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Acquisition

PRODUCT SUPPORT BUSINESS CASE ANALYSIS

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This Department of the Air Force Pamphlet (DAFPAM) complements Air Force Instruction (AFI) 63-101/20-101, *Integrated Life Cycle Management*. It provides informational guidance and recommended procedures for executing a Product Support Business Case Analysis (PS-BCA). Additional non-mandatory guidance on best practices, lessons learned, and expectations are available in the *Department of Defense Product Support BCA Guidebook*. To ensure standardization, any United States Space Force (USSF) or United States Space Force (USAF) organization supplementing this publication will send the implementing publication to the Assistant Secretary of the Air Force/Product Support and Logistics (SAF/AQD) for review and coordination before publishing. This publication applies to the Regular Air Force, the Air Force Reserve, the Air National Guard, and, unless and until such time as independent guidance is issued, the United States Space Force. It also applies to other individuals or organizations as required by binding agreement or obligation with the Department of the Air Force (DAF). **Note**: Until such time as the USSF issues its own guidance, all references to United States Air Force (USAF) terminology, units, and positions will also apply to the equivalent in the USSF, as appropriate. For example, references to Airmen will also apply to Guardians. References to MAJCOMs or NAFs will also apply to Field Commands. References to wings will also apply to deltas/garrisons. Air Staff roles and responsibilities (i.e. AF/A4) may also apply to the equivalent Office of the Chief of Space Operations (Space Staff) office (i.e. SF/COO, etc), as appropriate. For nuclear systems or related components ensure the appropriate nuclear regulations are applied as specified in AFI 63-101/20-101. Refer recommended changes and questions about this publication to the OPR listed above using Air Force (AF) Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate chain of command. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with

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SUMMARY OF CHANGES

This document has been substantially revised and should be completely reviewed. It reflects process improvements, evolving best practices, organizational structure changes, and administrative updates.

Chapter 1

OVERVIEW

1.1. Product Support Business Case Analysis (PS-BCA) Pamphlet Overview. Product Support Business Case Analysis (PS-BCA) Pamphlet. This is designed to assist the PS-BCA Team in developing comprehensive Product Support (PS) strategies that achieve the optimal balance between warfighter capabilities and affordability (i.e., best-value). The pamphlet covers key areas that the PS-BCA Team needs to consider when developing an effective PS-BCA. The pamphlet provides a standardized format, assists in developing and evaluating courses of action (COAs), recommends useful decision support methodologies that enhance defendable decision making processes, and provides guidance on developing the PS-BCA report. Additionally, the pamphlet provides examples and best practices, identifies existing laws, integrates Department of Defense (DoD) guidance located in the DoD Product Support BCA Guidebook (April 2011), and supplements existing Air Force Manuals (AFMANs) such as AFMAN 65-506, *Economic Analysis* (September 2019). The focus of the pamphlet is on Major Defense Acquisition Programs (MDAPs), however, the techniques provided can also be applied to any program using any acquisition pathway.

1.2. Business Case Analysis (BCA). A Business Case Analysis (BCA) is a decision support document that identifies COAs and then presents convincing business (both financial and non-financial) impacts, risks, sensitivities, and technical arguments for selecting a specific COA that will achieve desired objectives. A BCA provides a fair and objective study that leads to a decision, not justify a decision after the fact. Specifically, a BCA is a comparative analysis product that fits under the umbrella of the economic analysis approach. All BCAs are required to follow the guidance in AFI 65-501, *Economic Analysis,* and AFMAN 65-506.

AFMAN 65-506 provides more detailed information on the elements that must be addressed as part of the economic analysis approach whereas this pamphlet provides the standardized format for completing BCAs as well as lessons learned and best practices.

1.2.1. Introduction. Defines what the business case is about (subject), why (purpose) it is necessary, what the objectives are, and who the decision maker is for the BCA.

1.2.2. Problem Statement. Concisely defines the problem, requirement or opportunity being analyzed. What problem is trying to be solved and is it realistic? What is the scope of the analysis? The problem statement helps define the analysis framework.

1.2.3. Methods and Parameters. States the analysis methods and rationale that will fix the boundaries of the business case (the costs and benefits examined over what time period). This section also outlines the rules for deciding what belongs in the analysis and what does not. Facts, ground rules, and assumptions are parameters that must be explicitly stated on what is believed to be true of a current or identify future state of affairs. Further details regarding each of these parameters can be found in AFMAN 65-506, Section 2.4.

1.2.4. Business and Operational Impacts. Documents costs, benefits and non-monetary benefits impacting business and operational results for each COA.

1.2.5. Risk Analysis. Evaluates the probability of negative events occurring in each COA and their impact on desired objectives.

1.2.6. Sensitivity Analysis. Demonstrates how the BCA results are affected by changes in key variables such as assumptions, weightings, and key data drivers in the analysis. AFMAN 65-506 requires a sensitivity analysis to test the effect that major assumptions have on analysis results.

1.2.7. Recommendation and Implementation Plan. Recommends a preferred COA and the action plan required to achieve desired objectives.

1.2.7.1. Per the *DoD Product Support BCA Guidebook* and AFMAN 65-506, a BCA does not replace the judgment of the decision maker, but rather provides an analytic and uniform foundation that allows decision makers to make informed decisions. A BCA can vary in size and scope, is developed in an unbiased manner, and is not constructed to justify a preordained decision. A key element in constructing an effective BCA is acquiring sufficient data from reliable sources and then analyzing the information utilizing a consistent methodology. With the same data and comprehensive documentation, readers not familiar with the analysis should be able to replicate the analysis and arrive at the same conclusions.

1.3. Product Support Business Case Analysis (PS-BCA).

1.3.1. Decision Support Document. A PS-BCA is a decision support document that assists Product Support Managers (PSMs) in developing COAs for product support strategies using the best value approach, which incorporates Integrated Product Support (IPS) elements. **Attachment 1** defines best value per the Federal Acquisition Regulation (FAR).

1.3.2. PS-BCA Process. The PS-BCA is an iterative process that incorporates organizational or programmatic changes. PS-BCAs can be used for a number of purposes to include the following:

Determine whether or not to change Product Support Strategy (PSS)
Determine whether or not to invest in product support
Determine whether or not to select among COAs
Validate proposed scope, schedule, or budget changes during the course of the program

1.3.3. Product Support Decisions. The PS-BCA supports major product support decisions, especially those that result in new or changed resource requirements. Program Managers (PMs) are responsible for deploying the PSS and monitoring its performance according to the Life Cycle Sustainment Plan (LCSP). While the PS-BCA assists in the leaders' decision making process, it does not supersede or overturn other statutory requirements (e.g., 10 USC §2464, *Core Logistics Capabilities*, 10 USC §2466, *Limitations on the performance of depot-level maintenance of materiel.*

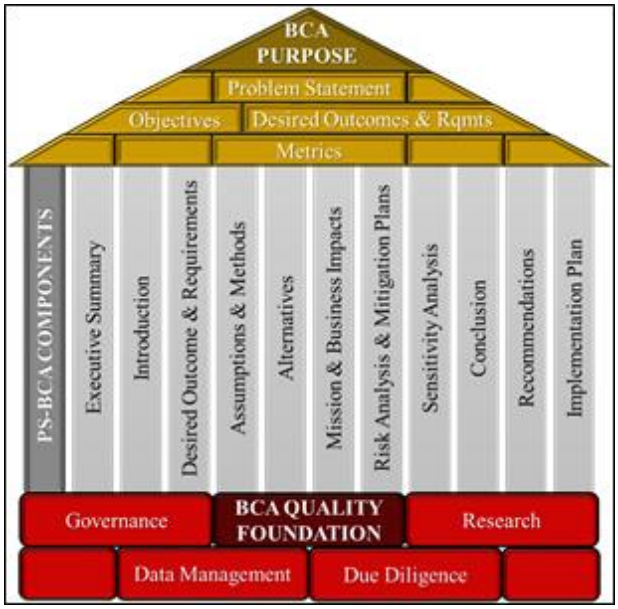
1.3.4. Major Elements. The PS-BCA has three major elements: purpose, process components, and quality foundation (see **Figure 1.1** below) that work together to ensure the PS-BCA targets the relevant subject matter, analyzes and reports the results, and integrates into the organization's mission and vision.

1.3.4.1. Purpose. Identifies the problem statement, objectives, metrics, desired outcomes, and requirements. The purpose annotates what problem the PS-BCA is attempting to solve and how to measure success.

1.3.4.2. Process Components. Subsections of the PS-BCA that directly execute and report on analytical actions. PSMs should refer to the *DoD PS-BCA Guidebook* and must follow guidance in AFMAN 65-506 to determine what to include in the components section. Of particular note, within the implementation plan, a PS-BCA should include predetermined off-ramps. These off-ramps are actions to be taken when the desired objectives are not being achieved for the selected COA.

1.3.4.3. Quality Foundation. Directly affects the quality and completeness of the analysis. This section consists of research, due diligence (verifying the accuracy of the information), governance (provides oversight), documentation, and data management.

Figure 1.1. Product Support BCA Elements.



1.3.5. Integrated Product Support (IPS) Elements. The PS-BCA is used to analyze a program's PSS and are represented by the 12 IPS elements, as identified in Appendix A of the *DoD Product Support Manager Guidebook*. 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. The IPS elements categorize major support areas and provide standardized definitions. One recommended approach in addressing the 12 IPS elements is shown in **Figure 1.2** The 12 IPS elements are 1) Product Support Management; 2) Design Interface; 3) Sustaining Engineering (SE); 4) Supply Support; 5) Maintenance Planning and Management; 6) Packaging, Handling; Storage & Transportation; 7) Technical Data; 8) Support Equipment; 9) Training and Training Support; 10) Manpower and Personnel; 11) Facilities and Infrastructure; and 12) Computer Resources. Of the 12 IPS elements, those most often compared between COAs within a PS-BCA are the following:

1.3.5.1. Product Support Management. Focuses on integrating all sources of product support, public and private, within the scope of a product support arrangement.

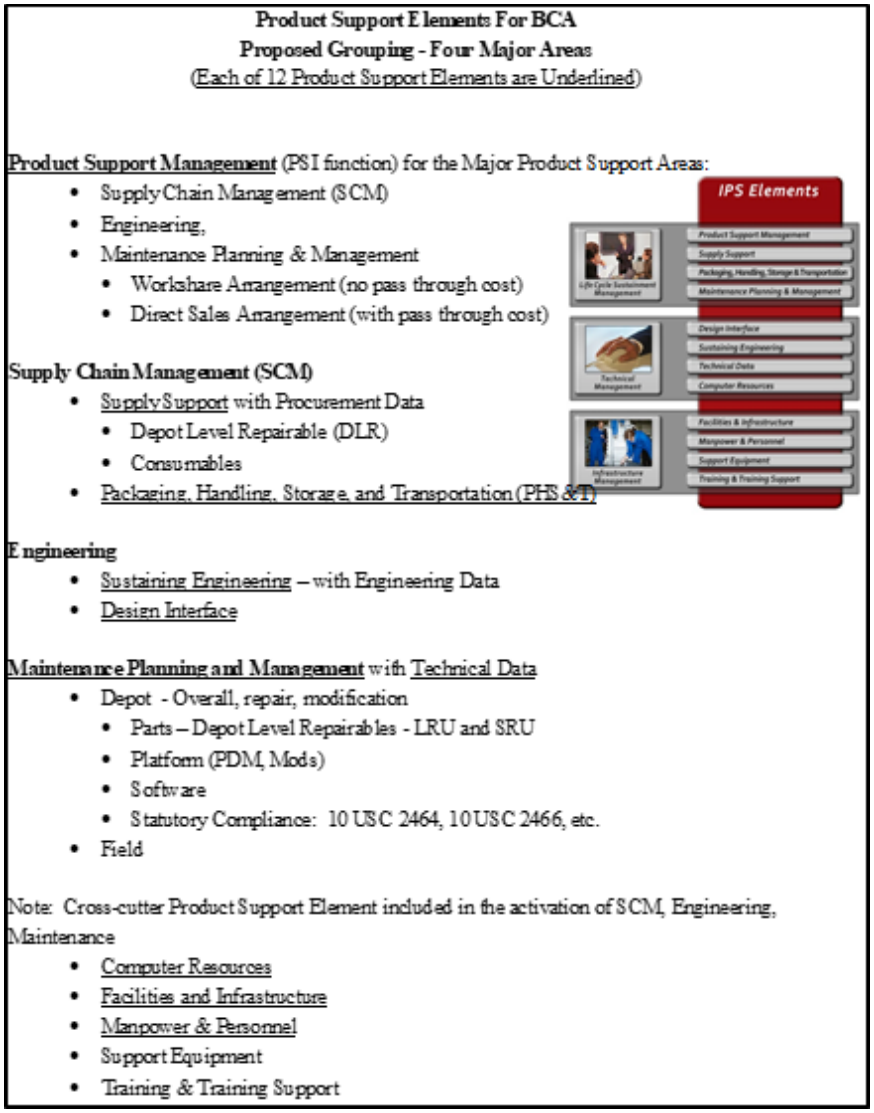
1.3.5.2. Sustaining Engineering. Examines the technical tasks (i.e., engineering and logistics investigations and analysis) required to ensure continued operation and

maintenance of a system. See AFI 63-101/20-101, Chapter 5, "Systems Engineering," for guidance on the engineering requirements that PMs will address to ensure the continued operation and maintenance of a system.

1.3.5.3. Supply Support. Focuses on procuring, producing, and delivering products and services to customers as well as the flow of funds.

1.3.5.4. Maintenance Planning and Management. Focuses on the maintenance of parts, assemblies, sub-assemblies, and end items. This might include manufacturing parts, making modifications, testing, and reclamation, as needed.

Figure 1.2. Four Major Areas for 12 IPS Elements.



1.3.5.5. The PS-BCA should follow the cost estimating guidance outlined in the DoD "*Cost Assessment and Program Evaluation (CAPE) Operating and Support Cost Estimating Guide 2014*" and be structured according to the IPS elements and the CAPE Cost elements.

1.3.5.5.1. Best Practice. The Program Management Office (PMO) should also plan to acquire government data rights and delivery of technical data as required by 10 USC §2320, *Rights in Technical Data*. Prior to Milestone (MS)-B, the PMO should develop a PS-BCA data collection plan that identifies the data requirements and data system access requirements for the analysis. Information such as demand history for supply chain (which parts are replaced or repaired and how often), maintenance repair procedures/process, and product support performance metrics (e.g., Customer Wait Time (CWT), engineering request response time) are types of information that can be captured. In addition, cost reporting and priced bill of materials with the appropriate amount of fidelity should be obtained if available.

1.4. When to Conduct a PS-BCA. The PS-BCA is a statutory requirement for all major weapon systems based on 10 USC §2337, *Life-Cycle Management and Product Support*. Air Force Instruction (AFI) 63-101/20-101 further identifies PS-BCA requirements as mandatory for Acquisition Category (ACAT) I and ACAT II programs and at the discretion of the Milestone Decision Authority (MDA) for ACAT III programs.

1.4.1. MDA Discretion. For existing platforms/systems, the MDA also has the discretion to initiate a PS-BCA. All modification programs that are classified as ACAT I or ACAT II programs also require a PS-BCA. PS-BCAs for modifications to ACAT III programs are at the discretion of the MDA. However, once modifications are in the sustainment phase, consolidate the modification PS-BCA into the system/platform level PS-BCA. The PS-BCA should begin as early as pre-MS-A or initial entry into the acquisition life cycle.

1.4.2. Objectives and Approach. PS-BCA objectives and approach are determined by the point at which they are accomplished within the program's life cycle.

1.4.2.1. Prior to MS-A and MS-B. Department of Defense Instruction (DoDI) 5000.02 states a BCA will be included as an annex to the LCSP. While there are challenges to completing a BCA early in the acquisition life cycle due to the lack of data and system information available, DoDI 5000.02 directs a BCA to be accomplished in support of the MS-A decision. This BCA includes "the assumptions, constraints, and analysis used to develop the product support strategy documented in the LCSP." This comprises the BCA scope and methodology, laying the groundwork for product support management and integration, supply chain management, and maintenance planning. Defining these areas early provides the framework to assess options for potential future COAs and solidifies the methodology for conducting the PS-BCA. PS-BCAs prior to MS-A and B may be limited in depth and detail when compared to a PS-BCA at MS-C and later.

1.4.2.2. Between MS-B and MS-C. A PS-BCA that fully examines the system's PSS should be completed prior to MS-C using a best value approach for PSS development that addresses each IPS element. A "revalidation" of previous PS-BCAs is statutorily required if five years or more will span between milestones. The revalidation should confirm the strategy is progressing and update the data and analytical results.

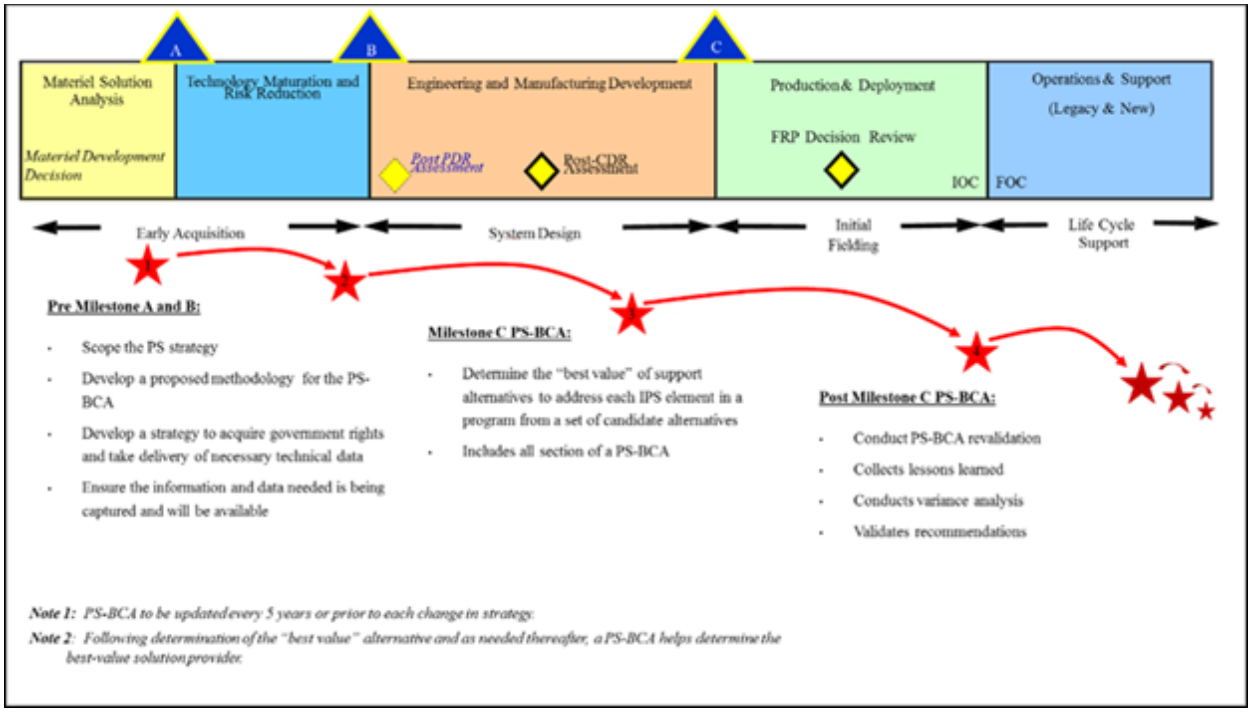
1.4.2.3. Post MS-C. A PS-BCA requires revalidating/updating prior to any proposed change in the PSS or at a minimum every five years. Follow the decision tree in section 1.3.1 to determine if a program should accomplish a PS-BCA if a PS-BCA has not been accomplished previously. The same level of analysis may not be required in all cases for a Post MS-C PS-BCA. If the situation allows, a PS-BCA may only require "revalidation"

of the previous analysis, by confirming the strategy is progressing and updating the data and analytical results. **Note**: Programs that are post MS-C prior to the enactment of 10 USC §2337, *Life-Cycle Management and Product Support*, did not have the legislated requirement to develop a PS-BCA prior to

MS- C. As a result, they are not required to perform a PS-BCA as part of their 5-year revalidation. A PS-BCA is still required when determining a change to the PSS.

1.4.2.4. The level of detail in a PS-BCA differs according to where the program is in the life cycle, as shown in **Figure 1.3**:

Figure 1.3. PS-BCA Schedule Throughout the Life Cycle.



1.4.2.5. Given the product support COAs may evolve as the life cycle progresses, there is no standard set of support COAs for a PS-BCA. Best value product support approach may include some mix of organic (e.g., government) and contractor support, as well as Public-Private Partnerships (PPP). DoD Public-Private Partnering (PPP) for Product Support Guidebook provides greater fidelity on PPP. The potential COAs should materialize through the execution of the PS-BCA process. The merits of various sourcing and partnering options should be identified as system support capabilities are analyzed across the IPS elements and various support COAs are weighted against desired support requirements and objectives.

1.4.2.6. The PS-BCA decision tree in section 1.4.3.1 is designed to assist the PSM in determining what actions are required with respect to either developing a PS-BCA or revalidating/updating the previously completed PS-BCA. At each step within the process the narrative addresses the requirements and expected objectives. Revalidating/updating the PS-BCA does not mean completely redoing the PS-BCA every five years. As the PSM works through each step, the decision tree process assists in determining the requirements

(i.e., Memorandum for Record (MFR) to document findings or update previous PS-BCA) and outputs.

1.4.3. PS-BCA Decision Tree

1.4.3.1. Step 1: PS-BCA been previously completed for THIS program?

Figure 1.4. Step #1 of the PS-BCA Decision Tree.

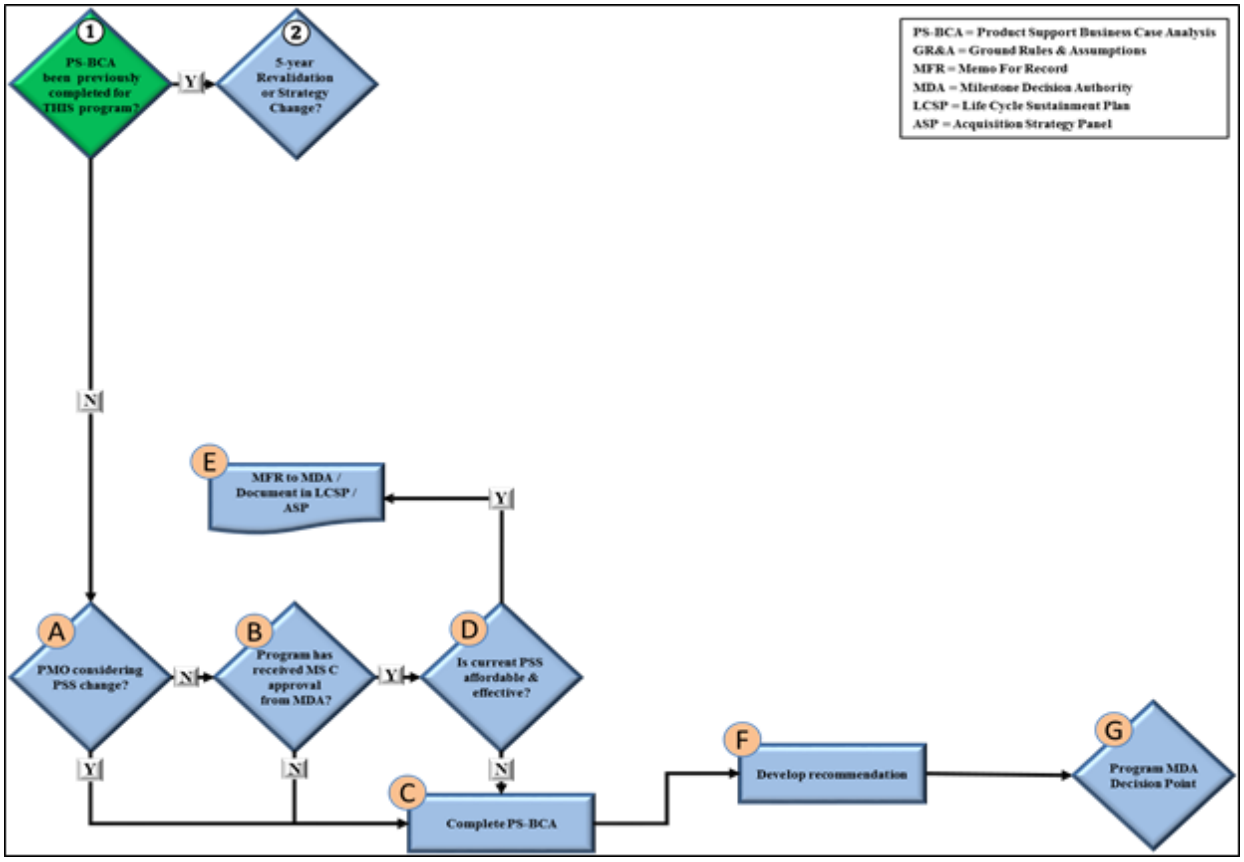


Table 1.1. Step #1 Decision Tree Process Flow.

Step	What Happens	
❶ **PS-BCA** BEEN PREVISOULY COMPLETED FOR **THIS** PROGRAM**?**		
	Establish if a PS-BCA was previously completed. If a PS-BCA was completed, consider this effort an update. Utilize the previously completed PS-BCA as the starting point.	
	If Yes (Previous PS-BCA completed)	If No (No previous PS-BCA)
	Continue to "Step (2) 5-year Revalidation or Strategy Change"	Continue to "(A) PMO Considering PSS Change"
A	Determine if the PMO is considering a change to the existing Product Support Strategy	
	If Yes (Change to PSS Change)	If No (No change to PSS)

Step	What Happens	
	Continue to "(C) Complete PS-BCA	Continue to "(B) Program has received MS-C approval from MDA?
B	Determine if program has received MS-C approval?	
	If Yes (Program has received MS-C from MDA?)	If No (Program does not have MS-C approval from MDA)
	Continue to "(D) Is current PSS affordable & effective?	Continue to "(C) Complete PS-BCA
C	Complete PS-BCA Complete a PS-BCA in accordance with the following guidance: AF PS-BCA Pamphlet AFI 65-501 AFMAN 65-610 DoD PS-BCA Guidebook *Continue to Activity (F)*	
D	Establish if current PSS is within expected costs and metrics are achieving warfighter requirements.	
	If Yes (PSS achieving goals)	If No (PSS not achieving goals)
	Continue to "(E) MFR to MDA / Document in LCSP"	Return to Activity "(C) and complete PS-BCA"
E	MFR to MDA / Document in LCSP Prepare a memo for the record that documents the results of the analysis performed. Memo for record includes rationale for the assessment of affordability and effectiveness of the program. This documentation should be included in an annex within the LCSP. MDA documentation and updates should be annexed within LCSP. Attachment 2 provides a sample Legacy Program PS-BCA Sufficiency Memo. *Process ends after this step*.	
F	Develop Recommendation Summarize the findings in a clear and concise manner that explains the recommended solution and why it is recommended. Make reference to the other COAs and how they compare to the recommended COA in costs, benefits, and risks. The recommendation should be specific, comprehensive, measurable, consistent, accurate, timely, unbiased, and achievable. *Continue to activity (G)*	
G	Program MDA Decision Point Present the recommendation to the MDA for approval. The MDA should document the rationale for the PS-BCA final decision. 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. The MDA decision provides closure to the process and initiates the transition to the selected PSS. MDA documentation (MFR to MDA) and updates should be annexed within LCSP. *Process ends after this step.*	

1.4.3.2. Step 2: 5-year Revalidation or Strategy Change

Figure 1.5. Step #2 of the PS-BCA Decision Tree.

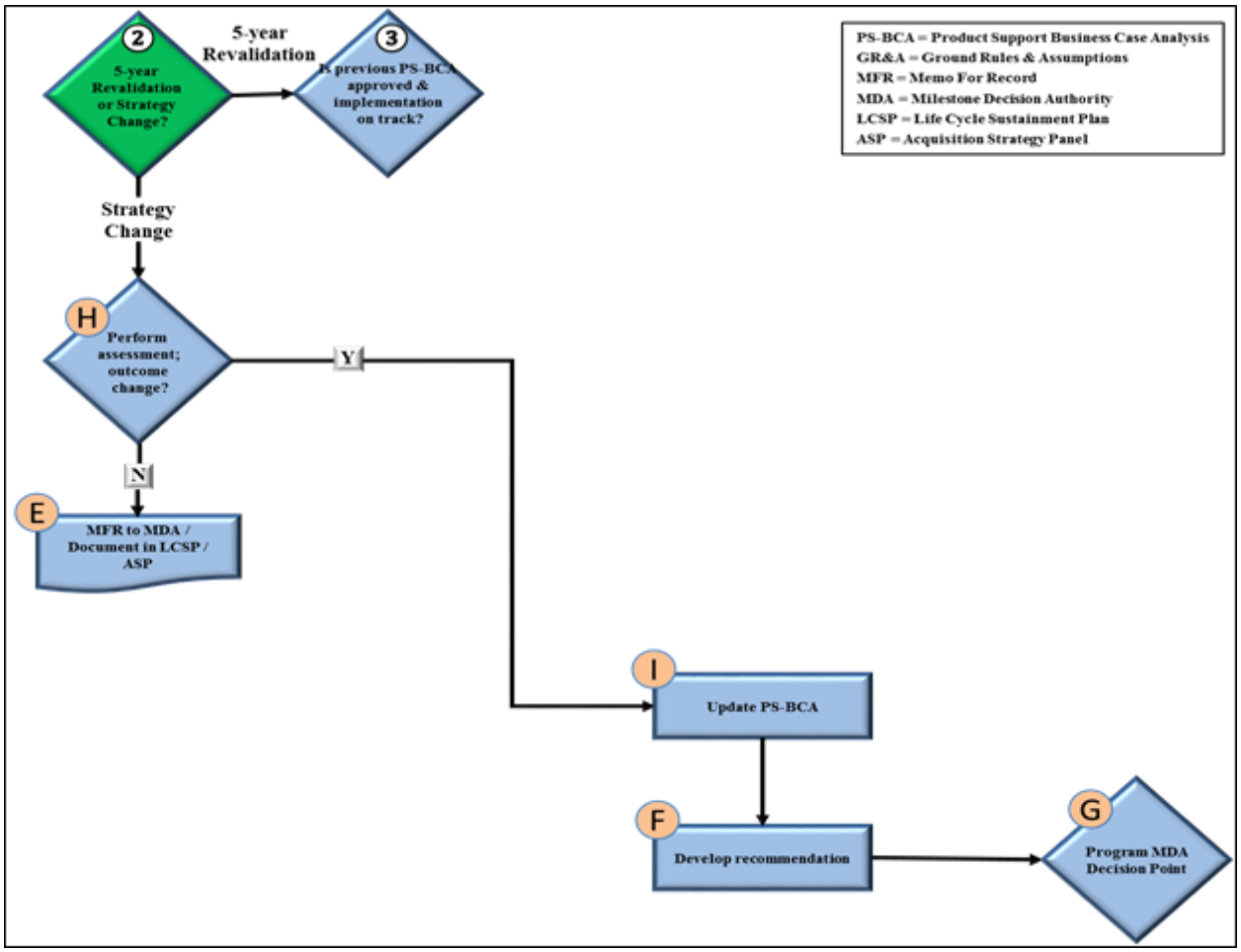


Table 1.2. Step #2 Decision Tree Process Flow.

Step	What Happens	
❷ 5-YEAR REVALIDATION or STRATEGY CHANGE?		
	If a PS-BCA was completed previously, determine the reason for updating the PS-BCA. There are generally two reasons to update a PS-BCA: 1) five years have lapsed since the most recent PS-BCA was accomplished or 2) there is a change in the PSS.	
	If 5-Year Revalidation	If a Strategy Change
	Continue to "Step 3) Is previous PS-BCA approved & implementation on track?"	Continue to "(H) Perform assessment; outcome change?"

<table>
<tr><td>H</td><td colspan="2">Perform assessment; outcome change?
Determine how changing the PSS impacts the previous PS-BCA, by determining what changed and then assess how the changes impact costs, benefits, and risks. Next, assess if the changes would lead to a different recommendation. This can be done in a variety of ways, one of which is to determine how much the previous results would have to change in order for the recommendation to change. Then determine if the current changes fall within those bounds. This is equivalent to performing a sensitivity analysis on the prior PS-BCA.</td></tr>
<tr><td></td><td>If Yes (Change in outcome)</td><td>If No (No change in outcome)</td></tr>
<tr><td></td><td>Continue to “(I) Update Previous PS-BCA”</td><td>Continue to “(E) MFR to MDA / Document in LCSP”</td></tr>
<tr><td>I</td><td colspan="2">Update Previous PS-BCA
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 (e.g., extension of the service life since the last PS-BCA) that has come available since the previous PS-BCA was completed and update ground rules and assumptions as appropriate.
Continue to activity (F)</td></tr>
<tr><td>F</td><td colspan="2">Develop Recommendation
Summarize the findings in a clear and concise manner that explains the recommended solution and why it is recommended. Make reference to the other COAs and how they compare to the recommended COA in costs, benefits, and risks. The recommendation should be specific, comprehensive, measurable, consistent, accurate, timely, unbiased, and achievable.
Continue to activity (G)</td></tr>
<tr><td>G</td><td colspan="2">Program MDA Decision Point
Present the recommendation to the MDA for approval. The MDA should document the rationale for the PS-BCA final decision. 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. The MDA decision provides closure to the process and initiates the transition to the selected PSS. MDA documentation (MFR to MDA) and updates should be annexed within LCSP.
Process ends after this step.</td></tr>
<tr><td>E</td><td colspan="2">MFR to MDA / Document in LCSP
Prepare a memo for the record that documents the results of the analysis performed. Memo for record includes rationale for the assessment of affordability and effectiveness of the program. This documentation should be included in an annex within the LCSP. MDA documentation and updates should be annexed within LCSP. Attachment 2 provides a sample Legacy Program PS-BCA Sufficiency Memo.
Process ends after this step.</td></tr>
</table>

1.4.3.3. Step 3: Was the Recommendation Implemented?

Figure 1.6. Step #3 of the PS-BCA Decision Tree.

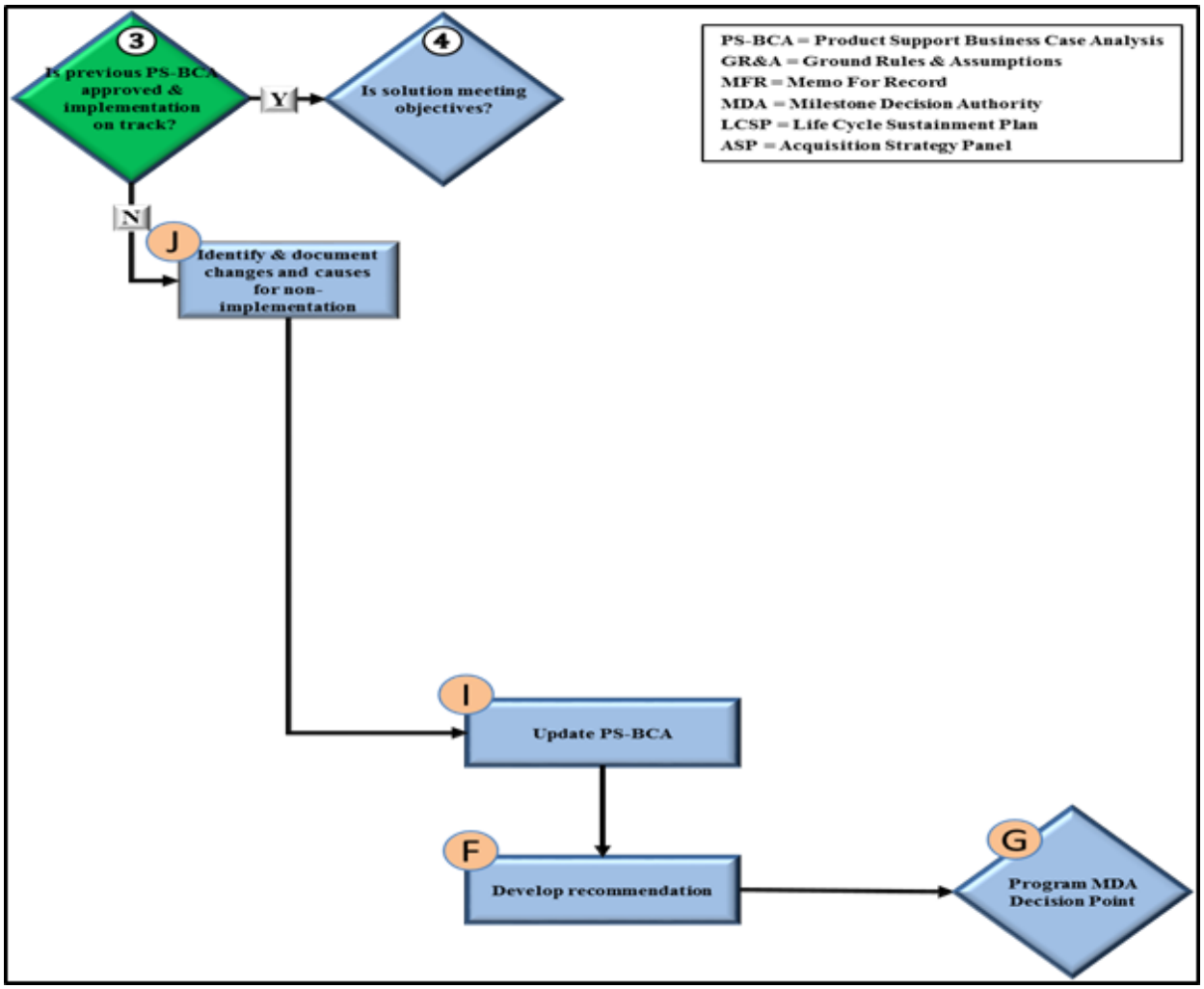


Table 1.3. Step #3 Decision Tree Process Flow.

Step	What Happens	
❸ WAS THE RECOMMENDTION IMPLEMENTED?		
	If five years has passed since the latest PS-BCA was completed, an update is required. Updating the PS-BCA does not mean the PS-BCA should be completely redone. Decide first if the PS-BCA recommendation was implemented or is being implemented.	
	If Yes (Recommendation was implemented)	If No (Recommendation not implemented)
	Continue to "Step 4) Is the Solution Meeting Program Objectives?"	Continue to "(J) Identify & document changes and causes for non-implementation"

Step	What Happens
J	Identify & document changes and causes for non-implementation Assess and document the reasons why the recommendation was not implemented. Those reasons could include lack of funding, changes in the political environment, programmatic changes, inability to obtain required technical data, etc. If the implementation date slipped, update the implementation plan accordingly and document the reason for the slippage. Once the reason for non-implementation is identified and documented, an assessment should be performed to determine if the recommendation is still valid. If the recommendation is no longer valid, update the previous PS-BCA in order to determine the appropriate PSS based on current ground rules, assumptions, program environment and current data. *Continue to activity (I)*
I	Update Previous PS-BCA 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 (e.g., extension of the service life since the last PS-BCA) that has come available since the previous PS-BCA was completed and update ground rules and assumptions as appropriate. *Continue to activity (F)*
F	Develop Recommendation Summarize the findings in a clear and concise manner that explains the recommended solution and why it is recommended. Make reference to the other COAs and how they compare to the recommended COA in costs, benefits, and risks. The recommendation should be specific, comprehensive, measurable, consistent, accurate, timely, unbiased, and achievable. *Continue to activity (G)*
G	Program MDA Decision Point Present the recommendation to the MDA for approval. The MDA should document the rationale for the PS-BCA final decision. 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. The MDA decision provides closure to the process and initiates the transition to the selected PSS. MDA documentation (MFR to MDA) and updates should be annexed within LCSP. Process ends after this step.

1.4.3.4. Step 4: Is the Solution Meeting Program Objectives?

Figure 1.7. Step #4 of the PS-BCA Decision Tree.

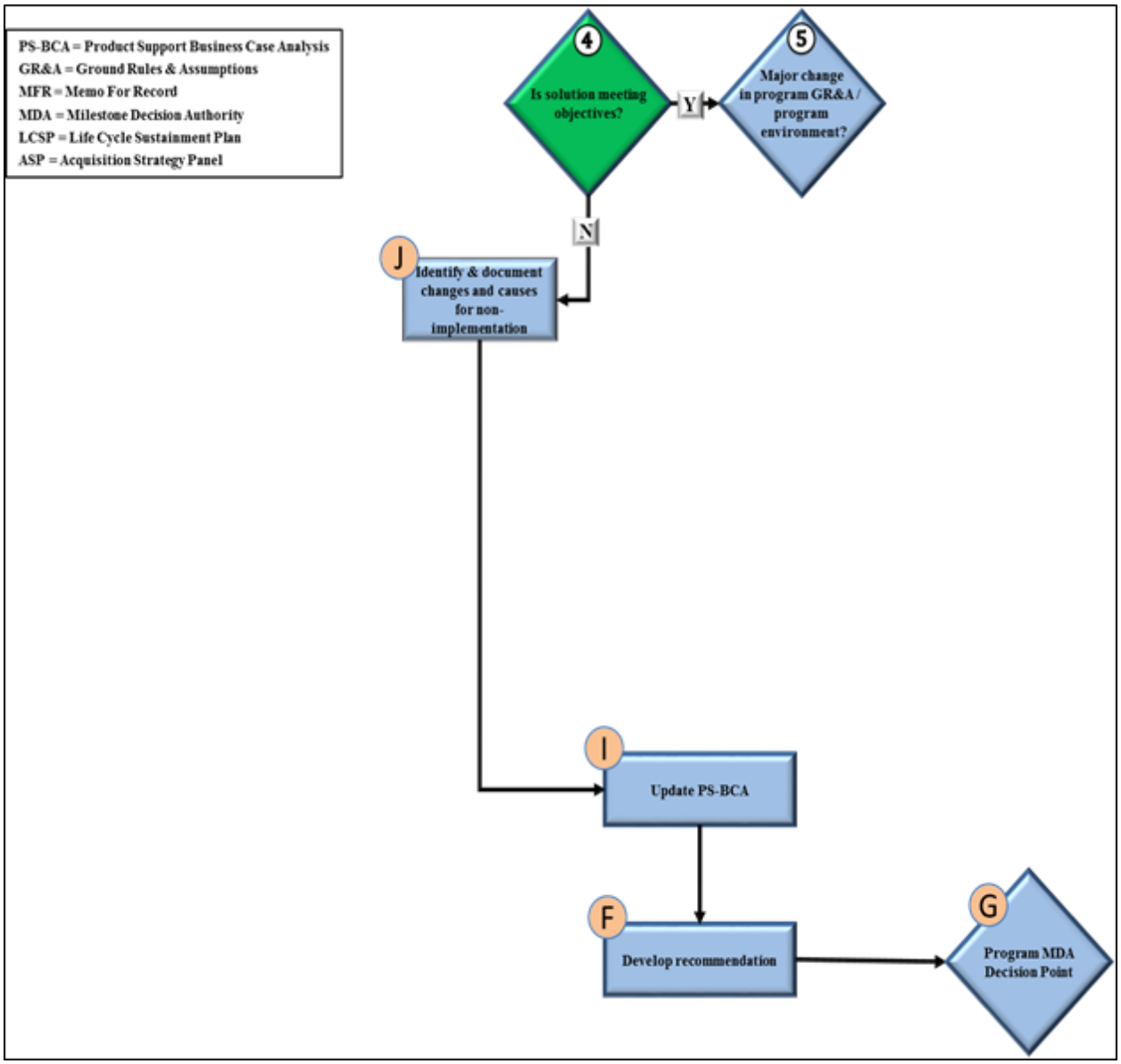


Table 1.4. Step #4 Decision Tree Process Flow.

Step	What Happens	
❹ IS SOLUTION MEETING OBJECTIVE?		
	Assuming the recommendation was implemented, determine if the solution is meeting the objectives as stated in the PS-BCA.	
	If Yes (Solution is meeting objective)	If No (Solution is not meeting objective)
	Continue to "Step 5) Major Change in Program Ground Rules and Assumptions (GR&A) or Program Environment?"	Continue to "(J) Identify & document changes and causes for non-performance"

Step	What Happens
J	Identify & document changes and causes for non-performance Identify and document the reasons why the solution is not meeting the objectives set forth in the PS-BCA. An example could be that a single work stream is not performing as projected (e.g., maintenance organizations not meeting flow days, supply organizations inability to fill customer requisitions in a timely manner or cost increases have caused budgetary impacts to the program). *Continue to Activity (I)*
I	Update Previous PS-BCA 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 (e.g., extension of the service life since the last PS-BCA) that has come available since the previous PS-BCA was completed and update ground rules and assumptions as appropriate. *Continue to activity (F)*
F	Develop Recommendation Summarize the findings in a clear and concise manner that explains the recommended solution and why it is recommended. Make reference to the other COAs and how they compare to the recommended COA in costs, benefits, and risks. The recommendation should be specific, comprehensive, measurable, consistent, accurate, timely, unbiased, and achievable. *Continue to activity (G)*
G	Program MDA Decision Point Present the recommendation to the MDA for approval. The MDA should document the rationale for the PS-BCA final decision. 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. The MDA decision provides closure to the process and initiates the transition to the selected PSS. MDA documentation (MFR to MDA) and updates should be annexed within LCSP. Process ends after this step.

1.4.3.5. Step 5: Major Change in Program GR&A or Program Environment?

Figure 1.8. Step #5 of the PS-BCA Decision Tree.

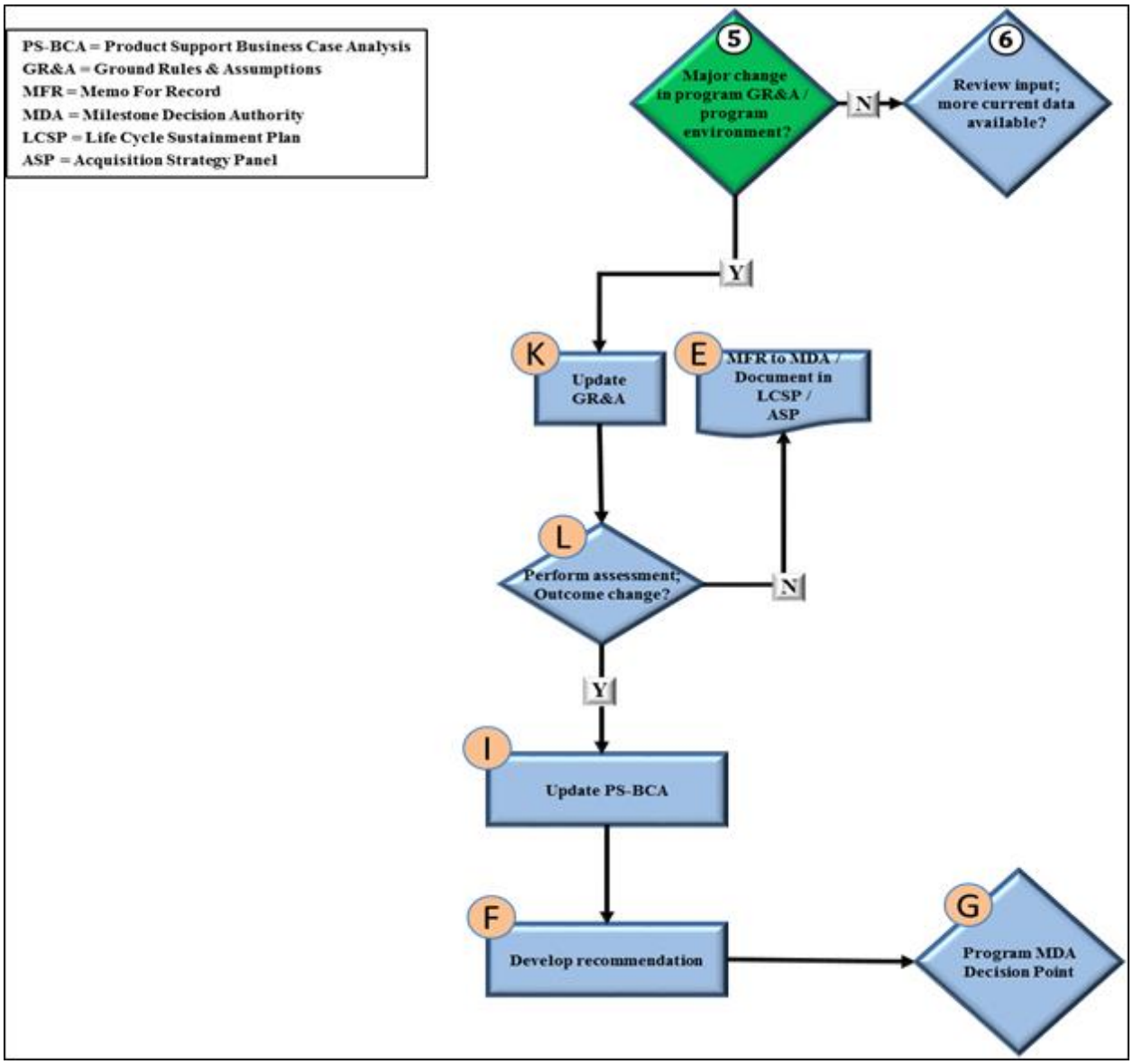


Table 1.5. Step #5 Decision Tree Process Flow.

Step	What Happens	
❺ MAJOR CHANGE IN PROGRAM GR&A / PROGRAM ENVIRONMENT?		
	Assuming the solution is meeting the objective, assess if the PS-BCA GR&As and/or operating environment have changed.	
	If Yes (GR&A or environment changed)	If No (GR&A or environment not changed)
	Continue to "(K) Update GR&A"	Continue to "Step 6) Review Input; More Current Data Available?"

Step	What Happens	
❺ MAJOR CHANGE IN PROGRAM GR&A / PROGRAM ENVIRONMENT?		
K	Update GR&A To determine how changes in the GR&A and/or program environment impact the PS-BCA, review the existing PS-BCA GR&A. The Integrated Project Team (IPT) should document any changes to the GR&A and/or program environment. If new information is available that would drive additional GR&As that were not previously captured, those would be included in the update. *Continue to activity (L)*	
L	Perform assessment; outcome change? Identify if and how those changes/additions in the GR&A and/or program environment affect costs, benefits, and risks. Determine if the recommendation would change based on the updated information. There are several methods that can be used, however, the method used and results should be documented. No one method is prescribed, but the method and logic used should be thoroughly documented to the degree that it is repeatable.	
	If Yes (Change in outcome)	If No (No change in outcome)
	Continue to "(I) Update PS-BCA"	Continue to "(E) MFR to MDA"
I	Update Previous PS-BCA Update the PS-BCA to reflect the revised GR&A and/or program environment. 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 (e.g., extension of the service life since the last PS-BCA) that has come available since the previous PS-BCA was completed and update ground rules and assumptions as appropriate. *Continue to activity (F)*	
F	Develop Recommendation Summarize the findings in a clear and concise manner that explains the recommended solution and why it is recommended. Make reference to the other COAs and how they compare to the recommended COA in costs, benefits, and risks. The recommendation should be specific, comprehensive, measurable, consistent, accurate, timely, unbiased, and achievable. *Continue to activity (G)*	
G	Program MDA Decision Point Present the recommendation to the MDA for approval. The MDA should document the rationale for the PS-BCA final decision. 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. The MDA decision provides closure to the process and initiates the transition to the selected PSS. MDA documentation (MFR to MDA) and updates should be annexed within LCSP. Process ends after this step.	

Step	What Happens
❺ MAJOR CHANGE IN PROGRAM GR&A / PROGRAM ENVIRONMENT?	
E	MFR to MDA / Document in LCSP Prepare a memo for the record that documents the results of the analysis performed. Memo for record includes rationale for the assessment of affordability and effectiveness of the program. This documentation should be included in an annex within the LCSP. MDA documentation and updates should be annexed within LCSP. Attachment 2 provides a sample Legacy Program PS-BCA Sufficiency Memo. *Process ends after this step.*

1.4.3.6. Step 6: Review Input; More Current Data Available?

Figure 1.9. Step #6 of the PS-BCA Decision Tree.

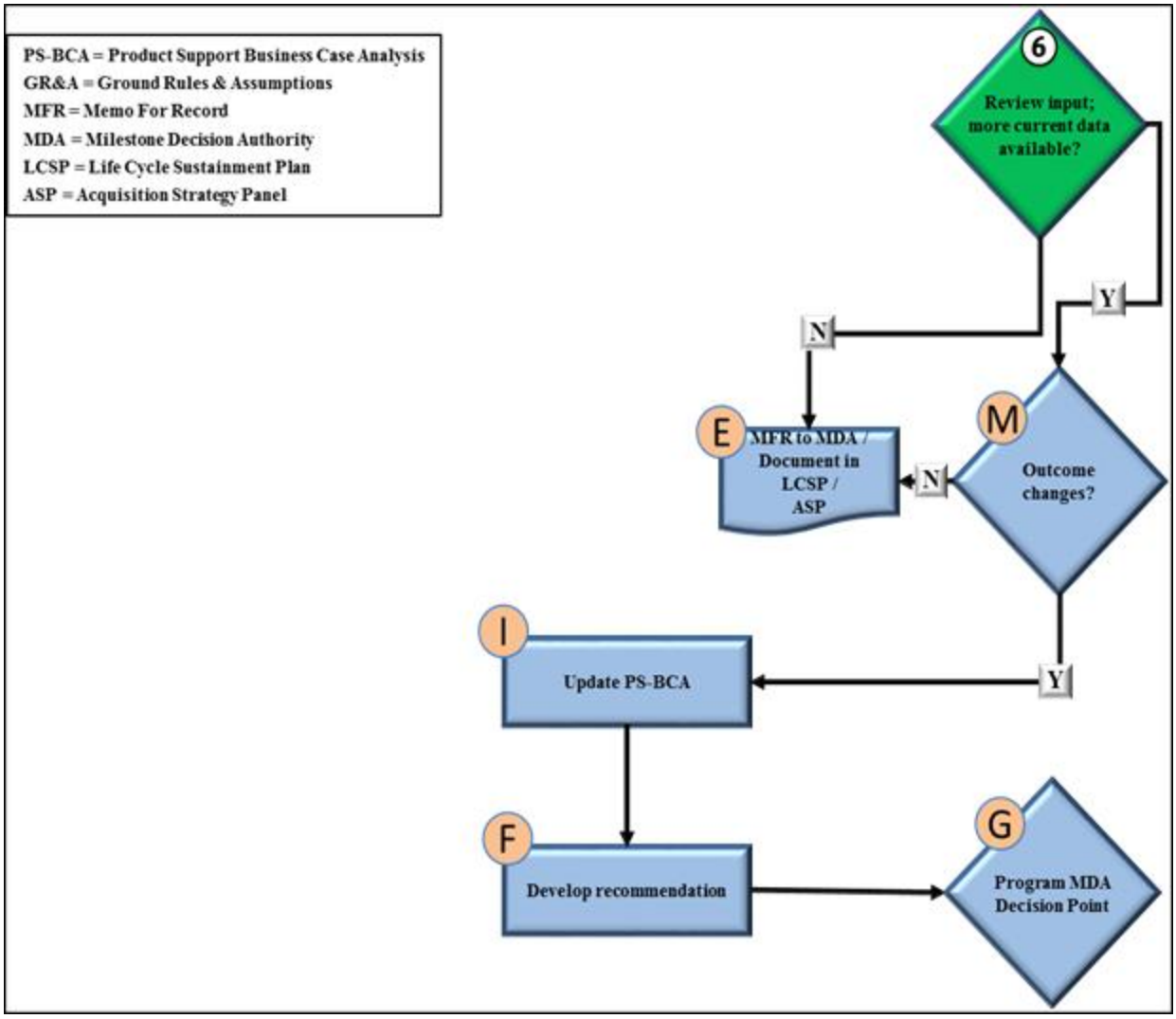


Table 1.6. Step #6 Decision Tree Process Flow.

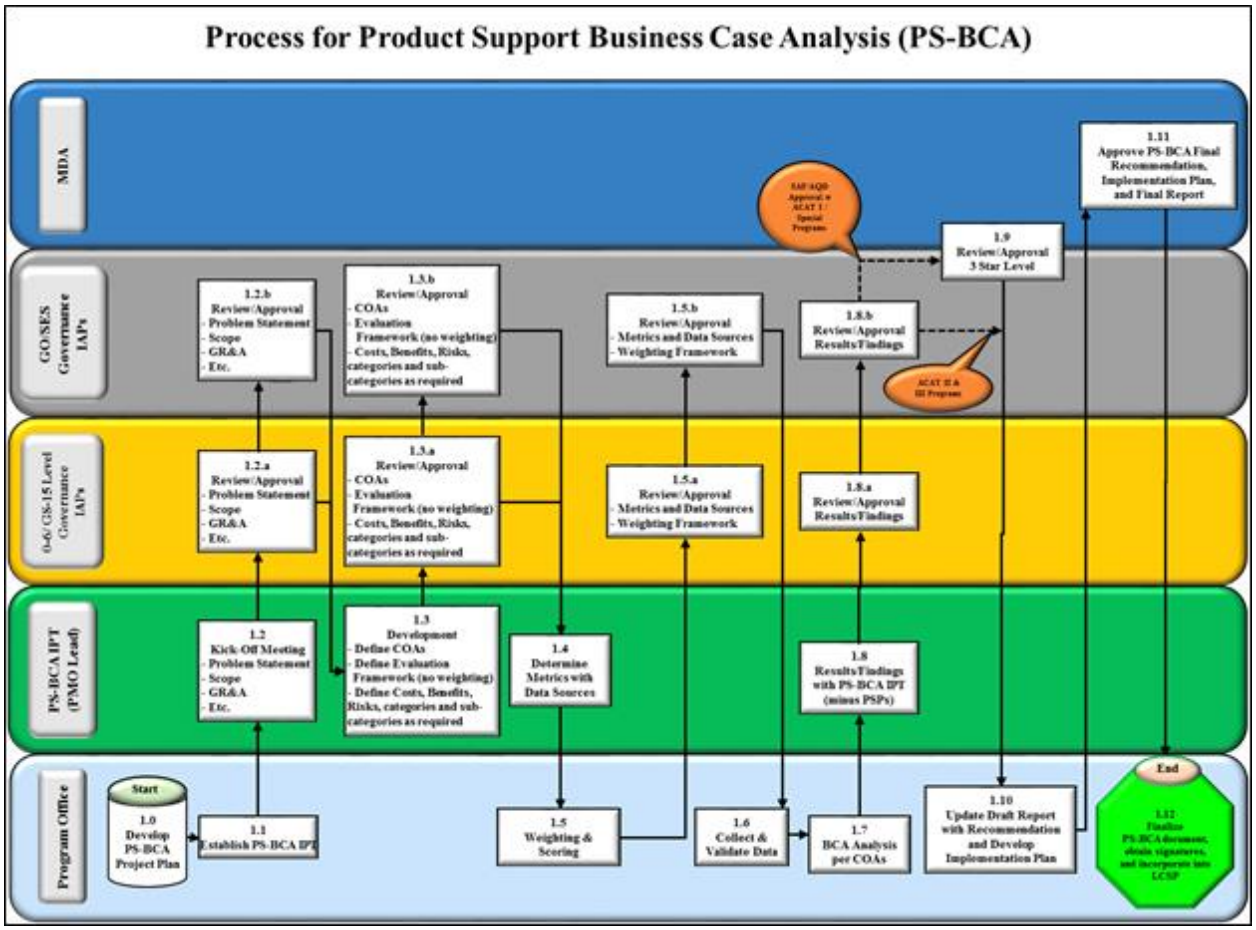
Step	What Happens	
❻ REVIEW INPUT; MORE CURRENT DATA AVAILABLE?		
	Assuming there are no major changes in program GR&A and/or program environment, review the data used within the PS-BCA and update to reflect the most current data available.	
	If Yes (More current data available)	If No (Data is current)
	Continue to "(M) Outcome changes?"	Continue to "(E) MFR to MDA"
M	Outcome changes? Identify if and how the more current data will affect costs, benefits, and risks. Determine if the recommendation would change based on the updated information. There are several methods that can be used, however, the method used and results should be documented. No one method is prescribed but the method and logic used will be thoroughly documented to the degree that it is repeatable.	
	If Yes (Change in outcome)	If No (No change in outcome)
	Continue to "(I) Update PS-BCA"	Continue to "(E) MFR to MDA"
I	Update PS-BCA Update the PS-BCA using the most current data available. As the system progresses through the life cycle, additional data will become available. If the previous PS-BCA was based predominately on analogous systems, the update should replace analogous data with actual data. 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 (e.g., extension of the service life since the last PS-BCA) that has come available since the previous PS-BCA was completed and update ground rules and assumptions as appropriate. *Continue to activity (F)*	
F	Develop Recommendation Summarize the findings in a clear and concise manner that explains the recommended solution and why it is recommended. Make reference to the other COAs and how they compare to the recommended COA in costs, benefits, and risks. The recommendation should be specific, comprehensive, measurable, consistent, accurate, timely, unbiased, and achievable. *Continue to activity (G)*	
G	Program MDA Decision Point Present the recommendation to the MDA for approval. The MDA should document the rationale for the PS-BCA final decision. 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. The MDA decision provides closure to the process and initiates the transition to the selected PSS. MDA documentation (MFR to MDA) and updates should be annexed within LCSP. *Process ends after this step.*	

Step	What Happens
❻ REVIEW INPUT; MORE CURRENT DATA AVAILABLE?	
E	MFR to MDA / Document in LCSP Prepare a memo for the record that documents the results of the analysis performed. This include rationale includes assessment of affordability and effectiveness of the program. This documentation should be included in an annex within the LCSP. MDA documentation and updates should be annexed within LCSP. Attachment 2 provides a sample Legacy Program PS-BCA Sufficiency Memo. Process ends after this step. *Process ends after this step.*

1.5. PS-BCA Process Overview.

1.5.1. PS-BCA Process Map. The PS-BCA process map shown in **Figure 1.10** assists the PMO in identifying the individual steps of the PS-BCA process. Greater fidelity of the PS-BCA process is described in **Attachment 3**.

Figure 1.10. PS-BCA Process Map.



Chapter 2

ROLES AND RESPONSIBILITIES

2.1. PS-BCA IPT Members. Developing a PS-BCA represents a major effort that involves comparing a variety of COAs in order to support major resource decisions in an effort to obtain the best value for the product support strategy. Given the scope, scale, and complexity involved, participation is required from a number of stakeholders (to include the warfighter), support subject matter experts (SMEs), and advisors. The consolidated participants are led by the PSM and are referred to as the PS-BCA IPT. The IPT should include major command/Field Command (MAJCOM/FIELDCOM), Headquarters Air Force (HAF) and United States Space Force (USSF) representatives. Additional information on the roles, responsibilities, and functions of the PS-BCA IPT are located in **paragraph 2.5**.

2.2. Approval Level. The approver of the PS-BCA is the MDA. Depending on the scope and sensitivity of the decision, the MDA can be the Under Secretary of Defense for Acquisition, Technology and Logistics (USD (A&S)), Head of the DoD Service Component, Service Acquisition Executive (SAE), or Program Executive Officer (PEO). Additionally, the MDA can delegate the responsibility to make the PS-BCA final decision as outlined in section 2.3 and maintain compliance with AFI 65-501 and AFMAN 65-506.

2.3. Milestone Decision Authority (MDA). The MDA has overall responsibility for the acquisition program. The MDA has the authority to approve the entry of an acquisition program into the next phase of the acquisition process and is accountable to authorities such as Congress for costs, schedule, and performance. The MDA is based on ACAT levels as listed below:

ACAT ID and ACAT IAM: USD (A&S) or as delegated.
ACAT IC and ACAT IAC: Head of the DoD Service Component or, if delegated, the SAE (not further delegable).
ACAT II: SAE or the individual designated by the SAE.
ACAT III: Designated by the SAE. This category includes Automated Information System (AIS) programs that do not meet the criteria for MAIS programs.

2.3.1. *Under Secretary of Defense for Acquisition, Technology and Logistics (USD (A&S)).* The USD (A&S) is responsible for supervising the Defense Acquisition System. The USD (A&S) is the principal staff assistant and advisor to the Secretary of Defense and the Deputy Secretary of Defense for all matters concerning acquisition.

2.3.2. United States Air Force Service Acquisition Executive (SAE). The USAF SAE, also known as the Component Acquisition Executive (CAE), is responsible for all Air Force research, development, and acquisition activities in accordance with DoDI 5000 series directives. This executive provides direction, guidance, and supervision of all matters pertaining to the formulation, review, approval and execution of acquisition plans, policies and programs. The SAE can serve as the MDA on ACAT IC programs, if delegated, and recommends decisions on ACAT ID programs. The SAE represents the Air Force to USD (A&S) and Congress on all matters relating to acquisition policy and programs.

2.3.3. Program Executive Officer (PEO). The PEO is responsible for cost, schedule and performance in an acquisition program and/or portfolio. Additionally, the PEO ensures PMs are coordinating with appropriate stakeholders and representatives to develop capabilities

based requirements, technical level architectures, integrated test plans, technology transition plans, product support strategies, and acquisition strategies throughout the entire life cycle. The PEO validates the PMs' recommendations and implementation plans. Validation answers the question, "Is it the right solution to the problem?" A PEO is typically delegated as the ACAT II and III MDA for programs in their portfolios. The PEO may delegate ACAT III MDA authorities to any appropriately qualified individual(s). In addition, the PEO, or their delegate, chairs the Executive Level Incremental Approval Point (IAP) sessions.

2.4. Governance Structure. For ACAT I (MDAP or MAIS) and selected Office of the Secretary of Defense (OSD) programs, the coordination/approval structure depicted in **Figure 2.1** below should be followed during the development, review, and approval of the PS-BCA. The PMO is responsible for identifying a coordination approval structure for the PS-BCA that is commensurate with the ACAT level of the program. The PMO may leverage existing boards or steering groups or utilize an existing MDA chain as final review and approval authority for the the PS-BCA. Prior to the PS-BCA kick-off meeting, the PMO also identifies organizations (i.e., recommended stakeholders) that should participate in the IAP steps to ensure enterprise level requirements are addressed. In addition, IAP reviews should be leveraged to ensure "buy-in" throughout the PS-BCA development process.

2.4.1. PS-BCA Engagement. The following section provides the PS-BCA team insight to ensure a wide range of diverse perspectives prior to and in support of making major decisions. The people and organizations representing this diversity are the foundation for governance, validation, and approval type bodies. **Figure 2.1** depicts the governance structure for MDAP/MAIS ACAT I and special interest OSD programs. **Figure 2.2** depicts the governance structure for ACAT II & III programs.

2.4.1.1. DoD Policy: An acquisition program is categorized based on the criteria in DoDI 5000.02. All defense acquisition programs are designated by an ACAT (i.e., I through III) and type (e.g., MDAP, MAIS, or Major System). Once an ACAT is established, it remains throughout the lifecycle of the program. Once sub-programs are incorporated into system level, all expenditures are included into the higher level system.

2.4.1.2. For ACAT I (MDAP or MAIS) and selected OSD programs, the governance structures depicted in the **Figure 2.1** should be utilized by the PMO during the development, validation, and approval of the PS-BCA.

2.4.1.3. For ACAT II/III programs, the coordination/approval structure depicted in **Figure 2.2** below should be followed during the development, review, and approval of the PS-BCA.

Figure 2.1. MDAP/MAIS ACAT I and Special Interest OSD Programs.

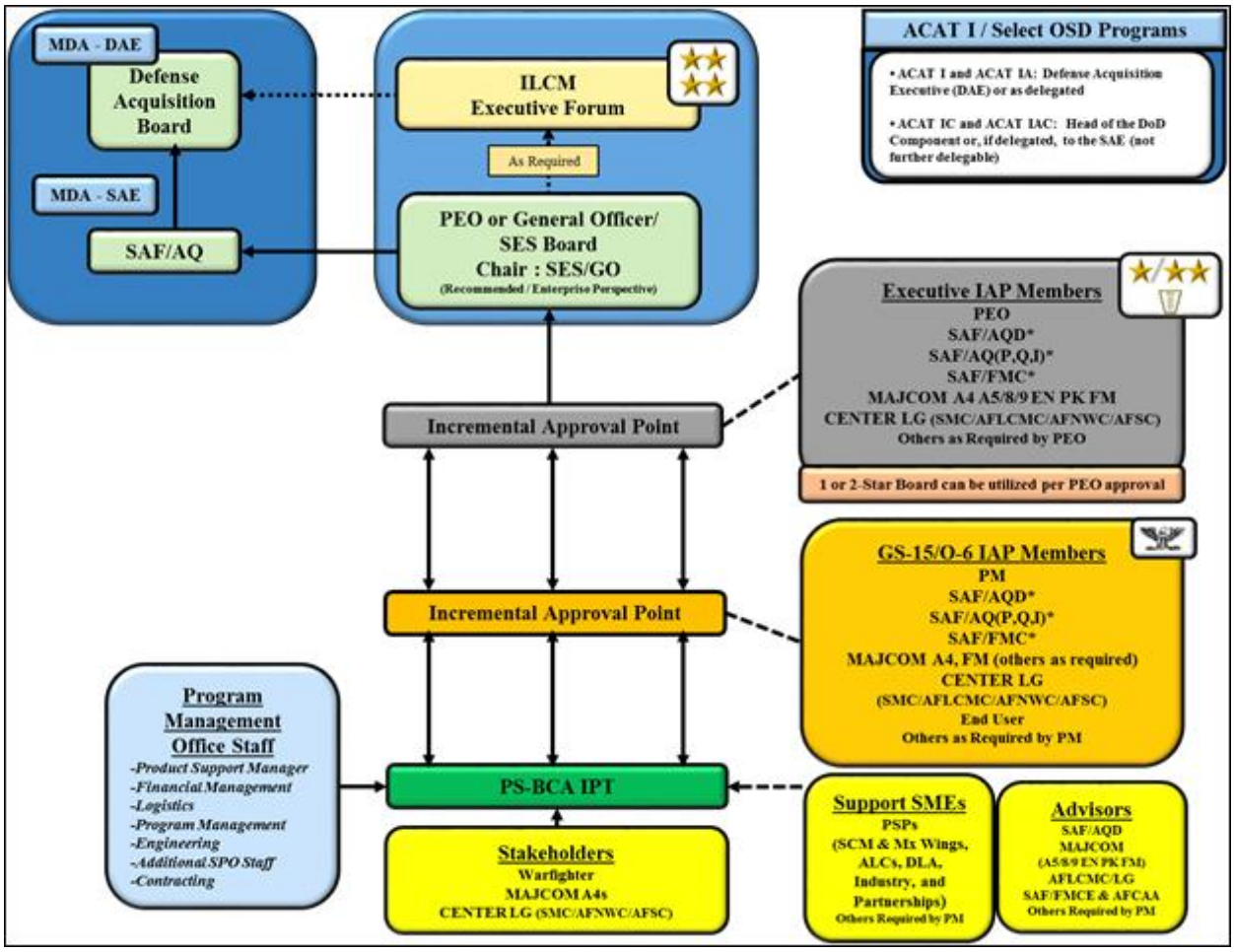
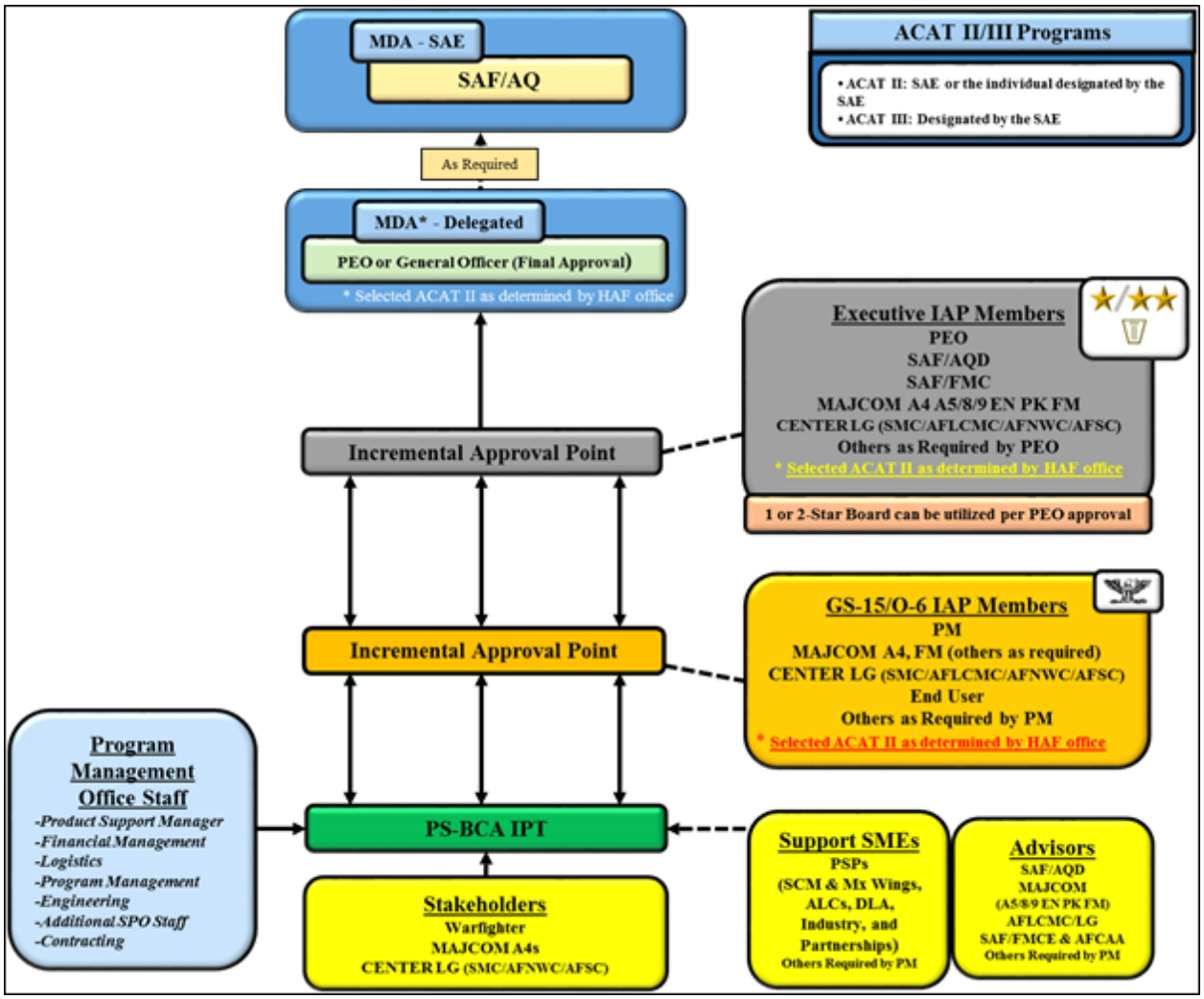


Figure 2.2. ACAT II and III Programs.



2.4.2. Defense Acquisition Board (DAB). The Defense Acquisition Board (DAB) is the senior advisory board for the DoD acquisition system and provides advice on critical acquisition decisions. The board is chaired by the USD (A&S) and includes the Vice Chairman of the Joint Chiefs of Staff, the Service Secretaries, and a number of Under Secretaries of Defense. Members of the DAB are responsible for approving MDAPs and serve as the most important executive review of expensive acquisition projects in the DoD. The DAB is also the principal review forum enabling USD (A&S) to fulfill 10 USC Chapter 144 responsibilities concerning ACAT I programs.

2.4.2.1. Best Practice: Presenting/coordinating the PS-BCA recommendation to the appropriate stakeholders/advisors and within the chain of command is the responsibility of the PMO. While not technically in the PM-PEO-MDA chain of command, it is recommended for all ACAT IC/D and ACAT IAC/AM programs to ensure product support validation within sustainment command centers prior to making recommendation to the SAE. (e.g., Programs within Air Force Materiel Command (AFMC) should ensure Air Force Sustainment Center (AFSC) / Air Force Life Cycle Management Center (AFLCMC)

Air Force Nuclear Weapons Center (AFNWC) commanders are presented with the PS-BCA recommendation.) Coordinate ACAT IC programs with SAF/FMC per AFI 65-501.

2.4.3. Assistant Secretary of the Air Force (Acquisition) (SAF/AQ). The SAF/AQ has the authority, responsibility and accountability for all Air Force acquisition programs and for enforcement of USD (A&S) procedures. The SAF/AQ may choose to enact a decision based on their inherent knowledge of a program for ACAT IC, ACAT IAC, and ACAT II programs (if not delegated).

2.4.4. Incremental Approval Points (IAPs). IAPs are vector checks designed to provide directional guidance and concurrence throughout the process on such matters as the scope, GR&A, evaluation criteria, problem statement, COA selection, data sources, risk mitigation strategies, and all other critical factors contained within the PS-BCA. IAPs ensure the PS-BCA strategy integrates an enterprise wide perspective. IAPs help identify and gain concurrence on key GR&As, constraints, and most notably the weighting and scoring methodology. IAP members are determined by the impact and level of the decisions being made, as well as the PSM's chain of command.

2.4.5. IAP Frequency. There is no limit for the number of IAPs during development of the PS-BCA. Discretion as to how many IAPs to conduct is left to the PSM. The PSM needs to ensure all aspects of the PS-BCA are well communicated and shared with appropriate stakeholders, SMEs, and advisors. The PSM should have this governance body in mind when developing the PS-BCA. These periodic meetings, and/or coordination activities, should ensure that no stakeholder or approval authority is surprised by the final PS-BCA recommendation.

2.4.5.1. Executive (GO/SES) Level Incremental Approval Point. The Executive General Officer/Senior Executive Service (GO/SES) level IAP includes multi-functional senior executives who provide an enterprise perspective to enhance decision making for the MDA. The Executive IAP members provide senior level review balancing requirements, resources, priorities, and mandates. Executive IAP members also provide guidance to the acquisition execution chain from an integrated and enterprise perspective. This includes providing insight and ensuring statutory and regulatory compliance and providing support to the PS-BCA team as requested. The PEO may choose to utilize existing command 1-Star governance boards or virtually coordinate with the Executive IAP members. Executive IAP members include, as applicable:

2.4.5.1.1. PEO

2.4.5.1.2. Directorate of Logistics and Product Support (SAF/AQD)

2.4.5.1.3. Directorate of Information Dominance (SAF/AQI)

2.4.5.1.4. Directorate of Global Power (SAF/AQP)

2.4.5.1.5. Directorate of Global Reach (SAF/AQQ)

2.4.5.1.6. Directorate of Cost and Economics (SAF/FMC)

2.4.5.1.7. MAJCOM A4 A5/8/9 Engineering (EN), Contracting (PK), Financial Management (FM) (or USSF equivalent)

2.4.5.1.8. Center LG (Space Systems Command (SSC)/Air Force Life Cycle Management Center (AFLCMC)/Air Force Nuclear Weapons Center (AFNWC)/Air Force Sustainment Center (AFSC))

2.4.5.1.9. Space Systems Command (SSC)/Space Logistics Directorate (S4)

2.4.5.1.10. Others as required by PEO

2.4.5.2. O-6/GS-15 Level Incremental Approval Point. The multi-functional O-6/GS-15 IAP reviews the GR&A, constraints, and weighting/scoring criteria and advises on the authoritative data sources used by the PS-BCA IPT to conduct the financial and non-financial analysis. The criteria for the authoritative data source should be: accurate, comprehensive, consistent, timely, available, and accepted. This approval step may occur numerous times in the course of the PS-BCA process as data sources are revealed as determined by the PM. The O-6/GS-15 IAP members include, as applicable:

2.4.5.2.1. PM

2.4.5.2.2. MAJCOM A4 A5/8/9 Engineering (EN), Contracting (PK), Financial Management (FM) (others as required)

2.4.5.2.3. Center LG (SSC/AFLCMC/AFNWC/AFSC)

2.4.5.2.4. End-User

2.4.5.2.5. Others as required by the PM

2.4.5.2.6. SAF/AQD (Only ACAT I / Select OSD Programs)

2.4.5.2.7. SAF/AQ (I, P,Q) (Only ACAT I / Select OSD Programs)

2.4.5.2.8. SAF/FMC (Only ACAT I / All OSD Programs)

2.5. PS-BCA IPT Roles, Responsibilities, and Functions. The following section provides guidance on assembling a PS-BCA IPT. The section addresses involving the right stakeholders, support SMEs, and advisors at the kickoff meeting and assembling the governance structures. A PS-BCA is a team effort undertaken by experienced participants across a wide range of specialties. From the initial stages of accomplishing the background research and gathering the data, through the final stages of staffing a PS-BCA for senior decision makers, completing an effective PS-BCA requires significant effort by all those involved.

2.5.1. PS-BCA IPT Structure. Product support encompasses a range of disciplines including, but not limited to, logistics, requirements, operational mission planning, financial management, contracts, legal, and integrated product support elements. The structure of the PS-BCA IPT varies depending on the maturity and the mission of the program. The PSM should be cognizant of where the program is in the life cycle, understand the major milestones/events, and provide useful information to the decision makers for the program to move successfully forward through the life cycle. The team should leverage the cross-functional expertise of its members to ensure all support COAs are considered and the best value PSS is selected.

2.5.2. PS-BCA IPT Characteristics. PSS are comprehensive and require early and frequent discussion and planning efforts across and between all key stakeholders and advisors. An effective PS-BCA IPT has these characteristics:

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

2.5.3. PS-BCA Role and Responsibilities. The following sections describe roles and responsibilities of key IPT members that may be involved in the PS-BCA depending on the program's life cycle phase. The PMO should maintain an IPT membership plan which should use all of the information collected to lead IPT membership. The IPT membership plan is a key component of executing and completing a successful PS-BCA. A large portion of IPT management focus is on communication. The cornerstone of stakeholder and advisor management is understanding who needs what information and when or how often they need it. The PS-BCA process map (see **Figure 1.10**) incorporates relationships between activities and functional units. This diagram focuses on the logical relationship of the value activities and shows opportunities for open dialogue across multiple levels. The various stakeholders representing organizations, SMEs, advisors, approval authorities, etc. should all work together from the initial development of the problem statement through the final PS-BCA report incorporating the MDA decision and attaching the PS-BCA to the LCSP.

2.5.3.1. Program Management Office (PMO). The PMO staff assists the PM and PSM in developing the PS-BCA. Within the PMO, the PSM is responsible for planning, developing, implementing, and executing the PSS, informed by the PS-BCA. Each member of the PMO staff should actively participate in the PS-BCA kickoff meeting and in developing the scope, GR&As, and problem statement. PS-BCA roles and responsibilities should generally remain consistent regardless of whether the role is performed by a government employee or a contractor, but ultimately the PMO staff is responsible for the content and PS-BCA deliverables.

2.5.3.1.1. The PMO staff should determine what individuals or groups can influence and affect the PS-BCA or be affected by its performance and outcome. IPT member identification is the process used to identify all stakeholders, SME support, and advisors for a PS-BCA. It is important to understand that not all IPT members have the same influence or effect on a PS-BCA, nor will they be affected in the same manner. There are many ways to identify IPT members, however, it should be done in a methodical and logical way to ensure that IPT members are not easily omitted. The selection process may be done by looking at IPT members organizationally, geographically, or by involvement with various phases or objectives. Another way of determining IPT members is to identify those who are directly impacted by the PS-BCA and those who may be indirectly affected. Examples of directly impacted IPT members are the project team members or the MAJCOM who directed the PS-BCA is being done for. Those indirectly affected may include an adjacent organization or members on the local community. Directly affected IPT members should usually have greater influence and impact of the PS-BCA than those indirectly affected.

2.5.3.1.2. Support contractors (extension of the PMO) may participate in the PS-BCA IPT, but they cannot commit the PMO they support to a specific position. The PMO is responsible for ensuring support contractors are employed in ways that do not create the potential for a conflict of interest. Contractor support staff may participate in PS-

BCA IPT discussions, however, they are not permitted to represent the position of the supported organization and it is recommended they be asked to sign non-disclosure agreements prior to deliberations. The PMO should consult with the legal advisor to determine whether an organizational conflict of interest exists.

2.5.3.2. Program Manager (PM). The owner of the PS-BCA is the PM and he/she is the primary initiator of the actions and recommendations derived out of the PS-BCA. The PM also obtains the resources necessary for accomplishing the PS-BCA.

2.5.3.3. Product Support Manager (PSM). While the PSM reports directly to the PM, he/she has statutory responsibility, per 10 USC §2337, to lead the PS-BCA. This includes overseeing the team that is conducting and writing the PS-BCA. The OSD PSM guidebook and the DoD PS-BCA guidebook can assist the PSM in defining the roles and responsibilities of the team members. PSMs are also responsible for managing support functions required to field and maintain the readiness and operational capability of major weapon systems, subsystems, and components. Ultimately, the PSM serves as the overall lead for the development of the PS-BCA:

Responsible for assembling the governance structure, appropriate board members, stakeholders, support SMEs and advisors
Identify PS-BCA IPT members (to include Contractors, Original Equipment Manufacturers (OEMs), depot/operations/logistical units)
Key player in the problem statement development and approval
Provides insight on support strategy and integration of the IPSEs.
Key player on development of COAs and identification of data sources

2.5.3.4. Data Manager. One of the primary responsibilities of the data manager is maintaining and keeping historical records of PS-BCAs. These records include research, performance outcomes, cost estimates and methodology, and sources of data. Effective configuration management of acquisition documents supports the decision making processes by allowing decision makers to have information available throughout the present and future PS-BCA process. The functions a data manager performs can be accomplished utilizing existing resources. Some members of the PS-BCA may perform multiple roles and responsibilities.

2.5.3.5. Cost Analyst. The cost analyst has the training and skills to develop the financial/cost analysis section, the analytical methodology for the PS-BCA, and comparative analysis of both quantitative and qualitative factors for each COA. The cost analyst works with the budget analyst who analyzes historical funding and develops the budget plan with regards to the recommended PS-BCA approach. The cost analyst prepares and organizes the PS-BCA cost estimate in accordance with (IAW) applicable AFI, AFMANs, OSD, and Office of Management & Budget (OMB) guidance, actively participates in the formation of the cost scope and baseline, and performs PS-BCA calculations to include life cycle cost estimates, benefit analyses, risk assessments, affordability, and sensitivity analyses. The cost analysis is a primary duty of the PS-BCA IPT and highlights the cost differences between support or sustainment strategies. PS-BCA cost analysts should follow the cost estimating guidance outlined in the DoD "Cost Assessment and Program Evaluation (CAPE) Operating and Support Cost Estimating Guide (September 2020)."

2.5.3.6. Logistician (Requirements, Logistics, and Supportability Manager). The logistician is responsible for ensuring the sustainment strategy, requirements, and performance measures are in the PS-BCA. The logistician also provides COA specifics and ensures sustainment requirements are comprehensively met. Additionally, this person is responsible for completing the mission impact section, including the non-financial analysis of the PS-BCA as well as collecting and calculating system/program logistics metrics such as failure projections, operating hours and sparing requirements. The PMO may have to obtain Space Operations Command (SpOC), Headquarters Air Force Materiel Command (HQ AFMC) or AFSC SMEs for Supply Management, Deployment/ Distribution/Transportation, Maintenance support, and Life Cycle Logistics (LCL) expertise.

2.5.3.7. Chief Engineer. The Chief Engineer and the PSM work together to align the program's strategies for systems engineering and product support so they are mutually supportive, avoid duplication, and take advantage of available synergies. The Chief Engineer develops COAs with the PSM and works with the PM and the PSM to select the program's comprehensive life cycle engineering approach.

2.5.3.8. Contract Officers/Managers. Contracting officers/managers are active IPT members to ensure contractually viable strategies.

2.5.3.9. Stakeholders. A stakeholder is a person or group of people who can affect or be affected by the PS-BCA. Depending on the complexity and scope of the PS-BCA, there may be very few or an extremely large number of stakeholders. The PS-BCA lead should look at each stakeholder to gather more in depth information in order to understand their impact, involvement, communication requirements, and preferences. Are they a cohesive team? Do they support this PS-BCA or are they critical of it? What is this stakeholder's interest in this project? These are the types of questions that should be answered in order to provide a complete analysis.

2.5.3.10. Warfighter. PS-BCA impacts on the warfighter are the primary considerations. The warfighter provides the performance requirements for the weapon system which are taken into account for the PSS. The warfighter also provides feedback on the system and PSS.

2.5.3.11. AFMC

2.5.3.11.1. AFMC/A4. PS-BCA impacts on the enterprise sustainment infrastructure are the primary considerations of AFMC from a command perspective. AFMC ensures statutory compliance for core, 50-50, 6% capital investments, and achieve best value while ensuring support to the warfighter.

2.5.3.11.2. Air Force Sustainment Center Logistics Directorate (AFSC/LG). Responsible and accountable for managing AFSC's overall planning, resource, process & performance execution to achieve Air Force Sustainment Center Commander (AFSC/CC) integrated vision for a strategy focused organization. AFSC/LG has inherent authority to oversee, integrate, standardize, and direct processes, resources, and organizations to achieve AFSC goals and objectives.

2.5.3.12. Space Systems Command (SSC)

2.5.3.12.1. SpOC/S4. Responsible for PS-BCA impacts on the acquisition and sustainment of space capabilities, including life cycle management planning, sustainment planning and sustainment management for all assigned AF space and missile systems.

2.5.3.12.2. Space Systems Command, Product Support Enterprise Directorate (SSC/ECP). Responsible for acquisition and sustainment of space capabilities, including life cycle management planning, sustainment planning and sustainment management for all assigned AF space and missile systems. SSC/ECP is the single focal point for life cycle management of space systems logistics and sustainment functions for AF PEO Space delivered systems. SSC/ECP consolidates, coordinates, and provides a single focal point for logistics/sustainment activities including cross system integration, acquisition logistics, logistics readiness, SE, and program support of assigned PSMs.

2.5.3.13. Subject Matter Experts (SMEs). SMEs are recognized experts with specialized knowledge applicable to the analysis and preparation of the PS-BCA components (logistics, engineering, contracting, budget analysis, etc.). The PS-BCA IPT should leverage SMEs within the PMO, and from functional areas with specific expertise in the focus area or life cycle phase of the program (e.g., software or materials or risk SMEs). This includes other relevant members that provide inputs to and/or impact the PS-BCA analysis. SMEs are typically found among those who have been in their roles long enough for the knowledge and experience to be "second nature," or in other words, they know how to do their jobs without having to look up information. In the case of extremely complex roles, they might have to look up information even as a SME, but they know exactly where to find that information. Evidence of sound SMEs include – but is not limited to – the following:

Correctly determines what levels of performance are acceptable and can identify and clearly describe performance objectives.
Knows the order in which successful performance steps are to be performed, and may have made recommendations for improvement that have been adopted.
Has a high degree of familiarity with the technical jargon in his/her area of expertise.
For work that is less about performing tasks and more about mastering knowledge required to make effective decisions or to prioritize and assign work to teams, a SME is very familiar with the requisite knowledge that underlies effective decision-making.
Can produce many cases that illustrate "good" versus "poor" decisions in his/her area of expertise.
Knows how to explain his/her area of expertise clearly to others and may serve as a coach, mentor or supervisor within his/her area of expertise.

2.5.3.14. Product Support Providers (PSPs). Organic organizations (Supply Chain Management Groups (SCMGs), Maintenance Groups, Defense Logistics Agency, etc.) Private Sector (Industry), and Partnership representatives may be invited to PS-BCA IPT meetings to provide information, advice, and recommendations to the IPT, however, the following guidelines should govern their participation:

PSPs should not be formal members of the PS-BCA IPT.
PSPs should not be present during IPT deliberations on acquisition strategy or competition sensitive matters, nor during any other discussions that would give them a marketing or competitive advantage.
At the beginning of each meeting, the IPT lead should introduce each PSP representative, including their affiliation, and their purpose for attending.
The PS-BCA lead should inform IPT members of the need to restrict discussions while PSPs are in the room, and/or the IAP chair should request the representatives to leave before matters are discussed that are inappropriate for them to hear.

2.5.3.14.1. Best Practice: Given the sensitive nature of PS-BCA IPT discussions, PSPs may not be permitted to participate in certain discussions. The PSM may permit PSPs to make presentations to the PS-BCA IPT, when such views will better inform the IPT and do not involve the PSPs directly in government decision making.

2.5.3.15. Advisors. The role of an advisor is to provide guidance and assistance to the PS-BCA IPT. Advisors provide the IPT with an objective point of view during the decision making process with logical and holistic context considering product support strategies.

2.5.3.16. SAF/AQD (Required). Provides enterprise oversight of all matters pertaining to product support, Supply Chain Management (SCM), maintenance of military materiel, and all support functions required to field and maintain the readiness and operational capability of weapon systems, including all functions related to weapon system readiness. Supports programs with oversight, guidance and assistance relative to product support during the development of programmatic documentation and the execution of program reviews throughout the life cycle. Responsible for enterprise oversight of all matters pertaining to Air Force depots throughout the life cycle and advises the Assistant Secretary of the Air Force (Acquisition) (SAF/AQ).

2.5.3.17. SAF/FM and/or MAJCOM FM (Required). Provides expert cost, economic, comparative analysis, and financial decision support to the Air Force, DoD, and Congress, thereby enhancing Air Force warfighting capabilities and maximizing available resources. Responsible for cost analysis, budget formulation, distribution of budget and execution oversight for base infrastructure and space weapon systems sustainment, funds control and distribution for all appropriations and overall financial resource management, accounting and oversight. Supports the requirements definition process, specifically in leading the cost analysis working group for studies for satisfying warfighter requirements and furnishing expertise for independent review, when applicable, of cost estimates produced by other entities.

2.5.3.18. AFCAA (Required). The Air Force Cost Analysis Agency (AFCAA) provides independent component cost analyses for major space, aircraft, and information system programs as required by public law and DoD policy, or those of special interest. It is responsible for cost estimating and for enhancing the state-of-the-art methodologies in cost analysis. It provides guidance, analytical support, and quantitative cost risk analyses to 11 major commands and the Air Force corporate staff on development of cost per flying-hour factors and resource requirements. AFCAA performs special studies supporting long-range planning, force structure, analysis of COAs, and life-cycle cost analyses. For ACAT

I and special programs, AFCAA along with the Directorate of Economics and Business Management (SAF/FMCE) perform the SAF/FMC review and coordination/certification of products that include comparative analyses.

2.5.3.19. AFLCMC/LG or SSC/ECP or AFNWC/LG. Provides product support and life-cycle logistics capability through functional management and training of logisticians SMEs. Also provides hands-on assistance planning, workforce management and development support for all logisticians. Provides an analytical capability to support PMOs and Center leadership and integration with other AFMC Centers.

2.5.3.20. SSC/S4. Provides product support and life-cycle logistics capability through functional management and training of logisticians and SMEs. Also provides hands-on assistance planning, workforce management and development support for all logisticians. Provides an analytical capability to support PMOs and Center leadership and integration with the Space Systems Command (SSC).

2.5.3.21. AFMC A5/8/9 SSC/S5/8/9. Responsible for the requirements definition process for core sustainment command capabilities. Responsible for operational requirements development and oversight of the development, acquisition and fielding of new capabilities. Assists with command-wide and functional assessments of current and future plans, operations, logistics and sustainment requirements. Provides oversight of modeling and simulation efforts, as well as scientific analyses and assessments.

2.5.3.22. Legal Officers/Advisors. Legal officers/advisors should be involved early and frequently in the PS-BCA process to ensure compliance with laws and regulations, to aid in COA analysis, and in risk identification and analysis.

Chapter 3

PLANNING FOR THE PRODUCT SUPPORT BUSINESS CASE ANALYSIS.

3.1. PS-BCA IPT Kickoff Meeting. The PS-BCA IPT kickoff meeting is a working level meeting focused on providing training and guidance. Organize, Train, & Equip (OT&E) organizations such as AFLCMC/LG, AFSC/LG, AFNWC, and SSC/ECP should provide PS-BCA training and the PMO should provide program description and overview. The PMO works with stakeholders and mandatory advisors to ensure the right IPT members are identified for the kickoff meeting and provides input in preparation of the kickoff meeting. IPT 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, and review action items and way forward.

3.2. Preparation for Kickoff Meeting. The PMO should identify appropriate stakeholders and mandatory advisors to begin preparing for the PS-BCA IPT Kickoff Meeting as soon as practical. This PS-BCA framework includes developing an agenda, problem statement, scope, desired outcome(s), schedule, and the initial GR&As which become part of the PS-BCA charter. The appropriate governance structure should eventually approve the elements of the framework.

3.2.1. Determine PMO PS-BCA Staffing Requirements. The PMO determines if the PS-BCA will be executed entirely with organic resources or if contractors will be used to assist in the analysis. The PMO should coordinate with Acquisition Center Logistics Directorate personnel to obtain guidance for conducting the Product Support Business Case Analysis, 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 kickoff meeting, the PMO should ensure the contractors are contacted and required Associated Contractor Agreements are in place. It is recommended the agreements include pre-priced extensions, if needed, to complete the final out-brief and PS-BCA report in case there are unforeseen schedule extensions.

3.2.2. Identify PS-BCA IPT Membership. The PMO determines which organizations (defined in Section 2: Roles and Responsibilities) are required to support the PS-BCA effort. Prior to the PS-BCA IPT kickoff meeting, the PMO requests Point of Contact (POCs) from each organization that will be part of the PS-BCA IPT and provides any background or relevant program information.

3.2.3. Identify the Governance Structure and Approval Authority. The PSM should have an established approval structure for the PS-BCA. The PSM may use existing PM/PEO/MDA chain or establish a separate governance structure to approve a PS-BCA. The PSM may choose to use existing boards to serve as part of the governance structure. The PSM is responsible to contact the secretariat and coordinate the intent to use the board as part of the PS-BCA governance. It is important that the PSM leverages the IAP to ensure the PS-BCA is fully coordinated prior to seeking approval from the chosen PS-BCA governance structure.

3.2.4. Preliminary Assessment. Conduct preliminary assessment of potential COAs and required data needed to support the analysis.

3.2.5. Data Collection Plan. The data collection plan will be discussed in more detail in **Section 9** (Data Selection, Collection and Assessment Plan), however, the PMO should conduct a review of potential data sources (both organic and contractor) and identify potential

authoritative data sources (e.g.: LIMS-EV, AFTOC, CEMS, etc.) prior to the kickoff meeting. If a gap in data exists, the PMO should determine if it is feasible to mitigate the gap (i.e.: request data via Contract Data Requirements List (CDRL), establish contractual agreement, or develop potential workaround/alternative data sources). In the event the data is not available and no workaround exists, this gap identification should be addressed at the kickoff meeting and may impact the development of potential COAs/metric selection processes.

3.2.6. Data Quality. By collecting useful technical and cost data early in the life-cycle, decision makers should have the information necessary to make the best assessment possible of the current product support plan with respect to any COA, placing the program leadership in a better position to complete the PS-BCA requirement. Since the PS-BCA is periodically required to be revalidated, it is in the PM's best interest to have the highest quality data available. As a result, the team should anticipate and plan for adequate updates to firmly address the usual risks associated with a PS-BCA, such as a lack of platform specific historical cost data, or a change in procurement quantity, scope, or service life.

3.2.7. Situational Awareness. Review prior product support related analyses and determine if any additional analysis should be completed/ updated/reviewed prior to the PS-BCA kickoff meeting (i.e.: 5-year Depot Source of Repair (DSOR) review, Independent Logistics Assessment (ILA), Depot Activation Prioritization Model assessment, Program Office Estimate (POE), etc.).

3.2.8. Determine Realistic Schedule. As noted previously, a PS-BCA requires significant effort to complete and establishing an appropriate and achievable schedule is critical to mission success. Experience has shown that schedules can be influenced by the size of the program, the current life cycle phase of the program, whether new documentation or revalidated documentation will be used, access to leadership, review time required by the leadership, to name but a few.

3.3. Identify and Establish the PS-BCA IPT. The PS-BCA IPT should consist of stakeholders, support SMEs, and advisors who have a stake or interest in the outcome of the PS-BCA. Stakeholders represent organizations or entities that play an active role in the execution of the program throughout the life cycle. Advisors represent organizations or entities that support either the program or the PS-BCA process but do not play an active role in the execution of the program.

3.3.1. IPT Membership. **Table 3.1** provides a list of organizations that can provide program specific PS-BCA IPT members upon request. Request for team member participation should be sent to the various organizations prior to the kickoff meeting.

Table 3.1. IPT Membership.

Organization	Role	Support Responsibility
PMO	Stakeholder	PS-BCA author and IPT lead (PSM) Provides program unique data and resources (e.g. program management, data management, financial management, cost analysis, logistics, systems engineering, legal, contracting) Supports PSM in development and execution of the PS-BCA

Organization	Role	Support Responsibility
		Reviews analyses
Warfighter	Stakeholder	Provides the performance requirements for the weapon system which are taken into account for the PSS
HQ AFMC/A4 or HQ SpOC/S4	Stakeholder	Provides operational and supportability requirements Provides operational data to support analysis Ensures statutory compliance Develop PS-BCA implementing guidance Function as part of incremental approval point process Provide expertise as requested to PEOs in support of PS-BCA IPT functions Provide training as required to workforce related to PS-BCA implementation, ensure workforce possesses knowledge, skills, abilities, and tools necessary for PS-BCA implementation Collaborate with SAF/AQD, AFMC/A4, AFIT and Defense Acquisition University as required to develop/refine training specific for PS-BCA implementation
AFSC/LG	Stakeholder	Responsible and accountable for reviewing proposed COAs to ensure AFSC capabilities are being considered and addressed Consolidates, validates, and verifies information and data provided by AFSC support SMEs to PS-BCA IPT Entry/exit point for AFSC for subject matter expertise and specific data requests
Supply Chain Management Wings	Support SME	Provides data as required via AFSC/LG as required
Air Logistics Complex	Support SME	Provides data as required
DLA	Support SME	Provides data as required
Contractor/(OEM)	Support SME	Provides data as required
Partnership Representatives	Support SME	Provides data as required
SAF/AQD	Advisor	Assists with PSS development
SAF/FMC	Advisor	Advises with PS-BCA methodology and cost model development for ACAT I level and all OSD programs
SSC/ECP	Advisor	Consolidates, validates, and verifies information and data provided by AFSC Functional Stakeholders

Organization	Role	Support Responsibility
		Provide the latest PS-BCA guidance to all Space programs Archive and share samples and best practices with PMOs Review draft PS-BCAs and provide comments
MAJCOM FM	Advisor	Validates all cost analysis prior to final report coordination/briefings
AFCAA	Advisor	Provide guidance, analytical support, and cost risk analyses for ACAT I level and all OSD programs
AFLCMC/LG	Advisor	Enterprise level PS-BCA process lead for their command
SpOC/S4	Advisor	Enterprise level PS-BCA process lead for their command
AFMC A5/8/9 SpOC/S5/8/9	Advisor	Requirements definition process for core sustainment command capabilities Oversight of modeling and simulation efforts, as well as scientific analyses and assessments

3.4. Kickoff Meeting.

3.4.1. Introductions. The PSM conducts roll call and allows stakeholders, support SMEs, and advisors to introduce themselves by name, organization and their role in the PS-BCA process.

3.4.2. Agenda Review. The PSM provides an overview of the agenda.

3.4.3. Program Overview. The PSM provides a program overview that includes a brief history of the program, the phase within the acquisition life cycle, industry/market conditions, significant program events, and any product support challenges or performance deficiencies the program is experiencing. Additionally, the overview includes relevant information on historical precedents, previous BCA or PSS attempts, acquisition documentation and stakeholders. The overview should provide enough background to give a general understanding of the program. This step facilitates defining the baseline, or "as is" COA, and provides context for development of the problem statement. Background information should include:

3.4.3.1. Program description.

3.4.3.2. Mission.

3.4.3.3. Acquisition phase.

3.4.3.4. Reason for PS-BCA (Milestone phase in the acquisition life cycle, New weapon system or platform, Proposed change in PSS, Five-year revalidation).

3.4.4. Significant changes. Any significant changes to the following since previous analyses were accomplished (revalidation):

3.4.4.1. Operating environment.

3.4.4.2. Operating tempo.

3.4.4.3. Modifications to contracting language.

3.4.4.4. Basing.

3.4.4.5. Budgetary environment.

3.4.5. Review Charter. The PS-BCA IPT reviews and updates the charter to summarize the PS-BCA IPT's direction and approval process. Elements of the charter include authority, purpose, problem statement, scope, desired outcome(s), baseline determination, governance structure, and schedule.

3.4.6. Baseline Determination. Describe the "as is" state in sufficient detail to establish cost, and for new systems identify analogous systems for comparative cost analysis. Refer to Section 4 (COAs) for additional information.

3.4.7. Framework Development

3.4.7.1. Problem Statement. The PS-BCA problem statement should provide an accurate and concise reason for conducting the PS-BCA, as well as define the analysis framework for the current deficiencies, additional requirements, or opportunities for improvement. The problem statement is also commonly referred to as the "objective." For additional detail, refer to guidance in AFMAN 65-506, Section 2.2. The PS-BCA should also focus on identifying the best value PSS by balancing requirements (i.e.: Operational Availability (Ao)) and affordability to meet the warfighters' requirements. The PSS for a specific program or component should be tailored to the operational and support requirements of the system. However, readiness and availability should be balanced with affordability, taking budget realities into account. There is no "one size fits all" approach to PSS development. During the PS-BCA IPT problem statement development, the IPT needs to consider the following key questions:

3.4.7.1.1. What is the desired end state?

3.4.7.1.2. What is the purpose of the analysis?

3.4.7.1.3. What is required to meet statute?

3.4.7.1.4. Is there an existing PSS in place? If so, are requirements/expectations being met?

3.4.7.1.5. Are their deficiencies, additional requirements, or opportunities to improve system support?

3.4.7.1.6. What decision(s) is/are the analysis intended to support?

3.4.7.1.7. Has appropriate product support analysis been completed (such as Level of Repair Analysis, Depot Source of Repair, Supportability Analysis)

3.4.7.1.8. Caution/Pit Fall: PS-BCA problem statements should not assume a specific means of achieving the desired result. Rather, problem statements contain an objective description of the desired end-state or outcome (i.e., not biased toward any one COA). Biases or unfounded assumptions in problem statements undermine the analytical purpose of the PS-BCA by jumping to conclusions.

3.4.7.2. Scope. A well-defined problem statement aids in establishing the scope of the PS-BCA. The scope will then aid the IPT in setting and maintaining the boundaries for the analysis. Scope includes what product support capability and timeframes will be analyzed. The scope should also state what aspects of the program are not included in the analysis and why (i.e.: covered under separate analysis, not a differentiator across the COAs, outside the area of responsibility of the PMO, etc). The scope of the analysis describes the content that is included in the analysis and the content that is excluded from the analysis. In order to determine the scope, the PS-BCA IPT needs consider the following:

3.4.7.2.1. Will the analysis be conducted for the entire system or only on certain sub-systems?

3.4.7.2.2. Will the analysis include both common and peculiar components?

3.4.7.2.3. Will the analysis include associated equipment not managed by the PMO conducting the analysis (i.e.: training systems, weapons, system engineering/automated test systems (ATS), etc.)?

3.4.7.2.4. Will all 12 IPS elements be analyzed? If one or more of the IPS elements are not applicable to the PS-BCA, a rationale should be provided that describes the exclusion.

3.4.7.2.5. What organizations are impacted/involved in the analysis?

3.4.7.2.6. What geographical areas, sites, and locations are impacted/involved in the analysis?

3.4.7.2.7. Is this a peacetime or wartime operating environment?

3.4.7.2.8. Are there other categories that might have a potential impact on the decision?

3.4.7.2.9. Will the PS-BCA consider all 12 IPS elements? **Table 3.2** shows a second recommended categorization of the 12 IPS elements combined into higher level/overarching categories. The asterisks (*) within **Table 3.2** annotates cross-cutting elements and should be considered across all categories. This second categorization is very similar to the breakout of the 12 IPS elements previously discussed in Section 1 (Overview) of the pamphlet.

Table 3.2. Integrated Product Support (IPS) Element Categorization.

Product Support Management	Maintenance	Supply Chain Management	Sustaining Engineering
Technical Data Computer Resources (except for S/W Maintenance) Facilities and Infrastructure* Support Equipment* Training and Training Systems*	Computer Resources (S/W Maintenance Only) Maintenance Planning and Management	Supply Support PHS&T	Design Interface Sustaining Engineering

Manpower and Personnel* Product Support Management			

3.4.7.2.10. Has the PS-BCA IPT clearly explained and documented why an area of the program was included or excluded and the rationale needs to link back to the PS-BCA problem statement?

3.4.7.3. Desired Objectives and Requirements. The desired objectives for requirements identified by the PS-BCA IPT should be coordinated at the O-6/GS-15 IAP. The PS-BCA IPT needs to come to consensus on the desired objectives and periodically review them to remain on track. IAP members should also concur with the desired objectives. Some possible sources of program requirements may be the Key Performance Parameters (KPP), Key System Attributes (KSA), performance metrics already identified by the Capability Development Document (CDD), and Capabilities Production Document (CPD).

3.4.7.3.1. The desired objectives and documented requirements may take the form of a Product Support Arrangement (PSA). A PSA is an implementing agreement, such as a contract, memorandum of understanding (MOU), memorandum of agreement (MOA), commercial service agreement (CSA), service level agreement (SLA), and similar formal agreements to ensure performance expectations (on both sides) are clearly articulated.

3.4.7.3.2. Desired Objectives Examples.

3.4.7.3.2.1. MAJCOM perspective: Increase in Aircraft Availability (AA) to meet mission requirements without increasing fleet size.

3.4.7.3.2.2. A reduction of Mission Impaired Capability Awaiting Parts (MICAP) across the platform that supports an increase in AA to meet mission requirements without increase in cost or logistics footprint.

3.4.7.3.2.3. Reduction in Operation & Support (O&S) costs.

3.4.7.3.3. Best Practice. It is difficult to create a good problem statement without thinking through the scope and desired objectives. The problem statement creation is iterative. A good problem statement provides a clear description of the issue areas to be evaluated and how success will be evaluated. The problem statement should be approved by the appropriate governance structure at/or around the time of the kickoff meeting, i.e. PEO and/or PM. Leadership concurrence early in the PS-BCA process can mitigate unnecessary rework and ensure the analysis covers the assigned subjects. Make sure problem statement scope and objectives are properly aligned. Clearly identify if multiple ACAT program(s) are associated with the analysis and include in GR&A (i.e.: If the PS-BCA is planned to include a weapon system and any associated modernization efforts, need to state what modernization efforts are included in the baseline.) Ensure that desired objectives can be properly addressed in the analysis. For example, if one of the desired objectives is an increase in AA, ensure that methodologies and relevant data will be available to provide this information.

3.4.7.4. Ground Rules & Assumptions (GR&As). This section provides guidance on documenting GR&As and methodology used for a PS-BCA. GR&As and methodologies should be examined early in the PS-BCA process and the draft GR&As and methodology should be developed prior to the kickoff meeting. Putting the GR&As in the charter helps frame the analysis and supports the rules of engagement for the PS-BCA IPT. The initial GR&As may be modified as the analysis progresses. Any change to GR&As after the charter is signed should be vetted and agreed to by the IAP members prior to implementation.

3.4.7.4.1. Ground Rules. The ground rules document known or dictated parameters and conditions for the PS-BCA. Prior to formulating assumptions, what is known for certainty should be stated under the ground rules: facts, laws, defined criteria, constraints, regulations, OSD and/or Service guidance. Included in the ground rules are any factors known to be true that may affect the current or future business conditions. Constraints are those factors known or discovered that are beyond the control of the PM or PSM and bound the PS-BCA analysis. The PS-BCA IPT needs to understand these constraints before beginning the analysis. Constraints should be presented to the governance board and decision maker of the PS-BCA. An example of a constraint could be funding constraints originated by a congressional mandate. Programs should have an initial DSOR at MS-A, and an updated DSOR at MS-B. For programs at or past MS-C, they should have completed their DSOR and preceding Core determination. These DSOR and Core determinations should not be superseded by the PS-BCA. The ground rules should be compliant with all applicable laws including but not limited to 10 USC §2460, §2464 and §2466. A non-exhaustive list of major PS-BCA ground rules includes:

3.4.7.4.1.1. Legislation, regulations, and policy

3.4.7.4.1.2. Financial data in base-year or then-year dollars

3.4.7.4.1.3. Directed inflation index

3.4.7.4.1.4. Quantity of fielded systems

3.4.7.4.1.5. Expected flying hour program and service life

3.4.7.4.1.6. The XX Fleet size is ### with an expected service life of YY years.

3.4.7.4.1.7. Flying hours per system is ###.

3.4.7.4.1.8. Engines will average initial and subsequent overhaul intervals of ~XX,XXX flying hours.

3.4.7.4.1.9. MAJCOM Ao threshold is ##% and Objective is ##%.

3.4.7.4.1.10. Other DoD agencies (i.e. Navy, Army, Defense Logistics Agency (DLA), etc.) will manage/repair common (stock listed) spare parts and/or support equipment that applies to the (name of program) system.

3.4.7.4.1.11. The (program name) will be maintained using what maintenance concept – organizational level (O-level) and depot level (D-level); however, there will be some O-level back shop work to be defined.

3.4.7.4.1.12. All costs will be presented in Base Year 20XX (BYXX) dollars and

Then-Year (TY) dollars.

3.4.7.4.1.13. All comparative cost dollars will be presented in Net Present Value (NPV) or Present Value (PV) Costs, as appropriate.

3.4.7.4.1.14. The O&S Element Structure used in the cost analysis will be based on the guidance provided in the *Operating and Support Cost Estimating Guide* and prepared by the OSD CAPE.

3.4.7.4.2. Assumptions. An assumption is an informed position about what is true of a current or future state of affairs for a situation where explicit factual knowledge is unobtainable (i.e., 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 IPT bases the analysis. After stating factors in the ground rules section, list assumptions and document why those assumptions were selected. If a stakeholder or advisor non-concurs with any selected assumption, document the rationale for the non-concurrence. Assumptions are also vital for the risk and sensitivity analysis. It is important to note that GR&As may be changed throughout the analysis process. GR&As do not need to be 100% complete for charter inclusion. GR&As in the charter should be used to help frame the analysis and support rules of engagement for the IPT. However, any changes to GR&As after the charter is signed should be vetted and agreed to by the IPT prior to implementation. In the sensitivity analysis section, evaluate each major assumption to determine its impact on the PS-BCA recommendation. Omitting, changing, or misusing of assumptions can directly influence which COA is recommended. A non-exhaustive list of major PS-BCA assumptions includes:

3.4.7.4.2.1. Financial metrics and inputs (inflation).

3.4.7.4.2.2. Physical environment.

3.4.7.4.2.3. Contingency vs. non-contingency operations.

3.4.7.4.2.4. Expected useful life of a weapon system.

3.4.7.4.2.5. The “as-is” COA should represent the current POE and LCSP.

3.4.7.4.2.6. **(List additional items)** should be considered as part of the PS-BCA.

3.4.7.4.2.7. **(List additional items)** not considered as part of the PS-BCA.

3.4.7.4.2.8. Benefits metrics span the same time period as the cost estimate to provide uniformity in comparing cost to benefits.

3.4.7.4.2.9. Programmed Depot Maintenance (PDM) / Analytical Condition Inspection (ACI) / modification line will remain on an X-year cycle for the study scope of YYYY-YYYY.

3.4.7.4.3. Exclusions and Inclusions. Exclusions are those areas outside the scope of the analysis and/or those areas that would be the same for all scenarios. Examples of areas that could be excluded from the analysis are as follows:

3.4.7.4.3.1. Sunk costs

3.4.7.4.3.2. Realized benefits

3.4.7.4.3.3. Modification programs under development

3.4.7.4.3.4. Programs that required a standalone study

3.4.7.4.4. Inclusions identify areas specifically considered as applicable to the study. Examples of areas that could be included in the analysis are as follows:

3.4.7.4.4.1. Non-recurring start-up costs

3.4.7.4.4.2. Material cost

3.4.7.4.4.3. Depot Maintenance Cost (incremental rate and full cost to recover rate)

3.4.7.4.4.4. Support equipment

3.4.7.4.4.5. Training/simulators

3.4.8. Update Charter. The PS-BCA IPT updates the charter to summarize the PS-BCA IPT's activities per the IPT kickoff meeting.

Chapter 4

COURSES OF ACTION

4.1. Introduction. COAs, also known as alternatives, are various options to achieve the desired objective. Selection of the proper product support COA is essential to the success of the PS-BCA. There is no set maximum number, however, a minimum of two COAs is required for a PS-BCA. The decision maker, however, should have a representative range of COAs to make a well informed decision. If too many COAs are evaluated for example, the costs and time to perform the PS-BCA analysis will increase and the quality of the analysis for each COA will likely be negatively impacted. Therefore, the team should carefully consider the breadth and variety of COAs to be selected for analysis.

4.1.1. COA Development. COAs can be intuitively obvious or they may take a determined effort to define. Creativity is key to developing effective COAs and many times groups are more creative than individuals. All alternatives that are reasonable and feasible shall be fully analyzed (AFMAN 65-506, Paragraph 3.3.2). Those developing COAs should have knowledge of the program in question and an understanding, or at least a solid foundation, of the different IPS elements.

4.1.2. COA Detail. COAs need to be described in sufficient detail to facilitate proper analysis (cost, benefit and risk). COAs should also be defined so that appropriate IPS and costs elements can be identified and evaluated in terms of the scope of work and who will perform the work. Even those unfamiliar with the COAs should be able to read the descriptions and fully understand the concepts and what is required to implement the COAs. Additionally, each COA needs to be clearly distinguishable from other COAs.

4.2. Status Quo COA. The PS-BCA should include a COA which is the status quo as documented in the LCSP. This is the “change nothing” or “as-is” COA that describes how the function or process under study currently exists. The PS-BCA is about action, inaction and consequences. Changing nothing for now is not necessarily "neutral" - there can be both negative and positive consequences - and a full consideration of all factors should strengthen any subsequent findings. For assessments completed prior to MS-C, the PMO should utilize the PSS approved at the previous MS as the “as-is” COA.

4.2.1. COA Baseline. The status quo or “as-is” COA should serve as a baseline against which all other COAs are compared. This COA also takes into account the future plan of the organization, such as planned and scheduled changes and/or enhancements to the existing program, and should reflect a review of the mission and strategic goals.

4.3. Future State COAs. Future state COAs, also known as the “to-be” COAs, establish other options that should be evaluated. As stated previously, these COAs need to be clearly distinguishable from each other and also provide sufficient variety to give decision makers options to choose from.

4.3.1. COA Formulation. Future state COAs are formulated by the PS-BCA IPT. The IPT utilizes brainstorming techniques or structured techniques such as the Decision Support Matrix for Product Support, as described in the DoD Product Support PS-BCA Guidebook, to assist them throughout the process. There are two primary methods to structure COAs, holistic and modular.

4.3.2. Holistic Approach. The holistic approach views the work streams, or IPS elements, as interrelated and are not analyzed independent of each other. This is essentially an "all or nothing" perspective to developing COAs. When using a holistic approach costs, benefits, and risks are assessed across all IPS elements at the same time. If a PS-BCA is being performed after MS-C, a holistic approach is generally used due to overlapping work streams. **Table 4.1** shows how this approach would be represented for the individual IPS elements.

Table 4.1. Holistic Approach.

IPS Element	COA 1	COA 2	COA 3
Product Support Management	PSP A	PSP C	PSP B
Sustaining Engineering	PSP A	PSP A	PSP C
Supply Support	PSP B	PSP B	PSP A
Maintenance Planning and Management	PSP C	PSP B	PSP C

4.3.3. Modular Approach. The modular approach, views the work streams or IPS elements as standalone elements which can be combined to form a COA. An example of a modular approach, shown in the **Table 4.2**, assesses costs, benefits, and risks associated with each work stream and then combining those work streams in a variety of combinations to determine the best overall COA. The IPT should examine each of the IPS elements to ensure the proprietary nature of data and intellectual property does not inhibit potential combinations. If a PS-BCA is being performed prior to MS-C, a modular approach is generally used due to the analogous data that is used and this should provide flexibility to decision makers by allowing them to customize a COA for their decisions.

Table 4.2. Modular Approach.

Work Stream / IPS element	Product Support Management	Sustaining Engineering	Supply Support	Maintenance Planning and Management
Product Support Provider (PSP)	PSP A ■■	PSP A ■	PSP A	PSP A ■
	PSP B	PSP B ■	PSP B ■■	PSP B ■
	PSP C ■	PSP C ■	PSP C ■	PSP C ■
■ COA 1 ■ COA 2 ■ COA 3				

4.3.4. Comprehensive View. The best solution is not necessarily the most obvious solution, and some innovative thought is often required to develop other possible solutions to a problem. In defining COAs, the IPT should take a comprehensive view and include considerations related to each COA.

4.3.5. COA Limitations. To begin defining COAs, the IPT should establish the limits of viable COAs (bookends) in order to establish boundaries for a diverse set of COAs to analyze. While

COAs can be defined in terms of capabilities and performance, they are usually defined in terms of the source of product support (i.e., organic or contractor). 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). Even though all organic or contractor source of product support are often not viable, the rationale for their exclusion from evaluation should be included in the PS-BCA. The alternative analysis focuses on achieving the appropriate mix of organic and contractor capabilities through finding the best value solution for each of the IPS elements required for sustainment.

4.3.6. COA Evaluation. When defining future state COAs, the IPT needs to explain how each "to-be" COA operates, how it provides value to the organization, and how it compares to the current "as-is" COA. Other questions the IPT needs to consider include: How do future state COAs address shortfalls in the current state? How does one future COA relate to other "to-be" COAs being examined? For each COA considered, the IPT describes the future state of operations that the proposed decision should help achieve. Additionally, the PS-BCA contains the rationale decisions on how COAs were developed and how COAs were eliminated as part of a down-select process.

4.3.7. Additional Factors. Other factors to consider when identifying and defining future state COAs include the following.

4.3.7.1. Identify the reasonableness and feasibility of product support providers across the different IPS elements. For additional detail, refer to AFMAN 65-506, Section 3.3.

4.3.7.2. Consider various feasible combinations of workload percentages, such as 50–50, 25–75, 75–25.

4.3.7.3. Consider the possibility of developing competitive contractor COAs using both the OEM and Third Party Logistics (3PL) options.

4.3.7.4. Consider various contract types and specify the degree to which it impacts the analysis.

4.3.7.5. When applicable, use PPP to leverage the capabilities of both organic and contractor sectors. See DoD PPP for Sustainment Guidebook for further information on each type of PPP. Tailor partnerships to IPS elements at the component, sub-assembly, or system/platform level.

4.3.7.6. Address items that have been identified as a requirement to establish repair capability, including considerations of facilities, personnel and data rights.

4.3.7.7. Ensure COAs are in compliance with Title 10 U.S. Code §2464, *Core logistics capabilities,* the DSOR decision, and Title 10 U.S. Code §2466. Explanation needs to be included if a COA is not in compliance.

4.3.7.8. For systems in sustainment, consider focusing COA development on specific IPS elements where there are performance gaps or opportunities for improvements. Additionally, keep in mind that previous decisions or specific leadership direction may influence COA development for systems in the sustainment phase.

4.4. Reasonableness and Feasibility. By definition, the option selected to meet the desired objective should be one of, or a combination of, the COAs considered. Therefore, it is essential that in the decision-making process a range of reasonable COAs are examined. For a COA to be

reasonable, it must be consistent with all legal requirements and Air Force regulations. Adequacy and feasibility are other key elements in the identification of reasonable COAs. Adequacy refers to the capacity of the potential COA to meet the desired objective. Feasibility refers to the potential COA being consistent with funding, technological and scheduling realities.

4.4.1. 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. This information should be summarized in the PS-BCA. 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.

4.4.2. 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 O-6/GS-15 IAP to gain concurrence with its removal. COA elimination requires approval at the O-6/GS-15 level of the governance body. For example, a number of COAs were considered but as the analysis progressed, only two emerged as feasible. The preliminary calculation of life-cycle costs and benefits demonstrated that one of the two COAs was clearly superior to, and less costly, than the other. At that point, there was no benefit to be gained from completing any further analysis. The findings should simply be documented in a short report or memorandum.

4.4.3. 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.

4.4.4. Additional Consideration. Areas to consider when validating and determining feasibility include, but are not limited to, the following:

Are all feasible COAs considered?
Are a reasonable number of COAs considered to include the limits (bookends) COAs and hybrid COAs containing diverse combinations of providers for the various integrated product support elements?
Are COAs significantly different?
Is adequate supporting documentation provided for all COAs that were down selected before full analysis was completed?
Are the COAs in accordance with legislative guidance?
Were other government agencies' capabilities to provide a product or service considered?
Are the COAs defined in such a manner that the applicable benefits, cost elements and possible risks can be clearly identified and assigned?
Do the COAs clearly identify who will provide support in each case? For example, will support be provided organically or commercially?
Do the COAs identify where the work will be done? For example, will depot or material support be provided locally or will transportation to other locations be required? Depending on the answer, this might involve additional cost and possibly an increase in time.

Are obvious COAs included or addressed in some manner? For example, an obvious issue to address in the COAs is whether maintenance and other sustainment activities should be performed by the government or by a contractor.

Chapter 5

BENEFITS AND NON-FINANCIAL ANALYSIS

5.1. Benefits Introduction. Benefits are non-monetary factors that are a critical part of COA evaluation in comparative analyses. Benefits differ from cost in that, costs are inputs (monetary resources) required to implement each COA, whereas, benefits are the outputs to be gained as a result of the resource inputs. In developing the list of costs and benefits, care should be taken to avoid double-counting (i.e., benefits should be mutually exclusive). Benefits are evaluated using the metrics that measure success in the "as is" state of the current product support arrangement. These metrics should be applicable to all the COAs. They can be qualitative or quantitative in nature (subjective or objective).

5.2. Selecting Benefits. To determine which benefits to include, stakeholders should assess the factors most important in achieving the desired outcome and for evaluating the problem statement. These should be tied to the product support requirements such as SCM, SE, maintenance, etc. Benefits may be qualitative in nature, which injects a degree of subjectivity into the assessment. While this subjectivity cannot be avoided, it is important that the scoring and results are traceable and repeatable. Any and all categories of benefits analyzed should be fully explained so someone unfamiliar with benefits can fully understand the benefit and its measurement. **Note:** If a benefit can be measured in monetary terms, it should be included in the cost section of the analysis.

5.2.1. Stakeholder Input. One approach to select the benefits to be assessed is to receive input from stakeholders, support SMEs, and advisors that are listed in Section 3 (PS-BCA IPT Membership). As discussed above, a key advisor on the team should be a cost analyst who should advise the team on methodology and process, but should not participate directly in the weighting and scoring of benefits. The first step in the benefit analysis process is for the team to develop a list of benefits expected to accrue as a result of implementing the COAs under consideration.

5.2.2. Benefit Realization. Benefits should be developed within the context of the problem statement and the scope of the analysis. The benefits developed should be benefits to the government, not simply the program under study, attained over the period of analysis. Realized benefits are excluded from consideration and this should be documented in the GR&As. There are two broad categories of non-monetary benefits: non-monetary quantitative benefits and non-monetary qualitative benefits.

5.2.3. Category Metric Attributes. The linkage from the category down to the metric and attribute, along with the rationale and data source, should be completely documented by the PS-BCA Team (see **Table 5.1**). Appendix F in the OSD Performance Based Logistics guidebook, dated 2016, is a good source for metrics across the product support elements.

Table 5.1. Category Metric Attribute.

Category	Four main categories: PSM, Material Management, Maintenance Planning, and Sustaining Engineering
Sub-Category	Lower level elements within primary category
Metric and Attribute	Measure of goodness (Metric) and Evaluation focus area (i.e. Attribute: responsiveness, quality, etc.)
Data Source	Data system to collect data

5.3. Quantitative Benefits and Metrics.

5.3.1. Non-monetary Factors. These factors are non-monetary, but quantifiable in terms other than dollars. Examples of non-monetary, quantifiable benefits include AA, parts supportability, system sustainability, etc. Benefits are the overall criteria selected of "measures of goodness" of the COAs under consideration. PS-BCA IPTs should take care to fully use quantitative benefits, if data permits, rather than a subjective benefit that is intended to measure the same factor.

5.3.2. Metric Evaluation. Metrics are the data elements used in the evaluation of the benefits categories. For example, a benefit selected by the team under the Supply Support Category may be Issue Effectiveness. Existing metrics of the program under study, or an analogous program for new programs with no history, provides a starting point for determining the most important outputs of a particular project or program. There is no precise "right number" of benefits or supporting metrics. However, benefits should be limited to those most important in meeting the requirements established in the problem statement. Evaluating an excessive number of benefits tends to dilute the impact of any one benefit and may result in inconclusive results.

5.3.3. COA Comparison. All feasible COAs considered in the analysis should be evaluated against the same set of benefits categories and metrics. If a particular COA does not provide a stated benefit, it should be scored zero in the weighting and scoring process (Section 8.0, Weighting and Scoring).

5.3.4. Wash Benefits. Benefits not expected to differ across COAs are wash benefits, just as costs that are the same across COAs are wash costs, and can be excluded from the benefits analysis. Excluded benefits should be discussed in the GR&As, so that it does not appear that the omission was accidental.

5.3.5. Metrics supporting PSS. Metrics are the means by which the PSM and PS-BCA team gain understanding of the PSS and identify potential gaps between required and actual performance. There is no perfect metric, but selecting an appropriate set of metrics should promote the desired behavior and outcome for executable COAs. Benefits criteria should be coordinated with the O-6/GS-15 IAP.

5.3.6. Value-Add Metrics. Metrics should be selected or constructed to encourage performance improvement, effectiveness, efficiency, and innovation. These metrics should be applicable to "as is" state and should be the starting point for the PS-BCA. The metrics should effectively align with the warfighters' mission, contribute to meeting requirements, ensure on-time delivery of a quality product, and reduce costs. It is important to exercise caution when

selecting a combination of metrics to ensure that they are not redundant, confounding, or counteractive. Multiple metrics can reinforce desired behavior or create undesirable conflicts.

5.3.7. Metric Documentation. The PS-BCA Team should document the reasoning/rationale for using the specific metrics. The sources and derivation of quantitative benefits must be documented in the same level of detail as costs, and should include all interim calculations as appropriate. The stakeholders and advisors should understand and agree to this rationale. Below are examples of some quantitative benefits and associated metrics:

Table 5.2. Quantitative Benefits and Associated Metrics.

Category	Subcategory	Metric	Attribute	Data Source
Supply Chain Management	Components	Issue Effectiveness	Responsiveness	LIMS-EV
Supply Chain Management	Components	Fill Rates	Responsiveness	LIMS-EV
Supply Chain Management	Components	MICAP Hours	Responsiveness	LIMS-EV
Supply Chain Management	Components	Customer Wait Time (CWT)	Responsiveness	SBSS
Maintenance Planning & Management	DLRs/PDM/C-check/ACI	PQDR	Quality	Joint Deficiency Reporting System
Maintenance Planning & Management	DLRs/PDM/C-check/ACI	Flow days	Responsiveness/ Schedule	MP&E, LIMS-EV
Sustaining Engineering	Sustaining Engineering	107 Requests	Engineering Response Times	Program Office
Sustaining Engineering	Sustaining Engineering	202 Requests	Engineering Response Times	Program Office
Sustaining Engineering	Sustaining Engineering	339 Requests	Engineering Response Times	Program Office

5.4. Qualitative Benefits and Metrics. Qualitative benefits are intangible benefits that are not easily quantified, but are nonetheless important. This might include factors such as capability enhancements, environmental benefits (use of renewable energy resources, lower or less toxic emissions, etc.), morale/quality of life, and safety. Strategic organizational benefits may be difficult to quantify or may be unquantifiable/intangible in some situations, but are often very critical when developing a business case. These benefits may be very important to the organization because of law, policy, or strategic objectives that direct the result or because of other organizational goals. A well done qualitative benefit analysis is as valid as a quantitative analysis. Definition and explanation of benefits are important to give the analysis credibility and to help readers understand their importance. Thorough definition and explanation of weighting and scoring rationale go a long way in balancing the inherent subjectivity associated with a qualitative analysis, and assuring decision makers that the benefit evaluation was based on sound reasoning and represents stakeholder/advisor consensus on the methodology.

5.4.1. Financial Management Compliance. Compliance with AFI 65-501 and AFMAN 65-506 states analysis, inputs and rationale must be fully documented as part of the BCA, so that it is traceable and repeatable.

Chapter 6

COST AND FINANCIAL ANALYSIS

6.1. PS-BCA Cost Estimates. This section states the requirements for developing credible, defendable, and high quality PS-BCA cost estimates. The intent is to construct cost estimates for all considered COAs which appropriately account for platform maturity and which can be thoroughly documented, easily replicated, and utilized to effectively inform the MDA. Cost methodologies must be thoroughly documented so the analysis can be replicated if necessary (AFMAN 65-506, Paragraph 4.1.3.) Below are the criteria for completing credible, defendable, and high quality PS-BCA cost estimates:

6.1.1. GR&As are reasonable and properly documented.

6.1.2. Guided by the problem statement.

6.1.3. Properly utilizes comparative analyses methods.

6.1.4. Data is normalized, projected and used in the estimate correctly.

6.1.5. The PS-BCA model and cost estimates accurately represent the PSS for each COA.

6.1.6. Ensures cost risk is handled consistently for each COA.

6.1.7. Enables the decision maker to make the most informed decision possible.

6.2. Criteria 1 – Guided by the Problem Statement. The cost analysis is guided by the problem statement which is explained in section 3.2.6.1 of this pamphlet. If the problem statement is a best value determination such as "The F-XX PS-BCA will determine the best value COA long-term sustainment strategy for the F-XX unique items consistent with Air Force objectives," then both costs and benefits are evaluated and the cost estimates should include only F-XX unique items. If the problem statement is a cost effectiveness analysis such as "The T-XX PS-BCA will look at all strategies that reduce cost while keeping performance the same," then cost is the only variable and the estimates should keep performance the same across all COAs. If the problem statement is a fixed budget optimization, such as "maximize performance of the B-XX while not exceeding a $XXM threshold," then the performance criteria should be adjusted until the corresponding cost estimate is under the dollar threshold. The problem statement clearly defines the purpose of the decision that the cost analysis is intended to support. The data collected and analyses performed are focused on providing the decision maker as much information as possible for the problem being addressed and the criteria being used to make the decision.

6.3. Criteria 2 – GR&As are Reasonable and Documented. The GR&As for the cost analysis should be reasonable, documented, and constructed to aid the PS-BCA IPT in building credible, defendable, and high quality cost estimates. Relevant GR&As should: (1) address elements that drive a cost delta between COAs; (2) ensure the PS-BCA is fair, balanced, and a realistic comparison across all COAs; and (3) have coordination from the IAP member organizations. The rationale and source for each GR&A should be included.

6.3.1. Example: When transitioning from contractor maintained components to government maintained components, it would be reasonable to assume that Interim Contract Support (ICS) may be required for a few years while organic capabilities are being prepared. The

corresponding ground rule might be: For COAs standing up additional government repair, assume four years of ICS, then transition to government.

6.4. Criteria 3 – Properly Utilizes the Various Types of Analysis. The PS-BCA is a comparative analysis. The categories of costs included in a comparative analysis are governed by OMB Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*, and differ from the categories of costs included in other program cost estimates.

6.4.1. Comparative Analysis: A comparative analysis is any type of analysis examining the costs, benefits and risks of alternative ways of achieving a given objective or fulfilling a need.

6.4.1.1. For comparative analyses, OMB Circular A-94 requires an "incremental" cost approach.

6.4.1.2. The cost analysis will only include costs for which funds have not yet been expended or irrevocably committed. Do not include sunk costs, as these costs do not factor into the decision. When the magnitude and timing of a cost or benefit is identical for all alternatives, they can be considered as "common costs" (also called "wash costs") or benefits. Common costs that do not add any additional information to the decision-making process may be excluded from the comparison. Caution should be taken when identifying common costs to confirm that costs or benefits excluded are identical for all alternatives. Additionally, common costs should not be excluded when there is a requirement to reflect the total program costs.

6.4.1.3. Caution. Other program estimates based on the total cost of the program won't match the cost estimate used for comparative analysis in the PS-BCA. Typical examples include the Life Cycle Cost Estimate (LCCE) generated to support milestone decisions or generated for budget purposes. While an LCCE can be the starting point of a PS-BCA cost estimate, adjustments must be made to ensure that only incremental costs are included, that sunk and wash costs are removed, and any other relevant changes (e.g., Labor Rates – see below) are made to meet the requirements for a comparative analysis (AFMAN 65-506, Paragraph 4.4.2).

6.4.1.4. Pitfall. The cost estimates used in the PS-BCA for comparative analysis do not include all the costs necessary for understanding the implementation cost of an alternative or for making a budget comparison. Adjustments should be made to these estimates for use in any context outside the PS-BCA.

6.4.2. Labor Rates. Labor rates required for the PS-BCA should be different than those needed for full or total cost of the program estimates. For organic depot labor calculations (to include any civilian personnel not directly working at the depot but are necessary manpower increases for these COAs), the PS-BCA IPT utilizes the incremental labor rate portion of the sales rate/price to customers to identify the cost of implementing the final chosen alternative. The change in the workload distribution as a result of the PS-BCA decision could change the organic cost recovery sales rate/price and/or contractor labor rates.

6.4.2.1. For instance, if additional work is taken on by an organic depot, more mechanics, engineers, floor supervisors and material would be needed in order to complete the task. These incremental costs would be included in the organic depot incremental and full sales rates. An organic depot sales rate includes both labor and material. However, the cost of the base commander, while part of the burdening and cost to a customer, is not an

incremental cost and would not change with the decision to add workload to a depot. Therefore, the base commander cost would be excluded in an incremental rate for a comparative analysis. In most cases, the incremental cost rate uses the full cost to recover Sales Rate as the baseline, and then removes all of the General & Administrative Costs, as well as most of the Production Overhead costs – only leaving the Indirect Production Material costs and the Shop Operating Material costs in the Production Overhead category for Organic Depot Maintenance.

6.4.3. Workload Impacts. The last part of the analysis would be to determine if the decrease in workload impacts other customers. For example, if the decision was made to move full maintenance support for weapon system (A) from organic depot maintenance support to a contractor, organic labor rates may increase due to the change in workload being supported through the Air Force Working Capital Fund.

6.4.3.1. Similarly a change in workload for a contractor could impact a contractor's business base and labor rates, though this type of impact could be difficult to determine without a contractor's help or assistance from the Defense Contract Management Agency.

6.4.3.2. In addition to changes in direct costs, the PS-BCA IPT should be aware that a change in workload could drive price changes to unrelated commodities or services. This will definitely impact the taxpayer and should be taken into consideration.

6.5. Criteria 4 – Properly Utilizes the Highest Quality Data Available. Section 9 of this pamphlet specifically addresses data selection, collection and assessment for PS-BCAs.

6.6. Criteria 5 – Data is Normalized, Projected and Used Correctly. Gathering relevant data is vital to having a high quality cost estimate. Document completely the source/origin of all data collected. Since data can be gathered from a variety of sources, it is often in many different forms and needs to be adjusted before being used to enable apples-to-apples comparisons (i.e., so COAs can be compared without unintended bias) or as a basis for projecting future costs. The process of adjusting the data to enable an apples-to-apples comparison is called normalization. The analyst should thoroughly document the normalization process and adjustments performed throughout the cost estimating process. Data requires normalization for a number of reasons, some of which are discussed below.

6.6.1. Inflation and Price Escalation. Inflation and price escalation are important and necessary in developing a credible cost estimate and in normalizing existing data. They should not be used interchangeably.

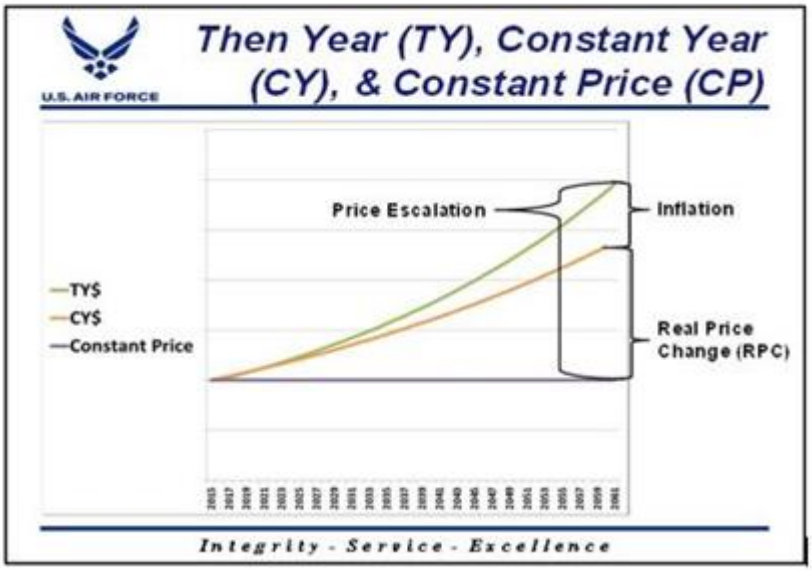
6.6.1.1. AFMAN 65-502, *Inflation*, defines inflation as the increase in general price level over time or the decreasing purchasing power of the dollar over time. In application, this means that, for a given number of dollars, less goods could be purchased 10 years in the future than today. As a result, in order to utilize cost data from an antecedent platform, the cost estimating team should need to adjust the source data to remove the effect of inflation to ensure that all dollars, regardless of time, have the same value (i.e., purchasing power). Collected data should be analyzed to determine the base year of the data. If the base year of the data differs from the base year of the PS-BCA, then the data should be adjusted to the PS-BCA's base year before proceeding.

6.6.1.2. Escalation refers to the total change in price of specific goods or services over a specific period of time. It includes both inflation and the "real price change" of the good

or service. The “real price change” is the difference between inflation and the total change in price, and is caused by changes in the market (supply and demand). The ‘real price change’ is the remaining price change after normalizing for inflation. The term “constant dollar” implies currency has been normalized for inflation only. The term “constant price” implies prices have been normalized for both inflation and market forces. In application, care has to be taken to ensure that all alternatives are normalized for inflation, price escalation, or both.

6.6.1.3. Escalation should be accounted for in the PS-BCA estimates for cost elements whose prices are volatile or change at a significantly different rate than inflation (e.g., fuel, specialized labor, etc.). Escalation rates deserve special consideration in order to properly normalize data for use in an estimate. The Air Force specifies price escalation indices for fuel, medical and government employee (military and civilian) pay and provides access to Global Insight indices for other goods and services (see the SAF/FMCE website). The escalation index used must be documented.

Figure 6.1. Illustration of Inflation, Price Escalation, and Real Price Change.



6.6.1.4. Best Practice: Assume the same escalation rate beyond known periods for all estimates. Do not assume that one COA will escalate in a vastly different manner in the far future unless the basis for that assumption can be firmly documented.

6.6.1.5. Caution/Pitfall: Setting unrealistic escalation assumptions or picking an escalation rate “out of the air.” Because of the compounding nature of such rates, unrealistic assumptions could drive or bias results. Utilize formal price indices and forecasts (e.g., Global Insight indices, AF indices on SAF/FMCE website) as the basis for the escalation assumptions.

6.6.1.6. Cost (e.g., content of cost, currency conversions). Units – Cost data needs to be converted to equivalent units before being used in a data set. That is, costs expressed in thousands, millions, or billions of dollars must be converted to the same format or denomination.

6.6.1.7. Content of Cost – The cost estimator needs to understand what the cost data includes and ensure the content matches the support strategy being estimated. For example, does it only include direct labor or does it include overhead and the contractor's profit as well?

6.6.1.8. Currency Conversion – Similarly, if costs are reported in different currencies, they must be converted into U.S. dollars in order to have a like comparison. The cost analysis portion of comparative analyses will be performed in United States dollars.

6.6.1.9. Sizing: Sizing normalizes data to a common qualitative and quantitative metric. When normalizing data for size, it is important to define exactly what the item represents: What constitutes a software line of code? Does it include carriage returns or comments? The main point is to clearly define what the sizing metric is so the data can be converted to a common standard before being used in the estimate.

6.6.1.10. Normalizing data for usage or quantity is another example of sizing to ensure a common standard before including the data in an estimate. **Figure 6.2** lists some of the common usage or quantity normalizations seen in PS-BCAs.

Figure 6.2. Considerations When Normalizing Data for Usage or Quantity (or Duration).

Normalize for Usage or Quantity (or Duration).
- Cost per usage
  -- Cost per Flight Hour (CPFH)
  -- Cost per operational hour (not to be confused with operational cost per flight hour)
  -- Cost per equipment month
- Cost per quantity (e.g., per Total Active Inventory, per squadron, per dozen)
  -- Cost per TAI – Cost per Total Active Inventory (tails)
  -- Cost per PAA – Cost per Primary Aircraft Authorized (tails that are resourced)
  -- Cost per Squadron

6.6.1.10.1. Key Groupings: Key groupings normalize data by similar missions, characteristics, or operating environments by cost type or work content. Products with similar mission applications have similar characteristics and traits, as do products with similar operating environments. For example, space systems exhibit characteristics different from those of submarines, but the space shuttle has characteristics distinct from those of a satellite even though they may share common features. Costs should also be grouped by type. For example, costs should be broken out between recurring and nonrecurring or fixed and variable costs.

6.6.1.10.2. Life-Cycle Effects/Productivity and Technology Maturity: Life-cycle effects should be considered when comparing data from different programs. For example, entering technology typically follows a reliability improvement curve and would require normalization to be compared to steady state data. Likewise, technology improves over time, so historic cost data may need to be normalized to adjust for productivity or quality improvements resulting from technological advancements over time.

6.6.1.10.3. All normalization actions must be documented. Price indices are often hard to find, so it is important that the source of the indices are documented. If the cost

analysis team constructed a price index for use in the PS-BCA cost estimate, the reasoning and process used in constructing the index must be documented as well. For additional information on data collection and the reason to use certain data sources (especially if multiple sources exist), refer to Section 9 of this pamphlet which specifically addresses data collection.

6.6.1.10.4. For additional guidance on inflation and price escalation and how to apply them properly in cost estimates, refer to AFMAN 65-502, *Inflation*.

6.7. Criteria 6 – Cost Estimates Accurately Represent the PSS for Each COA. The PS-BCA model is a decision-support tool used to produce cost estimates for each COA. In order to effectively support the decision maker, it needs to represent the PSS relationships. To do this, the cost analyst requires clear technical and programmatic direction to properly construct the model so that it produces cost estimates that reflect the PSS for each COA as accurately as possible. In addition, the PS-BCA IPT should have a basic understanding of how the cost model works to ensure that it accurately represents the PSS for all alternatives.

6.7.1. Vector Checks. While developing the cost estimating model, the PS-BCA IPT should seek periodic vector checks early and often to ensure the model being constructed accurately represents the PSS programmatic and technical content for each COA, not the COA's "cost behavior."

6.7.1.1. In addition to cost personnel, include technical and functional personnel in the vector checks to provide a fresh perspective on the cost model and to review its consistency with the PSS.

6.7.2. Cost Review Process. Do not wait until the estimate is near completion before starting the cost review process. This can lead to the realization that the entire PS-BCA estimating framework is incorrect which would require a considerable amount of rework and delay the already lengthy process to complete the PS-BCA.

6.7.3. Productivity Gains and Cost Avoidance. Efficiencies produced by an alternative that result only in additional time for personnel to perform other duties, but will not result in reduced manning or operating costs are defined as cost avoidances and should be addressed in the benefits analysis of the EA, not the cost analysis since costs won't change. For additional detail on productivity gains and cost avoidance, reference AFMAN 65-506, Paragraph 5.3.2.1.4.

6.8. Criteria 7 – Ensure Cost Risk is Handled Consistently for Each COA. Cost risk needs to be evaluated, and each PS-BCA should be consistent in how it handles cost risk for each COA. The importance of providing *comparable* cost estimates that include the appropriately associated cost risks cannot be overstated. In example, if a range and confidence levels are provided for one COA, then a range and confidence levels should be provided for all COAs. Where appropriate, all alternatives should be evaluated at similar confidence levels. For additional guidance specifically on cost risk, refer to the Joint Agency Cost Schedule Risk and Uncertainty Handbook.

6.8.1. Cost Risk. An example of cost risk is the risk of funding technical data collection which should be included in the risk analysis. If the risk can be quantified, it should be included in the cost estimate section. Stochastically modeled risk in the cost model should not be double counted by including it in the PS-BCA's risk analysis (section 7.0).

6.9. Criteria 8 – Enables Decision Maker to Make the Most Informed Decision Possible. The cost estimates for each COA need to be informative to the decision maker. The most precise cost estimate that assumes away critical incremental costs that differ among the COAs or that does not align with the intended PSS for that COA is not providing information that is essential. In the end, a high quality PS-BCA cost estimate is one that informs the decision maker with relevant cost information.

6.9.1. Present Value. Additionally, cost estimates have to be presented in a manner that the COAs can be compared. To make a meaningful comparison of COAs, all costs intended to be compared must be expressed in PV terms (AFMAN 65-506, Paragraph 4.4.2). Using PV allows decision makers to consider future money streams in relation to the current value of money. OMB Circular No. A-94 includes additional information and guidance, including discount rates and formulas for computing NPV. AFMAN 65-506 provides additional guidance on business case analysis and how to properly incorporate present value into a product support business case.

Chapter 7

RISK ASSESSMENT

7.1. Introduction to Risk Assessment. After risks are identified, each risk factor should be defined in detail to ensure all PS-BCA IPT 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 (such as Analytical Hierarchy Process (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. DAFPAM 63-128, *Integrated Life Cycle Management,* Chapter 12 provides the AF standard for risk assessment, and this document adds fidelity to the subject as it relates to PS-BCAs. Risk should be treated separately from cost and benefits. The analysis of risk 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.

7.2. Defining Risk. 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 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 pamphlet 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. As defined in the DoD Product Support Guidebook, risk can be classified as Business or Programmatic, Operational, Suitability, Process, Technical, Schedule, Organizational, Sustainability, Safety, and Environmental. Risks should exhibit three key components.

7.2.1. Future Root Cause. A future root cause (yet to happen), which, if eliminated or corrected, would prevent a potential consequence from occurring.

7.2.2. Probability. A probability (or likelihood) assessed at the present time of that future root cause occurring.

7.2.3. Consequence. The consequence (or effect) of that future occurrence.

7.3. Progression of Risk. Risk identification and analysis should evolve and mature over the life cycle of the system as a result of learning more about the aspects of the program and thus decreasing the uncertainty. At MS-B, system design is still preliminary and consequently product support planning depends heavily on comparison to like systems as will modeling and simulation. Identifying probability and impact at this phase may involve more qualitative analysis due to the lack of actual performance data or dependence on analogous systems that is not a complete representation of the new system in development. Identifying and mitigating moderate and high

risks early in the system's life cycle helps to avoid cost growth later. For example, the use of proprietary software could increase risk in the area of sustainability due to dependence on a sole source versus using open source code capable of being supported by multiple providers. As system design matures, the data and GR&As should also mature by aiding with the identification and management of risk involving different product support COAs. As a system moves through the acquisition life cycle, data availability should improve the ability to assess performance and better identify potential sources of risk. Risk management processes should continue to monitor identified risks and be watchful for new risks as the system progresses through each life cycle phase.

7.4. Classifications of Risk. When assessing risk, it is important to differentiate between risks that are of short or temporary duration, and those which are expected to continue throughout the system life cycle. For example, a short-term risk, such as schedule risk due to a transition delay, should not be considered to be of the same severity as a long term risk that will continue throughout the service life of the system. Remember that risk assessment is analyzing risk over the entire analysis period. Alternatives with short-term transition risk should not be automatically labeled "high" or "moderate" risk, due to a transition risk that might cease to be a factor in a few years, and which would constitute a fraction of the service life of the system. The potential for mitigation and the additional effort required to mitigate the risk should also be considered in the risk assessment.

7.5. Risk Management Planning. Risk management planning is the foundation of a continuous process that is accomplished throughout the system's life cycle, and it is the first step in the risk management process. It is an organized methodology for continuously identifying and measuring unknowns; selecting, planning, and implementing appropriate risk mitigations; and tracking the implementation to ensure successful risk reduction. Risk Management Planning should follow a standard process model through all phases of the system's life cycle. It links a program's risk management effort to life cycle planning by answering "who, what, where, when, and how" risk management should be performed.

7.6. Risk Identification. Risk identification is the second step in the risk management process. The best method for completing this step is to assemble a team of SMEs and relevant stakeholders/advisors. The team should generate a list of all the possible risks that could affect a COA and clearly provide rationale or basis why this is considered a risk. Brainstorming and other similar techniques should be used to identify potential problems. Later the list can be analyzed and filtered to eliminate unreasonable risks. Risk identification is the activity that examines each element of the program to identify associated root causes, begin their documentation, and set the stage for their successful management. Examination of a PSS is accomplished through decomposition into relevant elements, tasks or areas. Decomposition may be oriented to requirements, processes, functional areas or technical baselines. The team should guard against focusing on objectives versus the events that could produce the consequences. For example, the team may identify failing to meet maintenance stand up schedule instead of the events that could cause this to happen (lack of manpower, missing technical data, lack of required tools/support equipment).

7.7. Risk Analysis. Risk Analysis is the third step in the risk management process. Once a list of risks has been developed, the list needs to be analyzed to eliminate redundant risks or those risks whose impact is inconsequential. Risk management resources should be focused on risks that have the highest potential impact. Risk can be assessed in terms of probability and impact,

the combination of these two factors determines which risks are the highest threats to a particular COA. For example, a provider of spare parts may be in poor financial state resulting in a credible risk of going out of business. However, if the part is also available from several other vendors, the potential impact is minimal since other sources are available. On the other hand, if a part is rare, sensitive to damage in shipping, is a long-lead item and has few sources, the risk of losing an asset could be assessed as high as could the impact due to inability to replace. The bottom line for risk analysis is the process should critically examine both the probability and impact of each risk so sufficient planning can take place to reduce either the exposure or the impact.

7.7.1. Risk Matrix. A common approach for assessing both the probability and impact of risk is the use of the risk matrix. The risk matrix prioritizes uncertainties that could negatively impact program cost, schedule and performance. SMEs, typically engineers, PMs, logisticians and others familiar with the program, define the risk factors, probabilities, and resulting impact to cost, schedule, performance or a combination thereof.

7.7.2. Best Practice: Continuously monitor risks to ensure awareness of events that may change either the risk likelihood or risk impact. Additionally, mitigation plans should be reviewed to ensure they are still valid.

7.8. Risk Handling Planning & Implementation. Risk Handling Planning & Implementation is the fourth step in the risk management process. This step identifies, evaluates, and selects options to set risk at acceptable levels given program constraints and objectives. Risk Handling Planning & Implementation is intended to enable program success. It includes the specifics of what should be done, when it should be accomplished, who is responsible, and the funding required to implement the risk mitigation plan. The level of detail depends on the program life-cycle phase and the nature of the need to be addressed. However, there should be enough detail to allow a general estimate of the effort required and technological capabilities needed based on system complexity.

7.8.1. Risk Mitigation. Furthermore, risk handling planning & implementation focuses on either reducing the likelihood that a risk event will occur and/or reduce the impact should the risk be realized. In many cases, the more cost effective option is to reduce the likelihood of a risk occurrence. In the example of the vendor with financial troubles this may be mitigated by setting up an indefinite-delivery indefinite-quantity type contract with multiple vendors, thus reducing risk from sole source and adding opportunity for lower cost through competition. Similarly, the choice to use open source software versus proprietary code would mitigate the risk of depending on the original software manufacturer to provide follow-on support. In both cases the likelihood of the risk event happening was reduced through planning and design changes early in the system life cycle. However, not all risks can be addressed solely though reducing the likelihood of occurrence, so risk mitigation plans should be developed to reduce their impact. The exercise of developing risk mitigation plans is also a useful exercise in helping to identify the root cause of a risk event. In the example of the item sensitive to shipping, having limited sources and long lead time may be mitigated by improving packaging, shipping method or adding more robust materials in the design. Deciding which mitigation approach is most appropriate depends on knowing the root cause of damage during shipping. Is it packaging, shipping, poor quality parts or a combination of each? Knowing this from the risk assessment phase helps with developing the most appropriate and cost effective risk mitigation plan.

7.8.2. Risk Avoidance and Transfer. Two other approaches to risk mitigation are risk avoidance and transferring of risk. In risk avoidance, if a proposed PSS has an unacceptable level of risk that mitigation planning cannot reduce to an acceptable level (taking into account impacts to cost, schedule, performance), it may be best to avoid that COA. Unfortunately, this is not always possible. If a new weapon system is dependent on a new technology that is critical to the operation, then it cannot be avoided even if there are significant risk issues. This leads to the option of transferring risk.

7.8.3. Risk Transfer. Transferring risk does not eliminate the risk but if done properly, it could help reduce the likelihood or impact of such risk. One example is using fixed price contracts. If production costs are higher than projected due to poor quality, a fixed price contract could place part of the cost burden onto the contractor. Additionally, the potential for this cost burden could motivate the contractor to improve its production quality, and thus reduce the likelihood of increased costs. This is a very simple example only meant to point out that part of the risk can be transferred or shared helping to build in greater incentives to reduce the likelihood or impact of a risk event. The team responsible for completing the risk management process should thoroughly understand the risk to include its root cause to help plan for the best mitigation approaches.

7.9. Risk Tracking. Risk tracking is the fifth and final step of the risk management process. Once risk management planning has identified the risks, assessed the probability and impacts, and developed mitigation plans, it is necessary to monitor and adjust the risk management plan as appropriate. Early in the life cycle, monitoring is more focused on developmental planning and adjusting to changes in design, schedule or requirements. However, as the system matures, product support shifts from planning and developing to executing. Risk management is a continuous process and should include a periodic review of risk to ensure no new risks have emerged and existing ones have not increased or decreased in probability or impact. If a risk condition has changed this does not mean the PS-BCA should be re-accomplished, it should instead drive implementation of risk mitigation or contingency plans depending on the most appropriate course of action. Monitoring risks should be an ongoing activity to remain aware of changes to the environment that may change either the likelihood or impact of risks.

7.10. Risk Management Summary. The purpose of risk management is to address uncertainty in product support planning and provide the information required for decision makers to understand the tradeoffs between COAs. In addition, risk planning provides the methods necessary to determine likelihood and impact of each risk and facilitates completing mitigation planning to reduce or avoid a risk occurrence. Completing the process thoroughly and thoughtfully will assist with product support planning and ensure mission support requirements are executed at an acceptable cost level.

Chapter 8

DETERMINING EVALUATION FRAMEWORK, WEIGHTING, AND SCORING

8.1. Weighted Utility Score (WUS) and Multi-Objective Decision Analysis (MODA). The preferred methodologies for evaluating COAs are the Weighted Utility Score (WUS) and the Multi-Objective Decision Analysis (MODA). The two methodologies have similar steps but the level of information, calculation of results, and displays of results differ. If an alternate method is used, it should be fully documented and coordinated with the Executive IAP (refer to the Roles and Responsibilities for the PS-BCA governance structure in Section 2).

8.2. COA Evaluation. This section addresses the approach for evaluating various COAs with respect to the top-level categories of cost, benefit, and risks. The first requirement in using the WUS framework is to give relative importance/value (weighting) between cost, benefit, and risks and receive approval of the weighting from the Executive IAP. The relative balance in weighting is used to frame the PS-BCA assessment of the various COAs. In a fiscally constrained environment it cannot be "benefits/performance" at any cost or "lower cost" with inadequate "benefits/performance." The Executive IAP prevents the perception of gaming and safeguards the integrity of the results by approving weighting before collecting data. The goal is to make the COA assessments unbiased.

8.2.1. WUS. The WUS is a summation of the weighted top-level categories of cost, benefit and risk, based on a 100-point scale. For the notional example below, the relative balance (weighting) is: cost = 35, benefit = 45, and risks = 20.

Figure 8.1. Weighted Utility Score (WUS).

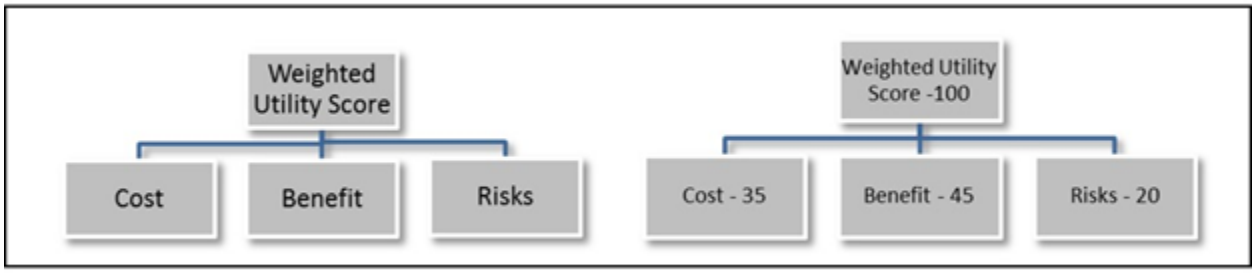
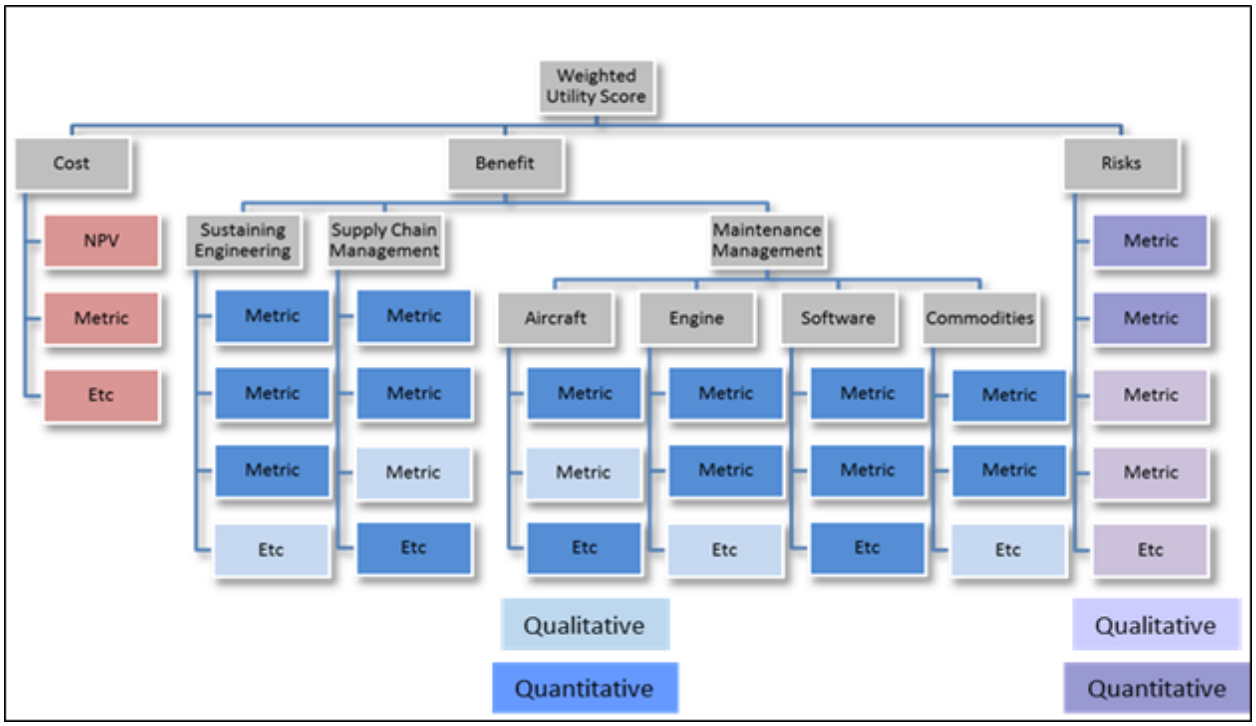


Figure 8.2. WUS Framework - No Weighting Assigned.



8.2.1.1. An example of the initial WUS framework with all the weightings assigned is shown in

Figure 8.3. WUS Framework – Criteria Weighting (Notional Data).

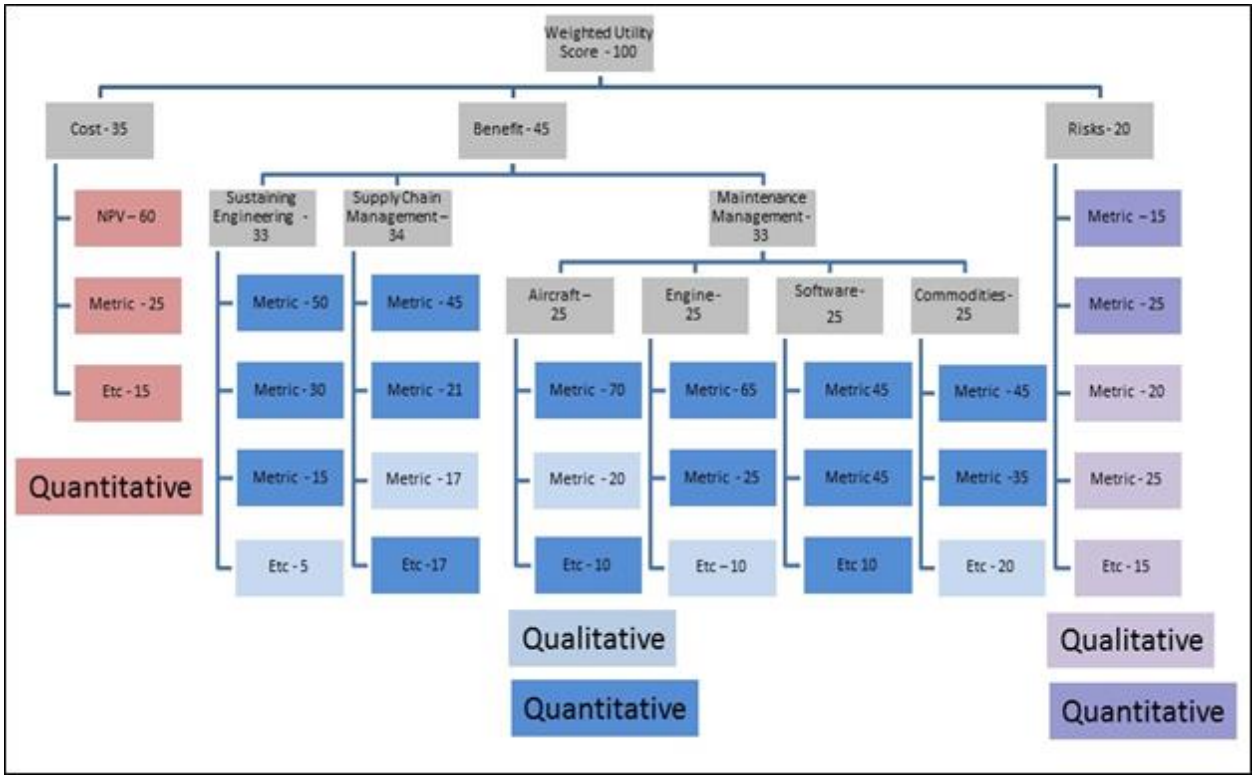
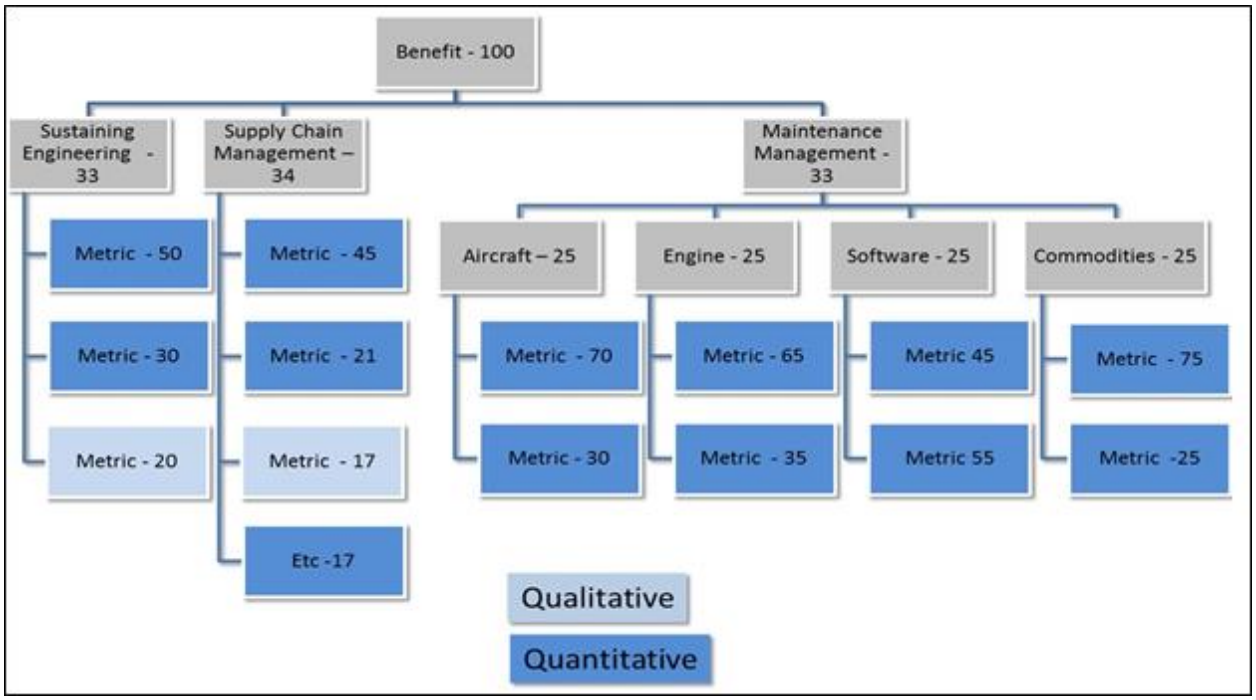


Figure 8.4. MODA Framework – Criteria Weighting (Notional Data).



8.2.1.2. When using the MODA framework, the benefits hierarchy focuses on benefits and cost remains independent. The benefits hierarchy in MODA is different than the one in WUS.

8.3. Steps to Build the WUS or MODA Framework. Identify sub-categories under each top-level category for cost, benefit, and risks. If appropriate, include any additional sub-category levels. In the example above, sub-categories under "Benefit" are SE, SCM, and Maintenance Management. For the sub-category Maintenance Management, there are four additional sub-categories (Aircraft, Engine, Software, Commodities).

8.3.1. Cost. Identify sub-categories under cost, however, they are not always required as demonstrated in the above example.

8.3.2. Benefit. The sub-categories should be consistent with those defined in the scope for IPS elements or grouping of IPS elements. For example, the benefits which may have been identified are SE, SCM, and Depot Maintenance Management.

8.3.3. Risks. The sub-categories should match those identified in the previous Risks section. Examples of the risk sub-categories are Transition (complexity, manpower, time, etc.), Environmental (political), Compliance with 50-50 or core laws, Investment, etc.

8.3.3.1. Identify metric(s) to measure the last/lowest category (if no sub-category) or last/lowest sub-category level.

8.3.3.2. After identifying the levels of sub-categories, determine the metrics that will measure each category level. As each metric is identified, document the rationale for selecting the metric for stakeholder/advisor understanding.

8.3.3.3. Although multiple cost metrics can be considered when determining the preferred alternative, the cost analyses for the alternatives will be compared using dollars that have been discounted to present value.

8.3.3.4. Questions that can assist in identifying metrics include:

8.3.3.4.1. Is the metric objective/quantitative or subjective/qualitative (Use objective/quantitative when available)?

8.3.3.4.2. Is the metric a direct measurement or will it be a surrogate measurement?

8.3.3.4.3. Is the metric data auditable?

8.3.3.4.4. Is the metric consistent across all sources (OEM, organic, and 3rd Party)? If not, what is the mitigation plan?

8.3.3.4.5. Is the metric a discriminator? For example, the result from a metric under SCM sub-category will discriminate (which is better) between organic, OEM, or 3rd Party suppliers.

8.3.3.5. These metrics should be applicable to the "as-is" COA since the "as-is" COA is the starting point for the PS-BCA. The metrics should effectively align with the mission and contribute to meeting the PS requirements. It is important to exercise caution when selecting a combination of metrics to ensure they are not redundant or counteractive. It is recommended to use the SMART approach to measure metrics in the last/lowest sub-categories.

8.3.3.5.1. S = Specific: The value of the metric should be clear to avoid misinterpretation and it specifies the allowable range or threshold.

8.3.3.5.2. M = Measurable: The unit of measure is specified and tied to the underlying data that allows for meaningful statistical analysis.

8.3.3.5.3. A = Attainable: For the "as-is" COA and the "to-be" COAs, the metric should be achievable, reasonable, cost-effective, and credible.

8.3.3.5.4. R = Relevant: The metric should be valued to the program and "as-is" state of the program's PSS. This metric should already be tied to mission and PS-BCA requirements and appropriate to a specific level of scope and responsibility.

8.3.3.5.5. T = Timely: The required data can be collected and analyzed within the established time frame.

8.3.4. Determine Data Sources. Determine data sources for each metric and ensure all sources have the same parameters and definition. For metrics, any difference in the parameters and definition (i.e., differences between organic data collected and contractor data collected) should have a mitigation plan before scoring or weighting. The data sources should be documented with the rationale for each metric from above (See example for CWT below in the section "Written Common Understanding and Frame of Reference").

8.3.5. Determine weighting and scoring plan. As previously stated, only use the benefit sub-category for weighting within the MODA framework.

8.3.5.1. The weighting and scoring plan should be developed by a select group of critical experts (CEs). Any stakeholder or advisor who is a CE with a business interest in the PS-

BCA result should not be included in the select group which determines the weighting and scoring plan to prevent a product support provider conflict of interest or an organizational conflict of interest. For MODA, only use the benefit sub-category for weighting.

8.3.5.2. The scoring and weighting methodology should be approved by the Executive IAP. The scoring plan should be completed prior to data collection. It is recommended that until the data is collected, the scoring and weighting methodology not be shared outside the select group and the Executive IAP. Not sharing this methodology preserves the integrity of data collection, weighting, and scoring processes.

8.3.5.3. Weighting Approach: The select group of CEs should begin to determine the weighting values for each category, sub-category, and metric.

8.3.5.4. It is very important that for each sub-category/metric to ensure the cumulative impact is appropriate as determined on WUS (especially if sub-category/metric is used more than once).

8.3.5.5. In the **Figure 8.5**, the cumulative impacts are shown in the first three columns. The weightings and metrics shown are examples only.

Figure 8.5. Cumulative Impacts of WUS.

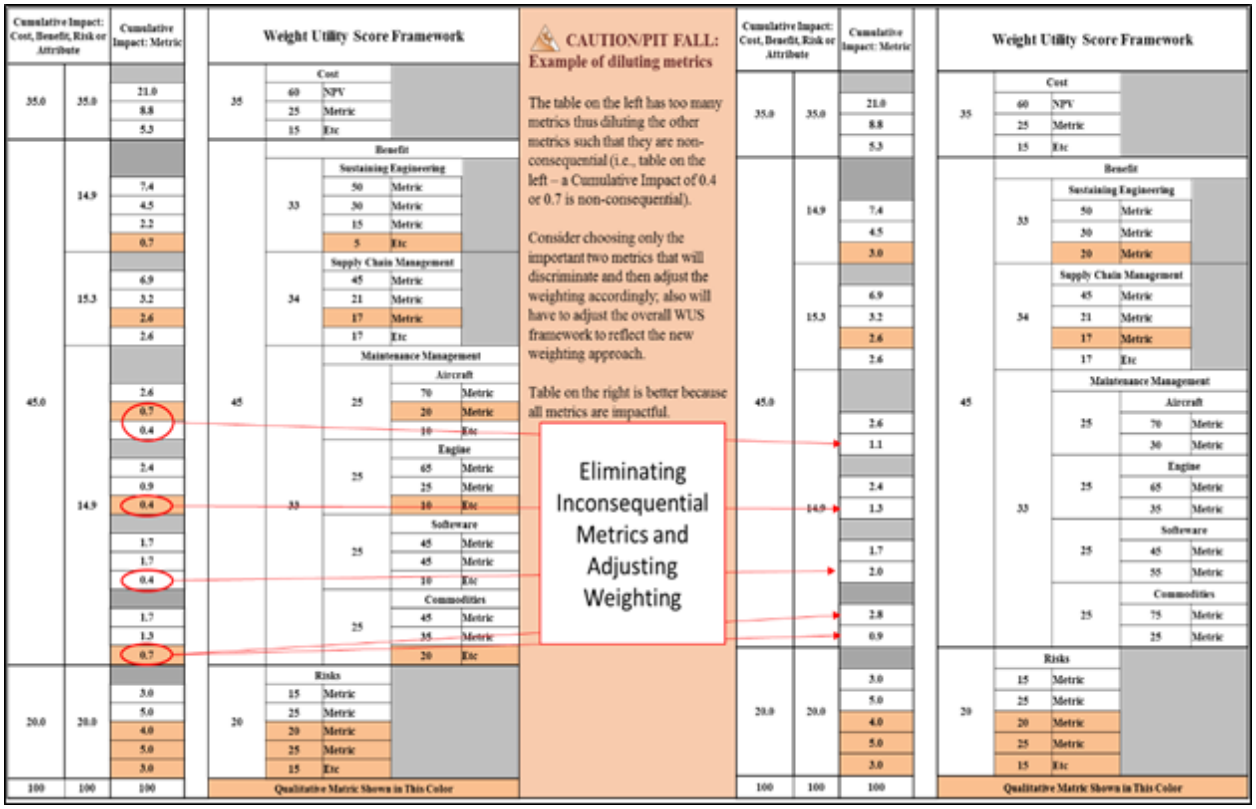
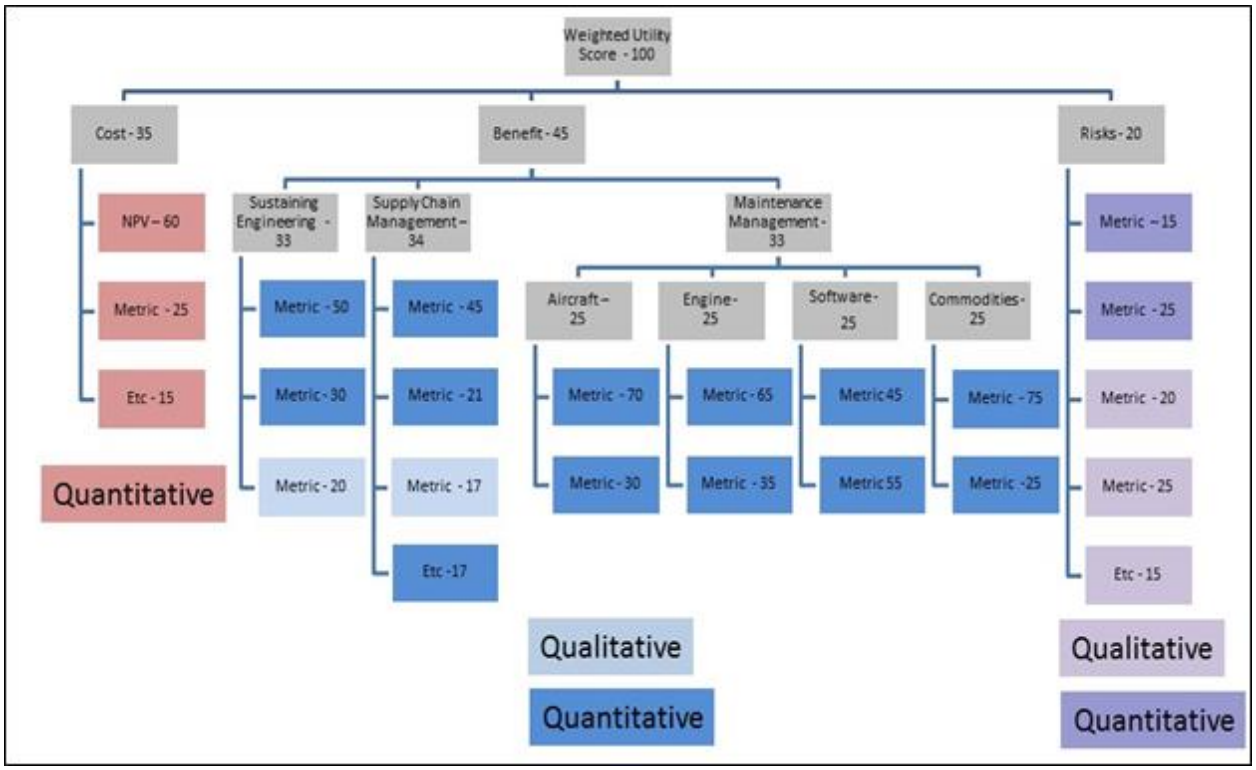


Figure 8.6. Updated WUS Framework.



8.3.6. Critical Expert Considerations. Based on the revised weighting, the updated WUS framework for assessing cost, benefit, and risks. To prioritize the values for weighting across sub-categories or metrics, CEs need to have a common understanding of reference for each sub-category and metric. Below are some, but not all, considerations to be provided to the CEs.

8.3.6.1. Written parameters and definitions for each sub-category and metric to be weighted. The SMEs should understand any difference in the metric parameters and definition (i.e., differences between the organic metric collected and the contractor metric) and the mitigation plan to enable equity before scoring or weighting.

8.3.6.2. Example: CWT for the government is defined as the time between when the unit's request for a part was initiated to when the part was delivered to the unit. CWT for a contractor may be defined as the time between when the contractor gets the request from the government for the part to when it delivers the part to a port. In this example, the parameters and definition for CWT is not the same. A mitigation plan is required before using CWT as a sub-category or metric. The mitigation can be an actual correction or an estimate correction, but if possible, an actual correction is preferred and should be weighted more.

8.3.6.3. Whether the sub-category or metric is an objective/quantitative or subjective/qualitative measure. Objective/quantitative is preferred.

8.3.6.4. Whether the sub-category or metric is a direct measurement or an indirect measurement for the desired outcome. Direct measurement is preferred.

8.3.7. Additional Considerations. The following is a list, but not an all-inclusive list, of additional considerations that needs addressing when using CEs to accomplish the weighting:

8.3.7.1. CEs' inputs should only apply to their areas of expertise.

8.3.7.2. Retain the ability to identify each CE's input for later sensitivity analysis.

8.3.7.3. Ensure equitable CE impact – one CE, or one organization CE group, should not be able to independently influence results.

8.3.7.4. Ensure CEs are of an appropriate level and expertise (consideration of experience and position).

8.3.8. Scoring Approach: After identifying the quantitative and qualitative categories and metrics, the selected group of SMEs then determine the scoring plan for each category and metric. Below are some examples of some common "how to" methods to score responses mathematically.

8.3.9. Numerical Responses. Numerical responses are normalized using either the maximum or minimum score across a metric. The following is how this scoring can be determined:

8.3.9.1. Highest Number is desired. The highest number for all the responses across all the COAs receives the maximum points. The numbers for the remaining responses should be scored by linear normalization to the highest number.

8.3.9.2. Lowest Number is desired. The lowest number for all the responses across all the COAs receives maximum points. This approach should be adjusted accordingly if averages of the numbers are used to determine the score.

8.3.9.3. Other Scoring. Any other scoring approaches used are explained for that metric.

8.3.9.4. "Yes" or "No" Responses. Where "Yes" response is desired. Scoring: "Yes" answer receives all the points.

8.4. Displaying the Results – WUS and MODA (Cost Capability Analysis). Choosing how to display the results is important. Some decision makers prefer seeing "numbers" (WUS), while others prefer a more visual display (MODA) of the results, and yet others prefer seeing both displays. Both methods are discussed in the following sub-sections.

8.4.1. Displaying WUS Results. When assessing the WUS results, one should understand what a higher score represents. For example, take the Internal Rate of Return (IRR) and investment cost metrics - a higher IRR is better, while a lower investment is better. Therefore, a higher IRR and a low investment cost will each result in a higher WUS number/value, however, this scoring method sometimes may be counter intuitive. To help understand the WUS number/value for both cost and risk, these areas are also colored (high cost or high risk is colored Red; medium cost or medium risk is colored Yellow; low cost or low risk is colored Green). The "color coding" for each cost and risk is independently determined based on the sub-categories and metrics for each area. Documenting the rationale for the color coding of each area is required.

8.4.1.1. In the example, total WUS weighting for risk is 20. Using the risk cube framework (**Figure 8.7**): High risk has a score of 4 or less, medium risk a score between greater than 4 and less than 10, and low risk has a score greater than equal to or greater than 10.

Figure 8.7. Risk Cube.

Figure 8.8. COA Weighting.

Maximum Total Weight	Type	As Is	COA 1	COA 2	COA 3	COA 4
15	Qual Ben	2	2	2	4	5
30	Quant Ben	9	10	13	28	29
35	Cost	19	21	23	13	11
20	Risk	15	15	17	9	4
100	Total Score	45	48	55	54	49
Note: Lower Cost = Higher Score (High Cost-Red ; Med Cost-Yellow; Low Cost - Green) Note: Lower Risk = Higher score (High Risk-Red ; Med Risk-Yellow; Low Risk - Green) Note: Higher Benefit equal Higher score						
NPV		3.5M	3M	4.2M	6.2M	6.8M

Figure 8.9. WUS Display (Example 1).

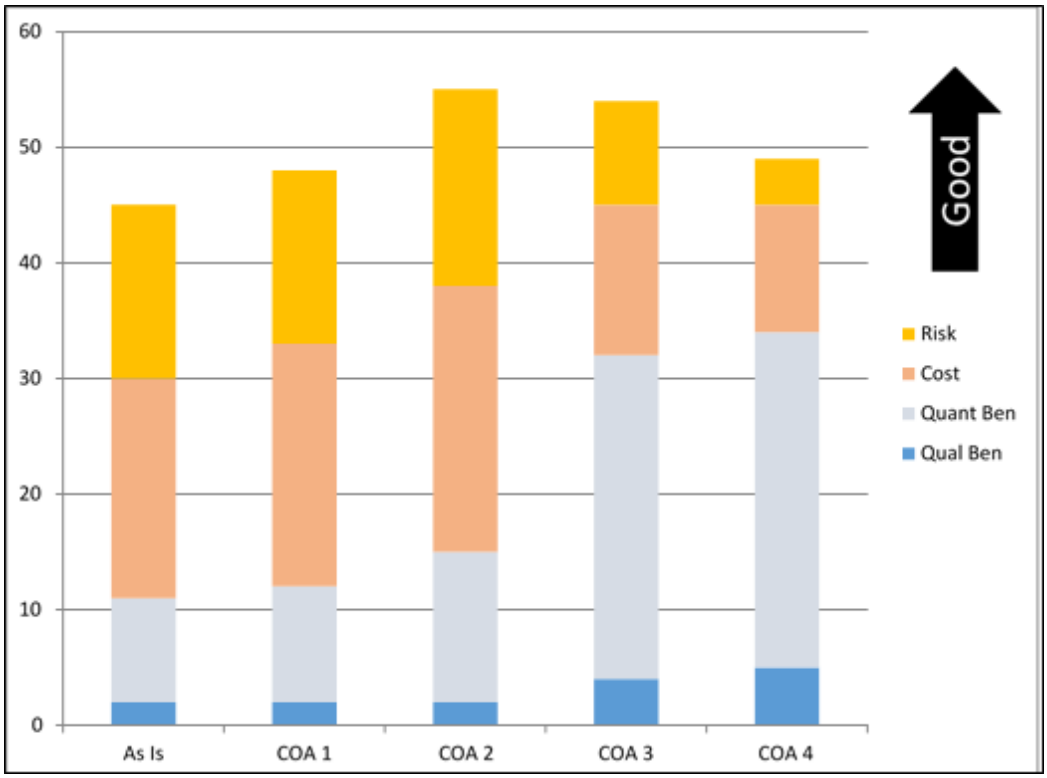


Figure 8.10. WUS Display (Example 2).

8.4.1.2. WUS Assessment.

8.4.1.2.1. Assessing the total score across the COAs, COA 2 and COA 3 have the highest scores, 55 and 54 respectively. These values are almost the same, however, the components (Cost, Benefit, Risks) of the score should also be assessed for the complete context and understanding.

8.4.1.2.2. Assessing benefits between COA 2 and COA 3, COA 3 (WUS = 32) has more than twice the benefits compared to COA 2 (WUS = 15); therefore, COA 3 is better than COA 2 based on benefits.

8.4.1.2.3. Assessing the cost between COA 2 and COA 3, COA 2 (WUS = 23) scored almost twice as high as COA 3 (WUS = 13); therefore, COA 2 is better than COA 3 based on cost. Also, COA 3's NPV is $2M more than COA 2.

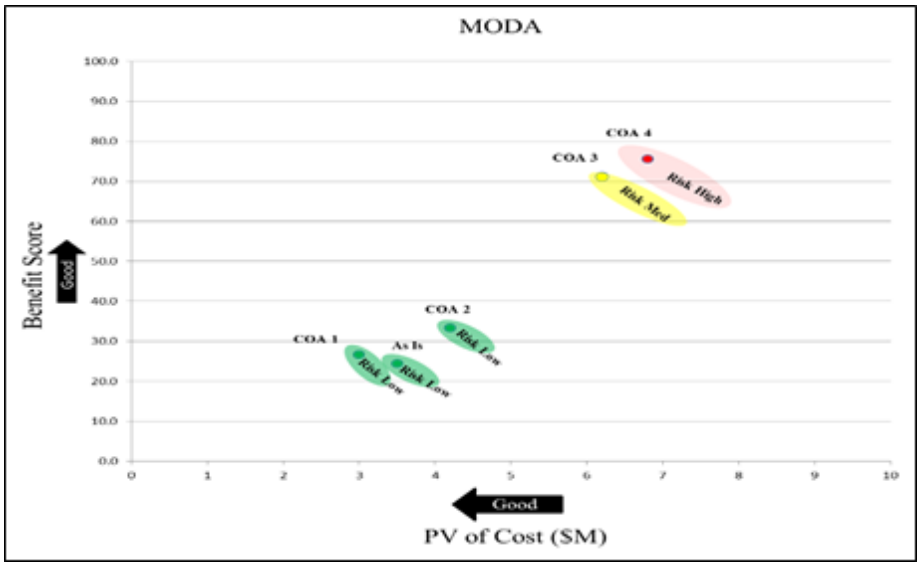
8.4.1.2.4. Assessing the risk between COA 2 and COA 3, COA 3 (WUS = 9) has almost twice the risk score compared to COA 2 (WUS =17), therefore COA 2 is better than COA 3 based on risk.

8.4.2. Displaying MODA Results.

8.4.2.1. When using MODA, benefits are plotted against the NPV rather than just against the single cost of implementing a COA. Comparing benefits only to cost can be misleading in determining best value. For example, COA 1 can have low one-time implementation costs with high recurring costs with little savings over the life-cycle; while COA 2 can have high one-time implementation costs with lower recurring costs and high savings over the life-cycle.

8.4.2.2. Converting WUS benefits for MODA graphing. In the example, the total WUS weighting for benefits is 45 (Qualitative plus Quantitative). Therefore, for each COA the associated WUS benefit score is converted to a total benefit scale of 100 point resulting in: COA 1 = 26.7, As Is= 24.4, COA 2 = 33.3, COA 3 =71.1, and COA 4 = 75.6. Each COA is plotted where the benefit score is on the Y-axis and the NPV is on the X-axis. The risk color for each COA is then overlaid on the graph. Using the NPV for the COAs takes these costs and savings into consideration. Thus, plotting benefits against NPV for each COA and then overlaying risk for each COA helps decision makers determine which COA is the best value. In the example, for each COA the benefits are given a weighted score and then plotted against NPV. The risk is color coded and displayed. The size of the risk area shown is directly related the WUS for risk.

Figure 8.11. MODA.



8.4.2.3. Both COA 3 and COA 4 have higher benefits (over twice the benefit score compared to the other COAs). COA 3 has medium risk while COA 4 has high risk.

8.4.2.4. COA 1, COA 2, and "as-is" have low risks and lower benefits.

8.4.3. Both the WUS and MODA Overall Assessment. The tradeoff for the decision maker between COA 2 and COA 3 is what is more important: Higher benefits or lower cost and/or lower risk. If high benefits is the most important and the medium risk is acceptable, then COA 3 is the better COA. If lower costs and/or lower risk are more important, then COA 2 is the better COA. The decision makers conducts the tradeoff evaluation and selects the better COA accordingly.

8.4.4. Summary of Key Points.

8.4.4.1. As each sub-category and metric is identified, document the rationale for its selection.

8.4.4.2. Ensure that for each sub-category/metric, the cumulative impact is appropriate as determined (especially if a sub-category/metric is used more than once).

8.4.4.3. In order to prioritize the values for weighting across sub-category or metrics, SMEs need to have a common understanding and frame of reference for each sub-category and metric. Therefore, provide written documentation to the SMEs.

8.4.4.4. Display the results in a clear format that can be easily understood by decision makers.

Chapter 9

DATA SELECTION, COLLECTION AND ASSESSMENT

9.1. Quality Data Collection. Within the PS-BCA process, quality data collection is often one of the most difficult and time consuming activities. In order to perform a quality PS-BCA, the PS-BCA IPT should clearly understand what data is required and ensure it is available and acceptable to support the analysis. Even though a program may technically comply with various DoD Instruction and other sustainment cost reporting requirements, the data collected may not be of sufficient fidelity to effectively accomplish a cost estimate. Therefore, before any data is collected, the PMO should document, in a data collection and management plan (data plan), how the team will locate, collect, verify, and use data to ensure the data is collected at a sufficient level for effective use in the PS-BCA. The data plan should focus on strategy early in the acquisition lifecycle. This information is important because it helps the PMO to determine what data is required for future analysis (e.g., BCAs) and long-term sustainment. This should also assist the program office in determining which data rights to include in future contracts. The data collection should include quantitative and qualitative data to support benefit, cost, and risk analyses. The resulting data plan should be coordinated through the IAP structure to ensure reasonable expectations are agreed upon by all stakeholders and advisors. PMO should ensure proper agreements are in place not only for data, but to include acceptable delivery per PMO requirements.

9.2. Data Selection. For the purposes of the PS-BCA, data selection is defined as the process of determining the appropriate data type and source to support the analysis. There are two key components of the data selection process: 1) identification of data requirements and 2) quality assessment of potential data sources.

9.2.1. Identification of Data Requirements. The first step in developing the data plan is identifying potential data requirements (both financial and non-financial). The product support framework, documented in the LCSP, should be the basis for the PS-BCA and data requirement. During MS-A/B in the life cycle, the intent of the PS-BCA is more closely tied to creating the initial product support framework and identifying potential data requirements such as technical data and data rights that will support a more detailed PS-BCA later in the life cycle. However, for MS-C and beyond, data is more detailed and system specific, and is collectively agreed to be the most applicable and representative data to support the PS-BCA as further discussed in the following sections.

Table 9.1. Milestone Data Maturity.

Data Prior to MS-B	Prior to MS-B, the program office ensures the information and data needed is being captured and be delivered to the government by the developing contractors.
Data Between MS-B and MS-C	Between MS-B and MS-C, the program office use the COAs for the PSS, the proposed methodology, and the delivery of information and data developed and determined prior to MS-B.
Data Post MS-C	Once MS-C is reached, the program office should have actual data and the focus should be on identifying any new, updated, and/or changed data.

9.2.1.1. The data collected for the PS-BCA will usually be a direct reflection of the platform maturity but should be reviewed periodically throughout the life cycle to ensure the data being collected supports the objectives of the PS-BCA. As the system matures, platform specific data should become more readily available. When completing a PS-BCA early in the platform lifecycle, specific platform data may not be available. During this time in the lifecycle, it is an accepted practice to use data from an analogous platform (see "Using Data from Analogous Systems" tip below). However, when available, more detailed cost data provides more confidence in the distinctions between COAs resulting in a higher quality cost estimate. Too often, cost data from the contractor is collected at such a high level it cannot be used effectively in completing an estimate without major concerns. For example, in order to accurately estimate the SE cost for a new airframe, one needs more detailed cost information than the total SE cost for the entire antecedent platform. Without the break out of specific cost for SE for the airframe, engines, and Depot Level Repairables (DLRs), a cost analyst has to make what could be a faulty assumption in an attempt to allocate the specific cost to the airframe. The team should consider using systems which have a predominately organic sustainment strategy as analogous data points.

9.2.1.2. If contractor data is required, the PSM works closely with cost analysts, logisticians, and contracting officers to ensure the proper data is contracted for and executed from the beginning of the life cycle of the program. The PMO should plan to acquire government rights and the delivery of technical data as required by 10 USC § 2320. However, if a platform is in the sustainment phase and is being supported by a CLS contract worth $50M or more (and software efforts greater than $20M), the PMO needs to complete a comprehensive Cost & Software Data Report (CSDR) plan package in accordance with DoDI 5000.02. The data collected from the CSDR can then be used as a baseline for the revalidation or for another study. In addition, tailoring the CSDR allows information to be collected in a specific area of interest (e.g., airframe SE), giving analysts a quality starting point to begin an estimate.

9.2.1.3. As data is collected, the PMO executes a cohesive plan for archiving and efficiently providing the data as appropriate to the various stakeholders/advisors. All parties should understand how the data choices impact the PS-BCA problem statement. Not collecting the correct functional and cost data reduces the effectiveness of the PS-BCA and hinders, delays, or inhibits future decision making efforts. Therefore, having a plan and a sustained commitment in place to collect the most accurate and useable data as it becomes available should make the current PS-BCA, and all subsequent PS-BCAs, more informative and accurate while also minimizing uncertainty or risk.

9.2.1.3.1. The questions listed below can aid the PS-BCA IPT identify potential data requirements to support the analysis:

9.2.1.3.2. What is the problem statement? What data is needed to properly evaluate the problem statement?

9.2.1.3.3. What metrics are proposed to support the benefits evaluation? What type of metric data is needed to support the evaluation of this metric?

9.2.1.3.4. What are the differentiators across the COAs selected? What level of information/data is needed to effectively evaluate those differences? For example, if the COA set considers organic versus contractor SCM, what type of data is needed to

evaluate the different cost, benefit or risks associated with the different product support providers?

9.2.1.3.5. Are the proposed data elements easily applied across all potential product support providers (i.e. organic or contractor providers)?

9.2.1.3.6. What are the program's data rights and/or ease of access to data?

9.2.1.3.7. When will the data be generated? What level of data is needed to differentiate across the COAs?

9.2.1.3.8. Is there a mitigation plan if the data is unavailable?

9.2.1.4. Quality Assessment of Potential Data Sources. The next step is examining potential data sources and assessing the quality of the proposed data. The term "quality data" is defined as data that achieves its purpose or use. Attributes of quality data include accuracy, precision, completeness, consistency, timeliness, and authority. **Table 9.2** and **Table 9.3** below outline the data quality tiers, along with potential PS-BCA data sources which include corresponding tiers.

Table 9.2. Data Quality Tiers.

Tier 1: DoD/AF Level Authoritative Data	Tier 2: Program or Other Government Data	Tier 3: Contractor Data	Tier 4: SME Survey Data
Data from recognized authoritative data base Typically collected and tracked across multiple weapon systems/programs	Data has been generated, validated and used to support other program level decisions Typically collected and tracked only for weapon system program being assessed	Data has been validated and/or used to support other program level decisions Typically collected and tracked only for weapon system program being assessed	Typically used for qualitative data

Table 9.3. Potential PS-BCA Data Sources.

Data Source	Tier	Types of Data	When to use?	Location of Data (Link, POC, etc.)
Logistics Installations and Mission Support - Enterprise View (LIMS-EV)	1	Contains historical logistics data	Can be used in a Benefits or Risk analysis	https://www.my.af.mil A4PA@us.af.mil
Air Force Total Ownership Cost (AFTOC)	1	Contains historical cost and logistics data	1. Costing out Depot Level Repairables	https://aftoc.hill.af.mil/

			2. Can be a starting point for all CAIG elements	smxg.aftoc.helpdesk@us.af.mil
Reliability & Maintainability Information System (REMIS)	1	Information on system reliability	1. Extrapolation or comparative analysis 2. Cost estimate	Applicable Air Logistics Center or Depot
Joint Deficiency Reporting System (JDRS)	1	Information on material deficiency history	Cost estimate	http://www.jdrs.mil
Life Cycle Sustainment Plan (LCSP)	2	Sustainment plan and standard	Cost estimate, defining baseline	Applicable program office or PSM
Cost Analysis Requirements Description (CARD)	2	Information on previous cost estimates and decision making	Cost estimate, defining baseline	Program office, Command FMCE or SAF/FMCE
Condemnation Expense Material Recovery (CEMR)	2	Rate for Organic Supply Chain costs	Cost estimate, defining baseline	AFSC/FM
Unit Manning Document (UMD)	2	Information on organic manpower	Cost estimate	Command Manpower
Business Overhead Cost Recovery (BOCR)	2	Information on overhead cost	Cost estimate	AFSC/FM
Manpower Estimate Report (MER)	2	Information on total manpower needed to operate, maintain and support	Cost estimate	Command Manpower
Contractor CDRLs	3		Potential input to benefits, cost and/or risk assessments	Internal Program Office Documentation
SME Input	4	May be used to support assessment of qualitative data	Should only be used if other data sources not available to support assessment and should only be used in qualitative metrics	SME Survey/Questionnaire

9.2.1.5. Additional considerations regarding data sources:

9.2.1.5.1. To the maximum extent possible, the authoritative data source should be accurate and reliable. Manage expectations of desirable data sources to ensure accuracy, consistency, timeliness, availability, and relevance.

9.2.1.5.2. Make efforts to only use non-proprietary data in a PS-BCA so subsequent iterations of the PS-BCA can be accomplished or updated.

9.2.1.5.3. Interim Contract Support can be written to collect data which may then be used for sourcing decisions and costing out Contract Logistics Support

9.2.1.5.4. At the end of the data selection process, the PS-BCA IPT should have a list of the required data, an identified source, and documented rationale as to why that data element was selected. **Table 9.4** below provides an example format to capture this information. The PS-BCA IPT should complete a separate table for cost, benefit, and risks data.

Table 9.4. Example – Data Requirements and Selection.

Data element (e.g. WBS or IPSE)	Data Source	POC/Office	Organizational POC	Level of Data Quality/Tier	Reason Source was Selected

9.2.1.6. Data Collection. Once the necessary data has been identified, the PS-BCA IPT develops the data collection procedures, collection schedule, entry documentation, data protection, data access/storage, and mitigation plan if the data is unavailable. Having a documented data plan is mandatory and is key to ensuring all PS-BCA players have the appropriate access to data and information. When documenting sources, include the data source, vendor, point of contact, and the date the data was obtained. Open source data obtained from the internet should include the website address, product/report number, contract number (if available), and CDRL (if available).

Table 9.5. Data Plan Considerations.

Data Plan Areas	Considerations
Data Collection	Establish rules of engagement for collecting data. Identify who, within the PMO, will be responsible for requesting, collection and distributing data. It is recommended that this be a single person within the PMO responsible for the PS-BCA. This individual should be a government employee, not a support contractor. Identify entry/exit points for data requests within supporting stakeholder/advisor organizations (e.g., MAJCOM POCs, Contractors, AFSC). If the data is pulled from an automated system, decide who is going to validate the data pulls. Also, consider what criteria will be used for QA, validation, etc. Determine how non-availability of data will be addressed and how issues will be mitigated. Decide if data will be provided in hard copy or electronically. If electronically, will it be in Excel or PDF? MS Office is highly recommended not only for PMO and analytical purposes, but also for higher level agency review and oversight. Determine if a data call is required. It is recommended that a formal request for data come from the senior decision maker to emphasize the importance of timely support. Periodically assess the data being delivered/collected supports upcoming PS-BCAs **Note:** Each functional organization providing data is responsible for the accuracy and completeness of the data (e.g., 448 SCMW for supply chain data, AFSC/LG for workload information, AFSC/FZ for organic rates and cost data, and Defense Contract Audit Agency or Defense Contract Management Agency for contract cost data).
Collection Schedule	Determine dates the data is required to support the PS-BCA schedule. Establish suspense dates for the data requested. Identify what actions should occur if suspense date is not met. What levels should this be elevated to in order to resolve missed suspense dates? What mitigating actions should be taken to keep the PS-BCA on schedule?
Entry Documentation	Determine who will be responsible for documentation of data. Determine how data will be documented: Date Received/Retrieved Query Parameters Utilized (if pulled from automated system) Format Received (hardcopy, electronic, etc.) Data Storage (SharePoint, etc.)?

Data Plan Areas	Considerations
Data Protection	Identify any non-disclosure, security issues. Determine if special access or permission is required before the data is released.
Data Storage/Access	Determine if the data will be accessed via a web system, MS Excel, or other means. Determine if the data needs to be available to everyone on the PS-BCA IPT. If not, document the rationale for any exclusion.

9.2.1.7. Provided below are common mistakes that occur in the data collection process:

Failure to be specific when requesting data or misunderstanding of data requirements regarding the information to be collected.
Ignoring data used in previous estimates (when it applies).
Not using data from preferred or best available sources (i.e. AF or DoD derived data) when available.
Using manufacturer data that may represent a base case scenario.
Not clearly stating the source and date of the data.
Not presenting data in a format that can be analyzed/recreated by an independent reviewer.

9.2.2. Data Assessment. Once collected, the team needs to review the data since flawed data can jeopardize the quality of the PS-BCA. The data received may be different than what was expected. For example, collecting the actual incurred cost to sustain the platform may provide better cost visibility for estimating purposes than a negotiated contract cost, although both may be referred to as 'actual cost data.' Therefore, the analyst may need to consider additional data sources if the data does not meet expectations. Some common errors with data include.

Unexplained gaps (e.g., missing periods of time).
Insufficient data points (e.g., limited use or recording of data).
Limited sample size (i.e., if the data collected was based on a sample).

9.2.2.1. However, before discarding a data source, the analyst should confer with stakeholders/advisors to determine if a logical explanation exists for the flaw or anomaly in the data.

9.2.2.2. Once the data is validated by the IPT, the analyst needs to determine if the data can be used as is or if some adjustment is needed to normalize the data. If normalization or manipulation is required, an explanation needs to be added to the documentation. For example, contractor data may be grouped by month or quarter and then averaged, while organic data may not be modified and is collected in real-time.

9.2.2.3. When completing a PS-BCA early in the lifecycle, specific data may not be available. During this time in the life-cycle, it is a generally accepted practice to use data from an analogous platform. However, analogous data is often misused in the following ways.

An analogy is used that is not representative of the target PSS.
Assumptions are made that cannot be proven with data.

Incomplete data is used that does not account for all the relevant cost associated with the COAs.

9.2.2.4. These missteps are often the result of either not having better data on hand or there is a limited understanding on what the data represents. For new platforms, early in the life-cycle (MS-A/B), there may not be enough reliable (platform specific) data to accurately model or forecast future cost, so analogous estimating is acceptable. For new systems with no clear antecedent platform, the PS-BCA team needs to have even more fidelity to complete a quality estimate. New systems may need analyzing at the part level to identify like-and-similar parts which can be effective in projecting the PS-BCA estimate.

9.2.2.5. In this case, it is expected that an analogous platform would be used to gather the necessary data to complete the PS-BCA estimate. However, the data choices and how they are applied determine the quality of the estimate. There should be a reasonable and logical correlation between the analogous system and the targeted system under study as identified by the PS-BCA team and associated SMEs. Those systems should also be documented in a manner that demonstrates why the systems are analogous. It should include the rationale for why the analogy was chosen and why it best supports a particular PS-BCA element. It is also vital that the data collected from the analogous program be complete and normalized to a targeted metric that will be used consistently throughout the entire analysis. This allows for a fair comparison of data sources that can be used to make more accurate projections. Here are some rules of thumb to keep in mind when using an analogy.

9.2.2.5.1. Is the analogy being applied in a logical and sensible way?

9.2.2.5.1.1. Effective: Using the engine reliability data from Platform A (a turbo fan engine maintained organically), to predict the engine reliability for Platform B (which is also a turbo fan engine maintained by a contractor). Both Platforms have similar engines in size, parts, and capabilities and are overhauled at similar scheduled time intervals.

9.2.2.5.1.2. Problematic: Using supply chain cost data from Platform A (contractor), which has different PSS content than Platform B (contractor), because they have similar engines.

9.2.2.5.2. What to do if an analogous platform is not available for the system under study, which is common in the Space community?

9.2.2.5.2.1. Effective: Using an established supply chain and sustainment strategy construct for Platform A that is similar to the targeted supply chain and sustainment strategy for Platform B. Although the platform may not be an analogous hardware solution, a successful analogy can still be applied in other creative ways to help estimate other key elements of the PS-BCA.

9.2.2.5.2.2. Effective: Dividing the system to the part level and then looking for existing parts that are similar while adjusting for complexity.

9.2.2.6. This approach is only as effective as the cost and technical data collected for the programs to be utilized in the estimate. Thus, it is important that each platform is properly documented throughout the entire lifecycle. For example, documenting the growth of the software maintenance, along with the systems, capabilities, and cost associated with the

platform would help ensure estimates better project software maintenance cost for the next generation warfighter or to satisfy the revalidation requirement of the support strategy or for use in a PS-BCA for a follow-on weapon system. The subjective nature of analogous estimating drives risk into the estimate. The PS-BCA team should expect to update this type of estimate with platform specific data in future PS-BCAs.

9.2.2.7. If the data requires special protection (e.g. classified or proprietary), the PS-BCA team may need to obtain Non-Disclosure Agreements prior to starting the data collection process. Once data is collected, the team needs to review the quality and quantity of the data. Data that is not representative of the targeted platform has the potential to jeopardize the quality of the PS-BCA. The team needs to understand how the data was compiled and whether there are any known limitations.

Chapter 10

SENSITIVITY ANALYSIS AND EVALUATION

10.1. Sensitivity Analysis Defined. Estimates of costs and benefits contain uncertainties. Since estimating errors can be introduced into the analysis because of the uncertainty, the potential impact of these errors must be analyzed. A sensitivity analysis assesses the extent to which COA costs and benefits are sensitive to changes in GR&As and data. Every comparative analysis must have a separate sensitivity analysis (AFMAN 65-506, Paragraph 6.1.2.3).

10.2. Risk and Uncertainty. Risk and uncertainty cannot be avoided because the future is unknown. While we may have a belief or opinion of what the future value of a variable (i.e., assumption, data item) may be, we don't know for sure, even if our opinion is based on data and analysis. Therefore, it is necessary to identify how "sensitive" the different COAs are to changes in GR&As and data. In the case of a PS-BCA, a 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 large changes in cost and benefits. While adjusting multiple variables can be done to see their combined effects, this is generally referred to as scenario analysis rather than sensitivity analysis.

10.3. Variables. A sensitivity analysis is performed for each COA to determine cost and benefit behavior over the range of key variables' possible values. Some variables may be GR&As, weights, or data items. The variables chosen for sensitivity analysis are usually those that are thought to be cost drivers and those whose values are the most uncertain. In a sensitivity analysis, the effect of varying the value of only one variable is analyzed at a time. A 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. A sensitivity analysis may yield one or several cost "cross-over" or "breakeven" points, but a "breakeven analysis" is not sufficient to be called a sensitivity analysis. A sensitivity analysis is not sufficient to quantify cost risk.

10.4. Steps in Conducting a Sensitivity Analysis.

10.4.1. Identify the Key Variables to Test. Key variables could be ground rules, assumptions, benefits rankings/weightings, cost drivers, risks, programmatic objectives, and raw data/scores. It is also important to address known politically sensitive assumptions and issues.

10.4.1.1. Rankings and weightings can be independent in a PS-BCA. The ranking can be the order of the benefits in terms of importance, whereas the weighting can be the percent (%) weight given the benefits in relation to cost and risk.

10.4.2. Perform a 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 MDA important information.

10.4.3. Document the Process and the Results. The methodology needs to be documented in enough detail to enable a reader to replicate the analysis. The analyzed variable, the way it was varied during the analysis, and the changes to the model's results (i.e., cost and benefits) as the value changed should be documented. Document results in the most understandable format (e.g., table, graph, bar chart, pie chart, etc.). That is, the format in which the results are presented should clearly convey the "big picture" and the implications for costs, benefits, and risks.

10.4.4. Repeat. Repeat steps 10.4.2 and 10.4.3 until all key variables identified in Step 10.4.1 have been tested independently.

10.4.5. Evaluate the Results. Sensitivity analysis provides decision makers with a better understanding of what drives change in costs, benefits, and risks. It can provide information that can lead to choosing a different COA from that based solely on initial results. 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 alterative under different objectives (e.g., minimize cost, minimize risk, and maximize benefits). The goal is to provide the decision maker an understanding of the circumstances that would lead to the different recommendations under the various different objectives.

10.5. Examples for Using Sensitivity Analysis.

10.5.1. Example 1 (Graduated Sensitivity Analysis)

10.5.1.1. Scenario: The PS-BCA IPT is attempting to address the risk regarding the programmatic variable of annual fleet flight hours. The current planning factors are 10,000 hours of historical fleet flight usage.

10.5.1.2. Issue: A steep increase in flight hours will increase the number of scheduled engine overhauls, which requires maintenance every 1,000 hours.

10.5.1.3. Impact: Organic only option, while previously was the preferred option, may not be able to handle the anticipated increase in demand to overhaul engines. $350M might be needed for additional CLS support.

10.5.1.4. Graduated Sensitivity Analysis Technique: What is the effect on maintenance hours/costs if the flight hours are increased to 15,000 hours? What is the effect on maintenance hours/costs if the flight hours are decreased to 8,000 hours?

10.5.2. Example 2 (Break-Even Point Analysis).

10.5.2.1. Scenario: Contractor labor rates are not yet known and a generic contractor labor rate is used.

10.5.2.2. Issue: The contractor labor rate is a highly uncertain variable.

10.5.2.3. Impact: The PS-BCA IPT completes sensitivity analysis and discovers a 35% increase in contractor labor rates, above organic labor rates, changes COA rankings.

10.5.2.4. Break-Even Point Technique: Changing one variable (in this case contractor labor rates) across COAs to ascertain the effect on the COA rankings. How much does the labor rate have to change to affect the COA rankings? What is the impact of the other

variables as a result of this change? What does the sensitivity analysis results imply about the relative COA rankings?

10.5.3. Sensitivity Analysis Articulation. Sensitivity analysis should explain what happens to costs and benefits if an underlying assumption changes or is wrong, or how changes in inputs (i.e., variable values) impact the output (i.e., order of COAs). Sensitivity analysis should identify the "what if" scenarios and the confidence range for your analysis results.

10.6. Applying Sensitivity Analysis to Weighting and Scoring of Benefits. While the use of a disciplined technique for weighting and scoring benefits for the PS-BCA, the process is permeated by subjectivity due to its inherent nature. As such, the use of sensitivity analysis upon the weighting factors should be treated as a best practice to determine the margin of variance until the weighting of benefits warrant a different ranking of results. Sensitivity analysis is designed to determine if the "solution" is applicable over expected ranges of critical parameters. Those critical parameters, more specifically, are the weights assigned by SMEs through the weighting and scoring process of the PS-BCA. The ultimate "solution" between multiple COAs that are very close in respective benefits can easily be flipped if the rankings are sensitive to marginal value changes.

10.6.1. Example. As a notional example, assume we have a production line that has quantitative and qualitative benefits of speed (amount of time to process an end item), capacity, meantime between repairs, ergonomics, and ability to produce.

Table 10.1. COAs and Attributes.

		1	1	1	1	1
		Attrib. 1	Attrib. 2	Attrib. 3	Attrib. 4	Attrib. 5
	Name	Speed	Capacity	MTBR	Ergonomics	Produce
COA 1	A1	135	550	4625	4	4
COA 2	A2	180	480	2750	3	4
COA 3	A3	190	460	2700	4	2
COA 4	A4	200	310	3200	4	4

10.6.1.1. Through the SME weighting process, each attribute or benefit receives a score between 0-100. Through this process, the following raw weights are derived:

Table 10.2. Raw Weights.

	Attrib. 1	Attrib. 2	Attrib. 3	Attrib. 4	Attrib. 5	
	Speed	Capacity	MTBR	Ergonomics	Produce	
Raw Weights =	90	80	20	60	50	*300*

10.6.1.2. Creating a total raw weight score of 300, the respective weights were then divided by the total raw weight score (300) to develop the proportional weight.

Table 10.3. Scaled Weights.

	Attrib. 1	Attrib. 2	Attrib. 3	Attrib. 4	Attrib. 5	
	Speed	Capacity	MTBR	Ergonomics	Produce	
Raw Weights =	90	80	20	60	50	*300*
Scaled Weights =	0.30	0.27	0.07	0.20	0.17	*1.00*

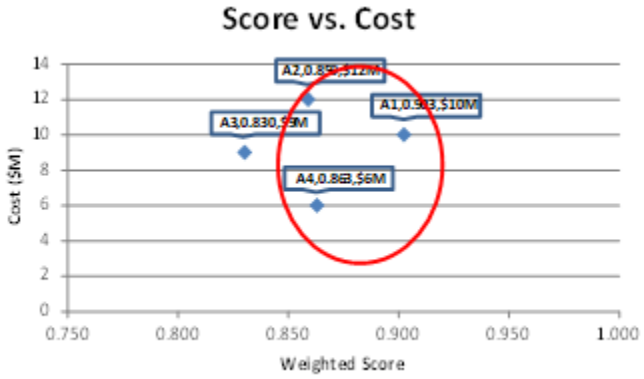
10.6.1.3. In this specific scenario, each attribute seeks to maximize the attribute's value (i.e., higher qualitative/quantitative values are better). Thus, the attribute value is then divided by the max attribute value. Example is highlighted below:

Table 10.4. COAs, Attributes, Raw and Scaled Weights.

		Attrib. 1	Attrib. 2	Attrib. 3	Attrib. 4	Attrib. 5	
		Speed	Capacity	MTBR	Ergonomics	Produce	
Raw Weights =		90	80	20	60	50	*300*
Scaled Weights =		0.30	0.27	0.07	0.20	0.17	Wt. Score
COA 1	A1	0.6750	1.0000	1.0000	1.0000	1.0000	0.9025
COA 2	A2	0.9000	0.8727	0.5946	0.7500	1.0000	0.8590
COA 3	A3	0.9500	0.8364	0.5838	1.0000	0.5000	0.8303
COA 4	A4	1.0000	0.5636	0.6919	1.0000	1.0000	0.8631

10.6.1.4. As can be seen in **Table 10.4**, COA 1 has the highest weighted benefit score, with COAs 4 and 2 being almost the same, but a distant second and third.

Figure 10.1. COAs Weighted Benefit Scores vs Their Cost.



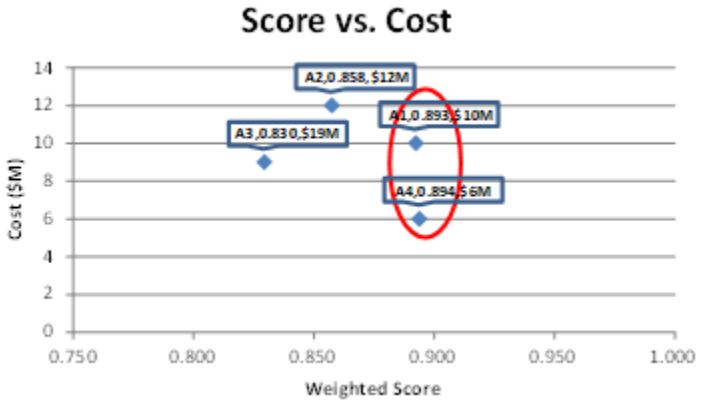
10.6.1.5. Once the benefits framework has been developed and a weighted score for each COA has been achieved, the analyst should begin determining the sensitivity of the weighted score. With sensitivity analysis, we discover that the "solution" COA 1 (ALT 1), is surpassed in score by COA 4 (ALT 4) when the raw weight for "capacity" is decreased from 80 to 52 (a change of 35%). The example below highlights this change:

Table 10.5. Sensitivity Analysis Adjustment.

		Attrib. 1	Attrib. 2	Attrib. 3	Attrib. 4	Attrib. 5	
		Speed	Capacity	MTBR	Ergonomics	Produce	
Raw Weights =		90	52	20	60	50	272
Scaled Weights =		0.33	0.19	0.07	0.22	0.18	Wt. Score
COA 1	A1	0.6750	1.0000	1.0000	1.0000	1.0000	0.8925
COA 2	A2	0.9000	0.8727	0.5946	0.7500	1.0000	0.8576
COA 3	A3	0.9500	0.8364	0.5838	1.0000	0.5000	0.8297
COA 4	A4	1.0000	0.5636	0.6919	1.0000	1.0000	0.8939

10.6.1.6. The result of the sensitivity analysis on Attribute 2 would provide a final "solution" of a weighted score of .8939 for COA 4 (ALT 4) versus .8925 for COA 1 (ALT 1). An important note to make, however, is that when the COAs are compared, COA 4 (ALT 4) is $4M less expensive than COA 1 (ALT 1).

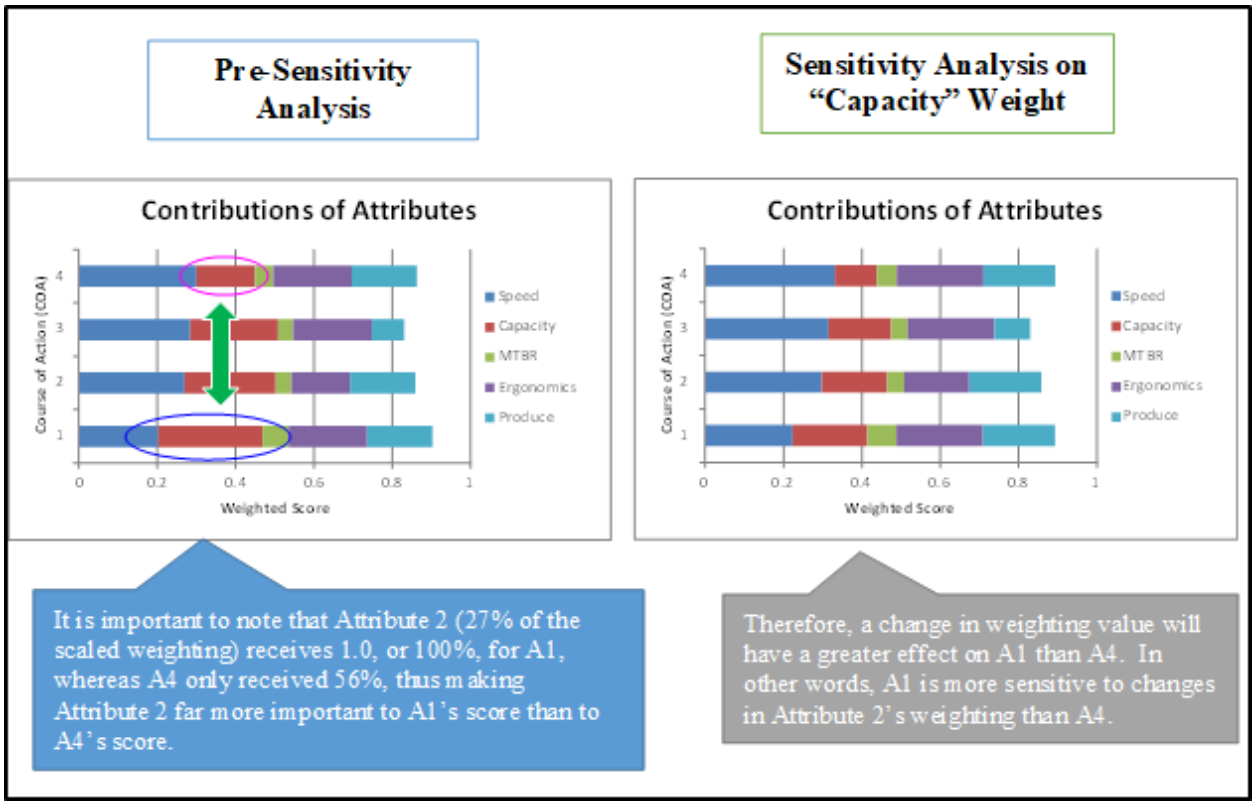
Figure 10.2. COAs Weighted Benefit Scores vs Their Cost after Weight Changes.



10.6.2. Alternative Methods to Preliminary Assessment of Sensitivity. Another approach to identifying possible criterion that may be sensitive to changes in scoring/weighting is through the visual analysis of the parameters that make up each COA's weighted score.

10.6.3. Sensitivity Analysis Display. **Figure 10.3** on the left hand side shows the weighted scores of each of the four COAs. By reviewing the chart, one will find the points scored for each of the COAs broken out by the scoring criterion. In short, one can visually see the factors that are driving the total point score. By reviewing this chart, one can see that COA 1's score is greatly affected by the second criteria (capacity). It can also be quickly observed that COA 4's score is not as sensitive to capacity as COA 1's. As a result, since the weight given to capacity affects the overall score each COA earns for capacity, a component of the overall weighted score, the overall weighted score might be sensitive to the weight given to capacity. The below chart on the right hand side shows the result of applying sensitivity analysis by changing the weighting factor for capacity from 80 to 52. It is ultimately the analyst and the PS-BCA IPT's responsibility to determine sensitivity as it relates to weighting and scoring of both quantitative and qualitative benefits.

Figure 10.3. Sensitivity Analysis Displays.



10.7. Applying Sensitivity Analysis to Benefits. The purpose of sensitivity analysis is to test how robust the results are.

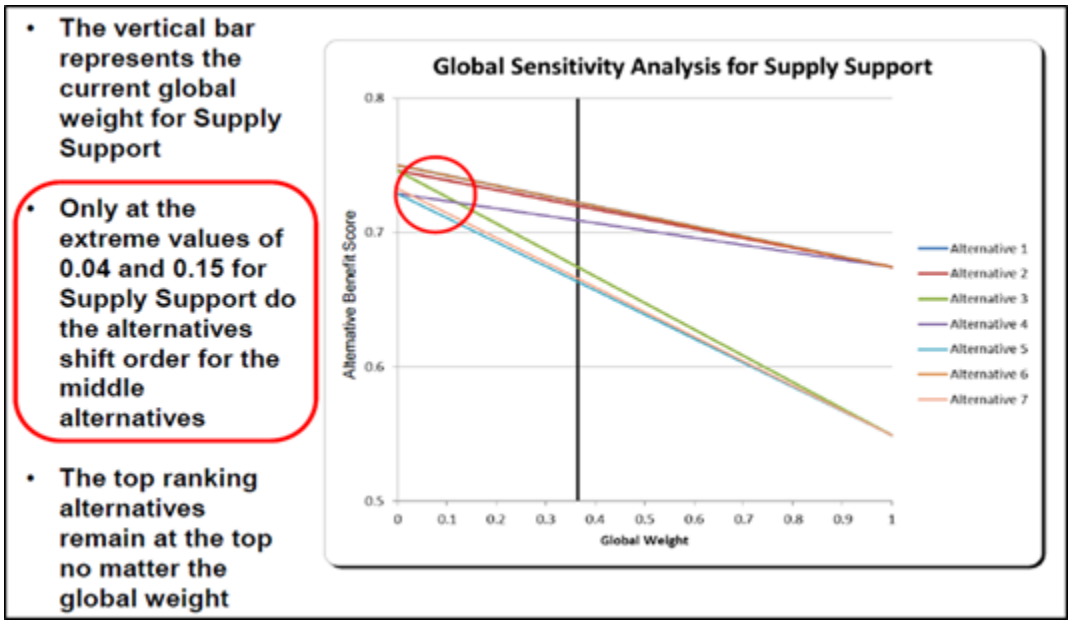
10.7.1. Remove one stakeholder's/advisor's vote (or group of stakeholder's/advisor's votes) one at a time and then recalculate the global weights and final COA scores to identify a driver among the votes.

10.7.2. From the recalculated results, if the order of the COAs change by removing the one stakeholder's/advisor's vote (or group of stakeholder's/advisor's votes), then further investigation should be accomplished to understand why that vote (or group of votes) is a driver.

10.7.3. If removing stakeholder's/advisor vote (or group of stakeholder's/advisor's votes) one at a time does not change the order of COAs, then no one vote (or group of votes) has an undue influence on the results in ranking the COAs.

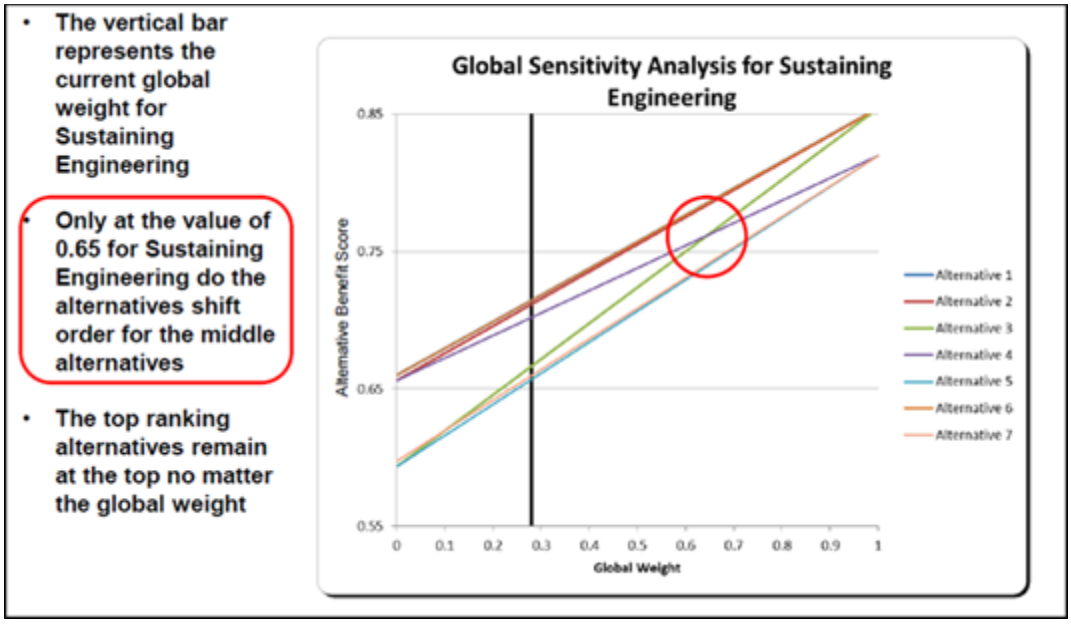
10.8. Shifting Attribute Scores. Shifting attribute scores between the minimum and maximum values (e.g., from 0 to 100). The score for each major benefit (e.g., SCM, Maintenance, etc.) is shifted from the minimum value (0.0) to the maximum value (1.0) and the COA scores recalculated. **Note:** For scoring, the maximum value can be shown as 1.0 or as 100 points. Graph the results of the analysis. The charts below show the results for the major benefits of Supply Support (SS) and SE where the maximum value is 1.0.

Figure 10.4. Global Sensitivity Analysis for Supply Support.



10.8.1. What is the likelihood that the values of 0.04 and 0.15 could occur in the data assessed? If the likelihood is great, then the decision between COAs 7 and 4 is sensitive to the score used to assess SS. Also, the decision between COAs 3 and 4 is sensitive to the score used for assessing SS.

Figure 10.5. Global Sensitivity Analysis for Sustaining Engineering.



10.8.2. What is the likelihood that the value of 0.65 could occur in the data assessed? If the likelihood is great, then the decision between COA 3 and COA 4 is sensitive to the data used to assess SE.

10.9. Tipping Point. The purpose of sensitivity analysis is to determine what will happen to the expected outcome if a key variable were to change.

10.9.1. If the sensitivity analysis does not reveal a change to the PS-BCA recommendation, then the PS-BCA IPT can be confident that the recommended COA will remain so over the broad range of values the variable could take on. In other words, the decision maker should not be concerned over the uncertainty involved with the variable.

10.9.2. If, however, the sensitivity analysis indicates the expected ranking of COAs will change with relatively small changes in key variables, then the PS-BCA recommendation would not be stable. If the ranking of the PS-BCA COAs change as a result of changing a variable's value, understanding the sensitivity of the element and its relative importance to the recommended COA is crucial information in the decision support process. The team would need to focus on understanding the dynamics of this particular variable to address the uncertainty in the estimate or be ready to have a detailed discussion with the decision maker as to the likelihood the variable will take on the values that lead to different recommendations.

Chapter 11

FINDINGS, RECOMMENDATION, APPROVAL AND IMPLEMENTATION FOR THE FINAL PRODUCT SUPPORT BUSINESS CASE ANALYSIS REPORT

11.1. PS-BCA Report. This section provides guidance on initial findings, recommendation, governance and MDA approval, and implementation plan for the final PS-BCA report.

Table 11.1. PS-BCA Report Process.

PS-BCA Findings	PM Recommendation	Governance Approval	MDA Approval
Program Office Consolidate Initial Findings Program Office Conduct Findings Cross Check Program Office Document Preliminary PS-BCA Report	Program Office Develop and Evaluate Other Business Considerations Program Office Develop Preliminary Transition Plans PM select and Brief Initial Recommendation and Document Rationale to PS-IPT (minus PSPs)	Program Office Develop and Evaluate Other Business Considerations Program Office Develop Preliminary Transition Plans PM select and Brief Initial Recommendation and Document Rationale to PS-IPT (minus PSPs)	Approve and Document Final Decision and Implementation Plan Sign PS-BCA Final Report

11.2. PS-BCA Findings. The PS-BCA initial findings are data driven results from the analysis. At this point, the PMO understands the overarching results of the PS-BCA as well as performs a cross-check to validate the integrity and overall soundness of the PS-BCA.

11.2.1. Findings Summary. At this stage, costs, benefits, and risks need to be evaluated together either through a MODA or WUS approach.

Table 11.2. Findings Summary.

	Work Streams				Benefit Score	Risk	Cost (NPV $M)
	PSM	Supply	Mx	Sustain Eng			
1	GOV	GOV	GOV	GOV	0.75	MED	$3,500
2	GOV	GOV	GOV	Contract	0.80	LOW	$3,750
3	GOV	Contract	GOV	GOV	0.70	HIGH	$4,000
4	GOV	Contract	Contract	GOV	0.65	MED	$3,800
5	Contract	Contract	Contract	Contract	0.60	MED	$3,600

11.2.2. Cross-Check. A cross-check ensures the integrity and overall soundness of the PS-BCA is maintained. Usually, after the initial findings are collected and displayed, the PMO identifies outliers and/or key drivers in the analysis. Once outliers and/or key drivers are identified, the IPT (minus the PSPs) then determines if there are steps that need to be taken either through sensitivity analysis, additional data samples, etc. to validate the quality of the data that is causing the outlier and/or key driver. Based on the example in **Table 11.2**, next steps could include:

11.2.2.1. What are the key drivers within each of the COAs across costs, benefits, and risks?

11.2.2.2. What is the driver behind COA 2 having the highest benefit score?

11.2.2.3. What was the quality/certainty in the data that supports that driver?

11.2.2.4. What are key differences in costs between COA 3 and COA 1?

11.2.2.5. Are there any confidence bounds on any of the key drivers? (For example, COA X projected to have an AO increase of 2% (+/- 1%))

11.2.2.6. Based on the initial findings, are there areas where additional sensitivity analysis is required?

11.2.2.7. Based on the initial findings are there data procurement recommendations that would benefit the next PS-BCA?

11.2.2.8. Are there any potential excursions that would aid the decision maker in making a decision?

11.2.3. Review and Coordination. SAF/FMC is responsible for certifying comparative analyses meeting the criteria outlined in AFI 65-501, Section 1.5. This includes the analyses captured in PS-BCAs. Accordingly, the PMO should have their comparative analyses reviewed and coordinated by the MAJCOM FM and SAF/FMC for ACAT I and special programs. MAJCOM FM offices should review ACAT II and ACAT III programs. The PS-BCA final report should include the documented coordination.

11.2.4. PM Recommendation. The PM recommendation should take into account all of the PS-BCA findings, other business considerations, and preliminary transition plans. The recommendation should be documented in the preliminary PS-BCA and include detailed rationale, justification, and supporting information to explain the COA recommendation and why the submitted COA is recommended over the other COAs. The preliminary PS-BCA should also summarize the main considerations that contributed to the recommendation. Finally, the PM recommendation should discuss whether this is a final solution, or if follow-on projects are necessary to achieve full benefits.

11.2.4.1. Other business considerations are considerations outside the span of control of the PS-BCA scope and subsequent findings but may be relevant data points to the governance structure and/or decision maker in making a recommendation determination. Examples of other business considerations include:

11.2.4.1.1. Loss of critical industrial capabilities

11.2.4.1.2. Preservation of multiple sources of product support capabilities

11.2.4.1.3. Geo-Political considerations

11.2.4.1.4. Additional sensitive /classified information only known by senior leaders

11.2.4.1.5. Evaluate and determine potential positive or negative impacts to 10 USC 2464 (Core workload) and 10 USC §2466 if each COA were implemented.

11.2.4.1.6. Evaluate and determine potential positive or negative impacts to Working Capital Fund.

11.2.4.1.7. If a specific skill set is proposed to be outsourced, is there a potential for the government skill set to atrophy over time?

11.2.4.1.8. Any potential obstacles not already considered that would impede the implementation of the proposed COA?

11.2.4.1.9. Assessment of potential impacts (positive or negative) to organizations involved in the transition, implementation and /or execution of the proposed COA.

11.2.4.1.10. Other political impacts that should be considered?

11.2.4.1.11. Summarize potential best practices to include any potential limitations on the Air Force implementing the best practice available due to laws, regulations or DoD policy.

11.2.4.2. Funding Impacts. The PS-BCA team should compare the proposed COAs to the current program budget and consider the funding impact and "Cost to the Program" from an affordability perspective **Note:** The Cost of the Program view should be for the total analysis period; however, comparisons to the budget for the recommended COA would be primarily for the FYDP. A more detailed funding plan is required for the recommended COA.

Table 11.3. Cost to the Program Output Example.

Cost to the Program

Program Funding & Quantities		Acquisition to O&S Cost Ratio						(BY yyyy)	Curr. Est.	Delta Current	Delta Original
		Total Required Acq. (BY$M):			4,486		30%	PAUC:	55.7M	4.60%	10.20%
		Total Required O&S (BY$M):			10,359		70%	APUC:	50.4M	-3.20%	80.20%
($ in Millions/ Then Year)	Prior	FY14	FY15	FY16	FY 17	FY18	FY 19	FY20	FY16-20	To Comp	Prog. Total
RDT&E											
Prior $ (PB15)	108.0	32.4	44.2	45.1	37.9	12.4	5.3	3.2	103.9		288.5
Current $ (PB16)	108.0	30.0	43.1	45.6	38.3	12.5	5.4	3.2	105.0		288.1
Delta $ (Current - Prior)	0.0	(2.4)	(1.1)	0.5	0.4	0.1	0.1	0.0	1.1		(2.4)
Required $	108.0	32.4	44.2	45.6	46.0	15.0	6.5	4.0	117.1		301.7
Delta $ (Current - Required)		(2.4)	(1.1)	0.0	(7.7)	(2.5)	(1.1)	(0.8)	(12.1)	0.0	(15.6)
Procurement											
Prior $ (PB15)	0.0	99.9	150.4	200.2	304.8	618.6	627.6	380.1	2111.3	2257.3	4618.9
Current $ (PB16)	0.0	99.5	148.2	203.1	309.2	522.9	530.5	538.1	2103.8	1958.5	4306.0
Delta $ (Current - Prior)	0.0	(0.4)	(2.2)	2.9	4.4	(95.7)	(97.1)	158.0	(7.5)		(312.9)
Required $	0.0	99.9	150.4	203.1	312.3	528.1	535.8	548.5	2122.8	1978.1	4196.8
Delta $ (Current - Required)	0.0	(0.4)	(2.2)	0.0	(3.1)	(5.2)	(5.3)	(5.4)	(19.0)	(19.6)	(41.2)
MILCON											
Prior $ (PB15)	0.0	0.0	1.3	1.6	0.0	2.1	2.3	3.0	9.0	15.3	25.6
Current $ (PB16)	0.0	0.0	1.4	1.7	0.0	2.0	2.1	3.0	8.8	12.6	22.8
Delta $ (Current - Prior)	0.0	0.0	0.1	0.1	0.0	(0.1)	(0.2)	0.0	(0.2)	(2.7)	(2.8)
Required $	0.0	0.0	1.4	1.7	0.0	2.0	2.1	3.0	8.8	12.6	22.8
Delta $ (Current - Required)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SYSTEM O&M											
Prior $ (PB15)	0.0	6.1	8.3	10.4	26.5	37.8	55.0	91.4	221.1	0.0	235.5
Current $ (PB16)	0.0	6.1	8.3	11.4	29.2	41.6	60.5	98.6	261.3	0.0	255.7
Delta $ (Current - Prior)	0.0	0.0	0.0	1.0	2.7	3.8	5.5	7.2	20.2	0.0	20.2
Required $	0.0	6.1	8.3	11.4	29.2	41.6	60.5	98.6	261.3	5908.8	6180.5
Delta $ (Current - Required)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(5908.8)	(5908.8)
TOTAL											
Prior $ (PB15)	108.0	138.4	204.2	257.3	369.2	670.9	690.2	457.7	2445.3	2272.6	5168.5
Current $ (PB16)	108.0	135.6	201.0	261.8	376.7	579.0	598.5	642.9	2458.9	1967.1	4830.6
Delta $ (Current - Prior)	0.0	(2.8)	(3.2)	4.5	7.5	(91.9)	(91.7)	185.2	13.6	(2.7)	(297.9)
Required $	108.0	138.4	208.3	261.8	387.5	596.7	604.9	640.1	2490.0	7881.5	10,832.2
Delta $ (Current - Required)	0.0	(2.8)	(7.3)	0.0	(10.8)	(17.7)	(6.4)	(5.1)	(31.1)	(5914.4)	(6001.6)
QUANTITIES											
Prior $ (PB15)	0.0	2.0	3.0	4.0	6.0	12.0	12.0	0.0	34.0	41.0	80.0
Current $ (PB16)	0.0	2.0	3.0	4.0	6.0	10.0	10.0	10.0	40.0	35.0	80.0
Delta $ (Current - Prior)	0.0	0.0	0.0	0.0	0.0	(2.0)	(2.0)	10.0	6.0	(6.0)	0.0
Required $	0.0	2.0	3.0	4.0	6.0	9.0	9.0	9.0	37.0	38.0	80.0
Delta $ (Current - Required)	0	0	0	0	0	1	1	1	3	(3.0)	0.00

11.2.4.3. Manpower Impacts. In addition to an assessment of the funding/budget, the potential manpower impact may be a factor the decision maker should consider. While the manpower for the PMO and user should be available from the Cost Model, quantifiable impacts to WCF positions may not be easy to determine due to uncertainty of specific workloads. However, the PS-BCA team may be able to annotate potential risks or opportunities if specific COAs are selected.

Table 11.4. Alternative Comparisons.

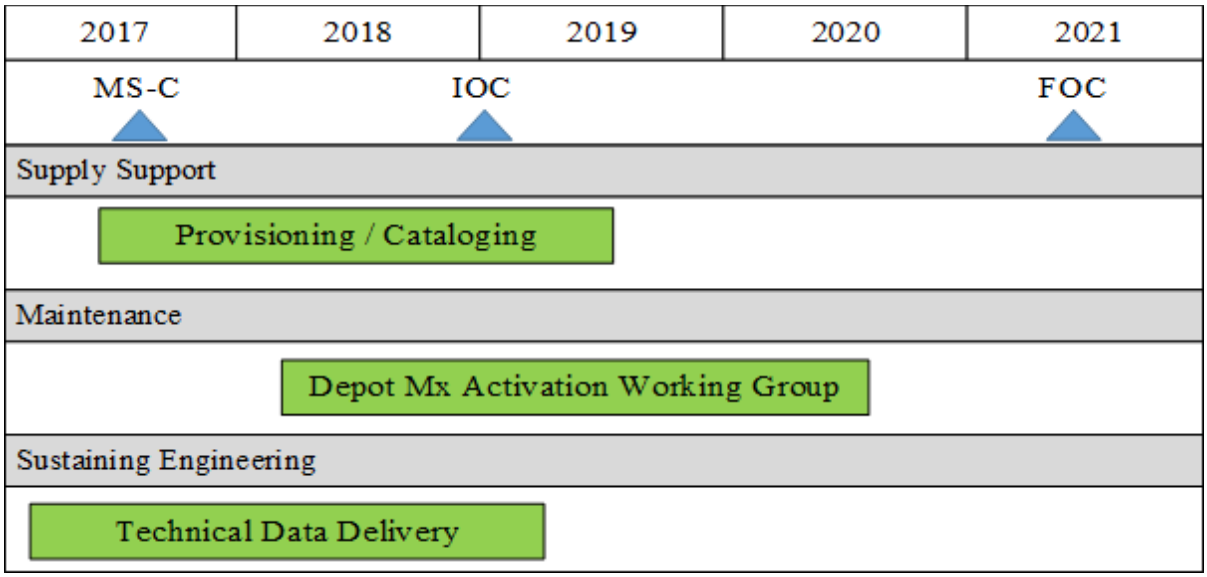
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
AFLCMC	+/- #	+/- #	+/- #	+/- #	+/- #
AFNWC	+/- #	+/- #	+/- #	+/- #	+/- #
SpOC/SSC/ECP	+/- #	+/- #	+/- #	+/- #	+/- #
Other PSP	+/- #	+/- #	+/- #	+/- #	+/- #
User	+/- #	+/- #	+/- #	+/- #	+/- #

11.2.5. Preliminary Transition Plans. The preliminary Transition Plan should be laid out to show the major events/changes that are required to take place during the transition from the "as is" to a given COA. Assess changes in work streams or "Transition events" to determine actions required to implement proposed changes (i.e.: contract, funding/budgeting, manpower, facilities, training, enter into data systems, etc.). Ensure PS-BCA Risk Assessment and Mitigation Plans are reflected in transition planning.

11.2.5.1. Evaluate cost model to ensure transition plan aligned with cost model estimates.

11.2.5.2. Identify potential critical path for implementation (may be considered an off ramp in final implementation plan).

Figure 11.1. COA Example for Transition Plans.



11.2.6. Governance Approval.

11.2.6.1. PM Brief to Governance Structure. Through the governance structure process, the PM should summarize the analysis methodology and approach, PS-BCA IPT (minus PSPs) initial findings and recommended COA with supporting justification and rationale to include other business considerations and key contributors to the PM's recommendation. During this time, the governance structure members should provide concurrence on 1) the PS-BCA IPT (minus PSPs) initial findings and 2) the PM's recommendation. If the governance structure identifies concerns with the PS-BCA IPT's (minus PSPs) findings, the PS-BCA IPT (minus PSPs) may be directed to perform additional cross-checks to ensure their findings are sound. If the governance structure agrees with the findings but does not concur with the PM's recommendation, the governance structure members should provide their rationale to the PM and those concerns should be taken forward along with "views of others" to the MDA for consideration prior to a final decision being made.

Table 11.5. Outline for PS-BCA Out-Brief.

Section	PS-BCA Out-Brief Outline
1	Bottom Line Up Front (BLUF)
2	Overview of Program
3	PS-BCA Team Membership
4	Problem Statement

Section	PS-BCA Out-Brief Outline
5	Scope – Product Support Elements/Grouping Facts, Ground Rules, and Assumptions (GR&As) Ground Rules
6	Assumptions
7	Defined COAs
8	Analysis Findings (COAs compared to "as-is") Costs Benefits Risks with Mitigation Plan Overall Perspective
9	Methodology and Criteria WUS and/or MODA; or Another Approved Method Evaluation Structure and Criteria (e.g., Weighting) Metrics
10	Sensitivity Analysis & Cross-Check Rationale for selecting the drivers to conduct the sensitivity analysis Driver or drivers that would change the relative ranking of COAs Amount of sensitivity of driver or drivers (e.g., Factor of Change to Data – 2 times, 3 times, etc.)
11	Other Business Considerations (e.g., Political, Financial)
12	Finding Summary
13	Recommendation
14	Off-ramps if recommendation cannot be implemented and/or benefits cannot be achieved
15	Way Ahead

11.2.6.2. Outline for PS-BCA Final Report. The PS-BCA final report ensures the PS-BCA is fully documented per project objectives, including methodologies that are repeatable and traceable, and provides formal documentation of PS-BCA analysis and findings. The PS-BCA final report at this stage should document the overall approach, methodology and thought process that went in to the analysis up to this point to include the initial findings and supporting cost model. This includes Subject Matter Expert (SME) rationale for the benefit analysis, weighting and scoring, and any other facets of the analysis where SMEs are utilized. The PS-BCA final report should be presented in the prescribed outline with the appropriate information that explains in detail how the PS-BCA was completed, the methodology, define the COAs and define the associated risk and benefits used throughout the PS-BCA.

Table 11.6. PS-BCA Final Report Outline.

Section	PS-BCA Final Report Outline
1	Executive Summary
2	Introduction Problem Statement Background Scope
3	Desired Outcomes and Requirements Desired Outcomes Requirements
4	Assumptions and Methods Facts, Ground Rules, and Assumptions (GR&As) Analysis Methods, Tools, and Rationale Evaluation Criteria
5	Courses of Action (COAs) Current Baseline/Anticipated Initial Support/Status Quo Other COAs
6	Mission and Business Impacts Benefits and Non-Financial Analysis Cost and Financial Analysis
7	Risk Analysis and Mitigation Plans Risk Analysis Mitigation Plans
8	Sensitivity Analysis & Cross-Check
9	Conclusion Comparison of COAs Summary of Results
10	Recommendations Specific Actions Based on Business Objectives Implementation Plan

11.2.6.3. Implementation Plan. In support of the MDA decision process, the PM should develop a detailed implementation plan 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 includes a Communications Plan, Project Plan, Budget Plan, Change Management Plan (including Stakeholder Action Plan), and Training Plan. 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. Reference AFMAN 65-506, Section 7.8, for additional discussion on information and activities that are important for implementing a decision.

Table 11.7. Implementation Plan Outline.

Section	Implementation Plan Outline
1	Management Overview
2	Description of Implementation
3	Points of Contact
4	Configuration Management
5	Major Tasks to Implement the Recommendation Detailed Schedule Timeline for Each Task IMS for overall plan (integrated across all tasks)
6	Security System Security Features Security During Implementation
7	Implementation Support Hardware Software Facilities Material
8	Personnel Requirements/Staffing
9	Training
10	Implementation Team
11	Users if Required
12	Performance Monitoring
13	Implementation is on schedule and on cost
14	Recommendation will meet cost and performance benefits from PS-BCA
15	Off-Ramp Plan
16	Go/No Go Decision
17	Post Implementation Verification

11.2.6.4. Off-Ramps. The PMO should ensure there are off-ramps built into the plan in case something occurs that prohibits execution of the recommended COA. Off- ramps are decision points with potential alternate solutions that can be implemented if conditions change (for example: if needed funding is not received, what is the alternate solution?). Status updates, changes to the implementation plan, and any decision not to continue to execute approved COA for any reason should be briefed through the governance structure and ultimately approved by the MDA to ensure all parties understand the changes and concur.

11.2.7. Milestone Decision Authority (MDA) Approval.

11.2.7.1. MDA Decision and Documentation. The PM is responsible to present the recommendation, Governance approval (to include any "views of others") and the implementation plan to the MDA. Via an Acquisition Decision Memorandum (ADM), 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.

11.2.7.2. PM Update and MDA Sign PS-BCA Final Report. Following the MDA decision, the PM should document the final decision and any supporting rationale in the PS-BCA report and attach the ADM if required. If the MDA decision is different than the PM's recommendation, the PM should document the MDA decision and rationale and update the implementation plan to reflect the MDA's approved COA. At this point, the PS-BCA report is now considered final and should be sent to the MDA for approval and signature. Once approved, the PS-BCA final report is attached to the Life Cycle Sustainment Plan as an annex. Implementation and execution should be monitored IAW with the approved implementation plan.

DARLENE J. COSTELLO
Principal Deputy, Assistant Secretary of the Air Force
(Acquisition & Logistics)

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

10 U.S.C. 2320, *Rights in Technical Data*

10 U.S.C. 2337, *Life-Cycle Management and Product Support*

10 U.S.C. 2460, *Definition of Depot-Level Maintenance and Repair*

10 U.S.C. 2464, *Core Logistics Capabilities*

10 U.S.C. 2466, *Limitations on the performance of depot-level maintenance of materiel*

AFI 63-101/20-101, *Integrated Life Cycle Management*, 16 September 2016

AFI 65-501, *Economic Analysis*, 29 October 2018

AFMAN 65-502, *Inflation*, 30 October 2018

AFMAN 65-506, *Economic Analysis*, 6 September 2019

DAFPAM 63-128, *Integrated Life Cycle Management*, 3 February 2021

DoD Directive 5000.01, *The Defense Acquisition System*, 9 September 2020

DoD Cost Assessment and Program Evaluation (CAPE), *Operating and Support (O&S) Cost-Estimating Guide*, September 2020

DoD Product Support Business Case Analysis Guidebook, April 2011

DoD Instruction 5000.02T, *Operation of the Defense Acquisition System*, 07 January 2015

DoD Instruction 7041.03, *Economic Analysis for Decision Making*, 9 September 2015

OMB Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*, 29 October 1992

Abbreviations and Acronyms

3PL—Third Party Logistics

50/50—Distribution of Depot – Level Maintenance

A4—Logistics Directorates

Ao—Operational Availability

ADM—Acquisition Decision Milestone

AA—Aircraft Availability

ACAT—Acquisition Category

ACI—Analytical Condition Inspection

AF—Air Force

AFCAA—Air Force Cost Analysis Agency

AFI—Air Force Instruction

AFLCMC—Air Force Life Cycle Management Center

AFLCMC/LG—Air Force Life Cycle Management Center Logistics Directorate

AFMAN—Air Force Manual

AFMC—Air Force Materiel Command

AFNWC—Air Force Nuclear Weapons Center

AFREM—Air Force Enterprise Risk Management

AFSC—Air Force Sustainment Center

AFSC/CC—Air Force Sustainment Center Commander

AFSC/FZ—Air Force Sustainment Center Cost Estimating

AFSC/LG—Air Force Sustainment Center Logistics Directorate

AFTOC—Air Force Total Ownership Cost

AHP—Analytical Hierarchy Process

AIS—Automated Information System

Ao—Operational Availability (Aircraft)

ATS—Automated Test System

BCA—Business Case Analysis

BLUF—Bottom Line Up Front

BOCR—Business Overhead Cost Recovery

CAE—Component Acquisition Executive

CAPE—Cost Assessment and Program Evaluation

CDD—Capability Development Document

CDRL—Contract Data Requirements List

CE—Critical Expert

CEMS—Comprehensive Engine Management System

CER—Cost Estimating Relationship

CLS—Contractor Logistics Support

COA—Course of Action

CPD—Capabilities Production Document

CSA—Commercial Service Agreements

CSDR—Cost & Software Report

CWT—Customer Wait Time

DAB—Defense Acquisition Board

DLA—Defense Logistics Agency

DLRS—Depot Level Repairables

DoD—Department of Defense

DoDI—Department of Defense Instruction

DSOR—Depot Source of Repair

EN—Engineering

FAR—Federal Acquisition Regulation

FM—Financial Management

GO/SES—General Officer/Senior Executive Service

GR&A—Ground Rules and Assumptions

HAF—Headquarters Air Force

HQ AFMC—Headquarters Air Force Materiel Command

IAP—Incremental Approval Point

IAW—In Accordance With

ILA—Independent Logistics Assessment

ILCM-EF—Integrated Life Cycle Management – Executive Forum

IPS—Integrated Product Support

IPT—Integrated Project Team

IRR—Internal Rate of Return

KPP—Key Performance Parameter

KSA—Key System Attribute

LCCE—Life Cycle Cost Estimate

LCL—Life Cycle Logistics

LCSP—Life Cycle Sustainment Plan

LIMSEV—Logistics Installations and Mission Support – Enterprise View

MAIS—Major Automated Information Systems

MAJCOM—Major Command

MDA—Milestone Decision Authority

MDAP—Major Defense Acquisition Program

MER—Manpower Estimate Report

MFR—Memorandum for Record

MICAP—Mission Impaired Capability Awaiting Parts

MOA—Memorandum of Agreement

MODA—Multi-Objective Decision Analysis

MOU—Memorandum of Understanding

MS—Milestone

NPV—Net Present Value

O&S—Operation & Support

OEM—Original Equipment Manufacturer

OMB—Office of Management & Budget

OSD—Office of the Secretary of Defense

OT&E—Organize, Train, and Equip

P/CS—Probability & Consequence Screening

PAA—Primary Aircraft Authorized

PDM—Programmed Depot Maintenance

PEO—Program Executive Officer

PK—Contracting

PM—Program Manager

PMO—Program Management Office

POAM—Plan of Actions and Milestones

POC—Point of Contact

POE—Program Office Estimate

PPP—Public-Private Partnership

PS—Product Support

PSS—Product Support Strategy

PSA—Product Support Arrangement

PSBCA—Product Support Business Case Analysis

PSM—Product Support Manager

PSP—Product Support Provider

PV—Present Value

REMIS—Reliability & Maintainability Information System

S4—Space Logistics Directorate

SAE—Service Acquisition Executive

SAF/AQ—Assistant Secretary of the Air Force (Acquisition)

SAF/AQD—Assistant Secretary of the Air Force / Product Support and Logistics

SAF/AQI—Assistant Secretary of the Air Force / Directorate of Information Dominance

SAF/AQP—Assistant Secretary of the Air Force / Directorate of Global Power

SAF/AQQ—Assistant Secretary of the Air Force / Directorate of Global Reach

SAF/FMC—Assistant Secretary of the Air Force / Directorate of Cost and Economics

SAF/FMCE—Directorate of Economics and Business Management

SCM—Supply Chain Management

SE—Sustaining Engineering

SLOC—Source Lines of Code

SME—Subject Matter Expert

SpOC—Space Operations Command

SSC—Space Systems Command

SSC/S4—Space Systems Command/Acquisition Logistics and Mission Sustainment

SSC/ECP—Space Systems Command/Enterprise Corps

TAI—Total Active Inventory

TY—Then Years

USAF—United States Air Force

USC—United States Code

USD (A&S)—Under Secretary of Defense for Acquisition and Sustainment

USSF—United States Space Force

USSF/S4U—United States Space Force Life Cycle Management

USSF/S4—United States Space Force Logistics, Engineering, and Force Protection

WUS—Weighted Utility Score

Terms

Best Value—Expected outcome of an acquisition that, in the Government's estimation, provides the greatest overall benefit in response to the requirement. (Source: Federal Acquisition Regulation (FAR), Section 2.10.)

Best Value Analysis—An analysis that considers not only cost, but other quantifiable and non-quantifiable factors to support a decision. This can include, but is not limited to, impact on readiness, quality and cycle time. (Source: DoDM 4151.23)

Contractor Logistic Support (CLS)—A contractor, rather than the government, is responsible for the integration of logistic support functions such as providing engineer support, identifying requirements for spare and repair parts, facilities, materiel, equipment, personnel and performing

maintenance on weapon systems. The Original Equipment Manufacturer (OEM) often times provides CLS as well as can provide Product Support Integration (PSI) functions.

Contractor Support—An overarching term that applies to a contractor's materiel and/or maintenance support for a system.

Due Diligence—Process of systematically researching and verifying the accuracy of information.

Integrated Product Support Elements (IPS Elements)—The package of support functions required to deploy and maintain the readiness and operational capability of major weapon systems, subsystems, and components, including all functions related to weapon systems readiness.

Life Cycle Sustainment Plan (LCSP)—A plan describing sustainment influences on system design and the technical, business, and management activities to develop, implement, and deliver a product support package that maintains affordable system operational effectiveness over the system life cycle and seeks to reduce cost without sacrificing necessary levels of program support.

Milestone-A (MS-A) —Milestone-A is a Milestone Decision Authority (MDA) led review at the end of the Materiel Solution Analysis (MSA) Phase. Its purpose is to make a recommendation or seek approval to enter the Technology Maturation & Risk Reduction (TMRR) Phase.

Milestone-B (MS-B)—Milestone-B is a MDA led review at the end of the TMRR Phase. Its purpose is to make a recommendation or seek approval to enter the Engineering and Manufacturing Development (EMD) Phase. Milestone B is considered the official start of a program.

Milestone—C (MS-C) - The point at which a recommendation is made and approval sought regarding continuing an acquisition program, i.e., proceeding to the next phase. MS-C approval allows entry into the Production and Deployment phase. MS-C authorizes entry into Low Rate Initial Production (LRIP) (for MDAPs and major systems), into production or procurement (for non-major systems that do not require LRIP) or into limited deployment in support of operational testing for Major Automated Information System programs or software intensive systems with no production components.

Organic—Refers to U.S. government entities (principally DoD organizations) such as infrastructure, personnel, equipment, and other sustainment capability to support a program.

Product Support Business Case Analysis (PS—BCA) - A PS-BCA is an expanded cost/benefit analysis with the intent of determining a best value solution for product support. It assesses each COA and weighs total cost against total benefits to arrive at the optimum solution. 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 hybrid blend of both Performance Based Logistics and transactional product support strategies broken out at the component, sub-system or system level, along with a best value mix of government and industry capabilities to deliver the 12 IPS elements in an integrated product support package at affordable cost. (Source: *Defense Acquisition University Integrated Product Support Element Guidebook*, Apr 2021).

Public—Private Partnerships (PPP) - A cooperative arrangement between an organic product support provider and one or more private-sector entities to perform defense-related work, utilizing

DoD facilities and equipment, or both. There are three basic types of public-private partnership in use within the defense sustainment community: workshare, direct sale, and lease. The bulk of the current authorities for partnerships are focused on depot maintenance.

Attachment 2

LEGACY PROGRAM PRODUCT SUPPORT BUSINESS CASE ANALYSIS SUFFICIENCY MEMORANDUM

Figure A2.1. Legacy Program Product Support Business Case Analysis Sufficiency Memorandum.

[Date]

MEMORANDUM FOR RECORD
FROM:
SUBJECT: [program name] Product Support Strategy Assessment

References: (a) Title 10, United States Code, Section 2337
(b) Air Force Instruction 63-101/20-101, *Integrated Life Cycle Management*
(c) Air Force Pamphlet 63-123, *Product Support Business Case Analysis*

1. The purpose of this memorandum is to document that the [program name] Product Support Strategy (PSS) is affordable and effective, and that changes to the product support strategy are not being considered at this time.

2. The [program name] program PSS is within expected costs and performance metrics and is achieving warfighter requirements. This determination has been validated through review of the sustainment measurements reported in the [program name] Defense Acquisition Executive Summary (DAES). The three measurements are: Materiel Availability, Materiel Reliability and Operating and Support (O&S) Costs. All three Current Estimates (CE) are better than their respective Current Baseline goals. Specifically, Material Availability CE is [xx%], well above the Baseline goal of [xx%] and the Material Reliability CE of [xx hours] far exceeds the Baseline goal of [xx hours]. Similarly, the O&S CE is [$XXB], under the Baseline goal of [$XXB] (both in BY92$).

3. [Include a brief description of any assessment of the PSS that was accomplished, if applicable]. The [program name] program office also conducted an assessment to consider whether alternative PSS might be more affordable or effective. This assessment was completed on [DATE], and it was found that the current PSS is the best value alternative.

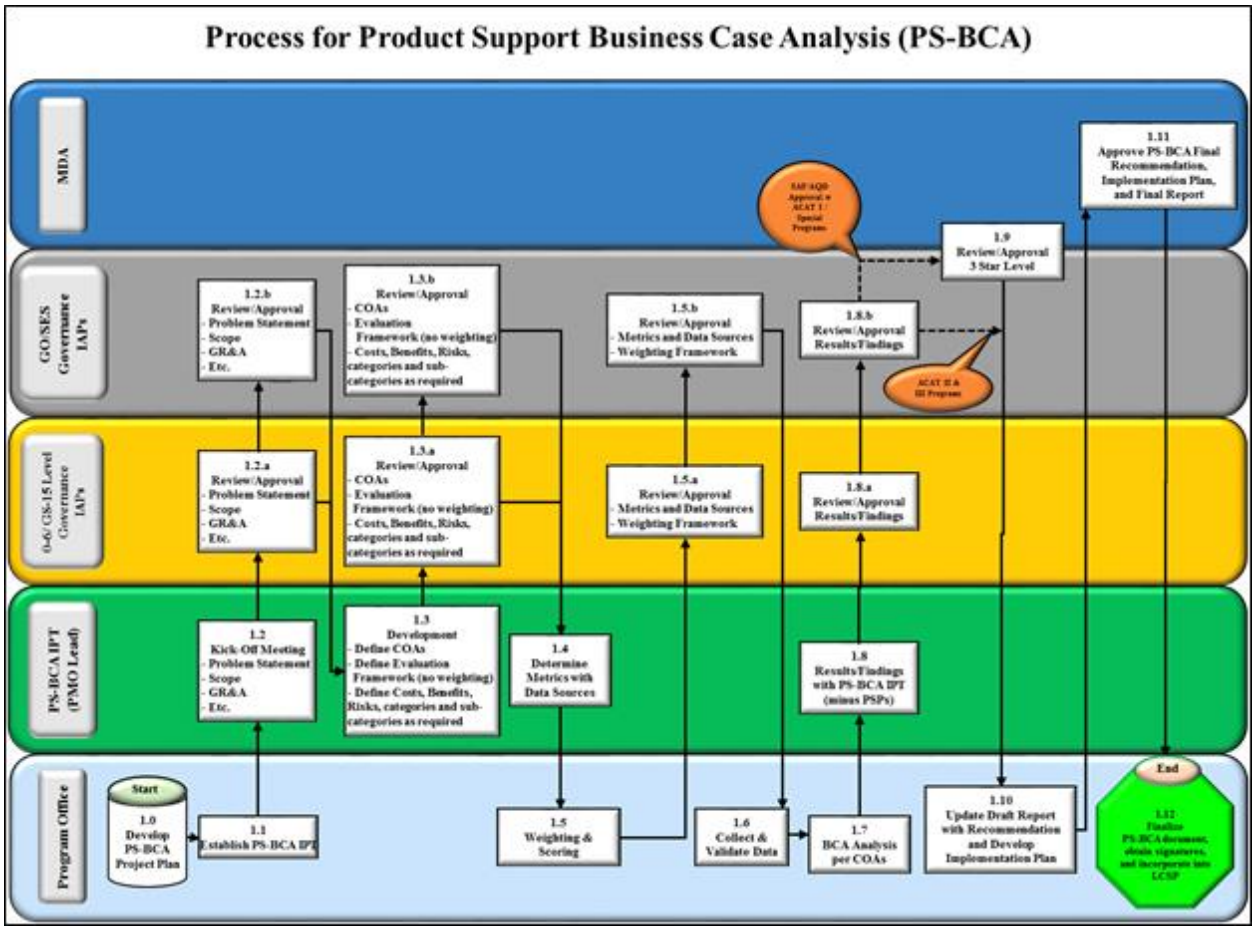
4. In accordance with References (a), (b) and (c), I have determined that the appropriate analyses have been conducted to validate the PSS and that no further analysis of the [program name] PSS is necessary at this time.
5. For any questions regarding this memo, please contact the [program name] Product Support Manager, [PSM Name], at DSN [XXX-XXXX].
Attachment:
[Copy of Assessment (If applicable)]

Attachment 3

PROCESS NARRATIVE

A3.1. The PS-BCA Process map documents the various steps to assist the PMO in working through the individual steps of the PS-BCA process.

Figure A3.1. PS-BCA Process Overview.



A3.2. The PS-BCA process narratives consist of the following elements:

A3.2.1. Process Name: Name of process step.

A3.2.2. Process Description: Provides a concise overview of the process step.

A3.2.3. Responsible OPR: The office with primary responsibility is the organizational unit or individual(s) responsible for ensuring the process step is completed.

A3.2.4. Inputs and Output: For every process step there is a series of inputs. Additionally, each process step has an output. The final result of the process includes documentation, correspondence, approvals, etc. to show the process was completed successfully.

Table A3.1. Develop PS-BCA Project Plan (Process 1.0).

Process Narrative		
Process Name:	1.0 Develop PS-BCA Project Plan	
Process Description:	Determine if a new or revalidated PS-BCA is required and begin the initial development of the project plan	
Responsible OPR	PMO (PSM)	
Inputs		Outputs
A decision tree to determine if a new or revalidated PS-BCA is required is located in the introduction section of the pamphlet		Decision made to conduct a new or revalidated PS-BCA If developing PS-BCA: PMO PS-BCA staffing requirements PS-BCA IPT Membership Governance members identified (O-6 & GO/SES levels) Preliminary assessment of potential COAs Draft problem statement Draft Plan of Actions and Milestones (POAM) if developing PS-BCA

Table A3.2. Establish Internal PMO PS-BCA Team (Process 1.1).

Process Narrative		
Process Name:	1.1 Establish PS-BCA IPT	
Process Description:	Identify appropriate stakeholders/advisors and begin planning and preparing for a kickoff meeting. The PS-BCA IPT should consist of stakeholders, support SMEs, and advisors who have a stake or interest in the outcome of the PS-BCA.	
Responsible OPR	PMO (PSM, PS-BCA IPT Lead)	
Inputs		Outputs

Process Narrative	
Decision on new or revalidated PS-BCA made Initial set of stakeholders/advisors for IPT identified Governance members identified Draft problem statement Draft POAM	Establish PS-BCA IPT membership (including contractors if required) Refine draft problem statement Draft scope, charter, and agenda (for kickoff meeting) Draft facts, ground rules & assumptions (GR&A) Update POAM If revalidation, collect previous data, assumptions, and update on implementation of previous PS-BCA Finalize IPT and Governance membership Establish date and time for kickoff meeting and invite stakeholders/advisors

Table A3.3. Kickoff Meeting (Process 1.2).

Process Narrative	
Process Name:	1.2 Kickoff Meeting
Process Description:	Review initial documents and finalize various outputs
Responsible OPR	PSM, PS-BCA IPT Lead

Inputs	Outputs
IPT members received advance copies of the following draft documents Kickoff meeting agenda Charter Problem statement Scope GR&A Updated POAM IPT and Governance members identified If revalidation, collect previous data, assumptions, and update on implementation of previous PS-BCA	Charter Problem statement Scope Facts, GR&As Updated POAM Schedule O-6 level Governance Incremental Approval Point (IAP) meeting

Table A3.4. O-6/GS-15 level IAP (Process 1.2a).

Process Narrative	
Process Name:	1.2a O-6/GS-15 level IAP

Process Narrative	
Process Description:	Review and approve IPT's first incremental work (e.g. Problem Statement, Scope, GR&A, POAM)
Responsible OPR	PMO (PSM, PS-BCA IPT Lead)

Inputs	Outputs
Problem statement Scope Facts, GR&As Updated POAM	O-6 level Governance approved: Problem statement Scope Facts, GR&As POAM Guidance from O-6 level Governance Schedule Executive level Governance IAP meeting

Table A3.5. Executive (GO/SES) level IAP (Process 1.2b).

Process Narrative	
Process Name:	1.2b Executive (GO/SES) level IAP
Process Description:	Review and approve IPT's first incremental work (e.g. Problem Statement, Scope, GR&A, POAM)
Responsible OPR	PM

Inputs	Outputs
O-6/GS-15 IAP approved: Problem statement Scope Facts, GR&As POAM	GO/SES level Governance approved: Problem Statement Scope Facts, GR&As POAM Guidance from Executive level Governance

Table A3.6. PS-BCA Development (Process 1.3).

Process Narrative	
Process Name:	1.3 PS-BCA Development

Process Description:	Conduct analysis to develop COAs, evaluation framework, and break down of categories and sub-categories for each: Costs, Benefits, and Risks as appropriate
Responsible OPR	PSM, PS-BCA IPT Lead

Inputs	Outputs
Approval from GO/SES level Governance: Problem Statement Scope Facts, GR&As POAM Guidance from O-6 and GO/SES level Governance members	Defined COAs Defined evaluation framework (no weighting) Defined costs, benefits, risks categories and sub-categories as required Schedule O-6/GS-15 level Governance IAP meeting

Table A3.7. O-6/GS-15 level IAP (Process 1.3a).

Process Narrative	
Process Name:	1.3a O-6/GS-15 level IAP
Process Description:	Review and approve IPT's incremental work (e.g. COAs, Defined Evaluation Framework, Defined Costs, Benefits, Risks categories and sub-categories as required)
Responsible OPR	PMO (PSM, IPS-BCA IPT Lead)

Inputs	Outputs
Defined COAs Defined evaluation framework (no weighting) Defined costs, benefits, risks categories and sub-categories as required	O-6/GS-15 level Governance approved: COAs Evaluation framework (no weighting) Costs, benefits, risks categories and sub-categories as required Guidance from O-6/GS-15 level Governance Schedule Executive level Governance IAP meeting

Table A3.8. Executive (GO/SES) level IAP (Process 1.3b).

Process Narrative	
Process Name:	1.3b Executive (GO/SES) level IAP

Process Description:	Review and approve IPT's incremental work (e.g. COAs, Defined Evaluation Framework, Defined Costs, Benefits, Risks categories and sub-categories as required)
Responsible OPR	PM

Inputs	Outputs
Approval from O-6/GS-15 level Governance: COAs Evaluation framework (no weighting) Costs, benefits, risks categories and sub-categories as required Guidance from O-6/GS-15 level Governance	GO/SES level Governance approved: COAs Evaluation framework (no weighting) Costs, benefits, risks categories and sub-categories as required Guidance from Executive level Governance

Table A3.9. Metrics Determination (Process 1.4).

Process Narrative	
Process Name:	1.4 Metrics Determination with Data Sources
Process Description:	Define and identify metrics with rationale to assess for costs, benefits, and risks **Note:** IPT can reach back to SMEs as required
Responsible OPR	PMO (PSM)

Inputs	Outputs
GO/SES level Governance Approved: COAs Evaluation framework (no weighting) Costs, benefits, risks categories and sub-categories as required Guidance from Executive level Governance	Defined metrics and rationale to assess the lowest level of category or sub-category for: costs, benefits, and risks Identified authoritative data sources for each metric Schedule O-6/GS-15 level Governance IAP meeting

Table A3.10. Weighting & Scoring (Process 1.5).

Process Narrative	
Process Name:	1.5 Weighting & Scoring
Process Description:	PMO utilizes a select group of CEs from appropriate sustainment commands to develop the weighting and scoring plan

	Note: Identified SMEs should have non-disclosure statements. CEs are those stakeholders, advisors, and/or selected SMEs with an enterprise view and have expertise across multiple areas.
Responsible OPR	PMO (PSM)

Inputs	Outputs
Defined metrics and rationale to assess the lowest level of category or sub-category for: costs, benefits, and risks Identified authoritative data sources, scoring approach, and normalization plan if required for each metric	Weighting for categories and/or sub-categories for costs, benefits, and risks Weighting and scoring approach with normalization plan for each metric

Table A3.11. O-6/GS-15 Level IAP (Process 1.5a).

Process Narrative	
Process Name:	1.5a O-6/GS-15 level IAP
Process Description:	Review and approve PMO's weighting and scoring plan
Responsible OPR	PMO (PSM)

Inputs	Outputs
Weighting for categories and/or sub-categories for costs, benefits, and risks Weighting and scoring approach with normalization plan for each metric	O-6/GS-15 level Governance approved: Weighting for categories and/or sub-categories for costs, benefits, and risks Weighting and scoring approach with normalization plan for each metric Guidance from O-6/GS-15 level Governance Schedule Executive level Governance IAP meeting

Table A3.12. Executive (GO/SES) level IAP (Process 1.5b).

Process Narrative	
Process Name:	1.5b Executive (GO/SES) level IAP

Process Description:	Review and approve PMO's weighting and scoring plan
Responsible OPR	PM

Inputs	Outputs
O-6/GS-15 level Governance approved: Weighting for categories and/or sub-categories for cost, benefits, and risk Weighting and scoring approach with normalization plan for each metric Guidance from O-6/GS-15 level Governance	GO/SES level guidance for the PM and PS-BCA IPT Executive level Governance approved: Weighting for categories and/or sub-categories for cost, benefits, and risk Weighting and scoring approach with normalization plan for each metric

Table A3.13. Collect & Validate Data (Process 1.6).

Process Narrative	
Process Name:	1.6 Collect & Validate Data
Process Description:	Obtain data from authoritative sources and determine effectiveness of data for analysis
Responsible OPR	PMO (PSM)

Inputs	Outputs
Identified authoritative data sources for each metric Guidance from Executive level Governance	Authoritative data with normalization plan as required (*resultant data will have same parameters and definition from each source*)

Table A3.14. PS-BCA Analysis per COA (Process 1.7).

Process Narrative	
Process Name:	1.7 PS-BCA Analysis per COA
Process Description:	Utilize data to conduct PS-BCA analysis for each COA

Responsible OPR	PMO (PSM)

Inputs	Outputs
Selected CEs for weighting/scoring Weighting for categories and/or sub-categories for costs, benefits, and risks Weighting and scoring approach with normalization plan for each metric Authoritative data with normalization plan as required	Scoring of COAs Sensitivity analysis Results/Findings (relative rankings of COAs) Prepare PS-BCA IPT meeting

Table A3.15. Results/Findings with PS-BCA IPT minus PSPs (Process 1.8).

Process Narrative	
Process Name:	1.8 Results/Findings with PS-BCA IPT minus PSPs
Process Description:	Share results/findings with IPT. IPT lead should ensure PSPs do not have access to results and findings.
Responsible OPR	PMO (PSM, PS-BCA IPT Lead)

Inputs	Outputs
Scoring of COAs Sensitivity analysis Results/Findings (relative rankings of COAs)	IPT comments and guidance Prepare for O-6/GS-15 level Governance IAP meeting Schedule O-6/GS-15 level Governance IAP meeting

Table A3.16. O-6/GS-15 level IAP (Process 1.8a).

Process Narrative	
Process Name:	1.8a O-6/GS-15 level Governance IAP
Process Description:	Share results/findings with O-6/GS-15 level Governance resulting in approval
Responsible OPR	PMO (PSM, PS-BCA IPT Lead)

Inputs	Outputs

IPT developments: Scoring of COAs Sensitivity analysis Results/Findings (relative rankings of COAs)	Approved scoring of COAs Approved sensitivity analysis Concurrence on PS-BCA IPT's initial findings and PM's recommendation (if Governance non-concurs with PM's recommendation, incorporate changes or note "views of others") Guidance from O-6/GS-15 level Governance Sufficient information/feedback to prepare GO/SES level Governance IAP meeting Schedule Executive Governance IAP meeting

Table A3.17. Executive (GO/SES) level IAP (Process 1.8b).

Process Narrative		
Process Name:	1.8b Executive (GO/SES) level IAP	
Process Description:	Share results/findings with GO/SES level Governance resulting in approval	
Responsible OPR	PM	
Inputs		Outputs
O-6/GS-15 level Governance approved: Scoring of COAs Sensitivity analysis Results/Findings (relative rankings of COAs) Guidance from O-6/GS-15 level Governance		Approved scoring of COAs Approved sensitivity analysis Concurrence on PS-BCA IPT's initial findings and PM's recommendation (if Governance non-concurs with PM's recommendation, incorporate changes or note "views of others") Guidance from Executive level Governance Schedule 3-star level board and determine participants

Table A3.18. 3-Star Level Review/Approval (Process 1.9).

Process Narrative		
Process Name:	1.9 3-Star Level Review/Approval (ACAT I & Selected Programs)	
Process Description:	Share results/findings with 3-star board	
Responsible OPR	PEO / PM	
Inputs		Outputs

GO/SES level approved: Scoring of COAs Sensitivity analysis PS-BCA IPT's initial findings and PM's recommendation (or "views of others") Guidance from Executive level Governance	3-star level approved: PS-BCA IPT's findings PM's recommendation (or "views of others") Guidance from 3-star level board for input to Milestone Decision Authority (MDA) decision

Table A3.19. Final Report Developments (Process 1.10).

Process Narrative		
Process Name:	1.10 Final Report Developments	
Process Description:	Develop Draft Final Report and Implementation Plan	
Responsible OPR	PMO (PSM)	
Inputs		Outputs
3-star level approval on: PS-BCA IPT's findings PM's recommendation (or "views of others") Guidance from 3-star level board		Draft final report to include: PS-BCA IPT's findings PM's recommendation Governance approval (or "views of others") Implementation plan on directed COA with detailed schedule and off-ramps

Table A3.20. Approve Recommendations/Draft Final Report (Process 1.11).

Process Narrative		
Process Name:	1.11 Approve Recommendation, Implementation Plan, and Draft Final Report	
Process Description:	MDA Review and Decision	
Responsible OPR	PEO	
Inputs		Outputs

Draft final report to include: PS-BCA IPT's findings PM's recommendation Governance approval (or "views of others") Implementation plan on directed COA with detailed schedule and off-ramps	MDA decision on the following: PS-BCA IPT's findings PM's recommendation (to include any "views of others") Implementation plan Identify any additional implementation off-ramps noted by the MDA Rationale for the final recommendation Sufficient information to finalize PS-BCA

Table A3.21. PS-BCA Document Finalization (Process 1.12).

Process Narrative	
Process Name:	1.12 PS-BSA Document Finalization
Process Description:	Finalize PS-BCA report based on MDA decision and incorporate into LCSP
Responsible OPR	PMO (PSM)

Inputs	Outputs
MDA decision on the following: PS-BCA IPT's findings PM's recommendation (to include any "views of others") Implementation plan Identify any additional implementation off-ramps noted by the MDA Rationale for the final recommendation Sufficient information to finalize PS-BCA	Finalized PS-BCA with supporting rationale (including Acquisition Decision Memorandum if required) If MDA differs from PM's recommendation, update implementation plan to reflect MDA's guidance Send finalized PS-BCA report to MDA for approval and signature Once signed, attach to LCSP as an annex