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# INNOVAZIONE TECNOLOGICA, DIGITALIZZAZIONE PER IL SETTORE DEI TRASPORTI, UNMANNED VEHICLES E RIFLESSI ASSICURATIVI

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Swiss Re
Corporate Solutions

# INNOVAZIONE TECNOLOGICA, DIGITALIZZAZIONE PER IL SETTORE DEI TRASPORTI, UNMANNED VEHICLES E RIFLESSI ASSICURATIVI. SVILUPPI DELL'INDUSTRIA MARITTIMA


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MSC.1/Circ.1638
3 June 2021

**OUTCOME OF THE REGULATORY SCOPING EXERCISE FOR THE USE OF MARITIME AUTONOMOUS SURFACE SHIPS (MASS)**

1 The Maritime Safety Committee, at its 103rd session (5 to 14 May 2021), approved the *Outcome of the regulatory Scoping Exercise for the use of Maritime Autonomous Surface Ships (MASS)*, as set out in the annex, which provides the assessment of the degree to which the existing regulatory framework under purview of the Maritime Safety Committee (MSC) might be affected in order to address MASS operations. It further provides guidance to the MSC and interested parties to identify, select and decide on future work on MASS and, as such, facilitate the preparation of requests for, and consideration and approval of, new outputs.

2 Member States and international organizations are invited to take the annex into account when proposing future work on MASS for consideration by the MSC and bring it to the attention of shipowners, operators, academia and all other parties concerned.

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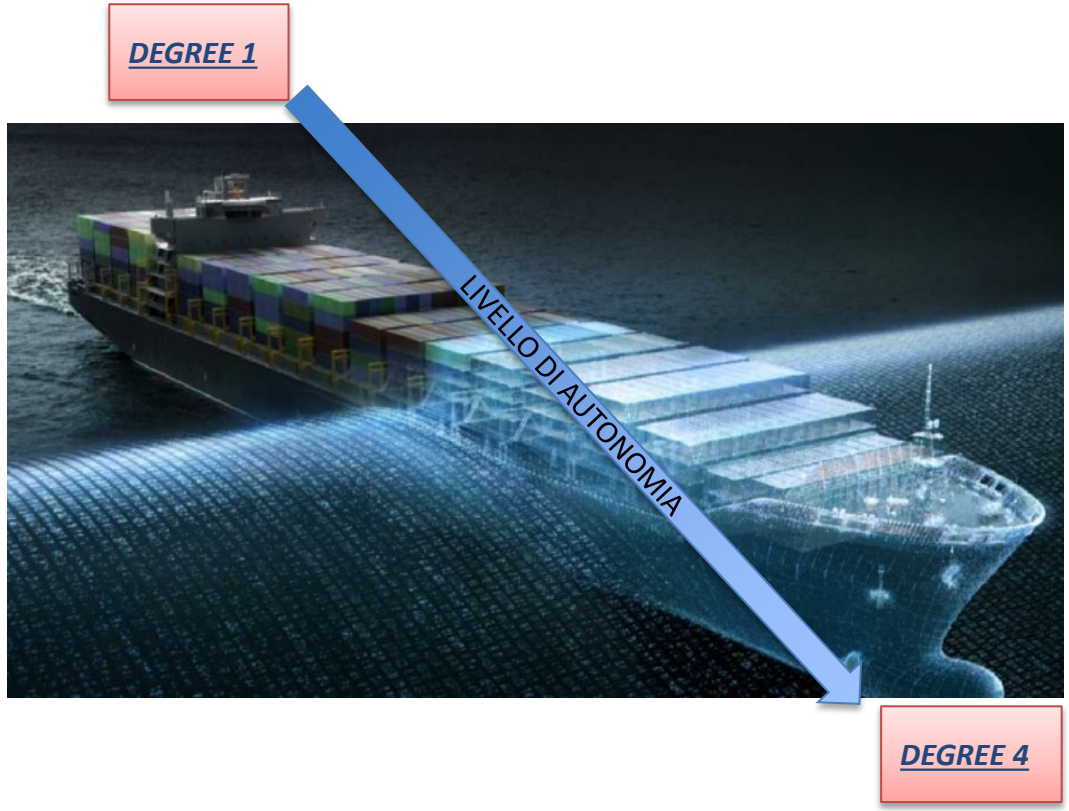
**SMART SHIP = "***ship equipped with automation systems capable, to varying degrees, of making decisions and performing actions with or without human interaction***"**

**AUTONOMOUS SHIP = "***the operating system of the ship able to make decisions and determine actions by itself. It performs functions related to operation and navigation independently and self-sufficiently. Terms to be reserved to ships complying with degree 4 of automation***":**

**D1: Ship with automated processes and decision support:**
*Seafarers are on board to operate and control systems.*
**D2 : Remotely controlled ship with seafarers on board**
*The ship is controlled and operated from another location.*
**D3: Remotely controlled ship without seafarers on board**
*The ship is controlled and operated from another location. There are no seafarers on board*
**D4:Fully autonomous ship**
*The operating system of the ship is able to make decisions and determine actions by itself*



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**REGISTRO ITALIANO NAVALE**
NOTAZIONE DI CLASSE **MASS**

- **MASS-ADS: ship with Automated processes and Decision Support:** *seafarers are on board to operate and control shipboard systems and functions. Some operations may be automated and at times be unsupervised but with seafarers on board ready to take control.*
- **MASS-RCM: Remotely Controlled Manned ship:** *the ship is controlled and operated from another location. Seafarers are available on board to take control and to operate the shipboard systems and functions.*
- **MASS-RCU: Remotely Controlled Unmanned ship:** *the ship is controlled and operated from another location. There are no seafarers on board.*
- **MASS-FAS: Fully Autonomous Ship:** *the operating system of the ship can make decisions and determine actions by itself*

**Amendments to Parts A and F of the "Rules for the Classification of Ships": new additional class notations MASS (Maritime Autonomous Surface Ship):**

- **Part A, Chapter 1, Section 2: [6.14.56] (NEW) and Table 3;**
- **Part A, Chapter 5, Section 1: Table 1;**
- **Part A, Chapter 5, Section 12: [1.1.1] and [35] (NEW);**
- **Part F, Chapter 13, Section 37 (NEW SECTION);**

*Effective from 1/10/2021*

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## Yara to start operating the world's first fully emission-free container ship

NOVEMBER 19, 2021

Oslo, 19 November 2021: The world's first electric and self-propelled container ship – Yara Birkeland – has departed for its maiden voyage in the Oslo fjord. Today, the Norwegian Prime Minister was given a tour by CEO of Yara, Svein Tore Holsether.

"We are proud to be able to showcase the world's first fully electric and self-propelled container ship. It will cut 1,000 tonnes of $CO_2$ and replace 40,000 trips by diesel-powered trucks a year, says Svein Tore Holsether, CEO of Yara.

Yara to start operating the world's first fully emission-free container ship | Yara International

Splash 247.com

SECTOR REGION MARITIME CEO CONTRIBUTIONS PUBLICATIONS EVENTS JOBS

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Containers Greater China Operations Tech

## China's first autonomous boxship readies to enter service

Andrew Cox · September 8, 2021 · 1 · 3,519 · 1 minute read


The race to develop operational autonomous vessels is intensifying, with the announcement that the AV *Zhi Fei*, a Chinese-built 300 teu cargo vessel is set to enter service next month on a short-sea route between Dongjiakou and Qingdao.

The 5,000 dwt *Zhi Fei*, 117 m in length with a maximum speed of 12 knots, has been been developed by Navigation Brilliance (Qingdao) Technology in conjunction with Dalian Maritime University and the China Waterborne Transport Research Institute.

Navigation Brilliance has previously conducted autonomous trials with a smaller vessel, the *Zhi Teng*, to test its navigation technology, and intends to order larger autonomous containerships in the range of 500 to 800 teu if the Zhi Fei is successful.

https://splash247.com/chinas-first-autonomous-boxship-readies-to-enter-service/

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Home / Sector / Offshore / Ocean Infinity orders its largest marine robotic vessels to date

Americas Environment Europe Offshore Shipyards Tech

## Ocean Infinity orders its largest marine robotic vessels to date

Adis Ajdin · February 24, 2022 1,292 1 minute read


Ocean Infinity has upped the ante on its robotic vessel fleet, booking its largest shore-operated multipurpose ships ever from shipbuilder Vard.

The Houston-based company has placed an order for a new series of six 85 m long, optionally crewed robotic vessels, all of which will be operated from shore and will eventually use green ammonia as fuel. The landmark order will take Ocean Infinity's remote vessel fleet to 23. The new vessels of Vard 9 80 design will augment Ocean Infinity's current Armada fleet of nine 21 m and 36 m long vessels, plus eight 78-m vessels which are already in production.

"Armada will play a huge role in enabling the global maritime community to reduce its carbon emissions from operations at sea. These new 85-m vessels will be optimised for inspection, maintenance and repair and light construction work to offer remote, ultra-low carbon services to the offshore energy market. Like the 78-m series currently under construction, the new design continues to drive minimalised environmental impact with its integration of new fuel-cell and battery technology," said Richard Daltry, technical director of surface technology at Ocean Infinity.

Ocean Infinity orders its largest marine robotic vessels to date - Splash247

## World's first fully autonomous ship navigation system tested on coastal ferry

BY AMIT MALEWAR / JANUARY 19, 2022 / TRANSPORTATION

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The SOLEIL ferry during fully autonomous ship navigation systems demonstration test. Credit: Mitsubishi Heavy Industries

The Nippon Foundation, Mitsubishi Shipbuilding Company, and the Shin Nihonkai Ferry Company have successfully completed a demonstration test of the world's first fully autonomous ship navigation systems on a large car ferry. The demonstration was part of MEGURI 2040, a project promoting the development of fully autonomous vessels supported by The Nippon Foundation.

World's first fully autonomous ship navigation system tested on coastal ferry - Inceptive Mind

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| Project number | 1 | 2 | 3 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|
| Commenced Trial | Commenced | Commenced | Commenced | TRIAL | TRIAL | TRIAL |
| Project | Armada & Infinity Fleet | Mayflower Autonomous Ship (MAS) | YARA Birkeland | Sunflower Shiretoko | ASKO | Mikage |
| |  |  |  |  |  |  |
| Last update | 2/24/2022 | only on homepage updates w/o stamp | 11/19/2021 | 2/7/2022 | 2/3/2022 | 2/7/2022 |
| Commercialisation year | 2025 | 2020 | 2022 | 2025 | 2024 | 2025 |
| Purpose | Ship, multipurpose operations | Ship, ocean science, data collection | Container | Ferry, cars | Container shuttle | Container shuttle |
| Propulsion system | hybrid / fully electric | fully electric | fully electric | diesel engine | fully electric | diesel engine |
| Green transition support | yes | yes | yes | no | yes | no |
| What | largest shore-operated multipurpose ships ever from shipbuilder Vard | small autonomous research vessel | world's first 100% electric and autonomous self-propelled e-container ship, fully powered by a Leclanché battery system | a large car ferry (100 meters, 11,410 gross tons) operated by MOL Ferry Co. | Fully electric trucks will take the cargo between the warehouses and the ports of Moss and Horten, and in shipments of 16 the trailers will be transported across the fjord on the battery-driven vessels. This solution is cost effective, sustainable and will remove trucks from a heavily trafficked road.<br><br>Electric autonomous vessels (sea drones) with associated port infrastructure carrying trailers and containers without | fully autonomous domestic container ship |
| Who | Ocean Infinity ordered at Fincantieri-controlled VARD | FinMare Co-Founder Brett Phaneuf | Yara Birkeland has developed in collaboration with Kongsberg Group, ordered at VARD, financial support ENOVA.<br><br>Yara Birkeland is a collaborative project between several actors, where KONGSBERG is responsible for the development and delivery of all newly developed technology on the ship. The ship will be operated from Massterlys' monitoring and operations center in Horten. Massterly is a joint venture between KONGSBERG and Wilhelmsen. YARA international is the owner.<br><br>Enova, a government enterprise responsible for promotion of renewable energy, has allocated up to NOK 133.5 million to build the world's first electric | The Nippon Foundation MEGURI2040 Fully Autonomous Ship Program, launched by The Nippon Foundation in February 2020 through support for five consortia | Norwegian grocery distributor ASKO has agreed a deal with Kongsberg Maritime and Massterly, the autonomous shipping joint venture launched by Kongsberg and Wilhelmsen in 2018. | The Nippon Foundation Fully Autono... by The Nippon... 2020 throug... |

| Count of Commercialisation year | | | | | Commercialisation year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Green Transition sup... | Project | Where | Commenced Tri... | Purpose | 2020 | 2021 | 2022 | 2024 | 2025 | ? |
| no | Deseo | The Netherlands | TRIAL | Container | | | | | | 1 |
| | Mikage | Japan | TRIAL | Container shuttle | | | | | 1 | |
| | Sunflower Shiretoko | Japan | TRIAL | Ferry, cars | | | | | 1 | |
| | Suzaku | Japan | TRIAL | Container, bulk carrier | | | | | 1 | |
| | ZhiFei | China | Commenced | Container | | 1 | | | | |
| no | Soleil Ferry | Japan | TRIAL | Ferry, cars | | | | | 1 | |
| yes | Armada & Infinity Fleet | US, Houston | Commenced | Ship, multipurpose operations | | | | | 1 | |
| | ASKO | Norway, Moss - Hor | TRIAL | Container shuttle | | | | 1 | | |
| | Bastö Fosen VI | Noway, Moss-Horte | Commenced | Ferry, cars and passengers | 1 | | | | | |
| | Callboats | Helsinki | TRIAL | Ferry, passengers | | | 1 | | | |
| | Mayflower Autonomous Ship (MAS | UK | Commenced | Ship, ocean science, data collection | 1 | | | | | |
| | Nellie Bly | Northern Europe | TRIAL | Tug | | | | | | 1 |
| | Roboats | Amsterdam | TRIAL | Ferry passengers, multipurpose operations | | | | | | 1 |
| | Suomenlinna II | Finland, Helsinki | TRIAL | Ferry, passengers | | | | | | 1 |
| | YARA Birkeland | Norway | Commenced | Container | | | 1 | | | |
| Grand Total | | | | | 2 | 1 | 2 | 1 | 5 | 4 |

**Data Analysis:**

All projects focus on virtual traffic systems (VTS) including cameras, artificial intelligence and remote control
Northern Europe countries/projects tend to go more into a green transition direction and do not only focus on remote control but also on green fuels / decarbonization
Asia's focus is more asap traffic security and congestion avoidance by refitted existing ships (diesel engines) with autonomous systems
Mostly ferries or container shuttles have been focused to reduce delays in costs as of lorries on the street
Smaller autonomous vessels for canals and cities for operations such as waste collection or passenger transportation also a focus
Avoiding traffic congestion, increase sustainability and safety at sea and canals but also working against crew aging and skill gap

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## EVOLUZIONE DEL RISCHIO ASSICURATIVO

- PROTOTIPI ?
- CRITERIO DI NAVIGABILITA'
- STATISTICHE SINISTRI?
- RISCHI CYBER?

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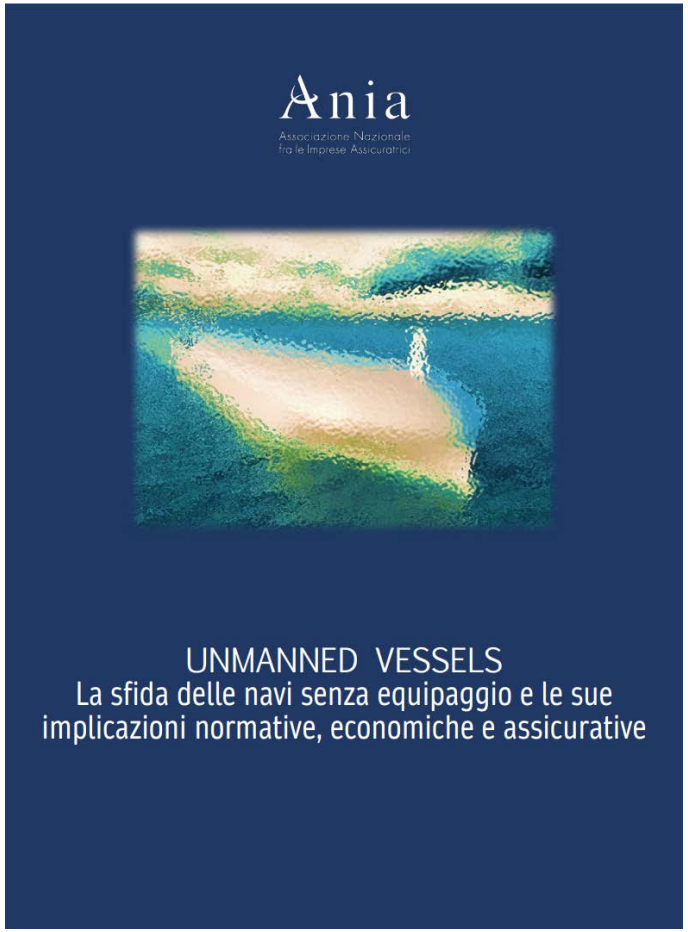
*«l'impiego di navi senza equipaggio avrà significative implicazioni sul piano tecnico, economico, ambientale, legislativo e sociale negli anni a venire»*

Cristina Castellini, Marine, Aviation & Transport
Antonio Nicelli, Servizio Studi Economici e Ricerca



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Roberto Spanu – Senior Marine Risk Engineer – Swiss Re Corporate Solutions

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