



KONGSBERG

Protecting people and planet



2023 A YEAR OF CHANGES, TECHNOLOGY & COLLABORATION

MACHC 2024
MSc Leonardo Figueroa
Team Leader – Kongsberg Discovery for Latin America



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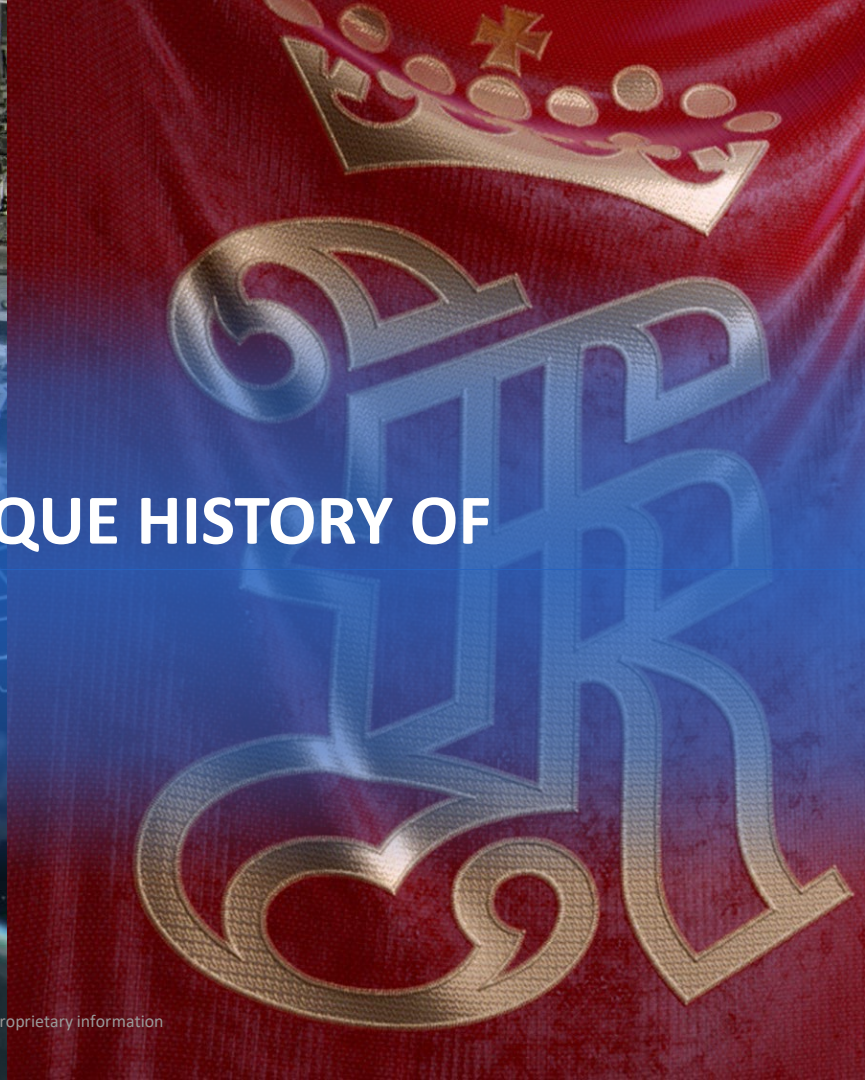


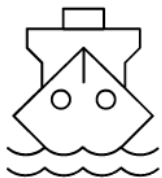
KONGSBERG

KONGSBERG HAS A UNIQUE HISTORY OF MORE THAN 200 YEARS

WORLD CLASS – Through people, technology and dedication

KONGSBERG PROPRIETARY - See Statement of Proprietary information





KONGSBERG MARITIME

Efficiency and safety throughout the whole maritime technology spectrum.



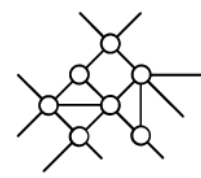
KONGSBERG DEFENCE & AEROSPACE

Technology and innovation in the supply of defence and aerospace-related systems.



KONGSBERG DISCOVERY

Committed to deliver technologies for a secure and sustainable ocean space.

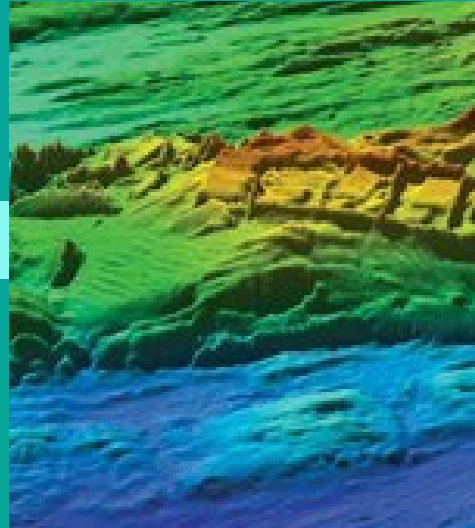


KONGSBERG DIGITAL

Expertise and reliability in the digitised industry of tomorrow.

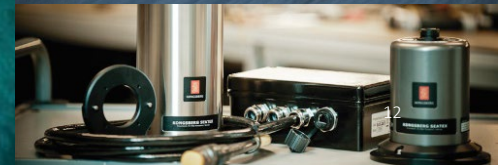
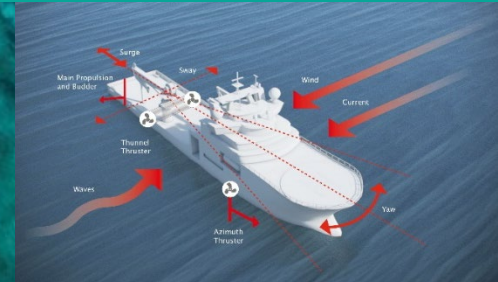
Kongsberg Discovery

Values below the surface



Uncrewed Platforms

Seatex





KONGSBERG

Kongsberg Discovery with global reach – Prelim ver.





FEMME

EDINBURGH | 2023

Kongsberg User Conference

More than 230 participants including customers, partners and representatives from academia, research institutions, commercial survey companies and governmental hydrographic offices got together.



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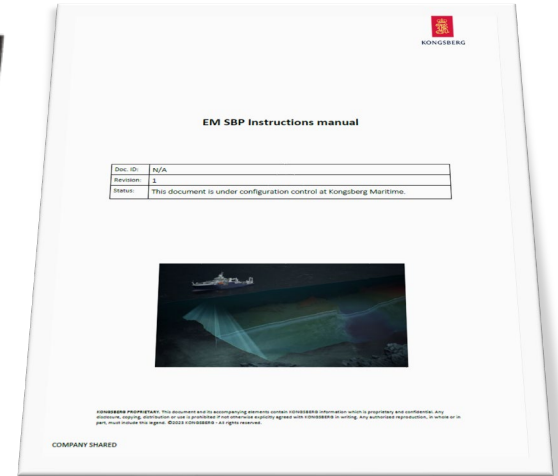
EM[®]SBP

Sub-bottom capability with EM[®]304 and EM[®]124

Scope of supply and installation

EM-SBP

- EM SBP license key
- EM SBP software package
- Instruction manual
- Hydrographic Workstation (HWS)



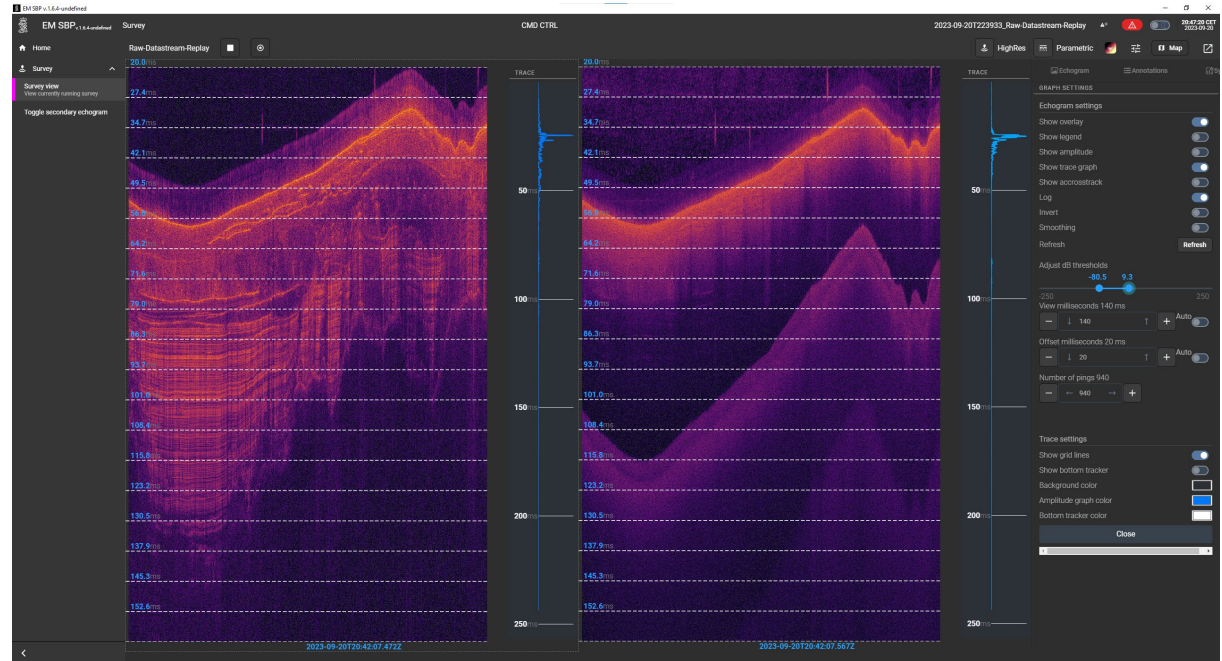
Doc. ID:	N/A
Revision:	1
Status:	This document is under configuration control at Kongsberg Maritime.



Sub-bottom capability with EM 304 and EM 124

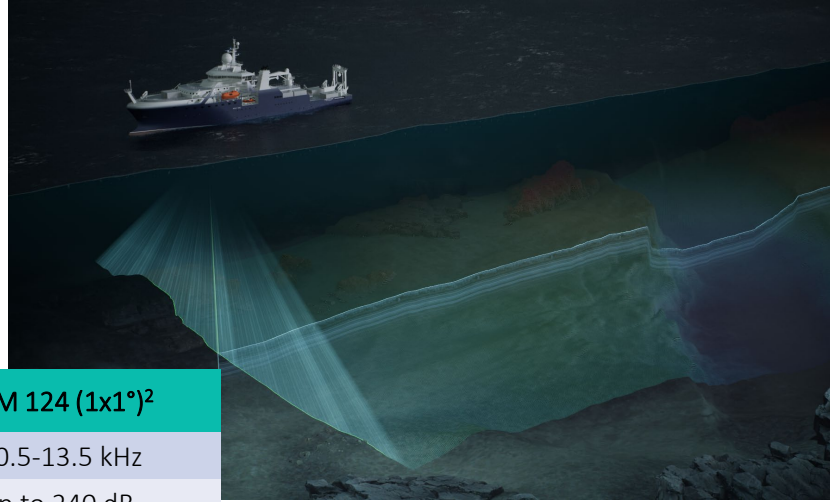
EM-SBP

- Add sub-bottom imaging to your EM[®]304 or EM[®]124 multibeam survey without any extra hardware
- Sub-bottom or multibeam pinging at your selectable sequence
- Simultaneous imaging by both primary frequency and parametric signal
- Licensed software package run on a separate computer



Specifications

EM-SBP

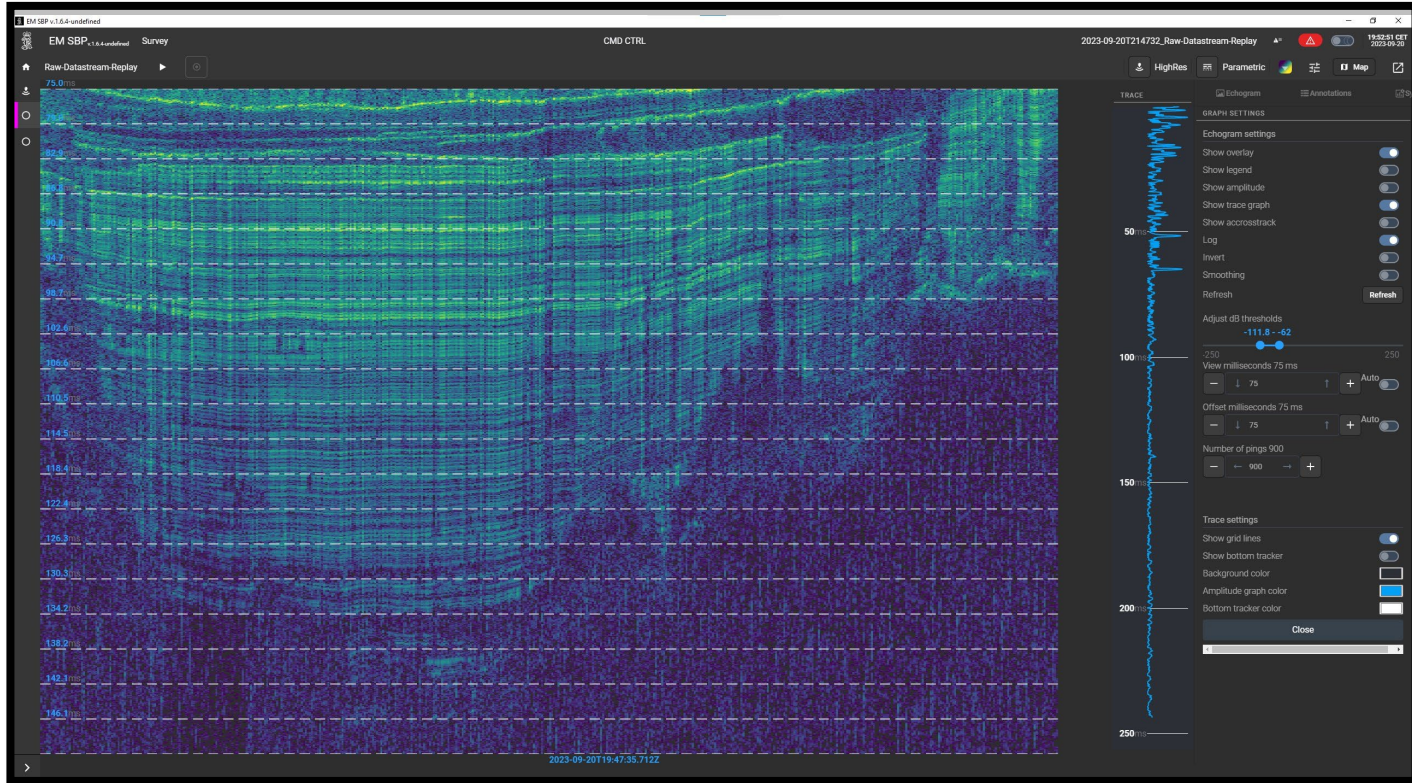


	EM 304 MKII (1x1°) ²	EM 124 (1x1°) ²
Primary frequency range (B)	20-32 kHz	10.5-13.5 kHz
Primary source level [dB re 1 μPa ref 1m]	Up to 237 dB	Up to 240 dB
Parametric frequency range	2-12 kHz	1-3 kHz
Parametric source level @4 kHz [dB re 1 μPa ref 1m] ¹⁾	201 dB	N/A
Maximum vertical resolution (1/B)	0.10 ms	0.33 ms
Beam width along	1°	1°
Beam width across	6.5°	3°

1. *Equivalent source level @4kHz in the far field estimated based on expected parametric signal conversion*
2. *Several other configurations are available*

User interface example

EM-SBP



Launches

EM 2042

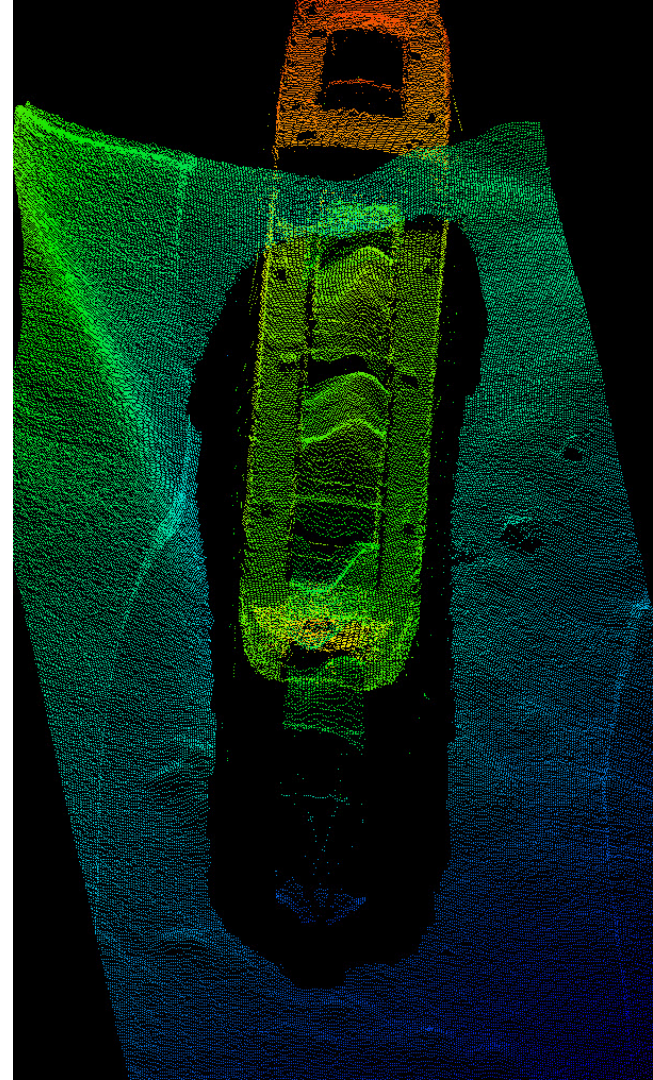
- **Main characteristics / features included by default**
 - Full 4D motion compensation (Roll, Pitch, Yaw, and Heave)
 - High Resolution bathymetry, and seabed backscatter
 - Water column backscatter real time visualization
 - CW and FM (chirp)
 - Engineered to surpass IHO Exclusive Order / LINZ Special Standard
 - Seamless integration with SIS and 3rd party software (K-controller)
 - Up 1024 soundings /swath and RX (4096 soundings with Dual Rx and Dual Swath)
- **Optional features (in SIS and 3rd party software via K-controller)**
 - Logging of water column backscatter
 - Logging of water column phase
 - Extra detections
 - EM Multifrequency Backscatter mode
 - EM High Frequency mode
 - Dual Swath
 - EM QuadSwath™
 - EM PredictivePitch™



New features

EM 2042

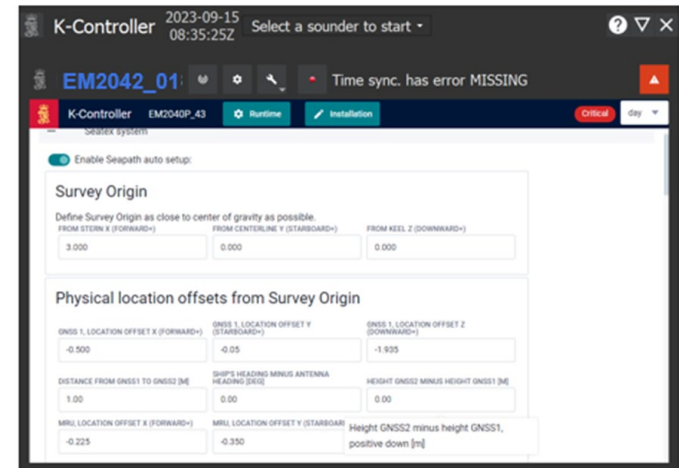
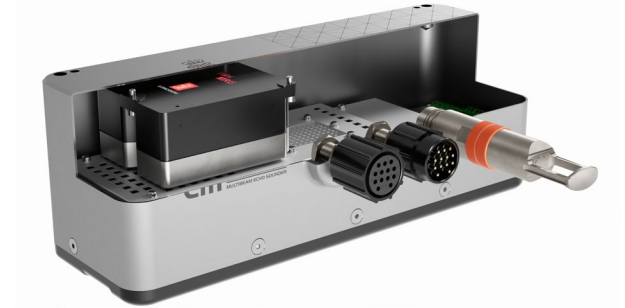
- 1024 beams /swath and RX (4096 Dual Rx and Dual Swath)
 - Achieved by extracting more soundings from the phase ramp of each beam
- EM QuadSwath™ **OPTIONAL**
 - Up to 4 swaths in a ping cycle
 - Increases sounding density in high-speed surveys
 - New CBMFx2 cards in PU
- EM PredictivePitch™ **OPTIONAL**
 - Realtime prediction of pitch
 - Improves sounding accuracy when using small platforms in challenging sea conditions
 - Exclusively for KONGSBERG Seatex MRU integrations



OPTIONAL EMBEDDED miniMRU

EM 2042

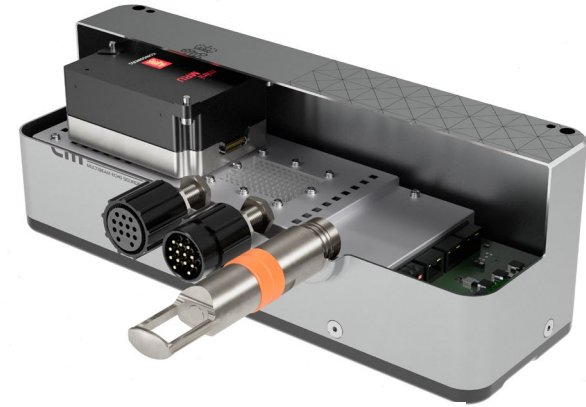
- Embedded OEM miniMRU 40/50/60 within RX
 - Paired to Seapath.
 - OEM miniMRU 40 is the standard option.
Roll/Pitch/Heading accuracy up to 0.02/0.02/0.04
 - OEM miniMRU 50/60 recommended for challenging sea conditions and mounting angles >30 degrees .
Roll/Pitch/Heading accuracy up to 0.01/0.01/0.04
 - No need of calibration (maintenance service)
 - Automatic miniMRU detection and setup through K-Controller



OPTIONAL SOUND VELOCITY SENSORS

EM 2042

- **Embedded AML X2change in RX**
 - Speed and temperature measurements
 - Very low power consumption: 30mW
 - The sensor can be easily unscrewed from the instrument for servicing OUT OF THE WATER
 - Recommended calibration interval is 1 year, estimated cost 600 EUR. AML Calibration centers in Canada and new location in Europe opening in 2024
 - Sensor status to be reported in BIST (SIS)
- **External SV sensors**
 - Dedicated clamp for SV sensors from any vendors



Specifications

EM 2042

TECHNICAL SPECIFICATIONS

Frequency range	150 - 700 kHz (including High Frequency mode)
Number of beams	Single RX: Up to 2048 (1024 per swath) Dual RX: Up to 4096 (Dual Swath)
Swath coverage	Up to 170° (Single RX) / 220° (Dual RX)
Depth range	0.5 m to max 600 m
Depth rating	50 m
Beam stabilization	Roll ($\pm 15^\circ$), Pitch ($\pm 10^\circ$), Yaw ($\pm 10^\circ$)
Depth accuracy	Up to 5.5 mm
Embedded Seatex MRU angular accuracy (RMS)	Up to 0.01° Roll and Pitch. 0.04° Heading
Embedded SV	AML X2change™ SVT sensor
Power requirements	93 W



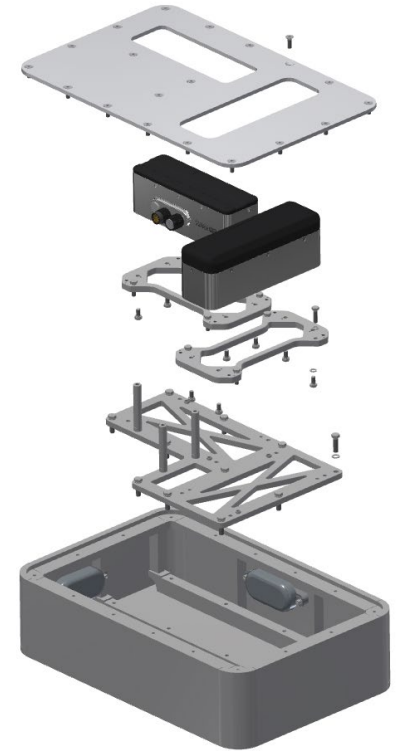
Beamwidth							
	150 kHz	200 kHz	300 kHz	400 kHz	600 kHz	700 kHz	
TX 04	1°	0.7°	0.5°	0.4°	0.25°	0.225°	
TX 07	2°	1.5°	1°	0.7°	0.5°	0.45°	
RX 07	2°	1.5°	1°	0.7°	0.5°	0.45°	



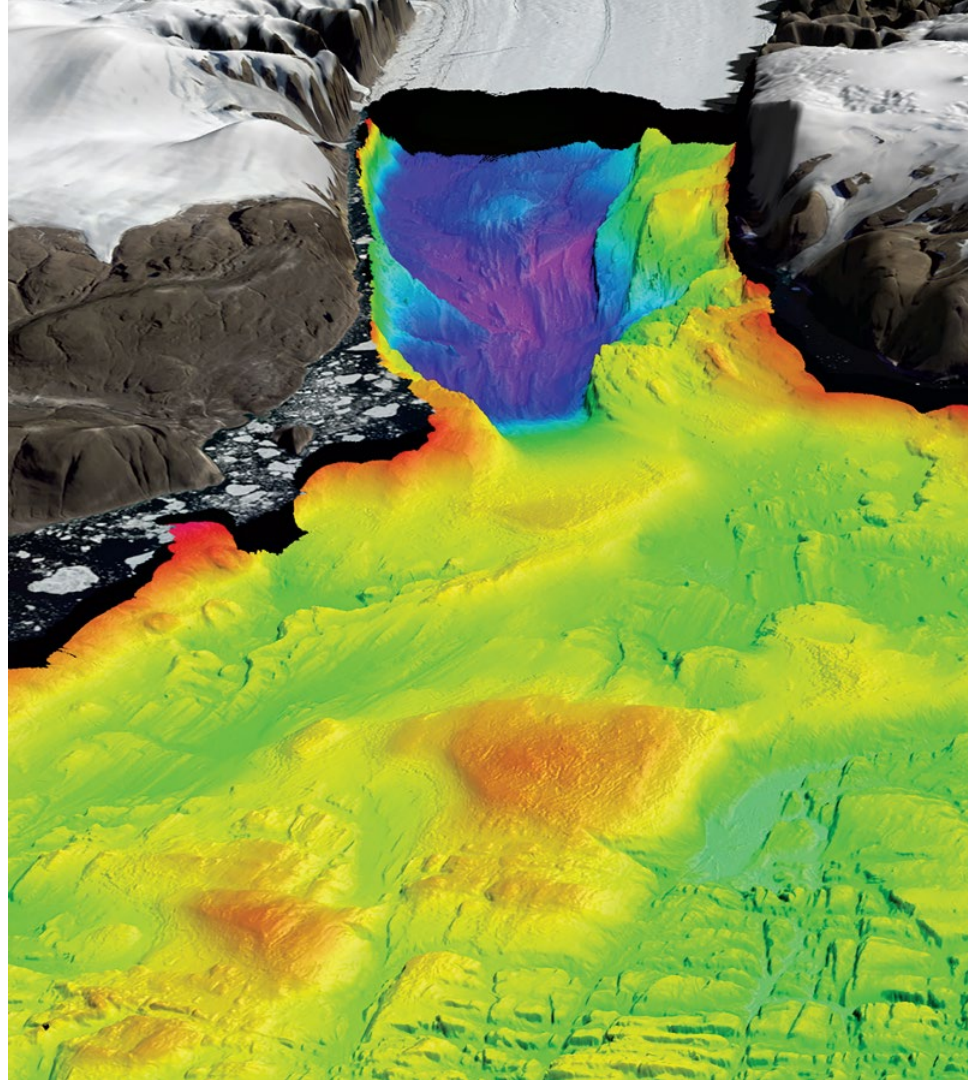
Mounting Options

EM 2042

- **Portable**
 - Accommodates EM2042 sonar head, and optional external MRU and SV sensor
 - Suitable for pole mounts, ,USV integrations and can substitute POD installations
 - Made in aluminum*. Front faring made and SV clamp in polymer. Total weight 4.2 kg
 - Reference marks with known offsets from acoustic center facilitate easy setup of optional external MRU
 - *It can be made in titanium and stainless steel under demand
- **Existing EM2040 hull installations on surface vessels can be easily upgraded**
 - New transducers with single cable to PU or reuse existing TX to PU if cable is OK
 - New sync cable TX-RX
 - Adapting plate for EM2042 transducers so the acoustic centers location are preserved
 - PU update



Remote Operations



MBR Communication

IP- based data networking



16,5 Mbps Payload



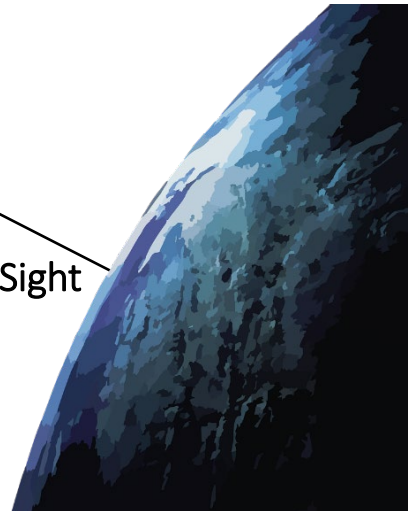
Deterministic Latency

Frequency Band-5: 4,9-5,9 Ghz

Point to point and point to multipoint



Beyond Line-Of-Sight



Different antennas for different applications

MBR

IEC. standard



MBR 189



MBR 179



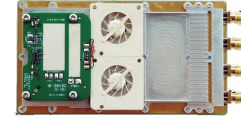
MBR 144



MBR 144 OEM



MBR 144 Personal

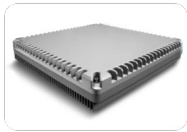


MBR 144 UAV



MBR Submersible

Mil. standard



CRE2-179



CRE2-189



CRE2-179-AM-POD



CRE2-144-ETH-M2



CRE2-144-LW



CRE2-179-UAV



CRE2-144-OEM



Examples from the field



Chile

Examples from the field



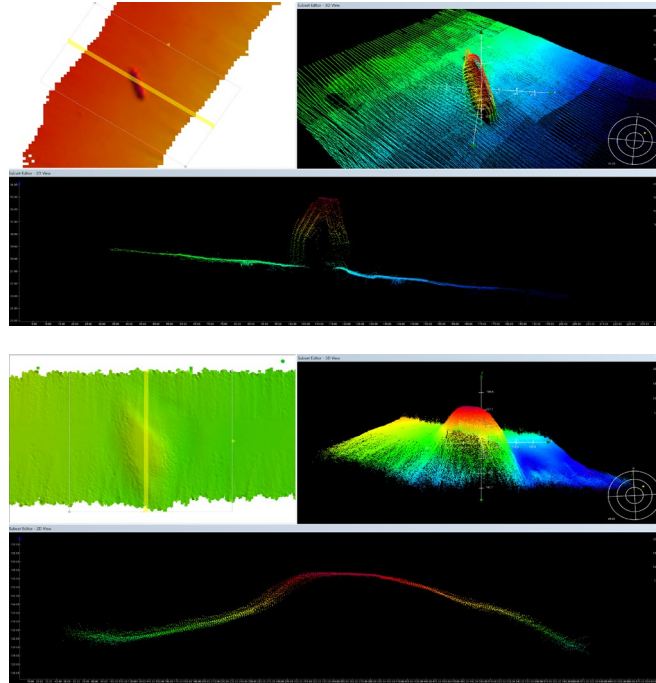
Extreme performance for extreme conditions....



Punta Arenas, Chile

Chile

Examples from the field



Punta Arenas, Chile



KONGSBERG



Peru

Examples from the field



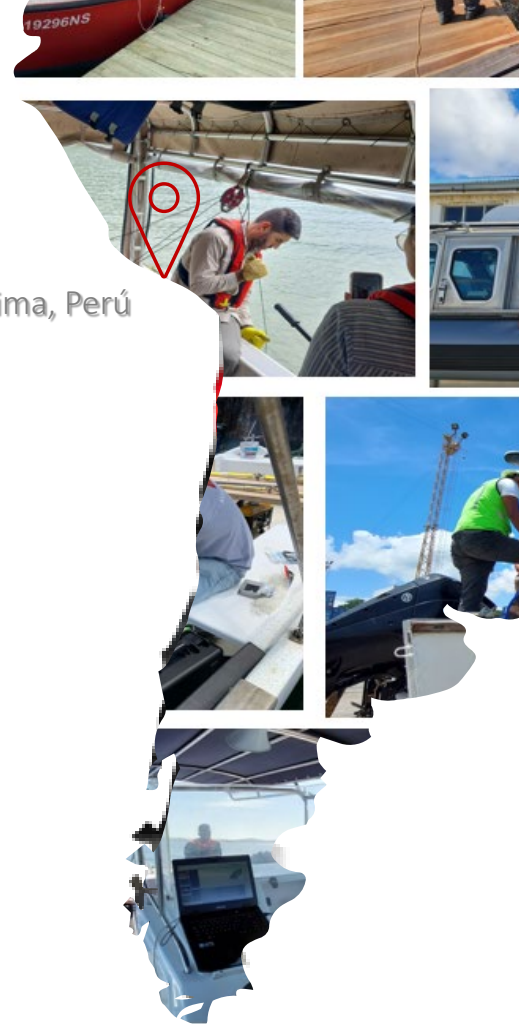
Peru

Examples from the field

THE NIPPON FOUNDATION-GEBCO
SEABED
 **2030**

5th Regional Mapping Community Hybrid meeting for the South and West Pacific
Lima, Peru / Hybrid
12 – 14 July 2023

Lima, Perú



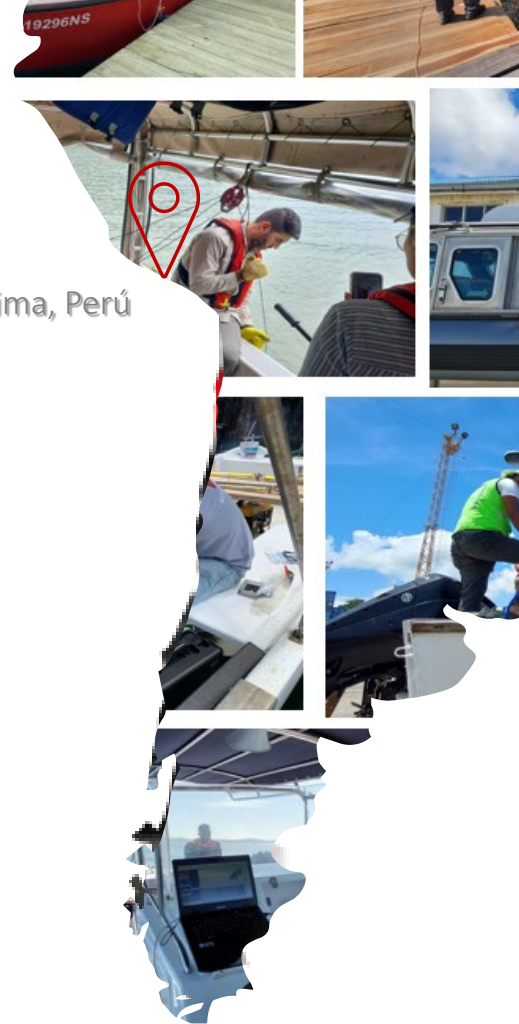
Peru

Examples from the field



In collaboration with the Marina de Guerra del Peru and TASA.
Using an EM2040P with Seapath 130 / MRU 5+
Communication through MBR 144

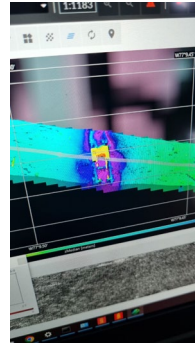
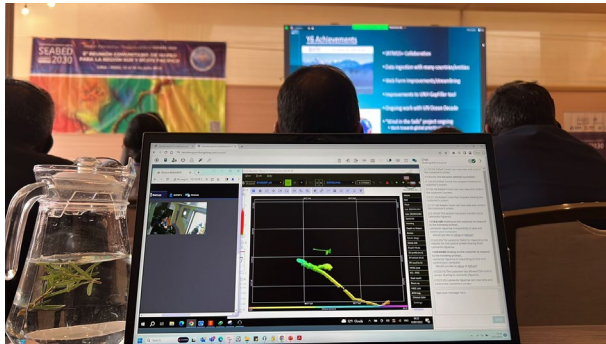
Lima, Perú



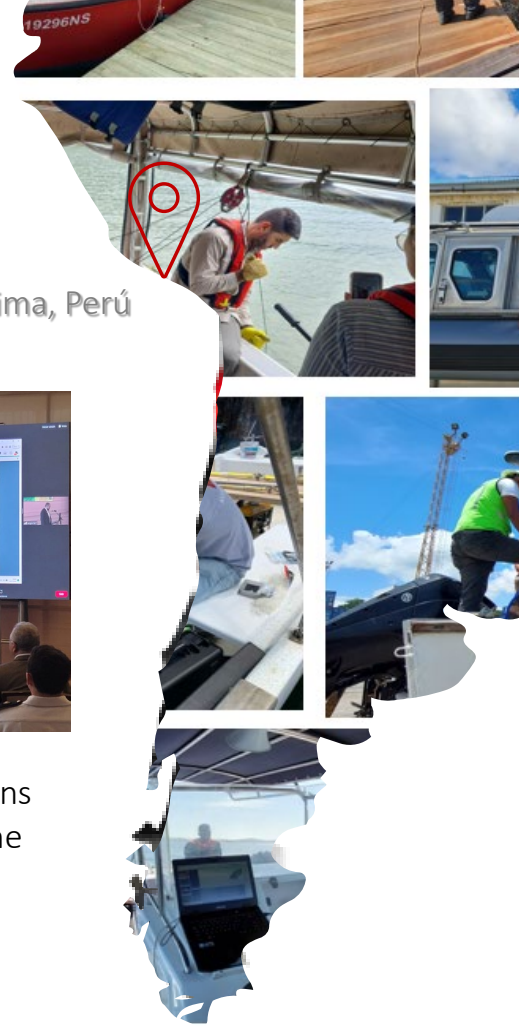
Peru

Examples from the field

Lima, Perú

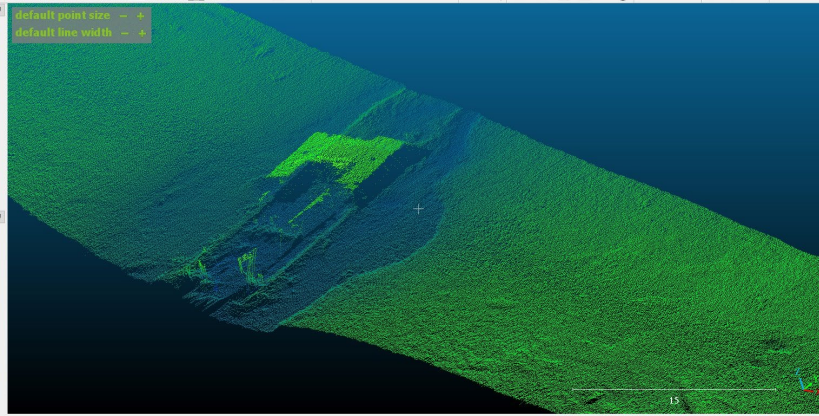


Hydrographic data acquisition was conducted in the Callao Bay, Peru, utilizing remote operations (SIS Remote) from the conference center in Miraflores, Peru. These data will be shared with the Seabed 2030 database

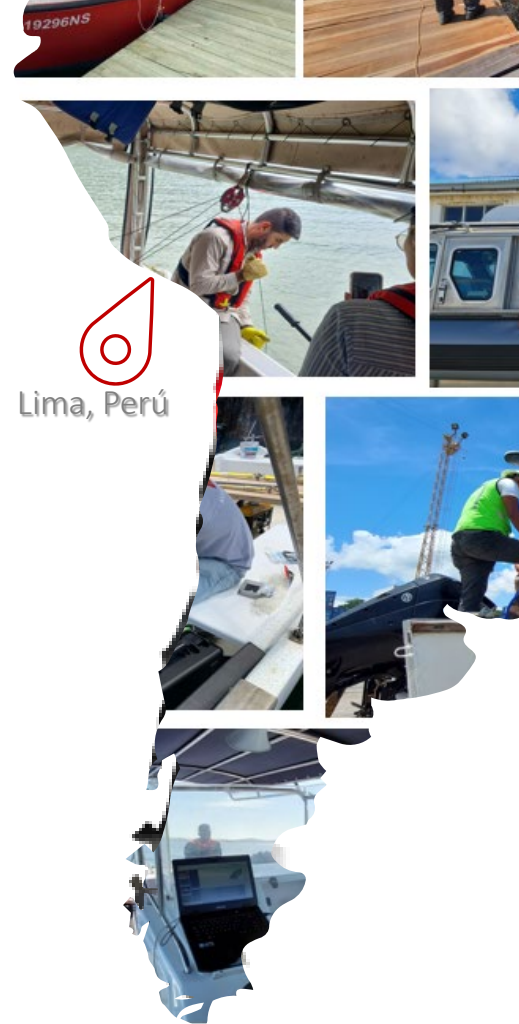


Peru

Examples from the field

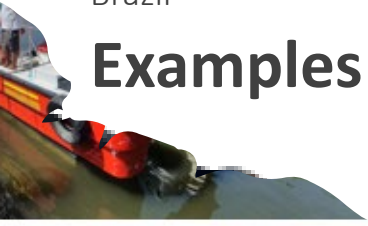


Unfortunately, during the demonstration, a mechanical failure occurred in the ship's engine, preventing us from completing the survey as planned. Nevertheless, we were able to achieve what might be the first-ever hydrographic survey while the ship was being towed



Brazil

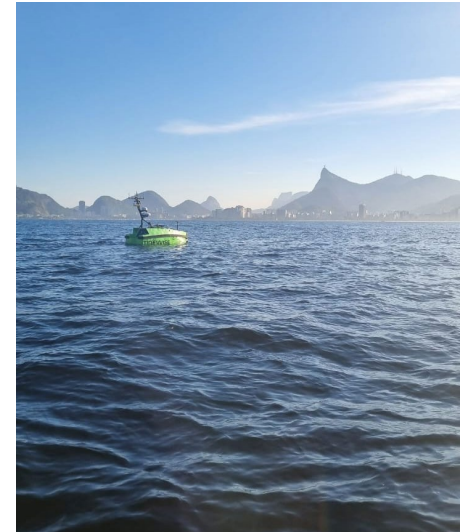
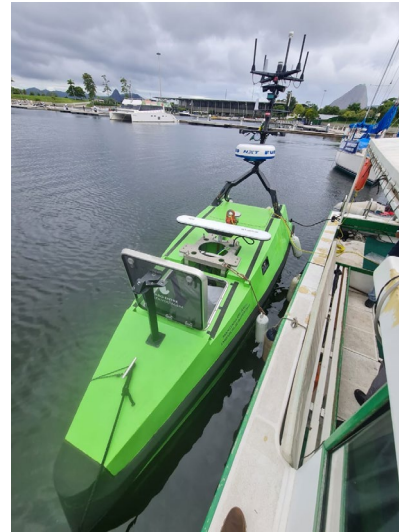
Examples from the field



In Brazil, we have a collaboration with the Tidewise, they developed an uncrewed vehicle capable of performing a variety of missions in the region. This vessel has been equipped with an Em2040P multibeam sonar along with Seapath 130 and MRU 5+ navigation systems.

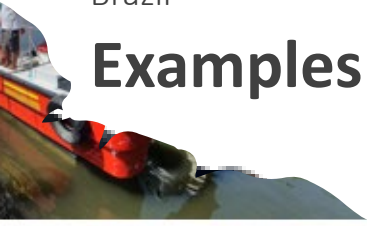


Rio de Janeiro, Brazil



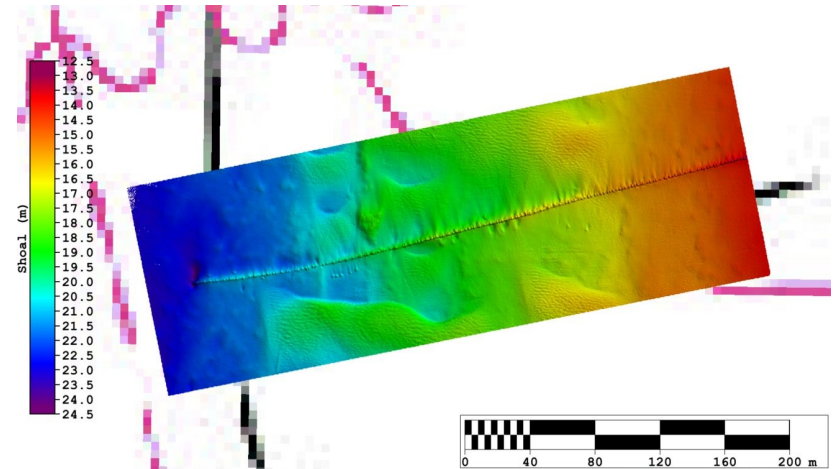
Brazil

Examples from the field



Rio de Janeiro, Brazil

As the TUPAM (Tidewise vessel) is entirely unmanned, all operations must be carried out remotely. The communication with the vessel was done through the onboard 4G network. SIS Remote software was used for the control of the operation acquisition parameters and monitor the progress of the survey.



Brazil

Examples from the field



Rio de Janeiro, Brazil

As part of the activities during the 2023 Brazilian Hydrography Symposium, a hydrographic survey was conducted remotely from the conference room using the SIS Remote system.



Collaboration

Kongsberg Discovery is always seeking collaboration opportunities, particularly within the Latin American region, to enhance the capabilities of hydrographic centers. This involves initiatives such as:

1. Collaborating with hydrographer training programs.
2. Providing office licenses for familiarity and training purposes.
3. Offering rental/demo equipment for hydrographic surveys.



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Please subscribe to be notified about our software updates for Kongsberg EM Multibeams, EA Singlebeams and Sub bottom profilers.

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Company name *

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Please slide the bar to the right to confirm.

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SUBMIT

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A new software update for Kongsberg Maritime seabed mapping systems has been made available

The following system software has been updated:

System	New version	Short release description
EM2040 for SIS5	2.0.3	Bundled with SIS 5.9.4 Updated version of Kongsberg Visor 3D engine that uses less memory. Updated version of K-Controller. See release note on download site for detailed description.
EM2040PM for SIS5	2.0.1	Updated version of Kongsberg Visor 3D engine that uses less memory. Updated version of K-Controller. See release note on download site for detailed description.
EM2040 K-Controller SW for SIS5	1.4.3	Updated version of K-Controller. See release note on download site for detailed description.
EM2040PM K-Controller SW for SIS5	2.6.1	Updated version of K-Controller. See release note on download site for detailed description.



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