AUTOSHIP
Autonomus Shipping Initiative for European Waters

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Why autonomy in waterborne transport? – A systematic review

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

AUTOSHIP

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AUTOSHIP aims at **speeding-up the Next Generation of Autonomous Ships**

Developing Enabling technology — Bridge the missing gap to **integrate and develop Key Enabling Technologies up to Demonstrating autonomous vessels in real environment** Short Sea Shipping and Inland Water Ways.

Building a common vision — Actively **contributing to understand** business cases, regulations, standards, liabilities and **socio-economics of autonomous shipping**

Achievement:

Retrofit and operate 2 remote and autonomous vessels and their needed shore control and operation infrastructure, reaching and going over TRL7.

	Inland Water Way	Short Sea Shipping
Vessel type	Class2 Pallet Shuttle Barge (PSB)	Fish-feed carrier with a 1462 deadweight capacity-DWT and 74,7 m length
	 INLAND WATERWAYS BARGE	 SHORT SEA FEED CARRIER
Operational focus	Transit, docking & undocking, lock navigation, continuous operation	Transit, docking & undocking, cargo operation, fish farm interaction, weather window
Autonomy level	4. Constrianed Autonomous & Continously Unmanned	3. Constrained autonomous & Periodically unmanned bridge - high degree of automatic operations
Area of operation	Inland Waterways	Open Sea
Rules & regulations	National Authorities and local governing bodies	Flag state, Classification Societies, IMO
Shore operation	Logistical and transport planning, monitoring, exception handling	Route planning, monitoring, remote controlled operations, exception handling, decision support
Infrastructure	RIS (River Information System), VTS, Lock interaction	Local / Coastal VTS
Connectivity	Near land possible use of mobile networks and shorter range communication	Shorter range communication where available, otherwise satellite communications

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WHY ARE WE DOING IT?

CHALLENGES IN THE MARITIME INDUSTRY

With **less than 100.000 vessels** worldwide, shipping repersents over **90 percent of world trade**

10.6 % of transport emissions. Ca. 3 % of global emissions.

Shipping is co-responsible of **ocean acidification**.

Emissions of **air pollutants like sulphur dioxide** can travel long distances.

The number of **seafarers quitting the industry** increases every year (safety, unsettled life, hard-work)

Modal shift targets to decongestion EU roads

Keep **EU technology leadership**

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ARE WE SURE THAT IT CAN HELP?

3 weeks ago

This is impressive I must say, but I still think that ships need human crews onboard no matter how technologically sophisticated they are.

3 weeks ago

Green shipping would be a massive leap in pollution reduction considering most ships burn fuel oil which inevitably seems to find a way into bilge waste which is routinely dumped in the open oceans without a care, bu autonomous shipping with all the variables at sea just sounds like a disaster waiting to happen, however the proof is in the pudding as they say but if accidents did happen its only with hindsight people would show animosity toward the practice.

Show less

11 REPLY

2 weeks ago

Looks like an excellent application of technology for non-passenger transportation plying inland waters. But entering foreign ports and carrying families requires career-level credentials for captain and crew.

3 weeks ago

This should be way easier than doing cars. Not much out there to hit when far from port and most places have a pilot that boards for docking

s a British public broadcast service. Wikipedia

3 weeks ago

Well done Norway a great way to put people out of work

#ClimateChange #Norway #BBCNews

Self-driving electric container ship sets sail in Norway - BBC News

154,113 views Aug 15, 2022 What's expected to be the first autonomous container ship is at the

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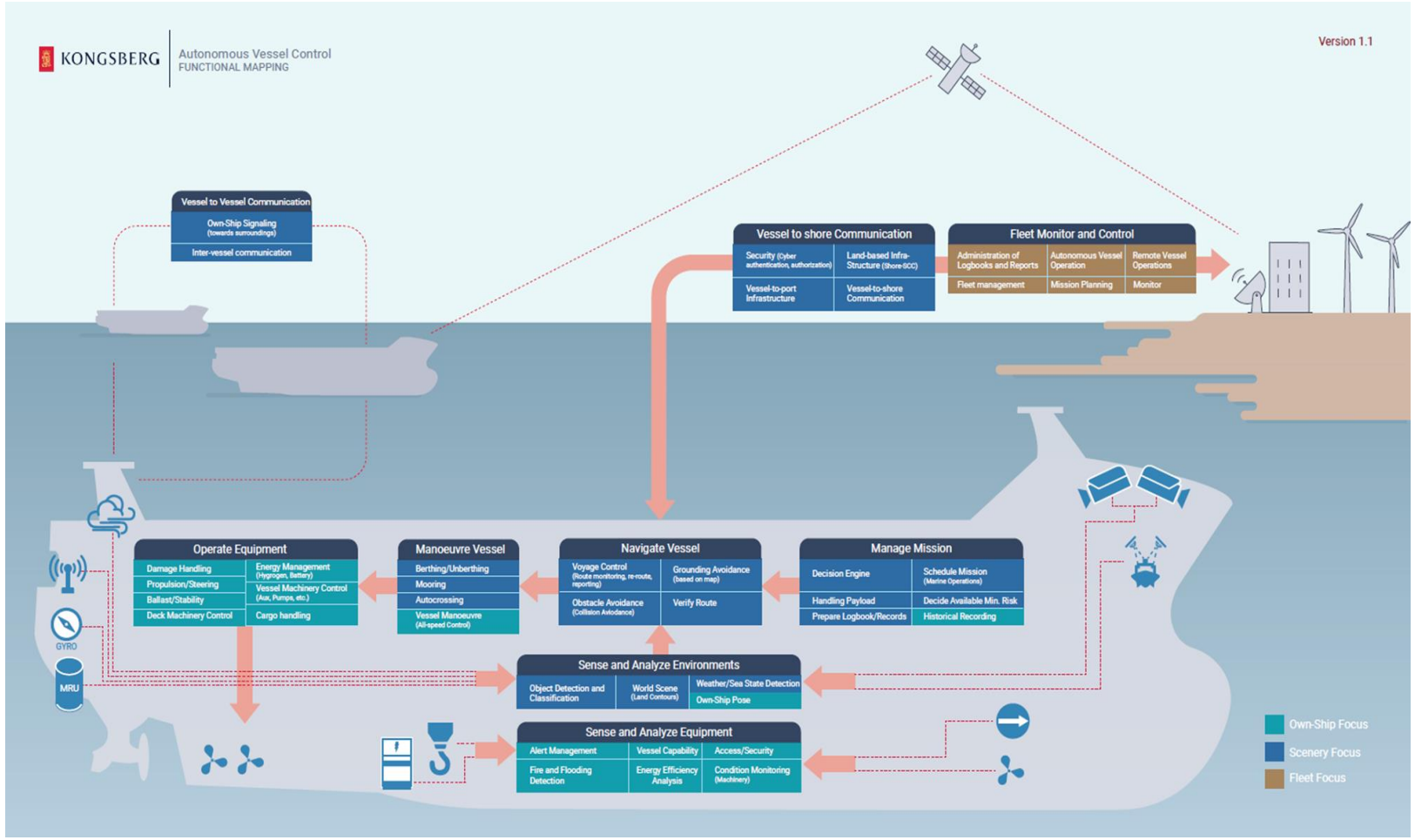
WHAT IS AUTONOMY IN THE FIRST PLACE?

- The definition of an autonomous (or smart) ship is not universally shared among stakeholders

- At the moment, **the closest scenario to reality can be described by "constrained autonomy"** which is defined as ***uncrewed operation*** *with limited but* ***relatively advanced automation onboard*** *and* ***supported in complex situations by operators*** *in a remote-control center (RCC) (Rødseth, 2021)"*



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WHY AND HOW ARE FIRST MOVERS DOING IT?

"Yara Birkeland will be the world's first fully electric and autonomous container ship, with zero emissions. With this vessel, Yara will reduce diesel-powered truck haulage by 40,000 journeys a year".

"Grocery distributor ASKO Will replace 150 daily truck trips with two battery driven vessels…to develop a zero emissions logistics chain involving two autonomous vessels crossing the Oslo Fjord "

- ✓ Reduction of local truck transport through urban areas
- ✓ Completely green electric transport

Cargo-owners are the promoters

New routes changing the value-chain

Safe transition/learning from humans

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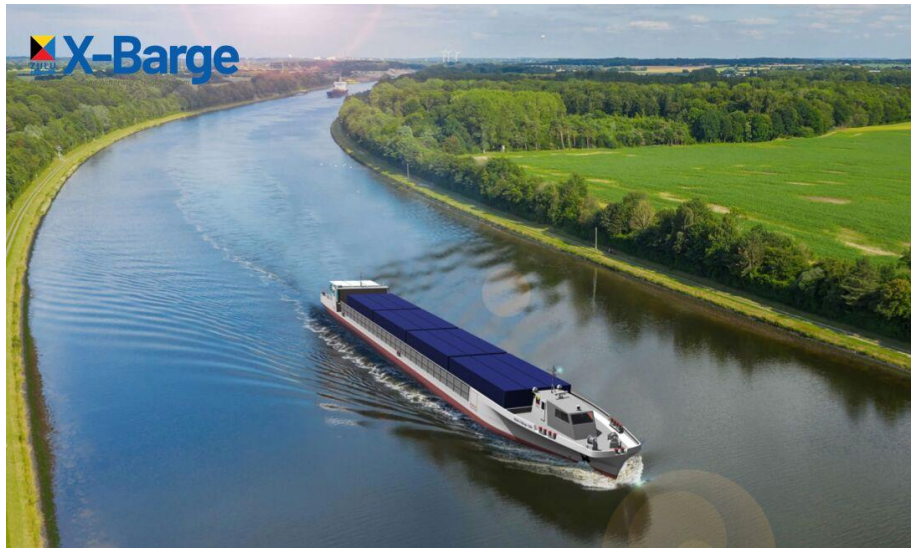
HOW DO GREEN, COST EFFICIENT AND SAFE TRANSPORT RELATE TO AUTONOMY?



Reduced crew | No accommodation | Full automation

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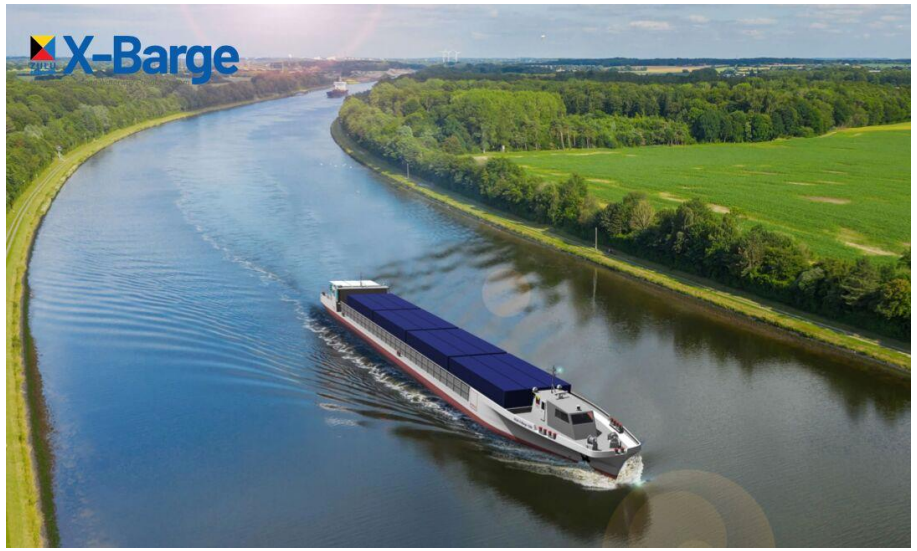

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More competitive business and new operation profiles → More Cargo | Smaller Ships | Operate 24/7

The smaller the better: changing the economy of scale paradigm

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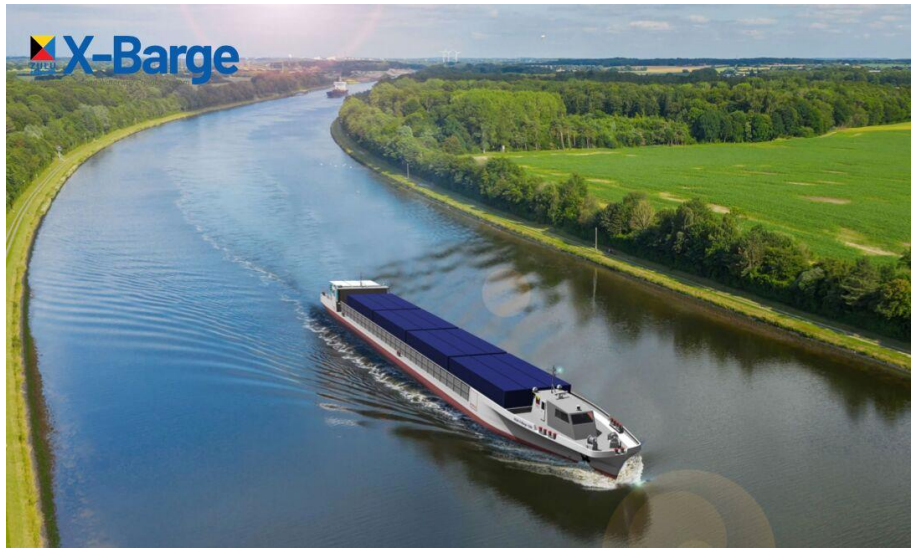

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A better waterborne Infrastructure → - Infrastructure | + Reliability | + Resilience

The smaller the better: changing the economy of scale paradigm

Increased flexibility with less infrastructure needed for smaller vessels

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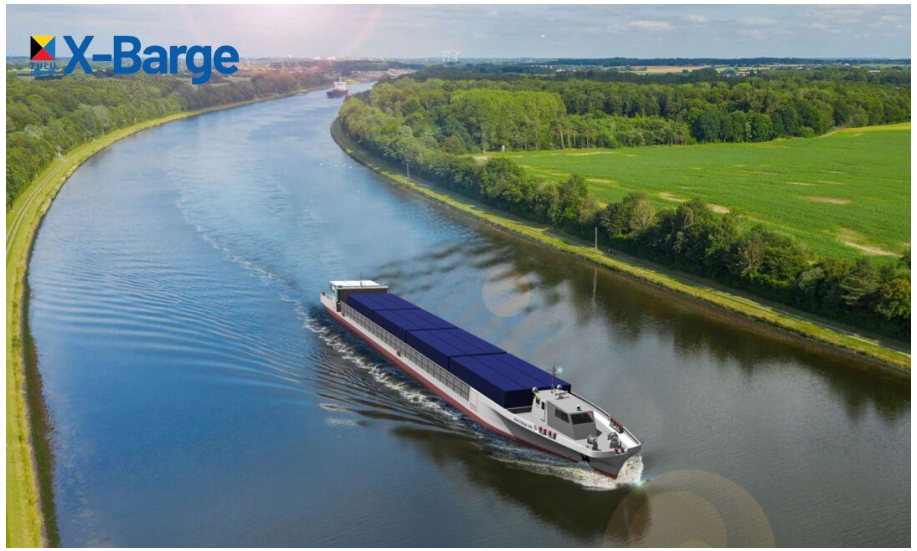

	Reduced crew	No accommodation	Full automation
More competitive business and new operation profiles	More Cargo	Smaller Ships	Operate 24/7
A better waterborne Infrastructure	- Infrastructure	+ Reliability	+ Resilience
Increased societal benefits	- Energy	+ Modal shift	- Accidents

The smaller the better: changing the economy of scale paradigm

Increased flexibility with less infrastructure needed for smaller vessels

Operational and design characteristics make electrification easier

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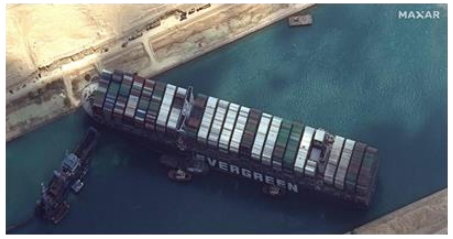
IN SHORT: AUTONOMY IS NOT A GOAL BY ITSELF BUT CAN BE A GAMECHANGER

SAFETY, RENEWAL, DECARBONISATION, ROAD DECONGESTION



PREVENTING HUMAN MISTAKE

MORE CARGO AND PROFITABILITY

SMALLER AND MORE FLEXIBLE VESSELS

BETTER ENERGY PERFORMANCES

NEW CONTROL CENTERS ON THE SHORE

NOT A GOAL BY ITSELF

- ❑ Optimizing crew and energy requirements, reducing OPEX
- ❑ Incrasing safety and resilience of the transport system
- ❑ Fostering moving more goods and people from road to sea
- ❑ Reducing emission (reducing vessels speed and improving control)
- ❑ Improving working conditions and safety
- ❑ Create standardised vessels concepts
- ❑ Impacting on the whole value-chain enabling new busienss concepts
- ❑ Improving reliability and resilience

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SOME OPEN POINTS

- **KPIs shall be measured** in metrics that investors should understand Need fo**r cost benefit analysis**
- Additional costs related to new sensor systems and automation – **business models are key**
- Integrate into the logistic value-chain to build **shared value and acceptance**

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CONTACT

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Since 2014 in PNO, he is a Team manager and Heads of the Innovation Analysts unit. He works as Project Manager and expert in specific cleantech engineering domains, focussing on Industrial, Energy and Transport sectors.
As of 2019 he is the Coordinator of the H2020 AUTOSHIP project.
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Thank you

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