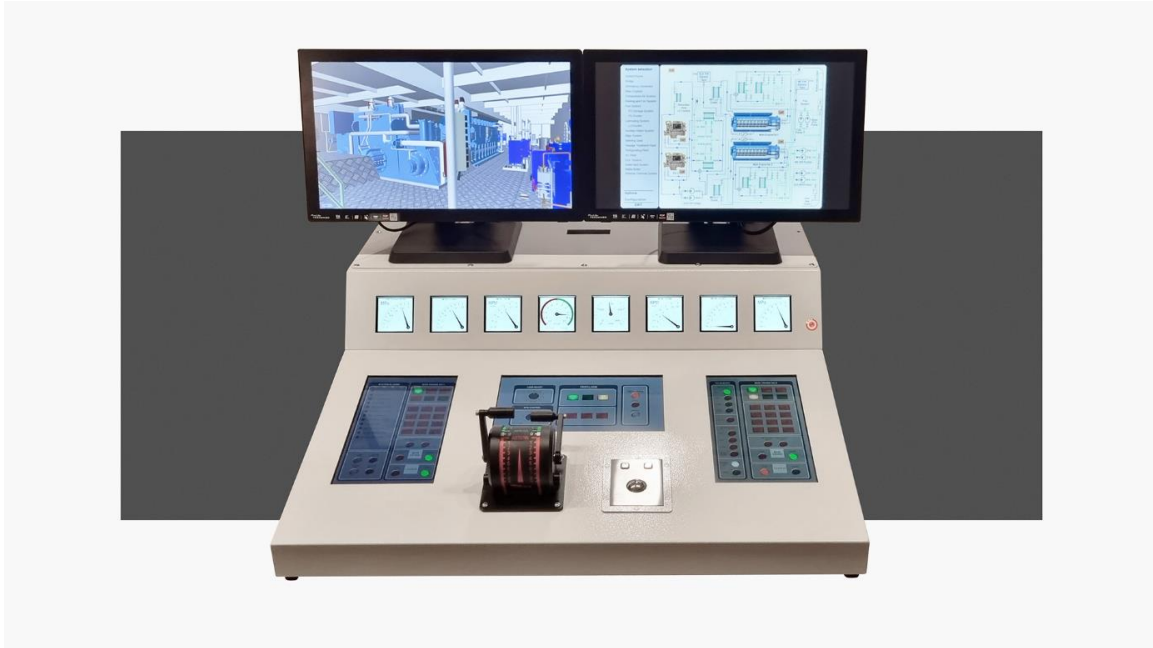


## UNITEST SINGLE CONSOLE ENGINE ROOM SIMULATOR



*Figure 1. Desktop type Hardware Console - general view*

Unitest Single Console Engine Room Simulator combines features and benefits of a hardware simulator (steal console with real levers) with a very compact size. It can be used in normal PC classrooms as a multiple installation in different configurations: desktop type (version A), freestanding type (version B), freestanding type with wall-mounted monitors (version C).

It allows for a significant increase in the training realism when compared to the software version.

The new console is compact in size and includes real engine control levers, digital gauges and several touchscreen monitors. The PC is built inside the device, so no additional configuration is required and the simulator is immediately ready to use.



Figure. 2. Desktop type - version A.



Figure. 3. Freestanding type - version B.



Figure. 4. Freestanding type with wall-mounted monitors - version C.



Figure 5. Desktop type - general view.

The new console is recommended for small training centers and can work with various medium speed engine room models.

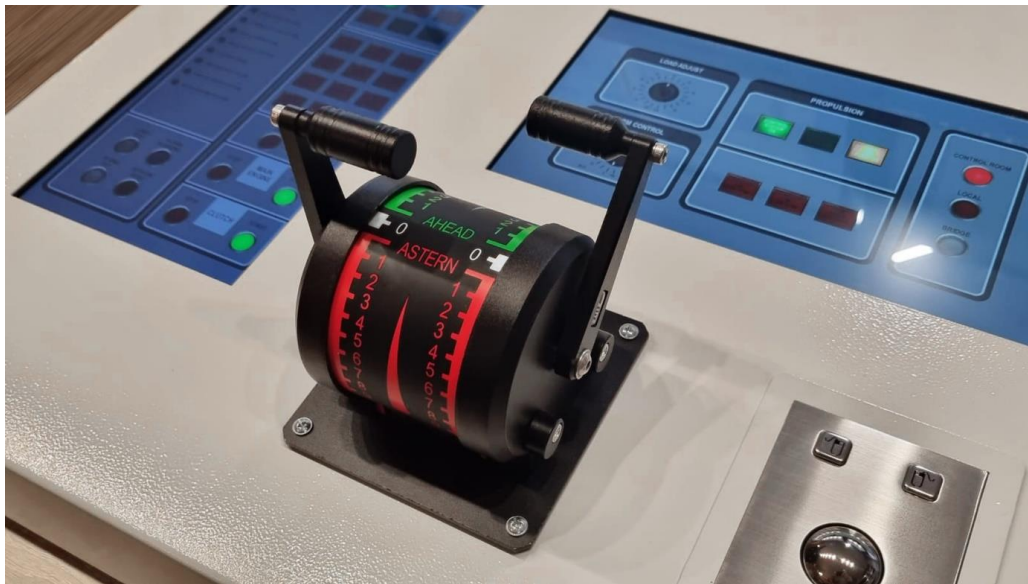


Figure 6. Desktop type Hardware Console - general view.

### Engine room simulation software - MER3D

The UNITEST **MER3D** Engine Room Simulator is based on typical solutions presently used in medium sized engine rooms (2 four-stroke type main engines with reduction gear and controllable pitch propeller).

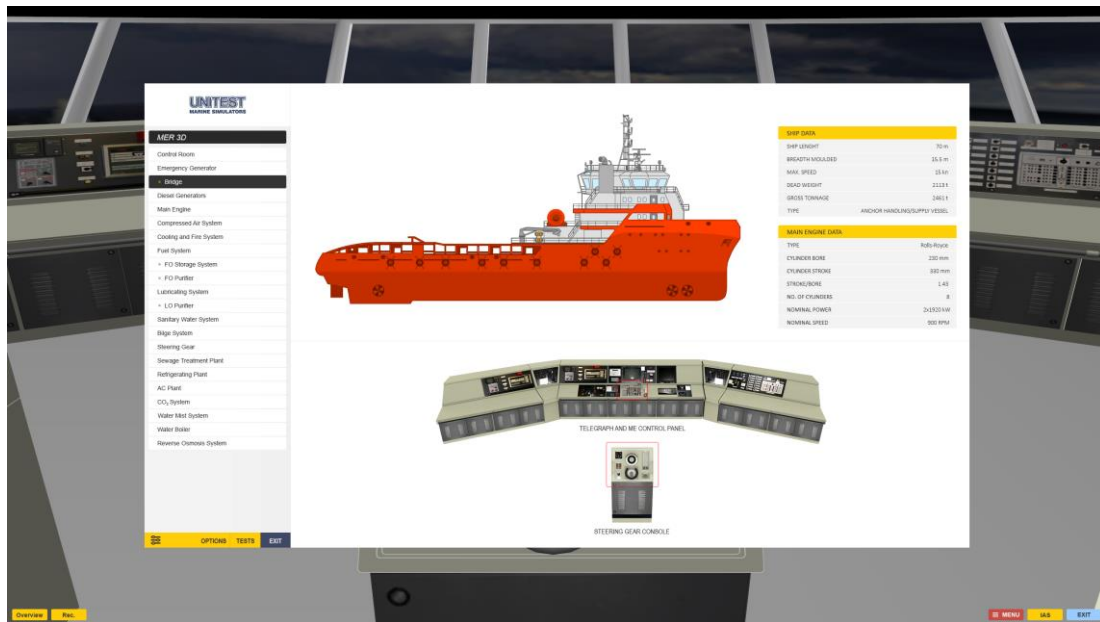


Figure 7. MER3D software.

The main purpose of the simulator is the practical preparation of the trainee for engine room operation, in particular:

- familiarization with the basic engine room installation (compressed air system, fresh and sea water cooling system, lubricating and fuel oil system, gear and CPP hydraulic system);
- acknowledgment with main engines and auxiliary equipment starting procedure;
- propulsion system maneuvering (main engines – reduction gear – CPP);

**MER3D** has been developed to comply with:

- STCW Code: Section A-1/12 and Section B-1/12.
- ISM Code: Section 6 and Section 8.

The **MER3D** simulator is based on an engine room composed of two (2) medium speed diesel ME's and two (2) diesel engine generators.

The propulsion system includes two (2) ME's, which driving the controllable pitch propeller (CPP) through reduction gear. The propeller's revolutions and pitch are controlled simultaneously.



*Figure 8. MER3D engine room view.*

The simulator introduces 3D model of the Engine Room, based on the real equipment. In order to create the impression of working in real environment, it provides 3D sounds which can be listened to on 2, 4 or more speakers.

**MER3D** simulator model includes the following systems:

- Fuel System
- Cooling & Fire System
- Lubricating System
- Compressed Air System
- Power Plant
- Emergency Generator
- Sanitary Water System
- Bilge System
- Steering Gear
- Sewage Treatment Plant
- Fresh Water Generator
- Air Conditioning Plant
- Water Mist System
- CO2 System
- Reverse osmosis system
- Hot water boiler
- Refrigerating Plant

### Overview, checklists, assessment tests

The program interface has been designed in such a way as to enable efficient and effective navigation around the engine room. At the same time, navigation provides the simulator exercises realism very close to reality.

The simulator uses an original navigation technique based on zooms in the 3D environment and dedicated navigation maps.

The overview windows enable a quick overview of the situation in the engine room. The green colour means: ready for the operation, while orange: not ready for the operation. The particular statuses are displayed for the whole subsystems (SW System, FW System etc) and the individual equipment (coolers, generators). Detailed information on the statuses in each system is available after selecting the appropriate tab. In addition, the detailed screens display statuses of manual valves, pump statuses and main parameters are also available.

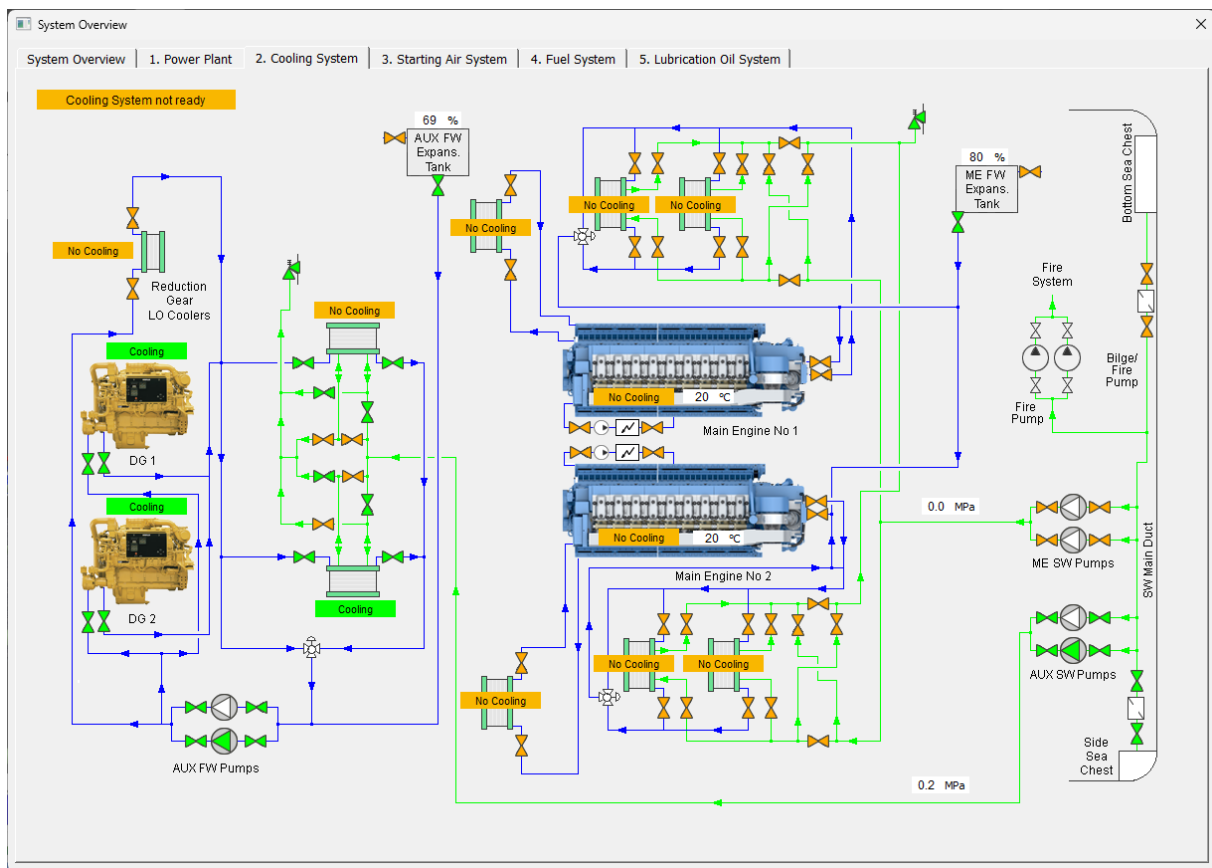


Figure 9. Overview window.

The main purpose of checklist introduction is to teach the user the proper engine room operation. This will be especially important when ME3D is used in the stand-alone mode, i.e. without the instructor's support. The checklists combined with an assessment should create new standards for ship engineers training and competency verification.

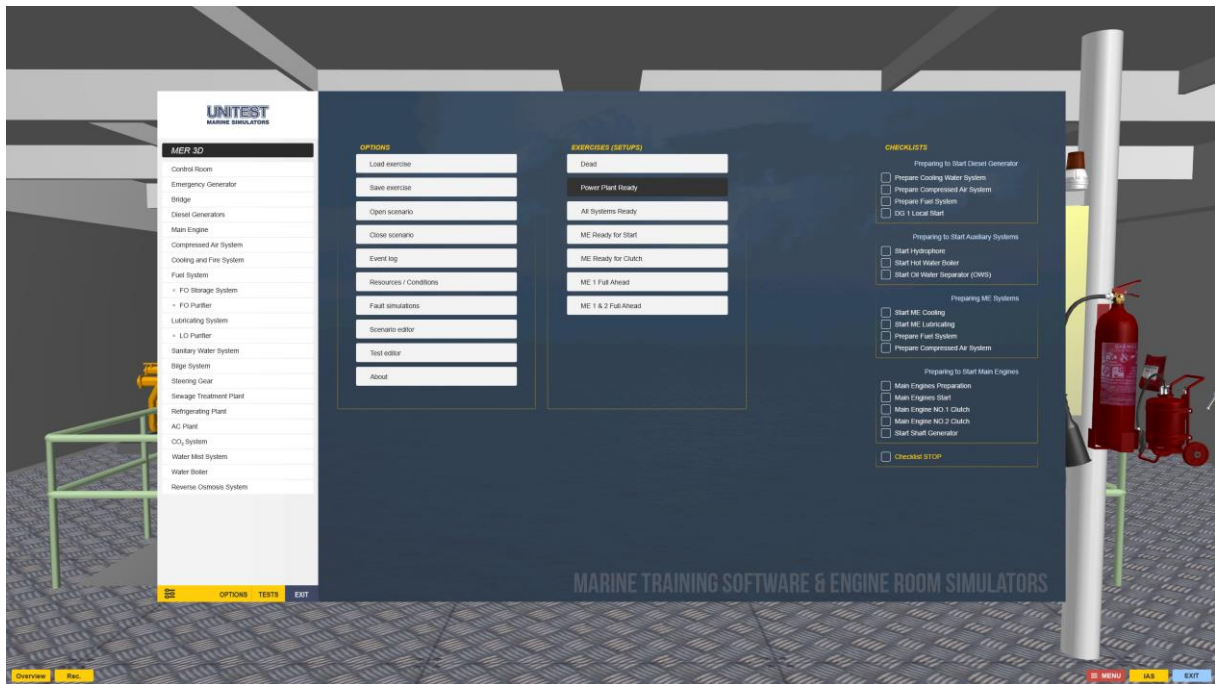


Figure 10. Checklist selection.

The simulator includes a set of automatic tests that are used to assess the competences of students.

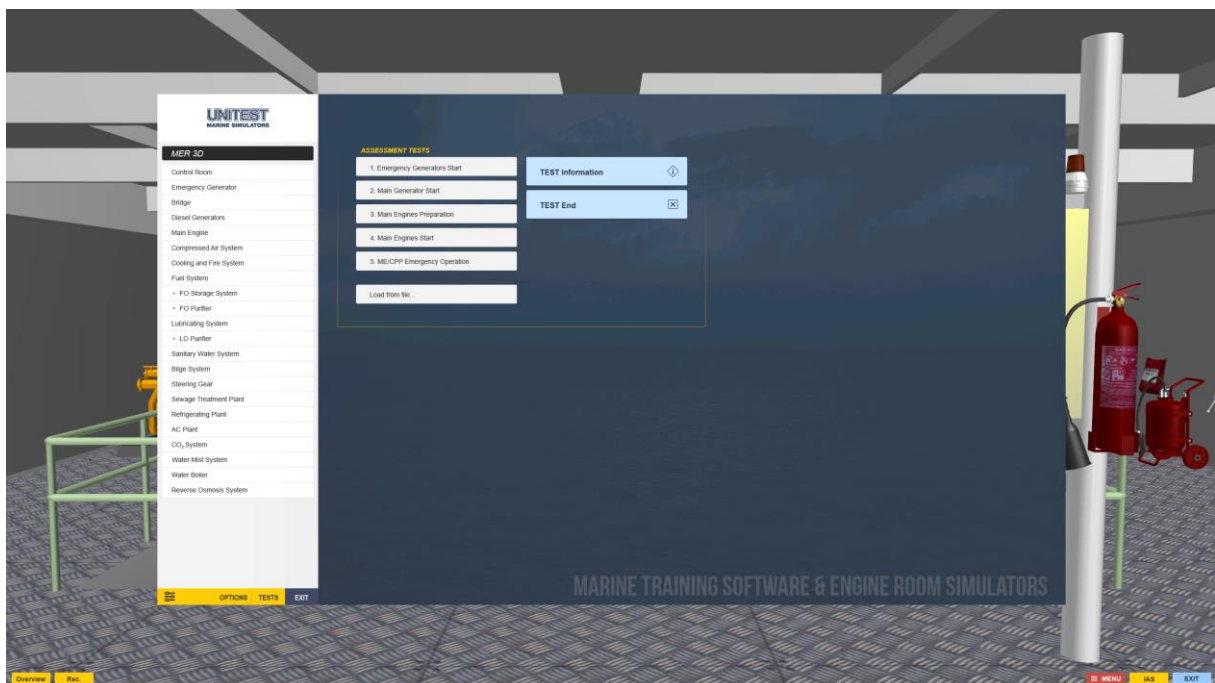


Figure 11. Checklist selection.

**MER3D's** main features:

- MER3D is a highly realistic simulator for engine room training which can also be used as a low cost introductory simulator.
- The mathematical model simulates a typical ship's engine room with two 2-stroke, medium speed engines, which driving the controllable pitch propeller through reduction gear.
- All vital auxiliary systems have been implemented.
- The user interface includes virtual controls and alarms and creates a very realistic environment.
- The 3D virtual reality with active valves, tank level indicators and selected digital gauges allow for comfortable engine room operation and monitoring.
- Multichannel digitized sound provides a very realistic engine room feel. The sound effects include: engine sound correlated with engine speed, sound of a diesel generator starting and running, open indicator valve sound, alarm and machine telegraph buzzers.
- Emergency procedure training including fire simulations.

The main educational tasks which can be accomplished using MER3D have been listed below:

- Learning the engine room's typical operating routines.
- Engine room operation training. The user will have the possibility to accomplish any operational tasks starting from different set-ups, both pre-prepared and saved by the user. Corrective action learning when faults occur. Different faults can be simulated and mixed in the run-time or loaded from disk.