# HOLOSHIP
# DIGITAL INNOVATION | MARINE

seaspan SHIPYARDS

## ABOUT THE HOLOSHIP

**There are four key areas in shipbuilding where 3D visualization is most impactful:**

1. Vessel Design
2. Vessel Build/Production
3. Training and Handover
4. In-Service Support

## 1. VESSEL DESIGN

- Better vessel designs resulting in improved crew working environments
- Rapid design refinement and finalization results in significant cost savings
- Enhances the value for 3D design and modeling work already established in modern shipbuilding

## 2. VESSEL BUILD & PRODUCTION

- Provides an accurate and effective construction and manufacturing strategy validation that helps reduce cost and mitigate risks
- Increases the safety of a shipyard's workers by providing an opportunity to review and assess the future structure and working environment.
- Customers and other stakeholders can monitor and assess progress more frequently by incorporating digital reviews alongside on-site inspections
- Provides an efficient mechanism to allow multiple stakeholders in different areas an opportunity to review the build as it currently is in development.

## 3. TRAINING & HANDOVER

- Reduces the handover period by training or familiarizing crews before a vessel build is even complete.
- Many training scenarios can be accommodated in a low-cost and risk-free way.

## 4. IN-SERVICE SUPPORT

- Immersive visualization makes digital twin data accessible and understandable and maps complex operations data and analysis to an accurate representation.
- Provides a remote support structure to aid in vessel maintenance and refits, reducing costly down-time.
- Creates an innovation-first approach to how In-Service Support is delivered and how fleets can be managed and proactively adapt service planning in unpredictable environments and extended periods in theatre.

## SYSTEM DESCRIPTION

Seaspan Shipyard's HoloShip Initiative is an innovation effort that will bring industry leading Immersive 3D Visualization to its partners across the B.C. and Canadian marine sector.

The flagship component of Seaspan's HoloShip is an advanced immersive visualization suite produced by Virtalis called ActiveWall. The suite is a purpose-built facility at the Headquarters of Seaspan Shipyards in North Vancouver, B.C. It consists of a 5.6-meter-wide immersive 3D Display Wall that includes technology identical to that used on world leading marine digital twin visualization systems.

This immersive Display Wall provides a fully tracked stereo 3D experience in a display format that is large enough for groups to collaboratively experience (even with COVID required distancing and protocols). The Display Wall uses 3D glasses and a six-camera motion tracking system to deliver a responsive 3D scene with full depth perception. Collaborative visualization of this scale empowers better problem solving and decision making, by providing accurate spatial context and enabling multiple stakeholders to be immersed in the same 3D scene.

The final key capability of this system is the ability to integrate multiple users into a single 3D scene. For example, a group of viewers can view the same 3D scene on the display wall, while a single subject matter expert virtually performs a specific task wearing the virtual reality headset. The virtual reality user is visible as an avatar in the 3D scene, providing both a visual and immersive context for a task or design element from each participant's observation point.


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There is an art and a science to correctly visualizing and presenting data when you are building a large vessel. Visual context makes the data more natural for the human mind to comprehend and therefore makes it easier to confirm that the outcome of decisions is as planned, identify areas that need attention or improvement, and allow insights to affect change before cutting steel, thereby increasing productivity and quality. Good data drives impactful change.

Here at Seaspan Shipyards, we are leading the shipbuilding industry with our innovative platform that provides a 3D virtual reality environment that allows us to develop, integrate, test and demonstrate activities from concept through to building the ship.

The HoloShip platform readily supports ongoing engineering design efforts and reviews by digitally representing the vessel and allowing participants to assess and evaluate a wide range of scenarios including equipment arrangements, line-of-sight, accessibility or build strategy. Participants can use the facility through both group and immersive visualization environments or using a networked system at a remote location.

Seaspan Shipyards is committed to creating value as one of the leading shipyards in Canada, supporting the creation of thousands of jobs and engaging with hundreds of suppliers across Canada. To-date, we've generated over $1B in significant economic benefits to communities across the country. Every day, we work closely with our customers to help them deliver on their mandates while also providing innovative capabilities that will help ensure mission success, and immersive visualization is just one of these innovative capabilities.

## VESSEL DESIGN

Immersive visualization facilitates key decision-making early in the design process. All stakeholders, from vessel designer to production team to future crew, can form a more intuitive understanding of the design configuration and intent early in the design lifecycle. Using an immersive environment provides a significantly more compelling and life-like experience over conventional design reviews using drawings or 2D digital perspectives.

The capability provided by immersive visualization to picture, review and validate a vessel's design can aid in faster design processes and convergence on a more robust pre-production design, resulting in reduced costly late-stage changes.

Sharing the ability to view the data in real-time brings global teams together, virtually, providing a safe and cost-effective method to collaborate with large groups of people and across diverse areas of expertise.

Immersive visualization is of particular use for interaction-focused use cases, including Human Factors Validation (such as GBA+). The Holoship platform enables users to experience a design as they would in reality—incorporating key biomechanical attributes of each user, such as eye level and arm reach, when assessing a design.

## VESSEL BUILD & PRODUCTION

Immersive visualization provides an exceptional way of reviewing the build strategy for a complex scope of work such as a block with complex equipment or a highly outfitted compartment. The hull block construction method in shipbuilding uses the progressive assembly of standard interim products through purpose-designed workstations and repeating work teams. The HoloShip platform displays the sequence of key elements of the build and provide metadata for each part. Virtually building the ship early in the design process provides critical feedback to improve production design, allowing tradespeople to effectively evaluate and provide feedback that makes a design easier to build.

Safety is improved by enabling a realistic pre-action review with all stakeholders in challenging build evolutions. Immersive visualization enables everyone to review and understand the required process to execute the build safely.

## TRAINING & HANDOVER

New vessels require extensive familiarization with the design and functionality by the ship's crew to ensure they are able to accept the vessel once construction and trials are complete. Seaspan Shipyard's HoloShip provides an immersive visualization facility and interactive visualization platform that supports crew training by transferring personalized knowledge and leveraging Seaspan Shipyard's expertise and lessons-learned during the build. This capability enables earlier and faster training to allow for a quicker vessel handover and ensures the development of critical skillsets by the crew.

Immersive visualization is a key element of next generation training solutions for operators in almost all fields, especially those where operators must be trained for high-risk environments or on expensive assets or platforms.

Combining immersive visuals, accurate spatial controllers, and a platform behavior simulation, an immersive visualization facility can cover a wide range of operator duties and scenarios, enabling a more efficient use of people and resources.

## IN-SERVICE SUPPORT

Seaspan Shipyards is driving digital transformation in modern shipbuilding using immersive visualization to ensure vessels we build or maintain are mission-ready whenever and wherever they are needed.

The HoloShip platform helps operators and ship maintainers manage vessel lifecycle more efficiently; reduces down-time for repair and maintenance by providing predictive information; and integrates multiple data sources by leveraging an information rich visualization environment. Immersive visualization provides:

- Data streams to manage vessel maintenance and predict maintenance issues
- Dynamically-updated representations of vessels and their subsystems
- Virtual reality to visually interrogate and interact with 3D digital twin data
- A network of vessel sensors that report on the condition of the vessel and its subsystems
- Advanced artificial intelligence and machine learning algorithms

Immersive visualization provides a foundation for effective life cycle material management, logistics support, design and engineering, quality management, training, preventative and corrective maintenance, management of spares, vessel enhancement, and equipment and platform disposal.