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Design of an Underwater Remotely Operated Vehicle (ROV)

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Abstract

Underwater Remotely Operated Vehicles (ROVs) are robots controlled by an operator on the surface. These robots are tethered enclosing a set of wires that provide the communication link between the ROV and the operator and provide power for its operation. There is no other practical, safe, and economically feasible way to perform deep underwater work or underwater intervention, as it is called in the industry. Underwater ROVs are useful because they can accomplish tasks that are dangerous, uncomfortable, or tedious for humans to perform. Some laborious tasks, such as research in commercial, military, and scientific fields under sea for surveying and collecting visual acoustic images, are better accomplished by ROVs. By removing the human presence, and giving the vehicles a degree of autonomy, the effectiveness of the ROVs can be greatly increased. One measure of advantage is cost effectiveness. An ROV that can do twice the work of a human diver is difficult to sell to end-users, if the total cost of the operation is ten times that of a diver. In our project, we present model-based analysis and synthesis applied to the dynamics, guidance, and control of an underwater ROV. The vehicle dynamics is one of the most important concerns in designing and developing an ROV, while the guidance and control are the key issues in achieving the desired vehicle performance. As far as we are aware there is no such underwater ROV designs developed in Sri Lanka. In this project we intend to study the design and development of the ROV. This designed underwater ROV travels balanced and smoothly more than 10m depth and to visualize the undersea environment.The total cost of the developed ROV was approximately LKR 60,000 (US$ 500). The intended application is coral reef observation.

Keywords: *Balance movements, Computer Aided Design (CAD), Electronics, Mechanical structure, Robotics, Sensors, Software design*