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Persistent Operation of Mobile Robots

In Nonlinear and Autonomous Systems Lab,
we are developing theoretical, computational, and experimental tools
for long-term operation of network of autonomous vehicles in complex
environments. The application is for a air, ground, and sea robots.

Challenge

❑ Collective power management for long-term multi-robot operation.

❑ Effectively respond to energy needs in the presence of dynamic conditions and environmental uncertainty.

Solution

The key is lowering deployment and operating costs, while also increasing efficiency, endurance and persistence.

Our approach includes:
• task and energy routing scheduling,
• efficient path planning and coordination,
• low-infrastructure platforms.

Task and Energy Routing Scheduling

Mission planning architecture for persistent operation to

- place and uses static charging stations

Or

- find the rendezvous positions of mobile chargers

With primary objective: minimize the energy spent

Low-Infrastructure Platforms

North– East Trajectory– Circular Path
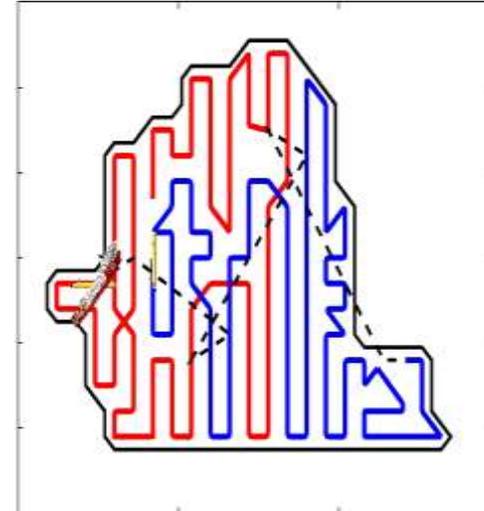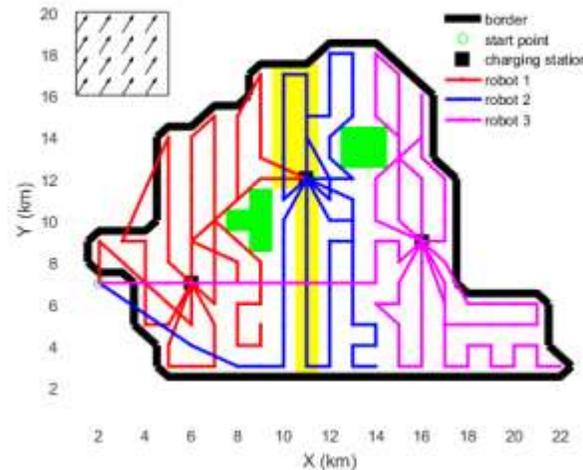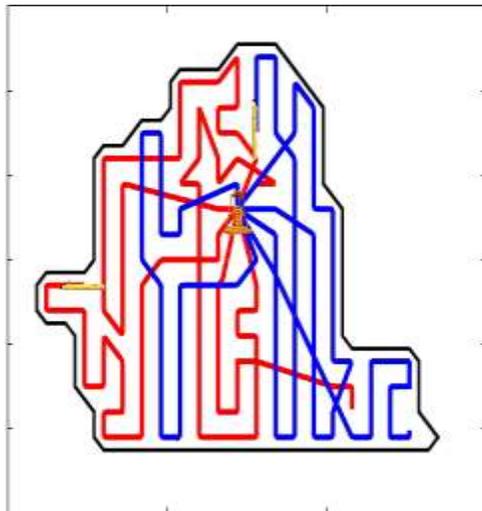
- Reducing the cost of deployable AUVS while increasing maneuverability and capability of operation
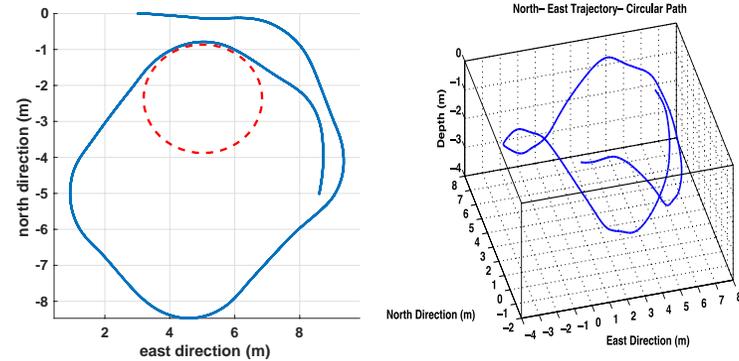
ROUGHIE: Research Oriented Underwater Glider for Hands-on Investigative Engineering

- Developing experimental test-bed including a mobile charger capable of autonomous docking and wireless energy transfer for marine settings.
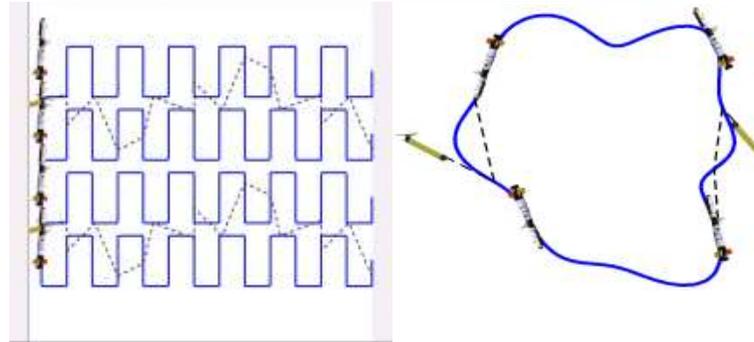
NAS Lab Team

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