The Transas Engine Room Simulator ERS 5000 has been specifically designed for the education, training and assessment of competence of engine department personnel including the engineer officer in charge of watch, senior engineering staff and ratings forming part of engineering watch:

- Familiarisation
- Standard operation and watch keeping
- Advanced operation and troubleshooting
- Vessel resource management

**COMPLIANCE**
Transas engine room simulators:
- Cover the essential areas of maritime training in full compliance with the STCW requirements
- Designed to meet the requirements of IMO Conventions and Resolutions and IEC standards
- Approved by DNV (as per the Standard for Certification of Maritime Simulators No. 2.14 October 2007)

**TRAINING GOALS DEFINE SIMULATOR CONFIGURATION**

<table>
<thead>
<tr>
<th>Training goal</th>
<th>Simulator type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-education, equipment familiarisation and refresher training</td>
<td>Stand-alone simulator, distance learning (Solo)</td>
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<tr>
<td>The training of technicians in the principles of operation and diagnosis of marine engineering/electrical systems</td>
<td>Classroom simulator, full mission simulator and simulators installed on laptop computers (distance learning)</td>
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<tr>
<td>Switchboard operating certificate (SOC)</td>
<td>Full mission engine room simulator</td>
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<tr>
<td>Control room watchkeeping certificate (CRWC)</td>
<td>Full mission engine room simulator</td>
</tr>
<tr>
<td>The training and qualification of marine engineering officers and technicians prior to taking up their positions onboard specific vessels</td>
<td>Specially designed full mission engine room simulators</td>
</tr>
<tr>
<td>Resource management and team training for navigating officers, marine engineering officers and technicians</td>
<td>An interlinked full mission engine room and bridge simulators.</td>
</tr>
</tbody>
</table>

**CONFIGURATION TYPES**

**ERS 5000 Solo**
- Run on stand-alone PC

**Networked class**
- Supports 12 interactive trainee workstations with one instructor station

**Full mission simulator**
- Custom design of an engine room specific for a certain vessel is possible
**SIMULATOR COMPONENTS**

Trainee Software – replica of structure and hierarchy of ship’s real control system:

- Monitoring and operation of Propulsion Plant from Navigation Bridge
- Automatic and remote operation and monitoring from Machinery Control Room
- Local operation and monitoring from auxiliary stations

The following systems are imitated:

- Ship’s diesel propulsion plant
- Auxiliary systems and machinery
- Ship’s electric power plant
- Machinery sound imitation
- Alarm systems with Sound & Visual Alarm Unit
- 3D visualization for Tanker LCC, LNG, Ro-Ro, ASD tug, OPV and ANZAC frigate models

**Control from bridge**

- Propulsion Plant Control Panel
- Steering Control Panel
- Control from bridge by VDU
- Fire Alarm Station

**Control from Machinery Control Room**

- Propulsion plant control panel
- Steering control and stabilizers panel
- Sections of main switch board
- Alarm, monitoring and control system
- Control from MCR by VDU

**Local Operation Posts:**

- Main Engine(s)
- Diesel Generator
- Purifiers, etc.

**Set of interactive system diagrams for:**

- System configuration analysis
- Monitoring of state of system components
- Local manual control of valves
- Monitoring of levels in tanks

*Example of video wall*
FEATURES

3D Virtual Reality
- Familiarisation support
- Standard and advanced operation, including troubleshooting
- Familiarisation with engine room sounds
- Access to local posts from 3D visualisation

Imitation of Local Operation Posts in Machinery Compartments
- Trainee selects a starting point and a point of destination
- A video from a real vessel is displayed showing a walk-through to the destination from MCR
- On arrival trainee can operate the selected local operation post
- Once in the machinery space, 3D visuals allow the student to move to an individual piece of equipment and operate it. This eliminates the need for "gaming" experience to navigate to a given location. It also adds real time constraints into full mission resource management exercises

Integration with navigational simulator for crew resource management training
The joint training of engineering personnel and deck officers in a single environment solves the following tasks:
- Training of efficient and well-coordinated cooperation between the engine room and bridge crews at it is onboard the real ship
- Understanding of the complexity of all onboard equipment and interactions
- Training for emergency situations
- Advanced equipment familiarisation necessary due to the increased level of automation on board ships, where modern engine monitoring and control devices are installed on the bridge (in accordance with the IMO 'Watch 1' standard)

Interactive Mimic Diagram
Systems can be controlled from the unified diagram. Appearance replicates standard control mimics found on real vessels.

Imitation of Local Manual Control from Machinery Compartments
Control ability is available directly from individual system pages or from 3D visual model.

Zoom function enables using large and extensive diagrams.

Management Level Training
Advanced level training abilities have been increased through a more flexible and greater range of malfunction capabilities with ERS 5000 models.
- Parameterisation is meant for adjustment of ME Governor, temperature controllers and simulation of different pumps, coolers, heaters, filters and conditions of units by instructor or trainee
- Conditions could be changed both in initial state before exercise start and in online mode during an exercise

Graphic presentation
- Combustion process with adjustments
- Trend curves of all physical parameters
HardWare
To simulate the vessel interior with greater realism and thus further improve the efficiency of training, ERS 5000 can be supplied with full-size control consoles comprising built-in monitoring and control panels. To better match training goals and budget, several hardware options are available:

Transas standard and customised dedicated control panels

Virtual Dedicated Hardware panel (VDHW) – control by touch screen display:
- Relatively low cost
- Realistic presentation of equipment
- Possibility to reconfigure on the run for different ships with different controls

Combination of real dedicated panels with virtual dedicated panels
To allow several ship models to be simulated using the same full mission simulator infrastructure ERS 5000 provides a virtual hardware option. Large flat touch screen displays replicate the main switchboards and switchboard generator controls.

Third party equipment interfaced to Transas ERS
INSTRUCTOR STATION CAPABILITIES
- Monitoring and recording the trainee in online mode
- Exercise editor for exercise creating and editing
- Debriefing facility for viewing and analysis of recorded exercises
- Evaluation and assessment system
- Extended possibilities for exercise data printing

SHIP MODEL LIBRARY
ERS 5000 incorporates the library of ship models with the most widespread types of propulsion plant. The model library is constantly growing. Customised models can be developed on request, given that a customer provides the necessary technical data on the vessel’s engine room equipment.

The following ship models are available at the moment:

Oil Tanker
Oil tanker of 60,500 DWT, with a two-stroke low-speed reversible turbo charged diesel engine and fixed pitch propeller. The Auxiliary systems: Oily Water Treatment System & Incinerator added according to MARPOL requirements.

**Main Engine**
- Type – MAN B&W 6S60MC
- No. of cylinders – 6
- MCR – 12,240 kW
- Corresp. Engine speed – 105 rpm
- Propeller – FPP

General Cargo
Multipurpose dry-cargo vessel/container ship of 12,000 DWT, carrying general cargo, 20’ and 40’ containers.

**Main Engine**
- Type – MAN B&W 6S60MC
- No. of cylinders – 6
- MCR – 12,240 kW
- Corresp. engine speed – 105 rpm
- Propeller – FPP
Ro-Ro vessel
Ro-Ro vessel of 5,000 DWT, with a four-stroke medium-speed non-reversible turbo charged engine and controllable pitch propeller.

Main Engine
- Type – S.E.M.T. Pielstick 16 PC2.2 V-400
- No. of cylinders – 16
- MCR – 5,966 kW
- Corresp. engine speed – 520 rpm
- Propeller – CPP

LNG Tanker
LNG tanker of 76,000 DWT, with a steam turbine as the main engine, driving a fixed pitch propeller via a turning gearbox.

Main Engine
- Type – Steam Turbine Kawasaki UA-400
- Output MCR – 29,450 kW
- Output NCR – 25,040 kW / 85,3 R.P.M.
- 2 x Steam Boilers
- Superheated steam – 61,5 bar / 515 oC / 63,500kg/h at M.C.R. condition
- Propeller – FPP

General Cargo-2
Multipurpose general cargo-containership of 12,000 DWT, having a two-stroke reversible low-speed turbo charged diesel, and direct transmission to a fixed pitch propeller.

Main Engine
- Type – Wartsila-Sulzer RTA58
- No. of cylinders – 6
- MCR – 12,750 kW
- Corresp. Engine speed – 105 rpm
- Propeller – FPP
- MEP – 19 bar

Container Ship
Containership of 83,105 DWT with a two-stroke reversible low-speed turbo charged diesel with fixed pitch propeller.

Main Engine
- Type – MAN B&W 10K98MC
- No. of cylinders – 10
- MCR – 57,200 kW
- Corresp. engine speed – 94 rpm
- Propeller – FPP

Transas Engine Room Simulators
ERS 5000
**ASD Tug**

The modern ASD Tug of 366 t displacement having two high speed diesel engines with transmission to two Azimuth thrusters

*Propulsion*
- Main engines – 2 x CAT 3516BTA
- Azimuth thrusters – 2 x Rolls Royce Ulstein Aquamaster
- Slipping clutches – 2 x Twin Disc MCD 3000

*Electric Power Plant*

Generator sets – 2 x CAT 3304B T + Harbour generator

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**Fishing Vessel**

Trawler with a four-stroke high-speed turbo charged diesel engine, reversible reduction gear and fixed pitch propeller

*Main Engine*
- Type – CATERPILLAR 3508 TA
- Cylinder bore – 170 mm
- Piston stroke – 190 mm
- No. of cylinders – 8
- MCR – 526 kW
- Corresp. engine speed – 1,200 rpm
- Propeller – FPP
- Propeller blades – 4

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**Offshore Patrol Vessel (OPV) ship model**

**Propulsion:**
- 2 x MAN B&W Diesel 12RK280 (MAN 12V 28/33D), 5400 kW, 1000 RPM;
- 2 x Double-reduction gear ZF W63000 NR2H, non-reversible, hydraulic clutch;
- 2 x CPP – Wartsila Hub-Type Propeller

*Electric Plant:*
- 3 x Diesel Generator 530 kW, 440V/60 Hz, 3 ph (engine MAN V12 D2842, 620 kW, 1800 RPM, generator LE301);
- 1 x Emergency Generator 103 kW, 440V/60 Hz, 3 ph (engine MAN L4 D0824, 110 kW, 1800 RPM, generator LE201).

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**Frigate ship model (ANZAC class / modified MEKO type 200)**

**Propulsion (CODOG):**
- 2 x Diesel engine MTU 12V1163 TB83, 3040 kW, 1160 RPM;
- 1 x Gas Turbine General Electric type 7 LM 2500-SA-MLG 15, 22 500 kW, 3600 RPM;
- Reduction Gearing set Type MAAG 2MG/TA-340/2H: two Main Gearboxes (MG) (PORT and STBD) each with synchronous clutches and fluid coupling attached, Cross-Connect Gearbox (CCG) with synchronous clutch attached;
- 2 x Hub-type Controllable Pitch Propeller (CPP).

*Electric Plant:*
- 4 x Ship Service Diesel Generator (SSDG) - 812 kVA, 440V/60 Hz, 3 ph (diesel MTU 8V 396 TE54 690 kW, 1800 RPM);
- Two Main Switchboards (MSB) – FWD MSB and AFT MSB with cross-connection between MSBs;
- 3 x Shore Connection Boxes

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**AsD Tug**

Length o.a. – 25.3 m
Breadth mld – 10.26 m
Displacement – 366 t
Speed astern – 12.5 knots
Bollard pull – Up to 53 t

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**Fishing Vessel**

Length o.a. – 24.5 m
Breadth mld – 6.31 m
Draught at design WL – 3.25 m
Deadweight at SLM – 250 t
Speed in full load – 11 knots

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**Offshore Patrol Vessel (OPV) ship model**

Length – 81.5 m
Beam – 12.05 m
Draught – 3.4 m
Speed – 22.5 knots

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**Frigate ship model (ANZAC class / modified MEKO type 200)**

Length – 118 m
Beam – 14.8 m
Draught – 4 m
Speed – 27 knots