Real-Time Autonomous Underwater Navigation & Mapping

Breif Background

Oceans remain largely unexplored due to challenges like limited human access, high pressure, and poor visibility, making traditional exploration methods costly and risky. Autonomous Underwater Vehicles (AUVs) offer self-guided navigation, mapping, and data collection using advanced sensors such as DVL, IMU, SONAR, and LiDAR. However, accurate navigation is still a big challenge due to the independency of data capturign devices. Hence there is a necessit for the multi-sensor based navigation an dmapping system for oceans.

Application Sectors

- Marine Research and Oceanography
- Environmental Monitoring and Disaster Management
- Resource Exploration and Sustainable Development.

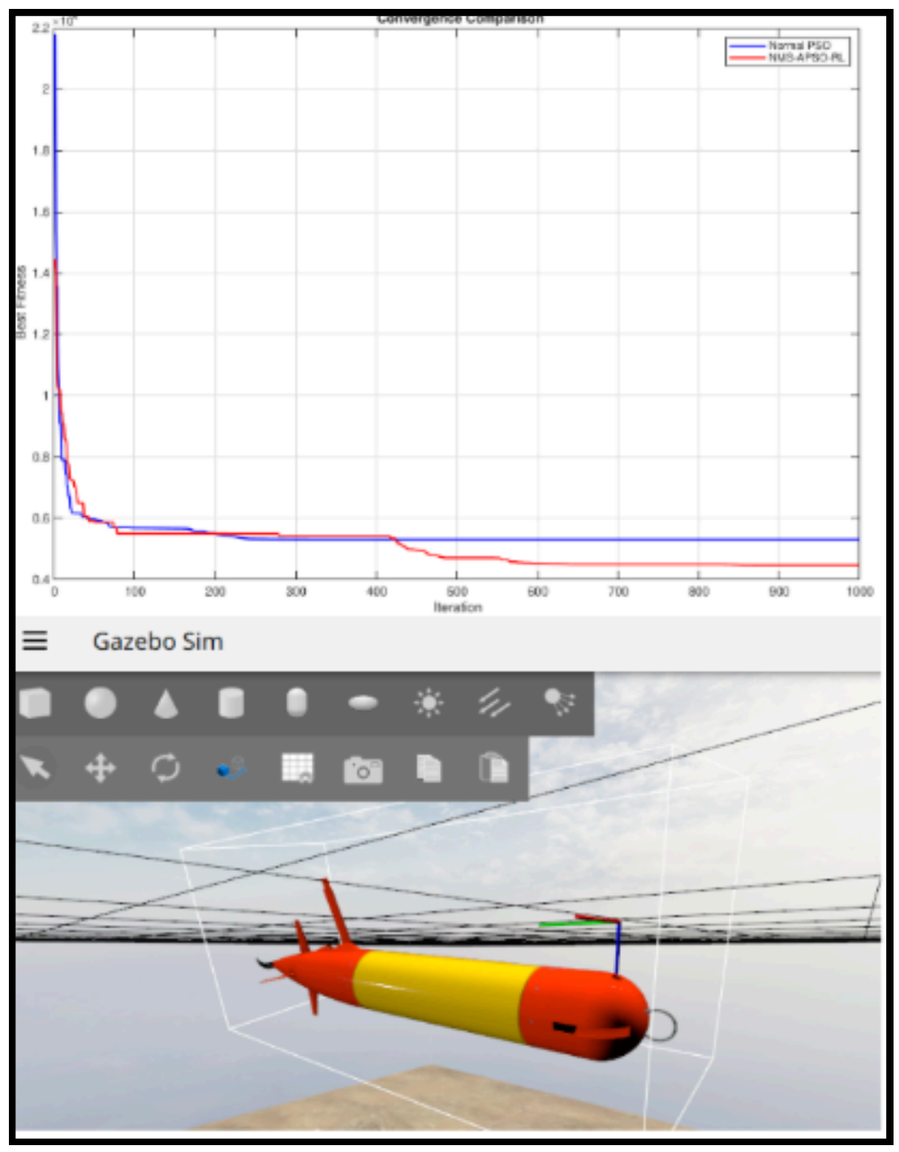
TRL  **4**

Tech/Prod. Summary

A real time system that integrates advanced sensors, AI-driven navigation algorithms, and 3D mapping techniques for ocean exploration, environmental monitoring, and sustainable resource management.

Tech/ Product Description

This is an intelligent underwater robotic platform for real-time exploration, data collection, and 3D mapping of marine environments. Equipped with advanced sensors like DVL, IMU, SONAR, and LiDAR, it uses Unscented Kalman Filter-based sensor fusion for accurate navigation in GPS-denied waters. The system autonomously manages path planning, obstacle avoidance, and adaptive mapping, while enabling real-time monitoring and post-mission analysis.



Impact - SDG:

- SDG 14 – Life Below Water
- SDG 13 – Climate Action
- SDG 9 – Industry, Innovation & Infrastructure

Market Potential

AUV-N&M System: $2.7 billion in 2025 to $5.9 billion by 2030.

Value Proposition

Highly precise autonomous underwater navigation and mapping