



NFAS Norsk Forum for Autonome Skip

FREMTIDENS GODSTRANSSPORT MED UBEMANNENDE SKIP

Ørnulf Jan Rødseth

Daglig Leder, NFAS - Seniorforsker, SINTEF Ocean

OrnulfJan.Rodseth@sintef.no

SINTEF Ocean

Fra januar 2017, sammenslåing av:

- MARINTEK
- SINTEF Fiskeri og havbruk
- SINTEF Miljøkjemi

Not-for-profit, uavhengig AS

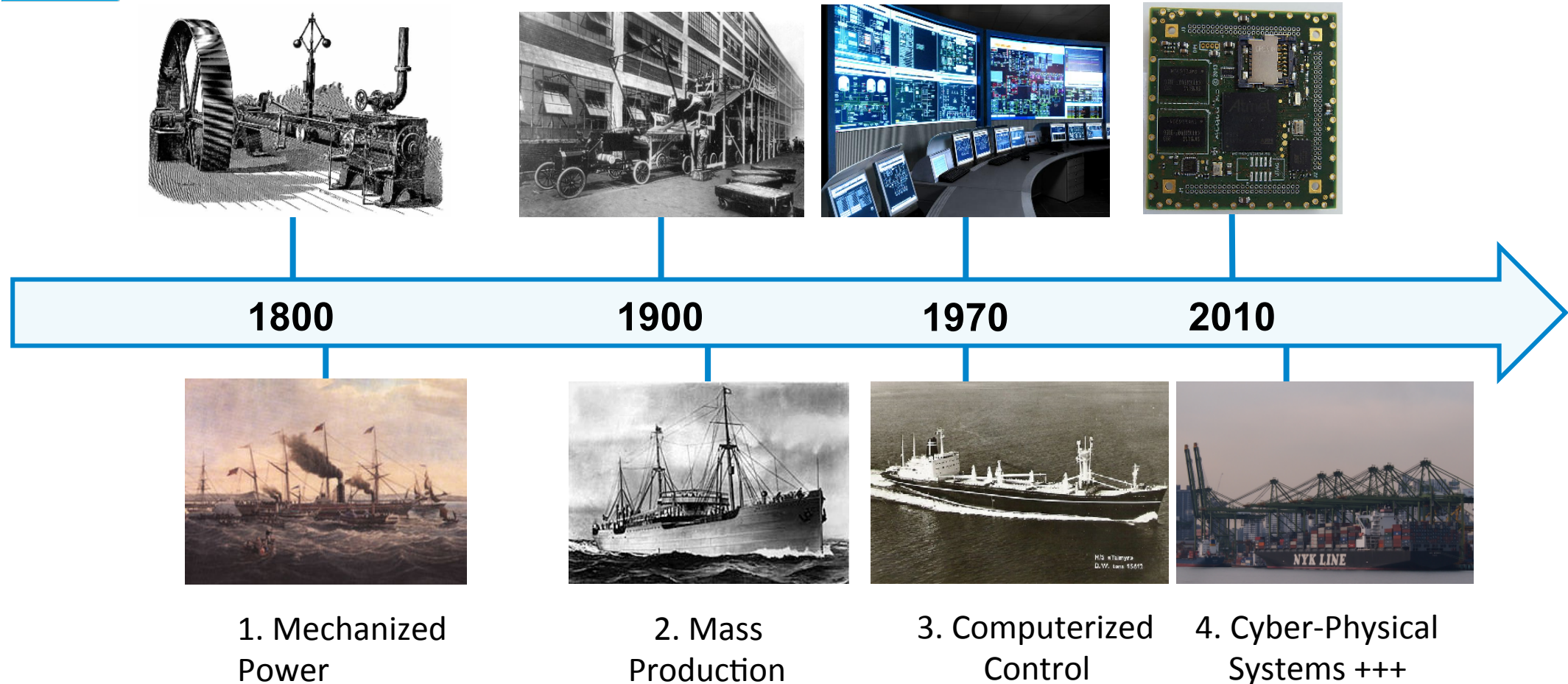
Kontraktsforskning

360 ansatte

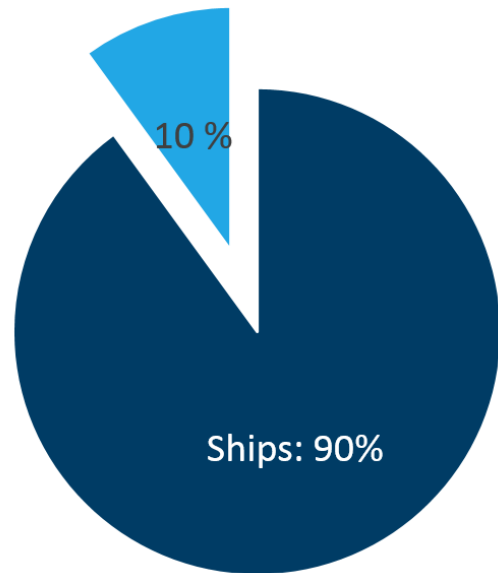


Hvorfor autonome skip og hvorfor i Norge ?

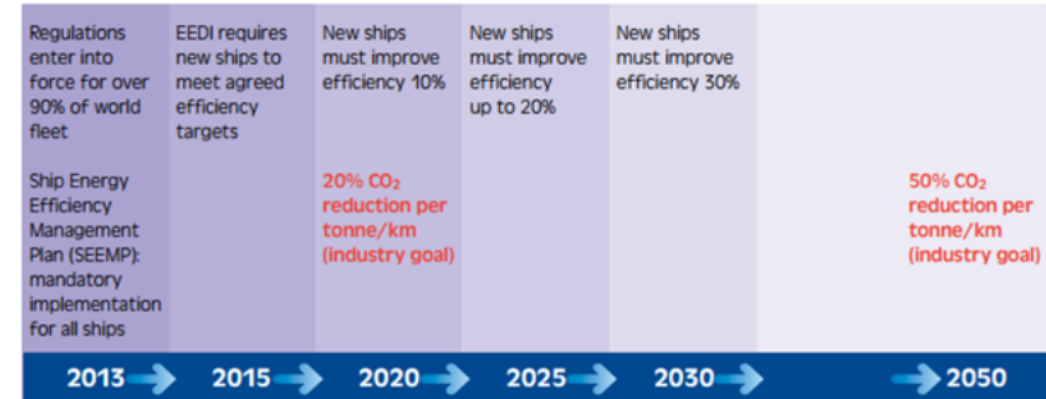
The fourth shipping revolution is on



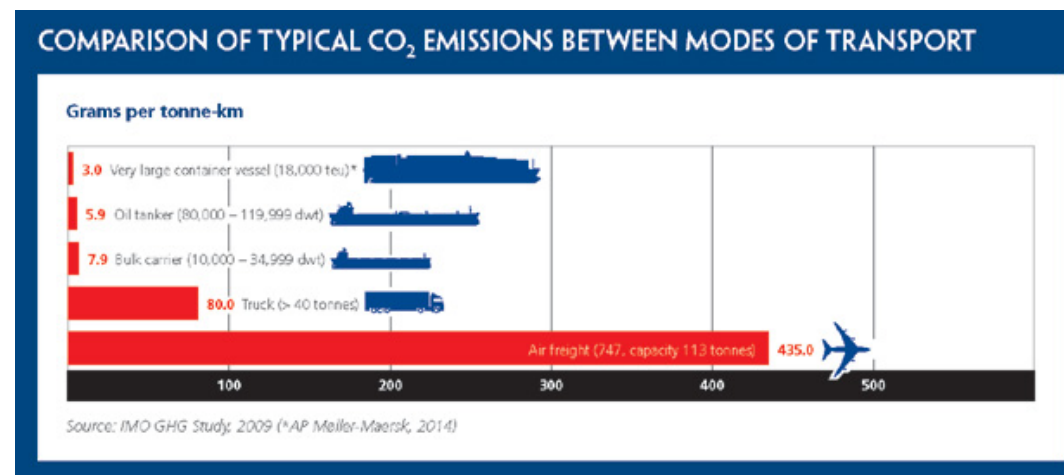
Ship transport: The life-blood of world trade



90% of world trade



... but aim is to make it 50% more effective by 2050



Extremely efficient

Why autonomous ships?



Fewer accidents



Fewer oil spills



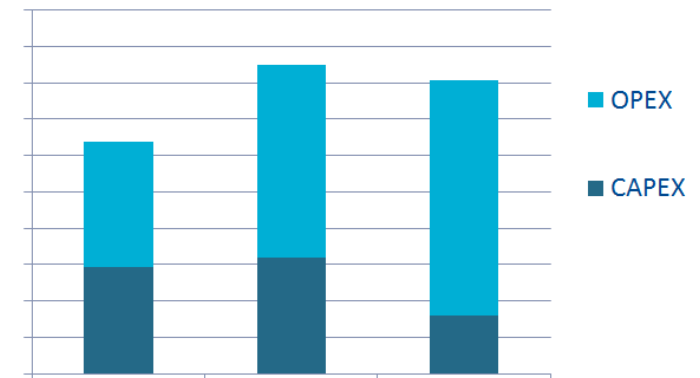
Working conditions and crew



Lower emissions



Fully unmanned!



Lower costs

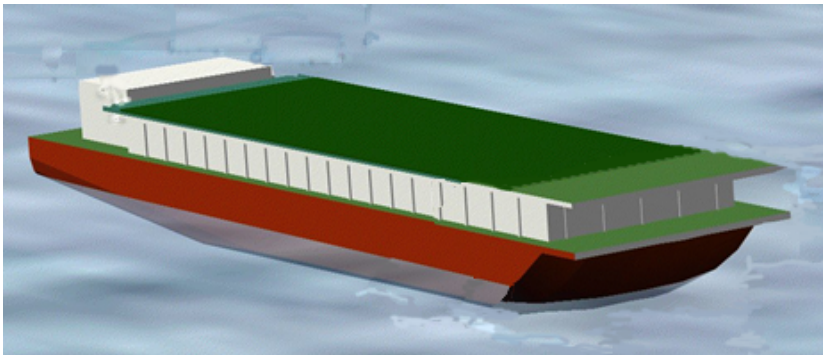
New transport systems and business models



Mother ship and unmanned drones



Low operational cost short sea shipping



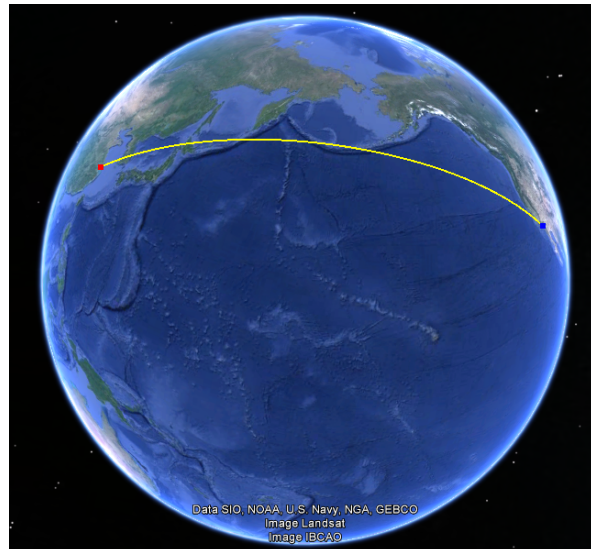
Small scale last mile shipping



Automated
Offshore supply

Deep sea is feasible, but not first mover ?

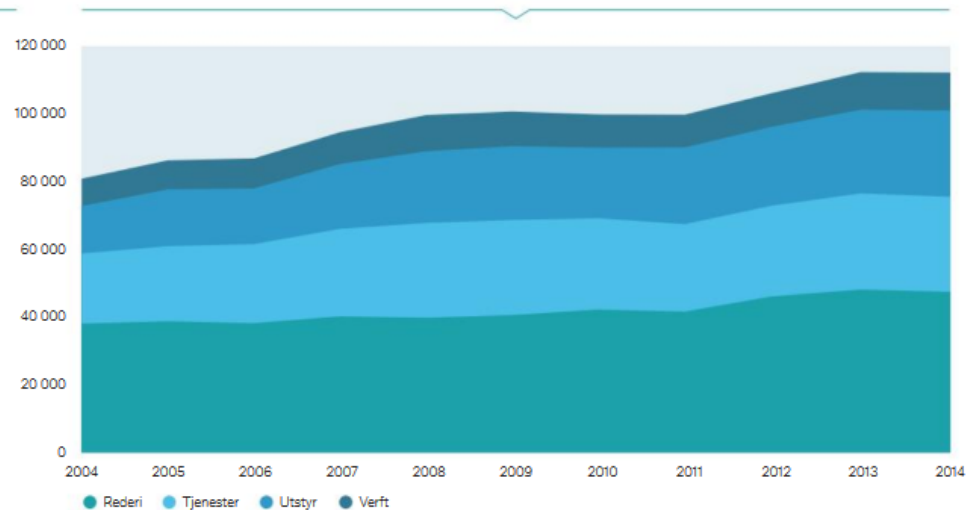
- 10 000 TEU container vessel
- Shanghai – Los Angles
 - Two states involved
 - 6000 nm, open sea
 - No channels
 - Short port approach
 - Remote control to port
- Dual propulsion systems
- Two stroke diesels
- Biofuel, methanol ...



Why shipping in Norway?

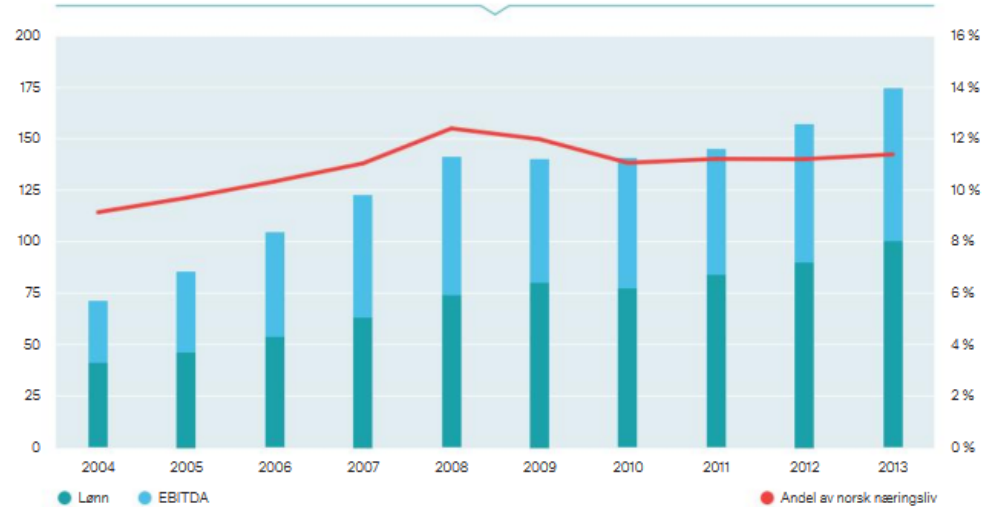
Maritim Verdiskapingsbok 2015, Maritimt Forum, Norge

Figur 2-4: Antall ansatte i maritim næring i Norge fordelt på fire hovedgrupper 2004-2014. Kilde: Menon/Bisnode

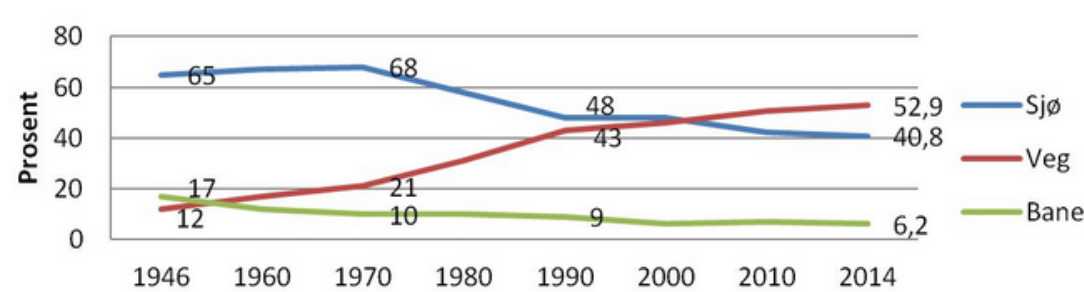


> 100 000 employees – 4% of workforce

Figur 2-1: Maritim verdiskaping og næringsandel av norsk næringsliv 2004-2013. Kilde: Menon/Bisnode

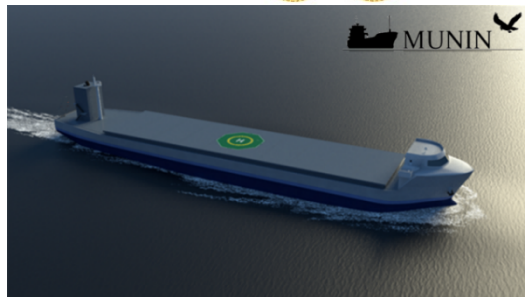


14% of value creation from businesses
38 % of export (ex HC)



Still a big role in inland cargo transport –
that needs to be increased

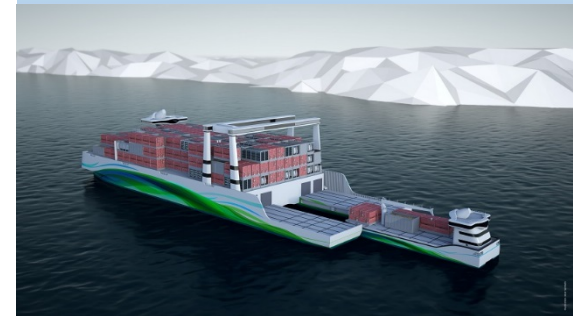
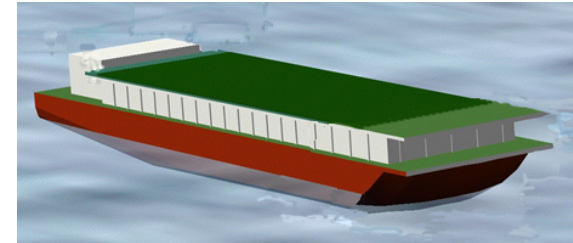
Why autonomous ships in Norway?



Yards and equipment



Shipping & services



New transport systems

Hvor kommer vi fra ?

Extensive research in Norway on AUVs in 1980s



The HUGIN AUV was a result of that

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/>

Followed by huge international interest

- DNV GL ReVolt
- Rolls Royce AAWA
- Test area Trondheim
- Kongsberg Hrönn
- Cooperation forums in NO and UK



NFAS Norwegian Forum for
Autonomous Ships



Nye infrastruktur-aktiviteter
og teknologiutvikling.

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/>

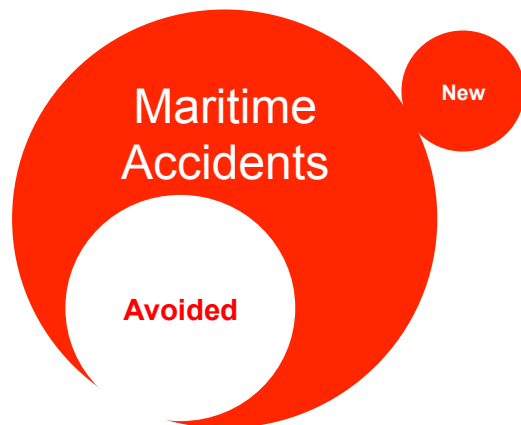
Norwegian Forum for Autonomous Ships

- Established October 4th 2016
- 38 Institutional Members
 - Including Industry, authorities, class, insurance research, universities, ports ...
- Establishing international links
 - FI, US, UK, BE in discussions



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

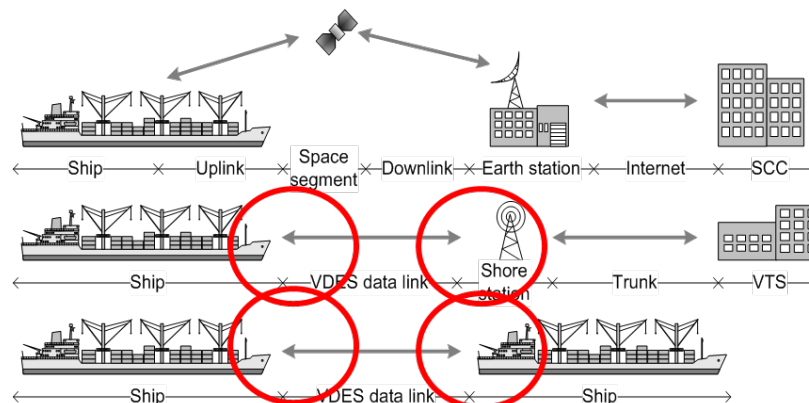
En rekke nye prosjekt for teknologiutvikling



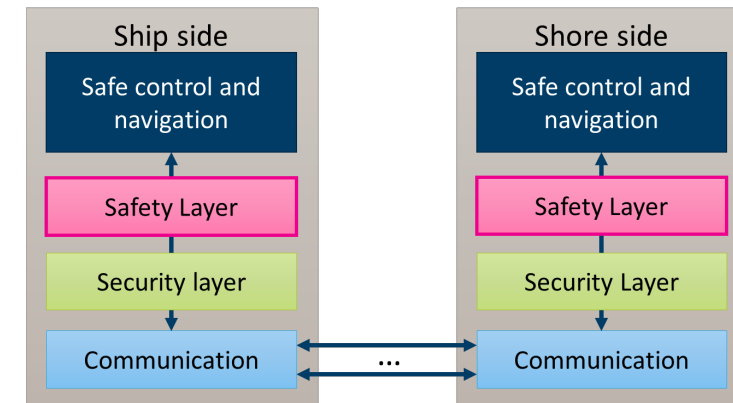
SAREPTA: Risiko og akseptkriterier



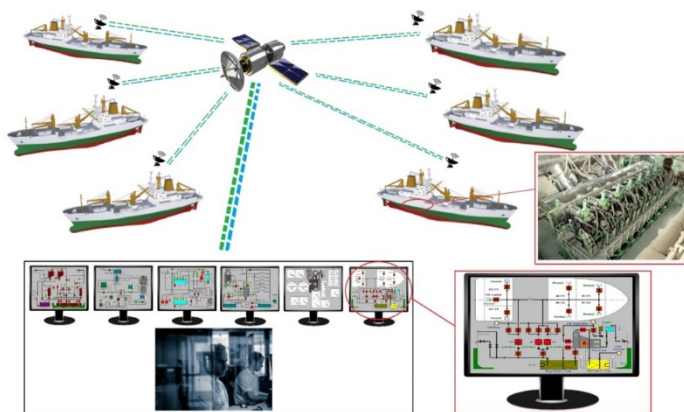
AutoSea: Sensorer og navigasjon



CySiMS: Cyber Security



Safe communication

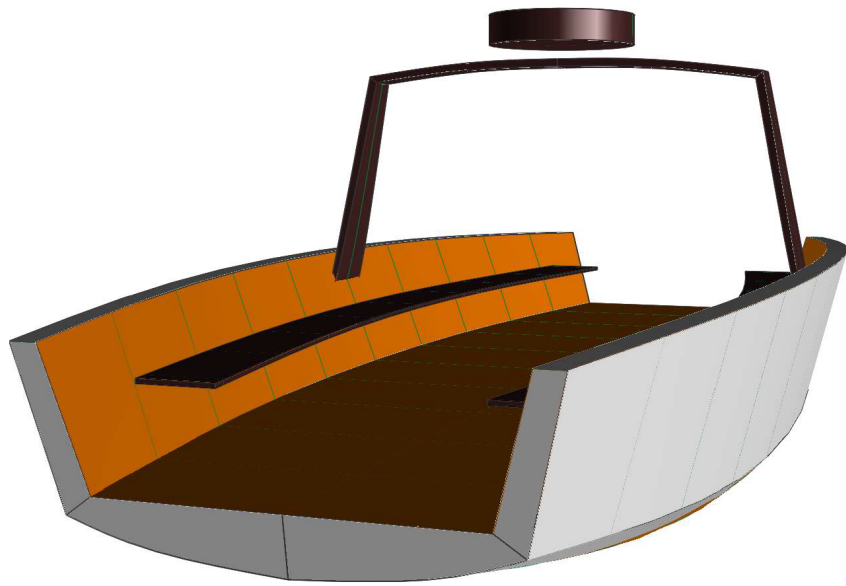


ROMAS: Remote engine control

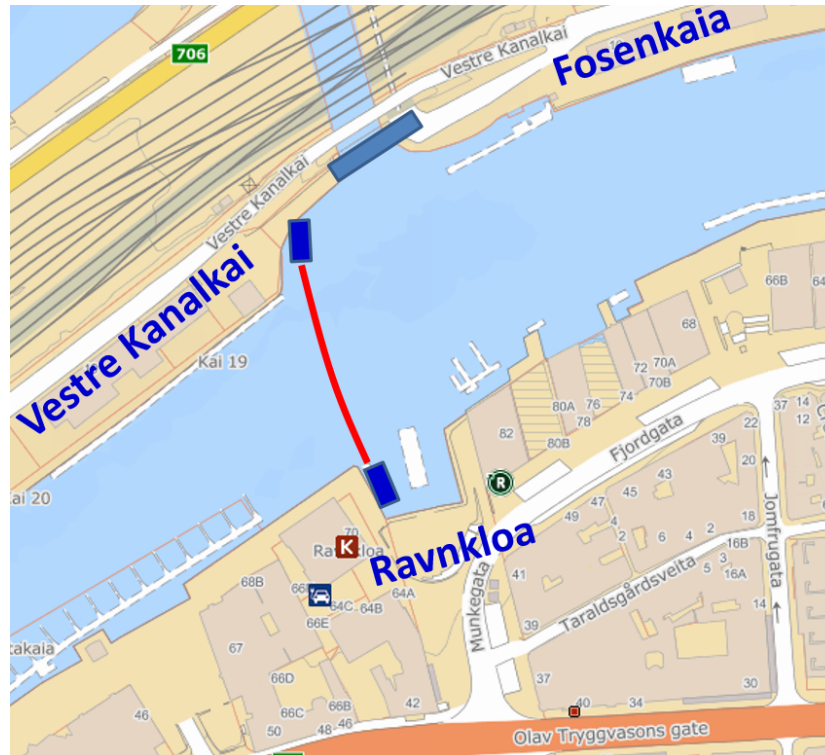
SEA
TONOMY

Utviklingsmetodikk

Nye skipstyper under utvikling.
Nye transportsystemer.



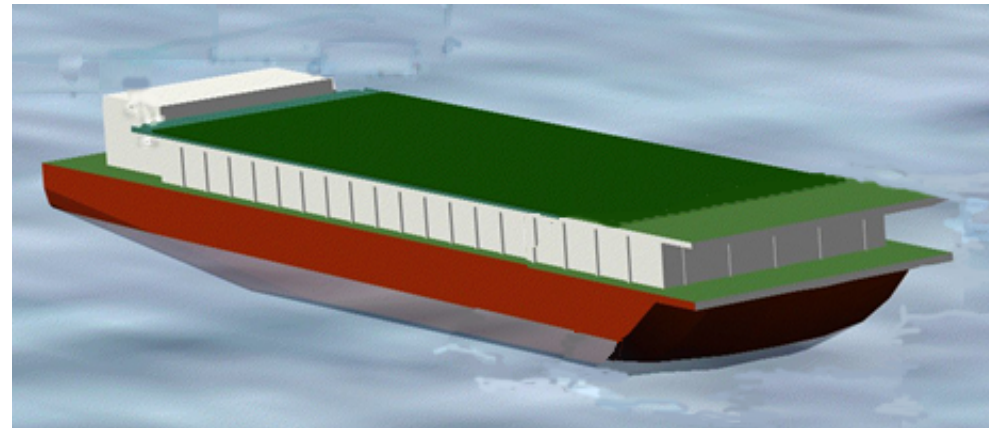
- On-demand passenger ferry
- Max 12 persons + bicycles
- Electrical propulsion, battery
- Inductive charging at quay



Linking center of Trondheim to
seaside and rail station

Autonomous Ship Transport at Trondheimsfjorden (ASTAT)

- Short voyages
- 12-50 TEU
- Inland, fjords/
sheltered
- Low cost: Wait in port
- Legs 4-12 hours
- Port cranes
- Automated berthing
- Batteries



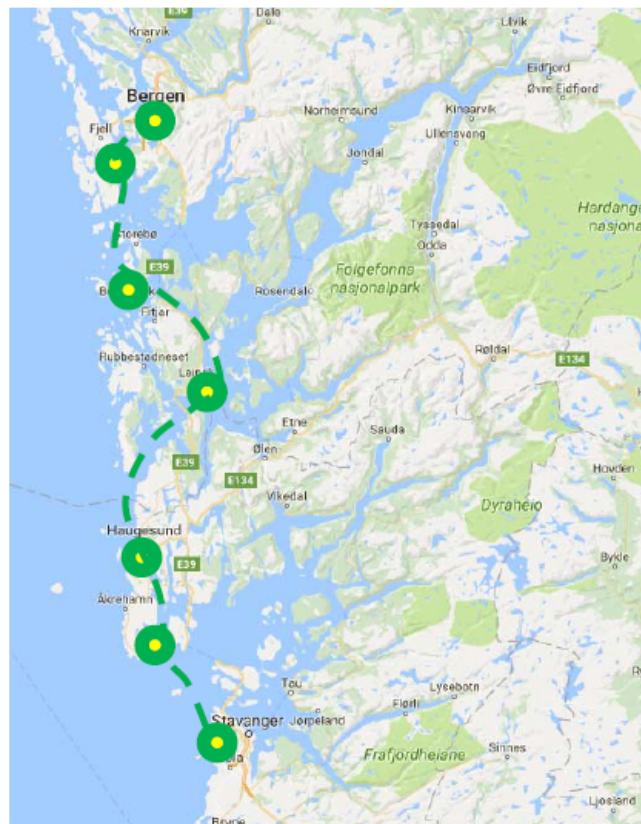
Possible cases in Trondheimsfjorden



GREEN COASTAL SHIPPING PROGRAMME

Pilot 8: AUTONOMOUS COASTAL CONTAINER FEEDER

Operational area



Vessel

Plug in hybrid.

Battery powered during normal operation.

Speed: 12 kts

Operational range: 100nm

Capacity: 100 TEU

1300 DWT

LOA: 60 m



KONGSBERG

The SIMAROS project

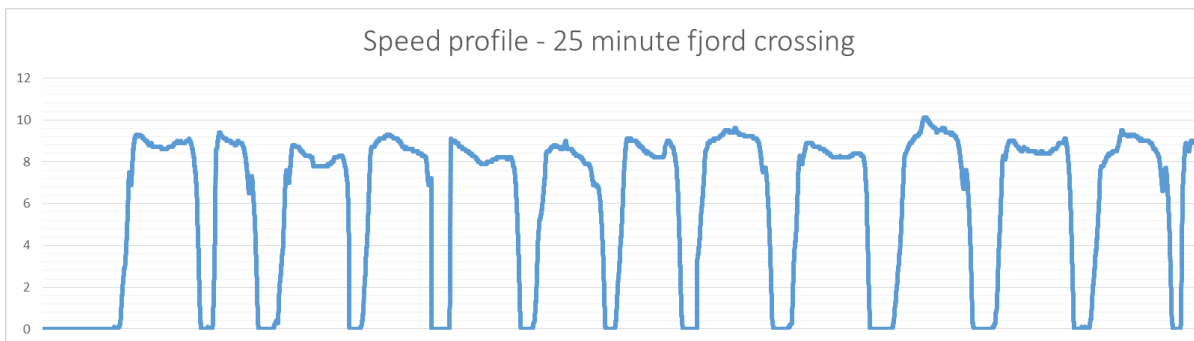


Automatisering av fjordkryssing



Ikke samme ferge!

Speed profile - 25 minute fjord crossing



Avslutningsvis ...

- Autonome skip vil endre transportsystemene og blir en viktig faktor i av-karboniseringen av transport – ikke minst ved å overta mye veitransport.
- Norge har naturlige fortrinn for utvikling av autonome skip, både industrielt, i viljen hos myndighetene og i transportsystemene.
- Vi er allerede godt i gang og fremtiden blir meget spennende!



Technology for a better society

NFAS Norsk Forum for
Autonome Skip

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