## WhaleTech Robotics

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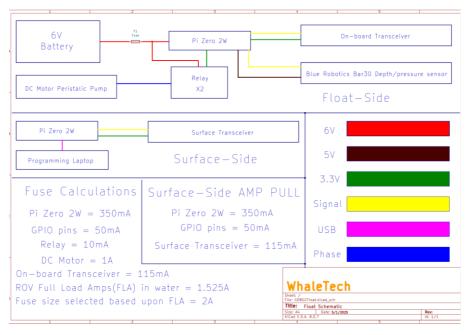
## MATE WORLD COMPETITION 2025

## Non-ROV Device Design Documentation

WhaleTech's Remora II is deployed to complete task 3, which calls for completing two vertical profiles along the water column, with auto stops, and communicating with the mission station after each surface. The Remora II consists of two systems, a control system, and a buoyancy engine. Both systems are housed within a blue robotics cast acrylic tube, 3" in diameter and 150 mm in height. Set of four AAA Non-nickel hydride batteries are used to power all control system components; a raspberry pi zero 2W, a transceiver, a pressure sensor, and a DC motor, which in turn powers the buoyancy engine.

The 4 AAA batteries are housed in AAA battery holder, mounted securely within a custom 3D printed battery pack holder. Five centimeters from the power compartment is a 2A fuse, combining the ground wires from each holder. The buoyancy engine consists of a 150 millimeters of mercury (mmHg) rated IV bag modified to utilize a pump system powered by a peristaltic pump driven by a 6V DC motor. The peristaltic pump moves water in and out, altering the interior volume of the Remora II, changing the density above and below that of the water it is in, causing it to sink or float respectively. While the Remora is underwater, it collects and stores pressure data to be sent to the mission station when it reaches the surface.





When at the surface, the Remora II will communicate with the mission station using two paired transceivers, one within the Remora II and the other within the surface receiver box. The transceiver is capable of interfacing with Pi software, which allows for the information communicated to be easily modified. When the information is communicated with the mission station, a Pi zero 2W reads it and sends it to the laptop to be graphed.

All systems are housed in a cast acrylic tube to ensure the safety of marine life as well as all components inside. It serves as protection from collisions for all components in addition to serving as a waterproof housing. The endcaps also serve as additional pressure releases should the build-up of pressure occur.