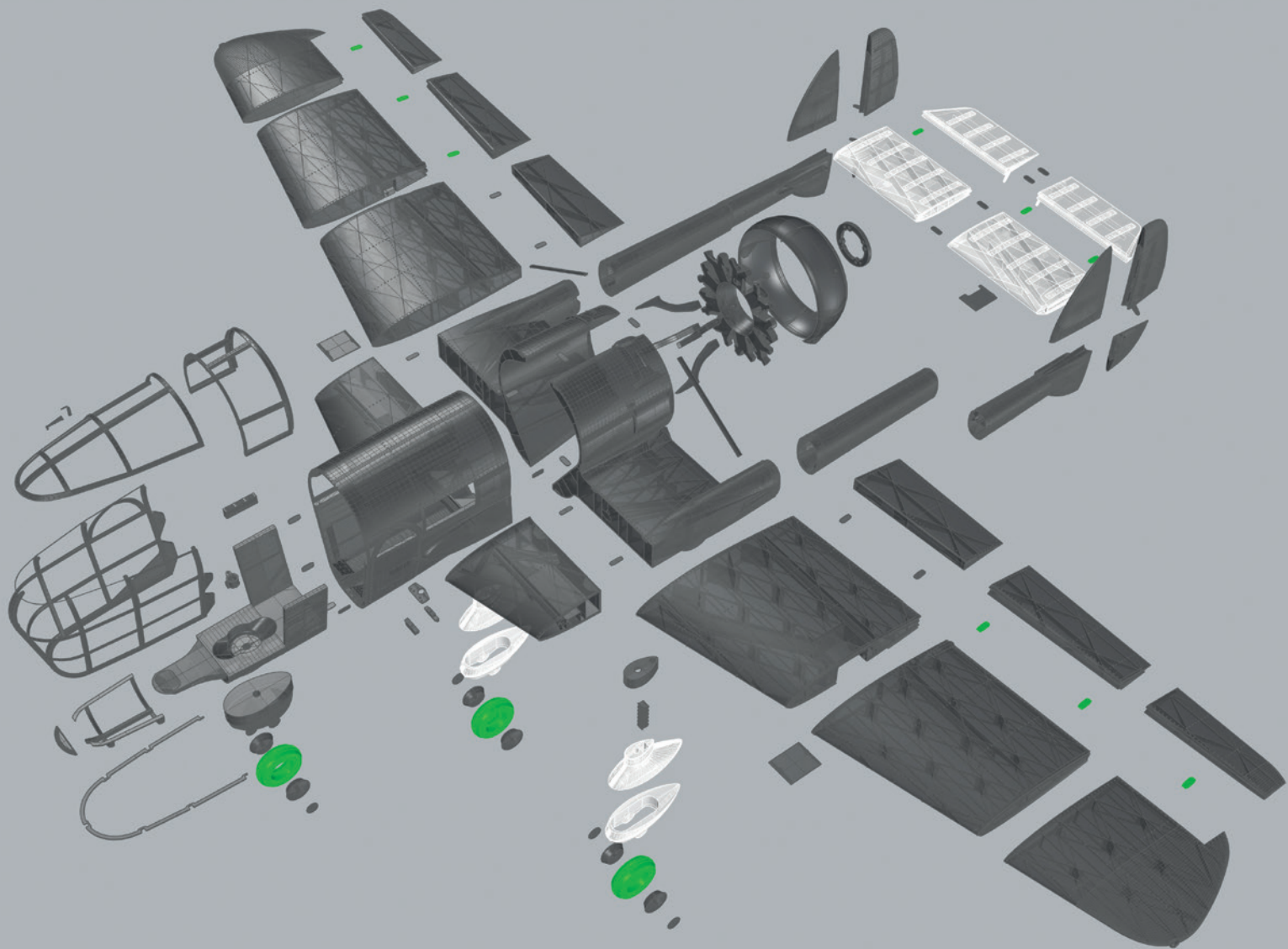


1 piece like **AMX Racing 1151MG WP Mini** or comparable.
This servo moves the nose wheel and both rudders, so a slightly stronger servo with metal gears should be used here.

Maximum dimensions:



PLANE PRINT ABRAMS P-1 EXPLORER



LW-PLA

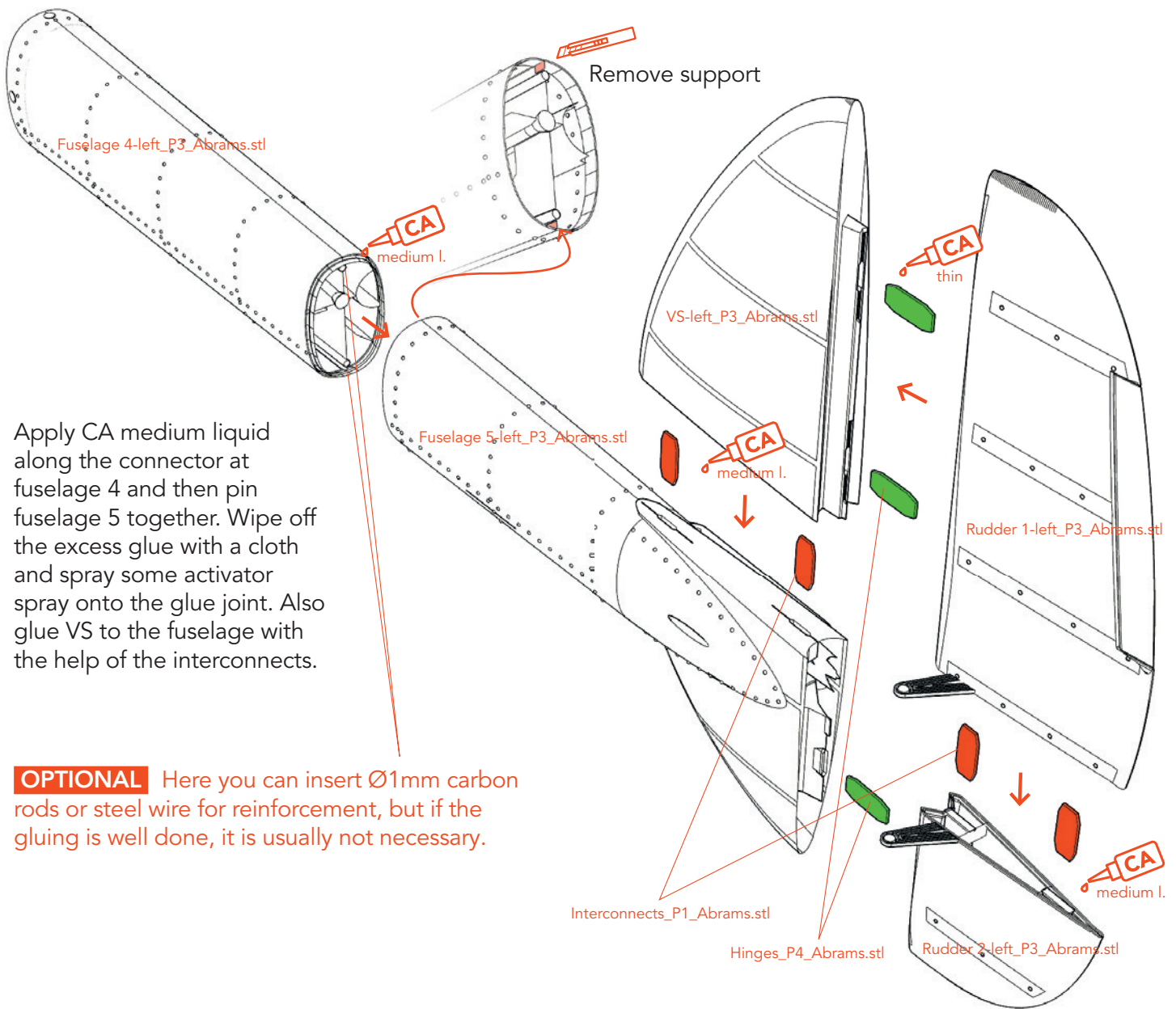


PLA



TPU

Vertical stabilizer assembly – left and right



Apply CA medium liquid along the connector at fuselage 4 and then pin fuselage 5 together. Wipe off the excess glue with a cloth and spray some activator spray onto the glue joint. Also glue VS to the fuselage with the help of the interconnects.

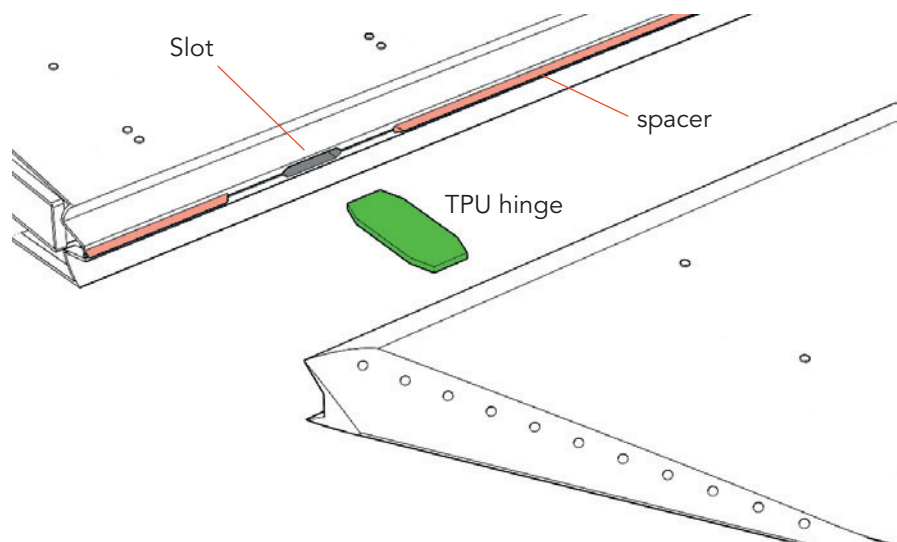
OPTIONAL Here you can insert $\varnothing 1\text{mm}$ carbon rods or steel wire for reinforcement, but if the gluing is well done, it is usually not necessary.

Installing the hinges – rudder/elevator/ailerons



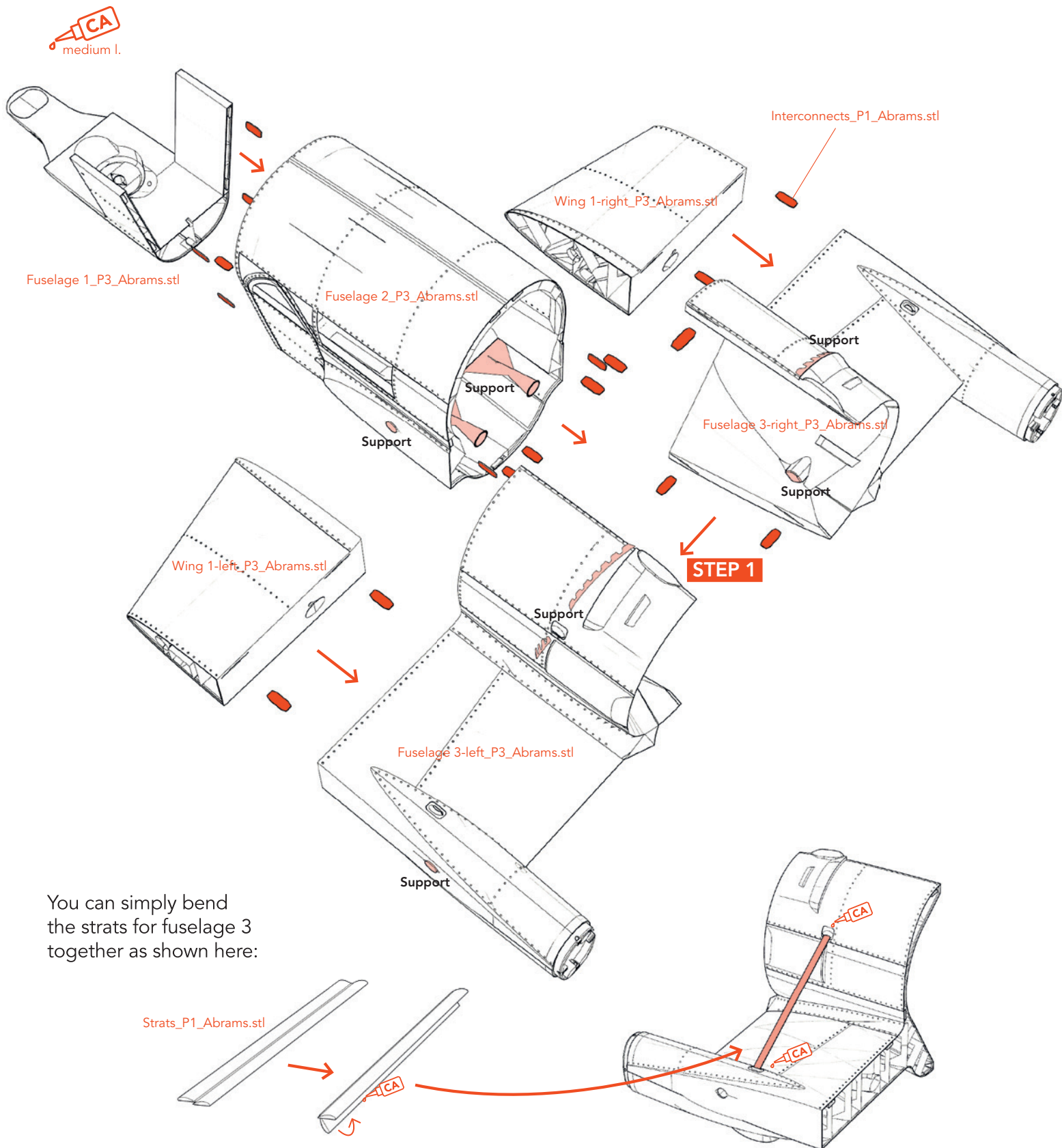
First glue the TPU-Hinges into the fuselage/horizontal or vertical stabilizer with **thin** CA glue. Apply a small amount of thin CA glue to the slots for the hinges in the rudder/elevator/aileron and attach it to the / horizontal or vertical stabilizer. Put the parts together until they touch each other, printed spacers provide the necessary mobility.

Do not use too much glue and test if each hinge holds well.



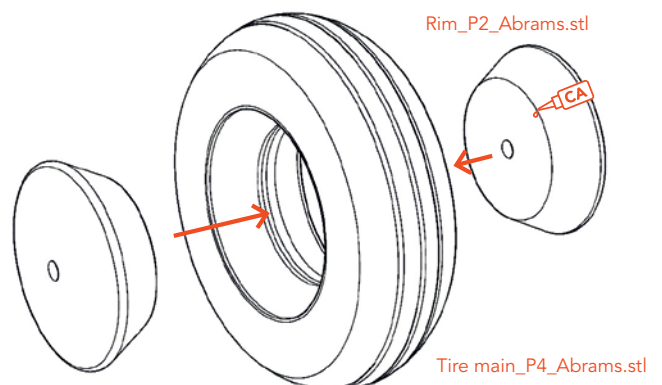
Fuselage assembly

The first thing to do is to **remove all the support** sites. Then the adhesive surfaces should be roughened somewhat with sandpaper. Before gluing the parts together, insert the **interconnects** on one side into the slots provided and check whether the parts can be plugged together easily. Then put some medium CA glue on one side and glue the parts together. Wipe off the excess glue with a cloth and spray some activator on it. The interconnects help set up and do not need to be glued.

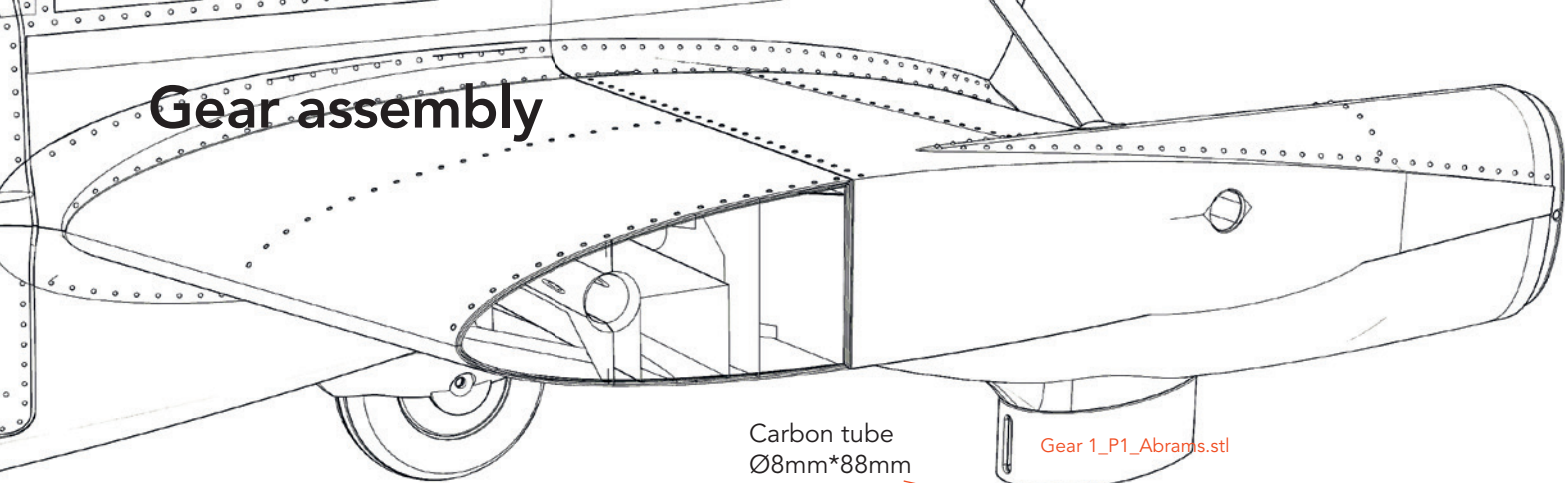


You can simply bend the strats for fuselage 3 together as shown here:

Gear assembly

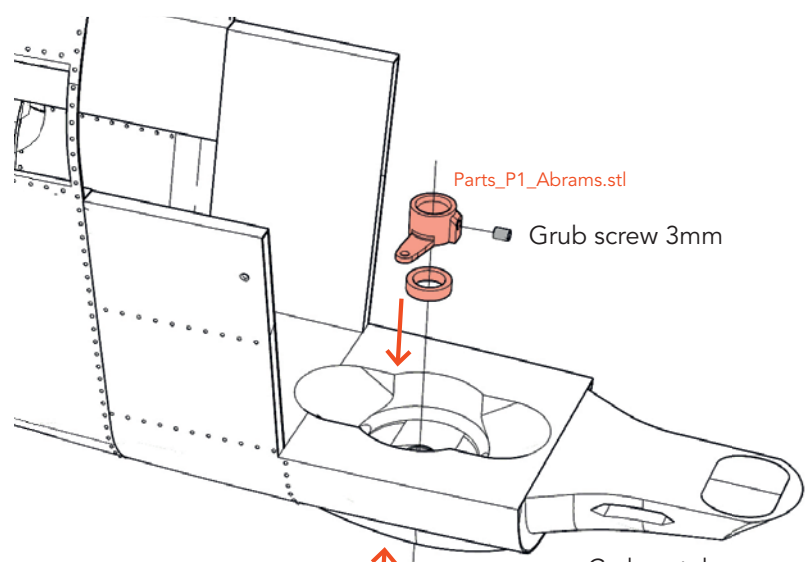
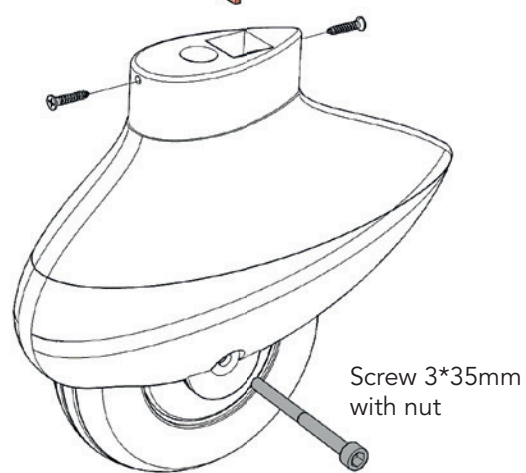
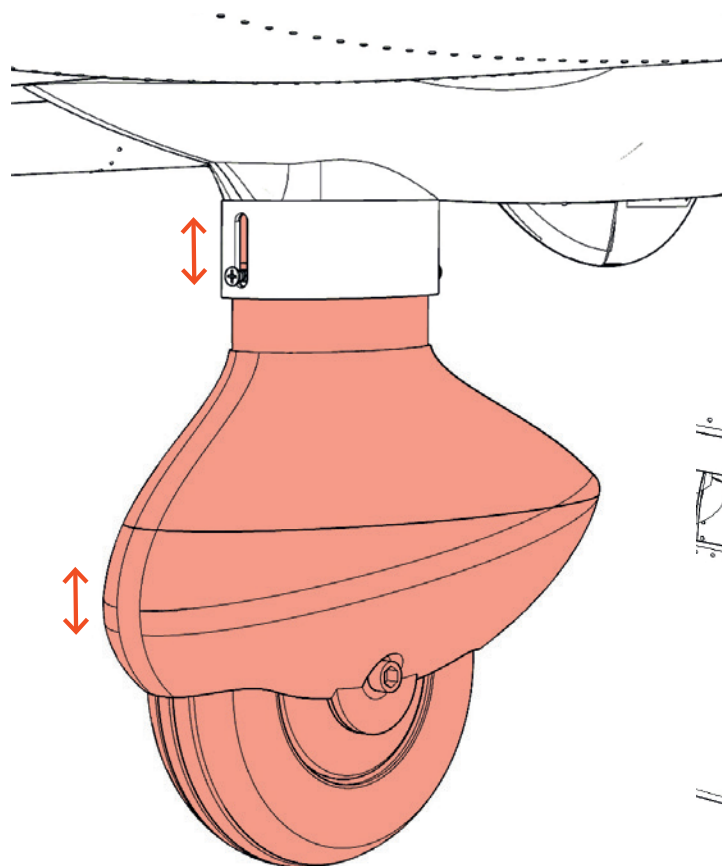
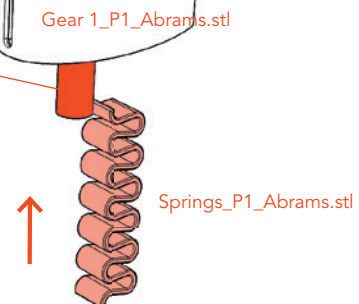


Gear assembly



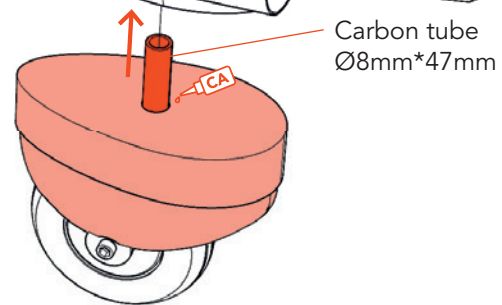
Cut two 8 mm carbon tubes to the **exact** length of 88 mm and insert them from below into the fuselage 3.

Insert the springs into the square hole of the gear and attach everything to the fuselage. Fix the gear through the slots of Gear 1 with two 2*12mm sheet metal screws. The gear must be able to move 10 mm vertically.



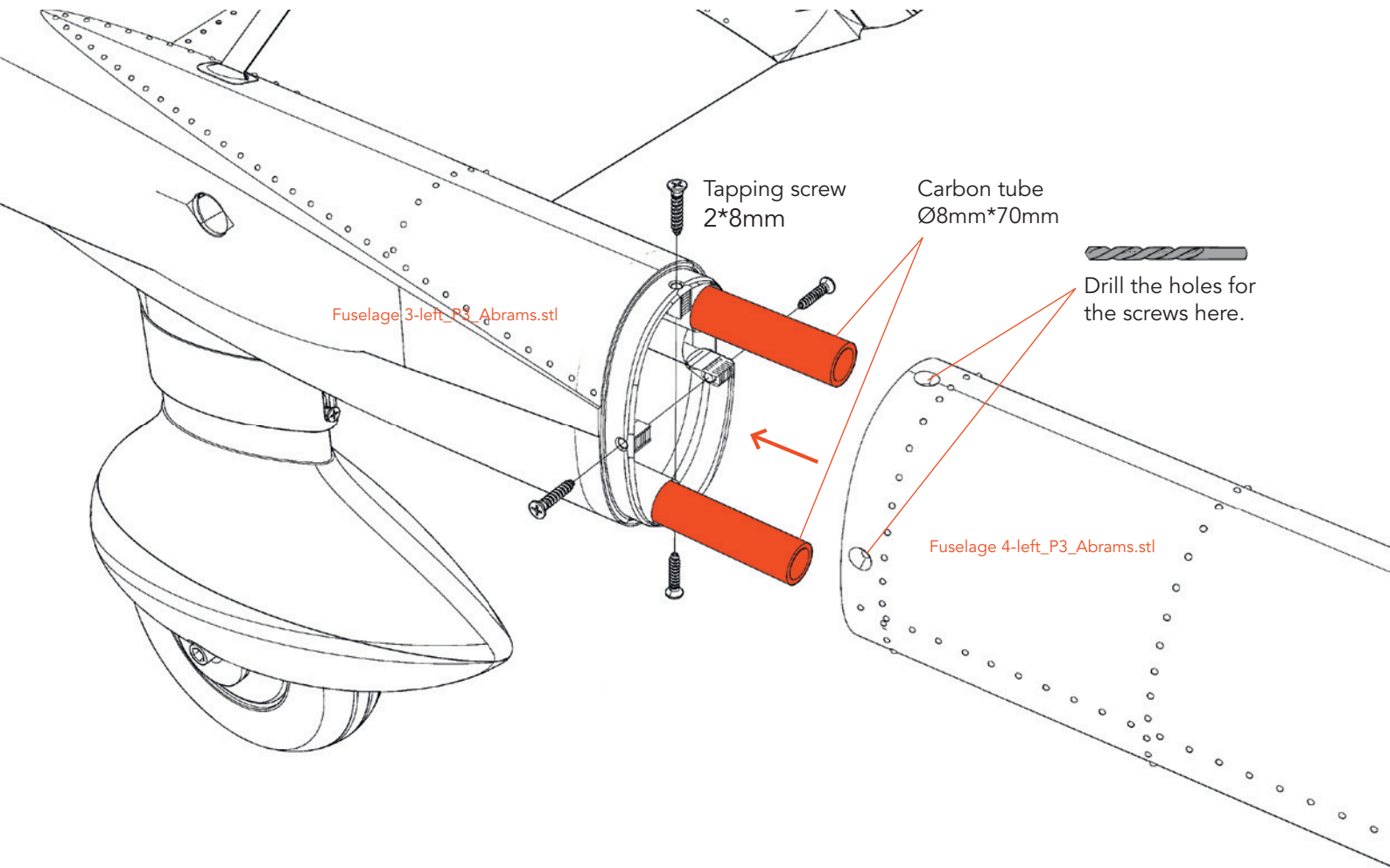
Glue the carbon tube into the **front gear** and put the parts together as shown in the picture.

Fix the control horn with a 3mm grub screw. The screw should point exactly forward when the wheel is straight.

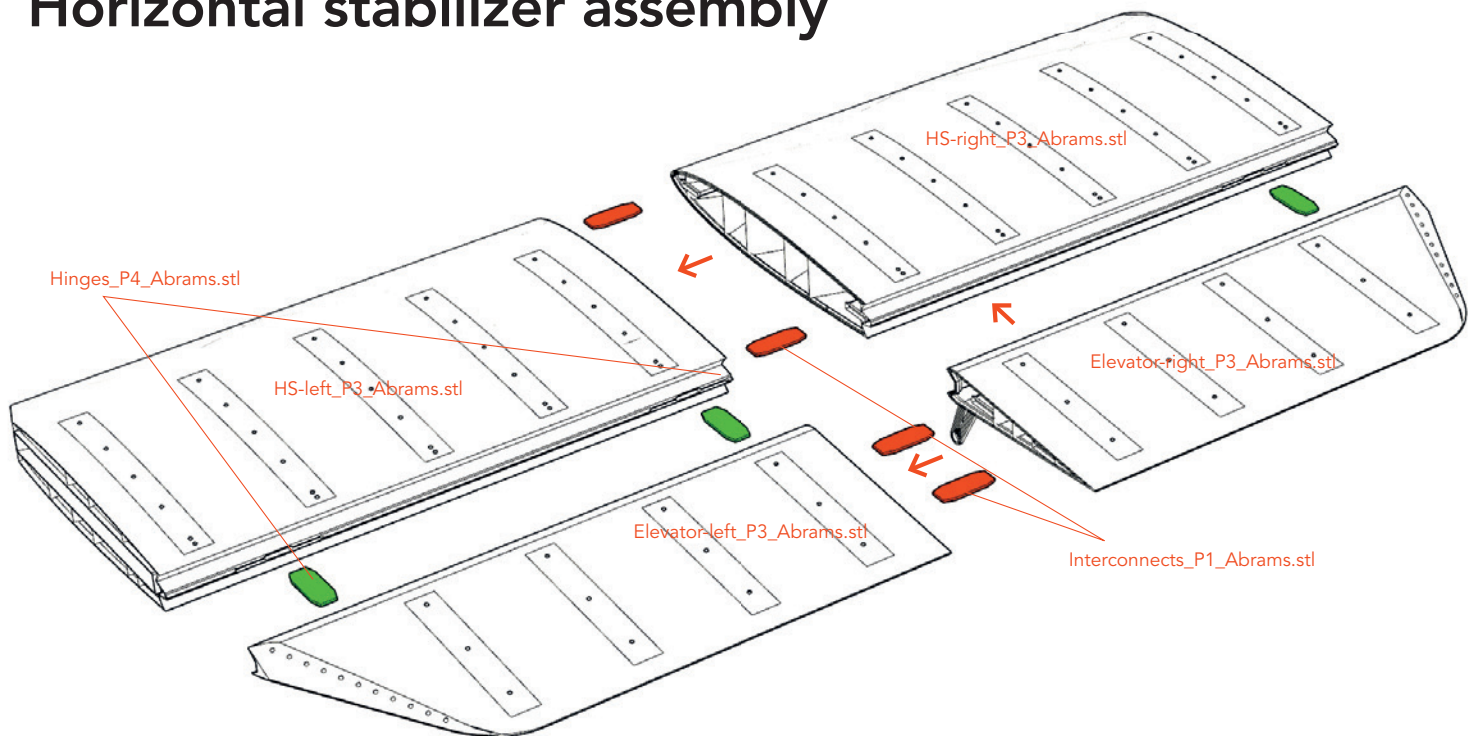


Fuselage assembly

To facilitate repairs, we have designed the fuselage in assemblies that can be bolted together.



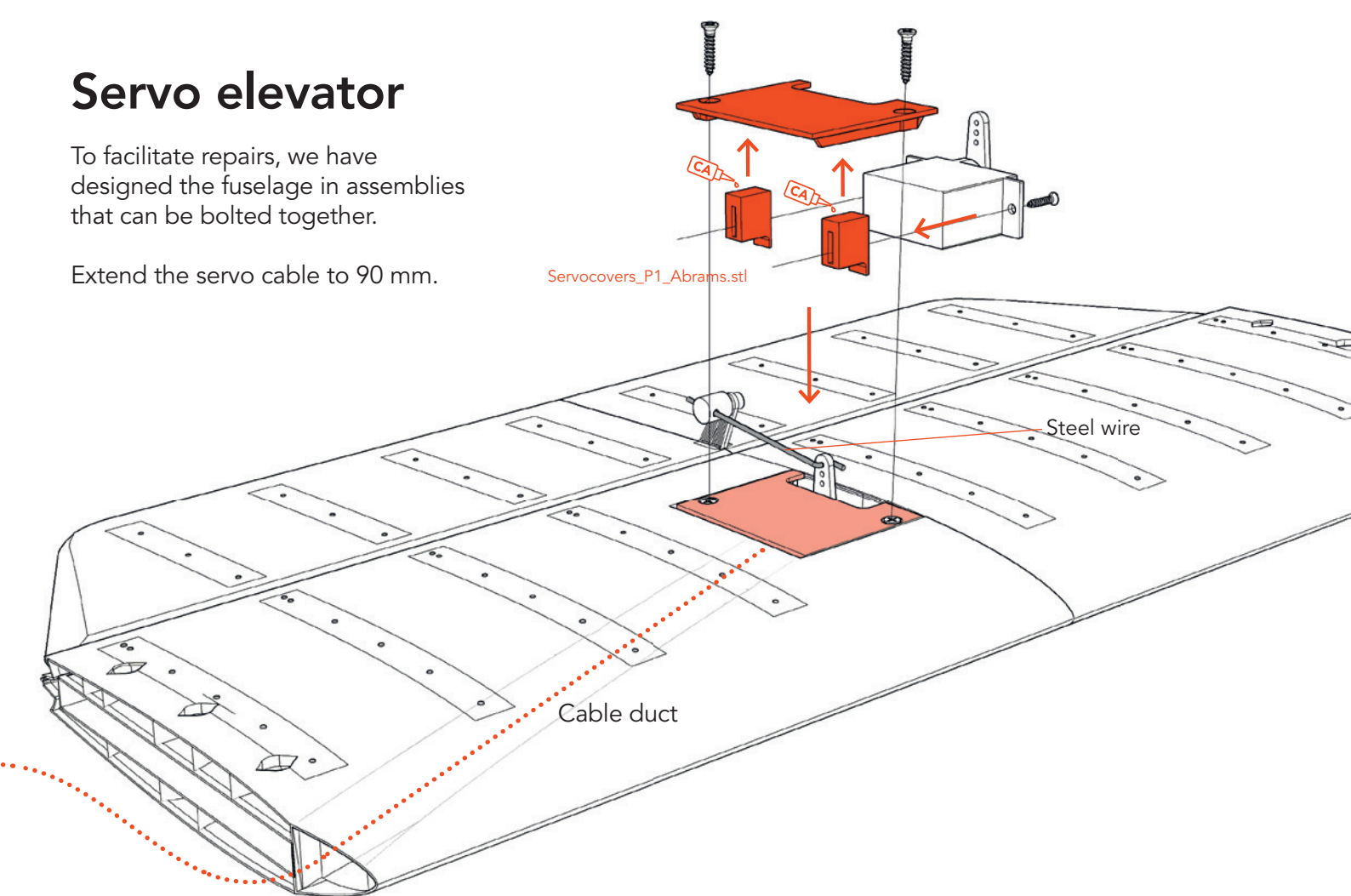
Horizontal stabilizer assembly



Servo elevator

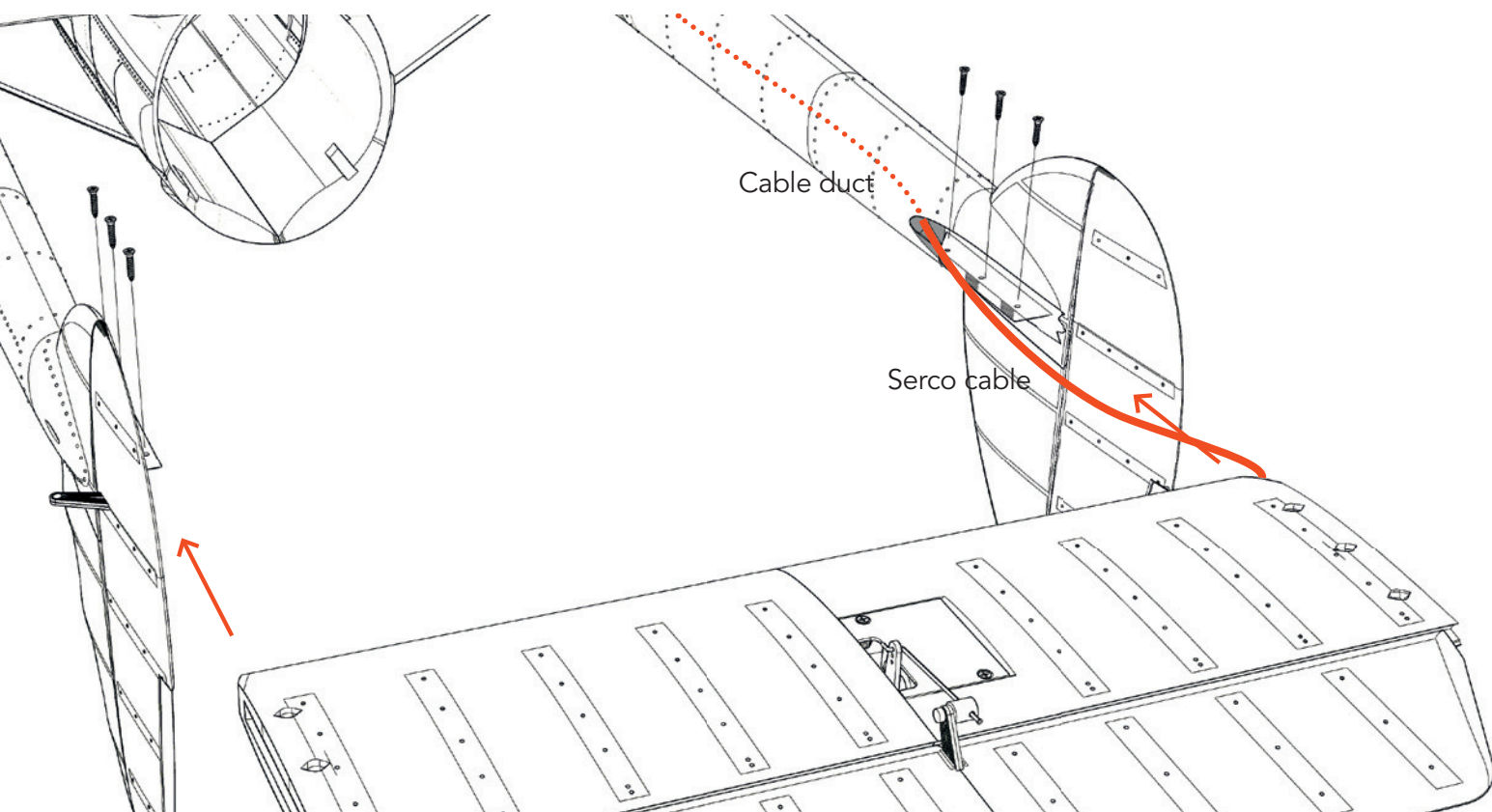
To facilitate repairs, we have designed the fuselage in assemblies that can be bolted together.

Extend the servo cable to 90 mm.



Horizontal stabilizer assembly

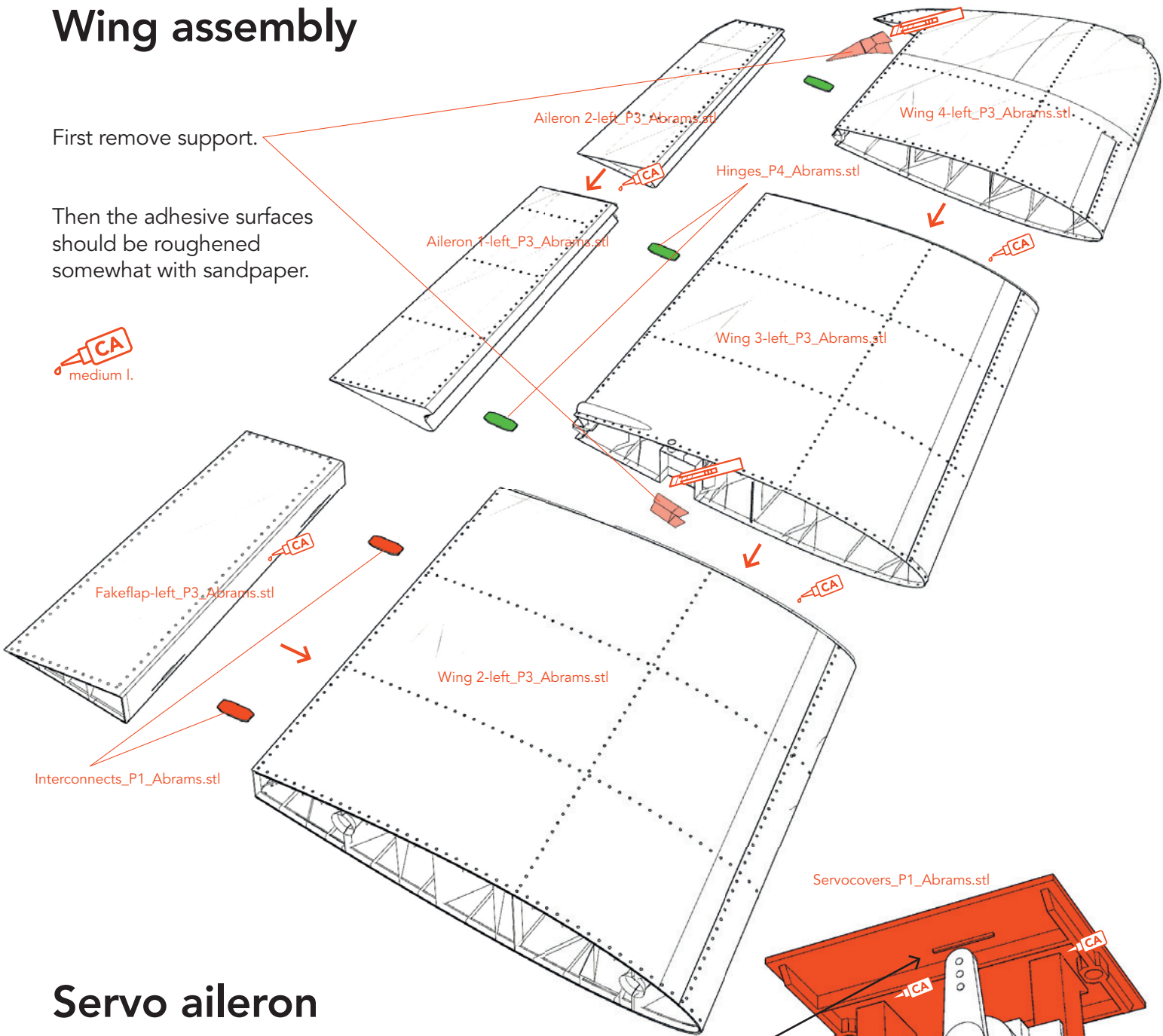
Pull the servo cable into the cable channel of the fuselage with the help of a wire. Insert the horizontal stabilizer into the fuselage and tighten it with six tapping screws from below.



Wing assembly

First remove support.

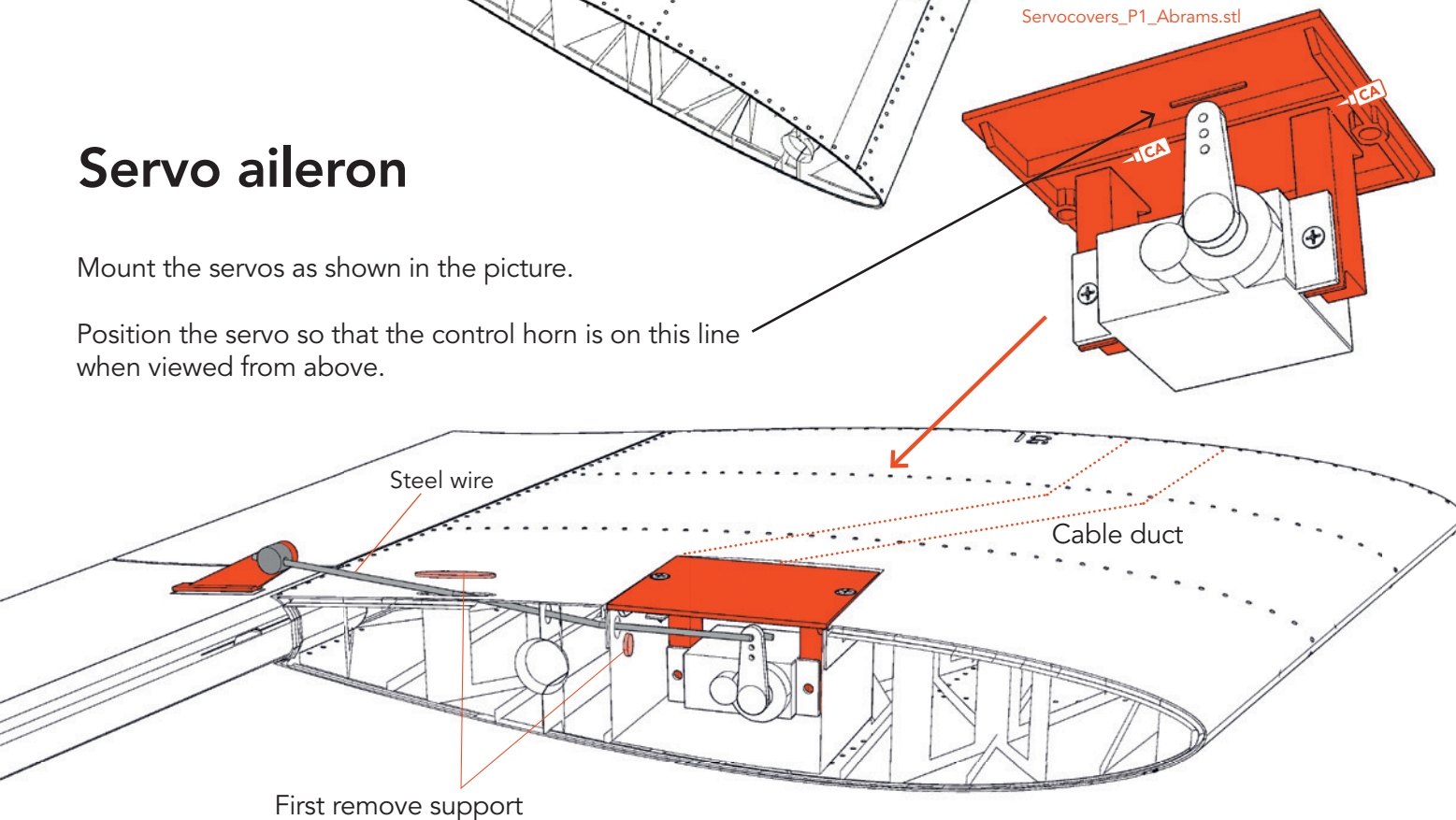
Then the adhesive surfaces should be roughened somewhat with sandpaper.



Servo aileron

Mount the servos as shown in the picture.

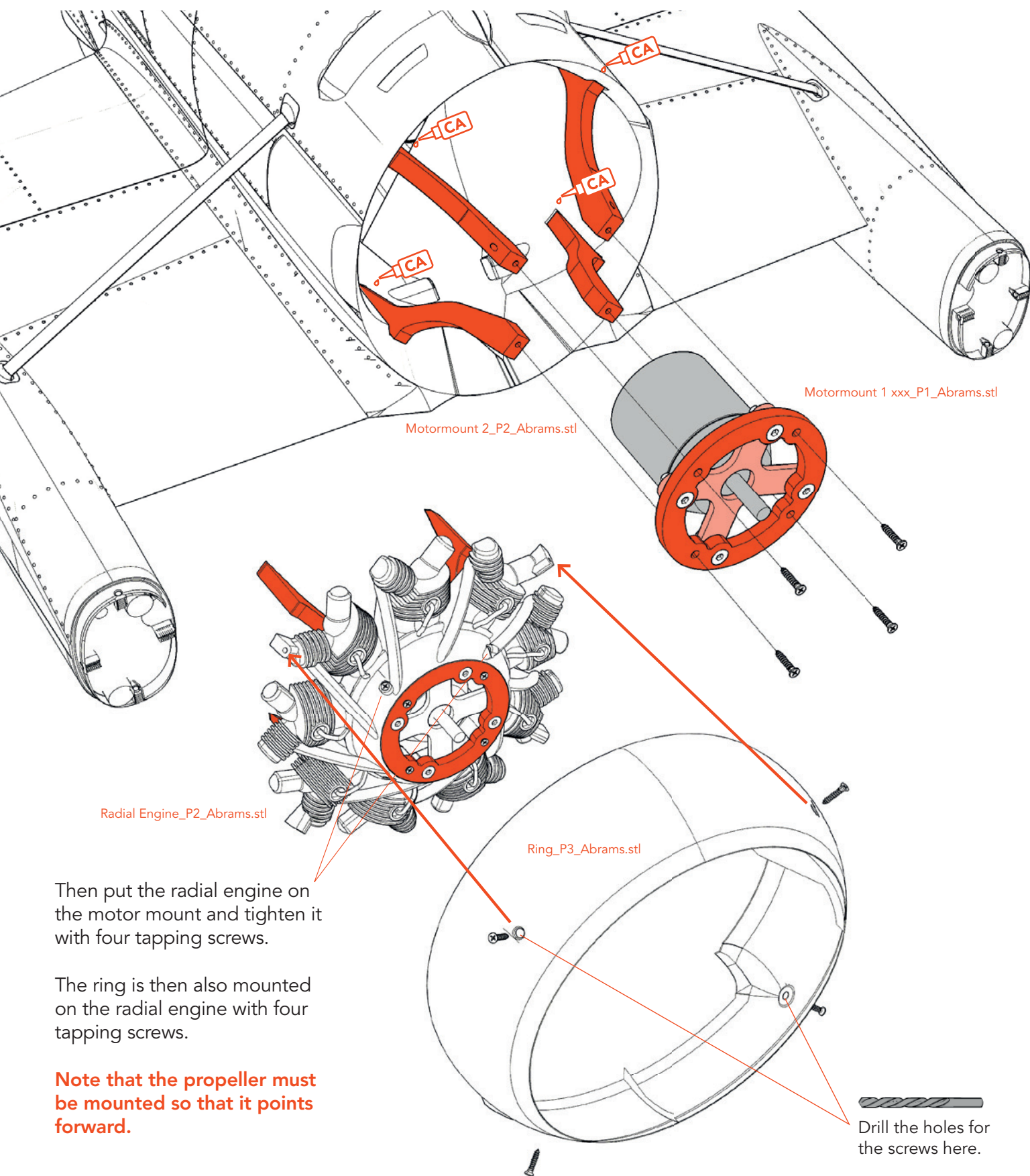
Position the servo so that the control horn is on this line when viewed from above.



Motor mounting

Tape the four motor mounts firmly into the recesses in the fuselage. Screw the metal motor cross to the motor and the motor mount ring, then screw it to the fuselage.

SAFETY FIRST Use appropriate screws for motor mounting to ensure safe operation! Make sure the prop runs smoothly and does not generate vibrations. **Check regularly that the motor mounting is absolutely tight!**



Then put the radial engine on the motor mount and tighten it with four tapping screws.

The ring is then also mounted on the radial engine with four tapping screws.

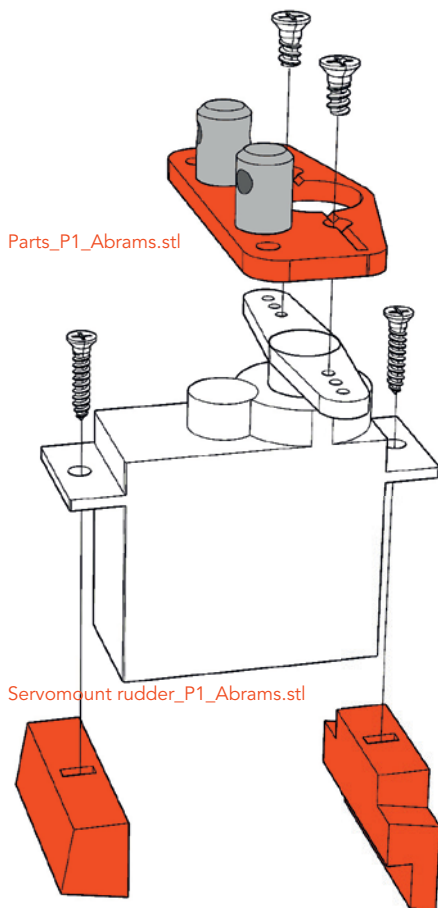
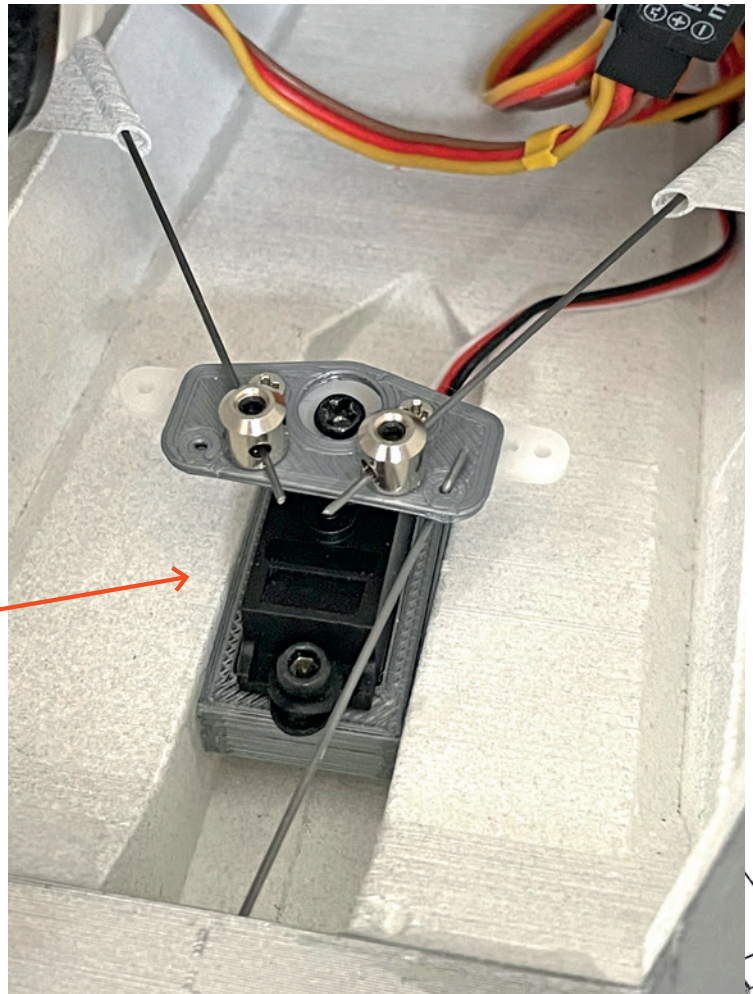
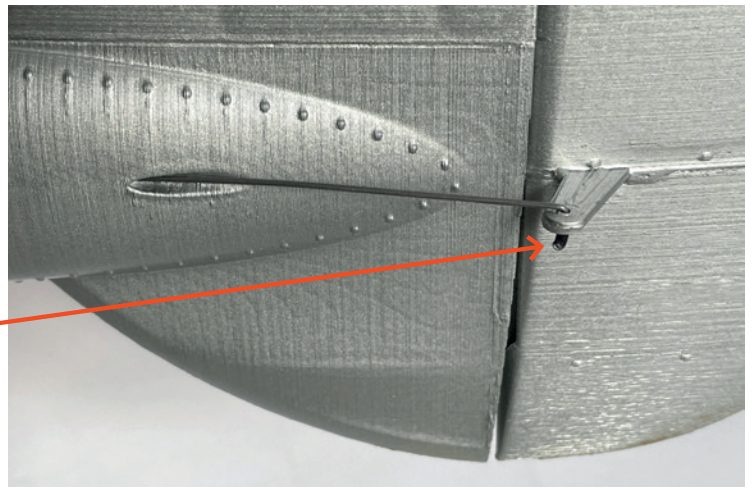
Note that the propeller must be mounted so that it points forward.

Servo rudder

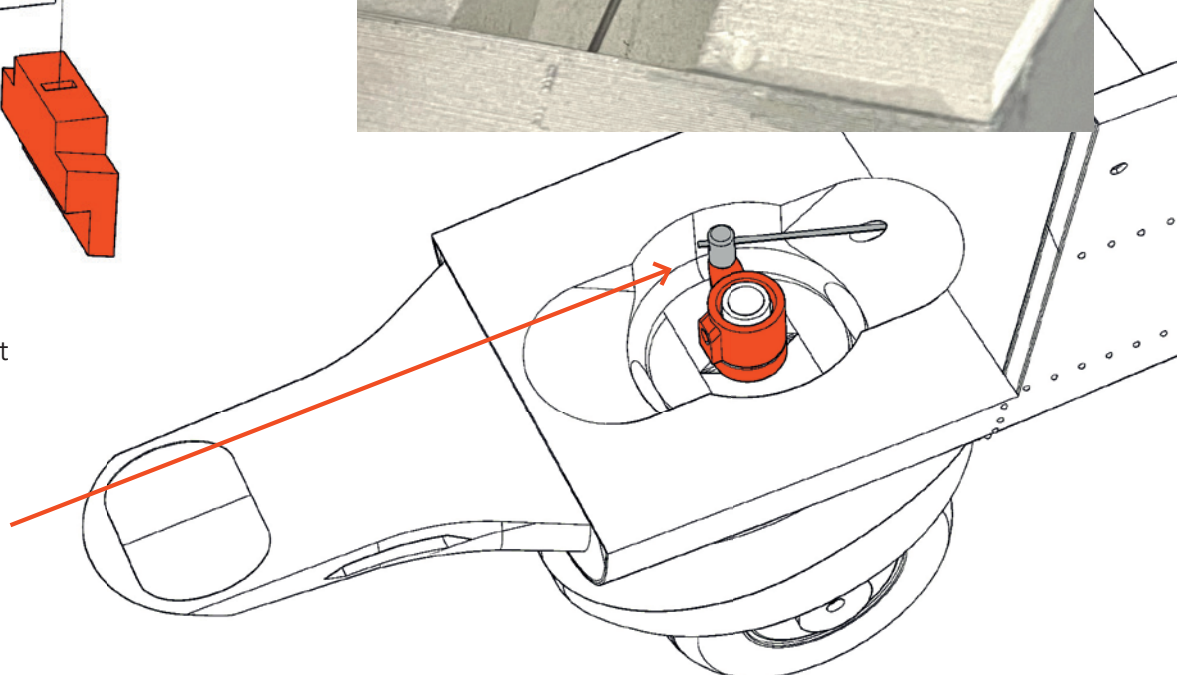
Bend the Ø0.8mm steel wire by 90° and insert it into the bowden of the fuselage until it runs left and right towards the servo.

Secure the linkages to the pin horn with a short piece of heat shrink tubing (shrink it beforehand on a piece of steel wire and then cut short pieces) and a drop of medium CA glue.

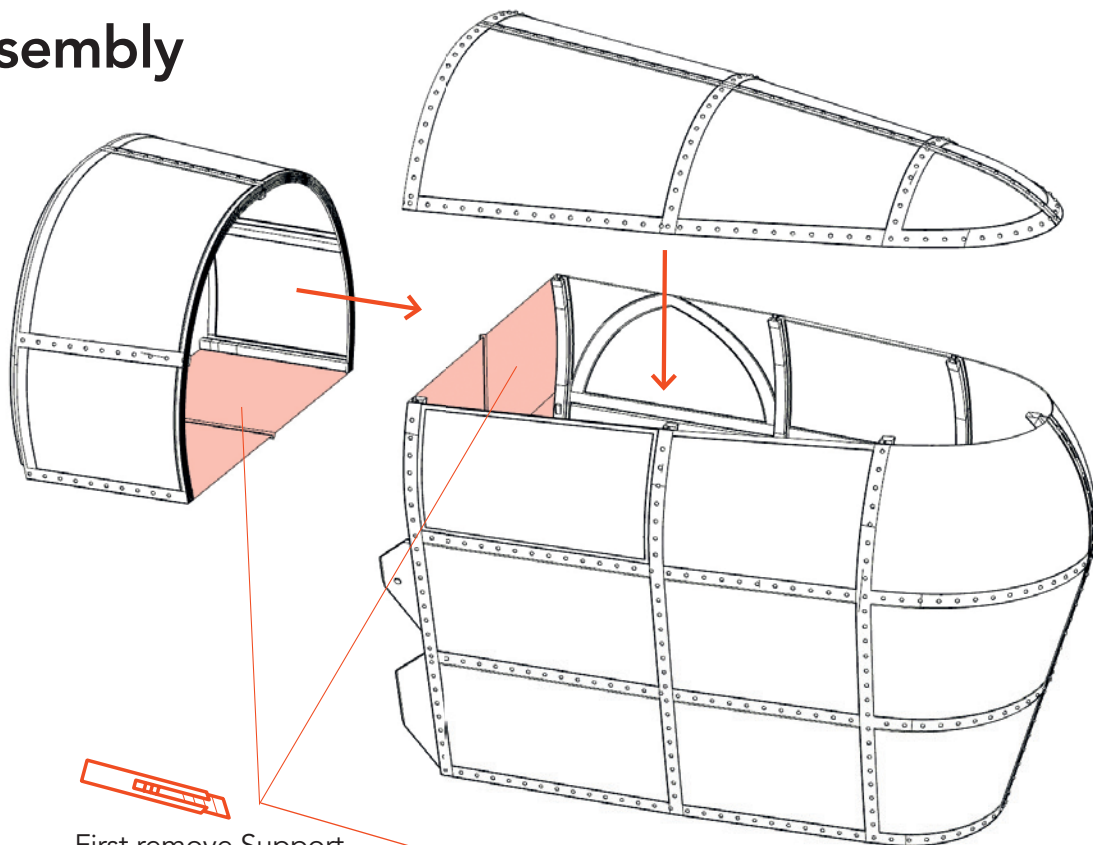
Mount the servo as shown here. Insert it into the fuselage and connect the steel wires from rudder and front gear (a bit tricky, I know) and insert the servo into the fuselage. The servo will automatically be positioned correctly by the wires. now you can glue the servo mounts with CA glue. **Here, a somewhat stronger servo with metal gears should be used.**



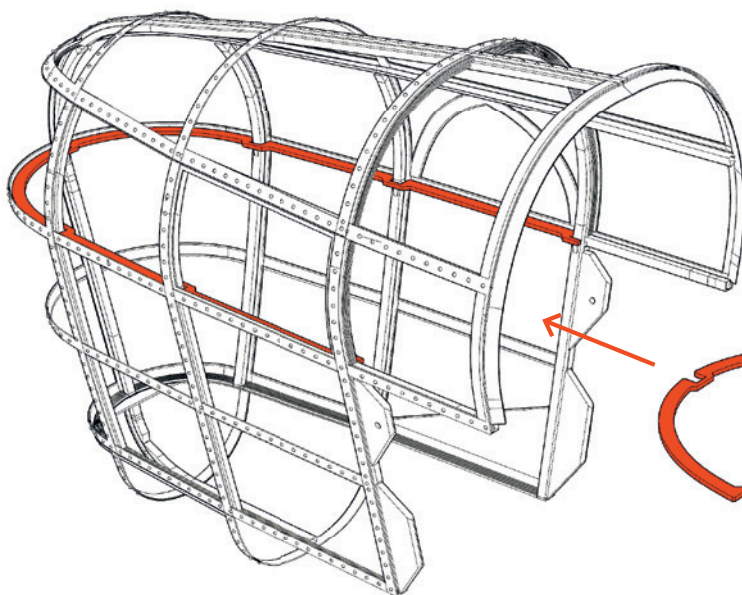
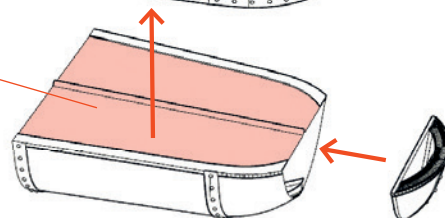
The steel wire for the front gear is pushed into the bowden from the back to the front with the servo installation. The gear is adjusted at the front with a rod connector.



Canopy assembly

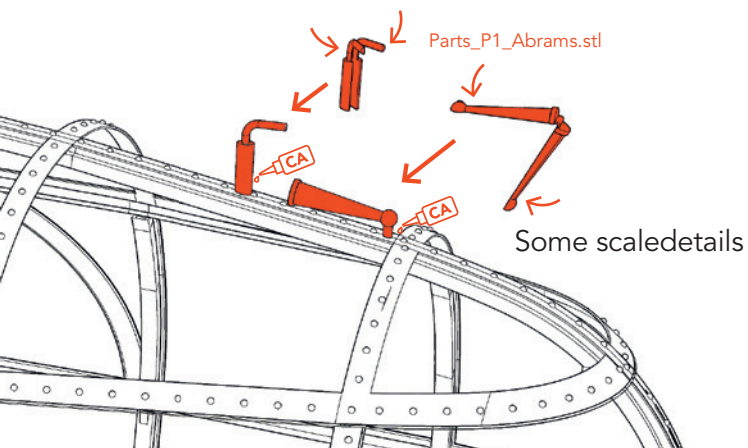
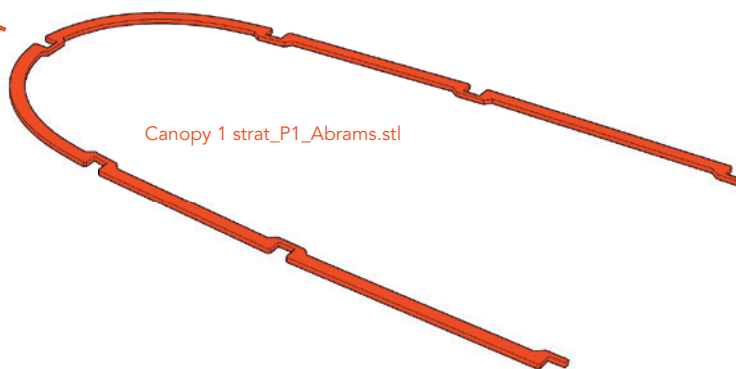


First remove Support



The Canopy strut is only needed when you cut out the windows.

Canopy 1 strut_P1_Abrams.stl

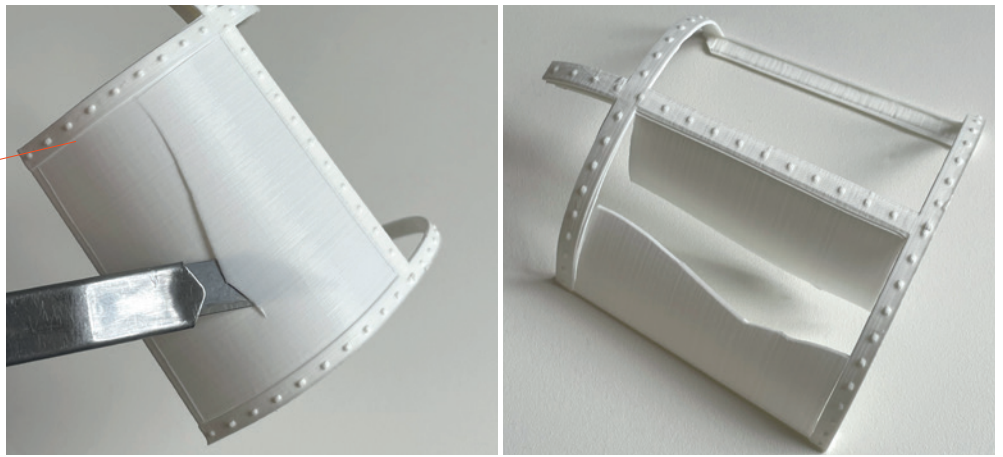


Some scaledetails

You can paint the windows or remove them and make a glass canopy. How this works is explained on the next page ...

Glass canopy

To remove the windows, cut along the **outer edges** several times with little pressure and a very sharp knife. You only need to scratch the surface. Then cut the window in the middle across the print layers as shown in the picture. Then you can break out the two parts.

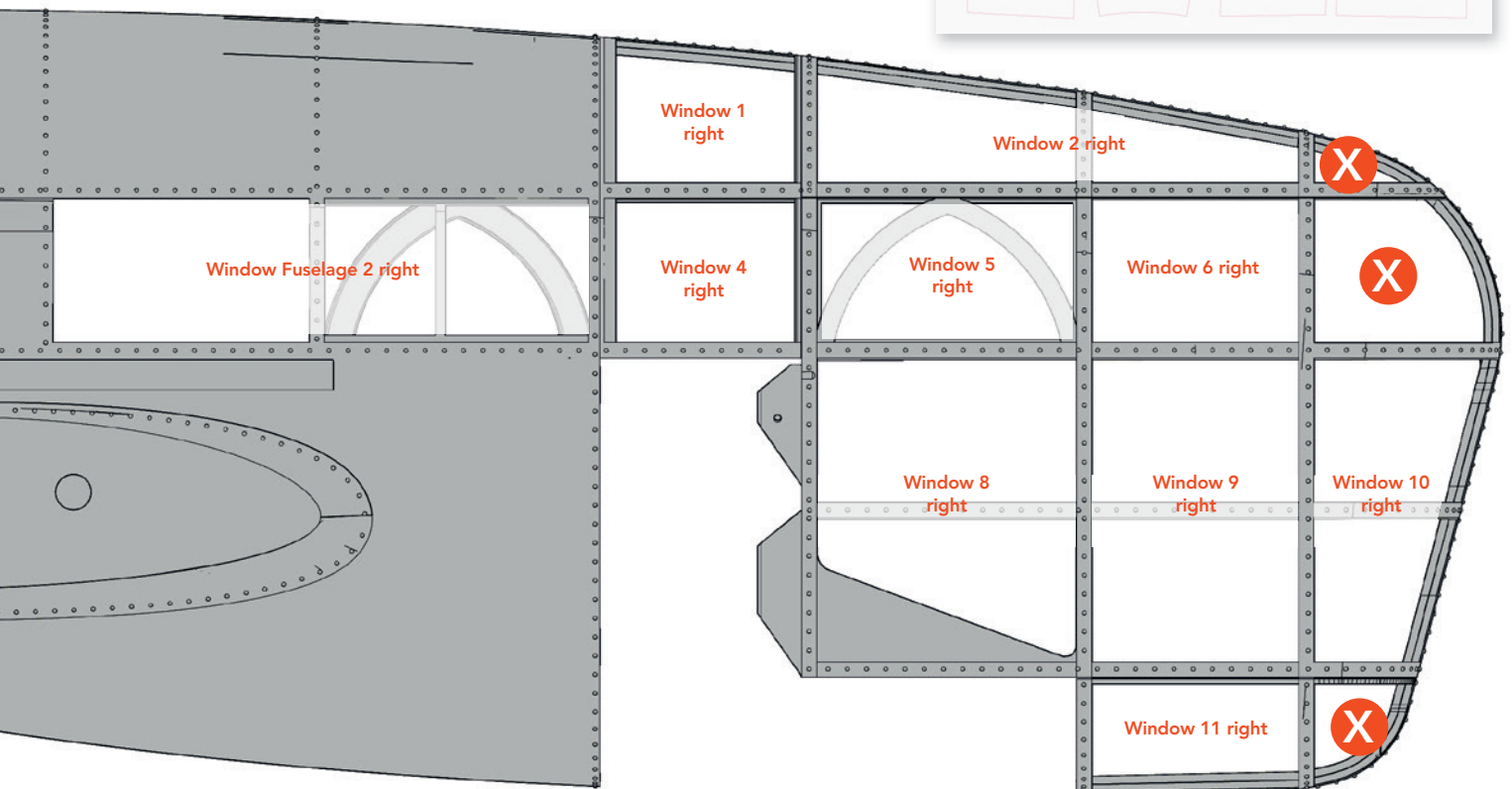


With the STL data you will find the PDF file **Abrams window template.pdf** as a cutting template for the Canopy windows.

IMPORTANT: the print must be set to 100% page size, so that the size fits exactly!

Suitable foils are overhead foils or binding covers of scripts (~0,2mm, office trade) in DIN A4 format.

Fix the foil on the printout and cut out the windows exactly with the knife.



Insert the individual windows into the slots of the canopy and let some thin CA glue run into the slots from the inside. **DO NOT use activator spray, it will cloud the glass!**

The windows marked **X** are convex curved and must be cut from matching PET water bottles from the grocery store. With the template [Bottle finder_P1_Abrams.stl](#) you can find the right bottle while shopping by comparing the two necessary radii – see next page ...

Glass canopy

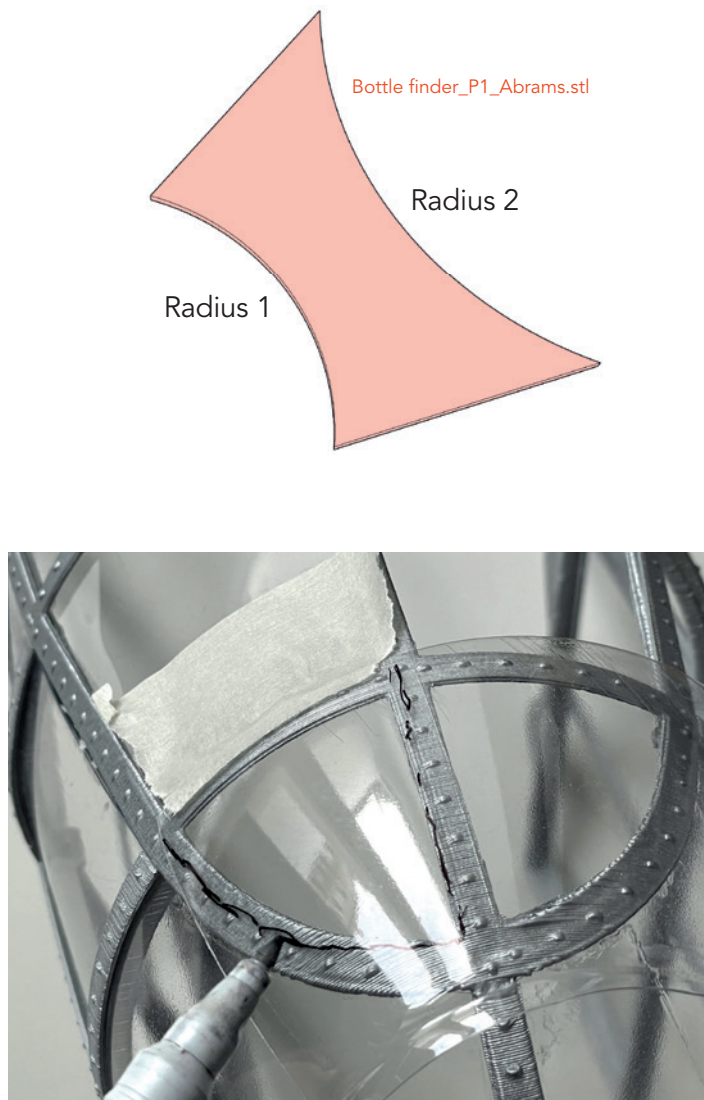
Take the bottle finder to the supermarket and look for suitable PET bottles. You need both radii.



Cut out a suitable part of the bottle slightly larger and fix it to the canopy frame with an adhesive strip.

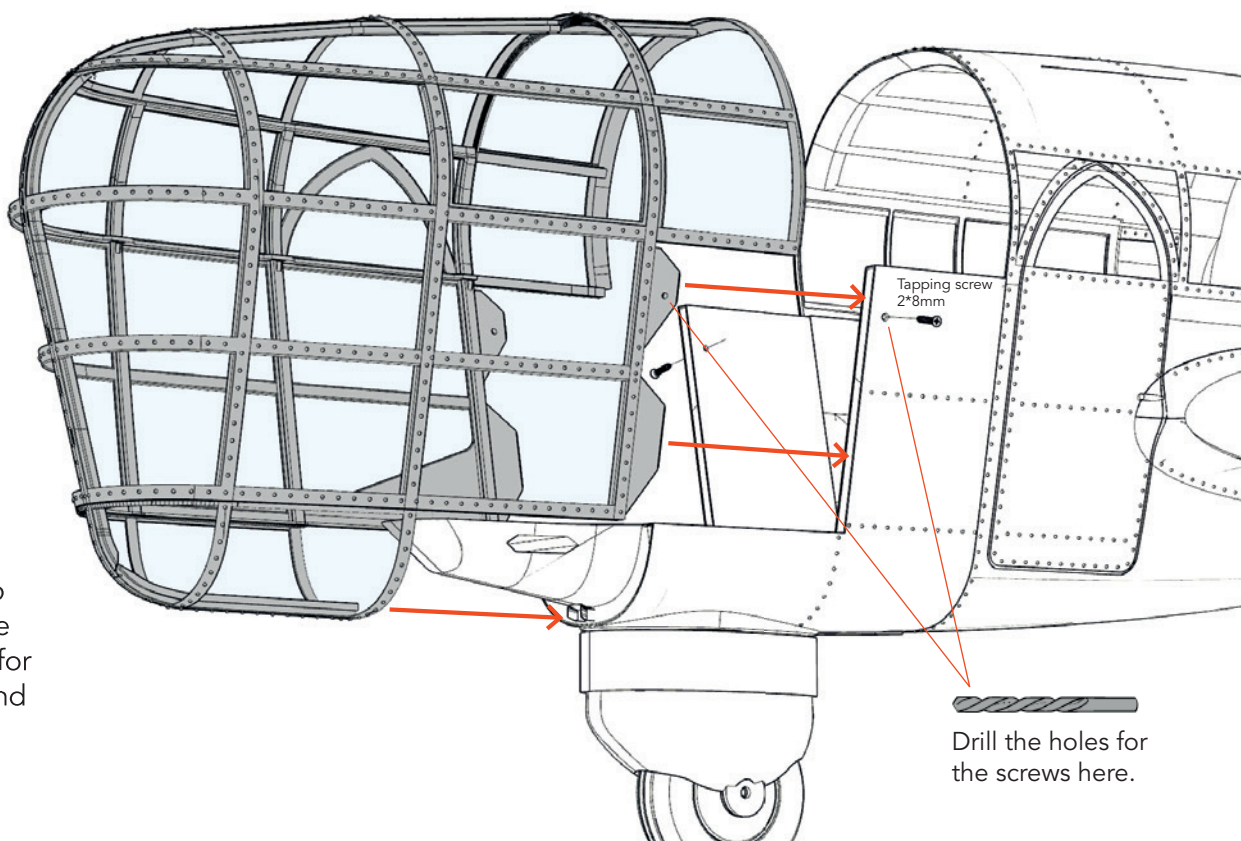
Then trace the window edge a little outside and cut out the window exactly. You may have to trim it a bit to make it fit into the slot in the frame.

Then glue it in place like the other windows.



Canopy fastening

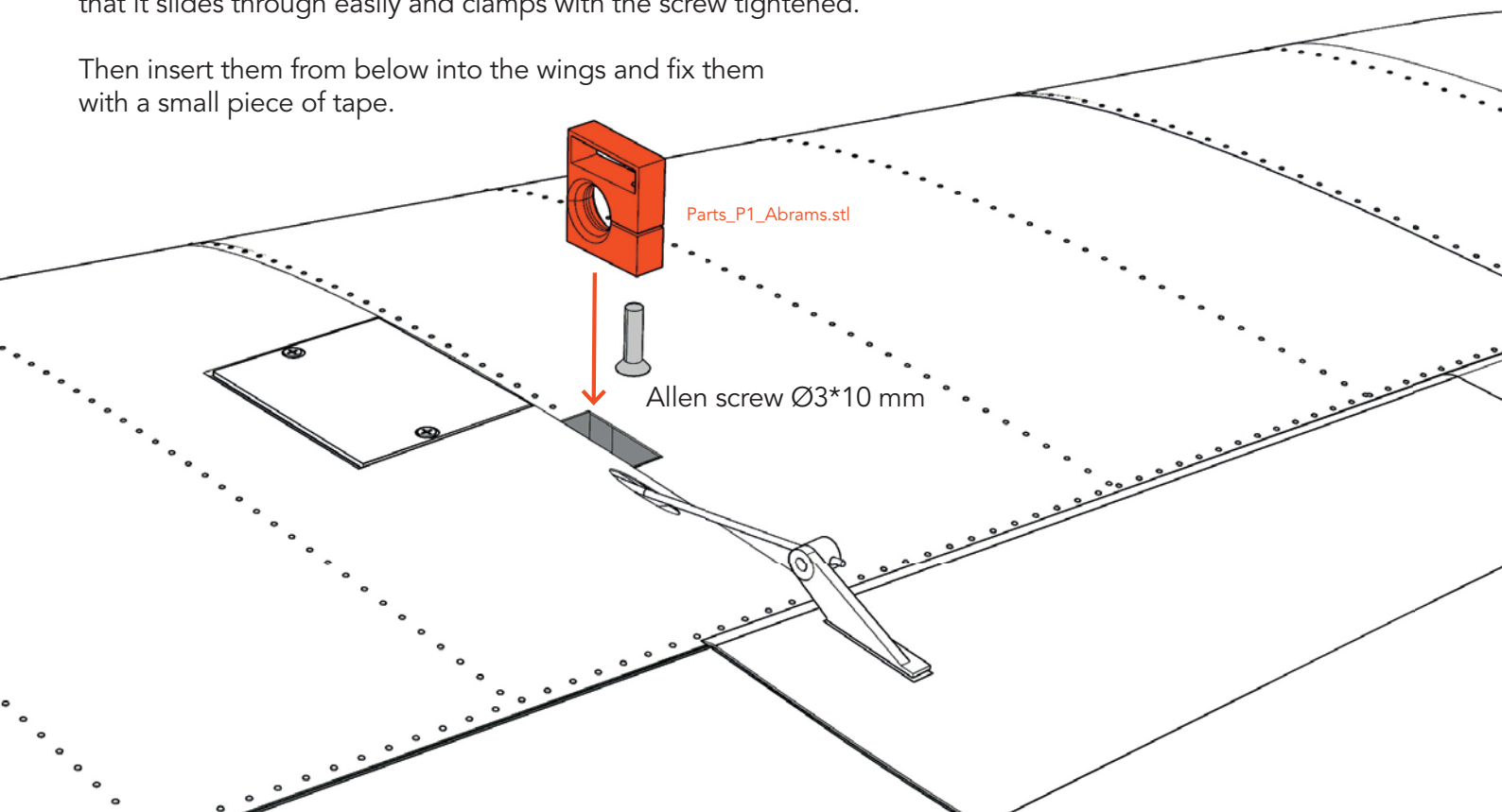
Attach the canopy to the fuselage from the front. Drill the holes for the screws beforehand (or use hot wire).



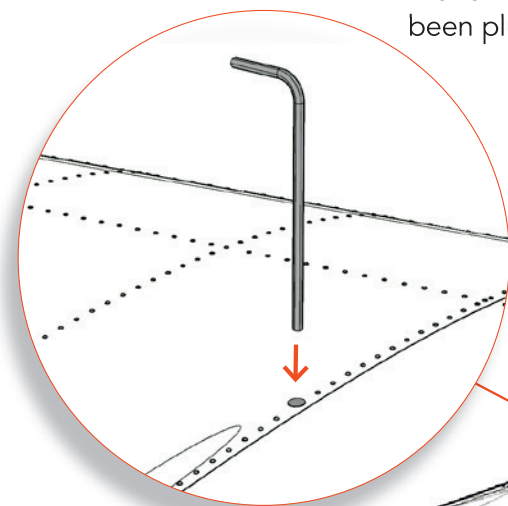
Wing mounting system

Screw the 3mm screws into the tube clamps and test on the 8mm carbon tube that it slides through easily and clamps with the screw tightened.

Then insert them from below into the wings and fix them with a small piece of tape.

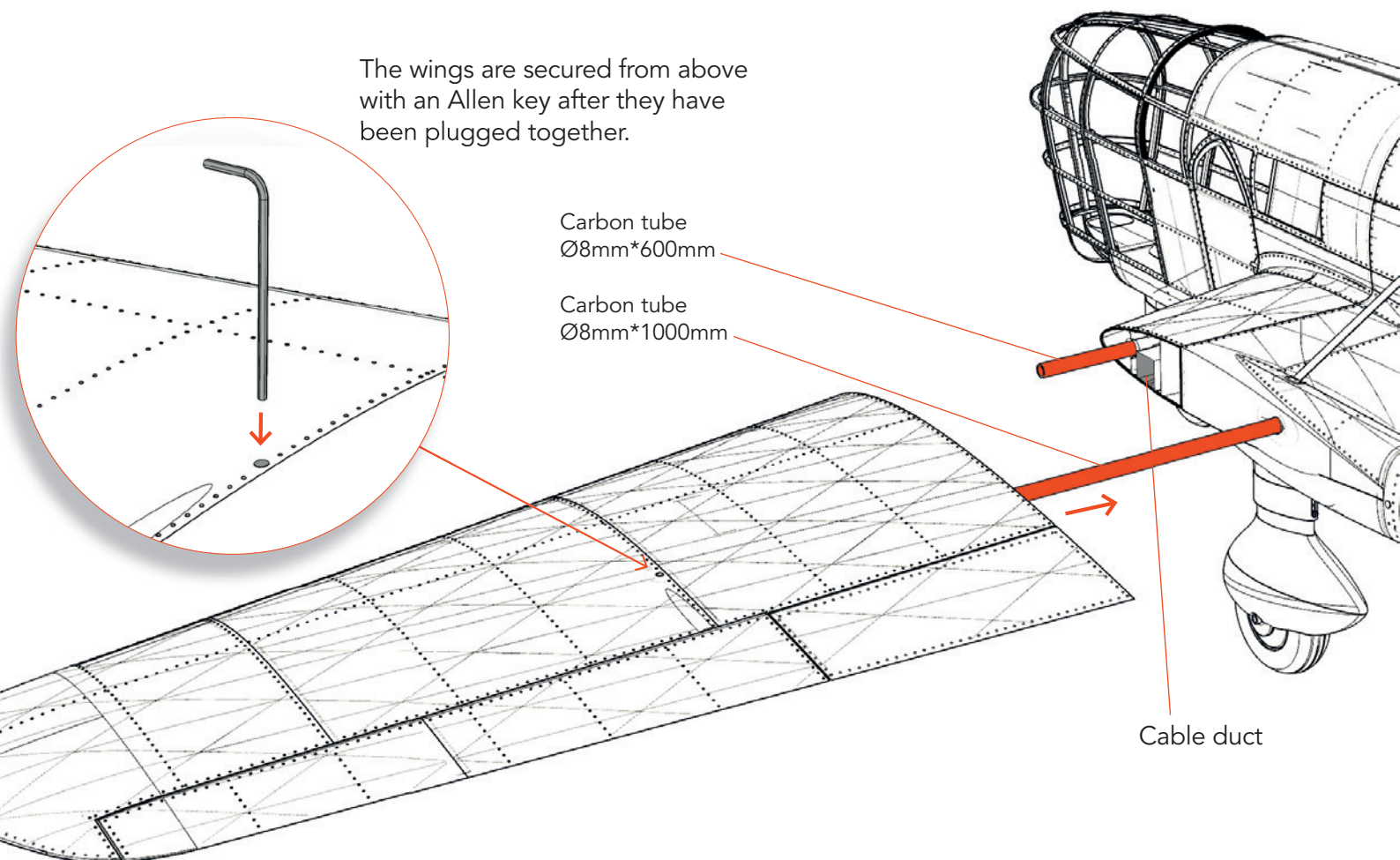


The wings are secured from above with an Allen key after they have been plugged together.



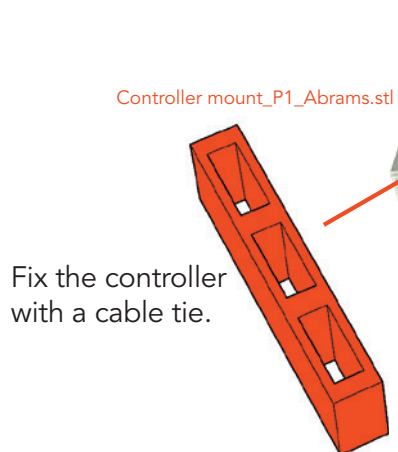
Carbon tube $\text{\O}8\text{mm} \times 600\text{mm}$

Carbon tube $\text{\O}8\text{mm} \times 1000\text{mm}$



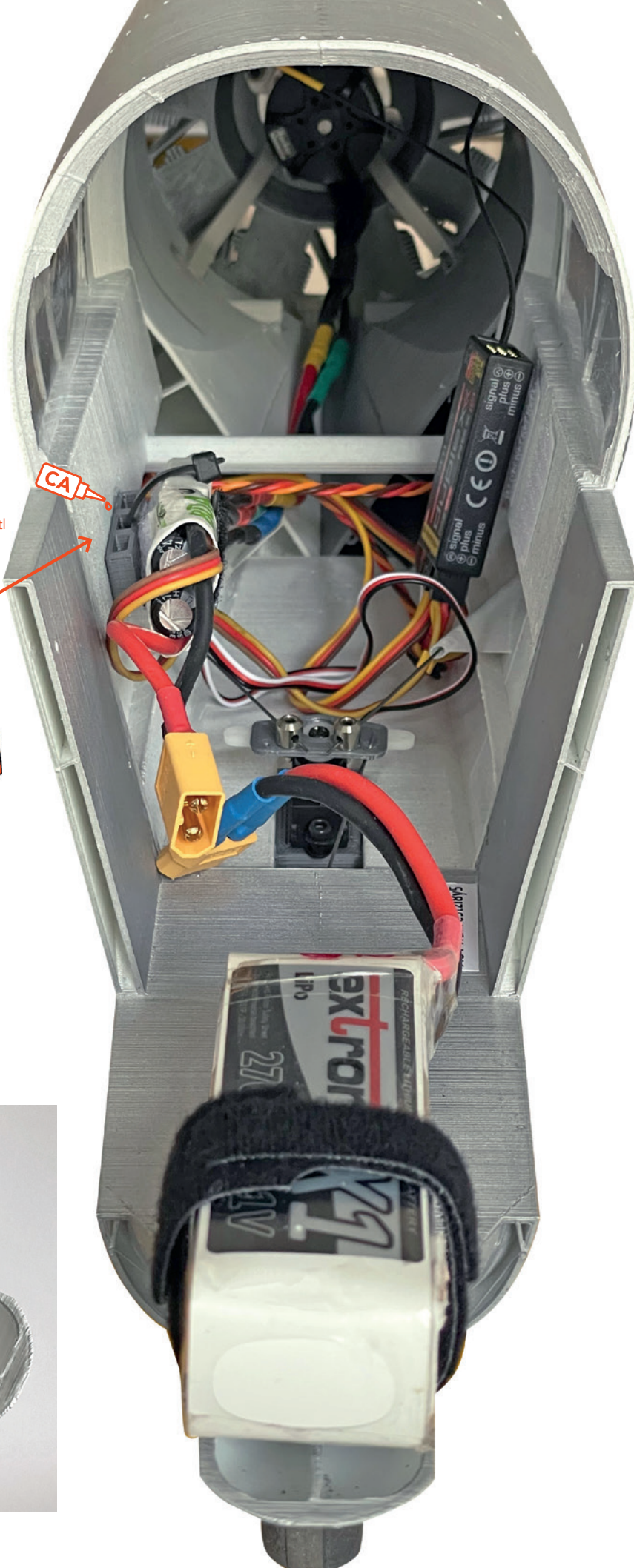
RC components

Use self-adhesive Velcro tape to attach the RC components.



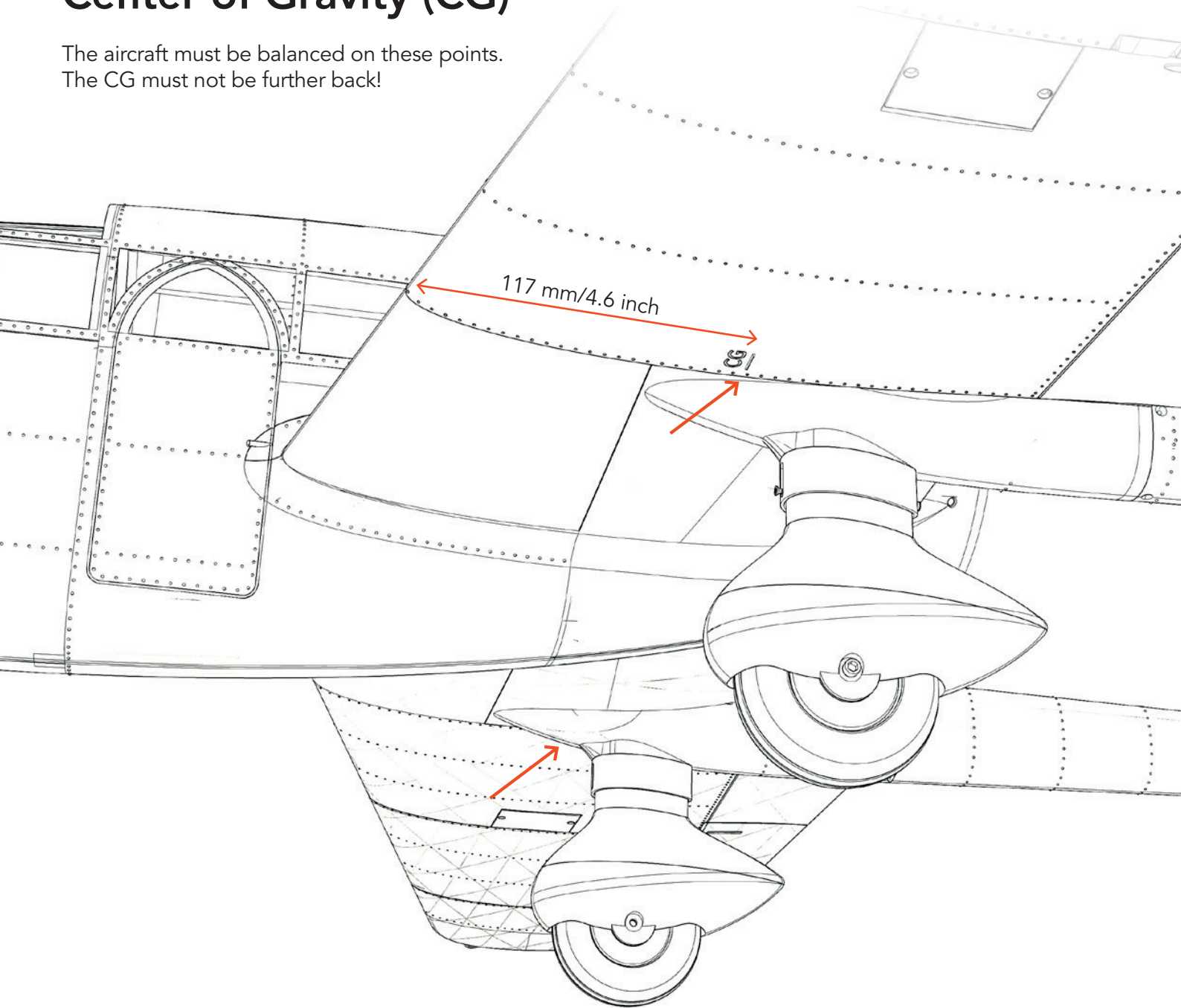
Set the exact CG by positioning the battery.

If you need lead to reach the CG you can open the two chambers in the front.

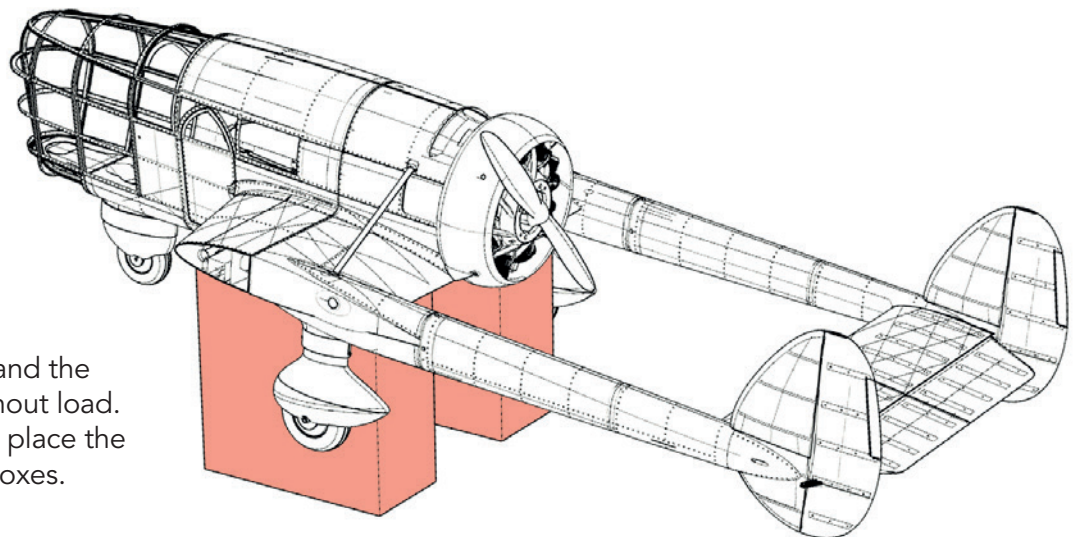


Center of Gravity (CG)

The aircraft must be balanced on these points.
The CG must not be further back!



NOTE The gear spring and the tires should be stored without load. The simplest method is to place the Abrams on two filament boxes.



Setting the servo travel

ELEVATOR up: 15 mm, down: 15 mm

Since the engine is positioned much higher than the CG on the Abrams, the engine pushes the aircraft down a bit at full throttle. **Therefore, an electronic mixer must be programmed to the elevator at full throttle. The mixer must be linear:**

- zero throttle: elevator + 0 mm up
- half throttle: elevator + 1.5 mm up
- full throttle: elevator + 3 mm up

AILERON up: 16 mm, down: 14 mm

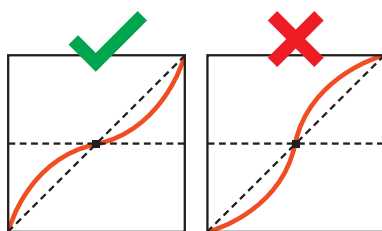
RUDDER left/right: about 14 mm

Expo setting

ELEVATOR 40 %

RUDDER 30 %

AILERON 30 %



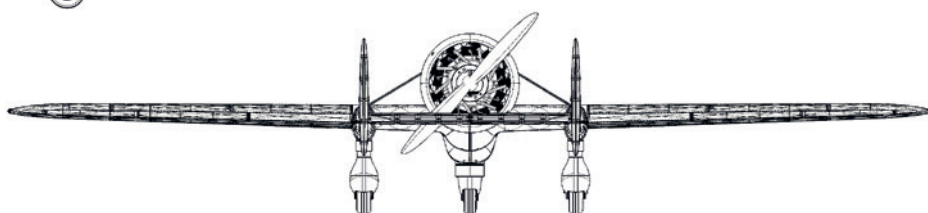
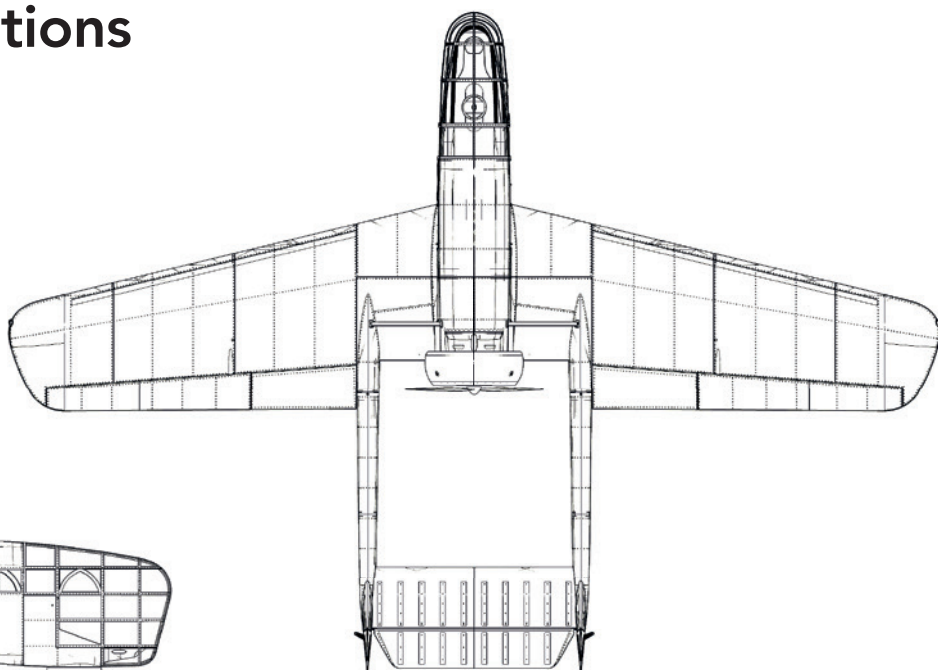
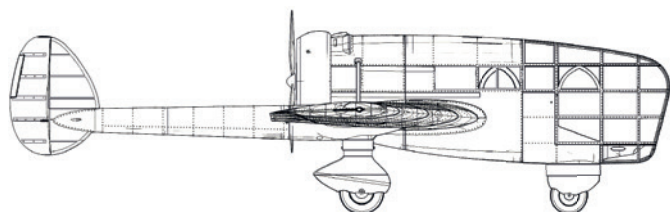
(for some remote controls a minus has to be in front of the number)

Technical specifications

WINGSPAN 1500 mm/59 inches

LENGTH 1050 mm/41.3 inches

FLIGHT WEIGHT 2.100 grams

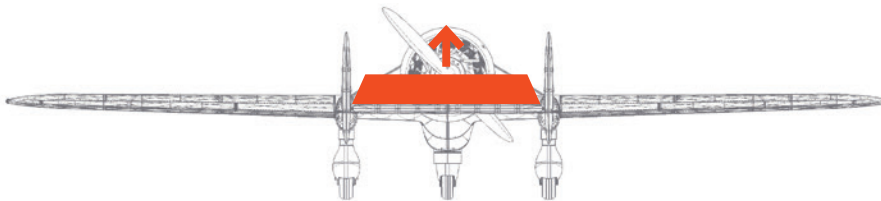


Control Direction Test

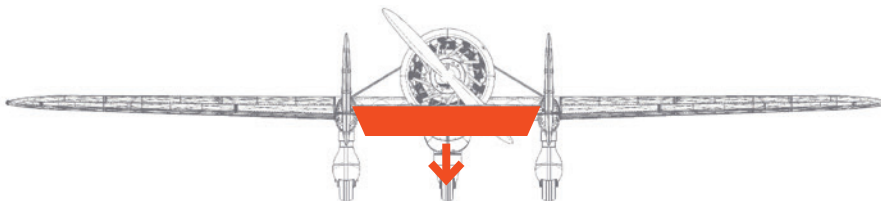
Turn on the transmitter and connect the battery.

When checking the control directions, **look at the aircraft from behind.**

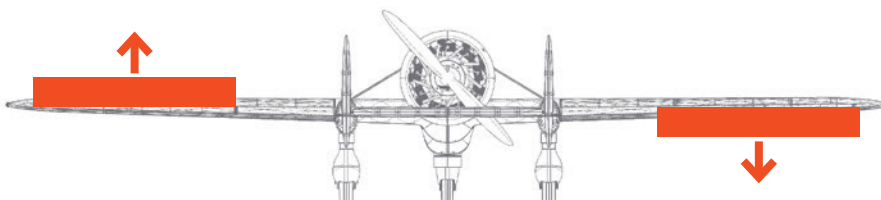
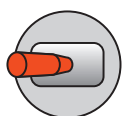
Elevator up



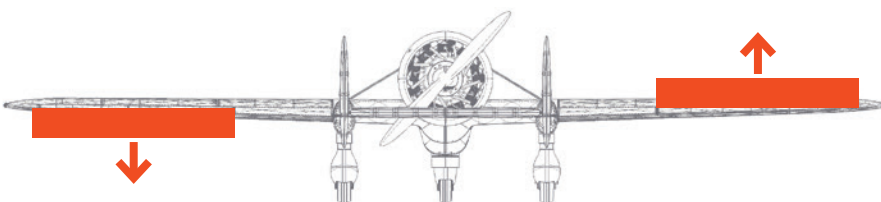
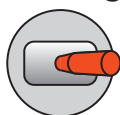
Elevator down



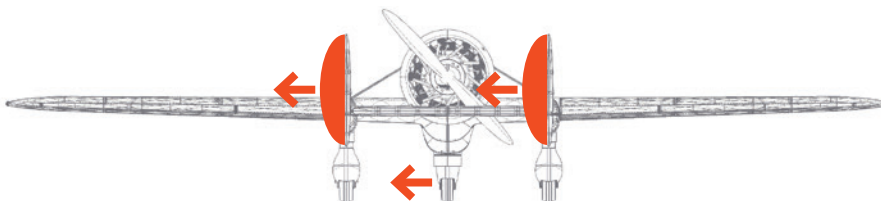
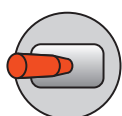
Aileron left



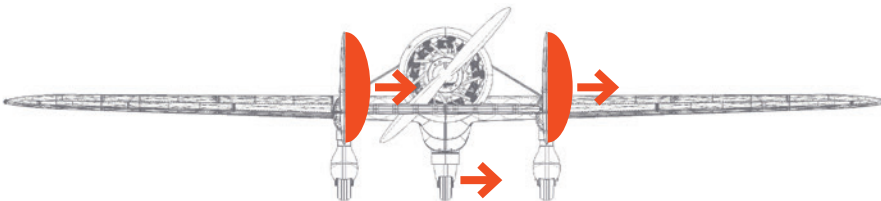
Aileron right



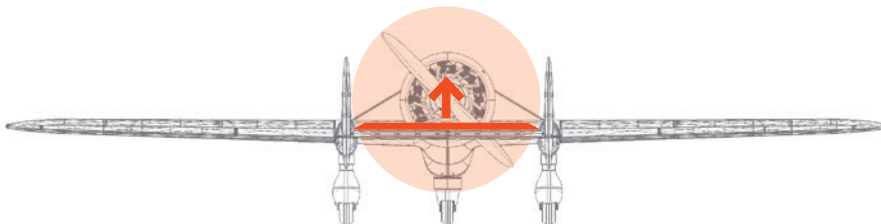
Rudder left



Rudder right



Full throttle (mix)



AGE RECOMMENDATION 14+

**NOT FOR CHILDREN UNDER 14 YEARS.
THIS IS NOT A TOY!**

By using the download data, an RC model airplane, called „model“ for short, can be manufactured using a 3D printer. As a user of this model, only you are responsible for safe operation that does not endanger you or others, or that does not damage the model or property of others.

PLANEPRINT.com assumes no responsibility for damage to persons and property caused by pressure, transport or use of the product. Filaments, printing supplies, hardware or consumables that can not be used after faulty 3D printing will not be replaced by PLANEPRINT.com in any way.

When operating, always keep a safe distance from your model in all directions to avoid collisions and injuries.

This model is controlled by a radio signal. Radio signals can be disturbed from outside without being able to influence it. Interference can lead to a temporary loss of control.

Always operate your model on open terrains, far from cars, traffic and people.

Always follow the instructions and warnings for this product and any optional accessories (servos, receivers, motors, propellers, chargers, rechargeable batteries, etc.) carefully.

Keep all chemicals, small parts and electrical components out of the reach of children.

Avoid water contact with all components that are not specially designed and protected. Moisture damages the electronics.

Never take an item of the model or accessory in your mouth as this can lead to severe injuries or even death.

Never operate your model with low batteries in the transmitter or model.

Always keep the model in view and under control. Use only fully charged batteries.

Always keep the transmitter switched on when the model is switched on.

Always remove the battery before disassembling the model.

Keep moving parts clean and dry at all times.

Always allow the parts to cool before touching them.

Always remove the battery after use.

Make sure that the Failsafe is properly set before the flight.

Never operate the model with damaged wiring.

Never touch moving parts.

We develop our models to the best of our knowledge and belief. We accept no liability for consequential damage and injuries caused by improper use. **Please be careful when handling motors, batteries and propellers** and only move your model with insurance and in approved places!

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