



Design Rationale

A Pugh table evaluating factors such as manufacturability, stability, and reliability was used to determine the buoyancy engine in ROAR-E 1's float. A closed-loop configuration using 4 peristaltic pumps and 2 bladders was selected over other configurations, such as an open loop configuration with 4 syringes. The buoyancy engine runs at 6 V, powered by 8 D cell batteries selected for form factor, dual functionality as ballast, and minimization of voltage drop during operation. A hall effect sensor is implemented to activate/deactivate the buoyancy engine without disassembling the float. The float's internal frame is 3D printed, and COTS soft bladders are modified in-house to accommodate luer lock fittings. A COTS cast acrylic tube and radial-sealing end cap were purchased for safety and reliability.



Figure 1: ROAR-E 1's float.

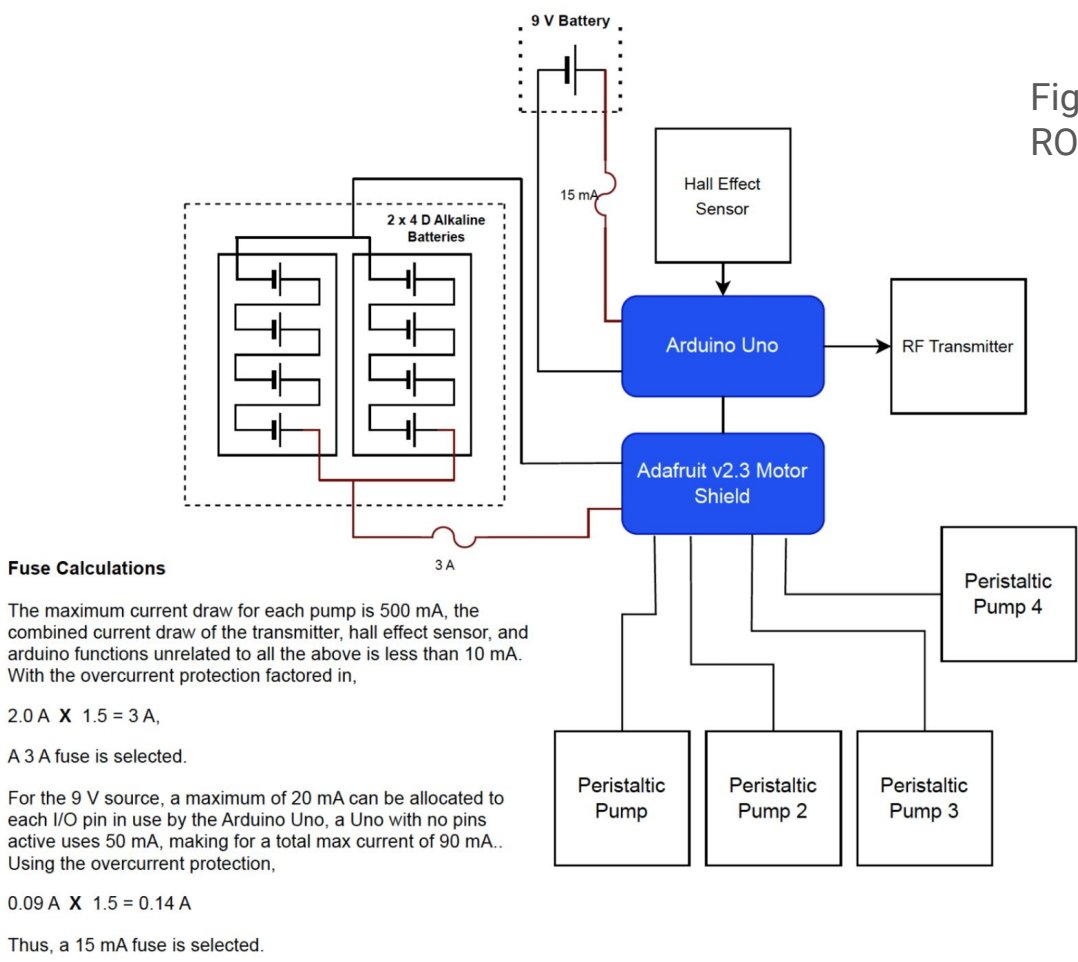


Figure 2: Non-ROV device SID.