



PROFILE

Company: Huntington Ingalls Industries (HII) - Ingalls

Website: www.ingalls.com
huntingtoningalls.com/products/ipd

Ship Class: LPD 17 (12 ships)

System: Integrated Data Environment (IDE)

Products Used

- Hexagon Ship Information Repository (SIR™) solution
- Hexagon Integrated Ship Design and Production (ISDP) 3D CAD software suite
- Hexagon Solution Engineering™ system engineering process

Key Benefits

- Integrates all programmatic, support, design, engineering and production data for the LPD 17 ship class
- Enables simulation, testing, and virtual inspections before construction, saving time and money
- Hull applicability minimizes effort to design and produce 12 ships
- Provides a single point of access to configuration-managed data and documents
- Supports concurrent design and build through incremental review and release
- Integrated configuration and change management includes CAD models and enables change tracking
- Allows data to be captured once, used many times

HEXAGON US FEDERAL MANAGES DESIGN AND PRODUCTION OF LPD 17 SHIP CLASS

THE VISION

The vision for the LPD 17 Integrated Data Environment (IDE) was to conceive, design, build, test, train, and operate the ship in a computer before cutting metal. This enabled the U.S. Navy and Marine Corps to simulate shipboard operations that ensured the LPD 17 would meet mission requirements, avoiding costly alterations after delivery. It also enabled the shipbuilder to validate and optimize the production process before construction, eliminating “trial and error” prototyping and production. As a result, the program was able to meet objectives to reduce total ownership costs and incorporate design for ownership principles. Hexagon US Federal provided the technical leadership to envision, design, develop, and sustain the first ship acquisition IDE mandated by the Navy.

The LPD 17 IDE will maintain the configuration and configuration changes for each of the 12 ships of the San Antonio class, which are the next generation of powerful amphibious assault platforms used to project power ashore. Collectively, these ships functionally replace more than 41 ships (the LPD 4, LSD 36, LKA 113, and LST 1179 classes of amphibious ships).

PROJECT OBJECTIVES

- Design, develop, and sustain the IDE system and infrastructure for the LPD 17 ship class
- Re-engineer processes to incorporate IDE
- Enable desktop access across the enterprise and ship program to all LPD 17 data and documents
- Interface the LPD 17 IDE to Navy and HII legacy systems

THE CONCEPT

The IDE is a shared, configuration-managed, distributed data environment accessed through a common set of tools and interfaces. Data is captured once at its source and used many times by all stakeholders - shipbuilders, integrators, and the government. Navy sites across the country also access the LPD 17 IDE. The single source of configuration controlled data increases the accuracy and availability of data to end users. It eliminates passing of paper, conflicting data, and time wasted searching for data.

Per U.S. Navy mandates, the Hexagon IDE also integrates programmatic and support data, extending the same cost reduction and benefits to the entire enterprise, not just serving as a PDM/PLM tool for engineering. This also enables the Navy to monitor overall progress. In-place delivery of contract deliverables further reduces program costs and preserving deliverables within the IDE. To achieve this, the IDE contains four categories of data and documents:

- Ship product model data such as 3D models, specifications, parts, engineering calculations, and studies
- Associated data products such as drawings, technical manuals, GFI, product sheets, vendor data, technical manuals, and training materials
- Change requests/orders to track authorization and modifications to the ship product model
- Program execution information such as plans, schedules, deliverables, and procedures

Finally, the IDE must support many users from many different functional areas to work together in one logical system: design, engineering, planning, production, test, material management, configuration management, requirements, cost analysis, ownership, and logistics. This requires IDE support for multiple data views and update permissions for functional areas. Navy and shipbuilder legacy systems must be interfaced with the IDE. Functional areas may continue to use specialized legacy systems, but the end products must be incorporated and managed in the IDE. The long construction time required for Navy ships also demands IDE support for concurrent design and build with incremental approval and release capability.

THE SOLUTION

Hexagon provided hardware, software, services, and infrastructure needed to implement the LPD 17 IDE. The two key software packages were Integrated Ship Design and Production (ISDP) suite for 3D computer-aided design (CAD) and the Ship Information Repository (SIR™) for the shipbuilding product model. More than 1,200 people have used the system daily during peak production.

Hexagon SIR supports document management, product data management, workflow management, configuration

management, change management, and revision history. The SIR shipbuilding product model supports ship class, hull, system, compartment, zone, unit, functional item, SCLISIS data, requirements, CAD files, equipment in CAD files, catalog parts, engineering parts, action requests (engineering change requests/proposals), configuration package, and shipbuilding document types, as well as other object types.

The SIR product model is unique in its support for hull applicability, which enables shipbuilders to manage data by default for the ship class, and manage hull-specific exceptions only as needed. In a class mode, all elements (design, engineering, production, changes) are applicable to all hulls in the class by default. The LPD 17 IPDE has been in production for over 16 years. During that time, Hexagon has delivered IDE enhancements and upgrades to the production environment while ships were in design and production. So far, nine ships have been successfully delivered and two are under construction.

THE FUTURE

The Hexagon LPD 17 IDE solution will continue in service through the last ship expected to be delivered in 2019. Estimates show the U.S. Navy will save more than four billion dollars during the life of the ship class through decreased manufacturing rework and increased collaboration and innovation.

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 enterprise information management 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.

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