# OpenROV

Open Source Remotely Operated Underwater Vehicle

IRON RANGE ENGINEERING

# Project Overview

- Group Selected OpenROV Project
- 
- Scoping
- Started Build
- Design Presentation
- Electronics/Wiring
- Final Presentation
- Final Document

# Deliverables

- Functioning ROV
  - How to Guide/Instruction Manual
- Parts Lists/ Cost List
  - Budget

[1]

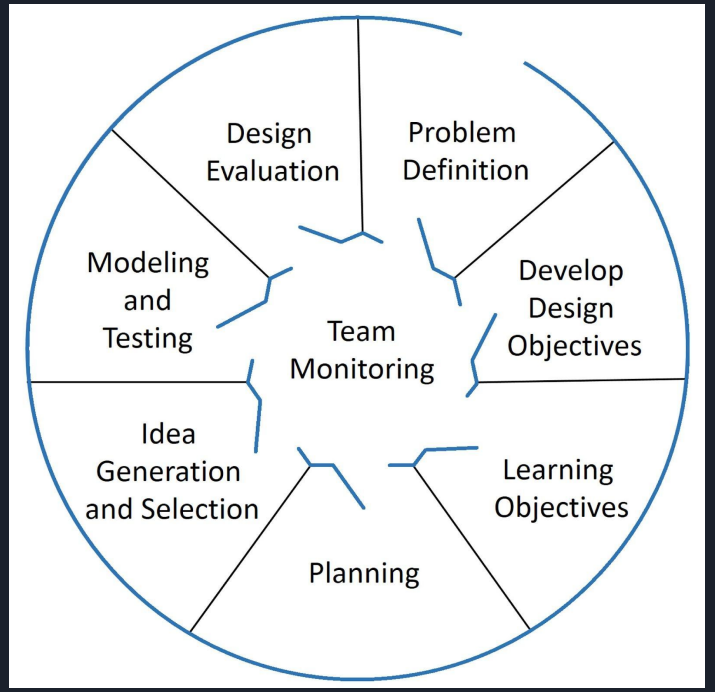
| Item | Price | Link | Quantity | Total Price |
|---|---|---|---|---|
| ESC | $31.99 | https://www.ama | 1 | $31.99 |
| Converter | $10.42 | https://hobbyking | 1 | $10.42 |
| Enclousure | $193.00 | https://bluerobot | 1 | $193.00 |
| Cable Penetrators | $4.00 | https://bluerobot | 4 | $16.00 |
| 3D Filament | $21.99 | https://www.ama | 3 | $65.97 |
| Remote | $45.99 | https://www.ama | 1 | $45.99 |
| Motor | $16.99 | https://www.ama | 3 | $50.97 |
| Camera | $25.99 | https://www.ama | 1 | $25.99 |
| FPV Reciever | $22.99 | https://www.ama | 1 | $22.99 |
| Tether | $39.95 | https://www.ama | 1 | $39.95 |
| | | | | |
| | | | Total | $503.27 |

# Constraints

- Must be watertight at depth and maintain its hull integrity
  - Rated for 100 m Depth
- Data transmission for the camera and control interface
- Fit the allotted budget for overall project
- Meet the semester deadline with functional and finished product
- Provide a meaningful solution to our initial problem

# Design Process Description

- We started by defining the problem
- We made a list of design objectives to implement to the ROV
- The group wanted to learn how to self-direct this project
- Planning took place and we made a made a schedule
- We chose ideas that best reflect our abilities and resources
- Created and assembled the OpenROV for testing
- Final review and assessment of our progress



# Design Decisions

| | Cost | Integration | Enclosure | Usability | |
|---|---|---|---|---|---|
| **Weight** | 3 | 2 | 2 | 2 | **Score** |
| Design 1 | 1 | 1 | 2 | 3 | 15 |
| Design 2 | 2 | 3 | 5 | 4 | 30 |

Cost

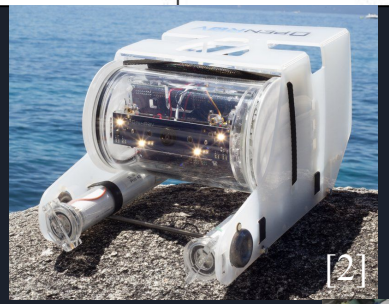
1- $500+ 2-$400-499 3-$300-399 4-$200-299 5-$0-199

Integration

1-Everything bought and nothing original 3-Room to change and can be built in IRE Labs 5-All in house Fabrication

Enclosure

1- Similar cost and less-insured 3- Purchased enclosure 5- Affordable and easily acquired


[2]

Design 1

Final Design


[3]

# Project Design

- 3d Printed Frame
- RC Remote and Receiver
- Brushless Motors
- USB Camera Receiver
  - Housed in PVC Piping

[4]

[5]

# Final Design

Pros

- 3D Printable
- Hobby Grade Electronics
- Commercial Enclosure
- Easily Operated

Cons

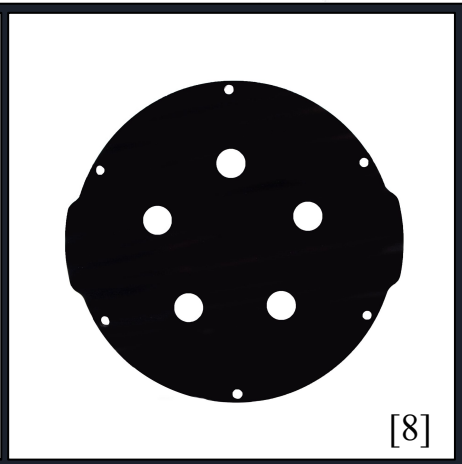
- 3D Printed layers
- Not as large of community base
- Printed in pieces

# Testing and Validation

- Waterproofing
  - Cable Penetrators
- Tether
  - Tested with a Short Piece
- Testing
  - Large Tub of Water
- Ballast Weight System

[6]


[7]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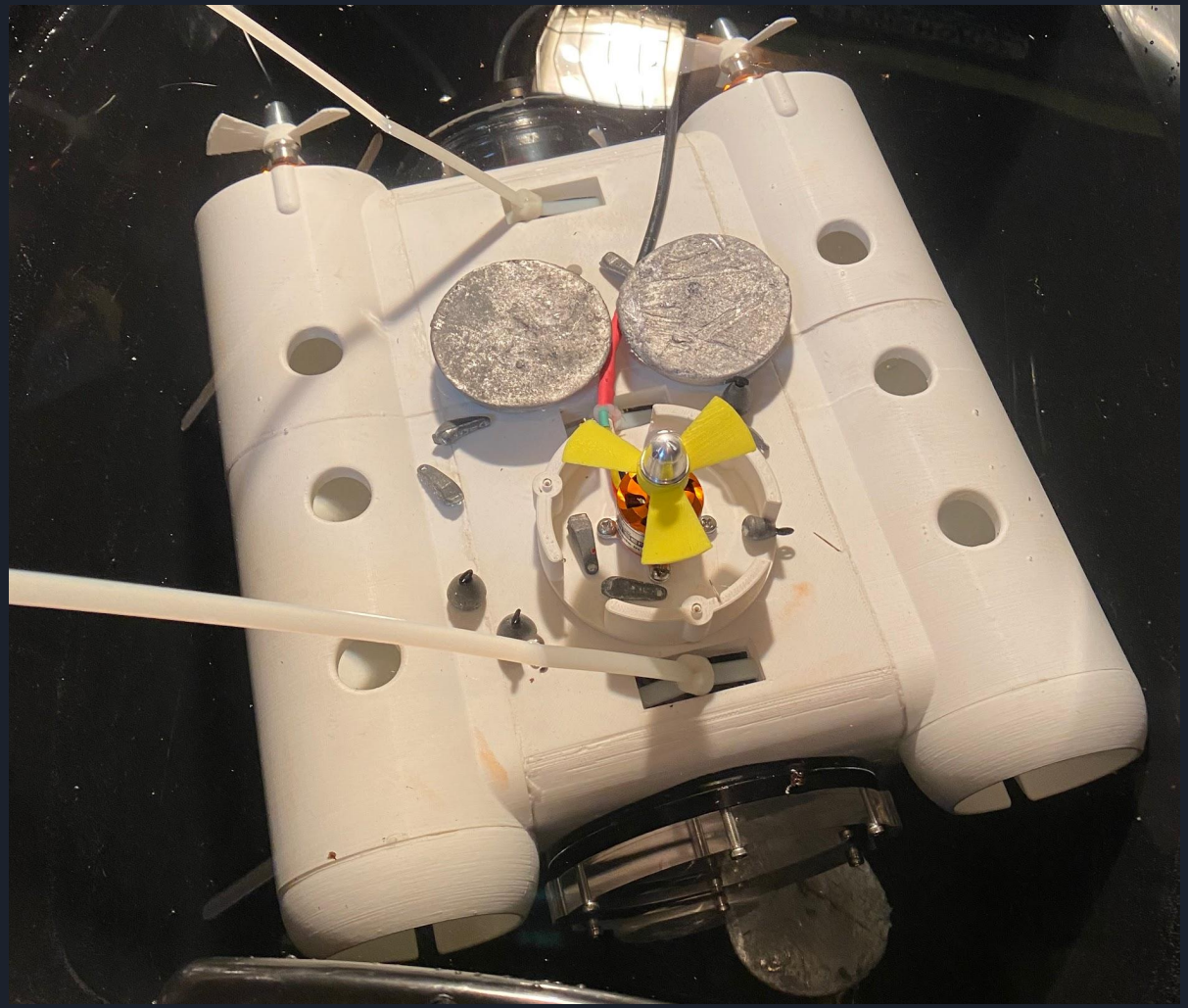
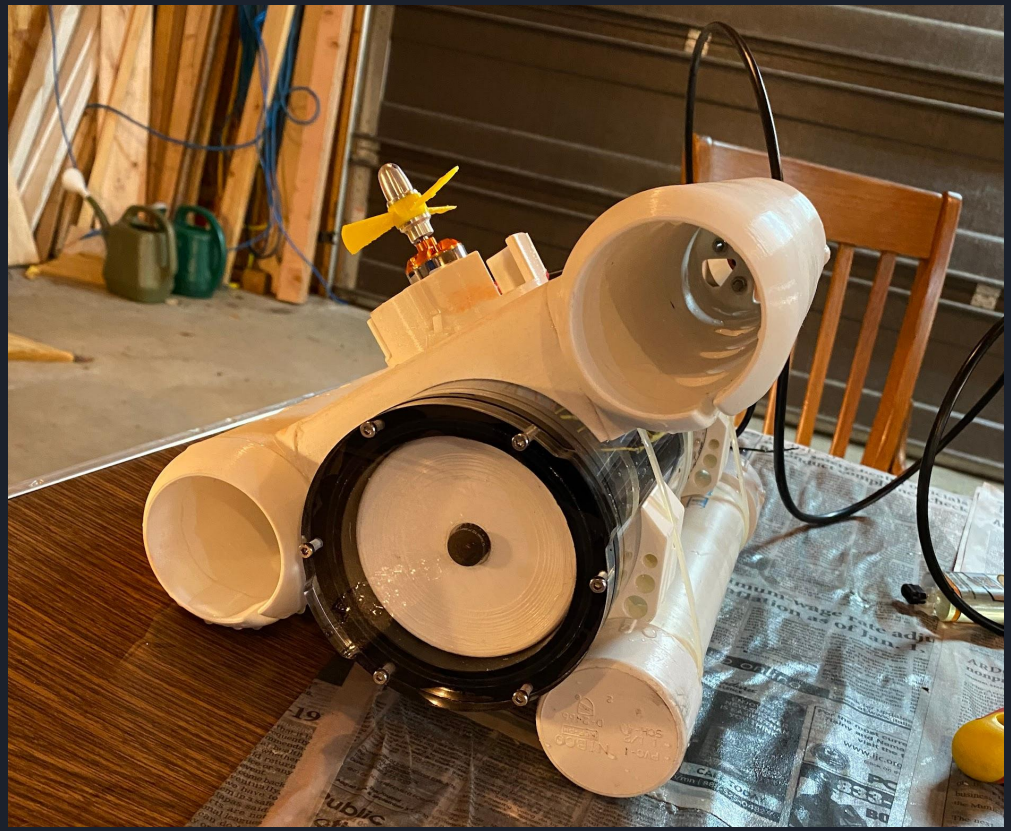
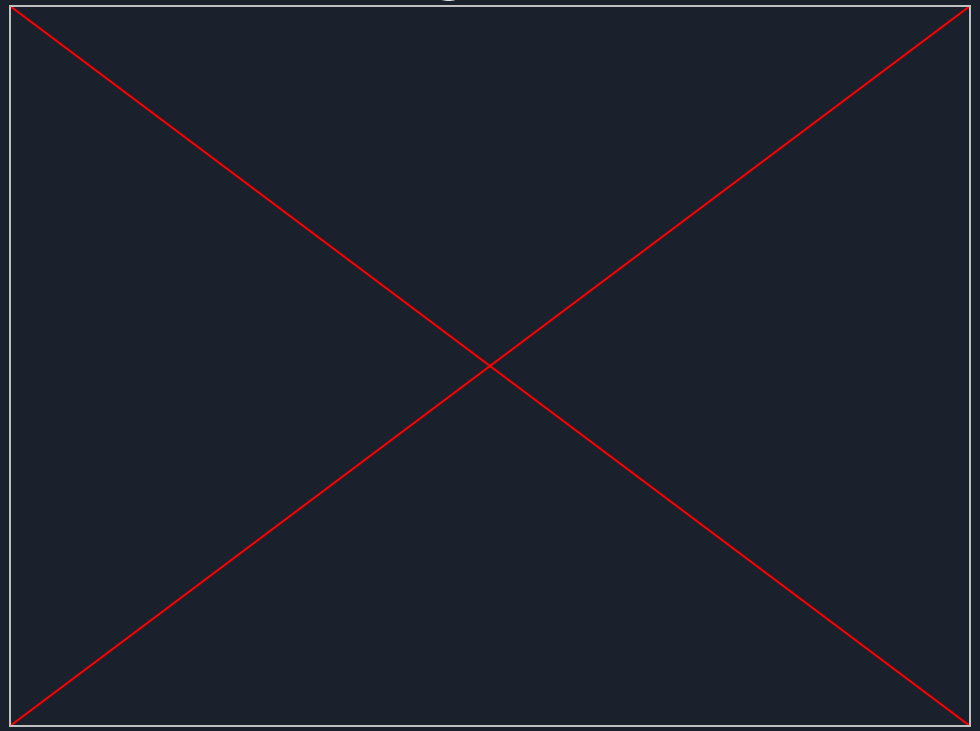
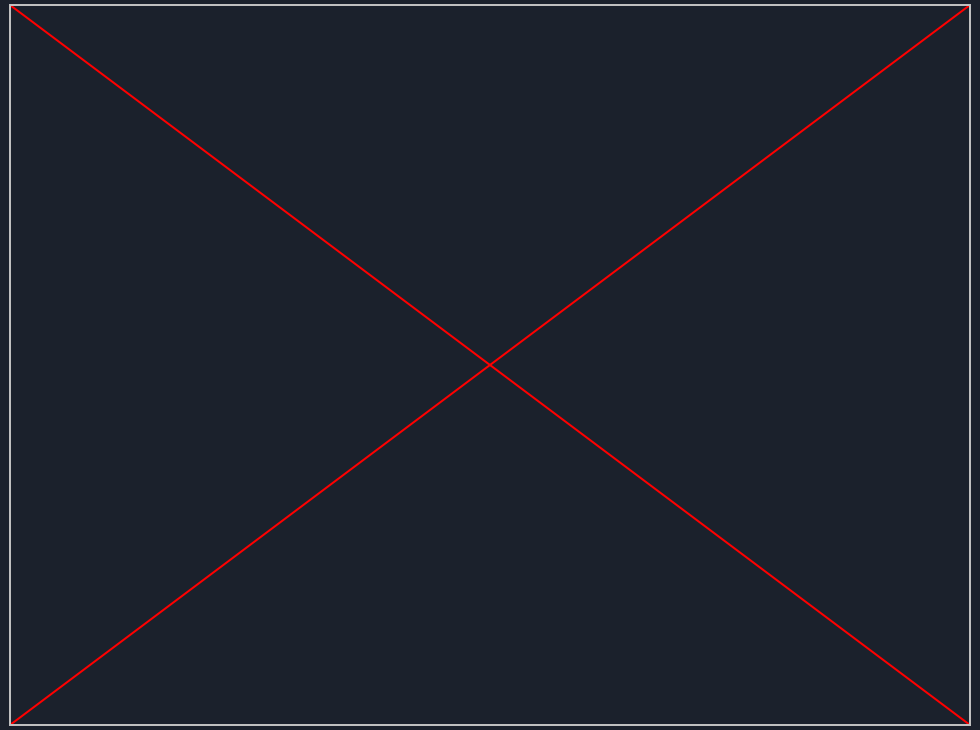




# Correct Ballast Weight



# Motors Running Forward and Backwards



# Future Work

- Retrieval Method
  - Adding Another Tether
- Lights
  - Alter the Camera Cap
- Cable Tray in Enclosure
  - 3D Printed
- Battery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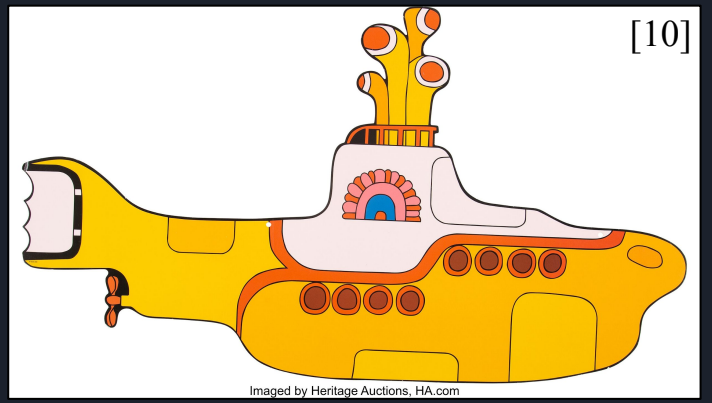
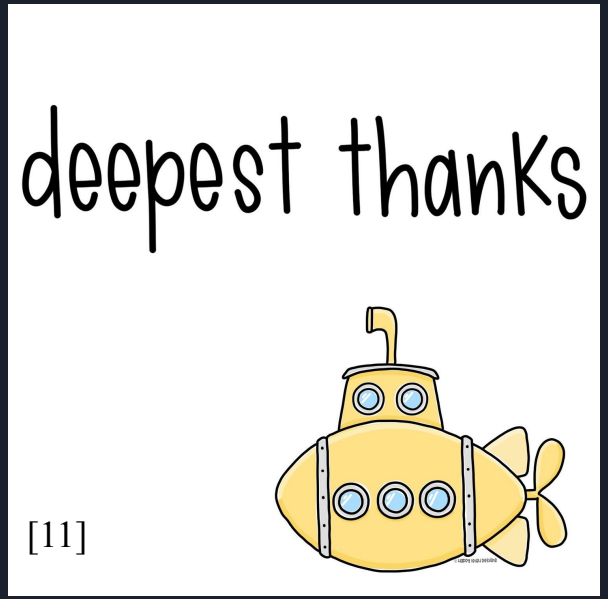
# Overall Learning



[10]

- Reese
  - Underwater vehicles/design, remote data transfer
- Carson
  - Project Management
- David
  - Control system used for underwater vehicles
- Jordan
  - 3D Printers, Shops, Word Docs
- Joe
  - 3D Printing

# Questions?




[11]

# Citations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