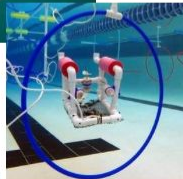
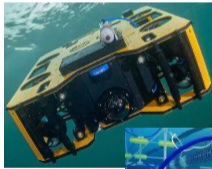


Abstract/Project Overview:

Underwater robotics is an important real-world innovation that helps humans explore and protect oceans, lakes, and many other bodies of water. It is a powerful real-world innovation that allows humans to explore, study, and protect environments that would otherwise be difficult or dangerous to reach.

Programs-

While students in programs like SeaPerch introduce the basics of this technology, underwater robots. They also known as remotely operated vehicles (ROVs).



What are they used for?

ROVs are commonly used to study marine ecosystems, monitor pollution, inspect underwater structures like bridges and pipelines, and assist in rescue or recovery missions. These robots are controlled remotely through cables or wireless systems and may include cameras, sensors, or tools to complete tasks. The goal is to create a machine that can operate efficiently in challenging underwater environments.

Which are used in worldwide industries such as science, engineering, environmental

protection, and the military. As oceans cover over 70% of the Earth, underwater robotics plays a very critical role in helping us learn and understand our planet. This innovation not only improves safety and efficiency but also opens new opportunities for discovery and problem-solving in real world situations.



Design Approach/Methodology:

Add The design of underwater robots focuses on creating a machine that can move efficiently, remain stable, and function reliably in harsh underwater conditions.

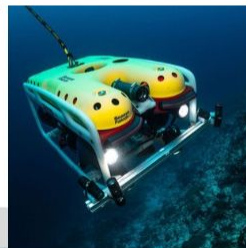
Engineers begin by identifying the robot's purpose, such as exploration, inspection, or data collection.

From there, they design the structure using durable, waterproof materials that can withstand pressure and corrosion.

A key part of the design is buoyancy, which determines whether the robot floats, sinks, or stays neutrally balanced in the water. This is

adjusted using weights and flotation materials. Motors and propellers are added to control movement in multiple directions, allowing the robot to navigate through water smoothly. The robot is typically connected to a controller through a tether, which provides power and allows the operator to guide it from the surface.

Modern underwater robots may also include cameras, lights, and sensors to capture images, measure temperature, or detect chemicals in the water. Engineers test their designs in pools or controlled environments, analyze performance, and make improvements to increase efficiency and reliability. This process of building, testing, and redesigning is essential to creating successful underwater technology.



Results + Discussion:

Underwater robotics has had a significant impact across many real-world fields. In engineering, ROVs are used to inspect underwater structures such as oil rigs, pipelines, and bridges, helping detect damage early and prevent costly or dangerous failures.

In environmental science, these robots collect important data about ocean conditions, marine life, and pollution levels, which helps scientists understand and protect ecosystems.

Additionally, underwater robots are used in search and recovery missions, such as locating lost objects or assisting in rescue operations after

accidents. Because they can operate in deep or hazardous environments, they reduce the need for human divers and greatly improve safety. In the military, they are used for tasks like underwater surveillance and mine detection. Overall, underwater robotics

continues to grow as technology advances. It not only improves our ability to explore and protect the underwater world but also inspires innovation and future careers in STEM fields. As more students and engineers develop these technologies, underwater robots will become even more important in solving global challenges and expanding human knowledge.

