

ELC 495 Design Review 3

Autonomous Drone with Thermal Imaging Capabilities



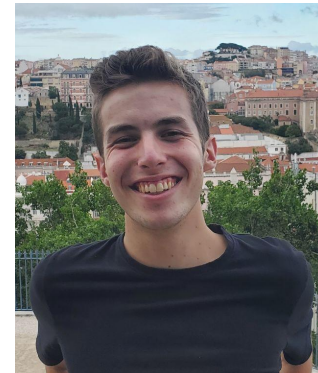
Fall Semester 2022

Advisor: Dr. Deese

Team Members



Sean Burtnett



Mike Bond



Jack Delvecchio



Darion Parks

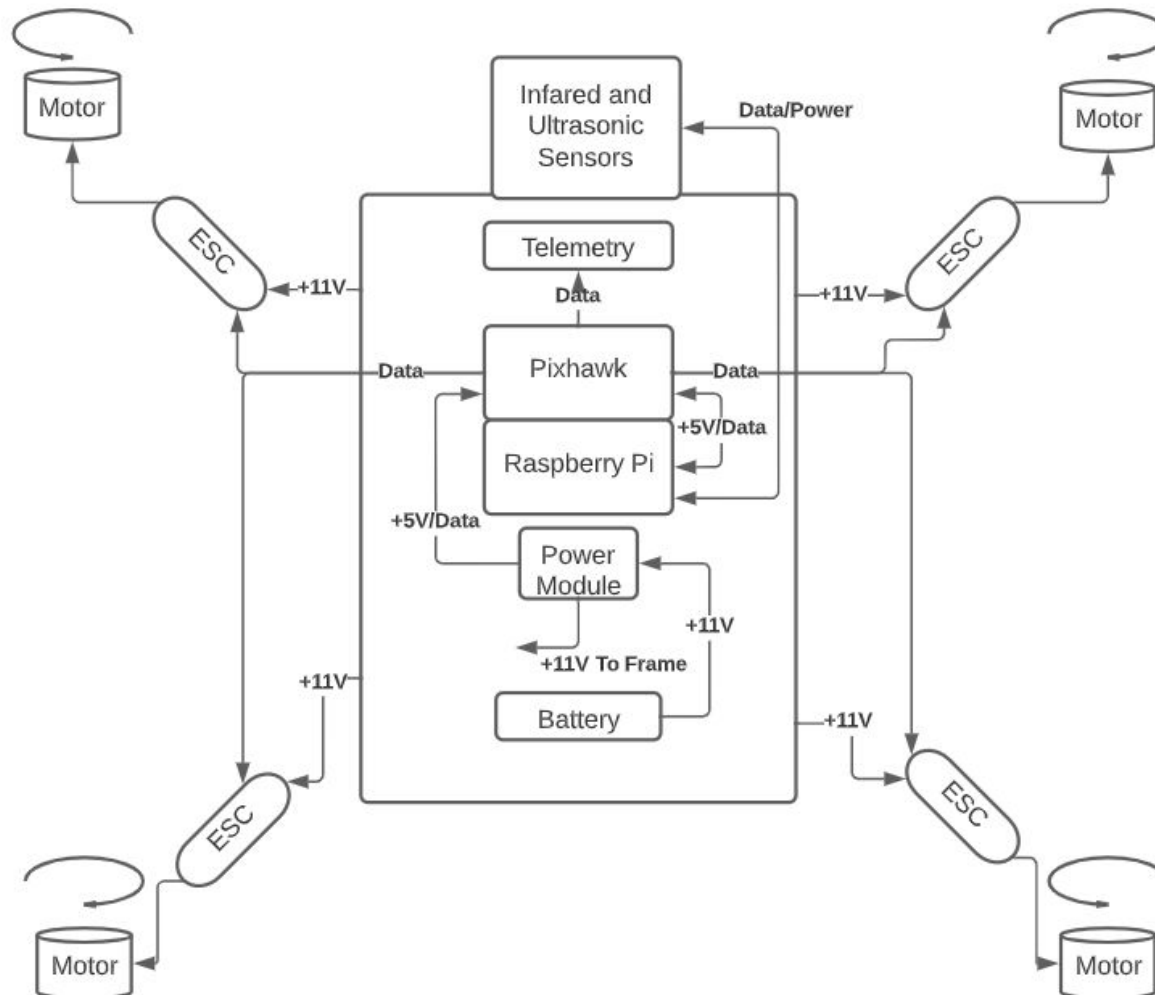
Agenda

- Project Overview
 - Schedule
 - Updated Schematics & Flow Chart
- Project Plan
 - Parts and Assembly
 - Open AIs
- Miscellaneous
 - Presentation Plans
 - Project Report Progress
 - Website
 - Updated Budget and Hours
- Summary

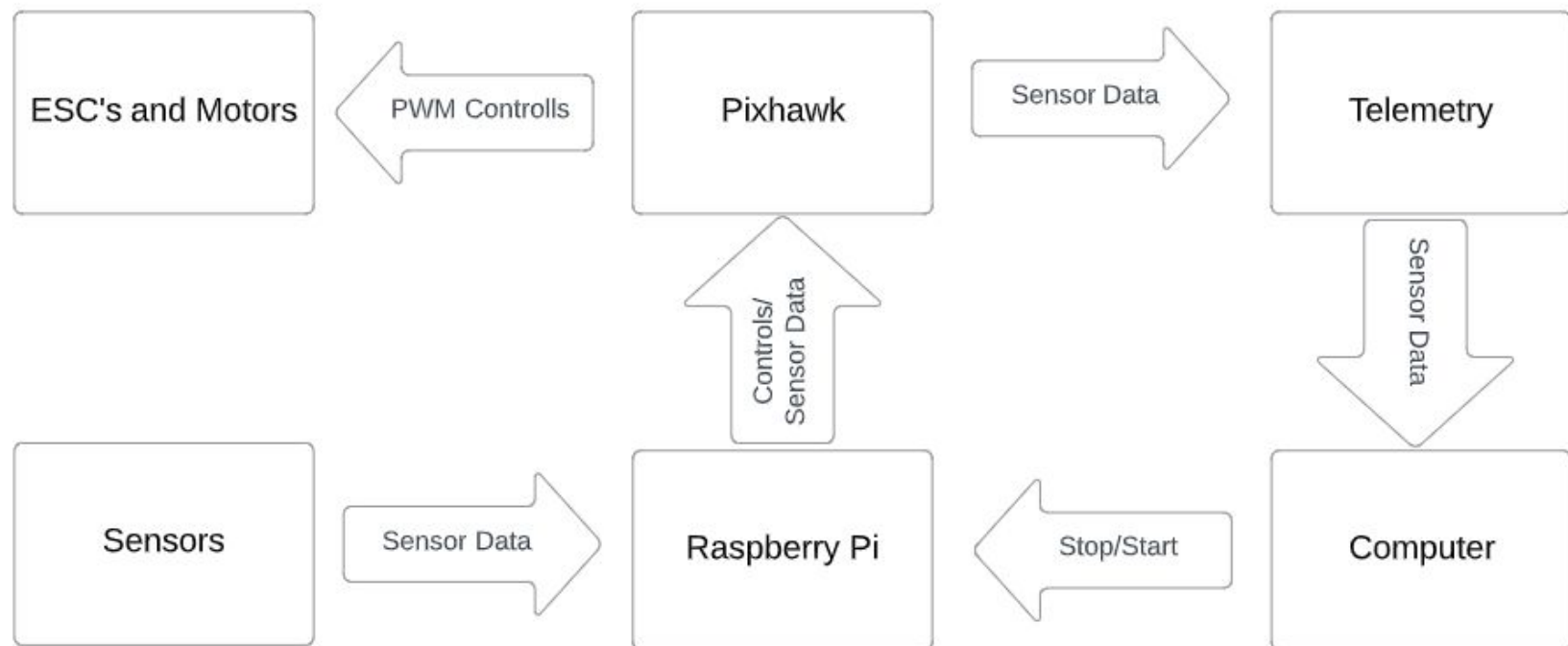
Schedule

Task	TASK TITLE	START	END	LENGTH OF TASK	PCT OF TASK DONE	Phase 1: Preliminary Design					Phase 2: System Integration					Phase 3: Testing/Evaluation			
						1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	System Architecture	8/31/22	9/28/22	4	100%														
2	Develop Website	9/21/22	12/6/22	11	60%														
3	Select/Order Parts	9/7/22	10/5/22	4	100%														
4	Drone Assembly	10/5/22	10/26/22	2	80%														
5	Modify Flight Control	10/12/22	11/9/22	4	0%														
6	Thermal Sensor	10/12/22	11/9/22	4	0%														
7	Flight Testing	11/9/22	12/6/22	4	0%														
8	Documentation	8/31/22	12/6/22	14	70%														

Schematic



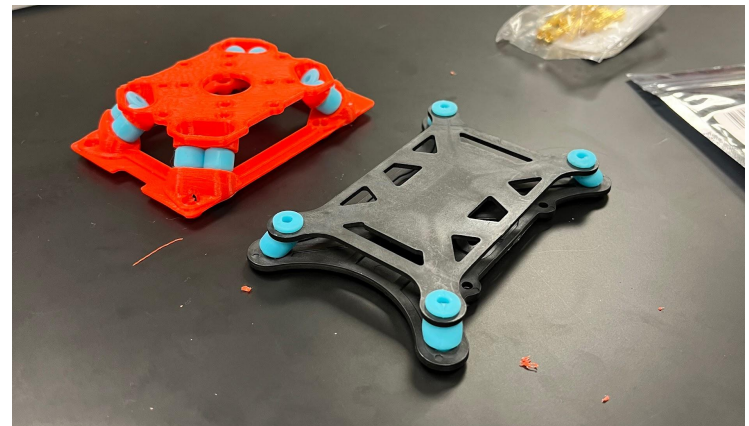
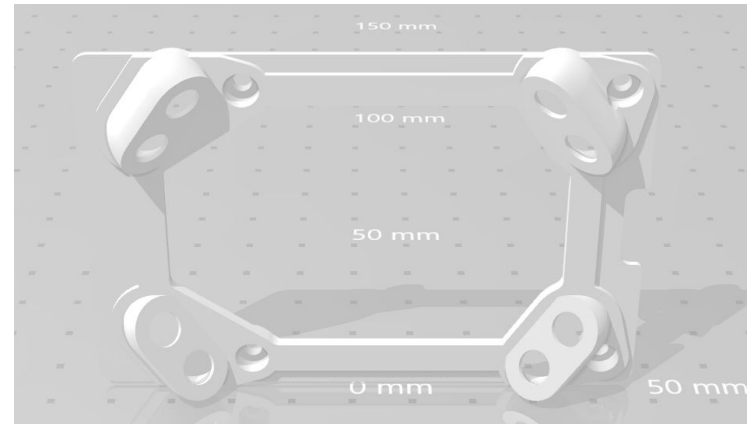
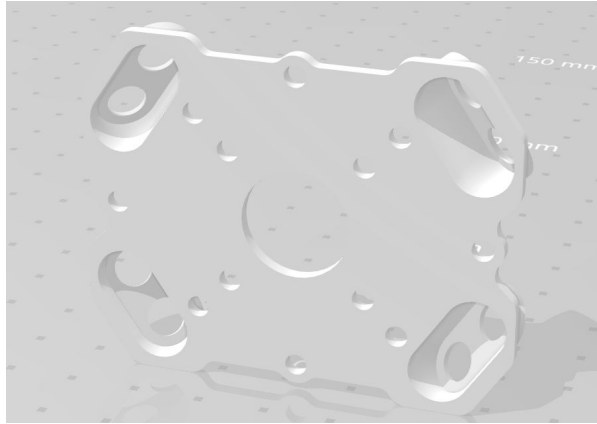
Flow Chart



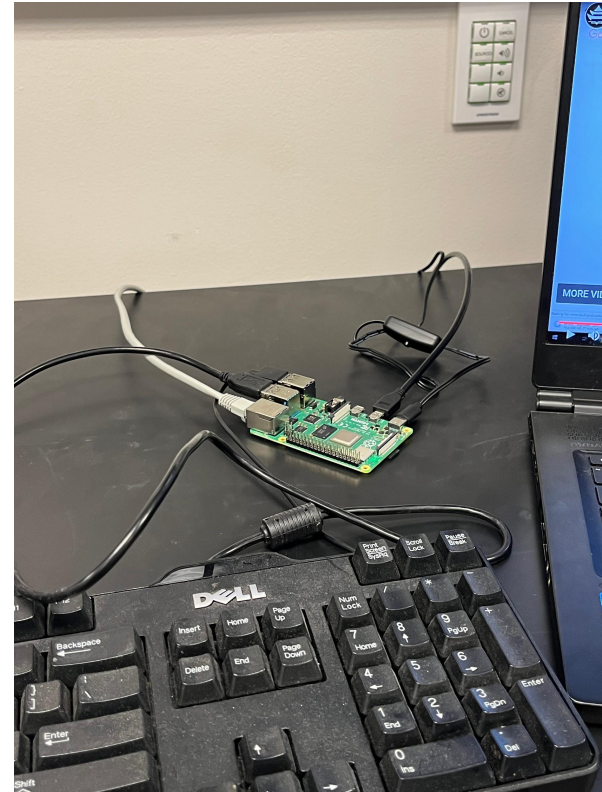
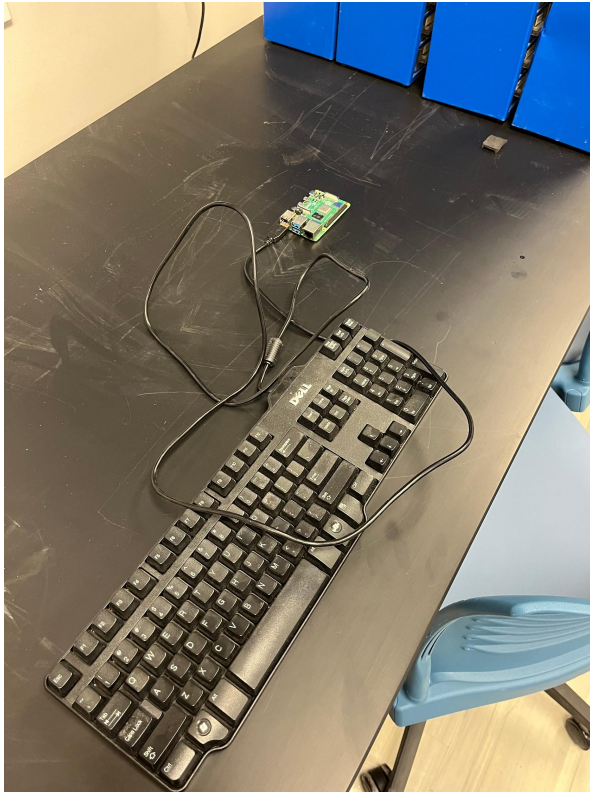
Striped Motors + Soldered Bullet Connectors w/ Heat Shrink



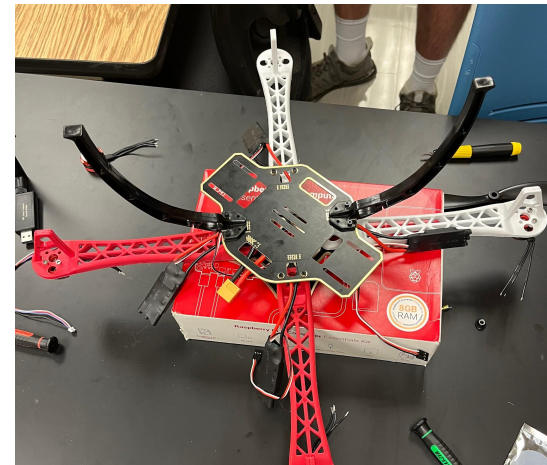
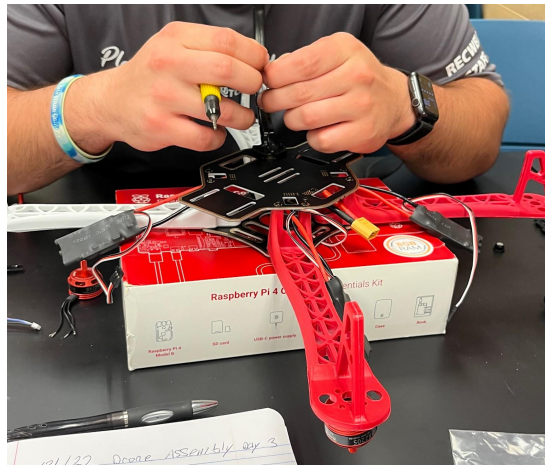
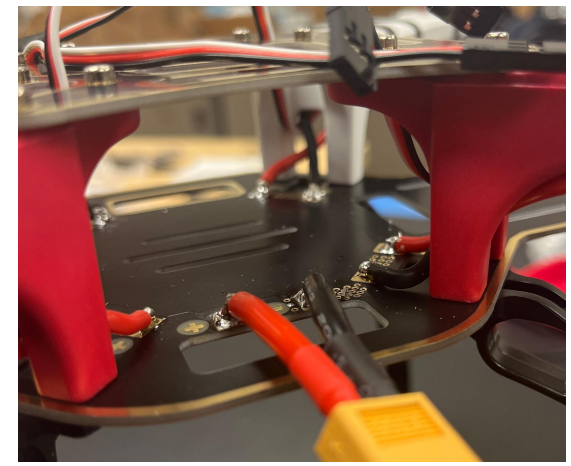
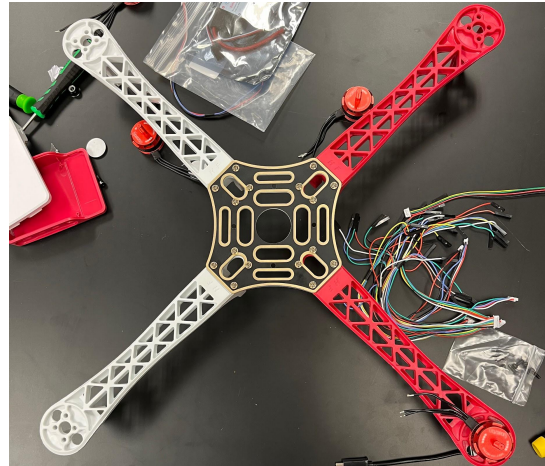
3D Printed Vibration Plates + Stand for Flight Controller



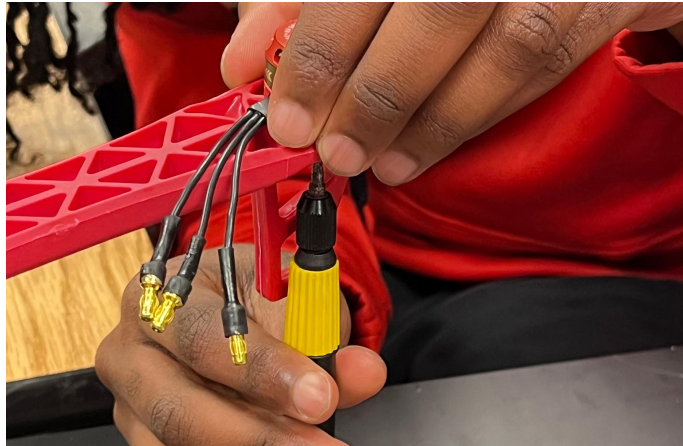
Flashed Operating System to SD + Installed Additional Software



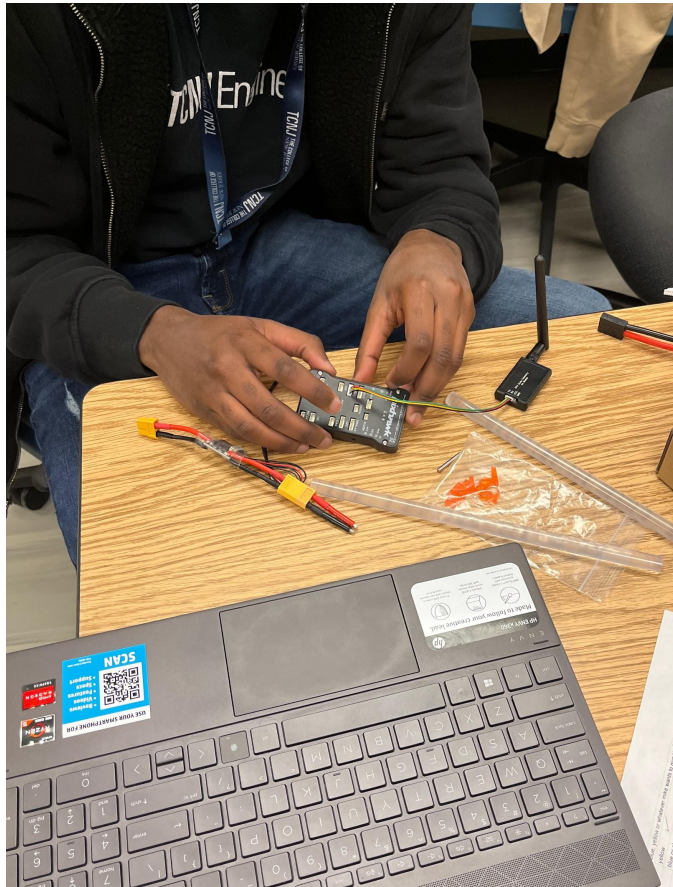
Assembled Frame + Soldered ESCs/ Battery Connector to PDB



Secured Motors/ ESCs to Frame + Attached Motors to ESCs



Started Pixhawk Calibration



Open AIs

- Troubleshoot the Pixhawk
 - Pixhawk calibration (QGroundControl)
 - Flight Control (ArduPilot)
- Troubleshoot the Raspberry Pi
 - Solve connectivity issues (Mavlink)
 - Interface with Pixhawk
- Order additional parts
 - Battery replacement + propeller attachments

Fall Semester Demonstration Plans

Main Goals

1. Achieving motor control/air stability

Stretch Goals

1. Dynamic/advanced movement in air
 - a. Roll, Yaw, Pitch
 - b. Semi-autonomous movement
2. Thermal sensor sending data while drone is in flight

Project Report Update

- We have completed our project abstract and bios
- We are actively working on formatting the report and adding necessary content

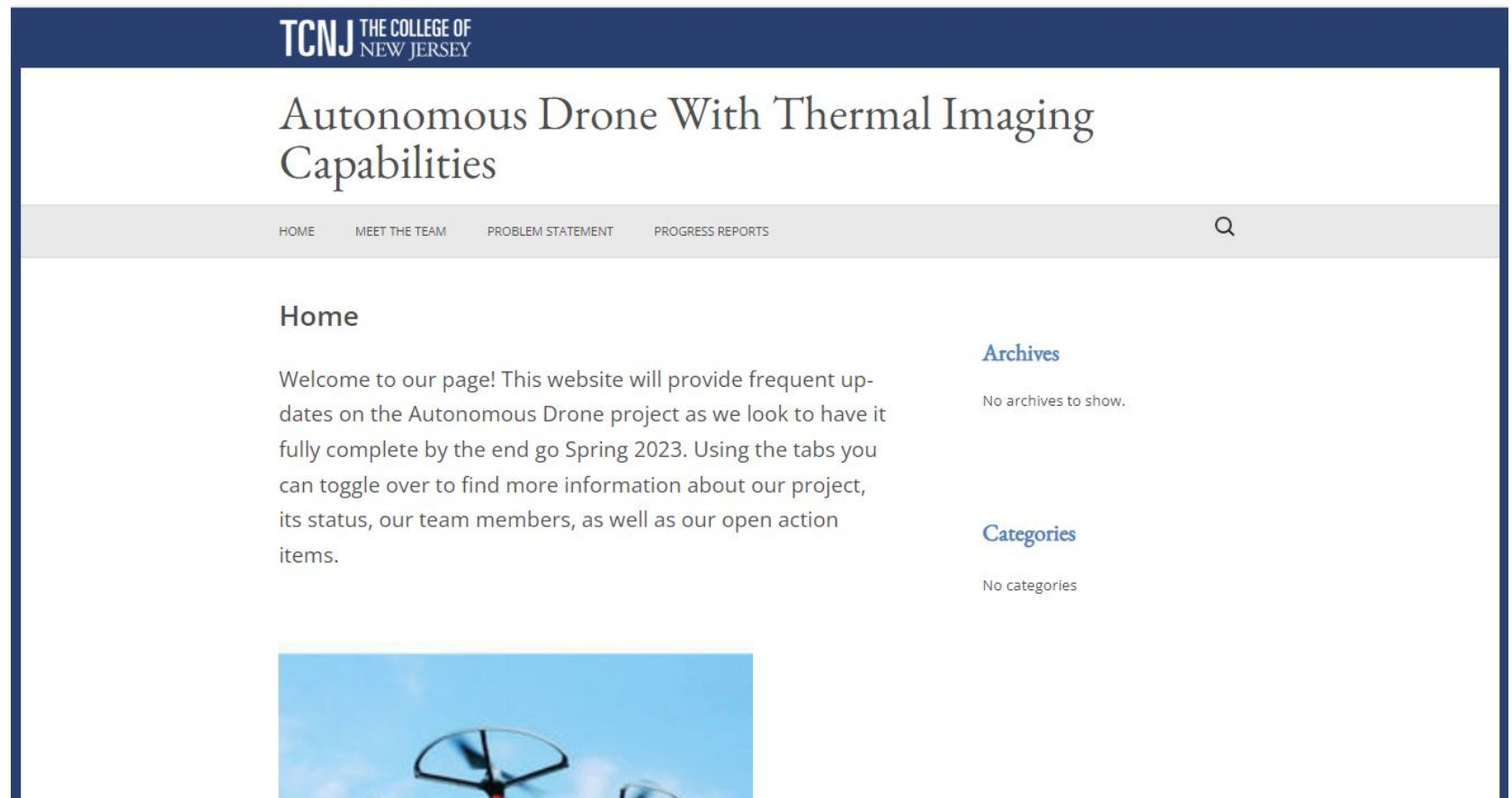
Website Update

- Home page: brief description about the website
- Meet the team: a brief description of each role
- Problem Statement: a brief description about our drone and goals
- Progress reports: a biweekly report that includes open action items and recent accomplishments

Website



<https://engprojects.tcnj.edu/autonomous-drone/>

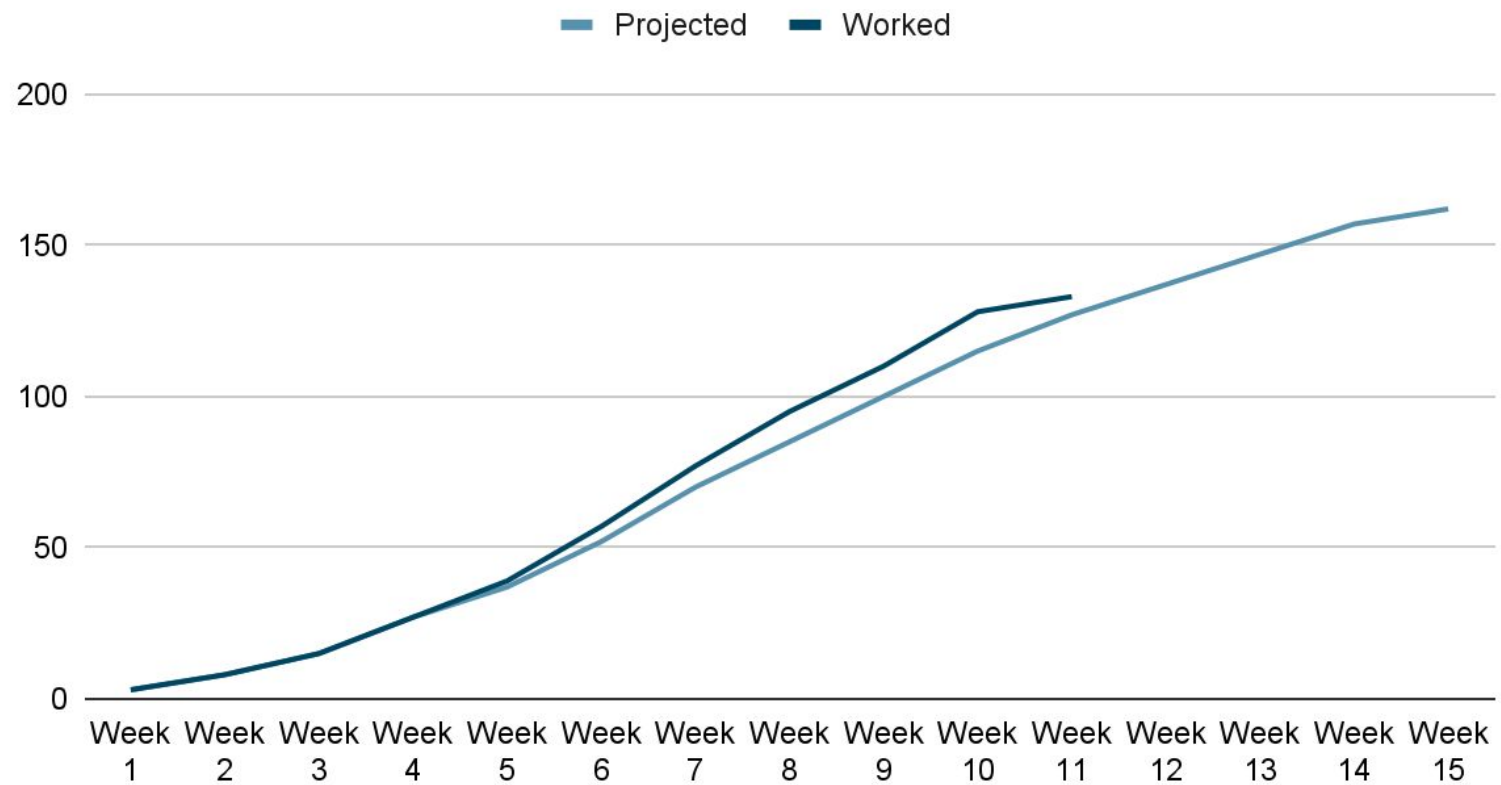


Updated Budget

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

Cumulative Budget Hours

Cumulative Hours Chart



Summary/Conclusion

Completed

- System architecture
- Motor prep + soldering
- Vibration plate + frame assembly

Start/continue

- Drone construction
- Project report + demonstration
- Raspberry Pi + Pixhawk calibration

Questions?

