



KONGSBERG

KONGSBERG MESOTECH

PRODUCT OVERVIEW

MAXIMIZING PERFORMANCE BY PROVIDING THE FULL PICTURE

OUR MISSION

We shall earn respect and recognition for our dedication to provide innovative and reliable marine electronics that ensure optimal operation at sea.

By utilising and integrating our technology, experience and competencies in positioning, hydroacoustics, communication, control, navigation, simulation, and automation, we aim to give our customers The Full Picture.

The Full Picture yields professional solutions and global services that make a difference, enabling you to stay ahead of the competition.

OUR PHILOSOPHY

Our success depends on the success of our customers. Actively listening to our customers and truly understanding their needs, then translating these needs into successful products and solutions, is central to achieving our goal.

Our people are the key to our success and we empower them to achieve. Working together in a global network of knowledge, guided by our values, engenders innovation and world class performance. Every day we have to think a little differently, because every client is unique. We aspire to translate the imagination and dedication of our staff into successful technologies and solutions. Our commitment is to add value to your operations by providing you with The Full Picture.

CONTENTS

.....

KONGSBERG MESOTECH LTD.	3
M3 SONAR®	4
HIRES SCANNING SONAR	6
CLARISCAN	8
DUAL AXIS SONAR (DAS)	9
ALTIMETERS	10
TRAINING AND SUPPORT	11

CLARITY FOR THE WORLD BELOW

Kongsberg Mesotech Ltd. (Mesotech), the Canadian subsidiary of Kongsberg Maritime, is a global leader in the underwater acoustic industry. With over 40 years of innovative product development and manufacturing experience, we designs and produces underwater sonar with superior image resolution.

Characterized by exceptional engineering capabilities, Kongsberg Mesotech continues to make technological advances and to expand its product lines through research and development. We remain competitive and keep pace with the ever-increasing spectrum of markets by focusing on customer satisfaction and producing quality, reliable products.

We supply a worldwide customer base with products for search and recovery, marine engineering, security and surveillance, fisheries and other underwater applications. Mesotech has an extensive support network including product training and experts available for application support and data interpretation.



M3 SONAR®

Multimode Multibeam for Multiple Applications

- Generates imaging and bathymetric datasets from one sonar head
- Produces single-beam image quality with the speed of multibeam sonar
- Provides GeoTIFF output and creates real-time mosaic using third-party software
- Compliant to IHO Special Order & 1A
- Uses Linear FM, CW and Doppler pulses

The innovative design of the M3 Sonar® uses two sets of complementary transducers which allow it to generate both imaging and bathymetric data with the same head. Unique to the M3 Sonar® is the patented eIQ mode of operation that generates multibeam images with unprecedented clarity.

The M3 Sonar® has the ability to configure applications using complex pulses. The system allows the operator to interleave active pings and passive listening modes, Doppler, multiple true-zoom windows (up to 4) with linear FM and CW imaging modes of operation.

Data outputs are compatible to the following third party software:

Hypack	QINSy	MATLAB	Caris
OIC SAMM	Echoview	EIVA	Visual Soft

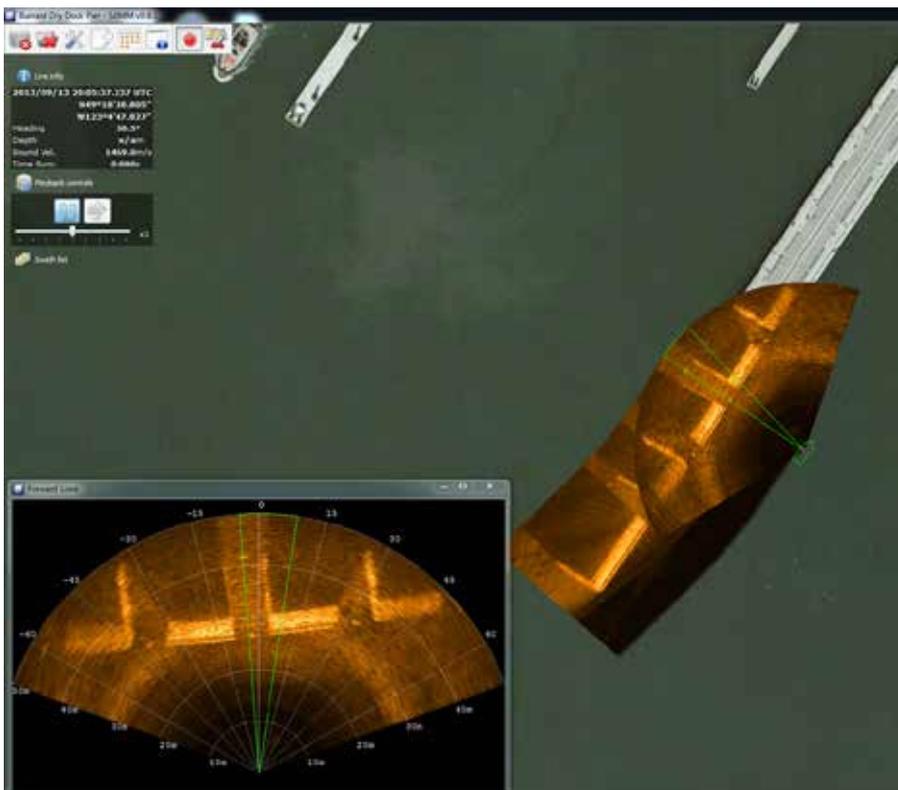
Five operating modes:

1. Imaging
2. Enhanced Image Quality (eIQ)
3. ROV Navigation (selects eIQ or imaging based on range)
4. Profiling/Bathymetry
5. Dual Head Pipeline survey

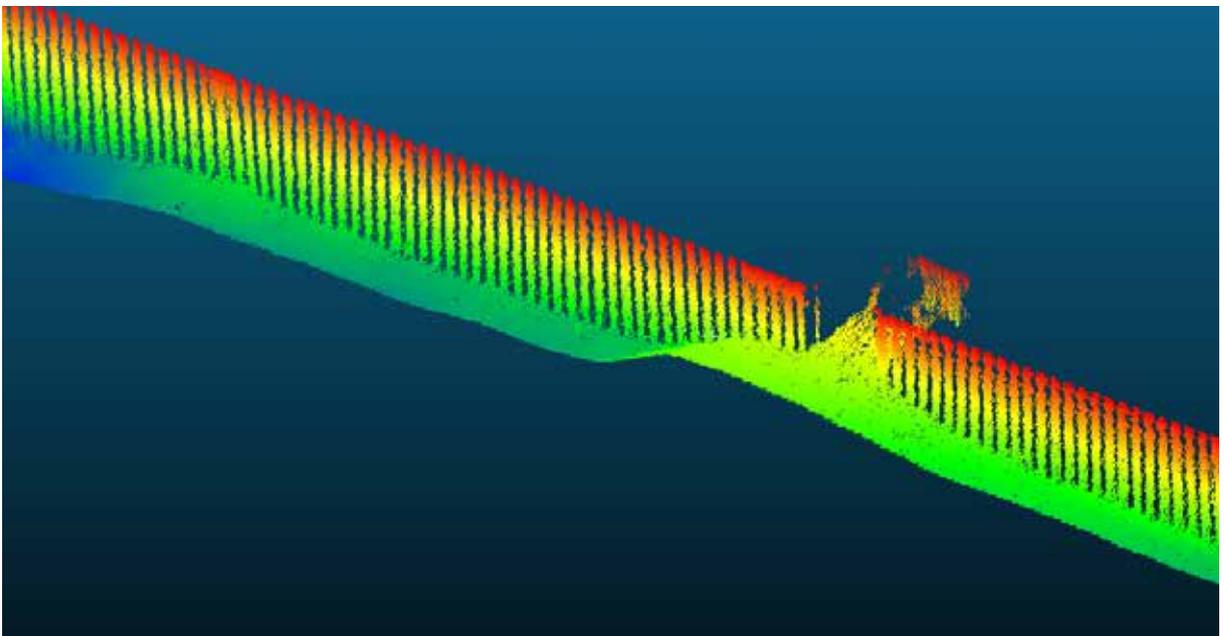
Applications

- Marine engineering & site inspection
- Shallow water bathymetric surveying
- ROV navigation / obstacle detection & avoidance
- Pipeline surveying
- Search & recovery
- Underwater security & inspection
- Environmental monitoring
- Underwater construction support
- Scientific research

From top right clockwise: 1. 500m M3 Sonar®, 2. Complete M3 Sonar® System packed for shipment, 3. Real-time image mosaic of a pier using SAMM Software (standalone mosaic software).



Bathymetric data examples. Top image: Mactaquac survey; data courtesy UNB Ocean Mapping Group. Bottom image: Sheet pile 3D point cloud processed in Hypack.



HIGH-RESOLUTION SCANNING SONAR

- Narrower horizontal beam angle and smaller angular resolution for superior image quality
- Tuneable frequency transducers (model dependant)
- Exposed transducer to eliminate acoustic lensing
- Increased power output for better signal to noise ratios

The 1171 Series High-Resolution Scanning Sonar sets the industry standard for image clarity. No other scanning sonar comes close to the image resolution generated by this scanning sonar. With a frequency bandwidth of 500 kHz-plus, an operator can tune the unit for range or resolution. The bare-faced transducer is unaffected by high temperature or high pressure-induced defocusing seen in domed heads from other manufacturers.

Mesotech's high-resolution scanning sonar is available in two configurations:

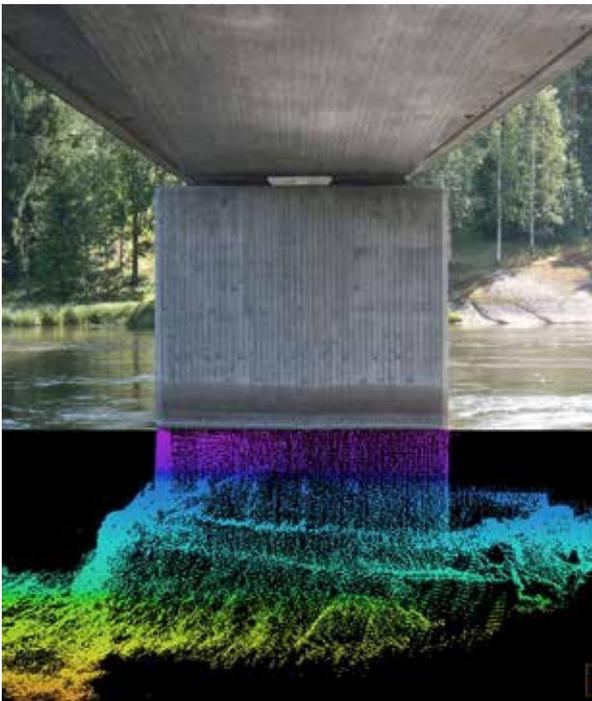
1. Imaging sonar
2. Combined imaging and profiling sonar

The High-Resolution heads use custom-made composite transducers that provide the highest possible bandwidth with the benefit being image sharpness. The combination fan/cone transducer is the standard for marine engineering and construction companies that need both imaging and profiling capabilities.

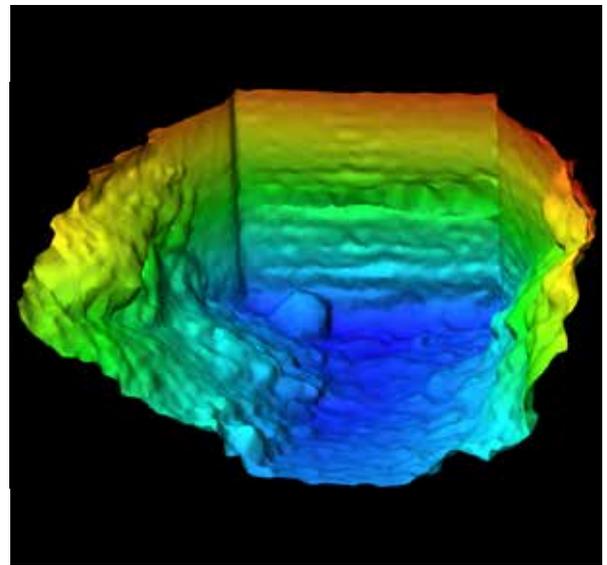
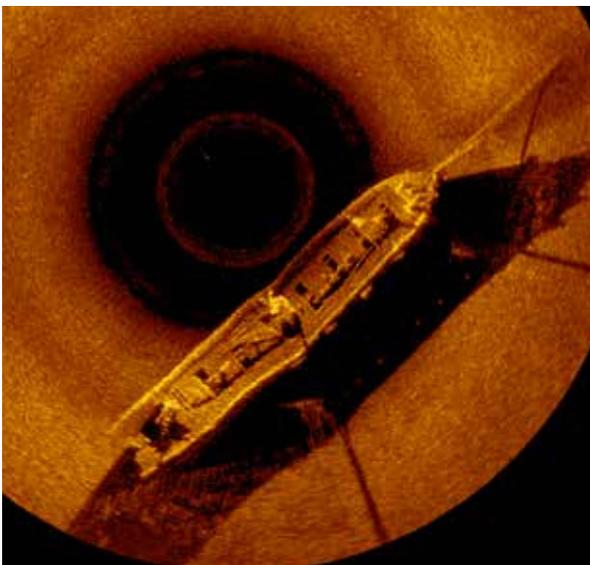
Applications

- Underwater inspection
- Underwater construction support
- Search and recovery
- Underwater visualization of vertical structures
- Diver support
- Scour and sediment monitoring
- Archaeological surveying
- Environmental monitoring
- Underwater security & Inspection
- 3D point cloud profiling (when fitted to a KML precision rotator)

Left image: below waterline acoustic profiling of bridge pier (VRT Finland OY). Right image: HiRes Sonar Heads from top to bottom - fan beam transducer (imaging); fan/cone (imaging and profiling) transducer; back-to-back fan (imaging) transducer.



Data examples. Top: Seawall visualization survey (Nautilus Marine Group LLC). Middle left: Shipwreck survey. Middle right: 3D model of an intake (Dominion Divers). Bottom: Riverbed profile (VRT Finland OY).



CLARISCAN

- New patented acoustic lens technology
- Improved image resolution and sharpness
- Improved operating range and frequency

Clariscan is Mesotech's latest innovation in domed sonar technology. Clariscan combines the Company's wide-bandwidth composite transducer with a patented acoustic lens to provide unprecedented image clarity from a domed sonar head.

Domed Sonar Background

In the 1990s, designers enclosed the transducer in an oil-filled dome to provide mechanical protection and eliminate flooding due to O-ring failure on the traditional exposed transducer shaft. While the oil-filled dome solved the O-ring flooding failures, it introduced beam defocusing in two conditions, warm & shallow and cold & deep. The beam defocusing effect becomes more extreme in warm shallow water as temperature increases and cold deep water as depth increases. Until now, there has been no solution to this problem, aside from using a high-resolution scanning sonar head.

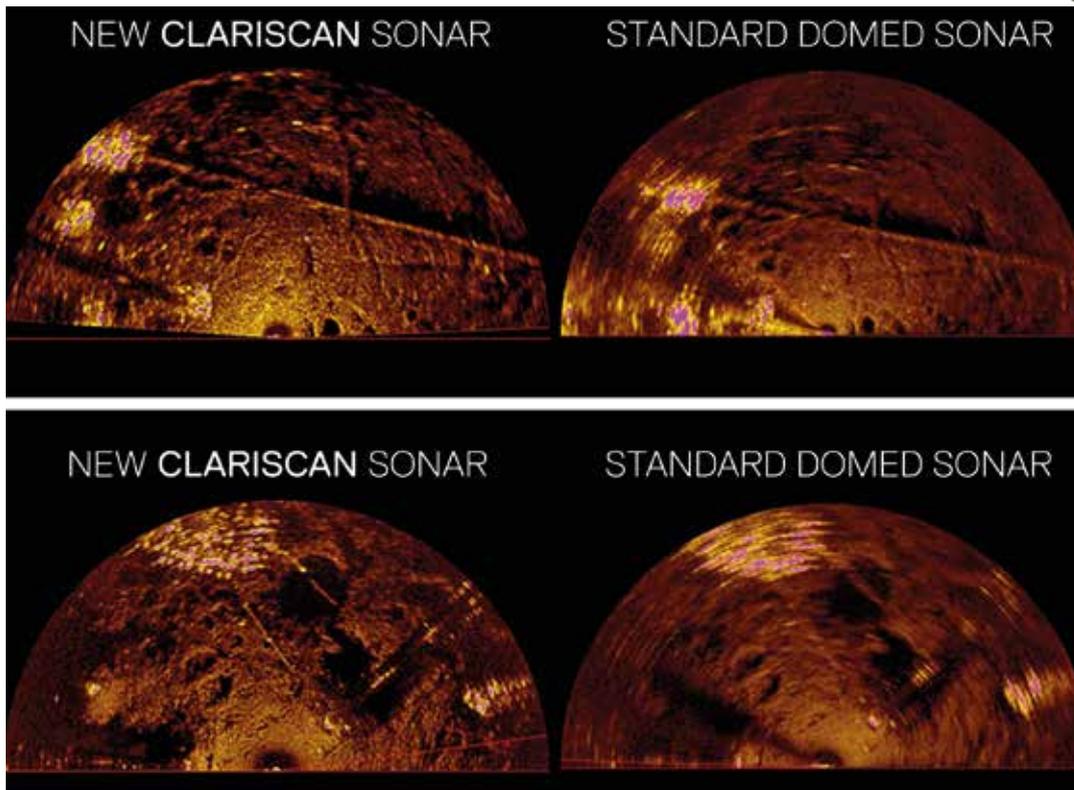
Mesotech engineers solved this problem by designing a patented acoustic lens that maintains beam focus through operational temperature and depth changes, significantly improving sonar performance and resulting in images that are much sharper. The Clariscan acoustic lens behaves like an optical contact lens, correcting the refraction caused by the oil in the dome.

Clariscan is currently available in the 4000M depth-rated version.

Applications

- Obstacle avoidance
- Pipeline survey
- Target detection
- Underwater construction support

Left: Data comparison between two sonar heads mounted side by side on an ROV, exposed to the same temperature, pressure and salinity conditions, and operated simultaneously during image capture. Right: Clariscan sonar head.



DUAL-AXIS SONAR (DAS)

- Designed for long-term deployment in harsh conditions
- Operates using MS1000 Software, in "standalone" mode, or remotely using K-Observer
- Outputs a 3D profile point digital data string

The Dual-Axis Sonar (DAS) is a 3D profiling system designed for long-term seabed or structure monitoring. The continuous 3D surveying capability of the DAS provides crucial real-time information on the dynamics of sediment scour and aggregation, and its rugged design is ideal for deployment on structures located in high current or harsh offshore environments.

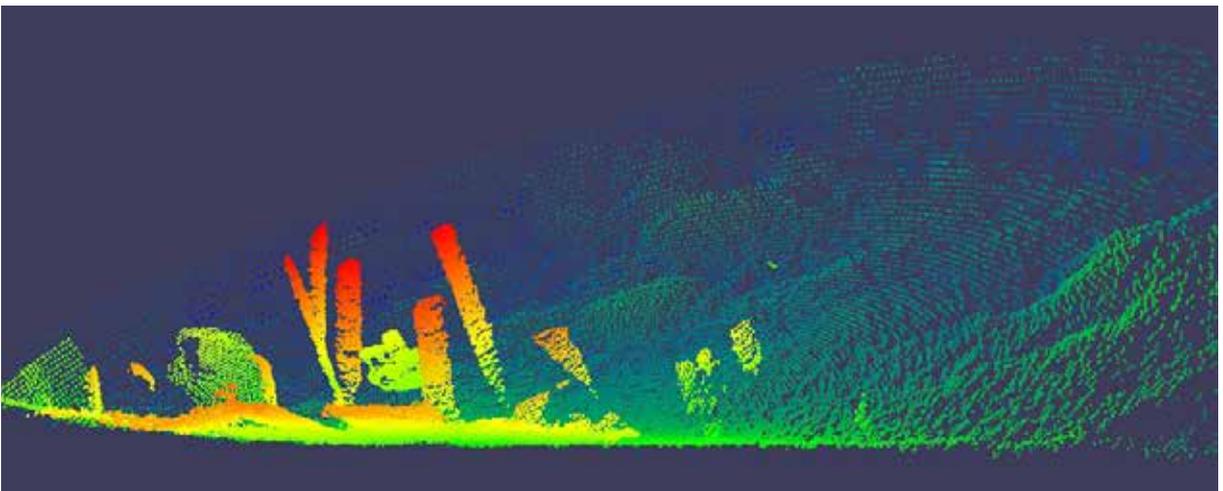
This scanning sonar works with both the MS1000 software program or in "standalone mode" where the data is logged in the head and transmitted to shore via cable or wireless telemetry.

The DAS outputs an X, Y, Z serial data string of profile points that is processed by Kongsberg Maritime's K-Observer, or any other third-party digital terrain modelling software packages.

Applications

- Berth depth monitoring reporting system
- Scour monitoring
- Bridge scour & sediment aggregation studies
- Sediment build-up in holding ponds or dam faces

Clockwise from right: Four DAS sonar heads connected to the K-Observer monitoring and reporting system. Bottom: DAS 3D point cloud processed through K-Observer showing pilings. Below: Photo of bridge pilings shown in DAS point cloud.



ALTIMETERS

- Robust design
- MS1000/Express capability
- Easy to configure analogue/digital outputs
- 3000M, 6000M and 11,000M depth ratings

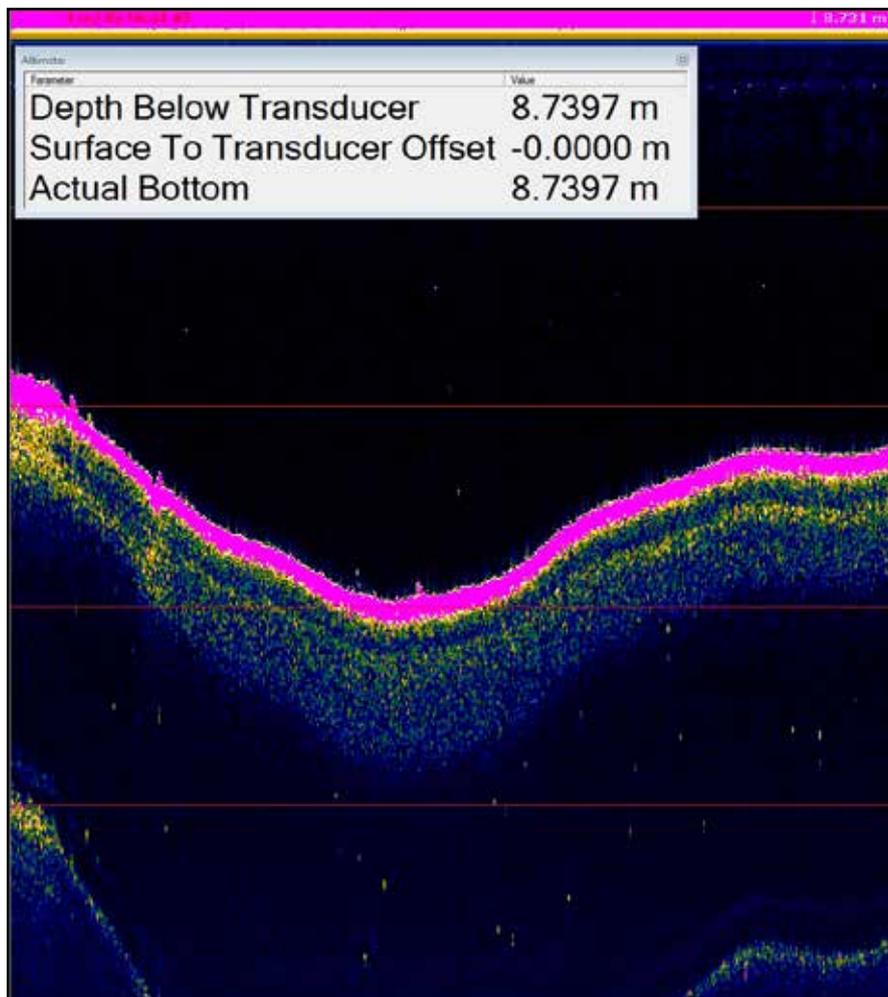
The 1007D Series underwater altimeters are ideally suited for deep ocean applications and are primarily used on underwater vehicles (ROVs and AUVs). Various depths and frequencies are available to suit different applications.

Mesotech altimeters can be programmed for minimum/maximum ranges, configured to output digital or analogue signals

Applications

- ROV/AUV altitude
- Obstacle avoidance
- Positioning
- Upward-looking surface level monitoring

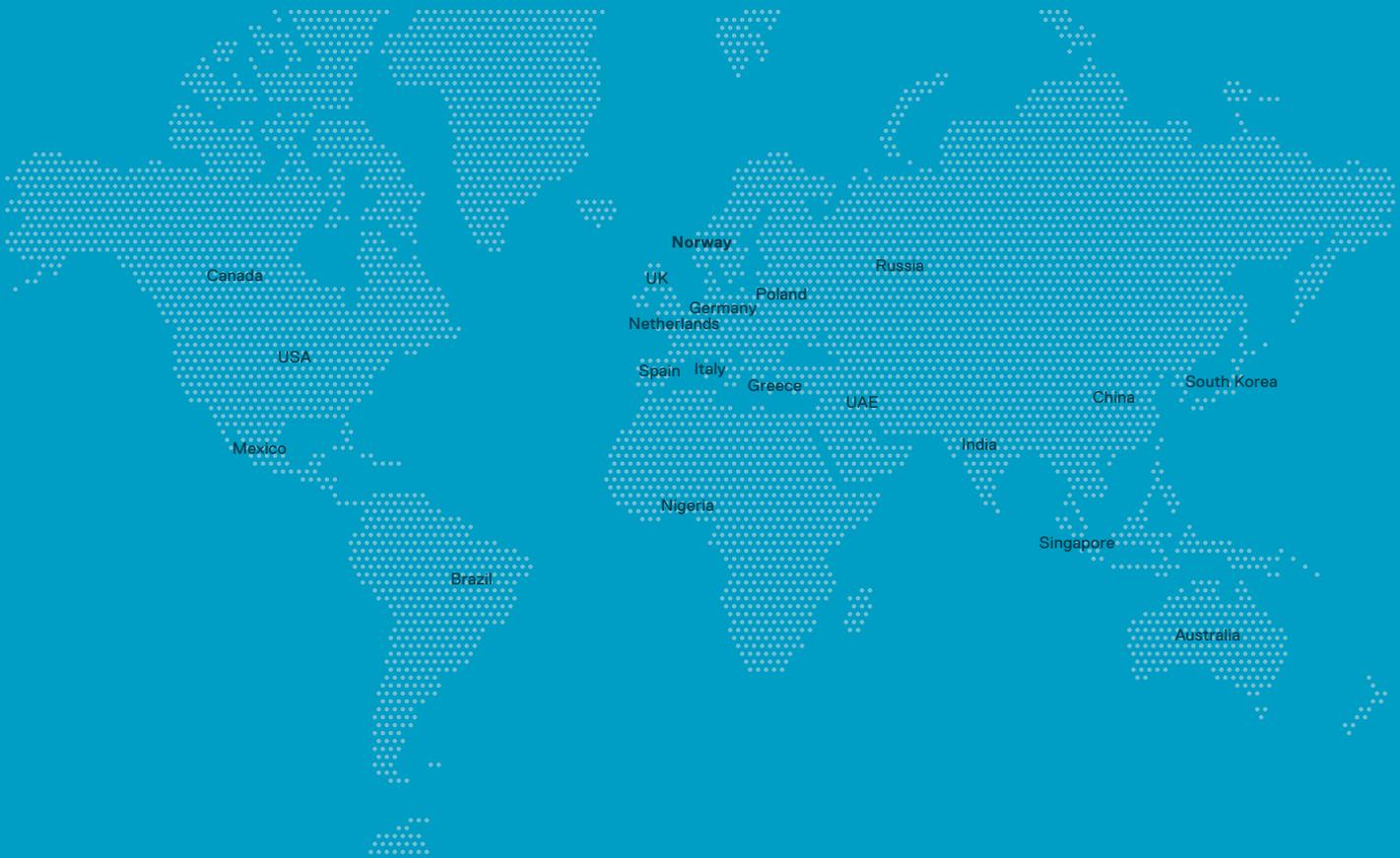
Altimeter echo-sounder display in MS1000 Software showing the seabed.



TRAINING AND SUPPORT

As part of our commitment to total customer satisfaction, we offer a wide variety of services to meet individual customers' operational needs. Mesotech has an extensive support network including product training and experts available for application support and data interpretation.

Service work is carried out at the Mesotech factory and authorized service centres around the globe. With expert staff well versed in both your systems and the local supplier base, Mesotech ensures professional sourcing, procurement and delivery of sophisticated and technical parts exactly where and when they're needed.



SALES SUPPORT

Call +1 604 464 8144
E-mail: km.sales.vancouver@kongsberg.com

PRODUCT SUPPORT

Call +1 604 464 8144
E-mail: km.support.vancouver@kongsberg.com

KONGSBERG MESOTECH LTD.
1598 Kebet Way, Port Coquitlam, BC V3C 5M5
www.kongsbergmesotech.com

kongsbergmesotech.com



KONGBERG