GRIP PROJECT

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THE PROJECT

Project Acronym:	G.R.I.P.
Project full title:	Green Retrofitting for Improved Propulsion
Grant Agreement no:	284905
Call ID:	FP7-SST-2011-RTD-1
Start Date:	01/11/2011
End Date:	31/10/2014
Project Duration:	36 months

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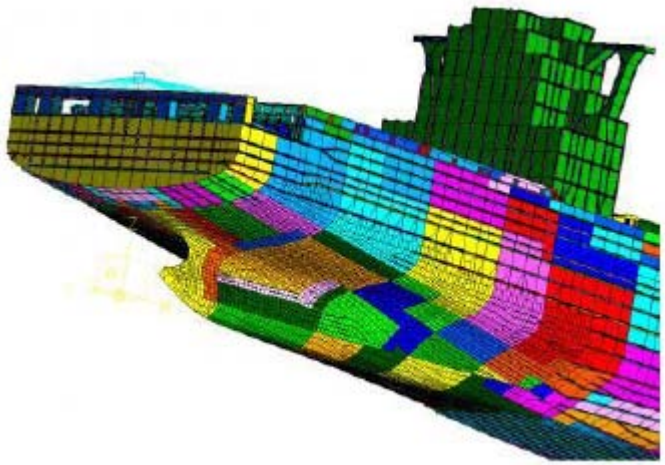
THE CONSORTIUM

- MARIN – coordinator
- HSVA (Germany)
- VICUSdt (Spain)
- CMT (Germany)
- IMAWIS (Germany)
- Wartsila (Netherlands)
- Bureau Veritas (France)
- Trasmediterranea (Spain)
- Fincantieri (Italy)
- Uljanik (Croatia)
- ARTTIC (France-UK)



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BACKGROUND

GRIP

- Response to Call 2011
- Green retrofitting through optimization of hull-propulsion interaction
  - Development of tools for accurate determination of costs and benefits
  - Structural analysis
  - Efficient retrofitting solutions
  - New devices
  - Optimisation of existing ships and devices
- Type of project
  - Level 1
  - Maximal funding 3MEuro

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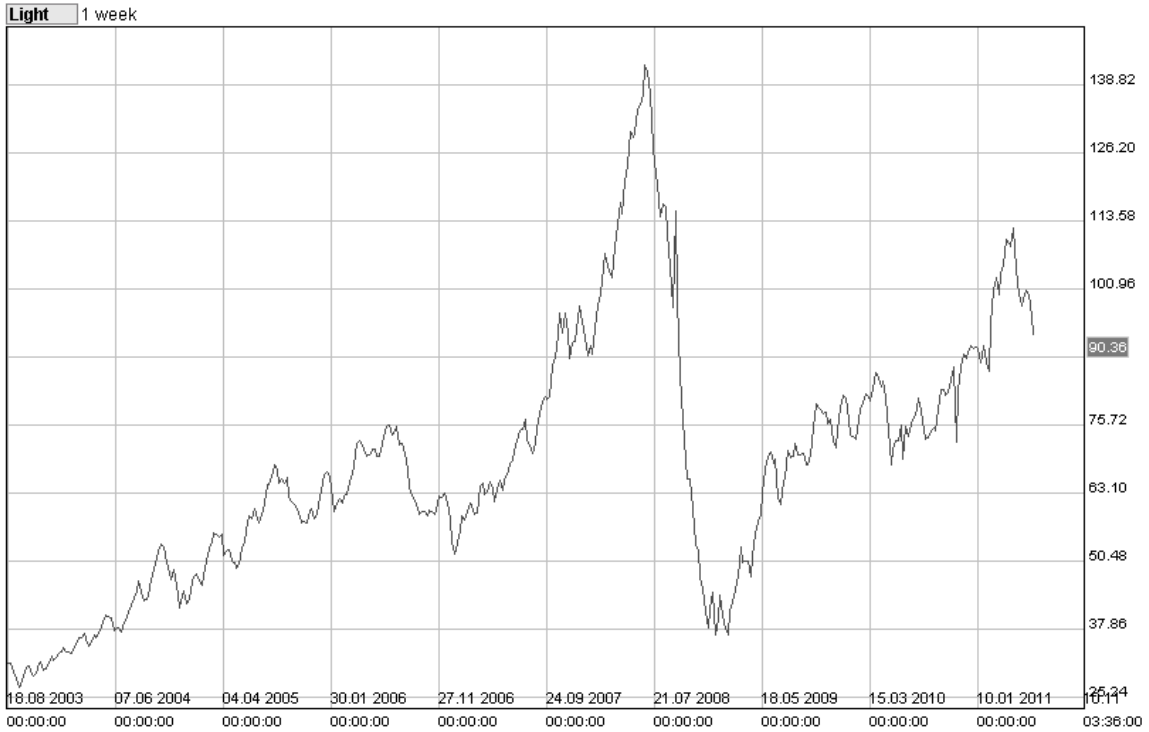
BACKGROUND

The GRIP project addresses the urgent need from industry for retrofitting ESD solutions for existing ships. The high demand for retrofitting is driven largely by four factors:

- **Reduction of CO2 emissions**
- **Historically high fuel prices**
- **Upcoming regulations**
- **Lifetime extension of existing ships.**



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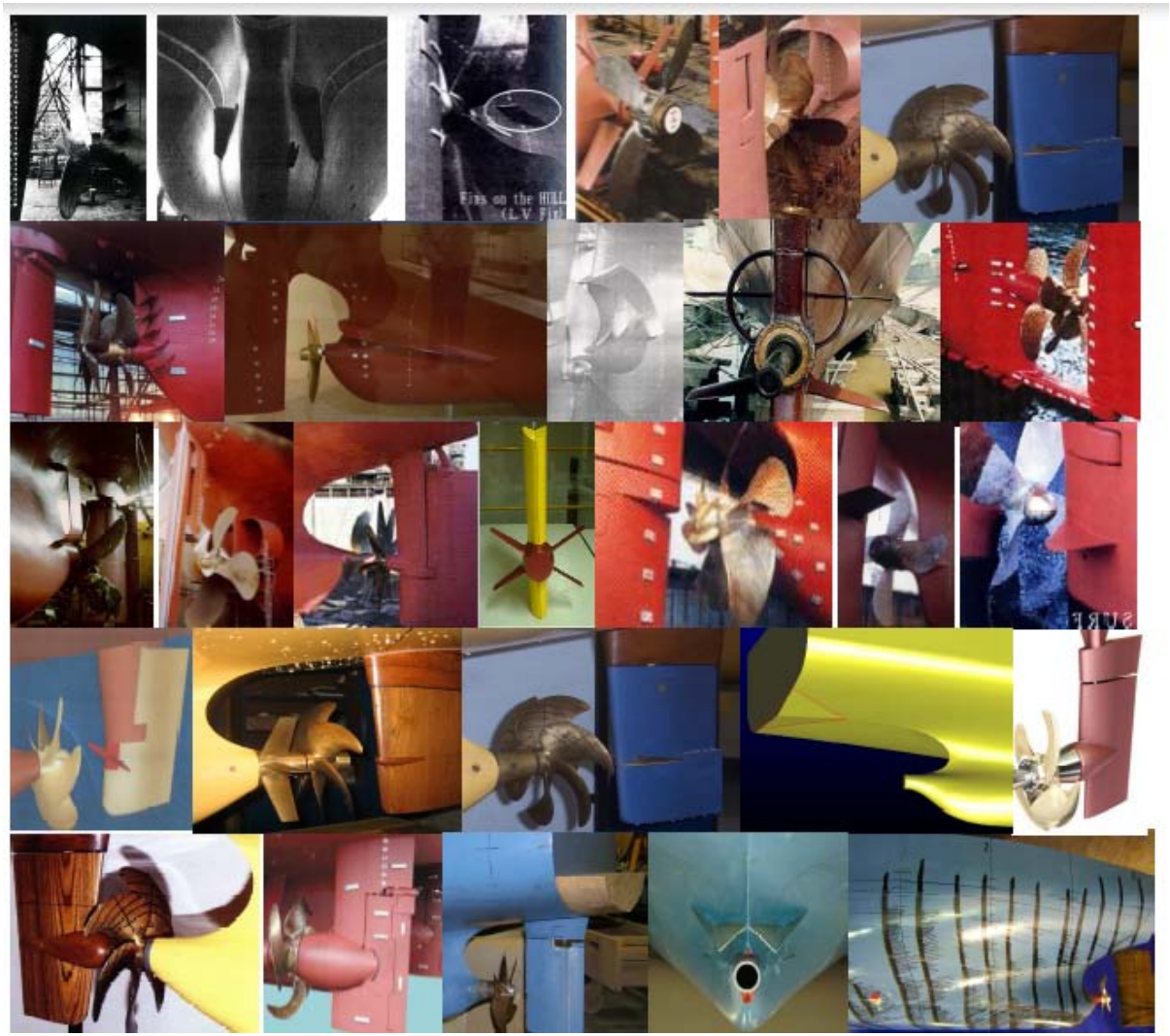
BACKGROUND

However, application of energy saving devices is hampered by uncertainty over actual benefits, uncertainty over actual ship hull lines and the high cost of the actual retrofitting.

- **Does it save fuel?**
- **Why?**
- **Model promise but full scale fails**
- **Claims on real size from manufacturers. Who verifies?**



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BACKGROUND

URGENT NEED:

UNDERSTANDING THE FLOW MECHANISMS INVOLVED IN THE POTENTIAL ENERGY SAVING OF A DEVICE.

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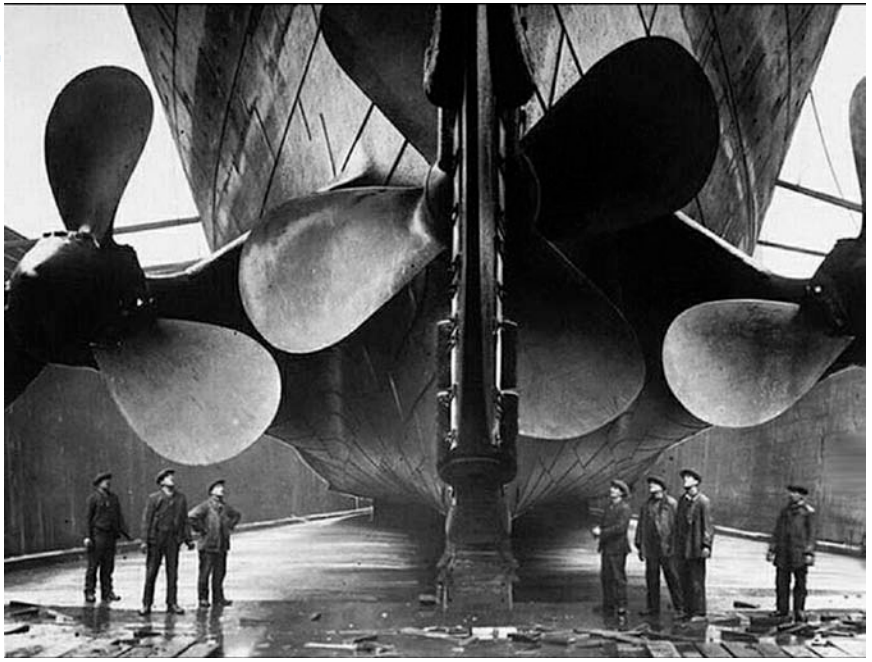
OBJECTIVES & RESULTS

- **GRIP aims to provide a significant reduction in fuel consumption in shipping operations through RETROFITTING OF ESD'S TO EXISTING SHIPS.**
- **On average, fuel consumption will be reduced by 5% with reductions for individual ships of up to 10%.**
- **Enable EUROPEAN SHIPYARDS to be competitive in retrofitting ships.**
- **Economic and environmental benefits.**



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OBJECTIVES & RESULTS

- **TOOL** for quick decision making on retrofitting.

- Determine **ship's hull lines** independently from the original

- To provide an optimized and numerically modeled **retrofitting process** for shipyards.

- To **characterize the physical mechanisms** behind the different available energy saving devices, as a basis for an advanced design procedure.

- To **design new optimal energy saving devices** for the ship types contributing most to the CO2 emissions from international shipping.

- Achievements to be **validated** through measurements.

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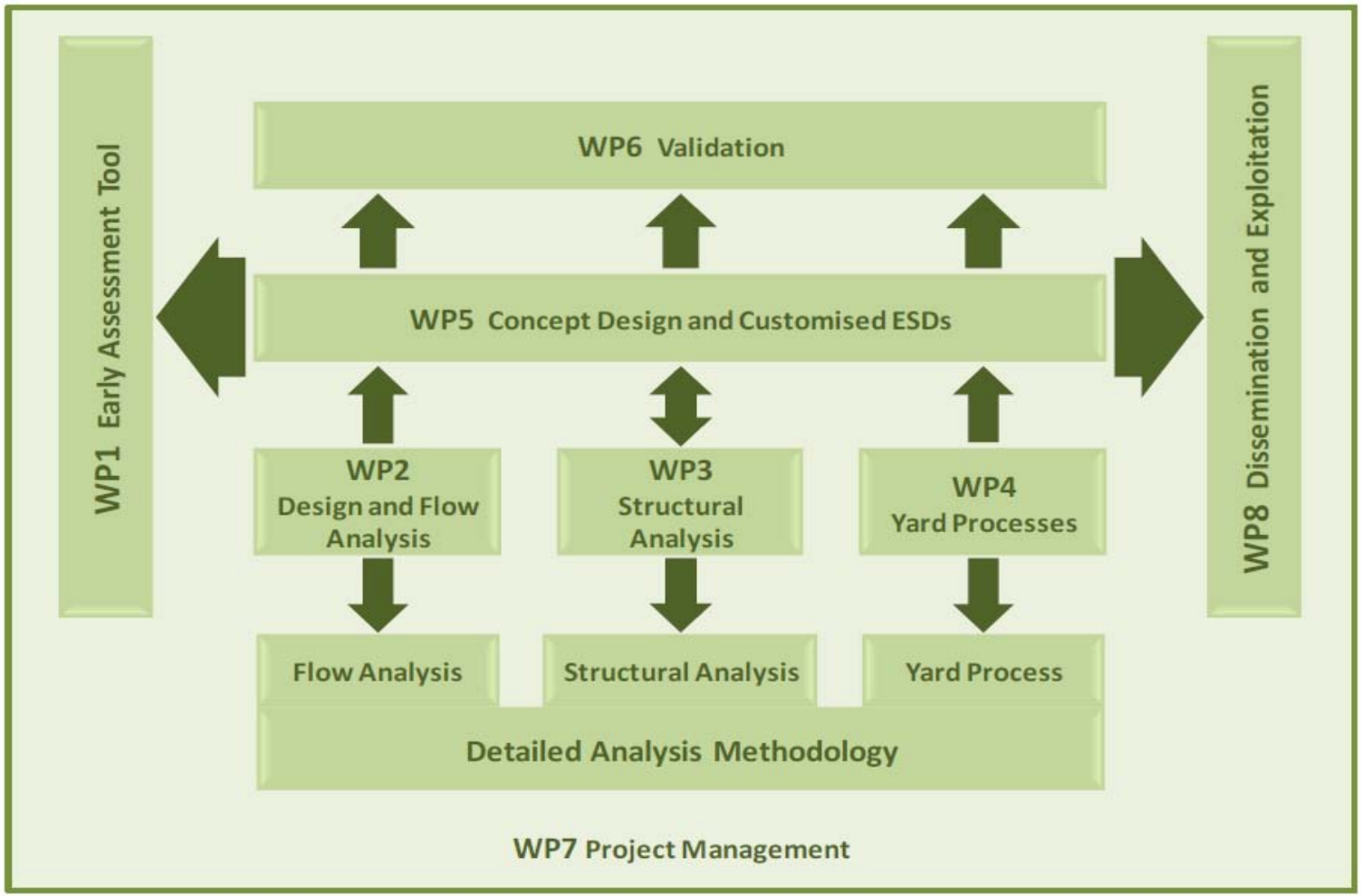
DESCRIPTION OF WORK

WORK PACKAGE STRUCTURE



DOW. WP1 EARLY ASSESMENT TOOL

Estimate ROI from field of application, performance and the required investment.

The Early Assessment Tool supports decision making for the other Work Packages.

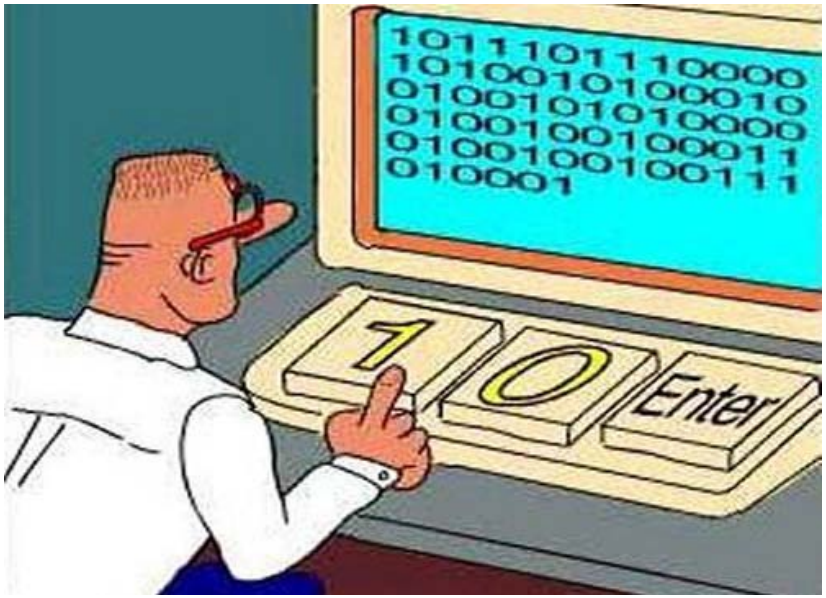
Objectives

•Set up a database of reliable performance data of ESDs

•Calculation tool for benefit of ESDs in early stage

•Develop a cost model for estimation of ROI

•Develop and implement an early assessment tool



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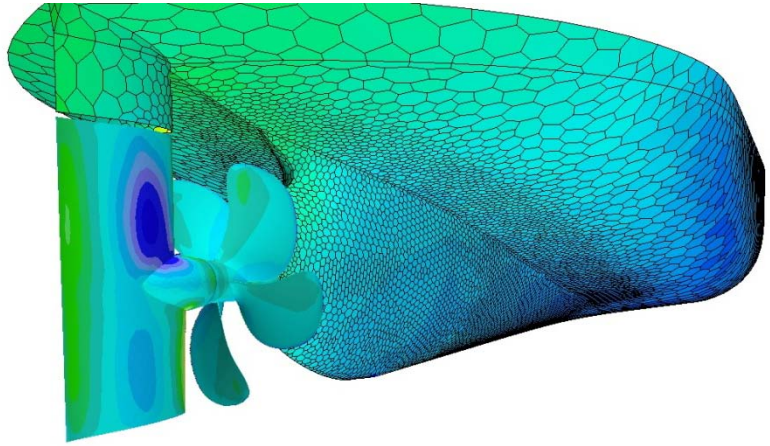
DOW. WP2 DESIGN AND FLOW ANALYSIS

- **Establish BEST PRACTICE GUIDELINES on the modeling of the hull-propeller-ESD system for numerical simulations.**

- **Find the MOST OPTIMAL PROCEDURE for the design of a propeller-ESD configuration for a given hull form, thereby using numerical models within the constraints given by computational and preparatory effort.**



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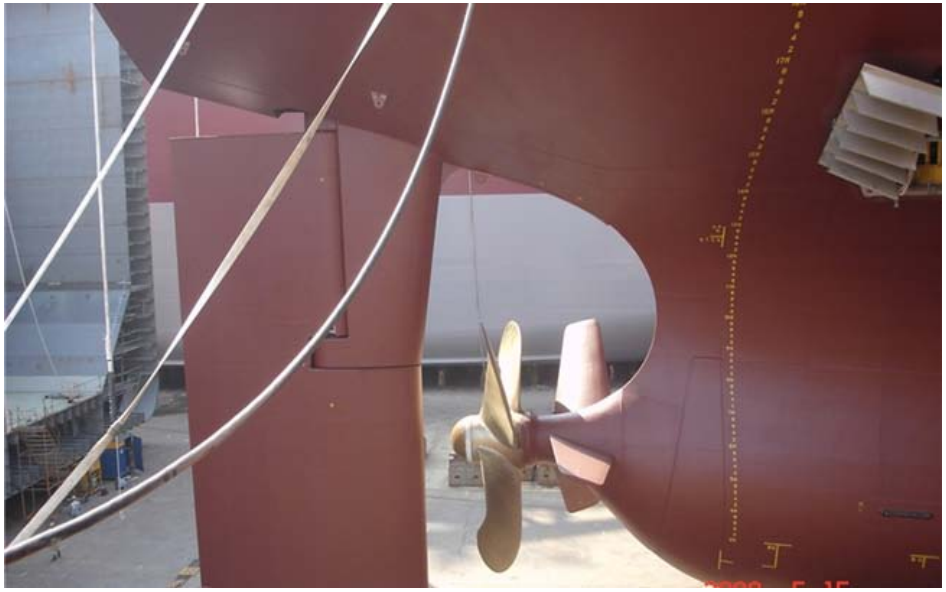
DOW. WP3 STRUCTURE ANALYSIS

- **The structural assessment will cover STRENGTH assessment, VIBRATION analysis and FATIGUE.**

- **The INFLUENCE of the flow modification by the ESD on the hydrodynamic loads exerted on other hull outfitting elements will be assessed**

- **RECOMMENDATIONS on the way to include the influence of ESD in the hull outfitting design will be issued.**



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DOW. WP4 OPTIMIZED YARD PROCESSES

The scopes of work package 4 are the shipyard processes:

- **Preparation – measurement - data collection**
- **Planning**
- **Production**

WP4 will develop methods and a concept to support these processes.

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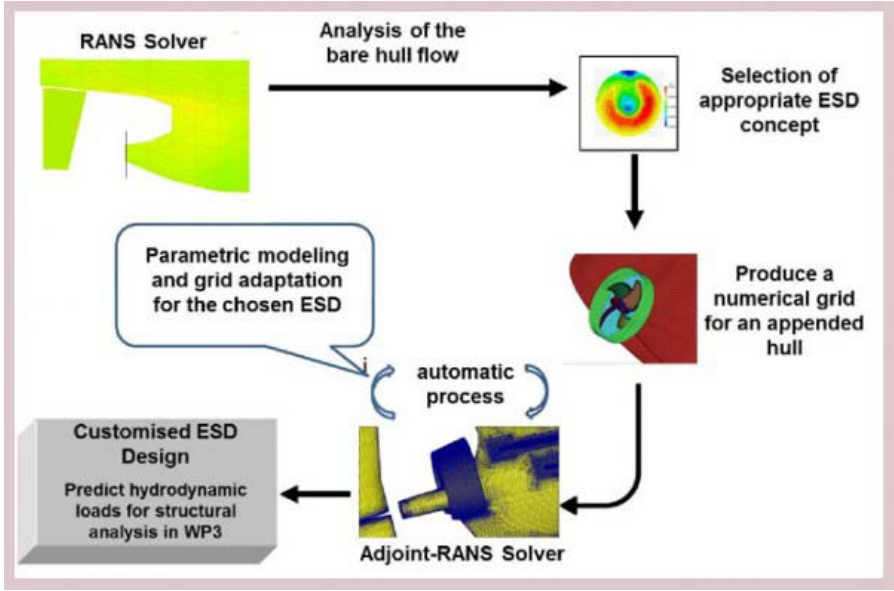
DOW. WP5 DESIGNING CUSTOMIZED ESD

- **The most promising candidate ESD technologies for a range of vessel types will be selected for optimizing the propulsive performance of a number of reference cases.**

- **Customised ESD DESIGNS for selected reference vessels.**
- **HYDRODYNAMIC LOADS for structural analysis.**
- **CERTIFY improvements in propulsive efficiency obtained for a number of reference vessels.**
- **LIFE-CYCLE assessments for the modified vessels with customised ESDs.**
- **FEASIBILITY of the selected ESDs to be manufactured.**



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DOW. WP6 VALIDATION

- **Development and validation of accurate PROPELLER THRUST measurement techniques .**

- **Development and validation of a MEASUREMENT TECHNIQUE to obtain 3D velocity fields in the flow around a ship in full scale conditions.**

- **Manufacturing and installation of the ESD on a target ship**

- **Measurement of the UNDERWATER HULL-GEOMETRY of a ship while being submerged under water, to validate the manufacturing process.**

- **Develop PLANNING and control tool for the shipyard.**

- **Propeller efficiency improvement and 3D flow field on the test ship will be validated by means of TRIALS before and after the retrofitting.**

This will result in validation material for computer simulation studies executed in earlier work.

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PROJECTS. GRIP

SOME TECHNOLOGIES TO BE INVESTIGATED

Ducts or Wake Equalising Ducts	Pre-Swirl Stators or Fins	Post-Swirl Stators or Fins	Alternative Devices
			
			
			

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