

# **REINTRIEB**

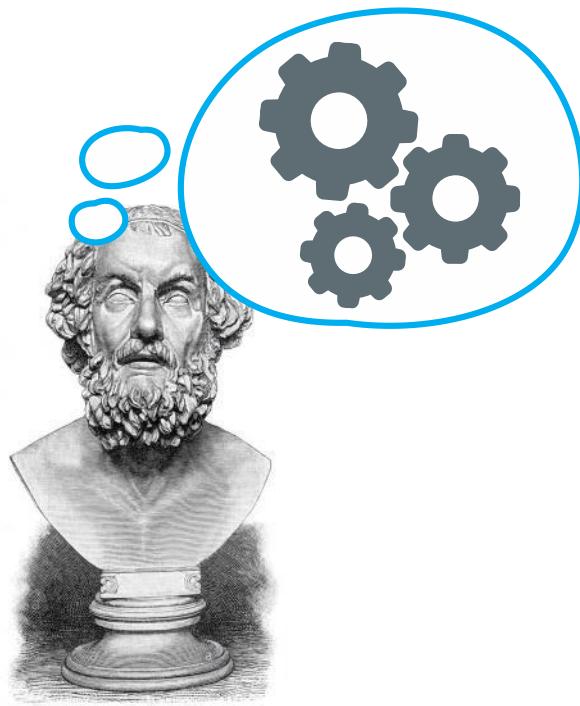
AMBIENT WATER TRANSMISSIONS

## PRESENTATION AMBIENT WATER TRANSMISSIONS & SIDE-BY-SIDE PROPELLER



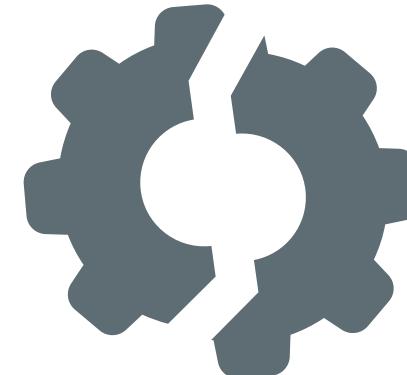


# A sticky problem ...



Since the Greeks invented gears ...

... engineers have been trying to find ways to use them without breakage.





## A sticky problem ...



Modern gears are lubricated (and cooled) with highly noxious oil.



Sad but true: oil is highly problematic for the environment, the climate, humans and animals.



## A sticky problem ...



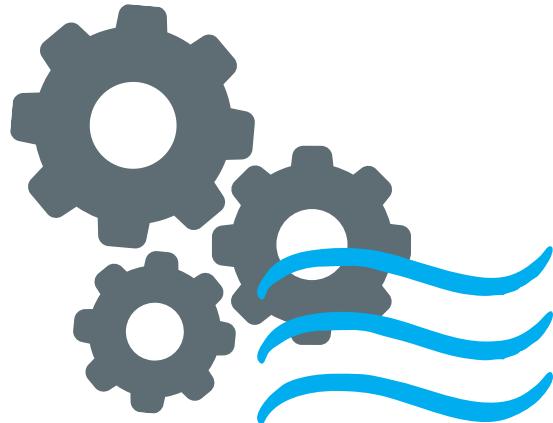
And: Oil is expensive to buy,  
to store and to dispose off  
...

Wouldn't it be great to  
replace the expensive, toxic  
oil in gears with something  
environmentally friendly and  
cheap?



# Our solution is water!

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We have developed a method to lubricate gears with ambient water.

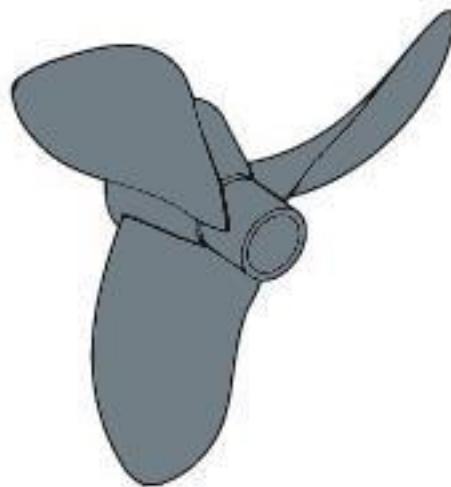
Based on this we are developing the first high-performance (!), oil free (!!), water lubricated gear box in the world.

This invention has enormously disruptive potential in the propulsion technology, particularly in maritime propulsion systems.

Welcome to the world of REINTRIEB



# Water lubrication in maritime propulsion



Depending on the system one or several gears are used in maritime propulsions.



Due to a lack of alternatives, they are all lubricated with highly noxious oil.



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# Water lubrication in maritime propulsion



Ensuring that no toxic oil escapes into the seas or the rivers is technically complicated and costs a lot of money.



But we all know that there are no perfect seals. Something always leaks. Everywhere, everyday, around the world.



# Water lubrication in maritime propulsion



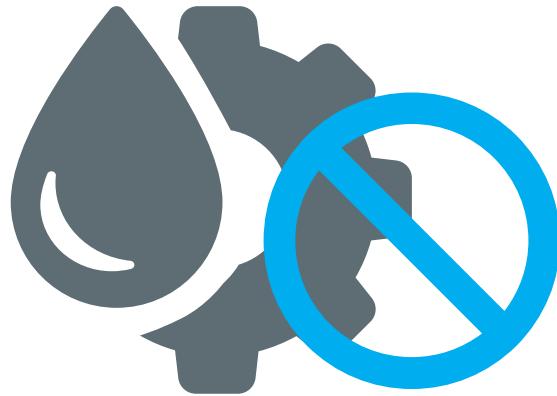
As a consequence ship owners and carriers are confronted with high fines, evens bans for some waterways and a bad public image ...



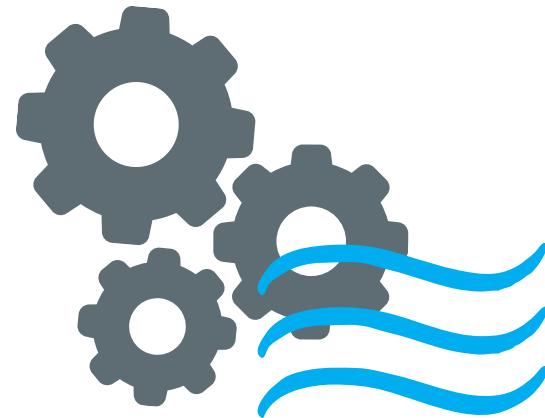
... and our fresh water reserves are being regulated and protected more and more.



# Water lubrication in maritime propulsion



Vice versa: If tiny amounts of water leak into your gear, the consequences are costly: expensive repairs, even dry dock and business interruption.

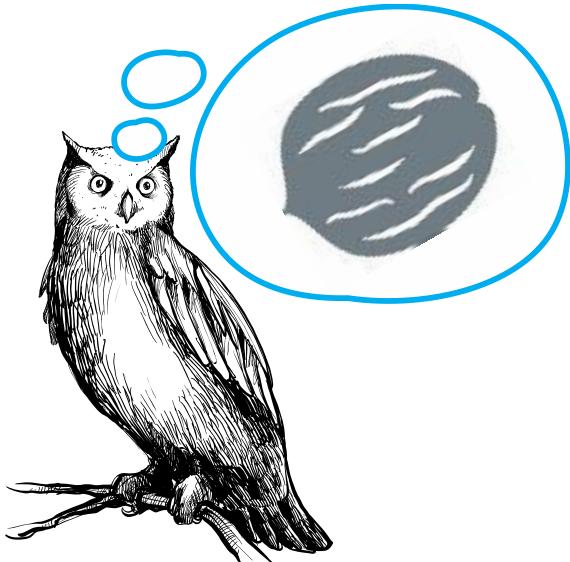


If maritime gears are lubricated with water instead of oil, all these problems would be addressed and solved at once.



## A hard nut to crack...

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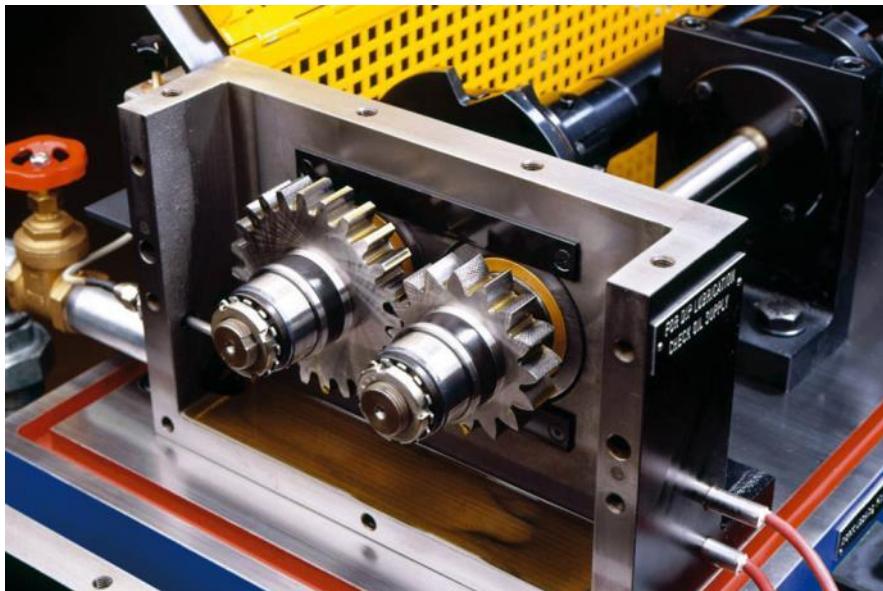
Before any ship in the world is launched with an ambient water transmission, we need a proof-of-concept.

We have assembled a team of maritime engineers and conducted many, many tests to make sure that our water transmissions work ...



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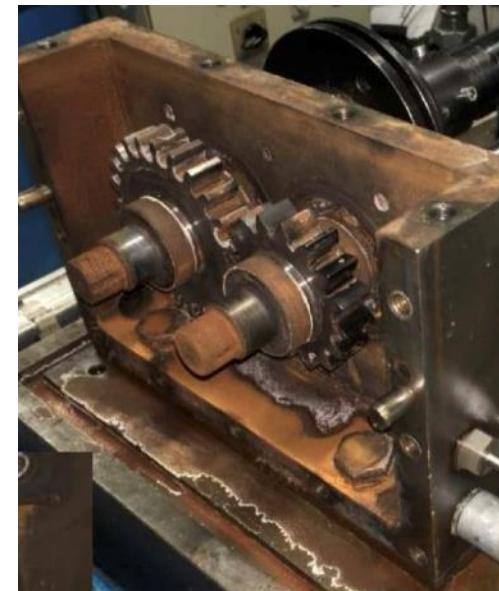
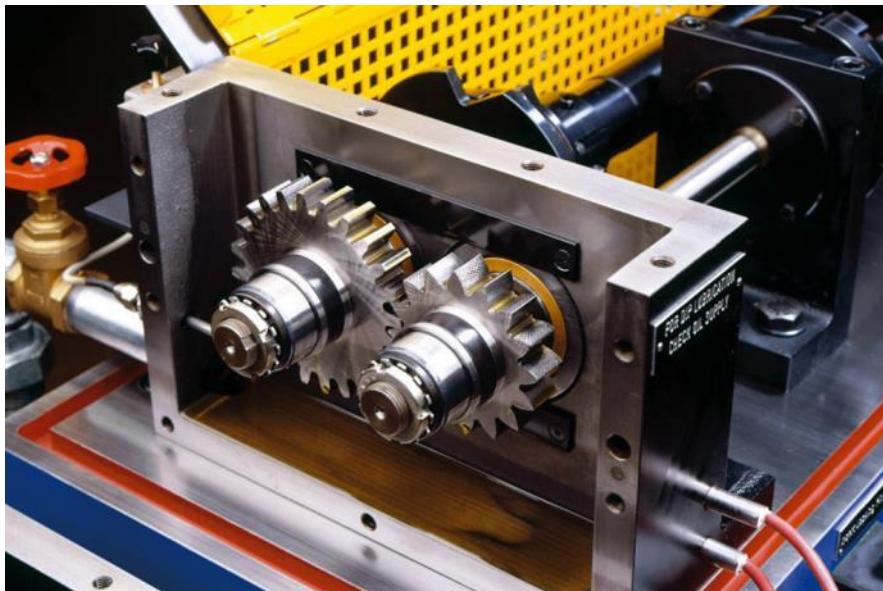
# Where we stand...



- The most important hurdle on the way to the proof-of-concept has been taken: The scuffing safety test conducted by the FZG institute of the Technical University Munich.



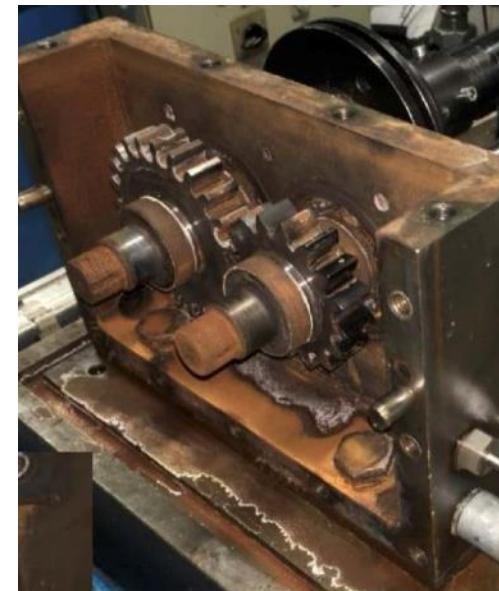
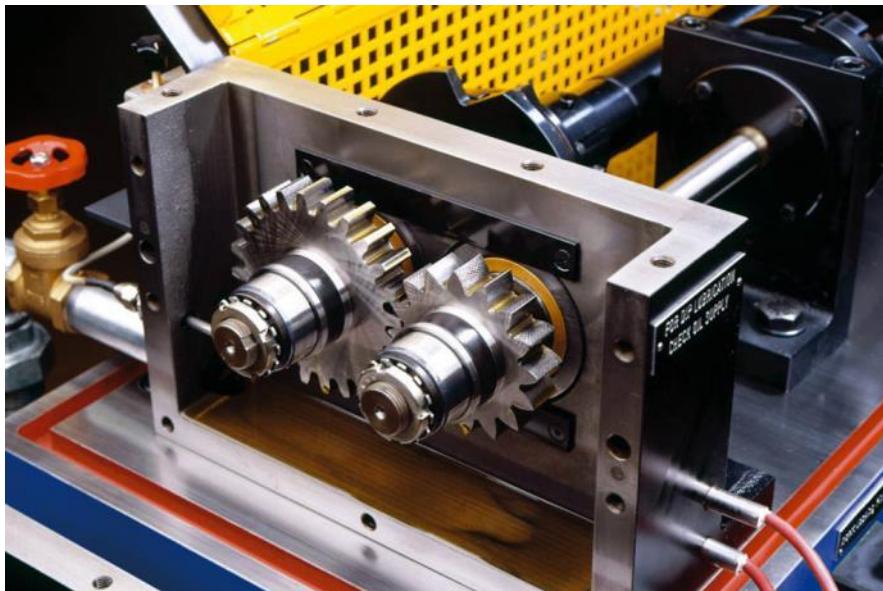
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# Where we stand...



- The most important hurdle on the way to the proof-of-concept has been taken: The scuffing safety test conducted by the FZG institute of the Technical University Munich.
- Our asset: European Patent EP 2 614 000 B1 awarded to Reintrieb on 14 February 2018 (more patents pending)



## Our roadmap:

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### ➊ Already achieved:

- Scuffing Safety
- Corrosion free gear casing

### ➋ Currently testing:

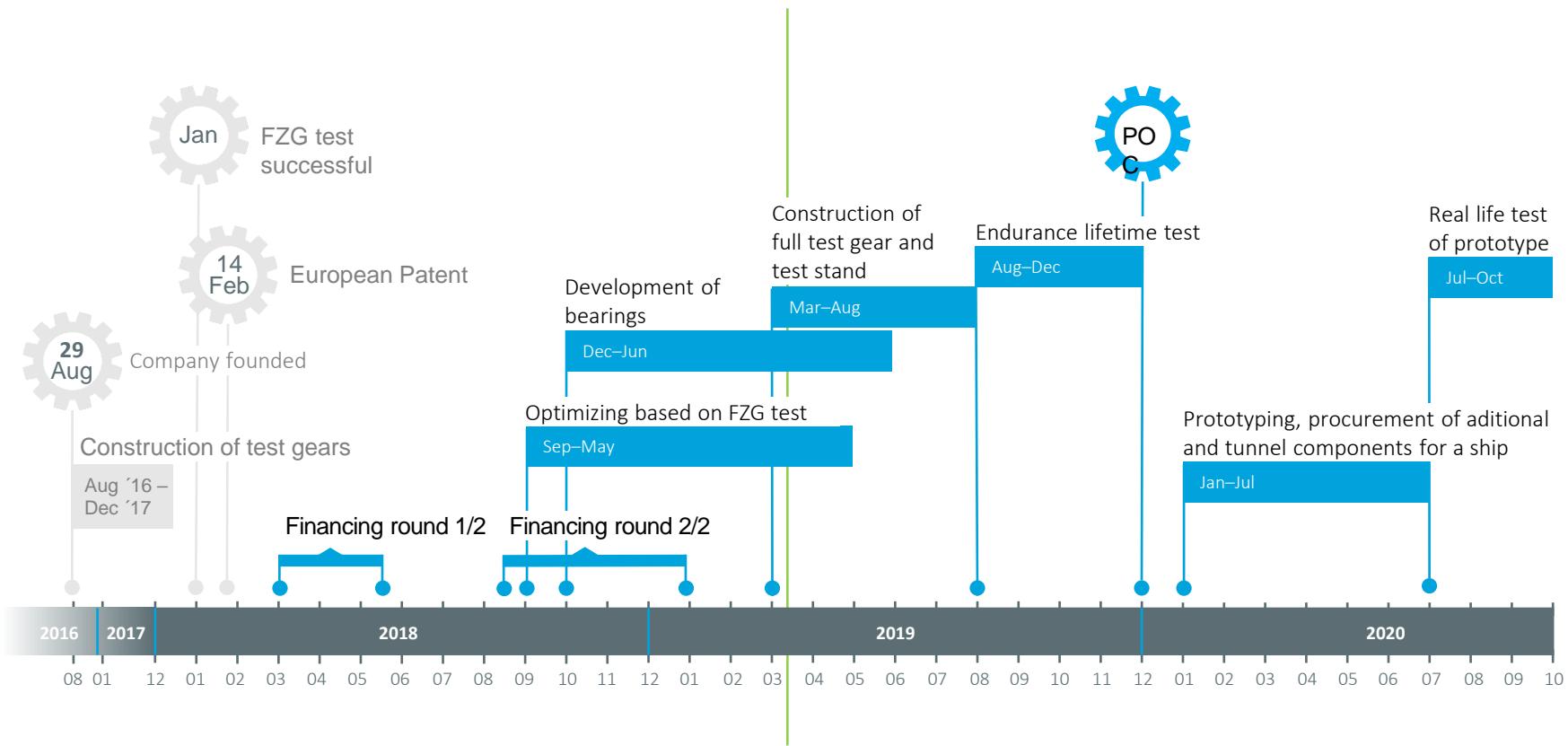
- Water lubricated bearings

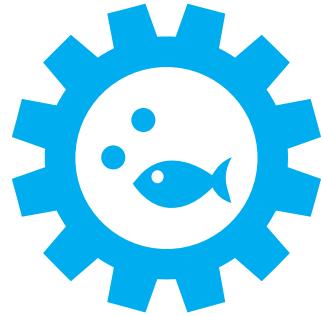
### ➌ Still to do (Fall 2019):

- Endurance lifetime test



# Roadmap for „Proof of Concept“ and beyond





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**REINTRIEB SIDE-BY-SIDE PROPELLER**



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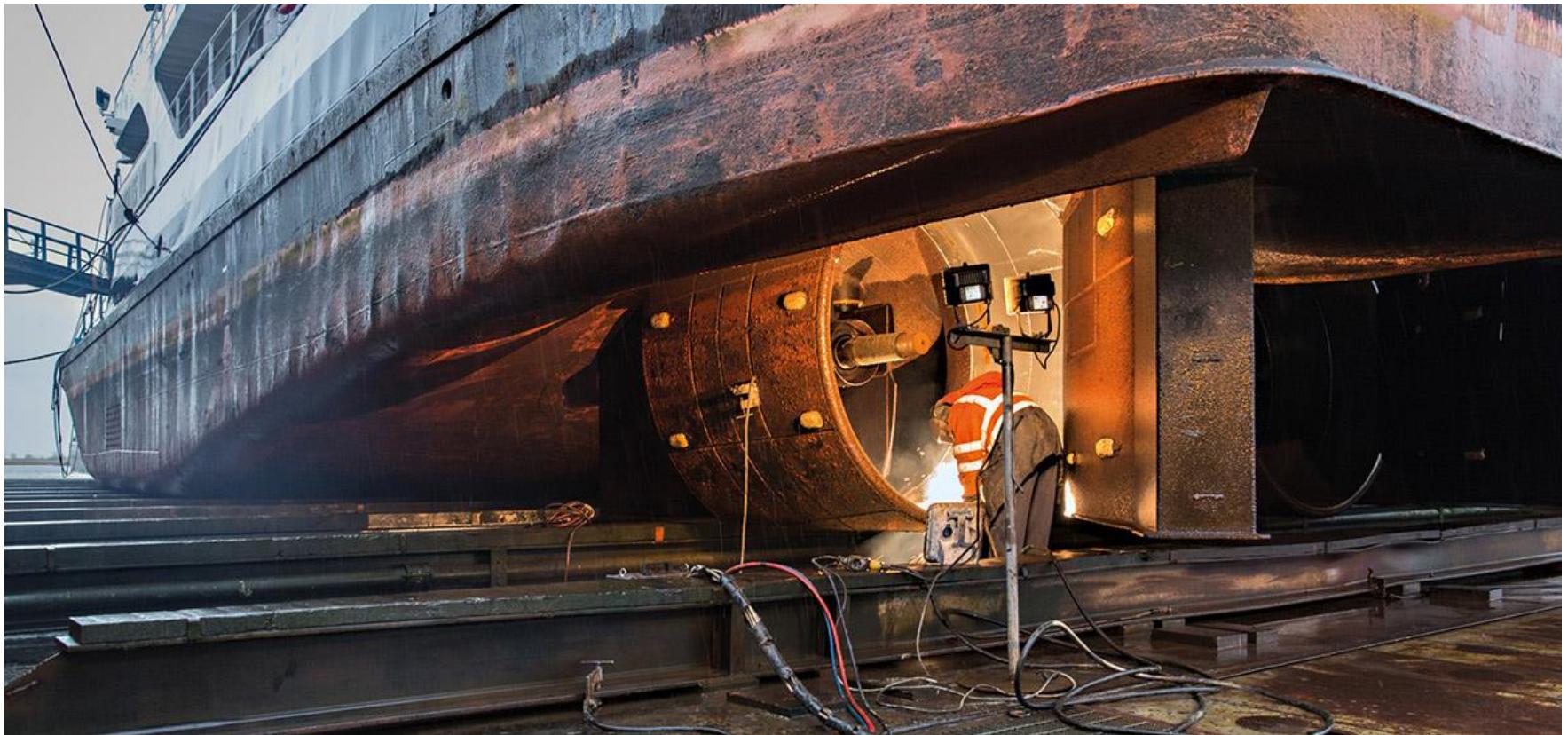
# Typical propulsion configuration cargo carrier





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# Typical propulsion configuration danube fleet - MGS

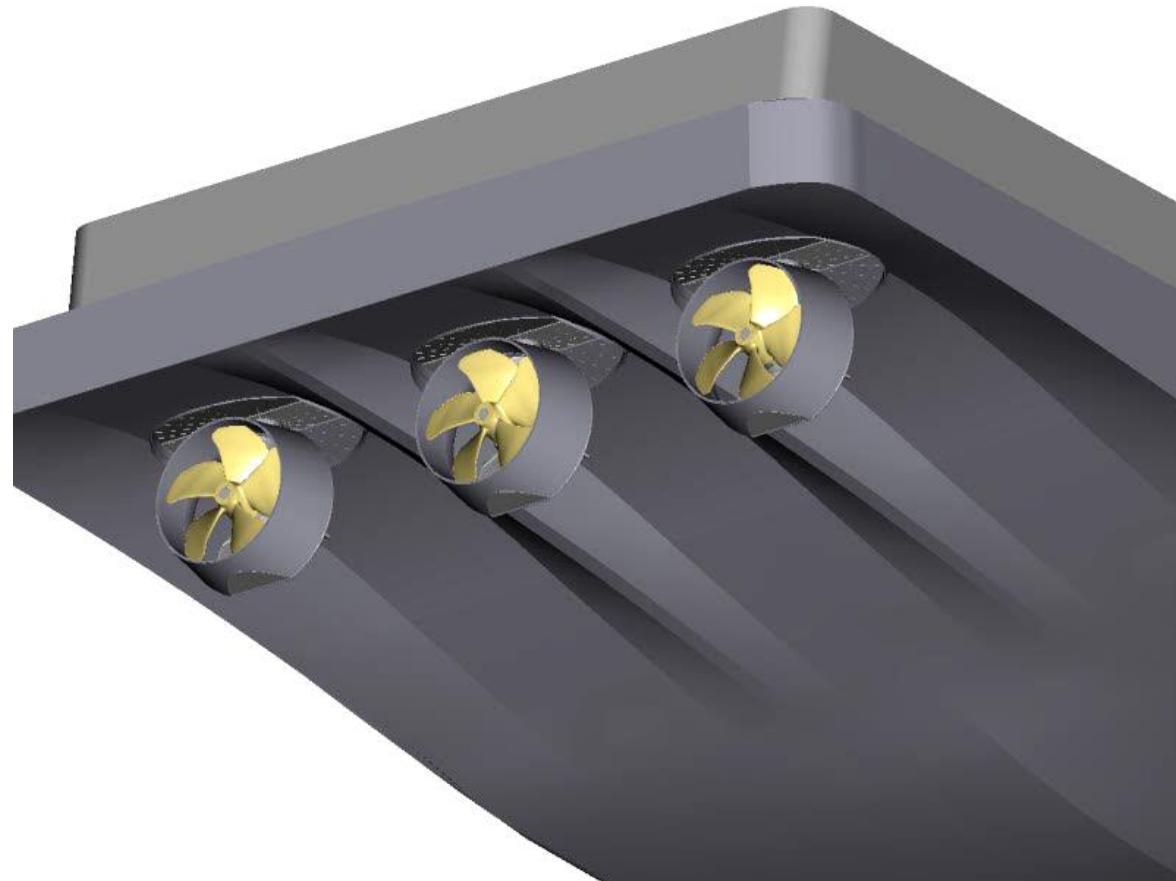




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# Current Ruder Propeller Systems

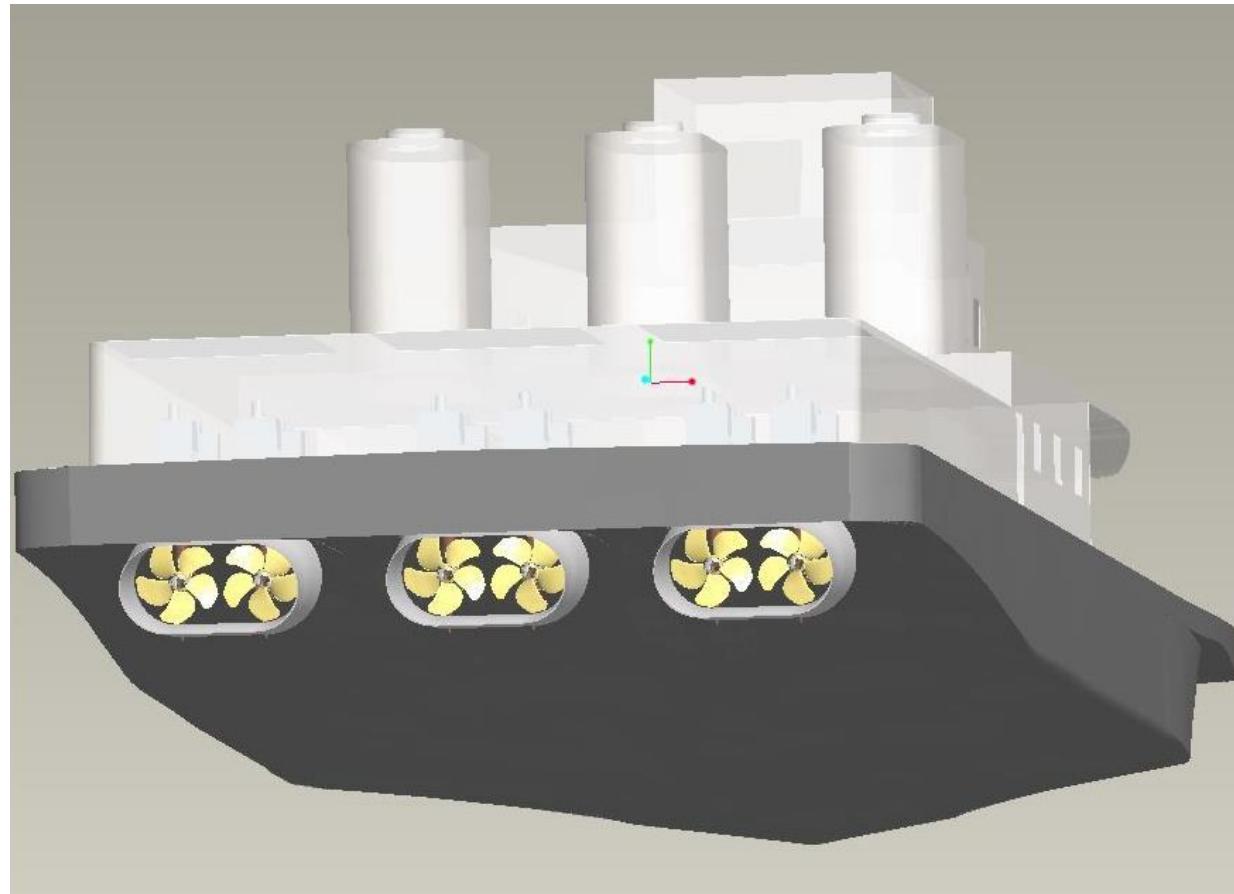
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# Possible Side-by-Side Construction





# Advantages Side-by-Side Construction

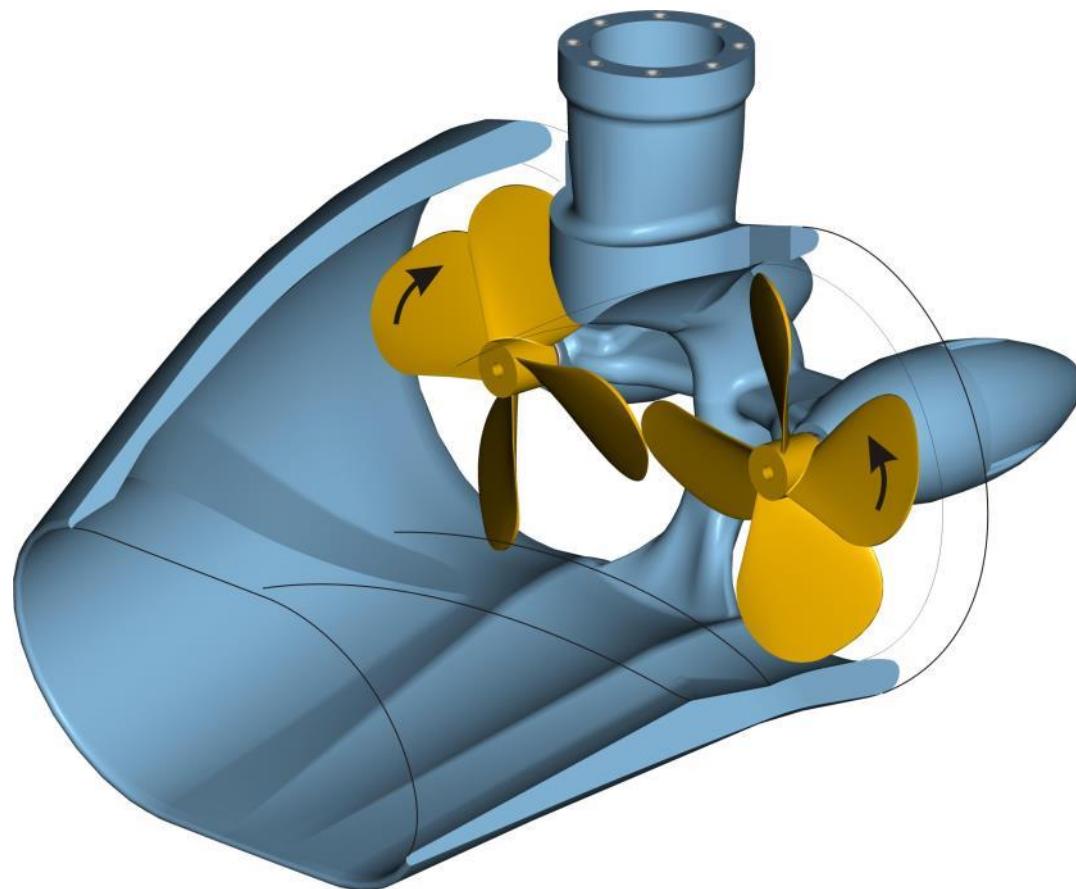


- Same efficiency with shorter build (75% of current propeller diameter)
- Able to operate at lower water levels (i.e. draught)



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# Side-by-Side 3D test model

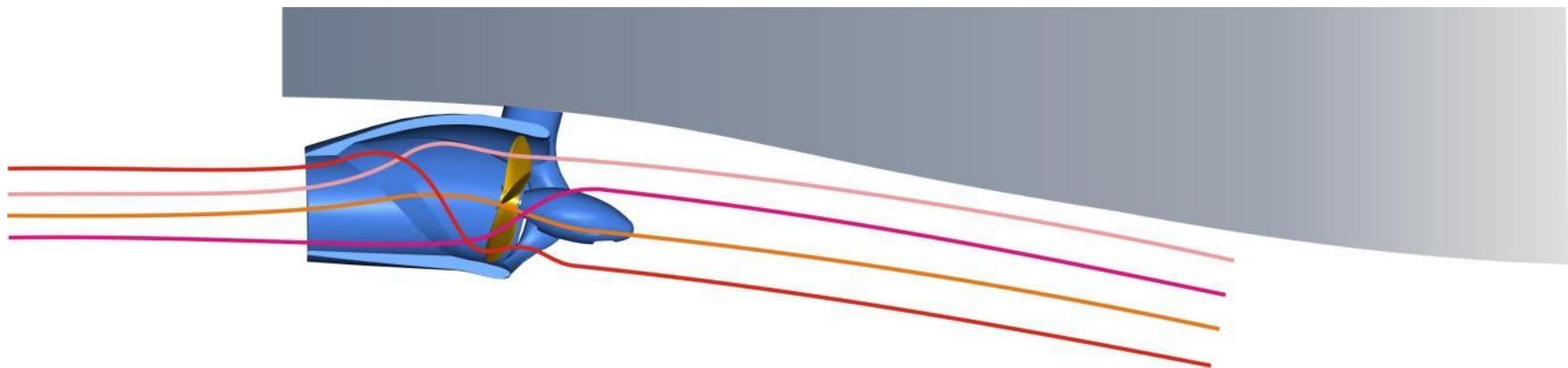


○ Schematic



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# Side-by-Side 3D test model



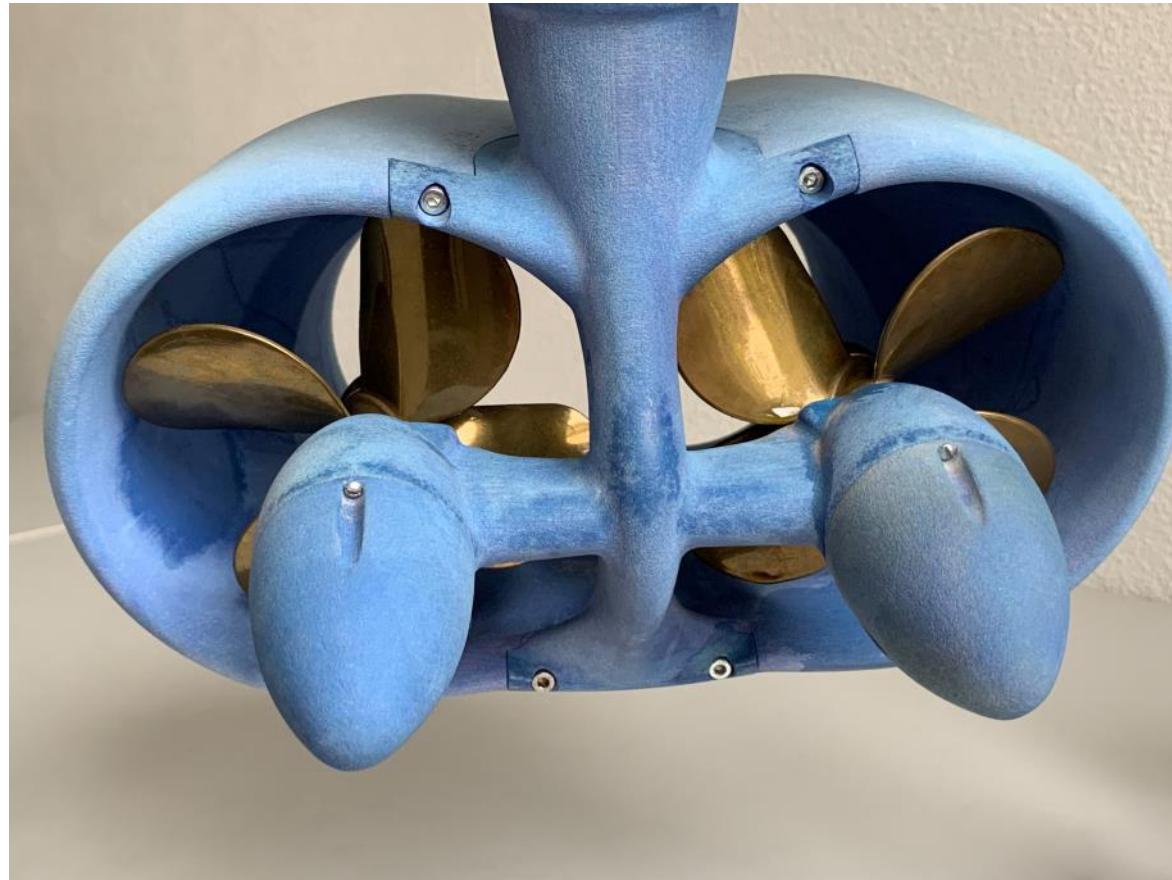
## Water Flow



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# Side-by-Side 3D test model

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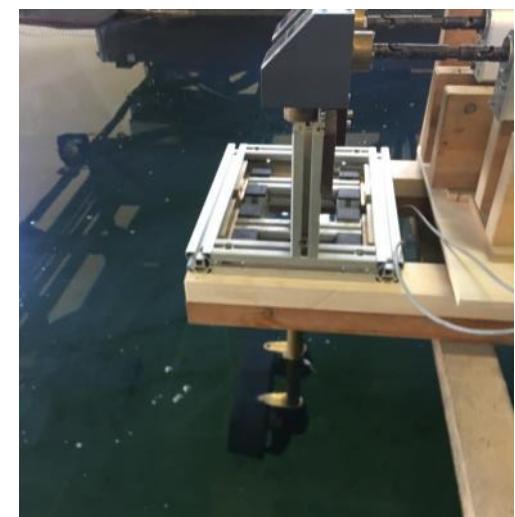
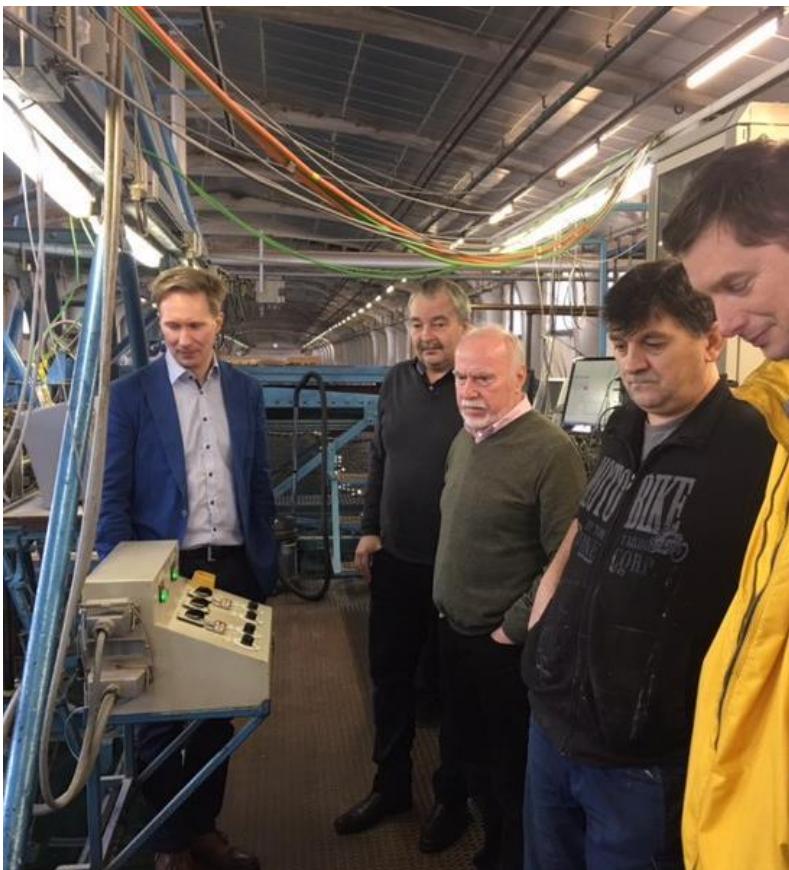


➊ Test Model – Front View



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# Side-by-Side tests



- ➊ Primary air tests
- ➋ Current water tests (Feb 2019)



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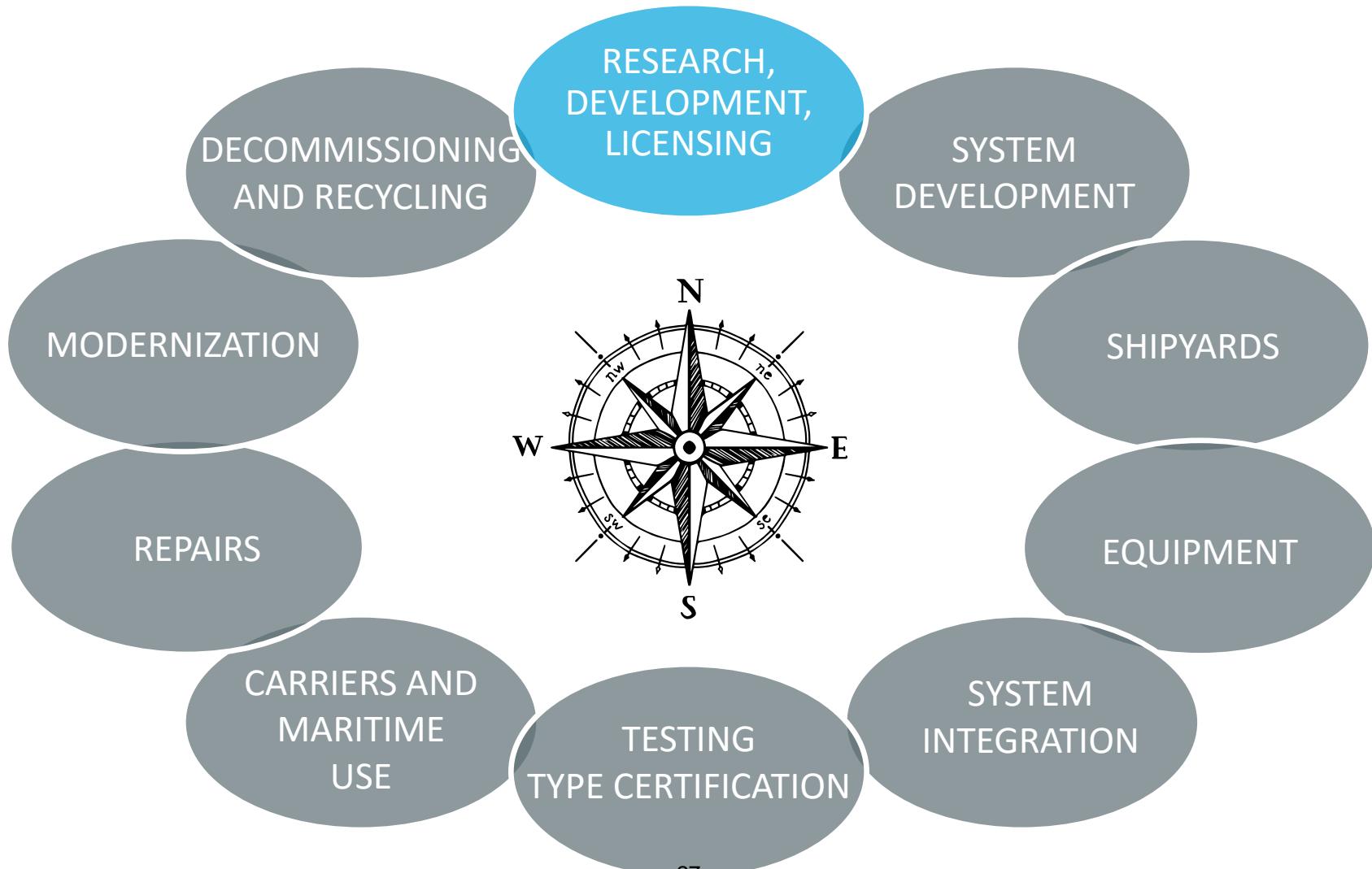
# Side-by-Side tests



- ➊ Current water tests

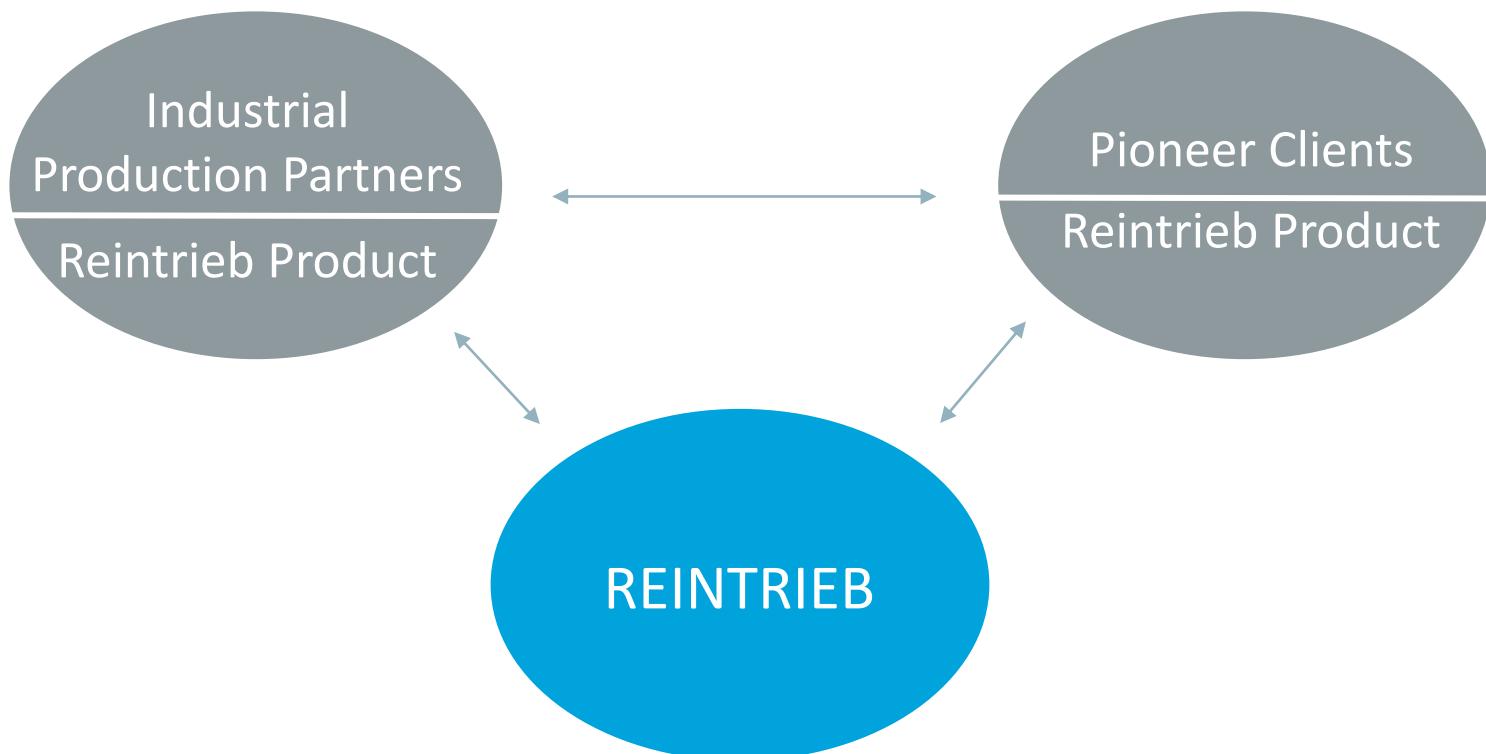


# Reintrieb in the maritime value chain





# What we are looking for...





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Thank you for your interest and attention

**Please fill out our questionnaire!**



# Legal Disclaimer



Quelle: Hafen von Triest 1912 / Alexander Kircher

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