



Retreat

Retreat

Evolution

Drones

Underwater
Vehicles

Research to
market

Collaboration

From Ideas to Impact: Research, Prototyping, and Innovation in Core Engineering

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Outline

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① Evolution

② Drones

③ Underwater Vehicles

④ Research to market

⑤ Collaboration



Evolution of Autonomous Vehicles at GITAM

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Drones



2023



2024



2025



2026

Underwater Vehicles



2023



2024



2025



2026



What is a Drone?

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Definition

A **Drone** or **Unmanned Aerial Vehicle (UAV)** is an aircraft that operates without an onboard human pilot. It can be remotely piloted, fully autonomous, or operate in a hybrid mode using onboard sensors, navigation algorithms, and wireless communication.

Key Features

- Autonomous or remote operation
- GPS/INS-based navigation
- Onboard sensors and cameras
- Real-time data acquisition
- Cost-effective and rapid deployment

Major Applications

- **Engineering:** Inspection, surveying, mapping, logistics
- **Agriculture:** Crop monitoring and precision spraying
- **Environment:** Air quality, wildlife and climate monitoring
- **Defence:** Surveillance



A Typical Drone

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Chronological Evolution of Drone Prototypes at GITAM

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2023

- Establishment of Drone vertical under the Centre for Autonomous Systems
- New course: *Fundamentals of Autonomous Vehicles (EECE 2191)*
- Development of a primitive prototype as part of summer internship

2024

- Formation of *CtoSKYAI Pvt. Ltd.*
- Development of an AI augmented drone prototype
- Demonstration of AI drone to CM of AP, and Aviation minister; and award

2025/26

- Development of agricultural drone
- Delivery drones
- **Granted Patent** on drones



Evolution of Drones at GITAM

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Underwater Vehicles: Overview and Applications

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Overview

- Underwater vehicles (ROVs/AUVs) perform exploration, inspection, and intervention below the water surface.
- They operate in environments that are inaccessible or hazardous for human divers.

Applications

- Marine research, offshore inspection, environmental monitoring, and aquaculture.
- Defence, underwater surveillance, search & rescue, and underwater infrastructure inspection.

Challenges

- No GPS, limited communication, and poor visibility.
- High pressure, ocean currents, and hydrodynamic drag.



Chronological Evolution of Underwater Vehicle Research at GITAM

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2022

- Establishment of UWV vertical under the Centre for Autonomous Systems
- New course: *Fundamentals of Autonomous Vehicles (EECE 2191)*
- Development of a primitive prototype as part of course work
- Grant received to study fault-tolerant aspects of underwater vehicles

2023

- Development of a more matured CPS-based underwater vehicle prototype
- Integrated into assignments and summer internship programs

2024

- Formation of *CtoSKYAI Pvt. Ltd.*
- Grant received to develop underwater vehicles for aquaculture applications

2025

- Development of rectangular box-shaped underwater vehicle prototype
- Grant received to develop UWVs for studying aquatic flora and fauna

2026

- Grant received to develop multi-sensor data fusion methods for defence vehicles; TRL 6 vehicle



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Figure: Prototype Developed as part of Summer Internship and EECE 2151



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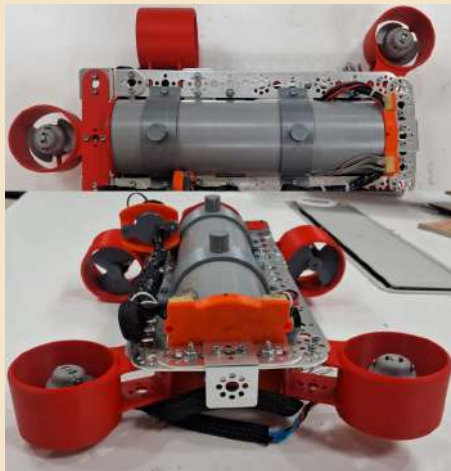


Figure: Prototype Developed as part of Summer Internship and EECE 2151 and for aquafarms



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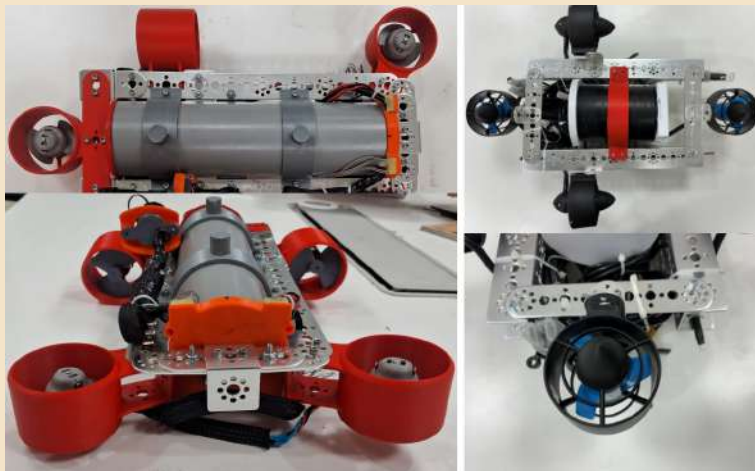


Figure: Prototype Developed as part of summer internship and for aquafarms



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Figure: Prototype to study fault tolerant mechanism



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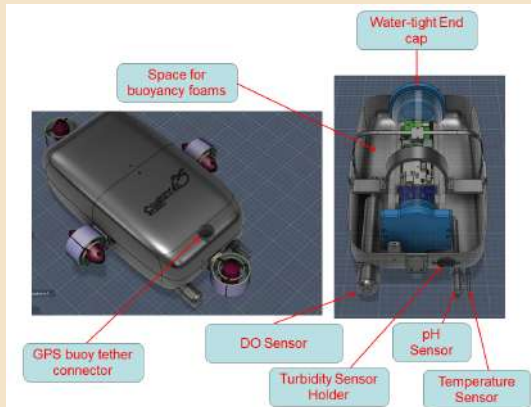
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Evolution of Underwater Vehicles at GITAM

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Commercialization Pipeline





Interdisciplinary Capstone Projects using Drones

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School of Sciences & Biotechnology

- Biodiversity assessment and wildlife monitoring
- Crop health, medicinal plant mapping and ecosystem analysis

School of Health Sciences

- Air quality and environmental health monitoring
- Emergency medical logistics and disaster response

School of Pharmacy

- Medicinal plant identification and plantation monitoring
- Drone-enabled pharmaceutical and vaccine delivery

Potential Funding Agencies

ANRF

DST

DBT

ICMR

ISRO



Interdisciplinary Capstone Projects using Underwater Vehicles

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School of Sciences & Biotechnology

- Water quality monitoring and pollution assessment
- Aquatic biodiversity and ecosystem monitoring

School of Health Sciences

- Water-borne disease surveillance
- Environmental health and sanitation monitoring

School of Pharmacy

- Detection of pharmaceutical contaminants in water
- AI-enabled water quality analytics for public health

Potential Funding Agencies

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DST

DBT

ICMR

MoES

BIRAC



Team

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