**Software/Hardware**

**Software**

* Autodesk EAGLE
* Sketchup
* Arduino IDE

**Tools**

* Soldering Iron
* Multimeter
* Clamp Multimeter

**Components**

* Arduino UNO R3
* 2x L298 Dual H Bridge Motor Controllers
* LM2596 Voltage Regulator
* 4x 1100 GPH Bilge Pumps
* PVC Pipe
* Basic USB Webcam
* 2x Joysticks

**Introduction**

An ROV is a Remote Operated Vehicle, they can range from aeronautical ROVs to submersible ROVs but most common, the submersible ROV. Usually the ROV is powered by boat propellers, but because they are extremely expensive, modified bilge pumps work just as well in some cases. Each pair of bilge pumps is controlled by a L298 Dual H Bridge Motor Controller. At the maximum speed setting, each pump will consume 3 Amps which means the 12V 12Ah Lead Acid Battery will last for about an hour. The ROV is controlled by an Arduino UNO R3 microcontroller and between the two joystick is 25 meters of Cat3 ethernet cable. Because wireless signals aren't strong at cat3 cable is used to transmit data. Because 24 gauge wire will melt with 12 Volts and 12 Amps running through it, there is a positive and negative 12 gauge wire that is responsible for power delivery. There are two modified bilge pumps at the top that are responsible for vertical movement. The two bilge pumps are put at angles opposite to each other to minimize horizontal movement produced by the vertical motors. The other two motors are for left and right horizontal movement. The shell has room for expanding, for example, there is room for future sensors or bilge pumps. In the future, fiber optic cables could replace the Cat3 cable.

**Why I chose to make this project.**

I chose to make this project so I can take photographs underwater and to learn about computer science and electrical engineering.

**How this relates to S.C. Standards.**

ISTE 4b, 4c, 4d

ISTE 5b, 5c

ATMEGA328P

ATMEGA328P DIP socket

L298 Dual H Bridge

Voltage Regulator

Arduino UNO R3

Perf Board

Arduino Prototype Board

Terminal Blocks

Raspberry PI 3

Multimeter

Wire Cutters

Clamp Multimeter

Soldering Iron

Modified Bilge Pump

Remote Control Body

**What I learned**

I learned about how to make an object neutrally buoyant, how to make a remote controlled vehicle, and how to use analog input to control digital output in the C++ programming language.