



Product Support Business Case Analysis Guidebook



FOREWORD

I am pleased to release the Department of Defense (DoD) *Product Support Business Case Analysis (PS BCA) Guidebook*, which updates guidance published in 2014. A PS BCA is 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. I highly recommend the use of this guidebook to assist in executing the PS BCA process to develop executable and defensible recommendations for the Product Support Strategy (PSS).

The original DoD BCA guidebook, like many of our other Product Support guidebooks, was developed and released by my office in response to the DoD Weapon System Acquisition Reform Product Support Assessment and the 2010 “*Better Buying Power*” initiative, which focused on improved governance, affordability, and controlling cost growth. Since that time, product support statute, policy, and guidance have undergone significant changes. These include updates to Title 10, United States Code; publication of DoD Instruction 5000.91, *Product Support Management for the Adaptive Acquisition Framework*; establishment of the requirement for Sustainment Reviews; revision of the *DoD Product Support Manager (PSM) Guidebook*, the *DoD Performance Based Logistics (PBL) Guidebook*, *DoD Life Cycle Sustainment Plan (LCSP) Outline Version 3.0*, and the *DoD Independent Logistics Assessment (ILA) Guidebook*.

To better assist the PSM, this guidebook provides expanded guidance on how to meet the revalidation requirements within statute and policy. Also, this guidebook updates descriptions of impacts to sustainment planning within the Regional Sustainment Framework (RSF), including operations in contested logistics environments.

This guidebook is a living document that will continue to be updated based upon policy changes, lessons learned, and best practices. It provides overall guidance for conducting a PS BCA and should be used in conjunction with other analytical tools. Component and agency PS BCA guidance can be further tailored to meet the unique requirements of the weapon system.

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SMITH.LISA.P [REDACTED]
[REDACTED]
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Lisa P. Smith
Deputy Assistant Secretary of Defense for Product Support
Office of the Under Secretary of Defense for Acquisition and Sustainment
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PS BCA Guidebook – June 2024

For questions regarding this guidebook, please consult your Component or Agency product support functional office. Recommendations for updates to this guidebook may be sent to:

The Office of the Deputy Assistant Secretary of Defense for Product Support
3500 Defense Pentagon
Room 5E621
Washington, D.C. 20301-3500
Office Phone: (703) 614-6082
E-mail: osd.pentagon.ousd-a-s.mbx.dasd-product-support@mail.mil

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Record of Changes

Date		Rationale for Change
2011	Version 0	
2014	Version 1	The guidebook was updated in March 2014 deleting Appendix C and editing content to reflect current law, DoD instructions, and Better Buying Power 2.0.
2024	Version 2	<ol style="list-style-type: none">1. The guidebook has been revised to illustrate the process steps of conducting a PS BCA.2. Provides more information on structure of a PS BCA report.3. Updated to reflect current law and DoD Instructions.4. Removed Appendix D, Analytical Tools, which contained a listing of various models used by DoD to assist in analysis of programs. The guidebook now directs readers to the <i>Defense Acquisition University (DAU) Product Support Analytical Tools Database</i>" at https://www.dau.edu/tools/product-support-analytical-tools-database to better reflect current models.5. This edition also includes guidance on revalidation of PS BCAs with the addition of appendices on revalidation considerations; and Frequently Asked Questions (FAQ).

INTRODUCTION

This guidebook is for Component Leadership, Program Executive Officers (PEOs), Program Managers (PM), Product Support Managers (PSM), Logistics Managers, Contracting Officers, Financial Managers, System Engineers, and other parties responsible for developing and executing Product Support Strategies (PSS). It has been updated to incorporate changes in statute, policy, and guidance since the last update in 2014. The guidebook follows the same format as other Product Support guidebooks, e.g., the DoD Performance Based Logistics (PBL) Guidebook and DoD Independent Logistics Assessment (ILA) Guidebook. It has step-by-step instructions on how to execute a successful PS BCA including analytical processes, methods, and documentation of findings and recommendations to guide decision makers when instituting a PSS.

How to Use This Document

The guidebook is divided into seven sections, each with various subsections. Section One provides background information on completing a successful PS BCA. Section Two addresses the statute and policy that guides execution of the PS BCA process, including the initial PS BCA and subsequent revalidations. Sections Three through Five contain the 16 steps comprising the PS BCA process. Sources of more information are provided in Section Six and Acronyms and Glossary are included in Section Seven. There are also four appendices which include information on revalidating the PS BCA, developing a Charter, frequently asked questions, and a sample memorandum to document a PS BCA revalidation. The PS BCA process is organized into three phases:

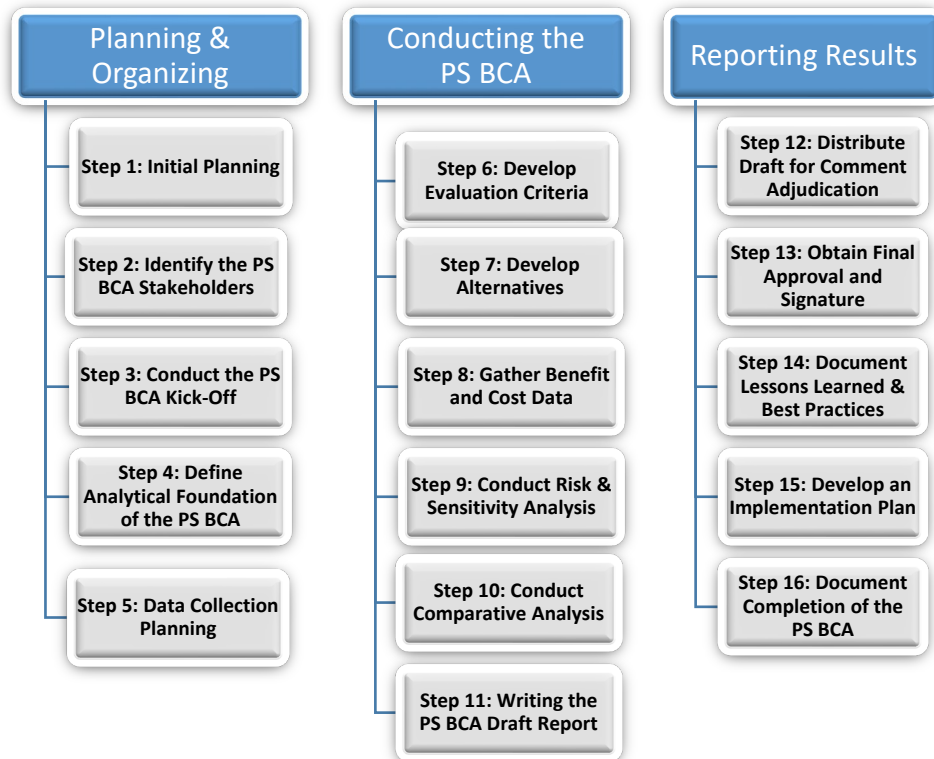
Planning & Organizing the PS BCA Process: Provides the background, key personnel, roles, responsibilities, and data management involved in conducting a PS BCA.

Conducting the PS BCA: Provides the method of preparing a PS BCA, including analyzing cost-benefit data, conducting risk and sensitivity analysis, comparing potential alternatives, and writing the PS BCA report with a recommended course of action.

Reporting Results and Implementation of the PS BCA: Provides a method for obtaining final approval for the PS BCA recommended course of action, collecting lessons learned, and developing an implementation plan.

The following process flow (Figure 0-1, below) provides a visual representation of the general steps within each section that are necessary to complete a Product Support BCA. The *PS BCA Guidebook* follows this structure, from initial planning through publishing of the PS BCA. While this graphic is provided for illustrative purposes, tailoring of the process may occur to meet the needs of the stakeholders and sponsor.

Figure 0-1: PS BCA Process Flow



1 BACKGROUND

1.1 What is a Product Support Business Case Analysis?

A PS BCA uses a structured methodology that aids decision making by identifying and comparing possible PSS alternatives. The PS BCA process includes a careful analysis of the mission and business impacts (both financial and non-financial), including risk and sensitivity impacts, to inform a program's Life Cycle Sustainment Plan (LCSP). A PS BCA may be somewhat different from other decision support analyses because it emphasizes the enterprise-wide perspective of stakeholders and decision makers, and it assesses the holistic effects impacted by the decision. Other names for a PS BCA are Economic Analysis, Cost-Benefit Analysis, and Benefit/Cost Analysis. The PS BCA process culminates in a PS BCA Report, which - once approved - is included as an annex in the program's LCSP.

PS BCAs are completed and revalidated throughout the life cycle. The data, factors, alternatives, and focus of the PS BCA will evolve consistent with the point at which the analysis is performed within the life cycle.

1.2 Purpose of the PS BCA

A PS BCA does not replace the judgment of a decision maker. The PS BCA provides an analytic, standardized, and objective foundation upon which credible decisions can be made. The PS BCA should be a comprehensive, fair, and accurate comparison when evaluating multiple alternatives and it should consider broad Department-wide impacts and context throughout the analysis.

The primary goal of the PS BCA is to analyze and determine the best value Product Support Strategy (PSS) of the system at the notional, projected, or known, work breakdown structure (WBS) level¹. Once the system is analyzed at the WBS level, the PM can then consider broader Department wide impacts and context throughout the analysis. The PSM prepares a PS BCA, often based on analogous system data, to inform designing for supportability after understanding past performance (e.g., system's actual performance of the integrated product support (IPS) elements, root causes to cost drivers, technical data, software, and license rights impacts, lessons learned) during program development. This analysis helps the PSM integrated product team (IPT) drive a best value maintenance concept, supply support concept, modular open systems approach (MOSA) and supplemental supply support and maintenance concepts in a contested logistics environment.

All these considerations may impact the intellectual property (IP) strategy and should be weighed against risk of achieving cost, schedule, and performance goals of the weapon system. This is done to ensure affordability during the competitive phase, or ensure these factors are incorporated into competition when a legacy system's affordability and readiness is being negatively impacted. PS BCAs inform courses of action that support innovative, flexible, and agile product support strategies.

A PS BCA aids the PSM and the decision maker - who may be the PM, PEO, Service Acquisition Executive (SAE), or other Milestone Decision Authority (MDA), as applicable, in making an informed PSS decision. The PS BCA should be tailored to inform the decision maker of costs, benefits, and risk implications of the alternative strategies being considered and it

¹ See [LCSP Outline 3.0](#), Figure 2-2.

should reflect the proper level of analysis needed to provide a fair assessment of the proposed alternatives. The analysis also:

- Identifies the PSS that achieves optimal balance between warfighter capabilities and affordability.
- Frames how the system will be supported across the Integrated Product Support (IPS) elements.
- Aids in decision making by identifying and comparing alternatives.
- Examines financial and non-financial mission and business impacts, risks and sensitivities which may include operating in a contested logistics environment, distributed network, or working within a regional sustainment framework.

The PS BCA process concludes with a recommendation and implementation plan to achieve system and/or organizational objectives and desired outcomes. One principal application of this guidebook is to help the PSM in identifying the PSS that achieves the optimal balance between Warfighter capabilities and affordability.

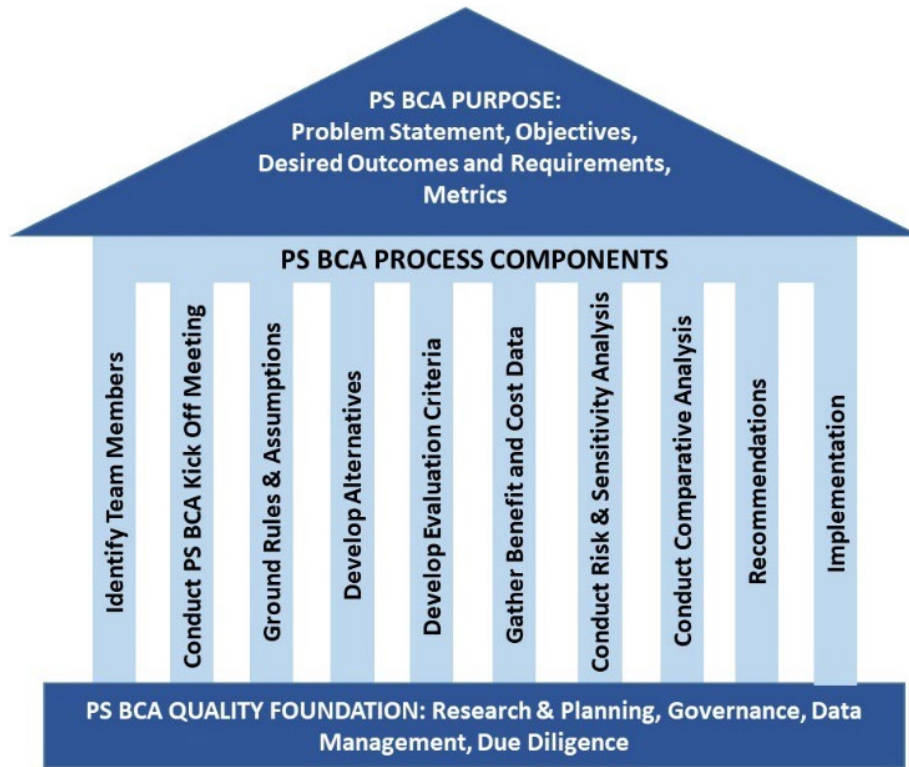
1.3 Elements of a Successful PS BCA

A successful PS BCA has three major elements: (1) a clearly identified purpose, (2) detailed process elements, which are further elaborated in the PS BCA process steps and (3) a quality foundation comprising governance, data (to include measurement against the prior PS BCA baseline²), and planning (see Figure 1-1).

The PS BCA begins with identification of the problem statement, objectives, and metrics; these should clearly annotate what issue the PS BCA is attempting to solve and how success will be measured. The PS BCA process elements are those subsections of the PS BCA that directly execute and report on analytical actions. The PS BCA supporting foundation should reflect the quality and completeness of the analysis which includes background research, proper planning, governance, and data management. Such control provides a foundation for critical thinking and analysis throughout the process. It is important to establish a strong foundation – with effective governance and oversight – to ensure the PS BCA maintains an enterprise-wide context that will guide the analysis. These three elements work together to ensure the PS BCA targets the relevant subject matter, credibly analyzes and reports the results, and integrates into the organization’s mission and vision.

² The term baseline as used in this guidebook is the *As-Is* state of the PSS.

Figure 1-1: Elements of a Successful PS BCA Process



2 OVERVIEW OF PS BCA GUIDANCE

2.1 Statute and Policy

PSM responsibility to conduct cost-benefit analyses for covered systems is spelled out in Section 4324(c)(2)(C) of Title 10, United States Code.

Product Support Managers “conduct appropriate cost analyses to validate the product support strategy and life cycle sustainment plan, including cost-benefit analyses as outlined in Office of Management and Budget (OMB) Circular A-94.”

And in DoD Instruction 5000.91 4.3(d), for covered and non-covered systems.

“The PSM will conduct a PS BCA to assess courses of action being considered and document the recommended course of action in the LCSP that achieves readiness goals, manages risks, and is cost-effective. The PSM will collaborate with users, systems engineers, cost analysts, and other stakeholders to develop risks and assumptions unique to the systems.”

Table 2-1 gives an overview of applicability of the PS BCA requirement by Acquisition Category (ACAT) level aligned to statute and policy.

Table 2-1: PS BCA Applicability by ACAT Level

ACAT Level	Covered System*	Description	PS BCA Authority	Signatory	PS BCA Timeframe Requirement
ACAT I	Yes	See DoDI 5000.85, Major Capability Acquisition	Statutory; 10 U.S.C. § 4324(c)(2)(c) and Regulatory: DoDI 5000.91 4.3(d)	Designated by Component	At Milestone A: (Regulatory) For covered systems DoDI 5000.91, 4.3(a) requires a PSS documented within the LCSP and DoDI 5000.91 4.3 (b)(1) states the LCSP must include results of the PS BCA. (Include the report as a required Annex.) Prior to MS B and C approval: (Statutory) 10 U.S.C § 4324(b)(1); programs must have an approved LCSP, and (Regulatory) DoDI 5000.91 4.3 (b)(1); the LCSP must include results of the PS BCA. (Include the report as a required Annex.) Post IOC: Revalidate the PS BCA in conjunction with Sustainment Reviews and update the LCSP. (Include the report as a required Annex.)
ACAT II/III	No	Does not meet ACAT I criteria.	Regulatory; DoDI 5000.91 4.3(d)	Designated by Component	Regulatory; DoDI 5000.91, 4.3(c)(10), for those programs with a tailored LCSP; include results of the PS BCA in the LCSP. (Include the report as a required Annex.)
Non ACAT programs	No	See Pathway Descriptions in this Guidebook with appropriate policy references. Middle Tier Acquisition (MTA) follow appropriate ACAT Category.	N/A		See Pathway Specific Guidance
Notes:	*Covered System:	A Major Defense Acquisition Program (MDAP) as defined in Title 10 United States Code USC) 4201 (previously 2430) or an acquisition program or project that is carried out using the MTA acquisition pathway that meets the ACAT I threshold.			
	Non-Covered System:	Any system not meeting the definition of a covered system; generally, ACAT II and below			

2.2 The Adaptive Acquisition Framework (AAF)

Table 2-2 includes added, specific guidance for all pathways within the AAF. The scope and complexity of PS BCAs will vary across acquisition pathways. DoDI 5000.91 includes guidance for AAF programs that are transitioning between pathways or to Programs of Record (PoR) - such as an Urgent Capability Acquisition (UCA) transitioning to a PoR – who will need to complete a PS BCA. Consult service specific regulations for PS BCA requirements by AAF pathway.

Table 2-2: General Guidance for PS BCAs within the AAF³

Urgent Capability Acquisition (UCA)	Not required until the disposition official recommends transition to a PoR (DoDI 5000.91, para 5.2b). Refer to DoDI 5000.81 4/5e(3)(c) for more information on transitioning to a PoR.
Middle Tier of Acquisition (MTA)	PS BCA is a derived requirement as annex to Major Weapon System LCSPs (ACAT 1 Covered Systems), required for entrance to Rapid Fielding. Refer to DoDI 5000.80, Table 1, DoDI 5000.91 para 6.3c(1), and Section 4324 of Title 10, United States Code for covered systems. For MTAs that are covered systems, re-validate the PS BCA in coordination with the Sustainment Review.
Software	Not required for stand-alone software programs, which conduct annual value assessments. The value assessments are required to maintain Continuous Monitoring (ConMon) Authority to Operate (cATO) (as appropriate). Refer to DoDI 5000.87, 3.1e and 3.3b(12).
Defense Business Systems (DBS)	Not required. A <i>business case</i> is highly recommended for the tailored business system acquisition strategy. Refer to DoDI 5000.75, Appendix 4B.2i(1).
Services	Not required. A <i>business case</i> is required for acquisition of \$50M or more that may significantly overlap with the requirements of an existing contract. Refer to DoDI 5000.74 Section 3.3d(9).

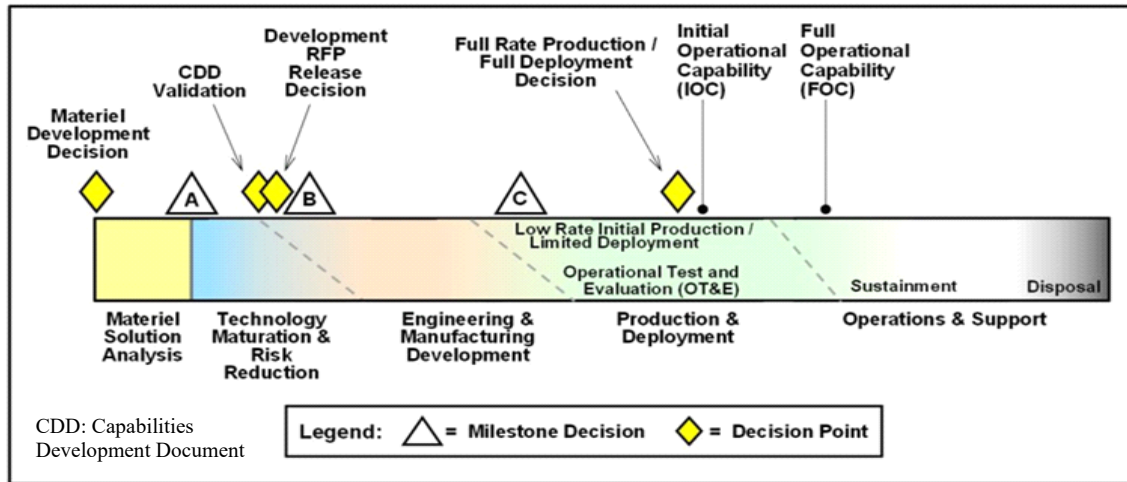
2.3 Timing

The PSM will conduct a PS BCA to assess courses of action being considered and then document (within the LCSP) the recommended course of action that achieves readiness goals, manages risks, and is cost-effective. (Refer to DoDI 5000.91 para 4.3d.). The PS BCA report and any revalidation documentation should be included as an Annex in the LCSP.

The PS BCA frames the program’s alternatives or courses of action for implementing the PSS, which is expanded upon and further defined and documented in the LCSP. At milestone decisions, or at least once every five years, an assessment should be made that validates the program has not changed enough to warrant a PSS change. A general timeline of PS BCA activities, using the MCA pathway as an example, is included in Figure 2-1.

³See DoDI 5000.02, Operation of the Adaptive Acquisition Framework, for more information.

Figure 2-1: PS BCA Timing Chart



Milestone A and B	Milestone C	Post Milestone C and O&S
<ul style="list-style-type: none"> • Conduct the PS BCA and scope the PS Strategy. • Develop a proposed methodology. • Develop a strategy to acquire necessary rights and the delivery of technical data, computer software, and software documentation. • Ensure the information and data needed is being requested and will be available. • Develop the Implementation Plan and Communication Plan for the selected alternative. 	<ul style="list-style-type: none"> • Conduct or revalidate the PS BCA in support of the MS decision. • Determine the <i>best value</i> of the support alternatives to address each PS element. • Update the Life Cycle Cost Estimate (LCCE). • Develop the Implementation Plan and Communication Plan for the approved alternative, as needed. 	<ul style="list-style-type: none"> • Conduct PS BCA Revalidation (see Para 2.4). • Compare predicted outcomes with actual outcomes. • Collect lessons learned. • Validate recommendations.

The decision to initiate the PS BCA process and the level of detail required will be unique to each program and at the discretion of the Services/Components. Some suggested considerations to guide the PS BCA process during each milestone within the program’s life include:

- **Early Life Cycle and Pre Milestone A:** An early life cycle phase PS BCA, such as the MCA pathway’s Milestone A, is often constrained by the lack of real-world performance, supportability (reliability, availability, and maintainability), and cost data, making it highly reliant on analogous data, if available.
- **Pre Milestone B:** A MS B PS BCA will utilize the same format and section content as subsequent PS BCAs but will likely contain much less detail and include data from like or similar systems that will be replaced with actual system, subsystem, or component supportability data, as appropriate, as it becomes available. Each iterative PS BCA update

or revalidation will improve the ability of the PSM to identify and compare viable product support strategies.

- **Pre Milestone C:** A MS C PS BCA, with the inclusion of requisite test and evaluation data, cost data, and applicable risks, will begin to identify the viable sourcing and support alternatives. This more robust PS BCA should enable an analysis of sustainment alternatives sufficient to develop and implement the scope of the PSS and the identification of the key performance and supportability outcomes. The PS BCA supports identifying best value workload sourcing decisions can be implemented.
- **Post Initial Operational Capability (IOC):** For covered systems, when in sustainment, post IOC, DoDI 5000.91 para 7.2b(2): states “...The Sustainment Review (SR) will be conducted in conjunction with *revalidating the PS BCA* and updating the LCSP.” The PSM should ensure the findings and recommendations from the PS BCA are captured in the LCSP PSS.

There is a linkage between the PS BCA and updates to the LCSP. When revalidating the PS BCA, the PSM should assess whether the LCSP needs update. For MCA programs, “the LCSP will be updated at each milestone, full rate production decision, and prior to each change in the PSS, or every five years.” (5000.91 para 7.1c). LCSPs for covered and non-covered systems include results of the PS BCA (5000.91 para 4.3b(4) and 4.3c(10)).

Note: If the recommendations from the PS BCA are not implemented, provide amplifying information in the program LCSP to explain the rationale behind the decision not to implement or factors inhibiting implementation.

2.4 Revalidation of the PS BCA

A revalidation of the PS BCA is defined as the process to re-evaluate the ground rules and assumptions (GR&A), performance of the PSS, and any other attributes of the system such as a change to concepts of operation (CONOPS) or support strategy to confirm the continued soundness and acceptability of the previously approved PSS. Acceptability is defined as being capable of meeting the performance and cost metrics in the program’s requirements documents. Document the output of the revalidation process as described in Appendix A of this guidebook.

PSMs are to revalidate the PS BCA per Section 4324(c)(2)(G) of Title 10, United States Code:

“[P]rior to each change in the product support strategy or every five years, whichever occurs first, revalidate any business-case analysis performed in support of the product support strategy.”

And DoDI 5000.91 para 4.5b:

“The PM and PSM will revalidate the PS BCA based on changes (to systems, hardware or software, constraints, and operational environment) or every five years, whichever occurs first.”

The revalidation analysis examines the actual results versus the planned or estimated results and includes four primary categories of information: operations, cost, performance, and funding. To improve a PSS that is not meeting performance or cost objectives, the analysis will substantiate

changes that may require significant investment in government personnel, facilities, and data rights. The analysis may also inform recommendations for more modest adjustments to the PSS, such as moving from a transactional approach Product Support Arrangement (PSA) to Performance-Based Logistics approach for a specific sub-system or component.

In addition to the 5-year statutory requirement, each of the following conditions could trigger a revalidation:

- There is a major hardware upgrade such as moving to a new technology or software update such as replacing a legacy network with a new network that covers a variety of systems.
- A legacy system is reaching the end of its life cycle, and units are being retired. The smaller group of units doesn't warrant a full PBL, and new PSS is required that may be more transactional in nature.
- The supported system is not meeting Key Performance Parameters (KPPs) or is breaching the Operating and Support (O&S) cost targets defined in the Capabilities Development Document (CDD). For instance, the cost element for maintenance is causing an escalation in overall O&S costs and a new solution found that is more cost effective.
- The Operational Environment is changing, and more sustainment options are available for consideration. These sustainment options may include close collaboration with international partners and allies and partnering with the collective defense industry to better align commercial capabilities with Defense sustainment needs.

Revalidation Enablers

Revalidation of PS BCAs can be facilitated by two key enablers established during the initial or previous PS BCA.

The first is a vetted, working version of the cost model (e.g., spreadsheet, simulation, or database). Vetting should be accomplished by the program office and command cost teams, and where applicable, cost agency experts as part of the PS BCA coordination process. If the PS BCA cost model is developed by a support contractor or another PS BCA provider (e.g., Navy Price Fighters), the program office should arrange for delivery of the model at the conclusion of the PS BCA along with documentation of or a database that includes a comprehensive listing of supporting data and sources.

The second enabler is a vetted, working copy of any other analyses that informed selection of the PSS. This could include a Discrete Event Simulation such as the Air Force's Logistics Composite Analysis Toolkit (LCOM-ATK) or the Army's Logistics Simulation (LogSIM) capability. These simulations allow PSMs to adjust various factors that may change over time to "dial in" the optimum strategy, to include aspects such as level of repair, commercial vs. organic repair, repair turnaround times, manpower levels, etc. Center-level Subject Matter Experts (SMEs) facilitate execution of these simulations, and as with the cost model, the program office should arrange delivery of the final vetted, working copy of the data set or database for the simulation.

A PSM armed with these two enablers is well-postured to execute an efficient revalidation of the previous PS BCA by assembling an Integrated Product Team to identify and collect data on which factors have changed and then "re-run" the simulation (if applicable) and cost model with the new data.

Important Note:

Revalidating” is not the same as “redoing.” It may only involve confirming that the:

- PS BCA ground rules and assumptions are still valid,
- the system CONOPS hasn’t changed,
- the PS metrics thresholds are being met,
- the most recent Product Support Analyses performed (e.g., Level of Repair Analysis (LORA), Depot Source of Repair (DSOR), Trade Studies) still supports the PSS.

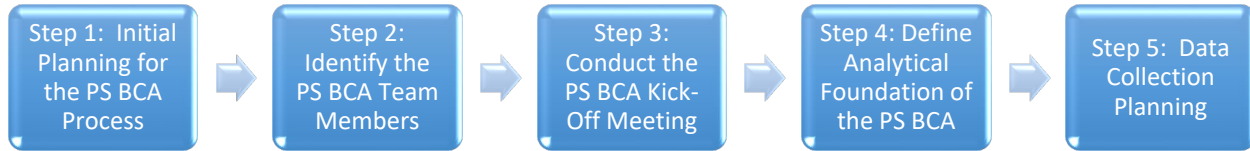
If so, much of the revalidation is complete. If any of those statements are untrue, then a more in-depth analysis may be needed for the changed areas. Performing another PS BCA to the same degree as the original wouldn’t be needed unless circumstances have changed so dramatically that it has become completely obsolete.

See Appendix A for more information that can help illustrate how to approach the revalidation of a PS BCA.

3 PLANNING AND ORGANIZING

The objective of this section is to ensure the required preparation takes place in sufficient time to properly execute the PS BCA process.

Figure 3-1: PS BCA Process Steps 1-5



3.1 Step One: Initial Planning for the PS BCA Process

In the early part of the PS BCA process, there is a critical need for proper planning, which includes research and analysis in preparation for the PS BCA execution. The PSM, supported by the PS BCA core team, should begin the planning effort including the initial timeline, scope, and identification of the key stakeholders. After this initial planning is complete, but before beginning the PS BCA, the PSM and core team should meet with all the necessary stakeholders and SMEs. During this initial meeting, the core team should establish the intended outcomes, constraints, and methodology for conducting the PS BCA. Consulting with the right stakeholders from the beginning is critical to the success of the PS BCA process and outcome.

The core team should begin researching potential courses of action to help guide initial decision making. The core team should gather data, interview SMEs, examine previous iterations of the PS BCA (if applicable), and collect other documentation as needed throughout the analysis. This effort should emphasize the relationship between the product support decision and the capabilities, objectives, potential impacts, and possible repercussions across the enterprise.

3.2 Step Two: Identify the PS BCA Team Members

Developing an effective, defensible, data-driven PS BCA is a team effort undertaken by experienced participants across a wide range of specialties. Many PS BCAs have an expert analyst as the team lead specific to the effort. This does not relieve the PSM of his/her statutory and regulatory responsibilities. Each position identified in this section should be filled by highly competent and dedicated personnel who are given the resources and time to fully and properly perform the tasks required. From the initial stages of accomplishing the background research and gathering the data, through the final stages of staffing a PS BCA for senior Department decision makers, conducting a PS BCA requires significant effort by all those involved.

To ensure the accuracy of analyses and viability of the resulting recommendations, all PS BCA team members and stakeholders should understand their roles and responsibilities related to executing the PS BCA. Table 3-1 describes the roles and responsibilities of the individuals that may be involved throughout the PS BCA process. The levels of involvement will vary according to the type of PS BCA being conducted, the stage of the PS BCA process, and the organization.

The PSM is responsible for overseeing the PS BCA process, leading the PS BCA team, and briefing results. A contractor can be part of the PS BCA team, with a primary focus on facilitation, to include data gathering and developing the initial analysis. To avoid a potential conflict of interest, contractors supporting a PS BCA should not be associated with potential product support providers (PSPs) or product support integrators (PSIs).

Table 3-1: Roles and Responsibilities

Function/Role	Responsibility Description
Warfighter	Impacts on the Warfighter are the primary considerations of the PS BCA. As the user of the weapon system, the Warfighter is typically the ultimate beneficiary of the PS BCA. The Warfighter provides the performance requirements for the weapon system which are ultimately considered for the support strategy. The Warfighter establishes the CONOPS and provides feedback on the support strategy.
Sponsor	The sponsor is the primary decision maker. Depending on the size, scope, and sensitivity of the decision, the sponsor may be the MDA or another designated Component official. The sponsor uses PS BCA recommendations and findings to assist in decision making. The sponsor may help identify and agree to the uses of assumptions, constraints, and other metrics, most notably the weighting of factors' importance.
PSM	The PSM, working for the PM, is responsible for the planning, implementation, and execution of the PS BCA. This includes leading the team that is conducting and writing the sections of the PS BCA. These roles are also defined by statute, policy, and guidance. ⁴ The PSM estimates the cost of conducting a PS BCA and obtains the necessary resources. To avoid a biased analysis the PSM should employ an objective, data-driven team to execute the analysis and provide the PS BCA recommendations. The PSM should ensure objectivity by maximizing structured analysis in a transparent manner.
PM	The PM prepares programs for key decisions and executes approved acquisition and product support strategies. The PM is accountable to the Sponsor and the Warfighter. The PM maintains cognizance over the PS BCA process, participates in periodic updates, and elevates or removes obstacles at his/her level, but typically delegates day-to-day management to the PSM.
Governance Body/ Approval Authorities	Approval authorities provide directional guidance and concurrence throughout the PS BCA process on such matters as the problem statement, assumptions, constraints, data sources, risk mitigation strategies, courses of action (COAs) to be analyzed and weighting and scoring. The governance body has the responsibility to ensure that the PS BCA strategy integrates an enterprise-wide perspective. Normally, the organizational level and membership of the governance board is determined by the impacts of the decisions being made and the PM's chain of command and may be pre-determined by center or command-level policy or guidance.
Business Analyst (Financial, Cost, and Budget analyst)	The business analyst has the analytical training and skills to support the PS BCA with regards to cost analysis, to include building the cost model and cost comparison. This includes development of the financial/cost analysis section and the analytical methodology for the PS BCA. The government budget

⁴ Statute: Section 4324 of Title 10 United States Code. Policy: DoDI 5000.91. Guidance: Section 2 of the PSM Guidebook, PSBM, Roles and Responsibilities, Product Support Arrangements, and PSS and Implementation

	analyst conducts and reviews the funding analysis and builds the budget plan according to the recommended PS BCA approach. The Business Analyst also coordinated cost model review with higher-level cost organizations, such as center, command, Service, and/or Office of the Secretary of Defense (OSD Cost Assessment and Program Evaluation (CAPE) as applicable.
Logistician (Supportability Manager)	The logistician is responsible for ensuring the sustainment strategy, requirements, and performance measures are addressed in the PS BCA. Additionally, this person is responsible for completing the mission impact section, including assisting with non-financial analysis of the PS BCA.
Systems Engineering and Engineering Disciplines	Systems engineers, typically supported by reliability & maintainability engineers, system safety and environmental safety and occupational health engineers, and human systems integrators validate that the alternatives are considering operationally suitable requirements which are technically feasible to achieve optimal total system performance at minimal life cycle cost.
PSI/PSP	The PSI and PSP may provide subject matter expertise, data, and consultation with regards to the attributes of the product support strategies and alternatives being explored in the PS BCA. The PSI performs as a formally bound agent (e.g., contract, Memorandum of Agreement, Memorandum of Understanding) charged with integrating all sources of support, public and private, defined within the scope of PSAs to achieve the documented outcomes. ⁵ The PSI, PSP, or potential PSI(s)/PSP(s) should not be involved in establishing scoring criteria, weighting, or decision meeting regarding the PS BCA.
PS BCA Data Manager	The PS BCA data manager is responsible for maintaining and keeping historical records of past PS BCAs and is responsible for maintaining a repository or database of requested and provided data to serve as an audit trail for analysis. These records include research, performance outcomes, cost estimates and methodology, and sources of data. Historical records maintenance is critical to future analysis, variance analysis, and future iterations of the PS BCA.
Legal and Contracts	The legal and contracting officers and managers review the PS BCA as an advisor concerning IP considerations, compliance, existing contracts, pertinent laws and regulations.
Subject Matter Experts (SMEs)	SMEs are recognized experts in the specialized knowledge applicable to the analysis and preparation of the PS BCA elements (e.g., cost estimation, system requirements, risk analysis, etc.) This includes other relevant stakeholders that provide inputs to and impacts on the PS BCA analysis, e.g., Information Technology (IT) Continuous Support, software, and cybersecurity.
Other	The Sponsor or PM/PSM makes the decision to bring other participants into the PS BCA process, as needed.

⁵ See the Product Support Manager Guidebook for more information including definitions of PSI/PSP

3.3 Step Three: Conduct the PS BCA Kick-Off

The Program Management Office (PMO) should finalize the list of appropriate stakeholders and mandatory advisors to begin preparing for the PS BCA Kick-off Meeting as soon as practical. Preparing for the kick-off includes developing an agenda, problem statement, scope, desired outcome(s), schedule, and the initial GR&As, which will become part of the PS BCA charter. The charter is approved by the appropriate governance structure. More information on the PS BCA charter, with a notional template, is included in Appendix C.

3.3.1 Purpose of the Kick-Off Meeting

The PS BCA Team kick-off meeting is a working level meeting focused on providing training and guidance. Life Cycle Management Commands, Sustainment Commands or System Commands may provide PS BCA training; the PMO should provide a program description and overview. The PMO collaborates with stakeholders and advisors to ensure the right PS BCA team members are identified for the kick-off meeting and provides input in preparation of the kick-off meeting. Team members should review and finalize the charter, draft a problem statement, develop GR&As, identify and document desired objectives, discuss COAs, set up the structure of analysis, review action items and the way forward.

The PMO determines if the PS BCA will be executed entirely with core and matrixed government resources, or if contractors or other external entities will be used to assist in the analysis. The PMO should coordinate with functional home offices and PEO reporting chain offices to obtain guidance for conducting the PS BCA, to include using government personnel to the maximum extent possible, prior to awarding contracts for the analysis. If contractors are used, then prior to the kick-off meeting, the PMO should ensure any required contractor agreements are in place. PS BCA support contracts may include pre-priced extensions, if needed, to complete the final out brief and PS BCA report in case there are unforeseen schedule extensions.

3.3.2 Develop a Problem Statement

The Problem Statement helps to define the issue(s) being addressed and supported by the analysis being assessed by the PS BCA. It should provide an accurate and concise reason for conducting the PS BCA, and it should define the analysis framework for the current deficiencies, additional requirements, or opportunities for improvement. This statement should not assume a specific means of achieving the desired result. Rather, the problem statement should contain an objective description of the desired end-state or outcome (i.e., it should not be biased toward any one alternative solution). Biases or unfounded assumptions in the problem statement undermine the analytical purpose of the PS BCA by jumping to conclusions.

Questions to consider as the team develops the problem statement include:

- What is the desired end state?
- What is the purpose of the analysis?
- What is the scope of the analysis?
- Who is the decision maker?
- What are the potential impacts to the enterprise?

Having a clear and well-defined Problem Statement provides a reference point throughout the analysis. After reading the problem statement the decision maker should understand the purpose

of the analysis and the framework of its conclusion. The approval authorities or governance board should review the draft Problem Statement for validation at the PS BCA kick-off meeting. Such validation can avoid unnecessary rework and ensure the analysis covers the assigned subjects.

3.3.3 Define the Scope of the PS BCA

Scope is the range of coverage encompassed by the PS BCA, including the platform, subsystem(s), or component(s) being evaluated along with other dimensions such as the time horizon and IPS elements of major interest. The major elements may include supply support, sustaining engineering (e.g., obsolescence management), and maintenance planning and management aspects such as IP (e.g., technical data, computer software and associated data rights), software support, depot repair, regional maintenance and contested logistics.⁶ Boundaries define the scope precisely and provide rules for data, organizational influences, and personnel. Areas of concern that may influence the boundaries within the PS BCA include:

- Time and schedule
- Cost/Benefit
- Organizations
- Functions and positions
- Technology
- Peacetime vs. Wartime operating environment(s)
- Geographical areas, sites, and locations
- Foreign Military Sales (FMS) and co-sustainment⁷
- Other factors or emergent concerns that have a potential impact on the decision.

3.3.4 Identify the Governance Structure

If not pre-determined by Service policy, establish a governance body with the relevant approval authorities at the kickoff meeting. The governance body is normally tied to the sponsor's and PM's chain of command. In some cases, the composition of the governance body will be established by command or center policy and will only need to be tailored to the needs of the program. This body will continue to provide guidance throughout the process and will also ensure buy-in during appropriate steps within the PS BCA process. The governance body should meet periodically, on an agreed schedule, to discuss progress, issues, and next steps; and to discuss required actions to remove any obstacles to a successful PS BCA. The PSM should have this governance body in mind when documenting the results of the PS BCA. The periodic meetings should ensure that no stakeholder or approval authority is surprised by the final PS BCA recommendation.

The approval of a PS BCA is ultimately dependent upon the decision maker, but the people and organizations represented within the governance body form the foundation for the PS BCA process and provide valuable insight and a wide range of diverse perspectives prior to and in support of making major decisions.

⁶ Contested logistics is defined in <https://www.dau.edu/glossary/contested-logistics-environment>

⁷ The term "co-sustainment" is an emerging concept associated with the Regional Sustainment Framework and means, "The enduring collaboration among allies and partners to enable effective and efficient logistics, sustainment activities and personnel services to operationally maintain defense platforms, systems, sub-systems, or components".

3.3.5 Discuss Potential Alternatives

An initial attempt at developing alternatives should be included in the kick-off agenda to obtain input from potential organic PSI(s)/PSP(s), improvements, and new or alternative approaches to satisfying the requirement. More alternatives may be added by the PS BCA team during or soon after the kick-off meeting. Discuss the process to document the filtering or pare down criteria to explain how the PS BCA team and the governance body will choose which alternatives are feasible and will be analyzed and considered throughout the PS BCA. Feasibility refers to the potential alternatives being consistent with funding, technology, and scheduling factors.

3.4 Step Four: Defining the Analytical Foundation of the PS BCA

This section provides guidance on defining the analytical foundation of the PS BCA based on known data sources such as warfighter desired outcomes and requirements and current system performance. Early understanding of the requirements and desired outcomes provides a target to pursue through the analysis.

3.4.1 Warfighter Desired Outcomes and Program Requirements

Identify the Warfighters' desired outcomes in addition to documented requirements. Identifying both the desired outcomes and requirements ensures that the results of the analysis are not buried in the details of the requirements. The PS BCA team and its stakeholders should come to consensus on the desired outcomes and periodically refer to them to stay on track. The governance board should concur with planned deliverables and outcomes.

After identifying the desired outcomes, state the program requirements. DoDI 3110.05 establishes other criteria, including availability and cost changes. For MCA programs sources of the requirements include KPPs, Key System Attributes (KSA), Additional Performance Attributes (APAs), Performance Metrics identified in the Reliability, Availability, Maintainability-Cost (RAM-C) Rationale Report, CDD, Legacy System Capabilities Production Document (CPD) or updates to these documents. For programs in other acquisition pathways, requirements are determined within the appropriate governing DoDIs. For example, MTA programs are covered under DODI 5000.80.⁸

The documented outcomes and requirements may take the form of a PSA, which is a generic term representing the range of implementing agreements to ensure performance expectations (on both sides) are clearly articulated. These agreements include contracts, Memorandums of Understanding (MOUs), Memorandums of Agreement (MOAs), Commercial Service Agreements (CSAs), Service Level Agreements (SLAs), and similar formal agreements.

⁸ MTA programs will not be subject to the guidance in Chairman of the Joint Chiefs of Staff Instruction 5123.01H and DoD Directive 5000.01. Each DoD Component will develop a streamlined process that results in a succinct requirement document no later than six months from the time the operational needs process is initiated.

Critical Thinking Questions for PS BCA Outcomes and Requirements:

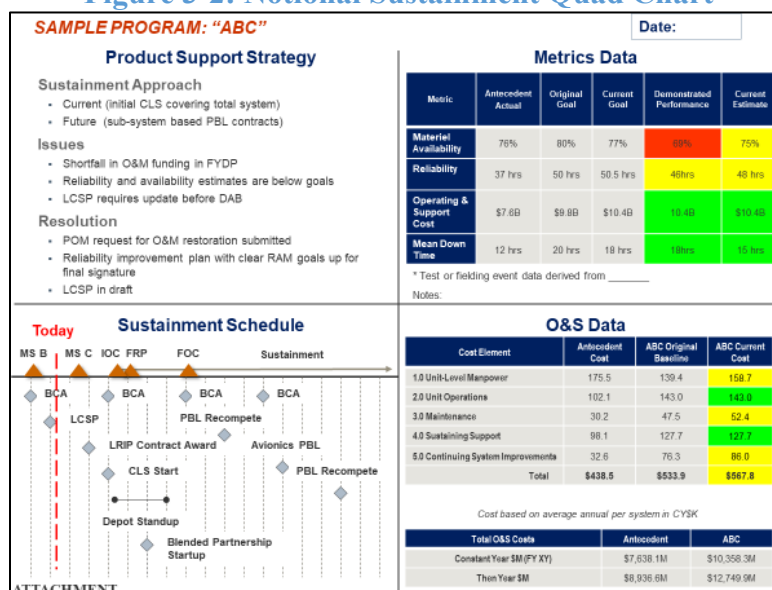
- Is the outcome clear, specific, and realistic?
- Are the expected outputs/accomplishments defined in quantifiable, measurable terms?
- Is the objective, as stated, unbiased as to the means of meeting the objective?
- Are any feasible alternative solutions excluded due to a bias in the objective statement?
- Is the problem statement phrased so that the type and variety of potential alternatives are not unnecessarily limited?
- Are performance measures and outcomes appropriate for monitoring performance?
- Is the cost analyst integrated in the PS BCA analysis? How are outcomes incorporated in the LCCE?

3.4.2 Performance and Cost Baseline of the Program

Depending upon the AAF pathway being used as described in Table 2-2, and the Acquisition phase as shown in Figure 2-1: PS BCA Timing Chart, additional information on the performance and cost baseline may be available for consideration and analysis. For example, see the LCSP and Sustainment Quad Chart described in Appendix C of the DoD *Product Support Manager's Guidebook*. The current strategy, operations and tactics that are being followed should be fully explained and rationalized. If the results change the PSS, update the LCSP to reflect the new baseline.

For programs that require reporting, Figure 3-2 Notional Sustainment Quad Chart, displays a top-level overview of an MCA program's key management items of interest. It contains a brief description of the program's plans, schedule, benefits, and costs. While this quad chart by itself does not provide enough information to conduct a PS BCA, it can provide a roadmap and starting point for deriving solutions to issues. It also provides a mechanism by which the baseline and alternatives can be described from a top-level viewpoint. During a PS BCA revalidation effort, the Sustainment Quad chart will provide information on how the system is performing against the current requirements.

Figure 3-2: Notional Sustainment Quad Chart



3.4.3 Ground Rules and Assumptions

This section provides guidance on documenting the GR&As of the PS BCA. GR&As should be identified and documented early in the PS BCA process.

3.4.3.1 Ground Rules

The ground rules document the PS BCA's known or predetermined parameters and conditions. Prior to formulating assumptions, what is known with certainty should be stated under the ground rules (e.g., facts, laws, defined criteria, constraints, regulations and OSD, Service Component, or Agency guidance). Include any factor known to be true that may affect the current or future business conditions under consideration in the analysis.

It is also important to understand and document any known constraints—those factors known or discovered during the research and planning period, normally beyond the control of the PM or PSM, which bound the PS BCA analysis. The PS BCA team should account for these constraints before beginning the analysis. Constraints should be presented to the governance board and other stakeholders. For example, funding constraints such as congressional mandates could inform a ground rule for the analysis.

A non-exhaustive list of major PS BCA ground rules includes:

- Source of funding streams
- Legislation, regulations, and policy (such as requirement to leverage existing Maintenance, Repair and Overhaul (MRO) capabilities with partners)
- Financial data in constant or current dollars
- Directed inflation index
- Quantity of fielded systems
- Expected operational tempo (OPTEMPO) and service life
- Enterprise constraints

3.4.3.2 Assumptions

An assumption is an informed position about what is true of a current or future situation where explicit factual knowledge is unobtainable (e.g., inflation rates). Assumptions define aspects that are beyond the control of the PS BCA team. They are explicit statements about the conditions on which the PS BCA team bases the analysis.

After stating factors in the ground rules section, list the assumptions about what is not known, or about future states affecting business conditions. It is crucial to identify all key assumptions and gain stakeholder concurrence used in the PS BCA and critical for the risk or sensitivity analysis. Any non-concurrence by a stakeholder and the supporting justification should be documented.

Note: Prior to sensitivity analysis, assumptions are treated as facts for the purposes of the analysis.

In the sensitivity analysis section, evaluate each major assumption for its impact on the PS BCA recommendation if the assumption were to be significantly off target. Omitting, changing, or misusing an assumption can directly influence which alternative is recommended. It is important

to include Warfighter-provided assumptions on operating and supporting the system. A non-exhaustive list of major PS BCA assumptions includes:

- Financial metrics and inputs (inflation)
- Operational environment including considerations within the RSF, based on user or stakeholder input⁹
- OPTEMPO or contingency vs. non-contingency operations (e.g., contested logistics)
- Expected useful life of a weapon system

3.5 Step Five: Data Collection Planning

The program office should discuss and plan for locating, collecting, verifying, and using data within decision support products. The data collection should include both benefit (i.e., non-monetary) factors, as well as financial data. The PSM should work very closely with the product support business financial management functionals (cost analyst, program analyst, budget analyst), logisticians and contracting officers to ensure that the proper data is obtained in a timely manner from authoritative sources, including government organizations, Original Equipment Manufacturers (OEMs), and support contractors (as applicable). Not collecting the correct functional and cost data can reduce the effectiveness of the PS BCA and hinder, delay, or inhibit later decision-making efforts. As the data is collected, the program office should execute a cohesive plan for archiving and efficiently distributing the data to authorized stakeholders.

3.5.1 Data Transparency

In addition to collecting quality and relevant data, the PM should encourage transparency of data for both the organic and contractor support. This will assist in maintaining consistency of data across the COAs and help ensure an apples-to-apples comparison, for example in terms of fully burdened rates. PSMs should seek out and use information technology tools to automate and reduce the level of effort required to collect and analyze programmatic data. This ensures that the PS BCA team has access to relevant information and can compare similar data points.

As a general note, research and data management is the responsibility of all the appropriate roles involved in conducting the PS BCA. Each functional area lead is the expert for their requirements and sources of data to perform their respective analyses. As such, each functional representative should spearhead the solicitation and configuration control of PS BCA data, in conjunction with the data manager and other members of the PS BCA team.

Wherever possible, use only non-proprietary system data in a PS BCA and ensure that all data and processes will be provided or available to the program office with necessary rights so that subsequent iterations of the PS BCA may be accomplished or updated by the government or a contractor other than the original creator of the PS BCA.

3.5.2 Access to Data

From the beginning of the process the program office should establish (e.g., via a charter) how the data will be made available for the PSM to conduct the PS BCA. This should be discussed and agreed upon by all parties following the ground rules for managing intellectual property. For instance, provide the data via an integrated digital environment or other methods.

⁹ DAU Acquimedia Article “[Regional Sustainment Framework](#)” gives more information on this concept.

3.5.3 Authoritative Data Sources

The governance board should also approve the authoritative data sources from which the PS BCA team will conduct the financial and non-financial analysis. This is a critical part of the PS BCA and repeatedly cited by the Government Accountability Office (GAO) as a weakness in some PS BCAs.¹⁰ The criteria for the authoritative data source should be: accurate, comprehensive, consistent, timely, available, and accepted. This approval step may occur numerous times during the PS BCA process as data sources are revealed. Possible sources of cost data include Enterprise Visibility and Management of Operating and Support Cost (EVAMOS) or Cost and Software Data Reporting (CSDR) for cost data sources.

Table 3-2 gives an example on how to document data sources. Services and components may have other examples on how to document data sources.¹¹

Table 3-2: Notional Data Source Table

Data Descriptio	Purpose of Data	Requested from (Org/Email/Phone)	Date Data Provided	Version/As-Of Date	Remarks
Contractor Lowest Repairable Unit (LRU) Repair Cost	Cost Model	Contracting Officer	30 Oct 2023	V1.0/6 Mar 2022	Awaiting V2 update
Supply Provider Customer Service Results	Benefit Scoring	Quality Assurance Evaluator (QAE)	6 Dec 2023	V1.0/31 July 2023	Requester Reviewing
Program Office Risk Register	Risk Scoring	Risk Manager	Pending	SRA/12 Sep 2023	Awaiting Results of Independent Risk Assessment
Depot Sales Rates (Fully Burdened)	Cost Model	Sustainment Command	20 Sep 2023	V2.1/31 Aug 2023	Requested Updated Rates

3.5.4 Data Repository

All programs should have a data repository to host historical records, including prior approved PS BCAs and analysis of actual performance of the implemented COA against planned performance. The PSM will assign configuration control responsibilities within their team to support this historical archive. This is a critical step to support subsequent iterations of the PS BCAs or a variance analysis as the program matures or requires additional analysis to support decisions, such as a change in the program strategy. Data should be documented in accordance with DoD, Component, or Agency guidance.

¹⁰ GAO 09-41: Improved Analysis and Cost Data Needed to Evaluate the Cost-effectiveness of Performance Based Logistics, December 2008

¹¹ Another example of data source documentation can be found in DAFPAM 63-123 Table 9.4.

Once a PS BCA has been approved the outcome, along with the implementation plan, risks, funding profile, assumptions and constraints should be reflected in the LCSP.

Note: The PS BCA Team should establish measures to protect Controlled Unclassified Information (CUI), classified information, and other non-public information such as competition sensitive information. Refer to your program Classification Guide.

4 CONDUCTING THE PS BCA

The purpose of this section is to give an overview of the different activities required to successfully complete the PS BCA process.

Figure 4-1: PS BCA Steps 6-11



4.1 Step Six: Develop Evaluation Criteria to Assess Cost and Benefit Factors

One of the most important and challenging elements of a PS BCA is correlating analysis of benefits with cost, to develop criteria-based recommendations that enable best value decisions. Best value considers the intersection of performance and cost, based on specific criteria, and is defined as the expected outcome that, in the Government's estimation provides the greatest overall benefit in response to the requirement (see Federal Acquisition Regulation 2.101).

For the purposes of this guidebook, the PS BCA assesses each COA and weighs total cost against total benefits, along with risk, to arrive at a recommended solution. The respective weights for costs and benefits are set by the PS BCA Team. The PS BCA process goes beyond cost/benefit or traditional economic analyses by documenting how each COA fulfills the strategic objectives of the program; how it complies with product support performance measures; and the resulting impact on stakeholders.

The PS BCA identifies which alternative product support options provide optimum mission performance given cost and other constraints, including qualitative or subjective factors. The PS BCA may result in a recommended PSS that is a hybrid of both PBL and transactional product support strategies—decomposed to the component, system, or sub-system level—along with a best value mix of government and industry capabilities to deliver the 12 IPS elements within an IPS package at affordable cost.¹²

The PS BCA team will establish the evaluation criteria for both financial and non-financial factors early in the process after conducting background research and obtaining approval from the governance body.

4.1.1 Quantitative and Qualitative Values

The PS BCA problem statement, requirements, and Warfighter desired outcomes should drive the evaluation criteria. All criteria should be numerical and may include both quantitative and qualitative criteria. Criteria may be inherently quantifiable, for example, financial benefits and cost per flight hour. Other criteria may require numerical transformation of a qualitative variable, for example, manageability, maintainability, supportability, or customer satisfaction. The methods and rationalization for numerical transformation of subjective (qualitative) factors should be fully described. Evaluation criteria should be independent, relevant, discriminating, and clearly defined for the reader of the PS BCA.

¹² *Defense Acquisition University Integrated Product Support Element Guidebook*, Jan 2024

Consider the following, non-exhaustive list of quantitative and qualitative benefits categories:

- Availability
- Reliability
- Supportability
- OPTEMPO or contingency vs. non-contingency operations
- Expected useful life of a weapon system
- Manageability
- Sustainability
- Versatility
- Affordability (Note: this is normally considered a cost variable but may be explored here as well depending on the analytical team's approach)
- Energy, safety, environment (including climate) and installation impacts
- Cybersecurity Resilience including sustainment of hardware and software

4.1.2 Scoring and Weighting

After identifying the quantitative and qualitative criteria, the governance board prioritizes the values for the criteria by agreeing on a scoring and weighting methodology such as Pairwise Comparison¹³, Value Focus Thinking (VFT) and Analytical Hierarchy Process (AHP).¹⁴ Establishing the scoring and weighting criteria ensures traceability for the next iteration of a PS BCA or auditing capabilities during a variance analysis. The scoring and weighting criteria should correlate to the Warfighters' and sponsor's identified desired outcomes and requirements.

4.1.3 Quantifying Qualitative Values

Financial costs are by their very nature quantifiable; however, benefits may be more qualitative in nature. Consider using SMEs to generate scores for each variable. When trying to quantify areas that are not easily enumerated, always define the scoring system and scores used, and how the resultant values were applied in an evaluation. For example, manageability could be rated as a 0 for *does not improve manageability*, 1 for *maintains current manageability*, or 2 for *improves current manageability*. The larger the span of ratings, the greater the difficulty in explaining what improvements an alternative would need to move up a point in the ratings scale. Any number of potential scoring methodologies can be devised. However, avoid situations where one alternative is rated 18 out of 20 and another is rated 19 out of 20 without any accompanying definition to show what made one alternative one point above the other. Another consideration is that not all benefits may be equally important to the decision maker and should be prioritized and weighted accordingly.

Note: Not all cost elements necessarily deserve the same weighted importance. Devote the appropriate time to the more significant cost driving elements.

¹³ For more information on Pair-Wise Comparison, please refer to the DoD PBL Guidebook, page 71.

¹⁴ For more information on VFT and AHP, please refer to materials and classes offered by the Army Sustainment University, located at <https://alu.army.mil/about/history>.

4.1.4 Normalization

To compare benefits with different units of measure, score or poll them on a consistent scale (e.g., 1 -10). Describe the scoring criteria for each benefit to identify how the benefit will be measured and how that measure will translate into a score. If there is uncertainty or disagreement that is not resolved during rank ordering, prioritization, and weighting determination, then address these in the sensitivity analysis to determine how it will impact the overall decision.

4.1.5 Rank Ordering/Prioritization

Establishing the weighting and scoring criteria also is important in cases such as, *Is the benefit of manageability equal to safety improvement?* or *Is safety improvement equal to quality improvement?* Just as in determining a rating scale, deliberately define the weighting scale. For example, a 100 percent weight means the benefit is *critical importance*, a 75 percent weight indicates *above average importance*, 50 percent shows *average importance*, 25 percent shows *below average importance*, and 0 percent means the benefit does not impact the recommendation.

If using SMEs to generate the scores, define and document the specific methodology and parameters in the PS BCA. Also identify the justification for differences in scoring between alternatives based on specific factors or reasoning. Refer to the suggested methodology below:

- 1) Vote. Have each individual spread 100 points over the value measures based on the measures' importance.
- 2) Discuss significant differences. Have the *outliers* discuss their rationales.
- 3) Revote until the group agrees on the ordinal ranking of the value measures.
- 4) Vote again requiring each person's weights to follow the group's ordinal ranking of the value measures.
- 5) Average the weights (cardinal ranking of weights) and normalize so they sum to one (or 100 percent).
- 6) Discuss significant differences. Have the *outliers* discuss their rationales.
- 7) Repeat these steps until the group agrees or resolves any *gray area* requiring further discussion based on rules established for the PS BCA.

4.1.6 Sensitivity Analysis of Subjective Analytical Methods

Once the evaluation criteria scoring and weighting is complete, evaluate the results to ensure they are not artificially inflated or biased toward any single alternative based on the scoring and weighting criteria. If there are any concerns, mitigate them through sensitivity analysis by conducting an analysis on the extreme ends of the numerical spectrum for weighting and/or scoring. This will help discern when the recommended alternative begins to change and tip the recommendation in one direction or another.

4.2 Step Seven: Develop Alternatives

Alternatives should include a wide range of all possible solutions from which feasible solutions for in depth analysis are selected. Possible alternatives and considerations could include:

- Government provided organic depot maintenance, manufacture and production.
- Contractor provided depot maintenance.

- Various feasible combinations of depot and contractor maintenance percentages, such as 50–50, 25–75, or 75–25
- PBL vs transactional agreements
- Public Private Partnerships (PPP)
- Various contract types
- Management functions and execution strategies
- IP strategies, including MOSA¹⁵
- Supply Support strategies
- Sustaining Engineering strategies
- RSF strategies
- Other IPS Elements or sustainment functions

4.2.1 Using the Decision Matrix for Product Support

PS BCA alternatives can vary depending on a range of pertinent factors. These factors include the point in the system life cycle in which the PS BCA is accomplished, the scope of product support for the objective system, and considerations reflecting statutory, policy, guidance, or financial requirements. Figure 4-2, The Decision Matrix for Product Support (DMPS)¹⁶, defines the potential range of product support strategies as defined by two key strategic system characteristics:

- Weapon system scope: the level at which readiness and sustainment outcomes are measured and managed at the platform, major subsystem, or component level.
- Integration approach: the desired or required industry, organic, or blended (partnership) capabilities.

Considering MOSA when Developing Alternatives

The Product Support Analysis will inform which components make sense to implement a MOSA; this will inform the long-term IP strategy for MOSA components. Once the PS BCA COAs have been identified, the PSM should consult with the PS BCA Team (including their Service IP SMEs) to review the recommended logistics, maintenance, and sustainment alternatives to ensure best value mix of appropriate technical data, computer software and data rights to support implementation of [the] PSS. These inform the IP strategy and should be priced and competed during each RFP to support competition and reduce cost. (PSM Guidebook)

To inform development of the IP strategy, no later than program initiation, the PM and PSM should review the initial PS BCA results with their Service, OSD, or DoD IP Cadre (as applicable) to identify aspects of the recommended sustainment alternative that influence pricing and valuation criteria, rights in technical data, and licensing options and impacts. The IP strategy (technical data, computer software, rights, and timing of delivery of the priced options, and all deliverables) is documented in the Acquisition Strategy and LCSP.

Please refer to the DoD *Intellectual Property Guidebook* for more information on MOSA and IP relationships.

References: DoDI 5000.88
DoDD 5000.01
DoDI 5010.44

¹⁵ MOSA: The DoD’s goal with MOSA is to design and acquire systems with highly cohesive, loosely coupled, and severable modules that can be competed separately and acquired from independent vendors. This integrated technical and business approach allows the Department to acquire warfighting capabilities, including systems, subsystems, software components, and services, with more flexibility and competition. MOSA uses technical architectures with modules connected by modular system interfaces compliant with either widely accepted, consensus-based standards or DoD system standards or specifications for which the technical information is licensed with sufficient rights to meet competitive Government support needs.

¹⁶ Refer to the DoD Product Support Manager’s Guidebook, for additional information on using the DMPS.

Figure 4-2: Decision Matrix for Product Support

Weapon System Strategy	System	1.1 Industry-Centric Platform Strategy <i>(Example: USAF C-12 Huron)</i>	1.2 Blended DoD-Industry Platform Strategy <i>(Example: USAF C-17)</i>	1.3 DoD-Centric Platform Strategy <i>(Example: USA Common Ground System)</i>
	Subsystem	2.1 Industry-Centric Subsystem Strategy <i>(Example: USA High Mobility Artillery Rocket System (HIMARS))</i>	2.2 Blended DoD-Industry Subsystem Strategy <i>(Example: USN Auxiliary Power Unit (APU))</i>	2.3 DoD-Centric Subsystem Strategy <i>(Example: USA M119-A2 Howitzer)</i>
	Component	3.1 Industry-Centric Component Strategy <i>(Example: USN Military Tires)</i>	3.2 Blended DoD-Industry Component Strategy <i>(Example: USAF Industrial Prime Vendor (IPV))</i>	3.3 DoD-Centric Component Strategy <i>(Example: DoD War Reserve, Contingency Stock)</i>
		Industry Capabilities	Partnerships	Organic Capabilities
		Integration Strategy		

While the DMPS portrays nine potential separate product support alternatives, a tailored best value PSS may be located at an infinite number of points within the 3×3 matrix. In that regard, the DMPS serves as an initial guide to the PSM outlining the boundaries of potential product support strategies.

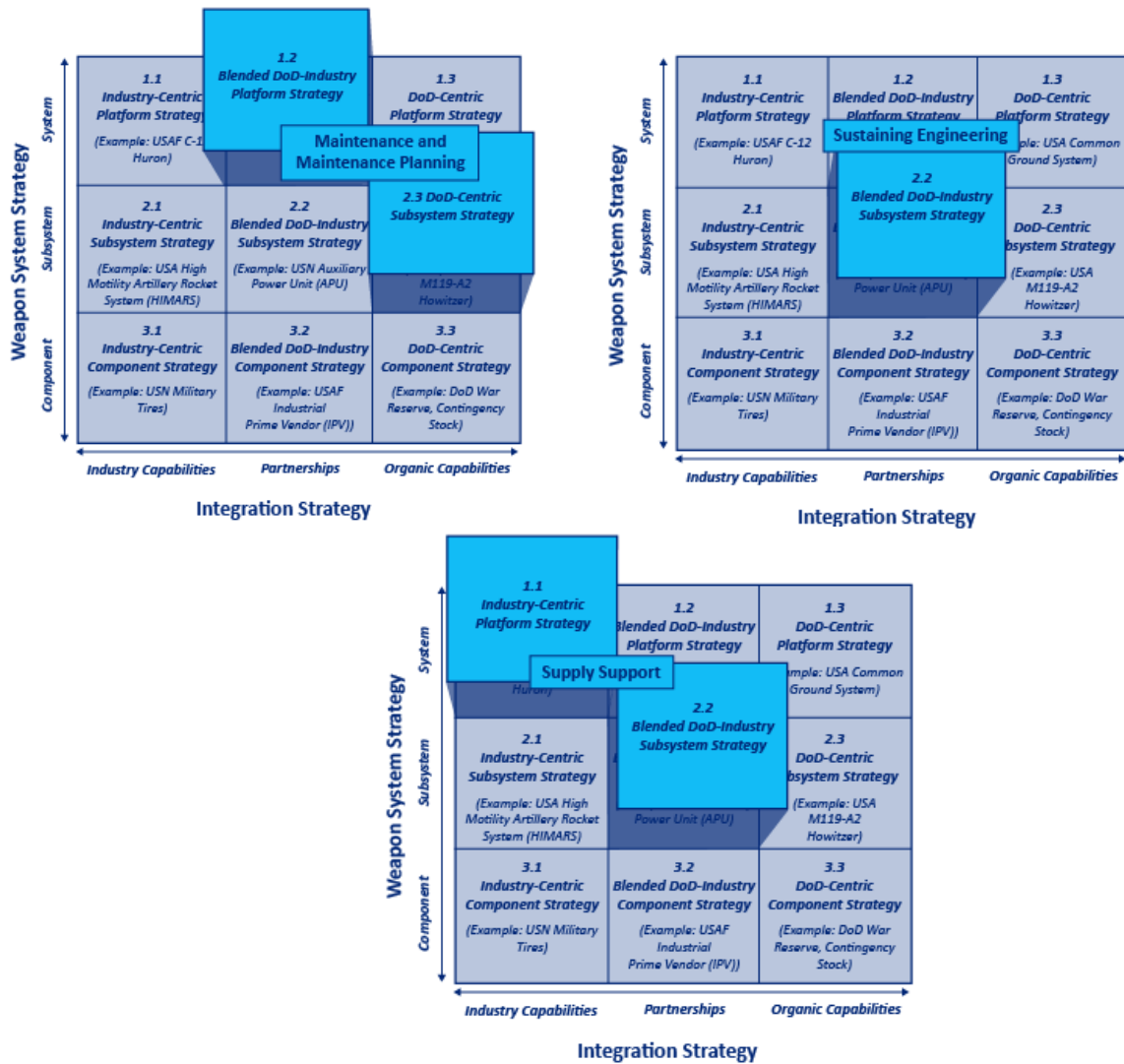
Note: The weapon systems highlighted in the DMPS graphic are real-world examples of how different product support strategies can be developed within the matrix.

Consideration of alternatives should be anticipated as early as possible in the life cycle. These alternatives may require an earlier implementation of contractual agreements to support future maintenance requirements and flexibility to evolve the PSS to meet changing operational requirements.

Consider extreme alternatives that may be tailored to inspire innovative alternatives such as no or low maintenance scenarios that may trade O&S costs with procurement costs. Identify the decision points, e.g., *When do costs and benefits occur?* and *When do they change?* When identifying alternatives, keep in mind that *all organic* or *all contractor* supported systems are rare, and are generally limited to mission driven operational environment factors (all organic) or commercial or commercial-derivative systems (all contractor). In general, neither the organic nor commercial industry base possesses the resources, infrastructure, or the skills base to accomplish all sustainment functions for most defense systems. The alternative analysis focuses on achieving, for each of the IPS Elements required for sustainment, the best blend of organic and industry capabilities to arrive at a best value solution. In that regard, the DMPS serves as an

initial guide to the PSM outlining the boundaries of potential product support strategies. An example of this blending is illustrated in Figure 4-3.

Figure 4-3: Blended Solutions within the DMPS



4.2.2 Integrated Product Support Elements

The PS BCA is used to analyze a program’s PSS including the 12 IPS elements, as identified in Appendix A of the *DoD Product Support Manager’s Guidebook*. The 12 IPS elements are 1) Product Support Management; 2) Design Interface; 3) Sustaining Engineering; 4) Supply Support; 5) Maintenance Planning and Management; 6) Packaging, Handling; Storage and Transportation (PHS&T); 7) Technical Data; 8) Support Equipment; 9) Training and Training Support; 10) Manpower and Personnel; 11) Facilities and Infrastructure; and 12) IT Systems Continuous Support. The IPS elements categorize major support areas and provide standardized definitions.

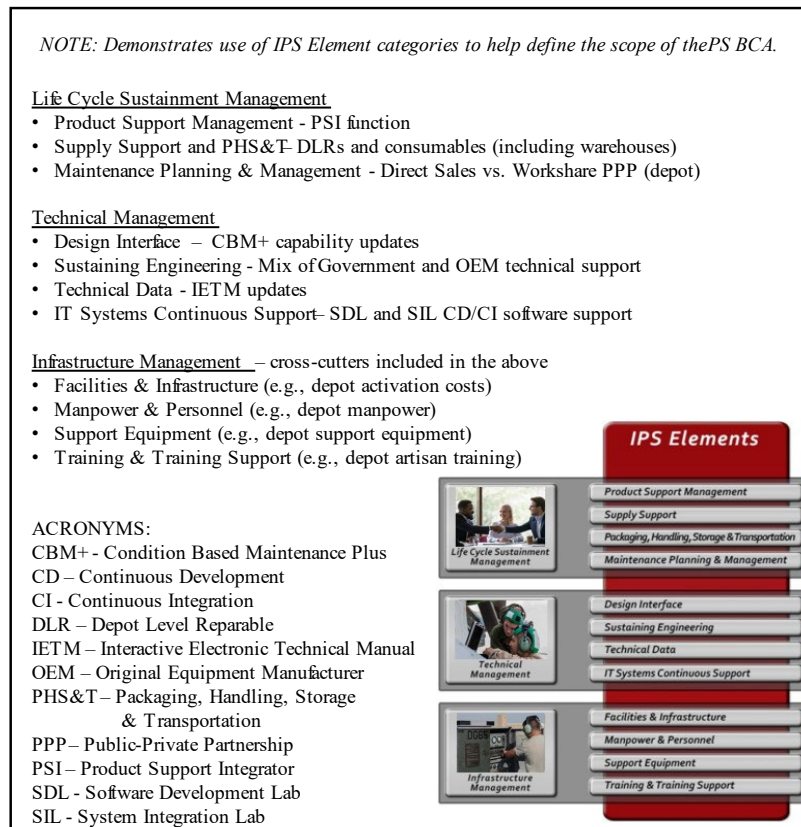
Each program is unique and the IPS elements to be analyzed are dependent upon the specific sustainment requirements of the weapon system. Rationale should be provided for each of the 12 IPS elements whether utilized or not within the PS BCA.

Of the 12 IPS elements, those most often compared between COAs within a PS BCA are the following:

- Product Support Management. Focuses on integrating all sources of product support, public and private, within the scope of a PSA.
- Sustaining Engineering. Examines the technical tasks (i.e., engineering and logistics investigations and analysis) required to ensure continued operation and maintenance of a system.
- Supply Support. Focuses on procuring, producing, and delivering products and services to customers as well as the flow of funds.
- Maintenance Planning and Management. Focuses on the maintenance of parts, assemblies, subsystems, and end items. This might include manufacturing parts, making modifications, testing, and reclamation, as needed.

Figure 4-4 illustrates the relationship between the three major groups of IPS elements and the analytical structure of a PS BCA.

Figure 4-4: Product Support Element Relationships



4.2.3 Alternatives at Various Stages of Life Cycle

Product Support alternatives will, to some degree, be dictated by where the system is in the life cycle. Early in the life cycle (between Milestone B and Milestone C, or equivalent phase of other AAF pathways), the PS BCA sharpens the PSM’s focus on sustainment planning. DoD policy

does not require establishment of Core logistics capability until four years following IOC. During the early life cycle design and development of the system there is typically a minimal amount of performance or supportability data. The early life cycle PS BCAs serve to initiate the PS BCA process, institutionalizing the collection and analysis of available data, and evolving the analysis as the amount and accuracy of data matures.

When adequate data is sufficient to make a life cycle PSS decision, DoD regulations stress the importance of making the best possible use of DoD and industry resources at the system, subsystem, and component levels while maximizing the use of outcome-based product support strategies. When a program's support strategy is under further assessment, the intent of the PS BCA is to derive the best value sustainment strategy for the objective system based on available competencies, capabilities, and cost while complying with Title 10 requirements for workload sourcing.

4.2.4 Validating Alternatives to Be Analyzed

Each alternative should identify the full period to address the cost of the decisions and should not be constrained by appropriation categories. Identify and describe in detail the feasible alternatives to the current support method (the status quo), including changes to the current state and any assumptions specific to each alternative. Alternatives concerning the source of work should include organic, commercial, and partnership arrangements. Alternatives should also include partnerships tailored to IPS elements at the component, sub-assembly, or system or platform level. Ensure final alternatives are realistic and assume the possibility of selection.

COA analysis may encompass:

- **Iterative Process.** COA analysis is an iterative process. The first step is an examination of the range of potential COAs to determine which are reasonable and require further evaluation. The range of potential COAs should be summarized in the PS BCA report. An alternative that meets the desired objective, including the status quo, is reasonable if it cannot be eliminated on non-economic grounds. It is possible that only one COA will be reasonable; however, generally there are two or three reasonable COAs that warrant further evaluation. Normally, no more than four or five COAs are considered in detail, although there are exceptions.
- **COA Elimination.** A COA can be eliminated from further analysis whenever it appears to no longer achieve the desired objective; it should be coordinated with the program office leadership team (governance body) to gain concurrence with its removal. For example, during the PS BCA process several COAs were considered but as the analysis progressed, not all emerged as feasible. One COA required depot processing which the facility could not accommodate, so at that point, there was no benefit to be gained from completing any further analysis for this alternative.
- **COA documentation.** If a COA was considered but dismissed as unreasonable, document the rationale for dismissal in the PS BCA final report. Cost alone is not a valid rationale for a COA being dismissed. If cost is the only aspect of an infeasibility determination for a COA, the analysis should be shown. Specifically, the COA should be developed, costed, and proven to be prohibitive, not merely dismissed from the onset as being infeasible due to cost.

Critical Thinking Questions for Validating PS BCA Alternatives:

- Is a reasonable subset of all potential feasible alternatives? Was the status quo used as the baseline for alternative evaluation?
- Were alternatives rejected before a full analysis was adequately documented?
- Are the alternatives significantly different as opposed to superficial restructuring of a single COA?
- Were other partnerships, (e.g., other government agencies' regional) capabilities to provide a product or service considered, where applicable?
- Were differing contracting alternatives considered (including public private competition under OMB Circular A-76 or termination and consolidation of existing contracts)?

4.3 Step Eight: Gather Benefit and Cost Data to Analyze Mission and Business Impacts

This section provides guidance on gathering benefit and cost data to assist in analyzing mission and business impacts of the COAs identified in the PS BCA.

4.3.1 Methods and Tools

Document the types of financial and non-financial analysis methods used and why. The PS BCA team should use guidance from OMB *Circular A-94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs* on cost/benefit analysis at all relevant points. As a rule, the PS BCA team should include the following financial analysis metrics, tools, and techniques unless there is a documented rationale not to use them: Net Present Value (NPV), Payback Period, Break Even Point, Return on Investment (ROI), Internal Rate of Return (IRR), Life Cycle Cost (LCC), Time Value of Money Considerations (current or constant dollars and discounted dollars), and O&S cost.

4.3.2 Benefits and Non-Financial Analysis

The benefit analysis should focus on the non-monetary factors influencing the decision. To determine which benefits to include, stakeholders should assess which factors are most important for the desired outcome, as determined during selection of evaluation criteria in Step Six. Requirements defined in DoDI 3110.05, the Manual for the Joint Capabilities Integration and Development System (JCIDS), Annex D, Sustainment KPP Guide¹⁷ and documented in the RAM-C Rationale Report, ICD, CDD, or legacy CPD, should be explored in the Benefits and Non-Financial Analysis section of the PS BCA. These metrics include four of the five elements of the Sustainment KPP (Materiel Availability (Am), Operational Availability (Ao), Reliability (R), and Maintainability (M)). O&S should be assessed in the Cost and Financial Analysis section of the PS BCA.

Additionally, any other KPP requirements or other metrics that the program office deems important should also be included in the analysis. These should be tied to program requirements and parameters, such as schedule, technical performance, mission completion, etc. Benefits are frequently qualitative in nature, which injects a degree of subjectivity into the assessment. While

¹⁷ [JCIDS Manual](#)

this subjectivity sometimes cannot be avoided, it is important to ensure that the scoring and outcomes are traceable and repeatable.

Critical Thinking Questions for PS BCA Benefits and Non-Financial Analysis:

- Have all PS BCA results, outputs, benefits, or yields been included?
- Do the benefits significantly relate to the PS BCA objectives?
- Are the benefits identified in measurable terms where possible?
- Are benefits measuring techniques properly defined and supported?
- Is benefit priority or ranking criteria clearly stated and used in the evaluation? Is any weighting scale consistently and reasonably applied?
- Are negative results or outputs identified and adequately evaluated?
- Is the list of benefits free of double counting?
- Are secondary benefits (not related to the objective) identified?
- Are all cost savings represented as a negative cost rather than as a benefit?
- Are the benefits suitably tabulated, graphed, etc.?
- Are the assumptions identified and rationale explained? Are they too restrictive or too broad?
- Are estimating techniques defined? Are they appropriate?
- Are information and estimation sources clearly identified?
 - Are data collection methods valid and adequate?
 - Are benefits estimating techniques valid?
 - If savings have been claimed, will a budget be reduced? Have the identified savings been fully coordinated with the impacted activity?
 - Have all advantages and disadvantages of the alternatives been identified?
 - Is expert opinion used? Were these experts properly qualified?

4.3.3 Performance Data

Performance metrics are only as good as the supporting data. Data collected for the metrics needs to be timely, accurate, and meaningful. Metrics should conform to the SMART construct: specific, measurable, attainable, relevant, and timely.¹⁸ The selected metrics should not be so complex that good data collection becomes too expensive and difficult to achieve. Standard data reporting should be used whenever possible. Data collection methods should minimize burdens on the Warfighter and should not add significant costs to the logistics support providers.

4.3.4 Benefits and Non-Financial Analysis Methodologies and Strategies

The costs and benefits should be weighted using the criteria established in Step 6, Develop Evaluation Criteria, to account for their relative importance. For example, if availability and customer satisfaction are both benefits being evaluated, the program office may determine that availability of the objective system to the Warfighter is twice as important to the PS BCA decision as customer satisfaction and weigh it accordingly. It is important to document the weighting approach in the PS BCA.

¹⁸ For more information visit <https://www.dau.edu/acquipedia-article/product-support-smart-metrics>

The application of outcome or performance-based strategies make consideration of qualitative factors crucial to the PS BCA decision process. Most cost estimating methodologies apply consistent GR&A factors across all alternatives and price them out based on cost of labor, cost of infrastructure, and other applicable cost elements. While it is important to have established GR&A to ensure uniformity in estimation and analysis, the evaluation of process efficiencies should not be eliminated from consideration; this requires flexibility in the benefits analysis. The consideration of process efficiencies may play a significant role in the results of the PS BCA. The PS BCA should not assume assignment of similar efficiencies to all sourcing alternatives. Rather, it should document and substantiate all analytical decisions for generating efficiency figures. Specifically, if one alternative is given credit for a more efficient process (such as fewer workers) as compared to other alternatives, this efficiency should be discussed in the PS BCA report and documented with substantiating material. Also, it should be referenced directly to the supporting mathematical PS BCA documentation. Likewise, those key processes that are assumed or set in the analysis to be equal should also be explained and documented.

4.3.5 Other Non-Financial Considerations

There are different sustainment scenarios that may or may not have an easily quantifiable financial element that should also be considered within the BCA.

The Regional Sustainment Framework¹⁹. The RSF may provide benefits to the program that are not easily quantifiable (e.g., operational availability) and support DoD operations in a contested logistics environment. This ensures sustainment aspects providing value to the warfighter are included in the final PSS recommendation.

When included as an alternative within the PS BCA analysis, the RSF alternative may hold more weight to support program strategic imperatives on forward maintenance and regional partnering over pure cost considerations” (e.g., if an alternative would expand ‘co-sustainment’ activities, provide weighting to that option”). More information is provided in the call-out box on the RSF.

Statutory Requirements. These may include (but are not limited to) Section 2464, Core Logistics Capabilities, of Title 10, United States Code; as well as Section 2466, Limitations on

The Regional Sustainment Framework

The system under analysis for the PS BCA may be a candidate for inclusion in a Regional Sustainment Framework (RSF) and may be included as one or more of the identified Courses of Action (COAs). Where applicable, the analysis may provide more weight to strategic imperatives on forward maintenance and regional partnering over pure cost considerations” (e.g., if an alternative would expand ‘co-sustainment’ activities, provide weighting to that option”).

The RSF is a strategic blueprint intended to bring existing and potential weapon system Maintenance, Repair, Overhaul (MRO) capability and capacity closer to the forward deployed point of need, and to augment traditional strategies to enhance and maintain readiness in an increasingly contested logistics environment.

Within the RSF, DoD intends to achieve this by closely coordinating and aligning with the United States and International Partner industrial base to establish a resilient co-production and co-sustainment ecosystem for defense logistics planning and execution that will provide an enduring advantage for all stakeholders. In this respect the primary goals of RSF are:

- Prevail in a Contested Logistics Environment
- Enhance Military Readiness
- Strengthen Regional Partnerships

Within the PS BCA structure, working within this framework may provide benefits to the program that are not easily quantifiable but support DoD initiatives to support operations in a contested logistics environment.

¹⁹ [DAU ACQuipedia Article on Regional Sustainment Framework](#)

the Performance of Depot-Level Maintenance of Materiel, and others that constrain the program's flexibility in using commercial support alternatives.

4.3.6 Cost and Financial Analysis

4.3.6.1 Estimation

The objective of cost estimation is to compile and forecast the cost to perform the tasks associated with each IPS Element, for each alternative, during a specified timeframe of analysis. Cost considerations should be included in every decision relating to the allocation of resources. The appropriate cost estimating method depends on the program being evaluated and the availability of data.

PS BCA acceptance depends largely on the credibility of the cost estimates. Therefore, an analyst must document data sources, provide the derivation of all costs, and maintain a clear audit trail. There are multiple sources available to provide additional guidelines and details on conducting cost estimates.²⁰

Cost estimates supporting the PS BCA are a subset of the program's LCCE. Results from the PS BCA should be integrated into the life cycle estimate. At a minimum, the following guidelines should be observed in supporting the cost estimating process:

- Include all incremental, direct, and indirect costs. Refer to the *CAPE Cost Estimating Guide* and *CAPE O&S Guide* for additional guidance.
- Support the comparative analysis process by fully documenting the status quo (existing system) and providing its cost estimate.
- Include relevant anticipated costs directly or indirectly associated with each feasible alternative over the life of the program. Show resources required to achieve the stated objective. Estimate future costs from the start of the earliest alternative (other than the status quo) through implementation, operation, and disposal for a program. In the disposal, include the cost of disposal, or residual value for the old unit.
- Ensure that cost estimates are consistent with the GR&A and objectives of the PSS.
- Estimate relevant future costs from inception through implementation, operation, and disposal for the program.
- Ensure that the cost of an alternative includes the cost of operating the status quo programs until the chosen alternative is fully implemented.
- Do not include sunk costs as part of the evaluation, analysis, or recommendation.
- Disclose distribution parameters, including confidence intervals, for all cost drivers, and totals, including risk.

²⁰ Sources for Cost Estimating Guidance include GAO-20-195G Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs, March 2020; the CAPE Cost Estimating Guide and CAPE O&S Guide

Critical Thinking Questions for the Documenting Cost Data in the PS BCA:

- Are the costs thoroughly documented so an independent reviewer may replicate it?
- Is it possible to trace costs to their basic inputs, units of measure, sources derived from, and as of date for any special rates or factors?
- If costs, assumptions, or other input to the estimate is based upon expert opinion, does the supporting documentation include the individual's office symbol, email address, and phone number?
- Will the PS BCA "stand on its own?"
- Will an independent reviewer be able to reach the same conclusion?

4.3.6.2 Examples of Cost Estimating Methods

The engineering, parametric, analogy, and expert opinion approaches are examples of cost estimating methods. The use of a specific approach varies with the amount and reliability of data available. Each approach may have positive attributes and limitations for a particular application.

- **Engineering Approach.** The engineering or bottom-up approach can be broadly defined as an examination of separate segments of work at a low level of detail and a synthesis of the many detailed estimates into a total. Estimating by the engineering method requires the analyst to have an extensive knowledge of the system characteristics such as the system design, the sustainment processes, and the sustainment organization. Break the system, activity, or item of hardware into its level components and make estimates of each component. An analyst may use different estimating methods in estimating the costs of some components. Combine the costs of the components and the costs of integrating the components to get the total system cost. The detailed knowledge required for an engineering analysis is not always available, making this approach the most difficult to apply.
- **Parametric Approach.** In parametric cost estimating, the cost is based upon physical attributes or performance characteristics and their relationships to highly aggregated component costs. For example, the total estimated cost of an item will depend on such things as size, weight, and speed. The lack of a significant number of data points can limit or preclude the use of parametric cost estimating. The results of a parametric estimate depend upon the ability of the analyst to establish valid relationships between the attributes or elements that make up the alternative and its cost. Therefore, carefully choose and describe the Cost Estimating Relationship (CER). When documenting results that have used a CER, present the statistical characteristics of the CER, the source database, and all assumptions surrounding the CER development.
- **Analogy Approach.** The analogy approach is based on direct comparison with actual data, historical information of similar existing activities, systems, or components. The major disadvantage of this method is that it is a judgment process, requires considerable experience and expertise, and assumes that analogous systems are available. Use this method when the comparability of the analogous system and the product/process is well documented. The documentation should give a convincing argument that the product or process is similar enough to the source to make the analogy valid. A variation to this

methodology is to make an adjustment to the source data to account for some variation in the estimate of the product or process. For example, if commercial vehicle data are used to estimate some aspect of a tactical vehicle, an adjustment could be made to the source data. Document the "adjustment technology" well so that there is no doubt about the methodology.

- **Expert Opinion Approach.** The expert opinion approach uses the judgment of an experienced individual or group. This method requires just as much rationalization and explanations as any other method. While estimates developed by expert opinion are occasionally both useful and necessary, they are normally highly uncertain and have a low confidence rating. Do not use expert opinion when time permits the preparation of a more thorough analysis. Do not use expert opinion as a convenient substitute for more scientific methods when such methods are available for use. If expert opinion is used, the documentation should contain the sources and qualifications of the opinion and a list of the attributes of the sources. One of the expert opinion methods used is the Delphi questionnaire. This method involves the query of expert opinion from a group. Seek information and supporting rationale from each expert independently. Summarize the results and send a report to each expert. Gather a second opinion after each individual reviews the report, and then summarize the results. Continue this iteration process for several cycles until there is a consensus, or near-consensus.
- **Other Approaches.** The CAPE *O&S Cost Estimating Guide* references actual costs and cost factors as two additional approaches. Other cost modeling and analysis techniques also exist. The PS BCA report should have the proper description and documentation of all analytical techniques deployed to maintain the tenets of credibility, traceability, and repeatability. Most often this detail is contained in an appendix to the main body in written documentation and Excel/other mathematical tools. The main body of the PS BCA contains a top-level description and review of the analytical techniques used.

4.3.6.3 CAPE Guidance on Cost Estimation

Cost and Financial Analysis should be captured according to the IPS elements²¹, the CAPE *Cost Estimating Guide*²² and the CAPE *O&S Guidebook* and customized according to where the weapon system is in the life cycle. Every category and cost element should be examined to collect the entire cost. This level of analysis should be repeated for each alternative.

When using IPS elements, two sets of costs should be identified: one for non-recurring or investment costs and another for recurring costs. Once both sets of costs are identified, add them together for each year under consideration to come to the total cost. The total costs can then be used for other financial analysis (such as net present value).

When developing the O&S estimate, the cost element structure is divided into five major categories. The basic scope and intent of the five major categories should be retained, even if changes are made to lower-level entries. These categories are²³:

²¹ Please refer to Appendix A, the [Product Support Manager Guidebook](#) for more information on IPS Elements.

²² [CAPE Cost Estimating Guide, Feb, 2022](#)

²³ CAPE Operating and Support Cost Estimating Guide, Sep 2020

- **Unit-Level Manpower:** Cost of operators, maintainers, and other support manpower assigned to operating units. Includes military, government civilian, and contractor manpower.
- **Unit Operations:** Cost of unit operating material (e.g., fuel and training material) and unit support services; excludes all maintenance and repair material.
- **Maintenance:** Cost of system maintenance other than maintenance manpower assigned to operating units; consists of organic and contractor maintenance.
- **Sustaining Support:** Cost of system support activities other than maintenance that can be attributed to a system and are provided by organizations other than the system's operating units.
- **Continuing System Improvements:** Cost of hardware modifications and software maintenance to keep the system operating and operationally current.

4.3.6.4 All Relevant Comparative Costs: Life Cycle Cost

For a PS BCA, the LCC of a program consists of elements directly associated with the program plus other indirect costs that are *logically attributed to the program*. Include any incremental cost to the taxpayer that can be traced to an alternative when executing the cost portion of the PS BCA, regardless of agency, appropriation, or timing.

The DoD is taking several new steps towards more thorough and accurate projections of collective systems' LCC for cost reduction efforts to be taken earlier within the Acquisition process. For example, LCC-focused estimates of cost for material alternatives during the Analysis of Alternatives (AoA) process will be conducted with the intent to strongly steer initial systems specification, development, and acquisition. LCC consideration and influence on the earliest system configuration, sourcing, and trade-off decisions should be made. LCC estimates and analyses that are built on AoA findings and continued as major decisions will play a significant role in the evolution of design, development, and establishment of an effective life cycle sustainment program. For fielded and mature programs, comprehensive LCC measurement and analysis can help reduce costs and influence PS BCA factors for the performance capabilities of future upgrades and entire replacement of systems.

The Office of the Deputy Director, Cost Assessment defines LCC categories in the *O&S Cost Estimating Guide*. The major categories are Research and Development (R&D), Investment, Operations and Support (O&S), and Disposal. CAPE has removed indirect costs from the O&S CES structure for estimates in support of the defense acquisition process, but indirect costs should be included in O&S for the purposes of the PS BCA.

- **Research and Development:** Consists of development costs incurred from the beginning of the materiel solutions analysis phase through the end of the engineering and manufacturing development phase, and potentially into low-rate initial production. Typically includes costs of concept refinement, trade studies, advanced technology development, system design and integration, development, fabrication, assembly, and test of hardware and software for prototypes and/or engineering development models, system test and evaluation, system engineering and program management, peculiar and common support equipment, peculiar training equipment and initial training, technical publications and data, initial spares, and repair parts associated with prototypes and engineering development models.

- **Investment:** Investment costs occur during the production and deployment phase. Typically includes costs associated with producing and deploying the primary hardware; system engineering and program management; peculiar and common support equipment, peculiar training equipment and initial training, technical publications and data, and initial spares and repair parts associated with production assets; interim contractor support that is regarded as part of the system production and is included in the scope of the acquisition program baseline; and military construction and operations and maintenance associated with system site activation. These costs are a critical enabler for a program's product support package.
- **Operations and Support:** At the broadest level, O&S costs consist of all sustainment costs incurred from the initial system deployment through the end of system operations. This would include all costs of operating, maintaining, and supporting a fielded system. Specifically, this consists of the costs (organic (government civilian and military) and contractor) of personnel²⁴, equipment, supplies, software, and services associated with operating, modifying, maintaining, supplying, and otherwise supporting a system in the DoD inventory. These costs include those associated with the system-specific training of personnel necessary to support the system.
- **Disposal:** Consists of costs associated with demilitarization and disposal of a military system at the end of its useful life. It is important to consider demilitarization and disposal early in the life cycle of a system because these costs can be significant, depending on the characteristics of the system. Costs associated with demilitarization and disposal may include disassembly; materials processing; decontamination; hardware; collection, storage, and disposal of hazardous materials or waste; safety precautions; and transportation of the system to and from the disposal site. Remember that there may be residual value or positive credit for resource recovery and recycling.

4.3.6.5 Appropriation Category Limitations

Initially, the PSM should not restrict or bind the requirements of the financial analysis according to the guidelines provided in the DoD Financial Management Regulation 7000.14-R and should instead focus on capturing costs and benefits per OMB A-94 guidance. After conducting the analysis with the assumption of *colorless money*, spread the costs across budgetary appropriations. If the appropriation category is a known limitation from your sponsor or other stakeholders, it should be identified as such under the GR&A's and mitigated in the Programmatic Risk (as a Funding Risk) section and the Implementation section of the PS BCA.

At the point of developing the recommendation, be prepared to address in the implementation plan the steps for how the program office plans to fund and execute the decision. The PSM needs to ensure processes are in place to enable the PSM and PM to maintain an awareness of funding complexities such as when one category of funding goes up, another category of funding is forced down as a result.

²⁴ See DoDI 7041.04 "Estimating and Comparing the Full Costs of Civilian and Active-Duty Military Manpower and Contract Support."

Critical Thinking Questions for PS BCA Cost and Financial Analysis:

- Are cost and savings schedules realistic?
- Have all incremental costs to the taxpayer, including common costs, been provided for each alternative?
- Have cost estimates been provided for the status quo? Are they reasonable? Can they be verified?
- Are all government direct and indirect costs included for each alternative?
- Do investment costs include CAPE guidance, IPS Elements, etc.?
- Are personnel costs all inclusive; that is, specific skill levels, fringe benefits, overtime and shift differentials, etc.? Are personnel costs broken out by rank/grade, number of employees in each category, etc.?
- Are future equipment replacement costs included as investments as opposed to operations costs?
- Are available asset values considered and are such values adequately documented?
- Are cost collection and aggregation methods, correct?
- Are estimating relationships and procedures identified and properly supported?
- Are program costs expressed in constant dollars?
- Where inflation or cost escalation is used, have the factors been identified and validated?
- Are cash flows discounted at the proper discount rate using OMB Circular A-94 guidance?
- Are the sources of estimates identified? Are these sources accurate and appropriate?
- Are cost factors current and supportable?
- Is appropriate backup documentation, e.g., cost sources, data sheets and variable explanation sheets, provided to support cost estimates?
- Are cost estimates consistent with assumptions and constraints?
- Has the life cycle cost estimate been provided for all feasible alternatives?

4.4 Step Nine: Conduct Risk and Sensitivity Analysis

This section provides guidance on conducting a risk analysis and associated mitigation plans. After risks are identified, each risk factor should be defined in detail to ensure all PS BCA Team members are interpreting the risk in the same way. Care should be taken in this step to ensure there is no duplication or overlap in risk factors. Any duplication will inappropriately skew the risk analysis and invalidate the results. If methodologies that aggregate cost, benefit, and risk (e.g., AHP) are used in the PS BCA, it is particularly important to ensure elements of cost, benefit and risk are mutually exclusive. Any distortion in individual category results is amplified due to the weighting and scoring algorithms used with these methodologies. The process of comparing different COAs is not complete until a risk assessment is performed on each COA.

Risk should be treated separately from cost and benefits. The analysis of risk²⁵ should be based on probability and the impact of an event. One COA may be the most cost effective but could be assessed as high risk due to technical, operational, or other risk classifications.

It is difficult to discuss risk without discussing and defining the distinction between risk and uncertainty. Risk, in its simplest sense, is the chance (probability) of loss or injury. Uncertainty is the indefiniteness about the outcome of a situation in which both favorable and unfavorable events can occur. Risk is then the probability of an unfavorable event occurring that is the result of our uncertainty about a situation. In the sustainment of a weapon system, risk can be defined

²⁵ The DoD RIO Guidebook provides detailed information on analyzing risk. <https://www.cto.mil/wp-content/uploads/2023/11/RIO-2023-2-2.pdf>

as an uncertain event or condition that, if it occurs, can have negative effects on the implementation of the PSS. It addresses the potential variation in the planned approach and its expected outcome. While such variations could include positive as well as negative effects, this guidebook emphasizes the negative future effects (i.e., risk, not uncertainty).

Risk management for a PS BCA involves the identification of potential risks for each COA, assessing probability and impact of identified risks, developing a response to the risks, and finally monitoring risks over time. Risks should exhibit three key elements.

- **Future Root Cause.** A future root cause, which, if eliminated or corrected, would prevent a potential consequence from occurring.
- **Probability.** A likelihood assessed at the present time of that future root cause occurring.
- **Consequence.** The effect of that future occurrence.

4.4.1 Risk Analysis in a PS BCA

Each risk should be separately reviewed and assessed by comparing and quantifying factors such as probability and impact of occurrence. Risk analysis is critical—the level of risk can be a factor in eliminating or reducing the value of an alternative that is otherwise highly evaluated. For example, a particular alternative PSP may evaluate highly due to attractive labor rates for a particular workload which requires highly skilled personnel. However, further data reflects that the PSP has insufficient labor to accomplish the projected workload and must hire additional personnel to meet the requirement. The risk of hiring highly skilled personnel or training lower skilled personnel to accomplish the more complex workload is a significant organizational and technical risk and could lead to concluding that an alternate PSP with higher labor rates but adequate in-place skilled personnel is the best value option.

4.4.1.1 Risk Classification

Risk should be viewed as an undesirable implication of uncertainty. Risk can be estimated in terms of probability of occurrence and impact of occurrence. In certain situations, probabilities of various outcomes can be estimated, and the impact quantified. Risk can be classified as Business or Programmatic, Operational, Suitability, Process, Technical, Schedule, Organizational, Sustainability, Safety, and Environmental. (These classifications expand upon those identified in the DoD *Risk, Issue and Opportunity (RIO) Management Guide for Defense Acquisition Programs*.)

- **Business or Programmatic Risk:** Risk of undesirable consequences that affect the program's viability, affordability, and budget. For example, the unknown problems associated with managing product support providers; the risk associated with not anticipating all requirements when developing a contract and paying a premium for those requirements later. Other examples include poor performance on behalf of a product support provider, cost growth, and extended labor disputes.
- **Operational Risk:** Risk to the Warfighters' ability to perform the mission as planned. Included in operational risk is examining each alternative's impact on the readiness and performance of equipment. Examples include: *How would other alternatives affect the risk to the overall operations, how do the alternatives increase or decrease wartime effectiveness, and is there any potential degradation across the operational spectrum?*

- **Suitability Risk:** Risk to the availability and reliability of systems and support systems and other factors affecting the system's ability to be supported in its intended operational environment.
- **Process Risk:** The potential for undesirable performance in a newly established process that could cause failure to meet the expected performance or standards. An example of a process risk is a depot maintenance facility being unable to meet the requirements of a new process.
- **Technical Risk:** Risk associated with failing to develop or implement the technology necessary to institute process change or technologies that may render an alternative useless. Typically, technical risk increases with the use of immature technologies. Using systems engineering methodologies such as spiral development can mitigate some technical risks.
- **Schedule Risk:** Risk associated with time allocated for performing the defined tasks. This factor includes the effects of programmatic schedule decisions, the inherent errors in schedule estimating, and external physical constraints.²⁶
- **Organizational Risk:** Risk associated with difficulties in implementing a change within an organization. Implementing an effective communication and change management strategy can mitigate organizational risks.
- **Sustainability Risk:** Risk associated with addressing the needs of the present at the cost of the needs of the future. The PM may consider whether the alternative can balance economics (i.e., profit), efficiency, environment, safety, and social responsibility (i.e., impact on local community) in the long term. Note: Sustainability is different from Supportability, which is a key component of availability and addressed in the Suitability Risk category above.²⁷
- **Safety Risk:** Risk associated with exposing personnel to hazardous work environments. Unsafe conditions endanger the human capital of the organization and create legal liabilities.
- **Environmental Risk:** The chance of harmful effects to ecological systems resulting from exposure to physical, chemical, or biological stressors which may adversely affect specific natural resources or entire ecosystems. Damage to the local environment can drain organization resources for cleanup, litigation, and bad public relations.

4.4.1.2 Risk Prioritization

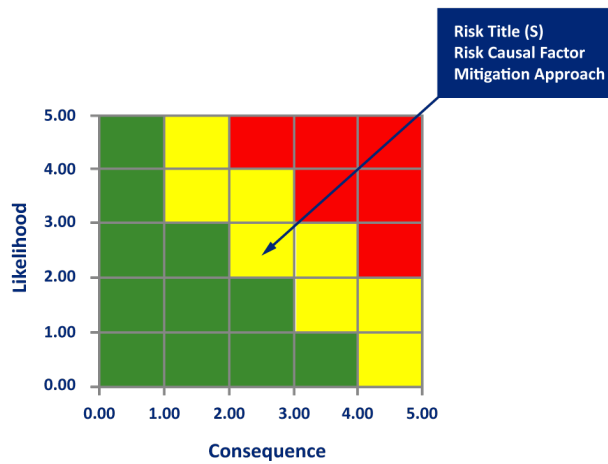
Risks are prioritized according to their potential implications for meeting the program's objectives. A common approach to prioritizing risks is to use a Risk Probability and Impact Matrix (see Figure 4-5, Sample Risk, Probability, and Impact Matrix from the September 2023 *DoD RIO Management Guide for Defense Acquisition Programs*). The specific combination of likelihood and impact that lead to a risk being rated as high, medium to moderate, or low overall effect on a risk scale between 1–5 is usually set by the organization. Also, provide a definition of the thresholds for high, medium, and low for the reader. There should also be a description of the

²⁶ <https://www.dau.edu/tools/risk-and-opportunity-rio-guide>, September 2023

²⁷ See <https://www.dau.edu/blogs/sustainment-vs-sustainability-updated-study-contrasts> for more information.

impact of the risk on the program or system (e.g., time delayed in days, loss of funds). The risk score helps guide and prioritize risk responses.

Figure 4-5: Sample Risk Probability and Impact Matrix



4.4.1.3 Mitigation Plans

After identifying, ranking, and prioritizing the risks, develop a mitigation plan. Adopting simpler processes, conducting more tests, or choosing a more stable supplier are examples of mitigation actions. Taking prompt action to reduce the probability or impact of a risk associated with the alternative is often more effective than trying to repair the damage after the risk has occurred. Mitigation plans may involve making tradeoffs in capabilities, cost, schedule, and performance. If budgets are cut, certain tradeoffs will be made (e.g., reduced capabilities, delayed schedule, lesser accepted performance). To make fully informed decisions on which course to take, leadership needs to understand the risks in all these areas. Essential elements of the risk mitigation plan include roles and responsibilities, risk analysis definitions, and risk thresholds for low, medium to moderate, and high risks.

Risk mitigation implies a reduction in the probability and impact of an adverse risk event to an acceptable threshold. However, the PM, PSM and PS BCA team should be aware that in some cases there are follow-on effects of risk mitigation. Mitigating risk in one area may have adverse effects in other areas of the program. Mitigation may require prototype development to reduce the risk of scaling up from a bench scale model of a process or product. Where it is not possible to reduce the risk probability, a mitigation response may lessen the impact by targeting linkages that determine the severity. Risk and risk mitigation strategies should inform and influence the sensitivity analysis section.

Critical Thinking Questions for PS BCA Risk:

- Assuming that a risk analysis has been performed, how were the probability estimates derived?
- Has an uncertainty analysis been performed? What technique was used (for example, a fortiori – making use of conclusions inferred from another reasoned conclusion or recognized fact – or contingency analysis)?
- What point values are driving the selected course of actions?
- What ranges or point values negate the recommended course of action?
- Were ranges of values used for unknown quantities?
- Were point values varied to illustrate impact?
- Has all relevant *What if?* questions been answered?

4.4.2 Sensitivity Analysis

Sensitivity analysis is a repetition of an analysis with different quantitative values for cost or highly variable GR&As to determine their effects for comparison with the results of the basic analysis. It is a tool that can be used for assessing the extent to which costs and benefits are sensitive to changes in key factors. Sensitivity analyses conducted on major unknowns for each feasible alternative can provide a range of costs and benefits that may provide a better guide or indicator than a single estimate. It is generally not sufficient to present the decision maker with a set of alternatives whose costs and benefits are based on *most likely* factors and assumptions. The decision maker needs to be informed about how well the rankings hold up under reasonable changes to factors and assumptions and describe how sensitive costs and benefits are to changes.

Ensure sensitivity analyses is accomplished to the depth and extent necessary to inform decisions on the PS BCA results. It becomes more critical when a PS BCA does not favor any one alternative or there is significant uncertainty about a cost element, benefit, other parameter, or assumption. Sensitivity analysis should explain what happens to costs and benefits if an underlying assumption changes or is proven incorrect, or how certain changes in inputs impact the output(s). Analyses should identify the *what if* scenarios or the confidence range for analysis results. These analyses can be performed using tools like Monte Carlo simulations (Discrete Event Simulations), sampling of variables, and emulator methods. Assumptions and contributing factors can include system service life (economic useful life), fleet size, repair workload, future labor and overhead rates. Sensitivity analysis can also be performed on subjective criteria weighting and prioritizing aspects of the analysis, especially those elements discussed in the Comparison of Alternatives section.

4.4.2.1 Addressing Risk and Uncertainty

Risk and uncertainty cannot be avoided because the future is unknown. While practitioners may have beliefs or opinions of what the future value of a variable (e.g., assumption or data item) they don't know for sure, even if opinions are based on analysis. Therefore, it is necessary to identify how *sensitive* the different COAs are to changes in GR&As and critical parameters. In the case of a PS BCA, sensitivity analysis attempts to isolate the effect of changing a variable's value across all COAs. Sensitivity analyses should be performed one variable at a time to see which variables drive substantial changes in cost and benefits. While one could adjust multiple variables at once to see their combined effects, this is generally referred to as scenario analysis rather than sensitivity analysis.

4.4.2.2 Variables and the Sensitivity Analysis

Sensitivity analysis is performed for each COA to determine cost and benefit behavior over the range of key variables' possible values. Variables may include GR&As, system performance within the alternatives, weighting, or critical parameters (data values). The variables chosen for sensitivity analysis are usually significant cost drivers and those whose values are the most uncertain. As described above, the effect of varying the value of only one variable is analyzed at a time. Sensitivity analysis demonstrates how strong or robust a recommended COA is. A recommendation is said to be strong or robust if it does not change over the wide range of a variable's possible values. Sensitivity analysis may yield one or more cost *cross over* or *breakeven* points, but a simplified *breakeven analysis* is generally not sufficient to be considered sensitivity analysis. Also, sensitivity analysis is generally not sufficient to quantify cost risk (i.e., the probability that the alternative will meet cost objectives), which should be determined through risk analysis.

4.4.2.3 Steps in Conducting Sensitivity Analysis

- **Identify the Key Variables to Examine.** Key variables can include ground rules, assumptions, cost drivers, risks, programmatic objectives, and benefit or cost values. It is also important to address known politically sensitive assumptions and issues such as shifts in depot workload or alternatives that would require an exception to policy.
- **Perform Sensitivity Analysis on a Selected Variable.** (Note: this step should be repeated for each variable). This step uses two approaches, and each approach provides different information. The first approach, called *graduated* sensitivity analysis, is to vary the value of the variable and record the results (i.e., output) of the model. This provides insight to the COA's cost behavior over the broad range of a variable's possible values. The second approach, called "break-even" analysis, identifies the point(s) at which the order of the COAs change. In other words, this analysis looks at how much each variable can change before there is a change in the ranking of COAs. Both approaches are valuable to the analysis and provide the decision maker important context about the recommended COA.
- **Document the Process and Individual Variable Results.** The methodology needs to be documented in enough detail to enable a reader to replicate the analysis, particularly for PS BCA revalidation. The analyzed variable, the way it was varied during the analysis, and the changes to the model's results (i.e., costs and benefits) as the value changed should be documented. Document results in the most understandable format (e.g., table, graph, bar chart, pie chart). That is, the format in which the results are presented should clearly convey the *big picture* and the implications for costs, benefits, and risks.
- **Repeat.** Repeat the above process until all key variables have been evaluated independently.
- **Display the Results.** Display the summary of results of sensitivity analysis in graphic or tabular form to highlight key points for the decision maker. For example, a stacked bar chart could be used to highlight the impact of specific benefits on specific alternatives, or a line graph could highlight the global (across all alternatives) sensitivity for critical parameters to include the tipping point where the recommended alternatives changes.

- Evaluate the Results.** Sensitivity analysis provides decision makers with a more comprehensive understanding of what drives change in cost, benefit, and risk scoring. It can provide information that can lead the decision maker to choose a different COA from the one recommended based solely on initial results, particularly if results for two or more COAs are similar. If minor changes in a variable's value change the recommended COA, the PS BCA should describe the circumstances under which the various COAs would be recommended, as well as the recommended alternative under different objectives (e.g., minimize cost, minimize risk, and maximize benefits, such as system performance). The goal is to provide the decision maker an understanding of the circumstances that would lead to a different recommendation under various parameters, particularly subjectively determined or qualitative ones.

Note to the Reader

For a useful example of sensitivity analysis including displaying and interpreting results, refer to DAFPAM 63-123, Section 10.

4.5 Step Ten: Conduct Comparative Analysis

Compare the baseline against the alternatives according to the identified selection criteria with the key stakeholders and approval from the governance body. Provide a value analysis that includes a narrative explaining the methodology and rationalization of comparison criteria. Finally, restate the methodologies and tools used to develop the conclusion. There may be a need for an incremental analysis approach for complex systems. The trade space among key analytical factors should be fully vetted and described to present a fully matured analysis and conclusions focused on providing the decision maker the richest understanding of the feasible choices and tradeoffs.

Note: Although an AoA is a different product from a PS BCA, both will include a comparative cost analysis. The OSD *CAPE AoA Cost Estimating Handbook* provides a framework for developing comparative cost analyses.

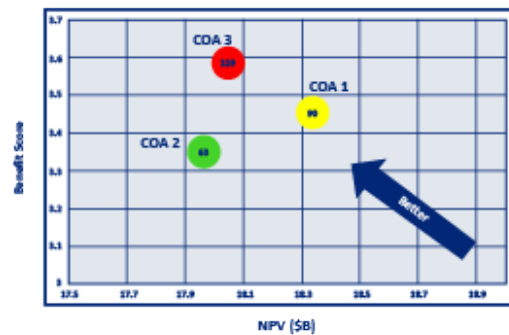
During final scoring and review, PS BCA stakeholders should determine, where applicable, the relative best value of alternative(s) that deliver benefits and cost within the trade space between desired and required outcomes. For example, would a significant increase in benefits warrant a relatively insignificant cost increase?

There are differing methods of evaluating alternatives and displaying results. Examples of two methods used by the Air Force are: 1) the Weighted Utility Score (WUS); and 2) Multi-Objective Decision Analysis (MODA).²⁸ The WUS method combines Cost, Benefit, and Risk into a single weighted score for each alternative and is generally displayed as a table or stacked bar chart to facilitate alternative comparison. The MODA approach provides a more visual display of results, plotting each alternative's Benefit score along the vertical axis and its Cost (e.g., Net Present Value (NPV) or total cost) along the horizontal axis. The Risk score (and

²⁸ Both are described in DAFPAM 63-123, Product Support Business Case Analysis, Section 8, at https://static.e-publishing.af.mil/production/1/saf_aq/publication/dafpam63-123/dafpam63-123.pdf

color) is displayed within or beside the *marker* plotting the Benefit vs. Cost. An example MODA chart is shown in Figure 4-6. Use of the WUS or MODA approach should be identified during PS BCA planning and documented in the charter (if used).

Figure 4-6: Example of Multi-Objective Decision Analysis (MODA)



Another method to display alternative recommendations is included in Figure 4-7. There is more information on displaying evaluation results in Step 6, Product Support Value Analysis, in the *DoD PBL Guidebook*²⁹.

Figure 4-7: Sample Comparison Chart

Overall Comparison of Alternatives	Financial							Non-Financial			Best Option
	NPV	Break Even	BCR	ROI	Cost (FY15-21) \$M	Unfunded (FY15-21) \$M	Savings (FY15-21) \$M	Requirements (Exceeds, Meets, Not Acceptable)	Operational Benefits (Significant, Moderate, Low, None)	Managed Risk (Low, Med, High)	
Alternative 1 (As-Is)	N/A	N/A	N/A	N/A		N/A	N/A				←
Alternative 2											
Alternative 3											

Acronyms:
 NPV: Net Present Value
 BCR: Benefit-Cost Ratio
 ROI: Return on Investment

4.6 Step Eleven: Writing the PS BCA Report

After the analysis is complete, the PS BCA Team should begin drafting the final report documenting the findings and recommendations. The report may follow this generic outline with tailoring for specific circumstances. The Component lead may have specific guidance for the PS BCA report. A brief description of each section follows in Table 4-1.

Table 4-1: Sample PS BCA Report Outline

Section 1: Executive Summary
Decision makers often read and analyze the Executive Summary first, making it a critical part of the overall PSS documentation. The Executive Summary should be written last even though it is usually the first section read. The Executive Summary should be concise, (generally no

²⁹ DoD [PBL Guidebook](#)

more than two pages in length), identify the problem statement in question, and highlight key elements of the recommendation. It should summarize mission and business impacts, risk and sensitivity analyses results, as well as briefly address other important sections as required to help the reader quickly understand the PS BCA's PSS recommendation.

The Executive Summary provides the recommended solution and why it is recommended over the competing alternatives. It should include a reference to each rejected alternative and how it compares to the recommended alternative in costs and benefits, pros and cons, and other relative merits established in the PS BCA. This comparison can be portrayed as a balancing of tradeoffs among alternatives for a more robust recommendation. At a minimum, the recommendation section should include:

- Key assumptions
- Brief description of the alternatives
- Description of the approach to executing the PS BCA
- Summary of objective weighting criteria and alternative scoring
- Description of the implementation plan at a level of detail necessary to support the recommendation.

Section 2: Introduction

This section includes the problem statement and background to begin the main body of the PS BCA Report. The introduction lays out much of the background and reasoning for conducting the PS BCA and helps to define the issue being addressed and supported by the analysis.

Provide necessary background on the organization, industry or market conditions, or other systems which create cost and performance drivers for the system being analyzed. Also include relevant background on historical precedents, previous PS BCA or PSS attempts, acquisition documentation such as AoAs, and stakeholders.

The PS BCA process should always build on itself to incorporate lessons learned and best practices and recommendations from previous iterations of a PS BCA. For example:

- If this is five years after a PS BCA or prior to a change in the strategy, document recommendations from the previous PS BCA
- Document the recommendation implemented from the previous PS BCA as the current baseline and compare to the alternatives.

Also include information on the scope of the PS BCA. Scope is the range of coverage encompassed by the BCA along with several dimensions such as time and functional areas of sustainment. A few examples include software (especially integration across platforms), depot repair, technical publications, diminishing manufacturing and material shortages, obsolescence management³⁰, and supply chain.

³⁰ DoDI 4245.15, Diminishing Manufacturing Sources and Material Shortages Management; <https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/424515p.PDF?ver=1nGN1Q4HzmReR3-nCo59UQ%3d%3d>

Section 3: Assumptions and Methods

In this section document the ground rules, assumptions, and methodology used in the execution of the PS BCA. Include any information on constraints that impacted the PS BCA assumptions and provide a description of how the constraints affected the analysis of possible alternatives.

Section 4: Alternatives Considered

Provide a description of each of the alternatives assessed in the PS BCA. Include a discussion on alternatives that may have been identified earlier but were not included in the PS BCA. Then give a detailed breakdown of each alternative including:

Section 5: Benefits and Cost Analysis

Describe key cost assumptions used in developing the cost estimate for each alternative. Define the life cycle period for the analysis, which will impact the cost estimate tables used in the PS BCA. Document discount rate and inflation rates used along with applicable dates/sources. Explain the confidence level in values and whether they represent low-, mid- or high-range estimates.

Describe non-cost related assumptions used for and how it impacts the alternatives. Explain why they are important and the extent to which they could affect the analysis or project results if they change. Examples of non-financial constraints include the Regional Sustainment Framework or DoD related statute or regulation that may limit alternatives.

Section 6: Risk Analysis and Mitigation Plans

Use narrative to summarize risks. For each alternative identify risk management actions and evaluate risk before and after risk management to determine which strategies are likely to have the most impact. Identify costs associated with risk management actions. Include any risks associated with assumptions. Provide visual assessment of risk within a risk cube in accordance with the *DoD RIO Management Guide for Defense Acquisition Programs*.

Section 7: Sensitivity Analysis

Elaborate on the variables subjected to sensitivity analysis and how it impacts each of the alternatives.

Section 8: Comparative Analysis Across the Alternatives

Compare the baseline against the alternatives according to the selection criteria identified during the PS BCA. Provide a value analysis that includes a narrative explaining the methodology and rationalization of comparison criteria. Finally, restate the methodologies and tools used to develop the conclusion. There may be a need for an incremental analysis approach for complex systems. The trade space among key analytical factors should be fully vetted and described to present a fully matured analysis and conclusions focused on providing the decision maker the richest understanding of the feasible choices and tradeoffs.

Summarize all the results of all the different analyses conducted in the PS BCA, across all alternatives. This should be a list of all alternatives, along with pros, cons, risks, and additional findings and observations for each.

Section 9: Recommendations and Implementation Plan

Recommendations provide closure to the PS BCA process and begin the transition to the selected PSS. Provide the rationale, justification, and supporting information for each recommendation. Other pertinent information to include is a roadmap and implementation plan that includes time for validation and approval of PS BCA, documenting or archiving the PS BCA, determining gaps, and documenting lessons learned.

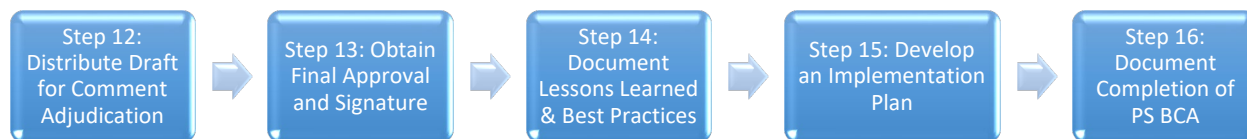
Critical Thinking Questions for the PS BCA Report

- Does the executive summary adequately state the problem, study objective, and significant criteria, assumptions, and constraints?
- Are the feasible alternatives clearly identified and differences explained?
- Is the recommended alternative adequately supported by referencing details of the analysis?
- Can an acquisition workforce member not associated with the PS BCA adequately understand the important context and results just by reading the Executive Summary?
- Was a specific course of action recommended?
- Does the analysis seem free of bias in favor of a particular alternative (for example, no benefits indicated for one or more of the alternatives, biased assumptions, etc.)?
- Are the recommendations logically derived from the material?
- Are the recommendations feasible in the real world of political or policy considerations?
- Are the recommendations based on significant differences between the alternatives?
- Do benefits exceed relevant costs for the preferred alternative?
- Have all significant differences between the recommended alternative and others been emphasized?

5 DISSEMINATE RESULTS OF THE PS BCA

The purpose of this section is to provide guidance on gaining approval of the Draft PS BCA report from the members of the governance structure. It also contains a description of a notional implementation plan, including communication planning and budgeting.

Figure 5-1: PS BCA Process, Steps 12-16



5.1 Step Twelve: Distribute Draft for Comment Adjudication

5.1.1 Component Decision and Documentation.

The PM or designee, often the PSM, will present the PS BCA briefing and recommendation (including the views of others) to the governance body and Sponsor, and to the MDA, as appropriate, for approval. The MDA should provide sufficient information so that the PM has formal documentation of the final decision, to include implementation trigger points (i.e., off-ramps) that would require the PM to come back to the MDA.

Note: Off-ramps are those situations that may cause the Program to go back to the other COAs and determine a new path forward. Refer to the Service lead for more information on developing and assessing off-ramps.

5.1.2 Comment Adjudication

Every attempt should be made to resolve substantive and critical comments at the lowest level possible. Where not possible, the PSM should consider adopting the GAO comment procedure that can be seen in the appendix of most GAO reports. This provides the organization an opportunity to comment on the study or recommendations to avoid the “accept or reject” process. This streamlines the approval process that is repeatedly cited as one of the lengthiest process segments in completing a PS BCA.

5.1.3 Final Review

The PS BCA sponsor should conduct a final review of the PS BCA and look for a PS BCA recommendation that is comprehensive, consistent, accurate, timely, and unbiased. The sponsor or the ultimate decision maker should document the reason for agreeing or disagreeing with the PS BCA recommendation. This final decision documentation serves as an archive, and combined with the PS BCA, provides the baseline for the next iteration of the PS BCA.

5.2 Step Thirteen: Obtain Final Approval and Signature

Following receipt of the decision selecting an alternate, the PM should document the final decision and any supporting rationale in the PS BCA report and attach an ADM if required. If the decision is different than the PM’s recommendation, the PM should document the decision and rationale and update the implementation plan to reflect the approved COA.

5.3 Step Fourteen: Document Lessons Learned and Best Practices

After the PS BCA is completed Program Office should endeavor to capture the lessons learned and share the best practices within the PEO, center or command, and when available, across the DoD. The program office should document the significant findings and observations to serve as valuable lessons learned and best practices for the process that could be of use by other programs who are going through their own PS BCA analysis.

5.4 Step Fifteen: Develop an Implementation Plan

In support of the decision process, the PM should develop a detailed implementation plan (see Table 5-1) and summarize it within the LCSP as needed (for the recommended COA only). The implementation plan builds and expands upon the preliminary transition plan for the recommended COA. The development of the PS BCA Implementation Plan may include a Communications Plan, Budget Proposal, Change Management Plan (including Stakeholder Action Plan), and Training Plan, amongst others. The PMO should develop an executable implementation plan, detailed schedule, and off-ramps for implementing the approved PS BCA COA. The PMO should identify each task required to implement the solution and ensure a timeline/schedule for each task is developed and that a fully integrated schedule is established for full implementation of the approved COA.

With a well thought-out, high-level project plan, the PM or PSM will be able to communicate, coordinate the tasks, and manage the risks necessary for a successful transition throughout the pilot, implementation, and sustainment phases. The well thought out Implementation Plan may also help validate or uncover aspects of a recommendation that were not previously considered.

Implementation plans should have specific events tied to specific, achievable milestones that factor in technological, cost, and schedule risk. Ensure the plan includes steps for how the program office plans to fund the decision. Identify the type of approach to implementing the preferred alternative, for example one large project, several smaller projects or a combination of both. Brief the implementation or action plan with all stakeholders to verify that all necessary tasks are accounted for, are in their proper sequence, and are assigned to appropriate organizations or individuals. PS BCA preparers should make sure the implementation plan is consistent with scheduled costs and budgets elsewhere in the PS BCA.

Table 5-1: Example of an Implementation Plan³¹

Section	Implementation Plan Outline
1	Management Overview
2	Description of Implementation and Approach
3	Points of Contact
4	Configuration Management of the Plan
5	Major Tasks to Implement the Recommendation Detailed Schedule & Timeline for Each Task IMS for overall plan (integrated across all tasks)
6	Security

³¹ Department of the Air Force Pamphlet (DAFPAM) 63-123, Product Support Business Case Analysis

7	Implementation Support; Hardware, Software, Facilities, Material
8	Personnel Requirements/Staffing
9	Training
10	Implementation Team
11	Customer Engagement
12	Performance Monitoring
13	Cost and Schedule Management
14	Status Reporting
15	Off-Ramp Plan
16	Go/No Go Decision
17	Post Implementation Verification

5.4.1 Elements of the Communication Plan

Without effective communication, key stakeholders may miss vital information. Customers might not be aware of the plans for a new way of doing business and raise concerns about how the proposed alternative would meet their needs. The other military Services, Defense Agencies, or the Joint Staff may need to be informed of the PS BCA recommendation. Oversight groups such as OSD, OMB, Joint Staff, or Congressional staff may need to be informed or require approval of the PS BCA recommendation through the budget formulation process if not by any other means.

Provide a communications plan³² for the selected alternative (see Table 5-2 for a notional example). Focus on increasing integrated efforts, strategic messaging, and clear communication of desired actions. The best way to approach communication is to develop a clearly planned approach or strategy. Address the means, methods, and messages—including who will issue messages—along with a schedule for delivery. Explain the initiative to stakeholders and other parties impacted by the proposed new way of doing business.

³² Reach out to appropriate offices to assist with developing the communications plan (i.e., Public Affairs Office, Legislative Liaison Office, etc.)

Table 5-2: Notional Communications Plan

Target Audience	Objective	Communication Tool	Responsible Party	Due Date	Costs?
Identify the Target Audience by considering the following: <ul style="list-style-type: none"> • Who will benefit from the PS BCA decision implementation? • Who, if any party, will view the recommendation negatively? • Who are the key stakeholders? • Who are the stakeholder groups and target audience within them? 	What do you intend to communicate to the stakeholder groups? What are the key points stakeholder groups need to understand and act upon?	What communication methods and tools are most appropriate for the stakeholder groups? e.g., electronic, verbal, written	Who will be responsible for implementing each action?	When must the action be implemented?	What are the costs associated with each action?

Critical Thinking Questions for the Implementation Plan and Communication Plan

- Does the communication plan show a reasonable plan for spreading the word about the proposed business process to all affected parties?
- Does the implementation plan spell out in sufficient detail the actions different offices or organizations will need to take to implement the new way of doing business?
- Does the plan include reasonable steps that are sequenced in proper order to get from the “as-is” to the “to-be” state of business?
- Do steps in the plan acknowledge any barriers to implementation and allow time and a reasonable plan of action to overcome implementation barriers?

5.4.2 Budget Proposal

Provide a budget proposal in line with the Services’ annual program and budget process in concert with the Planning, Programming, Budget and Execution (PPBE) calendar based on the PS BCA analysis and recommendations. Identify the amount of funding required for each phase of the recommended alternative, identify the source for these funds, and the current funding status. Be sure to understand and account for any restrictions associated with these funding sources. The budget plan should consider and address:

- What is the amount of funding from existing or previously submitted budgets for the existing operation that could be used for the new proposed operation?

- What is the amount of new funding, if any, needed to be requested by appropriation or major budget account?
- What is the rationale for requesting funds from these sources?
- What are the limitations on these funding sources?
- Will proposed funding require other existing or planned efforts or programs to go unfunded or have budgeted amounts reduced?
- What is the effect of funding impacts on organizations for the function or the organization proposing the new way of doing business?

Note: The PSM is encouraged to work with the PMO cost analyst to ensure that the strategy and results via life cycle cost impacts are accurately reflected in the LCCE.

5.5 Step Sixteen: Document Completion of PS BCA Requirement

Document the completion of the PS BCA process by inserting a copy of the document in the appropriate Appendix in the Program Office LCSP. If the process results in an updated PS BCA (revalidation) that confirms the results of the previous PS BCA, provide a Memorandum for the Record, as described in Appendix D of this guidebook, and place a copy in the appropriate LCSP PS BCA Annex.

6 PS BCA REFERENCES AND SOURCES OF INFORMATION

Statutory Requirements, DoD Policy and DoD Guidance (with embedded links)

- [Section 4324, Life-Cycle Management and Product Support, of Title 10, United States Code](#)
- [Office of Management and Budget, Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs](#)
- [DoD IT Business Case Analysis Template](#)
- [DoD Instruction 3110.05, Sustainment Health Metrics in Support of Materiel Availability](#)
- [DoD Directive 5000.01, The Defense Acquisition System](#)
- [DoD Instruction 5000.02, Operation of the Adaptive Acquisition Framework](#)
- [DoDI 5000.73, Cost Analysis Guidance and Procedures \(replaced DoD 5000.4-M\)](#)
- [DoDI 5000.85, Major Capability Acquisition](#)
- [DoDI 5000.91, Product Support Management for the Adaptive Acquisition Framework;](#)
- [DoDI 7041.03, Economic Analysis for Decision-making](#)
- [DoD Product Support Manager Guidebook](#)
- [DoD Performance Based Logistics Guidebook](#)
- [DoD Operating and Support Cost Management Guidebook](#)
- [Cost Assessment & Performance Evaluation \(CAPE\) Operating & Support Cost Estimating Guide](#)
- [DAU Product Support Analytical Tools database](#)

Service-specific guidance

Air Force

- [AFI 63-101/20-101, Integrated Life Cycle Management](#)
- [Air Force Manual \(AFMAN\) 65-506, Economic Analysis](#)
- [Department of the Air Force Pamphlet \(DAFPAM\) 63-123, Product Support Business Case Analysis](#)

Army

- [Army Regulation \(AR\) 11-18, Army Programs: The Cost and Economic Analysis Program](#)
- [Department of the Army Pamphlet \(DAPAM\) 700-127, Integrated Product Support Procedures](#)

- [Army Cost Analysis Manual 2020 edition](#) (Requires CAC to access.)

Navy

- [Secretary of the Navy Instruction \(SECNAVINST\) 5000.02G, Department of the Navy Implementation of the Defense Acquisition System and Adaptive Acquisition Framework](#)
- [Naval Sea Systems Command Instruction \(NAVSEAINST\) 4000.8, Policy for BCA in the Evaluation of PS Alternatives](#)
- [Naval Air Systems Command \(NAVAIR\) BCA Best Practices in “Performance Based Logistics \(PBL\) Guidance and Best Practices” Memo](#)

Defense Acquisition University (DAU) resources

- [ACQuipedia article, Product Support Business Case Analysis](#)
- [LOG 0150, PS BCA \(Online Course\)](#)
- [LOG 3400, Life Cycle Product Support \(Instructor-led Course\)](#)

7 ACRONYMS AND GLOSSARY

7.1 Acronyms

ACRONYM	MEANING
AAF	Adaptive Acquisition Framework
ACAT	Acquisition Category
ADM	Acquisition Decision Memorandum
AHP	Analytical Hierarchy Process
Am	Materiel Availability
Ao	Operational Availability
AoA	Analysis of Alternatives
APA	Additional Performance Attributes
ASD(S)	Assistant Secretary of Defense, Sustainment
BCA	Business Case Analyses
BCR	Benefit-Cost Ratio
CAPE	Cost Assessment and Program Evaluation
CDD	Capability Development Document
CER	Cost Estimating Relationship
COA	Course of Action
CONOPS	Concept of Operations
CPD	Capability Production Document
CSA	Commercial Services Agreement
CSDR	Cost and Software Data Reporting
DASD(PS)	Deputy Assistant Secretary of Defense, Product Support
DBS	Defense Business Systems
DAU	Defense Acquisition University
DMPS	Decision Matrix for Product Support
DoD	Department of Defense
DoDI	Department of Defense Instruction
DSOR	Depot Source of Repair
EMD	Engineering and Manufacturing Development
EVAMOSOC	Enterprise Visibility and Management of Operating and Support Cost
FAQ	Frequently Asked Questions
FMS	Foreign Military Sales
GAO	Government Accountability Office
GR&A	Ground Rules and Assumptions
ILA	Independent Logistics Assessment
IOC	Initial Operational Capability
IP	Intellectual Property
IT	Information Technology

IPS	Integrated Product Support
IPT	Integrated Product Team
IRR	Internal Rate of Return
KPP	Key Performance Parameters
KSA	Key System Attributes
LORA	Level of Repair Analysis
LCC	Life Cycle Cost
LCCE	Life Cycle Cost Estimate
LCSP	Life Cycle Sustainment Plan
M	Maintainability
MCA	Major Capability Acquisition
MDA	Milestone Decision Authority
MDAP	Major Defense Acquisition Program
MOA	Memorandum of Agreement
MODA	Multi-Objective Decision Analysis
MOSA	Modular Open System Architecture
MOU	Memorandum of Understanding
MRO	Maintenance, Repair and Overhaul
MS	Milestone
MTA	Middle Tier of Acquisition
NPV	Net Present Value
O&S	Operations and Support
OEM	Original Equipment Manufacturer
OMB	Office of Management and Budget
OPTEMPO	Operational Tempo
OSD	Office of the Secretary of Defense
PBA	Performance Based Arrangement
PBL	Performance Based Logistics
PEO	Program Executive Officer
PM	Program Manager
PMO	Program Management Office
POA&M	Plan of Action and Milestone
POC	Point of Contact
PoR	Program of Record
PPP	Public Private Partnership
PSA	Product Support Arrangement
PS BCA	Product Support Business Case Analysis
PSI	Product Support Integrator
PSM	Product Support Manager
PSP	Product Support Provider

PSS	Product Support Strategy
R	Reliability
RAM-C	Reliability, Availability, Maintainability-Cost
R&D	Research and Development
RFP	Request for Proposal
RIO	Risk, Issue and Opportunity
ROI	Return on Investment
RSF	Regional Sustainment Framework
SAE	Service Acquisition Executive
SME	Subject Matter Expert
SLA	Service Level Agreement
SR	Sustainment Review
TOC	Total Ownership Cost
UCA	Urgent Capability Acquisition
VCNO	Vice Chief of Naval Operations
VFT	Value Focus Thinking
VVA	Verified, Validated and Accredited
WBS	Work Breakdown Structure
WSARA	Weapon System Acquisition Reform Act
WUS	Weighted Utility Score

7.2 Glossary

A complete Glossary of acquisition terms is maintained on the Defense Acquisition University website. The Defense Acquisition University Glossary is located at <https://www.dau.edu/glossary>

APPENDIX A – PS BCA REVALIDATION EXAMPLES

Preparing for a Milestone Review or Equivalent		
Evaluate the Following:	<p>1. Are the underlying ground rules and assumptions (GR&As) from the approved PS BCA changing?</p> <p>2. Will any of these changes significantly impact cost, benefits, or risks?</p> <p>3. Is there significantly more accurate and comprehensive current cost/benefit data available outside the range upon which the sensitivity analysis was performed that could lead to an update to the previously recommended/implemented Product Support Strategy (PSS)?</p> <p>4. Are there changes in the operational environment, such as potential incorporation into an RSF?</p> <p>5. Has scope of the program increased or decreased to such a degree that support considerations may change, such as use of commercial or organic depots? An example would be an increase in the number of end items that change the financial calculations for support opportunities.</p> <p>6. Is the Acquisition Pathway changing, such as Middle Tier of Acquisition (MTA) to Major Capability Acquisition (MCA), which may require a re-validation of the previous PS BCA?</p>	
	If the answer to any of the above is yes:	If the answers to all the above are no:
Action:	Update the previous PS BCA using the most current data available. Since the outcome has changed, this should require reviewing all areas within the PS BCA (i.e., costs, benefits, and risks). Incorporate any new information that has come available since the previous PS BCA was completed and update GR&As as appropriate. Update recommendations for the PSS and Implementation Plan.	Draft a Memorandum for the Record signed by the Milestone Decision Authority (MDA) or his/her designee with enough detail to show an acceptable level of analysis was completed to support the conclusion to not update the PS BCA.
Documentation:	Include the signed PS BCA with the Life Cycle Sustainment Plan (LCSP) and route to the appropriate MDA prior to the Milestone (MS) Decision.	Include the signed Memorandum with the LCSP with the previously approved PS BCA and route to the appropriate MDA prior to the MS Decision.
PS BCA Approver:	Acquisition Category (ACAT) 1D or Special Interest Programs: Route the LCSP to Assistant Secretary of Defense for Sustainment (ASD)(S)) via Deputy Assistant Secretary of Defense, Product Support (DASD) (PS)) for Signature with the approved (by Component) PS BCA included as an Appendix. ACAT 1C and below: Determined by Component	ACAT 1D or Special Interest Programs: Route the LCSP to ASD(S) via DASD(PS) for final signature with the Approved (by Component) PS BCA Memorandum included as an Appendix. ACAT 1C and below: Determined by Component

<p>Evaluate the Following:</p>	<p>The Product Support Strategy is Changing</p>
	<p>The Program should update the PS BCA when conditions within the program indicate the PSS is not performing as planned and new approach is required, for example:</p> <ol style="list-style-type: none"> 1. The program isn't meeting requirement goals such as Am, Ao, R, M, cost/day of availability, and O&S) cost. 2. The program is going through a change significant enough to make the current PSS obsolete. This could include a shift in life cycle such as moving into sundown, where the number of units is so reduced that a new support strategy would be better suited to the situation. 3. The current provider is no longer capable of supporting the system. 4. Changes in operational environment, such as potential incorporation into an RSF. 5. A scope increase in the program is significant enough to change underlying assumptions to a degree that financial considerations are impacted. This could include bringing new maintenance and repair options into consideration. 6. Is the Acquisition Pathway changing, such as MTA to MCA, which may require a re-validation of the previous PS BCA?
	<p>Update the PS BCA to support recommendations for a new PSS</p>
<p>Action:</p>	<p>Update the previous PS BCA using the most current data available. Since the outcome has changed, this should require reviewing all areas within the PS BCA (i.e., costs, benefits, and risks). Incorporate any new information that has come available since the previous PS BCA was completed and update GR&As as appropriate. Update recommendations for the PSS and Implementation Plan.</p>
<p>Documentation:</p>	<p>Include the signed PS BCA as an Annex in the updated and approved LCSP.</p>
<p>PS BCA Approver:</p>	<p>ACAT 1D or Special Interest Programs: Route the LCSP to ASD(S) via DASD(PS) for Signature with the approved (by Component) PS BCA included as an Appendix</p> <p>ACAT 1C and below: Determined by Component</p>

The Program is at the Five-Year Revalidation Point		
Evaluate the Following:	<p>1. Have any underlying assumptions changed? Does the change impact cost, benefits or risks or risks that could lead to an update to the previously recommended/implemented PSS?</p> <p>2. Is there enough information now available that could lead to a change to the previously recommended/implemented PSS?</p> <p>3. Evaluate current cost/benefit data - is there more accurate and comprehensive data available that could lead to a change to the previously recommended/implemented PSS?</p> <p>4. Evaluate requirement goals such as Materiel Availability, Operational Availability, Reliability, Maintainability, and Operating and Support Costs.</p> <p>5. Are there changes in the operational environment, such as potential incorporation into a RSF that should be considered?</p> <p>6. Has scope of the program increased or decreased to such a degree that support considerations may change, such as use of commercial or organic depots? An example would be a reduction in the number of end items that change the financial calculations for support opportunities.</p> <p>7. Is the Acquisition Pathway changing, such as MTA to MCA, which may require a re-validation of the previous PS BCA?</p>	
	If the answer to any of the above is yes:	If the answers to all the above is no:
Action:	Update the previous PS BCA using the most current data available. Since the updated PS BCA may change the PSS, this should require reviewing all areas within the PS BCA (i.e., costs, benefits, and risks). Incorporate any new information that has come available since the previous PS BCA was completed and GR&As as appropriate. Update recommendations for the PSS and Implementation Plan. Update the LCSP.	Draft a Memorandum for the Record signed by the MDA with enough detail to show an acceptable level of analysis was completed to support the conclusion to not update the PS BCA.
Documentation:	Include the signed PS BCA with the updated LCSP and route to the appropriate signature authority. If this is being done in conjunction with a Sustainment Review (SR), provide as drafts for the SR and update/approve the PS BCA and LCSP after the SR is complete.	Include the signed Memorandum with the LCSP with the previously approved PS BCA and route to the appropriate MDA for signature. If this is being done in conjunction with a Sustainment Review, provide as drafts for the SR and update/approve the PS BCA and LCSP after the SR is complete.
PS BCA Approver:	ACAT 1D: Route the updated LCSP via DASD(PS) for ASD(S) signature and include the approved PS BCA as an Appendix ACAT 1C and below: As designated by Component Leads	ACAT 1D: Route the updated LCSP via DASD(PS) for ASD(S) signature and include the approved PS BCA Memorandum as an Annex along with the previously approved PS BCA. ACAT 1C and below: As designated by Service Leads

APPENDIX B – FREQUENTLY ASKED QUESTIONS

Question: Why are PS BCAs important?

Answer: A PS BCA is important to help the Program Manager (PM)/Product Support Manager (PSM) in developing and analyzing cost-effective product support strategies. Per Section 4324, Life-Cycle Management and Product Support, of Title 10, United States Code, the PSM must conduct appropriate cost analyses to validate the Product Support Strategy (PSS), including cost-benefit analyses as outlined in Office of Management and Budget (OMB) Circular A-94, and revalidate any business-case analysis performed in support of the PSS prior to each change in the PSS or every five years, whichever occurs first.

Question: My program will be organically supported. Why is it necessary to do a PS BCA?

Answer: Even for programs with direction to establish organic support, a PS BCA is useful in determining the cost, benefit, risk, and sensitivity analysis of various alternatives. For example, the PS BCA could evaluate use of a Public-Private Partnership with an industry product support integrator or provider to mitigate concerns with delivery of intellectual property or spare parts. Or the PS BCA could evaluate a Performance Based Logistics (PBL) approach versus a transactional approach or a mix of approaches within the Decision Matrix for Product Support for various subsystems or components. The PS BCA may uncover additional factors that improve performance and/or reduce cost that were overlooked or assumed not available with an organic strategy.

Question: My program is small and without many resources to support a PS BCA. What are my options to complete this requirement?

Answer: A BCA does not necessarily need to be costly or time-consuming. It should be tailored to meet the needs of the program and the upcoming decision point or revalidation. In addition, PSMs should explore opportunities to accomplish a BCA *in-house* with government Subject Matter Experts such as the Navy's Price Fighter organization.

Question: If a legacy program never completed a PS BCA and has a stable PSS, is it necessary to complete a PS BCA?

Answer: The PSM for the program should consult with the Military Department responsible for PS BCA guidance. Acquisition Category (ACAT) 1D programs should also consult with Deputy Assistant Secretary of Defense for Product Support (DASD)(PS) for further guidance.

Question: How do I determine if a change to the program or PSS is of enough significance to trigger a re-validation PS BCA?

Answer: Refer to the Table in Appendix A. In general, "significance" is in the eye of the beholder, meaning decision makers such as the Warfighter, PM, and Milestone Decision Authority (MDA). While DoD does not establish thresholds to objectively determine significance for PS BCAs, practitioners should evaluate the percentage change (e.g., in availability, reliability, O&S cost) and utilize critical thinking to make judgements. The Sustainment Review criteria for covered systems, such as a 25 percent increase in O&S cost growth as *critical*, may serve as a guide absent additional Component policy on this matter. (Note: The Updated DoDI 3110.05 establishes other criteria, including availability and cost changes, triggering reporting that could serve as a guide to assessing *significance*).

Question: How much time do product support PS BCAs generally take to prepare/complete?

Answer: A relatively straightforward analysis for a low value component may be done in a few days to a few weeks. A subsystem PS BCA may take six months or more, and the most complex platform-level PS BCAs could take 12-18 months or more. The time required to perform a PS BCA is determined by the complexity of the alternatives being evaluated. This analysis provides information required by the PM and PSM to evaluate the support alternatives and select one. The analysis should not require greater effort or cost than warranted by the decision being made. It should give a clear comparison of each alternative in terms of cost, benefits, and risk to aid the PM in selecting the alternative that meets Warfighter requirements at lowest O&S cost.

Question: Who is responsible for the development of the PS BCA?

Answer: The PM is accountable and the PSM is responsible for the PS BCAs. However, anyone who needs a disciplined process for informed decision making should include PS BCAs in their toolkit.

Question: Where can I find additional information about product support PS BCAs?

Answer: DAU provides extensive references and training via the DAU Website, including:

- [DoD Product Support Business Case Analysis \(PS BCA\) Guidebook](#)
- [DoD Product Support Manager \(PSM\) Guidebook](#)
- [Product Support Analytical Tools Database](#)
- [LOG 0150: Product Support Business Case Analysis](#)
- [BCE 1000: Fundamentals of Cost Estimating](#)
- [Product Support Business Case Analysis \(PS BCA\) ACQuipedia Article](#)

APPENDIX C – ELEMENTS OF A PS BCA CHARTER

A charter may be used to guide planning and execution of the PS Business Case Analysis. Elements of the charter should be tailored for the needs of the program and PS BCA and typically include:

- Authority – statutory (Section 4324 of Title 10, United States Code), regulatory (DoDD 5000.01, DoDI 5000.91, AAF pathway DoDI, and Component regulation), and program-level direction (e.g., Acquisition Strategy or Acquisition Decision Memorandum)
- Purpose – why the PS BCA is being conducted (e.g., to support a Milestone decision or the Product Support Strategy is changing) or revalidated (e.g., as required by Section 4324 of Title 10, United States Code).
- Problem Statement
- Scope
- Desired Outcomes
- Initial Ground Rules and Assumptions
- Baseline Description (*as-is* state of the PSS)
- Governance Structure
- PS BCA Schedule
- PS BCA Resources (e.g., personnel, funding, contract support)

The PS BCA team, led by the Product Support Manager (PSM), should develop the charter for approval by the Sponsor or as specified by the Component Governance Structure (if applicable). The charter should provide enough structure and detail to effectively guide the PS BCA but not be overly restrictive to permit the PS BCA team from utilizing creativity, innovation, and critical thinking.

If the charter requires a change during the execution of the PS BCA, the PSM (or designated PS BCA lead) should consult with the Sponsor to decide how best to obtain approval and document the change. Simple administrative changes or minor changes to the schedule should not require re-approval.

APPENDIX D – SUFFICIENCY MEMORANDUM FOR PS BCA UPDATE

Note: Include a copy of this memo in the LCSP within the PS BCA Annex.

[Date]

MEMORANDUM FOR RECORD

FROM: [organization]

SUBJECT: [program name] PS BCA Revalidation

References: (a) Title 10, United States Code, Section 4324

1. The purpose of this memorandum is to document that the [program name] Product Support Business Case Analysis has been re-validated.
2. List of re-validated assumptions.
3. Brief description of performance of the system within the PSS validated by the PS BCA.
4. In accordance with References (a), (b) and (c), I have determined that the appropriate analyses have been conducted to re-validate the PS BCA and that no further analysis of the [program name] is necessary at this time.
5. For any questions regarding this memo, please contact the [program name] Product Support Manager, [PSM Name], at DSN [XXX-XXXX].