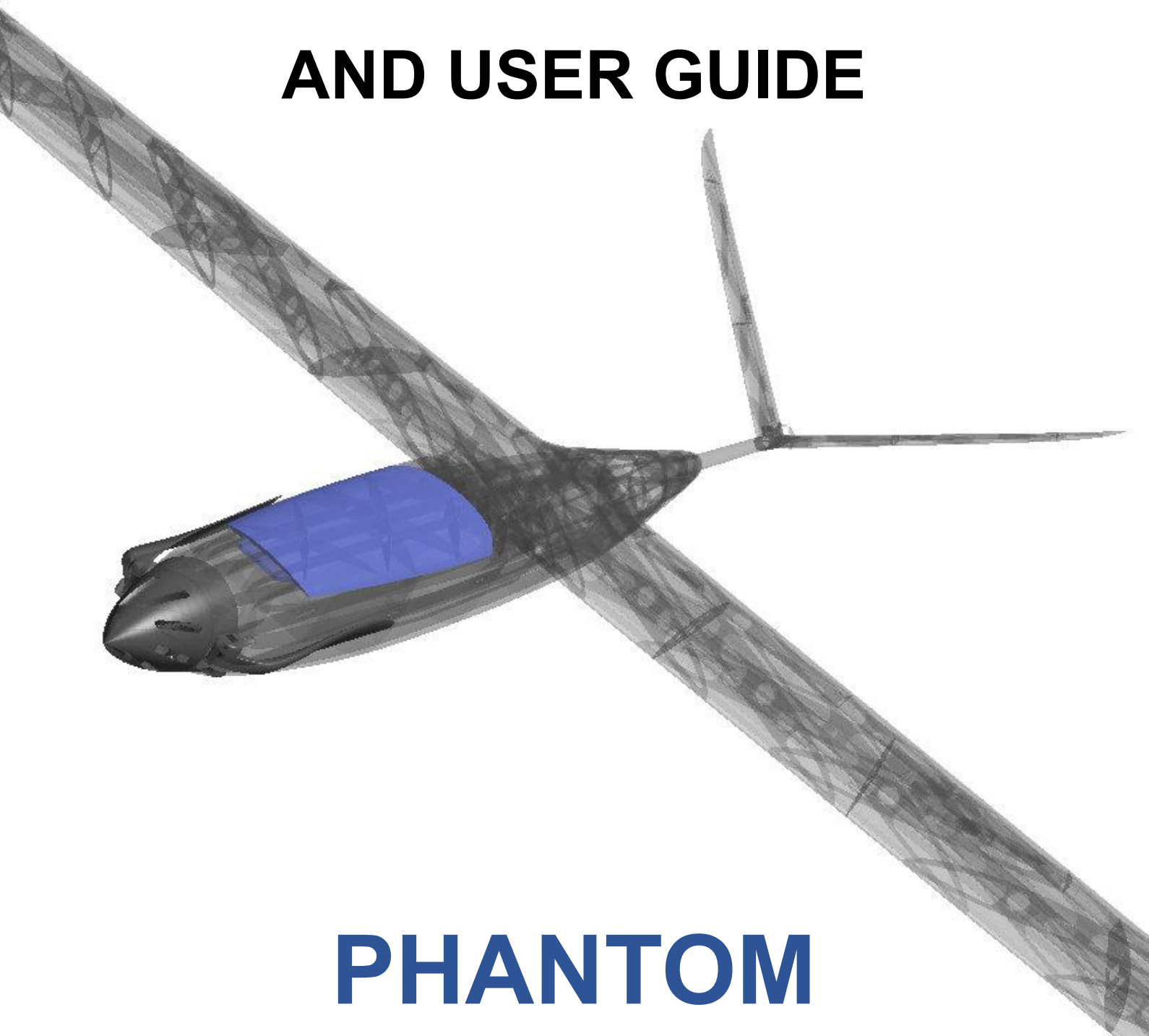


ASSEMBLY MANUAL AND USER GUIDE



PHANTOM

4000

By 3D AEROWORKS

OVERVIEW:

This custom design of a low weight, low drag glider is intended to be a thermalling monster and is designed for quick and easy construction, printed in PLA. Based on our very successful Tracer 2000 model, the Phantom is a scaled up version of the Tracer, measuring in with a whopping 4 meter wingspan. Designed to suit the 3548 900kv outrunner on a 15x10 printed or carbon propeller. Utilizing the MH32 aerofoil, Ailerons, flaps and a V-tail, this model is a real floater at low speed but picks up speed quickly when you want to. 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/phantom-4000-4m-thermal-glider>

GENERAL SPECIFICATIONS

WINGSPAN:	4000mm
PRINT WEIGHT:	2300g
FLYING WEIGHT:	3200g

ELECTRICS

MOTOR:	3548 900KV (can accept 42 size motors with slight adjustment)
ESC:	60amp (min) recommend 80amp
SERVOS:	9g MICRO
BATTERY:	4500mah 4s 50c (400g)

INCLUDED:

Factory files for Simplify 3d

G-code files

STL files for all components

Detailed assembly manual and user guide

Print settings guide

MINIMUM BUILD VOLUME: 300mm x 300mm x 250mm

BUILD OPTIONS:

This model has been designed to suit four different build configurations depending on your building experience and intended style of flying.

WING DESIGN:

OPTION 1 > Standard wing - Using the proven external servo arm and control horn, this option is perfect for the “first time builders” and those who want to get in the air fast.

OPTION 2 > RDS wing - Rotating drive system is an internally mounted arm which rotates the control surface through a torque rod extending into the control surface. This results in no external control horns and reduces drag and has a very clean appearance. The assembly procedure is more difficult than the standard wing and is recommended for experienced builders.

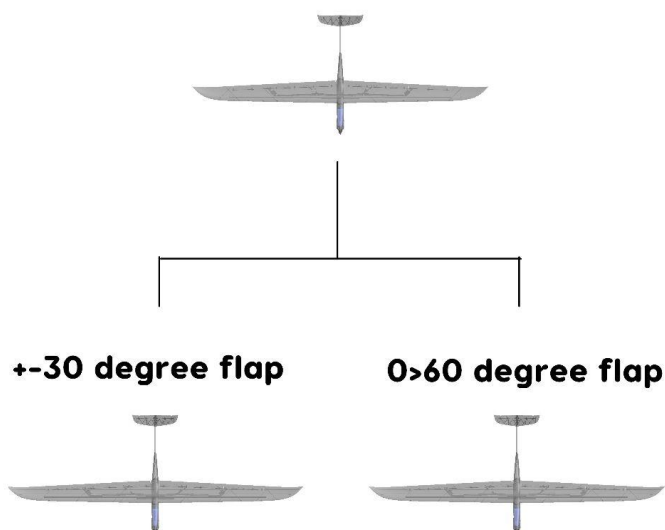
FLAP STYLE SELECTION:

+ -30 degree flap - Operating the same control throws as the ailerons, this flap style is designed to improve banking response and increase roll rate. This still provides a wide flight envelope, allowing for thermalling-flap when needed.

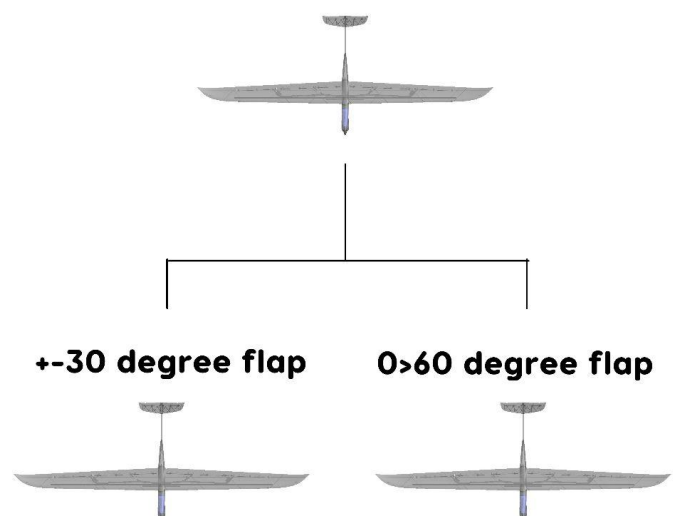
0 > 60 degree flap - This design of flap is more intended for those who want to have the flaps double as air-brakes or crow-flaps when necessary. They can also be effectively used to aid in descending fast when strong thermals are carrying your Phantom glider out of sight.

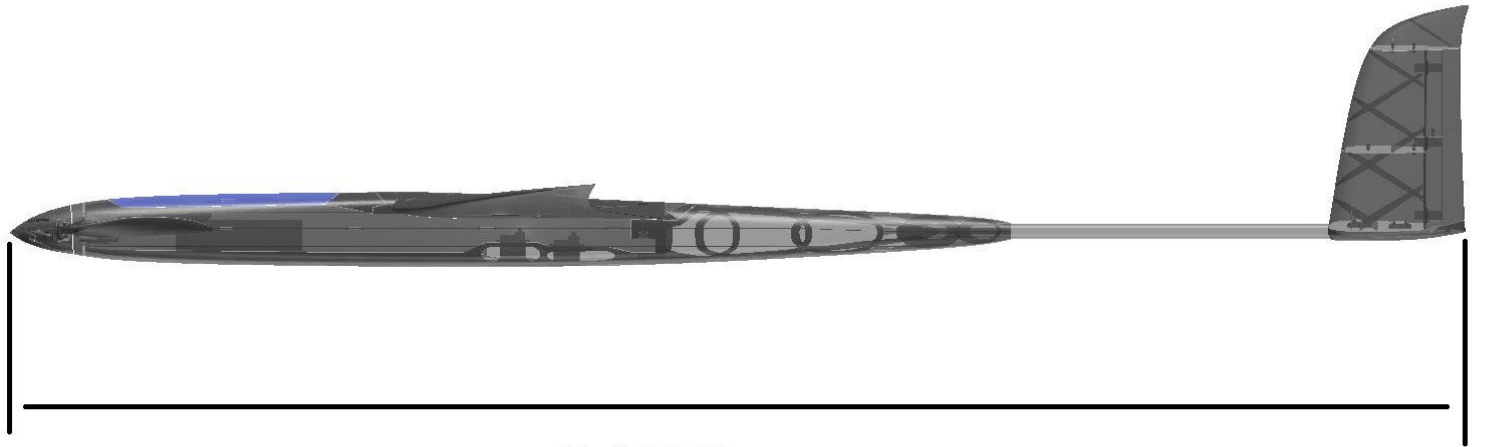
(flight video was filmed with the RDS wing using 0>60 deg flaps)

RDS WING DESIGN

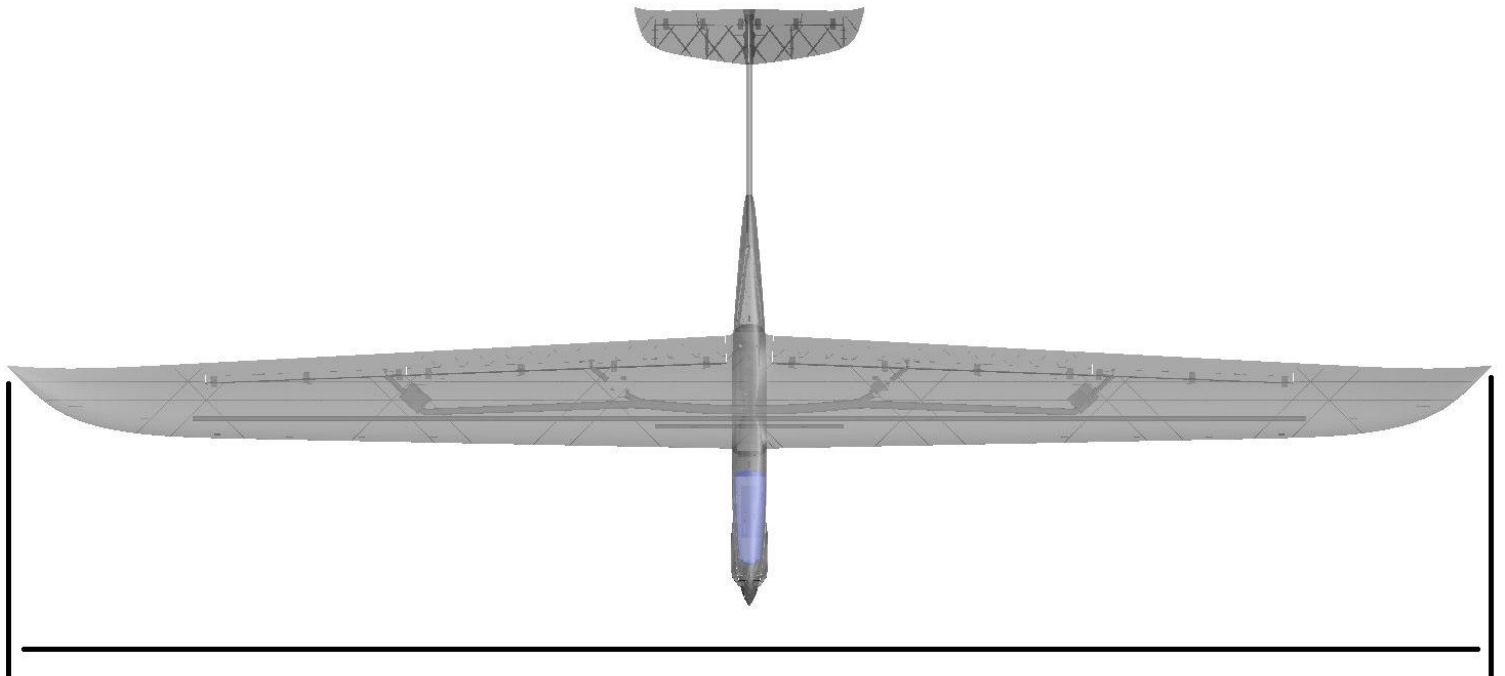


STANDARD WING DESIGN





1630mm



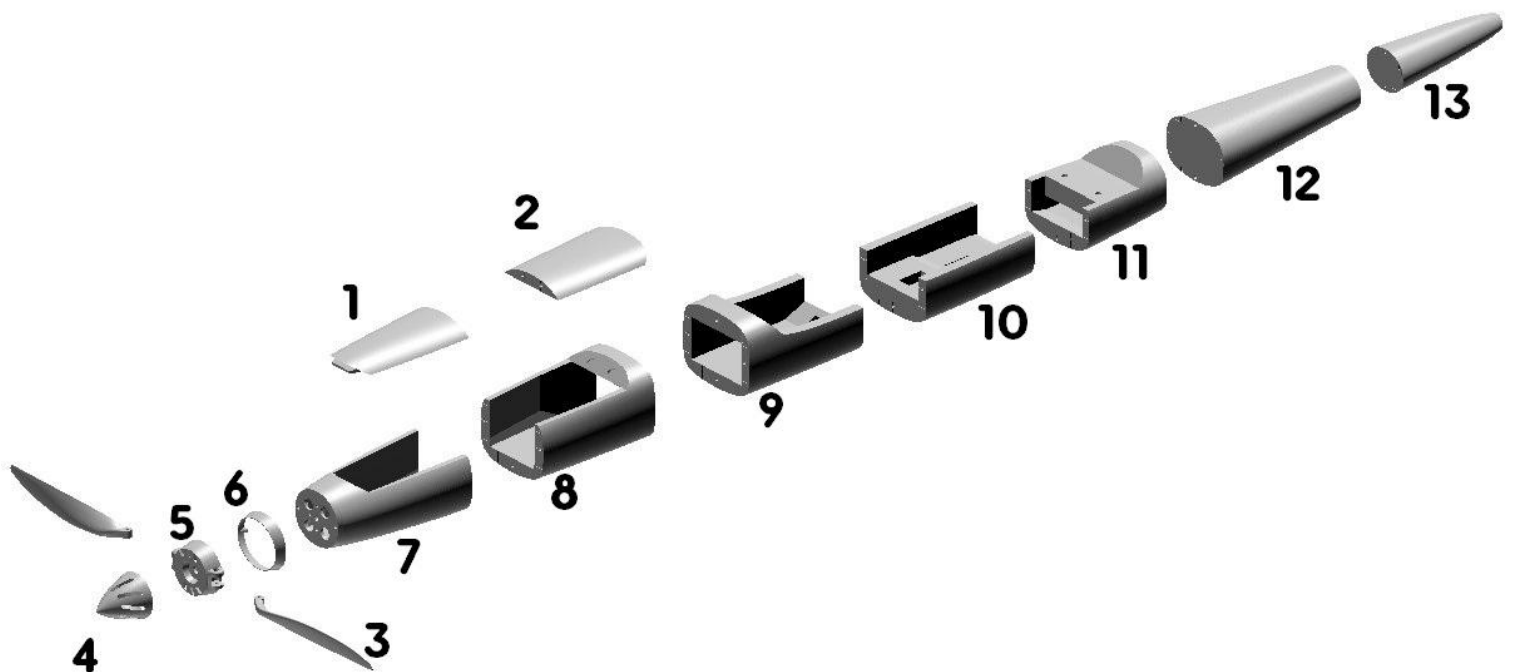
4000mm



PARTS LIST

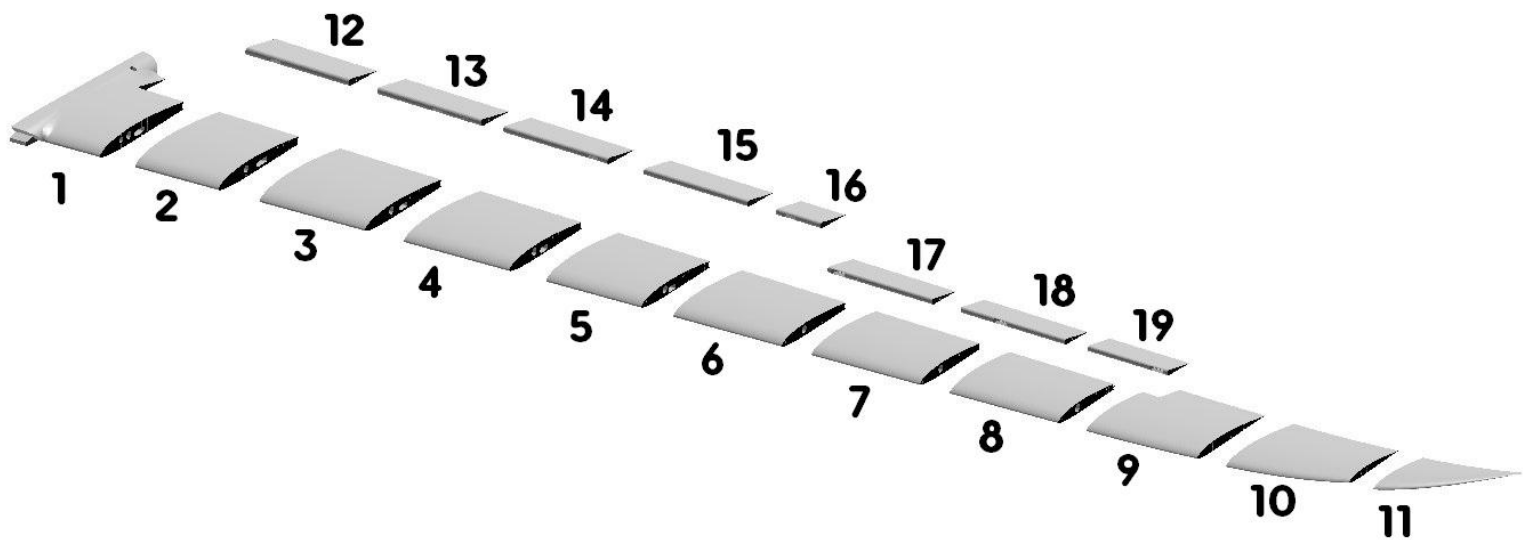
Fuselage and Propeller assembly

PART NUMBER	PART NAME	PART WEIGHT (g)
1	CANOPY FRONT	17.5
2	CANOPY REAR	17.5
3	PROPELLER BLADE	13
4	SPINNER	9
5	SPINNER BACKPLATE	27
6	COWLING	2.2
7	FUSE 1	60
8	FUSE 2	53
9	FUSE 3	56
10	FUSE 4	44
11	FUSE 5	40
12	FUSE 6	46
13	FUSE 7	27



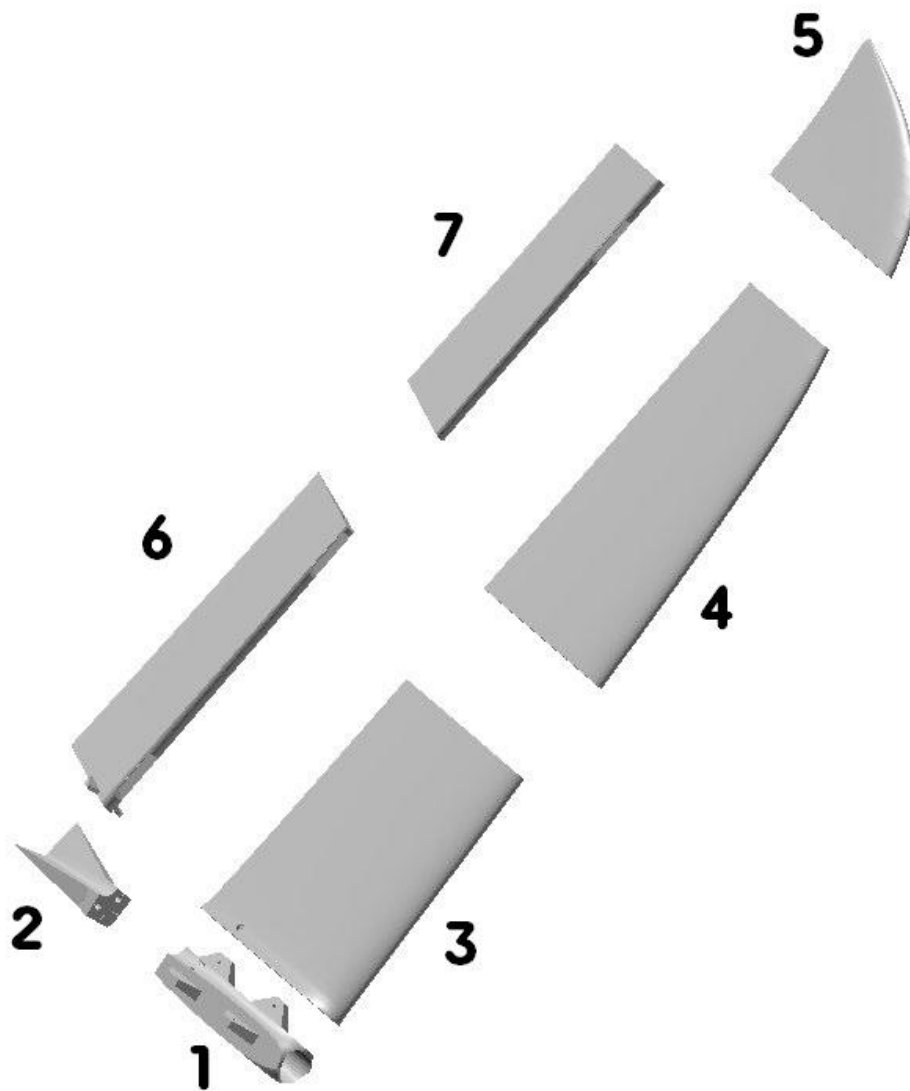
Wing assembly

PART NUMBER	PART NAME	PART WEIGHT (g)
1	WING 1	102
2	WING 2	74
3	WING 3	88
4	WING 4	78
5	WING 5	67
6	WING 6	73
7	WING 7	62
8	WING 8	55
9	WING 9	59
10	WING 10	49
11	WING 11	19.5
12	FLAP 1	15
13	FLAP 2	20
14	FLAP 3	20
15	FLAP 4	20
16	FLAP 5	15
17	AILERON 1	15
18	AILERON 2	15
19	AILERON 3	11



Tail assembly

PART NUMBER	PART NAME	PART WEIGHT (g)
1	V-TAIL HUB FRONT	10
2	V-TAIL HUB REAR	2.5
3	V-TAIL STABILIZER INNER	26
4	V-TAIL STABILIZER MIDDLE	25
5	V-TAIL STABILIZER OUTER	7
6	ELEVATOR INNER	10
7	ELEVATOR OUTER	8



REQUIRED TOOLS:

KNIFE	CA GLUE (super glue)
LIGHTER	SCREW DRIVERS
SANDPAPER (MEDIUM GRIT 320 recommended)	FILE OR RASP
PLIERS	SOLDERING IRON (led version)
	DRILL

REQUIRED COMPONENTS:

X1 3548 900KV MOTOR (or similar)

X1 60AMP ESC

X1 4500MAH 4S LIPO OR SIMILAR (400g)

X4 DS239mg Slim Servo

X2 HK15148b mg Servo (21g)

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

X20 16mm x 29mm HINGES

X6 12mm x 10mm x 500mm carbon tube

X2 10mm x 8mm x 500mm carbon tube

X1 16mm x 14mm x 500mm carbon tube

X2 M3 x 16mm hex bolt

X4 M2 x10mm screws

M1.6 x 6mm screws (optional)

1mm piano wire (Standard wing only)

M2 push rod (110mm min length) (RDS wing only)

Braided fishing line 20LBS (or similar)

X2 M6 x 60mm nylon bolts and nuts

X2 0.3mm x 5mm extension spring in

15x10 carbon Propeller blades

VELCRO

3mm BAMBOO FOOD SKEWERS

ASSEMBLY INSTRUCTIONS

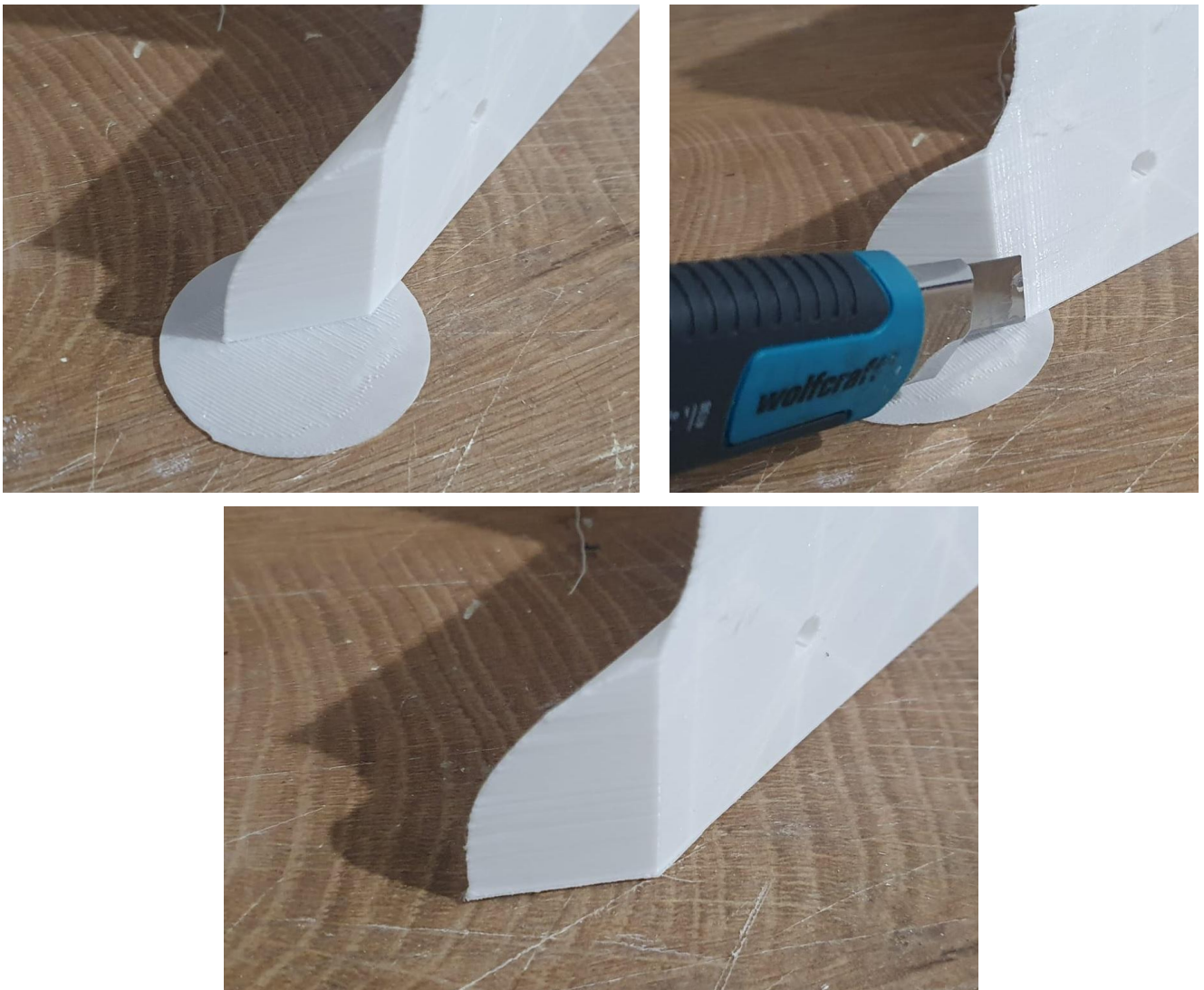
Prepping parts

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.



Bed disk removal

Remove all bed disks by laying the part flat and using a blade.

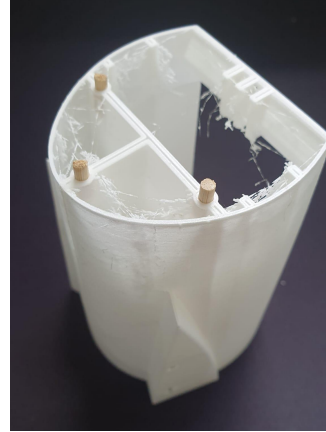
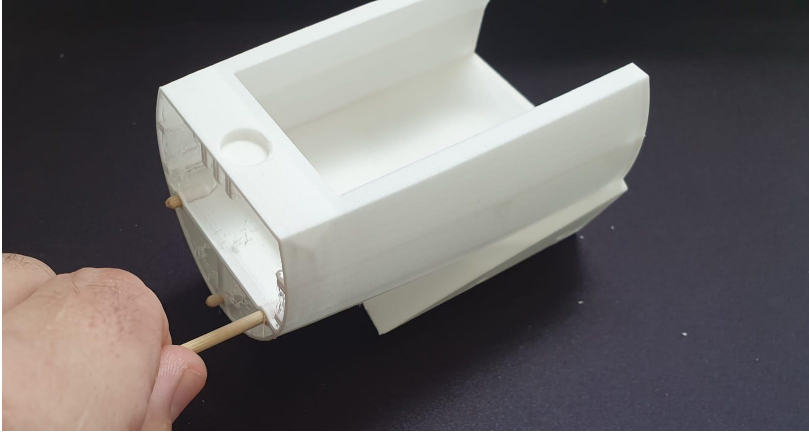


Alignment pins

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.

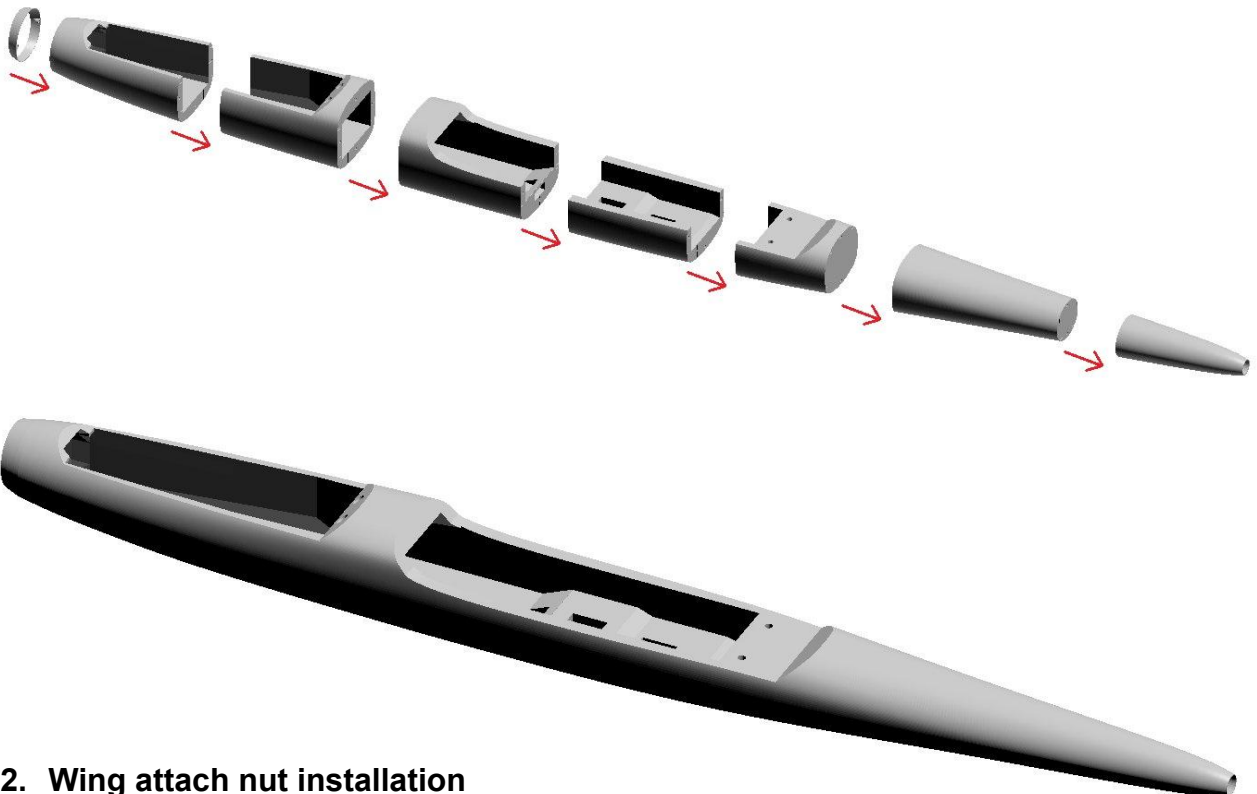
Test fit the sections of the fuse before gluing to ensure a clean fit.



FUSELAGE

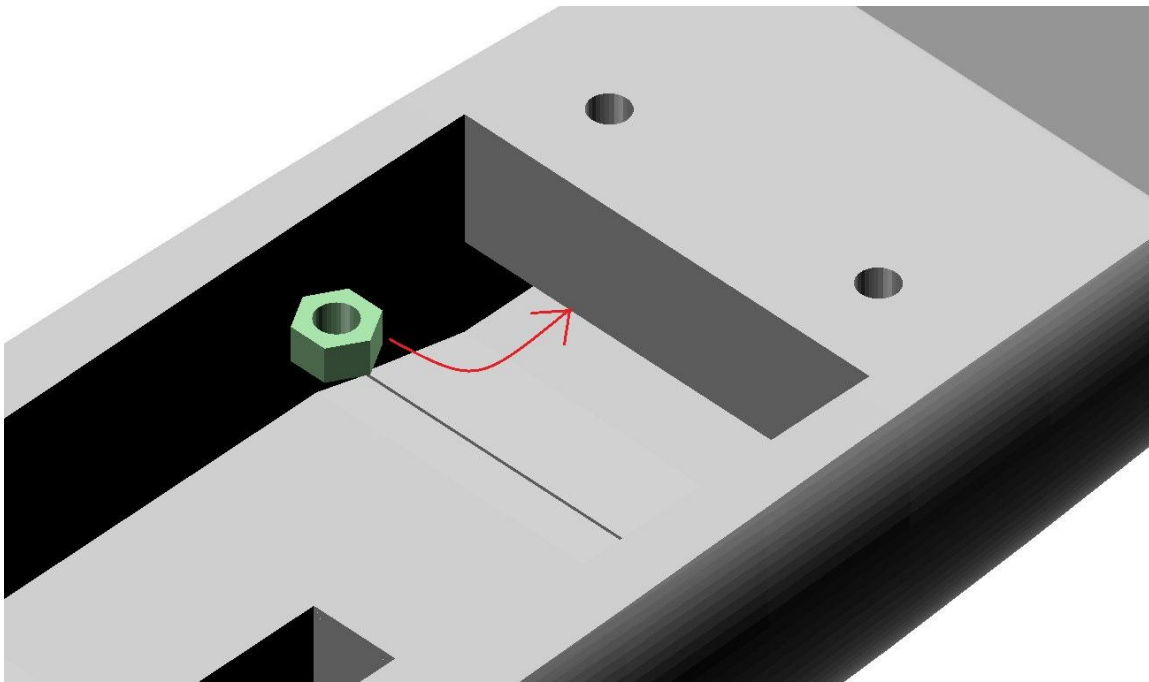
1. Fuselage assembly

Glue all the sections of the fuselage together using CA.



2. Wing attach nut installation

Using hot glue, secure the m6 nylon nuts in their dedicated slots in the underside of the wing attach points.



3. Canopy assembly

Glue the sections of the canopy together using CA

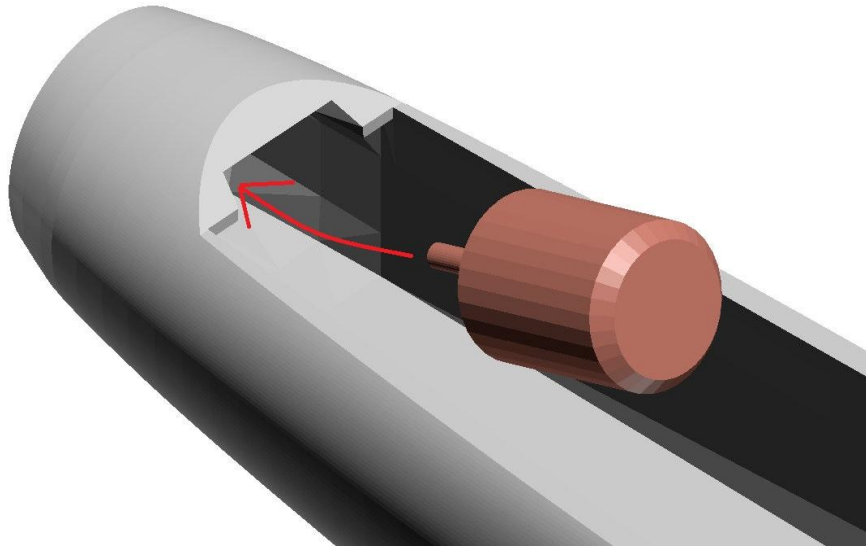
Install two magnets into the slots in the rear of the canopy.

Install two magnets into the slots in the Fuselage NOTE- make sure that the magnets being installed into the canopy are orientated correctly.

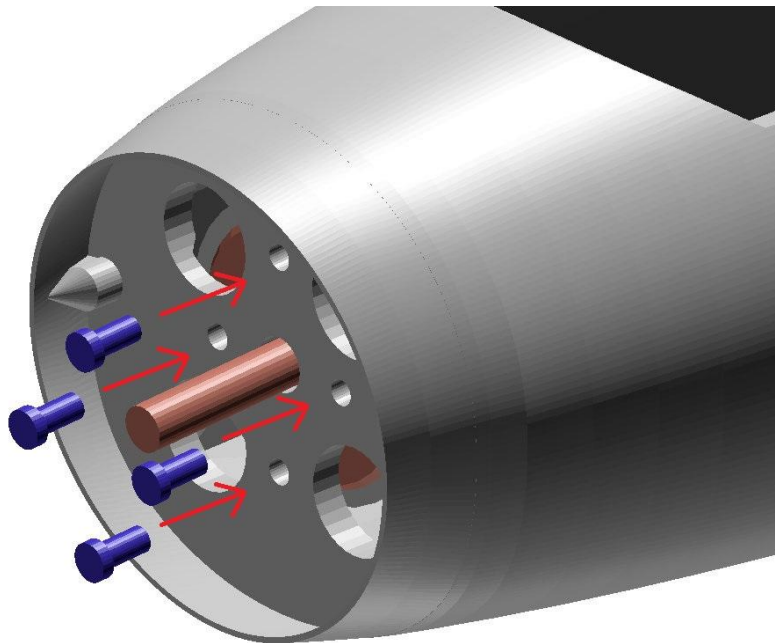
4. Motor installation

Using a 3mm drill bit, open up the holes on the fire wall for the motor screws.

Fit the motor through the battery back slot.

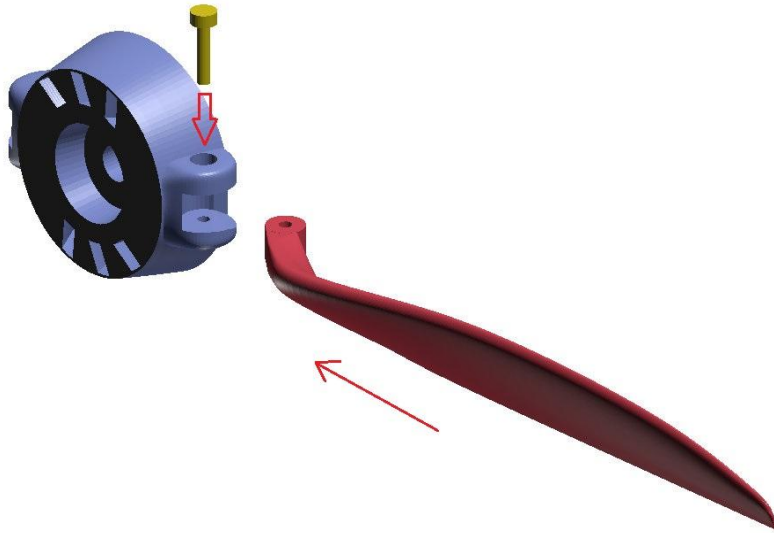


Secure the Motor in place using the m3 screws.

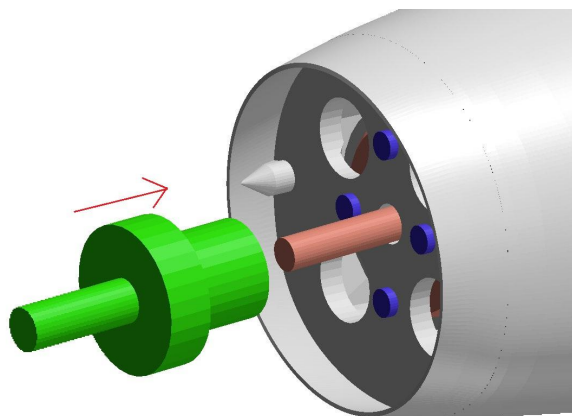


5. Propeller installation

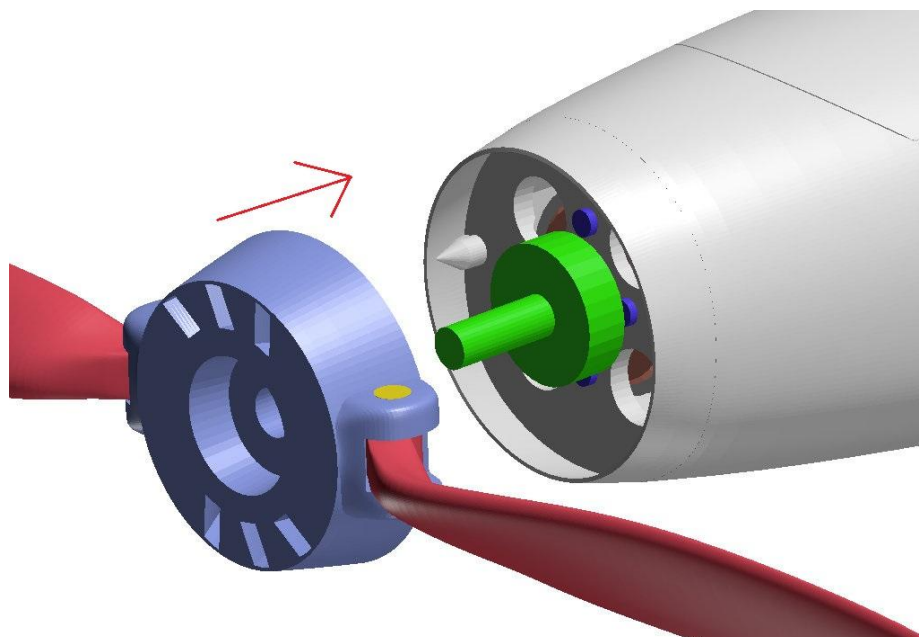
Fit the Propeller blades to the hub and secure them with m3 x 15mm (machine thread) screws. NOTE - it is advisable to drill out the propeller blade pivot hole with a 3mm drill bit to ensure the blade swings easily when required.



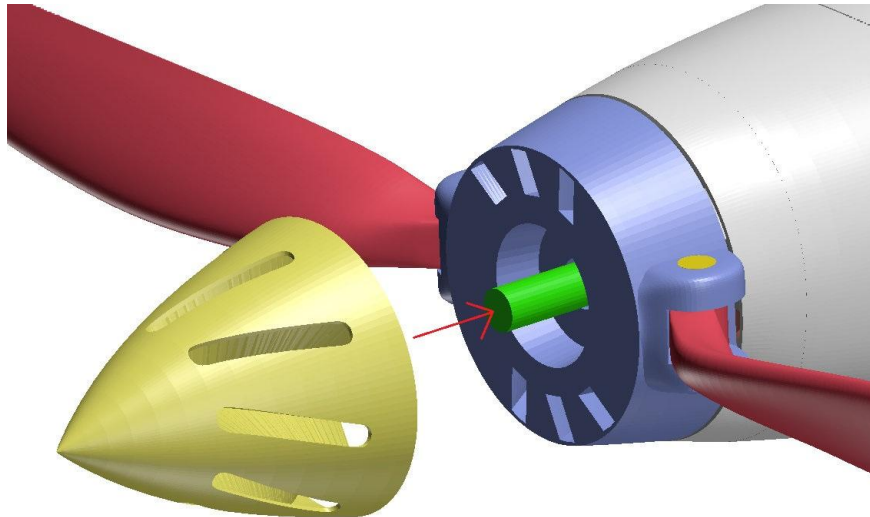
Install the Propeller adapter to the motor shaft.



Install the Propeller hub to the motor shaft ensuring that the backplate of the Propeller hub is clear of the Cowling when spinner. Secure the Propeller hub with the supplied m8 nut.

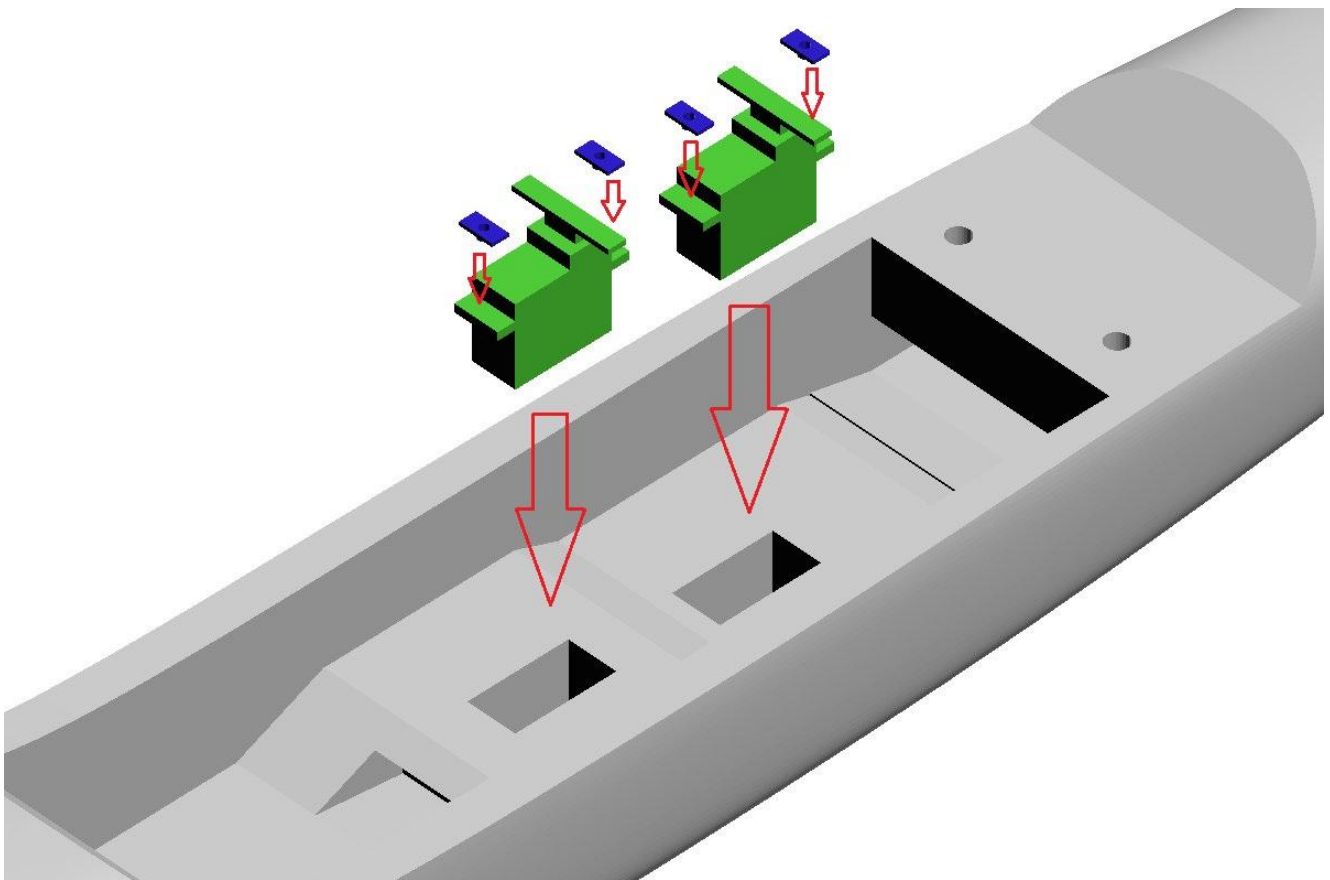


Thread the Spinner to the motor shaft and wind it on until it is “finger-tight” against the front of the Propeller hub.



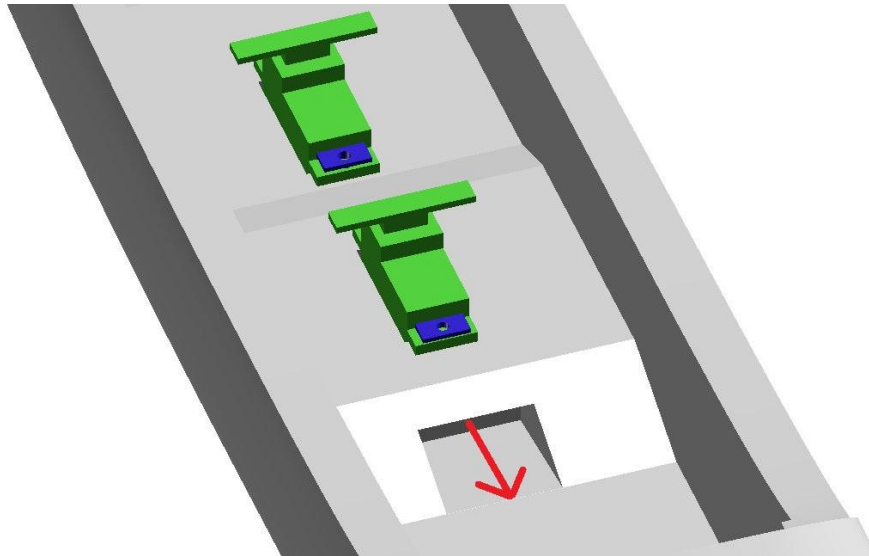
6. V-tail servo installation

Fit the servo mount adapters to the servo mount arms (if required) and mount the Servo's in their respective slots in the Fuselage.



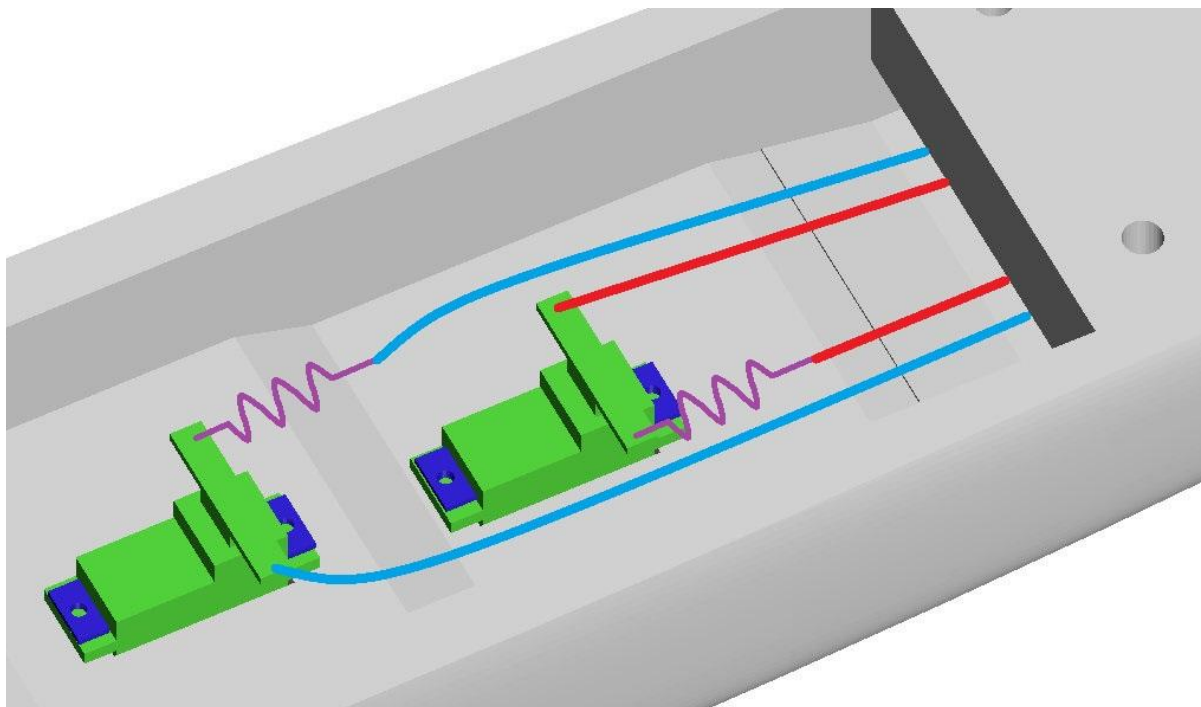
Note the locations of where the mount holes should be and drill 1mm pilot holes in the deck of the Fuselage.

Install the Servo's in place with either the included screws that came with the Servo or m2 x 10mm screws. Pull the Servo wires out through the slot forward of the Servo's in the Fuselage floor.



Cut four 1.2m lengths of Braided fishing line (**control wire**)

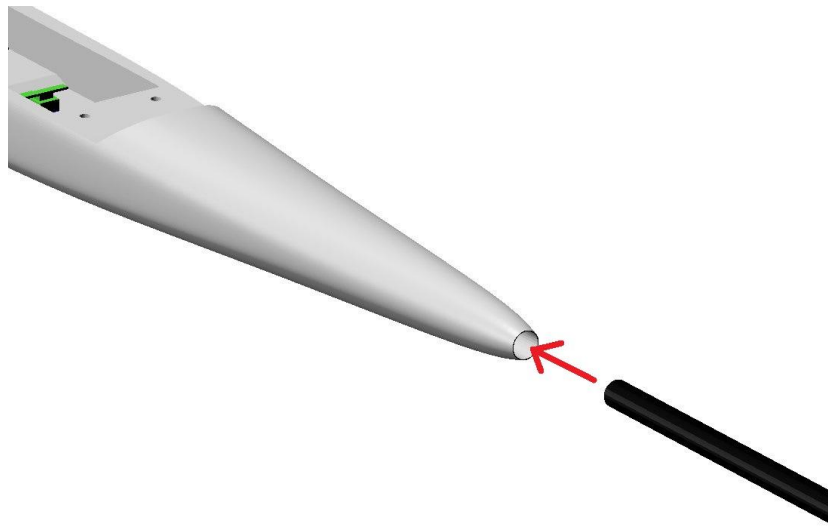
Fit a 5mm length of small extension spring to one side of each Servo arm and attach the Control wire as shown below. NOTE- it is advisable to add a drop of CA to the knot of the Control line to prevent them from coming loose.



TAIL

1. Tail assembly

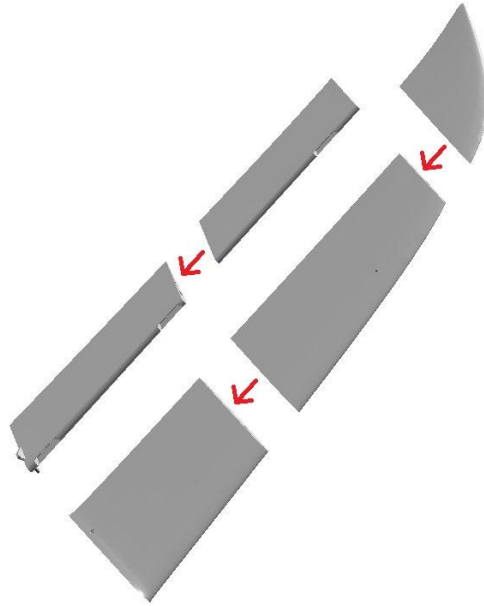
Glue the 16mm Carbon tail boom into the slot in the rear of the Fuselage.



Feed the Control lines through the Carbon Tail boom. NOTE - ensure that the Control wires are not pinched, binding or tangled.



Glue the sections of the V-tail stabilizers and Elevators together using CA.



Run a 1mm drill bit through the hole in the control arm of the Elevator to make it easier for the Control line to be installed.

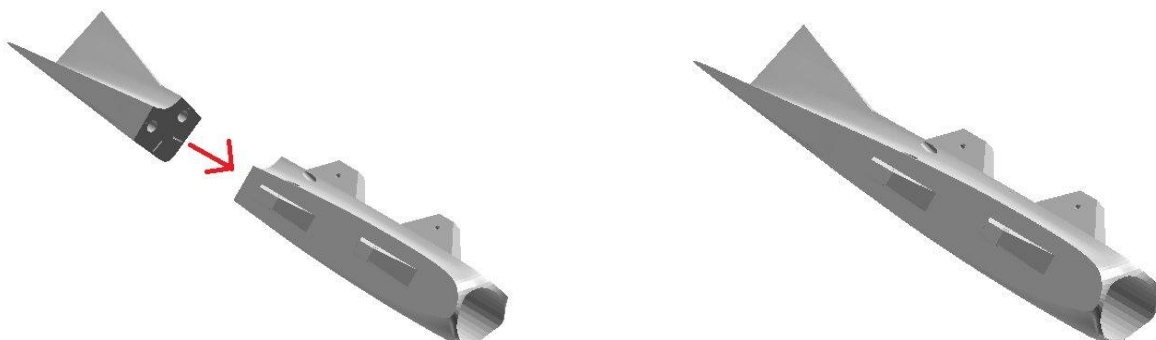
Install Nylon pinned hinges into the hinge slots **in the V-tail stabilizers** and secure with CA.

NOTE: Be sure that the CA is only inside the hinge slot. Wipe away any excess CA from the entrance otherwise the hinge will bind and render the part useless.

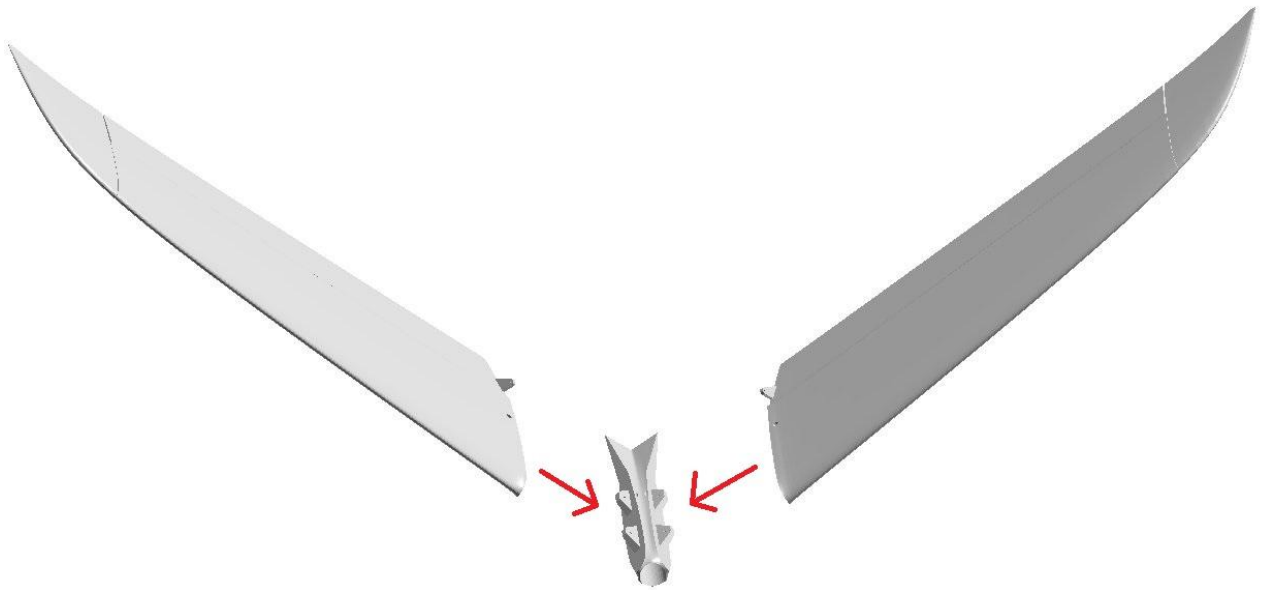
Using CA, glue the Elevators to the hinges in the V-tail stabilizers.

NOTE: Be sure that the CA is only inside the hinge slot. Wipe away any excess CA from the entrance otherwise the hinge will bind and render the part useless.

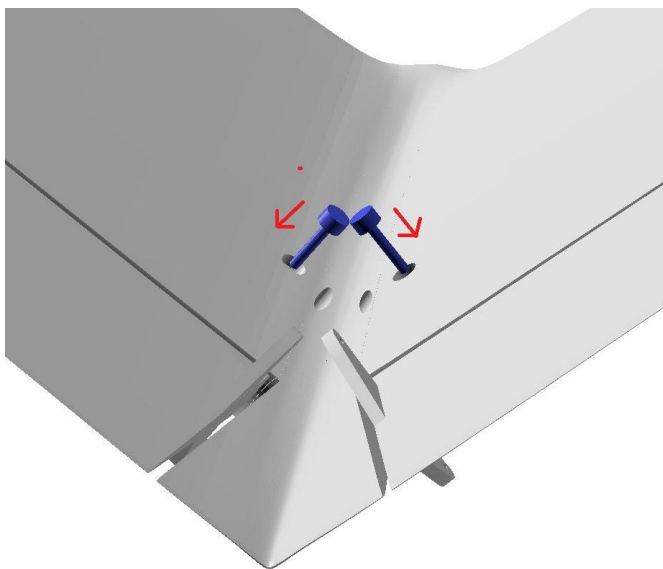
Glue the two halves of the V-tail hub together using CA.



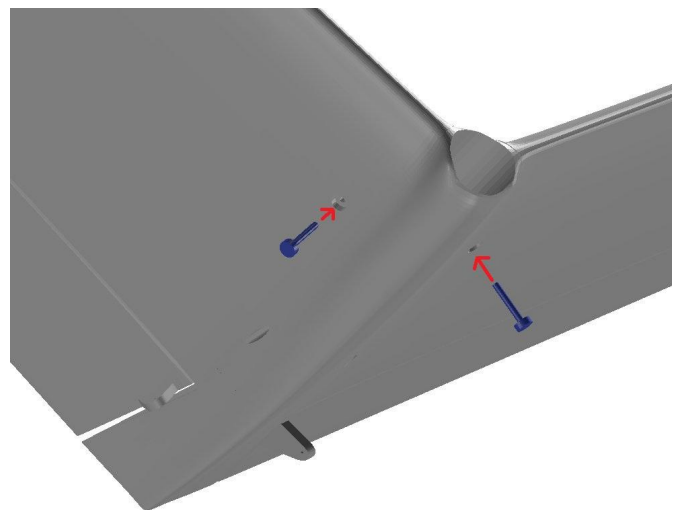
Fit the V-tail stabilizers to the V-tail hub and secure them in place using m2 x 10mm screws. NOTE - the V-tail stabilizers can be CA glued in place if you feel like they are not stiff enough on the mounts.



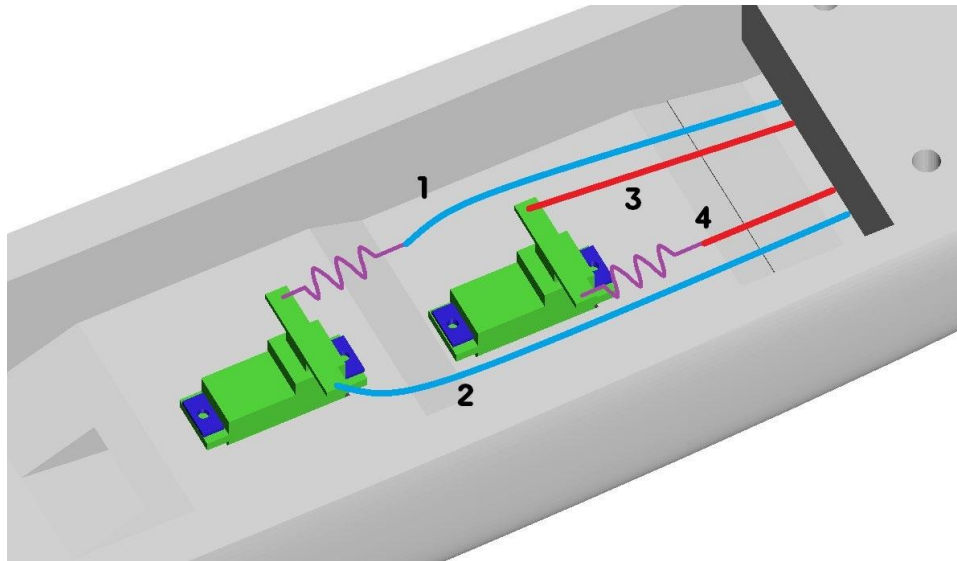
TOP SIDE



UNDERSIDE

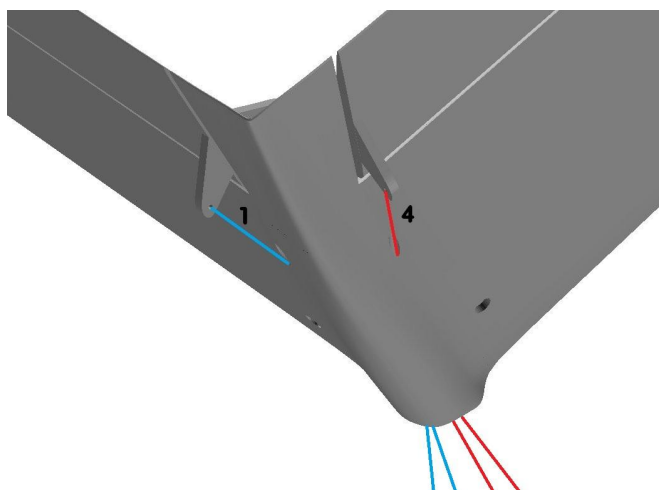
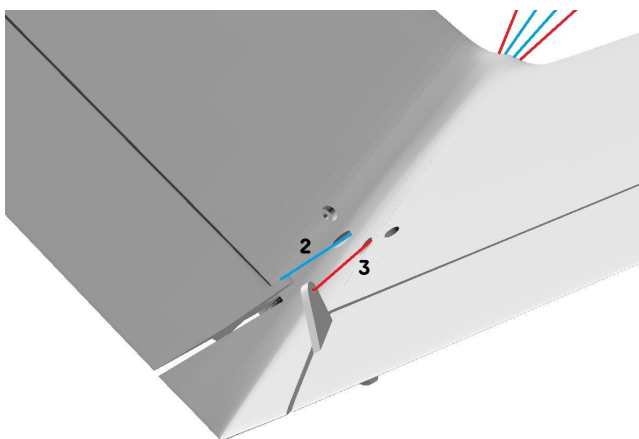


Feed the Control lines through the v-tail hub. NOTE - ensure that the Control lines are fed through the correct holes for each Elevator control horn. ***see below***

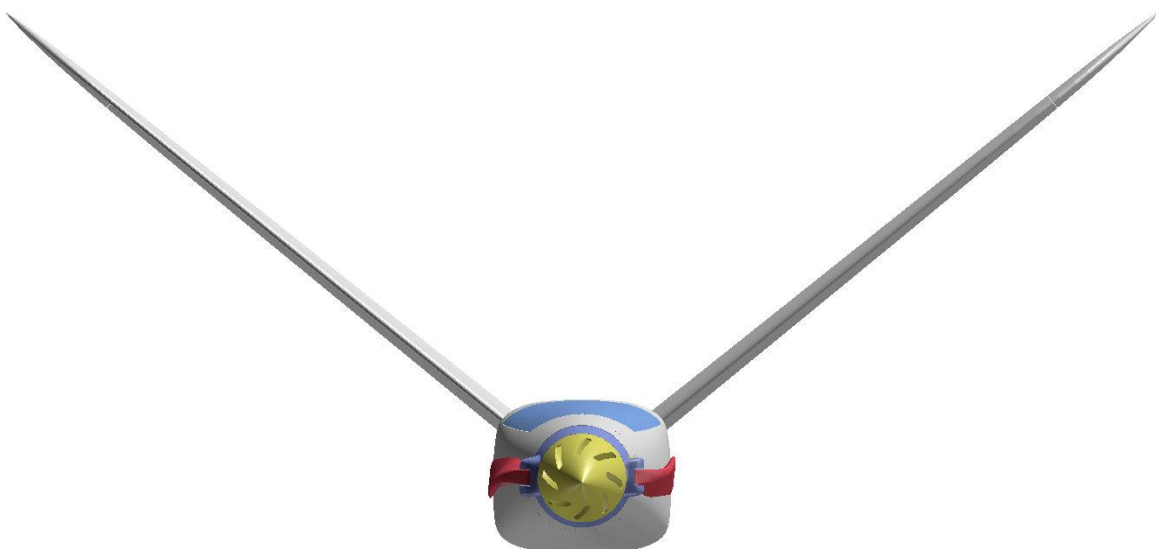


TOP SIDE

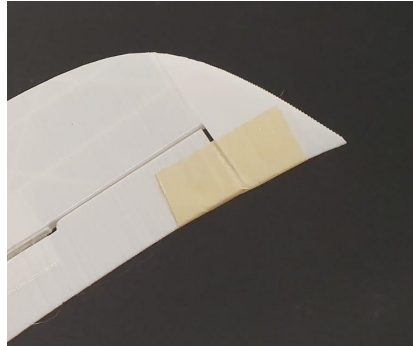
UNDERSIDE



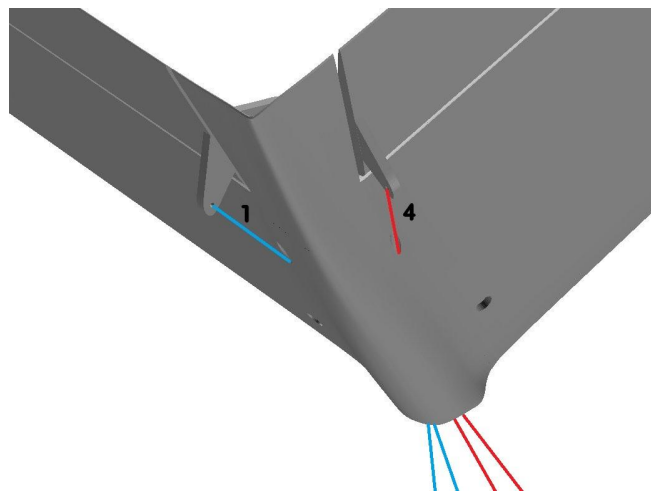
Glue the V-tail hub to the Carbon tail boom ensuring that the V-tail is level with Fuselage.



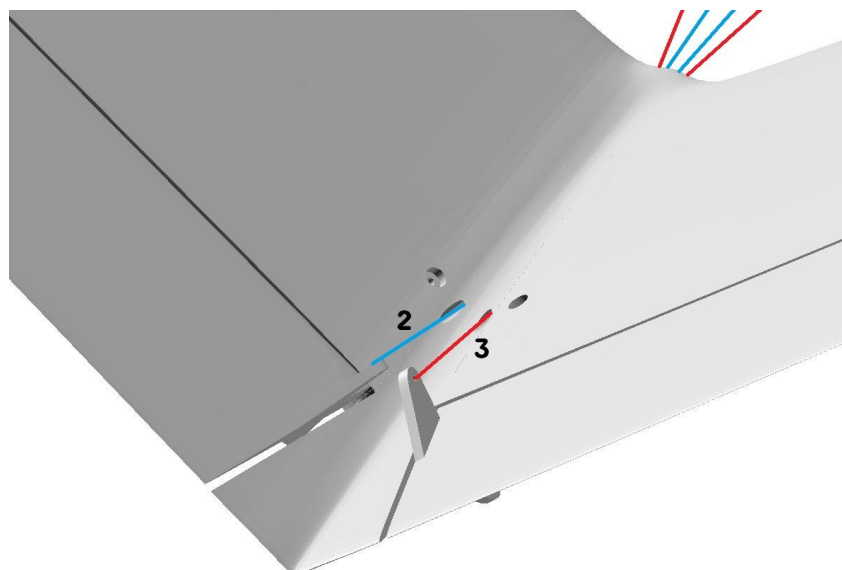
Fix the Elevators in place with tape as shown below during the process of connecting the Control lines. This will make it easier to accurately tune the neutral position of the Elevators.



Secure the Control lines for the underside (1,4) of the Elevators first and tension them so that the spring is beginning to slightly extend. NOTE- it is advisable to add a drop of CA to the knot of the Control line to prevent them from coming loose.



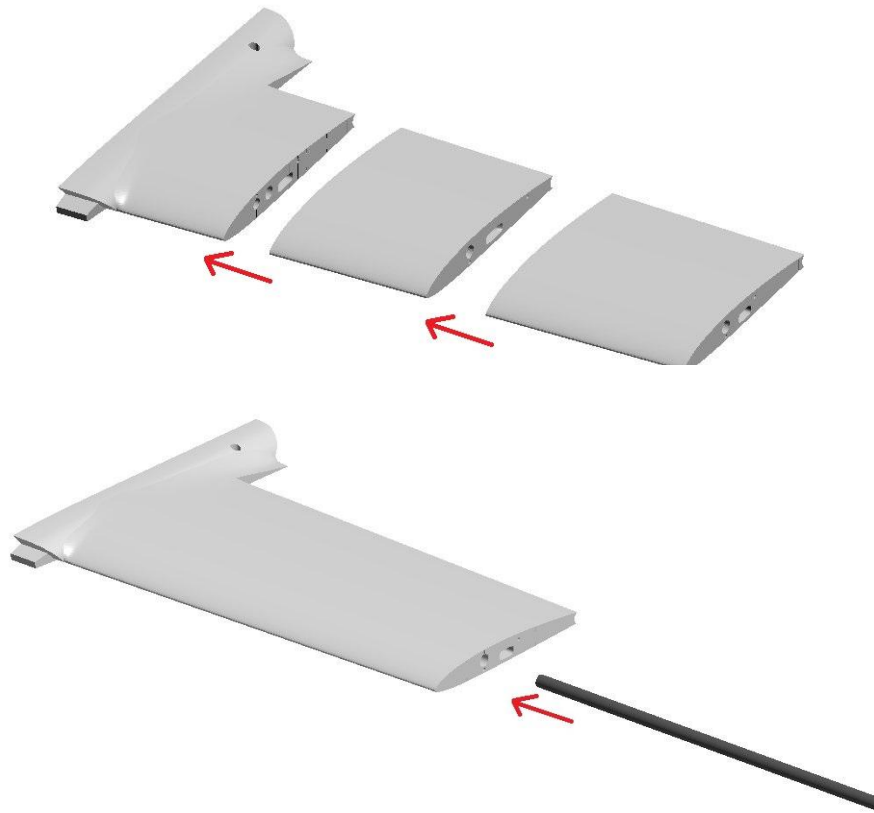
Secure the Control lines for the top side (2,3) of the Elevators. NOTE- it is advisable to add a drop of CA to the knot of the Control line to prevent them from coming loose.



WINGS

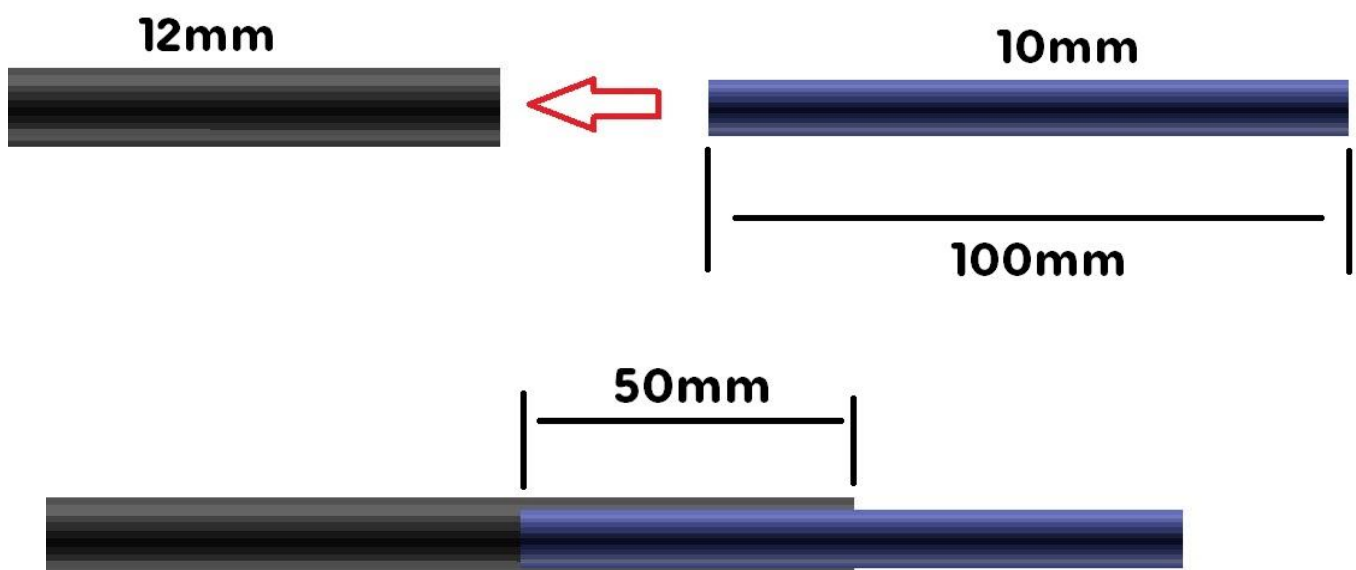
1. Wing assembly

Glue sections 1-3 of the Wings together and fit the first 12mm carbon tube into the wings.

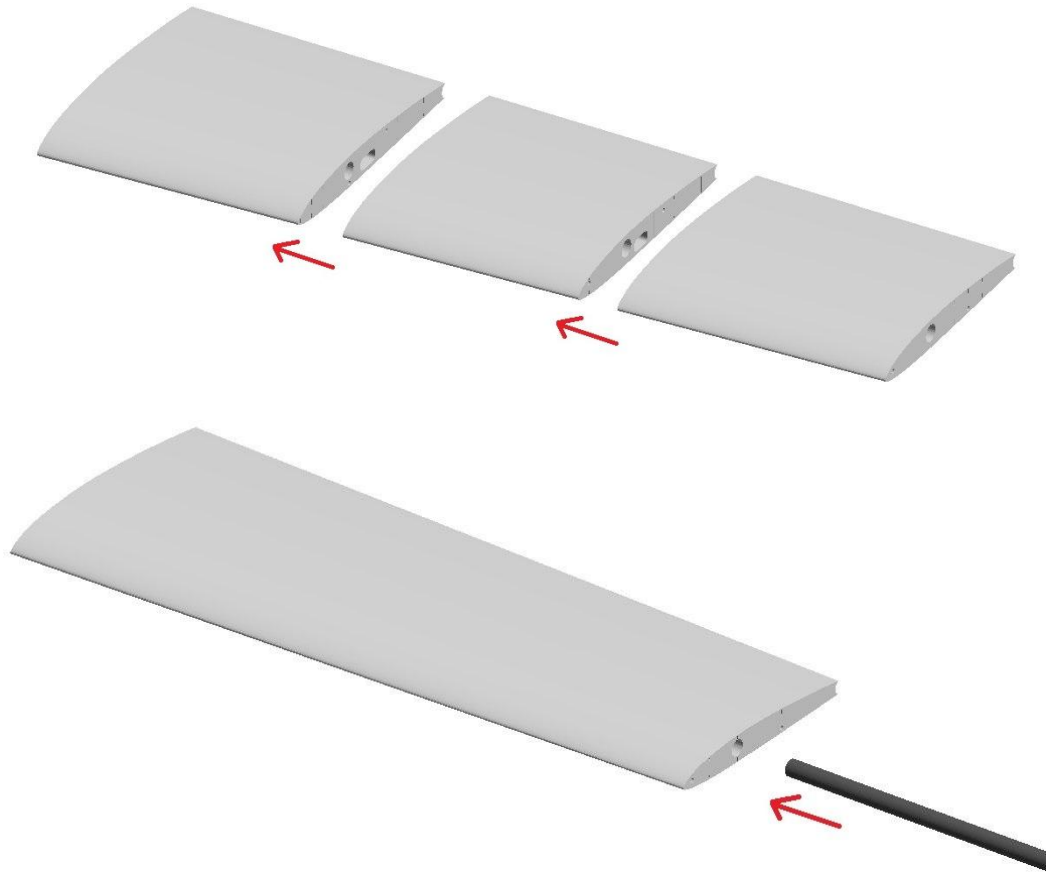


Cut a 100mm length of 10mm carbon tube and insert it 50mm into the first 12mm carbon tube. This will be a joiner for the 12mm carbon tubes.

Secure it in place with a drop of CA.

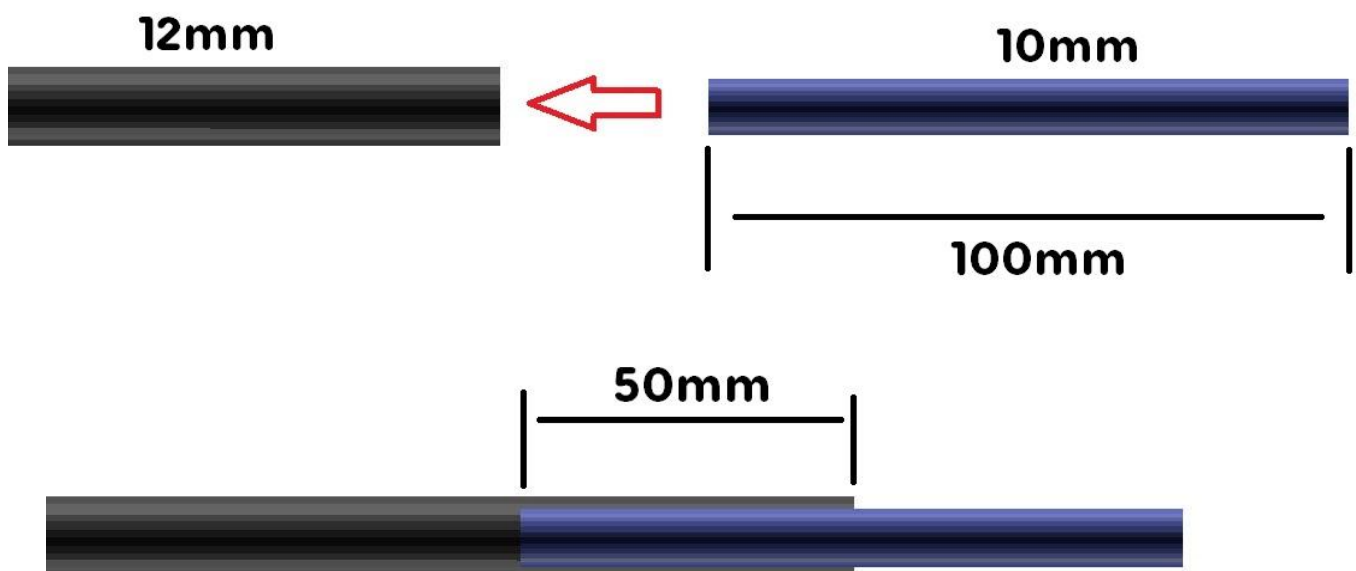


Glue sections 4-6 of the Wings together and fit the second 12mm carbon tube into the wing.

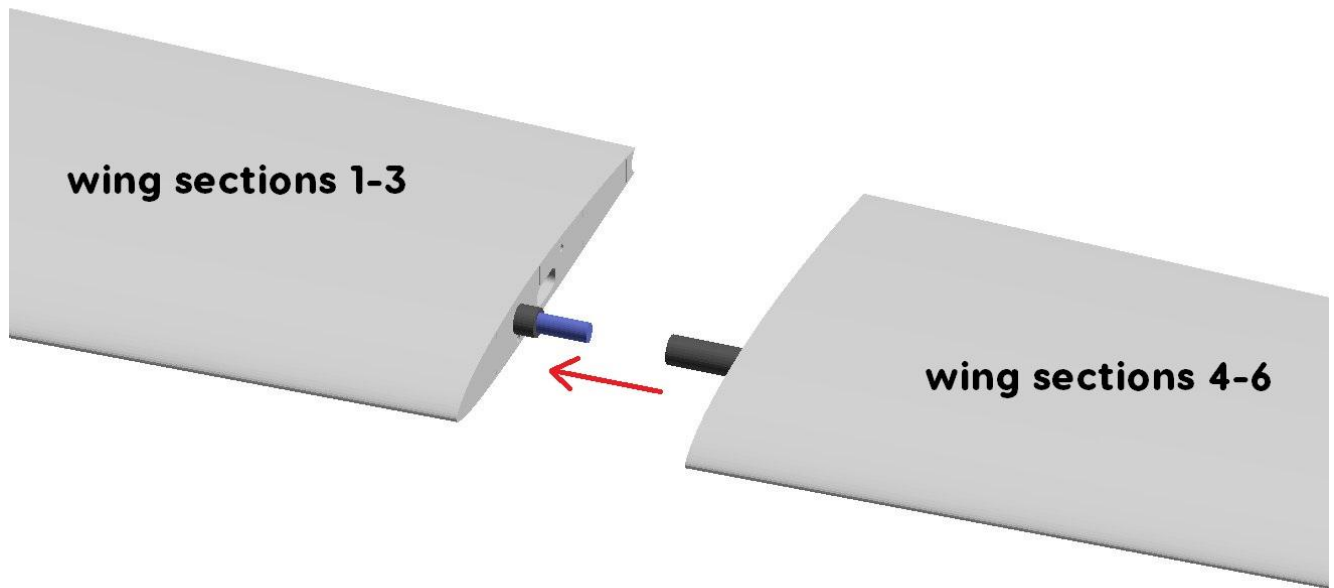


Cut a 100mm length of 10mm carbon tube and insert it 50mm into the second 12mm carbon tube.

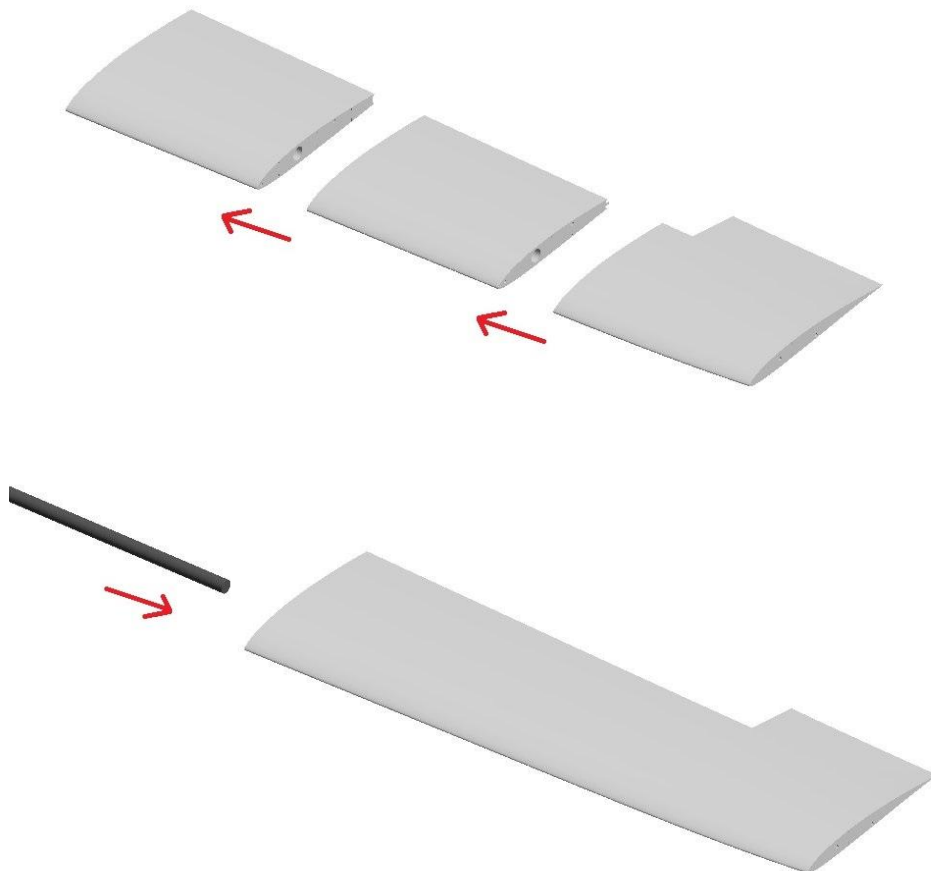
Secure it in place with a drop of CA.



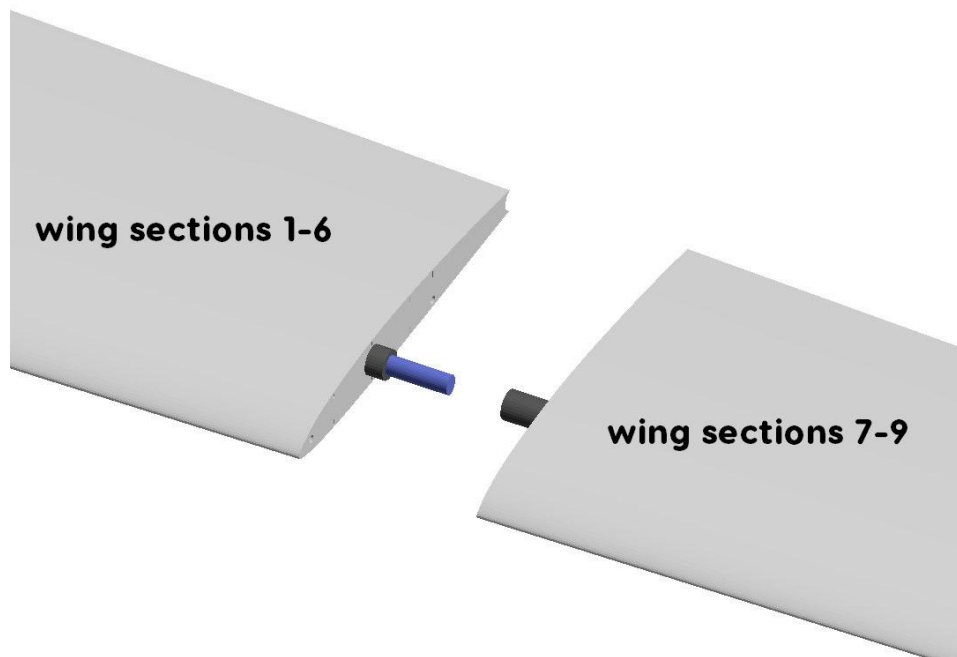
Glue the 1-3 Wing assembly to the 4-6 Wing assembly and tap the second carbon tube down over the 10mm carbon tube protruding from the first carbon tube.



Glue sections 7-9 of the Wings together and fit the third 12mm carbon tube into the wing.

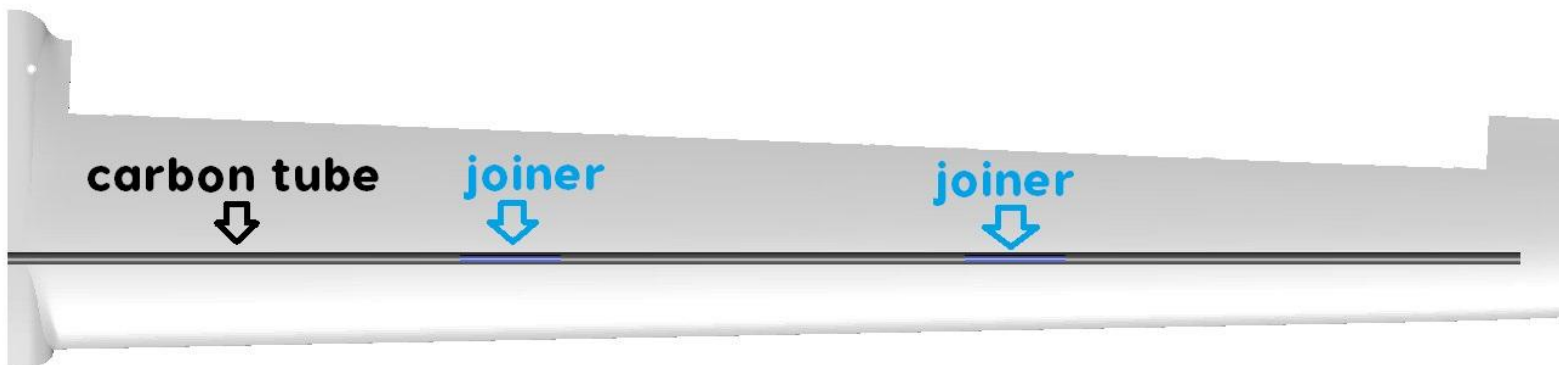


Glue the 1-6 Wing assembly to the 7-9 Wing assembly and tap the second carbon tube down over the 10mm carbon tube protruding from the first carbon tube.



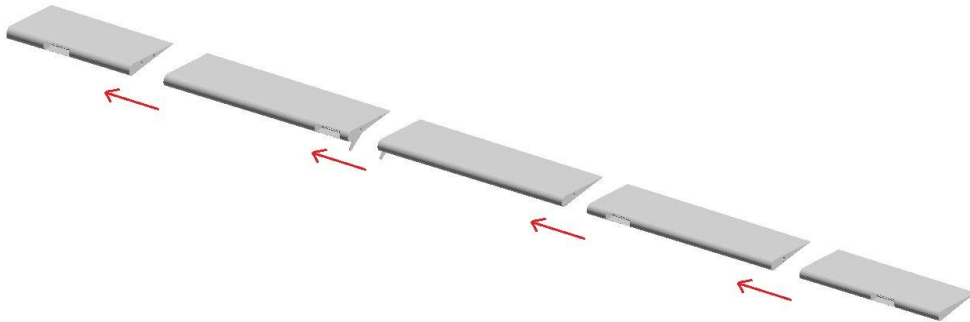
Glue the remaining sections of the Wings (10-11) together and Glue them to the Wing 1-9 assembly.

Below is an example of how the assembly should look.



2. Control surface installation

Glue the sections of the Flaps together.



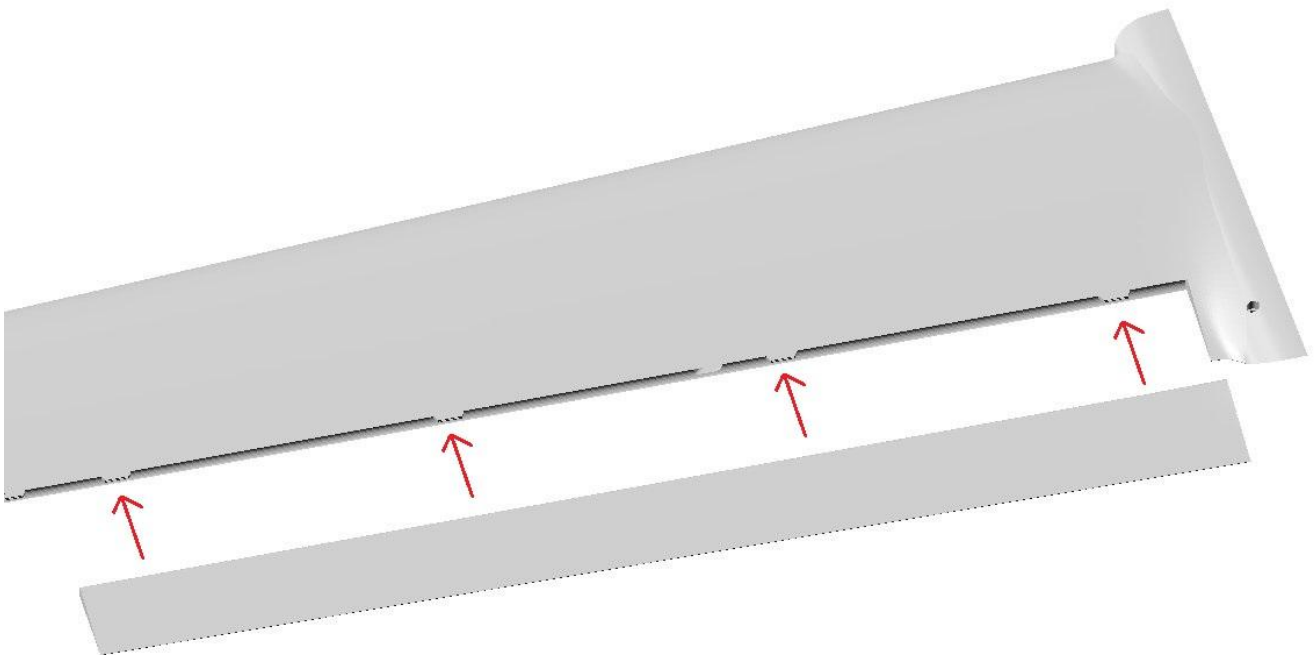
Run a 1mm drill bit through the hole in the control arm of the Elevator to make it easier for the Control line to be installed. (**standard control surface only, not required for RDS**)

Install Nylon pinned hinges into the hinge slots **in the wing** and secure with CA.

NOTE: Be sure that the CA is only inside the hinge slot. Wipe away any excess CA from the entrance otherwise the hinge will bind and render the part useless.

Using CA, glue the Flap to the hinges mounted in the Wing.

NOTE: Be sure that the CA is only inside the hinge slot. Wipe away any excess CA from the entrance otherwise the hinge will bind and render the part useless.



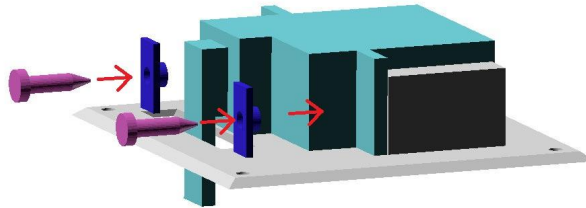
Glue the sections of the Ailerons together and repeat the process which was completed with the flaps.

Connect up the Ailerons and flaps using either 1mm or 1.5mm pushrod as desired.

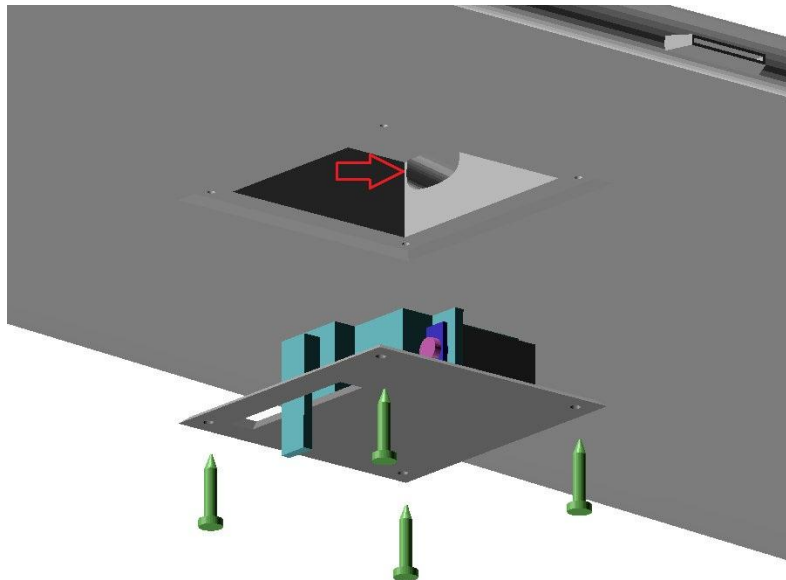
BUILD OPTION 1 > Standard control surface assembly

1. Servo installation

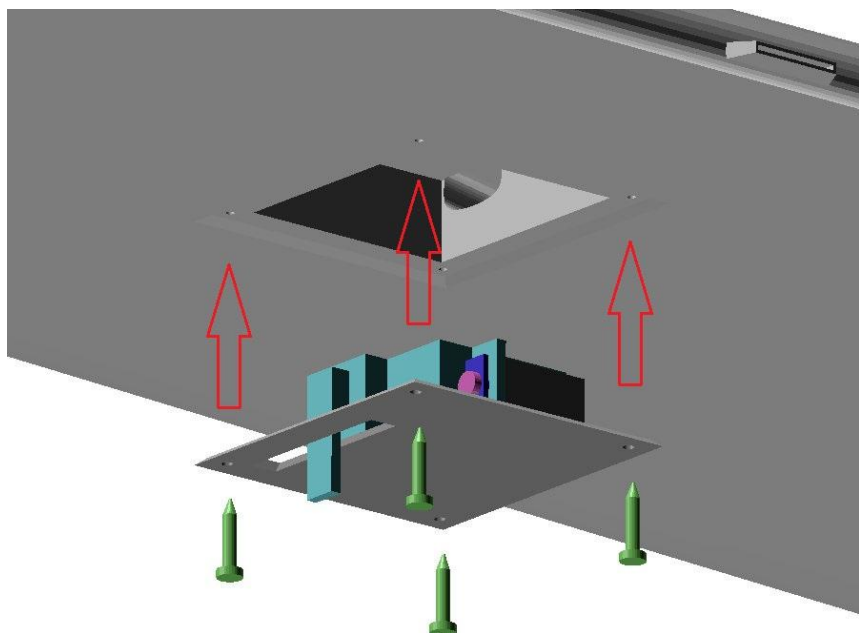
Install the Aileron and Flap (21g) servos to their respective mounting plates and secure them to the wing with m2x6mm screws. Install the 21g mount plate adapters if required.



Feed the servo wires into the wing and through the servo wire tunnel.



Screw the servo assembly into the wing with m2 x 6mm screws.



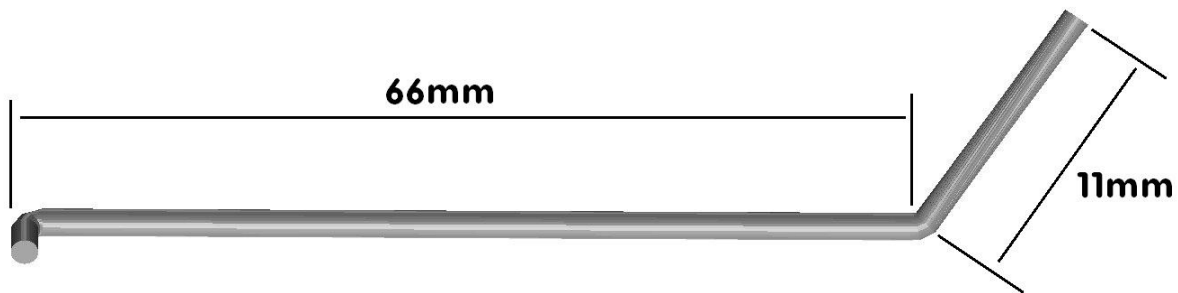
BUILD OPTION 2 > RDS (rotary drive system) control surface assembly

2. Flap control rods

Cut two 82mm lengths of 2mm push rod and bend according to the images below.

NOTE: Be sure to bend the “servo arm” end of the control rod according to the style of flap you want to use. **SHOWN IN FRONT VIEW.**

TOP VIEW



SIDE VIEW



FRONT VIEW

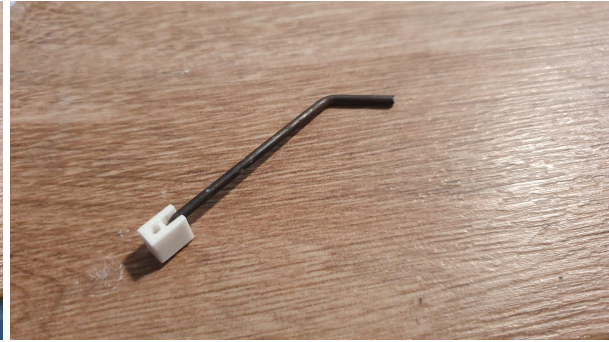
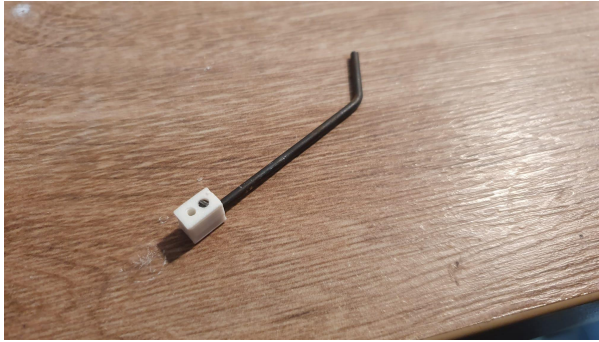
+/- 30 Degree flap option



0 > 60 Degree flap option



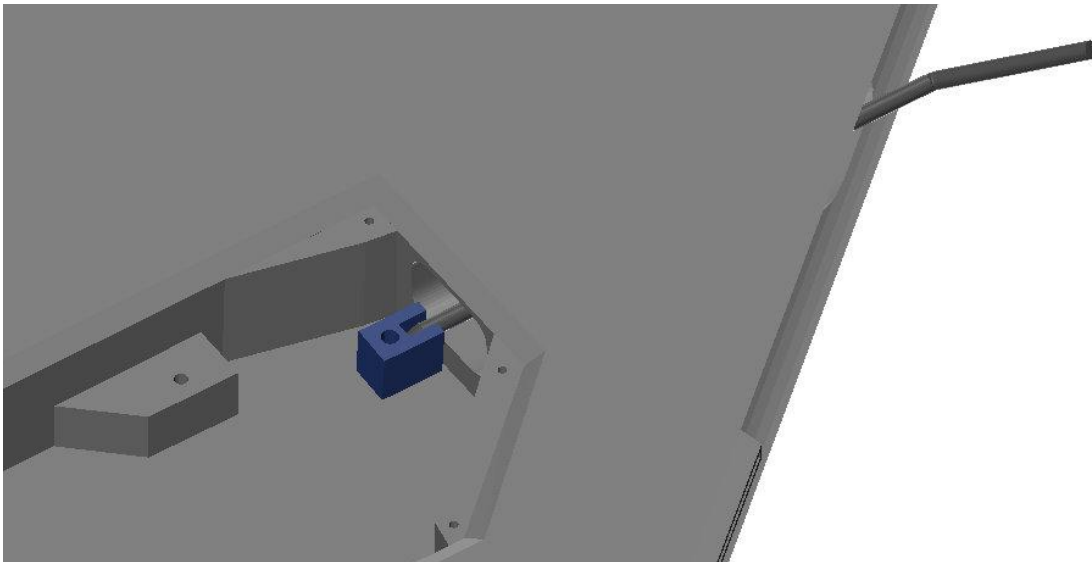
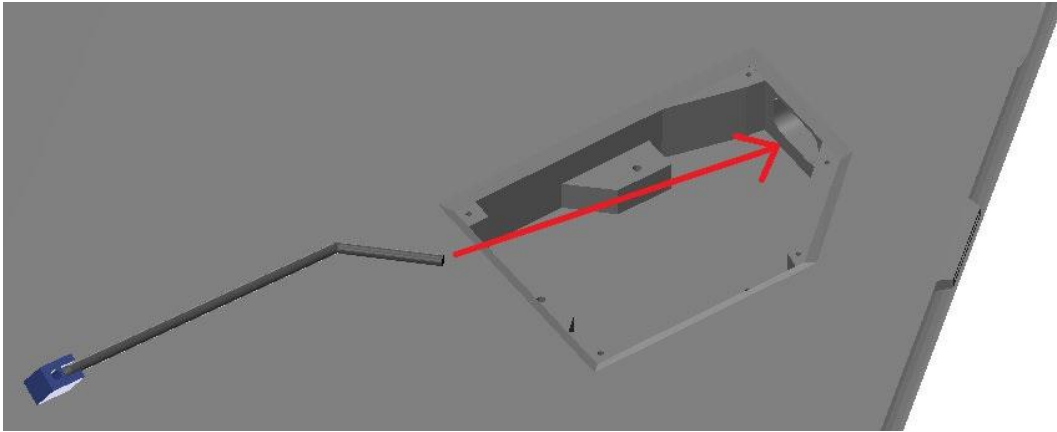
Fit the Torque connector link to the end of the push rod with the short 90 deg bend.



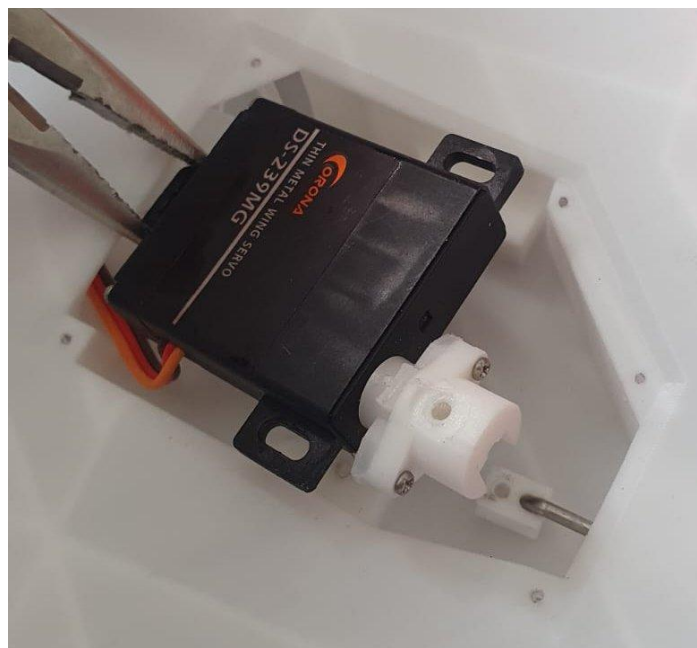
Fit the servo connector to the servo using small m1.6 or m2 screws. (be sure the connector is centered in the neutral position when the servo has power.)



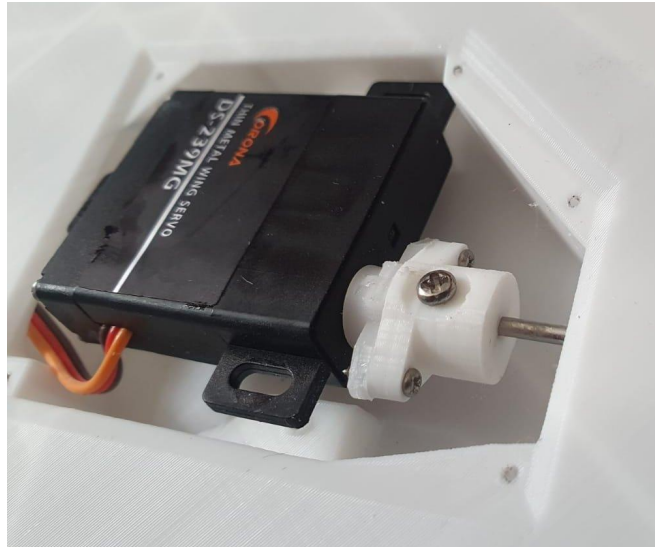
Insert the Control rod through the tunnel.



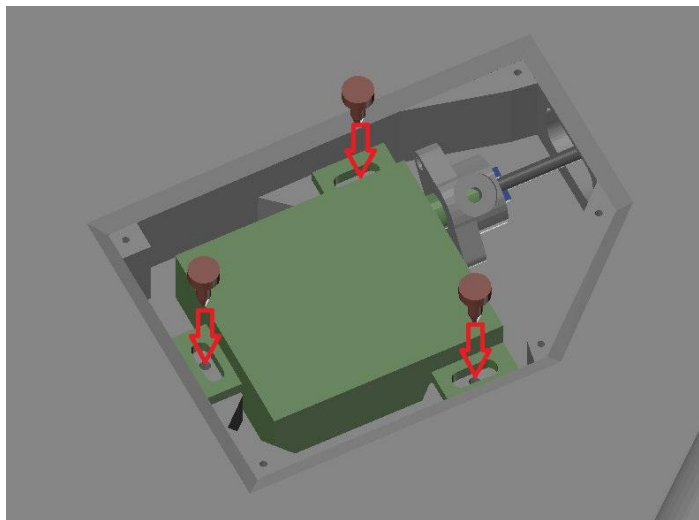
Loosely fit the servo into the wing.



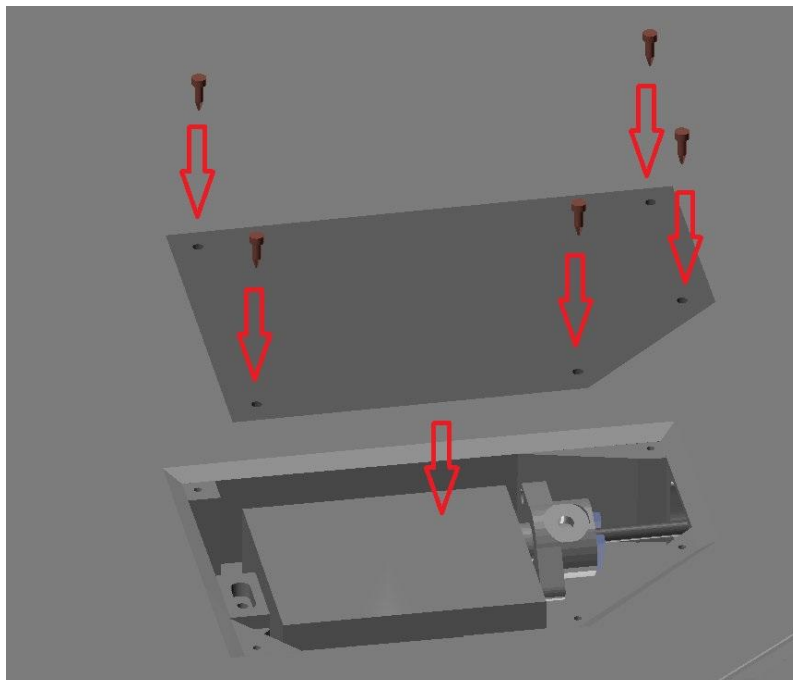
Assemble the connector and the torque link using an **m2 x 8mm** screw. NOTE - The Control rod needs to be fitted to the Connector so that the screw sandwiches the Control rod in the Connector. See image. (fitting it the other way will allow the rod to fall out of the torque link)



Secure the Servo in the slot with the screws provided.



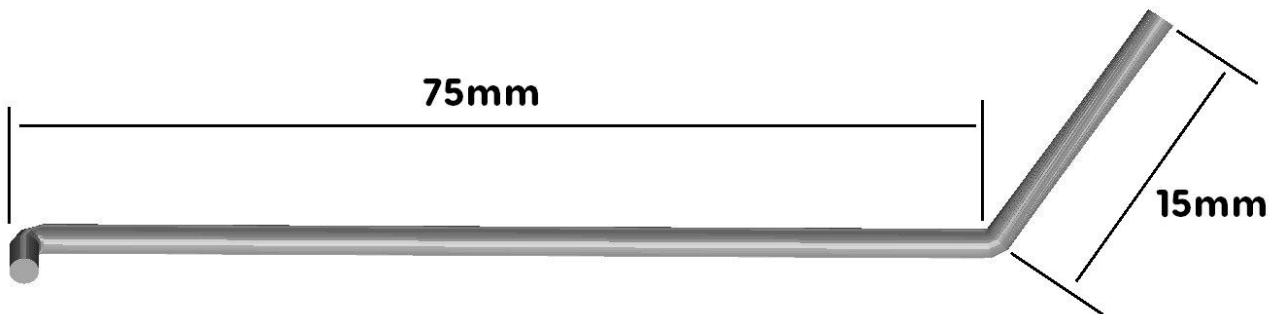
Secure the Servo covers using m1.6 screws (recommended) or m2 screws as desired.



3. Aileron control rods

Cut two 100mm lengths of 2mm push rod and bend according to the images below.

TOP VIEW



SIDE VIEW



FRONT VIEW



Repeat the steps for installing the Control rod and Servo the same as was completed with the flaps

BALANCING AND CG

Fit the battery using Velcro as required and balance the aircraft on the CG marking points located **95mm 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 +/- 10mm

Aileron +/- 15mm

Rudder +/- 10mm

Flaps Thermalling 10 degrees

Flaps Landing 30 degrees

Flaps Airbrake / Landing 60 degrees

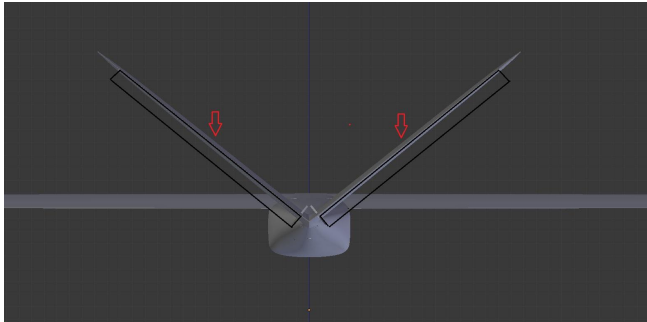
MOTOR TUNING:

The 15x10 printed Propeller was decided on so as to generate enough thrust to climb whilst being able to maintain relatively low RPM. Typically this Propeller size is too large for the 3548 motor to spin at 100% power. You will need to reduce the maximum power output to the amp draw limit on the motor (about 50 amps). Alternatively limiting the motor to 7000rpm (static RPM) is an option if you want to run a larger motor. RPM's higher than 7000 have not been tested on this Propeller hub design and could result in structural failure of the Propeller hub.

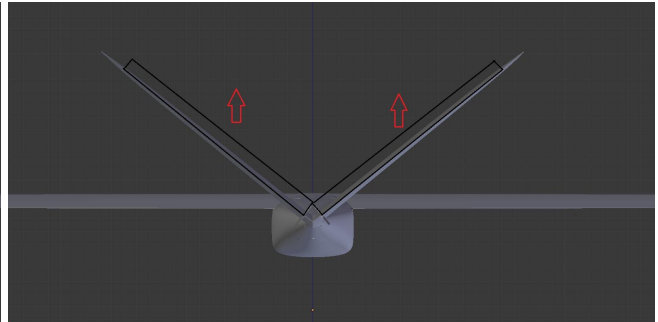
V-TAIL CONTROL DEFLECTION:

ALL IMAGES ARE VIEWED FROM THE REAR OF THE AIRCRAFT

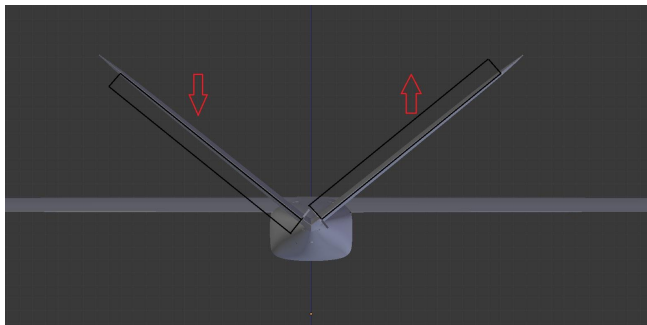
DOWN ELEVATOR



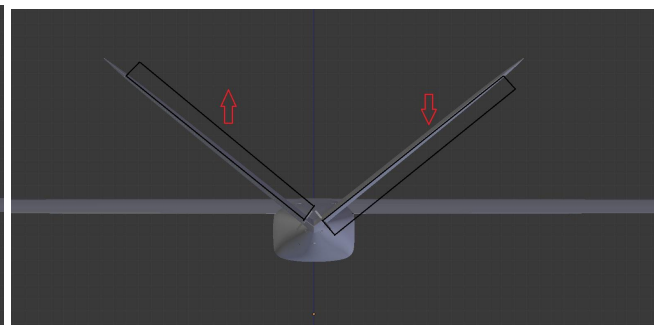
UP ELEVATOR



LEFT RUDDER

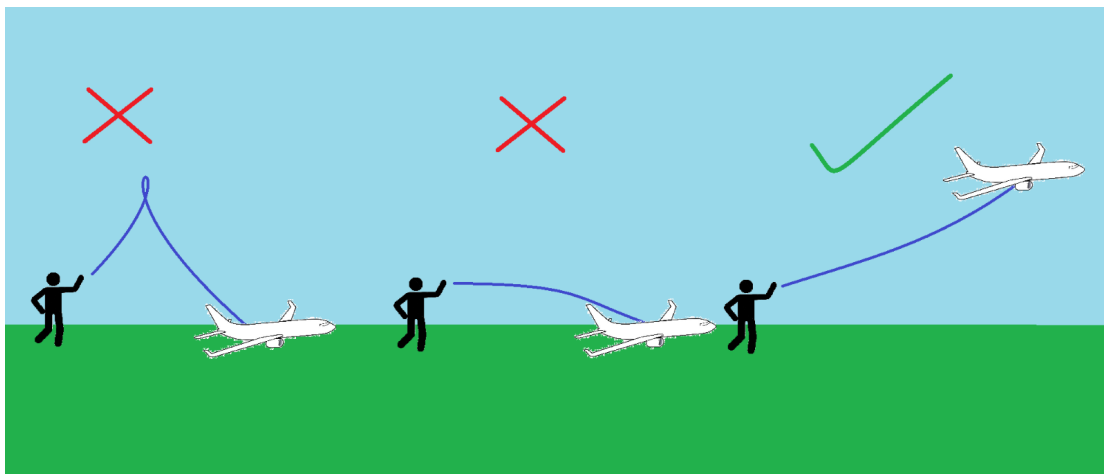


RIGHT RUDDER



LAUNCHING:

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



PARTS LINKS:

X1 3548 790KV MOTOR (or similar)

https://de.aliexpress.com/item/1005005617581055.html?spm=a2g0o.productlist.main.1.51e84caeyU32Yw&algo_pvid=cc9774fa-f3cc-4973-889b-016e21534eca&aem_p4p_detail=2023092006432010491243280299900000404878&algo_exp_id=cc9774fa-f3cc-4973-889b-016e21534eca-0&pdp_npi=4%40dis%21EUR%2137.55%2112.02%21%21%21286.00%21%21%4021038edc16952174002697310e0781%2112000033835998666%21sea%21DE%21118672630%21S&curPageLogUid=OxA5XdEzRzGM&search_p4p_id=2023092006432010491243280299900000404878_1

X1 60AMP ESC

https://de.aliexpress.com/item/1005004974106887.html?spm=a2g0o.productlist.main.13.6f84716dtVklZR&algo_pvid=2f33ccd8-93bd-470e-949a-3a4191a1af58&aem_p4p_detail=2023092006552910904187897135360000433670&algo_exp_id=2f33ccd8-93bd-470e-949a-3a4191a1af58-6&pdp_npi=4%40dis%21EUR%2113.34%2111.6%21%21%21101.59%21%21%40211b88ec16952181293265140e504b%2112000031207445278%21sea%21DE%21118672630%21S&curPageLogUid=MIkhq0aBZbD5&search_p4p_id=2023092006552910904187897135360000433670_7

X1 4000MAH 4S LIPO OR SIMILAR (400 - 450g)

https://hobbyking.com/de_de/turnigy-battery-4000mah-4s-30c-lipo-pack-xt-60.html

X4 DS239mg Slim Servo

https://de.aliexpress.com/item/4001289968428.html?spm=a2g0o.productlist.main.25.314a69b6hfTZIn&algo_pvid=98bcacad-b6d2-4124-a9f8-3397d8cf26b8&algo_exp_id=98bcacad-b6d2-4124-a9f8-3397d8cf26b8-12&pdp_npi=4%40dis%21EUR%2111.98%2111.03%21%21%2112.51%21%21%40211b88ec16952183121971595e504b%2110000015650816147%21sea%21DE%21118672630%21S&curPageLogUid=pBPHO2CkcQOp

X2 HK15148b mg Servo (21g)

https://hobbyking.com/de_de/hobbykingtm-hk15148b-mg-digital-servo-1-7kg-0-18sec-21g.html

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_

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

X6 12mm x 10mm x 500mm carbon tube

X2 10mm x 8mm x 500mm carbon tube

X1 16mm x 14mm x 500mm carbon tube

https://de.aliexpress.com/item/4000407024494.html?spm=a2g0o.productlist.main.9.3bac68f7NQwE55&algo_pvid=e14d5c77-825a-4af4-9a1b-6438151d2e40&aem_p4p_detail=202304110653027532058566074200021097557&algo_exp_id=e14d5c77-825a-4af4-9a1b-6438151d2e40-4&pdp_npi=3%40dis%21EUR%215.49%215.49%21%21%21%21%21%21%4021227f0f16812211825723462d087a%2110000001678731776%21sea%21DE%21118672630&curPageLogUid=2NOrvN0R2jlr&ad_pvid=202304110653027532058566074200021097557_1&ad_pvi d=202304110653027532058566074200021097557_1

X2 M3 x 16mm hex bolt

https://de.aliexpress.com/item/32810872544.html?spm=a2g0o.productlist.main.2.267d1da6QLEHE7&algo_pvid=5221b211-89da-48dc-a3cb-ffd1c1c51b5d&aem_p4p_detail=2023092007034215068383794558700000453377&algo_exp_id=5221b211-89da-48dc-a3cb-ffd1c1c51b5d-1&curPageLogUid=o0SWAtyua2Ja&search_p4p_id=2023092007034215068383794558700000453377_2

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&frce ctupt=true>

1mm Piano wire

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

M2 pushrod (min length 110mm) < FOR RDS ONLY

<https://de.aliexpress.com/item/4000682811650.html?spm=a2g0s.9042311.0.0.27424c4dJCDkps>

M1.6 x 6mm screws (optional)

https://de.aliexpress.com/item/1005003966275108.html?spm=a2g0o.productlist.main.3.31376e84hJRFtO&algo_pvid=2c7e8f78-230d-4df0-a349-37f99513ba16&aem_p4p_detail=20230920070204277976701729110000449228&algo_exp_id=2c7e8f78-230d-4df0-a349-37f99513ba16-1&pdp_npi=4%40dis%21EUR%212.52%211.59%21%21%212.63%21%21%40211b88ec16952185239726359e504b%2112000027589939786%21sea%21DE%21118672630%21S&curPageLogUid=k8TShSANrKJ8&search_p4p_id=20230920070204277976701729110000449228_2

1mm piano wire (Standard wing only)

https://de.aliexpress.com/item/1005005870073038.html?spm=a2g0o.detail.0.0.1e0cfrjYfrjYFR&gps-id=pcDetailTopMoreOtherSeller&scm=1007.40000.327270.0&scm_id=1007.40000.327270.0&scm-url=1007.40000.327270.0&pvid=4c7397fd-a9ea-4b8a-8f50-00a798eff607&t=gps-id:pcDetailTopMoreOtherSeller.scm-url:1007.40000.327270.0.pvid:4c7397fd-a9ea-4b8a-8f50-00a798eff607.tpp_buckets:668%232846%238111%231996&pdp_npi=4%40dis%21EUR%213.53%213.53%21%21%2126.91%21%21%40211b5e2316952189910638478e1384%2112000034644044289%21rec%21DE%21118672630%21S

M2 push rod (100mm min length) (RDS wing only)

<https://de.aliexpress.com/item/32968322924.html?gatewayAdapt=glo2deu>.

Braided fishing line 20LBS (or similar)

https://de.aliexpress.com/item/1005005907222394.html?spm=a2g0o.productlist.main.3.37902806JFAK0W&algo_pvid=13b360bf-d76c-4c17-b72d-9df69ce005c5&algo_exp_id=13b360bf-d76c-4c17-b72d-9df69ce005c5-1&pdp_npi=4%40dis%21EUR%212.56%211.25%21%21%2119.46%21%21%40211b88ec16952192612798552e504b%2112000034797462939%21sea%21DE%21118672630%21S&curPageLogUid=oH1Tb9Kr3DZO

X2 m6 x 60mm nylon bolts and nuts

https://de.aliexpress.com/item/1005003552668675.html?spm=a2g0o.productlist.main.33.505573470pvtwB&algo_pvid=ff8d2a88-e615-4f36-9dc7-8241276ee557&algo_exp_id=ff8d2a88-e615-4f36-9dc7-8241276ee557-16&pdp_ext_f=%7B%22sku_id%22%3A%2212000026259386907%22%7D&pdp_npi=2%40dis%21EUR%2111.66%216.18%21%21%21%21%21%40211bf12316673936387387553d0732%2112000026259386907%21sea&curPageLogUid=pNbb66m68qTS

15x10 carbon Propeller blades

<https://de.aliexpress.com/item/4000506829550.html?gatewayAdapt=glo2deu>

X2 0.3mm x 5mm extension spring

https://de.aliexpress.com/item/1005003309028296.html?spm=a2g0o.productlist.main.3.6af07ab2ORiu0w&algo_pvid=c8033fd5-aa06-4a65-83b9-f9656b63deae&aem_p4p_detail=202309200715535421157122178310000479381&algo_exp_id=c8033fd5-aa06-4a65-83b9-f9656b63deae-1&pdp_npi=4%40dis%21EUR%213.97%213.13%21%21%214.14%21%21%40211b88ec16952193533251457e504b%2112000025132460102%21sea%21DE%21118672630%21S&curPageLogUid=GmEWLS60EwLC&search_p4p_id=202309200715535421157122178310000479381_2

VELCRO

(local craft or hardware store)3

3mm BAMBOO FOOD SKEWERS

(local craft store)

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

Aeroworks3d@outlook.com

