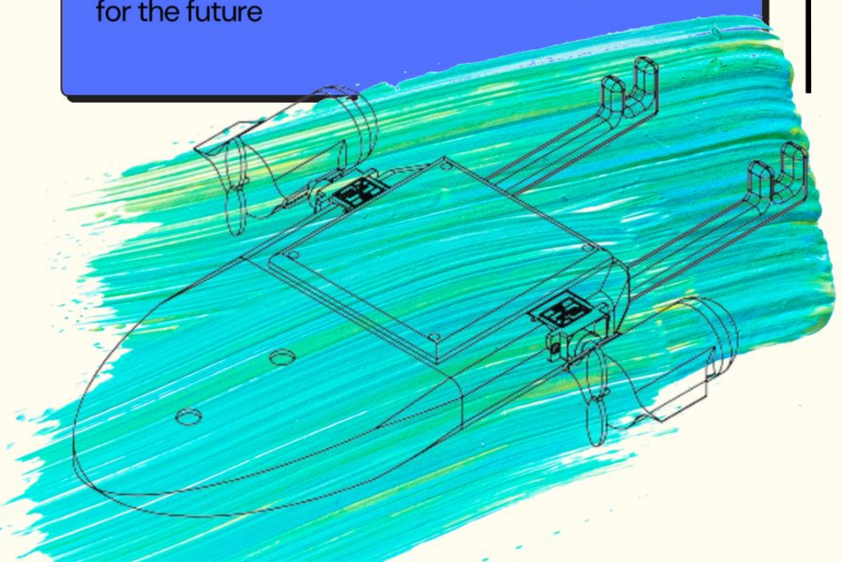
WATER MONKEYS ROV

Robotics Organization for the Community OC
Placentia, CA, USA

TACKLING THE OCEAN POLLUTION AND MARINE DEBRIS CRISIS

ABSTRACT

The keys issues that our ROV attempts to tackle is the global ocean pollution crisis. To aid in this crisis, the ROV is capable of maneuvering at a steadily and efficiently through areas inaccesible by humans to locate areas of trash. The ROV is able to pick up smaller pieces of trash in its areas, and collect data for larger areas through the camera and depth sensor for scientists to analyze. Simply put, the ROV can be used to identify locations with marine debris and rid of smaller marine debris. With our project we were able to get our prototype working, but need to work on waterproofing techniques for the future



BACKGROUND AND MOTIVE

Our team set out by evaluating the issues in the ocean, and tackle as many as possible with a portable and efficient ROV.

According to National Geographic:

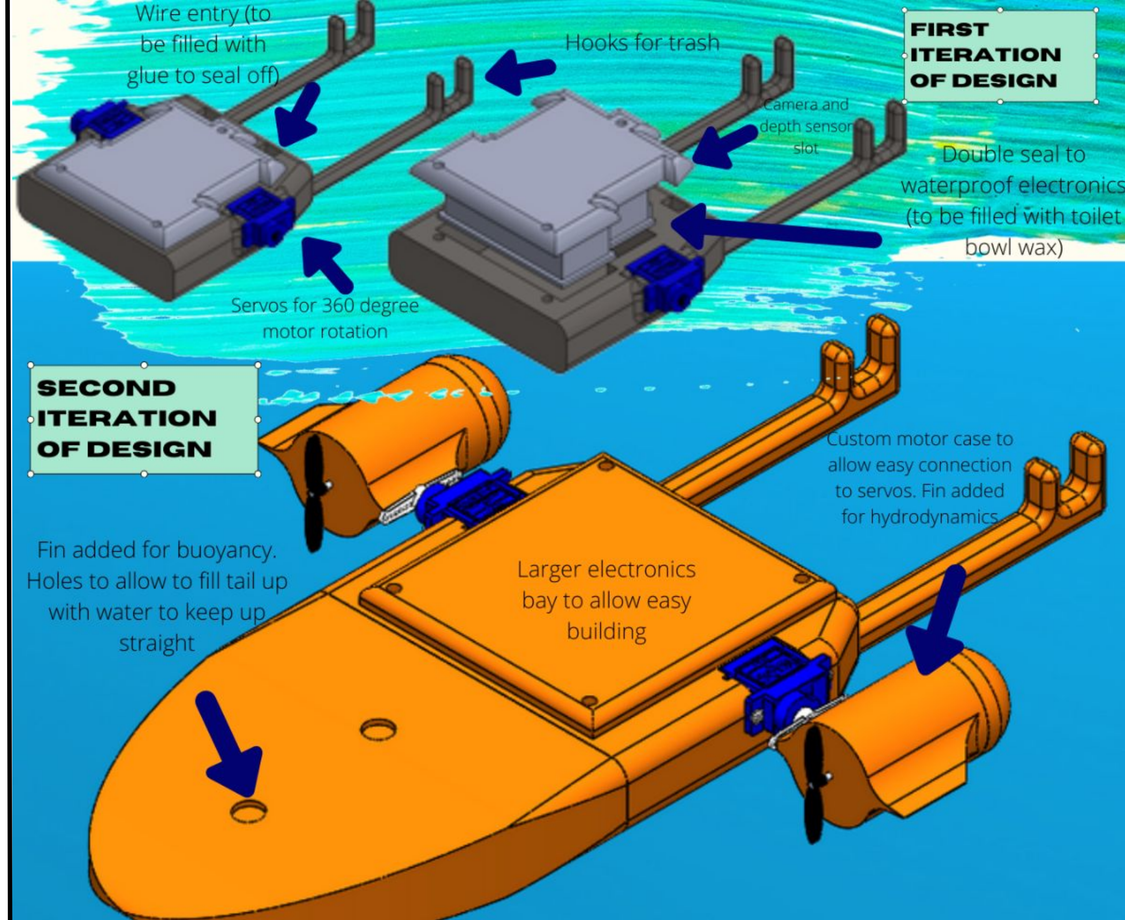
- sunken debris and ocean trash on the seafloor is a key issue
- about 70% of marine debris has been discovered residing on the seafloor beneath the garbage patch
- aerial drones have been used to identify big patches, but are unable to do so underwater
- scientists analyze areas of marine debris
- lots of trash becomes stuck in inaccesible caves and is harmful to the ocean ecosystem

RATIONAL AND APPROACH

After analyzing the issues of the ocean, we decided to set out to create a Design Specification for things we wanted our ROV to achieve . We decided we wanted to help scientists in their identification and research process, as well as be able to collect smaller marine debris.

DESIGN SPEC

- easy maneuverability
- stable movement
- compact and portable
- able to pick up small marine debris
- collect data in excursion through camera and sensors



TESTING

Weight	Depth (from pool surface in a 6ft deep pool)
¼ oz	4 in
½ oz	2 ft 8 in
1 oz	3 ft 2 in
1 ½ oz	4 ft 5 in
2 oz	6 ft (touch pool floor)

The ROV was initially positively buoyant so we tested different fishing weights on the ROV. We decided to use 1 oz of weights because the depth was closest to half of the pool depth, which we decided would mean it is neutrally buoyant.

Electronics

For the short time we were able to test, the electronics and the propulsion system worked well. With trial and error we adjusted the PID of the flight controller to 300% weight. What we tested here was the best turn radius for the servos.

The camera was also functional and picked up good footage for navigation. We think it would be effective to be used by scientists.

⚠ Key Issues ⚠

However we would soon face a problem that we did not anticipate with the waterproofing. Because 3D Printing prints parts with air inside, the water began seeping into the plastic lid and filling it up, eventually seeping into our electronics compartment. Unfortunately, his would wrap up our testing and lead us to planning for the future.

NEXT STEPS

We would like to further iterate this design, but work on solutions to waterproof the electronics. Possible solutions we will test include:

- printing the lid with 100% Infill (no air pockets)
- Using a watertight electronics enclosure
- Using a watertight pipe

We will pick up this ROV design soon in the summer and are excited to continue.