KONGSBERG

K-SIM® NAVIGATION

SIMULATOR SYSTEM
MAXIMIZING PERFORMANCE

MAXIMIZING PERFORMANCE BY PROVIDING

THE FULL PICTURE

OUR MISSION

We shall earn respect and recognition for our dedication to providing innovative and reliable marine electronics that ensure optimal operation at sea. By utilizing and integrating our technology, experience, and competencies in positioning, hydroacoustics, communication, control, navigation, simulation, and automation, we aim to give our customers the Full Picture.

The Full Picture yields professional solutions and global services that make a difference enabling you to stay ahead of the competition.

OUR PHILOSOPHY

Our success depends on the success of our customers. Actively listening to our customers and truly understanding their needs and then translating these needs into successful products and solutions is central to achieving our goal.

Our people are the key to our success, and we empower them to achieve. Working together in a global network of knowledge, guided by our values, engenders innovation and world class performance.

Every day we have to think a little differently because every client is unique. We aspire to translate the imagination and dedication of our staff into successful technologies and solutions. Our commitment is to add value to your operations by providing you with the Full Picture.

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MAXIMIZING PERFORMANCE

Next generation ship's bridge simulator
K-Sim Navigation represents a new generation ship's bridge simulator specially designed for optimum user experience and the future of advanced and integrated simulation training. The design, advanced hydrodynamic vessel modeling and integration of a sophisticated physics engine, ensure maximum realism in exercises, which is important for making competence training adaptable to real-life scenarios.

K-Sim® Navigation provides:

- efficient tool for education of vital skills, enhancing knowledge, safety and cost-efficiency at sea
- real-time simulation supporting everything from mandatory STCW training to advanced integrated crew training for maritime, naval and offshore industries
- a user-friendly instructor tool supporting excellent training on all levels and for a multitude of exercises and courses
- a robust and reliable training solution with the flexibility to expand, adapting to changing training needs
- advanced simulation of complex maritime operations supporting pre-mission planning, feasibility studies and research projects for decision support

Compliant with standards & regulations
K-Sim Navigation complies with the following international standards and regulations:

- the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW, regulation 1/12)
- DNV GL's standard DNVGL-ST-0033: March 2017
- IMCA Guidance on the Use of Simulators; C 014 Rev.2

K-Sim Navigation provides realistic and advanced simulation exercises adapted to the level of competence and learning objectives of students and course participants.

Fully equipped training environment
K-Sim Navigation's full mission bridge includes instrumentation that looks, feels and has functions like the real equipment used on board vessels. It is delivered with a set of standard instrument panels and bridge equipment complete with the necessary controls and functions for training ship handling, navigation, and communication.

To optimize the learning experience further, and achieve full familiarization with the real ship, all K-Sim Navigation bridges can integrate additional equipment like for example K-Pos Dynamic Positioning (DP) to support DP training on all levels, including Dynamic Positioning Operator (DPO) training according to DNV GL and NI's standards. A Power Management System (PMS) is also available for DPOs to monitor vessel systems and practice how to take appropriate action during power failures.

LEADING SIMULATION TECHNOLOGY

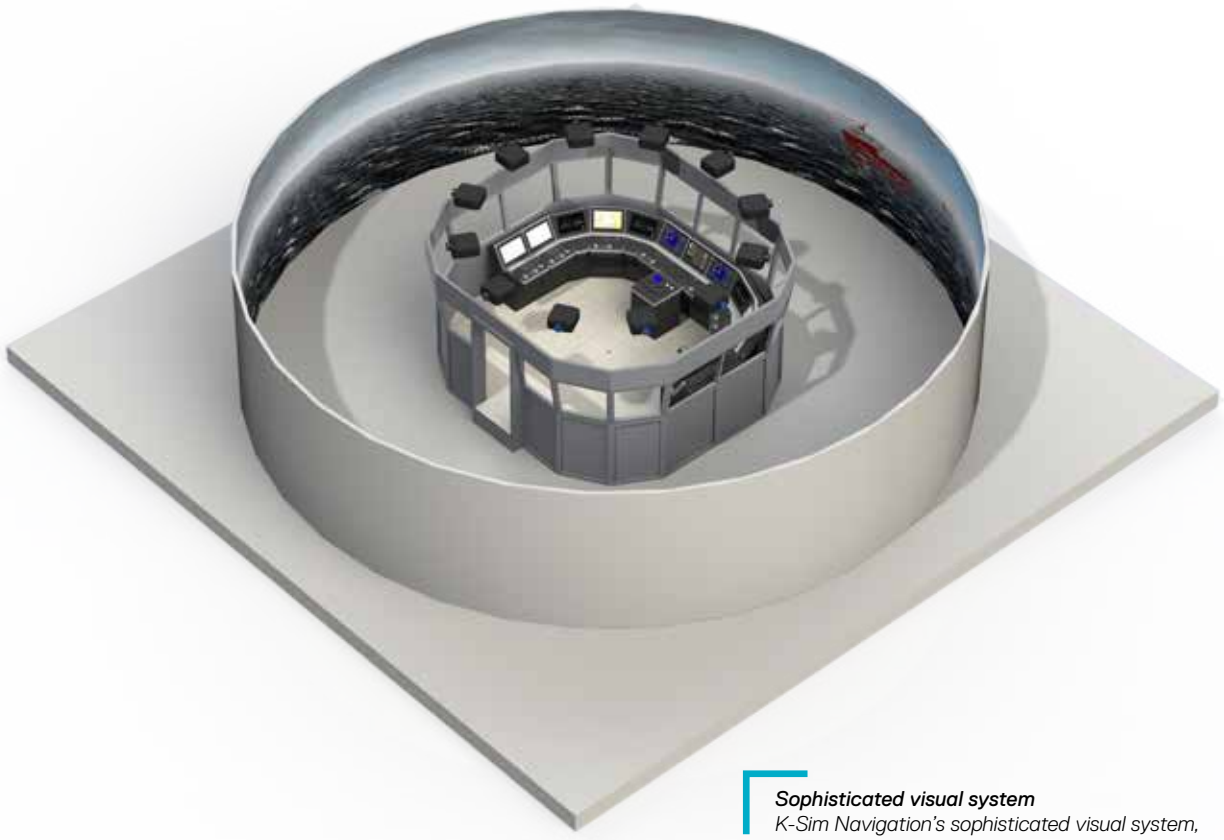
World Class Simulation
K-Sim Navigation is specifically designed to provide training in best practices and to build the level of competence needed for advanced operations. It integrates a sophisticated physics engine, which in addition to offering advanced hydrodynamic modeling, allows vessels, objects, and equipment to behave and interact realistically, improving the quality of training significantly. With a state-of-the-art visual system and the many options for integrating additional equipment and simulators, K-Sim Navigation stands out as the most comprehensive simulator available within maritime training.

Realism in simulated vessel models
K-Sim Navigation provides simulations of a range of hydrodynamic ship models with six degrees of freedom, ensuring an excellent level of vessel motion accuracy. All simulator vessel models can be delivered with dynamic loading, ballast control and optional integration to load calculators to demonstrate e.g. proper or improper loading.

The use of a sophisticated physics engine supports full interaction including 3D hull collision detection with shore- and maritime-based objects and vessels. The physics engine provides a high degree of realism in the behavior of lines, wires, and chains, and calculates the winch load and line forces in detail, for instance, in tug and mooring exercises.

SMART Objects
With the use of SMART Object functionality, instructors can adapt the vessel model to accommodate a multitude of learning objectives. A model can change colour, ship name, logo and texture, as well as the loading condition for a specific exercise. In addition, the model can be equipped with e.g. cranes, winches, gangways and davits to provide complex training scenarios. Avatars can be included for communication and safety training as well as interaction with the wheelhouse, winch or crane operator.

Detailed exercise areas
Geographical exercise areas that correspond exactly to real-life environments are required to ensure realistic, quality simulation training. K-Sim Navigation offers a comprehensive library of exercise areas with radar, depth, buoy, chart and visual files. The Student Field Chart can be used to create customized exercise areas for specific requirements



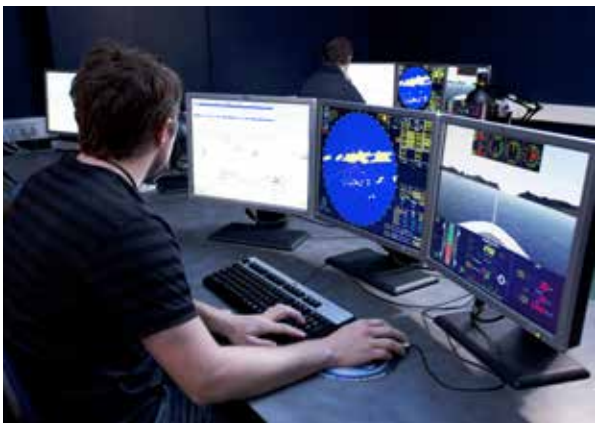
Sophisticated visual system
K-Sim Navigation's sophisticated visual system, SeaView, is recognized for its very high degree of realism in details, depth perception, and motions. Training scenarios bring vessels and objects in all weather conditions to life, and a range of geographical sailing areas is available to accommodate different training objectives.

OPTIMIZE THE LEARNING EXPERIENCE

Customized to meet specific training goals
K-Sim Navigation offers a fully scalable range of modern bridge designs to meet any training requirement and budget; from a PC-based desktop system to a fully equipped forward bridge on a six-degrees-of-freedom motion platform.

Depending on the training goal, the system can be equipped with a diverse range of additional bridge instruments, providing the ultimate familiarization in training. The flexibility of K-Sim Navigation enables expansion at any time, either with new instruments, workstations and complete integrated bridge systems, or even with other simulators for crew resource management training.

A full mission K-Sim Navigation installation can be customized to any bridge design at vessels such as cruise ships, tankers, tugboats, offshore vessels and navy vessels, with additional instruments depending on training and familiarization needs. The pictures below shows various simulator configurations including desktop, full mission bridge and customized navy bridge.



Training possibilities
K-Sim Navigation is designed specifically to provide training in best practices and to test and build the level of competence required to carry out even the most critical operations. It provides training for a broad range of operations, including the following:

- navigation and integrated navigation
- ship handling and manouvering
- bridge watchkeeping
- ship interaction
- environment conditions
- communication and GMDSS
- familiarization with equipment used on board
- squat and bank effects
- ice navigation/ice management
- tugging and towmaster training
- dynamic positioning modes (by K-Pos DP integration)
- response in emergency situations
- crisis management

Research & development
In addition to standard and special task training, K-Sim Navigation enables testing and R&D for:

- engineering studies
- fast prototyping
- concept testing and verification
- procedure development & testing
- vessel behaviour studies
- fuel economy studies
- crew competence screening
- operator fatigue studies
- port and fairway development studies

Integrated team training
K-Sim Navigation supports interdepartmental crew training through an interface to other K-Sim simulators, including: Offshore Vessel, Offshore Crane, Engine, Cargo and Dynamic Positioning.

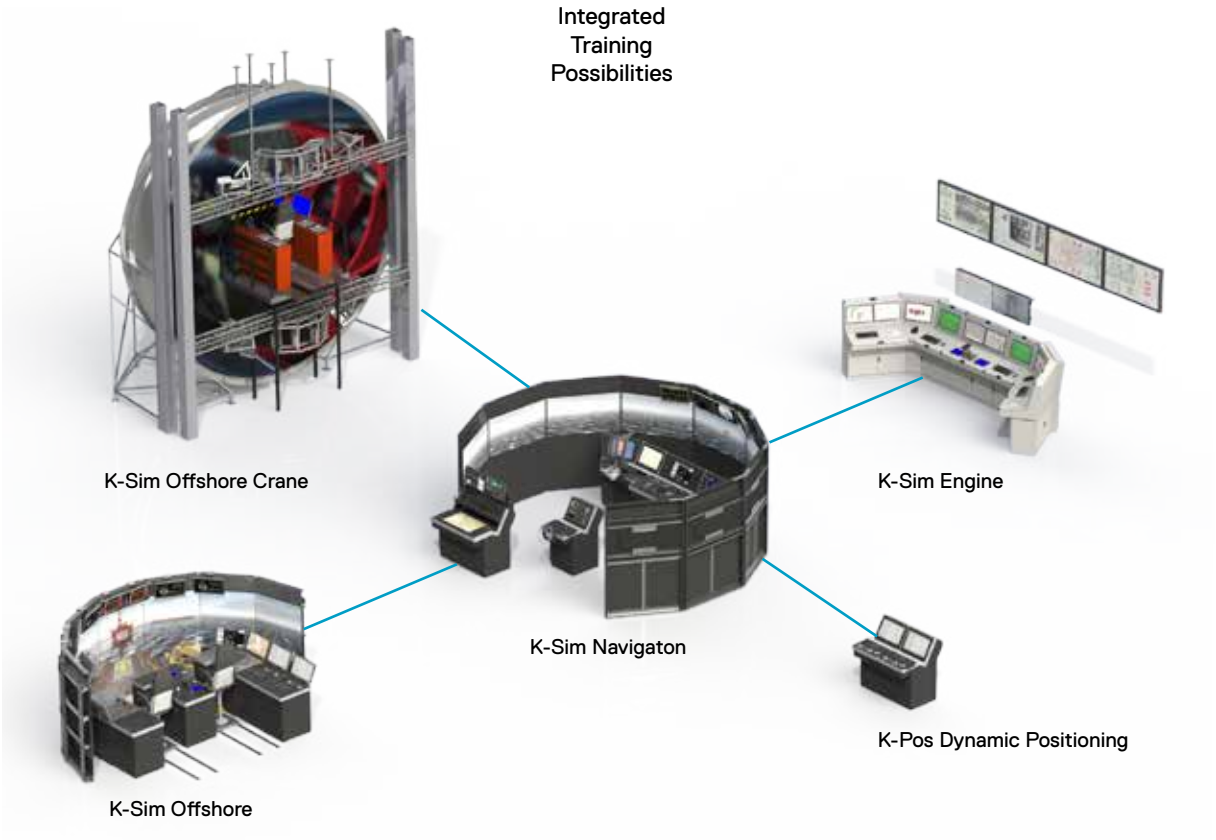
The integrated solution enables focus on vital human factors such as:

- situational awareness
- interaction and team-work
- intership- and shore communication
- leadership and decision-making

K-Sim Navigation enables a vast amount of training possibilities and customized course offerings according to international standards, including:

- Bridge Resource Management (BRM)
- Crew Resource Management (CRM)

K-Sim Navigation can be integrated with other K-Sim simulators for full crew training to increase competence and communication skills.

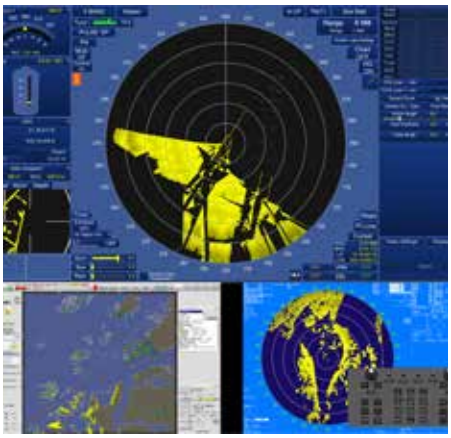


AN OCEAN OF TRAINING OPTIONS

With a multitude of vessels, navigation aids, objects, avatars and geographical areas with all possible weather conditions, K-Sim Navigation enables a vast amount of training options.

Navigation
K-Sim Navigation facilitates navigation training at different times of day in various geographical areas, waters and weather conditions.

- safe navigational watch
- use electronic navigational aids to determine vessel position
- full vessel instrumentation, hands-on equipment, replica, touch screen operation and full scenario sound (engine, fog-horns, navigation aid, wind, etc.)
- use the ship equipment for safety of navigation and anti-collision
- global and local wheather (preparation of wind, wave, and tide polygons) enables highly realistic scenarios



RADAR/ARPA
We offer both simulated and real radars. Most commercially available radar and ARPA displays can be connected to our ship's bridge simulator. When connected they function in the same manner and with much the same accuracy as on board. Our radar simulator takes into account such operator selections as pulse length, tune signal, and range selection. All performance standards for radar/ARPA training such as:

- T/X power
- scan rate
- PRF and pulse lenght
- beam width and noise
- offsets and lobes
- indirect echo

ECDIS
The STCW Code has defined that skills and understanding of ECDIS navigation and electronic charts are important to undertake the duties of a navigational watch officer. K-Sim Navigation fulfills the requirements of IMO Model Course 1.27 and accommodates ECDIS training such as:

- ECDIS familiarization
- operating the ECDIS system with all available functions in order to navigate safely
- knowledge of the capability and limitations of ECDIS operations and all sub-topics
- proficiency in operation, interpretation, and analysis of information obtained from ECDIS and all indicated sub-topics
- management of procedures, system files, data and all indicated sub-topics

Communication
Communication is important for safe navigation. K-Sim Navigation is delivered with communication systems for practicing effective communication, between crew members, or towards VTS towers, pilot boarding stations, or other vessels.

Available systems are:
VHF and MF/HF with Digital Selective Calling (DSC), connection to Narrow Band Direct-Printing (NBDP) and Inmarsat system to cover sea areas of GMDSS A1, A2, A3 and A4. All intraship communication devices; InterCom, PA systems and UHF radio. All systems are available with any mix of handsets, stalk mic or headsets.

Bridge watchkeeping
The K-Sim Navigation is designed for watch keeping training for all bridge personnel. Operational equipment may include wing stations, binocular with bearing read-out as well, as well as a classic Pelorus.

All possible weather conditions are available: day/night with transition; fog and fog banks, local weather, rain, snow, hail, all including drift and local setting. A quadraphonic sound system enhances the realism.

Ship handling & Manouvering
The K-Sim Navigation bridge can be equipped with all necessary instrumentation and controls to support maneuvering training for various vessels in scenarios like:

- free maneuvering
- berthing and unberthing
- mooring and unmooring
- maneuvering using anchors
- maneuvering using thrusters
- maneuvering using tugs
- maneuvering with mooring lines affixed to jetty, buoy, or platform
- maneuvering with Dynamic Positioning (DP) interface in manual or DP mode

Towing and tugging
K-Sim Navigation can be configured to support vessel towing in oceans or harbors. Towing exercises can include one or multiple towing vessels, towlines and bridles for towing vessels needing assistance in the training scenario. In addition to individual competency training, CRM training involving vessel master, tow master, winch and crane operator, and company representatives is available.

This allows crew to conduct:
- cost-efficient mission planning
- risk-analysis
- procedural and mission rehearsal
- emergency response and preparedness

Pilotage
K-Sim Navigation enables realistic pilot training for guiding vessels safely into or out of ports, or whenever navigation may be considered hazardous due to bad weather, challenging fairway conditions. Both student-to-student tug handling and instructor-controlled automatic tugging are available.

Typical training scenarios are:
- pilotage and ship handling
- bridge management
- effective communication with the crew on shore and at tugs or other vessels in the area
- port control
- boarding & boarding emergencies

Ice Navigation
Traffic in Arctic waters and new IMO and STCW Polar Code requirements have led to increased need for deck officers and masters with skills in ice navigation. K-Sim Navigation can be delivered with objects, different vessels and relevant geographical exercise areas with different types of ice and weather conditions to accommodate realistic ice navigational training, such as:
- ship handling and navigation in various ice conditions
- interaction between passing vessels
- ice avoidance
- close proximity maneuvering
- towing icebergs
- ice management

Patrol and surveillance
The simulator is well suited for coastal surveillance, patrol and boarder protection training. Surface vessels and airborne objects along with hostile targets can be used to prepare realistic exercises.

The system enables training such as:
- formation keeping with multiple vessels
- severe weather conditions
- communication and reporting
- multiple instructors for increased stress and object handling
- dual season database

High Speed and RHIB
Configured as a high speed vessel or a RHIB cockpit, K-Sim Navigation is the perfect tool for practicing all sorts of RHIB operations including missions like law enforcement, emergency, search and rescue and anti-piracy in a dangerous and hostile environment. Examples of training options:
- launching and recovery of the RHIB from a deck or port
- RHIB handling and maneuvering
- mission planning and safety procedures
- multi-vessel operations including military operations, anti-piracy and interdiction
- emergency operations, search and rescue
- station keeping and close proximity
- communication between davit operator and RHIB or between vessels

Inland Waterways
Training for ship handling in rivers and channels demands high simulation performance due to the demand for accuracy in drift, current, bank effects, ship-to-ship interaction etc. K-Sim Navigation offers advanced 3D-hull hydrodynamic vessel models, ensuring that the simulated vessels behave as realistic as possible in the various simulated environmental conditions. This makes the simulator ideal for reconstruction of incidents like collisions, in addition to typical training scenarios such as:
- navigation and ship handling
- vessel to vessel interaction
- vessel to bank interaction
- squat and shallow water effects
- communication procedures

Dynamic Positioning (DP)
By integrating K-Sim Navigation with the K-Pos DP system from KONGSBERG, it is possible to conduct DP training including seatime reduction DP operator training according to DNV GL and Nautical Institute (NI).

Typical DP training scenarios are:
- instrument and panel familiarization
- maneuvering according to current, wind and waves
- automatic station keeping
- independent joystick control
- failures on DP and DP reference systems
- thruster performance and monitoring
- available full power management system

Vessel Traffic Services (VTS)
Integration between K-Sim Navigation and Kongsberg Norcontrol's VTS system, enables VTS operator training to improve safety and efficiency of vessel traffic and to protect the environment.
Typical training scenarios are:
- procedures according to IALA model courses; V-103/1 and V-103-2
- cooperation and understanding between the ship and the shore to conduct safe operations of vessels in a VTS area
- navigational decision making
- management of traffic within a port or waterway
- communication procedures and instructions between VTS operator and shipmasters

Search And Rescue (SAR)
K-Sim Navigation facilitates realistic Search And Rescue (SAR) operations including launch and recovery of helicopters from support vessels. A full range of targets such as damaged vessels, aircrafts, oil spill, life buoys and life rafts, man overboard, buoyant smoke and various other objects can be delivered to conduct SAR training scenarios with maximum realism.

A rescue operation center may be added for enhanced realism using multiple instructor stations.

Bridge Resource Management (BRM)
K-Sim Navigation is the perfect tool to conduct BRM training with focus on casuality prevention and human errors in order to reduce risk at sea. In K-Sim Navigation officers can be trained in handling dynamically escalating situations, improve teamwork, leadership, communication, decision-making and resource management.

Typical BRM training scenarios include:
- decision making
- situational awareness and human errors
- effective communication
- planning & prioritization
- leadership and team work
- cultural awareness
- stress coping and workload management

Crisis Management
K-Sim Navigation is ideally suited to prepare crew and emergency management personnel for unexpected events. The system provides action planning and training for crises where decision making, quick response, interaction and communication are critical.

K-Sim Navigation features a wealth of emergency training scenarios, including multiple vessels scenarios and operations involving the launch and recovery of helicopters from support vessels and rigs. To ensure realistic training, K-Sim Navigation provides a full range of modeled objects, such as damaged ships, oil slicks, icebergs, life rafts, man over board, smoke and flares.

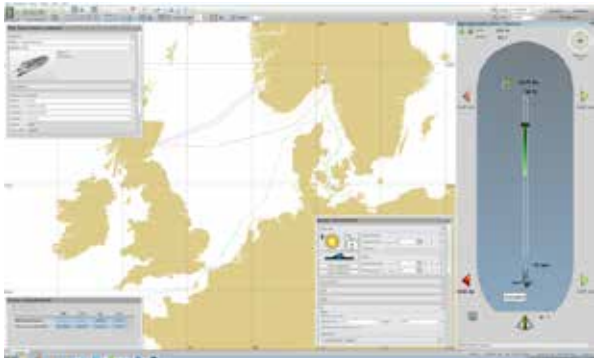
Naval Training
K-Sim Navigation can be delivered with objects, vessels and geographical exercise areas creating a realistic trainig scenario for naval training, such as:
- tactical maneuvers and combat tactics
- navigation incl. ECDIS and celestial
- mission planning
- communication
- replenishment at sea
- formation sailing/convoy
- anti-piracy and border protection
- riverine interception
- border patrol and port security
- towing
- RHIB launch and recovery
- team tactics and firearms profiency

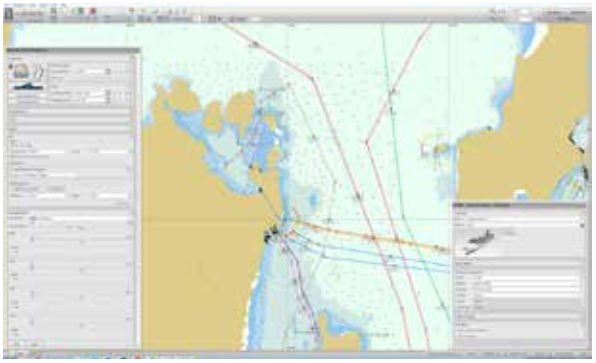
POWERFUL INSTRUCTOR SYSTEM

Intuitive & efficient pedagogical tool
K-Sim Navigation Instructor System is designed with the user experience firmly in focus. The instructor system provides the instructor with a powerful and efficient tool for designing, controlling and assessing customized exercises for individuals and teams.

Capabilities:
- customization of menus and pages for enhanced flexibility and user experience
- modified ECDIS chart as a starting point for easy creation of a geographical area for the exercises
- intuitive drag-and-drop function for selection of all exercise variables, including ship models
- quick and easy-to-use route preparation and validiation
- advanced Seagen GIS (Geographical Information System) tool for simple import of third party environmental data such as currents, tides, waves and winds to create optimum realism
- control of the configuration of student stations to define what information should be accessible and visible
- control of simulator actions derived from input variables and malfunctions, that can be initiated instantaneously, or pre-programmed as part of the exercise, e.g., extreme weather conditions, or power blackout.
- guidance and feedback possibilities through triggers and e-coach messages during the exercise
- excel type data logging with parameter wizards, templates and export possibilities
- underwater view to observe hull/seabed interaction, chains, wires and anchors
- stopping, going back and resuming simulation for guidance
- automatic recording of the simulated scenario and all parameters for full replay

Assessment, debrief and evaluation system
Student evaluation can be incorporated as part of the exercise with trigger events, e-coach messages, and scores drawn from student performance. The entire simulated scenario with all variables is automatically recorded during the exercise. Review and debriefing can include a replay of the entire exercise or a selected segment from any point in the exercise to focus on a specific learning objective. The instructor system also features an advanced assessment system for ensuring optimal training and feedback standards.





K-Sim Navigation Instructor system provides an efficient and user-friendly tool for basic and advanced training

LIFE CYCLE SUPPORT

Designed to purpose – maintained to last
Our life-cycle management service will assist our customers throughout all the phases, from design to installation and during the operational life time.

Solid in-house competence, both in system design and user competence enables us to provide solutions that are fit to purpose and thus yields efficiency in operation.

Our system is designed with maximum flexibility, making it easy to add new functionality or complete new control segments. This enables us to offer up-grades step by step to meet your changing requirements.

We take pride in knowing that KONGSBERG will give your training an additional competitive edge by:

- increased system reliability
- competitive life-cycle support
- easy up-grade solutions

World-class support program
KONGSBERG's customer support program provides flexible system support in world class to our global simulation system customers. The Long Term System Support Program (LTSSP) consists of three different levels of support: Basic, Priority and Premium Customized Care. Each support level offering is designed to address the customer's needs. Investing in an LTSSP ensures that your simulation system is always current and operating at peak capacity and provides the assistance you need in order to deliver the best simulation training available.

Training
Qualified personnel are one of your major assets in efficient and safe operations. This is why we offer modular training courses to instructors and technical personnel.

Our systems are easy to install and maintain – supported by professionals either on-site or through remote connectivity. They are designed for optimal operational availability and allow for favourable life-cycle expenditure

GLOBAL CUSTOMER SUPPORT

We are always there, wherever you need us
KONGSBERG customer services organization is designed to provide high-quality, global support, whenever and wherever it is needed. We are committed to providing easy access to support and service and to responding promptly to your needs. All support and service activities are supervised from our headquarters in Norway, with service and support centres at strategic locations around the globe – where you are and the action is.

As part of our commitment to total customer satisfation, we offer a wide variety of services to meet individual customers' operational needs. KONGSBERG Support24 is a solution designed to give round-the-clock support. For mission-critical operations, KONGSBERG Support24 can be extended to include remote monitoring. We can adapt the level of support needs by offering service agreements, on-site spare part stocks, and quick on-site response arrangements.

Global and local support
We provide global support from local service and suport facilities at strategic locations worldwide. Service and support work is carried out under the supervision of your personal account manager, who will ensure that you receive high-quality service and support where and when you need it.

Your account manager will ensure continuity and work closely with your personnel to improve and optimize system availability and performance. Under the direction of your account manager, and with a local inventory of spare parts, our well-qualified field service engineers will be able to help you quickly and effectively.

CONTACT US

KONGSBERG

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