An Amphibious Teleoperated Vehicle Designed to Collect Water Samples in Remote and Hazardous Environments

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This research project endeavors to create an amphibious, teleoperated robotic vehicle capable of navigating aquatic and terrestrial environments that are potentially hazardous to humans, and also taking samples of water at points designated by the operator. The vehicle will be able to respond quickly to emergency situations, and also have the platform stability to provide reliable sampling collection in a frame rugged enough to handle challenging environments. As stated above, the vehicle targets aquatic areas potentially hazardous to humans, including areas affected by oil or chemical spills, algal blooms, and high levels of radiation. The vehicle will be inexpensive to manufacture due to the setting that it is being developed in, and ultimately attempts to make remote sampling technology plausible for water quality research and data collection. The design will have several subsystems, including a drivetrain for terrestrial and aquatic locomotion, an extrusion-type deployment mechanism for the water sampling probe, two pumps and an H-Bridge circuit for controlling pumping of water into syringes for sampling, a camera and data link for remote operation, and a temperature probe. Extensive testing has not been conducted due to the timeframe of the project, but testing has been conducted on the pump, drivetrain, data link and camera subsystems. A prototype chassis has also been constructed to qualitatively test integration. Continued testing is necessary to determine if the full system functions in such a way that it satisfies the aforementioned goals of operating in areas affected by algal blooms, chemical spills, and radiation.

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