Univerza v Ljubljani

Fakulteta za pomorstvo in promet

Marine Simulators at University of Ljubljana Faculty of Maritime Studies and Transport

Brief overview of available simulators and courses

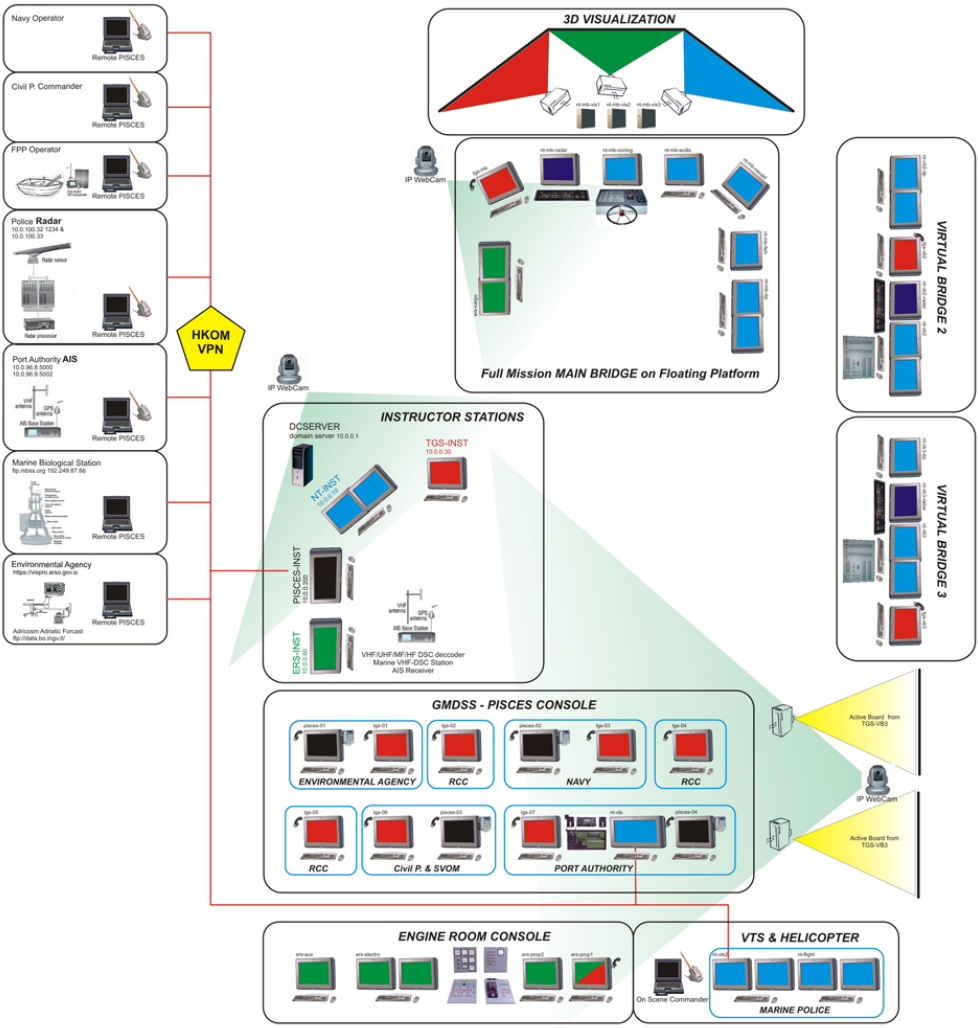
Maritime Training and Crisis Management System Simulation Center

at

University of Ljubljana, Faculty of Maritime Studies and Transportation

&

Secondary Marine School Portorož



In cooperation with:

Administration for Civil Protection and Disaster Relief, Slovenian Maritime Directorate - Port Authority Koper, Sea Shore Safeguarding Service, Slovenian Police Administartion Unit - Marine Police Division, National Institute of Biology Ljubljana, Marine Biology Station Piran Ministry of the Environment and Spatial Planning, Environmental Agency - ARSO , Slovenian Navy

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Transas marine simulator systems

TRANSAS
SETS THE STANDARD

NAVIGATION SIMULATOR

The navigation simulator consists of three navigation bridges. The first, the “full mission bridge”, is set on a movable platform that recreates the sensation of rolling of a large ship at sea. A similar effect is produced by the visualization system of four computer-generated visual representations of the navigation environment in a 180° sector, which can be rotated and further divided into subsectors. The image is projected onto a 2.5mx7m curved screen. The “full mission bridge” allows training in the navigation of ships of various sizes and with different propulsion systems. The telegraph enables the simulation of navigation of single-engine or twin-engine vessels with a conventional fixed or controllable pitch propeller with direct or azimuth propeller drive. In addition to the main “full mission bridge” the system includes two additional virtual navigation bridges with a different projection system. Here navigation can be followed through a single visual channel in a 60° sector projected on a 42’’ LCD screen. These virtual navigation bridges allow the adjustment of the system to different propulsion systems. One of the bridges is equipped with a conventional Voith-Schneider mechanism and rudder, and the other with two LF70 telegraphs that allow the simulation of the operation of azimuth propulsion systems. In addition, one of the bridges is equipped with an additional helm used for conventional propulsion systems. Each bridge is equipped with the conning system, which displays data concerning navigation and condition of the ship’s propulsion plant. There are also signalization settings and a SAR module. On the left there is a screen that can be used to display as many as four different automatic plotting radar types. On the right there is a complete ECDIS system that, in addition to electronic charts, can display navigation and radar data if required. Here we can also find the display of navigation and information equipment. In order to provide the latest navigation equipment, the simulator is upgraded on a yearly basis.

Integration of simulators

Each bridge can be used individually or integrated in a scenario in which, for instance, one ship is proceeding alongside while two other vessels

act as tugs. The simulator offers the choice among more than 150 different vessels that can be used in highly complex scenarios in more than 100 navigation areas. When a complex scenario includes, for instance, communication with the VTS centre in San Francisco, VTS simulation and GMDSS communication can be integrated into the navigation scenario.

"Full mission" Navigation Bridge

If training of the crew in human resources management (deck department – engine room department) is required, the "full scope" version of the engine room simulator can be integrated into the scenario. This is a replica of the control console in the engine room control cabin. Other simulations that can be integrated into the navigation scenario include those of liquid cargo handling GMDSS and crisis management response in case of an oil spill at sea.

Thus, training in the most complex scenarios can be provided. These may include engine breakdown, stranding, squat effect, grounding, oil spill, transfer of oil to a barge, communication, formation of a Maritime Rescue Coordination Centre, search and rescue operations. The simulator records real data on meteorological conditions at sea, sea currents, and vessel traffic. It can be used in real emergency situations; it was used, for example, as support in an oil spill emergency in Lebanon, and the burning of the ro-ro vessel "Und Adriyatik" off the coasts of Istria. The simulator includes real VHF and HF/MF communication equipment. Importantly, for its performance capabilities the simulator can be used as a maritime research laboratory. It was used, for instance, in the preparation of the national Oil Spill Contingency plan, the assessment of LNG terminal locations, and the estimation of minimum width of sea basins in the cargo port of Luka Koper. Moreover, it allows integration with similar centres, which means that the simulator can be used in international maritime exercises (a joint maritime exercise with the centres in Kotka, Tallinn, St. Petersburg, and San Francisco is currently planned). A videoconferencing system is also available. In addition, the simulator is used in the training of seafarers within the system of acquisition of certificates in compliance with the systems and programmes as defined by various IMO documents. Details about each simulator can be found in the following sections.

VTS SIMULATOR

The VTS simulator is an integrated part of the navigation simulator. A scenario with two VTS stations in any navigation area can be designed. Each VTS station can be equipped with different radars set at various heights, an AIS base station at an appropriate location, video surveillance cameras, a radio direction finder, and an adjusted multi-channel communication station that keeps a record of all messages. The database includes traffic data that can be analysed in order to evaluate navigation information or the maritime traffic management system. The simulator enables detailed construction of each navigation area and the setting of a variety of vessel traffic management sectors.

SAR SIMULATOR

The SAR simulator accompanies the VTS and navigation simulators. The SAR module is located in the control computer on the navigation bridge. A special station can be used to simulate a SAR operation with a helicopter. In addition to the helicopter station there is a communication console used by the VTS centre to communicate with the SAR unit and ships in the SAR area. The person overboard or a life raft can be exposed to sea currents and winds defined for the navigation area either via the navigation simulator or in integration with the crisis management simulator.

ARPA SIMULATOR

ARPA simulations can be conducted on any of the three bridges and the helicopter radar. In addition, a separate laboratory is dedicated exclusively to ARPA training and research. It can be used for navigation simulations on a real radar display.

ARPA Radar Simulator

GMDSS COMMUNICATION SIMULATOR

The GMDSS simulator has already been mentioned within the process of

communication among vessels and VTS operators or SAR units. The GMDSS communication simulator is extensively used in the education process at the faculty, which is why it is regularly upgraded. The GMDSS communication simulator consists of ten operator stations. The instructor prepares the task, distributes the stations either into one common area or in pairs, and gives instructions to simulate the communication process. One station includes a real console with VHF/HF/MF equipment and the station charging system. Four stations are equipped with touch screens. Thus, the use of GMDSS

equipment is even closer to reality. All stations have headphones and loudspeakers. This system includes the most modern communication equipment, including the satellite FLEET 77 system, which allows simple communication through an e-mail interface. Each station is equipped with radar and a simple ship's conning console, enabling simplified SAR operations without integration with the navigation bridge.

GMDSS Console and Simulation Monitoring

ENGINE ROOM SIMULATOR

Two engine room simulators are located at the premises of the faculty. The first one, set up in the year 2000, operates on HP workstations in the Unix environment. Eight stations (one can be used by the instructor) enable the simulation of the use of three different propulsion systems: a large two-stroke engine of a VLCC, a medium-speed four-stroke engine of a fishing boat, and diesel-electric propulsion of a modern passenger ship. The engine room simulator encompasses the entire spectre of subsystems that are typical of each propulsion system. The VLCC simulator includes a complex steam system used for steam turbines during crude oil discharge; that of the fishing boat reproduces the hydraulic system and controllable pitch propeller; the last simulator, that of the passenger ship, simulates a high tension 6.6kV installation and electric propulsion.

In addition, the integrated simulator system includes the aforementioned “full scope” console. On five screens and real indicators it shows the operation of the engine and subsystems of an LCC. The console can work independently or be integrated with any of the three bridges if the selected vessel is an LCC.

CBT SIMULATORS

The engine room consists of complex subsystems that reach beyond the capabilities of simulators. As a result, additional required knowledge is provided by “Computer Based Training”, which comprises comprehensive technical drawings of each device or engine and detailed descriptions of their operation and maintenance. A simplified engine starting simulator is included as well. Students can follow the computer application independently and complete their tasks with an assessment test that automatically saves their scores.

LIQUID CARGO HANDLING SIMULATOR

Special attention within educational activities at the faculty is placed on cargo handling. The fundamental knowledge is acquired through simulations on “Load Masters”. These are calculators used for the calculation of stability and stress on various types of ships. They are upgraded with three liquid cargo handling simulators in a dynamic environment. In addition to stability and stress on the ship’s hull, the crude oil handling simulator for a VLCC focuses on oil transfer capacity, pipework pressure, and condition of propulsion steam, among others. The second simulator enables simulations of transhipment of thirty different chemicals. In addition to the condition of the ship, it focuses on the concentration of dangerous gasses, inerting, and tank washing with technical water. The third simulator works on the same HP workstations as the engine room simulator and is used for simulations of liquefied natural gas transhipment. Focus is placed on the pipework and tanks cooling process given that LNG carriers store gas at a temperature of -162^{o}C.

OIL SPILL RESPONSE SIMULATOR

The oil spill response simulator was purchased in 2004 and used for the first time only a year later in 2005 when the subregional action plan on the response in case of oil spills in the Northern Adriatic was signed. This simulator is used for the training in optimal response in case of marine pollution. In the configuration of the simulator a national stakeholder from the coordination group at sea (Civil Protection, Interception and Rescue of the Slovene Maritime Administration, Environment Agency and the National Service for the Protection of Coastal Waters, maritime police and army ...) takes over a simulator working station and assumes the role of rescue coordinator. Orders to the units in the field are given by the rescue coordinator. Each operator is given initial instructions that include the position of the vessel in distress, initial marine pollution, and oceanographic and meteorological conditions. The operators themselves have access to the management system in which they choose among the available equipment that the rescue coordinator then applies. The entire communication process takes place via GMDSS connections.

Accident and Oil Spill Response

SMARTBOARDS

The teaching and learning of complex content is significantly simplified and enhanced through the use of the smartboard. Using a video projector, a screen image from any simulator can be shown on two boards. The instructor can operate any simulator element by simply touching the board. Using pens he or she can then provide additional explanations of the working principles and use, or task-solving approach. Smartboards are indispensible elements in simulator-assisted education systems. Together with video surveillance they can be used for simulation analysis.

Virtual Bridge and Smartboards Used for Guided Simulation Display

COURSES PROVIDED BY THE FACULTY OF MARITIME STUDIES AND TRANSPORT AND THE MARITIME AND TECHNICAL EDUCATION CENTRE THAT ARE IN COMPLIANCE WITH THE PROVISIONS OF THE 1995 STCW CONVENTION AND EDUCATION QUALITY STANDARDS

Exam requirements for the international authorization and/or certification as defined by the 1995 STCW Convention and by the Slovene rules and code listed at the end of this text include:

a) Training in content necessary for the certification and authorization of professional seafarers shall be provided by an institution that is qualified for the training of seafarers, that has adopted Education Quality Standards, and has an accredited education and training programme.
b) Assessment of knowledge and qualifications shall be carried out by an independent committee that is appointed by the signatory state and cannot be from the training institution.
c) The exam registration form shall include a certificate of successfully completed education and training that is issued by the institution named under point a).
d) The signatory state issues a certificate or authorization, written in the Slovene and English languages.

Courses:

- Motorman,
- Master and Officer in Charge of Navigational Watch on Ships of Less than 200 Gross Tonnage,
- Yacht Master on Ships of Less than 500 Gross Tonnage,
- Officer in Charge of Navigational Watch,
- Rating Forming Part of a Navigational Watch,
- Officer in Charge of Navigational Watch on Ships of Less than 500 Gross Tonnage,
- Master on Ships of Less than 500 Gross Tonnage,
- Officer of the Watch on Ships of Less than 500 Gross Tonnage,
- Officer in Charge of Navigational Watch on Ships of 500 Gross Tonnage or More,
- Chief Mate on Ships of Between 500 and 3,000 Gross Tonnage,
- Chief Mate on Ships of 3,000 Gross Tonnage and More,
- Rating Forming Part of a Watch in a Manned Engine Room,
- Officer in Charge of an Engineering Watch on Ships Powered by Main Propulsion Machinery of Less than 750 kW,

- Officer in Charge of an Engineering Watch on Ships Powered by Main Propulsion Machinery of 750 kW Propulsion Power or More,
- Third Engineer Officer on Ships Powered by Main Propulsion Machinery of Between 750 and 3000 kW Propulsion Power,
- Third Engineer Officer on Ships Powered by Main Propulsion Machinery of 3,000 kW Propulsion Power or More,
- Fire Safety,
- Survival Craft and Rescue Boats,
- Fast Rescue Boats,
- Crowd Management on Ro-ro Passenger Ships,
- Passenger Safety, Cargo Safety, and Hull Integrity on Ro-ro Passenger Ships,
- Crisis Management and Human Behaviour for Personnel Serving on Board Ro-ro Passenger Ships,
- Passenger Ships Other than Ro-ro Ships,
- Crowd Management on Passenger Ships Other than Ro-ro Ships,
- Passenger Safety on Passenger Ships Other than Ro-ro Ships,
- Crisis Management on Passenger Ships Other than Ro-ro Ships,
- GMDSS-ROC,
- GMDSS-GOC,
- Medical Care on Board Ships,
- Automatic Radar Plotting Aids,
- Radar Observation,
- Solid, Bulk, and Packed Dangerous Goods Handling,
- Handling of Ships with Unusual Maneuvering Characteristics,
- Bulk Cargo Carrier Handling,
- Basic Tanker Training,
- Oil Tanker Safety,
- Chemical Tanker Safety,
- Liquefied Gas Tankers Safety,
- Ship Security Officer,
- Ship Safety Officer,
- ISM,
- Risk Assessment,
- Energy Saving,
- Incident Investigation and Analysis,
- Ship Tank Inspection.

Legal framework:

- Rules on Authorizations and Ranks of Seafarers (Official Gazette of the Republic of Slovenia, no. 89/2005),

- Rules Amending the Rules on Authorizations and Ranks of Seafarers (Official Gazette of the Republic of Slovenia, no. 95/2007),
- Maritime Code (Official Gazette of the Republic of Slovenia, no. 26/2001, Official Gazette of the Republic of Slovenia, no. 120/2006).