

# Triton Robotics *Enceladus* Float

## Non-ROV Device Design Document

MATE 2025 World Championship Ranger Class

Org: Triton Robotics (Community Team) *Team number TBD*

### *Enceladus* Float

**Dimensions:** 0.123m (diameter) x 0.498m (height)  
3.7 kg (mass); 36 N (weight)

**Mechanism:** Buoyancy Engine

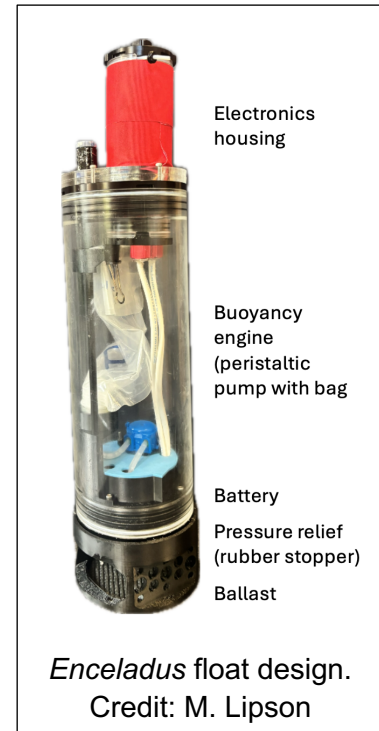
**Power:** (1x) 12VDC NiMH Battery Pack

**Fuse:** 2 Amp ATO mini blade fuse  
*Confirmed with MATE*

**Cameras:** No cameras

*See submitted Non-ROV SID for full electrical details.*

**Pressure Relief** 2.8cm diameter hole with rubber stopper  
vents entire float



***Enceladus*** is a vertical profiling float that features unparalleled depth hold capabilities through the use of a precision buoyancy engine. It is controlled by custom software and features a long-range telemetry system to stay in contact with the ground station when at the surface.

**Basics:** Our float is made from two repurposed acrylic tubes using custom designed end caps. It is powered by a 12VDC NiMH battery, and the electronics are protected by a 2A fuse within 5 cm of the battery. In the case of an emergency the entire float can be pressure relieved via a 2.8 diameter hole normally closed by a rubber stopper. While the entire chamber is open, the location and routing of the electronics chamber makes flooding it virtually impossible, keeping critical electronics safe.

**Buoyancy:** The buoyancy engine is built from a peristaltic pump connected to an internal 1L bladder located away from all sensitive electronics. The peristaltic pump can change the dV/V of the float in increments of less than 1/10,000<sup>th</sup> if needed. The pump is controlled by a relay connected to an Arduino Feather board.

**Telemetry:** Our Feather board contains a built-in 915mhz LoRa (long-range) radio for long-range communications with our mission station and we have tested this at over 1km range.

**Software:** All software on the float and mission control station is custom and features a robust set of modes and parameters that can be transmitted to control the float remotely.