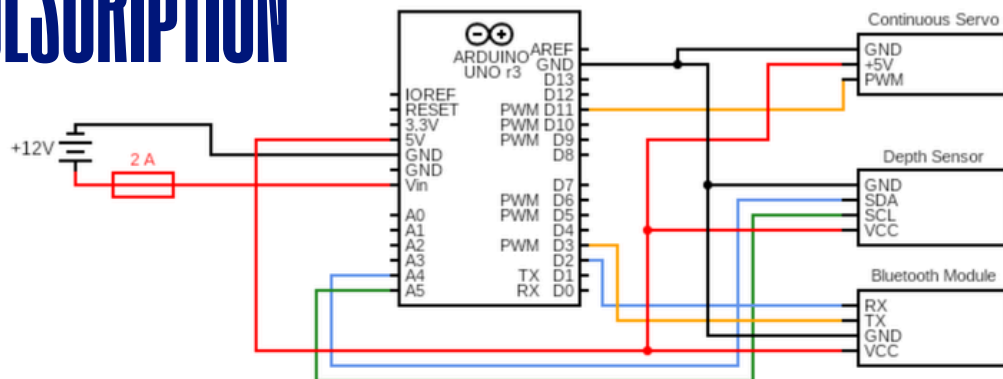




NON ROV DESCRIPTION



Vertical Profile Float

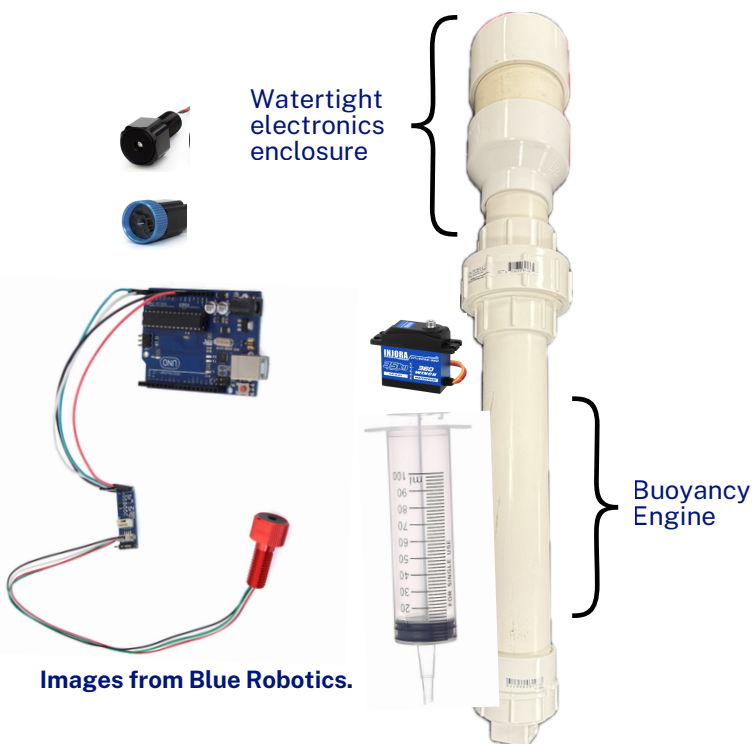
Our float design uses a 100 mL syringe connected to a threaded rod powered by a servo motor. As the servo rotates the rod, the syringe is able to pull in or push out water, which changes the float's buoyancy and allows it to rise or sink during missions. This system is mounted near the bottom of the float to help with stability and balance in the water.

The main body of the float is made from PVC and sealed with marine-grade epoxy to create a strong, waterproof structure. Since the electronics are mainly located toward the top of the float, keeping the enclosure watertight is very important for safe operation. To further reduce the chance of leaks, an O-ring seal is placed at the center connector joint, and an internal separator was added to allow wires to pass through while still helping block water from reaching the electronics compartment. This provides extra protection in case water enters the lower section of the float unexpectedly. Before deployment, the sealed sections were tested underwater to check for leaks and confirm the integrity of the waterproofing. Overall, the design focuses on buoyancy control, durability, and protecting sensitive components during operation.



Tenenergy NiMH Battery Pack 12V 2000mAh with a 2amp mini blade fuse (images from Amazon.com)

The Float uses a custom circuit board, HC-06 Bluetooth module, a Blue Robotics Depth sensor, a waterproof 360° continuous servo, a 12v NiMH battery, and an Arduino Uno. The circuit board is a power hub for the arduino and the sensors. There is a 2 amp fuse that feeds 12v to the Arduino, which in turn has the 5v and GND pins connected to the other side of the circuit board. The 5v circuit connects the Bluetooth module, depth sensor, and servo motor to the Arduino. This reduces the wires running to the Arduino, as the power and GND wires for the sensors and servo are wired in parallel and connect to the Arduino 5v/GND pins. This also simplifies troubleshooting. The battery is connected through a screw down mount, with the fuse being located in series after the positive lead of the battery. Each of the communication wires have to be separate due to the code protocols used. The depth sensor uses I2C, the Bluetooth module uses TX/RX (analog), and the servo uses PWM (pulse width modulation). The total number of wires running to the Arduino is 7 (2 for the 5v power, I2C, and analog communication, 1 for PWM) and 1 12v power plug that connects the Arduino to battery power. A full load amperage (FLA) rating of 2 amps was determined by taking the mean amp draw of each component. The Arduino uses 0.2 amps, the depth sensor uses 0.2 amps, the Bluetooth module uses 0.5 amps, and the servo motor uses 0.9 amps, for a total of 1.8 amps (~2amps).



Images from Blue Robotics.