

# ASSEMBLY MANUAL AND USER GUIDE



## **Dornier Do-335 Pfiel** **"Arrow"**

By 3D AEROWORKS

## OVERVIEW:

This replica of the Dornier Do-335 Pfiel is designed for quick and easy construction and printed using Colourfabb light-weight PLA (LW-PLA). For best results the canopy should be printed with clear PLA and the motor mounts and propeller assembly in regular PLA. A scale propeller is included and is designed to suit both the 1806 and 2804 2300kv outrunner motors with a range of propeller blades varying in size and pitch to choose from in 3 blade configuration. Utilizing 3 channel controls; aileron, elevator and throttle, this model performs extremely well given its small size and lightweight. Links to components used can be found on the last page of the user guide.

This model has taken many hours of hard work and testing in order to provide a nice flying aircraft. Please do not share it freely. Please show your appreciation by directing interested parties to the link below.

<https://www.rc3dmarket.com/dornier-do-335-700mm-lw-pla>

## GENERAL SPECIFICATIONS

WINGSPAN:	700mm
PRINT TIME:	APPROX 60 hrs
PRINT WEIGHT:	250g
FLYING WEIGHT:	450g

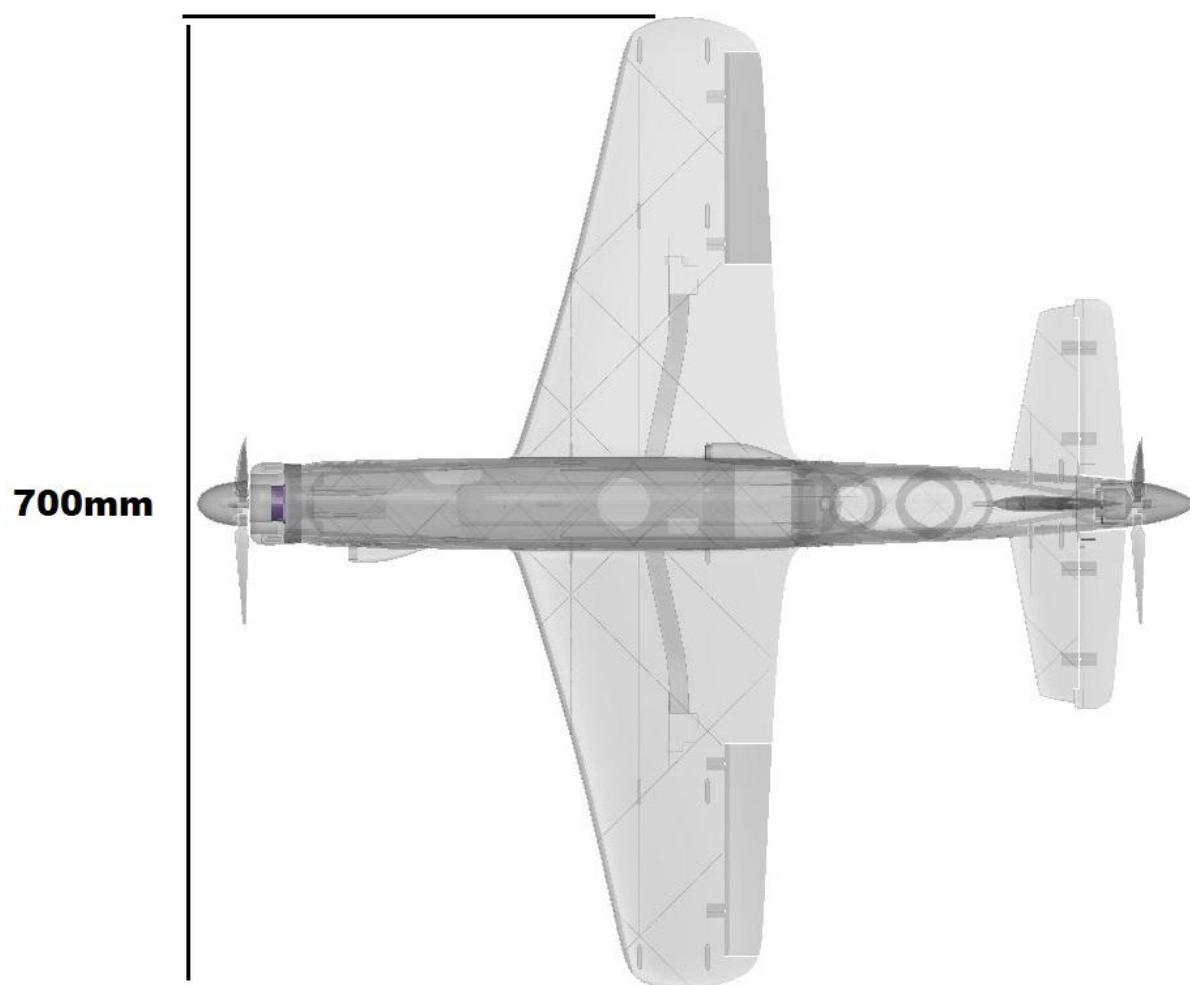
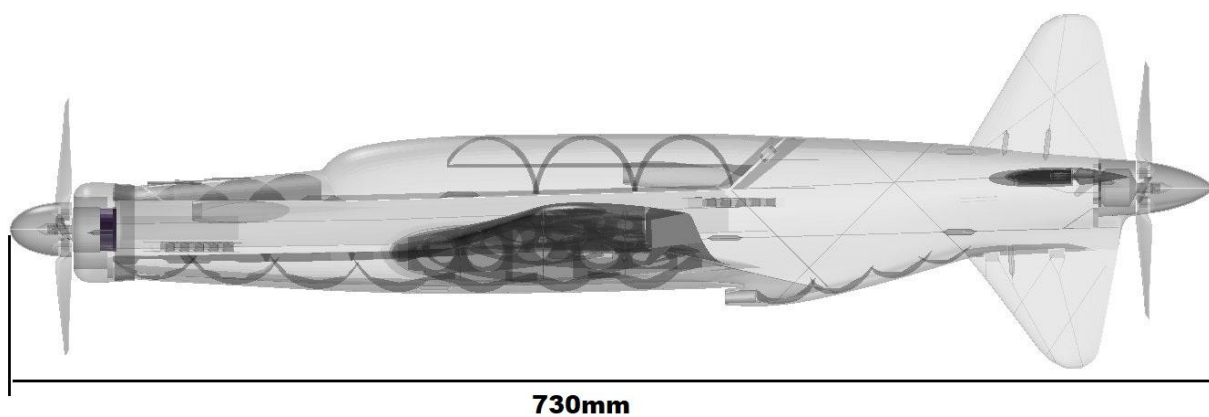
## ELECTRICS

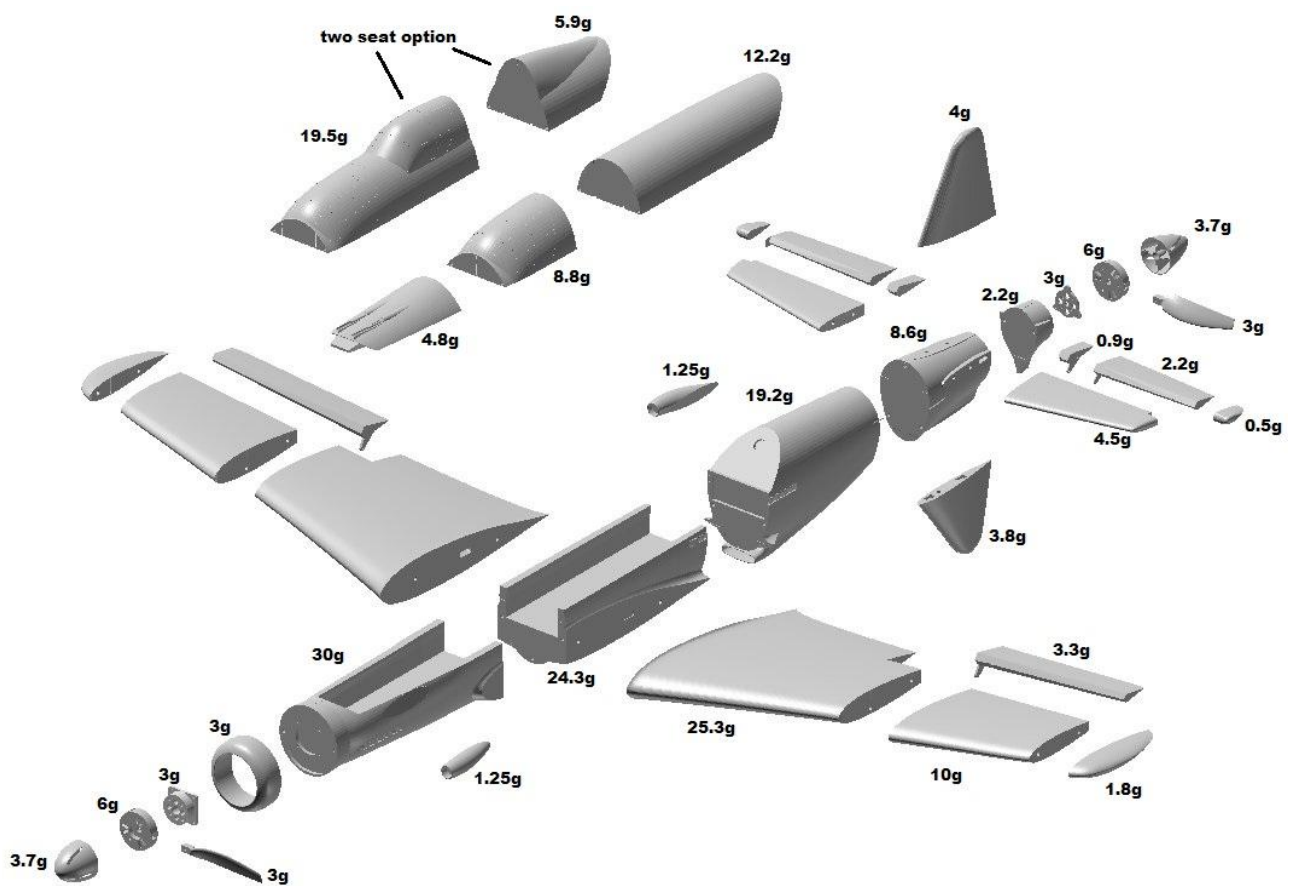
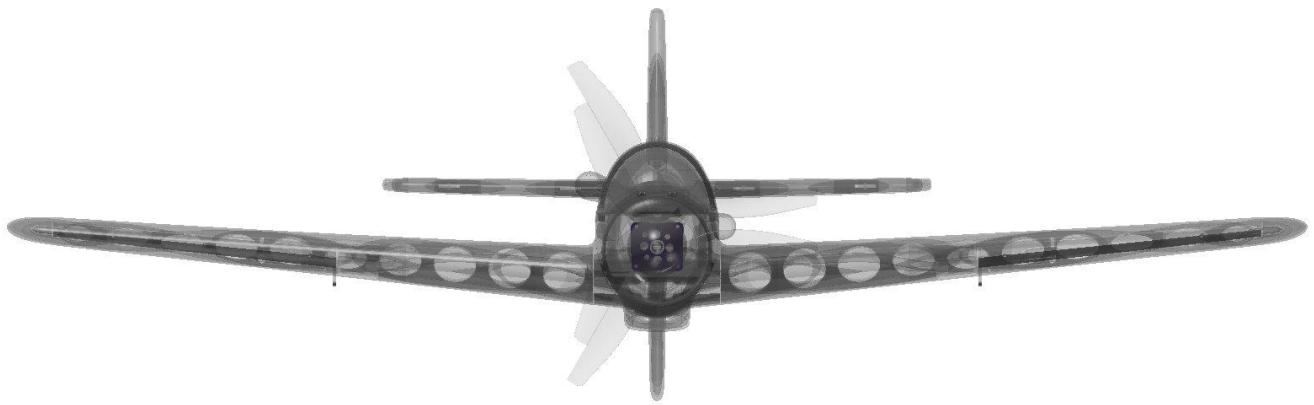
MOTOR:	x2 1806 or 2804 2300KV
ESC:	12amp (min)
SERVOS:	3.7g MICRO
BATTERY:	1500mah 2S (or similar)

## INCLUDED:

STL FILES OF ALL COMPONENTS **(scale to 1000% if not using S3D)**

FACTORY FILES FOR (S3D) SIMPLIFY 3D FOR PRINTERS: 200X200X200





- Weights are approximate based on Colorfabb LW-PLA and a bowden style printer -

## **REQUIRED TOOLS:**

KNIFE

LIGHTER

SANDPAPER (MEDIUM GRIT)

PLIERS

CA GLUE

SCREW DRIVERS

FILE OR RASP

DRILL

## **REQUIRED COMPONENTS:**

X2 1806 OR 2804 2300KV MOTORS (or similar)

X2 12AMP or 20AMP ESC

X1 1500MAH 2S LIPO OR SIMILAR

X4 3.7G MICRO SERVO

BAMBOO SKEWERS 3MM

HEAT SHRINK TUBE 3mm

X2 10mm X 10mm X 2mm MAGNET (ROUND)

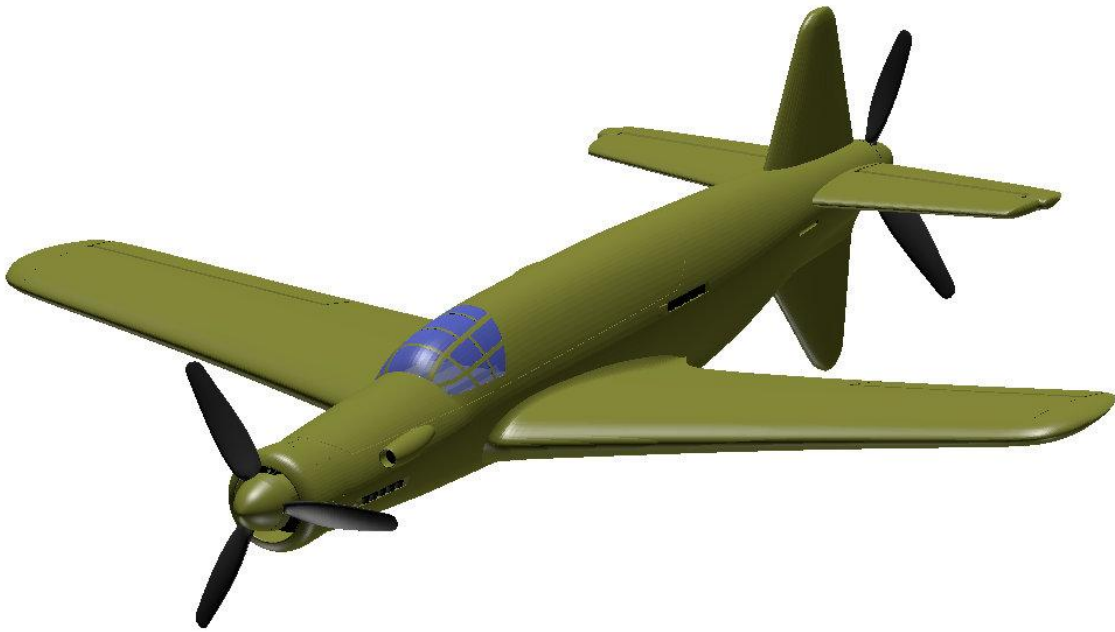
X10 MICRO HINGES (OPTIONAL)

VELCRO

X2 x 250mm CARBON STRIP 3mm x 0.6mm (OPTIONAL)

M2 x10mm SCREWS

1mm PIANO WIRE



## ASSEMBLY INSTRUCTIONS

### 1 POST PRINTING

After all parts have been printed, some may require to be cleaned as LW-PLA is prone to stringing. Do this by gently sanding back the rough sections with a file, sandpaper or blade until the surface is smooth.

### 2

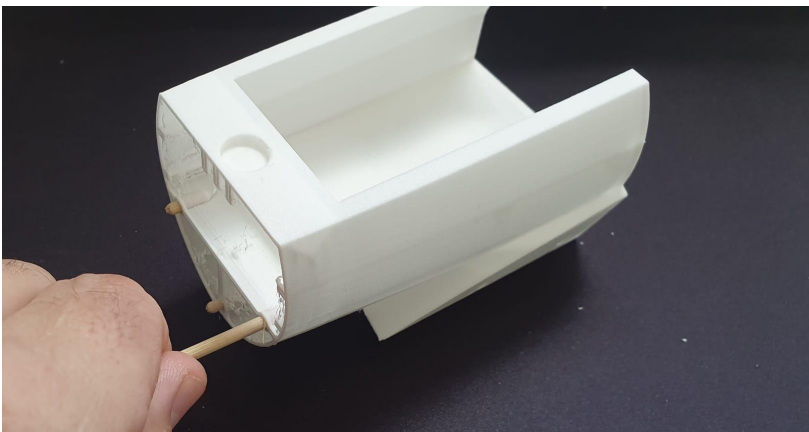
All faces which are to be glued to other parts need to be given a light sanding (scuff the surface) to assist with glue adhesion.

### 3

Cut 15mm sections of skewer and place into alignment holes in the fuselage sections.

**NOTE** - It may be required to open up the holes a small amount if the fit is too tight. Do this by using a 3mm drill bit. Gently spin it in reverse as you insert it into the hole. This will ensure the bit does not tear the print.

Test fit the sections of the fuse before gluing to ensure a clean fit.





#### 4 FUSELAGE ASSEMBLY

Glue all sections of the fuse together except fuse 1 and 6. These will be glued on last in order to allow for adding ballast lead to achieve the CG.

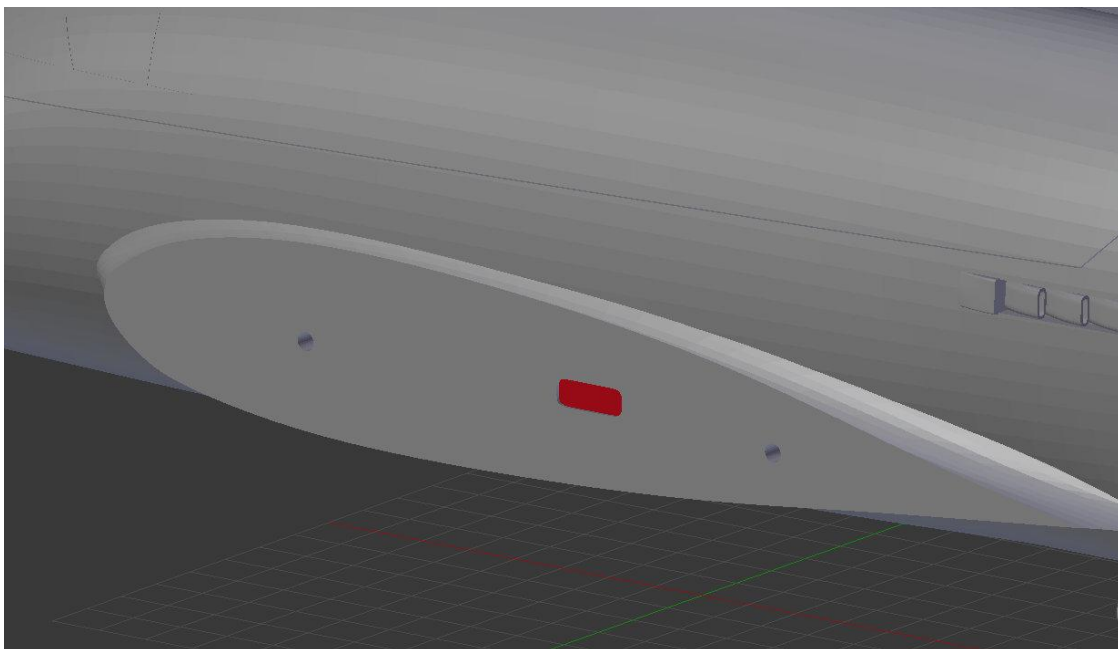
5

Once glued, with a sharp knife, remove the false floor of the battery hatch. (see pic/ highlighted faces) NOTE: The removed sections of LW-PLA that is the false floor will be used as hinge pieces later. **Do not throw away.**



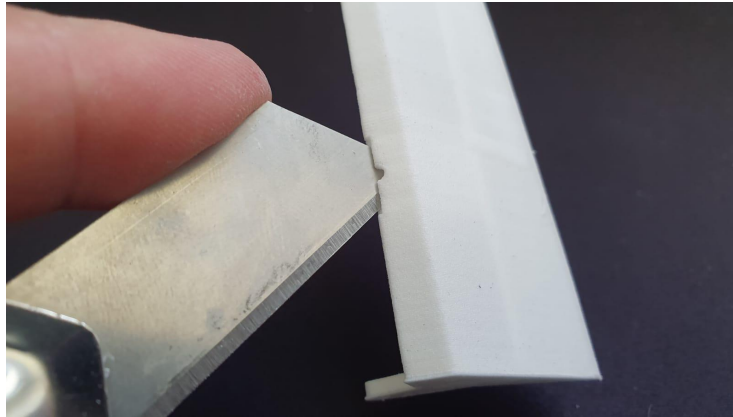
6

From part "fuse 3" remove the inner section of the lead tunnel with a knife or heated metal rod to allow the servo lead for the aileron to pass through. (marked red)



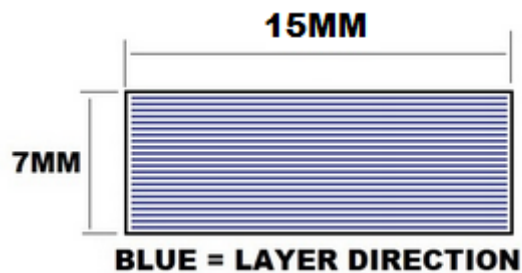
## 7 PREPARING THE CONTROL SURFACES

Test fit the hinges in the hinge slots for each control surface and its parent part, this will make gluing the control surface easier when the time comes. **NOTE**- Do not force the hinge if it is too tight. Loosen the slot by gently inserting a stanley knife.



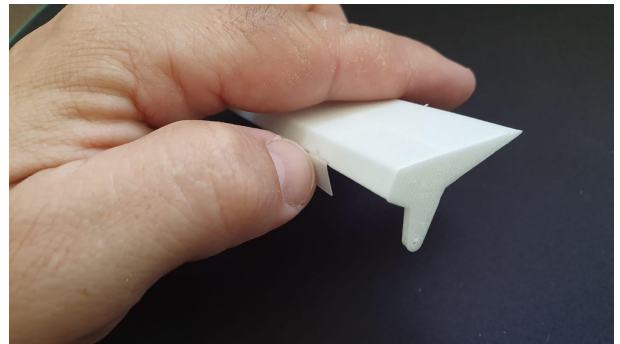
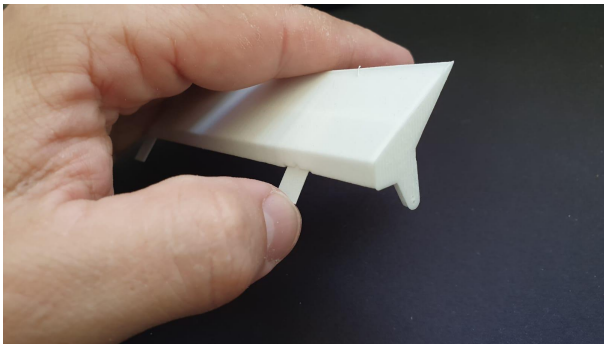
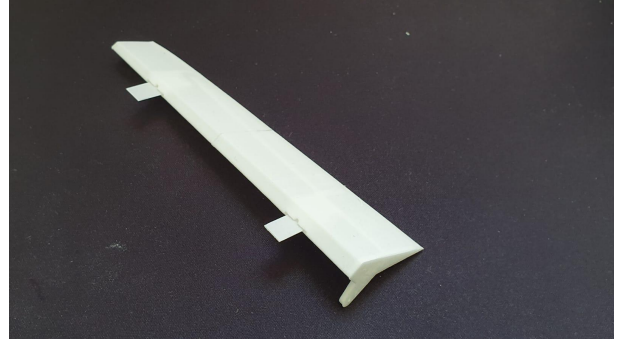
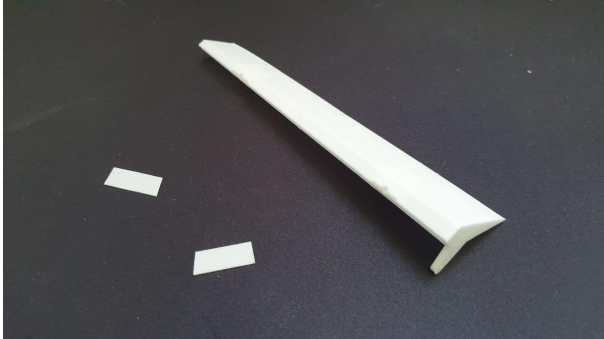
Using the LW-PLA as a hinge:

From the off-cuts from the fuselage false floor, cut small sections of 15mm x 7mm with the 7mm side being against the grain of the layers. Test fit the pieces into the hinge slots of the control surface and stabiliser or wing.



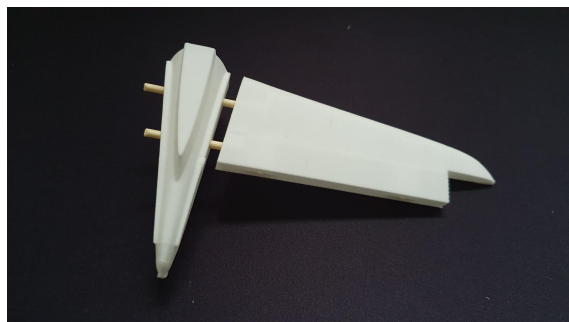
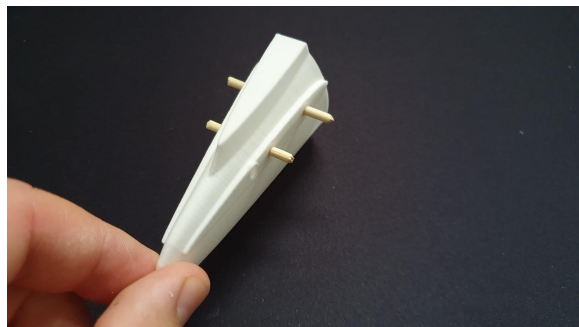
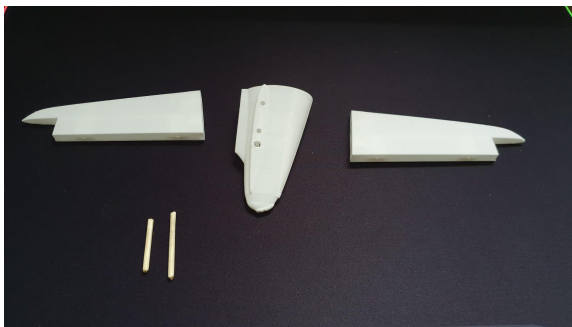


Place a drop of CA in the hinge slot of the control surface and insert the hinge. Be sure that the hinge is perpendicular to the control surface. Then bend the hinges to 90deg back and forward a few times to make sure they are appropriately loose. (the outer aileron and elevator hinge may need to be trimmed). **See below**



## 9 FITTING THE STABILIZERS

Fit the horizontal stabilisers to the fuselage using small sections of 3mm bbq skewers to align the stabilisers and glue with CA.



10

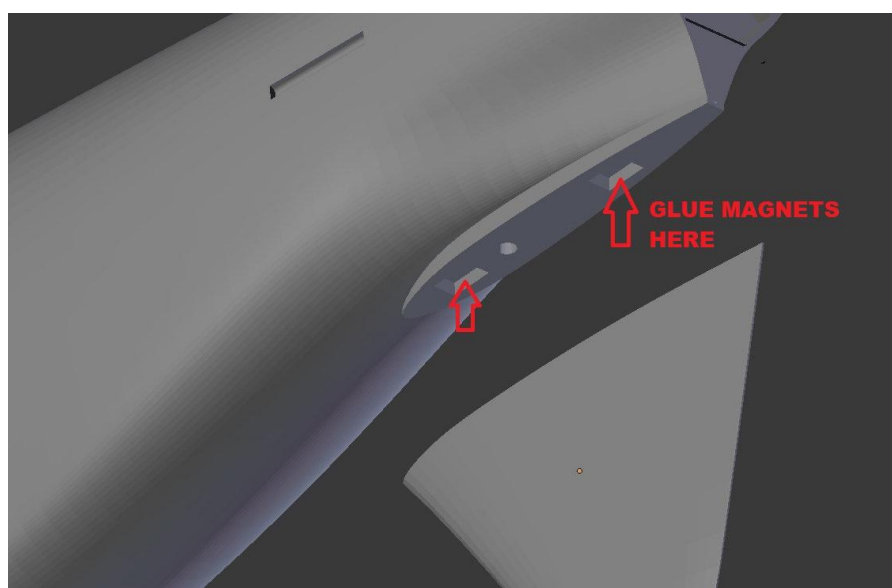
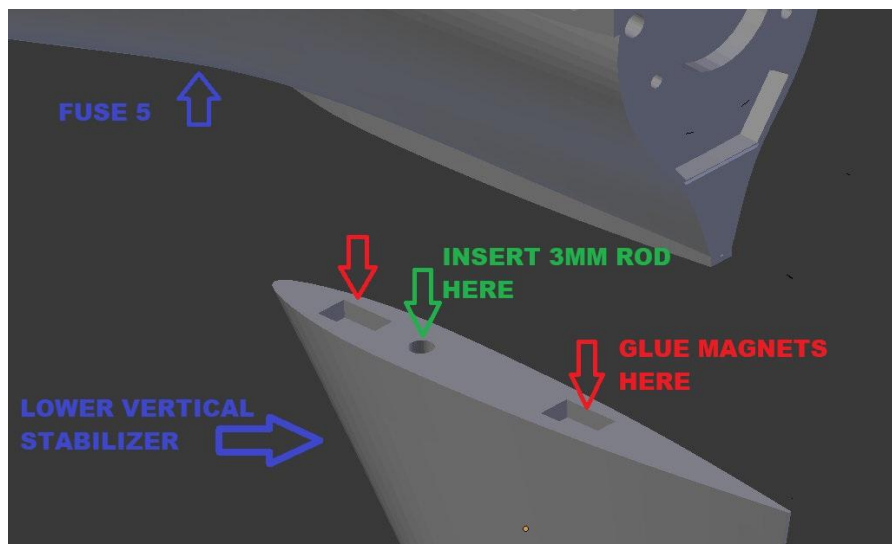
Glue the top vertical stabilizer in place.

11

Cut a 15mm length of 3mm skewer and glue it into the **lower** section of the vertical stabilizer.

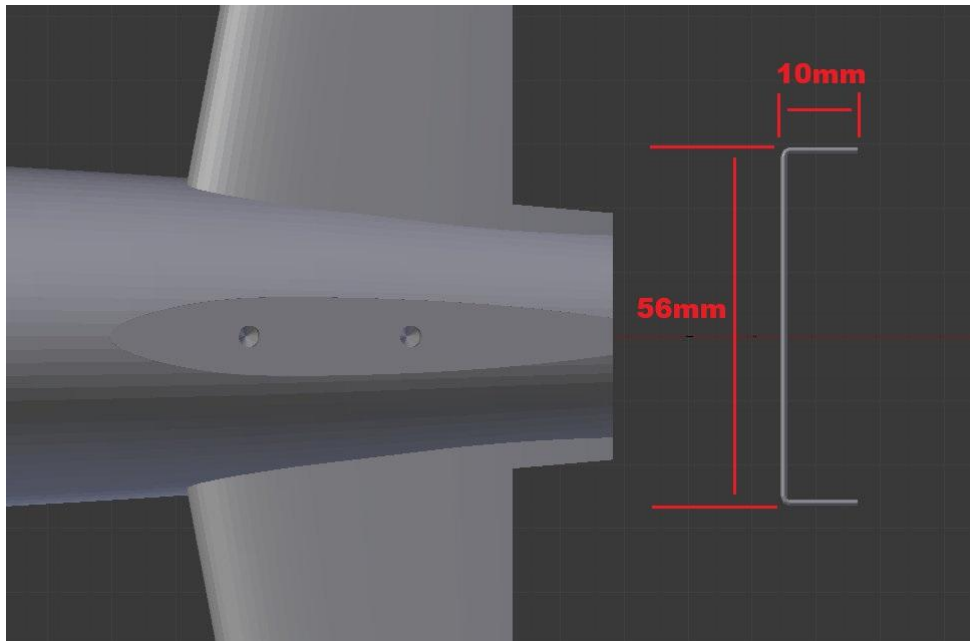
12

Glue the 8x4x2mm magnets into the slots provided on the underside of fuse 5 and the lower section of the vertical stabilizer. The 3mm rod should make the removal of the lower fin much harder to remove with lateral loads, but still able to “pop” out when it comes in contact with the ground to prevent it from breaking.

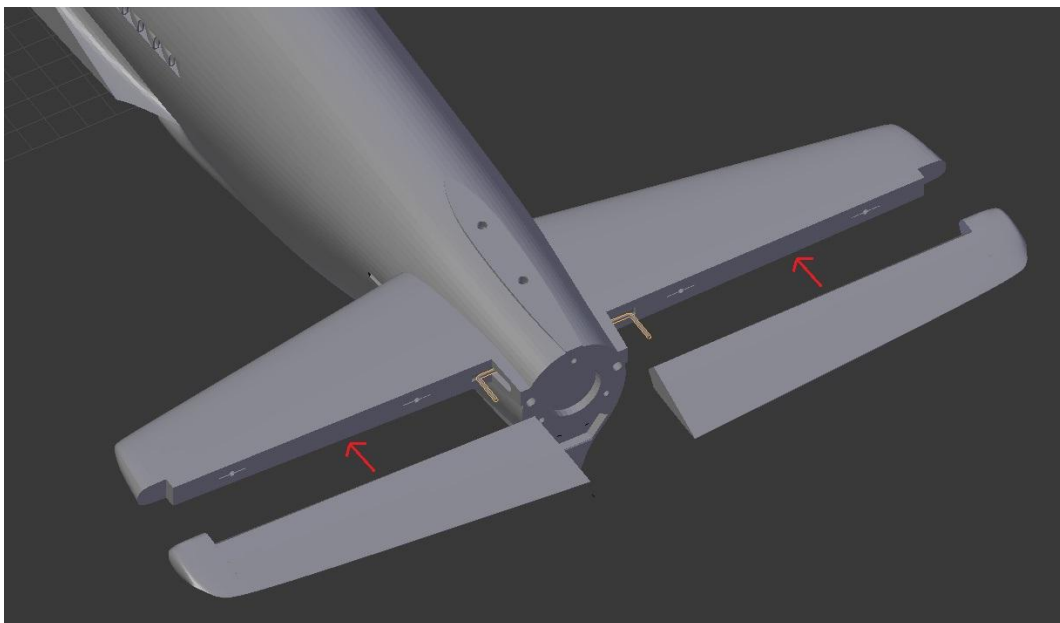


### 13 INSTALLING THE ELEVATORS

Bend a section of 1mm steel wire to connect the elevators together.

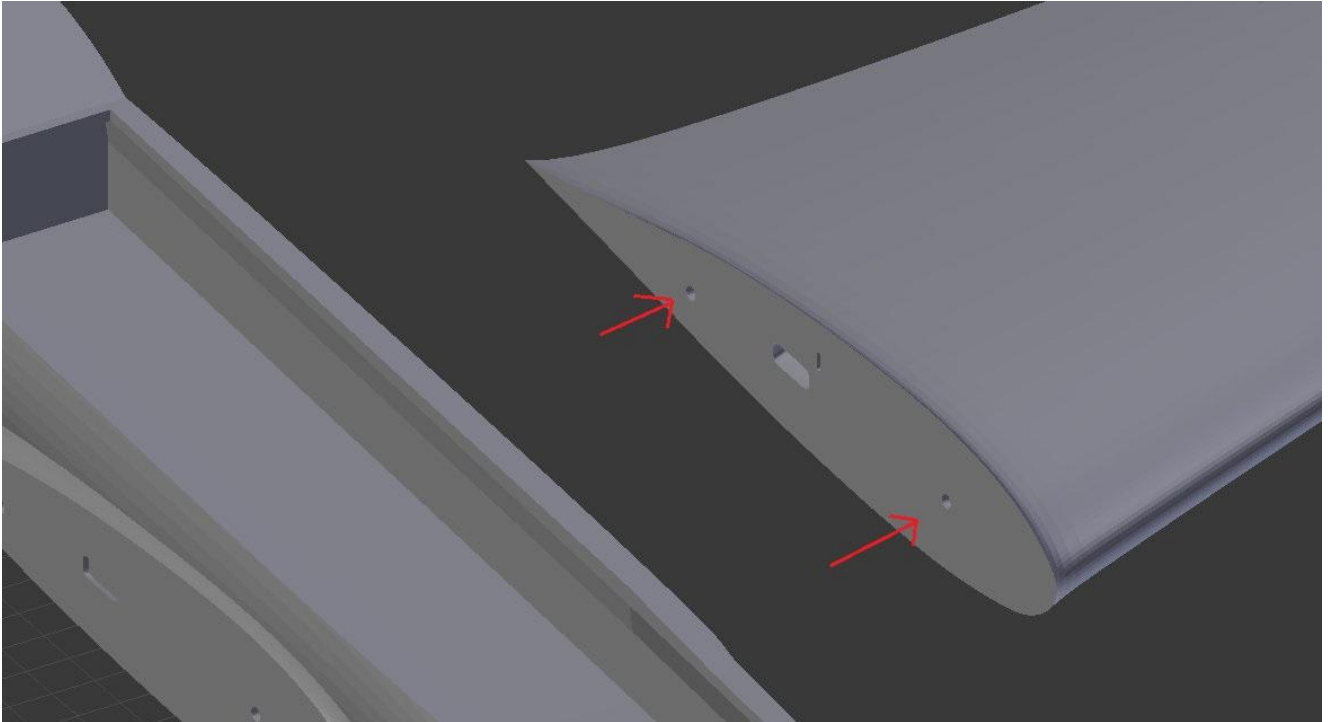


Test fit the wire and the elevators connection to the horizontal stabilisers before gluing the wire to the elevators, or the elevators to the tail plane. There should be un-obstructed travel. Once satisfied with the fitment and travel of the elevators, glue them in place.

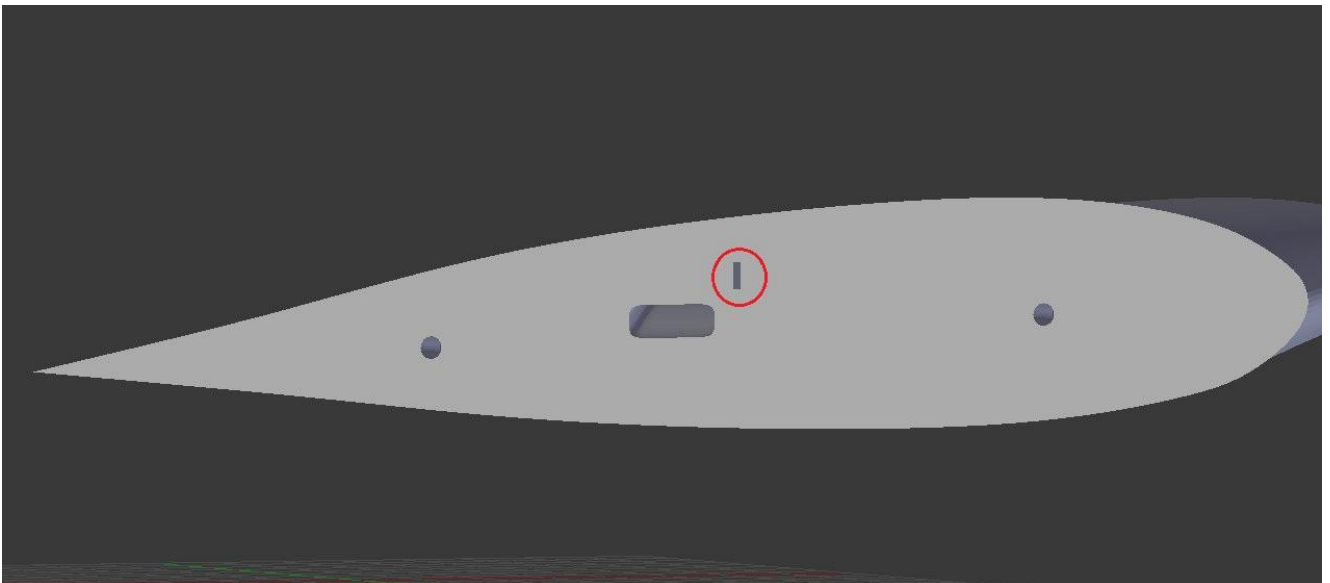


## 14 INSTALLING THE WINGS

Cut and four (2 per wing) 15mm sections of skewer. Insert the 15mm sections into the wings.



Glue the wings to the fuselage **NOTE** – if using 3mm x 0.6mm carbon strip, now is the time to install it. Simply slide the carbon strip into the slot and cut it so it does not protrude out of the wing (circled in red, see image). The cross structure of the fuselage spreads the load of the wings at the root which negates the need of a connecting spar in the fuselage.

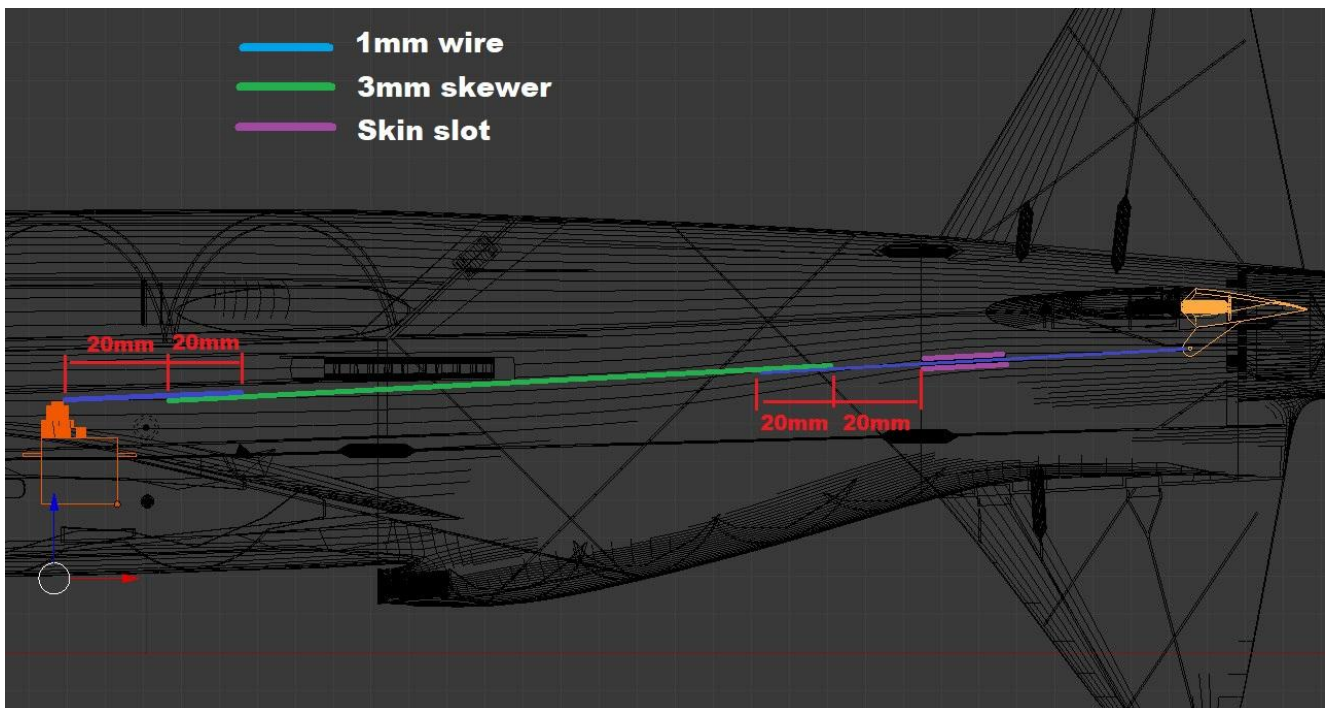
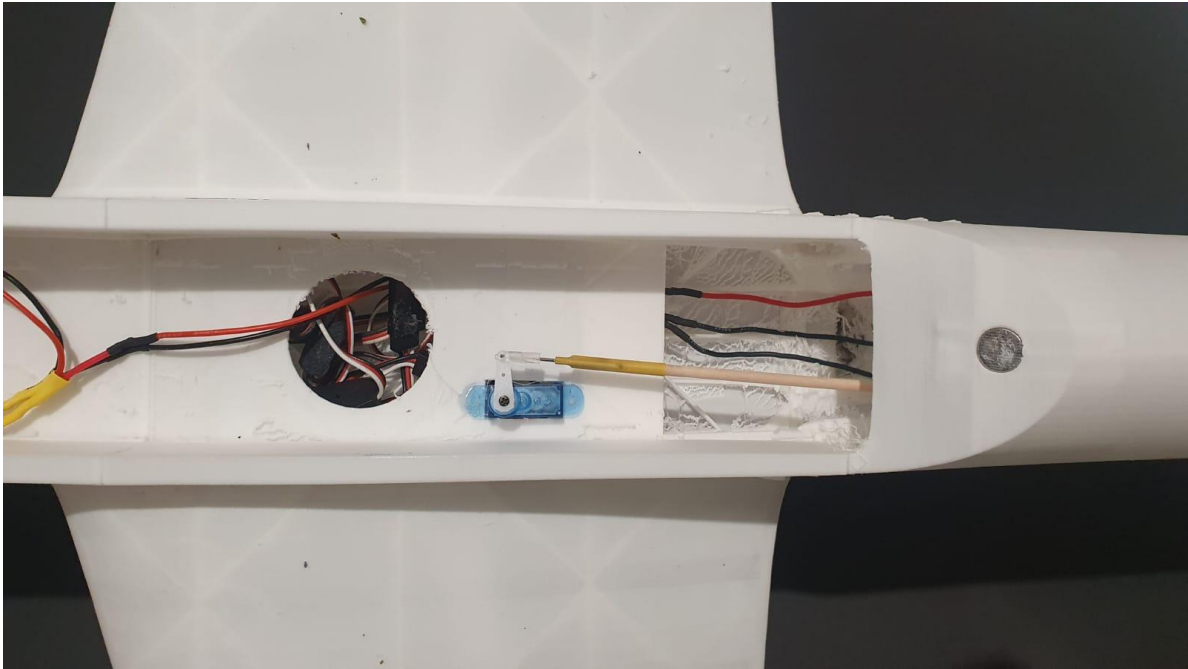


## 15

Install all servos using a small amount of hot glue to secure them in place. The aileron servo mounting tabs will need to be trimmed. Connect the ailerons to the servos using 1mm wire and the printed linkage locks.

16

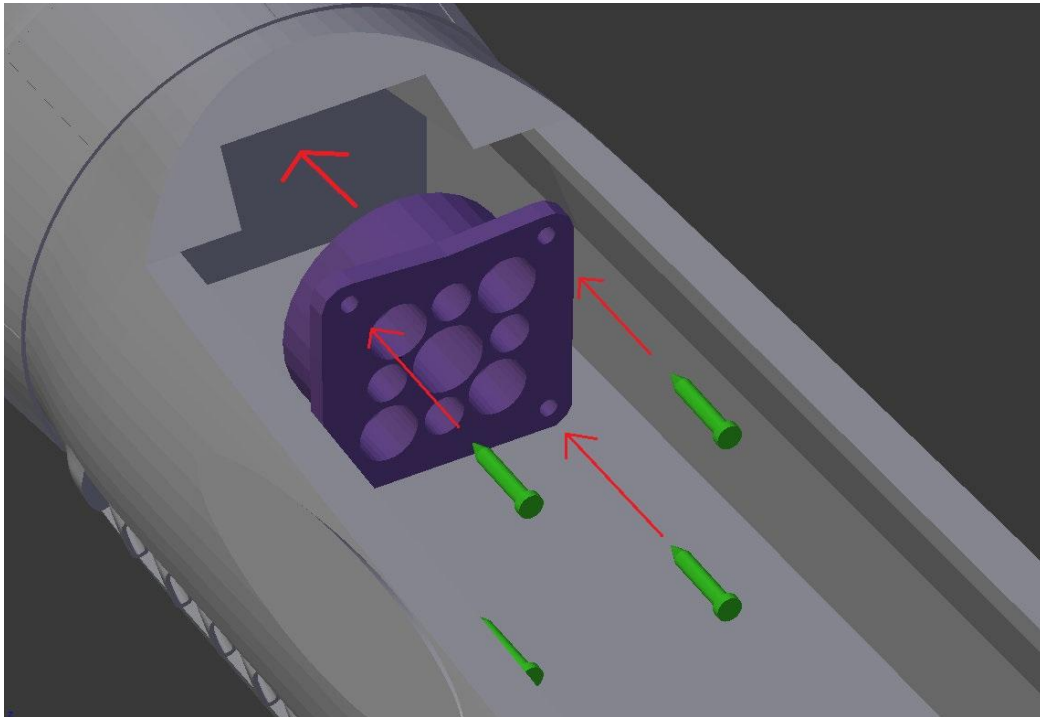
Using an appropriate length of skewer with 1mm steel wire on each end covered in heat shrink tubing, connect the elevator and rudder to their relative servo.





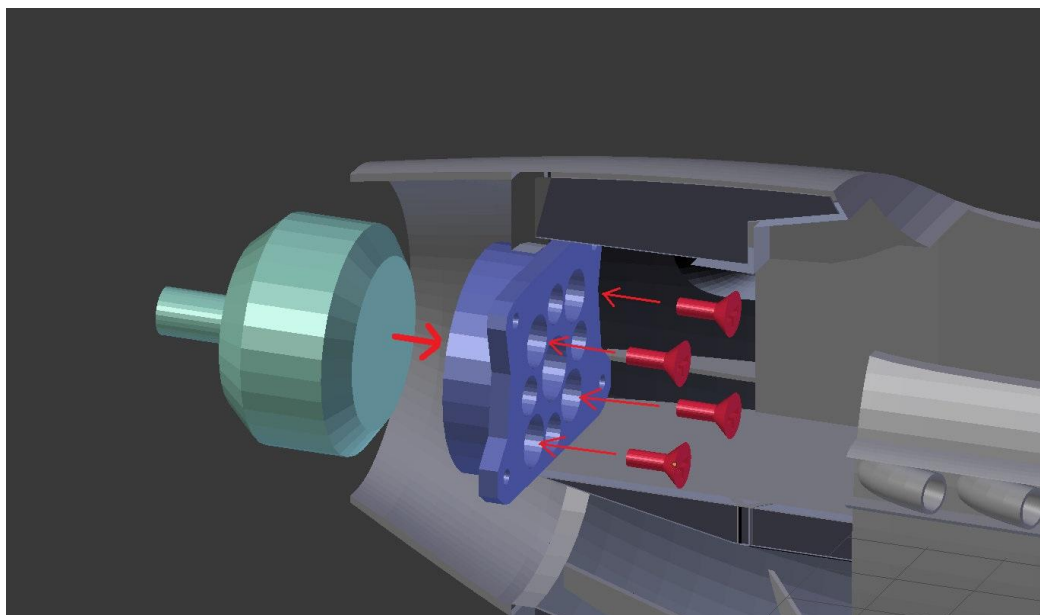
## 17 INSTALLING THE MOTORS

Install the forward motor mount appropriate to the motor being used into the front section of fuse 2 as shown below using m2 screws.



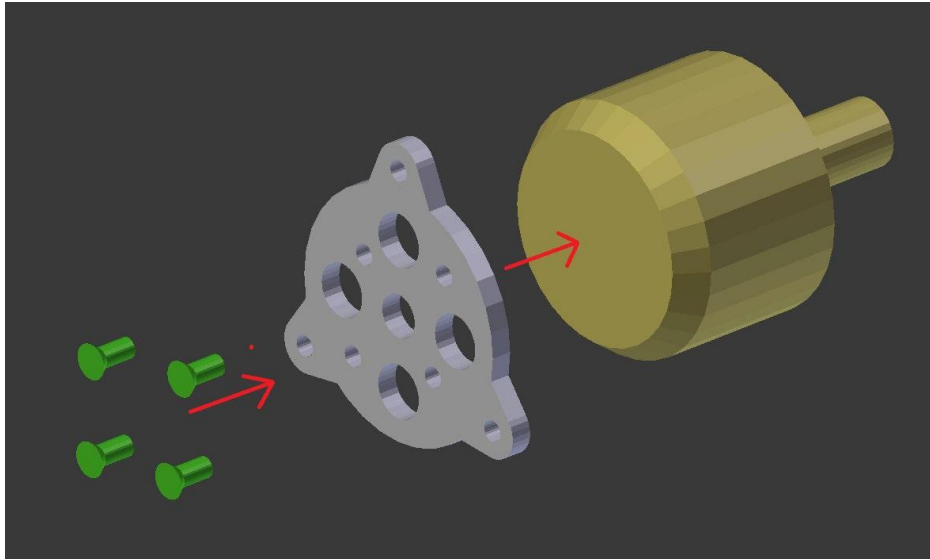
## 18

Install the forward motor to the mount as depicted in the image below.



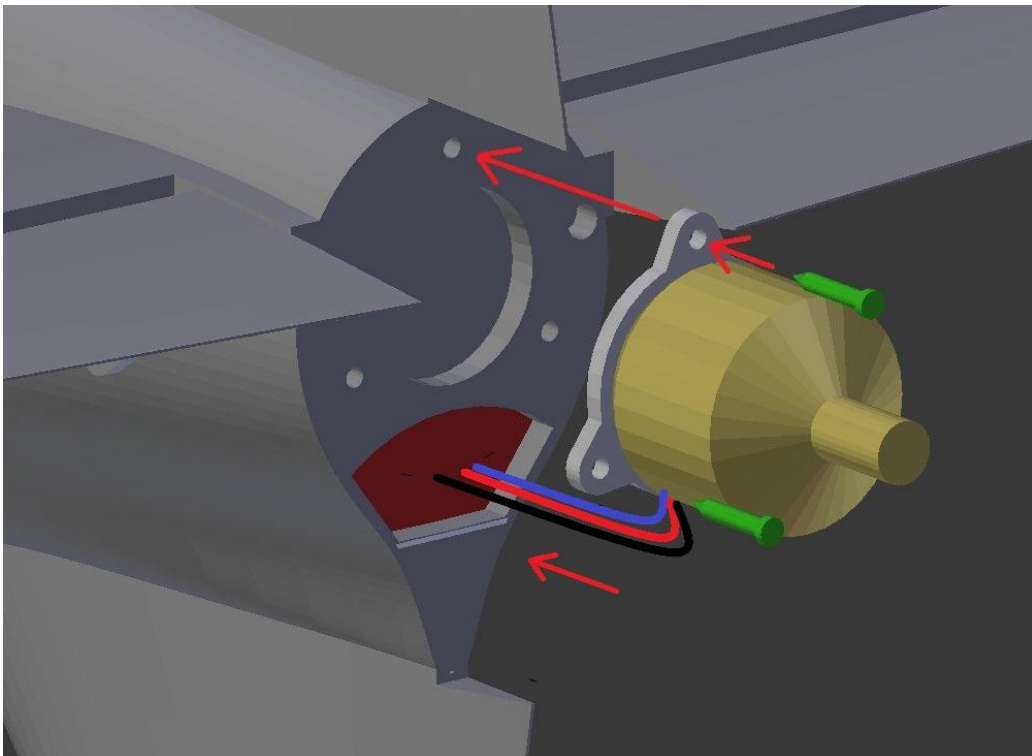
## 19

Fit the rear motor mount to the motor using the screws provided.



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Fit the rear motor and mount assembly to the firewall of fuse 5 as depicted below using m2 screws. **NOTE**- ensure that the wires for the motor are positioned on the mount so that they can easily pass through the slot provided (highlighted in red).



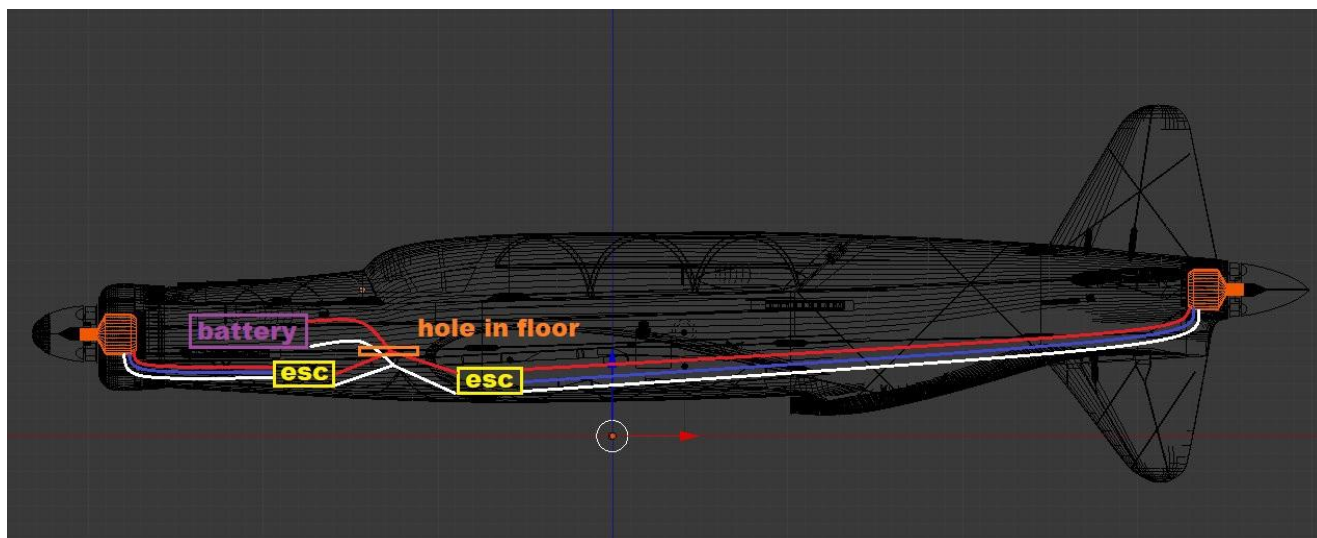


## 21 FITTING FUSE 6

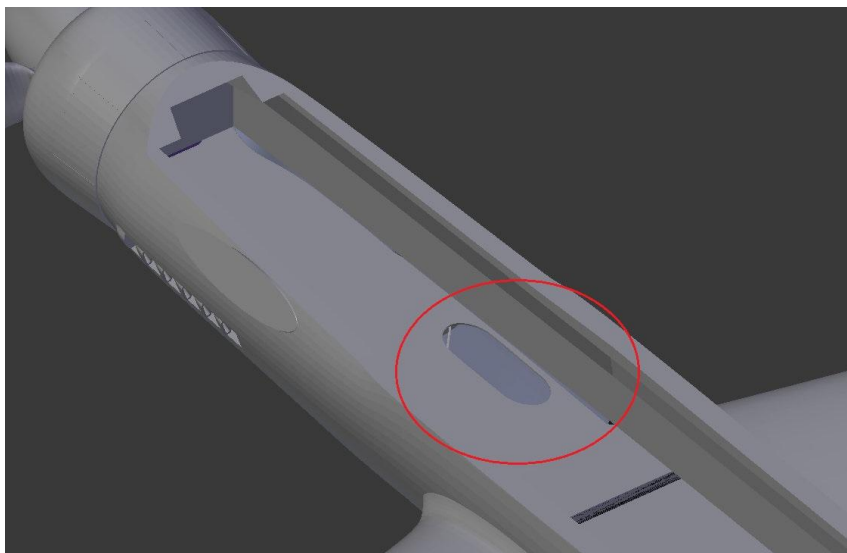
- 2205 MOTORS - The fuse 6 section needs to be fitted after the motor/motor mount has been installed due to the relative size of the motor and fuse 6. An m2 screw hole has been designed into fuse 5 and 6 for this sized motor to allow fuse 6 to be removed. A small amount of hot glue should be applied to the top section where the fuse 6 section meets the upper vertical fin.
- 1806 MOTORS - The motor mount and motor assembly can be installed or removed without removing fuse 6 by angling the motor forward as it is removed. Fuse 6 can be permanently glued in place with this motor option.

## 22 WIRING UP THE POWER SYSTEM

Wire up the ESC to the motor. The esc is intended to sit below the battery floor with the wires connecting to the battery through the hole in the mid section of the fuselage floor.



### BATTERY - ESC WIRE ACCESS

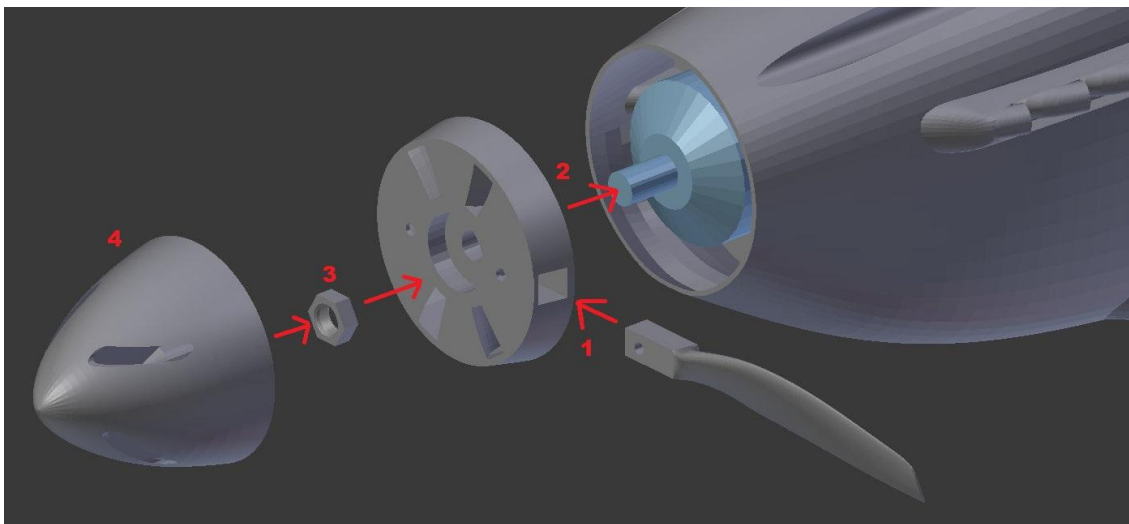


## 23 INSTALLING THE PROPELLER

Fit the propeller hub to the motor and screw in the blades using m2 x 10mm screws. Then secure the spinner to the hub. The propeller blades will need to be pre-drilled with a 2mm drill bit for ease of fitment.

### Installing the propeller:

- Install the blade to the hub and secure it with an m2 x 10mm screw. (screw direction towards the back of the hub)
- Install the hub to the motor.
- Secure with either metal nut provided or printed nut.
- Install the spinner. The spinner is designed with an m5 thread to suit most small motors with a regular cw thread.



## 24 ASSEMBLING THE CANOPY

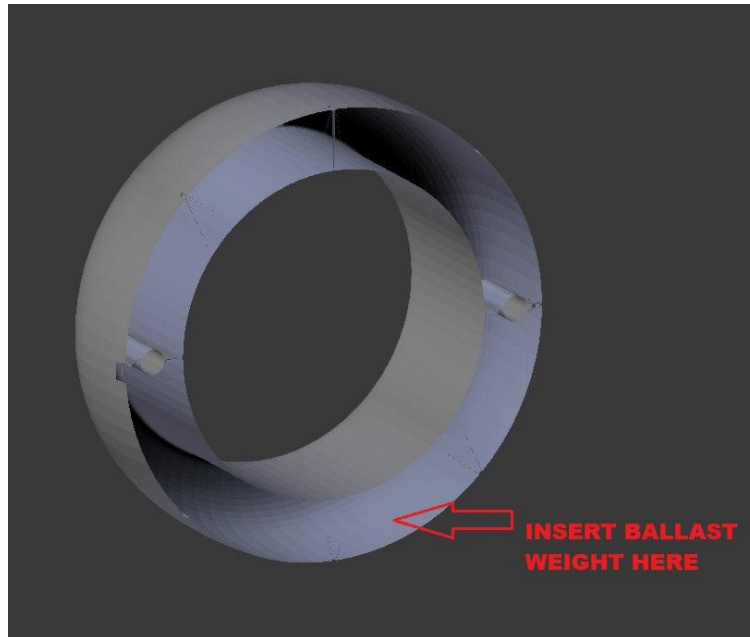
Glue the sections of the canopy together and install the magnets to both the fuselage and the canopy using CA.

## 25 FITTING AIR INTAKES

Glue the air intakes to the fuse and canopy using CA.

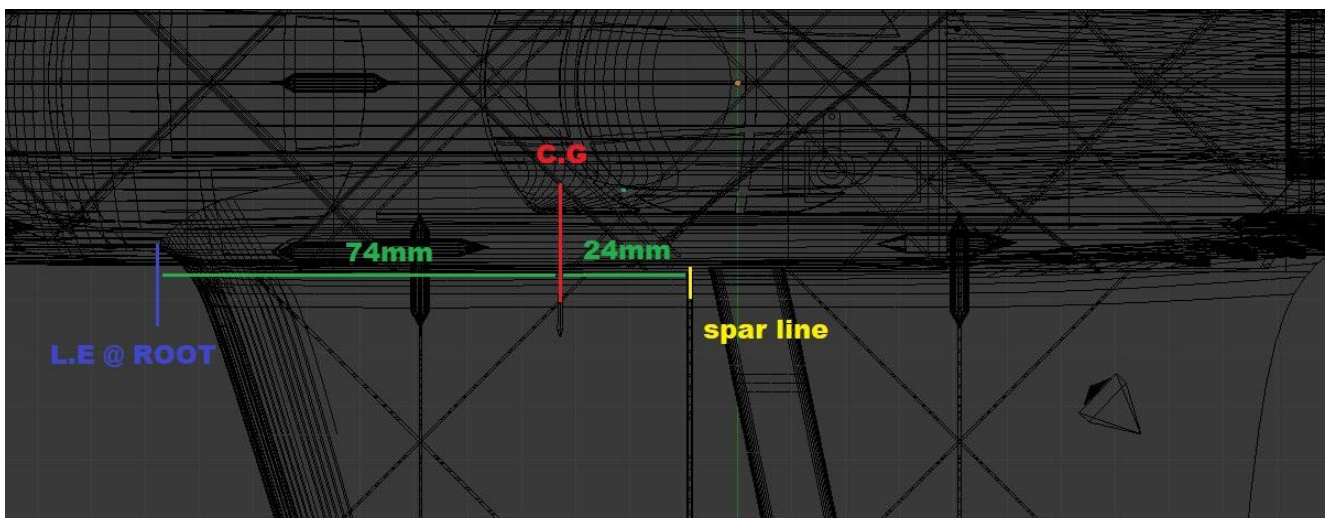
## BALANCING AND CG

The ballast lead required should be placed in the hollow section of fuse 1. **NOTE!** Balancing needs to be done with the propeller attached. See *below*



Once balanced appropriately, glue Fuse 1 in place with ca.

Fit the battery using Velcro as required and balance the aircraft inverted on the CG marking indents located **74mm aft of the leading edge at the wing root**. This can also be found by measuring 24mm forward of the main spar line. (horizontal support which houses the carbon spar)



## RANGE OF TRAVEL:

### MAIDEN / NORMAL FLIGHT:

Elevator     +/- 8mm

Aileron       +/- 8mm

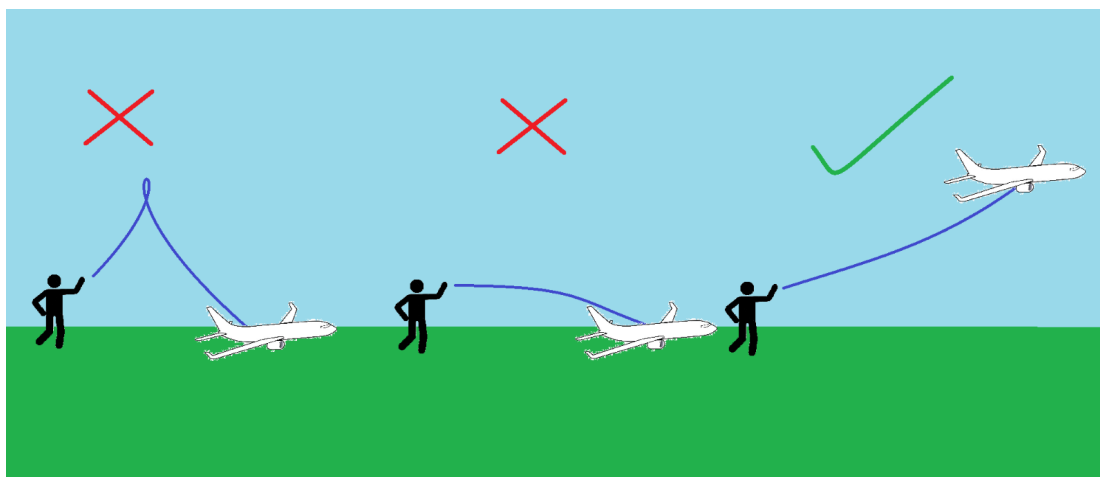
### AEROBATIC:

Elevator     +/- 15mm

Aileron       +/- 15mm

### LAUNCHING:

It was found that the safest and most successful launch technique for this model was the under-arm style. The aircraft should be launched at approximately 20deg nose up at 50% to 75% power. Too steep and the aircraft will stall, too shallow and it will contact the ground.



## **PARTS LINKS:**

X2 2805 2300KV MOTOR (HIGH POWER)

[https://de.aliexpress.com/item/32880887286.html?spm=a2g0o.productlist.0.0.138a29f3Y7bXF4&algo\\_pvid=95040ddc-7eca-4d17-b061-ba5ed52d7eac&algo\\_exp\\_id=95040ddc-7eca-4d17-b061-ba5ed52d7eac-3](https://de.aliexpress.com/item/32880887286.html?spm=a2g0o.productlist.0.0.138a29f3Y7bXF4&algo_pvid=95040ddc-7eca-4d17-b061-ba5ed52d7eac&algo_exp_id=95040ddc-7eca-4d17-b061-ba5ed52d7eac-3)

X2 1806 2300KV MOTOR (LOW POWER)

[https://de.aliexpress.com/item/1005001292827122.html?spm=a2g0o.productlist.0.0.16042b38npNHUd&algo\\_pvid=172a50c6-7faf-4cbb-9e16-23c3066deb0e&algo\\_exp\\_id=172a50c6-7faf-4cbb-9e16-23c3066deb0e-6&pdp\\_ext\\_f=%7B%22sku\\_id%22%3A%2212000015612371912%22%7D&pdp\\_pi=-1%3B4.03%3B-1%3B564%40salePrice%3BEUR%3Bsearch-mainSearch](https://de.aliexpress.com/item/1005001292827122.html?spm=a2g0o.productlist.0.0.16042b38npNHUd&algo_pvid=172a50c6-7faf-4cbb-9e16-23c3066deb0e&algo_exp_id=172a50c6-7faf-4cbb-9e16-23c3066deb0e-6&pdp_ext_f=%7B%22sku_id%22%3A%2212000015612371912%22%7D&pdp_pi=-1%3B4.03%3B-1%3B564%40salePrice%3BEUR%3Bsearch-mainSearch)

X2 12AMP ESC

[https://www.aliexpress.com/item/32905632543.html?spm=a2g0o.productlist.0.0.293536aecwu7yT&algo\\_pvid=09b70550-d77e-46d3-b25e-621167aaeef6&algo\\_expid=09b70550-d77e-46d3-b25e-621167aaeef6-0&btsid=0b0a556616077433274567589e7b03&ws\\_ab\\_test=searchweb0\\_0,searchweb201602\\_,searchweb201603\\_](https://www.aliexpress.com/item/32905632543.html?spm=a2g0o.productlist.0.0.293536aecwu7yT&algo_pvid=09b70550-d77e-46d3-b25e-621167aaeef6&algo_expid=09b70550-d77e-46d3-b25e-621167aaeef6-0&btsid=0b0a556616077433274567589e7b03&ws_ab_test=searchweb0_0,searchweb201602_,searchweb201603_)

X1 1500MAH 2S LIPO OR SIMILAR

[https://hobbyking.com/en\\_us/turnigy-1500mah-2s-25c-lipoly-battery-xt-60.html?\\_\\_\\_store=en\\_us](https://hobbyking.com/en_us/turnigy-1500mah-2s-25c-lipoly-battery-xt-60.html?___store=en_us)

X4 3.7G MICRO SERVO

[https://www.aliexpress.com/item/32965734270.html?spm=a2g0o.productlist.0.0.57d95e97aWNNAJ&algo\\_pvid=4824ea1c-06ed-43e8-b6c7-9737d1226dbe&algo\\_expid=4824ea1c-06ed-43e8-b6c7-9737d1226dbe-0&btsid=0bb0623415991458444523660eb7bd&ws\\_ab\\_test=searchweb0\\_0,searchweb201602\\_,searchweb201603\\_](https://www.aliexpress.com/item/32965734270.html?spm=a2g0o.productlist.0.0.57d95e97aWNNAJ&algo_pvid=4824ea1c-06ed-43e8-b6c7-9737d1226dbe&algo_expid=4824ea1c-06ed-43e8-b6c7-9737d1226dbe-0&btsid=0bb0623415991458444523660eb7bd&ws_ab_test=searchweb0_0,searchweb201602_,searchweb201603_)

X2 BAMBOO FOOD SKEWERS (3mm diameter)

HEAT SHRINK TUBE 3mm

[https://hobbyking.com/en\\_us/turnigy-3mm-heat-shrink-tube-black-1mtr-1.html?queryID=c16c094bb26b18e39fabcb12a93a96cb&objectID=46911&indexName=hbk\\_live\\_magento\\_en\\_us\\_products](https://hobbyking.com/en_us/turnigy-3mm-heat-shrink-tube-black-1mtr-1.html?queryID=c16c094bb26b18e39fabcb12a93a96cb&objectID=46911&indexName=hbk_live_magento_en_us_products)

X4 10mm X 10mm X 2mm MAGNET (ROUND)

[https://www.aliexpress.com/item/1005001362617359.html?spm=a2g0o.productlist.0.0.5da3607dAATH5j&algo\\_pvid=b9e32b8a-0d4f-469a-b838-b478442dda50&algo\\_expid=b9e32b8a-0d4f-469a-b838-b478442dda50-0&btsid=0bb0623a15991797178681785e1811&ws\\_ab\\_test=searchweb0\\_0,searchweb201602\\_,searchweb201603\\_](https://www.aliexpress.com/item/1005001362617359.html?spm=a2g0o.productlist.0.0.5da3607dAATH5j&algo_pvid=b9e32b8a-0d4f-469a-b838-b478442dda50&algo_expid=b9e32b8a-0d4f-469a-b838-b478442dda50-0&btsid=0bb0623a15991797178681785e1811&ws_ab_test=searchweb0_0,searchweb201602_,searchweb201603_)

X4 8mm x 4mm 2mm MAGNET (RECTANGLE)

[https://de.aliexpress.com/item/1005003744829268.html?spm=a2g0o.productlist.0.0.fa1a3d41oyZuli&algo\\_pvid=4a94aaf0-64c5-49ff-aaba-aac9fb5993fb&algo\\_exp\\_id=4a94aaf0-64c5-49ff-aaba-aac9fb5993fb-0&pdp\\_ext\\_f=%7B%22sku\\_id%22%3A%2212000027014842504%22%7D&pdp\\_pi=-1%3B2.68%3B-1%3B-1%40salePrice%3BEUR%3Bsearch-mainSearch](https://de.aliexpress.com/item/1005003744829268.html?spm=a2g0o.productlist.0.0.fa1a3d41oyZuli&algo_pvid=4a94aaf0-64c5-49ff-aaba-aac9fb5993fb&algo_exp_id=4a94aaf0-64c5-49ff-aaba-aac9fb5993fb-0&pdp_ext_f=%7B%22sku_id%22%3A%2212000027014842504%22%7D&pdp_pi=-1%3B2.68%3B-1%3B-1%40salePrice%3BEUR%3Bsearch-mainSearch)

X10 MICRO HINGES

[https://hobbyking.com/en\\_us/super-light-pivot-round-hinges-d2xw8xl24mm-12pcs.html](https://hobbyking.com/en_us/super-light-pivot-round-hinges-d2xw8xl24mm-12pcs.html)

VELCRO – (local hardware store)

X2 x 250mm carbon strip 3mm x 0.6mm (optional)

[https://www.aliexpress.com/item/32576381076.html?spm=a2g0o.productlist.0.0.4e922cc3nR6757&algo\\_pvid=500714e5-ce74-4e52-a1b0-e349cac3f595&algo\\_expid=500714e5-ce74-4e52-a1b0-e349cac3f595-7&btsid=0bb0623e15991463277515177efc08&ws\\_ab\\_test=searchweb0\\_0,searchweb201602\\_,searchweb201603\\_](https://www.aliexpress.com/item/32576381076.html?spm=a2g0o.productlist.0.0.4e922cc3nR6757&algo_pvid=500714e5-ce74-4e52-a1b0-e349cac3f595&algo_expid=500714e5-ce74-4e52-a1b0-e349cac3f595-7&btsid=0bb0623e15991463277515177efc08&ws_ab_test=searchweb0_0,searchweb201602_,searchweb201603_)

m2 x10mm screws

<https://www.ebay.com.au/itm/400PCS-M2-M2-6-Pan-Head-Self-Tapping-Screws-Assorted-Kit-Stainless-Steel-Black/254399626404?hash=item3b3b663ca4:g:CLEAAOSwQLZdsqkd&frcectupt=true>

Thank you for supporting us! We hope you enjoy many hours of flying your micro Do-335 Pfiel. If you have any questions regarding the build process or set-up of your model, please contact us at:

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