

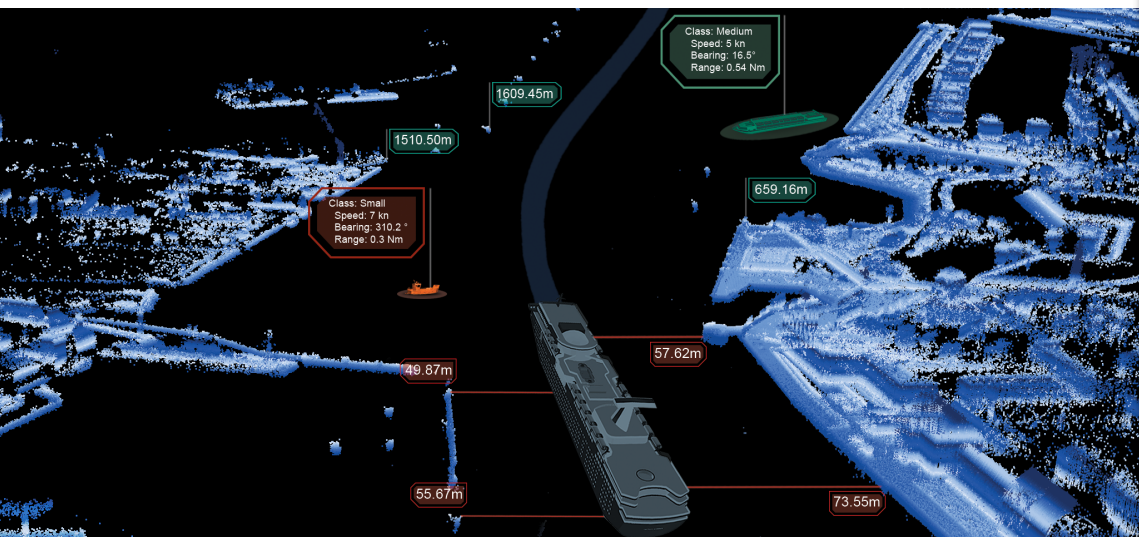
LONG RANGE 3D LIDAR FOR MARINE PERCEPTION



A long-range 3D laser scanner providing precise real-time positioning of vessels, infrastructure, coastline, and other hazards. The OPAL™ LiDAR delivers unparalleled resolution and accuracy for autonomous vessel navigation, on-board automation, and enhanced perception for maritime and port operations.

CAPABILITIES

- Precision Navigation
- Collision Avoidance
- Maritime Surveillance
- Vessel Detection & Tracking
- Coastline & Hazard Mapping
- Port & Waterway Automation
- Real-time 3D Measurements of Environment
- Minimal Returns Off Water
- Rugged All Weather Operation
- Object Classification
- Sensor Fusion with RADAR & Cameras
- Non-Metallic Object Detection
- Ice & Iceberg Detection





PROVEN MARINE EXPERIENCE

Capable of operating in extreme climates under adverse weather conditions, OPAL™ LiDAR is deployed globally on a wide variety of ship classes. Designed to function continuously with minimal maintenance and service requirements, OPAL LiDAR ensures high operational readiness and system uptime. OPAL LiDAR is currently being used in projects at the forefront of autonomous ship development.

AUTONOMOUS & UNMANNED NAVIGATION

OPAL LiDAR provides precise situational awareness to autonomous ships. It can enhance collision avoidance systems by detecting and tracking small objects that are often difficult to detect with other sensors. LiDAR's ability to discern individual ships when clustered together allows for efficient and reliable path planning. OPAL LiDAR can accurately distinguish nearby ships' size, speed, and direction. The 3D data streamed from an OPAL LiDAR allows autonomous ships to safely navigate under bridges, cranes, and other vertical hazards.

SENSOR FUSION

OPAL LiDAR supports an ideal sensing platform for fusing with existing maritime sensors including AIS, electronic charts, RADAR, infrared and visible spectrum cameras. LiDAR is less susceptible to clutter in comparison to RADAR and delivers higher resolution information crucial to mapping of environments for autonomous operation. In addition, OPAL LiDAR has superior detection performance against IR cameras for objects at ambient / water temperature, such as low docks and other semi submerged hazards.

OPAL LiDAR data is easily integrated with traditional electronic navigation systems such as ECDIS (Electronic Chart Display and Information System) and ECS (Electronic Chart System).

PORT & WATERWAY AUTOMATION

OPAL LiDAR offers a number of key features to improve automation of ports and waterways. This includes ship loading and unloading, cargo handling, and waterway system automation and control (locks, bridges, gates, and arrestors). OPAL LiDAR can also assist in surveillance and monitoring of valuable assets and infrastructures against incursions, collisions or theft.

