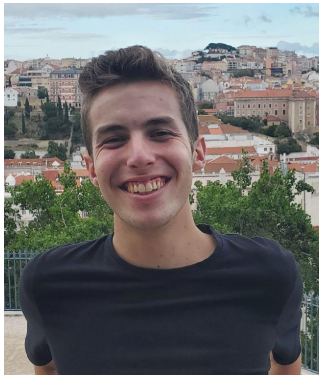
ELC 496 Design Review #4

Spring Semester 2023

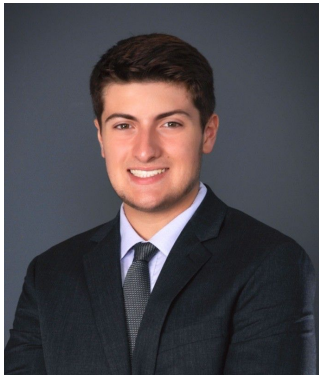
Advisor: Dr. Deese

Team Members

Sean Burtnett



Mike Bond



Jack Delvecchio

Darion Parks

Agenda

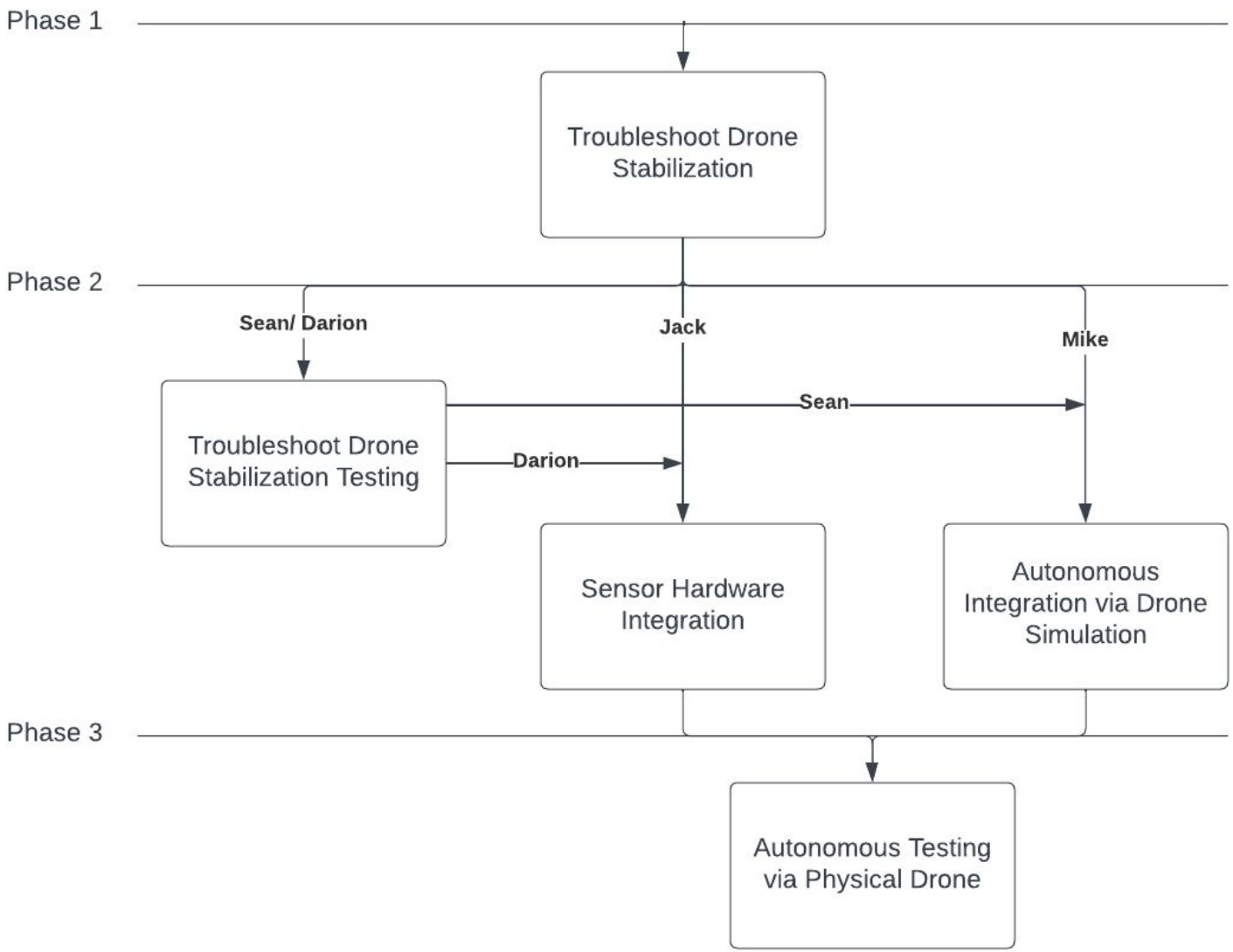
- Project Overview
  - Schedule
  - 2nd Semester Plans
- Project Plan
  - Troubleshooting Drone Stability
  - 2nd Semester Hardware
  - 2nd Semester Software
  - Open AIs
- Project Management
  - Updated Budget
  - Updated Hours
- Summary

Part 1
Project Overview

Schedule

Task	TASK TITLE	Job	PCT OF TASK DONE	Phase 1: Stability Testing + Sensor Design					Phase 2: System Integration					Phase 3: Testing/ Evaluation			
				1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Stability Testing	Group	33%														
2	Update Website	Jack	0%														
3	Select/Order Parts	Sean	0%														
4	Sensor Assembly	Jack Darion	0%														
5	Coding Autonomous Flight	Mike	0%														
6	Ultrasonic Sensor Integration	Mike Sean	0%														
7	Thermal Sensor Integration	Darion Jack	0%														
8	Documentation	Group	15%														

2nd Semester Plans



Part 2
Project Plan

Troubleshooting Drone Stability

Current Issues We're Facing

- RX/TX working with the motors
- Adjusting parameters in Mission Planner
  - Changing Servo Output Signal
  - Tree Parameters
  - PPM Encoder vs. PWM

Troubleshooting Drone Stability

Plan Going Forward

- Hard deadline of February 23rd set
  - If we can't get the drone flying with the RX/TX we will move on to focusing on end goal of our autonomous application by working in parallel

2nd Semester Hardware

- Ultrasonic sensors and thermal sensors will be attached to the drone
  - 6 ultrasonic sensors
  - 1 thermal sensor
- Ultrasonic sensors placed on all 4 sides of drone and 1 on top/ 1 on bottom
- Thermal sensor placed on the bottom facing frontwards

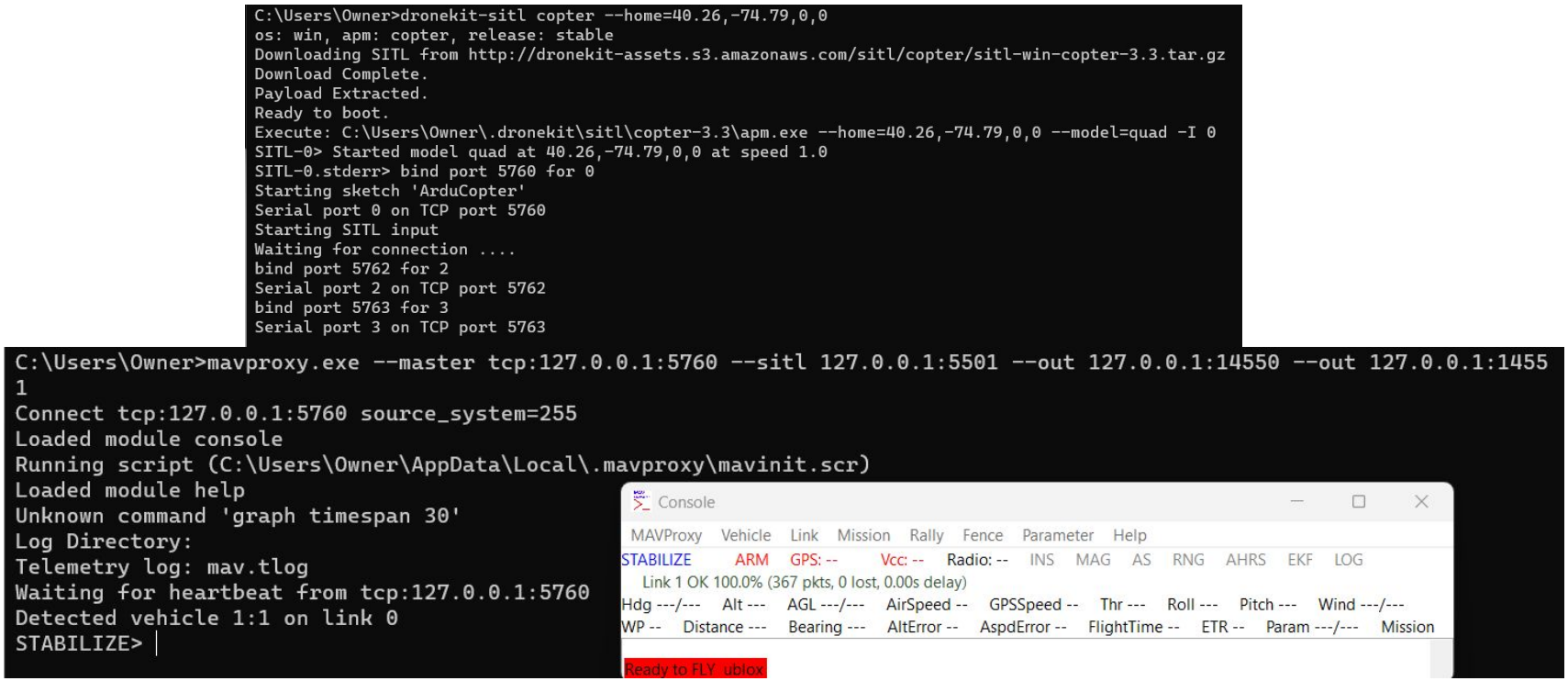
3D Printing

- 6 cages to hold the sensors in place will be needed
- 4 of the cages will be similar, they will fit between the legs of the drone to hold sensors

- Cages will be created using 3D printing
- Final sketches are being worked on and will be implemented during phase 2

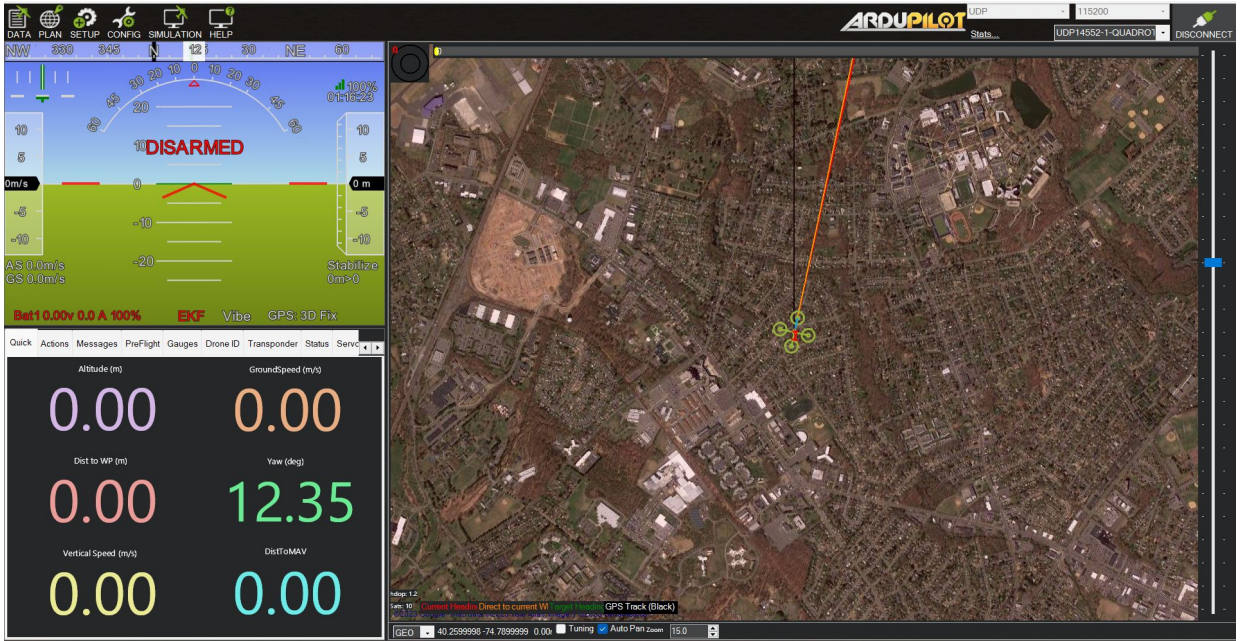
Drone Simulation

- Dronekit-SITL (Software in the loop) allows for simulated drone models
- This can be set up to work with Mission Planner and test Python Scripts



Drone Simulation

- Simulated Drone acts as a model to allow for the development of Python scripts
- The Simulated Drone uses GPS and doesn't have the sensors we will use
  - Scripts will be adapted for our drone



Open AIs

- Drone Stabilization
- Update Website
- Order Sensors and parts

TCF Demonstration Plans

Main Goals

1. Achieving motor control/air stability
2. Semi-autonomous movement

Stretch Goals

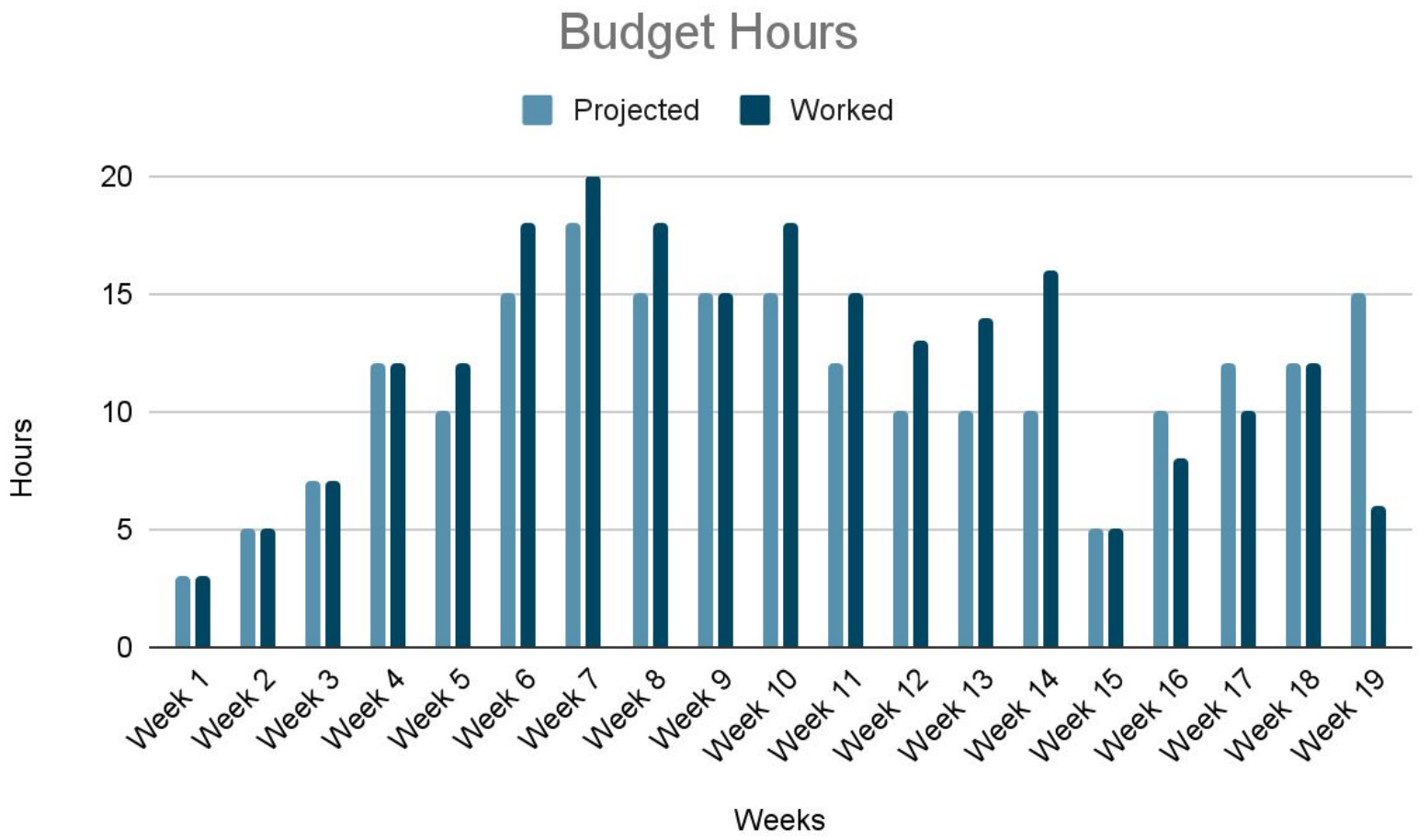
1. Thermal sensor sending data while drone is in flight
2. Full-autonomous mission capability with proximity sensor integration

Part 3
Project Management

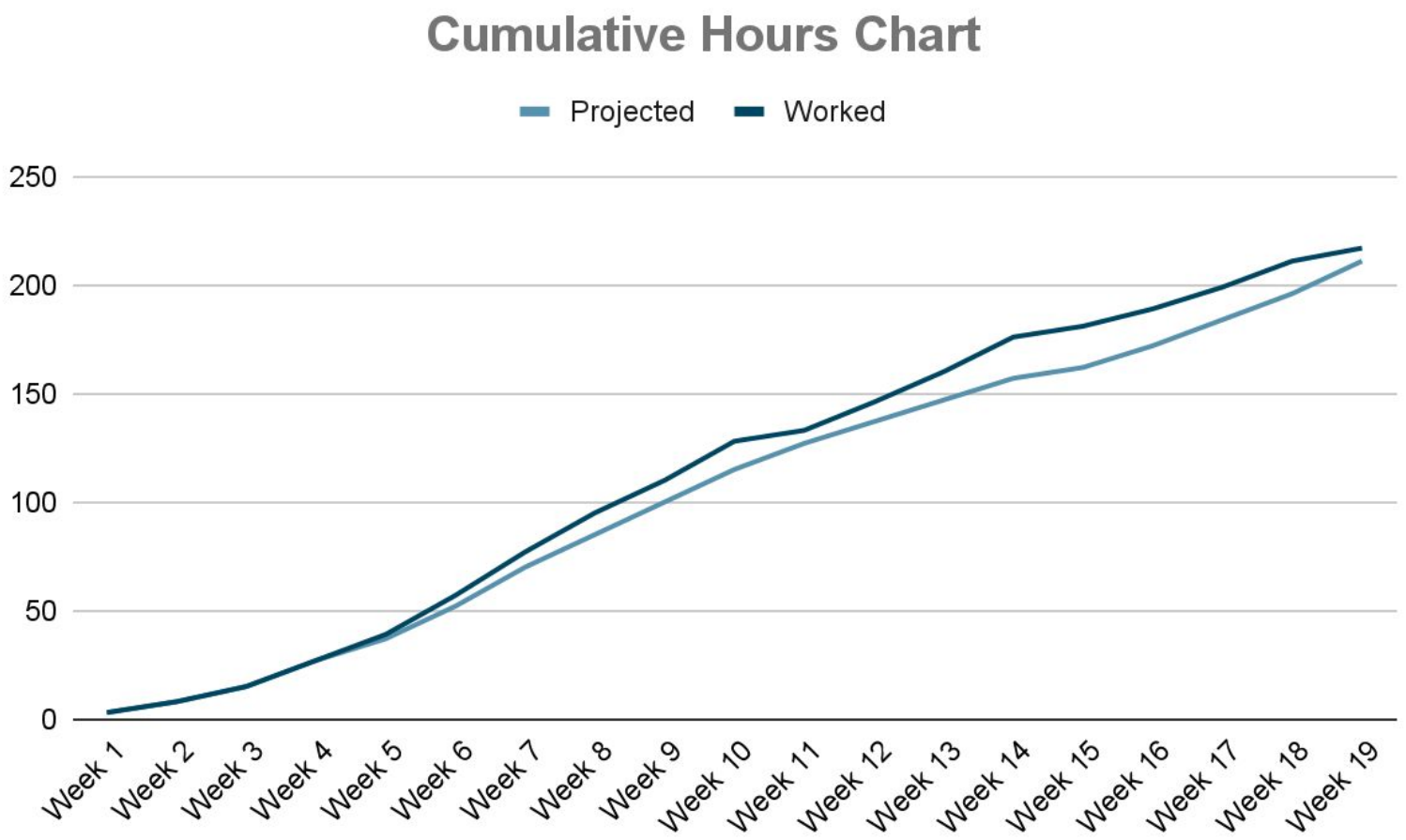
Budget

Parts	Cost	Our Price	Actual Price (bought)
Raspberry Pi 4 Model B (4 GB RAM)	$134.95	$0.00	$0
Pixhawk Flight Controller	$100.00	$100.00	$290
Adaptor Cables	$9.00	$9.00	$9
ESCs 4 PACK	$31.99	$31.99	$36
Motors 4 PACK	$51.79	$51.79	$0
Frame	$23.99	$23.99	$21
Props	$14.49	$14.49	$15
Battery	$25.99	$25.99	$38
Battery Connector	$8.99	$8.99	$9
Battery Charger	$41.99	$41.99	$12
Micro SD Card	$5.99	$5.99	$7
Micro SD to USB	$6.99	$6.99	$7
Velcro Straps	$9.99	$9.99	$14
Scotch Mounting Tape	$13.95	$13.95	$9
Zip Tie	$5	$0.00	$5
Vibration rubber + standoffss	$15	$15.00	$15
Telemetry	$97	$97	$0
PPM Encoder	$18.99	$18.99	$0
Vibration Plate	$8.00	$8.00	$0
3.5mm Bannana Plugs (20pck)	$15.00	$14.91	$15
Heat Shrink	$5.00	$5.00	$5
USB-C power	$15.00	$15.00	$15
micro HDMI + cords	$10.00	$10.00	$10
Ultrasonic Sensors x6	$122	$122	
Sensor Adaptor Cables	$10	$10	
Thermal Sensor	$150	$150	
Total	$951.09	$811.05	$532

Weekly Budget Hours



Cumulative Budget Hours



Part 4
Summary

Summary/Conclusion

- Complete stabilization of the drone needs to be completed ASAP
- The group will work in parallel to complete necessary end goals
  - Sensor Hardware
  - Drone Simulation Testing