Recovery Team

Week 7

Tasks last week

- Drone Test preparation #32
- Patch Antenna Design #20
- Power Distribution Board Fabrication #7
- Ejection charge Tests # 26
- Manual Ejection Test

What was achieved
1. Power distribution board fabrication

1. We finished designing the power distribution to be used.
2. We sent the Gerber files to a lab in Kiambu on Friday for fabrication. We are waiting on their feedback
3. Once the boards are back we will evaluate their quality and decide whether we can use the lab to fabricate our main flight computer

2. Drone Test Preparation

- Majorly flight software and flight computer PCB
- We have been writing the flight software for the better part of the week.
- We choose to go with an RTOS model for the software because all functions of the software are equally important
- We are improving on N2’s flight software, removing unecessary bloat and adding new faster features.

Flight Software parts

1. Reading sensors	DONE
2. Filtering the data	NOT DONE
3. Dispatching the data to MQTT	DONE
4. Saving the data on a flash memory chip	NOT DONE
5. Apogee detection algorithm	DONE
6. Parachute ejection algorithm	NOT DONE
7. GPS location	DONE

Flight Software

- Continuous Testing during all stages of development
- To ensure easier integration and final software testing

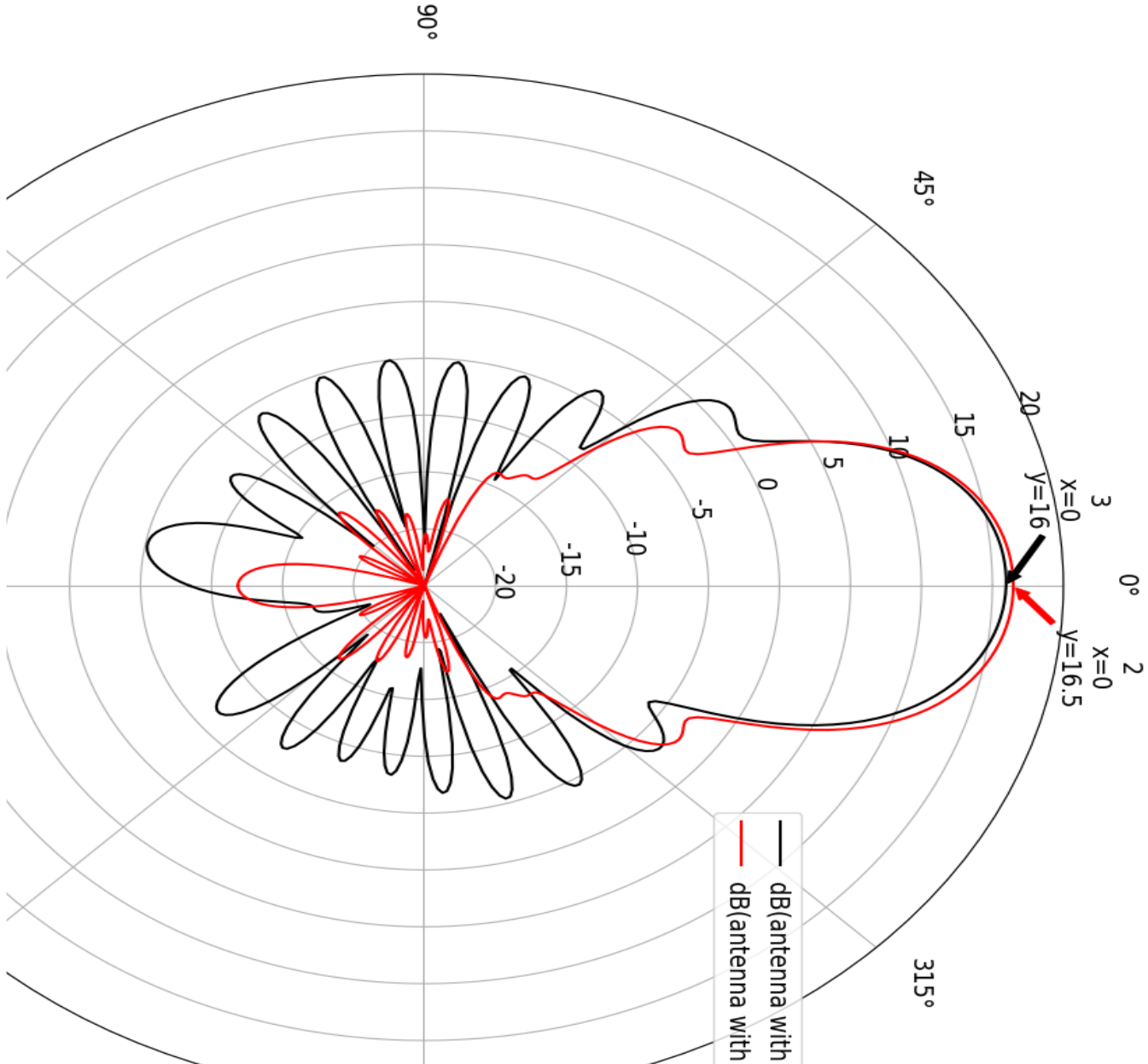
Drone test preparation
Flight computer

- The design is done awaiting fabrication

Patch Antenna Design

- The design is going on as planned
- We have managed to get power equally on both lobes of the antenna design which is not as desired because we want power to be more on one side of the antenna

Desired Power diagram



Manual ejection test

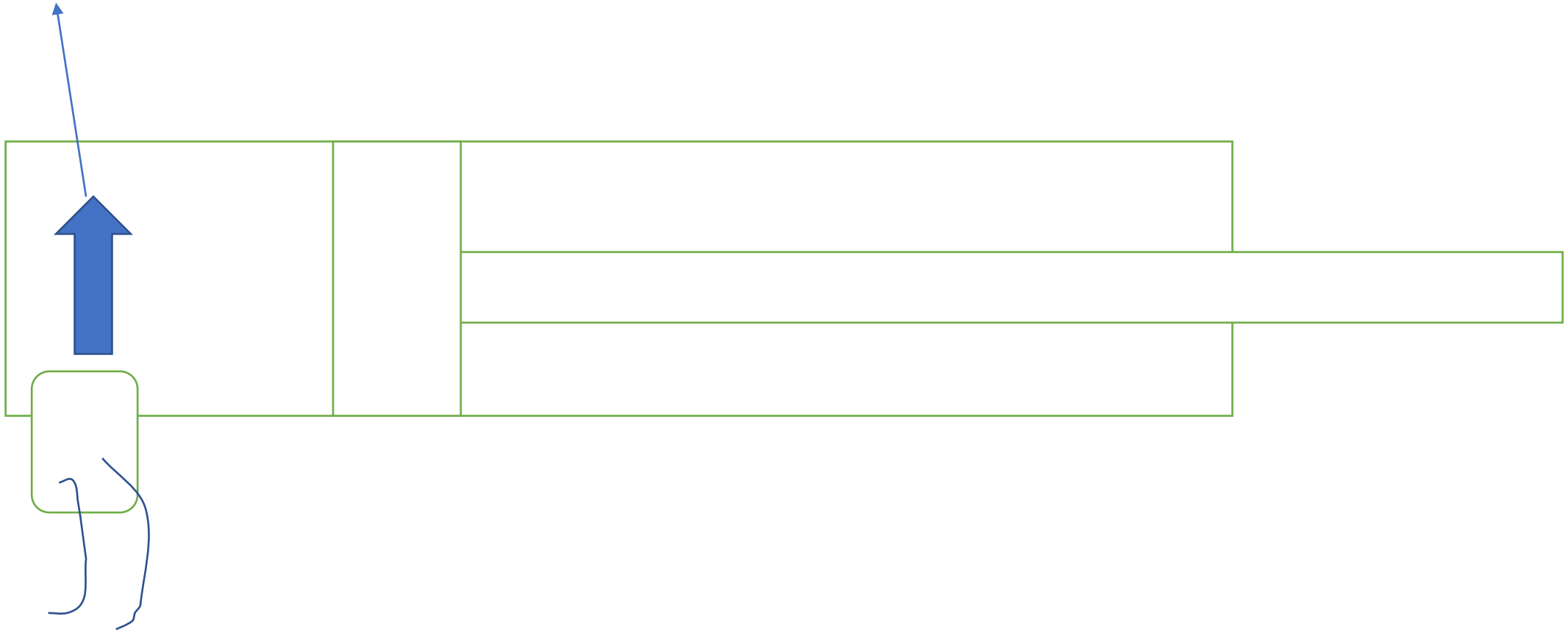
- We went to carry out manual ejection over MQTT
- There was a slight connection error but it has so far been resolved
- We will carry it out today

Ejection charge Tests

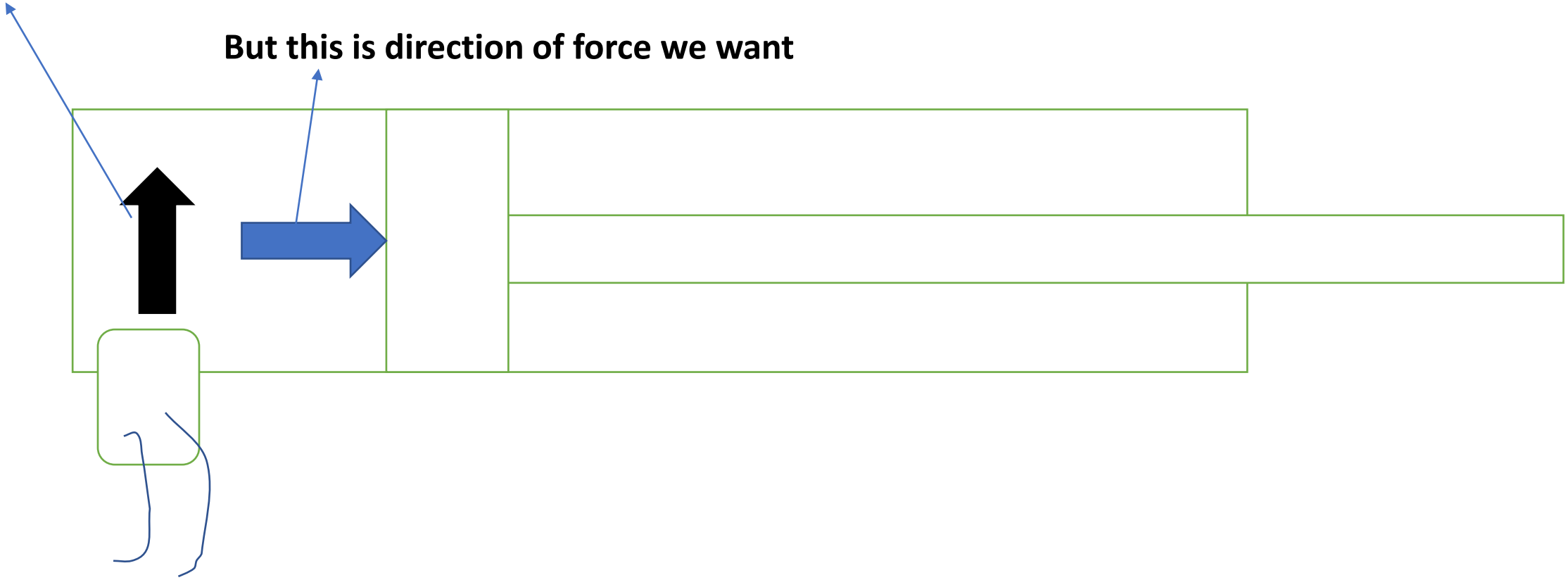
- We have held ejection charge tests for a few days to first develop a way of measuring how much thrust we get from the charges.
- We want to be as much precise as possible in having the exact amount of ejection charge on the parachute to avoid past mistakes like burning the parachute
- Ejection charge test continue this week.
- Previously we mentioned we will use a fire bolt
- But this is not a viable method because most of the force will be directed away from the piston shoe.

Ejection charge tests

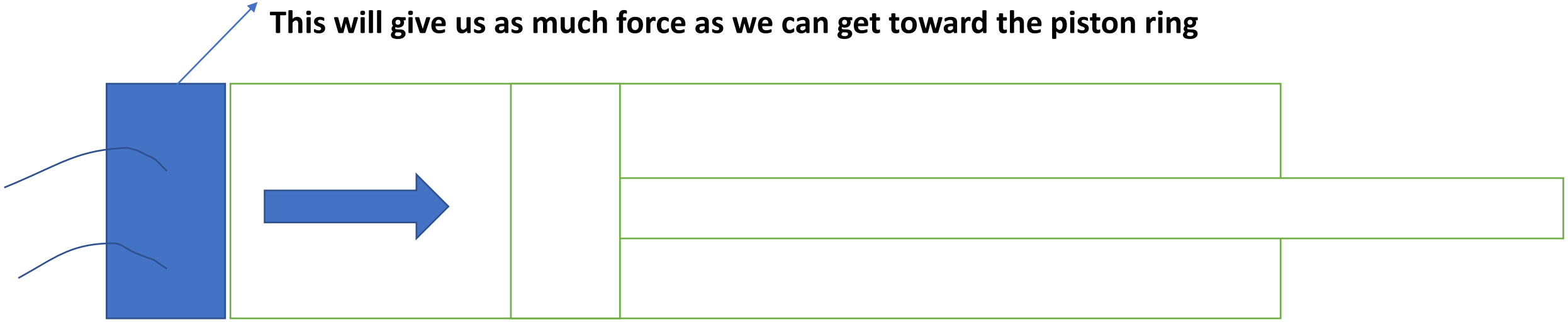
Direction of force - Undesired

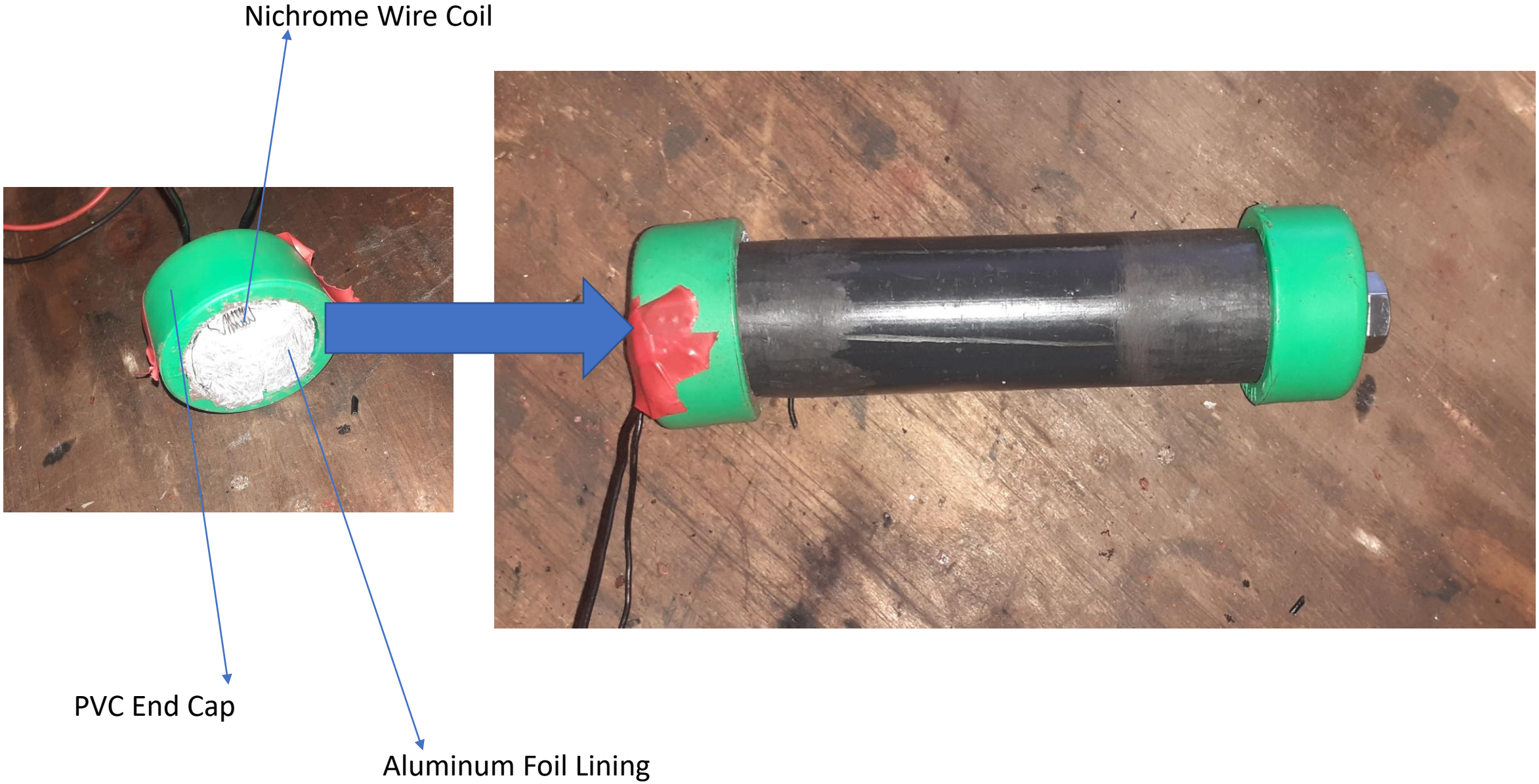


Initial design had this as the direction of explosion (undesired)



Placing the ejection charge here
This will give us as much force as we can get toward the piston ring




Nichrome Wire Coil
PVC End Cap
Aluminum Foil Lining

[Test Videos Here]

Effect After Ejection Test

End of the piston cylinder cracked

The piston rod was ejected away from
The piston cylinder - undesired

Improvements to be made

- If using PVC, secure all end caps with screws so that only the piston rod is pushed by the explosive power
- Machine a piston cylinder and end caps using aluminum
- Weight is not a major issue here. The explosive power is much high compared to the weight of aluminum
- All we need is the strength of aluminum
- Shield the nichrome wires leading to the with fireproof cladding
- Assemble a rig to hold the piston during upcoming tests

Tasks this week

- Flight software completion
- Power distribution board fabrication
- Flight computer design improvement and fabrication
- Ejection charge test improvement
- Ejection piston design improvement
- Patch antenna design