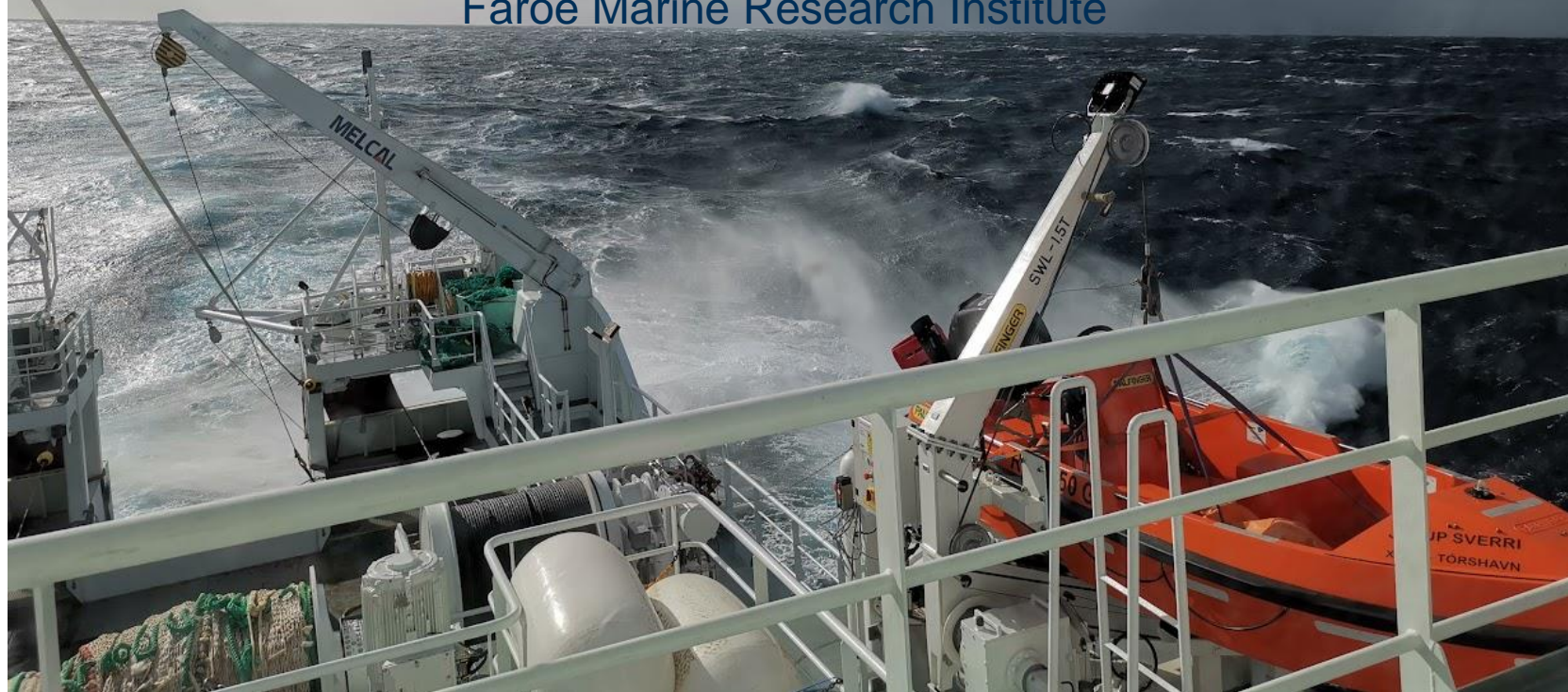


# RV Jákup Sverri

First year operations

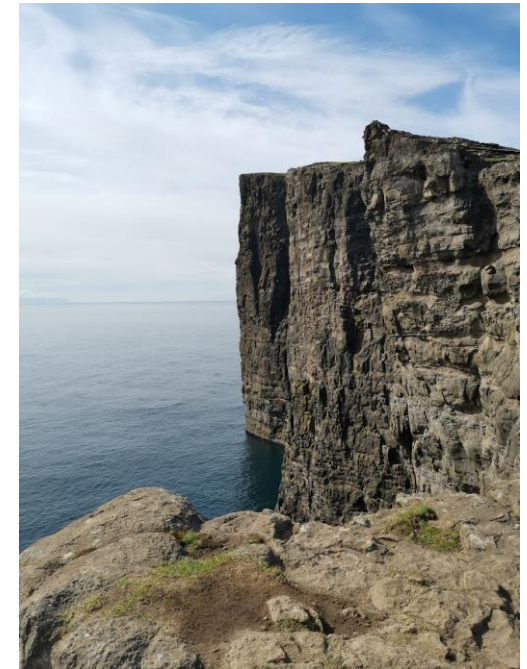
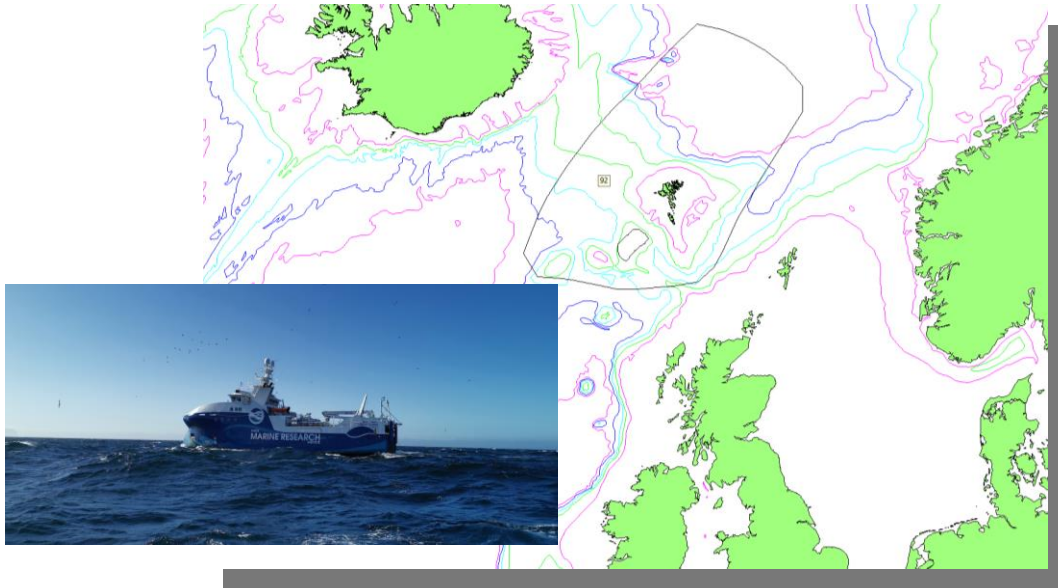
Leon Smith, Head of Tech. dept.  
Faroe Marine Research Institute



# Contents

- Faroe Marine Research Institute
- Research vessel
- Project goals
- Project timeline
- First year, how did it work?
  - Silent-R
  - Towing power
  - Dynamic positioning
  - Fisheries acoustics, Dropkeel, multibeam
  - Hangar, ramp, cranes
  - IT, Bridge KVM
- Conclusion

# Faroe Islands (EEZ)



Self governing province of the Kingdom of Denmark. Not an EU member. And by that own trade/fisheries policies.

54000 souls (rising)  
TW: 1399 sq. km.  
EEZ: 260995 sq. km

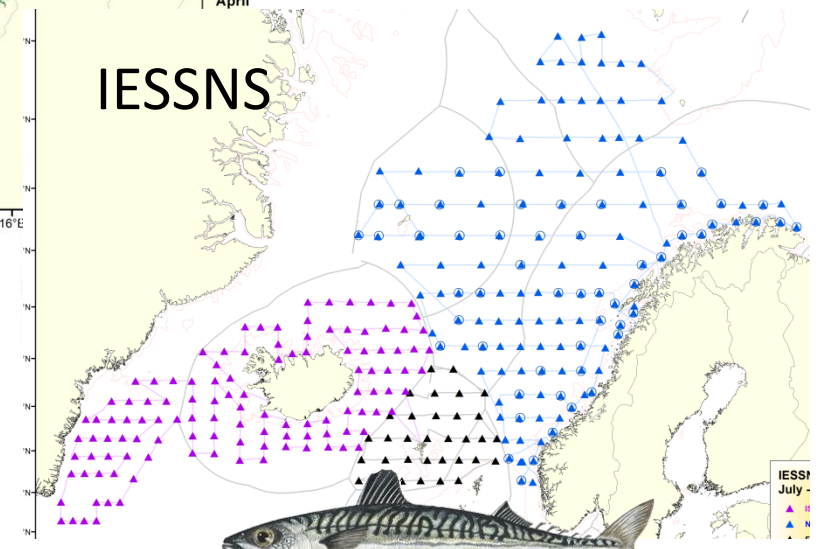
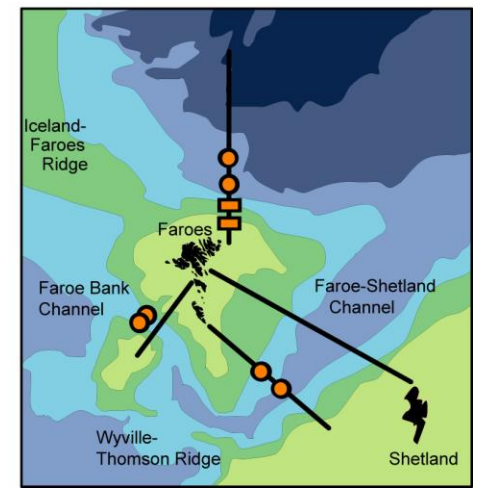
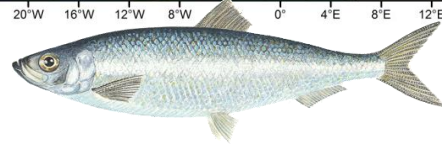
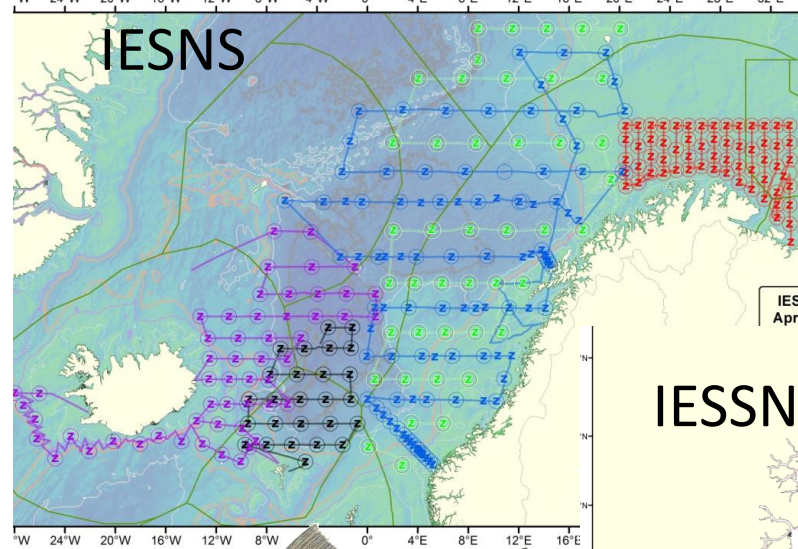
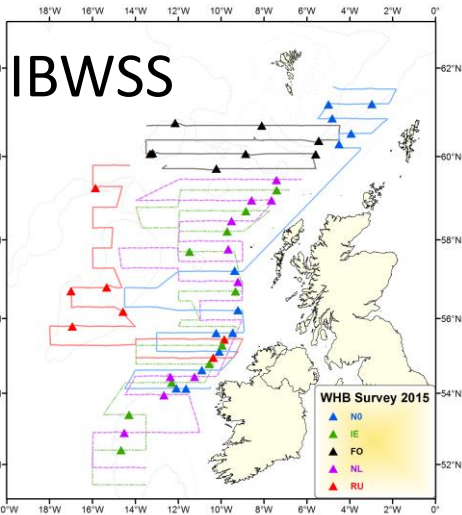


# Faroe Marine Research Institute



- 36 staff (2½ tech.)
- Oceanography
- Geochemistry, plankton, nekton
- Ecosystems
- Seabirds
- Fish biology, stock assessment
- Ecosystem research
- Gear technology
- Advice

# Areas of operations



# Trawler v. Research vessel

## MTr Magnus Heinason (1978)

- Length 45.5 m
- Beam 9.7 m
- Crew/Sc. workers 13 +5
- Capabilities
  - Trawler
  - Propulsion: Conventional
  - 20T trawl winches
  - Steady reconstruction (Fish handling, cranes, acoustics etc.) towards research ops. since 1982.

## RV Jákup Sverri (2020)

- Length 54.4 m
- Beam 13.6m
- Crew/Sc. workers 13 +12
- Capabilities
  - Research Vessel
  - Silent-R propulsion
  - Dynamic Positioning
  - Full acoustic package inc. Dropkeel
  - 30T trawlwinches
  - Tailormade for FO research requirements, and a trawler as well.

# Eurofleets datasheet RV Jákup Sverri(2020)

## Laboratory Facilities (fixed and temporary):

2 dry labs and 2 wet labs.

System for sorting, weighing and length measurement and automatic registration of fish catches. Freezing capacity.

### CTD/Plankton sampling:

Seabird CTD equipped with rosette sampler, 1.7 and 5 L Niskin bottles, fluorometer and PAR sensor. 3000m cable.

Plankton: Multinet, Bongo-net, MIK net and Gulf-net, WP2, Optical plankton recorder, Chelsea FastOcean APD system

### Multi-Beam(s)/ Sub Bottom profiling:

Simrad EM712 multibeam, TOPAS PS18

### Fisheries Echo Sounders/Sonar:

EK-80 multifreq. Drop keel mounted 18,38,70,120,200,333 kHz and ME70 multibeam, Simrad Sonars SU90 & SC90, ADCP 75 kHz.

### USBL:

Yes, Kongsberg HiPAP

### Coring/Sampling Capabilities:

Temporary Coring winch 4500m. Various grabs

### Winches:

2x 30t Trawl winches (3000m x 28mm wire , CTD winch 3000m x 8.1.8mm coax wire, WP2 winch 200m x 8mm, winch 3000 x 8.18mm coax wire (Drop Camera, Gulf Multinet), Coring Winch 4500m

### Communications:

Inmarsat C, GSM, Internet satellite connection

### Special features:

#### Suitable for:

Suitable for carrying out a variety of scientific operations in offshore and shelf locations. Pelagic and demersal trawling, Fisheries acoustics, hydrographic and plankton surveys, mooring deployment and benthic surveys. Options for seismic surveys with room for 3 x 20' containers and power supply appr. 400KVA on trawl deck.

### Scientific Limitations:

#### Vessel capability to support ROV deployment:

HiPAP guided DP track system, 6T lifting capability for launch over stern

## From old to new...

- Magnus Heinason was a technological loop in 1982
- Workflows are adopted into JS.





# Project goals

To build a oceangoing research vessel with the same capabilities as the newest research vessels around us, even as they are 50% larger (LS 2009)

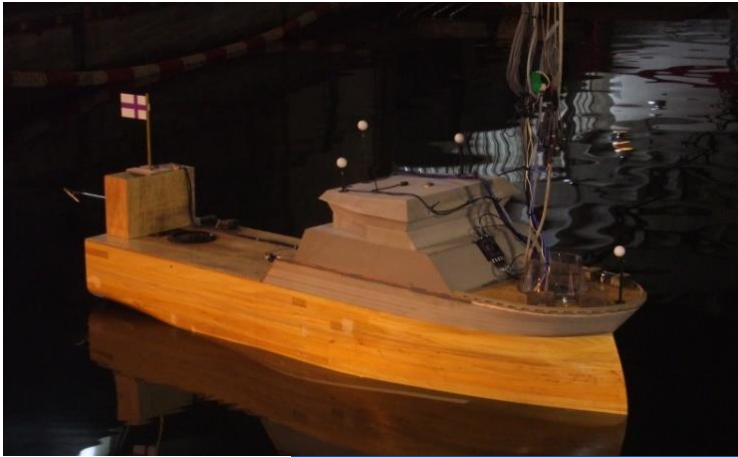
## Area of focus:

- Running costs (crew, fuel)
- ICES 209/Silent-R
- Acoustics/Dropkeel
- Working conditions (MH experience)
- Dynamic Positioning
- Seismics
- Towing pull
- Modern workplace

# Project time line

- 2007 Institute working group
- 2008 Public announcement by Fisheries Minister T. Jacobsen
- 2009 Pilot project (MEST yard, AMS, and FAMRI).
- 2011 Finance bill.
- 2012 Tender material
- 2016 Tender material ver. 2, bidding round
- 2017 Revised finance bill according to winning bid.
- 2017 Contract MEST Yard, Fisheries Minister Høgni Hoydal
- 2020 Handover 1'st of Dec. First cruise 7'th of Dec.
- 2021 Full program from 3'rd week of January. First very busy year of operation.

2009: Pilotproject, model runs



2012: design

# 2017 Design

## Specifications 2017

- L: 54.4m B: 13.6m
- Silent-R
- Dropkeel
- Dynamic Positioning
- 13 crew in single cabin/12 science workers in double cabins
- Modern facilities, meeting room, workout room 4 labs.+ fish treatment, icefish hold
- Speed 11-14 knots

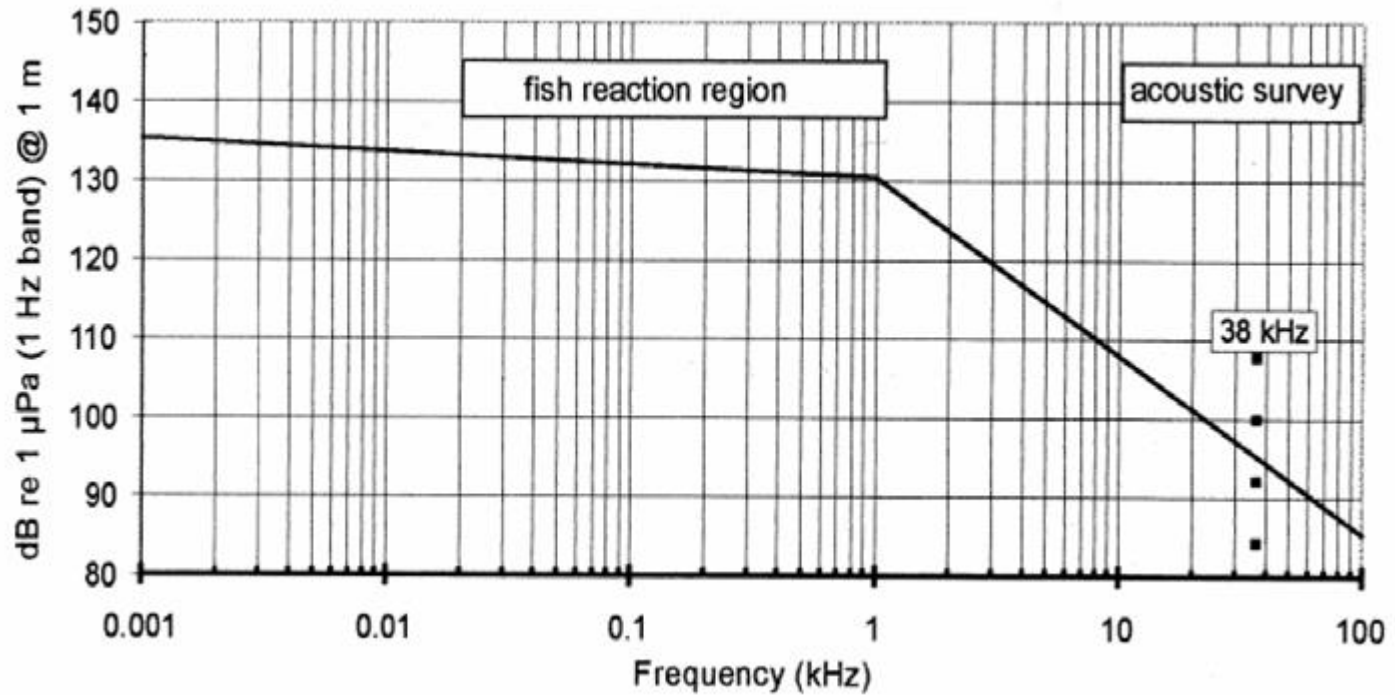


## Design changes since pilot project 2008:

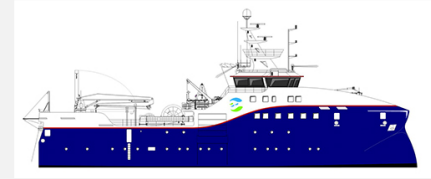
Length and beam, propulsion, accommodation, emission control(Tier III NOx), From ICES209 to Silent R and design/appearance. WW operations, polar cat C.



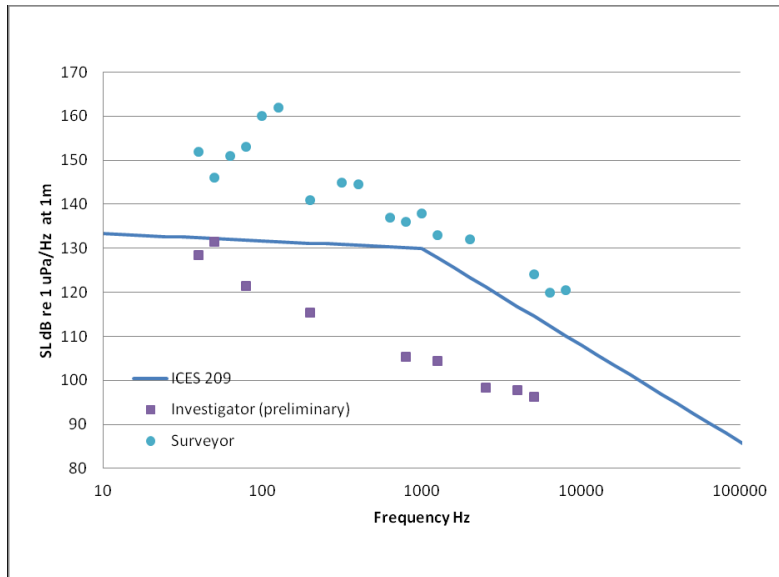
# ICES209



# Silent R



From conventional fishing trawler to ultra silent research vessel



## Sources of noise

- Propeller/propellerduct
- Transmission
- Machinery

## Solution:

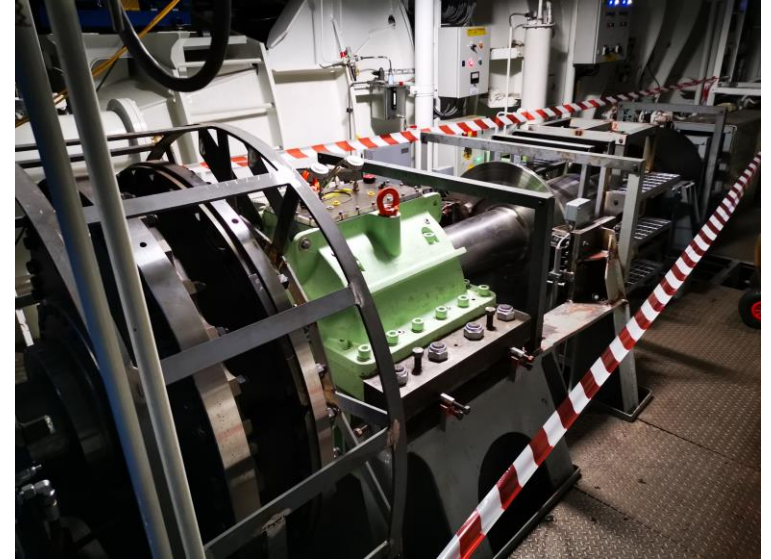
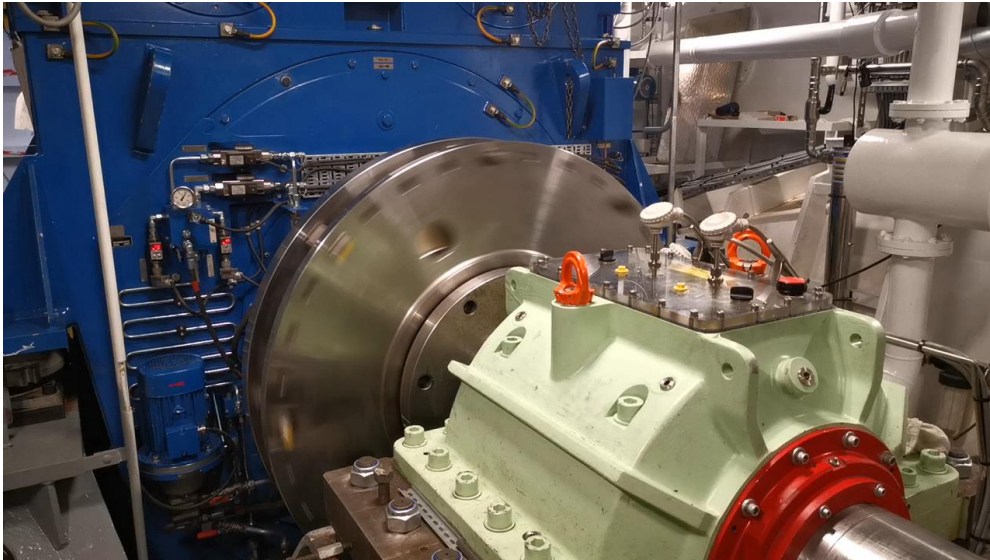
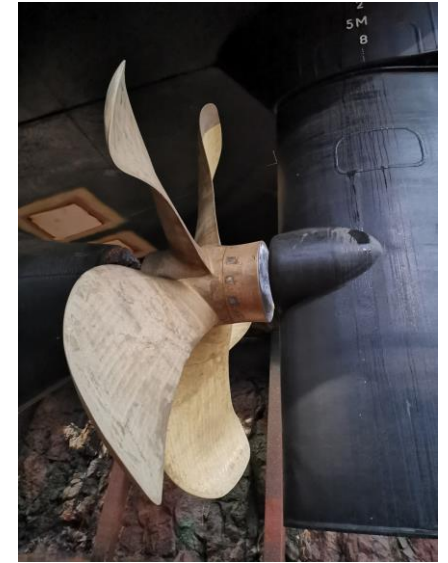
- Big propeller wo duct
- direct drive propulsion
- Double resiliently mounted machinery

20 dB less noise (around 100 times more quiet in linear domain). RV Investigator, CSIRO

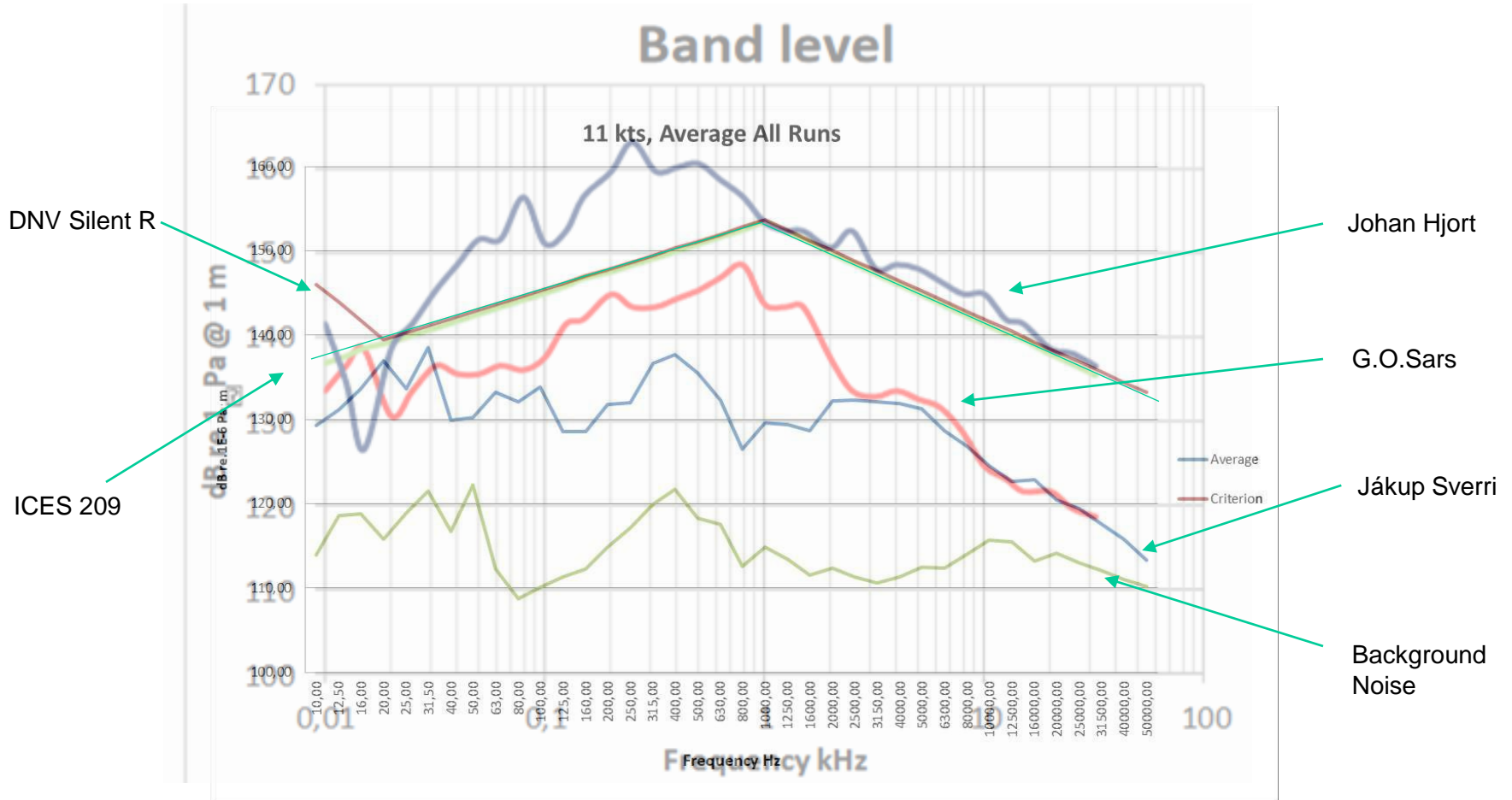
Australia

Reference: Characterising the acoustic footprint of Australia's new research vessel RV Investigator, Rudy KLOSER, Tara MARTIN, Matt SHERLOCK

# Running Silent R



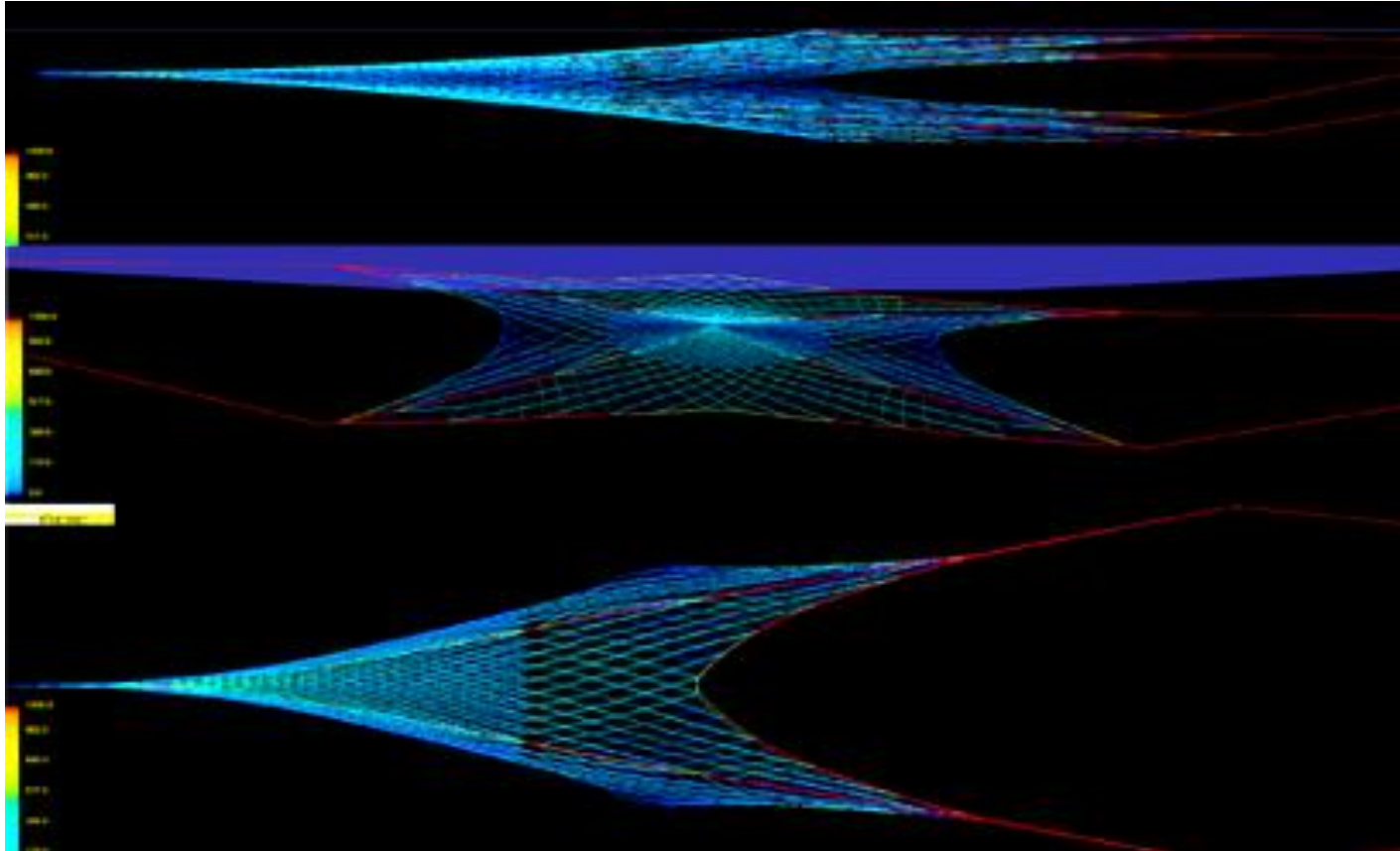
# Silent R, ICES209, RV Jákup Sverri results



Background data: Eurofleets2 Guidelines and recommendations for ship design on noise and vibration reduction, Grant Agreement n° 312762



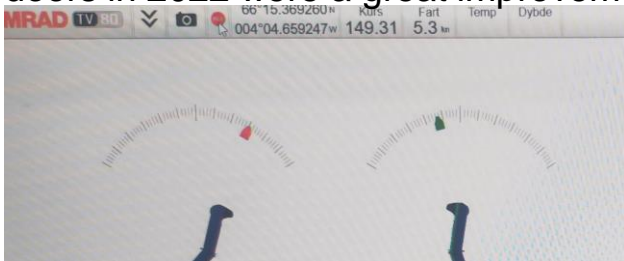
# Trawling performance



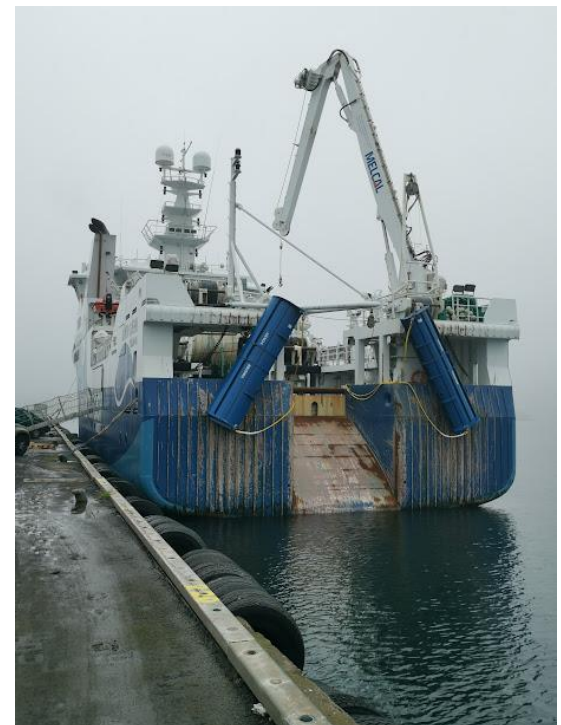
MULTPELT 832 pelagic Trawl Resistance 22 T at 5 knots.  
Propeller simulation: 28 T at 5 kn.

## Surface trawling 2021 and 2022.

Proved in practice, target speed reached, but close to limit of vessel performance. New trawl doors in 2022 were a great improvement.

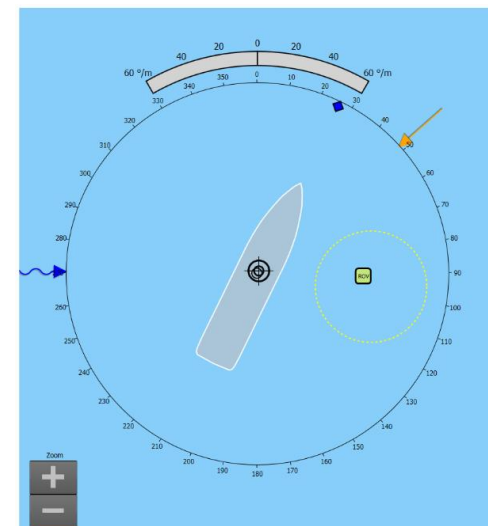
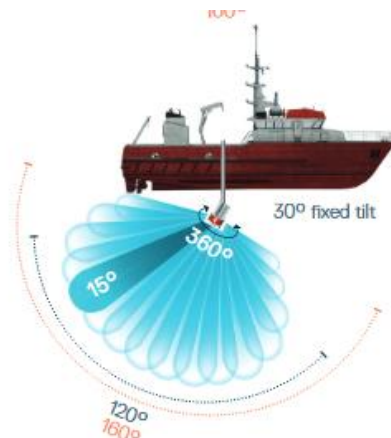


### New trawldoors 2022



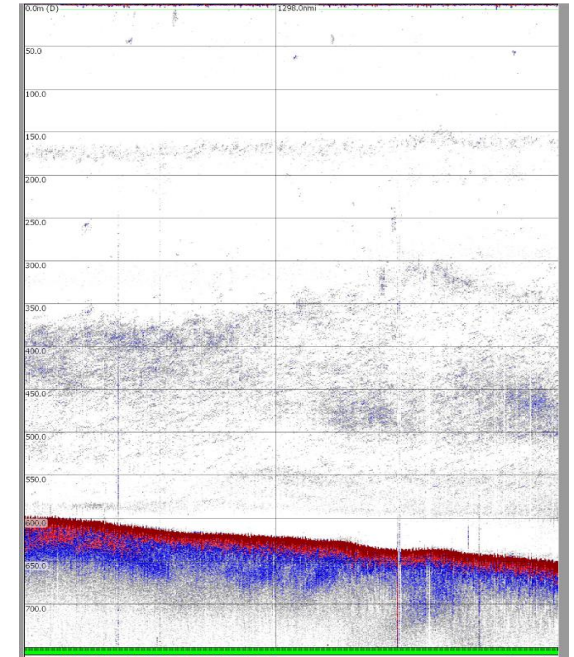
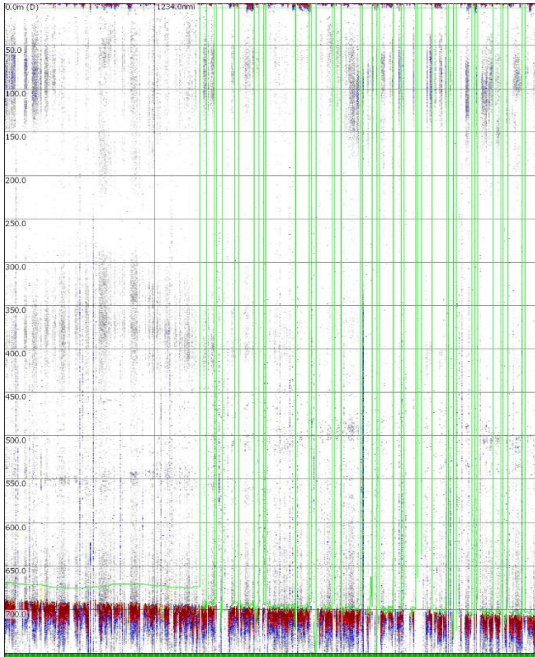
# Dynamic Positioning (DP)

- Tested and works fine within limits. Wind and currents must be taken in account. But performing well due to 800 kW azimuth propeller.
- Possible to chase a ROV or other object, giving its location via HiPAP. (High Precision Acoustic Positioning). Will be tested in 2023.



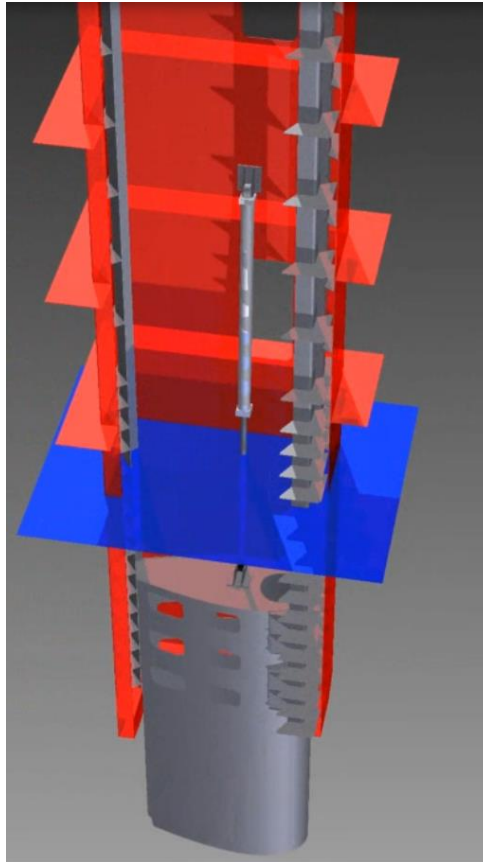
# Acoustics, dropkeel

- Dropkeel is a major improvement, acoustic work is possible in rough weather conditions. Adjustment made in Dec. 2021 to get mechanical tolerances more narrow, to get proper lock on the keel in bad weather. Performing real good in 2022.

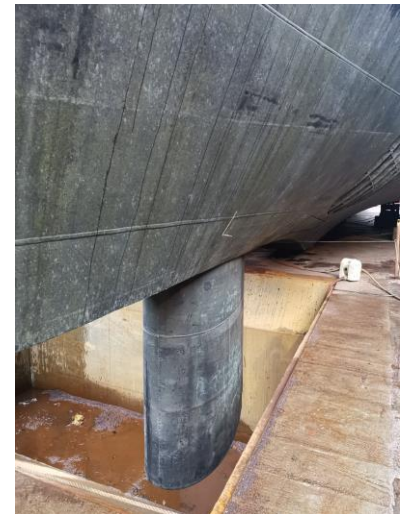




# Dropkeel equipment

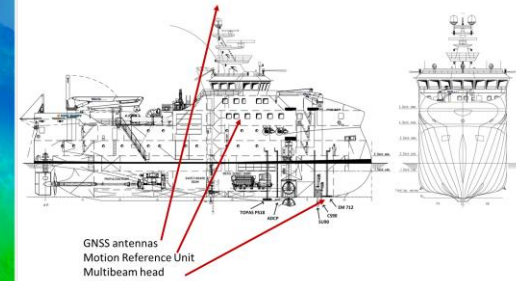
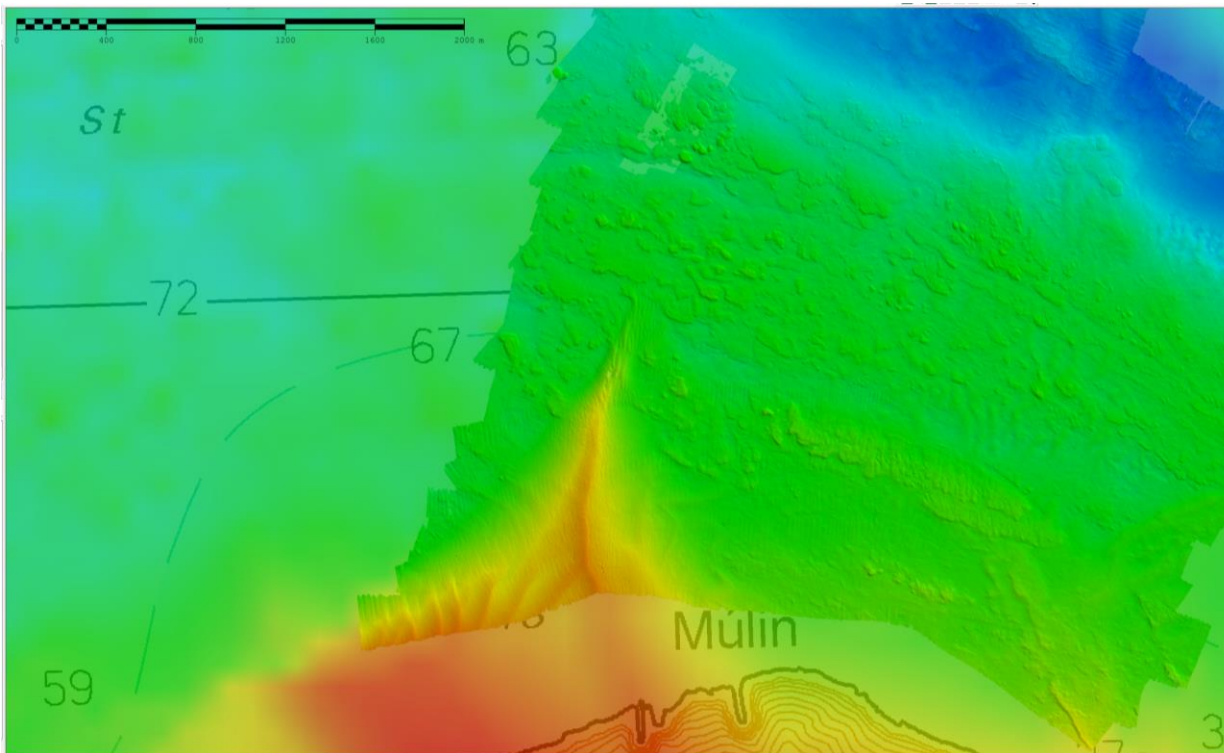
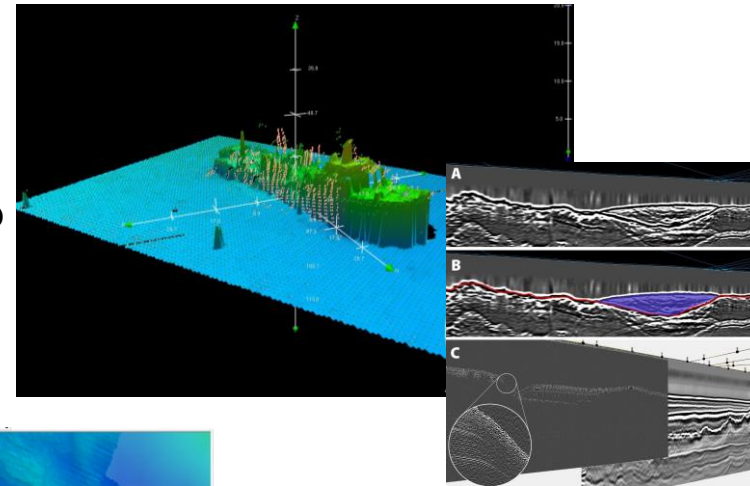


Simrad EK80:  
18,38,70,120,200, 333 kHz  
Simrad ME70 multibeam.  
Hydrophones



# Bathymetry EM712 and Topas18

In 2021 JS conducted 3 charting works for faroese customers. In addition Topas18 was tested. Major step forward hydrographical work in the Faroes. The Faroese Hydrographic Office was officially founded in January 2021.



Kongsberg installation documents



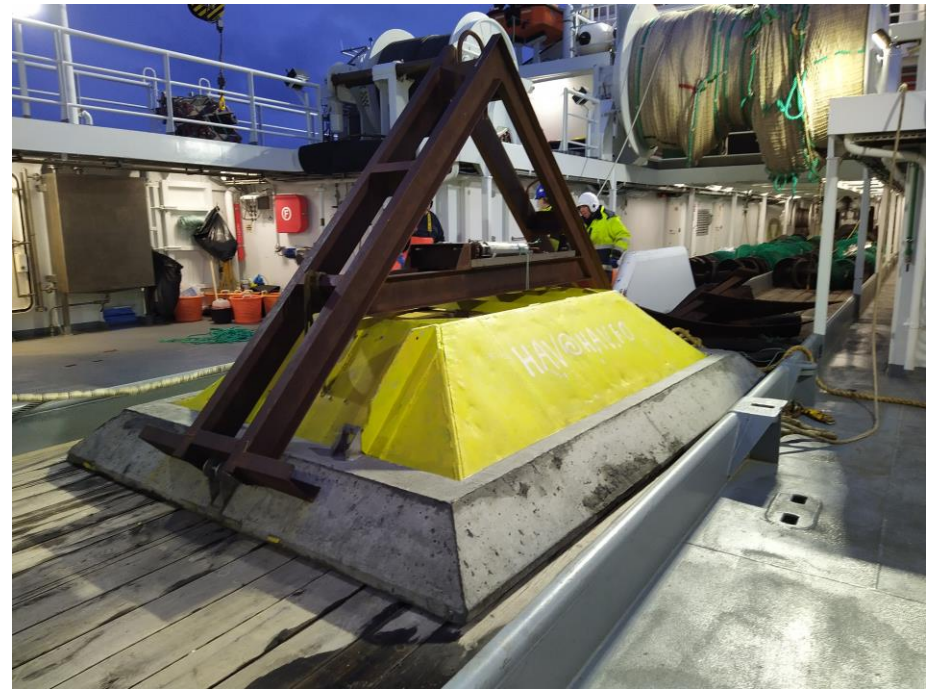


# Hangar and ramp



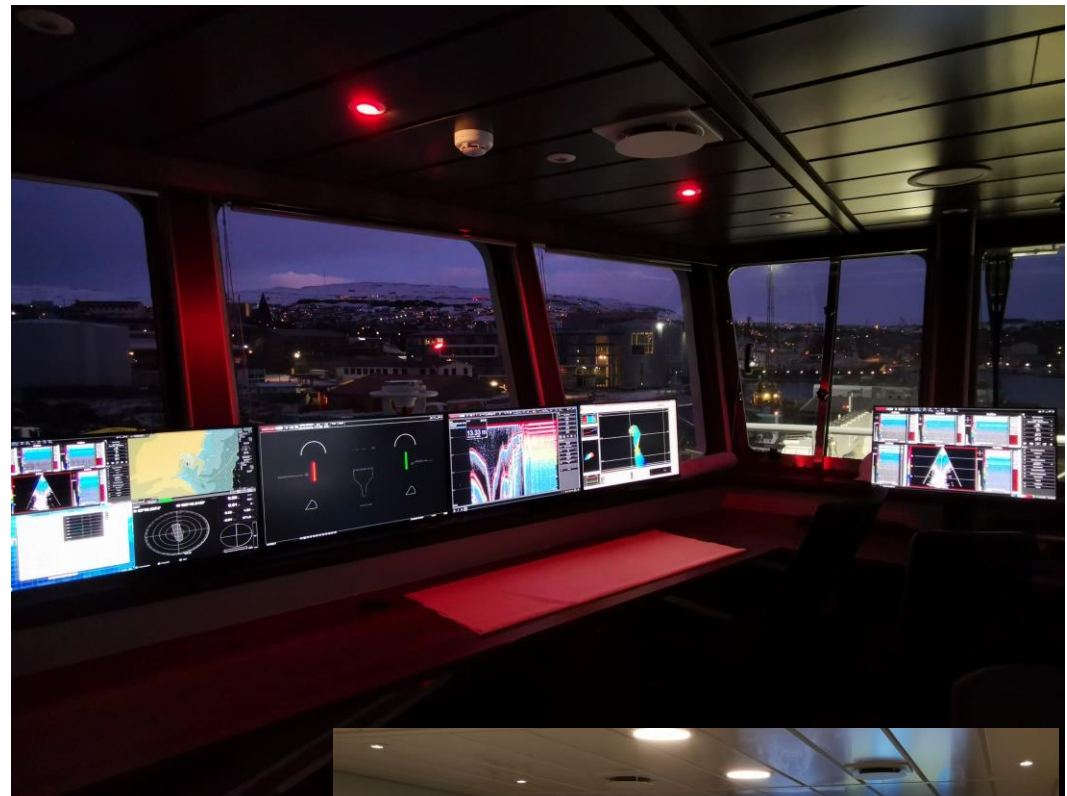


# Offshore crane





# IT and KVM systems



40+ computers/server/print/disc systems onboard, most of them are in the electronics room. Access to computers via KVM workstations /videowalls around the vessel.



## Running costs

- Running costs greater than MH.
- Fuel consumption greater than MH, longer tracks, bigger trawl, and rough weather is not a limit.
- So vessel is more suited for the work, and by that using more energy.
- But direct comparison JS and MH at 11 knots: Appr. 750 kW JS/ 1200kW MH.



# Conclusion

- Silent-R: URN performance second to none, which also adds to the comfort onboard.
- Trawling performance: OK
- Acoustics: Most of the equipment have been used, and is delivering data as expected
  - EM712 OK
  - Topas18 OK
  - ADCP OK
  - CS90 and SU90 OK
  - EK80 OK
  - ME70 OK
- Cranes/winches: Are functioning as good as expected.
- Fish treatment: Developed onboard MH and refined onboard JS.
- DP: OK
  
- Not tested yet:
  - Containerdeck for external equipment (seismics): April 2023
  - HiPAP, follow target June 2023
  - Coring

Further refinements (including blunders): More Ice producing capacity, faster gallow winch, additional internet parabola, finishing entertainment system and a long list of smaller improvements.

- A real good vessel, developed, designed og built by MEST yard in the Faroe Islands (Hull Western Baltic Shipyard, Lithuania)
- Thanks to all who have helped us along the road!



Or as the tale is told  
in France:



Jákup Sverri : bateau neuf, construit  
pour la recherche, à la pointe de la  
technologie. Christelle Nivoix, Toulouse

JS: new boat, built for research, at the cutting edge of  
technology.

Thank you for your  
attention!