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Submarine Simulation by Rheinmetall: Preparing submariners for their missions

In the complex underwater environment that submarines operate in, extensive prior training is a vital prerequisite for successful operational outcomes. As an experienced manufacturer of tactical simulators for conventional submarines, Rheinmetall offers the ideal solution: the Submarine Command Team Trainer (SCTT).

Rheinmetall’s Submarine Command Team Trainer (SCTT)

Developed by Rheinmetall’s Bremen, Germany-based Simulation and Training business unit, SCTT is highly scalable, ranging from operator training in individual sensors and systems to command team training for operational units.

Every important component of a submarine Combat Information Centre (CIC), including combat management systems, armament, modern sonar systems and non-acoustic sensors (radar, link, ESM, periscope, etc.) is simulated with extreme fidelity.

Importantly, the SCTT can be networked with other simulators (e.g. Submarine Control Simulators/SCSs, Anti-Submarine Warfare/ASW simulators and naval tactical trainers) via open simulation standard protocol interfaces (Distributed Interactive Simulation/DIS, High Level Architecture/HLA). To do this it uses Rheinmetall’s Advanced Naval Synthetic Environment (ANSE) for generating scenarios, joint databases and networking. It can simulate, emulate or stimulate sonar, command and control, and effector systems of various makes. The consoles are reconfigurable for assignment of specific tasks.

The SCTT records all relevant data, voice communication and monitor images for subsequent synchronized analysis and debriefing; the exercise can be restarted at freely selectable points during an exercise.

At Indo Defence 2014 Rheinmetall is presenting a mock-up of the SERO400 attack periscope, which can be used as a component of the SCTT.

The periscope image is reproduced at the periscope mock-up station in the CIC. The panoramic periscope view can be rotated in azimuth n x 360 degrees. A direction indicator on the periscope mock-up has been incorporated and gives the sighting direction with reference to the submarine. The periscope mock-up includes the main eyepiece with brow pads; a hand wheel on the ocular box is used for adjusting interpupillary distance. The optical system of the ocular box replica features two high-resolution micro displays. Highly robust, the periscope structure is made of welded aluminium or steel parts. The ocular box is mounted on a height-adjustable post. By means of a crank, the height of the eyepieces can be adjusted between 1.55m and 1.9m above ground.
For highly realistic simulation, the Rheinmetall Defence Electronics Digital Image Simulator System (DISI) generates a visual image of the environment, including ships with navigation lights, the sea surface, land, lighthouses and buoys.

The DISI is based on the functional principles of a computer-generated image and uses photo textures to achieve a realistic training environment.

Specially designed for nautical purposes, the visual image generator's mission is to display a high-fidelity visual image of the surrounding scenario.

The DISI scenario is controlled from the simulation server, while the DISI receives scenario and environmental data from the simulation server via SCTT LAN.

**How customers benefit from the SCTT**

As mentioned above, the SCTT offers a great flexibility, enabling customer-specific designs of system solutions in a spectrum ranging from generic to fully simulated and stimulated applications. Customers can also expand the database of targets and exercise areas, and/or adapt it to meet their own requirements.

Flexible configuration of simulation allows training at various levels in different on-board systems (full mission, sub-team training or part task). Training sequence and complexity of the simulation are flexible and adaptable.

Rheinmetall can completely integrate all sensors and effectors into the simulation. Depictions of all sonar systems available on the market are possible. The simulation of periscope and optronic masts looks and feels identical to on-board systems.

**Submarine simulation technology from Rheinmetall**

Rheinmetall has been supplying the submarine simulation market for over 35 years, satisfying and continually supporting its demanding client base with a full array of advanced solutions ranging from complete simulation/stimulation of original sonar, sensor, CMS and effector systems to emulation and low-cost generic replication of on-board systems in the form of a non-type specific submarine operating training system.

The Rheinmetall Group has longstanding expertise in the simulation of passive and active sonars, CMS and effector systems such as torpedoes and missiles. Furthermore, Rheinmetall has core competencies in sonar simulation and connection to command and weapon engagement systems for conventional submarines.

Freely configurable scenarios are simulated in multifaceted tactical situations under a variety of operating conditions. In addition, the simulation enables identification, classification and engagement of targets based on realistic characteristics such as sound beam progression, noise simulation and range.

**Rheinmetall: Bridging the gap between virtual reality and real world**

Rheinmetall has been supplying the world’s armed forces with simulation and training systems for ground, air and naval applications for decades, continuously perfecting
its state-of-the-art solutions. With over 2,000 systems in operation worldwide, Rheinmetall offers a comprehensive array of products, ranging from inexpensive PC-supported training systems to highly sophisticated full-mission simulators for surface, subsurface, aerial and land-based platforms, extending to simulation capabilities for fully networked joint and combined operations.

Building on its tremendous experience and expertise, Rheinmetall Defence bridges the gap between virtual reality and the real world, supplying training solutions that prepare personnel for their next mission.

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