Kongsberg Maritime

K-Sim® Cargo & Ballast

Empower the future
of maritime training

Maritime Simulation

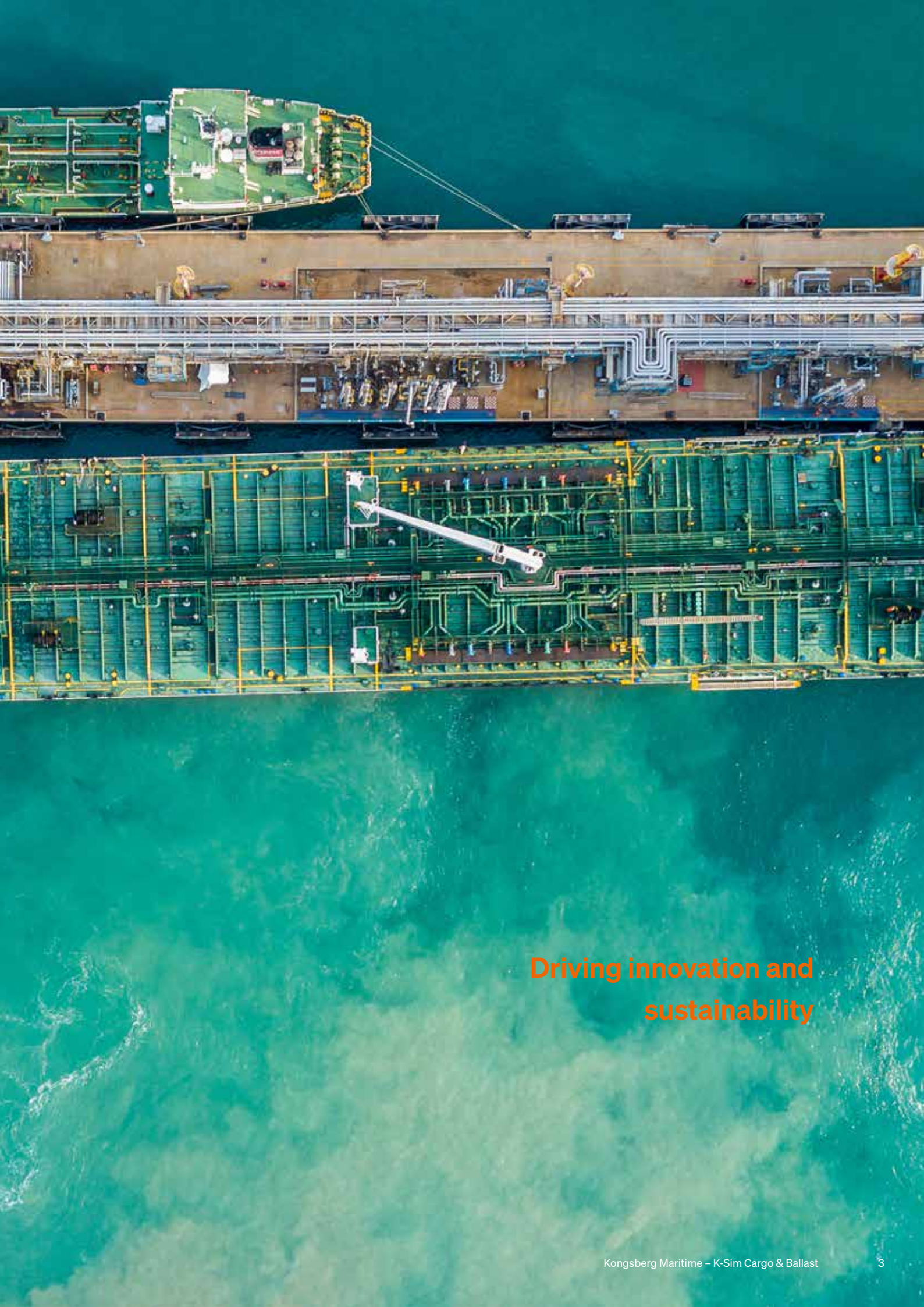
Kongsberg Maritime

Shaping the maritime future

Kongsberg Maritime is a global leader in sustainable maritime innovation. We deliver safe, efficient, and long-term performance across a wide range of ocean space markets - from passenger to cargo, from fishing to complex naval and offshore energy solutions.

With pioneering digital solutions and seamless integration, we help the maritime industry optimise operations, reduce emissions, and move toward a decarbonised future. Our committment to technological advancements keep us at the forefront of ocean space expertice, driving progress and shaping a greener, more connected maritime world.

Our simulation technology is widely embraced by maritime research and training centers worldwide, serving as a foundational tool for training both students and crew members. Moreover, it supports advanced studies in critical domains such as human factors, fuel consumption, emission reduction, port development, operational verification, digital twins, and the pioneering field of autonomous shipping operations.



Driving innovation and sustainability

Empower the future of training

As a global leader in ship automation and control systems, Kongsberg Maritime understands the maritime industry's evolving training needs. Our K-Sim Cargo and Ballast handling simulators enable high-quality training in every aspect of complex load and discharge operations, from single subsystems to the overall running of the operation.

Supports safer, smarter and greener vessel operations

K-Sim Cargo, and Ballast sets a new standard in maritime education by building real-world competence through advanced simulation. It offers a structured, hands-on approach to mastering basic as well as complex cargo handling operations—enabling students to isolate systems, repeat critical tasks, and sharpen decision-making skills in realistic scenarios.

By training for both everyday routines and emergencies, students learn to handle vessel stability, safety in cargo operations as well as reduce energy consumption and improve efficiency.

Through the use of advanced physical models and real-time simulation, K-Sim Cargo and Ballast provide knock-on effects across subsystems reinforcing cause-and-effect learning. K-Sim Cargo and Ballast gives instructors greater control and enables a wide range of training scenarios—meeting the demands of shipowners and maritime training centers worldwide.

Fulfilling training requirements

K-Sim Cargo and Ballast exceed requirements in the IMO's STCW convention, regulation 1/12 and DNV's standard DNV-ST-0033 for Maritime Simulator Systems.

With K-Sim Cargo & Ballast, the next generation of marine cargo operators gains the skills, confidence, and experience needed to drive safer, greener, and more efficient vessel operations.

Optimse the learning experience

At Kongsberg Maritime, we're committed to making high-quality maritime training accessible. That's why K-Sim Cargo & Ballast offers unmatched flexibility—from affordable PC-based desktop setups to fully immersive full mission simulators with real ship equipment and custom panels, including several detailed 3D solutions.

Solutions for any budget

While our desktop system is ideal for operation and process studies, the full mission system offers a physical familiarity with the real shipboard environment, and includes a cargo control room, cargo handling room and an instructor room.

K-Sim Connect - training anytime and anywhere

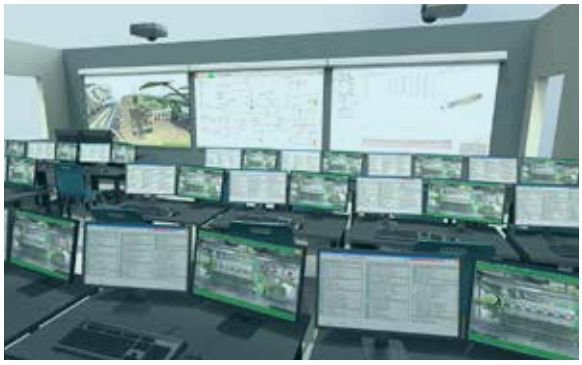
We provide a cloud-based training solution through our K-Sim Connect portal enabling students to get access to simulators for training anytime and anywhere. With a full range of simulation systems available, we have a cost-effective solution to fit every requirement and budget.

Maximum configuration flexibility

The flexibility in K-Sim Cargo makes different simulator configurations possible. The cargo control room may be represented by any combination of interactive mimic panels, operational panels/ consoles or desktop stations. Our concept allows individually laid out control rooms to meet exact customer requirements. The system can be upgraded or expand at any time during its life span.

Realistic training environment

The K-Sim architecture is extremely flexible, and can be used across a range of different interfaces offering benefits in value, flexibility and realism. In addition, we are able to integrate our K-Sim Cargo and K-Sim Ballast simulators with our real automation system, K-Chief. This gives a new level of realism, as crew can train on the identical equipment that they will later operate onboard ships.

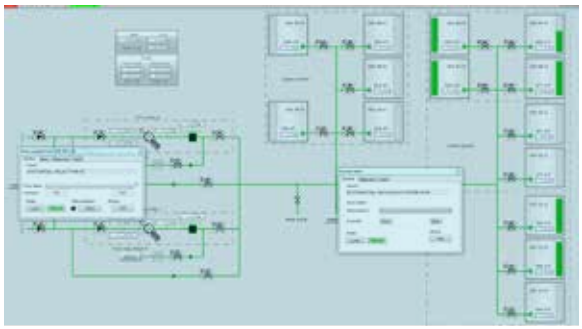


Integrated crew training

Training crews in shared scenarios improves communication, teamwork, and decision-making—reducing human error in both routine and emergency situations.

K-Sim Cargo & Ballast integrates seamlessly with Kongsberg Maritime simulators such as K-Sim Engine and K-Sim Navigation, creating realistic, cross-functional training environments.

Training objectives & skills transfer



"Co-located with our K-Sim Cargo simulator, the K-Sim Ballast, 2-DOF full mission simulator and related five part task desktop simulators have been in operation since 1994 and have served CMS well. The installed mathematical model of the semi-submersible mobile offshore drilling unit (MODU) forms part of our offshore training. With instructor control and full remote monitoring of the simulator, the system covers all ballast control room training requirements for our customers."

- Capt. Christopher Hearn, Director, The Centre for Marine Simulation, Fisheries and Marine Institute of Memorial University, Newfoundland and Labrador, Canada

Building competance for the future

The primary objective of simulator training is to develop the competence required to operate the complete cargo and ballast handling system safely, efficiently, and cost-effectively.

Whether using the full-mission or desktop version of K-Sim Cargo, trainees benefit from high-fidelity realism and strong pedagogical design, enabling effective skills transfer for both students and experienced personnel.

Typical training applications

- Routine and emergency cargo and ballast handling procedures
- System familiarisation across all cargo handling components
- Cargo loading and discharge planning
- Use of loading computers
- Line up for loading, ballasting, and discharge
- Tank stripping using vacuum and ejector systems
- Topping-up and finalising loading operations
- Aeration, inerting and nitrogen supply systems
- Compressor systems, heaters and boosters on LPG/E tankers
- LNG cargo operations, including compressors and boil off management
- Mulitple loading and discharge operations with flexible connections on chemical tankers
- Discharge pump operation with dynamic pump and system performance curves
- Flow control in relation to stability and mechanical forces
- Effective communication to terminals, deck crews, and the cargo control room

Ballast control

Handling of a Semi-Submersible Platform is a demanding and complex task. Technical, commercial, environmental and safety requirements will always represent important and often conflicting factors that have to be dealt with during the platform operations.

This can put immense pressure on the personnel involved and it raises an unquestionable demand for understanding the systems and operational training.

The purpose of K-Sim Ballast is to provide a training tool that gives a realistic replication of the dynamic behavior of a mobile drilling platform for ballast and position keeping systems. In this manner, knowledge in ballast control can be acquired without hazardous and potentially devastating consequences.

Advanced simulator capabilities

Integrated CCTV surveillance

Enhance realism and situational awareness with an integrated Closed-Circuit Television (CCTV) surveillance system. This feature mirrors real-life cargo operations by providing operators with live visual access to deck and manifold areas. Trainees can monitor loading arm conditions, identify potential oil or gas leaks, and respond to operational risks—creating a more immersive and safety-focused training environment.

K-Load - dry cargo load calculator

The K-Load Dry Cargo Load Calculator is available as a powerful standalone supplement. It allows users to define and manage bulk cargoes, solid cargoes, and containers with full operational flexibility. Users can evaluate loading conditions against loading and discharge sequences, port rotations, and damage stability criteria.

An intuitive graphical interface shows how the vessel trims and floats in real time, alongside clear visualisations of filling levels for each cargo and ballast hold or tank.

Comprehensive reports can be generated, including:

- Loading reports
- Container reports
- Ballast and consumables reports
- Water ballast exchange reports

Extensive model library

K-Sim Cargo and K-Sim Ballast feature an extensive library of high-fidelity vessel models covering a wide range of ship types and operational profiles. All models are developed using real ship specifications and validated performance data, ensuring maximum realism.

Multiple cargo system configurations and loading conditions can be simulated through reality-based exercises that reflect real operational challenges. This enables true learning by doing, helping trainees build the competence required for safe, efficient, and sustainable cargo operations at sea.

Cargo handling models:

- Product Tanker
- Chemical Tanker
- LPG/Ethylene Tanker
- LNG Tankers (Membrane and Spherical)
- Suezmax Tanker'
- Very Large Crude Carrier (VLCC)
- LNG FSRU

Ballast handling model:

- Mobile Offshore Drilling Unit (MODU)

During debriefing, the Instructor can replay the student exercise to show best practice

Provide objective assessment with our

Powerful Instructor System

The monitoring, assessment and configuration tool for our K-Sim Cargo & Ballast training solutions has been designed to enhance the quality of simulation training by providing complete, intuitive and userfriendly control of student exercises.

K-Sim Instructor enables the instructor to develop customised exercise modules for individuals, teams or a combination of both from any PC running the application, with fully controllable areas such as:

- Initial Condition – describes all the variables at the start of the exercise
- Triggers – a combination of events that initiate an Action, e-Coach message or assessment
- Actions – derived from input variables and malfunctions, which can be initiated instantaneously, or preprogrammed as part of the exercise
- e-Coach messages – an electronic guidance and performance feedback system
- Student Station Configuration – define what information is accessible and visible to students
- Assessment – monitor and assess alarms, and any of the many variables in the simulation models

Recording of all activity during the simulation exercise takes place automatically and review/debriefing can include the replay of parts of or the entire exercise in order to focus on specific learning objectives.

A unique 'resume' functionality also enables an exercise to be stopped and started at will. If a student begins to have problems or fails in a particular operation, the instructor can pause the simulation to give guidance or advice and then resume the exercise. The instructor can also go back to any earlier point in time and restart from there.

With the K-Sim Instructor system, monitoring, assessment and debriefing have never been easier.

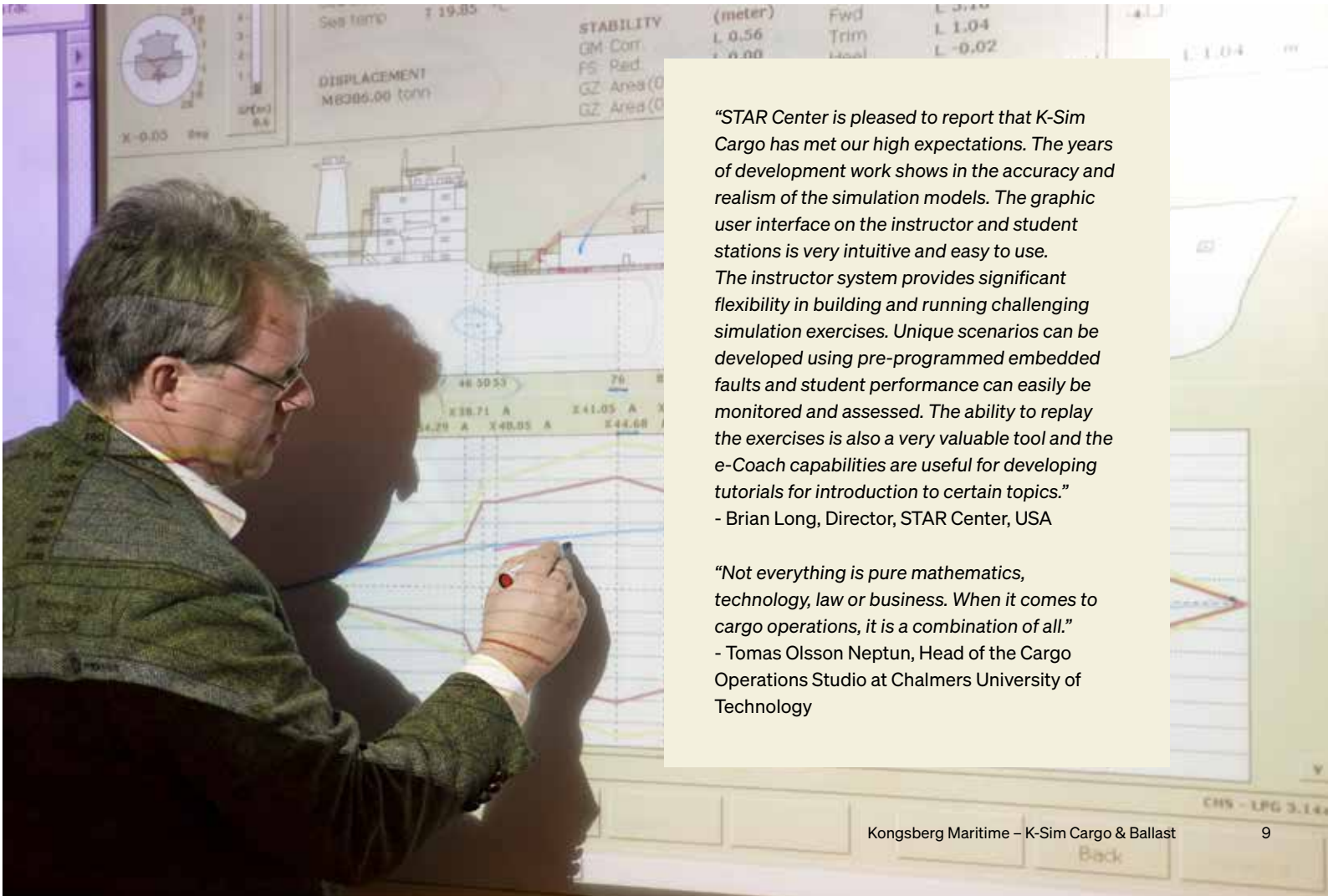
A library of approved exercises

Kongsberg Maritime offers a comprehensive library of DNV SeaSkill–approved LNG training exercises, developed to meet core competency and certification requirements for cargo operators. The exercises enable structured, standardized training while closely reflecting real-world operational procedures.

All exercises are available across the full range of K-Sim Cargo simulator configurations—from cloud-based and desktop solutions to full-mission systems—ensuring consistent, high-quality training regardless of platform.

Available LNG exercises include:

1. Cargo tank drying
2. Nitrogen purging of inter-barrier spaces
3. Inerting of cargo systems
4. Gassing-up of cargo systems
5. Cool-down of cargo systems
6. Commencement of loading and deballasting
7. Completion of loading
8. Loaded and ballast voyage: biol-off gas (BOG) and forced vaporization
9. Ballast voyage tank: tank cooling and BOG management
10. Cargo discharging
11. Boil-off management and tank warm-up
12. Gas freeing
13. Air purging
14. Gas freeing of a single cargo tank
15. Cargo system preparation and manifold connection
16. Operation of emergency cargo pump
17. Emergency discharge operation
18. Partial loading operations
19. Partial discharge operations
20. Leaking cargo tank scenario



"STAR Center is pleased to report that K-Sim Cargo has met our high expectations. The years of development work shows in the accuracy and realism of the simulation models. The graphic user interface on the instructor and student stations is very intuitive and easy to use. The instructor system provides significant flexibility in building and running challenging simulation exercises. Unique scenarios can be developed using pre-programmed embedded faults and student performance can easily be monitored and assessed. The ability to replay the exercises is also a very valuable tool and the e-Coach capabilities are useful for developing tutorials for introduction to certain topics."
- Brian Long, Director, STAR Center, USA

"Not everything is pure mathematics, technology, law or business. When it comes to cargo operations, it is a combination of all."
- Tomas Olsson Neptun, Head of the Cargo Operations Studio at Chalmers University of Technology

Life Cycle Support - stay updated!

Built for purpose – supported for life

At Kongsberg Maritime, we don't just deliver advanced simulation systems—we support you every step of the way. Our Life Cycle Management services guide customers from initial design and installation to long-term operation, ensuring optimal system performance over time.

With deep in-house expertise in both system design and user operations, we develop purpose-built solutions that enhance efficiency, adaptability, and long-term value.

Flexible, future-proof design

K-Sim Engine systems are engineered with maximum flexibility, allowing easy upgrades and the addition of new functions or control segments. This modular design ensures your simulator evolves with your training needs—step by step.

Why choose KONGSBERG?

- High system reliability
- Cost-effective life cycle support
- Simple, scalable upgrade paths
- World-class customer support

Long-Term System Support Program

Our Long-Term System Support Program (LTSSP) offers tailored service packages to keep your system up to date and fully operational. Choose from Priority Support or Premium Customised Care, depending on your needs. Both options ensure peak system performance and peace of mind—so you can focus on delivering top-quality training.

Instructor & technical training

Your people are your most valuable asset. We offer modular training programs for instructors and technical personnel to ensure they get the most from your K-Sim system—maximising safety, efficiency, and training outcomes.

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 a favorable lifecycle expenditure.

We empower the future of maritime training

Please contact us if you would like more information about our K-Sim Cargo Simulator Solutions. We are here to support you.

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