

Low- Cost Submarine Design for Subsurface Underwater Surveillance and Monitoring

Syed Usaid

Student, Department of Mechanical Engineering, BMSCE, Bangalore, India

Atithya Narayanan*

Student, Department of Mechanical Engineering, BMSCE, Bangalore, India

Yuvika Appaiah

Student, Department of Mechanical Engineering, BMSCE, Bangalore, India

Dr. Ram Rohit V

Associate Professor, Department of Mechanical Engineering, BMSCE, Bangalore, India

Abstract:

This paper presents an affordable Remotely Operated Vehicle (ROV) concept designed for underwater surveillance and environmental data logging. The primary objective of this project is to create an aquatic platform that stays accessible while executing tasks usually restricted to more advanced or prohibitively expensive autonomous systems. By drastically cutting material and production costs, this design aims to eliminate the financial hurdles frequently faced by smaller academic groups and institutions requiring practical marine research tools. A budget-friendly Marine Autonomous Tethered Vehicle

Explorer provides an economical approach for executing underwater monitoring and surveillance in shallow waters, constructed at approximately ₹20,000 utilizing a modular setup and low-cost hardware. Beyond affordability, these designs facilitate faster prototype revision cycles that are particularly beneficial when responding to changing marine research demands. These vehicles also offer the adaptability to host custom scientific payloads, allowing for the collection of specific environmental data that would otherwise demand expensive instrumentation.

By reducing economic and technical hurdles, this strategy expands participation in marine science by allowing diverse research groups - even those with restricted funding to conduct ongoing environmental observations. The paper describes the structural arrangement, component selections, and core low-cost engineering methods utilized to build this accessible ROV framework.

Keywords:

Environmental monitoring, Low-cost marine technology, Modular payload architecture, Remotely Operated Vehicle (ROV), Underwater inspection.