

# Kvarken Link's New Ferry Project - Towards the Future

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Age: 30 years old

Edu: M.Sc. in Economics and Business Administration (University of Vaasa)  
M.Sc. Naval Architect & Marine Engineering (Aalto University)  
B.Sc. in Applied Mechanics (Aalto University)

Career:	2016 – present	Rauma Marine Constructions Oy; Project Engineer
	2015	Wärtsilä Oy Business Development Trainee
	2011 – 2014	Deltamarin Ltd FEM Analyst
	2014	Finnish Navy Research Agency Research Assistant

Hobby: Tennis, floorball, reading, JCI Rauma

# PRESENTATION CONTENT

1. New Kvarken Link's ferry building place
2. Why Ferry Innovations coming from Finland?
3. NB 6002 Wasaline Ferry
4. Technology Trends
5. How new technologies are implement in NB6002 Wasaline Ferry?
6. Conclusions

# Newbuilding 6002 for Wasaline – Rauma Marine Constructions Oy



# RMC Focus product niches

## Car-/Passenger Ferries



- ✓ Obvious need for a fleet renewal in Northern Europe ferry market
- ✓ Well segmented and competitive market considered as RMC's greatest potential

## Icebreakers



- ✓ Renewal of the ageing Finnish icebreaker fleet. Governmental target execution prior to 2029
- ✓ Polar activities, commercial and strategic, increases the need for professional ice operations especially in Arctic regions

## Navy Vessels (Finnish Navy)



- ✓ Squadron 2020 corvettes for the Finnish Navy is the focus project, as well as the SQ2000 Mid Life Upgrade
- ✓ Defence co-operation between Finland and Sweden is a potential incentive for RMC in way of security of supplies

## Research and Special Vessels



- ✓ Research and Supply Vessels for harsh conditions is a segment where RMC's knowledge profile can add value
- ✓ National interests and a capability to integrate with those in way of academic research and industrial co-operation opens the potential

## Opportunistic Floating Structures



- ✓ New developing segment covering all kind of floating structures such as power stations, recreational or real-estate buildings
- ✓ Growing urban population in larger centres demands an utilisation of water areas for construction

# Finland – Leader in RoPax and Ferry Development

## Continous and Complete Value Chain

	<i>Actor</i>	<i>Task</i>	<i>Speciality</i>
<b>OPERATION</b>	<b>Tallink – Silja Wasaline Eckerö Line Internat. Operators</b>	Operation in Baltic areas <ul style="list-style-type: none"> <li>• Tourist cruising</li> <li>• Goods transportation</li> <li>• International links</li> </ul>	<ul style="list-style-type: none"> <li>• Climate and conditions</li> <li>• Management</li> <li>• Navigation Skills</li> </ul>
<b>DESIGN CONSTRUCTION MAINTENANCE</b>	<b>Rauma Marine Constructions</b>	RoPax ships <ul style="list-style-type: none"> <li>• Design</li> <li>• Engineering &amp; Construction</li> <li>• Modification</li> <li>• Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• Traditions, Experience</li> <li>• Naval Architecture</li> <li>• Skilful network</li> <li>• Competitive cost structure</li> </ul>
<b>RESEARCH DEVELOPMENT</b>	<b>Aalto University Business Finland RMC and network</b>	Innovation Ground <ul style="list-style-type: none"> <li>• Applied Science</li> <li>• Model Tests</li> <li>• Analysis for the Industry</li> </ul>	<ul style="list-style-type: none"> <li>• Data Base</li> <li>• Top Level Know How</li> <li>• Network</li> <li>• Environment Impact Understanding</li> </ul>
<b>EDUCATION</b>	<b>Aalto University SAMK Maritime Schools</b>	Naval Architecture+Navigation <ul style="list-style-type: none"> <li>• Ph.D. degrees</li> <li>• Master degrees</li> <li>• Officer and Seafarer Education</li> </ul>	<ul style="list-style-type: none"> <li>• Traditions</li> <li>• Knowledge</li> <li>• Facilities and Functionalities</li> </ul>
<b>AUTHORITIES</b>			

# Newbuilding 6002 for Wasaline



## TECHNOLOGY

- Dual Fuel with LNG as primary energy source
  - Possibility to use bio-LNG
- Electric Propulsion Drive with Azimuth Thruster Units
- Battery Power for Port entry/departure, Peak Shaving, Hotel Load and Boost Power
- Energy recovery and Environmental footprint in focus
- Ice Class 1A Super
- Passenger and Crew Comfort

## MAIN DIMENSIONS

Loa	150.0 m
Lwl	137.8 m
Beam mld.	26.0 m
Draught, Design	6.10 m
Gross Tonnage, about	24 300
Deadweight, Design abt.	3 500 t
Max. persons onboard (LSA)	1 000

## CAPACITIES

Passengers	800
Lane metres	1500
Cabins	68
Speed	20 kn
Public Decks	2 (Restaurants, Business Lounge, Family Cafeteria, Shop, Conference)
Route:	Vasa – Umeå (Bothnian Corridor Service)

## Newbuilding 6002 for Wasaline – Schedule

<b>Production start</b>	<b>9 / 2019</b>
<b>Keel laying</b>	<b>2 / 2020</b>
<b>Launching</b>	<b>8 / 2020</b>
<b>Delivery</b>	<b>4 / 2021</b>

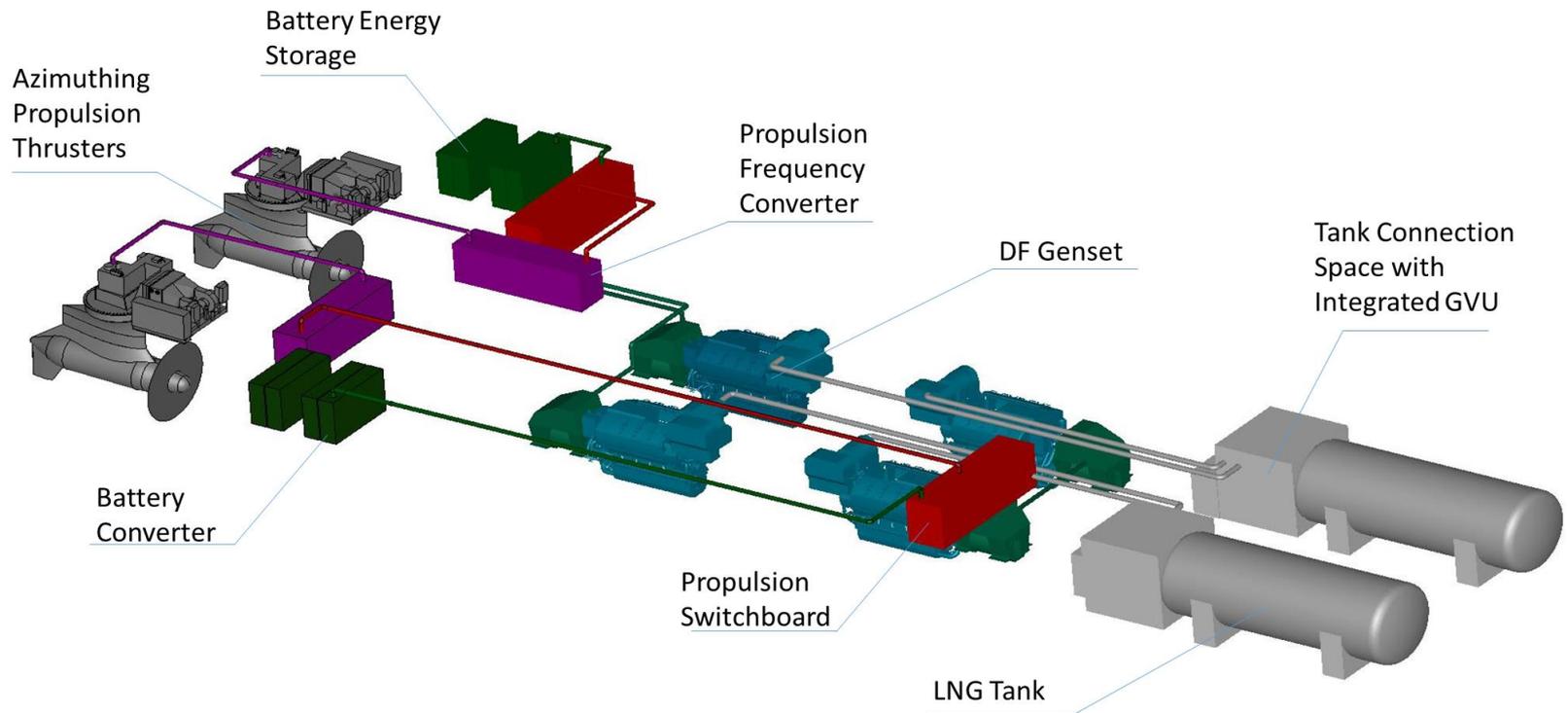
# Newbuilding 6002 for Wasaline – Towards the Future

- Hybrid solutions
  - Dual fuel system (LNG & MGO) & Battery systems
  - Hybrid propulsion.
- Electric propulsion
  - Increase fuel economy
  - Longer maintenance intervals
- Energy efficiency
  - Hull form
  - Energy recovery systems
  - Turn around time in harbors
- Automation & autonomous
  - higher reliability of components and sub systems → increase safety level onboard
  - Higher automation level → ship complexity increase
- Emission
  - Zero emission operations in harbor.
  - Emission limits.

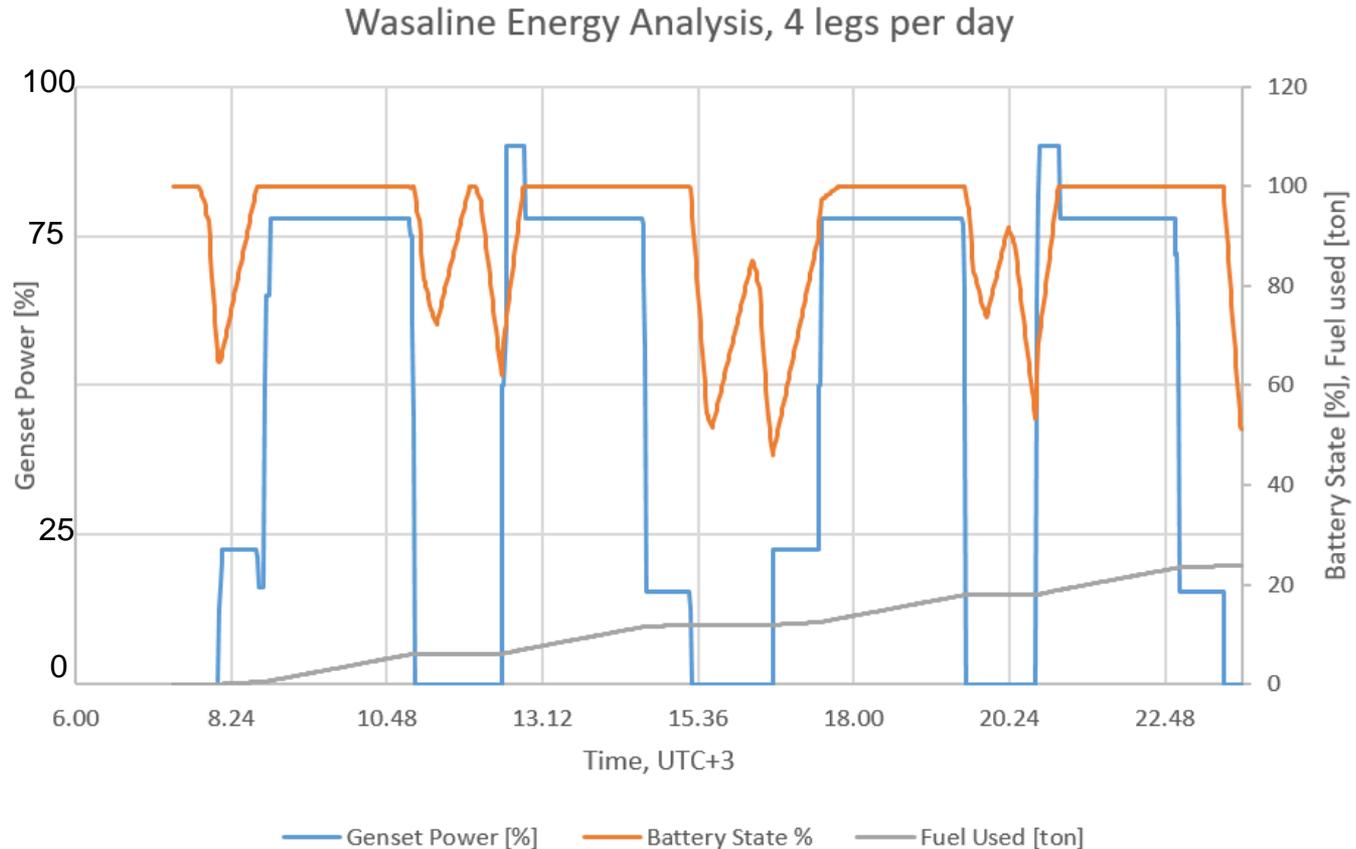
## Newbuilding 6002 for Wasaline – Developed hull design

- CFD optimized hull form
  - Reduce the hull resistance in open water → reduce installed engine power and fuel consumption
  - Reduce the hull resistance in ice → good ice breaking capability and better fuel economy in ice condition.
  - Optimized hull form for Vaasa & Umeå sea state.
- In Future
  - Using CFD calculation method will increase all the time
  - How to modelling ice dynamic in CFD?

# Newbuilding 6002 for Wasaline – Energy Solution and Power Transmission



# Newbuilding 6002 for Wasaline – Power Demand and Energy Consumption



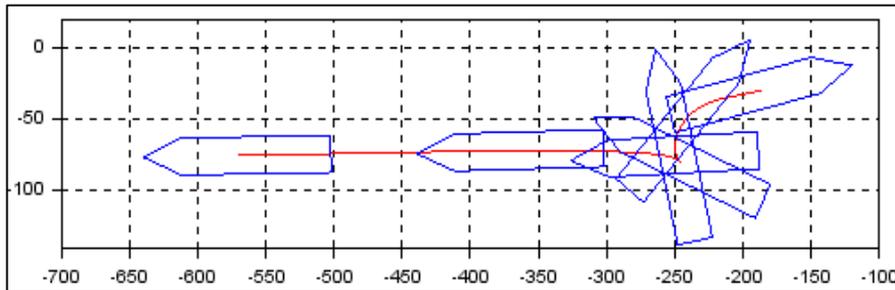
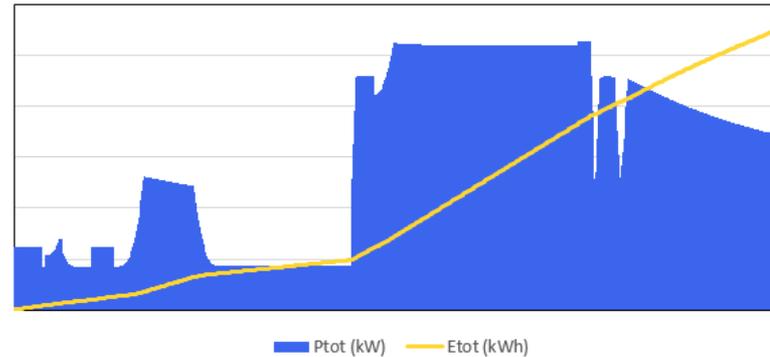
# Newbuilding 6002 for Wasaline – Manoeuvrability and Battery Operation

In-house code for:

- Power demand
- Energy expenditure
- Manoeuvring time in port
- Comparing propulsion options

Further development ongoing

Departure, Vaasa



## Newbuilding 6002 for Wasaline – Emission comparison

- Emissions will reduce extremely by using new technologies

Emission	Diesel Mechanical	LNG Electric
SO <sub>x</sub> ,	X ton/year	-100 %
NO <sub>x</sub> ,	X ton/year	-80 %
PM,	X ton/year	-98 %
CO <sub>2</sub>	X ton/year	-25 %

## Intelligent – Shipbuilding – Technology

- Increased automation in modern ships have created new weak points in the overall performance of the ships
  - increased instability in integration due to software mal functions
- Autonomous ships' R&D-efforts will give a higher reliability of components and sub systems
  - by extension an increased safety
- Mission based development of future ships will ensure deeper technology understanding
  - theoretical knowledge supported with experience and deep understanding
- Talent and well educated people will contribute to keep continuity in the shipping value chain
  - a guarantee for the sustainability – education – research – development – shipbuilding – operation

# CONTACT INFORMATION

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