

Minimum Standardized Content to Enable A NAVY Digital Enterprise

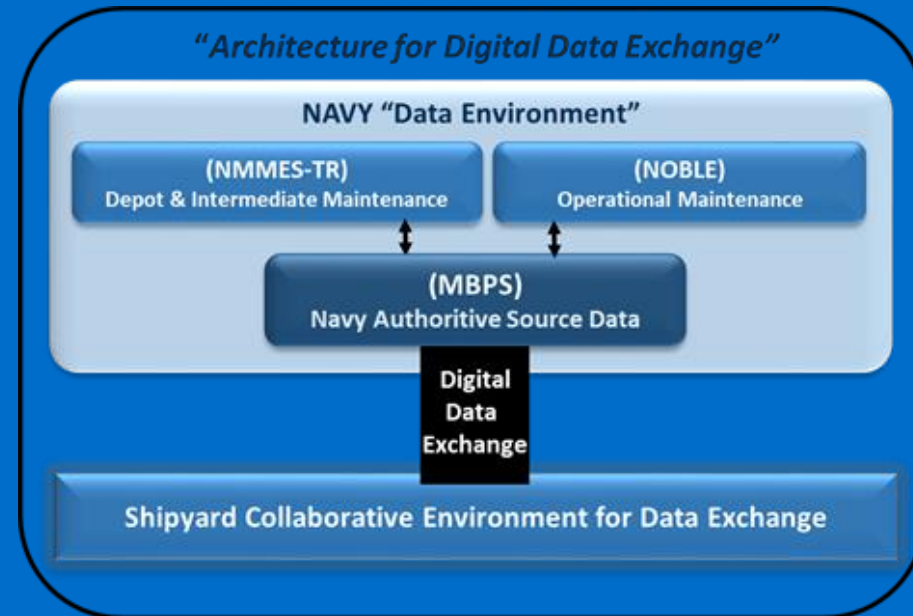
NSRP 2020

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Presenters:

Philip Jennings; HII-NNS

Mark Debbink; HII-NNS



Minimum Standardized Content to Enable A NAVY Digital Enterprise “Agenda”

- ☐ NSRP – Research Announcement (RA) Project Technology Transfer
- ☐ HII-Newport News Shipbuilding Overview
- ☐ Next Generation of Ship Builders and Operators
- ☐ The Shipbuilding Digital Thread
- ☐ “Minimized Standardized Content” Project Description
- ☐ ASME Standards
- ☐ Digital Ecosystem
- ☐ Shipbuilding Assembly based standards
- ☐ Navy Digital Environment
- ☐ “To Be” specifications
- ☐ Data Management/Information Technologies Objectives
- ☐ Discussion



Visit the nsrp.org site for more information.

The Navy & Shipbuilders are investing heavily in their Digital Data Environments



Newport News Shipbuilding



Founded 1886



Rivets to Welding



Nuclear Power



Next Reinvention

- Largest industrial employer in Virginia, employing about 24,000 people, many of whom are third- and fourth-generation shipbuilders



- Only company capable of designing, building, refueling, overhauling and inactivating nuclear aircraft carriers for U.S. Navy
 - One of only two companies capable of designing and building nuclear submarines for U.S. Navy



- Transforming our 130+ year company's paper-based processes to the Digital Age
- Eliminating drawings and moving toward a Model Based Enterprise (MBE)
 - Adopting technologies like laser scanning, digital twin, mobile computing and augmented reality



Reinvention, the next generation of shipbuilders & operators:

- Tech-savvy
- Constant access to information
- Expect speed and agility
- Desire meaningful work – leave their mark



Reinvention: 3D Design Disclosure – Digital Thread & Exploiting the Digital Twin



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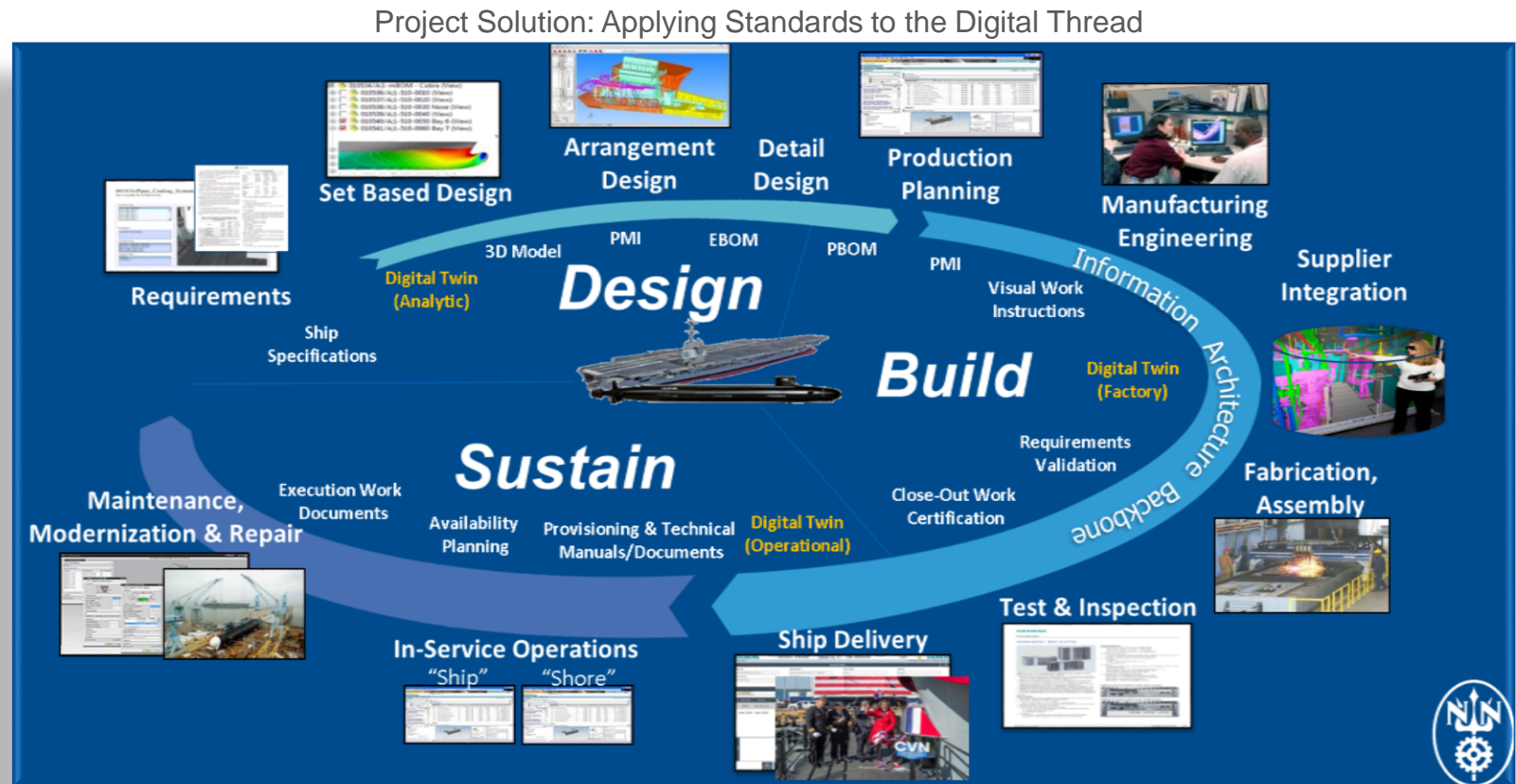
We have a problem today: The Navy is investing heavily in the digital future and is aware that the transition from legacy Shipbuilding “drawing centric processes” to “digital data centric processes” is considered *High Risk*.

This is *High Risk* is due to the magnitude of change and consequences of failure for not having data exchange and delivery standards (level of quality & common language) defined and in use.

The cost from a lack of defined minimum data standards, will be composed of:

- Significant amount data recreation,
- Recovering lost or missing information,
- Added cost for managing multiple configurations,
- Lack of trust in data due to traceability.

NNS Examples:
CVN80 & Columbia model
based disclosure challenges.



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ASME MBE Standards Committee

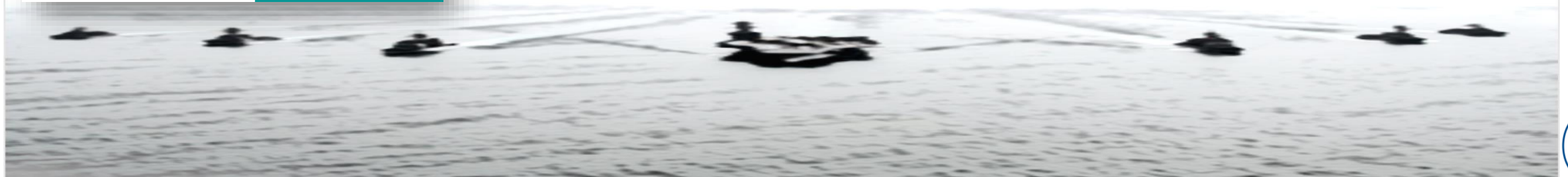


SCOPE: The MBE standards must provide rules and structure that facilitate creation and exchange of digital product definition (DPD) and associated data for reuse in downstream datasets, such as, analytical datasets and process-definition datasets, the standards must facilitate **data exchange, sharing, and reuse** between design, analysis, manufacturing, inspection, assembly, and all other lifecycle activities regardless of their originating system.

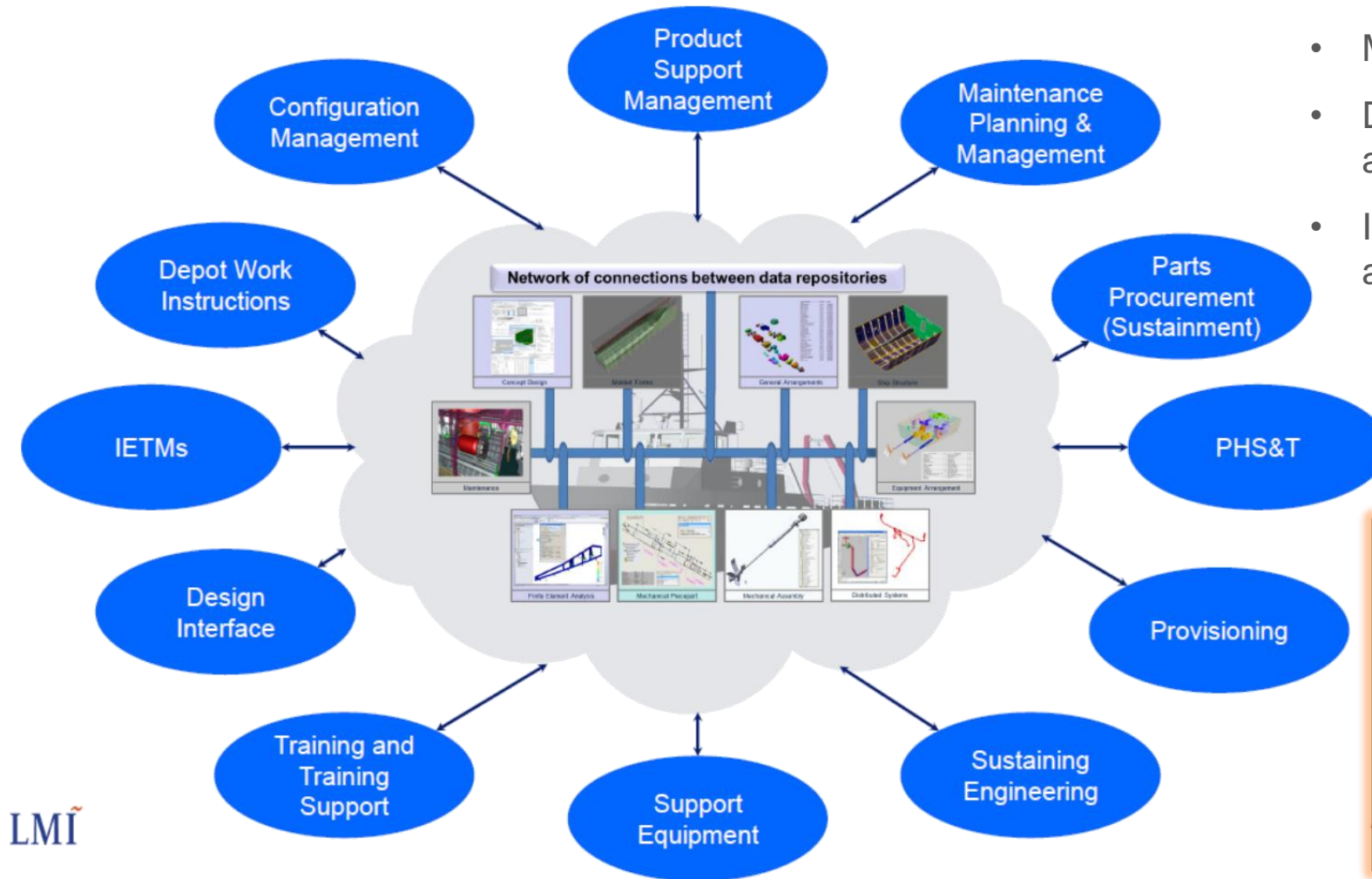
Model-based standards development (MBSD) methodology:

The MBE SG Recommends the MBE standards be developed using model-based methods and that the methodology include guidance for the following elements:

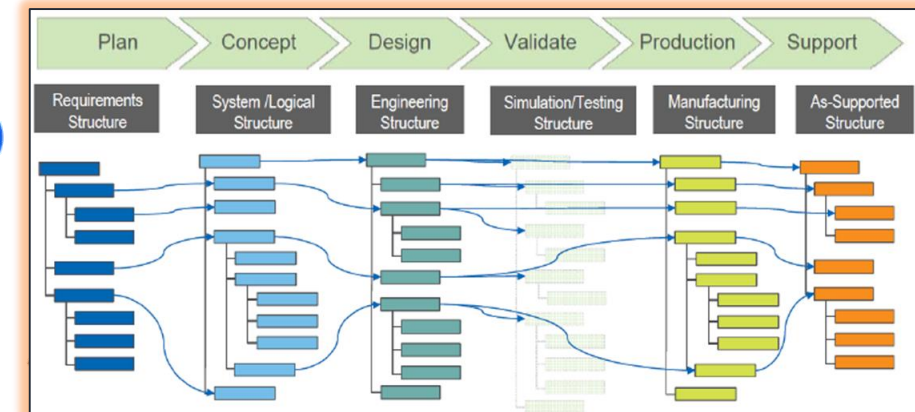
- Standards development policy
- Modeling languages
- Verification and validation (V&V)
- Configuration management
- Standard delivery
- Normative Sources
- Informative documentation
- Supportive resources



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- Master data set must support multiple needs
- Data accuracy and information perseverance after transfer is critical
- Industry is grossly behind in addressing assemblies

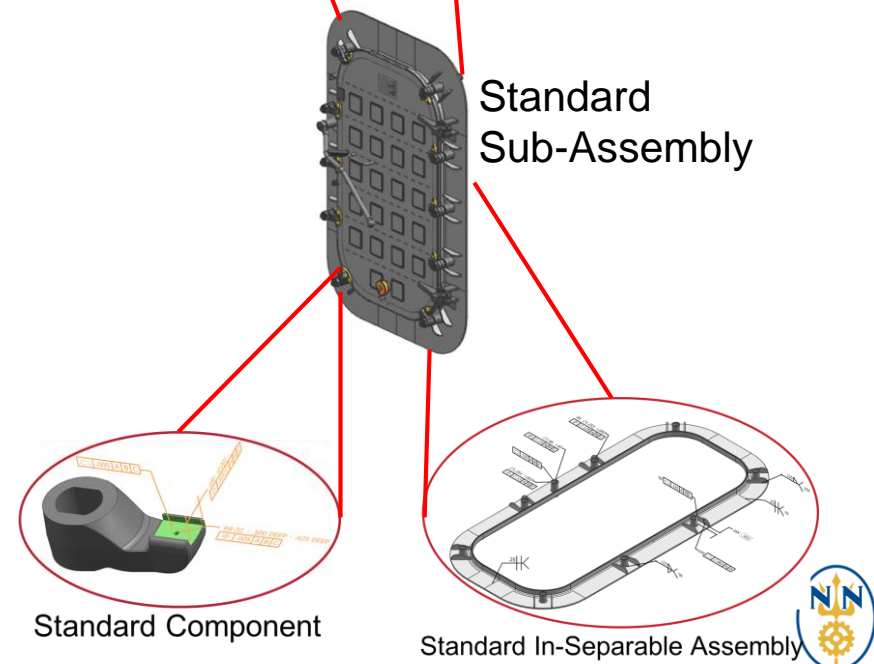
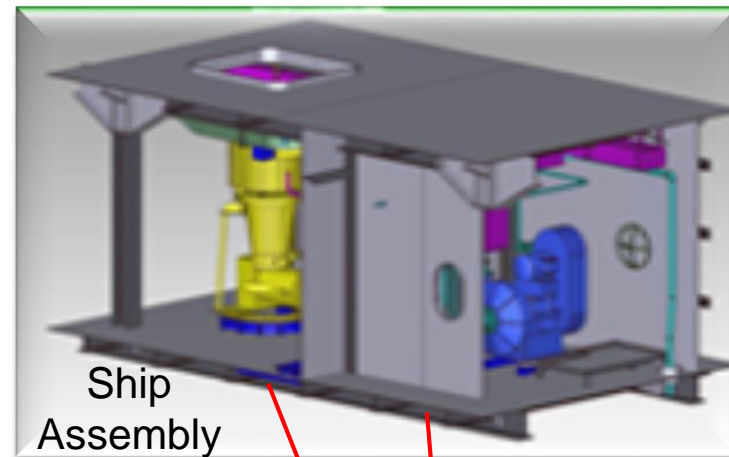
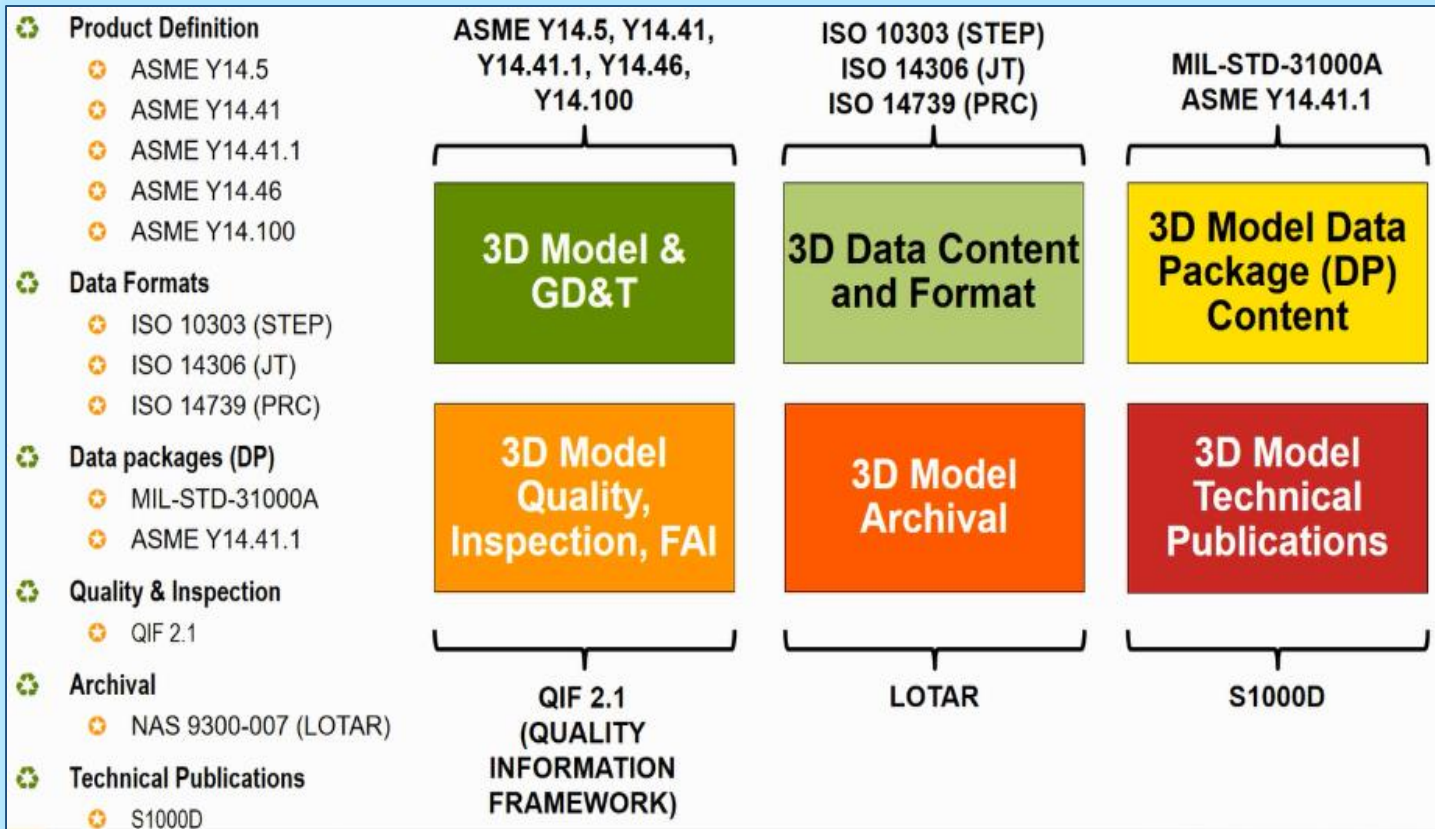
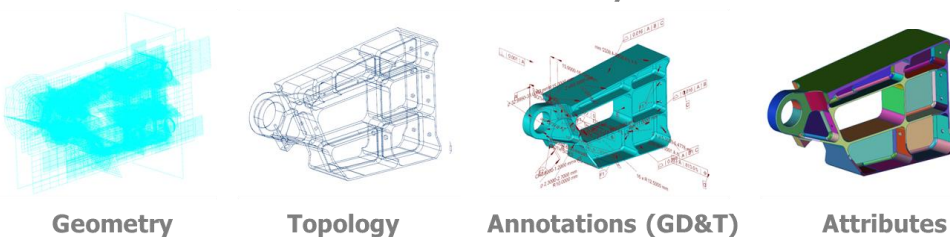


Data standards need to address the entire digital ecosystem and each stakeholder in the value stream!

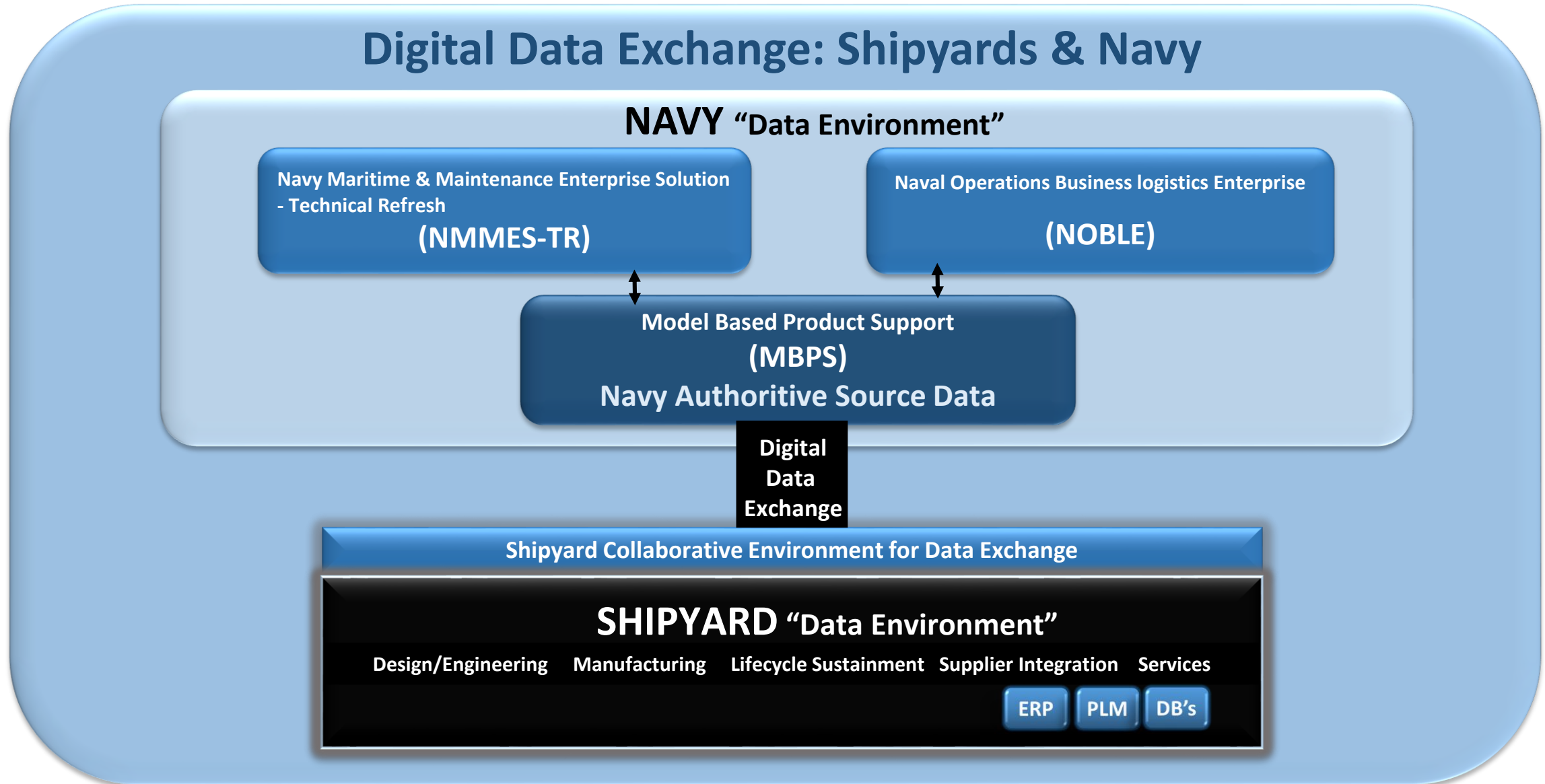


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MBD Model Based Definition – Reference Authority Model



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The “To Be” specifications tasks:

- Identify the “as is” specifications
- Identify gaps between the given “to be” specifications and the “as is” specifications
- Develop a roadmap for resolving identified gaps regarding acquisition of digital data
- Develop Sustainment Plan detailing the governance of digital data

S-Series Specifications

- S1000D - Technical Publications
- S2000M - Material Management
- S3000L - Logistic Support Analysis
- S4000P - Scheduled Maintenance Analysis
- S5000F - Operational and Maintenance Data Feedback
- S6000T – Training

Other Specification

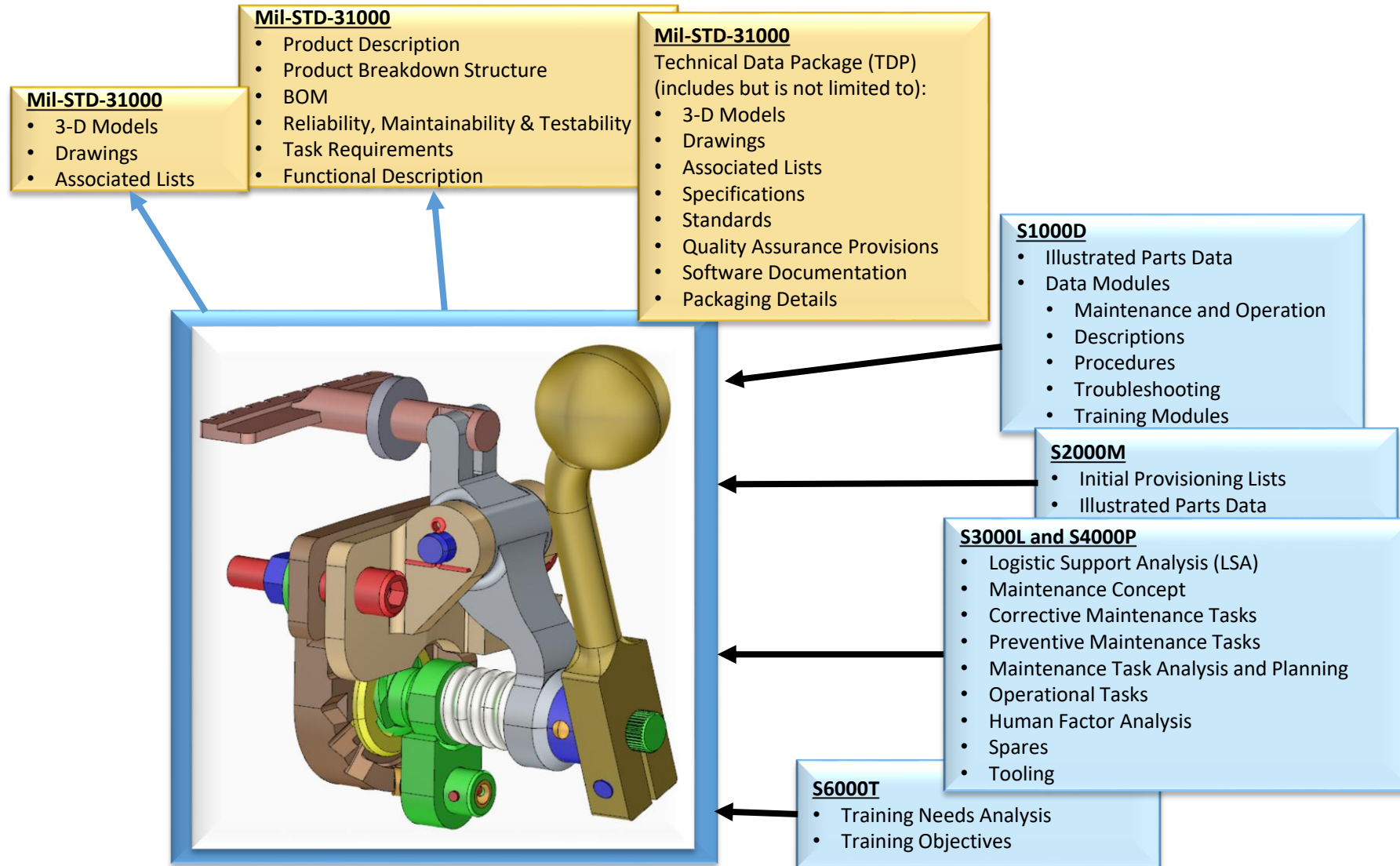
- MIL-STD-31000 - Technical Data Packages

We need to obtain consensus regarding the use of ANSI/EIA and AMSE Industry Standards



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S-1000D With MIL-STD-31000B and Other S-Series Specifications



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Data Management/Information Technologies Objectives:

- Define technologies and processes that provide actionable data at point-of-use to make real time decisions.
 - Research infrastructures that deliver time sensitive data across the Digital Thread
 - Develop data governance solutions that are scalable across different enterprises to reduce disparate data formats:
 - o Identify shipyard data structures/tools/formats
 - o Consider “open” standards for data portability
 - o Investigate data exchange, delivery, interoperability, intra-operability
- Define architectural elements required for a fully Digital Shipyard with close integration with our Navy and commercial customers.
 - Identify and research Digital Shipbuilding data strategies, architectures and infrastructures to enable the digital thread; extending to the ship and its lifecycle
 - Develop the processes for maintenance and implementation of digital data and technology insertion
 - Expand shipbuilding informatics (data analytics, applications, reporting)
- Provide time-sensitive configuration management solutions throughout ship lifecycles to enable the Digital Twin.
 - Define and/or develop a configuration control strategy which is suitable for product model architectures, is efficient to maintain, provides hull-specific data for the user to maximize the use of the digital twin
 - Develop processes to provide a current state Digital Twin (virtual and physical alignment) to address changes in ship operational configurations
 - Define requirements to advance Model Based Enterprise (MBE) at the shipyards to enable the digital thread

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Thank You, Discussion...

