Recovery Team

Week 9

Tasks last week

1. Avionics drone test
2. Completion of piston test cage design
3. Flight software development

Avionics Drone test

-The test did not go as expected

-Reason -> Issue with the flight computer board

- The ESP32 kept overheating

- It therefore could not supply enough power to the MPU6050 and BMP180 sensors

- We used the same power line for voltage and currents during this test

Avionics drone test

What worked

1. Dashboard - we were able to receive flight data but this was under battery power
2. Wifi Network Setup
3. Flight software - We used N2 flight software because N3’s flight software had not yet implemented the MQTT connection subsystem.

Avionics drone test

- Previous teams used a string to attach the avionics holder to the drone
- However, the drone pilots recommended we design a device that clicks onto the landing gear of the drone for the next round of tests
- Like the one they use to attach cameras on the drones

The avionics holder should be able to click onto the landing gear here

Trying to debug the flight computer

- We tested the flight computer when connected to the computer with a USB cable and it worked fine

- However, we did not test it under battery power prior to the drone test

- **Recommendations**: Adequate testing for the flight computer on standalone battery power
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- Account for fluctuations of power on the flight computer

- We are redesigning the flight computer and the power distribution board to supply each sensor with its own power - previous design had ESP32 supplying the sensors with power - which over-drove the supply lines

N3 Flight Software Development

Done

Sensor Readings

60% Done

Data filtering

90% Done

Flash storage

Done

Data transmission over MQTT

Done

GPS Reading

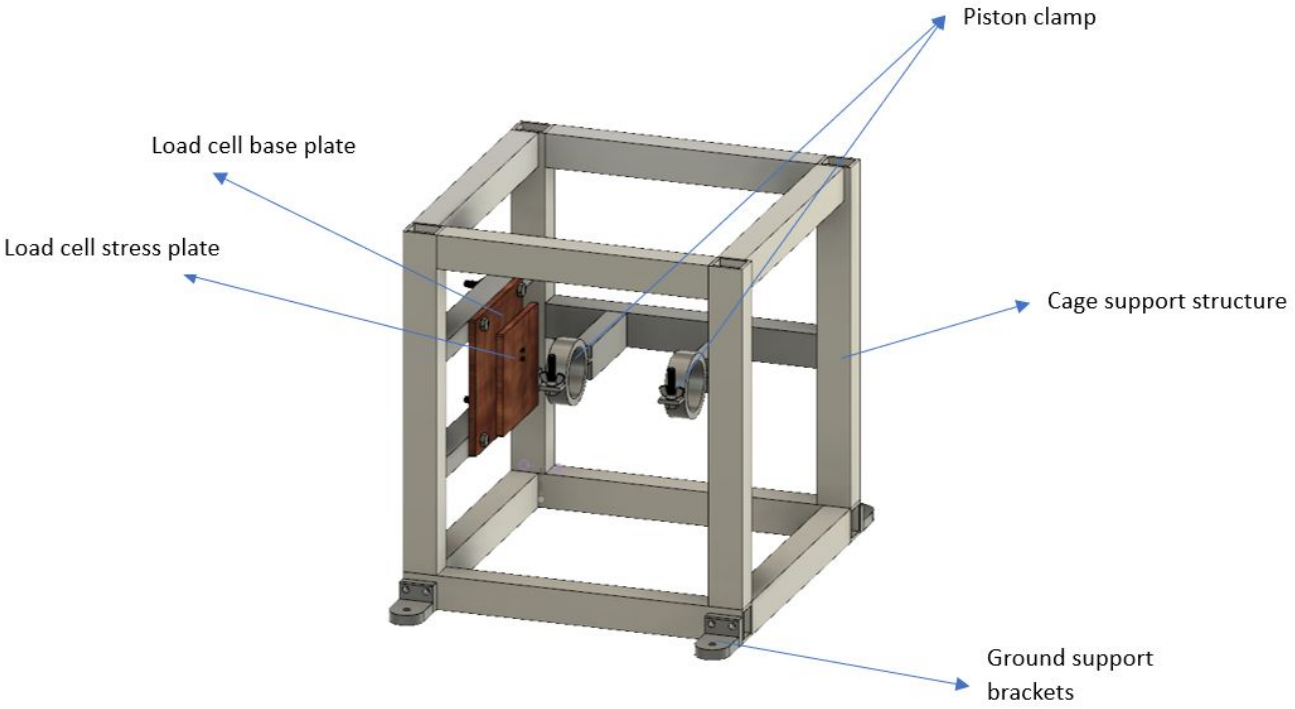
60% done

State machine to detect different flight states - apogee detection algorithm

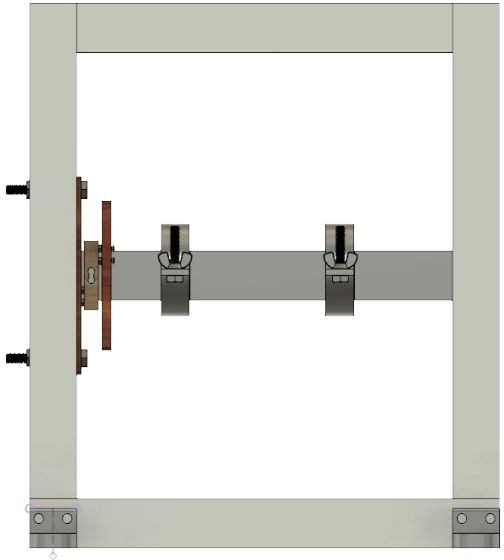
N3 flight software development

- For the flash memory, the code is there
- What is remaining is to solder the flash memory on the flight computer and test the code there
- The unit tests for the flash memory are done
- Parachute ejection algorithm unit test is done - what is remaining is to integrate it into the main flight software

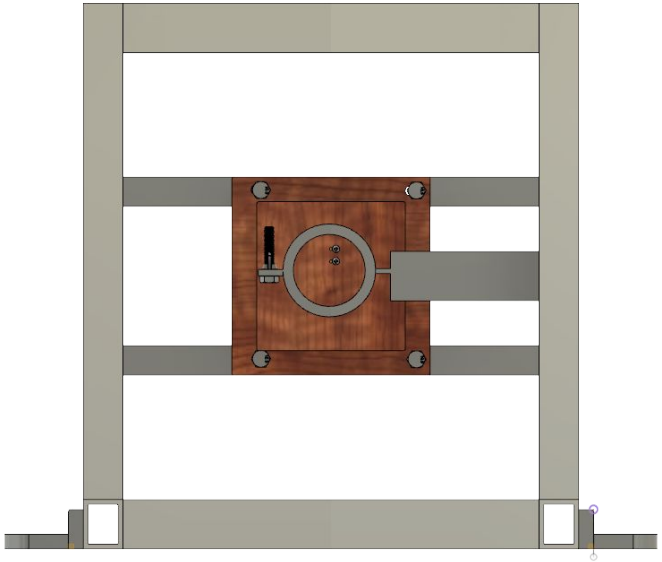
Piston test cage design completion



Side View



Front View



Purpose of test cage

1. **Safety**
2. Ascertain the amount of force we get from an ejection during tests

-The cage uses a 50kg bar load cell mounted on one end

-When the piston hits the load cell, we can register this amount of force

This week tasks

1. #37 Redesign of flight computer for drone testing
2. #33 Design avionics holder for mounting on DJI Matrice drone
3. #34 Design of avionics holder for drone testing - This one will include screw holes for mounting the PCBs - The previous one did not have enough clearance on the bottom layer
4. #41 N3 flight software Version 1 completion and testing
5. #40 Fabrication of piston test cage
6. #39 Design on aluminium pistons