

ervo

european research vessel operators

1-2 JUNE 2021

SUNMARE

SURFACE UNMANNED MULTIURPOSE RESEARCH MARINE VEHICLE

SUNMARE AS JOINT VENTURE



ISTITUTO DI INGEGNERIA DEL MARE
INSTITUTE OF MARINE ENGINEERING



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delle Ricerche

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SAPIENZA
UNIVERSITÀ DI ROMA

SUNMARE

Surface UNmanned multiurpose research MARine vEhicle

- POR FESR Lazio 2014-2020, Progetti di Gruppi di Ricerca 2020
- Approved in april 2021, the contractual phase is currently being closed

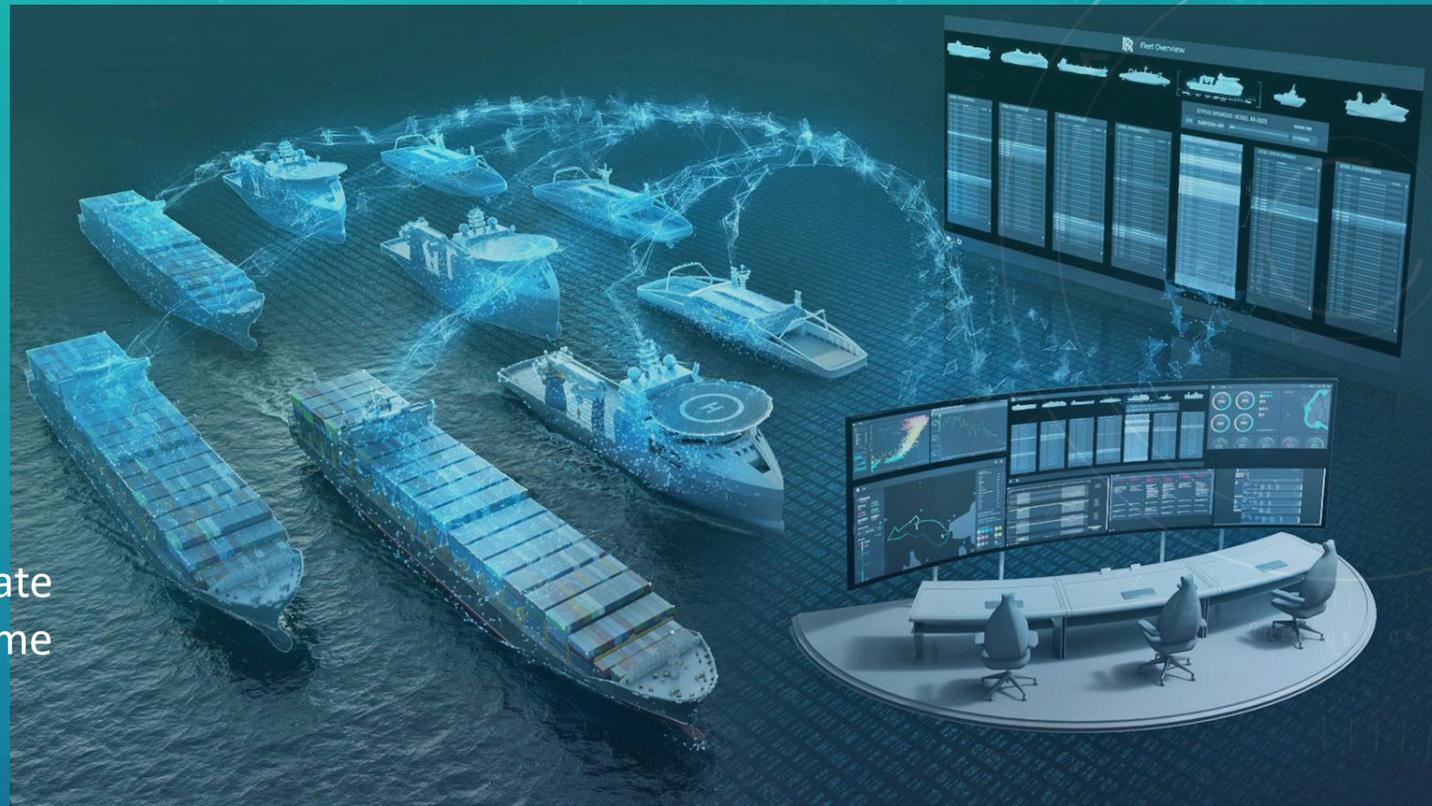
OBJECTIVE

Definition of technical, operative and functional requirements for an innovative multipurpose research USV (Unmanned Surface Vehicle) with «blue» environmental footprint

AUTONOMOUS SHIPS - IMO

MASS (Maritime Autonomous Surface Ship)

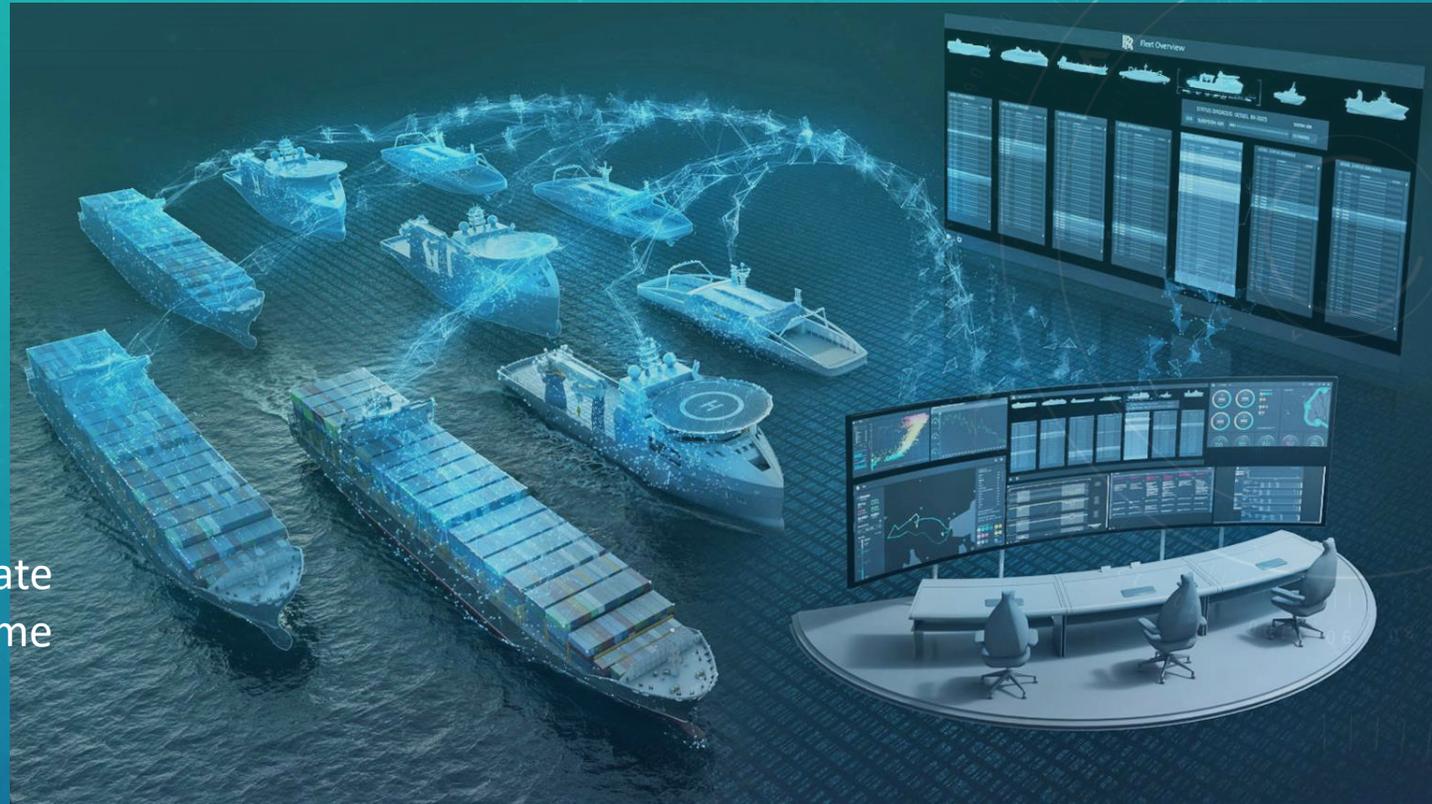
- Degree one: Ship with automated processes and decision support. Seafarers are on board to operate and control shipboard systems and functions. Some operations may be automated and at times be unsupervised but with seafarers on board ready to take control.
- Degree two: Remotely controlled ship with seafarers on board. 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.
- Degree three: Remotely controlled ship without seafarers on board: The ship is controlled and operated from another location. There are no seafarers on board.
- Degree four: Fully autonomous ship: The operating system of the ship is able to make decisions and determine actions by itself.



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VESSELS
ARMADA FLEET

A21



LOA	21m
Sensor depth	3m
Propulsion type	DP0, Diesel electric hybrid
Max speed	11 knots
Range	3000 nm
Regulatory regime	DNV Classed (hull) DNV UMS MCA Workboat code

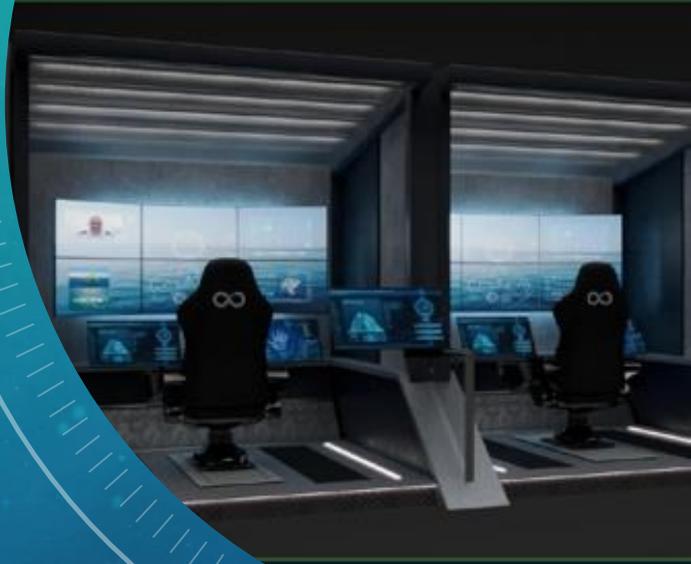
A36



LOA	36m
Sensor depth	3.6m
Propulsion type	DP2, Diesel electric hybrid
Max speed	12 knots
Range	5200 nm
Regulatory regime	Classed (hull) DNV UMS



OPERATIONS CENTRE
ARMADA FLEET



ROBOTIC SHIPS
ARMADA FLEET



STATE OF ART ON MASS 3 RESEARCH SHIPS

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Onboard technical systems for data acquisitions

Innovative technologies to reduce environmental impact

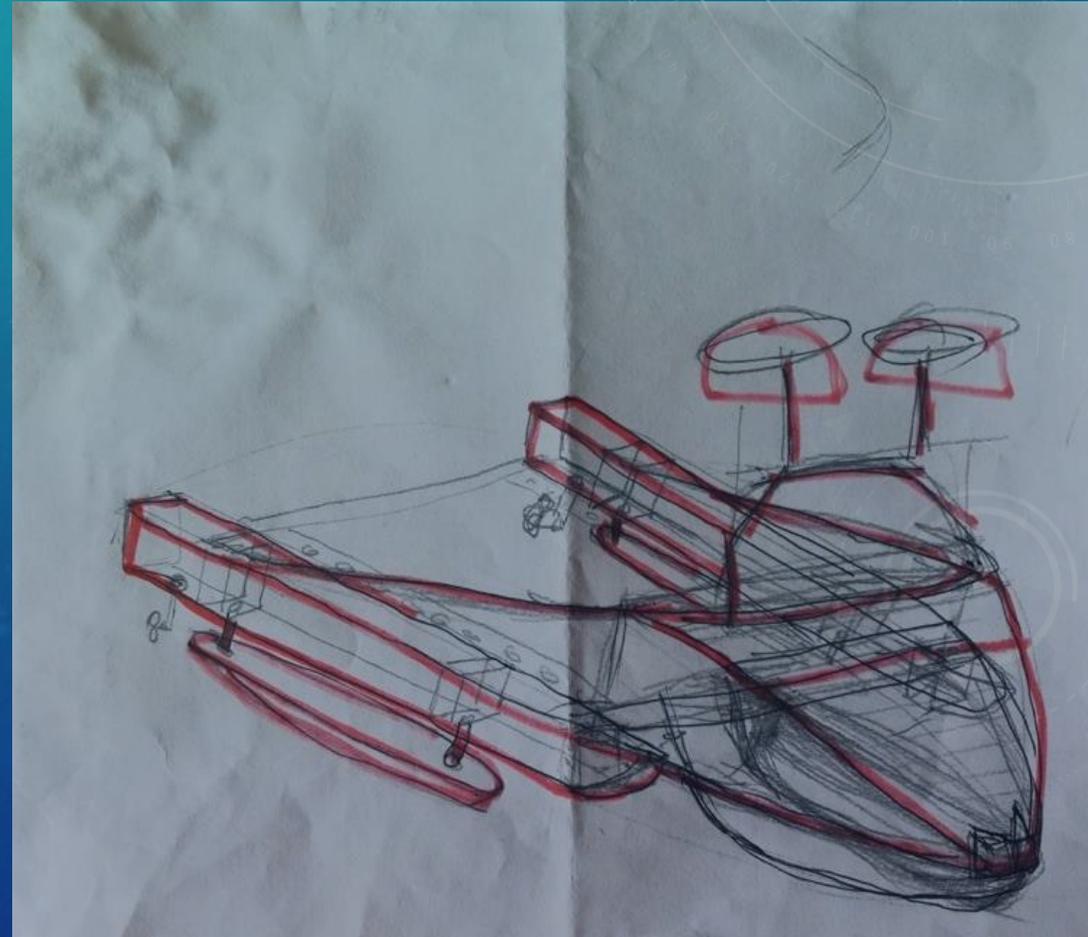
Advanced techniques for data acquisition

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PROJECT OUTPUTS

- FUNCTIONAL PROJECTS (CONcept of OPerationS - CONOPS)
- FEASIBILITY ANALYSIS, technical and economical reports



USV FEATURES

OPERATIVE CONDITIONS

- **Data acquisition:** slow motion (3,5-4 knots) or at rest at a dock station with discontinuous use of propulsion to keep positioning (maximum power use: 70% for no longer than 10 seconds)
- **Stand-by:** rest condition or extremely low speed but ready to start
- **Transfer:** cruise speed to reach acquisition region or pier base (7-10 knots)
- **Emergency (low speed):** low speed (4 knots) due to technical issues
- **Emergency (uncontrollable vehicle):** photovoltaic power supply for emergency systems

AUTONOMY

7-8 DAYS with switched-off generators
either one of these chances to occur during
each day:

- 7 hours in acquisition mode
- 3 hours in transfer mode

*Purpose: scientific research on sea bottom from
3 up to 200 m*

Fully autonomous

Catamaran-like hull

Length: 10 m

Width: to keep a ISO 10 container

Innovative materials for hull composition

Modular, transportable on road navigation

High manoeuvrability at low speed

Low vibrating and silent

Electrical power system: 2 hybrid propellers (propeller and electric engine). Possible hydrogen propulsion

Alternative power supply: photovoltaic panels for emergency operations

SCIENTIFIC INSTRUMENTS AND SURFACE SUPPORT

- Complete meteorological station
- High resolution camera
- Radar
- Lidar
- Surface water temperature monitoring
- GPS
- Communication system
- AIS and radio communication system
- Inertial system

ON BOARD INSTRUMENTS

- Coastal multibeam
- Biological eco-sounder
 - Chirp system – SSS
 - Magnetometer
 - ADCP
- Temperature, conductivity, oxygen sensors
 - Underwater acoustical positioning
- Horizontal multibeam for floating objects detection

The background is a gradient of blue and teal, featuring several large, faint circular patterns with tick marks, resembling a dial or a scale. There are also many small, out-of-focus circular spots (bokeh) scattered across the image.

THANKS!

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