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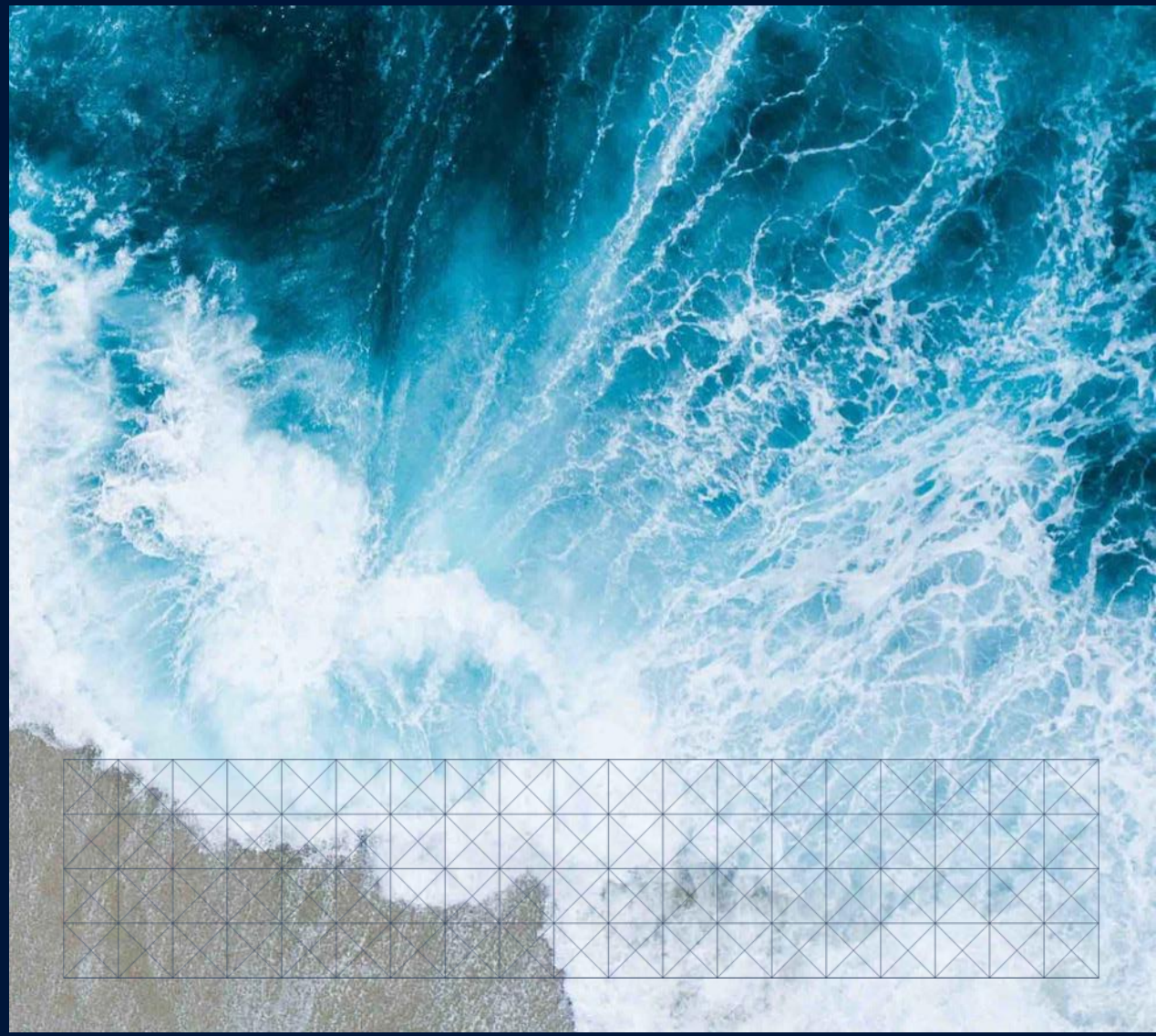
KONGSBERG MARITIME

OPTIMIZACION DE TOMA DE DATOS BATIMETRICOS



Vicente Carrasco

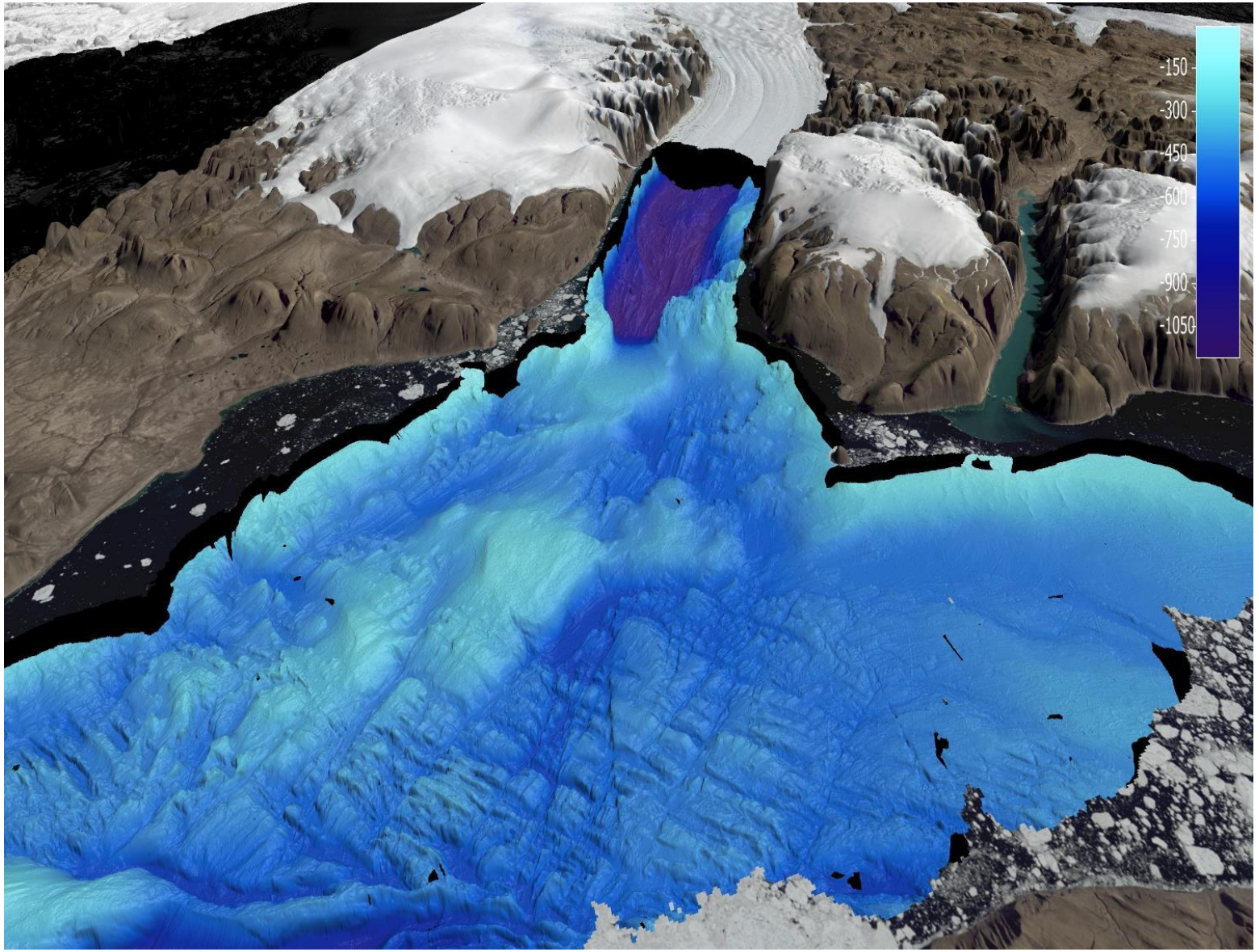
Jefe de Ventas

Kongsberg Maritime SUBSEA para Sudamérica

26/04/2019

Agenda

- Introducción
- Resolución/ Productividad
- Autonomía
- Mapping Cloud



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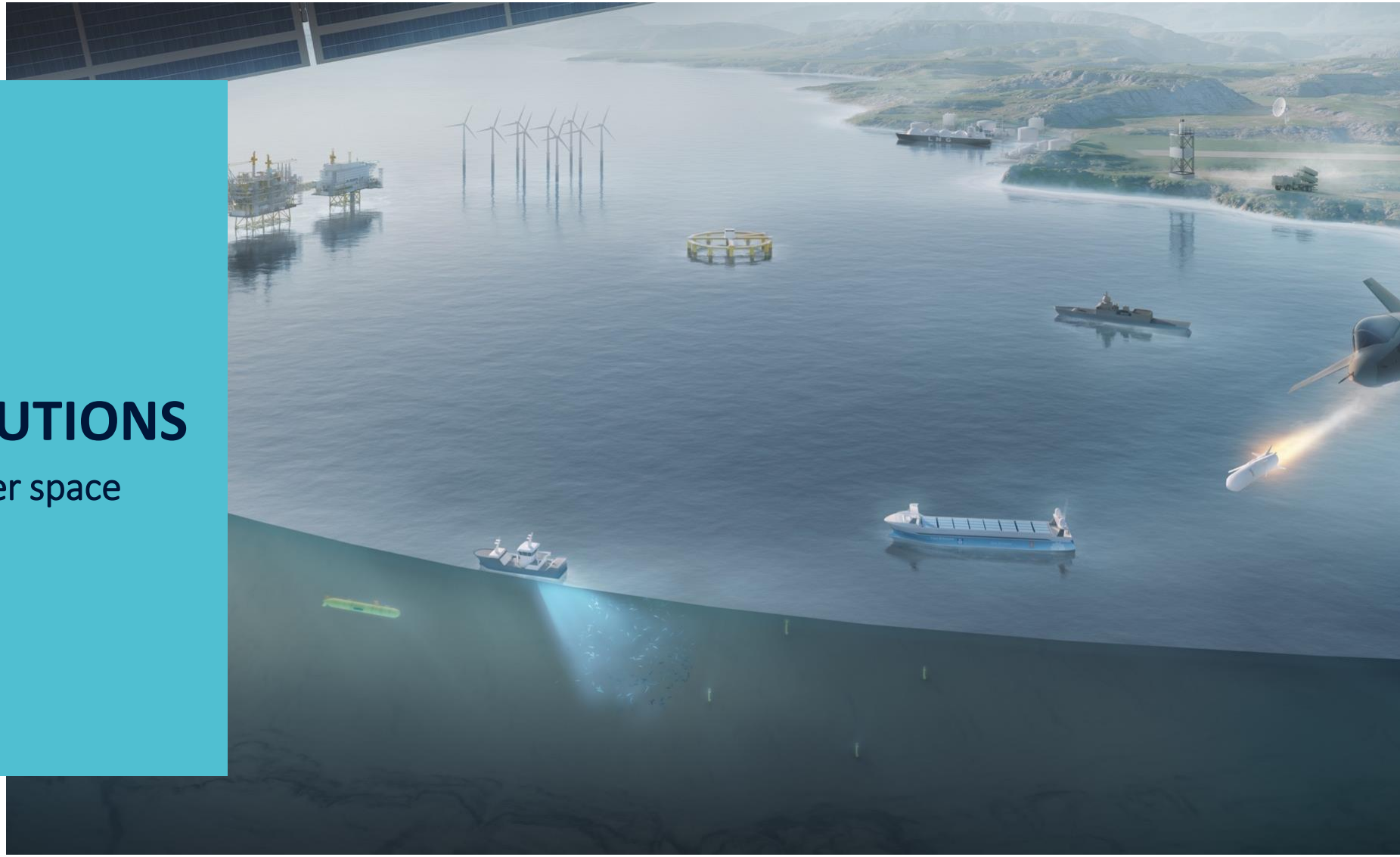
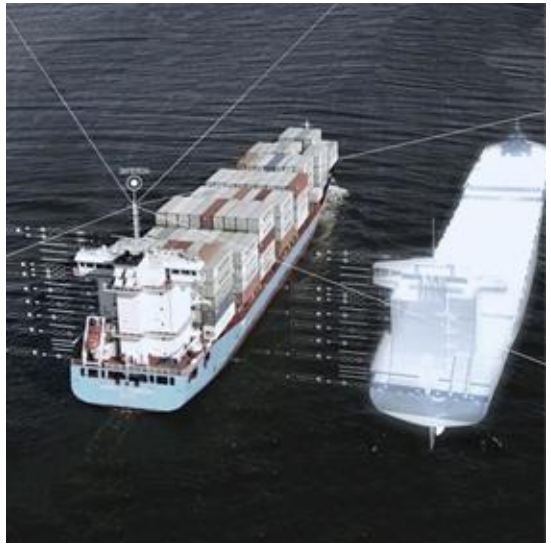
WE DELIVER SOLUTIONS

From deep sea to outer space



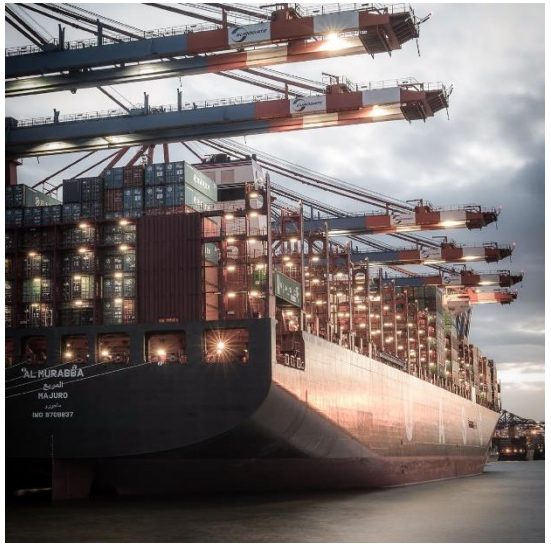
Business Areas

Technology is our common core



KONGSBERG DIGITAL

Maritime simulation
Industrial digitalization



KONGSBERG MARITIME

Seaborne transportation
Robotics and Sensors
Offshore, Oil & Gas

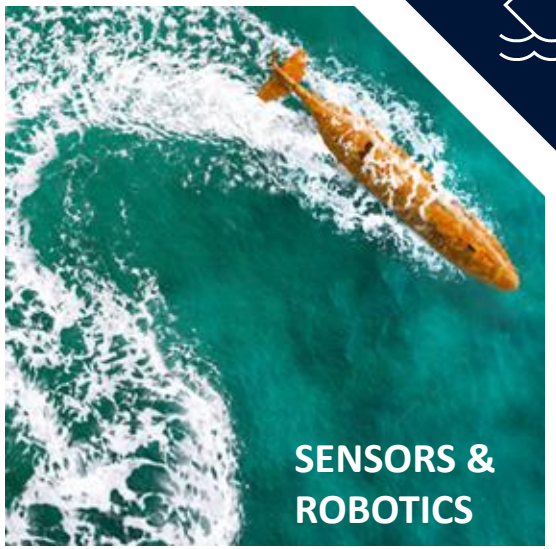
KONGSBERG DEFENCE & AEROSPACE

Defence
Space and Surveillance

KONGSBERG

The Broadest Portfolio of Products

Throughout the entire maritime industry



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Our Global Reach

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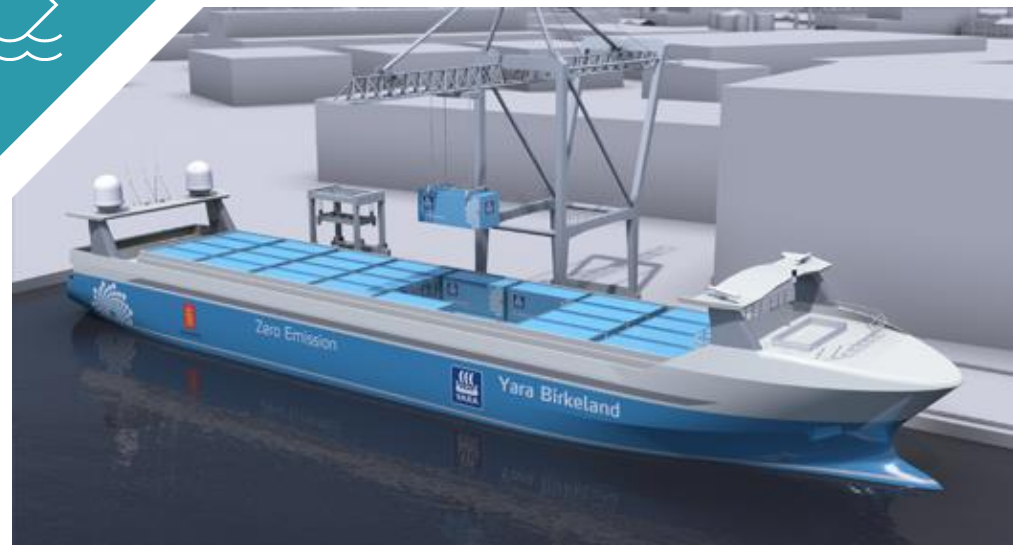
We are the Ocean Experts

80% of our business directly relates to the sea



The Maritime Industry is Changing

COST OPTIMIZATION **DIGITALIZATION** **SUSTAINABILITY** **SIZE MATTERS**

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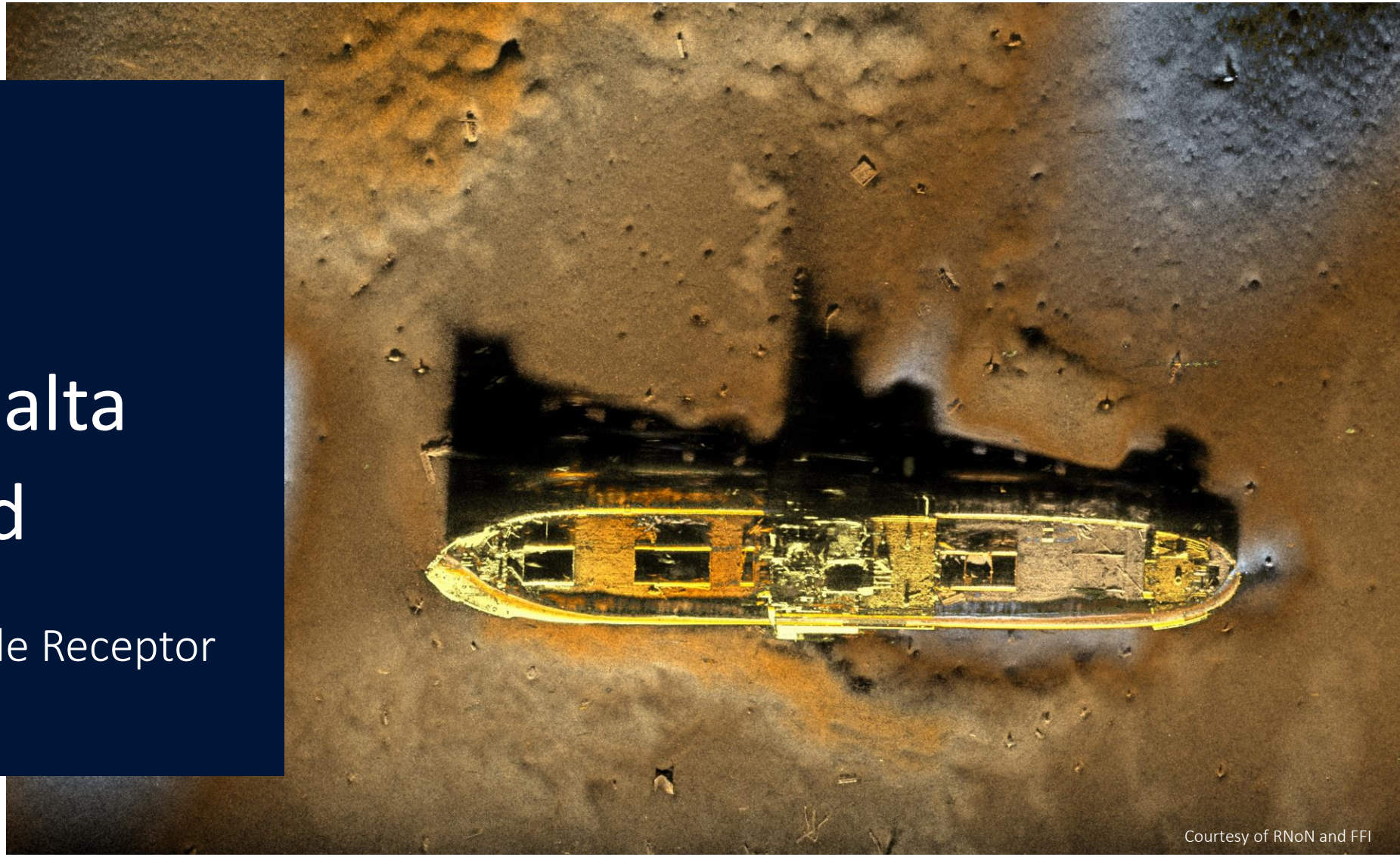
Datos de alta calidad

HISAS 1032 con Doble Receptor

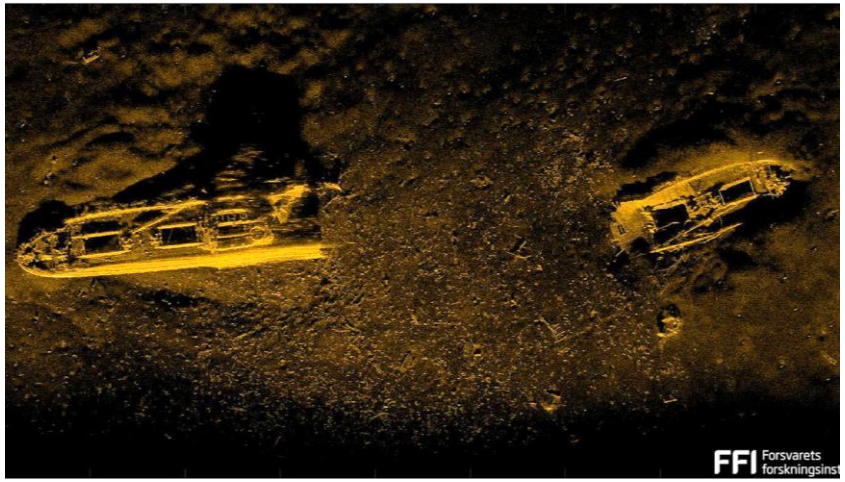


Courtesy of RNoN and FFI

HUGIN Superior

Best quality data collected in the most safe and cost effective manner

- 6000 m depth rating
- Superior data coverage
- Superior resolution
- Superior position accuracy
- Superior endurance

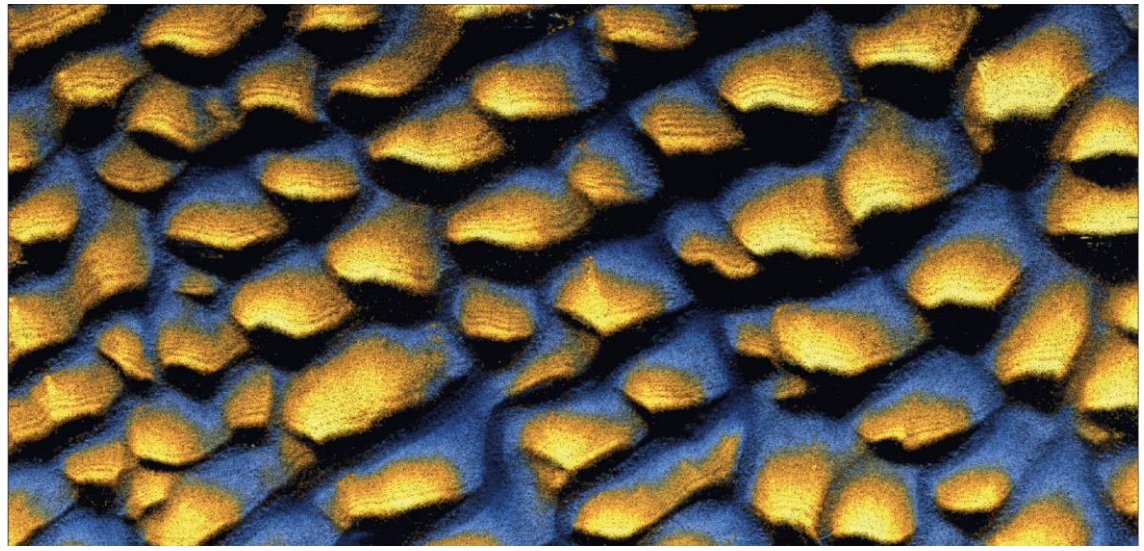


Cobertura de datos

HISAS 1032 Doble Receptor: cobertura de área mejorada para imágenes y batimetría

IMANGEN SAS

Imágenes de alta resolución con alcances de hasta 500 m a cada lado de la AUV, que proporcionan una cobertura total de hasta 1000 m a 2,5 nudos o 600 m a 4 nudos



BATIMETRIA

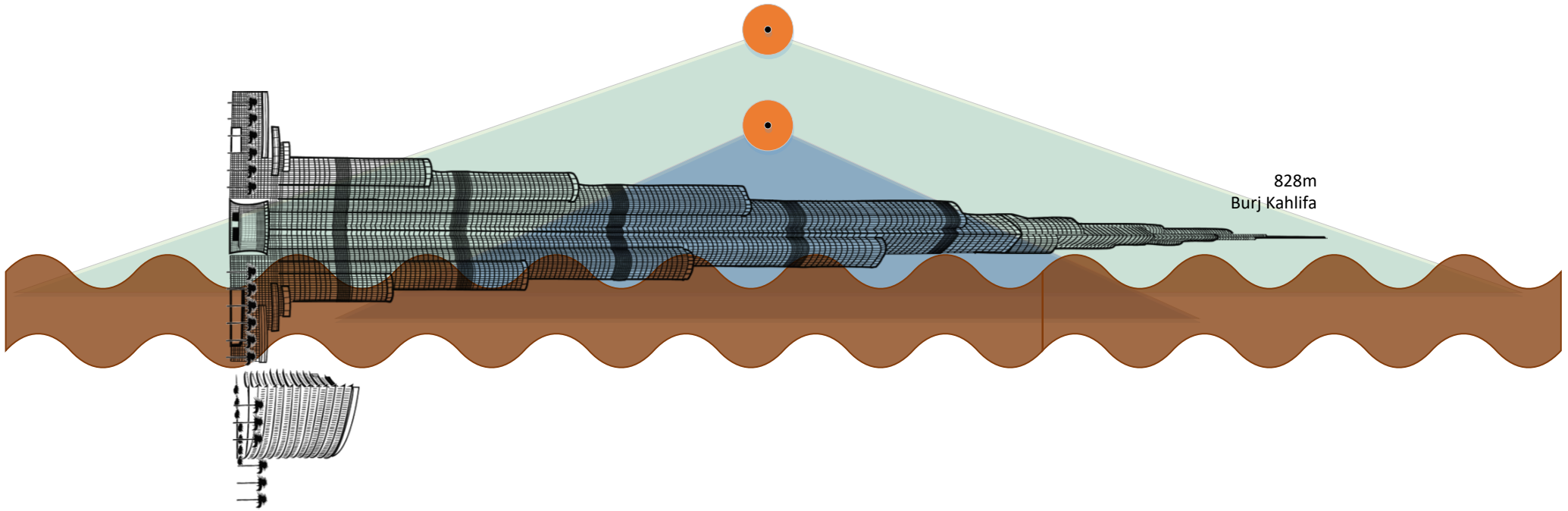
Batimetría SAS en una franja de 1 km que produce una resolución de 20 x 20 x 20 cm en rangos de 200 m, duplicando la cobertura de área para levantamientos hidrográficos

El nuevo procesamiento HISAS de datos genera batimetrías e imagen SAS del alcance completo, la cobertura de área aumenta hasta 4,5 km2 por hora

Área de Cobertura del HUGIN Superior

HISAS 1032

Nuevo HiSAS 1000m



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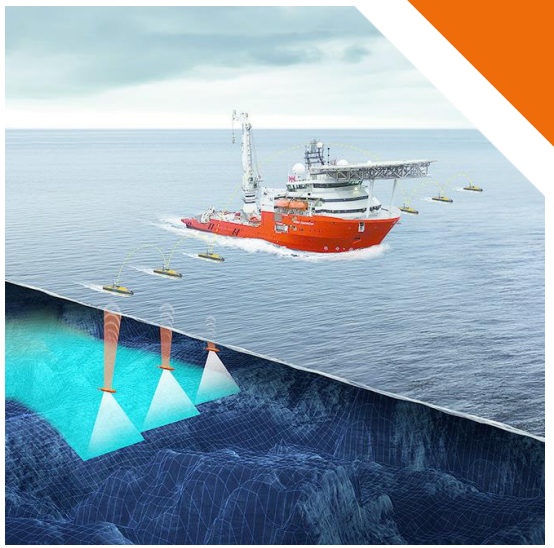
Force Multipliers

La aplicacion eficiente del uso de varios sistemas operando simultaneamente es el resultado del descubrimiento del ARA San Juan

Cubre una gran area en menos tiempo



Aplicación de Busqueda y Rescate

PERFORMANCE

OCEAN INFINITY LOCATES THE MISSING ARGENTINIAN SUBMARINE, ARA SAN JUAN

17/11/2018

Ocean Infinity, the seabed exploration company, confirms that it has found ARA San Juan, the Argentine Navy submarine which was lost on 15 November 2017.

In the early hours of 17 November, after two months of seabed search, Ocean Infinity located what has now been confirmed as the wreckage of the ARA San Juan. The submarine was found in a ravine in 920m of water, approximately 600 km east of Comodoro Rivadavia in the Atlantic Ocean.

Aplicación de Investigación de Iceberg en Antártica

Scientists aboard the icebreaker Nathaniel B. Palmer this month are getting their first up-close look ever at a massive Antarctic glacier that could play a big role in global sea level rise.

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A range of Portable Hydrographic Systems

Open to suggestions for new ways to integrate

POLE MOUNTED

Geoswath
M3 Sonar
EM 2040P
EM 2040C

C.S.V MOUNTED

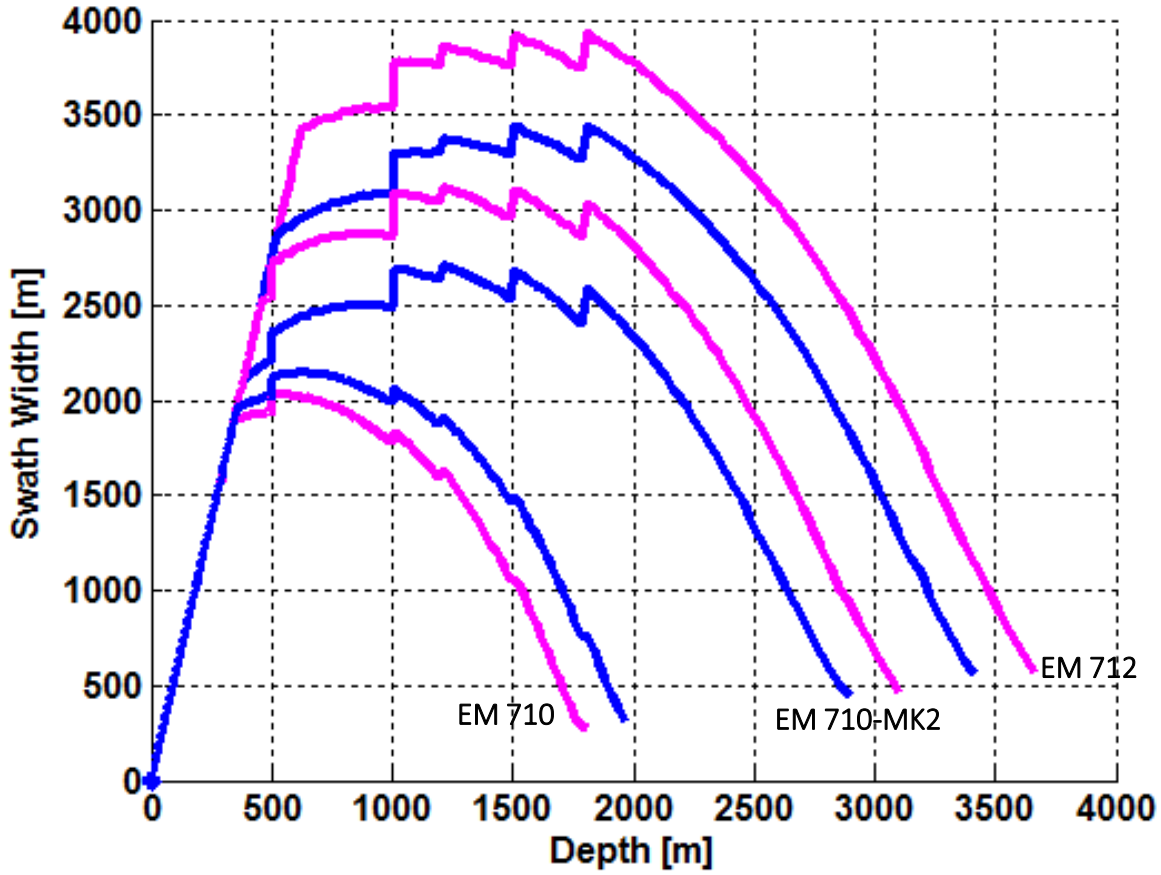
GeoSwath
M3 Sonar
EM 2040P
EM 2040C
Geopulse Compact

USV MOUNTED

GeoSwath
M3

EM 710, EM 710-MK2 y EM 712
Comparativa coberturas

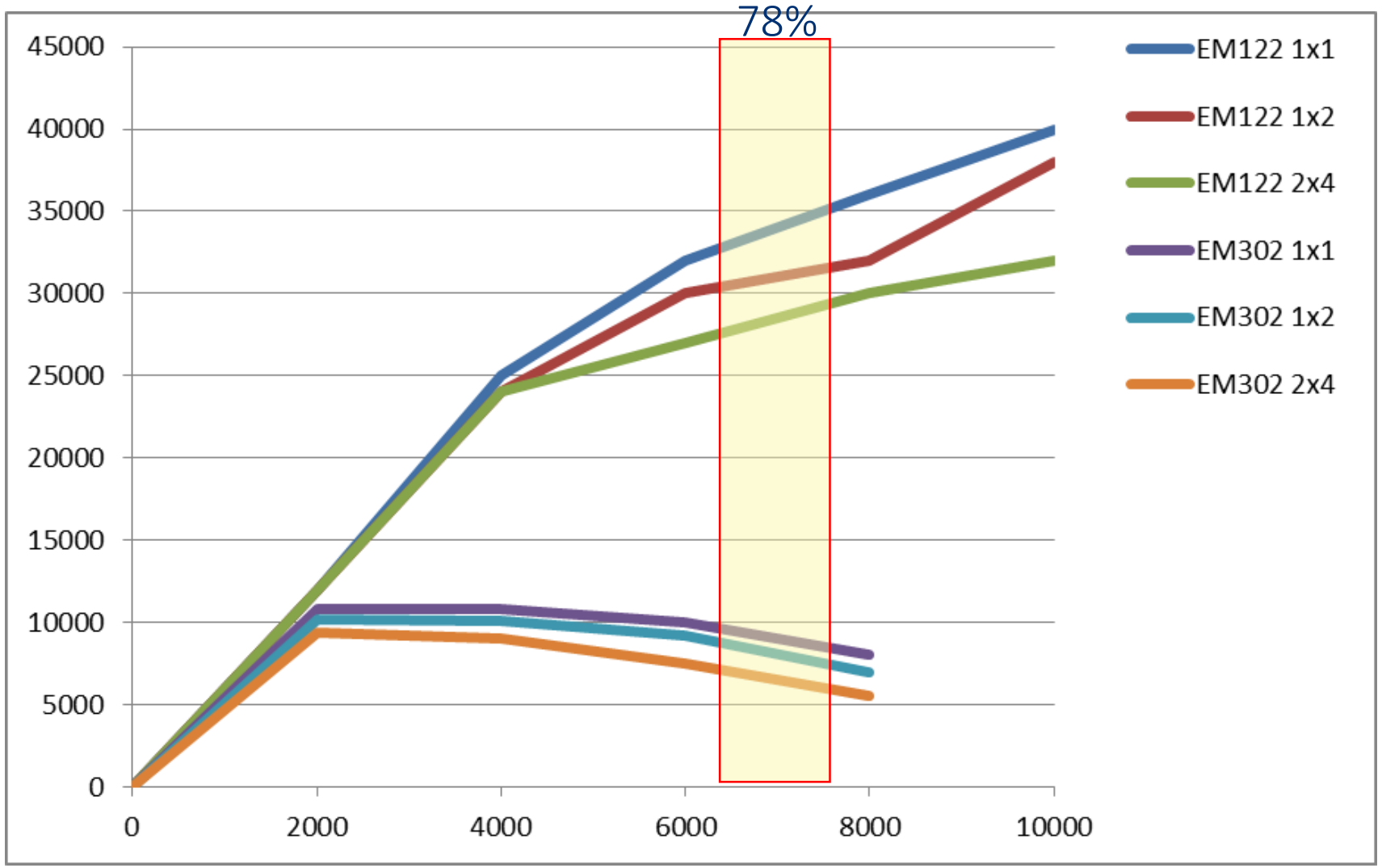
- Sistema 0.5º * 1º
- Magenta – Verano
- Azul – Invierno
- NL= 45 dB para EM 710 y EM 710-MK2
- NL= 35 dB para EM 712



Productividad

- Profundidad de trabajo >70 % de Actividad
- Cobertura de los diferentes modelos
- Solape entre líneas
- Diferencia de precios entre modelos
- Estimación de calculos de operación del buque
- Conclusión de detrminación del sistema óptimo condierando el ahorro en costes operativos

EM122 vs EM302 cobertura



EM 122 cobertura

	EM302	EM122	EM302	EM122	EM302	EM122	EM302	EM122
	Crosstrack coverage	Crosstrack coverage	4 knots	4 knots	24 hours	24 hours	45 days	45 days
	In meters	In meters	KM2/h	KM2/h	KM2/day	KM2/day	KM2 total	KM2 total
	1x1	1x1	1x1	1x1	1x1	1x1	1x1	1x1
2000	10800,00	12000,00	80,01	88,90	1920,15	2133,50	86406,91	96007,68
4000	10800,00	25000,00	80,01	185,20	1920,15	4444,80	86406,91	200016,00
6000	10000,00	32000,00	74,08	237,06	1777,92	5689,34	80006,40	256020,48
8000	8000,00	36000,00	59,26	266,69	1422,34	6400,51	64005,12	288023,04

Para que la EM302 cubra 288,023 km se requiren 202 dias de campaña esto supone 157 días extra.

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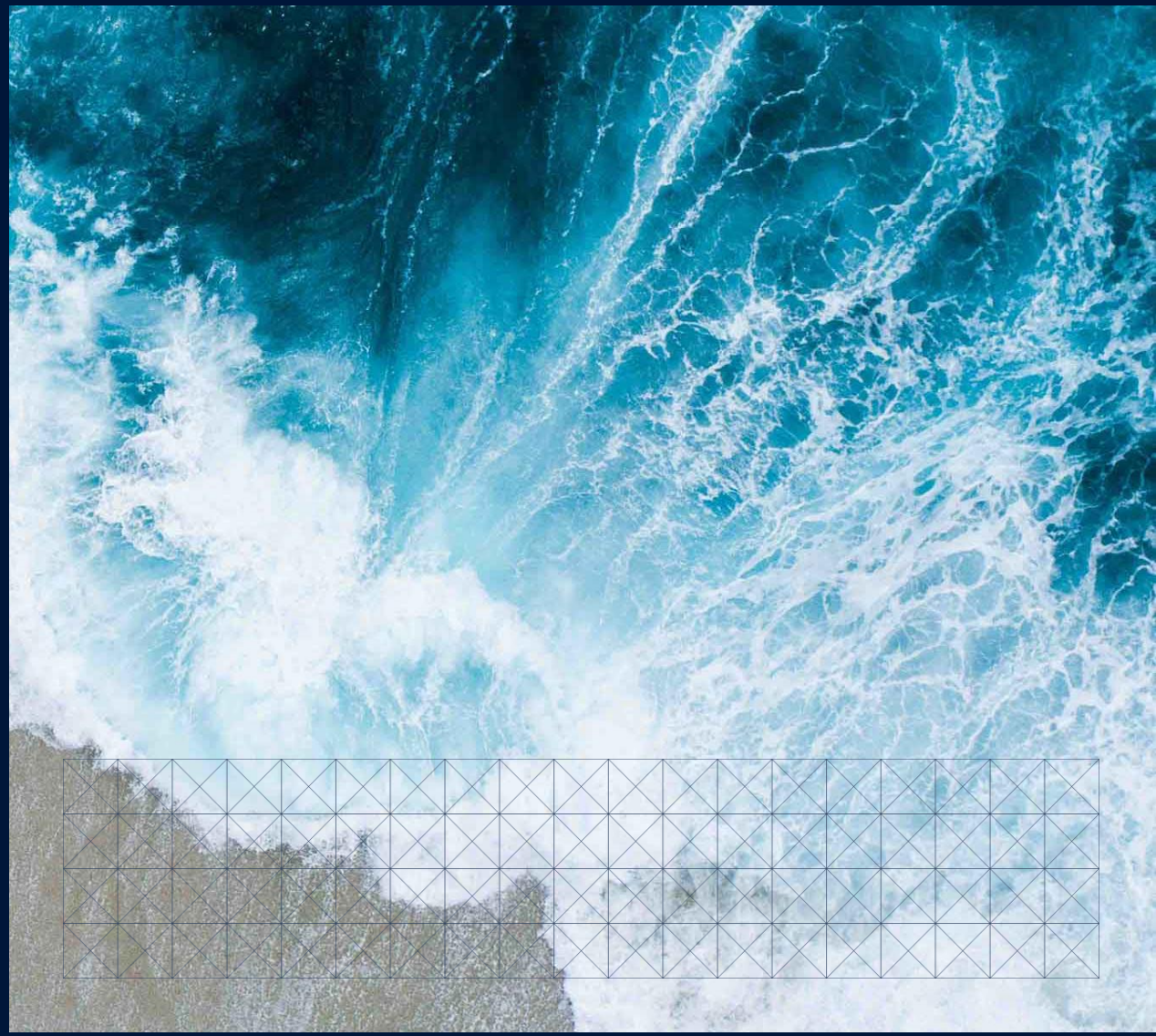
ENHANCE CAPABILITIES

AUTONOMY



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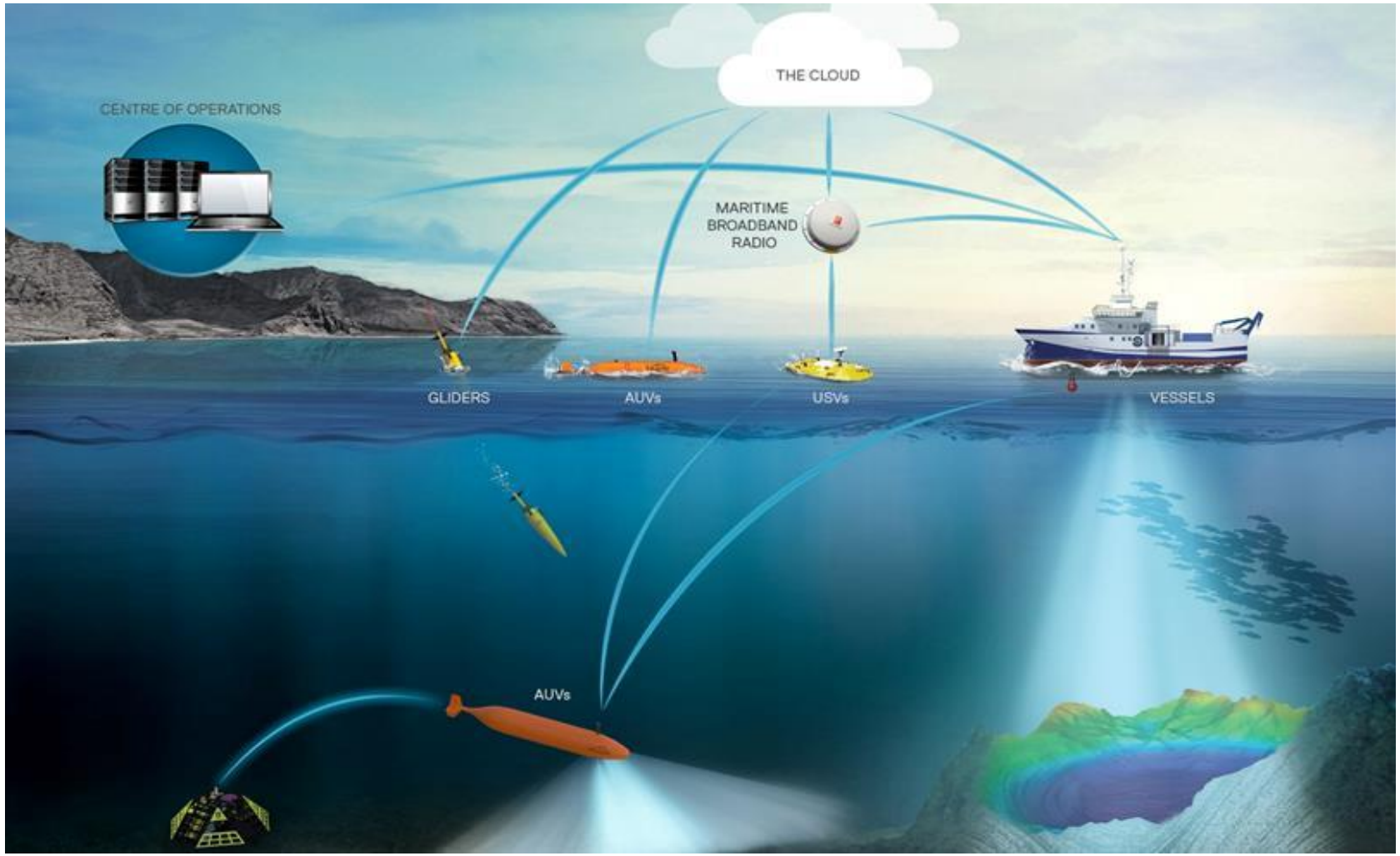
Autonomy

Improved operation and safety at lower cost



MARITIME BROADBAND RADIO

Operativa comun en tempo real, anywhere!

Vessel

RIB

ASV

UUV

Aircraft

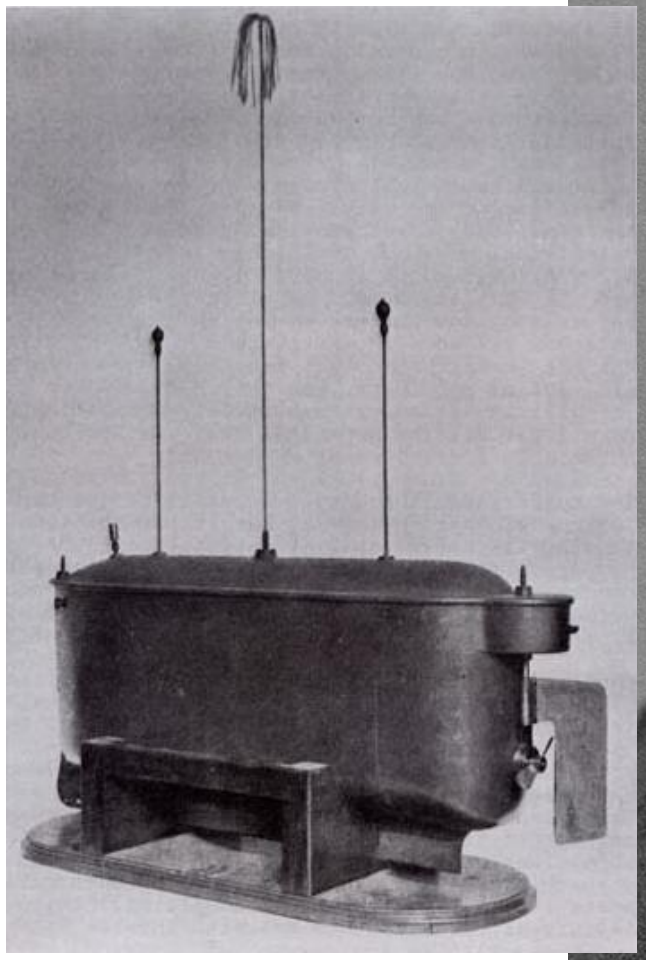
UAV

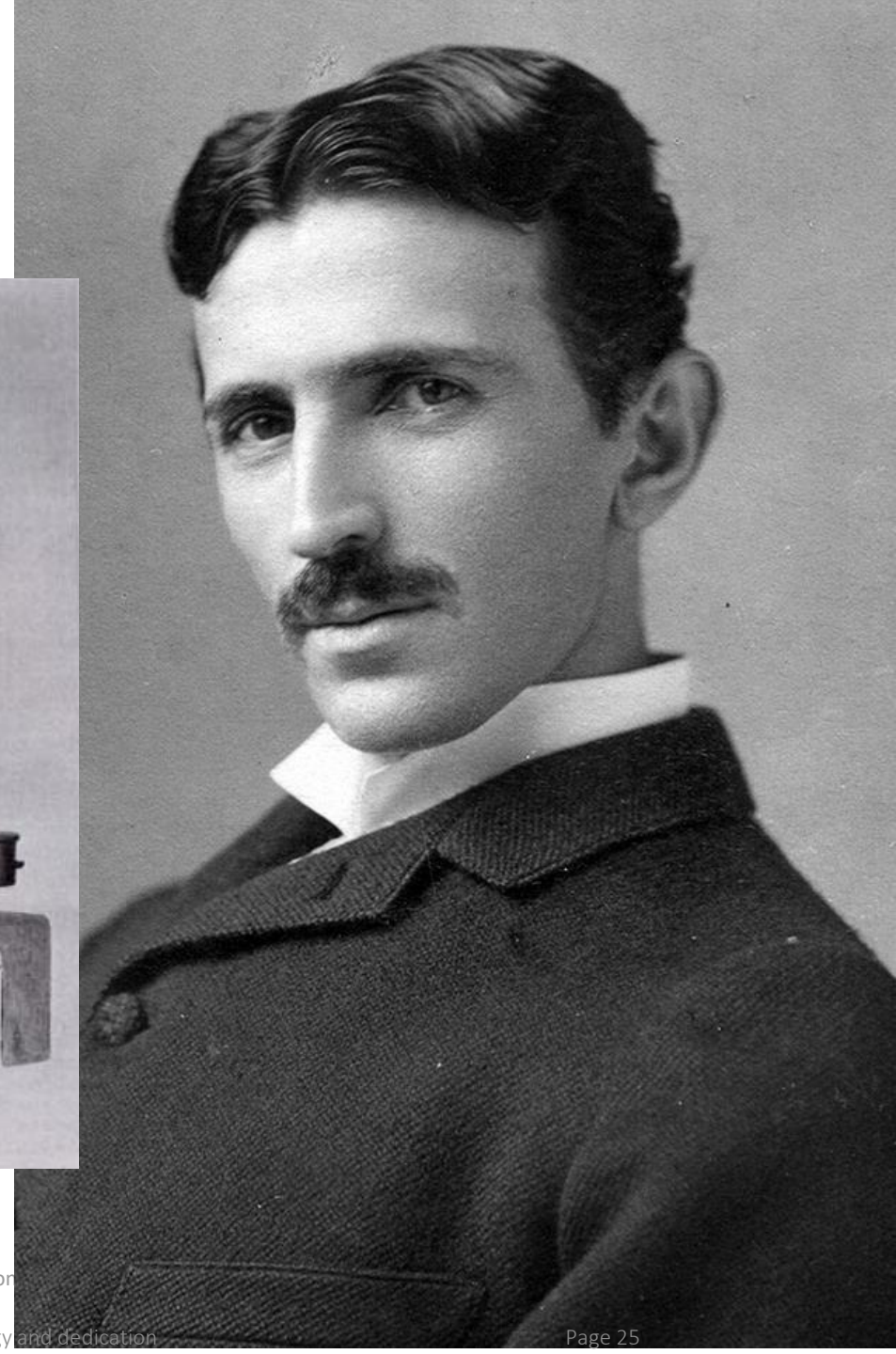
KONGSBERG PROPRIETARY - See Statement of Proprietary information

A brief history of Radio controlled Boat

Tether-less control made its first appearance in the 19th Century

- Nikola Tesla demonstrated a remote controlled boat during an exhibition at Madison Square Gardens in 1898
- In typical Tesla style, he convinced the audience they could control it with their thoughts!
- This was before the Radio was invented by Marconi brothers ?





Kongsberg Maritime and AUVs, 26 years of development

Key Milestones: KM AUV Development

- 1993: HUGIN I - 110 nautical mile dive
- 1997: First commercial survey
- 2000: First commercial sale
- 2001: First Military demonstration
- 2003: SAS prototype on HUGIN
- 2005: HISAS prototype on HUGIN
- 2007: Introduction of HUGIN 1000 model
- 2012: 6 battery HUGIN introduced
- 2014: In-Mission SAS developed
- 2015: Depth record for HUGIN 4449 m (fully supervised)
- 2015: 800,000 line-km of commercial survey completed
- 2016: Magnetometer, colour camera & laser profiler introduced
- 2016: HUGIN rated to 6000 m developed
- 2017: Sworm of AUV, USV
- 2018: Resident AUV - Eelume

Gama de Vehículos Autónomos Submarinos

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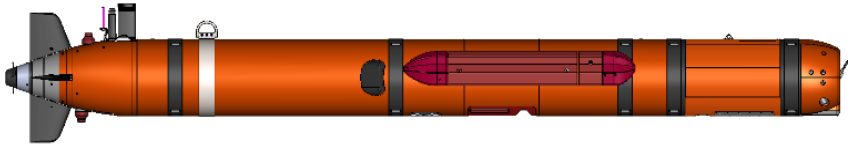
- MUNIN 600

  Baja Logistica – Maletas de transporte, gruas de cubierta, etc

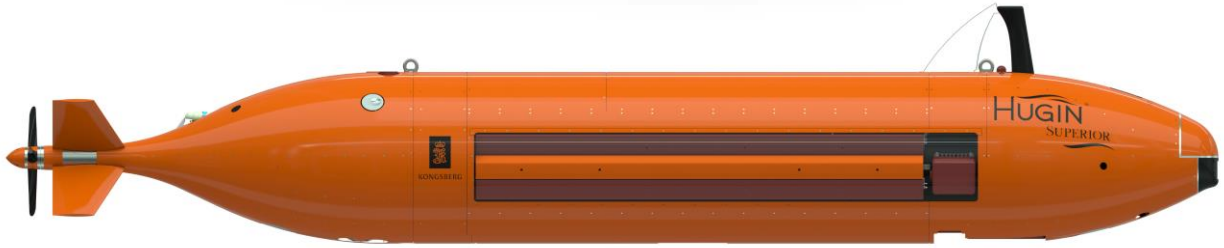
  - Profundidad hasta 600 m Ø12.75”
  - HISAS2040, EM2040P.
  - Autonomía 10-12h.

- MUNIN+
  - Modular – Maletas peli.
  - Profundidad hasta 1.500 m Ø19”
  - HISAS2040, EM2040P, SBP, camara.
  - Autonomía 24h.



- HUGIN
  - Aguas profundas.
  - Profundidad hasta 6000m .
  - HISAS1032, EM2040, SBP, camara, laser, senosres medioambientales++.
  - Autonomía 48h – 60 h.

- HUGIN SUPERIOR
  - Aguas profundas.
  - Profundidad hasta 6000m .
  - HISAS1032 doble receptor, EM2040 MkII, SBP, camara, laser, sensores medioambientales++.
  - Autonomía 52h – 72 h.



K-MATE: Yara Birkeland

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Key Facts:

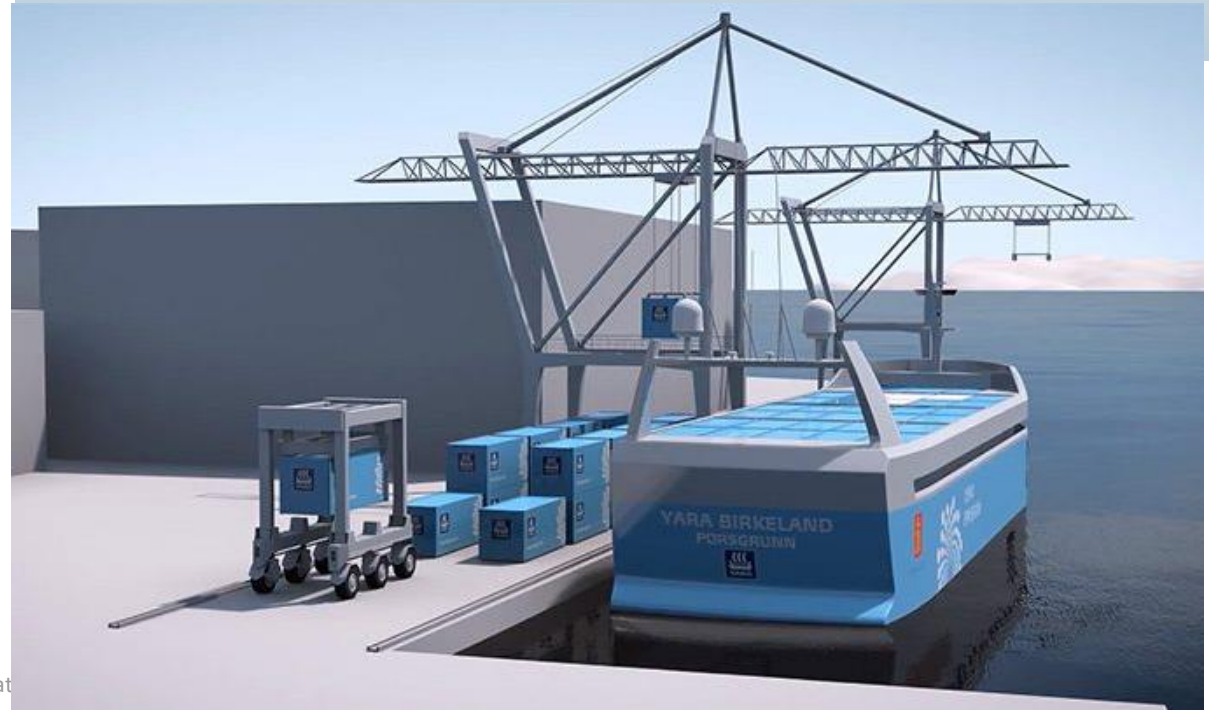
- Fully battery powered ship
- Prepare for remote control and fully autonomous operations
- Dimensions & Performance
  - LOA: >70 m
  - Beam: 15 m
  - Depth: 12 m
  - Draft: (full) 5m
  - Service speed: 6 Knots

Purpose and Performance:

- To replace road journeys
- Sail within 3 ports
  - Herøya to Brevik: 7 nm
  - Herøya to Larvik 30 nm
- Controlled by:
  - YARA at Porsgrunn
  - Kongsberg Maritime

Schedule:

- 2017: design finalized
- 2018 Delivery & testing with small crew
- 2019: Remote operation
- 2020: Fully autonomous operation



GeoSwath 4R USV

Vehículos Autónomos de Superficie - GeoSwath 4R USV ofrece mapeos de fondo simultaneamente batimetria y sonar de barrido lateral mediante una plataforma operada remotamente en superficie.

K-MATE: Odin

Proyecto:

- Desarrollo conjunto entre KM y FFI (Dept Desarrollo de la Defensa)
- Se puede manipular o operación remota
- Plataforma Multipropósito para investigación de la defensa
  - Hidrografía
  - Propección de Medidas Contraminas
  - Lanzamiento y Recogida AUV
- Configurado para portar un AUV

Equipos:

- Sistemas:
  - Dos motores
  - Ancla Electrónica
- Navegación, Comunicación y Prevención a la Colisión:
  - Sistema de Referencia Seapath 136
  - AIS 300
  - Radar, Camara & LIDAR
  - MBR – Radio de Banda Ancha
  - Iridium

K-MATE: SEA-KIT Batimetria

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Dimensiones:

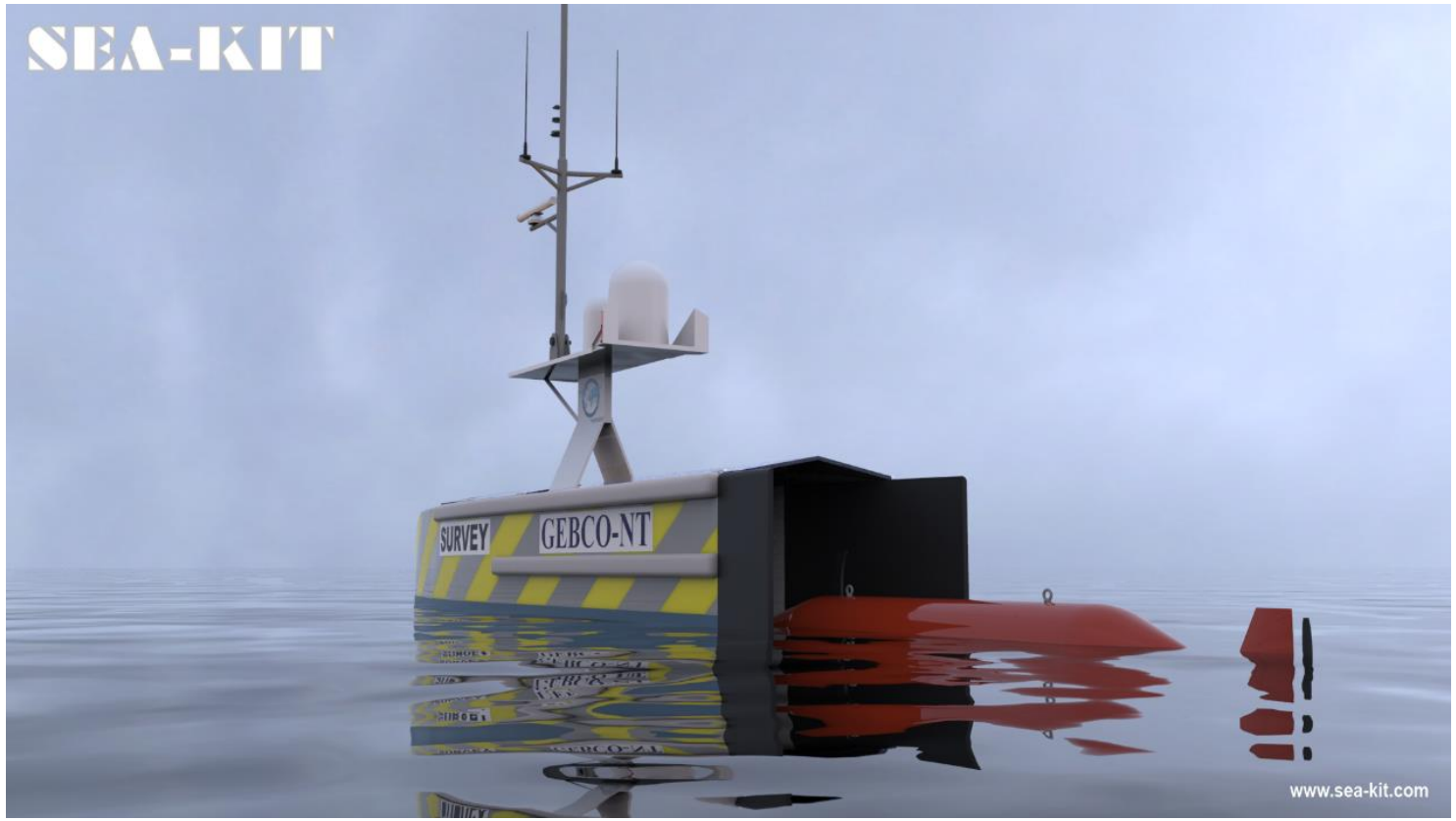
- Eslora: 11 m
- Manga: 3 m
- Altura: 3 m
- Deseñado para portar un HUGIN AUV

Operación:

- Autonomia:
  - Estandar: >30 días
  - Mejorado: >300 días
- Velocidad: <8 Nudos

Equipos:

- Sistemas:
  - Dos Generadores Diesel Electricos
  - Dos Helices de popa más una en proa
  - Ancla Electronica
- Navegación, Comunicación y Prevención de Colision:
  - Sistema de Referencia Seapath 136
  - AIS 300
  - Radar y Camara
  - MBR – Radio de Banda Ancha
  - INMARSAT & Iridium



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SOUNDER

SISTEMA USV


SOUNDER
La clave esta en los datos
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El sistema USV Sounder proporciona detección y clasificación de bancos de peces a menos de $50 de coste de combustible diarios

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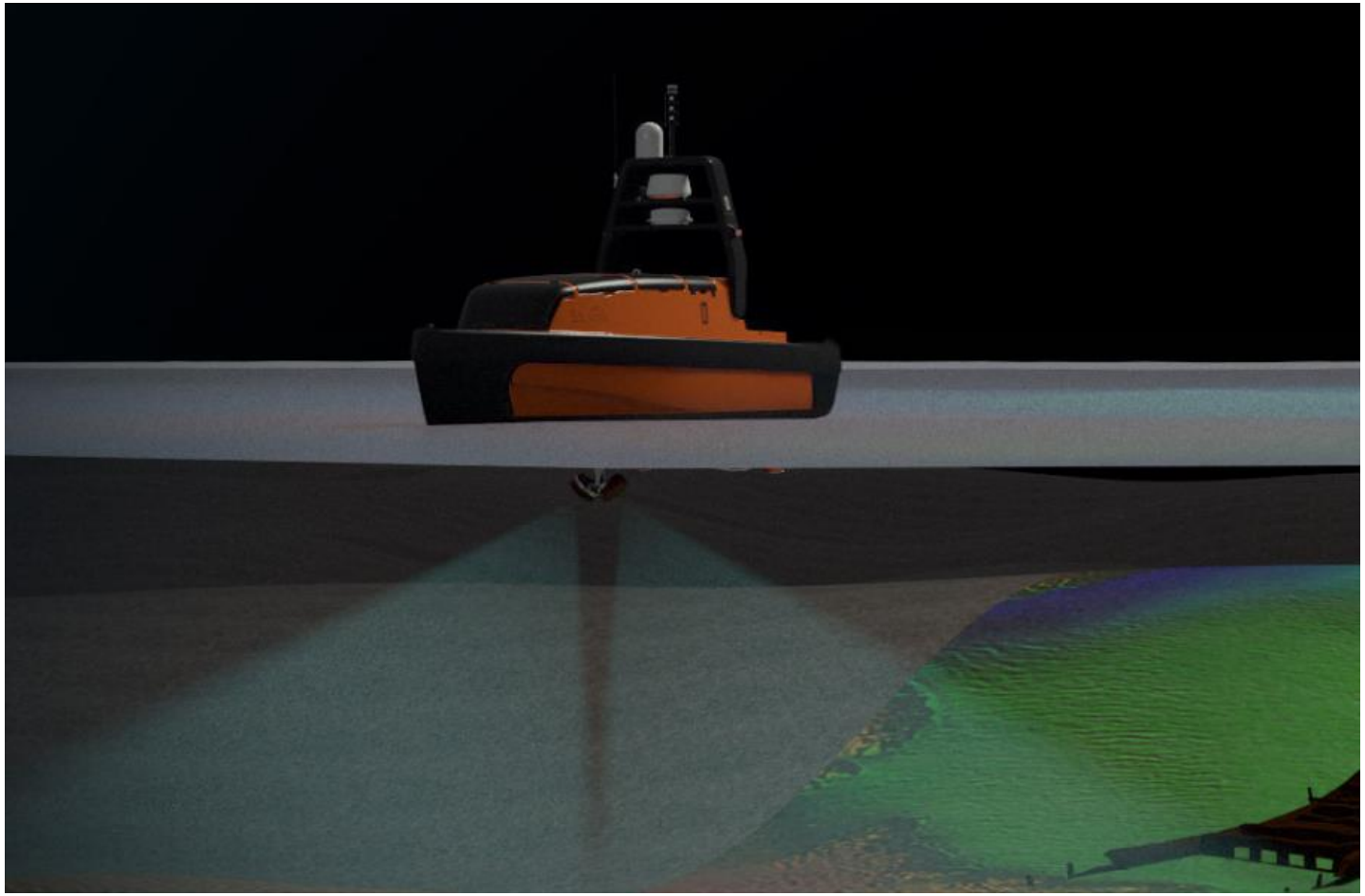
Aplicaciones de Mapeo

El sistema USV Sounder se puede equipar para aplicaciones de batimetria con sonda multihaz EM2040



SOUNDER

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SOUNDER

Sistema Completo

USV Sounder
Cerebro Autonomo K-MATE
Sistema de Lanzamiento y Recogida
Contenedores de transporte
Estacion de Operación en Tierra o a Bordo
Dirección de Flotas USV
Sensores de Montaje
Mantenimiento y conjunto de repuestos
Soporte 24/7-365 Internacional

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Percepción de la Situación y Previsión de Anti-Colisión

El sistema USV Sounder cuenta con un sistema de vanguardia para el análisis y conocimiento de la situación que permite evitar colisiones.


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Sistema USV Sounder

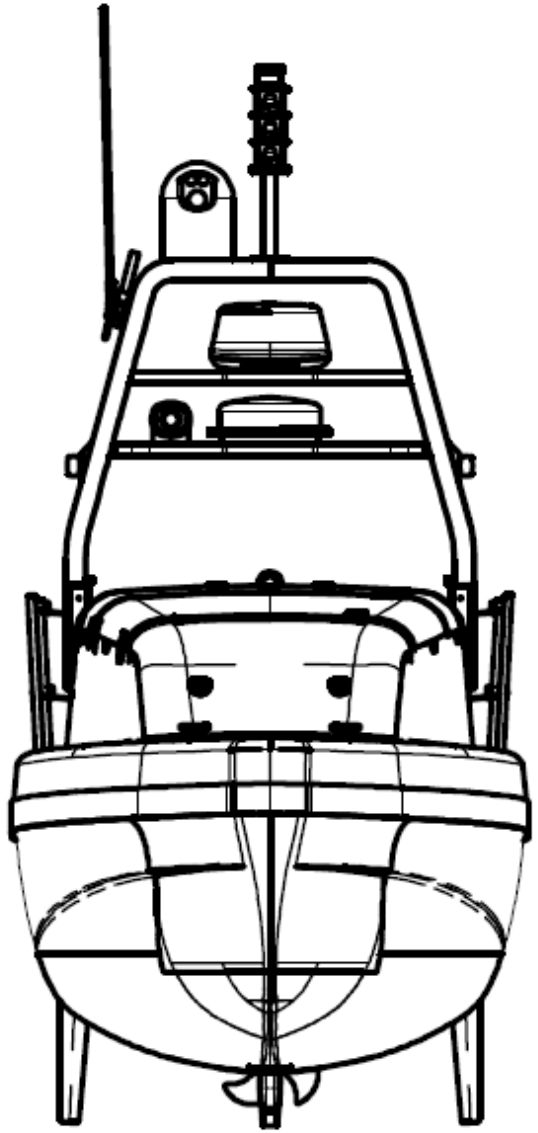
Especificaciones Técnicas

Operación

Autonomía:	10 días @ 4 nudos	(300L Tanque de Combustible)
Velocidad Maxima:	12 nudos	(Sin Carga)
Relación de Giro	15 m @ 11 knots	

Caracteristicas Especiales

- Moon pool
- Guinche CTD
- Refuerzo de Acero para equipos montados en proa
- Mastil abatible
- Diseño único para l a estabilidad y la operación hidroacústica optima
- Rack desmotable de 19’ para equipamiento
- Un único punto de enganche para carga y descarga



SOUNDER

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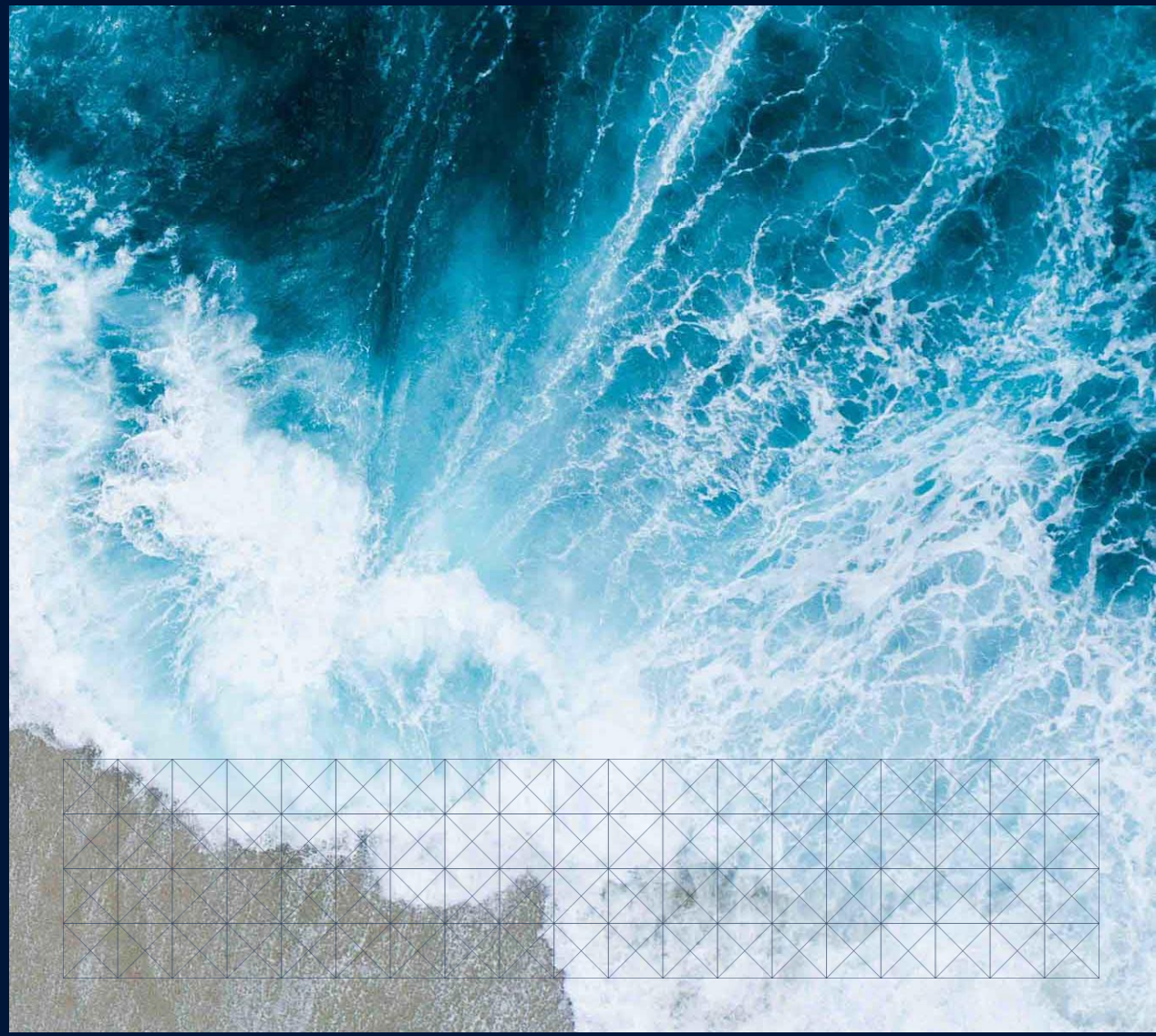
KONGSBERG MARITIME

STORAGE, PROCESS, VISUALIZE

KOGNIFAI



26/04/2019

Kognifai

Kongsberg's Open Digital Environment

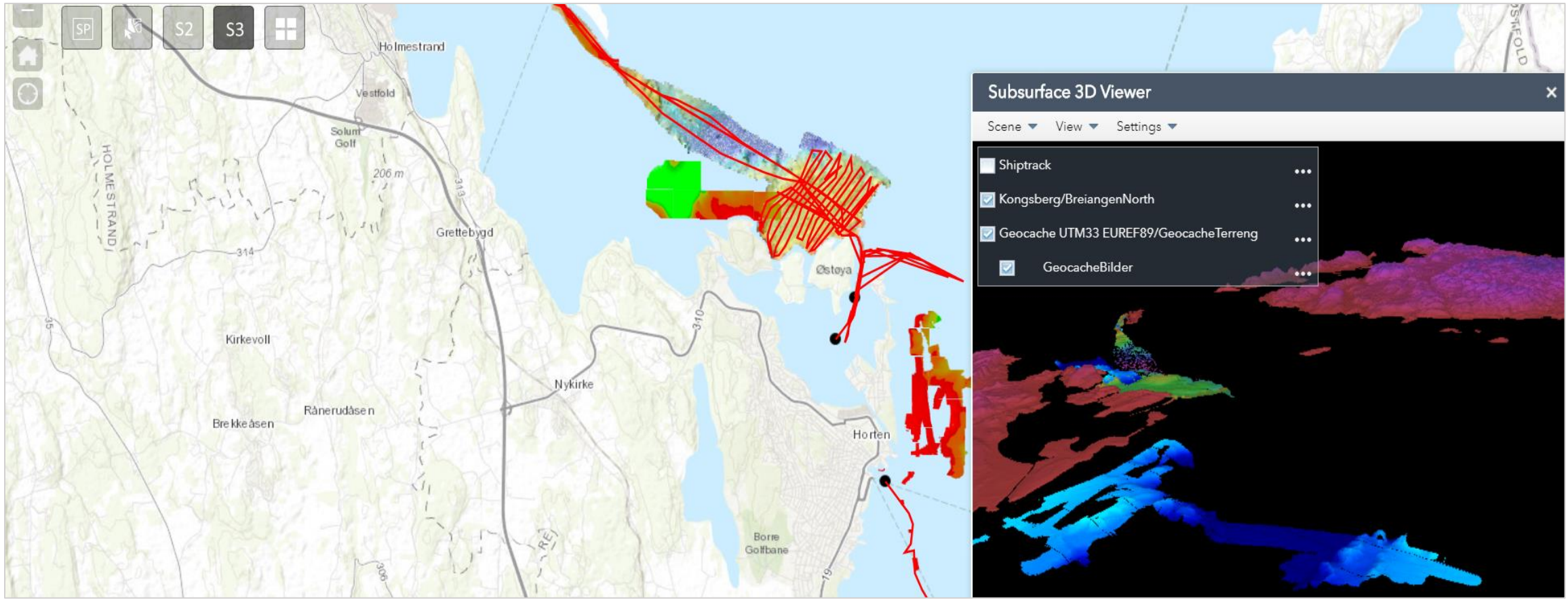
- Data upload
- Data sharing
- Combining data from many sources
- Big Data makes Machine Learning possible
- Scalable computer resources
- Easy access to Kognifai
- Secure storage
- Hybrid Cloud

- Software Development Kit for developers
- Virtual PC
- Processing on site/boat

- Reduce data volume to be transmitted into Storage
- Adapt data volume to available Internet bandwidth and cost

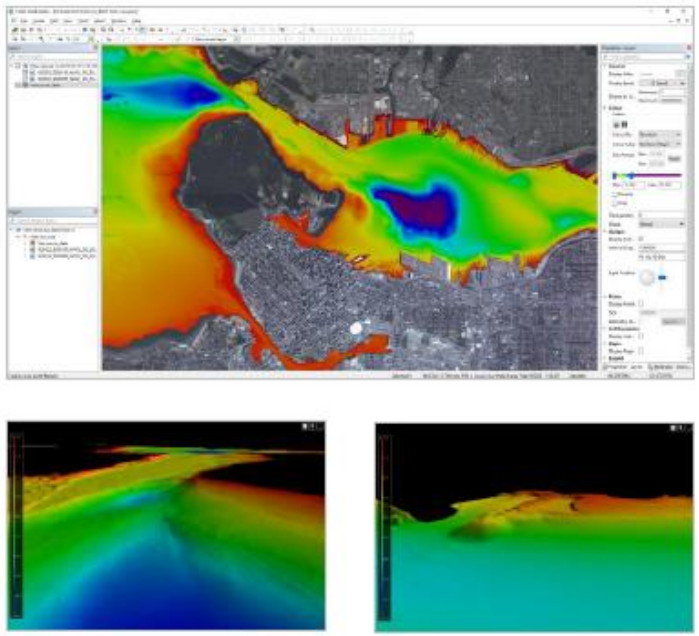
Open Standards and Cloud Ecosystems

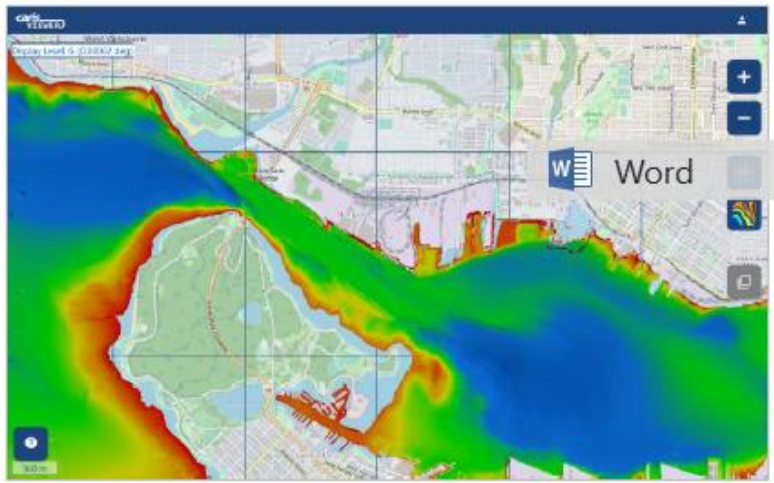
Handle, process, visualize and share vessel data and ocean data efficiently

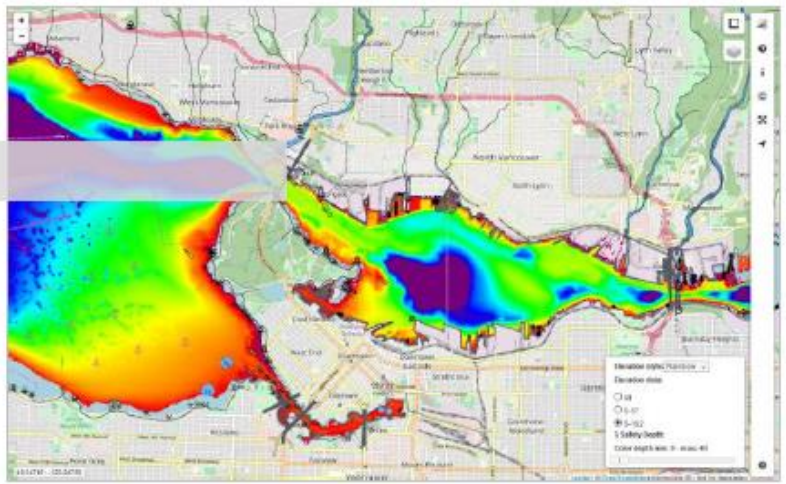


S-102 Bathymetry Cloud Pilot Project

Canadian Hydrographic Service, Teledyne CARIS, PRIMAR, Kongsberg Digital







CHS SURVEY BATHYMETRY IN CARIS BATHY DATABASE

*Could be data residing in the Kongsberg Cloud in the future for Cloud-to-Cloud data transfer from Survey to Products

CONVERTED IN S-102 BATHYMETRY PRODUCTS IN CARIS CLOUD

S-102 PRODUCTS IN PRIMAR ENC VIEWER FOR DOWNLOAD

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MUCHAS GRACIAS

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