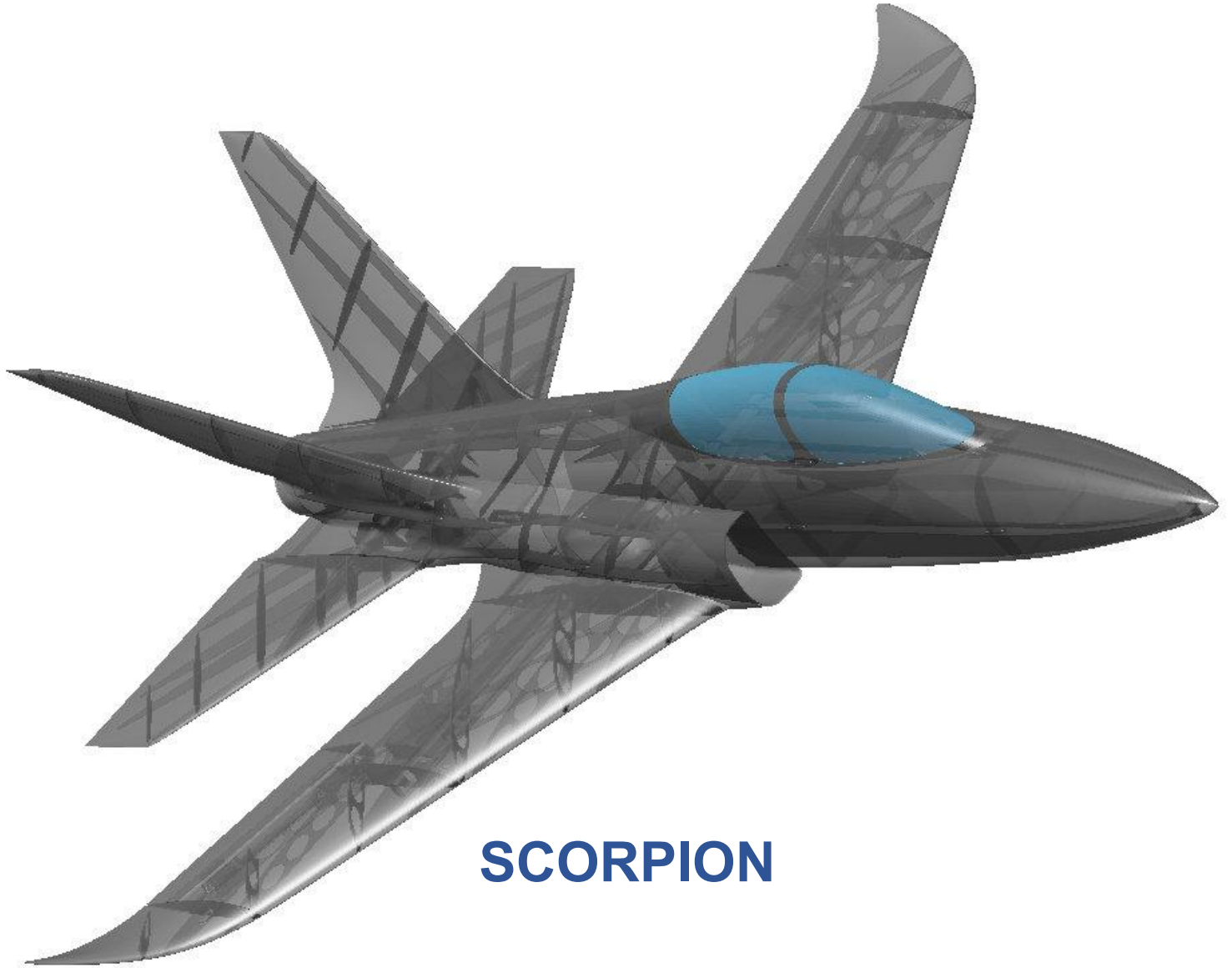


ASSEMBLY MANUAL AND USER GUIDE



SCORPION

PUSHER - JET

By 3D AEROWORKS

OVERVIEW:

This scale design of the Super Scorpion jet which is usually found in much larger sizes operating with large gas turbine engines has been scaled down for the park flier enthusiast. Designed for quick and easy construction printed in regular PLA. For best results the canopy should be printed with clear PLA. Designed to suit the 2836 2200kv outrunner on a 7x6 propeller using a standard 2200mah 3s lipo. Utilizing ailerons and full flying tail surfaces, this model is bound to out-perform anything else on the field. 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. Please show your appreciation by directing interested parties to the link below.

<https://cults3d.com/en/3d-model/various/scorpion-800mm-pusher-jet>

GENERAL SPECIFICATIONS

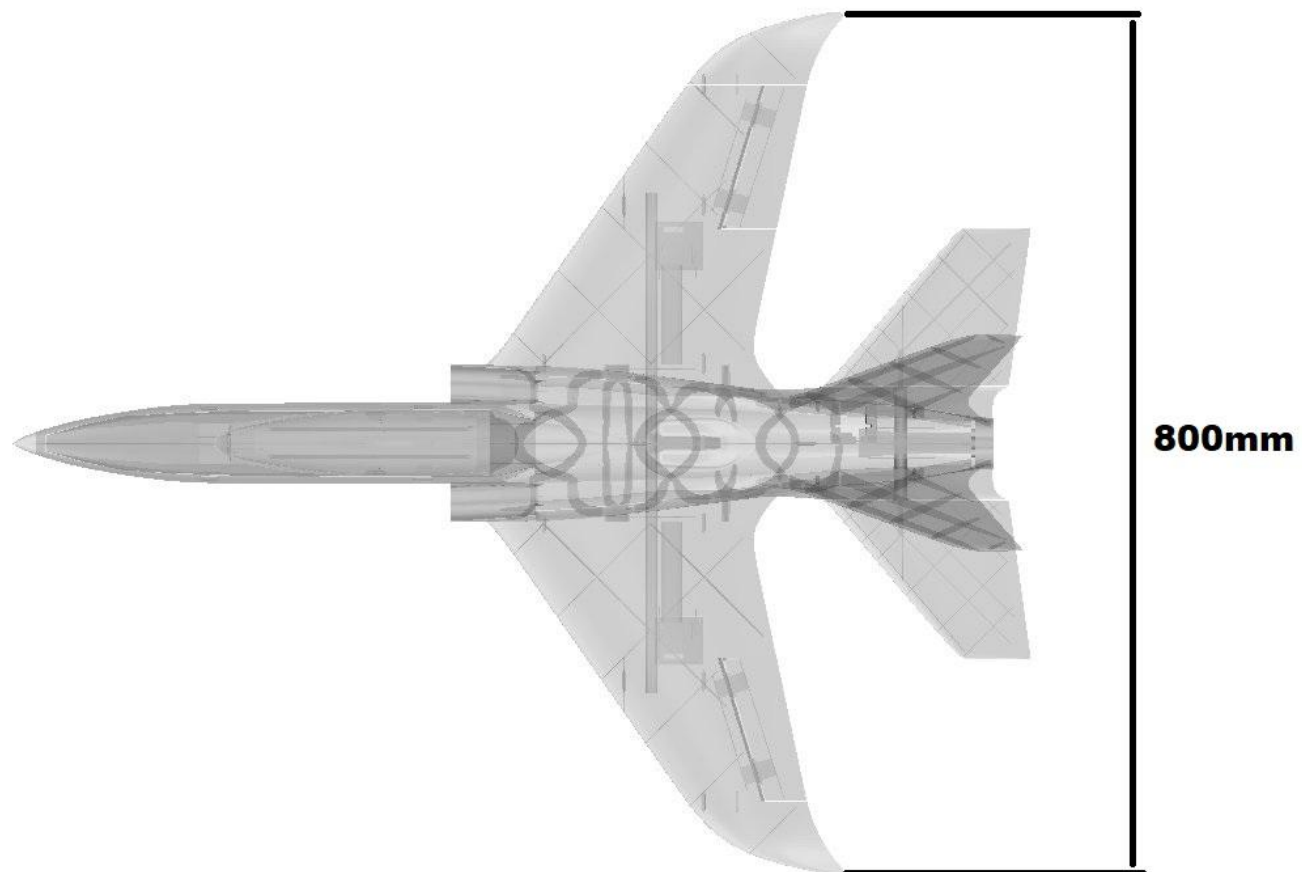
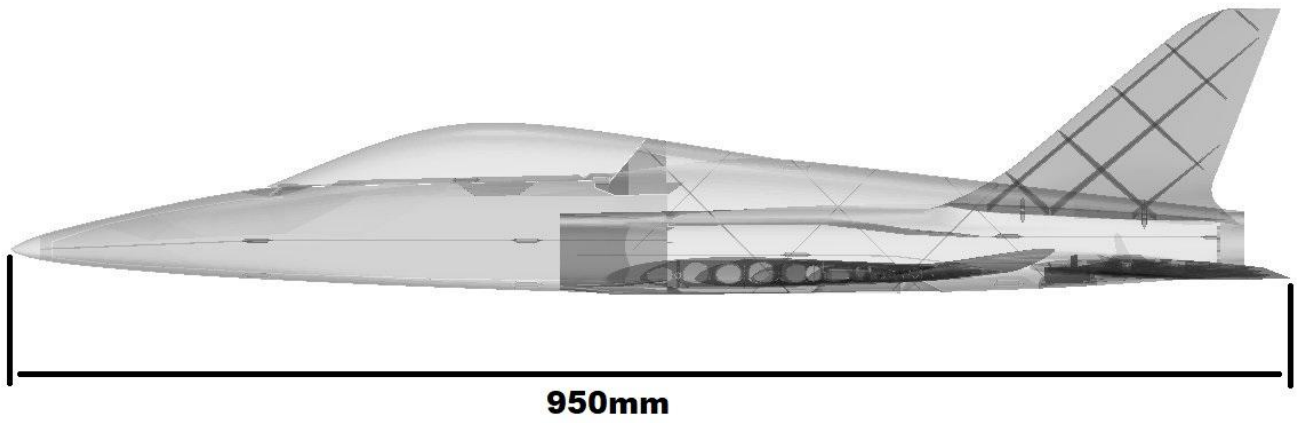
WINGSPAN:	800mm
PRINT TIME:	70 hrs
PRINT COST:	\$13 USD
PRINT WEIGHT:	650g
FLYING WEIGHT:	950g

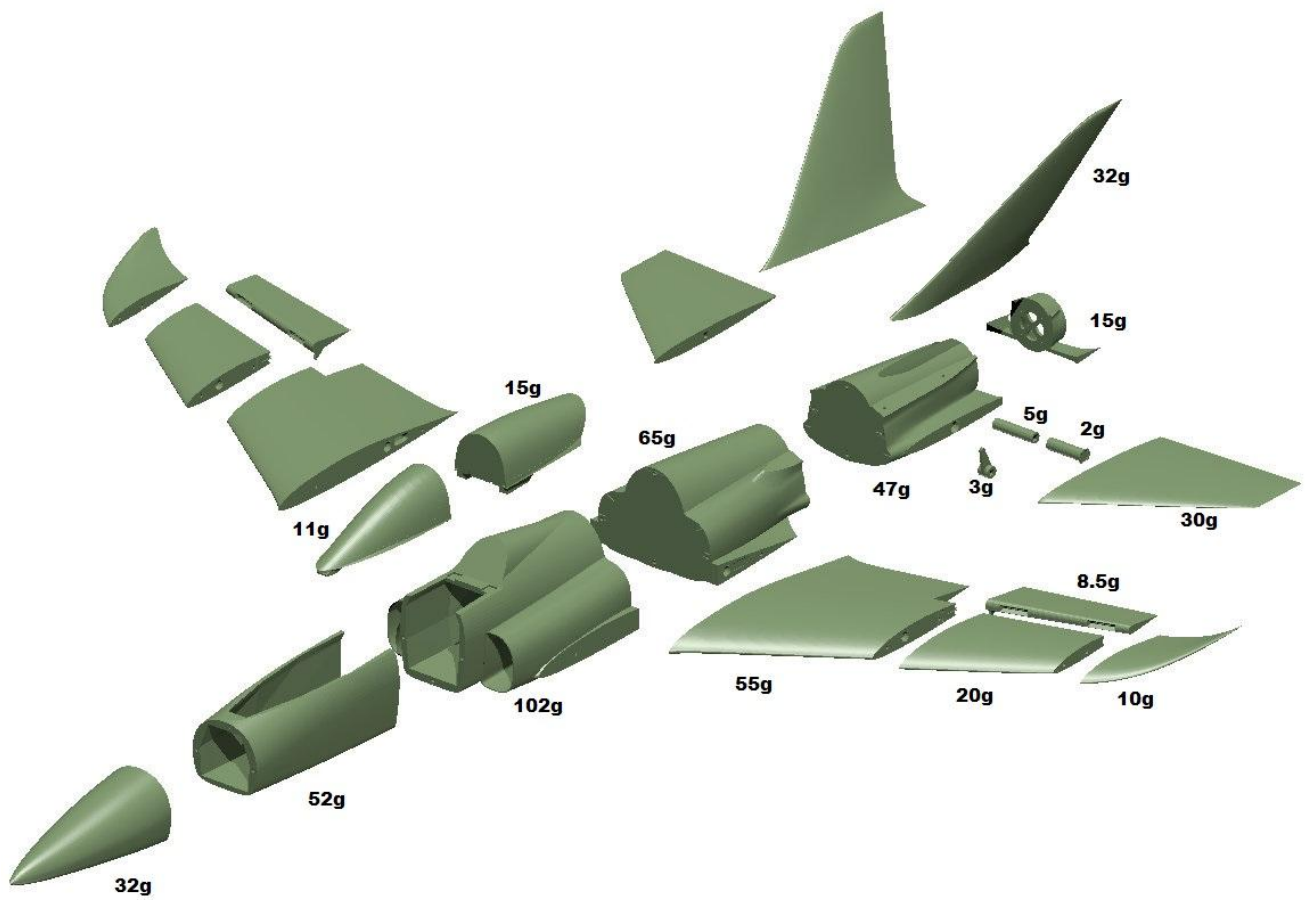
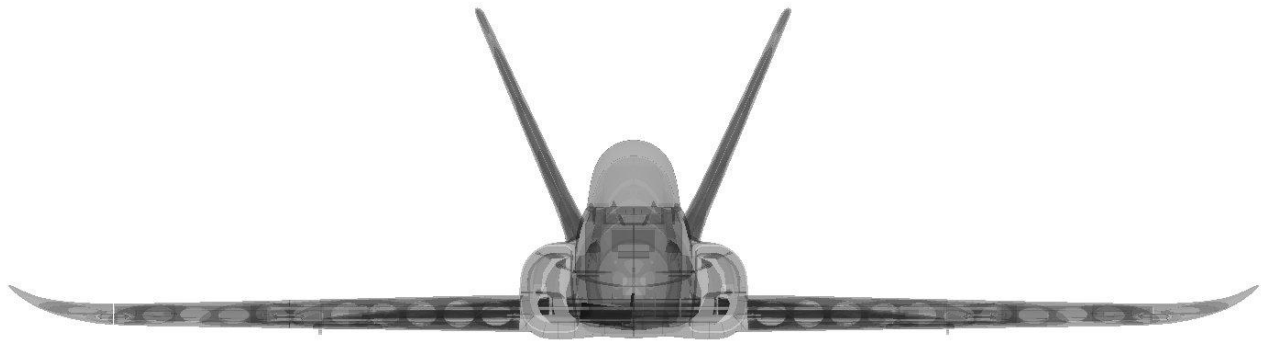
ELECTRICS

MOTOR:	2836 2200kv
ESC:	60amp
SERVOS:	9g MICRO
BATTERY:	2200mah 3s (or similar)

PRINT BED SIZE:

200mm x 200mm x 200mm





REQUIRED TOOLS:

KNIFE

LIGHTER

SANDPAPER (MEDIUM GRIT 320 recommended)

PLIERS

CA GLUE

SCREW DRIVERS

FILE OR RASP

DRILL

REQUIRED COMPONENTS:

X1 2836 2200KV MOTOR (or similar)

X1 60AMP ESC

X1 2200MAH 3S LIPO OR SIMILAR

X2 9g standard SERVO

X1 9g Metal gear SERVO

3mm BAMBOO FOOD SKEWERS

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

X4 16mm x 29mm HINGES

X1 10mm x 8mm x 500mm **round** carbon tube

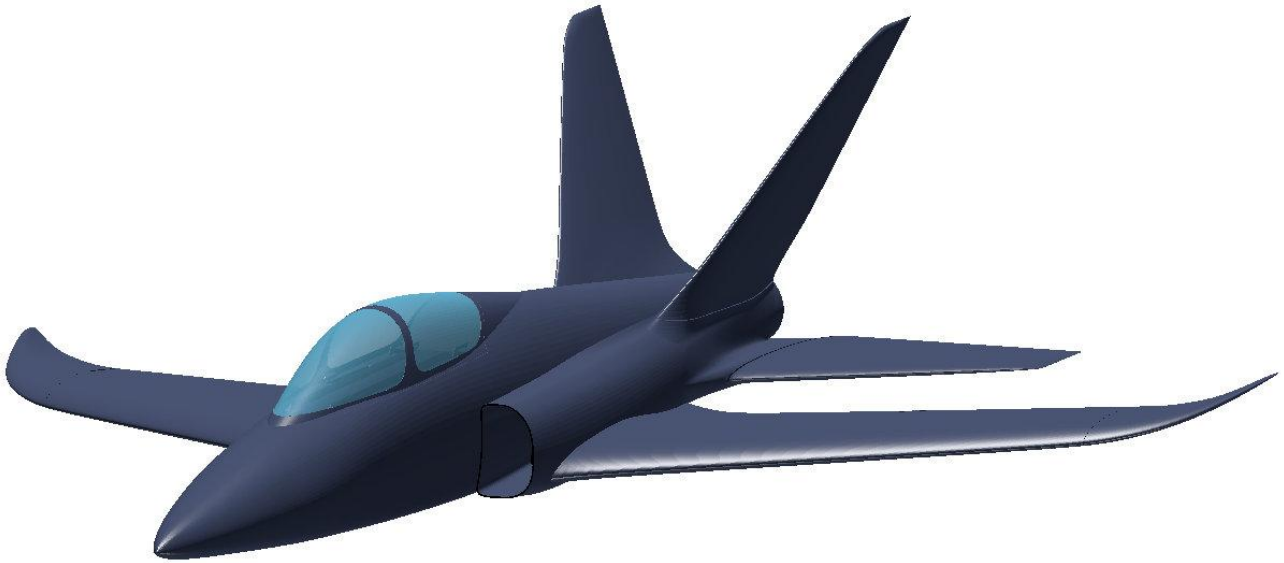
X1 10mm x 500mm **round** pine rod

X1 5mm x 5mm x 500mm **square** carbon tube

M2 x10mm screws

1mm or 1.2mm piano wire

VELCRO



ASSEMBLY INSTRUCTIONS

1

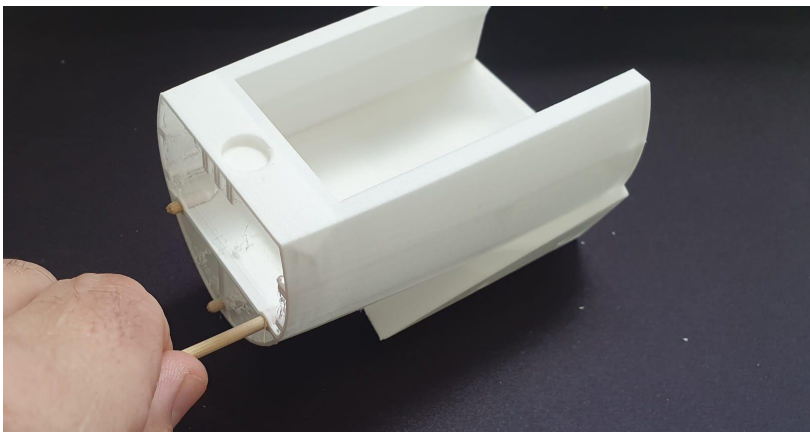
All faces which are to be glued to other parts need to be given a light sanding (scuff the surface) to assist with glue adhesion.

2

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

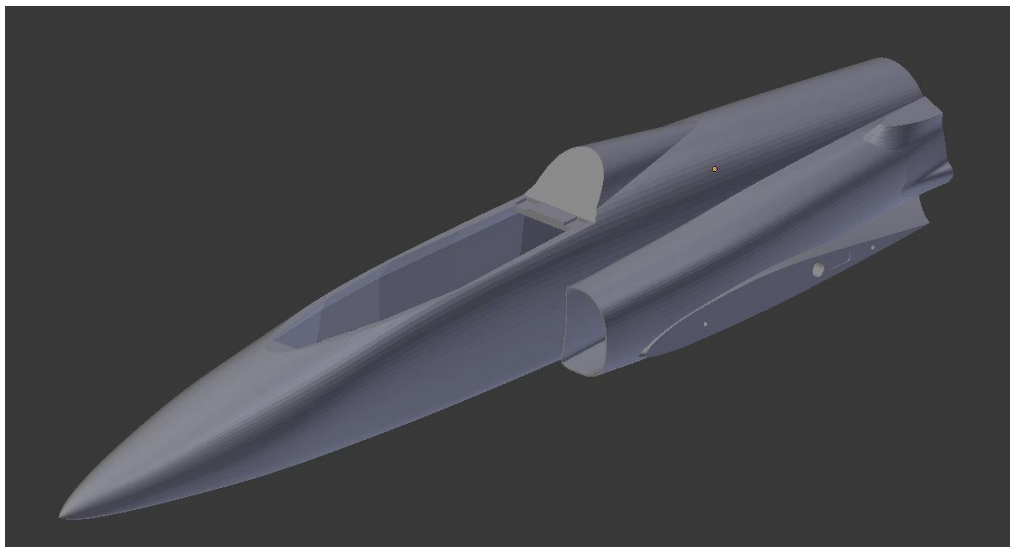
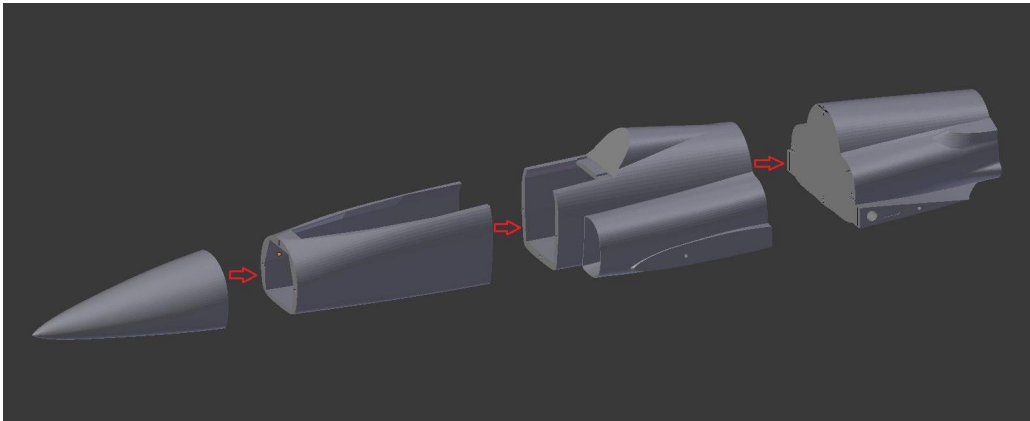
NOTE - It may be required to open up the holes a small amount if the fit is too tight. Do this by using a 3mm drill bit. Gently spin it in reverse as you insert it into the hole. This will ensure the bit does not tear the print.

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



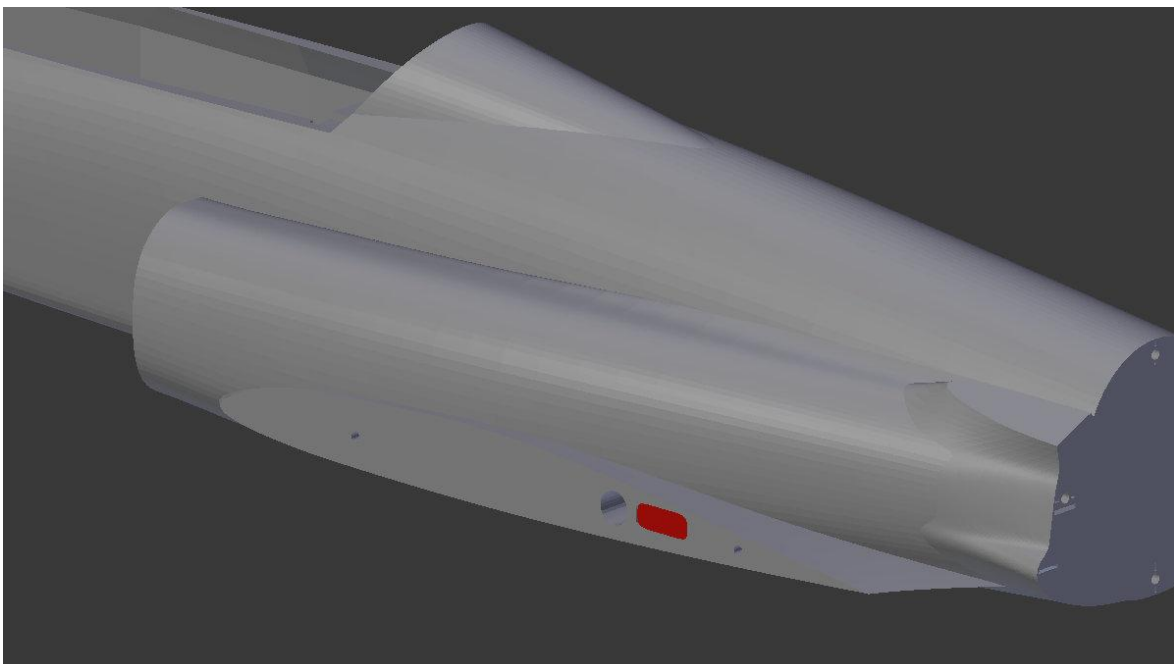
3 FUSELAGE 1-4 ASSEMBLY

Glue sections 1,2,3 and 4 of the fuselage together.



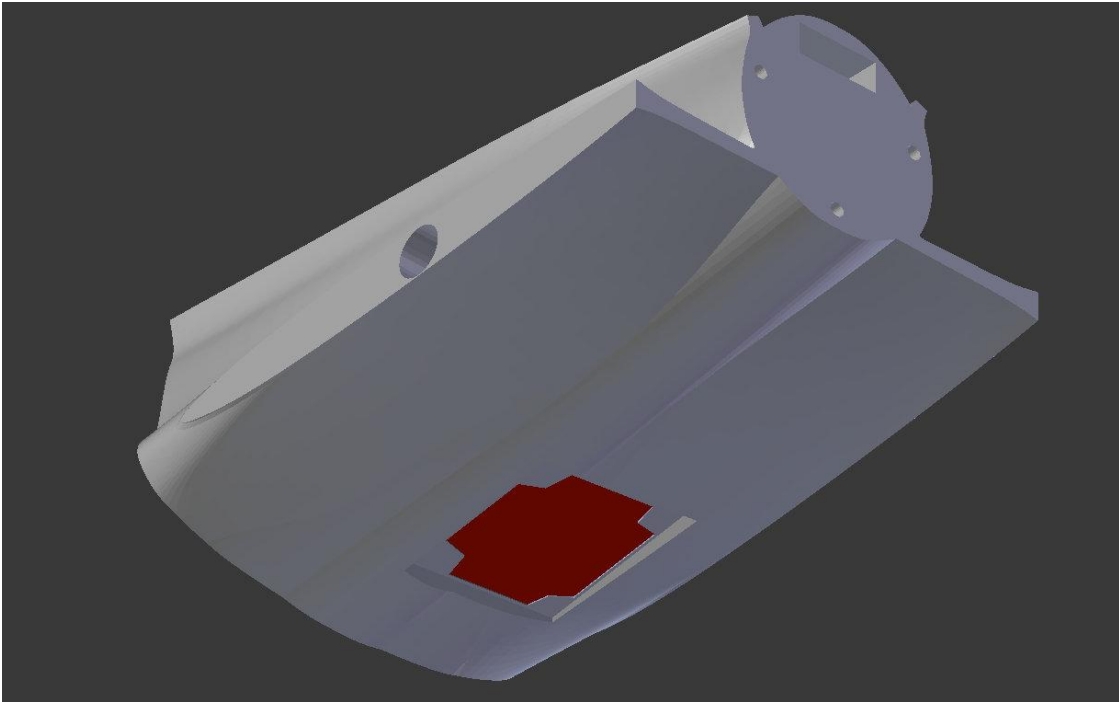
4

Using a soldering iron or hot piece of wire, remove the indented section (marked in red) to allow the servo lead for the aileron to pass through.



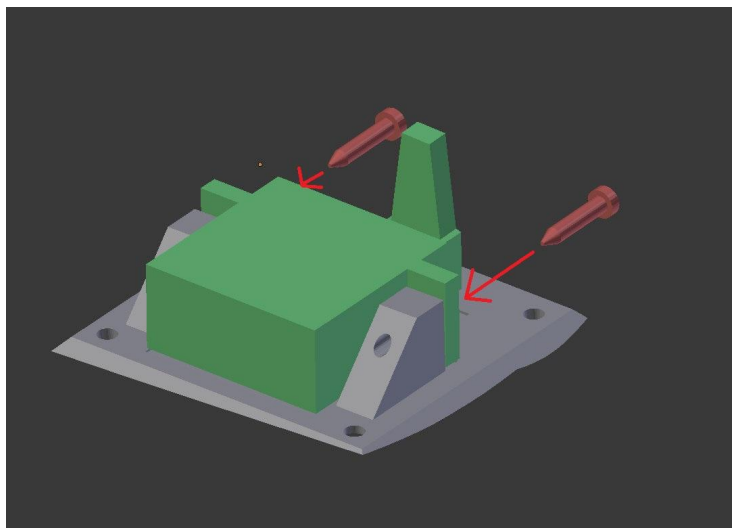
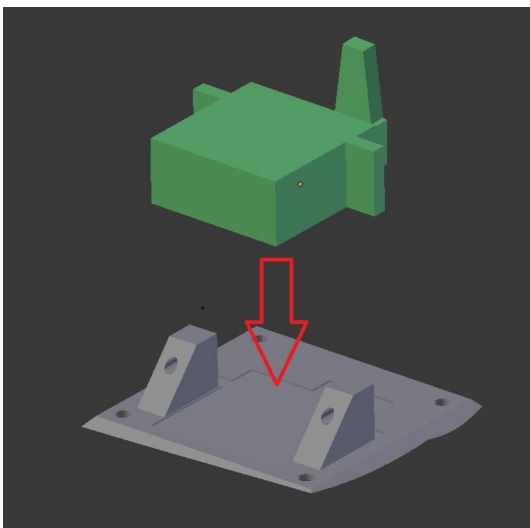
5 FUSE 5 ASSEMBLY

Using a soldering iron or hot piece of wire, remove the indented section (marked in red) to provide a slot for the elevator servo.



6

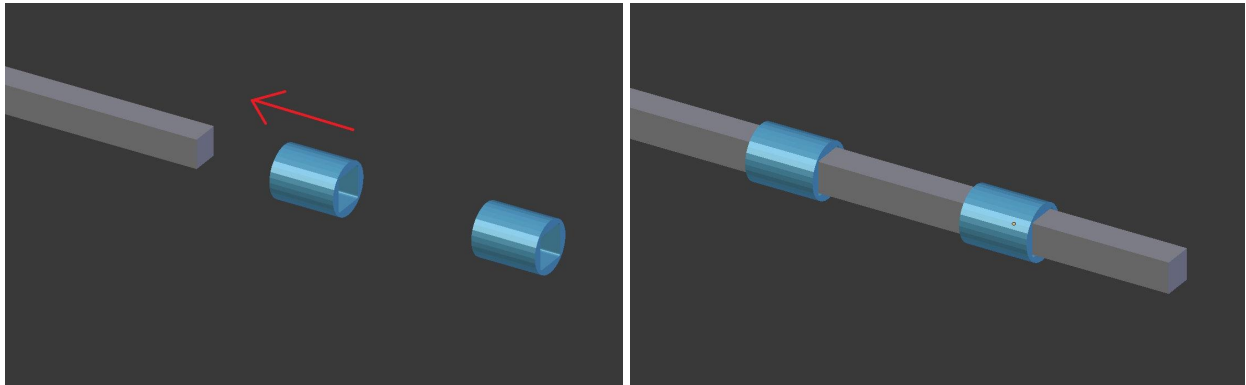
Secure the elevator servo to the elevator plate.



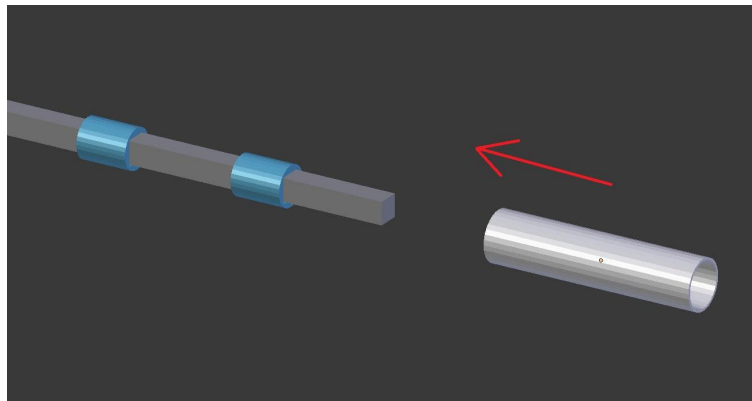
7 ELEVATOR CONTROL ARM ASSEMBLY

Cut a 173mm length of 5mm square carbon rod.

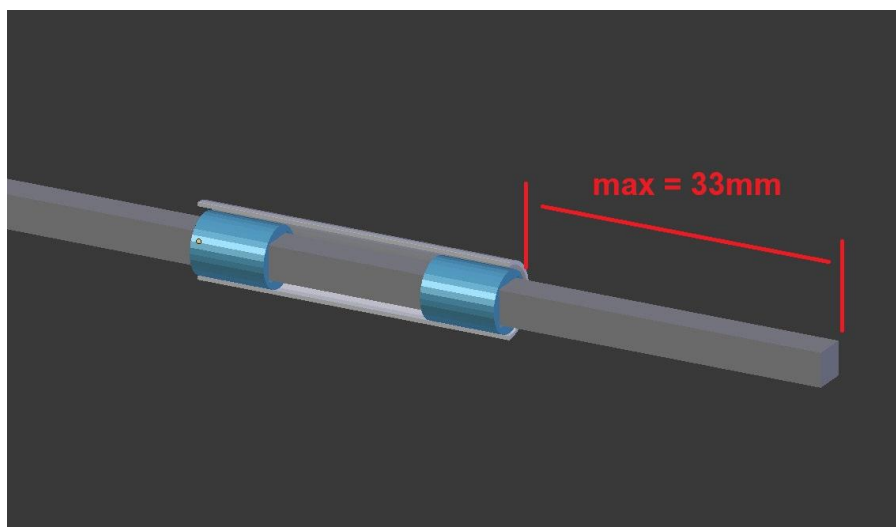
Fit the “torque tube sleeves” over the square carbon rod as shown on both ends.



Cut two 45mm lengths of 10 x 8mm round carbon tube and slide them over the “torque tube sleeves”. NOTE - The square carbon rod should be protruding from the sleeves by 33mm on each side.

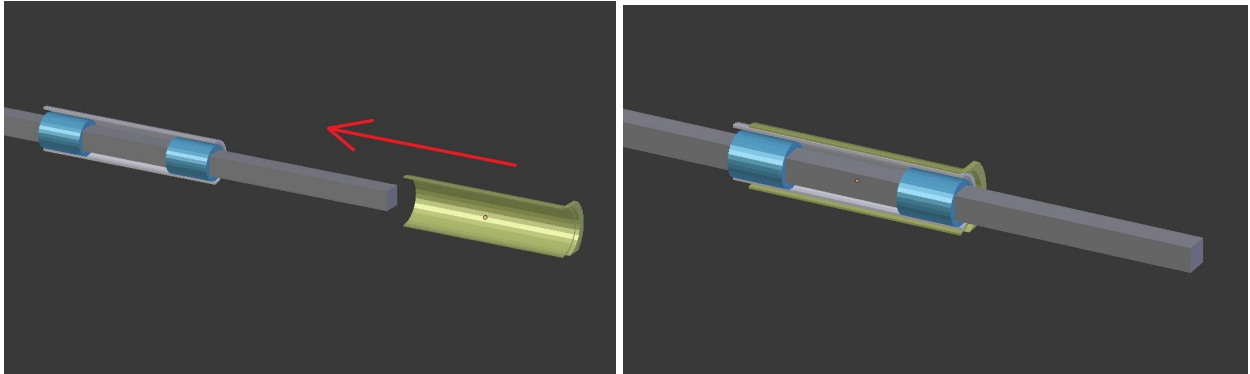


CROSS SECTION VIEW

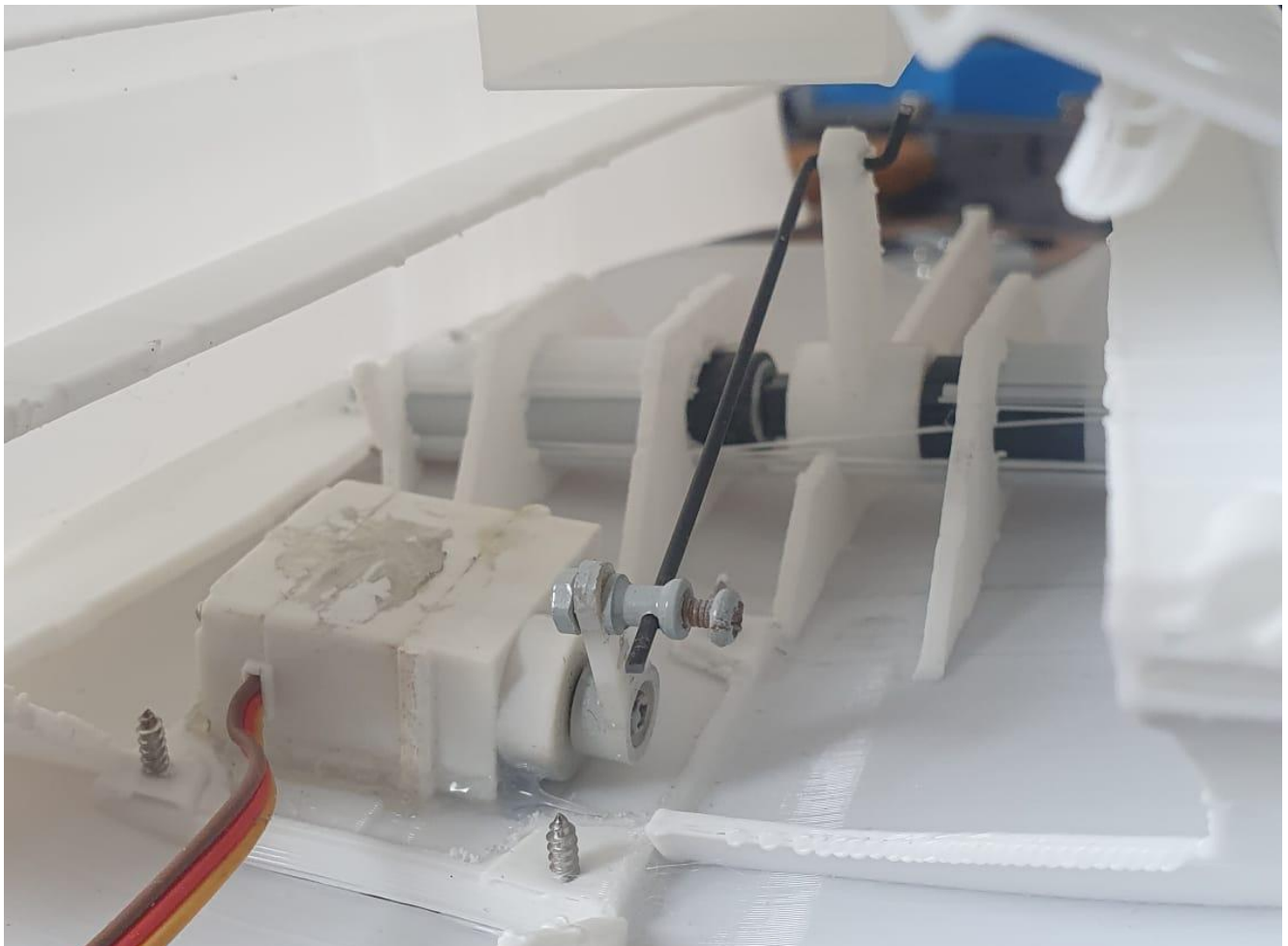


Slide the “Elevator race” over the 10 x 8mm carbon rod as shown.

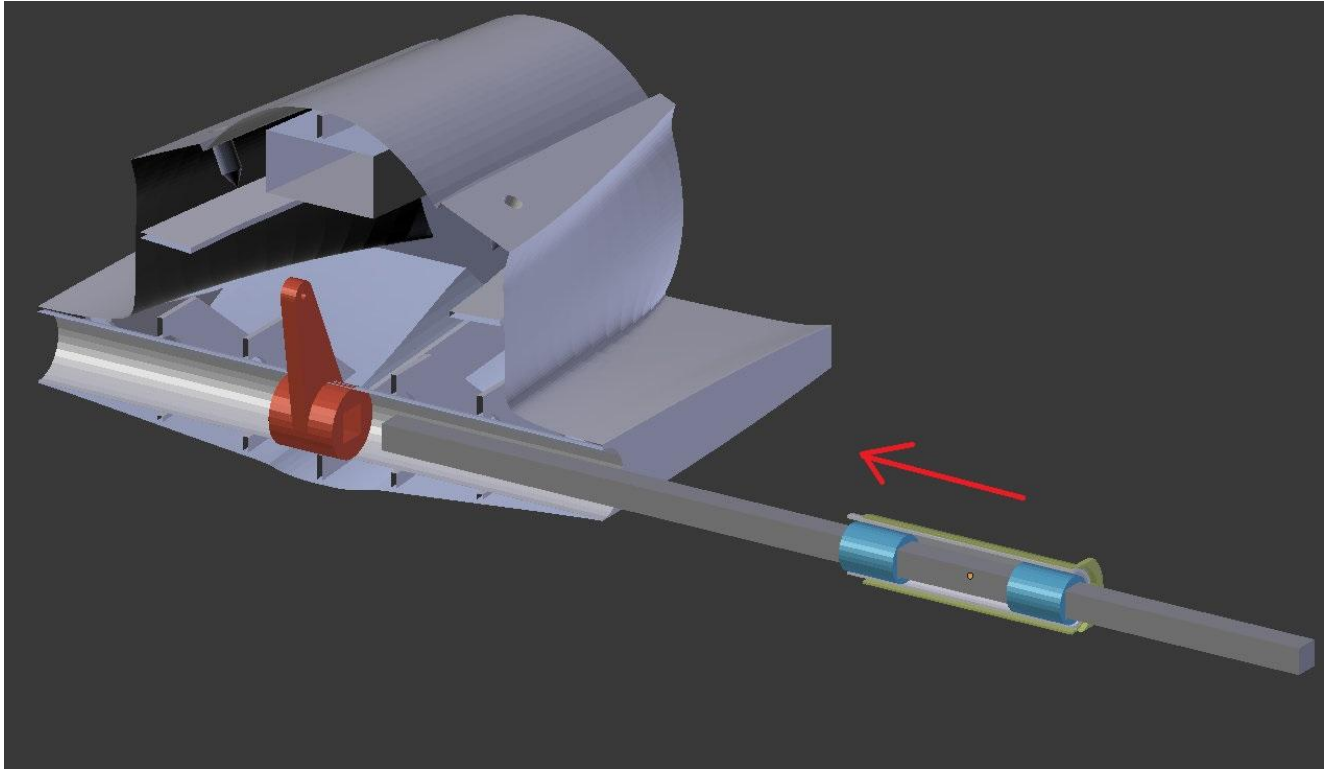
CROSS SECTION VIEW



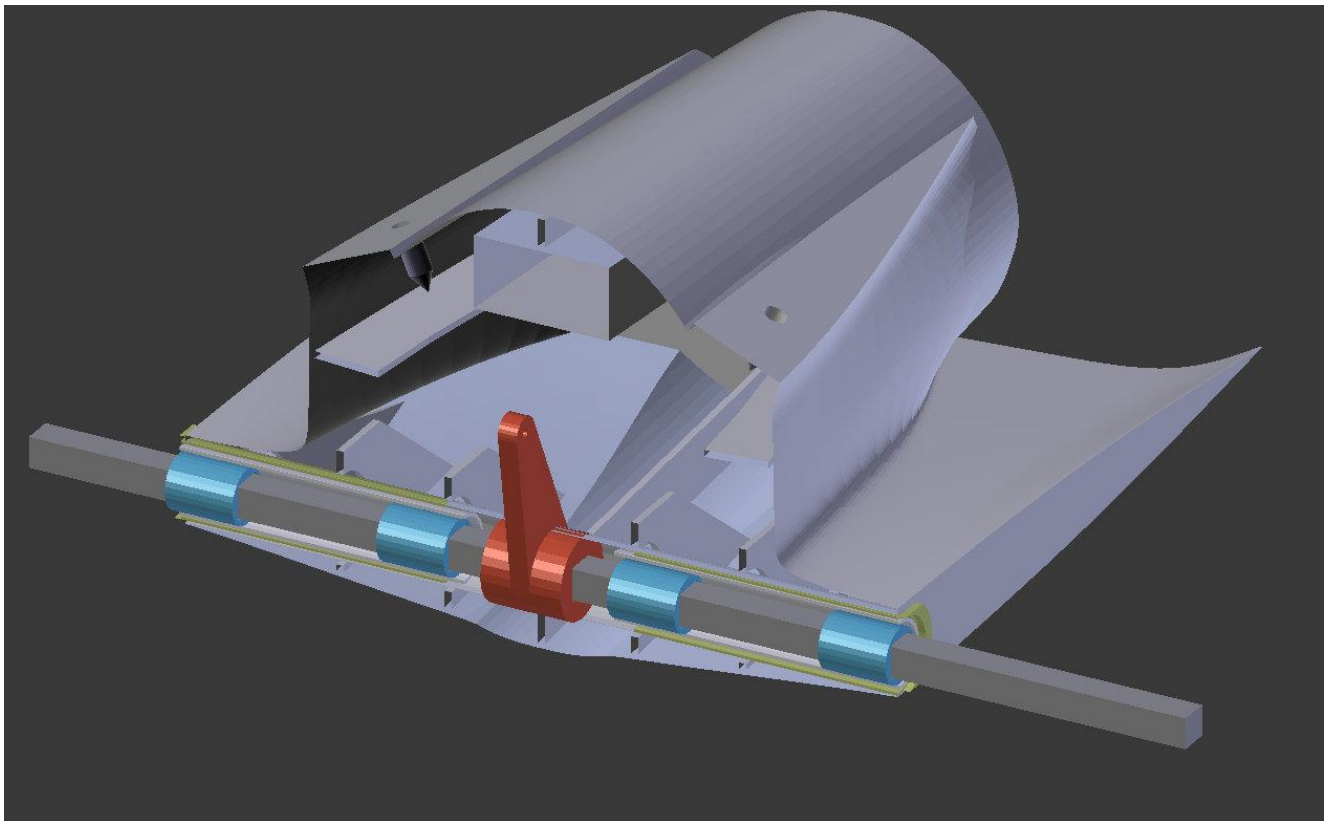
Connect up a 1mm or 1.2mm pushrod and cut it to a length of 65mm. This will be fitted to the elevator servo later, but you will not be able to easily access the control arm to fit the wire later. (SEE BELOW)



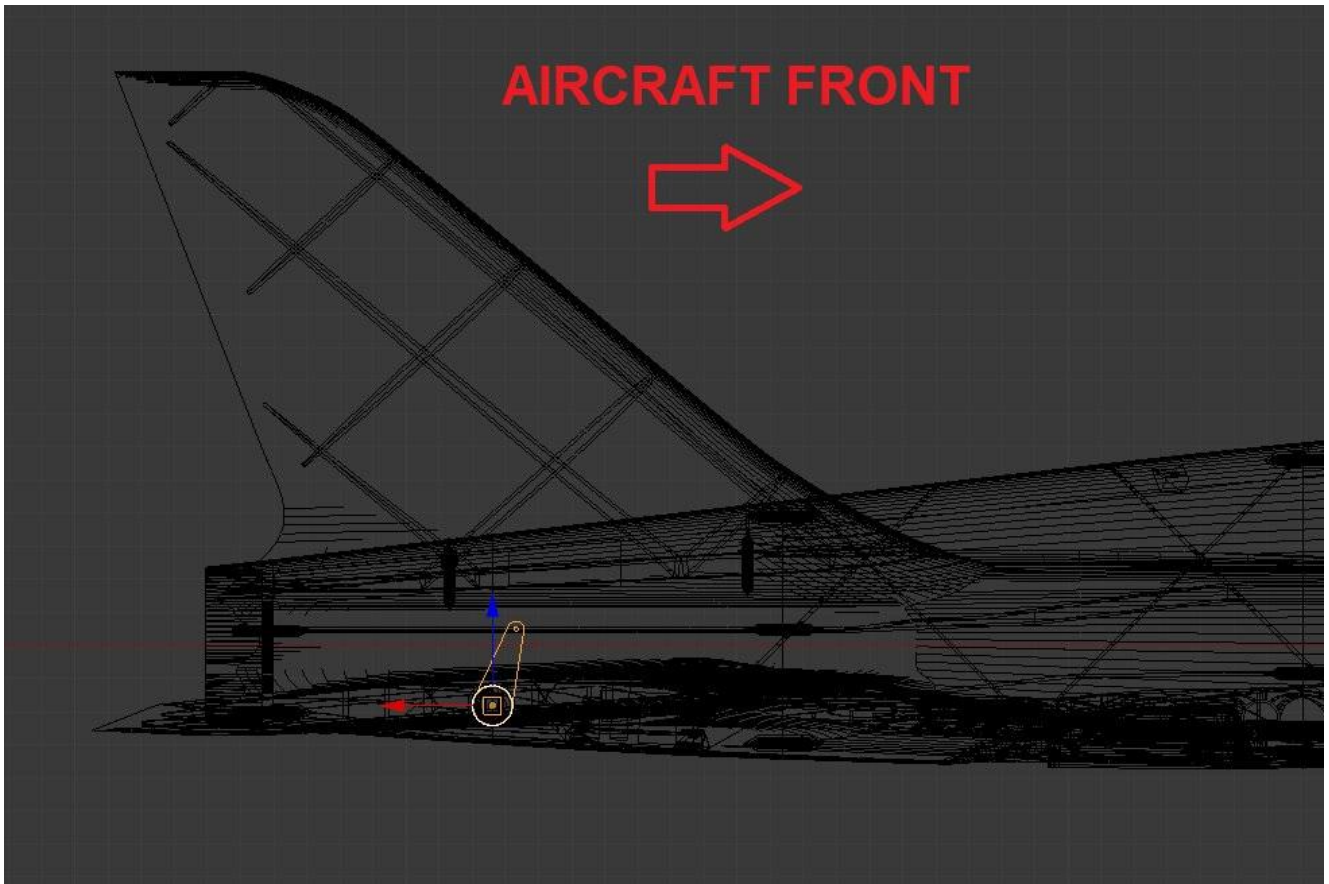
Insert the square carbon assembly into the slot in “fuse 5” with the “elevator control arm” in the middle. NOTE - you will need to trim away the excess material from between the support bridges so that the arm will fit.



Repeat the process for the other side. See finished assembly below



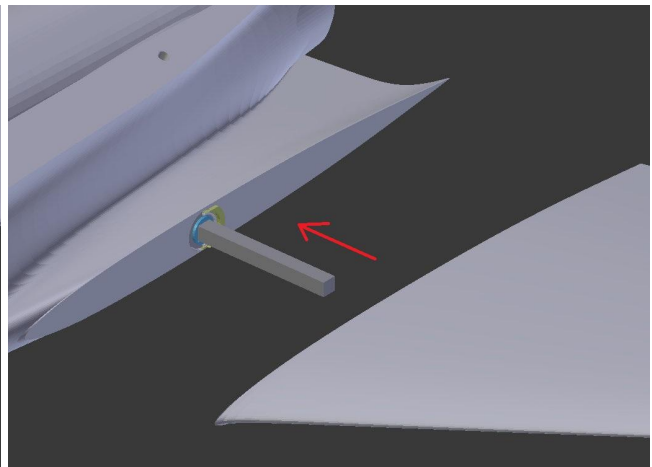
NOTE - The control arm should be positioned slightly forward of center with the square tube level.



Test the rotation of the control arm and make sure there is little to no play/slop in the control.

When happy with the fitment. Add a very small amount of CA to the lip of the “elevator race” to secure it in place.

Carefully apply CA to the inside of the “horizontal stabilizer” and secure it in place.



8

Glue the remaining sections of the fuselage to the front sections.

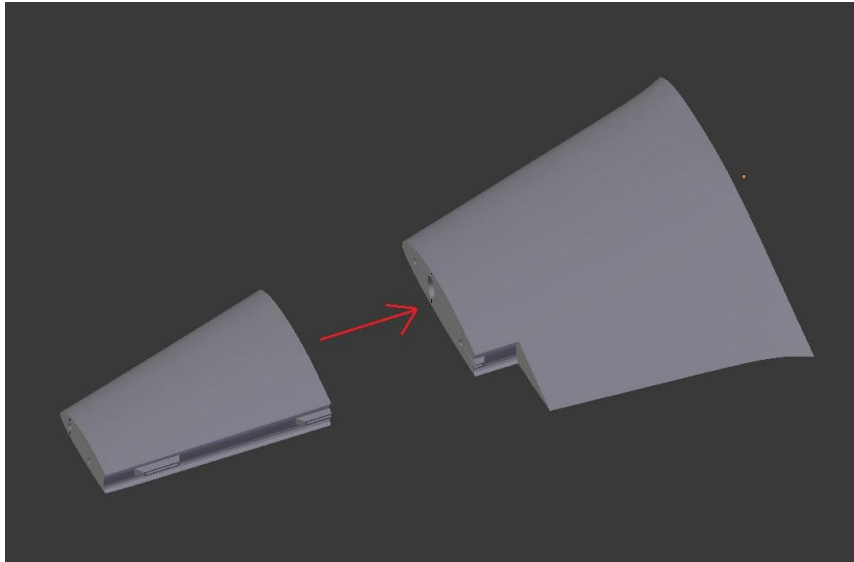
9

Glue the vertical stabilizers to the fuselage.

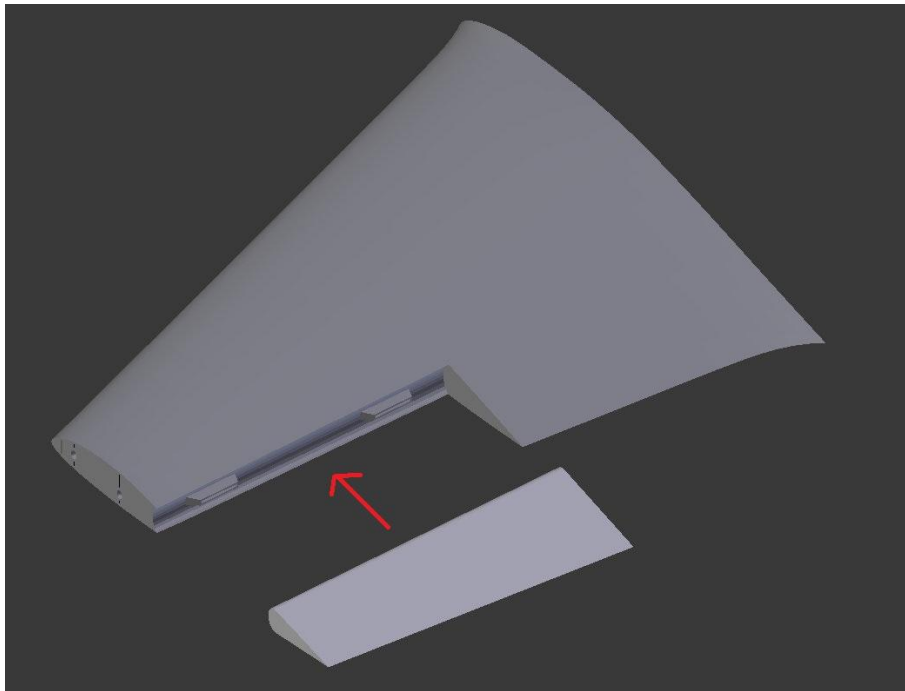
10 WING ASSEMBLY

Assemble the sections of the wings as per the following images:

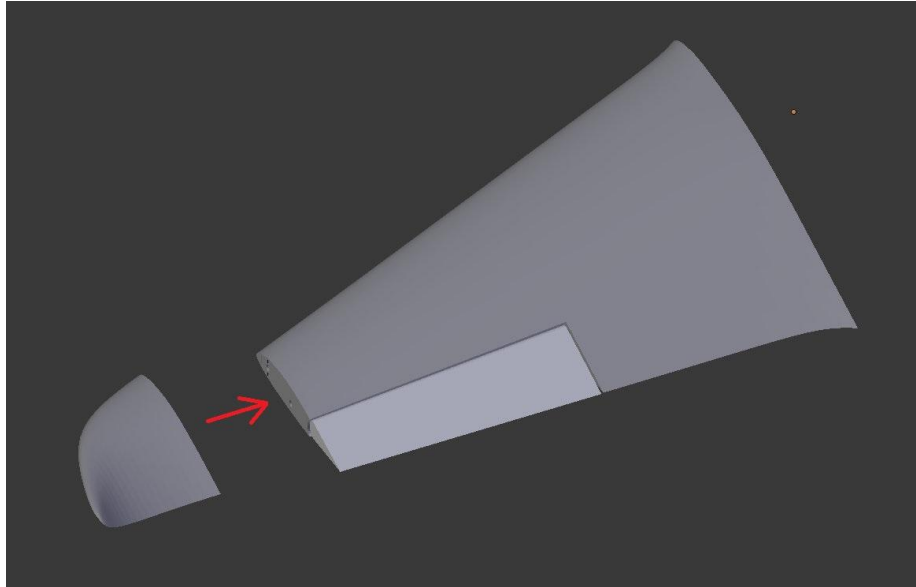
- Glue the inner and middle sections of the wings together.



- Glue the ailerons to the wing section with the nylon hinges.



- Glue the wingtips with the wing section.

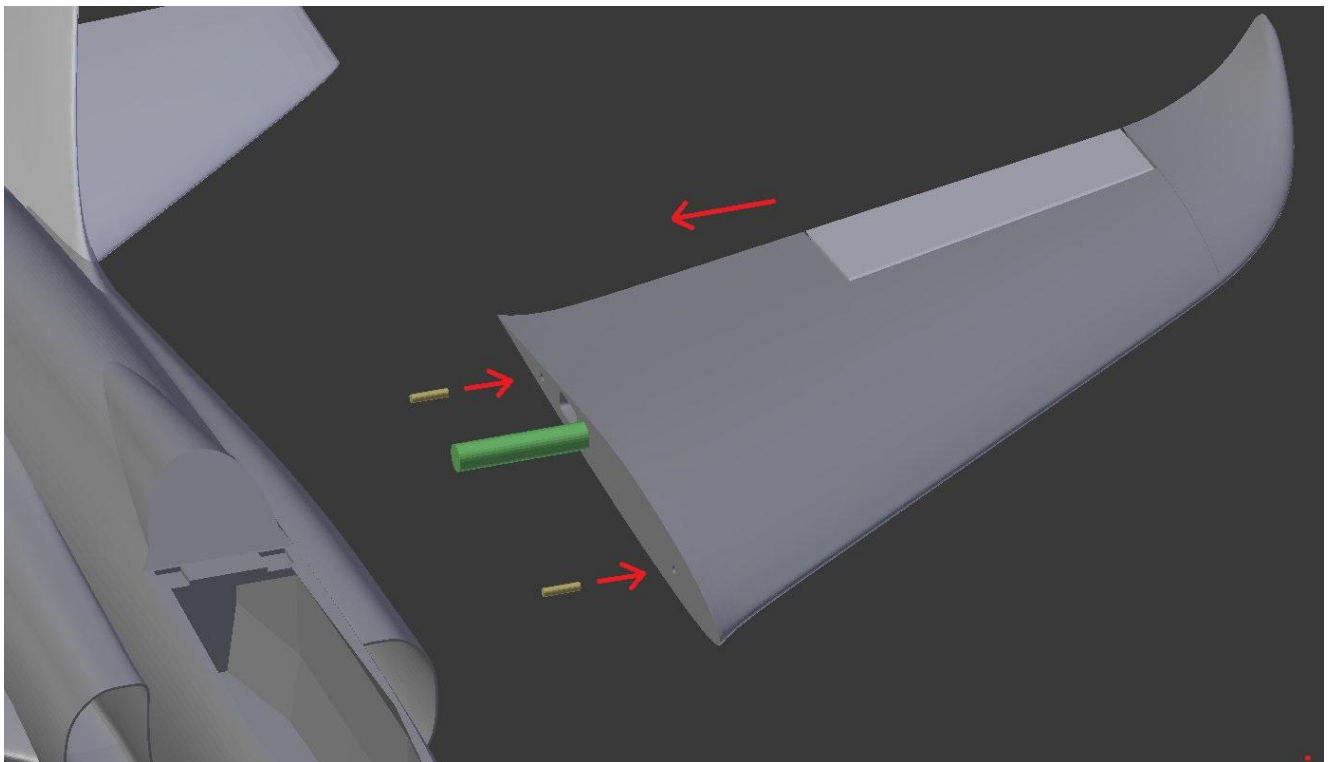


11

Cut the 10mm wooden spar to a length of 450mm.

12

Glue the wings to the fuselage section using 3mm sections of skewer and the 10mm carbon/wooden spar.



13

Screw the servos to the servo covers and install the aileron servo wires through the wing into the fuselage. The servo covers can be screwed to the insert of the wing with m2 screws. Finally, wire up the control surfaces with 1mm wire.

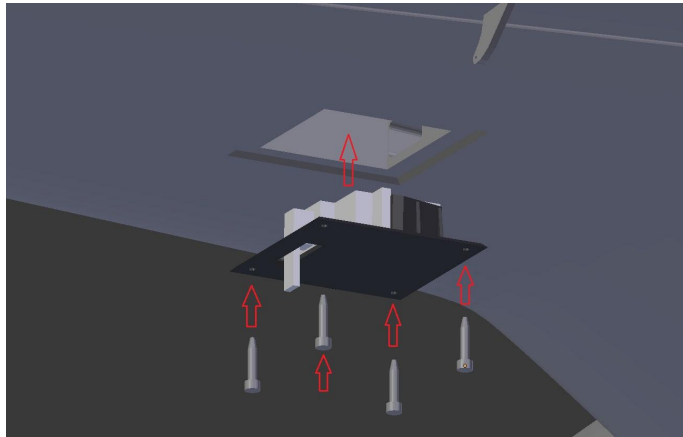


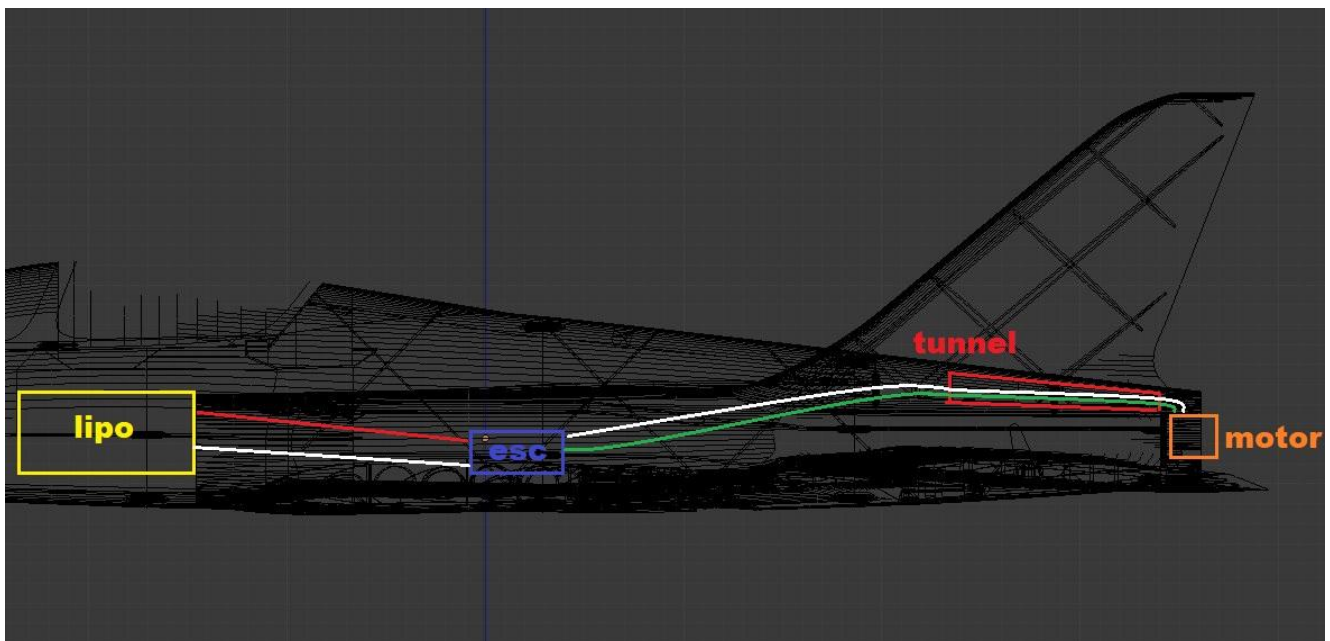
Image of left wing

14 CANOPY ASSEMBLY

Glue the sections of the canopy together and then the magnets into the canopy and fuselage.

15 ESC AND MOTOR WIRING

Fit the motor to the motor mount using m2 screws and connect to the esc. Feed the esc wires through the wire tunnel on the upper side of the fuselage.



BALANCING AND CG

Fit the battery using Velcro as required and balance the aircraft on the CG marking points located **130mm aft of the leading edge at the wing root.**

It is advisable on the first flight for the aircraft to be balanced on the cg markings, then move forward or aft as desired.

RANGE OF TRAVEL:

NORMAL / MAIDEN FLIGHT:

Elevator +/- 20mm

Ailerons +/- 10mm

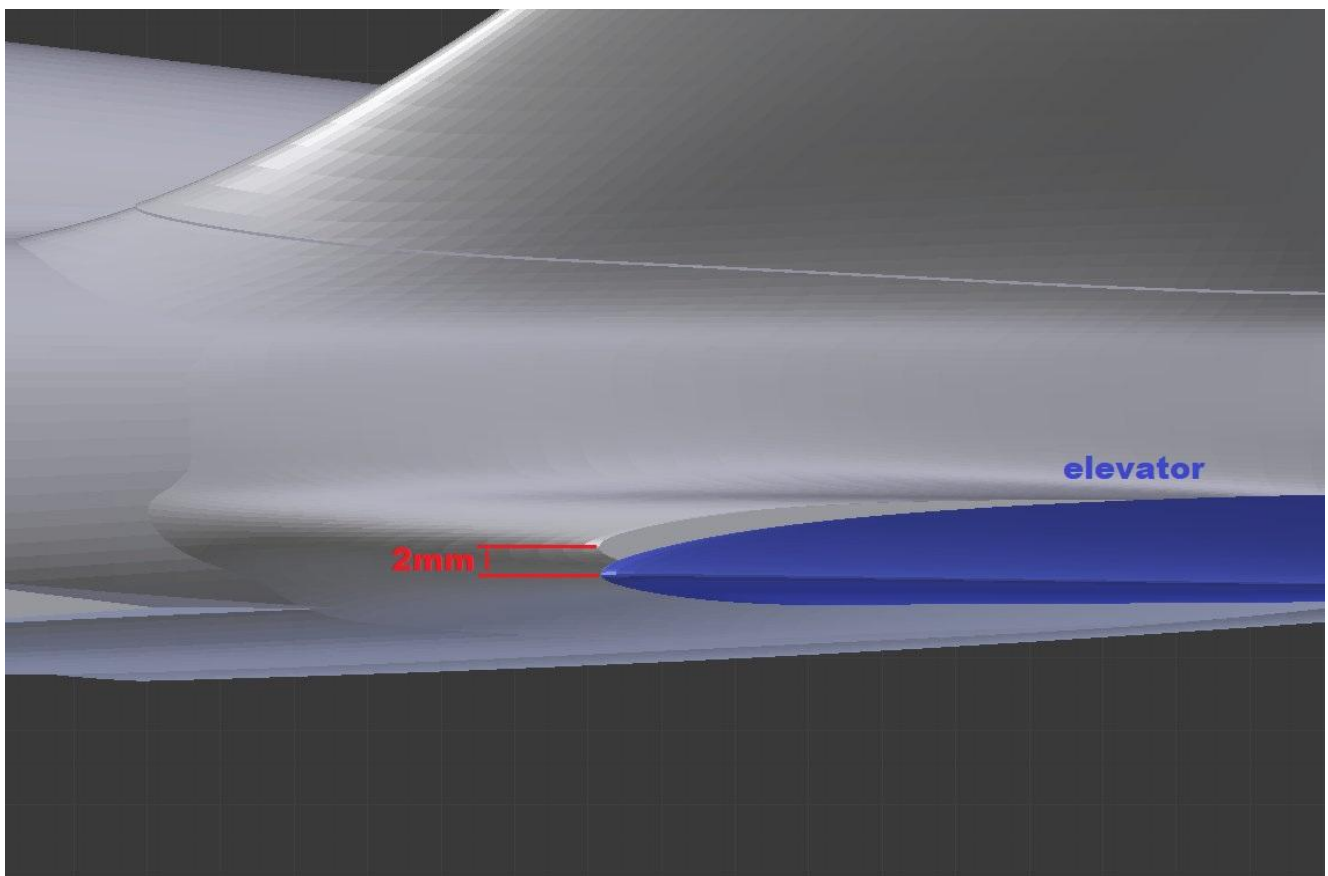
AEROBATIC:

Elevator +/- 50mm

Ailerons +/- 20mm

MAIDEN PRE FLIGHT CHECK FOR ELEVATOR

During testing, it was found that an elevator “UP-trim” of 2mm measured from the leading edge of the elevator at the root was suitable trim for level flight. It is advised for the maiden flight that this trim value be used.



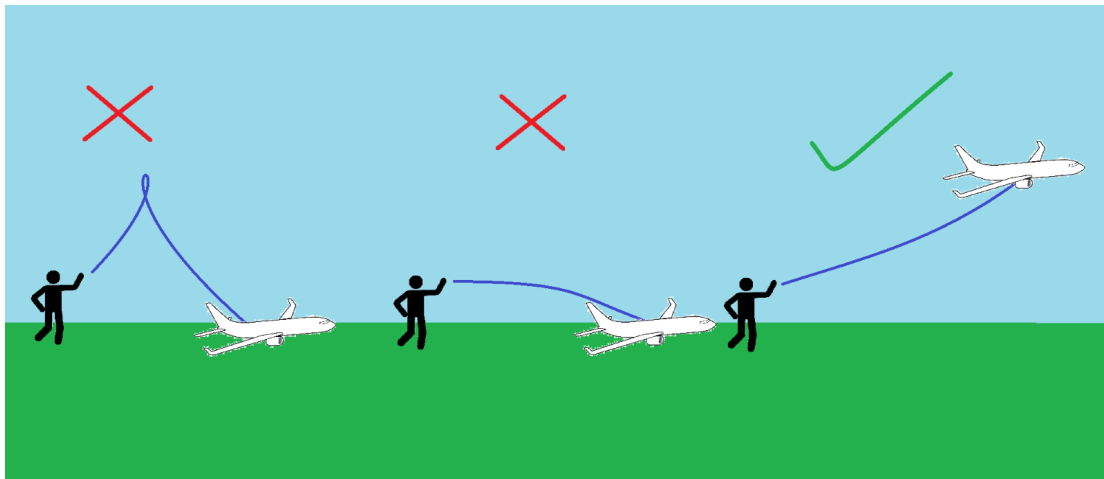
LAUNCHING:

Under-arm technique (preferred method):

It was found that the safest and most successful launch technique for this model was the under-arm style. Gripping the model around the fuselage just forward of the vertical stabilizers. This protects the fingers and gives a solid grip to launch from. Advance the throttle to 80-90% and gently toss the model (nose up 30deg) with a slight right wing down attitude (this is to counter the torque roll from the motor). With more than 1:1 power to weight, it will easily accelerate away.

Over-arm technique:

An over-arm toss can also be used and there is a finger grip in the belly to aid the launch technique; however, the person launching should use caution regarding their fingers and the propeller. The aircraft should be launched at approximately 20deg nose up at 70% power. Too steep and the aircraft will stall, too shallow and it will contact the ground.



PARTS LINKS:

2836 2200kv

https://hobbyking.com/en_us/propdrive-v2-2836-2200kv-brushless-outrunner-motor.html?store=en_us

60AMP ESC

https://de.aliexpress.com/item/32986228623.html?spm=a2g0n.productlist.0.0.45657bbbi7hsQ0&brower_id=eb7eb812d025420c919a8a70636e28c4&aff_platform=msite&m_page_id=ebebdcaaec1886e842778240d1f4cdbe5569232f05&gclid=&pdp_npi=3%40dis%21EUR%2116.37%2115.71%21%21%21%21%21%21%402122443916854813346542773d0790%2112000026434415472%21sea%21DE%21118672630&algo_pvid=d859defb-857a-4d3e-b809-b92814cf0ecd

2200mah 3s LIPO 50c

<https://www.ampow.com/collections/2200mah-3s-batteries/products/ovonic-50c-11-1-v-2200mah-3s1p-deans-lipo-battery>

9g servo

https://de.aliexpress.com/item/32898059654.html?spm=a2g0o.productlist.0.0.7d394771z9xfZq&algo_pvid=26dd1d90-4d3b-4f94-955c-e26a127ba26c&algo_expid=26dd1d90-4d3b-4f94-955c-e26a127ba26c-3&btsid=2100bdf016211823001362964e2ed8&ws_ab_test=searchweb0_0.searchweb201602_.searchweb201603_

9g metal servo

https://de.aliexpress.com/item/1005004589934496.html?spm=a2g0o.productlist.main.21.2c9c5828q3bemp&algo_pvid=dde224a9-2ed3-4116-b568-85b0fdafa98d&algo_exp_id=dde224a9-2ed3-4116-b568-85b0fdafa98d-10&pdp_npi=3%40dis%21EUR%212.53%212.22%21%21%21%21%21%40211bd4cd16854815560705378d07fa%2112000029744393793%21sea%21DE%21118672630&curPageLogUid=P3rexMlm0F6l

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

X1 10mm x 500mm **round** carbon tube or pine rod

<https://de.aliexpress.com/item/4000077470439.html?gatewayAdapt=glo2deu&spm=a2g0s.8937460.0.0.689f2e0e2eIHrl>

X1 5mm x 5mm x 500mm **square** carbon tube

https://de.aliexpress.com/item/4001086545108.html?spm=a2g0o.productlist.0.0.61796adeH8kxxQ&algo_pvid=303ba4c2-727d-4756-ac26-7117a8a664fd&algo_exp_id=303ba4c2-727d-4756-ac26-7117a8a664fd-3&pdp_ext_f=%7B%22sku_id%22%3A%2210000014296523702%22%7D&pdp_pi=-1%3B6.27%3B-1%3B-1%40salePrice%3BEUR%3Bsearch-mainSearch

16x29 HINGES

https://de.aliexpress.com/item/32659926010.html?spm=a2g0o.productlist.0.0.5e7f7ef2zlc3qX&algo_pvid=478c4573-19ad-4939-ba11-475e3dc6139e&algo_exp_id=478c4573-19ad-4939-ba11-475e3dc6139e-0&btsid=2100bdf016211823370763498e2ed8&ws_ab_test=searchweb0_0_searchweb201602_searchweb201603

VELCRO – (local hardware store)

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>

1mm Piano wire

<https://de.aliexpress.com/item/32975279180.html?spm=a2g0s.9042311.0.0.2e0f4c4d0HE2dZ>

1.2mm piano wire

<https://de.aliexpress.com/item/32975187998.html?gatewayAdapt=glo2deu&spm=a2g0s.8937460.0.0.2c0f2e0eVf9dow>

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

Aeroworks3d@outlook.com

