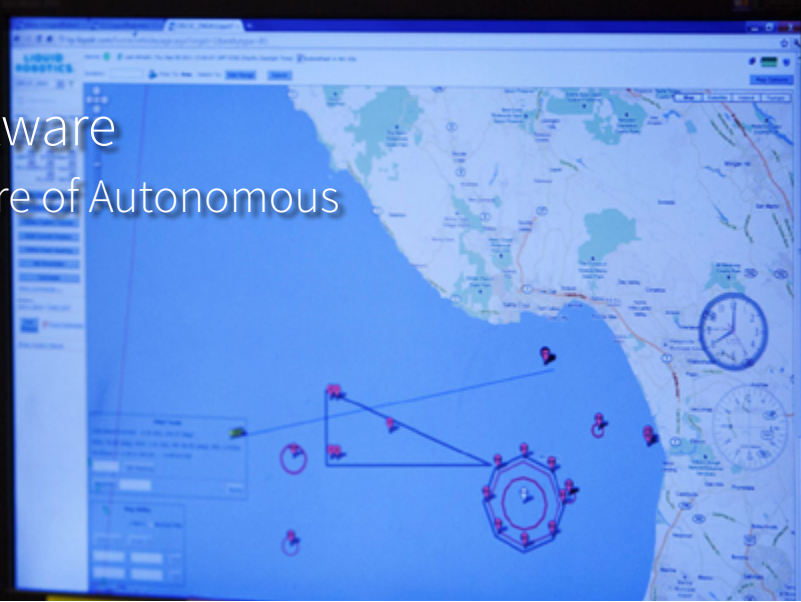# Mission Management Software
Software to Accelerate the Future of Autonomous Ocean Exploration

Liquid Robotics Mission Management software increases mission success and productivity by providing customers with better data, a single console for multi-mission operations, and the flexibility to adapt to changing mission needs. These capabilities are accompanied by a support service that is available 24/7 to provide guidance and help resolve issues.
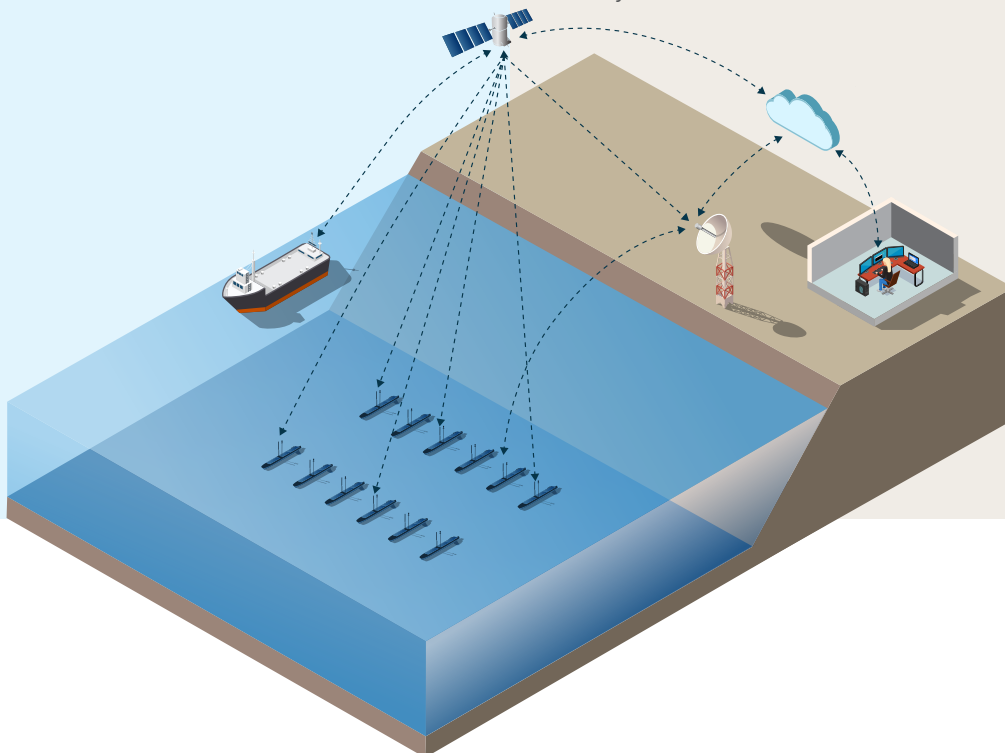
Our Mission Management software includes a hosted command and control environment, Wave Glider Management System (WGMS), and Regulus the operating environment resident on a Wave Glider®. Our command-and-control software is delivered as a service and designed to be highly available and redundant providing customers with continuous access to both vehicles and data. This software also includes access to a support team of experts who help customers drive mission success.

Intelligent Vehicle Software: Regulus

- Autonomy and precise control
- Detailed self-awareness and health monitoring
- Customize payload and vehicle behavior

Command and Control Software: WGMS

- Plan, monitor, pilot, missions, and manage data
- Multi-user, multi-vehicle, and multi-mission
- Real-time control and data access, anytime, anywhere

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Mission Management Software (continued)

Regulus

Regulus, the on-board operating environment for the Wave Glider, delivers insight and control designed to ensure the success of autonomous missions and operations. It enables command and control of all Wave Glider functions including sensors. Designed to be resilient in the face of harsh and unpredictable sea conditions that may affect sensors, communications and power, Regulus monitors and controls the health of the Wave Glider allowing operations for long durations with limited communications to shore. Regulus provides:

- Autonomous operations and precise vehicle control
- Detailed self-awareness and health monitoring
- Customizable behavior (and communications) based upon payload design
- Intricate logs of vehicle and component behavior for any necessary troubleshooting

As the brains of the Wave Glider, Regulus is a critical component to mission success. Autonomous operations capabilities include multiple navigation modes, ship-avoidance capabilities, and power management. As an orchestrator of real-time communications and persistence it allows a pilot, data analyst, or third-party systems to adjust the Wave Glider in near real-time.

Environmental, vehicle, and sensor awareness is a requirement for long-duration and remote autonomous missions. Regulus extracts both detail and summary data from the vehicle and sensors to help validate assumptions about the operational environment and ensure continuous mission operations.

Regulus provides remote telemetry information that can be used to change an operational plan or sensor configuration during a mission. This insight and control provides customers with the flexibility to adapt to changing conditions or simply run a new mission once data collection in one area has concluded.

Wave Glider Management System

The Wave Glider Management System (WGMS) provides command-and-control of one or more vehicles from a single console. It facilitates mission planning, piloting, vehicle health monitoring, and provides access to both core vehicle and auxiliary sensor data. Role-based access allows different participants to access data and vehicles at any time simultaneously. Key features and benefits include:

Mission Planning: Define navigation charts, build courses, and flag hazards in advance of a mission to facilitate collaboration between pilots and other stakeholders and to ensure mission success.

One-Pilot, Multiple Vehicles: From a single console a pilot can access and control different vehicles and missions, increasing pilot productivity and eliminating the need for multiple consoles.
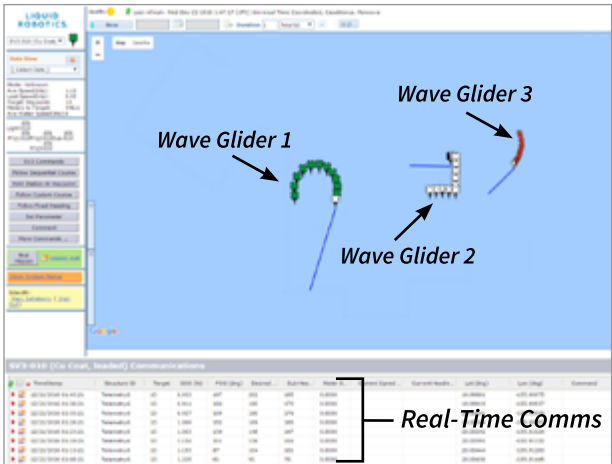
Multi-vehicle monitoring and telemetry

Real-Time Management & Control: From vehicle telemetry to pilot automation tools, operators have the insight and control needed to enable successful missions including:

- Real-time monitoring and flexible alerts: Improve pilot productivity and increase number of vehicles under management

- Detailed vehicle and sensor status data: Ensure successful data collection and vehicle operations

- Pilot automation assistance: Helps to avoid hazards like ships transmitting AIS and enables swapping between navigation modes with ease

- Reconfigure vehicles and sensors: Change sensor activity based on ocean conditions or data findings
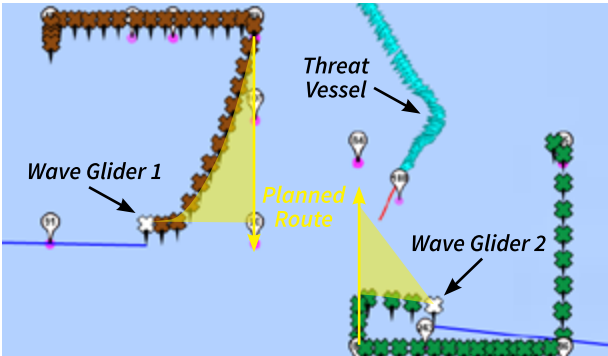
Real-time control with autonomous piloting such as ship avoidance, shown above

Role/Mission-Based Access: Tailor piloting and data access to mission, user, and group needs. The WGMS experience can be customized to meet different mission needs from simple repetitive missions to complex ones that involve testing of concepts or sensors. Defined roles and access control allow both collaboration and security, helping to protect mission and data integrity.

Mission Management Service Delivery

The support and services provided with our Mission Management software are designed to ensure that customers have 24x7x365 access to the WGMS, data about missions and vehicles, and support resources. A secure

and redundant data center infrastructure allows systems and data to be highly available. These capabilities help customers:

- Start fast: On-board new vehicles or pilots without any infrastructure investments

- Stay current: Maintain the latest version of WGMS and the latest software for vehicles

- Get expert help: Resolve problems or questions during the lifecycle of missions from planning to piloting to post-mission data access

- Share data with confidence: Provide secure access to mission and sensor data without additional IT infrastructure investments

Mission Management Software and Incident Support Service Includes:

- Use of WGMS as-a-service

- Installation and updates to Regulus

- Help desk/mission incident support with the following:

  - Incident management, problem determination, and with resolution or workaround (for operational or technical problems during missions)

  - 7x24 live call escalation for priority 1 and priority 2 incidents[*] and customer engagement through workaround

  - Next business day response for priority 3 and priority 4 incidents[*] directed to email/web form case handling

  - On-boarding/off-boarding: Set up mission administrative structure and registration of Wave Gliders and credentialed users

*For additional details about these services, please contact Liquid Robotics.

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