**Objective**

Construction of an Unmanned Underwater Vehicle (UUV) that is capable of autonomous navigation and garbage collection in a body of water.

**Item List**

Tube Structure

-1/2 inch PVC pipes for the frame

Main Module

* <https://www.amazon.ca/Waterproof-Plastic-Enclosure-Junction-265x185x125mm/dp/B00N41E6WU/ref=sr_1_262?ie=UTF8&qid=1496699338&sr=8-262&keywords=waterproof+box>
* https://www.amazon.ca/265mmx185mmx95mm-Power-Connector-Waterproof-Junction/dp/B00N41E7W4/ref=sr\_1\_22?ie=UTF8&qid=1496699916&sr=8-22&keywords=waterproof+box+265

Two Large Tubes

* 2inch ABS pipes. 22 inch length or 2 ft
* https://www.homedepot.ca/en/home/p.abs-pipe-2-inches-x--3-ft-cell-core.1000109869.html

4 motors and ESCs

http://www.ebay.com/itm/2212-920KV-CW-CCW-Motor-for-DJI-Phantom-30A-Simonk-Brushless-ESC-4Pcs-/111842854427?hash=item1a0a5a861b:g:gsIAAOSwOdpXxkg~

Gyroscope

http://www.robotshop.com/ca/en/mpu-6050-6-dof-gyro-accelerometer-imu.html?gclid=CjwKEAjwpdnJBRC4hcTFtc6fwEkSJABwupNi6eyCkgfcy1w8DG\_f-MMpeFOgpMxDI1w7sN17NzJI\_hoCx2Lw\_wcB

Camera

http://www.robotshop.com/ca/en/arducam-5mp-1080p-ov5647-noir-camera-module-12m-mount-raspberry-pi.html

Flash Light

SONAR/Waterproof Ultrasonic sensor (may not need)

http://www.ebay.com/itm/JSN-SR04T-Ultrasonic-Module-Distance-Measuring-Transducer-Sensor-Waterproof-/201322915390

Transceiver (optional)

Sealing material

http://www.canadiantire.ca/en/pdp/3m-marine-adhesive-sealant-5200-white-3-oz-0790215p.html

**Budget**

|  |  |
| --- | --- |
| **Item** | **Price** |
| Arduino Uno\* | 10.10 |
| Raspberry Pi 3\* | 45 |
| ½ inch PVC pipes (10ft) | 8.38 |
| Main Module | 27.44 |
| 2 inch ABS pipes (3ft) | 7.45 |
| 4 Motors and ESCs | 43.79 |
| MPU-6050 6 DOF Gyro Accelerometer IMU | 10.80 |
| Camera | 41.09 |
| Ultrasonic Sensor | ~10 |
| Water sealant | 16.99 |
| Other expenses (Tax + Shipping + etc) | ~50 |
| **Total** | **271.04** |

**Subsystems**

Navigation

* Able to move and turn in the water using its propulsion

Attitude Dynamics and Control

* Stabilizing of the UUV using gyroscope inputs

Obstacle Detection and Avoidance

* Use of SONAR or camera input to go around obstacle

Garbage Detection and Collection

* Detection of garbage, navigation and collection
* Use camera input to detect using OpenCV, navigate using motors, collect using trash grabber

Communication (optional)

**Design**

