Research and Innovation in the maritime field

SEA INNOVATORS

CETENA
S.p.A.
a FINCANTIERI company

Your speaker today

Nicola Bassan (b. 1984)

Head of Company Development and Innovation @ CETENA (Fincantieri's research center)

Main tasks: define RDI strategy, supervise (and write) applications to compete for RDI public funds, define policies for IP valorization, and lead negotiatior for IP contracts

Lesser tasks: lead for the digital transformation of CETENA internal processes (coding included)

Former senior associate consultant @ Bain & Co (Energy and Utilities practice).

2012 PhD in Astrophysics @ SISSA
2020 MBA @ Milano Politecnico Business School

Founder of the SISSA Alumni Association
Currently participating in the joint CDP-BPI France Young Leader Program initiative

Love reading, swimming, skiing

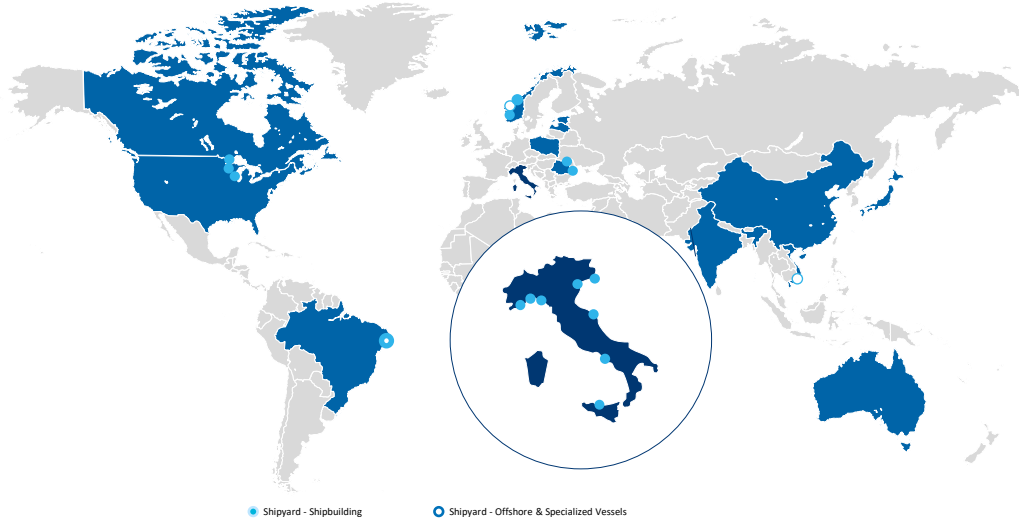Member of Amnesty International and WWF

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Agenda

Fincantieri and CETENA at a glance

Our vision and our strategy

Weren't you selling steel? This seems way too digital

Fincantieri at a glance

52% of our **employees** are based in Italy and **87%** of **revenues** come from international clients[1]

OUR FIGURES

- ~ **€ 6.7 bn** Revenues[2] in FY2021, **87%** of which come from international clients

OUR GLOBAL REACH

- **€ 34.5 bn** Total Backlog[1,3]
- **18** shipyards in **4** continents
- **>20,000** employees, **52%** of which are based in Italy
- ~ **90,000** including subcontractors

OUR IMPACT

- ~ **100** subsidiaries
- **4.5x** Economic multiplier[4]
- **5.9x** Employment multiplier[5]

○ Shipyard - Shipbuilding   ○ Shipyard - Offshore & Specialized Vessels

#1 Western designer & shipbuilder[6] with 230 years of history and over 7,000 ships built

CETENA
a **FINCANTIERI** company

CETENA

- A company incorporated in 1962, now belonging to Fincantieri Group.

- We mix technical expertise and research skills to develop original solutions aimed at tackling complex problems (oftentimes one of a kind problems)

- We are contributing to several RDI projects in partnership with other companies, Universities and Research Cetners (both private and publicly owned)

- We are a top tier Italian institution in Horizon Europe and European Defence Fund projects

Main Office
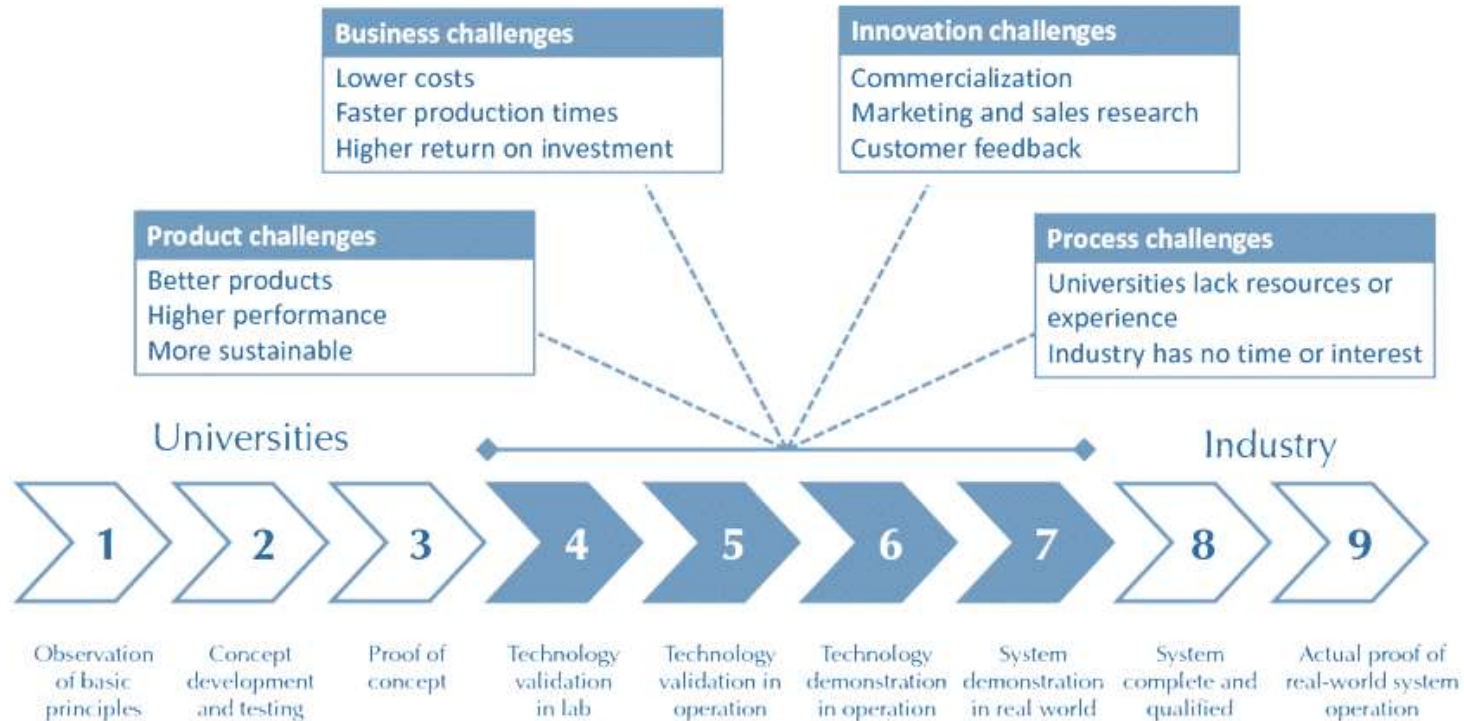- Genova

Laboratory
- Riva Trigoso

Offices
- Muggiano
- Trieste
- Ancona
- Castellammare
- Palermo

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CETENA's Mission

APPLIED RESEARCH

BASIC RESEARCH   INDUSTRY

Bridging the TRL death valley

Hensen, Jan & Loonen, Roel & Archontiki, Maria & Kanellis, Michalis. (2015). Using building simulation for moving innovations across the "Valley of Death". REHVA Journal. 52. 58-62.
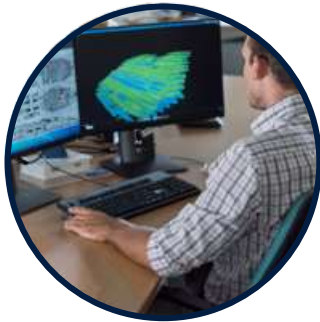
CETENA Activities

RESEARCH & INNOVATION

ENGINEERING CONSULTANCY

EXPERIMENTAL ACTIVITIES
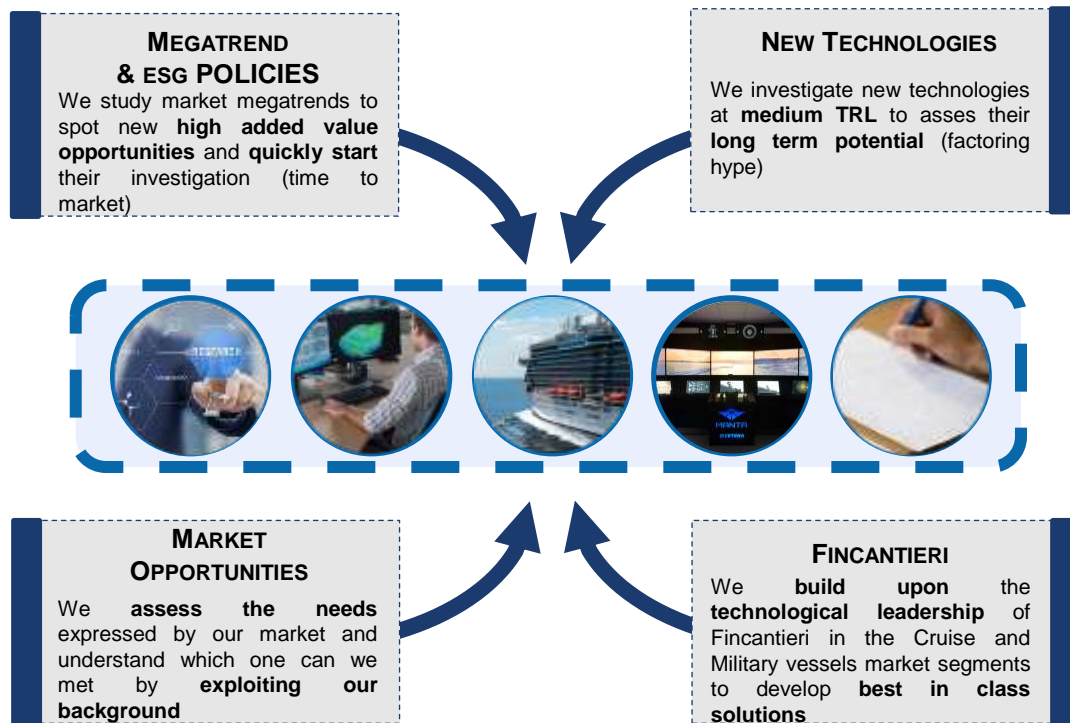
DIGITAL SOLUTIONS

TRANSFER OF TECHNOLOGY

Agenda

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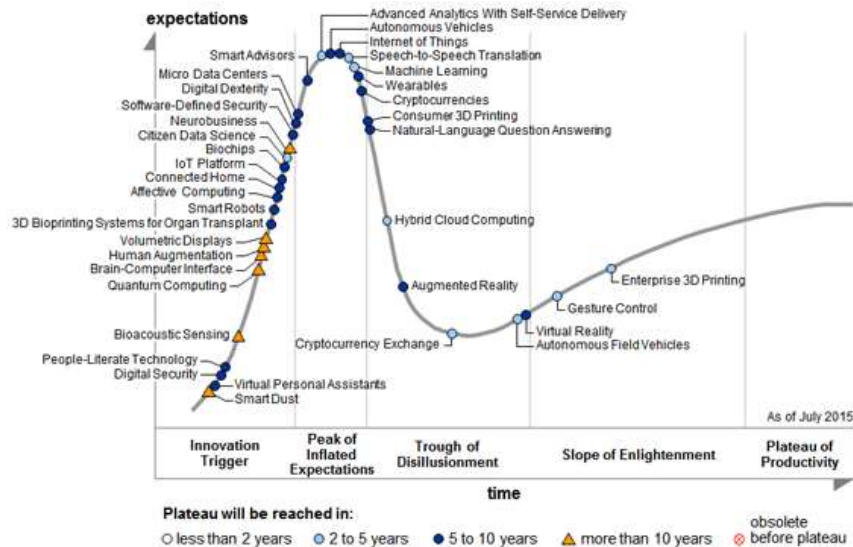
Our vision and our strategy

Weren't you selling steel? This seems way too digital

Setting our route

MEGATREND & ESG POLICIES
We study market megatrends to spot new **high added value opportunities** and **quickly start** their investigation (time to market)

NEW TECHNOLOGIES
We investigate new technologies at **medium TRL** to asses their **long term potential** (factoring hype)

MARKET OPPORTUNITIES
We **assess the needs** expressed by our market and understand which one can we met by **exploiting our background**

FINCANTIERI
We **build upon** the **technological leadership** of Fincantieri in the Cruise and Military vessels market segments to develop **best in class solutions**

ESG: Environmental, social and corporate governance

Technology hype

We work following an open innovation approach
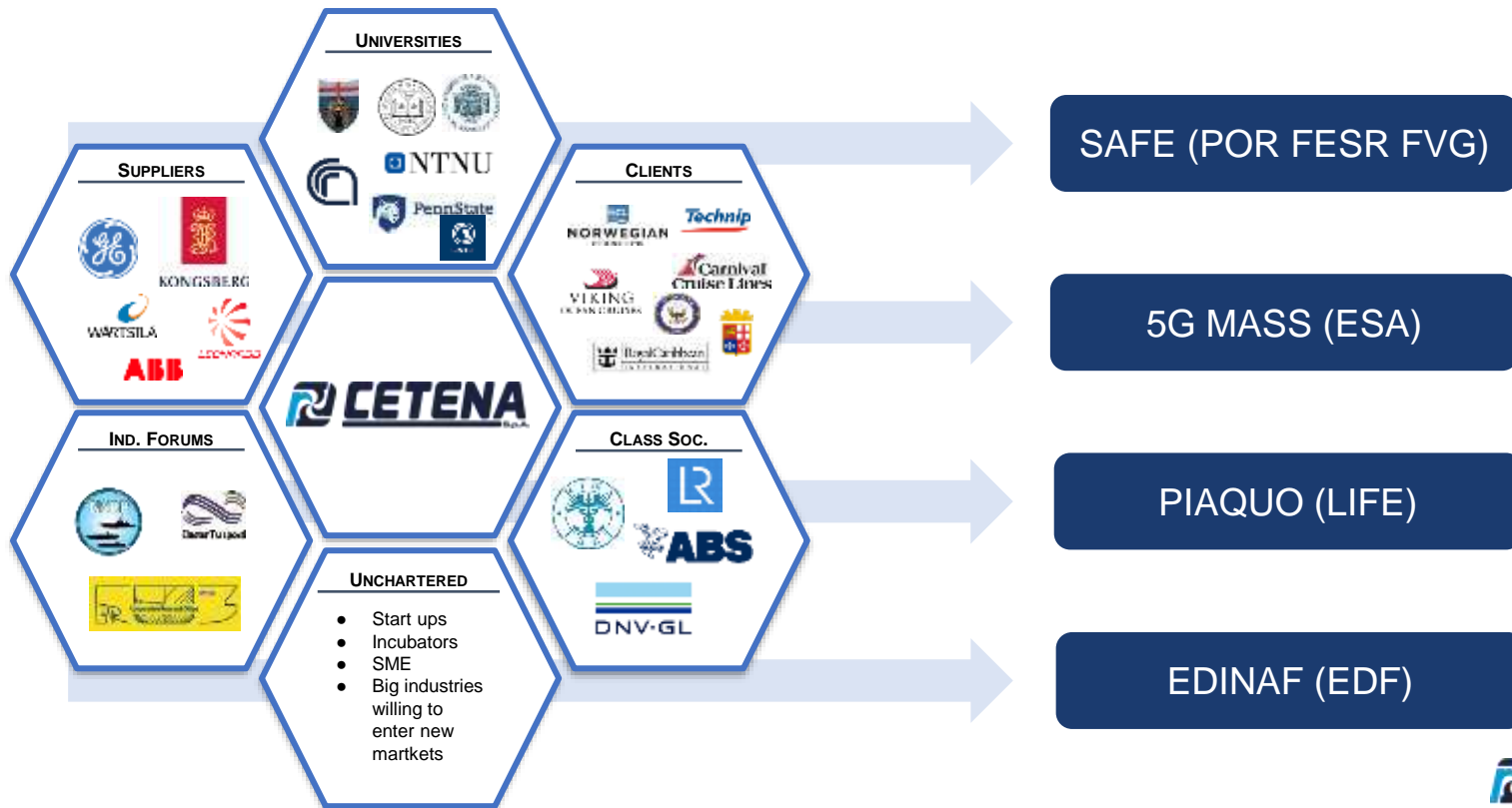
SAFE

Designing a realtime damage manager and decision support system for passenger ships

CETENA cooperated with UNITS, UNIUD, SISSA, a classification society and a few SMEs

Goal: replacing a ton of paper with a digital manual

Open questions:
- Can you do it on your own, or do you need an open approach?
- How do you manage IP?
- What about scientific publications? patents? Source code?
- How do you mange a public grant?

5GMASS

The 5G-assisted Maritime Autonomous Surface Ship (5G MASS) is focusing on the domain of assisted and autonomous shipping in the proximity of seaports. To this extent, the project will implement a set of functional blocks, shared between the ship and the port digital environments.

Thanks to the terrestrial 5G millimetre-wave network, it will be possible to aggregate real-time information shared between the shipboard and the port digital environments with the aim to maximize the positioning of the vessels in the port and to assist the pilot in the berthing operations.

CETENA is cooperating with CNIT, TIM and a few other big players that were interested in developing 5G applications and were looking for industrial use cases.

Guardia Costiera is also taking part in the activities.

Open questions:
- Do opportunities for innovation arise always in your backyard? Or should you go scout elsewhere?

- Which technologies are worth considering?

- When is the right time-to-innovate?

PIAQUO

PIAQUO
Reduce underwater radiated noise generated by ships and adapt it in real time to the ecosystems, in order to minimize their impact on the environment.

CETENA is cooperating with UNIGE and several shipyards (including Fincantieri and their competitors) in order to build quieter propellers

Open questions:
- When R&D is pre-competitive in nature? When competition starts?

- How do you protect non patentable innovations? How do you protect know how?

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EDINAF

EDINAF
European Digital Naval Foundation

SELECTED PROJECTS EUROPEAN DEFENCE FUND (EDF) 2021

CALL TITLE:	Smart ships
TOPIC TITLE:	Digital ship and ship digital architecture
DURATION OF THE PROJECT:	36 months
TYPE(S) OF ACTIVITIES:	Integrating knowledge; Studies; Design
ESTIMATED TOTAL COST:	€ 29,000,198.91
MAXIMUM EU CONTRIBUTION:	€ 29,000,000.00

SHORT DESCRIPTION OF THE PROJECT:

EDINAF will provide a European digital ship reference architecture, integrating the systems onboard altogether in order to achieve vessels fastest reaction and enhanced capabilities.

The project "European Digital Naval Foundation" (EDINAF) will enable the integration of a joint naval operational cloud as a component into the broader military multidomain operations cloud. EDINAF will work on an IT infrastructure and associated data interface standards (edge and cloud computing). It will support the design and the creation of next generation smart vessels and gather the European supply chain around a common standard applicable to equipment manufacturing and to future naval operations.

Open questions:
- Is there an opportunity for cross fertilization?

- What is the effect that defense R&D has on developing new technologies benefitting the society in general?

- How transfer of technologies work?

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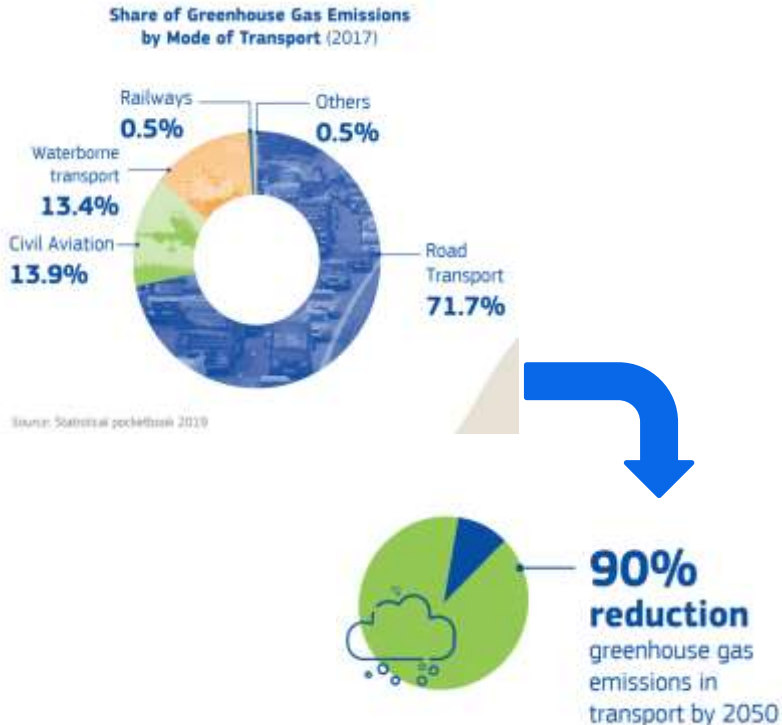
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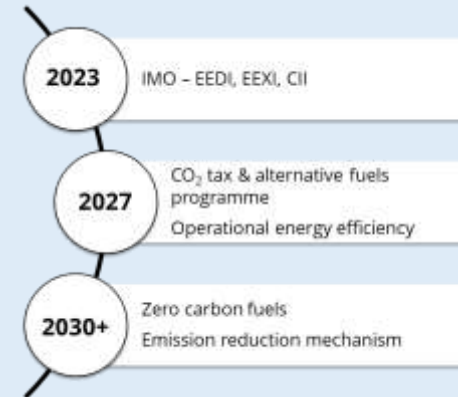**Weren't you selling steel? This seems way too digital**

Assist Energy

International Context: European Union and IMO

EU GREEN DEAL

Share of Greenhouse Gas Emissions by Mode of Transport (2017)

- Railways 0.5%
- Others 0.5%
- Waterborne transport 13.4%
- Civil Aviation 13.9%
- Road Transport 71.7%

Source: Statistical pocketbook 2019

90% reduction greenhouse gas emissions in transport by 2050

IMO TARGETS

The IMO Strategy includes a target to cut total GHG emissions from international shipping by at least 50 per cent by 2050 (compared to 2008) regardless of maritime trade growth.
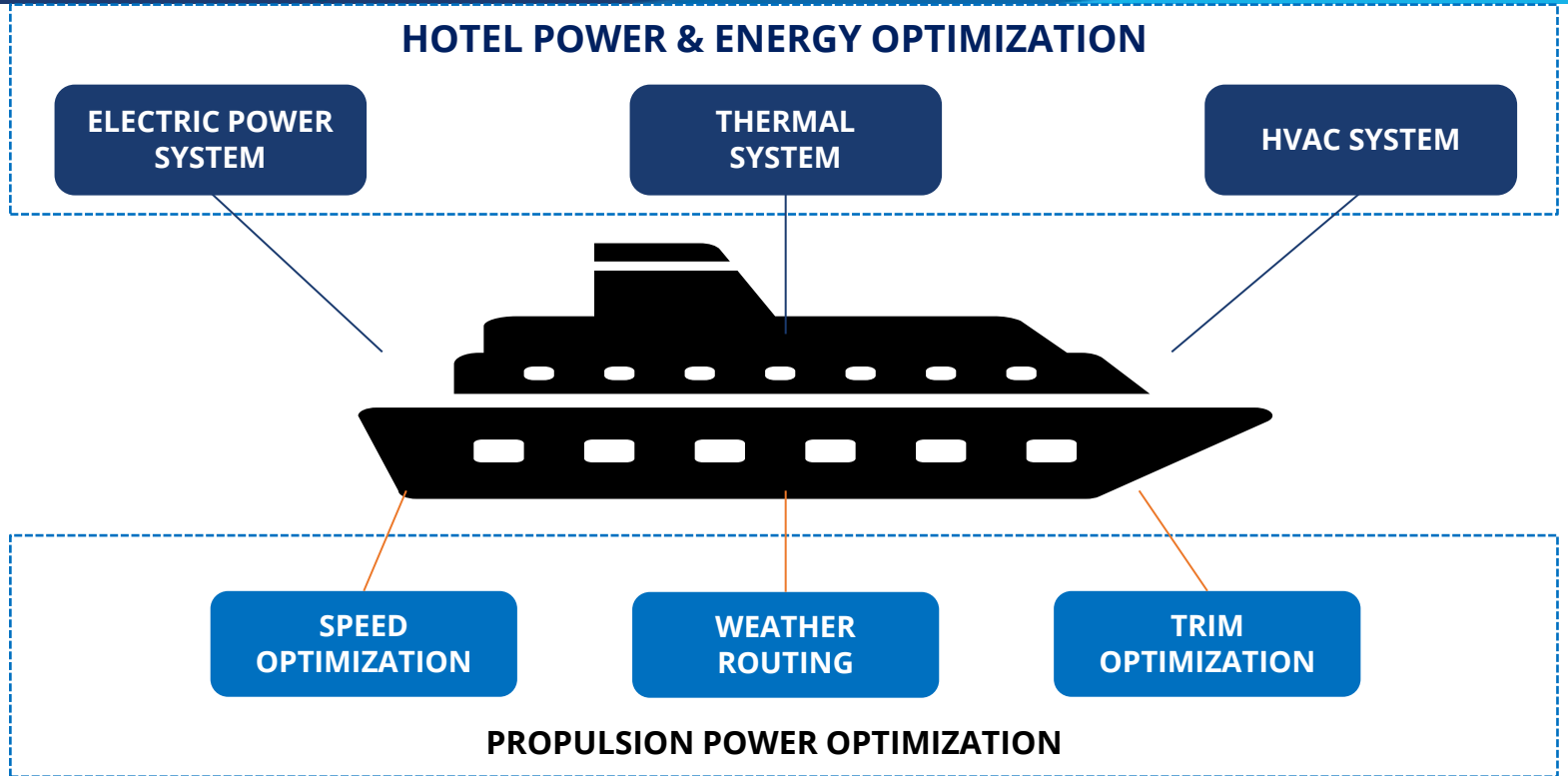
- **2023** — IMO – EEDI, EEXI, CII
- **2027** — CO_2 tax & alternative fuels programme; Operational energy efficiency
- **2030+** — Zero carbon fuels; Emission reduction mechanism

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HOW TO ADDRESS FUTURE GREEN CHALLANGES

OPERATIONAL VS TECHNICAL APPROACH

OPERATIONAL APPROACH

ASSIST ENERGY

ONBOARD ENERGY MANAGEMENT OPTIMIZATION

2022 → **2050**

Sustainable Alternative Fuels

RENEWABLE FUELS

TECHNICAL APPROACH

Propeller optimization

Hull optimization

Energy recovery systems improvement

CO_2 — Carbon capture and storage system

SHIP RE-DESIGN

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Assist Energy

Real Time Decision Support System

EFFICIENCY EVALUATION

MONITORING | DATA ANALISYS | FORECAST | LOAD MANAGEMENT | EFFICIENCY

Training systems
for maritime and naval applications

- Risk-free

- Cost reduction

- Joint complex scenarios

- Cooperate / compete / fight

Serious Games

Virtual environment to train operators on specific procedures recreating dynamic and interactive situations, customized following the customer requirement

The system is suitable for teams procedural training to facilitate safe learning even by simulating the most extreme and challenging conditions in a safe environment

ADVANTAGES
- **Flexible:** adaptable to specific operators' training needs
- **Realistic:** immersive VR viewing system actively involving the trainees
- **Scalable:** from basic training to complex scenario for realistic training
- **Interoperable:** operate with other simulators and/or real systems

EXAMPLES PROCEDURES
- ANCHORING OPERATIONS
- FIRE FIGHTING
- LAUNCH AND RECOVERY OF THE RHIB
- MAN OVER BOARD
- STEERING OPERATIONS IN DEGRATED MODE
- ANTIFLOODING
- RAS – REPLISHMENT AT THE SEA

03:30   S.W.L 2.5t

Elettricista

Padrone

Direttore

Prodiere

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Simulations systems to test, verify and validate equipment, entities and procedures

- Device analysis

- Virtual test bed

- Ergonomics and user interface

- New feature development

THANK YOU

BTW: we are hiring ☺