Polygone Internship:

During my internship, I worked on a couple of projects as outlined below

1) Conducting preliminary research on USV Design

As my primary focus was working on the USV project, I was tasked with conducting a preliminary analysis of existing USV's and research on typical electrical components to purchase for our prototype. This involved asking questions like: What sensors do we need? How do we wire all the electrical components? How do we make our electrical components waterproof? Is our design modular?

This part of the project took a significant amount because there's not really that much work to date on small-scale USV designs, especially ones which are cheap and easily manufacturable. As a result, with suggestions from team members, I chose to focus on BlueRobotics USV because it offered an open-source platform together with the ease and flexibility of re-using their electrical products. After further research looking into their design we concluded on purchasing the following components:

The prices, links, and quantities of each product are outlined in the following link: https://docs.google.com/spreadsheets/d/13vm9t7NQEQtumMhhq3nYRrcokjfx1zLlLs37x41BJE4/edit#gid=955135461

Items in red were never brought to my knowledge.

2) Wiring the electrical components

Wiring, especially considering the placement of the hulls and the lack of a central compartment necessitated the use of long wires to send signal & power across the left & right compartments. Diagrams for the wiring were first done using the online simulator, Circuitlab. After that, attempts were made and testing was conducted to ensure everything was on point.

Link to the wiring diagram: https://drive.google.com/file/d/1X2MwySCWN2Zf1i06XskuUkUMSm7K0R2H/view

3) Fitting components

During my Friday on-site work, I was tasked with fitting 3D-printed parts with some of the electrical components we had to test if everything fitted correctly. These tasks enabled several renderings of the components which enabled us to come to a final revision which fitted our current needs.
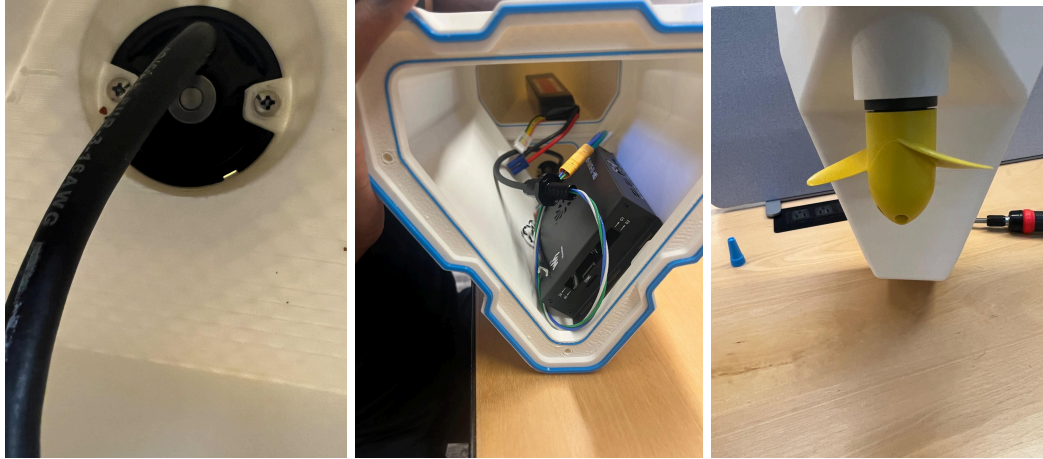
4) Remote Testing the motors

Remote testing of the motors which required wiring the raspberry pi, motors, and battery was conducted first at home and then in the office. Images and videos are shown below:

Links to the videos:
https://drive.google.com/drive/folders/1YGzpkFCR9fRZjUAfEmF4TSeDJF6zDFXI

5) Wiring & Testing the Buffer Pad

Wired and wrote an Arduino code to control the stepper motors in the Buffer-Pad system. Found and used "Universal GCode Sender" that allows users to use phone/laptop to operate stepper motors wirelessly including changing speed of rotation.

Link to code & video:
https://drive.google.com/drive/folders/1zhwQ57EwI-8LwMDVUP2t7WfkSMFuzIOF

Other Relevant links: https://www.youtube.com/watch?v=zUb8tiFCwmk&t=205s