Connectivity and Autonomous functions

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PROVIDING ADVANCED SOLUTIONS FOR EXTREME PERFORMANCE UNDER EXTREME CONDITIONS

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KONGSBERG SEATEX

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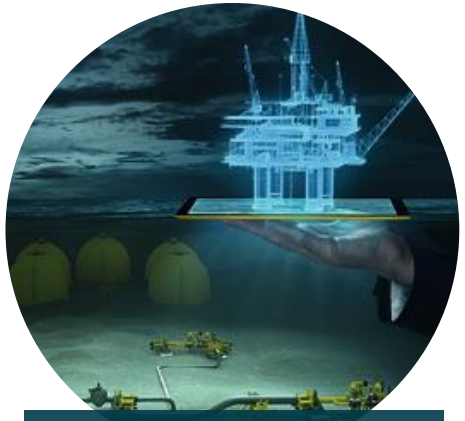
KONGSBERG DEFENCE SYSTEMS

Modern product portfolio in growing defence and aerospace niches

KONGSBERG PROTECH SYSTEMS

Unrivalled global market leader in remote weapon stations



KONGSBERG DIGITAL

Simulation, Renewables, Artificial Intelligence, Cyber security….

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Where we are

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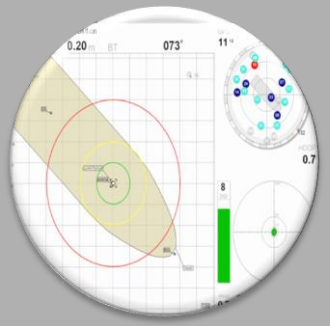
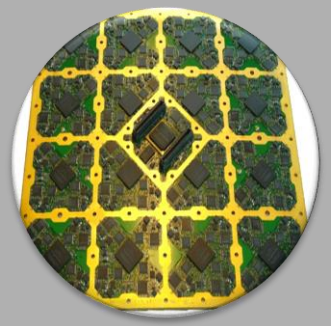
KONGSBERG SEATEX - Technology strategy

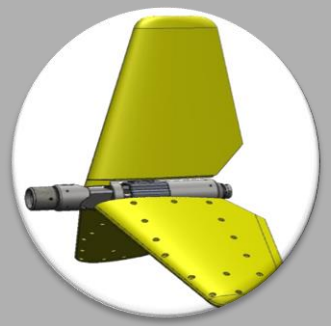


GNSS

Motion



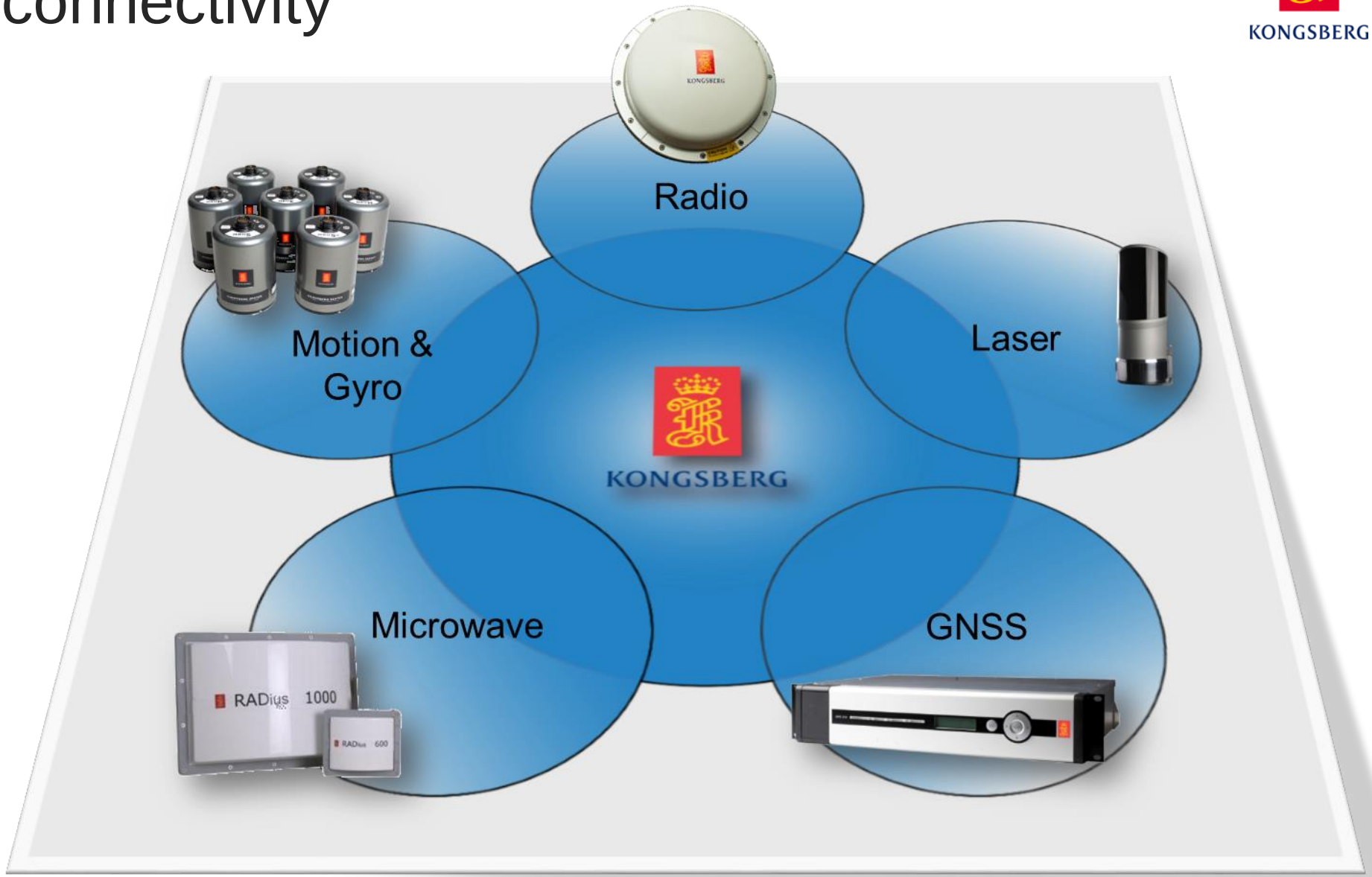
SW Radio
Lasers



Streamer control

Integration: Technology, Application, Market

Sensors and connectivity



eBird

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Seatrack – surface position buoy

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Connectivity

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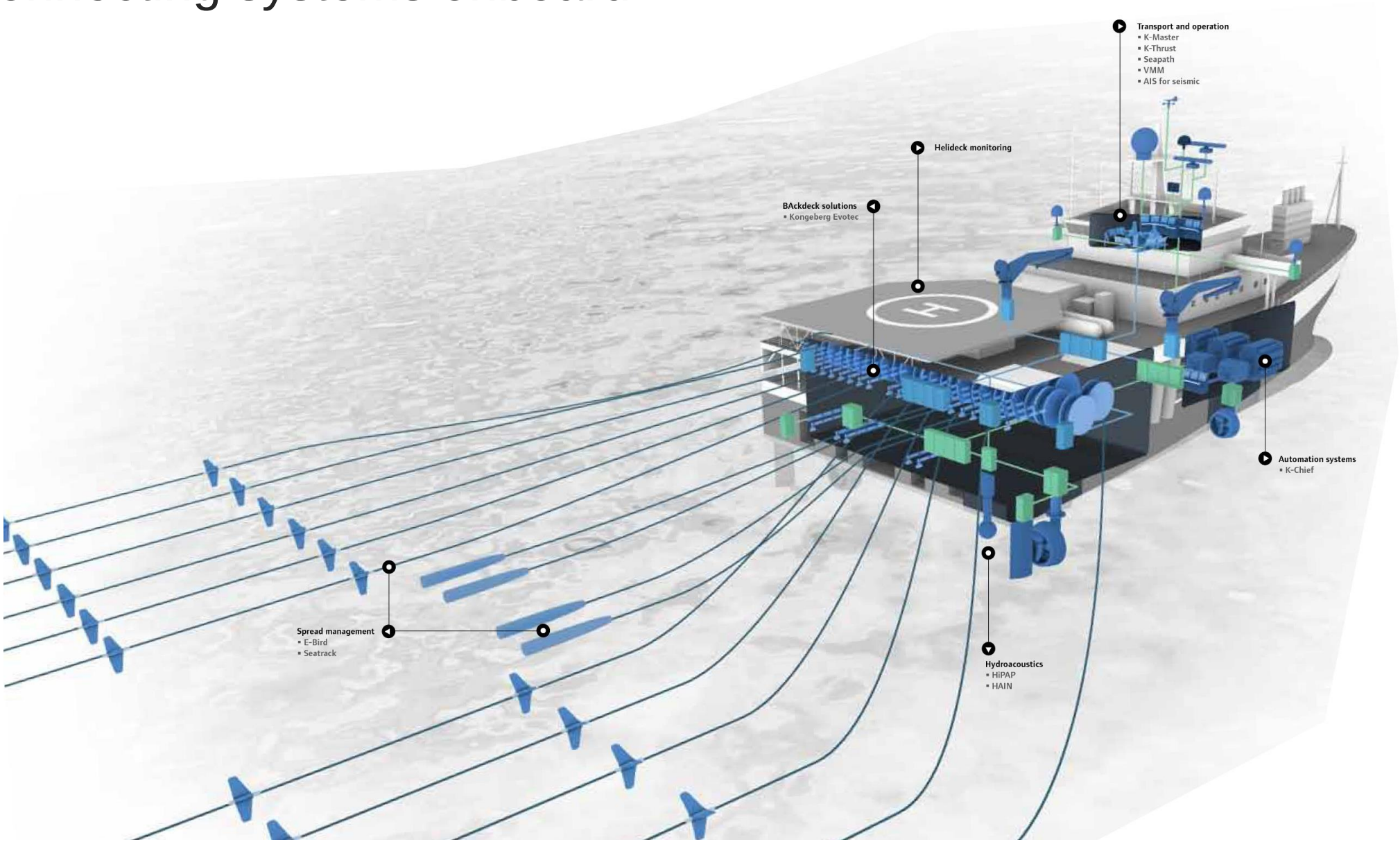
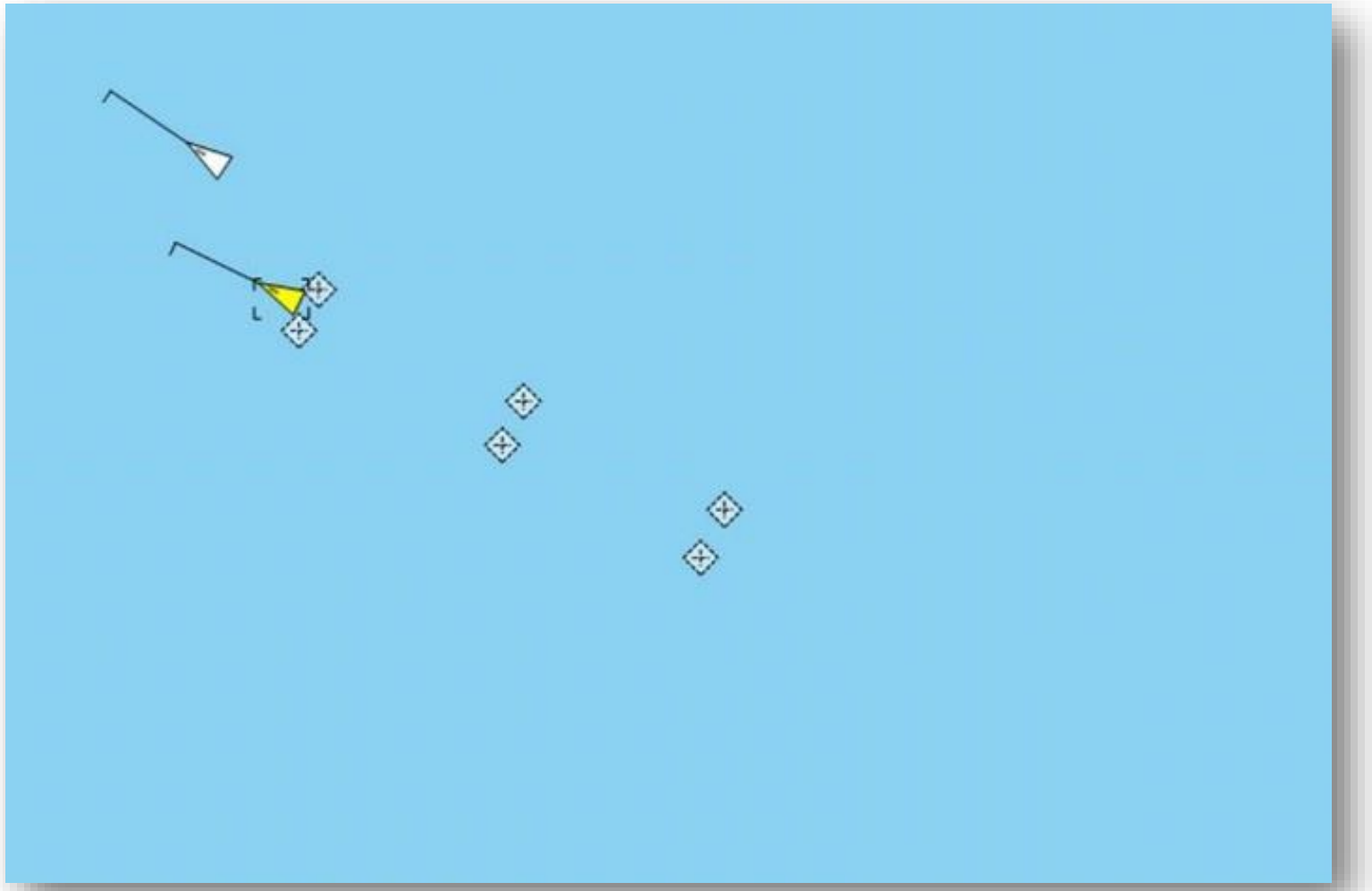
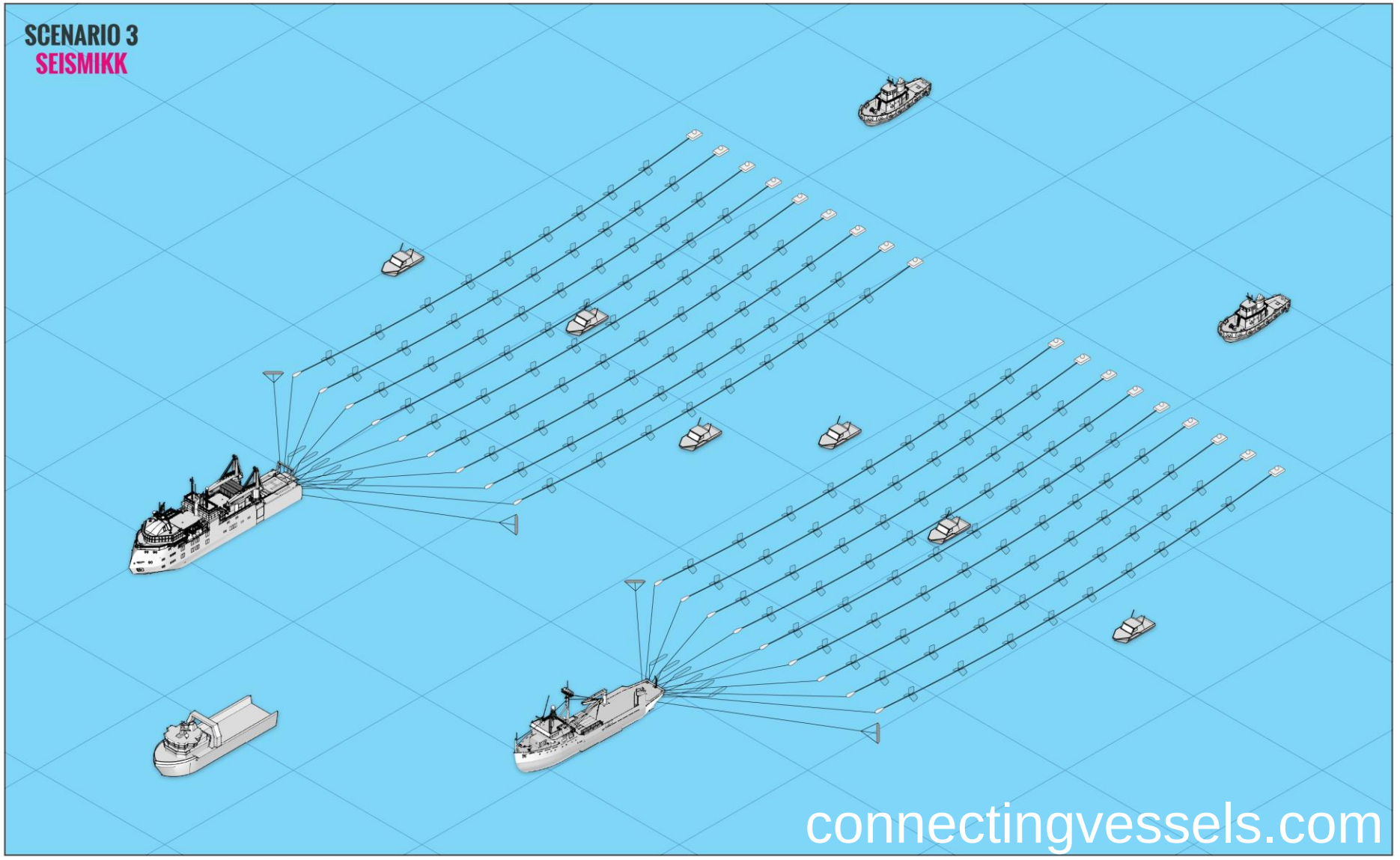
Connecting systems onboard



AIS 300S



Connecting vessels



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Requirements to the communication system

- be reliable
- handle maritime environment
- be able to communicate with vessels near as well as far
- maintain link when signal path is obstructed
- be easy to operate and install

- Existing broadband communication systems…
  - high throughput, but are not reliable
  - does not handle long range
  - needs tuning and adjustments in order to operate
  - Too high latency for real time sensor data

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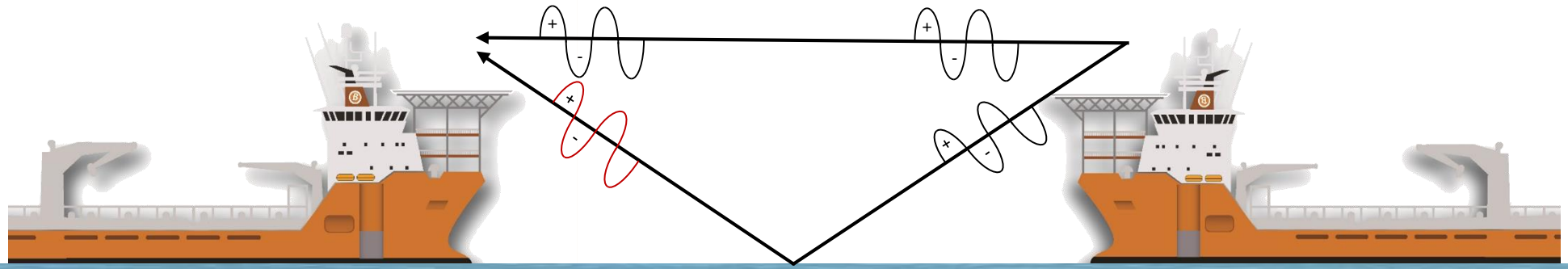
Maritime Communication

Problem

- Multipath
- Flat sea fading



Maritime Communication

Problem

- Near and far communication
- Communication beyond line of sight

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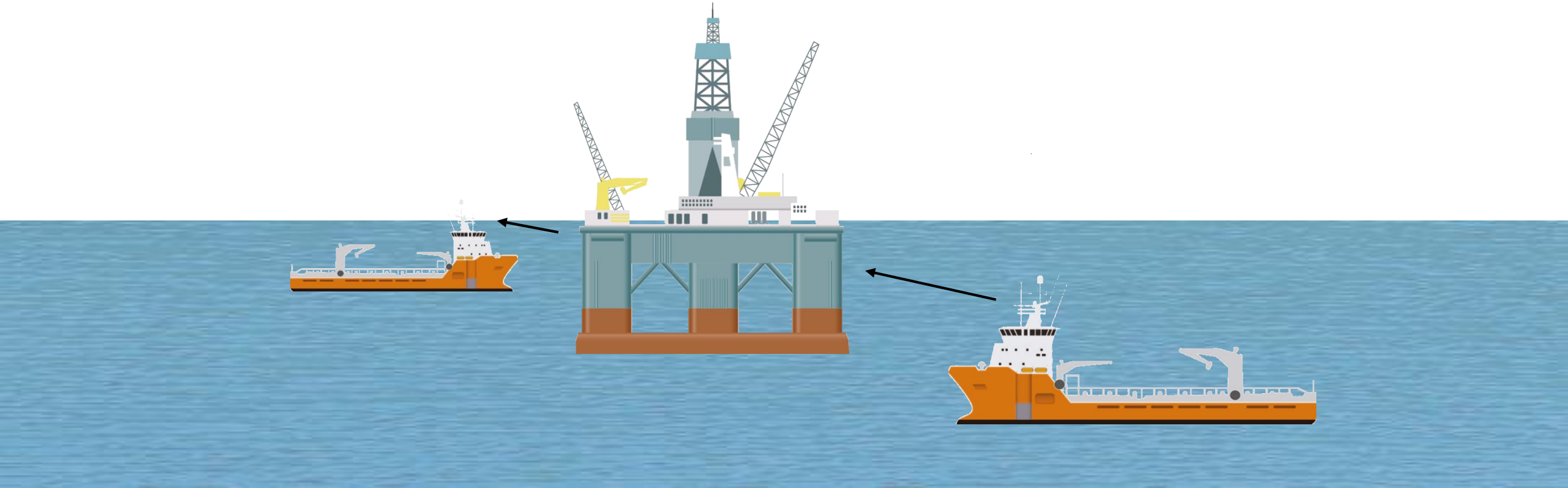
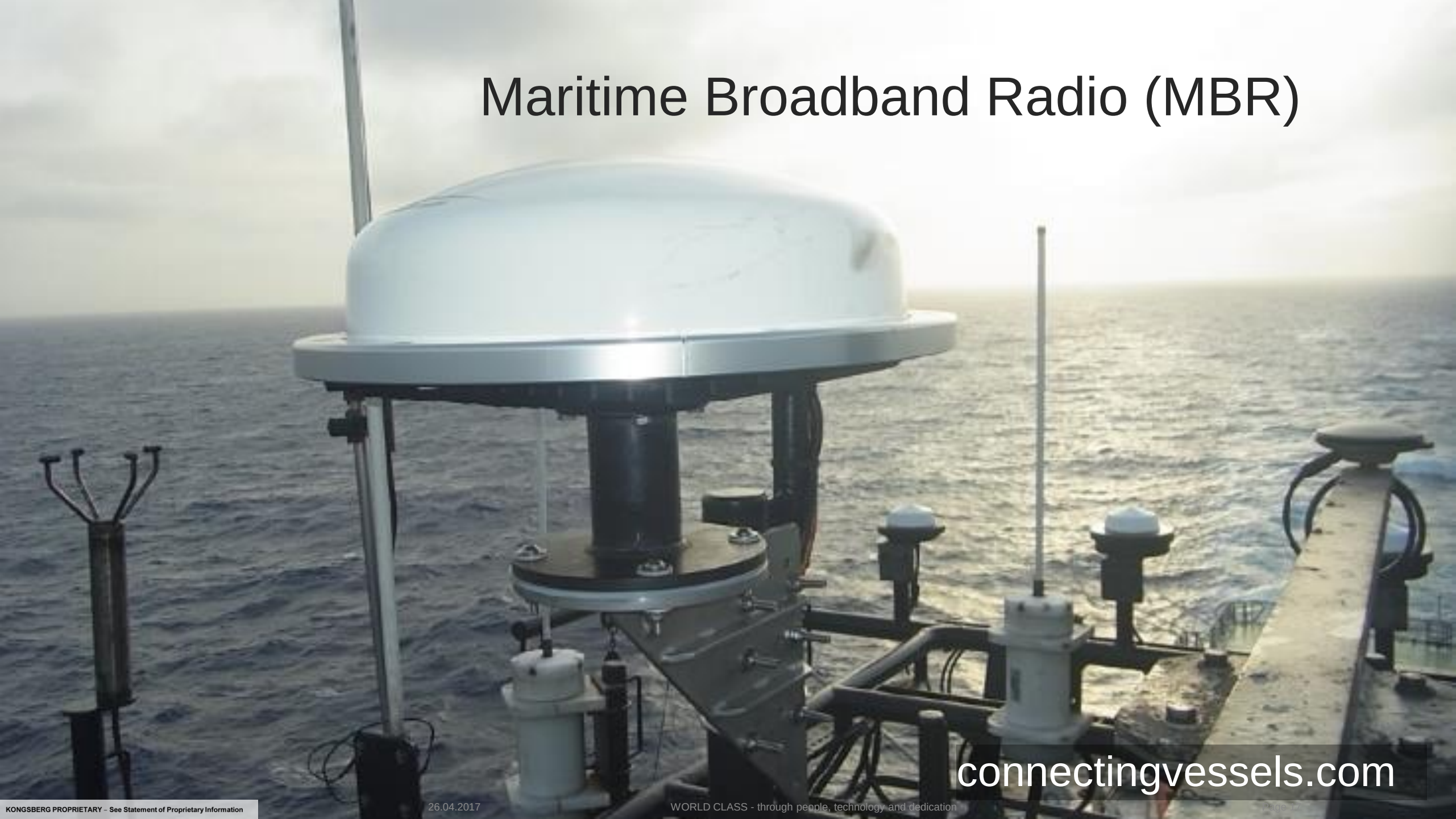
Maritime Communication

Problem

- Obstructions
- Object in signal path



Maritime Broadband Radio (MBR)



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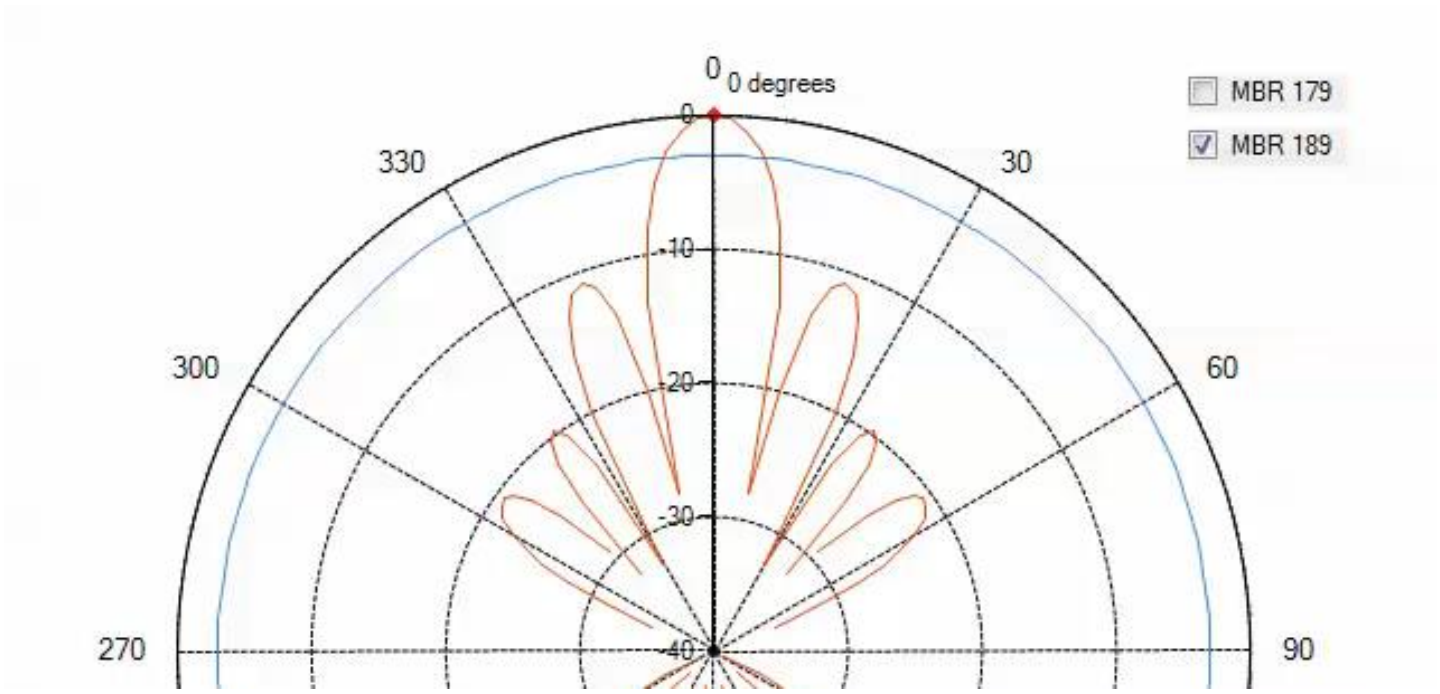
Long range broadband communication

HOW

- Smart antenna design
- No moving parts
- Beamforming



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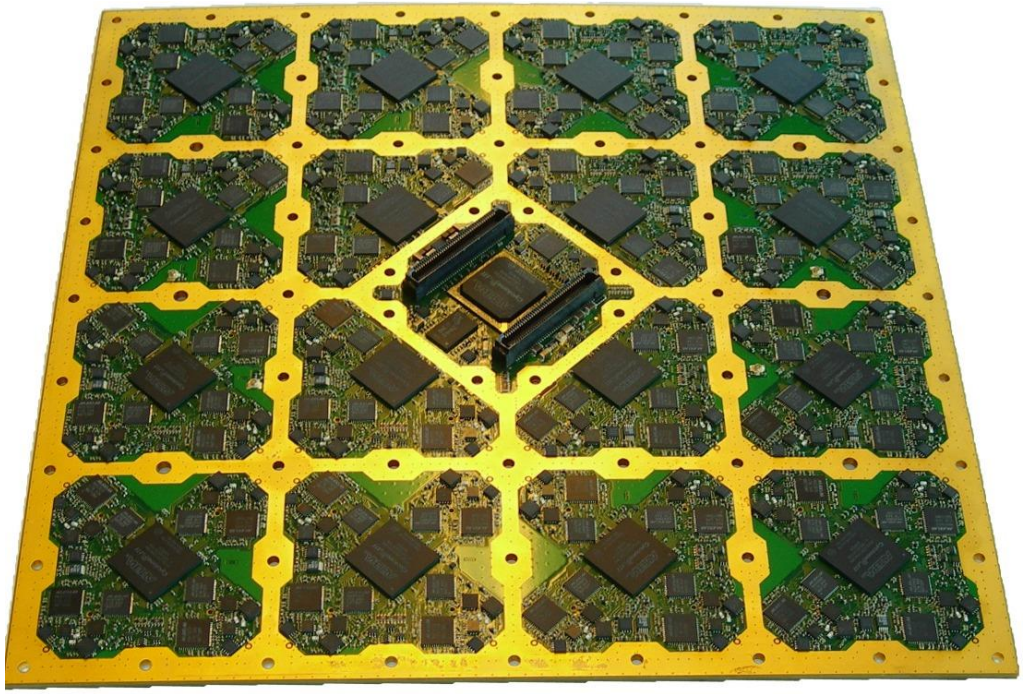
MBR Design – FPGA Technology

- 17 FPGA’s with a combined data stream of 40Gbps
- Real-time signal processing
- 60 independent transceivers
- Fail tolerant design



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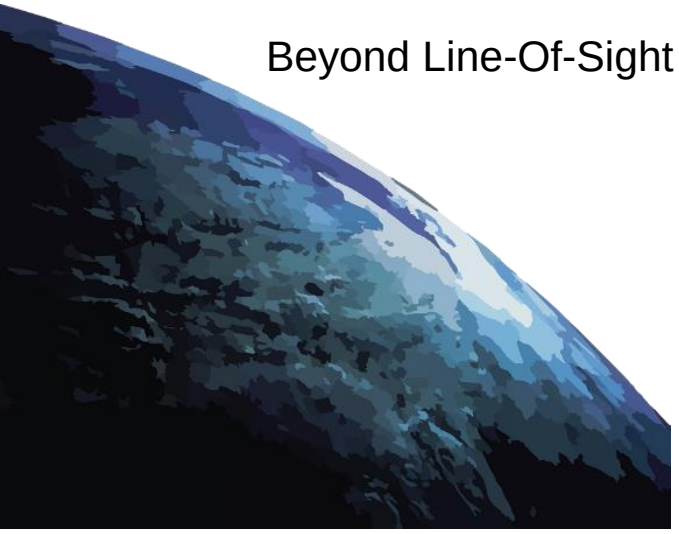
Facts and numbers

IP- based data networking

15 Mbps Payload

Point to point and point to multipoint



Beyond Line-Of-Sight

Deterministic Latency

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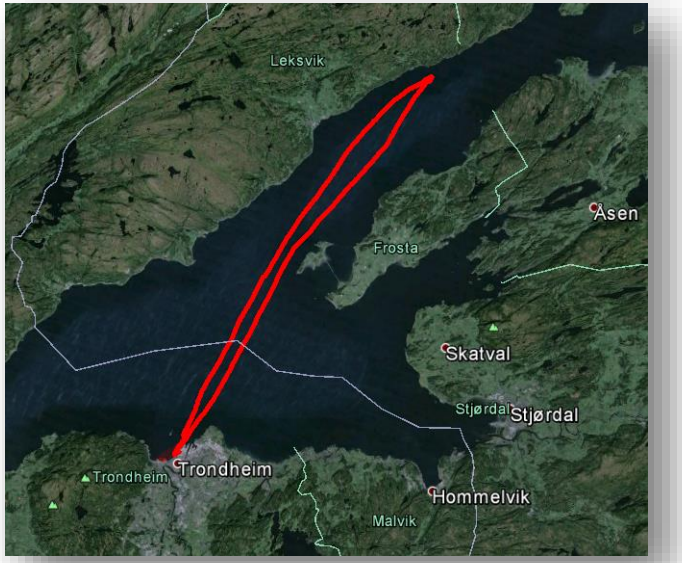
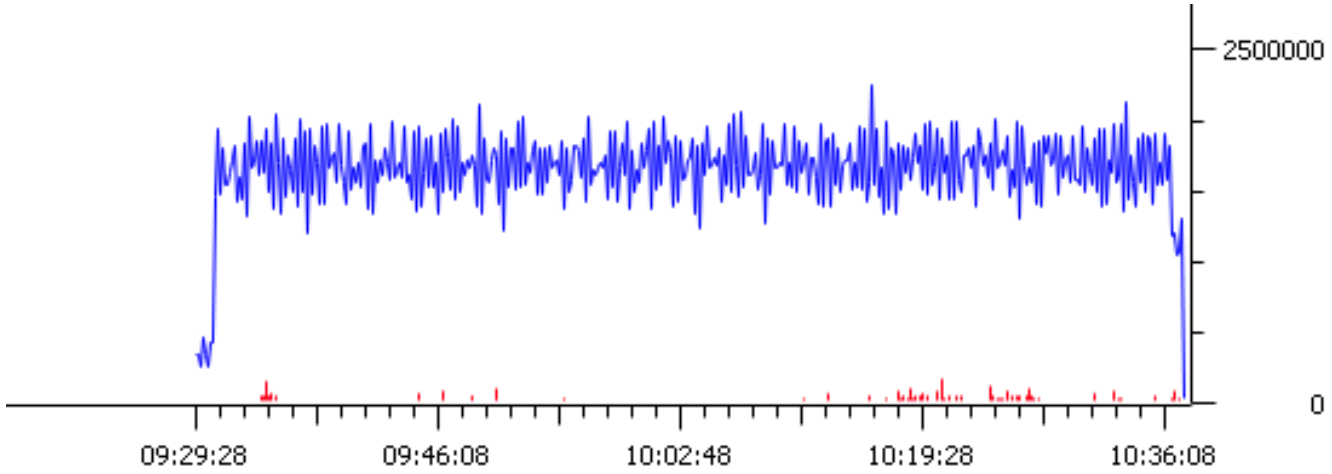
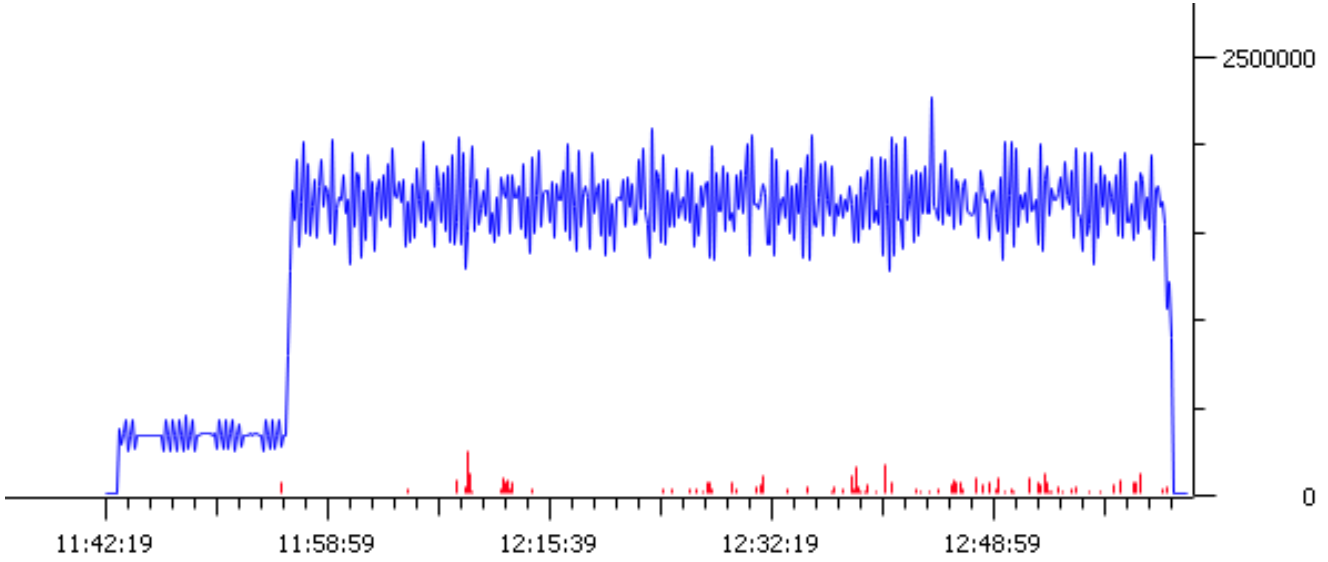
Reliable data transfer

PROOF

- **Orca data (TCP)**
- **TCP retransmission**







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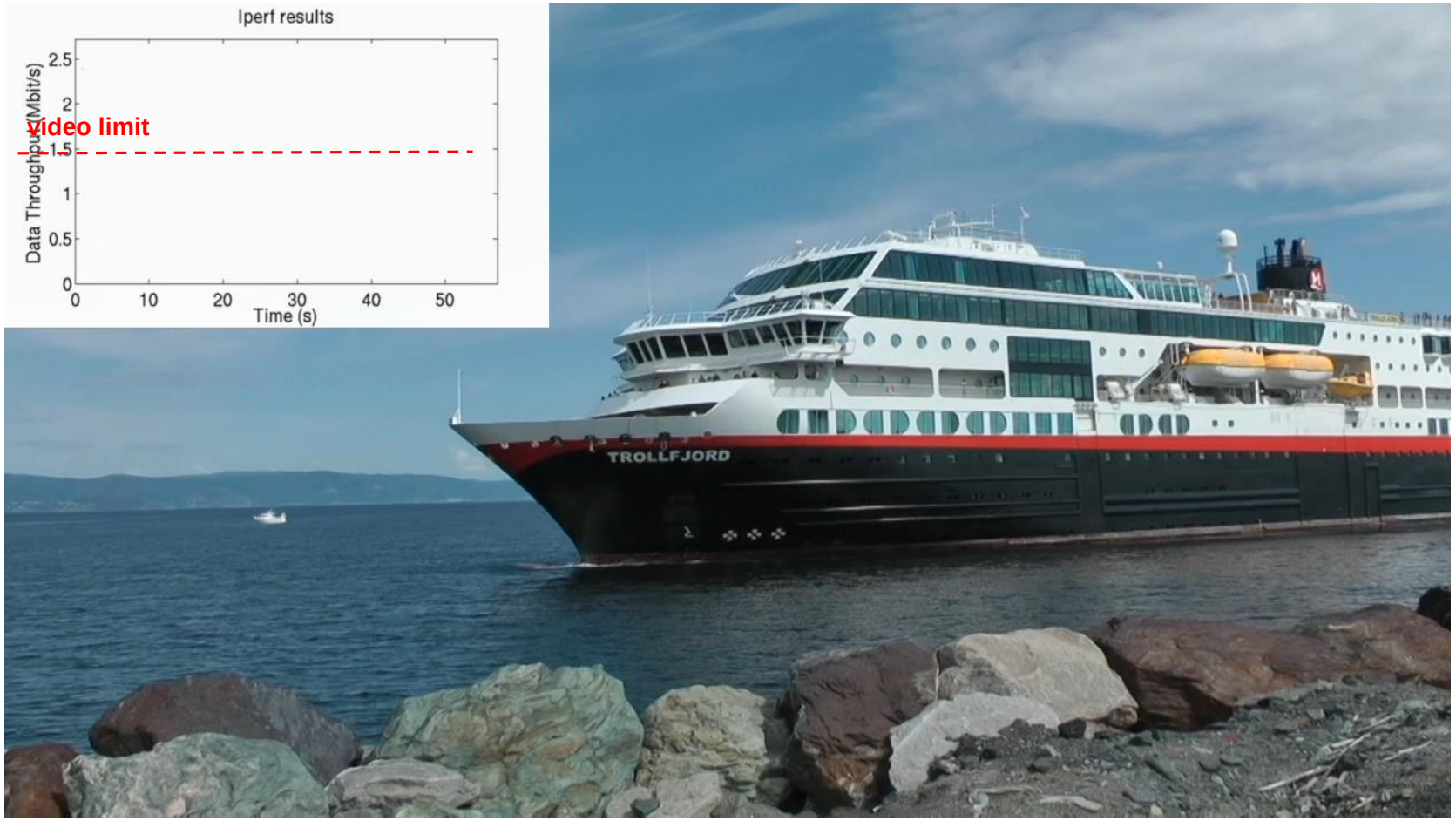
PROOF

Throughput test in difficult conditions

2 Mbps

1 Mbps



Autonomy

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Enabling technologies for Autonomy

Sensors
Surroundings
Condition monitoring

Cognition
Planning, learning and adaption

Perception
Analysis of signals and data
Generate proximity awareness

Localization and mapping
Relative positioning
Wider environment

Communication
Secure

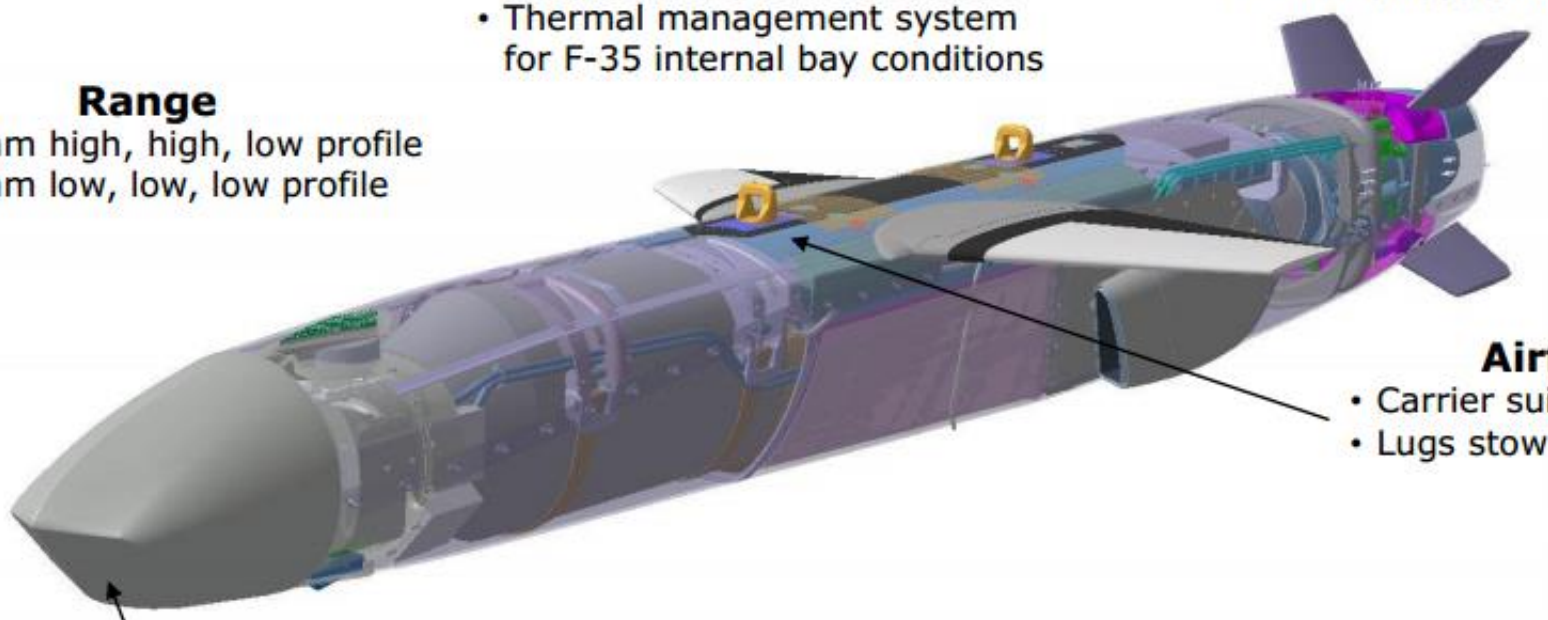
Human-Machine Interaction
Remote control
Man in the loop

JSM Missile Attributes

Propulsion
- Throttle modulates to achieve desired TOT
- > 1:1 thrust to wt in end-game

Avionics
- 2-way datalink
- Thermal management system for F-35 internal bay conditions

Range
- >300 nm high, high, low profile
- >100 nm low, low, low profile

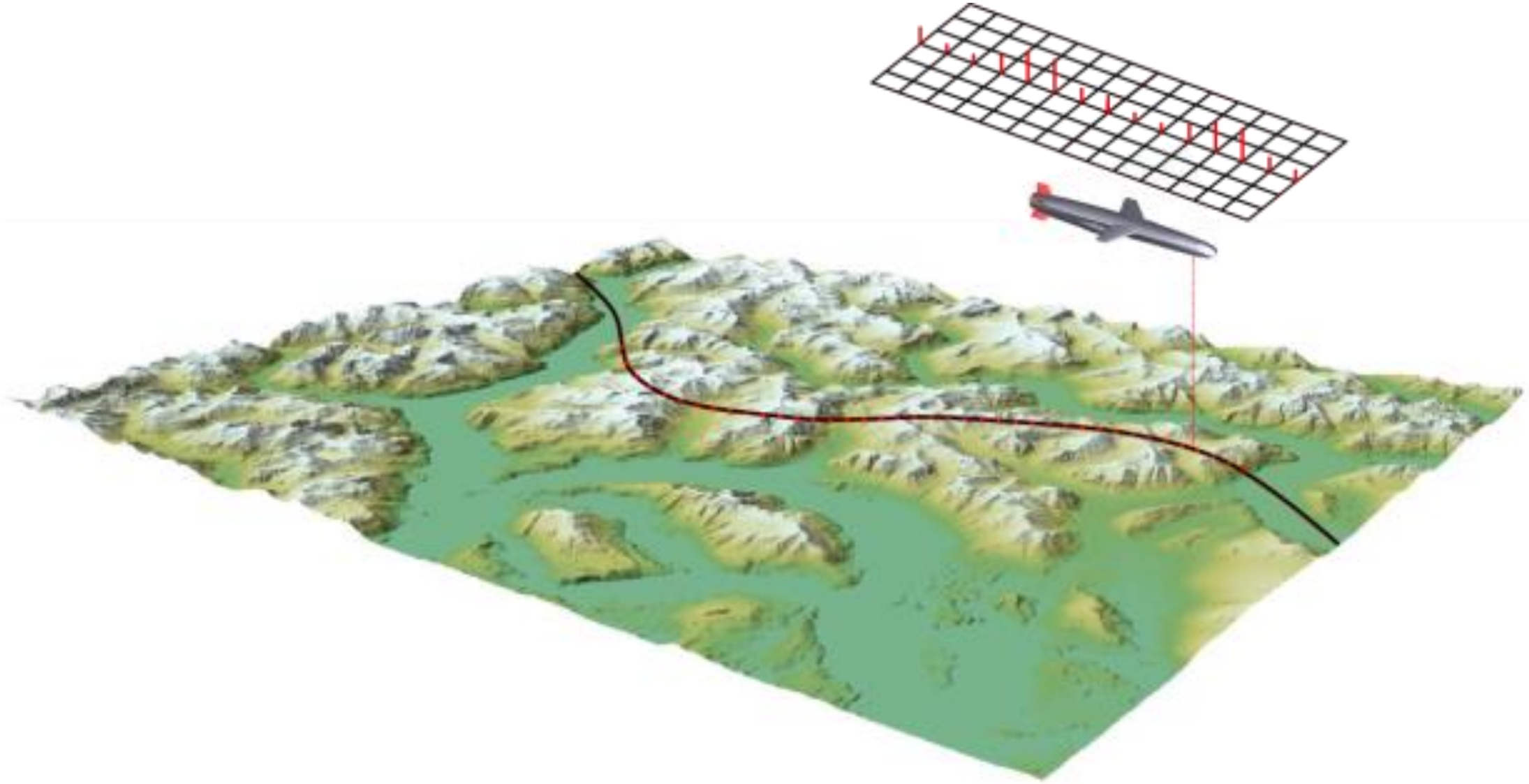


Airframe
- Carrier suitable reqmt
- Lugs stow after launch

Dimensions
- Length – 157 in
- Weight – 887 lbs
- Fits inside F-35A/C weapons bay
- CVN recoverable load

Seeker
- Seeker stablized on horizon

NSM/JSM Navigation System



HUGIN AUV

Dynamic Positioning – a level of autonomy

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eBird

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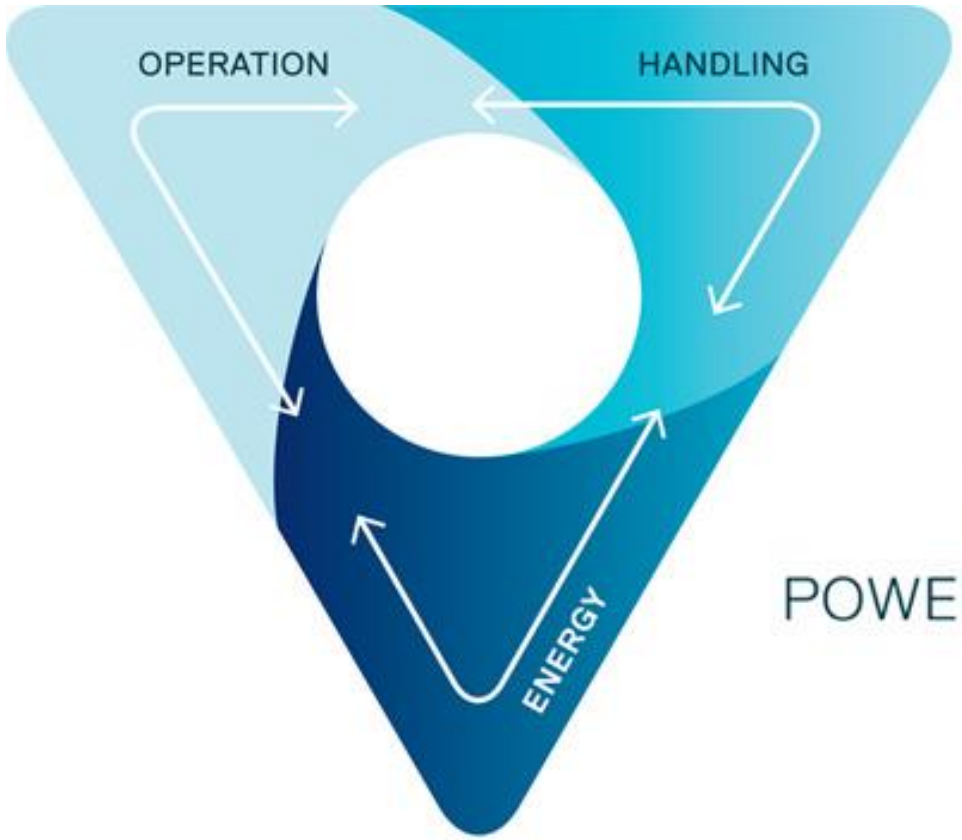

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THROUGH PEOPLE, TECHNOLOGY AND DEDICATION

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