



Marine Simulation Training

Bridge Simulator Classroom



PANGAEA R&D

SYSTEM OVERVIEW

The **Bridge Computer based simulation** stand alone classroom solution comprises of the interactive software **Bridge simulation modules** running on the **Instructor's station**, the **debriefing station** and the **trainee stations**.

- The 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 simulation are provided, adapted to the standard local educational curriculum, while following the above international training standard guidelines, recommendations and regulations.
- The simulations are designed and based on scientific mathematical models which apply to the marine engineering, hydrodynamics for creating a high precision navigation simulations.
- 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.
- 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.

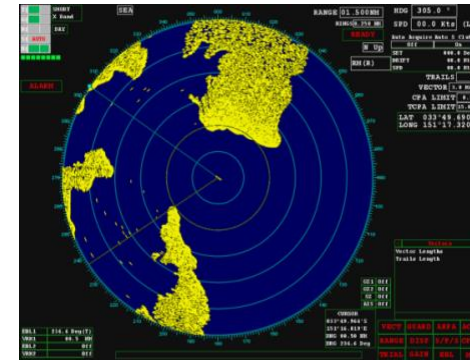
SYSTEM OVERVIEW

- The simulator provides ultra realistic ship simulation solutions for bridge officer and pilot training. The Bridge environment provides a significantly higher sense of physical realism and immersiveness and offers an accurate visual perspective, as would be available onboard, adding to overall accuracy in situational awareness. The system design offers a high degree of 2D and 3D visual effects and behavioral realism of the simulators, which allows and makes available to the instructor and the trainees, a digital state-of-the-art training facility for the Marine industry - especially **in the highly specialized tasks relating to Bridge operation, the “next to real” sense of the Bridge site and its surroundings**, the Navigation of vessels, Watch keeping, Berthing & Un-berthing mooring and tagging operations, Search and Rescue operations, Port cargo handling operations, Safety, Emergency & contingency, pilotage operations, and other ship processes which can be seamlessly carried out.
- The bridge simulator offers high performance, “next to real” simulation from a database of 20 types of own vessels and 50 target vessels, which can perform all the above mentioned specialized tasks, as different types of navigations, berthing, port cargo handling etc., in different operational scenarios and in 15 different exercise areas. These 15 exercise areas exist on the server's database, that they are in full parallel operation and seamlessly coordinated with the RADAR & ECDIS module of the simulator.
- 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 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 of a ship, that are normally unattended.
- The system offers an interface with the Engine room.
- The system offers the capability for Remote software downloading/upgrading with newer versions.

SIMULATION OUTLINE

The Bridge simulation offers training in :

- Mandatory Ship Maneuvering Training according to STCW 2010 – IMO – MARPOL and SOLAS standards for Navigating Officers at management and operational levels, NavAid
- Mandatory Training on 'Blind' Navigation Systems, NavAid
- Mandatory Training on RADAR/ARPA systems using NavAid
- Bridge Team Management Training
- Crisis Management Training
- Rule of the Road and Collision Avoidance Training
- Ship Manoeuvring and Training for Naval Officers
- ECDIS Training
- Port cargo handling
- Tug and mooring functionality
- Berthing, anchoring and other mooring operations
- Safety, Emergency situations

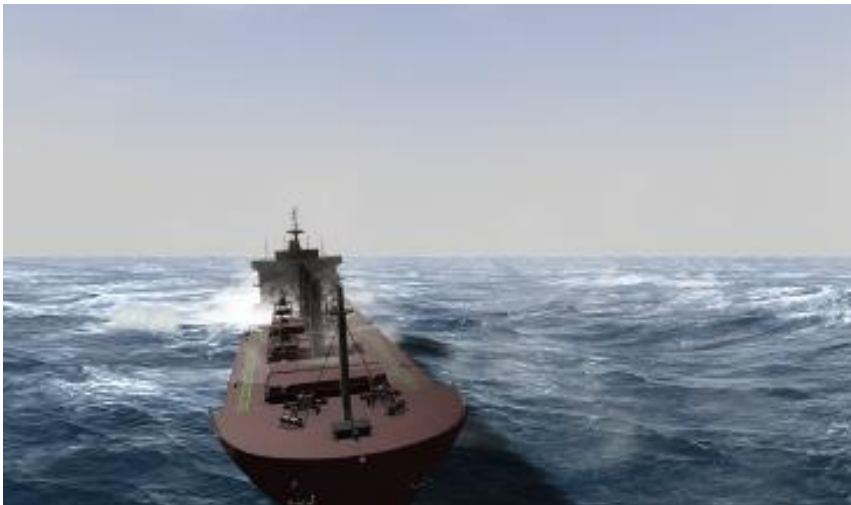


VESSEL MODELS

- The simulator is provided with 20 different types of Own ships and 50 types of target ships
- The simulator is able to displays and accounts for multiple target ships simultaneously, whereas the instructor is enabled to program voyage routes for each target ship individually.
- The target ships are equipped with navigational lights, shapes and sound signals, according to "Rules of the road".
- The model realistically simulates own ship dynamics in 6 degrees of freedom.
- The model realistically simulates own ship hydrodynamics in open water conditions, including the effects of wind forces, wave forces, tidal stream and currents.
- The simulation includes the depth according to charts that are being used.
- The model realistically simulates own ship hydrodynamics in restricted water-ways.

EXERCISE AREAS

15 exercise areas in full parallel operation and seamlessly coordinated with the RADAR & ECDIS module of the simulator. The Visual Conning system allows the choice of the exercise area for both Own and Target Vessel, the weather conditions applied and other visual parameters.



Simulated image of Own ship in various weather conditions



Sample Images from Simulator



Approaching berth



Berthing/Mooring

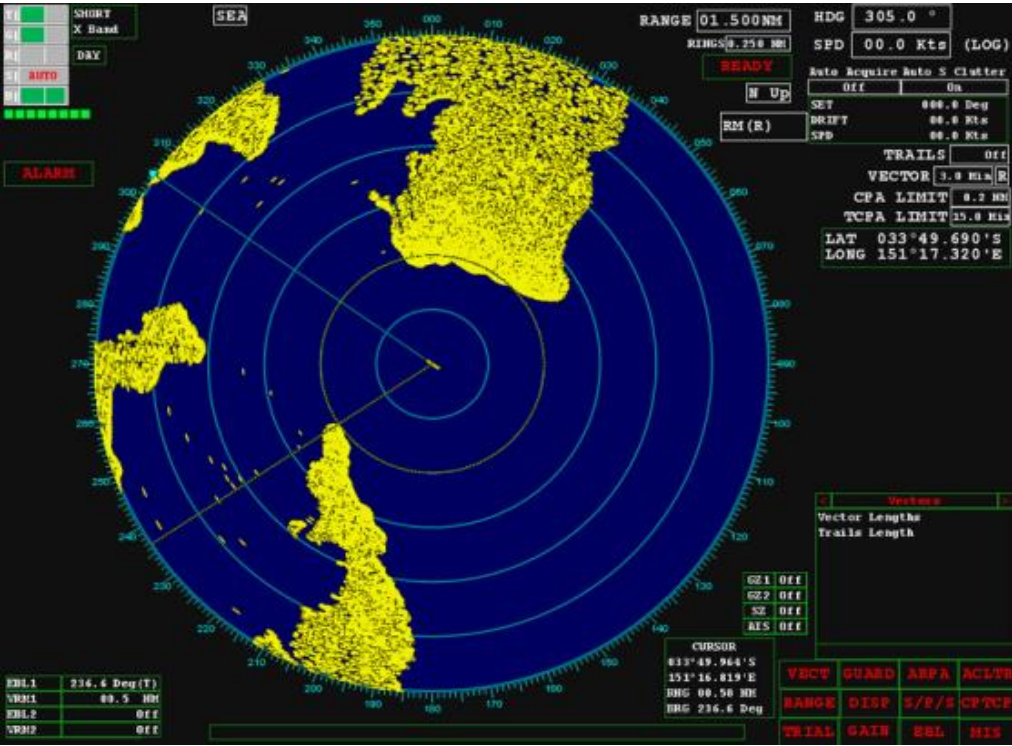


Use of Tug to assist vessel berthing

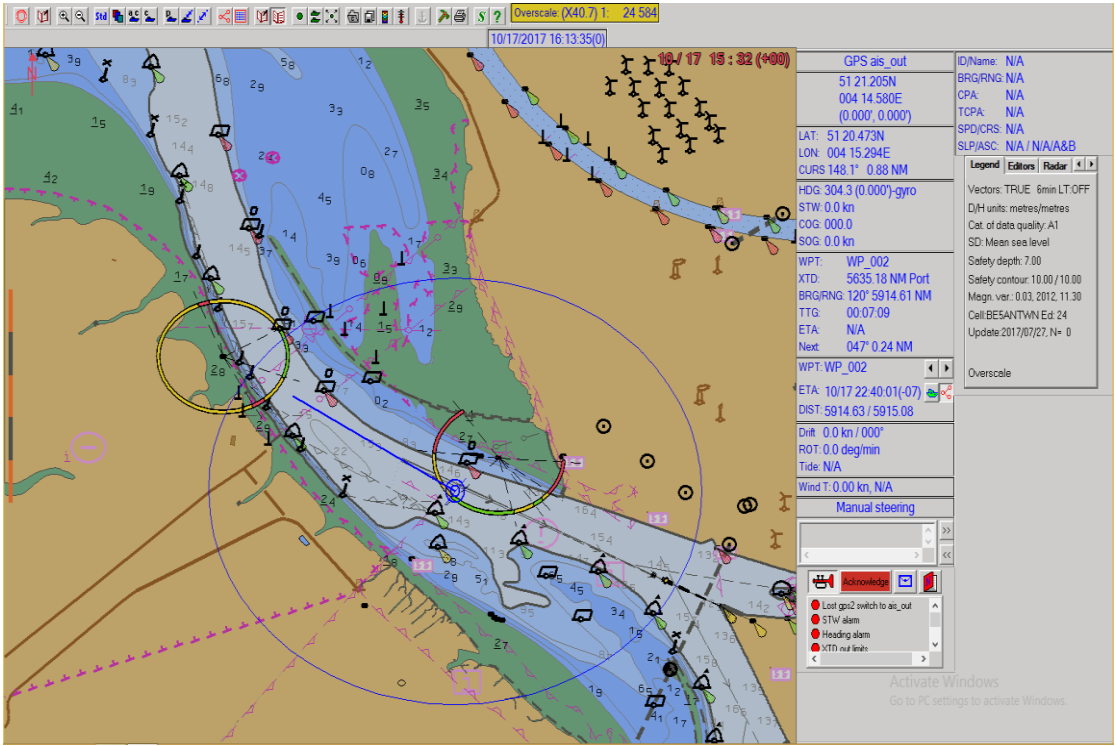


Restricted visibility

Images of Bridge Equipment – Radar & ECDIS



Radar



ECDIS

Sample Images of Bridge Equipment – **Nav-Aids**



GPS



AIS



Sample Images of Visual Integrated Conning



Visual integrated Conning



Sample Simulator images of Instructor Control

ARI
SIMULATOR

VesselsEnvironmentNav. Equipment FailureMachinery FailureLightsTugsAIS<>

ID / Name	Type	Dimensions (LOA, Bm, dMn)	Max Speed / RPM	Position	Heading (True)	SDG (k)	Steering Mode	Status	CPA / TCPA	Set Course	MMSI	IMO Number
V# 1 (Own_Ship#1)	Tanker 2	274.00m, 48.00m, 16.00m	14.7kts / 87	40° 59.99N 28° 59.70E	359.8°	0.88	Hand	Makingway		0°	636009820	9009138
V# 2 (Tanker 1)	Tanker 1	240.00m, 41.00m, 11.00m	13.9kts / 105	40° 58.32N 28° 58.47E	000.0°	0.00	Hand	Underway	0.93NM / 113.5min	0°	636011454	9225342

SELECTED SHIP ENVIRONMENT

CURRENTWIND

RateDirectionRateDirection

SWELL 1

Height (mtrs.)Period (sec.)

SWELL 2

Height (mtrs.)Period (sec.)

PRECIPITATION & THUNDER

RainDrizzleSlightModerateHeavySnow

ThunderThunder Interval (min)

CLOUD SETTINGS

CirrusCumulusCirro StratusCirro CumulusNimbo Stratus

Position0.5Radius (NM)

DAY, TIME & MOON PHASES

10:42 30 APR -15

Settings

Sky Cover

Disable Tidal CurrentTide SettingsZonesDisable Sea WavesSea ColorEnable BirdsWind Gust

CURRENTVISIBILITY

Current Rate (kts)

Clear1 NM50 MTR5 NM0.5 NM25 MTR3 NM100 MTR5 MTR

WIND - BF SCALECHANGE RATE

0.0 kts

0123456789101112

020151050

Instructor Alpha Numeric Control

ApplicationExerciseViewAdvanced ControlsTools

RPCH

37° 48.4718N122° 21.3146W D 0.305 NM B 332.1° (T)

Scale 1 : 22,000

Ship Time12:00:00 4 Nov

Position37° 48.22'N122° 21.10'W UTM

Information

Heading106.0°STW0.0 ktsCOG106.0°SOG0.0 ktsDBT0.00 mROT0.0°/min

Objects Display Mode

BaseStandardFull

Contours Display

Shallow Contour11mSafety Contour10mDepth Contour30m

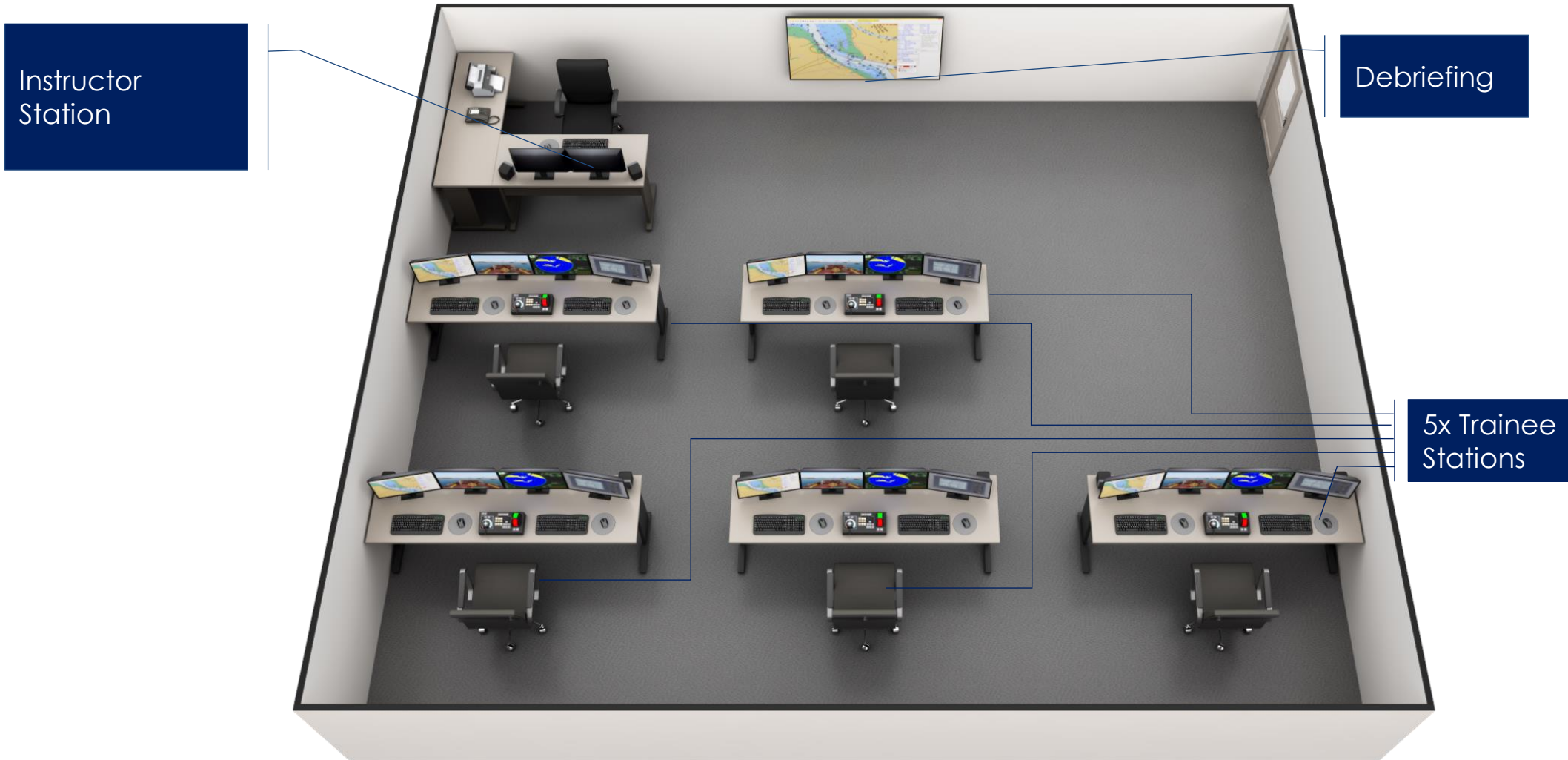
Other Display Settings

Two Shade Contour DisplayHighlight Shallow Contours

SymbolsSimpleTraditional

Instructor Electronic Chart Control

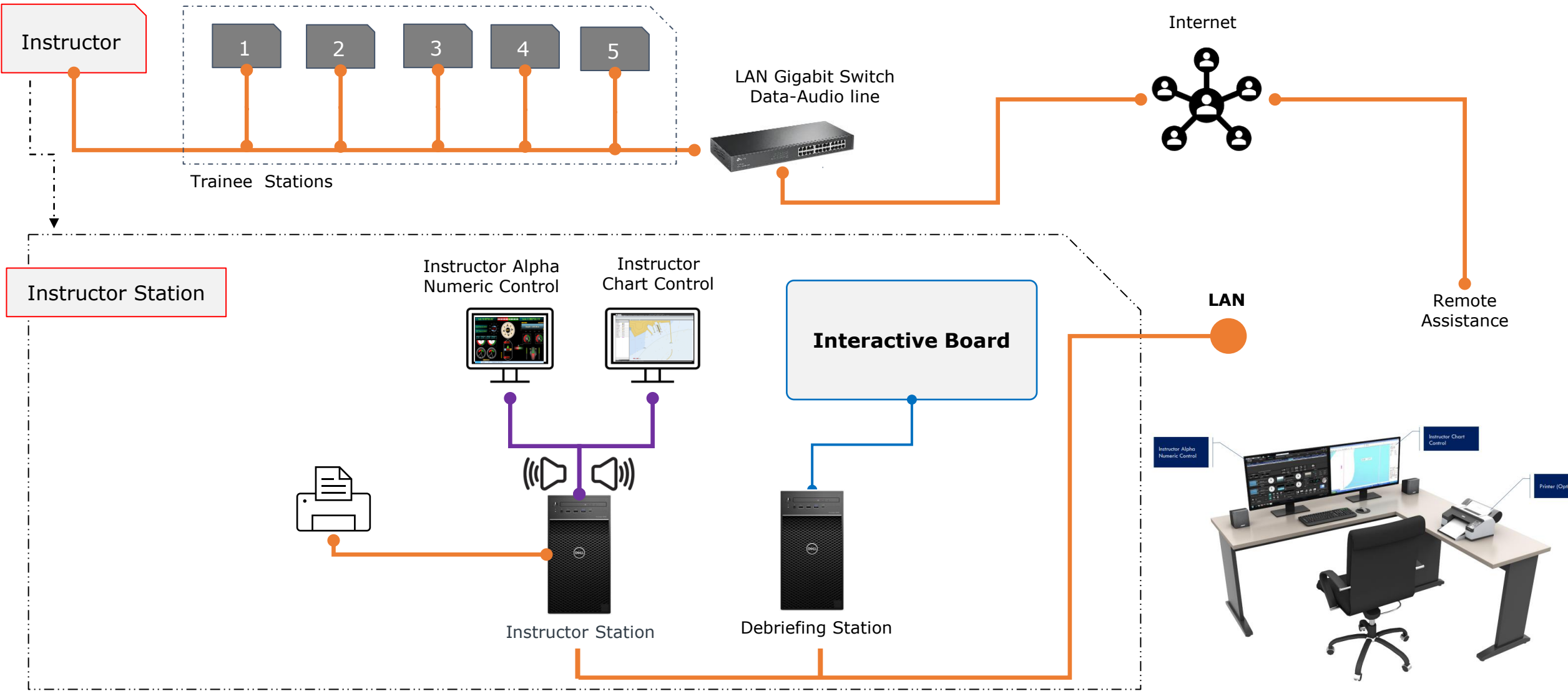
INDICATIVE ROOM LAYOUT



Configuration B : 1 Instructor, Debriefing & 5 Trainee stations

Note : Furniture are not included in the technical offer

Bridge Simulator Instructor Station
Network Diagram and Peripheral Equipment Links



INSTRUCTOR STATION

The instructor's Workstation consists of the basic simulator software and the debriefing system.

It is provided with:

- Instructor computer/server with 2 monitors installed, keyboard and mouse
- 1 set of speakers
- 1 printer
- 1 Computer with mouse and keyboard for the debriefing system connected to an interactive system (interactive board 65").

The above Instructor workstation quantities are the same for either:

Class Configuration A (3 trainee WS) or
Class Configuration B (5 trainee WS)

Each Instructor Station Software License includes:

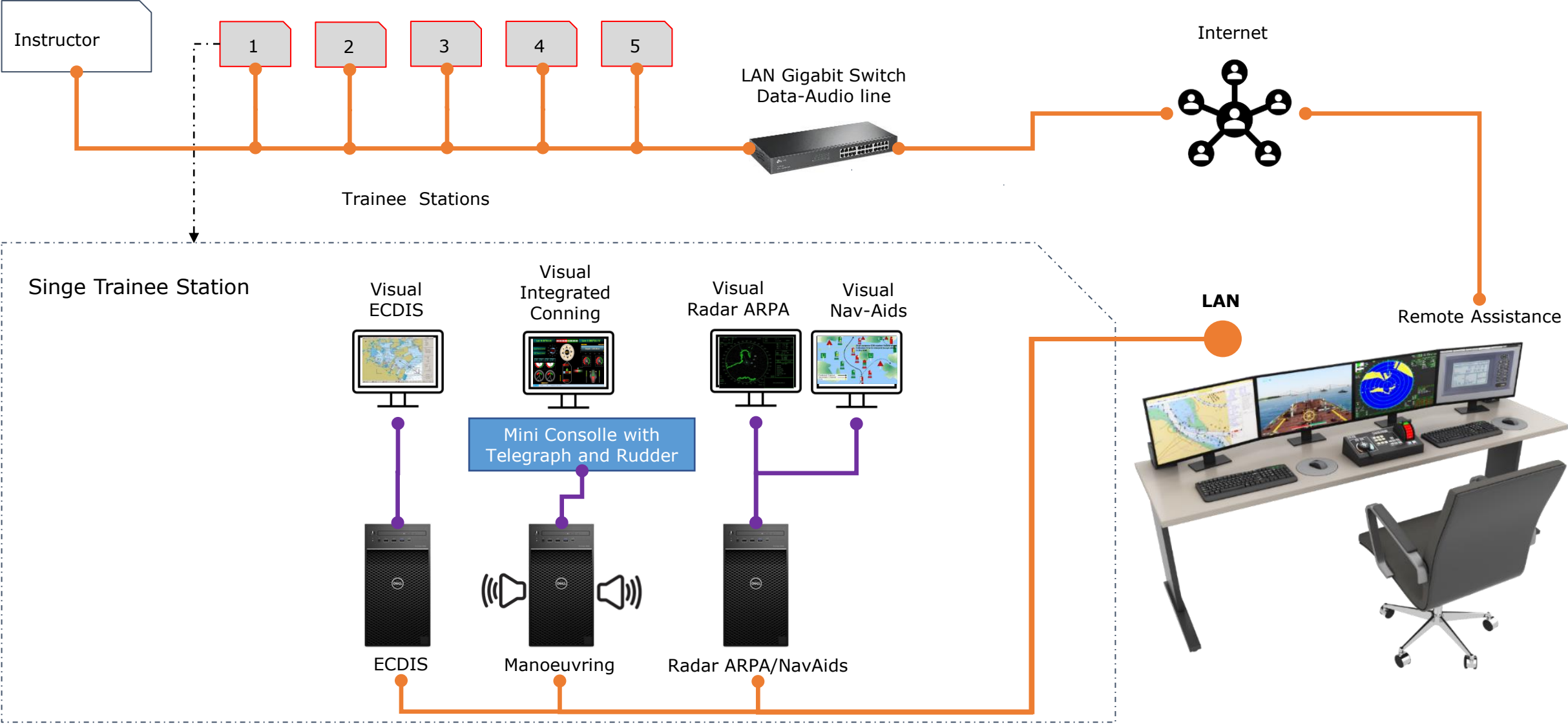
- Bridge Simulator Instructor Station
- Bridge Simulator Server Application (which gives access to the instructor on all Bridge Simulator Applications) and class monitoring
- Debriefing Application Module



Instructor workstation - TECHNICAL SPECIFICATIONS

Computers	
De-briefing station	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 STANDARD. K12 EDU only.
Instructor/Server	Dell Precision 3660 Tower Intel Core i5-12500 processor (18MB Cache, 6 Core (6P+0E), 3.0GHz to 4.6GHz, 8GB, 1x8GB, DDR5 up to 4400MHz UDIMM non-ECC memory, Intel Rapid Storage Technology Driver, Precision 3660T, Dell Wired Keyboard-KB216, Dell Optical Mouse-MS116, Dell Precision TPM, Nvidia GeForce RTX 3060, 3660T, 1TB 7200rpm SATA 3.5" HDD (boot), 500W Platinum PSU, Win11/Win10 Pro.
Graphic Cards	
Server/Instructor	Nvidia GeForce RTX 3060
Monitors/Projector	
De-Briefing Projector/ 65" LED Touch Screen	Dell 65 4K Interactive Touch monitor - C6522QT
Instructor/Server	DELL (SE2722H) 27" LED Screen, Maximum Resolution 1920 x 1080 at 60 Hz, wide aspect ratio 16:9, Input VGA, HDMI Mount Interface
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 and Accessories	
Printer	Epson ECOTANK L1250 - A4 color printer USB Wi-Fi
Cables	As required

Bridge Simulator Trainee Stations
Network Diagram and Peripheral Equipment Linkages



TRAINEE STATION

The trainee single Workstation consists of the ECDIS (Electronic Charts Display Information System software), the Conning console software with an integrated visual display system of the training area, of the ship itself and of the target ships, weather conditions etc., RADAR/ARPA software, Mini navigation console (with mini telegraph and rudder). **Each trainee workstation consists of 4 monitors, 3 computer units with keyboard and mouse and 2 sets of speakers.**

Each Trainee Station Software License includes:

- Visual Integrated Conning
- Electronic Chart System Module
 - ◊ ENC's license for offered exercise areas
 - ◊ Radar/ARPA module Software
- Navigation Aids simulation software module
- Resource pack of sound databases
- Resource pack for integration of hardware HMI components
- Resources:
 - ◊ 20 own ship models
 - ◊ 50 target ship models
 - ◊ 15 exercise areas

From the library of Ship models and Exercise areas.



**Image is indicative of a trainee workstation with a Conning console. Furniture not included.*



Trainee workstations - TECHNICAL SPECIFICATIONS

Computers:	
ECDIS PC / Radar ARPA - NavAids 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.
Conning, Visual PC	Dell Precision 3660 Tower Intel Core i5-12500 processor (18MB Cache, 6 Core (6P+0E), 3.0GHz to 4.6GHz, 8GB, 1x8GB, DDR5 up to 4400MHz UDIMM non-ECC memory, Intel Rapid Storage Technology Driver, Precision 3660T, Dell Wired Keyboard-KB216, Dell Optical Mouse-MS116, Dell Precision TPM, Nvidia GeForce RTX 3060, 3660T, 1TB 7200rpm SATA 3.5" HDD (boot), 500W Platinum PSU, Win11/Win10 Pro.
Visual System Monitors:	
Visual Integrated Conning, Radar, ECDIS	27" LED Screen, Maximum Resolution 1920 x 1080 at 60 Hz, wide aspect ratio 16:9, Input VGA, HDMI Mount Interface
Networking and accessories	
Alarm Sound for Conning, ECDIS, Radar	Desktop Speaker With USB Power OR (Use TFT/ Machine Built-in Speaker)
Cables	As required

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 trainees:** 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 sets 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 S.A.