

MPPT Ring



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Mobile & Marine
Robotics

Multi-Purpose Platform Technologies for Subsea Operations

MPPT Ring is a multi-purpose platform product, which enables easy system integration, planning, simulation, training, fault-tolerant control, enhanced operator interface, auto-enhanced survey execution and offline analysis of subsea operations.

Features:

- Signal-level compatibility between simulated and real-world environment,
- 3D real-time visualisation of navigation data,
- Real-time vessel and sonar simulators,
- Advanced, flexible fault-tolerant control system with auto-tuning capabilities,
- Open architecture for rapid control prototyping and hardware-in-the-loop development,
- Set of aiding tools for ROV pilot.

System Integration:

- Check connection and make system integration before mission execution.
- Detect and resolve problems in advance.
- Find optimal positions for sensors equipment.
- Make fast connection with ship & ROV resources and save costly ship time.

Planning:

- Build complex underwater scenarios using expandable database of objects (ROV and ship models), structures and custom components (moorings, buoys, etc.)
- Prepare mission plans, including routes, trajectories and way points.
- Generate marketing "proof of concept" visualisations.

Simulation:

- Simulate run-time behaviour in normal and critical situations under disturbances (waves, currents, umbilical effect) using full 6 DOF real-time simulators.
- Develop and test advanced fault-tolerant control system with auto-tuning features.
- Use hardware-in-the-loop to evaluate the performance of embedded controller.
- Simulate system response to different faults (thruster faults, leakage in the bottle).

Training:

- Provide real-fee training without exposing personnel and equipment to hazards, while simultaneously saving expensive ship based training.
- Train pilots to control the vehicle in normal and harsh conditions, including strong currents, waves, thruster faults and system errors.
- Provide interaction with dynamic objects using standard input interfaces.

Fault-Tolerant Control:

- Provide optimal and robust vehicle control in fault-free case.
- In faulty cases detect, isolate and accommodate faults by distributing control energy among operable thrusters and continue missions with minimum loss of performance and manoeuvrability.
- Using set of aiding tools allow operators to be more concentrated on other tasks.

Enhanced Operator Interface & Auto-Enhanced Survey Execution:

- Expand existing operator display with real-time 3D VR visualisation.
- Create virtual view points and view the VR scene from different angles.
- Minimize decision uncertainties due to low visibility and harsh weather conditions.
- Logs run-time data for later replay and analysis.
- Synchronised sonars & ship auto-tracking based on RT captured digital terrain.

Offline Analysis:

- Replay the mission looking at the scenario from any angle/view point.
- Use advanced features of real-time simulators and statistic tools to calibrate instruments and improve accuracy of sonar images.
- Determine factors that need to be improved to make future missions even better.

