



Abstract

Army Cost Management requires an understanding of the level of commitment the Department of the Army has made to cost management that goes beyond the Program Management Office (PMO) through, TRADOC, and HQDA levels. By requiring any program that is a new start, or major upgrade of an existing program to submit a Cost-Benefit Analysis based on guidance from the VCSA is one of the unique cost management products the Army has instituted. This is now the first step to securing a viable and executable acquisition program within the Department of the Army.

Contingent on the level of significance, and or possible ACAT designation of a program, OSD AT&L may issue an ADM for an Analysis of Alternative (AoA) to get completed. As the process continues, a program that makes the ACAT ID level may be subject to requiring the Army Cost Position (based on the reconciliation of the Program Office Estimate or Component Cost Estimate) must be done to ensure that buy in from Army Senior leadership occurs in order to establish the program with a major acquisition decision.

This presentation will describe the requirements for cost products ODASA-CE uses to offer analytical and management support to Army Senior leaders and the acquisition community. A case study of an ACAT ID program will be used to better describe how such a common cost estimate can evolve into a high vis cost management undertaking.

-Tomeka Williams (ODASA-CE)



“The Day in the Life of a Cost Estimator”





Basic Cost Estimating Process

- **Determine what needs to be estimated? [analyze the Work Breakdown Structure (WBS) & CARD]**
- **Select methodology on how to determine what each WBS cost element should cost (analogy, parametric, engineering, and/or actuals)**
- **Facts and assumptions consistent with CARD!**
- **Cost estimate always in Constant Yr \$;
Budget Estimate is in Then Year \$**
- **Check the math (or formulas in spreadsheets)!**



Case Study of Army Cost Management: Managing Variability in Analytical Cost Products for an ACAT ID Program

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Army Cost Management

- Operational Definition
- Background
- Regulatory & Statutory Requirements
- Current Army Cost Management Products
- Case Study: ACAT ID Program
- Lessons Learned
- References



Operational Definition

ARMY COST MANAGEMENT PRODUCTS-

Methods used to manage cost estimating products by updating a cost estimate based on the evolution of characteristic data available at the time.

Cost Estimating Theory assumes that various levels of a Cost Analysis Requirements Description (CARD) “like” document is always available.



Weapon System Acquisition Reform Act 2009

"The purpose of this law will be to limit cost overruns before they spiral out of control. It will strengthen oversight and accountability by appointing officials who will be charged with closely monitoring the weapons systems we're purchasing to ensure that costs are controlled. If the cost of certain defense projects continue to grow year after year, those projects will be closely reviewed, and if they don't provide the value we need, they will be terminated. This law will also enhance competition and end conflicts of interest in the weapons acquisitions process so that American taxpayers and the American military can get the best weapons at the lowest cost."

**Signing Statement
May 22, 2009**

PRESIDENT BARACK OBAMA





Regulatory & Statutory

Acquisition Decision Support Products



Economic Analysis

- Statutory for Major Automated Information System (MAIS) acquisition programs, required at MS A (may be combined with AoA), MS B (or equivalent).
 - Section 811 of Public Law 106-398, Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001, Acquisition and Management of Information Technology.

Business Case Analysis

- Prerequisite to the application of Performance-Based Life-Cycle Product Support (PBL), the latest evolution of Performance-Base Logistics.
 - Section 2244a of Title 10, US Code.
 - PBL offers the best strategic approach for delivering required life cycle readiness, reliability, and ownership costs. Sources of support may be organic, commercial, or a combination, with the primary focus optimizing customer support, weapon system availability, and reduced ownership costs.

Army Cost - Benefit Analysis

- Directed by Department of the Army for each unfunded requirement and new or expanded program proposal submitted to the Secretary of the Army, chief of Staff, Army, Under Secretary of the Army or Vice Chief of Staff, Army.
 - Memorandum for Principal Officials Headquarters, Department of the Army, Cost Benefit Analysis to Support Army Enterprise Decision Making, 30 Dec 2009
 - US Army Cost Benefit Analysis Guide, DASA-CE,14 March 2011.

Analysis of Alternatives

- Statutory, required at MS A, updated as necessary at MS B, C.
 - Subtitle III of Title 40, US Code (formerly Clinger-Cohen Act of 1996).
 - Section 2366a of Title 10, US Code.
 - Weapon Systems Acquisition Reform Act (WSARA) of 2009 (Public Law 111-23, May 22, 2009)
 - DODI 5000.02, Enclosure 4, Table 2-1 ,2-2, & 3; Enclosure 7



Regulatory & Statutory

Army Decision Support Products



*Component Cost Estimate**

- Regulatory requirement at MS A, B, & FRP (mandatory for MAIS; as required by CAE for MDAP)
 - DoDI 5000.02, Enclosure 4, Table 2-1 ,2-2, & 3; Enclosure 7

Army Cost Position (Reconciled CCE & POE)

- ODASA-CE delegates the reconciliation of the POE and the WS Division's CCE to the Cost Review Board to objectively get to the Army Cost Position. The ACP is submitted to OSD CAPE as the Service Cost Position after signed by the ASA (FM&C)
 - DA Cost Analysis Manual, March 2002
 - DoDI 5000.02, Enclosure 7

***NOTE: Component Cost Estimate is called the Component Cost Analysis in the DA Cost Analysis Manual, May 2001**



Army Cost Management Products



Definitions:

- Economic Analysis - A systematic approach to identify, analyze, and compare costs or benefits of alternative courses of action that will achieve a given set of objectives. This approach is taken to determine the most efficient and effective manner to employ resources. In the broad sense, the systematic approach called economic analysis applies to new programs as well as to the analysis of ongoing actions.
- Business Case Analysis - an expanded cost/benefit analysis with the intent of determining a best value solution for product support. The BCA assesses each alternative and weighs total cost against total benefits to arrive at the optimum solution. The BCA process goes beyond cost/benefit or traditional economic analyses by documenting how each alternative fulfills the strategic objectives of the program; how it complies with product support performance measures; and the resulting impact on stakeholders. The BCA identifies which alternative support options provide optimum mission performance given cost and other constraints, including qualitative or subjective factors.
- Cost Benefit Analysis (C-BA) - A systematic quantitative method of assessing the desirability of government projects or policies when it is important to take a long view of future effects and a broad view of possible side-effects. The cost benefit analysis weighs the total expected costs against the total expected benefits over the near, far, and lifecycle timeframes from an Army enterprise perspective.
- Analysis of Alternatives (AoA) - An AoA is an analytical comparison of the operational effectiveness, suitability, and life-cycle cost (or total ownership cost , if applicable) of alternatives that satisfy established capability needs.

References:

- Department of the Army, Economic Analysis Manual, US Army Cost and Economic Analysis Center, February 2001.
- Acquisition Community Connection (<https://acc.dau.mil/bca>)
- White House Circular No. A-94 (Revised).
- US Army Cost Benefit Analysis Guide, DASA-CE, 14 March 2011.
- Defense Acquisition Guidebook



Army Cost Management Products



Definitions:

- Component Cost Estimate (CCE) - A systematic quantitative method of assessing the desirability of government projects or policies when it is important to take a long view of future effects and a broad view of possible side-effects. The cost benefit analysis weighs the total expected costs against the total expected benefits over the near, far, and lifecycle timeframes from an Army enterprise perspective.
- Army Cost Position (ACP) - An AoA is an analytical comparison of the operational effectiveness, suitability, and life-cycle cost (or total ownership cost, if applicable) of alternatives that satisfy established capability needs.

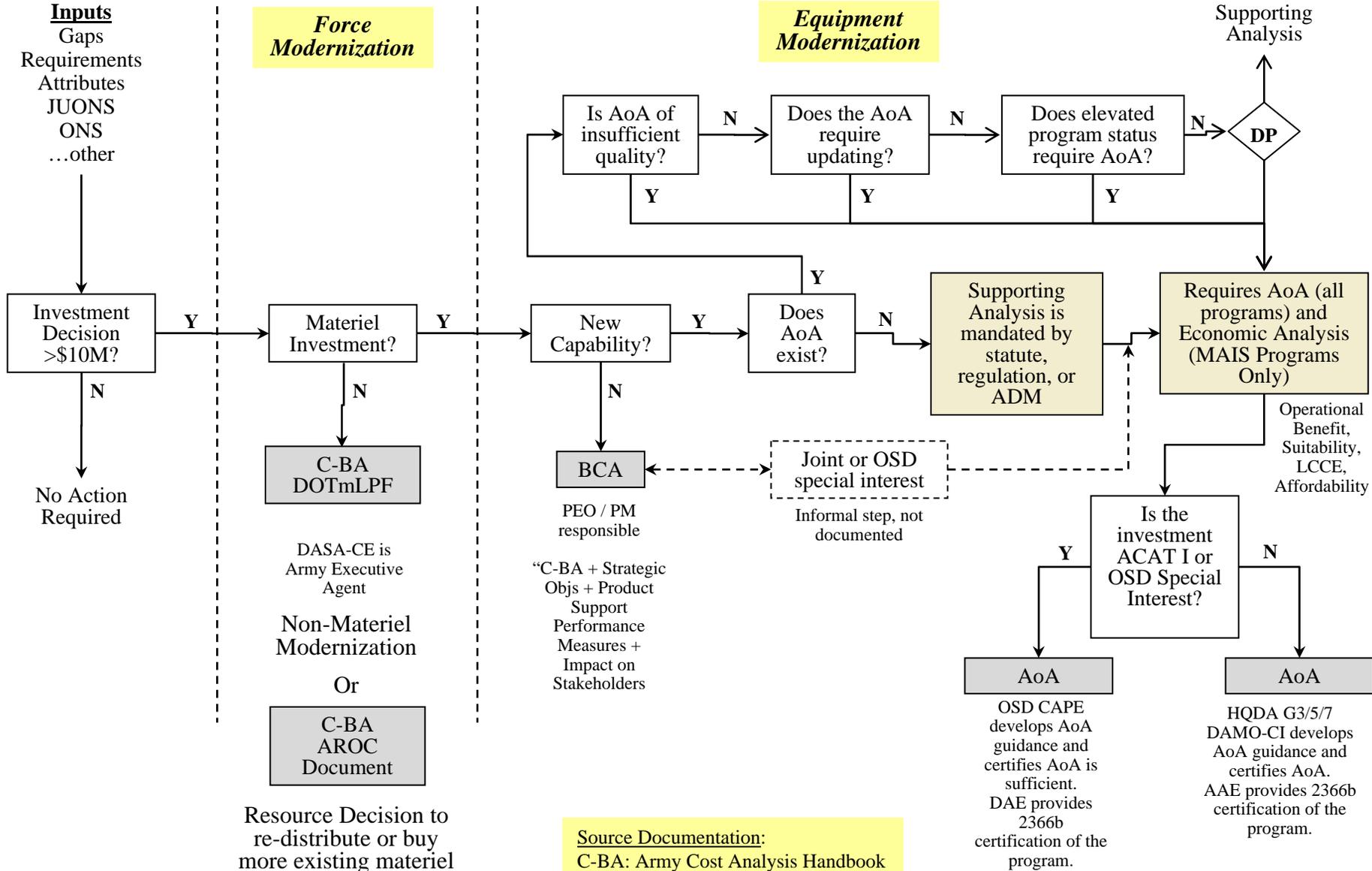
References:

- DoDI 5000.02,(mandatory for MAIS, as required by CAE for MDAP)
- Department of the Army Cost Analysis Manual March 2002
- DoD 5000.2-R
- Department of the Army Cost Analysis Manual March 2002

Army Cost Product Decision Tree

CBA-BCA-AoA

(Reference: TRADOC Brief 9 June 2011)





Basis of Estimate Evolution



Pre MS

An Example
MS A Phase vs TD Phase

Pre MS B

Material Solutions Analysis (MSA) Phase

Analysis Category

Tech Demo (TD) Phase

- Evaluates competing *technologies*.
- Must deal with wide degree of maturity and confidence, for array of existing and developing technologies, and systems.

Alternatives

- Evaluates competing *systems*.
- Must deal with array of systems ranging from “design concept” to COTS / GOTS, and the influence of TD prototypes.

- Relies upon ROM estimates with *lower confidence*.
- Uses cost estimating ratios based on historical data.

Life Cycle Costs

- Relies upon program and item-level costing with *higher confidence*.
- Based on engineering level data and industry proposals.

- Identifies the *acceptable capability attributes* to mitigate gaps and their threshold values to inform *first CDD draft*.

Attributes / Requirements

- Evaluates the *key performance parameters and key system attributes* threshold values to inform *final CDD*.

- Relies upon *RFIs and/or RFPs* to industry to include RFPs for Concept Definition.
- Industry not generally under contract.

Industry Involvement

- Leverages PM’s TD *data from Tech Demo* and may rely on RFIs if required.
- Industry is under contract to build and test prototypes for PM evaluation.

- Focuses on identifying integration and technical risk.
- Considers a wide range of potential *technologies that may not be integrated into a system or concept design*.

System Integration

- Focuses on identifying integration and technical risk and production risk.
- Considers *systems with technology integration* accomplished or well understood.

- Generally *focused on technology performance*.
- Examines benefits in terms of technology contributions to gap mitigation and operational impact.

Operational Benefit

- Examines the *operational effectiveness or impact* of each alternative as part of its unit of employment within the operating environment.



Economic Analysis

- Addresses the basic problem of economic choice and can be applied to all decision processes dealing with at least two feasible ways of meeting a requirement.
 - Systematically identifies costs and benefits of each suitable future course of action.
 - Specifies the objectives and assumptions, addresses appropriate alternative courses of action, includes cost of the alternatives, and describes benefits and/or effectiveness of each alternative.
- A rigorous and systematic analysis leading to better allocation of resources through improved management visibility.
 - All organizations must consider EAs necessary for all resource allocation decisions.
 - Can be applied to very small, as well as very large problems.
- Provides a strong analytical framework for evaluating alternatives, identifying costs and issues, highlighting implications of individual alternatives, identifying variables that drive results, assessing risks, uncertainties, and sensitivities of assumptions and costs, and suggesting recommendations.
- Required when seeking higher headquarters approval, for all new or ongoing programs or activities involving choices or trade-offs between two or more alternatives.



Cost-Benefit Analysis

- A decision support tool that documents the predicted effect of actions under consideration to solve a problem or take advantage of an opportunity.
- Defines a solution aimed at achieving specific Army and organizational objectives by quantifying the potential financial impacts and other business benefits such as:
 - Savings and/or cost avoidance.
 - Revenue enhancements and/or cash-flow improvements.
 - Performance improvements.
 - Reduction or elimination of a capability gap.
- Considers all benefits to include non-financial or non-quantifiable benefits of a specific course of action.
- Includes an analysis of business process performance and associated needs or problems, proposed alternative solutions, assumptions, constraints, and a risk analysis.
- Documents the purpose for the investment, the options available, and describes how the investment helps the organization reach its goals.
 - Focuses decision maker on “tipping point” issues.
- Requires the consideration of bill-payers.
- Tailored to fit the problem.
- Should reveal whether there is a strong “value proposition,” that is, a clear statement that the benefits more than justify the costs and required trade-offs.



Business Case Analysis

- Underpins optimal “business” decisions during a product’s life cycle that enable the weapon system to meet the warfighter-stated performance requirement, at the lowest Life Cycle Cost (LCC) and smallest logistics footprint while complying with applicable statutes, policies and plans.
 - Outlines the key tasks, activities, and focus areas during each Acquisition Phase, and further delineates the Systems Engineering methodologies which should be applied to ensure the goals of achieving reliable systems with a reduced logistics footprint are achieved.
 - Used in the initial decision to invest in a project.
 - Guides the decision to select among alternative approaches.
 - Used to validate any proposed scope, schedule, or budget changes during the course of the project.
 - Should also be used to identify the various budget accounts and amounts affected by the various product support strategies.
 - **Should be a living document – as project or organization changes occur they should be reflected in updates to the business case.**
 - Should be used to validate that planned benefits are realized at the completion of the project.



Analysis of Alternatives

- Used to identify the most promising end-state materiel solution, but the AoA also can play a supporting role in crafting a cost-effective and balanced evolutionary acquisition strategy.
 - ID the technology cost drivers and integration risks (Weapon Systems Acquisition Reform Act of 2009 (WSARA)).
 - ID the trades in cost, performance, and schedule (with associated risks) to deliver a militarily useful capability to mitigate capability gaps (WSARA).
 - Illuminate capability advantages and disadvantages.
 - Consider joint operational plans.
 - Examine sufficient feasible alternatives.
 - Discuss key assumptions and variables and sensitivity to changes in these.
 - Calculate costs.
 - Assess the following:
 - Technology risk and maturity.
 - Alternative ways to improve the energy efficiency of DoD tactical systems with end items that create a demand for energy, consistent with mission requirements and cost effectiveness.
 - Appropriate system training to ensure that effective and efficient training is provided with the system.



Component Cost Estimate

- An agency not in the direct PM acquisition community develops the CCE to support specific regulatory acquisition milestone requirements. Analysts use the CCE to test the reasonableness of the POE.
- For major materiel systems, ODASA-CE develops this estimate. Independence is the key in the conduct of the CCA.
- Independence does not mean that the CCA analyst is uninformed about the POE and its methodology; rather, it means that the analysis behind the CCA takes a different, independent approach from the POE.
- Otherwise, the CCA has all the characteristics of the POE.
- The CCA is a life cycle estimate, documented and reflecting a snapshot in time.
- The CCA meets the statutory requirement for the ICE on ACAT IC programs.
- ICEs shall include all program costs, regardless of funding source or management control.
- This includes system integration and modification costs, logistics support costs, and military construction costs. Significant deficiencies in the cost estimates or their documentation may lead to deferment of the milestone review.
- DoD components shall not contract for development of CCAs without prior written approval of the CAIG Chair. Requests must demonstrate that special circumstances require use of contractor, vice organic, personnel for the CCA, and that adequate safeguards will protect against conflicts of interest.



Army Cost Position

- The ACP is the Army's approved LCC estimate for the materiel system. It is the basis for Army planning, contracting, programming, budgeting, and execution.
- For DoD milestone reviews, the ACP satisfies the DoD 5000.2-R requirement for a Component cost position.
- The ACP is also a snapshot in time as are the POE and CCE.
- The ACP is recorded in the Acquisition Program Baseline.
- The CRB recommends approval of the proposed ACP after an intensive review of both the POE and CCA.
 - The first step in developing an ACP is to compare the POE to the CCA. This is to ensure that both estimates represent the same scope of work defined in the CARD.
 - Otherwise, the CRB working group must adjust either the POE or the CCA.
 - Any remaining difference is with estimating methodology.
 - The CRB working group then analyzes the POE and CCA to check whether the data and methodology employed were correct and properly used.
 - The CRB working group should make a comparison to locate the cost elements (or PME subelements) where differences are greater than 10 percent.
 - The CRB must judge which methodology is **most** reasonable and sound. This judgment process is not a matter of negotiation with the POE preparer; rather, it is a matter of objective reasoning.
 - The ASA(FM&C) approves the ACP for the AAE.
 - When approved, the ACP is the reference for all planning, contracting, programming, and budgeting for the system.
 - The cost analysis brief (CAB) documents the rationale for reconciling the POE and CCA to form the ACP.



CASE STUDY:

Comparative Analysis

of Army Cost Management Product

Evolution for an ACAT ID Program



Example of Army Cost Management



To categorize RDTE / Procurement deltas in a comparative analysis of cost estimates that were based on the changes to the Basis of Estimate

Cost Delta BLUF

- Cost increases from Feb BCA to draft ACP
 - Survivability: \$XXM RDTE / \$XXM Procurement
 - Schedule: \$XXXM Procurement
 - CARD (Scope definition): \$XXX RDTE / \$XXX Procurement
 - Methodology: \$XXXM RDTE / \$XXXM Procurement



Lessons Learned

- Document your methodology and constantly track deltas between different cost products pertaining to the same system
- Be prepared to answer questions throughout all levels of leadership when it comes to questions about cost of a system
- Organization is the key to managing your cost products as time goes on and the system's requirements evolves.

Army Cost Management Products



	Business Case Analysis	Economic Analysis	Cost-Benefit Analysis	Analysis of Alternatives	Component Cost Estimate	Army Cost Position
Decision Support	✓	✓	✓	✓	✓	✓
Statutory Requirement		Section 811 of Public Law 106-398		Subtitle III of Title 40, US Code Section 2366a of Title 10, US Code		
Req. for MDAP Acquisition				✓	✓	✓
Req. for MAIS Acquisition		✓			✓	✓
HQDA Directed			✓	✓	✓	✓
Includes Risk	✓	✓	✓	✓	✓	✓
Requires Cost Analysis	✓	✓	✓	✓	✓	✓
Formal Guidance Provided				✓	✓	✓



References

- Section 811 of Public Law 106-398, Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001, Acquisition and Management of Information Technology.
- Subtitle III of Title 40, US Code (formerly Clinger-Cohen Act of 1996).
- Section 2366a of Title 10, US Code.
- Weapon Systems Acquisition Reform Act (WSARA) of 2009 (Public Law 111-23, May 22, 2009)
- DoDD 5000.1 The Defense Acquisition System, 12 May 2003
- DoDI 5000.02 Operations of the Defense Acquisition System, 02 December 2008
- Department of the Army, Economic Analysis Manual, US Army Cost and Economic Analysis Center, February 2001.
- Department of the Army, Cost Analysis Manual, US Army Cost and Economic Analysis Center, May 2002.
- TRADOC Analysis of Alternatives (AoA) and Cost Benefit Analysis (C-BA) dated



Summary

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Questions