Autonomous Floating Vehicle

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Background

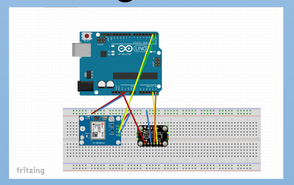
The use of unmanned buoys for data collection is not a new concept as government offices such as NOAA utilize them for the collection of weather and oceanic data. The reliability of such systems has been a key focus for development. As of 2020, 10% of NOAA's buoys have become inoperable. These reliability challenges necessitate the need for an external method of data collection as a portion of the buoys labeled inoperable may have simply experienced a malfunction in their communication systems. As this is the case for simple peacetime equipment, the need for a physical data transfer system is further necessitated by the complexity of wartime systems. An unmanned vessel that is capable of navigating to a buoy, establishing a physical connection and downloading data would mediate these losses in buoy performance.

Objectives

- Design a floating vessel that when given coordinates of a buoy, can autonomously navigate to that buoy and create a physical connection to transfer data
- Making sure the vessel floats by picking proper material and design
- Making sure electrical components are protected from water damage

Components

GPS and Magnetometer navigate the boat:



Propulsion from 2 ESC brushless motors:

Timeline

Fall 2021 — **Starting Phase (week 1-6)**
- -Learn about existing solutions
- -Define goals/design requirements

Fall 2021 — **Design Phase (week 6-10)**
- -Pick Chassis Design
- -Choose components
- -Design steering system

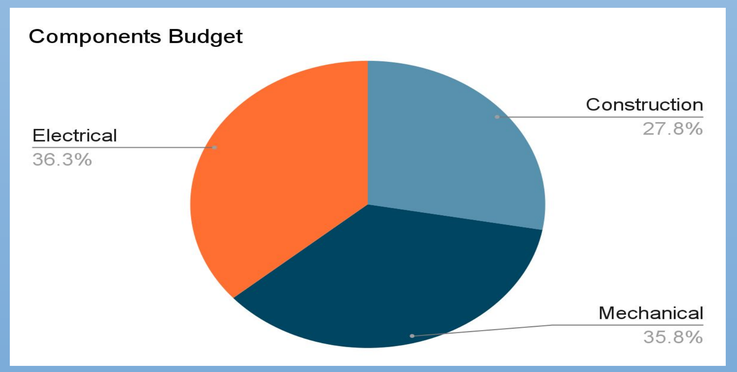
Winter 2022 — **Manufacturing Phase**
- -Fabricate hull and superstructure
- -Integration of electrical/propulsion systems

Winter 2022 — **Testing phase**
- -Load capacity testing
- -Investigation into seaworthiness
- -Testing of waterproofing

Chassis Fabrication

Due to supply issues, the chassis fabrication plan had to be modified. The original plan called for the assembly of the hulls using polypropylene coated expanded polystyrene sheets but was changed to polyurethane foam casting using a 3D printed mold. The result was an increase in buoyancy with the drawback of reduced impact resistance. The superstructure is still fabricated via assembly of EPS sheets.

Components Budget



Team

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