

DoD Template for Application of TLCSM and PBL In the Weapon System Life Cycle

The purpose of this template is to provide program managers, their staff, and logistics participants in the acquisition process a tool to assist them in ensuring that effective sustainment is addressed and accomplished over the life cycle. The National Defense Strategy, the Quadrennial Review, and other key defense documents have made it clear that over and above performance we must have weapon systems that have a reduced footprint, reduced cycle times, and are affordable. Meeting these objectives requires early and proactive actions during the acquisition process to address those key logistics criteria and actions that will achieve this goal. This guide provides assistance in that process.

The tenets of Total Life Cycle Systems Management (TLCSM) and Performance Based Logistics (PBL) emphasize an early focus on sustainment within the system life cycle. TLCSM is the implementation, management, and oversight, by the designated Program Manager (PM), of all activities associated with the acquisition, development, production, fielding, sustainment, and disposal of a DoD weapon system across its life cycle. It empowers the PM as the life cycle manager with full accountability and responsibility for system acquisition and follow-on sustainment. PBL is the preferred sustainment strategy for weapon system product support that employs the purchase of support as an integrated, affordable performance package designed to optimize system readiness. PBL meets performance goals for a weapon system through a support structure based on long-term performance agreements with clear lines of authority and responsibility. TLCSM and PBL concepts are now policy and have been initiated to provide more effective, affordable, operationally-ready systems through increased reliability, supportability, and maintainability.

This template focuses primarily on actions during the Acquisition phases, where the greatest opportunities exist to leverage sustainment objectives. However, TLCSM also makes the PM responsible for ensuring, throughout the weapon system life cycle, that the sustainment strategy is both regularly assessed and in full compliance with applicable statutory requirements in Title 10, United States Code. These responsibilities include completed core capabilities and workload assessment and annual affirmative determination that the depot-level workloads generated will not cause the owning Service to exceed the limitations imposed by 10 USC 2466 (the “50/50” rule).

While this template references the DoD 5000-series Acquisition Model and is intended to be fully compatible with the 5000-series policy documents, its purpose is not to

repeat existing policy. For example, the full complement of entrance and exit criteria and supporting statutory and regulatory information for each acquisition phase are specified in DODI 5000.2, and are not repeated here.

The phases of the DoD life cycle, through sustainment, are shown in Figure 1 below. This template emphasizes those logistics analyses, activities, and documents within these phases necessary to ensure the design, development, testing, production, and fielding of reliable, affordable and maintainable weapon systems. The criteria, information, and activities listed are inclusive – that is, they cannot necessarily be applied to all systems. Each program must determine which items are applicable to their specific concept, technology, and/or system.

THE 5000 MODEL

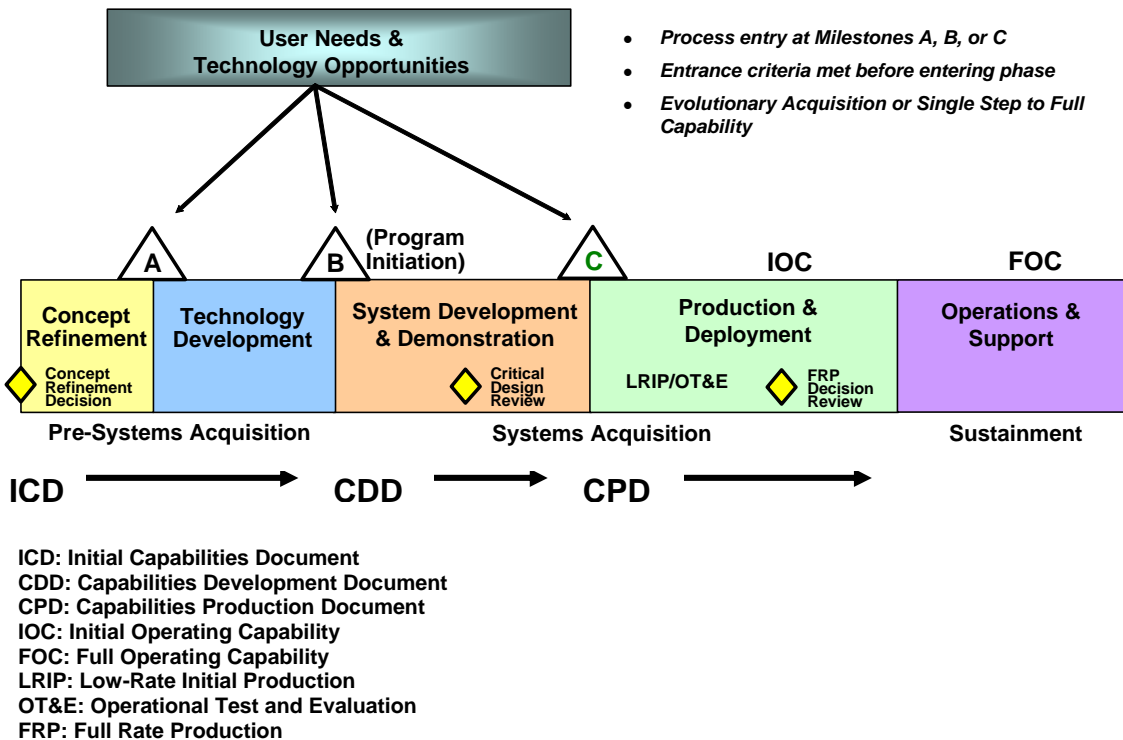


Figure 1

Concept Refinement Phase and Milestone A Technology Development Phase

The purpose of Concept Refinement is to refine the initial concept and develop a Technology Development Strategy (TDS). Entrance into this phase depends on a validated Initial Capabilities Document (ICD) and an approved plan for conducting an

Analysis of Alternatives (AoA) for the selected concept approved in the ICD. In the ICD the user should document those lessons learned and cost drivers of current systems, and/or constraints that impact the supportability related design requirements of the planned system along with those of the support system. These details guide the acquisition community on refining the concept selected in the ICD and identifying potential constraints on operating and support resource requirements.

Upon approval of the TDS and selection of an initial concept, the project will enter the Technology Development phase at MS A. The purpose of this phase is to reduce technology risk and to determine the appropriate set of technologies to be integrated into a full system.

Key Logistics criteria for consideration during Concept Refinement and Technology Development should include:

- Forecast the physical and operational maintenance environment of the proposed system.
- Given the forecasted environment, assess the functional characteristics of the proposed system, its complexity, and the obstacles and enablers to effective sustainment in that environment.
- Assess the impact of the proposed system on the maintenance capabilities planned for the period in which the system will be introduced.
- Assess preliminary manpower and personnel requirements and constraints in both quantity and skill levels, and use of contractor support.
- Begin compilation of information and requirements for logistics footprint reductions, deployment requirements, and other factors affecting the in-theater operational concept.
- Initiate the development of operating and support reliability objectives and their corresponding benefits and resource requirements. Consider the performance histories of prior systems or systems of similar capability where feasible.
- Assess the concept and technology with regard to their ability to facilitate the use of embedded diagnostics, prognostics, and similar maintenance enablers.
- Initiate the compilation and assessment of data on the projected sustainment demand, standardization of platforms, and required support equipment.
- Develop Rough Order of Magnitude (ROM) Life Cycle Cost estimates.

Key Logistics Information compiled during Concept Refinement and Technology Development:

- Analysis of Alternatives to include alternative operating and system support concepts, with specific consideration of performance-based options.

- Identification of key performance and related support parameters for inclusion in the Capabilities Development Document (CDD) and their basis as design requirements for subsequent phases to affect availability, reliability, maintainability, interoperability, manpower, and deployment footprint – the overall capability of the system to perform and endure in the required mission operational environment.
- Market analysis for system and product support capabilities (public and private) to define extent and scope of opportunities for achieving support objectives through design and viable product support strategies. Analysis should include:
 - Elements of support currently provided (for legacy system to be replaced).
 - Current measures used to evaluate support effectiveness.
 - Current efficacy of required support.
 - All existing support data across the logistics support elements.
 - Assessment of existing technologies and associated support that impact the new system under development.
- Initial identification of support related risk and risk mitigation planning.
 - Design and technology (e.g. low-observables, non-COTS, etc).
 - Future projections of domestic and foreign facilitation and logistics infrastructure.
 - Cost drivers.
- Where applicable, the requirements for providing sustainment during Advanced Concept Technology Demonstrations (ACTDs), Advanced Technology Demonstrations (ATDs), and other technology oriented demonstrations.

Key Logistics activities that must be completed before MS B:

- Preparation and/or assessment of sustainment planning and parameters in the Capabilities Development Document (CDD)
- Description of the product support strategy as documented in the Acquisition Strategy (ASR)
- Description of the appropriate logistics metrics, criteria, and funding requirements in the Acquisition Program Baseline (APB).
- Description of the appropriate logistics considerations and test points in the Test and Evaluation Master Plan (TEMP)

MILESTONE B – System Development and Demonstration (SDD) Phase

The system formally enters the acquisition process at MS B. MDA approval at MS B permits the system to enter the SDD phase. The purpose of SDD is to develop a system; reduce integration and manufacturing risk; ensure operational supportability with particular attention to reducing the logistics footprint; implement human systems

integration (HIS); design for Producibility; ensure affordability and protection of critical program information (CPI); and demonstrate system integration, interoperability, safety, and utility. During this phase the program and the system architecture are defined based upon the selection and integration of the mature technology suite accomplished during Concept Refinement and Technology Development. System design requirements are developed to the major subsystem level. During this phase the support concept and strategy are refined and potential performance based logistics Product Support Integrator and providers identified.

Key Logistics criteria for consideration during SDD should include:

- Mission capabilities: More discrete identification of the taxonomy and metrics driving performance-based outcomes.
- Availability requirements: A detailed assessment of the requirements for the system to operate successfully in the mission operational environment, and the necessary support requirements to achieve that objective.
- Reliability: Given the operational environment and combatant commander availability requirements, define the logistics reliability targets and the corresponding sustainment infrastructure necessary to ensure achievement of the reliability objectives.
- Maintainability – comprehensive identification of both projected maintenance strategy, including diagnostics, prognostics, maintenance duration targets, and similar measures.
- Manpower and personnel requirements, both organic and contractor sourced.
- Continued refinement of Life Cycle Cost estimates.
- Support-related performance and acceptance criteria to be demonstrated during planned testing and through modeling and simulation.
- The collection, analysis, and evaluation of system performance and maintenance performance data to determine the need for and prescribe changes to the system configuration, maintenance support structure, and maintenance resource requirements. Utilization of on-board (embedded) monitoring sensors, diagnostics, and prognostics are integral to this process.
- Continued inclusion of logistics support considerations in detailed design reviews to include life cycle costs, and characteristics such as openness of design, upgradeability, modularity, testability, and commercial technology insertion.
- Iterative refinement of logistics support considerations correspondent with the evolutionary acquisition strategy (when employed).
- Begin verification of support-related design characteristics and product support strategy and infrastructure.

- Identification of Product Support Integrator and potential support providers (public and private) and potential partnering opportunities.
- Depot-level maintenance core capability assessment and the identification of workloads required to sustain those capabilities.
- Identification of potential organic depot-level sources of maintenance.
- Development of PBL Business Case Analysis (BCA) to determine:
 - The relative cost vs. benefits of different support strategies.
 - The impact and value of Performance/Cost/Schedule/Sustainment trade-offs
 - Data required to support and justify the PBL strategy
- Product Support Integrator performance outcomes/requirements (e.g. mission readiness, logistics footprint, response times, etc).
- Development of performance based logistics product support concept to include development of warfighter and support provider agreements.

Key Logistics information compiled during SDD:

- Updated support strategy, sustainment funding requirements, key logistics parameters, and logistics testing criteria (see information that must be completed before MS C, below).
- PBL Business Case Analysis (BCA)
- Auditable Depot-level maintenance core capability and workload assessment (to be completed bi-annually).
- As required by statute, an annual determination of the distribution of maintenance workloads.

Key Logistics information/activities that must be completed or updated before MS C:

- Updated support strategy within the Acquisition Strategy (ASR).
- Updated logistics criteria and parameters with the Acquisition Program Baseline (APB).
- Logistics and overall sustainment requirements as referenced in the Capabilities Production Document (CPD)
- Logistics parameters and test points in the Test and Evaluation Master Plan (TEMP).
- Acceptable performance in development, test and evaluation, and operational assessment, to include:
 - Mature software capability.
 - Acceptable interoperability.
 - Acceptable operational supportability.

- Demonstration that the system is affordable throughout the life cycle, optimally funded, and properly phased for rapid acquisition.

MILESTONE C – Production and Deployment Phase

The purpose of the Production and Deployment phase is to achieve operational capability that satisfies mission needs. Milestone C authorizes entry into Low-Rate Initial Production (LRIP). At Milestone C the system design should be sufficient to initiate production. The system level technical requirements have been demonstrated adequate to provide acceptable operational capability. The product support strategy is fully defined, a Product Support Integrator has been selected, and performance based logistics agreements reflecting performance, support and funding expectations should be documented and signed. Funding should be identified and available for testing and implementation of the selected performance based logistics strategy with a selected Product Support Integrator.

Key Logistics criteria for consideration during Production and Deployment should include:

System Requirements:

- **Mission capabilities:** Reviewed and modified as final testing and configuration decisions are made. Emphasis on the capability of the sustainment strategy to meet overall mission capability requirements.
- **Reliability:** Mission and logistics reliability should clearly meet desired metric targets while supporting the achievement of overall system performance objectives.
- **Maintainability:** The effective operation of diagnostics, prognostics, and performance-based maintenance arrangements should be in place or in transition, meeting previously specified objectives.
- **Manpower and Personnel:** Goals for both organic and contractor manpower requirements should be validated.
- **Life Cycle Cost Estimate:** Final refinement of life cycle costs should be validated.

Product Support:

- Completed Business Case Analysis on performance based logistics approach (consistent with evolutionary acquisition/spiral development planning, where applicable).
- Completed, approved and funded product support/sustainment approach to include:
 - Documented performance agreements between

- The PM, product support integrator and the force provider defining the system operational performance requirements (e.g. readiness, availability, response times, etc).
- The PM, product support integrator and the support provider(s) which include required support metrics necessary to meet the system performance requirements. Support providers may be public, private, or a mix to include public – private partnerships. Examples of public support providers include Service maintenance depots, Service and Defense Logistics Agency (DLA) inventory control points, and DLA distribution depots.
 - Funding commitments commensurate with support provided.
 - Planned product support integrator/product support provider and warfighter implementation structure to include:
 - Integrator accountability for managing and integrating all support providers to meet established requirements.
 - Roles, relationships and functions between PM, integrator, provider(s) (public/private), and warfighter to include funding.
- Comprehensive review of support-related performance and acceptance criteria in a pre-IOC supportability assessment (see below).
 - Verify implementation and execution of performance based logistics agreements.
 - Verify funding of operations and support to required levels.

Key Logistics information compiled during Production and Deployment:

- Updated support strategy within the overall Acquisition Strategy (ASR) (to include technology development strategy updated for follow on increments if Evolutionary Acquisition is employed).
- Updated logistics parameters in the Acquisition Program Baseline (APB).
- Updated logistics and sustainment criteria and test points in the Test and Evaluation Master Plan (TEMP).
- Performance Based Logistics Agreements (PM, Product Support Integrator and War fighter, PM, Product Support Integrator and Providers).

Key Logistics activities that must be completed or updated before Operations and Support:

- Satisfaction of sustainment criteria addressed in Initial Operational Test and Evaluation (IOT&E).
- Performance Based Logistics Agreements (PM, Product Support Integrator and War fighter, PM, Product Support Integrator and Providers).

- Fully funded sustainment program.
- Pre-Initial Operational Capability (IOC) Review
 - This review performed at Service – level is carried out to:
 - Confirm design maturity of the system.
 - Determine status of correction of any deficiencies identified.
 - Confirm configuration control.
 - Certify Product Support Integrator/Providers plans to meet war fighter requirements.
 - Verify Product Support Integrator/Provider agreements/contracts and funding in place.

Post IOC Evolution of Sustainment Strategies

Sustainment strategies for iterative production increments in an evolutionary acquisition strategy should fully address the support requirements for each block increment. A thorough assessment of the existing support strategy vis-à-vis new system performance and support requirements should be conducted at each evolutionary phase, and changes made as necessary. An initial assessment at increment one should address the support implications of the logistics support strategy for both the initial block and follow-on increments. At each successive increment, a total systems support assessment should be conducted for that block. This introduces the need for assessment and revision of support strategies as a continuing, life-cycle process, with the corresponding need for regular reviews, as outlined below.

Post Deployment Reviews

While acquisition phase activities are critical to designing and implementing a successful and affordable sustainment strategy, the ultimate measure of success is application of that strategy after the system has been deployed for operational use. TLCSM, through single point accountability, and PBL, by designating performance outcomes vice segmented functional support, enables that objective. Warfighters require operational readiness and operation effectiveness – systems accomplishing their missions in accordance with their design parameters in a mission environment. Systems, regardless of the application of design for supportability, suffer varying stresses during actual operational deployment and use. Accordingly, the Services shall conduct periodic assessments of system support strategies vis-à-vis actual vs. expected levels of performance and support. These reviews occur nominally every three to five years after IOC or when precipitated by changes in requirements/design or performance problems, and should include, at minimum:

- Product Support Integrator/Provider performance.

- Product improvements incorporated.
- Configuration control.
- Modification of performance based logistics agreements as needed based on changing war fighter requirements or system design changes. When assessing and revising agreements and support strategies, the process should encompass all previous configuration/block increments, and also include elements of System Design and Development (SDD) phase activities, with an emphasis on not only “adding on” new support as required but addressing the support strategy in total across the entire platform and range of deployed configurations.