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Underwater Remotely Operated Vehicle Sponsored by Dr. Sherif Hassaan

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A.R.C.H.E.L.O.N.

Advanced Remote Controlled Hydrodynamic Explorer of Logistics & Oceanic Navigator

Executive Summary

Coastal areas in California attract millions of tourists a year and the more crowded these areas become, the more they are prone to pollution and trash build up. There are a few solutions when it comes to debris collection from bodies of water. We propose an underwater remotely operated vehicle (ROV) capable of maneuvering and object retrieval. Our ROV is nicknamed Archelon and it features applications of modern technology derived from underwater ROV research.

OUR TEAM

- **Eric Friestedt**

Team Lead / Software

- **Hassan Elquosey**

Assistant Team Lead / Structural

- **Zaid Khan**

Team Outreach / Electrical

- **Xuejun Hong**

Task Organization / Ballast

- **Hamza Hanif**

Secretary / Mechanics

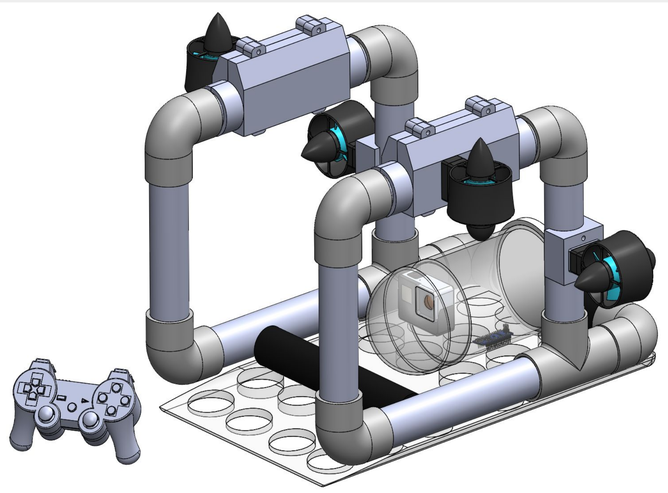
- **Nicholas Nielsen**

Treasurer / Propulsion

Camera

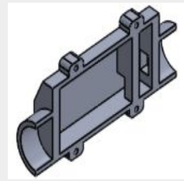
- Record/Relay live footage from below the water

ROV



Ballast

- Threaded to be waterproof



Housing

- Waterproof
- Holds all Circuitry & Electronics
- Serves as another ballast

Thruster

- Propel the Rov
- Provide thrust

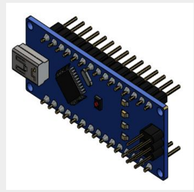
Equation for thrust:

$$T = \rho \times n^2 \times D^4 \times C_T$$

- T: Thrust (N)
- ρ: Fluid density (kg/m^3)
- n: Propeller rotational speed (RPM)
- D: Propeller diameter (m).
- C_T: Thrust coefficient.

Arduino

- Generate & Manage signal transmission

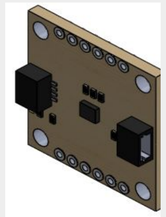


Magnet Bar

- Capture & Retrieve target

Gyroscope

- Present ROV Orientation



HOW WILL THE ROV FLOAT?

Fundamental Buoyancy Equation:

$B = \rho \times V \times g$

B: Buoyant Force

ρ: Density (1000 kg/m³)

V: Volume of Water Displaced

g: Force of gravity (9.8 m/s)

Societal Benefits & Impacts

- Raise awareness of the technical applications of robotic technology and its marine applications
- Demonstrate the effectiveness of underwater study through exploration and mapping and object recognition and retrieval

Future Improvements

- Better materials and thrusters that did not fit the current budget
- Scalable model subsystem prototypes
- Easily scalable design for commercial use

References:
- MATE ROV Competition
- Seaperch