



New Norwegian ice going Research Vessel *Kronprins Haakon*

Øystein Mikelborg | Assistant project manager



A long time in the making – first concepts around 2000



A long time in the making – frozen design 2013



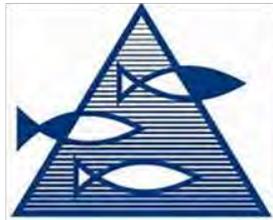
Then and now...



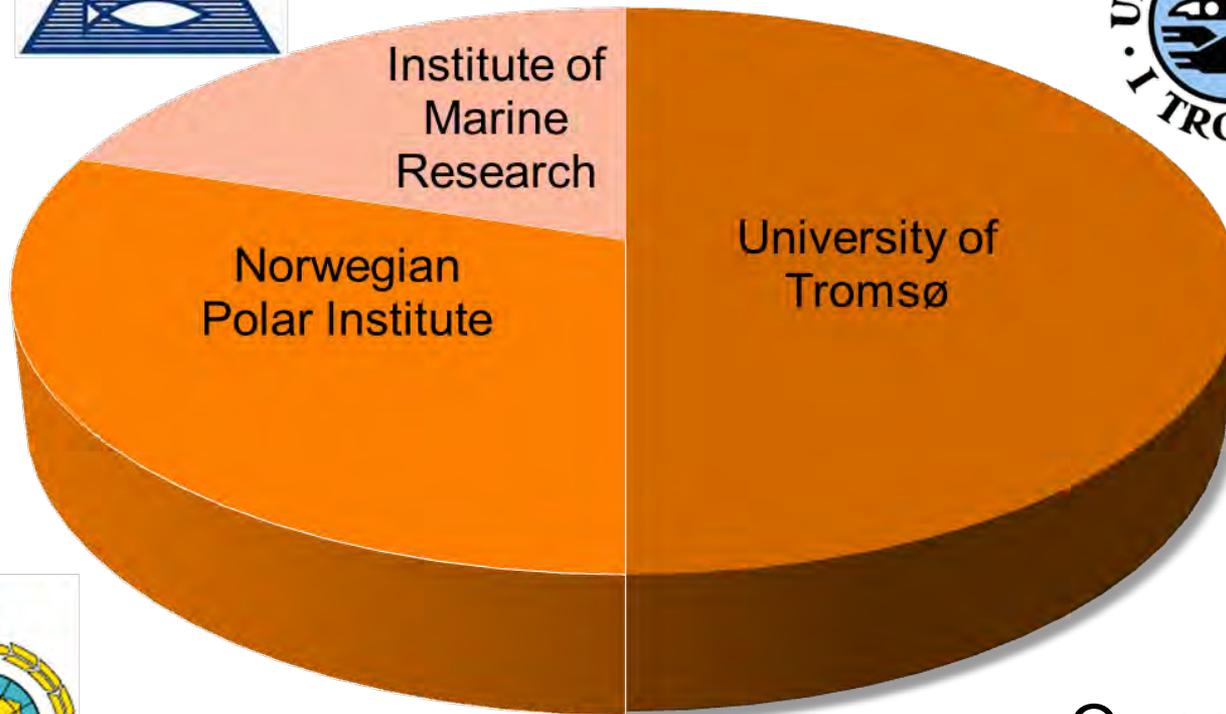
Then and now...



Owners and users



Users



Owner: NPI
Operator: IMR



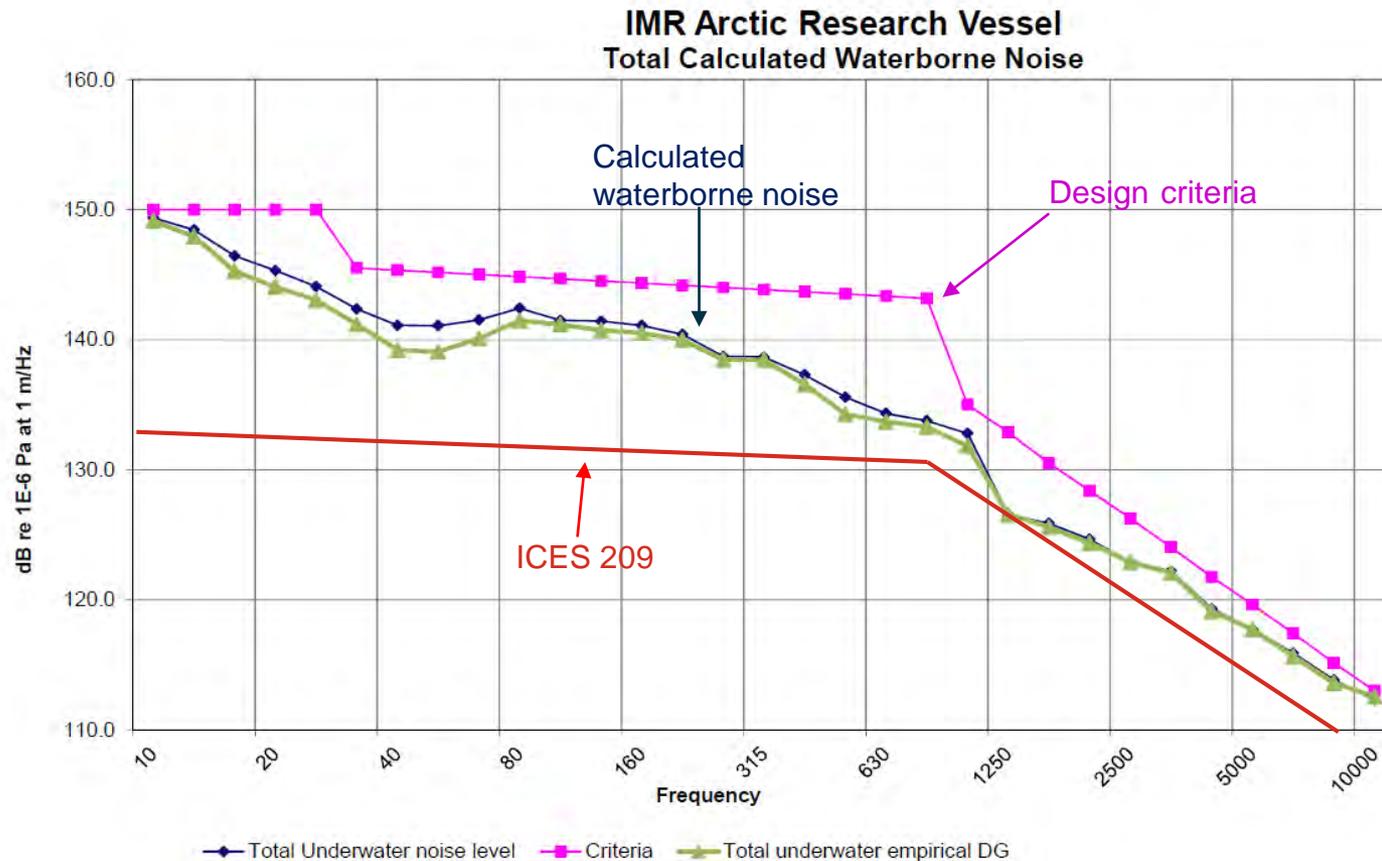
Areas of special attention

- Underwater Radiated Noise (URN) – relaxed ICES 209
- Bubble sweep down (27 transducers)
- Icegoing/icebreaking capabilities
- Helicopter facilities
- Multi-function scientific capability
- Student training facilities
- EMC - control of Electromagnetic Radiation **Hazard**
 - HERP: Personnel
 - HERF: Fuel
 - HERA: Aviation
 - HERE: Equipment



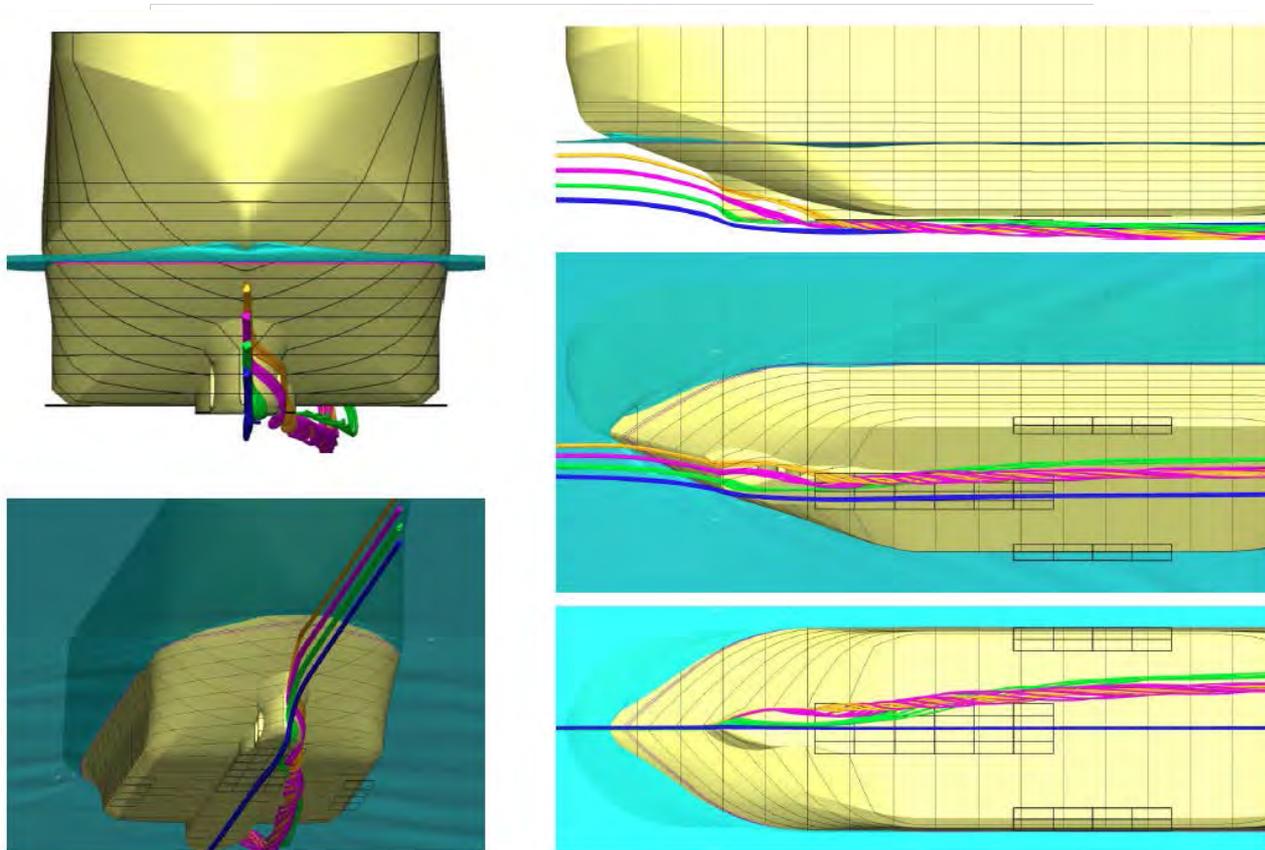
Areas of special attention

■ Underwater Radiated Noise (URN) ICES 209



Areas of special attention

- Bubble sweep down



Model test at HSVA in 2009, 2013 and 2015



Azimuth thrusters



Technical details

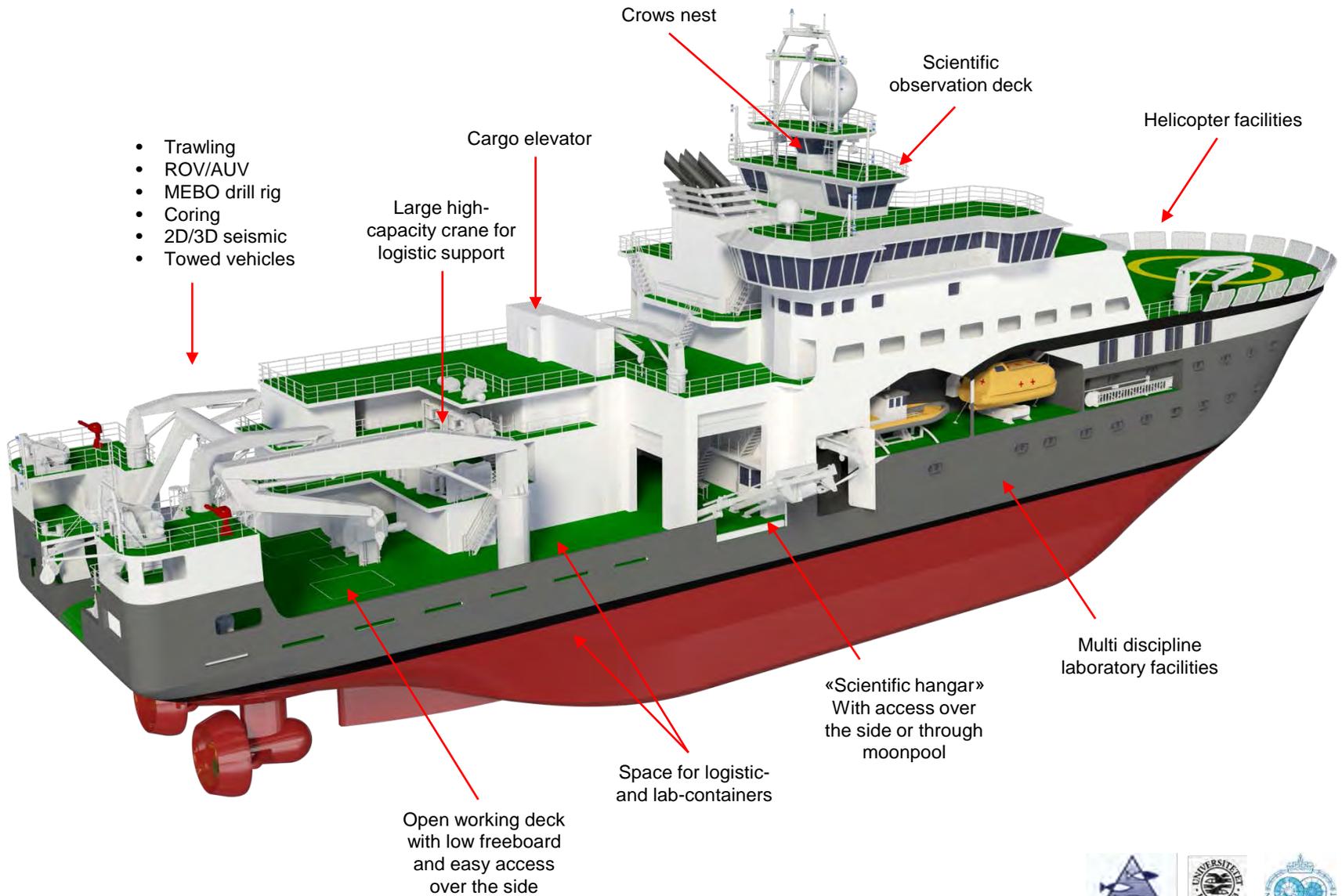


- Length over all (LOA): 100,0m
- Breadth: 21,0m
- Draft: 8,5m
- Gross tonnage 10900T
- 4 diesel gensets (A/C) 15MW
- Two (Z-drives) aft 11MW
- Two tunnel thrusters fwd 2,2MW
- Dynamic Positioning (DP 1)
- PC-3 *Year-round operation in second-year ice which may include multi-year ice inclusions.*

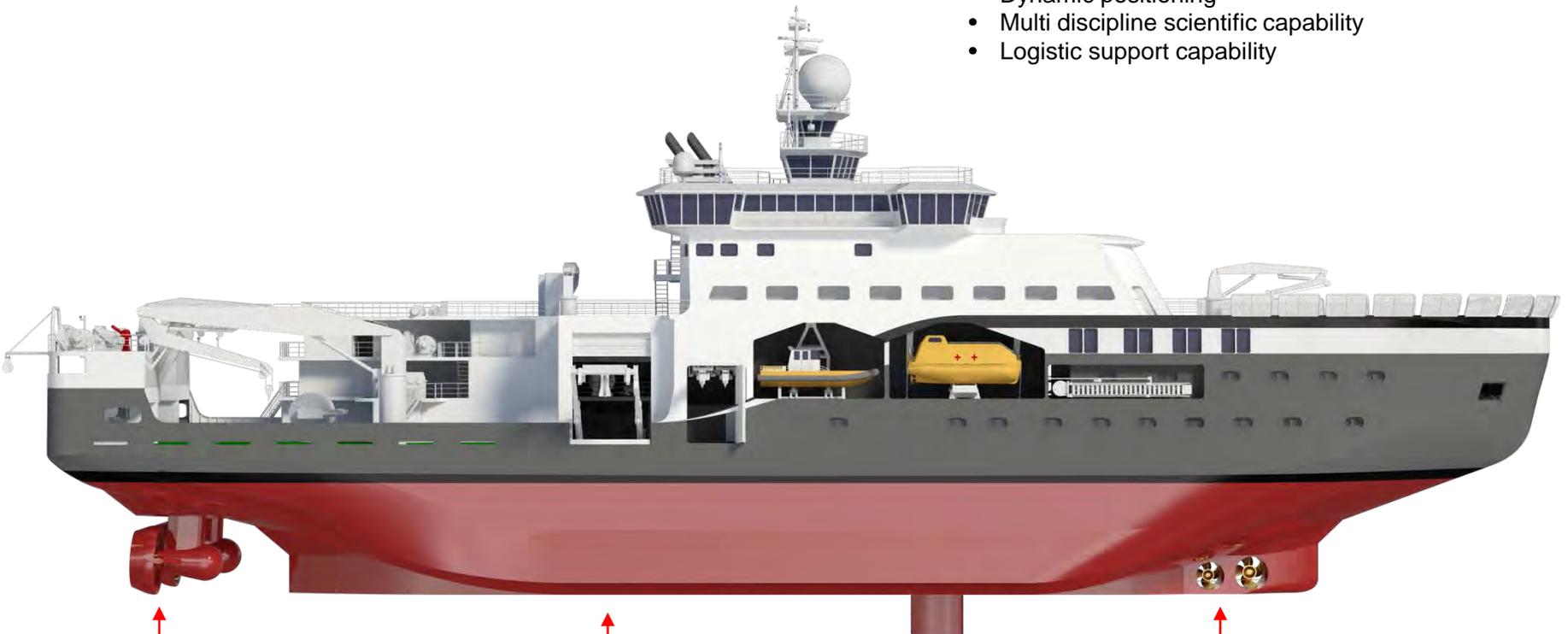
Technical details

- Accomodation for 55 persons in 38 cabins (15-17 crew).
- Maximum cruising range of approx. 15.000 nautical miles
- Endurance 65 days at cruising speed
- Designed to operate in winter ice with pressure ridges and multi-year ice





- Built to IMO Polar Code requirements (PC 3)
- Dynamic positioning
- Multi discipline scientific capability
- Logistic support capability



Azimuth propulsors
with diesel-electric
power

3x4m moonpool

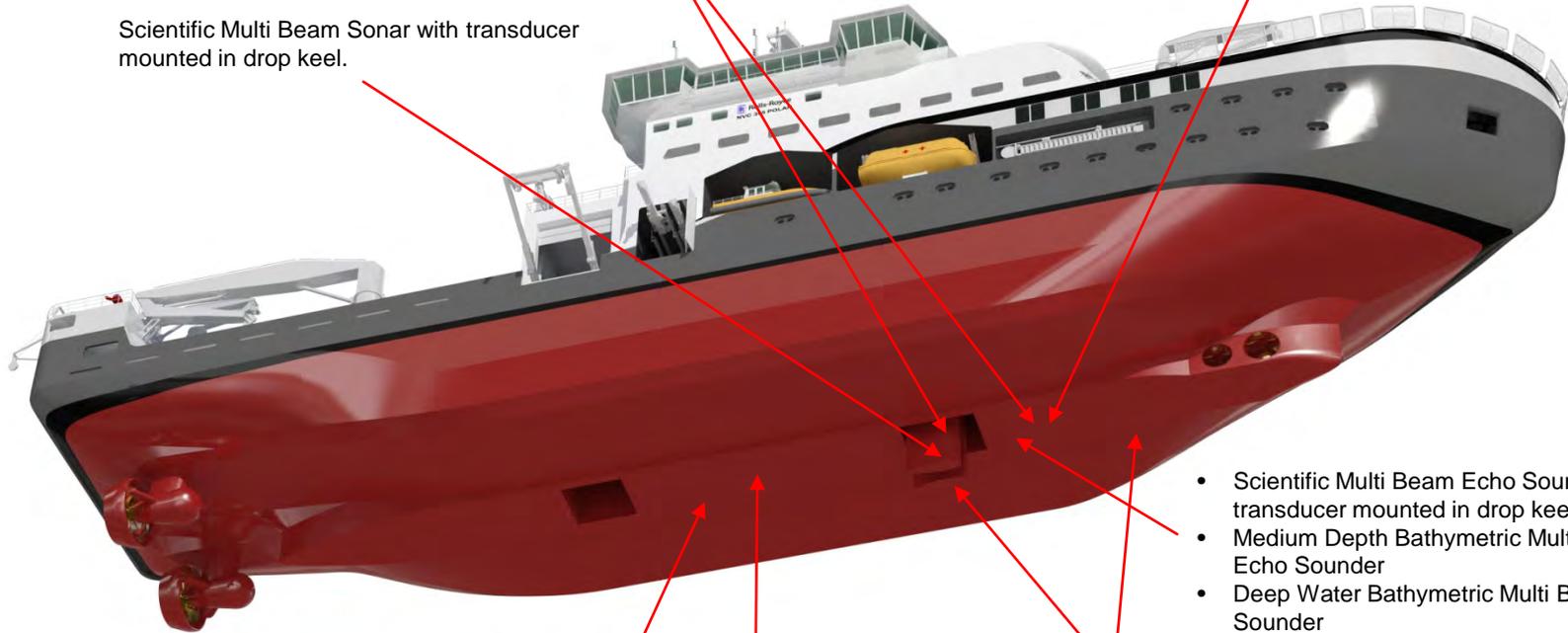
Side thrusters/
dynamic positioning



- 38 kHz ADCP
- 150 kHz ADCP
- transducers both in drop keels and in arctic tanks in the hull.

- Medium range omni-directional fisheries sonar
- long range omni-directional fisheries sonar

Scientific Multi Beam Sonar with transducer mounted in drop keel.



- Scientific Multi Beam Echo Sounder with transducer mounted in drop keel.
- Medium Depth Bathymetric Multi Beam Echo Sounder
- Deep Water Bathymetric Multi Beam Echo Sounder

Sub Bottom Profiler

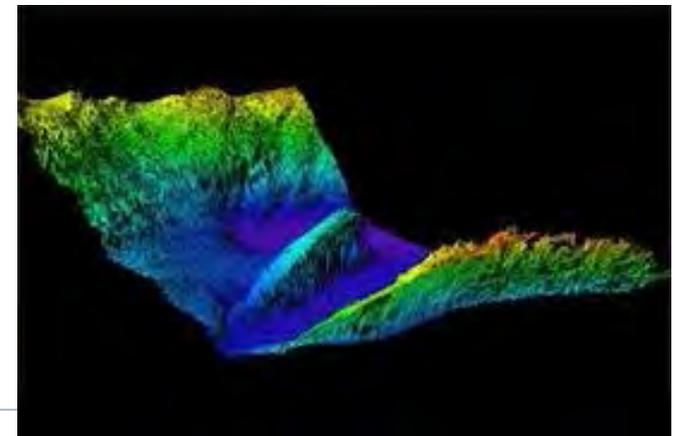
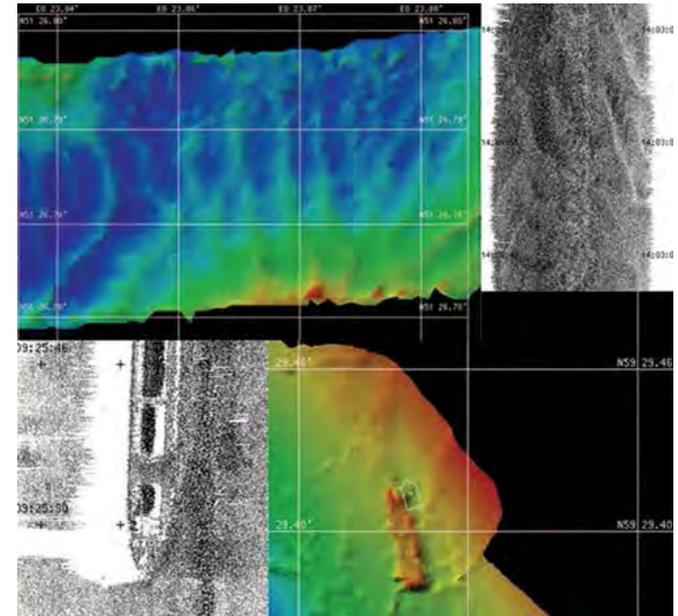
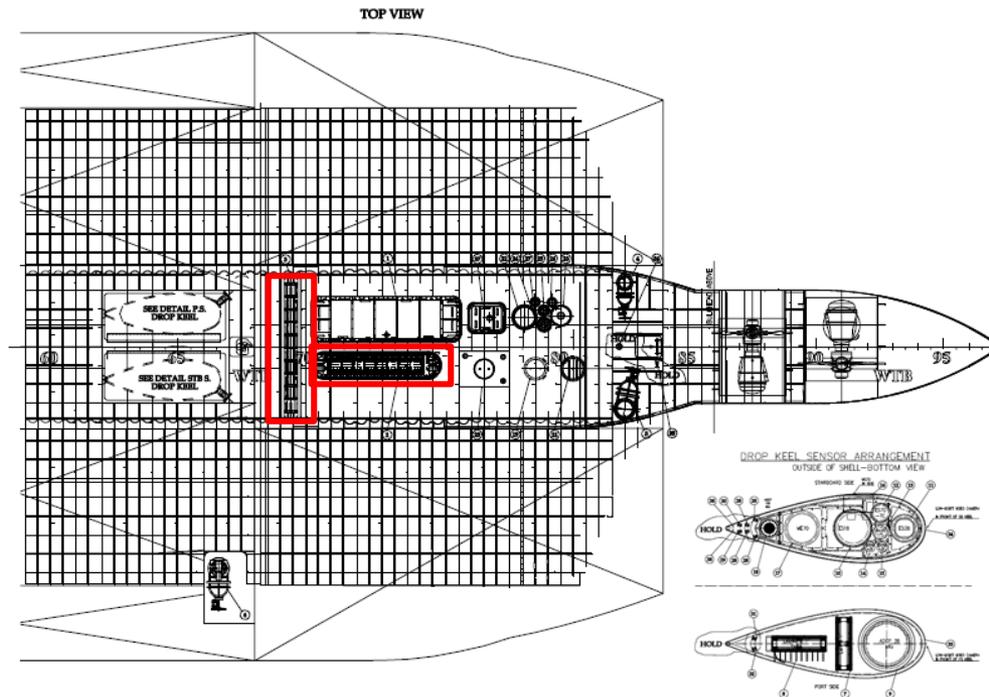
Scientific Split Beam Echo Sounders: 18, 38, 70, 120, 200 and 333 kHz with transducers both in drop keels and in arctic tanks in the hull.

Single Beam Echo Sounder with 12 kHz transducer mounted in "arctic tank" in the hull.



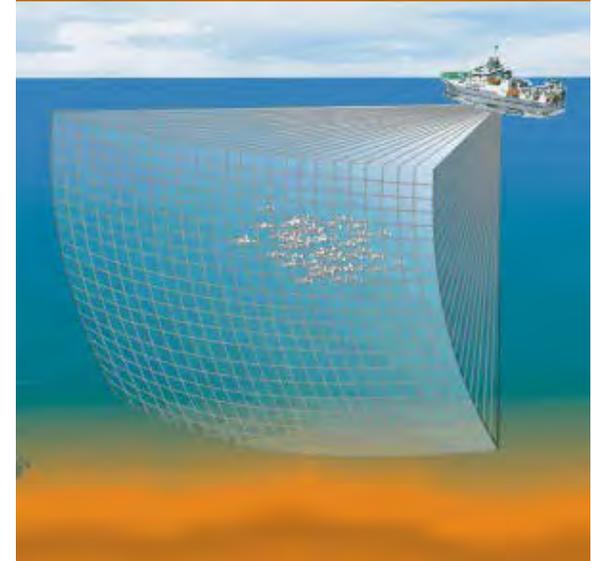
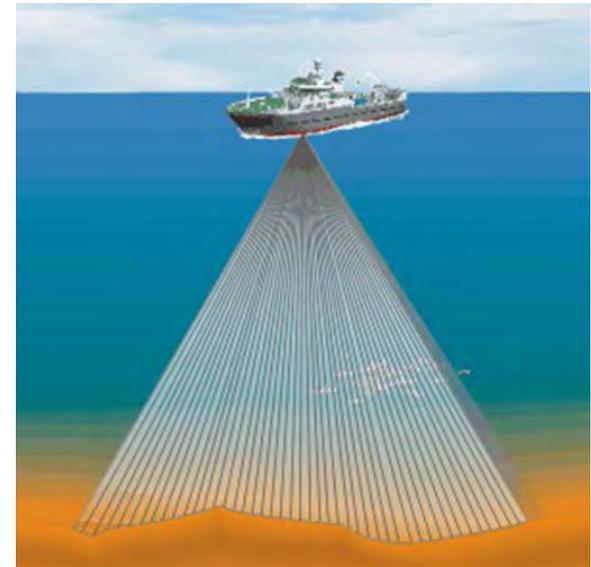
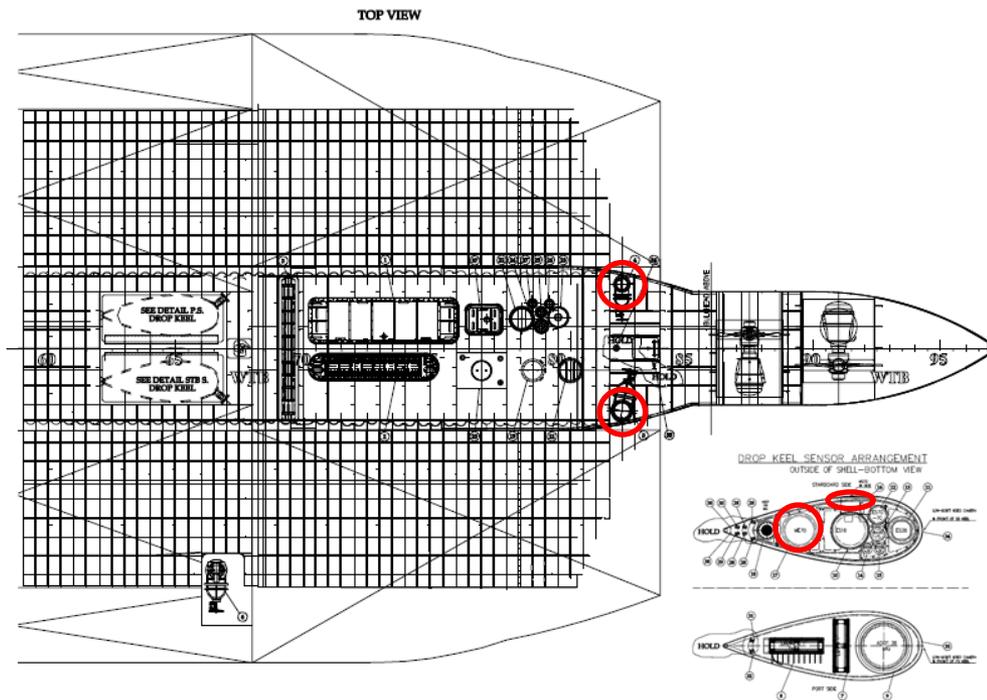
Multi-beam bathymetric echosounders

- Simrad EM302 Deep Water Bathymetric Multi Beam Echo Sounder
- Depth range 10-7000m
- 1°x1° beam



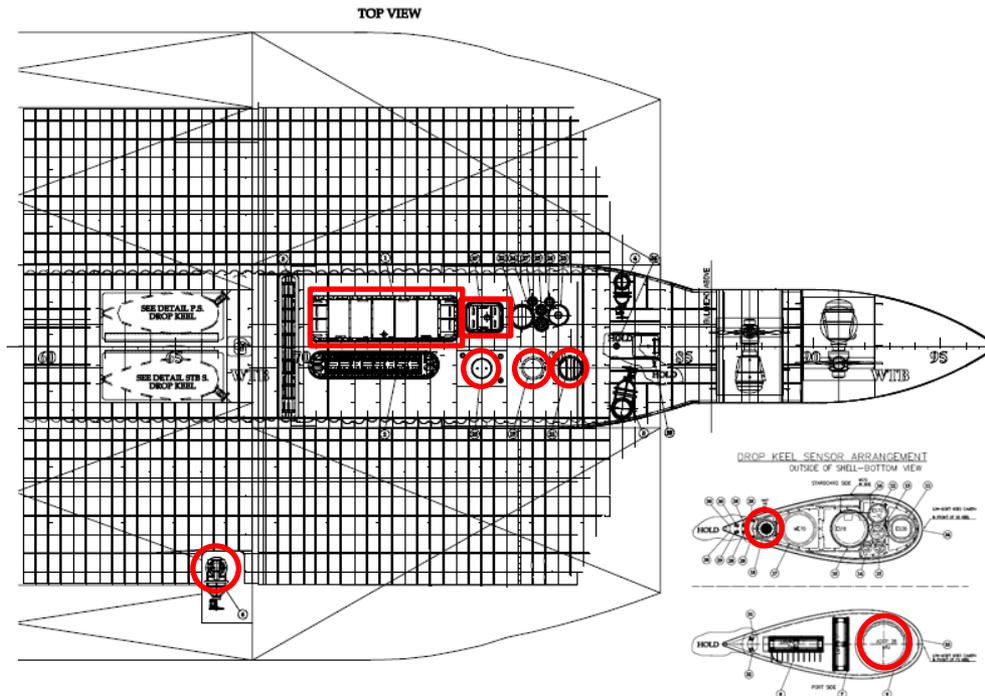
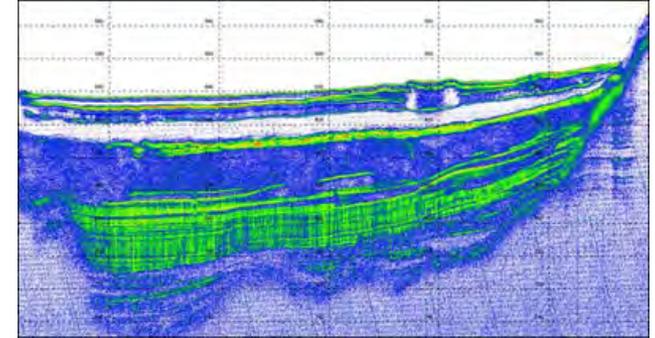
Marine biology echo sounders & sonars

- Simrad SH 90 omnidirectional sonar
- Simrad SU 90 omnidirectional sonar
- Simrad MS 70 multibeam sonar
- Simrad ME 70 multibeam echosounder

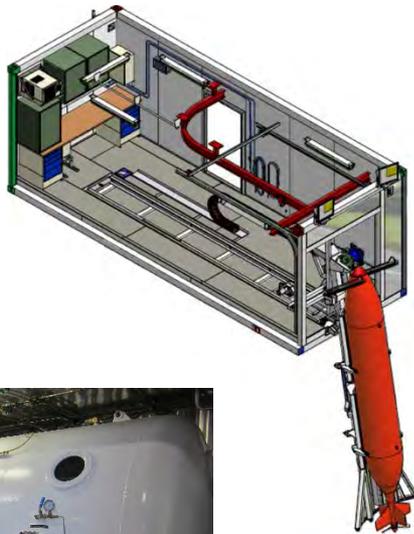


Miscellaneous hydro acoustic equipment

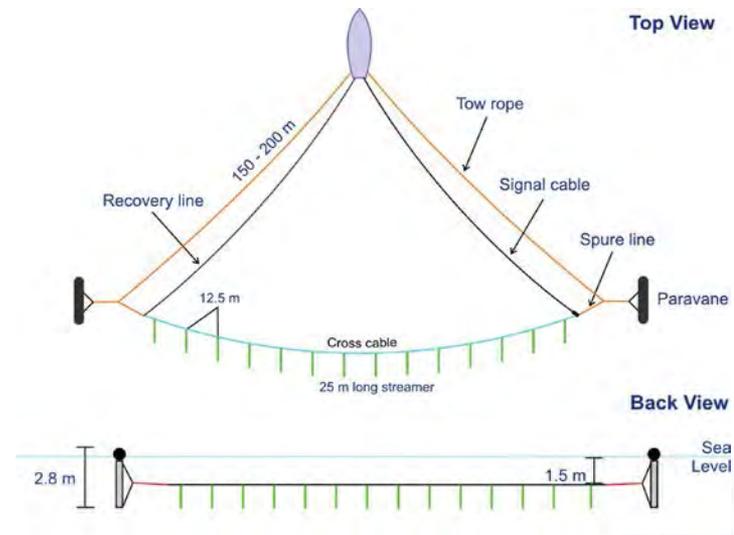
- Kongsberg SBP300-6 Deep Water Sub bottom profiler
- Simrad Topas PS40 Sub bottom profiler
- Teledyne RDI ADCP 38kHz & 150 kHz (in arctic hull tanks and on drop keel)
- Kongsberg HiPAP 501
- Kongsberg EA 600 – 12kHz single beam echo sounder
- Scanmar Catch monitoring/trawl geometry



Other facilities



- 2D seismic surveying (multi-channel)
- 3D seismic mini system
- ROV heavy duty
- HUGIN 3000 AUV
- Magnetometer
- Gravimeter
- Diving facilities with pressure chamber



Geology Equipments – Coring

Coring systems:

- Gravity corer (< 5-6 m)
- Calypso coring (ca. 30 m long)
- Surface-subsurface sampling:
 - multicore-box core
 - Vibrocoring (mobile unit) for stiff bottom
- MeBO mobile drill rig:
2000m water depth/80m
sampling



The MeBO sea floor drill platform launched from R/V Maria S. Merian



Ægir 6000 ROV

National facility financed by NFR



Research facilities

- 15 Laboratories
- 3 container laboratories
- 4 cooler rooms for samples
- 2 freezer rooms for samples
- Auditorium (50 seats)



Lab no.	Name of laboratory	Users
102	Clean seawater sample room	Common use
202	Gravity meter room	Common use
301	Chilled lab	Common use
302	Dry lab common	Common use
303	Wet lab common	Oceanography/Biology
307	Isotopic lab	Biology
308	Wet lab biology	Biology
310	Catch sample room	Biology
311	Environmental toxicology lab	
316	Filtering lab	
317	Education lab	Common use
319	Wet Lab Geology/Benthos	Geology
320	Microbiology lab	Common use
321	Dry lab	Common use
322	Ice Lab	Common use
	Container lab 1	
	Container lab 2	
	Container lab 3	
312	Cooler room	
314	Cooler room	
315	Cooler room	
323	Cooler room	
325	Freezer Ice Samples	For ice samples
313	Freezer room	
318	Fine/EI-workshop	
324	Chemical store	
	Auditorium – 50 seats	
701	Observation Central	Common



Support capability

Helicopter

- Hangar for two small/medium helicopters
- Deck dimensioned for NH-90 (Coastguard) and Super Puma (Svalbard SAR)



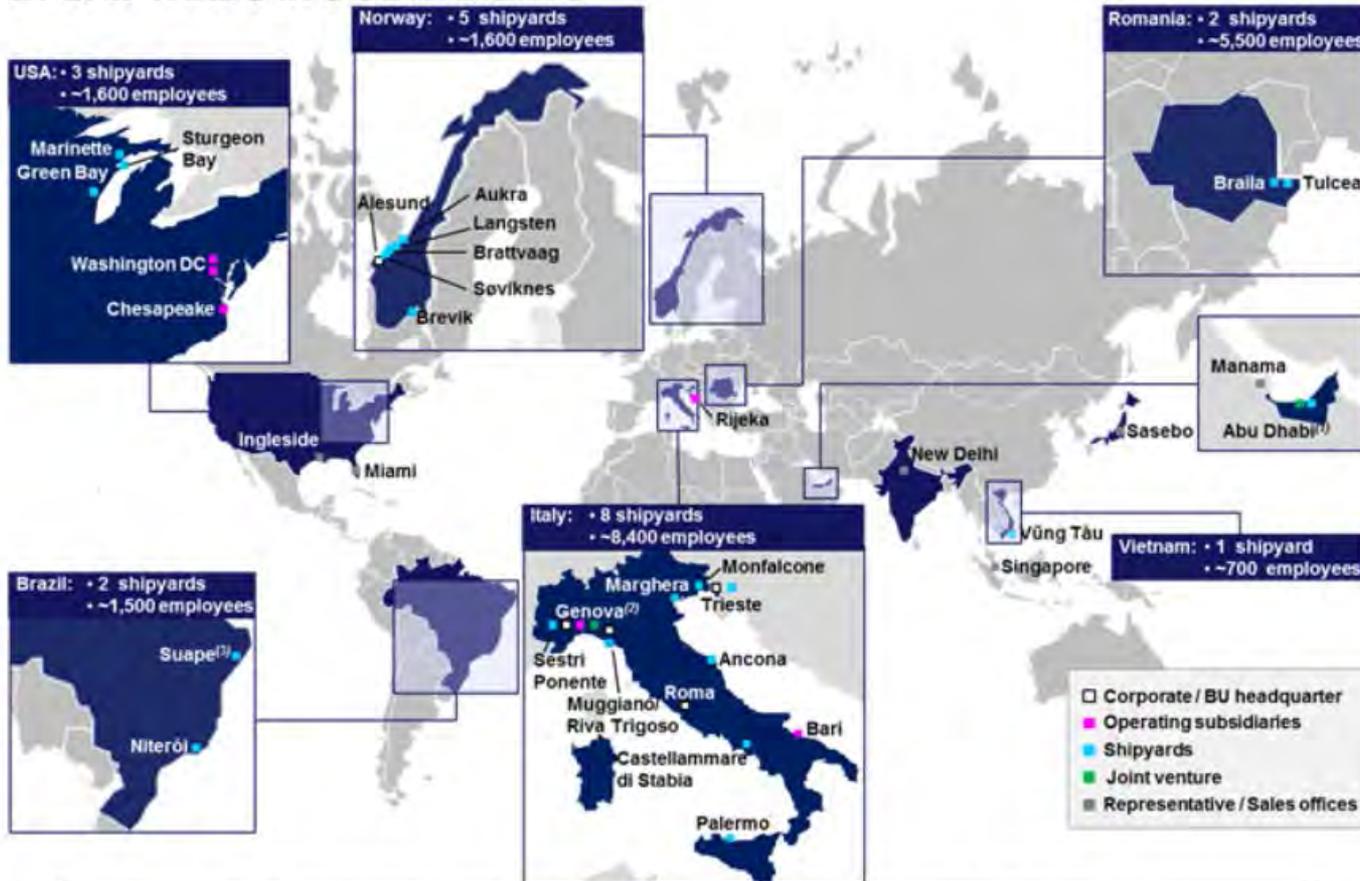
Support capability

- 40 passengers
- Long range/high endurance
- Space for 20 containers (20')
- Cargo hold (1180 cbm)
- Cargo elevator
- 5 cranes
 - 1x12tons@20m/30 tons@10m
 - 3x5tons@10m
 - 1x3tons@11m
- 158 ton bollard pull
- Firefighting class 1 compliant
 - 2x1200m³/hour. Range 120m at 45 m height



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21 SHIPYARDS IN 3 CONTINENTS

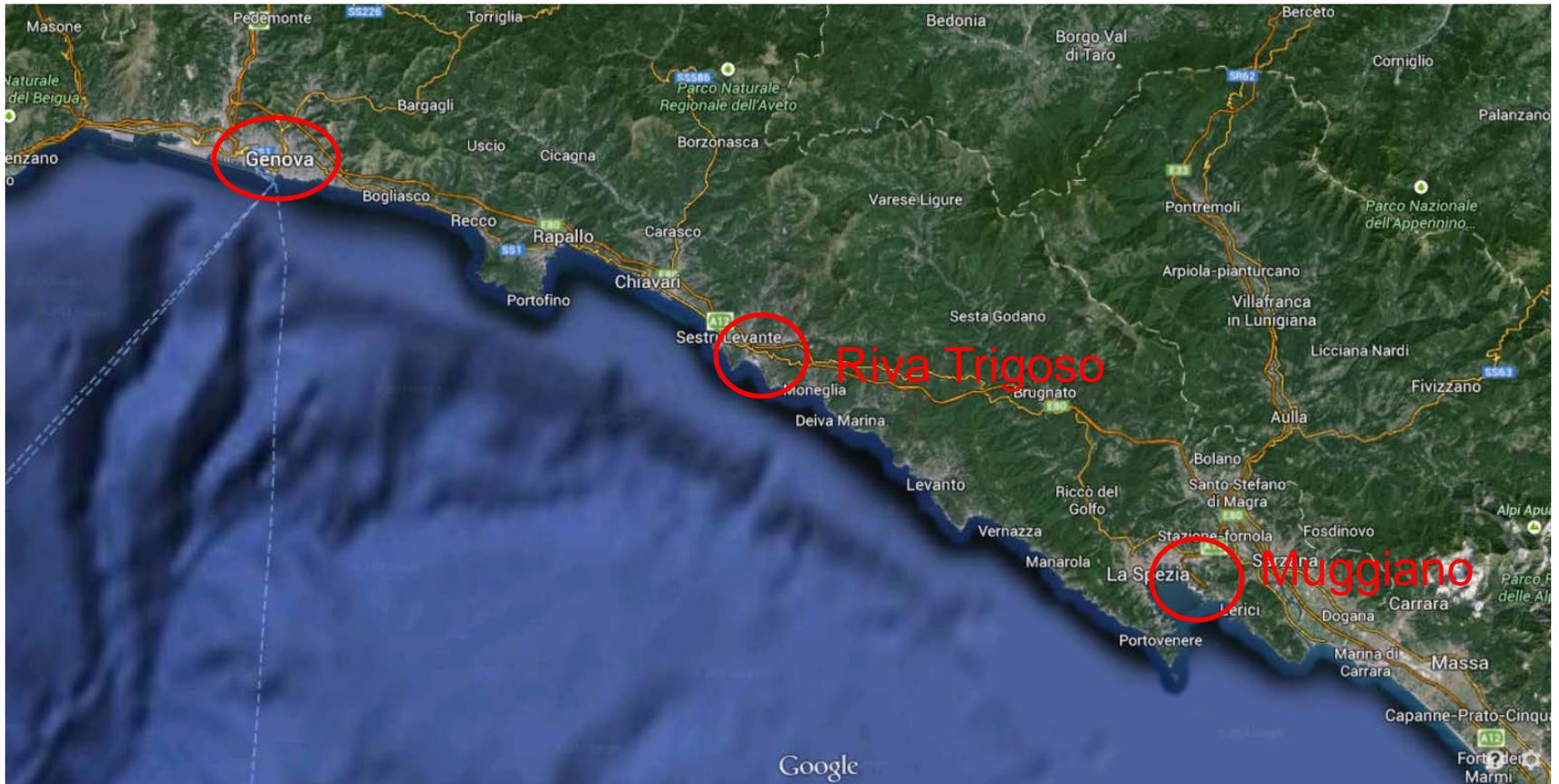


- 21 shipyards (including the "integrated shipyard" of Muggiano and Riva Trigoso) in 3 different continents
- Approx. 19,000 direct employees of which 15,500 in Europe

2014 Agreement with Alcatel Submarine Networks (ASN) and Alcatel Submarine Networks (ASN)



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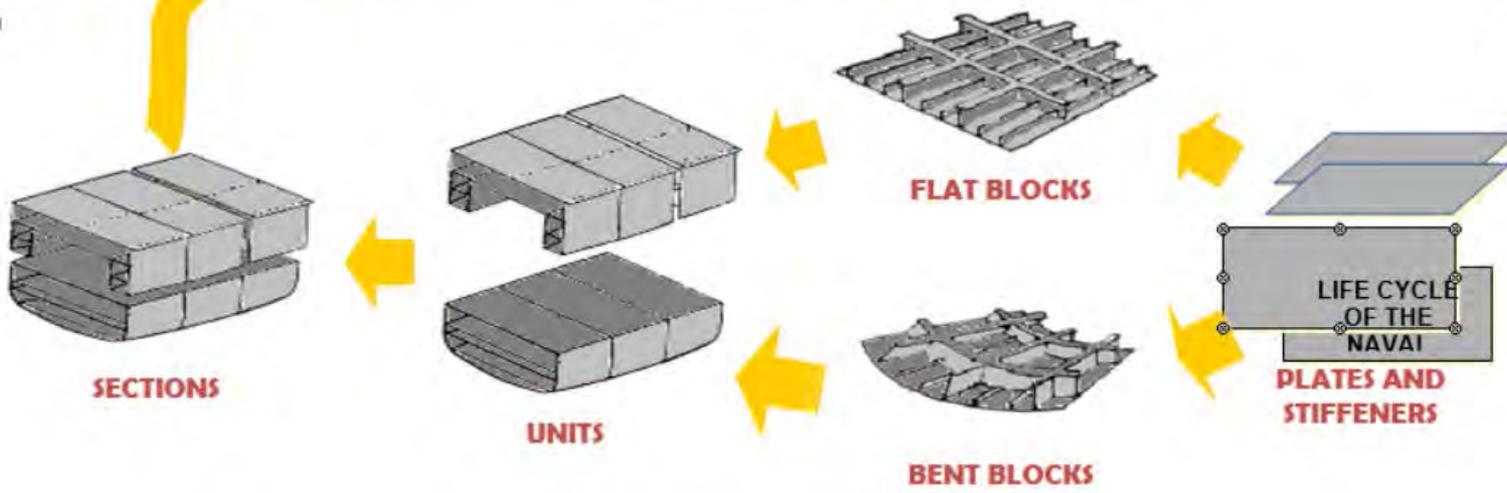
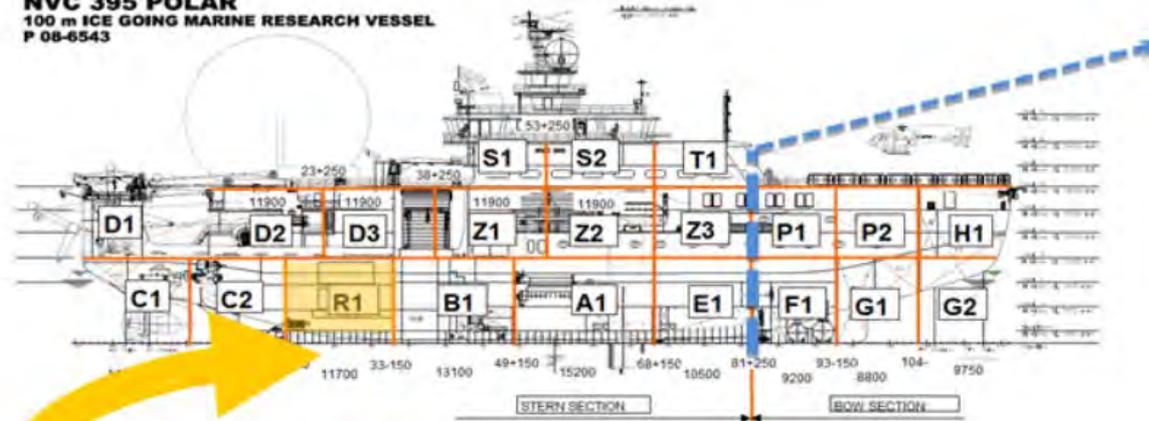


Hull fabrication

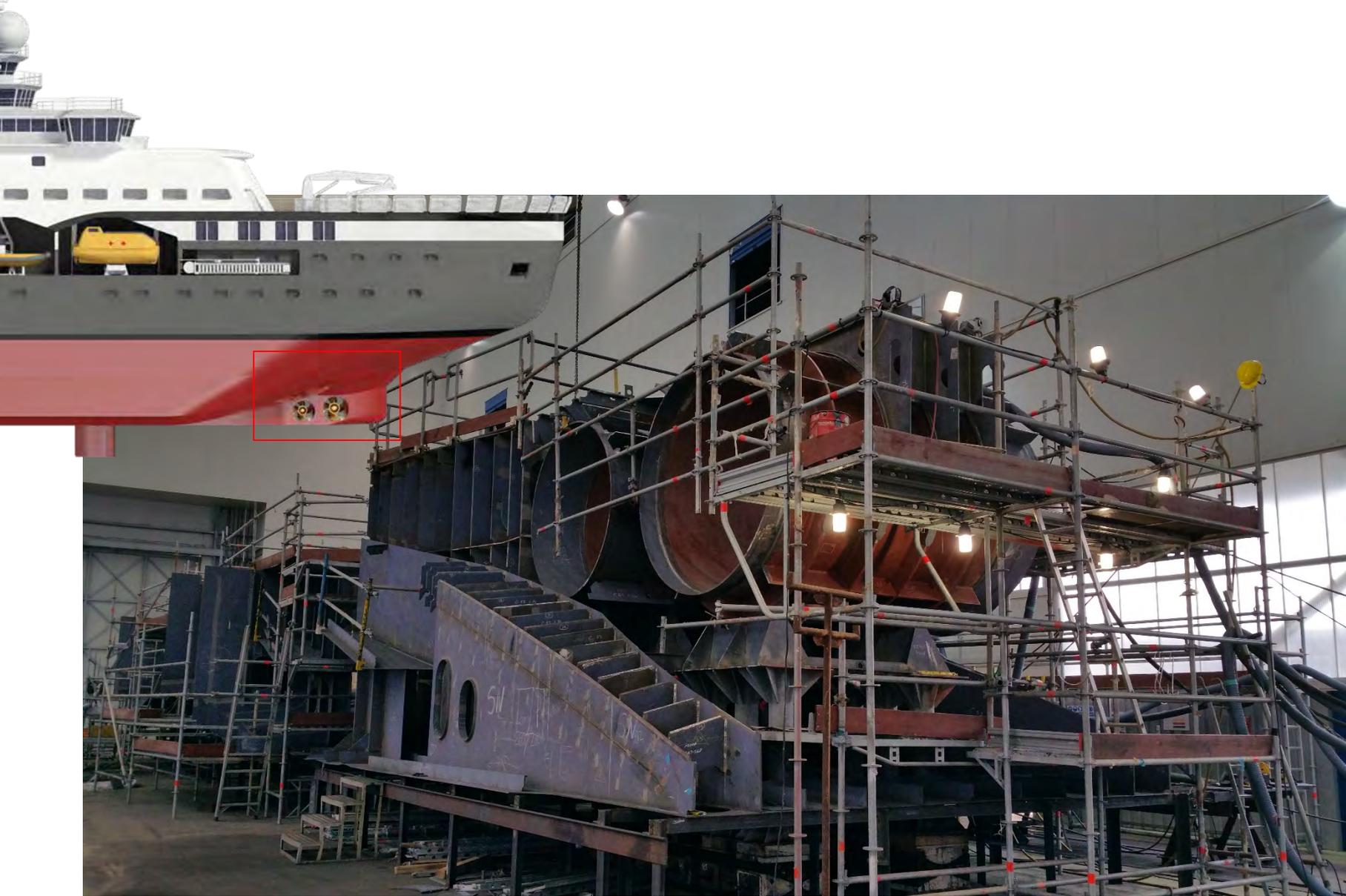
1 HULL FABRICATION

NVC 395 POLAR
100 m ICE GOING MARINE RESEARCH VESSEL
P 08-6543

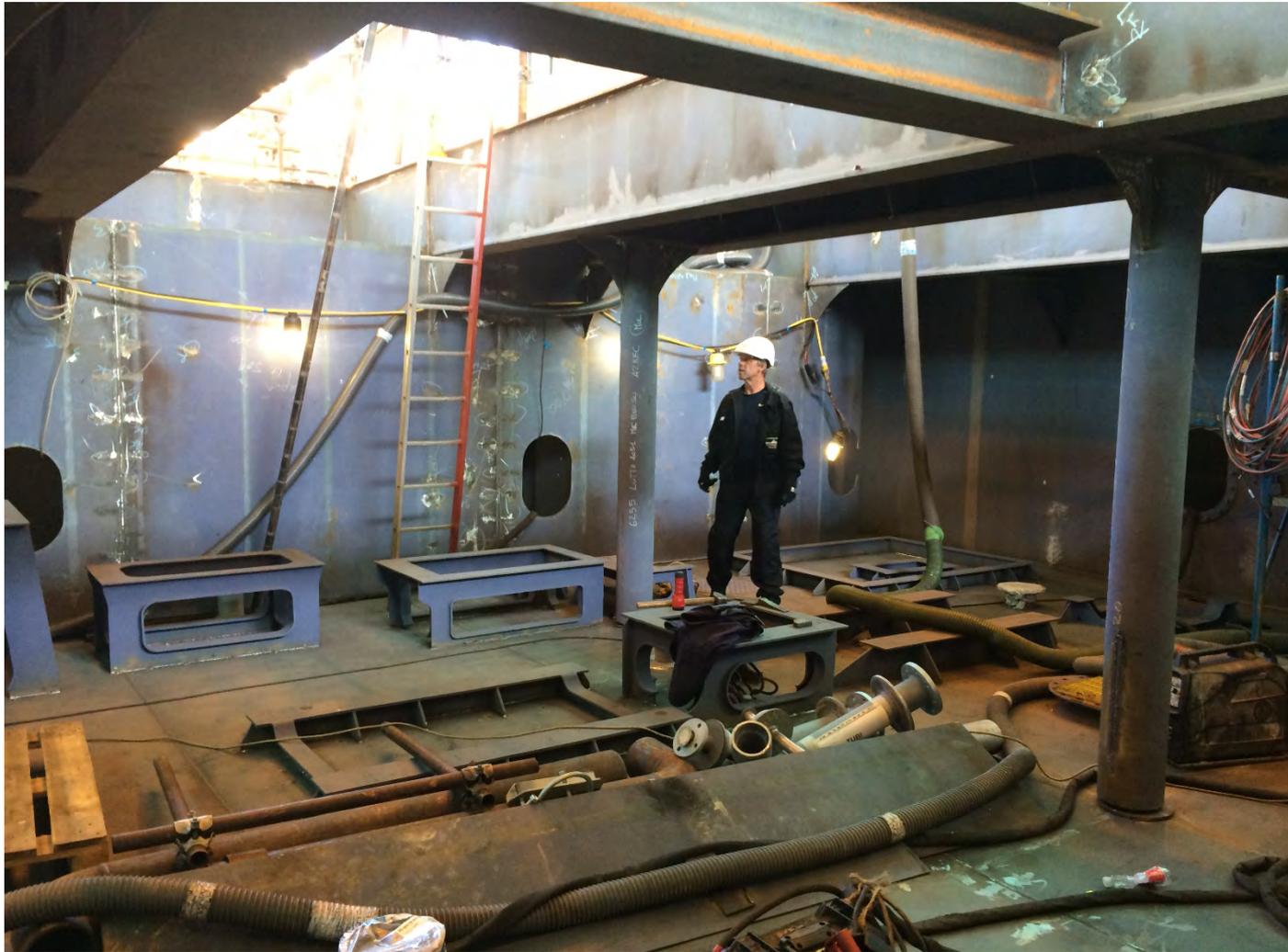
The vessel will be built in two sections











Outfitting of labs – Final sea acceptance test (Langsten)



Cardinal dates

- Contract signature 19/12/2013
- Steel Cutting 15/06/2015
- Keel laying 02/09/2015
- Launching Dec 2016 (T.B.D.)
- Transfer to Norway May 2017 (T.B.D.)
- Delivery Jul 2017 (T.B.D.)



