Drone Project

Studio - 6 Seymour Reeves-Boddy

Problem

1. Drones Cost a lot of Money
2. Operating Costs are increadibly high
3. Dificult to use and training is required

1 Cheap and easily replacable platform

2 DIY and fixable by user

3 Minimal knowldge required

Solution

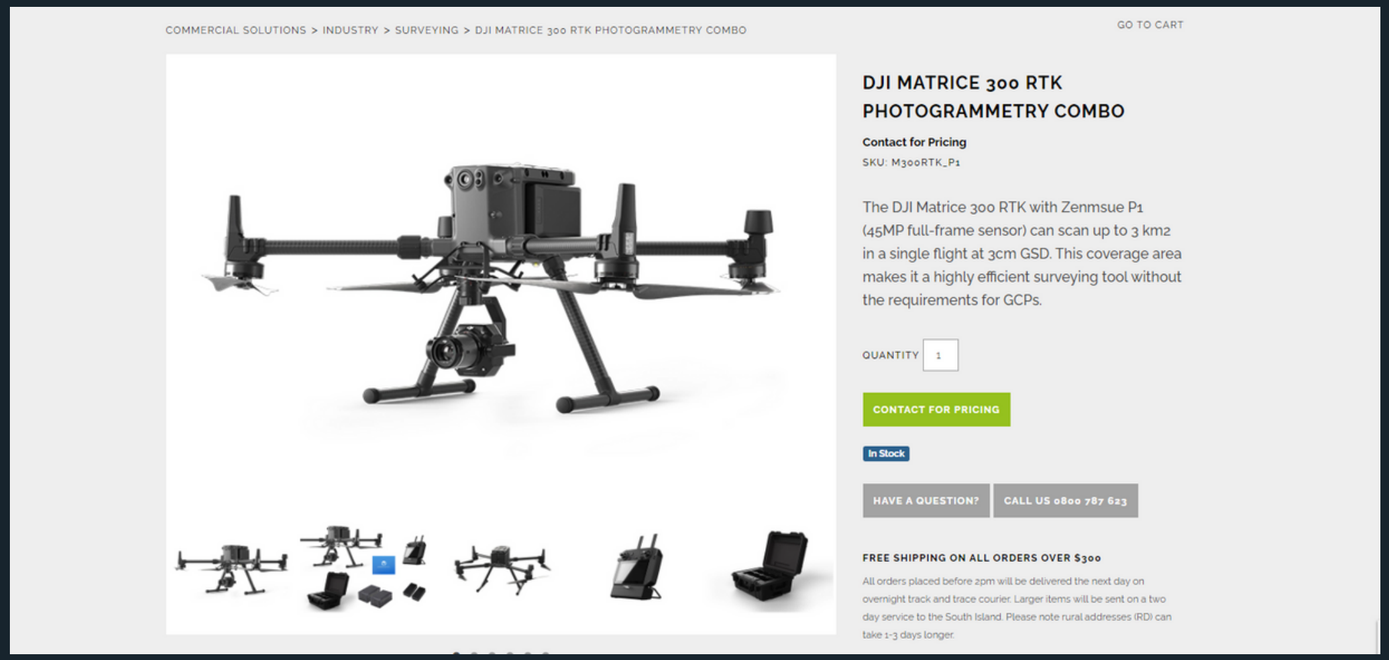
Plan

My main goal for this Studio 6 project is to create a drone that is both cheap and easy to use, for the end user.
Drones play a big part in surveying and other tasks and i want them to be easily accessible to farmers and doc for suevrying operations.

Currently,most drone projects are done by large scale operations that use very large and expensive drones to complete the task. They also require a trained operator that adds to this cost.

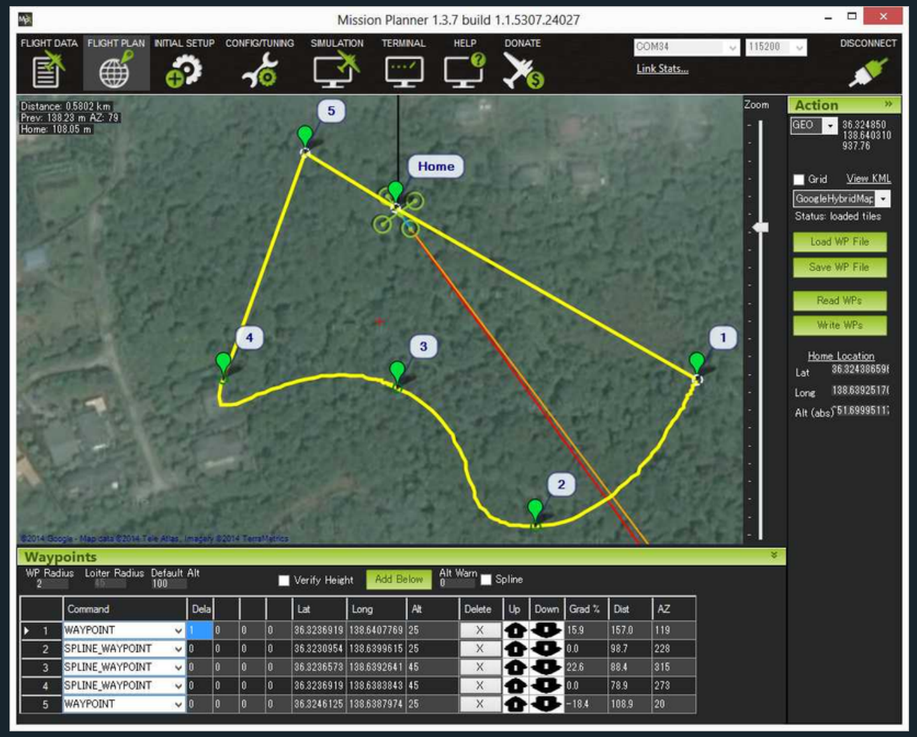
Once i have a 3d printed Drone that is cabapale of completing tasks. I wil begin to work on devloping a Aplication that will interface with the drone and allow the users to create waypoint missions for the drone to follow then begin to genrate a map of the surveyd area

Research



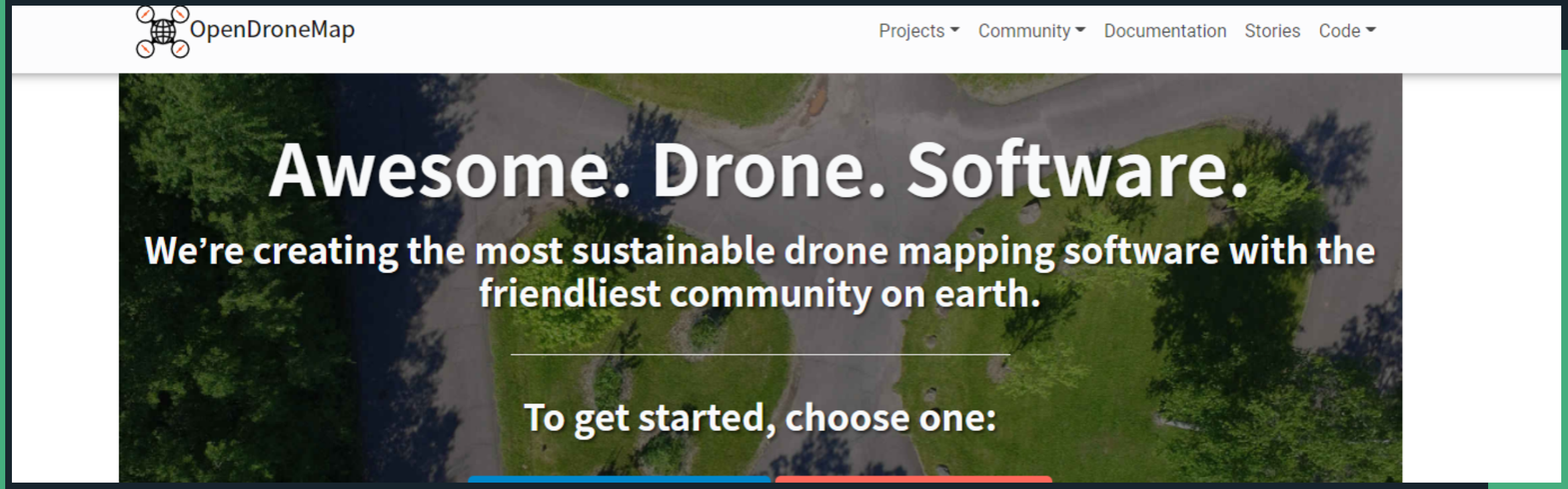
Drones Such as this one are increadibly usefull for surveying but cost upwards of $40,000 NZD and this inherit cost can be a big hurdle for users and i seek to create omething that might not be as advanced as a $40,000 drone but still give the user what they need, that be surveying or other required operations.

Applications



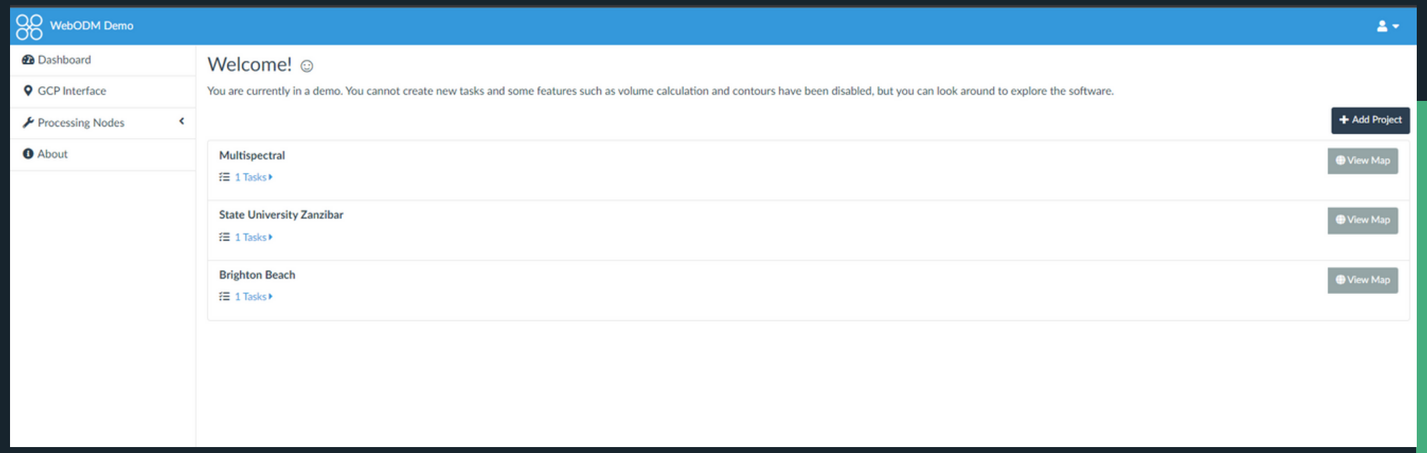
Ardu Pilot is the main aplication that i will be using for testing and creating missions for the drone
it is an open source project with extensive documentation on utilizing it to its full potential.
and it easily interfaces with GCS (Ground Control Software)
that i hope to create

Applications



Open Drone Map is another key software that i am using to facilitate my project.
It is also a very trusted open source codabaser that allows for image stiching and creating maps with captured images it will also interface with my aplication allowing the users to easily see the mapped area the drone has been,
I chose this software as it its open source and i can build on an already devloped and tested platform,
it is also the most full featured drone mapping solution

Applications



Open Drone Map Also has the WEBODM that can be used to create a web aplication to my needs for orgazning jobs for the images to be proccesd and get multiple types of data from the images.

Drone Software

For the matek F765-Wing it can run on two systems Arduplane And i Nav, i decidec on using i nav due to the fact that ardulane is more advanced and has the ability to use the full potential of the controller.

But its not as simple and user friendly as i nav and since this is a solo project i wanted to be able to work on something quickly and effiecetly.

Planning and Timeline

1-5

Finish Assembling Wing
See what Parts are required
search how to use web DO

5-10

Drone Working and bench test parts

New parts arrived and tested

10

Drone software running

GPS syetm working
Radio and Video Link

15+

Drone Flying
Demo Software

1 To do

- Drone Can Loiter
  Added by REEVS3

2 In progress

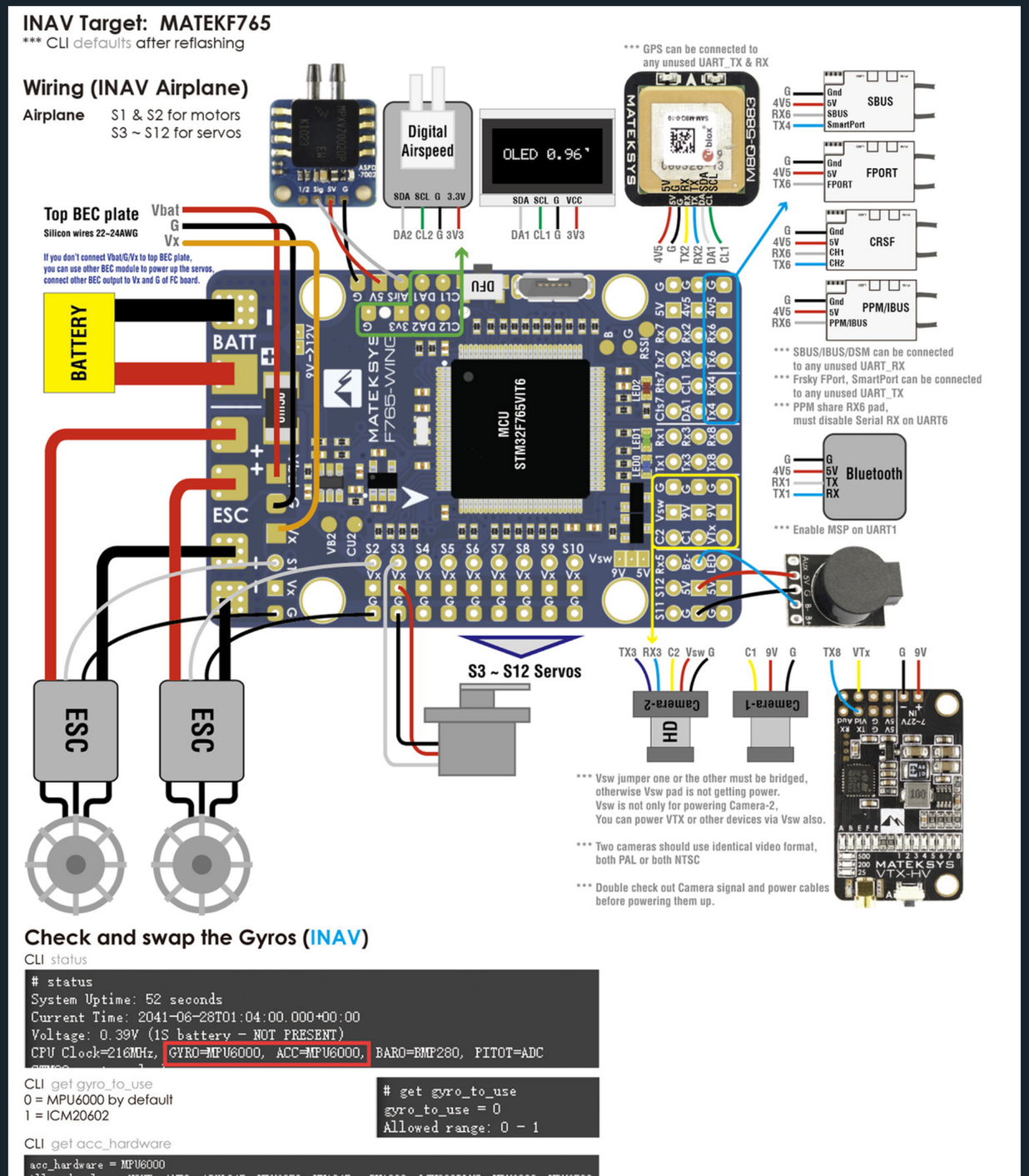
- First Waypoint Mission
  Added by REEVS3
- Drone Can land And take off
  Added by REEVS3

5 Done

- Order Final Parts
  Added by REEVS3
- Build And Assemble final drone parts
  Added by REEVS3
- Plan test flight
  Added by REEVS3
- Software and firmware loaded and ready fopr drone
  Added by REEVS3
- Organize Software for drone and choose what software
  Added by REEVS3

I NAV and how it works

I nav is the software for the drone to run on and it is how everything is managed i will go through how to use the sodtware and what every tab and part does for future students working on this project.



Check and swap the Gyros (INAV)

CLI status

```
# status
System Uptime: 52 seconds
Current Time: 2041-06-28T01:04:00.000+00:00
Voltage: 0.39V (1S battery - NOT PRESENT)
CPU Clock=216MHz, GYRO=MPU6000, ACC=MPU6000, BARO=BMP280, PITOT=ADC
```

CLI get gyro_to_use

0 = MPU6000 by default
1 = ICM20602

```
# get gyro_to_use
gyro_to_use = 0
Allowed range: 0 - 1
```

CLI get acc_hardware

```
acc_hardware = MPU6000
```

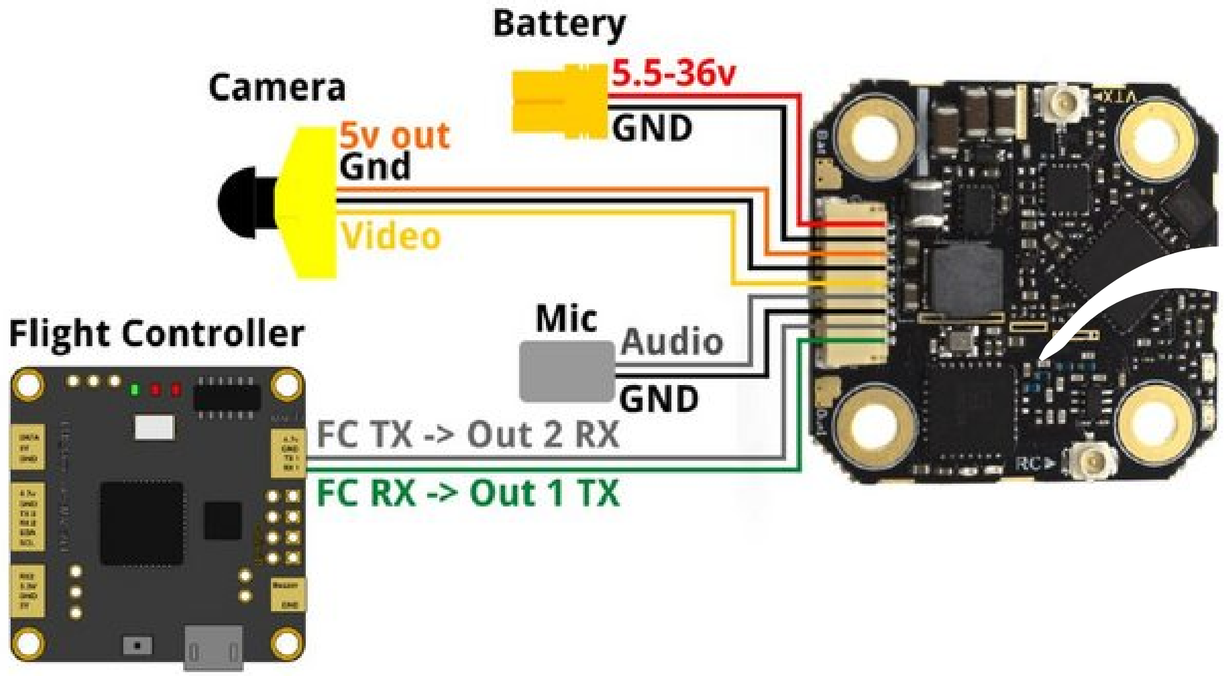
Wiring diagram for the flight controller
al the port marked rx and tx correspond to

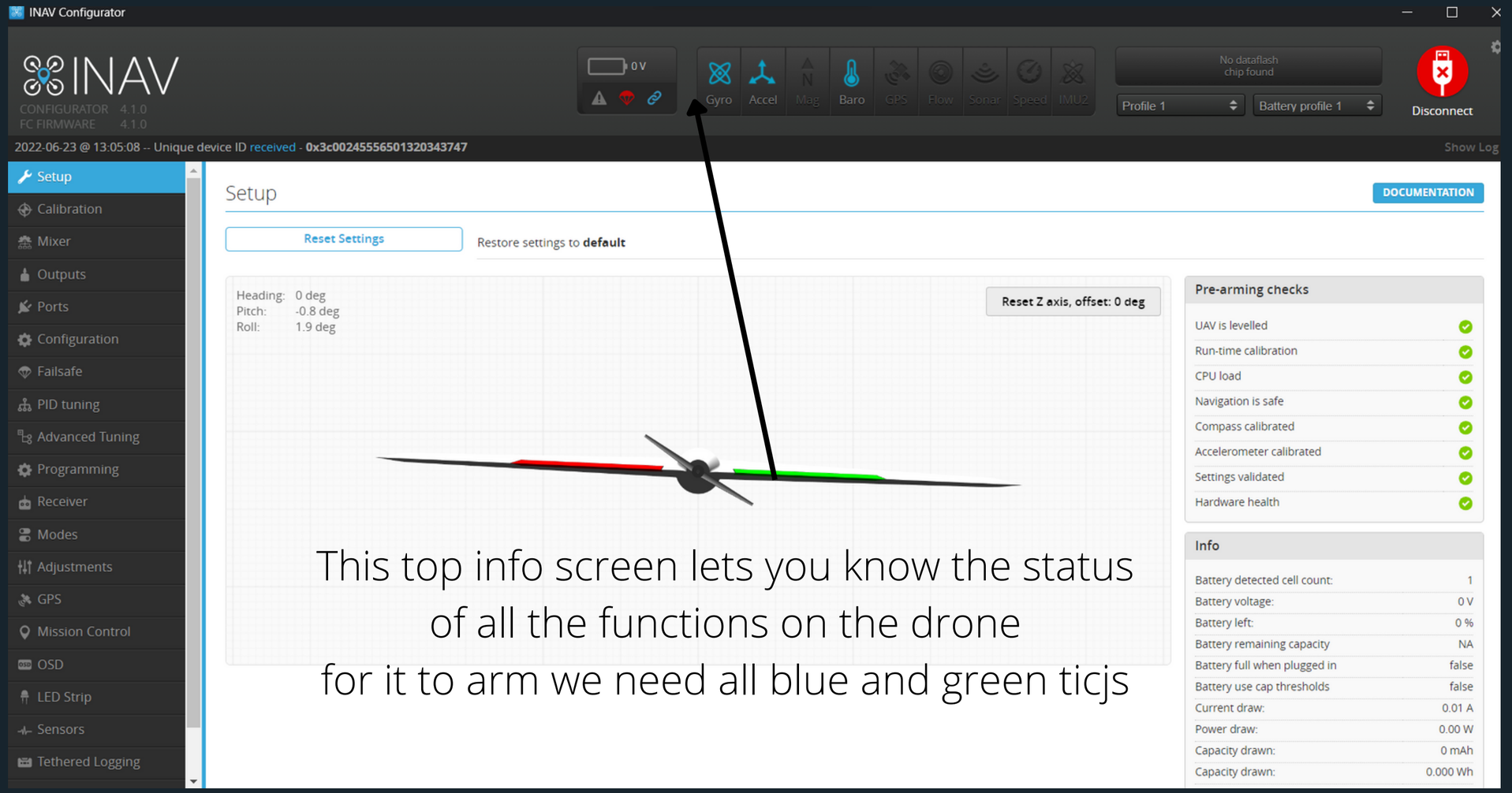
Uart ports in the software for the drone so if the camera is on rx2 and tx2 this means it will be mapped to uart 2 for all the communication for the drone
same for sevros and gps etc

Vtx and how it connects

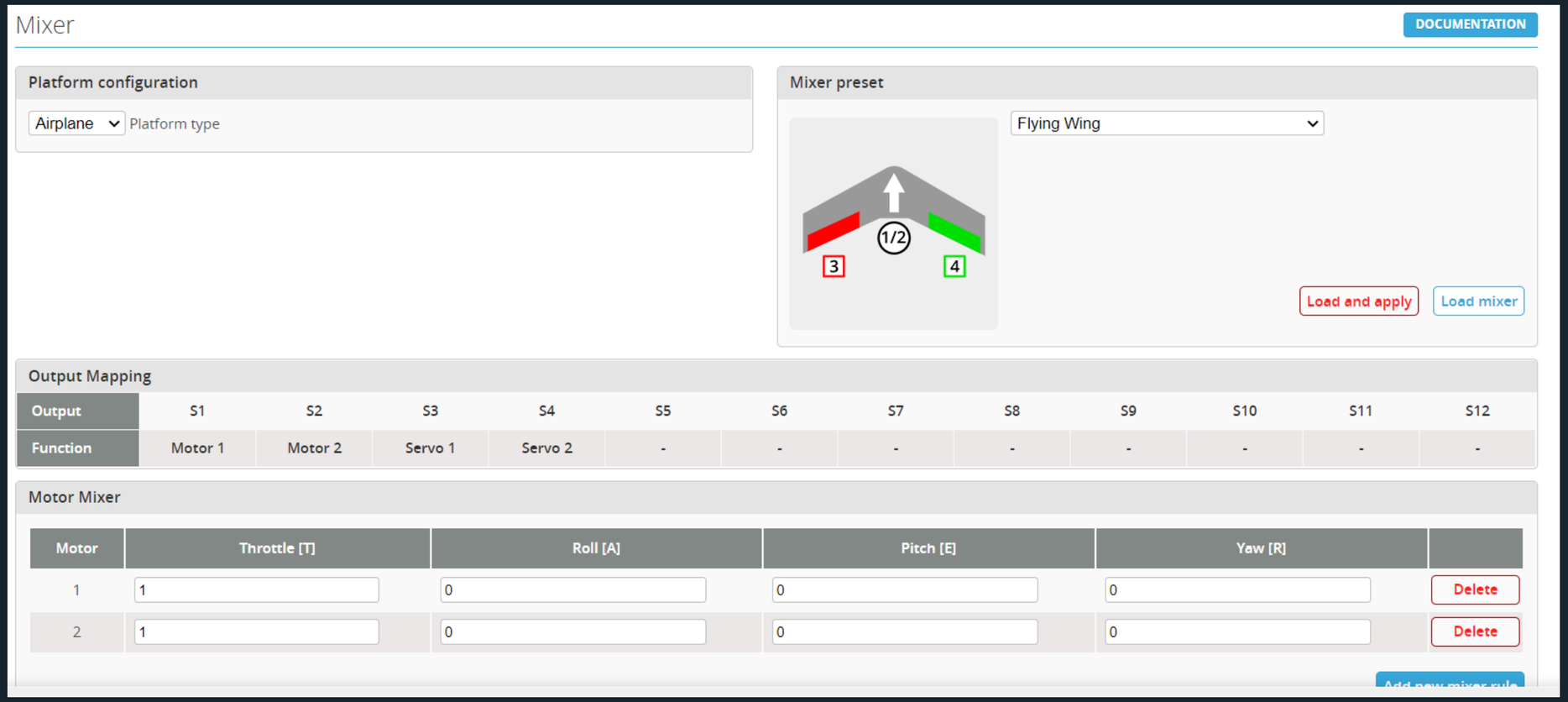
The vtx is responsible for sending a video link to the drone.
this is sent on an analog signal to goggles followed with other information displayed on the OSD
see the following diagrams

Wiring example:

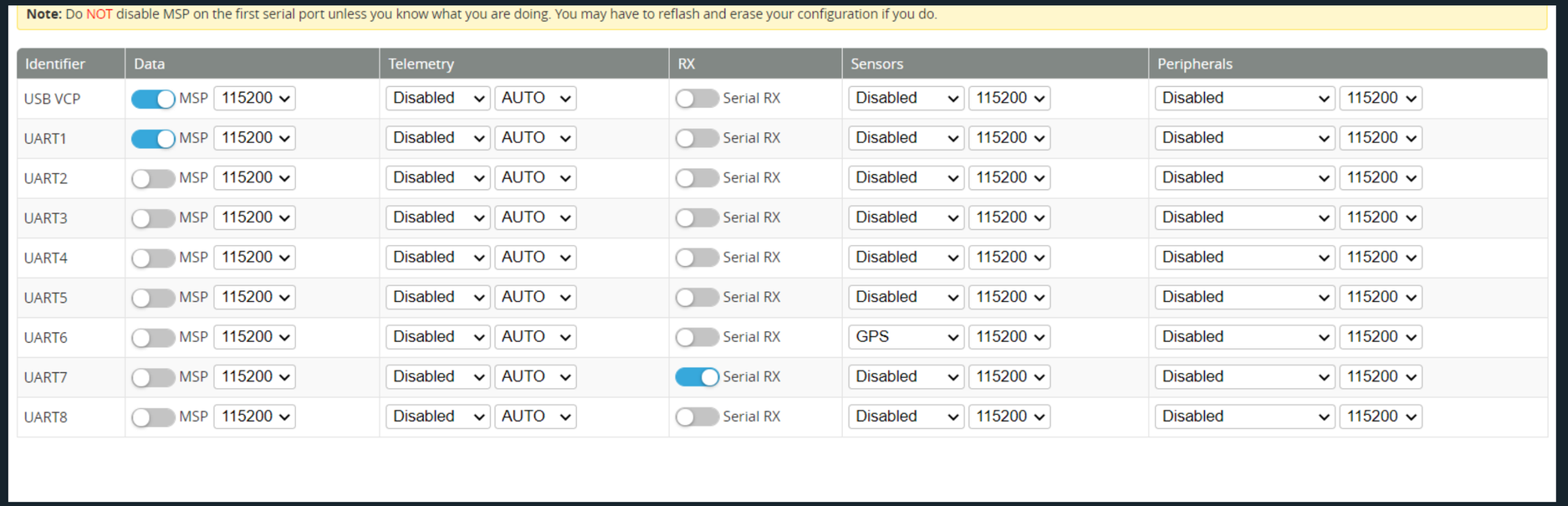




This top info screen lets you know the status of all the functions on the drone for it to arm we need all blue and green ticjs



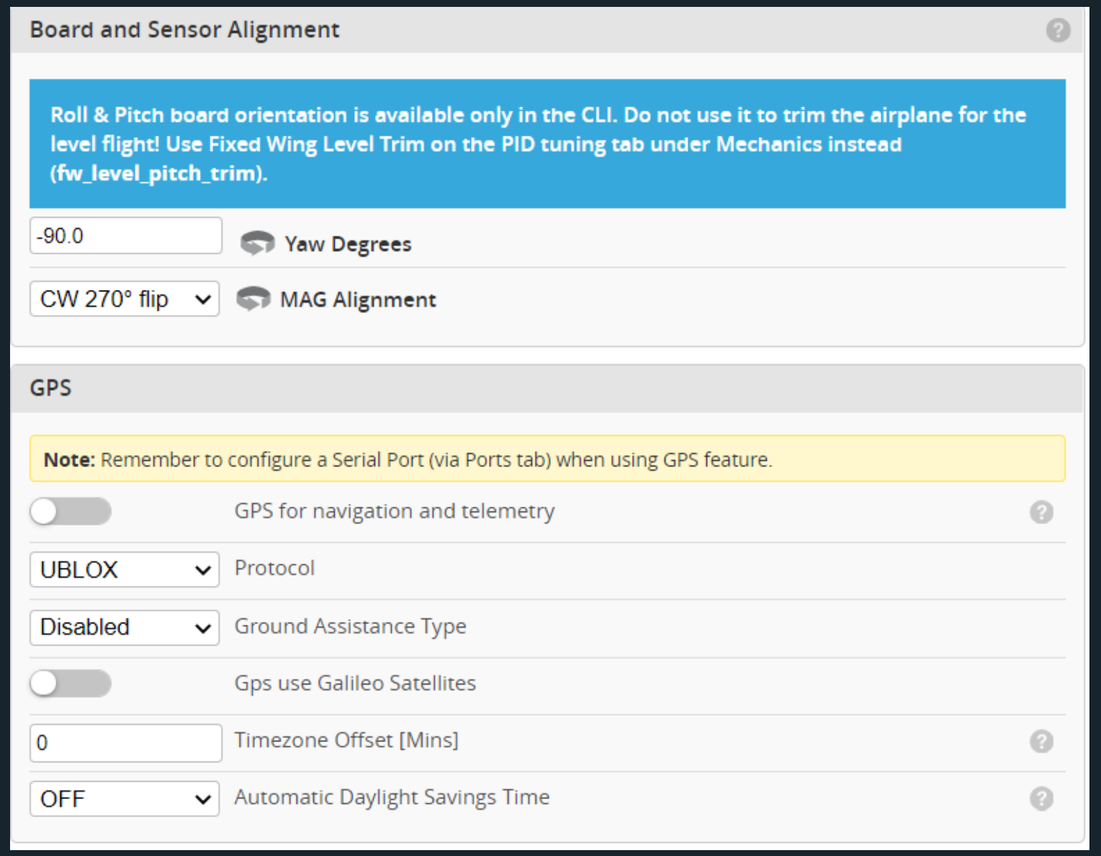
This is the motor mixer tab and the servos where we control what servo is addressed to what port



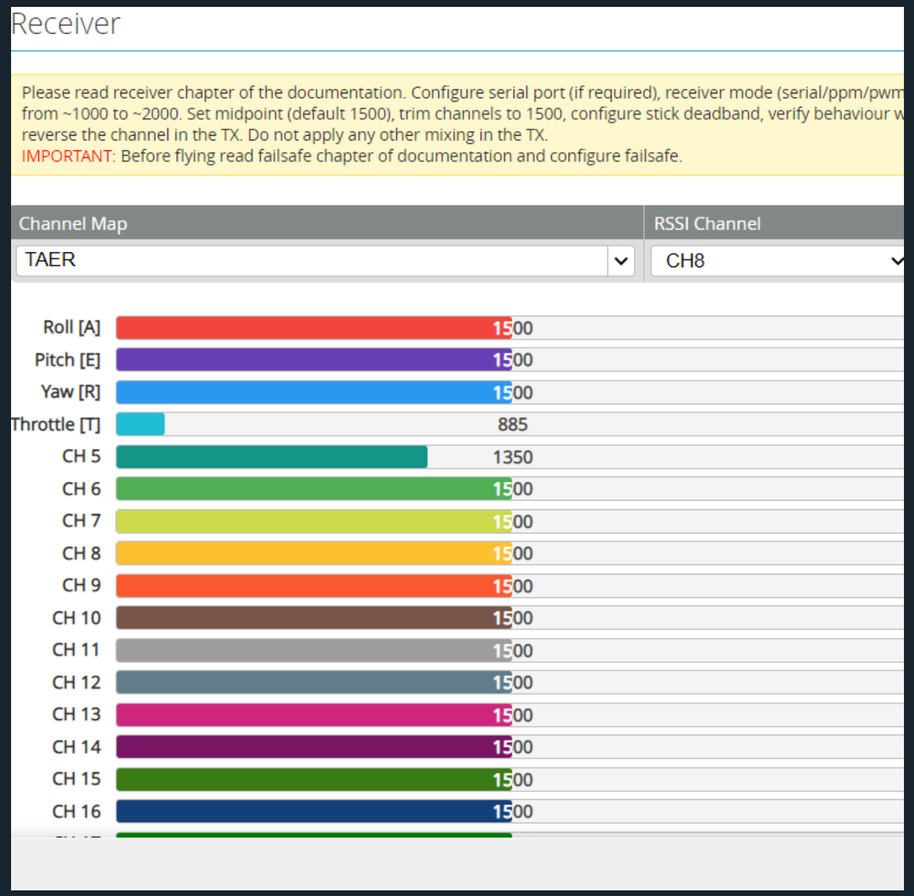
Note: Do NOT disable MSP on the first serial port unless you know what you are doing. You may have to reflash and erase your configuration if you do.

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 115200	Disabled 115200
UART1	MSP 115200	Disabled AUTO	Serial RX	Disabled 115200	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	Disabled 115200	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 115200	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 115200	Disabled 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 115200	Disabled 115200
UART6	MSP 115200	Disabled AUTO	Serial RX	GPS 115200	Disabled 115200
UART7	MSP 115200	Disabled AUTO	Serial RX	Disabled 115200	Disabled 115200
UART8	MSP 115200	Disabled AUTO	Serial RX	Disabled 115200	Disabled 115200

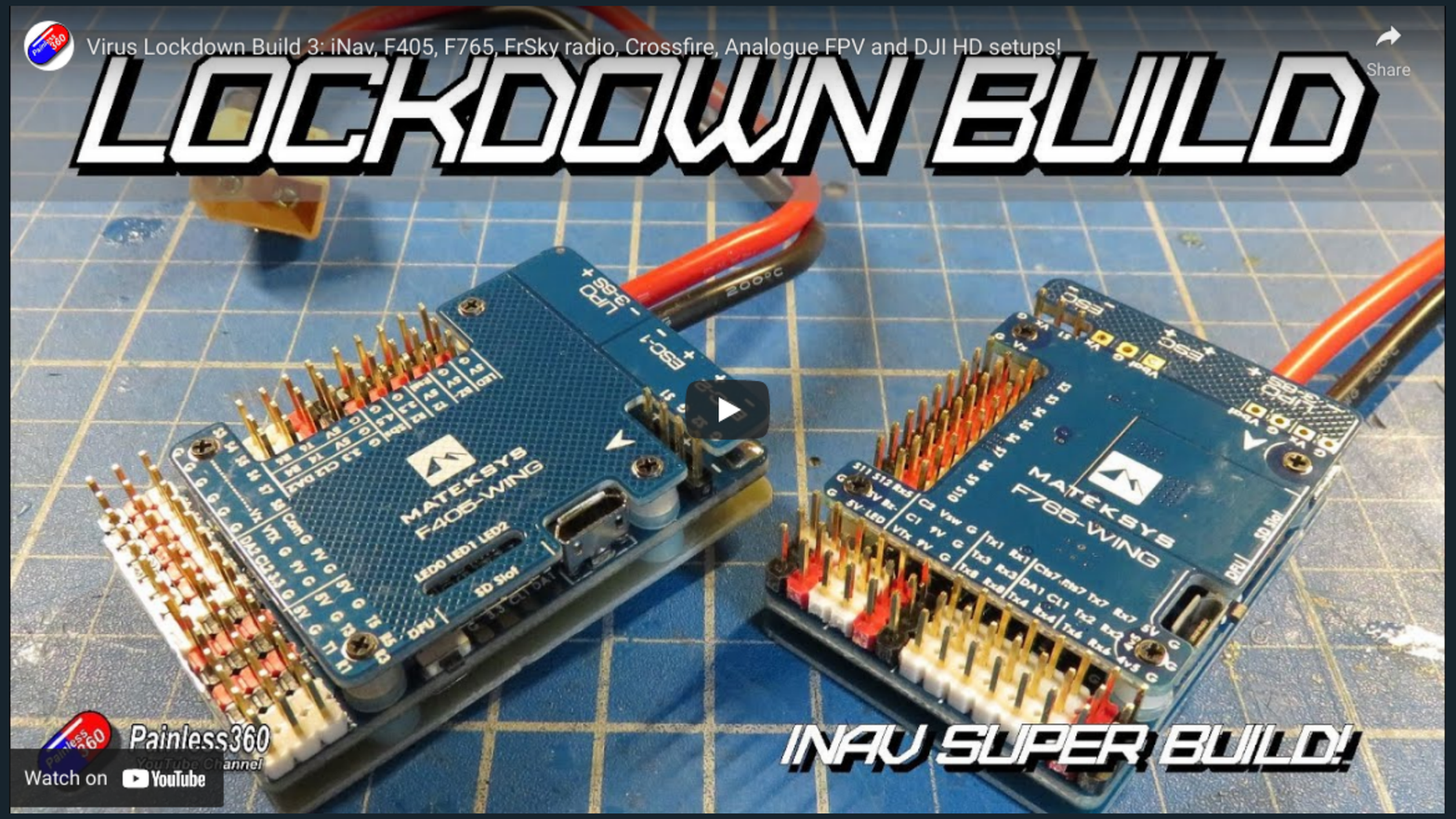
This is the ports tab as later mentioned where we connect and associate rx2 tx 2 to uart 2 etc depending on what u are connecting u can select and control what sensors are used,



This is the configuration tab where u can see the alignment of the board as well as enable gps and other functions



This is the receiver tab where we can see what channels are being sent to the flight controller via the reciever


Virus Lockdown Build 3: iNav, F405, F765, FrSky radio, Crossfire, Analogue FPV and DJI HD setups!
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LOCKDOWN BUILD
MATEKSYS
F405-WING
MATEKSYS
F765-WING
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Further docs and links

https://www.opendronemap.org/webodm/

https://github.com/OpenDroneMap/WebODM/

https://github.com/REEVS3/DroneProject


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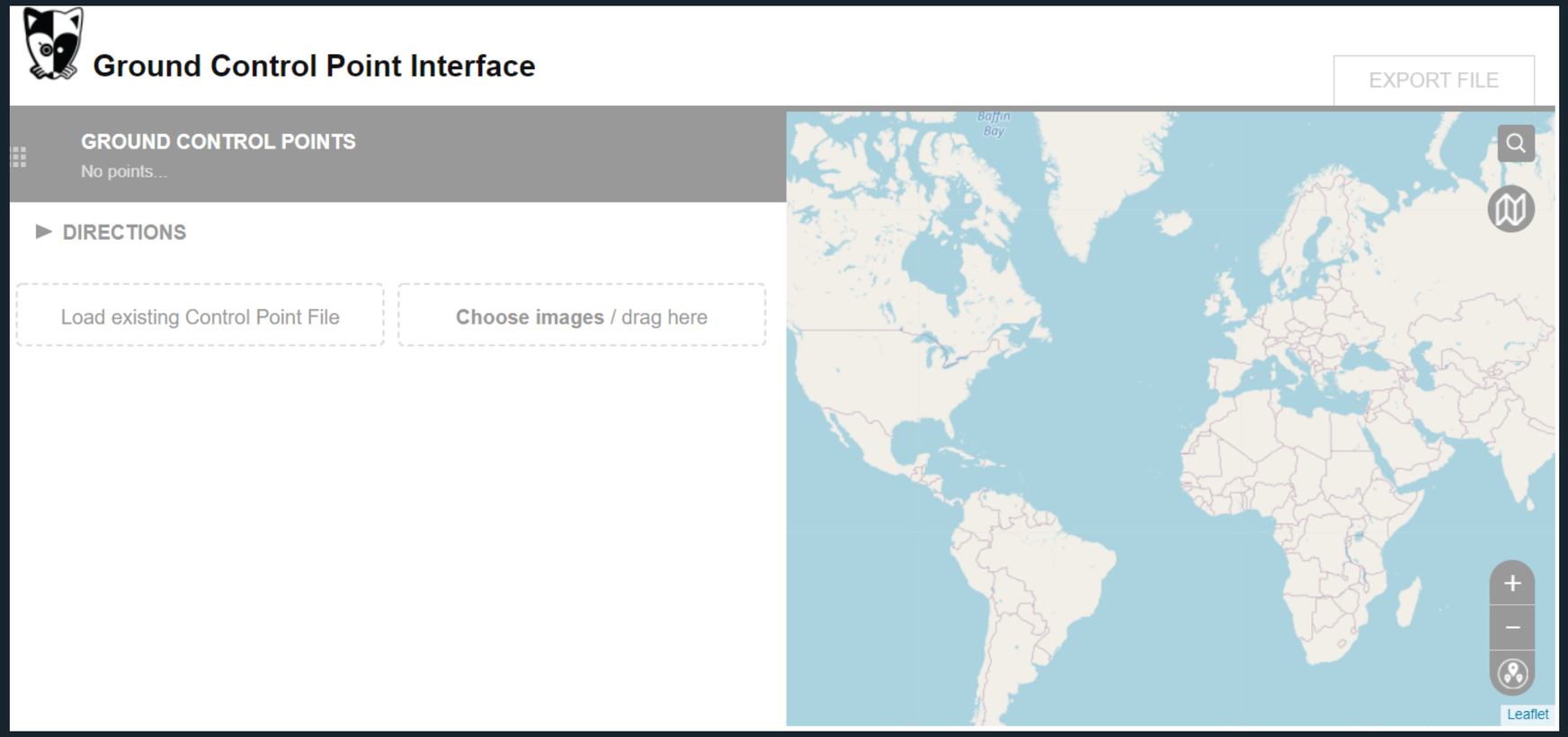
Mapping Software

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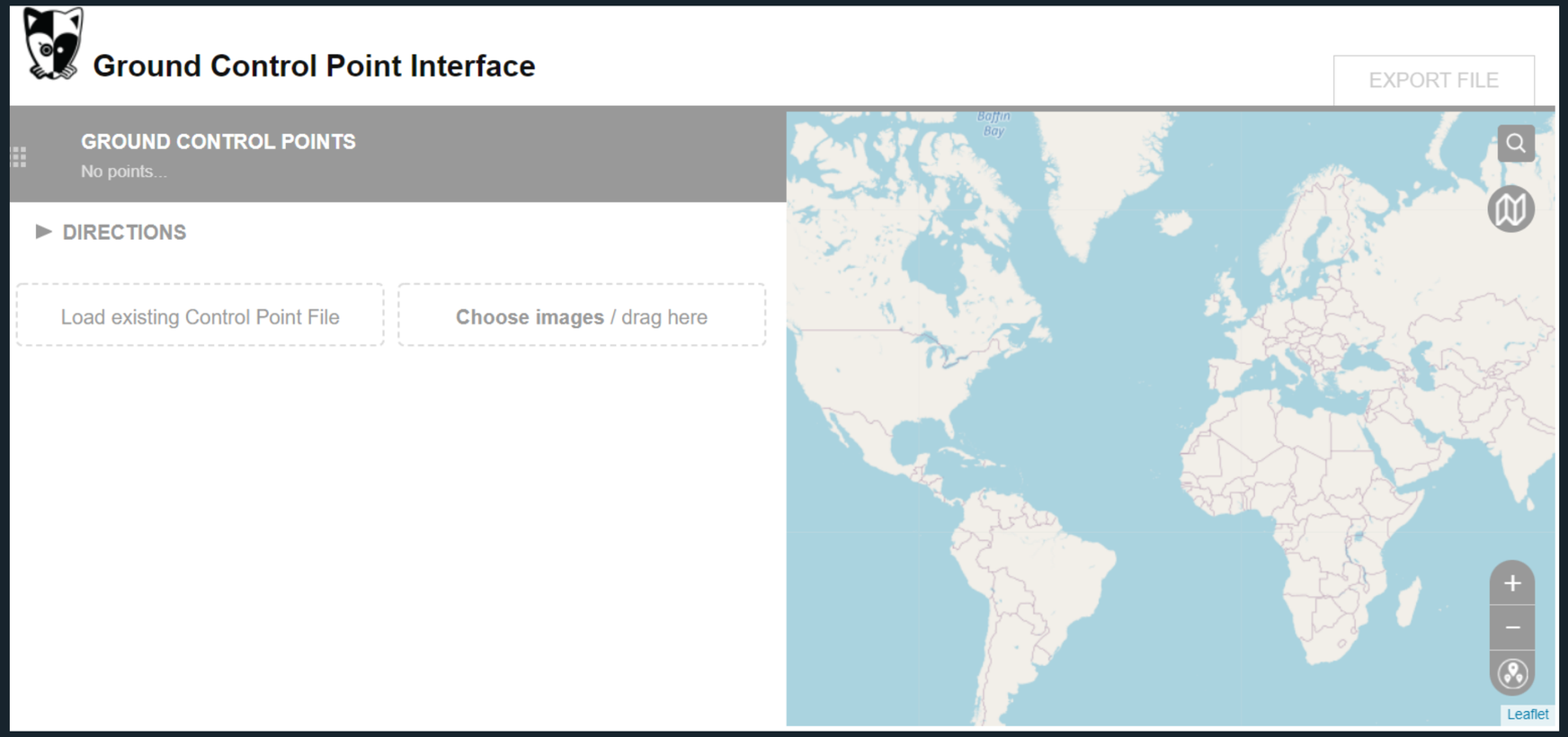

Further docs and links

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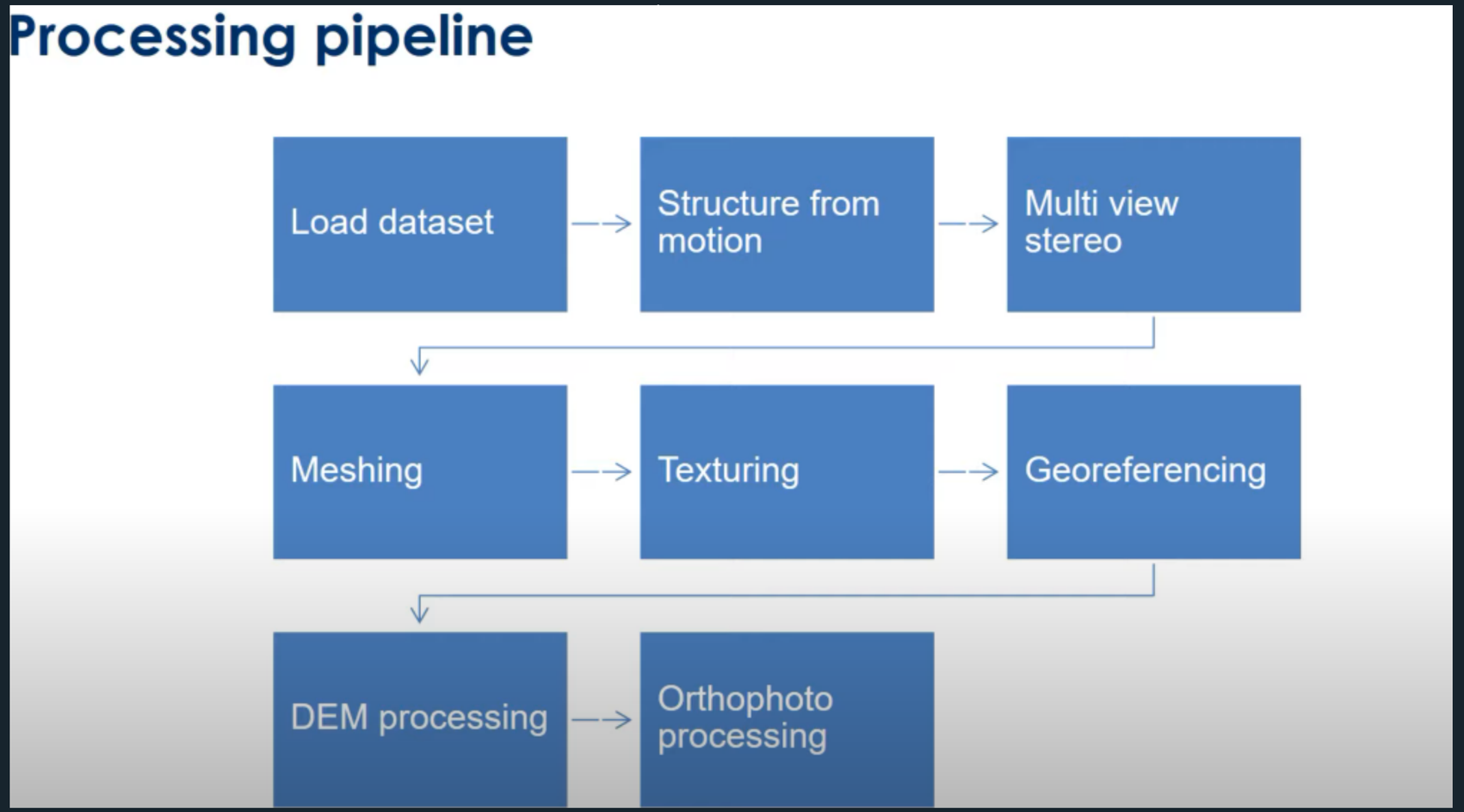
https://github.com/OpenDroneMap/WebODM/

https://github.com/REEVS3/DroneProject

Once we have our mapping software running on a docker container
we will be able to process our images easily for example i will use a demo data set to



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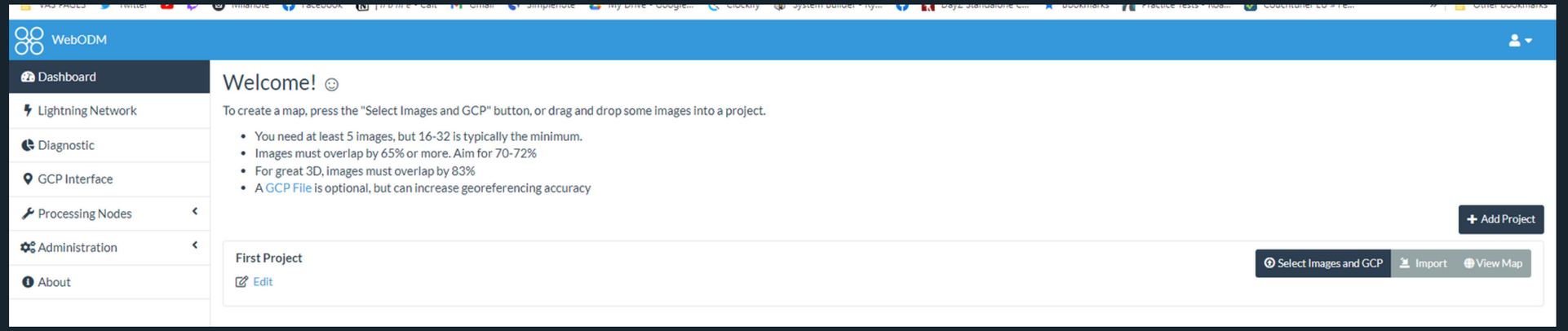

WebODM
Dashboard
Lightning Network
Diagnostic
GCP Interface
Processing Nodes
Administration
About
Welcome! ☺
To create a map, press the "Select Images and GCP" button, or drag and drop some images into a project.
You need at least 5 images, but 16-32 is typically the minimum.
Images must overlap by 65% or more. Aim for 70-72%
For great 3D, images must overlap by 83%
A GCP File is optional, but can increase georeferencing accuracy
Add Project
First Project
Edit
Select Images and GCP
Import
View Map

29 files selected. Please check these additional options:

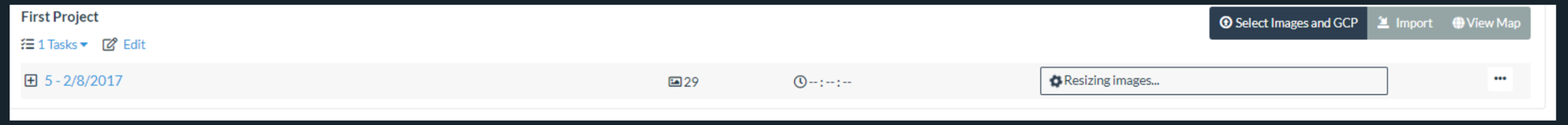
Name 5 - 2/8/2017

Processing Node Auto

Options Fast Orthophoto | Edit

Resize Images Yes | 2048 px

Cancel | Review


First Project
1 Tasks
Edit
Select Images and GCP
Import
View Map
5 - 2/8/2017
29
--:--:--
Resizing images...