



Meriteollisuus
Finnish Marine Industries

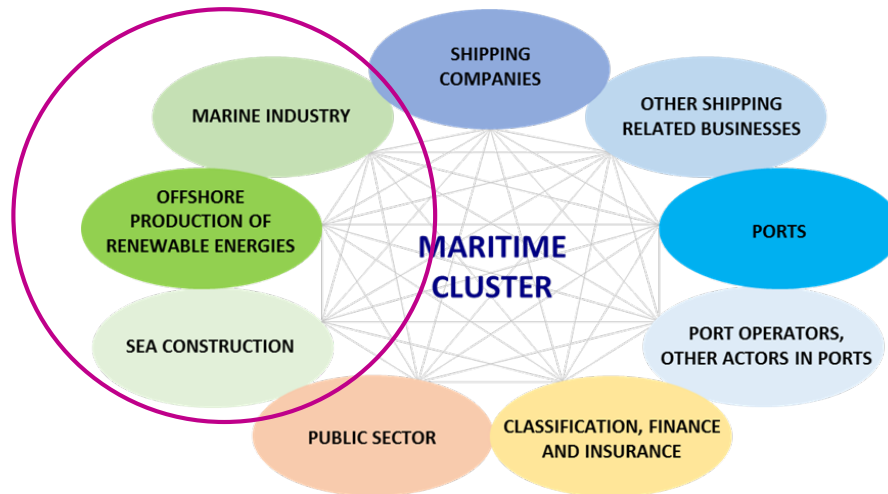


SMART MARITIME TECHNOLOGY SOLUTIONS 2017-2025



Finnish Maritime Cluster

The **Finnish Marine Industry** employs 30 000 people, the Maritime Cluster employs 48 000. The companies and research institutes of the cluster work in global networks.





Motivation for common SRA

- Marine technology is a high-tech branch
 - Long term RDI is the only way to be competitive when operational environment and customer needs are changing fast
- Marine projects are complex investment projects, when implementation of innovation can take even a decade
 - This is why foresight is important, the solutions must be ready when rules and regulations come in the force
- Cooperation is the only way to success, common vision is needed
 - The Cluster has a several decade long tradition of common RDI programmes



Introduction

- The Strategic Research Agenda is based on the **vision of how the industry and research institutions together** improve the competitiveness of the Finnish Maritime Cluster
- The agenda was created by the Finnish Marine Industries **Research Committee's** task leaders, who have extensive experience in the field of marine technology and represent the companies
- The Committee has **representatives from the whole Maritime Cluster**
 - Including shipyards, suppliers, ship owners, the Finnish Transport Safety Agency, the Finnish Navy, and other research institutes and universities



23.11.2016

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MacGregor Finland



Tasks and Task Leaders

Cruise and Ferry

Kari Sillanpää, Meyer Turku Shipyard

Arctic Technology

Arto Uuskallio, Aker Arctic

Offshore

Pekka Rouhiainen, Prizztech Ltd

Energy, Environment and Sustainability

Iikka Rytkölä, Wärtsilä Finland Oy

Intelligent Ship, Systems and Solutions

Sauli Eloranta, Rolls-Royce Marine

Competitiveness and competence development

Pentti Kujala, Aalto University, Elina Vähäheikkilä, Finnish Marine Industries

Coordinators

- Esko Mustamäki, Arctech Helsinki Shipyard Inc., Chairman of the Research Committee
- Merja Salmi-Lindgren, Secretary General, Finnish Marine Industries
- Elina Vähäheikkilä, Project Manager, Finnish Marine Industries

Editor

Jani Romanoff, Professor, Aalto University, Department of Applied Mechanics



By 2025 Finland will have:

- **The most creative, agile and adaptive maritime network** with:
 - Customized products, services and forms of operation
 - Delivered on a flexible schedule
 - Entire life cycle in a sustainable and digitalized setting
 - Long-term, multidisciplinary research and development work





Competitiveness

- When competition is intense, companies need to strengthen competitiveness, refine their business behavior and better meet their customers' needs
- The marine sector offers opportunities in both existing and new markets
- Components of competitiveness:
 - *Social responsibility and safety*
 - *Highly Competent Education and RDI-Ecosystem*
 - *Efficient production of tailor-made products*
 - *Utilizing New business models, Emerging business & Blue Growth*
 - *Foresight*

New openings

- Unmanned ships, Remote controlled solutions for harsh conditions
- Open Marine data platform
- New digital services and business models from sharing economy and platform economy, Uber of the Seas
- Robotics and automation for shipbuilding, New simulation tools for production process and shipbuilding method
- Tools for optimization for entire fleet performance
- Sustainable shipbuilding and ship repair, circular economy: reduce, reuse, recycle
- New energy sources: Hydrogen, Syngas, bio gas, Wind, Solar, Tidal, Algae, nuclear, fuel cells
- New main structural concepts based on lightweight materials and structures
- Creation of communication networks to the Arctic with applications
- Concepts for specialized vessels, equipment and structures for different Blue Growth activities
 - Renewal energy from oceans
 - Underwater mining
 - Ocean farming
 - Floating energy storages
 - Floating living structures
 - Multiuse offshore platforms
 - etc



Competence Development

- A number of new, high doctoral level experts in the industry
- Close co-operation of the whole cluster to reach the challenging aims
- A new young generation of multidisciplinary experts educated to complement basic naval architecture on the following topics:
 - *Marine-IT, Autonomous ships and shipping*
 - *Cruise and Ferry experience: Combine Engineering, Art and Business*
 - *Energy-efficient solutions, new concepts and zero emissions*
 - *Arctic technology*
 - *Light structures and new materials*



Deltamarin

The objective is to produce the cleanest energy solutions in ships and to minimize the environmental impact of shipping globally.



Energy, Environment and Sustainability

- Energy use and sustainability affect all fields of industry and communities, the requirements are becoming increasingly strict
- The future vision: Fossil fuel-free marine cluster
- RDI themes:
 - *New energy sources (gases, methanol, ethanol, emulsions, condensates, renewables, bio etc.)*
 - *Power-generation flexibility*
 - *Recovery of energy from on-board systems; energy storage*
 - *Emissions (gases, particles, noise) and energy economics*
 - *Performance, maintenance and emissions management need to be improved by operational profiles*
 - *Circular economy*



Rolls Royce Marine



Intelligent Ship, Systems and Solutions

- Intelligent solutions enable safer and more efficient operations, user-friendliness and effective and streamlined services
- Digitalisation can support stakeholders to strengthen their position in the value chain – by e.g. increasing operational efficiency or by creating new added value through digital service offerings
- RDI themes:
 - *An open marine data platform*
 - *Business development for digital services*
 - *Remotely operated and autonomous vessels*
 - *Cyber security*





Cruise and Ferry

- Record-high cruise ship orderbook challenges the whole passenger ship design and builder network
- The significance of corporate social responsibility and the sustainability of the products is growing all the time
- More intelligent systems will take safety, reliability, efficiency and comfort to a new level
- RDI Themes:
 - *Production improvements*
 - *Concept and product innovations and implementing new technologies*
 - *New energy sources and technologies*



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LUMI

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Arctic Technology

- Finland is known for innovative concepts for ice-operating vessels, offshore and subsea solutions
- Safe, environmentally friendly, and energy-efficient with optimised ice-breaking and open water characteristics
- Co-operation in RDI leads to best results
- RDI Themes:
 - *Performance based design and operation optimization for changing ice conditions*
 - *Understanding the different special conditions and needs in various Polar areas*
 - *Utilization of latest technologies, ICT etc, in Arctic conditions*
 - *Building up infrastructure for Arctic operations*
 - *Ships with optimised ice-breaking process and excellent open water characteristics*





Offshore

- The offshore industry is undergoing a renewal due to market changes
- With squeezed margins, innovation is the key to long-term profitability, now an opportunity to introduce new solutions
- Finnish expertise in harsh and arctic conditions, using technology from shipbuilding (e.g. accommodation)
- RDI Themes:
 - *Weight- and cost-efficient, movable and recyclable floating solutions for harsh environments*
 - *Offshore support vessel construction, Subsea equipment and operations, automation and remote control*
 - *Production technology and modularisation in design and construction*
 - *Energy efficiency and enhanced safety in oil and gas production*