DEEP WATER
Marine Corps

May, 2023

IDEA
PROPOSAL

AUV

AUTONOMOUS UNDERWATER VEHICLE

ABOUT US

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ABOUT THE IDEA

Water covers about 3/4th of the earth's surface, leaving us with only a small portion accessible. With the accelerated depletion of already available resources, there is a need to discover better resources that help maintain the sustainability of resources. 71% of the earth not accessed by us also implies that that much parts of the world is yet to be explored by humanity. This leaves us with the need for exploring and researching the never ending water bodied regions.

Why AUVs?

Understanding the ocean Environment

The ocean is a vast and largely unexplored environment, and underwater exploration can help to uncover new species and ecosystems that were previously unknown. Understanding the complex interactions between different species and their environment is crucial for the management and conservation of marine ecosystems, as well as for the development of new medicines and biotechnologies.

Discovery & development of underwater resources

The ocean floor is rich in mineral and energy resources such as oil, gas, and rare metals. Underwater exploration can help to identify new resource deposits and develop new technologies for their extraction. The development of sustainable & responsible mining practices can help to reduce the impact on the marine environment & ensure the long-term viability of these resources.

Studying climate change & it's impact on the oceans

The ocean plays a critical role in regulating the Earth's climate and absorbing carbon dioxide from the atmosphere. Understanding the impacts of climate change on the oceans and their ecosystems is essential for developing strategies to mitigate its effects. Underwater exploration can help to collect data on ocean temperature, salinity, and other parameters that are critical for climate modeling and prediction.

Development of new technologies & innovations

The ocean environment poses unique challenges, such as high pressure, low visibility, and extreme temperatures, that require the development of specialized technologies. Underwater exploration can help to drive innovation in fields such as robotics, materials science, and energy storage, with applications that extend far beyond the ocean environment

DEEP WATER MARINE CLUB

From :

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April 7, 2022

To :

Dr. Anantha Narayanan V.
School of Computing,
Coimbatore

We are writing this letter to request your permission and funding support for an exciting new Internet of Things (IoT) project that we are developing, called AUV (Autonomous Underwater Vehicle).

As you know, IoT is a rapidly growing field, with enormous potential for innovation and advancement across many different industries. Our AUV project aims to leverage the power of IoT to develop a fully autonomous underwater vehicle that can perform a wide range of tasks, from underwater exploration and data collection to environmental monitoring and more.

However, as you are aware, developing such a complex system requires a significant amount of resources, both in terms of equipment and funding. That is why we are reaching out to you, to request your support in providing us with the necessary permissions and funding to bring this project to life.

We believe that AUV has the potential to be a game-changer in the field of underwater technology, and we are excited to begin working on this project as soon as possible. With your help, we can make this vision a reality and contribute to the advancement of the IoT field.

Thank you for your time and consideration. We look forward to hearing from you soon.
Sincerely,

Giri Prasath R

Jegadit S Saravanan

Nithish USR

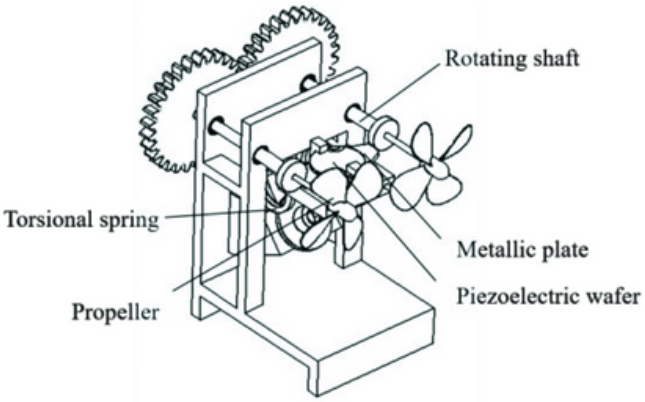
ESTIMATED BUDGET

DESCRIPTION: Budget estimate for building a full real world industrial level AUV

DESCRIPTION	AMOUNT
Arduino,ESP32 (Mega, ESP32)	₹5000
Raspberry PI (Model 4)	₹7000
Temperature Sensor (DS18B20)	₹300
Pressure Sensor (Gravity Analog Water Pressure Sensor)	₹3000
Ph Sensor (Gravity: Analog pH meter/sensor)	₹2500
Water Quality Sensor (Turbidity Sensor)	₹1800
Communication Module	₹???
Batteries for controllers (4v/5v/6v lead acid battery)	₹5000
Batteries for turbines (12v/24v lead acid battery)	₹15000
Underwater Camera	₹???
Motors-Turbines & ESCs (T200 Thruster) x1 //need 3	₹20000
GPS module (NEO-6M GPS Receiver Module)	₹700
Sonar	₹40000
Misc. (Wires/cables, Pipes, Other hardware components)	₹700
TOTAL	**₹140,300+**

Misc

Research papers

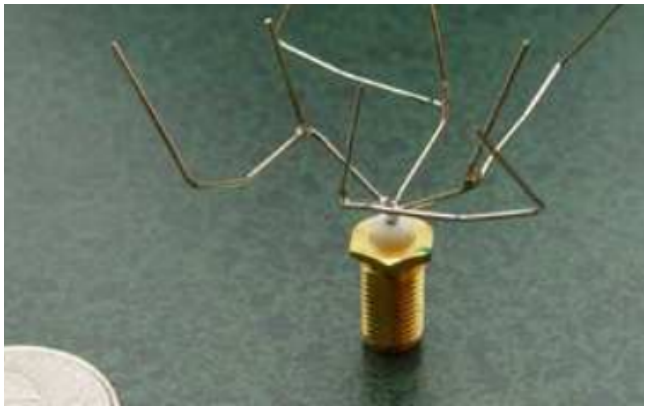


Turbine

Ultrasonic motor is an actuator driven by ultrasonic vibration, which has the characteristics of low electromagnetic interference, low noise, light weight and compact structure

Toroidal propeller

Toroid propellers are significantly quieter, and are more efficient than traditional propellers both in air and water.



Antenna built using GAs

Building efficient design of antenna for communication of data using evolutionary algorithm

Other usecases and sensors

- *Direct Drive PMSM motors combined with B-series propellers--63% effective*
- *Inline Thrusters: Lian 130e thruster -- highly efficient*
- MAIN THRUSTER: 300-W *nominal power thruster (a Seaeye* SI-MCT01-B)
- LATERAL THRUSTER: *Seabotix* BTD150
- *Water Conductivity Sensor, Attitude and heading reference system, inclinometer, GPS & Compass*
- GEOMAR AUV ANTON (*Girona* 500)