

# Design and Development of Underwater ROV

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**Abstract**— Remote operated underwater vehicle is our project which swims underwater. Our project is tethered by various wires for sending the signal to the Remote operated vehicle. Our project is also equipped with the lights, propulsion and camera feed. Other components like manipulator, sensors, distance measuring instruments, LEDs, etc. are also included.

**Keywords**—tethered, wires, signal, lights, propulsion, camera feed, components, etc.

## I. INTRODUCTION

Remotely Operated Vehicles are mostly used in the range of underwater applications including off-shore oil & gas, aqua-culture, studies scientific & in defence, usually for the inspection activities. In case to find the solutions for the requirements for this activities & also use underwater efficiently, the vehicles may need certain navigation & control-systems to make the vehicle to move and maintain the readings with bit effort from the user. A remote operated underwater vehicle is a tethered underwater mobile device commonly called a underwater robot. It will consist of a PVC pipe on frame in order to provide necessary buoyancy to perform variety of tasks with ease. The bottom accommodates variety of sensors and other packages. The propellers are placed at sideways to maintain the stability of the robot in maneuvers. Propellers are usually placed in a balanced configuration to provide the most precise control possible. The electrical components will be placed in water tight compartments to protect them from corrosion and being crushed by the water pressure exerted on the ROV.

## II. ACTUAL DESIGN

We are using composite material instead of a metal for development of frame as for smooth diving operation. Our composites for the material will contribute good bouyancy readings & its specifications, hence can make the under-water things complex for the detection with the help of system identification. We are using the current technology in order to develop and operate the underwater vehicle. The shape of our vehicle will be in the shape of a rectangular seal, which will be blocked from cap.

## III. WORKING OF UNDERWATER ROV

The vehicle uses motors for propulsion & a separate motor for the directional control. Both the motors are attached with propellers to achieve this task. Such mechanism will make the use of a unique rudderless mechanism which further uses motor drives to control the movement of the ROV. This mechanism will not make the use of loaded tanks to control buoyancy. The vehicle is consisting motors to provide front

drive & also for the left right direction control. The motor is also used to control the vertical alignment of the vehicle. All the motors & controller unit will be enclosed in a water-proof chamber. The vehicle also uses a camera to capture various footages underwater. These footages are transmitted to the floating buoyancy unit from there user which can be connected via cable to check the footages. The system makes the use of a raspberry pi controller for footage transfer.

## IV. DESIGN OF UNDERWATER ROV

The pressure is surrounded by the hydro-dynamic shape & is therefore much less chances for failing due to the pressure of hydrostatic. This rectangular shape for our project is a better body area which will avoid various effects of the hydro-static pressure. This type of shape is easily blocked, far good than the triangular shape of similar size. Our ROV will have the two ends & the crew members if required for the movement.

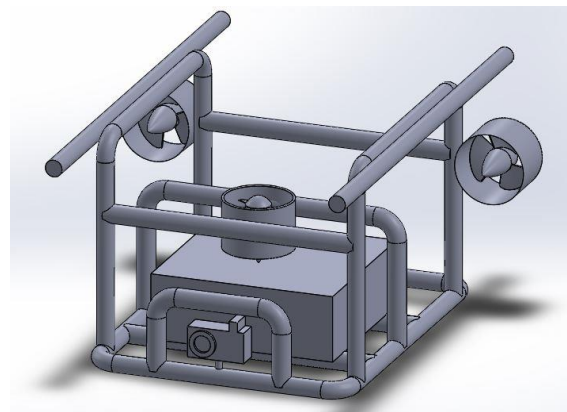


Fig. 1 Actual Design of Underwater ROV

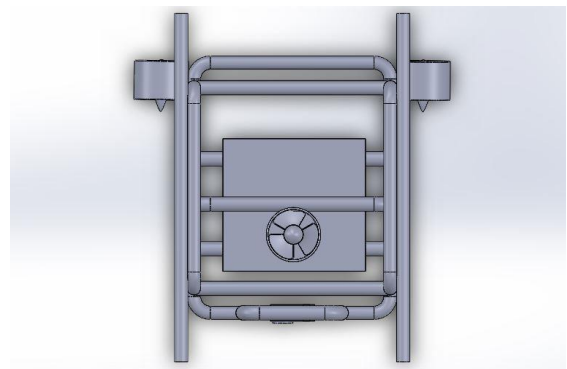


Fig. 2 Top view of Underwater ROV

## V. CONCLUSION

The Underwater ROV is able to carry out ascent, descent, translational and rotational movements on the three axes in order to seize images on video graphic. Thus, the development of the underwater remote operated vehicle and the chassis is successfully assembled.

Table 1 List of Components of Underwater ROV

Sr. No	COMPONENT	FUNCTIONALITY
1.	LED	Light provides illumination for the camera underwater
2.	THRUSTERS	Used to maneuver the vehicle and to provide movement
3.	CAMERA	To provide an image from underwater
4.	TETHER	Carries electrical signals to the surface
5.	FRAME	Provides a structure to attach all components together
6.	ARDUINO	Controlling and operating sensors used in the vehicle
7.	MOTOR	To provide power to all the electrical components of the vehicle
8.	ADAPTER	Converts attributes of one system to those of other system
9.	MOTOR DRIVER	It acts as the interface between the motors and control circuits
10.	PUSH BUTTON	It acts as a switch mechanism to control all the processes
11.	REMOTE CONTROL	Controlling the vehicles for physical interface

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