



## Houston Simulator Facility

In December 2013 representatives from SNAME and the Nautical Institute jointly opened the MARIN simulator in Houston. MARIN invited them for this event to illustrate the simulator was built as a bridge between engineering and operations. The simulator allows direct interaction between engineers and operational personnel and opens new possibilities for more operational input in the design.

### MARIN USA

MARIN USA has proved its value as a link to MARIN's facilities, services and know-how in the Netherlands since 1997. The services incorporate a unique combination of simulation and calculation studies with MARIN's dedicated and validated tools. Through continuous contact with the MARIN organization in the Netherlands, MARIN USA offers independent verification and advice, project scope optimization and early involvement in concept development resulting in optimized solutions. With the Houston Simulator, MARIN USA is equipped to provide clients with an added service using the most up-to-date and validated tool for concept design and operations training.

### Objectives

The objective of the simulator in Houston is to provide clients with:

- Interaction between engineers and mariners for optimized designs
- Assistance in operational design and operational feasibility
- Training of offshore operations and hazard identification
- Training for emergency situations during operations such as malfunctions of engines and rudder, line breaking and harsh environments

### System description

The Houston bridge simulator facility consists of a main bridge with full console, two tug stations and an Instructor Operator Station. The main bridge simulator is equipped with:

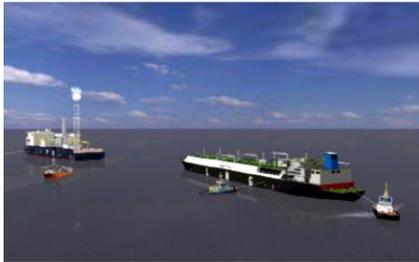
- 6 projection screens allowing for 360° view
- Main console with:
  - Ship controls (telegraph, tiller, bow thrusters or controls for PODs, ASD, VSP, flexible interface for winch controls, crane controls, line handling controls etc.)
  - ECDIS, ARPA, Conning including: rpm indicators, rudder indicator, thrusters angle indicators, ROT's, wind and current indicators



Bridge console



Tug stations



Stealth view

The simulator is located in our offices at Kirby Drive. For a demonstration of its capabilities or for more information contact MARIN USA:

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The two tug stations are equipped with:

- 300° View
- Touch screen interface allowing for versatile display of ship controls and custom bridge configurations
- Dual Kwant ASD controls
- Conning including: rpm indicators, rudder indicator, thrusters angle indicators, ROT's, wind indicators, heading indicators, SOG, lateral speeds at bow and stern, line status monitoring tools, etc.
- ECDIS

### Possibilities and capabilities

The Houston bridge simulator is perfectly suited for complex research or training projects as it allows the study of any navigation or manoeuvring situation, such as:

- Harbours and open water/coastal navigation
- Terminal design including ship channels
- Offloading operations including approach and departure
- Manoeuvres with: anchors, tugs, free floating FPSOs, formation of ships, float-over operations, lines to: floating platforms, SPMs, quays mooring dolphins etc.

The simulator accounts for

- Shallow water effects
- Squat
- Effect of: bank suction, ship-ship interaction, individual collision forces, grounding, inhomogeneous wind, wave and current fields
- Line Handling
- Anchoring (anchor and chain weight, bottom type, holding force)
- Propeller wash

### Software

The DOLPHIN software on the Houston Simulator is based on MARIN's extensible modelling framework (XMF). The framework is incorporated throughout MARIN's time domain software tools, thus allowing for direct integration of models between aNySIM XMF (fast-time simulations) and DOLPHIN (real-time bridge simulations). The DOLPHIN software combines MARIN's manoeuvring and mooring software allowing for real time engineering feedback during simulations. Vessel motions, vessel forces, line loads and other valuable information can be obtained during and after simulations. The software is DNV approved and based on extensive and on-going research into the field of ship hydrodynamics, port and waterway design. The MARIN mathematical models are highly sophisticated manoeuvring models that are validated with sea trials and model test results. Any type vessel and any existing propulsion system can be handled.



The simulator also includes a stealth system which offers complete flexibility to take up any observation point during the simulations. The system can be connected to the bridge of any vessel or be in a free mode allowing the user to "fly" through the simulation area.