GROUP 6

MSE353 PROJECT

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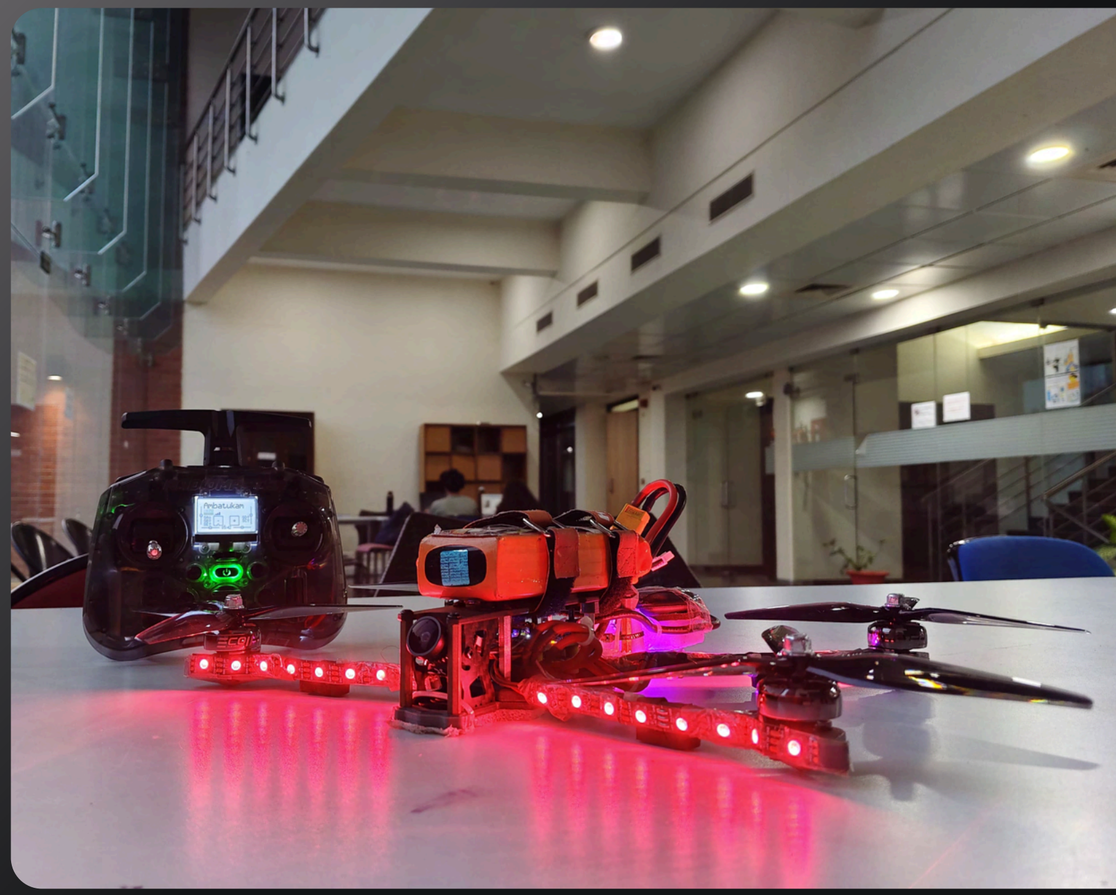
CARBON FIBER 7" FPV DRONE

About

Our project was to build a Long-Range FPV Drone that can travel long distances at high speeds.

The drone boasts a frame built from carbon fiber, ensuring high crash resistance. In fact, during our testing, the drone fell from 5 floors up and didn’t have any major issues.

Equipped with a GPS and Compass Module, the drone automatically returns to home when the signal is lost. It also helps the drone maintain stability and stick to its coordinates.



Parts Used

Flight Controller
SpeedyBee F405 v4 Stack

Brushless Motors
EMax ECO-II 2100KV

GPS
UBlox NEO M8N GPS

ELRS Reciever
2.4GHz ELRS Reciever

Parts Used

FPV Camera
Foxeer Nano Toothless 2

Frame
Titan DC7 7" Carbon Fiber

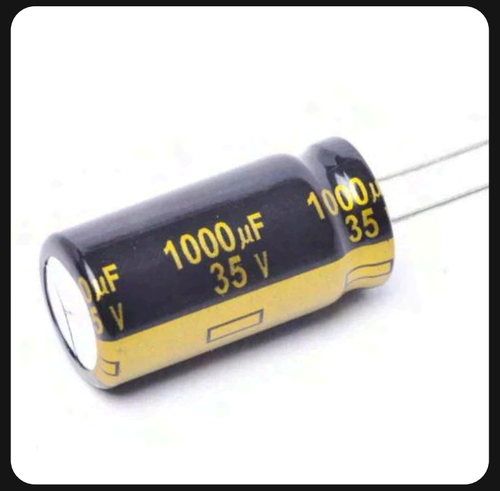
Battery
4S 14.8V 5000mAh Li-ion

Video Transmitter
AKK 1000mW 5.8GHz VTX

Parts Used

Lighting
WS2812B LED Strips

Propellers
Gemfan 7" Propellers



PF Capacitor
1000uF 35V Capacitor

Transmitter
Radiomaster Pocket ELRS 2.4GHz

Manufacturing Process

1. After the testing of all the individual components was successful, we moved on to making the final wiring assembly needed. The motor wires were soldered to the ESC board, the GPS, VTX, Camera, Battery Wires/Capacitor and Receiver were soldered to the SpeedyBee board.

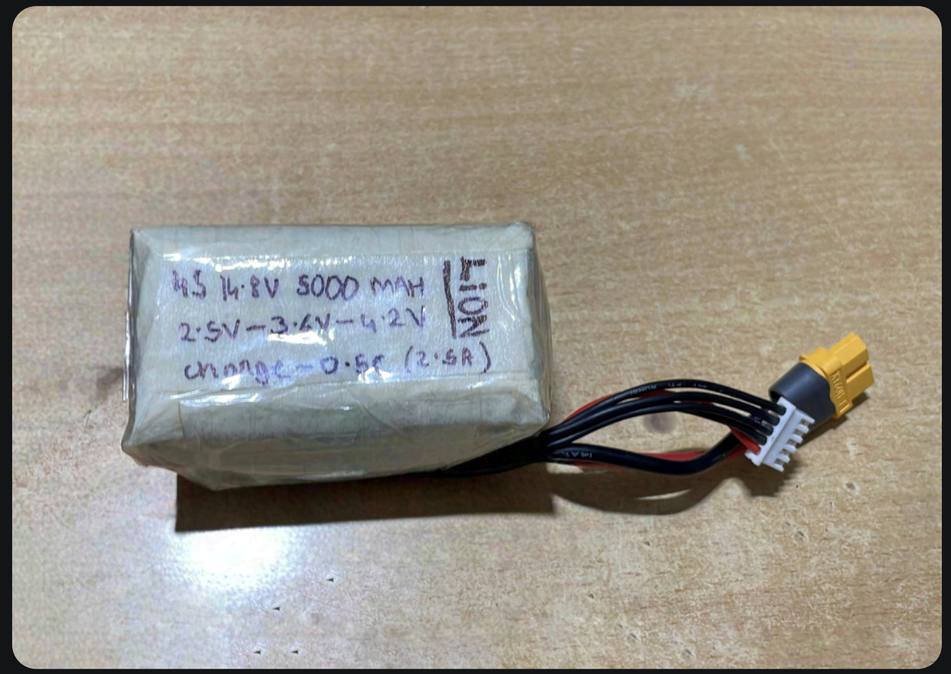
2. The frame was then assembled and the electronics were fit into place making sure no connections are touching the exposed carbon fiber frame as it is conductive in nature. Foam paddings were added for softer landings.

3. After the drone was checked for shorts using a smoke-preventer battery module, the ELRS reciever was binded to the Pocket ELRS transmitter. The Flight Controller was then configured in the BetaFlight Software.

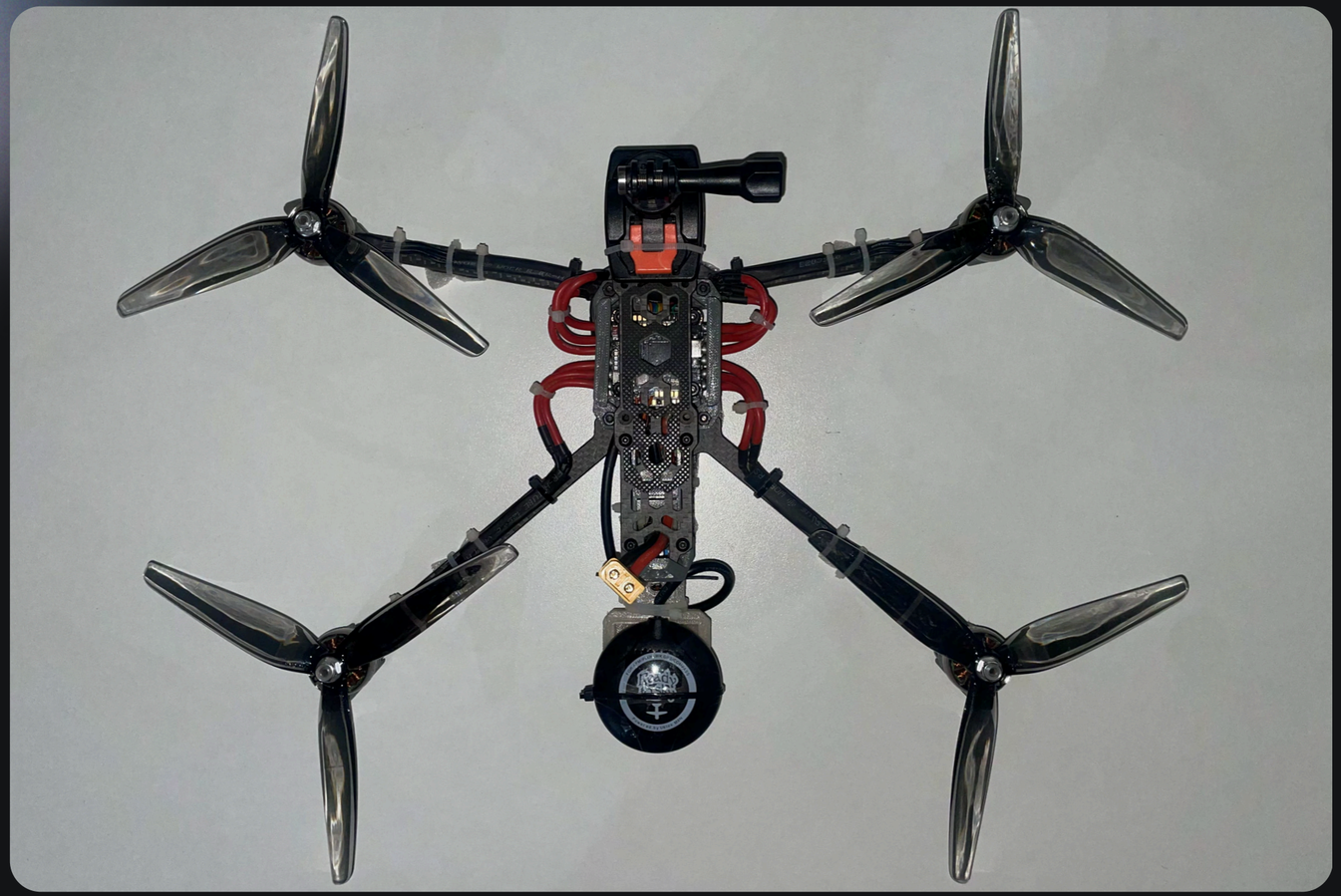
4. The BetaFlight software was used to control many parameters such as the controller button mapping, GPS Failsafe settings, PID settings, sensor calibrations, lighting, OSD for the FPV camera, ESC Response Type (Ex: DShot600) etc.

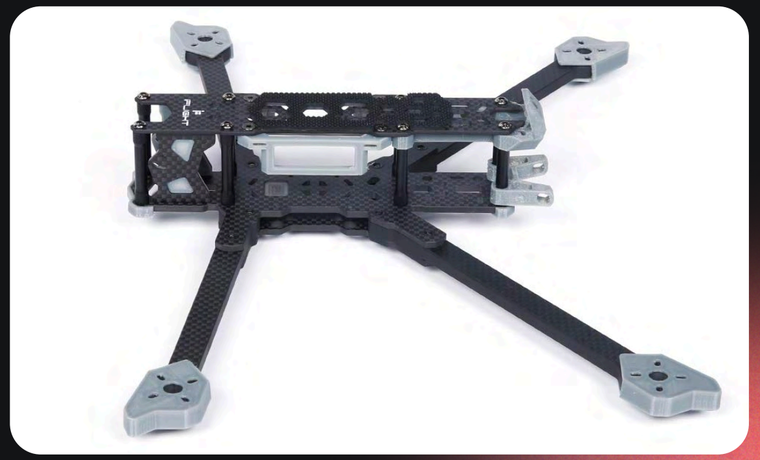
Manufacturing Process

We also built our own Lithium-Ion 4s (14.8v) 5000mAh battery pack using off-the-self Samsung batteries and the appropriate power connector (XT60) and balanced charging plug.



Assembled Drone

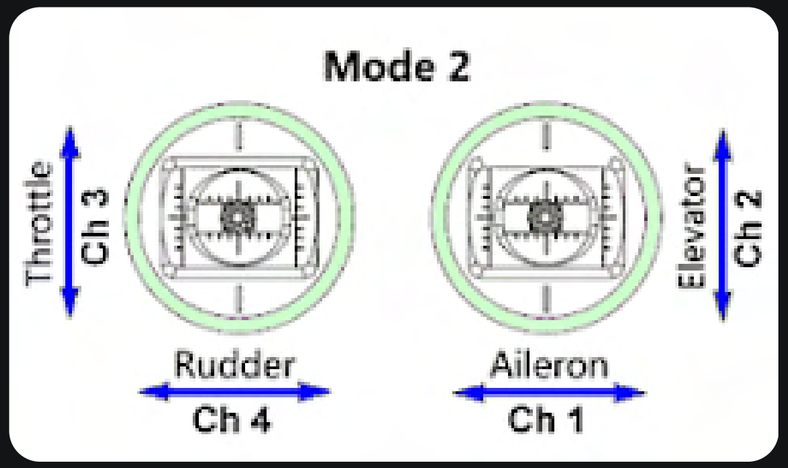




Maiden Flight

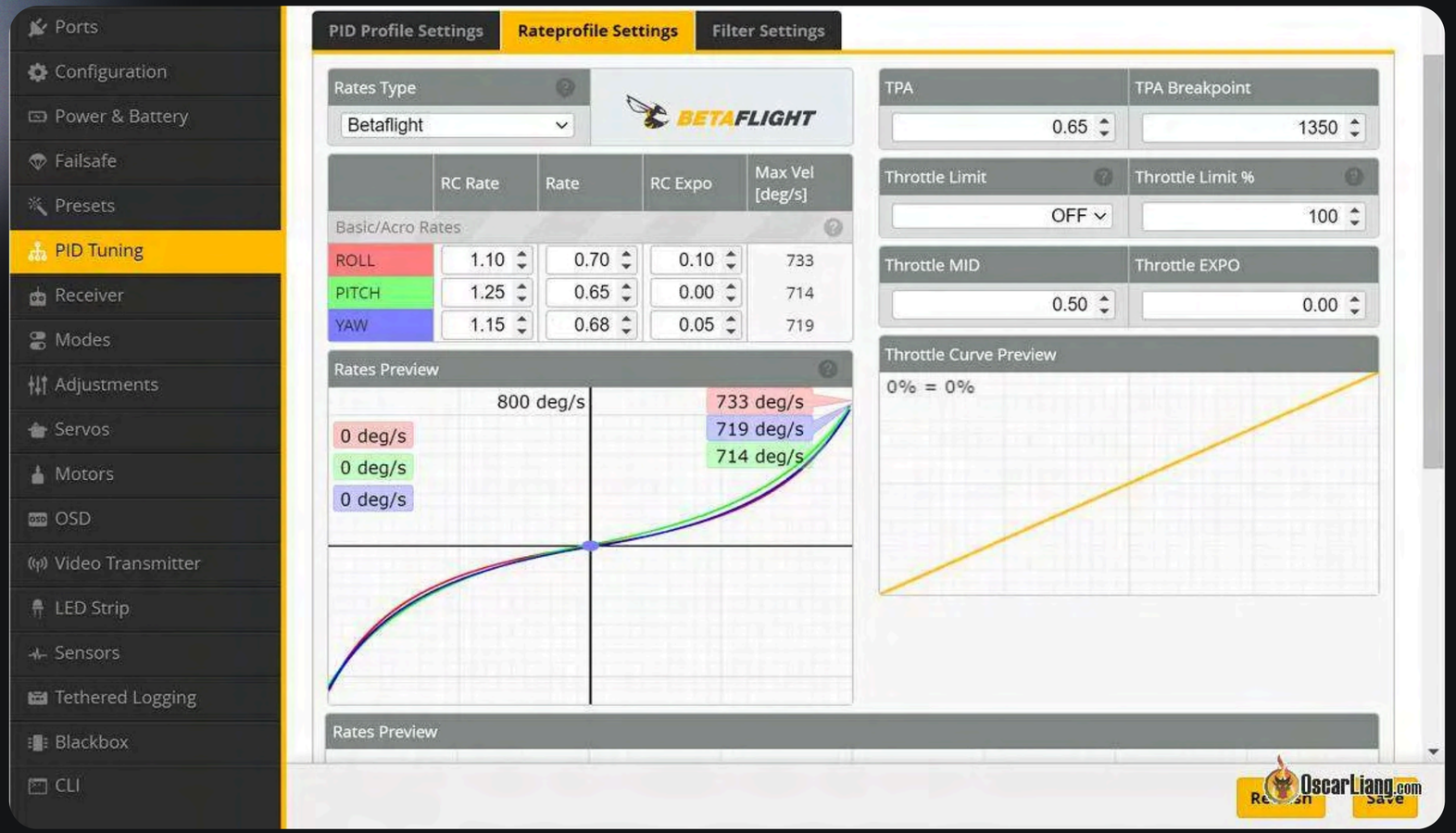
The motors were then tested without the propellers and calibrated. It was then time for the first maiden flight of our Drone.

After checking the battery voltage with the battery voltage checker and making sure that it is around 16.2V, the drone was powered on. We took the drone to an open ground and calibrated all the sensors. After locking on to 12 satellites, we were ready to launch.



Gimbal(Joystick) Configuration for Mode 2 TX

PID Tuning



After many test flights and playing around with the PID settings, we finally settled on these PID values.

These seemed to give the most stable flight no matter the wind conditions.

The Footage.

Panki Power Plant


Thank You
Ambatukam