Project Nautilus

TEAM 016

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CIE COE EE AE 6 ME ICS

Introduction

The Nautilus Submarine Project aims to develop a compact, affordable, and autonomous underwater vehicle (AUV) with advanced sensors, AI/ML capabilities, and real-time data transmission. Designed for subsea inspection and environmental monitoring, it emphasizes minimal human intervention and robust performance in challenging marine conditions.

Submarine Control System Flow Chart

Specifications and constraints

Constraints: The AUV must not exceed 50 cm in any direction, The vehicle must operate reliably at depths of up to 3 meters, The AUV must be able to carry at least 0.5 kg of scientific equipment, All components must withstand operation in seawater with a salinity level of 40 g/dm, Total project cost must not exceed 10,000 SAR, The submarine must endure ambient underwater pressures of up to 50 kPa, The AUV design must maintain a drag coefficient between 0.2 and 0.4

Specification: Maximum weight: 7 kg (C), Maximum dimensions: 50 cm in all directions (C), Corrosion resistance: Less than 10 microns/year (C), Maximum speed: 2 knots (1 m/s) (C), Flow resistance tolerance: 1 knot (0.5 m/s) Maximum rise/fall speed: 1 knot (0.5 m/s), Operational duration: At least 1 hour on a single charge Environmental tolerance: Functional in turbidity levels up to 5 NTU and 0.1 lux, Image resolution: 12 MP, Data transfer rate: Greater than 1 Mbps (S), Communication range: Up to 10 meters AI model size: ≤ 7 MB (S)

Prototype Design

Thruster   Servos   Sealed Capsule
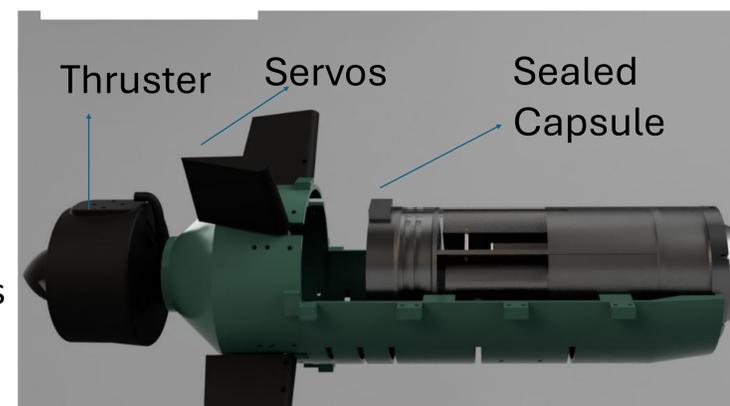
The aim of the prototype design is to have a protective Sealed Capsule that includes all electronic components and batteries, while keeping its hydrodynamic efficiency
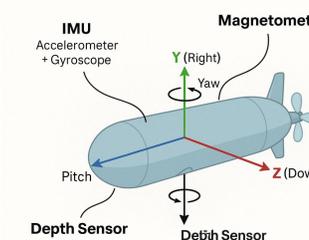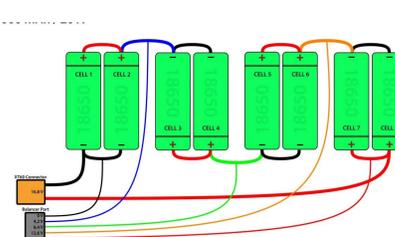
Subheading

• Dimensional And structural Specifications are met and proved in the shown Prototype Model. Operational Capability: the submarine can function for over 1 hour, exceeding the specification

12.3 MP Sony IMX500

Image Resolution is over 12MP

Location:	C:\Users\Abdullah\Downloads
Size:	6.23 MB (6,534,387 bytes)
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AI MODEL <7 MP

Conclusion

The Nautilus Submarine project delivered a compact, low-cost AUV prototype meeting key targets: 3 m depth, 3.1 kg weight, and a 10,000 SAR budget. It features integrated sensors, camera, sonar, and real-time control using Raspberry Pi and Pixhawk. Core functions were validated, with future improvements focused on communication and AI-based autonomy.