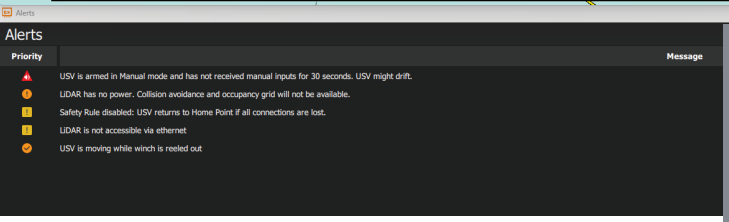
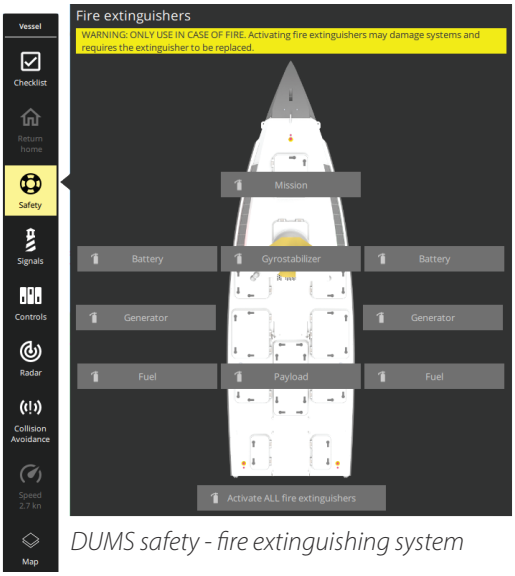


Main screen DUMS

DUS USV SOFTWARE

INTEGRATED SOFTWARE FOR USVS

DEMCON unmanned systems' maritime-grade USV control, mission and autonomy software is a field-proven integrated suite for remote and autonomous vessel operations. It combines a ROC operator interface, mission planning, vessel control, safety logic, alert handling and diagnostics within a modular architecture. Developed in-house using a certification-focused architecture aligned with relevant remote and autonomous vessel operation frameworks. The software enables safe, scalable and efficient USV operations for survey, inspection, security and remote operation missions. It supports seamless integration with all DUS USV platforms and can also be deployed on third party and OEM vessels.



DUMS safety - fire extinguishing system

KEY FEATURES

Integrated ROC operations

Singe integrated ROC environment for mission planning, vessel control, alert handling and situational awareness, from mobile field setups to control rooms.

Autonomous control and positioning

Supports manual, assisted and autonomous modes, including waypoint navigation, track following and Dynamic Positioning (DP) for mission execution.

Safety, compliance and diagnostics

Integrated safety logic, alert management, automated fail-safes and continuous database logging for support, safe operations, traceability and post-mission analysis.

DEMCON | UNMANNED SYSTEMS

FULL-STACK SOFTWARE FOR USV OPERATIONS

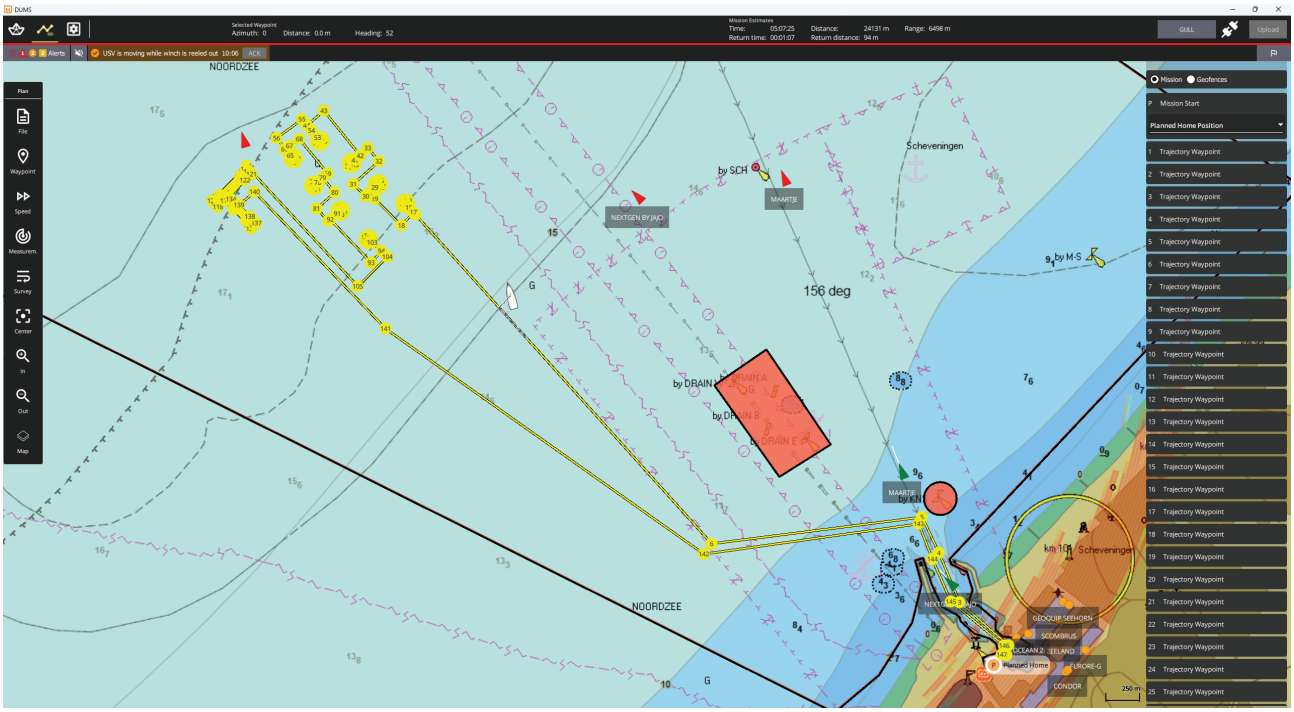
The DEMCON uncrewed mission and autonomy software is an in-house developed software suite for remote, assisted and autonomous USV operations. The software stack supports mission planning and management, ROC-based vessel control, autonomous navigation, safety management, alert handling, monitoring, logging and diagnostics.

The suite can be delivered as a complete integrated software stack for DEMCON USV platforms, or as configurable modules for OEM and third-party vessel applications. Its modular architecture allows functionality to be scaled per vessel type, mission profile, autonomy level and operational context.

SCALABLE SOFTWARE PACKAGE

The software suite can include the following core software modules:

- **DEMCON Uncrewed Mission Software (DUMS)** - ROC operator interface for mission planning and execution, vessel monitoring and situational awareness.
- **DEMCON Advanced DP Control & Navigation System** - Manual, assisted, dynamic positioning and autonomous navigation control modes.
- **DEMCON Safety System** - Safety rules, safety actions, emergency stop handling, collision warning, obstacle avoidance and return-to-home functionality.
- **DEMCON Logging & Monitoring Software** - Local or cloud based time-based vessel data logging, system monitoring, diagnostics and support tooling.



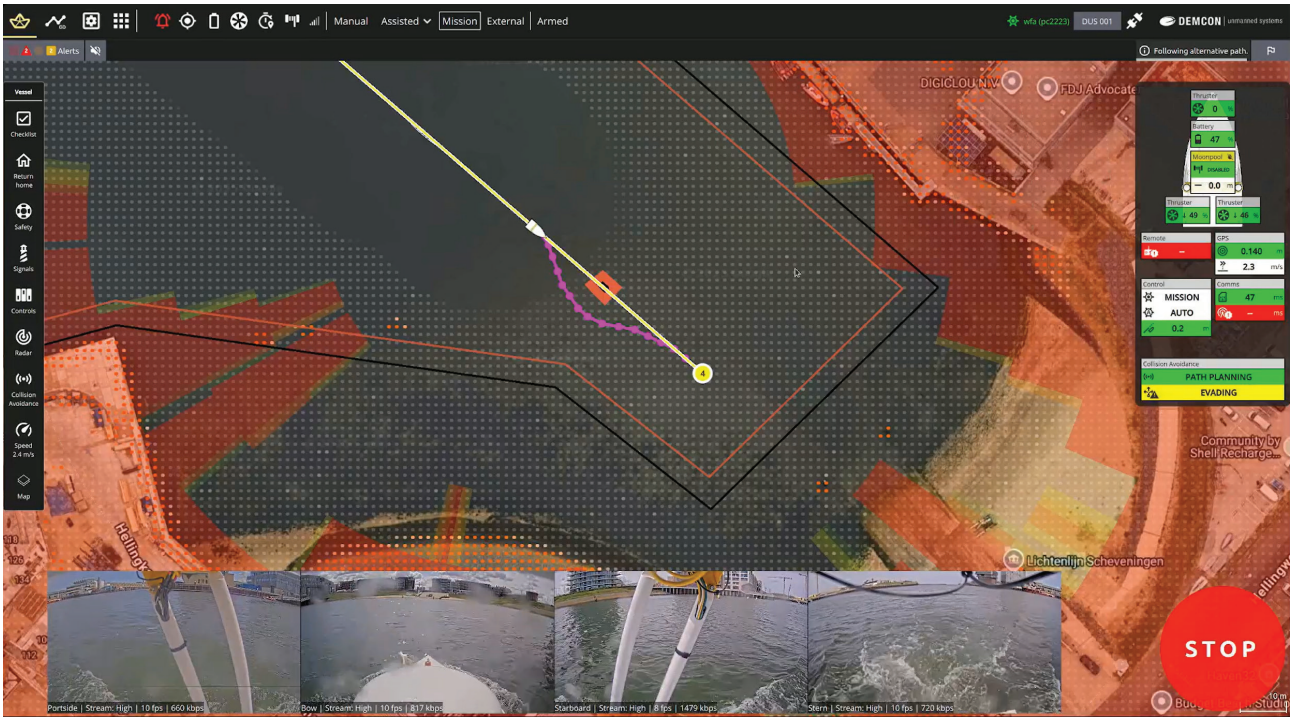
Mission planning in DUMS

ROC HELM AND MISSION INTERFACE

The **DEMCON Uncrewed Mission Software (DUMS)** application functions as the primary ROC operator interface for mission planning, vessel monitoring, mission control and situational awareness. It gives operators a clear operational picture of vessel position, planned route, sailed track, system status, alerts, sensor overlays, communication links and the surrounding environment.

Core capabilities include:

- Mission planning and mission execution
- Operator control handover between connected users and ROCs
- Central/Bridge Alert Management (CAM/BAM), designed to support Resolution MSC.302(87)
- Integrated safety rules and safety actions framework
- Live vessel and subsystem monitoring
- Multi-screen control room and multi-USV operation support
- Remote diagnostics and support interface



Collision avoidence

CONTROL AND NAVIGATION

The **DEMCON Advanced Control and Navigation System** provides manual, assisted, dynamic positioning and autonomous navigation modes for different mission phases and operating conditions. Operators can select the appropriate level of control, from direct remote operation during launch and recovery to autonomous route following, track keeping and positioning during survey or inspection missions.

Manual & hybrid control modes

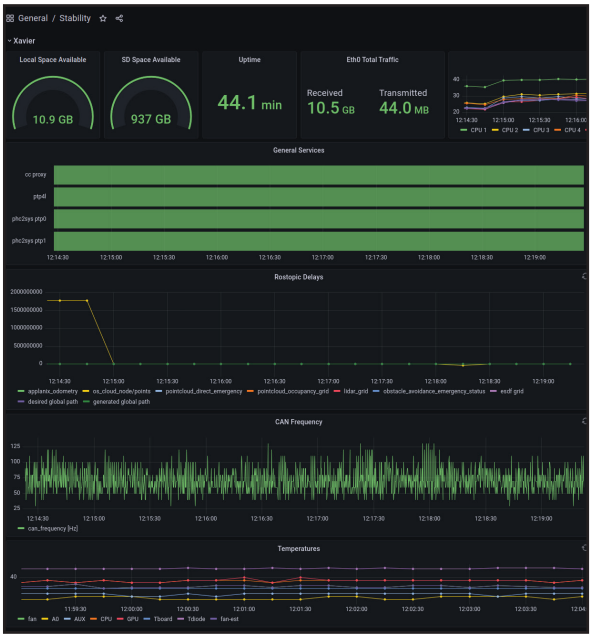
Available functions include:

- **Wireless Control Unit (WCU)** – Industrial manual joystick-based vessel control for launch, recovery and within line-of-sight close-range operations.
- **Keyboard remote control** – Vessel control via keyboard, laptop or external desktop controller interface.
- **Assisted manoeuvring/DP** – Assisted control mode supporting operators in complex manual manoeuvres near objects, quay walls, docking areas or during recovery operations.

Dynamic Positioning (DP) modes

Available functions include:

- **Station keeping** – Maintains vessel position at a fixed point with fixed heading.
- **Weathervaning** – Automatically aligns the vessel heading towards the dominant environmental disturbance, such as wind, current or waves, while maintaining position.
- **Virtual Anchor** – Maintains position within a defined radius around a setpoint, reducing unnecessary energy use.



Local or cloudbased database

Mission and autopilot modes

Available functions include:

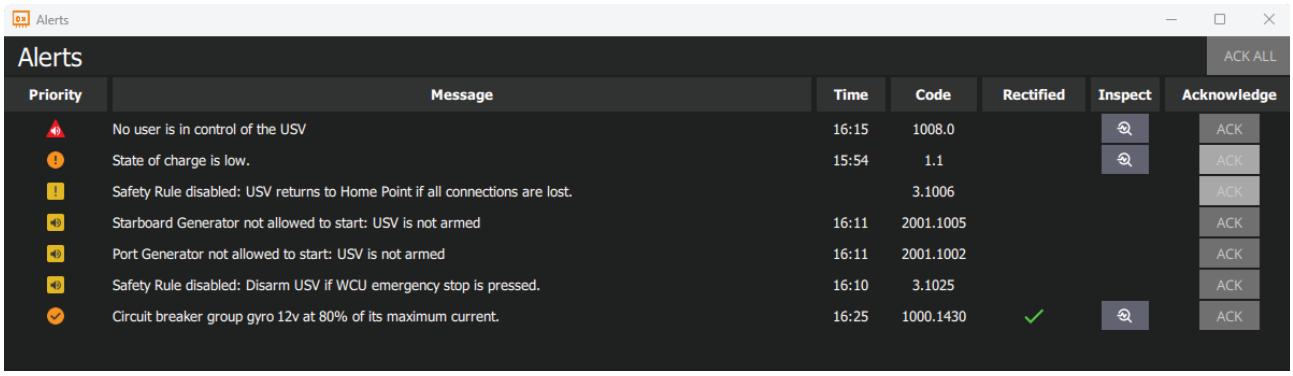
- **Auto track** – Follows predefined waypoint tracks with speed and heading control while minimising cross-track error.
- **Autopilot mode** – Maintains a selected heading and thrust setting automatically.
- **Dynamic Position track** – Follows a predefined track with independent heading control, allowing vessel heading to differ from direction of travel.
- **External waypoint control** – Allows third-party survey, sensor or payload software to provide waypoint input using supported maritime data formats.
- **Collision Avoidance** – Supports autonomous evasive manoeuvres based on real-time object detection and sensor-fusion input.

SAFETY SYSTEMS

DEMCON integrated safety systems continuously monitor vessel state, environment and mission execution. The safety architecture combines alert management, safety rules, controlled safety actions, object detection, collision avoidance, emergency stop handling and return-to-home functionality into one operational framework.

Included safety systems and functions:

- Collision warning and avoidance
- Central/Bridge Alert Management (CAM/BAM)
- Autonomous Emergency Braking (AEB)
- Object detection and tracking
- Sensor-fusion situational awareness overlays in the ROC
- Remote emergency stop functionality
- Emergency Control Mixer for thruster failure handling
- Return-to-Home functionality
- Mission planning safety features, including geofencing
- Pre-mission digital checklists



Central Alert Management System

Configurable Safety Rules

The configurable Safety Rules System defines automated safety behaviour per vessel and mission profile. Operators can visualise active safety rules, review their current state and configure selected rules depending on the operational context.

Example functions include:

- Real-time overview of active safety rules and status
- Rule enable/disable per mission segment
- Automatic safety responses based on vessel state, mission state or sensor input
- Configurable actions like position hold or Return-to-Home on communication loss

Controlled Safety Actions

The configurable Safety Actions System enables authorised operators to perform controlled safety actions in predefined exception scenarios. This supports safe recovery, troubleshooting and controlled restoration of vessel functionality while maintaining operator awareness and traceability. Example functions include the controlled reset or override of safety functions and the controlled recovery of vessel functionality under predefined conditions.

LOGGING, MONITORING AND DIAGNOSTICS

DEMCON Logging and Monitoring Software provides local and/or cloud-based vessel and ROC data logging and storage, system status monitoring and diagnostic support for remote and autonomous USV operations. The DUS Diagnostics portal gives operators, technicians and DEMCON support teams user-friendly dashboards with real-time and historical insight into critical vessel subsystems, component status and operational performance.

Logged and monitored parameters include:

- Safety sensor data, including water ingress, temperature, hatch status and vibration
- Vessel management data, including power, propulsion, thrusters and batteries
- Control modes, setpoints and mission states
- Communication link status
- Software status, events and diagnostics
- Alerts, warnings and operator-relevant system notifications

GET IN CONTACT

Our software solutions are configurable and can be tailored to vessel type, mission profile, autonomy level and operational requirements. To learn more about capabilities, integrations and use cases contact us via e-mail or call us.

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