

# New levels of realism

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**The next generation of maritime training has arrived in Europe, setting a new benchmark for realism, safety, and even sustainability. Capital Ship Management Corp., in collaboration with FORCE Technology, has launched Europe's first Extended Reality Full Mission Bridge Simulator. Planning to be installed at Capital Group's advanced new training centre on the Greek Chios Island, the simulator, based on the SimFlex4 platform, represents a significant leap forward in the use of immersive technologies for ship handling and navigation training.**

**E**xtended Reality (XR) is an umbrella term that encompasses Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR). In the context of maritime simulation, XR enables the creation of fully immersive training environments where real-world physical elements, such as bridge controls, are seamlessly integrated with high-fidelity virtual scenes. Trainees wear headsets that place them inside this digital world, interacting with actual equipment while responding to virtual scenarios. The result is a highly realistic and engaging training experience that closely mirrors live ship operations.

This shift of maritime simulators – from screen-based visualisation to full-immersive environments – could reshape how training is delivered and how effective it can be. It is enabled by a combination of mature simulation expertise, advances in hardware and graphics capabilities, and a growing need to train crews more efficiently, sustainably, and collaboratively.

## Tech's pedagogical value

The roots of FORCE Technology's XR innovation can be traced back to

Australia, where a cutting-edge SimFlex4 AR simulator is now operational at Smartship Australia in Brisbane. This facility, renowned for pilotage training and advanced ship-handling simulation, is home to the most advanced maritime AR simulator in the Southern Hemisphere.

Developed in partnership with FORCE Technology, the Smartship upgrade enables a significant leap in training fidelity. It supports port development, risk analysis, and pilot training for clients across Australia and Asia-Pacific. The simulator is also compatible with FORCE Technology's new DEN-Mark2 mathematical model, offering improved hydrodynamic performance and line force accuracy, which is key when training for tug operations or advanced mooring scenarios.

Smartship's AR platform demonstrates the technology's pedagogical value. It shows how immersive, sensor-rich environments can strengthen trainee confidence, promote operational awareness, and deliver better learning outcomes. Smartship Australia broke new ground in AR, and Capital's simulator is doing

the same, this time with the first use of XR in a full green screen environment and embedded real-world bridge equipment. The result is that to the trainee wearing a headset, the visual scene is seamless.

## Complete rethinking

Scheduled to open this year, Capital's training centre on Chios Island will act as a hub for maritime safety, sustainability, and operational excellence. The XR simulator installed there is provided by FORCE Technology and integrates advanced XR headsets, real bridge equipment, and a cohesive virtual environment enabled by green screen technology used in everything from big-budget summer blockbusters to YouTube shorts and podcasts.

The facility is a complete rethinking of how bridge operations are taught and practised. Designed to give seafarers a heightened sense of realism, the simulator allows users to move naturally within a 360-degree green screen room while interacting with real hardware. It is equipped with FURUNO's latest navigation systems, delivering a tactile experience that mirrors real bridge environments.

### Additional perks

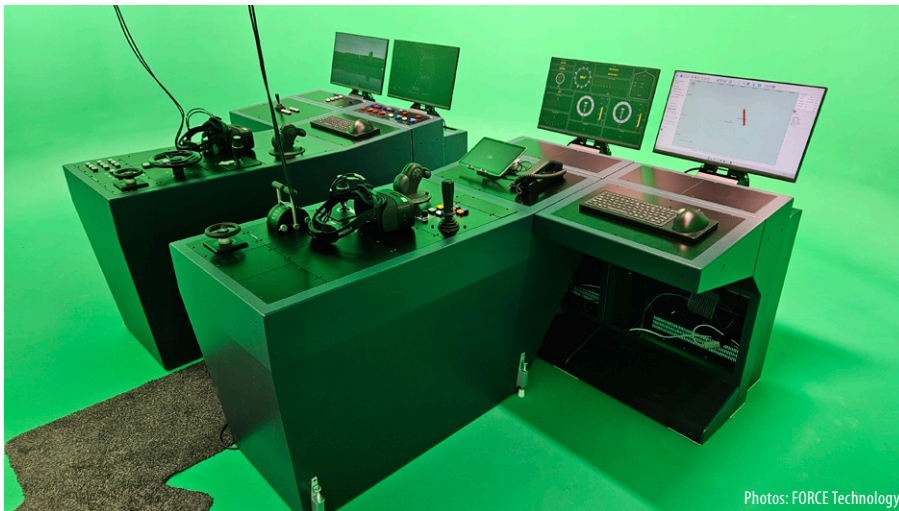
From an operational perspective, the XR solution offers multiple advantages. Conventional simulator setups can require up to 20 monitors and an equal number of high-performance computers to run them. By comparison, the XR solution delivers a superior experience using fewer PCs and no external cameras. It significantly reduces the hardware footprint, lowers energy consumption, and simplifies IT support requirements. Over the lifecycle of the system, this translates into cost savings and a reduced environmental impact – factors that are increasingly important in modern maritime operations.

Another benefit is the potential for remote participation. While the current generation of systems allows external users to join as additional vessels in the scenario, future iterations aim to introduce full avatar presence, enabling remote bridge team members to appear virtually in the same room. It is an exciting development for global fleet operations and collaborative training.

### Better-prepared

The deployment of the SimFlex4 XR Full Mission Bridge Simulator on Chios marks a new chapter in European maritime training. It builds on FORCE Technology's longstanding expertise in simulation design and pushes it into new territory. By combining XR immersion with tactile interaction with real equipment that blends perfectly into the visual scene, collaborative capabilities, and strong sustainability credentials, this new simulator provides a glimpse into the future of maritime training. It promises to produce better-prepared seafarers, more efficient training workflows, and ultimately, safer and more resilient operations at sea.

Through its work with Capital and Smartship, FORCE Technology is showing how innovation in simulation can have a real-world impact, supporting not only the professional development of crews but also the broader goals of operational safety and environmental responsibility. As new challenges continue to emerge across the global maritime sector, solutions like SimFlex4 and XR-based training environments – especially with green screen rooms – will play a central role in helping the industry adapt. ■



Photos: FORCE Technology

At the heart of the installation is FORCE Technology's SimFlex4 simulation engine, known for its precision ship and environment modelling. By embedding physical controls directly into the virtual scene, the system achieves a level of immersion and responsiveness that traditional screen-based setups cannot match. Whether training for confined waters navigation, complex pilotage operations, or port approaches, bridge teams can experience scenarios that are as close to reality as current technology allows.

Importantly, this realism extends beyond the visuals. The system also facilitates collaborative training, with multiple users able to join shared simulation scenarios, even from remote locations, allowing for distributed team coordination and joint response exercises.

### The real-virtual blend

The key to this new level of immersion lies in the green screen approach. Instead of relying on multiple high-resolution monitors to create a panoramic simulation, the entire room is painted in subtly varied shades of green. This enables XR headsets to track movement and blend real-world equipment fluidly with the virtual seascape without the jarring visual artefacts typical of digital backgrounds.

With this setup, trainees see the virtual world all around them through the

headset: the ship's bridge structure, waves, weather, and port infrastructure, but when they look down, they are interacting with real, tangible navigation controls. This eliminates the sense of detachment that can occur in conventional VR or mixed environments where the floor and walls behind or close to hardware can sometimes become part of the visual scene (think of when you see through your colleague's blurred background on a video call). With the green screen, however, the real hardware becomes a natural part of what the trainee sees.

Traditional but high-fidelity modelling also plays a critical role in realism. As FORCE Technology's flagship simulation platform, SimFlex4 supports a wide range of mathematical and environmental models, including accurate representations of local port conditions and vessel hydrodynamics. The platform is continually refined with input from decades of research and operational data, making it a trusted tool for maritime authorities and ship operators worldwide.



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