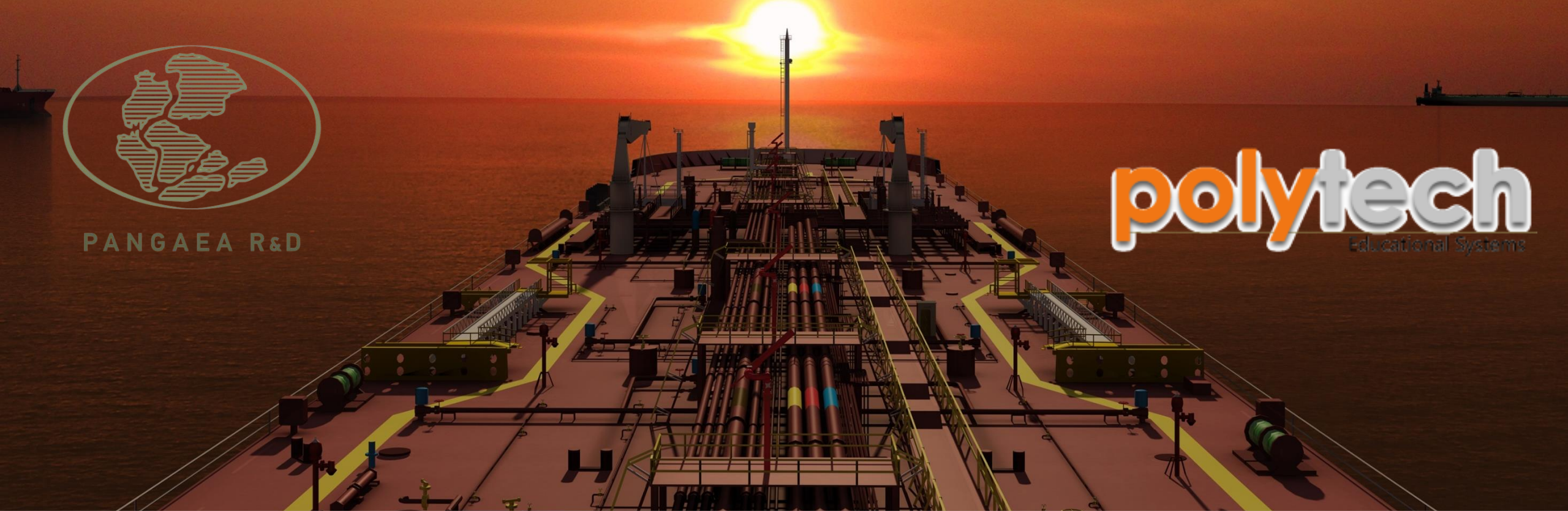




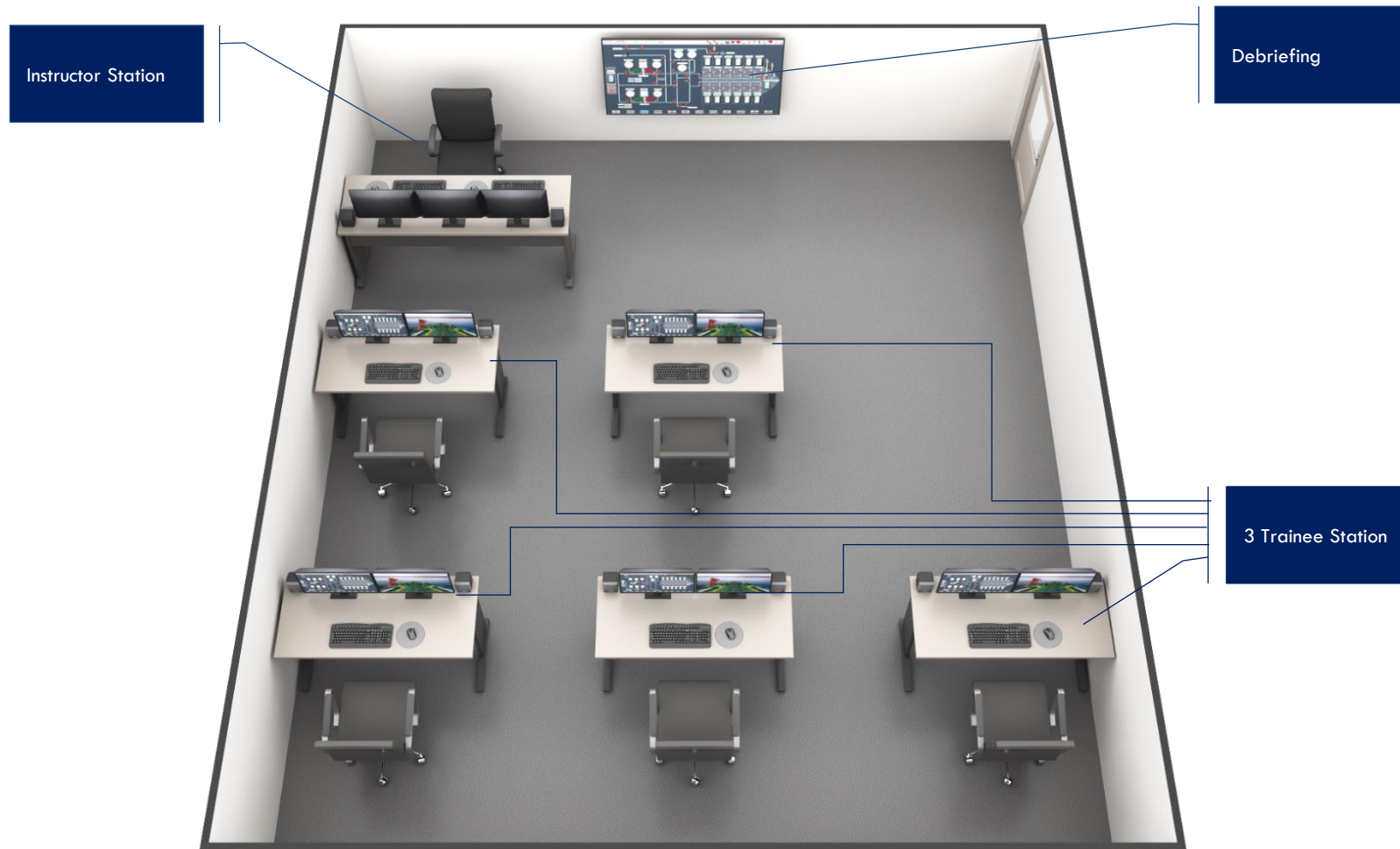
PANGAEA R&D

polytech
Educational Systems



LIQUID CARGO HANDLING SIMULATOR

INDICATIVE ROOM LAYOUT

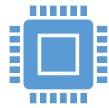


Configuration: Instructor, Debriefing & 5 Trainee stations

Note : Furniture are not included in the technical offer

SYSTEM OVERVIEW

The LCHS – **Liquid Cargo Handling Computer based simulation** stand alone classroom solution comprises of the interactive software **simulation modules** running on the **Instructor's station**, the **debriefing station** and the **trainee stations**



The LCHS Simulators are designed, built and installed in accordance with the requirements of IMO, STCW 2010 - MARPOL and SOLAS and is approved by DNV-GL to the highest Class A Standards. The content of the simulator including its presentations, exercises and a simulations are provided adapted to the standard local educational curriculum while following the above international training standard guidelines, recommendations



The simulations are designed and based on scientific mathematical models which apply to the marine engineering, hydrodynamics for creating a high precision liquid cargo handling. The mathematical model that drives fluid behavior in the simulator is exceptionally powerful and ensures that accurate and reliable results are observed under every condition likely to be experienced during typical liquid cargo



The simulator is suitable for training personnel at all levels - familiarization, operation and management. At each level learning objectives can be realized, recorded, analyzed and assessed. A feedback report is provided to trainee for improvement.



SYSTEM OVERVIEW

The Liquid Cargo Handling Simulator simulates the real time process flow control systems used in the storage and transfer of potentially hazardous bulk liquids from shore to ship and vice versa, and is capable of being used for training over the full range of situations from routine operations to emergencies with catastrophic potential. **The trainer allows the students to familiarize with all the relevant site, orientation equipment and process with its visual effects and behavioral realism.**

- The system offers an integrated, modern alarm simulation system with visual and audio alarms with automatic logger, emergency security system with slow-hold control, as well as Dead-man monitoring system for monitoring the presence of staff in areas on board a ship that are normally unattended.
- The system offers the classroom Debriefing module, at Instructors workstation, connected to the LAN and also connected to an interactive board via HDMI connection. Projector also can be selected for the debriefing station, as per client choice).
- The Liquid Cargo Handling Simulator simulates in a complete and realistic manner the real time process flow control systems used in the storage and transfer of potentially hazardous bulk liquids from shore to ship and vice versa, and is capable of being used for training over the full range of situations from routine operations to emergencies with catastrophic potential.
- The system offers the capability for Remote software downloading and remote version upgrading.

SYSTEM OVERVIEW

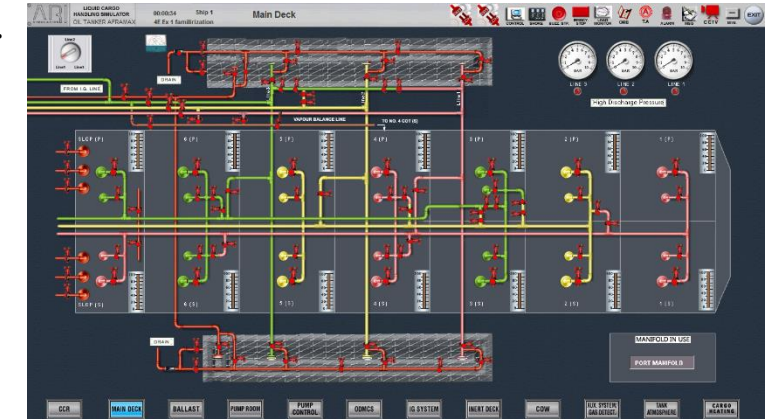


- The simulator system is capable of supporting the full extent of training requirements and incorporates maximum design flexibility. It offers the facility of creating and enabling different simulation scenarios with incremental levels of complexity per case, as students progress in the course work.
- As part of the training process, (theory delivery and simulation practice) assessment tests take place, in order to ensure that the students comprehend and perform the tasks correctly.
- This, step by step process of performance evaluation covers the whole didactic content. **At each level learning objectives can be realized, recorded, analyzed and assessed. A feedback report is provided to trainee for improvement.**
- The curriculum is separated into its **Standard mode** of operational training level and its **Advanced mode** of operational training level in a sequence of appropriate theory, simulation process practice and testing through problem solving procedures.



Features and Capabilities

- Complete Liquid cargo handling operations from drydock to drydock can be performed.
- Manifolds view for monitoring cargo loading arm is available.
- Stability and stress calculator is available.
- Valves can be partially opened as required.
- Fixed gas detection system is available.
- Trainees can be grouped in different ways to meet the training objectives.
- Trainee analyzer is available as an assessment function.
- Emergency conditions can be created for training and assessment.
- Realistic criteria are fully met.
- UTI Sonic gauging system is available
- Alarm and monitoring systems are available.
- All trainee and instructor actions are logged for debrief discussions.
- Record and replay ability is available.
- Ability to change from replay mode to real mode is available.
- Tank heating system is available.
- Large library of faults and malfunctions is available.
- Standard and Advanced mode including troubleshooting.



Ship Model Library

The physical depiction of the model ship systems is ultra realistic both in terms of complexity and appearance. This makes the learning environment extremely immersive. The software is, both by design and implantation, highly intuitive and easy to operate this is expected to considerably reduce the training time and afford required for instructors.

The Simulation in its standard configuration Includes:

- Models of crude oil tanker – AFRAMAX and LNG tanker (moss type, membrane type).



Software Modules

Instructor station creates, runs, monitors and manages all exercises with full control over all events, stations, fault injection and replay.

Each Instructor Station Software License includes:

- Desktop LCHS Simulator Instructor Station Software module
- Desktop LCHS Simulator Server Software
- Debriefing Module

Each Trainee Station Software License includes:

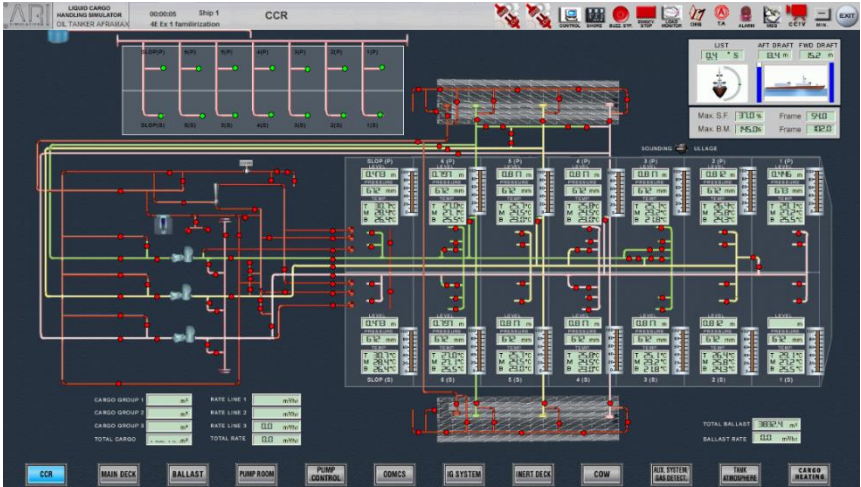
- Desktop Trainee Station LCHS Software Module
- Cargo / Tanker Module
 - ◊ *Oil Tanker (Aframax) Module*
 - ◊ *LNG Carrier Module – Membrane Type*

Optional Ship Models

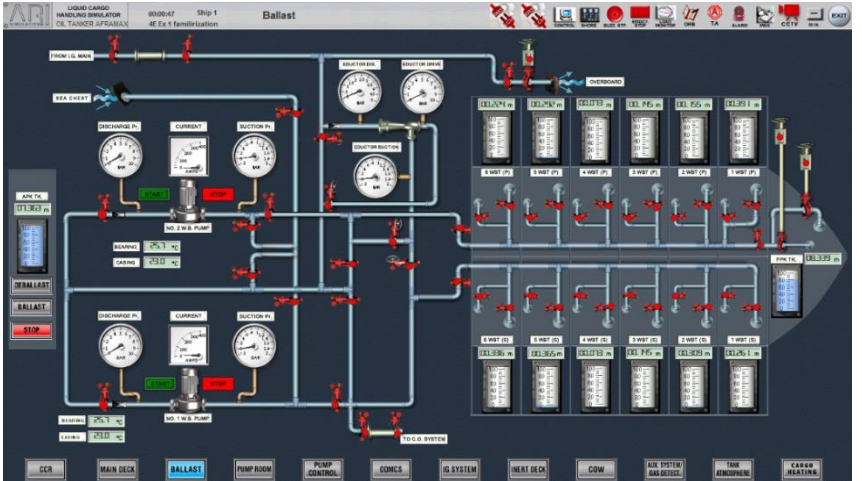
- CRUDE OIL TANKER - VLCC
- CHEMICAL TANKER
- LPG CARRIER PRESSURISED
- LPG CARRIER REFRIGERATED
- PRODUCT TANKER
- LNG TANKER MOSS TYPE
- CUSTOMIZED MODELS
- BULK CARRIER BALLAST HANDLING



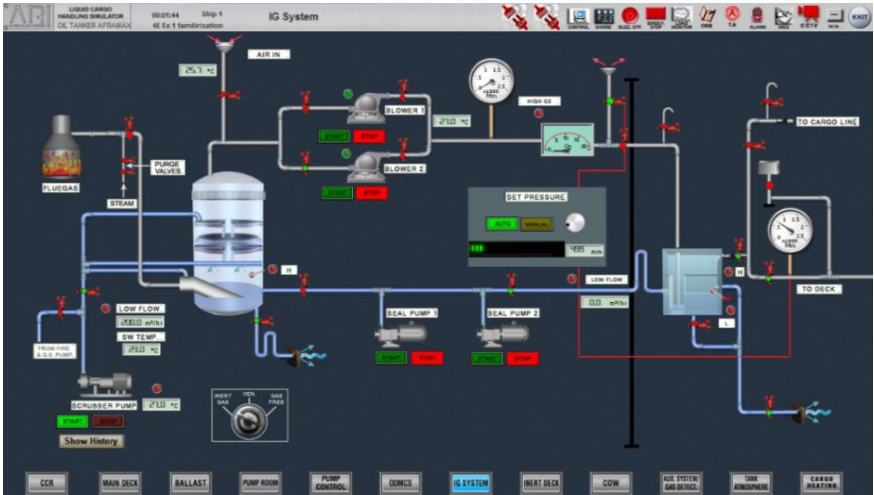
Sample Images from Simulator – Oil Tanker (Aframax) Module



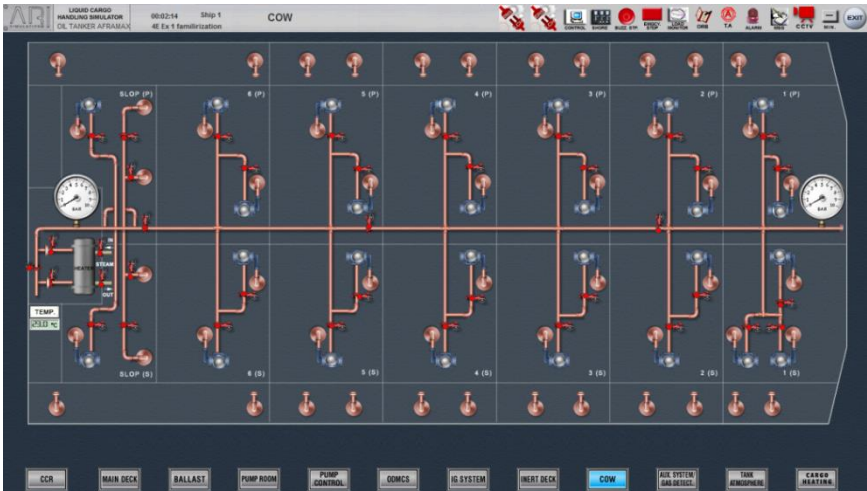
CCR Panel – Oil Tanker



Ballast System– Oil Tanker



IG System– Oil Tanker



Crude Oil Washing System – Oil Tanker

SAMPLE POINT POSITION

TOP	97%
UPPER MIDDLE	97%
MIDDLE - 90%	97%
MIDDLE LOWER	97%
BOTTOM	97%
SUMP PORT	1%

TANK PRES. 51.6 mb
LEVEL 0.00 m
RATE OF RISE 0.00 m/h
LIQUID VOLUME 0.00 m³

WH-ESSOE SAAB
SAAB

CARGO PUMP(S)
 CARGO PUMP(P) 0.0 bar
 CARGO PUMP(S) 0.0 bar
 SPRAY PUMP 0.0 bar

SUC. PRES. 0.0 bar
DIS. PRES. 0.0 bar

NO.1 CARGO TANK

- 99.4% - ESD TANK PROTECTION LEVEL (SHUTDOWN)
- 99.2% - LEVEL ALARM VERY HIGH (CLOSE FILLING VALVE)
- 98% - LEVEL ALARM HIGH HIGH (START CLOSING FILLING VALVE)
- 95% - LEVEL ALARM HIGH
- 2m - LEVEL ALARM LOW
- TANK 1 SAAB SENSOR FAULT COMMON ALARM
- BILGELEVELHIGH

TEMPERATURES:

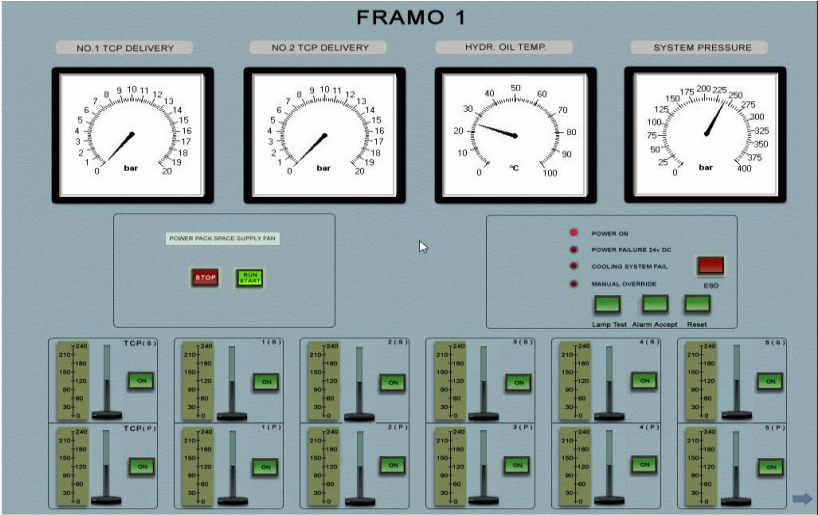
TOP	0.0 °C
UPPER MIDDLE - 75%	0.0 °C
MIDDLE - 50%	0.0 °C
MIDDLE LOWER - 25%	0.0 °C
BOTTOM	0.0 °C
SUMP PORT	0.4 °C
SUMP STBD	0.4 °C
HOLD SPACE	23.0 °C
EQUATOR RING	0.0 °C
AVERAGE LIQUID TEMP	0.4 °C
AVERAGE VAPOUR TEMP	0.4 °C

STATUS BAR:

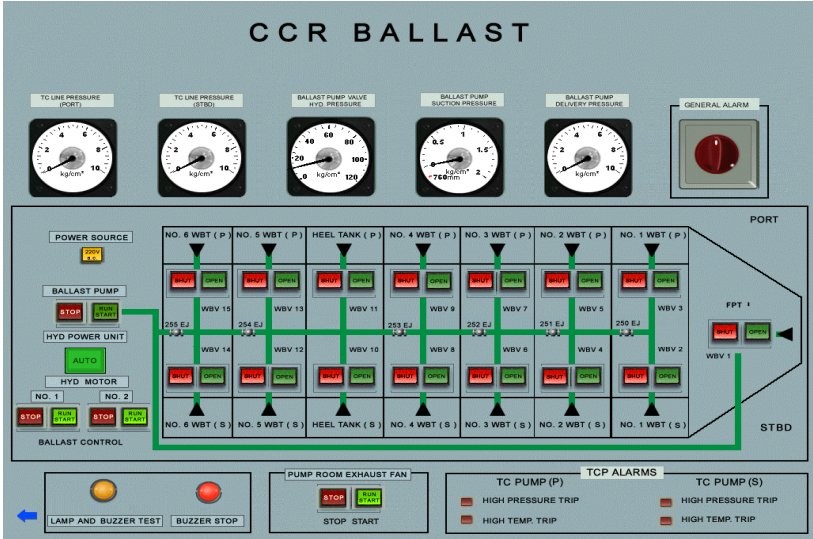
NO.1 CARGO TK	NO.2 CARGO TK	NO.3 CARGO TK	NO.4 CARGO TK	COMPR NO.1	COMPR NO.2	LD COMPR NO.1	LD COMPR NO.2	FORKING VAPORISER	LWS VAPORISER	HD HEATER	LD HEATER	BALL TANK ALARM	CARGO TEMPR	IG/N2 GENERATOR
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HD Compressor Room—LNG Carrier

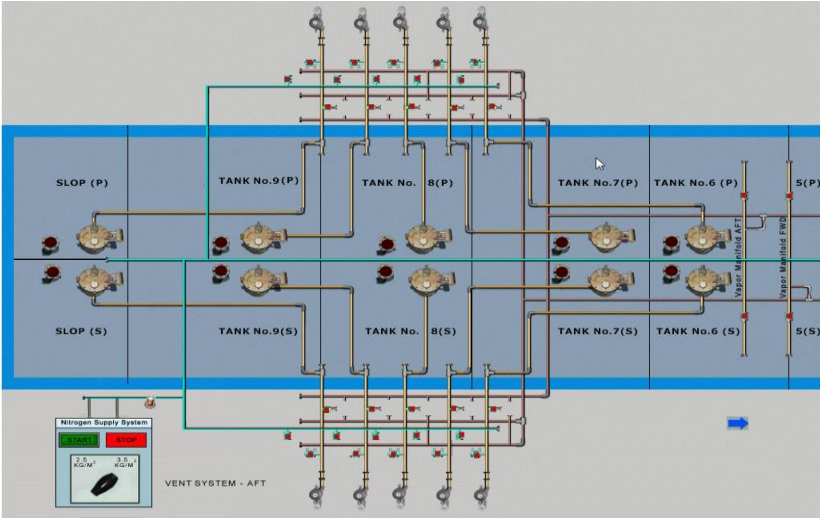
OPTIONAL MODULE
Sample Images from Simulator – Chemical Tanker



Cargo Control System



Ballast Control System



Inert/nitrogen and venting control system



Tank Cleaning Heater

Sample Images from Simulator – LPG Carrier



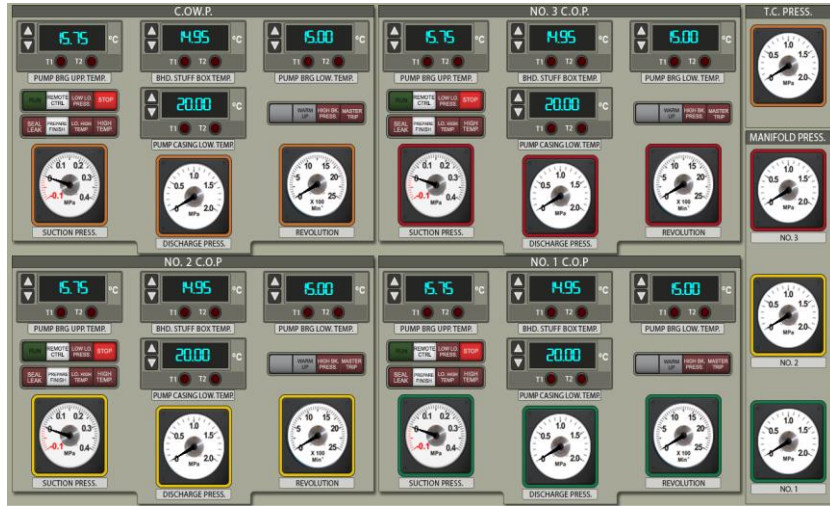
Sample Images from Simulator – Product Tanker



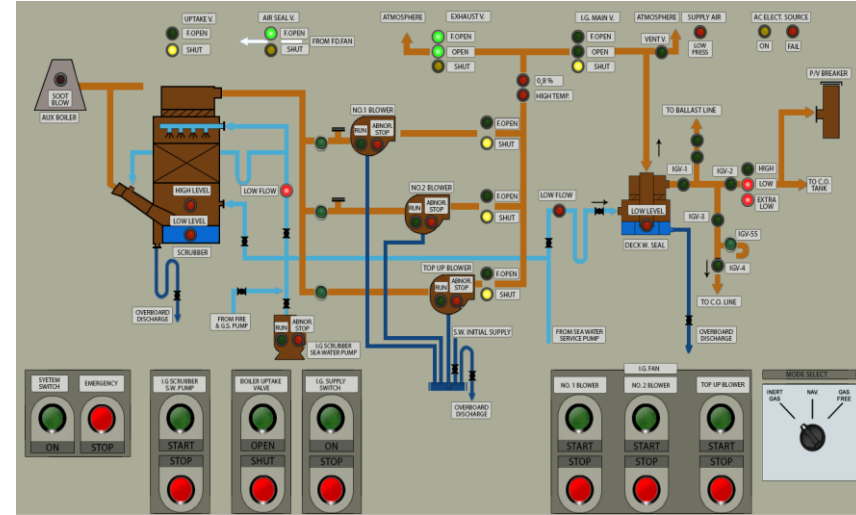


OPTIONAL MODULE

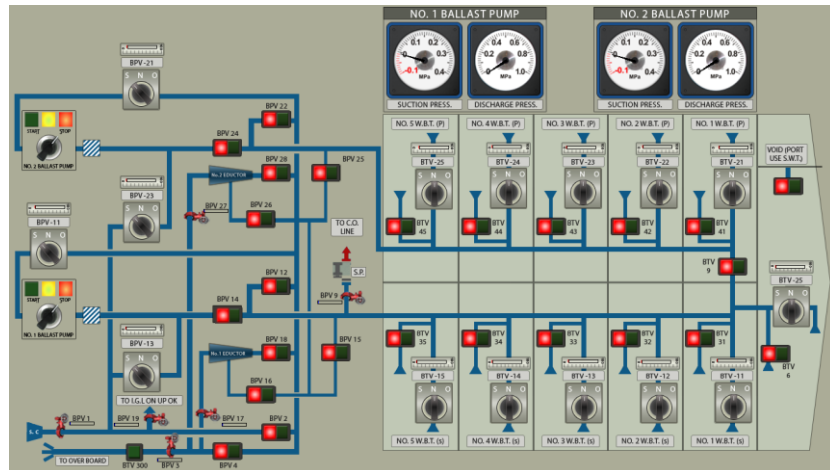
Sample Images from Simulator – VLCC OIL TANKER



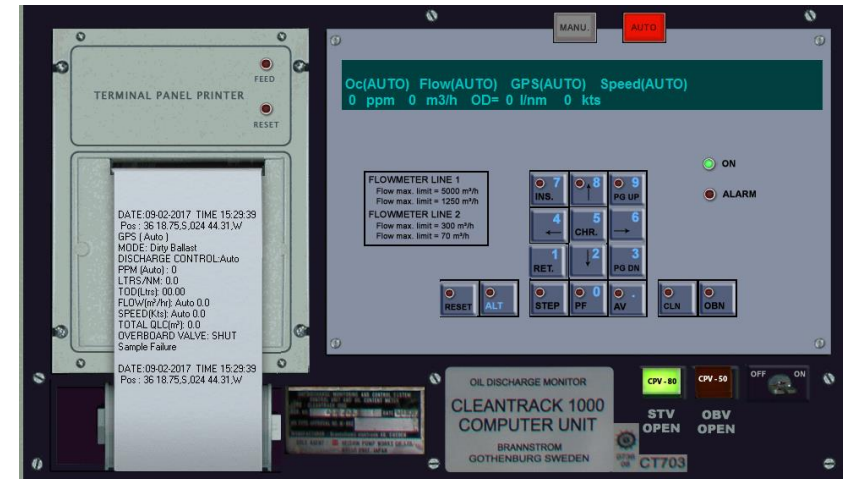
Cargo Control Room



Inert Gas Operating Panel



Ballast System



ODMCS panel



INSTRUCTOR STATION

The instructor workstation includes:

- Instructor simulator software
- Standard Hardware:
 - 1 x LCHS Server PC with keyboard and mouse
 - 3 x Monitors
 - 1 x set of speakers
 - 1 x printer
 - 1 x Debriefing PC with keyboard with Interactive board 65"



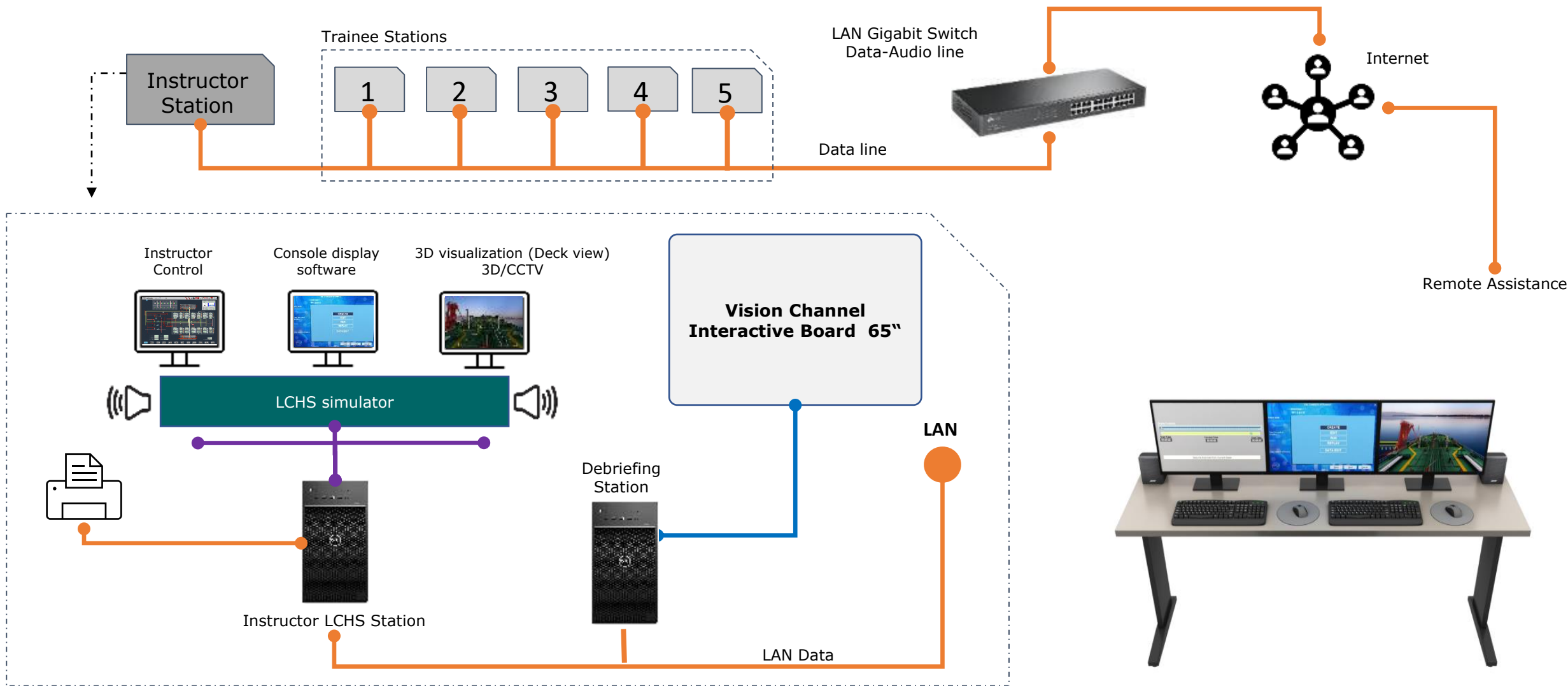
**Image is indicative of an instructor’s workstation.
Furniture not included.*

DATA SHEET

Computers	
Instructor and Debriefing PCs	Dell OptiPlex 3000 Small Form Factor Intel Core i5-12500 (6 Cores/18MB/12T/3.0GHz to 4.6GHz/65W), Internal Speaker, Dell Wired Keyboard-KB216, Dell Optical Mouse-MS116, 180 W internal power supply unit (PSU), Waves Maxx Audio, AMD Radeon 550 2GB LP (DP/DP), 16GB (1x16GB) DDR4 non ECC memory,M.2 2230 512GB PCIe NVMe Class 35 Solid State Drive, Win11/Win10 Pro DGR Natl Aca STANARD. K12 EDU only.
Monitors/Projector	
Instructor/Server	Dell 24 Monitor - SE2422H- 60.5cm (23.8")
De-Briefing Projector/65" LED Touch Screen	Dell 65 4K Interactive Touch monitor - C6522QT
Networking and accessories	
Network Switch Gigabit unmanaged	TP-Link 24-Port Gigabit Switch, 24 Gigabit RJ45 Ports, 1U 13-inch Rack-mountable Steel Case - TL-SG1024D
Printer & Cables	
Printer	Epson ECOTANK L1250 - A4 color printer USB Wi-Fi
Cables	As Required

LCHS Simulator Instructor Station (Cofiguration B: 5 trainee stations)

Network Diagram and Peripheral Equipment Links



TRAINEE STATION

Each Workstation for trainees consist of:

- 1 x LCHS PC – with keyboard and mouse
- 2 x Monitors (1 for 3D visualization (Deck view) & 1 x CCTV)
- 1 x set of speakers

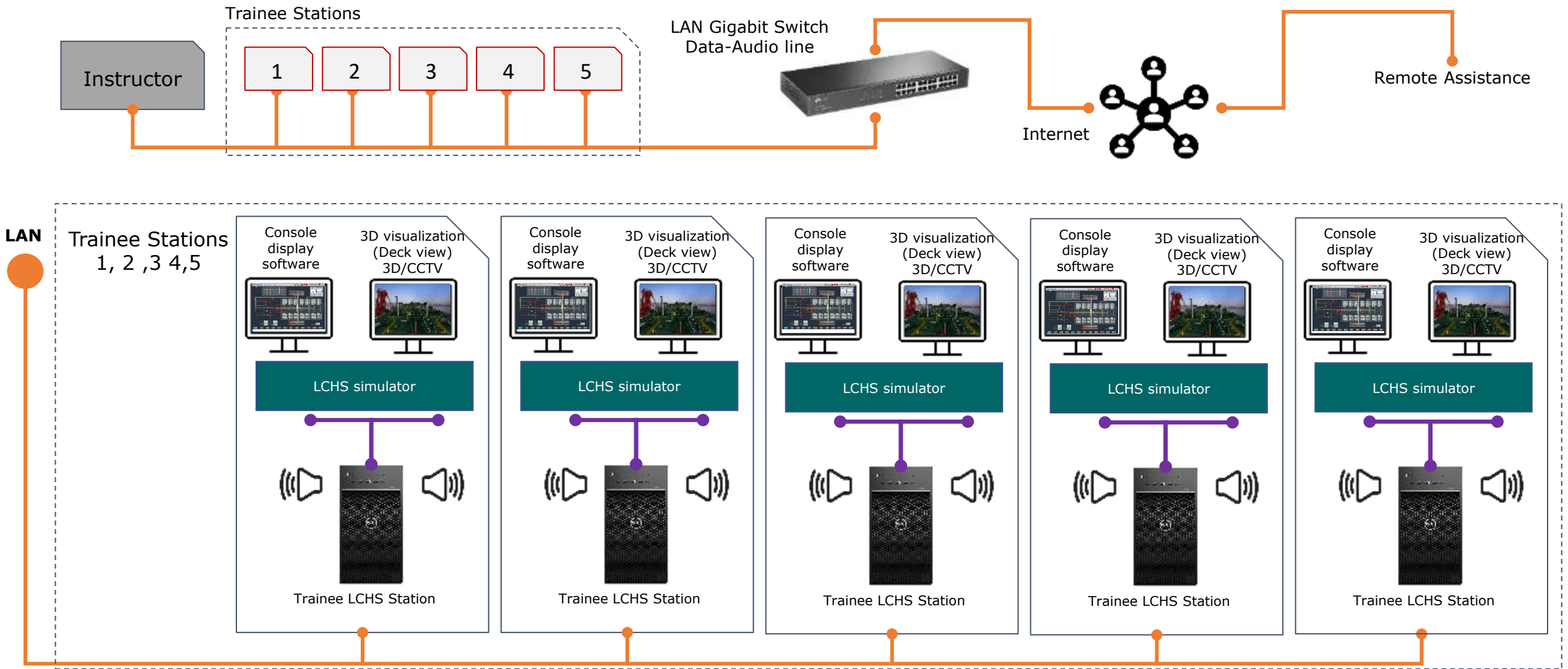


**Image is indicative of an instructor’s workstation.
Furniture not included.*

DATA SHEET

Computers	
LCHS PC	Dell OptiPlex 3000 Small Form Factor Intel Core i5-12500 (6 Cores/18MB/12T/3.0GHz to 4.6GHz/65W), Internal Speaker, Dell Wired Keyboard-KB216, Dell Optical Mouse-MS116, 180 W internal power supply unit (PSU), Waves Maxx Audio, AMD Radeon 550 2GB LP (DP/DP), 16GB (1x16GB) DDR4 non ECC memory,M.2 2230 512GB PCIe NVMe Class 35 Solid State Drive, Win11/Win10 Pro DGR Natl Aca STANARD. K12 EDU only.
Visual System Monitors	
Trainee Station	Dell 24 Monitor - SE2422H- 60.5cm (23.8")
Networking and accessories	
Alarm Sound	Desktop Speaker With USB Power OR (Use TFT/ Machine Built-in Speaker)
Cables	As Required

Liquid Cargo Handling Simulator (LCHS) Trainee Station (x5) – Network Diagram and Peripheral Equipment Linkages



Installation Training and Support

- **Installation** and **commissioning** of the simulator systems will be performed by a certified (of the simulators manufacturer) territorial integrators POLYTECH SA and PANGAEA R&D
- Prior to any installation a detailed **study of requirements** will be provided for the network and power facilities for each site of delivery.
- **Training the trainers:** Simulator operation training and instructor certification for training completion will be provided by a manufacturer's certified instructor, after installation is completed per site.
- With each system a complete **3 set of documents** will be delivered in electronic form, containing all the appropriate technical, operational and didactic material for each simulator system and its components.
- Assigned, certified system integrator for the territory of Greece: POLYTECH SA