Kongsberg Digital SimConnect 2017

Fort Lauderdale, Florida	June 8th
Vancouver, Canada	June 14th

K-Sim Engine & K-Sim Cargo - introduction & training opportunities

by Leif Pentti Halvorsen, Kongsberg Digital

ERS CHS 2016-2017

- K-Sim Engine
- HI-Voltage Training
- MAN ME model
- 3D Virtual Engine Room
- DEDF LNG Cruise Ferry
- Royal Australian Navy
- K-Sim Cargo
- Integrated Training

K-Sim Engine: Typical Training Applications

- Be familiar with the use of instruments and parameters used in Engine Room of modern ships
- Develop awareness of the need to follow proper checklist and be familiar with the time durations involved in start up procedures
- Have a better understanding and awareness of correct watch keeping procedures
- Develop an understanding of interdependency of various machinery
- Obtain experience in identifying operational problems and trouble shooting them
- Improve their decision making abilities with respect to safety and efficient plant operation.
- Make a safer and more effective contribution to the operation of vessel's machinery installation.
- Be able to analyze the changes in various parameters and effectively take necessary action to restore normalcy

- **Engine Room Resource Management**
- **Officers In-Charge of Engineering Watch**
- **High Voltage Management and Operation**

How do we meet the regulations?

- The International Convention on Standards of Training, Certification and Watch keeping for Seafarers (STCW) requires the approval of simulators used for mandatory training or assessment of seafarers.
- DNV GL`s Standard for Certification of Maritime Simulator Systems (DNVGL-ST-0033 2014) addresses the elements from the 2010 revised STCW Convention.
- Kongsberg has certified all our standard ERS and CHS models according to this Standard
- Models Certified are now in process to be recertified according to new standard DNVGL-ST-0033 Maritime simulator systems 2017 revision.

New ERS Full mission Simulators 2016

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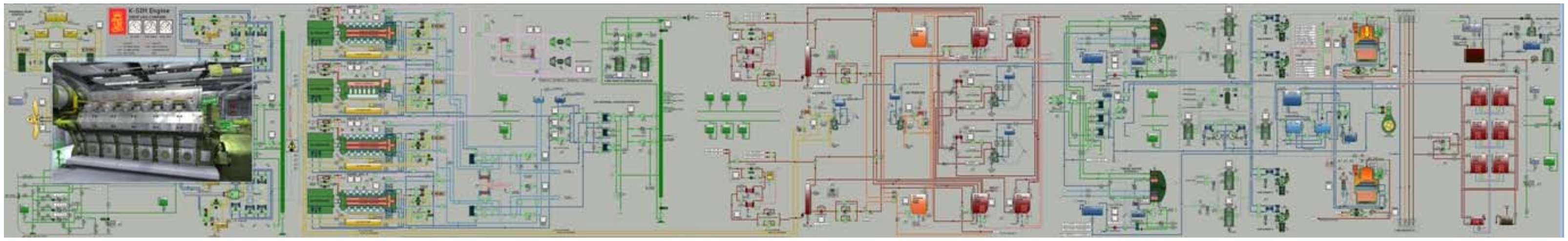
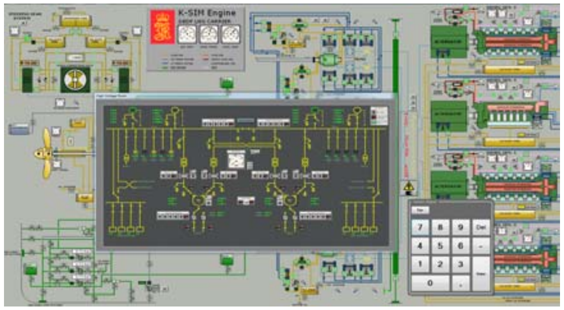
1. ENSM Le Havre, France
2. Grimsby Institute/ Modal Training, UK
3. Maersk Training Houston, USA
4. Norwegian Training Centre – Manila, The Philippines
5. Senegal Navy, Senegal
6. Bernhard Schulte Ship management, Cyprus
7. Odessa National Maritime Academy, Ukraine
8. Australian Maritime College (AMC), University of Tasmania
9. Ministry of Transport; Indonesia
10. Star Center USA
11. Bergen Maritime Fag Skole Norway
12. San Jacinto College Maritime & Technical Education Center USA

BigView – Interactive Mimic System



- The BigView is a combination of interactive schematic mimic of all relevant engine room compartments
- The system diagrams provides students with sufficient information to recognize interactions between systems and sub-systems and identify component statuses.
- 13 BigView models in our library !
- Cargo Handling BigView is currently under development. (2 models) LNG-M and SCC.



K-Sim Engine Engine Models

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Low speed diesel engine plants

•ERS L11 MAN B&W 5L90MC VLCC –V *
•ERS L11 Sulzer 12RTA84 Container Vessel
•ERS L11 Wärtsilä RT Flex Container Vessel *
•ERS L11 MAN 6S70ME-SCC L11 **New 2016 !**

Medium speed diesel engine plants

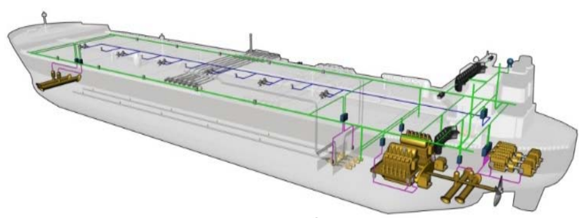
•ERS M22 Pielstick 10PC4 Ferry-IV*
•ERS M21 Pielstick 6PC20 Multi Purpose Vessel
•ERS M22 MaK 6M453C River
•ERS M11 MaK 8M32C Trawler*
•ERS M42 AHTS*
•ERS M11 CNTR **New 2015 !***

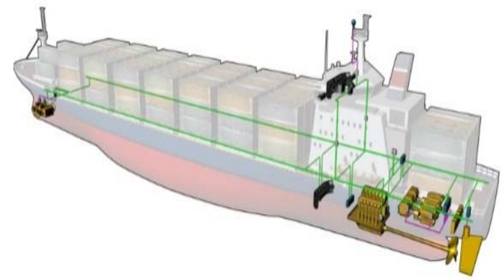
High speed engine plants

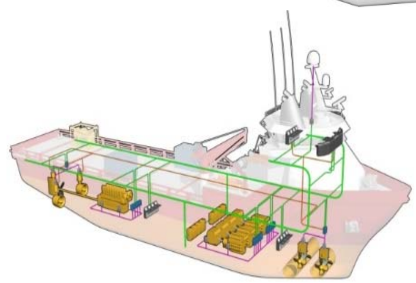
•ERS H22 MTU WaterJet

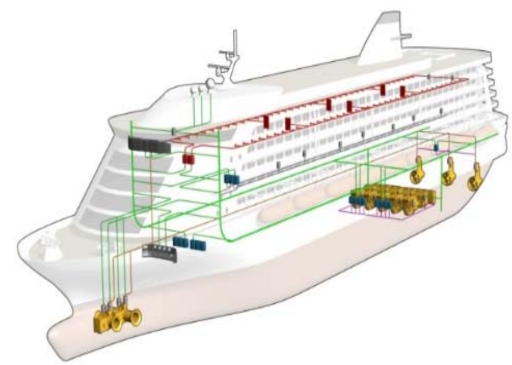
Diesel electric propulsion plants

•ERS DE 22 AC-AC Cruise Vessel – III*
•ERS DE 21 Dual Fuel LNG Carrier*
•ERS DE 32 Landing Helicopter Dock*
•ERS-DE 88 Semi-Submersible Drilling Rig*
•ERS-DE 66 Drill Ship*
•ERS-DE 42 Landing Ship Dock **New 2017 !***
•ERS-DE 42 Dual Fuel LNG Cruise Ferry **New 2017 !**









Steam turbine propulsion plants

ERS Steam Propulsion Dual Fuel

Gas Turbines

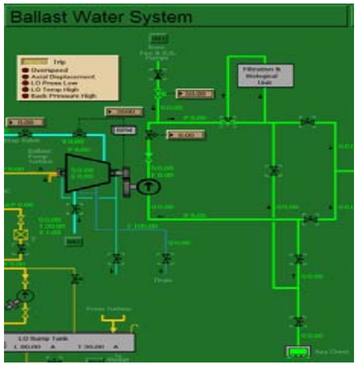
•ERS GE LM2500 30 Gas Turbine

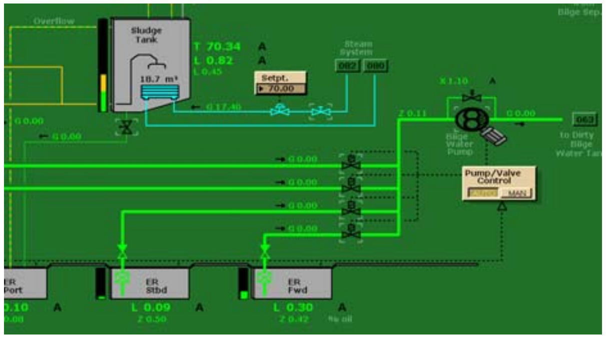
Thermal Power Plant

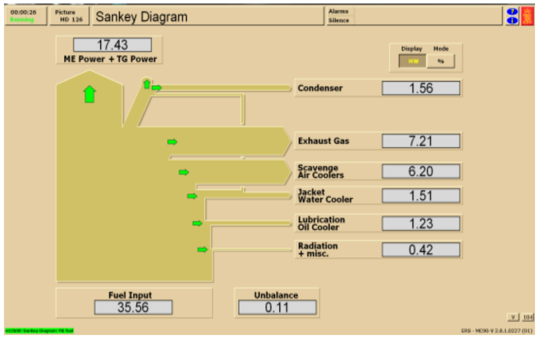
•Steam driven shore based Power Plant*

MAN B&W 5L90MC VLCC L11-V 2.9

- **More than 30 individual cases affecting the model operation from 2.7 to 2.8**
- **New Navigation Menu for the 3D Views**
- **Sankey Diagram**
- **3d Walk Trough Engine Room**
- **Touch Screen Fire Control Panel**
- **Additional Malfunctions**
- **K-SIM NAV Interface**
- **Removed connection between Sludge tank and Bilge Pump (Marpol)**
- **Ballast Water Treatment implemented (Marpol)**

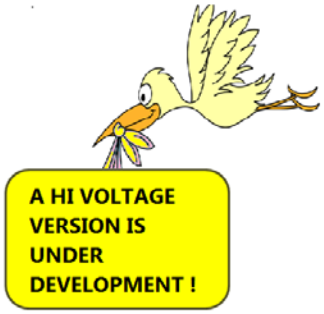


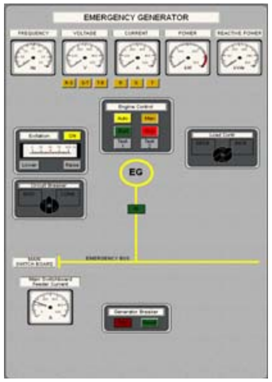


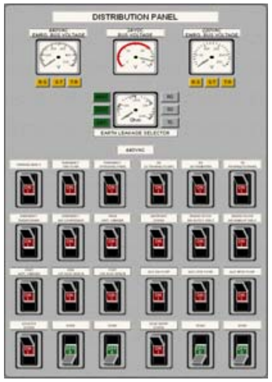


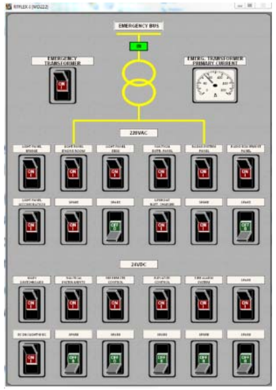
Wärtsilä RT Flex Container Vessel 2016

- More than 50 Imp
- CCTV Improveme
- New Fire Alarm a
- 3D View for Start
- 3D View for Sepa
- Touch Panel Emergency Switchboard
- Touch Panel Emergency Operation
- Several new Malfunctions









Using Engine Room Simulators in High Voltage Training Courses

- The revised STCW requires that seafarers working with, or around, high voltage systems are trained. While this only fully comes into force in January 2017, it has been applied to the revalidation of Engineering Certificates of Competency since January 2012.

- To avoid problems when revalidating certificates or having revalidated certificates bearing an endorsement forbidding their use on a ship with high voltage equipment, engineer officers will need to prove that they have completed high voltage training. Applicants for the new STCW rank of Electro-technical Officer (STCW III/6) will also have to show they have certified high voltage training.

- Many maritime training centers provide high voltage training courses where the instructors develop switching plans and implement them by using the high voltage switchboards and distribution systems. The use of simulators has also been used in parts of the courses and Kongsberg Digital has the recent year developed new functionally in their Engine Room Simulators in order to meet their clients requirements.

Real HV Breaker.

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- On a Full mission Simulator the software model can be interfaced to real Hardware.
- Kongsberg has on delivered full mission setup for a Diesel Electric Dual Fuel LNG Carrier, Drill Ship and Cruse Ship with diesel generators producing HV, One DG has a real high voltage breaker connected to the simulator SW model.

New MAN ME ERS model !

L11 MAN 6S70ME-SCC

Main Engine Data

Type	MAN 6S70ME-C
Cylinder bore.	70 cm
Piston stroke	280 cm
No. of cylinders	6
Nominal rating	18660 kW
Corresp. Eng. speed	91 rpm
Mean indicated press.	20 Bar
Scavenge air press.	2.1 Bar
Turbocharger speed	8500 rpm
Spec. fuel consumption	169 g/kwh
Fuel	HFO 700cst/MDO

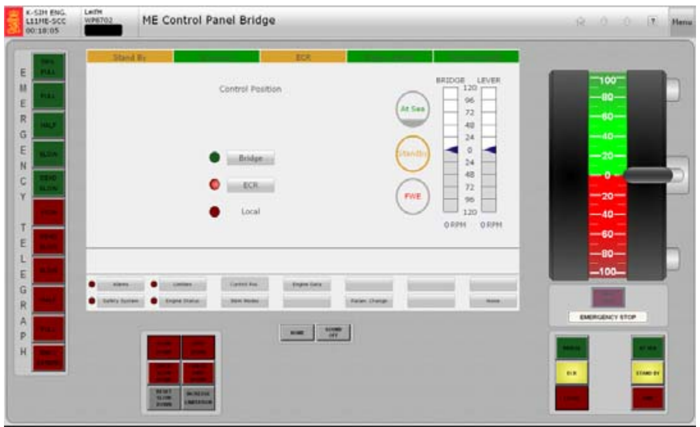
Vessel's Main Particulars

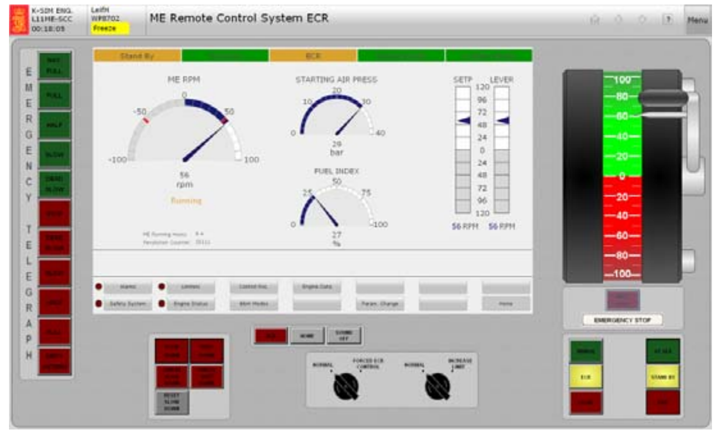
Length Overall	269.00 m
Breadth Moulded	46.00 m
DWT, Scantling	152.522 mt
Draught, Moulded	24.40 m
Speed	15,5 knots

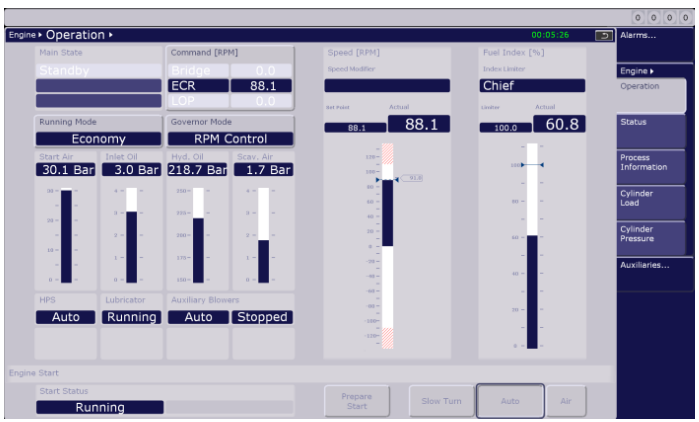
- Emulated AutoChief 600 ECS
- Emulated K-Chief 600 IAS
- Emulated MAN MOP
- Emulated Aalborg Boiler Control

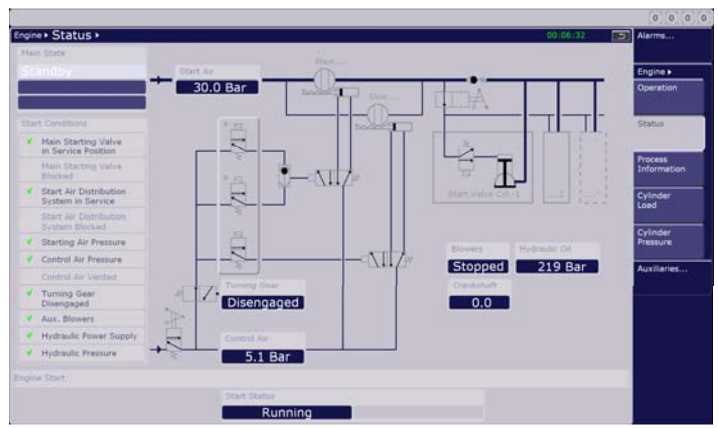
- MAN ME (Electronic Camshaft)
- 3 DG,s
- 2 Aux and 1 Composite Boiler
- 3 cargo turbines
- Ballast System
- Low Sulphur FO tanks
- Vessel's Performance Monitoring
- Scrubber System
- ESD, Watermist & Co2 Protection
- Alfa Laval FO and LO Separators
- Cylinder Indication
- Inert Gas System

Main Engine Control (Auto Chief 600) (MAN MOP)

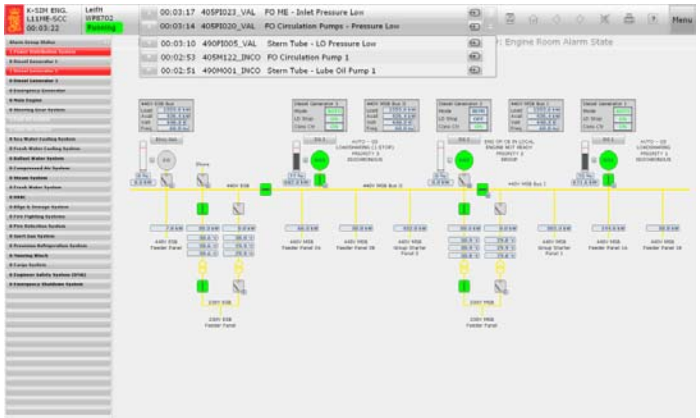


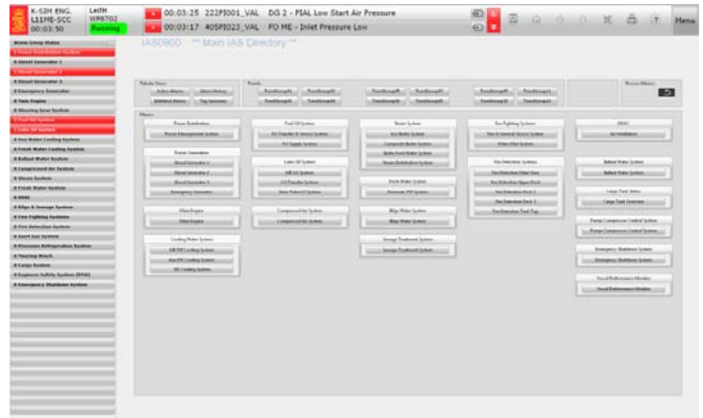


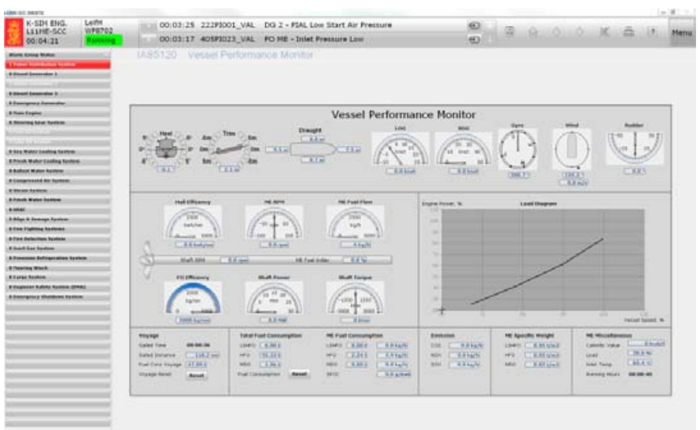


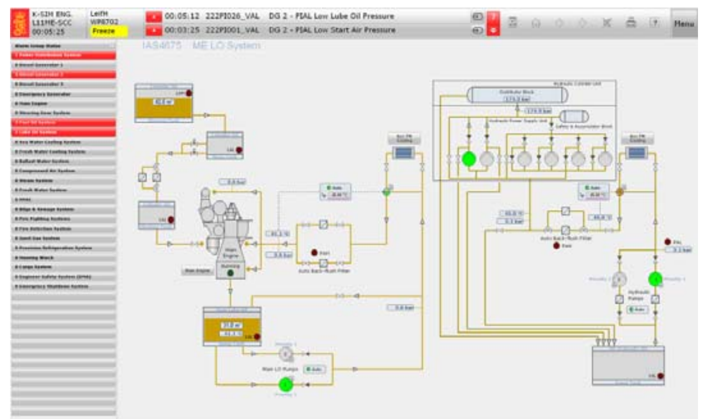


IAS (K-Chief 600)

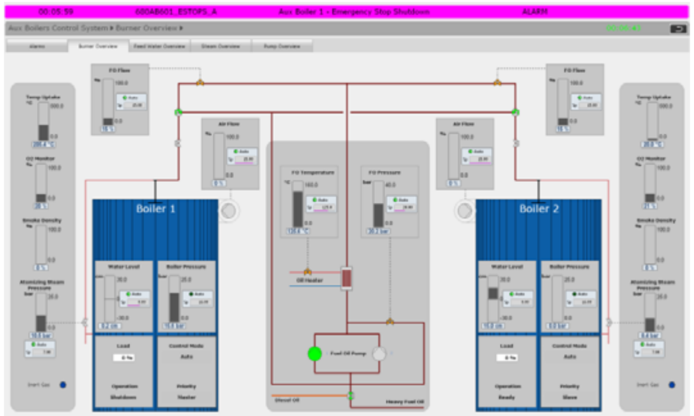


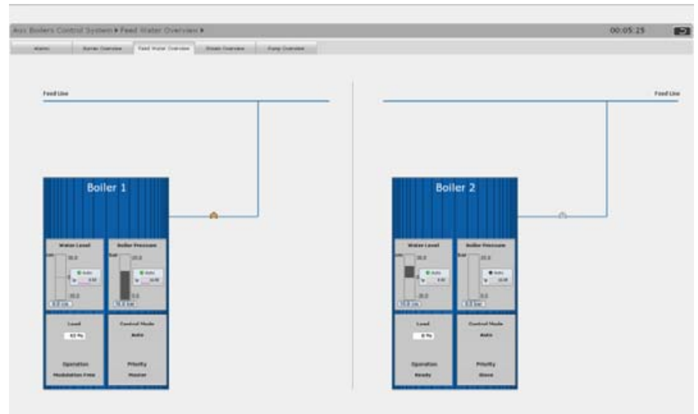


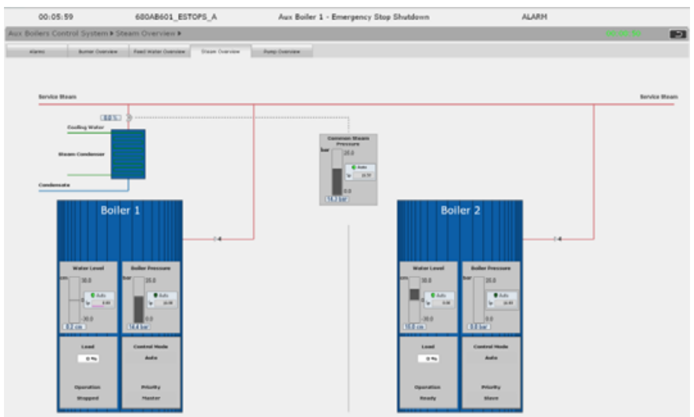


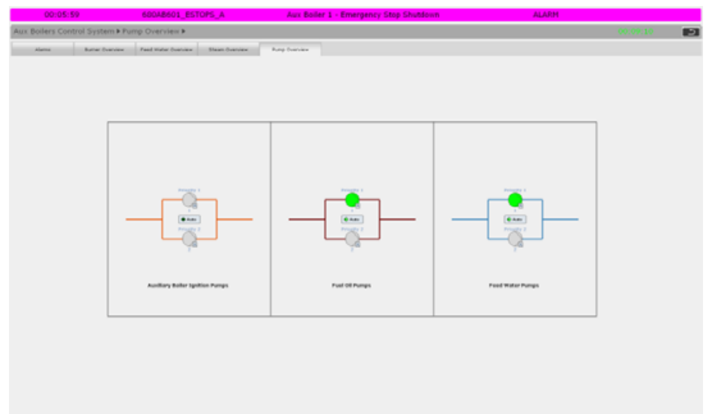


Aux Boiler Control (Aalborg)









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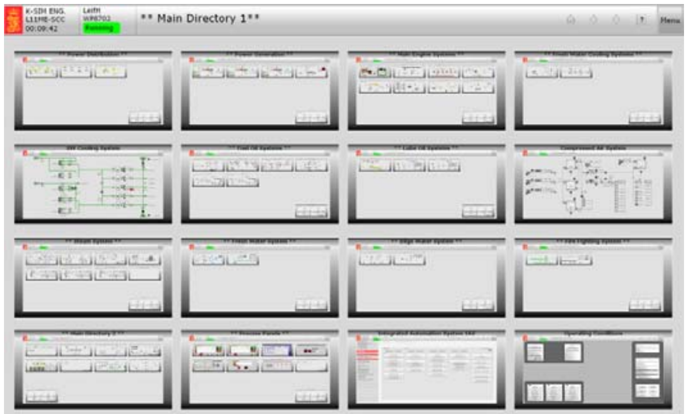
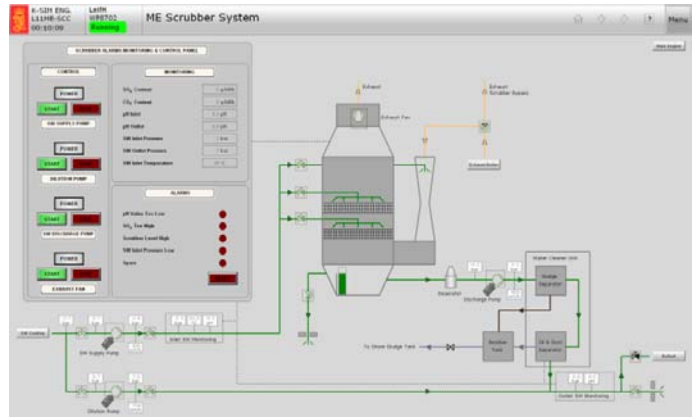
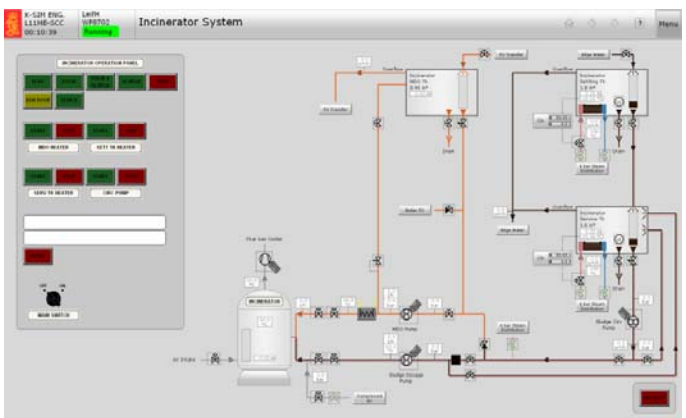
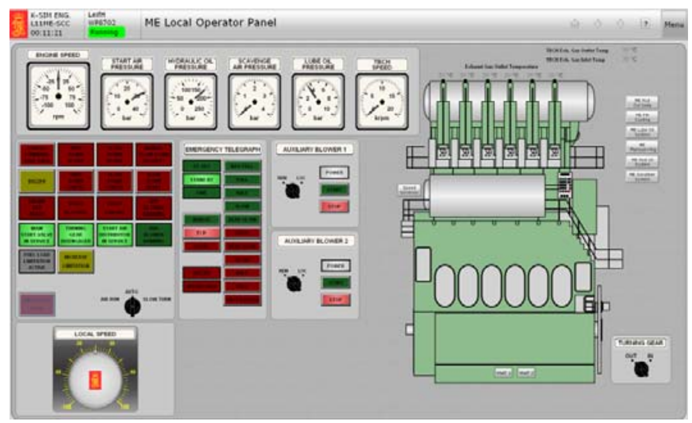
Process Mimic Displays 60 + Induvidual Mimics

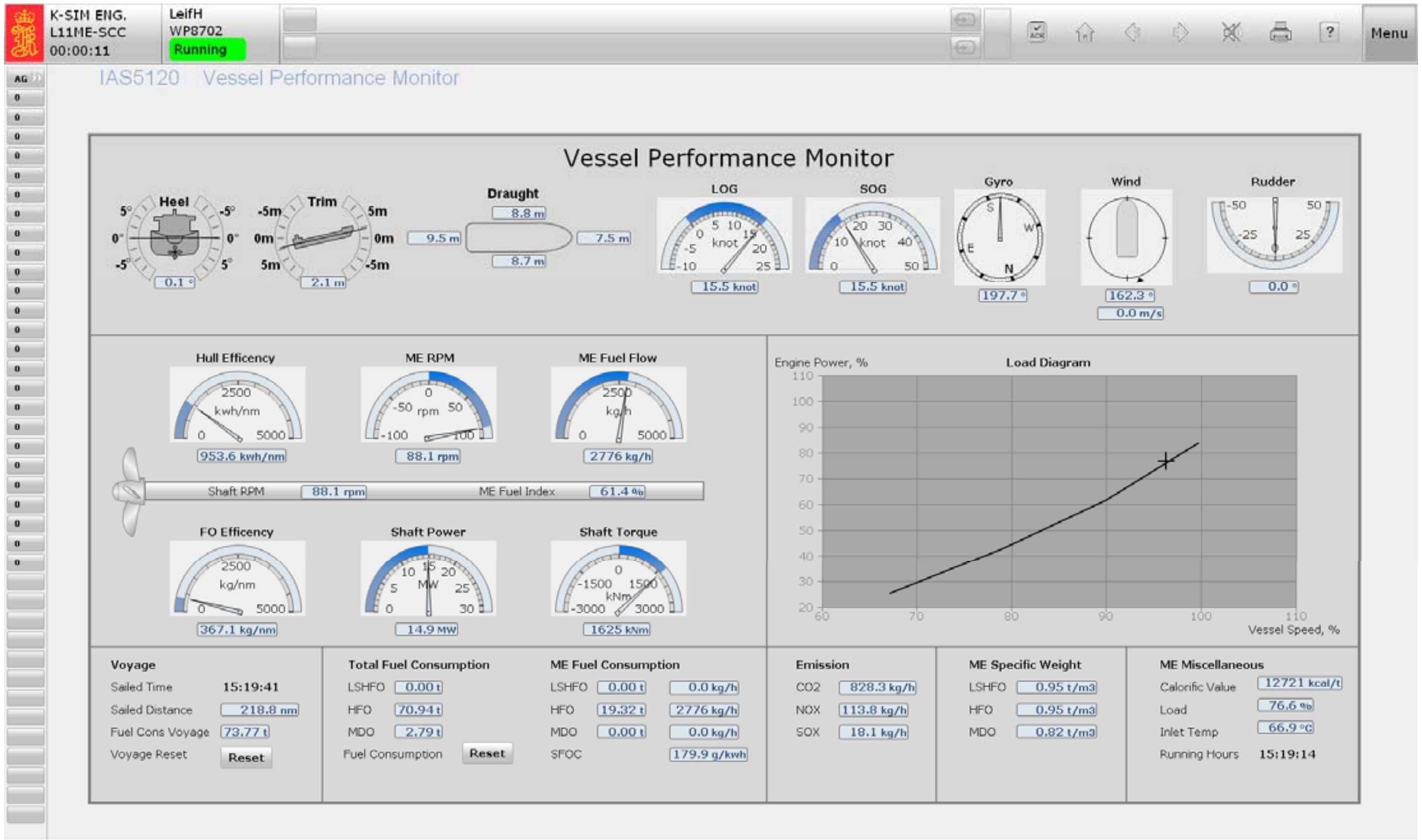








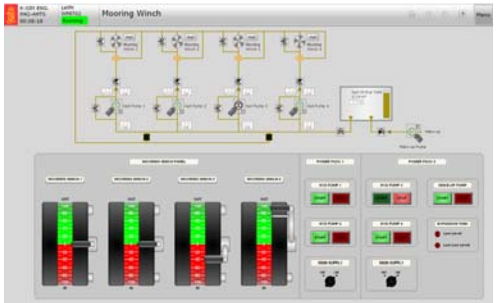
K-Chief Vessel Performance

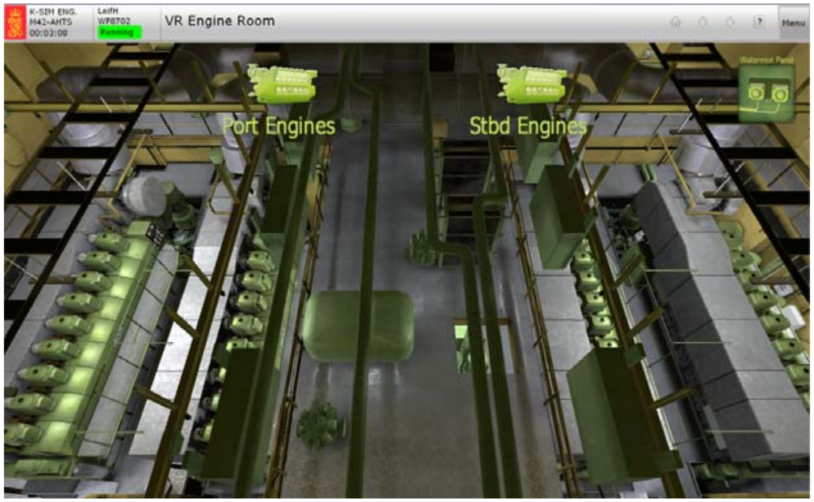


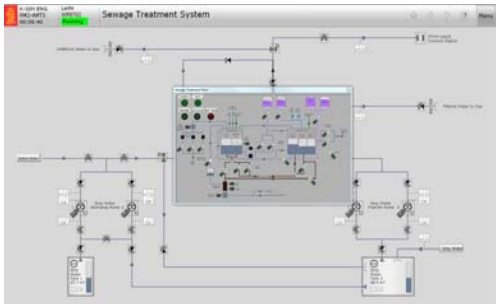
K-Power

M42-MaK AHTS 2,9

- CCTV Funnel
- Mooring Winch System
- Sewage Treatment System
- 3D Virtual Engine Room
- Improved bridge interface
- New Thruster Malfunctions







K-Sim M11-MaK Container (New Model)

3D Virtual Engine Room

Mc 90-V VLCC:
- Main engine: (MAN B&W MC 90)
- Diesel Generators (2 x Wärtsilä 6L20)
- HFO Separators (Alfa-laval)
- LO Purifier
- DO Purifier
- Start Air System

Diesel Electric Cruise Ship:
- Diesel Generators (4 x Wärtsilä 12V46)
- DG LO Cooling System

Diesel Electric Dual Fuel (LNG carrier): ***NEW Systems 2015***
- Diesel Generators (4 x Wärtsilä DF 50)

RT Flex. Container Ship: ***NEW Systems 2015***
- Main engine: (Wärtsilä 12 RT-Flex 82-C)
- Diesel Generators (3 x Wärtsilä 6L20)
- HFO Separators (Alfa-laval) LO Purifier, DO Purifier
- Start Air System

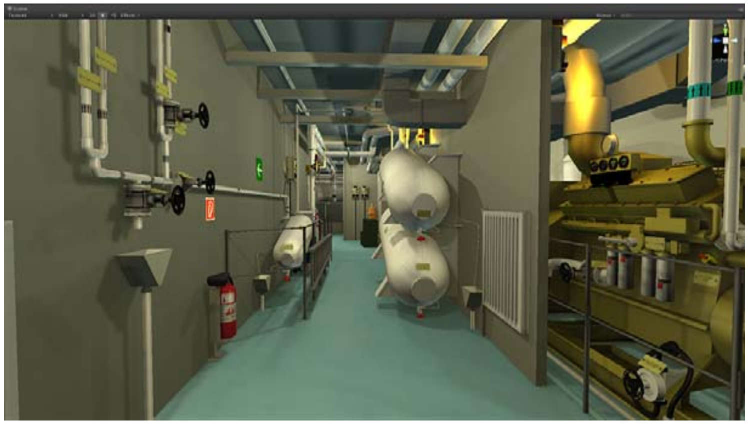
M42 AHTS ***:NEW Systems 2016***
- 4 MaK Main Engines with reduction gear

M22 Ferry: ***NEW Systems 2016***
- Diesel Generators (2 x Wärtsilä 6L20)
- HFO Separators (Alfa-laval)
- LO Purifier
- DO Purifier
- Start Air System

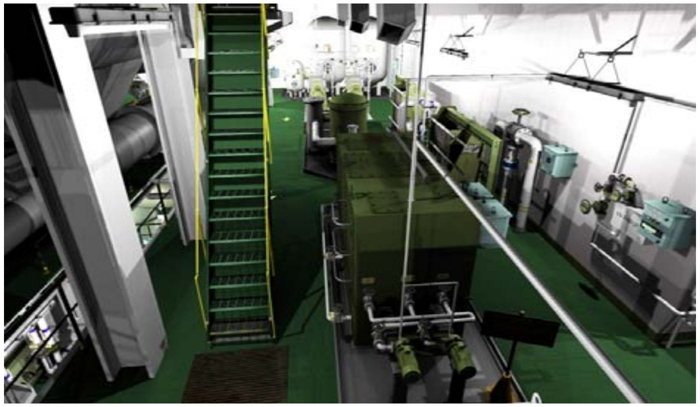
DE42 LSD ***:NEW Systems 2017***
- 4 Wärtsilä Diesel generators
- Separators
- Air Compressors

DE32 LHD
- Separators

”Walk Through” Virtual Engine Room



”Walk Through” Virtual Engine Room



1 January 2017 – SOLAS – IGF Code

- International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code), along with amendments to make the Code mandatory under SOLAS enter into force.

- The amendments to SOLAS chapter II-1 (Construction – Structure, subdivision and stability, machinery and electrical installations), include amendments to Part F Alternative design and arrangements, to provide a methodology for alternative design and arrangements for machinery, electrical installations and low-flashpoint fuel storage and distribution systems; and a new Part G Ships using low-flashpoint fuels, to add new regulations to require ships constructed after the expected date of entry into force of 1 January 2017 to comply with the requirements of the IGF Code, together with related amendments to chapter II-2 and Appendix (Certificates).
- The IGF Code contains mandatory provisions for the arrangement, installation, control and monitoring of machinery, equipment and systems using low-flashpoint fuels, focusing initially on LNG.

- Amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), and STCW Code, that includes **new mandatory minimum requirements** for the training and qualifications of masters, officers, ratings and other personnel on ships subject to the IGF Code, also entered to force in January 2017.

Competence related to the board use of LNG as Fuel By DNV GL

DNV·GL

STANDARD

DNVGL-ST-0026:2014-04

Competence related to the on board use of LNG as fuel

The standard identifies a suggested minimum level of knowledge and skills for people in various roles on board a vessel using LNG as fuel.

1.1 Introduction

The standard aims to cover important aspects related to the use of liquefied natural gas (LNG) as a fuel on board vessels. Depending on the role or position on board the suggested competence level may differ. Specific details related to ship-specific arrangements / systems cannot be captured in a standard of a general nature. However the standard aims to provide guidance for establishing a competence foundation, both for vessels with pressure tanks and atmospheric tanks, to be supplemented by e.g. operational / supplier manuals. The standard aims to identify a base set of competencies for key personnel involved in LNG-related activities on board.

1.2 Scope

The standard identifies a suggested minimum level of knowledge and skills for people in various roles on board a vessel using LNG as fuel. This standard can be used in the following ways:

- As a reference to familiarise or assess people in their specific role in relation to LNG.
- As a reference for global competence and defining training requirements.
- As a guide to training providers, who are to develop courses according to the requirements of the standard and needs of the industry.
- As a reference document for e.g. certification of personnel.

Standard equipment is supposed to be covered by current competence. (e.g. engines, heating system, compressors). Detailed competence in relation to e.g. fire-fighting and first aid is not covered in this standard.

The standard does not contain competence requirements for LNG cargo operators for vessels involved in transporting LNG as cargo. These can be found in DNV GL competence standard DNV GL-ST-0010 *Competence of shipboard LNG cargo operators*.

1.3 Target groups

The Target Groups below are based on the categories introduced in Resolution IMO MSC. 285(86).

CATEGORY	*TARGET GROUP*
Category A - BASIC	Basic competence for **ALL** officers / crew, regardless of role or function
Category B - DECK	Competence requirements for deck officers / operational deck crew
Category C - ENGINE	Competence requirements for engine officers / operational engine crew

The determining factor for selecting the required level of competence should always be the role, task or responsibility assigned to a person. It is the responsibility of the ship-owner to ensure that the right people possess the right competence.

The target group is considered to possess a thorough knowledge and understanding of regular equipment used on vessels.

Unik LNG-kurs startar på Chalmers

Nya lagkrav gällande svavelutsläpp från fartyg har drivit på efterfrågan på alternativa bränslen, som det lågsvavliga bränslet LNG. Men med nytt bränsle krävs också nya kunskaper om hur det ska hanteras. Chalmers sjöfart och marin teknik kan nu erbjuda en kurs i LNG-hantering.

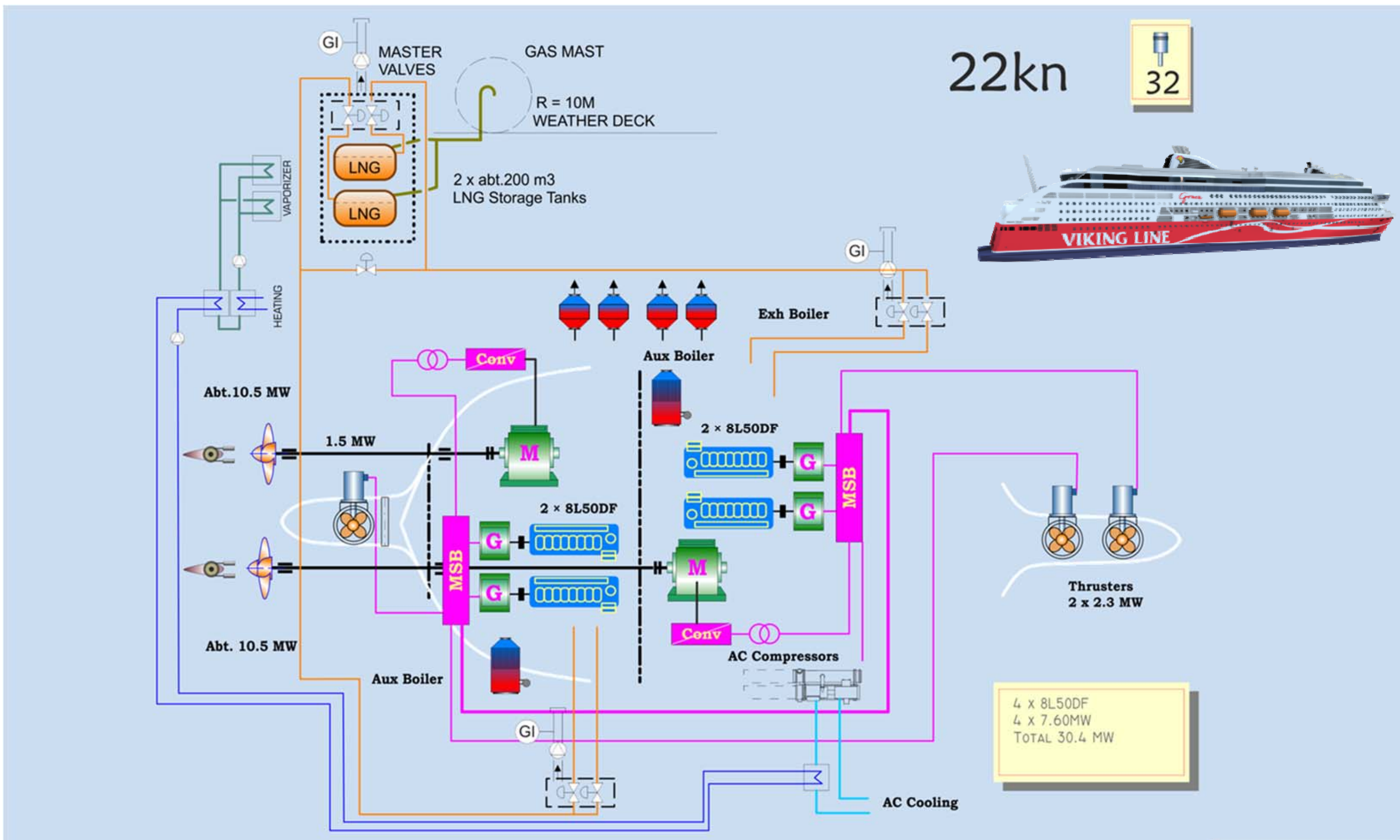
– I bränsletankarna förvaras den flytande gasen vid extremt låg temperatur vilket gör att vid ett eventuellt läckage kommer den att förångas mycket snabbt och expandera sex hundra gånger. LNG har också en mycket låg flampunkt vilket medför speciella risker, säger Cecilia Gabrielii, universitetslektor vid institutionen för sjöfart och marin teknik som varit med och utvecklat den nya kursen.

Chalmers har nu egentligen två LNG-kurser, en som är 1–2 dagar och en på 4–5 dagar. Det är främst befäl ombord som kommer att behöva den längre kursen och den ges som **fortbildningskurs via Chalmers Professional Education**. Den längre kursen kommer också att ingå i sjöbefälsutbildningarna.
– Trots att vi smygstartat kurserna är det några punkter som inte är helt klara än. Det som återstår är de

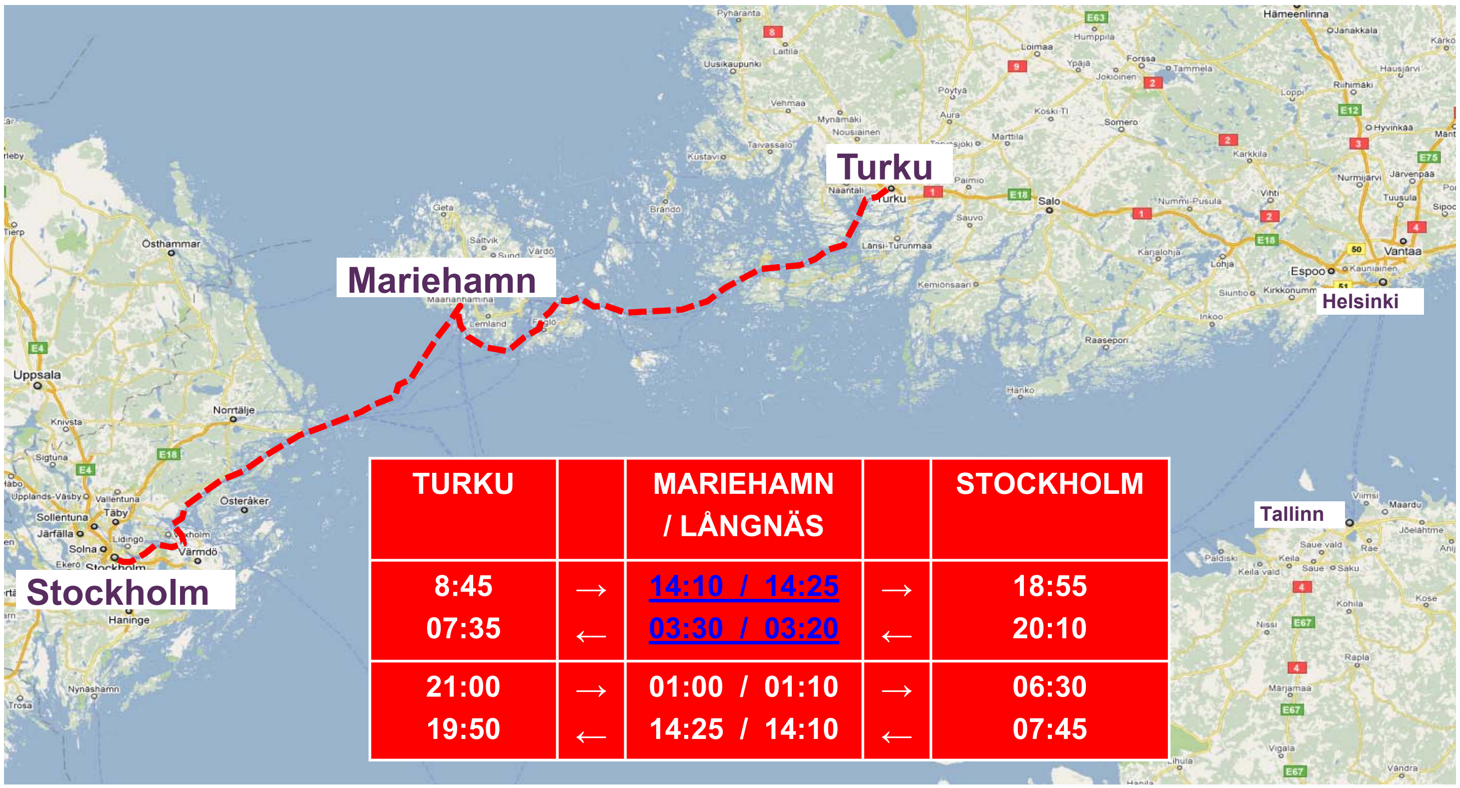
Diesel Electric Dual Fuel Cruise Ferry

- **Ship operating with Gas Engines.**
- **Focus on bunkering LNG**
- **High Voltage**
- **Gas Mangement**
- **Eco Drive/Safety**

- ***Viking Line,***
- ***BC Ferries,***
- ***Aida Cruises***
- ***Fjordline***
- ***Transport Canada***
- ***Tallink***
- ***Torghatten ++++++++***


GI
MASTER
VALVES
GAS MAST
R = 10M
WEATHER DECK
22kn
32
LNG
LNG
2 x abt.200 m3
LNG Storage Tanks
VAPORIZER
HEATING
GI
VIKING LINE
Exh Boiler
Aux Boiler
Conv
Abt.10.5 MW
1.5 MW
M
2 × 8L50DF
2 × 8L50DF
G
G
G
G
MSB
MSB
M
Thrusters
2 x 2.3 MW
Abt. 10.5 MW
Conv
AC Compressors
Aux Boiler
GI
AC Cooling
4 x 8L50DF
4 x 7.60MW
TOTAL 30.4 MW

M/S VIKING GRACE Route & Timetable



TURKU		MARIEHAMN / LÅNGNÄS		STOCKHOLM
8:45 07:35	→ ←	14:10 / 14:25 03:30 / 03:20	→ ←	18:55 20:10
21:00 19:50	→ ←	01:00 / 01:10 14:25 / 14:10	→ ←	06:30 07:45

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New ERS DEDF Cruise Ferry

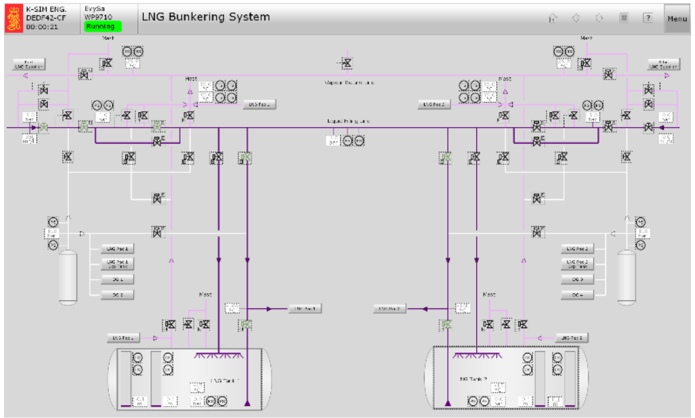
- Power Distribution
- 4 Dual Fuel Engines
- Bunkering
- Gas Heating (LNG Pac 1-2)
- Heating System

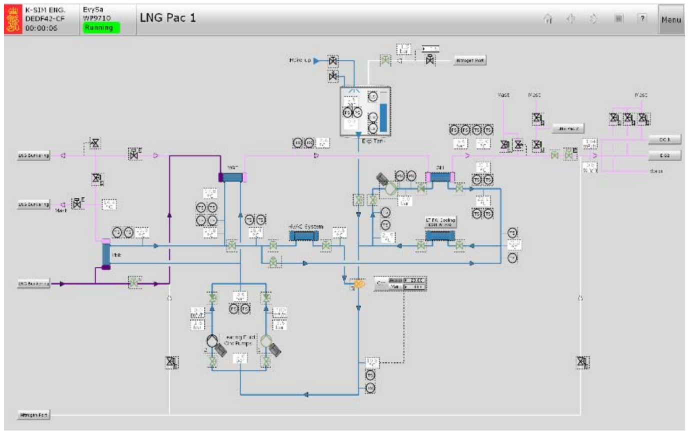
- LNG System Monitor

- Integrated Automation System
- Power Management
- Alarm Handling

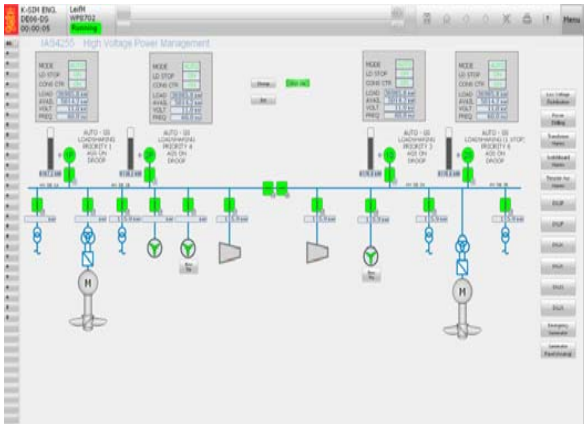
- Propulsion/Thruster control

- LNG Supplier Mimic (Truck-Barge-Terminal)





Kongsberg Standard IAS

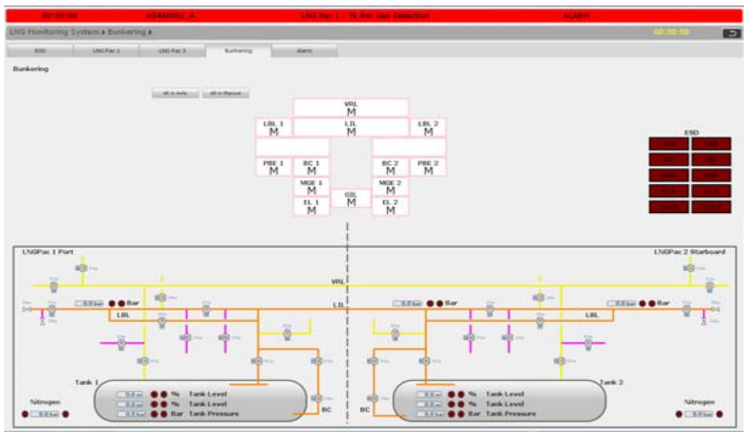


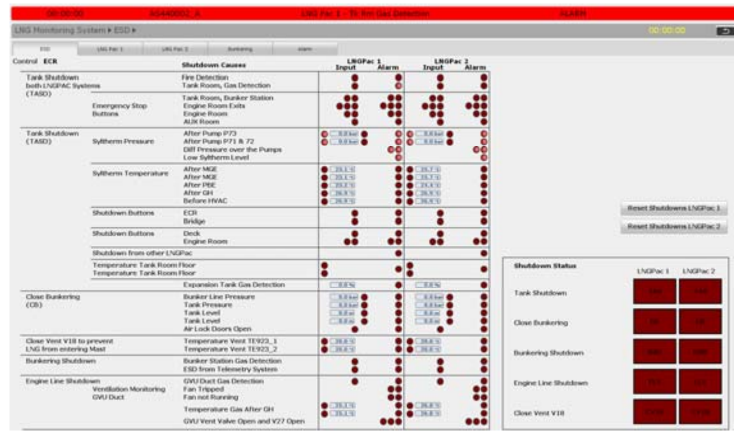
Kongsberg will use standard K-Sim Engine HMI on IAS.
Kongsberg will Emulate the Wärtsila LNG monitor system

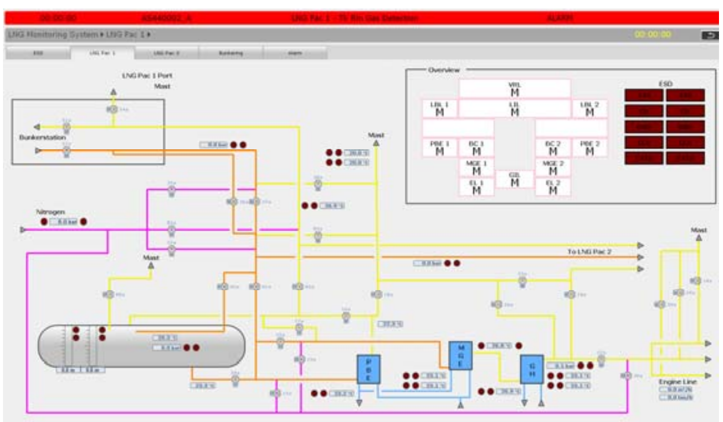
Simulator model Future.
CCTV, 3D, DNV GL Class A, Big View,Full mission, High Voltage Training

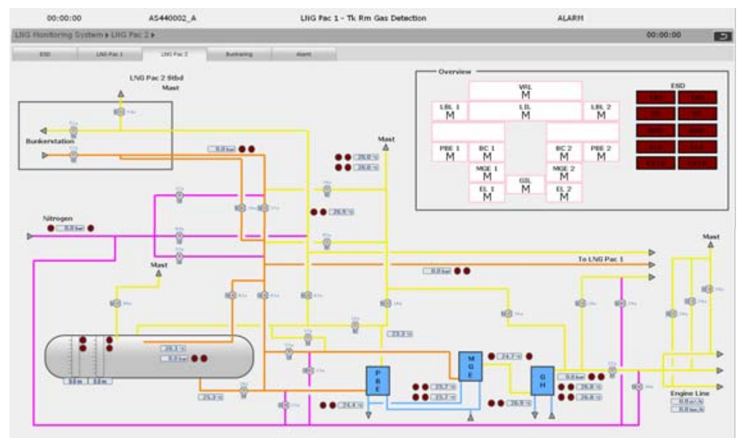
K-Sim Navigation Bridge Model.

LNG Monitor System









DNV-GL Standard for Maritime Simulator Systems

DNV·GL

STANDARD

DNVGL-ST-0033 Edition March 2017

Maritime simulator systems

https://rules.dnvgl.com/docs/pdf/DNVGL/ST/2017-03/DNVGL-ST-0033.pdf

2.3 Additional requirements for simulators used for training ship's officers onboard a vessel using LNG as fuel [1)]

DNV GL AS

Item	*Requirement*	*Class A (ENG)*	*Class B (ENG)*	*Class C (ENG)*	*Class S (ENG)*
2.3.1	It shall be possible to simulate a LNG bunkering operation and sufficient control relevant for the particular ship type to enable simulation of the ship/truck/shore to ship interface.				X
2.3.2	It shall be possible to simulate LNG connection/disconnection of shore connection.				X
2.3.3	It shall be possible to simulate flow rate related to LNG bunkering.				X
2.3.4	It shall be possible to simulate purging control related to LNG bunkering.				X
2.3.5	It shall be possible to simulate effects of excess line pressures and resulting actions related to LNG bunkering.				X
2.3.6	It shall be possible to simulate a propulsion plant integrated automation system including alarm safety warning system, power management system and propulsion control system.				X
2.3.7	It shall be possible to simulate at least one dual fuel engine and support systems.				X
2.3.8	It shall be possible to simulate LNG monitoring for bunker operation.				X
2.3.9	It shall be possible to simulate the onboard LNG storage system.				X
2.3.10	It shall be possible to simulate dual fuel engine gas trip.				X
2.3.11	It shall be possible to simulate fuel and gas supply system for gas engines.				X
2.3.12	It shall be possible to simulate gas leakage test prior to engine startup.				X

1) Class S requirements will be dependent upon the type of simulated equipment and/or scenario, and the defined competence requirements.

FAT Completed 31/5 2017 (SAT 12/6 2017)

Kongsberg Ship: RT-FLEX DF 50

KONGSBERG

GENERAL:

Builder:	Avic Dingheng Shipbuilding co. LTD, Cina 2016
Class notation:	BV XHULL, XMACH, OIL Tanker, Chemical Tanker Dualfuel,ESP, Unrestricted Navigation, ICE CLASS 1A, XAUT-UMS, SYSNEQ, MON-SHAFT, VCS, INWATERSURVEY, CLEANSHIP

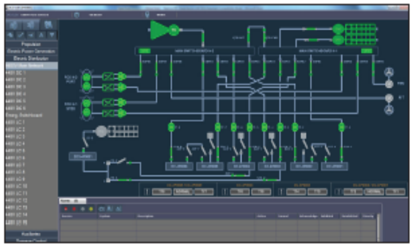
PARTICULARS:

Imo No:	9722390
Flag:	DIS
Call Sign:	OWPV2
Length Overall:	147.00 m
Length Between Perpendicular:	143.50 m
Breath (moulded):	22.00 m
Depth (moulded):	11.70 m
Draught (scantling):	9.00 m
Deadweight (at scantling draught):	15.000 t
Gross tonnage:	11.374 t
Design:	Rolls-Royce Marine AS, type NVC 615 CT
Consumtion:	12.0 knots 8.9 tonst LNG/Day
Marine gas oil	610m3
Cargo tank capacity 98%::	16.559m3
Ballast water tanks:	6.636m3
LNG fuel storage tanks	630m3
Marine gas oil	610m3
Slop tanks:	242m3
Tech fresh water tanks:	325m3
Urea:	52m3

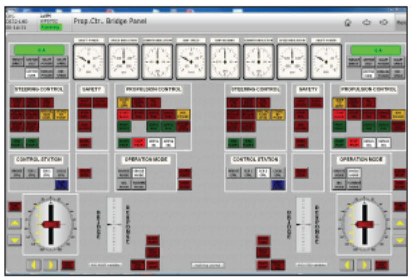
Cargo Pumps:	Deepwell pumps type DW 200/250 multisuction. Frequency controlled 450 m3/h at 120 m.l.c.
Cargo Alarm & monitoring systems:	Kongsberg Tank Radar,K-Chief 600 alarm, monitoring & control system, Operator station-OS. Kockumation Loading computer.
Intergas system:	The Inertgas system is using one existing dedicated Thermal oil heater with a burner modified to also be able to generate Inertgas. Capacity 3950 m3/h.
Nitrogen System:	A N2 generator, cap. abt. 100 Nm3/h @ 96% N2 installed in ER. N2 buffer tank of about 20 m3 for Cargo handling. Buffer tank serving dual fuel machinery in ER also installed.
Balast water treatment:	Panasia GloEn-Patrol™ BWMS is a combined treatment system taking advantage of Filter and UV units most environmentally friendly and optimally designed. Treatment Capacity: 1200m3/hr x 1 set
Bowthruster:	1 Tunnel Thruster 1650 AUX CP 865 kW 60Hz. DNV Class notation Ice 1A.
Main Engine:	Wärtsilä 5RT-flex 50 DF 5.850 kW 102 RPM 2-stroke, low pressure, LNG dual-fuel engine.
Fuel management:	Kongsberg fuel performance system, Shaft Torque/Power, Fuel Index, Ships speed, Fuel flowmeters.
AuxiliaryDiesel:	GENERATOR SET DATA 3 x Mitsubishi MAS 850-S, 790 kWe @ 1800rpm, 60Hz
Catamiser:	Combined exhaust gas heat recovery and SCR for NOx reduction below Tier III
Shaft Generator:	Permanent Magnet Shaft Generator with Variable Frequency Drive to allow running the Engine/Propeller in Combinator mode for optimum efficiency. Rated output shaft generator PTO 780 kW / PTI 1000 Kw

- Wärtsilä RT-Flex DF 50
- K-Chief 600
- AutoChief 600

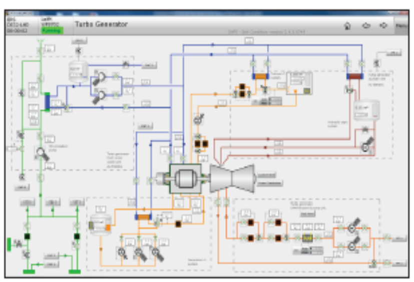
RAN ERS Model Made 2012/2013



Modern Integrated Automation System



Propulsion Control Bridge Panel



Detailed Process Mimics

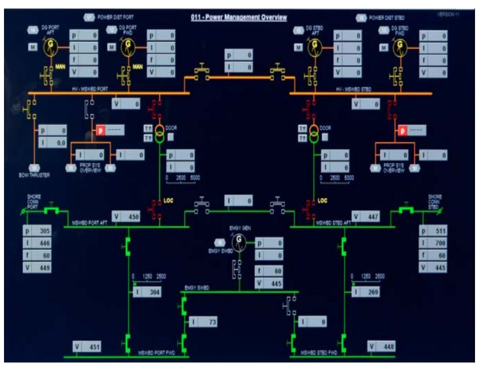
- The Ship simulated is the RAN Canberra class Landing Helicopter Dock.
- The propulsion engines consist of 2 x 11MW pods.
- The electrical plant includes:
- Gas-turbine generator driven by GE LM 2500 (17.4MW),
- Diesel generators driven by 2 x 7.2MW diesels,
- Emergency diesel generator.
- The model is based on real engine data that ensures the dynamic behavior of the simulator closely reflects the real engine response

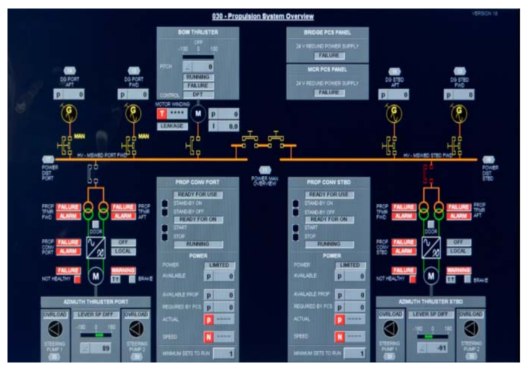
Diesel Electric
Landing Helicopter Dock DE 32

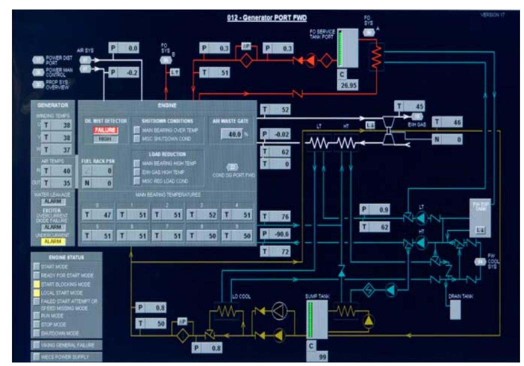
KONGSBERG

New ERS model for RAN (2017)

- The ERS-DE42 Landing Ship Dock simulates the RAN Bay class (HMAS CHOULES)
- The propulsion plant consists of 2 x propulsion pods and one bow thruster
- The electrical plant includes two [Wärtsilä](#) 8L26 6,000 hp (4.5 MW) diesel generators and two Wärtsilä 12V26 generators, 9,000hp (6.7 MW) and one emergency diesel generator.

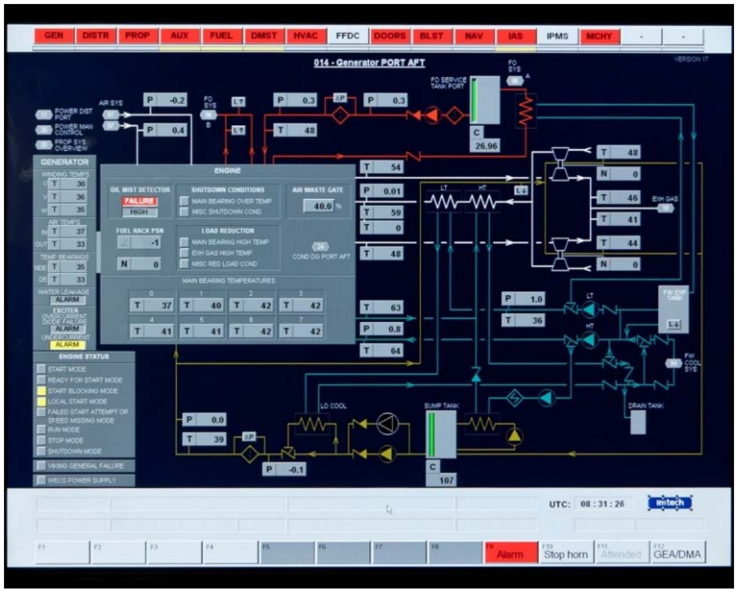


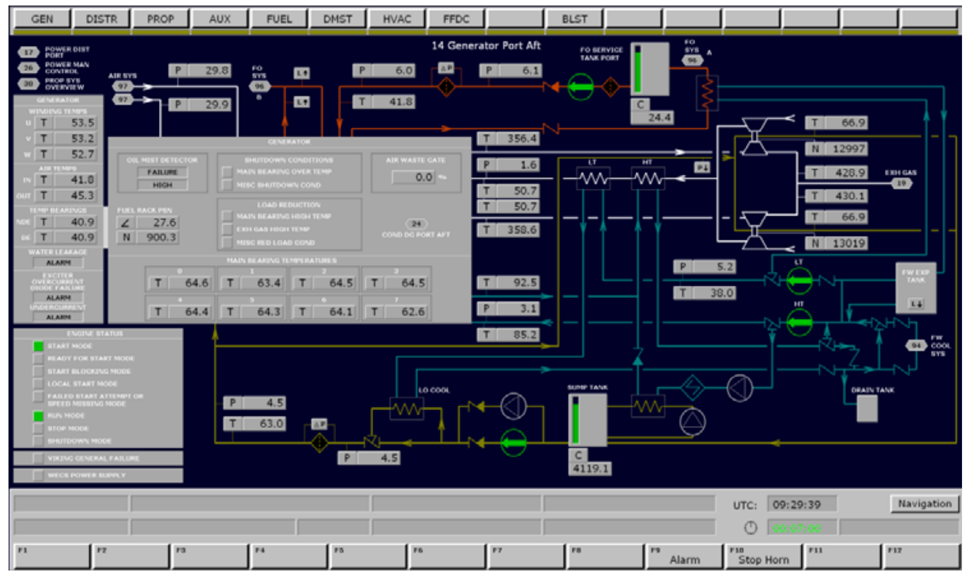




Integrated Platform Management System

KONGSBERG

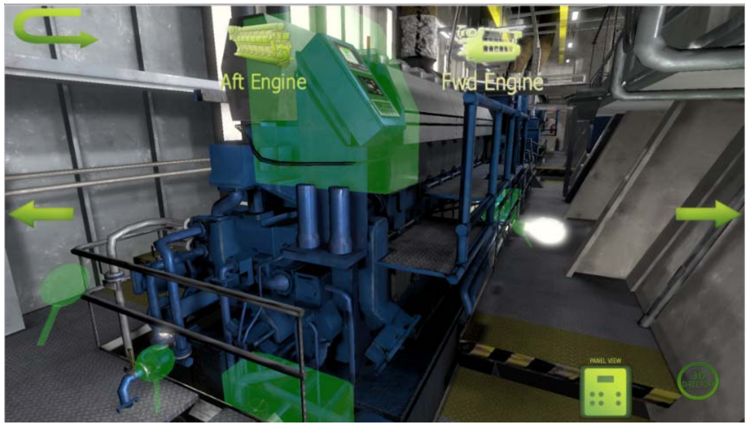


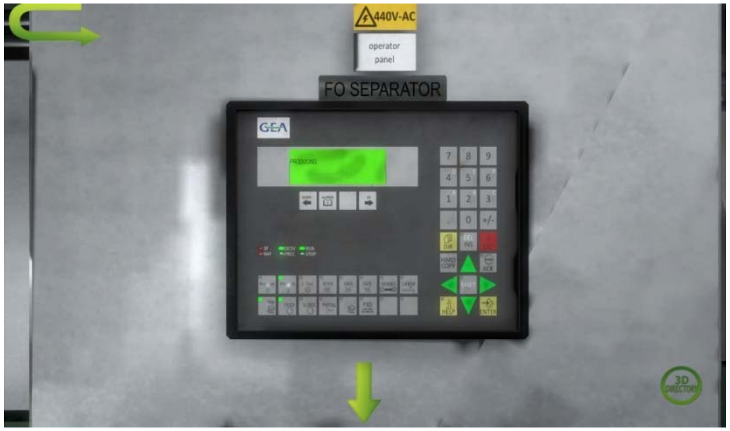


- Real Imtech Integrated Platform Management System (IPMS) onboard

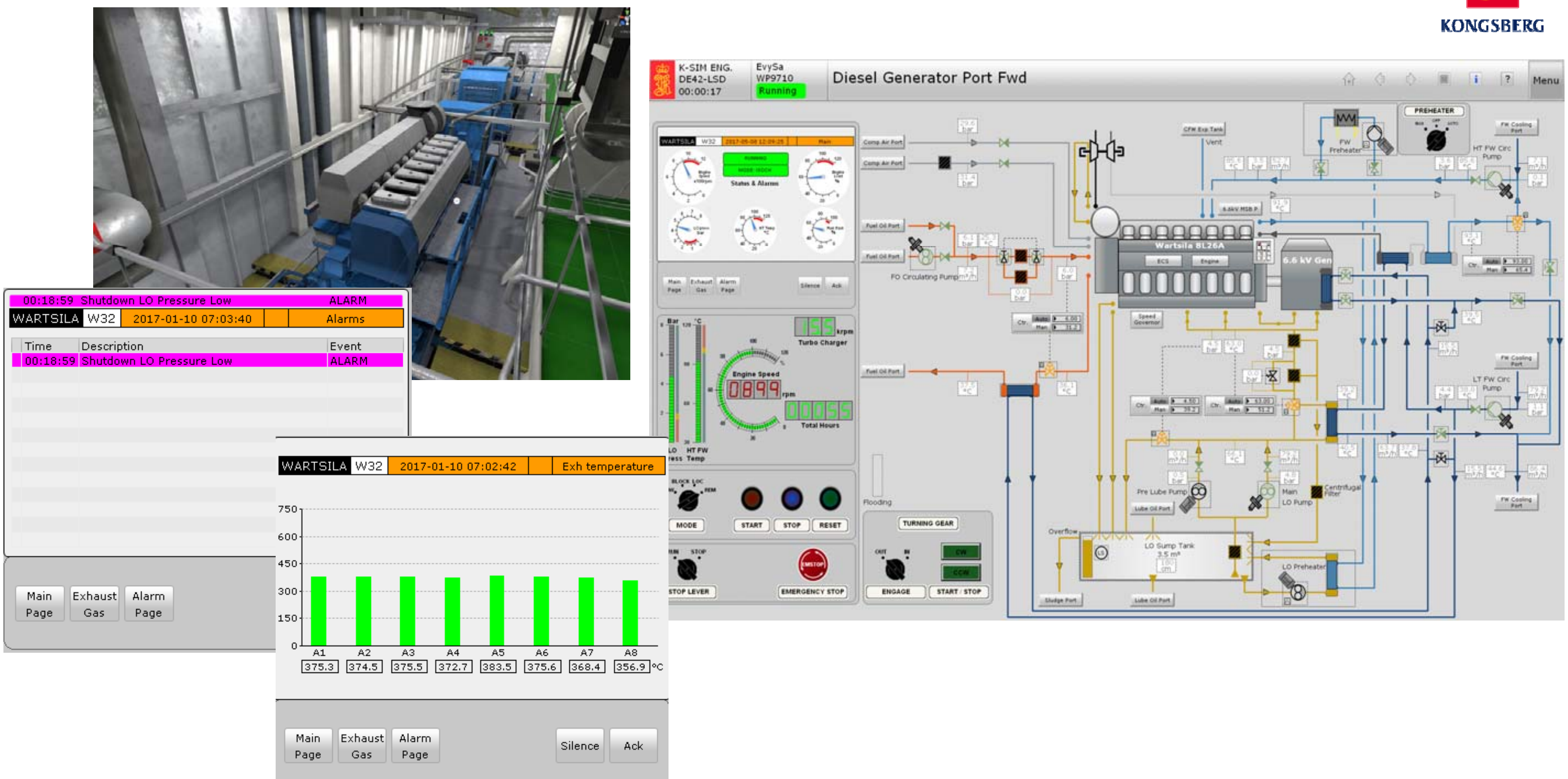
- Control system in the simulator

DE42-LSD 3D Views





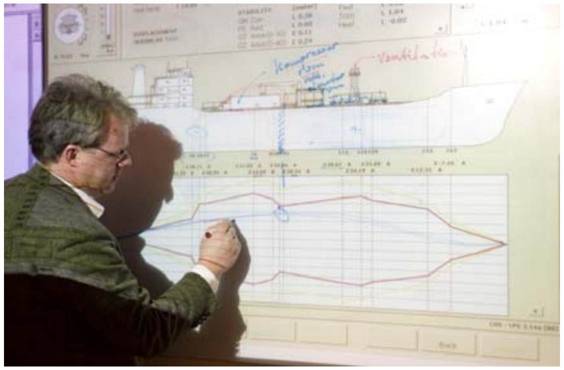
Wärtsilä Diesel Generators



KONGSBERG

K-Sim Cargo : Typical Training Applications

- Routine and emergency procedures
- Familiarization with all parts of the cargo system
- Planning of cargo loading and discharge
- Use of loading computer
- Line up for loading and ballasting
- Line up for discharge
- Stripping of tanks by means of vacuum and ejector systems
- Topping up and finalizing loading
- Aeration, inerting and nitrogen supply
- Compressor systems, heaters and boosters on LPG/E tankers
- LNG tankers with compressor systems and boil off
- Multiple loading/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
- Communication to terminal, deck and cargo control room



K-Sim Cargo Models

LNG – M:	Liquefied Natural Gas Membrane Tanker
LNG – S:	Liquefied Natural Gas Spherical Tanker
LPG:	Liquid Petroleum Gas Tanker
CC:	Chemical Tanker
PrC:	Product Carrier
VLCC:	Very Large Crude Oil Carrier
SCC:	SuezMax Crude Oil Carrier **NEW !**
LC:	Stand-alone Load Calculator

All models are based on real ships' construction & performance!

Ballast Handling Models

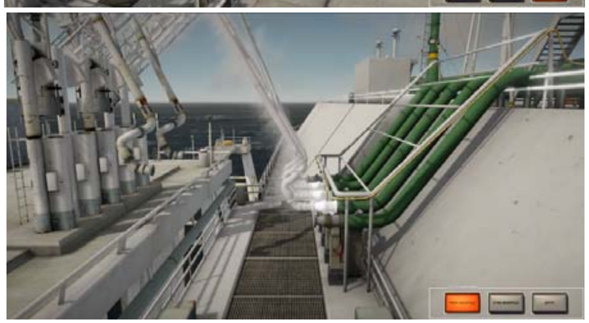
MODU:	Mobile Offshore Drilling Unit
FOFO:	Semi-submersible Heavy-Lift Ship Float-On/Float-Off

New Touch Panels for CHS models

CCTV – Surveillance camera

A Closed Circuit TV surveillance camera function is integrated into the Cargo Handling Simulator. This gives students a more complete training scenario.

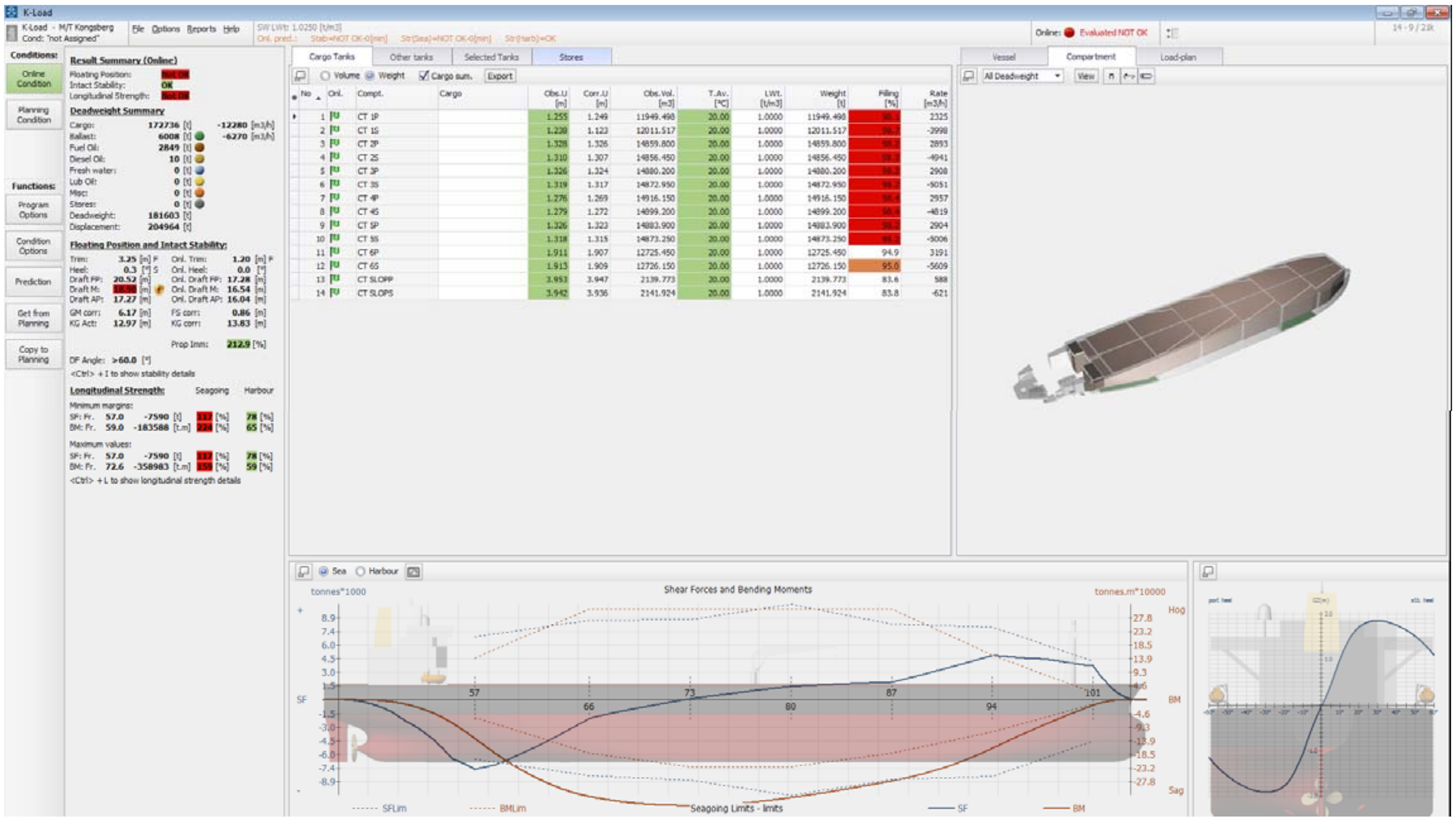
As in live operations, the CCTV mode will give the student/operator the ability to see what is going on at the manifold, to check for instance, if the loading arm is connected or if there is an oil or gas leak.



CCTV Closed Circuit Television System:

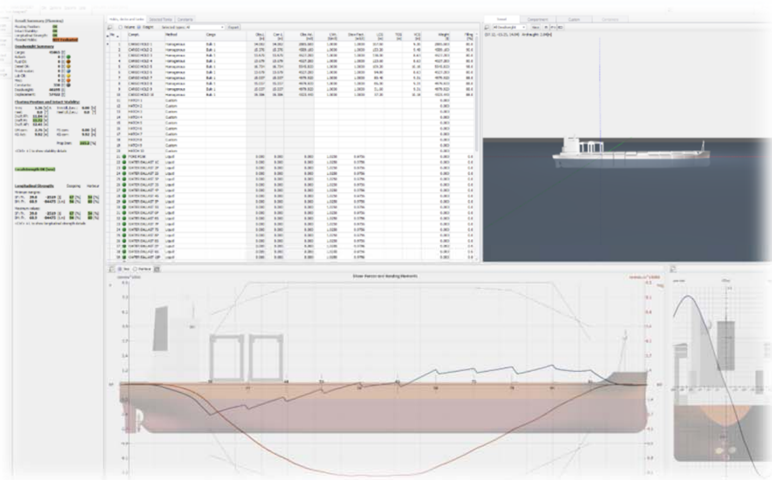
- Simulated manifold camera view
- Connections
- Leakage on manifolds

K-Load - Load Calculator



Dry Bulk Load Calculator

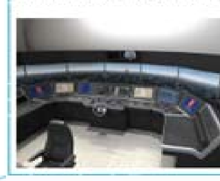
- K-Load Dry Cargo Load Calculator is a supplement to our liquid cargo simulators.
- The system has been added after receiving several customer requests for training possibilities for dry-bulk.
- The calculator is modeled on the vessel ‘Saga Odyssey’, a 46,500 MT dry bulk carrier that can load grain and containers. The system comes with drawings and full documentation.



K-Sim SuezMax Crude Oil Carrier.

Cargo Model (SCC-II)	2015
Engine Model (L11 MAN 6S70ME-SCC)	2016
Integrated Engine and Cargo model	In Progress
Integrated K-Sim Navigation Model	2017

SHIPS BRIDGE SIMULATOR

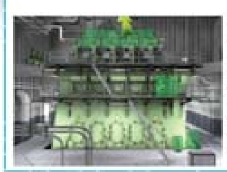


- NAVIGATION/SHIP HANDLING
- DYNAMIC POSTITIONING
- REFERENCE SYSTEM MONITORING & CONTROL
- POWER MANAGEMENT
- THRUSTER AND PROPULSION CONTROL

ENGINE CONTROL ROOM SIMULATOR

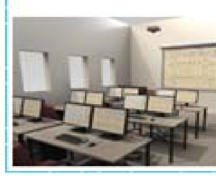
- ALARM HANDLING
- POWER MANAGEMENT
- ENGINE CONTROL
- DAMAGE CONTROL
- BALLAST CONTROL
- SWITCHBOARD OPERATION

ENGINE ROOM SIMULATOR



- LOCAL CONTROL
- MAIN ENGINES
- DIESEL GENERATORS
- COOLING WATER
- LO & FO SUPPLY/STORAGE SYSTEMS
- BILGE WATER
- COMPRESSED AIR
- STEERING GEAR
- SHAFT SEALS

CARGO AND BALLAST SIMULATORS



- ALARM HANDLING
- LOAD CALCULATION
- PUMP/VALVE CONTROL
- GAS DETECTION
- OIL DISCHARGE MONITORING
- INERTGAS HANDLING
- TANK CLEANING

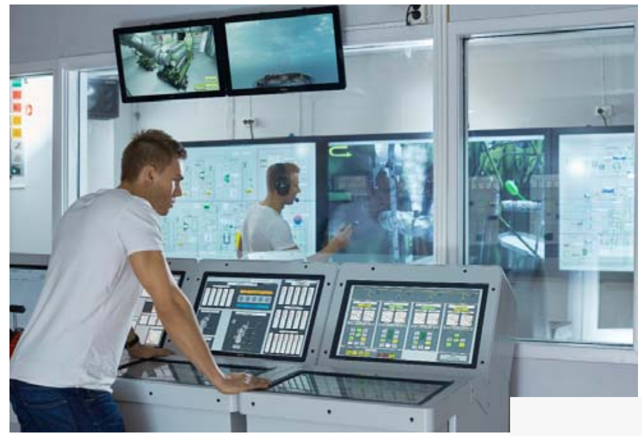
Maritime Damage Control Trainer

The virtual engine room simulator can be extended to cower an entire ship.

Potential training:

- Familiarization with emergency exits.
- Location of firefighting equipment.
- Management training.
- Compare GA Drawings with real life.
- Finding missing persons.
- Black out training.
- Flooding
- Evacuation

- Assessment.



WORLD CLASS

THROUGH PEOPLE, TECHNOLOGY AND DEDICATION