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

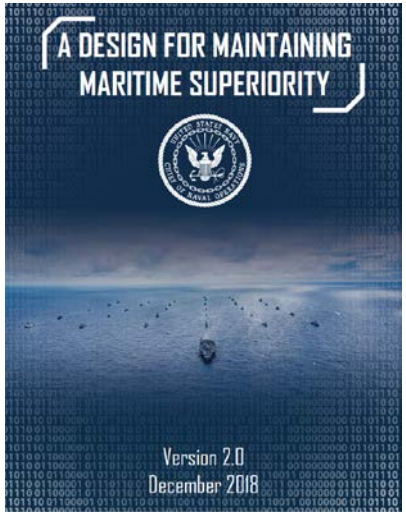
Model Based Product Support (MBPS) Overview

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

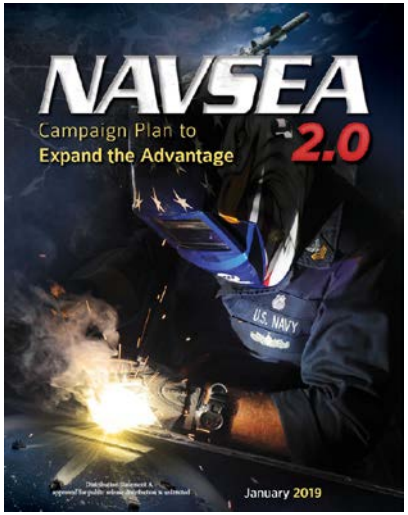
SEA06L 18 July 2019

MBPS Strategic Alignment

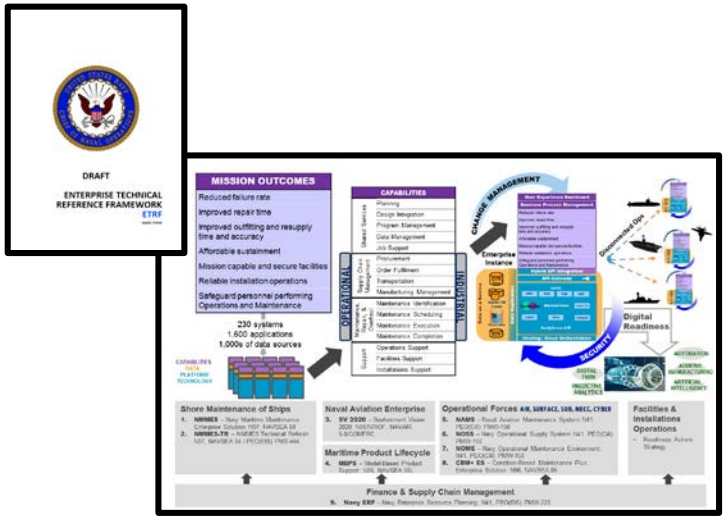
- The Navy maritime **Model Based Product Support (MBPS)** program is a logistics IT transformation effort that will increase weapon system uptime and reduce support costs
- MBPS directly aligns to Navy Strategies by:



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***

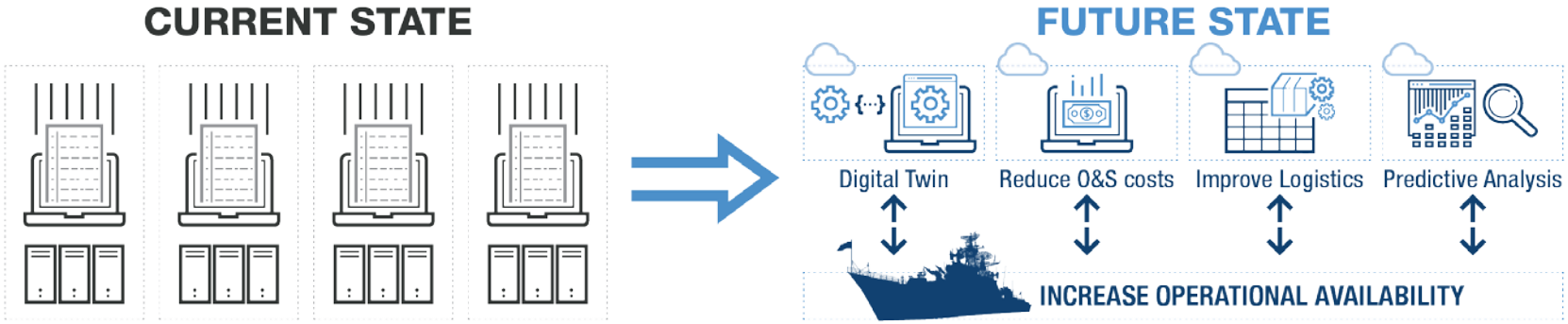


Executing OPNAV N41 Logistics Digital Transformation vector to ***enable data-driven decision making across all aspects of Navy missions to improve outcomes and the experience of end users***

MBPS Problem Statement

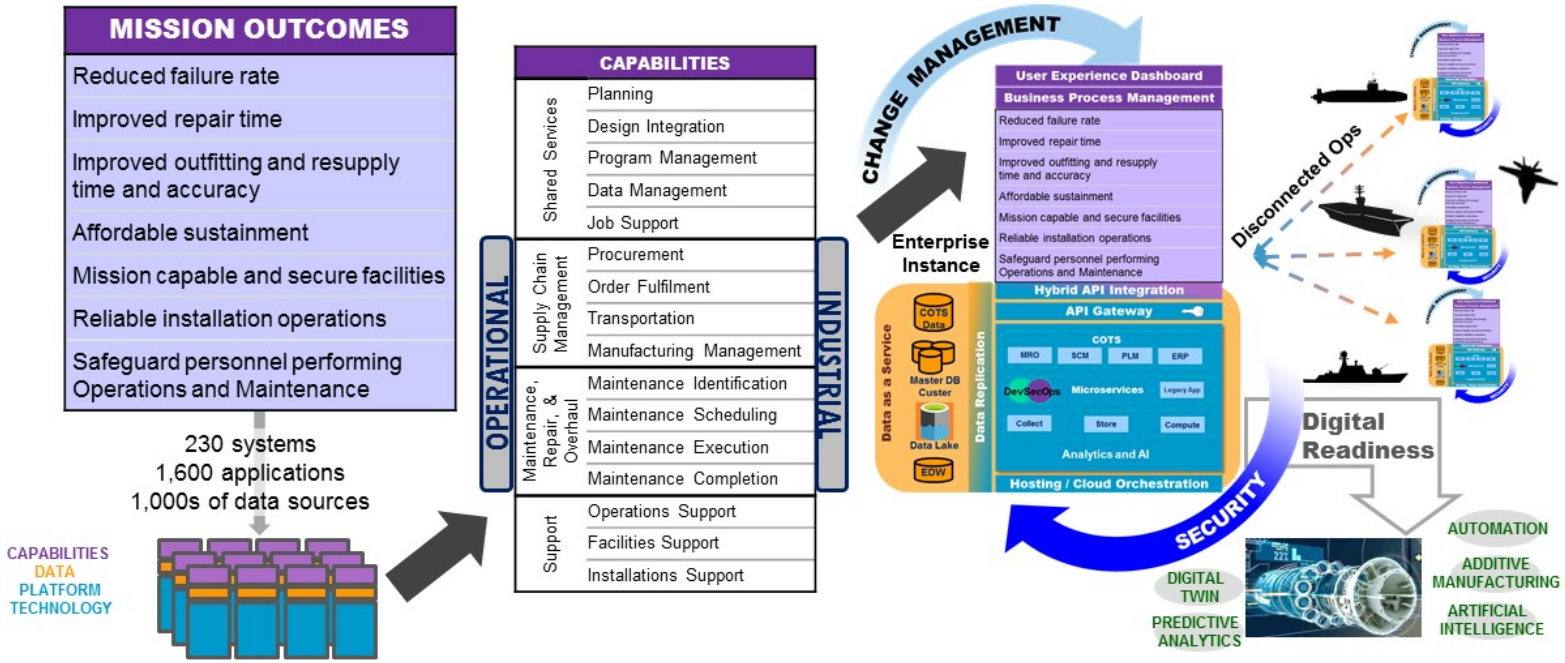
As stated in the MBPS Business Capability Requirements Document (BCRD)

- 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



Shore Maintenance of Ships

1. **NMMES** – Navy Maritime Maintenance Enterprise Solution: N97, NAVSEA 04
2. **NMMES-TR** – NMMES Technical Refresh: N97, NAVSEA 04 / PEO(EIS) PMS-444

Naval Aviation Enterprise

3. **SV 2020** – Sustainment Vision 2020: N98/NWCF, NAVAIR 6.0/COMFRC

Maritime Product Lifecycle

4. **MBPS** – Model-Based Product Support: N96, NAVSEA 06L

Operational Forces AIR, SURFACE, SUB, NECC, CYBER

5. **NAMS** – Naval Aviation Maintenance System: N41, PEO(C4I) PMW-150
6. **NOSS** – Navy Operational Supply System: N41, PEO(C4I) PMW-150
7. **NOME** – Navy Operational Maintenance Environment: N41, PEO(C4I) PMW-150
8. **CBM+ ES** – Condition-Based Maintenance Plus Enterprise Solution: N96, NAVSEA 05

Facilities & Installations Operations

- Readiness Ashore Strategy

Finance & Supply Chain Management

9. **Navy 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.

PEOPLE

Prepare Life Cycle Logistics workforce to execute MBPS and accomplish Ao at Cost

USER EXPERIENCE

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

PROCESS

Standards, policy, process to acquire product data and maintain through lifecycle

OPERATIONAL ANDSYSTEM 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

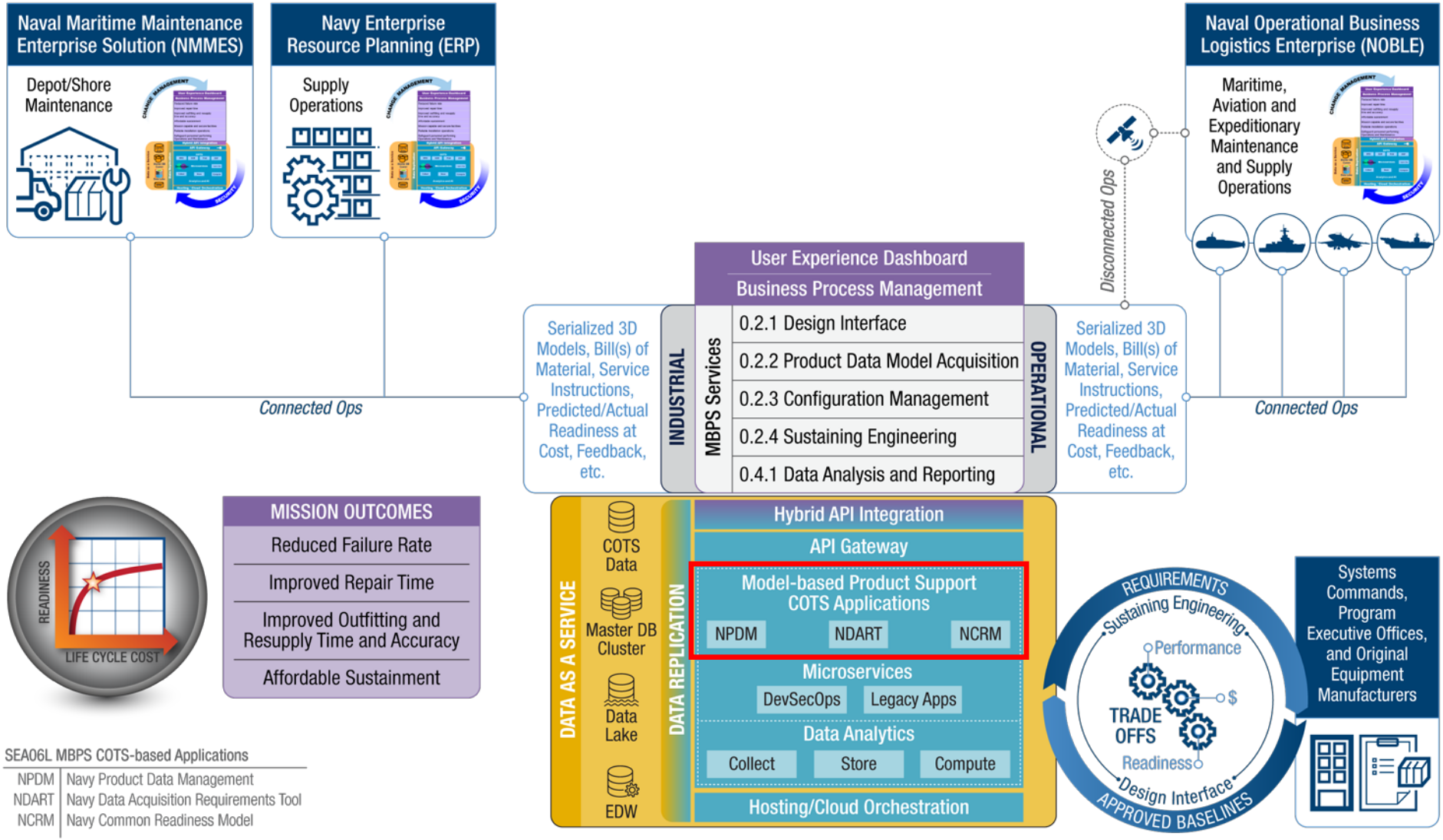
TECHNOLOGY

Enable MBPS to Improve Readiness at Cost

MBPS CAPABILITIES

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

Model Based Product Support (MBPS) OV-1

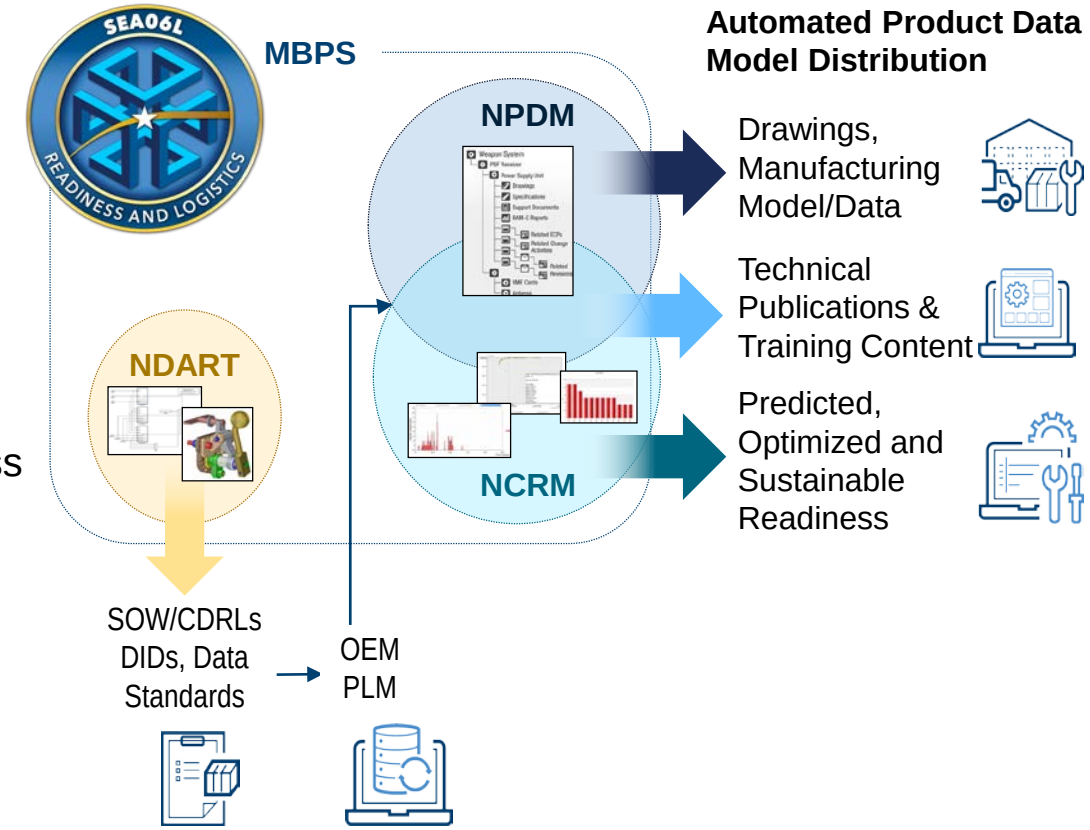


SEA06L MBPS COTS-based Applications

NPDM	Navy Product Data Management
NDART	Navy Data Acquisition Requirements Tool
NCRM	Navy Common Readiness Model

MBPS Capability Overview

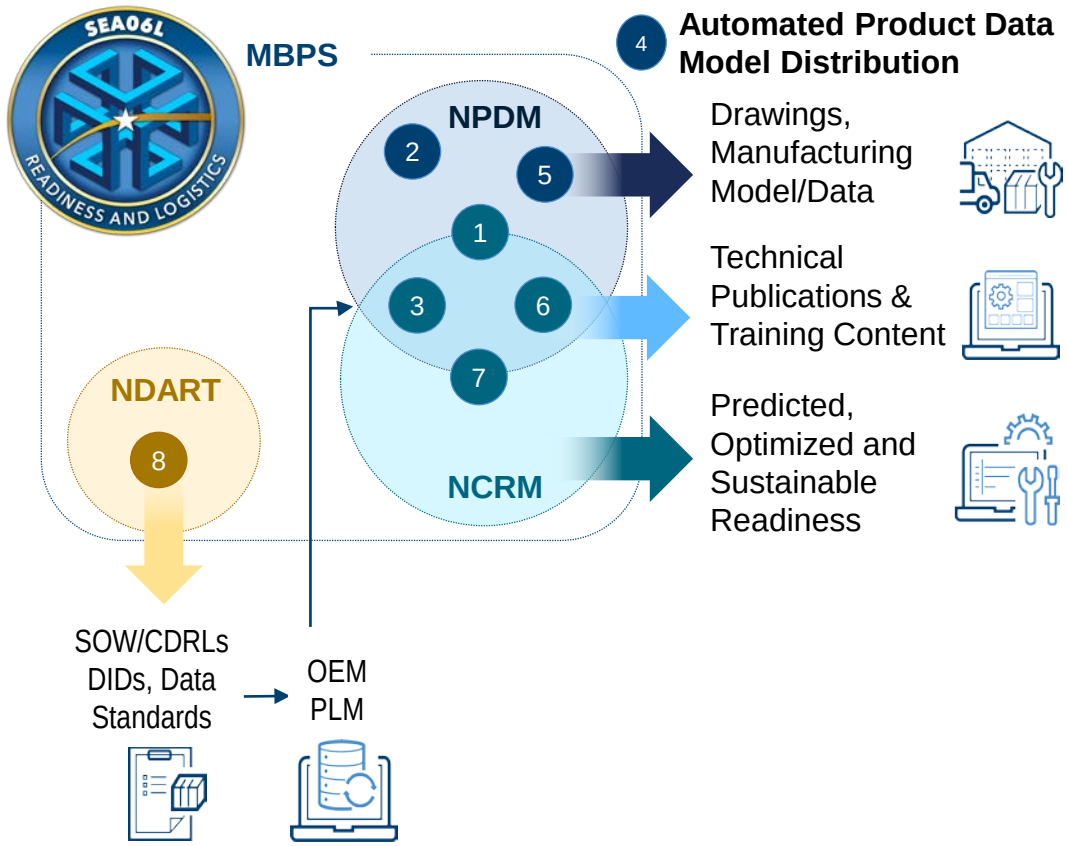
- **Navy Product Data Management (NPDM):**
  - Configuration manage, sustain, and provide enterprise access to all components of legacy and future standards-based Navy Weapon System Technical Data Packages (TDP)
- **Navy Common Readiness Model (NCRM)**
  - Analyze, report, predict, and optimize weapon 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



MBPS is comprised of three primary capabilities providing enterprise product data and readiness analytic services

MBPS to In-Service Systems Alignment

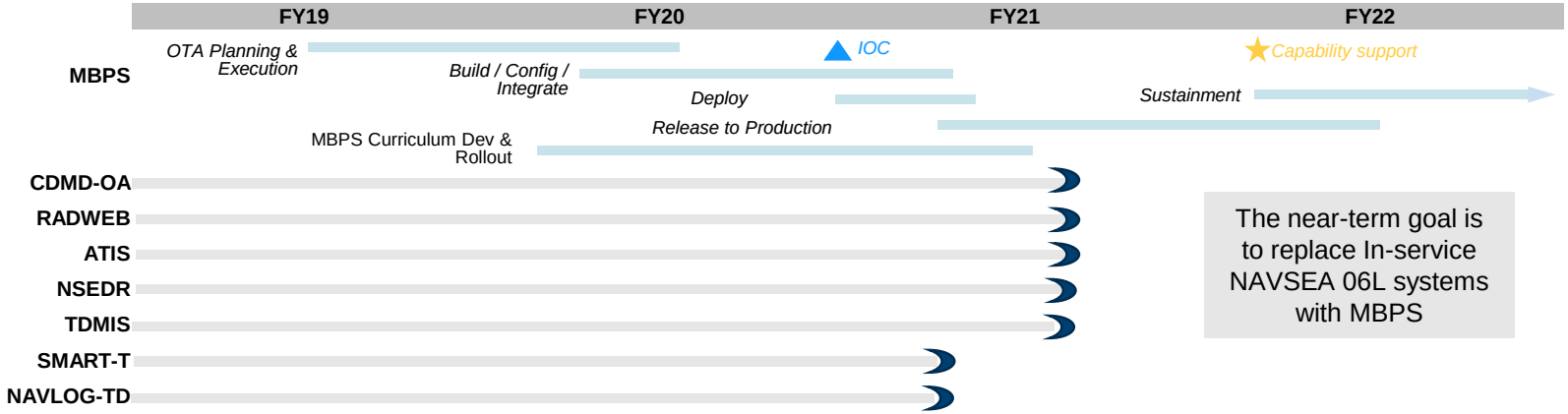
1. **System Shipboard Config Status**
   - CDMD-OA, RADWEB
2. **Configuration Mgmt & Modernization**
   - NDE
3. **Provisioning Parts Information**
   - ICAPS
4. **Ship & Shore Tech Data Viewing**
   - ATIS
5. **Ship Drawings**
   - NSEDR
6. **Org & Depot Maint Procedures**
   - TDMIS, NAVLOGTD, PMSMIS
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 Digital Transformation (BCAT II)

- 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



MBPS is executing an OTA Prototype Acquisition approach targeted to deliver operational capabilities in FY21

MBPS Organizational Change Management (OCM) Strategy

Objectives

Enable Stakeholder Adoption

Operationalize Life Cycle Logistics (LCL) Practices with MBPS Technologies

Single, authoritative system baseline, technical data management, logistics product data, change and configuration management environment to acquire, manage, and sustain technical data

Integrated modeling and simulation-based approach to supportability analysis across the system lifecycle, which enables acquisition programs to design and sustain equipment and logistics service solutions to meet fleet readiness and cost objectives

Web-based Statement of Work (SOWs), Contract Data Requirements Lists (CDRLs), and Data Item Descriptions (DIDs) to procure technical and product data for the system lifecycle

OCM Focus Areas

- 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.

Embedded Fault Detection, Fault Isolation, Fault Codes, and Sensors

Naval Operational Business Logistics Enterprise (NOBLE)

Maritime, Aviation and Expeditionary Maintenance and Supply Operations

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

NOME

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.

NOSS

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).

NOME

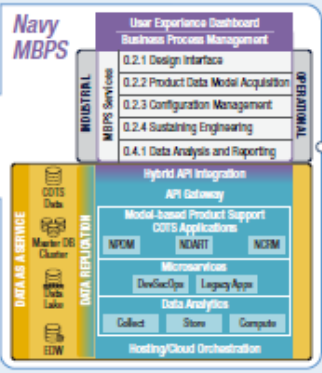
5 Maintenance scheduled, part arrives, and sailor conducts maintenance changes; augmented reality (AR) can be enabled from handheld.

NOME

8 Update ship baseline

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

Navy MBPS



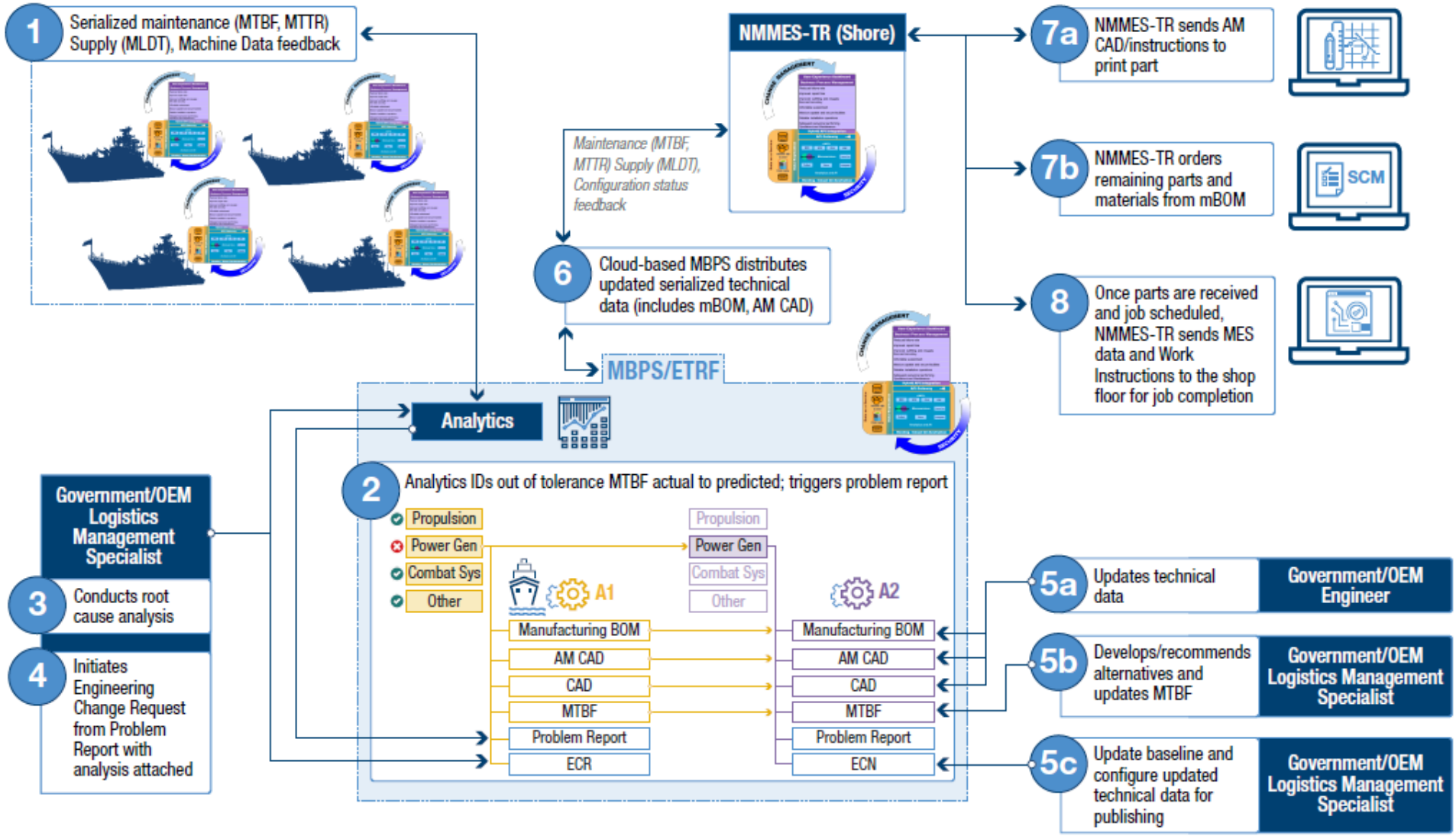
Providing an exploded product data model update containing: part numbers/NSNs; Reliability, Maintainability and Availability (RMA) data, 3D drawings/CAD models; maintenance tasks; and tech manual content

MBPS/ ETRF

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.

Training	Engineer	Tech Data Manager	Readiness at Cost Analyst
3D Training Content	3D Drawing	Tech Data	Failure Rate, Time to Repair, Logistics Delay (60 days)
Maintenance Review	3D/AR Service Instructions	Component Manual	Propulsion, Power Gen, Combat Sys, Other
			Illustrations, Operating Procedures, Service Procedures, Spare Parts List

MBPS Shore Modernization Scenario



Questions & Comments

Back-Up

Model Based Product Support

MBPS increases weapon system uptime and reduces Operating and Support (O&S) costs through readiness analytics and enterprise product data

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

MBPS to Legacy Systems Alignment

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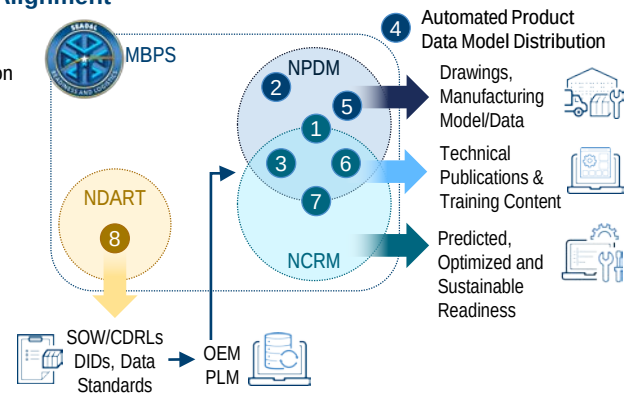
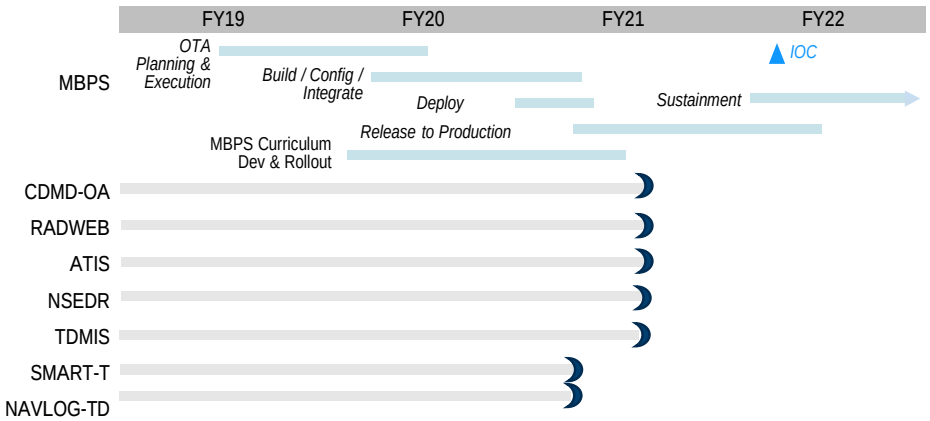


MBPS is a Business Capability Acquisition Category Level II (BCAT II) currently in Phase 1.It will consolidate existing logistic configuration and technical data systems. SEA06L is executing an Other Transaction Authority (OTA) to initiate an incremental approach for prototype development. Phase 2 completion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

Notional Milestones



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** (STA_OR). Initiative to improve the Maritime Spares process and Navy's ability to connect spares to system Operational Availability (A_O).

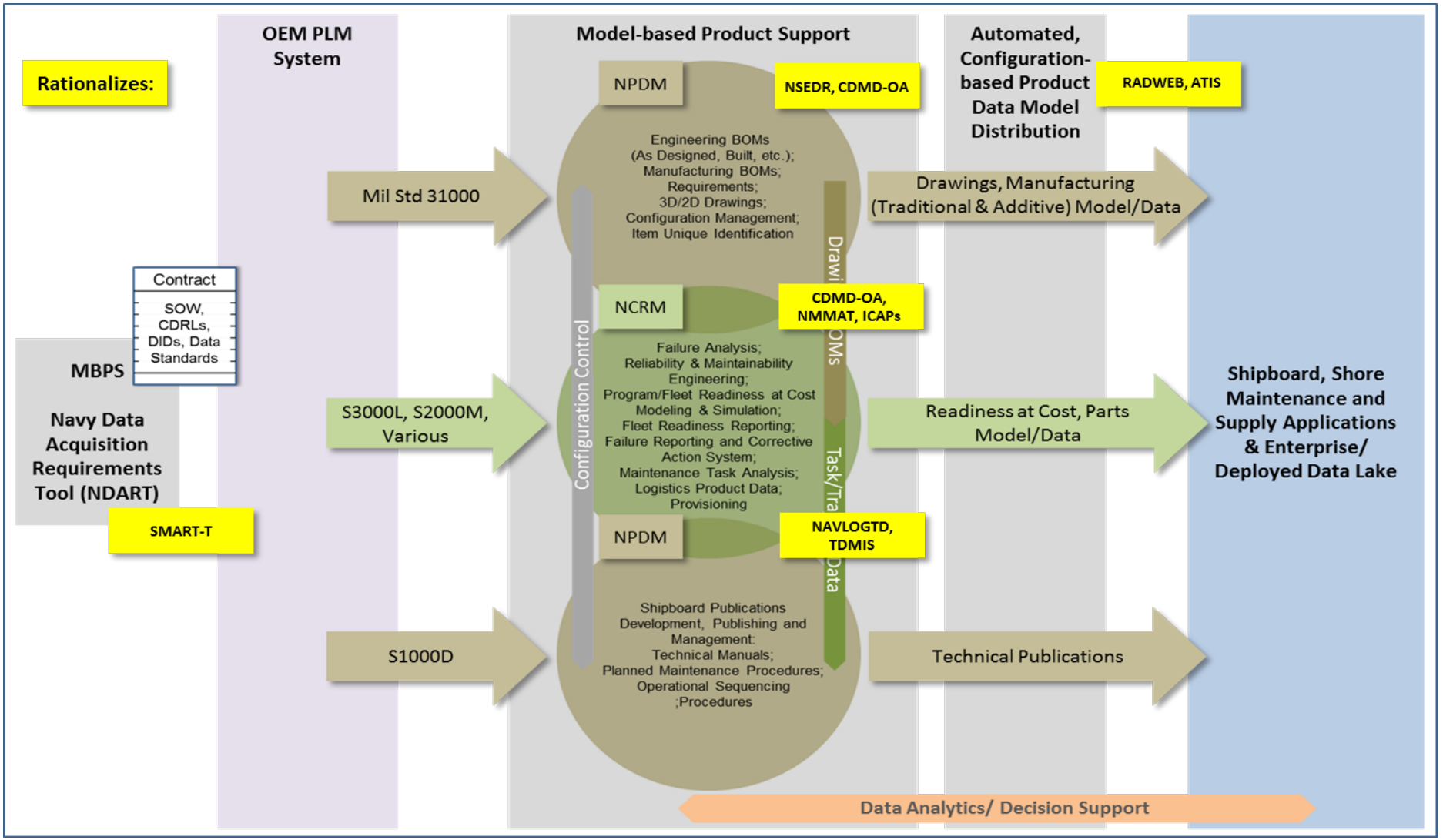
SEA06L Mission: Advance and deliver superior Product Support through people, processes, and technologies to enable affordable Fleet readiness

FOR MORE INFORMATION

CAPT Stuart Day, SC
Director, SEA 06L
Stuart.day@navy.mil

Tom Murphy
Deputy Director, SEA 06L
tom.l.murphy@navy.mil

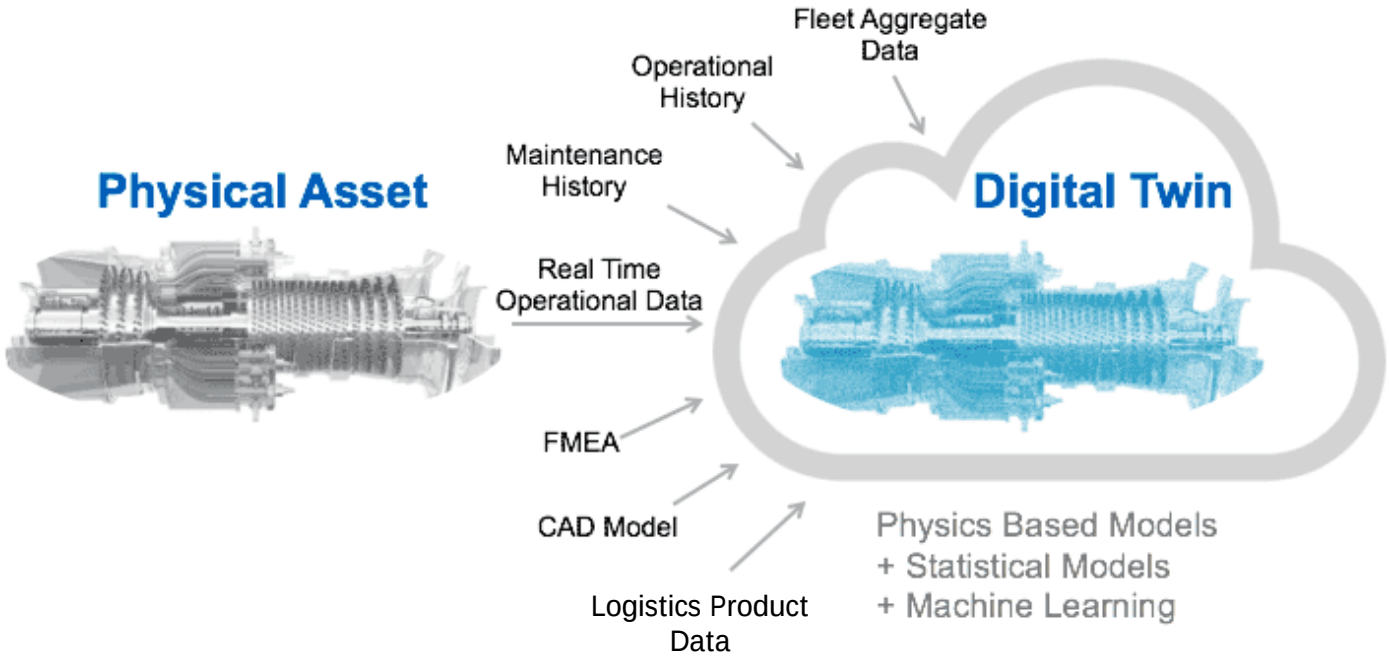
MBPS to Legacy Systems Alignment



To Be Specifications vs As Is Product Data

To Be Specification	As Is Product Data	Comments
S1000D	TMs, OSS (EOSS, CSOSS)	
S2000M	Provisioning, Configuration, Material Supply	
S3000L	Logistic Support Analysis, Maintenance Tasks As-Maintained BOM	
S4000P	PMS	PMS developed using S1000D
S5000F	TDMERs, Feedback Documents	
S6000T	Competency Models and Lesson Plans	Training Courses developed using S1000D
MIL-STD-31000	3D Models, 2D Drawings, As-Designed BOM, As-Maintained BOM	

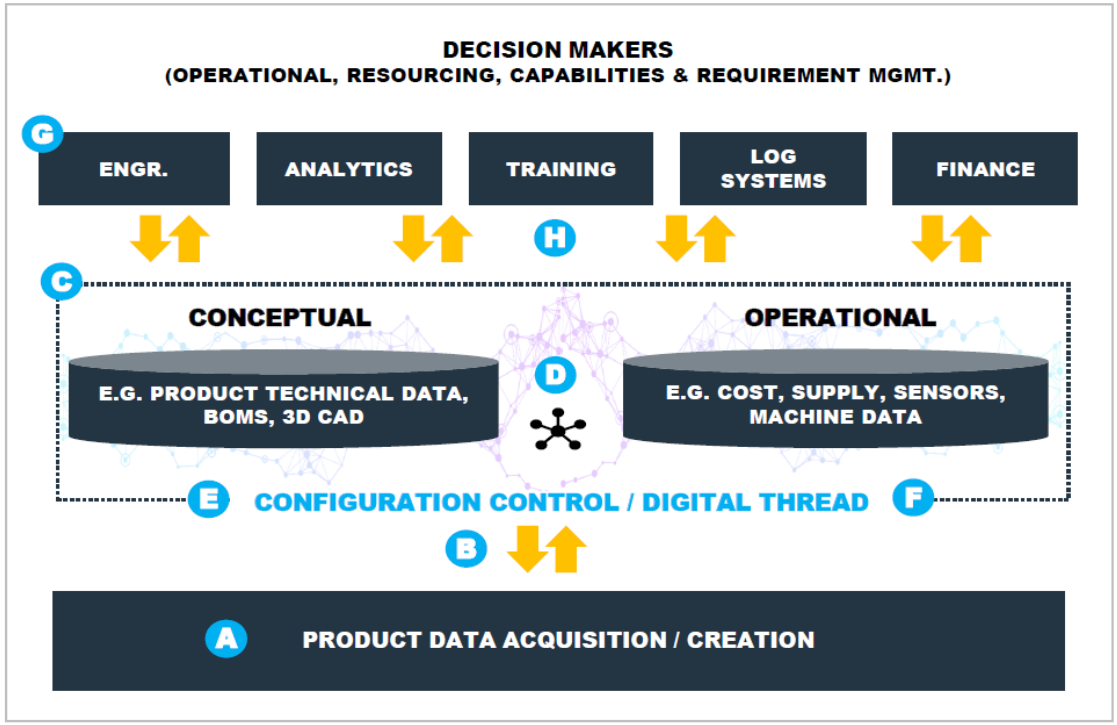
Digital Twin



- 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

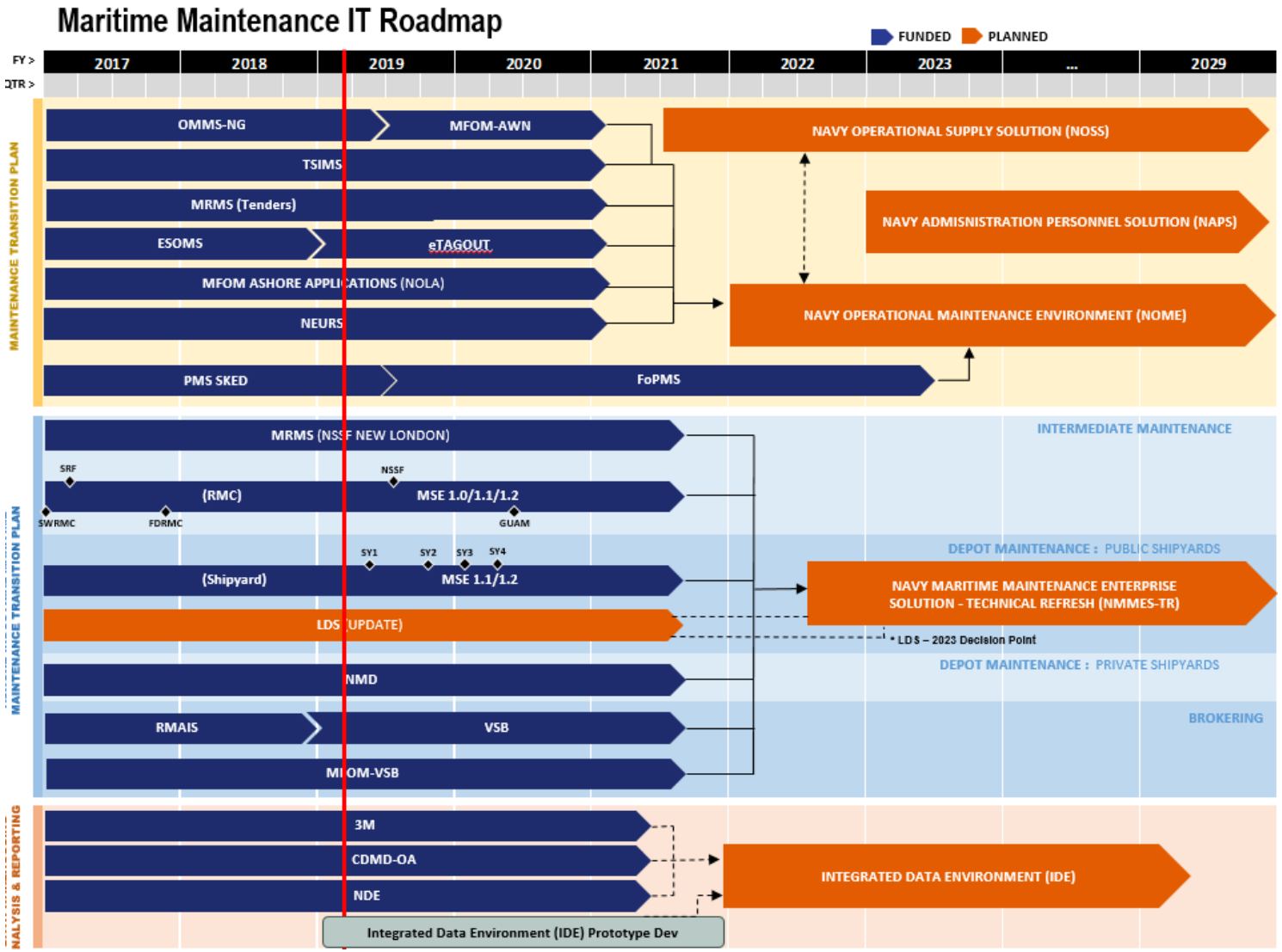
ENTERPRISE PLM COMPONENTS



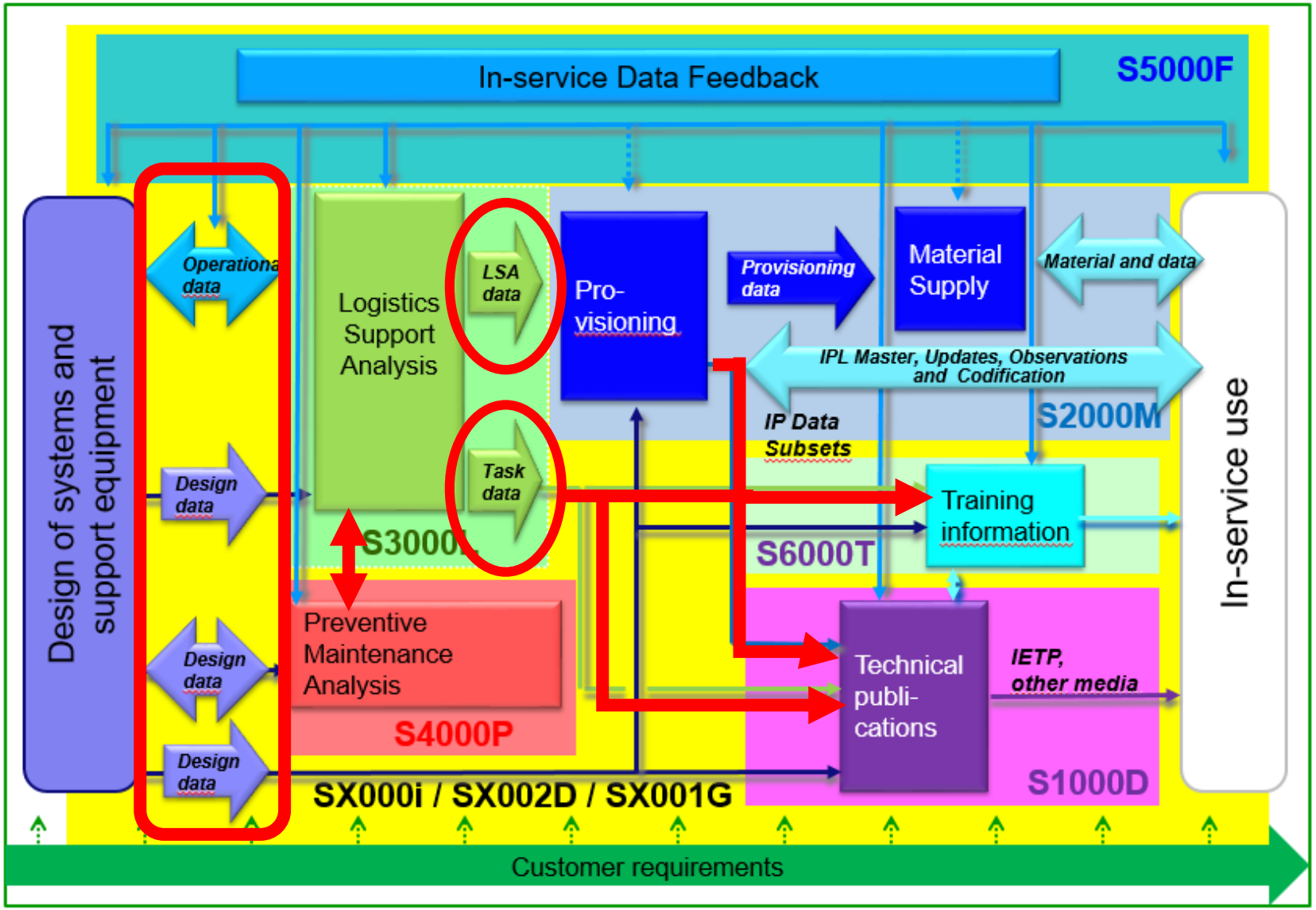
COMPONENT DESCRIPTIONS

- **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 Roadmap



Logistic Product Data Flow

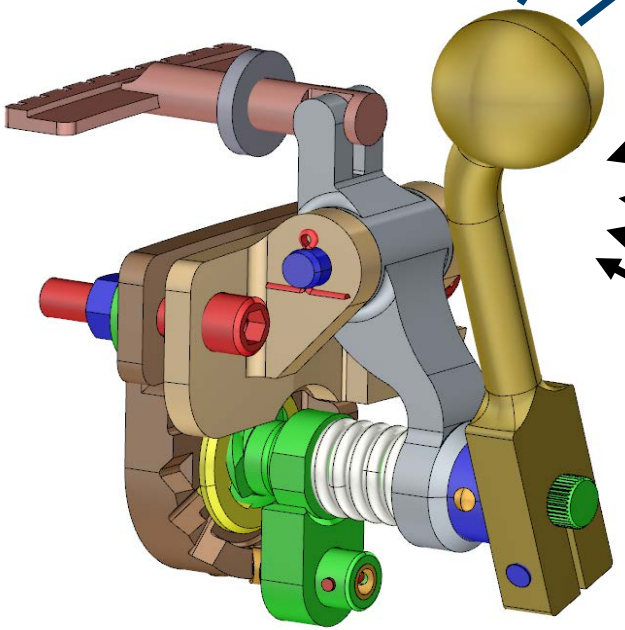


Product Model Data - Specifications

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

S6000T
- Training Needs Analysis
- Training Objectives

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

MIL-STD-31000
Technical Data Package (TDP)

Technical Data Package (TDP)
(includes but is not limited to):

- 3-D Models
- Drawings
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- Specifications
- Standards
- Quality Assurance Provisions
- Software Documentation
- Packaging Details

NOTES:

1. APPLICABLE STANDARDS/SPECIFICATIONS:
   A. ASME Y14.100-2013
   B. ASME Y14.5-2009
   C. ASME Y14.41-2012
   D. MIL-W-13855

2. QUALITY ASSURANCE PROVISION REQUIREMENTS PER DRAWING NUMBER 12993884 APPLY.

THE NOTES DISPLAYED ABOVE ARE FOR REFERENCE ONLY. SEE VIEW STATE MBD0_TITLE_BLOCK FOR COMPLETE NOTES.

PARTS LIST

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11	7012748	1
12	7012800	1
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14	7012765	1
15	7070734	1
16	NAS1352-4-12	1
17	MS35743-11	1
18	MS24665-283	2
19	MS51963-67	1
20	MS27183-15	2
21	MS51922-17	2
22	NAS1352-6-28	2

SHOW ALL | ISOLATE | HIDE | SHOW | ZOOM FIT

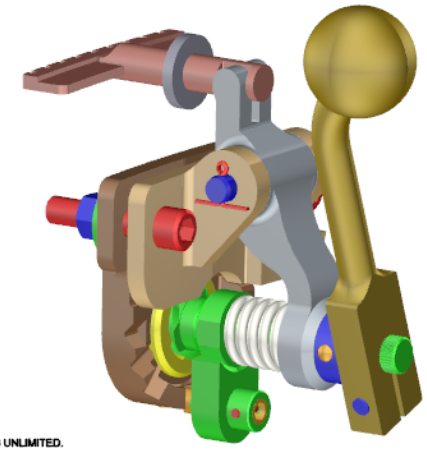
NOTES:

1. APPLICABLE STANDARDS/SPECIFICATIONS:
   A. ASME Y14.100-2013
   B. ASME Y14.5-2009
   C. ASME Y14.41-2012
   D. MIL-W-13855

2. QUALITY ASSURANCE PROVISION REQUIREMENTS PER DRAWING NUMBER 12993884 APPLY.

201 II V — WORKMANSHIP

202 II V — PARTS MISSING OR IMPROPERLY ASSEMBLED



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REVISION

REVISION	F
DESCRIPTION	L1753007 2017-01-30
DATE (YYYY-MO-DA)	2017-02-01
APPROVED	JTD

MODEL VERSION: F.2

MODEL VIEWS | Print Selected Views

- MBD0_TITLE_BLOCK
- MBD1_NONE
- MBD2A_GENERAL
- MBD2B_LEVER_POSITIONS

CURRENT DESIGN ACTIVITY CAGE CODE: 19200
ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
PICATINNY ARSENAL, NEW JERSEY 07806-5000

UNITS	ENGLISH
PART NO.	123456

DESIGN ACTIVITY
US ARMY
TANK-AUTOMOTIVE AND ARMAMENTS COMMAND
WARREN, MICHIGAN 48397-5000

NOMENCLATURE
LOCKING ASSEMBLY

CAGE CODE	19207
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DATE DRAWING ISSUED	2016-09-12
UNIT WT.	4.60226

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MIL-STD-31000B

APPENDIX B

Page 34

		DRAWN BY: C. SMITH	MODIFIED BY: C. JONES
		CHECKER: A. BEE	ENGINEER: A. JONES
		ENGINEER: B. JONES	QUALITY ENGINEER: C. DEE
		DRAWING APPROVAL: B.SMITH	2016-04-06
7012727 NEXT ASSY	MS ASSEMBLY USED ON	DESIGN APPROVAL: A. SMITH	2016-04-06
APPLICATION		TEMPLATE VERSION: 3.0	