STANDARD OPERATING PROCEDURES

For statement of work (SOW) and project timelines: here

SLA Hardware Specification and Assembly

SLA – hardware:

- 1500 OEM Rev E included:
    - programmed SOM
    - firmware 2.25.05 [FPGA ver. 10]
    - license 0xFFFF
    - heatsink on the top
- 1500 - SLA - nAB rev A
- 1500 - SLA-FPC Rev B
- SLA – 1500 – CASE
- Airborne camera (Mono camera) and sensor

Assembly:

The picture below is how pieces are connected together.

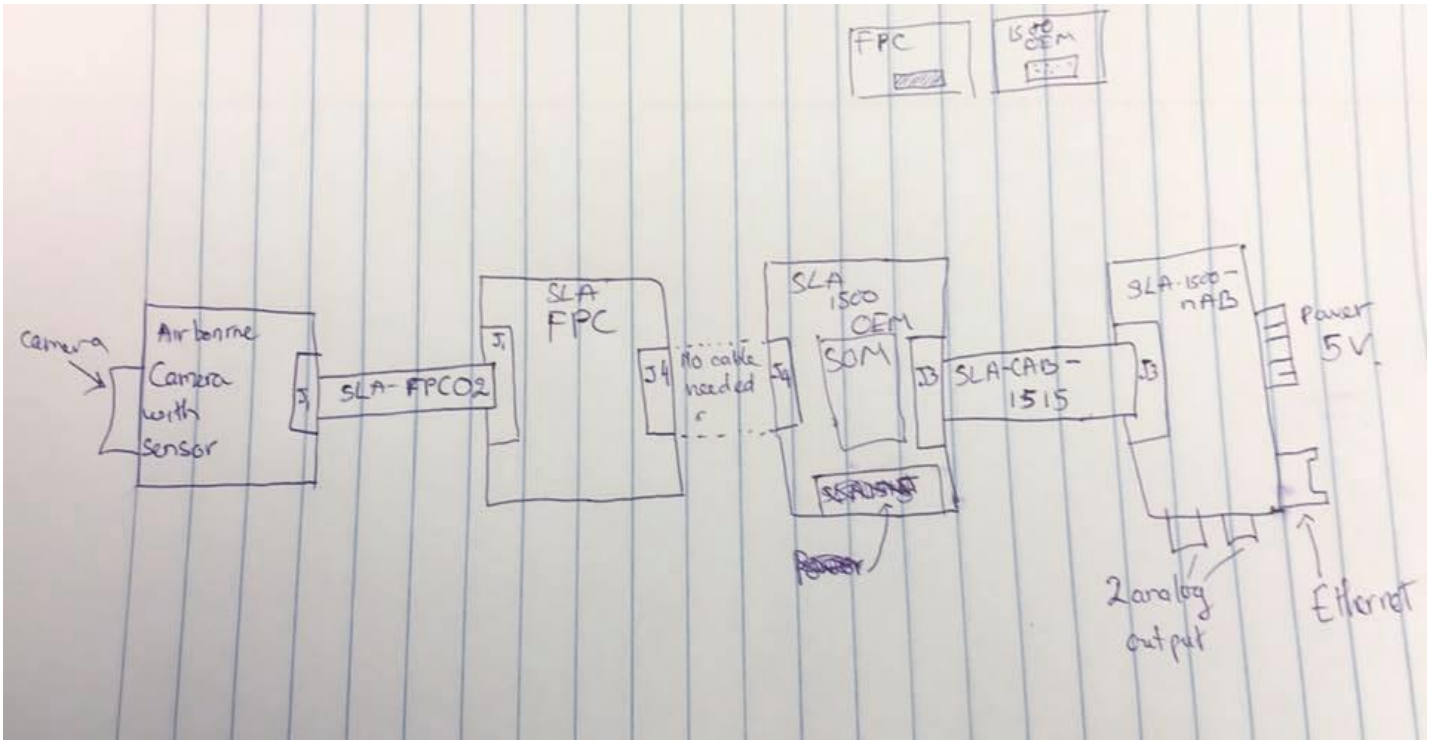


Fig 1. Basic assembly and connection

SLA-FPC 02: CABLE FFC 39 POS 0.3 MM 2” - part#: 150150239 -DigiKey

SLA-CAB-1515 – Specialize at Sightline (no part #)

J1: 39-POS, 0.3 MM – Molex – part #: 501912-3990

J4: part #: DF12B(5.0)-50DP-0.5V(86) [CONN header 50 POS 5MM SMD 0.5MM – Hirose] from 1500 OEM
CONN RECEPT 50POS 0.5MM GOLD SMD DF12-50DS-0.5V(86) from 1500 – FPC.

J3: CONN header 14POS 1.25MM VRT SMD – Molex – Part# 53398-1471

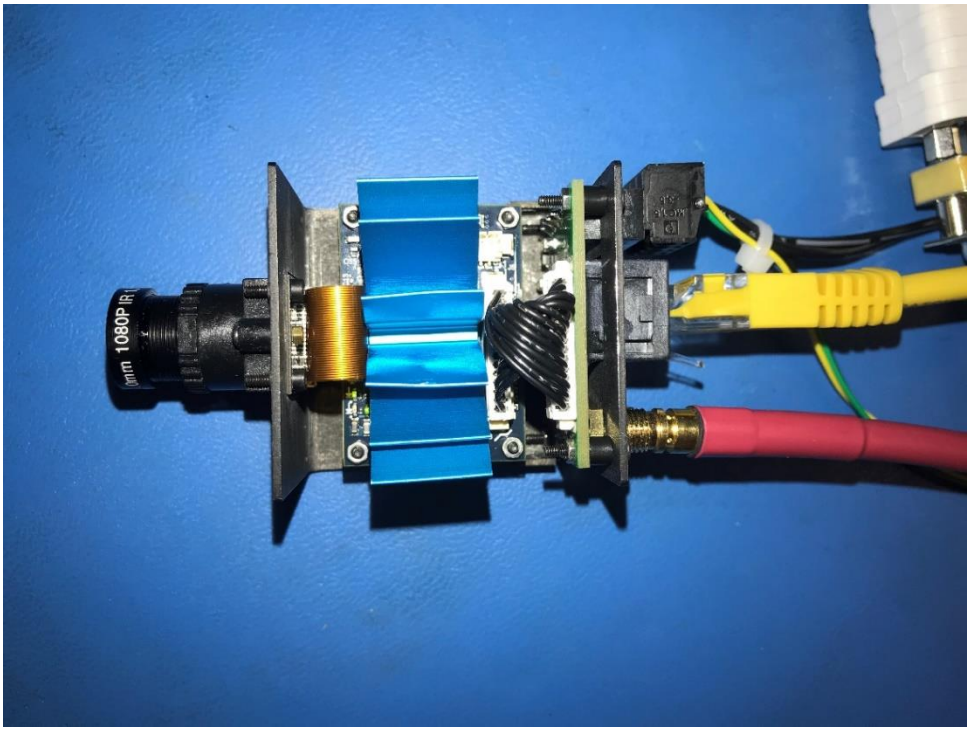


Fig 2. Assembled SLA hardware. Those external cables are: Ethernet, Analog out, and 5V power.

The hardware has been tested successfully.

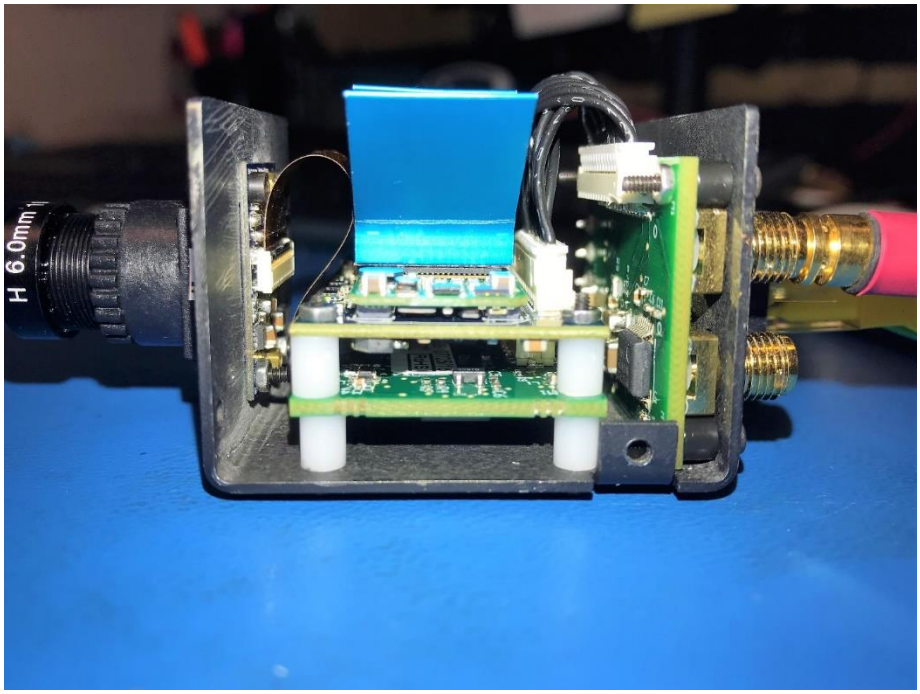


Fig 3. Assembled SLA hardware

Pixhawk 4 and Qgroundcontrol Initial Set up

Pixhawk 4 Basic information

Pixhawk 4 is only needed to setup and upgrade for the first time, it might need to do some additional update if the firmware on Qgroundcontrol change.

- Go to Qgroundcontrol: http://qgroundcontrol.com/ to download the software and help.
- For a quick summary of Pixhawk 4: https://docs.px4.io/en/flight_controller/pixhawk4.html

First, download and install the newest version of Qgroundcontrol to your ground control station (GCS) which I assumed is your laptop or PC.

In your Pixhawk 4 package, use the provided USB cable to connect the USB port of Pixhawk 4 to the GCS (I assumed it's your laptop or PC).

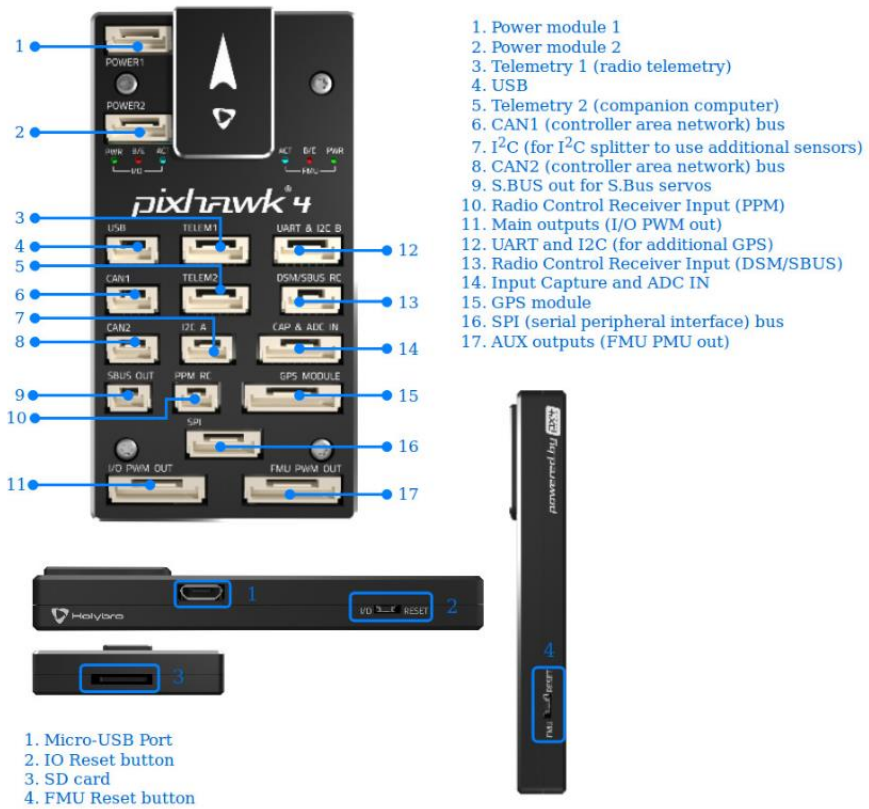
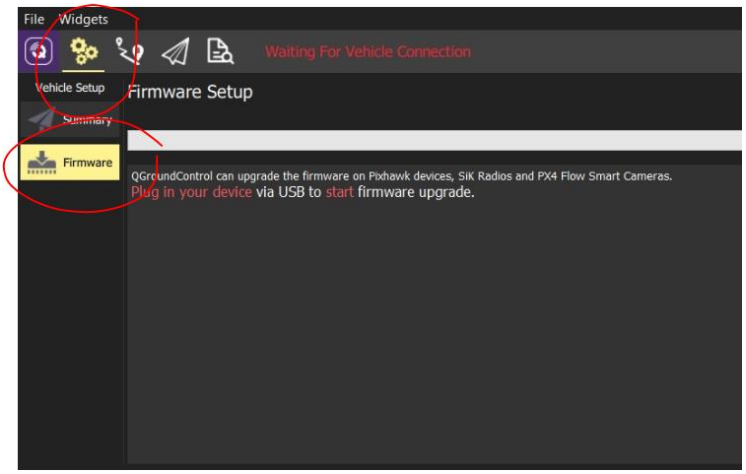


Fig 4. Pixhawk 4 connections

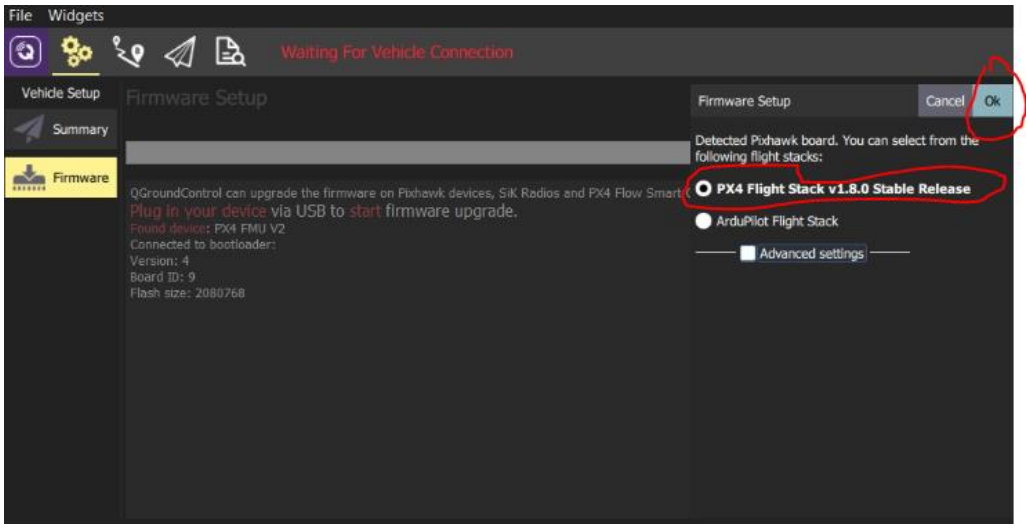
Pixhawk 4 Firmware update

Open your Qgroundcontrol in your GCS, the first thing it might ask you to do is **update the Pixhawk 4 firmware to latest version.**

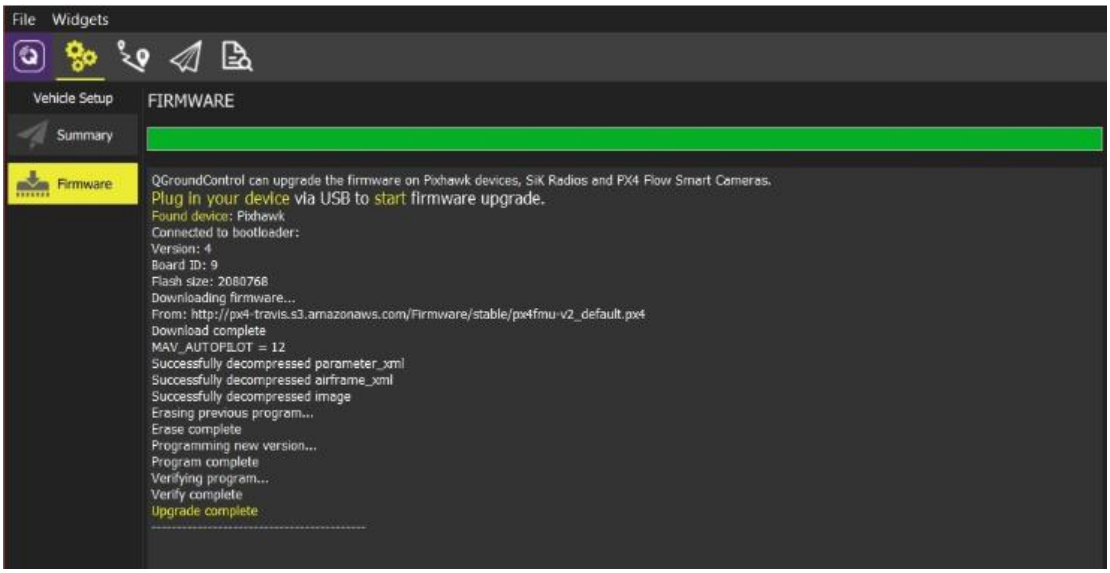
- Select the **Gear icon** (Vehicle Setup) in the top toolbar and **choose Firmware** in the sidebar.



- **Unplug** everything that you connected to the Pixhawk 4, then wait for a few second. If you have Telemetry sensor connected to your laptop or PC, unplug it too.
- You will soon see the Qgroundcontrol recognize the Pixhawk 4. Then plug in your Pixhawk 4 to start upgrade.



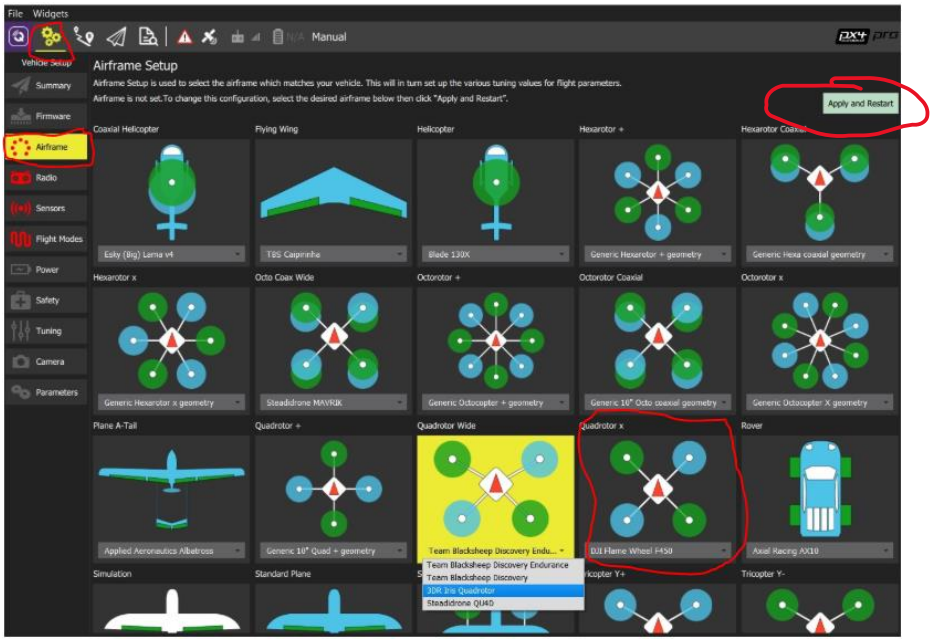
- Choose **PX4 Flight Stack** and choose **OK.**
- The update will be completed after a few minutes.



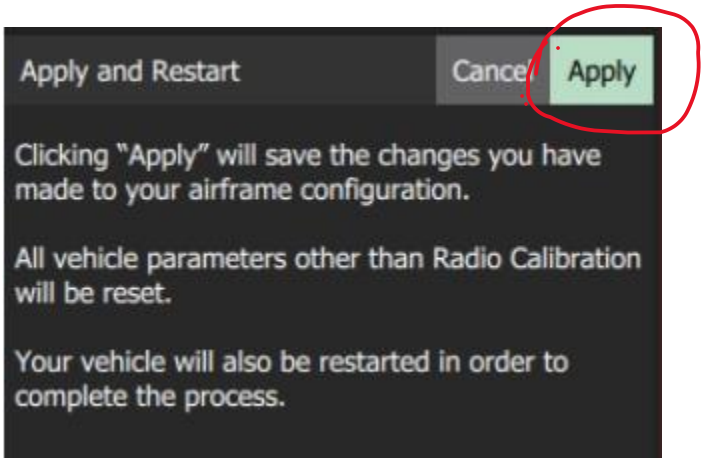
- **Power Cycle** your device before going to the next step.

PX4 Pro Airframe Setup

- Choose **Gear**, then choose the **Airframe** on the side bar.
- There will be a lot of option for airframe to choose. In this project, we used **Quadcopter X, and choose DJI Flame Wheel F450.**

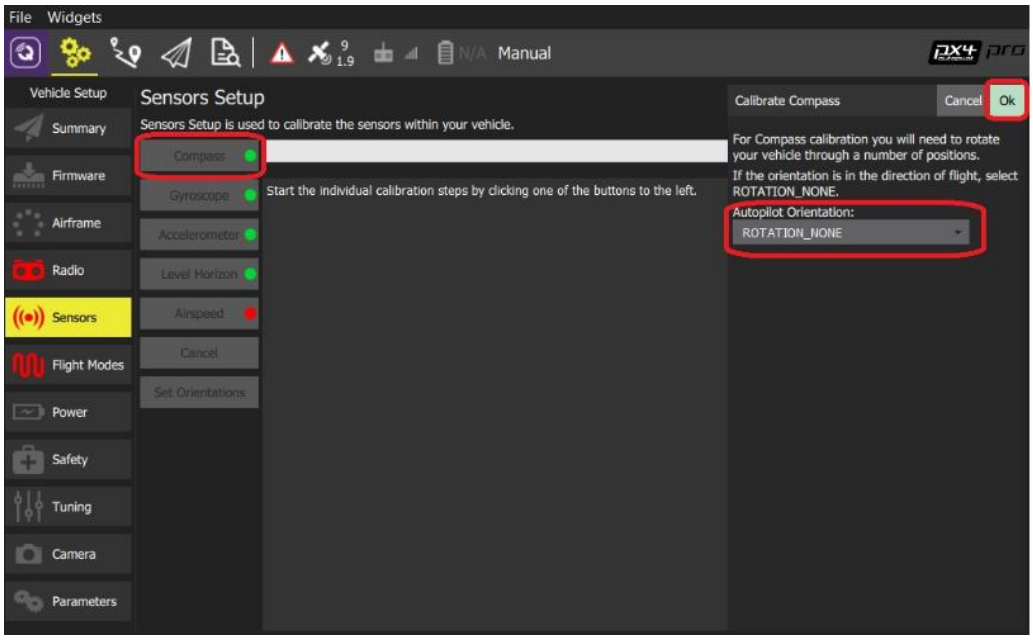


- Click **Apply and Restart** button on the top right.
- Choose **apply** again to save the setting and **restart** the vehicle.

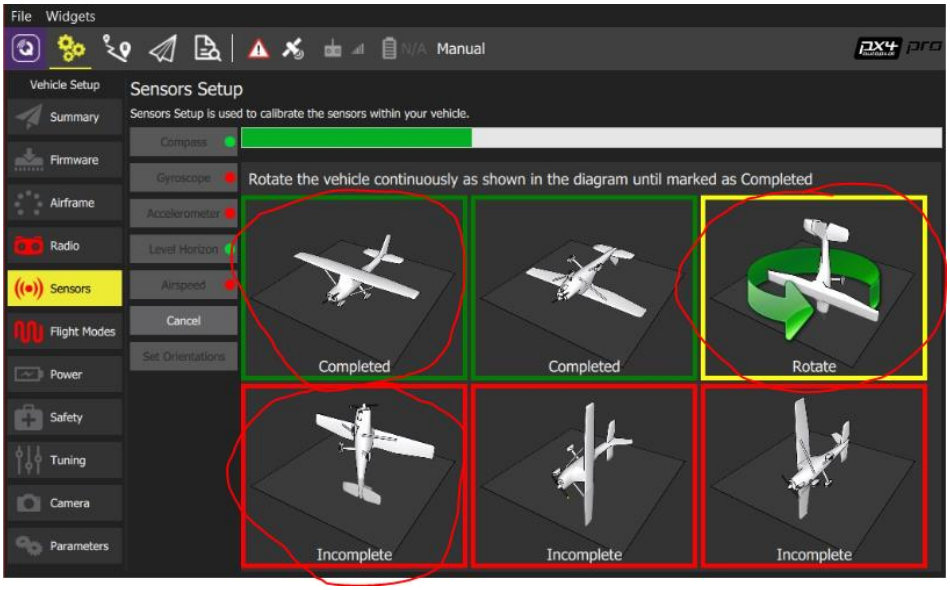


Sensor Calibration – Compass

- Choose **Gear** > choose **sensor** > choose **Compass**
- On the right, choose **OK** to calibrate Compass



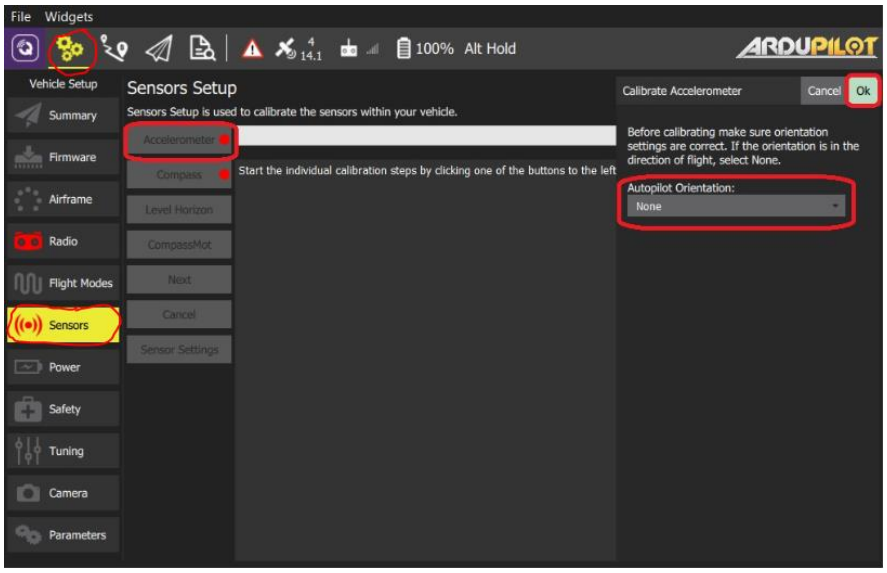
- Place the vehicle (Pixhawk 4) in any of **the orientation shown in Red**, **and hold it still** for a few second.



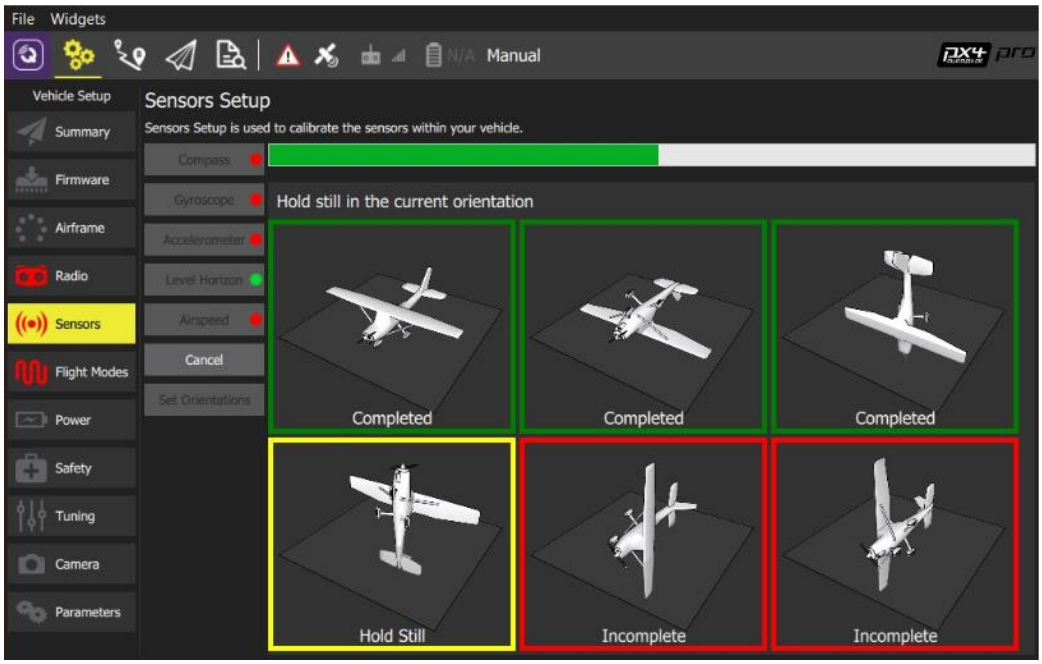
- Wait until the chosen orientation **image turn yellow**, then start rotating about 360 degree, follow their rotating direction, or until the chosen orientation shown **completed.**
- Continue to complete all 6 orientations.

Sensor Calibration – Accelerometer

- Choose **Gear** > Choose **Sensor** > Choose **Accelerometer**
- On the right, choose **OK** to start calibrating Accelerometer.



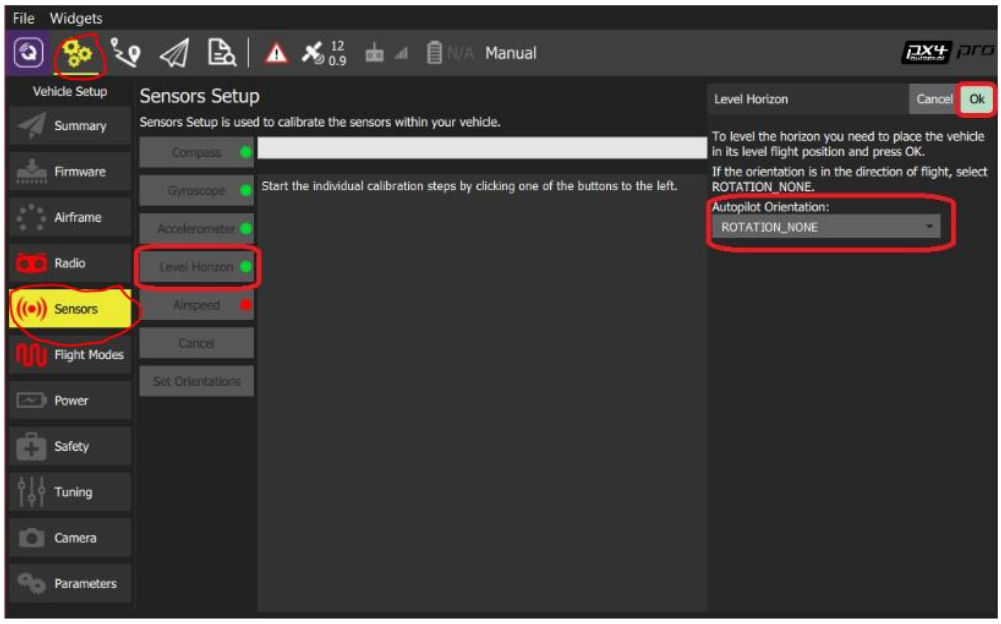
- Choose the orientation **shown in red**, hold the Pixhawk 4 still until the image turn **yellow.**



- Continue **holding it still** until it shown completed.
- Continue to complete all 6 orientations

Sensor Calibration – Level Horizon

- Choose **Gear** > Choose **Sensor** > Choose **Level Horizon**.
- Place vehicle, Pixhawk 4, on the **horizontal surface** or on the top of quadcopter
- On the right, choose **OK** to start level horizon calibration



- Keep the vehicle in the **same position** until the calibration completed

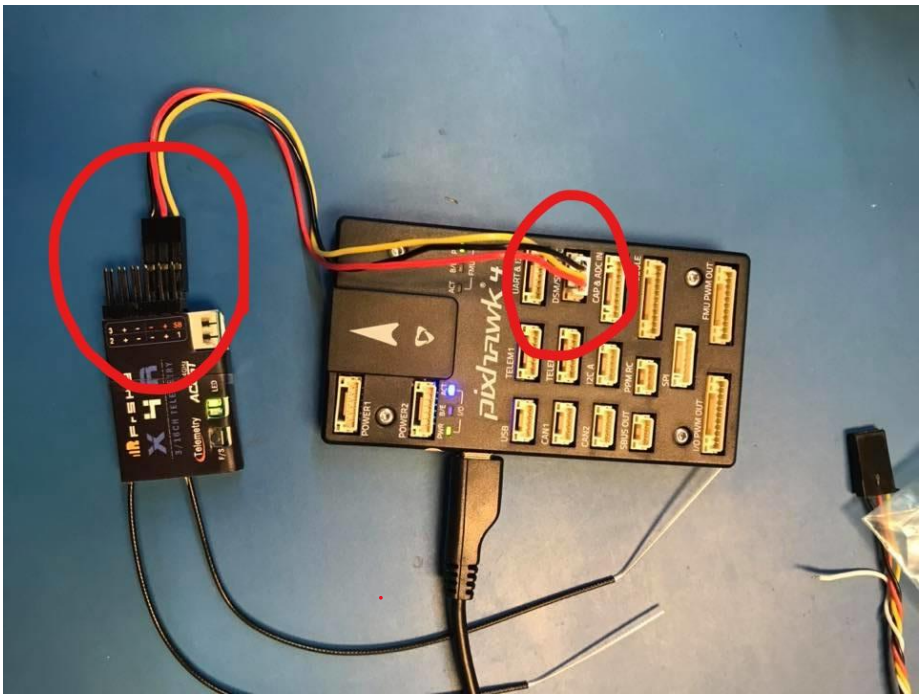
NOTE: For sensor calibration, you only need to perform calibration for those shown in red (have a big red dot on their name). For those shown in green, you don't need to perform calibration.

Radio Setup

The radio setup procedure has 2 main steps: Binding receiver and transmitter; and Radio setup on Qgroundcontrol.

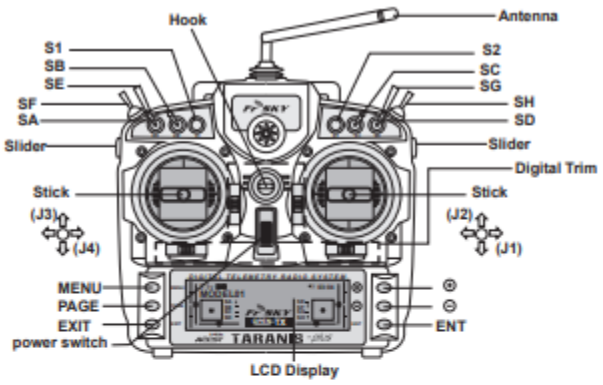
Binding receiver and Transmitter

- Grab your transmitter (Taranis plus X9D) ready.
- Connect the X4R receiver (or similar receiver) to the Pixhawk 4 via **DSM/SBUS RC** port. Pixhawk 4 **has 5-pin molex SBUS RC and 5-pin molex DSM RC** which can be able to connect with X4R via **3 pin-header**. Use the **SBUS RC 5 pin molex** to connect with X4R on the **bottom 3-pin header** connection (SB + -).



- On receiver, X4R, **hold the F/S button**, and turn on your transmitter at the same time.

- **Release the F/S button**. On X4R, we will see the **green light is on, and the red led is flashing** which is indicating the binding mode is ready.
- On transmitter, skip those starting-up warning by press **exit button**, until you reached the main menu.

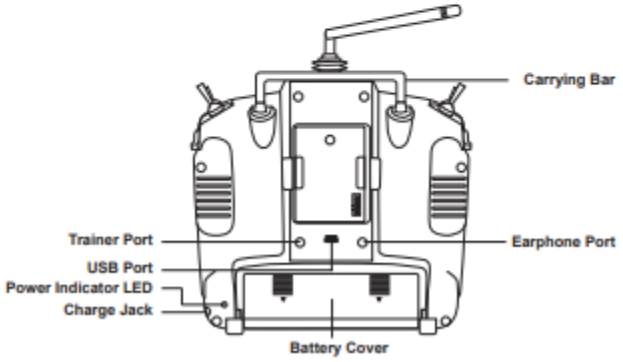


Overview

(Switch Default Settings)

- SA: 3 positions, Short Lever
- SB: 3 positions, Long Lever
- SC: 3 positions, Long Lever
- SD: 3 positions, Short Lever
- SE: 3 positions, Short Lever
- SF: 2 positions, Long Lever
- SG: 3 positions; Short lever
- SH: 2 positions, Momentary; Long Lever

You can choose the Switch and define its positions in the Mixer menu.

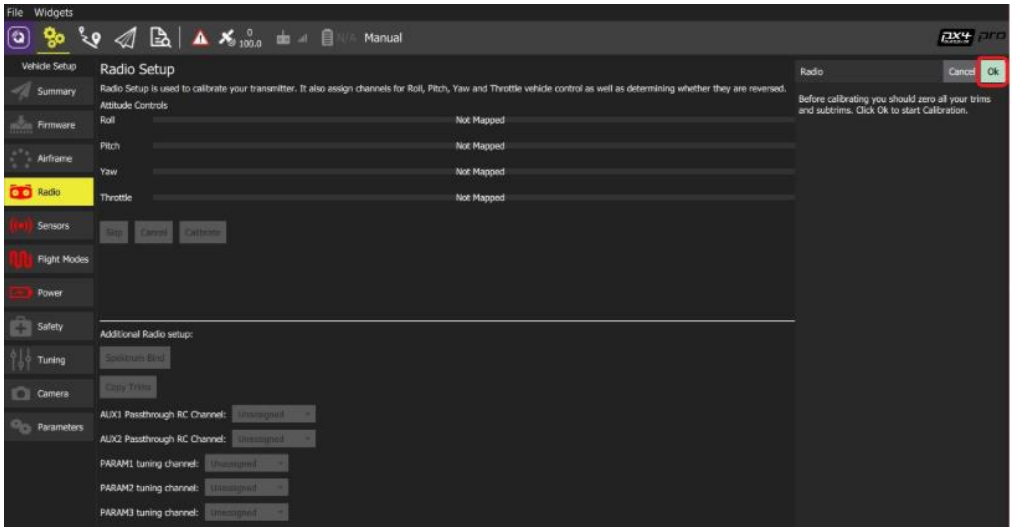


- Press **Menu button** and choose the model that you want to operate. I choose the first model and changed its name to "**DJI F450**".
- Press **enter** choose to the model, press **Page** to open the model description.
- Use **+ button or – button** to move up or down.
- Move to the **Internal RF** option, and choose the following:
  - **Mode: D16**
  - **Channel Range: CH1-8**
- Move the cursor to [**Bind**], and press **Enter**. You will hear the **bird chirping sound** which indicated the binding was successful. Now **power cycle** both radio control transmitter and the X4R receiver.
- The X4R now will have a **green LED light ON**, indicated that the X4R is ready to receive the command from the RC transmitter.

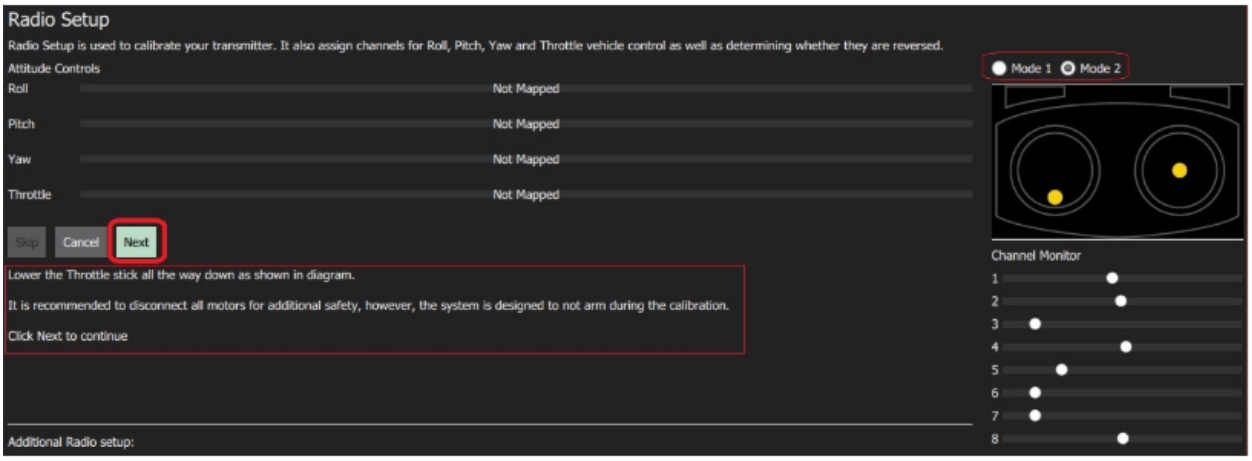
For more information about transmitter and receiver, please use X4R receiver and Taranis plus X9D user manual.

Radio Setup on Qgroundcontrol

- On Qgroundcontrol interface, choose **Gear** > Choose **Radio**.
- On the right, select **OK** to start the calibration.



- On the right, **select the transmitter mode**. The chosen mode should be matched with your transmitter sticks' position.
- On your transmitter, move the stick following the location was indicated in the transmitter image. Press **next** when the sticks are in the indicated position.

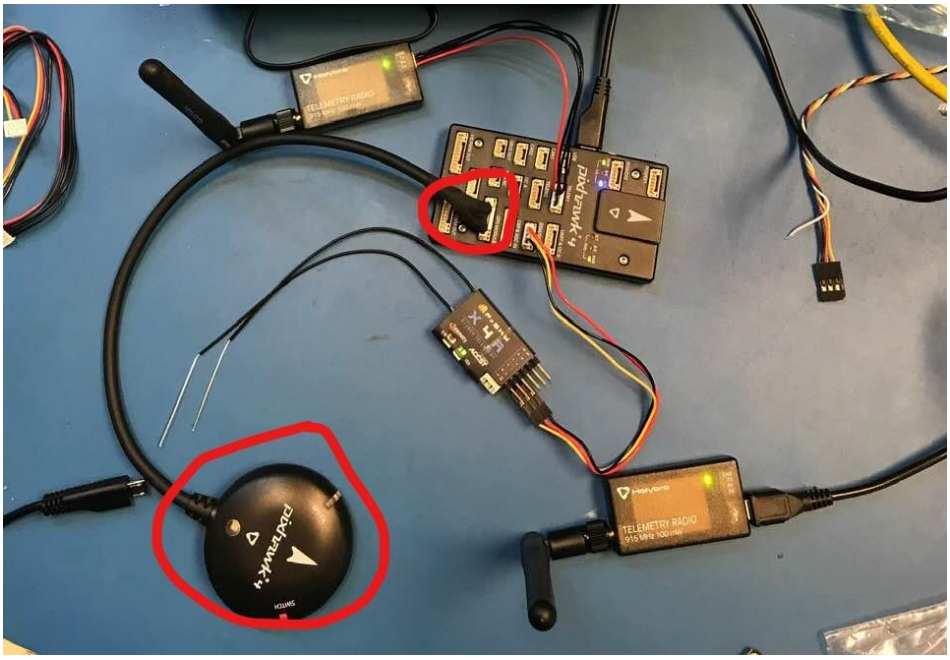


- Repeat for all position until complete. When you move the sticks, you will able to observe the stick motion on the Channel monitor.
- Press **next** to save the setting.

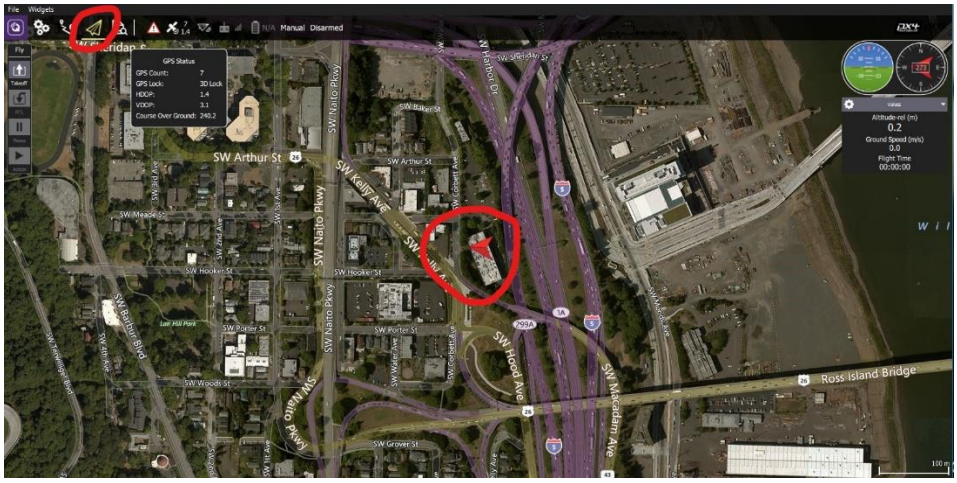
Note: Additional setting are Flight modes, battery, safety which are recommended but not required. You can comeback to do all the setting you want later.

The Initial setup for Pixhawk 4 and Qgroundcontrol is completed.

GPS setup



- Connect the GPS to the Pixhawk 4 via GPS Module port, the blue LED will be flashing, then followed by the slow flashing red LED which indicated the connection was successful.
- On the Qgroundcontrol, to the flight symbol on the top, then you will see a red arrow which indicated for the vehicle.
- Try to turn your vehicle around, you will see the arrow is also turning followed your actual vehicle direction.
- On the Qgroundcontrol interface, you will also see the speed and altitude of your vehicle.



Silk Telemetry Radio Wireless:

The Pixhawk 4 kits will have 2 Telemetry Radio Wireless, they both have the same function. One connected to Pixhawk 4 will be receiver and one connected to your laptop is transmitter.

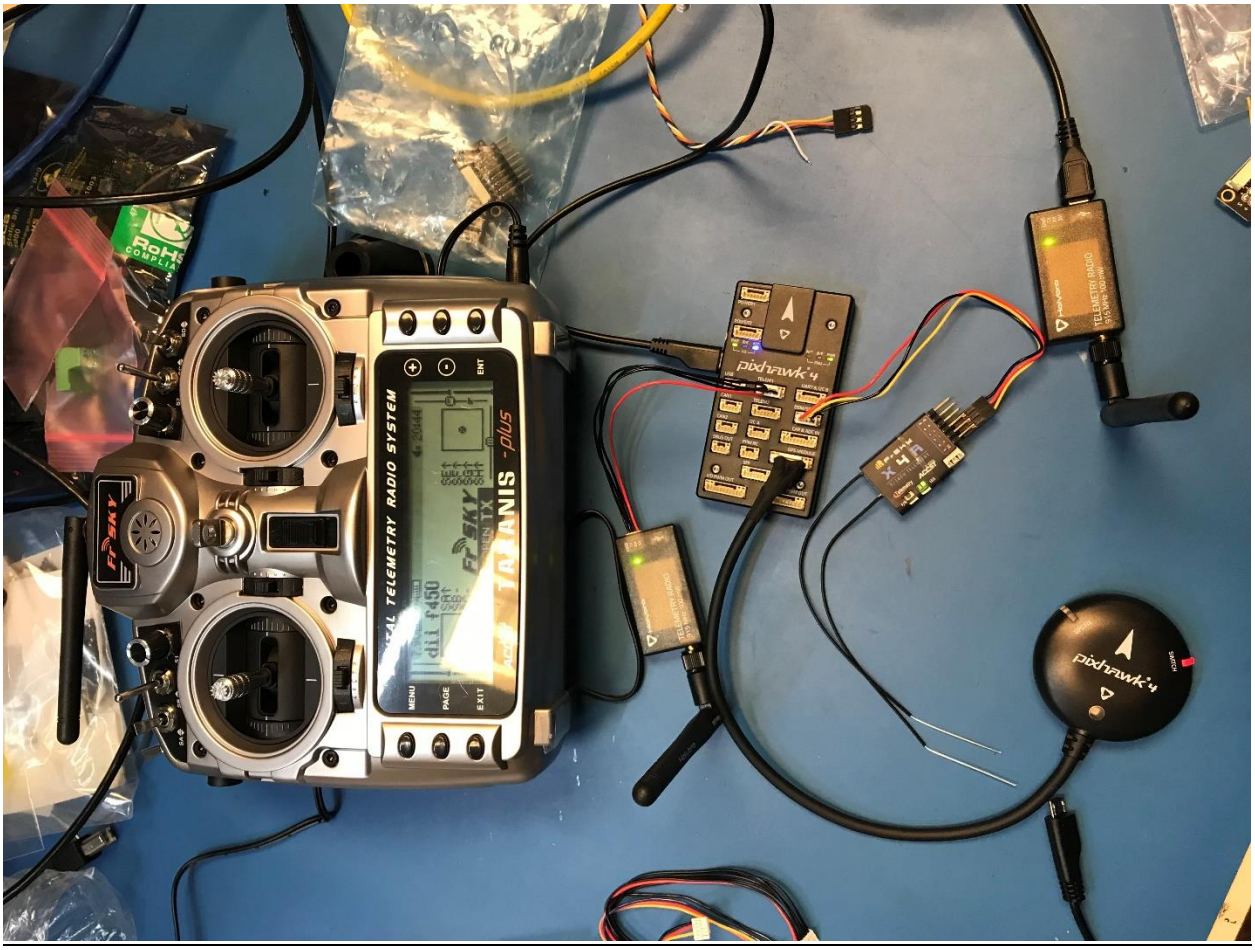
Upgrade the firmware for Silk Radio Telemetry

- Connect your first Telemetry Radio Wireless to your laptop
- Choose Gear > Choose firmware
- Unplug your Pixhawk 4 as well as your Telemetry from your laptop.

- Only connect your Telemetry to your laptop to upgrade your telemetry to the same firmware as your Pixhawk 4. After connecting your Telemetry to your laptop for a few second, you will see the Qgroundcontrol recognize your Silk Radio Telemetry.
- On the right, click OK to start upgrade firmware for your telemetry.
- Wait until it complete. Unplug your telemetry.
- Repeat the same procedure for your second telemetry.

Connect the Telemetry to our Pixhawk 4 and Qgroundcontrol

- One telemetry will be connected to Pixhawk 4 via Telemetry Port 1.
- Another telemetry will be connected to your laptop.
- Wait for a minute, until both telemetries have orange LED flashing which meant both telemetries are communicated to each other.



Debug:

Your laptop can't recognize the Pixhawk 4

Try to connect Pixhawk 4 direct to your laptop port, not through USB hub. If the issue still persisted, **use different laptop.**

Radio Setup problem.

If you have a problem with radio setup in Qgroundcontrol, or you got an error message such as "..need 5 pin connected…". **Please check the connection between X4R and Pixhawk 4, and make sure you connected to the right location in X4R.**

UART & I2C B port *

Pin	Signal	Volt
1(red)	VCC	+5V
2(black)	TX(out)	+3.3V
3(black)	RX(in)	+3.3V
4(black)	SCL2	+3.3V
5(black)	SDA2	+3.3V
6(black)	GND	GND

*A spare port for connecting sensors supporting serial communication or I2C e.g. a second GPS module can be connected here.

Connect SLA hardware to Pixhawk 4

Connect SLA hardware to Pixhawk 4 using UART (serials). UART will provide 5V input voltage and 1.5 A Max current which is good for 1500 OEM.

Cut one end of the molex – 6 pin cable. Remove I2C pin (pin 4 and 5) then connect with 4-POS-M-Pin from Sightline.

Open SLA Panel Plus and verify that you are able to stream the Video on Panel Plus.

How to stream the video from Panel plus to Qgroundcontrol? Please refer to Sightline document which can be accessed here: https://github.com/phamtaiece/Capstone-Sightline/blob/master/Sightline%20Docs/EAN-Ground-Control-Stations.pdf

Airframe: Quadcopter DJI Flame Wheel F450 Assembly (Kimball)

The assembly instructions from the DJI F450 user manual were more of an assembly diagram.

The following shows step by step how the F450 frame was assembled for the project.

Figure 1 DJI F450 kit

Figure 2: In the kit there are 2 clockwise motors and 2 counter clockwise motors. The CW motors have a dimple on the rotor shaft the CCW motors do not.

Figure 3: The motors were attached to the arms with the screws provided with the motors oriented according to the user manual.

Figure 4: The ESC length was measured to get rid of any additional slack

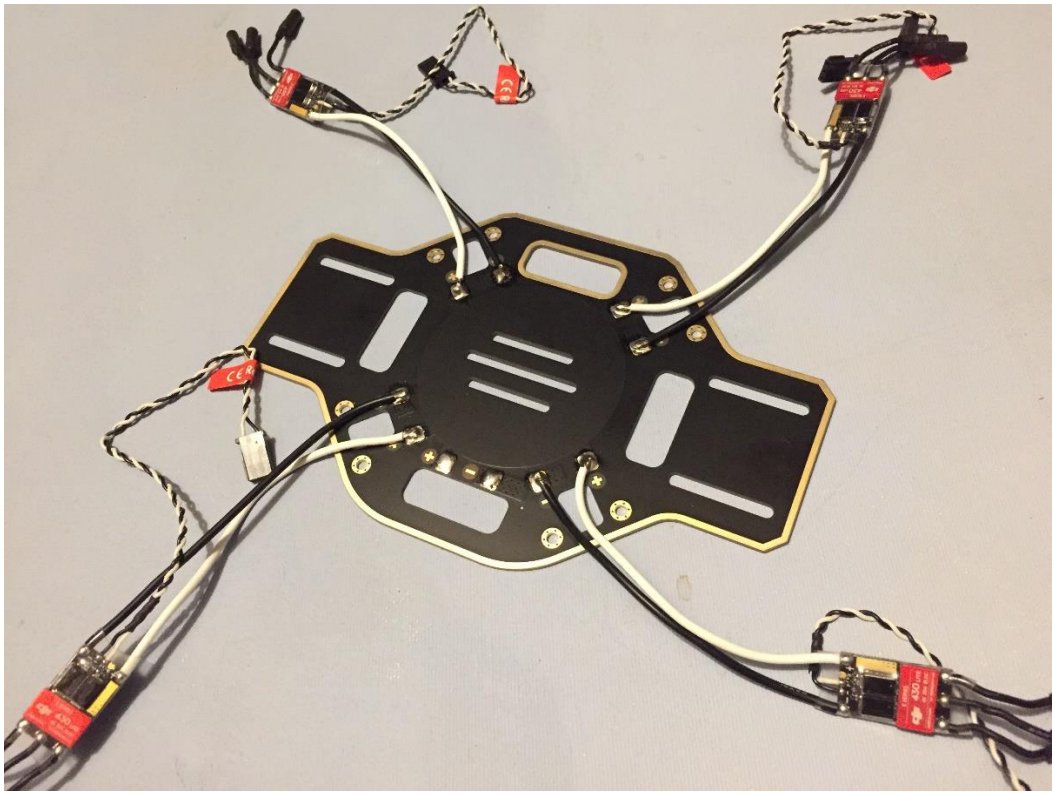


Figure 5: The ESC wires were cut to length then soldered to the base plate.

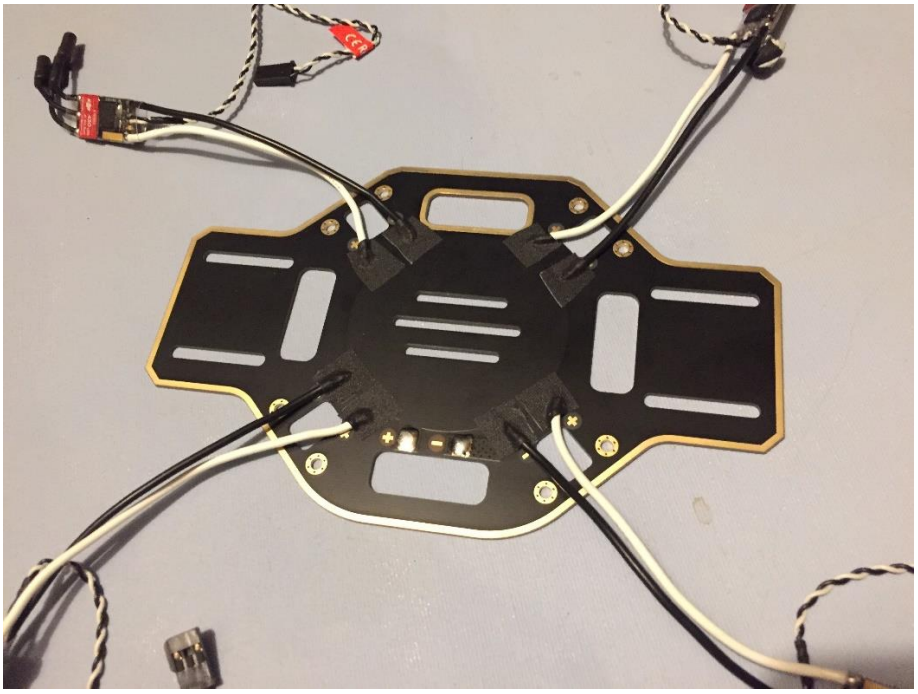


Figure 6: Insulating tape was applied over the solder joints.

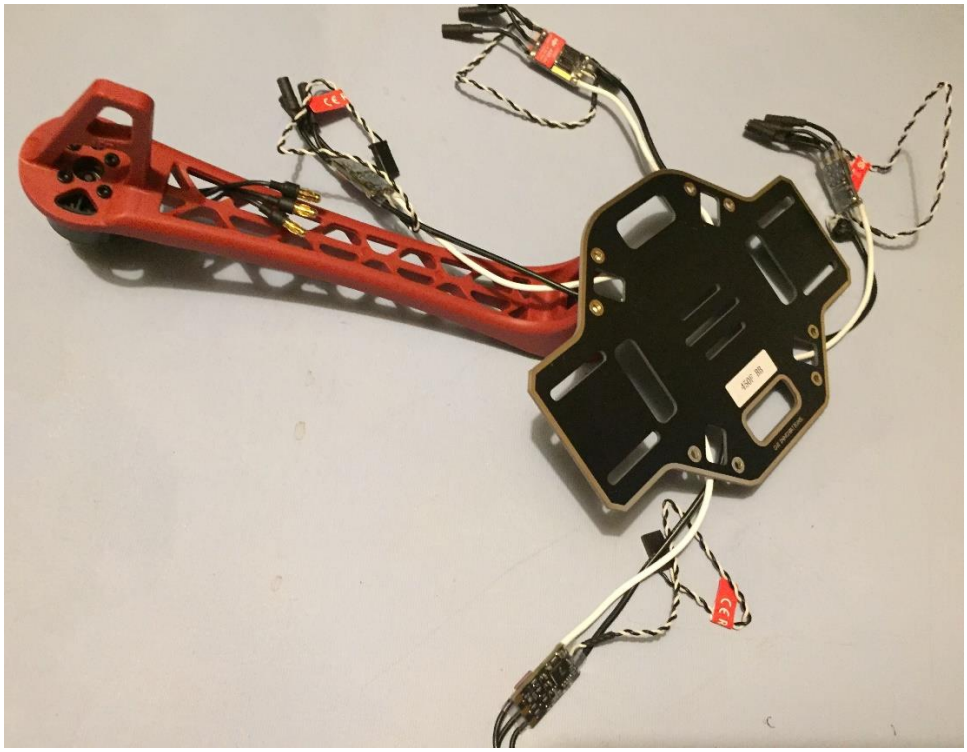


Figure 7: The base plate was flipped over onto one of the red arms, again the motor orientation from the user manual was observed. The arm shown has a CW motor attached.

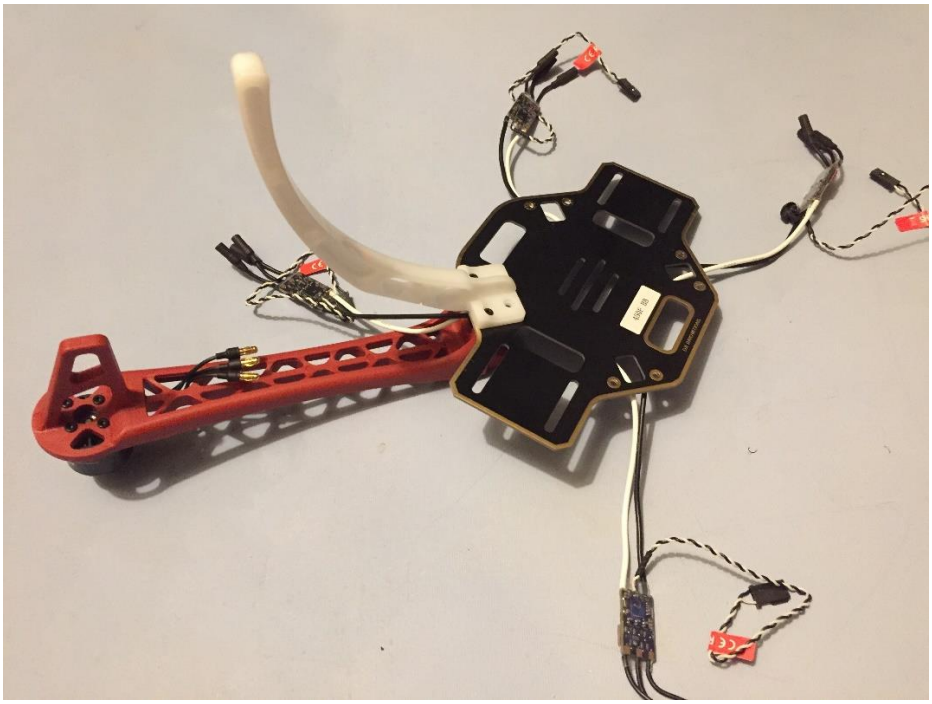


Figure 8: The landing gear and the frame arms are attached to each other with two screws through the base plate.

Figure 9: The process was repeated for the remaining three sets of arms and landing gear making sure to orient the CW and CCW motors according to the user manual.

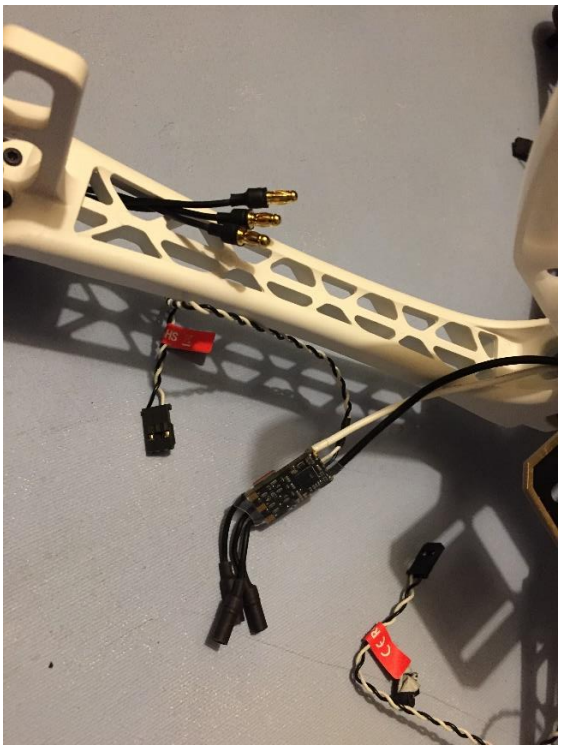
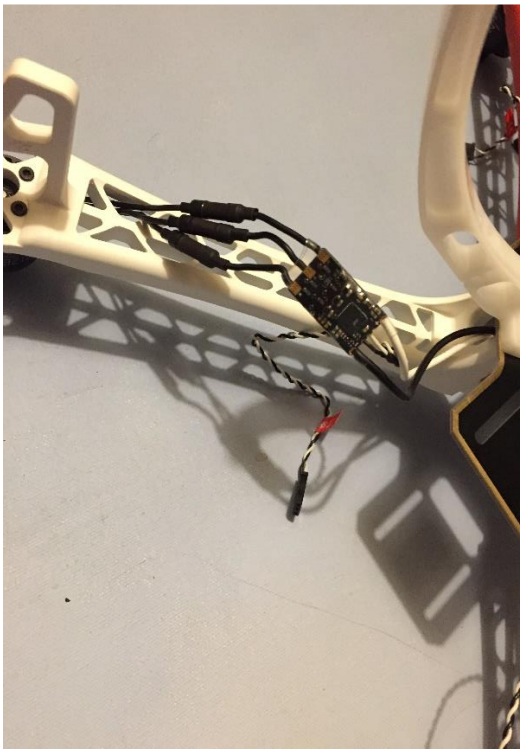


Figure 10: The ESC's were connected to the motors and the wires secured to the frame with zip ties as shown below.



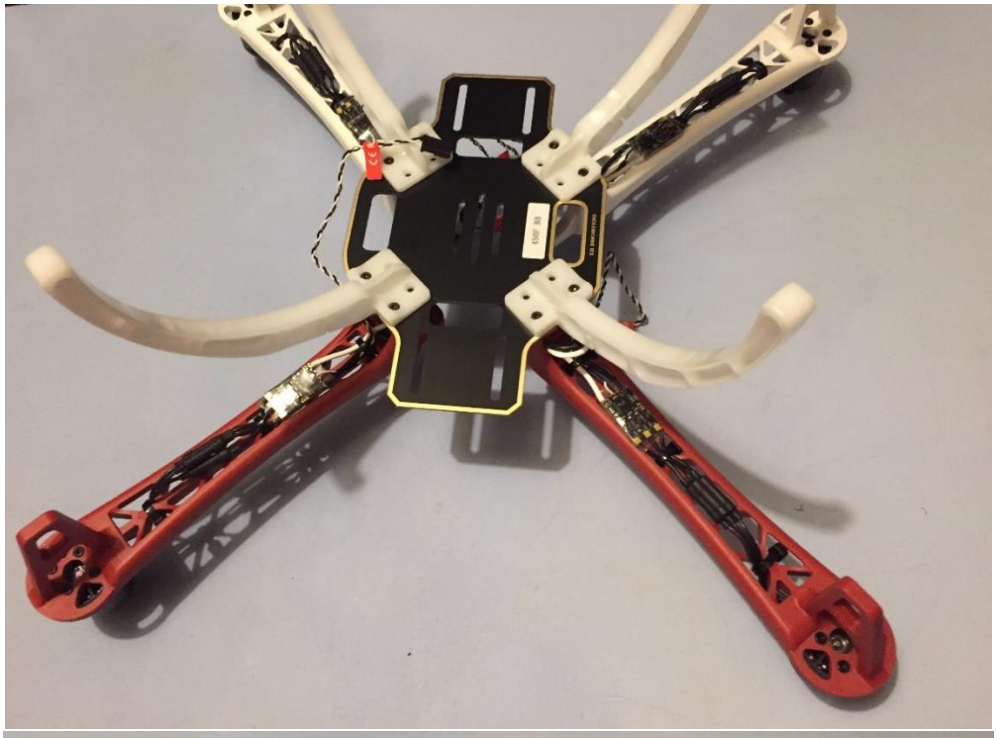


Figure 11: The top frame plate was then attached.

Figure 12: Then the propellers were attached.

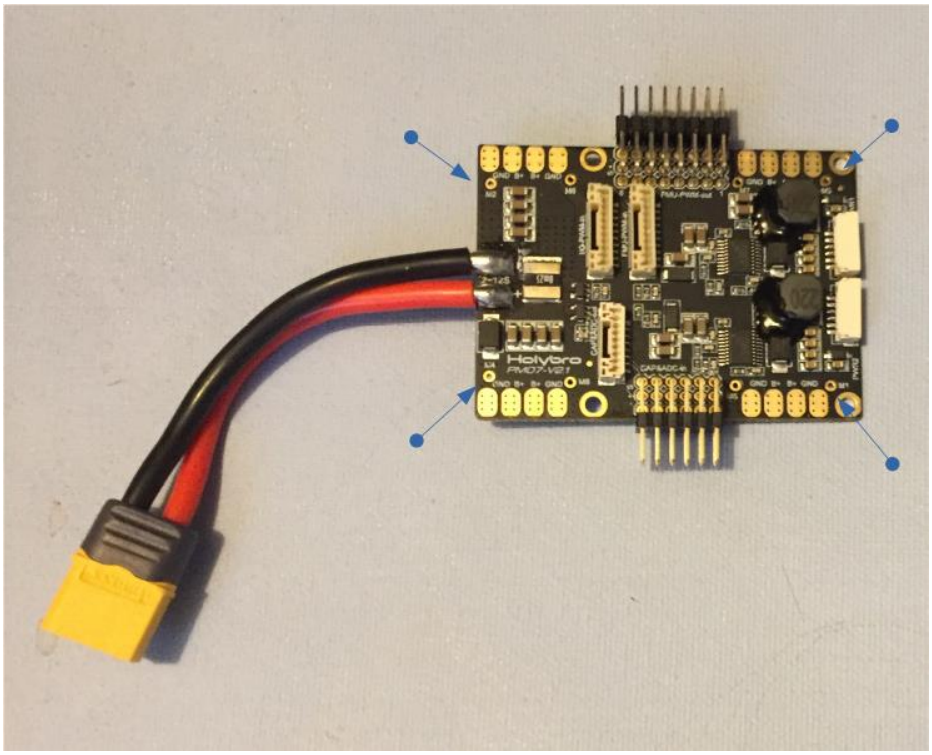


Figure 13: The ESC signal connections for the power management board have to be soldered on. The ESC connections from the motor are 3-pin 0.1" servo connectors with a twisted pair.

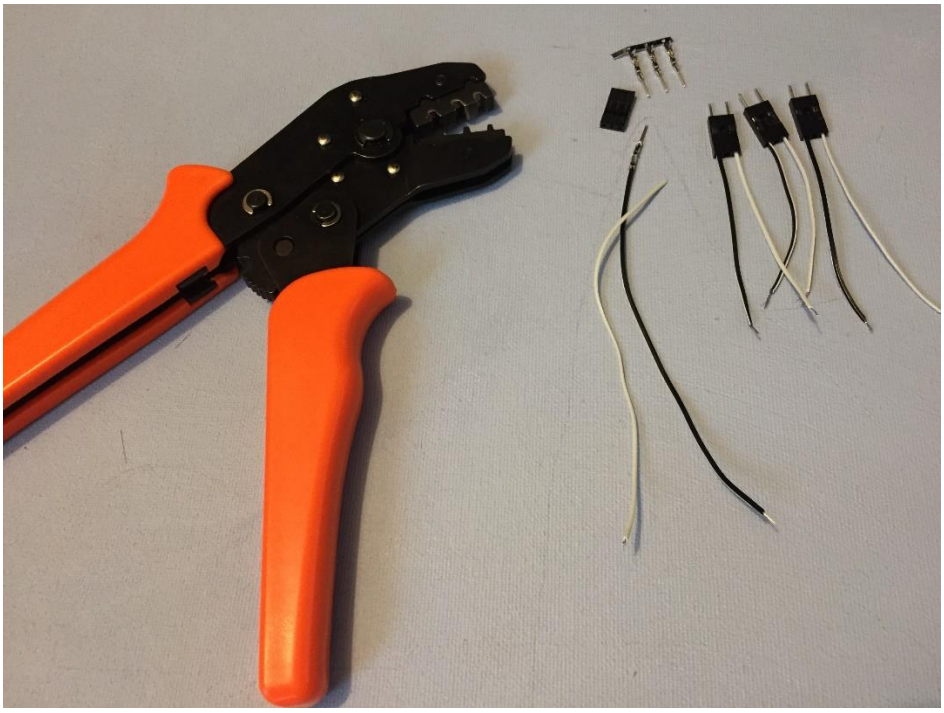


Figure 14: Instead of soldering the ESC connections directly to the PMB, custom cables were made to connect to the servo connectors from the ESC.

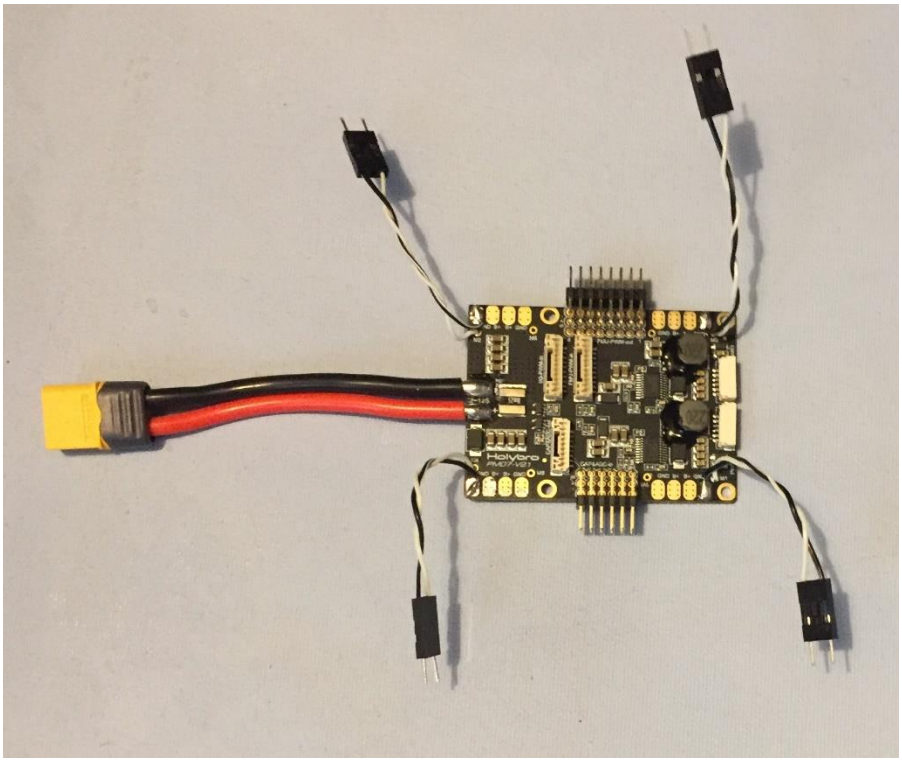


Figure 15: The cables were then soldered to the PMB.

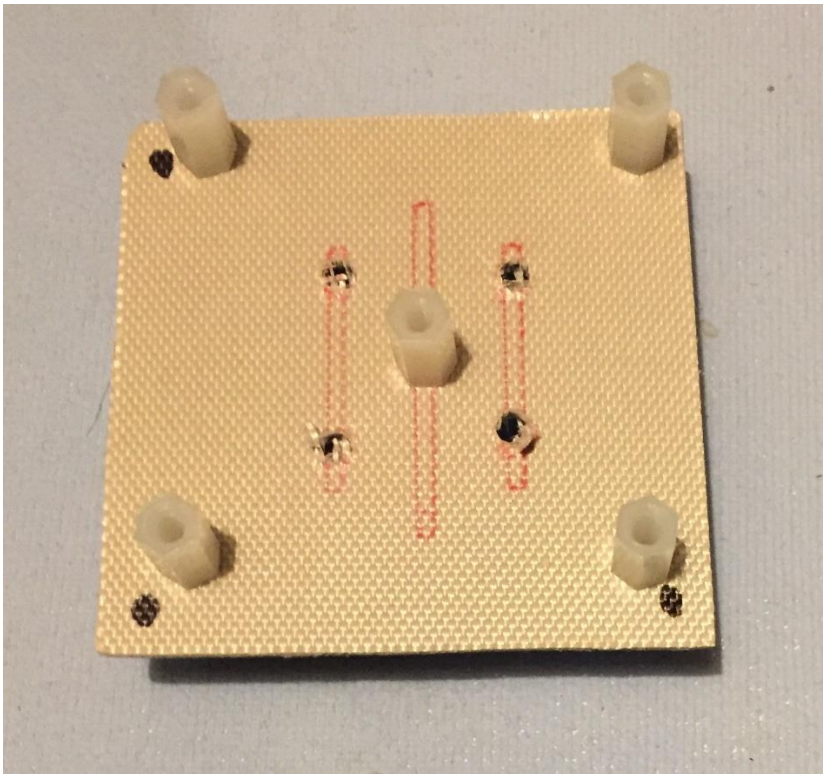


Figure 16: A custom carriage for the PMB was constructed from copper stripped FR4 laminate and nylon standoffs (Bottom View).

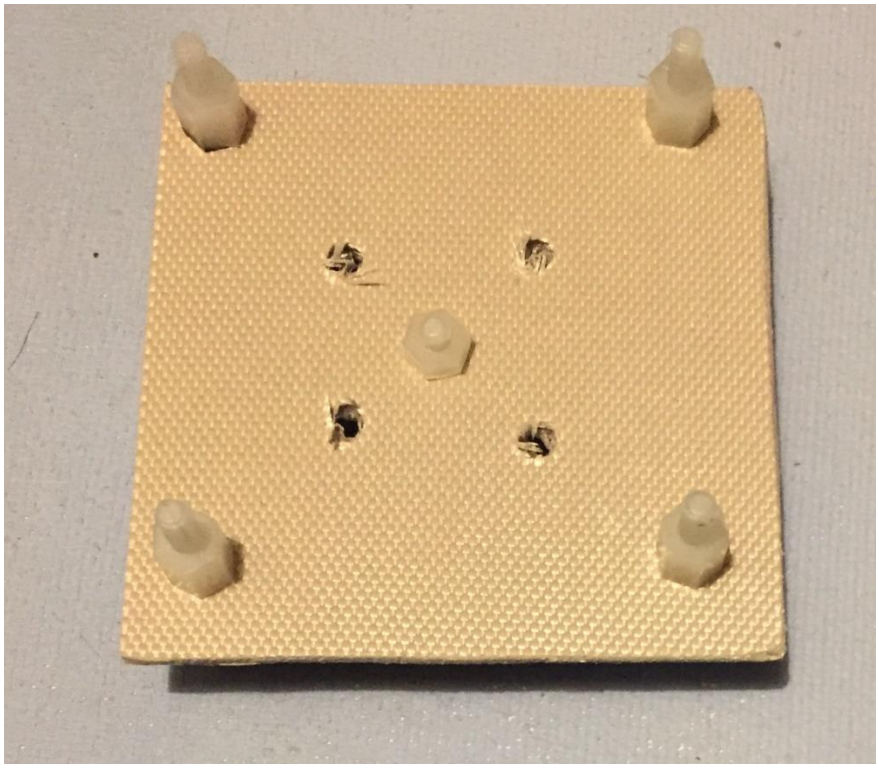


Figure 17: PMB carriage (Top View)

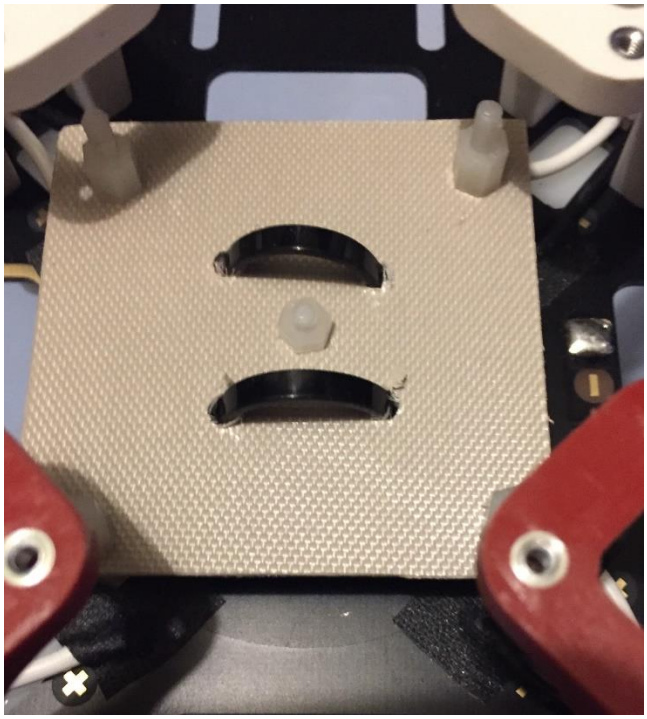


Figure 18: The PMB carriage was attached to the bottom plate in the middle of the F450 frame(Top View).

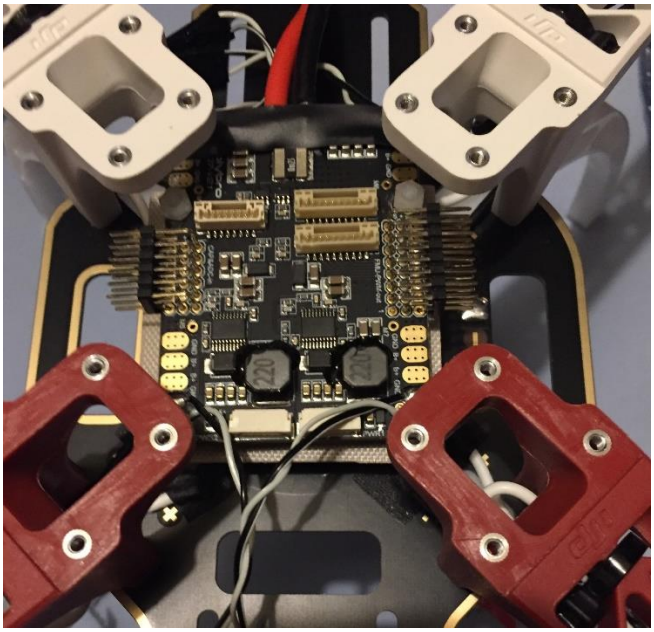


Figure 19: The PMB was then attached to the carriage.

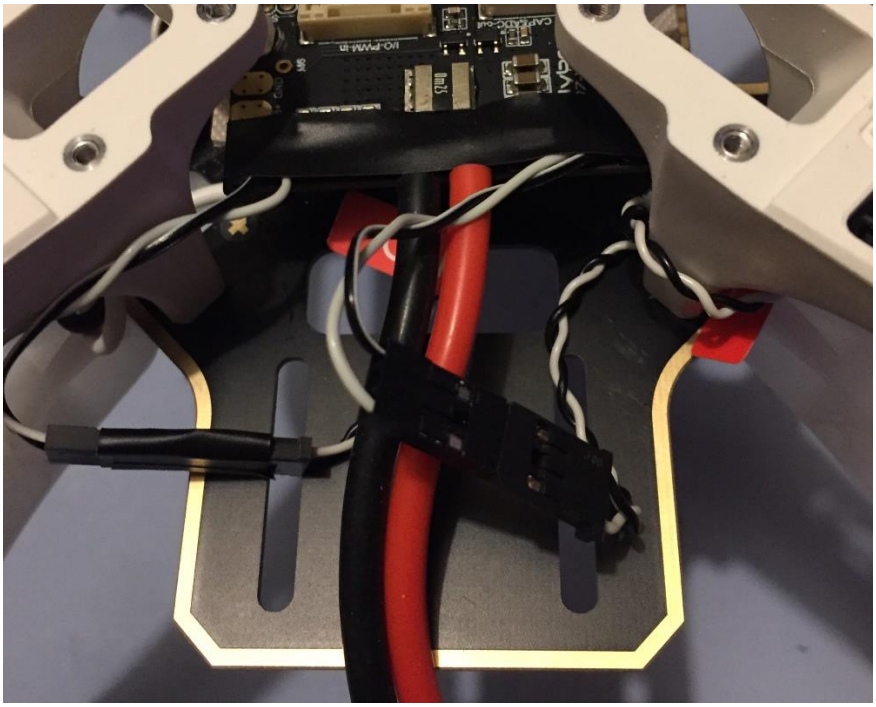


Figure 20: The ESC signals M1-4 were connected to the PMB.

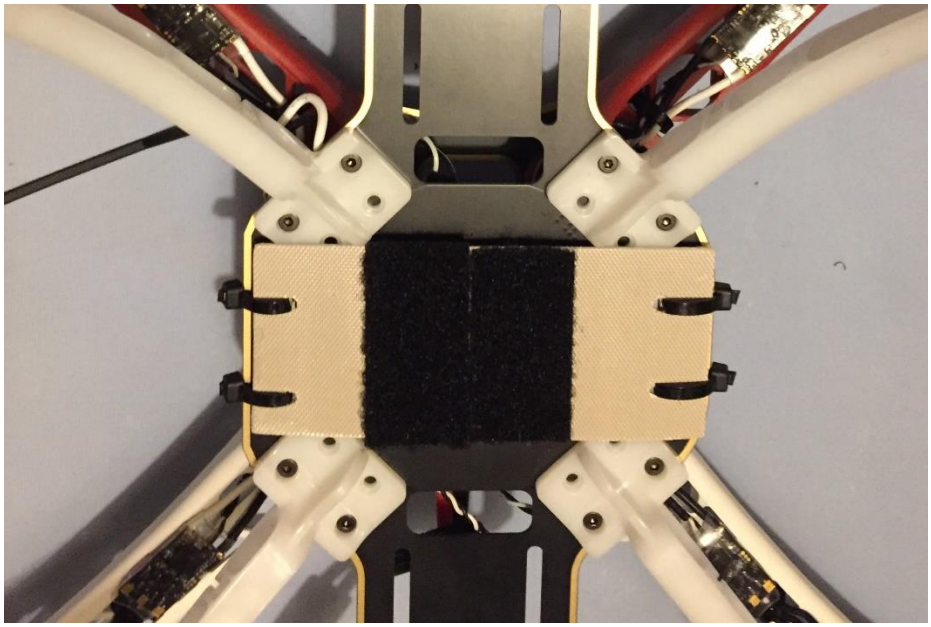


Figure 21: A battery carriage was created out of the same material with added velcro and zip tied to the bottom plate.

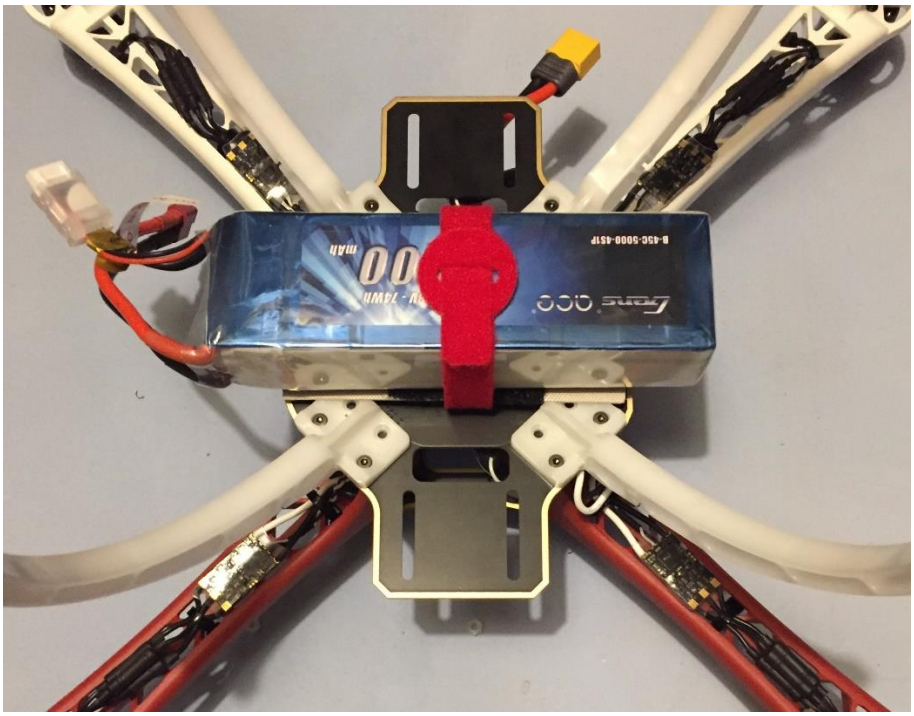


Figure 22: Battery attached to carriage with velcro and velcro strap

Figure 23: DJI F450 frame with motors, ESC, Pixhawk PMB, and battery installed

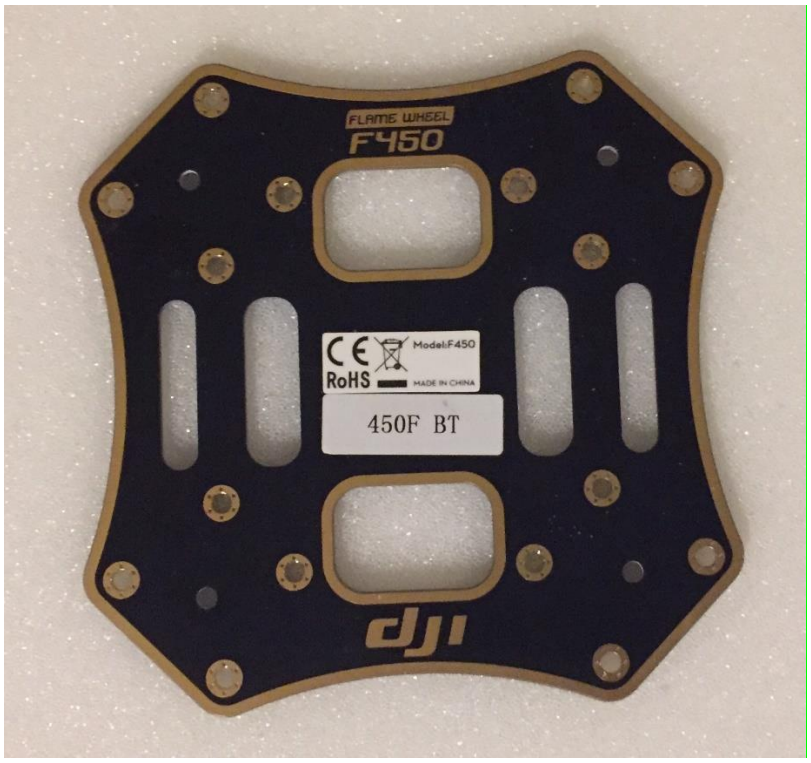


Figure 24: The top plate was removed, and holes were drilled for standoffs.

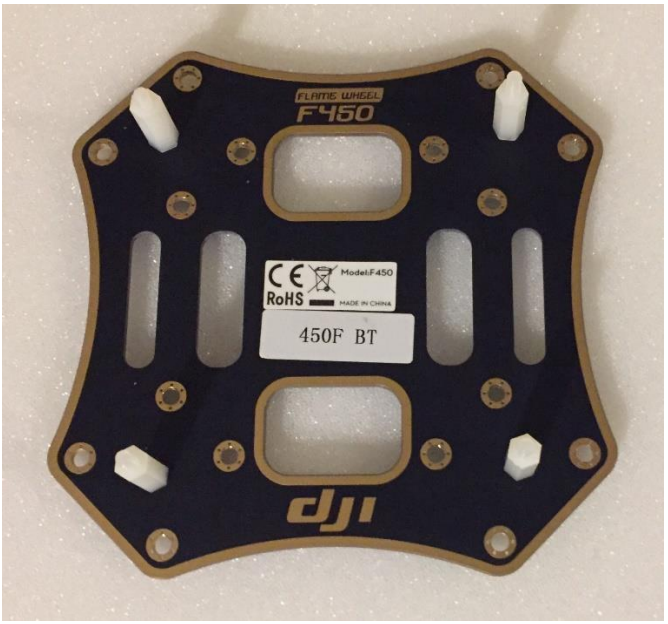


Figure 25: Nylon standoffs were installed

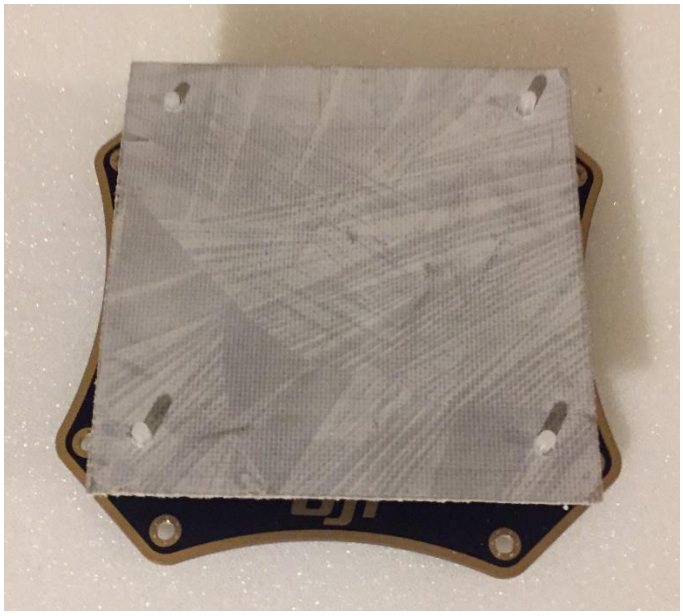


Figure 26: A bottom plate for the antivibration carriage was made out of copper stripped FR4 and attached to the standoffs

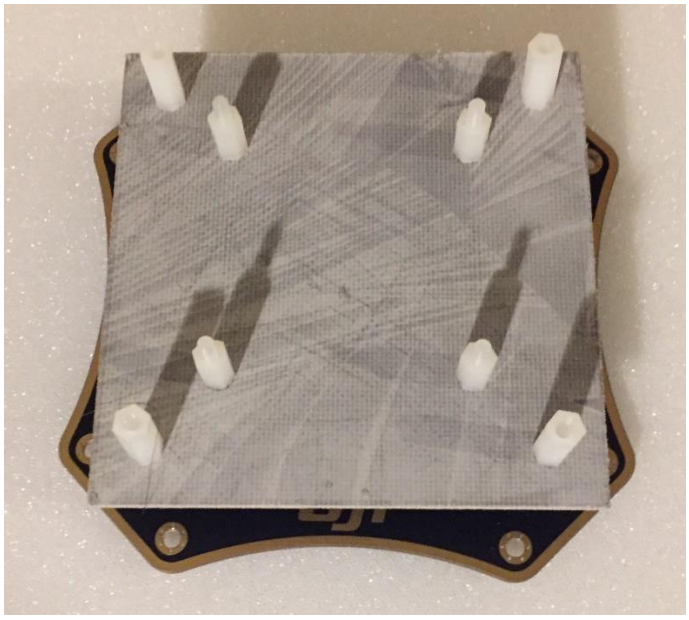


Figure 27:Additional standoffs were installed for the antivibration carriage

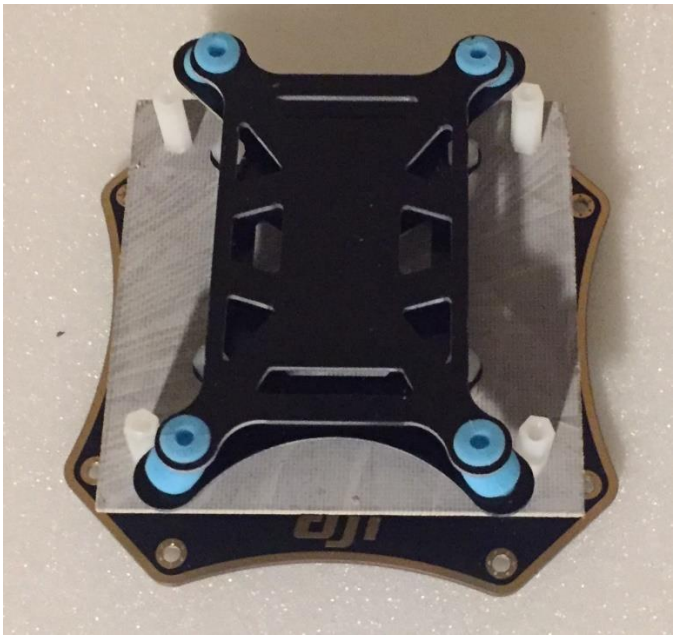


Figure 28:Antivibration carriage installed on top plate.

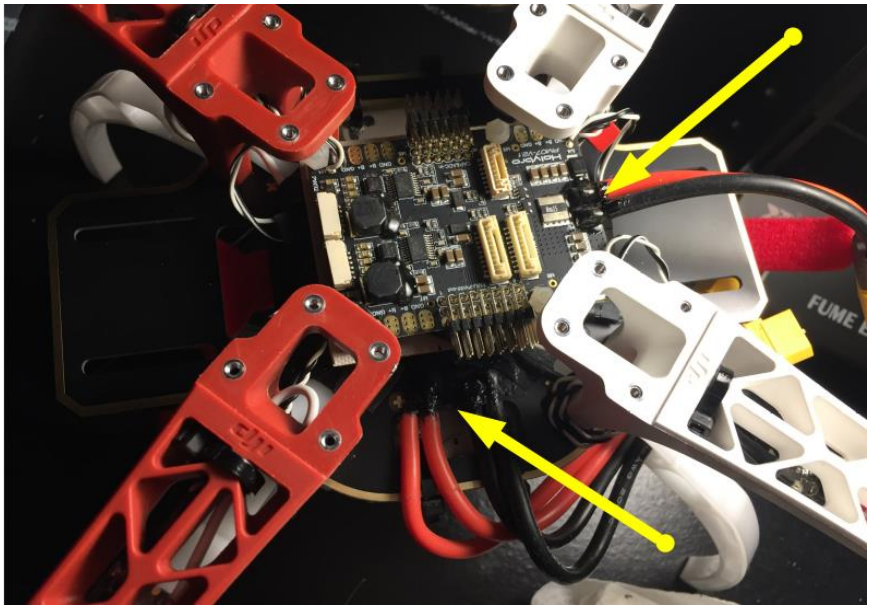


Figure 29: While the top plate was off, the power connections were soldered to the bottom plate. Liquid electrical tape was applied over connections to prevent accidental shorting of the battery at these points.

Figure 30: The batteries came with Deans type connectors attached, while the Pixhawk PMB came with an XT-60 connector. It was decided to change the Deans style connectors on the batteries because XT-60 connectors are much easier to solder and work with.

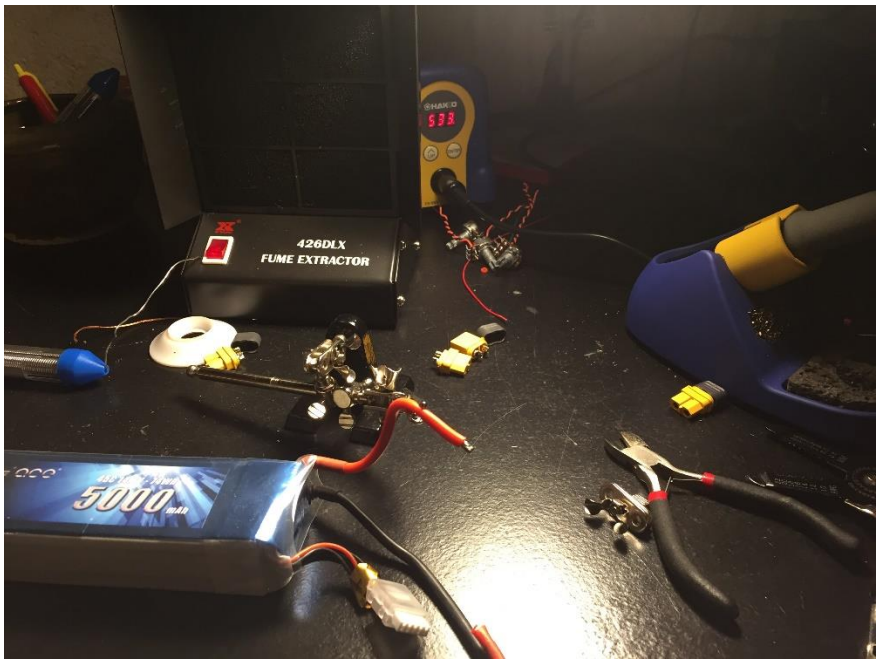


Figure 31: The deans connectors were removed. ***CAUTION****: shorting the battery terminals can result in a chemical explosion or fire. For safety only cut one cable at a time. soldering that cable to the new connector. Insulate the connector with electrical tape or shrink wrap then cut the second cable and solder to the new connector. Following this procedure ensures that the battery will not be shorted.*

Figure 32: Battery with XT-60 connector installed

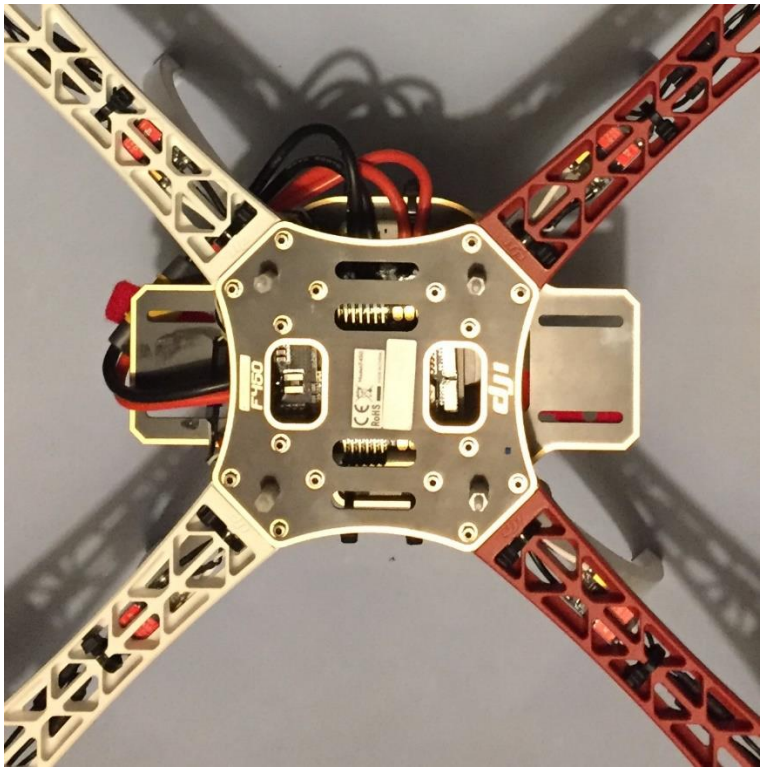


Figure 33:The top plate was reinstalled on the F450 frame.

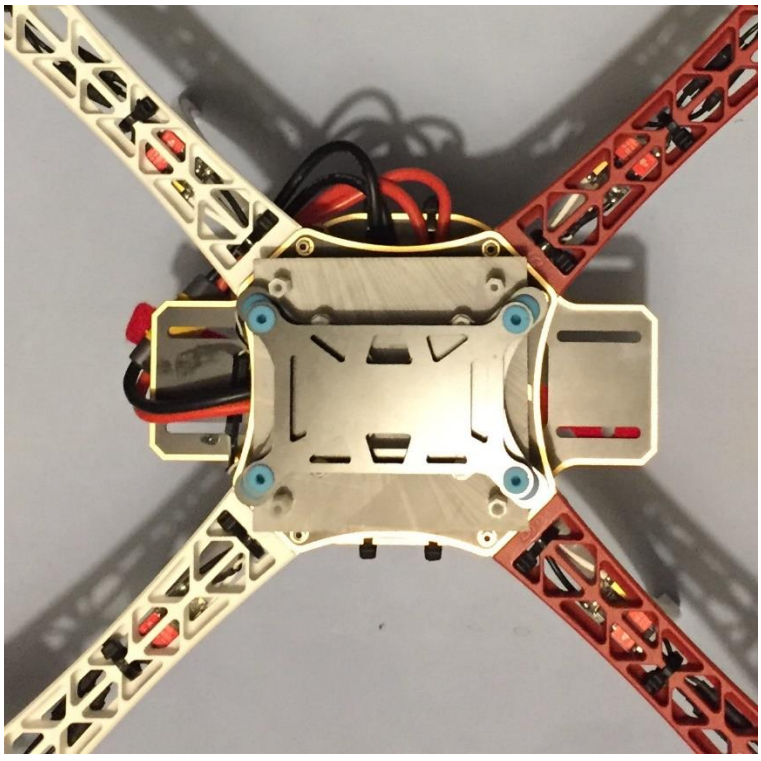


Figure 34: Then the antivibration carriage was attached to the top plate

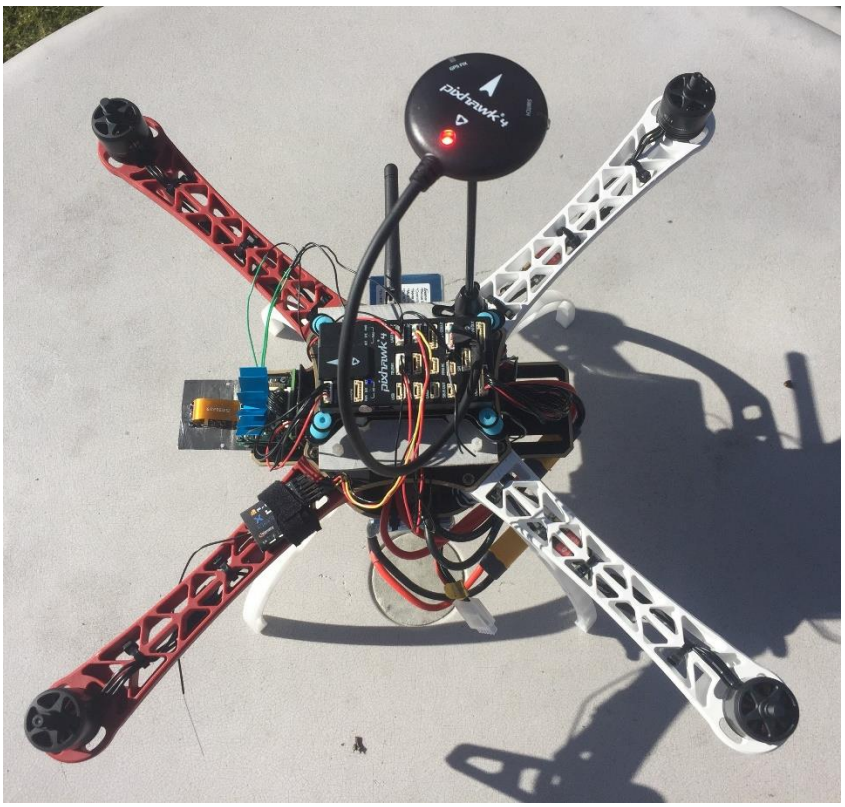


Figure 35: F450 frame with motors, esc, battery, PMB, Pixhawk, telemetry, GPS, and Sightline equipment installed

TENERGY TB6B BATTERY CHARGER USE (KIMBALL)

Using the following battery specifications settings for the Gens Ace 5000 maH batteries were saved to Program [01]. For information on how to change these settings refer to the Tenergy TB6B user's manual or watch this Youtube video.

Gens Ace Battery Specifications:

- Maximum Discharge (C) Rating: 45C
- Capacity: 5000 mAh
- 14.8V 4S battery
- 5000 mAh charged at 1C = 5A
- Tenergy charger recommends a charging rate of <1C for LiPo batteries
- Charge rate set to 4.5 A
- Maximum discharge power (Tenergy) = 5W
- Set discharge (Storage) rate to 0.3A

Charging the battery:

Figure 36: ***CAUTION:*** *To avoid shorting the battery always connect the bullet connectors to the charger first.*

Figure 37: Then connect the battery to the discharge cable and the 4S charge adapter to the battery and the charger.

Figure 38: Home screen

*Figure 39: Press **DEC** to get to the load data screen*

Figure 40: Press ENTER to get to program selection. Then hold enter to select Program [01} LiPo

Figure 41: Press INC or DEC until LiPo BALANCE is shown Then hold ENTER to select.

Figure 42: The charger checks the battery and will display the following screen. Press ENTER to start charging

Figure 43: The battery will begin charging and show this screen

While the Battery is charging:

- At any time press **MODE** to stop charging
- Press **INC** to show the individual Battery Cell voltage
- Press **DEC** to access: End Voltage, Capacity Cut-Off, Safety Timer, In Power Voltage, and External Temperature (If temperature sensor is installed)

When the battery is done charging an alarm will sound, press **MODE** to quit charging.

It is recommended for 4s LiPo batteries to store them “discharged”. The nominal voltage for storage is 3.85 volts per cell. The battery should never be discharged below 3V per cell and should usually not be discharged below 3.7V. To discharge the battery follow the procedures for charging the battery. Instead of selecting LiPo BALANCE as shown in Figure 29 select LiPo STORAGE and hold ENTER to start the discharge.

Quadcopter Control and Flight test

Here is a picture of how quadcopter look like in completed form.

Note: **if you have already attached the propellers to the quadcopter, you have to take it out of your quadcopter for your safety before moving to the next step.**

TAKE THE PROPELLER OFF THE QUADCOPTER.

First thing you need to do is checking the direction of the GPS and the Pixhawk 4. Make sure they have the same direction. It's essential for the GPS working properly.

Now, you have to go through the sensor calibrations again which include:

- Compass
- Gyroscope
- Accelerometer
- Level Horizontal

Connect the transmitter to the Pixhawk 4 via receiver, then try to move the sticks if the transmitter working. If it's not working, go through the binding process again.

Before doing any test, make sure you charge the battery and transmitter fully to prevent any error or failsafe setup.

Before every test, you should run the horizontal level calibration to ensure the GPS working properly.

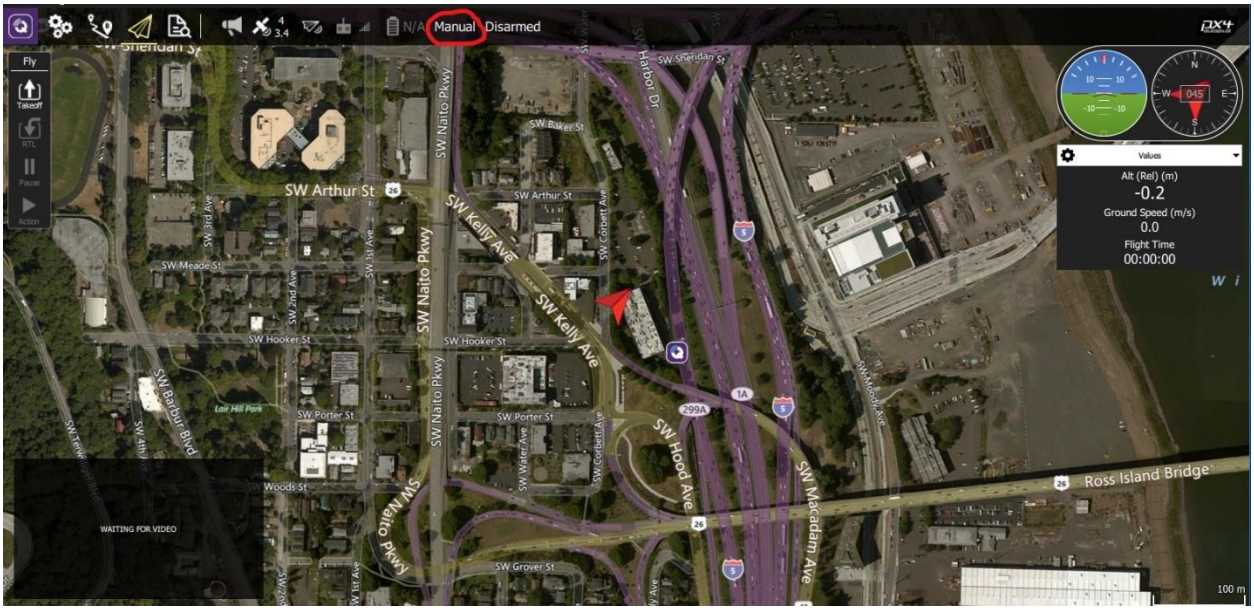
Manual Control

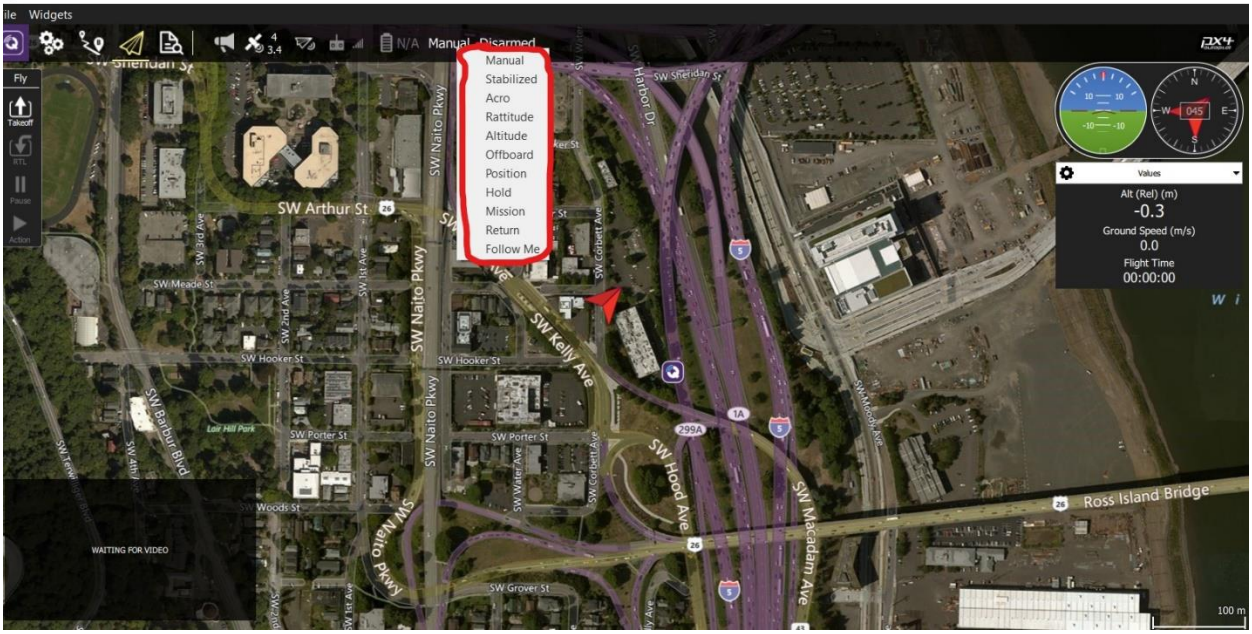
Connect the power from the battery to the Pixhawk 4, this also turn on the components that connected to the Pixhawk 4.

Turn on the transmitter and wait for the transmitter bound to the receiver from Pixhawk 4.

Turn on the Qgroundcontrol, wait for a few minutes to allow Qgroundcontrol connect and receive the information from Piwhark 4.

From the top menu, choose manual control to begin control the quadcopter manually.

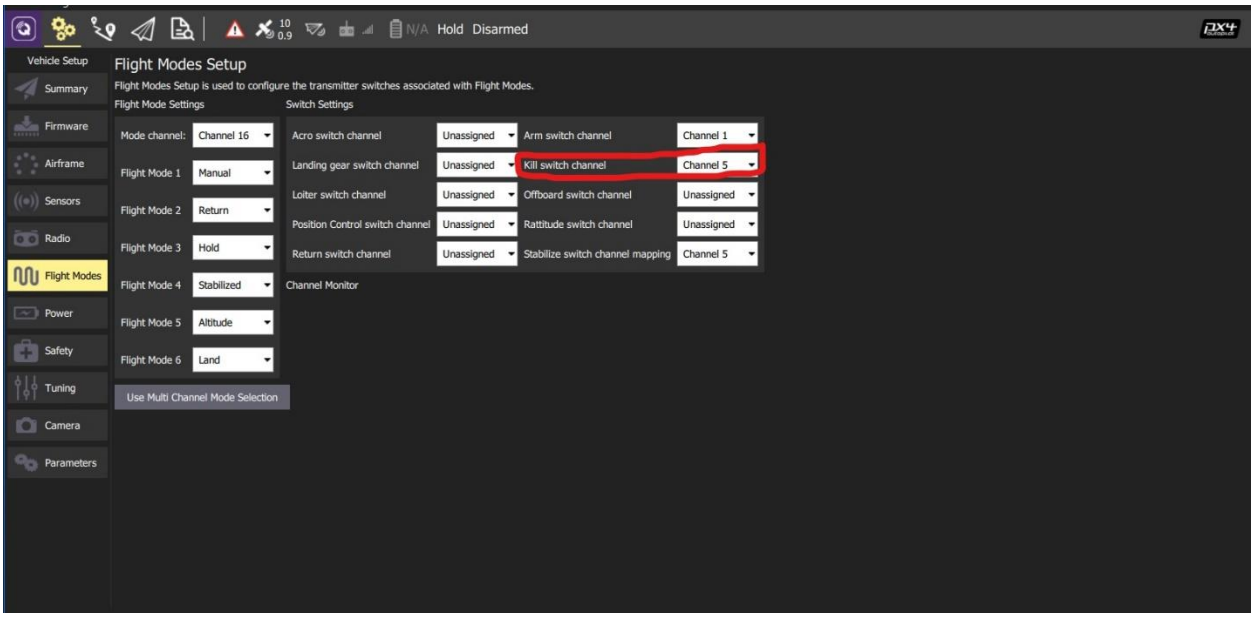




When you click the “manual”, there will be a list of other modes as indicated in the picture. You can choose either “Manual” which is fully manual control, or “Position” which allowed you to control it semi-manual (Both using radio control and Qgroundcontrol).

Choose gear, and choose Flight mode.

Set up the Kill Switch to channel 5 or 6, then using the radio control to move it away from the center point. This will deactivate the Kill switch. (???)



You can set up channel 1 to 4 to whatever mode you prefer.

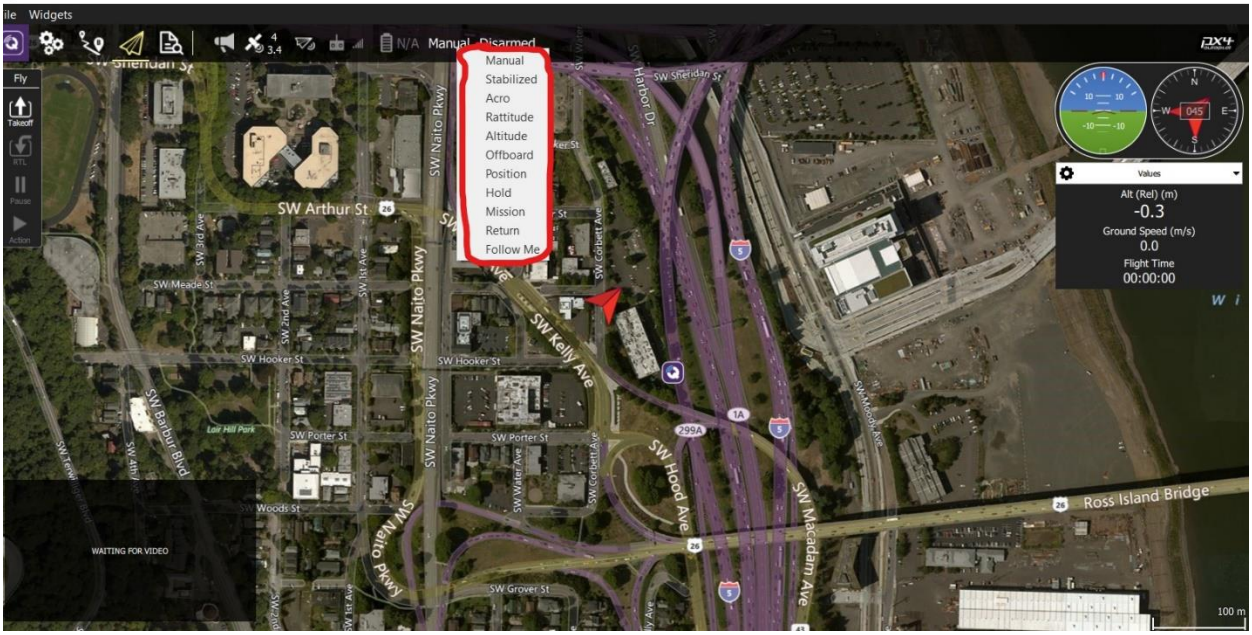
To turn on the quadcopter, move the left stick to the bottom inward corner, keep it for a few second, until the motors start spinning.

Then slowly move the left stick from the center and upward that will send a takeoff command to the quadcopter, and the quadcopter will takeoff.

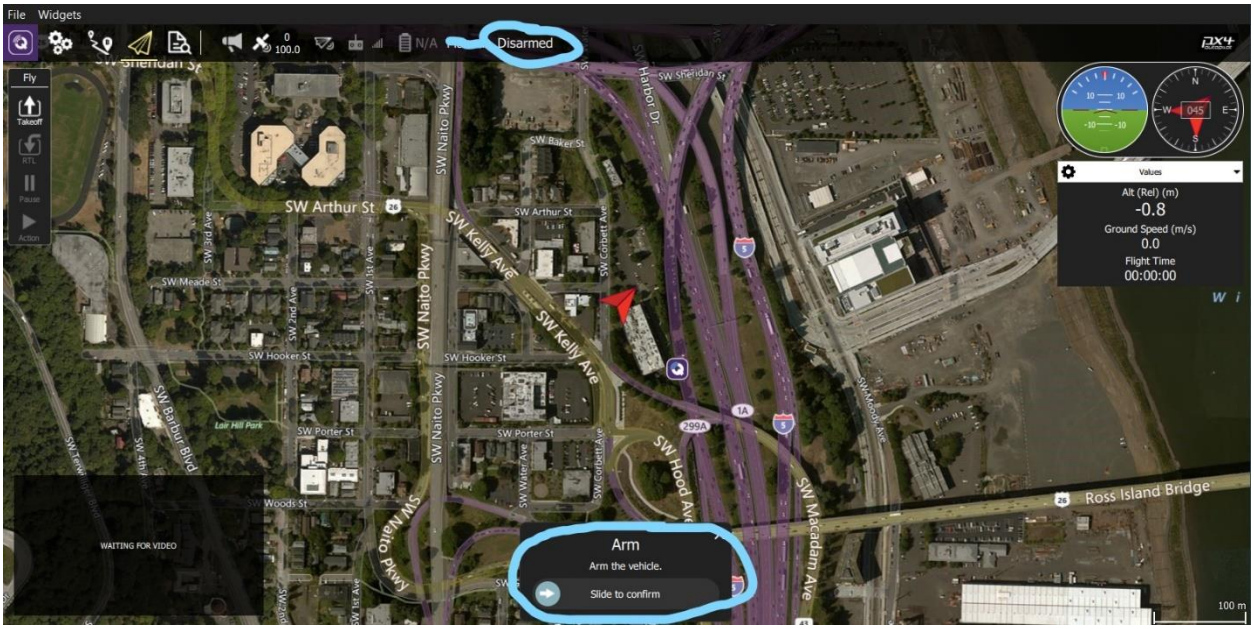
To kill the motors in case of emergency, move two sticks to the bottom outwards a few second, it will turn off the motors and the quadcopter will begin to fall.

Autonomous Control

To activate the autonomous control, simply switch the manual mode to Hold or Altitude mode

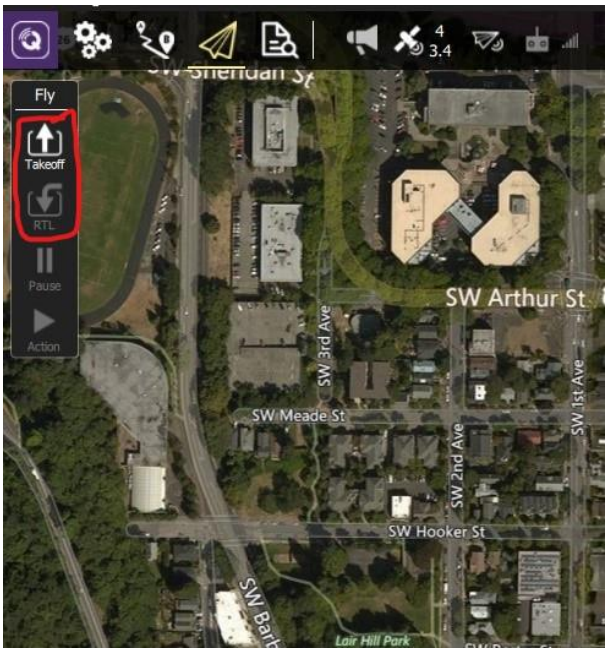


On the top, choose arm/disarm, then slide the bar to the right. This will arm the vehicle



If you want to turn off the motors, you can choose arm/disarmed again, and slide the bar to the right. This will also kill the motors right away (This can be used in case of emergency)

When you are ready -> On the sidebar choose takeoff. The initial maximum takeoff altitude is 2.5m (default).

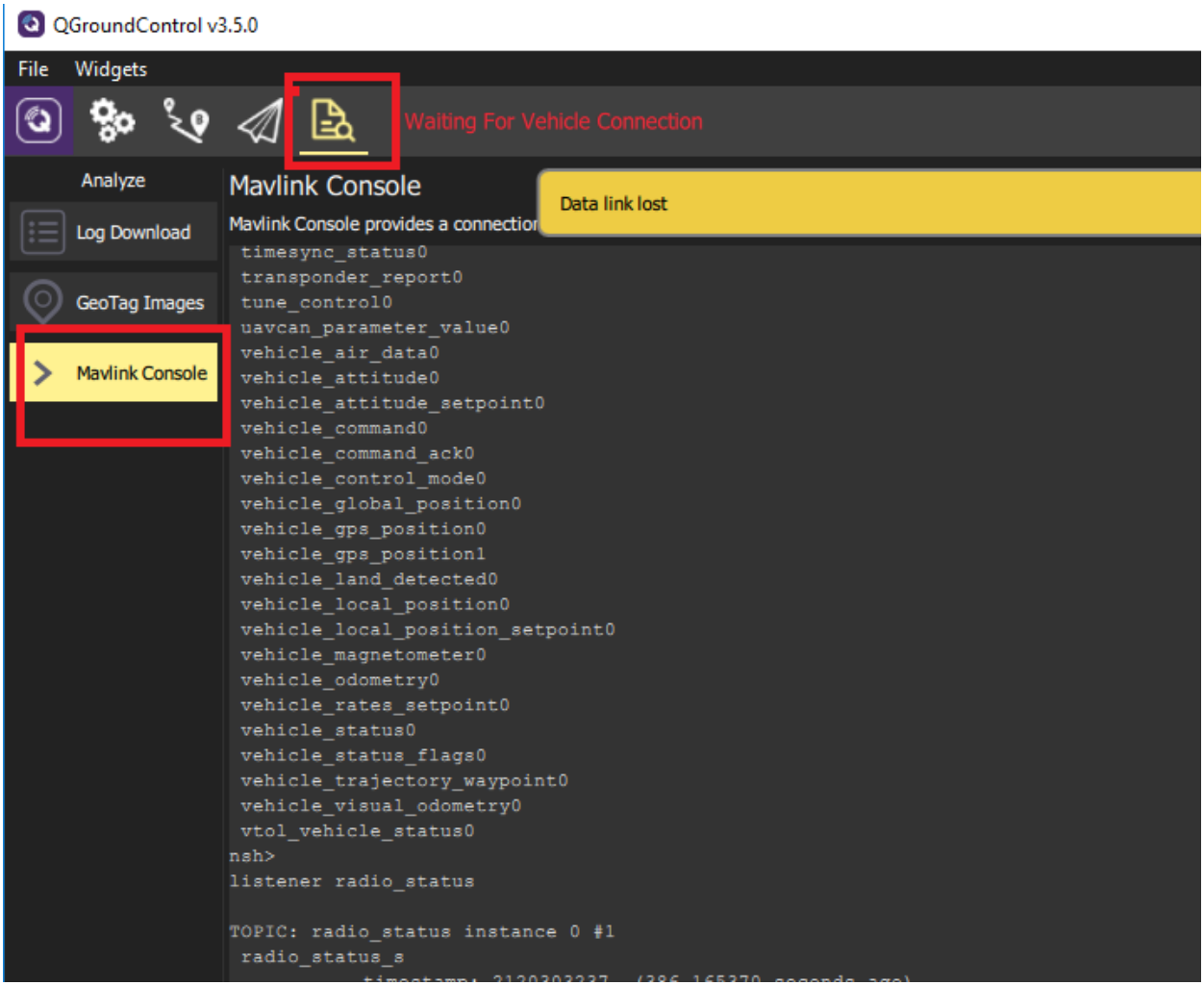


If you want to land, on the sidebar, choose Land, or return to the original location.

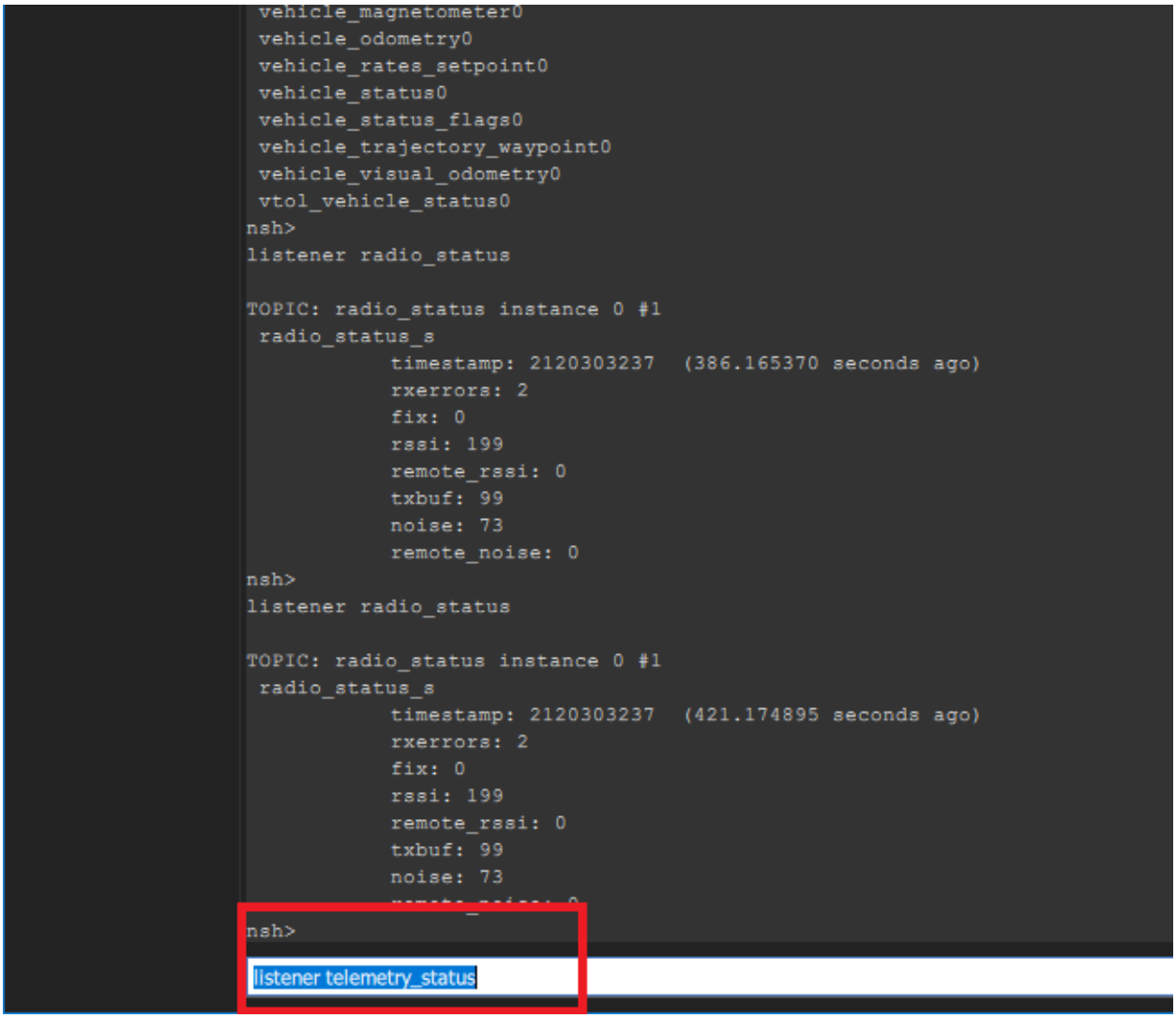
A few modes that can be used when flying is Position/Hold/Return/Land/Stabilize. Pay attention on the mode you are using.

MAVLink console and useful commands

Figure below show how to access the MavLink Console.



In MavLink Console, there are a lot of useful command, however, the most useful command we are using is **listener** command



The command listener can be called from within the Qgroundcontrol MAVLink Console to inspect the values of sensors and other topics. This is powerful debugging tool because it can be used when QGC is connected over a wireless link.

To show all the parameters that we can listen to, use command:

ls obj/ (l as lemon)

The two powerful command could be:

listener telemetry_status

listener vehicle_status

Virtual Simulation using Mission Planner

How to start virtual simulation on Mission Planner (Software In The Loop, SITL)

Here is an overview of SITL simulator for Mission Planner: http://ardupilot.org/dev/docs/sitl-simulator-software-in-the-loop.html

Setting up the Linux system and SITL controller for Windows 10: http://ardupilot.org/dev/docs/building-setup-windows10.html#building-setup-windows10

How to access the SITL simulator: http://ardupilot.org/dev/docs/using-sitl-for-ardupilot-testing.html (It uses Linux system)

Follow procedure below after installing the Linux and SITL controller for Windows 10.

Open the Linux window, and type:

Cd ardupilot

cd ArduCopter

sim_vehicle.py --console (if no location was specified).

OR: sim_vehicle.py -L Sightline --console --map

****

Note: Sightline is the location in files locations.txt

How to access the locations.txt file:

The directory of locations.txt: ardupilot/Tools/autotest/locations.txt. Inside the autotest directory, type ls to check the files.

cd ardupilot

cd Tools

cd autotest

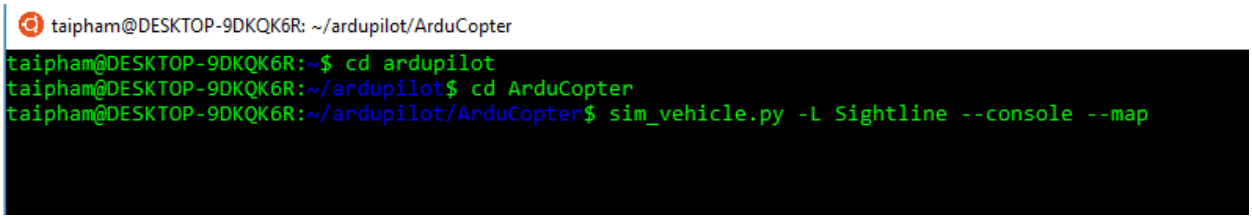
ls ("l" as linda, not "I" as Ice-cream)

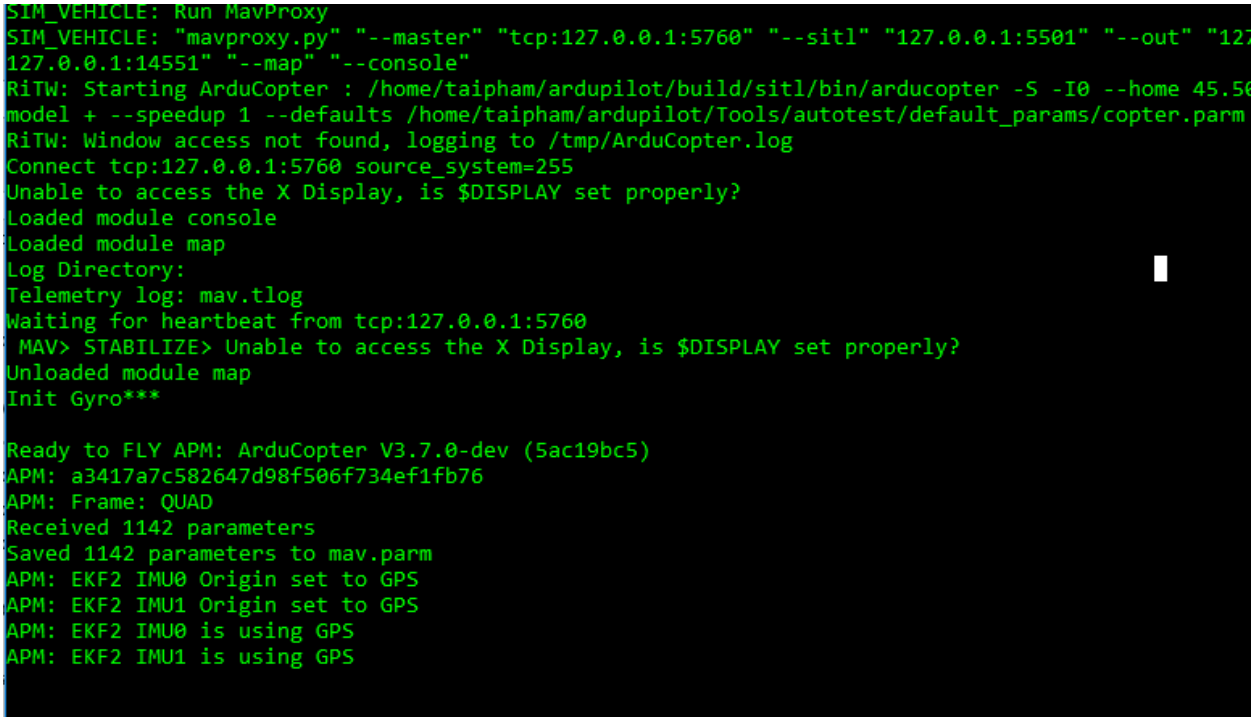
vi locations.txt (open the locations.txt file)

*Type "i" (as ice-cream) to edit the file, and add the desired location in the file following the format:
`#NAME=latitude,longitude,absolute-altitude,heading (no space between them)`

Virtual Simulation using SITL

Open Mission Planner Apps after the command “sim_vehicle.py -L Sightline --console --map” completed running.





Figures above shows the command on Linux-Ubuntu and how the screen look likes after the command completed.

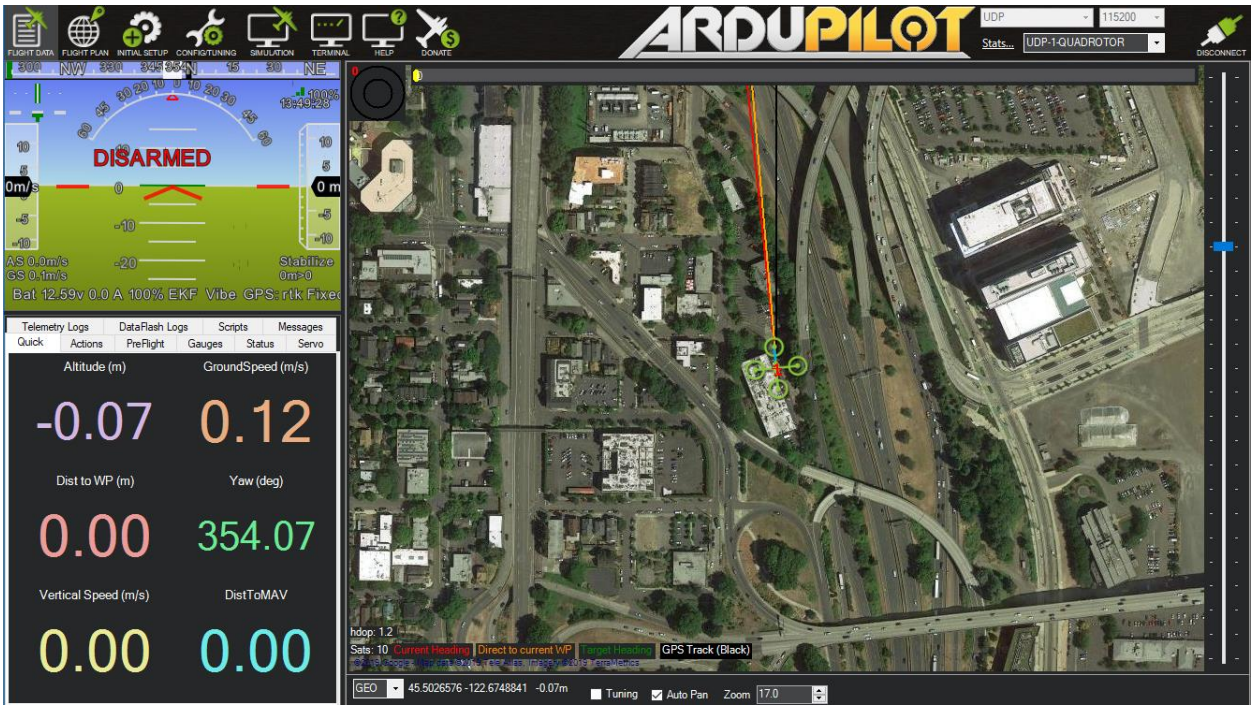
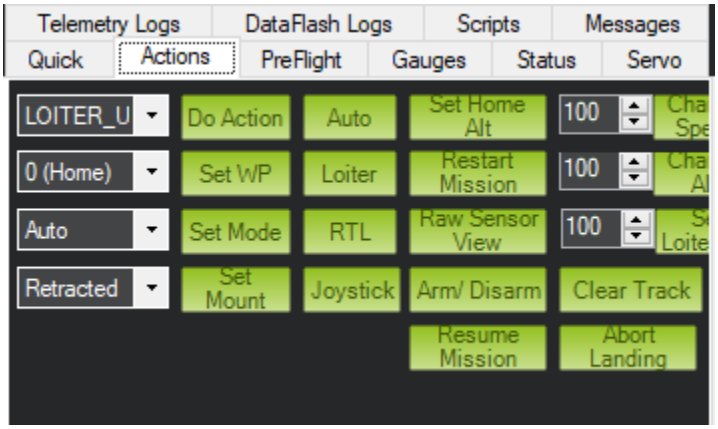


Figure above shows how the Mission Planner looks like after running the command: sim_vehicle.py -L Sightline --console --map

On the left, choose “Action” tab to start the mission or Arm the aircraft



On the Linux command window, you can type “arm check all” to check the quadcopter conditions. However, this is simulation, so obviously nothing will have a problem. Type “arm throttle” to arm the quadcopter on Linux window command.

To reset the save parameters on simulation: on ardupilot/ArduCopter directory type: sim_vehicle.py -w ← this command will delete all save parameters (go back to default parameters)

**There is a problem with speedup command, not recommend to use the command param set sim_speedup x **

How to set up a mission in Mission Planner?

Go to Flight Plan

Set up a mission (change the altitude if necessary)

On the Flight Plan window click on Write WPs, selected YES if the setup altitude is what you want.

On the linux window command type:

Mode guided

Arm throttle

Takeoff 300 (with 300 is the takeoff altitude)

Mode auto (change to auto mode after the quadcopter meets the specify altitude)

Then the quadcopter will flight their mission.

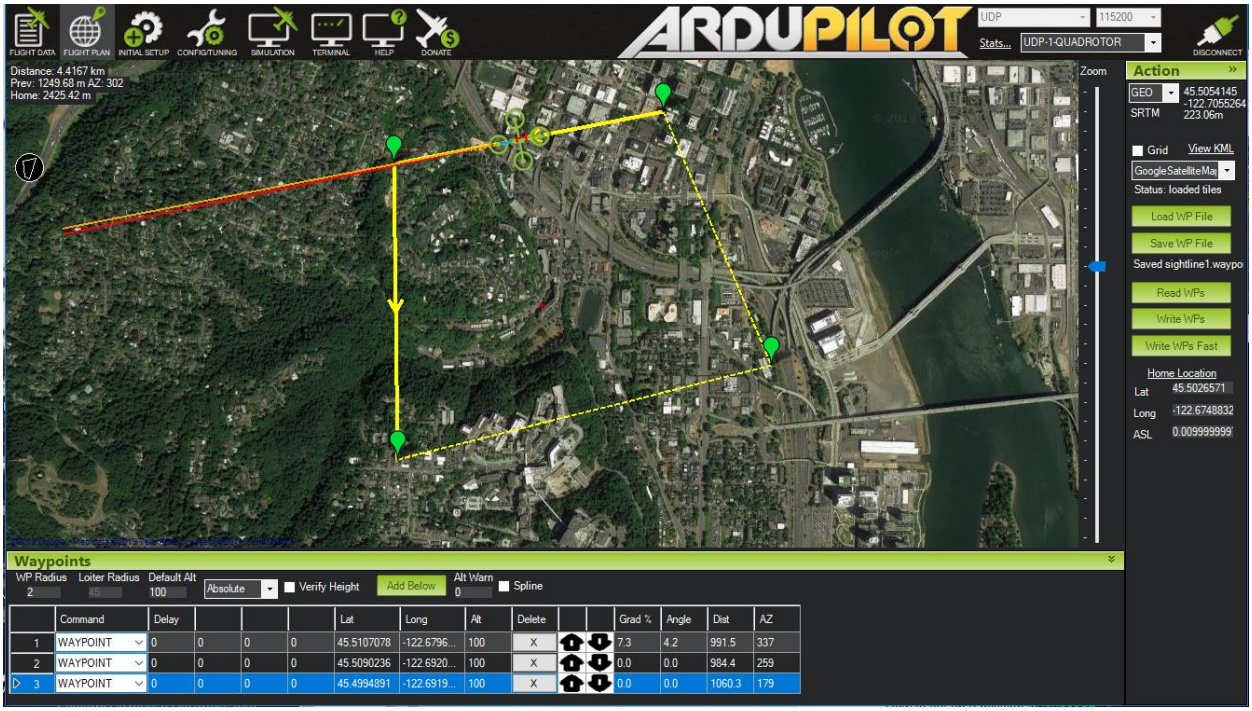


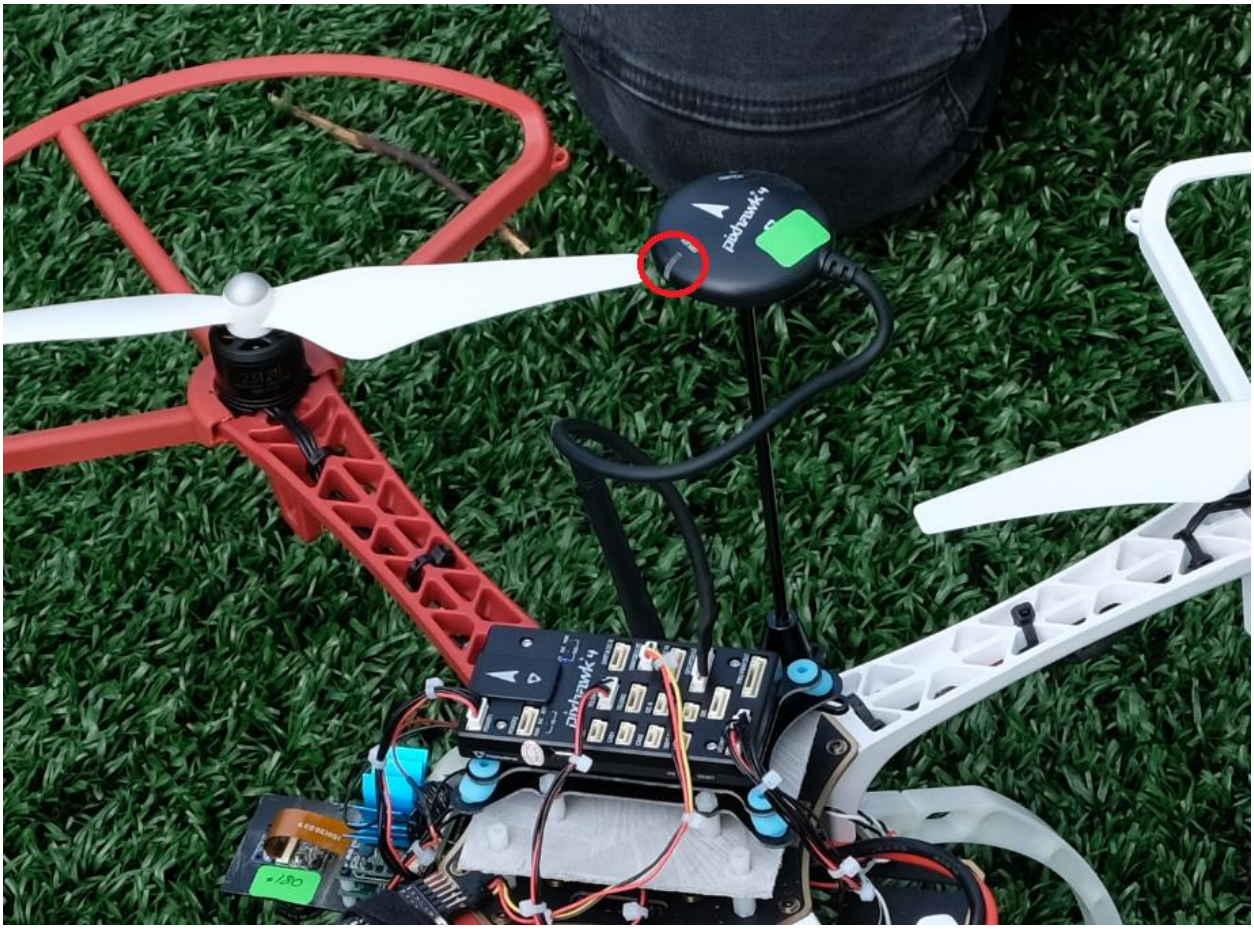
Figure above show the completed mission on Mission Planer.

Setup Flight Test for QuadCopter

The flight test should be performed outdoor to avoid some unnecessary damaged.

Safety Check

- Turn off the safety button on the GPS.



Whole the clear button for a few seconds until hear the “bip bip” sounds.

- Check if 2 telemetries talk to each other (both Telemetries will have orange LED flash)

  Qgroundcontrol will let us know if we have any problem with telemetry, reset the telemetry if it has any problem

- Check if we have any pre-fight check fails
  If there are any problem with sensors, re-calibrate all the sensors, and restart the Pixhawk 4.

- Check if the we see the map clearly on Qgroundcontrol (It’s better if we have Wifi connection, if not, use your phone as a Hotspot)

- Make sure to charge both batteries before the flight

Flight Test

Connect the battery to the Power Management Board (or the quadcopter)

Connect the second telemetry to your Ground Control Station (your laptop which has Qgroundcontrol on it)

Wait a few minutes and do the **safety checks** above

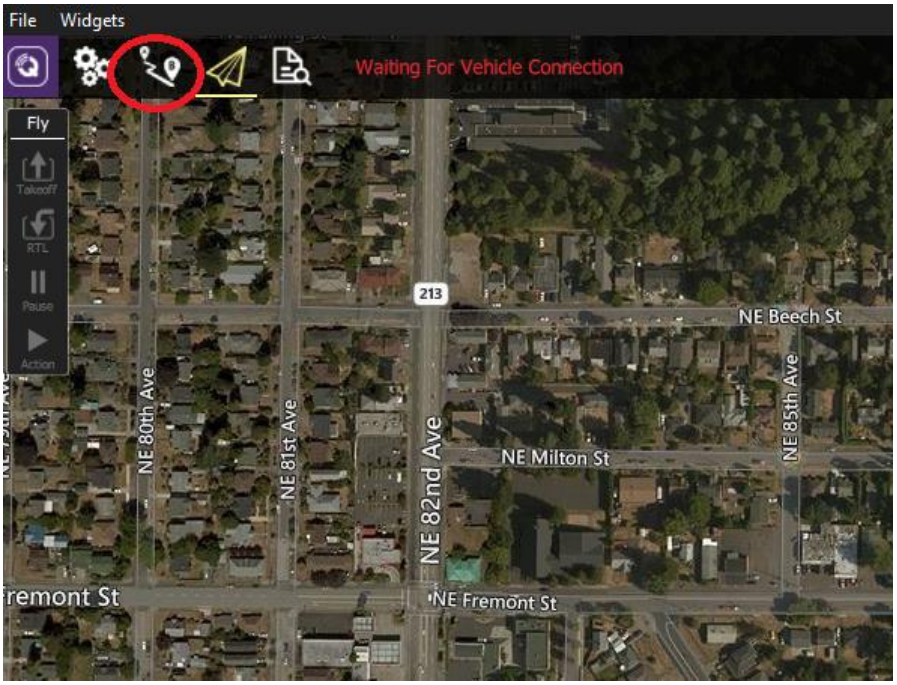
Change the flight mode to the Altitude/Position/Stabilize mode

Takeoff/landing test

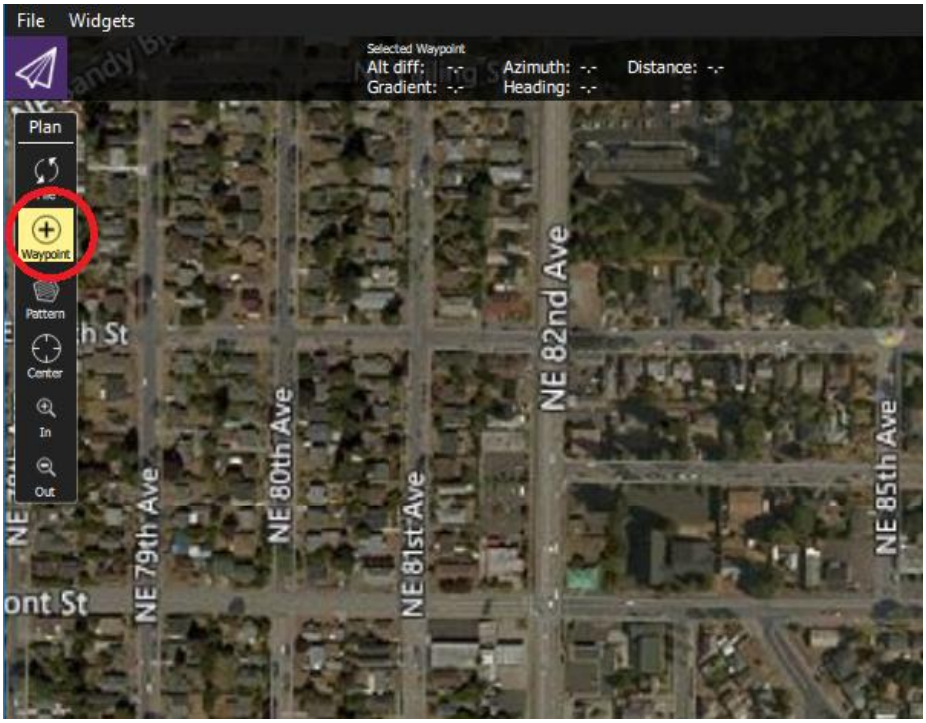
- Try to arm the quadcopter using Qgroundcontrol Arm/disarm command.
- Try to takeoff the vehicle using takeoff command (the default takeoff will be 10m, change in the parameter setting if necessary). If the vehicle doesn't respond to the takeoff command. Reboot the vehicle.
- Try to land using land mode

Flight to a single destination

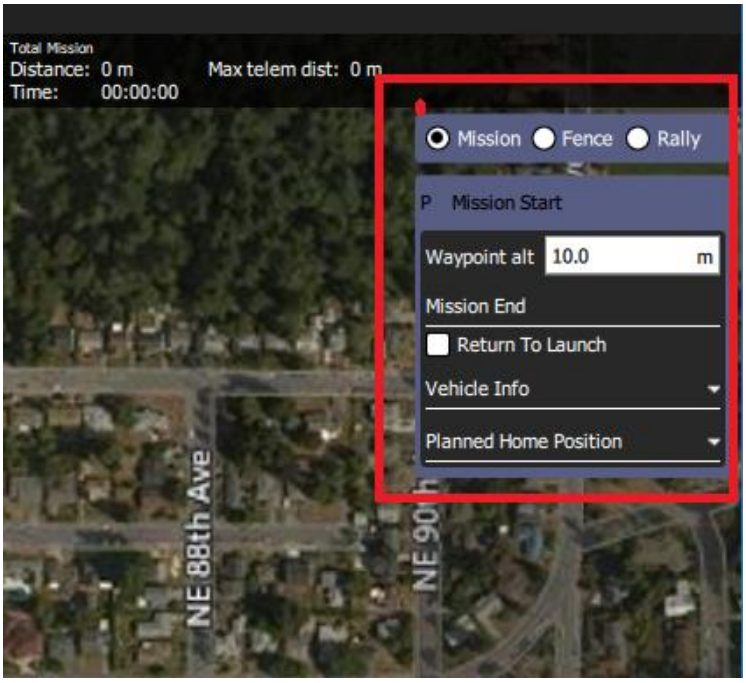
- Select the Mission mode



- Select Waypoint or destination that you want to flight there



- Choose your desired altitude



Go back to your main screen, and start the mission. The quadcopter will flight to the desired destination and stop there. Choose the mode “Return To Land (RTL)” anytime you want to return to the original position.

Flight to multiple destinations

The steps are similar to the flight to single destination, you just need to choose the multiple waypoints, and then the last waypoint will be return-to-land.