

# **Eurofleets 2 WP 11 – Task 11.4**

**Innovative technologies for optimisation of existing ships  
(M18 – M48)**

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Capri, Italy – 10 October 2016



# Before you start upgrading the vessel, check.....

- Stability
- Buoyancy
- Electrical power production and distribution capability
- Available spaces and volumes for new equipment
- Probability of reclassification



# Reduced fuel consumption

- "Greening" (ref Eurofleets WP 3)
- Diesel-electric, Hybrid diesel-electric, Hybrid shaft generator or Hybrid propulsion system
- Permanent Magnet motors
- Power management system
- Hull sand/water blasting and coating
- New propeller(s)
- Installing or reshaping bulb
- Lengthening the hull to reduce drag
- Remove appendices on the underwater hull
- Install shore power system
- LED lightning



# Optimize crew and staff on board

- Crew size
- Automation of machinery
- Remote (radio and/or wire) control of cranes and winches
- Navigation and bridge equipment
- Scientific equipment



# Increase scientific equipment performances

- Reduce underwater radiated noise (URN)
- Reduce bubble sweep down
- Drop keel(s)
- Gondola
- Dynamic Positioning (DP)
- E-access
- Additional scientific winches with various cable types
- Heave compensated winches



# Vessel infrastructure for scientific equipment

- Container couplings
- Lashing points
- Storage
- Open deck space
- Lab-containers & other scientific containers
- Computer networks
- Power supply



# Two IMR upgrade projects in 2016/17 which will be described in the report



Johan Hjort

Built in 1990, LOA: 64,4m

Kristine Bonnevie  
(Ex-Dr. Fridtjof Nansen)  
Built in 1993, LOA: 56,8m



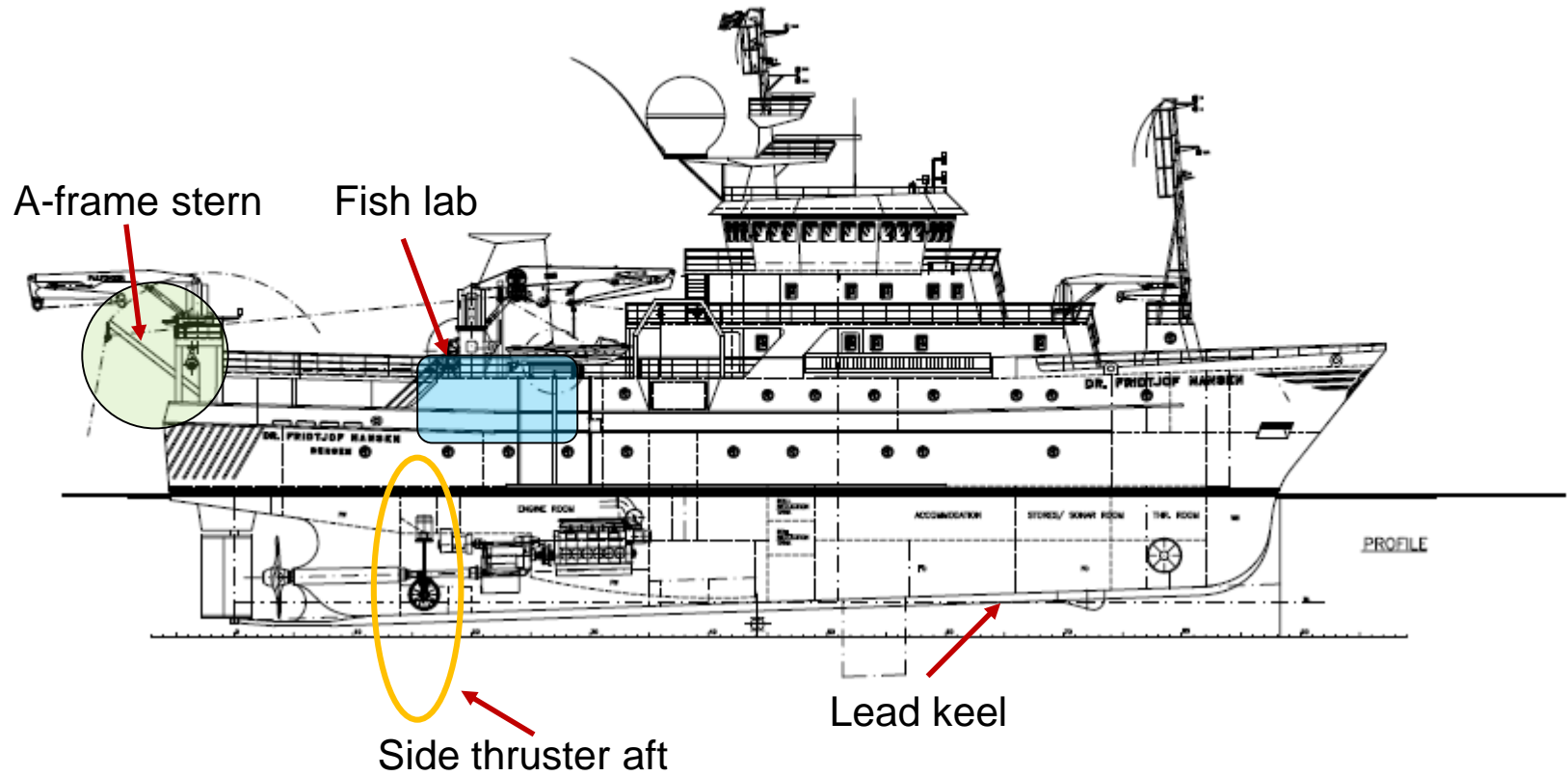
# Upgrade of RV "Kristine Bonnevie"

- Conversion from "tropical" to "artic" research vessel
- Improve stability and buoyancy by:
  - Removing obsolete equipment and spares stored on board
  - Installing a "lead keel" around the original keel
  - Reduce fuel and fresh water tank capacity.Necessary for operations in waters where icing can/will be an safety issue
- Installing a side thruster aft and a DP0 system.
- In order to supply the side thruster replacing one auxilliary engine with a larger model. Rearranging parts of the engine room to make room for a larger motor.
- The trawl gallow"opened" and an A-frame installed over the trawl slipway
- Installing new scientific towing winches.
- The "open" fish lab "built in" to be suitable for the Barents Sea.
- In addition a number of other minor upgrades to the vessel.
- To avoid reclassification is an important "constraint" for the project!





# Major upgrades of "Kristine Bonnevie"



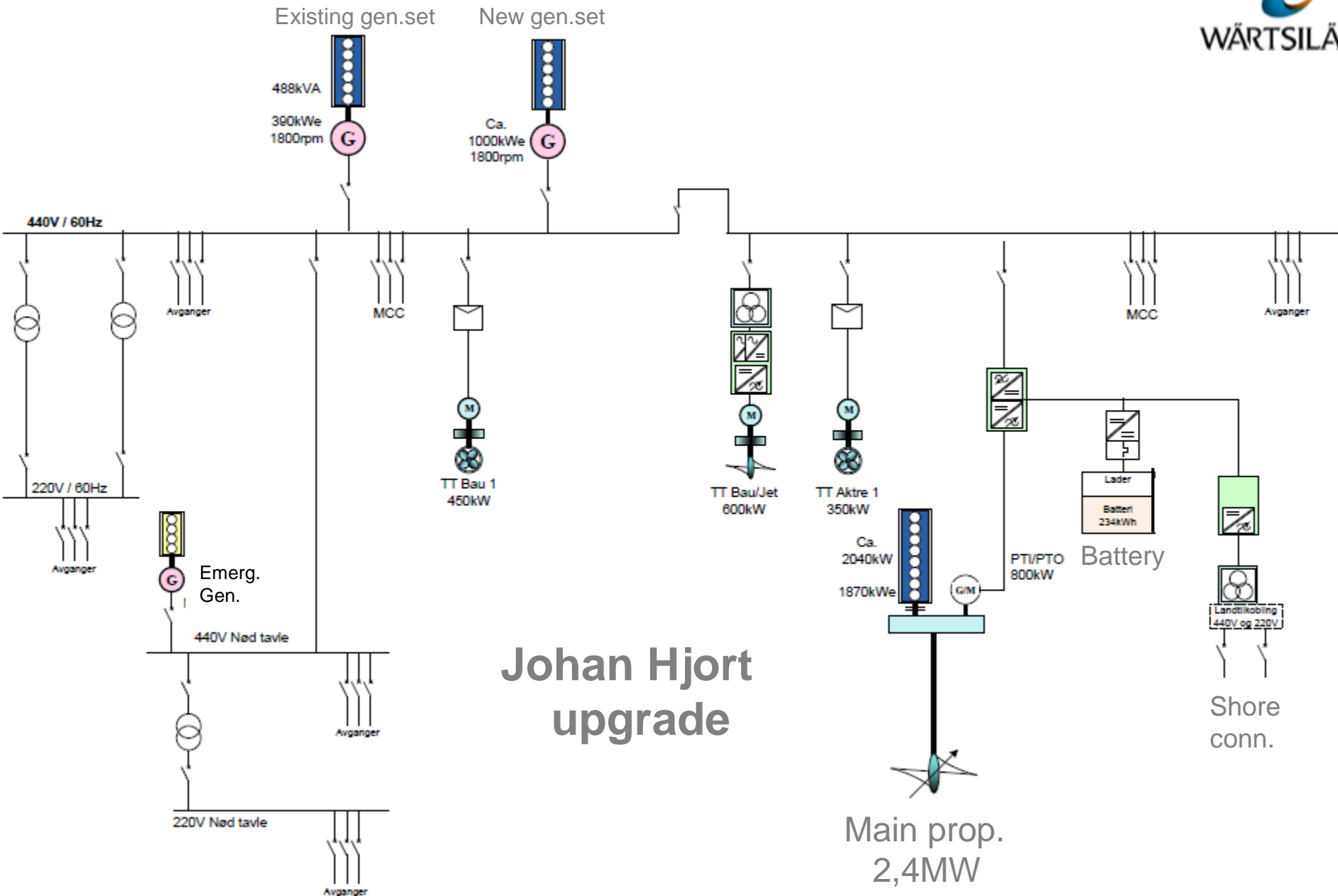
Ready for service early November 2016



# Replacing propulsion system on "Johan Hjort"

- Propulsion system (main engine, gear, shaft generator, propeller blades, auxilliary engine) to be replaced on "Johan Hjort" at the end of 2016 as part of a "midlife refit" in order to improve reliability and operational availability
- The plan is to install a hybrid system with a new main engine, two auxilliary engines (one new and one existing), a shaft generator with PTI and PTO, and a battery bank to take the peak loads and make it possible to run only on shore power and batteries when in port
- Will also install catalysator for new auxilliary engine to reduce emissions when running in "low load mode"





# Johan Hjort upgrade

Main prop.  
2,4MW

# QUESTIONS?

