



Ingalls Shipbuilding

A Division of Huntington Ingalls Industries



Pathway to Digital Shipbuilding

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Presentation Overview



- DoD Requirements and Research
- Setting Expectations
- Develop the Vision
- Path to the Vision
- Digital Roadmap
- Execution Challenges
- What is Next?

DoD Requirements and Research



- Navy Requirements and Efforts

- Ship Acquisition Program rarely requests delivery of Product Model data
- The NAVSEA infrastructure is not prepared to exclusively operate within the model based environment
- NAVSEA has funded a project to study the transition to a 3D product model environment
- MIL-STD-31000
- Department of the Navy Policy to procure and accept product and technical data in a digital format¹.
- NAVSEA Instruction to procure and accept product model data used for ship and ship system design, acquisition, and fleet support activities ².

- DoD Research Efforts

- National Shipbuilding Research Program
- DoD Engineering Drawing and Modeling Working Group
- Digital Manufacturing and Design Innovation Institute
- ManTech Program

“Recent Navy investment in the Model Based Environment are focused on completing the Digital Thread. These activities will help identify challenges, conduct research, overcome implementation issues, and provide lessons learned in manufacturing and quality assurance where a complete digital 3D product model serves as the authoritative information source for all activities in the product's lifecycle. In all, an effective and high quality digital foundation will help create affordable next generation naval platforms.”

- John U. Carney, Director, Affordability Initiatives Division and Navy ManTech Program; Office of Naval Research

¹ DON POLICY ON DIGITAL PRODUCT/TECHNICAL DATA, ASN(RDA), Washington D.C., 10/23/2004.

² ACQUISITION AND MANAGEMENT OF PRODUCT MODEL AND OTHER TECHNICAL DATA, NAVSEA Instruction 9040.3A, Naval Sea Systems Command, Washington D.C., 4/3/2013.

Setting Expectations

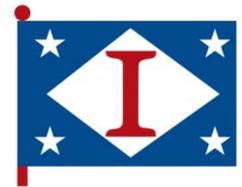


- Production Volume Comparison
 - Commercial Industry
 - BMW produces 30,000 vehicles a year in the South Carolina plant alone
 - Army Industry
 - Stryker Armored Vehicle averages 50 units a year
 - Air Force Industry
 - Joint Strike Fighter averages 30 planes a year
 - US Navy Ship Industry
 - Surface Ship averages 3-7 years
- Low Production Challenges
 - High change volume
 - Manual change incorporation
 - Low volume of repetitive shapes, sizes, configurations, etc
 - Multiple design and planning tools

"A strong model based enterprise is a prerequisite for advanced engineering and manufacturing technologies. Our incredible team of scientists and engineers is involved in the development of technologies that will advance the model based enterprise to meet the current and future operational needs of the fleet. At the Naval Surface Warfare Center and in particular Carderock, we are also committed to applying these technologies to weave the digital tapestry necessary to continually advance our in-house S&T, engineering, and manufacturing capabilities."

- Dr. Joseph T. (Tim) Arcano, Jr., Technical Director, Naval Surface Warfare Center Carderock Division West Bethesda, MD, November 10, 2014.

Develop the Vision



- Team Development

- Requires committed free thinking leaders from each organization
- Identify Enablers, Barriers, Capabilities, and Requirements

- Paint the Landscape

- Document Current State
- Develop End State

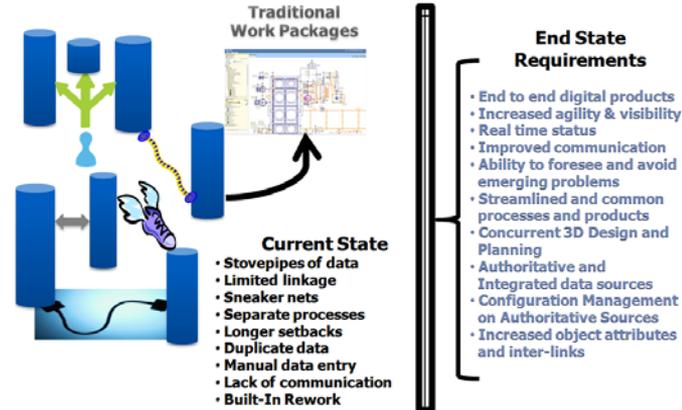
- Set Priorities & Goals

- Quick win tactical fixes
- Long-term strategic roadmaps

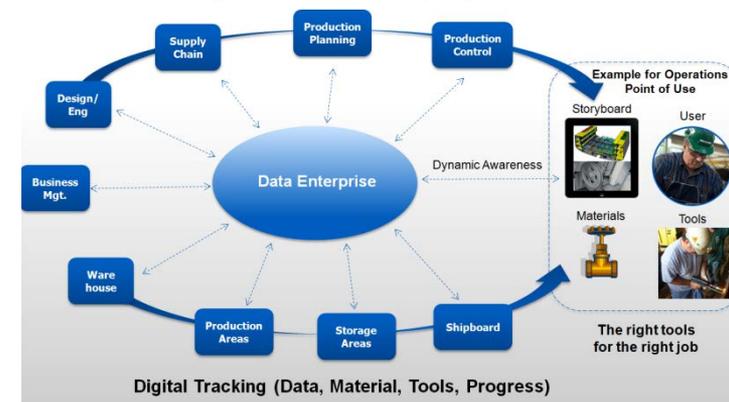
- Initiative Establishment

- Digital Value Stream
- Data Enterprise
- Digital Point of Use
- Digital Tracking

Typical Digital Landscapes



Digital Value Stream Flow (Data)





Process Steps Definition

1. Define End State
2. Develop Requirements
3. Define Barriers
4. Establish Solutions
5. Develop Execution Plan

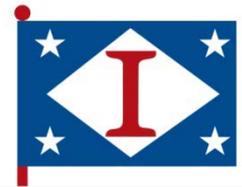
Actions

1. Plan & Project Development
2. Determine Funding Sources
3. Plan & Project Execution
4. Implementation
5. Cultural Change Management
6. Achieve Results



C & O Canal Towpath, Somewhere Between Oldtown and Town Creek

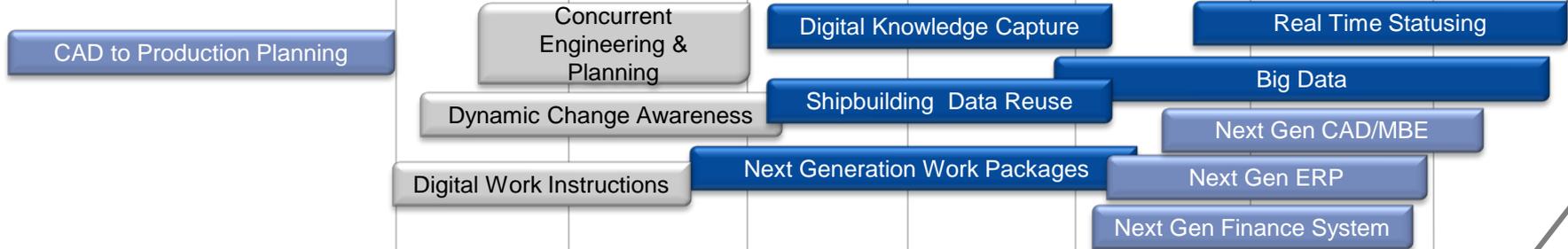
Digital Roadmap



2013 2014 2015 2016 2017 2018 2019 2020

Data Enterprise

Recurring System Upgrades



Automation & Technology Insertion

Recurring Hardware Upgrades and Technology Enablers



Material & Work Flow Tracking

Agile Tracking Enablers



Legend



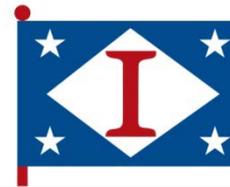
Execution Challenges



- Resistance to Change
- Process Modifications
- Seamless Integration of a Total Enterprise Solution
- Data Architecture
 - Preventing Obsolescence
 - Identification of Correct & Efficient Architecture
- Navy Acceptance of Information Delivery Change



Next Steps



- Execute Strategy
- Integrate and Implement Solutions
- Reduce Navy Cost
- Collaborate Across Services and Agencies

