AUV Team Midterm Presentation

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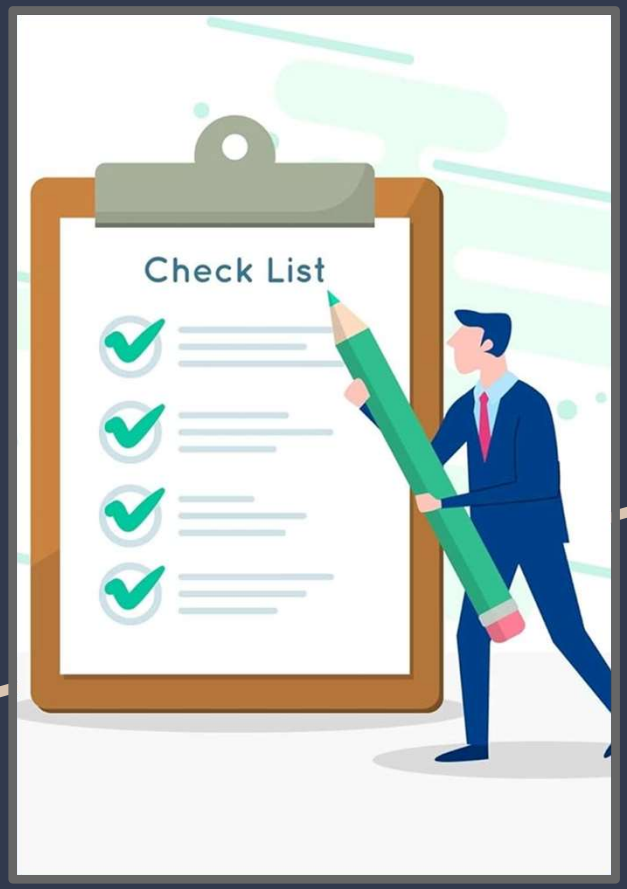
Introduction

- AUVs come in various designs for various purposes
- Most AUVs are used for research
- Our AUV is a testbed for near shore research and swarming technology
- The team was given the task of improving the design of the AUV that the previous team worked on

Semester Goals

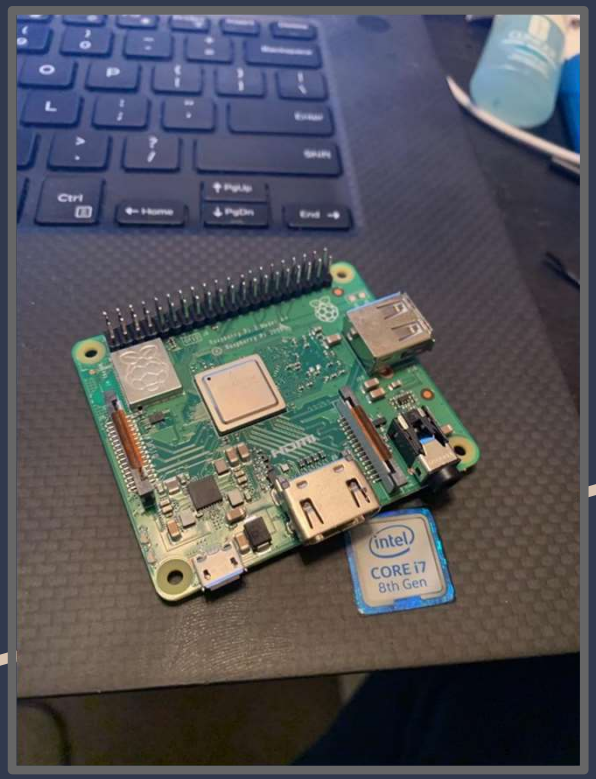


- Improve waterproofing and reduce water ingression
- Improve control system
- Improve buoyancy characteristics
- Lay groundwork for autonomy

Engineering Standards

- ASME Y14.5: Geometric Dimensioning and Tolerances
- Parker Manual: O-ring usage
- ASTM D570-98(2018): Water absorption of Plastics
- ASME BPVC Section X: Hydrostatic pressure design and testing

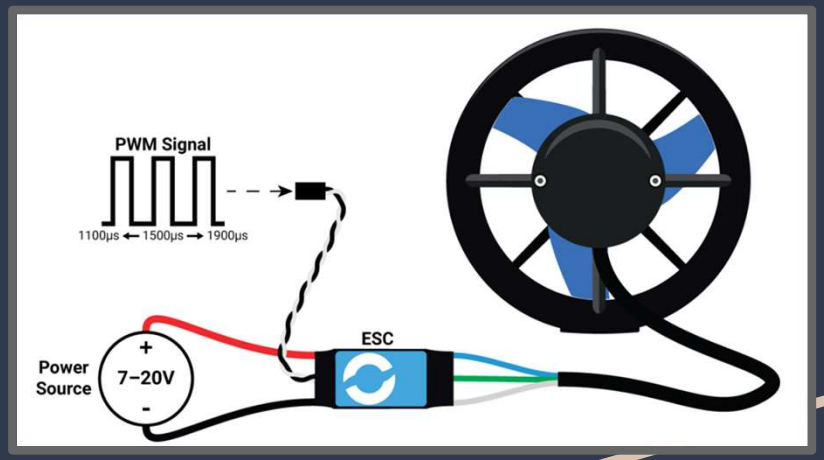
Completed Methods



Raspberry Pi

- Raspberry Pi has been successfully connected to the four Motor modules with a PWM signal.
- To initiate a connection between the Raspberry Pi it was required to modulate the frequency of the PWM signal Up and Down.

Control System



Control System

- Raspberry Pi, the internal computer, will accommodate the new control system
- Wireless control from Surface

Ballast Testing

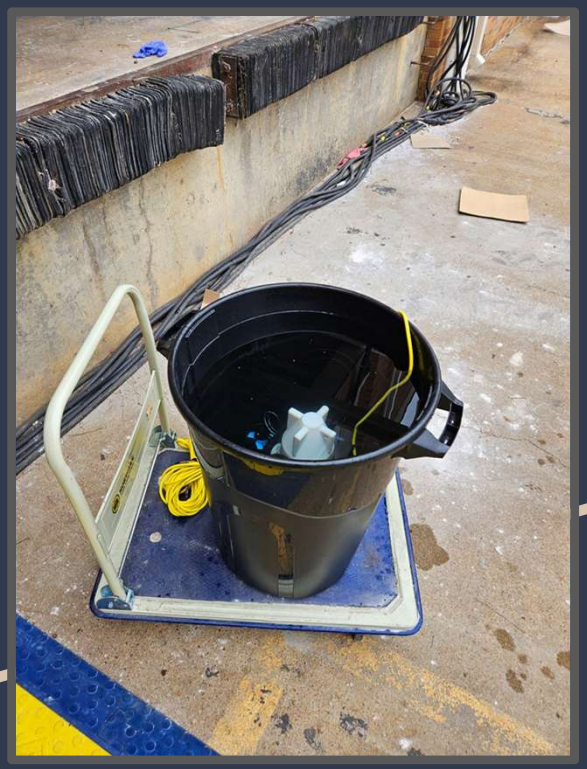
Ballast Testing

- Testing the appropriate ballast by immersion testing in closed environment
- Calculated internal air volume and displacement of the drone

Results

- Thruster sealing not effective
- O-ring sealed poorly at the test depth
- Approximately 50 mL water was found inside the AUV after immersion testing

Results Continued



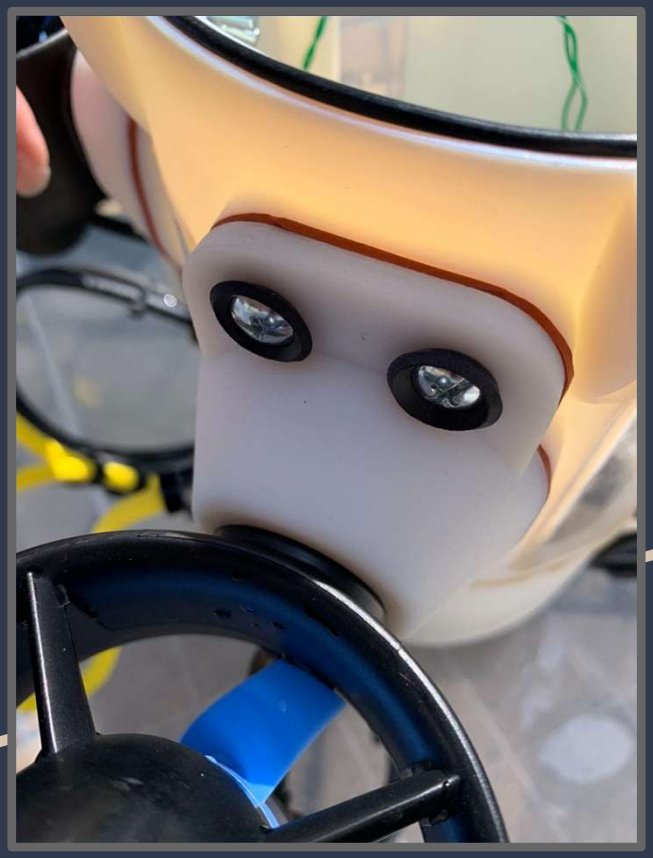
Water Resistance Testing

- This an Image of the latest round of testing where new O-ring seals were used to attempt a better seal.
- We found that the new o-rings were ineffective at stopping leakage.
- Found that the motor mounts were a possible leak point

Response

- We will attempt to use a combination of Latex gasket with Nitrile o-ring for better elasticity.
- We are also considering possibilities of applying epoxy/silicone caulk to prevent leakage.

Discussion



Current Status

- Problem with the material of the AUV disintegrating when in the water
- Figured out where we are having water infiltration
- Figured out how much weight is required to make the AUV neutrally buoyant

Future Improvements

- Work on coating the AUV with a clear epoxy
- Improve Water Resistance by inserting a latex gasket to keep water from infiltrating the inside of the AUV

Questions?