Open Simulation Platform - a collaborative effort to facilitate system integration

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DIGITAL TWIN

The digital twin is a virtual representation of an asset, used from early design through building and operation, maintained and easily accessible throughout its lifecycle.

Analytical models for structures and hydrodynamics

Information models for systems and components

3D visualization models of components and structures

Time-domain models of components and systems

Virtualized communication networks

Software-driven control algorithms

Sensor and process data from the real vessel

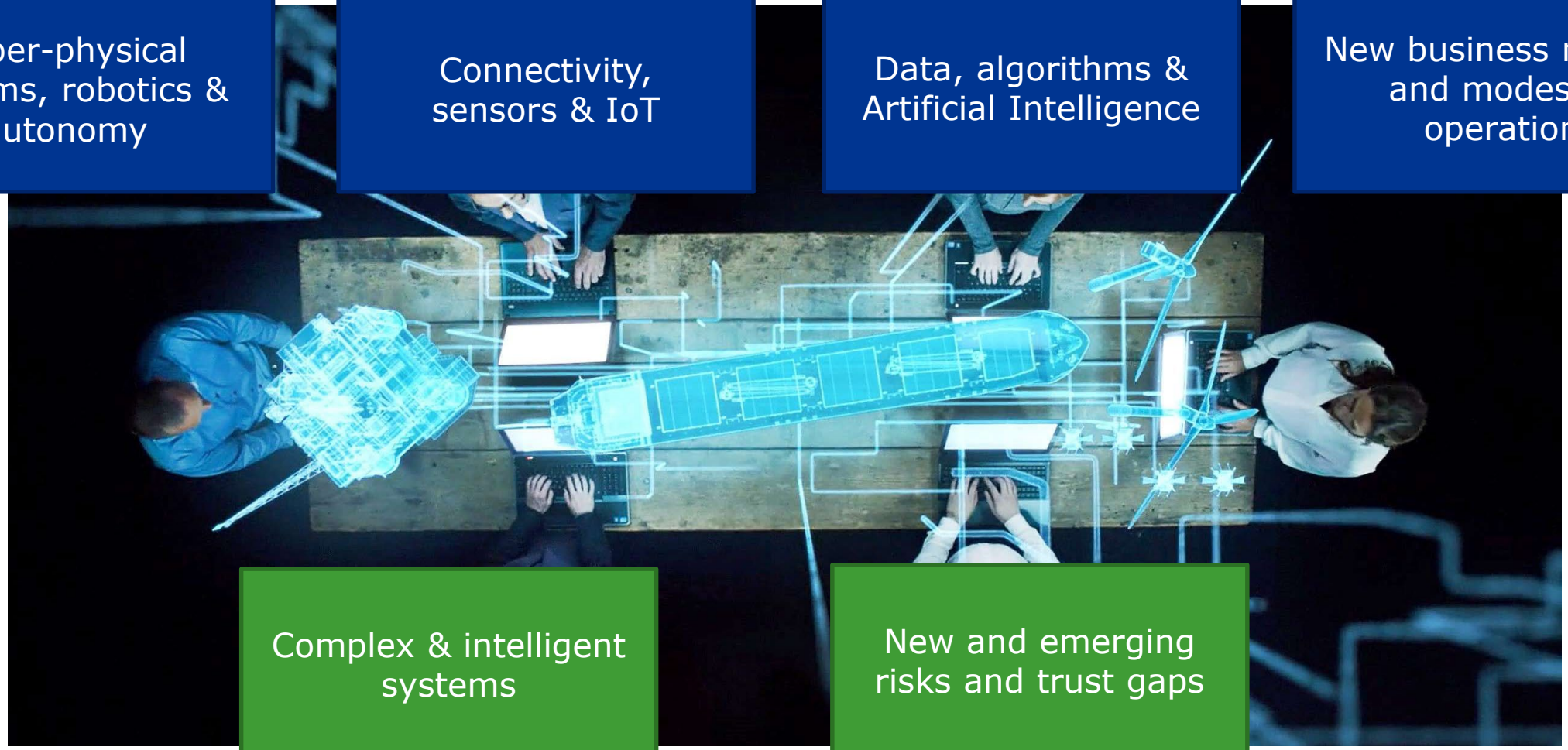
The impacts of digitalization

Cyber-physical systems, robotics & autonomy

Connectivity, sensors & IoT

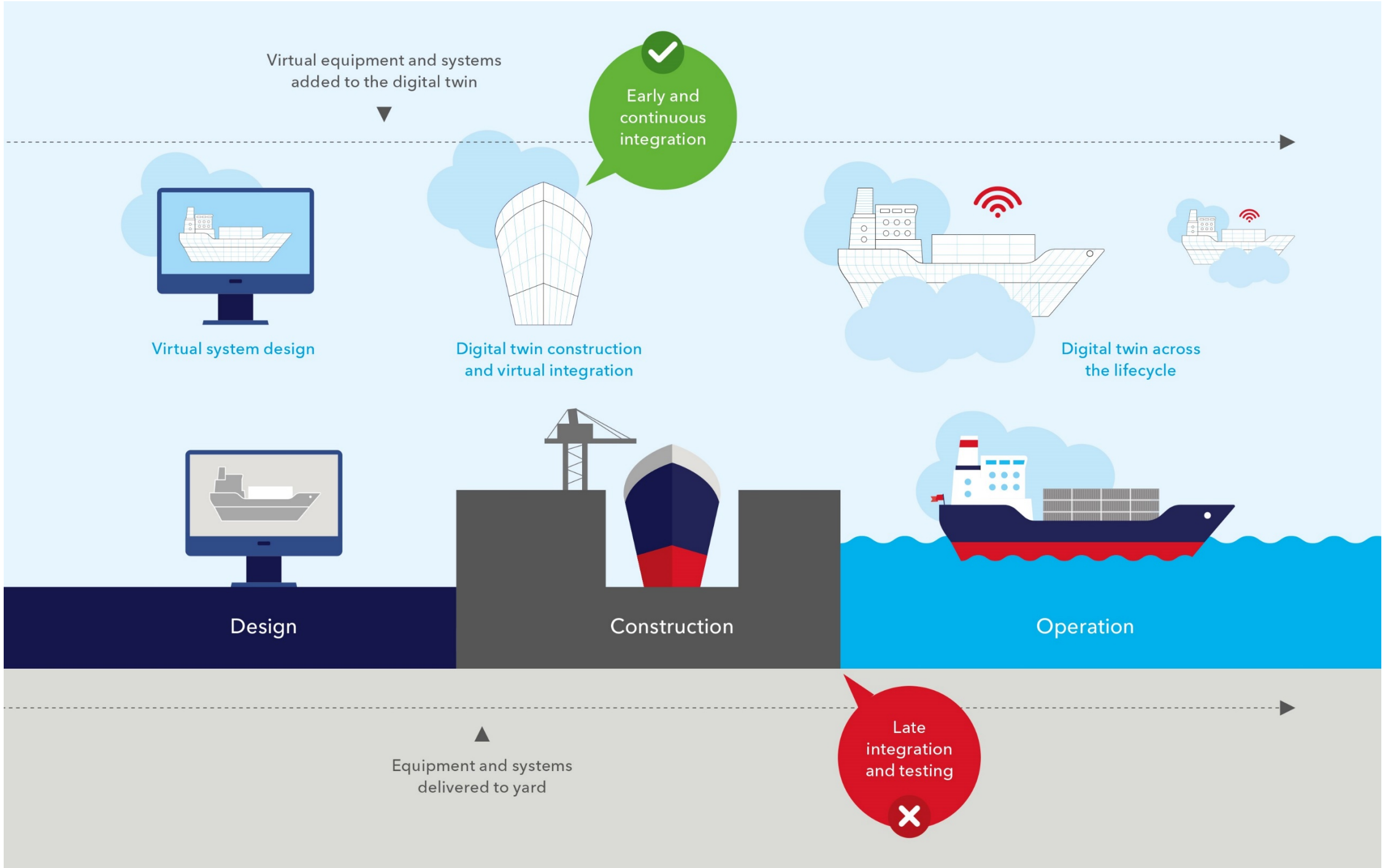
Data, algorithms & Artificial Intelligence

New business models and modes of operation

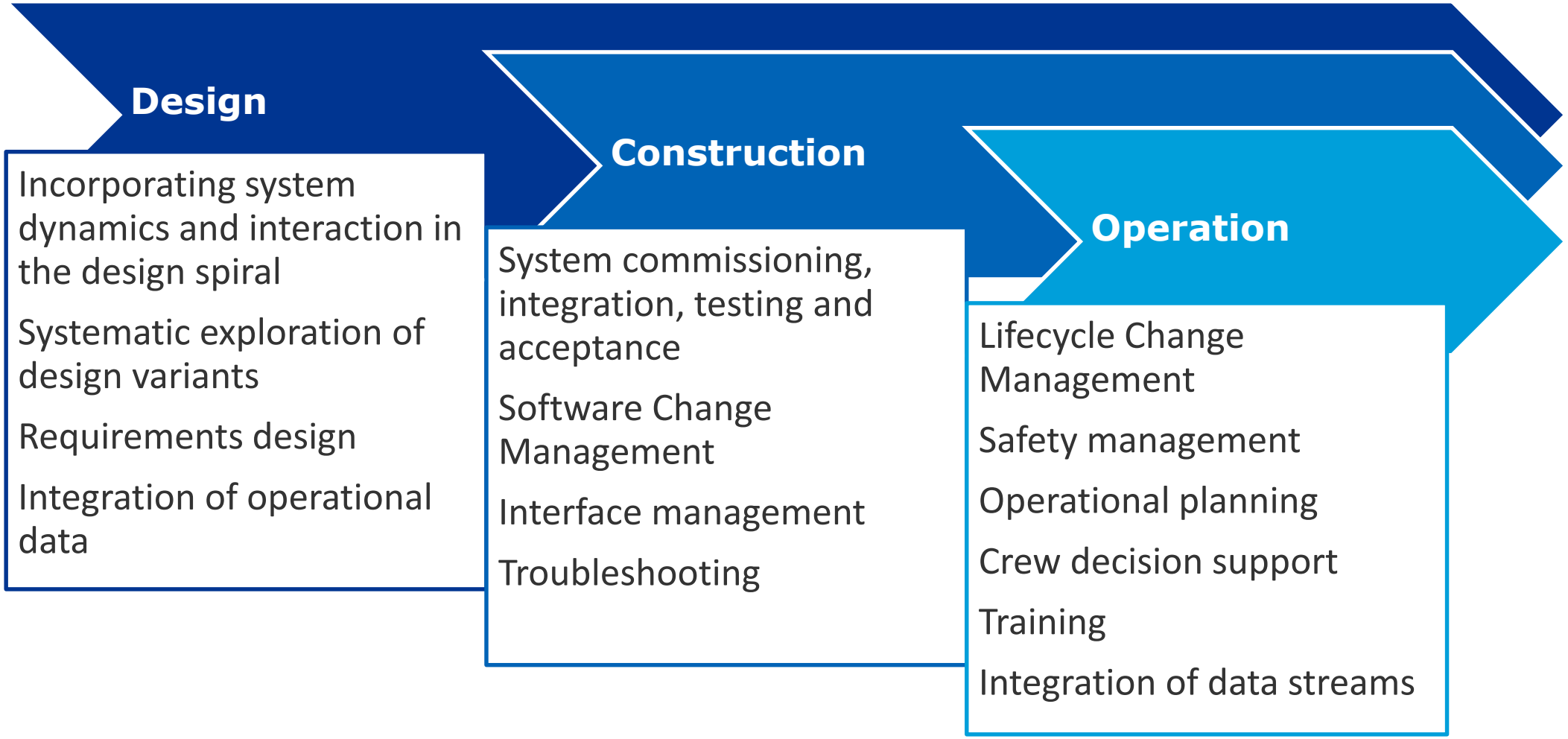


Complex & intelligent systems

New and emerging risks and trust gaps


Virtual equipment and systems added to the digital twin
Early and continuous integration
Virtual system design
Digital twin construction and virtual integration
Digital twin across the lifecycle
Design
Construction
Operation
Equipment and systems delivered to yard
Late integration and testing

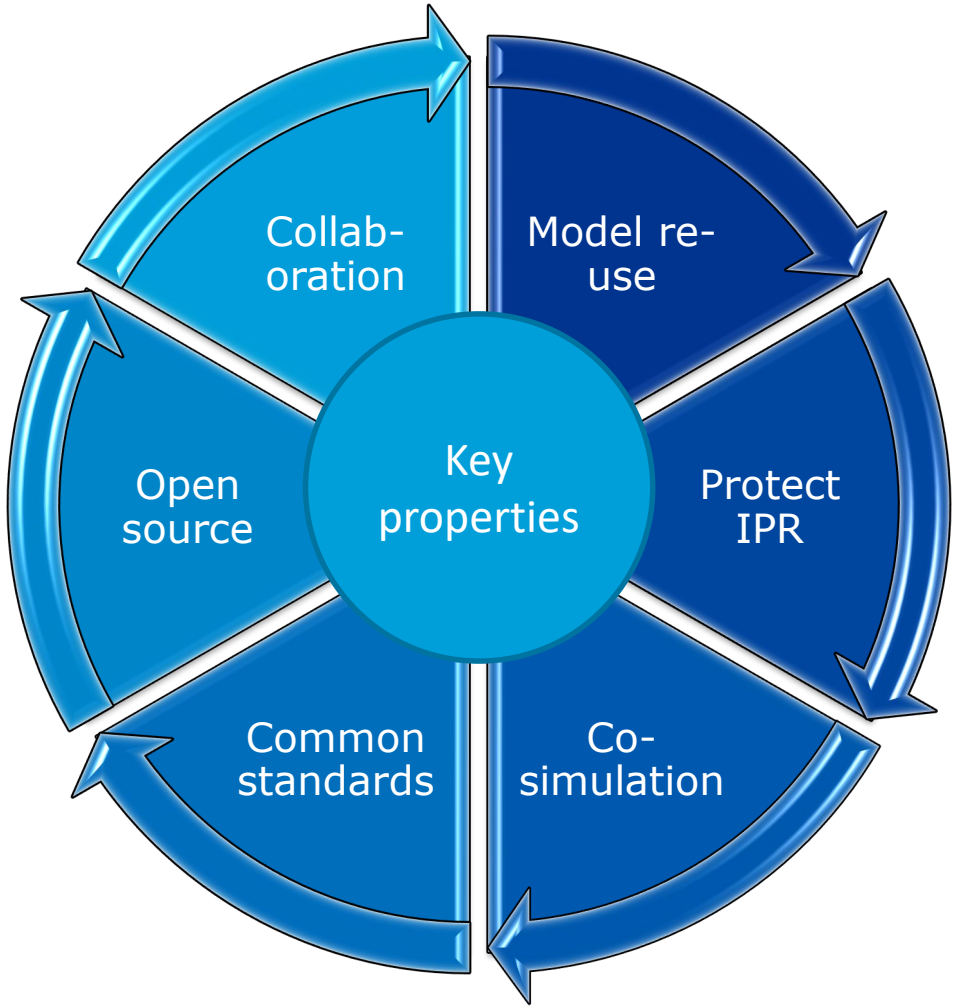
Use cases to solve by simulation models



We need to build digital twin systems & vessels

"Master design, optimization, testing, operation and assurance of complex, integrated systems"

In an efficient and effective way…

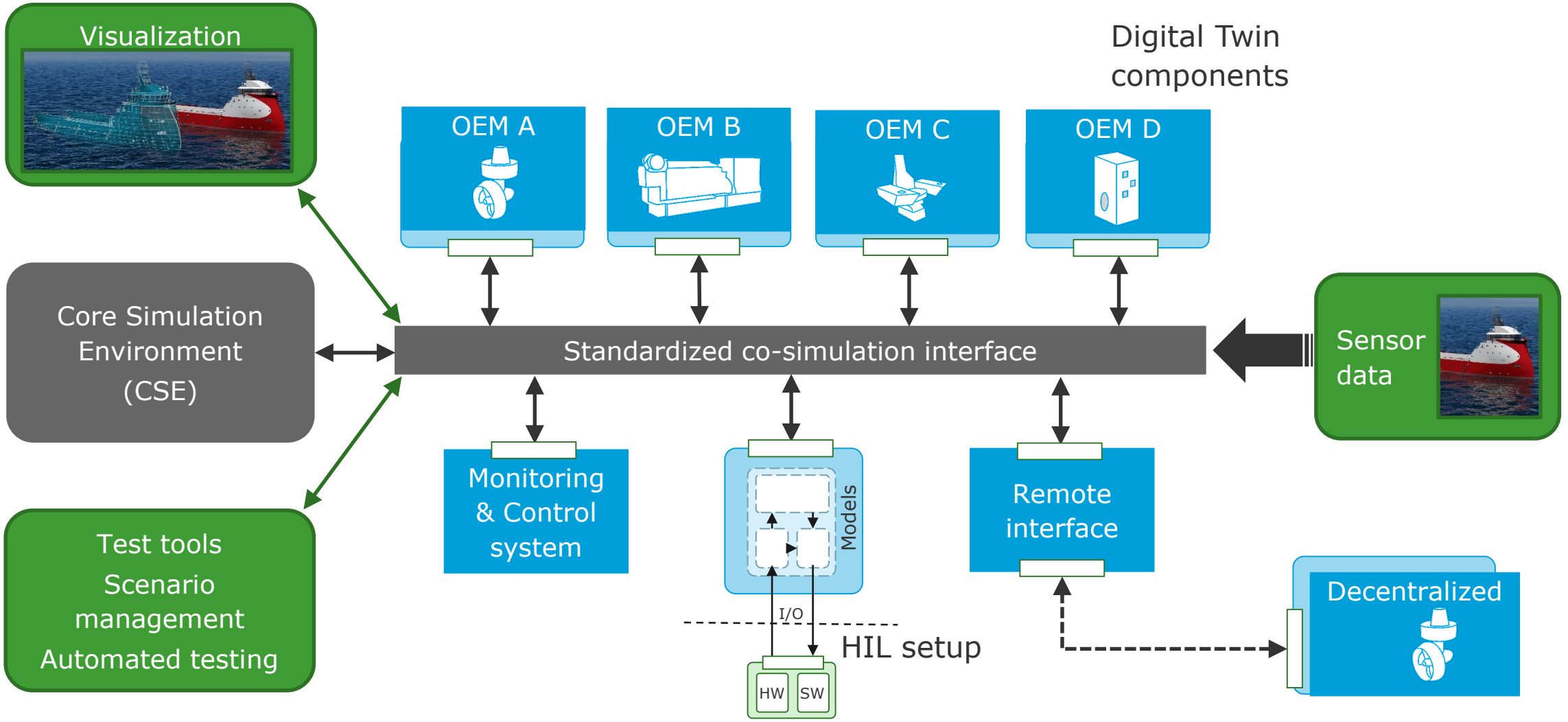


Open Simulation Platform

Simulation environment

Model library

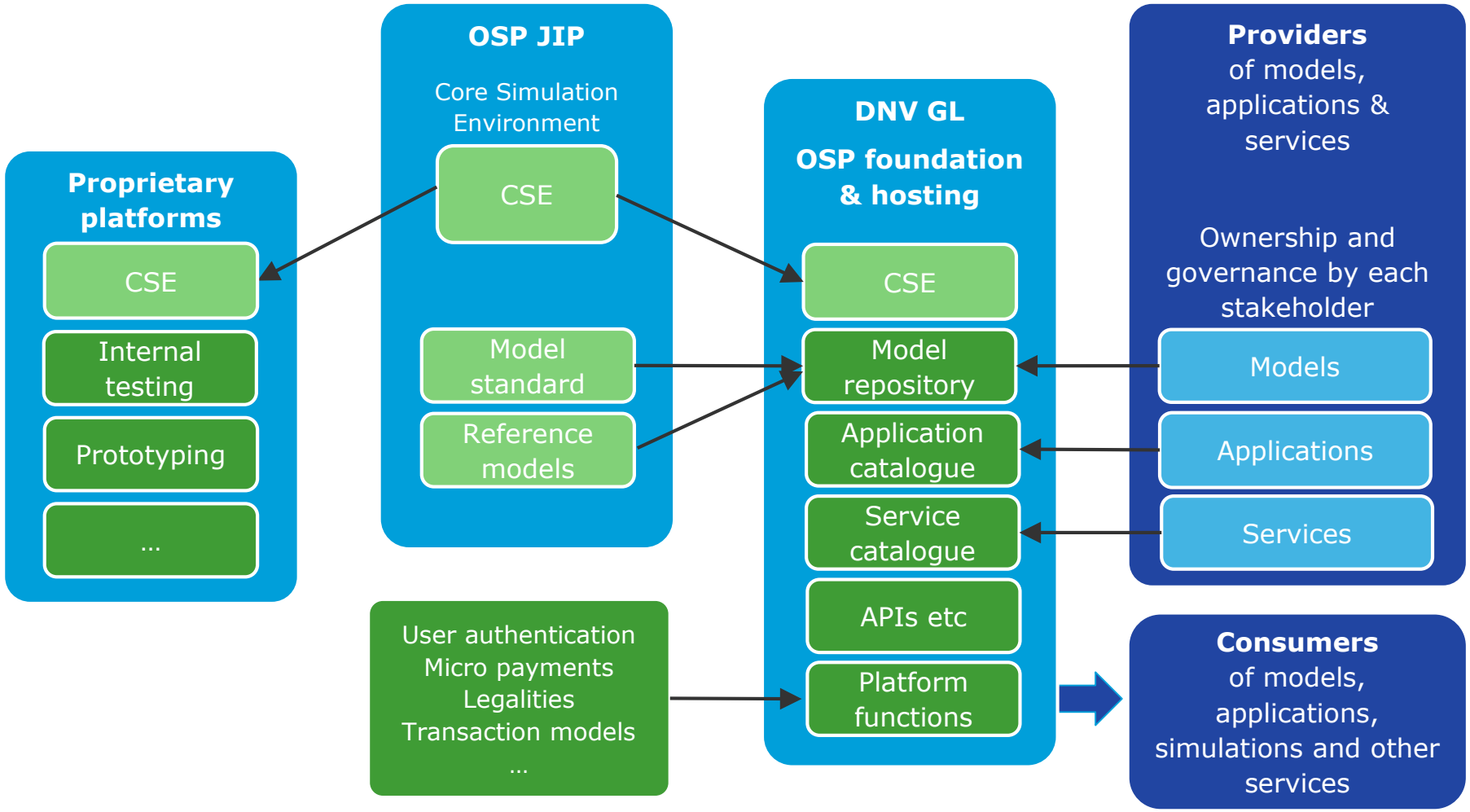
The Open Simulation Platform Architecture



Open Simulation Platform Joint Industry Project

www.opensimulationplatform.com

Hosting of an Open Simulation Platform



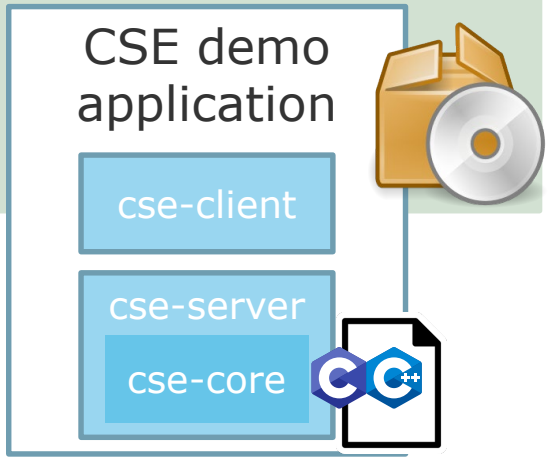
OSP JIP work packages - status

WP1 Core Simulation Environment

- Co-simulation software

➢V0.5.1 released to JIP partners

➢Demo application in Windows and Linux

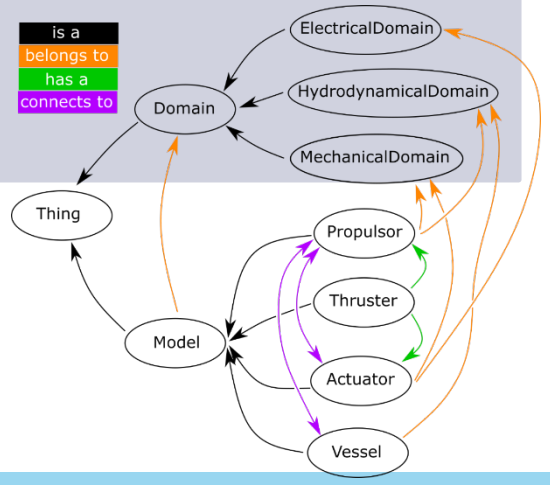


WP2 Marine Systems Model Interfaces

- Model standard - MSMI
- Model library structure
- SW tool for verification

➢Alignment with existing standards

➢Ontology for efficient system modelling



WP3 Reference models

- Digital implementation of the model standard
- Openly available reference implementations of selected equipment

➢Models from a range of tools collected

➢Alignment with MSMI standard (interface and documentation)

WP4 Use cases

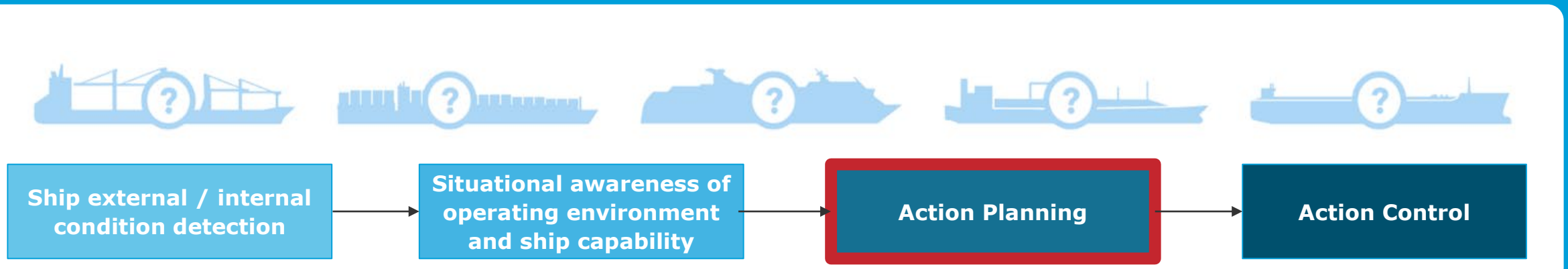
- Explore mutual benefits of co-simulations
- Provide feedback to OSP development from JIP

➢ Design of hybrid ferry

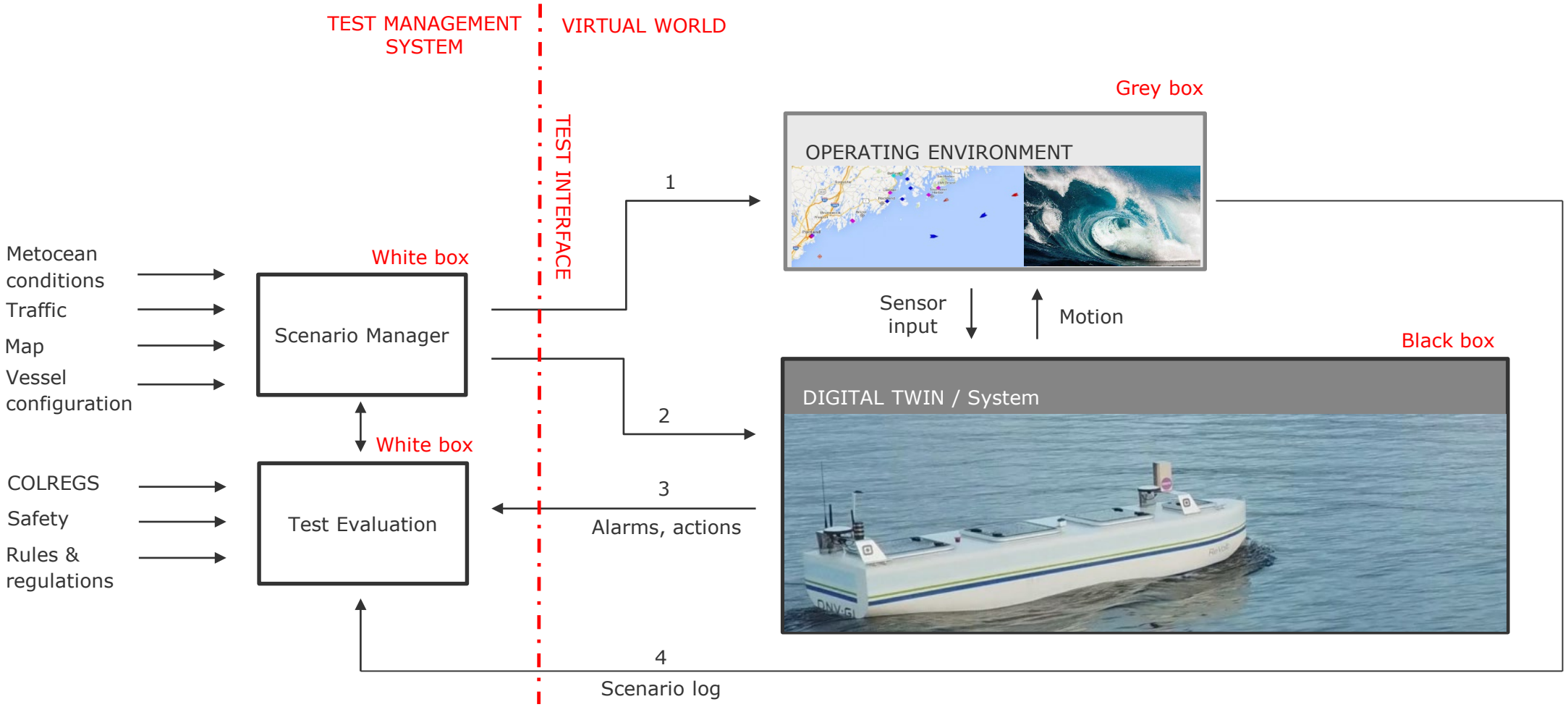
➢ Integration testing of control systems

➢Operational planning

Example: Test System for Autonomous Vehicles



Test System for Autonomous Navigation System



Summary - Open Simulation Platform benefits

- Cost-efficient establishment of digital twins
- Lifecycle perspective; from design to operation
- Open industry platform
- Model and interface standardization - interoperability
- Co-simulation for protection of IPR
- Validation and verification of integrated systems

Thank you for the attention!

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