VX Industries

Long Beach City College
Long Beach, CA, USA

VERTICAL PROFILE FLOAT DESIGN SHEET & SID

Viking Drakkar ROV

VX Industries Employees

Name	Position	
Guadalupe Vasquez	Chief Operations Officer	1st Year
Nick Zartman	Chief Design Engineer	1st Year
Robert Anderson	Electrical & Support	1st Year
Remi Ayon	Electrical & Support	1st Year
Tony Melena	Electrical & Support	1st Year
Ismael Torres	Electrical & Support	1st Year
Candice Martinez	Support	1st Year
Danny Vasquez-Alverez	Design & Fabrication	1st Year
Humon Moeen	Payload & Floater Design	1st Year

Mentor: Scott Fraser

20 MATE ROV World Championship

Vertical Profile Float Design Sheet

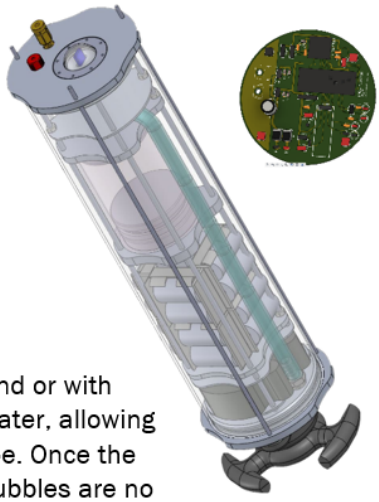
VX Industries Float

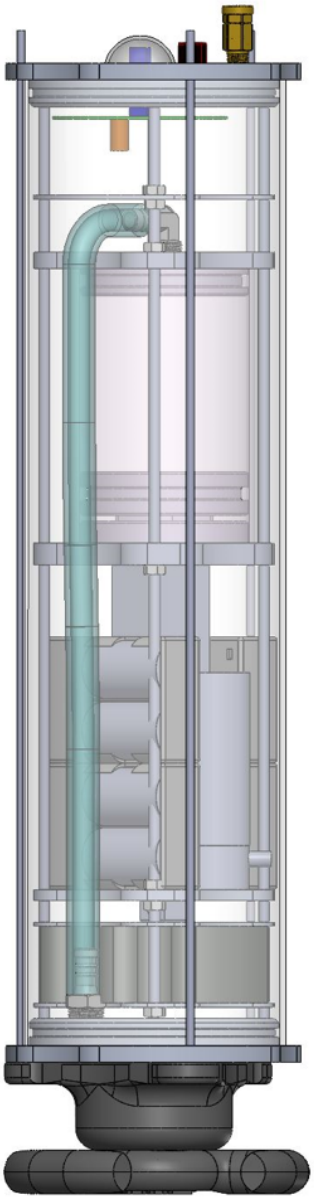
June 2022 • MATE ROV Competition

Photo by Anthony Powell (antarcticimages.com)

Design Summary:

A vertical profiling float is used to take scientific measurements at various depths in the ocean. Once deployed in the ocean, our float takes advantage of Archimedes' Principle of Buoyancy to complete several vertical profiles and uses sensors to collect valuable scientific data along the way. Our float design focuses on safety, simplicity, and reliability.





Float Operation:

The float can be deployed in bodies of water by hand or with an ROV. First the float is held upside-down underwater, allowing water to fill the internal cylinder through a vinyl tube. Once the cylinder and tube are filled with water and rising bubbles are no longer apparent, the float is released and will sink to the ocean floor. While underwater, sensors located at the top of the float collect data such as depth and temperature. After reaching the ocean floor, the float ascends to the surface and sends the collects data to your device through Bluetooth. The float then completes another vertical profile and sends the second batch of data.

Buoyancy Engine Design:

The float uses a unique "syringe" design to ascend and descend in water. By filling the float cylinder and tube with water, the weight of the float increases, thus overcoming the buoyant force and causing the float to sink. The float utilizes a Printed Circuit Board designed in house. While sinking, the float periodically takes depth measurements. When the float reaches the ocean floor and no longer senses a change in the depth, a linear actuator moves the piston and pushes water out of the cylinder. This decreases the float's weight and allows the buoyant force to ascend the float.

Safety Considerations:

Safety is our first and foremost priority when designing the float. The alkaline batteries are secured in place using battery holders that are strapped down inside the float. A 2.5 cm diameter pressure relief plug is included on the bottom end cap in case of pressure build up inside the float. The power supply does not exceed the 12 VDC and 6 amp maximum specifications and a 7.5 amp fuse within 5 cm of the battery terminal.

Specifications:

Max Diameter:	18 cm	Battery Type:	8 Alkaline D Cells
Total Length:	67 cm	Fuse Type:	7.5 amps
Cylinder Volume:	10,100 cm	Controller:	Arduino Nano

4. System Integration Diagrams