Designing A Technological Efficient ROV (Remotely Operated Vehicle) to Monitor Non-Point Source Pollution in Rivers and Estuaries

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The purpose of this project was to design a Remotely Operated Vehicle (ROV) prototype that has active control capability that efficiently stabilizes rolling motion while in flight and can monitor the pressing issue of nonpoint source pollution facing estuaries, rivers, and streams linked to the Chesapeake Bay watershed. In addition, the project sought to create an efficient ROV that could measure for different pollutants underwater at various depth levels. The experimental procedure included designing the ROV based on the slim hydrodynamic shape of the Humboldt Squid (Dosidicus gigas). Once the ROV was developed, the speed and velocity was calculated. The ROV was tested in the Patuxent River at St. Leonard, Maryland. Additionally, preliminary water quality test were conducted for the non-point source pollutants in the water. The results of the experimental data supports the hypothesis: if the ROV is designed at a speed of 5 to 10 knots, a mass of 4kg (this mass was between 20-40 percent greater than the displacement of water and its center of buoyancy), then the ROV is capable of stabilizing rolling motion at certain depths in water and would allow for instrumentation to be added to ROV for water quality data collection. Instrumentation used in this study included: a TFT color monitor camera and a YSI 85 probe that measured dissolved oxygen, conductivity, salinity, and temperature of water in the Patuxent River.

Awards Won: