Impact Factor Value 4.046 **e-ISSN: 2456-3463**
National Conference on "Recent Advances in Engineering and Technology" SAMMANTRANA 19
Organized by Government College of Engineering, Nagpur
International Journal of Innovations in Engineering and Science, Vol 4 No.8, 2019
www.ijies.net

Review On Design And Fabrication of Prototype of Underwater ROV

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Abstract- *This paper gives the concept of design development of prototype of underwater ROV based on remotely operated vehicle technology. ROV is one of the unmanned underwater vehicle tethered with cable and remotely operated by vehicle operators. Control system of ROV is bit complex because of unknown non-linear hydrodynamic effect parameters uncertainties and lack of precise model of the ROV dynamics and parameters*
ROV technology is mainly used in aerial drone and some robotics equipments. Drone system is used for spying operations, photographical works, surveillance etc.
We used same phenomenon for underwater operation such as aquaculture, hull inspection, fuel tank inspection, military mission.

1. INTRODUCTION

An underwater remotely operated vehicle (Underwater Drone) is a mobile robot design for aquatic work environment .This remote control vehicle operates in lake, ponds, well, etc. It is constructed basically by leak proof material like carbon fiber ,thin aluminum sheet .It contains one camera with two LED lamp for better visualization .It contain different brushless D.C motor according to power required to move the Underwater Drone inside the water.

During deep water the pressure get increases continuously so the design of Underwater Drone is based on submarine which help to distribute pressure on a whole body of Underwater Drone.

The propellers are used to move the Underwater Drone inside the water. The design of propeller is constructed with specific angle and the propeller is fitted in round cylinder with brushless motor shaft .The cylinder use the specific amount of water to the propeller because of this maximum energy is use to move the drone. It contain GPS to track the location of drone

The material well be used in the Underwater Drone are made up from aluminum and using some electronic components. The propeller are made from alloy copper material

The use of this project based on small robotic vehicles is now widespread in engineering curricula. In contrast, the underwater environment presents unique design challenges and opportunities. The wire guided Underwater Drone project describe a below relatively in expensive to implement. The built controller for the LEGO motors and evolves their design In to Underwater Drone, Underwater vehicles controlled remotely by a human operator via connecting wire

The Underwater Drone can reach areas out of diver's range, while the computerized graphic controller allows the operator, By means of video camera within Underwater Drone.

The Underwater Drone is design to develop three main submarine tasks inspection, repair and maintenance.

1. PROBLEM STATEMENT

We select this project for ease in underwater operation to find out some accidental object like parts of vehicle, crash aero planes, and ships inside the water during any natural disaster.

To study aquatic environment like different species of aquatic animal and plant.

For inspection of hull to reduce the effort of divers.

For surveillance to keep eye on terrorist activity.

OBJECTIVE

Rescue Operation -underwater drone introduced to rescue operation to find out misplace bodies during floods also used to search destroyed accidental part such as aero plane, ships, etc.

Infrastructure maintenance, Municipalities and service companies use the ROV's underwater remote camera to perform frequent inspections of storm water/drain pipes, water tank, sewer pipes.

To perform underwater operation and inspection in crucial area with the help of underwater drone.

1. CONSTRUCTION AND WORKING PRINCIPAL

Main component

MOTOR:

To assure the proper movement of the ROV inside the water powerful brushless motors were used. The main reason why brushless motors were used is that they can work inside the water without any problem and they do not have to be waterproofed. Brushless motors are suitable for working underwater since they do not have contacts, and they are powered by the stationary coils. The stationary coils are powered by an AC signal to spin the casing containing the magnets. So there is nothing for the water to interfere with electrically speaking (assuming the wiring is all insulated).All brushless motors are rated in KVs.

ESC (Electronic Speed Controller):

As per the name of this component it is used to control the speed of brushless dc motor. IN order to increase the speed of motor the ESC must provide more voltage than before. By increasing the output current of Esc user can achieve higher torque value. Esc have two cable for power (positive and negative).Another feature of ECs have is that user is able to change the direction of the motor by reversing the polarity.

1. APPLICATION

Infrastructure maintenance: - municipalities and service companies' can use the ROV's underwater remote camera to perform frequent inspections of storm water/drain pipes, water tank, sewer pipes.

Photography: - It use for underwater photography. It is use to capture inner beauty of oceans, lakes, etc.

Search and rescue: - underwater drone introduced to rescue operation to find out misplace bodies during floods, also used to search destroyed accidental parts of aero plane, ships, etc.

Aquaculture – To observe the health of aquatic animal by Inspection this is useful for fisherman.

Hull infection:- Using the camera on our remote control LED underwater vehicles to perform hull inspection provides a cost effective preventive maintenance step can detect signs of minor hull damage before it become a serious issue.

Military missions: - Underwater ROV can be used to keep an eye or spying work which can be useful for military purpose.

2. FUTURE SCOPE

- Sensors are used in underwater ROV, which sensing water temperature.
- GPS can used to navigate the underwater ROV in which position.
- Hydraulic arm are used to underwater welding.
- Robotics hands are used to pick up unwanted particle or environmental hazardous present in water to throughout side water resource.
- Further ROV can be constructed for dual purpose i.e. (aerial as well as underwater operations).

3. CONCLUSION

In this paper, we focused on the design of low cost controller. The motherboard of robot for easy and wired controlling. There was some challenge to make every parts of this robot waterproof. One of the master side is the robot is constructed by local parts instead of ready robotic kits such as thrusters, ESCs, wired remote controller. Currently, our team is working for enlarging the range of robot and minimizes the size of the structure. We also planned to change the shape of mechanical structure into cylindrical for better stability and fast movement. We are going to have an experimental drive in the swimming pool, Pond to observe Aquatic environment and take data, images and videos.

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