Team AUV-IITK

About the Team

The oceans are unexplored mystic areas, and humanity has always tried to master the seas since ancient times. We are a team of undergraduate students researching in the field of marine robotics. The team started off in 2014, as the brainchild of a group of enthusiastic engineers. From a team with just an idea to create an impact on underwater robotics, we have grown into a family of over 40 members, through consistent dedication and hard work. We have successfully designed and manufactured two robust autonomous underwater vehicles, namely, Varun and Anahita. These machines are capable of navigating in unknown environments, performing acoustic localization, and identifying objects using computer vision.

Longer Description

Over the past years, the team has witnessed a close collaboration between students from various departments coming and sharing ideas; creating a small yet strong network of people who are eagerly looking for a low-cost solution to large-scale problems. Using our primary vehicle, we can mount a wide variety of assemblies for research experimental purposes as well as for tasks assigned in various competitions.

To cater to these soaring requirements of technological innovations, the team strives to build something better and brilliant day by day. We have successfully manufactured two robust autonomous underwater vehicles, namely, Varun and Anahita. We have successfully developed a system capable of navigating in unknown environments, performing acoustic localisation and identifying objects using computer vision.

AUV-IITK has bagged the position of first runner-up in NIOT-SAVe twice, aided by Varun in the year 2016 followed by Anahita in the year 2019. In the year 2018, our paper titled ''Design and Development of Underwater Vehicle: ANAHITA'' was selected for poster presentation in IEEE OES Autonomous underwater Vehicle Symposium held at the University of Porto, Portugal. To add to our achievements, we were the only team of undergraduates as well as the only team from India to be invited to the symposium. Anahita became our first vehicle to participate in the international Robosub Competition, for the first time.

In the future, we are working to collaborate with The Centre for Ganga River Basin Management and Studies (cGanga) for research in environmental fields. On the competition side, we will be aiming at Robosub 2020 and NIOT-SAVe 2021.

Technical Details

Name	ANAHITA
Degrees of Freedom:	6
Number of Thrusters:	8
Weight	32 Kg
Buoyancy	+1%
Dimensions (in cms)	85*35*53 (cm x cm x cm)
Sensors	Camera (IDS Germany), IMU (xsens), DVL (Teledyne Pathfinder), Pressure Sensor, Hydrophones,
Endurance	3 Hours
Production Cost	23 Lakhs
Drag Coefficient (0.6m/s)	0.12

Marine Robotics

Spawned by fast-paced progress in marine science and technology, the past two decades have witnessed a growing interest in ocean exploration and exploitation for scientific and commercial purposes.
The development of technological products for the maritime and offshore industries, and a host of other activities in which the marine environment takes center stage. In this context, marine robotics has steadily emerged as a critical enabling technology for the execution of increasingly complex and challenging missions at sea. Intensive research and development in this field have led to significant advances and shown the effectiveness and reliability of marine robotics solutions in several domains unequivocally.

Future Prospects

1. **Swarm systems** - Multiple collaborative robots working together to perform a specific task.
   Application: Oil collection system that consists of a swarm of nanotechnology vehicles that communicate their location wirelessly and can work continuously without human support.

2. **Autonomous chemical effluent tracking**: AUVs can be equipped with sensors capable of tracking the concentration of chemicals.
   Application: Can be used to monitor the pollution levels in the rivers in industrial areas.

3. **Ship maintenance tasks**: Autonomous vehicles can enable the proactive grooming of a ship, that allows a ship's hull to be operated in a clean state. Clean hulls operate more efficiently,

4. **Convertible Aerial to Underwater Vehicle:** Autonomous vehicle that can perform task in both aerial and underwater environment.
   Application: Can be used in rescue missions.