



# INAS AND THE NEED FOR TESTING AND TEST AREAS

Ørnulf Jan Rødseth, SINTEF Ocean

# MUNIN: A concept study for a fully unmanned handymax dry bulk carrier on intercontinental voyage.

- Duration: 01.09-2012 – 31.08.2015
- Funding: 2.9 million EUR of budget 3.8 million EUR
- Activity code: SST.2012.5.2-5: E-guided vessels - the 'autonomous' ship



<http://www.unmanned-ship.org/munin/>

# Test area Trondheimsfjorden



- Established September 30th 2016

- Industry, university, research
- Port of Trondheim
- Norwegian Maritime Administration
- Norwegian Coastal Administration



- Area covers Trondheimsfjorden

- Permits
- Instrumentation and communication
- Exchange of experience

<http://navtar.no/>

# Norwegian Forum for Autonomous Ships

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- Established October 4th 2016
- Operated as a joint industry project at SINTEF Ocean.
- General Manager is Mr. Ørnulf Jan Rødseth.
- A board of governors overseeing operations. General assembly approves budgets and strategies.
- 47 Institutional Members
  - Including Industry, authorities, class, insurance research, universities, ports ...
  - 2 other institutions as personal members

**NFAS** Norsk Forum for  
Autonome Skip

<http://nfas.autonomous-ship.org>

# International Network for Autonomous Ships

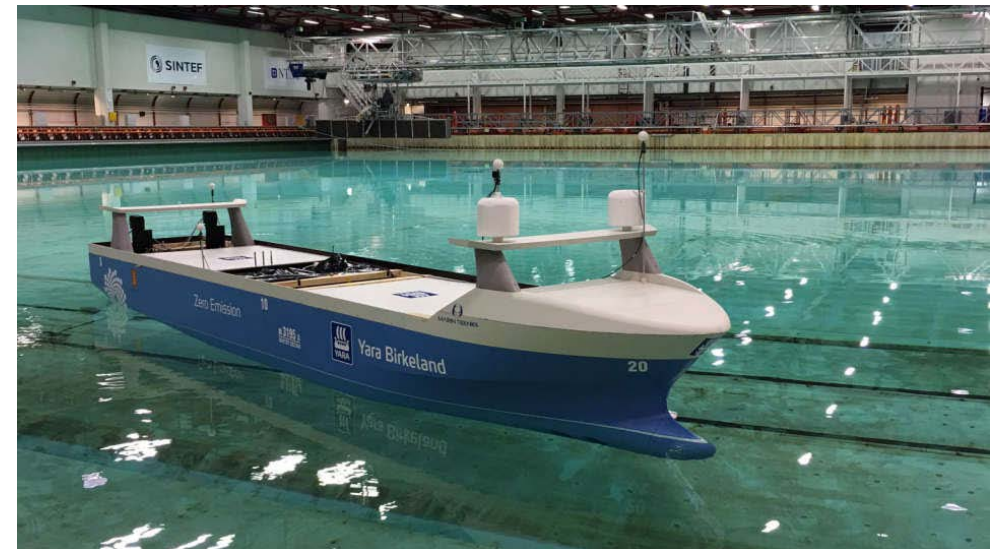
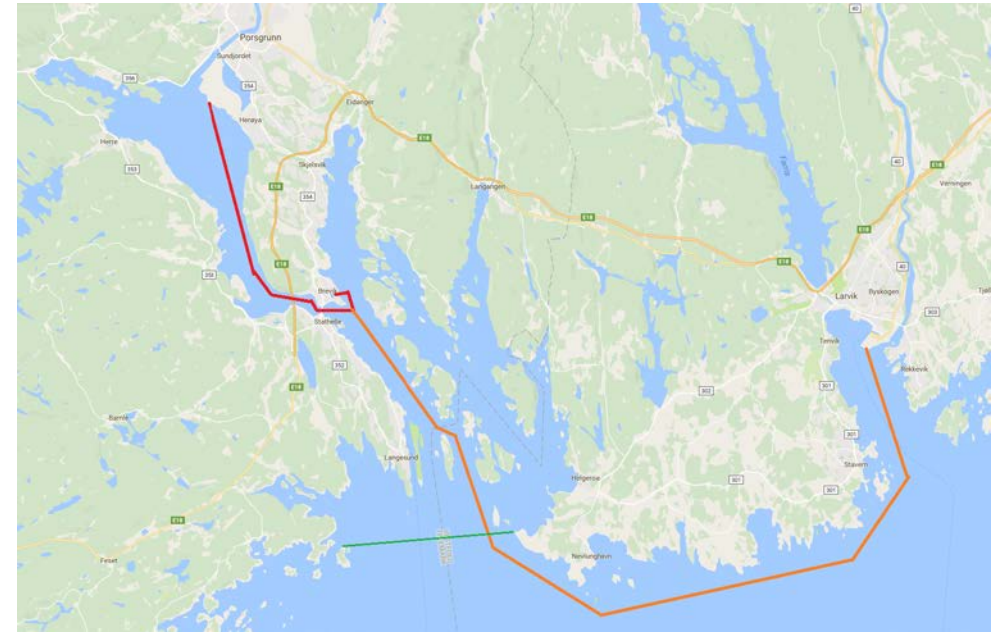


- Agreed on at meeting in Oslo Oct. 30th 2017
- Hosted by NFAS and SINTEF Ocean
- 13 active countries
- 2 correspondent countries
- 3 regional organizations



# Yara Birkeland

80x15 m  
3500 DWT  
6-12 knots  
Busy & narrow Fairway



# Automatic road ferries

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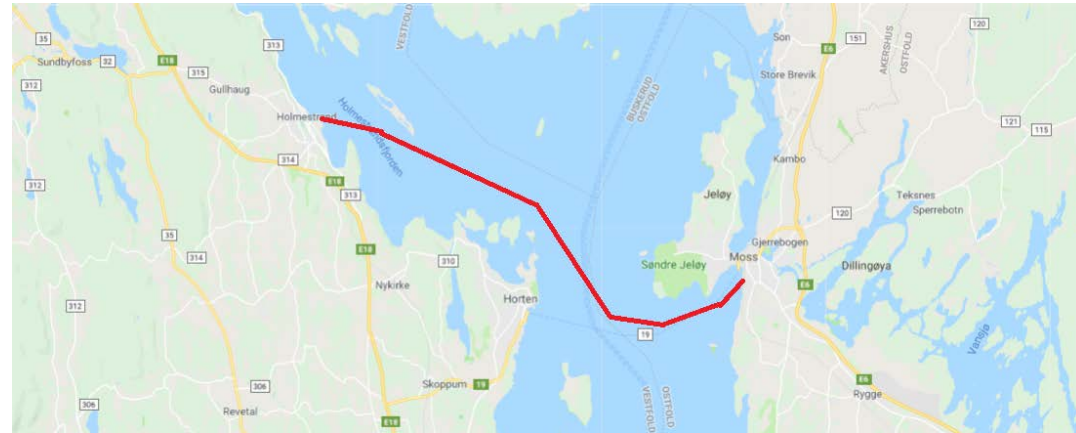


Picture: Fjord1

# ASKO trailer ferry

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- Connects warehouses at different sides of the Oslo fjord, 8 nm distance
- Truck trailers automatically positioned on ferry
- Sixteen 45 feet containers with trailers - two or three ferries
- Fully electric ferry and transport chain



# Autoferry

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- Avoid bridges
  - Blocks other ships
  - Costly
- Flexible and lower cost
  - On-demand operations
  - 24x7 operation without crew
- Environment
  - Battery operation
  - Silent, no congestion
  - Better use of infrastructure





**AUTOSHIP**  
Autonomous Shipping Initiative for European Waters

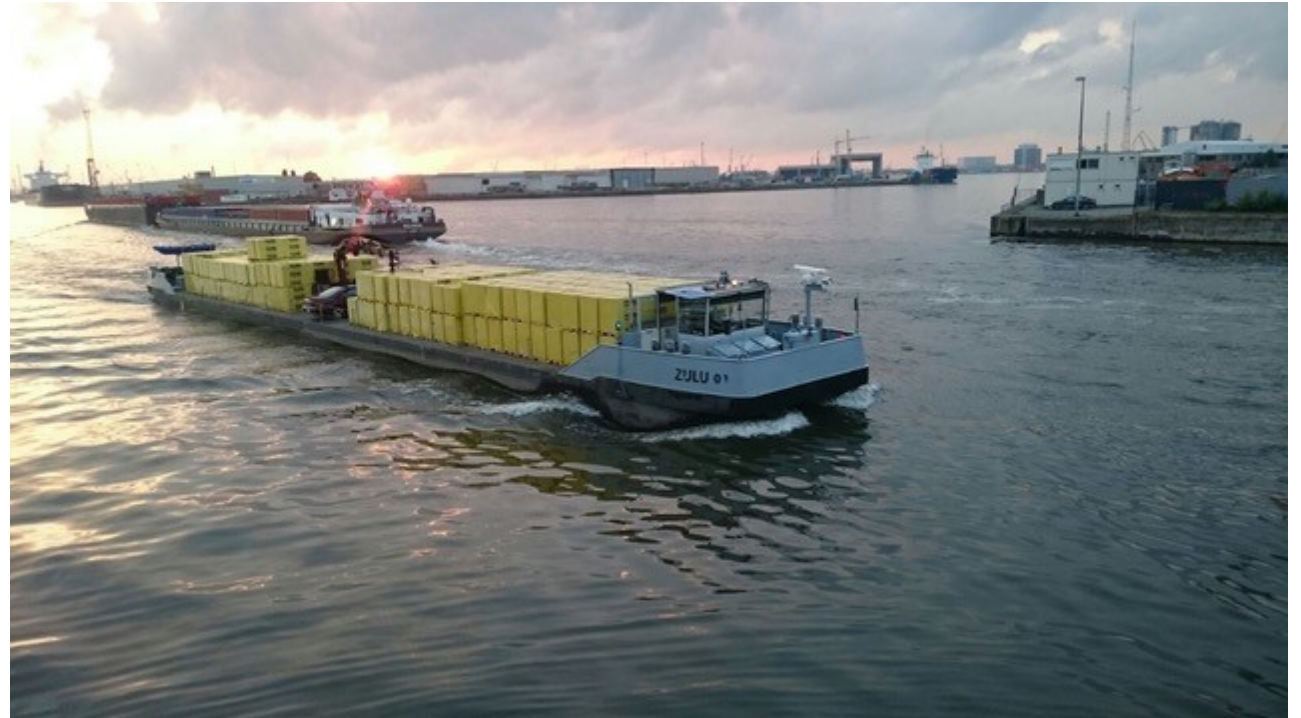


The project has received funding from the European Union's Horizon 2020 research and innovation program under Grant Agreement N°815012.

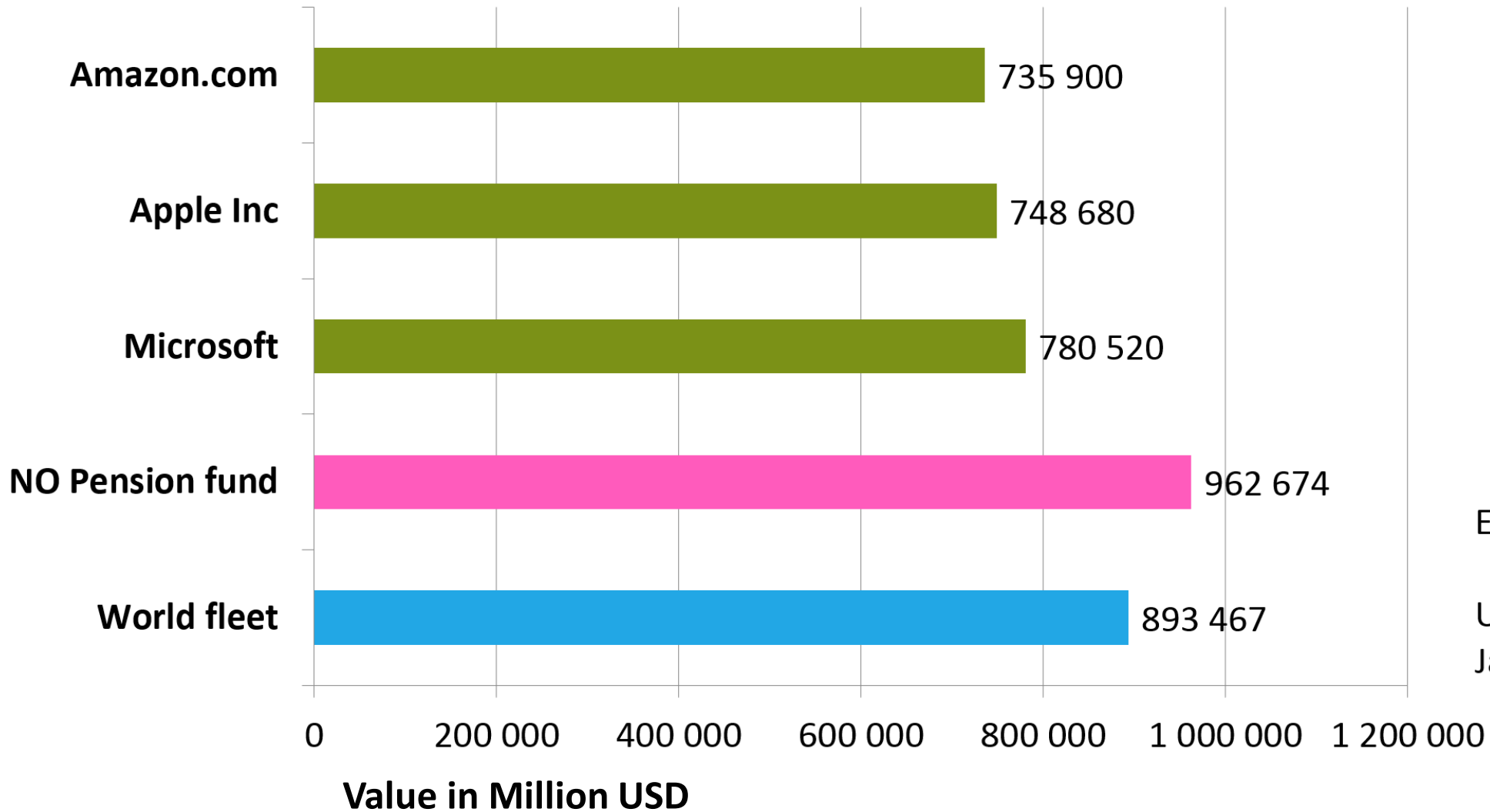
AUTOSHIP will build and operate the next generation autonomous ships and their shore control and operation infrastructure to Technology Readiness Level 7

- One use case for inland waterways
- One use case for short sea shipping

Coordinator: Ciaotech Srl (PNO Group)  
Total project cost: €27,679,830  
EU Contribution: €20,109,109  
Duration: 42 months (from 06/19)



# Value of world fleet



End 2018

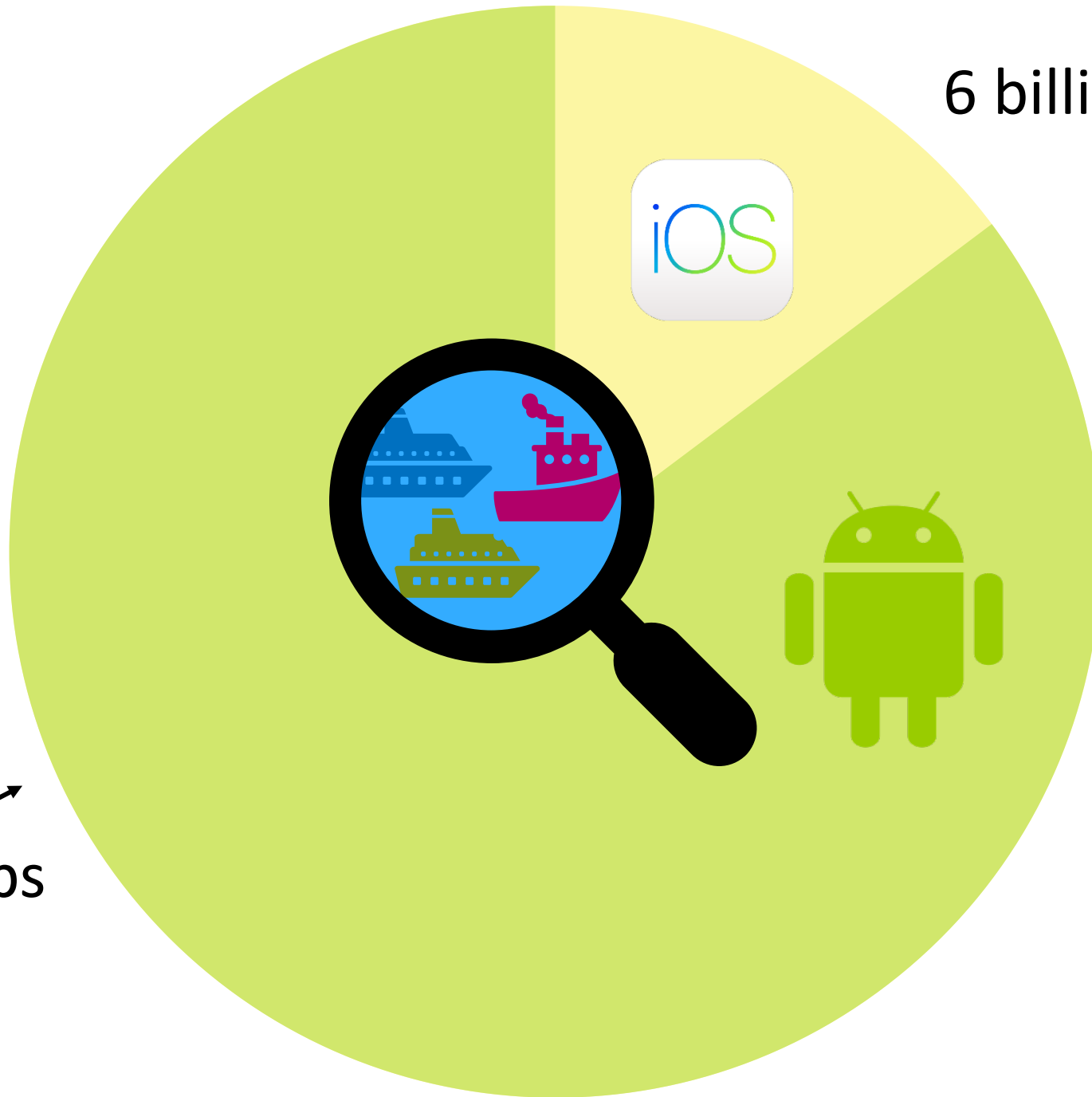
UNCTAD/Clarkson, 2018  
January 2018

6 billion smartphones

60 000 ships

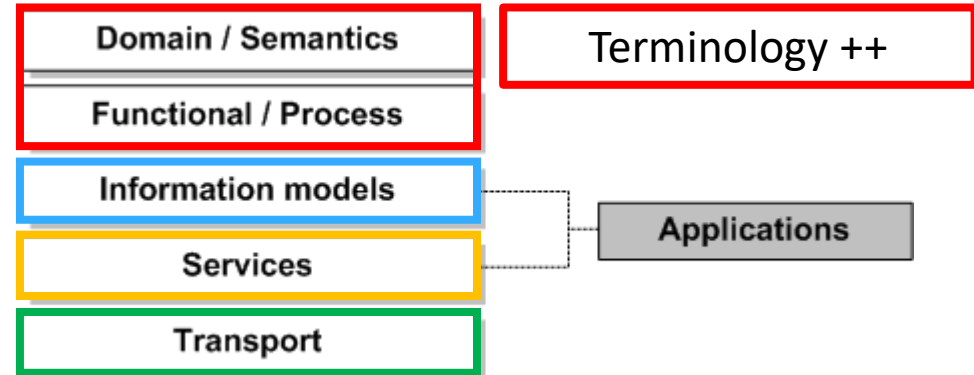
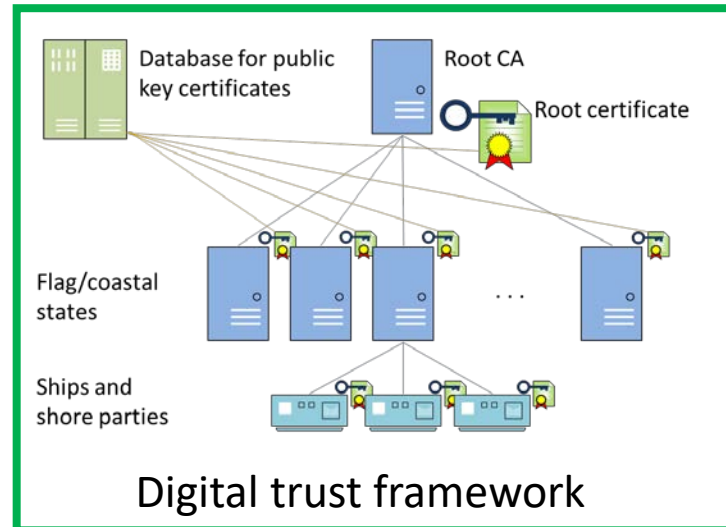
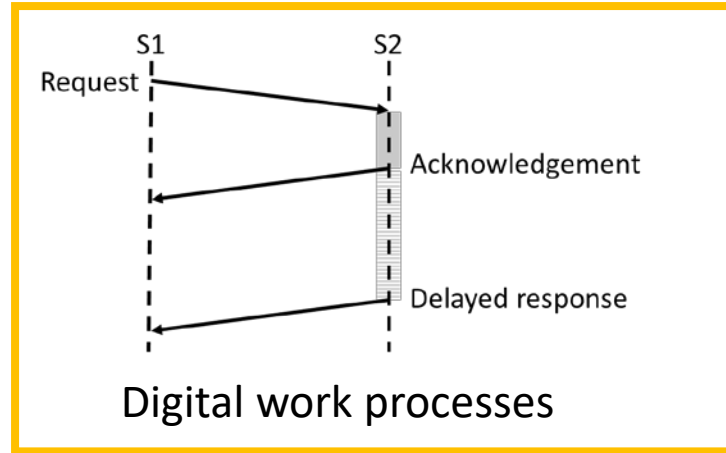
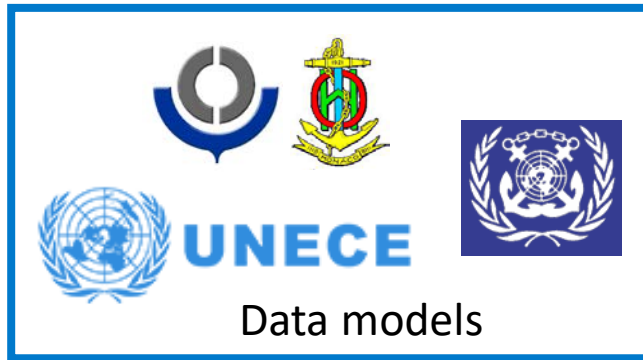


6 billion smartphones

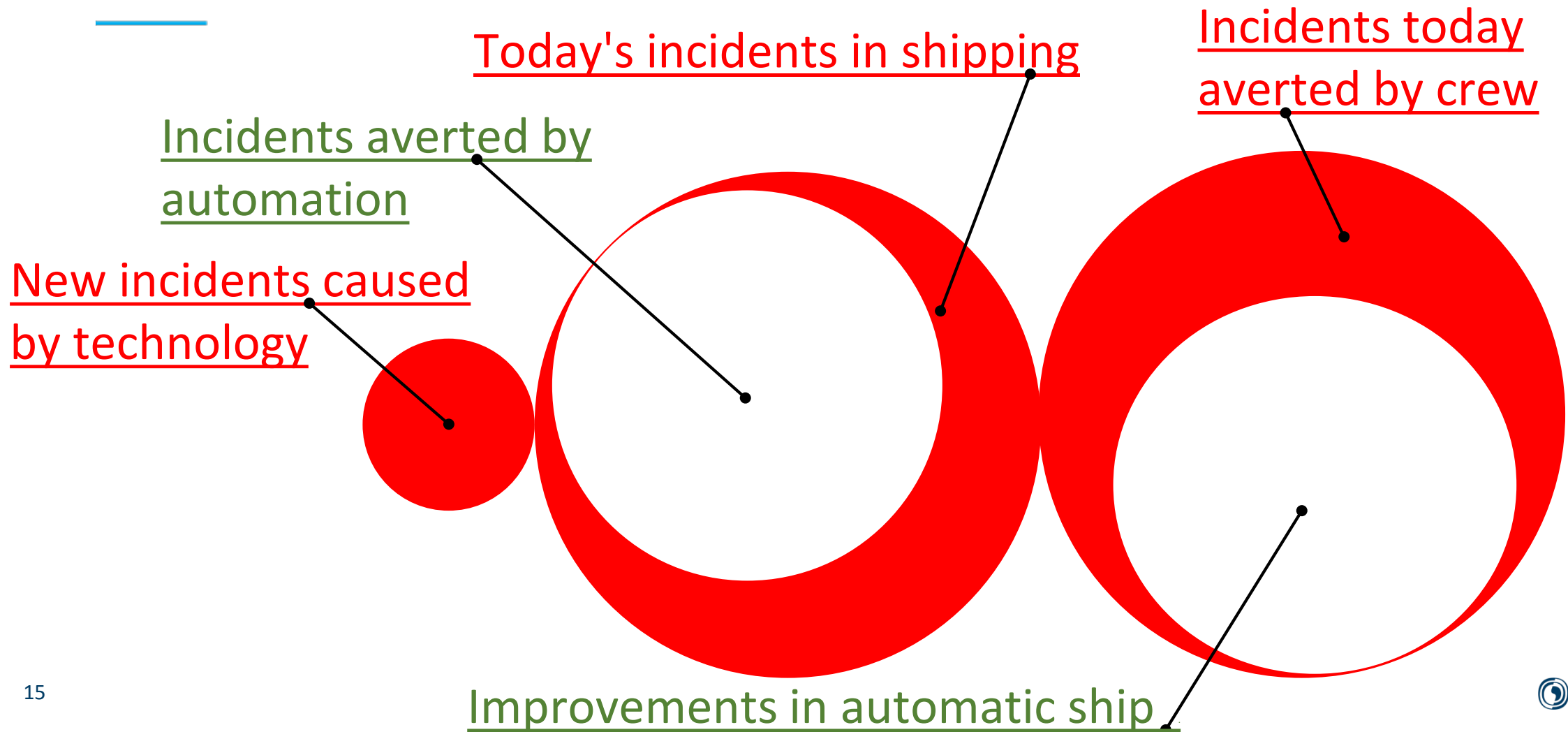


60 000 ships

# Automation of digital processes

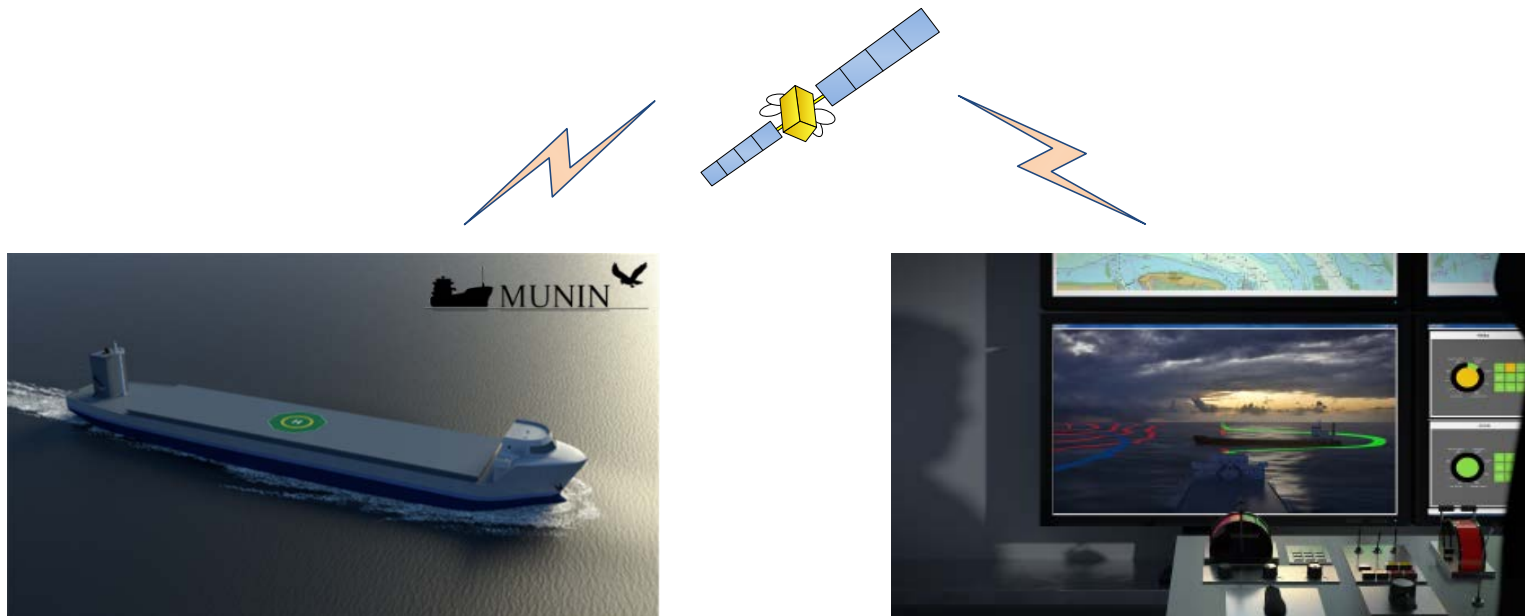


# Safety targets and testing



# Standards for communication to remote control

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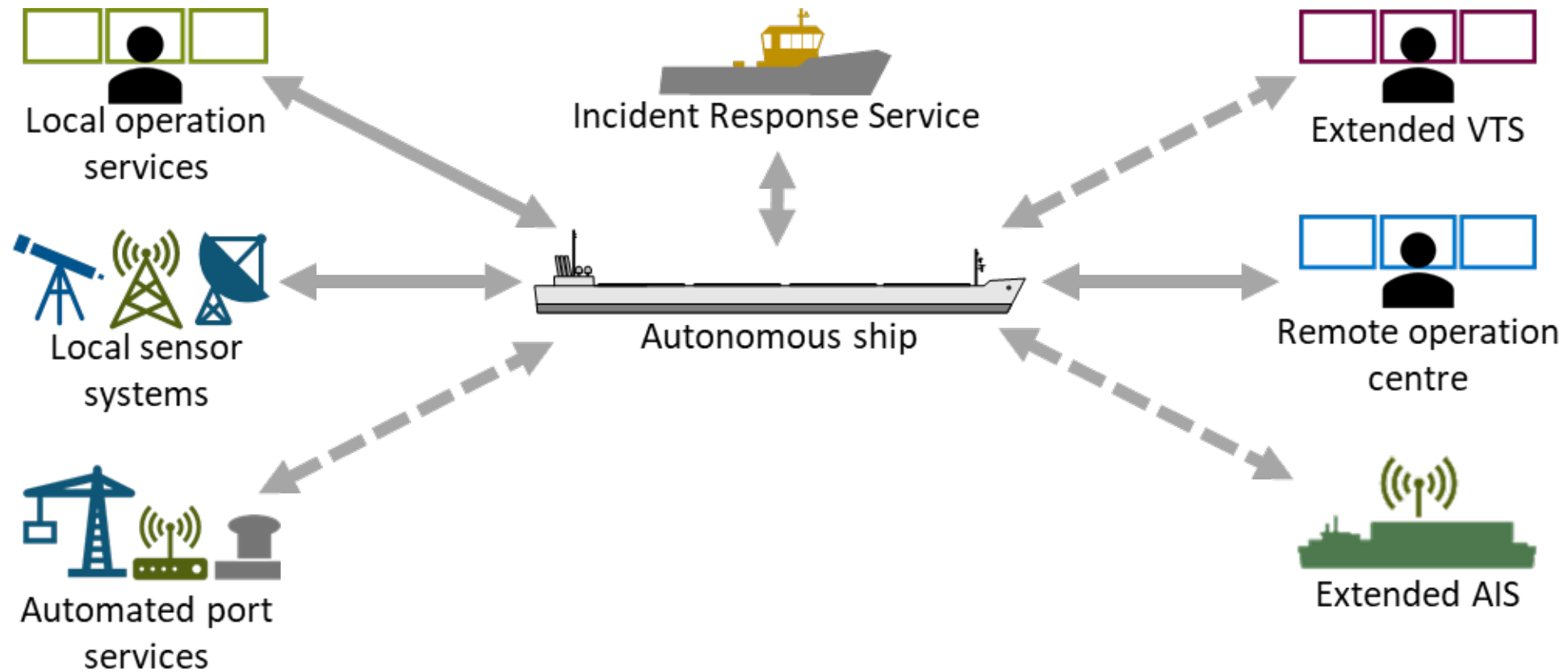


To RCC

RCC to VTS

RCC to Pilot?

# ... nor other entities near the ship



# Conclusions

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- Autonomous ship deployment requires standards
- Perhaps most importantly in digital interfaces and safety targets
- Test areas can be a driver for developments