R-Mode Baltic

Project status and results: November 2018

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EUSBSR PA Safe 19th Steering Committee Meeting

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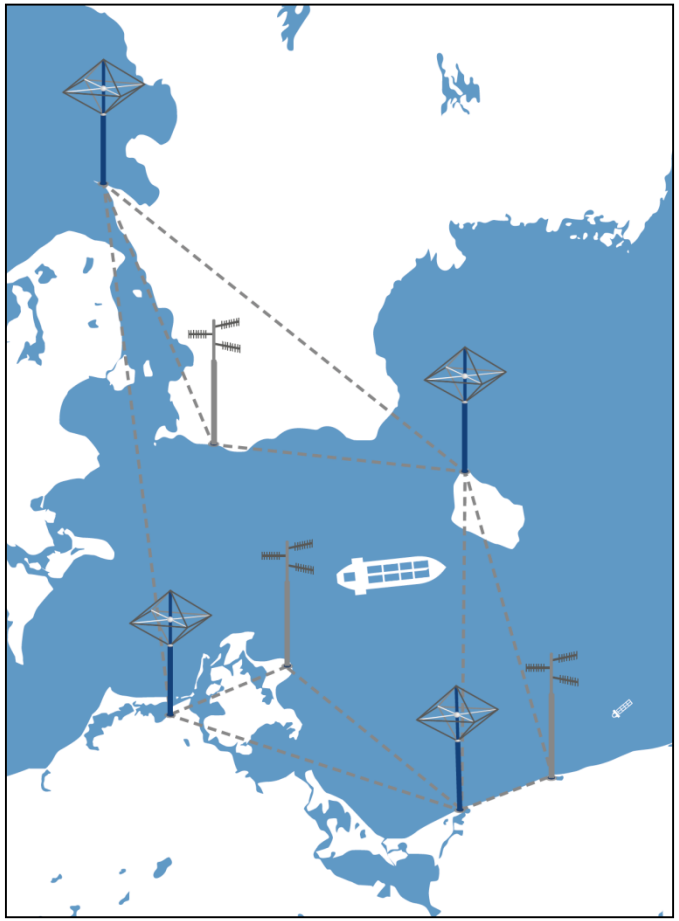
R-Mode Baltic project goal

The main goal of the R-Mode Baltic Project is the development and demonstration of a new maritime backup system for position, navigation and time (PNT) purposes.

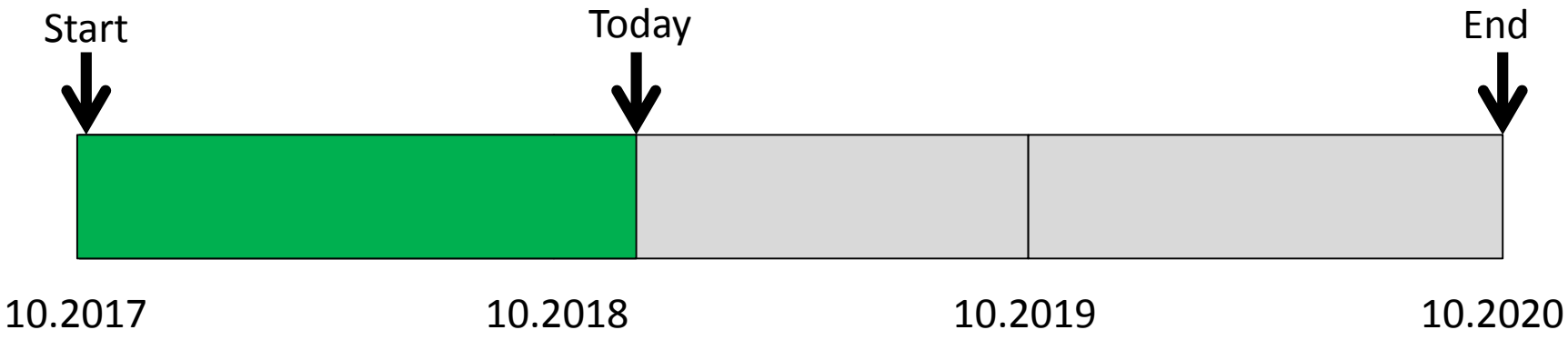
- R(anging)-Mode is a positioning system that
  - transmits timely synchronised ranging signals
  - using the communication channel of existing maritime radio infrastructure

- Project utilises signals of maritime radio beacons and AIS base stations



Timeline

- First results available: user requirements
- Ongoing activities: selection of testbed area, signal development, station timing, dissemination
- Just started activities: testbed implementation, R-Mode positioning, hardware development



User requirement used in the project R-Mode Baltic

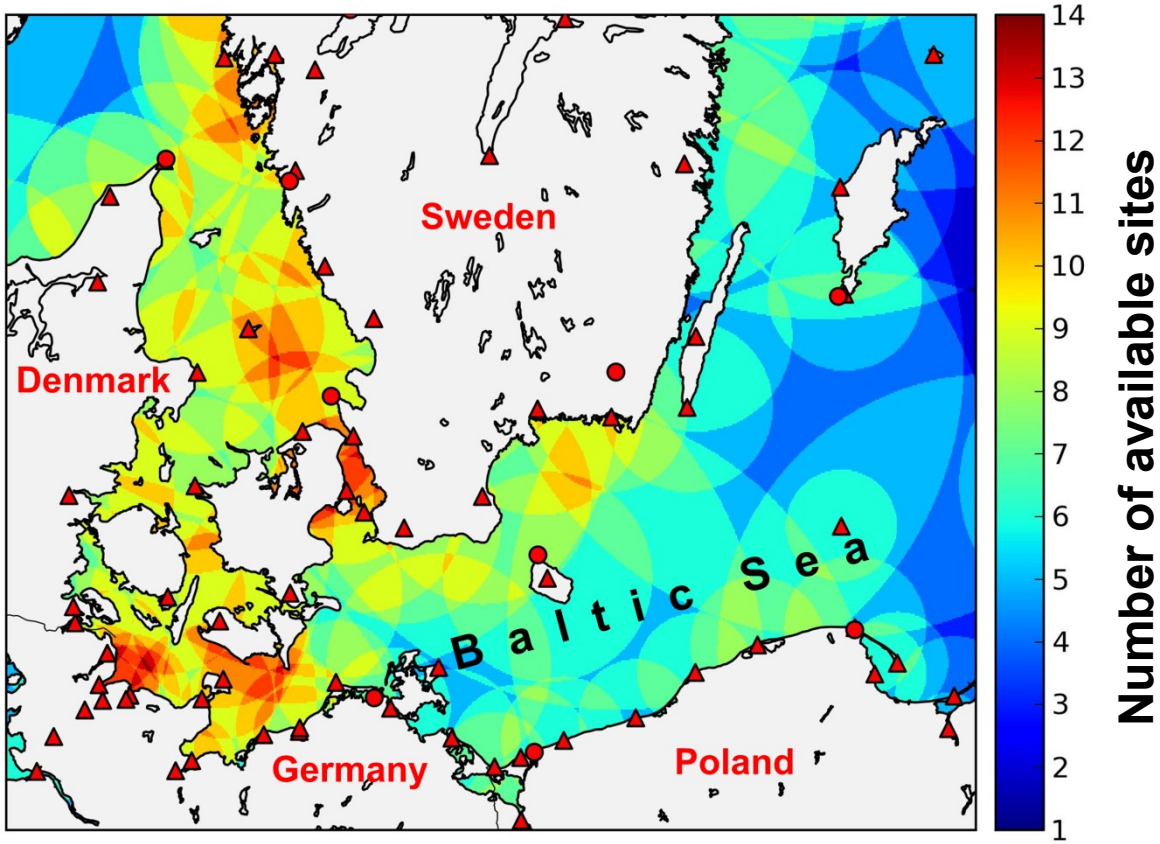
Study result of available documents from IMO, IALA, EMRF, …

The project team will setup a contingency system for GNSS, which in case of unavailability of GNSS should allow positioning for at least **2 hours** with:

	System level parameters				Service level parameters			
Maritime region	Absolute Accuracy	Integrity			Availability % per 30 days	Continuity % over 15 minutes	Coverage	Fix interval (seconds)
	Horizontal (meters)	Alert limit (meters)	Time to Alarm (seconds)	Integrity Risk (per 3 hours)				
Coastal	100	250	30	10^{-4}	99	N/A²	Regional	15
Port approach and restricted waters	10	25	10	10^{-4}	99	99,97	Regional	2
Inland Waterways	10	25	10	10^{-4}	99	99,97	Regional	2

Coverage of the Baltic Sea with VHF and MF signals

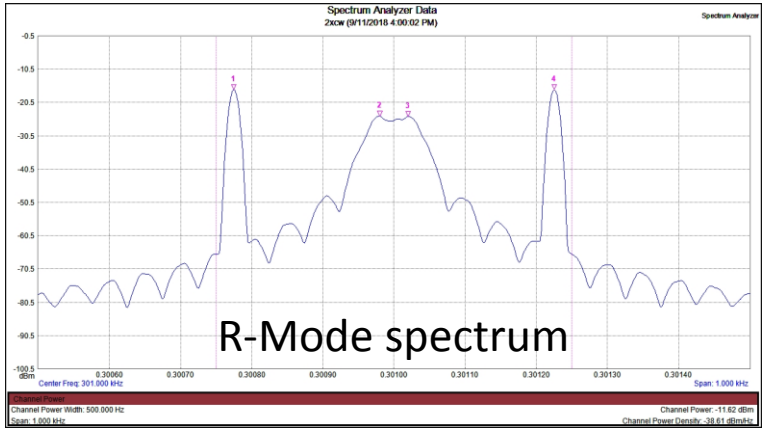
Considers not disturbances of signal propagation

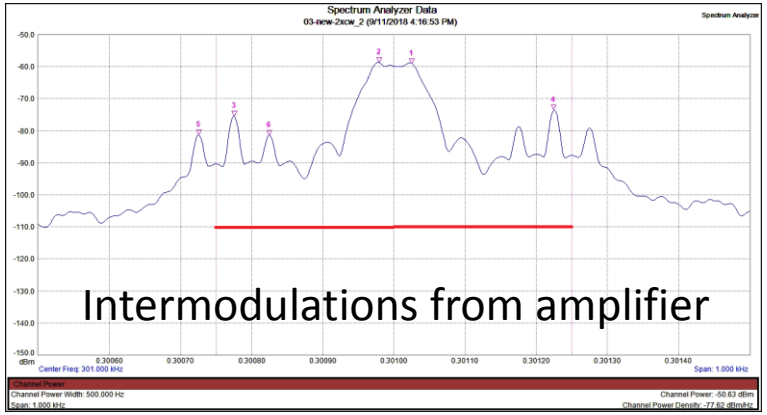


Sufficient number of available signals (>3) for positioning in the Southern Baltic Sea – R-Mode based positioning requires AIS and radio beacon signals

Compatibility tests maritime radio beacon Rozewie

Challenge upgrading existing radio beacons (MF) with R-Mode signals





=> MF station transmitting chain incompatibilities has to be considered when planning an upgrade.

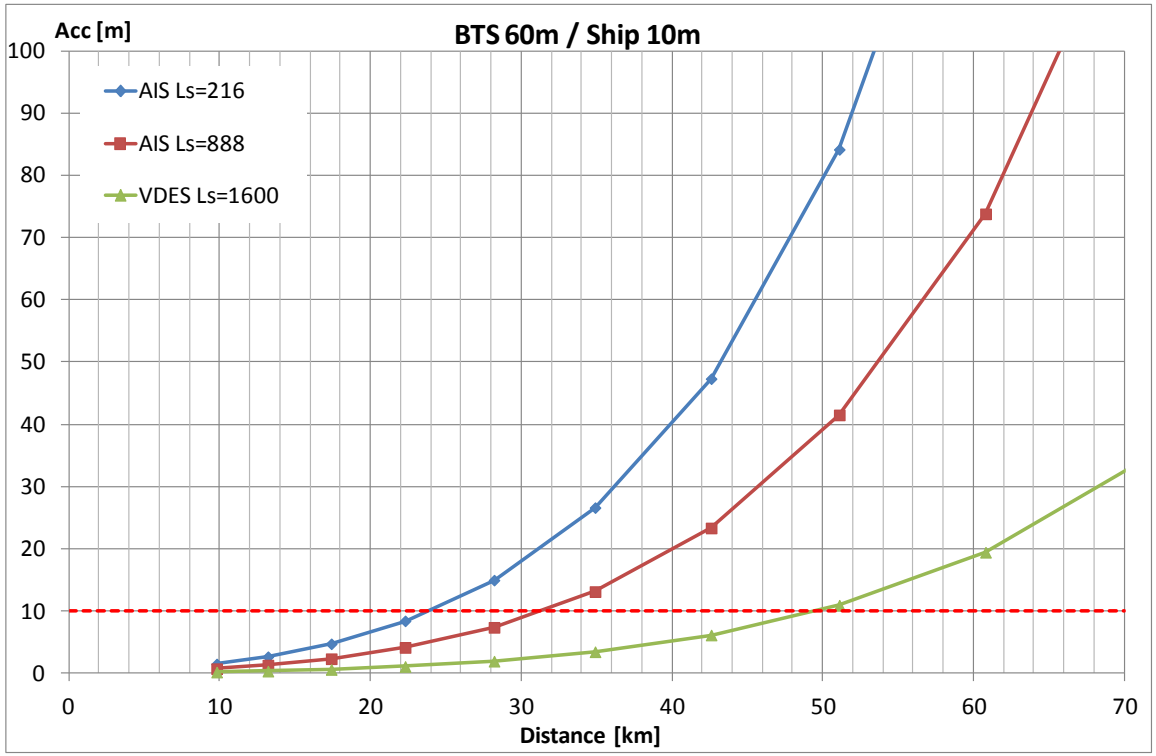
R-Mode in the work programme of IALA ENG committee

- Maritime administrations are well aware of R-Mode system

- Project contributes to IALA ENG committee task register for next 4 years
  - New Guidelines planned:
    - R-Mode – radio beacon
    - R-Mode – AIS or VDES
    - Station timing and time synchronisation
  - Proposed workshop on R-Mode in 2019 (organised R-Mode Baltic, IALA)
  - R-Mode testbed progress coordination
  - R-Mode: input to sister organisations on R-Mode standards

Move focus from AIS to VDES

- AIS is foreseen for distribution of safety relevant information
- VDES new radio communication system with higher capacity
- IALA ENAV communication working group has reasonable doubts of insufficient AIS channel capacity for R-Mode => recommendation to use VDES
- Project will shift the main focus from AIS to VDES



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