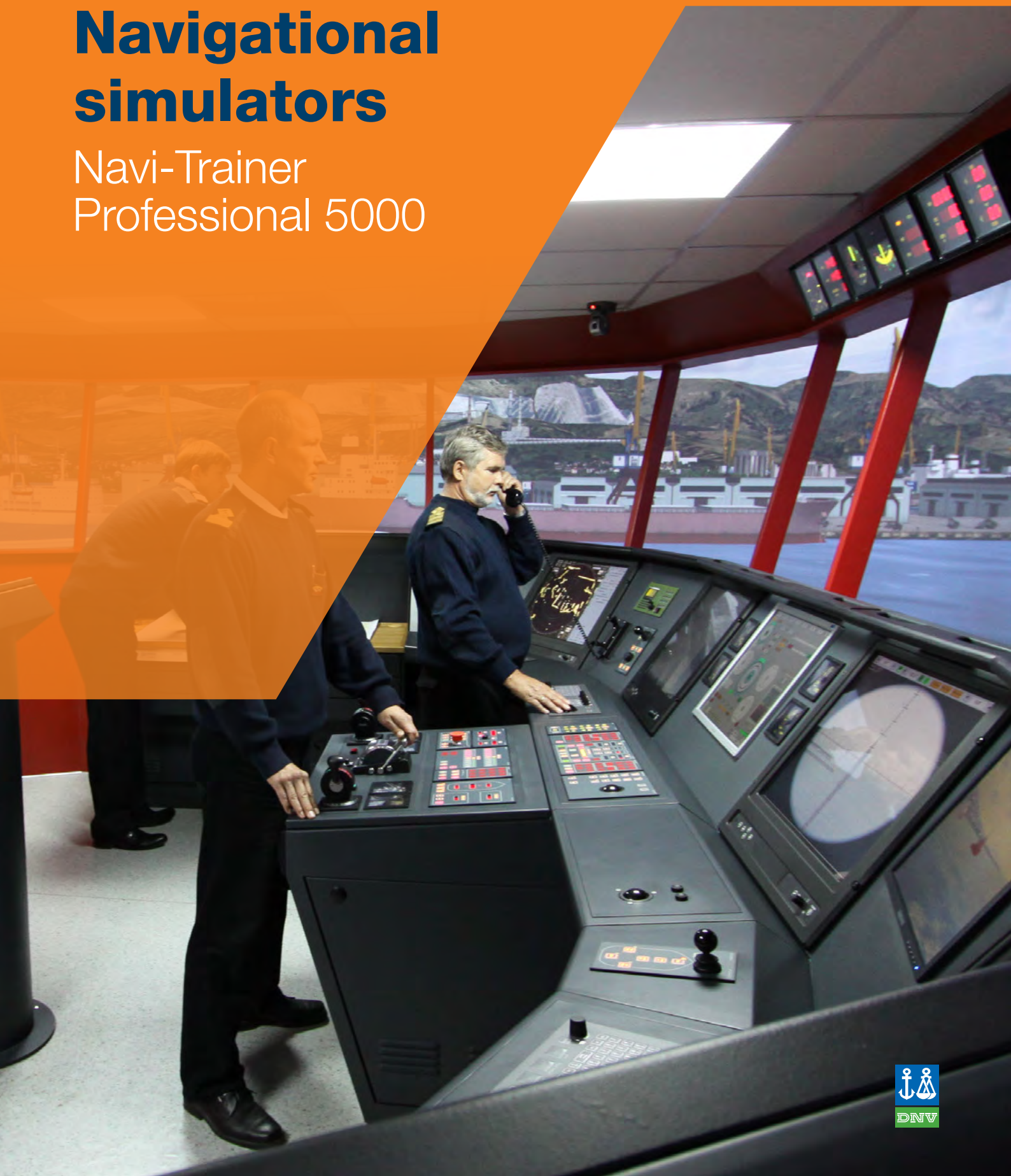# WÄRTSILÄ

Navigational simulators

Navi-Trainer Professional 5000

The Navigational Simulators

Navigational simulator Navi-Trainer Professional 5000 (NTPRO 5000) enables simulator training and certification of watch officers, chief officers, captains and pilots on all types of vessels.

Training to STCW 2010

ECDIS

ARPA/Radar

Bridge Team Management

Crew Resource management

...and beyond

Ice Navigation

DP and Offshore

Tug Handling

Search and Rescue

Pilot Training

Port Study, R&D

Naval Applications

Incident Investigation

Onboard Nav. Equipment

Emission monitoring and fuel consumption

High Speed Craft

Fishing Operations

Anchor Handling

VTS

Anti-piracy

Compliance with International Standards and Regulations

- International Convention of Training, Certification and Watch keeping for Seafarers (STCW'2010).

- IMO model courses.

- International SOLAS Conventions.

- Approved with class notations: INTEGRATED SIMULATOR SYSTEM, NAUT AW (SIM), DYNPOS - AUT (SIM), HSC, TUG, ICE, AHTS to the Class A Standard for Certification of Maritime Simulators No. DNVGL-ST-0033 April 2018.

- Regulations concerning 'special' training: fishing operations, VTS operator training etc.

STATEMENT OF COMPLIANCE

Training Goals Define Simulator Configuration

Computer based training

- Individual in-house or distance learning.

- Equipment familiarisation.

- Refresher training.

- Self-examination and competence assessment.

- Onboard training and assessment.

Networked classes

- Interactive group exercises under instructor supervision.

Full mission simulator

- Final training and certification.

- Bridge resource management.

Interlinked Navigational and Engine Room simulators

- Crew resource management: 'Whole ship' evolution training; exercising communications between the bridge and engineering departments.

Georgian College, Canada

US Merchant Marine Academy

California Maritime Academy, USA

MITAGS, USA

ECDIS Training

With mandatory introduction of ECDIS for SOLAS vessels, ECDIS operation training becomes essential.

Our ECDIS Simulator is based on Navi-Sailor ECDIS Multifunction Display MFD 4000 with inbuilt Navi-Planner voyage planning software, both fully compliant with the latest performance standards for shipborne navigation equipment. It incorporates Chart Delivery Server Emulator for charts delivery, charts updates and licence updates in automatic mode which is a critical issue during ECDIS training. Among other new options are fictitious area database, new training chart folios and weather forecast.

Måløy vidaregåande skule, Norway

Our ECDIS systems can be supplied in various configurations, from the computer programs suitable for shipboard training to the full mission simulators with real ship controls. Configurations may vary to suit individual or group simulator training and the needs for monitoring from the instructor station.

The simulator ensures efficient training, fully compliant with IMO and STCW requirements.

Radar/ARPA Training

NTPRO 5000 in any configuration allow training in modern radar and ARPA operation skills. For this purpose, both computer imitators and actual radar displays connected to the simulator can be used.

Wärtsilä can create radar scenes of any water area in the world at the customer's request.

Pacific Maritime Institute, USA

The radar picture generation algorithm considers:

- the geometry of objects, their relative position
- the reflective properties of materials
- 3D wave
- antenna three-dimensional motion
- earth curvature

A wide range of realistic effects is simulated: shaded areas, loss of targets in heavy sea, radar picture change depending on ship's rolling and pitching, echo-signals of different range depending on geometry and reflective capability of a shore line.

Real ARPA/radar units and keyboard can be incorporated.

Bridge Team Management Training

Weakness in bridge organisation and management has been cited as a major cause for marine casualties worldwide. Frequently, accidents in operations are caused by resource management errors. Bridge team management reduces the risk of marine casualties by helping a ship's bridge crew anticipate and correctly respond to their ship's changing situation. The simulator is designed to ensure this kind of training in compliance with international standards.

ALAM, Malaysia

By the end of the course the trainees will be able to:

- form bridge teams, making full use of all the competencies available and ensure that all members of the team are aware of their duties and responsibilities
- draft detailed passage plans and monitor the vessel's progress to maintain the plan
- recognise the threat potential of a situation and make decisions which maintain the safety of the vessel
- support and monitor a pilot
- recognise the need to make contingency plans in areas of high risk
- recognise the development of an error chain, and effectively break such a chain
- interpret and make efficient use of a ship's manoeuvring data
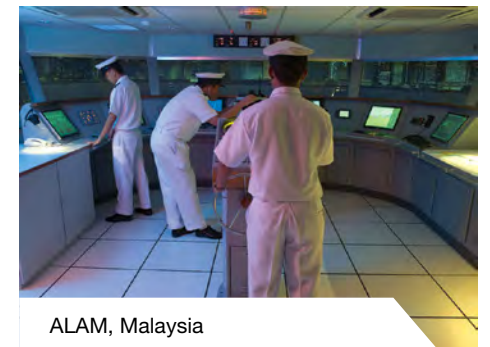
Crew Resource Management Training

MESTE, Royal New Zealand Navy

We have developed a Total Ship concept to provide 'whole ship' evolution training and facilitate communications between the bridge and engineering departments.

'The integration is very important. The communication and coordination in a situation when something goes wrong is something we would like to train in the Royal New Zealand Navy. We always train for the worst and hope for the best.'

Desmond Tiller

Lieutenant Commander, Technical Training Officer for the Royal New Zealand Navy

Tug Handling

Our fully integrated tug simulator supports:

- offshore tugging and towing
- ship assist work
- high speed escort work
- operating various anchor equipment
- oil rig and platform moves
- integrated tug master and pilot training

Practically all types of tugboats are simulated, including conventional single-screw tugs, conventional twin-screw tugs, cycloid-drive (Voith-Schneider) tractor tugs and Z-drive reverse tractor drive.

MITAGS, USA

ASD Tug simulator
in cooperation with Seaways Europe

Pilot Training

Pacific Maritime Institute, USA

The simulator provides facilities for combined training with tugboat masters and VTS operators and ensures:

- realistic ship maneuvering in heavy weather conditions, shallow water, narrow channels and in a lock
- specialist training tasks including docking/undocking with or without mooring lines and tugs, anchoring
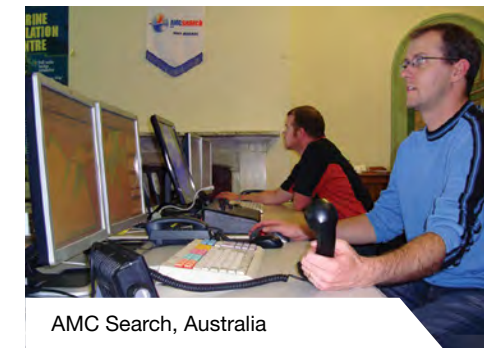- extensive database of simulated ship models and controls to work with

VTS Operator Training

Our VTS simulators comply and exceed relevant requirements stated in IALA recommendation V-103 on Standards for Training and Certification of VTS Personnel.
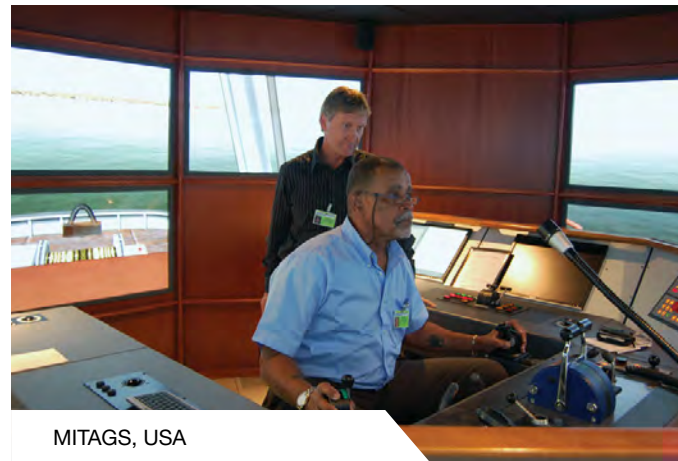
The simulator equipment and software imitate all the main VTS functions and allow instructors to create areas with different navigational situations, control target ships and generate various training scenarios and tasks.

VTS simulators fully correspond to the functional capabilities of our actual VTS systems operating in dozens of ports worldwide.
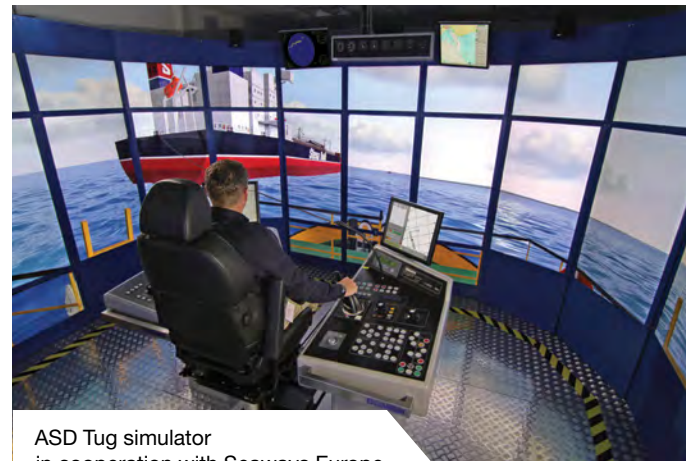
VTS simulators can operate in a common environment with navigational and GMDSS simulators.
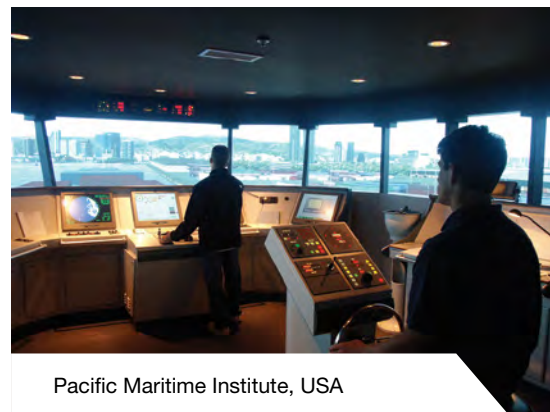

AMC Search, Australia

Ecological Simulator:
## Fuel and Emission Monitoring

We have developed a new simulator to monitor fuel consumption and emissions in cooperation with its customer Rörvik Safety Center (Norway). The simulator meets the new MARPOL Convention amendments concerning air pollution from ships.

It is an educational and realistic way to show the correlation between different types of vessels handling and discharge of emissions to air.

During the simulator training, navigators will learn how to reduce harmful emissions of pollutants and greenhouse gases. Fuel consumption and costs can also be reduced through simulated ecological planning.

The most important features of the ecological simulator:

- simulate various types of vessels (ferries, speed boats, etc.)
- measure the speed and time spent
- measure the fuel consumption in real time, total and average
- measure the emissions of NO_x, SO_x, CO_2 and HC
- store simulations to debrief course participants
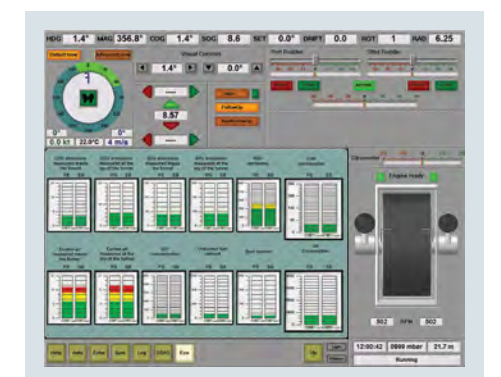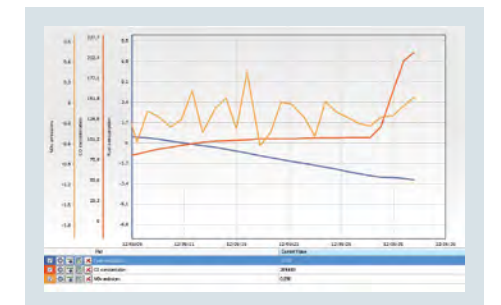
Offshore Operations and Using DP System

Our Offshore Simulator, compliant with NI and DNV requirements, is designed to train teams involved in the transfer and supply of anchored mobile offshore units.

The system is intended for:

- MOU personnel (oil installation manager, MOU DP master, anchor winch operator, offshore crane operator)
- AHT personnel (AH winch operator, DPO/navigator)

Dynamic positioning system training

The simulator enables:

- station keeping, manoeuvring in various sea and weather conditions, in close proximity of offshore installations
- introduction of faults on all DP related equipment such as sensors, GNSS, thrusters and power management system
- oil spill response and rescue operations training
- incorporation of customer-defined exercise areas and customer's ship controls and DP systems from various manufacturers

Oil rig crane operations

The simulator provides oil rig crane operator training. The following operations can be practised:

- transfer/receive PCP
- transfer/receive cargo

Modelling of anchor handling operations

- The Offshore Simulator features a detailed model of deck equipment, an accurate model of anchor handling operations, interactive control of anchor handling operations and flexibility in building scenarios for various anchor-handling methods.
- The system simulates physical and hydrodynamic interaction of all objects involved in the process.
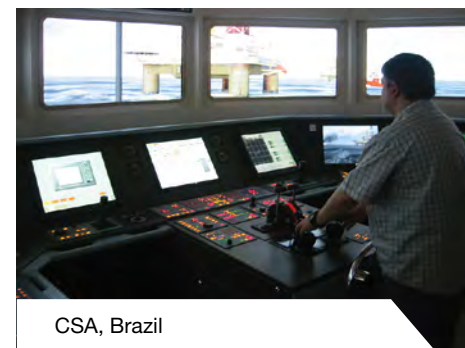
CSA, Brazil

Måløy vidaregåande skule, Norway

Pan-Arab E-Navigation, Egypt

Ice Navigation

The ice navigation module developed jointly with the Arctic and Antarctic Research Institute and Krylov Shibuilding and Research Institute allows crew to be trained in:

- navigation and ship handling in ice according to the STCW requirements of the Polar Code
- Ice Management of Offshore installations in Arctic environment
- offshore loading operations such as mooring to Single Point Mooring (SPM) and FPSOs in ice conditions
- proceeding in broken ice, along solid ice edges, bumping against ice edges, in open pack ice, in ice holes and in patches of ice-free water
- following icebreaker (training in watch service procedures for maintaining position within an convoy, maintaining communication between the ship, icebreaker and other ships in convoy)
- using radar information while sailing in ice conditions
- using ice charts in ECDIS

Functionality features and modelling effects

- New realistic breaking of ice fields into smaller ice pieces, interacting with each other and structures like ship's hull and offshore installations.
- Accurate modelling of Ice resistance with the possibility for the instructor to customize lateral and/or longitudinal ice resistance of each ship model.
- Possibility add ice accretion on ship's superstructure to change the stability of the ship model along with visual effects.
- Hull friction with an edge of an ice field, and bumping into an ice field, high quality visualization of various ice surface types, nocturnal conditions, visibility effects and reflections, ensure the maximum realism and training efficiency.

Search and Rescue

Wärtsilä simulators enable the full scope of training in search and rescue operations as per the IAMSAR manual.

Modelled modern types of rescue boats, helicopters, facilities for search and rescue at sea, combined with communications modelling, allow training and coordination of search and rescue operations in the most adverse weather conditions. The synchronous recording and playback of the event, the use of equipment and exchange on the air are the most effective means for collective training in the rescue of human life at sea.

Fishing Operations
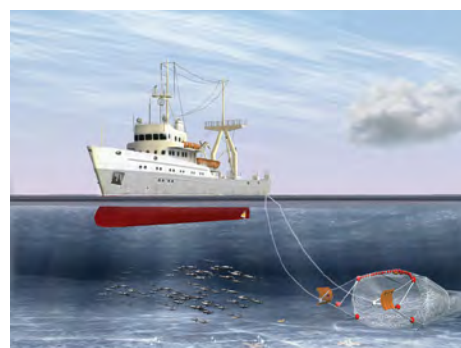
The fishing simulator trains fishing academy cadets in basic processes, including vessel manoeuvring and acoustic device handling. It also supports refresher training for experienced crews prior to voyages, and licence assessment for deck officers, trawl masters and deck crews.

A highly realistic model of the trawl system, an advanced model of fish behaviour under influence of vessel, trawl and environmental conditions, modern acoustic fish finding and trawl controlling devices all allow the creation of exercises and training in different aspects of fishing operations.

Naval Operations Application

NTPRO 5000 is an efficient tool for naval and military training, which trains full teams or combat system operators in:

- fleet formation management
- underway replenishment
- lifeboat operations
- helicopter operations
- weapon application scenarios
- anti-piracy scenarios

German Naval Academy
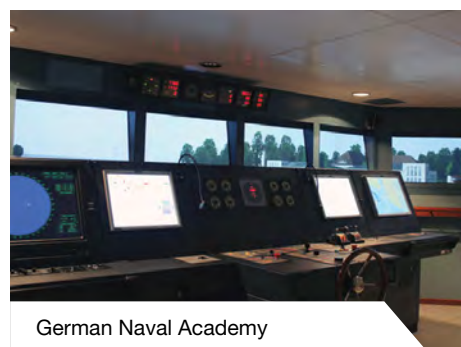
Research Works for Ship Modelling, Harbour and Fairways Design

Maritime simulators have a new role in R&D applications as an effective port/waterways design tool, thanks to the increasing accuracy of models and their adoption by navigators to prepare traffic operations.

NTPRO simulator R&D suite includes 3D database editing tool Model Wizard, ship hydrodynamic model development package Virtual Ship Yard and a 3D current analysis and forecasting software Cardinal.

The simulator can be used for various projects such as port design and planning; the study of ship operations in restricted water conditions and mooring operations including tug operation; ship design and incident investigation.

## Model Wizard 3D Database Editing Tool

Model Wizard powerfully produces and updates integrated databases, making it possible to create simulation areas for anywhere in the world and automatically present them perfectly.

Model Wizard develops the following data sets:

- the set of vector electronic charts
- terrain and depths database
- radar database
- visual database
- models of water flows distribution

Virtual Ship Yard

The Virtual Ship Yard software is used for ship model development and uses a modular principle for easy modification. The software supports two modes of the development: simplified for quick modeling and more accurate modeling based on the latest technical instruments for professional simulation use.
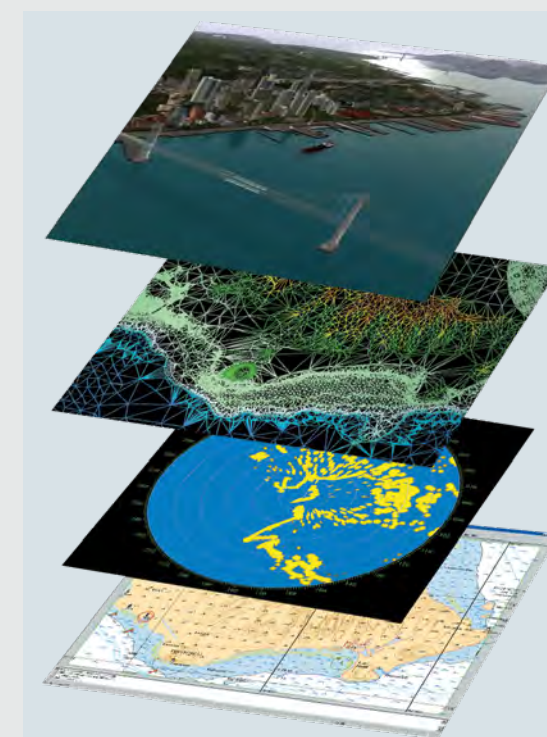
Mathematical Modelling

NTPRO 5000 simulates integration of ship/channel hydrodynamic effects and operational procedures so that simulators can be used not only for traditional maritime training but for a number of R&D applications as an effective port /channel /terminal design tool.

- Realistic soft grounding simulation
- Lock effect
- Modelling of ship squat in restricted channels
- Modelling of bank and channel effects
- Effect of mud layers
- Parametric effect of waves on ship stability

Ship Model Library

Our models are internationally recognised for top quality and application flexibility. The library comprises accurate realistic mathematical models (more than 320) of a wide selection of ships including open ocean navigation, confined waters navigation, berthing/mooring operation, tug and ship assist operations and specialised vessels.

Mathematical models of ships and ship equipment, physical forces and effects have been based on the results of research carried out by global leading research centres, and comply with the highest possible global standards.

These models have been developed specially for Bourbon Offshore

Sailing Area Library

The impressive library of simulated areas in our collection includes 294 areas and counting. The existing areas cover practically all the important shipping areas, straits and ports of call, as well as extensive sections of inland waterways. New areas can be developed based on customer requirements.

Visualisation

Leading the way in visualisation, we offer a brand-new highly realistic visualisation system.

Visual presentation of a new wave includes three dimensional bow waves and associated floating object interference, reflection of the entire scene, water translucency and light refraction, white caps, foam and splashes.

NTPRO 5000 is the world first simulator presenting dynamic shading calculations of all exercise and scene objects.

The icing effect, which is mandatory for ice navigation in accordance with the DNV standard, influences both visual and motion model behaviour.

The visualisation tuning and adjustment module is integrated into the simulator to provide geometry correction, soft edge blending, uniformity adjustment and colour matching.

Instructor Workplace

The role of instructors in simulator training cannot be overestimated. The instructor station incorporated in our simulators provides the instructor with all the necessary tools for the efficient generation, editing, managing and assessment of training exercises.

Features

- High accuracy data presentation on the basis of vector charts (able to automatically load all the charts referring to the selected gaming area).

- Multi-lingual user interface (e. g. English, Japanese).

- Creation of exercises and automatic competency assessment scenarios.

- Control of simulator session(s).

- Continuous automatic recording of data in the course of the exercise (main, audio and video log files).

- Real, slow and fast time modes.

- Able to display a track in the form of a succession of contours (Track mode) and to set the track prediction mode (Trend mode) for all the exercise objects (Global settings) and for one object (Local settings).

- Weather conditions manager.

### Evaluation and Assessment System

Our Evaluation and Assessment System allows objective assessment of a trainee's exercise. The system enables automated online assessment with the ability to correct any assessment rule at any moment in time. Trainees are promptly given error correction advice in a form pre-programmed by the instructor.
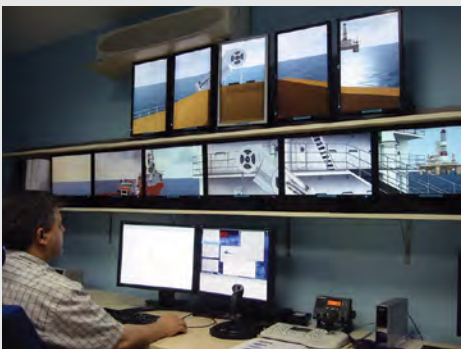

Additional information on the Instructor selective visualization
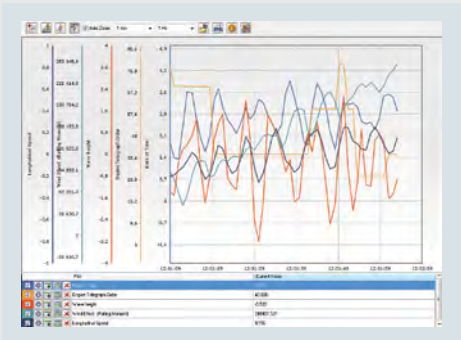
Graphic presentation of ship motion parameters
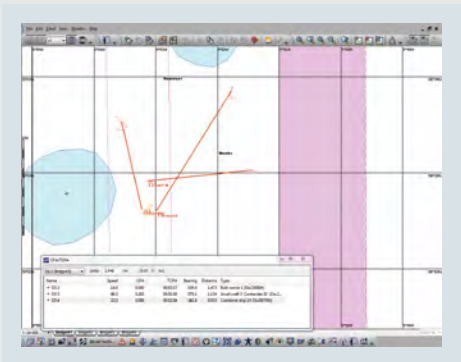
CPA/TCPA

German Naval Academy

Hardware Controls

- Indispensable for 'hands-on' full mission shiphandling and Bridge Team exercises.

- Our customer or third-party equipment.

- On-screen controls replicating or simulating real ship control equipment.

Interschalt AG, Germany.
Integrated bridge systems supplied by Sperry, Raytheon and Transas are simulated

Our universal hardware solutions

Long Term Partnership with Our Customers

We have always believed strongly in mutually beneficial partnerships and long term close relationships with our customers, with the goal of providing a solid benefit to the marine industry.

With extensive field experience and a significant number of installations, and in collaboration with our friends and partners at training institutions across the globe, we have developed a comprehensive, flexible and customisable product maintenance and development program.

Global Service and Support

- Applicable to all our simulation systems independently of age and size.

- Allows the customer to effectively predict and manage the maintenance and system development budget.

- Programme is flexible and customised according to customer requirements.

- Maintains the value of the customer's investments into our system by keeping all system components up to date with the national and international regulations and modern technologies.

- Guarantees the minimum downtime of the system with low-cost maintenance budget by using the extensive network of certified service partners and modern technologies.

Wärtsilä is a global leader in smart technologies and complete lifecycle solutions for the marine and energy markets. By emphasising sustainable innovation, total efficiency and data analytics, Wärtsilä maximises the environmental and economic performance of the vessels and power plants of its customers.

wartsila.com