

# KONGSBERG MARITIME AS

## Current Icebreaker Projects.



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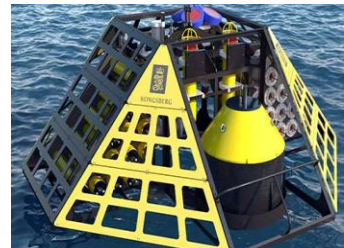
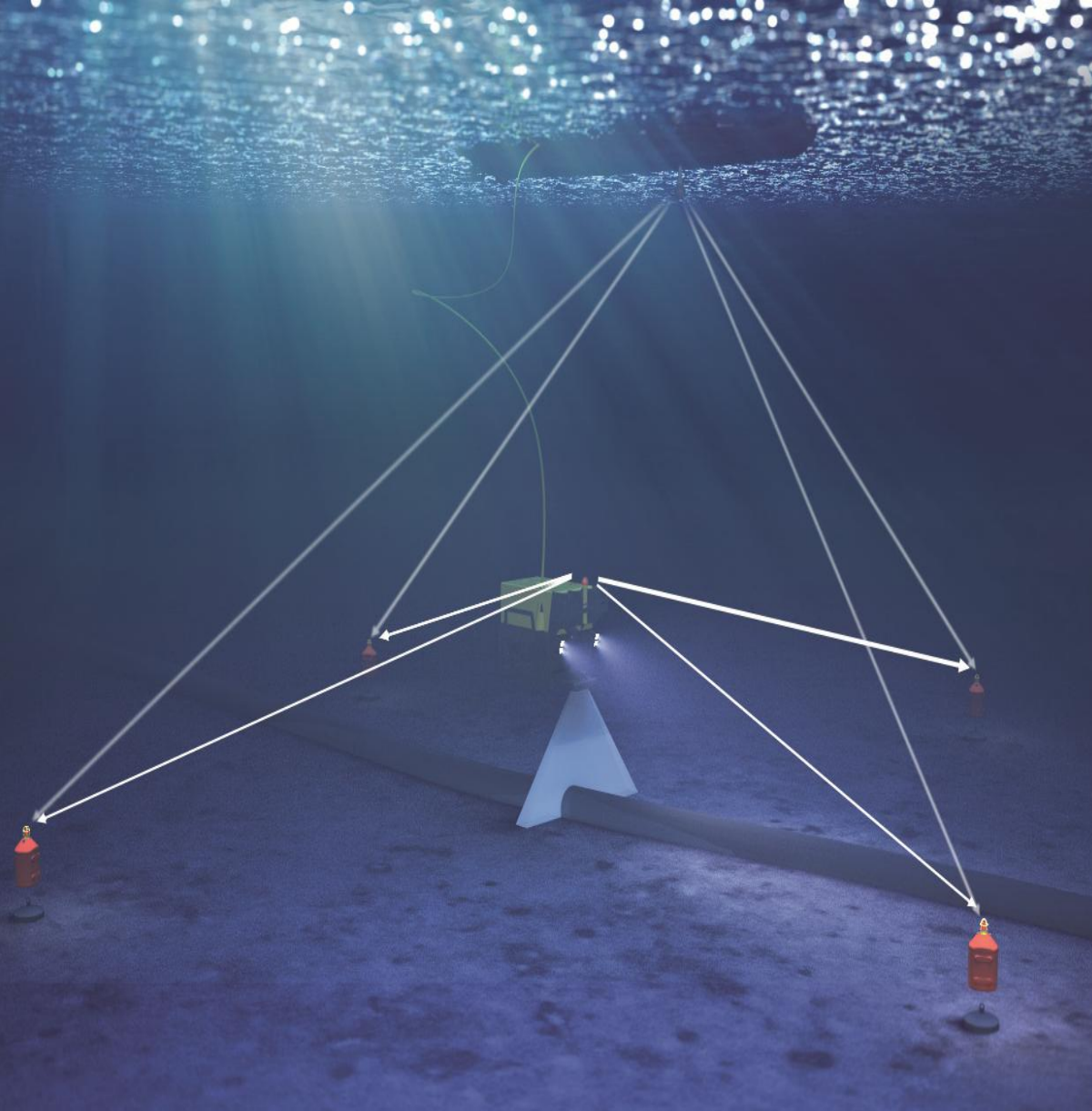
14th Conference of the IHO Hydrographic  
Commission on Antarctica (HCA)  
Tromsø, Norway, 28 – 30 June 2016

Jan Haug Kristensen  
Director Sales Americas  
Subsea Sales & Marketing



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## SUBSEA – Growth ambition

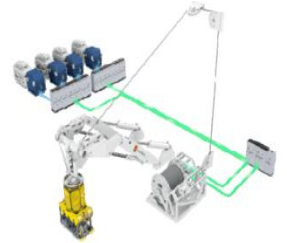
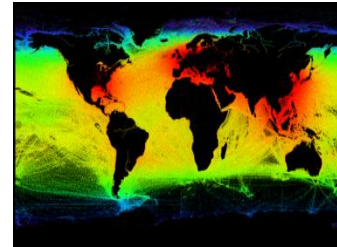






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## EMERGING BUSINESS





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# OFFSHORE

– Diverse business in a challenging market



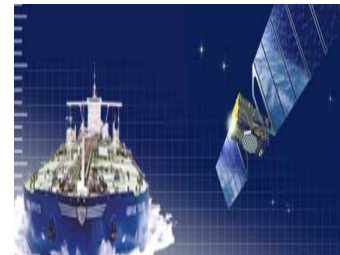
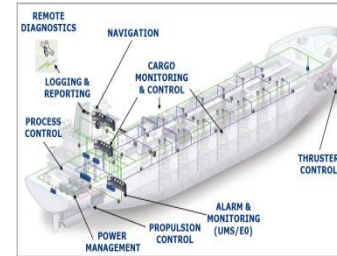




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# MERCHANT MARINE

## - Solid position in a fragmented market

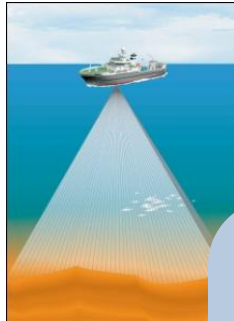


# Products for any subsea applications

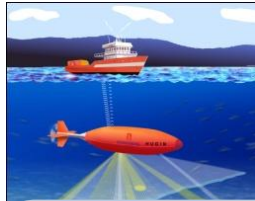
Surveillance



Fishery/ F.  
Research/  
IEM



AUV



Seabed  
mapping



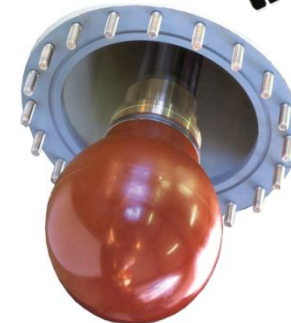
Under water  
navigation



Naval  
sonars



One third of the world  
is covered by land –  
The rest is covered by  
**KONGSBERG**



# Antarctic and Arctic operations

## Content of presentation :

- Introduction
- Ongoing Projects
- Vessel design
- Transducer installation and bubble sweep down
- Noise
- Integration
- Shallow water operations
- Conclusions



# Antarctic and Arctic operations - History



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UTM

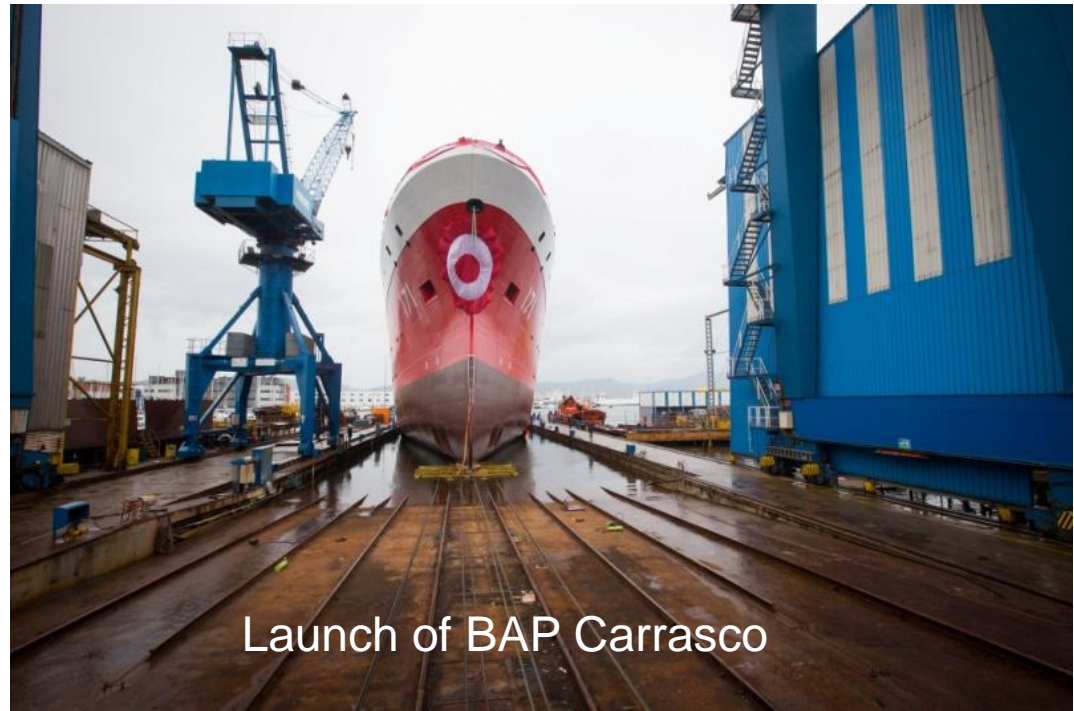


# Antarctic and Arctic operations – Today/Future

## Existing/new projects

- Peru : BAP Carrasco
- Norway : Kronprins Haakon
- UK : Sir David Attenborough
- India
- Australia
- Korea
- Chile
- Ecuador
- Venezuela
- Sweden
- Germany
- Canada
- USA

**Ice Breakers and Ice  
Going Vessels –  
Different Ice Classes**



Launch of BAP Carrasco

# Antarctic and Arctic operations - Future

## U.S. to build first icebreaker in 25 years



USCGC Polar Star. Photo: US Coast Guard

The United States Committee on Appropriations has approved the FY2017 Defense Appropriations Bill which includes \$1.0 billion in Navy shipbuilding funds to build the first USCG-operated icebreaker since FY1990.

The United States currently relies on just one heavy vessel and one medium vessel, one of which has been in service for 40 years.

*“Our FY2017 defense funding bill makes a critical investment in the long-delayed expansion of the U.S. icebreaker fleet,”* Senate Appropriations Committee Chairman **Thad Cochran** said. *“We must take assertive action to provide the vessels needed to protect American national security and economic interests in the Arctic region. The United States needs the capability to have year-round access to Polar Regions.”*

The funding for the Polar Icebreaker Recapitalization Project will accelerate plans announced by President Obama last year to shift planned icebreaker construction from 2022 to 2020.

In addition to funding, language in the bill would encourage actions to facilitate an earlier construction start and long-range cost savings.

The U.S. heavy icebreaker, the Polar Star, entered service in 1976 and is well beyond its 30-year service life. Congress last funded a new icebreaker in the FY1990 Defense Appropriations Act.

In contrast, the Russian fleet consists of roughly 40 operational icebreakers and 11 icebreakers either planned or under construction.



# Antarctic and Arctic operations – Today/Future

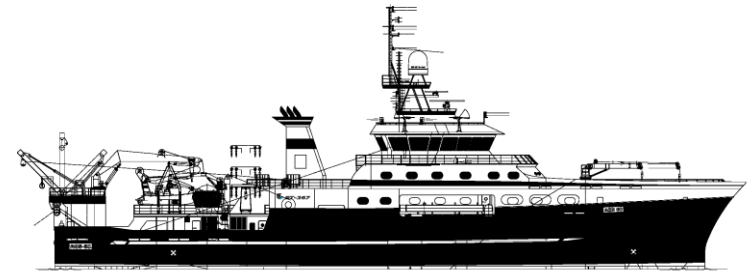
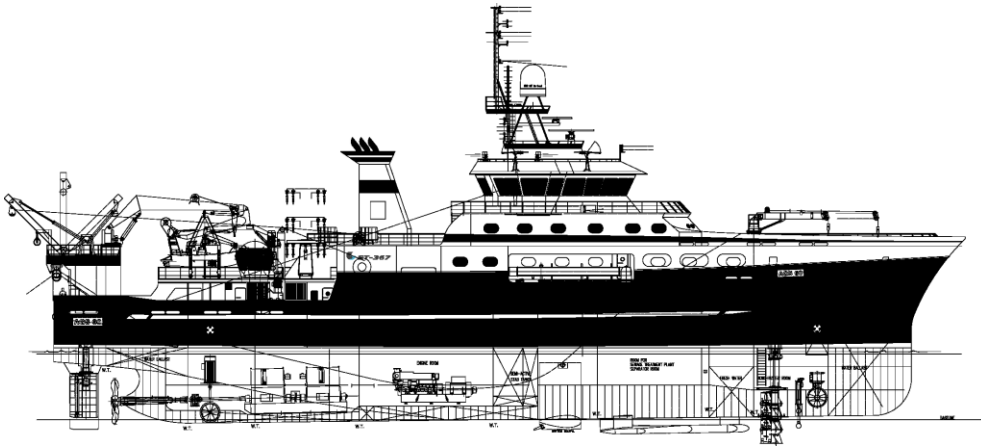
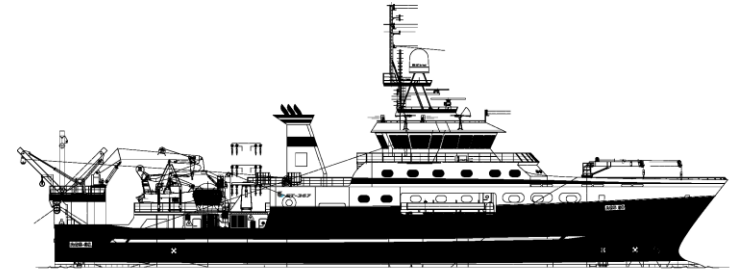
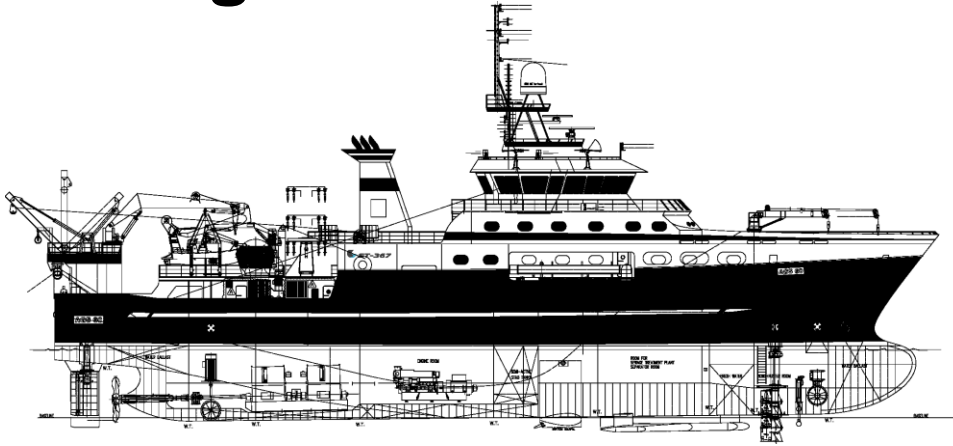


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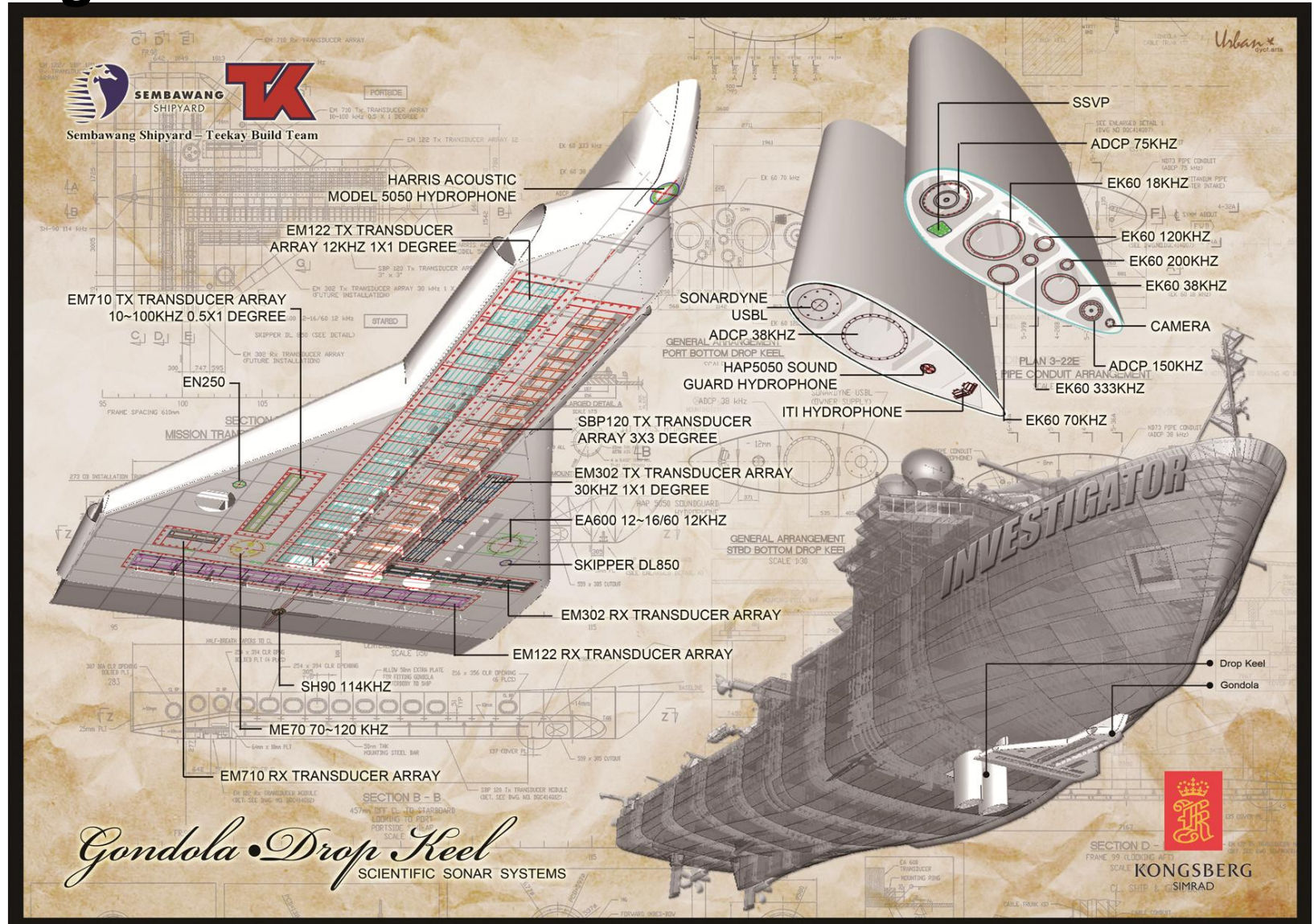
# Antarctic and Arctic operations – Vessel Design





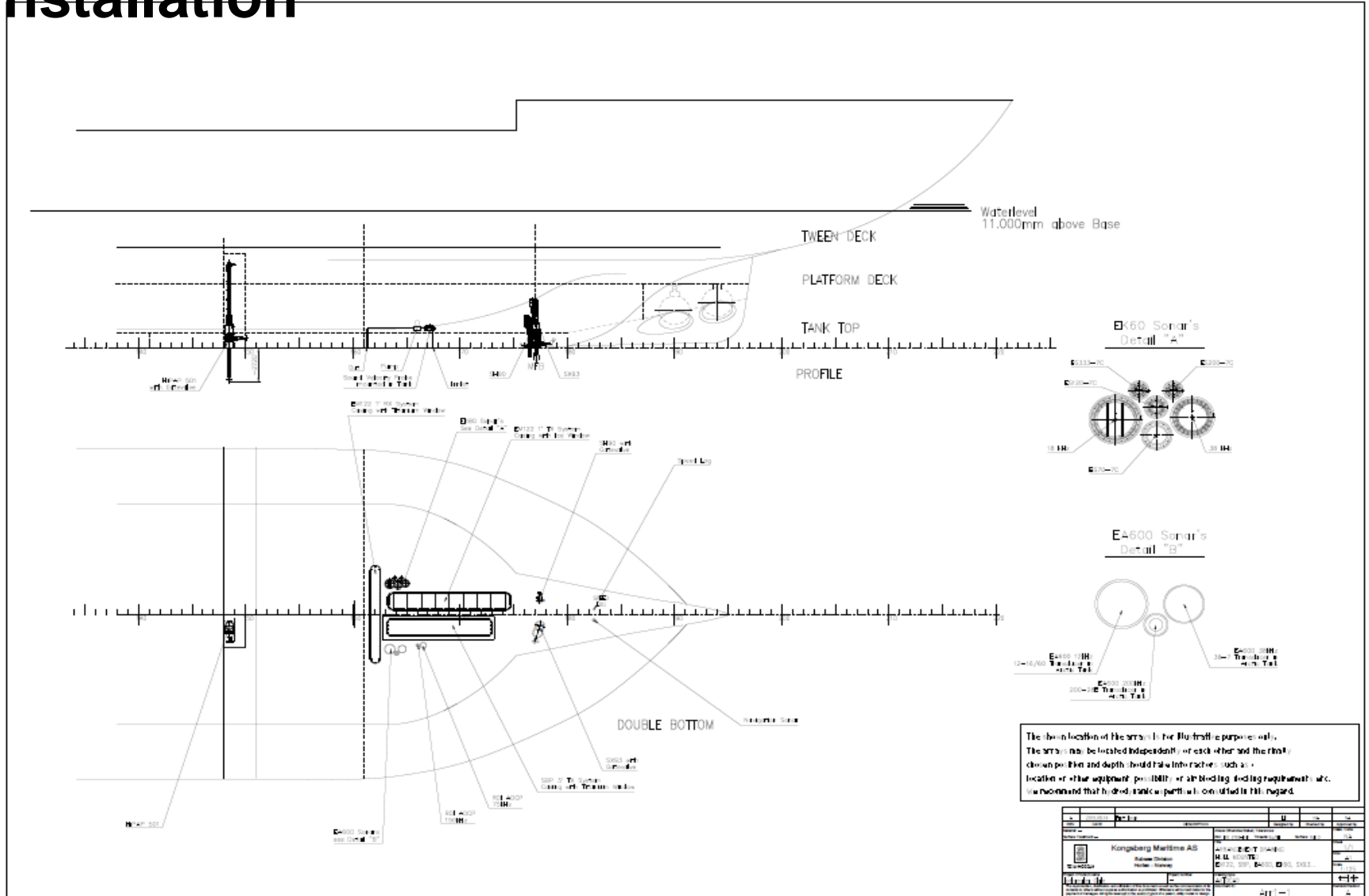


# Antarctic and Arctic operations – Vessel Design





# Antarctic and Arctic operations – Transducer Installation



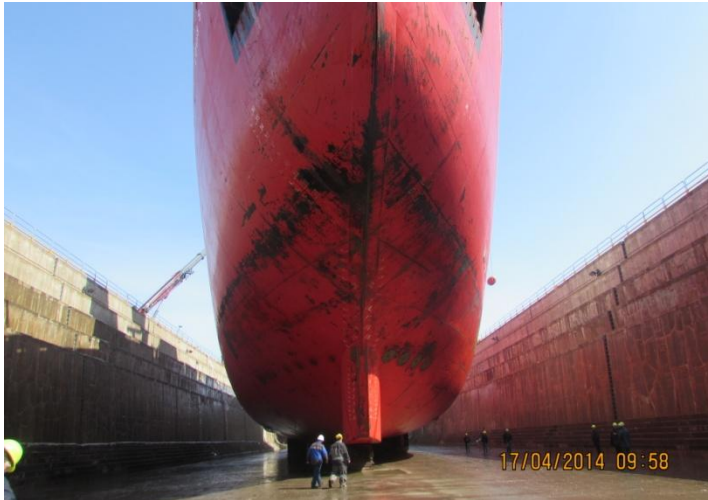
NO.	REVISION	DATE	BY	CHKD.	APP.
1					
<p>Kongsberg Maritime AS            Address: Østlandsveien 10            1400 Sandnessjøen, Norway</p> <p>ATTENTION: Please contact            HULL SERVICE            E: HULL.SERVICE@KONGSBERG.COM            T: +47 73 50 00 00</p>					





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# Antarctic and Arctic operations – Transducer Installation





# Antarctic and Arctic operations - Noise

- Noise is critical to the performance of all acoustic systems installed onboard a vessel. There are a number of different sources of the noise affecting the acoustic systems. As a standard part of Kongsberg Maritime sea trials, we do a noise test using the acoustic systems in passive mode to establish the noise level around the vessel that the acoustic system needs to work in.
- On the following illustrations we show three different examples of measured noise levels on ice breakers. This shows the measurements from three different vessels and two different designs. Different speed and direction towards the weather is also taken into consideration.



# Antarctic and Arctic operations

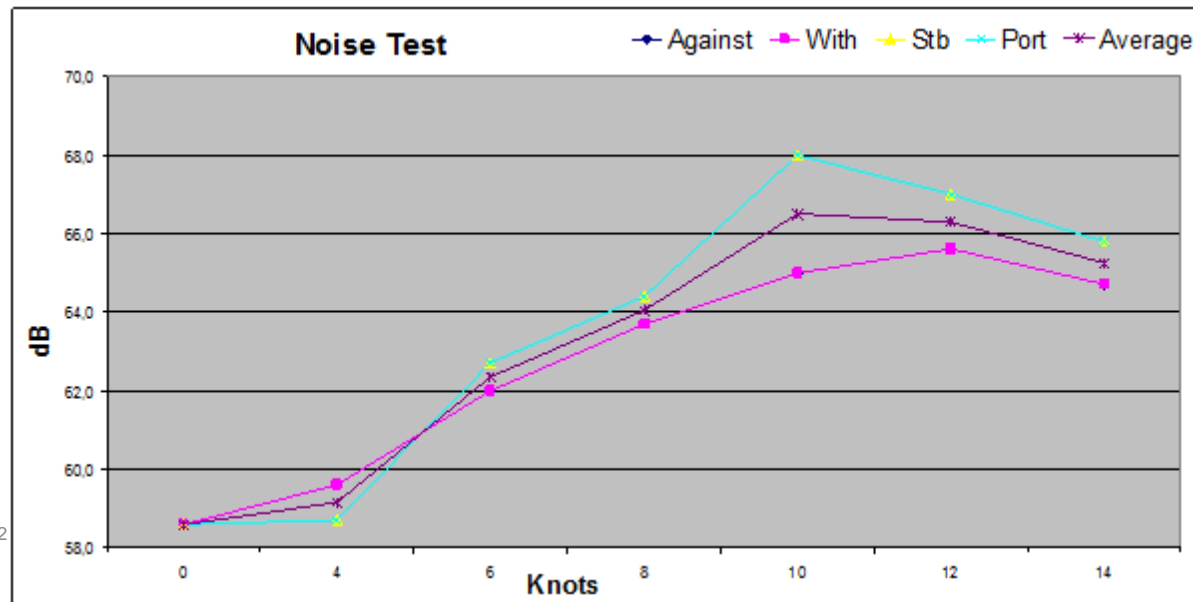
“Classic design”



Corresponding noise measurements from two different vessels



# Antarctic and Arctic operations - Noise

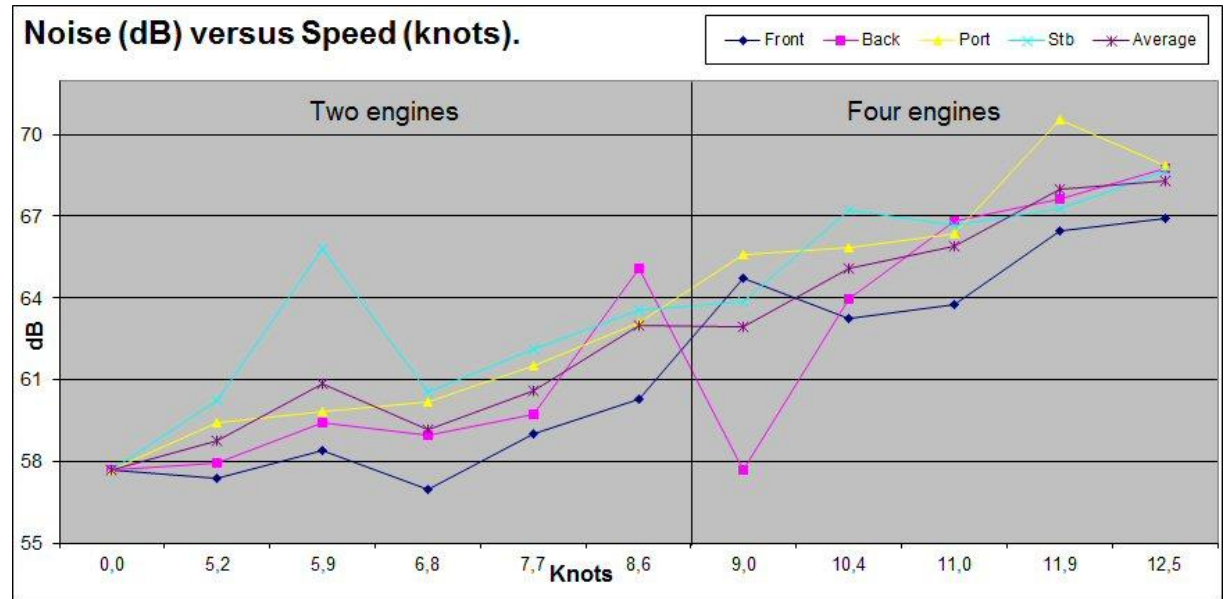




# Antarctic and Arctic operations - Noise

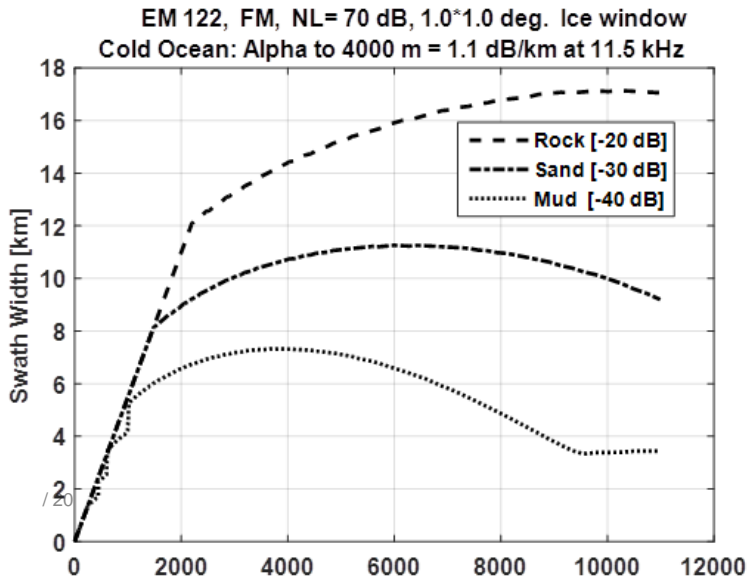
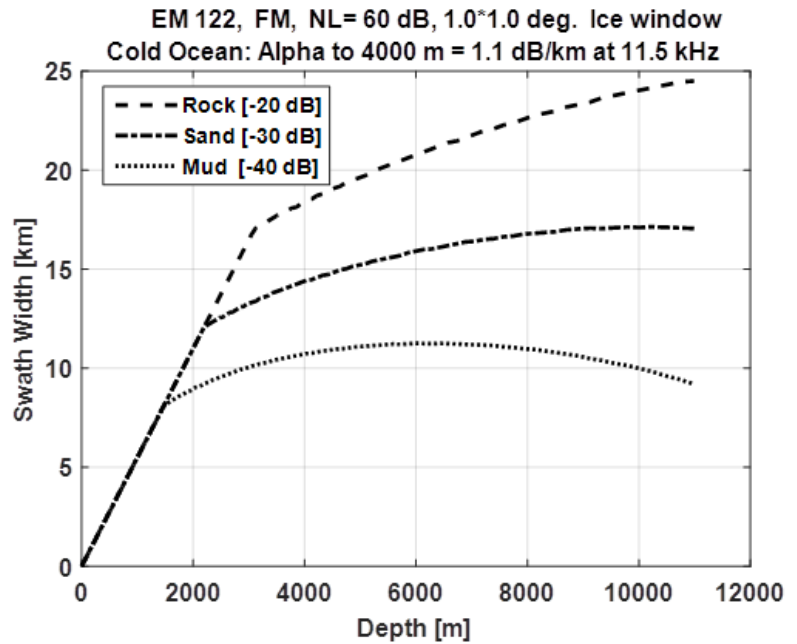
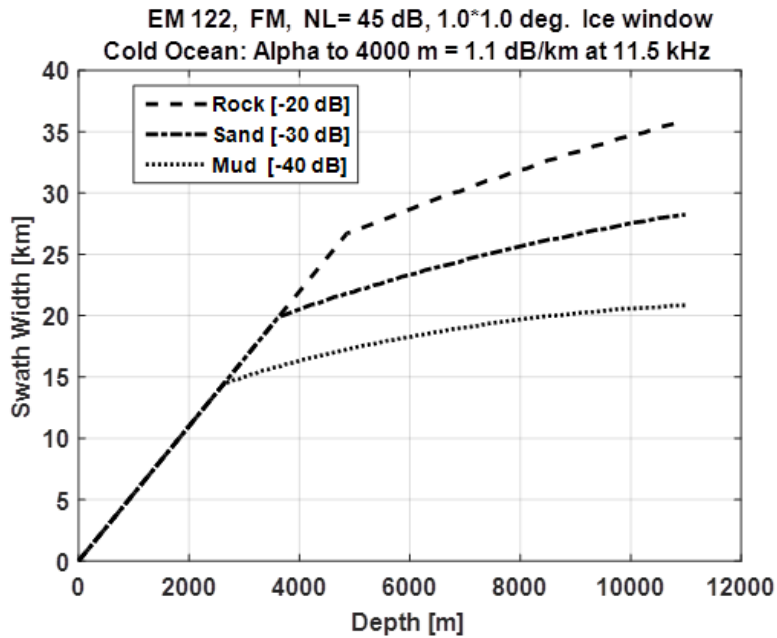


Vessel with a "flat bottom" design with Ice Knife and corresponding noise curves





# Antarctic and Arctic operations – Noise





# Antarctic and Arctic operations - BAP Carrasco



## Dimensiones

Eslora total

**99,7 m**

Eslora entre p.p.

**88,8 m**

Manga

**18 m**

Puntal de trazado a cbta ppal.

**7,4 m**

Puntal de trazado a cbta superior

**10,2 m**

Puntal de trazado a cbta mezzanine.

**13 m**

Calado max. aprox.

**6,5 m**

Cubierta francobordo

**Cubierta principal**

Posicionamiento dinámico

**DP (AM)**

## Características técnicas de la serie NC-704



## Velocidad

15 nudos



## Potencia

Diesel Eléctrica aprox.

**4 x 1.550 kW**



## Tripulación

52 personas:

**24 tripulantes + 28 científicos**



## Laboratorios

Laboratorio de bioluminiscencia

**13 m<sup>2</sup>**

Cuarto de medición de salinidad

**8,8 m<sup>2</sup>**

Laboratorio medio ambiental

**121 m<sup>2</sup>**

Laboratorio principal

**53 m<sup>2</sup>**

Laboratorio para fines múltiples

**85 m<sup>2</sup>**

Hangar principal

**65 m<sup>2</sup>**

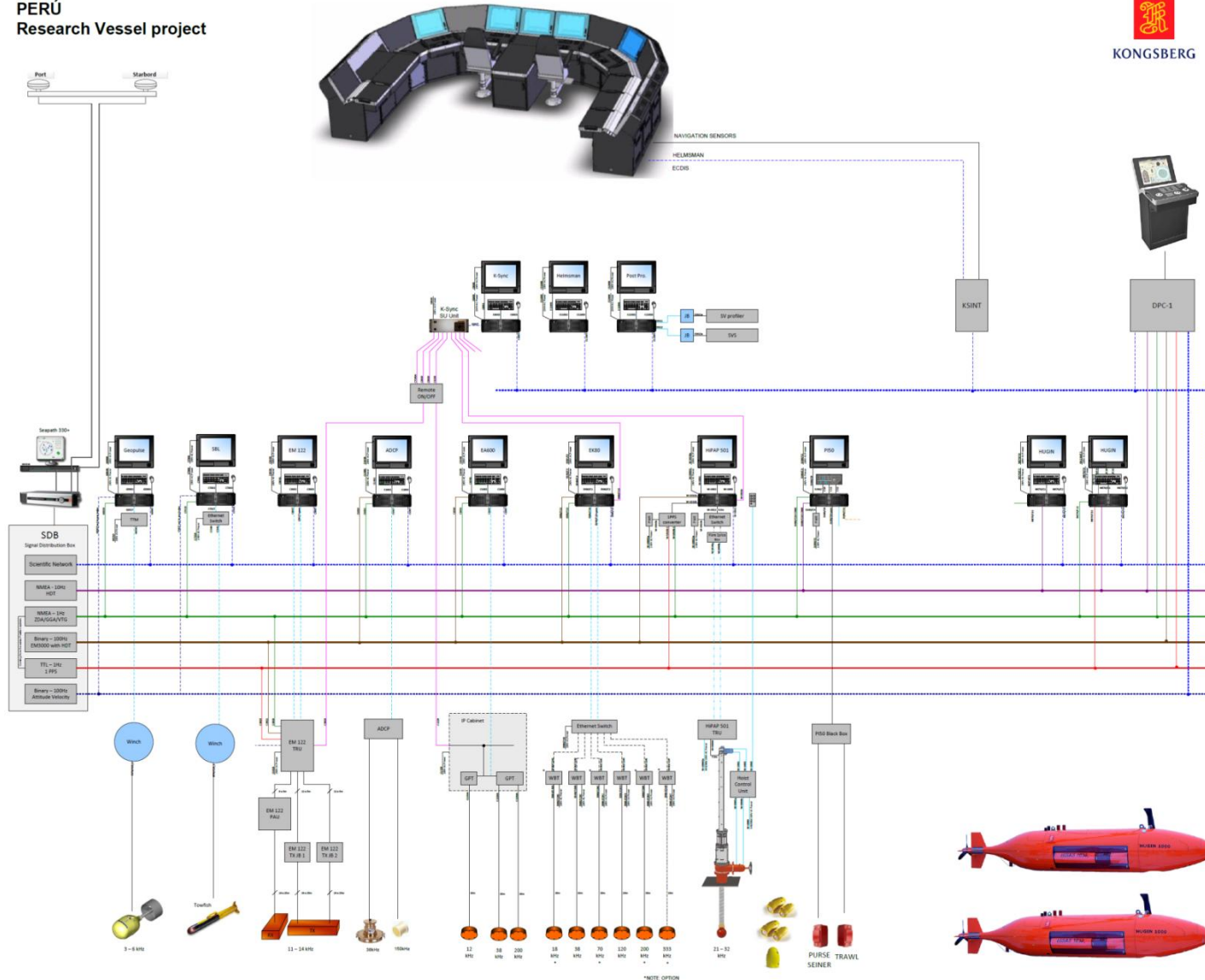
Laboratorio de cubierta

**15 m<sup>2</sup> 28 m<sup>2</sup>**

Laboratorio químico

# Antarctic and Arctic operations - Integration

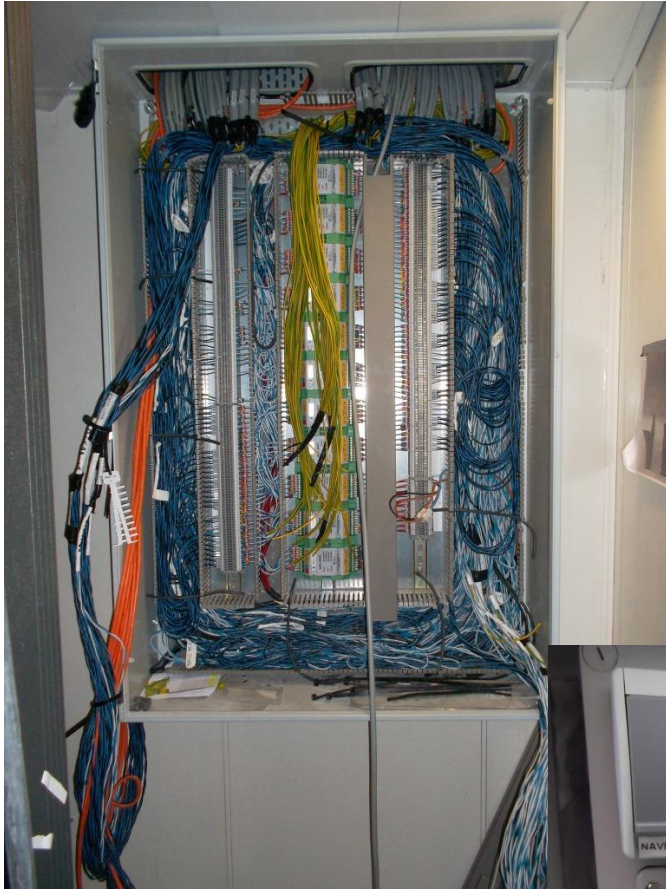
PERÚ  
Research Vessel project



# Antarctic and Arctic operations - Integration



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# Antarctic and Arctic operations - Integration

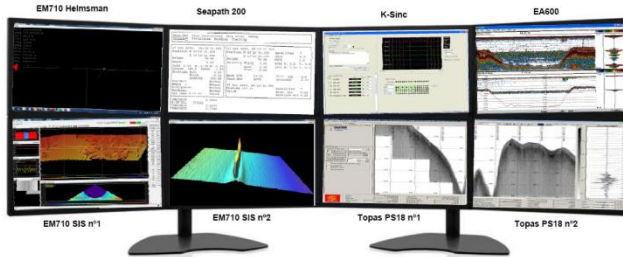


# Antarctic and Arctic operations - Integration



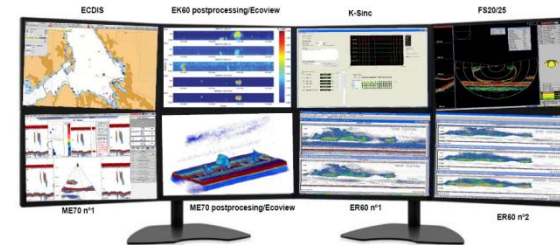
Laboratorio Acústica  
Centro de control Matrix

## Escenario Geología



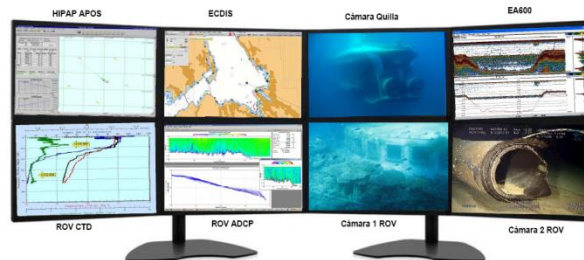
Laboratorio Acústica  
Centro de control Matrix

## Escenario Biología

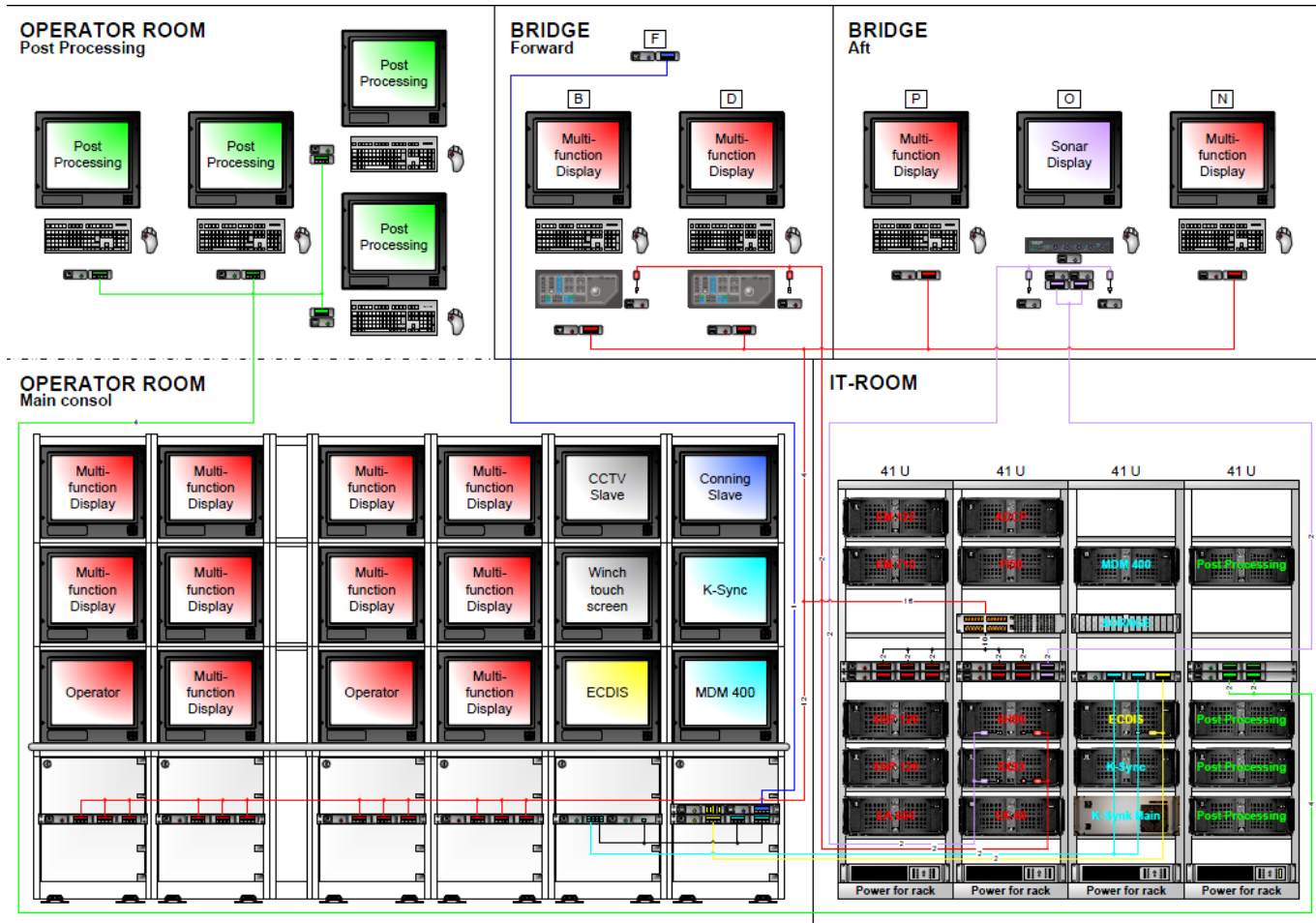


Laboratorio Acústica  
Centro de control Matrix

## Escenario ROV



# Antarctic and Arctic operations - Integration





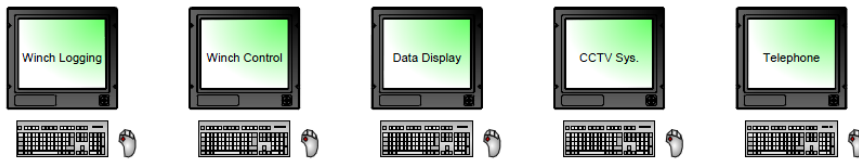


# Antarctic and Arctic operations - Integration

## OPERATOR ROOM

Winch / CTD operation consol

All monitors on the workbench are connected to the PC's in the IT-room with KVM extensions



## BRIDGE

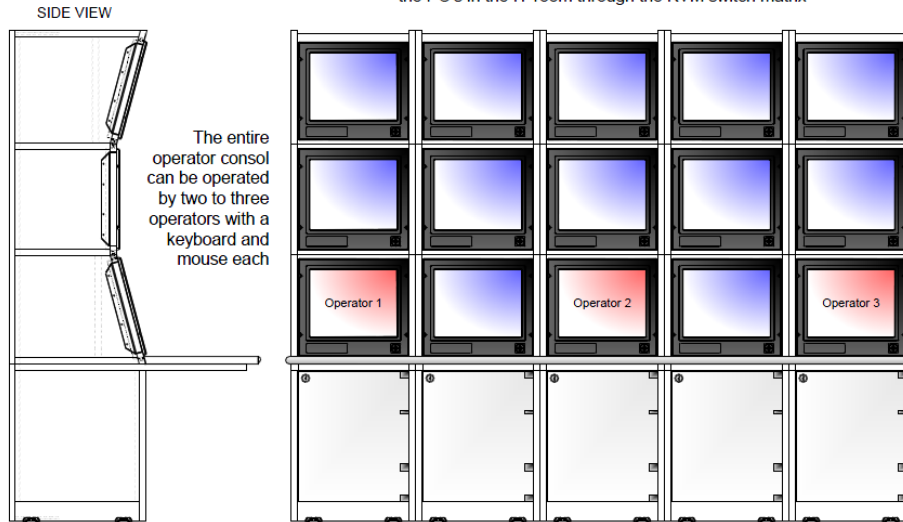
The Helmsman monitor and its slave display is connected to the PC in the IT-room through the KVM switch matrix



## OPERATOR ROOM

Main consol

All monitors in the operator consol are connected to the PC's in the IT-room through the KVM switch matrix



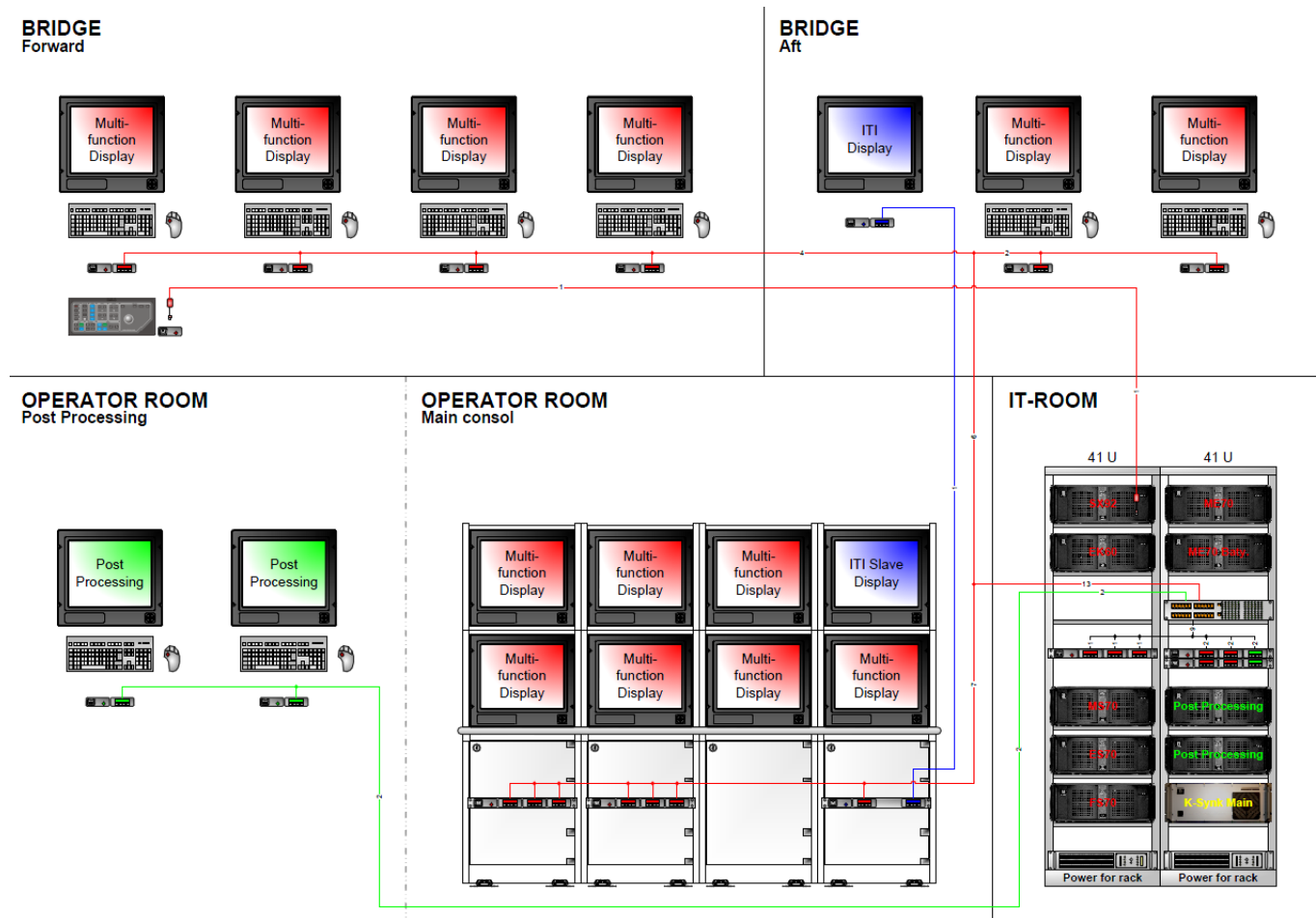
## IT-ROOM

All PC's for the scientific equipment is placed in the IT-room where a controlled temperature and humidity are maintained





# Antarctic and Arctic operations - Integration



# Antarctic and Arctic operations



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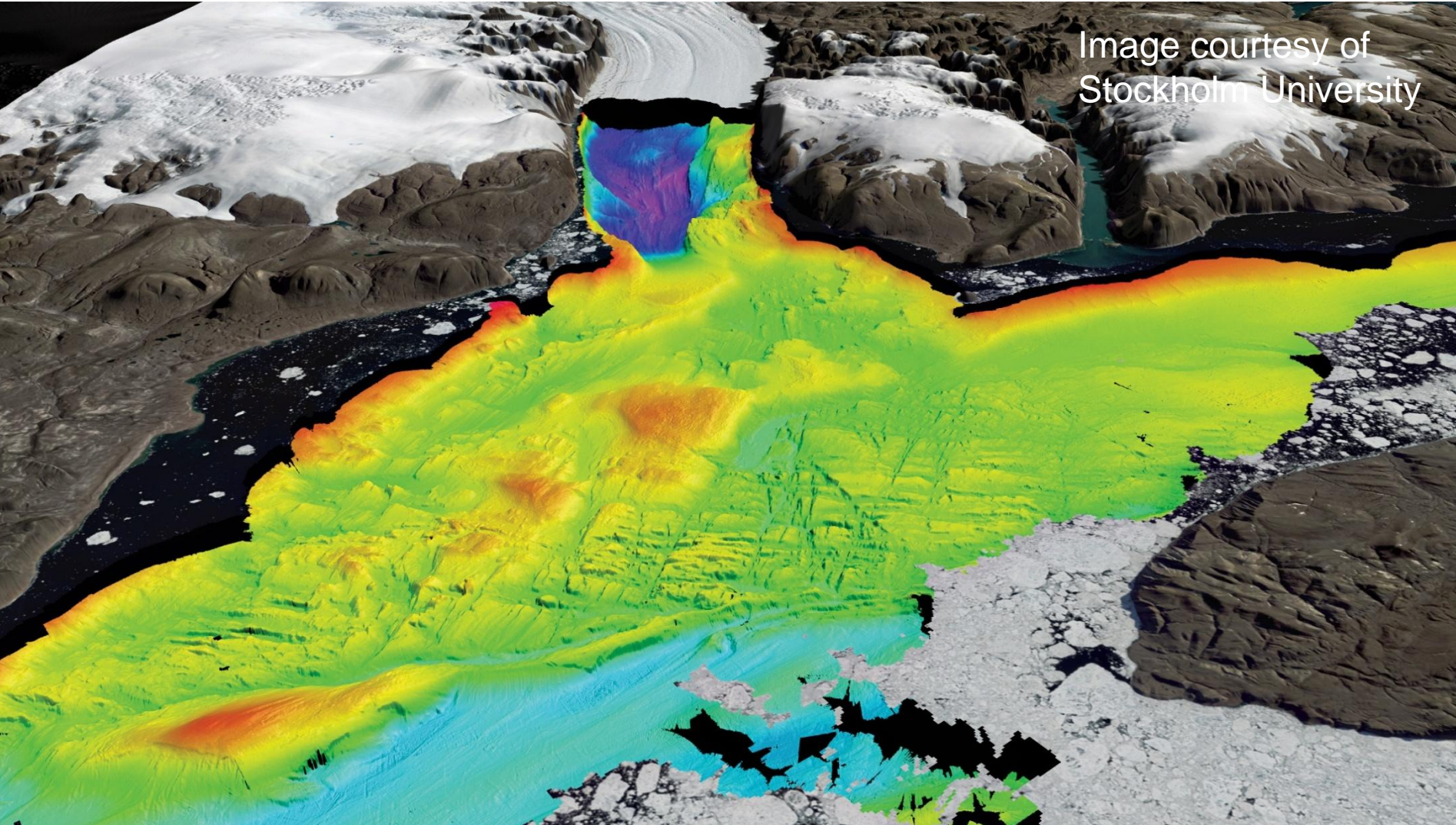
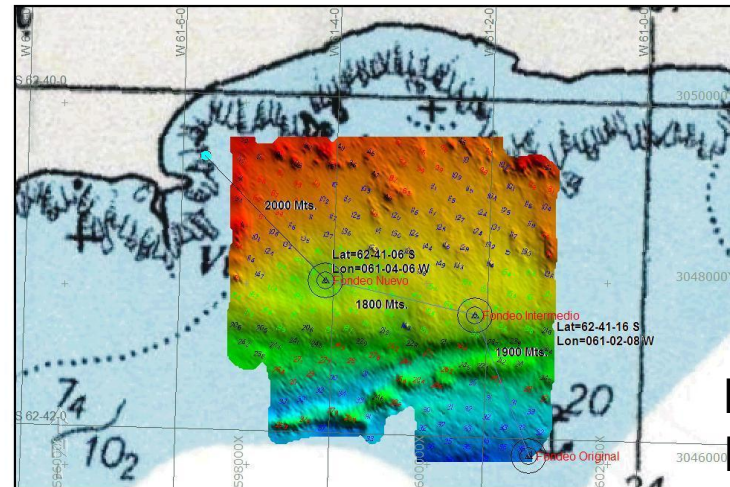


Image courtesy of  
Stockholm University





# Antarctic and Arctic operations

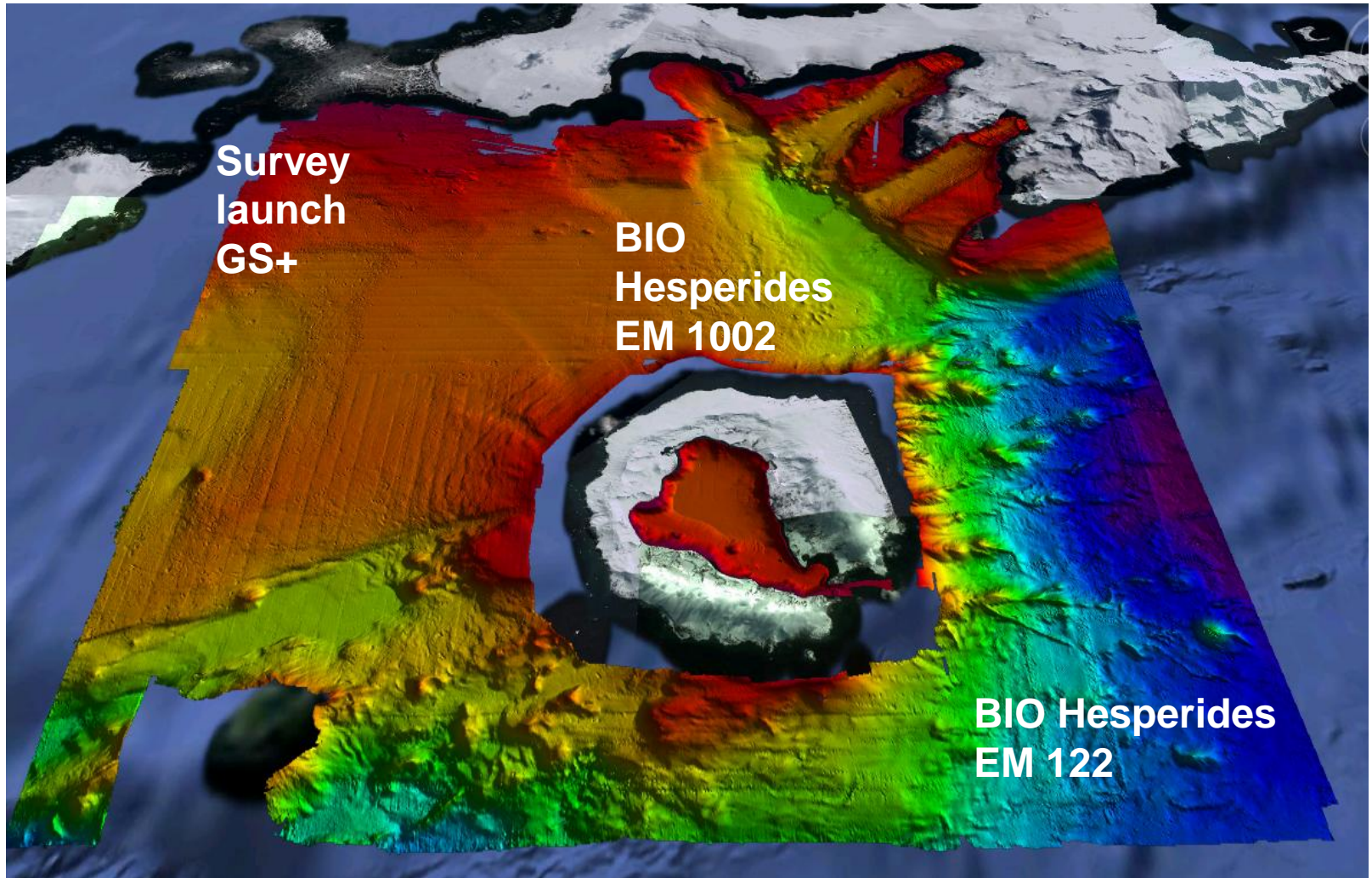


Isla de Livingston

Courtesy of IHM, Spain



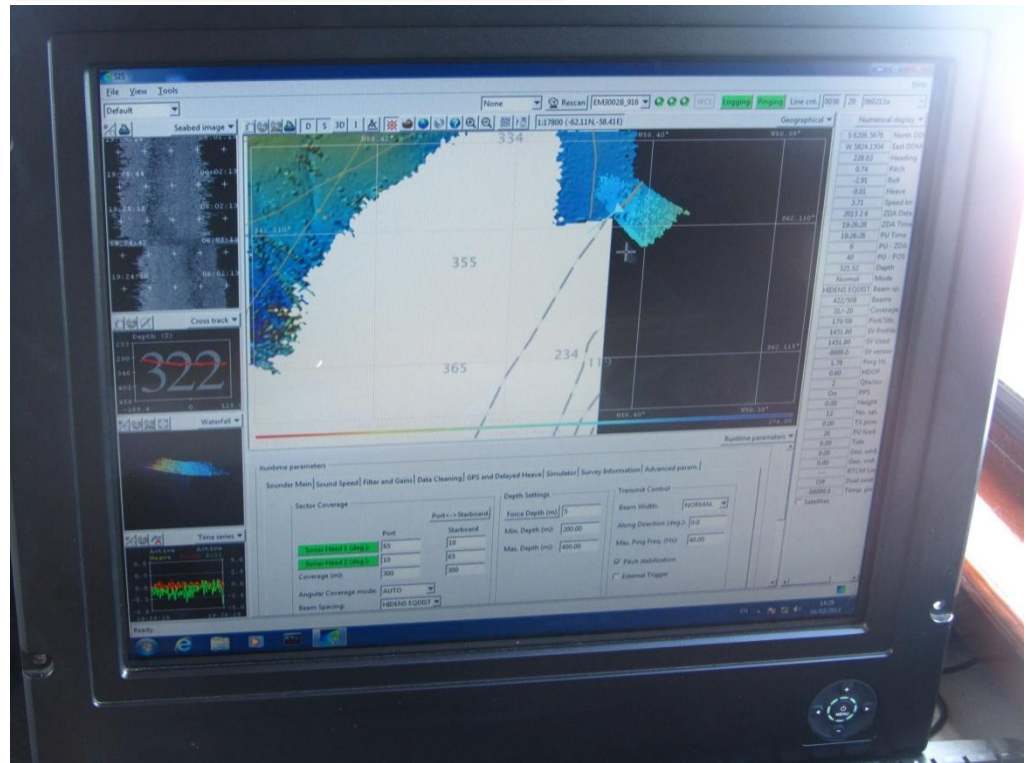
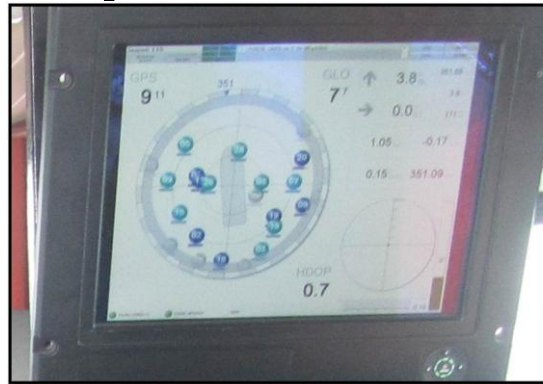
# Antarctic and Arctic operations



Courtesy of IHM, Spain

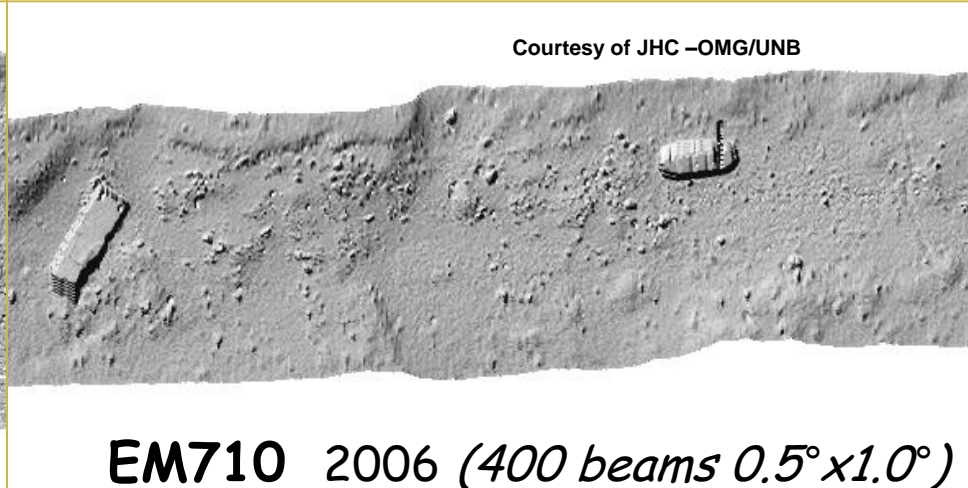
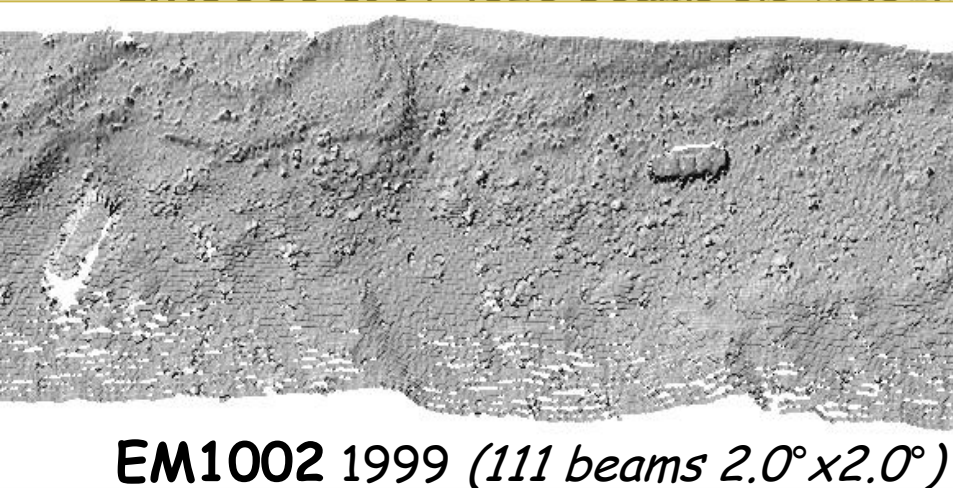
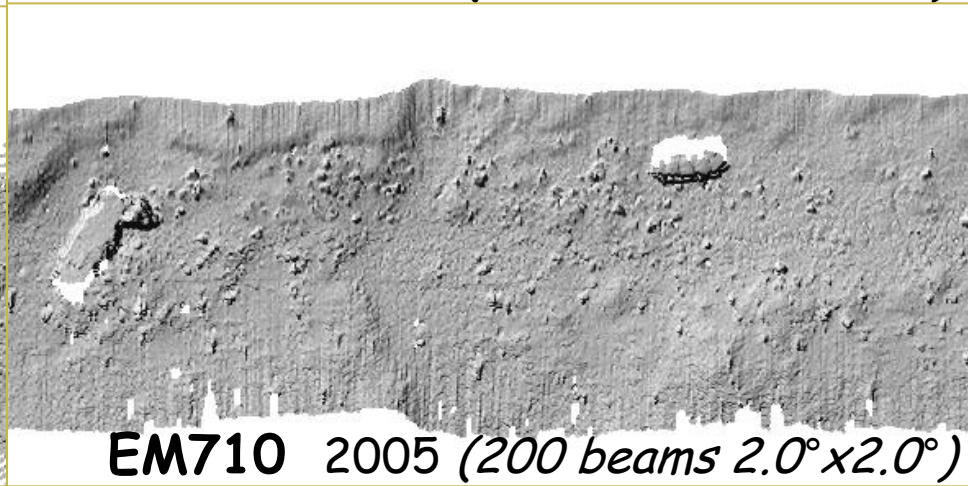
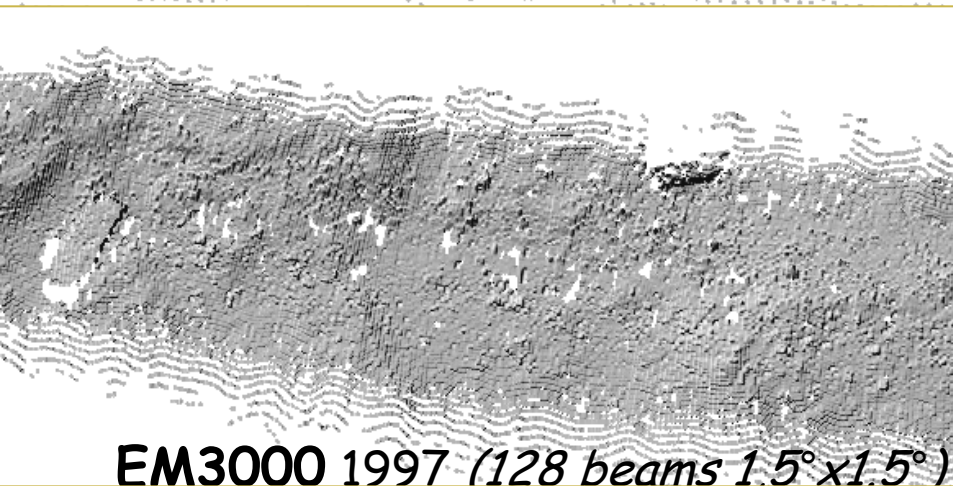
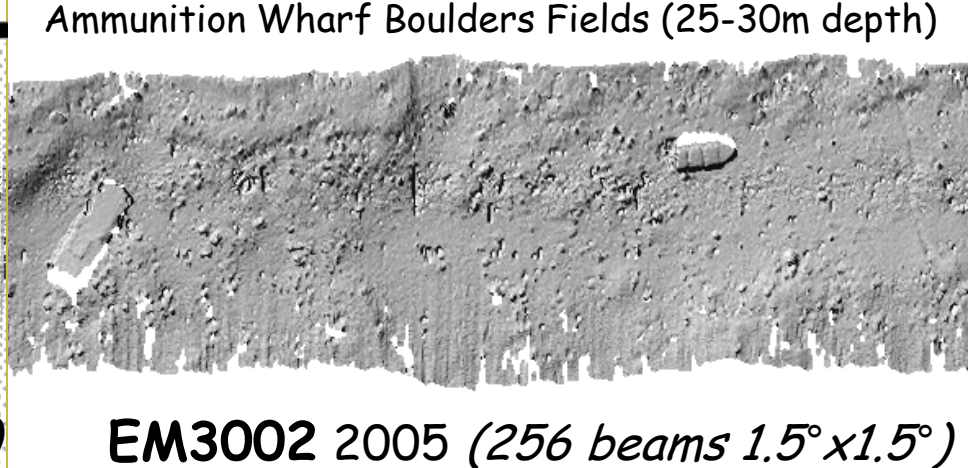
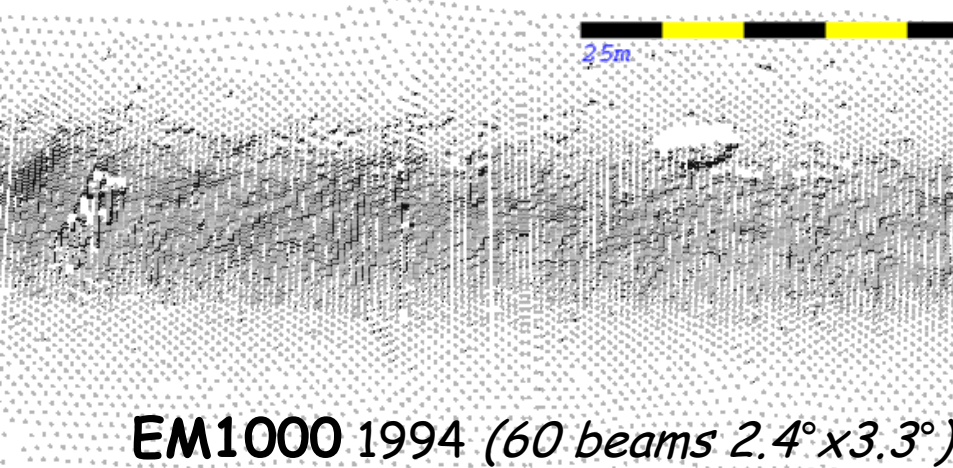


# Antarctic and Arctic operations



Courtesy of DHN, Peru





# Thank you for your attention !

[kongsberg.com](http://kongsberg.com)



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