Design and Assembly of a Variable Buoyancy System for an Autonomous Underwater Vehicle

Presented By: Evan Brown

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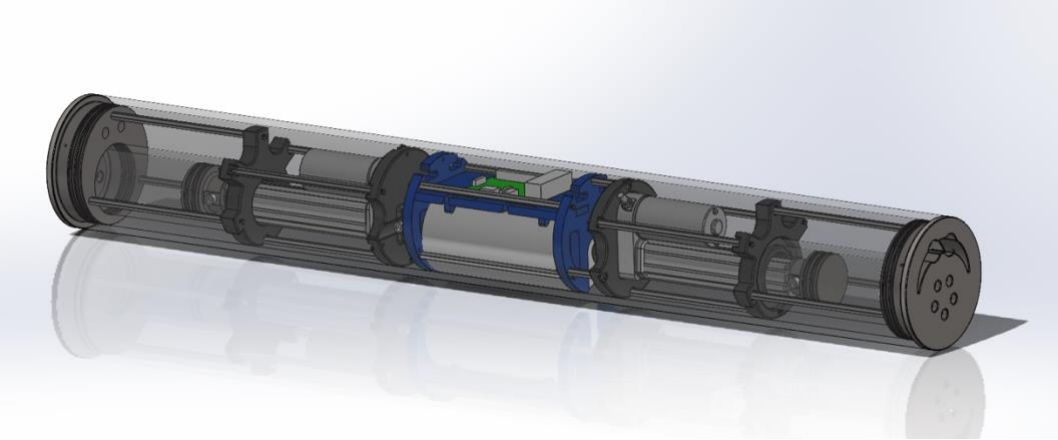

Underwater vehicles play a vital role in the surveillance and mapping of our oceans, often requiring extensive travel in extreme environments. A primary challenge in traversing this underwater domain is power management, due to limited volume to store power and power usage to overcome large drag and buoyant forces. Aiming to create a high-speed, long-range autonomous underwater vehicle (AUV), General Atomics is interested in developing a variable buoyancy system (VBS) to enhance the vehicle's efficiency and capabilities.

This thesis outlines the design and assembly of a prototype used for testing and modeling prior to integration onto the General Atomics AUV. The process involved developing a VBS within a cylindrical structure, similar to that of the AUV, to allow for underwater testing of its depth control capabilities. Then, dynamic modeling of this system was performed to establish a framework for the design of a depth controller for the VBS once integrated onto the AUV.

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