Project Ocean Patrol

The Riveters

Navarre High School

Navarre, Florida, United States

Abstract

Our high school is located five minutes from Navarre Beach. A lot of the things we do are influenced by our proximity to the beach and all of its wildlife and beauty. We realized, with the help of a friend, that our ROV could be used to benefit the beautiful beach that is right in our backyard.

Our ROV can be upgraded to expand its current capabilities. We would like to improve our design by adding certain advancements that would allow our ROV to collect data on things such as coral reefs and underwater wildlife. We also found ways that our ROV would be able to scan its surrounding for trash and be able to help clean said item. This would improve our original design because it allows drivers to see where trash pockets are located while collecting population data on plant and animal species in the community.

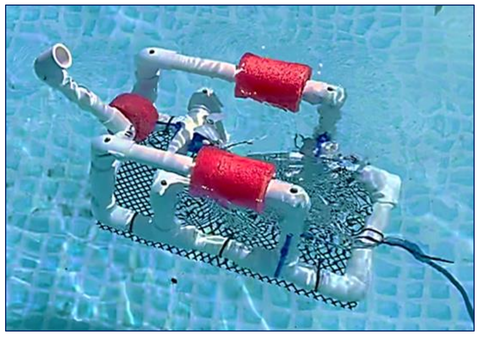
We selected this project in a very interesting way. We were volunteering at an event, called Autism Odyssea, and someone saw we had a little robot built from a kit and came over to talk to us. We started telling him about the other things we do, such as our SeaPerch ROV, and he started telling us about how our ROV could do so much more, such as fish watching, and act like a look out for dangerous ocean wildlife such as sharks. This man, Malcolm as we came to know, helped us look past our current ROV designs and applications.

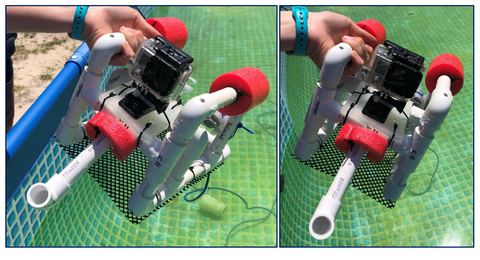
Background & Motivation

Talking to Malcolm helped us realize that there are many more applications for our ROV. We discussed further in detail certain aspects of our ROV that we would change to improve our ROV's capabilities. With certain advances, our ROV could be able to collect up – close observational data from wildlife mankind has deemed dangerous. This ROV will be capable of collecting and helping dispose of garbage. Our ROV, which we named Johnathan, could also be programmed to help collect certain types of information.

Johnathan, the name we gave our ROV, can aid in cleaning up our oceans without harming sea life.

Johnathan





Methodology

In terms of design, we would like to add extra components like an extra motor to make the arm capable of adjusting its angle underwater (which saves time), wireless motors, a camera to observe underwater items, like garbage and sea life.

One thing we had to take into account is that there is an AUV, which is similar to what we discussed and designed. An AUV is an autonomous underwater vehicle, whereas an ROV is a remotely operated vehicle.

Another aspect to change is the tether. During most of the driving, the tether was a struggle when it got tangled. With further research we discovered some pros and cons for a tethered ROV compared to a wireless ROV. These are listed in the chart below. In the end, we decided we would go for a wireless ROV.

With all of this in mind, the cost would be a lot with buying a camera, making it wireless and changing the motors, so most of our design is theoretical. However, we were able to borrow a GoPro to test our idea of adding a camera, which ended up working well.

Tether	Wireless
faster	May be slower
More reliable data transfer	Less reliable data transfer
May harm wildlife	Less harmful to wildlife
Cant go too far	Can go farther, but could possibly get lost
Conclusion: wireless	

Results & Discussion

We added a platform to hold the camera and tested it underwater. This method worked extremely well when we put it into practice because it gave us a clear picture of everything going on under the water. We have also discovered programs that check on the artificial coral reef on the beach. We could work with them to use our modified ROV in the ocean.

Next Steps

We would use our upgraded Johnathan to check the artificial reefs on Navarre Beach. We could use the camera to check for important species to be sure the ecosystem is healthy. We could also collect trash that we find to keep the area clean. We would call these checks "Reef Checks". We could do this with the help of the marine science sanctuary, an organization on Navarre Beach that works to educate others about marine life. We also would like to attach a microplastics collection container so we could collect microplastics while we are doing Reef Checks

Links to a video of our ROV driving with a camera attached and a video from the attached camera:
https://photos.app.goo.gl/Hgc99rpcYYEuikSq8
https://photos.app.goo.gl/37QN8wnt8AxT9ZhE6

Conclusion

Johnathan will be capable of doing so much for our community. Johnathan can help pick up far to reach trash, and has also taught our team, and our class so much about some of the world's current science problems and how they tie into the world beyond science, ranging from pollution in our waterways to laws put in place because of it. This opportunity has taught us that we are capable of much more than we thought.

Acknowledgements

We would like to thank Navarre High School for allowing us an opportunity to compete in SeaPerch, Ms. McConnell for mentoring us along the way, all the judges and people who put their time into allowing us such an opportunity, and Malcolm for helping us realize that there is so much more our ROV can be capable of. Finally, we would like to thank the Navarre Beach Marine Sanctuary for the inspiration for Reef Checks.

https://navarrebeachmarinesanctuary.org

They make all the work we do possible!