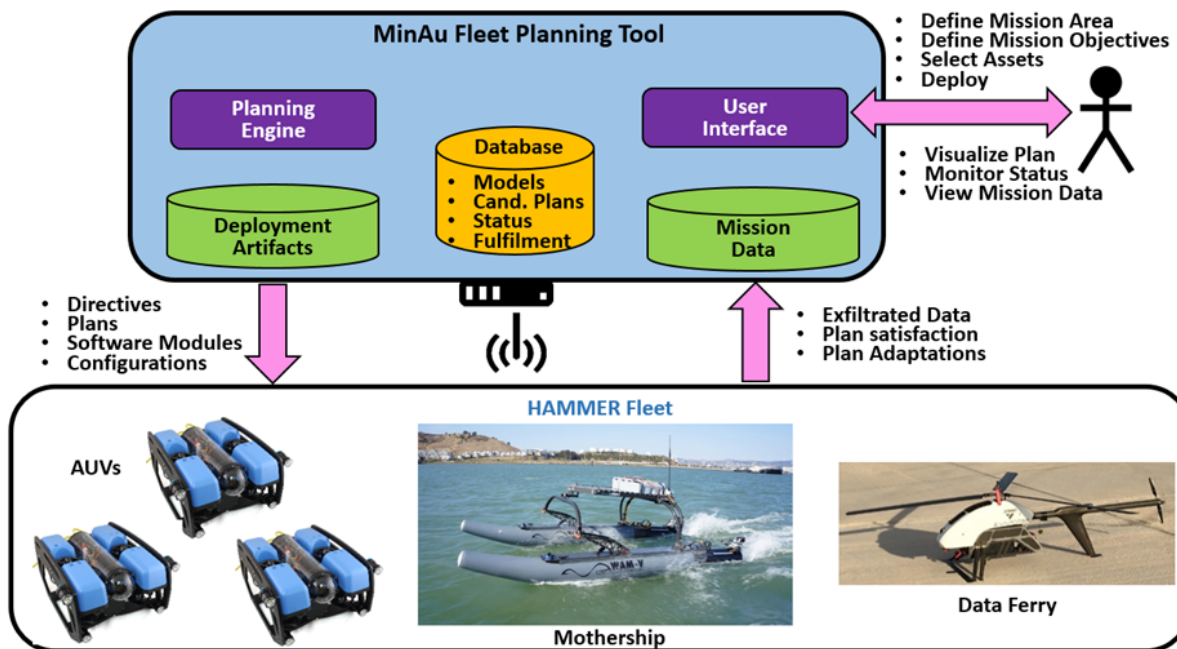




Press Release: Orbit Logic Awarded Phase II Navy Autonomy Contract

GREENBELT, MD (July 9, 2019) – Orbit Logic has been awarded a Phase II Small Business Technology Transfer (STTR) contract sponsored by the Office of Naval Research (ONR) to develop the MinAu System - an advanced multi-vehicle mission planning, scheduling, and response system for the maritime environment. MinAu addresses current and future mission needs by employing teams of autonomous, cooperative, agent-based vehicles of differing types. Through collaboration strategies, these teams can be highly effective in maximizing mission effectiveness in dynamic environments (where conditions may not be known until the team is deployed). MinAu accomplishes this flexibility through a combination of comprehensive up-front mission planning and onboard autonomous response capabilities. The solution has been adapted from Orbit Logic’s high-heritage COTS space mission planning software.

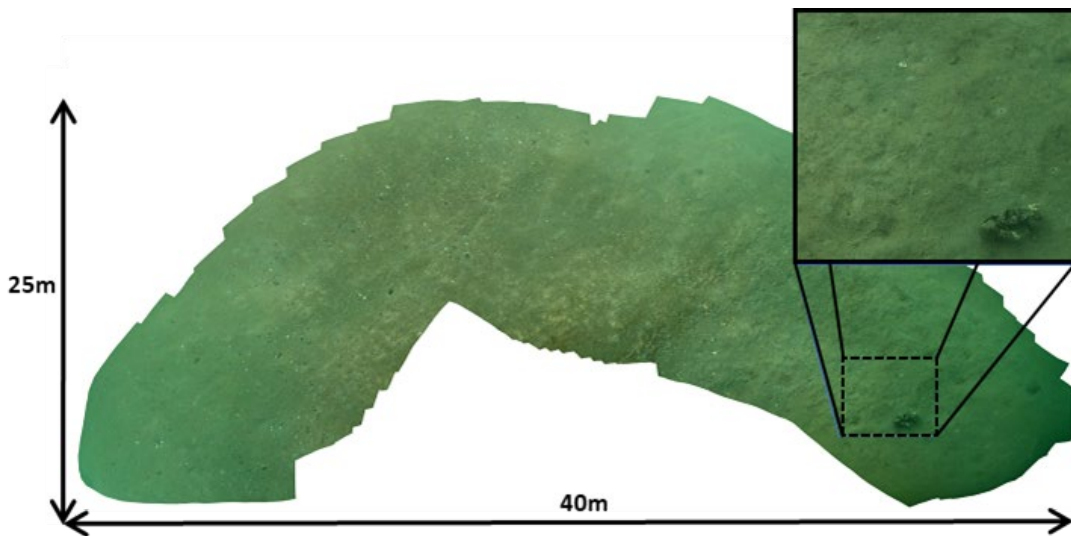
Our STTR team includes the University of Colorado Boulder’s (CU’s) Research and Engineering Center for Unmanned Vehicles (RECUV) and the University of California San Diego’s (UCSD’s) Multi-Agent Robotics (MURO) lab.



MinAu Architecture: System-Level Process Flow and Data Exchange

Phase I efforts resulted in an initial prototype of the MinAu solution that demonstrated its effectiveness through several relevant multi-vehicle collaborative mission scenarios played out in simulation.

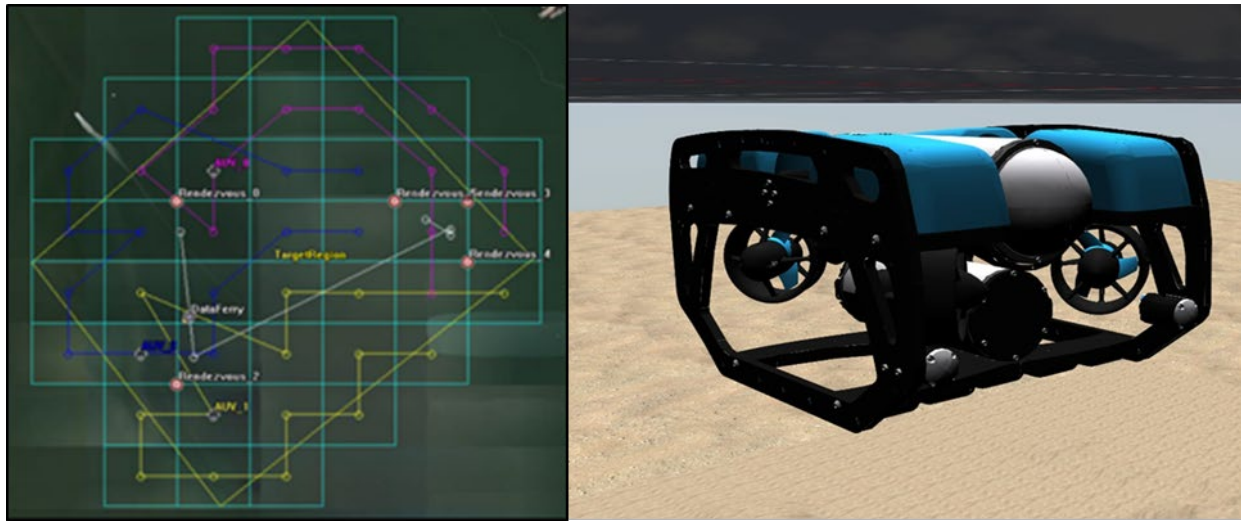
During Phase II of the STTR, the team will be collaborating with the Naval Information Warfare Center (NIWC) Pacific Command to integrate MinAu with vehicles in NIWC's Heterogeneous Autonomous Mobile Maritime Expeditionary Robots (HAMMER) system and validate its capabilities in a maritime test environment. The HAMMER system is comprised of NIWC's SeaRover UUVs (an autonomy enhanced and untethered BlueROV) for collaborative ocean floor bottom mapping, a USV Surface Craft to act as a mothership for UUV deployment and recovery, and a rotorcraft UAV used as a data ferry to transport mission data from the UUVs and mothership to a shore station for processing and visualization.



Ocean floor bottom mapping imagery obtained by HAMMER Sea Rover

For the HAMMER mission, MinAu will optimize an initial plan for all assets that maximizes the satisfaction of mission objectives (for example, getting the bottom mapping data collected by each asset to the shore station as quickly as possible) while minimizing the use of expendable resources, notably the energy stored in an asset's batteries. Once the HAMMER vehicles are programmed and deployed, the autonomous software onboard each asset will adapt its actions when unanticipated events or conditions are encountered.

CU's Event-Triggered Decentralized Data Fusion (ET-DDF) algorithm facilitates the exchange of state and situational information between assets with minimal use of acoustic communications equipment - which allows all collaborating assets to work together to best meet the original mission needs by responding appropriately to the unexpected. One example is UCSD's Conflict Avoidance algorithm, which enables each asset to meet its mission objectives as efficiently and effectively as possible while preventing collisions with other assets or obstacles in its operating environment.



Optimized Asset Collection Assignments, and Simulated Mission Execution

About Orbit Logic

Orbit Logic (www.orbitlogic.com) specializes in mission planning and scheduling solutions for aerospace and geospatial intelligence. Orbit Logic's operationally proven COTS products create better plans faster with fewer resources for all mission phases. Orbit Logic services are available to configure, customize, and integrate Orbit Logic's mobile, web-based, desktop, and flight software applications to provide turn-key operational solutions that leverage the latest available technologies to meet customer goals and exceed their expectations.

About the Research and Engineering Center for Unmanned Vehicles

The Research and Engineering Center for Unmanned Vehicles (RECUV) (www.colorado.edu/recuv) at the University of Colorado Boulder is a university, government, and industry partnership that collaborates to design, develop, and implement new technologies that will enhance the communications, mobility, and overall performance of unmanned vehicle systems. The center addresses the technical challenges associated with unmanned vehicles by integrating the traditional aerospace disciplines of aerodynamics, structures, navigation, control, and vehicle design with telecommunications, sensors, networks, and robotics.

About the University of California San Diego MURO Lab

As part of the Contextual Robotics Institute at UC San Diego (<https://contextualrobotics.ucsd.edu>), the MURO Lab (muro.ucsd.edu) aims to advance research to make autonomous vehicle systems a reality. In particular, the lab focuses on the development of novel control, coordination, mobility and manipulation algorithms for single and multiple robots, and their integration with novel communication and sensing technologies.