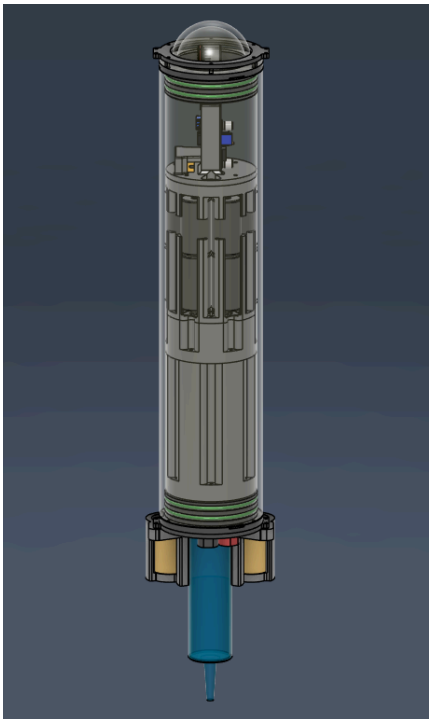
Blue Lobster

MATE Floats! Non-ROV Device Design

One Degree North, Singapore American School



Design

The float has a cylindrical, streamlined modular design, with each module stacked upon one another. The top layer consists of communication and control electronics, as otherwise the float would not be able to communicate with the surface station when it surfaces. The middle contains the batteries, and the bottom has a single-syringe buoyancy engine controlled by a Nema 17 stepper motor. In previous years, we tried to use a balloon as our buoyancy engine but decided to switch to a syringe since the balloon was unreliable and leaked often.

Pressure Release

In strict adherence to ELEC-NRD-006, both the enclosure end caps, fitted with internal O-rings, are designed to blow off if pressure builds up within the float to ensure the safety of the device and its surroundings.

Power

In compliance with ELEC-NRD-001 and ELEC-NRD-004, 12 1.5V C-type alkaline batteries produce a 9V power supply in 2 sets of 6 batteries wired in parallel. To comply with ELEC-008R, a 1.5A fuse is placed within 5cm of the batteries' positive terminals. The fuse calculations are shown on the Non-ROV Device SID.

Organization

When it came to organizing our wiring, we considered two options: creating divisions across the length or width of the tube. In the interest of more efficient wiring and cable management, we opted for 3D-printed divisions, which keep wires from tangling and make it easier to fix in case of a problem. To prevent any unwanted movement, the batteries are stored in a neat cylindrical format within ridges and spring contacts. The structure and electronics are secured in place with WAGO connectors, soldered connections, and fasteners.