Acquisition Logistics

TOPIC LEARNING OBJECTIVES

Upon successful completion of this topic, the student will be able to:

1. Identify the role of acquisition logistics and support costs of a system as they relate to life-cycle costs.
2. Recognize the importance of conducting supportability analyses as an integrated part of the Systems Engineering (SE) process.
3. Recognize the magnitude of the task involved with fielding/deploying a new defense system and the necessity for deploying/fielding the system with all its associated support in place at the deployed/fielded locations.
4. Identify the relationship of Reliability, Availability, and Maintainability (RAM) to acquisition logistics, and its impact on system performance, operational effectiveness (including support), logistics planning, and life-cycle cost.
5. Recognize the importance of the 12 integrated product support elements in supportability planning and their influences with respect to Acquisition Logistics.
6. Identify system supportability issues in planning and executing a defense acquisition program.
7. Determine the impacts to a given acquisition program if supportability issues are not resolved.
8. Identify acquisition logistics support activities and requirements that deal with fielding/deployment (e.g., planning, coordination, organizing deployment teams, material release).
9. Identify acquisition logistics support activities and requirements associated with post-production support (e.g., planning, adequate sources of supply, spares modernization, sustaining system readiness, and obsolescence).

STUDENT PREPARATION

Student Support Material

1. Acquisition Logistics Lesson Plan

Primary References

1. DoDI 5000 (series)
2. Defense Acquisition Guidebook

Additional References

1. USD(AT&L) Designing and Assessing Supportability in DOD Weapon Systems
2. Product Support Manager (PSM) Guidebook, https://acc.dau.mil/ipsm-guidebook
3. Integrated Product Support (IPS) Element Guidebook https://acc.dau.mil/ips-guidebook
4. Performance Based Logistics (PBL) Guidebook https://www.dau.edu/tools/t/Performance-Based-Logistics-(PBL)-Guidebook
5. ACQ 1010 Module 9 Acquisition Logistics

TOPIC LEARNING OBJECTIVES

Upon successful completion of this topic, the student will be able to:

10. Identify Reliability, Availability, and Maintainability (RAM) techniques used by Program Managers.
11. Identify key DoD logistics-related acquisition policies and their impact (e.g., Performance Based Logistics, Life-Cycle Cost, Contractor Logistic Support, Commercial-Off-The-Shelf And Non-Developmental Items, Information Technology, etc.).
12. Identify long term supportability and sustainment strategies through the application of Product Support Business model (PSBM) and the 12 Step Product Support Strategy Process Model.
13. Capture the Product Support Strategy and specific planning execution details in the Life-Cycle Sustainment Plan (LCSP).
14. Recognize the differences between outcome-based performance support and transactional support.
15. Recognize the importance of metrics as it relates to achieving system readiness and life-cycle cost goals.
16. Recognize the importance of Performance Based Logistics (PBL) contracting strategies and the impact of financial and non-financial incentives.

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Overview

- Defining Acquisition Logistics
- Acquisition Logistics policy
- Reliability, Availability, and Maintainability (RAM)
- Acquisition support costs
- Supportability analysis as part of the Systems Engineering process
- Product Support Business Model (PSBM) and the 12-Step Product Support Strategy Process Model
- Life-Cycle Sustainment Plan (LCSP) and 12 Integrated Product Support (IPS) elements
- Logistics and program planning
- Logistics concerns in fielding and deployment
- Post-production logistics support

A Simple Weapon System

Does this system meet the warfighter's needs?

The Full Weapon System

Defining Acquisition Logistics

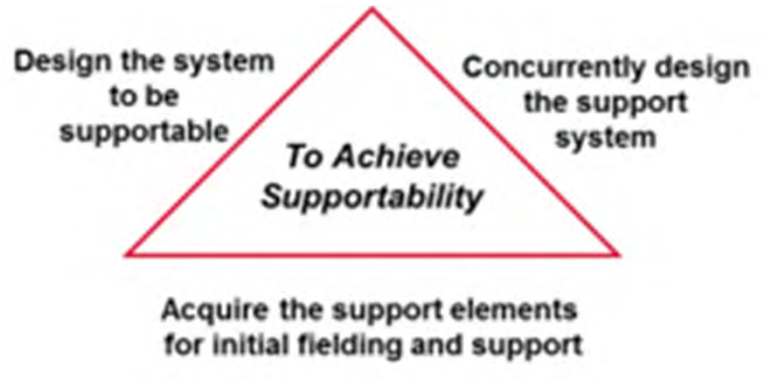
- Acquisition Logisitics is a multi-functional, technical management discipline associated with design, development, testing, production, fielding, sustainment, and improvement/modernization

- Technical and management activities conducted to ensure supportability implications are considered early and throughout the acquisition process

- The goal is to field ***cost effective systems*** that achieve the user's peacetime and wartime ***readiness capability needs***

Role of Acquisition Logistics

- To ensure that new systems are adequately supported, acquisition logisticians:
  - Ensure that the system is designed for supportability
  - Design the support infrastructure
  - Ensure the necessary support structure is in place when the system is fielded



Acquisition logistics ensures the system is designed for supportability and is measured by readiness-related parameters (Reliability, Availability, and Maintainability)

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Acquisition Logistics Policy

- DoDD 5000.01 Defense Acquisition System
  - The Program Manager (PM) is accountable for achieving program life-cycle management objectives
    - Plan for operations and support at program inception
    - Balance supportability with other requirements that impact program cost, schedule, and performance
  - Implement fundamentals of design and manufacturing that result in reliable and maintainable systems
    - Establish key fundamentals early and improve over the service life of the system
  - Design the Product Support Strategy (PSS) for enduring and affordable sustainment
    - Establish, track, and adjust support metrics to ensure product support objectives are achieved and sustained over the system life-cycle
    - Include the best use of public and private sector capabilities

DoD policy requires PMs develop and implement an affordable and effective PSS

Acquisition Logistics Policy

- A Major Defense Acquisition Program (MDAP) shall be supported by a Product Support Manager (PSM) per 10 USC 4324 paragraph c(1)
- DoD policy implementing 10 USC 4324 primarily resides in DoDI 5000.91 Product Support Management for the Adaptive Acquisition Framework. This DoD policy states:
  - The PM is the single point of accountability for achieving program life-cycle management objectives
  - PSM supports the PM in the development of a performance-based life-cycle PSS required for all covered systems
  - PSM will develop, plan, and implement a comprehensive PSS
  - Life-Cycle Sustainment Plan (LCSP) is required
- The Product Support Business Model (PBSM) and the 12 Step Product Support Strategy Process Model are operationalized by the LCSP

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Definitions

- Reliability: The ability of a system and its parts to perform its mission without failure, degradation, or demand on the support system
  - It does what it's supposed to during the mission
- Availability: A measure of the degree to which an item is in the operable and committable state at the start of a mission when the mission is called for an unknown (random) time
  - It'll be there and working whenever you need it
- Maintainability: The ability of an item to be retained in or restored to specified condition when maintenance is performed by personnel having specified skill levels, using prescribed procedures and resources, at each prescribed level of maintenance and repair
  - It's quick and easy to fix when it breaks

Acquisition Logistics and RAM

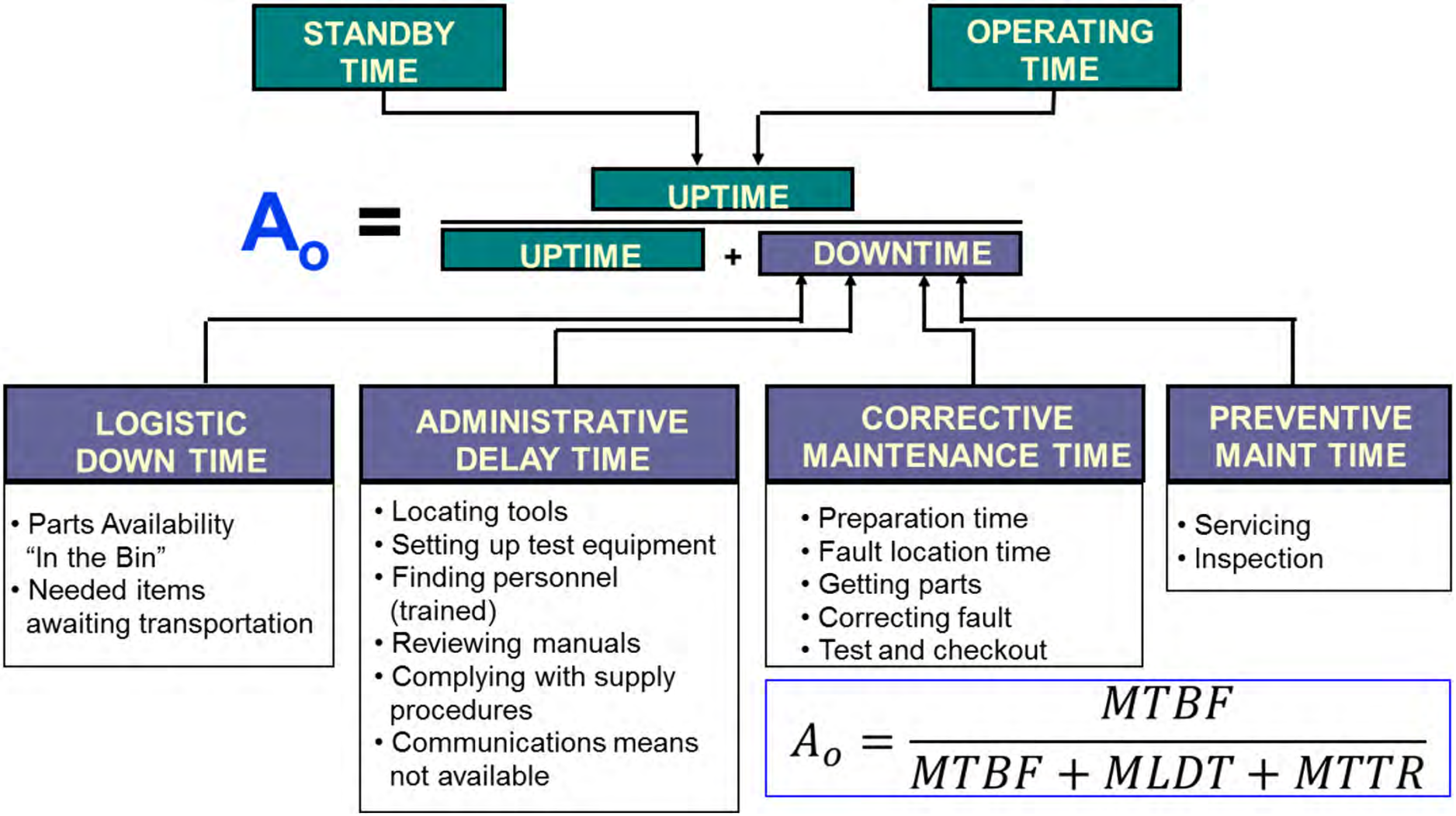
- Acquisition Logistics ensures the system is designed for supportability and is measured by readiness related parameters: Reliability, Availability, and Maintainability. The Program Manager shall:
  - Establish RAM objectives early in the acquisition cycle and address them as a design parameters throughout the acquisition process
  - Develop RAM system requirements based on the Initial Capability Document (ICD) or Capability Development Document (CDD) and Total Ownership Cost (TOC) considerations, and state them in quantifiable, operational terms, measurable during Developmental/Operational Test and Evaluation
  - Ensure RAM system requirements address all elements of the system, including support and training equipment, technical manuals, spare parts, and tools

Early program focus on RAM will increase operational effectiveness and reduce costs

RAM Metrics

- For all Acquisition Category (ACAT) I programs, the sustainment Key Performance Parameter (KPP) is mandatory and consists of two factors:
  - Material Availability, Am (is usually expressed as a percentage)
  - Operational Availability, Ao (is usually expressed as a percentage)
    - Ao is a function of reliability, maintainability, and cost (RAM-C)
- For all ACAT I programs, there are three mandatory supporting sustainment Key System Attributes (KSA)
  - Reliability
    - e.g., Mean Time Between Failures (MTBF) (is usually expressed in hours)
  - Maintainability
    - e.g., Mean Time To Repair (MTTR) (is usually expressed in hours)
  - Total Ownership Cost
- For ACAT II and below programs, the sponsor will determine the applicability of the sustainment KPP and KSAs

Operational Availability (A_o)



RAM is intertwined with performance, effectiveness, support, logistics, and costs

RAM Techniques

- Design for:
  - Human engineering
  - Minimizing failures
  - Accessibility
  - Visibility
  - Testability
  - Standardization
  - Simplicity
- Other considerations
  - Reliability Centered Maintenance (RCM) analysis
  - Operational & maintenance skill requirements
    - Repair level, tools
  - Test equipment
    - Built-In Test (Equipment) BIT/BITE

RAM Techniques

- Examples of how to design to minimize failures:
  - Mission, environmental, life profile
  - Stress analysis
  - Worst case analysis
  - Failure Mode Effects and Criticality Analysis (FMECA)
  - Allocation
  - Part and material selection
  - Derating criteria
  - Simplification
  - Design reviews

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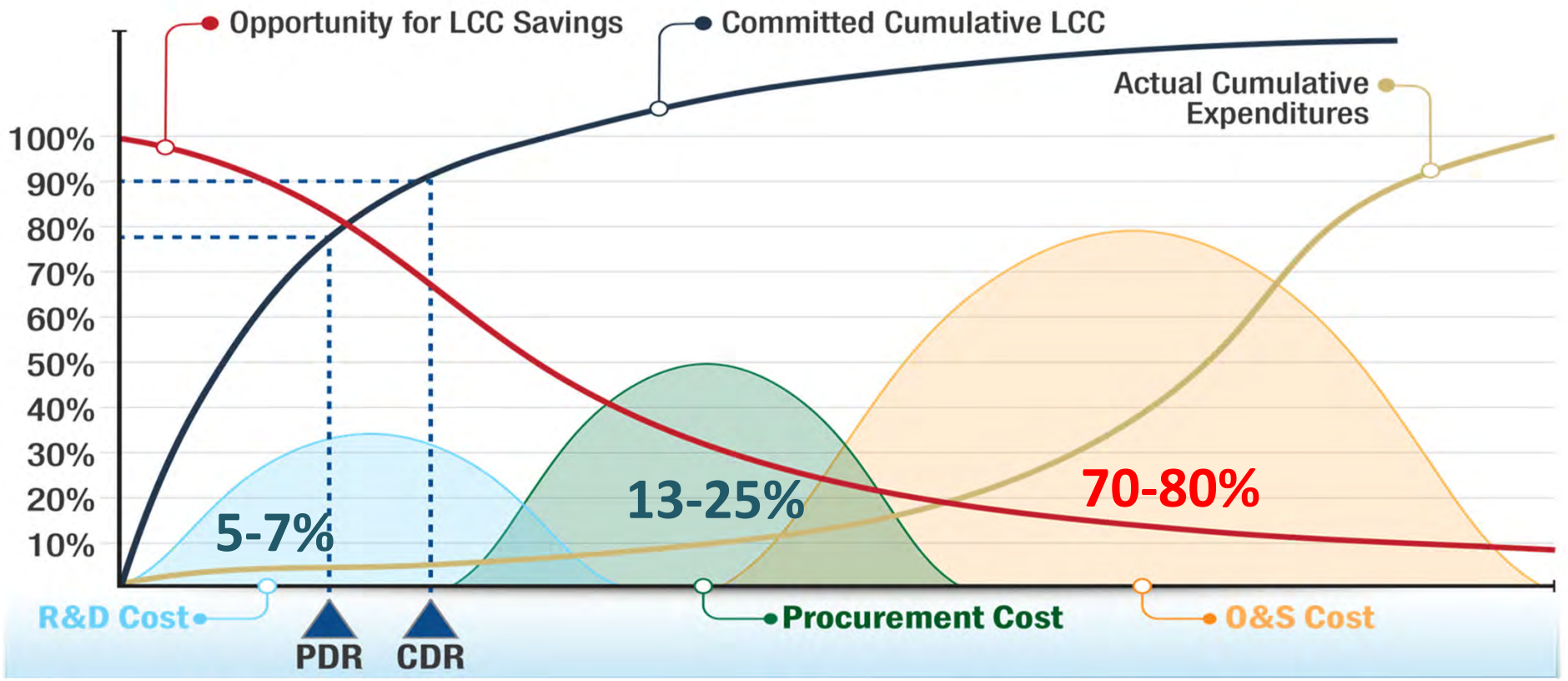
Typical Cost Distribution



Operation and support costs are about 70-80% of life-cycle costs for a typical program

Ex: Ship O&S Cost Estimating

1.0 ***Mission Personnel***

- 1.1 Ship Personnel

2.0 ***Unit Level Consumption***

- 2.1 Ship Petroleum, Oil, Lubricants
- 2.2 Repair Parts/Supplies
- 2.3 Depot-Level Repairable
- 2.4 Training Munitions/Expendable Stores
- 2.5 Purchased Services
- 2.6 Other (TAD)

3.0 ***Intermediate Maintenance***

- 3.1 Maintenance Afloat
- 3.2 Maintenance Ashore
- 3.3 Repair Parts/Supplies
- 3.4 Commercial Industrial Services
- 3.5 Other

Ex: Ship O&S Cost Estimating

4.0 ***Depot Maintenance***
- 4.1 Scheduled Ship Overhaul
- 4.2 Nonscheduled Ship Repair
- 4.3 Fleet Modernization
- 4.4 Equipment Rework
- 4.5 Naval Aviation Depot
- 4.6 Other Depot

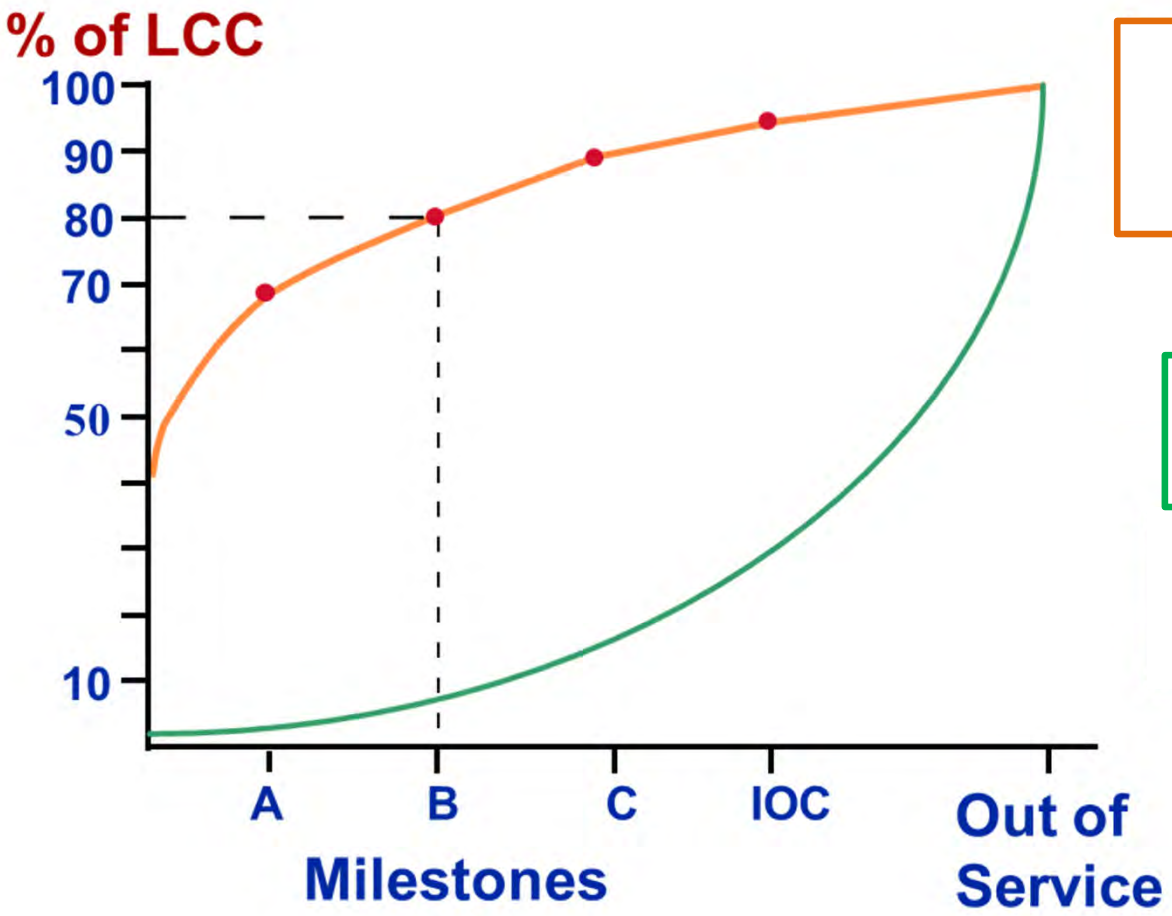
5.0 ***Contractor Support***
- 5.1 Contractor Support Services

6.0 ***Sustaining Support***
- 6.1 Support Equipment Replacement
- 6.2 Centrally Provided Material
- 6.3 Sustaining Engineering Support
- 6.4 Software Maintenance Support
- 6.5 Simulator Operations
- 6.6 Other

7.0 ***Indirect Support***
- 7.1 Personnel Support
- 7.2 Installation Support

Support costs includes the people, facilities, processes, tools, parts, etc. required to operate and maintain a system after it has been deployed

Influencing Design



Life-cycle cost effectively rendered unchangeable for a given design

Life-cycle cost actually expended

Early analysis and decisions affect LCC

Logistics Related Concepts

- Integrated Product & Process Development/Integrated Product Teams (IPPD/IPT)
- LCC must be considered throughout the program
- Commercial-Off-The-Shelf (COTS) and Non-Developmental Items encouraged
  - Reduced developmental risk and cost
  - Increased long term support risk
- Maintain adequate organic core depot maintenance capabilities
- Beware of increased long-term cost risks due to the maximization of Contractor Logistics Support (CLS), privatization, and outsourcing
- RAM as a force effectiveness multiplier
- Open systems design enables future upgrades
- Cradle-to-grave program management

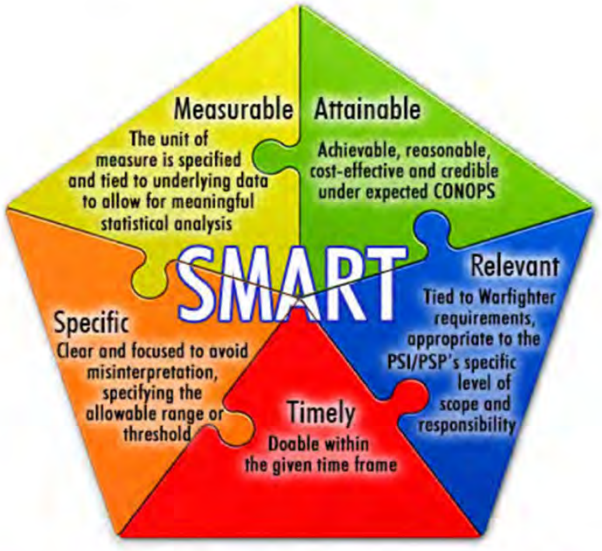
Performance-Based Logistics

- Performance-Based Logistics (PBL) is synonymous with performance-based life-cycle product support where outcomes are acquired through performance-based arrangements
- PBL ***is*** outcome-based performance support
  - Contractors incentivized for desired outcomes (performance) across the product life-cycle
- PBL ***is not*** transactional product support
  - Government purchases parts or maintenance services from a commercial Product Support Provider (PSP) when a repair is needed
  - PSP charges for repair or replacement on a transactional basis
- PBL focuses on the "end state" not the "how to"

PBL is the preferred DoD approach for product support

PBL Metrics

- Performance must be defined such that the achievement of required outcomes can be tracked, measured, assessed, and revalidated as required
- Metrics should be selected or constructed to encourage performance improvement, effectiveness, efficiency, and innovation
- Effective metrics ensure activities are aligned with the Warfighter mission, contribute to meeting Warfighter requirements, deliver an on-time, quality product, and reduce (or avoid) cost
- Good metrics should reflect Specific, Measurable, Attainable, Relevant, and Timely (SMART) criteria



Good metrics are critical to PBL implementation

Life-Cycle Sustainment Metrics

Requirement	Need	Performance Measure
Materiel Availability	Is the system ready?	• Mission Capability Rate • Reduced Down Time
Materiel Reliability	Will the system be effective?	• Mission Completion Rate (sorties, etc.) • Time on Wing • Mean Time Between Failures (MTBF)
Ownership Cost	How much will it cost?	• Operating Cost (per flight hour, mile, steaming hour, etc.)
Mean Down Time	How long does it take to meet the demand?	• Customer wait time • Mean Logistics Delay Time (MLDT) • Mean Time to Repair

These Life-Cycle Sustainment Outcome Metrics are universal across all programs and are essential to effective sustainment planning

PBL Contracting Strategy

- PBL contracts specify the requirements, parameters of support, deliverables, pricing, incentives, risk mitigation clauses, and the terms and conditions of performance
- Effective PBL contracts contain core attributes necessary to deliver improved reliability and availability performance at lower cost
- Successful PBL contracts are often fixed price, multi-year, and adhere to FAR Part 12 Acquisition of Commercial Items, among other key factors
- Contract funding strategies must consider factors such as funding stability, time and scope, and appropriation category

	Incentive Example	Relationship to Cost Reduction Initiatives
Financial	Metric performance	Contractor incentivized to achieve the outcome of the greatest reduction in total ownership cost
	Option years	Re-evaluation of performance and assess new cost reduction opportunities
Non-Financial	Open Systems Architecture	Increased competition through use of non-proprietary items
	Use of Government depots as PBL Providers	Increased public-private partnering, and more efficient use of Government resources
	Award Terms	Additional periods of performance incentivizes KTR investments

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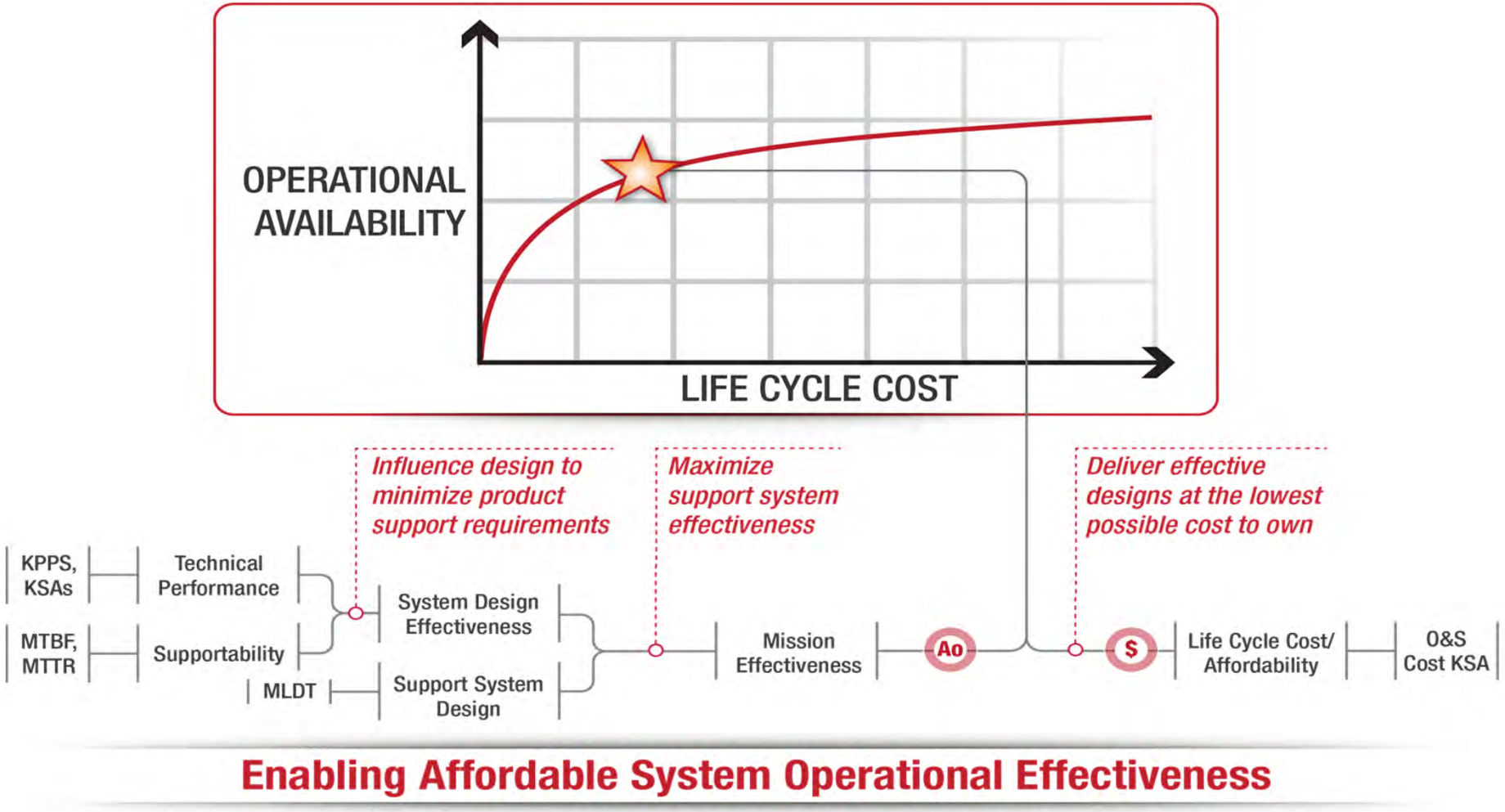
Supportability Overview

- What: Product Support Analysis (PSA) or supportability analysis is a body of procedures and methods used to define system performance and supportability goals
  - Failure Mode, Effects and Criticality Analysis (FMECA), Fault Tree Analysis (FTA), Reliability Centered Maintenance (RCM) Analysis, Level of Repair Analysis (LORA), Maintenance Task Analysis (MTA)
- When: Supportability analysis is conducted as part of the Systems Engineering process
- Why: Supportability analysis ensures supportability is included as a system performance requirement, and the system is concurrently developed with the support system and infrastructure to optimize readiness and LCC

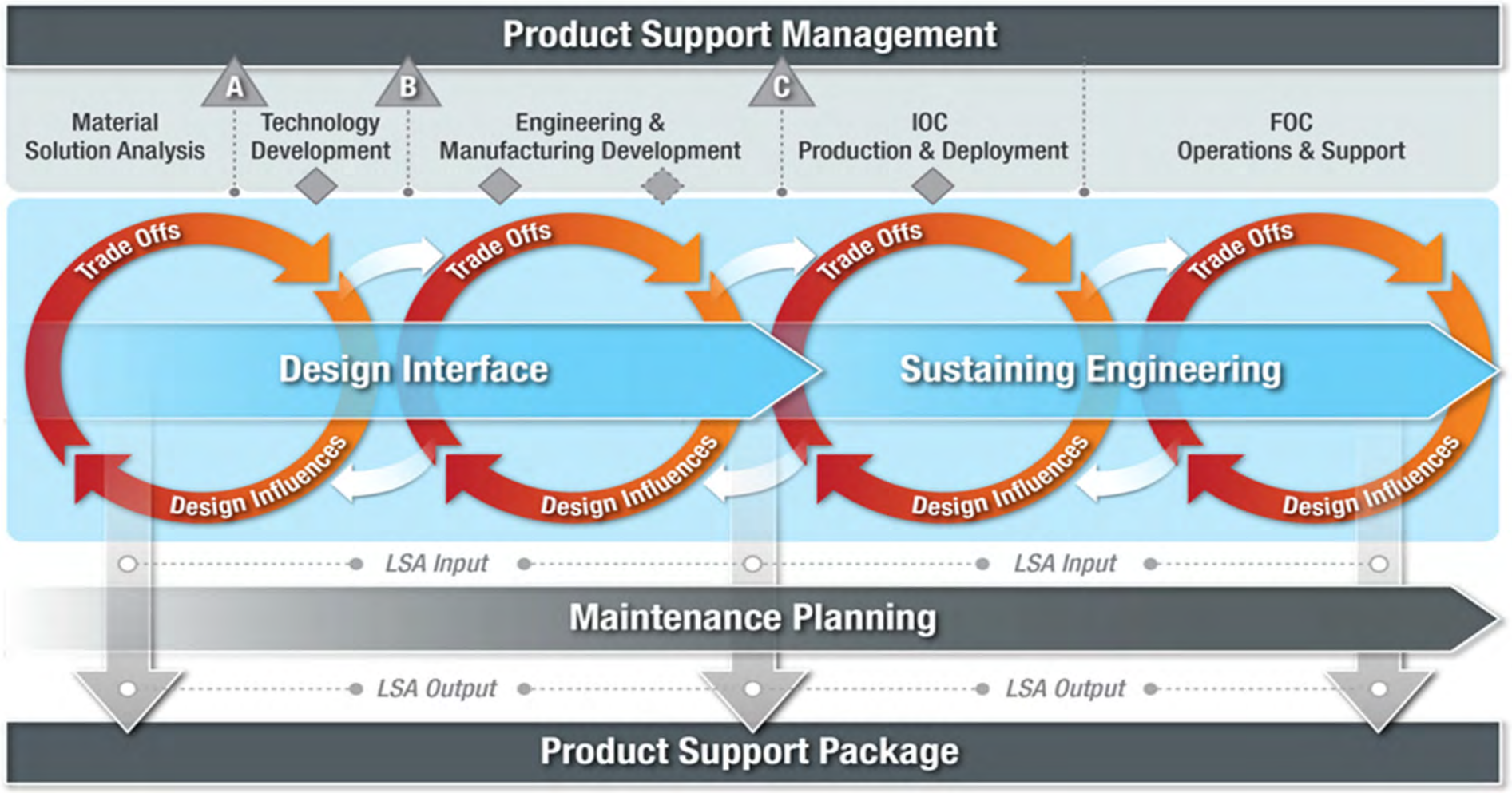
Supportability Overview



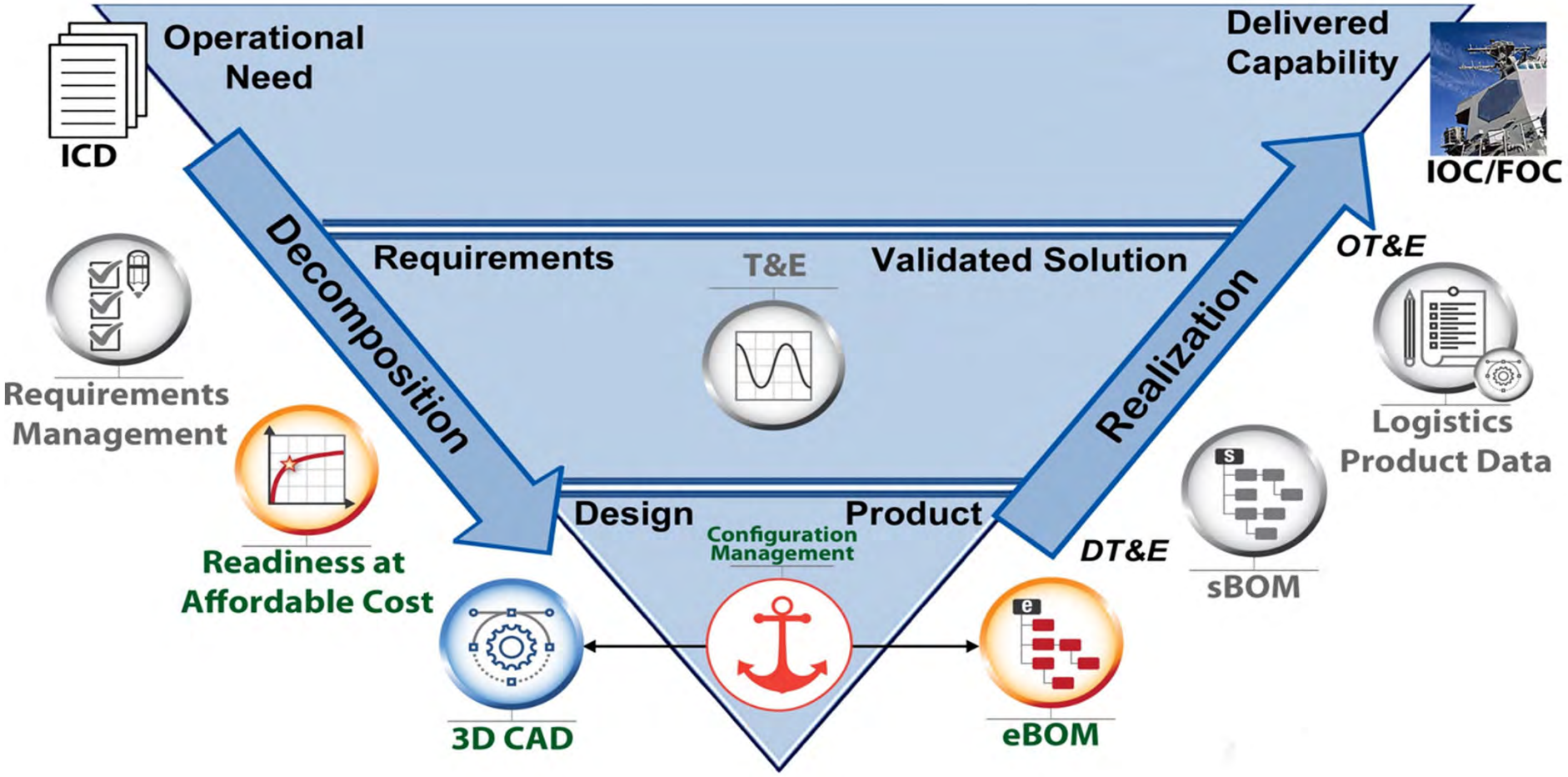
Product Support Analysis

- Product Support Analysis (PSA) is required to create the Product Support Package and is guided by MIL-Handbook-502A PSA
- Analysis of product support commences at the system level to affect design and operational concepts; and to relate design, operational, and supportability characteristics to system readiness objectives
- Must take place early in the acquisition life-cycle so critical factors can be considered as part of the Systems Engineering process
- Is less costly early in the life-cycle because you can influence the system design more easily upfront
- Helps ensure systems meet readiness objectives in a cost-effective manner
- Assessment and verification is conducted throughout the system's life-cycle

Supportability Analysis

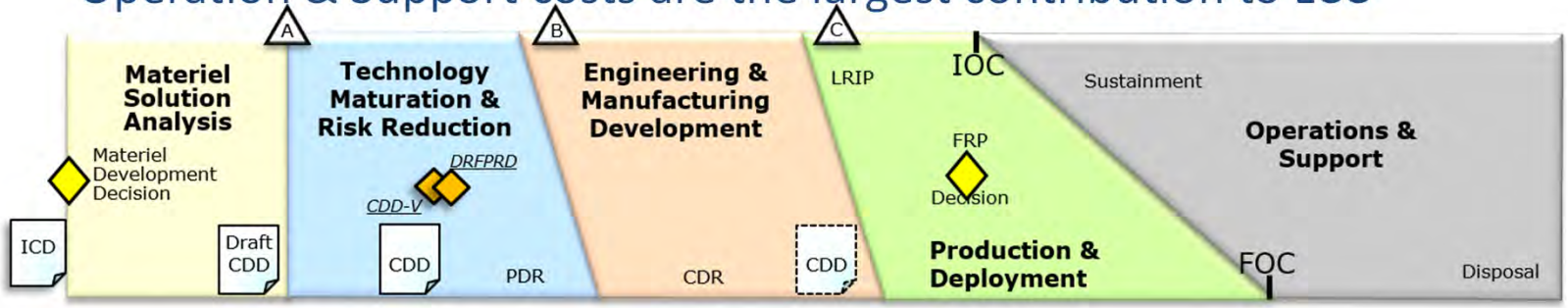


Supportability Analysis



Supportability Analysis and the Acquisition Life-Cycle

- M/S A: Ensure support considerations are an integral part of the system's design requirements
  - Best opportunity to reduce LCC
- M/S B: Ensure that the infrastructure elements necessary for the initial fielding and operational support of the system are identified, developed, and acquired
  - A system fielded without its associated infrastructure is not supportable and degrades Warfighter readiness
- M/S C: Ensure that the system can be cost-effectively supported throughout its life-cycle
  - Operation & Support costs are the largest contribution to LCC



Supportability Issues and Impact

- The Program Office must establish infrastructure to support system logistics. Even when a system has logistic support in place, issues such as these must continually be addressed:
  - Operating requirements - number of missions per unit of time, mission duration, annual operating requirement, operating environment, etc.
  - Readiness-related requirements - A_o, MTBF, MTTR, etc.
  - Manpower requirements - number of operators, maintainers, and support personnel, their required experience, skills, and NECs
  - Maintenance requirements – level of repair, repair vs. discard decisions; self-diagnostic capabilities; battle damage reparability
  - Environment, safety, and health constraints and considerations
  - Transportability

Failure to resolve supportability issues will increase LCC & degrade readiness

Supportability Issues and Impact

- The DoD has made it a requirement that contract specifications (including system design) contain reliability and maintainability as performance parameters
- ***Failure to satisfy those parameters will:***
  - Increase ownership costs
  - Reduce RAM supportability metrics
  - Decrease overall readiness of the system

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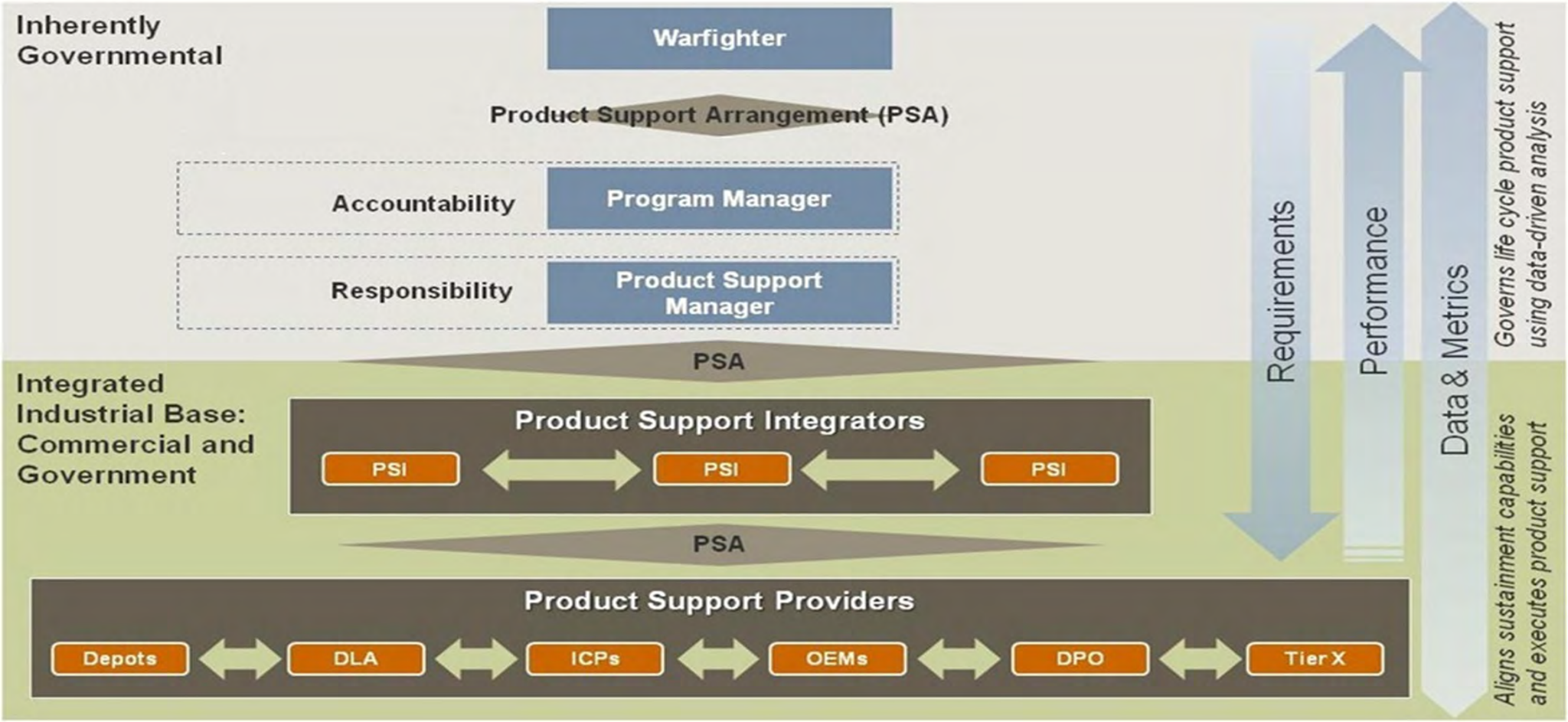
Product Support Business Model (PSBM)

- PSBM defines the hierarchical framework in which the product support for a weapon system component, subsystem, or system platform will be accomplished over the life-cycle
- Product support achieved through balancing maximum weapon system availability with the most affordable and predictable TOC
- Roles & Responsibilities
  - Total Life-Cycle Systems Management (TLCSM) responsibility lies with the PM
  - Life-Cycle Product Support Management responsibility lies with the Product Support Manager (PSM)
  - Support from (public or private) Product Support Providers (PSP) is integrated by one or more Product Support Integrators (PSI)

Product Support Business Model (PSBM)



12 Step Product Support Strategy Process Model

- Represents the major activities required to implement, manage, evaluate, and refine product support over the life-cycle
- Flexible, continuing, iterative process in which the sustainment of a system (or systems) is adapted and evolved to optimally support the needs and requirements of the Warfighter in an effective and affordable manner
- The development of, or revision to, a Product Support Strategy follows the 12 Step Product Support Strategy Process Model, including PBL efforts
- The first two steps are critical in developing a meaningful support strategy and developing the optimum sustainment strategy with the participation and consensus of all stakeholders

12 Step Product Support Strategy Process Model

1. Integrate warfighter requirements and support
2. Form the product support management IPT
3. Baseline the system
4. Identify/refine performance outcomes
5. Business case analysis
6. Product support value analysis
7. Determine support acquisition method(s)
8. Designate product support integrator(s)
9. Designate product support provider(s)
10. Identify/refine financial enablers
11. Establish/refine product support agreements
12. Implement and oversight

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Life-Cycle Sustainment Plan (LCSP)

- In October 2009, Section 805 of Public Law 111-84 established the key leadership position of Product Support Manager (PSM) and reiterated DoD's commitment to life-cycle product support management

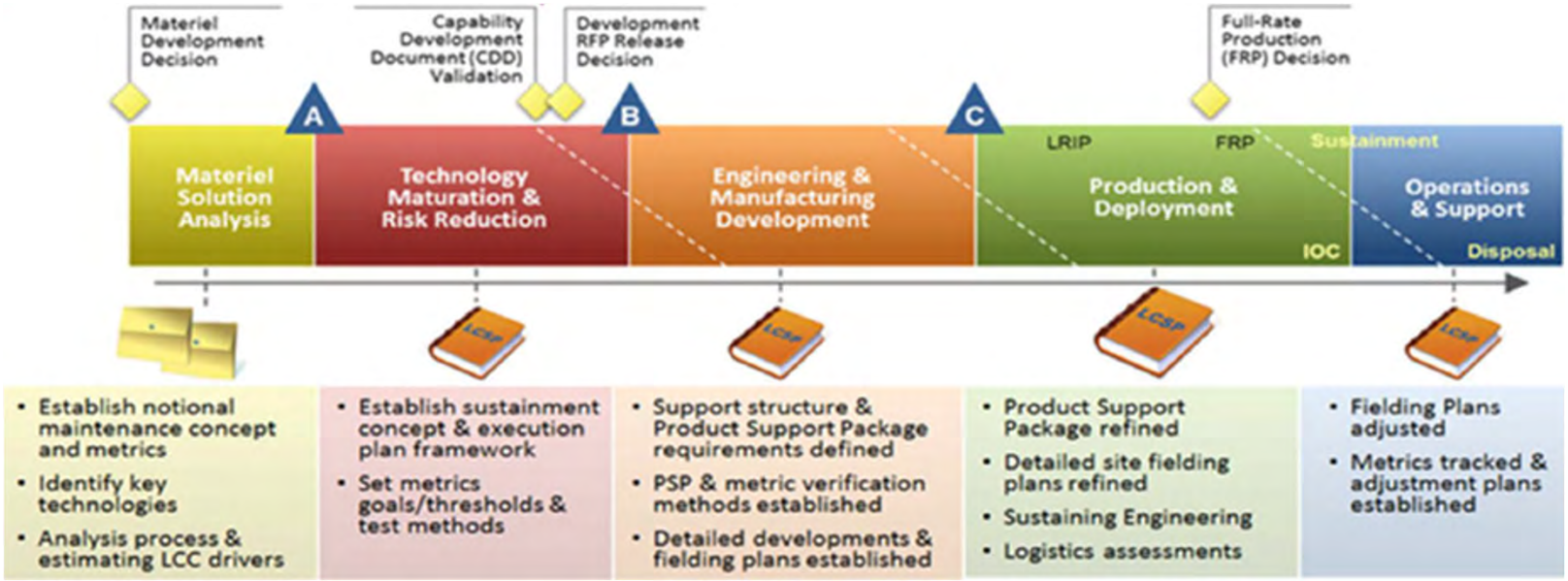
LCSP is…	LCSP is NOT…

• The program's plan for fulfilling its product support strategy (accomplishing policy and associated guidance)
• Focuses on specifically how the program will implement it
  • Who will do what
  • When
  • How (specific tools/processes)
  • How much will it cost
	• A rehash of policy or guidance

• The Program's management tool for delivering the product support package (communicating the plan at all levels)	• Assembled solely to satisfy the MDA at milestones
• A living document describing the sustainment approach and resources necessary across the life-cycle • Must document ***current*** program plan relative to sustainment	• Static, a document that lives separately from the management reality of the program

LCSP Development

- At M/S A, the LCSP will focus on development of sustainment metrics to influence design, the product support strategy, and on actions that can be taken prior to M/S B to reduce future operating and support costs
  - Planning will use factors and assumptions consistent with those used in the analysis of alternatives and affordability analysis, or justify any deviation from those factors and assumptions

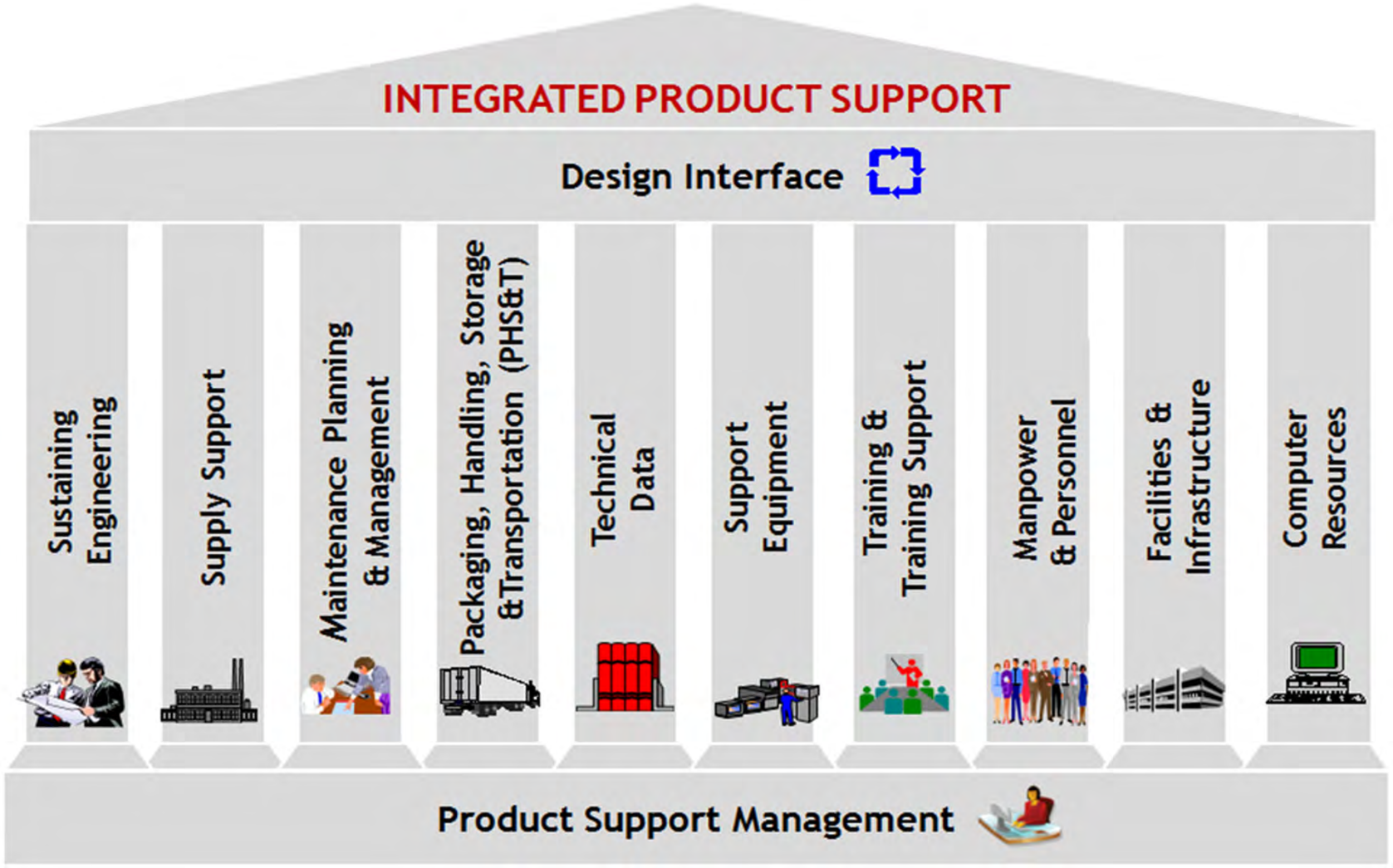


LCSP Development

- At the Development Request for Proposals Release Decision (DRFPRD) and M/S B, the LCSP will focus on finalizing the sustainment metrics, integrating sustainment considerations with design activities, and refining the execution plan for the design, acquisition, fielding, and competition of sustainment activities

- At M/S C, if applicable, the LCSP will focus on ensuring operational supportability and verifying performance and will include a comprehensive description of the product support package elements, competition, and fielding plan

12 Integrated Product Support Elements



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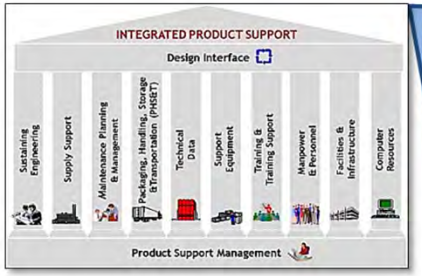
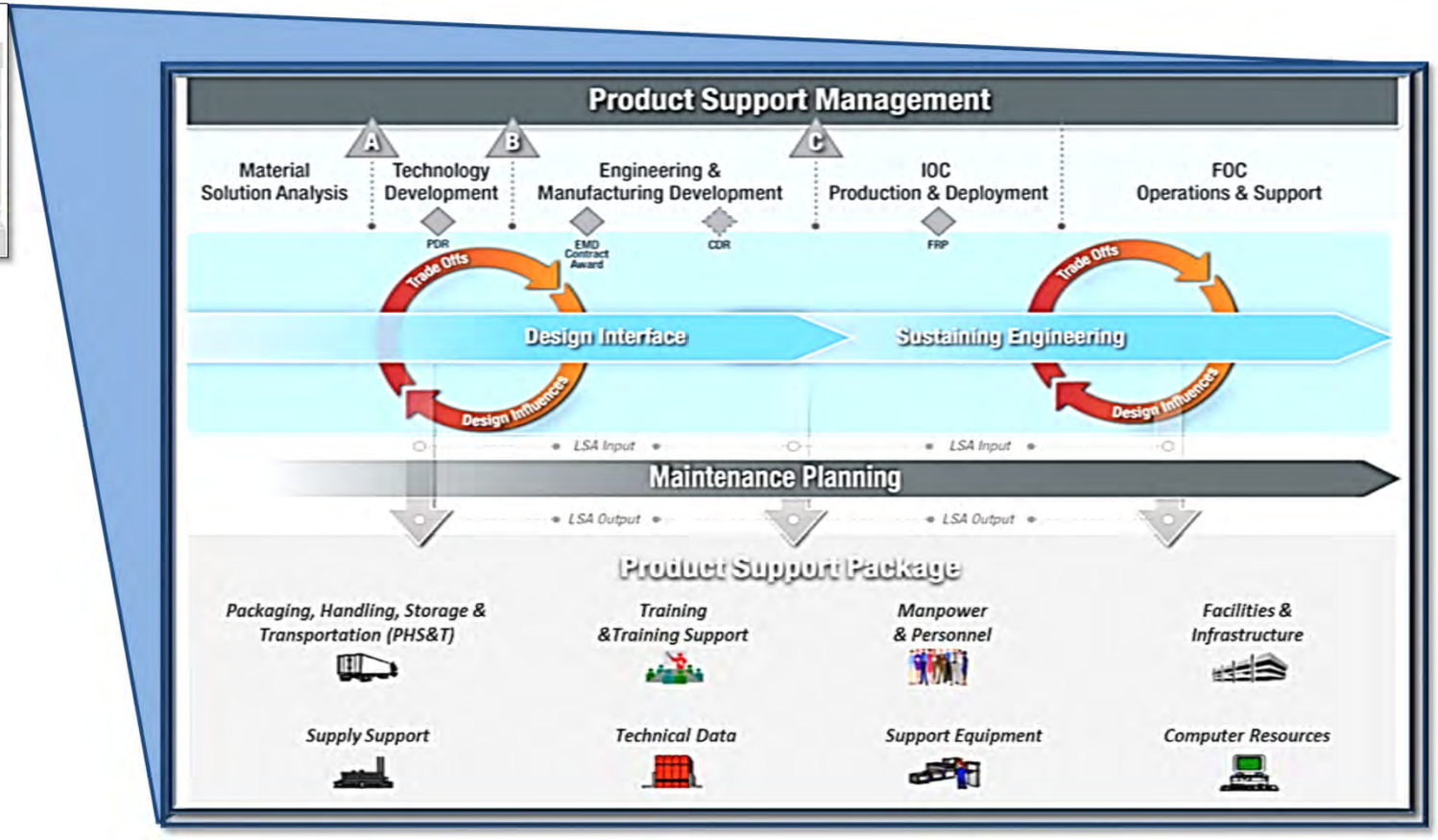




IPS Elements

- The 12 IPS Elements accommodate the expanded, enterprise-level role of the PSM
  - The term ***integrated*** is critical
  - PSM must understand how each element is affected by and linked with the others and should employ all of them in an integrated fashion to optimize Warfighter requirements for suitability and affordability

- Product support may be categorized into system, subsystem, or component level

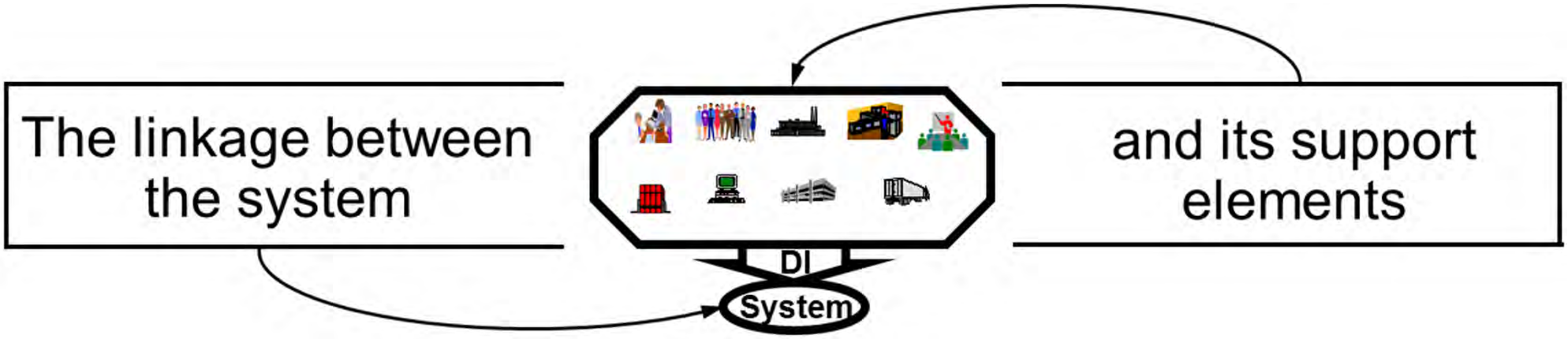
Each element is related in supportability planning

Product Support Management

- Product support management is based on integrating all activities across the IPS elements to achieve the program's KPPs and KSAs
- The integration starts during M/S A as part of requirements and metrics determination
- Requirements will drive emphasis towards specific approaches
- As the program matures through the acquisition life-cycle phases, the PSM will develop the product support concept, plan, and package to:
  - Optimize availability and reliability
  - Reduce cost
- Selection of the type, quantity, complexity, and affordability will require trade-offs among different support options

Design Interface

- Ensures that design parameters such as Reliability, Availability, and Maintainability are considered early in the life-cycle
  - Example: design interface for a HF whip antenna on a new ship class allows for easy installation and maintenance
- Assesses how design parameters address operational effectiveness and suitability requirements (e.g., interoperability, human systems integration)
- Must be test/demonstrated within the context of existing DoD and industry product support capabilities for ***each IPS element***



Sustaining Engineering

- Sustaining engineering supports:
  - In-service systems in their respective operational environments
  - Continued operation and maintenance of a system with managed risk
- The integration activities are focused on how to:
  - Minimize the downtime of the weapon system
  - Lower the risk for downtime
- Sustaining engineering outcomes can include:
  - Recommendations for weapon system design changes
  - Plans for modification of the facilities and infrastructure
  - Other changes within any of the IPS Element areas

Supply Support

- Identify initial fielding requirements (provisioning)
- Identify follow-on requirements (routine replenishment)
- Covers spares, repair parts, consumables and expendables for the system and associated support items (e.g., a trainer)
- Includes identification of acquisition, storage, issuance, and disposal
- Establish Allowance Parts Lists (APL) and Coordinated Shipboard Allowance List (COSAL)

Maintenance Planning & Management

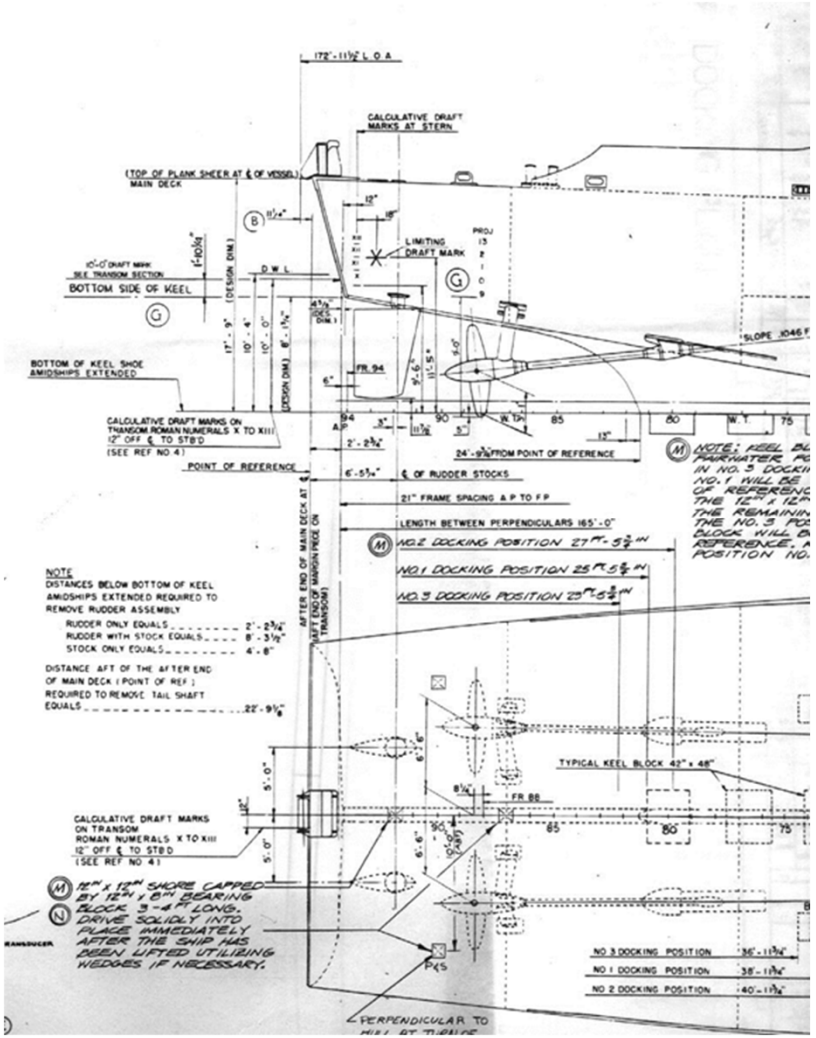
- Establish maintenance concept
  - Organic, Contractor, or combined support
- Identify and assign maintenance level requirements (Class Maintenance Plan)
  - Level of repair, skills required, repair times, required facilities, and test equipment
- Develop Planned Maintenance System (PMS) interface
- Significantly impacts how the other elements are addressed

Packaging, Handling, Storage, and Transportation

- Identify the resources, processes, procedures, design, considerations, and methods to ensure that system equipment and support items are preserved, packaged, handled, and transported properly
  - Environmental considerations (temperature, humidity, etc.)
  - Equipment preservation for short and long storage
  - Mechanical shock
  - HAZMAT

Technical Data

- Identify the scientific and technical information required to support and maintain the system throughout its life-cycle (e.g., technical manuals, engineering drawings, software documentation, etc.)
- Data should be the minimum necessary to effectively support the system
- Data requirements identified in procurement contracts
  - Contract Data Requirements List (CDRL)
- Special care is needed for software-intensive systems



Support Equipment

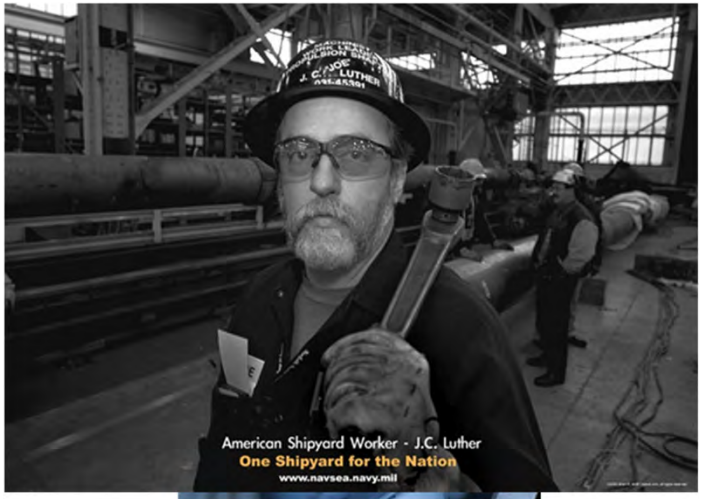
- Identify all equipment (mobile or fixed) required to support the operation and maintenance of the system (tools, calibration equipment, automatic test sets, etc.)
  - Includes support and test equipment
- Minimize the development of new unique support/test equipment
  - Use commercial testers or previously developed testers
- Develop Allowance Equipage List (AEL)

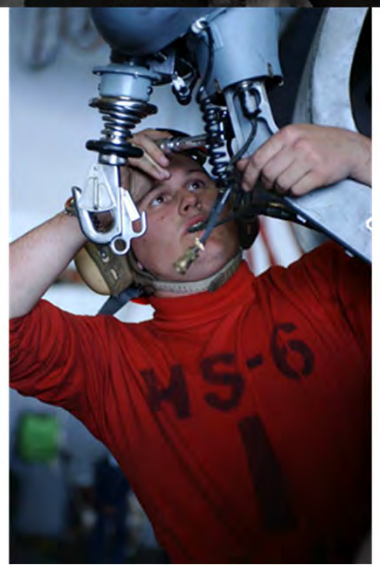
Training and Training Support

- Identify the processes, procedures, techniques, training devices and equipment needed to train military and civilian personnel to operate and maintain the system
  - Individual and crew training
  - Formal and on-the-job training
- Develop Navy Training Plan (NTP), curriculum materials, and method of delivery
  - Factory, organic (new or existing facilities), or computer-based

Manpower and Personnel

- Identify military and civilian skills required to operate and maintain the system over its life-cycle
- Identify both peacetime and wartime manning requirements
- Attempt to minimize military and civilian manning since this is usually the largest contribution to LCC





Facilities and Infrastructure

- Identify the permanent and semi-permanent real property assets required to support a system, including studies to define types of facilities or facility improvements, location, space needs, environmental requirements, and equipment
- Minimize the need for facilities to minimize the logistics footprint
  - When facilities are needed, use pre-existing facilities whenever possible
- Identify facilities requirement early since significant projects have a very long lead time (5-7 years)

Relationship with the Acquisition Process

- Facilities Engineering is:
  - A multi-disciplinary acquisition process
  - That involves all facets of life-cycle management

- Facilities Engineering is tied to weapons systems acquisition and has effects on cost
  - Facilities Engineering must be considered as early as the concept exploration phase of the weapons system acquisition process and throughout the systems life-cycle
  - Every assigned mission or weapon system requires facilities infrastructure support either directly or indirectly

Facilities Engineering directly affects cost and must be considered throughout the acquisition life-cycle

Relationship with the Acquisition Process

- Facilities development
  - Depends on the specifications of program requirements
  - Is necessary for the facility to meet schedule and functional mandates
- Support considerations are:
  - Contemplated early in the acquisition process
  - Seen as an integral part of the design requirements of a weapon system
- Infrastructure necessary for fielding and operational support of new weapon systems is identified, developed and acquired
  - In a cost-effective and timely manner
  - To support initial operational capability for the new system

Requirements Development

- The specific installation requirements for each assigned mission or weapons systems will differ depending on:
  - Operational needs
  - Maintenance needs
  - Supply/storage needs
  - Supporting activities

- When proposing changes to an installation's mission or weapon system, consideration must be given to impacts on facility requirements

Computer Resources

- Identify the facilities, hardware, software, documentation, and personnel needed to operate and support mission critical computer hardware/software systems

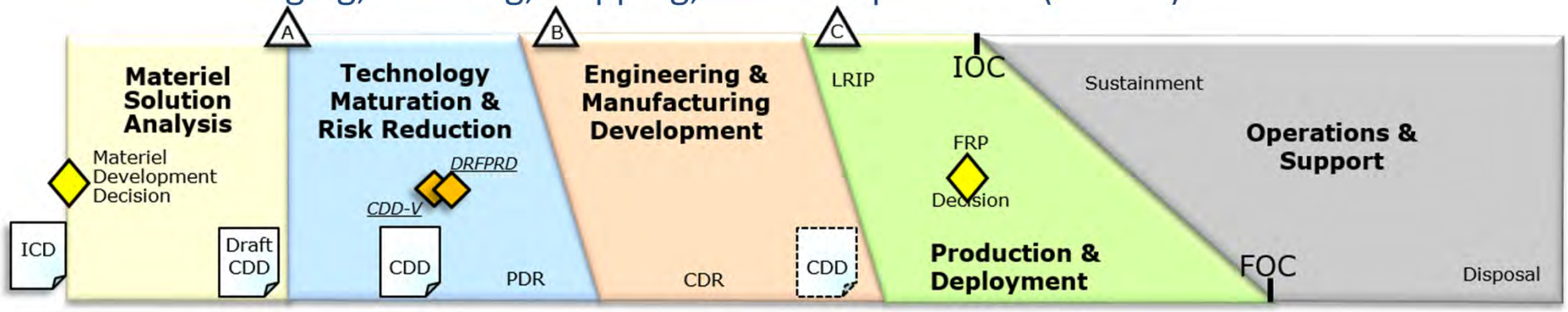
- Develop Software Life-Cycle Support Plan
  - Software maintenance concept and Software Support Agent
  - Software configuration management
  - Baseline development for error correction and product improvements
  - Software licensing

Overview

- Defining Acquisition Logistics
- Reliability, Availability, and Maintainability (RAM)
- Acquisition support costs
- Acquisition logistics policy
- Supportability analysis as part of the Systems Engineering process
- Product Support Business Model (PSBM) and the 12-Step Product Support Strategy Process Model
- Life-Cycle Sustainment Plan (LCSP) and 12 Integrated Product Support (IPS) elements
- Logistics and program planning
- Logistics concerns in fielding and deployment
- Post-production logistics support

Supportability Issues

- Supportability planning begins in Materiel Solution Analysis
- Common issues are:
  - Availability of training/tech data
  - Manpower to operate/support system
  - Adequate supply support
  - Facilities support
  - Packaging, handling, shipping, and transportation (PHS&T)



Supportability planning is directly related to how well a program is executed and the system is deployed

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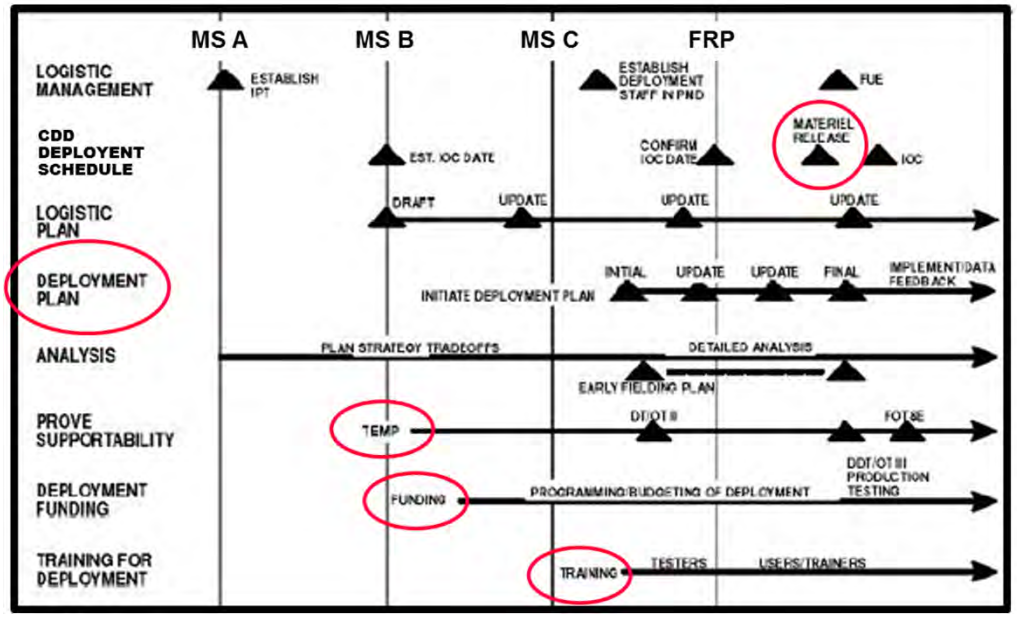
Logistics Support

- System deployment planning:
  - Starts in the Materiel Solution Analysis phase
  - Is coordinated by the Program Management Office (PMO) in support of Operational Commanders
- Major logistical milestones:
  - All required facilities complete
  - Users have been trained and equipped to operate and maintain the equipment
  - Deployment teams have been trained and are ready to commence fielding activities
  - Support equipment and required spare parts delivered to the end user
  - Initial issue of all technical data including maintenance documentation complete
- Common system deployment problems:
  - Personnel turnover
  - Conditional materiel release
  - Training of operators and maintainers
  - Establishing a PMO deployment team
  - Warranties
  - Contractor involvement in deployment planning
  - Problems during user hand-off period

System deployment is a complex activity that the PMO must coordinate across many areas requiring diverse stakeholder input

Initial Fielding/Deployment Activities

- Pre-deployment efforts meet multiple milestones to culminate in Material Release and IOC
- Materiel Release – certification by the developing activity that:
  - All materiel and logistics deficiencies identified in OT&E have been corrected
  - All logistics resources required to support the initial fielding are available



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Post-Production Support Activities and Requirements

- Life-cycle logistics management activities necessary to ensure continued attainment of system readiness objectives after final production of a specific configuration/model
  - Contractor logistics support/full-service contracting
  - Component redesign
  - Pre-Planned Product Improvement (P3I)/technology insertion
  - Data management
  - Acquire from multiple sources of supply
  - Open systems
  - Life of type buy
  - Spares modernization
  - Sustain an adequate training infrastructure
  - Assign and adequately fund an ISEA

Continuously manage post-production support risk throughout the life-cycle

Post-production Support Challenges

- Difficulty in sustaining the training infrastructure
- Long system life-span & late service life extensions
- Uneconomic order quantities during O&S
- Spares usage greater than predicted
- Diminishing Manufacturing Sources & Material Shortages (DMS/MS)
  - Vendors stop producing parts
  - Vendors go out of business
- Technical data and support
  - Inadequate technical data packages
  - Proprietary designs
- Design/technology obsolescence

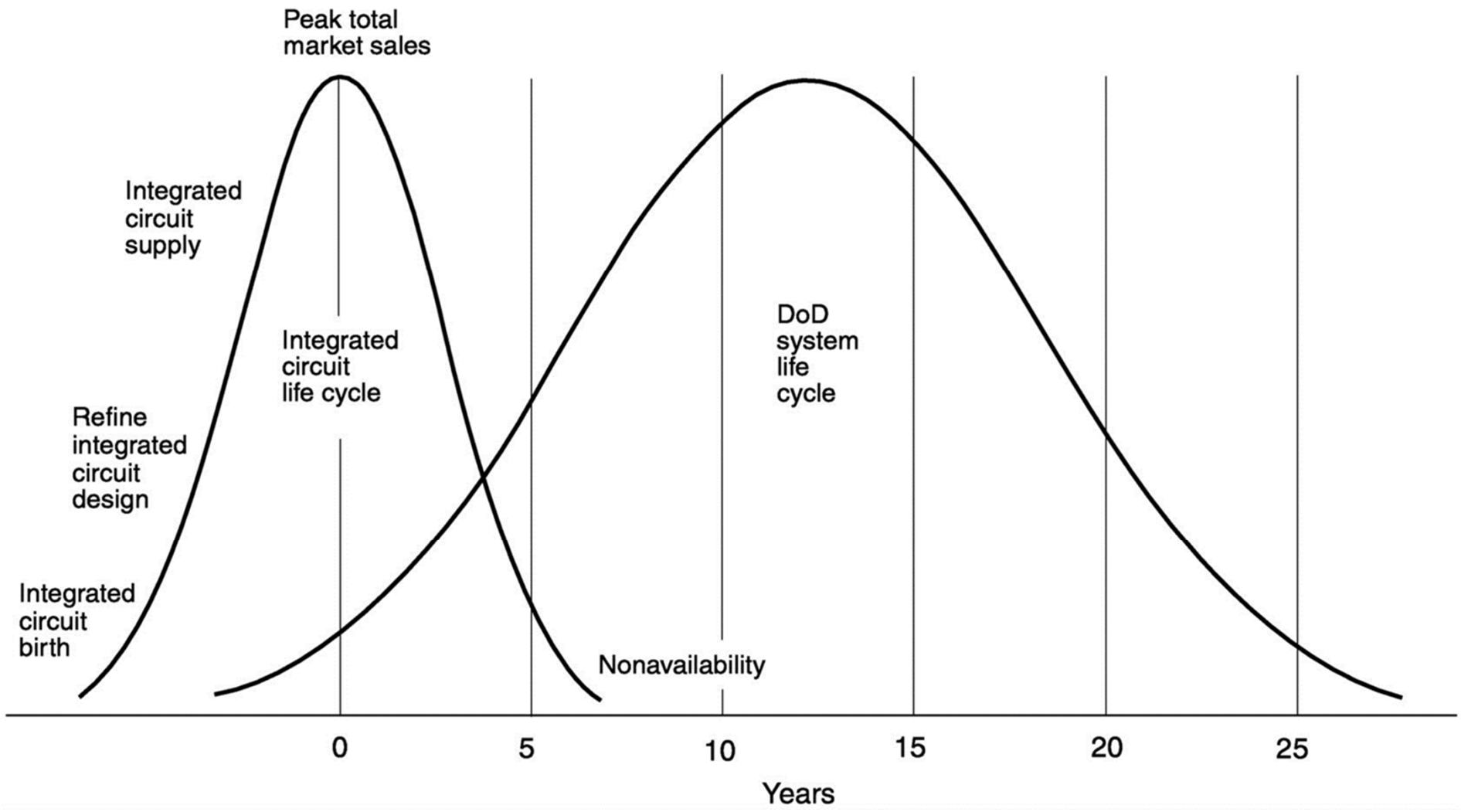
DMS/MS Example

Submarine Main Storage Battery Industrial Base Capabilities Assessment (July 2003)

The Naval Sea Systems Command conducted this assessment of the Navy's sole source for nuclear submarine flooded lead acid batteries. Submarine main storage batteries are the single product line of the GNB Industrial Power Division of the Network Power Business Group of Exide Technologies. The study was conducted in response to the provider's indication that its Kankakee, IL, facility was at risk of closure due to insufficient demand. Navy orders were falling below those required to meet the facility's minimum-sustaining rate. The study found that current Navy procurement rates are not sufficient to meet the Kankakee facility's economic ordering quantity after 2005—prior to meeting Navy out-year battery requirements.

Additionally, the Navy's current flooded lead acid battery acquisition rate is insufficient to meet submarine new construction and maintenance requirements. The Navy is developing a plan to replace the flooded lead acid storage battery with the Valve Regulated Lead Acid (VRLA) storage battery. The Navy will accelerate the procurement and installation of VRLA batteries to minimize increased costs and schedule disruption. The Navy also will purchase quantities of flooded batteries sufficient to meet the economic ordering quantity at the Kankakee plant for Fiscal Year 2004 and Fiscal Year 2005 to minimize the risk of production line shutdown until the VRAL battery alteration is ready.

Obsolescence Example



Must develop a plan to address system obsolescence in the overall program

Summary

- What is the role of Acquisition Logistics?
- What percentage of the total LCC of a program do operation and support (O&S) costs account for?
- What are the consequences of failing to design for supportability and/or resolving RAM issues?

Summary

- What are the 12 elements of integrated product support?

Summary

- What are the post-production support activities and requirements?