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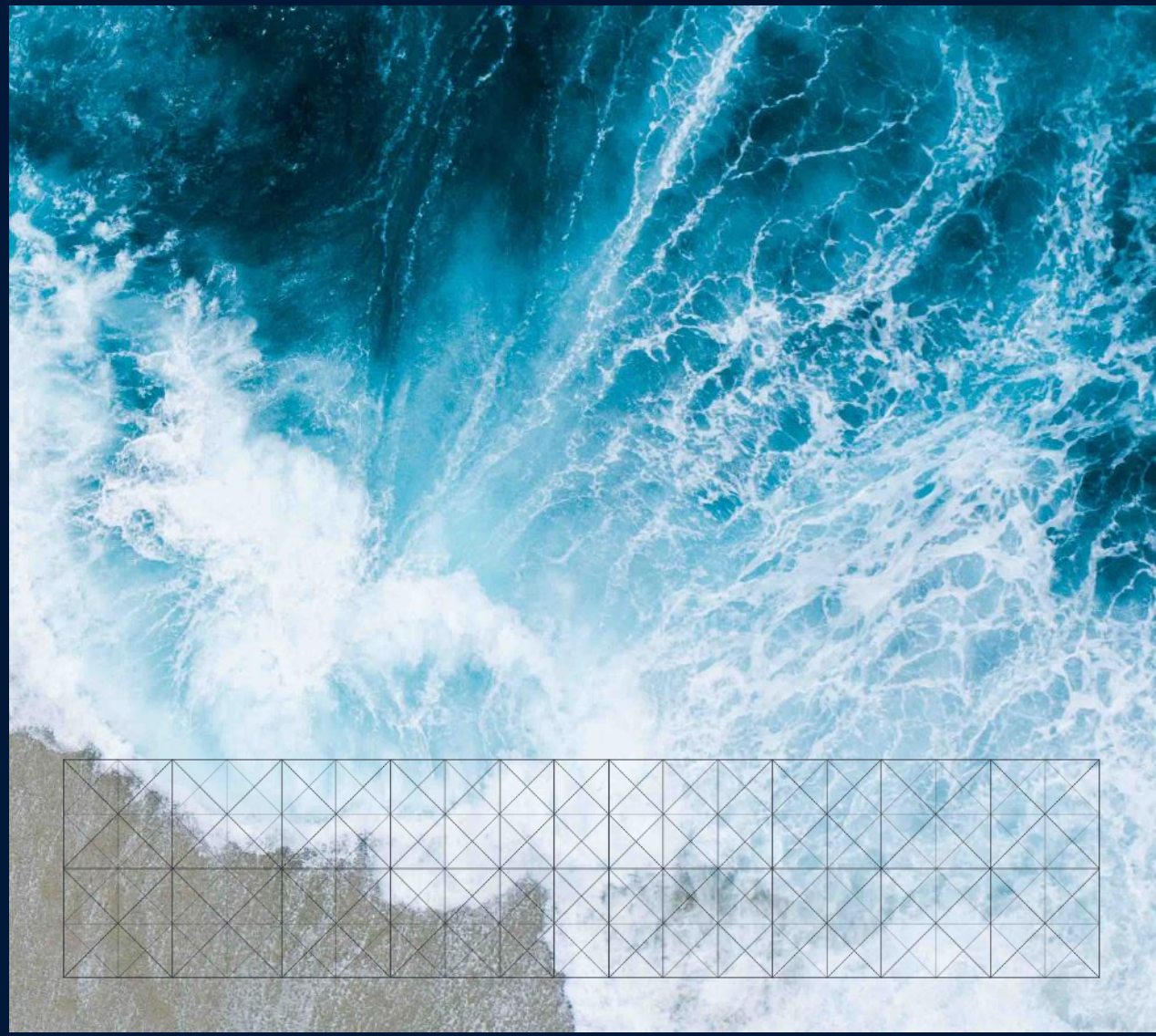
2018

Kongsberg Maritime Remote Survey Capabilities

10/01/2019

Dr Martin Gutowski
Regional Sales Director Subsea
Richard Mills
Director Marine Robotics Sales



Kongsberg Group 200 Years of Innovation

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From Deep Sea to Outer Space

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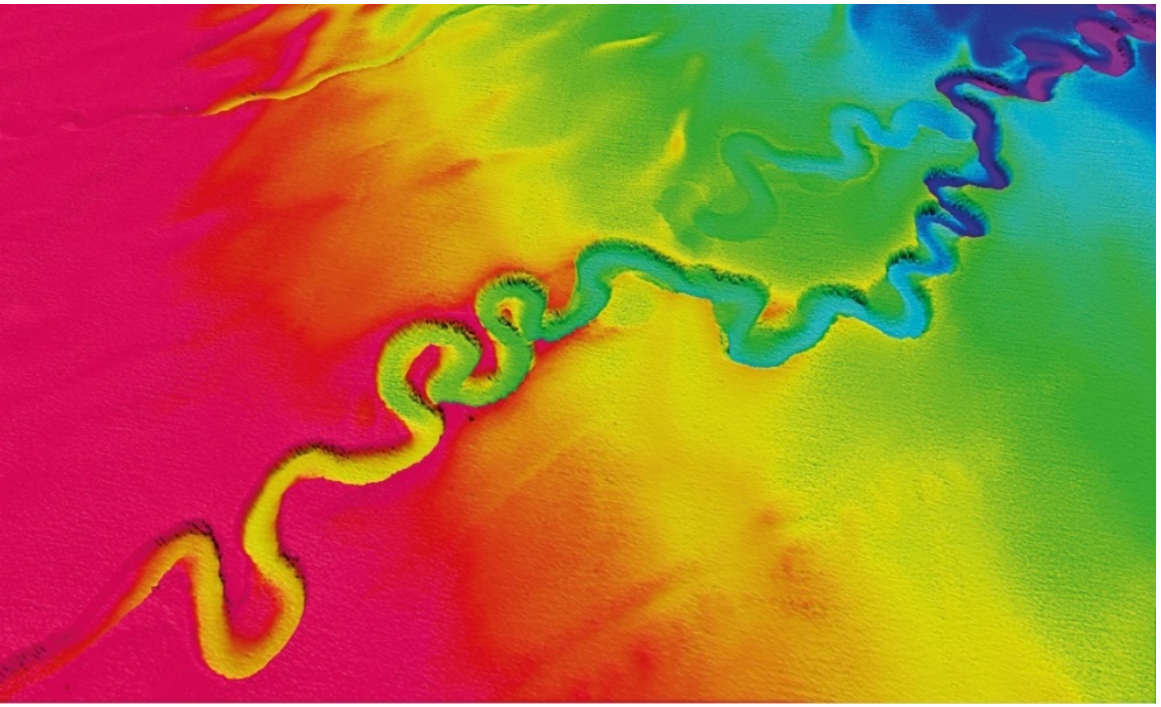
EM 304



Deep Sea Channels, depth 2100m, EM 302 2X2. Courtesy of IOLR

Higher number of beams for denser sounding pattern on seabed

- >1600 individual beams; maintained and automatically adjusted according to achievable coverage or operator defined limits
- 1600 for a 0.5 and 1 degree RX
- 1024 for a 2 degree RX
- 512 for a 4 degree RX (dual swath mode)

Full ensonification of the seabed

- 16 individual sector in dual swath mode, 8 sectors per swath
- Active real-time, stabilization of the transmit fan correcting for any yaw and pitch movement
- Roll stabilization applied on receiving beams

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EM 124

Long range	
Nominal frequency	12kHz
Frequency sweep	10.5 – 13.5 kHz
Range	20-11.000m, or full ocean depth
Max swath width	40 km 6x water depth 140 degrees coverage
Pulse length	1 ms CW to 100 ms FM effective pulse length
Ping rate	Maximum 10 Hz Limited by the round trip travel time in the water
Range sample rate	3.25 kHz (23 cm)

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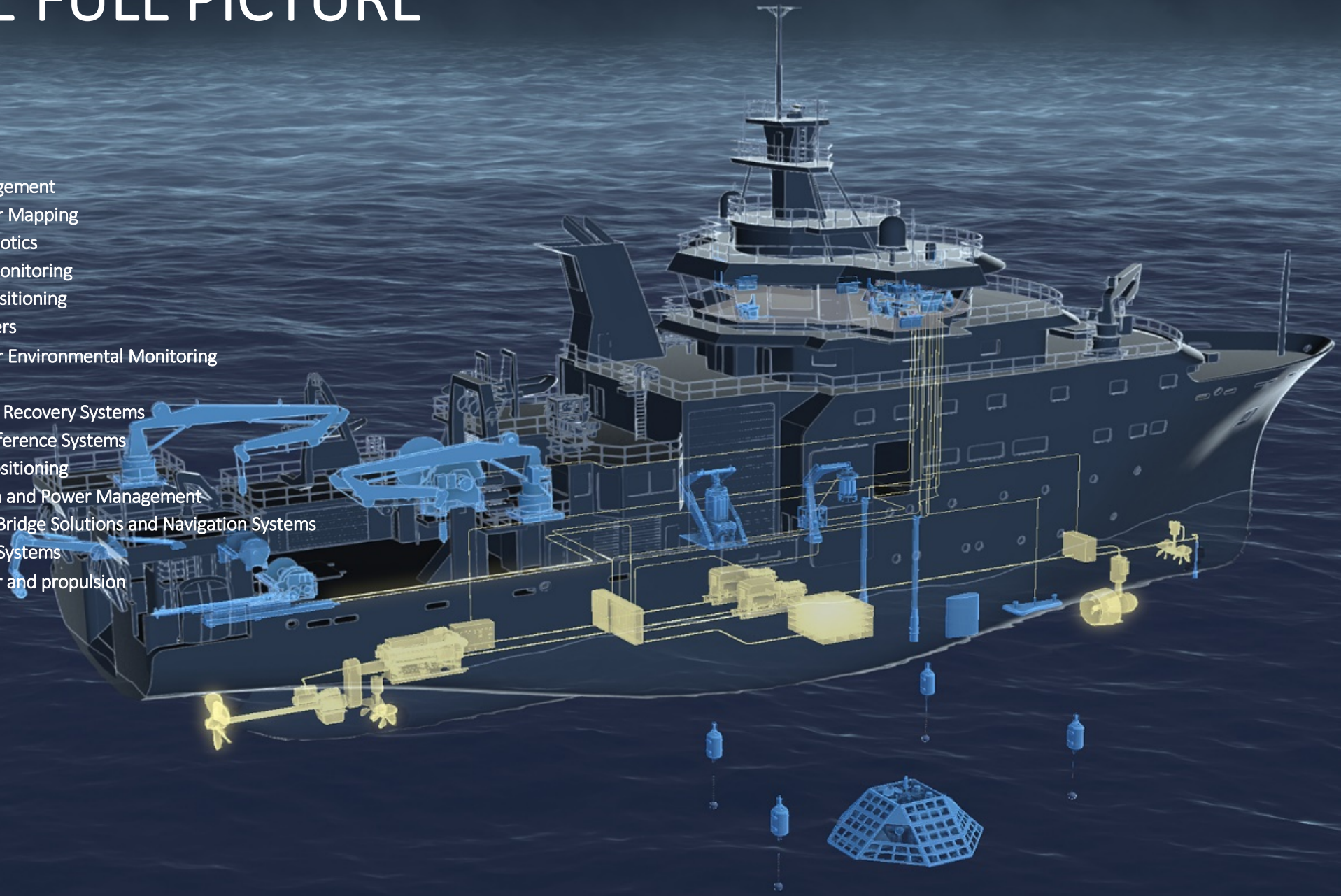
EM 2040P MKII

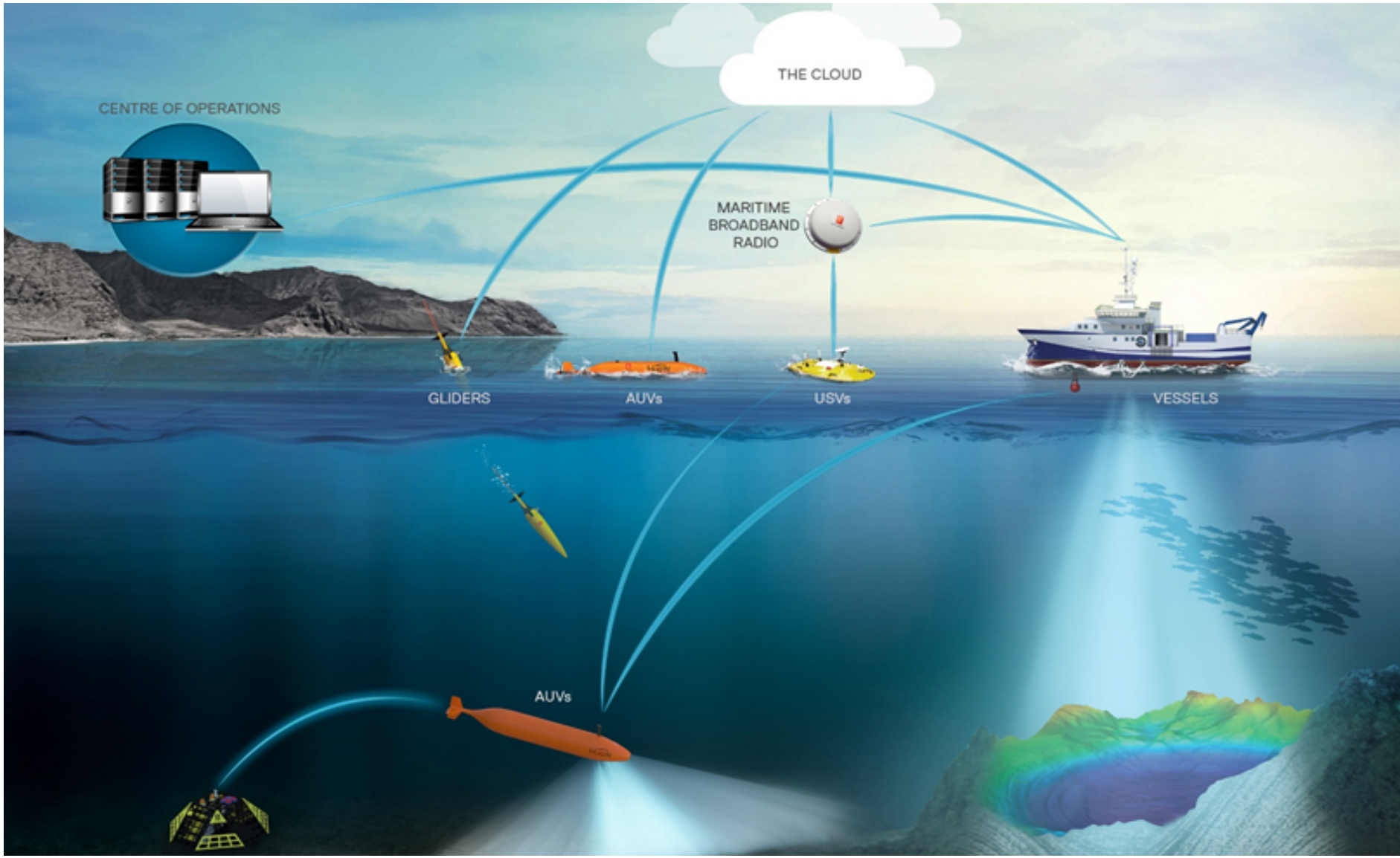
THE FULL PICTURE

- Data Management
- Underwater Mapping
- Marine Robotics
- Scientific Monitoring
- Acoustic Positioning
- Transponders
- Underwater Environmental Monitoring
- Camera
- Launch and Recovery Systems
- Position Reference Systems
- Dynamic Positioning
- Automation and Power Management
- Integrated Bridge Solutions and Navigation Systems
- Simulation Systems
- NEW power and propulsion



Best quality data

Collected in the most cost effective manner



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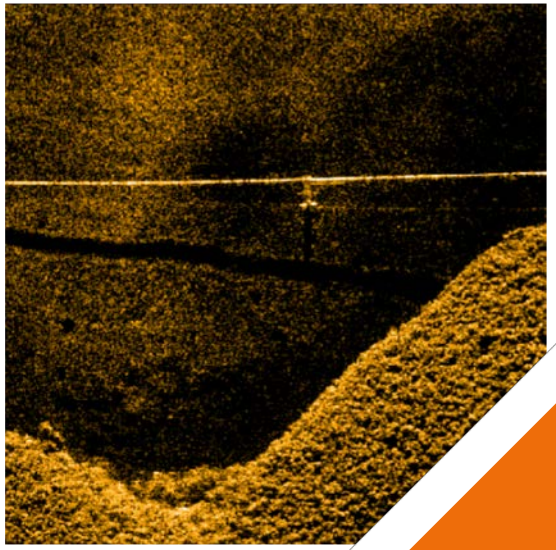
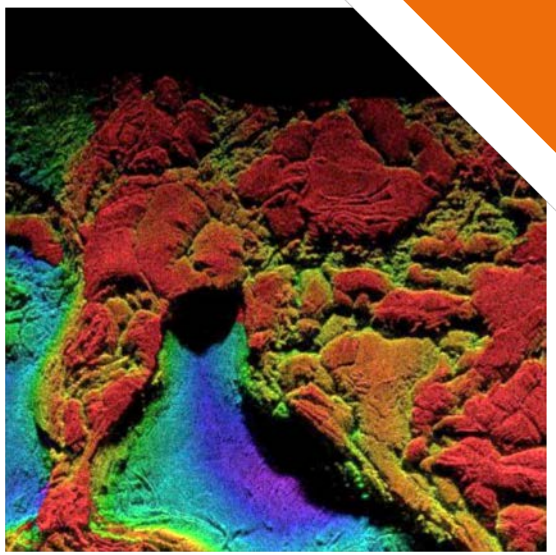
Kongsberg Maritime
Marine Robotics

Kongsberg Maritime Marine Robotics

We collect high value data and provide reliable processing tools to make a cohesive and accessible data set.

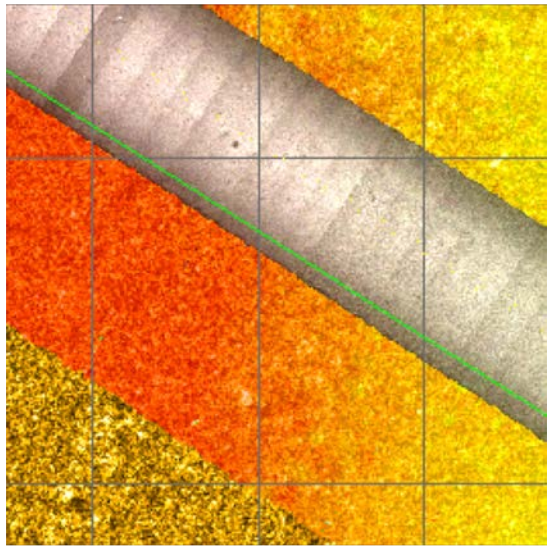




It’s all about the data, from collection to reporting

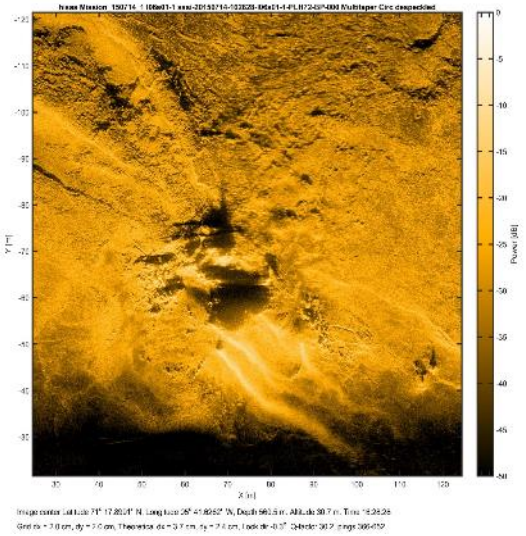
Marine Robotics System Applications

Our platforms are capable of multi-role operations designed to work in commercial, scientific, governmental and defence applications



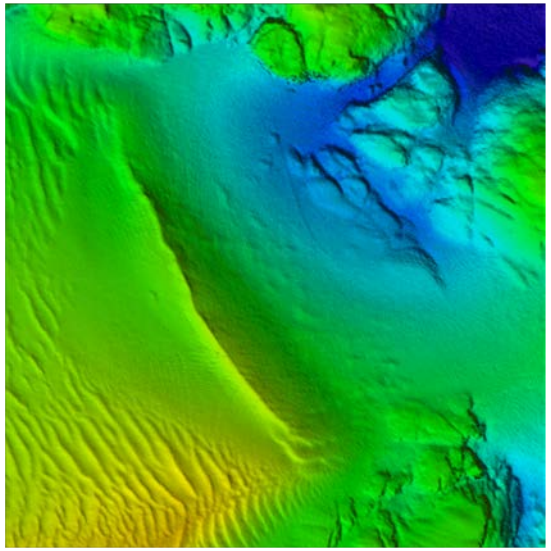
COMMERCIAL

Geophysical survey, site characterisation, route selection, pipeline survey and inspection etc.



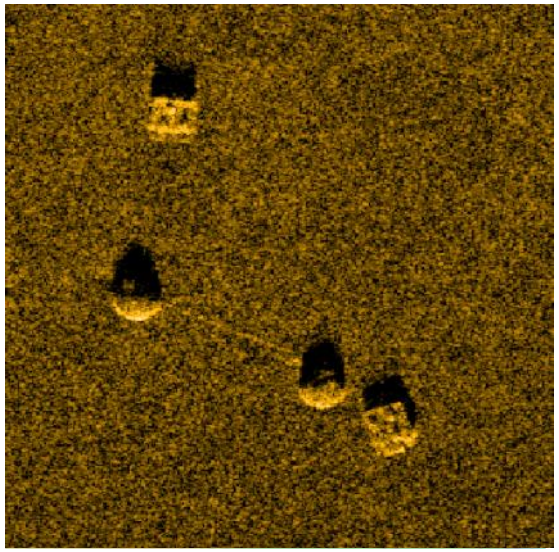
SCIENTIFIC

Environmental assessment, marine archaeology, sediment and scour survey, mineral exploration etc.



GOVERNMENTAL

Hydrography, search and rescue, environmental impact studies, pre-license exploration etc.



DEFENCE

Rapid environmental assessment, mine countermeasures, hydrography, anti-submarine warfare etc.

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Supporting the NF-GEBCO Alumni Team

Kongsberg Autonomy Enabling the System

The USV and HUGIN AUV share some common capabilities derived from Kongsberg Maritime's autonomy developments.

The SEA-KIT USV control is provided by K-MATE with KM scene analysis, mission control and data handling

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USV Systems and Sensors

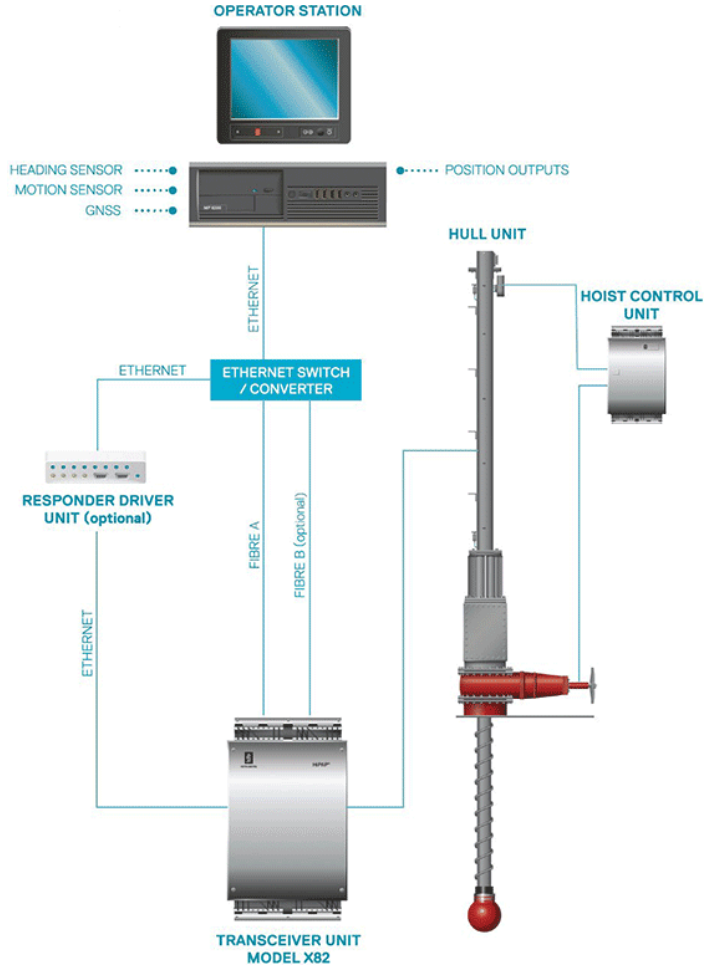
The USV is equipped with many other Kongsberg Maritime Systems and Sensors

MBR

SEAPATH 330

AIS 300

MGC-R3



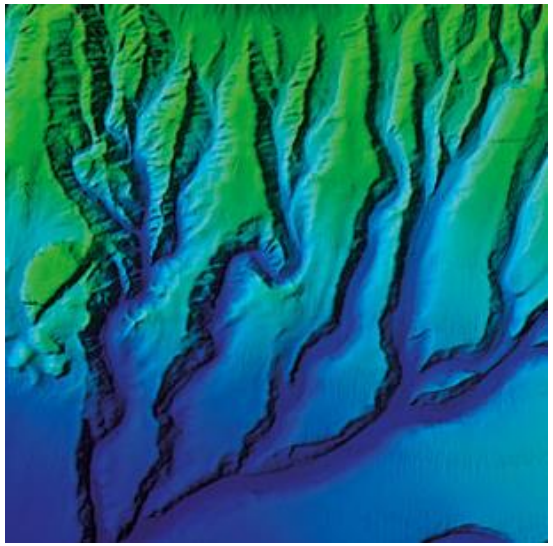
HIPAP 502

Progress Towards Round 2

Kongsberg Maritime has provided equipment, development, personnel and testing facilities to the Nippon Foundation-GEBCO Alumni team

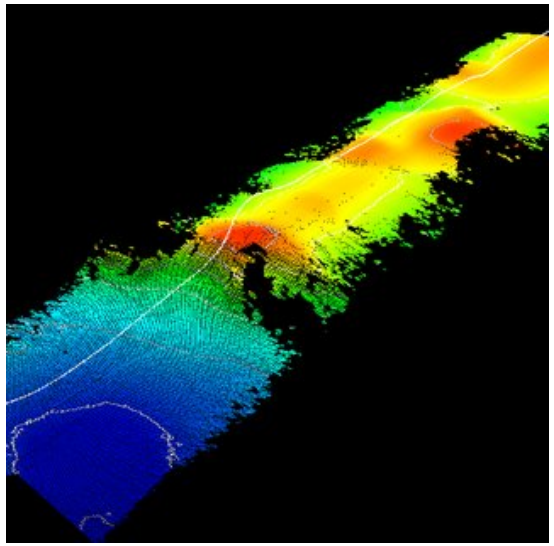
HUGIN AUV

Access to a HUGIN for trials and testing plus for the competition phase, either heavily discounted or free



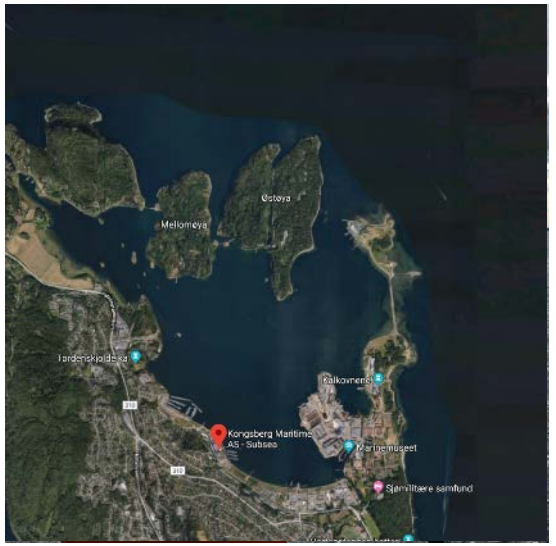
EM304

USV mounted multibeam echosounder for trials, testing and the competition phase with Mapping Cloud to access data rapidly on-shore



DEVELOPMENT

Custom bathyemtry algorithms created for the HISAS on board the HUGIN AUV to generate bathymetry over a much wider swath



TRIALS AND EVALUATION

Free access to trials and evaluation facilities and personnel during development phase

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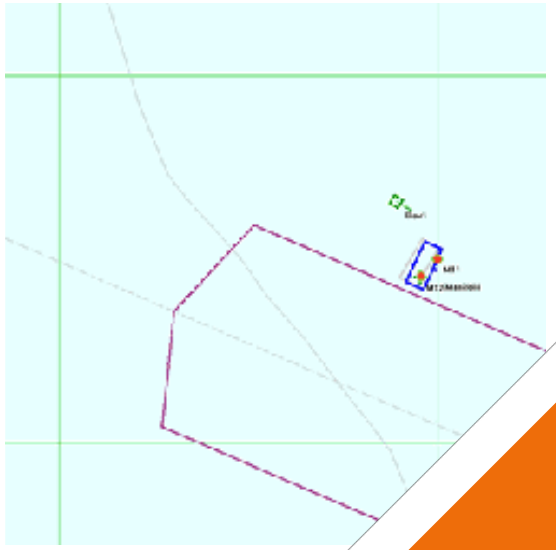
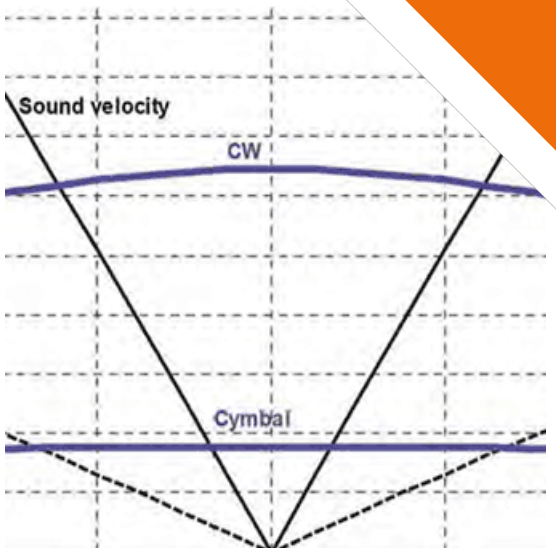
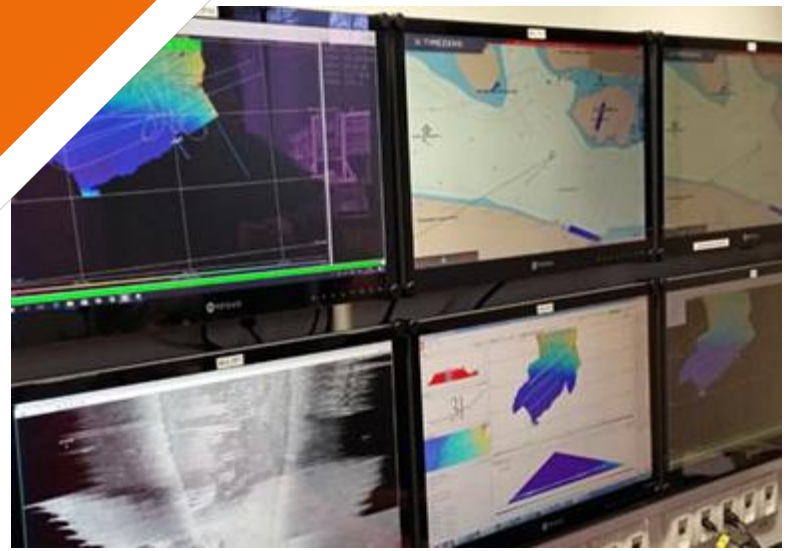


Installing the equipment is just the first part of making it work





Integration, Testing & Optimizing

Kongsberg has provided integration assistance, testing and advice to optimize the performance of the EM304, USV and HUGIN. Overcoming noise on the USV to generate good bathymetry has been a key focus.

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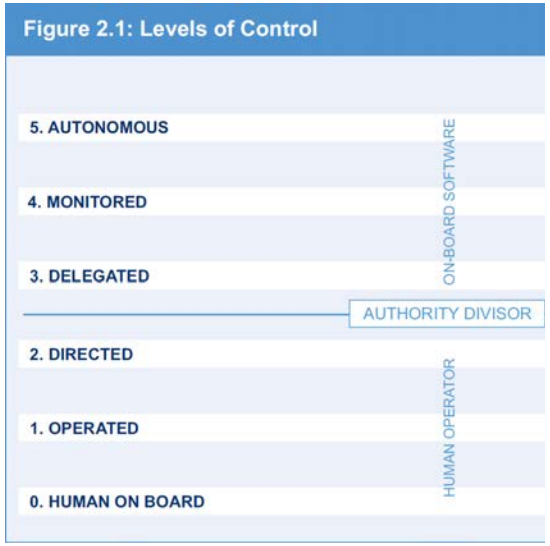
Unmanned Surface Vehicles

Unmanned Surface Vehicle

Deploying Kongsberg Autonomy on Unmanned Surface Vehicles



K-MATE

K-MATE is the controlling software that enables the safe and efficient autonomous operation of USVs

DEVELOPMENT

Working in conjunction with FFI (The Norwegian Defence Research Establishment) we have devloped advanced autonomy for USV

SURVEY CLASS

The Norsafe team have designed a USV for shallow water and near-shore use, controlled by K-MATE and equipped with KM sensor packages

COMBINED SYSTEMS

SEA-KIT has been developed by Hushcraft Ltd, GEBCO and the Nippon Foundation. It is controlled by K-MATE and equipped with KM sensor packages

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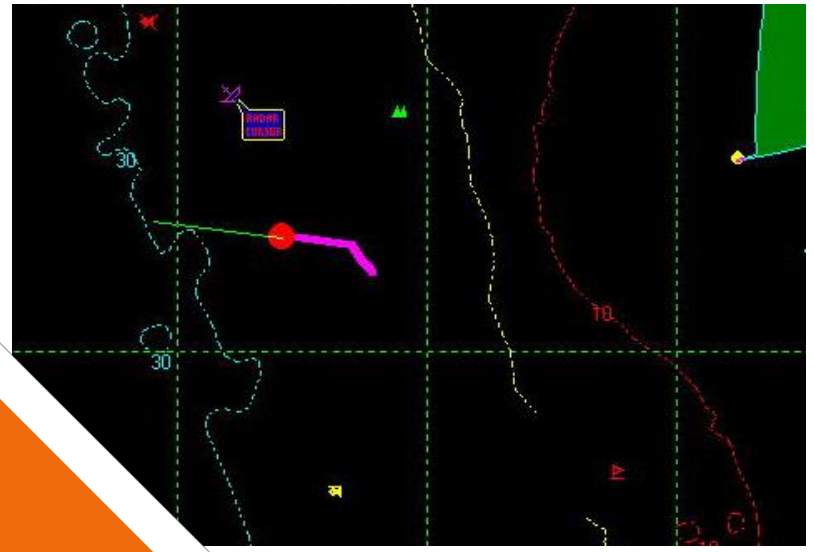
Advanced Control for USVs

K-MATE includes waypoint and event based mission capabilities combined with advanced control for safe operation.



Scene analysis and hazard avoidance

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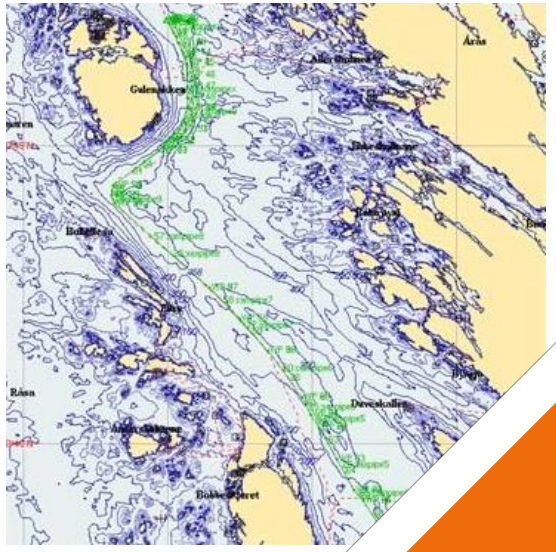
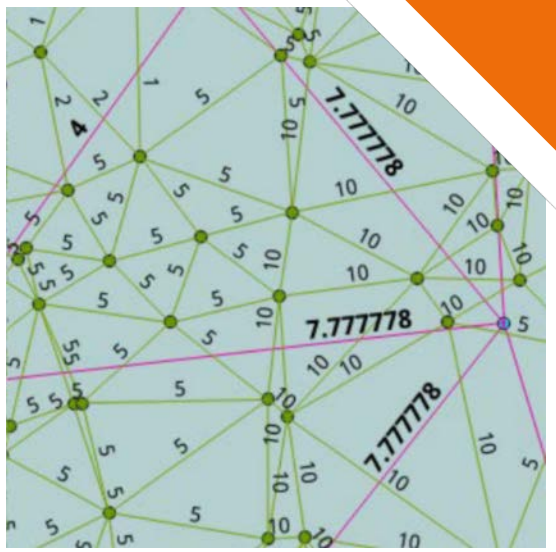
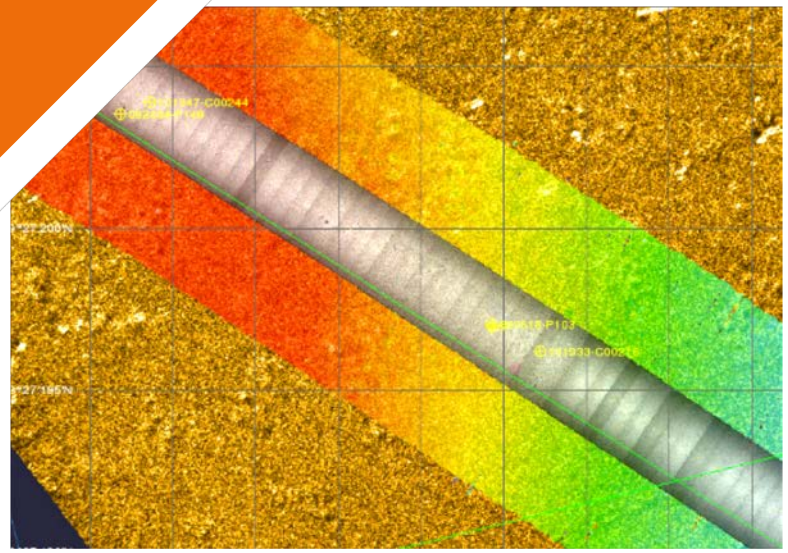


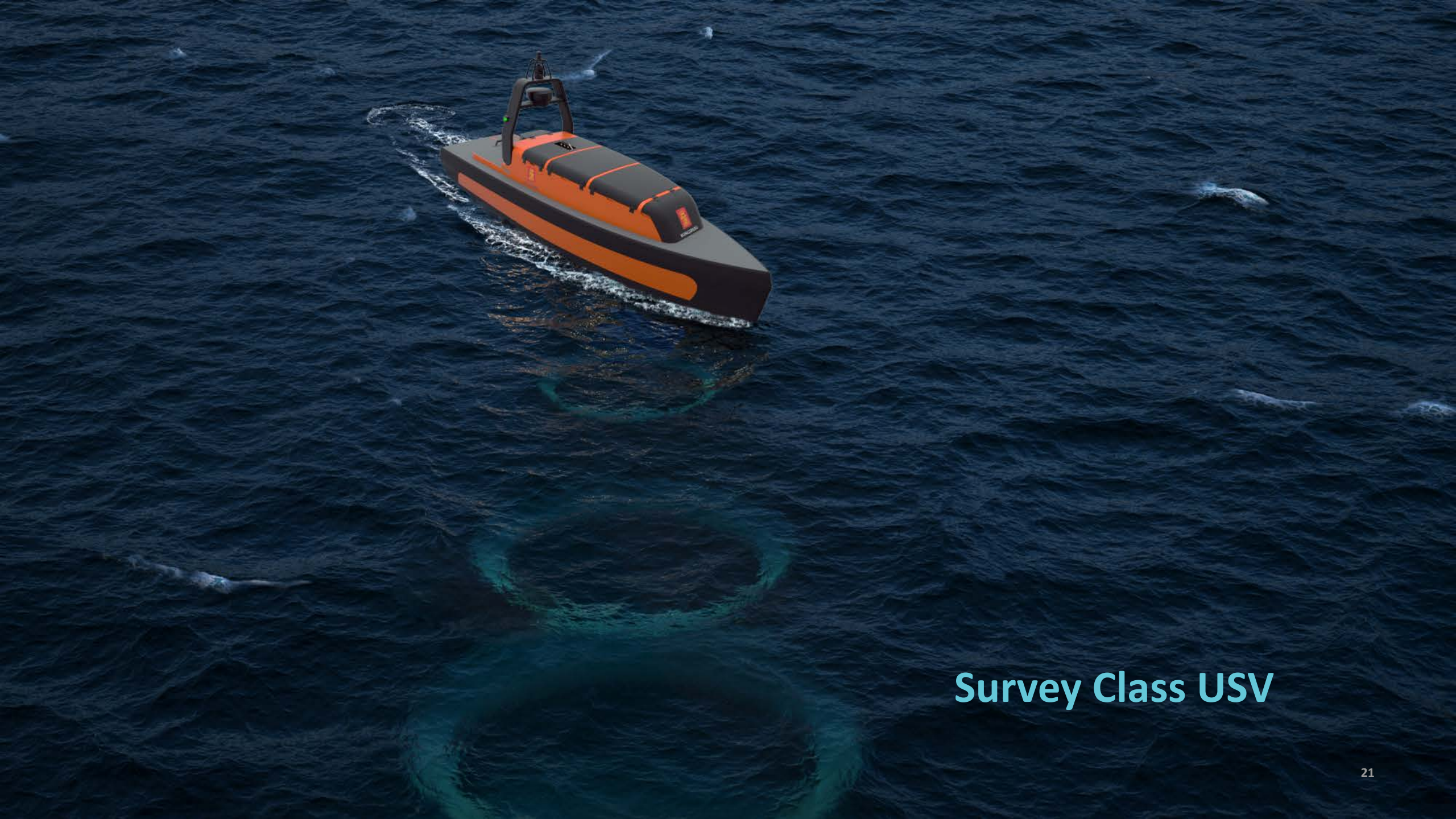
Goal based mission planning & adaptive control





Smart Autonomy

HUGIN OS and K-MATE combine event based autonomy with performance based control making the missions data centric.



Survey Class USV

Survey Class USV

- Length: 8 m
- Width: 2.2 m
- Speed Range: 0-14 knots
- Endurance: ~10 days @ 7 kts
- Survey: ~6.5 days
- IMU: MGC R3
- INS: Sunstone
- GNSS: Novatel GPS
- Comms: MBR, VHF & Satellite
- AIS: Seatex AIS 300
- Radar: Simrad 4G
- Lidar: Velodyne VLP32C
- Cameras: FLIR M400

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Combined Systems

The SEA-KIT USV is designed to launch and recover the HUGIN AUV making it a true stand-alone force multiplier that can operate remotely.

Launch, supervision and recovery of a HUGIN from a USV

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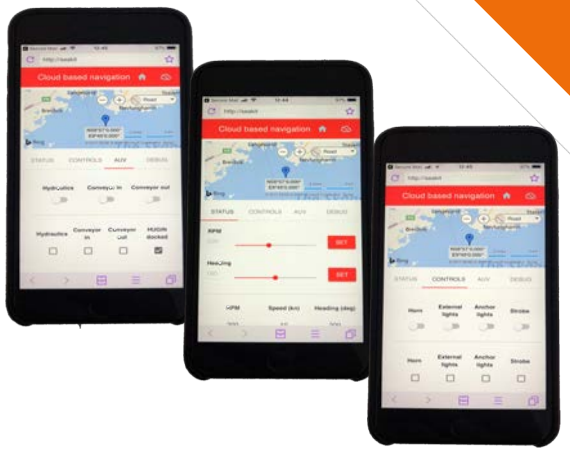
Connectivity

Connectivity Enabling Remote Operation

The implementation of digital connectivity through KongnifAI enables mission supervision and data processing from anywhere.

Providing remote access to data



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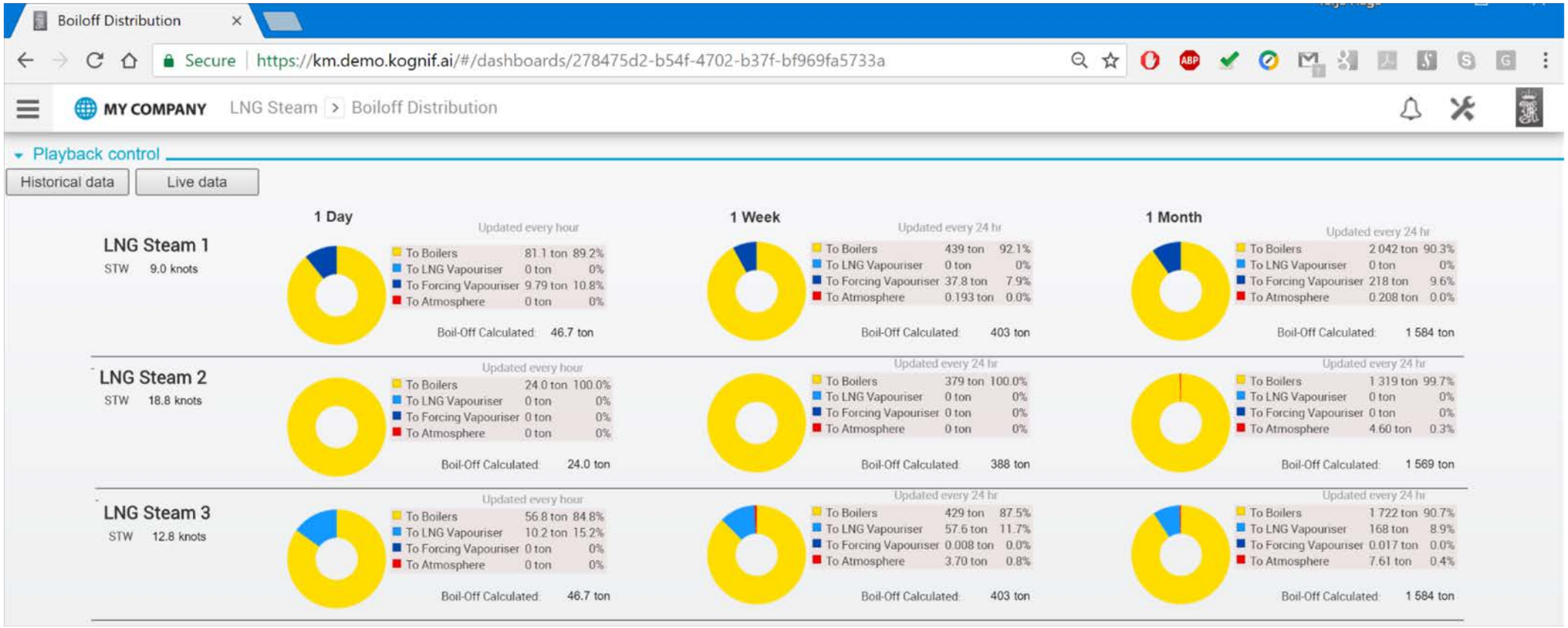
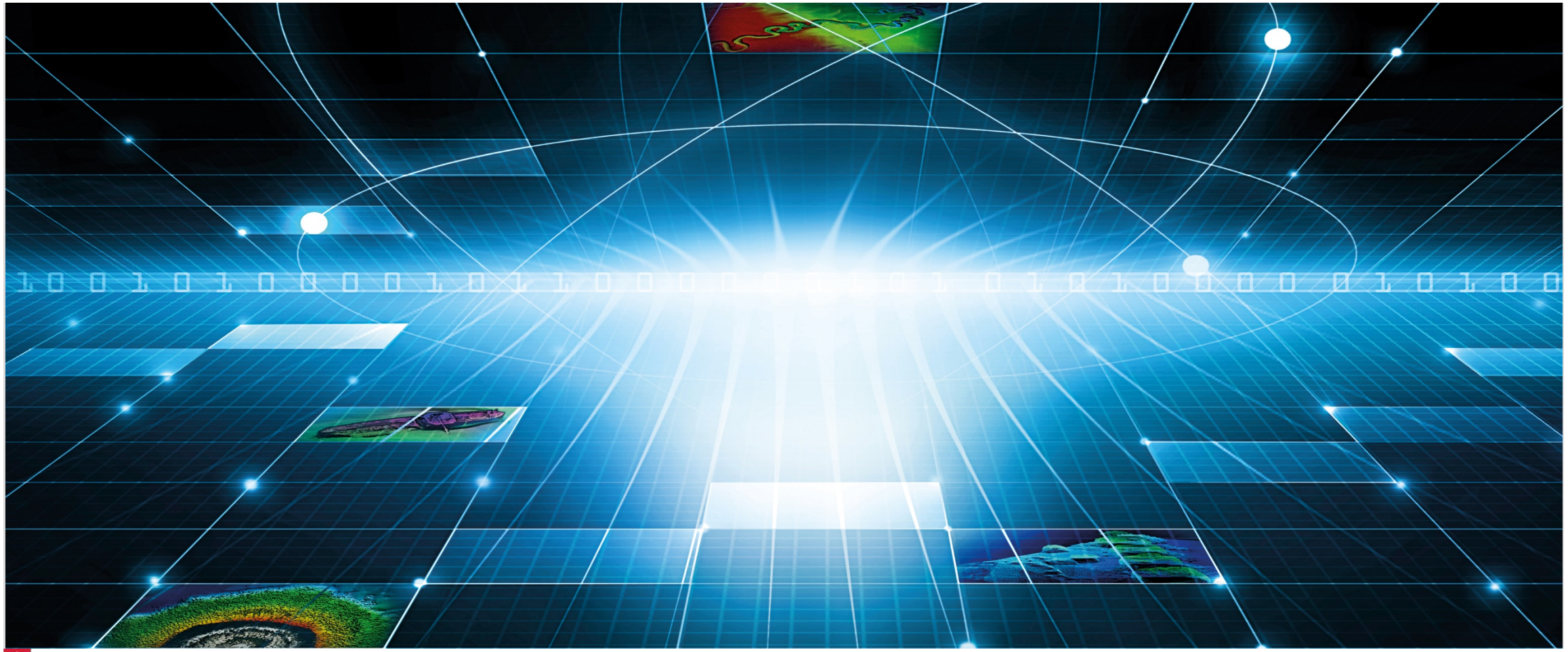
Kognifai in use

Vessel & Fleet Management



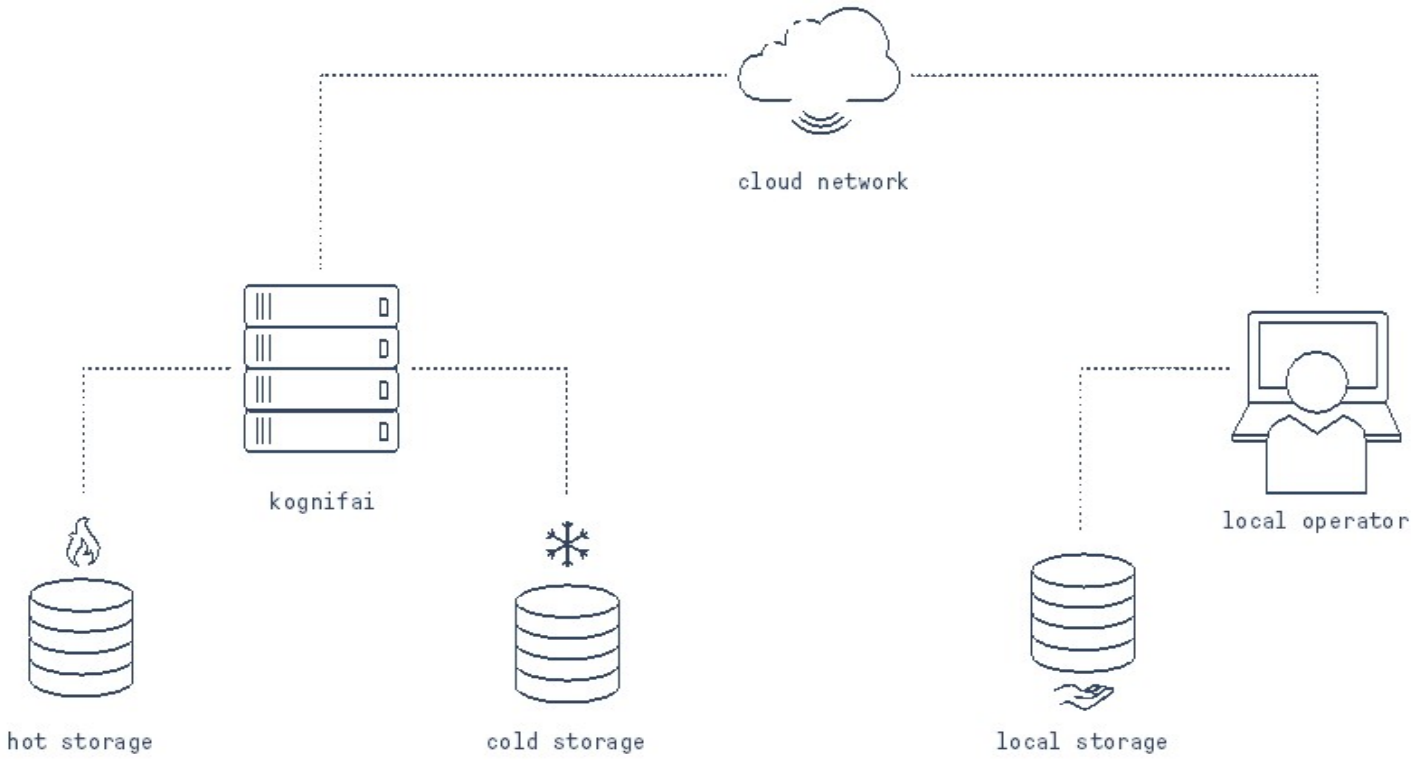
Mapping Cloud

Visualize, analyze and share multibeam data in real time



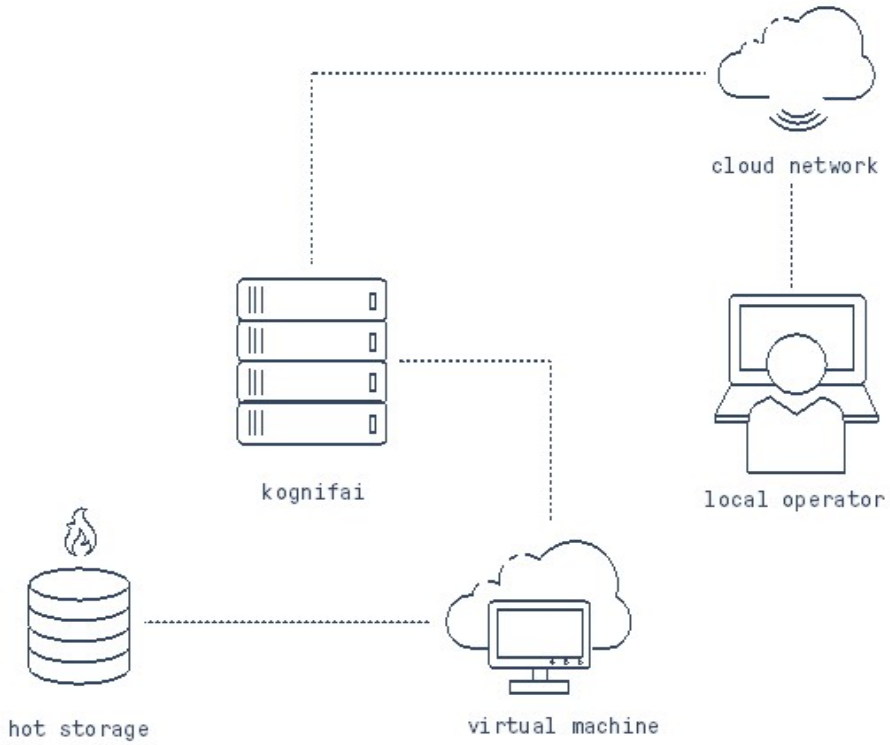
Storage

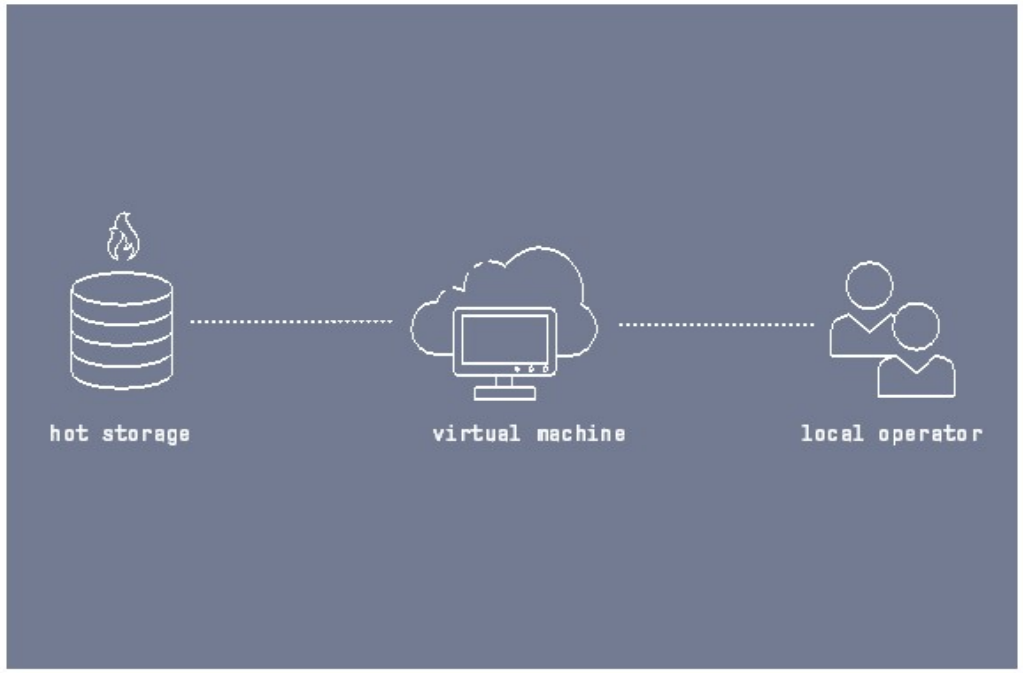
Managing your data in the Cloud



Virtual Machine

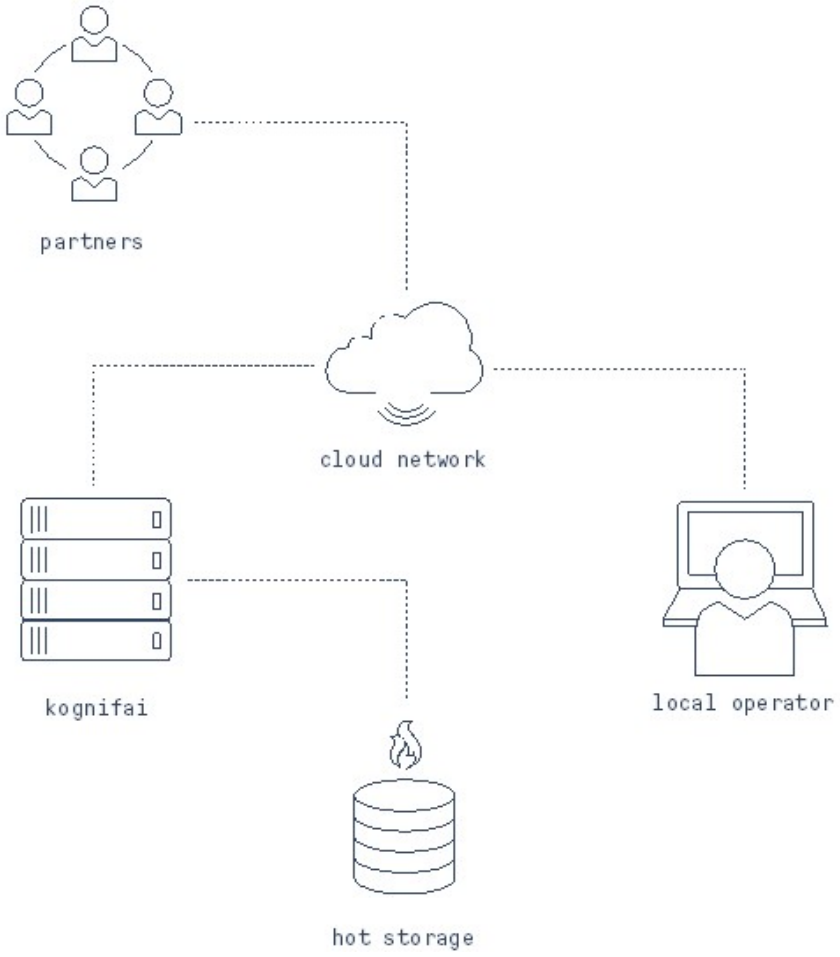
Your completely customised, personal workspace

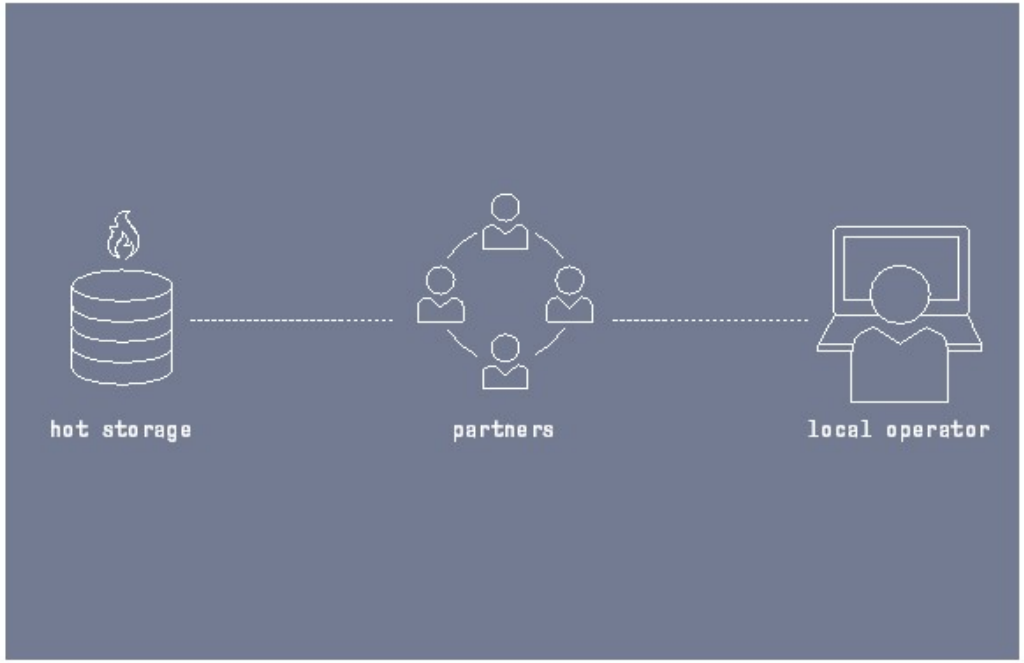




Partners

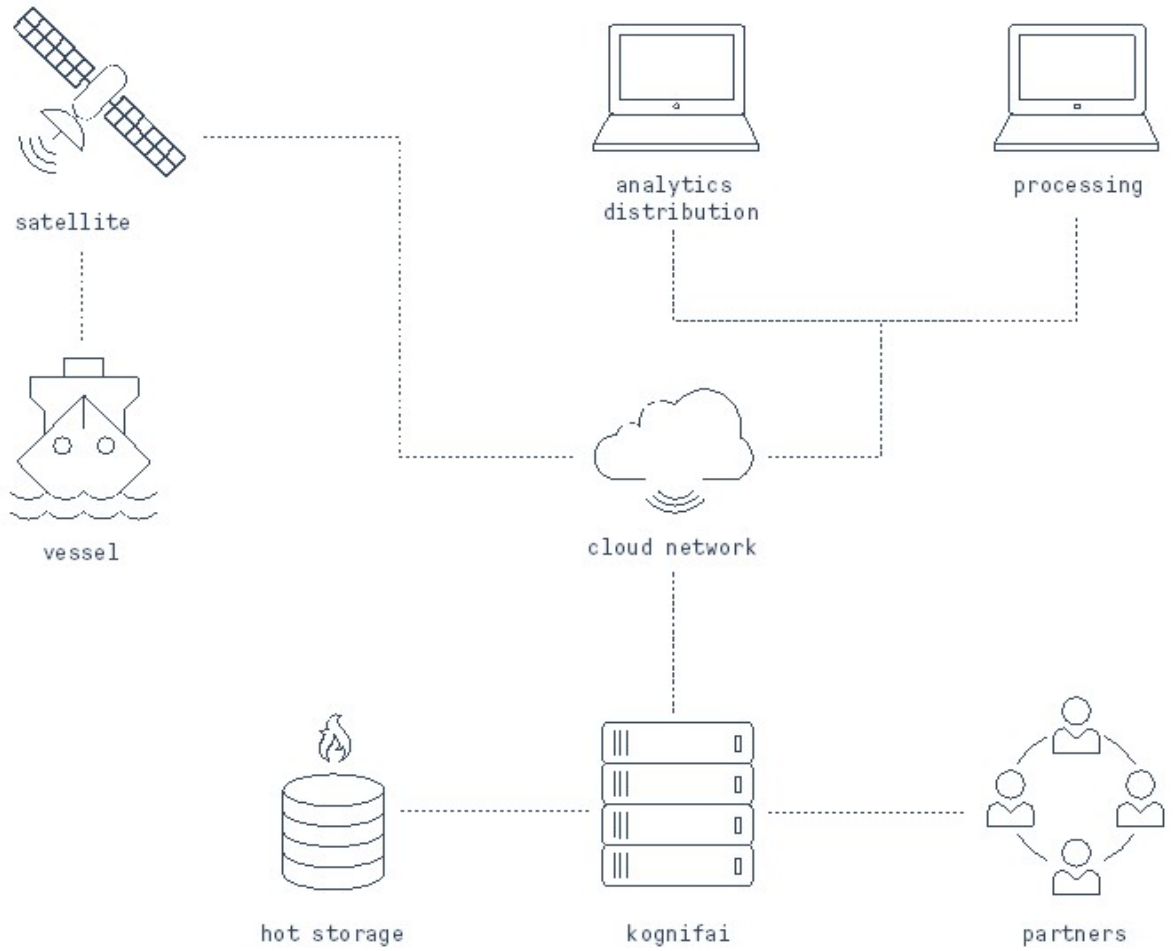
Every cloud can talk to each other in the virtual atmosphere





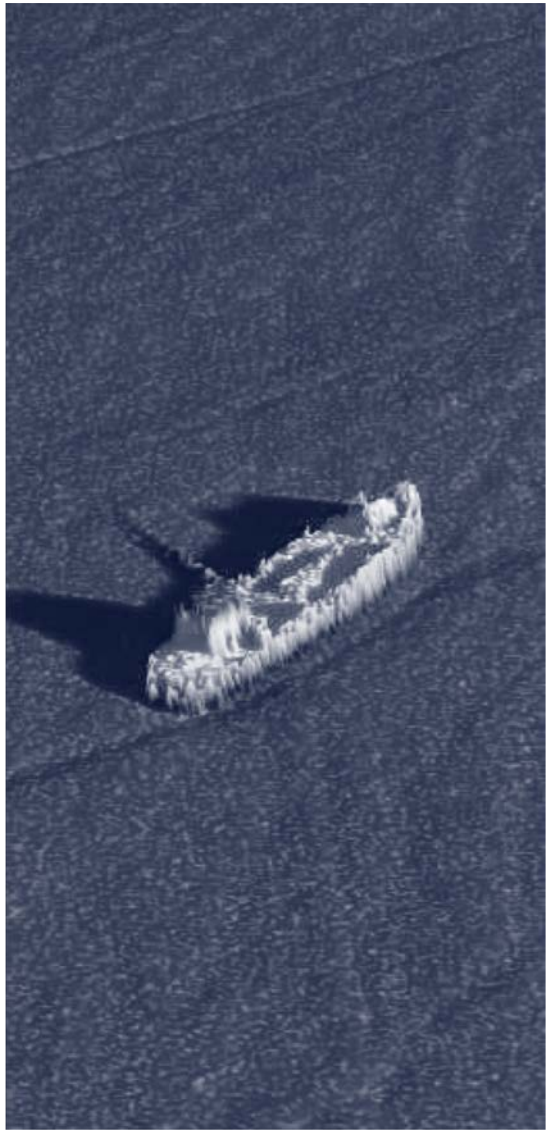
Real time

Everyone can work on data in real time - no matter where you are in the world



Accessing our Capabilities

We provide a flexible approach to delivering capability, from sale to service.



Standard payment terms for marine robotics systems up to 36 months

Access to the Norwegian export finance scheme: GIEK

Global quipment rental through Kongsberg Maritime Ltd.

System and Data as a Service to access our latest technology without CapEx

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Kongsberg Maritime Marine Robotics

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