



Introducing MARIN's Seven Oceans Simulator centre (SOSc)

Most realistic simulator centre for maritime operations in the world

Set to open in spring 2024, MARIN's new Seven Oceans Simulator centre (SOSc) is taking shape. With this state-of-the-art research facility, MARIN aims to make maritime operations safer and more efficient. The SOSc will be capable of ultra-realistic simulation of the behaviour of vessels and their interaction between maritime structures, the environment and people.

Key capabilities

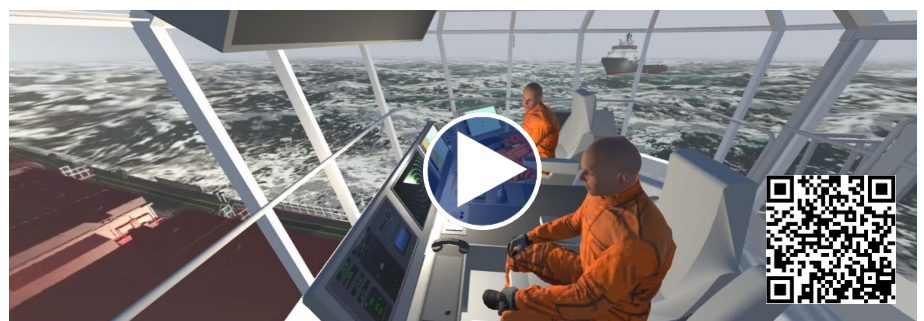
- Optimises nautical operations with excellent modelling of hydrodynamics.
- Prediction of hydrodynamics, including all interactions between ships, offshore constructions and environment.
- The latest visualisation, virtualisation and motion cueing techniques.
- Close observation of the behaviour and interaction between operators.
- Measurement and feedback on the performance and workload of operators.
- A research platform for new control techniques and human-machine interfaces to improve situational awareness during an operation.

All simulators can be linked to realistically simulate multi-ship and multi-tool operations.

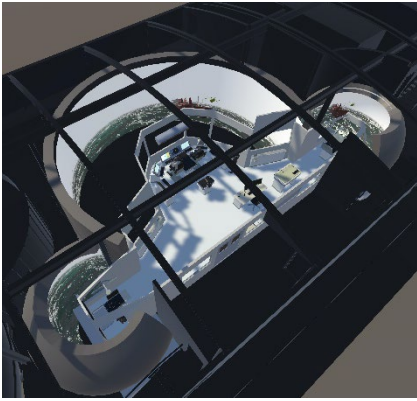
Ideal to simulate complex maritime operations

Maritime operations are becoming increasingly complex - containerhips are getting bigger, traffic and the number of new infrastructures at sea are increasing and also weather patterns are becoming more unpredictable. The safe performance of these operations requires a capable and well-trained crew. The spherical simulators in combination with a motion-based bridge will be unique in the maritime world and will immerse crews in such a way that the highest training and research value is achieved.

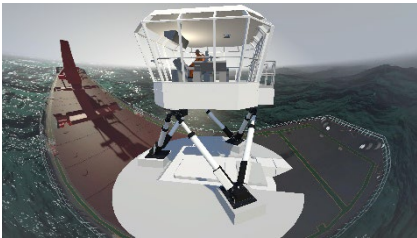
The new facility will also be used for research studies and testing innovative developments. Just some examples are the application of virtual reality, operational advice tools and the testing and monitoring of autonomous ships.



A research facility focused on people, with unique opportunities for simulating real-life situations at sea as authentically as possible to make the seas safer.



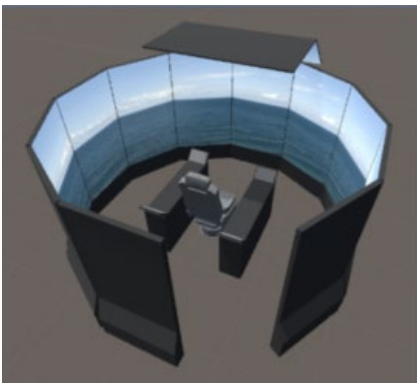
Impression of the Full Mission Bridge (FMB) with a 16 m diameter cylindrical projection and domes of 6 m wide at both bridge wings to allow forward, backward, downward and upward views during port and other complex operations.



Impression of the Large Motion Simulator (LMS) with a moving bridge of 4 x 5 m on a hexapod.



Impression of the Maritime eXperience Lab (MX Lab) with motion platform, treadmill, cable robot and Fast Small Ship Simulator (FSSS).



Impression of a Multi-Purpose Simulator (MPS) with 360 degrees projection for coupled tug or crane simulations.

In-house developed manoeuvring and simulation software

SOSc simulators run on the in-house developed manoeuvring and simulation software Dolphin. This can simulate the full range of maritime operations, from simple ship handling to high-risk, multi-player offshore operations, and from manoeuvring vessels to planing vessels. For the accurate prediction of the hydrodynamic behaviour, the combination of MARIN's test facilities, prediction methods (such as Computational Fluid Dynamics) and full-scale measurements is essential.

Key features

Large Motion Simulator (LMS): a six degrees of freedom motion-based bridge of 4 x 5 m on a hexapod with a payload of 14,000 kg and 360 degrees projection in a large spherical dome with a diameter of 16 m.

Full Mission Bridge (FMB): a 14 m wide bridge with a forward or backward view on a cylindrical screen (240 degrees horizontally and 42 degrees vertically). Both bridge wings have 6 m diameter domes to allow forward, backward, downward and upward views during port and other complex operations.

Four **Multi-Purpose Simulators (MPS)** of 4.2 x 4.2 m with 360 degrees projection for coupled tug or crane simulations.

The **Maritime eXperience Lab (MX Lab)** for advanced Virtual, Augmented and Mixed Reality applications, including the Fast Small Ship Simulator (FSSS), smaller motion platforms, treadmills, motion capturing and a cable robot. With the 8 cables of the cable robot moving objects (such as a crane hook) can be simulated above a moving platform or the FSSS for advanced interactive Mixed Reality simulations, both above and below water.

Vessel Traffic Management / Shore Control Centre Lab (VTM/SCC Lab): multi-purpose and flexible room with projection on three walls to simulate control or command centres on board or ashore, coupled to the other simulators and the MX Lab.

High Performance Computers (HPC): extra calculation power consisting of a combination of Central Processing Units and Graphics Processing Units for optimum real-time hydrodynamic modelling. These make it possible to include highly complex hydrodynamic features such as interactive wave fields.



Our mission 'Better Ships, Blue Oceans'

Research Institute MARIN is a provider of advanced expertise and independent research to the maritime industry. Using the newest test facilities and simulators and working together with an extensive innovation and research network we achieve our goal: the development of cleaner, safer and smarter ships and sustainable use of the sea.

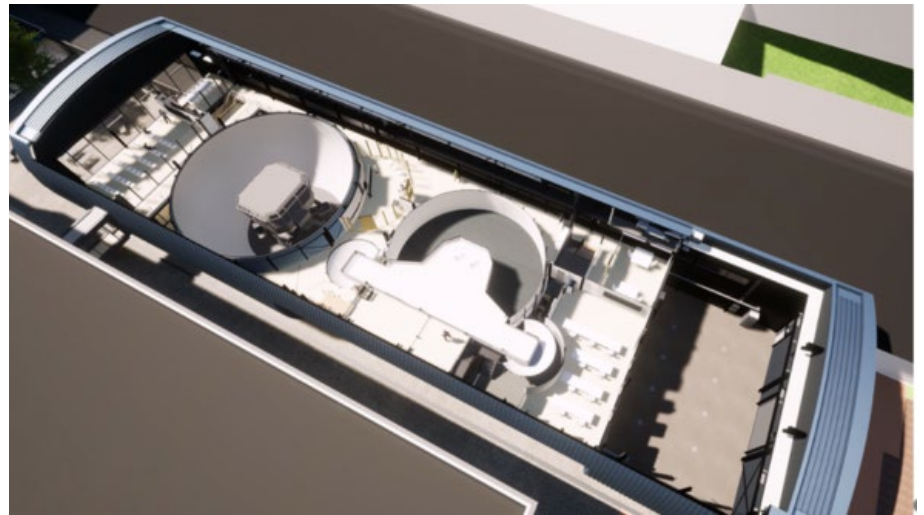
For more information and to discuss how to use these facilities for your projects, research or training, contact:

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Human Factor equipment: a sensor set consisting of eye trackers, heart rate sensors, galvanic skin response sensors, wearables and multiple cameras. Measurements of physiological parameters, such as heart rate variability and eye scanning, combined with observation techniques with multiple cameras and annotation capabilities, will give the instructor a clear picture of what is going on with the participants. Individual performance, team interaction and communication during the operation can be observed and optimised.

Instructor rooms and debriefing rooms: each of the large facilities has its own instructor operation station/shore control centre from which all aspects of the simulation are controlled. Modern debriefing facilities with live datalinks and extensive replay functionalities are available to follow and evaluate the simulations.

Additionally, there is a laboratory for vessel traffic management.



MARIN SOSc from left to right: meeting rooms, Large Motion Simulator (LMS) in projection dome, Full Mission Bridge (FMB), the High Performance Computer (HPC), 4 Multi-Purpose Simulators (MPS) and Vessel Traffic Management / Shore Control Centre Lab (VTM/SCC Lab) and the Maritime eXperience Lab (MX Lab).