



# Open ROV

Open Source Remotely Operated Underwater Vehicle

# Project Overview

Our team was tasked with building upon the OpenROV project and getting it to work as well as improve the functionality of the ROV.



*Past Semester ROV*

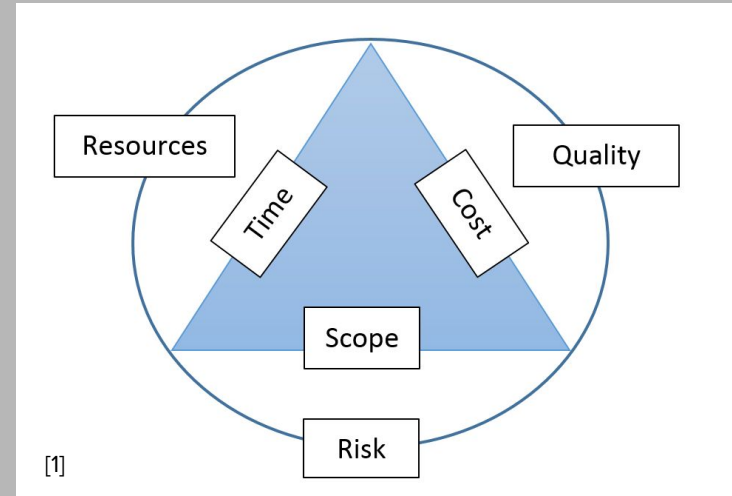
# Deliverables

- Conduct a real world test with documentation.
- Improvements upon last semesters ROV.
- Parts list for items required to make these improvements.

Part name	Link	Quantity	Price per	Total price
Lipo Safety Bag	<a href="https://www.amazon.com">https://www.amazon.com</a>	1	\$13.99	\$130.65
Batteries	<a href="https://www.amazon.com">https://www.amazon.com</a>	1 (pack of 2)	\$66.99	
Penetrators	<a href="https://bluerobotics.com">https://bluerobotics.com</a>	2	\$4.00	
Light Bar	<a href="https://www.amazon.com">https://www.amazon.com</a>	1	\$16.99	
Light Bar	<a href="https://www.amazon.com">https://www.amazon.com</a>	1	\$13.99	
Light Pods	<a href="https://www.amazon.com">https://www.amazon.com</a>	1	\$14.69	
Items already Owned by the School				
Part Name	Link (if applicable)	Quantity	Price per (if applicable)	Total Price
Arduino Nano	<a href="https://www.amazon.com">https://www.amazon.com</a>	1 (come in a 3 pack)	\$15.19	\$109.88
Arduino GPS Module	<a href="https://www.amazon.com">https://www.amazon.com</a>	1	\$10.99	
Temp Sensor	<a href="https://www.amazon.com">https://www.amazon.com</a>	1 (come in a 5 pack)	\$11.98	
PLA Filament	<a href="https://www.amazon.com">https://www.amazon.com</a>	1(only used a small p	\$23.73	
LiPo Charger	<a href="https://www.amazon.com">https://www.amazon.com</a>	1	\$47.99	

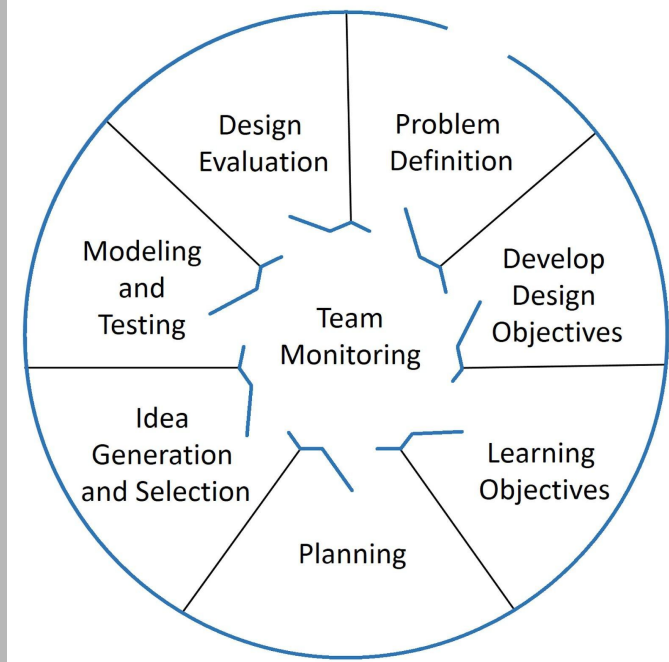
# Constraints

- Continuing project
  - Picking up where others left off
- Time
- Small team
  - Dividing large work loads
  - Aligning work time
- Budget
  - Not specified but in reason.



# Design Process Description

- Identify what could be added/changed to ROV
- Find what else is required to operate the ROV
- Order and install these items
- Implement the preliminary changes
- Conduct the maiden voyage
- Document changes that could be made
- Implement changes we are able to and note others for future work



# Design Decisions

Improvements we considered;

- Lights
- Temp Sensor
- Depth Sensor
- GPS
- Grapple / Manipulator

	Grapple	Depth Sensor	Temp Sensor	Lights
Capability (3)	1	2	3	5
Cost (1)	1	1	3	4
Enhancement (2)	5	3	2	5
Fabrication (2)	2	3	3	5
Scores	16	19	22	39

Design Rubric	Capability (3)	Cost (1)	Enhancement (2)	Fabrication (2)
1	Be very challenging for us to complete	Highest Cost	Doesn't add much to ROV	Has to be fully self fabricated
2	Be possible but not easy	Higher cost	Adds some improvements but not lots	Can be purchased but mostly made
3	Average ability to complete	Will cost around \$50	Adds decent improvements	Can be purchased and then assembled
4	Kind of easy	A small addition to cost	Adds a lot to the ROV	Majority can be purchased
5	Very easy to complete	Very Low cost	Significantly improves the ROV	Can be fully purchased and added to the ROV

# Project Design

Fixes we made to the Design:

- Rear Prop
- Camera Mount
- Weight Distribution

Improvements we made to the design:

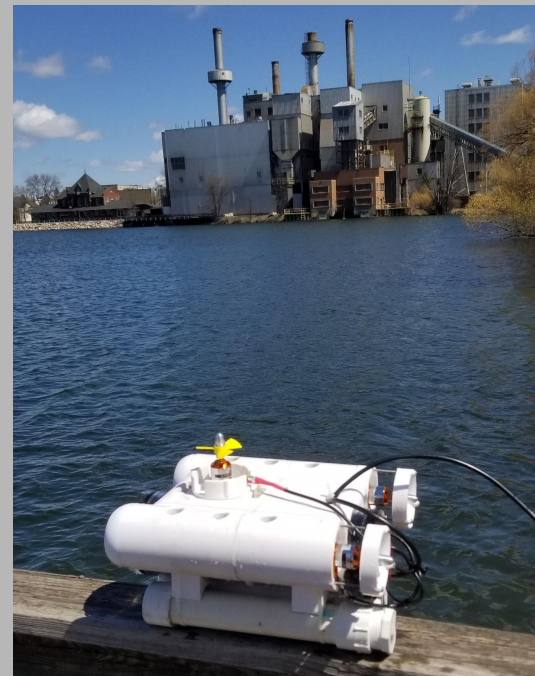
- Light Bar
- Started Temp Sensor/GPS



# Testing and Validation

- Maiden Voyage
  - Water proofing
  - Camera feed to phone
  - Controls
  - Run time
  - Ballast
  - Mobility





# Future Work

- Arduino assembly/setup
  - Track exploration and mark locations with gps.
  - Temp sensor to measure environment.
- Ballast
  - Making it less fluid
- Better battery mounting method.
  - I.e. 3d printed mount, velcro, etc.
- Phone mount to controller for convenience.



# Overall Project Learning

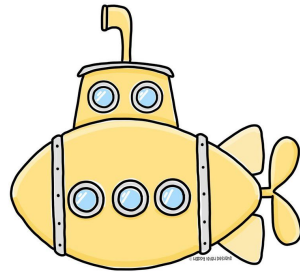
REDACTED: To better my project management skills and continuing a project for further development.

REDACTED: My goal was to gain a better understanding of robotics and Remote Operated Vehicles. I also wanted to see what it's like to add onto a project as well as improve my documentation.



Any Questions?

deepest thanks



# Citations

[2] <https://www.arrow.com/en/research-and-events/articles/hands-on-with-arduino-gps-usage>

[3] <https://thetrainingassociates.com/blog/8-shortcuts-to-stay-relevant-in-learning-development/>

[1] [https://www.google.com/search?q=constraints&rlz=1C1VDKB\\_enUS951US951&source=lnms&tbm=isch&sa=X&ved=2ahUKEwi9ILDszazwAhXaPM0KHdKtBnEQ\\_AUoAXoECAEQAw&biw=1920&bih=937#imgsrc=4KOcTGoh\\_inp5M](https://www.google.com/search?q=constraints&rlz=1C1VDKB_enUS951US951&source=lnms&tbm=isch&sa=X&ved=2ahUKEwi9ILDszazwAhXaPM0KHdKtBnEQ_AUoAXoECAEQAw&biw=1920&bih=937#imgsrc=4KOcTGoh_inp5M)