

# Navy Product Data Initiative



December 11, 2007

# Purpose

- Introduce the Navy Product Data Initiative (NPDI).
  - Being developed by the major shipyards and NAVSEA under the auspices of the National Shipbuilding Research Program (NSRP).
- Explain the need for an Integrated Product Development Environment (IPDE) specification.
- Describe the effort to develop and implement such a specification.

# IPDE Benefits

- Reduction in design cycle time
- Elimination of physical mock-ups
- Reduction of design errors found during construction
- Reduction in number of procured parts
- Reduction in number of Navy drawing approvals
- Improvements to learning curve

An Integrated Product Development Environment (IPDE) is a collection of business processes, computer systems, and associated services, which house the product model data, and enable people to work in concert towards common business goals throughout the lifecycle of a product.

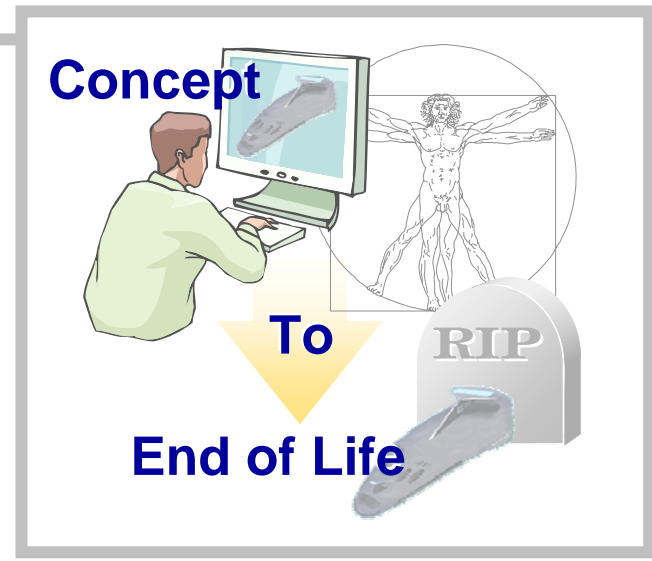
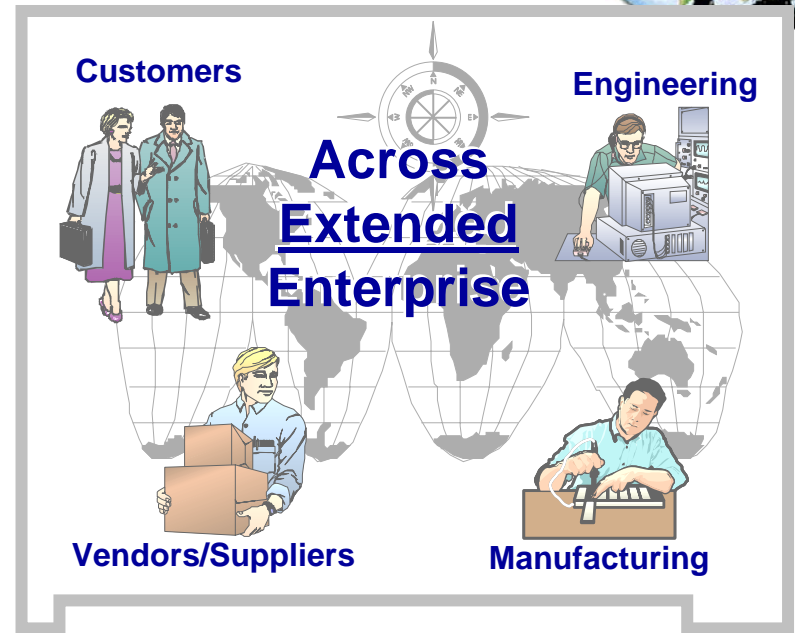
# IPDE Shortfalls

- Optimized to support lead ship design & construction
  - High cost and complexity of executing and managing changes due to ship-to-ship variability
  - System architecture and lack of data interoperability hinders support for multiple hulls & post-delivery environment
- Requires costly, time-consuming traditional software development
  - Closed system architecture with a significant amount of customized proprietary software
  - Large investment of time & money for each program start up due to specific program requirements
  - Limited flexibility and agility for deployment, enhancements and reconfiguration

# Ultimate Need

## Reduce Cost

- 🌊 Ship Construction
- 🌊 Technology Insertion
- 🌊 Class Modernization
- 🌊 Life Cycle Support



**IPDE Must Drive Cost & Cycle Time Out of Programs**

# NPDI Concept

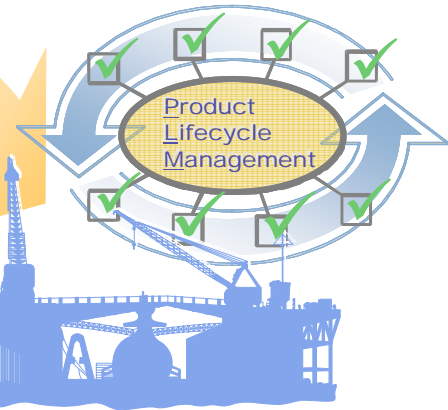
## IPDE Capability Requirements

- Parts Based CM
- COTS Technology
- Open Architecture
- PLM Environment
- Inter-operable Data Formats
- Life Cycle Applicability

## Government

## Validation & Verification

## Business Model Implementation

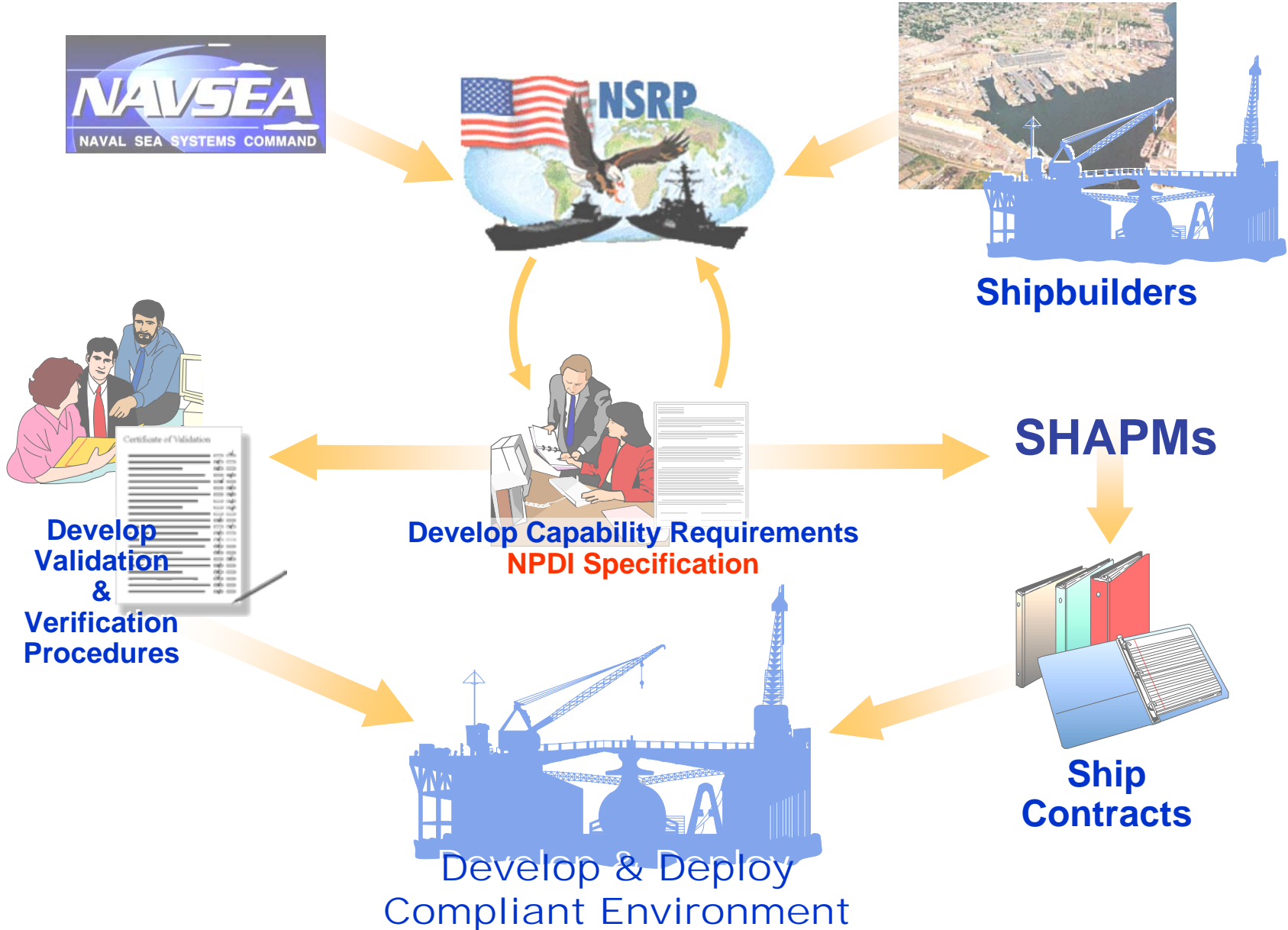


## Government/ 3rd - Party Activity

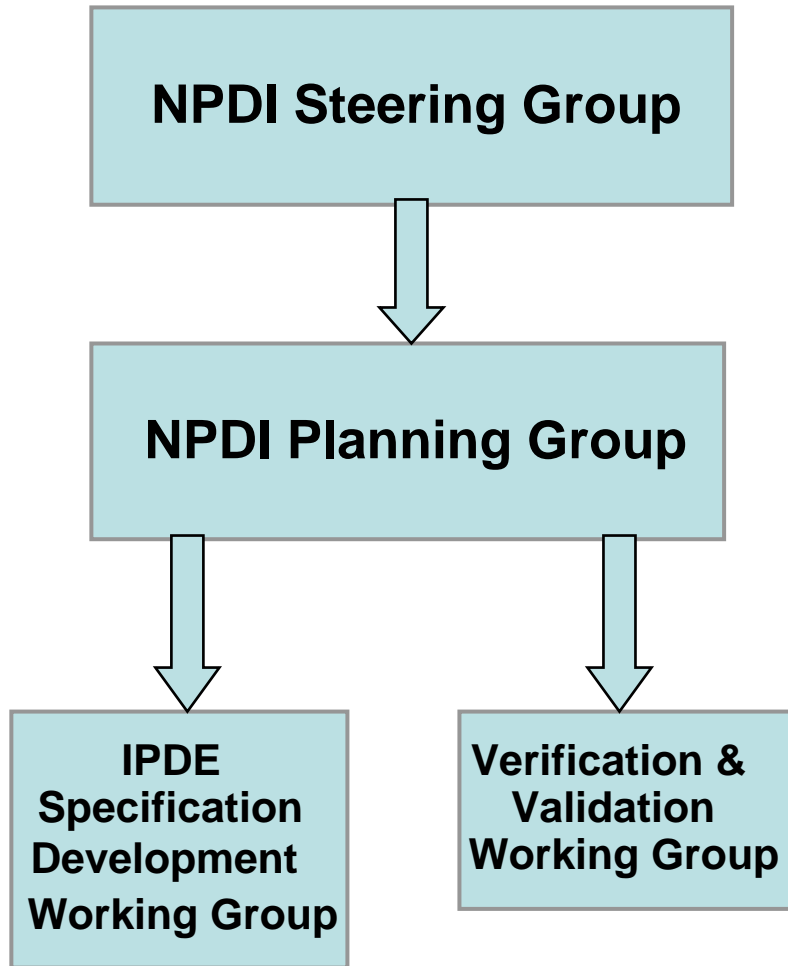
## Ship Construction/ Maintenance Yard

**NPDI**

# NPDI Process



# Navy Product Data Initiative Project Organization



**NPDI Steering Group:** Deputy PEOs (Subs, Ships, Carriers), NSRP ECB

**NPDI Planning Group:** Representatives from NAVSEA 05, PEOs, and shipbuilders

**NPDI IPDE Specification Development Working Group:** membership is shipbuilders and Navy subject matter experts

**NPDI Verification and Validation Working Group:** membership is shipbuilders and Navy subject matter experts



# NPDI Objective

*To specify the requirements for  
and drive the implementation of  
product data systems  
based on an open architecture  
having suitable functionality and enterprise-  
wide interoperability  
to support affordable Navy ships design,  
construction and service life support.*

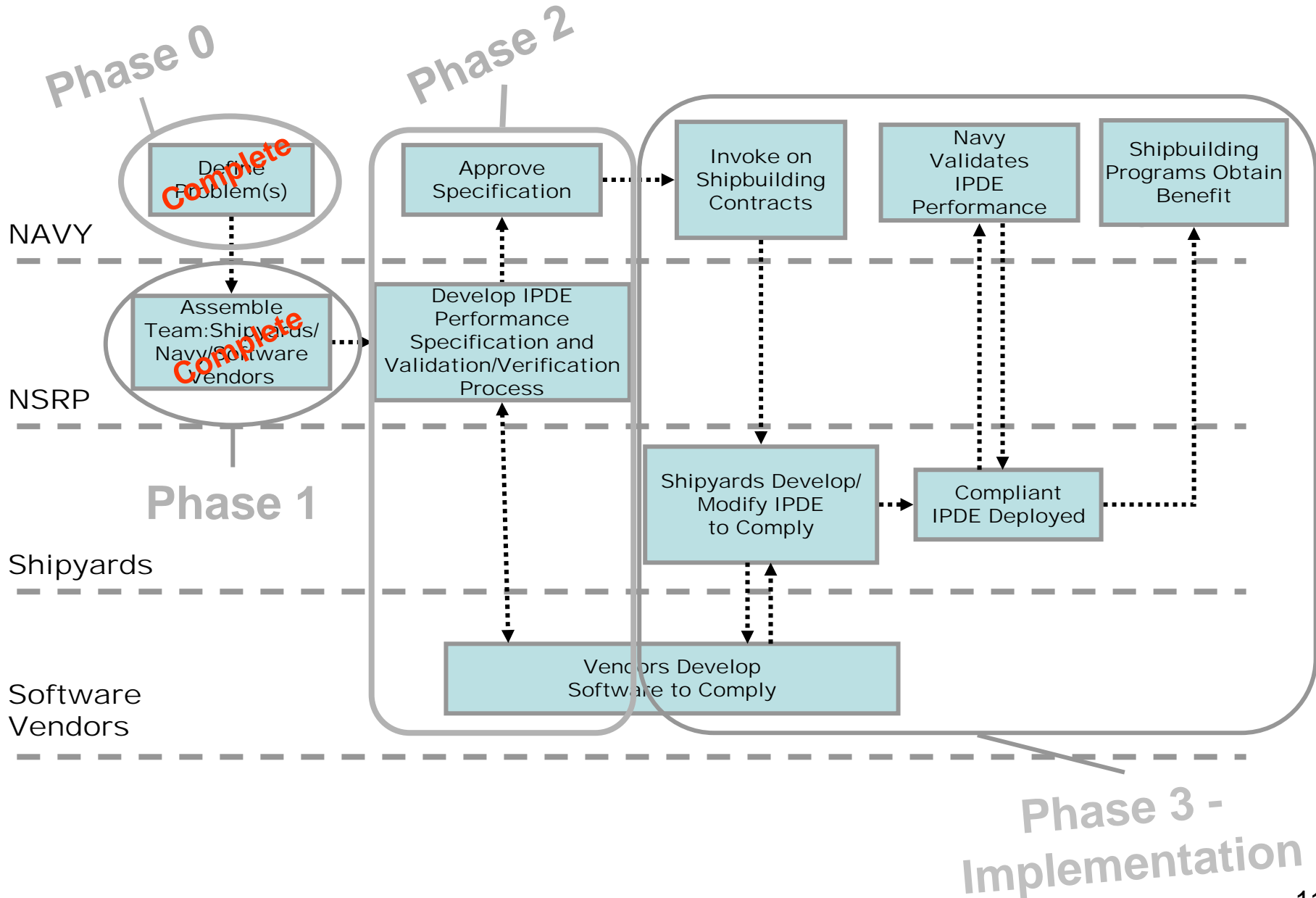


# NPDI Vision

More capable ships will be delivered at a lower cost, with improved design-build cycle time, and a significant reduction in the cost of changes. These gains will be achieved through:

- Lower cost
  - Each Navy shipbuilder will maintain spec-compliant IPDE solutions; BUT Yards choose - Navy will NOT dictate an IPDE
  - Individual IPDE components can be upgraded / replaced without major disruption
  - Software cost and development risk for incremental IPDE improvements can be spread across multiple programs / yards for shared benefit
- Improved design-build cycle time
  - Information will be readily communicated to other yards, suppliers, Navy, and classification society reviewers
  - Enhanced Sharing of Best Practices across the Enterprise
- Reduction in the cost of changes
  - Non-value added labor will be reduced searching for, transforming, and validating ship information

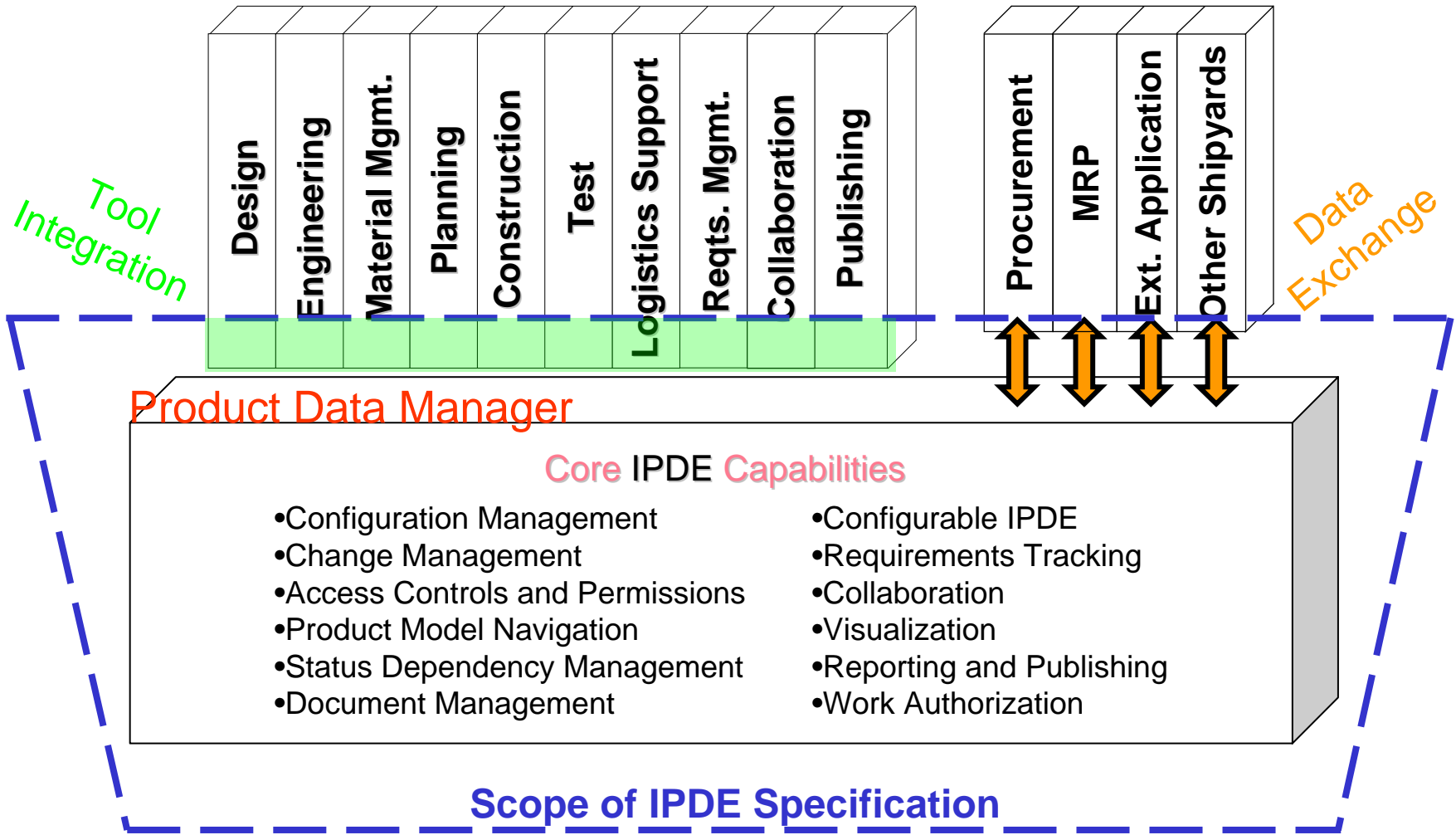
# NPDI Phases



# NPDI Specification Emphasis

- Configuration and change management
  - Ability to unlock data at the part level
  - Ability to assign hull numbers at the part level
  - Ability to rapidly call up hull specific configurations
  - Ability to configuration manage data at the correct level
  - Reduce non-value added work placed on the end user
- Interoperability
  - Open systems compliance with Navy guidelines
  - A published “Ship Common Information Model” (SCIM)
  - IPDE to IPDE integration
  - Archiving

# SPECIFICATION SCOPE



# Implementation Plans

- Specification will be delivered to PEOs to be invoked on future ship construction contracts
- Implementation plans cannot be specifically defined at this time because of a number of variables:
  - Specific solution chosen by the shipyard.
  - State of current shipyard IPDE.
  - Method of implementation (full or phased).
  - Invoked contract.
- Implementation approach at each shipyard will require a business case analysis and coordination with the appropriate PEO/Program Office.

# November PDR Objectives



- Provide update on Navy Product Data Initiative Activities
- Provide Verification, Validation & Accreditation (VV&A) Initial Plans
- Brief the Ship Common Information Model (SCIM) Approach
- Review the Proposed IPDE Specification
- **Obtain Feedback from Stakeholders/Vendors**



# November Preliminary Design Review

## Attendees

- Atlantec-ES
- AutoDesk
- Aveva
- Dassault Systemes & Matrixone
- NIIP / IBM
- Intergraph
- Industrial Planning Technology
- Oracle
- Product Data Services
- SAP
- ShipConstructor
- Siemens (UGS)
- Spatial Integrated Systems
- US Navy
- NGSS
- EB
- NGNN
- BIW
- NASSCO
- CSC
- ABS
- DNV
- NIST
- Lockheed Martin
- Perot Systems



# Technical Leads

- Established Section Leads
  - Section 1.0 Introduction
    - Rick Lobsitz      Northrop Grumman Information Technology
    - Don Slawski      General Dynamics Electric Boat
  - Section 2.0 Shipbuilding Needs
    - Karen Baird      General Dynamics Electric Boat
    - Mark Debbink    Northrop Grumman Newport News
  - Section 3.0 IPDE Common Services Requirements
    - Harshita Patel    General Dynamics Electric Boat
    - Scott Devine/Mike Olson      Northrop Grumman
  - Section 4.0 Interoperability
    - Kevin Richard    Northrop Grumman Information Technology
    - Dr. Burt Gischner      General Dynamics Electric Boat

# Activities leading to November Preliminary Design Review (PDR)

- Identified Subject Matter Experts to support Section Leads
- Conducted searches and reviews of existing specification materials
- Drafted initial outline
- Drafted support storyboards
  - Key points
  - Needs/Requirements
  - Graphics
  - Issues
  - References
- Consolidated all the material



# Schedule

- Initial Draft Jan 08
- Reading Session & 1<sup>st</sup> Revision Feb 08
- Planning Group Review Mar 08
- Post 2<sup>nd</sup> Revision for External Review Mar 08
- Reading Session Apr 08
- Distribute 3<sup>rd</sup> Revision for Concurrence May 08
- Final Delivery to NSRP ECB & PEOs Jun 08



# SPECIFICATION ORGANIZATION

- Organized to focus on the Navy's two main areas of concern:
  - Configuration Management/Change Management
  - Interoperability
- Section 1.0 Introduction/Scope
  - Background
  - Purpose
  - In Scope
  - Out of Scope
- Section 2.0 Shipbuilding Needs
  - Process centric look at all needs
  - Concept, Preliminary, Detail, Construction/Test, In Service Lifecycle

# SPECIFICATION ORGANIZATION (Cont.)



- Section 3.0 IPDE Common Services Requirements:
  - Technical IPDE Requirements needed to fulfill Section 2.0 needs
- Section 4.0 Interoperability Requirements:
  - Open System Compliance
  - Data Exchange
  - Archive
- Information Models to be referenced by the IPDE Specification will be defined in detail in a separate document called the Ship Common Information Model (SCIM)
  - SCIM will be developed separately be issued in approximately the same timeframe as the IPDE Specification
  - SCIM will re referenced from the IPDE Specification but both documents can be updated and revised independently

***QUESTIONS ???***