**HEXAGON** | US FEDERAL



## PROFILE

**Company:** U.S. Naval Sea Systems Command (NAVSEA)

**Website:** www.navsea.navy.mil

## Products Used

- Hexagon Interoperability Framework™

- Hexagon 3D Viewer

- Commercial-off-the-shelf (COTS) software and hardware

## Key Benefits

- Easy data access and visualization

- Intuitive and easy-to-use interface

- Geometrically accurate virtual 3D ship model

- Ensures accurate identification of equipment for maintenance or logistics

- Select equipment to view associated drawings, tech manuals, training, logistics, maintenance status, and data

- Select equipment and file 2-Kilo maintenance form

- Aid to familiarization training

- Applicable to legacy ships using drawings or photographs

- Single point of access to access to data

# A 3D GRAPHICAL INTERFACE FOR SHIP DATA

## THE VISION

A major challenge for the U.S. Naval Sea Systems Command (NAVSEA) is to make ship maintenance and logistics as easy, efficient, and cost-effective as possible. Both afloat and ashore, it is often difficult for a user to identify the correct piece of equipment on a ship and retrieve all the data and documents needed. NAVSEA needed a highly adaptable, intuitive, scalable, and portable means to view ship and ship class components and related data to support maintenance and logistics throughout a ship's life cycle.

## PROJECT OBJECTIVES

- Provide a simple, intuitive graphical interface to access and manage ship data
- Support maintenance and logistics throughout a ship's life cycle

## THE CONCEPT

Hexagon US Federal worked with NAVSEA to develop the concepts for two interrelated systems: 3D Viewer and Interoperability Framework. These systems improve data access, visualization, and performance. The 3D Viewer allows users to query and view 3D or 2D representations of ship structure, piping, cable, HVAC systems, compartments, and equipment as well as make the structures transparent. In addition, users can view and redline (nondestructive markup) associated drawings, documents, and technical manuals. Use of the 3D interface helps ensure users have selected the correct piece of equipment and are viewing the correct data.

The Interoperability Framework makes data access and visualization dramatically easier. Users no longer need to log into the multiple ship data repositories and spend large amounts of time compiling data from individual log-on sessions. With one point of access to all ship data and a geometrically accurate model to navigate, the system supports mission readiness and familiarity training while allowing users to interoperate with multiple ship repositories or data systems. Ultimately, this helps optimize processes, reduce total ownership costs, and improve readiness and quality of life.

## THE SOLUTION

Our solution was the 3D Viewer and Interoperability Framework™, a standards-based, scalable architecture that gives users an integrated, logical view of data retrieved from multiple software systems. The system builds on commercial off-the-shelf (COTS) technology to provide easy Web-based navigation, a geometrically accurate 3D virtual environment, and a single point of access to all available ship data. Interoperability is the key enabler for exposing configuration managed data to numerous users, thereby moving the focus from unique system interfaces to the data itself.

The 3D Viewer is built on a common 3D Graphical User Interface (GUI) that provides a lightened polygonal model representation of the ship that can be accessed through a Web-based interface on laptops or portable devices. The Interoperability Framework is an XML, Java 2 Enterprise Edition (J2EE)-compliant architecture providing Web-based access to multiple systems. Compatible with any Web server, the Interoperability Framework provides login access control to required data according to established privilege levels. The system automatically logs into the appropriate databases or systems, queries these systems based on the original request, and compiles, integrates, and presents data in a configurable style sheet.

Although prototyped using ship data, the Interoperability Framework can support any large or complex set of data, such as weapon systems, vehicles, and facilities. Hexagon designed the system so that the typical sailor would find it easy and intuitive to use. Users can access the system using an ordinary Web browser and log in only once for controlled, secure access to all data repositories related to the ship. The primary GUI is a geometrically accurate model representation of the ship that allows users to conduct virtual walkthroughs and drill down to specific components or spatial areas of the ship. Users can "drive" through the structure using basic button selections. They need only touch a piece of equipment to retrieve related data, and they can toggle selected parts of the model to make them transparent or invisible and see behind the equipment, something possible only in a virtual environment. Users can perform graphical or text-based queries to find and retrieve any ship component information.

Initially developed for the U.S. Navy LPD 17 Amphibious Assault Program and Torpedo Weapon Retriever (TWR) ship, NAVSEA is currently planning an extension of the system to additional platforms and programs. It has also been deployed at NSWCCD SSES Philadelphia to drive an immersive CAVE environment.

## THE FUTURE

Hexagon has over 30 years of marine and ship experience as well as a proven track record for software system engineering using our Solutions Engineering™ methodology to address the complete system life cycle. We have the experience with system engineering, software development, technology, and process knowledge to effectively design, develop, and deploy the right system for your needs. We ensure that it works seamlessly to reduce costs, improve efficiency, and provide a scalable enterprise architecture.

Hexagon provides services for system integration, software engineering, data management, enterprise content management, cyber security, and IT support.



*TORPEDO WEAPONS RETRIEVER 3D VISUALIZATION*

## Contact Us

Email: info@hexagonusfederal.com

Tel: +1 800 747 2232

hexagonusfederal.com

## About Hexagon US Federal

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