Nakuja Project

Avionics

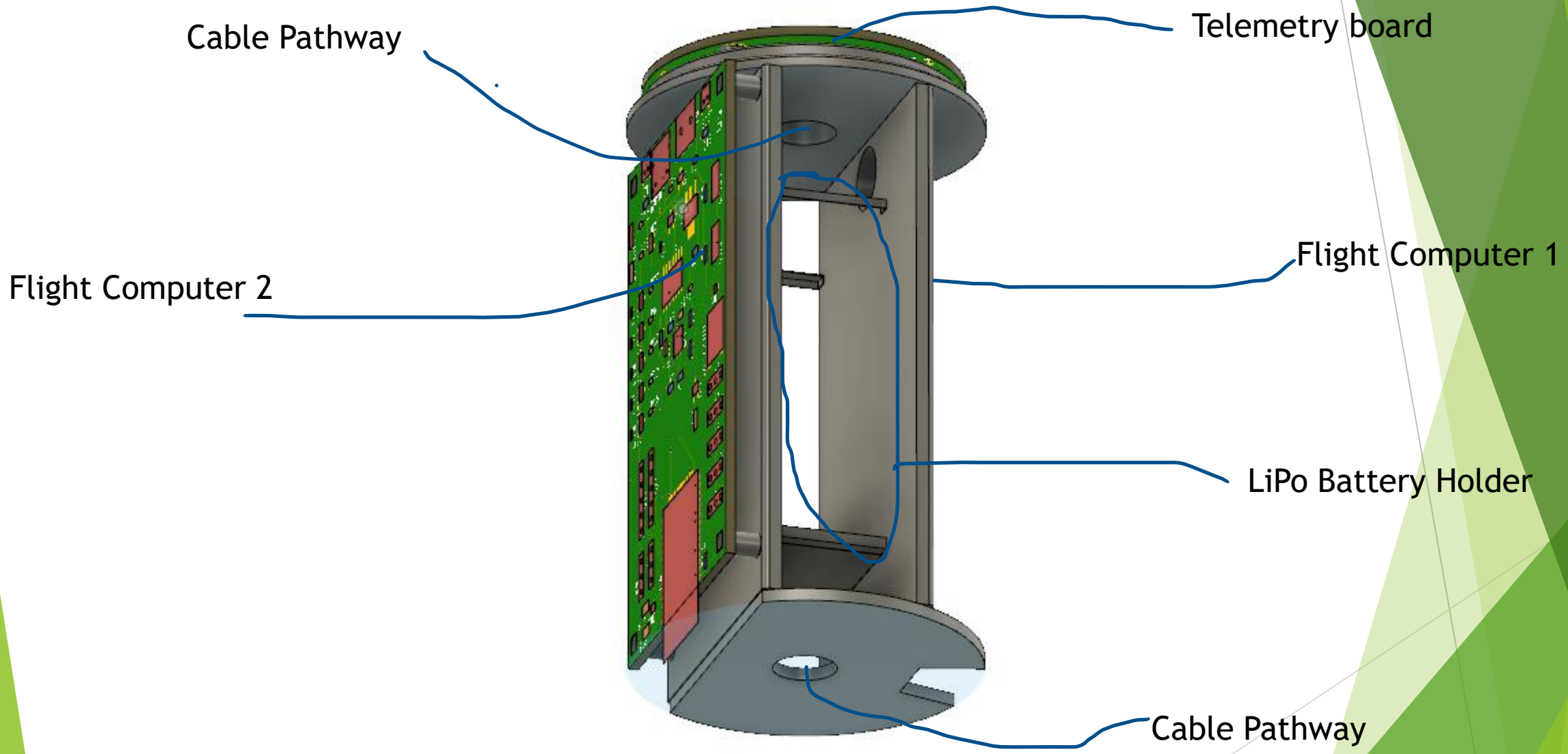
Week 4 Progress Report

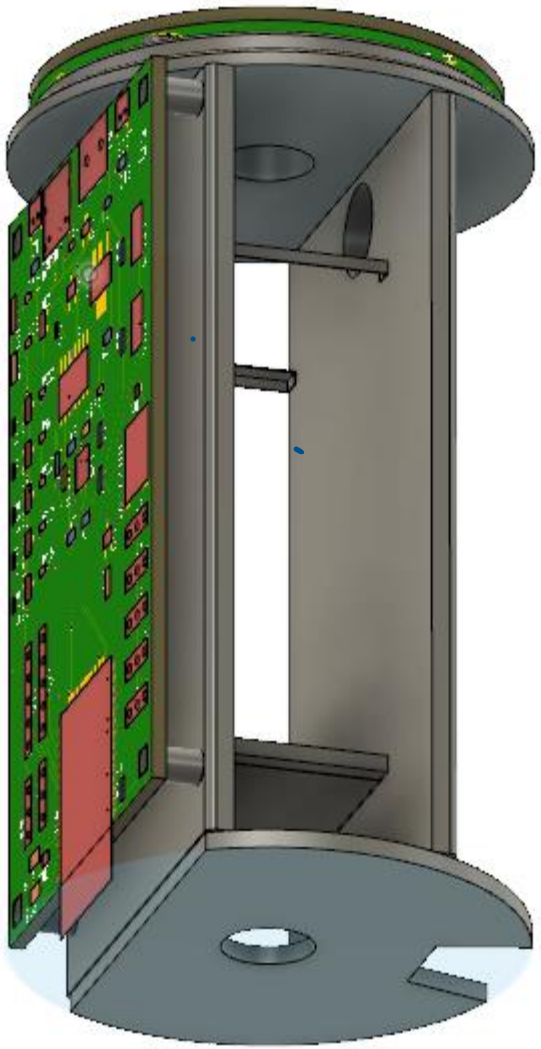
Tasks completed this week

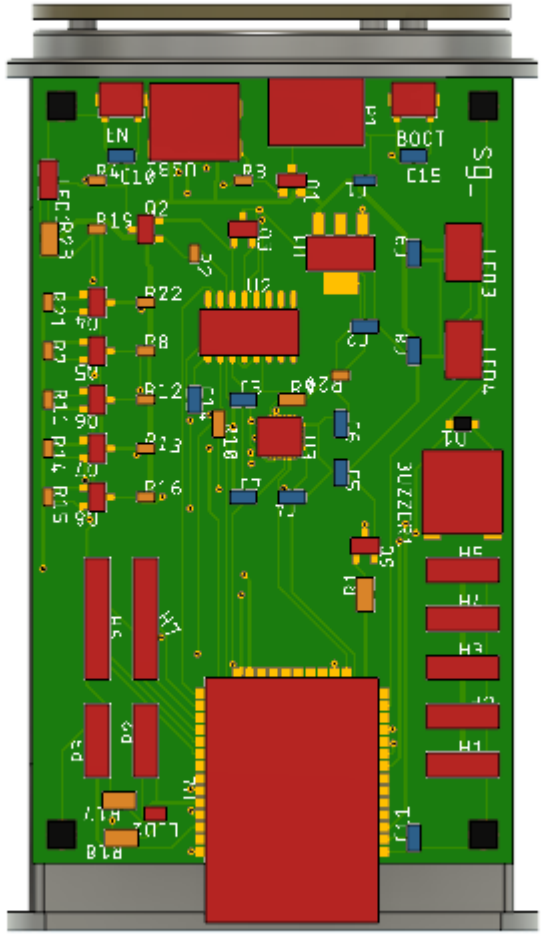
- [#23] Avionics Bay design
- [#83] : Power Management – In Progress
- Flight Computer PCB completion
- [#2] Wi-Fi Antenna Testing
- [#26] Kalman Filter performance improvement
- [#31] : Research on apogee detection logic

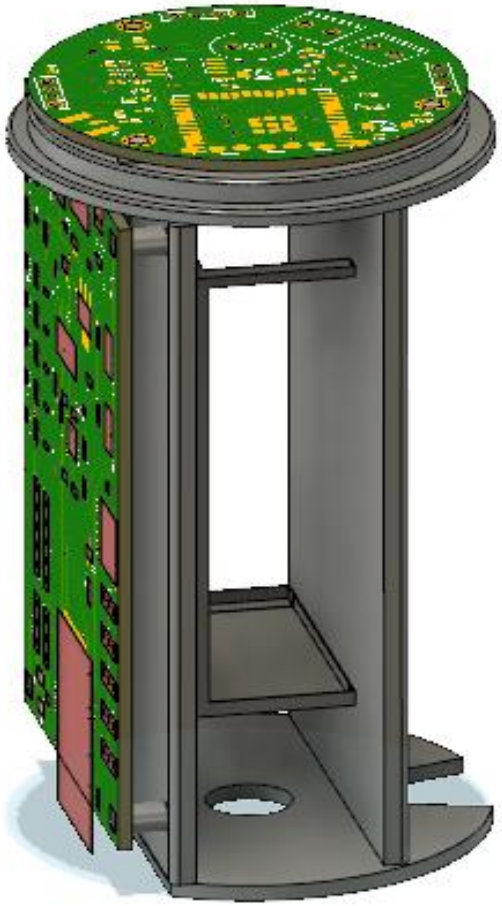
Avionics Bay Design

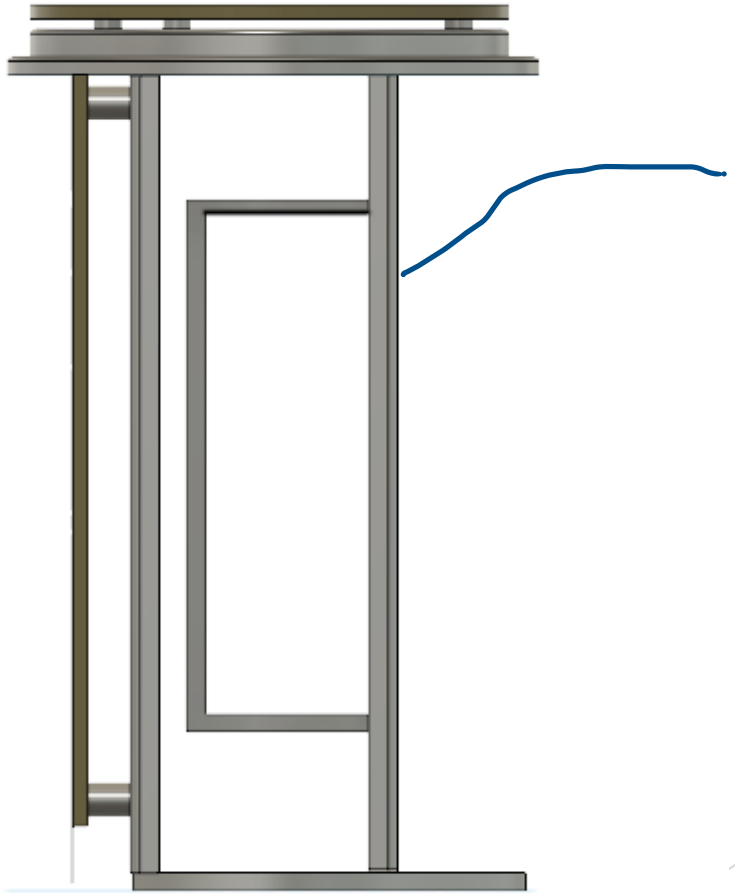
- We designed the avionics bay to hold the PCBs during flight
- Designed to fit with the internal diameter of the Rocket body tube


Cable Pathway
Telemetry board
Flight Computer 2
Flight Computer 1
LiPo Battery Holder
Cable Pathway

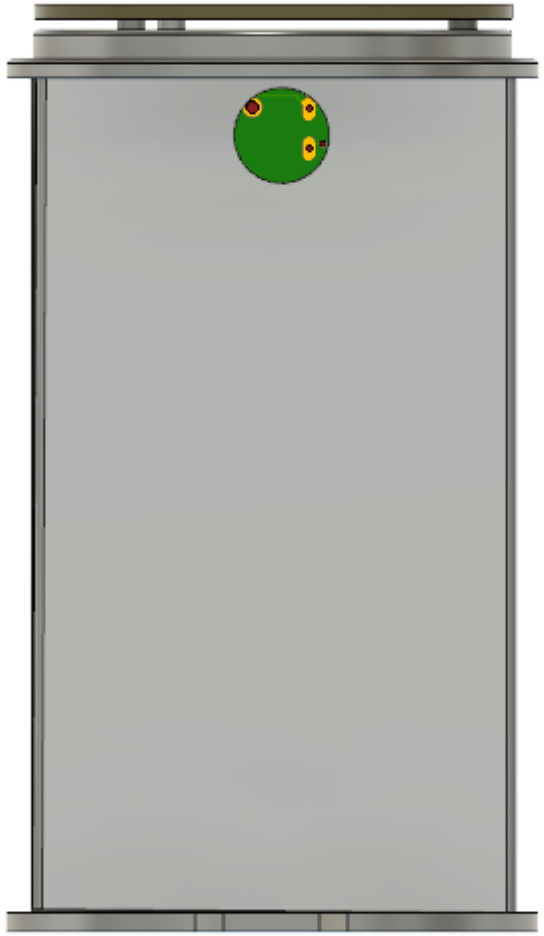








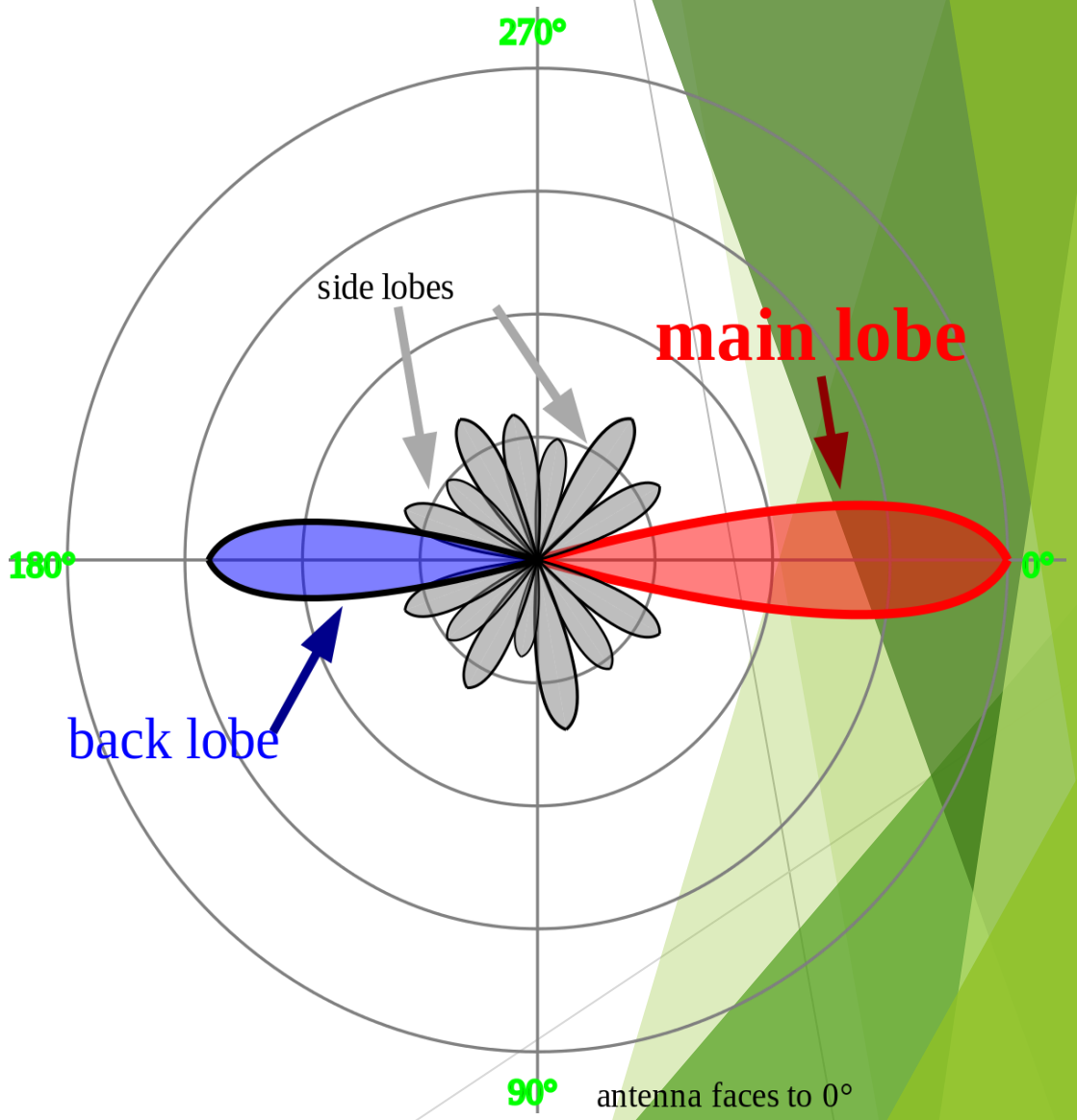
Flight Computer 1 PCB to be included here



[#2] Wi-Fi antenna Testing

- We built an aluminum foil antenna to reflect Wi-Fi signals directionally.
- The results were not as hoped because.
- We wanted the RSSI value of the ESP-Wifi to remain constant over long distances. But this was not the case.
- We are of using better antenna such as the Yagi antenna

Directivity



[#83] Power Management

- We realized that the different boards as well as the camera had varying power consumption needs.
- The required voltages being 12v, 9V, 7.4V, 5V and 3.3V with supply sourced from a 12V battery.
- It is thus necessary to create a Power Distribution Board that will safely distribute required power to all components.
- The board is currently under design

[#31]Apogee Detection Logic

We found that the most efficient means of apogee detection were:

- Zero Velocity logic – By use of the MPU6050, we could use the acceleration values received from the accelerometer to detect apogee when the velocity, area under the acceleration curve, reaches zero. As soon as the velocity reaches zero, apogee is detected and thus the parachute is deployed.

- Positive Air Pressure logic – The BMP180 measures air pressure and detects changes in air pressure in order to determine the height of the rocket. Apogee will be detected at the first instance when the air pressure stops decreasing, and begins to increase.

Task this week

[#83] : Power Management

[#26] : Improve on Kalman filter performance-In progress

[#34] : Program Flight Computer

Ground Station Dashboard Completion