Model Based Product Support (MBPS) Overview

Brief to NSRP - In-service Navy PLM Project Kick-off

SEA06L 18 July 2019
Enabling decision support capability to optimize resources ($) and readiness to **sustain the fight with the logistics capabilities needed for our operational forces**

Advancing digital and analytical capabilities to transform organizations into data driven organizations, **leveraging the power of data analytics for informed and rapid decision-making**

Executing OPNAV N41 Logistics Digital Transformation vector to **enable data-driven decision making across all aspects of Navy missions to improve outcomes and the experience of end users**
The Navy’s current logistics data systems that provide configuration management, provisioning, readiness modeling and technical data management support for ships and weapon systems are outdated.

These systems are at the end of their useful life, are no longer supportable. Combined with unacceptable sustainment costs, cyber vulnerabilities, software obsolescence, rapidly changing/emerging technologies, lack of common data standards and interfaces, and outdated business processes, it greatly inhibits the ability to effectively and cohesively perform supply and maintenance functions.

Increasing weapon system uptime while reducing support costs requires a **Digital Transformation of NAVSEA Logistics**
Program Overview & OPNAV Vision

**Mission Outcomes**
- Reduced failure rate
- Improved repair time
- Improved outfitting and resupply time and accuracy
- Affordable sustainment
- Mission capable and secure facilities
- Reliable installation operations
- Safeguard personnel performing Operations and Maintenance

**Operational Capability**

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<th>Capabilities</th>
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<td>Operations Support</td>
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<td>Facilities Support</td>
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<td>Installations Support</td>
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**Industrial Capability**

**Change Management**

- User Experience Dashboard
- Business Process Management
- Reduced failure rate
- Improved repair time
- Improved outfitting and resupply time and accuracy
- Affordable sustainment
- Mission capable and secure facilities
- Reliable installation operations
- Safeguard personnel performing Operations and Maintenance

**Digital Readiness**

- Security
- Automation
- Additive Manufacturing
- Digital Twin
- Predictive Analytics
- Artificial Intelligence

**Operational Forces**
- **AIR, SURFACE, SUB, NECC, CYBER**
  1. **NAVIES** — Navy Aviation Enterprise
  2. **SV 2020** — Sustainment Vision 2023, NSN/WCF, NAVAIR 6.11/COMFORC
  3. **NAMES** — Naval Aviation Maintenance System N41, PEO(C4I) PMW-150
  4. **NOSS** — Naval Operational Supply System N41, PEO(C4I) PMW-150
  5. **NOME** — Naval Operational Maintenance Environment; N41, PEO(C4I) PMW-150
  6. **CBM+ ES** — Condition-Based Maintenance Plus

**Facilities & Installations Operations**
- Readiness Ashore Strategy

**Finance & Supply Chain Management**

1. **NVY ERP** — Navy Enterprise Resource Planning N41, PEO(EIS) PMW-220
**Model Based Product Support (MBPS) Transformation Strategic Objectives**

**SEA06L MISSION**
Advance and deliver superior Product Support through people, processes, and technologies to enable affordable Fleet readiness.

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<th>PEOPLE</th>
<th>PROCESS</th>
<th>TECHNOLOGY</th>
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<tbody>
<tr>
<td>Prepare Life Cycle Logistics workforce to execute MBPS and accomplish Ao at Cost</td>
<td>Standards, policy, process to acquire product data and maintain through lifecycle</td>
<td>Enable MBPS to Improve Readiness at Cost</td>
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</table>

**USER EXPERIENCE**
- Simplified and expedited decision making
- Integrated and dynamic work prioritization
- Integrated training and execution
- Digitally enabled collaboration
- Easy and intuitive user interface

**OPERATIONAL AND SYSTEM READINESS AT COST**
- Reduced failure rate
- Improved repair time
- Improved outfitting accuracy and resupply time
- Improved facility capabilities and security
- Increased system operations reliability
- Improved safeguarding for maintenance personnel
- Affordable Sustainment

**MBPS CAPABILITIES**
- Cloud-based modern IT platform
- Navy Common Readiness Model (NCRM)
- Navy Product Data Management (NPDM)
- Navy Data Acquisition Requirements Tool (NDART)
MBPS Capability Overview

**Navy Product Data Management (NPDM):**
- Configuration manage, sustain, and provide enterprise access to all components of legacy and future standards-based Navy Weapon System Technical Data Packages (TDP)

**Navy Common Readiness Model (NCRM):**
- Analyze, report, predict, and optimize weapon system readiness and O&S cost throughout the life cycle

**Navy Data Acquisition Requirements Tool (NDART):**
- Common data standards, requirements and acquisition approaches to procure technical and product data

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**MBPS is comprised of three primary capabilities providing enterprise product data and readiness analytic services**
MBPS to In-Service Systems Alignment

1. System Shipboard Config Status
   - CDMD-OA, RADWEB

2. Configuration Mgmt & Modernization
   - NDE

3. Provisioning Parts Information
   - ICAPS

4. Ship & Shore Tech Data Viewing
   - ATIS

5. Ship Drawings
   - NSEDR

6. Org & Depot Maint Procedures
   - TDMIS, NAVLOGTD, PMSMIS

7. Readiness/Mission Models
   - NMMAT, MRDB, RBS

8. Tech Data Contract Requirements
   - SMART-T

MBPS will rationalize critical systems and applications. Other maritime logistics IT systems may be rationalized as part of the future state.
MBPS is a Business Capability Acquisition Category Level II (BCAT II) currently in Phase 1 with Phase 2 completion expected by the end of prototype develop period during Q2 FY21.

SEA06L is executing an Other Transaction Authority (OTA) to initiate an incremental approach for prototype development.

Deploy MBPS alongside NOBLE in Platform as a Service (PaaS) Amazon Web Services (AWS) environment.

The near-term goal is to replace In-service NAVSEA 06L systems with MBPS.

MBPS is executing an OTA Prototype Acquisition approach targeted to deliver operational capabilities in FY21.
Enable Stakeholder Adoption

Prioritize and engage people throughout based on their needs and addressing
- Organizational culture
- Workforce dynamics

Integrate Human Centered Design (HCD) approach alongside MBPS agile prototyping
- Stakeholder and User collaboration for requirements decomposition & validation testing
- Enhance user experience

Prepare LCL Workforce for MBPS rollout
- Design Learning Roadmaps for MBPS Apprentice, Journeyman, and Master
- Identify entry competencies (academic & experience based) for recruiting MBPS talent
- Define training curriculum and requirements

MBPS OCM Strategy focuses on people, process, and tools to realize Logistics IT Digital Transformation
MBPS Shipboard Maintenance Scenario

1. Ship CBM+ automatically detects future failure and fault and sends recommendation to NOBLE.

2. System auto generates 2K, which is verified and authorized by the Maintenance Chief.

3. Authorized 2K auto generates parts requisition 90 days prior to failure. Part is received and stowed 30 days prior to failure while maintenance is being scheduled.

4. Sailor can review the specific 3D training content for the repair prior to executing the maintenance action. Sailor can also review maintenance in virtual reality (VR).

5. Maintenance scheduled, part arrives, and sailor conducts maintenance changes; augmented reality (AR) can be enabled from handheld.

6. Program reviews the reported failure against system baseline data to understand root cause, determine if ECP required to change/modernize design to prevent future issues, etc.

7. Update Cloud-based MBPS baseline, initiate changes, etc.

8. Update ship baseline.
Model Based Product Support

The Navy maritime Model Based Product Support (MBPS) program will increase weapon system uptime and reduce support costs by providing:
- A decision support capability to relate resources ($) to readiness
- A maintenance and supply resource optimization model to dynamically meet mission readiness requirements
- Management and delivery of accurate, integrated, and modern 3D product data necessary to execute maintenance and supply actions on ships and submarines
- Common standards, requirements, and acquisition approaches for product and technical data

MBPS is a vector within the OPNAV N41 Logistics Digital Transformation and is comprised of 3 primary capabilities: Navy Common Readiness Model (NCRM), Navy Product Data Management (NPDM), and Navy Data Acquisition Requirements Tool (NDART)

MBPS is a Business Capability Acquisition Category Level II (BCAT II) currently in Phase 1. It will consolidate existing logistic configuration and technical data systems. SEA06L is executing an Other Transaction Authority (OTA) to initiate an incremental approach for prototype development. Phase 2 completion is expected by the end of the prototype development period during Q2 FY21.

Notional Milestones

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Notional Milestones:
- MBPS will rationalize critical systems/applications. Other maritime logistics IT systems may be rationalized as part of the future state.

MBPS to Legacy Systems Alignment

- Automated Product Data Model Distribution
- Drawings, Manufacturing Model/Data
- Technical Publications & Training Content
- Predicted, Optimized and Sustainable Readiness

RISKS
- Delays in OTA award
- BCAT II process alignment with OTA prototype and production
- Identification, inheritance, and compliance of security controls for target cloud architecture and services
- Aggregation of technical/product data and required information protection measures
- Rationalization of non-SEA06L IT systems or adding new requirements with deployed MBPS solution (e.g. NDE)

OPPORTUNITIES
- FFC N43 & SEA06L Fleet Readiness Analytics Tool project. Proof of concept for NCRM using SPS-48G data and modern COTS modeling solutions to perform readiness @ cost analysis.
- NAVSUP 04, SPAWAR 4.0, & SEA06L Spares To Operational Availability Reform (STA₄R). Initiative to improve the Maritime Spares process and Navy's ability to connect spares to system Operational Availability (Aₒ).
## To Be Specifications vs As Is Product Data

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<th>As Is Product Data</th>
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<td>As-Maintained BOM</td>
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<td>3D Models, 2D Drawings, As-Designed BOM, As-Maintained BOM</td>
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Digital Twin is a software-based replica of business assets, processes, and systems. The Digital Twin is an up-to-date and accurate copy of the physical object’s properties and states, including their position, shape, status and motion. As a digital representation, a digital twin provides both the elements and the dynamics of how a device operates throughout its life cycle.
EXAMPLE: Enterprise Product Lifecycle Management

ENTERPRISE PLM COMPONENTS

DECISION MAKERS
(OPERATIONAL, RESOURCING, CAPABILITIES & REQUIREMENT MGMT.)

- ENGR.
- ANALYTICS
- TRAINING
- LOG SYSTEMS
- FINANCE

CONCEPTUAL
E.G. PRODUCT TECHNICAL DATA, BOMS, 3D CAD

OPERATIONAL
E.G. COST, SUPPLY, SENSORS, MACHINE DATA

CONFIGURATION CONTROL / DIGITAL THREAD

PRODUCT DATA ACQUISITION / CREATION

COMPONENT DESCRIPTIONS

A. Ability to translate product support requirements into standards based product data acquisition requirements

B. Product data models transmitted by external or internal entities and received by Navy

C. Product data stored and organized in an authoritative & governed information environment

D. Synchronization and association of product data models with enterprise data

E. Configuration management service that captures current and historical product baseline

F. Digital thread capability that disseminates changes to product data baseline across the enterprise

G. PLM tools that allow end users to check out, update, and interact with product data models

H. Product data exposed to logistics community to enable cross-Navy applications and capabilities
### Maritime Maintenance IT Roadmap

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**Figures:**
- **OMMS-NG**: Operations, Maintenance and Materials System-Navy Global
- **IFOM-AWi**: Integrated Field Operations and Maintenance - Administrative Workload Interface
- **NAVY ASHORE APPLICATIONS (NOLA)**: Navy Ashore Applications (NOLA)
- **NEURS**: Network Enabling User Real-Time Support
- **PMS SKEED**: Program Management System - Support Equipment and Energy Division
- **NAVY OPERATIONAL SUPPLY SOLUTION (NOSS)**: Navy Operational Supply Solution (NOSS)
- **NAVY ADMINISTRATION PERSONNEL SOLUTION (NAPS)**: Navy Administration Personnel Solution (NAPS)
- **NAVY OPERATIONAL MAINTENANCE ENVIRONMENT (NOME)**: Navy Operational Maintenance Environment (NOME)

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**Legend:**
- **FUND**: Funded projects
- **PLAN**: Planned projects

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**Notes:**
- **Intermediate Maintenance**
  - MMMS (Tenders)
  - MMMS (NASS NEW LONDON)

**Depot Maintenance:**
- Public Shipyards
- Private Shipyards

**Decision Points:**
- LD-1: 2010 Decision Point

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**Integrated Data Environment (IDE) Prototype Dev**
- MMMS-NG
- IFOM-AWi
- NAVY ASHORE APPLICATIONS (NOLA)
- NEURS
- PMS SKEED
- FoPMS
- NAVY OPERATIONAL MAINTENANCE ENVIRONMENT (NOME)

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**Distribution Information:**
- **DISTRIBUTION A.** Approved for public release: distribution unlimited.
Product Model Data - Specifications

Mil-STD-31000
Technical Data Package (TDP)
(includes but is not limited to):
• 3-D Models
• Drawings
• Associated Lists
• Specifications
• Standards
• Quality Assurance Provisions
• Software Documentation
• Packaging Details

Mil-STD-31000
• 3-D Models
• Drawings
• Associated Lists

Mil-STD-31000
• Product Description
• Product Breakdown Structure
• BOM
• Reliability, Maintainability & Testability
• Task Requirements
• Functional Description

S3000L and S4000P
• Logistic Support Analysis (LSA)
• Maintenance Concept
• Corrective Maintenance Tasks
• Preventive Maintenance Tasks
• Maintenance Task Analysis and Planning
• Operational Tasks
• Human Factor Analysis
• Spares
• Tooling

S2000M
• Initial Provisioning Lists
• Illustrated Parts Data

S1000D
• Illustrated Parts Data
• Data Modules
• Maintenance and Operation
• Descriptions
• Procedures
• Troubleshooting
• Training Modules

S6000T
• Training Needs Analysis
• Training Objectives
MIL-STD-31000
Technical Data Package (TDP)

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