

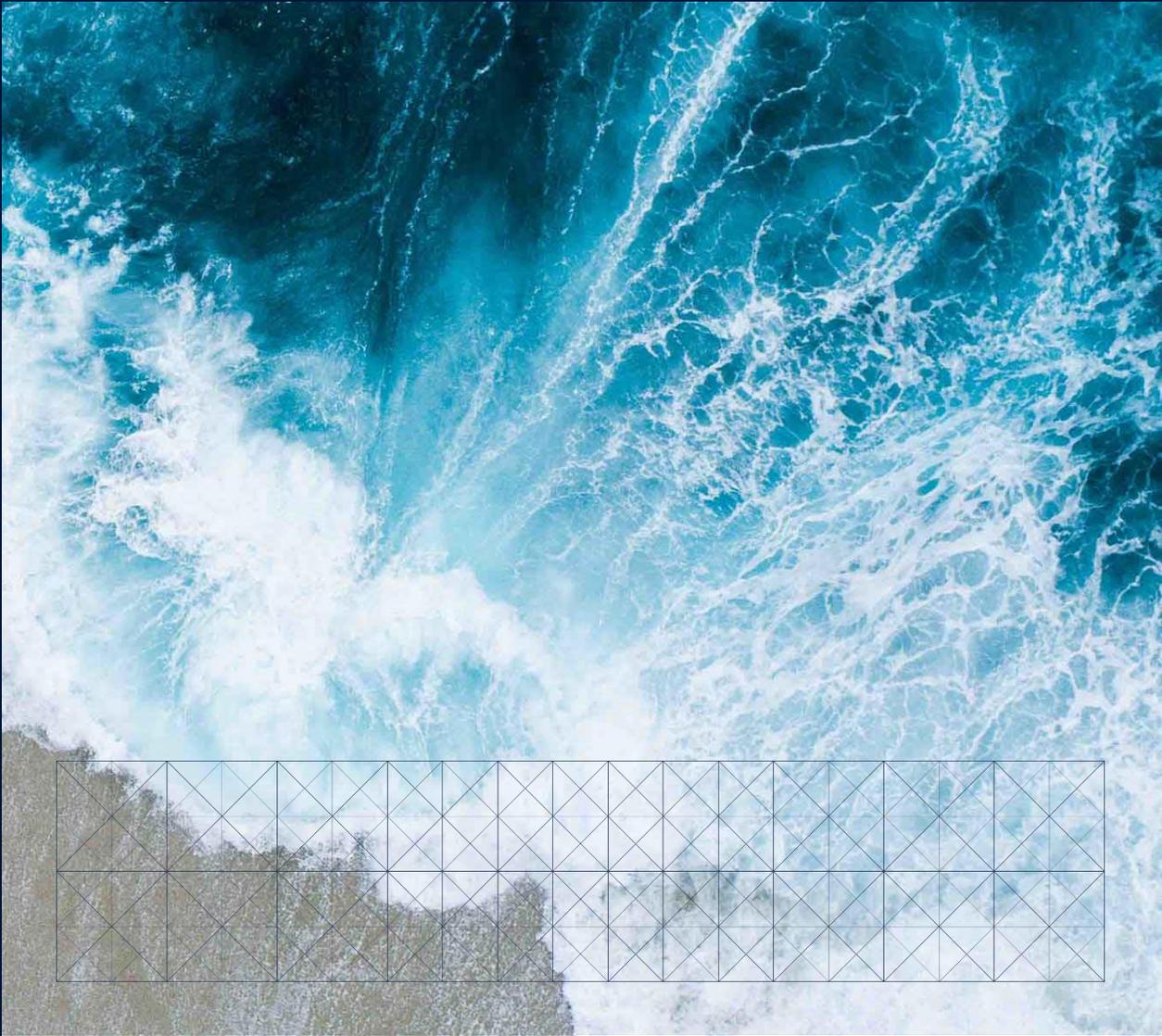


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ERVO MEETING BUCHAREST 2022

“Dry drop keel concept”

Reduce the noise for high frequencies



Miguel Angel Lleches. Kongsberg Maritime



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Dick Fosbury

“Beyond the box”

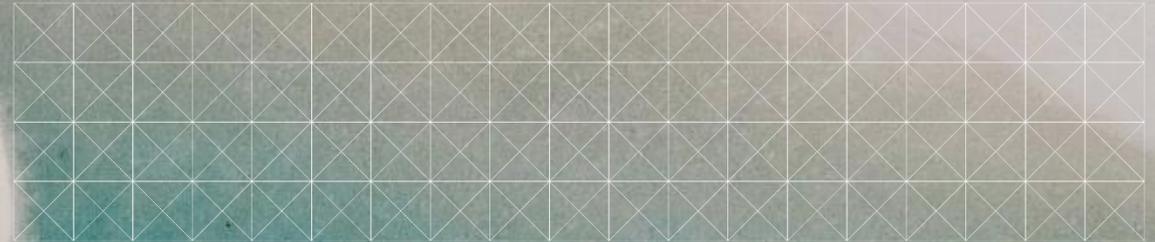
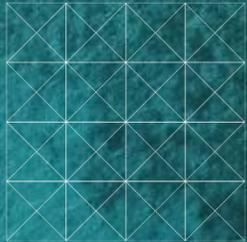




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Drop Keel

WHY?





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Pros

- Lower the transducers far from turbulent water
- Possibility to replace components with the vessel floating
- One or two units depending the amount of sensors and “Spare” space you need for future use





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Cons

- Huge space lost for the trunk
- Increases the length of the transducer cables with no possible protection for electrical interferences. No tubes.

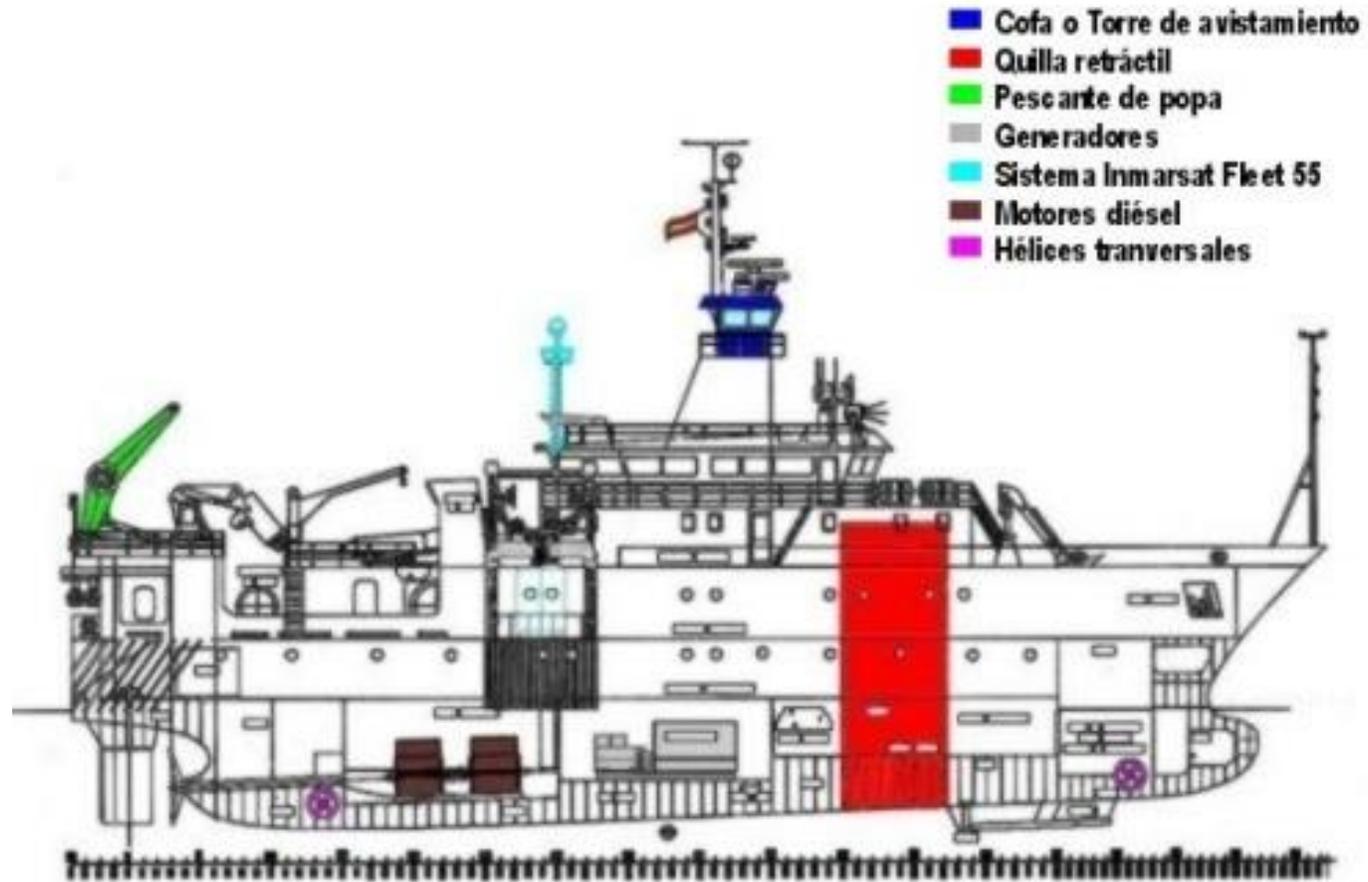




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Typical space need

R/V Vizconde de Eza

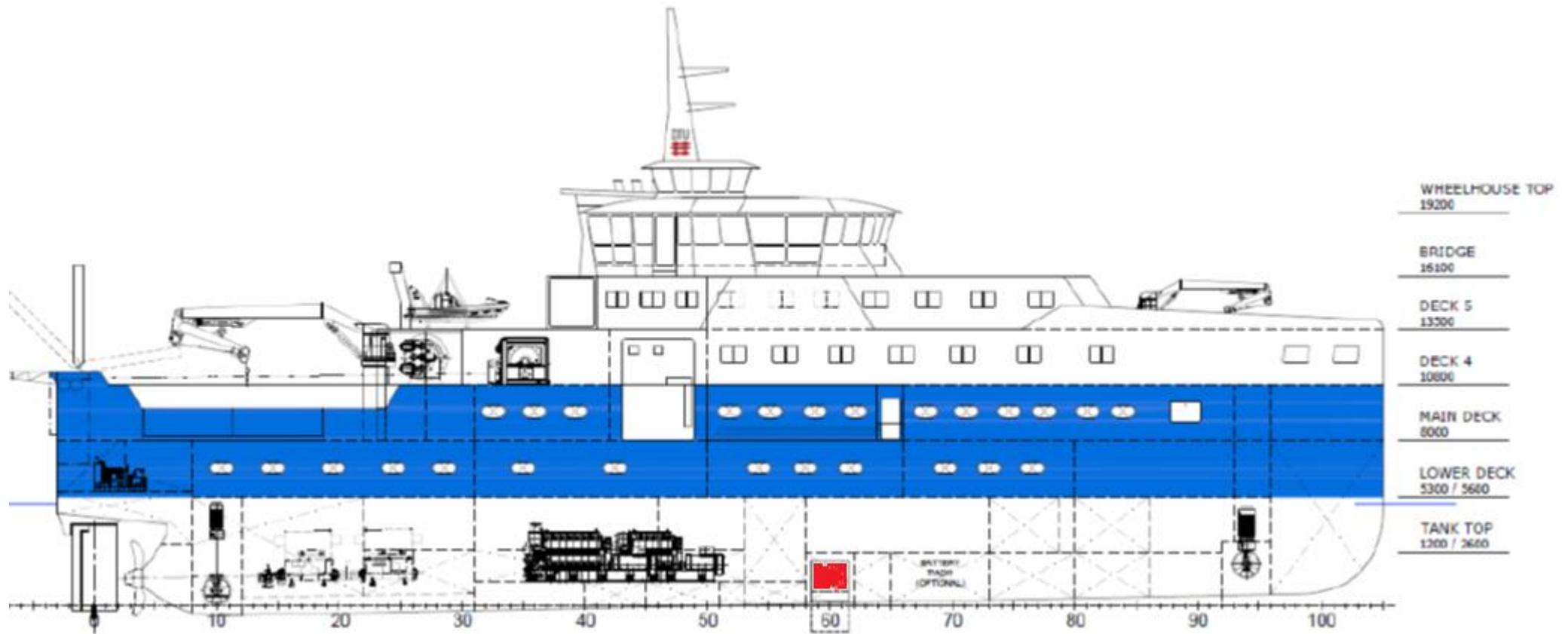




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Other Option

New Danish RV Project





The **EK80** system installation must be given the best possible working conditions.

- The transducer must be installed in such a way that water flow noise and/or bubbles are kept at a minimum,
- The transducer cables must be routed where the electrical noise is avoided reducing the length as much as possible and,
- The power supplying the WBTs must have a low ripple/low noise.



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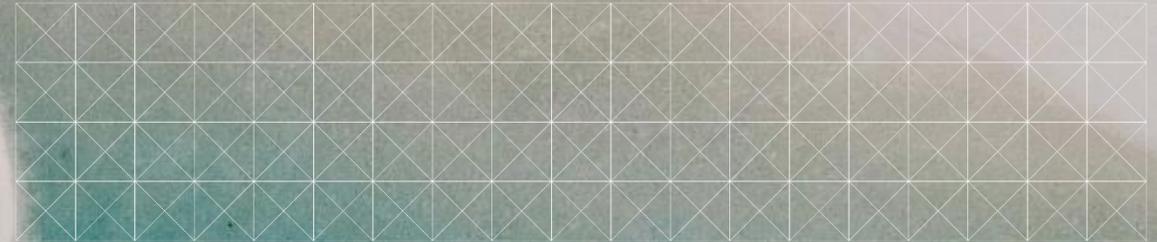
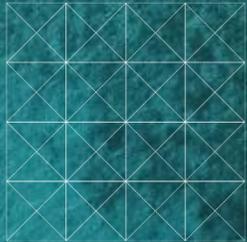
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RV Vizconde de Eza

Ministry of Fisheries, SPAIN





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- Project start 1998
- 53m
- Delivery in 2001
- Based in a fishing vessel design
- Drop Keel
- Gondola
- NO SILENT
- Diesel Electric





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Gondola





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Drop Keel

INTERIOR





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Dry keel

- Watertight with cable glands
- Man Hatch
- No condensation
- Clean environment

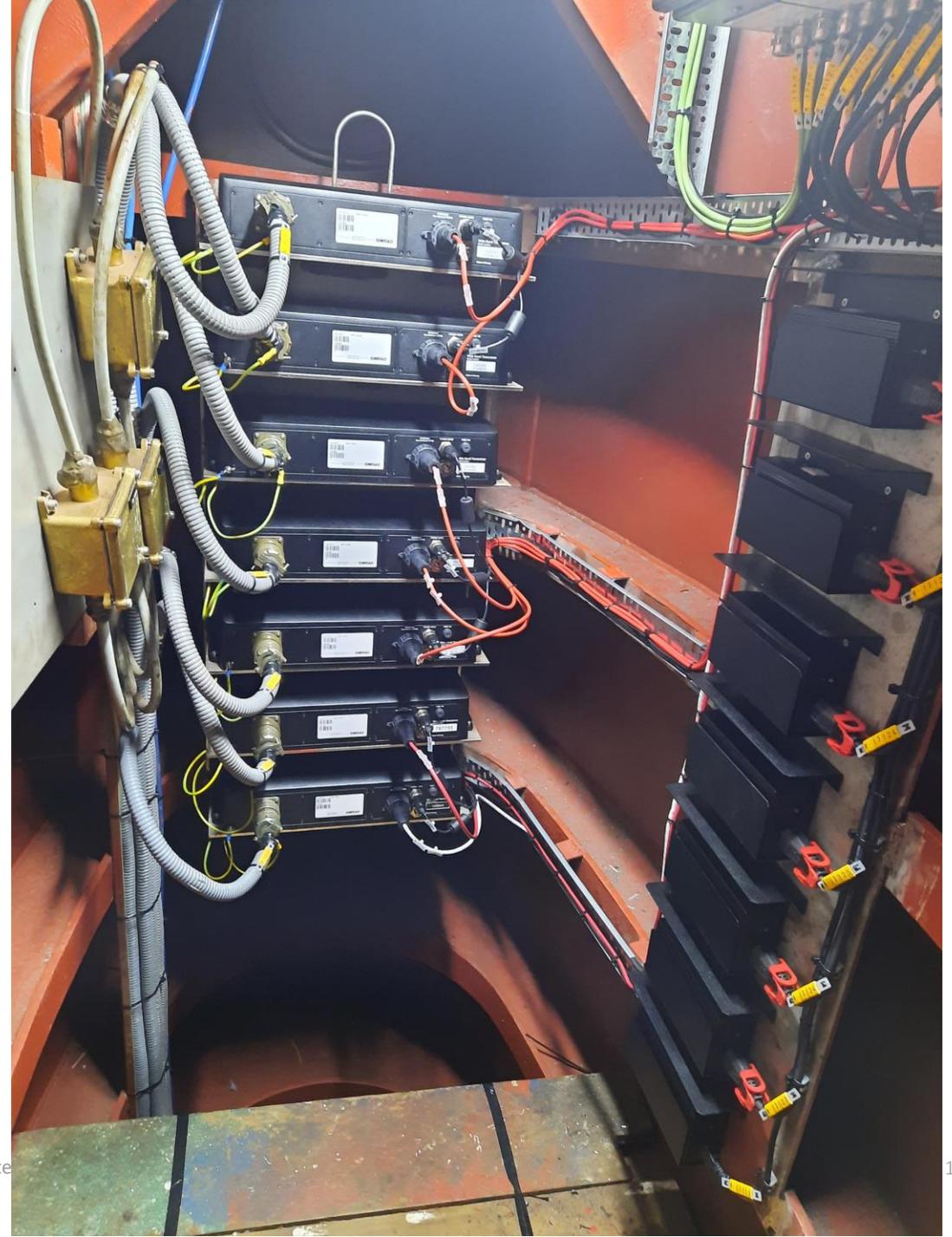




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Transceivers (WBT) and power supply installed inside the keel

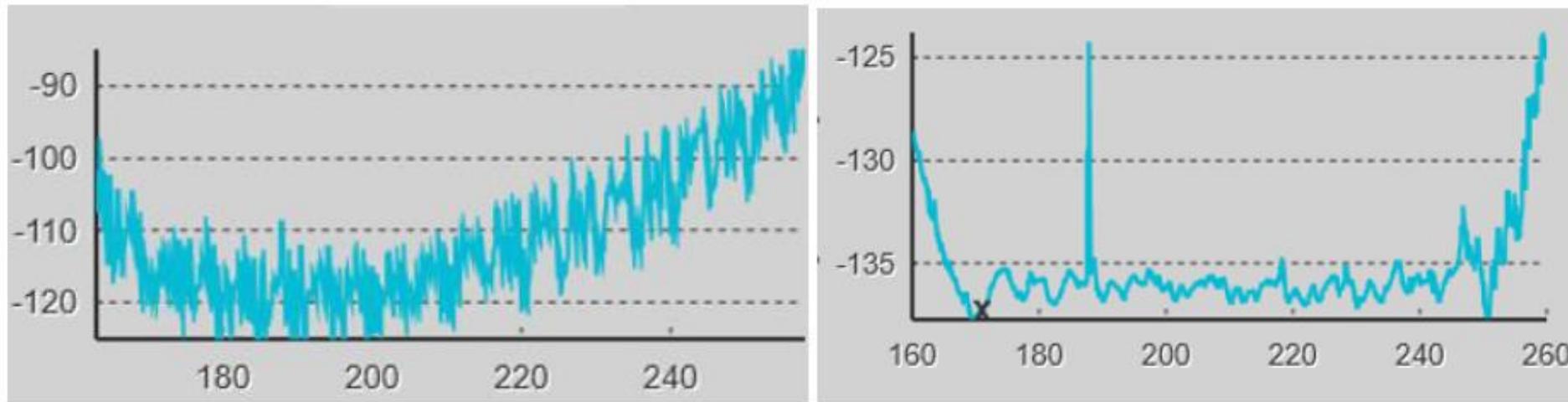
- Reduced length of the transducer cable to the minimum
- Reduced the number of cables out of the the drop keel from 7 to 2
 - 1 Ethernet
 - 1 Power cable
- Reduced the noise level up to 40dB!!!!





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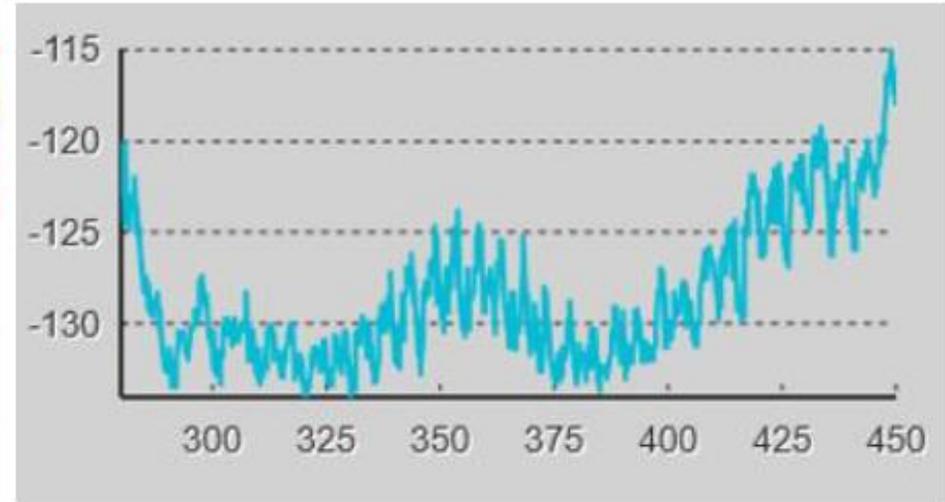
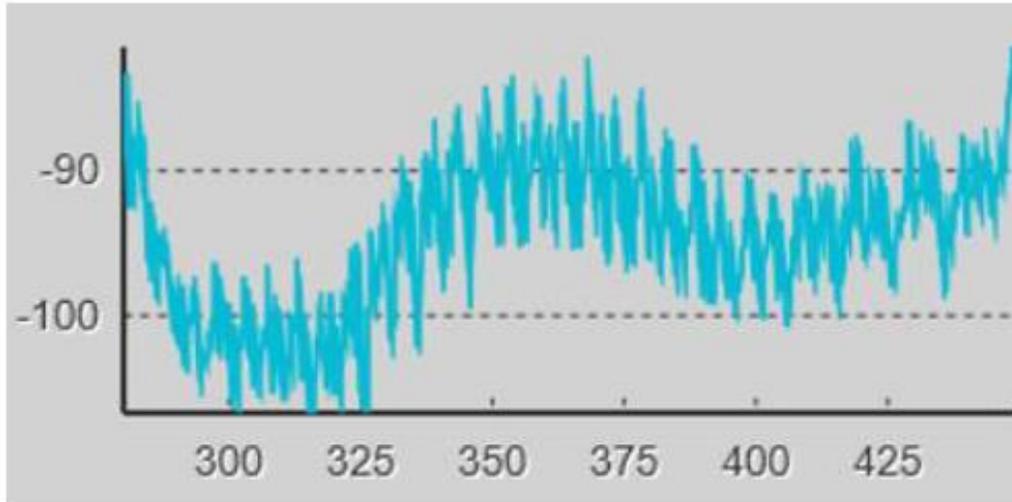
2.3.6 ES200-7C



In this frequency range there is also a significant improvement in the complete range of the 70 kHz. In parts of the bandwidth there is as much as 35 dB improvement in the SNR.



2.3.7 ES333-7C

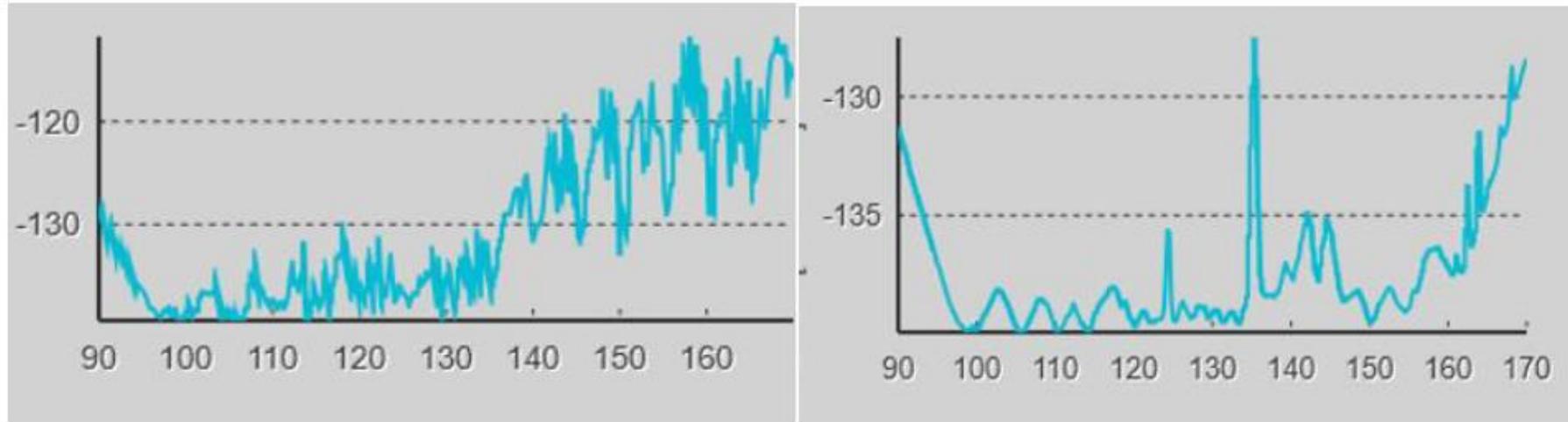


For the 333 kHz range there is also a significant improvement through the complete frequency range. The noise level is reduced by 30-40 dB. There is still some noise left in the bandwidth, but the system's performance is radically improved after the relocation.



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2.3.5 ES120-7C



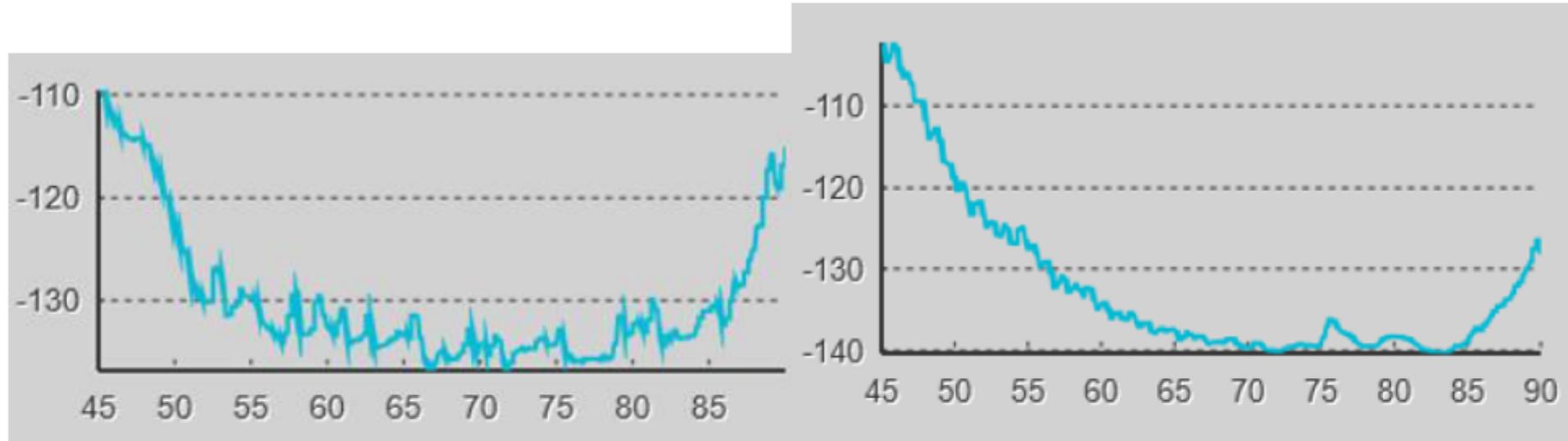
With the 120 kHz frequency range we are getting into the range where the electrical noise is being dominant. We see that the noise level is reduced by more than 5 dB in the lower half of the bandwidth. In the upper half the reduction is substantial with more than 15 dB.

After the relocation we can see that there is a prominent frequency component at approx. 135 kHz. This component was not visible before the relocation as it was masked by the higher noise floor.



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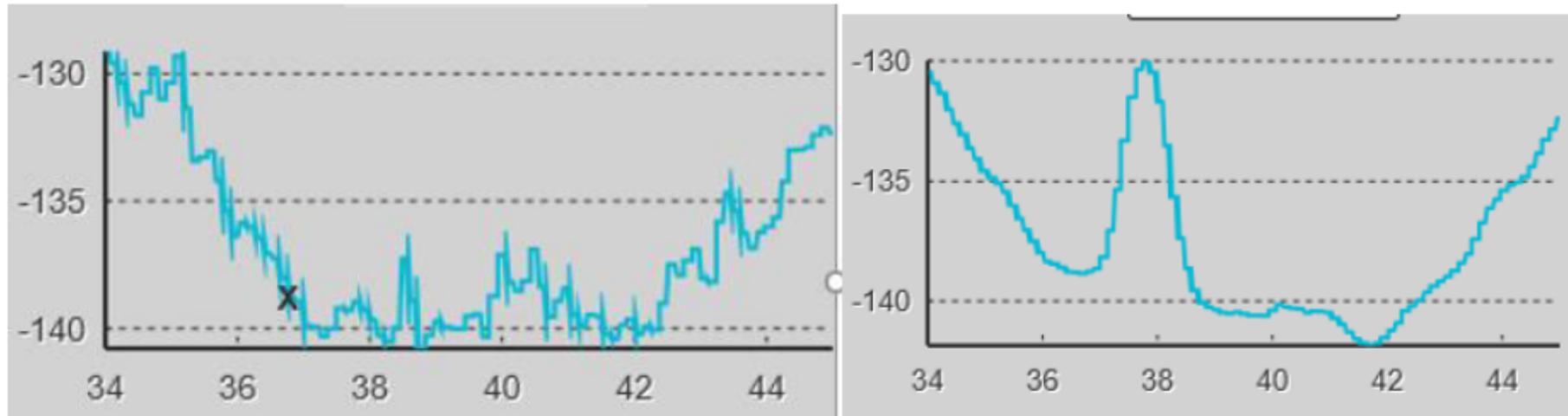
2.3.4 ES70-7C



As for the 18 and 38 kHz, the 70 kHz frequency range is expected to be more susceptible to ship noise than electrical noise. Still the 70 kHz frequency range has an improvement in the white noise. From 60 kHz and higher there is a noticeable improvement of more than 5 dB.



2.3.3 ES38-7



The 38 kHz frequency range is still more susceptible to environment noise than electrical noise. However, there is a noticeable improvement in the white noise, but it is also introduced a strong frequency component with centre close to 38 kHz and with a bandwidth of 2 kHz.



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Conclusions

- Empty or dry drop keel doesn't float
- Drop keel is a “Faraday box” that can be used for protecting electronics/antenna from inducted noise
- Frequencies above 60-100kHz are known to be dominated by electrical noise. The transducer cables carry low level signals that are being amplified in the receiver electronics.
- Frequencies below 60-100kHz are more susceptible to noise from the surroundings for example water flow, waves, wind, mechanical noise from ship and similar
- Installing the electronics inside the drop keel improves the performance



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FUTURE

More tests?

- Running WBTs with batteries installed inside the drop keel?

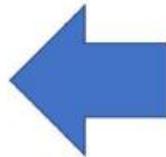


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FOR INTEGRATING YOUR FUTURE VESSEL

Integration simply explained





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