NAVSEA 06L Navy Model-Based Product Support (MBPS) Project

Technical Supplement

December 6, 2018

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I. Scope
This Technical Supplement describes the Navy’s high level requirements for the Model-Based Product Support (MBPS).

II. Strategic Intent

Naval platforms and weapons systems are costly to maintain and the cost to deliver and sustain readiness is increasing. This is due in part to a lack of an integrated and comprehensive decision-making environment, which allows product data, requirements, forecasts, costs, performance, and constraints to mutually inform one another across the product lifecycle and product support elements. In addition, the integrated decision-making environment must be available early in the weapon system lifecycle to enable mission and cost effective design decisions. A Government Accountability Office (GAO) study emphasized that affordability solutions should be focused on early design decisions that affect Operations and Support (O&S) costs, which are estimated to be about 70 - 80% of Total Ownership Cost (TOC). The study demonstrated that by the time a program reaches its critical design review, 85% of Operations and Support (O&S) costs are committed as a result of a program’s early design decisions.

To date, the Department of Defense’s (DoD) limited investment in technologies to address this issue has not yet resulted in a viable and readily repeatable capability that enables programs and program portfolios to understand the TOC and readiness impacts of early design decisions and thus maximize design affordability. A Navy sponsored study of the issue revealed that an integrated Model-Based Product Support (MBPS) capability that enables enterprise readiness analytics and decision support is the most viable solution. MBPS capabilities will enable programs in the early design phase to support trade-off studies with known impacts to TOC and readiness. Further, the capability will be readily leveraged throughout the program’s life cycle, so that programs can continuously make decisions that meet the Fleet’s current and future readiness requirements at the lowest TOC possible. MBPS will also provide the Fleet with deployable readiness analytics decision support and digitally threaded product and technical data services to improve decision making and lean support operations.

Additionally, the absence of a centrally sponsored MBPS with a commonly defined and enforced system and data architecture has resulted in a proliferation of non-standard MBPS solutions across the Navy. To enable enterprise readiness analytics, an enterprise MBPS service that enables programs to acquire and manage product support data / information within a single, structured, authoritative product information backbone is needed. Further, a closed-loop enterprise MBPS approach enables the system’s digital twin to be validated by the physical performance of the object to consistently increase the sophistication in digital representations and their fidelity to the physical world. These capabilities are foundational towards providing

1 GAO Study GAO-03-57
2 ePLM IDE Joint Services BCA
3 Technical data is the information, other than software as defined, which is required for the design, development, production, manufacture, assembly, operation, repair, testing, maintenance or modification of defense articles. Thus, a MIL-STD-31000 Technical Data Package (TDP) is merely one subset of Technical Data.

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viable edge decision support capabilities to the fleet and improving decision making, which is critical to combat effectiveness. As such, MBPS is a critical combat multiplier and key to realizing significant improvements in the effectiveness of logistics operations in combat.

III. Enterprise MBPS Requirement

A. Enterprise Technical Reference Framework

MBPS capabilities are an integral part of the Navy’s Logistics Information Technology (Log IT) portfolio and will be integrated into the Log IT architecture, the Enterprise Technical Reference Framework (ETRF). The vision of the ETRF, Figure 1, is to enable and accelerate the overall objectives of Digital Transformation within the Navy’s Log IT portfolio. The ETRF provides a Log IT architecture that will generate scalable, interoperable, flexible and fluid technology solutions; maximizing access to information / data via applications anywhere, on any device at any time. Solution Papers and Technical Demonstrations shall identify strategies and approaches that depict how the presented MBPS solution will be effectively and affordably integrated within the ETRF. A more thorough description is provided in Appendix A, The ETRF White Paper.

![Figure 1 - Digital Log IT Enterprise Technical Reference Framework](image)

1. ETRF Guiding Principles

The following ETRF guiding principles define the foundation of the new technology platform that will fulfill the vision and objectives of Digital Transformation within the Log IT portfolio:

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- Digital Transformation - Replace legacy logistics systems and optimally consolidate the number of IT systems and utilize a common access point, ideated with human centered design principles in mind.
- Shared Services Model - Adopt a functional domain driven design and micro services architecture approach to establish a shared services operating model and position the platform to create innovative cross-domain products and services.
- Cloud, Ashore, Afloat - Adopt a containerized cloud and edge posture utilizing a consistent technology stack to seamlessly extend Log IT capabilities across shipyards, ships and submarines including detached operations.
- Security and Audit - Establish a robust framework for automated governance and compliance using integrated DevSecOps strictly adherent to the Risk Management Framework (RMF), enabling mandates for continuous, proactive monitoring and defense.

2. ETRF Requirements

To enable ETRF guiding principles, the following requirements will be continually emphasized for each NAVSEA 06L Navy MBPS prototype:

- Enables the adoption of domain driven micro services and containerization to build a highly scalable platform promoting automated DevSecOps and scaled Agile Methodology.
- Enables enforcement of data governance and facilitates automated compliance strictly adherent to RMF and rapidly achieving Authority to Operate (ATO).
- Enables an integrated enterprise data platform that is scalable to thousands of data sources and millions of data points while enabling real time decision making in a highly immersive customer experience that leverages Mobility and Artificial Intelligence (AI).
- Enables a technology stack across cloud and edges. The principles of communicating information and syncing data exclusively via application program interfaces (APIs) will ensure that the cloud and edges remain consistent and complement each other’s capabilities.
  - Consistent Technology Stack: a traditional hyperconverged infrastructure (HCI) solution, standardizing DevOps tooling, APIs, Resource Management, and Infrastructure as a Service (IaaS) / Platform as a Service (Paas) / Data as a Service (DaaS) consistency with a cloud solution
  - Minimize Ashore Footprint: Support serverless posture at the edge, minimizing memory and processing foot prints for submarines, ships and expeditionary units. Support the application of cloud optimized AI algorithms, on limited data sets available for deployed solutions
  - Analytics and AI at the Edge: Support analysis on cloud native technologies which can be seamlessly synced with enterprise cloud
  - Opportunistic Data Exchange: Support prioritized data interchange between the enterprise cloud and the edge, based on network bandwidth and criticality of the business capability serviced
B. Digital Transformation Data Plan

The Digital Transformation Data Plan (Appendix B) outlines efforts to eliminate data silos and streamline capabilities enabling useful insight to be gleaned from data. These insights will inform readiness and logistics decisions driving the ideal “Digital Navy.”

Currently, thousands of data sources exist in pockets across the Navy. The key goal of the Digital Transformation Data Plan is to promote transparency of data throughout its lifecycle. This document provides actionable goals aligned to people, processes, and technology changes, coupled with best practices in data governance and management. The goals are derived from pain points and information collected from continuous dialogue and analysis. Ultimately, this plan drives to create trustworthy, auditable, and accessible information visible where and when it needs to be. Additionally, to promote data integration and reuse across the enterprise the Navy will use, to the greatest extent possible, industry data standards. Figure 2 depicts typical industry model-based data standards that may potentially be leveraged by the Navy. Data management is a critical enterprise MBPS enabler, so the strategies and requirements depicted in the data plan shall be considered as integral components of MBPS Other Transaction (OT) solutions and addressed in Solution Papers and Technical Demonstrations.

C. Digital Transformation Workforce Plan

Multiple external and internal imperatives are pushing Navy Log IT to rapidly adopt advanced technology and make significant leaps toward digital maturity. Moving to digital is no longer an option, but a necessity. The Logistics Functional Area Manager (LOG FAM) must take decisive and transformative steps to ensure its workforce is ready to enable and sustain this change. The Digital Transformation Workforce Plan (Appendix C) provides an
approach to guide the transformation of the workforce and the work culture, that support the future vision of a digital Navy.

Re-skilling the workforce must happen within a broader framework of managing this enterprise wide change. Technological transformation cannot be successful in isolation, so there are several areas that need to work in tandem for a holistic journey towards digital. The Digital Transformation Team (DTT) has identified five work streams requiring change to enable the overall digital transformation:

- Logistics Services
- Data
- Technology
- Security
- Change Management

Equipping the workforce with relevant skills and experience in these areas is a prerequisite for triggering the transformation. To support workforce transformation, the strategies and requirements in the Digital Workforce Plan shall be considered as integral components of MBPS OT solutions and addressed in Solution Papers and Technical Demonstrations.

D. Enterprise MBPS Overview

1. Logistics Services

   Services create a direct tangible link from the operational mission to the IT architecture supporting it. Leading organizations are adopting Service Strategy and Service Management principles to better define these links and ensure they are capturing the maximum investment value. The Logistics Services Plan (Appendix D) provides artifacts and guidance to translate mission needs into logistics capabilities (services), user experiences, and functional scenarios necessary to achieve desired logistics outcomes. The plan ensures mission and user needs are the main drivers behind the Navy’s digital transformation effort and move from the current state challenges to the future state. MBPS primarily aligns to Design Integration shared services which are critical enablers of the Supply Chain Management (SCM); Maintenance, Repair and Overhaul (MRO); Planning; and Job Support services. Therefore, strategies and requirements depicted in the Logistics Services Plan shall be considered as integral components of MBPS Other Transaction (OT) solutions and addressed in Solution Papers and Technical Demonstrations. The framework supports the delivery of logistics services (Figure 3) to provide the fleet with the following mission outcomes:

   - Materiel and Shore Readiness
     - Reduced failure rate
     - Improved repair time
     - Improved resupply time and accuracy
     - Affordable sustainment
     - Mission capable and secure facilities
   - Service Experience
     - Simplified and expedited decision making
     - Integrated and dynamic work prioritization

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2. Navy Model-Based Product Support Principles

MBPS serves two principal roles within the Logistics Services framework. First, it provides a single, structured, authoritative product information backbone to anchor materiel readiness services and outcomes to the program’s core systems engineering processes. The key enabling construct of the MBPS is a serialized, or item unique identification (IUID), digital thread capability that efficiently and effectively results in a high degree of data/information associativity, effectivity and traceability. The MBPS digital thread provides the foundation for realizing its benefits across the enterprise. The digital thread enables the enterprise Log IT solution to construct serialized digital twins both across a system’s lifecycle and across logical/operational groupings of systems. This bi-directional coupling of data across the enterprise enables tactical, operational and strategic decision support, detachable and deployable logistics services, and configuration-based automated distribution of digital technical and product data to enhance maintenance and supply operations. Therefore, data/information associativity, effectivity, traceability and other critical data management services are key requirements for realizing Materiel and Shore Readiness and Service Experience mission outcomes and shall be addressed in Solution Papers and Technical Demonstrations.

Secondly, MBPS is the principle driver towards realizing Digital Transformation Materiel Readiness at Cost objectives. Integrating a modeling and simulation-based approach to supportability analysis within the systems engineering process, MBPS enables acquisition programs to design and sustain equipment and logistics service solutions to meet fleet readiness and cost objectives. MBPS also enables programs to embed readiness at cost models as critical components of the system’s digital twin, which provides the foundation for continuous performance monitoring and enhances

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decision support services when integrated with enterprise data analytics capabilities. Because of the enterprise solution’s dependency on MBPS services, careful consideration must be given to MBPS requirements to ensure they fully enable enterprise logistics services.

3. Model-based Product Support Operational View

Figure 4 provides the operational view of the MBPS requirement, and its relationship to the ETRF, other LogIT capabilities (i.e. NOBLE, ERP and NMMES); and to the acquisition community. The acquisition community, which consist of the Systems Commands, Program Executive Offices (depicted bottom right), and Sustaining Engineering Activities (depicted top left) are the primary day-to-day users of the cloud-based NPDM, NCRM and NDART capabilities. These organizations principally participate in systems engineering activities with Original Equipment Manufacturers (depicted bottom right) to: design, validate/verify, and sustain system Readiness at Cost strategies, plans, designs and requirements (NCRM); define the Product and Technical Data Model Acquisition contractual requirements (NDART) required to support Readiness at Cost requirements; and receive, configuration manage, distribute and sustain OEM Product and Technical Data Models. The government SYSCOM, PEO and Sustaining Engineering organizations are geographically dispersed with limited network capacities to meet the expected significant computing requirements necessary to support cloud-based modeling and simulation and 3D model management requirements.

Further, MBPS will provide the Product and Technical Data Models needed to support shore and shipboard maintenance, overhaul and alteration operations. As indicated in Figures 4 (depicted top right) and 5, shipboard, to include deployed expeditionary units, maintenance and supply operations will be executed via NOBLE applications integrated within ETRF instances deployed shipboard. Shore based depot and intermediate maintenance operations, also geographically dispersed and principally tied to the cloud-based ETRF instance, are executed by NMMES-TR with shore wholesale and retail supply operations being supported by Navy ERP (both depicted top left on Figure 4).

To support the above Navy Log IT operational requirements the Navy desires that solution papers and technical demonstrations present enterprise solutions that affordably address the following: recommended cloud architecture and computing requirements to affordably maximize performance of the Navy’s cloud-based Readiness at Cost modeling and simulation / predictive analytics capability; recommended cloud architecture and computing requirements to minimize latency related with checking out, changing, and checking in large files, such as computer-aided designs, from minutes to seconds; recommended approaches to define, execute, and test integration requirements internally across MBPS capabilities and externally to the ETRF and other LogIT applications such as NOBLE; recommended software and cloud architecture requirements to support automated distribution of product and technical data models based on triggers and meta data from MBPS capabilities, specifically configuration management, as depicted in Figures 4 and 5.
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4. Legacy Program Rationalization

Information for Legacy Log IT systems that will be rationalized by MBPS capabilities is provided in Section IV of this document. OTA Solution Papers and Technical Demonstrations shall document legacy program rationalization best-value strategies and approaches; to include data migration, training, etc., that rapidly reduce Navy investments in legacy programs. To this end, the Navy desires to use prototypes to develop sound business and technical approaches to rationalize legacy enterprise Log IT (Log IT) capabilities. Core to that approach will be the development of a jointly developed industry-government MBPS Rationalization Plan. The MBPS Rationalization Plan will be based on business and technical analyses of enterprise legacy applications and Digital Transformation Objectives. It will also document the best-value rationalization approach for each with defined enterprise Log IT benefits. Guidance for developing the NAVSEA 06L MBPS Rationalization Plan is provided in the Application Portfolio Plan, Appendix E, with the minimal rationalization criteria defined below:

- Eliminate redundancy through platform standardization
- Align system criticality to service levels
- Upgrade systems past end of service life
- Enhance / Replace High Incident Critical Applications
- Consolidate systems with multiple instances
- Explore COTS to supplant heavily customized solutions
- Reduce interface complexity to simplify the enterprise environment
- Further, the analytical process and development of rationalization approaches should explore the full range of material and non-material solutions

IV. MBPS Capabilities and Requirements

A. Capability Overview

MBPS provides a single, structured, authoritative product information environment to: anchor materiel readiness and affordability outcomes to the program’s core systems engineering processes and products; and enable a systems engineering approach to design, deliver and sustain Fleet wartime materiel readiness and affordability objectives. SEA06L’s MBPS and IT Rationalization effort modernizes NAVSEA’s Technical Data, Configuration and Log IT systems to provide core MBPS capabilities that enable critical MBPS and LogIT Digital Transformation objectives. A description of the enterprise MBPS’s core capabilities is provided below and depicted in Figure 6. The Navy desires to use MBPS OT prototypes to develop and integrate these core capabilities to provide a single, structured, authoritative MBPS service in support of LogIT Digital Transformation objectives.

- Navy Product Data Management (NPDM), which provides the following capabilities:
  - To provide a single, authoritative system baseline and configuration management service
  - To provide the capability to design, deliver, and sustain products that enable affordable readiness (drawings, EOSS, Tech Pubs)
- Navy Common Readiness Model (NCRM), which provides the following capabilities:
To provide a common affordable readiness modeling and simulation capability that enables programs and product support providers to design, deliver and sustain affordable readiness.

To provide a single, authoritative source of product support source data to enable development of other product support services (provisioning, support equipment, technical publications, etc.).

- Navy Data Acquisition Requirements Tool (NDART) to provide a web-based capability to develop Statement of Work (SOWs), Contract Data Requirements List (CDRLs), and Data Item Descriptions (DIDs) to procure technical / product data informed by system / platform lifecycle phase and product support strategy.

To ensure affordability and sustainability, the government desires that design alternatives that address the above capabilities are drawn from the full range of material and non-material alternatives with decisions that balance impacts to acquisition cost, sustainment cost, schedule and performance equally.

**Figure 6 - MBPS Core Capabilities**

**B. MPBS System Level Requirements**

- The solution shall utilize the Government Cloud and the Navy Enterprise Technical Reference Framework (ERTF) to the maximum extent possible. Solution(s) are desired to consist of COTS products to the maximum extent possible.
- The solution shall be able to support classification of data up to Impact Level 6.
- Solution(s) should be capable of scaling to support over 1,000 ashore and afloat installations worldwide and over 150,000 users.

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The solution(s) may adhere to Human Systems Integration (HSI) guidelines provided as part of the Government’s HSI guidance document.

Solution(s) shall demonstrate the ability to be DoD cyber authorized (Authority to Operate) (ATO).

Solution(s) shall be capable of providing single user sign-on entry utilizing Common Access Card (CAC) / Public Key Infrastructure (PKI).

Solution(s) should provide the ability for Personal Identity Verification (PIV) credentials with role based applications embedded.

Solution(s) should demonstrate ability to meet Payment Card Industry (PCI) compliance controls.

The solution(s) shall demonstrate ability to integrate multiple platforms into a holistic environment, accessible via industry standard Application Program Interfaces (API).

The solution(s) shall demonstrate Disconnected, Disrupted, Intermittent, and Limited (D-DIL) operations.

The solution(s) shall demonstrate distance support by providing application functionality via an Enterprise system to remotely provide reactive, proactive, and predictive logistics support to Naval Operational Forces, including performing local functions remotely via appropriate roles.

The solution(s) shall demonstrate application functionality via an Enterprise system to remotely provide reactive, proactive, and predictive logistics support to Naval Operational Forces, including performing local functions remotely via appropriate roles.

The solution(s) shall demonstrate the ability to use mobile computing devices (e.g. Smart Phone, tablets, mobile printers etc.) (interdependencies between MBPS subcomponents at large).

The solution(s) shall demonstrate a common look and feel to the system thus reducing the number of entry points to appropriately consolidated applications based on application operating environment requirements (ashore, afloat, expeditionary).

The solution(s) should be able to connect to Navy classified and unclassified networks as well as receive and transmit classified / unclassified information.

The solution(s) shall provide connected and disconnected training solutions providing the knowledge and skills for all Users and System Administrators to operate and maintain the system.

The training solution(s) shall provide interactive Computer Based Training to support "Role Based" training (defined as the Role (clerk, supervisor, etc.) to the appropriate Community (i.e. Stores Clerk for Logistics Specialist (LS) rating). The Role Based training products shall provide at least 80% of the required training for the specific role, be integrated to allow for usage from any current Navy and USMC workstation, and will allow permission to the appropriate NOBLE system upon completion. The training completion process is expected to be provided by an 'Access Control' function.

The connected training solution(s) shall include a training environment, with redundancy, that allows Internet access 24/7 and will also report to the NOBLE Access Control application the course completion metric for granting of Role Based permissions to the NOBLE system.

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Applicable role based training and access control in a disconnected environment shall be provided. A synchronizing / replication mechanism for access shall be enabled when reconnected to update an authoritative User database at the connected web based system.

The solution(s) should have User and System Administrator guides deployed with disconnected users.

C. MBPS Business Needs and Requirements

1. Navy Product Data Management (NPDM)
   a) Principle Business Needs
      - Manage (develop, receive, store, export) or integrate product definition data and information (technical data and information such as CAD, Bills of Material, Requirements, Specifications, documents, etc.) so that all functional areas of the product team have access to the engineering data required to design and deliver product support. The primary data standard is MIL-STD-31000 Series, Technical Data Packages.
      - Provide collaborative model-based program and project management business capabilities to enhance a program’s ability to meet its business, schedule, quality, risk and technical requirements; associate objects to the program’s product structure; and provide configuration management as part of the system’s baseline.
      - Provide the capability for programs to acquire, sustain and publish Technical Data (e.g. Operational Sequencing, Technical Manuals and Planned Maintenance System (PMS)) with full data associativity, traceability and effectivity across the MBPS and Log IT enterprise solutions.
      - Provide a collaborative knowledge management environment with access and visibility to required program information and traceable environment digital communications for all program team members.
      - Provide the capability to develop and manage enterprise level workflows and provide business intelligence reporting to track workflow and business process status.
   b) Description
      - Classic COTS PDM / Product Lifecycle Management (PLM) environment (hosted within a cloud architecture) to manage the following data types:
        • Technical Data Package (TDP) management
        • Configuration Management
        • Configuration Status Accounting
        • Document Management, Workflow and Collaboration
        • 3D Models
        • 2D Drawings
        • Manufacturing Processes
        • Requirements
        • Workflows
• Business Intelligence / Reporting
  ▪ An integrated standards based (S1000D) environment for developing and publishing technical data. The primary data standard is S1000D (to include training) and other applicable aspects of the S Series Specification Specifications.
  ▪ Technical Publications
  ▪ Preventive Maintenance Instructions
  ▪ Training integration

c) Benefits
  ▪ Establishes common / modern product model environment for current and future programs to acquire and sustain procured TDPs.
  ▪ Establishes configuration and data / model reuse tied to a common readiness model (integrates with NCRM capability), publications, and logistics / maintenance source data from program inception.
  ▪ Establishes foundation and “source” for additive manufacturing.
  ▪ Establishes the “physical” component of Model Based Systems Engineering (MBSE).
  ▪ Establishes integrated capability with configuration, models / drawings, training, and logistics / maintenance data (digital twin / thread).
  ▪ Establishes commercial standard for procuring modular publication and training data (develop once, use many).
  ▪ Establishes and manages the digital twin and digital thread of the system.

d) Top Level Requirements (TRLs): TLRs and associated functional requirements will be provided separately with a zip file of the SySML and UML models.

2. Navy Common Readiness Model (NCRM)

a) Principle Business Needs
  ▪ Enable the use of modeling and simulation technologies to apply a systems engineering approach to supportability analysis to optimally design and sustain the system and its support by decomposing, allocating, verifying, validating and realizing system readiness (and each of its components) and affordability requirements.
  ▪ Readily enable fleet mission planners to aggregate system readiness at cost models to develop complex system, ship, strike / task group and fleet models that aligned to their applicable warfare area(s).
  ▪ Readily enable fleet mission planners to analyze and develop long term maintenance resource plans to affordably sustain Fleet mission readiness requirements for applicable operational plans.
  ▪ Enable fleet mission maintenance planners to rapidly disaggregate / aggregate task organized models to analyze, develop, execute and monitor maintenance resource plans for pending / ongoing operations to affordably sustain mission readiness requirements.
- Enable material condition reporting to the Navy’s readiness reporting system by receiving system component failure indicators from various sources (e.g. system sensors, maintenance information system, fault monitoring algorithms, etc.) and report mission readiness based on the end effect to mission(s) documented in the Fault Mode Effects and Criticality Analysis (FMECA) for all related fault modes within the system / aggregated Readiness at Cost model.

- Using system requirements and Readiness at Cost Model predicted mission and design outcomes, deploy a Failure Reporting and Root Cause Analysis System (FRACAS) to continuously monitor performance and conduct root cause analysis across all components of readiness and affordability traceable to the system / product support design elements that enable them (e.g. fault detection / fault isolation software, Remaining Useful Life (RUL) algorithms, component reliability, etc.).

- Deploy enterprise cloud / edge advanced data analytics decision support services to enable fleet and support activities to continuously improve performance, agility, responsiveness, and scale of supply chain, maintenance and support operations.

- Provide the capability for programs to acquire and sustain Maintenance Task Analysis data with full data associativity, traceability and effectivity across the MBPS and Log IT enterprise solutions. The primary data standards are S3000L, S2000M and other applicable aspects of the S Series Specification or GEIA-STD-0007.

- Provide the ability for programs to acquire and sustain service bills of materials with full data associativity, traceability and effectivity across the MBPS and Log IT enterprise solutions.

- Provide the ability for programs to acquire and sustain provisioning and cataloging data with full data associativity, traceability and effectivity across the MBPS and Log IT enterprise solutions.

b) Description

- Readiness model created at program inception and utilized through the life cycle (design reviews, fleet readiness, predictive maintenance / supply, etc.). Enables ability to create Availability and Cost Optimization Model using / integrated with:
  - FMECA
  - Reliability Block Diagram (RBD)
  - Multi-echelon Readiness Based Sparing (RBS)
  - Level of Repair Analysis (LORA)
  - O&S Cost optimization
  - R&M Predictions
  - FRACAS

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• Data Analytics integrated with modeling and simulation to enable performance monitoring, reporting and mission materiel readiness at cost decision support.
• Environment for the development and storage of maintenance and supply source data for use in technical publications, supply, and maintenance activities.
  • Logistics Product Data (LPD) or Logistics Support Analysis Record (LSAR) consisting of Maintenance Task Analysis and Provisioning Technical Documentation (PTD)

c) Benefits
• Connects readiness model to configuration as a part of overarching digital twin effort.
• Establishes integrated capability between configuration and readiness modeling from program inception – eliminating model accuracy issues.
• Enables point and time and predictive mission readiness including maintenance, supply, and manpower from a single model.
• Enables programs to assess availability and cost requirements throughout the requirements design process.
• Establishes integrated capability with configuration, training, and technical publications to ensure logistics and maintenance source data is never out of sync (digital thread).
• Establishes logistics / maintenance source data once to be used many times in publications, training, and enterprise supply / maintenance systems.

d) Top Level Requirements: TLRs and associated functional requirements will be provided separately with a zip file of the SySML and UML models.

3. Navy Data Acquisition Requirements Tool (NDART)
   a) Principle Business Needs
• Enforce common data standards, requirements, and acquisition approaches across all Navy weapon system acquisition contracts to:
  • Enable seamless integration of product data models from Original Equipment Manufacturers PLM systems into the Navy’s MBPS system
  • Support Log IT’s Data Management objectives
• Provide simplified, prompted solution that enables users to develop Statements of Work (SOWs), Contract Data Requirements Lists (CDRLs), and Data Item Descriptions (DIDs) to acquire product data models, Figure 7, based on system / platform, lifecycle phase, and acquisition strategy.

   b) Description
• Application that enables to users to enter program, product support and product data model parameters to produce a contract SOW, CDRLs and DIDs to acquire the product data model components needed to support the program’s product support strategy.
c) Benefits

- Establishes common standards / requirements for use in contracts to successfully procure technical data for use in a modern PLM environment.

d) Top Level Requirements: TLRs and associated functional requirements will be provided separately with a zip file of the SySML and UML models.

![Diagram of Navy Product Data Model](image)

**Figure 7 – Navy Product Data Model**

V. Legacy Application Overview

A. Legacy System Overview

NAVSEA 06L’s legacy Log IT systems, Figure 8, play a critical role in mission readiness for NAVSEA platforms and systems by providing the following capabilities:

- Provides an authoritative Configuration Status Accounting tool and configuration data source.
- Acquire, store, retrieve and view technical documentation by providing a central point of access to technical data for use by the Navy to include Planned Maintenance System and Engineering Operational Sequencing System (EOSS) information.
- Enable a single authoritative source to store, retrieve and view issued Naval ships’ drawings.

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B. **Legacy System Descriptions**

1. **Configuration Data Manager’s Database - Open Architecture (CDMD-OA)**

   CDMD-OA is the authoritative configuration status accounting data source for all Navy ship platforms and shore sites. It provides critical support for all Fleet maintenance and modernization efforts, shipboard system’s replication storage, shipboard allowance generation, equipment standardization initiatives, cross-platform weapons systems analysis (make, model, series), ship material condition metrics generation, preventative and corrective maintenance reporting and shipboard logistics product load-out. It also maintains the correct ship spares allowances and enables the successful scheduling and reporting of maintenance transactions. Policy support is identified under DOD 5000 (series), SECNAV 5000.2, OPNAV INST 5450.340, MIL-HDBK-61, NAVSEA 4130.12B, NAVSEA Technical Specification 9090.700 (series). Figures 9 and 10 depict CDMD-OA data flows. CDMD-OA has the following capabilities:

   - Provides shipboard logistics product load-out for approximately 4700 users.
   - Tracks the status of installed systems, equipment and their related logistics items on U.S. Naval and foreign military ships and shore activities.
   - Provides accurate configuration for ship, shore and Expeditionary Forces maintained in CDMD-OA and triggers the correct allowances of spares, test equipment, PMS documents and system / equipment technical documentation.
   - Consists of a distributed database with remote site servers hosting individual CDM databases that replicate data to a Central servers located at CEDC Charleston SC under SPAWAR.
   - Provides a complete view of all ships and shore sites, via a central repository, for which configuration status accounting and readiness reporting is based.
Transmits configuration data to NAVSUP WSS for supply and allowance allocation, in addition to all supply and configuration data to the shipboard systems.

Transmits configuration data to 20 other DON activities from ERP to NBIS, NAVSUP, MFOM as more in providing configuration data.

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2. **Revised Alternative Data Flow WEB (RADWEB)**

The Revised Alternative Dataflow Web site (RADWEB) acts as the electronic conduit through which shipboard and shore site allowance update and system/equipment maintenance history data files are passed among various activities (NAVSUP / NAVSUP WSS, NAVSEA, SPAWAR, NAVAIR, Warfare Centers, Regional Maintenance Centers, and Fleet Forces Command and Fleet Operational Units). RADWEB enables configuration, maintenance and allowance data transfer between ship and shore. CDMD-OA configuration data, ERP allowancing data and 3M maintenance reporting transactional data are replicated and exchanged thru RADWEB generated Automated Shore Interface (ASI) files between shipboard maintenance and logistics data systems (OMMS-NG / SNAP / R-SUPPLY / AWN/SSB) to ensure data synchronization and currency and supports approximately 3500 users. The RADWEB strategic data flow is depicted in Figure 11. Policy is supported under DOD 5000 (series), SECNAV 5000.2, OPNAV INST 5450.340, MIL-HDBK-61, NAVSEA 4130.12B, NAVSEA Technical Specification 9090.700 (series).

![RADWEB Strategic Data Flow](image)

**Figure 11 – RADWEB Data Flow**

3. **Command Technical Data**

The Command Technical Data (CTD) Program supports the Navy’s technical data and documentation requirements. The strategic data flow for CTD is depicted in Figure 12.
Figure 12 – CTD Data Flow

Command Tech Data consists of the following systems:

a) **Advanced Technical Information System (ATIS).**

ATIS is the primary system for shipboard storage, access, and display of (Technical Manuals (TMs) and drawings. ATIS is available on NIAPS, stand-alone, and client-server versions and used on all afloat platforms and ~200 shore activities with approximately 1000 users.

- Provides the capability to display technical manuals, engineering drawings, and other book-type documents stored in digital form on CDs.
- ATIS supports four primary functional areas: configuration, library, display, and support.
- The configuration functional area contains the databases and modules that allow the user to identify technical data.
- The library functional area contains the databases and modules that define what technical data is available, and allows the user access to view this data by drawing number, drawing title, publication ID, or publication title.
- The display functional area contains the module that initiates the display of TMs, Engineering Drawings (EDs), and other book-type documents.
- The support functional area allows the system administrator to manage ATIS users accounts, passwords, data, and databases.

b) **Technical Data Management Information System (TDMIS).**

TDMIS provides tech manual / documentation configuration and lifecycle management and enables users to research and view selected TMs. TDMIS supports 5000 – 10,000 users with the following functions:

- Assign publication, volume Identification (Vol ID), or stock number information support with history view screens.
- Assign product numbers to Technical Manuals (e.g., Technical Manual Identification Number, Volume Identification).
- Provides Technical Manual Management Activity POC, stocking point, and other information search screens.
- Provides ship hull/class or configuration-to-TM search screens.
- Generate and retrieve various reports, including Indexes of Technical Publications.
- Library, outfitting, and distribution information management.

c) **Streamlined Modular Acquisition Requirements Tailoring Tool (SMART-T).**

SMART-T provides a fast, easy, and accurate means for defining tailored TM acquisition and development requirements with the following capabilities:

- Generate Technical Manual Contract Requirements (TMCRs) and Technical Manual SEATASK Requirements (TMSRs).
- TM requirements conform to NAVSEA-approved specifications, standards, and NAVSEA TM Management Program (TMMP) policy.
- The generated TMCR / TMSR is intended for use in a Solicitation, Contract, Task / Delivery Order, or Government Agency tasking.
- Used by acquisition activities, developers, and reviewers to view TMCRs / TMSRs from the SMART-T Repository.

d) **NAVLOG Technical Data Repository System (NAVLOGTD).**

NAVLOGTD is the authoritative data repository used to develop, edit, publish, distribute and view technical data for EOSS, PMS, and Technical Manuals. NAVLOGTD supports ~3,500 registered users and ~800 editors for all component applications with the following capabilities:

- Provides EOSS for new construction ships and systems.
- Hosts the source data for the development, update, and distribution of PMS products to include Maintenance Index Pages (MIPs) and Maintenance Requirement Card (MRCs).
- Supports the development and distribution of Hull, Mechanical, and Electrical (HM&E) TMs.

e) **Naval Ships Engineering Drawing Repository (NSEDR).**

NSEDR stores and maintains all Naval ship drawings utilized by planning yards, Fleet activities, Naval Surface Warfare Centers, Systems Commands, In-Service Engineering Agents, etc. The NAVSEA-specific Repository under the Joint Engineering Data Management Information and Control System (JEDMICS) program with the following capabilities:

- DoD-wide Web-based Internet system containing all NAVSEA Non-sensitive (Non-U-NNPI) drawings.
- Accessible by US Government employees and contractors who have an official data agreement with the DoD and have a need-to-know for US Navy Ships’ EDs.
C. Legacy to MBPS Alignment

Figure 13 depicts the alignment from MBPS capabilities to the Legacy Systems they will potentially rationalize.

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Appendix A
Enterprise Technical Reference Framework White Paper

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Appendix B
Digital Transformation Data Plan
Appendix C
Digital Transformation Workforce Plan
Appendix D
Digital Transformation Logistics Services Plan

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Appendix E
Digital Transformation Application Portfolio Plan