

Augmented Reality for Naval Applications

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Digital Thread

- In order for shipbuilders to meet this demand and these challenges before the window of opportunity closes, they will have to design and build ships faster and better than ever before. This requires a completely different approach to ship design and construction.
- Achieve greater performance, lower ownership cost, higher fleet availability and reliability, and greater quality and compliance with the latest marine safety and regulatory requirements
- Make ships easier to build and repair, lowering construction, service and total ownership costs Shipbuilders will have verified and trusted suppliers linked with shipyard and service personnel with production schedules and 3D models of all aspects of the design.

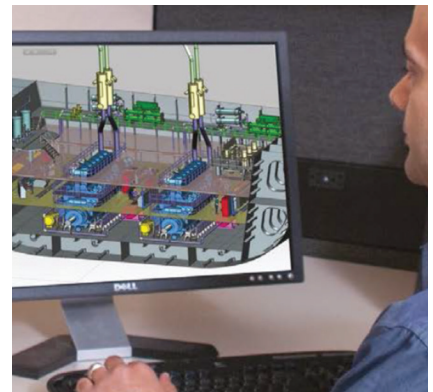
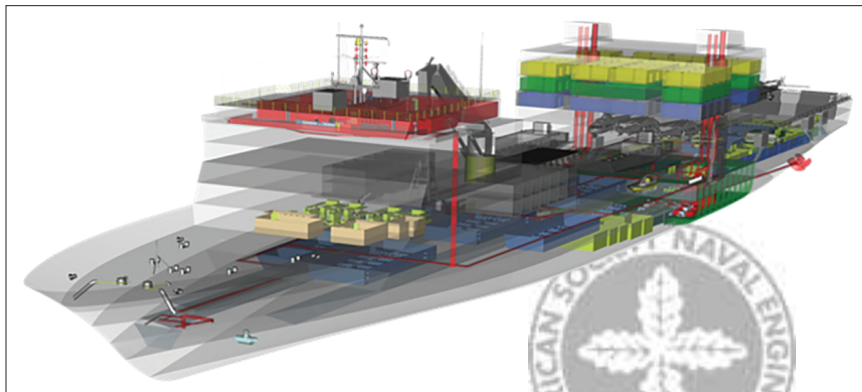


FIGURE 1. Digital thread and shipbuilding—(Siemens PLM Software, 2017)

- A holistic approach to shipbuilding based on a technology foundation that transcends the entire ship lifecycle and supporting enterprise.
- It integrates design, engineering, production, supply chain and assembly regardless of location into a seamless enterprise by ensuring controlled access to a single, comprehensive and current version of ship information throughout every phase of the ship's lifecycle.

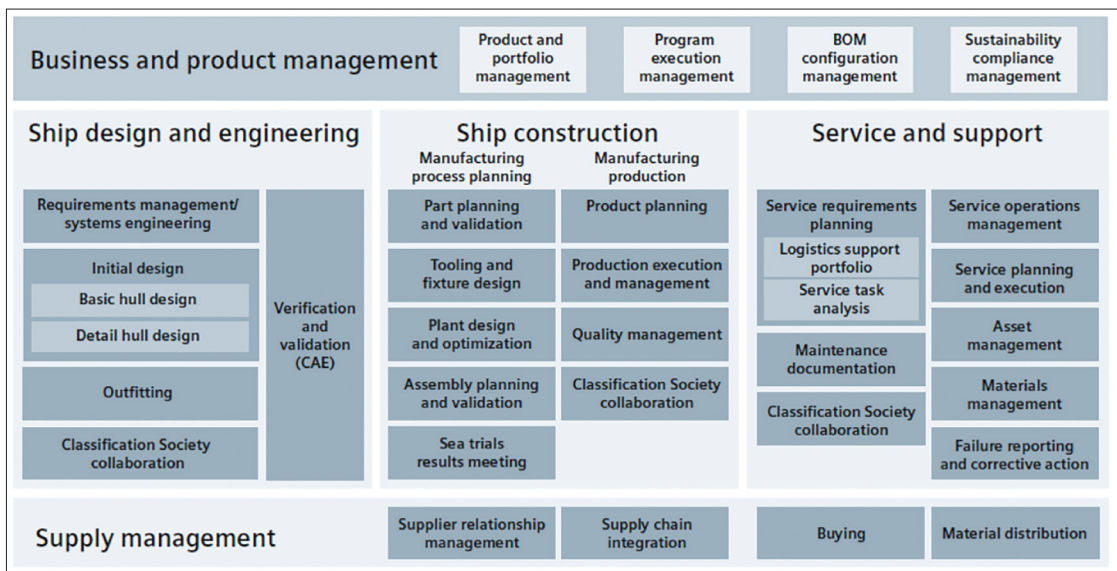


FIGURE 2: Integrated digital environment (IDE) (Siemens PLM Software, 2017)

Integrated Digital Shipbuilding

- The traditional way of designing ships with 2D paper drawings is being replaced by all digital designs that are stored in an online cloud-based database.

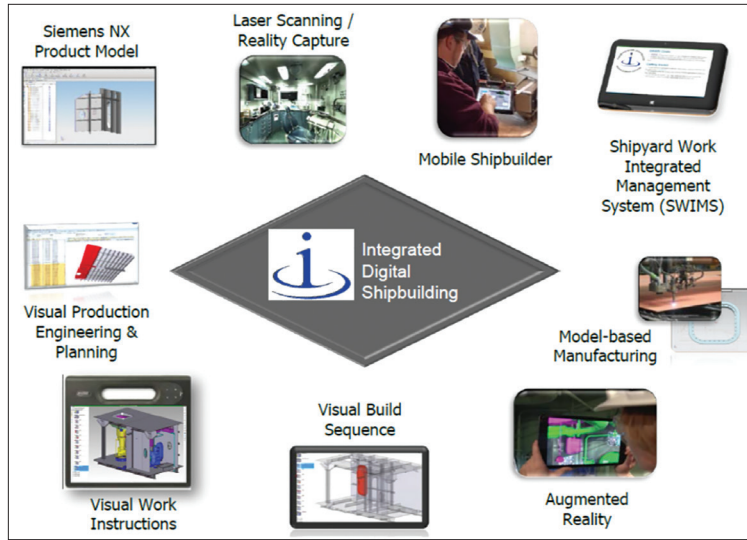


FIGURE 3: Integrated digital shipbuilding (Woodhouse, 2016)

- Augmented reality (AR) is a live direct or indirect view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data.
- Augmented Reality (AR) is a disruptive technology being implemented throughout many different industries today.
- AR is the correlation of digital information to a tangible object or environment.

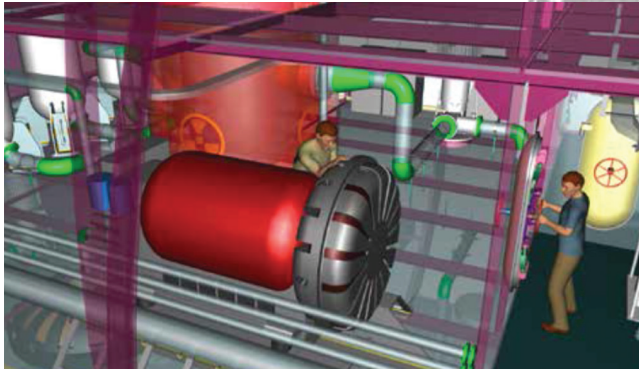


FIGURE 4: Digital manufacturing and ergonomic analysis



FIGURE 5: Virtual reality used for training purposes

- Virtual Reality is better suited for use in a controlled environment.
- With Virtual Reality the user is immersed in a completely virtual setting.
- Conversely, Augmented Reality enables the user to retrieve relevant digital information in real time from their surroundings.



FIGURE 6: Augmented reality vs virtual reality

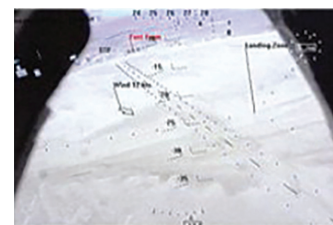


FIGURE 7: NASA X38 display showing video map overlays including runways and obstacles during flight test in 2000.

Current State Augmented Reality

- Current state AR experiences are primarily delivered and utilized on tablet based platforms.



FIGURE 8: Laser range-sensing using a hand-held device

- The future of Augmented Reality is moving towards Head Mounted Displays (HMD).
- Augmented Reality can improve efficiencies by eliminating non-value added work which in turn improves quality, cost, safety, and schedule.



FIGURE 9: Augmented reality with HMD

Augmented Reality Use-Cases

- Training
- Operations & Maintenance
- Inspection
- Manufacturing Construction
- Logistics

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