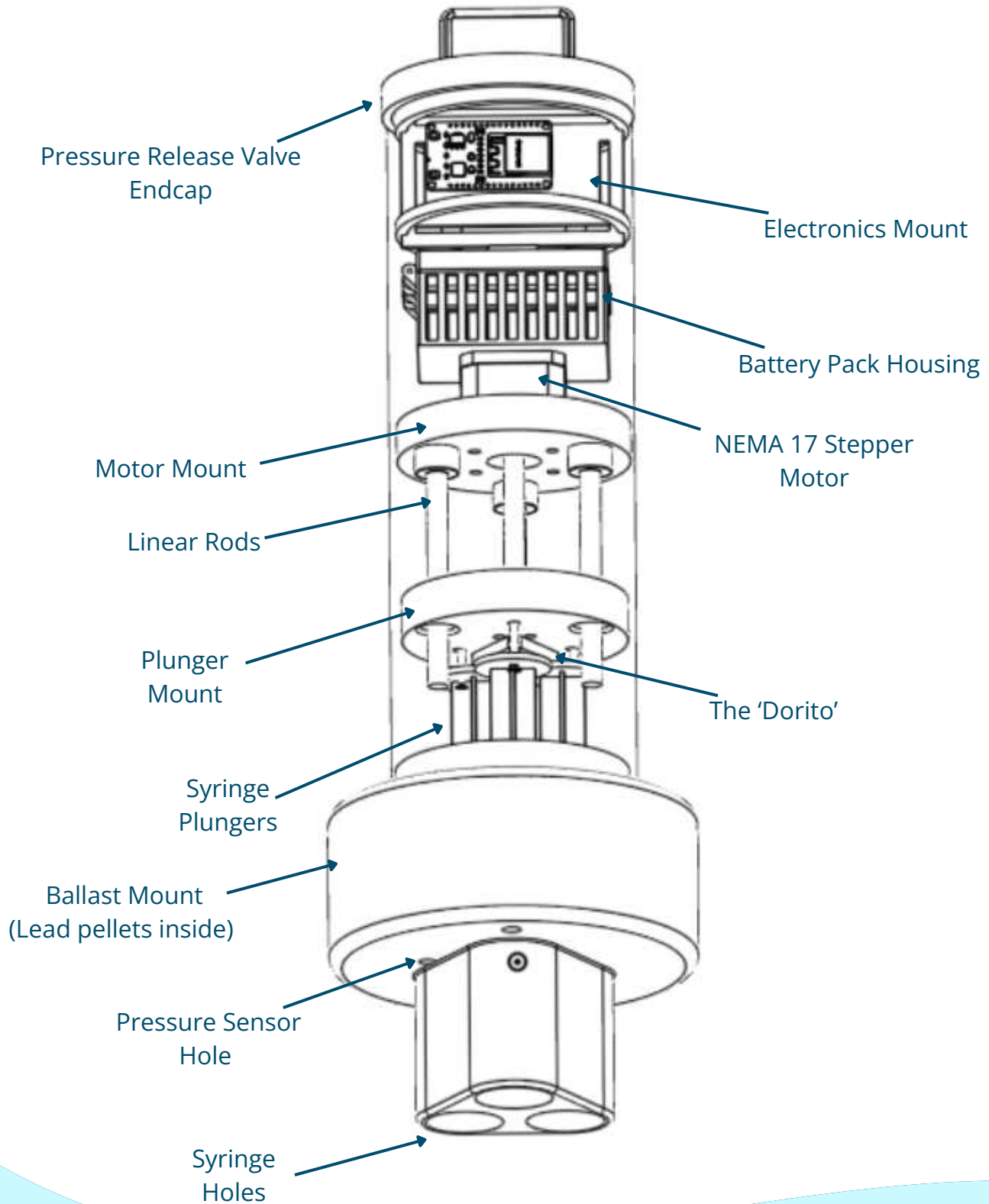




Non-ROV Device Design (Float)



Triton Tech ROV 2026 - Float (Eureka)

Triton Tech ROV introduces our first non-ROV device, Eureka, an autonomous vertical profiling float that changes position through a volume displacement buoyancy engine while recording time and pressure. Eureka utilizes an original design and autonomous electrical and controls system to operate its syringe buoyancy engine.

Mechanical System

The mechanical system is operated using a NEMA 17 DC Stepper Motor, that has an extending lead screw to provide linear actuation. A nut is integrated in the plunger mount connecting to the lead screw to provide the actuation mechanism. Three syringes provide redundancy in the case of syringe component failure. The syringe plungers are fastened with M3 screws into the plunger mount. A custom component, nicknamed the 'Dorito' for its triangular shape, fastens between the syringe plungers to provide bottom support during syringe actuation. The plunger mount also aligns with linear rods and bearings to provide structural support and prevent syringes from jamming during actuation. A rubber end cap with a U-bolt (for retrieval) is friction fitted at the top to provide a waterproof seal, and act as a pressure release valve in case of battery failure.

A ballast mount is secured to the bottom of the float to provide additional weight for buoyancy and balance adjustment. This component also supports the syringes extending through the ballast mount, and has a hole to accommodate the pressure sensor wires. The ballast mount is hollow to provide space for lead pellets for additional mass to fine tune center of gravity and buoyancy according to ocean salinity. The lead is then encased in epoxy resin to prevent harmful exposure and the pellets from shifting.

Electrical Design

Electrical design safety regulations were considered to align with MATE's Request for Proposals. The float's autonomous power is provided by a 12V DC Nickel-Metal Hydride (NiMH) battery selected for wire gauge with a 2 Amp fuse selected based on full load amperage value. We selected a 12V NiMH battery pack to accommodate the stepper motor's high-torque actuation. The 18 AWG supports 16 Amps, which is adequate for the 2 Amp current draw. The battery pack is secured in a heat-resistant, durable PETG ventilated housing.

Controls Development

The float uses an ESP32 microcontroller for software development and data collection. A buck converter is used to step down to 5V for ESP32 power, while the stepper motor receives 12V. The stepper motor is controlled by a A9488 Stepper Motor Driver, to provide a logic power supply for motor actuation. A 1000 μ F capacitor is integrated into the PCB to prevent voltage spikes and damage to the motor driver. The ESP32 connects to the GY-MS5837 Pressure Sensor via I2C signal for data collection and retrieval using the ESP32's Wifi/Bluetooth features. The pressure sensor is placed at the bottom of the ballast mount and syringes to provide accurate readings of depth