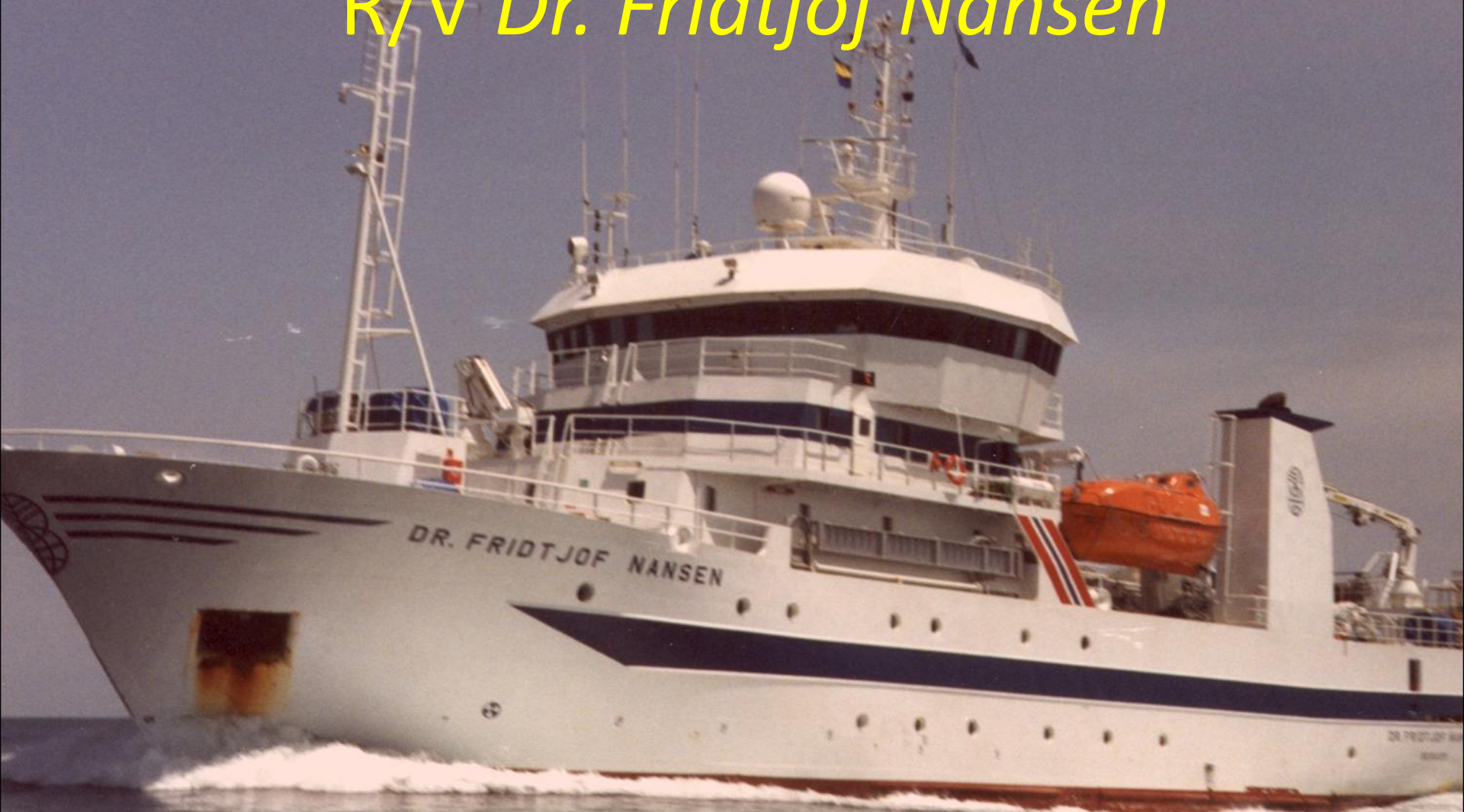


R/V Dr. Fridtjof Nansen



*Modification to prepare her for
cruises in the Arctic*

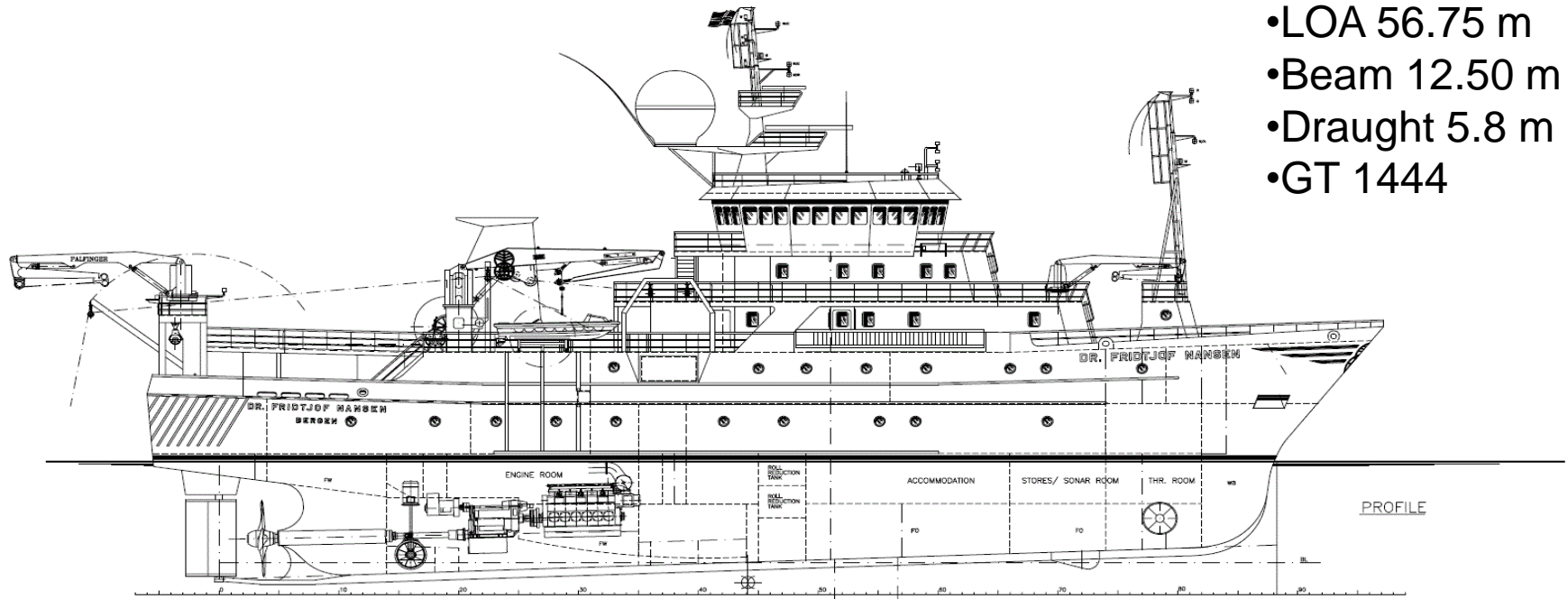


Name change

- After the modifications the vessel will be named " Kristine Bonnevie".
- Kristine Bonnevie will replace Håkon Mosby, and Håkon Mosby will be sold.



Scope of work "Kristine Bonnevie" (1)



- LOA 56.75 m
- Beam 12.50 m
- Draught 5.8 m
- GT 1444

- New tunnel thruster aft.
- A DP light system to be installed.
- New A-frame aft.
- One new winch for a towing wire and one new winch for coax wire
- New crane aft
- New fish-lab on shelter deck.
- General maintenance



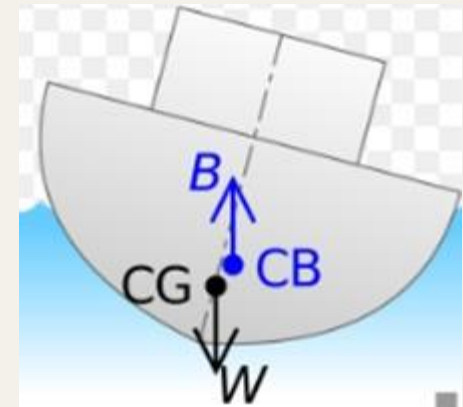
Preparations for the Arctic

- Check and repair insulation.
- Change out hydraulic oil for arctic environment.
- Protect tank ventilations.
- Prepare tarpaulins to cover winches etc. from ice (reduce risk for building ice).
- Evaluate installation of heating on some part of the superstructure.
- Carry out new inclining experiment and update the stability calculations to cover for operations in the Arctic and meet the Polar Code.



Challenges

- Deadweight
 - Inclining experiment in 2011 show that the vessel is heavier than expected.
- Stability
 - Inclining experiment in 2011 show limited stability.
 - For operations in the Arctic, icing on deck add stability requirements
 - Fixed ballast will add deadweight.





Loss of fuel capacity moving from summer to Winter North Atlantic



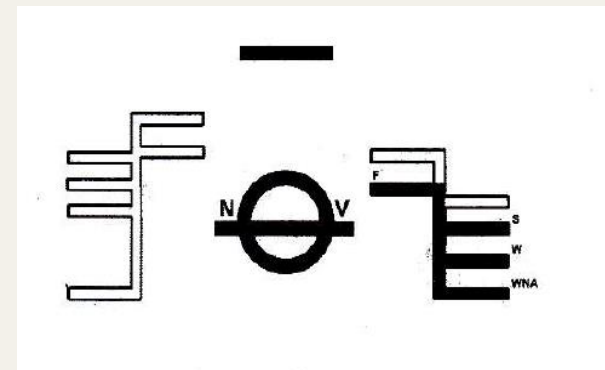
Freeboard from deck line:

Tropical	-	mm (T)
Summer	2455	mm (S)
Winter	2566	mm (W)
Winter North Atlantic	2616	mm (WNA)
Timber tropical	-	mm (LT)

From S to WNA is 17cm

TPcm = 5,35

Gives a fuel reduction of $5,35 \times 17 = 91$ tons compared to the operations on West Africa





Plan

- Reduce the deadweight as much as possible.
 - Remove everything that is not needed onboard.
 - All spareparts that is not critical for daily operation will be taken ashore and stored in Bergen.
 - Grit blast to remove some layers of old paint.
- Blank off some of the fuel tanks to reduce fuel requirements in the "arrival condition".
- Add approx. 80 tons of fixed ballast.



Summary

- We will lose approx. 30% endurance from what we had in West Africa to operation winter time in the North Atlantic.
- When a vessel has limitations on dead weight and/or stability, make sure you get full control of the situation before you change operation area to the North Atlantic or do any modifications.
- Make sure you know all the weights that will be brought onboard at the yard.
- Carry out a deadweight survey and an inclining experiment if in doubt.

Thanks for your attention

