



KONGSBERG

K-SIM[®] DP

Dynamic positioning simulator system maximizing performance



MAXIMIZING PERFORMANCE PROVIDING

The full picture

OUR MISSION

We shall earn the respect and recognition for our dedication to provide innovative and reliable marine electronics that ensure optimal operation at sea. By utilising 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.

KONGSBERG DIGITAL AS
MARITIME SIMULATION
K-SIM DYNAMIC POSITIONING BROCHURE

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Content

- 03 Maximizing performance in critical operations
- 04 DP Training solutions tailored to training standards & regulations
- 05 Compliance with dp operator training schemes
- 06 Configuration and integration optimizing the learning experience
- 08 Instructor system for exercise control & assessment
- 09 Efficient instructor training to start up and stay ahead
- 10 Life cycle support



Classroom training with K-Sim DP Basic simulators at Kalmar Maritime Academy, Sweden

Maximizing performance in critical operations

Built on KONGSBERG's advanced DP technology

With 40 years of experience gained from 4,000 Dynamic Positioning systems in operation, KONGSBERG has established itself as a standard-setter within the DP industry. The same unique experience, knowledge and equipment are transferred and used in our DP simulator, K-Sim DP, making it possible to offer our customers a completely integrated simulator from one single supplier.

Enables DP training on all levels to promote safety

The K-Sim DP integrates with KONGSBERG K-Pos Dynamic Positioning (DP) systems and supports DP training on all levels, including operator training according to DNV GL and Nautical Institute's standards.

K-Sim DP is the perfect tool for building competency to promote safety and secure profitability in operations. It provides a virtual yet fully realistic training environment, where mistakes can become lessons learnt without risking damage to people, vessels, equipment and the environment.

With K-Sim DP, crew and operators are able to:

- learn and practice standard procedures
- exercise effective communication and best practice
- enhance team skills & understanding
- develop attitudes and emergency preparedness
- practice emergency scenarios
- pre-simulate demanding operations prior to a mission

Compliant with standards & regulations

- IMCA M117, "Guidelines for Training and Experience of Key DP Personnel"
- DNV GL's standard DNVGL-ST-0033, "Maritime simulator systems"
- Nautical Institute (NI) standards for Dynamic Positioning training
- OSVDPA Simulator Standards version 2
- IMCA Guidance on the Use of Simulators; C 014 Rev.4

DP Training solutions tailored to training standards & regulations

DP Standards & regulations

K-Sim DP offers great flexibility to fit a wide range of training objectives. The simulator has the necessary fidelity and realism required for engineering, training and mission planning, as well as assessment of existing or new crews, where various challenging operations can be studied, evaluated and optimized safely in the simulator.

KONGSBERG offers several tailored K-Sim DP solutions in compliance with requirements in the Nautical Institute's (NI) "Dynamic Positioning Accreditation and Certification Scheme Standard" and DNV GL's "DNV-GL-ST-0033 Maritime Simulator Systems".

Each of the two regulatory bodies have defined requirements to the simulator systems according to defined Class A, B and C, depending on physical realism, equipment and behavioural realism as well as the operating environment in the simulator system.

We currently provide three levels of DP simulators:

- K-Sim DP Basic - Class C
- K-Sim DP Maneuvering - Class B
- K-Sim DP Maneuvering - Class A

K-Sim DP Basic - Class C

K-Sim DP Basic is a limited task simulator for instrumentation or blind DP maneuvering, joystick maneuvering and position keeping.

The system is compliant with Nautical Institute and DNV GL Class C, and features:

- K-Pos user interface with the same information and settings as on board a K-Pos-equipped vessel
- Automatic position-keeping (including position change and heading change), Follow Target-, Autopilot- and Auto Track Modes
- Simulated vessel behavior
- Simulated position-reference systems and sensors
- Simulated thruster performance
- Adjustment of simulated wind and current

K-Sim DP Maneuvering - Class B

K-Sim DP Maneuvering - Class B is a multi-task simulator for instrumentation or blind DP maneuvering, joystick maneuvering and position keeping.

The system satisfies Nautical Institute DP Simulator Class NI-B and DNV GL class B (DP) and features:

- K-Pos user interface with the same information and settings as on board a K-Pos-equipped vessel
- Automatic station-keeping including position change, heading change, autopilot and auto track
- Manual joystick operation
- Simulated vessel behavior
- Simulated position-reference systems and sensors
- Simulated thruster performance
- Adjustment of simulated wind and current
- Error and failures controlled by instructor or exercise
- Optional full integration with reference systems and various bridge equipment found on board different offshore vessels
- A visual system that can be panned 360 degrees is included to increase realism and learning outcome.

K-Sim DP Maneuvering - Class A

K-Sim DP Maneuvering - Class A is a full mission simulator capable of simulating Dynamic Positioning (DP) operations in a realistic and fully-equipped ship's bridge environment, K-Sim DP Maneuvering - Class A is compliant with NI and DNV GL's DP simulator requirements and features:

- All features in Class C and Class B
- A visual system is included to increase realism and learning outcome. The visual system will normally have a field of view of minimum 180 degrees (aft) or 210 degree (fwd) horizontally. The visual system for Class A can be expanded and panned 360 degrees



K-SIM DP Basic

K-SIM DP Maneuvering - Class B

K-SIM DP Maneuvering - Class A



Compliance with DP operator training schemes

DP training possibilities

K-Sim DP is designed to support operations, test procedures, increase competence and minimize errors in demanding DP operations.

For the DP Offshore Training Scheme:

- DP Induction course requires the use of a NI-C DP simulator with a maximum of two students per console
- DP Simulator course requires a NI-A or NI-B DP simulator with a maximum of four students per simulator
- Sea-time reduction course requires NI-A full mission DP simulator. Completion of this intensive simulator course is counted as 30 days' sea-time on board a DP vessel
- Revalidation course requires a NI-A or NI-B DP simulator. Through this course, DPOs with insufficient sea-time can revalidate their NI DPO certificate.

For the Shuttle Tanker Training Scheme:

- DP Induction course requires the use of a NI-C DP simulator with a maximum of two students per console
- DP Simulator course requires a NI-A or NI-B DP simulator with a maximum of four students per simulator.
- Shuttle tanker training course B requires a NI-A full mission DP simulator.

The DNV GL DPO Training Scheme is comprised of training and competency assessment with extensive use of simulators, refer DNVGL-RP-007, "Certification Scheme for Dynamic Positioning Operators" and DNVGLST-0023, "Competence of Dynamic Positioning Operators".

KONGSBERG DP simulators are certified by DNV GL according to their Standard DNVGL-ST-0033, Maritime Simulator Systems.

Training providers certified by DNV GL offer various simulator training courses, e.g.:

- DPO Start
- DPO Experience
- DPO Specialization Shuttle Tanker/Offshore Loading
- DPO Specialization Advanced Operations
- DPO Specialization Rig

Test centres certified according to DNVGL-ST-0032, "Test Centre for Certification of Personnel" provides assessment and testing of competencies in full mission simulators, e.g.:

- DPO Cert. Exam. Shuttle Tanker/Offshore Loading
- DPO Cert. Exam. Advanced operations
- DPO Cert. Exam. Rig

With KONGSBERG's full mission DP simulator, shuttle tanker simulator training according to Statoil and Oil & Gas UK requirements can also be offered by qualified training centres.

Configuration and integration optimizing the learning experience

The worlds most advanced simulator

K-Sim DP simulators are specially designed to train in best practice and build competence even for demanding operations. It integrates an advanced physics engine, which in addition to advanced hydrodynamic modelling allows vessels, objects and equipment to behave and interact realistically, which is extremely important for making competence training adaptable to real-life operations.

Equipment and configuration

K-Sim DP Maneuvering comprises a dual redundant K-Pos DP operator console, a DP controller and an independent joystick system. These systems are connected to an instructor station with dedicated operator functions to control a range of vessel settings and introduce various levels of faults to occur in the exercise. The realism and quality of the training increases by extending the simulator with a visual scene and by adding bridge equipment. This will allow more procedural training and new types of courses.

The K-Sim DP Maneuvering simulator includes a K-Sim Navigation or K-Sim Offshore simulator with RADAR/ ARPA, ECDIS, a visual scene up to 360 degrees, a dual redundant K-Pos system and an independent joystick system, cJoy. The simulator design is available either as an aft bridge or a forward bridge. For the ultimate realism, it can be fully integrated with KONGSBERG position reference systems,

third-party products and various bridge equipment typically found on board different offshore vessels.

Reference systems

The position reference systems are vital components in a DP system and play an important role during simulator-based training. K-Sim DP models are delivered with a variety of reference systems and KONGSBERG provides interfaces both to real reference systems used on board and emulated SW solutions. Below is a presentation of our K-Sim DP models with an overview of the reference systems available for the different models.

Power Management System

Knowledge and operational experience of the Power Management System (PMS) is vital for DPOs. A comprehensive PMS is available for K-Sim DP's advanced offshore vessel and rig models. Here, the DPO can monitor vessel systems and practice how to take appropriate action during power failures. A blackout of main electrical power to thrusters or the vessel control system is a critical situation. From experience and incident data on board DP vessels, it is clear that training of operators against correct routines and procedures on board is vital to understand the vessel's power and thrust redundancy. The K-Sim DP instructor can act engineer and has full access to the vessel's power plant and distribution system. He may introduce errors, additional and unexpected load as well as full breakdown.



K-Sim DP expansion possibilities

The K-Sim DP system can easily be expanded with hardware and software to form a complete K-Sim Offshore simulator. The flexibility enables you to adapt to your changing training needs and opens up for a wide variety of new training possibilities.

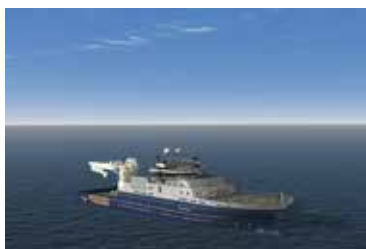
Simulation of offshore operations

K-Sim simulators enable simulation of specific operations including HAZOP/HAZID (hazard and operability/identification studies), concept studies and engineering. To support operations, test procedures, increase competency and minimize errors, thereby reducing the occurrence and ultimately the cost of incidents during DP operations. Examples of offshore operations involving extensive use of DP that can be realistically simulated:

- Offshore loading operations; tandem FPSO/FSO, buoy-loading CALM (catenary anchor leg mooring), OLS (offshore loading systems) and SAL (single anchor loading system).
- Loading and tug assistance
- Offshore operations; supply-, construction- and
- Subsea & dive support vessels etc.
- Semi-submersible/drilling vessel station keeping with use of DP during drilling operations
- Emergency maneuvering

KONGSBERG DP simulators provide training for most types of DP vessels and configurations including supply vessel, anchor handler, subsea/IRM vessel, wind generator installation vessel, shuttle tanker, drillship and semi-submersible rig. Additionally,

Below is a presentation of three of our K-Sim DP models with an overview of the reference systems available for the different models. Many other DP models are available depending of learning objectives, please consult us for further details.



Kongsberg Challenger II

The simulated vessel model is a multi-purpose Inspection, Maintenance & Repair Vessel. The vessel is developed according to IMO DP Class 2, with an option to upgrade to class 3 if requested.

LOA	108.70 m
Beam	23.00 m
Max draft	7.80 m
Dead weight	5,500 t
Speed	14 kts
Reference syst.	DGPS, HPR/ HiPAP, RADIUS, Fanbeam



Kongsberg Britannia II

The simulation model is a crude-oil DP shuttle tanker with capability for turret mooring and tandem operation. The model is designed for IMO DP Class 2.

LOA	264.70 m
Beam	42.50 m
Max draft	15.50 m
Min draft	7.10 m
Dead weight	123,600 t
Reference syst.	DGPS, Rel DGPS (DARPS),HPR/ HiPAP,RADIUS, Fanbeam, Artemis



Kongsberg Alpha Semi II

This is a simulated deep-water semi-sub drilling rig model. The model is designed for IMO DP Class 2, but can include Posmoor ATA and be upgraded to meet IMO DP Class 3.

LPP	114.50 m
Beam	89.00 m
Transit draft	8.0 m
Operational draft	20.00 m
Dead weight	23,500 t
Speed	7.5 kts
Reference syst.	DGPS and HPR/HiPAP

KONGSBERG has developed several customer-specific ship models with corresponding DP and hydrodynamic models.

Integrated team training

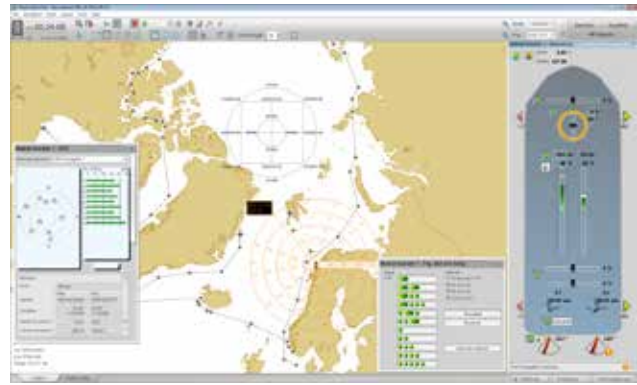
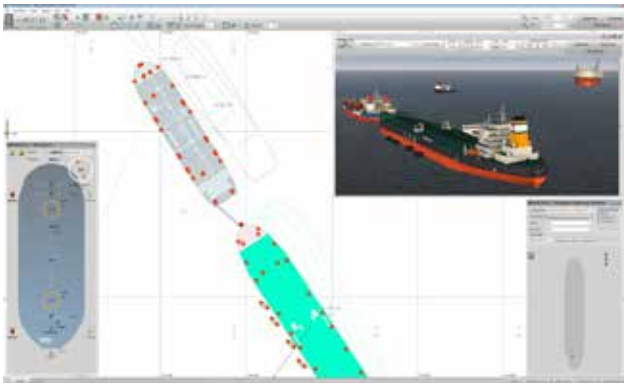
For operations in environments where human error can have devastating effects, it's often required to train essential crew in the same scenario. K-Sim DP supports interdepartmental crew training through interfacing to other K-Sim simulators, including: Navigation, Offshore Crane, Engine and Dynamic Positioning.

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

- Communication
- Situational awareness
- Leadership and supervision
- Interaction and team-work
- Decision making
- Awareness of stress and fatigue

By integrating the K-Sim Engine room simulator, marine engineers will among other have the benefit of experiencing high-voltage switchboard configurations with realistic scenarios related to the Diesel Generators (DG) and Switchboard behaviour.

K-Sim DP enables a vast amount of training possibilities and customized course offerings according to international standards, including Bridge Resource Management (BRM) and Crew Resource Management (CRM).



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

Instructor system for exercise control & assessment

Intuitive & efficient pedagogical tool

Designed with the user experience firmly in focus, K-Sim DP's instructor system provides the instructor with a powerful and efficient tool to design, control and assess customized exercises.

Capabilities:

- Customization of menus and pages for enhanced flexibility and user experience
- Modified ECDIS chart as starting point for easily creating a geographical area for the exercises
- Intuitive drag & drop function for choosing ship models and all other variables to create the exercise
- Advanced Seagen GIS (Geographical Information System) tool for simple importing of third-party environmental data such as current, tide, wave and wind to create optimum realism
- Control of the student station configuration to define what information should be accessible to students
- 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, power blackout or loose/stuck wire in the winch

- Guidance and feedback possibilities through triggers and e-coach messages during the exercise
- Control of men on deck as well as the ability to play the role of a tow master, winch- or crane operator to accommodate enhanced team and communication training
- Underwater view to observe the realistic behavior of chains, wires and anchor below the water to monitor the student's performance
- Stop, go back and resume simulation for guidance
- Automatic recording of the simulated scenario and all parameters for full replay

Evaluation and assessment system

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



Efficient instructor training to start up and stay ahead

Optimize the use and maintenance of your simulator

KONGSBERG believes that investing in people's abilities is the key to achieving long-term success. We therefore offer our customers a range of courses designed to optimize the operational use of our simulator systems:

- K-Pos DP Familiarization
- K-Sim DP Application
- K-Sim Navigation / K-Sim Offshore
- K-Sim Engine / K-Sim Cargo
- K-Sim Maintenance

Instruction & assessment courses

As a supplement to simulator operator training, KONGSBERG offers your instructors courses in instruction and assessment:

- The Art of Instruction course gives a basic understanding of the concept of learning and the factors that promote the learning process. It is based on IMO model course 6.09 and approved by DNV GL.
- The Art of Assessment course provides knowledge and understanding of the concept of assessment and how assessment is necessary to enhance the learning process. The course is based on IMO model course 6.10 and approved by DNV GL.

Certification program for DP instructors

With more than 30 years of experience with the NI training scheme, we are proud to also offer a comprehensive training and assessment program of DP instructors. This is an additional service supporting training centers in accreditation and certification of their DP instructors according to NI DP Accreditation and Certification Standard, January 2017.

Additional start-up services

For new DP training centres, KONGSBERG provides a courseware package for DP Induction and DP Simulator courses. The courseware package can include exercises, instructor manual, training manual, charts, vessel data, capability plots etc. In addition, we can offer advisory services, coaching and support during the NI accreditation and certification process of instructors and training center.

Tailored to your specific needs I

In addition to standard scheduled courses, we offer tailor-made courses specially designed to meet your specific training requirements. When tailoring courses, we aim to deliver practical, interactive and results-oriented training to ensure that the knowledge gained is immediately applicable in the work situation.

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 lifetime.

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

Our system is designed with maximum flexibility, which makes it easy to add new functionality or complete new control segments, thus enable us to offer step-by-step upgrades meeting your changing requirements.

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

- Increased system reliability
- Competitive life cycle support
- Easy upgrade solutions

World-class support program

KONGSBERG’s customer support program provides world-class flexible system support to our global simulation system customers. The Long-Term System Support Program (LTSSP) consists of two different levels of support: 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, providing 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. Thus, we offer modular training courses to instructors and technical personnel.



WORLDWIDE OPERATIONS

KONGSBERG is an international corporation with strong Norwegian roots. Collaboration with our customers, partners and suppliers, and a commitment to understand the context where our technology is applied, are important driving forces behind the corporation’s international development and growth.

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