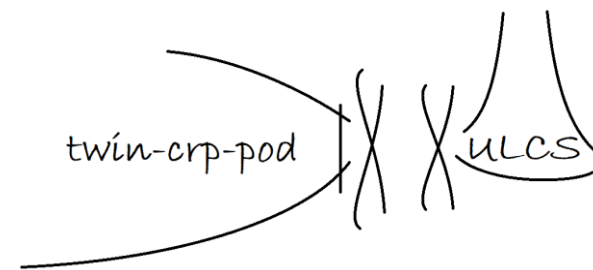


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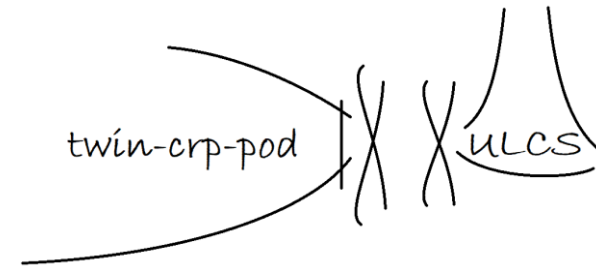


Twin-crp-pod system - a new idea to increase propulsion efficiency, reduce GHG emissions and improve navigational safety for Ultra Large Container Ships.

Hanna Pruszko, Maciej Reichel



KORAB CEMT Young 2020

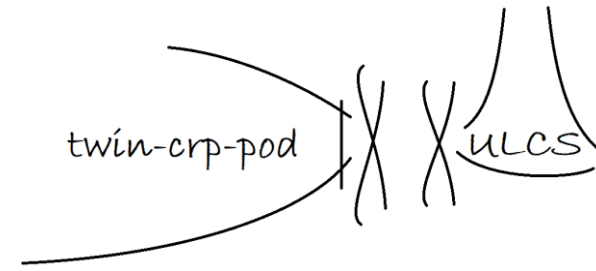


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Cofund scheme of Horizon 2020 of the European Commission

16 collaborating countries

To address a number of actual challenges

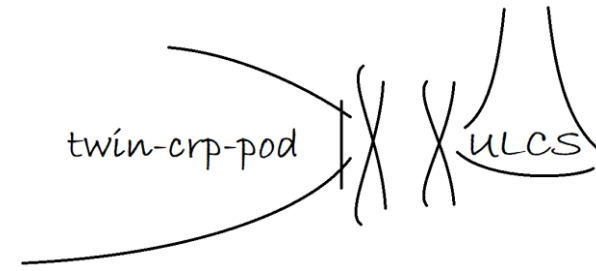


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Call 2019

Priority area - Environmental friendly maritime technologies

Application of hybrid CRP-POD propulsors on ultra large twin screw containerhips to increase propulsive efficiency, reduce GHG emissions and improve navigational safety



The idea

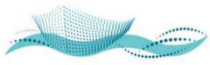
Ultra Large Container Ships

Well-known solutions

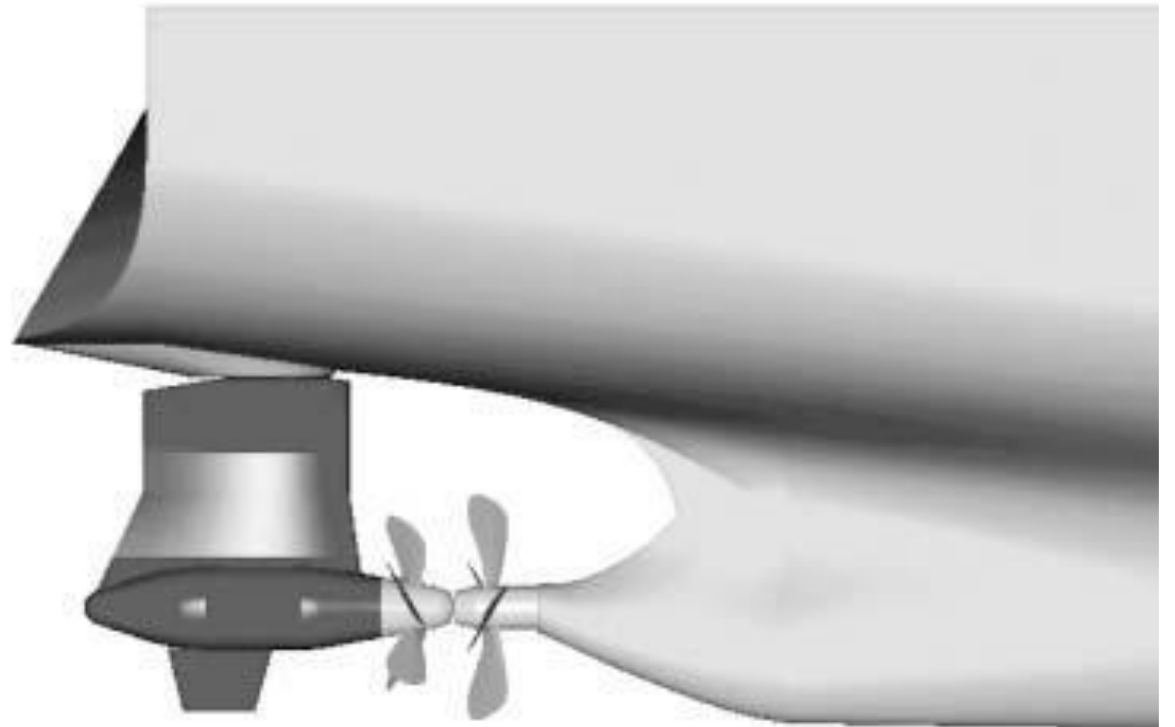
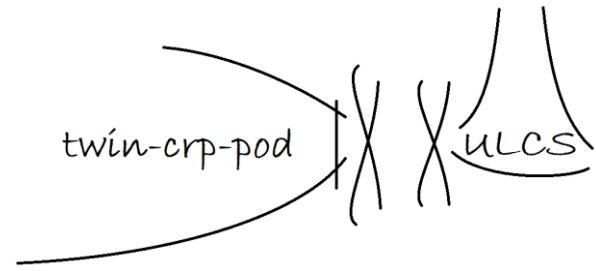
twin-screw

pod propulsors

contra-rotating propellers

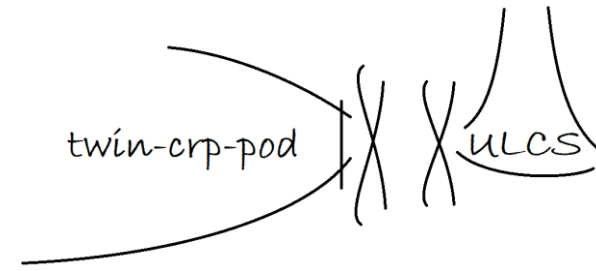


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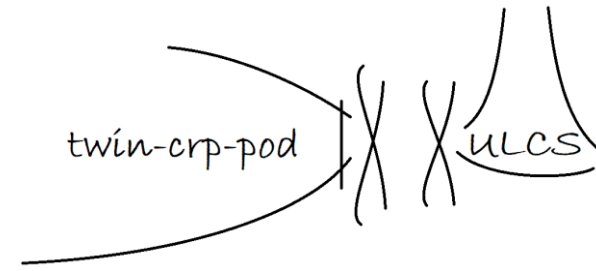
Four specific objectives

Recognition of propulsion efficiency for novel propulsion arrangement

Identification of the maneuvering abilities of redesigned ULCS

Definition of the technical and technological threats

Preparation of the ship masters and pilots for navigation and operation

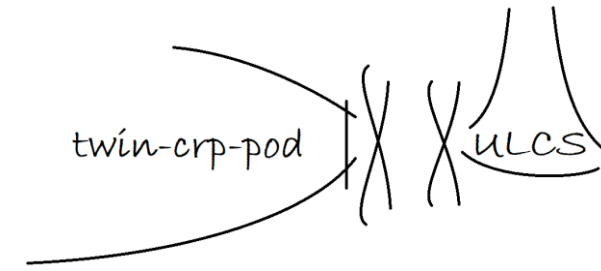


Tools

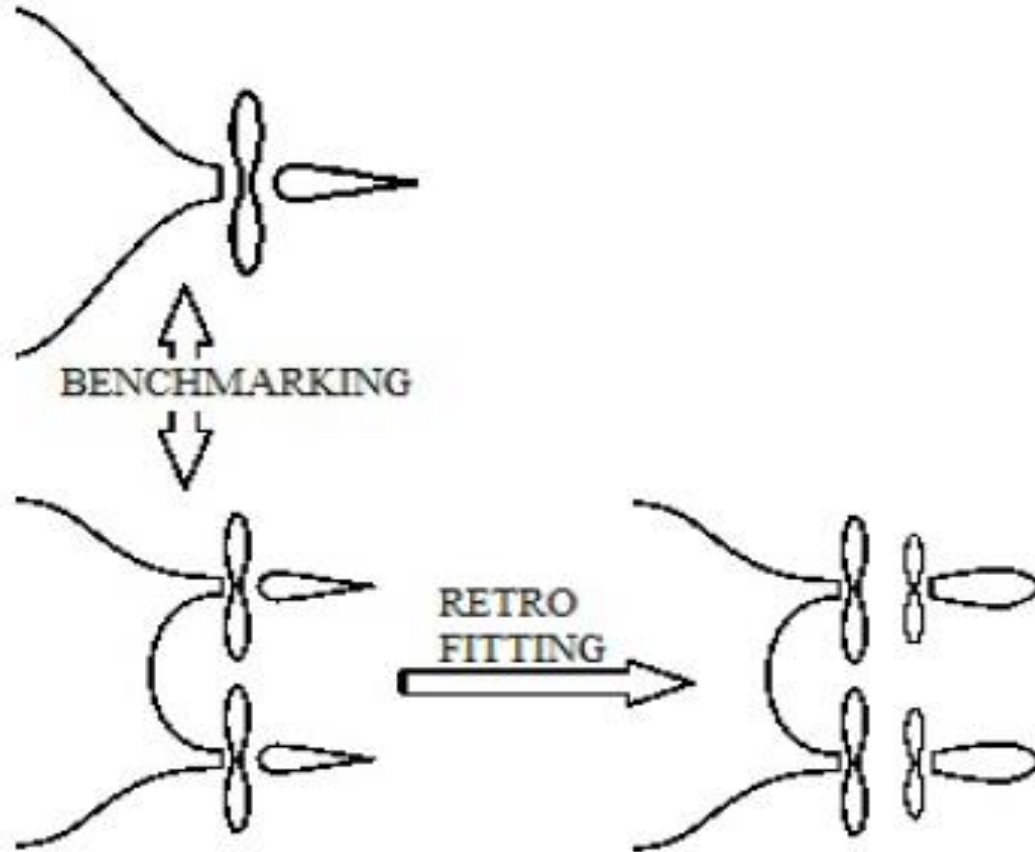
Numerical methods - CFD

Experimental investigation – towing tank tests, manned models

Analytical methods - LCPA tools



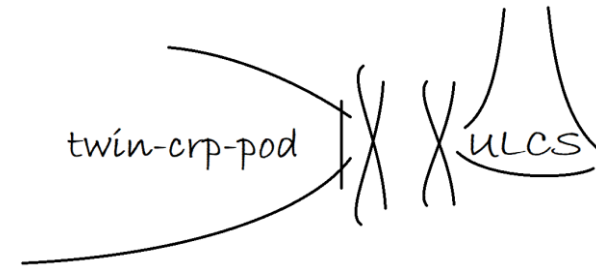
Research flow



single-screw

twin-screw twin-rudder

twin-crp-pod



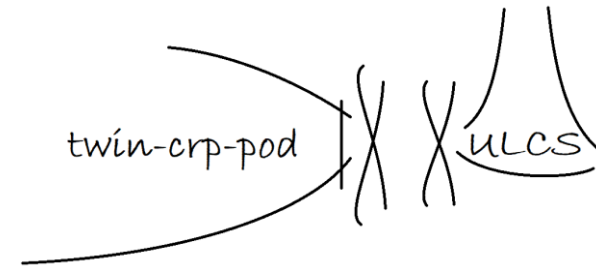
Investigations target



Length **396 m**

Capacity **16000 TEU**

Max speed **26 kn**



Research plan

INITIAL DESIGN

Design of twin-screw twin-rudder stern

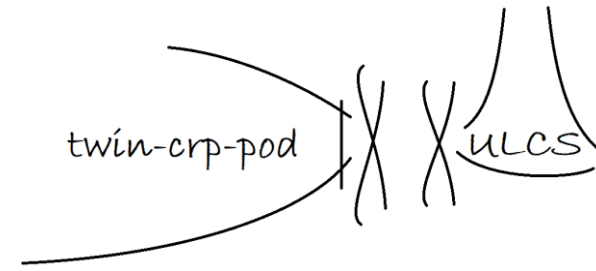
Retrofit to twin-crp-pod stern

Technical and technological challenges:

hull shape

engine room arrangement

propeller design



Research plan

NUMERICAL SIMULATIONS

Computational fluid dynamics

propeller design

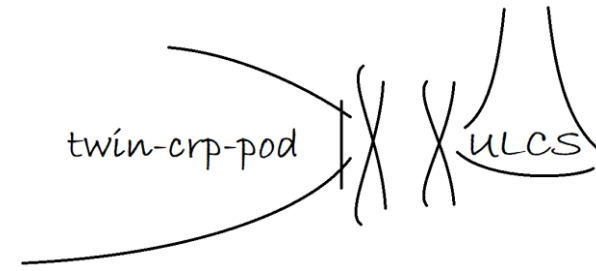
propeller-rudder interactions

propeller-pod interactions

Mathematical manoeuvring model

modular model

hydrodynamic derivatives



Research plan

TOWING TANK EXPERIMENTAL INVESTIGATION

Hull shapes verification

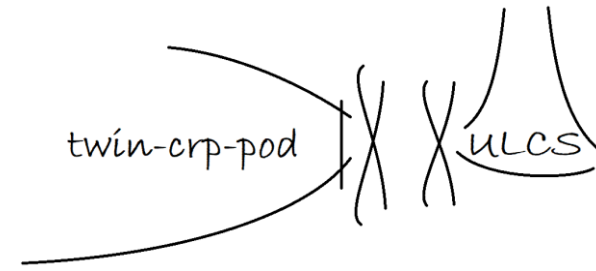
Propulsion predictions

Propeller-rudder interactions

Propeller-pod interactions

Pressures/cavitation

!! Propulsion prediction extrapolation method !!



Research plan

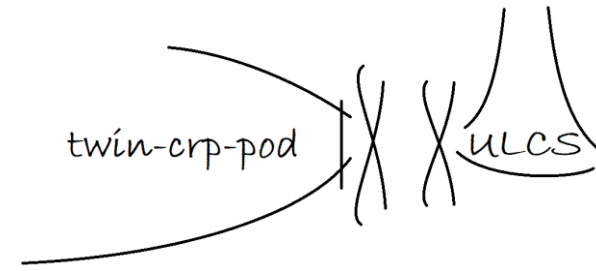
MANNED MODELS EXPERIMENTAL INVESTIGATION

IMO criteria verification

Ship handling training for masters and pilots

standard procedures

emergency manoeuvres



Lifecycle Performance Analysis

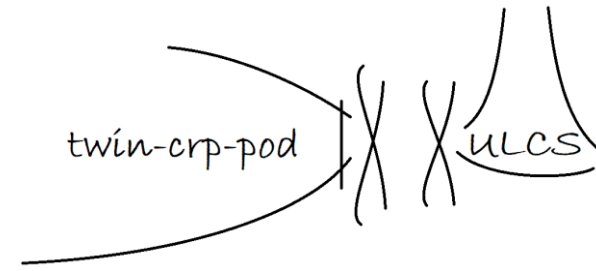
Key Performance Indicators

Future market scenarios

the environmental impact

the economic benefits

market uptake



Summary

3-years project

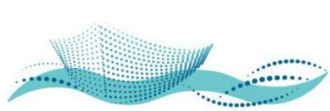
6 work packages

7 partners

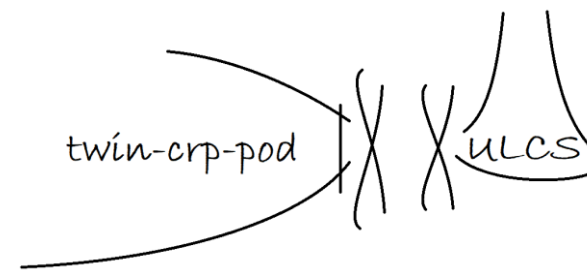
17 deliverables including peer-review journal articles and conferences

125 personmonths

1 246 000 euros total budget



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Maciej Reichel: maciejr@portilawa.com



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