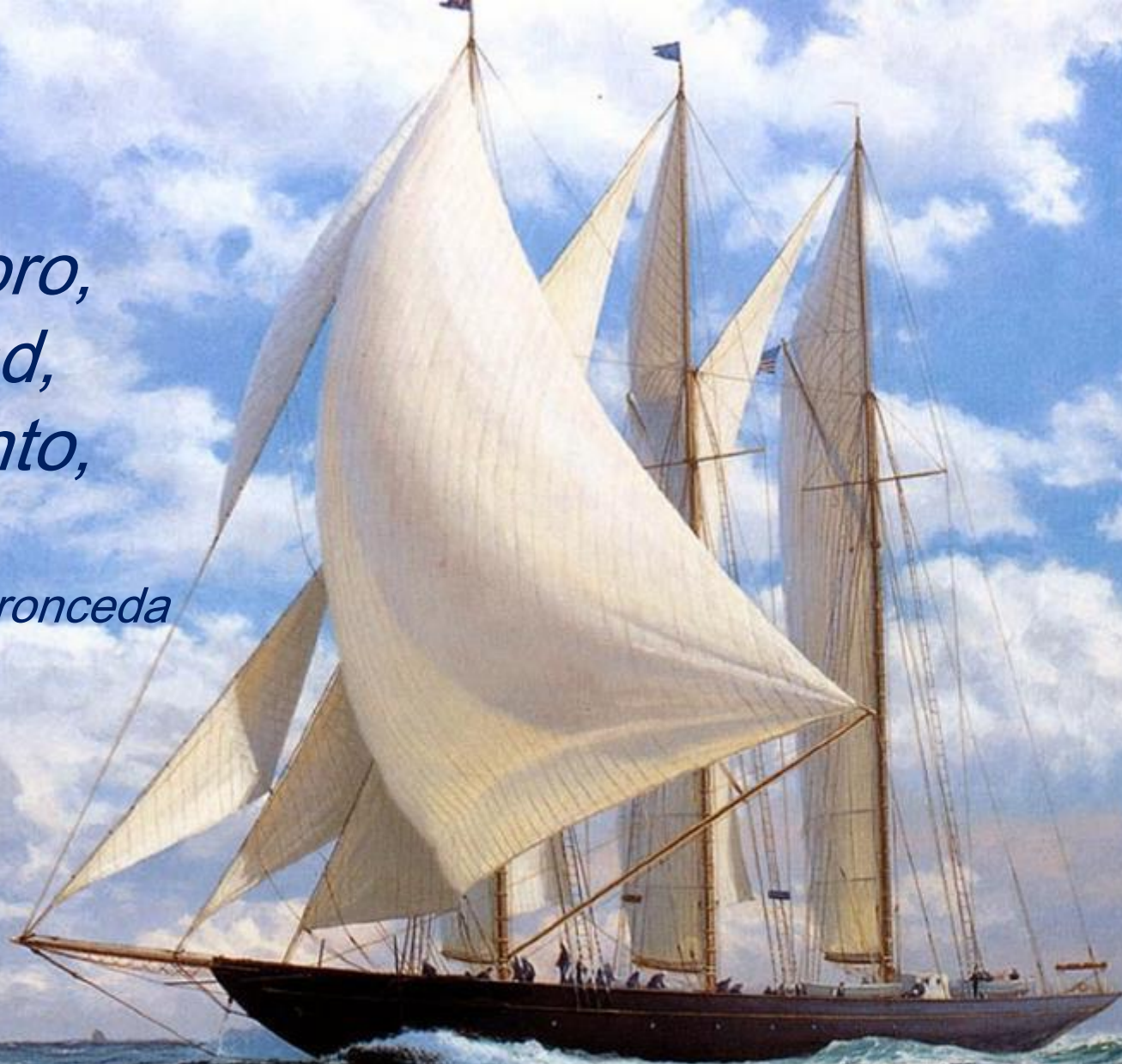


*Que es mi barco mi tesoro,  
que es mi Dios la libertad,  
mi ley, la fuerza y el viento,  
mi única patria, la mar.*

*Canción del Pirata - José de Espronceda*

*That is my ship my treasure,  
that is my God the freedom,  
My law, strength and wind,  
My only country, the sea.*



*Pintura de Steve Dews*

it is consequential damages the cap on sum of liability and the DAP,



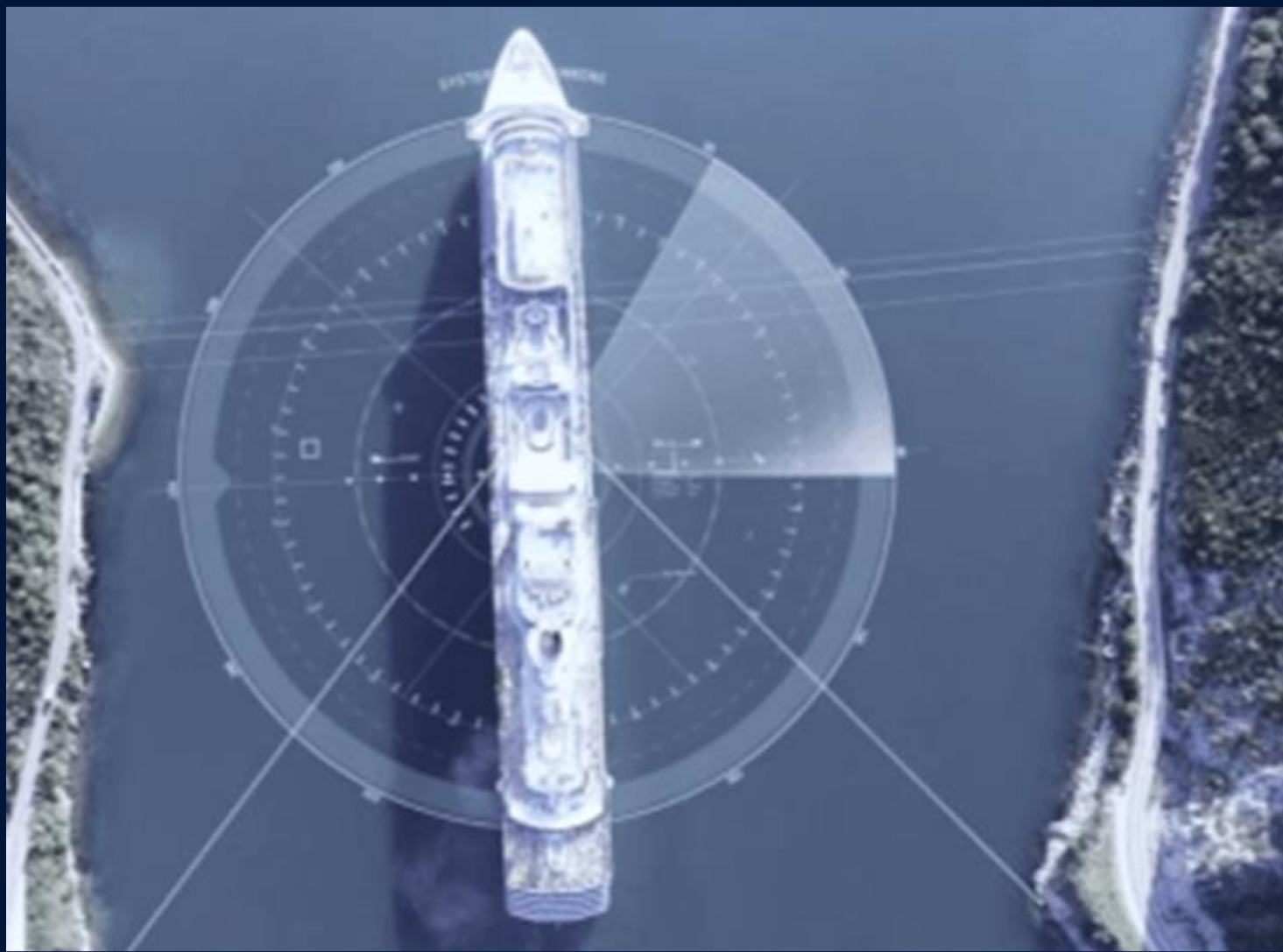
KONGSBERG

# Sonar Tools and Autonomous Platforms for Disaster Response Survey

Vicente Carrasco

Sales Manager

Sensor & Robotics for Latin America



IHO

International  
Hydrographic  
Organization





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# KONGSBERG has a long and unique history

Our history spans over  
two centuries



Est.  
**1814**

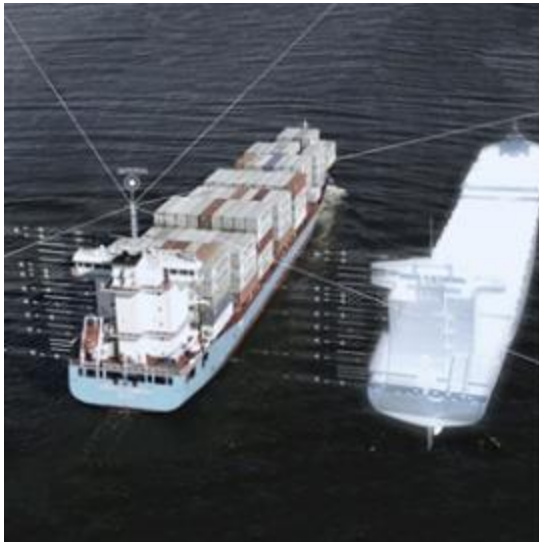




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# Business Areas

Technology is our common core



## KONGSBERG DIGITAL

Maritime simulation  
Industrial digitalization



## KONGSBERG MARITIME

Seaborne transportation  
Robotics and Sensors  
Offshore, Oil & Gas



## KONGSBERG DEFENCE & AEROSPACE

Defence  
Space and Surveillance



KONGSBERG

# The Broadest Portfolio of Products

Throughout the entire maritime industry



A person with long hair and a cap is looking through a telescope on a ship's deck. The background is a vast blue ocean under a clear sky. The image has a monochromatic blue tint.

# WE ARE ON THE VERGE OF A DIGITAL TRANSFORMATION IN MARITIME



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## Disaster definition

“A sudden calamitous event bringing great damage, loss, or destruction; broadly : a sudden or great misfortune or failure.”

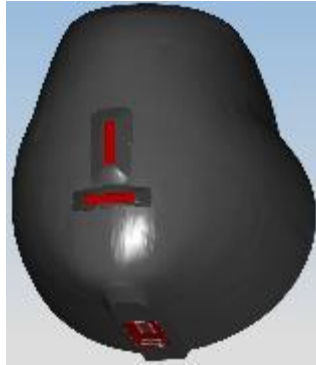




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# Main Operations – SURVEY - Hydroacoustics

## Applications



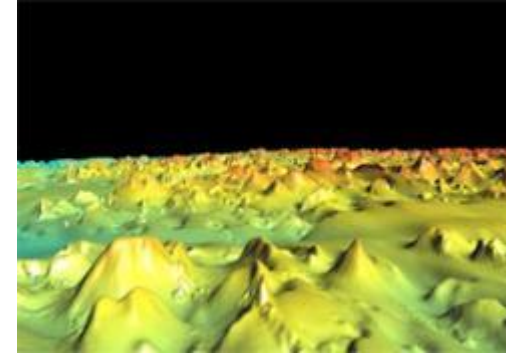
Naval Sonars



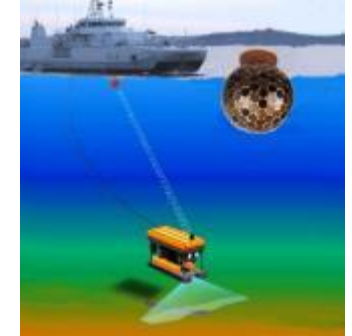
Fishery & Fishery Research



AUV

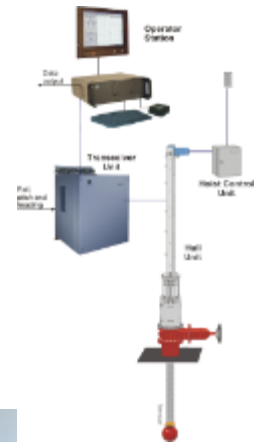
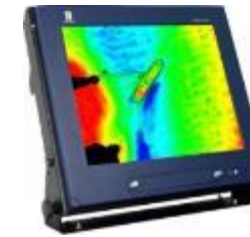


Hydrography

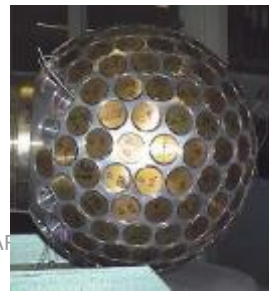
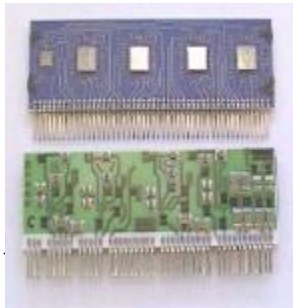


UW Nav.

## Products:



## Common Technology



WORLD CLASS – Through people,

ETAF

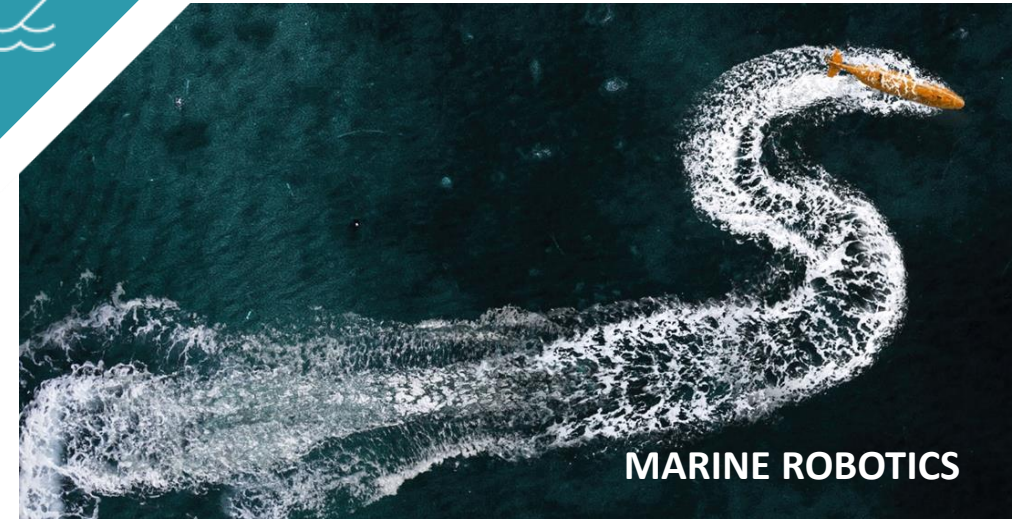
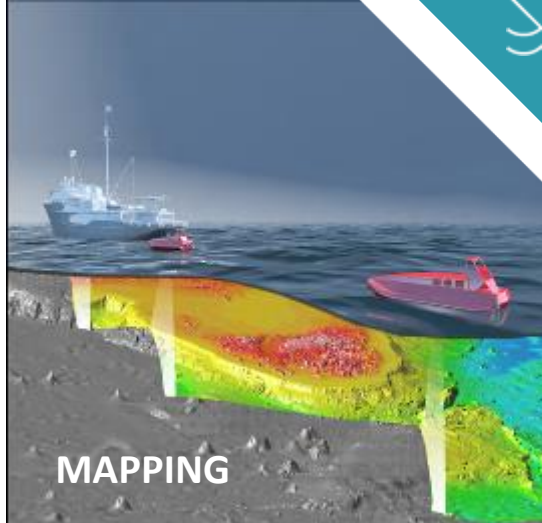
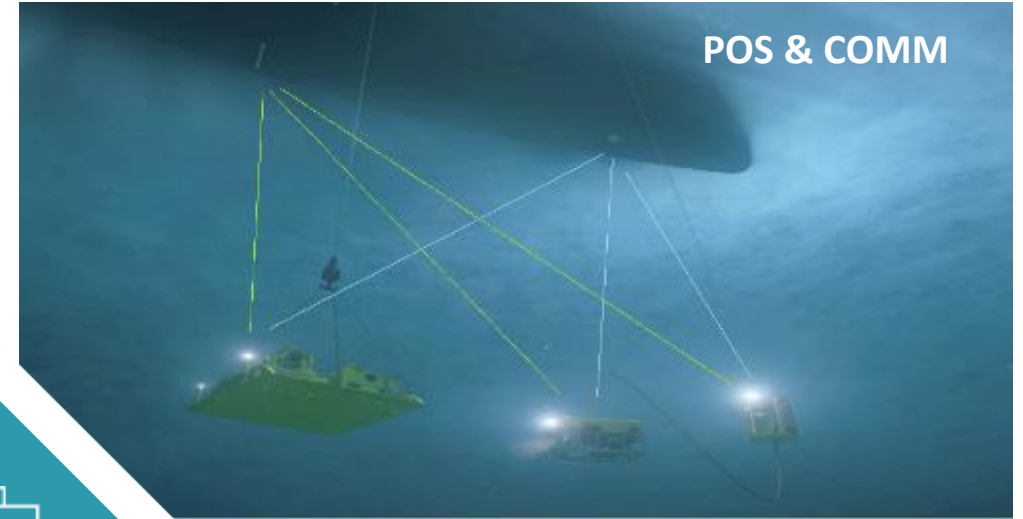
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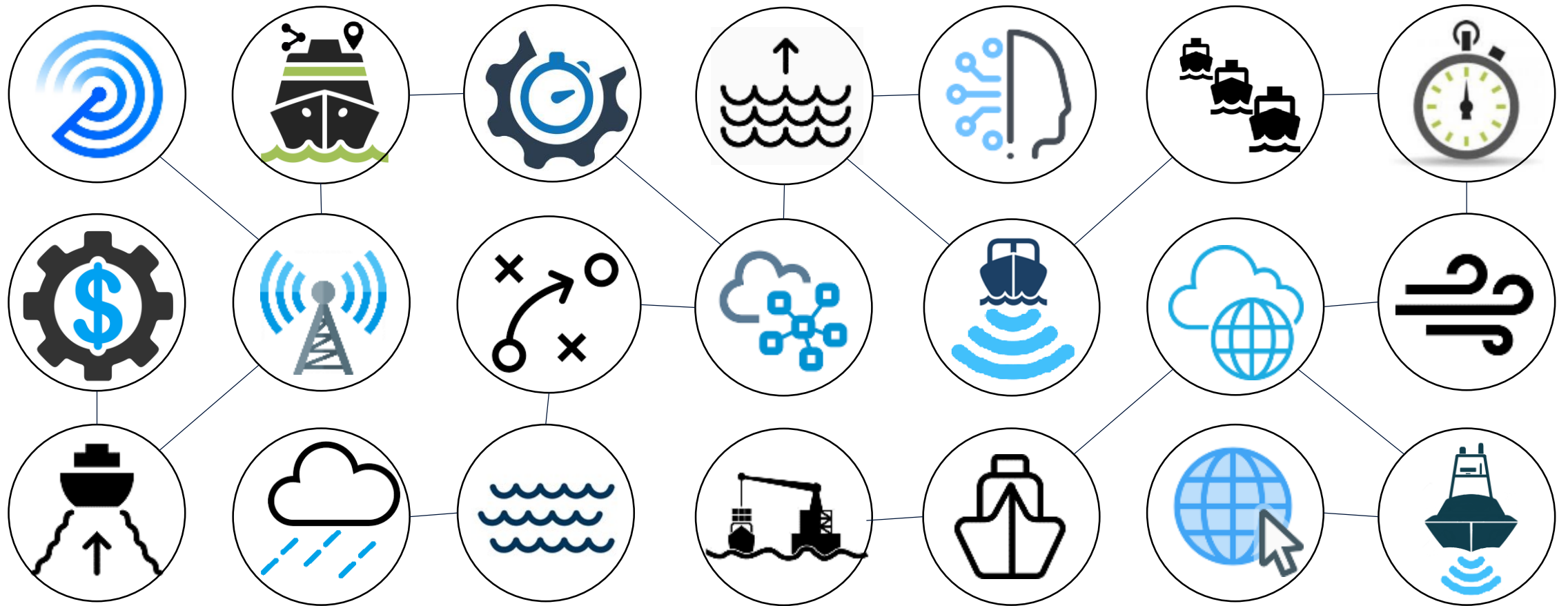
# Core Skills at Sensors & Robotics





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# Comprehensive Survey KM Integrated Capabilities





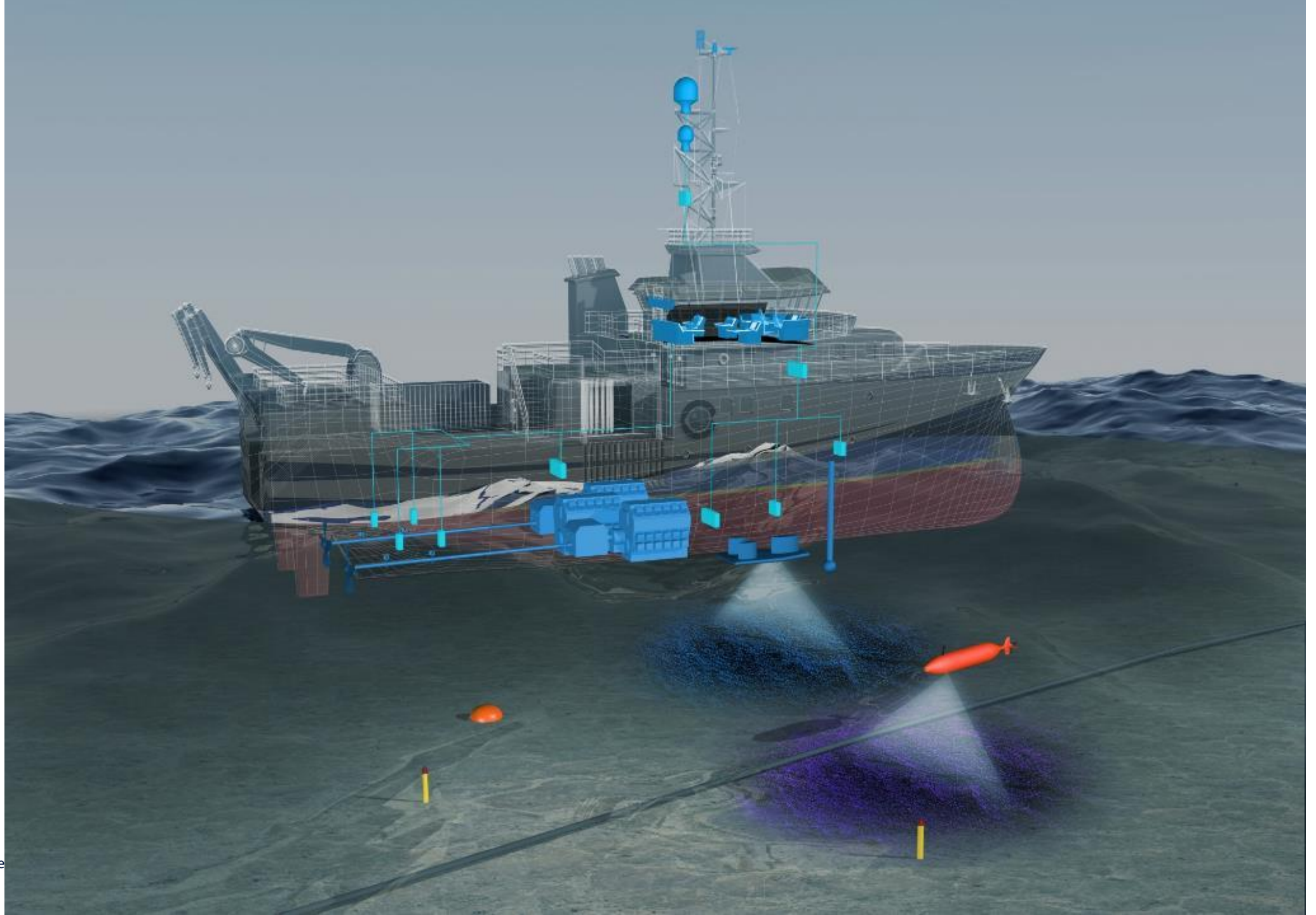
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# Survey – high accurate and available

Environmental parameters Integration – Tide, Wind, Rain,  
Current, Waves > Remote Survey > Remote Data Collection >  
Connectivity > Upload Data > E-Cloud > Big Data > Decision  
Strategy > Support Integration > Flow Traffic > Time Response  
> Scheduling > Increase Efficiency/Security > Cost Saving



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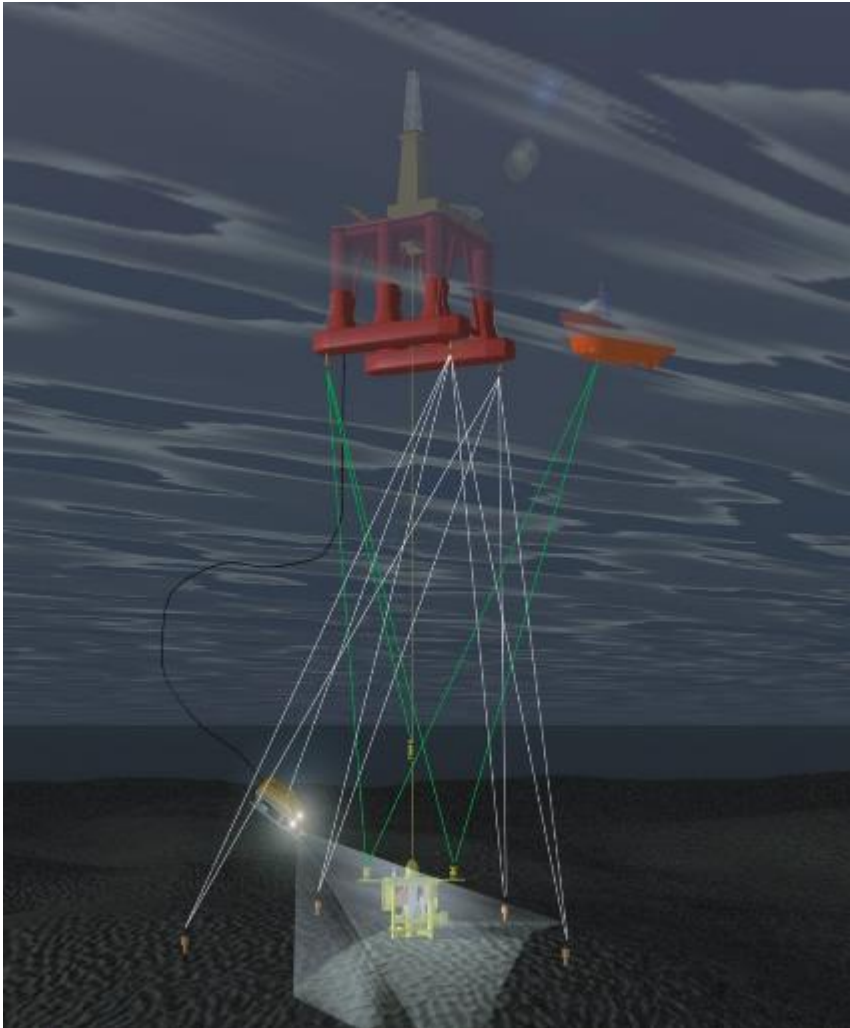


WORLD CLASS – Through pe



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# Enhance Underwater Communications



WORLD CLASS – Through people, technology and dedication

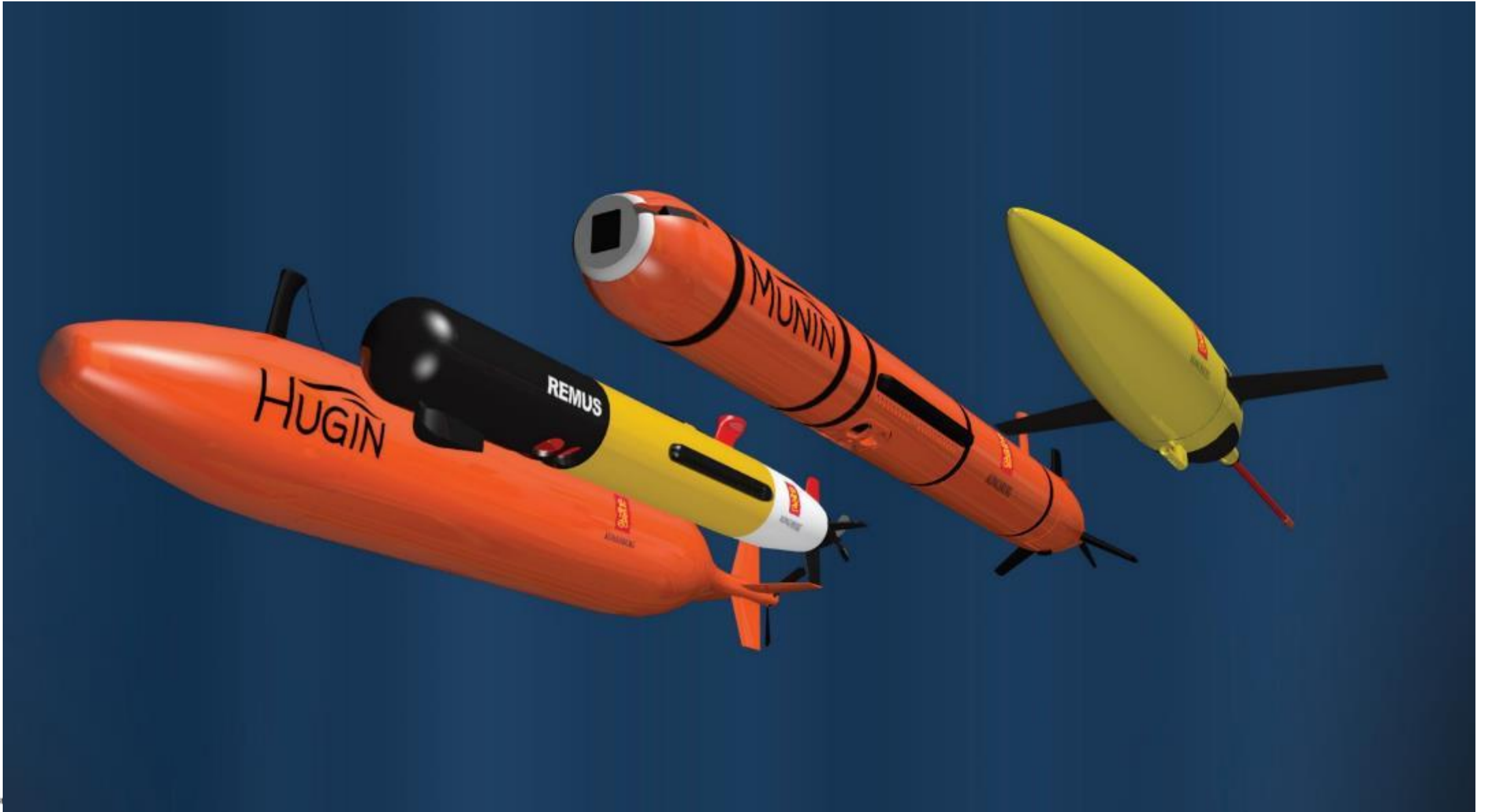
KONGSBERG PROPRIETARY - See Statement of Proprietary information

Page 13



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# Marine Robotics

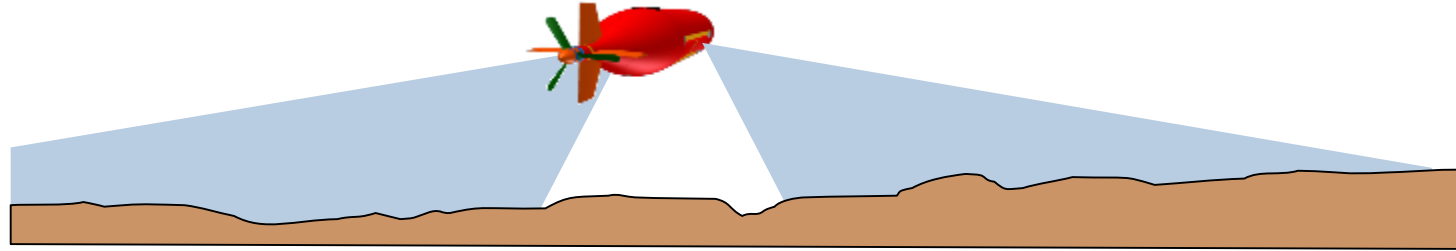


WORLD CLASS –



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# Operations for SURVEY Intervention



AUV

Video removed by the IHO due to space

EELUME



ROV



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# Main Operations - SURVEY

- Proven Technology for pipe inspection
- > 1 Mill lineal km surveyed World Wide
- > 40 units at Commercial Survey





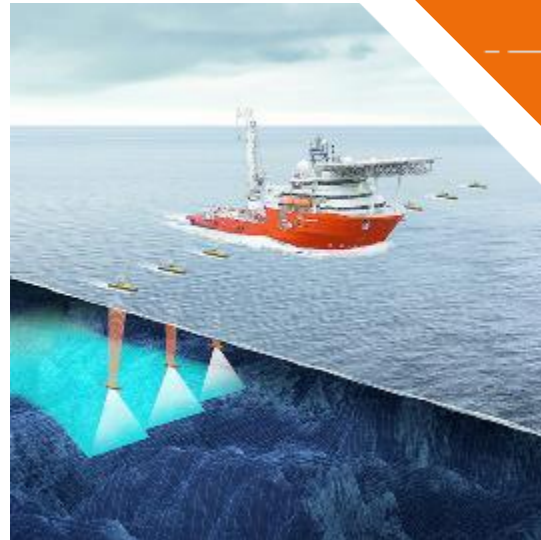


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## Force Multipliers

Success seeking of  
ARA San Juan –  
Argentinian Navy

Huge  
coverage in  
much less  
time





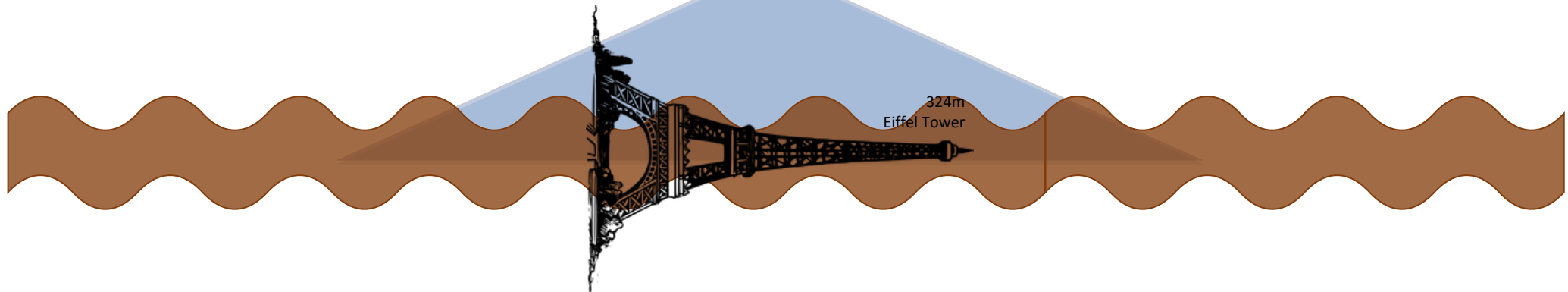
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# Standard Coverage Area

HISAS 1032



500m





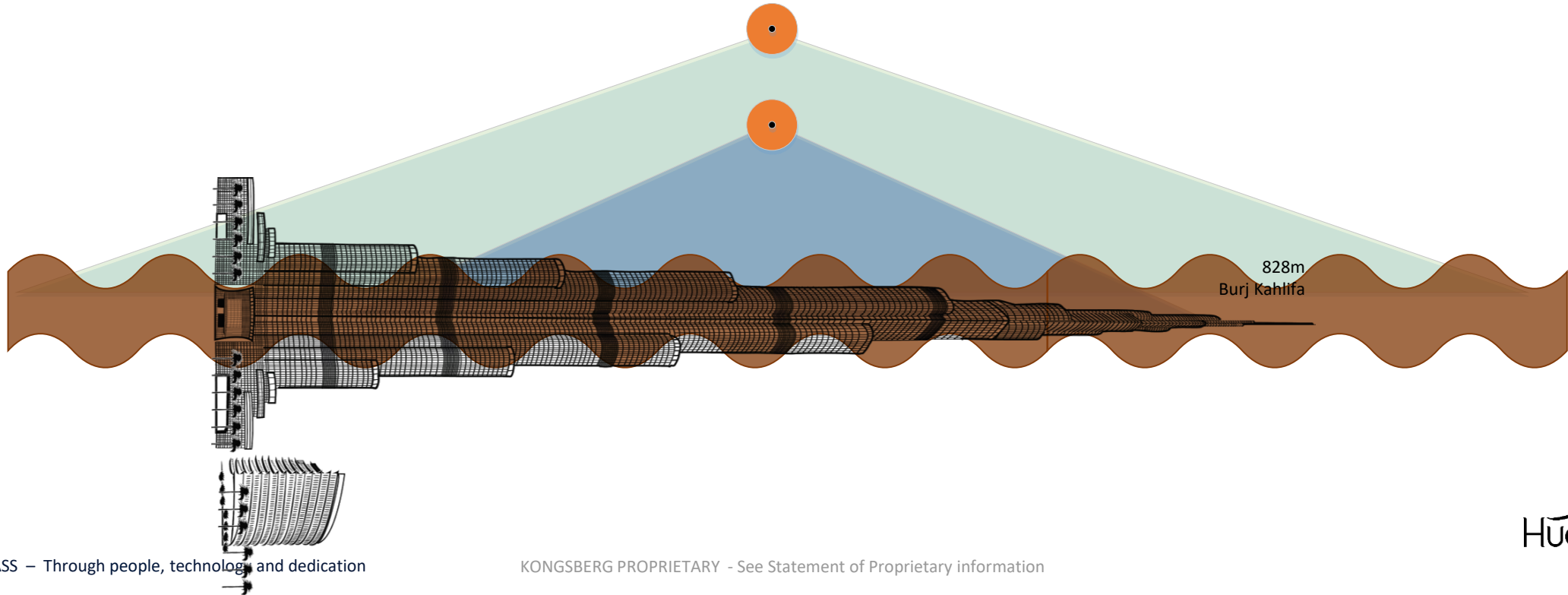
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# Coverage for HUGIN Superior

HISAS 1032



New HiSAS 1000m





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**MBR**

Wide Band Radio

Transfer Data  
Longer Ranges





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# Facts and numbers



IP-based data networking

16,5 Mbps Payload

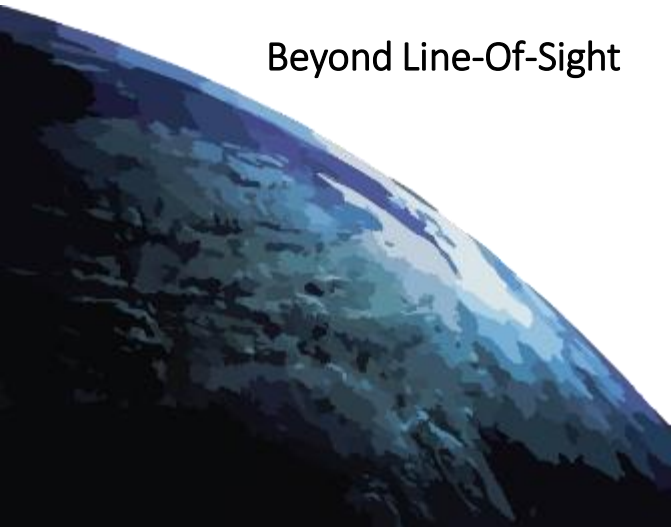


Point to point and point to multipoint

Beyond Line-Of-Sight

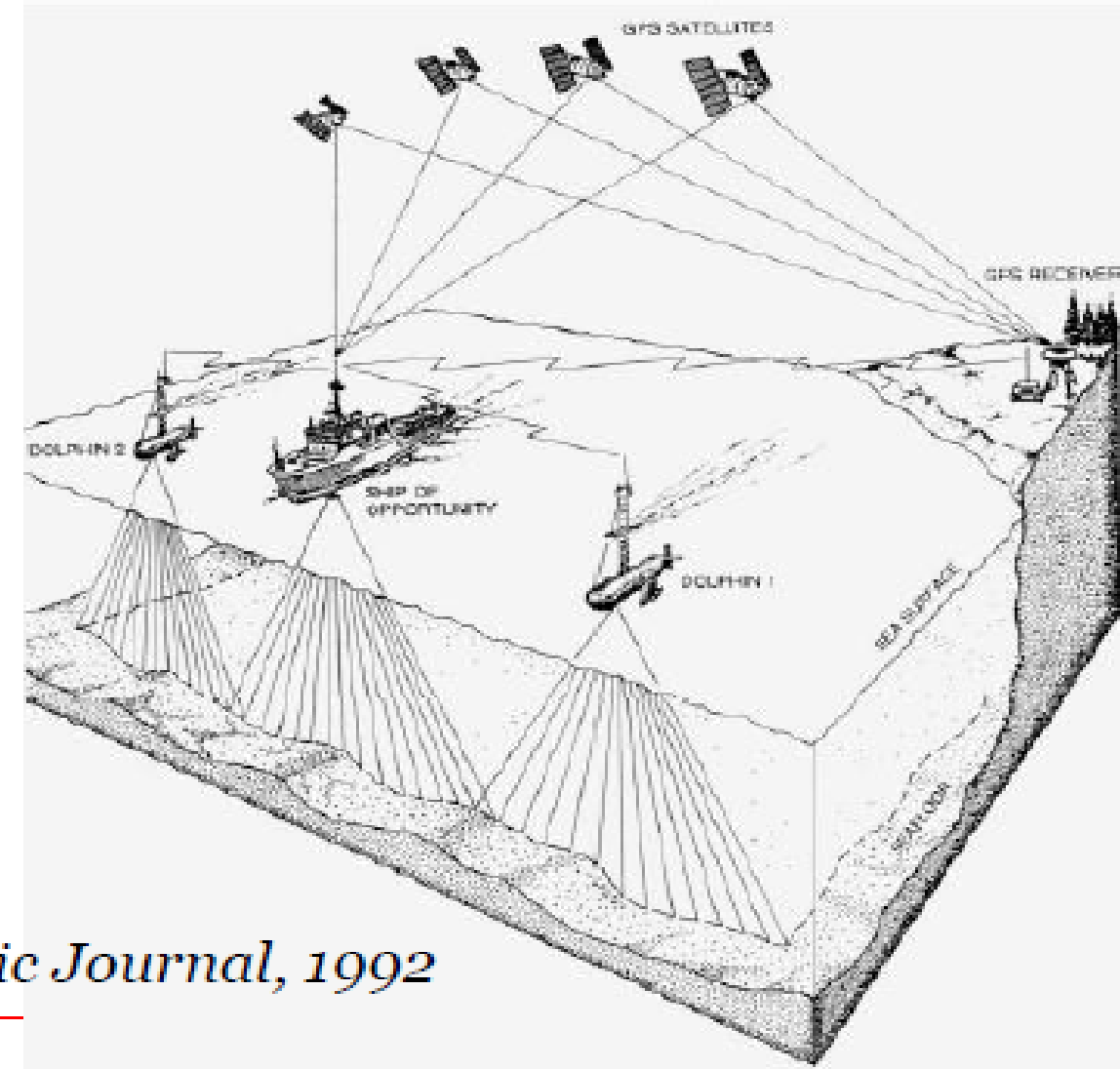


Deterministic Latency



Oceans Policy for Canada (1987) called for the development of a contracted-out ocean mapping program to collect hydrographic and geophysical data.

Canadian Ocean Mapping System (COMS), was envisioned to accomplish what is known today as a “force multiplier” in the collection of swath-based ocean mapping information.

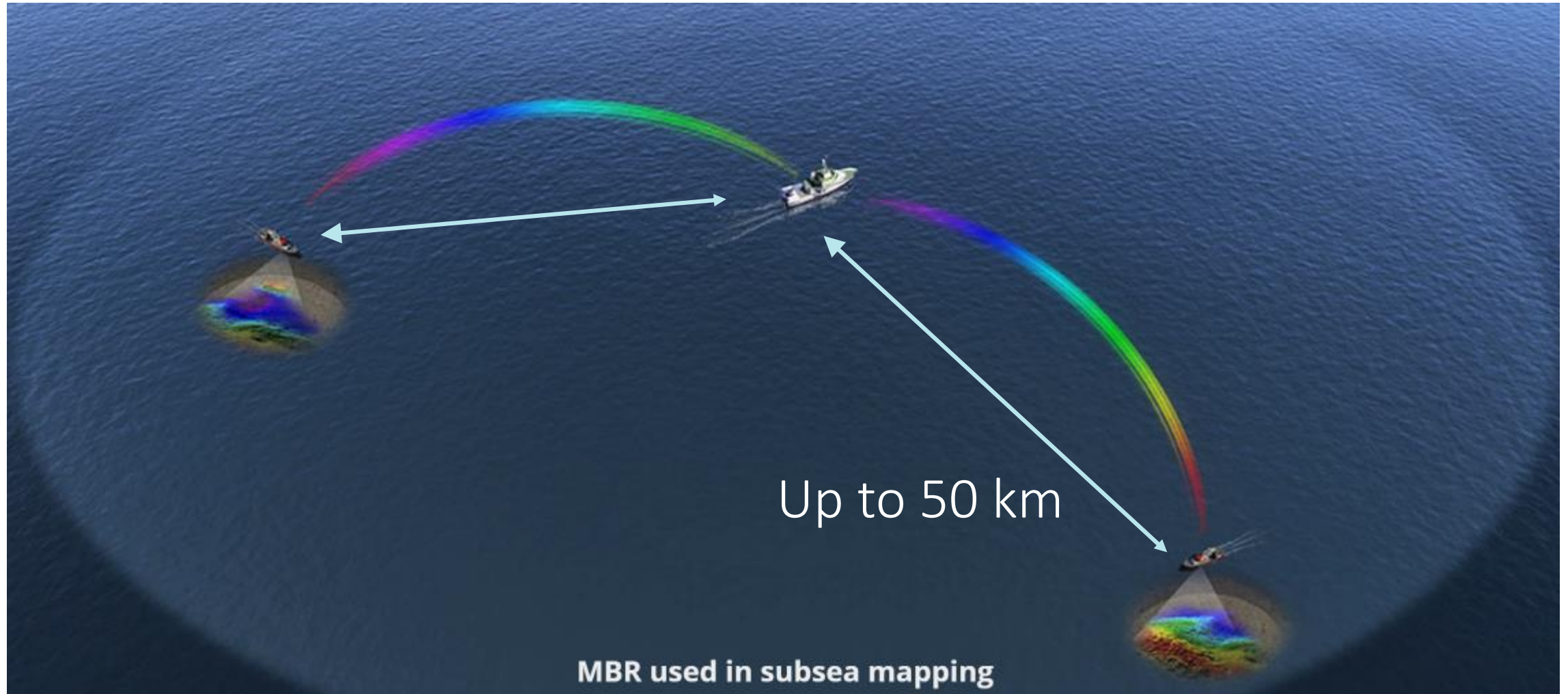


*The Hydrographic Journal, 1992*



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# Data flows longer distances



Up to 50 km

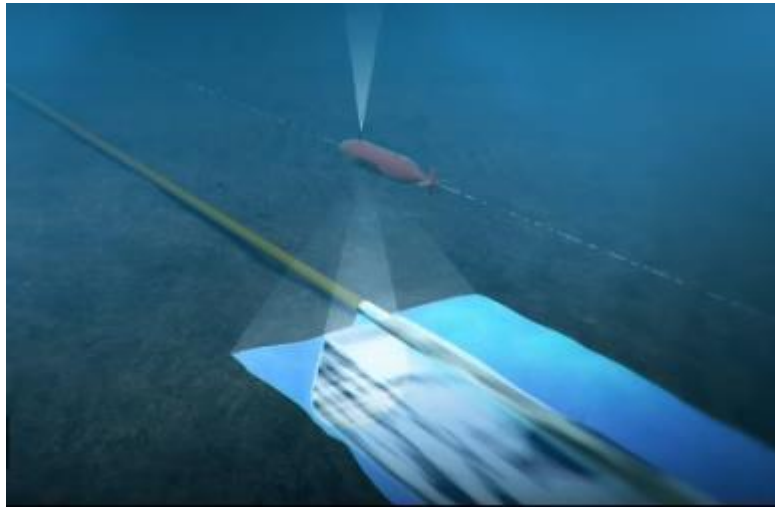
**MBR used in subsea mapping**



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# Worlds first fully autonomus pipeline inspection.

## Assets



Hugin AUV



Simrad Echo used as «USV».  
MBR 179 installed together  
with HIPAP for coms with Hugin



MBR 189 installed on the  
mountain Ulriken. (640  
meter antenna height)





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# Valparaiso - Long range from boat to ground link performance – 55 km



Video removed by the IHO due to space



WORLD CLASS – Through people, technology and

ment of Proprietary information



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# Unmanned Surface Vessel USV Sounder



Courtesy of RNoN and FFI



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# SOUNDER USV

## Operation

- Supervised
- Autonomous

## Dimensions:

- Length: 8 m
- Width: 2.4 m
- Height: 2 m

## Performance:

- Endurance:
  - Standard: >3 days max 20 days
- Speed: >14 Knots

## Equipment:

- Navigation, Communication & Collision Avoidance:
  - Seapath 136
  - AIS 300
  - Radar & Camera
  - MBR
  - INMARSAT & Iridium

WORLD CLASS – Through people, technology and dedication



KONGSBERG PROPRIETARY -

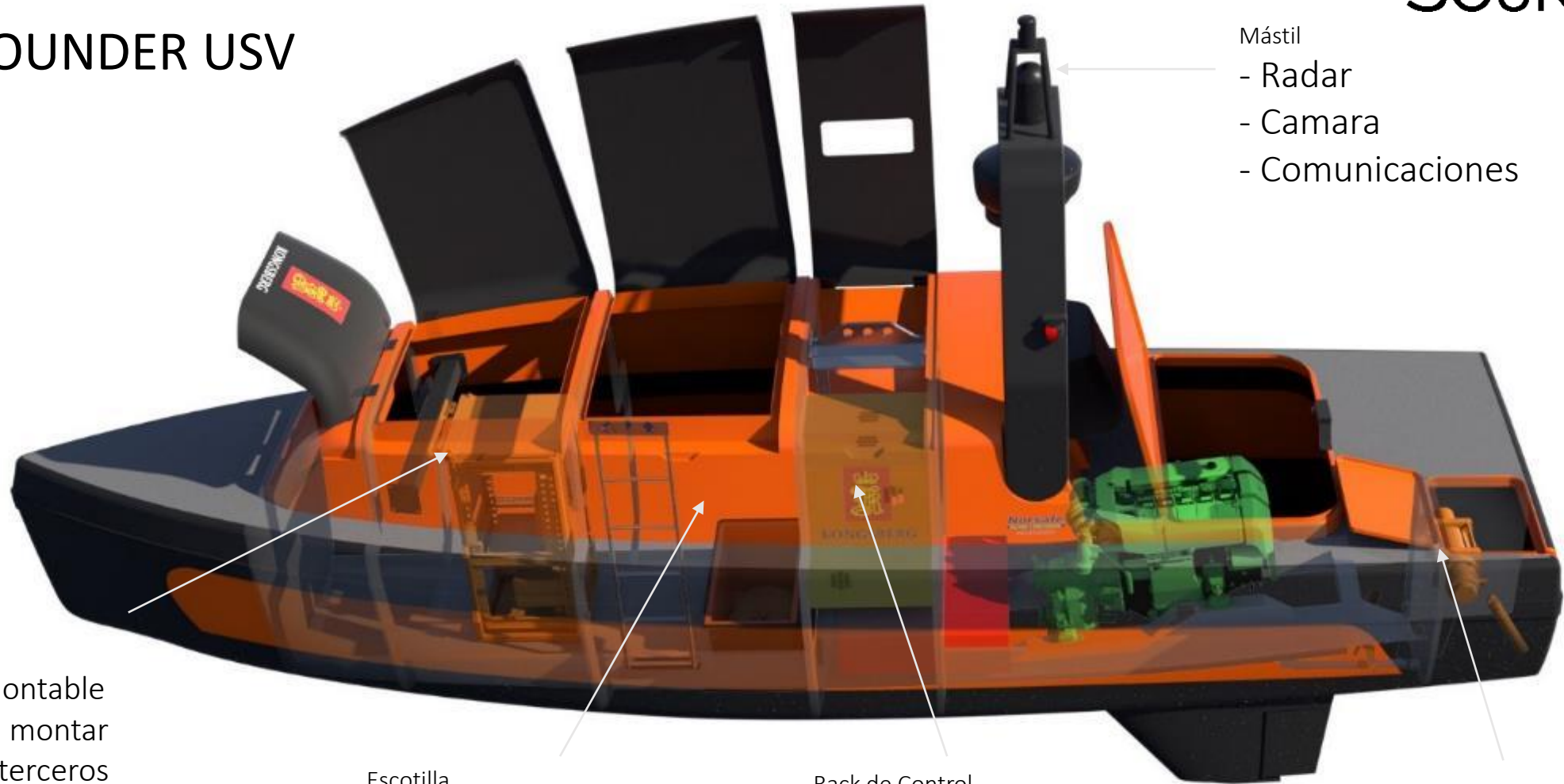
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# SOUNDER USV

# SOUNDER



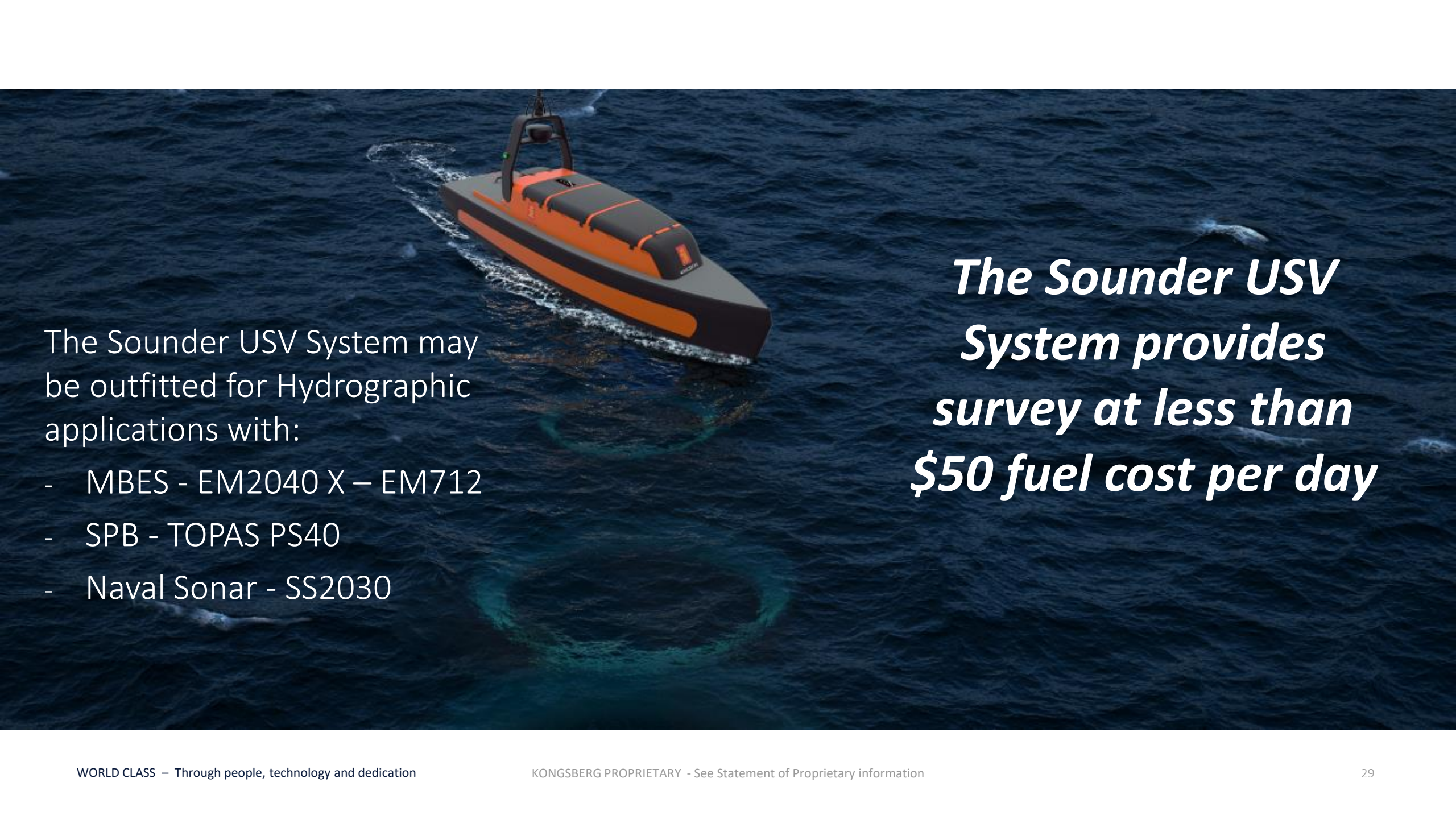
- Mástil
- Radar
  - Camara
  - Comunicaciones

- Rack Payload
- Rack desmontable
  - Se pueden montar equipos de terceros

- Escotilla
- Modular
  - Cambio a flote

- Rack de Control
- K-MATE
  - Comunicaciones

Sensor CTD



The Sounder USV System may be outfitted for Hydrographic applications with:

- MBES - EM2040 X – EM712
- SPB - TOPAS PS40
- Naval Sonar - SS2030

***The Sounder USV System provides survey at less than \$50 fuel cost per day***



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# Subsea Portfolio

## BTS – Boat Transfer System

A system designed for  
*safe and efficient*  
work boat handling



Park position - inboard

Launch position



Deployed



Designed to  
*reduce*  
hazardous situations



**PATENT  
PENDING**



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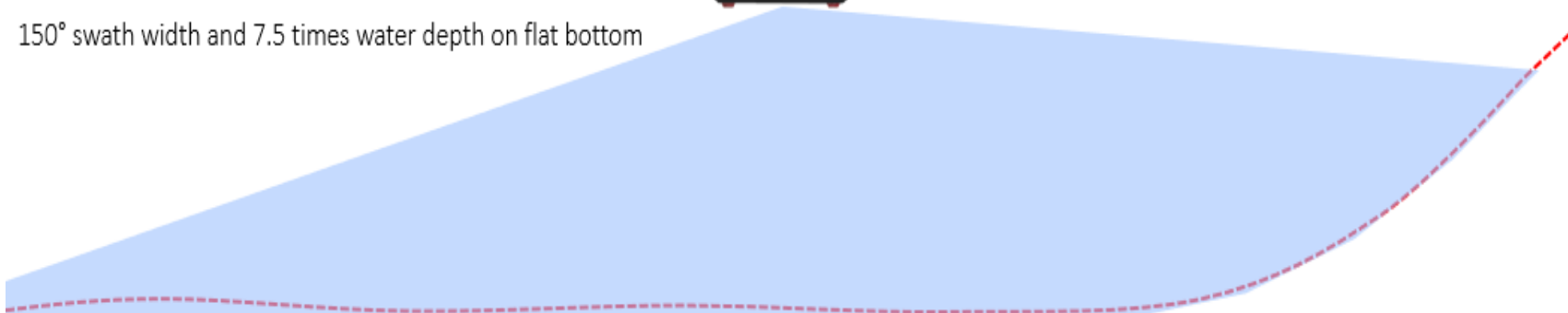
# KM range of Portable Hydrographic Systems

## EM 2040P MKII



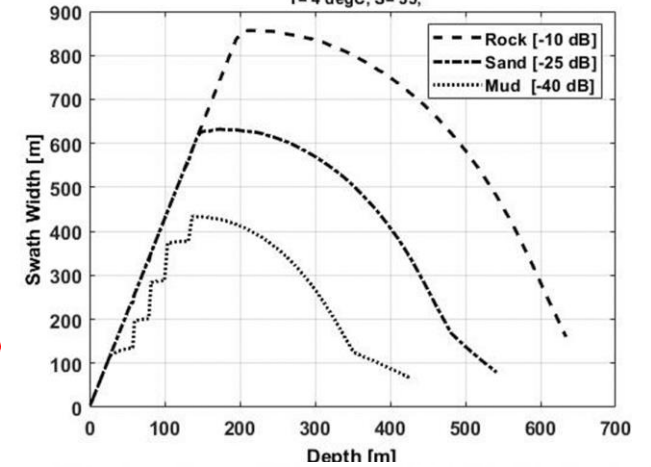
170° swath width up slopes and pier sides

150° swath width and 7.5 times water depth on flat bottom

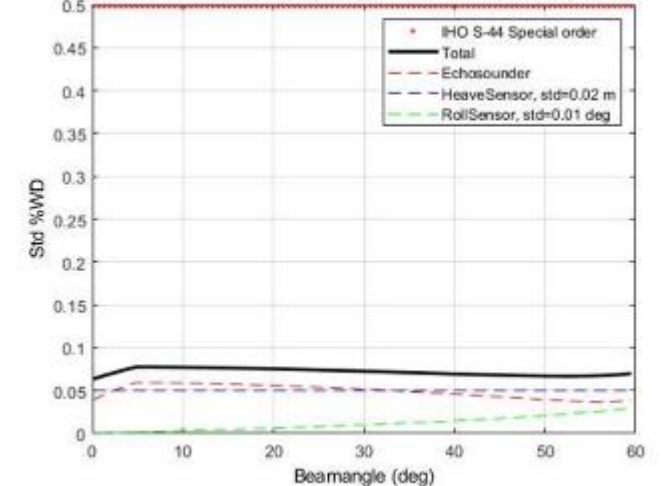


With good S/N ration (low noise vessel and hard bottom) a swath coverage of up to 220deg can be achieved

EM 2040P MKII, 200 kHz mode, FM, NL= 45 dB, Alpha to 200 m = 43.8 dB/km at 200 kHz  
T= 4 degC, S= 35,



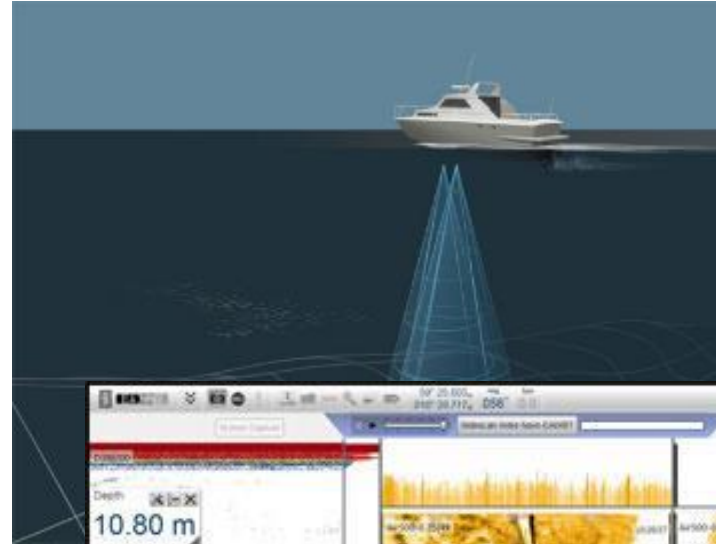
Est. dZ for EM 2040P MKII, S, CW, BW= 10.0 kHz, NL= 45, WD= 40 m





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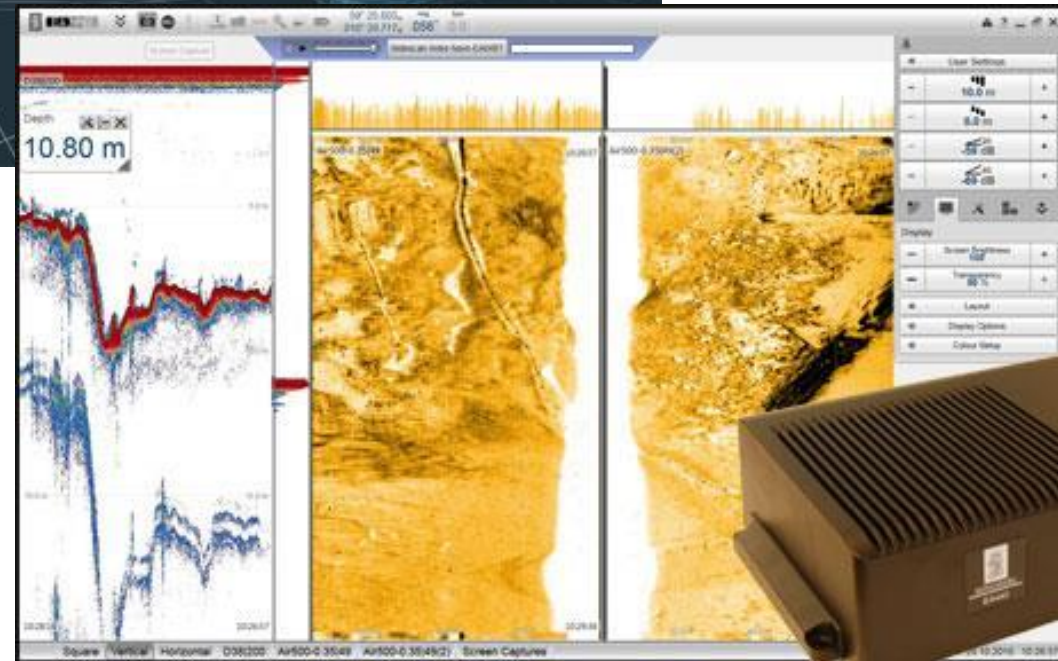
# Singlebeam echo sounders



EA440

EA440 SP

EA640







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# EA440 and EA640 elements

- Wide Band Transceiver (WBT)
  - Standard (4ch @ 0.5kW each)
  - High power (2ch @ 2kW each)
  - 10-500 kHz
  - Impedance 40-100 Ohm
- Transducers
  - Ranging fro 12 to 500 kHz
  - Sidescan transducers
  - Passive transducers
  - Hydrophone transducers
- EA software
  - Winson based
  - Interface for Sonar Mosaic

WBT - Standard



A F1: Transducer: Channel 1 - 2  
B F2: Transducer: Channel 3 - 4  
WBT - High power



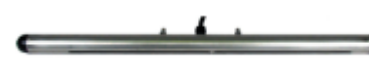
A F1: Transducer: Channel 1 - 2



200 and 500 kHz



15 kHz



Sidescan 200 and 500 kHz



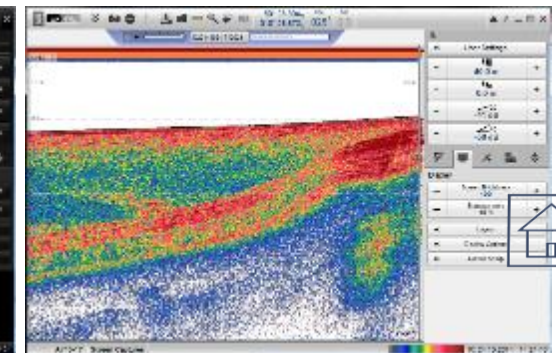
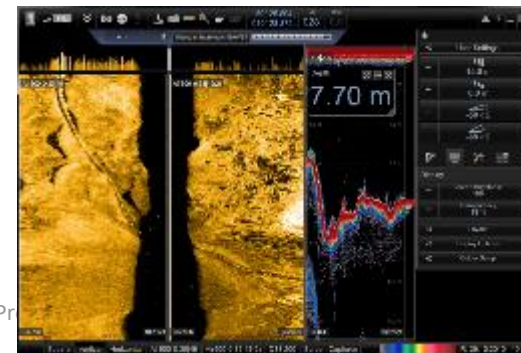
12/18kHz



38kHz



200kHz

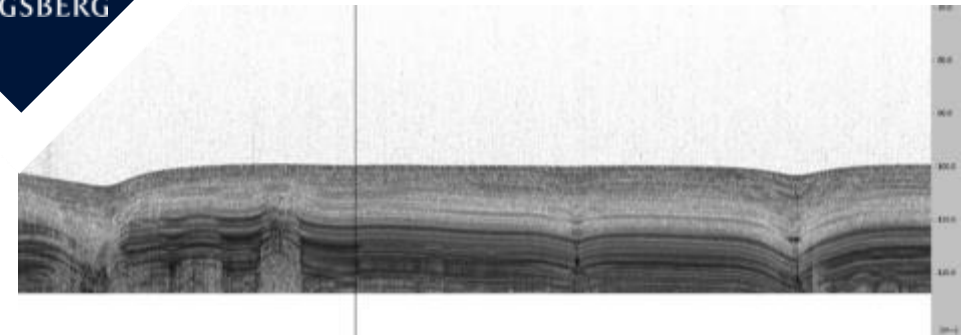
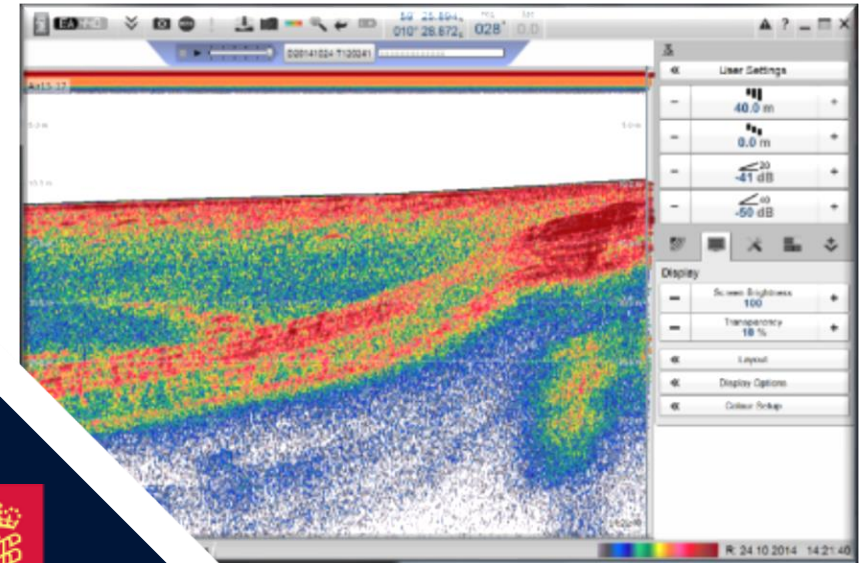




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# EA 440 Sub-bottom functionality

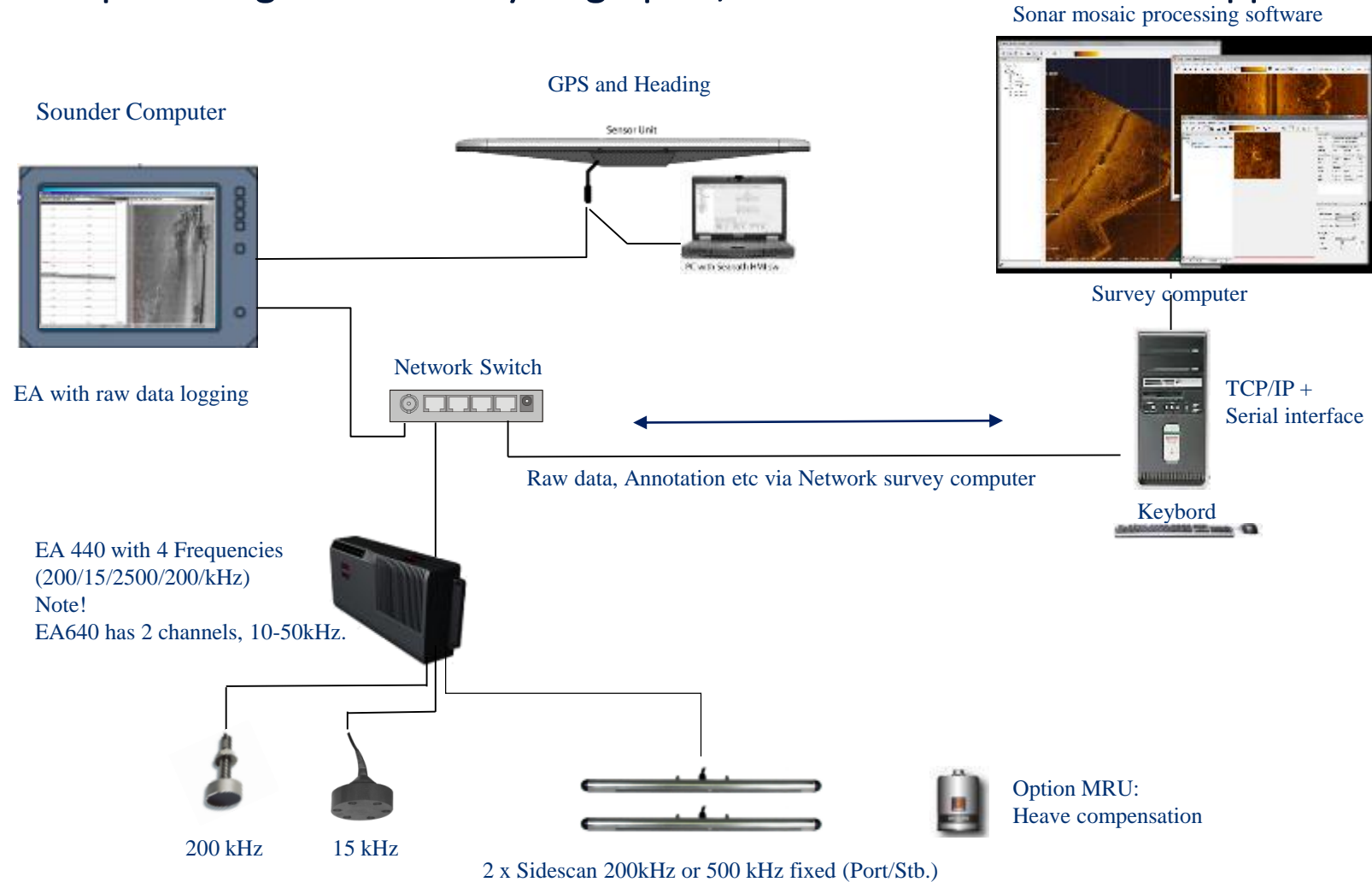
- 15 Khz transducer to max 300m
- 17 deg opening angle
- Penetration in upper layers
- Penetration typically less than 10m
- Applications:
  - Shallow depths
  - Harbours
  - Rivers, lakes





# EA440 & EA640 Singlebeam Echo sounder

## Example configuration for Hydrographic, Sidescan and Sub bottom application





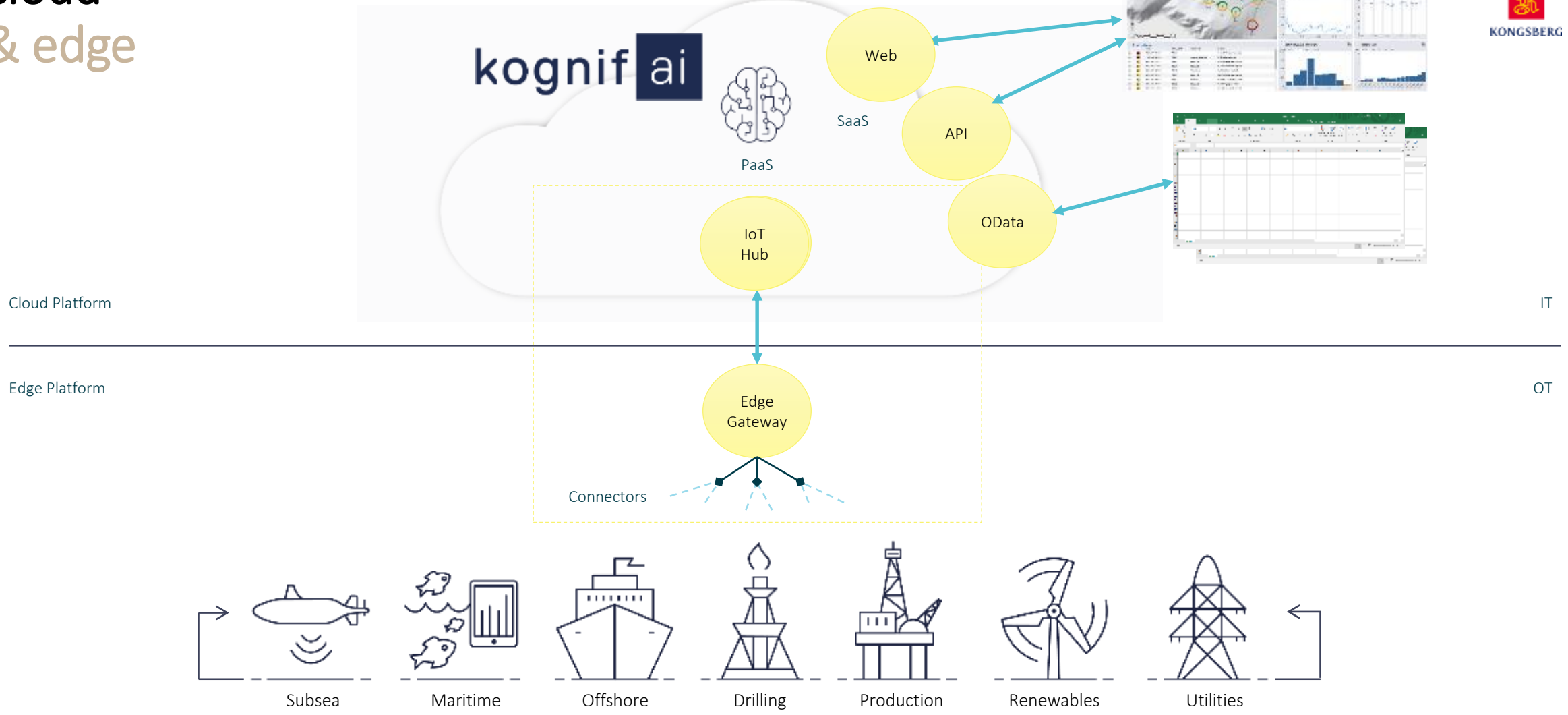
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# Kognifai



Courtesy of DIMAR

# cloud & edge

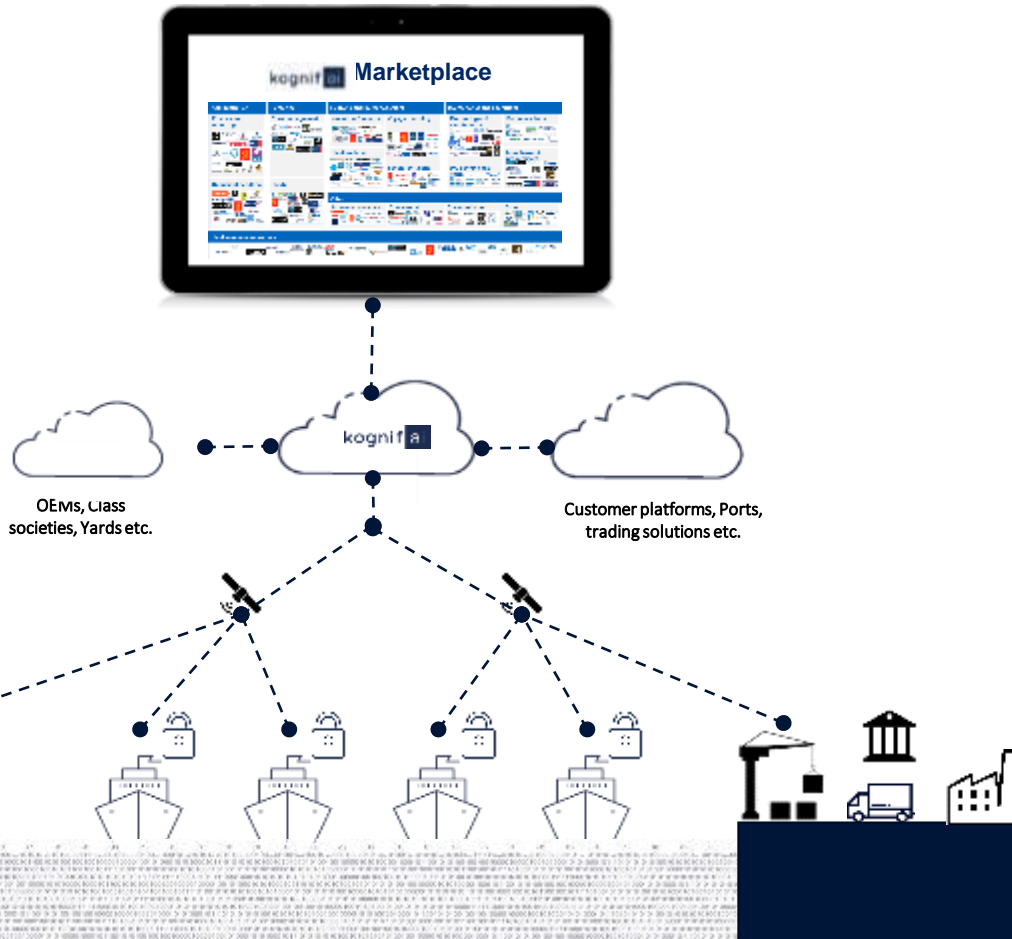




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# Kognifai Maritime Ecosystem

- Driving business impact by providing solutions to real problems



1

## ACCESS TO QUALITY DATA

Enable customers to capture and aggregate quality data from their asset in a cost-efficient way

2

## BUILD IN CYBER SECURITY

State-of-the-art technology ensures the highest level of security in both data transfer and storage

3

## ACCESS TO A BROAD RANGE OF SOLUTIONS

Enable customers to get access to leading applications and domain knowledge to improve operations

4

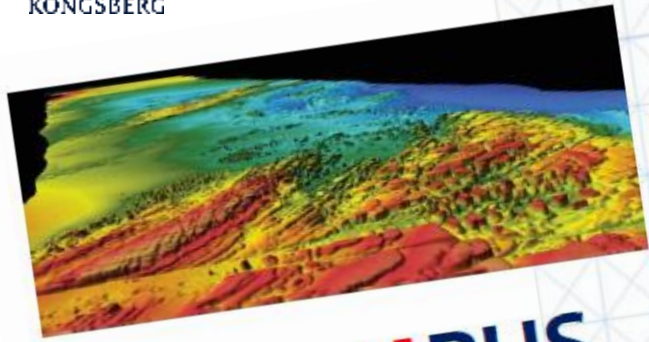
## OPEN AND COLLABORATIVE

Open standards for easy collaboration and at the same time strict data governance and full data ownership



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# 2º KaMpus Hidrográfico Latino Americano - 2020

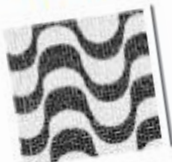


## 1er KAMPUS Hidrográfico Latino Americano

Copacabana, Rio de Janeiro

18 - 22 / Nov / 2019

Salon São Pedro da Aldeia  
HOTEL PESTANA - Copacabana



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### bre

embarcaciones autónomas USV y ROV.  
ónomas  
ercial Sensor & Robotics para Sudamérica  
cnico para Ventas de Sistemas Hidrográficos

rasil  
antamiento (topográfico) dimensional de los  
cnico para Ventas de Sistemas Hidrográficos  
gaçao - Brasil

rasil  
para aguas someras y profund  
Geoacoustics  
TOPAS para aguas someras y  
Geoacoustics

l sur de Argentina  
l Buenos Aires - CONICET - A  
licaciones ingenieras y de in  
es de petróleo en alta mar  
cnico para Ventas de Sist  
gícas de los Perfiladores  
Servicios. Kongsberg Mar

ver Arms  
lateral Viçosa - Brasil  
on Perfiladores del sub  
Servicios. Kongsberg M

rográficos a operacion  
cnico para Ventas de Si  
ra aplicaciones Hid  
cial Sensor & Roboti



z con SIS (Seafloor Information System)  
ventas de Sistemas Hidrográficas  
portuarios

az; adquisición y calibración con SIS  
ventas de Sistemas Hidrográficas

de ecosondas multihaz con SIS  
ventas de Sistemas Hidrográficas  
os pertenecientes al Servicio de



hidrográficas y operaciones con ROV  
Ventas de Sistemas Hidrográficas  
Experiencias en Colombia  
da de Colombia. (CIOH, DIMAR)  
res de Escaneo (Scanning Sonars)  
Ventas de Sistemas Hidrográficas

r sus aplicaciones.  
ventas de Sistemas Hidrográficas



ñihaz (Ejercicio con video/animación)  
y cobertura de hojas de campo de acuerdo a  
blema de gestao  
para Ventas de Sistemas Hidrográficas  
LUB - Brasil

ohaz/Sonar de Barrido Lateral  
hardware de estos sistemas  
ara Ventas de Sistemas Hidrográficas



ráfico - Latino América  
Noviembre

ida  
tor Comercial Sensor & Robotics para Sudamérica  
os Hidrográficos de Kongsberg Maritime  
s sobre acústica submarina.  
idad del Sonido  
lsto Técnico



WORLD

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# MUCHAS GRACIAS

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Sales Manager– Sensor & Robotics

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IHO

International  
Hydrographic  
Organization

