



AUTOSHIP

Autonomus Shipping Initiative for European Waters

28 January 2021

AUTOSHIP - MOVING FREIGHT BY WATER: SUSTAINABLE INFRASTRUCTURE AND INNOVATIVE VESSELS

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Project Manager



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



PROJECT OVERVIEW

Objectives



“Autonomous Shipping Initiative for European Waters”

- **Project Title:** Autonomous Shipping Initiative for European Waters’
- **Acronym:** AUTOSHIP
- **Contract number :** 815012
- **Project start date:** 1st June 2019
- **Duration:** 42 months
- **Current estimated eligible costs:** ca. € 29 M€
- **Maximum EU contribution:** € 20.109.109,13
- **Project Officer:** Renata KADRIC
- **Reporting periods:** 3 periods
 - ✓ **RP 1:** From M1 to M18 (November 2020)
 - **RP 2:** From M19 to M30 (November 2021)
 - **RP 3:** From M31 to M42 (November 2022)

Start Date:
01-06-2019

Duration:
42 Months

CALL H2020-MG-3-2-2018
AUTONOMOUS SHIP

IA – Innovation Action



AUTOSHIP

Autonomus Shipping Initiative for European Waters

SCOPE

AUTOSHIP will **retrofit and operate 2 remote and autonomous vessels** and their needed **shore control and operation infrastructure**, reaching and going over TRL7.

Testing will take place during **two pilot demonstration campaigns** addressing goods mobility from the North Sea to a major EU seaport and hinterland, which are most relevant areas with growing waterborne transport market demand in EU.

PROJECT OVERVIEW

GOAL

*AUTOSHIP responds to the call topic MG 3.2-2018 by joining a whole necessary value-chain of global players to **define, enhance and test in real environment a Next Generation of Autonomous Ships (NGAS)**, **integrating evolutionary as well as novel technologies**. Building on partners' advanced technologies and know-how, the proposed NGAS will upgrade them and dramatically **impact on businesses and competitiveness**. In the meantime, **the framework to make NGAS navigation possible and socially accepted** will be better assessed with direct engagement of relevant authorities.*



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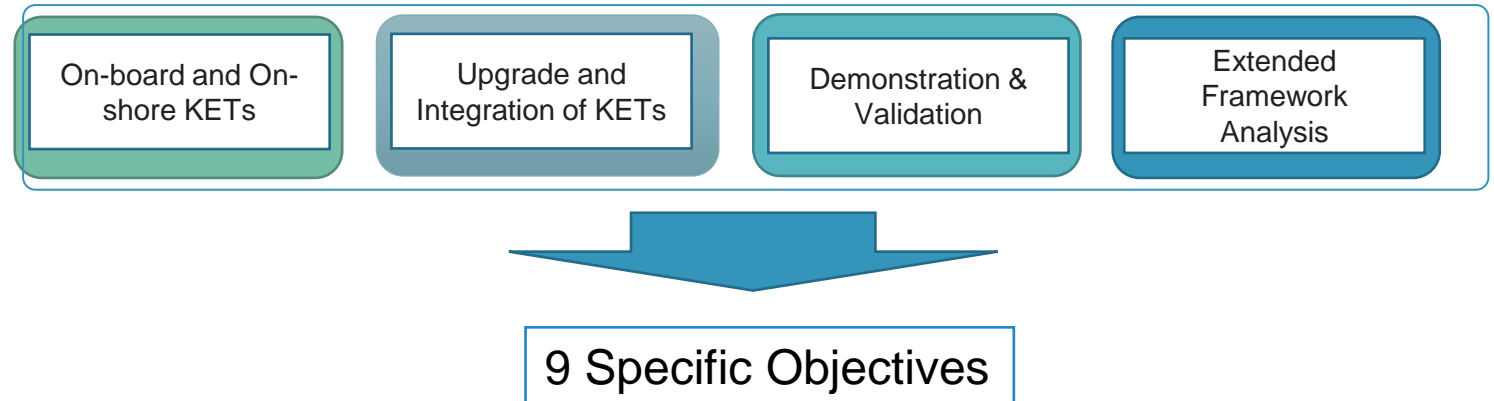
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Keywords





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9 Specific Objectives

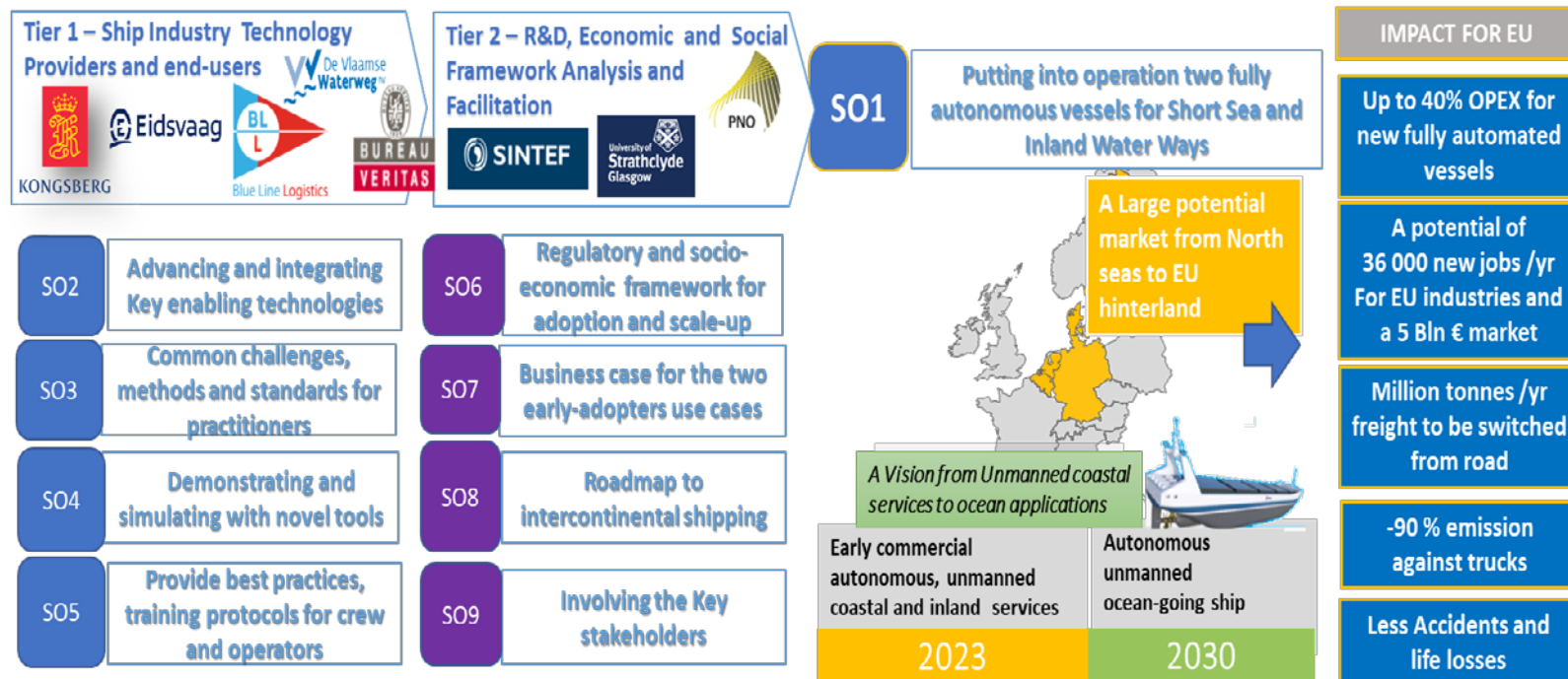
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Enabling technology

Building a common vision





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Challenge and Ambition

AUTOSHIP will speed-up the Next Generation of Autonomous Ships, by **demonstrating autonomous vessels in real environment** Short Sea Shipping and Inland Water Ways.

AUTOSHIP will **help ship operators/owners to improve the economy of scale of their investments**, to effectively gain competitiveness and renew their fleets, making them more competitive to replace road transport.

Demonstrating R&A vessels in SSS and IWW goods mobility

	Short Sea Shipping	Inland Water Way
Vessel type	Fish-feed carrier with a 1462 deadweight capacity-DWT and 74,7 m length	Class2 Pallet Shuttle Barge (PSB)
Sector	Fish Feed Sector	Transport of goods on pallets or in big bags (aka break-bulk) or hook-lift/roll container (up to 350t of goods).
Logistics Impact With high replicability	Future logistical concept for feed supply to fish farms	Concept for short and medium range transport of palletized goods





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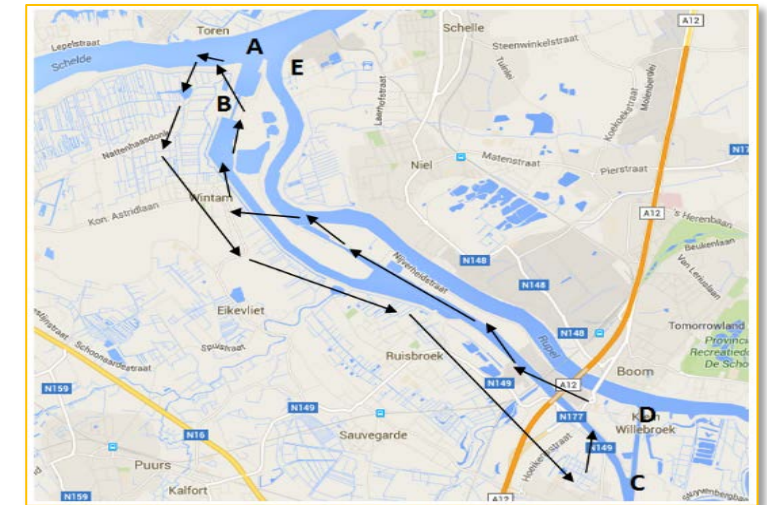
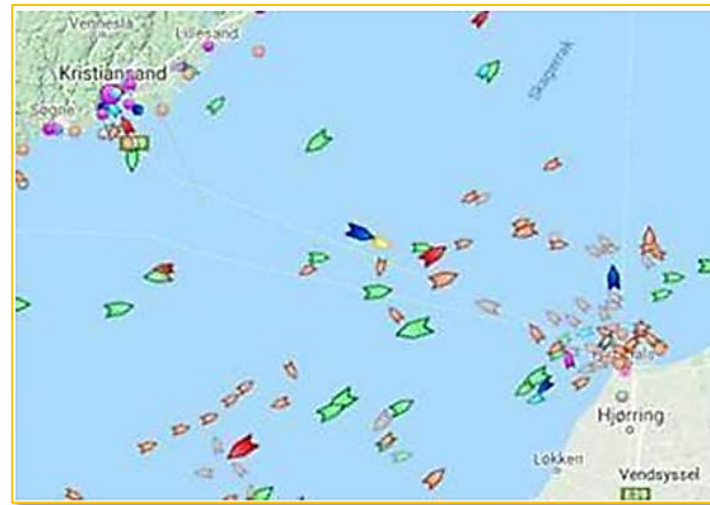
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Routes	The sailing route will extend between Hirtshals in Denmark and Kristiansand in Norway	In and around the major port of Antwerp & the Flemish region





What is at stake for Short Sea Shipping ?

IMPACTS Vs Challenges

SOURCE *World Economic Forum, 2009*



AUTONOMY IS NOT A GOAL BY ITSELF

- ☐ Increase Safety and resilience of the transport system
- ☐ Reducing emission (reducing vessels speed and improving control)
- ☐ Move goods and people from road to sea
- ☐ Improve Work-Life Balance (work moved on remote control centers decreasing fatigue)

SUPPLY CHAIN DECARBONISATION OPPORTUNITIES	POTENTIAL ABATEMENT MT CO ₂ E	ASSESSED INDEX OF FEASIBILITY
Clean Vehicle Technologies	175	High
Despeeding the Supply Chain	171	High
Enabling Low Carbon Sourcing: Agriculture	178	Medium
Optimised Networks	124	High
Energy Efficient Buildings	93	High
Packaging Design Initiatives	132	High
Enabling Low Carbon Sourcing: Manufacturing	152	Medium
Training and Communication	117	Medium
Modal Switches	115	Medium
Reverse Logistics/Recycling	84	Medium
Nearshoring	5	Medium
Increased Home Delivery	17	Medium
Reducing Congestion	26	Low

IMPACTS Vs Challenges

CUSTOMERS

- ☐ Impacting on the whole value-chain and support renewing fleets
- ☐ Probably changing WHO is the customer: cargo-owners becoming ship-owners (YARA, ASKO)
- ☐ Reducing OPEX
- ☐ Improving reliability AND resilience
- ☐ Changing insurance conditions
- ☐ Changing perception of autonomy as a job cut trend

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Challenge and Ambition

The technology package will include **full-autonomous navigation**, self-diagnostic, prognostics and operation scheduling,

as well as **communication technology** enabling a prominent level of cyber security and integrating the vessels into **upgraded e-infrastructure**. In parallel, **digital tools and methodologies for design, simulation and cost analysis** will be developed for the whole community of autonomous ships.

Upgrading and Integrating KETs



Autonomous Navigation System (ANS):
Aware Autonomous navigation and collision avoidance systems

Intelligent Awareness System (IAS) and Artificial Captain: failure modes and fault handling



Intelligent Machinery Systems (IMS): control main and ancillary services, predictive maintenance

Remote Operation Centre (ROC) aka Shore Control Center (SCC);

Infrastructure Upgrade & Systems for automatic docking/cargo handling



Tools & simulators (e.g. Digital Twins and 3D physical modelling, Decision Support Tool)

Connectivity and Cyber Security: optimized route transmissions, Established Edge IOT, resilient PNT

Autonomous sailing in the open sea between ports

Go in to and out of ports remotely controlled from a shore control centre,

Performing "auto-docking". And other manoeuvres by the docks



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Upgrading and Integrating KETs



VESSELS SECURE
NAVIGATION

MANOUVRE

OPERATE EQUIPMENT

MANAGE MISSION

SENSE AND ANALYSE
ENVIRONMENT &
EQUIPMENT



BI-DIRECTIONAL SECURE,
REDUNDANT
COMMUNICATION
AND E-INFRASTRUCTURE

VESSEL TO VESSEL

VESSEL TO SHORE



REMOTE OPERATION
WITH HUMANS IN THE
LOOP

FLEET MANAGEMENT

MISSION PLANNING



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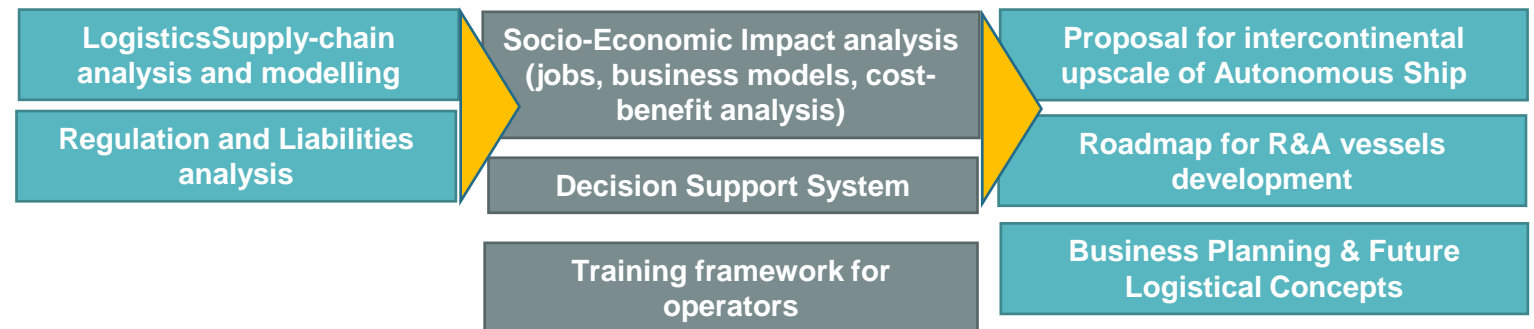
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Exteded Framework for analysis of logistics and goods mobility

Future logistical concept for feed supply to fish farms





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STORY SO FAR IN AUTOSHIP

The regulatory framework has been reviewed. The results are available in D2.3 reporting a Systematic assessment and investigation of the required framework to develop and test the next generation autonomous ships demonstrators.

*On its way to identify Gaps And Barriers, the **risk acceptance criteria have been developed**.* Novel methods have been applied to define acceptance criteria which can be compliant to Safety, Security, Cybersecurity regulations, rules and standards.

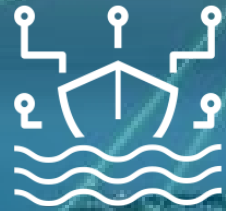
*A **framework for autonomous ship design standard has been published** (D3.1), along with testing principles (D3.2) and a **Cost-benefit tool for early design process** (D3.3)*

*The **development of the Key Enabling Technologies related to Vessel Control, the remote operations control and the Connectivity System between vessel and shore is progressing**.* The development is based on a thorough requirements capturing process involving both internal and external stakeholders. Essential **supporting documentation like CONOPS and Storyboards** have been established. Significant progress has also been made in the areas simulator **modelling and infrastructure requirements analysis**.

***Preparing the vessels new sensors are being installed**,* and upgrades of essential automation, control and navigation system are planned and prepared.

Communicating to a wide audience considering the “autonomous = job loss” equation

[Link to downloads](#)



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Thank you

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