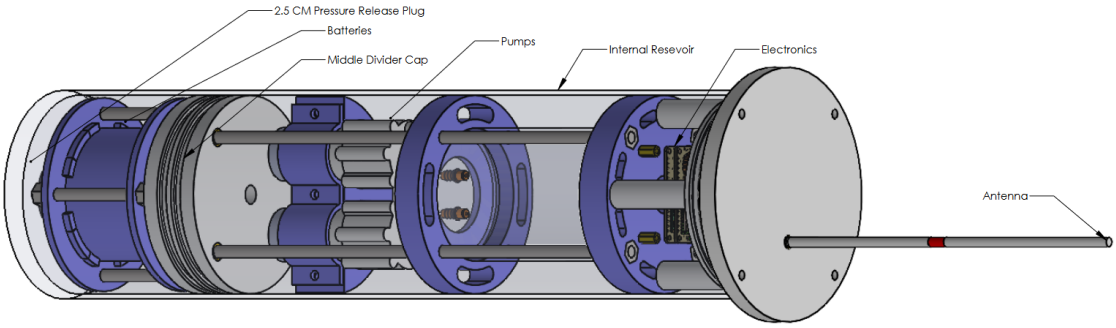
Cabrillo College Robotics opted to use a buoyancy engine as a profiling float. Variable buoyancy was created by filling and emptying an internal reservoir with water from outside the float using two air diaphragm pump DC motors. The assembly was encased in a 110 mm diameter aluminum tube with a 3D printed polyjet end cap on one end, with a marked antenna for easy identification when surfacing. The other end(bottom) has a 3 cm diameter pressure release plug that satisfies the minimum diameter requirement, that will release in the event pressure buildup occurs in the battery housing. No fasteners are used to seal the battery housing ensuring pressure will be released if it is greater inside than outside. The plug is machined from aluminum and has two O-ring seals. When the pressure inside exceeds that outside of the housing, the plug will release. The motors penetrate the housing via barb fittings to pull or eject water into the pool.



The vertical profiling float is powered by 14 AA alkaline batteries, arranged in a 7s2p configuration. The batteries are housed in a 3D printed disassemblable enclosure for easy swapping, with an in-line 5A fuse within 6cm of the positive terminal. (2). They power the pumps as well as electronics responsible for transmitting data to the mission station. The float is a completely separate system from the main ROV and will not conduct any ROV tasks. The electronics consist of adafruit modules including a GPS module for getting the time, motor controllers to drive the pumps, and a long range packetized radio module for transmitting the team number and Universal time to the mission station. The non-ROV device does not utilize cameras or thrusters, or access the internet.

Cabrillo Robotics Club
Vertical Profiling Float
SID V1.1 Ciaran Farley &
Stephanie L'Heureux

Fuse Calculations
Battery = 14 AA, 7s2p = 10.5V 5.7Ah
2x DC water pump, 500mA 10V = 10W
1x feather rp2040 500mA 3.3V = 1.7W
approx 12W
12Q at 10.5V = approx 1.2A
1.2A * 150% safety factor = 1.8A
3A fuse was chosen