



A realistic approach to decarbonization in times of uncertainty

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Energy Saving Technologies



IMO ISWG-GHG 20



From saving the oceans. To safeguarding the planet.

Right now



- Trajectory to reduce emissions remains
 - EU ETS
 - Fuel EU
 - CII, EEXI
-
- Fuel prices still high

“Strategy” Employed by most companies

- Reduce Energy Requirements
 - Conventional ESDs (around Propeller)
 - Reduce Friction
- Improve Operation
- Electrification
- Fuels
- Air Lubrication
- Wind
- Carbon Capture

The ERMA TECH GROUP Ecosystem

Energy Efficiency

FLEXSERIES
Energy Saving Devices for Hull and Propeller

CARBON FIT
Carbon Capture & Storage

ARMADA
Passive Air Lubrication System
*Strategic Partnership

NaviPULSE
Variable Frequency Drives

AMIO
Coriolis Flow Meters

METIS
Intelligent Analytics

BLUE CONNECT
Alternative Maritime Power

DBPI®
Ultrasonic Antifouling

POLCOR
Cathodic Protection

HAZDASH
IHM Platform

ERMA FIRST FIT BWTS
BWTS Full Flow EC

ERMA FIRST FLOW
BWTS Filterless Side Stream EC

EcoOne
BWTS Chemical Injection

oneTANK
BWTS Intank

ALIOS
Fresh Water Treatment

Cleansewage-BIO
MBBR STP

Cleansewage-MBR
Advanced Membrane STP

POSEIDON FIT
Bilge Water Separator

OWS-COM
Bilge Water Separator

TRITON EC & FIT
Electrochemical & Physicochemical STPs

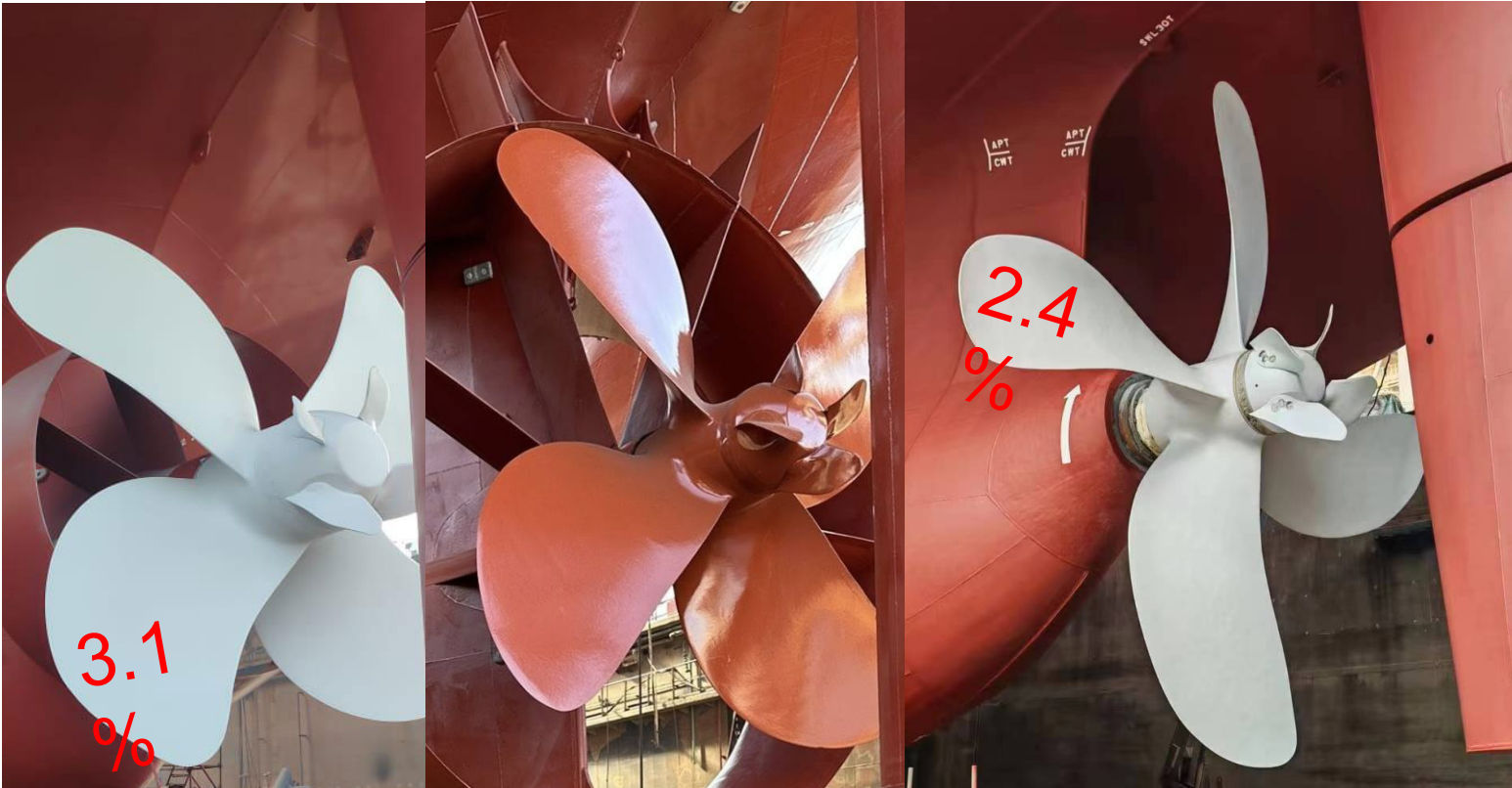
Water and Wastewater

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ERMA FIRST FLEX SERIES

Energy Saving Devices for Hull and Propeller

DECARBONISATION



Total savings ~7-8%

With low friction Paint >12%

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RIGHTSHIP
ZERO
HARM
INNOVATION
PARTNERS
2024



ERMA FIRST



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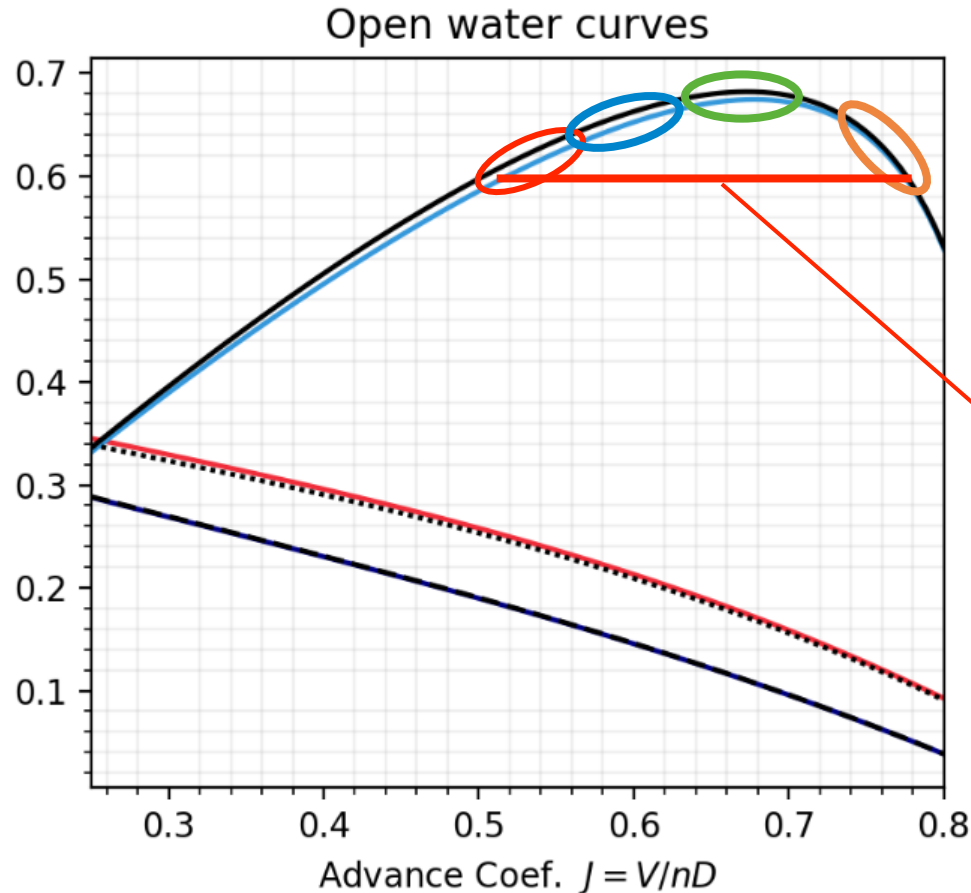
The End

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But wait...

- The phenomena are “highly non linear” (a.k.a. not that simple...)



“Typical” operation points

WED Installation

Low Friction

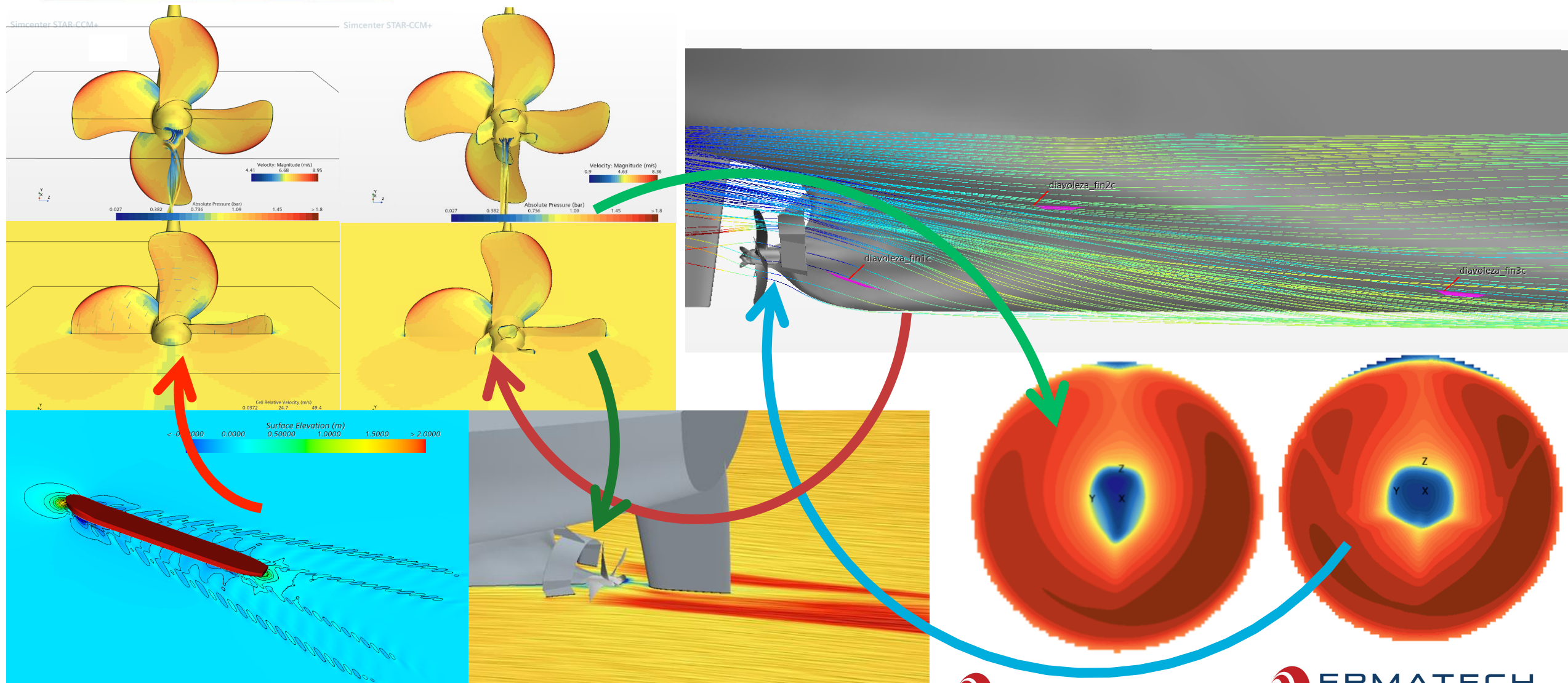
Wind

Same
Efficiency

Preswirl will reduce Power Margin

ERMA FIRST FLEX SERIES

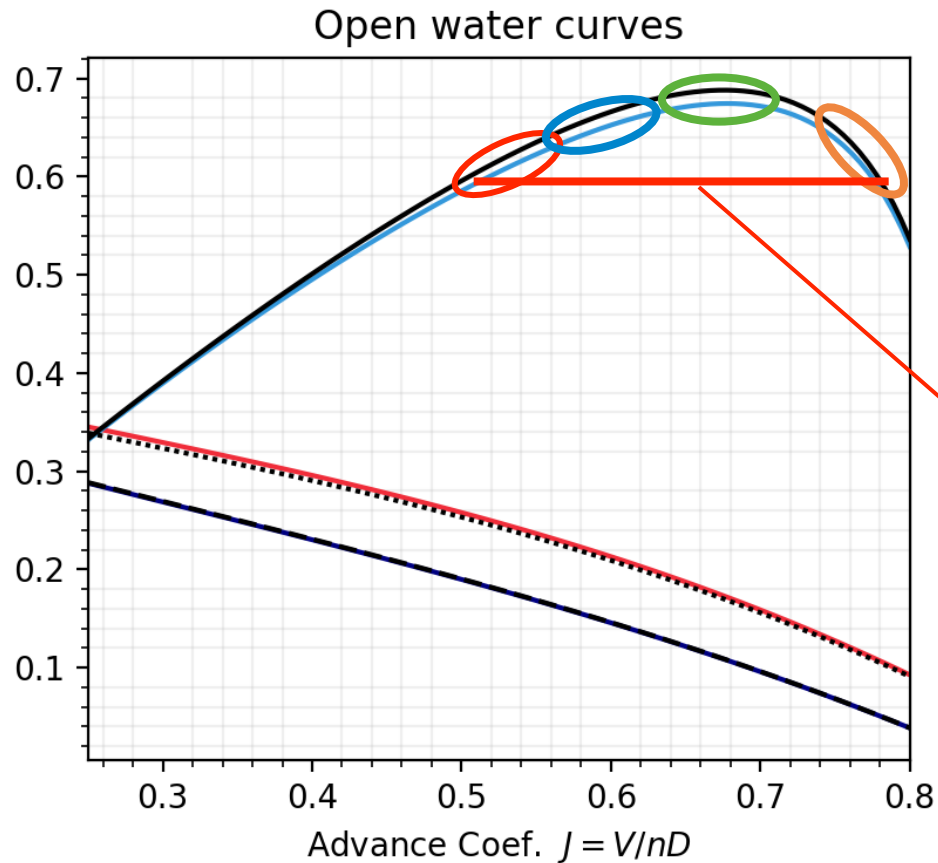
Optimization Using State of the Art simulation



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“Typical” operation points

WED Installation

Low Friction

Wind

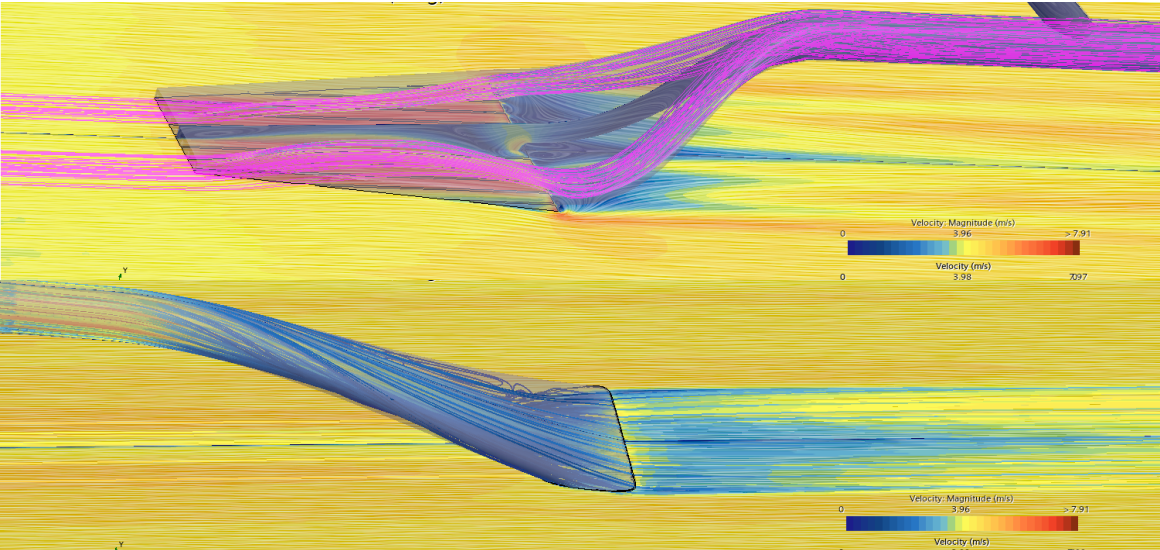
Same
Efficiency

Air Lubrication System

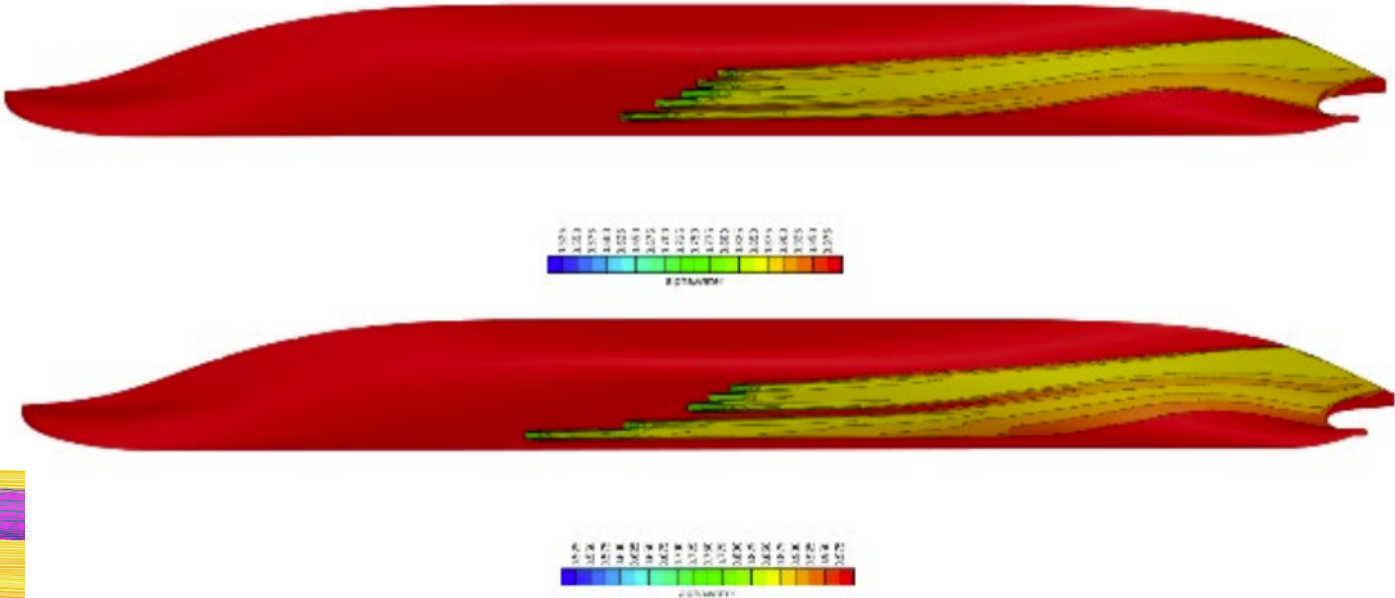


Armada Technologies' Passive Air Lubrication System (PALS) uses the forward motion of the ship to draw air from the deck and to create an air-water mixture for lubrication.

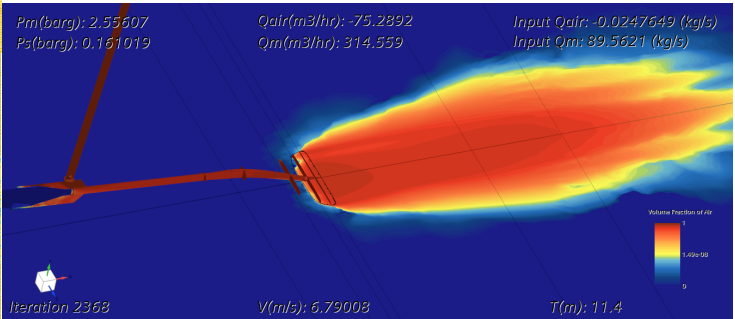
- No compressors
- less power



Inlet/outlet Optimization



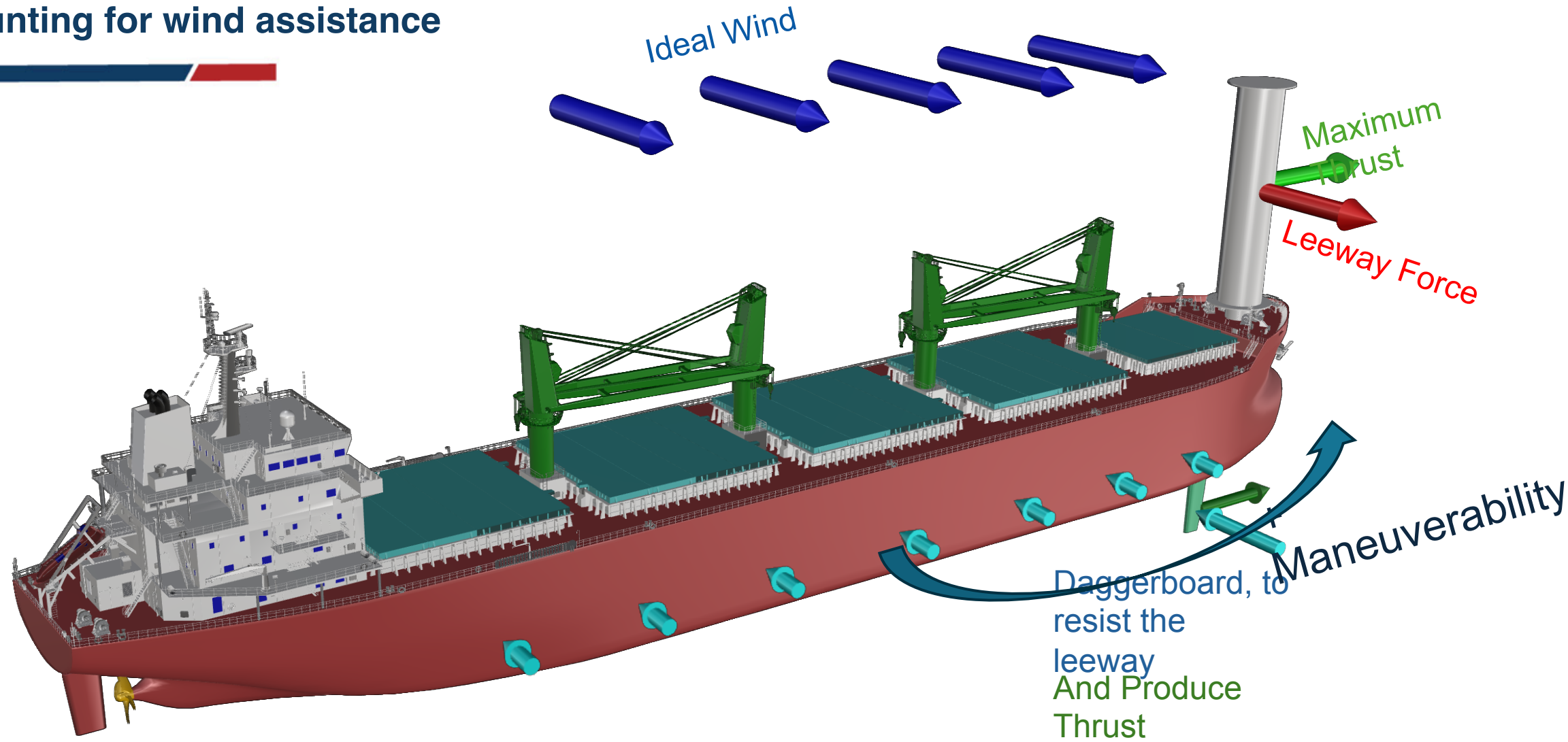
Ensure Air does not reach Propeller



Strategic partnership:

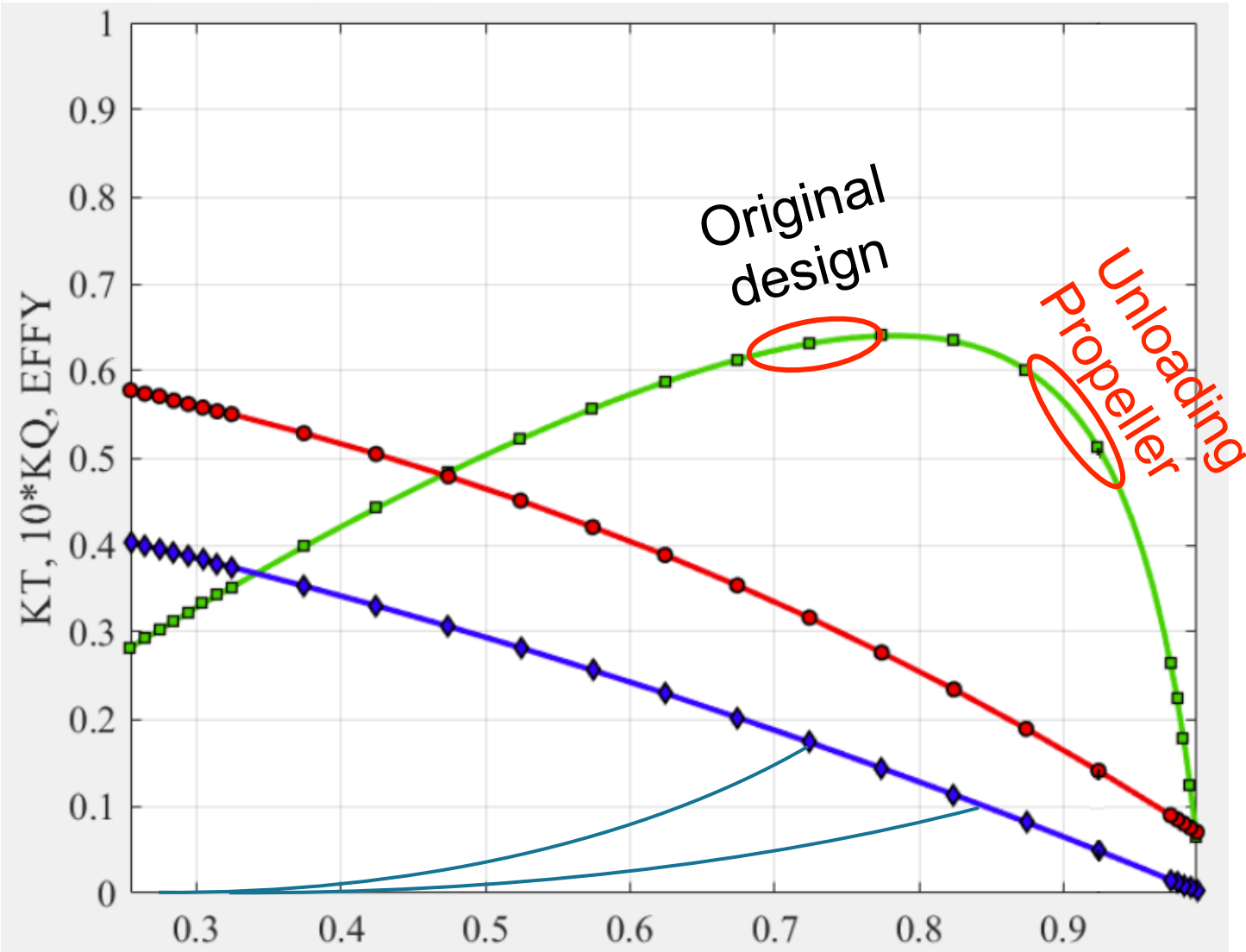


Accounting for wind assistance



Rudder Action

Issues with assistance



Solutions:

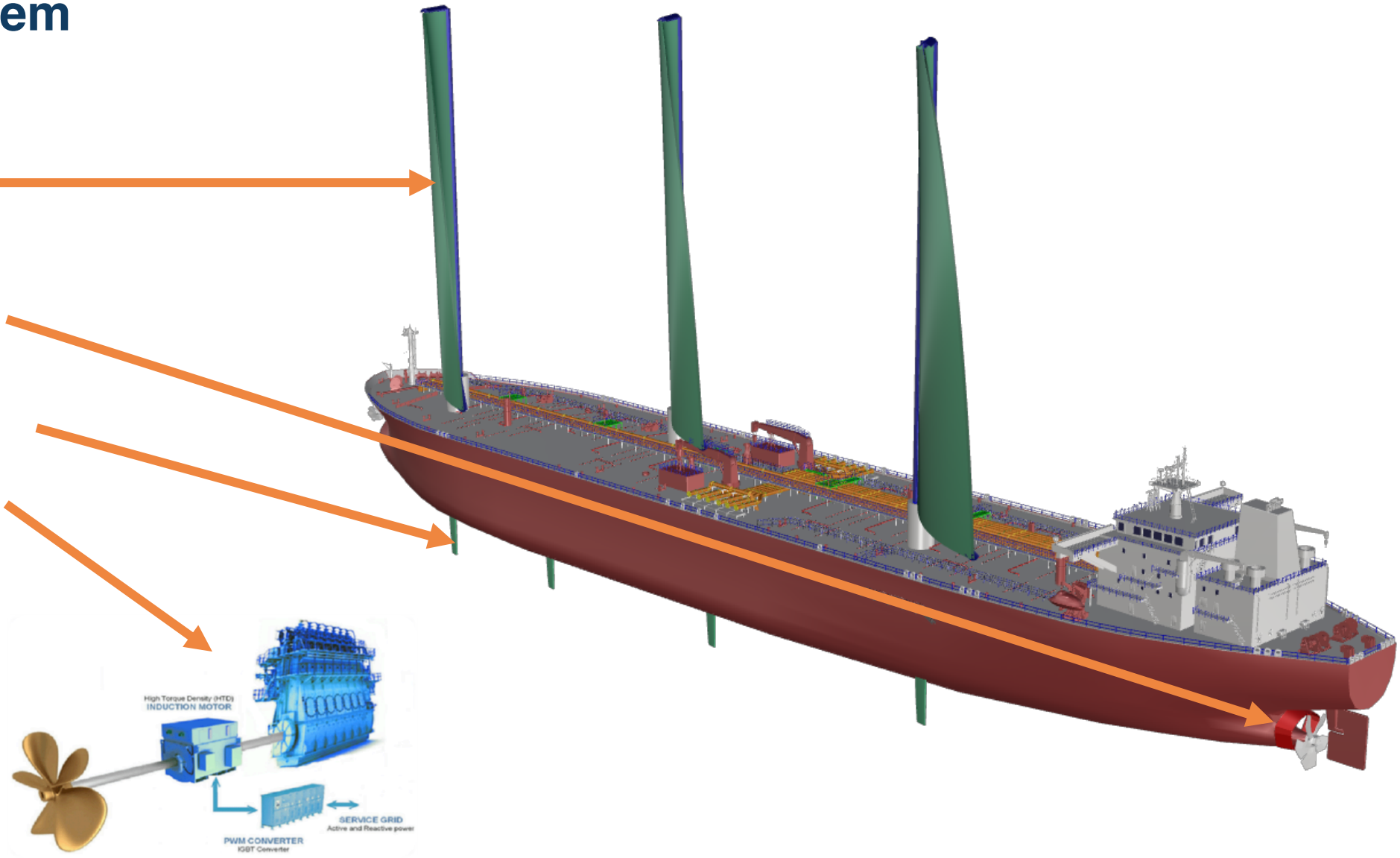
- Keep assistance low
- Controllable Pitch Propeller
- Blades changing geometry

Takeaways

- Future Unknown, but Energy Reduction remains a Must
- Solutions for Energy Improvement Already in Place
- Cumulative Savings CAN reach or exceed 10%
- ONLY if systems are Designed together
- Wind Assistance and Air Lubrication are promising, but not there yet

Extended Ecosystem

- FLEXWIND
- FLEXRING V2
- FLEXCAP V2
- Daggerboards
- Power Take Off
- CPP
- Routing







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THINK DECARBONISATION ...
THINK ENVIRONMENTAL PROTECTION ...
THINK ERMA TECH GROUP!



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