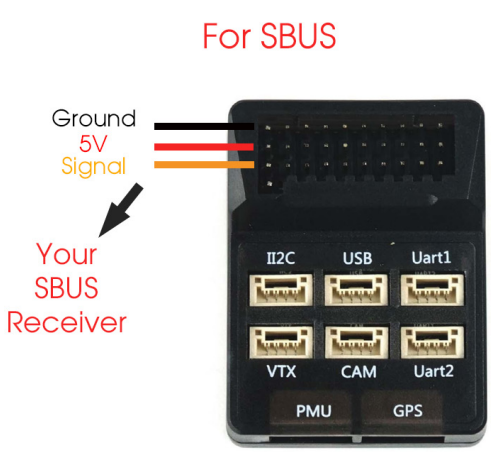
T1 Ranger VTOL – PNP Instruction Manual

Package Content

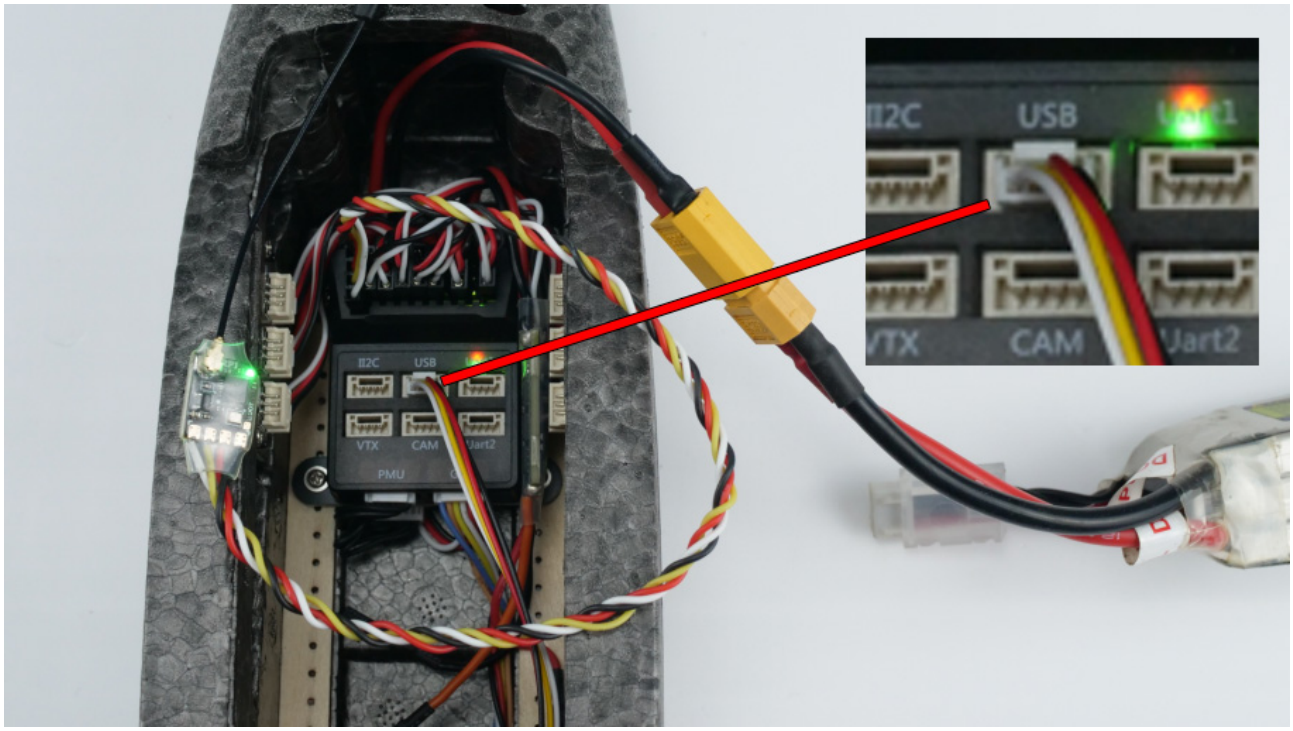
Remove the content out of the box including the provided USB wires for the Flight Controller. Also, prepare your radio, receiver and battery.

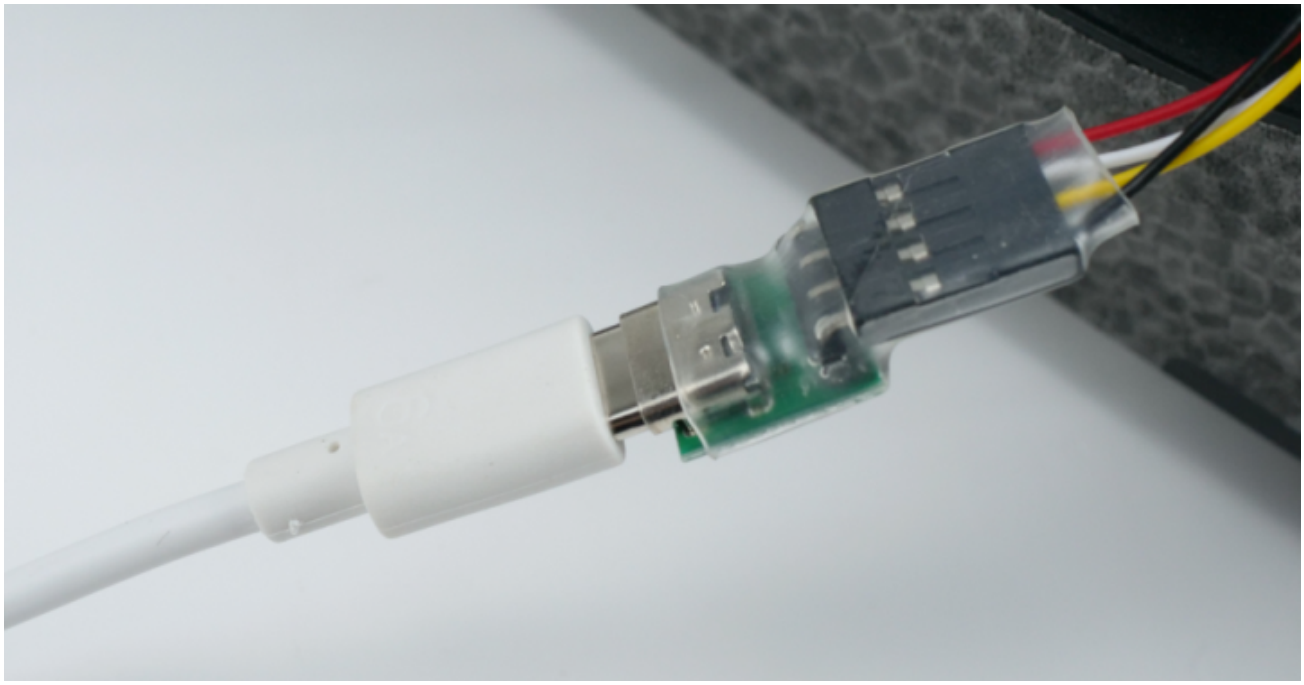
Connect your preferred receiver to the RC-In port of the FX-405 Flight Controller.
*Note the Ground, 5V & Signal line.



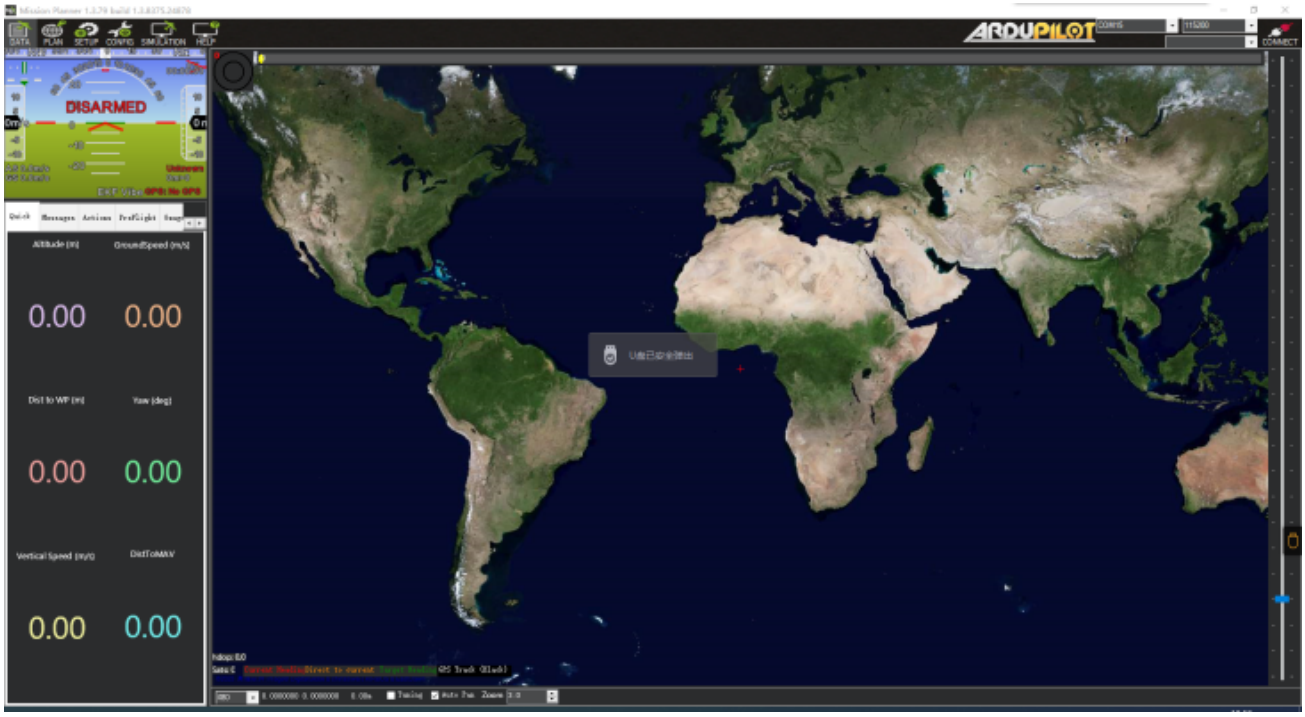
Turn on your radio and hook up battery to your T1 Ranger.

Then connect the USB cable provided to the flight controller’s USB port and the other end to your PC.

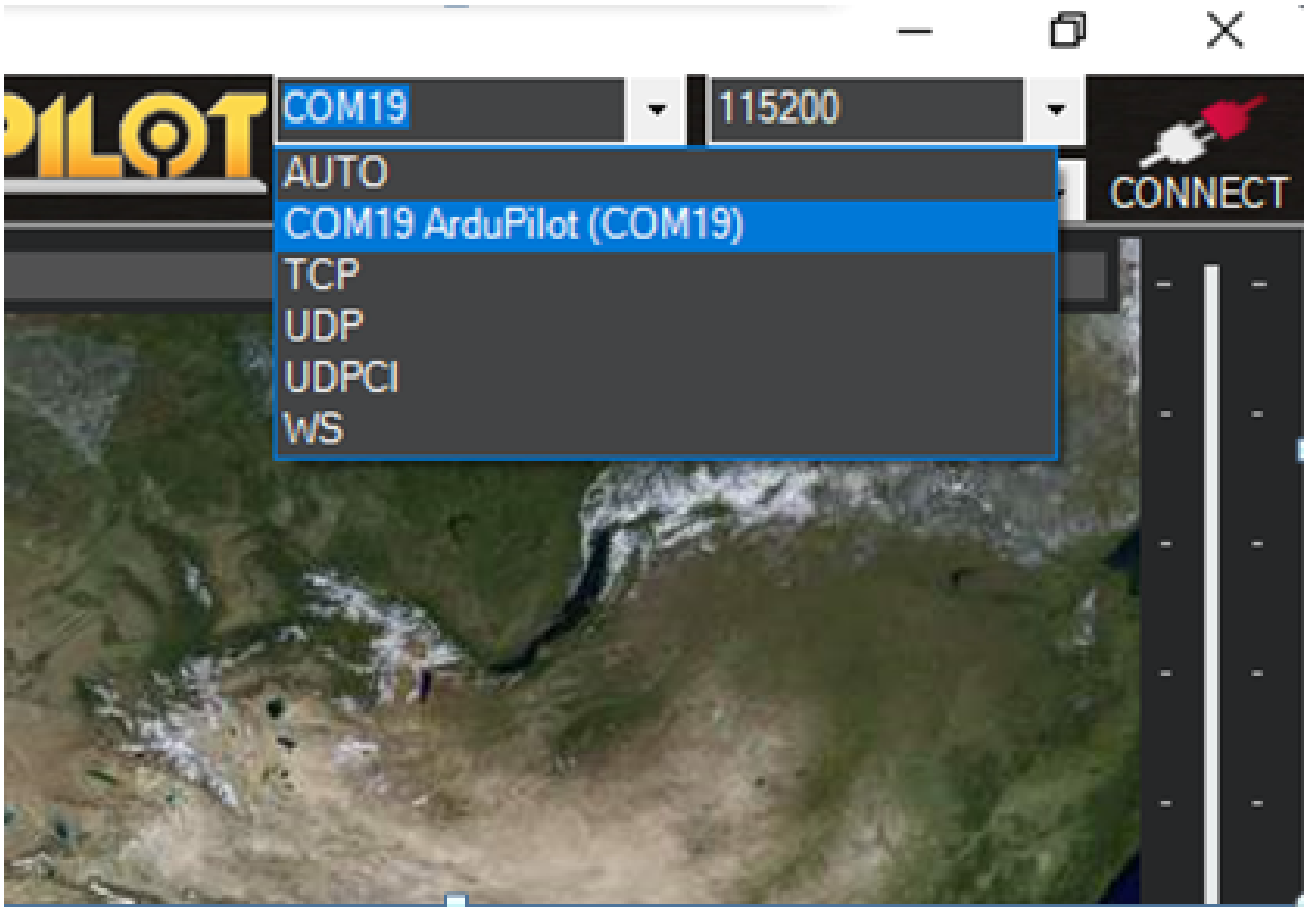




Open the Mission Planner software on your pc. If you do not have one yet, visit our website for the download link here > https://www.heewing.com/pages/fx-405-vtol-flight-controller

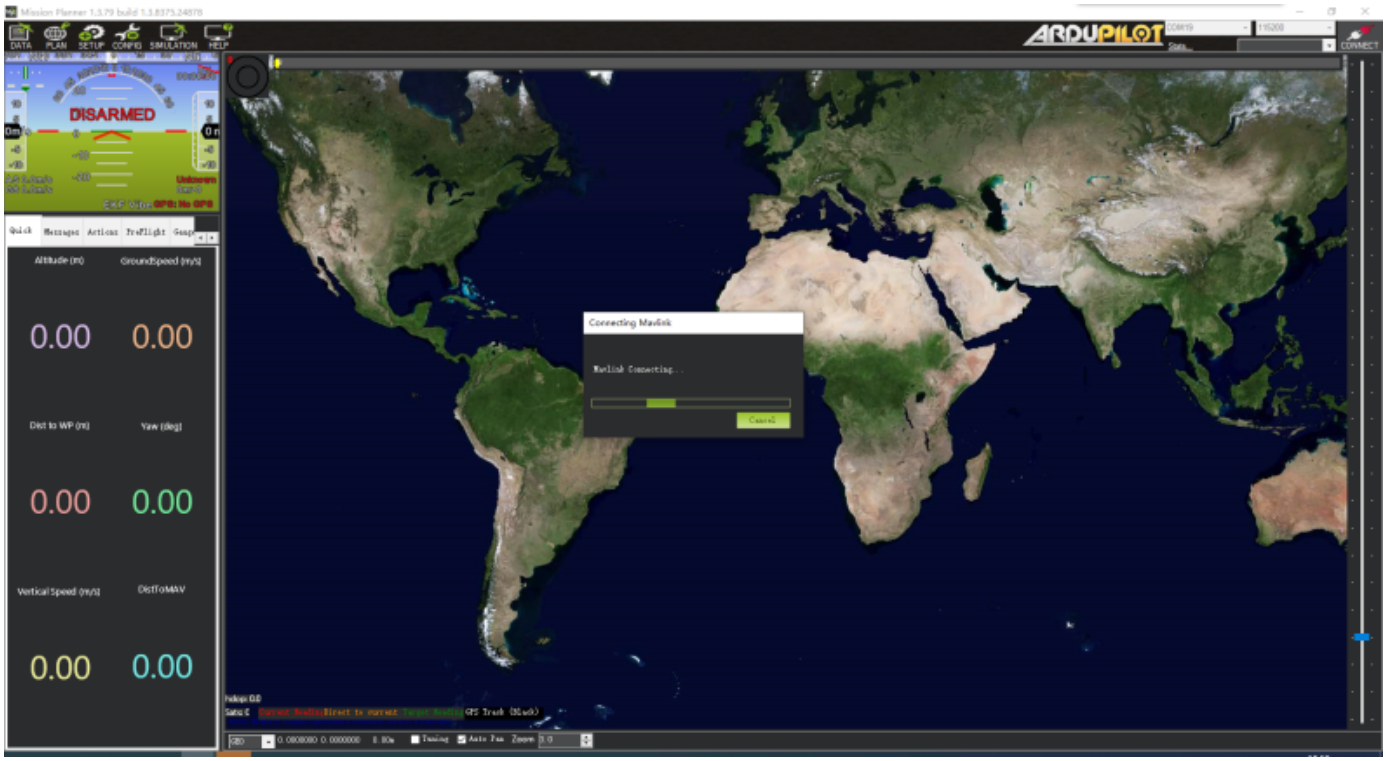


On the top right of the window, select the correct COM port. *every PC has different COM number, it will be different COM number on your PC.



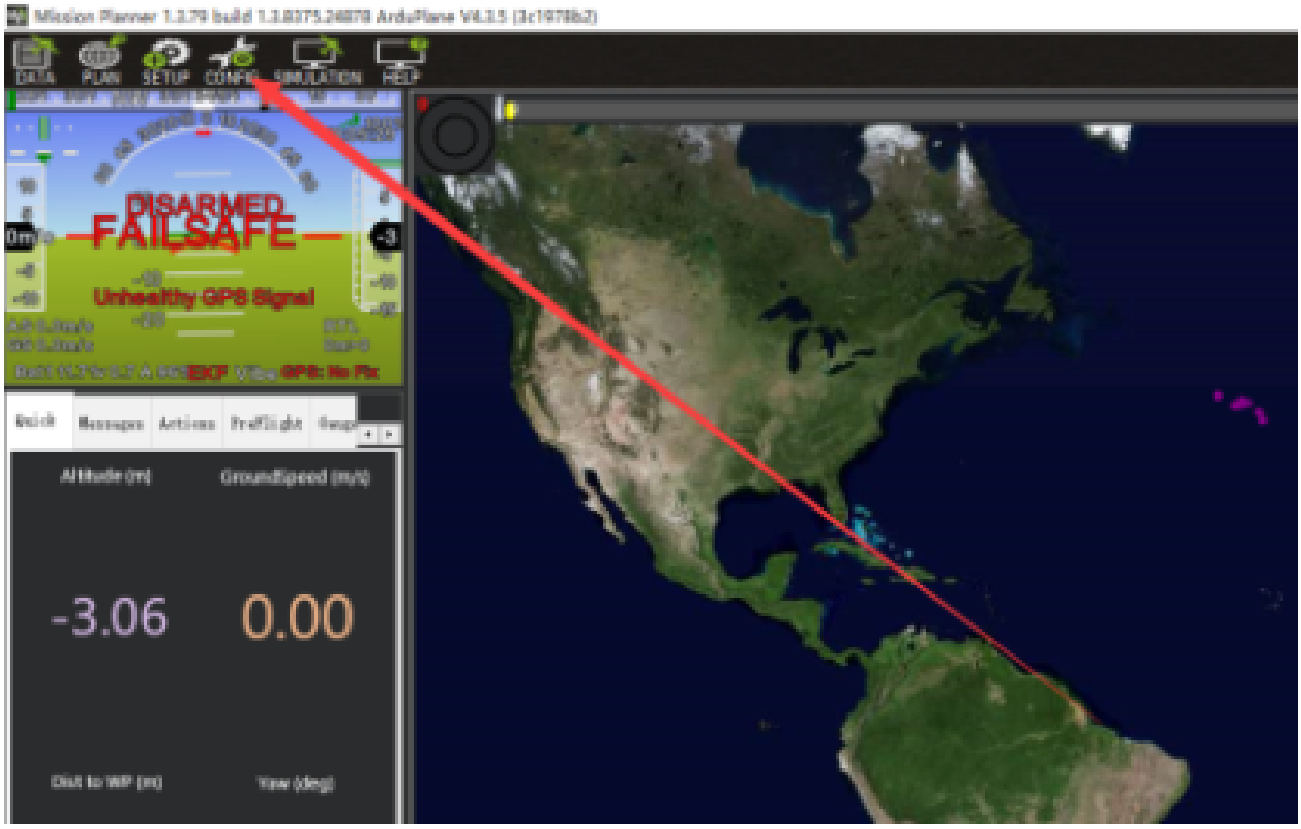
Then click connect

After successfully connecting to the flight controller, please ignore any errors and proceed to next step.
Note : Ardupilot automatically recognizes SBUS input, you do not need to perform receiver setup if you are using SBUS receiver. For Crossfire or ELRS receiver, please follow steps below.

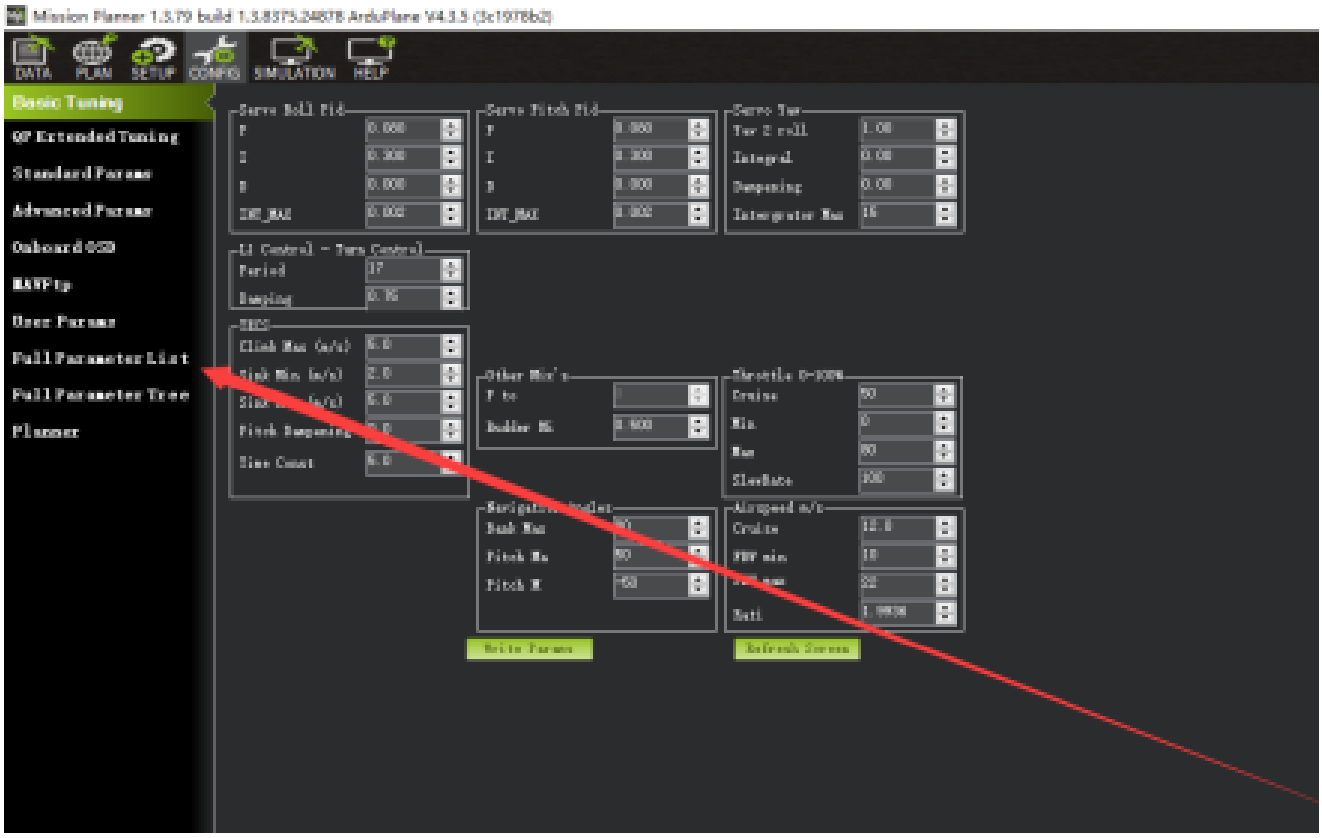


1. Setting up of the receiver

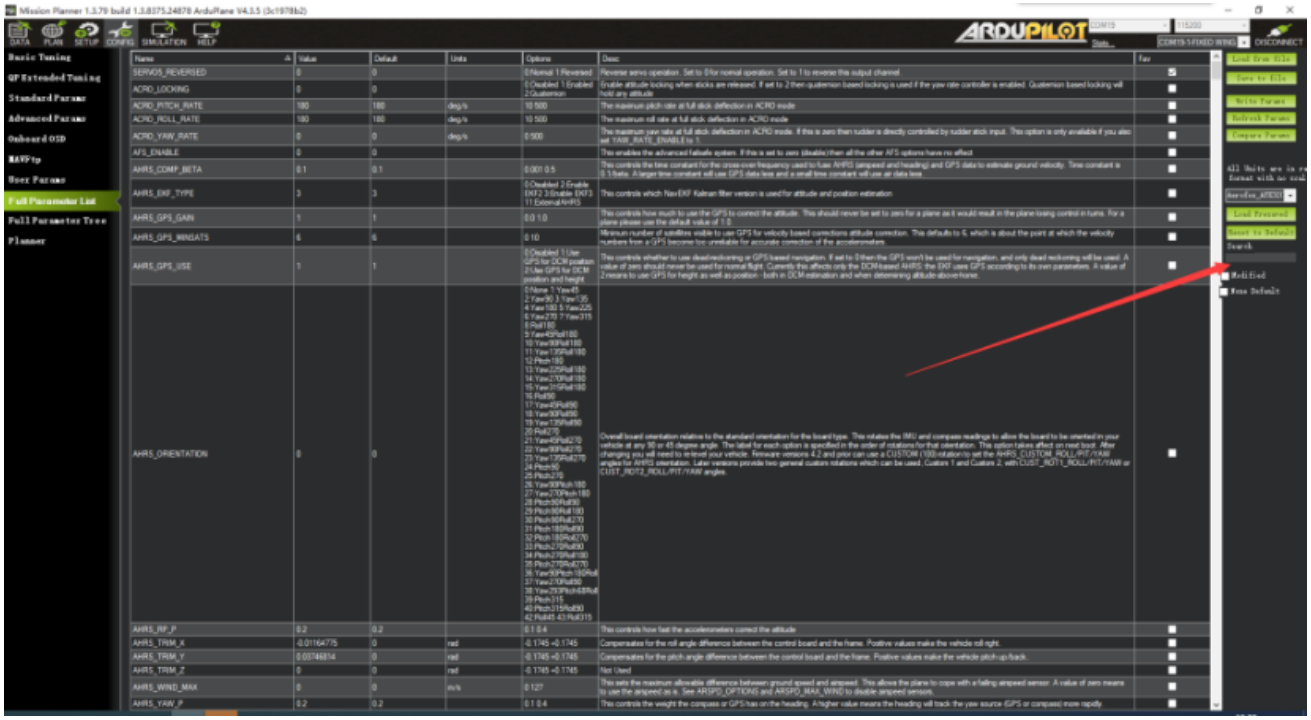
- Click CONFIG on the top left of the screen



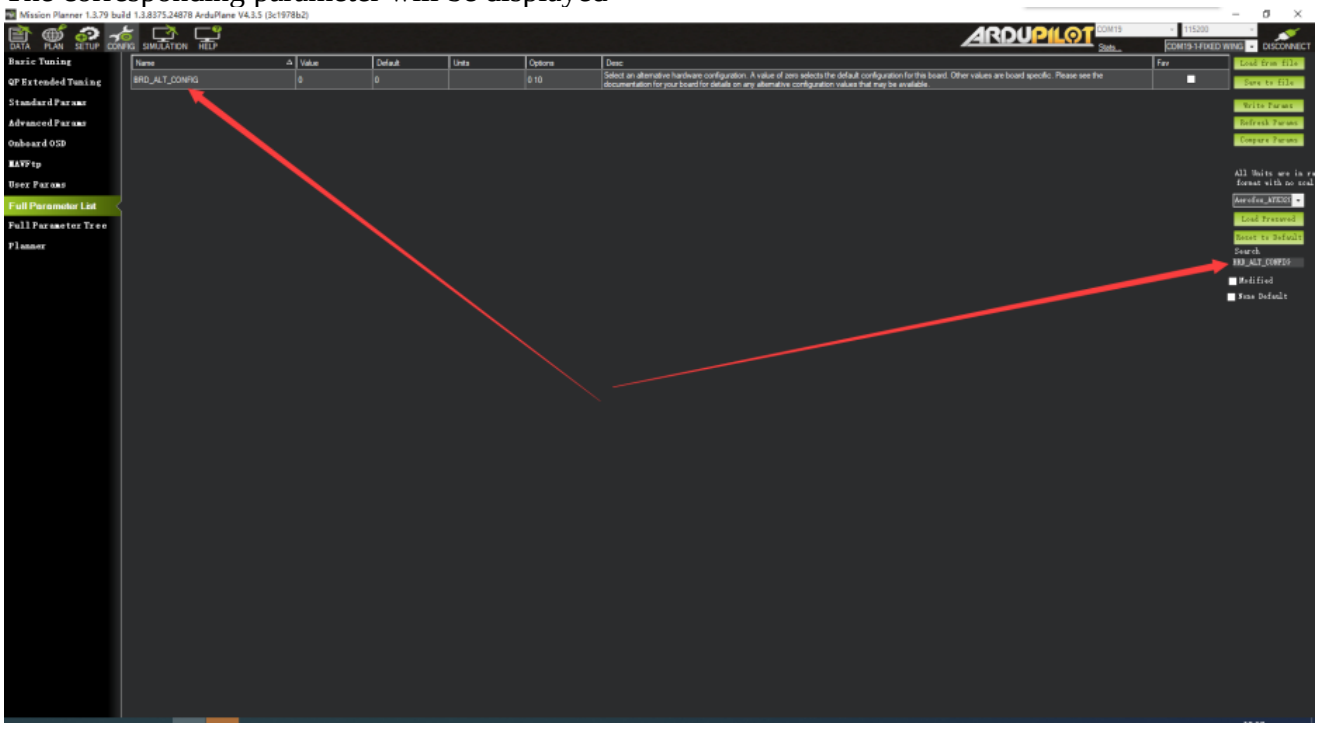
Click Full Parameter List on the left menu



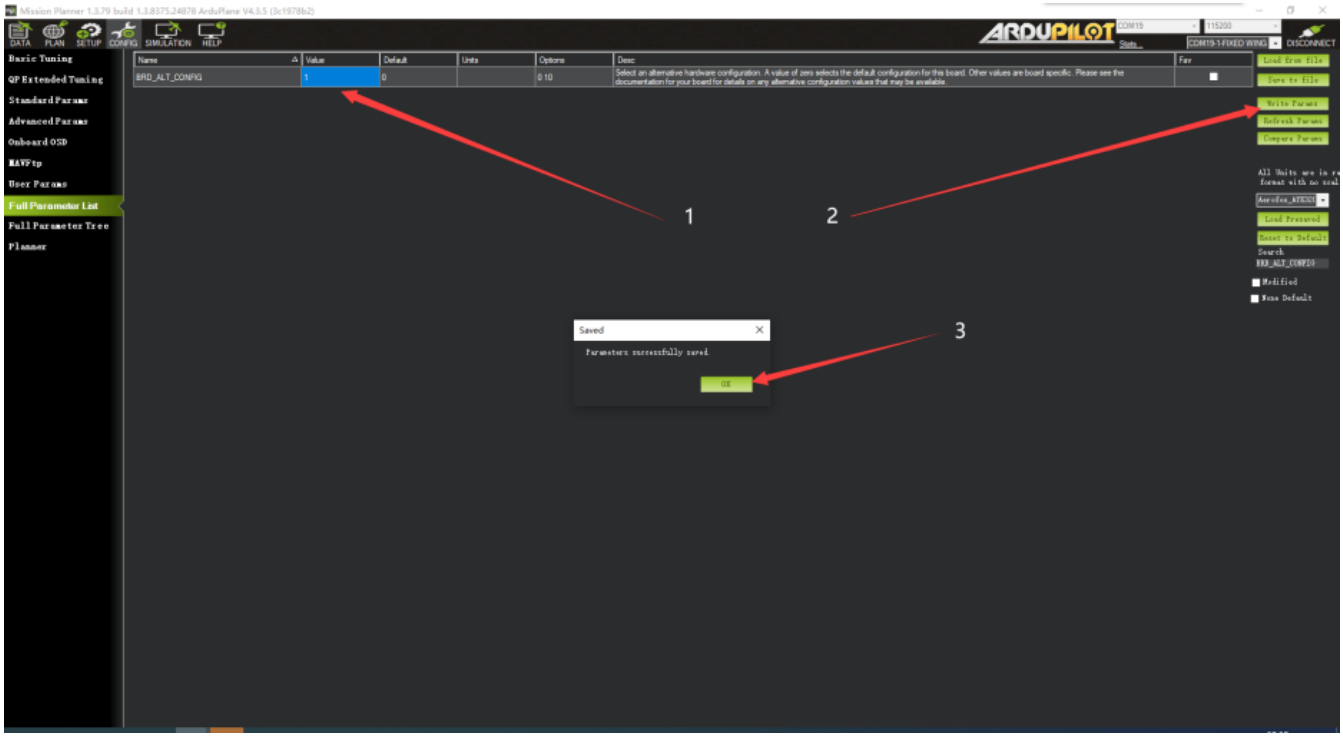
On the Search box on the right side, type BRD_ALT_CONFIG



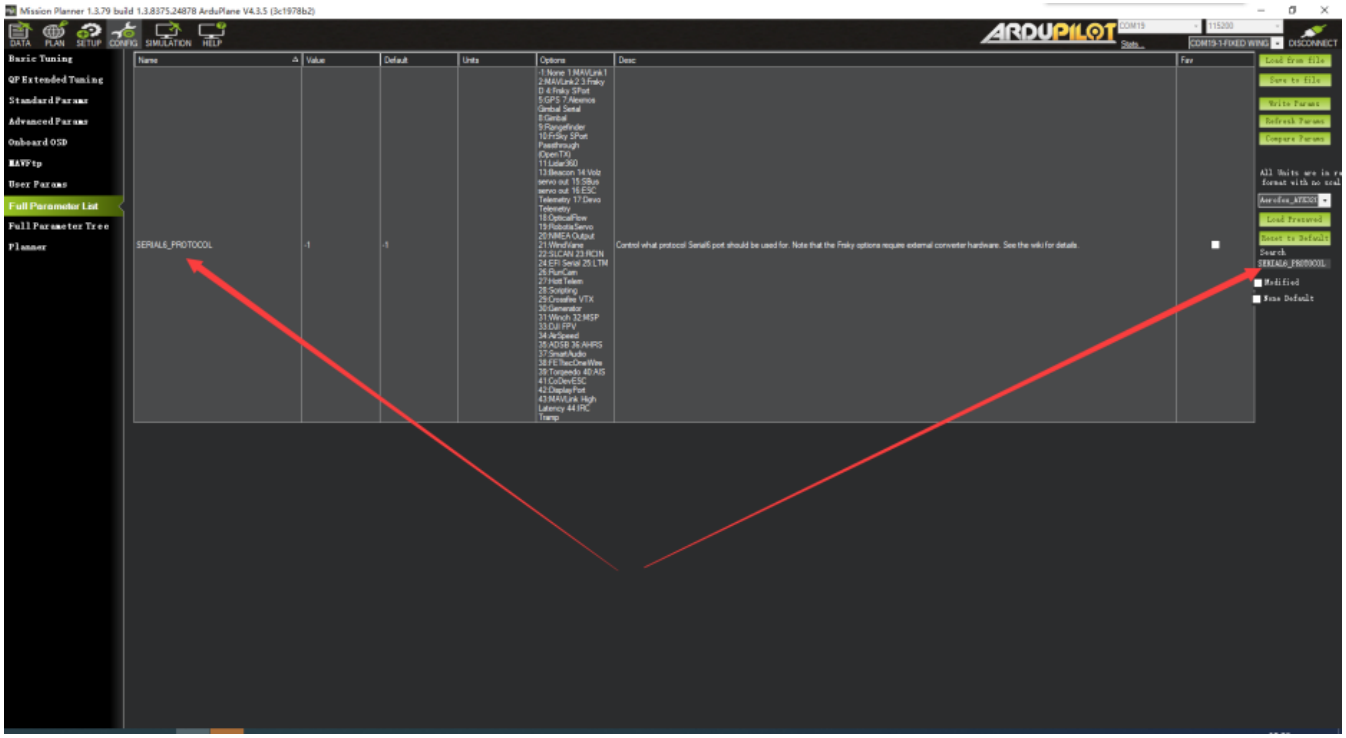
The corresponding parameter will be displayed



Change the “Value” from “0” to “1”, then click “Write Params” to write the changes to the flight controller. Click “Ok” to confirm.

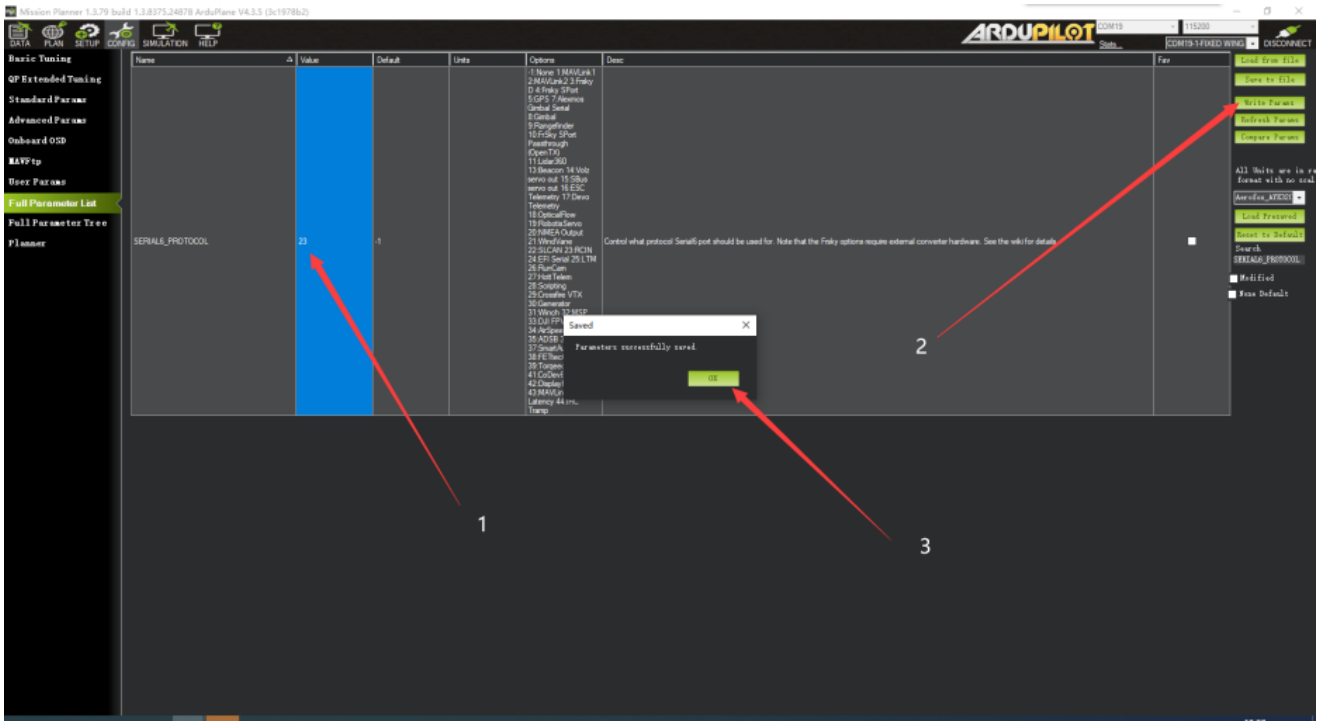


Again, on the Search box, type SERIAL6_PROTOCOL
The corresponding parameter will be displayed



Change the “Value” from “0” to “23”. Click “Write Params”, then click “Ok”.

Congratulation! You are done!

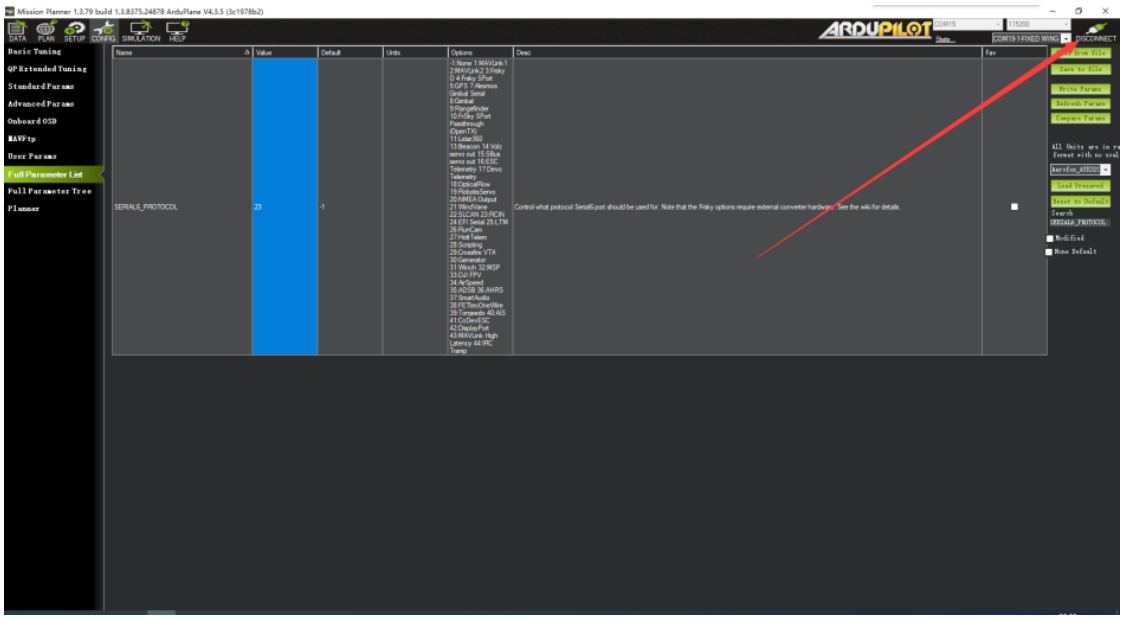


Below are the relevant parameters for your reference. Please make sure it’s correct.

SBUS receiver setup : BRD_ALT_CONFIG = 0 ; SERIAL6_PROTOCOL = -1
CRSF/ELRS receiver setup : BRD_ALT_CONFIG = 1 ; SERIAL6_PROTOCOL = 23

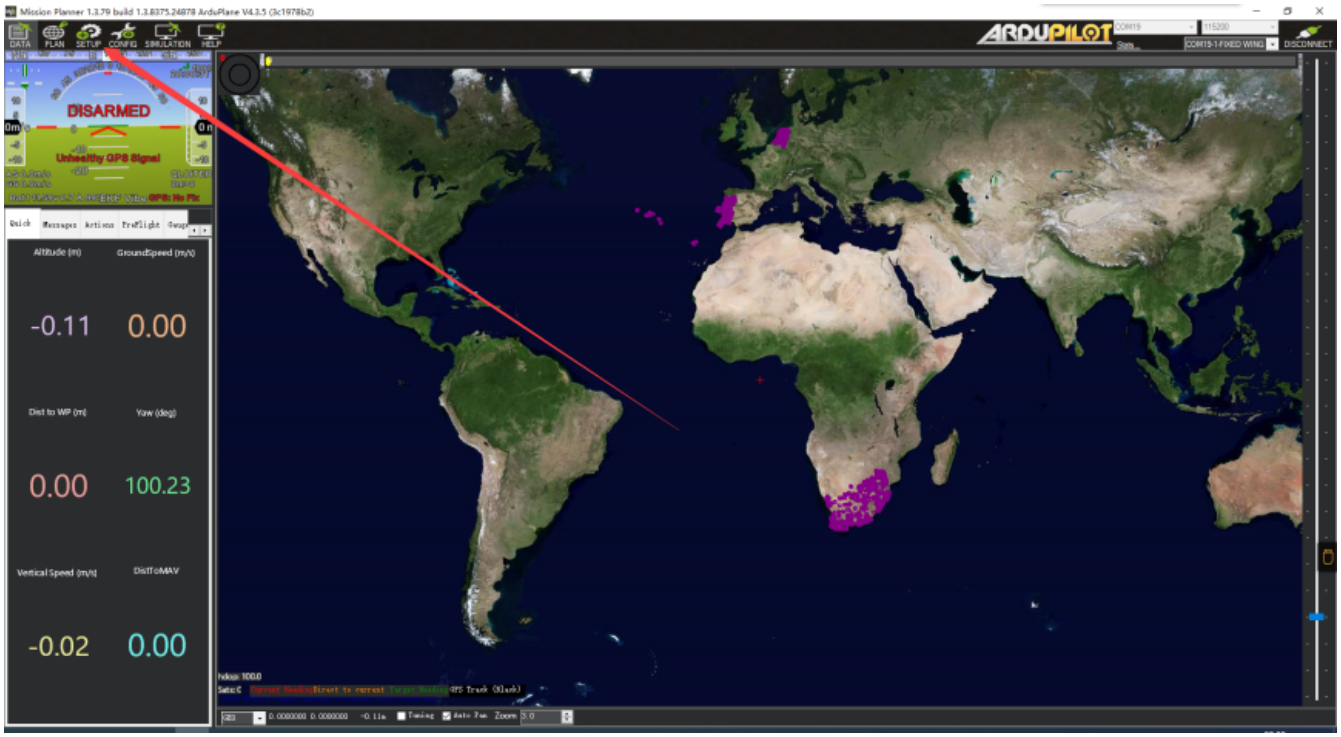
IMPORTANT, after the above is completed, before we proceed to next step, click “Disconnect” on the top right of the screen > disconnect the USB cable from the Flight controller and the PC > disconnect the battery.

When you connect the battery again, CRSF/ELRS should be working now.



2. Radio Calibration

Turn on the radio, connect battery to your T1 Ranger, connect USB to the flight controller and your PC.
Then open Mission Planner and click Setup.

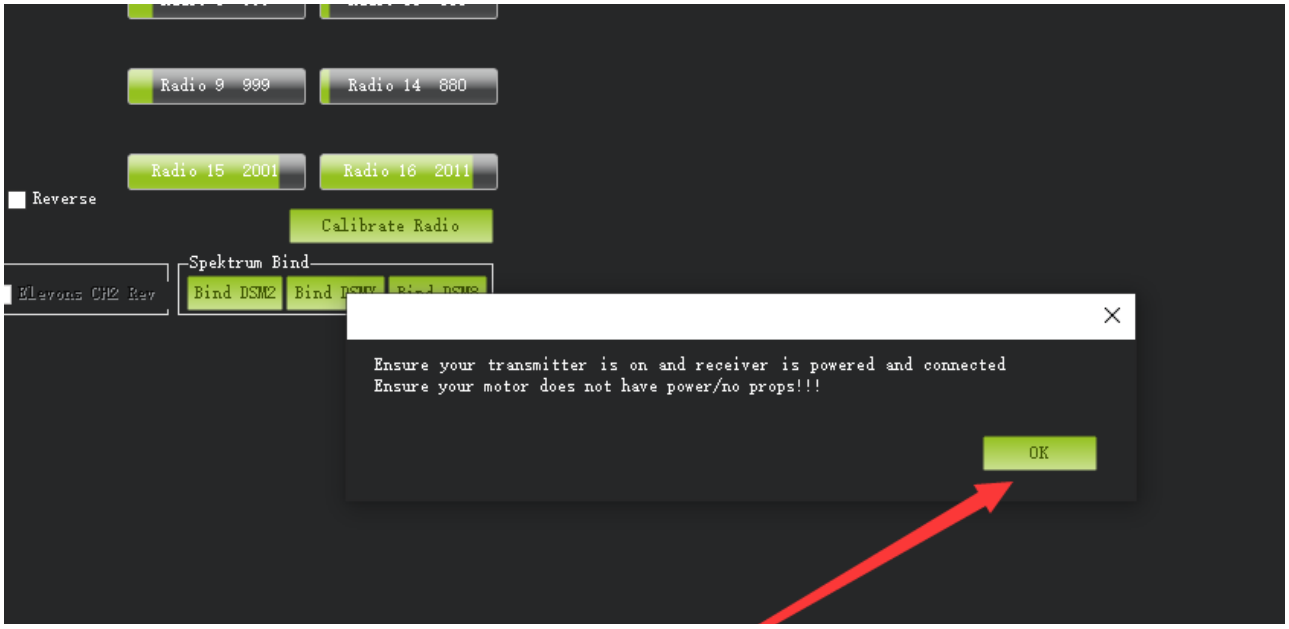


Click “Mandatory Hardward” on the top left.

Click “Radio Calibration”

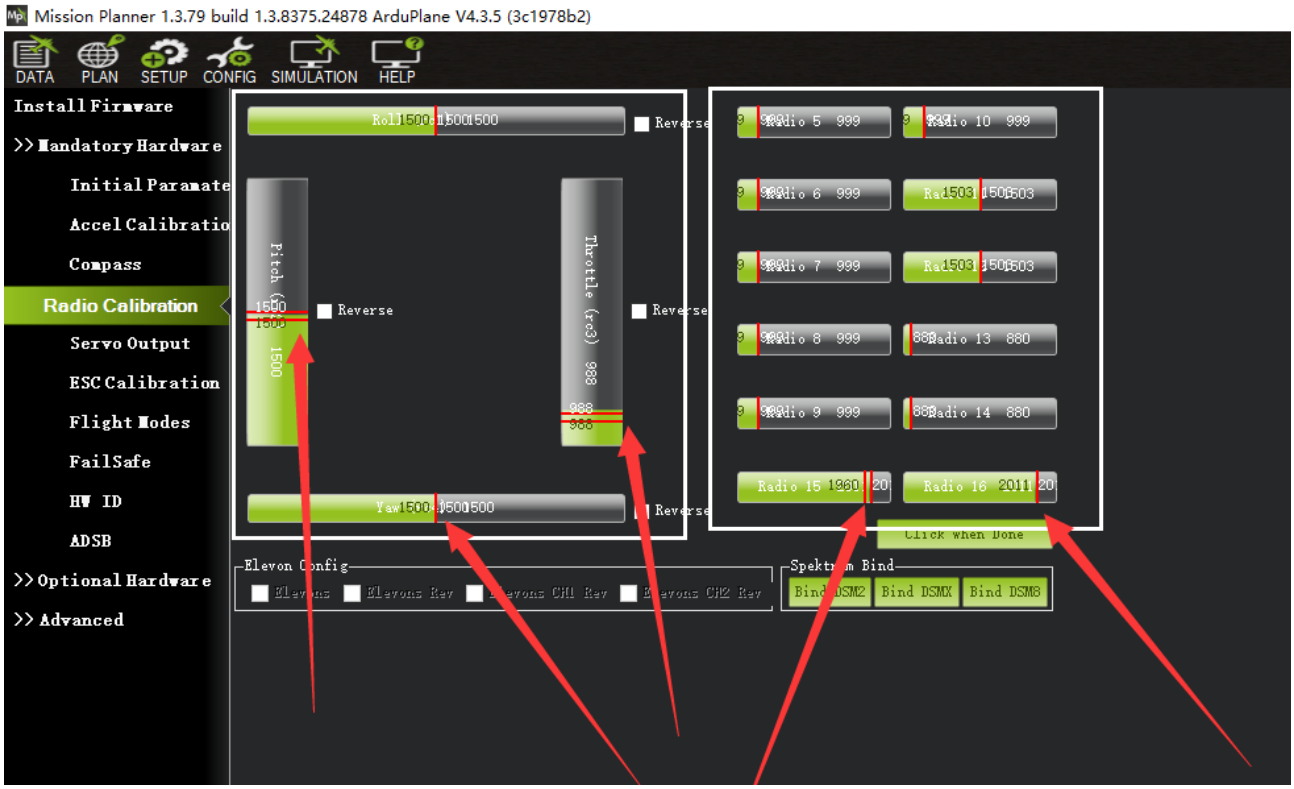
Click “Radio Calibration” as shown in the picture below

Follow the instruction as shown on the screen. Click OK.



Click OK and perform the instruction as shown. Move all your control sticks and flight modes switches to their max.

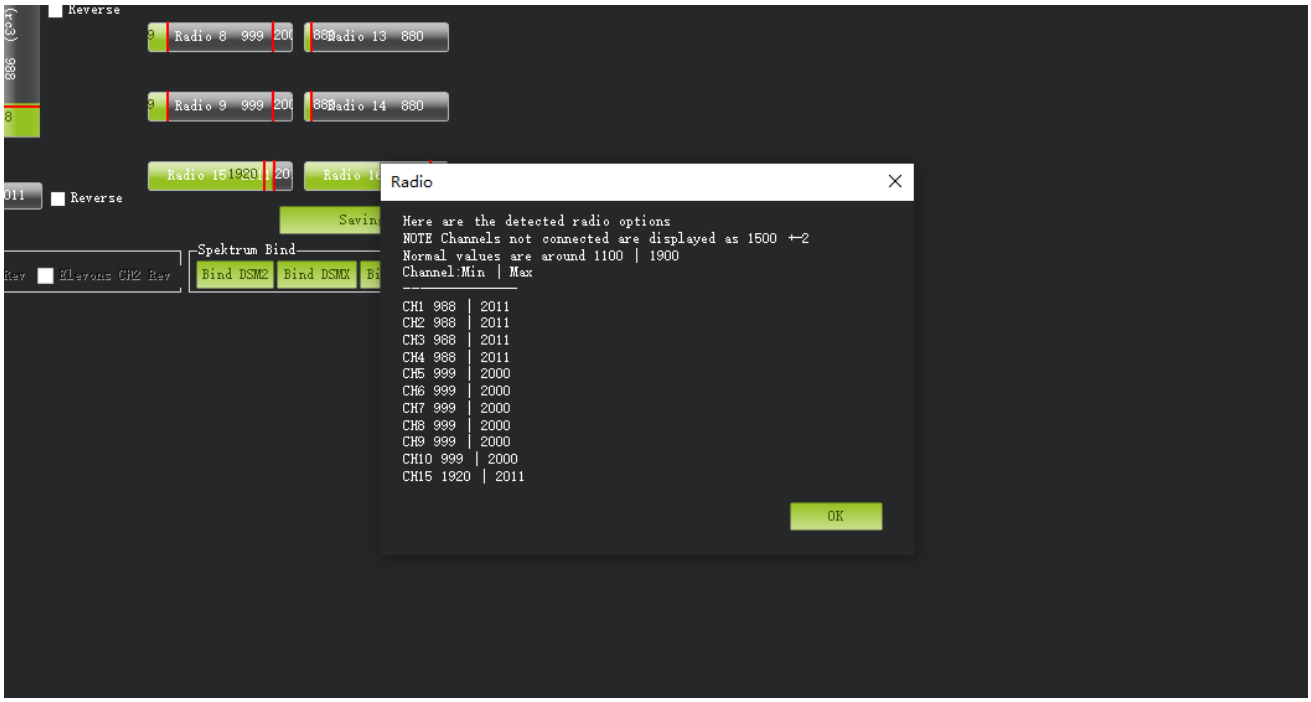
Click OK. Now observe Mission Planner recognizing your new inputs/stick values of your own radio.



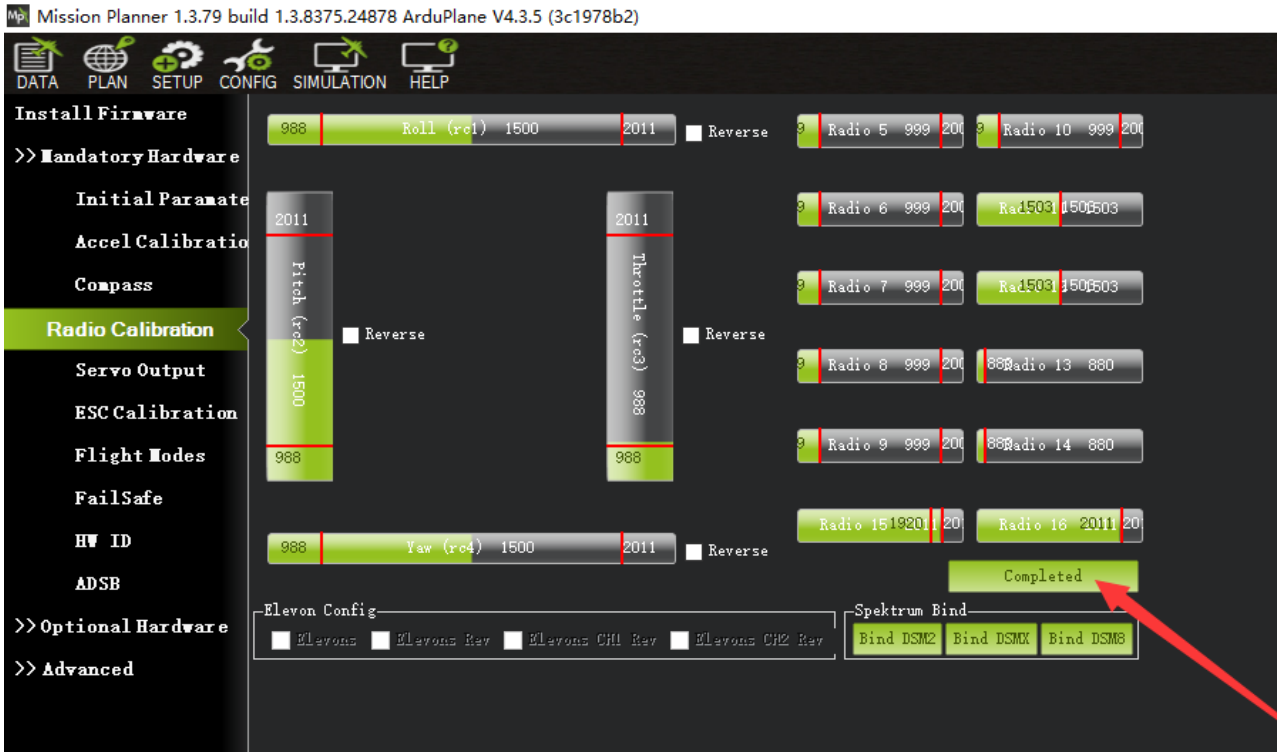
When you are done, click “Click when Done”

Follow the instruction shown and click OK

Mission Planner now display the MIN and MAX of your PWM values of your Radio.
Click OK again



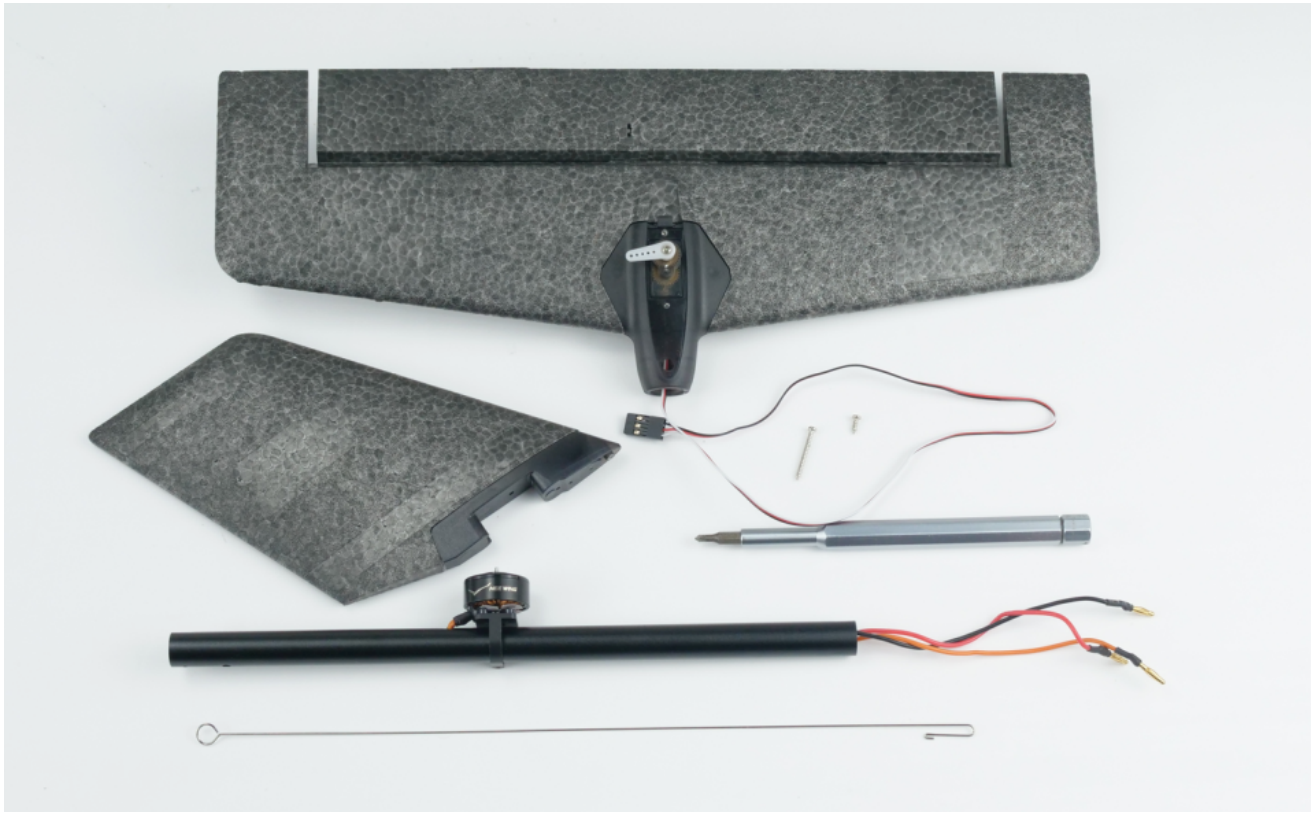
It will then display “Completed”



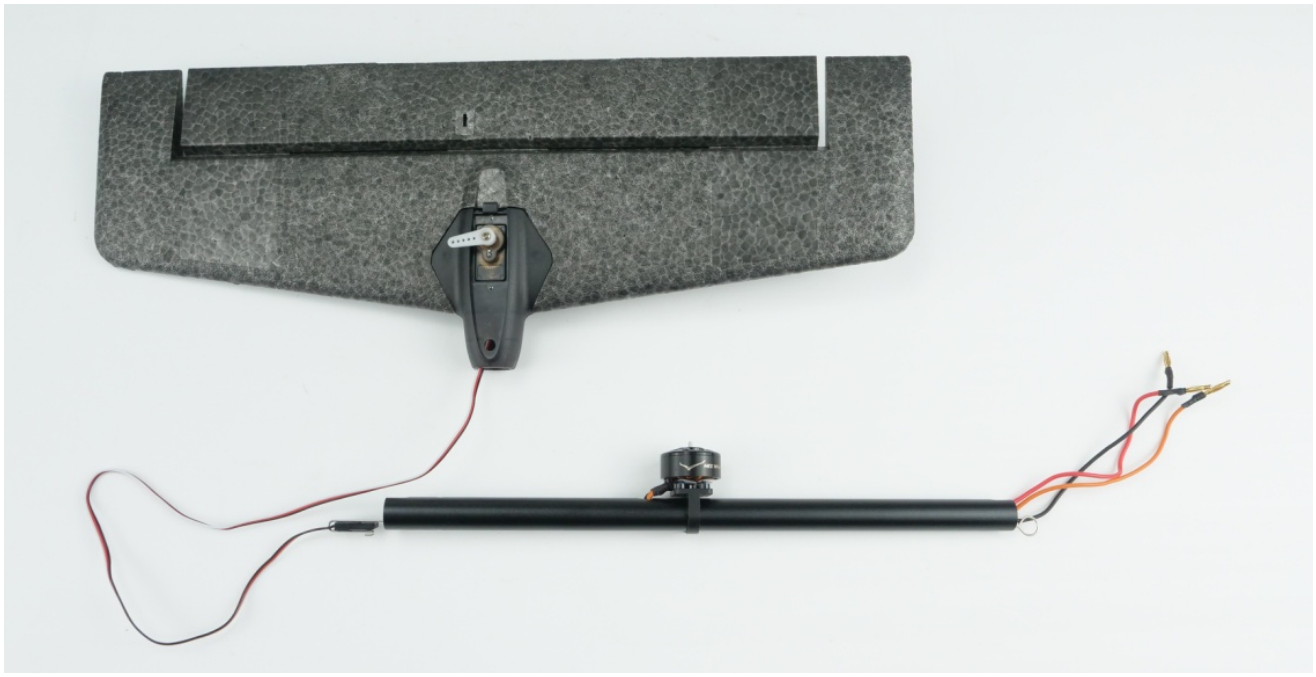
You have completed the Ardupilot/Mission Planner setup.

3. Assembly of the plane

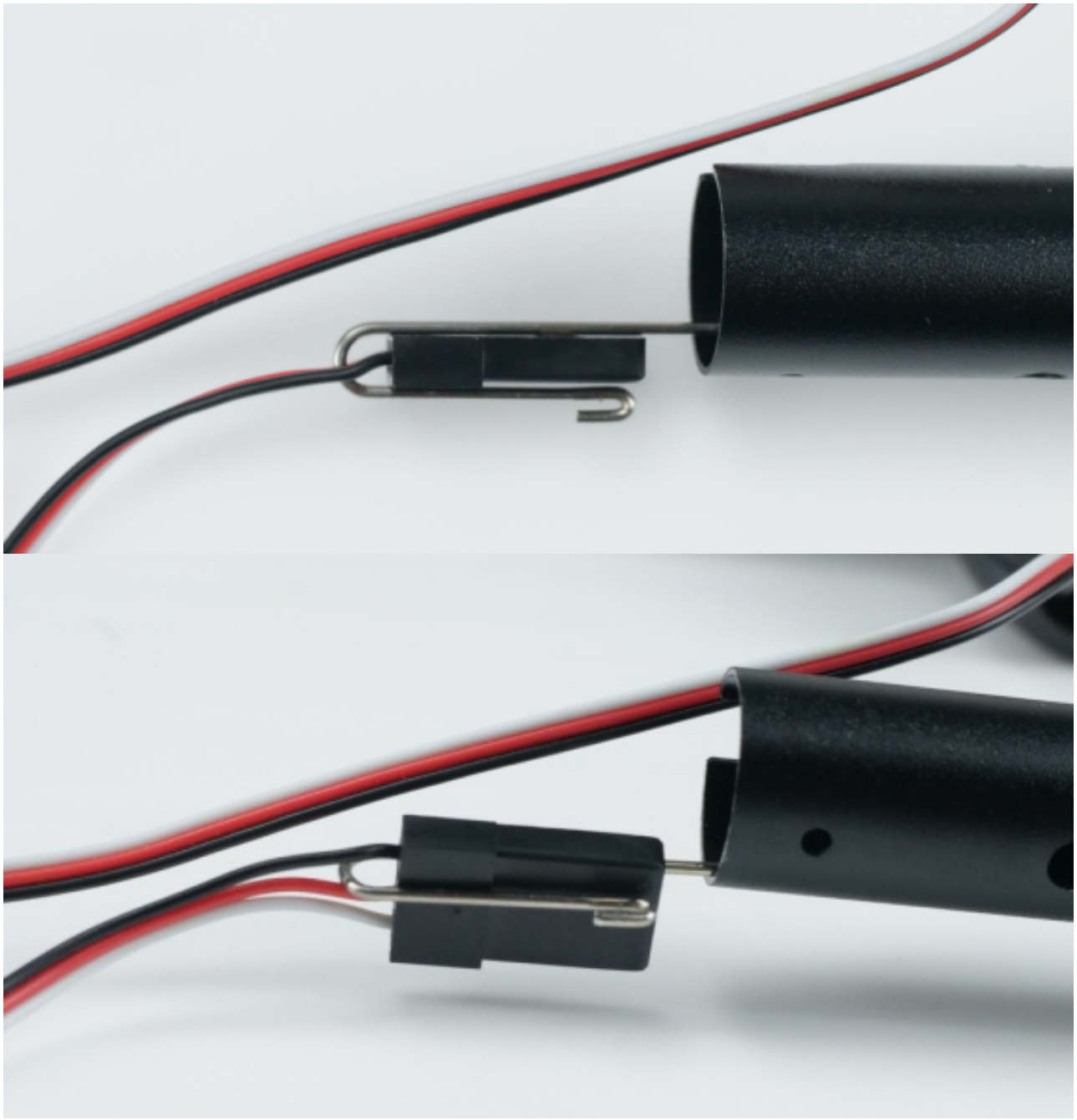
a. Prepare the tail boom, horizontal stabilizer, vertical stabilizer, guide wire, 2x20 screw, 2x6 screw and a Philips screwdriver.



b. Using the provided guide wire, pull the servo connector through from one end of the tail boom to the other end of the tail boom



Tips : using the U shape of the wire and clip it onto the servo connector



Gently pull the servo connector through the tail boom to the other end as shown

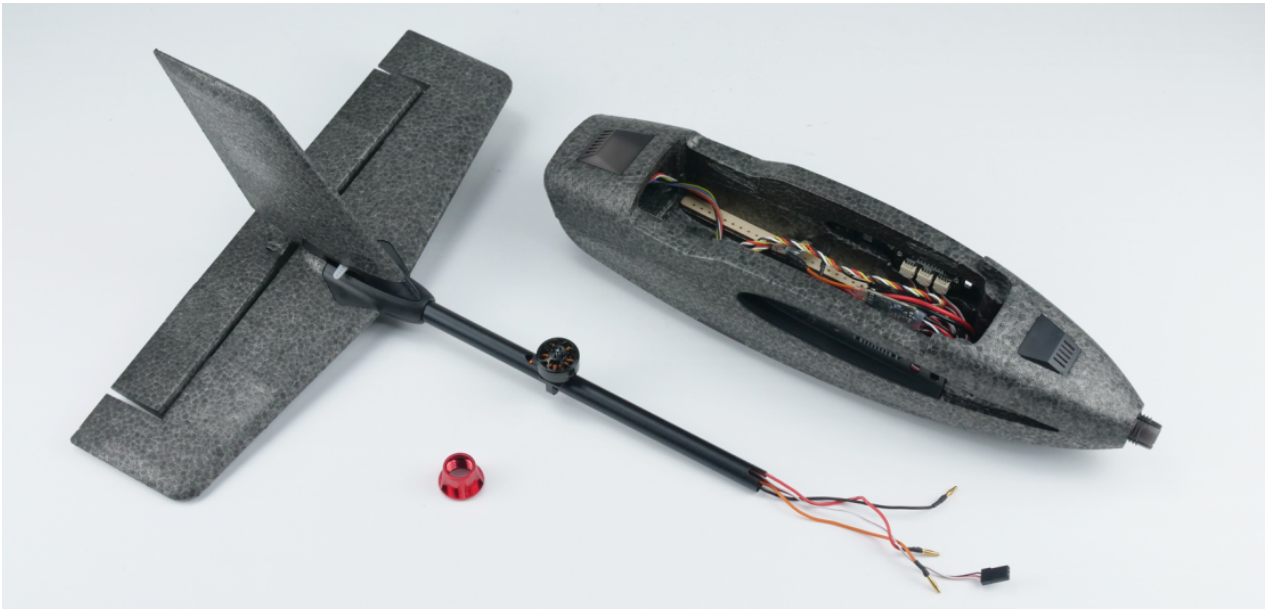
c. Observe the U Shape cut on the tail boom and align it to the stop inside the horizontal stabilizer mount.

d. After inserting the tail boom, ensure the U shape cut is centered and is not pushing onto any wires. If installed correctly, the hole is clearly see through and the servo wire is visible as well.

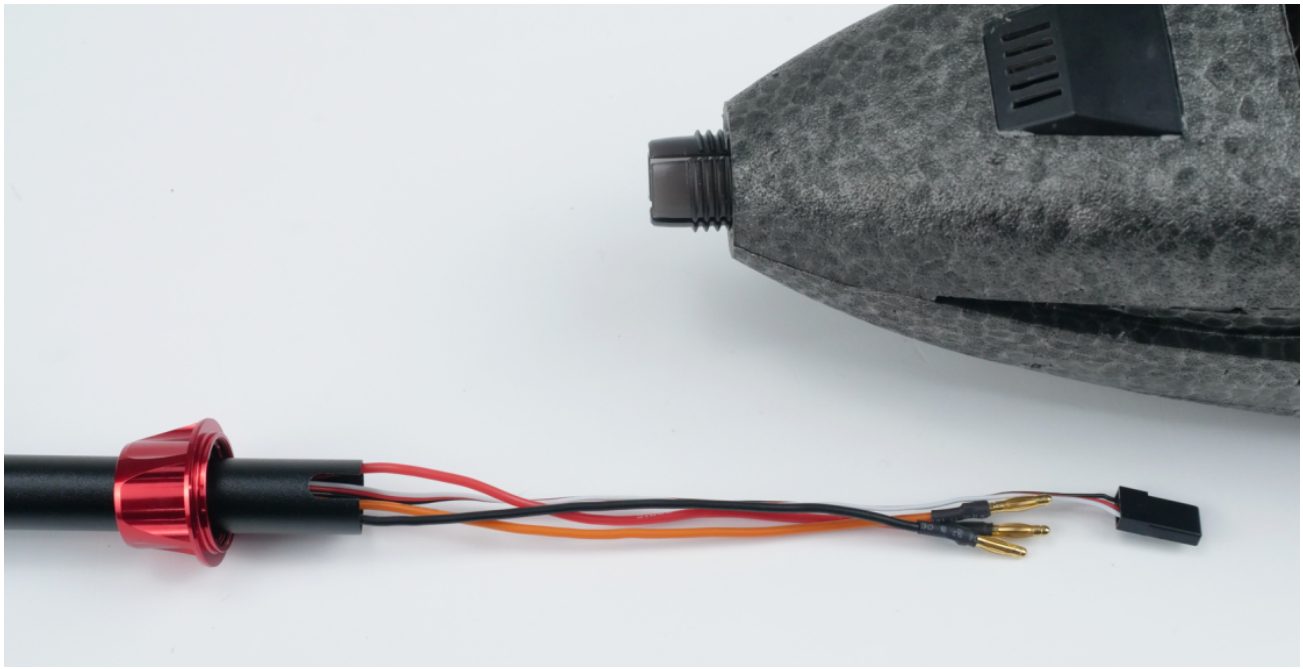
e. Align the vertical stabilizer onto the clip of the horizontal stabilizer as shown below and install it.

f. Rotate to the other side and install the corresponding screws according to the marking on the mount.

g. Now let’s assemble our completed tail onto the main fuselage. This is to be secured with the provided nut.



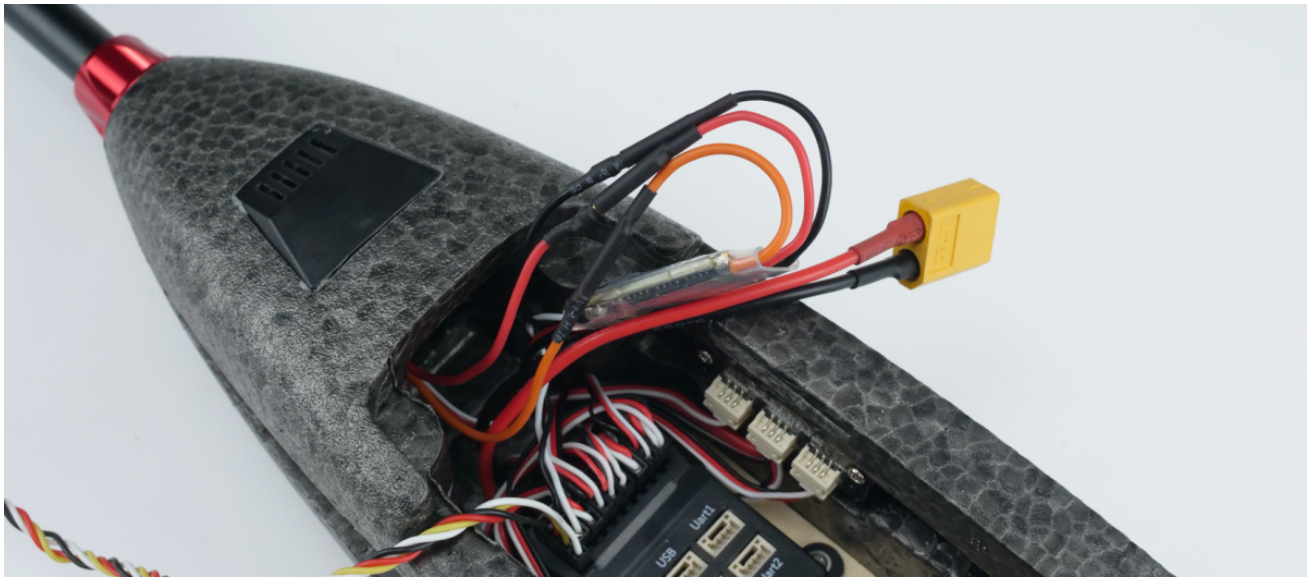
h. Slot the red color nut onto the tail boom first, observe the direction as shown below



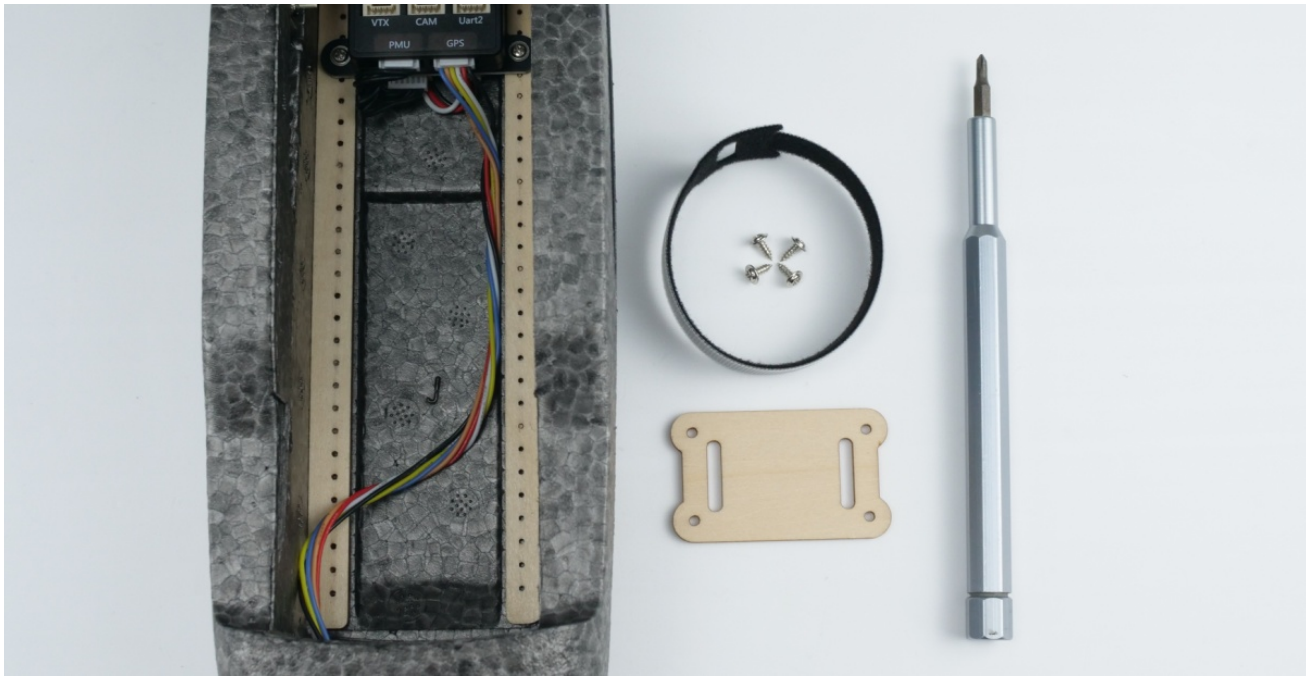
I. Slot in the wires into the fuselage together with the tail boom and secure it with the nut. Do not need to over tighten the nut as long as it’s not loose.

j. Connect the elevator servo into S2 port on the flight controller. Observe the Ground, 5V & Signal orientation.

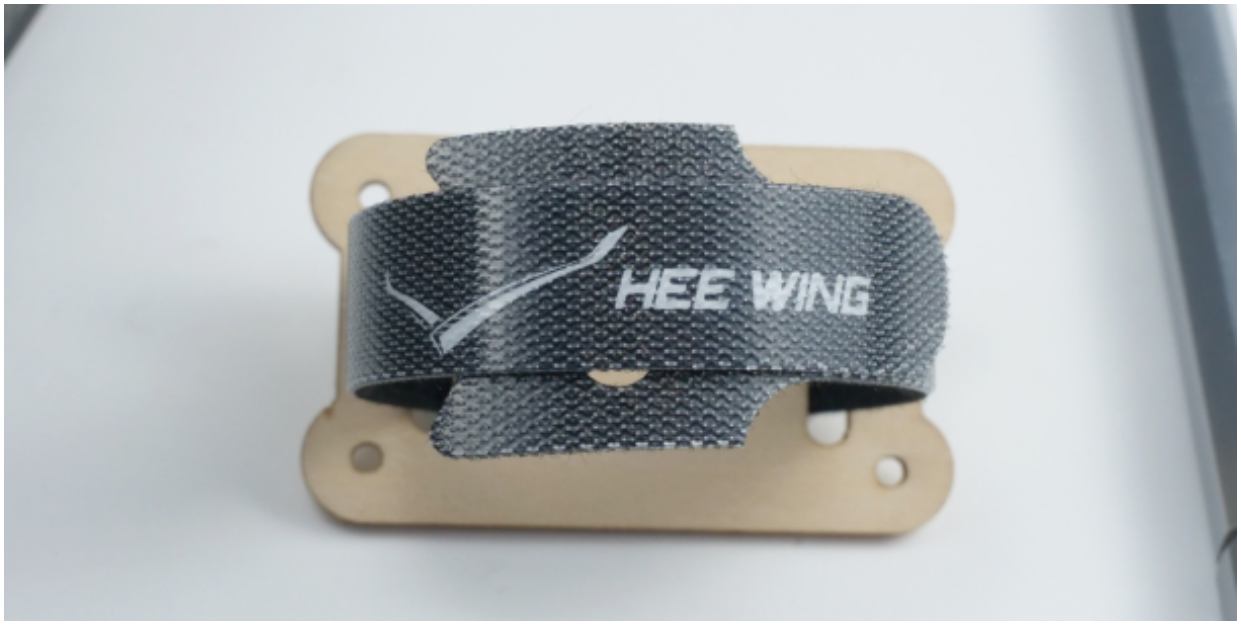
k. Now connect the 3 motor wires together. Just follow the wires color ie black to black, red to red and orange to orange.

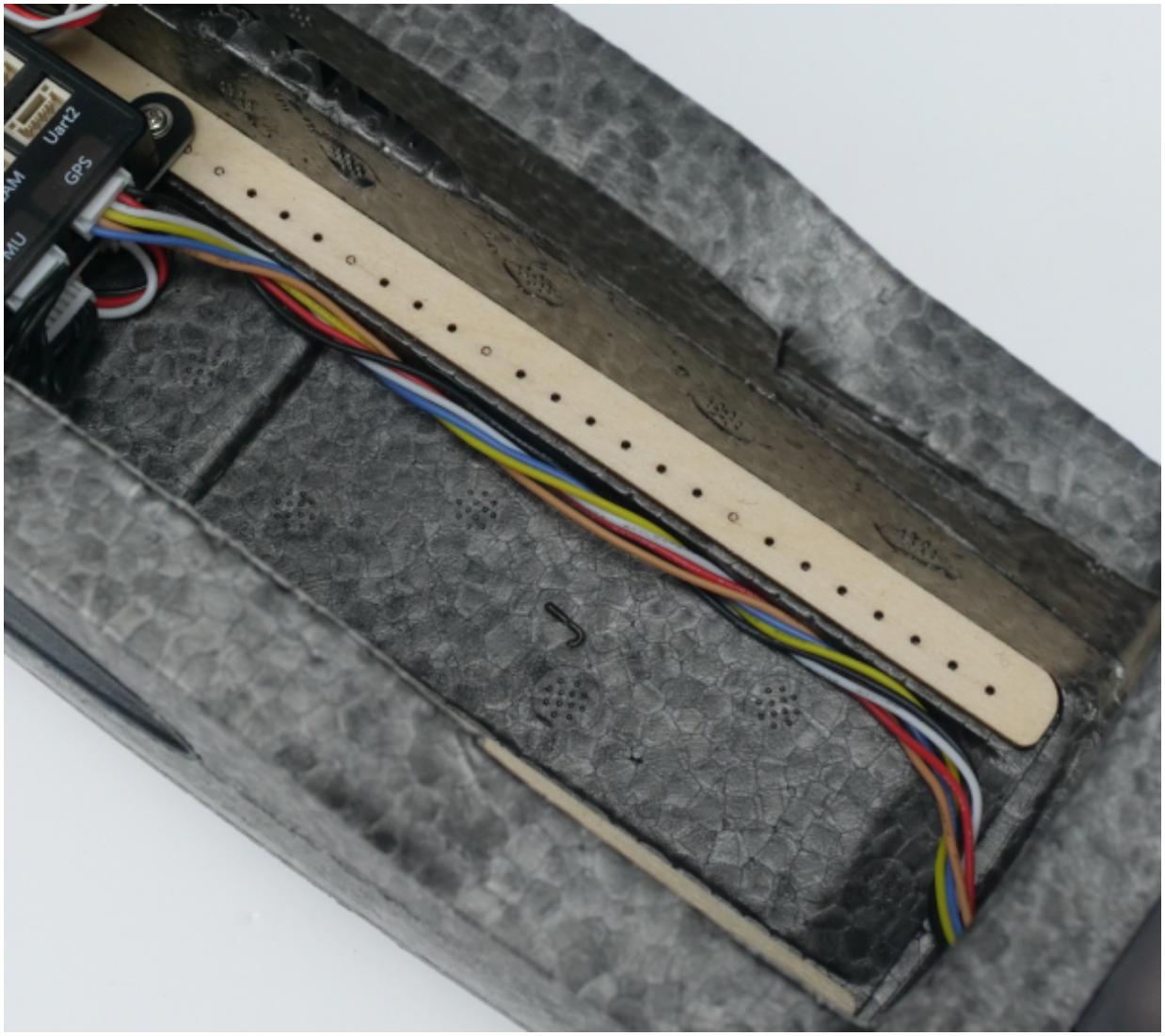


l. Now we are gonna install the battery mount. Prepare the battery mount, fuselage, battery strap, 2x6 screw and the screwdriver



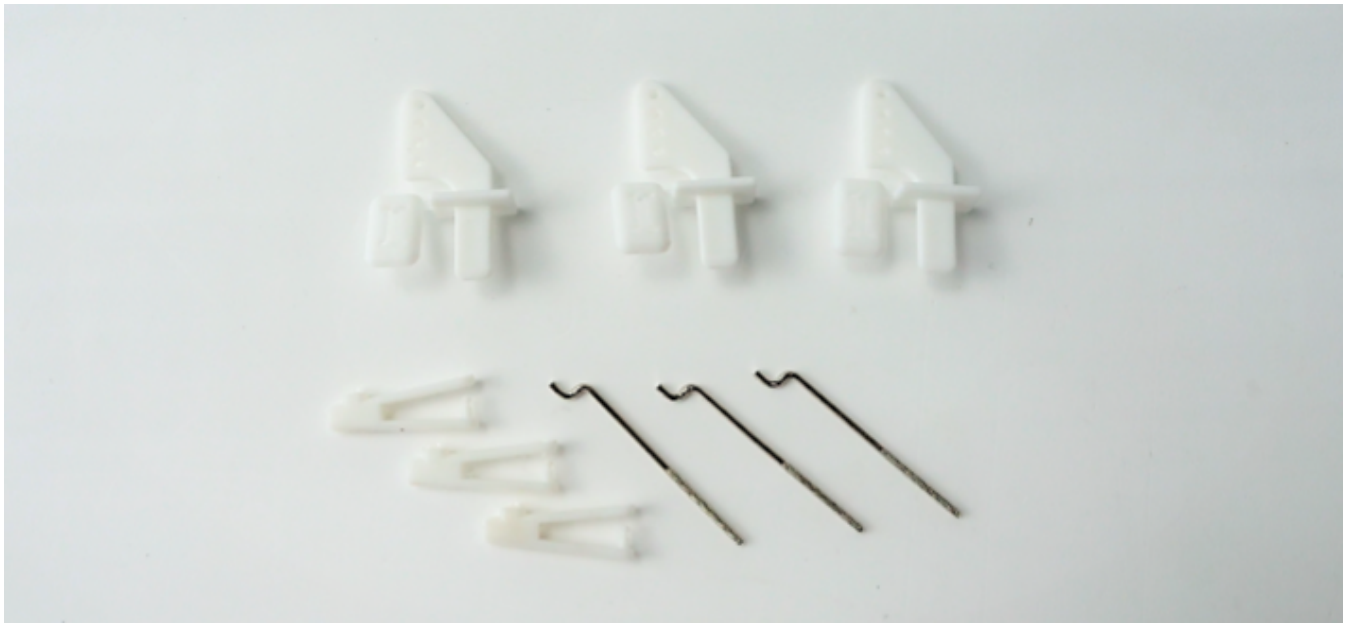
m. Slot the battery strap through the battery mount, organize the wires to one side to prevent the wires getting squashed



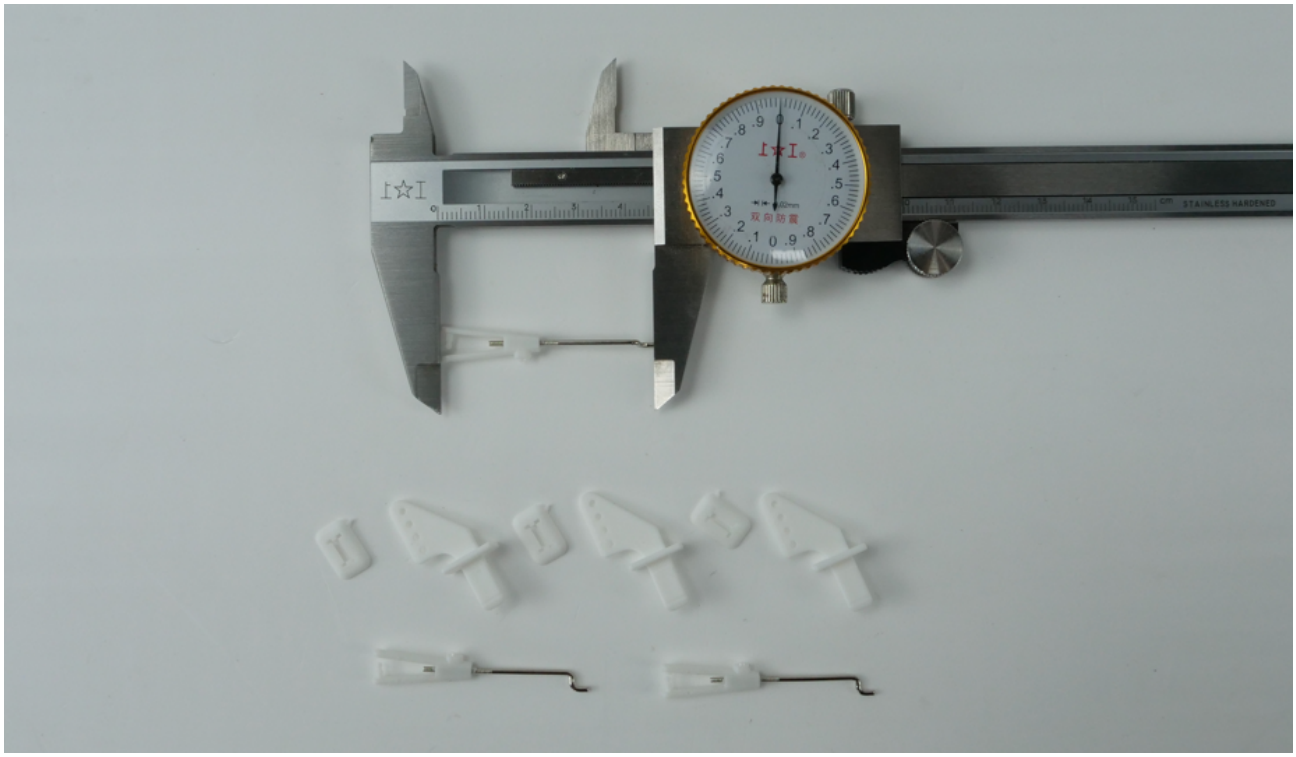


n. Place the battery mount onto the wooden rail, align the screw holes and secure it with 4pcs of 2x6 screw.

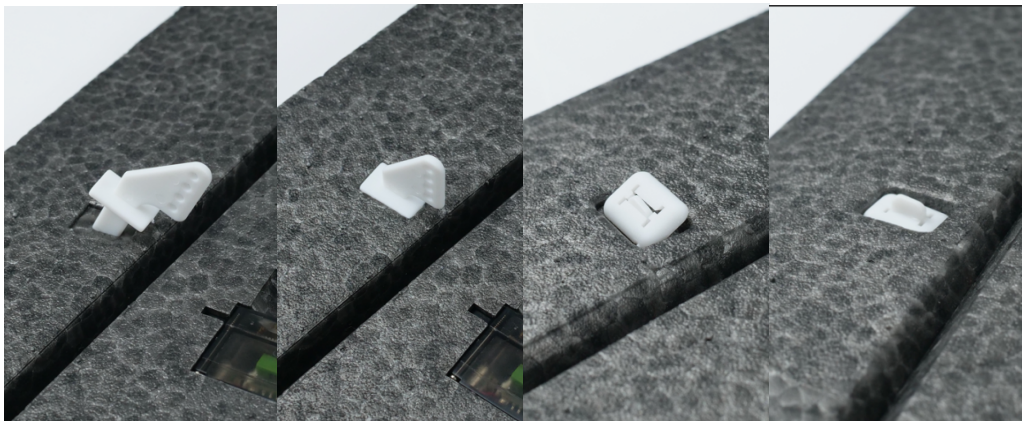
o. Now let’s install the Control Horns



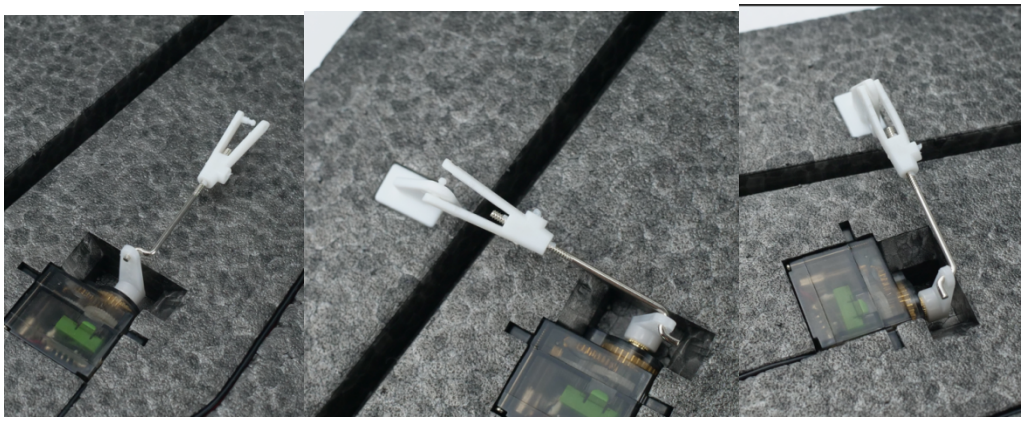
p. After installing the steel linkage into the latch, place it in the opening of a vernier caliper, the end to end length should be 46mm. If you do not have a vernier caliper, you may use a ruler.
Repeat the same thing for the other 2 linkages.



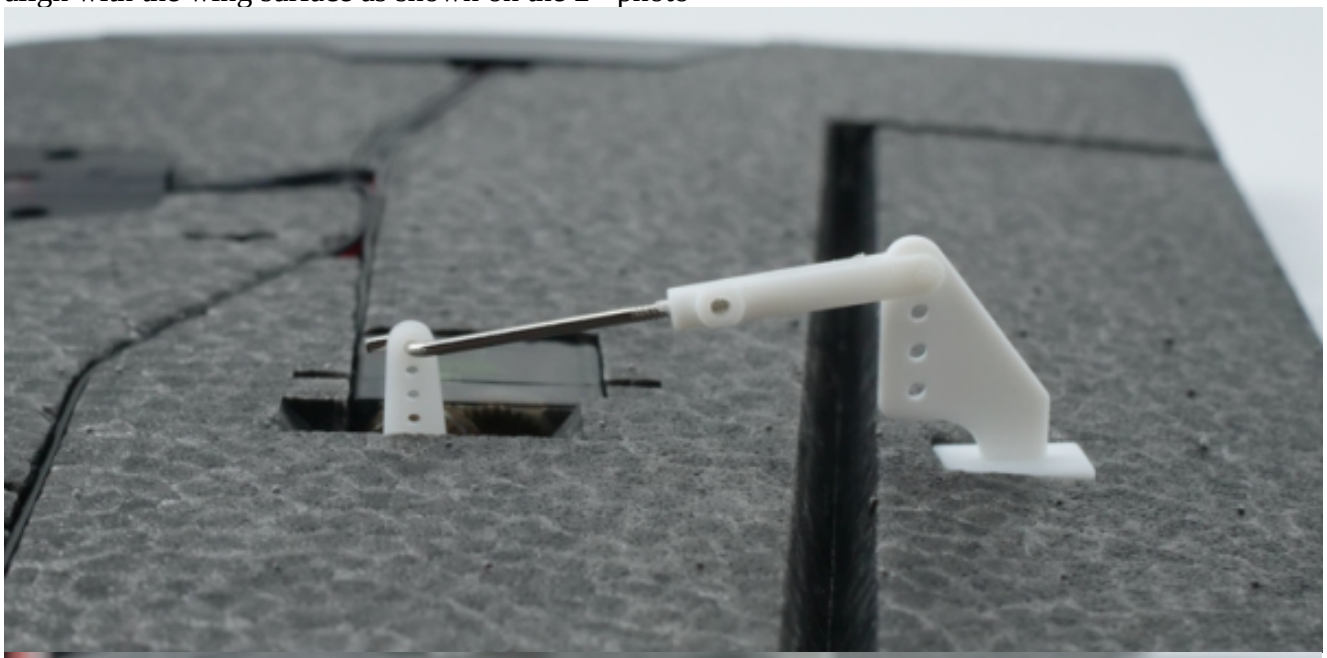
q. On the main wing, install the control horn through the slit of the control surface and secure it with the latch.



r. Slot the steel linkage into the hole on the servo horn that is furthest away from the center, then secure the other end onto the control horn.

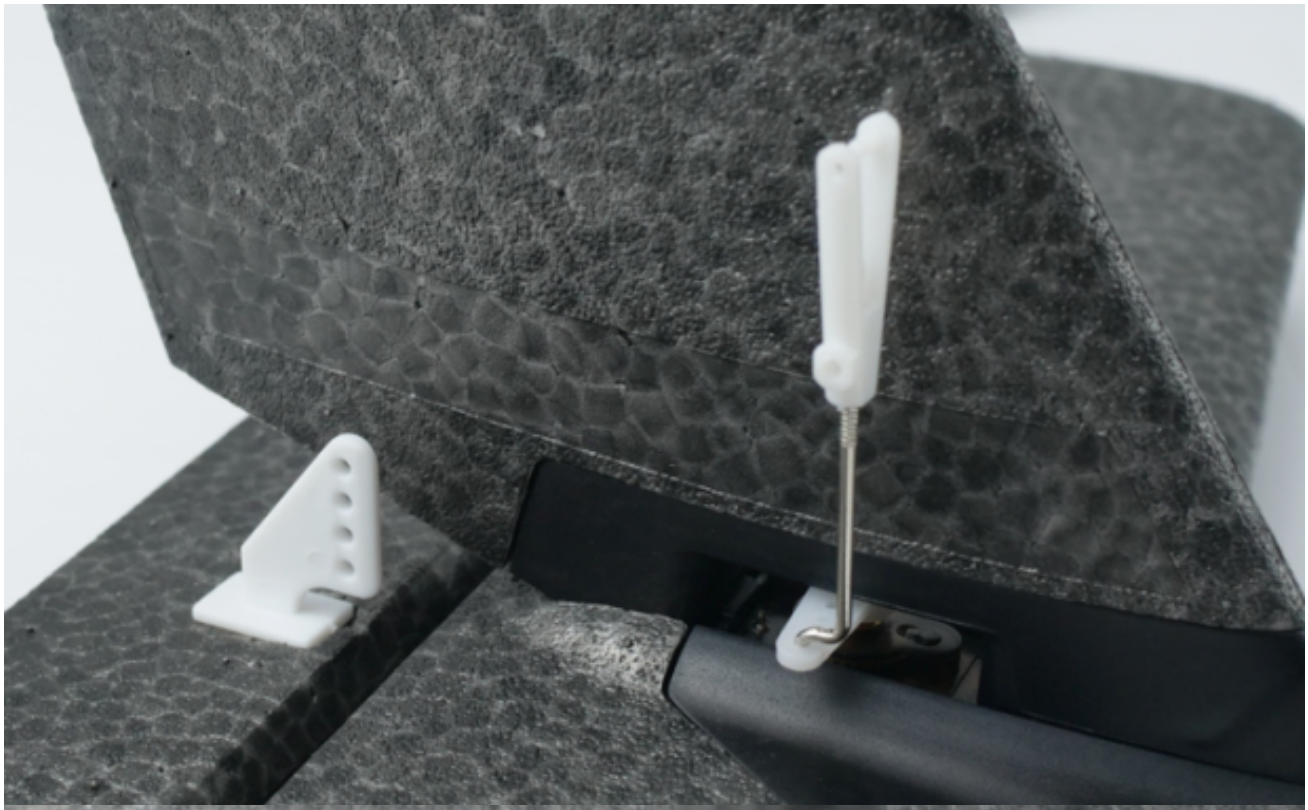


s. The servo horn angle should be parallel to the wing surface. With the servo centered(best when it’s powered), you may adjust the linkage length accordingly to ensure that the control surface is align with the wing surface as shown on the 2nd photo

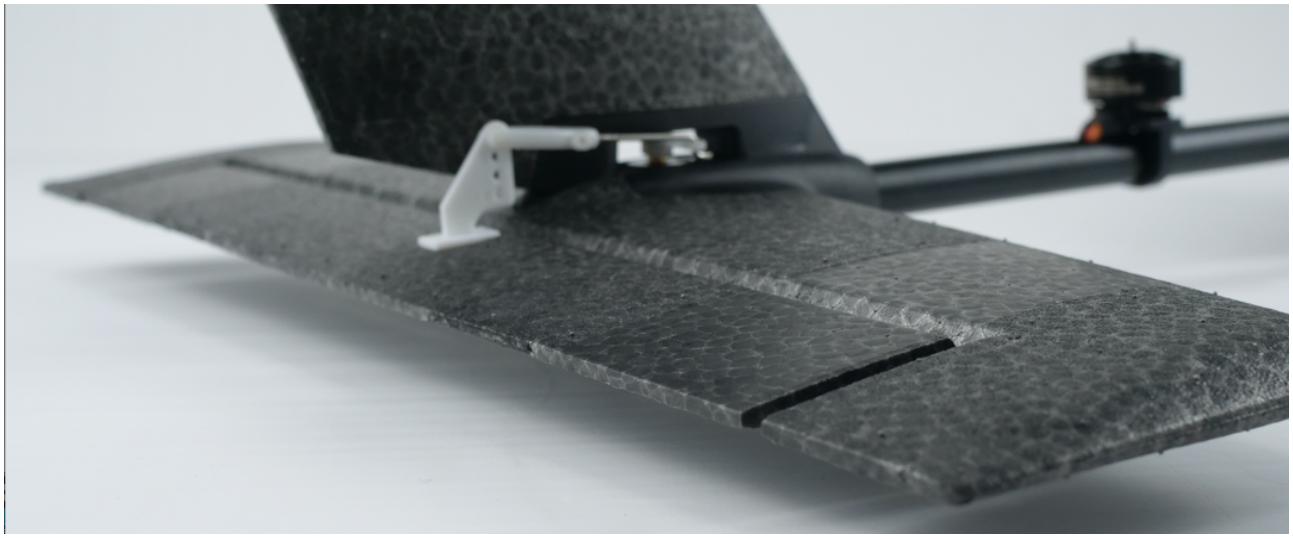


t. Install control horn onto the elevator and secure it with the latch

u. Install the linkage the same way as on the main wing previously



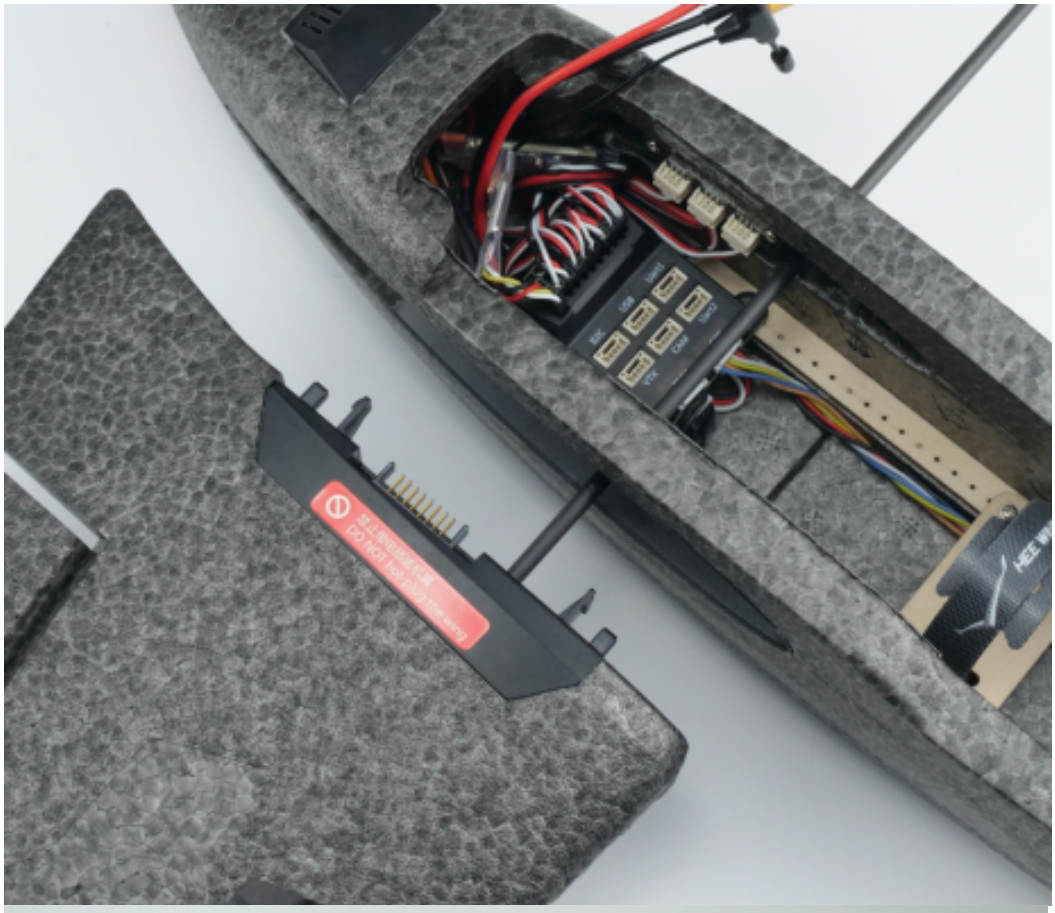
v. Ensure that the elevator is parallel to the horizontal stabilizer by adjusting the linkage length



x. Installing wings onto the main body/fuselage

y. Slot the carbon rod into the main wing\

z. Carefully atach the main wing onto the fuselage and ensure that it’s properly clipped onto.
*Do not attach or detach the main wing while it’s powered as this can damage the electronics



ab. Installing latch of the canopy

ac. Slot the latch through the canopy and secure it with the clip. The flat side of the clip facing outside.

ad. Slide the smaller rear canopy towards the rear of the fuselage and ensure no wire between the canopy and the carbon rod.

ae. Now slide the canopy with the hatch towards the front, gently press the latch onto the carbon rod to secure it onto the fuselage.

af. Installing the propellers

ag. Prepare your propellers, 2x8 screws and an allen key

ah. Secure the propeller onto the motor with the screws. Observe orientation of the propeller.

ai. Rotation of left and right side of the propeller

aj. The build is completed! You may install the decal or the landing gear according to your personal preference.