



1918

TALLINNA TEHNIKAÜLIKOOL  
TALLINN UNIVERSITY OF TECHNOLOGY



**ship-ST**  
naval architects & marine engineers

# Regional research vessel for the Baltic – background and basic design for BRV 35

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# Research vessels in Estonia (history)

**Aju-Dag (1976-1984)**, 41 research cruises, mainly in the Baltic Sea



**Arnold Veimer / Livonia (1984-1994)**, 48 research cruises, Baltic Sea and North Atlantic



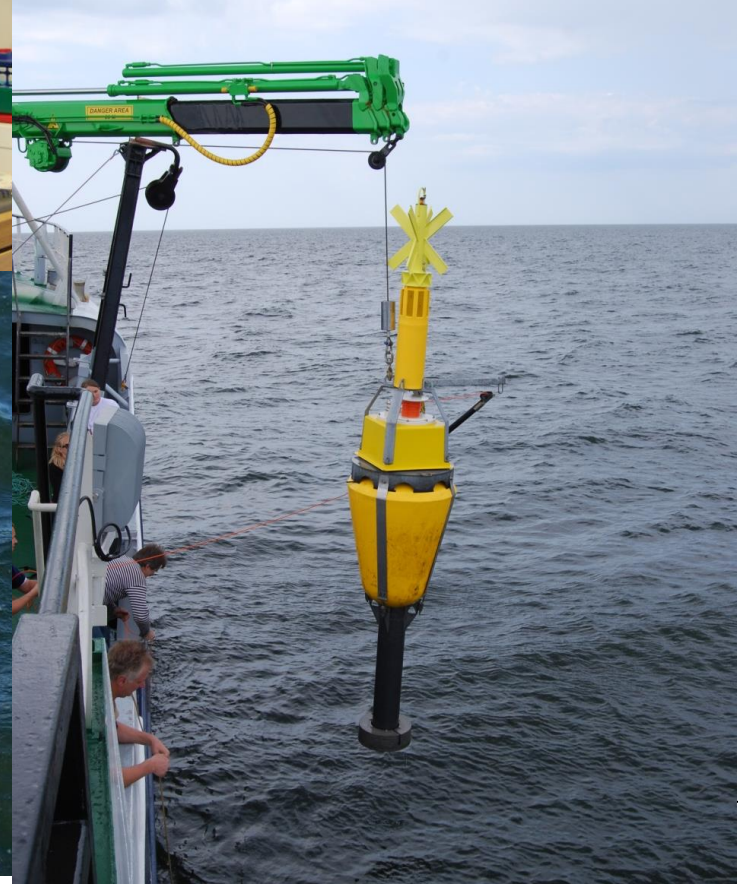
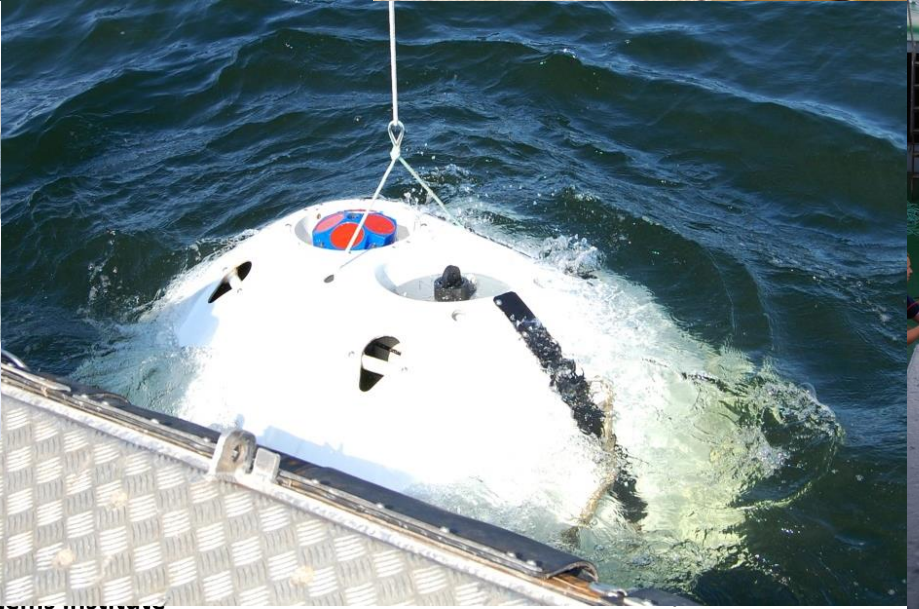
# Research vessel SALME (2006-...)



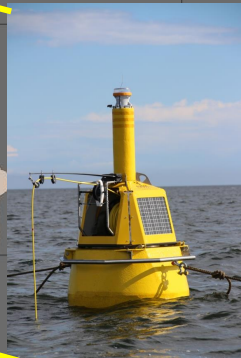
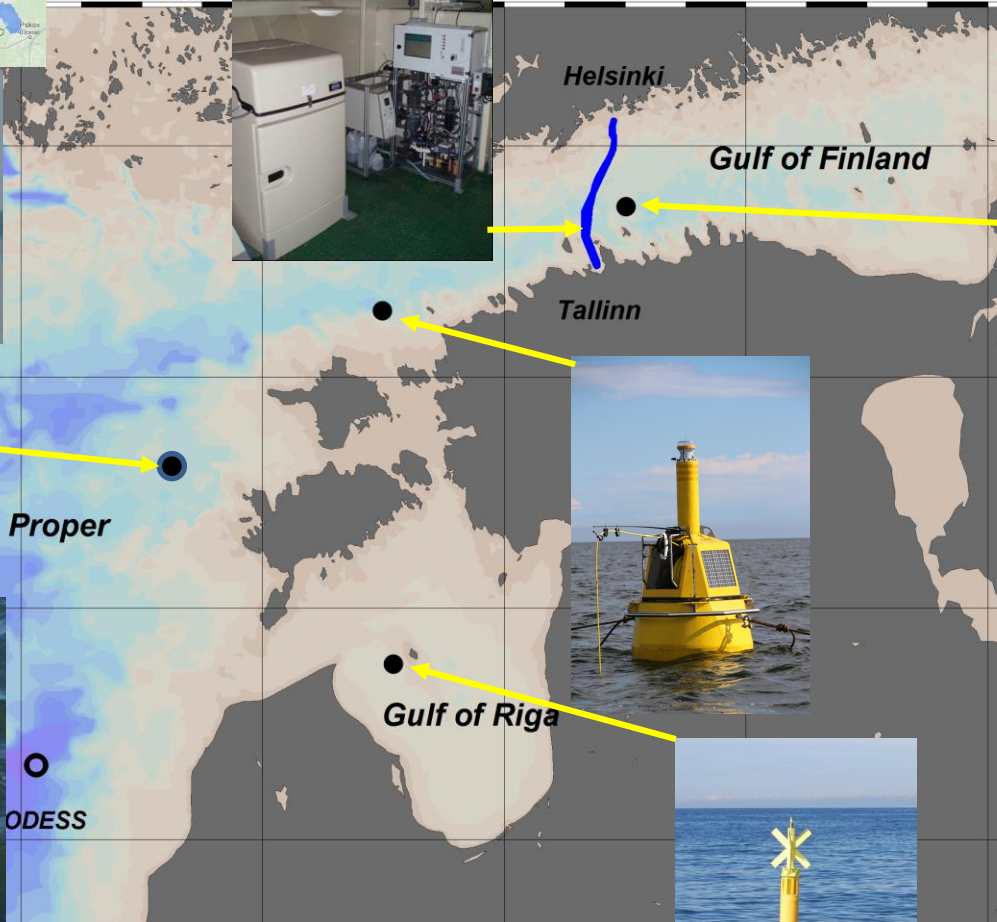
Photo: Kair

Built in 1974  
Owned by TUT since 2006  
Reconstructed in 2009  
GRT – 223 t  
Length – 31 m  
Draught – 2.5 m  
Area – Baltic Sea  
Crew up to 6  
Scientists up to 12  
2 labs + seminar room  
Equipment: crane,  
cable winch, winches,  
A-frame etc

# Equipment



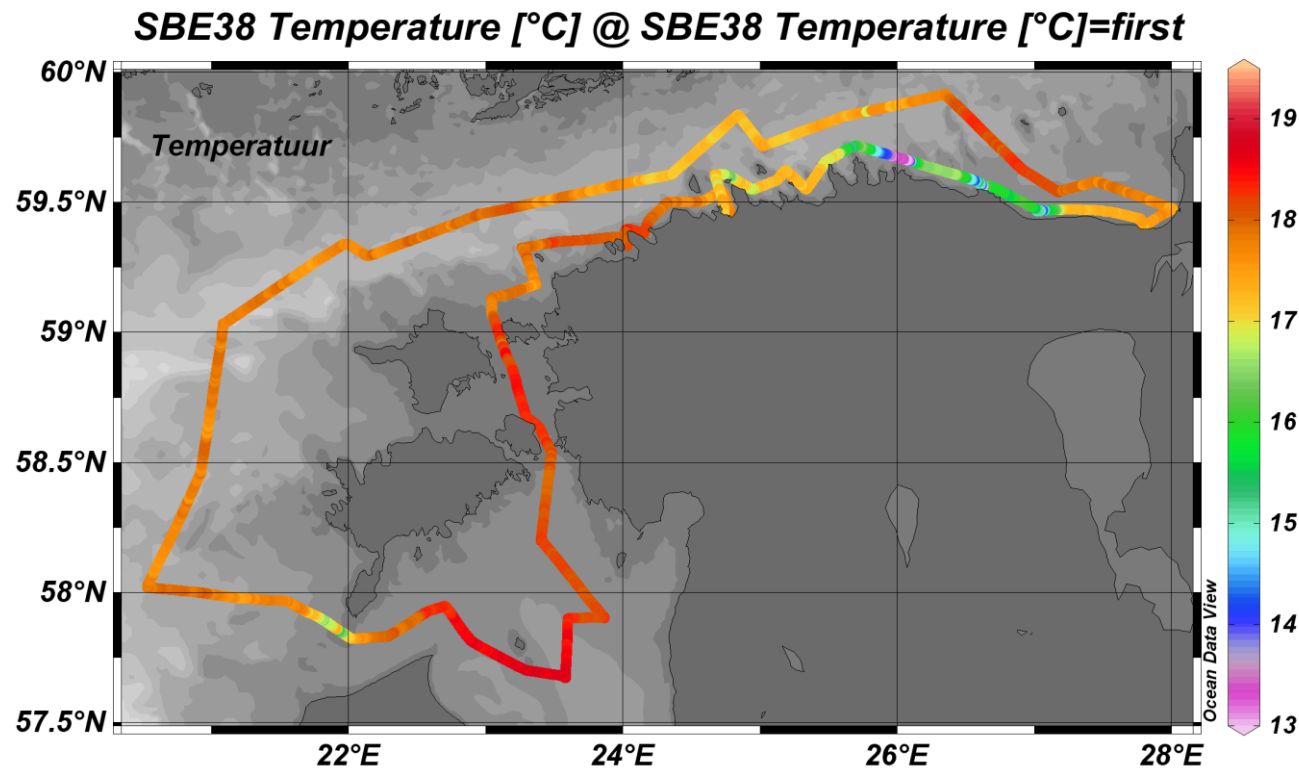
# Measurement systems (MSI, 2015)



24°E

28°E

# Near real-time data delivery



# Research vessel SALME 2010-2015

## Main partners and projects

### Governmental and public partners

Ministry of Education and Research, Estonia

Ministry of the Environment, Estonia

University of Tartu, Estonia

Geological Survey of Estonia

Latvian Institute of Aquatic Ecology, Latvia

IOW, Germany

### Projects

Basic Research

Environmental monitoring

Maintenance of operational observation equipment

Environmental impact of Nord Stream pipeline construction

Habitat mapping and geological studies

Sediment sampling for analyses of harmful substances

Underwater noise measurements

# Research vessel SALME 2010-2015

## Main partners and projects

### Business and private partners

Port of Tallinn, Estonia

Ramboll (funding from Gasum Oy, Finland)

Luode Consulting Oy (Finland)

Kala- ja vesitutkimus Oy (Finland)

4Energia OÜ, Estonia

### Projects

Environmental impact monitoring

Geological and environmental research for sand extraction

Research for wind park developments

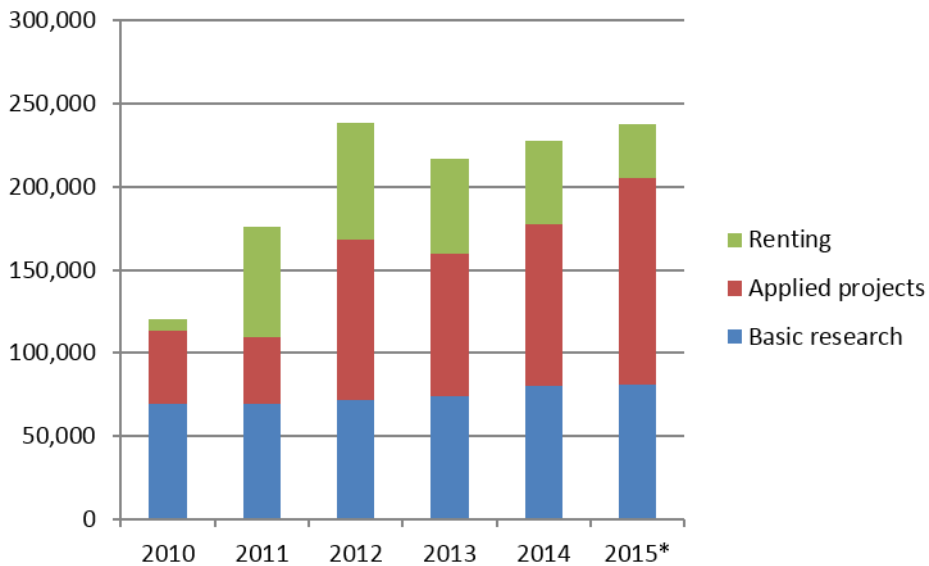
Studies for pipeline construction (Balticconnector)



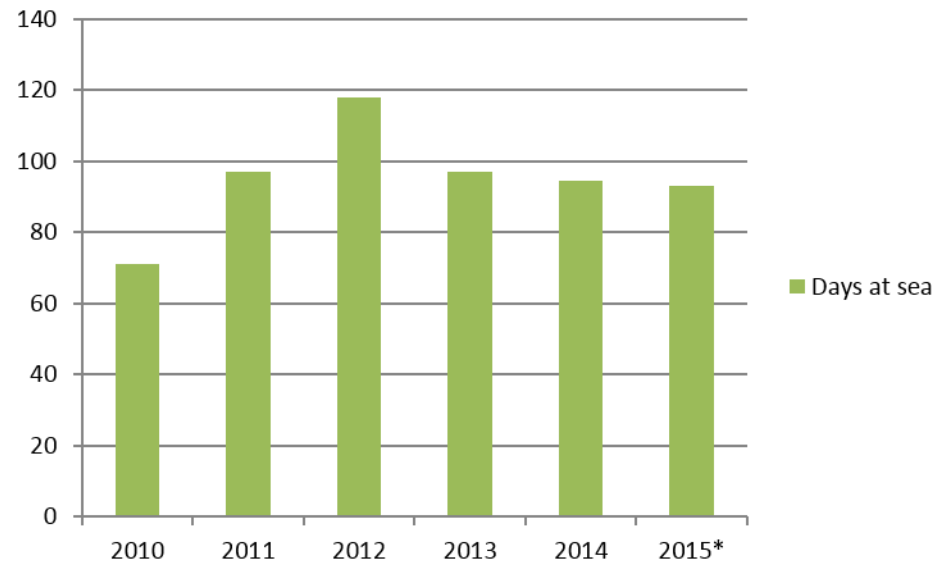
# Research vessel SALME 2010-2015

## Funding sources and days at sea

### SALME funding sources



### SALME days at sea



# Baltic Sea research fleets

Estonia – Salme, 1 coastal vessel in the Gulf of Riga

Finland – Aranda and 2 coastal vessels (Muikku, Geomari)

Sweden – 4 regional/oceanic vessels and 6 coastal vessels;  
regional vessel not available for Baltic Sea monitoring

Latvia – no research vessels

Lithuania – coastal vessel at EPA, new vessel at Klaipeda  
University

Poland – Oceania and 5 other vessels

Denmark – Dana, Aurora, etc. and coastal vessels

Germany – very long list of research vessels

Russia – long list of research vessels, not clear whether still  
available

# Plans in Estonia and time schedule

- 2010 – New regional Baltic Sea research vessel was included into Research Infrastructures Roadmap
- 2011-2014 – Planning phase to define research vessel users and management (Estonian research vessel or **shared regional vessel**, etc.), principles of access and funding etc.
- 2014-2018 – Design phase to define functionality of the research vessel, design, heavy equipment, possible funding schemes for construction and operations, etc.
- 2019-2020 – construction – not clear, will be decided in 2017-2018;
- Estonian funding agencies expect that the vessel will be a joint infrastructure; international co-operation and coordination should be in place
- Tallinn University of Technology has planned co-funding for vessel construction in its development plan

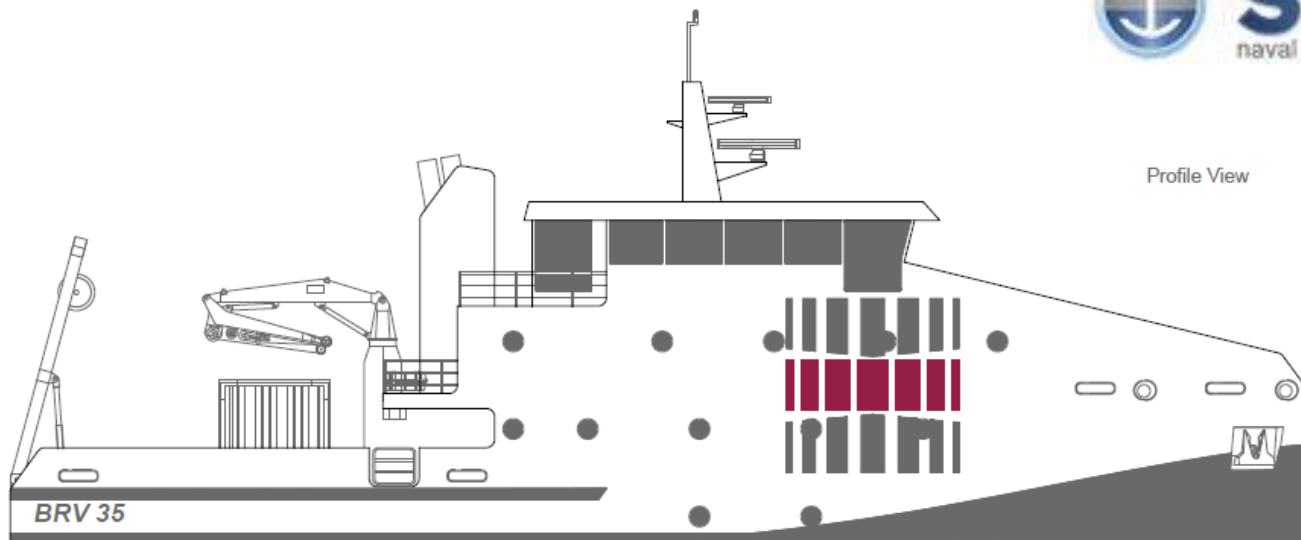
# Basic design BRV 35

The intended operation area for this 35 m monohull vessel is the Baltic Sea, including the shallow coastal areas. The vessel is adapted to the use by oceanographic institutes, agencies, Universities, and the design is defined by:

- flexibility for various missions,
- good integration of latest technologies,
- very good sea keeping and good manoeuvrability,
- robust and low-maintenance construction,
- low consumption,
- very good comfort at sea.



Profile View



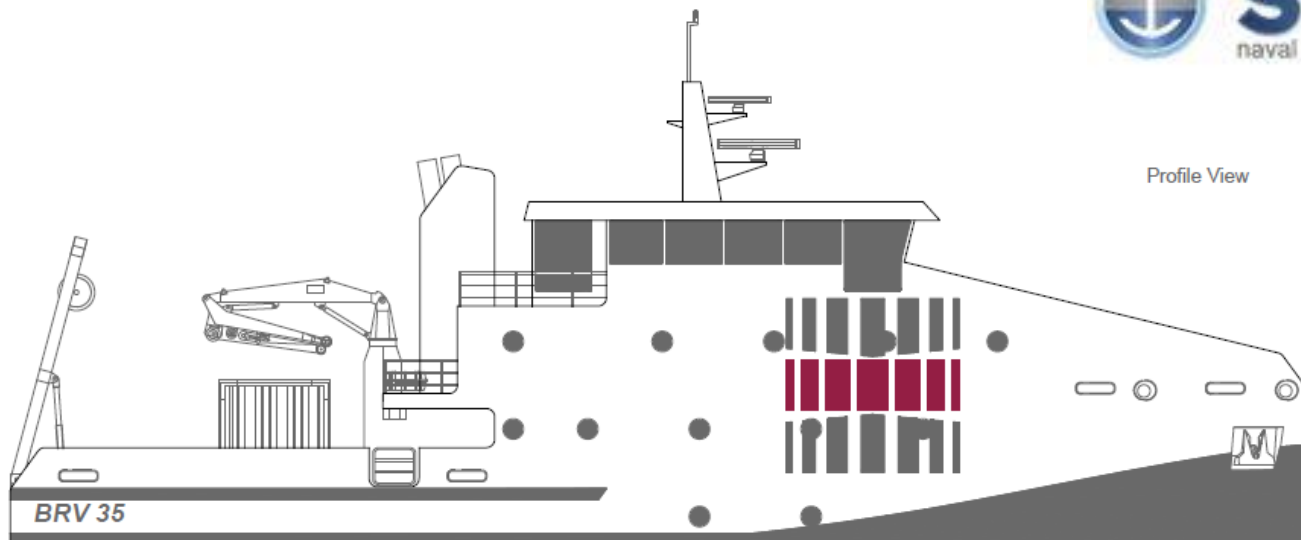
# Basic design BRV 35

The vessel has to be able to conduct multi-disciplinary research. A scenario of usage of the vessel could be specified as follows:

- Offshore and coastal hydrography and oceanographic missions (including environmental monitoring) – 40% of time,
- Biological surveys (including bird watching) – 5%,
- Geological surveys – 10%,
- Operating submarine systems – 5%,
- Service of buoys and other systems in off-shore areas – 5%,
- Transit – 10%,
- Harbours – 25%.



Profile View



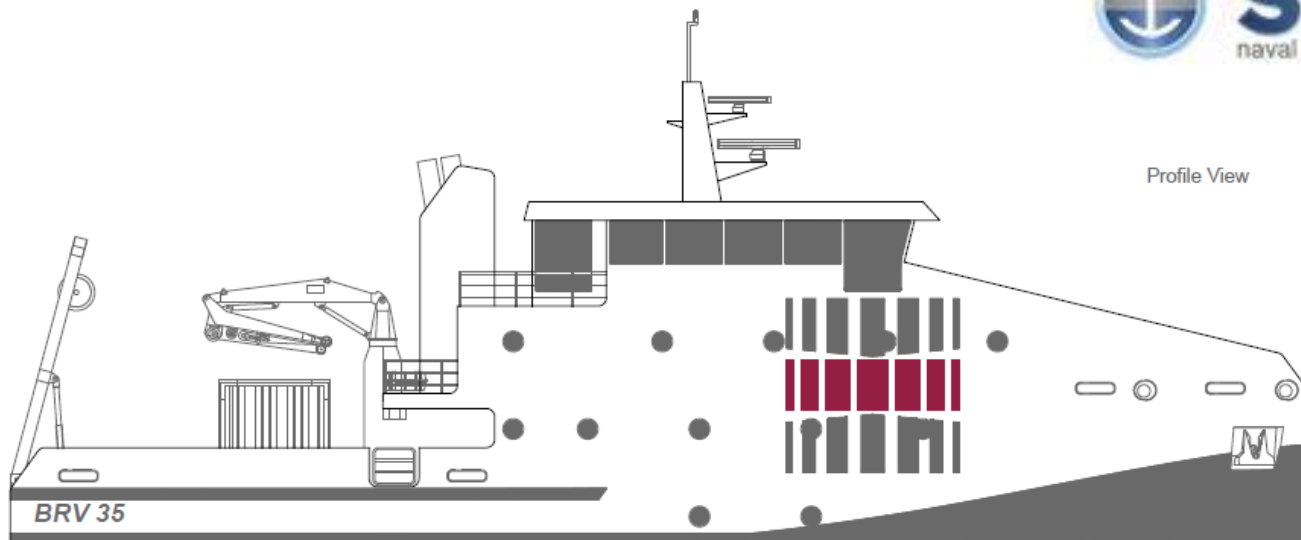
# Basic design BRV 35

The vessel is designed for autonomy of 12 days at sea (1200 nautical miles at speed 10 knots). The main particulars are:

- Length overall - 35.0 m
- Length between perpendiculars - 32.2 m
- Beam overall - 8.2 m
- Design draught - 2.50 m
- Depth at main deck - 4.00 m
- Design speed - 12 knots



Profile View



Mari  
Tallin

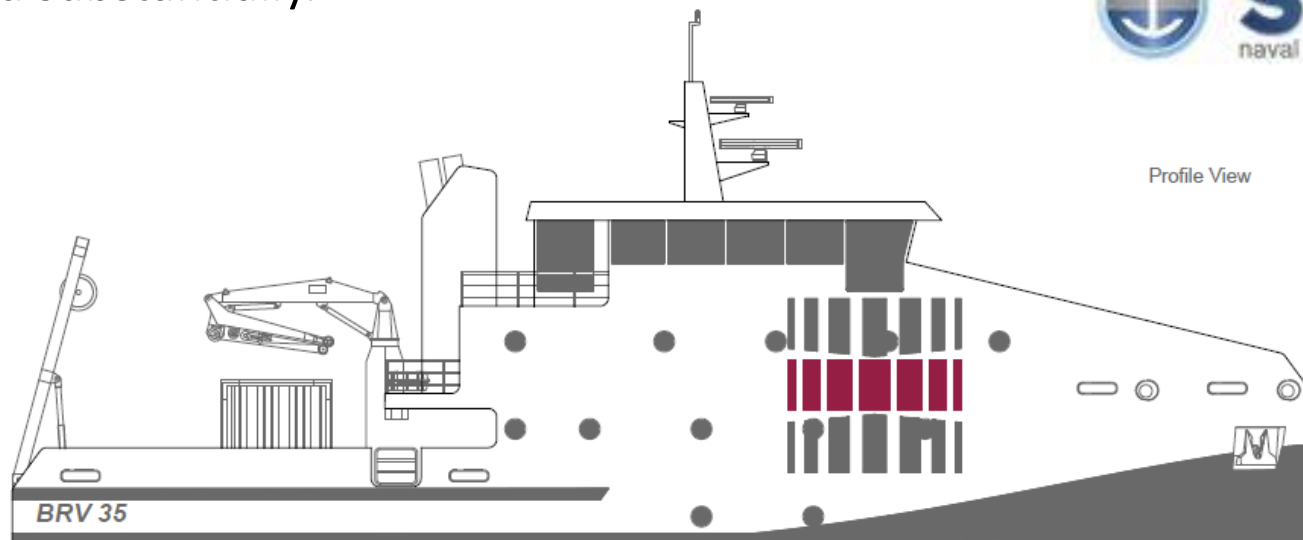
2016 meeting  
October 2016, Capri

# Basic design BRV 35

Preliminary estimates of tank volumes (approximately):

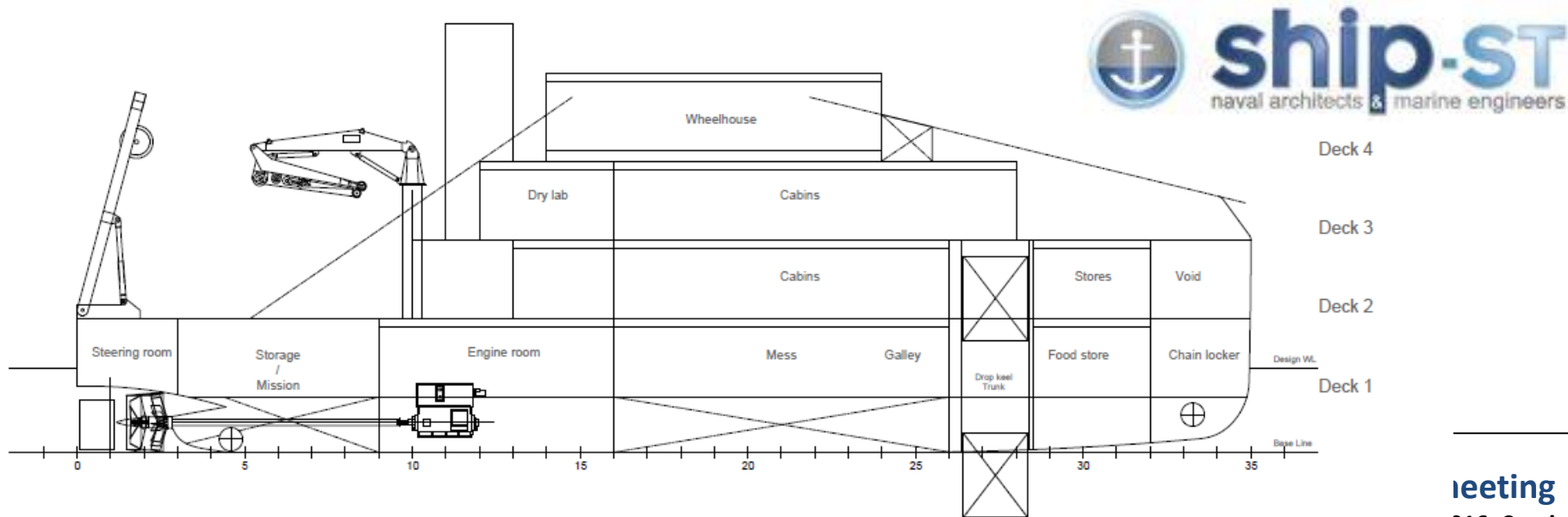
- Gas Oil tanks – 32 m<sup>3</sup>,
- Lube Oil tanks – 2.4 m<sup>3</sup>,
- Hydraulic Oil tanks – according to the need (defined at a later stage),
- Fresh water tanks – 24 m<sup>3</sup>,
- Black & Grey water tanks – 12 m<sup>3</sup>,
- Seawater ballasts – according to the need (defined at a later stage),
- Passive stabilisation tank – according to the need (defined at a later stage)

If liquid natural gas (LNG) as fuel will be used the above estimates will be changed substantially.



# Basic design BRV 35

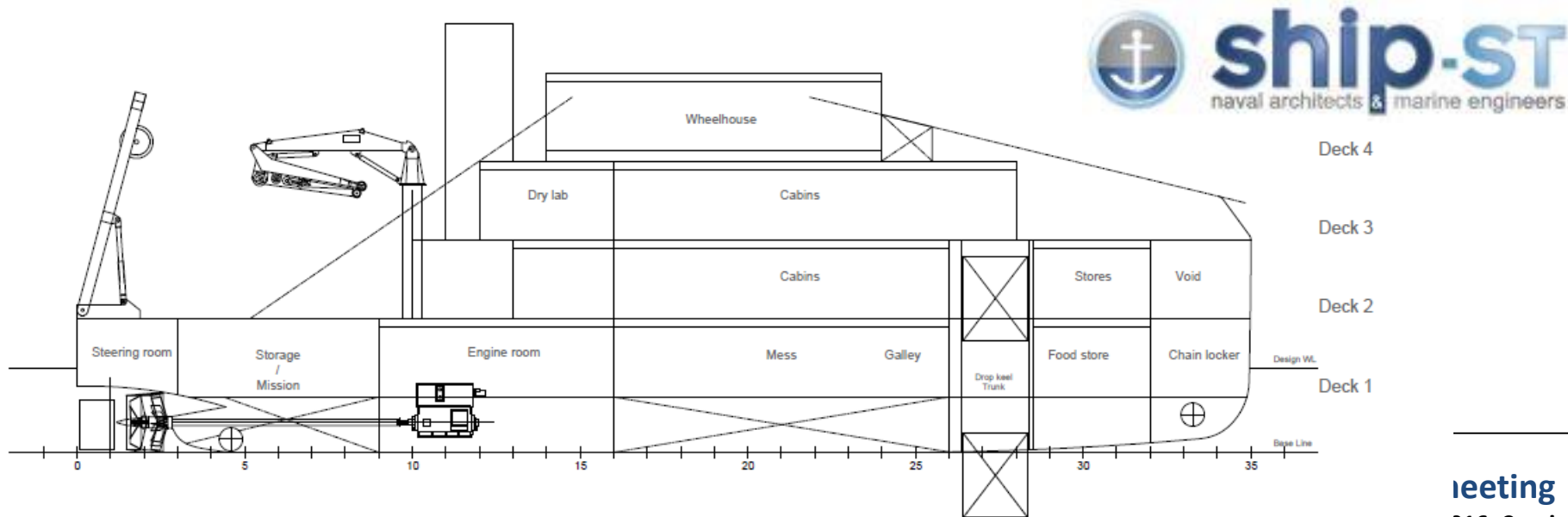
- A frame in aft (10t in central beam, 10t in lateral part), rotation: +/- 25°; used for AUV, ROV, coring
- Main crane on portside (capacity: 10t.m), maximum range 6m, rotation 180°; used for port operations, container, various scientific devices, boat lifting
- Telescopic crane on starboard side (capacity: 5t), range 2m; used for hydrology, CTD profiler, coring
- Auxiliary crane on fore part (capacity: 0,5 t @ 8m), rotation: 360°; used for provisions and garbage



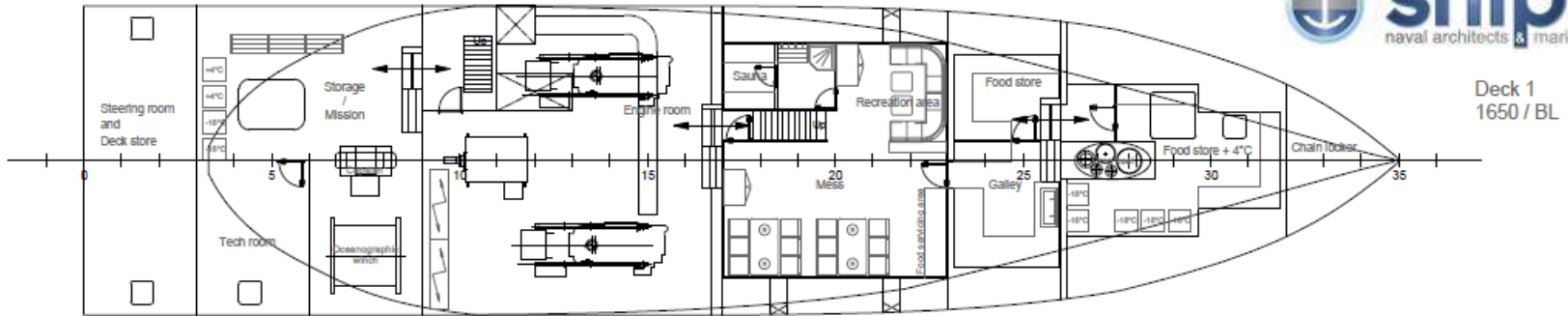


# Basic design BRV 35

- Oceanographic winch with capstan (capacity: 15t); length of cable 1500m, positioning control system
- CTD profiler and hydrology winch (capacity: 5t); length of cable 1000m, positioning control system
- All the lifting devices shall be controlled from a local panel and the “cranes and winches control desk” in the wheelhouse
- A drop keel or moon pool shall be integrated (ADCP, multi beam, intake for flow through system)



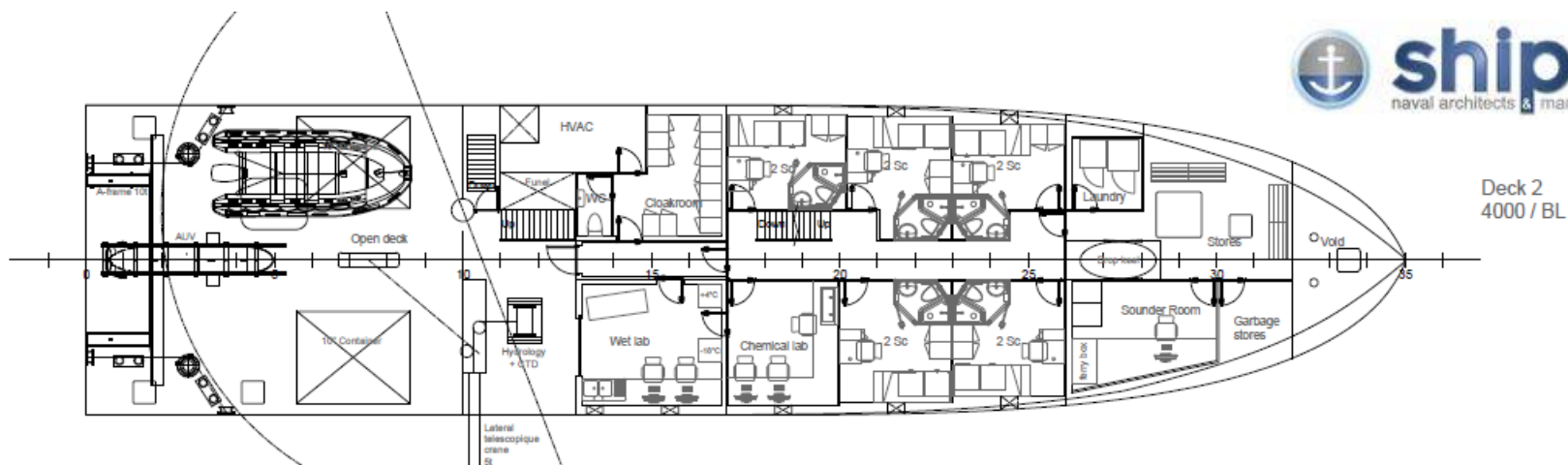
# Basic design BRV 35



**Deck 1:** steering room & deck store; tech room, oceanographic winch, storage/mission, engine room, mess & recreation area, sauna, galley, Food storage, drop keel tunnel/moon pool

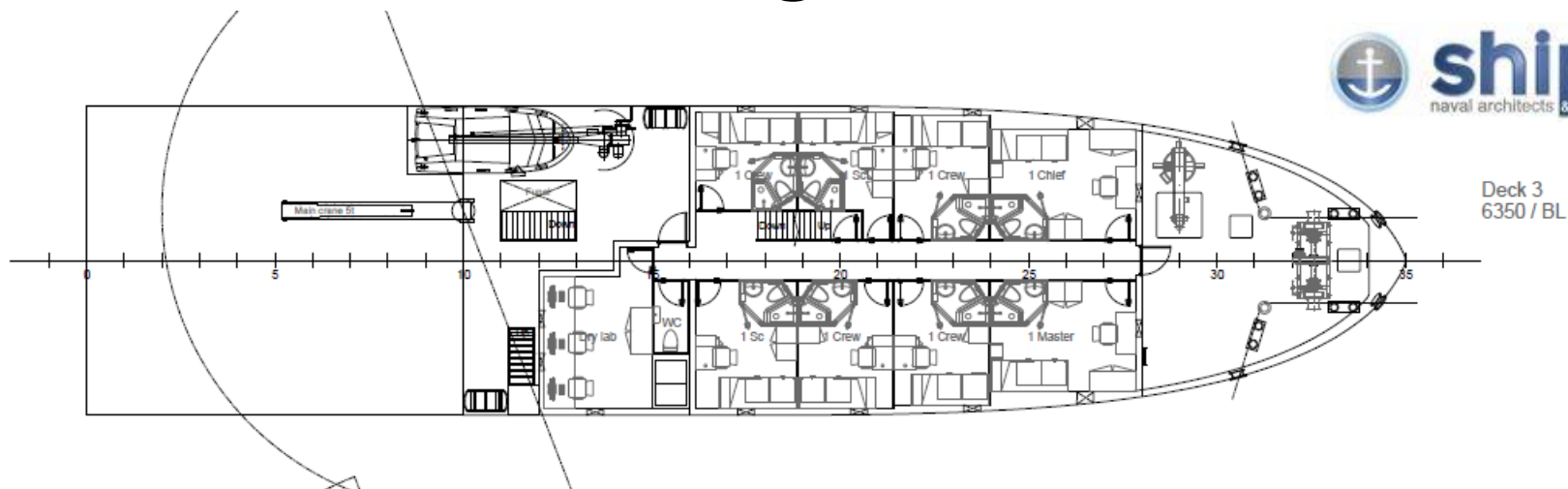
**Bottom – Deck 0:** stern thrusters, tanks & void spaces, drop keel tunnel/moon pool

# Basic design BRV 35



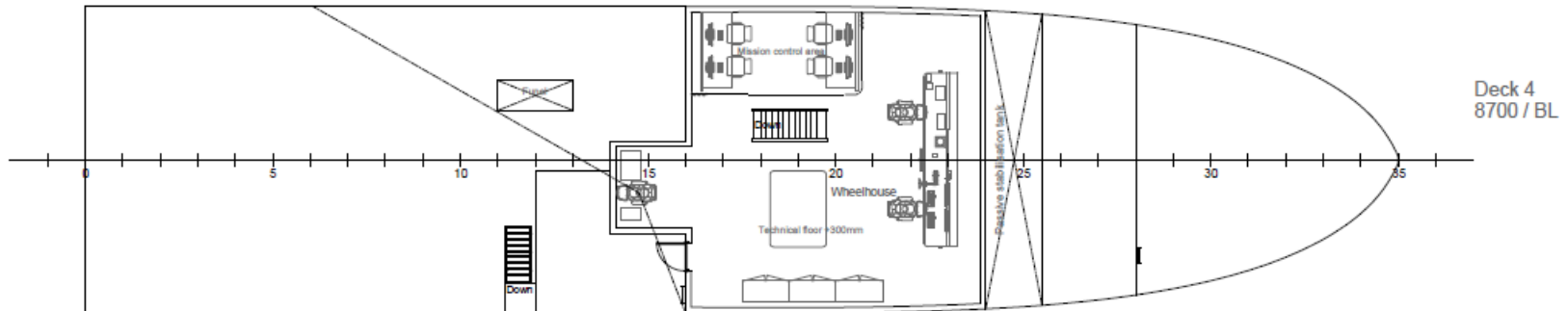
**Deck 2:** open work deck (it is possible to add 2 10"containers, AUV seating, ROV seating, belaying pins), CTD profiler working area, funnel, HVAC area, WC, cloakroom, wet laboratory (equipped with: large sink with cold and hot fresh water supply, 2 desks with computer connection and seat, 1 refrigerator, 1 deep freezer), chemical laboratory (equipped with: 2 working stations or more; each working station have computer installation, storage and working facilities; 2 chemical stations with sink, exhaust hood; 1 safety cabinet for chemical products), scientists cabins (5x2 persons), sounder room, laundry, stores, void

# Basic design BRV 35



**Deck 3:** dry laboratory (3 working stations, each working station has computer installation, storage and working facilities; frame to install separate deck units to connect with computers, storage for supplies), crew cabins (4 single cabins, 2 single cabins with office space), scientists cabins (2 single cabins), rescue boat, fore mooring deck, funnel, WC

# Basic design BRV 35



**Deck 4:** wheelhouse (navigation control desk, engine control desk, cranes and winches control desk, chart table with drawers), mission control area (4 working stations for mission control, each working station has computer installation, storage, working facilities and LAN connection), funnel, passive stabilisation tank

# Thank you for your attention!

