

**Two new research/survey vessels built to support VOTO's marine operations
and autonomous glider fleet.**

**Joacim Höög
COO Midocean AB**



Agenda

- Why two new research/survey vessels?
- The building process
- Transformation between the initially planned and the final state
- Challenges encountered during the building process

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Joacim Höög

Godkännare (tjst, namn)

Informationsklass enligt MO

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Informationsklass enligt SekrL

Dokumentidentitet

ERVO_2023

Utgåvedatum

2023-06-08

Antal bilagor

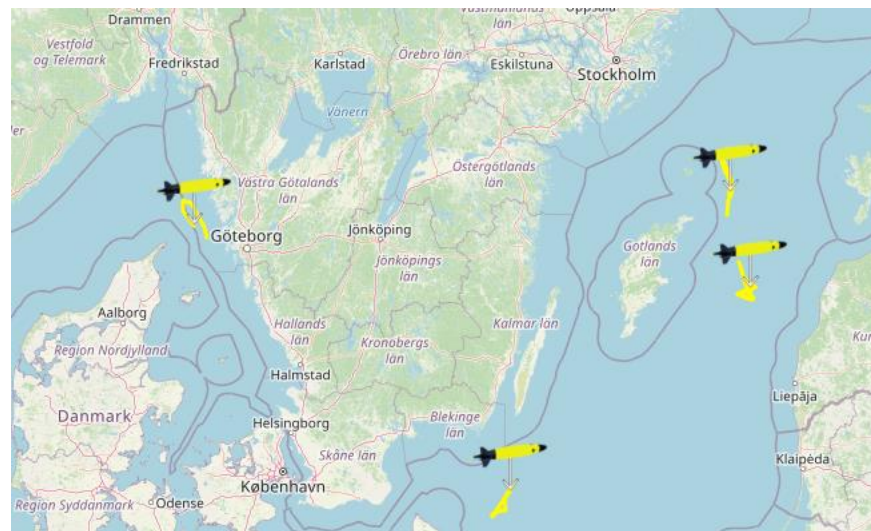
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Why two new research/survey vessels



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The reasons behind the new vessels

- Fulfilling Voice of the Ocean requirements
- Quick response to customer orders with versatile operations
- Compact vessel designed to fit most harbours, requiring minimal supervision
- Transit speed capabilities to reduce transfer time and maximize work efficiency
- Embracing hybrid technology for silent and environmentally friendly operations

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The building process

- **August 2020** – Voto started regular SeaExplorer and Sailbuoy operations
- **End of 2020** – First discussion on building dedicated Voto vessels
- **February 2021** – Initial meeting with Kewatec Shipyards
- **June 2021** – Signing the contract with planned delivery in June 2022
- **21 December 2022** – First vessel delivered
- **24 March 2023** – Second vessel delivered
- **8 June 2023** – First vessel Swedish-flagged

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Initial specifications for the new vessels

- Hybrid technology
- Speed (20 knots)
- Length - under 22 meters
- A-frame
- Heave compensated fiber cable winch
- 6-meter aft deck
- Easy access to the water
- Wet lab
- Survey capabilities
- ROV operations
- Low safe manning

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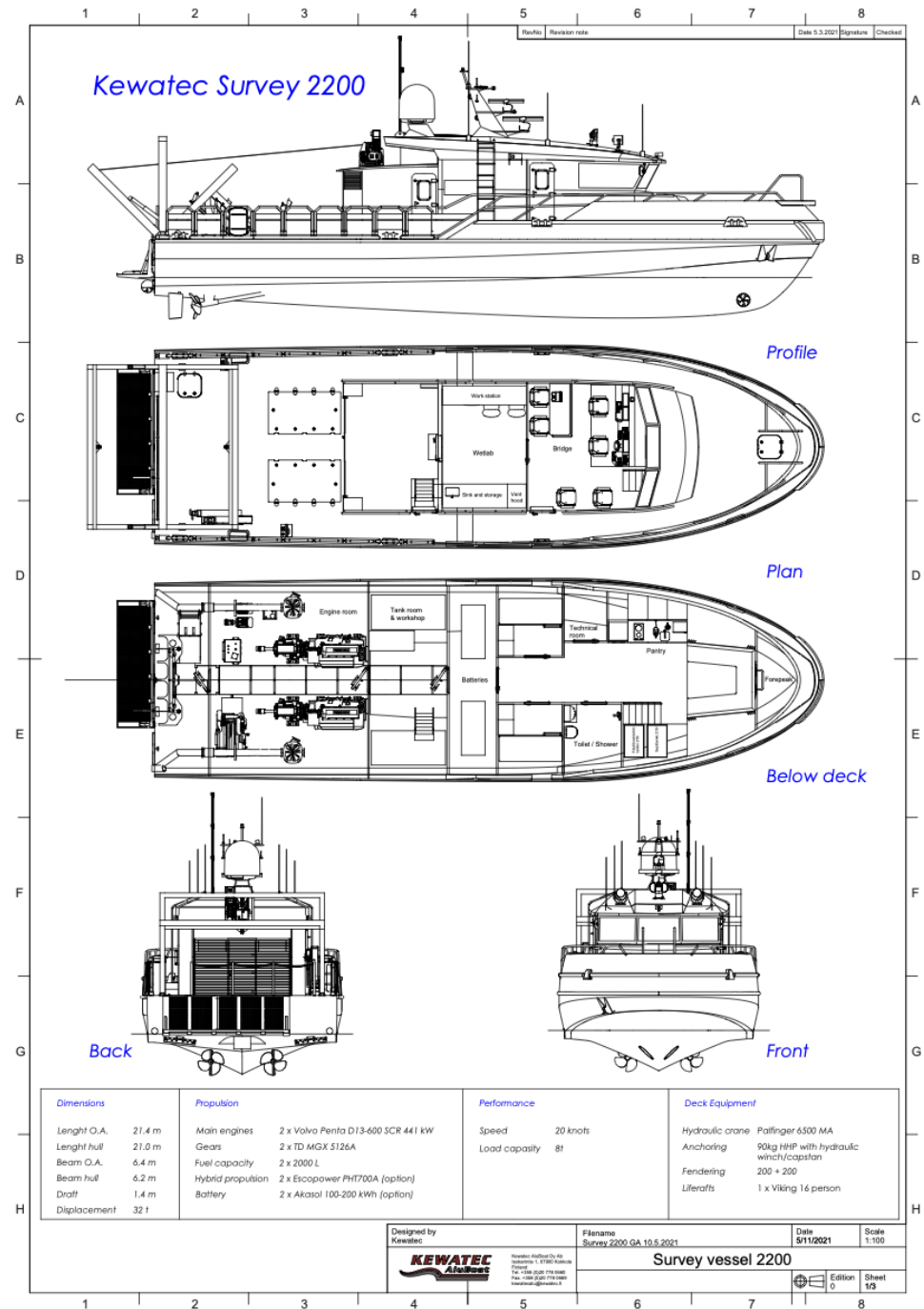
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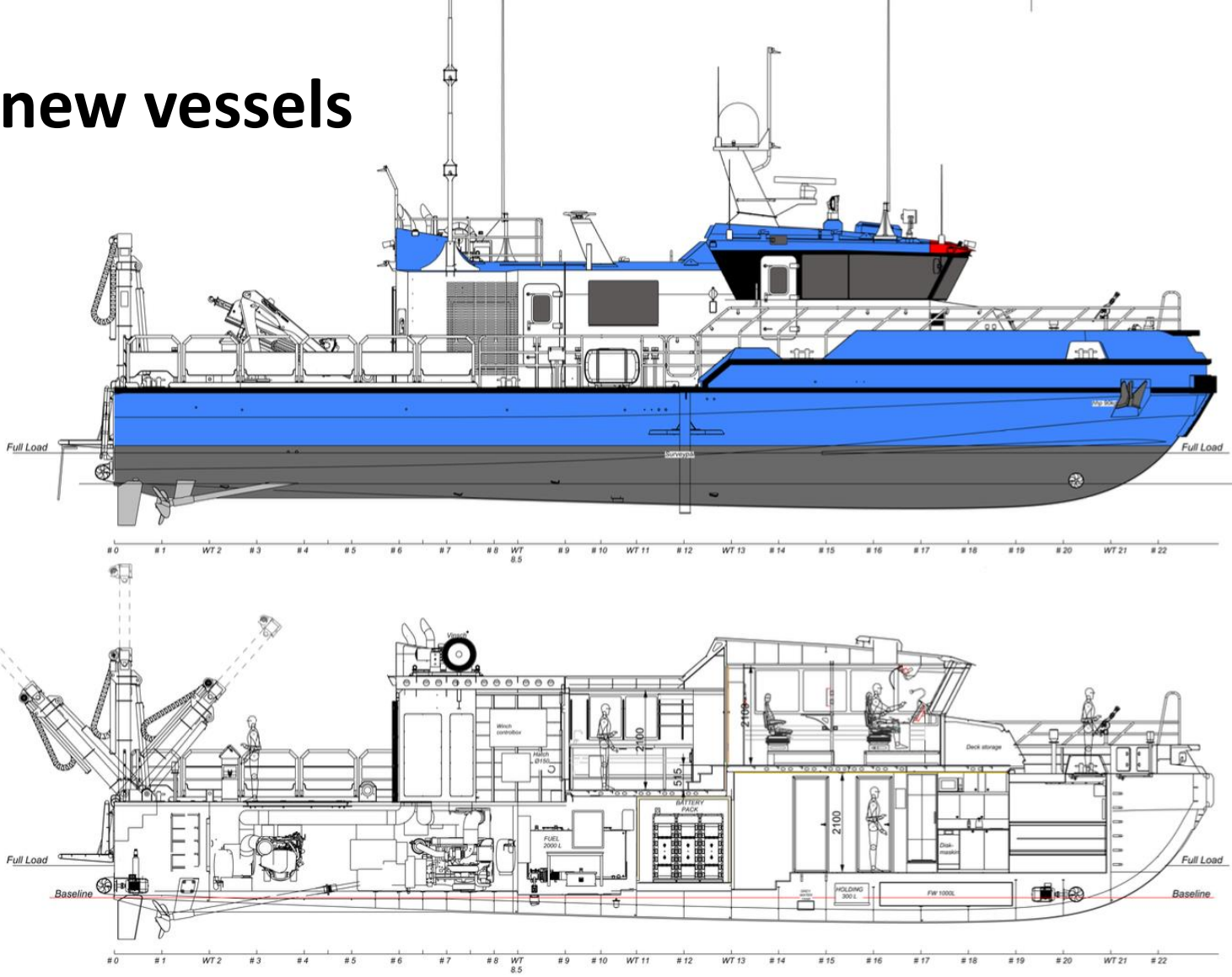
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Final specifications for the new vessels

Survey 2200 "Midocean"

LOA	23.6 m
Lh	23.0 m
BOA	6.4 m
Bh	6.3 m
Draft (max)	1.6 m
Weight (light)	49.5 t
2x Volvo D13-600 SCR 441 kW	
Fuel capacity 2x 2000L	
Hybrid propulsion 2x Escopower PHT700A	



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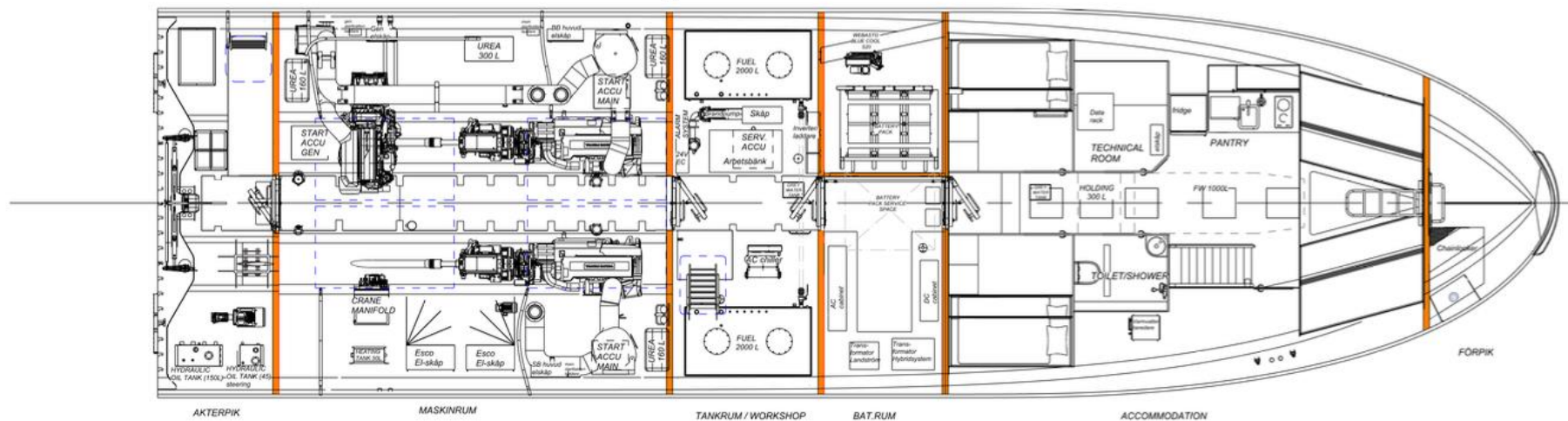
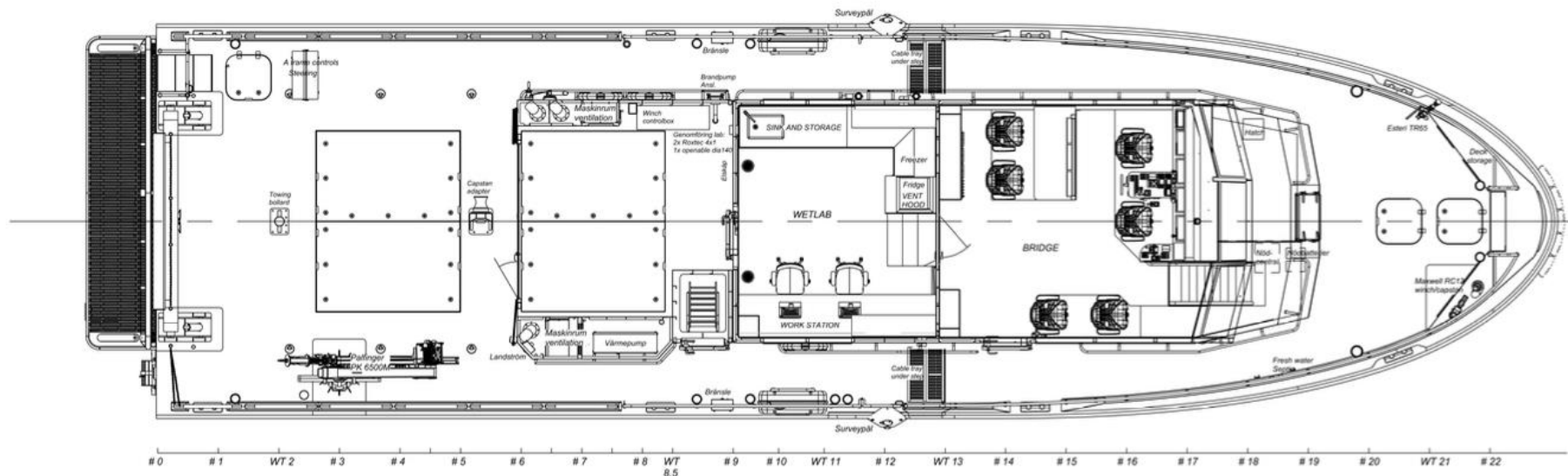
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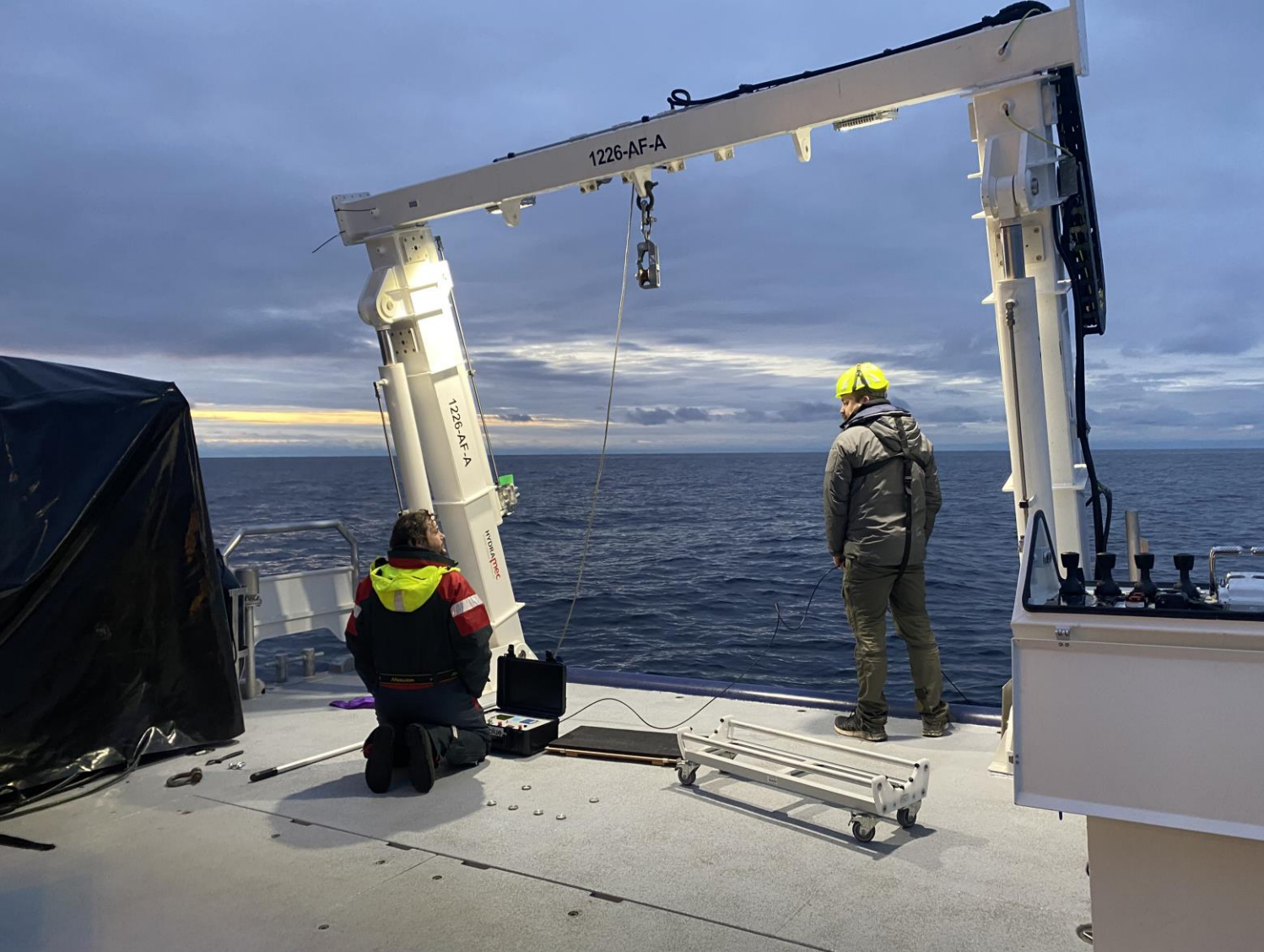
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Research / survey equipment



On each vessel:

- Sea&Syn Technology CTD90M
(additional sensors: dissolved oxygen, chlorophyll a , phycocyanin)
- Hydro-Bios multiwater sampler: 5 x 5l
- 6-place filtering system with 20mm and 47mm filter funnel

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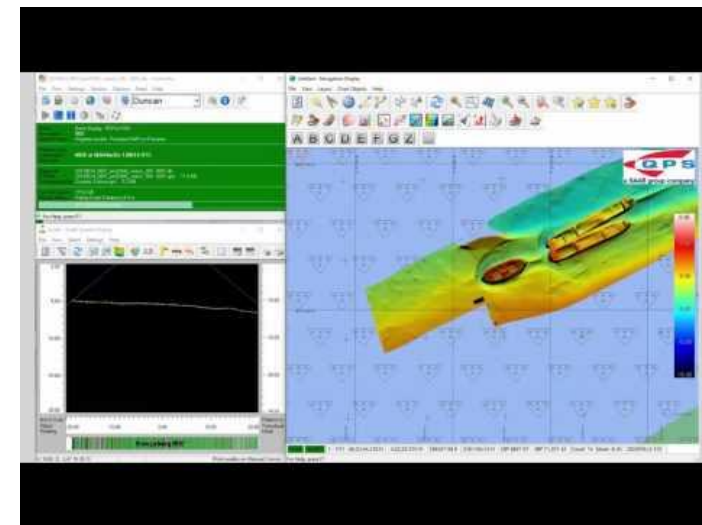
On each vessel:

Trimble BX992 dual frequency GNSS receiver

- Dual antenna heading
- Integrated MEMS IMU (Inertial Measurement Unit) in receiver unit
- High accuracy surface positioning and heading
- Integrated IMU providing vessel attitude (pitch, roll, yaw) even when other systems (MBES/USBL) not installed on vessel

QPS Qinsy 9 survey navigation and acquisition software

- Industry standard hydrographic navigation and data acquisition software
- Very versatile software allowing integration and navigation calculation of multiple independent objects
- Used for navigation calculations and data acquisition, as well as calculation and acquisition of other systems such as MBES.



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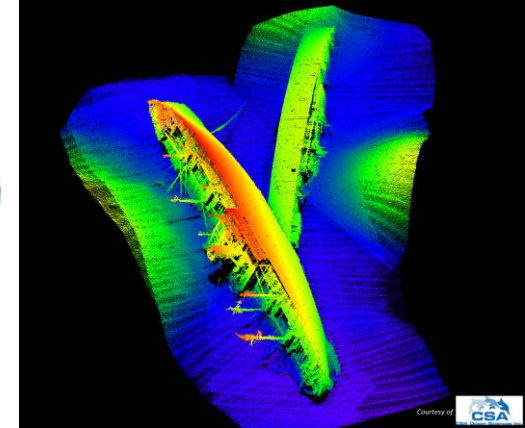
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Research / survey equipment

Single systems that can be moved between vessels without need for extensive mobilization and calibration:

R2Sonic Sonic Multibeam Echosounder System

- 200-400 kHz with additional 700 kHz Ultra High-Resolution mode
- Integrated IMU (Inertial Measurement Unit) / gyro / GNSS
- High resolution, high density MBES
- Multispectral backscatter and water column acquisition
- Valeport Mini-SVS sound velocity sensor at transducer head as well as Valeport Swift sound velocity profiler



Kongsberg HiPAP 352P-MGCR2 USBL Acoustic Positioning System

- cNode Micro transponders
- High positioning accuracy (less than 2 cm)
- Motion/heading compensated with integrated MRU (Motion Reference Unit) / gyro



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Challenges encountered during the building process

- **Delayed deliveries**
- **Specification changes from the costumer**
- **Shipyard experience**
- **Swedish legislation**

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Thanks for listening

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