



SMART
MARITIME

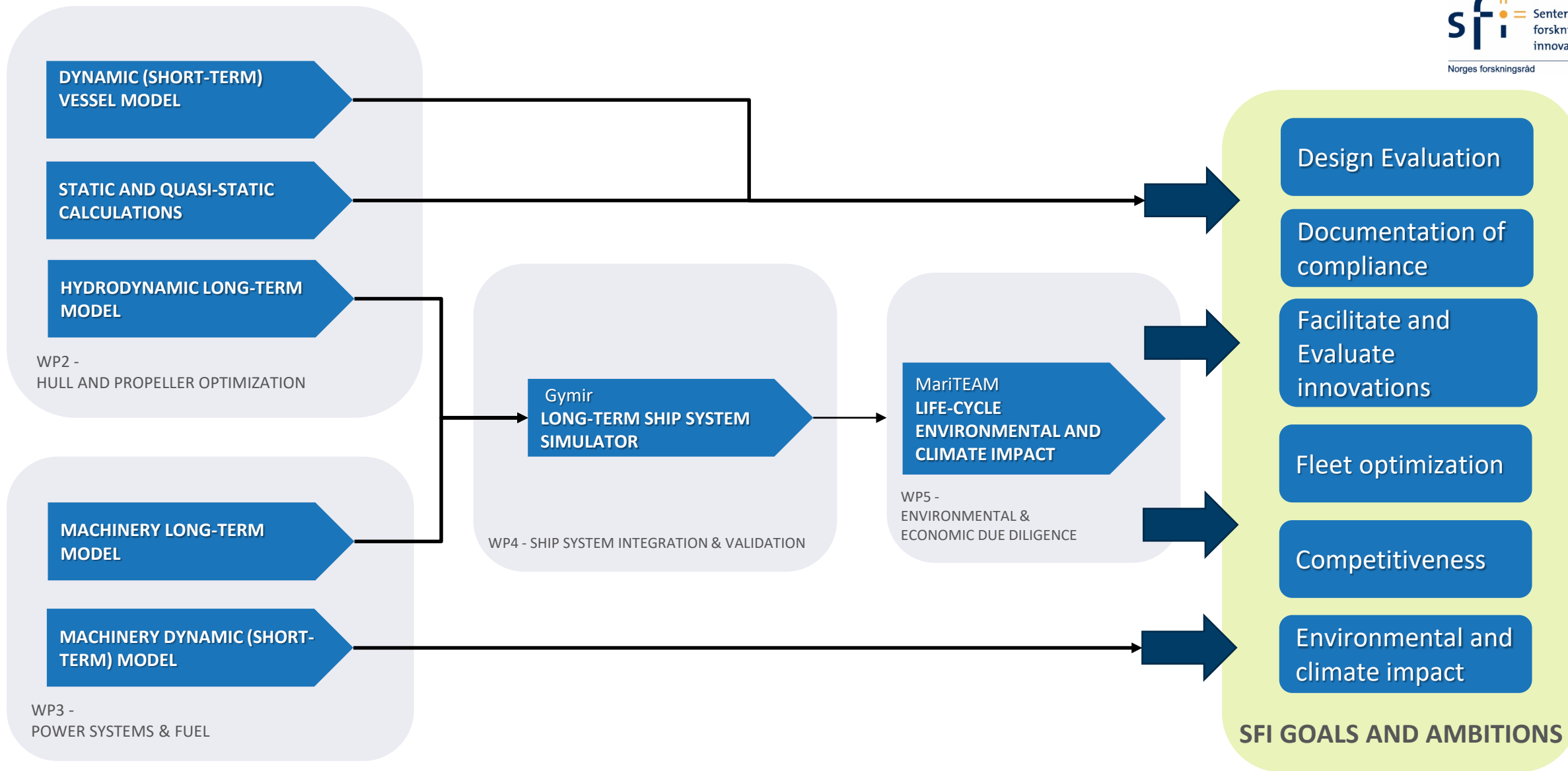


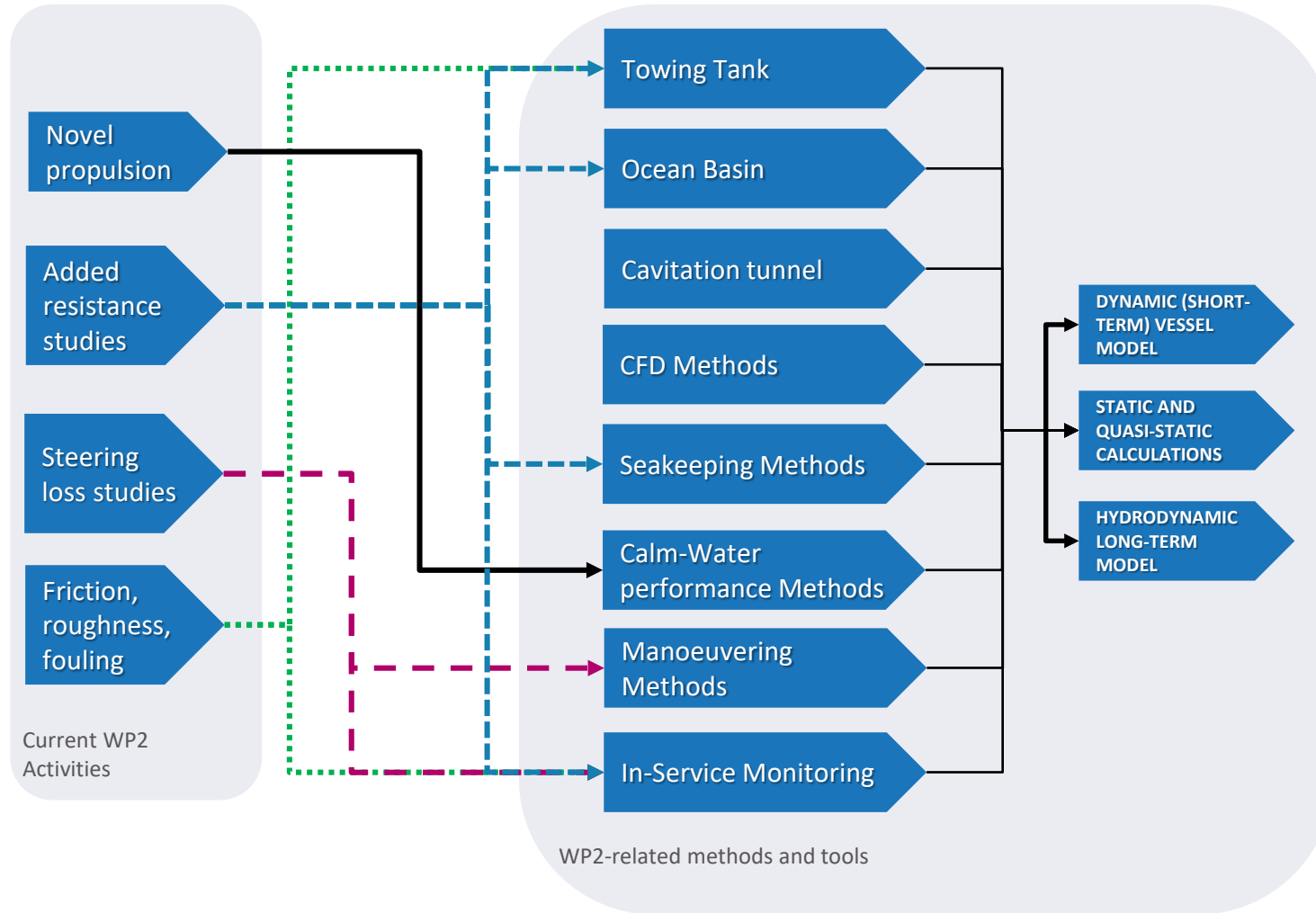
SFI SMART MARITIME MODELS & TOOLS

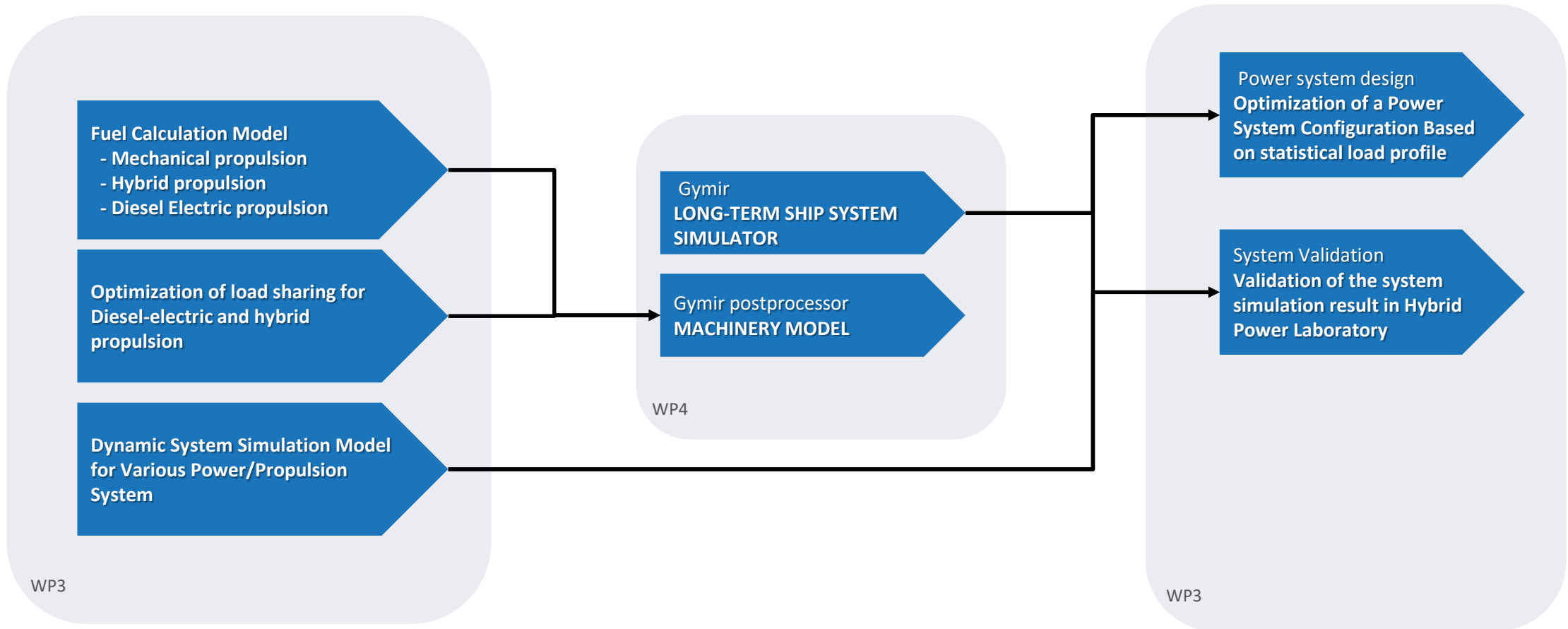
sfi = Centre for
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SMART
MARITIME



SFI SMART MARITIME GYMIR

Jon Schonhovd Dæhlen, SINTEF Ocean
SAC MEETING 20-09-2018

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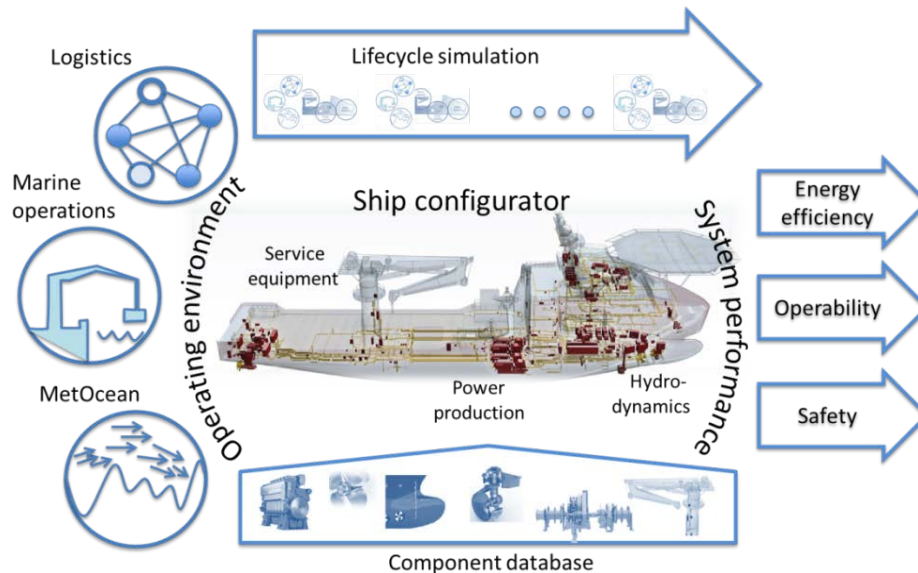
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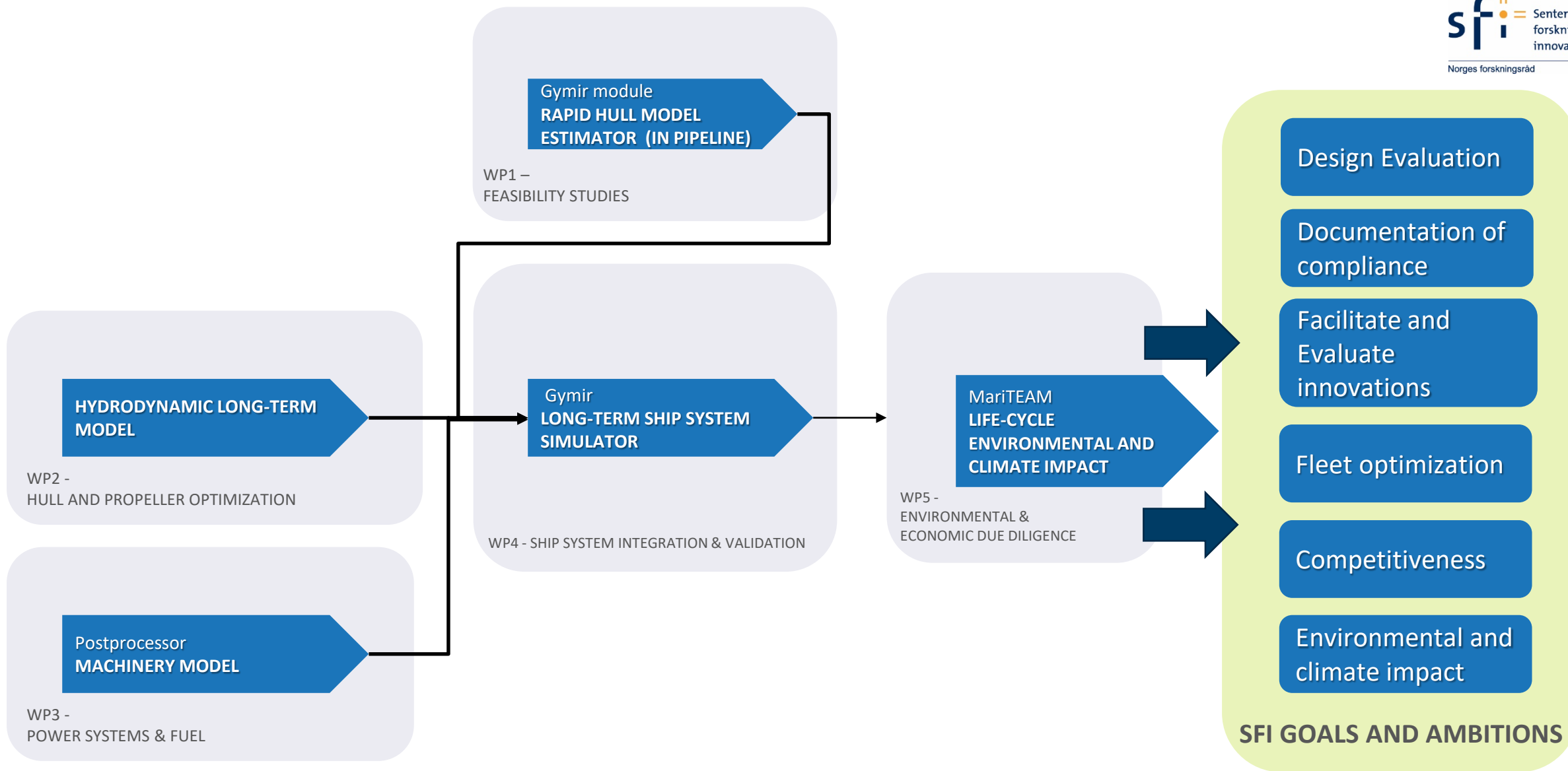
WP 4 – Ship system integration and validation

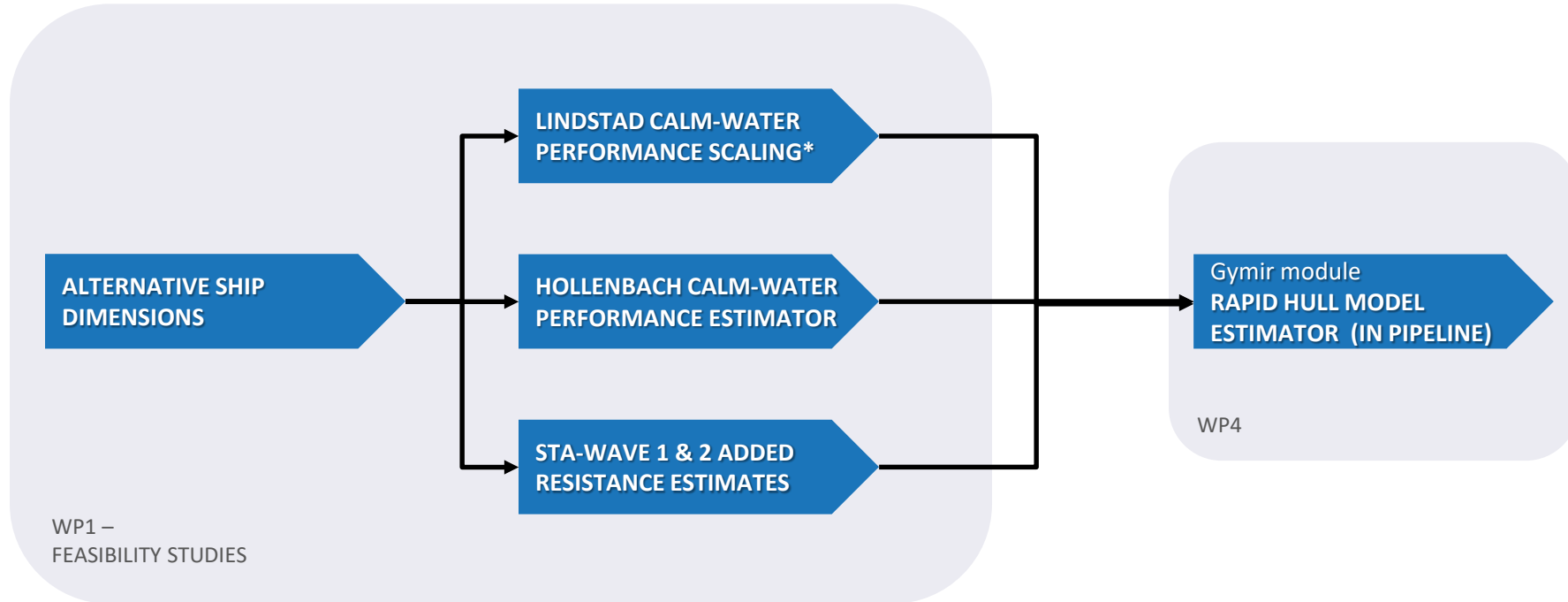
Main objective: Enable performance evaluation and benchmarking of designs on a ship system level and validate the results through laboratory and full-scale tests.

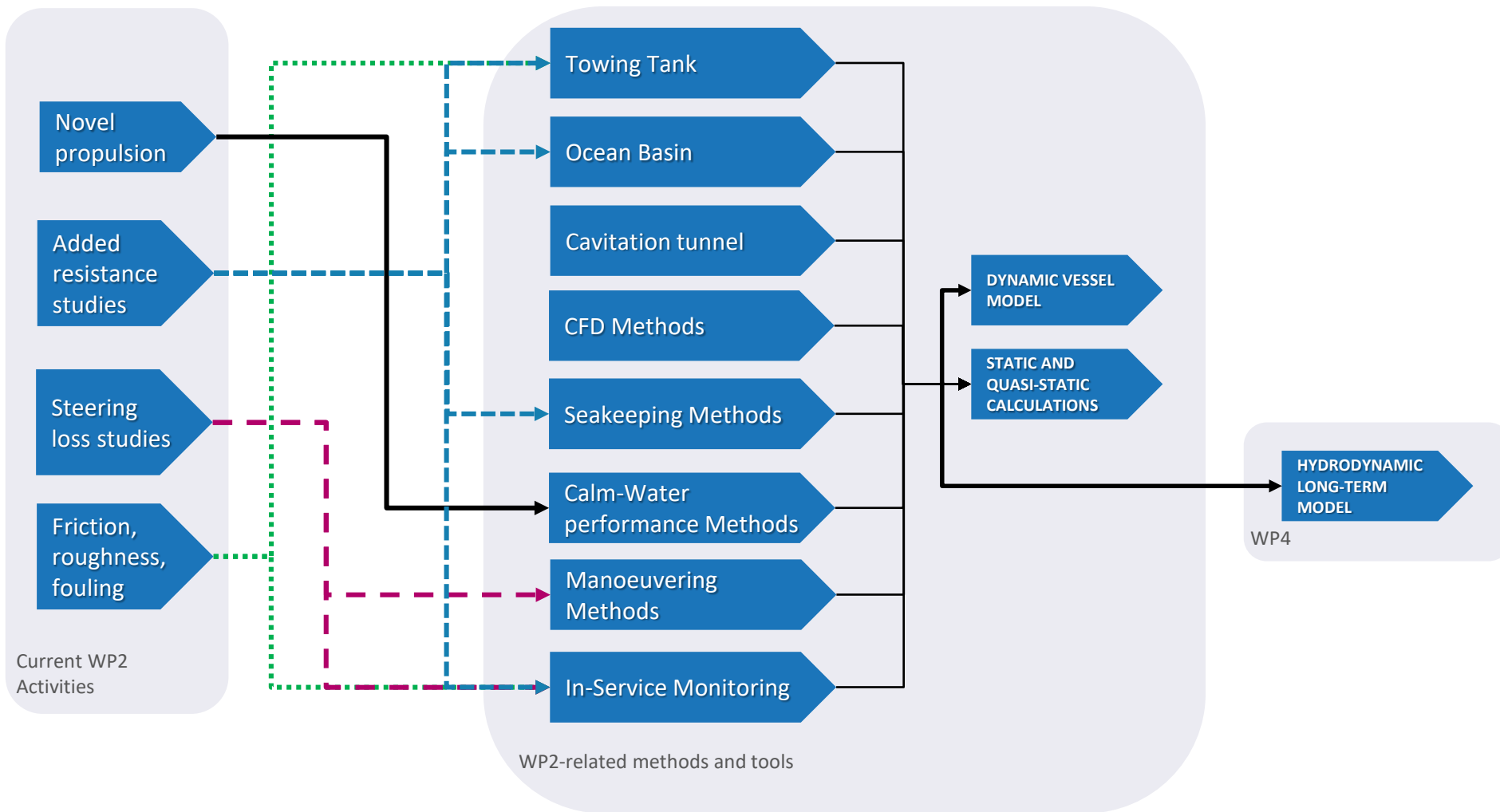


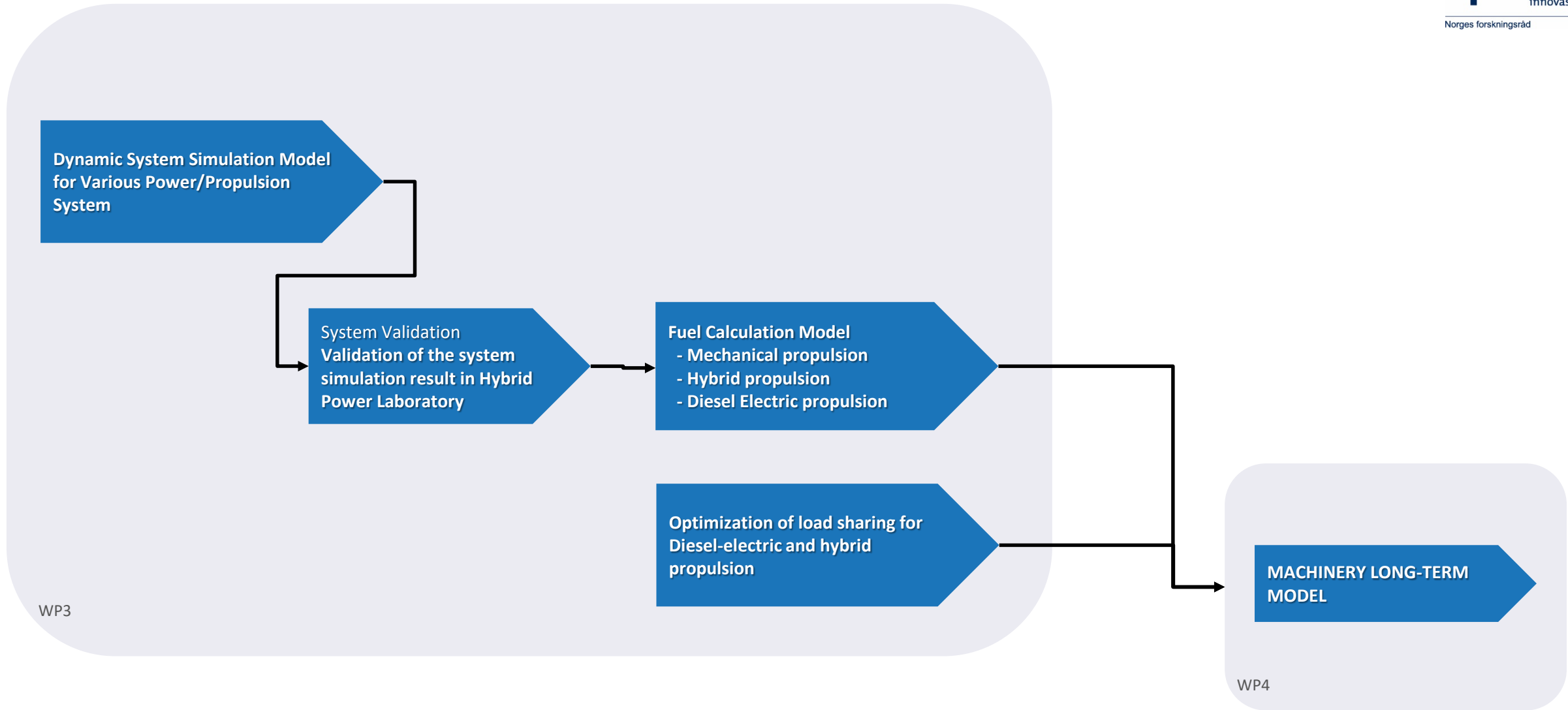
- **Research tasks:**

- Enable configuration of a **full ship system** by integrating sub-systems from WP2 and WP3
- Connect the different physical domains and modeling regimes of hydrodynamics, power systems and marine operations in **one open framework**
- Develop a **library database** for efficient use and re-use of component models and product data
- Outline methods for assessing system performance against **operational profiles** and usage scenarios
- Develop methodologies for collection, filtering and use of **full-scale measurement data** in order to validate and calibrate the ship system simulations



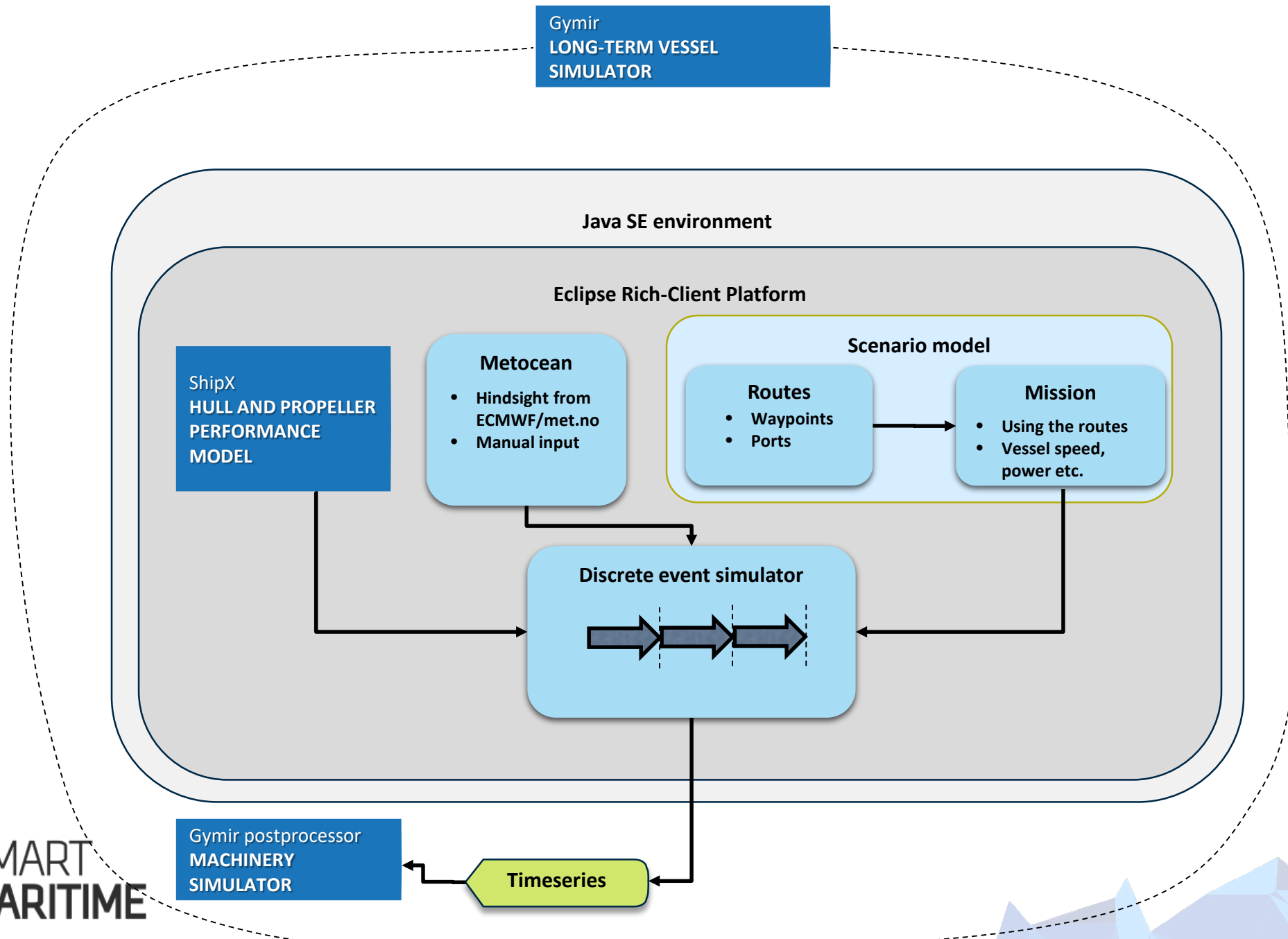






WP3

WP4



Publications 2017-2018

- E. Sandvik, B. E. Asbjørnslett, S. Steen, T. Johnsen. *Estimation of fuel consumption using discrete-event simulation - a validation study*. 13th International Marine Design Conference, Helsinki, June 2018
- E. Sandvik, M. Gutsch, B. E. Asbjørnslett. *A simulation-based ship design methodology for evaluating susceptibility to weather-induced delays during marine operations*. Ship Technology Research, 2018

Sub-project 7: Simulation-based concept design

- Virtual testing can be done at different levels of detail, from the dynamic time-domain simulations with full physical models and milliseconds time-steps to the static discrete-event simulations with average value calculations and hour-long timesteps.
- **In this virtual testing phase 1 project we will focus on the static simulations, which allows us to evaluate the ship performance over years of operation.**

Main objective: Improving early stage design decisions by enabling simulation of long-term performance of new ship technology and design solutions, and validate simulations against full-scale performance

Main industry contributors:

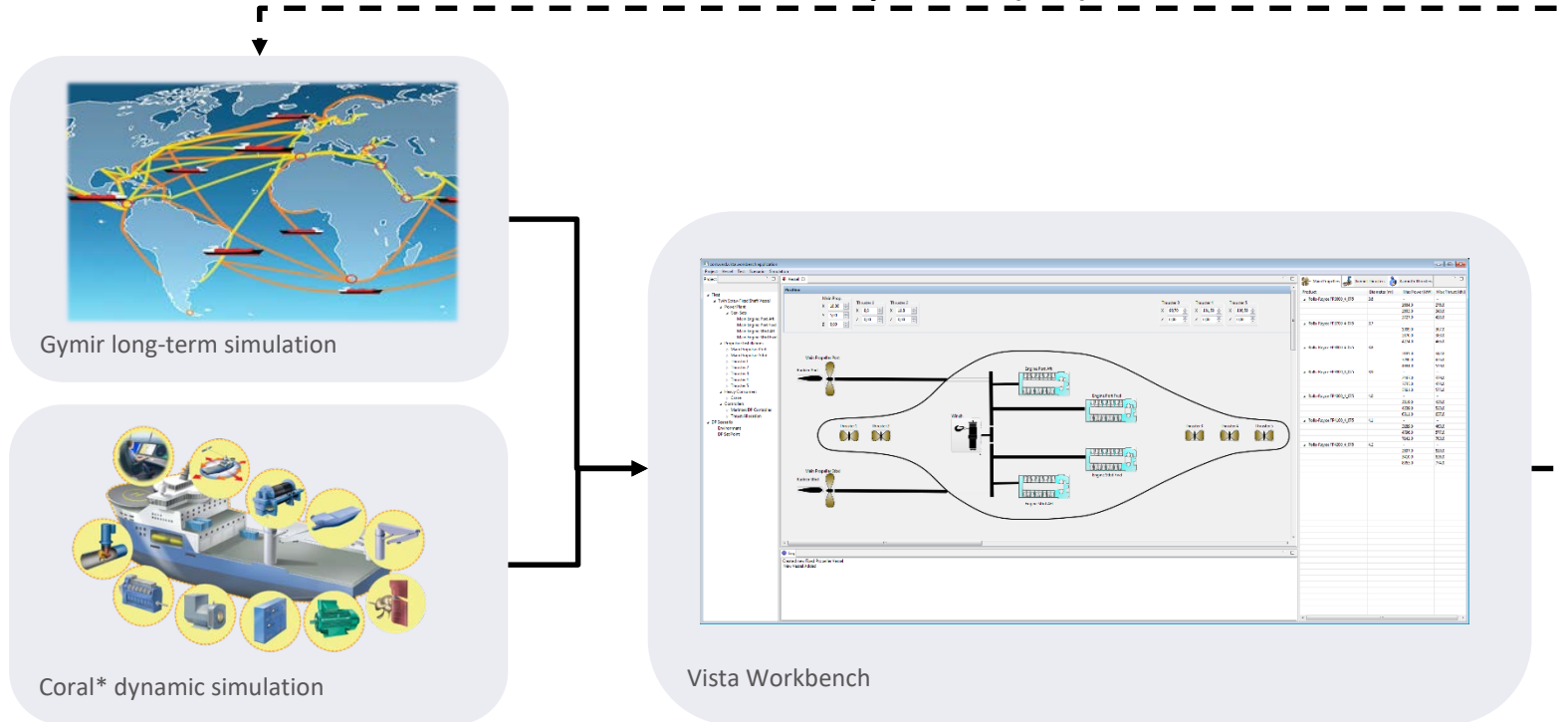




Gymir embedded in "Vista" simulation workbench.

- Active usage by naval architects, improving their ability to do long-term design evaluations as a supplement to conventional design and simulations.
- Giving vital feedback to WP4 for improvements and further work

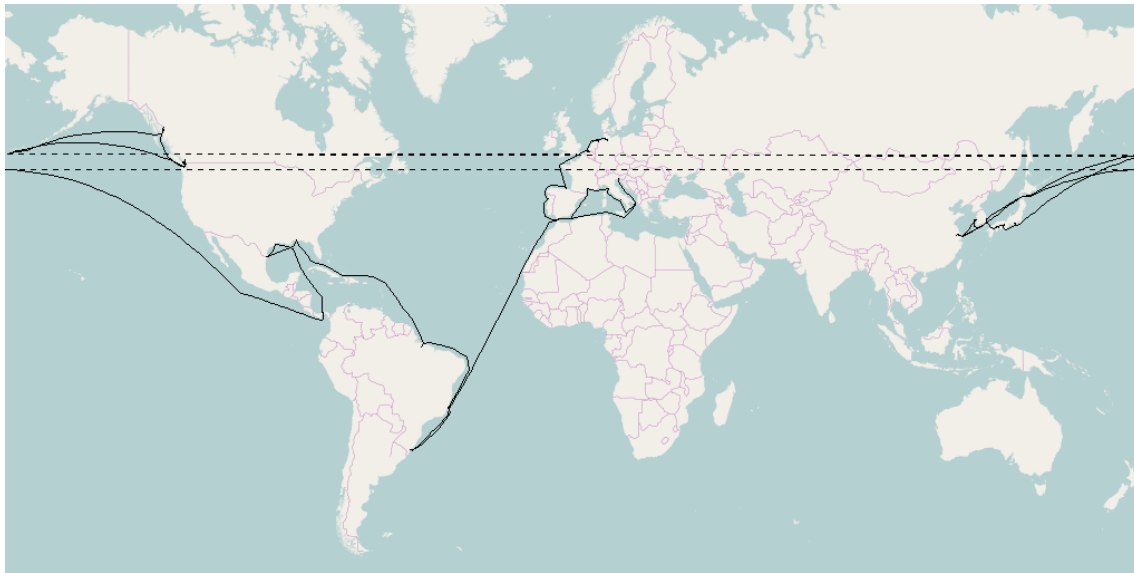
Experience (SP7)



* <https://github.com/viproma/coral>

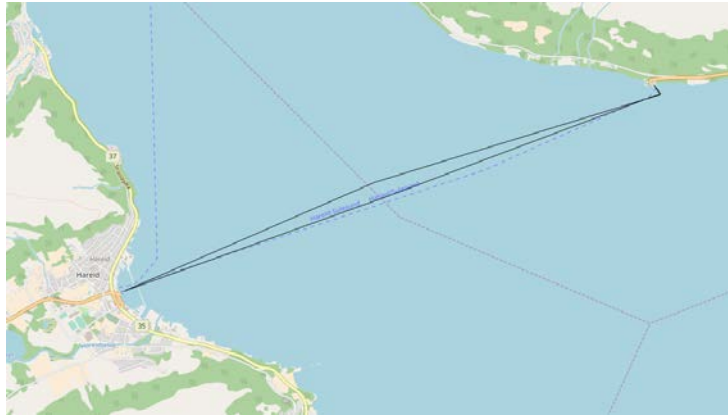


- Existing vessel simulated in realistic trade scenario to evaluate simulator flexibility
- Concept vessel evaluated in same scenario for comparison, giving indications of increased energy efficiency for a slightly altered design





- Simulation of new concept for Kystruten, improving competitiveness



- Evaluation of road-ferry concepts to document compliance with customer specifications

Pending work to take LTS to the industry

1. Improve ability to create ship models for long-term simulation
 - Closer integration with model-generating software of WP2
2. Improve accuracy of simulation
 - Validations studies
 - More realistic scenarios using weather routing and logistic models
3. Refactor GYMIR into a LTS framework
 - For embedding into existing simulation platforms
 - Defining standards for long-term simulation models