

A.Q.U.A.R.I.A

Non-ROV Device(Float)

Autonomous Quantitative Underwater Analysis and Remote Information Acquisition(A.Q.U.A.R.I.A), is URUC's robust vertical profiling float designed to complete all of MATE ROVs' 2026 missions.

A.Q.U.A.R.I.A can complete its vertical profiles at the expected depths specified by the task requirements. Additionally, it can wirelessly communicate with the offshore receiver, enabling it to transmit depth and time data to the surface. This data is then graphed as the mission is completed.

The dive and rise is completed through the use of a buoyancy engine, which makes use of a large syringe and a threaded rod to be able to intake and release water, raising and lowering the density of the float, respectively. While the wireless communication is completed through the use of two LoRa modules

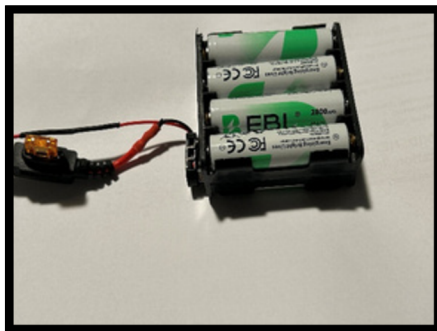


Figure 1. Battery pack and fuse

A.Q.U.A.R.I.A is powered by 8 AA NiMH rechargeable batteries. The fuse of the Husky VPF is a 5-amp mini-blade fuse. The power is distributed through the VPF through the use of protoboards. Additionally, the VPF sports reverse polarity protection and voltage dividers to prevent overloads, and damage.

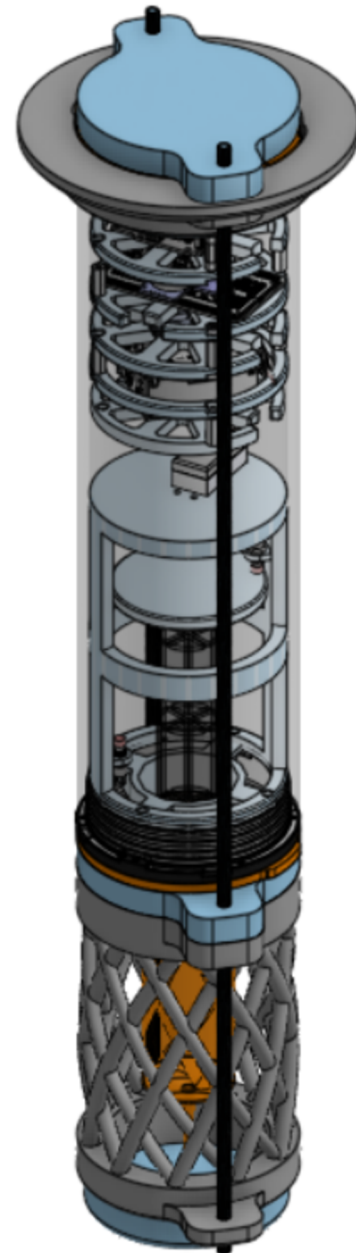
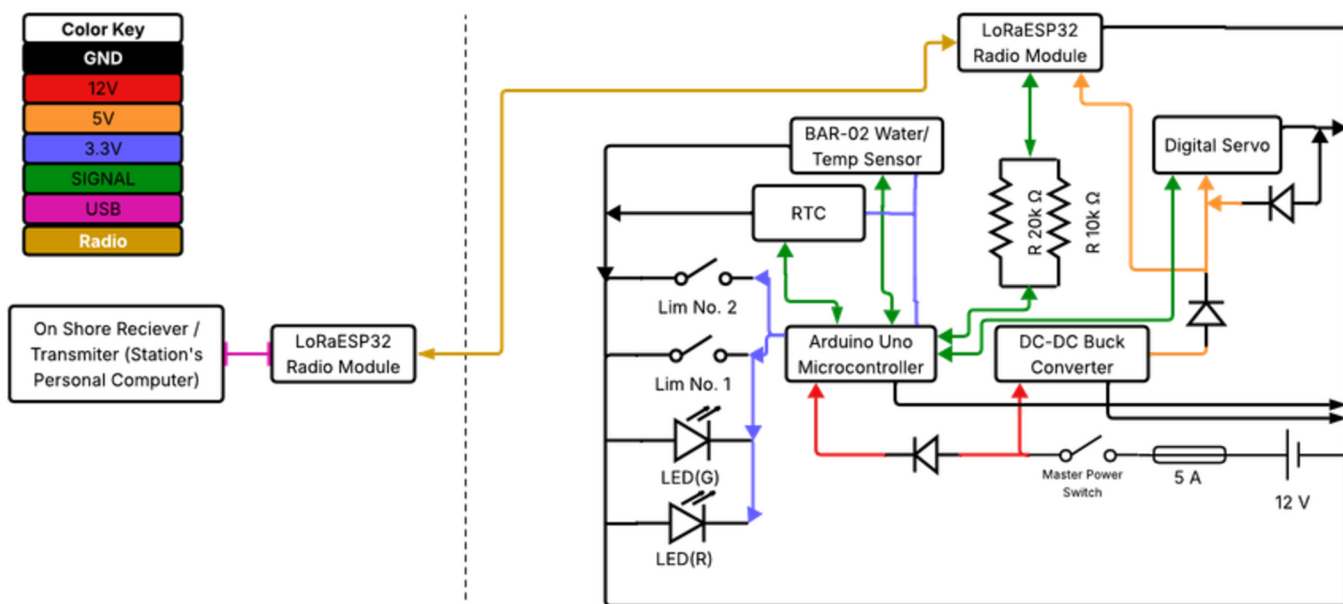


Figure 2. 3D Model

A.Q.U.A.R.I.A – SID

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Fuse Calculation Data

State	Components Active	Estimated Load (Amps)
Waiting	Arduino Uno, LoRa ESP32 (Idle), Bar-02, RTC, LEDs	~0.18 A
Buoyancy Change	All above + 20kg Digital Servo (Active) + LoRa (Tx)	~1.85 A
Peak / Stall	All above + Servo at Max Torque / Start-up	~2.80 A