Product Support Strategy Development Tool

Introduction

Welcome to the Product Support Strategy Development Tool. This updated job support tool updates what was previously referred to as the Product Support Manager's (PSM) Toolkit.

The 12-Step DoD Product Support Strategy Process Model described in this job support tool and seen above is discussed in depth in both the DoD Product Support Manager (PSM) Guidebook, and the DoD Performance Based Logistics (PBL) Guidebook. It also directly supports the Product Support Management Business Model (PSBM), as well as the processes and outcomes outlined in both the DoD Product Support Business Case Analysis (BCA) Guidebook and the DoD O&S Cost Management Guidebook.

The DoD continues to evolve and improve product support, with specific focus on increasing readiness and enabling better cost control and product support strategy affordability. The information provided in this job support tool can be used across the life cycle, whether the program is a new acquisition or a major increment on a legacy program. It applies to all variants, for all types of systems, at any phase of the life cycle. This tool is intended to support the Product Support Manager (PSM), the PM, the Life Cycle Logistician and the defense acquisition workforce as a whole with the implementation of next-generation product support strategies.

For related information, see also 10 U.S.C. 2337 Life Cycle Management and Product Support, the Product Support Key References website, the Product Support Key Definitions website, the Product Support Manager's (PSM) references website, and the myriad of product support and life cycle logistics ACQuipedia articles.

Performance Based Life Cycle Product Support (PBL)

Performance Based Logistics (PBL), also known as Performance Based Life Cycle Product Support, is a Department of Defense (DoD) product support arrangement designed to improve weapons system readiness within affordability constraints by bringing together integrated product support elements across the life cycle and leveraging public/private partnerships throughout the life cycle. The strategy is supported by detailing requirements in performance agreements specifying objective outcomes, measures, resource commitments, and stakeholder responsibilities. According to DoD Instruction 5000.02 (Enclosure 6, Para 2.a.(3)), "the program manager, with the support of the product support manager, will

employ effective performance-based logistics (PBL) planning, development, implementation, and management in developing a system's product support arrangements."

To deliver product support as an integrated and affordable package, the Product Support Manager tailors the product support strategy for any specific program or commodity to meet the operational and support requirements of the end item. In some cases, the strategy must be further refined to meet the Service or DoD enterprise level goals and objectives. In every circumstance, however, readiness and availability must be balanced with affordability, taking budget realities into account.

Program weapon system product support strategies often evolve over the life cycle. Whether developing a product support strategy for the first time, or updating the strategy, it is vital to adhere to a logical methodology. This methodology is captured in the Life Cycle Product Support Strategy Process Model. and is supported by this Product Support Strategy Development Tool. The model encompasses the major activities required to implement, manage, evaluate, and refine product support over the life cycle. It is not a one-time process, but rather a continuing, iterative process in which the sustainment of a system(s) is adapted and evolved to optimally support the needs and requirements of the Warfighter in an effective and affordable manner.

In today's product support environment, a government/industry team is a key long-term relationship developed among public and private sector stakeholders with contracts and product support arrangements. The team, under the government Program Support Manager's leadership, is built on a foundation of trust where there is mutual accountability for achieving the outcomes and performance goals in affordability, reliability, supportability, availability, and life cycle cost reductions over the life cycle of a weapon system or item of equipment. The designated weapon system or equipment product support manager often does not have directive authority over all of the required organizations, capabilities, or functions needed to attain desired levels of support. With a well-formulated product support strategy and life cycle support plan, however, the mechanism is put into place to create a network of capabilities and initiatives required to attain the prescribed performance, cost, and customer satisfaction supportability targets.

Product Support Strategy Development Tool Goals

To assist the Product Support Manager in creating and implementing product support strategies, DAU has created this Product Support Strategy Development Tool. This tool supports and directly reinforces the DoD Life Cycle Product Support Strategy Process Model outlined in both the DoD PBL Guidebook and the DoD PSM Guidebook. This job support tool provides the Product Support Manager and life cycle logistician with a comprehensive set of tools and references for integrating the right mix of support sources using best value determinations while maintaining compliance with statutes, policy, available funding, and the BCA. It helps move from the development of a strategy into the execution of a product support plan for a weapon system. The tool systematically documents a structured process and necessary implementation actions for effective use of the product support strategy to attain the desired levels of support performance, cost management, and customer satisfaction.

To begin using this Product Support Strategy Development Tool, click on any of the 12 interactive ovals in the graphic above and on each of the "step" pages to navigate directly to one of the twelve steps contained in the model. Users may also navigate through the tool using the menu on the left side of the screen.

Users may interact with this and participate in dialogue with other users by joining as a member of the ACC and then accessing the Q&A feature. To access job support tool's Q&A's and related Product Support Strategy discussions, click here. Users may also help grow this job support tool by adding reference materials using the Add Content feature. (Note: you must have an ACC account and be logged in to Add Content)

Purpose
The Product Support Strategy Development Tool supports DoD Product Support Managers (PSM) and Life Cycle Logistics workforce members in developing affordable and executable product support

strategies, while expanding on and reinforcing DoD product support guidance contained in both the DoD Product Support Manager's Guidebook and the DoD Performance Based Logistics Guidebook.

1.0 Integrate Warfighter Requirements & Support

It is necessary to translate system operational requirements into the sustainment strategy that will deliver those requirements. The objective of Product Support is to develop, enable, and execute a sustainment strategy that will deliver optimum operational readiness to the Warfighter, consistent with Warfighter requirements, at an affordable, best value cost. Warfighter requirements are expressed in operational terms. Those requirements must be interpreted and translated as needed into sustainment objectives that will drive the achievement of those outcomes.

Each major weapon system is supported by a Product Support Manager (PSM). The PSM is an integral member of a program office, directly supporting the Program Manager in planning and executing their Life Cycle Management (LCM) responsibilities outlined in DoD Directive 5000.01 and DoD Instruction 5000.02. The day-to-day oversight and management of the product support functions are delegated to a product support manager who leads the development and implementation of the performance-based product support strategy and ensures achievement of desired support outcomes. The PSM is responsible for accomplishing the overall integration of product support either directly through government activities or via a contract when commercial organizations are involved.

Integration of warfighter requirements and support begins early, and effective outcome based strategy implementation is led by the PSM and begins in the JCIDS process by focusing capabilities, overall performance and linking supportability to performance and affordability.

Understanding Warfighter requirements in terms of performance and affordability is an essential initial step in developing a meaningful product support strategy. The Product Support Management IPT consults with the operational commands and organizations that support the war fighting combatant commanders. The operational commands are generally the PM's primary customers. Their Warfighter capability needs are translated into requirements. The metrics are derived from the requirements to drive outcomes that will: (a) be documented in Product Support Arrangements (PSAs); and (b) serve as the primary measures of support provider performance. Supportability requirements should also be a Key Performance Parameter (KPP) consideration or a testable performance metric.

Understanding Warfighter requirements is not a one-time event. As scenarios change and the operational environment or funding profiles evolve, performance requirements may also evolve, leading to changes in the suitability requirements which in turn drive supportability strategy and outcome based sustainment methodology. Thus, meeting Warfighter needs and remaining in close alignment with Warfighter requirements and logistics personnel are essential and continuous processes for the PSM.

To achieve this needed flexibility, product support plans should be implemented via Product Support Arrangements that specify the roles, responsibilities, duration of support, resource commitments, and any specified support or performance outcomes and the corresponding metrics sufficient to achieve the operational requirements. Ideally, the product support strategy will be aligned across various tiers of support and operations tempos.

The concept of integrated requirements and product support is used to explain the dependency and interplay among system performance (reliability, availability, maintainability, and supportability), process efficiency (system operations, maintenance, and logistics support), and system life cycle cost. This overarching perspective provides a context for the resource and design tradeoffs available to a PM along with the articulation of the overall objective of maximizing the operational effectiveness of weapon systems. Ensuring system supportability requires the proactive, coordinated involvement of organizations and individuals from the requirements, acquisition, logistics and user communities, along with industry partners. This applies equally to new weapon systems as well as to major modifications and opportunistic upgrading of existing, fielded systems. Product support activity must relate the documentation of program capability requirements that balance operational capability, life cycle cost, and supportability.

DoDD 5000.01 Policy 1

PMs shall consider supportability, life cycle costs, performance, and schedule comparable in making program decisions. Planning for Operation and Support and the estimation of total ownership costs shall begin as early as possible. **Supportability***, a key component of performance, shall be considered throughout the system life cycle.*

The initial acquisition strategy, including the high-level product support strategy, must also be defined. The pre-acquisition timeframe offers the most leverage for positive impact on system supportability and sustainment.

During the entire acquisition life cycle the supportability emphasis is on not only designing the system to facilitate effective sustainment, but on implementing the product support strategy required to meet established warfighting capabilities. PBL, which emphasizes ensuring product support through incentivized arrangements with specific metrics that achieve objective outcomes, is optimized when the early acquisition phases include a strong emphasis on all factors that relate to operational effectiveness, including product support considerations across the life cycle. In all cases, full stakeholder participation is required in activities related to "designing for support," "designing the support," and "supporting the design."

Output

The output of this step includes the approved documentation of weapon system or equipment requirements for each phase of the acquisition and support process as required by the Joint Capabilities Integration and Development System (JCIDS). These include the current Initial Capabilities Document (ICD), the Capabilities Development Document (CDD), and the Capabilities Production Document (CPD). For weapon systems already in Operations & Support Phase, outputs would include an updated Life Cycle Sustainment Plan (LCSP) prepared as a result of post-IOC and periodic post deployment reviews.

1.1 Life Cycle Logistics Policy

Policy with specific relevance to supportability are found in DoD Directive 5000.01 (Defense Acquisition System), DoD Instruction 5000.02 (Operation of the Defense Acquisition System), and Directive-Type Memorandum (DTM) 10-015 - Requirements for Life Cycle Management and Product Support, date October 7, 2010.

These policies provide a clear rationale for the design and assessment of supportability in DoD weapon systems throughout the life cycle, and establishes accountability for product support strategy issues. They clearly establish that:

The PM is the single point of accountability: Each PM is charged with the accomplishment of program objectives for the total life cycle, including sustainment.

The PSM is responsible for product support strategy. Under the direction of the PM, the PSM develops and implements a comprehensive product support strategy for the weapons system.

Supportability and Sustainment are key elements of performance: Supportability and sustainment are essential components of battlefield effectiveness. If a weapon system is not supportable and sustainable, it cannot be considered as an effective war fighting capability.

Performance-based strategies: For the acquisition and sustainment of products and services, performance-based strategies will be considered and used whenever practical. This approach applies to new procurements, major modifications and upgrades, as well as to re-procurements.

Performance Based Life Cycle Product Support (PBL) strategies: PBL is the support strategy within the Department of Defense that we use whenever practical, and PMs are to work directly with users to develop and implement PBL agreements.

Increased reliability and reduced logistics footprint: PMs must ensure the application of a robust systems engineering process to provide for reliable systems with reduced logistics footprint and total ownership cost (TOC).

Continuing reviews of sustainment strategies: Reviews must be conducted at defined intervals throughout the life cycle to identify needed revisions and corrections, and to allow for timely improvements in these strategies to meet performance requirements.

Consider affordability, always. Irrespective of the strategy selected, conduct appropriate cost analyses to validate the product support strategy, including cost benefit analyses as outlined in Office of Management and Budget Circular A-94.

1.2 Product Support Requirements

Understanding Warfighter requirements in terms of performance is an essential initial step in developing a meaningful product support strategy. The PSM team consults with the operational commands and organizations that support the war fighting combatant commanders. The operational commands are generally the PM's primary customers. Their Warfighter capability needs are translated into requirements. The metrics are derived from the requirements to drive outcomes that will: (a) be documented in Product Support Arrangements (PSAs); and (b) serve as the primary measures of product support provider performance. Supportability requirements should also be a Key Performance Parameter (KPP) consideration or a testable performance metric.

Product Support Strategy implementation must consider the selection of an appropriate support philosophy to ensure optimum use of available resources. Along with personnel, spare parts and fuel, the cost of maintenance is one of the key factors involved in product support. Two fundamental influences are at work to revolutionize maintenance concepts for the 21st century: First, operating forces are increasingly expeditionary forces; they are geared for rapid deployment to areas of operation anywhere in the world. The forces must be agile and responsive, and significantly lighter with smaller sustainment footprints, if they are to respond to the operational demands of future conflicts. In this environment, the large and logistically cumbersome maintenance capabilities of the past need to be left at home, literally. The entire sustainment philosophy is changing from having 'just-in-case' capabilities to having 'just enough.' Express transportation systems provide delivery of shipments anywhere in the world in a matter of hours.

1.3 Warfighter Requirements

The future process for identifying and satisfying Warfighter weapons and material requirements is based on a joint concepts-centric capabilities identification process that will allow joint forces to meet the full range of military challenges of the future. Meeting these challenges involves a transformation that requires the ability to project and sustain joint forces and to conduct flexible, distributed and highly networked operations. To satisfy this need, the Chairman of the Joint Chiefs of Staff in coordination with the Military Components has created a series of policies and procedures known as the [Joint Capabilities Integration and Development System (JCIDS)](#).

New capabilities must be crafted to deliver technologically sound, sustainable and affordable increments of militarily useful capability. All capabilities shall be developed and procured to leverage the unique attributes of other DOD Components, international systems from allies and cooperative opportunities. Potential solutions may include a family of systems (FOS) that takes different approaches to filling the capability gap, each addressing operational considerations in a different way. Alternatively, the capability may require a system of systems (SoS) approach to fill a capability gap. The FoS and SoS materiel solutions may also require systems delivered by multiple sponsors/materiel developers. The process to identify capability gaps and potential solutions must be supported by a robust analytical process which incorporates innovative practices--including best commercial practices, collaborative environments, modeling and simulation and electronic business solutions.

JCIDS analysis process documents capability gaps, determines the attributes of a capability or combination of capabilities that would resolve the gaps, identifies material and nonmaterial approaches for implementation and roughly assesses the cost and operational effectiveness of the joint force for each of the identified approaches in resolving capabilities gaps. A result of the joint concepts-centric JCIDS analysis process is robust, cross-component analysis of war fighting and required capabilities. This will ensure the sponsor considers the most effective joint force capabilities and the integration of those capabilities early in the process. Appropriate Component, cross-Component and interagency expertise; science and technology community initiatives; and experimentation results must be considered in the development of solutions. Due to the wide array of issues that will be considered in the JCIDS process, the breadth and depth of the analysis must be tailored to suit the issue. Ultimately, JCIDS analysis will be based upon robust, integrated architectures and joint analytic assets. In the interim, JCIDS analysis will utilize existing resources.

JCIDS Fundamentals

Programmatic decisions support how we will fight across the spectrum of war. Operational concepts and architectures provide the **construct for analysis** and the tools to support an **integrated and collaborative** requirements and acquisition process.

- Overarching policies (NSS, DPG, and QDR) provide the foundation to develop war fighting strategies across the range of conflict. Integrated architectures provide construct for analysis to optimize competing demands.
- Capabilities are conceived and developed in an integrated joint war fighting context.
- Allows flexibility and room for discovery in development up to block design decision.
- Sufficient oversight through development process but avoids duplicative program reviews.
- Provides construct for prioritizing resourcing decisions.
- Povides a better basis for decision makers to say no.

1.4 Product Support Emphasis in Design & Development

All too often, DoD has procured weapon systems in the past without regard for the resources required to support and maintain the system. As the services procured weapons, they tended to focus on performance parameters such as the ability of a fighter aircraft to execute sharp turns or the ability of a weapon to fire long distances. However, recent history shows that weapon systems with top notch performance profiles are of little use to the combatant commanders, if those weapon systems are not available for use when the commander needs them, or the services cannot afford to support them once fielded. As weapon systems progress from the conceptual stage to the design stage, program managers must balance the performance needs of the Warfighter with the operational availability needs of the Warfighter.

There are a number of design factors that directly impact the future viability of logistics support. For example, some areas of consideration include:

- Reliability and maintainability (R&M)
- Materials
- Human factors
- System safety
- Survivability and vulnerability
- Hazardous material management
- Standardization and interoperability
- Energy management
- Corrosion
- Nondestructive inspection/testing
- Transportability

Enablers are processes or tools that help programs achieve the supportability KPPs and KSAs. There are a variety of current enablers that promise to significantly reduce maintenance requirements in operating units. Condition Based Maintenance+ (CBM+) and Reliability Centered Maintenance (RCM) are two important enablers.

The Condition Based Maintenance+ (CBM+) is an evolving set of initiatives focused on inserting technology into new and legacy systems that will improve maintenance capabilities or lead to more efficient and effective business processes. The goal of CBM+ is to reduce the total maintenance requirement by increasing the amount of predicted maintenance while decreasing both preventive maintenance and reactive (unplanned) maintenance. The CBM+ initiatives allow on-board sensors to monitor equipment condition and eventually predict impending failure, decreasing troubleshooting time and complexity and reducing manpower requirements.

Most modern systems (about 80%) do not have a predictable wear out period, that is, the equipment doesn't fail on a predictable basis without sensors or inspections to identify deterioration. An example of an item without a defined failure pattern is the light bulb. There is no way to tell when a standard bulb is

going to fail, and the only test that's available is to turn it on to see if it still burns. Of course, turning the bulb on also shortens its life. Most maintenance programs simply wait for light bulbs to fail and then replace them.

Preventive maintenance, or scheduled maintenance, accomplishes lubrication and servicing tasks essential to continued operation. An example is the scheduled maintenance interval for passenger cars, which typically have manufacturer-recommended maintenance intervals that equate to two or three shop visits per year. Scheduled maintenance tasks can also be failure-finding tasks, when equipment condition is not evident to the operator, such as structural cracks and emergency or standby equipment that isn't normally operated.

Despite the inability to predict failure or to schedule failure-preventing tasks for most equipment types, there is a powerful incentive to take some form of maintenance action to avoid failure. The incentive is the relative cost to repair an item just before it fails versus the cost to recover from a catastrophic failure. Just-in-time maintenance is also cheaper than subjecting an item to early (and unnecessary) maintenance rather than operating it closer to the point of failure. The question becomes when to perform maintenance if failure is unpredictable. To answer the 'when' question, maintainers must know something about actual operating conditions to assess whether failure or unacceptable deterioration is imminent. Without this additional information, maintenance programs tend to set arbitrary life limits that remove equipment for overhaul, regardless of its actual condition. The need for information about actual equipment condition has led to the development of condition-based maintenance (CBM) programs. Under CBM, maintainers monitor equipment to assess its condition (e.g., reading temperature gauges or conducting spectrometric oil analysis to detect trace metals in lubricating fluids). Once analysts know a key operating parameter or measurement exceeds acceptable tolerances, they can predict impending failure. CBM+ involves a wide spectrum of 'tools' and techniques. These include:

CBM+ Tools and Techniques	
Diagnostic Sensors and Software	Portable Maintenance Aids
Prognostic Software	Failure Modes and Effects Analysis
Health and Usage Monitoring	Automated Configuration Management
Automated Identification Technology	Serialized Item Management
Interactive Electronic Tech Manuals – Job Performance Aids	

Table 1. CBM+ Tools and Techniques

There is a whole range of sensors and devices that can assist in determining equipment operating condition. These sensors and the analytic techniques that support them are part of the discipline called prognostics and diagnostics. Diagnostics provide the capability to identify deterioration or failure in equipment condition and pinpoint or isolate the cause. Prognostics provide the capability to predict remaining life in equipment.

Of course, some types of equipment, particularly electronics, do not often give warning -- they just fail. In those cases, accurate diagnostics of the failure may be the most important information to assist troubleshooting and repair. If maintainers can identify when deterioration begins and know how long it takes for equipment to completely fail after that, then they have time to schedule a maintenance task to avoid the failure. As a result, equipment operates much longer and more cheaply than incurring the cost of replacing failed items or removing equipment from service too early. A comparison of essential elements of previous maintenance methods with those of CBM+ is outlined in the following table.

Essential Elements of Previous Maintenance Methods and CBM+	
From	To
Test Off-Board	Assess On-Board
Fix After It Breaks	Fix BEFORE It Breaks
Demand Logistics	Anticipatory Logistics
Supply Intensive	Velocity Intensive
Reactive Communication	Proactive Communication

Table 2. Essential Elements of Previous Maintenance Methods and CBM+

New weapon systems have CBM+ capabilities built in. The built-in software can actually read sensor data, interpret and predict impending failure, and notify the ground unit that maintenance is required at the end of the flight. An example of the new capabilities can be seen in helicopter health usage and monitoring systems (HUMS), which promise the ability to monitor a wide range of helicopter subsystems, creating a data-rich environment in which to build an anticipatory maintenance and logistics structure. Older systems can have CBM+ capabilities added through modification.

Reliability Centered Maintenance

Reliability Centered Maintenance (RCM) is an analytical process used to determine preventive maintenance (PM) requirements and identify the need to take other actions that are warranted to ensure safe and cost-effective operations of a system. Designed to identify ways to avoid or minimize system failures, RCM establishes and adjusts PM requirements by basing those requirements on equipment failure characteristics. As a result, it allows equipment to realize its inherent reliability at the lowest total life-cycle cost. An RCM analysis would conclude the best course of action on a particular system or component (e.g., to allow a failure to occur and then effect repairs, to change an operational or maintenance procedure, or possibly redesign the component or system to perform within better operating parameters).

In order to assure effective, life cycle logistics support, Product Support Managers and Life Cycle Logisticians must participate early in the Material Solution Analysis (MSA) Phase to ensure that engineering design decisions fully consider product support implications. Conversely, once the design is determined, Product Support Managers and Life Cycle Logisticians must be fully aware of the range of design characteristics built into the weapon system that are likely to drive product support strategies, requirements and resources. As the weapon system or equipment acquisition cycle progresses from the design to the O&S phase of the life cycle, the PSM and Life Cycle Logistician's attention must shift from influencing the design to creating the most effective product support implementation environment for the deployed system.

The process of identifying the Warfighter's needs is known as the Joint Capabilities Integration and Development System (JCIDS). If the Warfighter's needs include procurement of a new weapon system, then the Defense Acquisition System is used in tandem with JCIDS to satisfy the Warfighter's needs. The following diagram shows how the stages of the acquisition system and JCIDS work together:
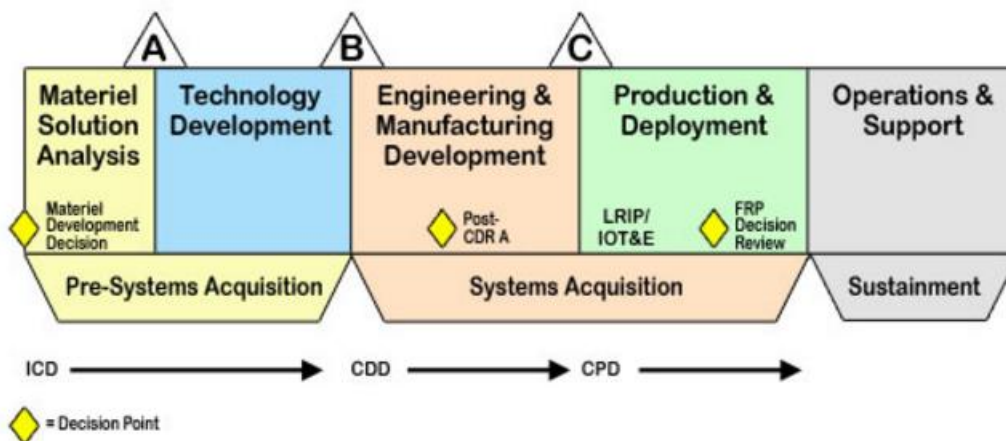

Figure 1. Stages of the Acquisition System

The JROC will conduct a DOTMLPF (doctrine, organization, training, materiel, leadership & education, personnel and facilities) analysis to determine whether a Materiel solution is the best way to meet the warfighter's requirement. A Capabilities-based Assessment will determine if a Materiel solution is best. If so, a Materiel Determination Decision (MDD) will be made and will initiate the Initial Capabilities Document (ICD). The ICD summarizes the analyses that have taken place so far, and explains why the procurement of a new weapon system best addresses the capability gap covered in the functional

analysis. The ICD supports the Materiel Solution Analysis Phase of pre-acquisition activities and will also be used to make the Milestone A decision.

The Capabilities Development Document (CDD) establishes the missing capability required by the Warfighter, which the acquisition system will procure. The CDD breaks out the required capability into key performance parameters (KPP). The CDD defines the program baseline, and should also include supportability attributes. The CDD supports the Milestone B decision.

The Capabilities Production Document (CPD) contains the necessary data to support the production phase of the new weapon system. The CPD contains the KPP's found in the CDD, with the accompanying minimum standards of performance. Generally, the CPD should not introduce any new system attributes that were not identified in the CDD. The CPD is used to support the Milestone C decision.

2.0 Form the Product Support Team

Form the Product Support Management (PSM) Integrated Product Team (IPT) that will develop, implement, and manage product support. The PSM is charged with the responsibility to plan, develop, implement, and execute the product support strategy. Product support encompasses a range of disciplines including, but not limited to, logistics, requirements, operational mission planning, financial, contracts, legal, and integrated product support elements functional subject matter experts.

A critical early step in any product support effort is to establish a cross-functional stakeholder team that takes guidance from the Warfighter to assist in the development, management, and implementation of the product support strategy. Although the PM is the total life cycle systems manager, the PSM is the orchestrator of that management. Effective product support strategies require the participation and consensus of all stakeholders in developing the optimal sustainment strategy. The IPT team, led by the PSM, may consist of Government and private sector functional experts, and it should include all appropriate stakeholders necessary to work across organizational boundaries including Warfighter representatives.

The structure of the team will vary, depending on the maturity and the mission of the program. The PSM must be cognizant of where the system is in the life cycle, understand the major milestones/events, and provide useful information to the decision makers for the program to move successfully forward through the life cycle. The team is able to consider all feasible support alternatives and to select an optimal product support strategy because of the strengths provided by the cross functional expertise of its members.

IPT membership will typically include a Program Office "core" team who has a daily responsibility to plan, develop, implement, and oversee the product support strategy. Other stakeholders and subject matter experts as needs arise will supplement the core team, often on an ad hoc basis. After the IPT is organized, the members establish their goals, develop plans of action and milestones (documented in an approved IPT Charter), and obtain adequate resources.

Product Support strategies are comprehensive and closely integrated, and require early and frequent discussion and planning efforts across and between all key stakeholders. A good product support team has these characteristics:

- All functional disciplines influencing the weapon system throughout its lifetime are represented on the team.
- All the members buy-in to the team's goals, plans of actions and milestones, responsibilities, and authorities.
- All staffing, funding, and facilities requirements are identified and soundly resourced.

A Product Support Management IPT could include representatives from a component command headquarters, life cycle logistics representatives from key functional support entities, such as supply, maintenance, transportation staffs. It could also include representatives from operational commands or defense agencies as well as engineering, technical, safety, procurement, comptroller, information technology organizations, and contract support. Depending on the stage of the Life-cycle, the team could

include the Product Support Integrator(s) and key Product Support Provider(s). After the team is organized, the members will establish their goals, develop plans of action and milestones, and obtain adequate resources. In addition to assisting the PSM in developing, refining, and implementing the product support strategy, the Product Support Management IPT also ensures consideration, throughout product support strategy design and development, of all factors and criteria necessary to achieve a best value strategy that leverages the best capabilities of the public and private sectors to meet Warfighter requirements. With a best value strategy, the Product Support Management IPT leverages the capabilities of public and private sectors to meet Warfighter performance, readiness, and availability at the lowest Life-Cycle cost.

Figure 1. Form the Product Support Management (PSM) Integrated Product Team (IPT)

This approach to effective life cycle product support teaming works best if the product support manager employs a style of leadership that emphasizes coaching and empowering an environment of open communication and timely decision-making. For their part, team members should bear in mind that the team is not the end result but rather the means by which the end result is achieved, namely the delivery of an affordable weapon system and support structure that meets the needs of the Warfighter.

Output
The output of this step is the formation of a cross-functional team of subject matter experts who will support the PSM in assisting the PM in the evaluation of all feasible product support alternatives and accomplish the execution of the product support strategy.

3.0 Baseline the System

A baseline serves as the starting point for measuring progress in the quality or quantity of work or performance related to either a product or a service. The baseline indicates a state at a certain point in time; the result of work or performance from that point onward shows whether things are improving, staying even, or getting worse.

Figure 1. Baseline the System

To construct a baseline collect the data, or begin assembling data for new systems, needed to assess and analyze support decisions, including inputs from Supportability Analysis. This data includes such things as Failure Modes Effects & Criticality Analysis (FMECA), Failure Reporting and Corrective Action System (FRACAS), Level of Repair Analysis (LORA), Maintenance Task Analysis (MTA), Reliability Centered Maintenance (RCM) analysis, and other key maintenance planning tasks, as well as Reliability, Availability and Maintainability (RAM) and Life-Cycle Cost (LCC) analyses.

Defining and documenting the system baseline provided the inputs needed to answer four key questions:

1. What is the scope of your support requirement?
2. Who are the key stakeholders?
3. What are your cost and performance objectives?
4. For fielded systems, what are the historic readiness rates and Operations and Support (O&S) costs relative to the upgraded or new system?

The PM/PSM needs to identify the difference between existing and desired performance requirements to develop an effective support strategy. Accordingly, the PM/PSM identifies and documents the current performance and cost baseline. The life cycle stage of a program determines the scope of a baselining effort. For new programs with no existing product support infrastructure, the baseline should include an examination of the cost to support the replaced systems. If there is no replaced system, Life Cycle Cost (LCC) estimates should be used. For new systems, the business model for supporting the product demonstrates its risks and benefits as part of the systems engineering process. This proof of concept for the support solution is part of the EMD phase. For existing systems, the baseline assessments form the basis for BCA of product support approaches being considered. Determination of the sustainment and readiness performance history and associated operations and support cost is essential. Therefore, actual data should be used for fielded systems.

Generally, there is more than one type of baseline associated with a weapon system. For example, the following may apply:

- Concept of Operations Baseline - The intention is to clearly establish the basic requirements that the system will fulfill.
- System Baseline - This may be considered to be the functional requirements developed for the system. It should be carefully controlled through the configuration management program. By establishing and maintaining formal system baselines, team members will not be able to add/delete requirements without fully considering the ramifications. Listed below are components of the system baseline:
  - Performance Requirements
  - Operational Mission
  - Range of Customers
  - Scope of Sub-Systems
  - Available Funding Resources
  - Subsystem Baseline - This baseline occurs after the requirements are completed and preliminary design work has established a mapping of high-level functions to system components.
  - Development Baseline - This baseline should be completed before system development begins. Once system development begins, there will be pressure to change system design for many reasons (desired new functionality, changes in technology, impediments to development, etc.). It is essential to carefully control these changes to design to maintain the integrity of the system and to control costs.
  - Product Baseline - This baseline essentially documents the "as-built" design that reflects the completed system. The product baseline is the result of the series of changes that have been made to the original developmental baseline during the system development process. Ideally, if the developmental baseline is under configuration control, the product baseline will simply be the evolution of the developmental baseline.
  - Operational Baseline - Given the pressure for change, weapon systems are "living" systems. In other words, the product baseline will change with time to adapt to the necessary changes. During system operations, it is essential to maintain the operational baseline to reflect changes that have been approved through the configuration management process and implemented.
  - Support Baseline -The support baseline represents the range of resources, functional components, scope of responsibilities, support metrics, and the support strategy process (i.e., performance-based vs. transactional-based or blend of both) by which the weapon system is supported to achieve optimum operational availability and reliability. Under

Total Life Cycle System Management, it is the responsibility of the Program Manager to develop and document the Support Baseline. Like other baselines, it can, and most likely will, be modified over time to accommodate changes in weapon system funding, utilization, life cycle phase, performance requirements, and DoD and Service policy and guidance. Listed below are the constraints and enablers of a support baseline:

- CORE
- 50/50
- Existing Infrastructure
- Service Policy
- Service Guidance
- Life Cycle Phase
- Enablers
- Sources of Support
- Commerciality
- Interoperability
- Common Standards

Baselines are not necessarily set only once at the beginning of a program. They should be reset as the program evolves so that you can document where you are at various waypoints over the life cycle. By collaborating with stakeholders such as weapon system operators, organic and commercial support providers, and other customers of the acquisition, technology, and logistics community, you can use the baselines to establish reasonable performance targets and develop methods for tracking actual performance covering areas such as technical operations, cost, or schedule. An example of a formal baseline in managing a weapon system program is the acquisition program baseline (APB). The APB is a document that contains the most important cost, schedule, and performance targets (both thresholds and objectives) for the program.

The process of developing the system baseline is to identify all of the information known about the system to include performance, support, reliability, maintainability, and cost data. A robust Integrated Data Environment (IDE) should be initiated (or accessed) as a fundamental component in the support strategy development or revision process. This stage of the process also provides an essential linkage to a variety of systems engineering and life cycle logistics efforts to ensure a system is designed with supportability in mind, including key inputs from Supportability Analysis activities outlined in the Affordable System Operational Effectiveness model. These include IPS element activities such as Failure Modes Effects & Criticality Analysis (FMECA), Failure Reporting and Corrective Action System (FRACAS), Fault Tree Analysis (FTA), Level of Repair Analysis (LORA), Maintenance Task Analysis (MTA), Reliability Centered Maintenance (RCM) analysis, and other related maintenance planning tasks, as well as Reliability, Availability and Maintainability (RAM) and Life Cycle Cost (LCC) analyses. Throughout the maintenance planning process; however, it is important to remember that "the PM shall design the maintenance program to minimize total life cycle cost while achieving readiness and sustainability objectives. Maintenance planning and management shall begin at program initiation."

Implementation of a disciplined design for support approach, including these systems engineering analysis tools are directly linked to a system's Reliability, Availability, and Maintainability (RAM) attributes and life cycle costs, and will play a key role in not only establishing top-level product support metrics, but in ultimately meeting Warfighter performance outcome requirements. Close collaboration between systems engineers and life cycle logisticians is critically important during system design and development and throughout the life cycle. These tasks are further refined during the subsequent Business Case Analysis to determine a cost effective, sustainable product support solution to meet user needs in an operational environment.

4.0 Identify/Refine Performance Outcomes

The identification, alignment, and refinement of metrics to outcomes across the Integrated Product Support Elements is an important effort in the development of product support strategies. Product support requirements are used to identify critical product support outcomes and measurements/metrics for success. Metrics drive the critical behaviors to influence actions to achieve product support strategy outcomes.

The starting points for the metrics identification effort are the Warfighter outcomes and OSD's specified top-level weapon system metrics. Each evolving product support strategy must be tailored to be consistent with the maturity of data and existence of in-place support infrastructure and capabilities. The achievement of Warfighter and OSD top-level outcomes must be measured by metrics that are tailored to be achievable and accountable, while maintaining close correlation with Warfighter requirements.

After the Warfighter, Service, and OSD requirements for each IPS element are identified, the actual and as-measured performance outcomes required for the product support strategy must be specified. (For Joint Requirements Oversight Committee interest programs, specific guidance is provided. More on this below.) When executed, the formal Product Support Arrangement between the PSM and the Warfighter states the objectives that form the basis of the product support strategy effort. The PSM should focus on a few key outcomes, such as material availability, cost & affordability, mission reliability, and/or overall system readiness levels.

A one-word definition of performance outcomes could be results. Warfighters want affordable and operationally effective, reliable, and available systems on the battlefield. The PSM must first work with the user, the 'Warfighter' (from Force Provider Commands to Combatant Commanders) to identify the required performance outcomes for the development of the Product Support Strategy. The PSM must leverage the resulting support plan to ensure that it will optimize achievement of these outcomes. Linking key reliability, availability, maintainability, supportability, and cost metrics to existing Warfighter measures of performance and reporting systems is essential.

Many existing logistics and financial metrics can be related to top-level Warfighter performance outcomes. Although actual product support strategies may delineate metrics at levels lower than the Warfighter top

level measures (e.g., system availability), it is important that the initial identification of performance outcomes be consistent with the four key Life Cycle Sustainment Outcome measures. These four measures are Materiel Availability (KPP), Materiel Reliability (KSA), Ownership Cost (KSA), and Mean Down Time. Materiel Availability, Materiel Reliability, and Ownership cost are identified in the Joint Capabilities Integration and Development System (JCIDS) CJCSM 3170 Joint Capabilities Integration and Development System (JCIDS) . Three Life Cycle Sustainment Outcome measures—Materiel Availability, Materiel Reliability, and O&S Cost—are mandatory for Joint Requirements Oversight Council (JROC) interest programs with materiel solutions. (The fourth, Mean Down Time, is optional but recommended.) These measures are applicable to all product support strategies.

We cannot always include the exact performance metrics desired by the Warfighter. The suite of metrics included in any PBL product support performance agreement or PBL contract will generally have to be tailored to reflect the realities of the support provider's scope of responsibility, available support resources, and the ability to measure and assess various processes. In practical terms, the PBL strategy will need to be tailored to include metrics that track performance at some level below overarching system level metrics (e.g., Material Availability, or AM), but that directly relates to and supports achievement of these top level outcomes. The bottom line is that a product support provider cannot be held accountable for metrics pertaining to support functions they neither manage nor perform; a means must be in place to collect, compile, and assess metric data against which product support provider performance is evaluated.

Metrics should meet the SMART criteria. This means the measure has a Specific purpose for the business, it is Measurable to really get a value of the KPI, the defined norms have to be Achievable, the improvement of a KPI has to be Relevant to the success of the organization, and finally it must be Time-phased, which means the value or outcomes are shown for a predefined and relevant period.

The sustainment metrics are a powerful tool for the PSM to create an aligned product support strategy. While the JCIDS metrics are mandatory, programs should have additional, subordinate metrics aligned to the JCIDS metrics to ensure Warfighter system requirements are met. Metrics that the PSM might use are provided in Appendix B – Typical Supporting Performance Metrics of the Product Support Manager Guidebook.

In all cases, the program metrics must be integrated to communicate a shared understanding of expectations across stakeholders and to measure success in achieving the specified outcomes. Each stakeholder must understand how their performance contributes to the overall system attainment of the outcomes. While the metrics management process described below starts prior to program initiation, it is a recurring process applied in all life cycle phases. The main difference is that later in the life cycle, metrics are analyzed at a greater level of detail based on actual performance rather than estimates created early in system life.
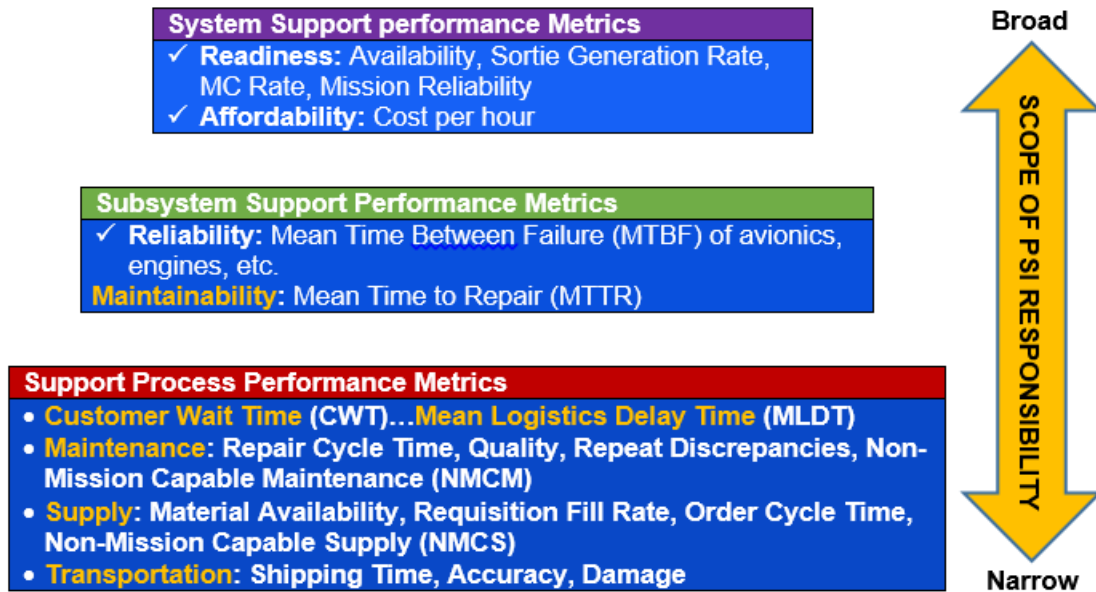
Figure 1. Support Performance Metrics

Metrics in Product Support arrangements can either be explicit (specified) or implicit (implied), with explicit metrics being the usual default choice. Explicit metrics are as described, tangible metrics that can be easily defined, quantified, measured, and assessed. Examples of explicit metrics would be Not Mission Capable Supply (NMCS) the percentage of time for which a system is 'not capable' due to non-availability of a critical part), Depot Repair Time, or any of the numerous "Mean Time Between" metrics such as Mean Time between Critical Mission Failure.

There are situations where both the government and product support provider can benefit by using implicit metrics. An example would be a PBL fixed price contract for parts availability that had a declining contract price of 2% per year over a five year contract term. The product support provider is obligated to provide the specified parts included in the contract at a guaranteed availability rate and delivery time frame but the total demand quantity is undefined. Obviously, both the product support provider and the government have discussed and agreed on the potential forecasted demand, but a total demand quantity is not specified in the contract. The product support provider, for a fixed price, must meet all demands. The implicit metric approach motivates the product support provider to reduce the demand. Since the product support provider is working with a fixed price contract, reducing demand can increase profit. As an added incentive to reduce the demand, the contract price, as mentioned, declines by 2% per year over the five year term.

In this situation, the product support provider enters into the contract confident they can reduce the demand sufficient to profitably satisfy the total requirements and sufficiently reduce the demand to meet, and striving to exceed, the annual 2% cost reduction amount. The product support provider is given the opportunity to generate additional profit by controlling demand. This implicit metric motivates the product support provider to invest in item reliability improvement, buying higher quality parts, parts testing, or other similar demand reduction activities. The additional incentive of a long term five year contract gives the product support provider confidence that the Return on Investment (ROI) will be adequate to not only recoup any investment, but generate added profit as well. In this way, PBL product support strategies create true 'win-win' relationships by promoting 'good behavior' by the product support provider that benefit both the product support provider and the government. DoD systems become more reliable and contractors increase their profit.

Output documentation will describe selected metrics, units of measure, acceptable and quantifiable targets of performance, sources of data and data collection methods and the metrics review process. Successful implementation of logistics metrics is assessed quantitatively through visibility and review of

'balanced scorecard' type of approach to metrics consisting of performance, cost, and customer satisfaction perspectives.

Once the system is fielded, actual performance tracking enables corrective actions and adjustments to the product support package as required to achieve Warfighter requirements and to control O&S costs. This is accomplished by continually comparing performance against requirements, defined as thresholds; and expectations, defined as objectives. Actual equipment and product support performance data will be used, improving product support strategies to meet the users' requirements. This includes updating the variance analysis that examines actual versus predicted cost and performance, supply chain processes based on actual values to help balance logistics support through a thorough review of readiness degraders, maintenance data, maintenance capability, and product support process implementation. For example, reliability data captured through the maintenance process can be compared, using reliability modeling, to specified system reliability. Those components that are critical reliability drivers can then be submitted for analysis to determine the most cost-effective mitigation strategies.

Output
The output of this step is the documentation of high level warfighter performance objectives and their quantifiable performance and/or support metrics that will facilitate achievement of those objectives. In Product Support strategies, product support providers are both accountable and incentivized to achieve documented metrics targets.

5.0 Business Case Analysis

OSD has issued guidance emphasizing the use of the DoD Product Support Business Case Analysis (BCA) as a fundamental tool to support product support strategy decisions. The intent of the BCA is to assist the Product Support Manager (PSM) in identifying the product support strategy that achieves the optimal balance between Warfighter capabilities and affordability. A BCA is a structured process that assesses the capabilities, effectiveness, cost, competencies, and process efficiencies to identify the optimum best value product support solution. A Product Support BCA concludes with a recommendation and associated specific actions and an implementation plan to achieve stated organizational objectives and desired outcomes.

A Product Support BCA provides a best value analysis, considering not only cost, but also other quantifiable and non-quantifiable factors supporting the product support strategy implementation and related investment decisions. This can include, but is not limited to, performance, producibility, reliability,

maintainability, and supportability enhancements. In outcome based product support strategies, it is important and frequently necessary to make up-front investments in Reliability and Maintainability (R&M) improvements and proactive obsolescence/DMSMS mitigation that result in short-term increases in system costs to generate the requisite LCC savings later. To provide this justification, it is critical that the process, scope, and objectives of the BCA be clearly understood and communicated. A BCA should be developed in an unbiased manner, without prejudice, and not constructed to justify a preordained decision.

The Product Support BCA does not replace the judgment of a decision maker. Rather, it provides an analytic, standardized, and objective foundation for credible decisions. The Product Support BCA should be a comprehensive, fair, and accurate comparison when evaluating multiple alternatives. It should take into account broad Department wide impacts and context throughout the analysis. The PSM prepares a Product Support BCA for major product support decisions, especially those that result in new or changed resource requirements. The Product Support BCA helps leadership with significant investment and strategic decisions across all applications of Product Support. For example, Product Support BCAs may support decisions on whether or not to transform business operations, develop a web-based training curriculum, develop solutions to any of the Integrated Product Support Elements (IPS Elements), or retire an asset.

The [DoD Product Support Business Case Analysis Guidebook](#) provides a structured methodology and document that aids decision making by identifying and comparing alternatives and examining the mission and business impacts (both financial and non financial), risks, and sensitivities. BCAs may be somewhat different from other decision support analyses through their emphasis of the enterprise wide perspective of stakeholders and decision makers and assessment of the holistic effects impacted by the decision. Other names for a BCA are Economic Analysis, Cost-Benefit Analysis, and Benefit-Cost Analysis.

Broadly speaking, a BCA is any documented, objective, value analysis exploring costs, benefits, and risks. The intent of a Product Support is the determination of a best value solution. The BCA assesses each alternative and weighs total cost against total benefits to arrive at the optimum solution. The Product Support BCA process goes beyond cost/benefit or traditional economic analyses by documenting how each alternative fulfills the strategic objectives of the program; how it complies with product support performance measures; and the resulting impact on stakeholders. A Product Support BCA is a tailored process driven by the dynamics of the pending investment (PBL) decision. The BCA identifies which alternative support options provide optimum mission performance given cost and other constraints, including qualitative or subjective factors. Developing the Product Support BCA should determine:

- The relative cost vs. benefits of different support strategies.
- The methods and rationale used to quantify benefits and costs.
- The impact and value of Performance/Cost/Schedule/Sustainment tradeoffs.
- Data required to support and justify the PBL strategy.
- Sensitivity of the data to change.
- Analysis and classification of risks.
- A recommendation and summary of the implementation plan for proceeding with the best value alternative.

The Product Support BCA has three major elements: the purpose, process components, and quality foundation (see Figure 1).

1. **BCA Purpose** identifies the problem statement, objectives, and metrics. The items of this element should clearly annotate what issue the BCA is attempting to solve and how to measure success.
2. **BCA Process Components** are those subsections of the BCA that directly execute and report on analytical actions.
3. **BCA Quality Foundation** contains the supporting foundation of the BCA that directly affects the quality and completeness of the analysis. Background research, due diligence, governance, and data management and control underlie and prop up the entire process. Governance represents the oversight and enterprise wide context that helps to steer the analysis throughout the process.

The three elements work together to ensure the Product Support BCA targets the relevant subject matter, credibly analyzes and reports the results, and integrates into the organization's mission and leadership's vision.

Figure 1: Product Support BCA Elements
Source: DoD Product Support Business Case Analysis Guidebook

The Product Support BCA becomes an iterative process, conducted and updated as needed throughout the life cycle as program plans evolve and react to changes in the business and mission environment.
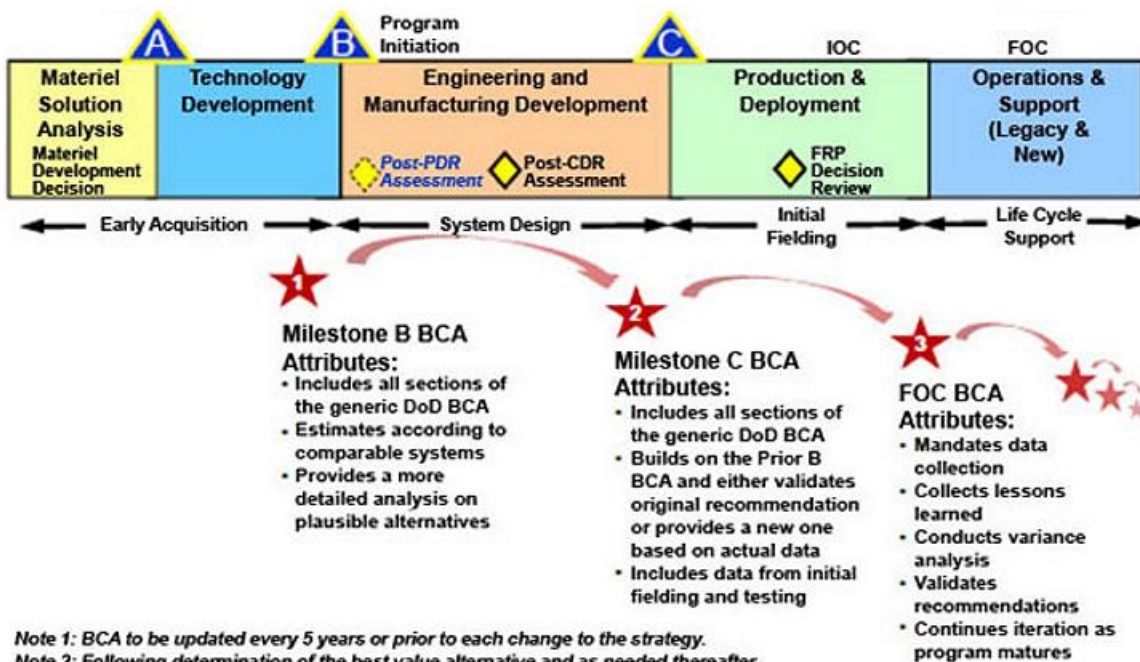
Details of this execution are documented in the DoD Product Support Business Case Analysis (BCA) Guidebook. As a program matures, the BCA must be updated and it evolves as learning takes place and data is captured. BCA's are living documents.

6.0 Product Support Value Analysis

The Product Support Value Analysis must stand on its own and be able to withstand rigorous analysis and review by independent audit agencies. According to the Federal Acquisition Regulation, "best value" means the expected outcome of an acquisition that, in the Government's estimation, provides the greatest overall benefit in response to the requirement. Since a best value determination is in the "Government's estimation," due diligence requires that extensive documentation be developed and maintained. Often, the value analysis relies on data developed in the BCA process.

The Product Support BCA is an iterative process, inter-related with the value analysis, periodically revisited or updated throughout the life cycle. Portions of value choices informed by BCAs can include:

- Initial decision to invest in product support;
- Decision to select among alternative approaches;
- Validation of any proposed scope, schedule, or budget changes during the course of the program;
- Identification of the various budget accounts and amounts affected by the various product support strategies;
- Should be a living document—as Program or organization changes occur, they should be reflected in updates to the business case;
- Should be used to verify that planned benefits are realized at the completion of the project.

This information should be used in further decisions to sustain or enhance the best value decision and to refine estimation of benefits and costs for the program and future programs in the organization. Throughout this process, collaboration and negotiation by the PSM across the stakeholder community is vital in order arrive at the best value recommendation, including qualitative or subjective factors as well as quantitative analysis, to the PM for the selected Product Support Strategy.

Best Value analysis should span:

- Optimum level of support (System, Sub-system, or component level), evaluation of product support strategy considerations related to the 12 IPS elements;
- Supply Chain Management strategy, including the DoD Joint Supply Chain Architecture;
- Workload allocation strategy (including depot maintenance Core, 50/50, $3M Rule, and Public-Private Partnering (PPP) considerations);
- Refinement of Technical Data Rights Strategy (TDS);
- Strategies for continuous modernization and improvement of system reliability, availability, and maintainability (RAM), and proactively addressing obsolescence, Diminishing Manufacturing Sources & Material Shortages (DMSMS), and corrosion issues;
- Life cycle cost control and risk mitigation;
- Affordable alignment with Department strategic objectives.

Product Support Value Recommendations are constrained by Title 10 requirements. The most significant sections are:

- [2460: Definition of Depot Level Maintenance](#)
- [2464: CORE Logistics Capability](#)
- [2466: Depot Level Maintenance Limitations](#)
- [2469: $3M Rule (Competition)](#)
- [2474: Centers of Industrial and Technical Excellence](#)
- [2563: Depot Subcontracting](#)

All involved in Product Support Value Analysis should take the time to understand each of these requirements, with a particular emphasis on Public-Private Partnering. Section 2640 defines depot level. Maintenance and Public-Private Partnering allows the inclusion of organic depot maintenance activity in an overall support plans. Title 10 USC, sections 2474 (designation of Centers of Industrial and Technical Excellence, or CITEs) and 2563 (Articles and services of industrial facilities: sale to persons outside the Department of Defense) together provide the statutory foundation for effecting a partnering arrangement. In essence, the organic depot accomplishes repair or overhaul of items included within the scope of a product support strategy, and 'sells' those items to the PBL contractor. This allows PBL contracts to facilitate compliance with other Title 10 requirements such as section 2464 CORE workloads and section 2466 50/50, which limits depot maintenance performance by contractor personnel to no more than 50% of the total expenditures for depot maintenance, at the overall Service level, in any given fiscal year.

In Best Value Analysis decision makers must embrace the idea that public-private partnerships can work. When implemented to truly leverage key capabilities of both government and our industry partners, DoD has significantly enhanced weapon system product support. This has repeatedly been demonstrated in the area of depot level maintenance. Going beyond depot maintenance, we must continue to refine, improve, and enhance these collaborative organic and industry sector relationships to deliver best value, efficient and effective long-term, outcome-based product support not only for our own program, but also for our Service, the American taxpayer, and ultimately our Warfighters.

Public-private partnerships are emphasized in statute and policy. DoD policy requires that sustainment strategies shall include the best use of public and private sector capabilities through government/industry partnering initiatives, in accordance with statutory requirements. ([DoDD 5000.01, para E1.17](#)) On September 14, 2010, the Under Secretary of Defense for Acquisition, Technology, and Logistics issued guidance on obtaining better buying power. This memo details the 23 efficiency initiatives that speak directly to the issue of obtaining best value for the government. The Defense Acquisition University maintains a website for the ["Better Buying Power" Community](#).

Developing the workload allocation strategy is really the 'heart' of implementing a product support strategy. The decisions as to where, how, and by whom workloads will be accomplished is a significant and critical task to achieve an optimum, best value support plan. As has already been mentioned, PBL is not 'outsourcing', it is the considered assessment of the best public and private capabilities against a set of criteria to determine the optimum best value support solution for each discrete support function,

process, and workload. An effective support strategy considers 'best competencies' and public/private partnering opportunities for each support function in terms of:

- Capability
- Skills
- Infrastructure
- Opportunities for partnering
- Compliance with Title 10
- Public/Private flexibility
- Affordability

Support workloads include both system unique sub-systems, commodities, or components and common sub-systems, commodities, and components. Building on this previously developed System Baseline, the PM and product support team must address each discrete workload and assess how it can best be accomplished while considering statutory (i.e., Title 10), regulatory, and pertinent Military Department (MILDEP) guidance. There are specific guidelines to consider within these categories. Some are mandatory (i.e., Title 10 sections), some preferential (e.g., Service policy and guidance), and some are workload dependent (e.g., workload characteristics such as commercial items, common organic items, etc.). The most common guidelines to consider as the workload allocation and sourcing decisions are accomplished include:

- Title 10 USC applicability (Core, 50/50);
- Existing support process (e.g., contract, organic);
- Existing support infrastructure (in-place, to be developed);
- Best capabilities evaluation (public, private sector market research);
- Opportunities for public/private partnering;
- And similar factors.

The outcome of the Product Support Value Analysis will be an optimized product support strategy which will fall somewhere on the Product Support Decision Matrix (PSDM) shown in Figure 1 (source: DoD Product Support Manager Guidebook). Note that this matrix shows the continuum between component and system-centric strategies and government and commercial capability-based strategies. The Product Support Decision Matrix is explored in detail in the [Product Support Manager Guidebook](#).

Virtually every product support strategy is comprised of both government and commercial product support. Finding the right blend of both public and private support while simultaneously determining the level (component, subsystem, system) of support, and tailoring that support to the objective system dependent on its life cycle phase, mission, operational environment, and funding requirements is a complex process. While the PSDM shows nine discrete support strategy —blocks, in reality there are variations within each of those blocks, resulting in a continuum of product support alternatives. This means the PSM should look at selected strategies from the perspective of what is required for their system with regard to determining the appropriate mix of support sources required to achieve Warfighter requirements at a best value.

Figure 1. The product Support Decision Matrix shows the continuum between component and system centric strategies and partnerships using predominately commercial or industry capabilities to government or organic capabilities. See the Defense Acquisition Guidebook (DAG) Chapter 5, Sections 5.1.1 and 5.1.2 for further discussion of Product Support strategy development.

Figure 2 (source: Product Support Manager Guidebook) shows how an aircraft Sustainment BCA might recommend the best value alternative for the Sustaining Engineering, Supply Support, and Maintenance and Maintenance Planning IPS elements. Similar PSDMs would show the best value strategy for each of the remaining IPS elements. In this example, Sustaining Engineering would be performed on a subsystem basis with a dedicated team of government and commercial engineers. Supply Support would similarly have a partnership to support engines with government and commercial personnel. Conversely, the Supply Support strategy for the aircraft that is independent of the engine is to use capabilities that are predominately held by a commercial entity with only minimal government involvement to manage the airframe PSI. Finally, Maintenance and Maintenance Planning would have a partnership with roughly equal government and commercial capabilities providing Depot level maintenance services at the system level with Organizational level maintenance performed by organic personnel.
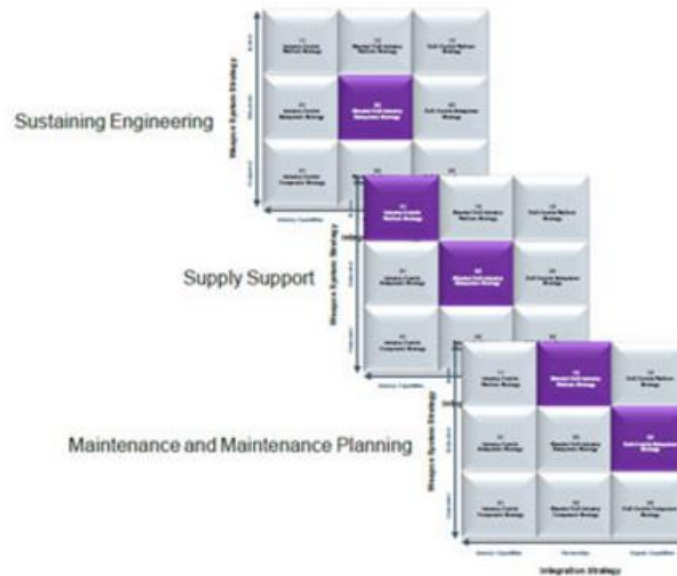

Figure 2. Each IPS element will have a recommendation to achieve Warfighter requirements at a best value, with this recommended alternative falling somewhere on the PSDM.

One of the key principles set forth by OSD for product support is that "Enterprise Means Enterprise and Joint Means Joint." The Product Support Value Analysis, undertaken in support of the BCA, is an opportunity to embrace this tenet.

- Exhaust opportunities for joint economy and reduce unnecessary redundancy;
- Build the capability to make good enterprise decisions;
- Enforce consistency in product support processes and infrastructure.

The challenges of affordability constraints, the need to upgrade equipment and infrastructure, and a continuing, persistent operations tempo prescribe a clear need for DoD implementation of an integrated plan to address product support across the Defense enterprise, and that should happen in the value analysis.

Output
The output of this step is a best value product support plan that considers statutory, policy, and best value competencies and public-private partnership opportunities as part of a comprehensive support plan for each discrete product support function, process, and workload.

7.0 Determine Support Methods
One of the key responsibilities of the Product Support Manager is to determine whether support will be acquired from the Product Support Integrators and Product Support Providers using an outcome- or transactional-based acquisition method or a blend of both. Decision(s) are validated or made using a best value analysis consistent with the BCA.

A PSM does not perform product support. The PSM is the architect of the product support strategy, conducting a considered analysis to decide where, how, and who accomplishes that support. Once they have selected the overall architecture of product support, the PSM must decide how that support is to be acquired. The below graphic illustrates the traditional or "vertical" PSI arrangement where the PSI manages and integrates logistics elements support functions. For more information on alternative PSI arrangements, click here.

At either end of the spectrum, two options are available to acquire product support, with the possibility of blending a product support strategy at any point between these two options. At one end of the spectrum is the decision be to acquire the discrete goods and services necessary to enable the required Warfighter outcomes, or the product support strategy may be to acquire the outcomes themselves. The former is the transactional support model, and the latter is the performance based (or outcome based) model.

In addition, the PSM must decide if the product support strategy is going to be implemented at the component, subsystem, or system level.

PRODUCT SUPPORT STRATEGY IMPLEMENTATION MATRIX			
	Integrated Product Support Elements		
	Single	**Multiple**	**All**
System Level	Single element for an entire system	Multiple elements for entire system	All elements for entire system
Sub-System Level	Single element for a single sub-system	Multiple elements for a sub-system	All elements for sub-system
Component Level	Single element for a single component	Multiple elements for a single component	All elements for a single system

Table 1. Product Support Strategy Implementation Matrix

Traditional transactional product support can be characterized as the procurement of individual items or activities, with low integration. Sometimes that is a valid choice, but DoD policy and guidance specifies a preference for the performance based model wherever possible. No product support strategy is ever pure. They are just at different points in the spectrum of possibilities.

Note that the acquisition approach does not inherently specify the source of product support. In any system, the PSM can blend both transactional product support and outcome-based product support, or migrate to either end of the spectrum to choose one or the other. The Product Support Providers could be organic, or could be commercial partners in the Defense Industrial Base.

Figure 1. Spectrum of Product Support Strategies

In using the transactional model, the PSM and the organic product support structure must determine the quantities, timing, and locations where the unit-purchased goods and services must be delivered or accomplished – a demanding and complex task. If the product support purchased proves to be inadequate (or too much) the risk for performance, cost, and obsolescence, along with storage, maintenance, and distribution lies entirely with the organic acquirer of product support.

In the performance- or outcome-based model, there is a shared risk equation. The PSM, in assigning responsibility for outcomes to a PSI (who accomplishes them through management of subordinate PSPs), is responsible for specifying and incentivizing the appropriate outcomes. If specified correctly, the PSM and the PSI share the responsibility for delivering the desired outcomes. The method of product support, transactional- or performance-based, does not alter the basic functions or tasks that comprise the product support, only in how that product support is acquired. The PSM retains the overall role of and accountability for managing product support on behalf of the Warfighter.

The hybrid product support strategy is a best value blend of a PBL outcome based product support strategy and a traditional transactional based product support strategy which reflects the fact that PBL product support rarely applies to the entire system or all of the IPS elements. Those sub-systems and components that do not fall under PBL product support default to transactional based product support. The hybrid product support strategy is defined further as the best value mix of government and industry product support providers to implement an affordable product support strategy based on their capabilities, capacity and cost to perform the twelve IPS elements.

The Product Support Decision Matrix shows the continuum between component and system centric strategies and partnerships using predominately commercial or industry capabilities to government or organic capabilities. A hybrid product support strategy may evolve over time to become a full PBL product support strategy as more components and IPS elements fall under the responsibility of the PBL product support integrator. A Public-Private Partnership is an example of a hybrid product support strategy.

8.0 Designate Product Support Integrators

After the determination of the acquisition approach, if an outcome based strategy for support is selected, the PSM must identify the Product Support Integrator(s) who will be delegated the responsibility to integrate product support providers to deliver the specified outcomes assigned consistent with the scope of their delegated responsibility. These decision(s) are validated or made using a best value analysis consistent with the BCA.

Brief History NDAA Section 805

In October 2009, President Barack Obama signed the Fiscal Year 2010 National Defense Authorization Act. The legislation (Public Law 111-84) contained a provision in Section 805 entitled, "Life Cycle Management and Product Support" requiring: (1) that the Secretary of Defense issue comprehensive guidance on Life Cycle Management (LCM), and the development and implementation of product support strategies for major weapon systems; (2) that each major weapon system be supported by a Product Support Manager (PSM); and (3) that each PSM position be performed by a properly qualified member of the armed forces or full-time employee of the Department of Defense. Current Life Cycle Management and Product Support requirements are outlined in 10 U.S.C. 2337, Enclosure 6 of DoD Instruction 5000.02, Chapter 4 of the Defense Acquisition Guidebook, and the DoD Product Support Manager's Guidebook.

Relationship of the Program Manager (PM), Product Support Manager (PSM) & Product Support Integrator (PSI) for Product Support

The PM's responsibilities for oversight and management of the product support function are delegated to the PSM, who leads the development and implementation of the product support strategy and ensures achievement of desired product support outcomes during sustainment. The PM/PSM and the Product Support Management IPT employ a PSI or a number of PSIs as appropriate, to achieve those outcomes. The PSI is an entity performing as a formally bound agent (e.g., Performance Based Agreement (PBA), contract, Memorandum of Agreement (MOA), Memorandum of Understanding (MOU), Service Level Agreement (SLA), etc.) charged with integrating all sources of support, public and private, defined within the scope of the product support arrangements to achieve the documented outcomes. The PSM, while remaining accountable for system performance, effectively delegates the responsibility for delivering Warfighter outcomes to the PSI. In this relationship, and consistent with outcome based product support,

the PSI has considerable flexibility and latitude in how the necessary product support is provided, so long as the outcomes are accomplished.

Product Support Business Model (PSBM)

A fundamental tenet of the Product Support Business Model (PSBM) is identifying single-point accountability for product support. That responsibility belongs to the PSM, who delegates, as supported by the BCA, responsibility for one or more components of support to one or more PSIs who are responsible for integrating their sources of support, public and private, to meet the identified performance outcomes. The PM or PSM selects a PSI from the Government or private sector to coordinate the work and business relationships necessary to satisfy the product support arrangement.

The PSBM defines the hierarchical framework in which the planning, development, implementation, management, and execution of product support for a weapon system component, subsystem, or system platform will be accomplished over the life cycle. The PSBM effectively describes the methodology by which DoD intends to ensure achievement of optimized product support through balancing maximum weapon system availability with the most affordable and predictable total ownership cost. The model provides a clearly delineated description of the roles, relationships, accountability, responsibility and business agreements among the managers, integrators, and providers of product support. Those roles and responsibilities are portrayed, consistent with their level of accountability and responsibility, in Figure 1.
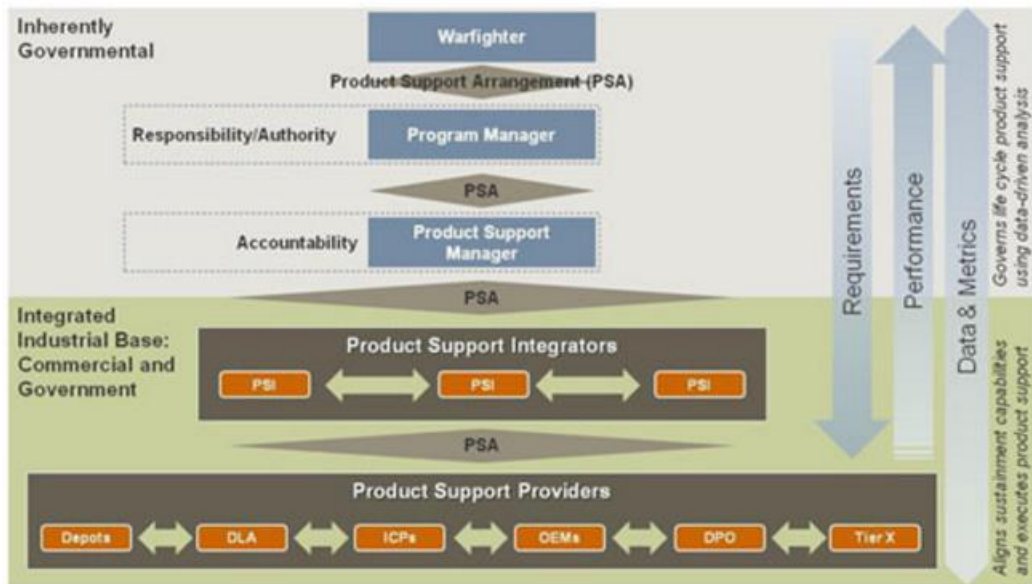

Figure 1. The PSBM highlights that the PSM is the Warfighter's principle product support agent responsible for integrating PSIs to achieve warfighter requirements.
Source: Product Support Manager Guidebook

Given the stated preference (by policy and statute) for outcome or performance based acquisition of product support services, an effective product support strategy will generally require designation of one or more Product Support Integrators who will be responsible, within the scope of their assigned product support outcomes, for managing and integrating the functions and Product Support Providers necessary to achieve the specified performance and/or product support outcomes designated by the PSM. Note that there are circumstances when transactional support is a correct support solution and may be evaluated as an alternative. In all cases, the PSM is accountable to the PM for the product support outcome.

Role of the PSI

The role of the PSI can be narrow or broad, as directed and designed by the PSM.

- At one end of the spectrum, a single PSI could be assigned with the *responsibility for entire system level outcomes* (e.g., Operational Availability, Materiel Availability). This approach has the advantages of clearly assigning responsibility (and visibility) of Warfighter outcomes to a single point of responsibility and provides for a comprehensive and horizontally integrated support solution that accounts for all the product support elements.
- Alternately, the PSM can assign top level PSI roles for the *major system subsystems*; the most prevalent example would be dual PSIs for an aircraft system, with a PSI designed for the airframe and a PSI designated for the propulsion system.
- Devolving further, PSIs could be assigned for *multiple major subsystems that comprise a larger platform system capability*, such as a naval vessel.

The determination of the number, designation, and responsibilities of the PSIs comprising a product support strategy framework will result from both the BCA process as well as the PSM's consideration of the operational mission role, environment, and support requirements of the objective system.

The PM or PSM selects a PSI from DoD or the private sector. Activities coordinated by support integrators can include, as appropriate, functions provided by:

- Organic organizations;
- Private sector providers; and/or
- Partnership(s) between organic and private sector providers.

The PSM ensures that the product support strategy is integrated across the IPS elements to provide an agile, robust, and cost-effective combat capability. The PM/PSM invites the Service and DLA logistics activities to participate in product support strategy development and IPTs. These participants help to ensure effective integration of system-oriented approaches with commodity-oriented approaches (common support approaches), optimize support to users, and maximize total logistics system value.

The primary role of the PSI is to integrate the activities of the various PSPs. The PSI function can be aligned along vertical (weapons system platform) or horizontal (at the sub-system, commodity, or component level) axes. The primary difference in the two approaches is whether or not the PSI is assigned the responsibility of implementing and managing the product support functions from the top down (a weapons system platform approach), or implements product support incrementally across a range of subsystems, etc., that may support multiple platforms.

The Life Cycle Sustainment Plan (LCSP) documents the PSI function as a key component in the product support strategy and support to the Warfighter. While product support execution is accomplished by numerous organizational entities (also called Product Support Providers or PSPs), the PSI is the single point of responsibility for integrating all sources of support necessary to meet the agreed to support/performance metrics.

For more information on alternative PSI arrangements, click here.

The PSI should be:

- **Knowledgeable** about the system;
- **Accountable** for meeting performance metrics;
- **Responsible** for integrating product support sources;
- **Incentivized** to continuously improve reliability, maintainability, and technology; and
- **Involved** early in the program life.

While the PM is ultimately accountable for weapon system performance, the PSI is accountable for meeting the performance metrics and is responsible for integrating all sources of support. To do this, they must be knowledgeable of the system and must be properly incentivized to continuously improve the Reliability, Availability, Maintainability, and Supportability (RAM&S) and technology of the system. The earlier they are involved in the development of the weapon system, the better they will be able influence those factors that will ensure success in support of the program.

Candidates for the PSI Role

There are a limited number of viable candidates qualified to assume the PSI role. They can, as previously mentioned, come from either the government (organic) or private (commercial) sectors. The fundamental PSI attributes are:

- A track record of experience with the technology to be supported;
- Expertise and experience providing integrated logistics support; and
- Willingness and capability to be responsible for integration of support within the scope of their negotiated responsibility for achievement of the PBL outcomes.

PBL product support strategies are not 'best effort' relationships; they are essentially warranties of performance, with commensurate rewards for achievement (via contractual incentives, discussed later), and, if warranted, sanctions for non-achievement.

Potential Candidates

The system's original equipment manufacturer or prime contractor. The principle prerequisite for successful PSI performance is in-depth system knowledge. The Prime Vendor/OEM, with responsibility for designing, producing, and successfully fielding a subject system has a vast array of system knowledge and corresponding robust infrastructure (equipment and facilities), along with in-place sub-contractor support, trained personnel, technical data, proprietary rights, and numerous other irreplaceable qualities and skills that make them eminently qualified to assume the PSI role

An organic agency, product, or logistics command (e.g., Depots, DLA, NAVSUP Weapon Systems Support - formerly Naval Inventory Control Point (NAVICP)). For legacy systems with an existing organic support infrastructure in place, wholesale transition to a contractor PSI led PBL product support strategy is generally not possible, which promotes subsystem and component or process level product support strategies as the most viable opportunities for performance based product support.

- For these systems, where PBLs will most often be initiated at 'less than system' level, the overall PSI top-level integration function will usually be done organically, either directly through the Program Office, or in partnership with a key organic support organization, such as a Depot or Inventory Control Point.
- Organic agencies assuming a PSI role must be willing and able to execute binding performance agreements (e.g., Memorandums of Understanding, Memorandums of Agreement, and/or Service Level Agreements) to which they will be held responsible for achieving documented performance and product support outcomes.
- Organic agency leadership must ensure that management processes, including resourcing and work prioritization, are in place and are adequate to meet the needs of the PBL product support partnership.

A third-party logistics integrator from the private sector. The use of 3PLs is becoming more prominent in both the public and private sectors. 3PLs are good candidates for "system of system" platforms that are not produced by a single prime contractor. Because 3PLs are not normally involved in the sale of weapon systems to DoD, they are normally viewed as a neutral party. 3PLs are attractive PSI candidates when they meet one or both of the following criteria:

- *Significant expertise in a Logistics functional area encompassed by the PBL relationship.* For example, the PBL product support strategy may be limited to Supply Chain Management (SCM). As such, a 3PL with significant expertise in SCM would be eminently qualified as a PSI.
- *Significant experience in integration management, especially when there is no clear Prime vendor/OEM.* For some systems, there may be a range of suppliers, with no clear Prime vendor able to encompass the range of suppliers and support functions needed to effectively integrate support. In those situations, a 3PL with significant experience at integrating a range of product support providers to achieve top-level outcomes may be the best candidate for the PSI role.

The PM's own logistics organization. The Product Support Integration function may be accomplished within the PEO/PMO when integrating a horizontal PBL product support strategy composed of both PBL product support and non-PBL discrete functional product support strategies.

Considerations in the Evaluation of PSI Candidates

Once the PM has answered some key questions, he or she is better able to evaluate the PSI options and select the alternative that provides the greatest benefits. Typical questions the PM may want to consider are:

- What sustainment functions are included in this product support strategy?
- What specific capabilities are required to perform these functions?
- Are these functions inherently Governmental?
- Are there statutory or regulatory limitations associated with performance of these functions?
- Are the desired functions more commonly performed in the commercial sector?
- Which product support provider offers the optimal mix of required performance at the lowest LCC (also frequently referred to as best value)?

Considerations by the Commercial PSI

Commercial PSIs anticipate reward and accept risk when entering into PBL partnerships. The primary reward, and risk, is financial. The potential for reward must be weighed against their financial risk from the partnership. With such risk, what are the offsetting benefits to PSIs for entering into PBL partnerships? There are several:

- *Stable Workload and Cash Flow.* In transaction-based (e.g., level of effort) relationships, the DoD workload required and financial resources available can vary significantly from year to year. PBL partnerships are generally more stable, with a predefined range of workload and commensurate income over time.
- *Flexibility.* In PBL product support strategies DoD buys outcomes, without dictating "how to" accomplish those outcomes. This provides the PSI significant latitude to exercise a creative and entrepreneurial approach to not only meet, but often exceed, DoD requirements.
- *Long Term Relationships.* PBL partnerships focus on continuity, as long as the desired outcomes are achieved. A common feature of these partnerships is Award Term contract incentives, where additional contract option years are awarded non-competitively based on continuing excellent performance.
- *Mitigation of Government Oversight.* Performance-based contracts are generally characterized by fewer administrative oversight requirements (e.g., government approved cost accounting systems and reporting requirements).

Title 10 and Workloads

As mentioned, the viable candidates to assume the PSI function are limited, given the significant responsibility, risk, and range of management and integration functions inherent in the role. The Office of the Secretary of Defense (OSD) has consistently stressed that PBL does not equal contracting out. In other words, PBL is not just outsourcing workloads. It should be emphasized that selection of a private sector commercial PSI does not presuppose outsourcing workloads.

The allocation of workloads in a PBL relationship will continue to be sourced in compliance with Title 10 and where it makes the best sense and provides best value given both public and private sector capabilities, infrastructure, personnel, and resources. The willingness of Congress to enact Title 10 changes to facilitate public private partnering is clear evidence that there is ample flexibility to maintain public sector workloads within the bounds of a contractor-PSI based PBL relationship.

9.0 Identify Product Support Providers

The PSI selects the best mix and blend of sources to perform the product support functions (i.e., Product Support Providers) utilizing BCA value analysis as well as PSI discretionary decisions for lower tiered supplier support. Decision(s) are made using a best value analysis consistent with the Product Support BCA. This is best understood by understanding the Product Support Business Model, displayed in Figure 1.
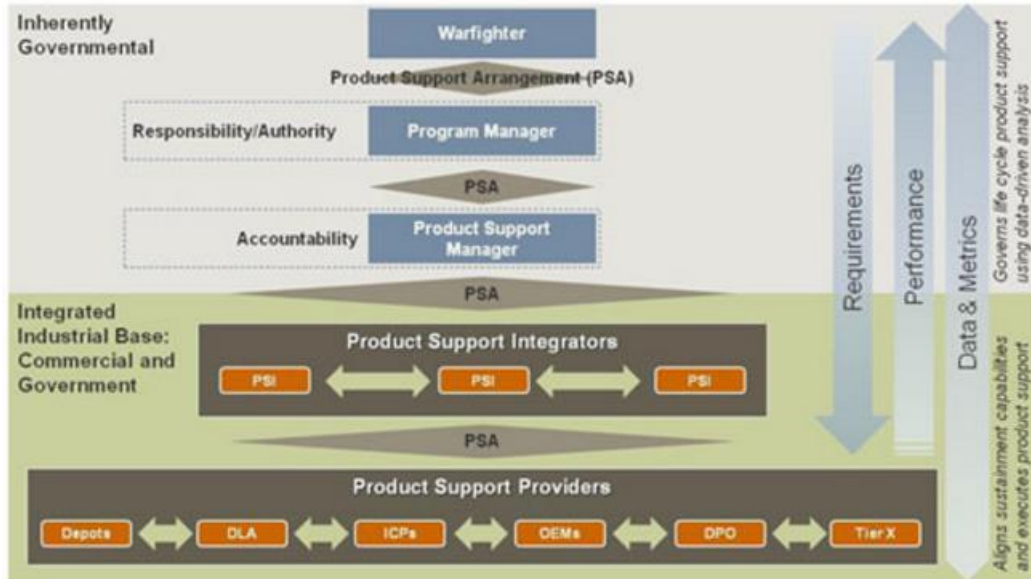
Figure 1. The PSBM highlights that the PSM is the Warfighter's principle product support agent responsible for integrating PSIs to achieve Warfighter requirements.
Source: Product Support Manager Guidebook

The framework's bottom tier portrays the product support implementing agents, with Product Support Providers at the foundational level. Consistent with the model's emphasis on a performance/outcome based product support approach, there may be a requirement for one or more PSIs who are chartered with integrating sources of support, public and private, defined within the scope of their implementing product support arrangements, to achieve the documented outcomes. There is a clear need for entities (public or private) assigned the responsibility for delivering performance outcomes to be endowed with authority to integrate, manage, and provide oversight over the lower-level support functions that, in combination, achieve the specified outcomes.

A primary objective of the Product Support BCA process is to determine, for the individual IPS elements and, in the objective system, the optimum sources of support depending on capabilities, competencies, best value, and the qualitative efficiency and effectiveness of support. For each of the IPS elements there will be logical candidates, both public and private, to accomplish the required product support. In addition, within each of those IPS element support functions the work will further delineate into technical, hands-on, management, and quality tasks. DoD guidance expresses a clear preference for performance-based product support, unless there is compelling financial, statutory, or other factors compelling pursuit of a traditional transactional product support strategy.

The PSM may elect to assign product support integration responsibilities to one or more Product Support Integrators who will be assigned specified performance or support outcomes and, consistent with that assignment, given authority to manage the Product Support Providers and functions necessary to achieve those outcomes. The mix of PSIs and PSPs may include government or commercial organizations, as determined by the BCA process. The use of a performance based product support strategy can simplify the complex process of configuring the broad range of sustainment functions and product support providers to optimize achievement of required Warfighter capabilities.

The most likely candidates for the PSP roles include:

- The system's original equipment manufacturer or prime contractor;
- Commercial sector suppliers, vendors, subcontractors, support contractors, etc.;
- An organic agency, product, logistics command or materiel (e.g., DLA, NAVSUP Weapon Systems Support, depots, USTRANSCOM);

- Commercial sector logistics, maintenance, repair, overhaul (MRO), and transportation organizations; and
- The PM's own logistics organization.

As the PSM and the PSI execute the product support strategy, they must remember a key principle: Build Mutually Beneficial Partnerships. Effective product support provider networks must:

- Optimize public and private product support capabilities;
- Leverage core competencies;
- Create product support arrangements that are effective, equitable, transparent, bilateral, and long term.

Developing an effective product support strategy requires consideration of all the above factors and using decision support tools, including Business Case Analyses, to arrive at best value decisions and to develop the optimum support sourcing decisions, as illustrated below:

Figure 2. Spectrum of Support Opportunities

Product support strategies driven by MOU's with the Warfighter's will vary across the spectrum of organic and commercial participation depending on:

- Age of system (phase in life cycle)
- Existing support infrastructure
- Organic and commercial capabilities
- Legislative and regulatory constraints

10.0 Identify/Refine Financial Enablers

In the final stages of the development of a product support strategy, the PSM must identify and define the range, types, and amount of funding needed to perform the required product support consistent with the anticipated terms, conditions, and objectives of the Product Support Arrangements. At the same time, prior to the execution of the Product Support Arrangements, PSM's should consider how funds are to be delivered to the product support providers, in the form of payments and incentives.

Once the product support strategy framework has been finalized to show the range and responsibilities of the PSIs and PSPs and the enabling Product Support Arrangements have been drafted, the PSM should work the financial aspects of the product support strategy. The PSM must assure that appropriate levels and types of funding are resourced to successfully execute the product support strategy and disburse the funds in the most effective way. The unique needs and characteristics of the system and its operational priorities drive the amounts and types of funding required. Various types of funding and appropriations across the life cycle, including Procurement, RDT&E, and Operations and Maintenance blend to deliver the required product support.

The PSM should plan and advocate for sufficient funding from the organizations to which those funds have been appropriated. This can involve actions ranging from ensuring that an adequate budget projection, commonly referred to as a "wedge," is inserted into the Planning, Programming, Budget, and Execution (PPBE) process sufficient to effect transition of a development system to operational use with sufficient funds for support, including Procurement and RDT&E funds for known required modifications and upgrades necessary for effective sustainment of the system. Once the funds have been appropriated, the PSM should ensure the funds are made available as needed to fund the support as defined in the Product Support Arrangements. While the Warfighter advocates for the required funding, the PSM has a clear management and oversight role of the funds used for product support. The PSM should request the full amount of funding needed and provide impact statements to the Warfighter, PM, and program sponsor explaining the impact of the reduced support that resulting from incomplete funding.

A well-constructed funding plan incentivizes accountability for performance. The three operative words, each vitally important, are incentives, accountability, and performance. Performance-based life cycle product support (PBL) processes, metrics, and incentives have proven to be effective means of delivering desired product support outcomes. They must deliver performance outcomes through enhanced and sustained product and process improvements such as (but certainly not limited to) reliability, availability,

maintainability, obsolescence & DMSMS mitigation, and efficient/effective supply chain management. Going forward, product support strategies must also be structured to identify, capture, quantify, track, evaluate, and analyze foundational underlying data through a rigorous and repeatable Product Support BCA process.

Support Provider Incentives

Performance-based contracting methods are intended to ensure that required performance quality levels are achieved and that total payment is related to the degree that materials and services performed meet contracted standards. For the DoD, that means a clear description of what the effort entails, performance expectations, and the incentives necessary to ensure contractor success.

With a primary focus on results, contractors are provided maximum flexibility in meeting the government's actual needs. A concise performance-based work statement enables the contractor to fulfill that need as best determined by the contractor. Specific, quantifiable performance indicators allow the contractor and the government to monitor task performance throughout the life of the project as opposed to vague statements of work that leave the contractor unclear about the project's success. Achievement of results greater than the contracted baseline of performance may be rewarded with tangible financial incentives.

Federal Acquisition Regulations both permit and encourage contract performance incentives. When preparing statements of work, agencies shall, to the maximum extent practicable:

- Describe the work in terms of "what" is to be the required output rather than either "how" the work is to be accomplished or the number of hours to be provided;
- Enable assessment of work performance against measurable performance standards;
- Rely on the use of measurable performance standards and financial incentives in a competitive environment to encourage competitors to develop and institute innovative and cost-effective methods of performing the work.

Performance Incentives

- Performance incentives may be considered in connection with specific product characteristics (e.g., a missile range, an aircraft speed, an engine thrust, or a vehicle maneuverability) or other specific elements of the contractor's performance. These incentives should be designed to relate profit or fee to results achieved by the contractor, compared with specified targets.
- To the maximum extent practicable, positive and negative (i.e., remedies) performance incentives shall be considered in connection with service contracts for performance of objectively measurable tasks when quality of performance is critical and incentives are likely to motivate the contractor.
- Technical performance incentives may be particularly appropriate in major systems contracts, both in development (when performance objectives are known and the fabrication of prototypes for test and evaluation is required) and in production (if improved performance is attainable and highly desirable to the Government).
- Technical performance incentives may involve a variety of specific characteristics that contribute to the overall performance of the end item. Accordingly, the incentives on individual technical characteristics must be balanced so that no one of them is exaggerated to the detriment of the overall performance of the end item.
- Performance tests and/or assessments of work performance are generally essential in order to determine the degree of attainment of performance targets. Therefore, the contract must be as specific as possible in establishing test criteria (such as testing conditions, instrumentation precision, and data interpretation) and performance standards (such as the quality levels of services to be provided).
- Because performance incentives present complex problems in contract administration, the contracting officer should negotiate them in full coordination with Government engineering and pricing specialists.
- It is essential that the Government and contractor agree explicitly on the effect that contract changes (e.g., pursuant to the Changes clause) will have on performance incentives.

- The contracting officer must exercise care, in establishing performance criteria, to recognize that the contractor should not be rewarded or penalized for attainments of Government-furnished components.

Current DoD financial budget, appropriation, and accounting rules and processes are not tailored to the fundamental concept of PBL buying a single, top-level outcome (i.e., performance). DoD funds are broken down into various types of appropriation accounts: Research, Development, Test, and Evaluation (RDT&E), Procurement, Operations and Maintenance (O&M), Military Construction (MILCON), and so forth. Within each of these appropriations funds are further separated into various "lines of accounting" depending on the functional area or product to which they have been allocated. And, each appropriation type has statutory time limits on use, e.g., Procurement funds are good for three years, RDT&E two years, and O&M one year. This creates problems because almost all of the activities funded by these different colors of money are used for the effective support and sustainment of DoD weapon systems. With traditional support strategies, this creates less of a problem, since traditional transactional support is purchased as discrete amounts of functional transactions, such as number of items repaired, supply parts purchased, or hours of engineering support, more in line with how funds are aligned. However, in PBL product support strategies, we are not buying various discrete functional transactions, but rather top-level performance outcomes.

DoD Working Capital Fund

Funding through the Working Capital Fund mechanism can be a significant financial enabler of the product support strategy. The basic tenet of the revolving fund system is to create customer/provider relationships between military operating units and support organizations, as illustrated in Figure 1.

- **Customers** DoD commands and organizations, non-DoD federal agencies, U.S. and foreign agencies, and DoD-authorized commercial enterprises.
- **Support Providers** Business Areas and related support organizations financed through DWCF that provide goods and services to the operating forces.
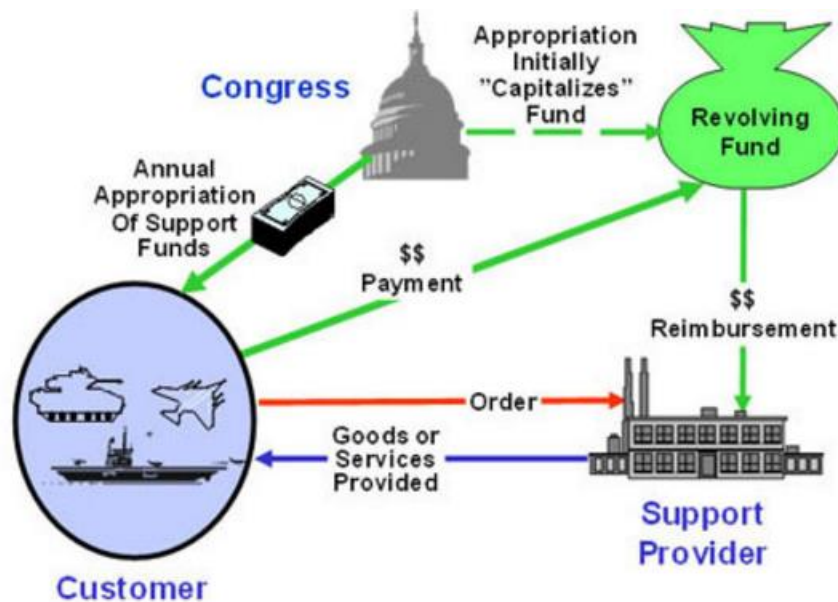
Figure 1: Defense Working Capital Funds

The customer/provider relationship is fundamental to the DWCF financial structure in that it increases the customer's responsibility for properly determining support requirements and the level of performance needed from DWCF Business Areas. The result of the customer/provider relationship is a meaningful linkage between military operations and the cost to support those operations. This relationship is also essential for a successful PBL product support arrangement.

Navy Working Capital Fund

The Navy has been very successful in utilizing the Navy Working Capital Fund (NWCF) to implement PBL product support strategies as illustrated in Figure 2. The NWCF is a non-expiring, revolving fund that finances the repair and procurement of Navy Depot Level Reparables, and select consumables at the wholesale level. The structure of the NWCF allows for contracts with multiple year performance periods, a necessity for PBL product support arrangements. PBL product support contracts citing the NWCF have been executed with five-year initial performance (base) periods and multiple five-year option periods. These long-term contracts incentivize contractors to make long-term investments to improve weapons systems support and performance that would not have been otherwise supportable by the contractor's internal investment criteria. Congressional multiyear contract authority is not required for these contracts, which greatly simplifies contract execution. Funding is applied to these long-term contracts in annual increments reducing the amount of funding that must be obligated at any given time.
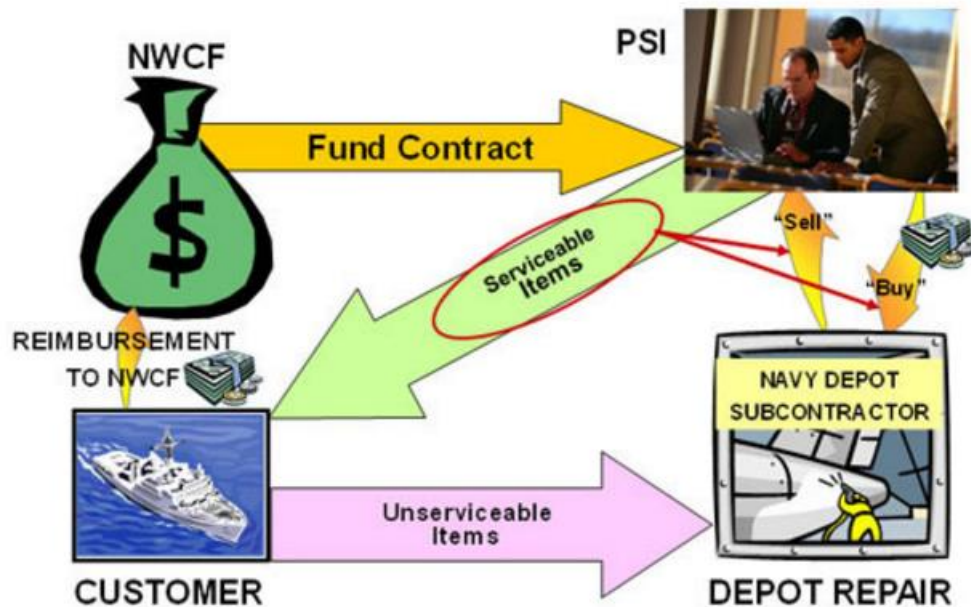

Figure 2: Navy Working Capital Fund: How the NWCF Funds PBL Contracts

Industry leaders have indicated that long-term PBL product support contract commitments enable consideration of investing company funds for product improvements since the time remaining on a PBL product support contract permits reaping a return for their investments. Some WCF contracts are currently in place with contract terms of 5 or more years, while PBLs funded with appropriated fund accounts may be placed with multiple one year options.

PSMs work with users to identify estimated costs of meeting performance capabilities. These estimates will become the basis for the user to advocate funding during the budget process. A thorough PBL Product Support BCA should precede this step in the process. The Services then identify specific appropriation elements that are intended to support product support strategies. Ultimately, this approach will result in clear lines of visibility and accountability, which will in turn support improved readiness and resource management.

Output

The output of this step is an overall resources plan for life cycle funding of support costs for the weapon system or equipment, including identification of funding resources and coordination with the activities providing funding. The resources plan should also include documentation of incentives offered to product support providers.

11.0 Establish/Refine Product Support Arrangements

Document the implementing Product Support Arrangements (contract, MOA, MOU, PBA, CSA, SOO/SOW for the Performance Work Statement, etc.) that assign and delineate the roles, responsibilities, resourcing, and reciprocal aspects of product support business relationships.

Product Support Arrangements, discussed in detail in Section 2.2 and Appendix F – Product Support Arrangement (PSA) Types of the Product Support Manager's Guidebook serve to formalize the roles, responsibilities, relationships, and commitments of the active participants in the product support strategy. These participants include, at minimum, the PM, PSM, Warfighter customer, resourcing Commands, PSIs, PSPs, and associated stakeholders or participants in product support. Product Support Arrangements may take a variety of forms, including Memoranda of Understanding (MOUs), Memoranda of Agreement (MOAs), Product Support Arrangements (PSAs), and contracts, or a combination of any or all of these. The PSM should ensure that PSAs are in place to document and define each relationship that is part of the execution of the product support strategy. These PSAs should reflect the exact price and performance agreements used in source selection and include agreed on mechanisms to demonstrate achievement of outcomes. The PSAs should ensure the PSM's plan will be executed in a manner agreeable to both the PSI and the PSM.

With on-going budget challenges within the department, a high degree of focus has been brought to the structure of agreements. Additional guidance and information can be found on the Better Buying Power website.

Traditional Support Strategies vs. Outcome-Based Strategies

In traditional support strategies, where DoD purchases transactional goods and services, it is incumbent upon DoD to specify which goods and services are desired, and how many of each is desired. The support provider's only responsibility is to provide the goods or services requested. If DoD managers make inaccurate decisions about which items need to be repaired, or what quantity of items need to be purchased, then responsibility for the subsequent degradation of system operational effectiveness lies with DoD, not the support provider. Conversely, when DoD buys a level of support or performance, then the responsibility for the subordinate decisions (i.e., which items to repair, what quantity of items to procure) transitions to the product support provider, along with the risk for the resulting effect on operational effectiveness.

Reducing "Risk" to the Government

Inherent in any business transaction where a level of performance is purchased, rather than discrete goods and services, there is a de facto shift of risk to the provider of support. This is true of outcome-based partnerships, as well. While DoD can never completely delegate risk for system operational performance, outcome-based strategies move a level of risk away from DoD to the product support provider commensurate with the scope of support for which the product support provider is responsible. If structured with the right metrics, incentives, and strictly limited exclusions to coverage, a product support package will highly incentivize the product support provider to make good decisions and manage to avoid financial consequences of bad decisions.

If responsibilities are delineated to match core competencies, overall programmatic risk is reduced. Good risk management means that the entity best positioned to manage and mitigate a risk should be responsible for it, and that can be the product support provider. Correctly structured product support strategies will significantly reduce, but not eliminate, risk to the government.

Contract Types

Contract types vary according to:

1. The degree and timing of the responsibility assumed by the contractor for the costs of performance; and
2. The amount and nature of the profit incentive offered to the contractor for achieving or exceeding specified standards or goals.

DoD support contracts fall into two broad categories: *Cost Plus or Fixed Price*. Product support contracts can be of either type, but typically the objective is to work towards a Fixed Price contract, in conformance with the concept of buying defined outcomes at a defined price. A recent discussion of the use and applicability of different contract types occurred in the Memorandum for Secretaries of the Military Departments and Directors of the Defense Agencies (November 3, 2010), signed by USD(ATL).

DOD CONTRACT TYPES			
	Fixed Price	**Cost Plus**	
	Firm-Fixed Price (FFP)	**Cost-Plus-Incentive-Fee (CPIF)**	**Cost-Plus-Award-Fee (CPAF)**
Description	• Price not subject to any adjustment • Specifies a target cost, a price ceiling and a profit adjustment formula • Maximum risk on Contractor • Minimum administrative burden on parties • Preferred contract type	• Government pays allowable cost and incentive fee • Incentive fee based on contractor achievement of objective metric targets • Can also include cost gainsharing; comparing actual cost to target cost and sharing of savings	• Government pays allowable cost, base fee and award fee • Base fee does not vary with performance • Award fee is based on a subjective evaluation of performance • Amount of award fee is unilateral
Product Support Application	• Requirement is well defined • Able to establish fair and reasonable pricing	• A relationship can be established between the fee and the performance measures	• Subjective evaluation is desired (i.e., customer satisfaction)

Table 1. DoD Contract Types

Within these two broad categories (Fixed Price and Cost Plus), there are further delineations of specific contract types:

1. Cost Plus
   a. Cost Plus Fixed Fee (CPFF):
      i. Used when cost and pricing risk is maximum (VERY early);
      ii. Basically reimburses the contractor for level of effort work accomplished, plus reasonable profit.
   b. Cost Plus Incentive Fee (CPIF):
      i. Used early in program when the metric baseline is immature;
      ii. Primarily oriented toward cost (allowable and target);
      iii. Can include some performance incentives other than cost.
   c. Cost Plus Award Fee (CPAF):
      i. Used when subjective assessments of contractor performance are desired (i.e., customer satisfaction);
      ii. When used - usually in combination with CPIF.
2. Fixed Price:
   a. Firm-Fixed Price (FFP) or Fixed Price - Award Fee (FPAF):
      i. Used when cost and resource baseline is fully mature - pricing risk is minimum;
      ii. Puts highest risk on the contractor and lowest risk on the government.

The major determinant factor in choosing between Cost Plus and Fixed Price contracts is the degree of pricing risk present in the support cost. In general, pricing risk is high during the early phases of program development and deployment; hence the use of Interim Contracting Support (ICS) contracts on a cost reimbursable basis. As costs become more stable, but still subject to pricing risk, a transition to a Contractor Logistics Support (CLS) contract of a Cost Plus (CP) type is feasible, including the addition of either Incentive Fee (CPIF) or Award Fee (CPAF) features, or a combination of both (CPIF/AF).

These types of Cost Plus contracts can be structured with cost targets, incentives, and other features that realize most, but not all, the price benefits of Firm Fixed Price contracts while still accommodating pricing risk. Again, the ultimate objective should be to convert to a long term Firm Fixed Price contract with appropriate incentive features (i.e., FPAF). Fixed Price contracts are inherently cost-controlled. The contractor will not be paid more or less than the specified fixed price.

When used in outcome-based strategies, where achievement of specified performance outcomes is desired, the Fixed Price Award Fee (FPAF) is the usual form of fixed price contract utilized. The contractor receives the fixed price negotiated in the contract, while also having the opportunity to earn a "bonus" amount in the form of the Award Fee based on their success in meeting the metrics specified in the Award Fee plan. In a Fixed Price contract, a commercial PSI enters into a contractual arrangement with the understanding that they will receive a fixed price, regardless of the amount of resources or cost they contribute to the effort. This financial risk is a factor in their negotiation of both contract price and incentives. The nature of the incentives will dictate the type of fixed price contract, such as Fixed Price Award Fee, Award Term, Gain Sharing, or others as appropriate.

"Award term" is a contract performance incentive feature that ties the length of a contract's term to the performance of the contractor during the performance period. The contract can be extended for "good" performance or reduced for "poor" performance. The award term feature is similar to award fee contracting where contract performance goals, plans, assessments, and awards are made regularly during the life of a contract. But, unlike an Award Fee, an Award Term does not result in the award of a fee. Instead, an incremental change to the period of performance is awarded. Award term solicitations and contracts should include a base period (e.g., 3 years) and a maximum term (e.g., 10 years) that can be earned through good performance.

The critical advantage to Fixed Price contracts is that they tend to be self-motivating. They motivate the contractor to do inherently good things such as procure ultra-reliable parts and perform high quality repair actions, since the contractor ultimately benefits from less cost (and higher profit) resulting from fewer parts and repairs required over the long term. Developing a contracting strategy, encompassing the phasing and types of contracts, is a critical factor in product support strategy development. A notional example of contract phasing is shown below.

Contract Incentives

Outcome-based product support has been described as a transition from arms length to arm-in-arm relationships between commercial providers and organic organizations. It requires open and honest communication, a commitment to team relationships that optimize system objectives over parochial interests and long-term success over short-term gain. Outcome-based contracts and formal agreements are, with intent, structured to produce win-win scenarios. For many years, DoD contracting had a strong "win" orientation, negotiating the best terms with little regard for the benefits or terms of the other party. In performance-based product support strategies, it is possible to describe and document terms that optimize performance outcomes and objectives for both parties in the relationship.

One of the best ways to achieve a win-win scenario in contracting is through the use of contractual incentives. Contract incentives will vary depending on the program phase, level of risk, and level of baseline maturity. Product Support Integrators should be motivated to achieve those performance outcomes that are 1) most relevant to the program activities ongoing at the current program phase, and 2) are consistent with the scope of PSI responsibility for managing activities to achieve those outcomes.

The most common incentives are listed below:

Incentive Fee

- Incentive Fee evaluations are quantitative in nature and are considered to be more objective than Award Fee contracts, which rely on subjective criteria.
- Most incentive contracts are primarily oriented toward cost incentives, which take the form of a profit or fee adjustment formula and are intended to motivate the contractor to effectively manage costs. No incentive contract may provide for other incentives without also providing a cost incentive (or constraint).
- Incentive contracts may include a target cost, a target profit or fee, and a profit or fee adjustment formula that (within the constraints of a price ceiling or minimum and maximum fee) provides that:
  - Actual cost that meets the target will result in the target profit or fee;
  - Actual cost that exceeds the target will result in downward adjustment of target profit or fee; and
  - Actual cost that is below the target will result in upward adjustment of target profit or fee.
- Performance incentives may also be included, and should be considered in connection with specific product characteristics (e.g., a missile range, an aircraft speed, an engine thrust, or vehicle maneuverability) or other specific elements of the contractor's performance. These incentives should be designed to relate profit or fee to results achieved by the contractor, compared with specified targets achieved by the contractor.

Award Fee

- An Award Fee plan is established
- Can be a combination of quantitative and qualitative assessments, but it is more subjective than an incentive fee plan
- Award fee (or portion thereof) is earned by meeting Award Fee plan performance goal

Award Term

- Additional (option) years are added to the original contract based on satisfactory contractor performance
- Like an Award Fee contract, an Award Term contract relies on evaluations that are qualitative in nature, and tend to be subjective.

Shared Savings (Gain Sharing)

- When a pre-negotiated maximum contractor profit increases (meaning costs decrease due to contractor achieved savings), DoD and contractor share the savings based on a percentage formula (e.g., 50/50); (NOTE: The Contractor should share in any cost OVER-RUNS as well!)
- The recently awarded USAF tanker contract is an example of a gain sharing approach.

Earning contractual incentives is based on meeting the contractual metrics for performance and/or support. Although varying from contract to contract, metrics should be structured to earn a full incentive if metrics are met or exceeded, and lesser portions of the incentives if the metrics are not fully met, with lesser amounts of incentive earned down to a metric floor at which point no incentives are earned. As an example, a metric may be Non-Mission Capable Supply (NMCS), which measures the percent of time that a system is not Mission Capable due to lack of a critical part supplied by the PSI. A typical percentage target for this metric would be 5%, meaning that the metric would be fully met if, for the weapon system fleet, the total Non-Mission Capable percent attributable to critical parts supplied by the PSI does not exceed 5% for the measurement period (i.e., the PSI makes the part available 95% of the time). If met, the PSI would receive the full incentive. However, the contract should also identify a sliding scale of NMCS percentages, for example, from 6-10%, with an incentive amount (less than the full incentive amount) identified for each percentage point higher than 5% but not greater than 10%. For example, if the NMCS percentage for the measurement period was 6%, then the PSI would receive the incentive amount (again, less than the full 5% NMCS incentive amount) identified at that percentage level, and correspondingly decreasing incentives at 7, 8, 9, and 10% respectively. An NMCS percentage of 11% or higher would earn no incentive. This award fee structure is shown graphically in the table below.

Award Fee Table							
NMCS %	5%	6%	7%	8%	9%	10%	11 % >
Award Fee Points	100	80	60	40	20	10	0

Table 2. Award Fee Table

Although the focus of outcome-based contracts is positive, through inclusion of incentives, it may be necessary to include disincentives, or remedies, when the PSI does not achieve a minimum performance requirement. Although not earning an incentive should be adequate sanction, as described above, there may be circumstances where an actual reduction in the base contract amount, vice non-earning of an incentive, will apply. Use of remedies in contracts should be rare and, as stated, will usually be suitable only for unusual, but highly mission critical, situations.
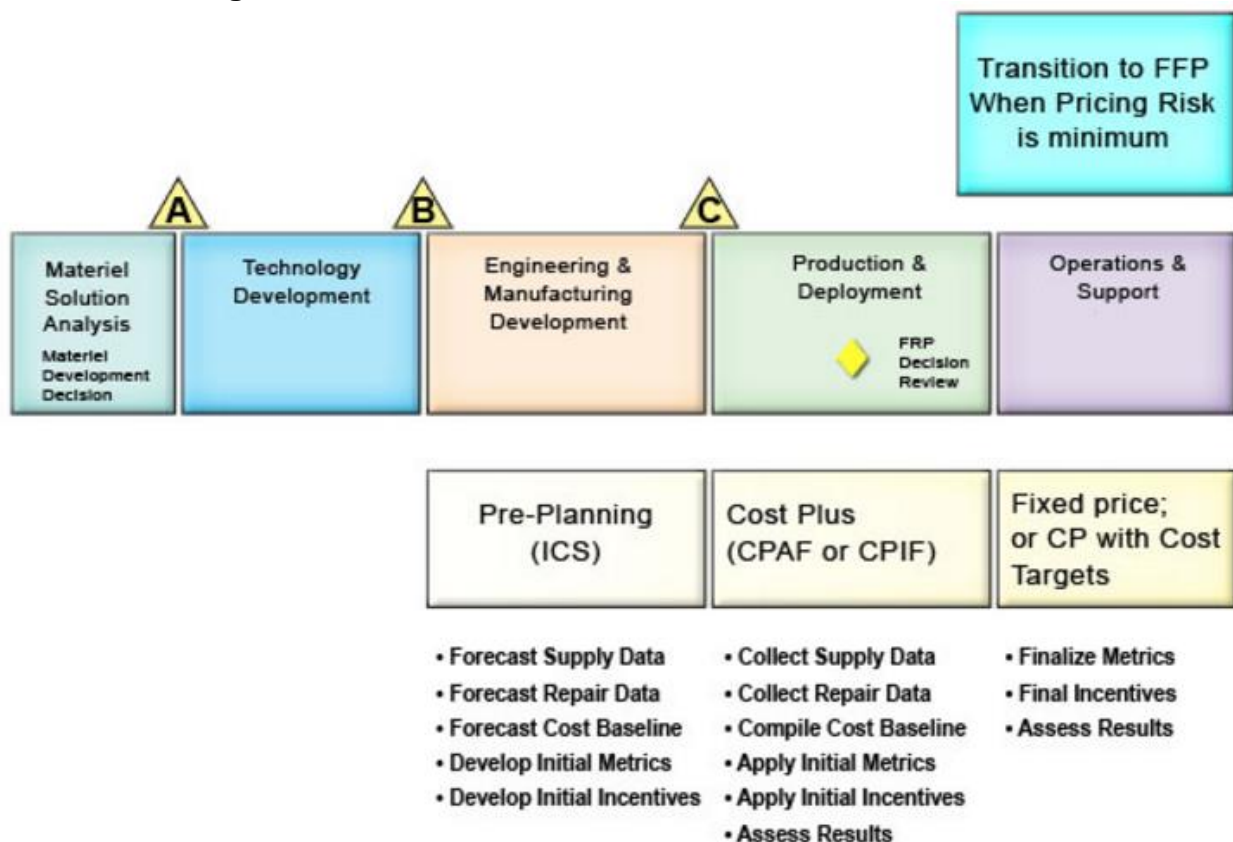
Contract Strategies

Figure 1. Notional PBL Contract Strategy

Figure 1 relates the notional contract type for a PBL Product Support Strategy to the applicable acquisition and sustainment life cycle phase. An initial CPFF contract is used for Interim Contractor Support (ICS) during the Engineering & Manufacturing Development phase in order to capture performance and cost data which will be used to improve the cost estimate accuracy and to reduce risks in subsequent contracting stages.

In the Production and Deployment phase, a Cost Plus Award Fee (CPAF) or Cost Plus Incentive Fee (CPIF) contract may be implemented to incentivize the Contractor to meet the more accurate performance and cost objective metrics.

By the Operations and Support Phase, sufficient performance and cost data has been captured to enable contracting with Industry at reduced risk with a Firm Fixed Price or Cost Plus Incentive Fee contract with cost reduction targets.

Long Term Contracting

A long-term contract is a contract issued for a period longer than one year. It may be awarded for a basic year with options for additional years (usually in one-year increments) or it may be a multi-year contract (where the base period is more than one year). It may be for a single item or service or for a group of related items or services.

In most cases a vendor quotes a single contract price based on the range and parameters set in proposed quantity range. The solicitation may request pricing separately for shipments that will go to different locations and separate prices for each option period. Whether he bases his unit price on the estimated annual demand or on the minimum or maximum quantities of the contract or delivery orders, is up to the vendor. A vendor must weigh his/her risks when quoting a long-term contract. Quoting based on

a guaranteed minimum quantity may be the safe way to not lose money but may not be competitive. On the other hand, quoting based on an assumption of the maximum contract quantity may place a burden on the vendor if and when the government only orders a small portion of that. Requirements contracts have an even greater risk, with no guaranteed quantity, but the benefits of secured sales over a period of time may be worth the risk. It is a judgment made by the vendor. Distributors, in particular, must ensure that they have long term agreements with manufacturers, so that they can provide the item at the prices quoted.

These include:

- Establishing a reliable source of supply.
- Taking advantage of modernization efforts the contractor may implement to reduce costs.
- Locking in a long-term commitment for supporting programming and budgeting requests.

Multi-Year Contracting

Multi-year contracting is a special contracting method to acquire known requirements in quantities and total cost not over planned requirements for up to 5 years unless otherwise authorized by statute, even though the total funds ultimately to be obligated may not be available at the time of contract award. This method may be used in sealed bidding or contracting by negotiation.

Multi-year contracting is a flexible contracting method applicable to a wide range of acquisitions. The extent to which cancellation terms are used in multi-year contracts will depend on the unique circumstances of each contract. Accordingly, for multi-year contracts, the agency head may authorize modification of the requirements of this subpart and the clause at 52.217-2, Cancellation Under Multi-year Contracts.

Agency funding of multi-year contracts shall conform to the policies in OMB Circulars A-11 (Preparation and Submission of Budget Estimates) and A-34 (Instructions on Budget Execution) and other applicable guidance regarding the funding of multi-year contracts. As provided by that guidance, the funds obligated for multi-year contracts must be sufficient to cover any potential cancellation and/or termination costs; and multi-year contracts for the acquisition of fixed assets should be fully funded or funded in stages that are economically or programmatically viable.

The termination for convenience procedure may apply to any Government contract, including multiyear contracts. As contrasted with cancellation, termination can be effected at any time during the life of the contract (cancellation is effected between fiscal years) and can be for the total quantity or partial quantity (where as cancellation must be for all subsequent fiscal years' quantities). For DoD, NASA, and the Coast Guard, the head of the agency may enter into a multi-year contract for supplies if:

1. The use of such a contract will result in substantial savings of the total estimated costs of carrying out the program through annual contracts;
2. The minimum need to be purchased is expected to remain substantially unchanged during the contemplated contract period in terms of production rate, procurement rate, and total quantities;
3. There is a stable design for the supplies to be acquired, and the technical risks associated with such supplies are not excessive;
4. There is a reasonable expectation that, throughout the contemplated contract period, the head of the agency will request funding for the contract at a level to avoid contract cancellation; and
5. The estimates of both the cost of the contract and the cost avoidance through the use of a multi-year contract are realistic.

Output

The output of this step is the coordinated and approved Product Support Arrangement (PSA) between the Program Manager and the Warfighter, documenting the product support to be provided by the PM over the weapon system or equipment life cycle. Individual PSAs may include arrangements with product support providers, or these may be documented as separate Product Support Arrangements. The PSA will describe expected levels of performance, resourcing arrangements, and the joint review process conducted by the PM, Warfighter, and stakeholders.

12.0 Implement and Assess

Once the product support strategy is assembled and documented, the PSM must follow-through and implement, then manage the product support. This includes documenting updates to the Life Cycle Sustainment Plan (LCSP), conducting and implementing recommendations from Logistics Assessments (LA), and maturing the Sustainment Maturity Level (SML). The execution plan includes the continuous, ongoing assessment of Product Support effectiveness through using the established governance mechanisms driving decisions and actions to review, modify, revise, or evolve product support strategies and business arrangements.

The PSM's oversight role includes developing the performance assessment plan, monitoring performance, and revising the LCSP and Product Support Package as needed. The PM also acts as the agent for the Warfighter, certifying PSI performance and approving incentive allocations. The PSM should take a hands-on approach and not assume that the PSAs will be self-regulating. Programs are required to conduct periodic post-IOC assessments of system product support strategies to determine actual versus expected levels of performance and support. These reviews occur nominally every five years after IOC or when precipitated by changes in requirements/design or by performance problems. These reviews should at a minimum assess:

- PSI performance;
- Product improvements incorporated;
- Configuration control;
- Modification of PSAs as needed based on changing Warfighter requirements or system design changes;
- Plans for conducting product support BCA(s);
- Revalidation or re-accomplishment of product support strategy BCA(s);
- Affordability and cost control of current product support strategy.

In July 2011, DoD released the "Logistics Assessment Guidebook," a powerful reference for conducting reviews. A Logistics Assessment (LA) is an analysis of a program's supportability planning. Preferably, it is conducted by an independent and impartial team of Subject Matter Experts (SMEs) not directly associated with the program being assessed. An LA is not a compliance audit, but an effective and valid assessment of the program office's product support strategy, as well as an assessment of how this product support strategy leads to successfully operating a system at an affordable cost. As part of the LA, statutory, regulatory, and Component required documentation is reviewed and assessed for

completeness and compliance prior to the milestone decision. The focus is on whether the program planning and methodology have a basis and can be successfully executed. Conducting the LA early in the program phase where the design can be influenced, and re-assessing the planning at each milestone and periodically thereafter as the design matures, is critical to fielding a sustainable system. It also provides senior decision makers critical information for making strategic trades within and across various programs, especially as today's Acquisition Category (ACAT) programs are becoming increasingly complex and integrated with other systems.

Although developing a product support strategy is a significant effort, and periodic evaluation of supportability is an important check step, the ongoing management of the product support strategy, once it has been implemented, is significant. Once the product support arrangements (e.g., contracts, memorandums) have been signed, the process of monitoring performance against the defined performance outcome metrics must be accomplished systematically, accurately, and with a constant assessment of needed revisions to the product support strategy. The PSM should review each PSI's performance against its PSA on at least a quarterly basis and use that data to prepare for the post-IOC assessments.

For Major Defense Acquisition Programs (MDAPs), data on four metrics must be reported quarterly to OSD using the Defense Acquisition Management Information Retrieval (DAMIR) system. The mandatory sustainment Key Performance Parameter (KPP) is Materiel Availability. Materiel Reliability and Ownership Cost are the two supporting mandatory sustainment Key System Attributes (KSAs). These requirements, along with Mean Down Time, align with recent Joint Staff actions and establish a single set of sustainment metrics throughout a program's life cycle.

Goals for these four materiel readiness outcomes should be established early in the materiel solution analysis and then carried through as program baseline goals until system retirement. These metrics are reported in the top right quadrant of the Sustainment Chart shown in Figure 1. Status towards these goals should be reported at Program Reviews. In addition, instructions for using the Sustainment Chart shown in Figure 1 are found in Appendix C of the Product Support Manager Guidebook – Sustainment Chart Usage Instructions. While only required for Major Defense Acquisition Programs, the Sustainment Chart provides a useful template and pathfinder for all programs.

SAMPLE PROGRAM: "ABC"

Product Support Approach

Sustainment Approach
- Current (initial CLS covering total system)
- Future (sub-system based PBL contracts)

Issues
- Shortfall in O&M funding in FYDP
- Reliability and availability estimates are below goals
- LCSP requires update before DAB

Resolution
- POM request for O&M restoration submitted
- Reliability improvement plan with clear RAM goals up for final signature
- LCSP in draft

Metric Data

Metric	XYZ Actual (Antecedent Program)	Original Goal	Current Goal	Current Estimate/ Actual*
Materiel Availability	76%	80%	77%	71%
Materiel Reliability	37 hrs	50 hrs	50.5 hrs	51 hrs
Ownership Cost	245.6B	385.5B	395.1B	395.1B
Mean Down Time	12 hrs	20 hrs	18 hrs	15 hrs

* Test or fielding event data derived from _____

Notes:

Sustainment Schedule

MS B MS C IOC FRP FOC Sustainment

BCA BCA BCA BCA
LCSP PBL Recompete
LRIP Contract Award Avionics PBL
CLS Start PBL Recompete
Depot Standup
Blended Partnership Standup

O&S Data

Cost Element	XYZ Cost	ABC Original Baseline	ABC Current Cost
1.0 Unit-Level Manpower	3.952	5.144	5.750
2.0 Unit Operations	6.052	6.851	6.852
3.0 Maintenance	0.739	0.605	0.688
4.0 Sustaining Support	2.298	2.401	2.401
5.0 Continuing System Improvements	0.129	0.025	0.035
6.0 Indirect Support	1.846	1.925	1.956
Total	15.046	16.951	17.682

Cost based on average annual cost per squadron

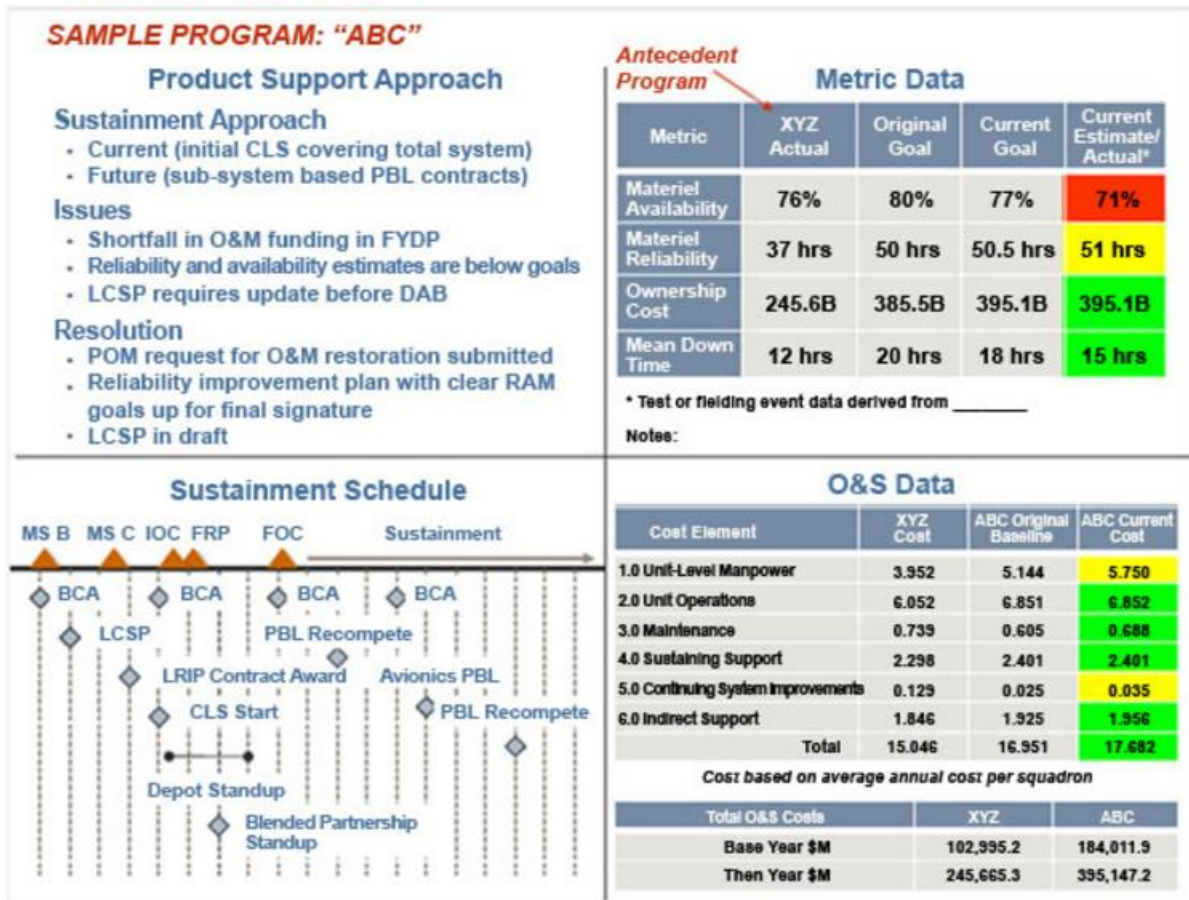| Total O&S Costs	XYZ	ABC
Base Year $M	102,995.2	184,011.9
Then Year $M	245,665.3	395,147.2

Figure 1. The "Sustainment Chart" provides a ready reference for executive decision makers to use when reviewing a program's product support organization, and is mandatory at all programmatic reviews.
Source: DoD Product Support Manager Guidebook

Another oversight tool available to support monitoring Life Cycle Sustainment Plans is Earned Value Management. Earned value is a management technique that relates resource planning to schedules and to technical cost and schedule requirements. All work is planned, budgeted, and scheduled in time-phased "planned value" increments constituting a cost and schedule measurement baseline. There are two major objectives of an earned value system: to encourage contractors to use effective internal cost and schedule management control systems and to permit the customer to be able to rely on timely data produced by those systems for determining product-oriented contract status. EVMS can serve as a useful tool between Logistics Assessments and Milestone Reviews, in parallel with the oversight system erected for the execution of the Life Cycle Sustainment Plan, but it does not replace the need for oversight specifically implemented over Product Support.

The Product Support Integrator serves an important role in execution of a Life Cycle Sustainment Plan. The Product Support Integrator (PSI) role is assigned within the scope, direction, and oversight of the PSM. Note that the PSI is assigned at the discretion of the PSM; not all programs will require a PSI. PSIs accomplish their product support role through use of one or more Product Support Providers (PSP). The PSI is responsible for performing oversight of the Product Support Providers falling under the PSI's defined scope.

Product support integrators are responsible for the activities and output of one or more product support providers within a specific product support element or across product support elements. There may be a

system-level PSI that manages subsystem level PSIs. A PSI may also perform the function of a product support provider. A PSI may be either a government or commercial entity.

For a commercial contractor, the contractual metrics and incentives are their lifeblood; they will make the difference between earning a reasonable profit and little or possibly no profit from the contract. For the organic product support provider, although there is no "profit" involved, there should be a comparable performance plan. Accordingly, for both commercial sources of support, it is critical to develop and include a comprehensive and detailed performance assessment plan. This plan must include, at minimum, the following information:

- The metrics to which the contractor will be held responsible (e.g., performance and support outcomes, such as system availability, reliability, process performance, etc.).
- The weighting (if used), prioritization, and range of metric values used to determine earning of contractual incentives.
- The identification of the source of the data from which the metrics will be calculated, how frequently the data will be collected and calculated, how the metric values will be calculated, the period of performance assessment upon which incentive evaluations will be made, who will collect, compile, calculate, and assess the metrics, and how disputes over assessment data will be resolved.

As with all major DoD processes, things change over time. Operations Tempo (OPTEMPO) changes, flying hour requirements change, training requirements change, funding priorities change, the list goes on. The Program Manager, responsible for life cycle management of the system, through the PSM must continually monitor, oversee, and manage the product support strategy cognizant of these external change factors and adjust the strategy as necessary to ensure full coordination between the resource priorities, Warfighter performance objectives, and the sustainment process.

Implementation and Assessment must start and end with the Warfighter's objectives, closing the loop with management processes to ensure that product support remains on track:

- Ruthlessly separate needs from appetites;
- Understand portfolio of alternatives;
- Tie metrics directly to Warfighter outcomes.

While recognizing fiscal realities and efficiencies demanded in the resource-constrained environment we live in, the PSM can never lose sight of the Warfighter. As General Petraeus so eloquently said, we can "never lose sight of who the ultimate customer is."

To support the Warfighter, the PSM and the Life Cycle Logistician must demonstrate and enforce a Life Cycle Focus:

- Govern sustainment as part of the life cycle;
- Design for sustainability, and integrate acquire-to-retire processes;
- Manage predictable costs throughout the life cycle;
- Integrate human capital planning into life cycle focus.

DoD life cycle management is not new. "Cradle-to-grave," "concept-to-disposal," "acquire-to-retire" thinking has been a foundational principle going back more than a half a century. Designing for support, integration of acquisition and sustainment, investing in long-term product support, and assigning Product Support Managers as life cycle product support managers are foundational tenets.

In the dynamic DoD environment, change is constant, but core principles guide us. It requires a vigilant, proactive Program Support Manager to ensure that the product support strategy consistently optimizes weapon system operational readiness consistent with DoD priorities.

Output
The output of this step is a documented plan for accomplishing PSM oversight of Product Support for the projected life cycle of the weapon system or equipment. The plan should include methods and a schedule

for reviewing and updating the resourcing plan, roles, and responsibilities for collection, processing, analysis, and management reporting of performance data. The plan should also include a description of the milestones and a formal performance review and issue/dispute resolution process.