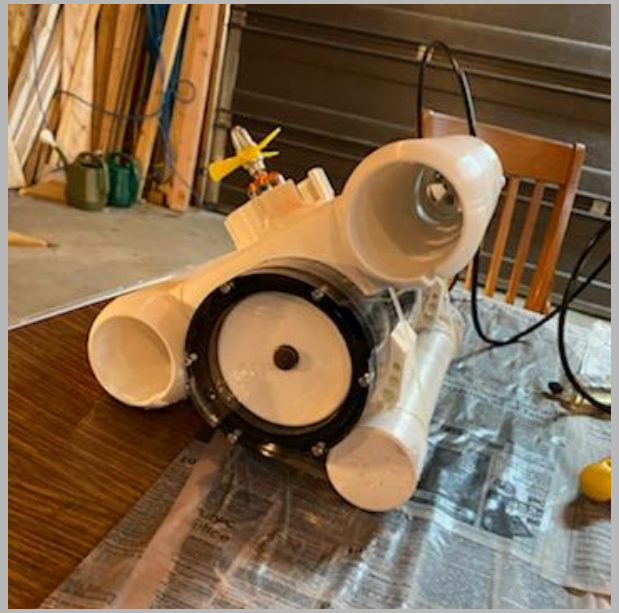
IRON RANGE
ENGINEERING

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

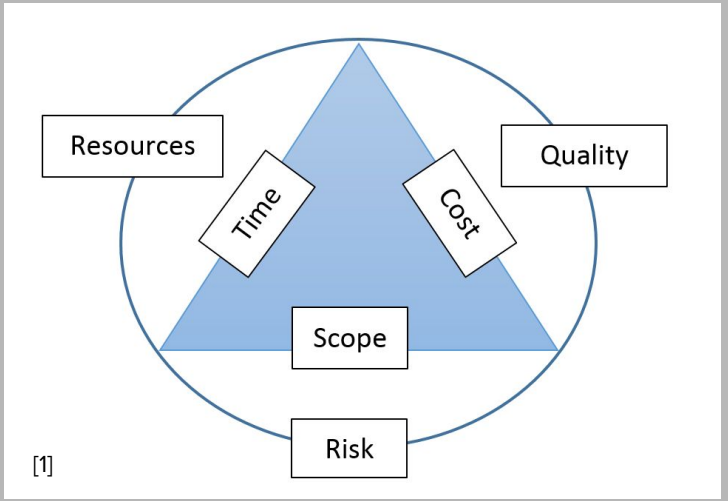
Deliverables

- Conduct a real world test with documentation.
- Improvements upon last semesters ROV.
- Parts list for items required to make these improvements.
- Updated Google Drive with progress and research.

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

Constraints

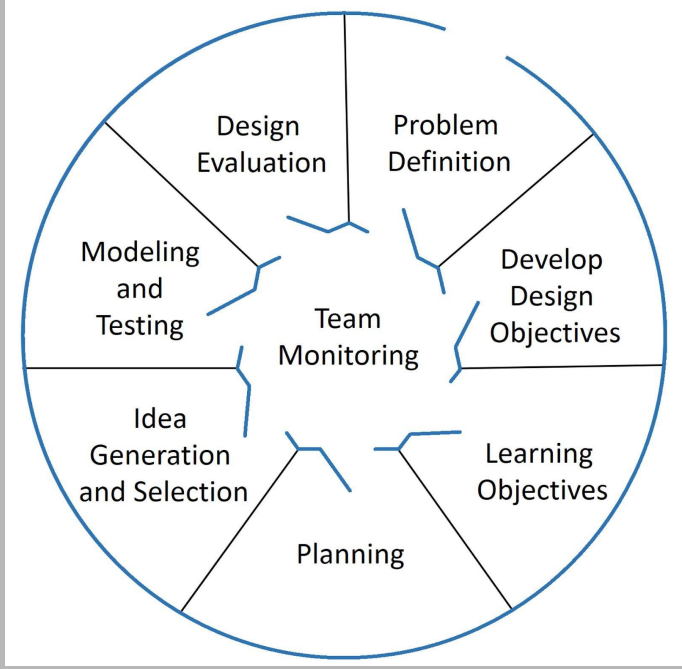
- Continuing project
  - Picking up where others left off
- Time
- Small team
  - Dividing large work loads
  - Aligning work time
- Budget
  - Not specified but in reason.



[1]

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 Imrpovments	Can be purchsed and then assembled
4	Kind of easy	A small adition 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:

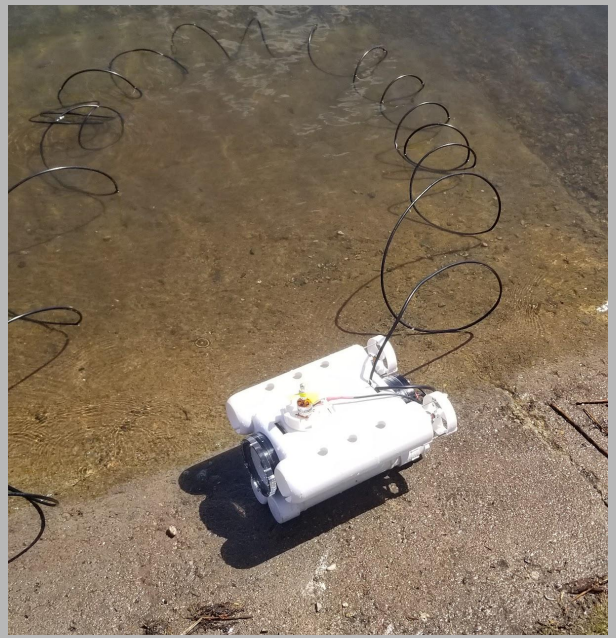
- Rear Prop
- Camera Mount
- Weight Distribution

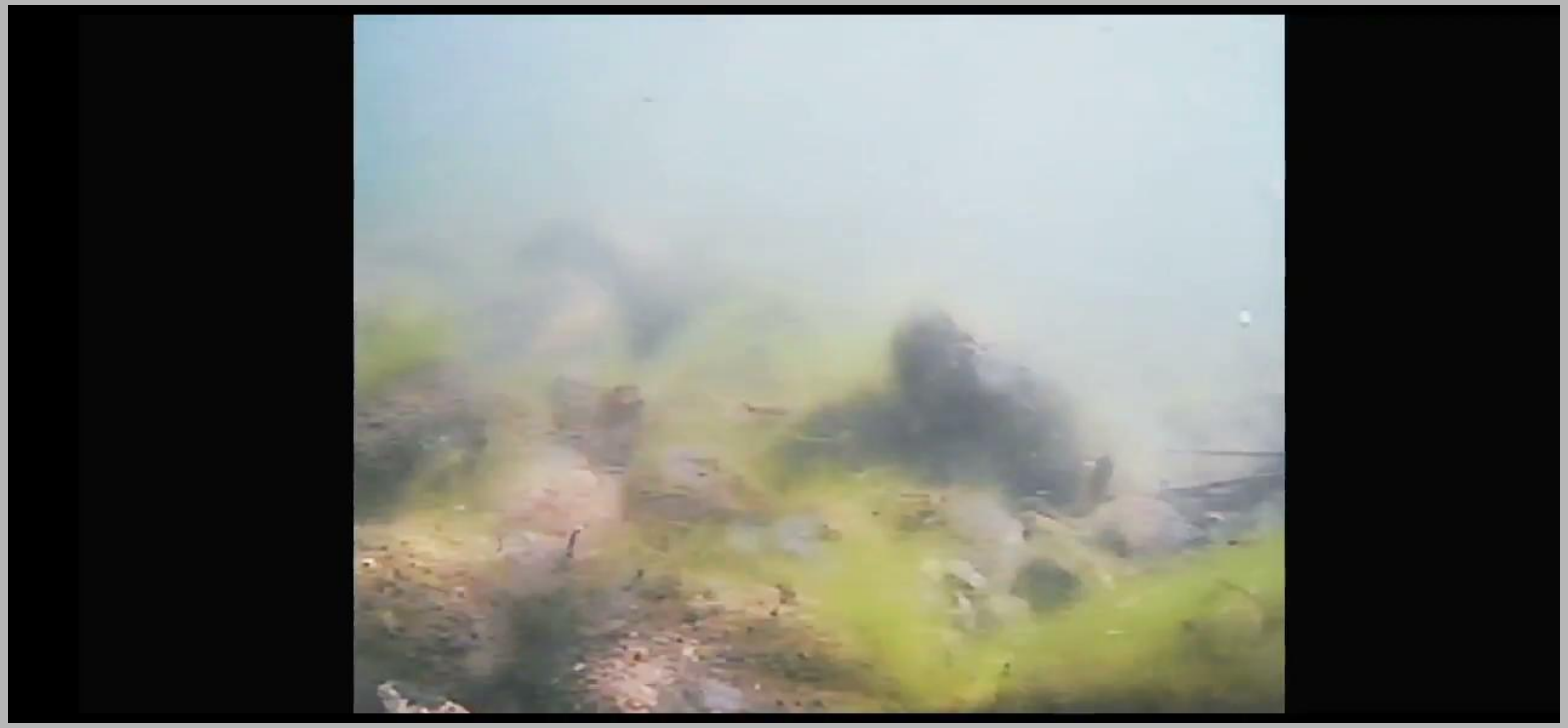
Improvements we made to the design:

- Light Bar
- Started Temp Sensor/GPS

Testing and Validation

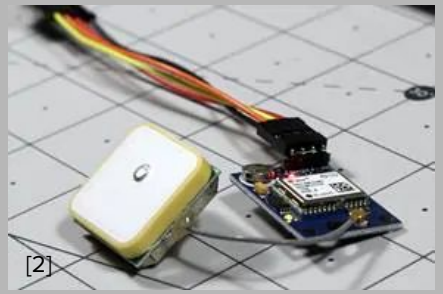
- Maiden Voyage
  - Water proofing
  - Camera feed to phone
  - Controls
  - Run time
  - Ballast
  - Mobility
- Collecting data from any tests conducted
  - Video
  - Pictures





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.
  - Ie. 3d printed mount, velcro, etc.
- Phone mount to controller for convenience.
- Finish light wiring and waterproofing
  - Originally not designed for submersion



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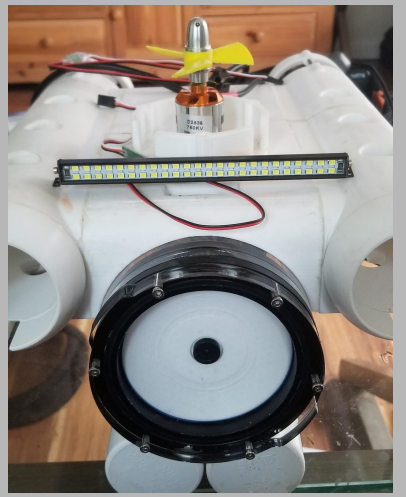


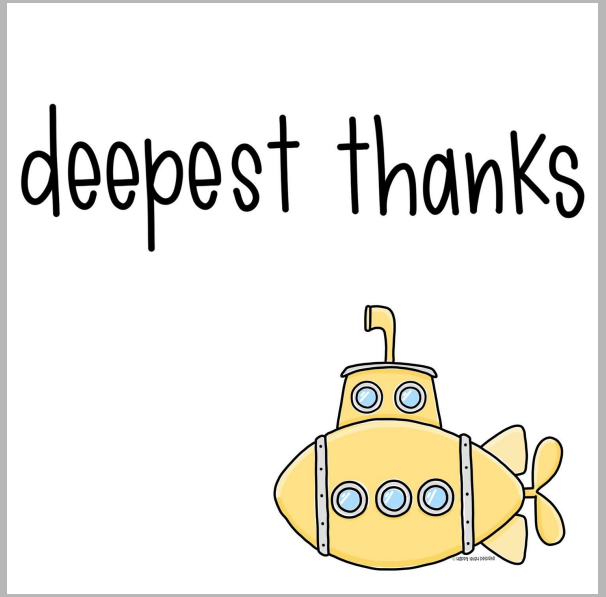
Overall Project Learning

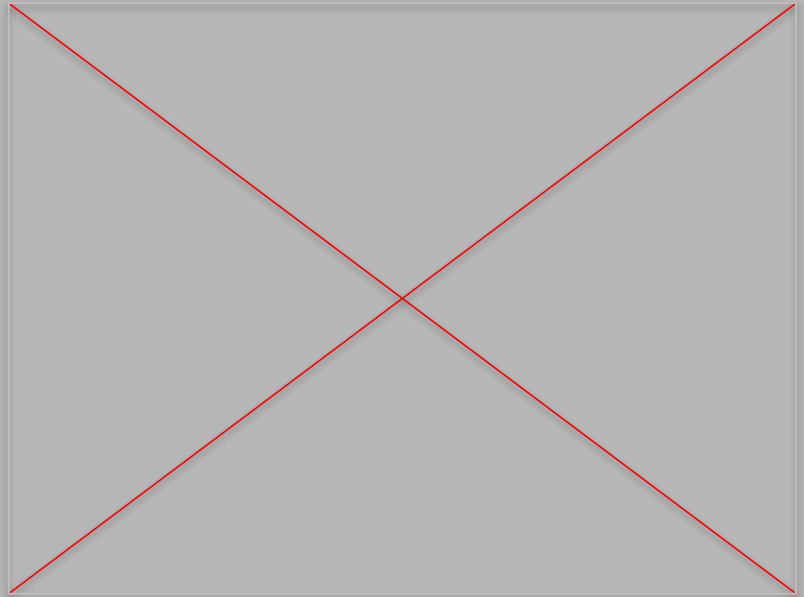
REDACTED: To better my project management skills, leading a team and overcoming challenges for my project team as a whole. Continuing a project for further development, being able to pick up where others left off and still make progress with what we are given.

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.

[3]

Any Questions?





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=2ahUKEwi9lLDszazwAhXaPM0KHdKtBnEQ_AUoAXoECAEQAw&biw=1920&bih=937#imgrc=4KOcTGoh_inp5M