Aquapod: A Tumbling Amphibious Robot for Environmental Monitoring
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Introduction
Maintaining high mobility in small robots is a difficult challenge. Tumbling is an unexplored method of locomotion that has the potential to offer a high mobility-to-size ratio. By actively involving the body of the robot it can scale larger obstacles and traverse more dynamic terrain in comparison to a similar sized wheeled robot.

This iteration of the Aquapod was built to explore the marshlands of the Gulf Coast after the Deepwater Horizon oil disaster. A specifically designed sensor suite and water sampler pack will allow the robot to look for oil contaminants in areas that are difficult or dangerous to get to in person.

The Aquapod System
All the components on the outside of the Aquapod were carefully designed or modified from stock products to withstand a hydrostatic pressure of 10m of water. This will allow the Aquapod to dive and collect samples near the bottom of most small lakes and streams.

Buoyancy Control Unit
The Aquapod is equipped with an internal buoyancy control unit that allows it to sink or float in water. A peristaltic pump brings in water from the environment, increasing the overall density to the point of sinking.

Water Sampler
One of the modular backpacks that was designed for the Aquapod is the water sampler. Modelled after Van Dorn bottles, the two servo tubes can collect small samples of water at a specified depth for further analysis later on.

Future Work/Conclusion
The goal of the Aquapod is to be used for environmental monitoring as a team of robots working together with different sensor suites. The current iteration was designed to be tested in the Gulf Coast marshlands. Knowledge gained from these tests, in addition to the on-going research in path planning with eventually allow these tumbling robots to be used autonomously in the field for long-term monitoring.

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