

photo: courtesy of Marin

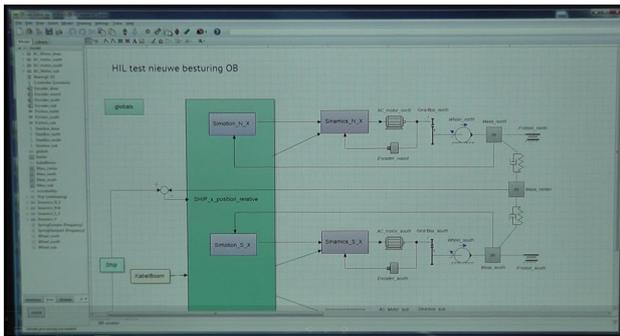
High Tech Systems – HIL Simulation

Towing Carriage

The Maritime Research Institute Netherlands (MARIN) was established in 1929 by the Dutch Government and Dutch industry to improve ship designs. To cope with the ever-increasing demands of the industry for research in the fields of powering performance, seakeeping and manoeuvring etc., a whole series of special test laboratories was successively built. The Seakeeping and Manoeuvring Basin is one of them. It allows model ships to run independently in waves, followed by a carriage containing measurement equipment. The carriage has been refitted by VSE with a state-of-the-art control system. Controllab has tested this control system using its Hardware-in-the-Loop (HIL) simulation technology.

HIL Simulation

MARIN contracted the company VSE to carry out an overhaul of the electronic systems of carriage, including the implementation of a state-of-the-art control system. The Seakeeping and Manoeuvring Basin is a facility that is in continuous operation. Delays after the overhaul would be very costly. That is why MARIN wanted the control system to undergo a complete test before actual implementation on the carriage.



The carriage model.

Virtual Carriage

Controllab is active in the markets of High Tech Systems and Marine and Offshore. The company provides HIL simulators for the testing of control systems. For VSE, Controllab has developed a virtual carriage, consisting of an accurate model of the ship and carriage and a simulator. This is called a Hardware-in-the-Loop (HIL) simulator.

By coupling the HIL simulator with the newly developed control system, all kinds of tests could be carried out. This allowed VSE to solve various errors and gradually increase the quality of its control system. It also allowed VSE to run scenarios that would potentially damage the real carriage and see if the control system would prevent this. Using HIL simulation, 90% of the FMEA could be carried out, weeks before the actual implementation of the control system.

Technology

Controllab is the developer of 20-sim, a package for the modeling and simulation of machines like MARIN's towing carriage. Controllab has created an extension to the package that allows it to be coupled to PLC systems like the Siemens Simotion Controller. The extension takes care that variables are



The HIL simulator setup.

transferred between a PC running 20-sim with the carriage model and the PLC running the control system. The extension also ensures that the 20-sim model is running in real time. The 3D animation facilities of 20-sim allow you to see the carriage in virtual reality, giving you a real sense of what the system is doing in every scenario that is tested.

Controllab

Controllab has been active in the High Tech Systems market for more than 20 years. We have excellent tooling that we can use to develop HIL simulators to test advanced control systems.

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