Autonomous Systems
Unmanned Floating Vehicle

UCI Samueli School of Engineering
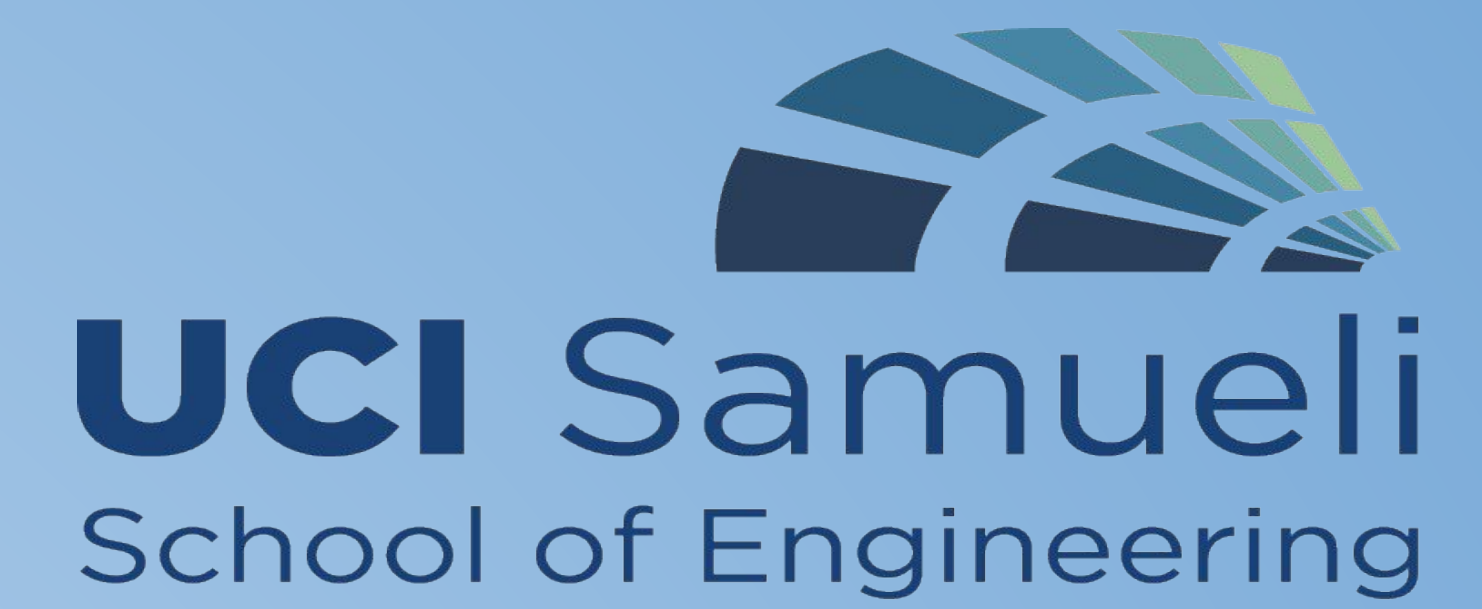
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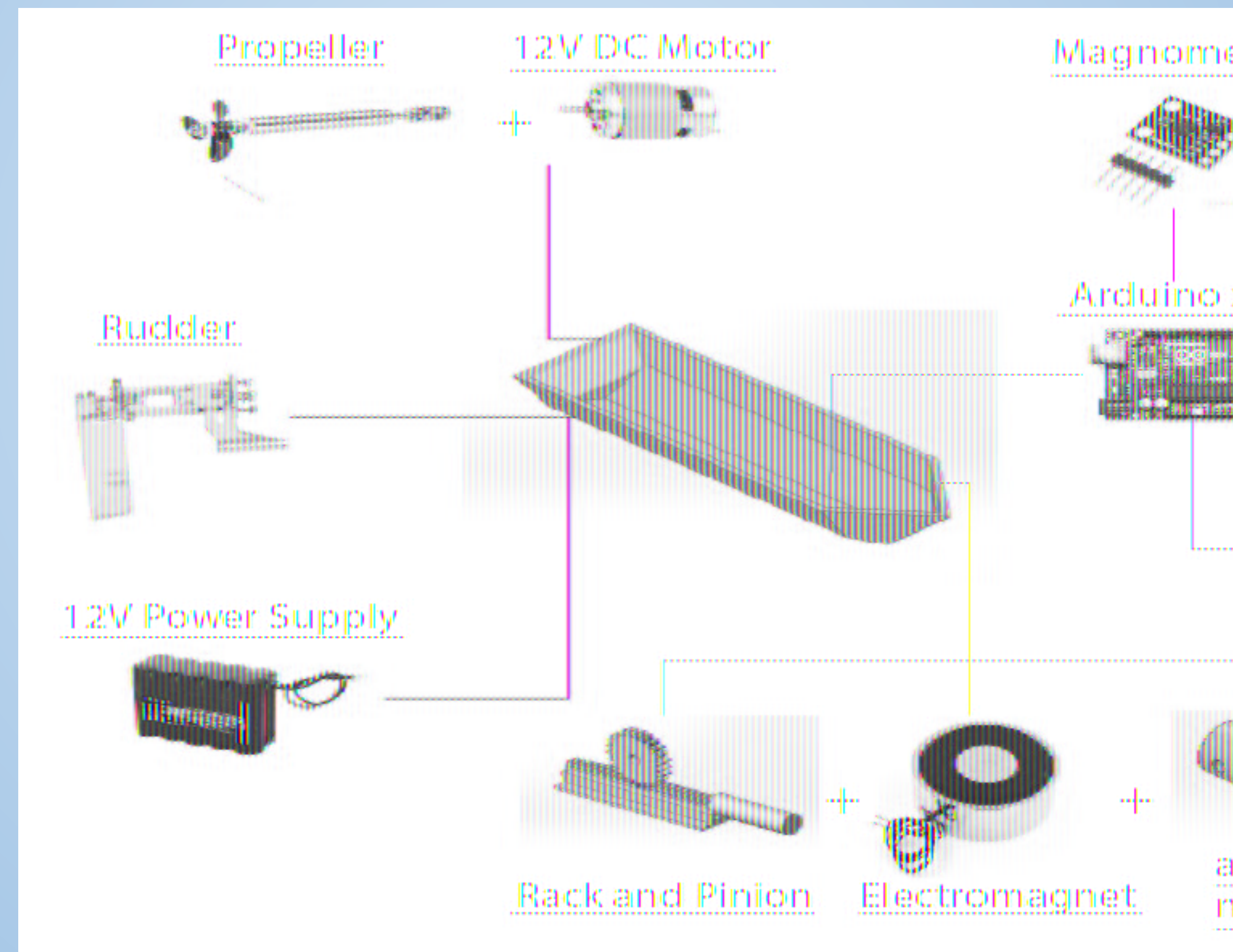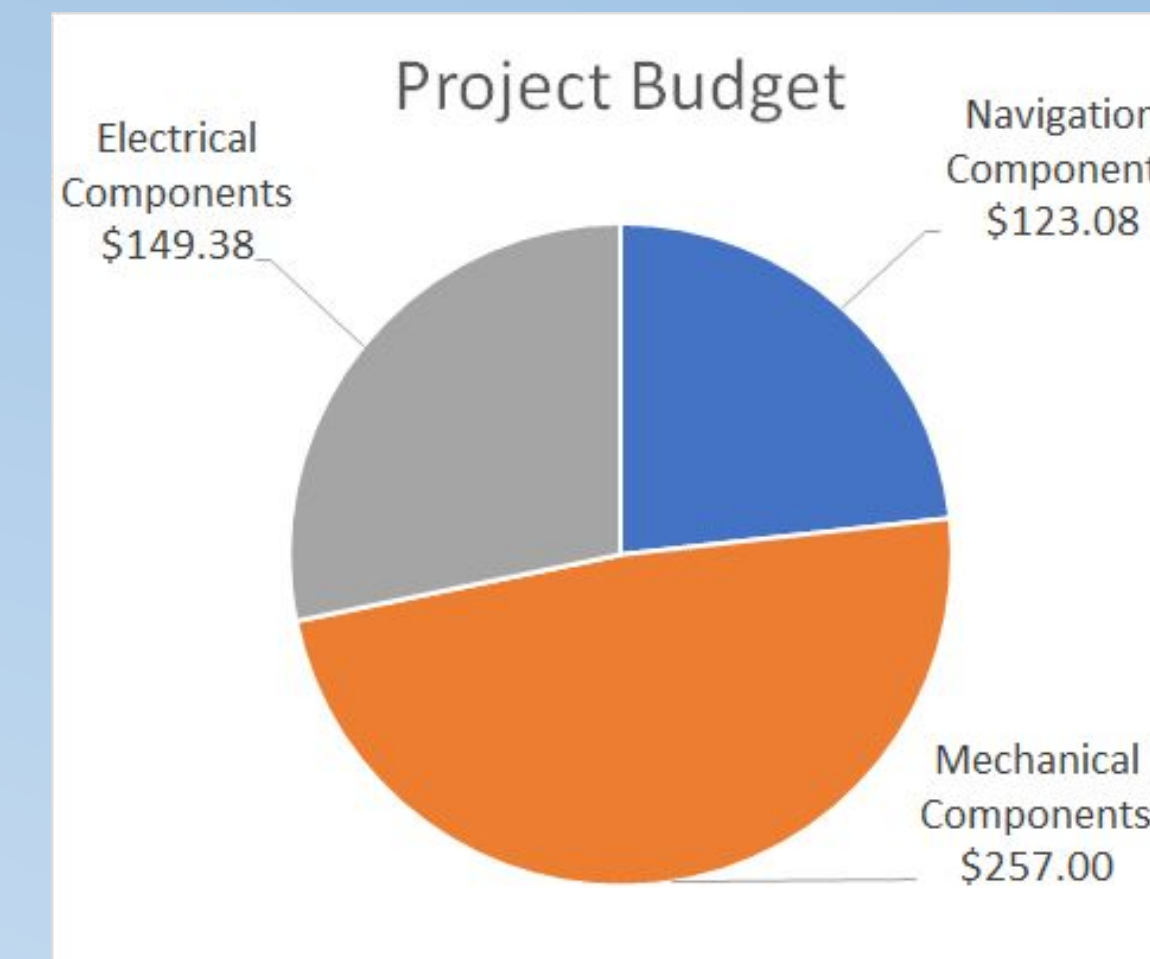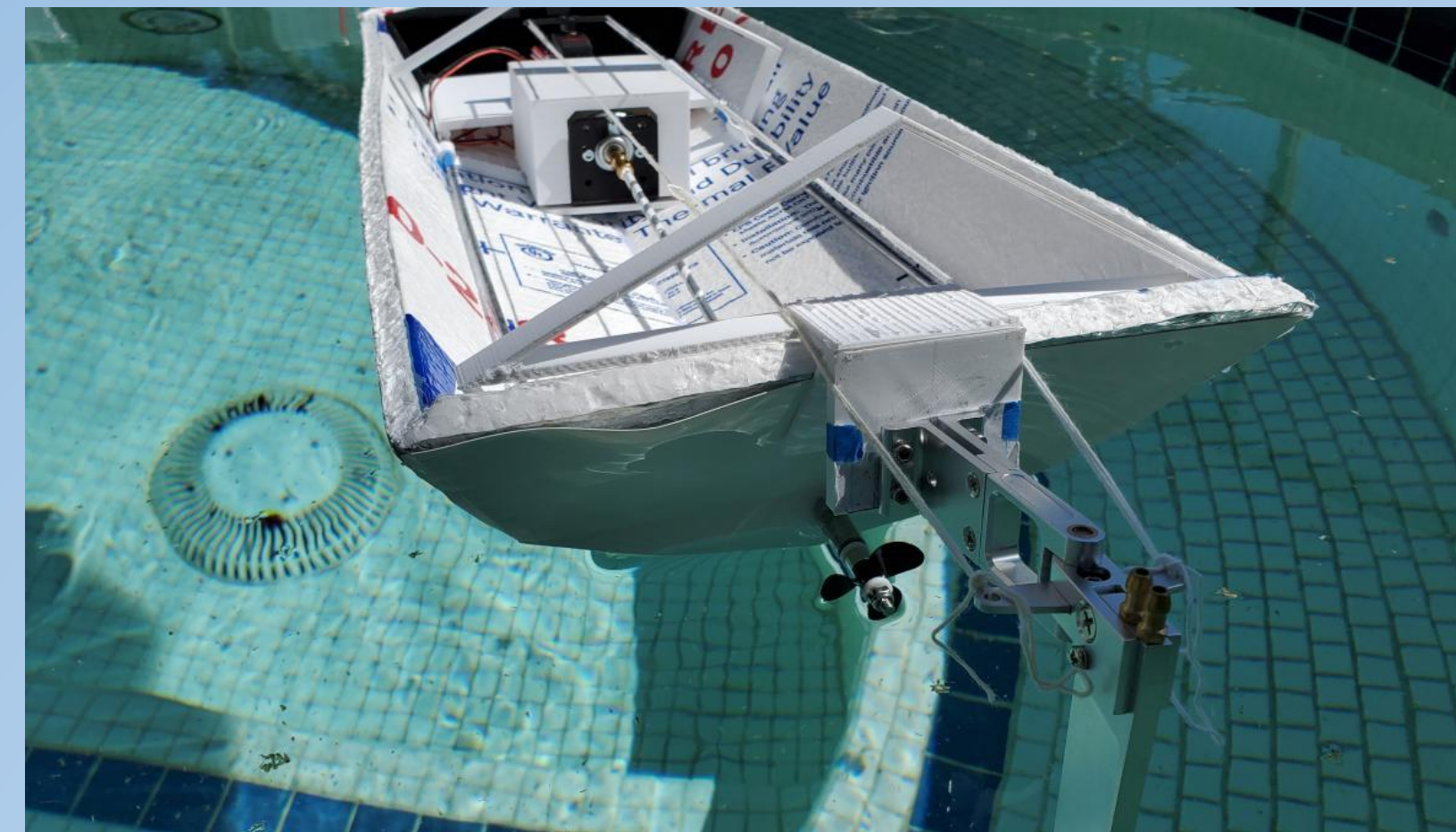## Faculty Advisor:

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Background:

As part of the UC Irvine Autonomous System, students will be in charge of designing and testing a floating vessel that will be able to autonomously navigate through the sea and physically upload new security patches and receive updated coordinates for its next mission.

Goals and Objectives

- Design a floating vehicle based on requirements proposed by the US Navy
- Assembly, fabrication, testing, and analysis of preliminary designs to provide the basis of construction for an efficient and durable final product
- Automate the navigation and steering of the vessel

Project Budget

- Electrical Components $149.38
- Navigation Components $123.08
- Mechanical Components $257.00

Propeller — 12V DC Motor — Magnometer — Rudder — Arduino — 12V Power Supply — Rack and Pinion — Electromagnet

Components

Image detection
Camera detects cable port and fixes it at the center and continuously tracks it

GPS Module
The GPS provides the real time longitude and latitude position of the vessel

Magnetometer
The magnetometer serves as a compass displaying the current direction the vessel is heading in

Motor and Fin
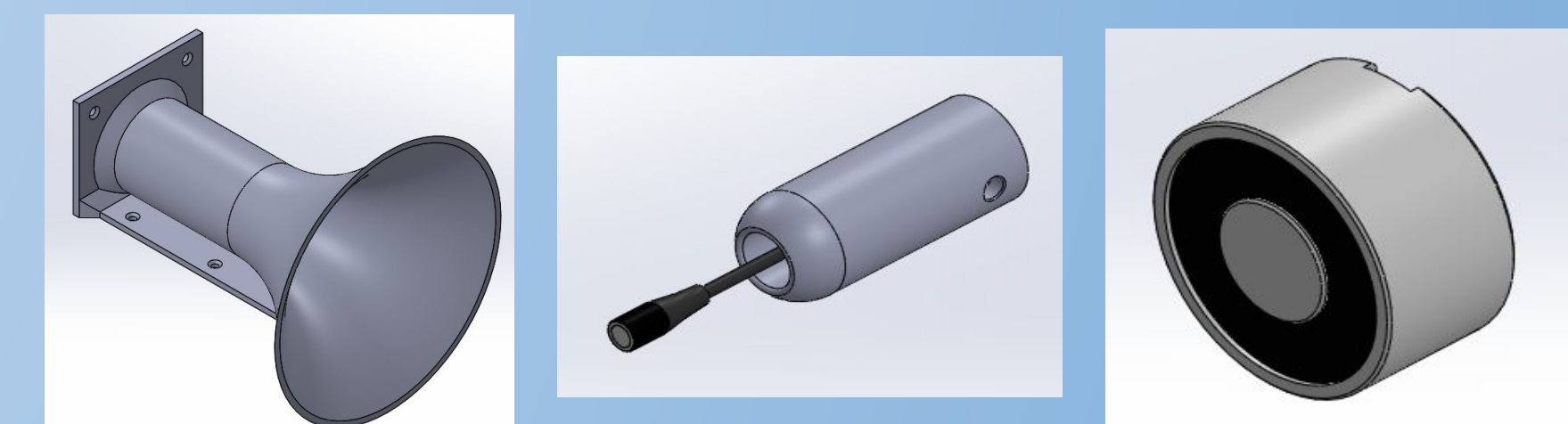Two DC motor and fin with servo are used for propulsion and steering

Rack and Pinion
3D printed and replaces the linear actuator for weight reduction

Boat Structure
Hand crafted from dense styrofoam and water resistant with epoxy coating

Cable & Port Alignment

- Used a funnel for a lower chance of connection failure
- 3D printed attachment inserts into funnel and is held in place with an electromagnet
- A magnetic USB C connector is housed inside the attachment

Timeline

Problem Definition	Design Iterations	Components	Circuits	Code & Assembly
Set requirements & define the project	Design the vessel and systems and redesign	3D print and order parts	Create the circuits for the subsystems	Code the systems and assemble the vessels components