Brother Rice Robotics

"Battling for a Bluer Tomorrow"

10001, S. Pulaski Ave, Chicago, IL, USA

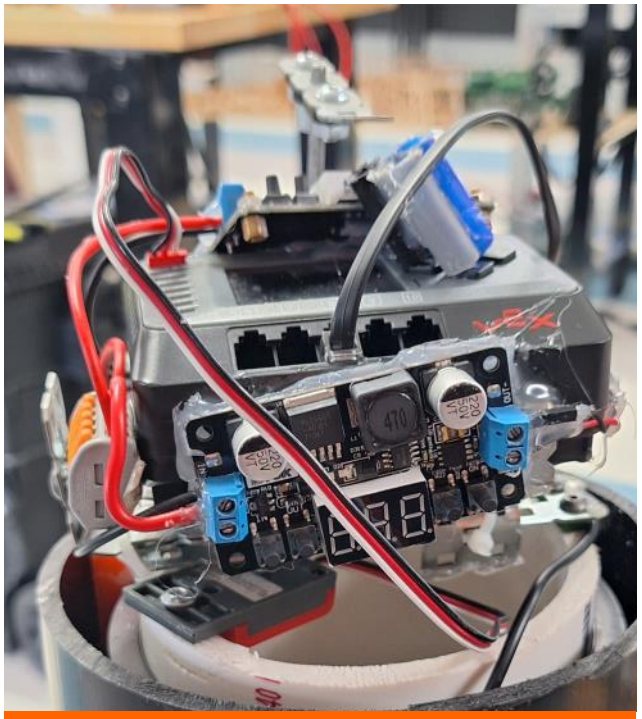
NON-ROV DEVICE DOCUMENTATION

Photo Credit:

N Scott

Battery back, Fuse, VEX motor and Syringe

Photo Credit: N Scott



Control interface that includes VEX Cortex, Dual Voltage Convertors, Master Power Switch and VEX Light Sensor

Photo Credit: N Scott

Float Overview

VESCO 2.0 is BR Robotics' second foray into vertical profiling float technology. 2.0 is significantly more capable. It is now powered by a buoyancy engine, greatly extending battery life. It is also equipped with a pressure sensor that is used to record the float depth and now wirelessly transmits data when at the surface.

Weight	Size (cm)	Cost (US)	Student Hours	Travel
12.3kg	80L x 18dia	$809	270	665km

VESCO 2.0

V—Vertical (Profiling)

E—Environmental

S—Survey

C—Collecting

O—Omnibus

Omnibus

VESCO 2.0 is an Omnibus as it can be configured to house any desired sensor package

Fully Autonomous

Once the float is activated the operator pushes a sequence of buttons on the cortex to start the program. After this point the float completes its mission completely autonomously

Exterior Software Control

The control interface is designed to be accessed and operated through the pressure relief cap. This decreases the chance of leaks due to a faulty housing seal as the housing only needs to be opened for maintenance purposes.

Buoyancy Engine

VECSO 2.0 uses a buoyancy engine to descend and ascend. A 500ml syringe ingests and expels water to change the inner volume. Running the motor to change the buoyancy is the largest energy draw. Each buoyancy change cycle only takes 17 seconds, greatly extending battery life of the system.

Battery Powered

Powered by 8D NiMH batteries that deliver 12v of power to the float. Four separate battery holders are secured to the inner frame and have been connected in parallel to deliver the 12v that power the float. A 5amp fuse was installed within 5cm of the final battery pack and care was taken to select hardware that did not exceed this limit

Control Interface Access

Photo Credit:

VEX Cortex

The VEX EXP coding platform is utilized to control VESCO 2.0. This is a robust and reliable system. A VEX motor and VEX light sensor are connected to the cortex

Analog to Digital Pressure Sensor

VESCO 2.0 uses a reliable analog pressure sensor to measure float depth. The analog readings adjust the light level inside the float and these readings are read and stored by the VEX light sensor and cortex

Prototype of Analog to Digital Pressure Sensor

Photo Credit: N Scott

Increasable Data Storage

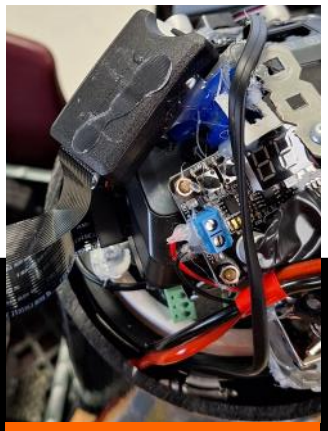
Float data is stored on an SD card. This allows the operator to install the proper sized memory card to meet the demands of the task.

Wireless Data Transmission

VESCO 2.0 creates its own wireless network. When on the surface this network can be accessed in order to download the float data

Safety

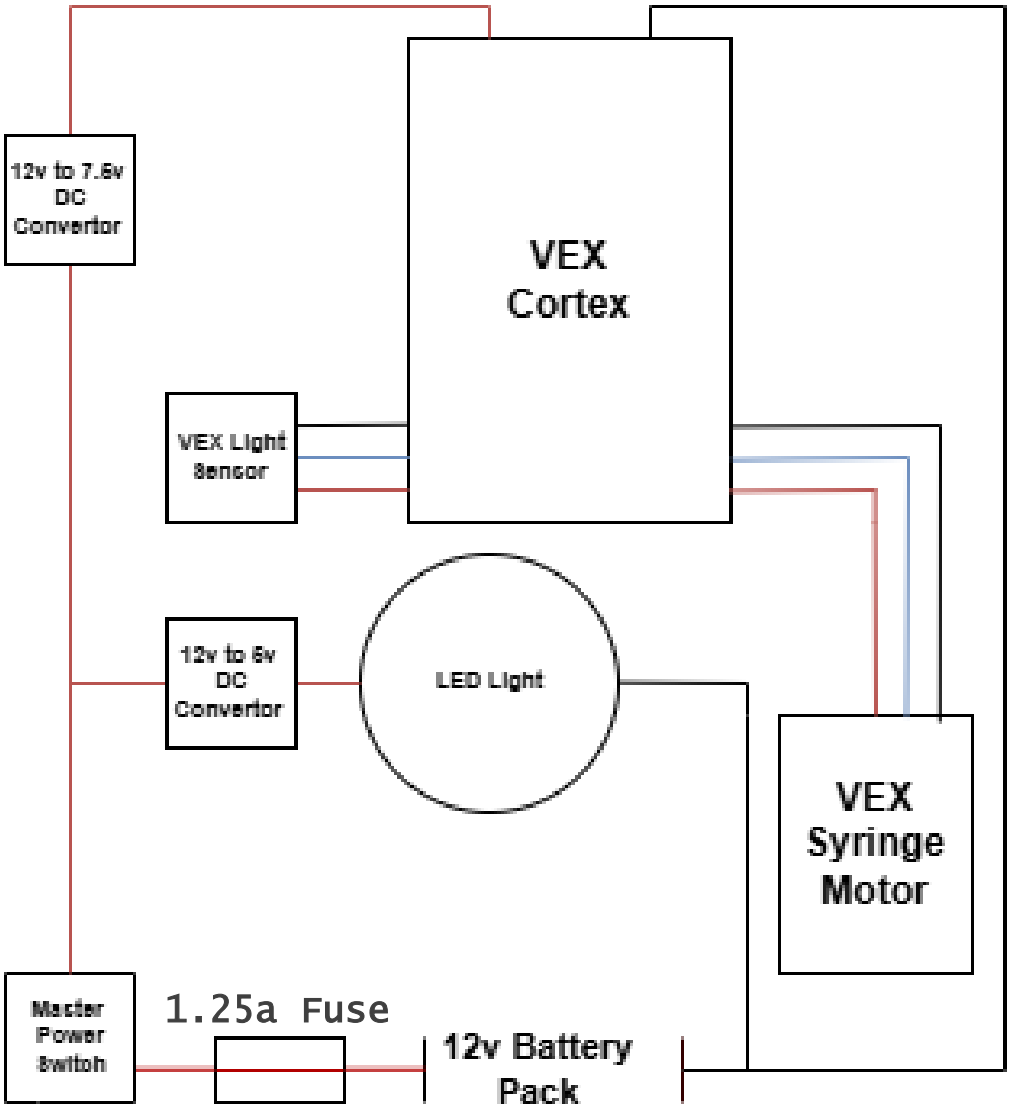
VESCO 2.0 incorporates a 5amp Blade fuse, to ensure safety and proper overload protection. A pressure relief plug is also built in incase internal pressures get to high. The ballast needed to balance the system is removable and does not have to be attached until just before launch. This reduces the risk of injuries to the float operators



Wireless SD Card

Photo Credit: N Scott

VESCO 2.0 SID



Positive Wiring

Ground Wiring

Signal/Data Wiring

Full Load Amperage (FLA)

FLA =1.03amps

Fuse Used = 1.25A

Brother Rice High School - Brother Rice Robotics

Non-ROV Device System Integration Diagram

2025 MATE Competition

Credit:

Max Griffin