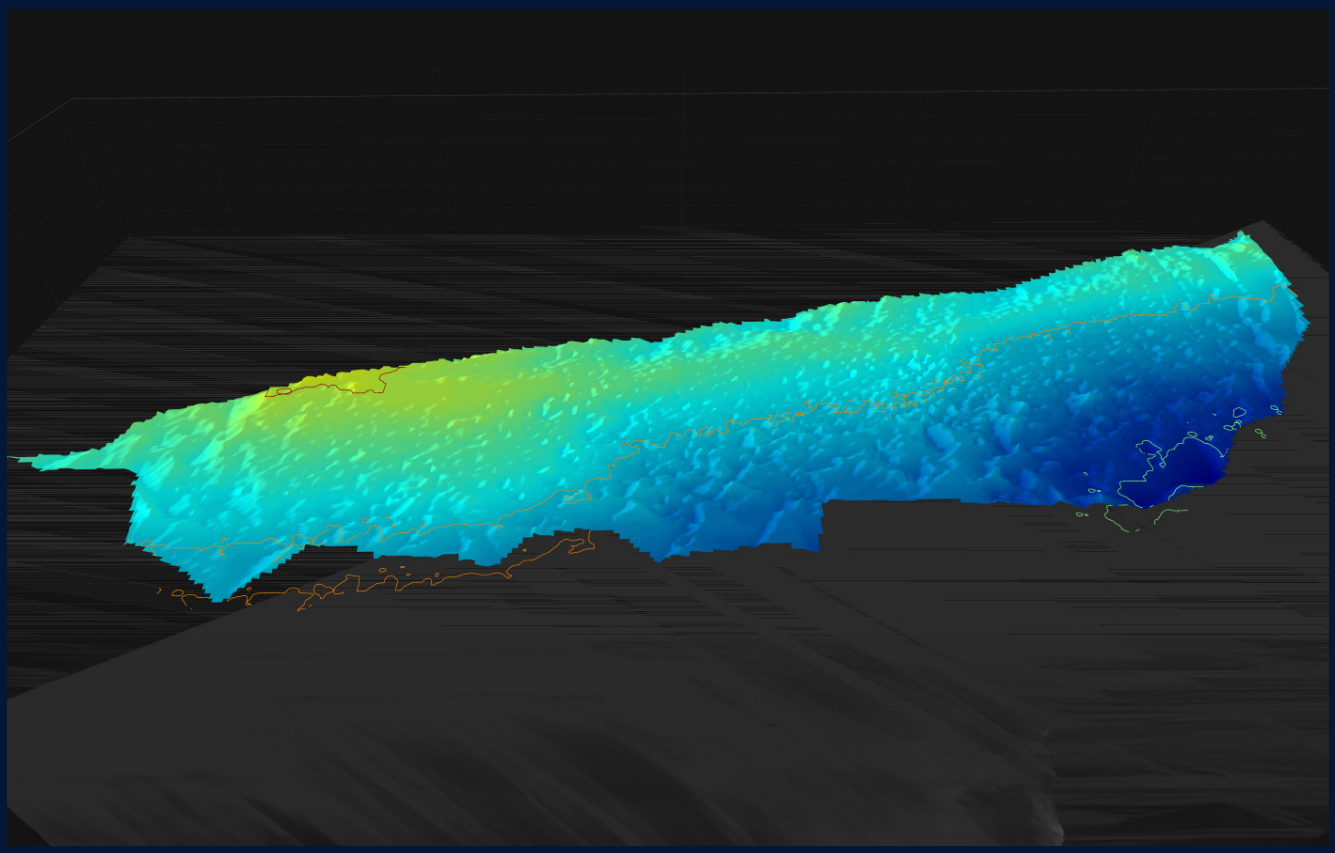
KONGSBERG

Case Study

BerthWatch™

Continuous monitoring of berth conditions at COVE (Centre for Ocean Ventures and Enterprises) in Dartmouth, Nova Scotia.



Summary

BerthWatch™ is an innovative solution that addresses the critical need for continuous seabed monitoring in port environments. This case study examines how KONGSBERG's K-Observer technology integrated with MarineLabs CoastAware software creates a comprehensive system for real-time bathymetric surveillance. The system enables port authorities to transition from reactive, intermittent survey methods to proactive, continuous monitoring of berth conditions. By providing high-resolution 3D point cloud data accessible through an intuitive web interface, BerthWatch allows operators to detect seabed changes caused by propeller wash, sediment transport, scouring, or siltation as they develop—enhancing operational safety, optimizing maintenance schedules, and improving infrastructure longevity. A successful trial at COVE (Centre for Ocean Ventures and Enterprises) in Dartmouth, Nova Scotia demonstrated the system's practicality and effectiveness in monitoring berth conditions across multiple scanning points.

Background

Harbour infrastructure is vital for global commerce, and port authorities require continuous visibility of berth conditions to ensure operational readiness, vessel safety, and infrastructure longevity. Conventional seabed surveys—while useful—are intermittent, expensive, and risky to carry out during adverse conditions or peak traffic.

Ports are dynamic environments. Seabed changes caused by propeller wash, sediment transport, scouring, or siltation can develop rapidly. Early detection of these changes is critical to avoid hazards and reduce maintenance costs. However, traditional survey methods are reactive and may fail to capture important events in real-time.

The challenge

Port operators need a way to monitor bathymetric changes over time in berthing areas without interrupting operations or relying solely on periodic survey campaigns. The system has to be robust, remotely accessible, and capable of capturing changes due to tides, vessel activity, and natural sediment movement—even during storms or outside regular inspection windows.

The solution

BerthWatch provides a fully autonomous sonar-based monitoring system for tracking seabed changes in berth zones over time. The system uses KONGSBERG's K-Observer, consisting of a Sonar Interface Unit (SIU), Sound Velocity Sensor (SVS), and Dual Axis Scanning Sonar (DAS), paired with MarineLabs CoastAware software.

The DAS continuously scans the berth area to generate 3D point-cloud data, enabling port operators to compare current seabed conditions with historical records. These changes can be visualized and analyzed through CoastAware, giving engineers

and decision-makers an actionable insight into sediment behavior, infrastructure impacts, and maintenance planning.

Multiple sonars can be deployed to eliminate blind spots, and the system supports flexible power (shore, battery, solar) and data transmission through LTE. All data is automatically uploaded to the cloud, where it is processed and presented via an intuitive web interface.

Key features

- Continuous high-resolution point clouds via DAS
- Remote monitoring via K-Observer
- Historical change tracking and baseline comparison
- Rugged design for permanent in-water deployment
- Flexible installation and communication options
- Scalable system — supports up to four DAS units per SIU, and can have multiple SIUs

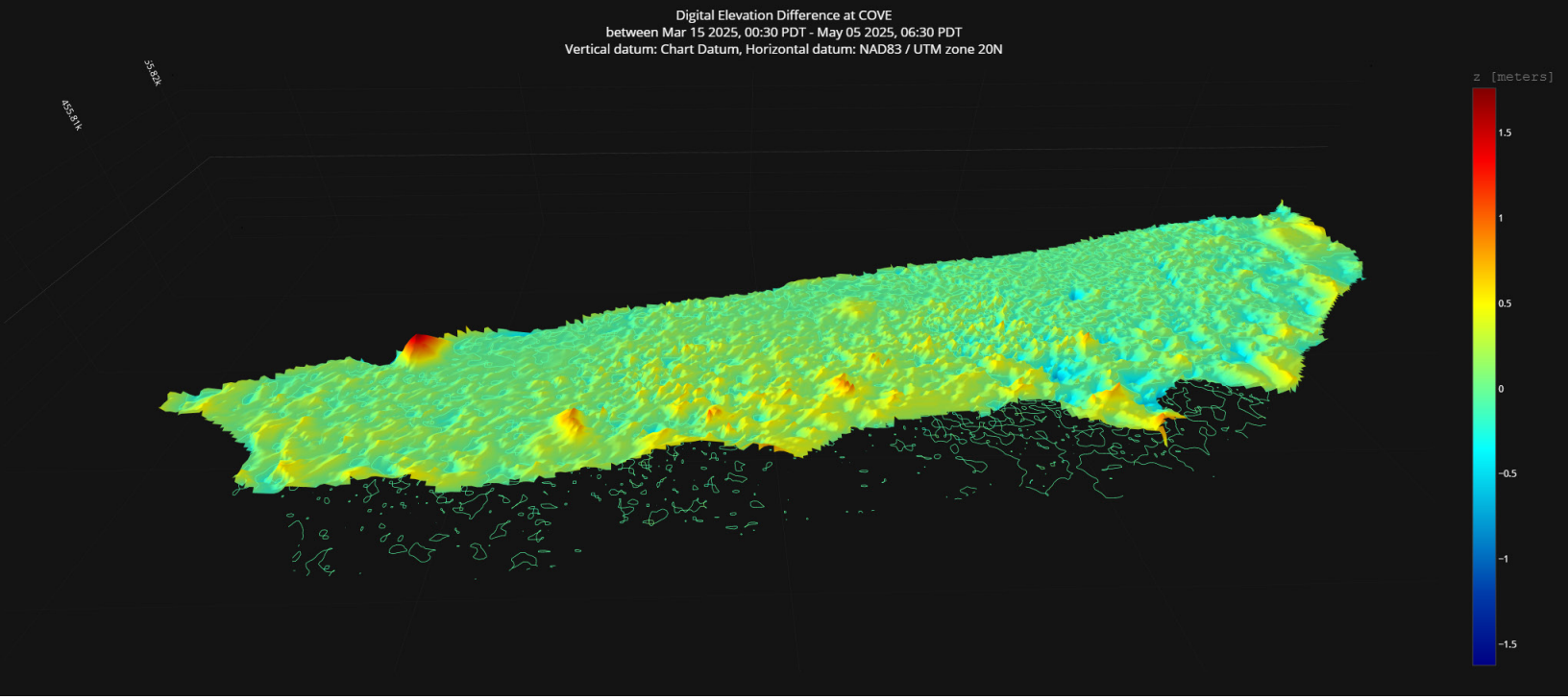
Key benefits

With BerthWatch, ports benefit from:

- Ongoing historical tracking of seabed change
- Remote data access for decision-making anytime, anywhere
- Improved maintenance planning based on sediment behavior trends
- Increased berth safety through early detection of hazardous build-up or erosion
- Operational continuity, even during storms or restricted access periods

BerthWatch allows port operators to move from reactive to proactive seabed management—reducing emergency dredging, optimizing survey efforts, and improving long-term infrastructure resilience.


DAS #3
SVS
SIU
DAS #2
DAS #1
stella maris
COVE



Implementation: COVE BerthWatch Trial

A BerthWatch trial was conducted at COVE (Centre for Ocean Ventures and Enterprises) in Dartmouth, Nova Scotia. The berths onsite are very similar to those at a typical port and provide ideal trial conditions. The trial consisted of three DAS sonars, one SIU, and one SVS scanning multiple times per day and sending data to MarineLabs CoastAware software for processing.

1. Pre-installation

- Performed a site assessment to determine feasible location for K-Observer to be deployed
- Visited the site to determine rough deployment locations of DAS, SVS, and SIU and proximity to power source, as well as dock factors such as freeboard and approximate depth
- Hired a contractor to fabricate a custom, non-destructive mounting solution

2. Installation

- Assembling DAS and cables on pole mounts
- Using a crane to maneuver the pole mounts into position
- Fastening pole mounts to berth in a noninvasive fashion
- Running and connecting cables
- Connecting the DAS and SVS to the SIU and connecting the SIU to a power source

3. Post-installation

- Survey to provide DAS XYZ positions and orientation
- Fine tuning of scan settings
- Optimizing scan schedule

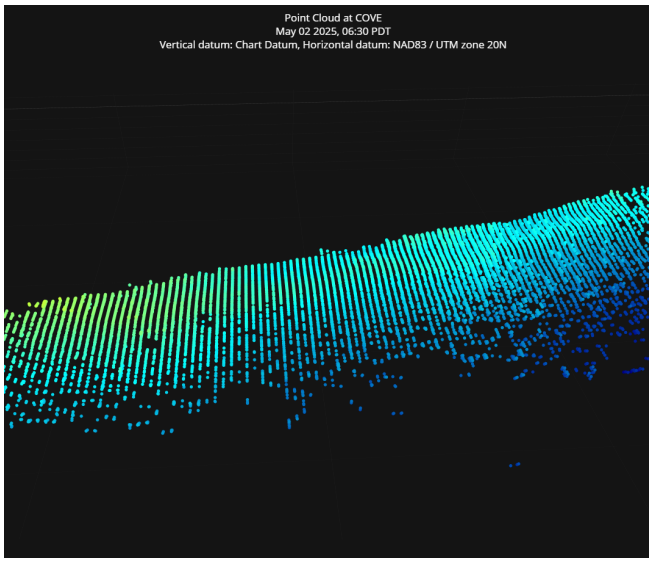
Results

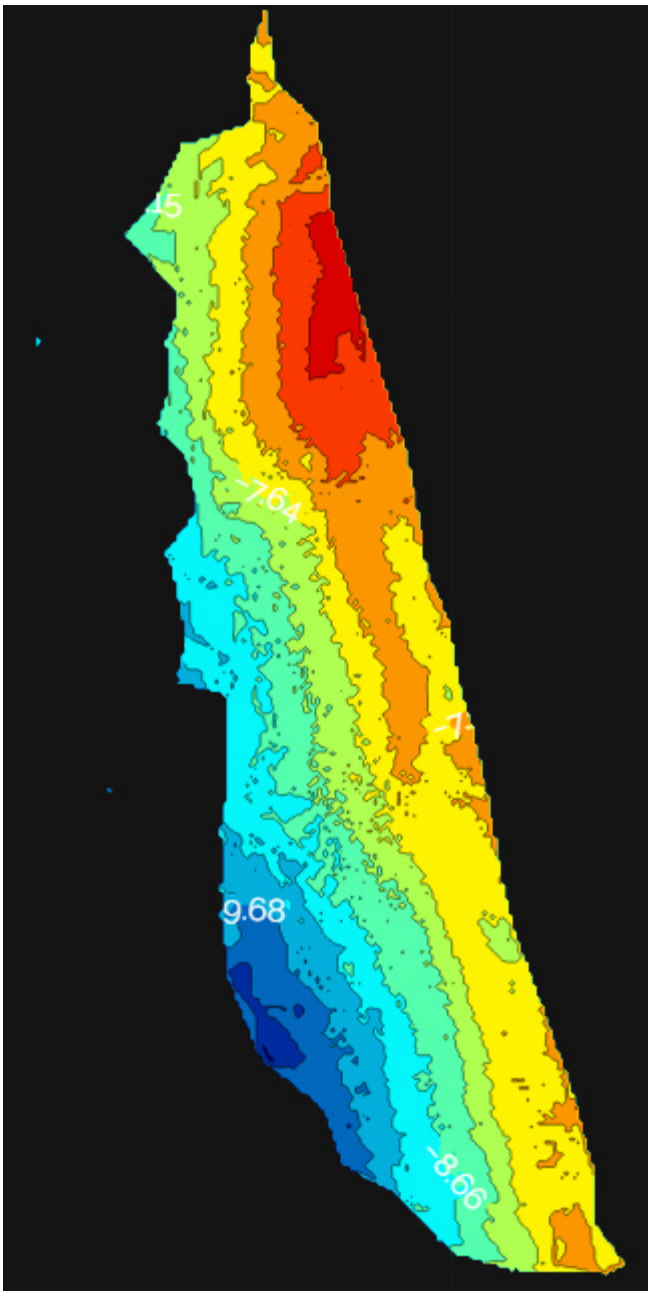
Raw range/azimuth date is immediately sent via LTE to a secure MarineLabs SFTP server for data processing and visualization in MarineLabs CoastAware.

Raw range/azimuth data is corrected for sound velocity, and transformed into an XYZ point cloud. The point cloud is XY georeferenced to NAD83 UTM Zone 20, and Z referenced to the local low-water datum.

The point cloud is then processed using cloth-simulation filtering, which is used to separate the seabed from potential noise in the water column. The resulting data is visualized as a point cloud, surface, or contour plot.

Additional difference plots can be calculated based on any two scans. This is particularly interesting for detecting scouring or shoaling. The current site does not have much vessel traffic or large sediment deposition, so the changes are minor. However, there still is movement of sediment due to tidal forces.





Conclusion

The BerthWatch™ system represents a significant advancement in maritime infrastructure monitoring technology. By implementing continuous sonar-based surveillance, ports can now detect and respond to seabed changes before they become operational hazards or require costly interventions. The COVE trial demonstrates that BerthWatch can be effectively deployed in real-world port environments with minimal disruption to existing infrastructure.

The system's ability to deliver georeferenced, processed data through the cloud enables remote decision-making and historical trend analysis that was previously impossible with traditional survey methods. This shifts port maintenance strategies from reactive to predictive, potentially delivering substantial cost savings while enhancing safety margins.

As maritime infrastructure faces increasing pressure from climate change impacts, larger vessel traffic, and economic demands for operational efficiency, solutions like BerthWatch provide port authorities with the tools needed to make data-driven decisions about infrastructure management. The technology's scalability and flexibility make it suitable for implementation across various port sizes and configurations, offering a forward-looking approach to berth management that aligns with the industry's digital transformation goals.

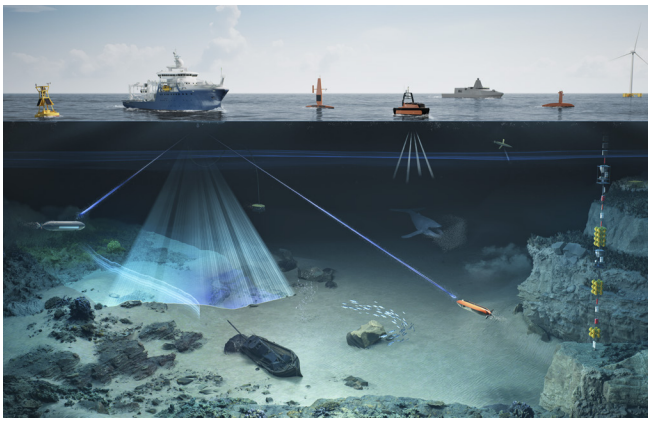
Kongsberg Discovery

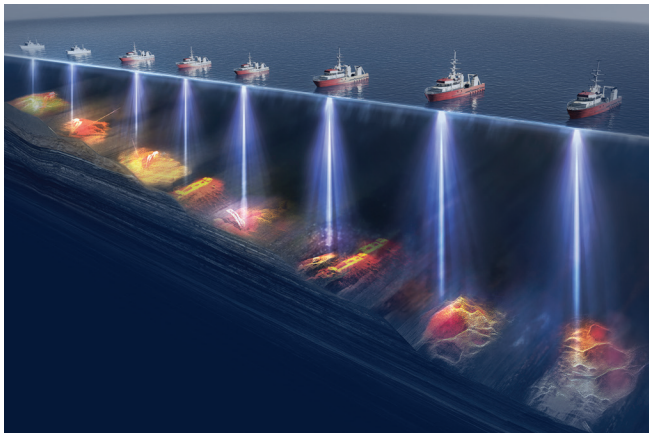
Protecting people and planet

From the deepest sea to outer space

Kongsberg Discovery serves the ocean space from the deepest sea to outer space. We develop technology to ensure sustainable management of marine resources, monitor climate change and critical infrastructure, and safeguard national security.

Our technology aims to sustainably manage marine resources, monitor climate change, secure infrastructure, protect national security, and address crucial global challenges. It is vital for offshore operations, fisheries, marine research, maritime activities, ocean energy production, infrastructure monitoring, and naval operations.





Committed to protecting our planet

We recognize the global sustainability challenges and are committed to developing solutions and products that resolve operational issues while addressing environmental impacts on the ocean ecosystem.

The business has over 1,100 employees located in Horten, Trondheim, and Oslo in Norway, as well as operations in Alicante in Spain, Aberdeen in the UK, Lynnwood (Seattle), Houston, and New Orleans in the USA, Vancouver and Halifax in Canada, Kuala Lumpur in Malaysia, and Singapore. Kongsberg Discovery is part of KONGSBERG, a leading technology group based in Norway.

KONGSBERG DISCOVERY CANADA LTD.
1598 Kebet Way, Port Coquitlam, BC, Canada, V3C 5M5
Phone: 1-604-464-8144
Toll-Free: 1-888-464-1598
Fax: 1-604-941-5423

sales.vancouver@kd.kongsberg.com

KONGSBERG