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Army Reserve Capabilities-Based Prioritization Study

TRADOC Analysis Center
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Monterey, CA 93943-0692

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14. ABSTRACT

This study was conducted for the United States Army Reserve (USAR), Program Analysis and Evaluation (PA&E) Directorate, as part of the Army Studies Program. In it, we were asked to identify a reproducible, quantifiable, qualifiable and auditable methodology for the prioritization and allocation of finite Army resources. The methodology must consider Army preferences for programs, determine individual program value, and link individual program value to available resources in order to develop a programming recommendation.

We began our study with a comprehensive literature review and stakeholder analysis designed to gain an understanding of the Planning, Programming, Budgeting, and Execution System (PPBES); to identify the current issues and problems associated with PPBES; and to develop a set of candidate methodological approaches. Based upon that research, we identified the required characteristics of the methodological approach; compiled a comprehensive list of potential alternatives; evaluated and compared the alternatives; and recommended a value-focused thinking (VFT) approach to resource allocation. We then conducted a proof-of-principle application of the VFT approach to a more narrowly-focused decision context involving the allocation of resources to potential USAR accession and retention incentives. We were then able to extrapolate the results to a larger Army resource allocation problem. Finally, we developed a tool, called the Value-Based Evaluation Support Tool (VBEST), to facilitate the application of our recommended approach.

This report describes the conduct of the study in detail to include the background research; methodology identification, comparison, and recommendation; proof-of-principle application; and the resulting decision support tool.

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Program Objective Memorandum; Value Focused Thinking; Planning, Programming, Budgeting, and Execution System; Decision Support Tool; Incentives

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Finally, we thank our sponsors, USAR PA&E, for their guidance, support, and availability and HQDA, G-8, Army Study Program for funding this study.

Without the untiring efforts and expertise of all of the above individuals and organizations, this significant effort would not have been successful.

Executive Summary

The United States Army Reserve (USAR), Program Analysis and Evaluation (PA&E) Directorate, submitted the proposal for this study in Fiscal Year (FY) 2007 to the Army Studies Program as the agency's top-ranked proposal. Headquarters, Department of the Army (HQDA), G-8, who manages the Army Studies Program, recognized the study's importance and funded it.

This study addressed the following problem statement:

> *The United States Army needs a reproducible, quantifiable, qualifiable and auditable methodology for the prioritization and allocation of finite resources.*
>
> - *Must facilitate the prioritization of capabilities and/or consideration of Army preferences for programs.*
> - *Must link resources to capabilities/objectives to facilitate determination of individual program value.*
> - *Must link individual program value to available resources in order to develop a programming recommendation.*

We began our study with a comprehensive literature review and stakeholder analysis designed to gain an understanding of the Army's Planning, Programming, Budgeting, and Execution System (PPBES); to identify the current issues and problems associated with PPBES; and to develop a set of candidate methodological approaches. Based upon that research, we identified the characteristics that a potential approach must possess in order to be a viable solution; compiled a comprehensive list of potential alternatives; evaluated and compared the alternatives; and made a recommendation. We then conducted a proof-of-principle application of the approach to a more narrowly-focused decision context involving the allocation of resources to potential USAR accession and retention incentives. The proof-of-principle demonstrated the approach's usefulness and provided value directly to the USAR by representing the incentives resource allocation problem in a comprehensive quantitative and qualitative model and developing valuable cost estimation methodologies. We were then able to extrapolate the results to larger Army Program Objective Memorandum (POM) problem. Finally, we developed a tool, called the Value-Based Evaluation Support Tool (VBEST), to facilitate the application of our recommended approach.

As a result of our background research, methodology comparison, and proof-of-principle application, we believe that a Value Focused Thinking (VFT) approach, as specifically implemented in the Systems Design Process (SDP), shows the most promise in solving the POM

resource allocation problem for the Army. The methodology allocates resources based upon the value returned by the programs, evaluating each as an entity to determine how it compares against other programs in terms of its value from the Army's perspective. Thus, it identifies what is expected of a program to make it successful to the organization. Additionally, the method possesses the key required characteristics; it is qualifiable, quantifiable, auditable, reproducible, and defensible, and can account directly for decision risk.

The approach is not without its challenges. Some of the key challenges include incorporating the many political considerations intrinsic to the Army resource allocation problem; developing meaningful measures that will apply across programming elements; choosing the appropriate level of programming elements to compare; and gaining senior-level leader acceptance of the approach.

We recommend that the sponsor solicit buy-in from the key stakeholders in the PPBES process if they wish to implement this approach. To do this, we recommend applying the technique first to a subset of the POM to demonstrate its usefulness, potentially within a Program Evaluation Group (PEG). Such a successful demonstration of value on a more limited scale will facilitate consensus-building among key stakeholders.

The proof-of-principle applied to a USAR accession and retention incentives problem demonstrated the usefulness of the approach to a more narrowly-focused problem and provided value directly to the USAR by capturing the comprehensive quantitative and qualitative model of the problem and valuable cost estimation methodologies.

Overall, we provided the following study deliverables as a result of our significant effort within a large, multi-disciplinary team.

- Annotated bibliography documenting the literature review conducted by the Library of Congress Federal Research Division on potential approaches for resource allocation in government, industry, and academia.
- Documented interview and survey results involving 25 personnel from numerous Army organizations and PEGs.
- Analytic identification, evaluation, and comparison of potential resource allocation approaches.
  - Identified numerous potential approaches which were narrowed down to the four most promising.
  - Evaluated the approaches based upon their potential for solving the resource allocation problem and the risk to implementation.

- Proof-of-principle application of the value-focused thinking approach to a USAR accession and retention incentive problem.
  - Developed a value model based upon stakeholder interviews.
  - Demonstrated the value-focused thinking approach by applying it to the incentives problem.
  - Developed a comprehensive spreadsheet value model that can be updated further to accommodate additional stakeholders or changing values.
  - Extrapolated the results to a larger POM resource allocation problem.
- Cost estimation methodologies for costing potential incentive programs with example estimates.
  - Provided a detailed report of the methodologies and results.
  - Developed an accompanying spreadsheet that can be manipulated and updated based upon new data.
- Prototype decision support tool to support a value-focused thinking approach to decision-making and resource allocation.
  - Can be used to support a wide range of decisions.
  - Open-source software that can be further developed to meet user needs.

This study should be viewed as a preliminary step to solving the Army resource allocation problem. Further efforts should be conducted to demonstrate and prove the value of the recommended approach in the larger context.

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Section 1 – Introduction

1.1. Background

The United States Army Reserve (USAR), Program Analysis and Evaluation (PA&E) Directorate, submitted the proposal for this study (included in Appendix A) in Fiscal Year (FY) 2007 to the Army Studies Program as the agency's top-ranked proposal. Headquarters, Department of the Army (HQDA), G-8, who manages the Army Studies Program, recognized the study's importance and funded it.

As stated in the original study proposal, the fundamental need for this study "is most keenly witnessed in planning and determining the optimal allocation of Army resources [in accordance with] dynamic strategic guidance… and response requirements, generated by external, and sometimes unexpected, scenarios of variable scope and severity."

This section contains our original and revised problem statements and study issues, as well as the study scope and methodology.

1.2. Problem Statement

1.2.1. *Problem Statement from the Study Proposal*

The initial problem statement provided in the study proposal is included below and can also be found in Appendix A.

> *The United States Army Reserve needs a reproducible, quantifiable, qualifiable and auditable methodology for the prioritization and allocation of finite resources. Methodology must balance risk and investment under a range of Army Reserve Expeditionary Force/Army Force Generation Model scenarios in the 2010 time-frame.*
>
> *Currently there is [no]:*
>
> - *Universally accepted and adopted lexicon or taxonomy for components or methodology for prioritization.*
> - *Secure, database repository of appropriate bins, criteria or metrics for prioritization.*
> - *Reproducible, auditable, quantifiable and qualifiable methodology for prioritization.*

1.2.2. *Revised Problem Statement*

Immediately upon receipt of the study, we met with the study sponsor and other key stakeholders and began conducting background research into the problem. Our goal was to gain a deeper understanding of the problem we were being asked to address. Based upon the

interviews, meetings, and related research, we refined the initial problem statement into a revised problem statement that fully encapsulated the sponsor's needs. Thus, the refined problem statement (included below) is a product of the first primary portion of our study methodology – problem definition.

> *The United States Army needs a reproducible, quantifiable, qualifiable and auditable methodology for the prioritization and allocation of finite resources.*
>
> - *Must facilitate the prioritization of capabilities and/or consideration of Army preferences for programs.*
> - *Must link resources to capabilities/objectives to facilitate determination of individual program value.*
> - *Must link individual program value to available resources in order to develop a programming recommendation.*

The reader should note that neither the original problem statement nor the revised problem statement specifically require the direct application of the concept of capabilities-based planning or prioritization in the solution to the problem. Although the title of this study includes the phrase "capabilities-based prioritization" (based upon the study title from the initial study proposal), we were given latitude in how we interpreted that phrase and how we identified potential solutions. While it is clear that capabilities-based planning is fundamental to the identification of Army priorities for system and force development, it is not clear that capabilities themselves must be directly implemented in a methodology for allocating Army resources.

For example, capabilities-based planning is essential for identifying the types of doctrine, organization, materiel, leadership and education, personnel, and facilities (DOTMLPF) solutions that should be pursued; however, it is not necessarily appropriate for determining which providers of capability should be funded versus others, particularly when multiple solutions provide similar capability. The Joint Capabilities Integration and Development System (JCIDS), tightly coupled with the Defense Acquisition System (DAS), focuses on the former. A methodological approach to allocating resources focuses on the latter. While we recognize the importance of capabilities-based planning to the Department of Defense (DoD) and the Army, we considered solutions that may not directly use capabilities as the fundamental element for resource allocation. That being said, all potential solutions to the problem must address the fundamental requirement to provide the necessary capabilities to the Army and account for overlap, redundancy, and gaps.

1.3. Study Issues

Once we fully understood the problem statement, we developed a set of study issues that, if answered, would comprehensively address the revised problem statement. For each study issue, we developed essential elements of analysis (EEAs) that further decompose each study issue into its key analytical components. As with the problem statement, we also continued to refine the study issues and EEAs throughout the problem definition phase. As we will discuss later in the report, the study changed direction after the first half of execution; therefore, we include both sets of study issues for completeness.

1.3.1. *Initial Study Issues*

Study Issue 1. What appropriate techniques and tools have been researched and/or developed?

Study Issue 2. How should the required capabilities be decomposed and prioritized?

Study Issue 3. How should resources be linked to capabilities to facilitate prioritization?

Study Issue 4. How should prioritized resource requirements be linked to available resources to develop a programming recommendation?

Study Issue 5. What tools should be used to facilitate the recommended methodology?

1.3.2. *Modified Study Issues*

After our first in-progress review (IPR), the feedback from the study sponsor led to a modification of the study issues (for reasons that will be discussed later in the report). They are included below. Note that Study Issues 1 and 5 did not change, and that modified Study Issue 2 is a combination of the original Study Issues 2, 3, and 4.

From a study perspective, the change to the study issues meant that we would not apply our recommended methodological approach directly to the Army Program Objective Memorandum (POM) resource allocation context, as originally planned. Instead, we applied the recommended approach to a more narrowly-focused decision context in order to demonstrate the value of the methodology (modified Study Issues 3 and 4).

Study Issue 1: What appropriate techniques and tools have been researched and/or developed?

- ***EEA 1.1:*** What previous related research has been conducted on this subject (findings, recommendations, suggestions)?
- ***EEA 1.2:*** What techniques and tools have been or are currently being used to support Army and Joint capabilities-based planning, prioritization, and programming?

- ***EEA 1.3:*** Are there appropriate techniques and tools being used outside of DoD and/or the government, to include industry and academia?

Study Issue 2: What are recommended methodological approaches that would facilitate the prioritization of finite resources?

- **Study Issue 2a:** Identifying, decomposing, and prioritizing Army preferences or capabilities.
  - ***EEA 2a.1:*** How should capabilities/objectives be decomposed to facilitate prioritization?
  - ***EEA 2a.2:*** How should the relationships between and within capabilities/ objectives be captured?
  - ***EEA 2a.3:*** Who should provide input to the decomposition and prioritization of capabilities/objectives?
  - ***EEA 2a.4:*** What are the appropriate metrics for assessing and prioritizing capabilities/objectives? How should the metrics be described to facilitate comparisons between capabilities/objectives?
- **Study Issue 2b:** Linking program elements to capabilities/objectives to facilitate assessment of program value to the Army.
  - ***EEA 2b.1:*** What are the appropriate programming elements for linking resources to capabilities/objectives?
  - ***EEA 2b.2:*** How should the resources be linked to capabilities/objectives?
  - ***EEA 2b.3:*** Who should provide input to the linking of programming elements to capabilities/objectives?
- **Study Issue 2c:** Linking program value to available resources to develop a programming recommendation.
  - ***EEA 2c.1:*** How should the value (or marginal utility) of programming additional resources to provide a capability be measured and what are the metrics?
  - ***EEA 2c.2:*** Who should provide input to the assessment of value?
  - ***EEA 2c.3:*** How should the inter-relationships and linkages between programming elements be captured?
  - ***EEA 2c.4:*** How should the allocation of resources be optimized?

Study Issue 3: What are the costs associated with the potential retention and accession incentive initiatives?

- ***EEA 3.1:*** What are the appropriate methodologies for estimating costs for each incentive under consideration?
- ***EEA 3.2:*** What are the estimated costs for the incentives under consideration during the FY10-FY15 POM planning period?

Study Issue 4: How can the recommended methodological approach be applied to prioritize potential Army Reserve retention and accession incentive initiatives?

- ***EEA 4.1:*** What is the appropriate *qualitative* value model for the incentives problem?
- ***EEA 4.2:*** What is the appropriate *quantitative* value model for the incentives problem?
- ***EEA 4.3:*** How can the results of the incentives proof-of-principle be applied to the larger Army resource allocation decision context?

Study Issue 5: What tools should be used to facilitate the recommended methodology?

- ***EEA 5.1:*** What are the requirements for tools that can be used or developed to support the methodology?
- ***EEA 5.2:*** Are there any existing tools that can be used to support the methodology?
- ***EEA 5.3:*** What tools should be developed to support the methodology?

1.4. Study Scope

The original problem statement identified USAR as the primary target for a methodological approach to prioritize and allocate resources. However, after our problem definition effort, we determined that an approach used independently by the USAR, but not by the Army in general, would not be a feasible solution. As a result, the scope of the study expanded beyond the USAR to the Army.

This section identifies the primary constraint, limitations, and assumptions related to the study. The US Army Training and Doctrine Command (TRADOC) Analysis Center (TRAC) (2005) defines a constraint as "a restriction imposed by the study sponsor that limits the study team's options in conducting the study" (slide 8). A limitation is "an inability of the study team to fully meet the study objectives or fully investigate the study issues" (slide 8). An assumption is "a statement related to the study that is taken as true in the absence of facts, often to accommodate a limitation" (slide 8).

1.4.1. *Constraint*

The only constraint was that the study must be completed by 30 June 2008.

1.4.2. *Limitations*

- Capabilities-based planning is not well-defined or consistent in practice. Thus the identification of a methodology based upon capabilities-based planning as an ambiguously-defined concept is problematic.
- Due to time constraints and internal resource availability, Army stakeholders interviewed and surveyed were primarily, but not exclusively, members of the Army Reserve.

- The combination of the limited number of subject-matter experts (SMEs), their tenure lengths, experience, and knowledge in some areas, limited the comprehensiveness of the stakeholder analysis.
- Key regulations and procedural guidance are not sufficient to determine the 'ground truth' of Planning, Programming, Budgeting and Execution System (PPBES).
- Due to the study timing, the recommended methodological approach could not be applied to the Army FY10 – FY15 POM process. The planning process for the current POM was already underway, making it infeasible to introduce new concepts in the process.
- The proof-of-principle application was much more narrowly-focused than the larger Army resource allocation problem; therefore, it did not address many of the challenges associated with the larger problem.
- Time available to conduct the proof-of-principle was limited.
  - Required data for both cost estimation and value system development was difficult and time-consuming to access, leading to our inability to obtain all of data we required.
  - Only a limited stakeholder analysis could be conducted within the resource limitations.

1.4.3. *Assumptions*

- A methodological approach that does not directly integrate capabilities-based planning is a valid solution as long as it can be integrated with capabilities-based planning concepts.
- Input from the available stakeholders provided sufficient information concerning the Planning, Programming, Budgeting and Execution (PPBE) environment to provide suitable answers to the study questions.
- Information received from SMEs about the processes and procedures used to execute the PPBES is a nearly-accurate representation of how the processes actually work.
- The proof-of-principle was a valuable demonstration of the recommended methodological approach that can be extrapolated to the larger Army POM planning process.
- The resulting value model and cost estimation methodologies related to the incentives proof-of-principle will provide value even with limited data and stakeholder access.
  - Use of available data will provide meaningful insights concerning incentive programs.
  - Stakeholders interviewed are representative of the USAR values concerning incentive programs.

1.5. Study Methodology

Figure 1 shows the original study methodology before the study issues were refined. However, even with the change in study direction, we were still able to execute the methodology, but with a slightly different emphasis. Steps 2 through 7 in Figure 1 were still executed; however, our focus shifted from developing those steps further to apply them to the Army POM process to demonstrating their application to a narrower proof-of-principle application.

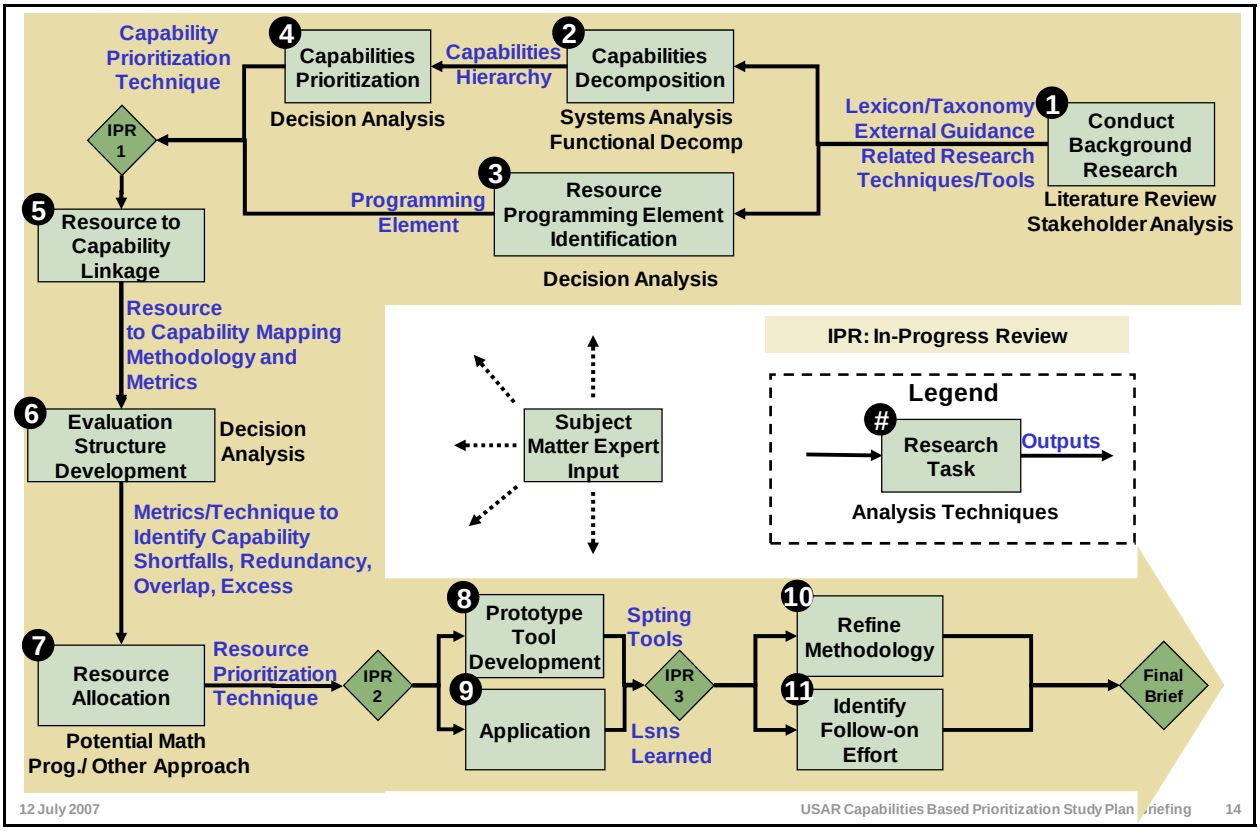

Figure 1. Original Study Methodology.

1.6. Report Content

The remainder of this report is broken into five sections. Section 2 – Background Research, focuses on Study Issue 1 and describes the main components of our problem definition phase, including our literature review and our stakeholder analysis. Section 3 – Methodological Approaches, focuses on Study Issue 2 and describes our identification and evaluation of potential methodological approaches, as well as the resulting recommendation. Section 4 – Proof-of-Principle Application to USAR Incentives, focuses on Study Issues 3 and 4, describing our application of the recommended approach to an accession and retention incentive resource allocation problem. Section 5 – Decision Support Tool Development, focuses on Study Issue 5

and describes the decision support tool that was developed to facilitate the methodological approach. The final section, Section 6 – Conclusions, provides a summary of the key aspects of the study. Appendices are included at the end of the report to provide administrative and detailed information related to the study.

Section 2 – Background Research

Study Issue 1: *What appropriate techniques and tools have been researched and/or developed?*

2.1. Literature Review

We conducted an extensive literature review with two primary goals:

- Develop an understanding of the PPBES, both in terms of how it is supposed to operate and how it actually works in execution.
- Identify potential methodological approaches to solving the problem under study.

This portion of the study primary addressed Study Issue 1, while indirectly supporting Study Issues 2 and 5. This represented a significant effort, because none of the study team members were currently involved in the Planning, Programming, Budgeting, and Execution (PPBE) processes, which are both extensive and complex.

We were able to access key documentation concerning capabilities-based planning, PPBES, the Joint Capabilities Integration and Development System (JCIDS), and other relevant topics from both stakeholders and standard search mechanisms. Appendix B, developed by the US Army Training and Doctrine Command (TRADOC) Analysis Center – Fort Lee (TRAC-LEE), contains an detailed overview of the relevant aspects of, and key terms related to, PPBES and JCIDS, and provided the foundation for our study. It is recommended that readers consult this appendix if they are not familiar with PPBES, JCIDS, and the associated terminology.

In addition to gaining an understanding of the key DoD and Army processes, we also identified relevant methodological approaches and related tools and techniques already developed or considered for DoD, particularly the Army. We will reference those resources later in our discussion of the identification of potential methodological approaches in Section 3.

In order to identify potential approaches to solving the problem developed within academia, industry, and the government (outside of DoD), we leveraged the Library of Congress Federal Research Division (LOC FRD). We asked them to deliver an annotated bibliography and summary review of research findings on strategic planning tools and techniques (software, management practices, etc.), describing their applications, findings, and recommendations. Their efforts directly supported EEAs 1.1 and 1.3. Their final report is included in Appendix C and was an extremely valuable and comprehensive review of the existing literature related to resource allocation.

2.2. Stakeholder Analysis

2.2.1. *Overview*

The stakeholder analysis portion of the effort was led by the TRAC-LEE. They developed and administered surveys (included in Appendix D) and led the interview effort.

The primary purpose of our stakeholder analysis was to identify the processes and tools used for:

- Determining and prioritizing Army capabilities/objectives.
- Linking individual programs to the planning construct.
- Allocating limited resources to programs.

In particular, when conducting our interviews and developing our surveys, we placed particular emphasis on:

- How the process actually works.
- Interface with and integration of the USAR.
- Linkage of programs and program elements to capabilities.
- Metrics used to assess achievement of a capability.
- Program element prioritization at PEG level and higher.
- Allocation of resources to programs.
- Agencies providing input during each stage of the process.
- Tools used to support planning and programming.
- Other key topics of interest.

2.2.2. *Stakeholders Interviewed and Surveyed*

Despite the limited timeframe available, our stakeholder analysis was substantial and insightful. We interviewed and/or surveyed 25 individuals from July – October 2007, from the following organizations:

- USAR PA&E.
- HQDA, G-3 (DAMO-CIR).
- HQDA G-8, PA&E.
- Center for Army Analysis (CAA).
- Installations (II) PEG.
- Sustaining (SS) PEG.
- Manning (MM) PEG.

- Training (TT) PEG.

Unfortunately, we were not able to interview and survey all of stakeholders we had initially identified. In particular, we were unable to interview representatives of the Equipping (EE) PEG; Organizing (OO) PEG; Joint Chiefs of Staff (JCS), J-8; the Army National Guard (ARNG); the Deputy Assistant Secretary of the Army for Budget (DASA-B); and the Assistant Secretary of the Army for Financial Management and Comptroller (ASA[FM&C]). However, the stakeholders we were able to interview and survey provided tremendous insights and pointed us to other resources for additional information. Table 1 shows a summary of those agencies we tried to interview and/or survey, including the number of personnel within each agency successfully contacted.

Table 1. Stakeholders Identified and Surveyed/Interviewed.

Stakeholder Candidates	Interviewed/ Surveyed	Number Interviewed/ Surveyed	Information Exchange Method		
			Interview	Survey	Both
DAMO-CIR	Y	1	X		
TT PEG	Y	1	X		
II PEG	Y	2	X(2)		
EE PEG	N				
SS PEG	Y	1	X		
MM PEG	Y	1	X		
OO PEG	N				
USAR PA&E	Y	12	X (12)	X (6)	X (6)
HQDA G-8 PA&E	Y	5	X (5)	X (1)	X (1)
JCS, J8	N				
CAA (TAA)	Y	2	X (2)		
ARNG	N				
DASA-B	N				
ASA (FM&C)	N				
Totals	**8**	**25**	**25**	**7**	**7**

2.2.3. *Summary Results*

The stakeholder analysis was tremendously valuable for our understanding of how the planning and programming processes (our primary focus) within the PPBES worked. In particular, we gained significant insights into the challenges faced by the various stakeholders within the processes. Responses by survey question can be found in Appendix E and a summary of key stakeholder comments is included in Appendix F. In both cases, the individual names associated with the comments have been removed to ensure non-attribution. This section consolidates those results into general statements concerning planning and programming as it

relates to this study. These are the key results that we subsequently used to draw insights in the next section. It is important to note that these results *are based upon the opinions of the interviewees and survey respondents* and should be read in that context.

Planning

- Action officers reported difficulty in tracking requirements and priorities throughout the series of strategic planning documents.
- The strength of the planning process is its linkage to TAP, particularly the Army Campaign Plan (ACP).

Programming

- Current trends in MDEP consolidation have made prioritizing MDEP more difficult, and made tracking and defending the programs more challenging for action officers.
- Competitiveness of the resourcing process appears counter to achieving the intended purpose of resourcing prioritized programs while achieving force balance.
- Validation and resource recommendation decisions depend significantly upon action officers' abilities to brief and defend their programs.
- Linkage to priorities during validation sessions is not emphasized; all action officers brief their programs as number one priority.
- There does not appear to be a single standard used for prioritizing, a single point of entry for program validation, a single process for decomposing and evaluating requirements, and thus no single process for allocating resources.
- There are several strategies mentioned by SMEs, taken singularly or combined, for obtaining validation and resourcing for individual programs.
- Prioritization is too subjective in practice; should be a more objective, analytically-based process.
- Prioritization is 'reshuffled' at each executive management level from the PEGs to the Secretary of the Army and beyond.

2.2.4. *Insights*

From the summary results, we drew key insights about the process that would drive our subsequent study efforts. The following is a list of those insights.

- The Army needs a consistent and timely method, with supporting tools, to link programs to planning guidance, particularly the ACP.
- The current MDEP structure does not appear to meet the original intent, leading to challenges in managing those MDEP.
- The competitive nature of the resourcing process, instead of a process based upon strategic priorities, as well as personnel turnover, make MDEP management more challenging.

- Action officers have developed various and inconsistent strategies to obtain program funding to fill the void created by an unclear planning and prioritizing environment.
- The Army needs a centralized and objective method to evaluate, prioritize, and fund requirements based upon strategic guidance that is more dependent upon the Army's objectives than upon action officer skills.
- Any proposed solution must be flexible enough to provide solid recommendations within the PPBES operational environment.

The overall results and insights were used to refine our original problem statement into the revised problem statement that underpinned the remainder of the study.

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Section 3 – Methodological Approaches

Study Issue 2: *What are recommended methodological approaches that would facilitate the prioritization of finite resources?*

3.1. Overview

This section describes our approach to Study Issue 2, including our development of requirements; the identification, evaluation, and comparison of recommended methodological approaches; and our resulting recommendation.

3.2. Requirements

Before identifying potential approaches, the study team developed the requirements for alternatives to be feasible solutions to the problem statement. The requirements were based upon our background research, and, in particular, on the insights we gathered from the stakeholder analysis. In order to develop requirements, we identified the primary functions that any alternative approach would have to perform. In some cases, we divided functions into objectives that further refine the intent of the function. For each bottom level function or objective in the hierarchy, we developed the required characteristics of the potential methodological approaches. This qualitative model, shown in Figure 2, would then be used to evaluate the candidate solutions.

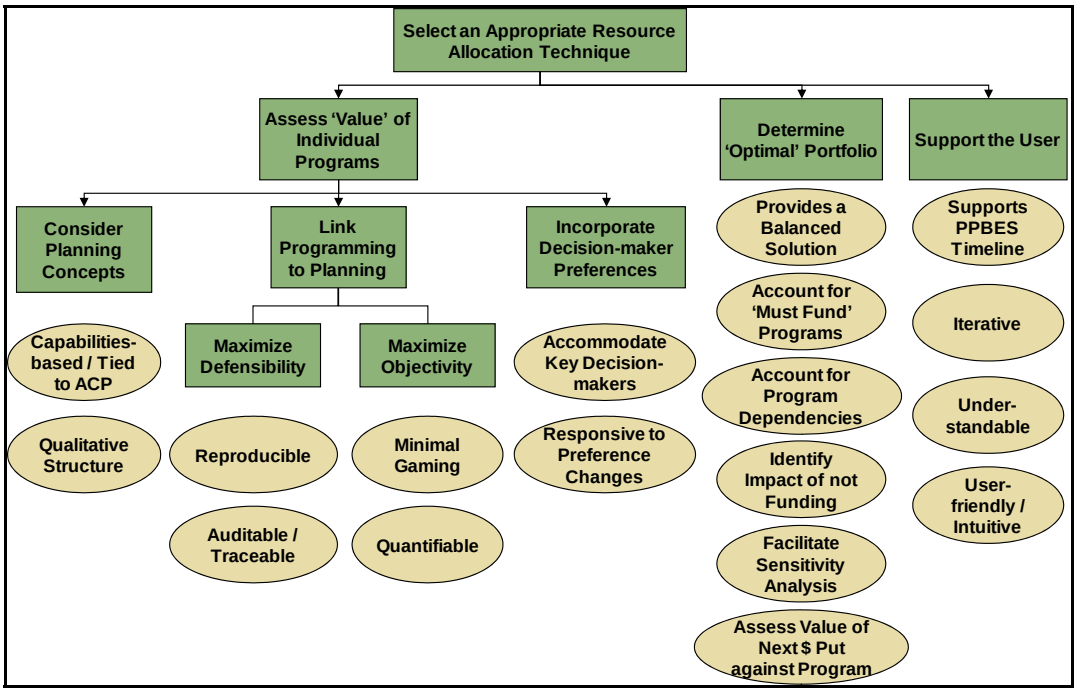

Figure 2. Methodology Evaluation Hierarchy.

As the reader will see later, this approach to developing requirements is similar to that recommended as the overall solution to the problem; however, in this case, we were much less formal and did not develop an underlying mathematical model to compare the approaches. We used this technique in order to capture the main requirements and to organize the information in a hierarchy.

3.3. Identification

3.3.1. *Overview*

Throughout our literature review and stakeholder analyses, we maintained a working list of potential methodological approaches. Some of the most useful references in this regard include the annotated bibliography delivered by the LOC FRD as part of our study; a review and comparison of five potential resource allocation techniques for POM planning by Stokes and Parnell (2002); and Shetzline's (2006) optimization-based approach to programming the Army's Total Obligation Authority (TOA). There were a great number of approaches that we considered; however, many only focused on a particular aspect of the study issue (a subset of the required functions and objectives), not the entire set of requirements. In some cases, the approaches had significant focus on performance evaluation, and were less focused on the linkage of programs to planning and objectives. However, we still examined those techniques in order to extract the components that might be useful as part of another alternative. The following is a list of some of the approaches that we considered.

- Balanced Scorecard.
- Harvard Policy Model.
- Strategic Principles, Strategy Maps, and techniques for communicating strategic planning to managers and employees.
- Scenario Planning.
- Five Forces Model Strategy.
- SWOT (Strengths, Weaknesses, Opportunities, and Threats) Technique.
- Relative Benefit Technique.
- Partial Funding Relative Benefit Technique.
- Multiple Objectives – Additive Value.
- Partial Funding Relative Pain.

- Partial Funding Measure Pain Technique.
- Value Focused Thinking (VFT).
- Systems Design Process (SDP).
- The Army Plan Management Analysis System (TAP-MAS).
- Organization-based Approaches.
- Quality Functional Diagramming (QFD) / House of Quality Approaches.

We then identified the most-promising alternatives from the list above and screened the initial list down to the four primary approaches we would consider in our subsequent analyses. It should be noted that the four alternative approaches discussed below can actually be thought of as categories of approaches. For example, the Value-Focused Thinking approach really considers also the SDP and Multiple Objective – Additive Value approaches, as well as aspects of other approaches.

3.3.2. *Final Alternatives*

The following are the four final alternatives we identified for subsequent evaluation and comparison.

- **Alternative 1 (Improve TAP-MAS Methodology):** Improve the TAP-MAS system to accommodate Army/USAR needs. This approach can also include aspects of QFD, as well as aspects of other approaches in the initial list.
- **Alternative 2 (Value Focused Thinking Approach):** Develop a fundamental objectives hierarchy with associated metrics for mapping program elements to objectives. This approach also includes the SDP and Multiple Objective – Additive Value approaches, as well as aspects of other approaches in the initial list.
- **Alternative 3 (Organization-based Approach):** Alternative that uses organizations (e.g., a brigade combat team [BCT]) as an intermediary to link programming to strategic planning priorities.
- **Alternative 4 (Radical Approach):** A complete redesign of the planning and programming structures from ground up to facilitate logical linkages between the two processes.

In all cases, each alternative recommends a prescriptive approach in that each is a potential method to assign some measure of merit to program elements in terms of the Army's objectives. The particular technique chosen will be capable of integrating with an objective function for an optimization that will determine the optimal portfolio based upon the measure of merit. Each alternative approach is discussed further in the following sections.

3.3.3. *Improvements to the TAP-MAS Methodological Approach*

The Army Plan Management Analysis System (TAP-MAS) is an existing approach developed for the Army by CALIBRE Systems, Inc., and DiStasio Associates, Ltd. Figure 3, from CALIBRE Systems, Inc. and DiStasio Associates, Ltd. (2006), shows a graphical representation of the shortfalls in the current process and how TAP-MAS attempts to address them.

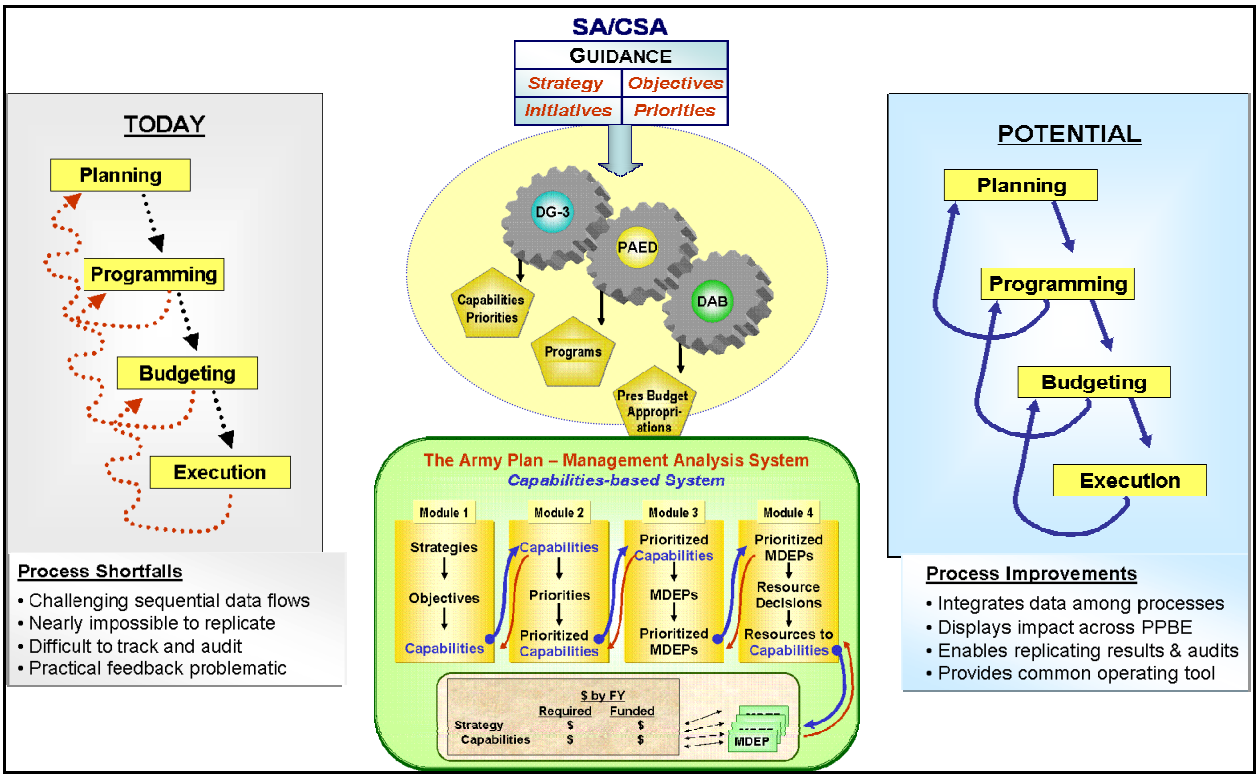

Figure 3. TAP-MAS Overview Representation.

The TAP-MAS tool consists of four modules. In the first module, high-level objectives are decomposed systematically into tasks and then capabilities by the stakeholders. In the second module, the capabilities are prioritized separately by multiple stakeholders by using pre-identified metrics. These first two modules represent the planning portion of PPBES. In the third module, the users then associate individual Management Decision Packages (MDEPs) with one or more capabilities, which results in a prioritized list of MDEPs. Finally, in the fourth module, resource allocation decisions are made and entered into the system, providing the ability to view the allocation of resources by capability, task, or objective. The second two modules represent the programming and budgeting portions of PPBES (CALIBRE Systems, Inc. & DiStasio Associates, Ltd., 2004).

Figure 4 shows a representation of the capability prioritization within the hierarchical structure of TAP-MAS. In order to link tasks to strategic objectives and capabilities to tasks, the system requires the user to assess the contribution of the lower-level concept to the next higher level in relation to four metrics: effect on mission success, effect on casualties and/or equipment and systems, effect on other capabilities, and the probability of use. The metrics themselves are weighted by importance. TAP-MAS then normalizes individual capability scores across all capabilities, based upon the metric scores, which allows the system to generate a prioritized list of capabilities (CALIBRE Systems, Inc. & DiStasio Associates, Ltd., 2004).

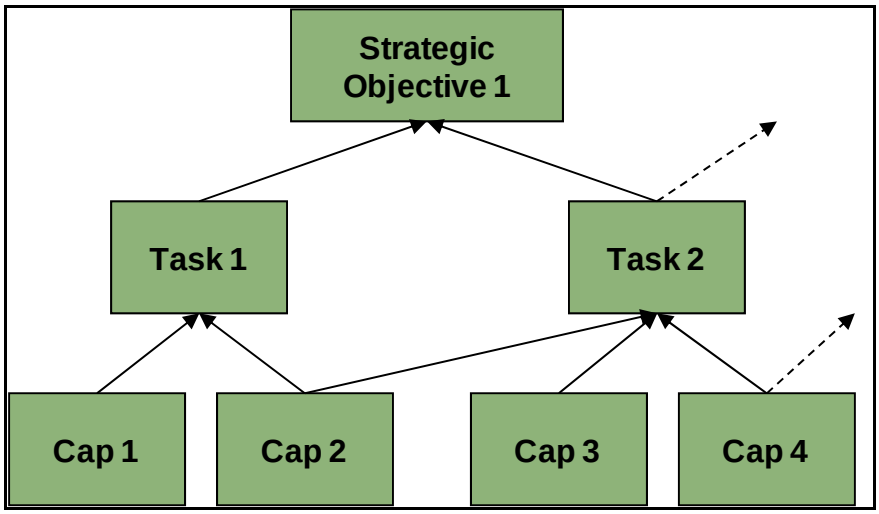

Figure 4. Capability Prioritization in TAP-MAS.

Figure 5 shows a conceptual representation of the method used in the third TAP-MAS module to link MDEPs to capabilities. Each MDEP is linked to capabilities by assigning the percentage contribution of that MDEP to one or more capabilities. The percentages must sum to 100%; therefore, the same portion of funding cannot be assigned to multiple capabilities. The MDEPs can then be prioritized based upon their contributions to the prioritized capabilities. Since each MDEP has an associated level of funding, the resource contribution to each MDEP in the entered resource allocation plan can be used to show roll-ups of resource allocations to capabilities, tasks, and strategic objectives in the fourth module (CALIBRE Systems, Inc. & DiStasio Associates, Ltd., 2004).

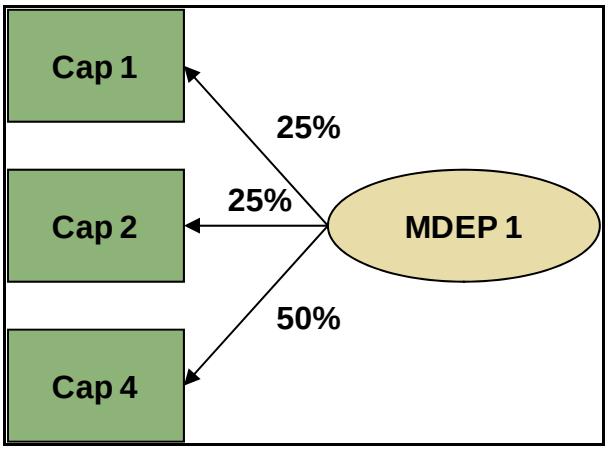

Figure 5. MDEP Mapping in TAP-MAS.

Since TAP-MAS is an existing system, we had the advantage of being able to evaluate the system based, in part, on the input of those who had experience with the system. We identified the following shortcomings in the TAP-MAS system:

- The system is not flexible enough to accommodate changes in Army planning frameworks (e.g., mission areas to strategic objectives). The way the Army thinks about its planning has evolved and continues to evolve over time; therefore, any system must be capable of adapting to these changes. The TAP-MAS structure currently does not support changes in the planning structure.
- There is a mismatch between the level of detail in the strategic planning modules and the MDEPs in the third module. Stakeholders pointed out that the system goes into a great amount of detail in the capabilities via extensive decomposition, but then only goes down to the MDEP on the programming side. Often, as we discovered in our stakeholder analysis, an MDEP may represent multiple programs and address a great number of the capabilities. As a result, it is difficult for the user to link MDEPs to capabilities.
- The system is not currently intended to allocate resources based upon importance or value of the program, which could then result in an optimal portfolio. The system does not suggest a spread of funding over the prioritized MDEPs based upon those priorities. The user must enter funding allocations manually. Thus, the system does not seem to go far enough to help stakeholders decide how to allocate the funding among the available MDEPs.

Based upon the shortcomings noted, we offered recommended changes that we would develop if the sponsor chose the TAP-MAS approach.

- We would reassess the structure and level of detail of the capabilities and program elements (MDEPs) to ensure a commensurate level of decomposition between the planning concepts and program elements.
- We would reconsider the metrics used for prioritizing capabilities to ensure that they represent the most important aspects for evaluating a capability.

- We would reconsider metrics for associating program elements to capabilities, which currently is just a percentage allocation of MDEP contribution to capabilities. Metrics could be used to assess the degree of contribution of the programming element to each capability.
- We would consider adding a more robust sensitivity analysis capability to the software to allow the user to examine easily the impact of uncertainty in the weighting or metric assessment on the results.
- We would consider adding an optimization capability to the system to suggest an 'optimal' spread of resourcing across program elements based upon user entries and potential constraints.

Our assessment of the TAP-MAS approach identified the following strengths and weaknesses of the approach.

- Strengths.
  - Would not require a new planning construct, since it is based upon the current planning structure developed by the G-3.
  - Relatively easy to understand by the user.
  - Captures and integrates stakeholder preferences at any level.
  - Likely to result in techniques and tools that can be implemented for the current POM cycle.
- Weaknesses.
  - Less objective (more subjective) than other alternatives under consideration.
  - May still require adjustments to the Army planning structure in order to minimize capability overlap.

3.3.4. *Value-Focused Thinking Approach*

The second alternative that we identified is based upon Value-Focused Thinking (VFT) and its particular implementation in the Systems Design Process (SDP), developed by the Department of Systems Engineering (DSE) at the United States Military Academy (USMA). Parnell and Driscoll (2006) include a graphical depiction of the SDP, shown here in Figure 6.

The entire process depends heavily upon accurately capturing the input of the right stakeholders. Therefore, the stakeholders must be involved throughout the process. In general, the approach involves the development of a value hierarchy based upon the Army's fundamental strategic objectives. At the highest levels of the hierarchy are the functions, which define what the organization or program under consideration must do to be considered successful by the Army. Under each of the bottom-level functions are objectives that identify the desired direction of attainment for the functions. Then, for each objective, there are value measures that measure

the level of attainment for each bottom-level objective. A notional example of a value hierarchy is shown in Appendix H.

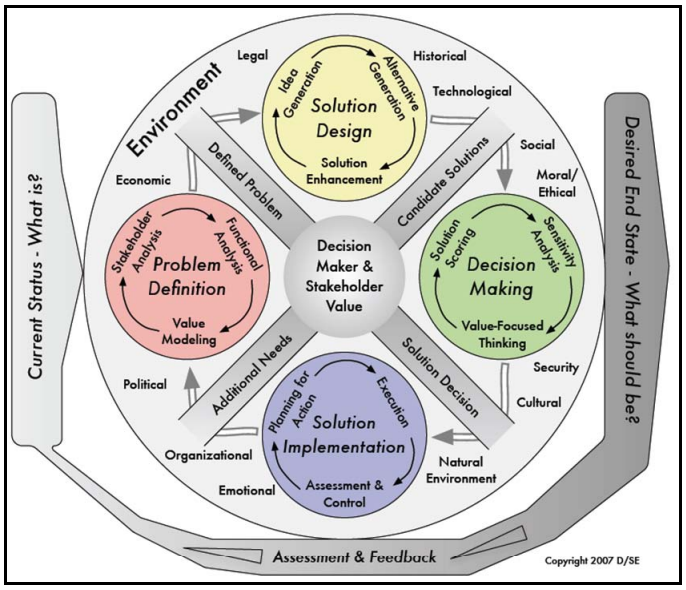

Figure 6. Systems Design Process.

For each of the value measures, a value function is developed that converts the raw performance estimates of each program into a common scale representing value to the organization (i.e., the Army). This ensures that the analyst can make 'apples-to-apples' comparisons between the alternative programs (potentially MDEPs). Each of the value measures are also weighted by both importance and the impact of the variability in the measure responses.

The possible set of alternative programs is then developed and each program is evaluated to determine its performance with respect to each value measure. In addition, cost estimates for each program must be developed.

With the qualitative (value hierarchy) and underlying quantitative (value functions, weights, alternative performance evaluations), each program can then be evaluated and scored with respect to the value model. The value-return 'scores' are then merged with the cost estimates to create the trade space, which the decision maker can then use to determine efficient programs to fund based upon resources available.

In addition to the above, the approach provides the capability to estimate and model uncertainty in the program performance estimates and to analyze the sensitivity of the results due to uncertainty in cost and value return. Furthermore, the outputs of the value model can be used to create an objective function allowing the analyst to develop an 'optimal' portfolio based upon

the model. The analyst can also assess decision risk by: identifying possible future scenarios that might impact the Army; evaluating each program within each scenario using quantitative value model; and examining the results to quantify risk.

We describe a few of the salient aspects of the approach below; however, since we ultimately recommended this alternative, it is discussed in greater detail in Section 4. Also, the reader can find additional information on VFT in Keeney (1992) and the SDP in Parnell, Driscoll, and Henderson (2008).

An example of developing a value measure follows. Consider a value measure in a training venue that we will call "professional development training (PDT)." The measure is a natural numerical scale defined as the number of annual FY training seats for special skills training (e.g., Ranger, Airborne, Graduate Flight Training) and language training, with a minimum value of 0 and a maximum value of 45,000. The following equation represents the calculation of the value measure:

$$PDT = \sum_{i=1}^{n} x_i$$

where i is the index for the specific type of training, n is the total types of training, and x_i is the number of seats available in training i. Figure 7, then, shows the value function that converts the raw measurement calculated above to a common value scale between 0 and 100. Note that the curve is convex, indicating increasing returns to scale. Thus, gains in number of seats have greater returns toward the higher part of the scale.

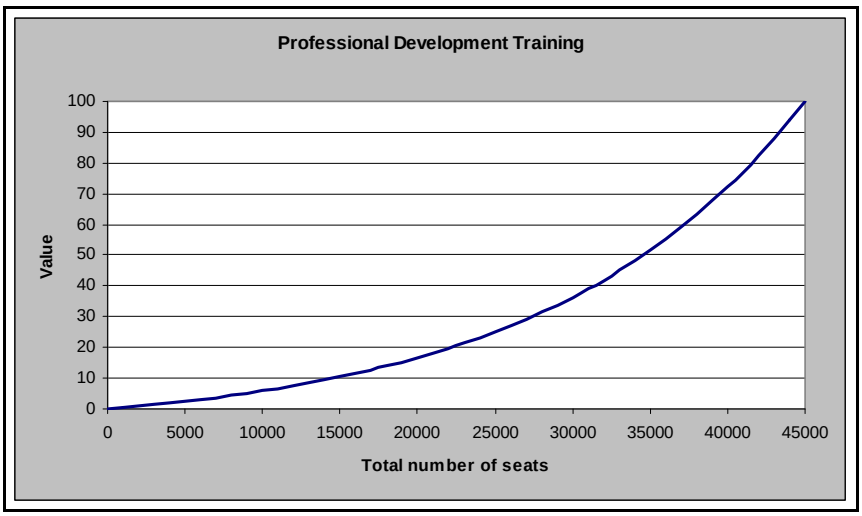

Figure 7. Notional Value Function.

Table 2 shows existing MDEPs which may contribute to the measure. The reader should note, however, that if value measures are developed for the entire Army program, they are unlikely to be as specific as in this example. Otherwise, the number of value measures would be impractical. The development of measures depends upon what expected of that which is being compared. For the POM, value measures designed to assess all Army programs should be developed in such a way that they apply to all, or most, programs under consideration. The example provided here is merely to familiarize the reader with the concept of developing measures in this approach.

Table 2. Potential Contributing MDEPs for the Notional Example.

MDEP	Title
TWOJ	Warrant Officer Candidate Course
TAGP	Graduate Pilot Training
TDLP	Defense Language Programs
TFNC	Special Skills Training
TAIG	Inspector General Training
FAJS	Continuing Legal Education and JAG School Activities

Our assessment of the VFT approach identified the following strengths and weaknesses.

- Strengths.
  - The technique is more objective than other alternatives under consideration; is data driven; and is easier to explain.
  - Accounts for returns to scale, recognizing that each additional increment of performance may not have the same value to the Army.
  - Possesses an additive structure; easy to translate into mathematical programming.
  - Likely to result in techniques and tools usable for this POM cycle, assuming stakeholder participation.
- Weaknesses.
  - Deviates conceptually from capabilities-based planning, the currently accepted approach.
  - Does not use the current G-3 planning framework, although it may be derived from, and mapped to, it. However, Figure 8, taken directly from HQDA's ACP (2007), demonstrates that the Army is already planning from an objectives approach.
  - Requires a significant initial level of effort and stakeholder involvement to ensure that all values are captured.
  - May be data intensive, depending upon the value measures developed.

- Requires expert facilitators to develop the hierarchy and metrics; should not be executed by personnel with little experience in VFT.
- Must have stakeholder participation and buy-in in order to make this effort succeed.

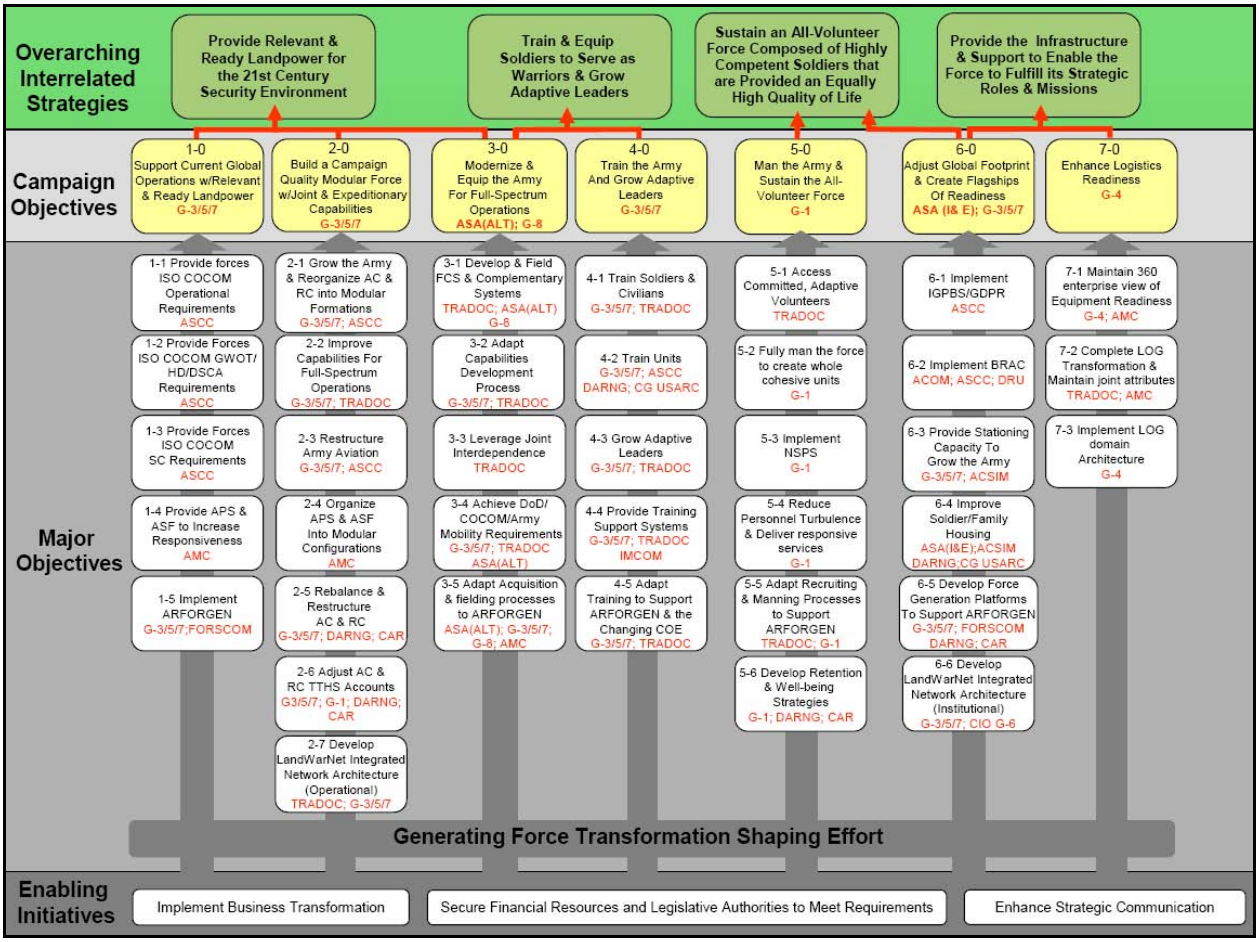

Figure 8. Army Campaign Plan Objectives.

3.3.5. *Organization-based Approach*

The third alternative we identified is an approach that focuses on units as the primary capability providers for the Army. This alternative has been considered by the Army, although it has never been fully implemented. In this concept, units or organizations (e.g., Brigade Combat Teams), are mapped directly to capabilities, instead of mapping programming elements (e.g., MDEPs, Army Program Elements [APEs]) to capabilities. One advantage of this approach is that units/organizations are mutually exclusive, whereas capabilities are not. Hence, many programming elements (e.g., operational tempo [OPTEMPO], personnel compensation, and equipment funds) can be mapped easily to the units they support. Installations can be viewed as supporting their operational tenant units. Since installations are also mutually-exclusive, the

mapping of programming elements to those installations, and subsequently to units, is relatively straight-forward. There are, however, installations, units, and other resources that do not directly support operational units. Techniques and 'business rules' must be established to accommodate those. One potential construct is a mapping based upon the Army's Life Cycle Model. In this construct, equipment and human resources not directly attributable to units or installations are mapped to their lifecycle, in recognition of the fact that such equipment and personnel provide critical support indirectly to the operational Army. A special interest category may also be required for those resources not directly linked to the previous four categories. Hoyt, Charbonneau, and Saffin (2005) identify one potential set of categories into which each programming element should fall might be:

- Units/organizations.
- Installations.
- Equipment lifecycle resources.
- Personnel lifecycle resources.
- Special interest.

This same construct can also be grouped based upon the 2001 QDR OSD risk management framework consisting of four risk quadrants, shown in Table 3. Any programming element that can be placed into more than one category is sub-divided to ensure a mutually-exclusive allocation to category.

Table 3. Organization-based Approach Mapped to 2001 QDR OSD Risk Management Framework.

Operational Risk	**Institutional Risk**
Operational units Installations	Statutory Headquarters Executive agent Other
Force Management Risk	**Future Challenges Risk**
Human resource lifecycle	Equipment lifecycle

Hoyt, et. Al. (2005) make the case that programming elements can be mapped to the ACP (e.g., by Unit Identification Code [UIC], human resource lifecycle, equipment lifecycle). As a result, POM resource allocation decisions can be made in light of achieving the ACP timelines and objectives, and can be optimization driven. Resources not mapped to the operational Army are potential first-responders to bill payer requirements in other areas. Such an approach makes it easier for the Army to quantify impacts of funding changes on the operational Army.

Our assessment of the organization-based approach identified the following strengths and weaknesses.

- Strengths.
  - Directly maps to the ACP, which is identified as a critical requirement by some stakeholders.
  - Provides an assessment of the ACP's feasibility in terms of its standards, force structure, and timeline.
  - Combines programs into coherent and comparable capability providers – BCTs.
- Weaknesses.
  - Harder problem conceptually to develop:
    - Requires an extensive set of 'business rules' to define relationships between program elements and organizations.
    - Determining value of an organization versus equipment and human resource lifecycles, or even versus other organizations, is non-trivial.
    - Challenging to identify what level of resourcing is critical to the organization's capabilities versus what is desired.
  - Study deliverables more likely to be conceptual, rather than implementable tools and techniques for this POM cycle; likely to require follow-on efforts.
  - In the long run, may be difficult to adapt the developed structure to likely shifts in systems or organizational structures.

3.3.6. *Radical Approach*

The final alternative that we developed involves a radical approach to redeveloping the Army planning and programming structures as they relate to the PPBES. It would require the redefinition and decomposition of Army capabilities from strategic guidance documents, as well as the restructuring of Army programming elements into more suitable capabilities-based packages (rather than the current MDEP structure). Such an approach may suggest restructuring of the PEGs as well. It would have to be developed in such a way as to remain flexible enough to adapt to future changes in Army capabilities-based planning concepts.

The idea behind this alternative is derived from general stakeholder input and the impetus behind the study proposal itself. The current planning and programming constructs are not aligned well, making it difficult to allocate resources and justify resource allocation in terms of capabilities. Thus, we identified this alternative to consider a means of directly realigning those processes, instead of developing methodological approaches to bridge the gap artificially. This

alternative is not clearly-defined as the other three were. It would require a more-directed study to rebuild aspects of PPBES from the ground up.

Our assessment of the radical approach identified the following strengths and weaknesses.

- Strengths.
  - Would directly align programming with Army strategy and planning.
  - Would simplify prioritization of programs.
  - Would allow for the development of a more ideal programming process in the long run.
  - Would ultimately result in a process that is more transparent (potentially both a strength and a weakness).
- Weaknesses.
  - A conceptual effort that would not be implementable in the near term; would require significant follow-on efforts.
  - Likely to face significant, if not insurmountable, resistance.
  - Would require the strongest leadership and highest-level leader support to succeed.

3.4. Evaluation and Comparison

After identifying the four potential alternatives that we would carry forward in the study, we then screened the alternatives based upon their feasibility in terms of risk. We considered two primary categories of risk: schedule and deliverable risk, which assessed the likelihood that the approach could be implemented within our existing study time and resource limitations; and solution acceptance risk, which assessed the likelihood that the solution would be accepted by users and receive the support of key stakeholders. For each of the two categories, risk was assessed using a scale from low to high. We decided that, in order to meet our study objectives, any alternative with a rating of high in either category of risk would be eliminated from further consideration. Table 4 shows the overall results of our feasibility screening. Given our time and resource limitations, as well as the high risk to solution acceptance, we considered the Radical Approach alternative to be infeasible; however, we still feel that this may be an approach that the Army should consider in the long run.

Table 4. Feasibility Screening Matrix for Risk.

Criteria	Improve TAP-MAS Methodology	Value Focused Thinking Approach	Organization-based Approach	Radical Approach
Schedule and Deliverable Risk Likelihood that the approach can be implemented within time and resource constraints.	Low	Low	Medium - High	High
Solution Acceptance Risk Likelihood that the solution will be accepted by users and receive the support of key stakeholders.	Low	Medium	Medium	High
Feasibility Assessment	**Feasible**	**Feasible**	**Feasible**	**Infeasible**

With our remaining set of three feasible alternatives, we subjectively evaluated each of the alternatives against the requirements identified earlier and shown previously in Figure 2. For each characteristic, we evaluated each alternative as a green (G), amber (A), or red (R), with green being the best possible assessment. In some cases, we were not able to assess an alternative with a single rating. For those, we identified the border between ratings into which the alternative fell (e.g., "A/G" represents a value somewhere between amber and green).

The resulting performance evaluation for each alternative and each characteristic is shown in Table 5. Unlike the VFT approach (one of our remaining alternatives), we did not develop an underlying quantitative model to support our assessment. Thus, the alternatives did not receive overall scores or ratings (green, amber, or red) for comparative purposes. Additionally, we did not weight the characteristics according to importance. Our final comparison was a subjective ranking based upon our background research and understanding of the alternatives. In the end, we ranked the VFT Approach alternative as having the best overall performance in terms of the required characteristics, with the Improve TAP-MAS Methodology and Organization-based Approach alternatives being second and third respectively.

Table 5. Subjective Assessment of Alternative Methodology Performance.

Characteristics		Improve TAP-MAS Methodology	Value Focused Thinking Approach	Organization-based Approach
Consider Planning Concepts	Capabilities-based/Tied to the ACP	G	A/G	G
	Qualitative structure	G	G	A
Link Programming to Planning	Reproducible	G	G	G
	Auditable/traceable	A	G	A
	Minimal gaming	A	G	A/G
	Quantifiable	A	G	A
Incorporate Decision-maker Preferences	Accommodate key stakeholders	G	A/G	G
	Responsive to preference changes	G	G	A/G
Determine Optimal Portfolio	Provides balanced solution	A/G	A/G	G
	Accounts for 'Must Fund' programs	G	G	G
	Accounts for program dependencies	G	G	G
	Identify impact of not funding	G	G	G
	Facilitates sensitivity analysis	A	G	A
	Assess value of next $	A	G	A/G
Support the User	Supports PPBES timeline	G	A/G	A/G
	Iterative	G	G	G
	Understandable	G	G	A/G
	User-friendly/Intuitive	G	A	A

3.5. Recommendation

Once we had evaluated and compared the alternative methodological approaches, we formulated our recommendations and presented our results to the study sponsor in December, 2007. We felt that it was important to present the results in terms of risk, as summarized previously in Table 4, and solution performance, as summarized previously in Table 5. We presented the sponsor with a trade space, shown in Table 6, within which the sponsor could choose an alternative based upon their willingness to accept additional risk for additional performance. The reader should note that the Organization-based Approach was dominated by the other two alternatives, because it assumed higher risk and had a lower potential performance than both of the other alternatives.

Table 6. Decision Trade Space Based upon Risk and Solution Performance.

Overall Criteria	Improve TAP-MAS Methodology	Value Focused Thinking Approach	Organization-based Approach
Solution Performance	2nd Best	Best	3rd Best
Risk	Best	2nd Best	3rd Best

After presenting our results, we recommended that the sponsor consider the tradeoffs and provide guidance for the path forward based upon their preferences, requesting additional information as necessary. We also recommended that the sponsor identify a target application group (e.g., USAR, PEG, DAMO-CIR) and obtain their agreement to participate in the application of the chosen methodological approach to their domain for the current POM cycle.

3.6. Subsequent Decision

The study sponsor received our recommendations and pursued the feasibility of applying one of the approaches to the POM cycle. Unfortunately, their discussions with the applicable Army staff organizations revealed that it was already too late in the current FY10-15 POM cycle to implement a new approach. As a result, in January, 2008, the study sponsor recommended that we modify our original study plan to focus on a demonstration of one of the approaches to a smaller resource allocation problem that would benefit the USAR.

Since our original study plan involved the application of our recommended methodology to the POM process, we had to modify the plan, as well as the study issues, to accommodate the new guidance. After conducting some additional background research to identify a potential USAR problem area that would benefit from such an approach, we recommended, in February, 2008, that we conduct a proof-of-principle application of the value-focused thinking approach to the evaluation and comparison of potential USAR accession and retention incentives from a programmatic perspective. We chose the VFT approach because we had evaluated it as the best alternative from a solution performance perspective. Also, the VFT approach could be applied directly to the incentives problem, whereas the Improve TAP-MAS Methodology alternative would have to be significantly modified in order to apply to a more narrowly-scoped problem. The ultimate goal of this proof-of-principle application was to assess the value of the methodology for solving the overall Army resource allocation problem. The study sponsor approved our plan.

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Section 4 – Proof-of-Principle Application to USAR Incentives

4.1. Overview

As discussed in the previous section, the next phase of the study involved a proof-of-principle application of the value-focused thinking approach to the evaluation and comparison of potential USAR accession and retention incentives from a programmatic perspective. The ultimate goal of this proof-of-principle application was to assess the value of the methodology for solving the overall Army resource allocation problem. We identified two main components of the proof-of-principle – cost estimation and value system design – which translated directly into our two new study issues and associated EEAs.

The cost estimation component would estimate the costs of each of the USAR accession and retention incentives under consideration, which would involve the collection of incentive-related data; consideration of a six-year planning (POM) horizon; and the development of cost estimation methodologies and resulting cost estimates. The value system design component would involve the development of the qualitative and quantitative value models of the USAR accession and retention incentive decision context by capturing the values of the primary stakeholders; developing value measures to assess the achievement of the objectives; and creating the underlying mathematical structure. We would then extrapolate the results of the proof-of-principle to the larger POM planning process and develop a supporting prototype decision support tool (discussed further in Section 5).

The reader should note that the primary focus of the study remained on the utility of the value-focused thinking approach for resource allocation decisions supporting the POM. While the actual proof-of-principle application to USAR incentive programs would provide additional value to the USAR, it was not focus of the study. As noted in the study limitations at the beginning of this report, we had a very limited timeframe within which to conduct the proof-of-principle; thus, additional effort would be required to refine its products before implementation.

4.2. Supported Studies

When the sponsor informed us of the change in study direction, we pursued an application area that would provide value to the USAR while demonstrating the usefulness of the VFT approach. We found such an application area via our sister organization at TRAC-LEE. TRAC-LEE had two recent studies relating to accession and retention incentives. The first study

was entitled the Army Reserve Accession and Retention Analysis (ARARA) study, which had been recently completed. It examined potential Army Reserve accession and retention incentives for first-term enlisted Soldiers and company-grade officers. As part of that study, TRAC-LEE sent out and received back over 25,000 surveys and interviewed over 200 Soldiers, in order to determine which incentives (both existing and new) might have the greatest impact on Soldier accession and retention. The purpose of the second study, entitled the Army Reserve Educational Assistance (AR EA) study, is to determine the best allocation of Educational Assistance (EA) funds to increase the Army Reserve (AR) end strength. That study is examining both current and potential future EA programs, and, as of the writing of this report, is still underway.

4.3. Cost Estimation

Study Issue 3: *What are the costs associated with the potential retention and accession incentive initiatives?*

4.3.1. *Overview*

Our first step in the cost estimation phase of the proof-of-principle was to identify the alternatives that we would consider for the purpose of cost estimates. In the surveys administered by the ARARA study team, the respondents were queried as to the desirability of 26 potential incentives. In addition, the ARARA study team recommended in their final briefing another incentive, Thrift Savings Plan (TSP) matching funds, which had not been included in the survey. That led us to a starting list of 27 incentives. However, given the study limitations, we were not able to develop cost estimates for all 27 incentives. Additionally, some of the alternatives did not have the necessary elements to allow us to develop estimates. We conducted a screening process to narrow down the original list of incentives to a smaller subset that we would consider further. EA programs considered in the TRAC-LEE AR EA study that were not part of the ARARA study were not included. In all of those cases, the EA programs applied to all Soldiers as education benefits, not necessarily directed incentives for accession and retention of Soldier sub-groups. Examples include the Tuition Assistance and Montgomery GI Bill (MGIB) programs. For a detailed discussion of the cost estimation effort, see Skaggs (2008). We will only provide a summary overview with selected examples here.

We conducted a sequential screening process based upon four criteria, during which each incentive was assessed against each criterion in order. If an incentive failed to satisfy a criterion,

it was not considered further in the screening process and was eliminated from further consideration in the proof-of-principle. The summary of this screening process is shown in the table in Appendix F. The four screening criteria are described below:

- The incentive must have been among the top ten incentives selected by at least one of the six surveyed demographic groupings. The particular ranking of each incentive within the demographic grouping is included in the table in Appendix F.
  - Enlisted Soldiers from the Army Reserve (AR).
  - Enlisted Soldiers from the National Guard (NG).
  - Enlisted Soldiers from the Active Component (AC).
  - Officers from the Army Reserve (AR).
  - Officers from the National Guard (NG).
  - Officers from the Active Component (AC).
- The incentive must be defined sufficiently to develop a cost estimate. For example, "More training" is an ambiguous incentive that could include a variety of potential solutions, making it difficult, if not impossible, to estimate costs without a detailed development of the incentive (such detailed development was not part of the ARARA study).
- The incentive must be likely to be considered a major cost element in the POM planning process. For example, "Being given 4 or more years advance notice of eligibility to deploy" would not be an incentive that would be programmed directly into the POM, but would likely be a policy change that might have indirect cost implications, but not direct cost elements programmed into the POM.
- The incentive must be specific to the USAR, and thus within its decision context. For example, "Increased basic pay," while one of the most chosen incentives by the survey respondents, would require a change to basic pay across the Army, not just in the USAR.

4.3.2. *Incentives Considered*

The following is the final list of seven incentives considered for cost estimation purposes.

- Lump sum bonuses.
- Paid TRICARE premiums for the Soldiers and their families.
- Reduction in the retirement age of 60 by one year for every two years served in the Reserve component past 20.
- One year of graduate school in school and degree of choice.
- Ability to transfer MGIB entitlements to a dependent.
- Student loan repayment.
- Thrift Savings Plan (TSP) matching funds.

4.3.3. *Data Collection*

The data collection associated with this effort was significant. Many of the incentives considered had not been previously offered within DoD, or had recently been implemented as pilot programs. Therefore, data concerning costs were not readily available. Additionally, in order to develop cost estimates, we required a significant amount of detailed demographic data associated with the USAR. As a result, given our time and resource limitations, we were not able to obtain all of the data we required.

Our data collection effort consisted of two primary steps. We first developed our requirements for the particular data elements necessary to develop our cost models. We then identified the appropriate sources of the data and submitted our requirements. The primary sources of data were TRAC-LEE, the United States Army Reserve Command (USARC) G-1, and the Defense Manpower Data Center in Monterey, CA. We were also able to gather smaller subsets of data from other sources as well.

4.3.4. *Cost Methodology and Estimate Development*

In order to develop our cost estimates, we constructed cost models for each of the incentives under consideration and integrated the available data with the cost models to develop lifecycle cost estimates for the six-year POM horizon. Our cost estimates were specific to the assumptions and target populations of the problem, and would therefore have to be extended to apply to other target populations. As part of this process, we created a spreadsheet containing our methodologies and data, which can be updated based upon new data or assumptions. We delivered that spreadsheet to the sponsor as one of our deliverables. For more information about our resulting methodologies and estimates, see Skaggs (2008).

Example

This section contains an example of the cost estimation methodology developed for the TSP matching funds incentive. We used the rules and conditions associated with the government civilian TSP matching funds program to define the incentive. We were also able to obtain their participation rates in order to estimate the variable participation rates expected from the target population throughout the life of the program. Additionally, we accounted for the fact that Soldiers in the USAR are only paid for the days of the year during which they actively participate in training or operations, which is a unique feature of the USAR compared to the

Active Component. The following equation represents the calculation of the lifecycle cost estimate for the six-year POM horizon.

$$Cost = \sum_{year,rank} \left(Elig_{year,rank}\right) * \left(Pay_{year,rank,YOS}\right) * \left(1 + Inflate^{(year-FY08)}\right) * \left(PayDays\right) * \left(0.01 + PRate * 0.04\right)$$

The following list describes each of the indices and variables in the equation:

- *year*: Fiscal Years 2010 through 2015.
- *rank*: Pay grade or military rank.
- *YOS*: Years of service.
- $Elig_{year,rank}$: End strength personnel eligible for retention incentive by year and rank.
- $Pay_{year,rank,YOS}$: 2008 military pay scale according to year, rank and YOS.
- $Inflate^{(year-FY08)}$: The annual inflation rate of .033. FY08 is the base year, so, for instance, (FY14 – FY 08) = 6.
- *PayDays*: Average days paid per year based on the Army Force Generation Model (ARFORGEN) five-year cycle.
  - (38+76+121+174+360)/5 = 154 day/year
  - Basic pay is based upon a 30-day-per-month scale.
- *Prate*: Participation rate based on government civilian historical rates.

4.4. Value System Design

Study Issue 4: *How can the recommended methodological approach be applied to prioritize potential Army Reserve retention and accession incentive initiatives?*

4.4.1. *Overview*

We will not describe the VFT Approach again here, but will describe the application of it to the USAR accession and retention incentive problem as part of the proof-of-principle application. Overall, the process involved interviewing key stakeholders; developing the qualitative value model (functions, objectives, and value measures) based upon the interviews; developing the underlying quantitative value model by extrapolating the opinions expressed during the interviews; and creating a spreadsheet with the value model to facilitate portfolio analyses. The resulting spreadsheet fully encapsulated the value system design and was a deliverable to the sponsor. The reader should note again that the model was developed under significant time and resource limitations, and was thus based upon the information we were able to obtain. Nonetheless, it serves as a significant initial effort that can easily be modified by the

sponsor for incentives-related problems. More than that, it demonstrates the usefulness of the VFT approach for solving resource allocation problems.

4.4.2. *Stakeholder Interviews*

The first and most important step in the value system design process involved the gathering of stakeholder input. Dr. Patrick Driscoll, from the United States Military Academy (USMA) Department of Systems Engineering (DSE), led the value system design effort and conducted the interviews. He interviewed five personnel from USARC G-1 in April, 2008. The purpose was to develop a value model for assessing the value return of alternative portfolio configurations for the USAR incentive program. He was able to gain tremendous insight into the objectives of the USAR incentive program and some of the key incentive implementation issues facing USARC G-1.

4.4.3. *Incentives Value Hierarchy*

Based upon the stakeholder interviews, Dr. Driscoll was able to develop a value hierarchy containing functions, objectives, and value measures. That hierarchy is shown in Appendix H.

4.4.4. *Measure Development*

Key to the quantitative value model is the development of value measures that, collectively, serve as a measure of the value return to the organization (i.e., USAR). They are the 'thermometer' that is stuck into the program to estimate its value return to the organization. Table 7 shows the value measures, and their description, developed for the proof-of-principle. Note that the measures are well-defined with an appropriate scale for measurement.

Table 7. Value Measures Developed in Support of the Incentives Proof-of-Principle.

Value Measure	Definition
Number of violations	The number of reported regulatory violations related to the implementation of incentives.
% of ENL contracts in target populations	Percentage of signed enlistment contracts representing marketing or recruiting target populations (e.g., scholars, minorities, skilled professionals, etc.).
% fill against ENL critical requirements	Percentage of signed enlistment contracts that represent a successful fill of USAR identified critical manning requirements (including training).
% of honorable ENL contract completions	Percentage of enlisted contracts that have completed their term of obligation with honorable service.

Value Measure	Definition
% of OFF contracts in target populations	Percentage of signed officer contracts representing marketing or recruiting target populations (e.g., scholars, minorities, skilled professionals, etc.).
% fill against OFF critical requirements	Percentage of signed officer contracts that represent a successful fill of USAR identified critical manning requirements.
% of OFF contract completions	Percentage of officer contracts that have completed their term of obligation with honorable service.
% of first term re-ups	Percentage of first contract personnel (officer & enlisted, NPS and prior service) that have extended their service commitment.
% of career retirements by cohort	Percentage of any fiscal year's contracts that complete service eligible for retirement benefits.
Number of shipping vacancies	The number of unfilled positions that remain so at unit deployment.
USAR accepted versus Joint offered ratio	Percentage of potential service enlistees who, after considering USAR and other service opportunities, sign contracts for USAR.
Number of NG or civilian 'better' incentives	The number of existing (or proposed and advertised) NG or civilian incentives that cannot be matched or bested in kind by USAR.
Dollars spent needlessly (thousands)	The number of incentives dollars that are distributed to individuals who did not require dollar incentives to commit to USAR service.
Number of future change compromises	The number of incentive program changes that become recruiter or public knowledge prior to official release.
Number of potential gaming opportunities	The number of opportunities that either a recruiter or potential enlistee has to 'game' the system for unfair personal credit or gain.

In addition, we used a swing weighting technique to weight each of the value measures based upon its level of importance to the decision maker and the impact of variation in the measure range. In this technique, shown in Table 8, the value measure that is most important and has the highest impact due to range variation is given an un-normalized weight of 100 points. Each of the remaining value measures is placed into the matrix and assigned a swing weight (Swt) between 0 and 100. The swing weights should decrease from left to right and from top to bottom in the matrix. Once all of the value measures are assigned swing weights, they are normalized in the matrix such that the sum of their weights equals 1. The resulting weights (Mwt) represent the relative importance of the measure within the value hierarchy when

comparing potential incentive packages. There are a number of other weighting techniques that can be used for this purpose; however, this is the technique recommended as part of the SDP.

Table 8. Value Measure Weighting Matrix Developed for the Incentives Proof-of-Principle.

		Level of importance of the value measure								
		Mission Critical	**Swt**	**Mwt**	**Mission Effectiveness**	**Swt**	**Mwt**	**Mission Factor**	**Swt**	**Mwt**
Variation in measure range	**High**	% fill against ENL critical requirements	100	0.142	% of OFF contract completions	70	0.099	% of first term re-ups	30	0.043
		% fill against OFF critical requirements	95	0.135	% of honorable ENL contract completions	65	0.092	Dollars spent needlessly (thousands)	10	0.014
		Number of shipping vacancies	80	0.113						
	Medium	% of OFF contracts in target populations	55	0.078	% of ENL contracts in target populations	45	0.064	Number of future change compromises	5	0.007
					% of career retirements by cohort	30	0.043			
	Low	USAR accepted versus Joint offered ratio	50	0.071	Number of violations per month	15	0.021			
		Number of NG or civilian 'better' incentives	45	0.064	Number of potential gaming opportunities	10	0.014			

In addition to weighting the value measures, we developed value functions to convert the raw performance of each incentive option into a common scale of value returned to the USAR. Figure 9 shows an example of the value function developed for the “percentage of signed officer contracts representing marketing or recruiting target populations (e.g., scholars, minorities, skilled professionals, etc.)” measure, which can range in raw performance from 0 -100%. Note that the value function is convex, indicating increasing returns to scale. Thus, gains in percentage have greater returns toward the higher part of the scale.

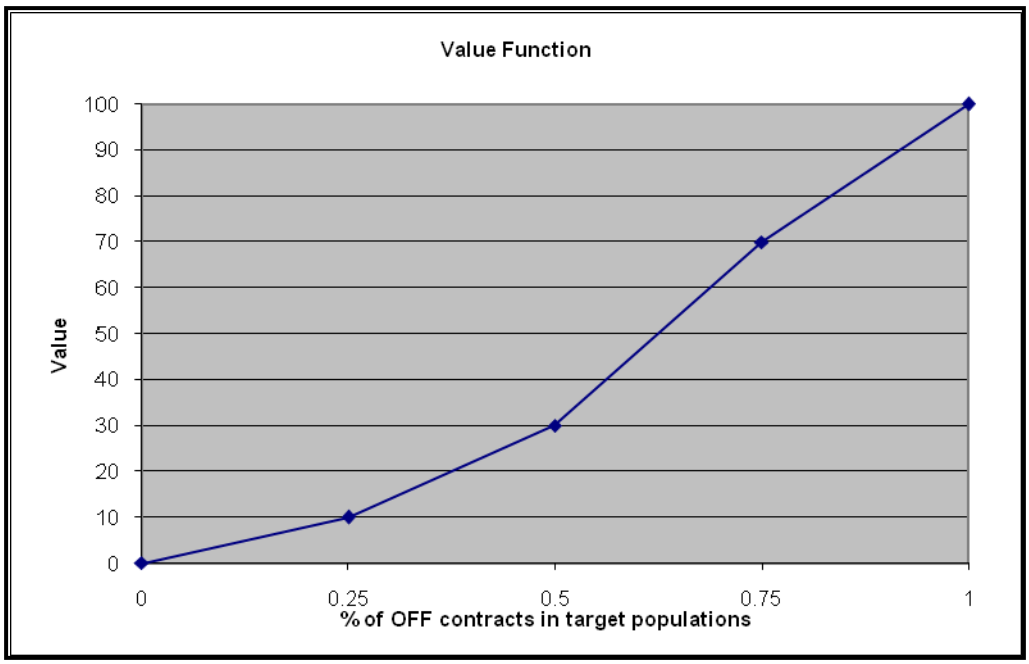
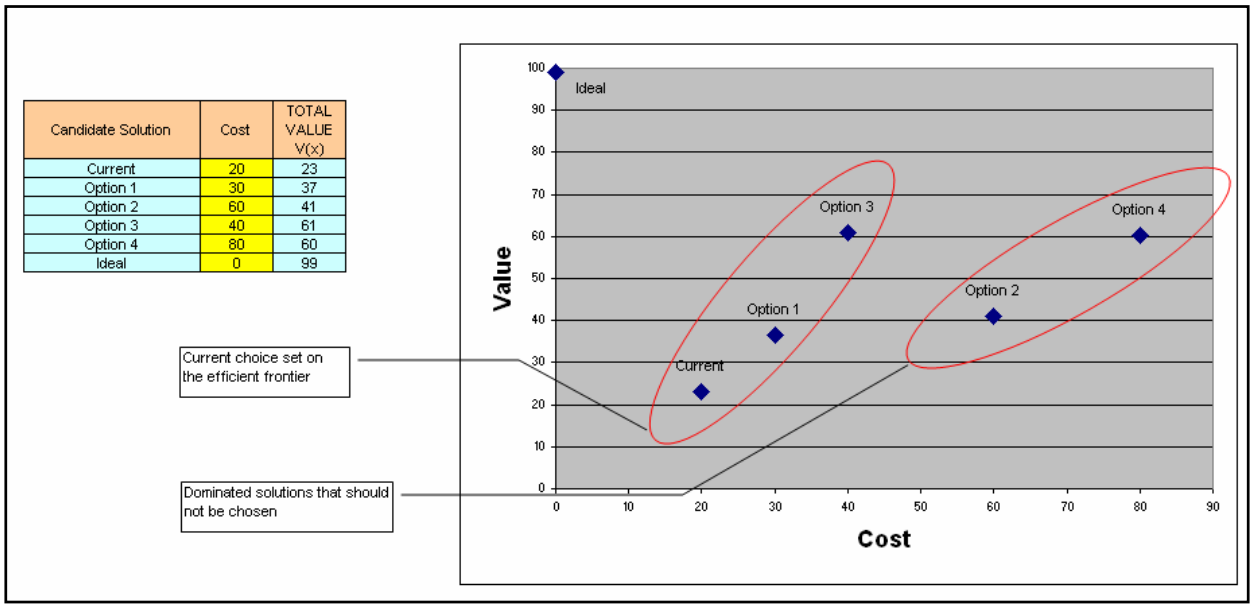


Figure 9. Value Function for the '% of OFF Contracts in Target Populations' Value Measure.

4.4.5. *Decision Trade Space for Alternatives*

Once each of the alternatives is evaluated against each of the value measures, the results can be viewed. One such view is a column chart comparing the total value scores of each of the alternatives. Such a chart is not shown here, but is discussed in the next section's overview of the decision support tool. Another way to view the results is a deterministic decision trade space for the alternatives, shown in Figure 10.



Candidate Solution	Cost	TOTAL VALUE V(x)
Current	20	23
Option 1	30	37
Option 2	60	41
Option 3	40	61
Option 4	80	60
Ideal	0	99

Figure 10. Example Deterministic Decision Trade Space for Alternatives.

This chart shows a scatter plot of the alternative total value scores versus their cost. Note that all of the data used to develop this chart is notional. The proof-of-principle did not involve an actual evaluation and comparison of potential USAR accession and retention incentives, because the data for the set of value measures was not available. In this example, Options 2 and 4 cost more and provide less value than at least one other alternative. As a result, these alternatives are dominated and need not be considered further by the decision maker. The remaining alternatives represent the current set of choices on the efficient frontier. The decision maker must then decide whether he or she is willing to trade-off additional cost for additional value. This example shows a deterministic trade space; however, the approach can facilitate the examination of an uncertain, or stochastic, trade space by modeling uncertainty in the alternative performance within the value measures. In fact, the spreadsheet we developed for this proof-of-principle included such capability.

4.5. Extrapolation to the POM Prioritization

Study Issue 2: *What are recommended methodological approaches that would facilitate the prioritization of finite resources?*

While the VFT approach was applied in the proof-of-principle to a much narrower decision context than the POM resource allocation context, we believe that the application highlights its value for the larger context.

4.5.1. *Advantages*

Based upon our background research, methodology comparison, and proof-of-principle application, we believe that the VFT approach has many key advantages that make it a viable solution to the POM resource allocation problem. The following is a summary of those advantages.

- Provides a methodology that allocates resources based upon the value returned by the program.
- Evaluates each program as an entity to determine how it fairs against other programs in terms of its value to the organization.
- Identifies what is expected of a program to make it successful to the organization.
- Possesses the key required characteristics.
  - Qualifiable – resulting value hierarchy is a comprehensive description of the decision context.

- Quantifiable – underlying quantitative value model is mathematically-based and accounts for uncertainty.
- Auditable – resulting 1-to-N list of programs can be traced back through the process all the way to stakeholder input.
- Reproducible – model-based, can be archived, and is repeatable.
- Defensible – results are tied quantitatively to the organization's goals and objectives.

- Directly accounts for decision risk.
  - Facilitates the identification of potential future scenarios.
  - For each program, can determine the change in value for each scenario.

4.5.2. *Challenges*

We recognize, however, that the approach is not without its challenges. The following list summarizes some of the key challenges associated with implementing the VFT approach for POM resource allocation.

- Incorporating political considerations.
  - Value model must capture more than just the military (capability) aspects.
  - Must capture *meaningful* aspects of value return to the organization.
- Measure development.
  - Choosing appropriate measures can be more of an 'art' than a 'science.'
  - Measures ultimately determine the final priority.
  - Should apply across programming elements (e.g., MDEPs).
  - May not be able to develop numerical measures; may require categorical or qualitative scales.
  - Should not be too specific if they are to apply across Army programs (e.g., number of ambulances).
- Choice of programming element (e.g., MDEP, sub activity group [SAG], APE, other).
  - Increased level of detail (MDEP → APE) increases the complexity of the problem.
  - Depends upon the measures and what is expected of the programming element.
- Implementation.
  - Would require G-3 to reconsider planning construct to support programming and a significant level of effort upfront.
  - Must have full participation of the involved organization and decision makers to succeed, as well as access to the required data.

- If the approach is applied within each PEG, must have an overall process for integrating results across the PEGs.
- Programs within one PEG may also provide indirect or direct value to other PEG functions as well.

4.5.3. *Recommendations*

We believe that the value focused thinking approach has great potential for the Army POM planning process. It evaluates programs against the fundamental objectives of the Army, and has all of the characteristics required of a viable methodological approach. Additionally, it is a proven technique for resource allocation that is gaining acceptance within DoD. For examples of its application to DoD problems, see Ewing, Tarantino, and Parnell (2006) and Trainor, et.al. (2007).

Since the approach cannot be successful without high-level acceptance, we recommend that the sponsor solicit buy-in from the key stakeholders in the PPBES process, if they wish to implement this approach. To do this, we recommend applying the technique first to a subset of the POM to demonstrate its usefulness, potentially within a PEG. Such a successful demonstration of value on a more limited scale will facilitate consensus-building among key stakeholders.

Section 5 – Decision Support Tool Development

Study Issue 5: *What tools should be used to facilitate the recommended methodology?*

5.1. Overview

In response to Study Issue 5, we developed a prototype decision support tool, the Value-Based Evaluation Support Tool (VBEST), to facilitate a value-focused thinking approach for resource allocation. The following are the key required characteristics of the software that we identified as part of the requirements process.

- **Qualitative:** can be used to develop the qualitative value model and view results based upon that model.
- **Scalable:** can accommodate any number of alternatives and metrics.
- **Modular:** can use multiple methods to weight the metrics and add new weighting modules.
- **Usable:** presents information and inputs in user-friendly interfaces to create value curves and view information.
- **Intuitive:** built via Visual Basic for Applications (VBA) using standard, familiar Microsoft Office products.

This effort built upon a previous Excel VBA tool developed for similar purposes by TRAC-MTRY for a previous study, by adding more functionality, making the code more efficient, and implementing a more user-friendly interface. We believe that it is a powerful tool that can be used for addressing a wide range of multi-attribute decision-making and resource allocation problems. Additionally, VBEST is government-owned and can be distributed without licensing issues, which is a significant advantage over related, commercially-developed software.

As of the writing of this report, we are still adding some functionality and making final refinements to the tool. We expect to deliver the final tool to the sponsor by the end of August, 2008. Where appropriate, we address future changes to VBEST as we continue its development beyond this study. Anticipating the eventual change-over of user software from Microsoft Office 2003 to Microsoft Office 2007, the developer, Mr. Anton Rowe, has ensured that VBEST will work in both software environments, although some aspects of data presentation may look slightly different between the two environments.

5.2. Tool Description

All example screenshots included in the discussion below are based upon the same data developed for the incentives proof-of-principle, which is only notional data and does not represent actual results. VBEST consists of four main screens: welcome, inputs, outputs, and settings. The welcome screen is shown in Figure 11. Each of the screens can be accessed via the list in the left panel of the screen, which remains visible at all times. The "About" button provides information about the version of the tool, the tool developer, and details for citing the tool. In the future, we will add an "Instructions" button, which will provide detailed instructions for using the tool.

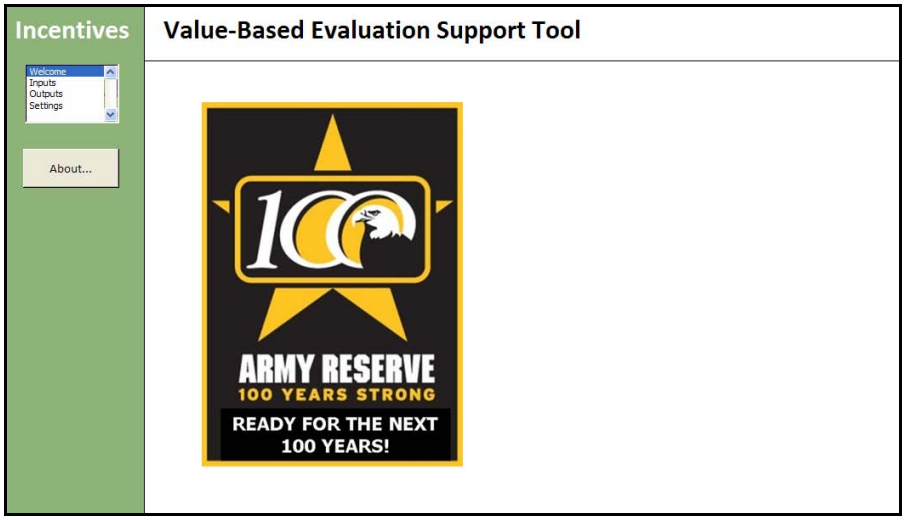


Figure 11. VBEST Welcome Screen.

The inputs screen is shown in Figure 12. The main portion of the screen is the raw data matrix, with each row representing a value measure and each column representing an alternative, except for the "Weight" column, which includes the un-normalized weights for each of the value measures. The information inside the matrix (for each possible combination of value measures and alternatives) represents the raw performance (in the original value measure units) for each of the alternatives with respect to the value measures.

Value measures that have no weight entry will be treated in the analysis as an independent variable for the trade space charts discussed later. Total cost of the alternative is frequently treated as an independent variable; however, in some cases, other metrics may be regarded as being so important to the decision maker that the user may choose to develop trade space charts for those as well. There is no limit to the number of trade space charts that can be developed.

Incentives

Welcome
Inputs
Outputs
Settings

Hierarchy

Value Measures...

Alternatives...

Validate

No errors

Inputs

Value Measures	Weight	Current	Option 1	Option 2
Estimated cost of incentives		$2,000	$3,000	$6,000
Violations per month	15	4	3	1
ENL contracts in target populations	45	50%	70%	80%
Fill against ENL critical requirements	100	80%	85%	82%
Honorable ENL contract completions	65	65%	70%	65%
OFF contracts in target populations	55	30%	50%	50%
Fill against OFF critical requirements	95	80%	85%	85%
OFF contract completions	70	70%	65%	85%
First term re-ups	30	50%	60%	60%
Career retirements by cohort	30	25%	25%	25%
Shipping vacancies	80	5	4	4
USAR accepted vs Joint offered	50	30%	40%	70%
NG or CIV 'better' incentives	45	5	4	4
Money spent needlessly	10	$110	$50	$75
Future change compromises	5	6	3	3
Potential gaming opportunities	10	2	2	5

Figure 12. VBEST Main Input Screen.

In this version of VBEST, there are four buttons in the left panel. The "Hierarchy" button brings the user to the screen shown in Figure 13. This screen is used to enter the value hierarchy. In that figure, the columns are named "Functions," "Objectives," and "Value Measures," but the columns can be given any name. Also, additional columns can be added if there are more than three tiers in the hierarchy. The naming of columns is particularly important when viewing results in the value stacks discussed later. The "Back" button returns the user to the main input screen.

Incentives

Back

Hierarchy

Functions	Objectives	Value Measures
Adhere to regulatory requirements	Minimize regulatory violations	Violations per month
Provide successful enticements to career service	Maximize high quality enlistments	ENL contracts in target populations
		Fill against ENL critical requirements
		Honorable ENL contract completions
	Maximize officer fill in critical positions	OFF contracts in target populations
		Fill against OFF critical requirements
		OFF contract completions
	Maximize retention in positions	First term re-ups
		Career retirements by cohort
Influence when soldiers ship	Meet deployment shipping requirements	Shipping vacancies
Compete successfully with NG and CIV alternatives	Maximize USAR win percentage	USAR accepted vs Joint offered
	Maximize competitive advantage	NG or CIV 'better' incentives
Operate within budgetary limits	Maximize cost efficiency	Money spent needlessly
Provide healthy operating environment for recruiters	Maximize security of future changes	Future change compromises
	Minimize gaming potential	Potential gaming opportunities

Figure 13. VBEST Hierarchy Screen.

The “Value Measures…” button allows the user to enter new value measures by providing a name and choosing the location within the existing list of measures where the new row will be inserted. Similarly, the “Alternatives…” button allows the user to enter new alternatives by providing a name and choosing the location within the existing list of alternatives where the new column will be inserted. These buttons can also be used to delete or hide measures and alternatives, or change their order. The “Validate” button checks user entries to ensure that all required information has been entered and is in the correct format. If information is missing or incorrect, the incorrect or missing entry will be circled with a red oval to identify where corrections are necessary. In future versions, we hope to have a “Weight” button on the main inputs screen for linking to various weighting techniques. We plan to implement the swing weighting method first, and then to add other techniques.

Each of the value measures in the inputs screen is hyperlinked. If users click on the hyperlink, they will be presented with an entry input screen to provide key measure information and the value function. There are two views available – the “Data” view and the “Graphic” view. The “Data” view is shown in Figure 14. In this view, the user enters key information concerning the measure; chooses whether the measure units are continuous or discrete; and develops the value functions, which convert raw data to value.

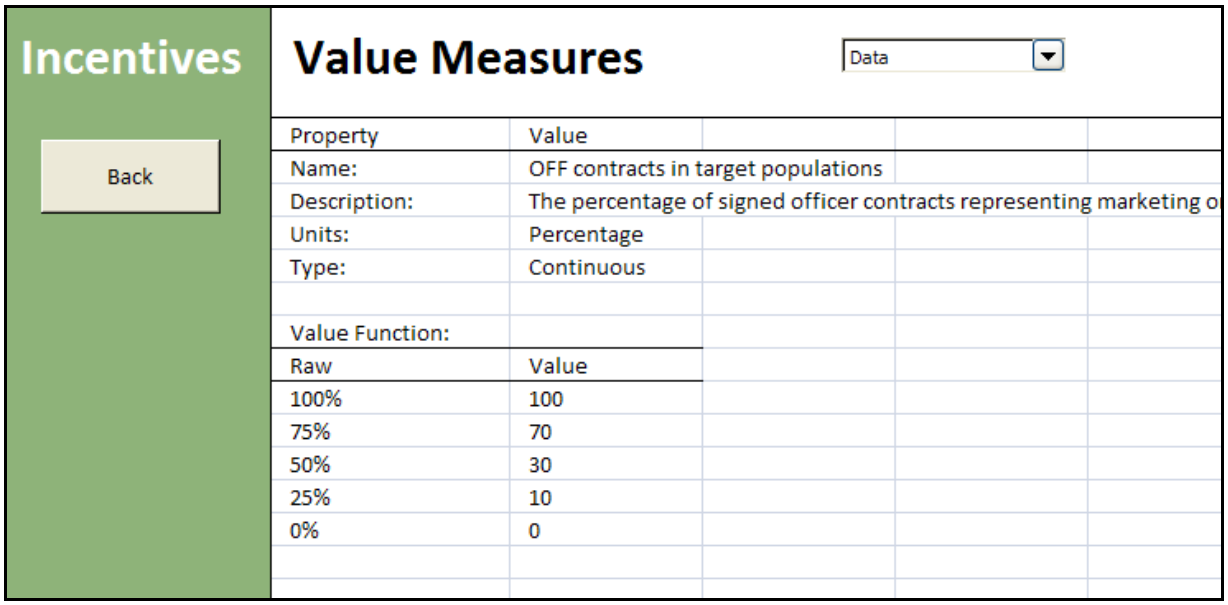


Figure 14. VBEST Value Measure Development Data Screen.

The user may use the drop-down menu in the upper right-hand corner of the “Data” view to choose the “Graphic” view. This view shows the value function in a chart. If the measure is a

continuous measure, the chart will look as shown in Figure 15 (a line chart). If the measure is discrete, the chart will be a column chart indicating that raw data between the entered levels are not possible and thus have no value. In Excel 2003, the user can drag the points on the curve to change its shape (which also updates the data table in the "Data" view). It is not clear whether this functionality will be available for users of Excel 2007 in the delivered version. In future versions, we plan to implement a "Reshape" button for choosing preset curve shapes (e.g., linear, convex, concave, s-curve). As before, the user may switch back to the "Data" view by using the drop-down menu, or return to the main inputs screen using the "Back" button in the left-hand panel.

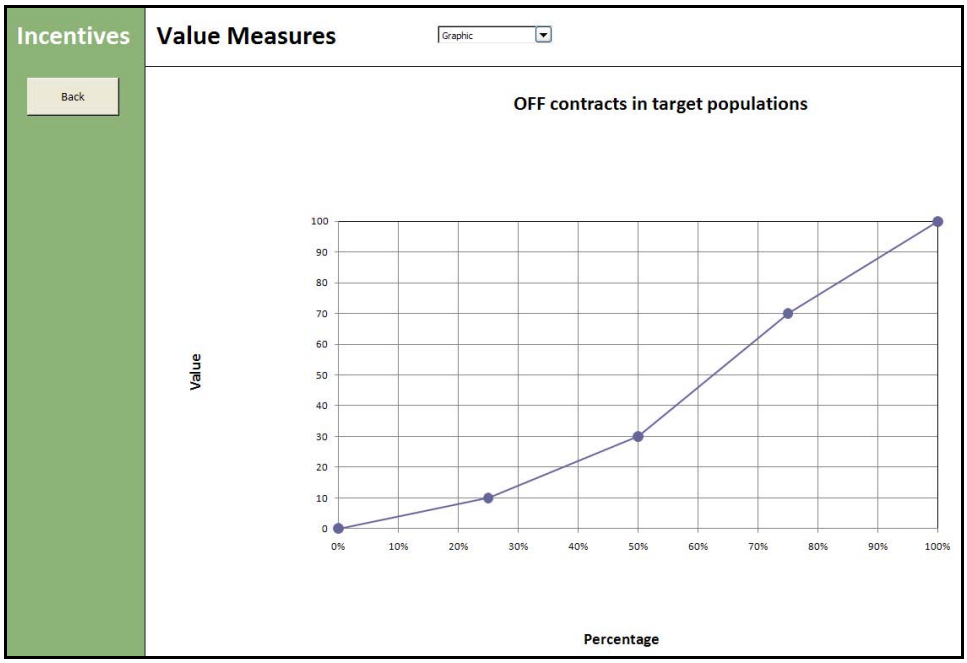
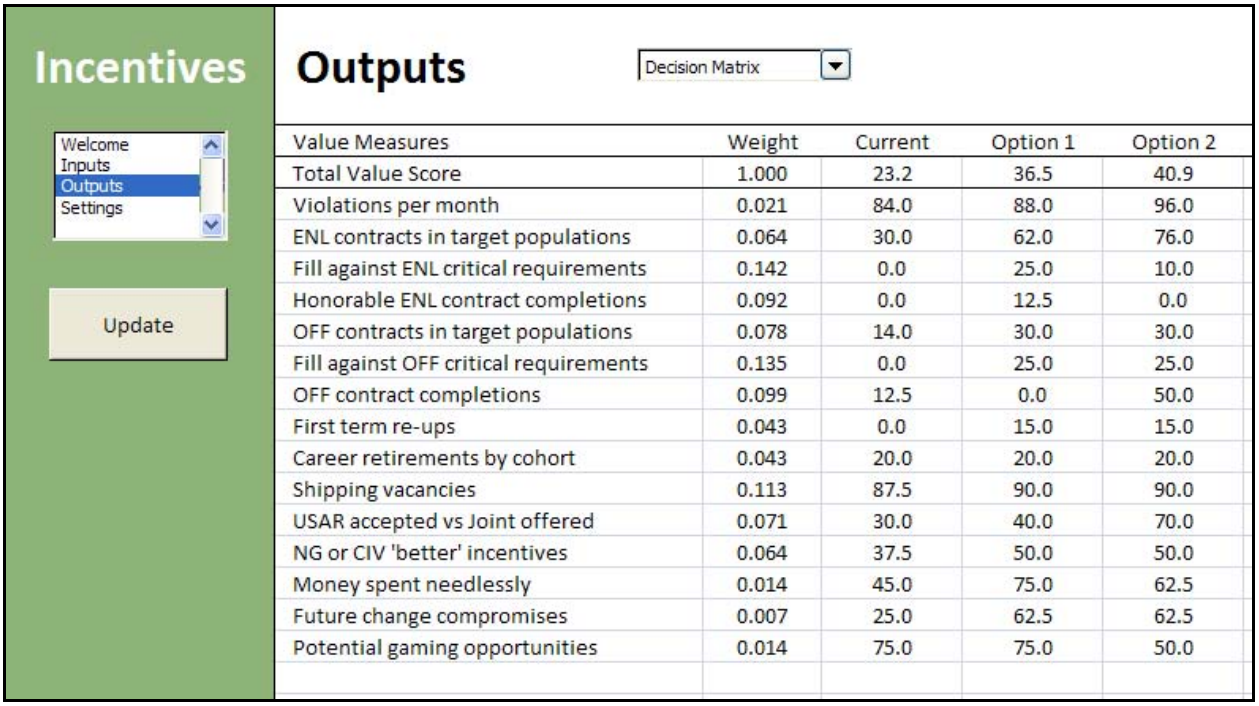


Figure 15. VBEST Value Measure Development Graphic Screen.

The outputs screen includes four types of views – a "Decision Matrix" view, a "Value Stack" view, a "Value Tradeoff" view, and a "Criteria Sensitivity" view. The user can switch between these views using the drop-down menu at the top of each of the output screens. The "Decision Matrix" view is shown in Figure 16. This view is similar to the main inputs screen in general format. However, in this screen, the weights are shown normalized (i.e., all weights are between 0 and 1 and their sum across all values measures is equal to 1). Also, instead of the raw data performance for each of the alternatives with respect to each value measure, the table shows the value scores (based upon each value measure's value function). The "Total Value Score" row toward the top of the matrix shows the total value score for each of the alternatives. The

number is calculated by multiplying each value score by the corresponding value measure weight and summing for all of the value measures (i.e., the sumproduct of the value score column and the weight column). Since the weights are normalized and the value scores range from 0 to 100, the total value scores will also be a number between 0 and 100, with 100 being the best possible total value score. The "Update" button must be pressed when viewing the output screen if changes were made to the input information. In this case, there will be a note below the "Update" button that says "Update required."



Value Measures	Weight	Current	Option 1	Option 2
Total Value Score	1.000	23.2	36.5	40.9
Violations per month	0.021	84.0	88.0	96.0
ENL contracts in target populations	0.064	30.0	62.0	76.0
Fill against ENL critical requirements	0.142	0.0	25.0	10.0
Honorable ENL contract completions	0.092	0.0	12.5	0.0
OFF contracts in target populations	0.078	14.0	30.0	30.0
Fill against OFF critical requirements	0.135	0.0	25.0	25.0
OFF contract completions	0.099	12.5	0.0	50.0
First term re-ups	0.043	0.0	15.0	15.0
Career retirements by cohort	0.043	20.0	20.0	20.0
Shipping vacancies	0.113	87.5	90.0	90.0
USAR accepted vs Joint offered	0.071	30.0	40.0	70.0
NG or CIV 'better' incentives	0.064	37.5	50.0	50.0
Money spent needlessly	0.014	45.0	75.0	62.5
Future change compromises	0.007	25.0	62.5	62.5
Potential gaming opportunities	0.014	75.0	75.0	50.0

Figure 16. VBEST Decision Matrix.

The "Value Stack" screen can be used to view the outputs in essentially two types of views – a column chart and a series of stacked column charts. The pull-down menu that appears to the right of the outputs pull-down menu allows the user to switch between these views. The top choice in the pull-down menu is for "Total," which is a standard column graph showing the total value scores for each alternative. An example of this view is not included here, because it differs little from the stacked column views. The other available views are stacked column views, which break up the column by the contributions of each element in the hierarchy tier chosen. An example is shown in Figure 17. In this figure, the user chose the "Objectives" view. Each column represents the total value score of the alternative with the individual contributions of value by each of the elements in the "Objectives" tier of the hierarchy. The pull-down menu

presents view options to the user that should match the column headings in the hierarchy view. Also, the "Total" view discussed above would be the same as this chart, except with solid columns instead of stacked columns.

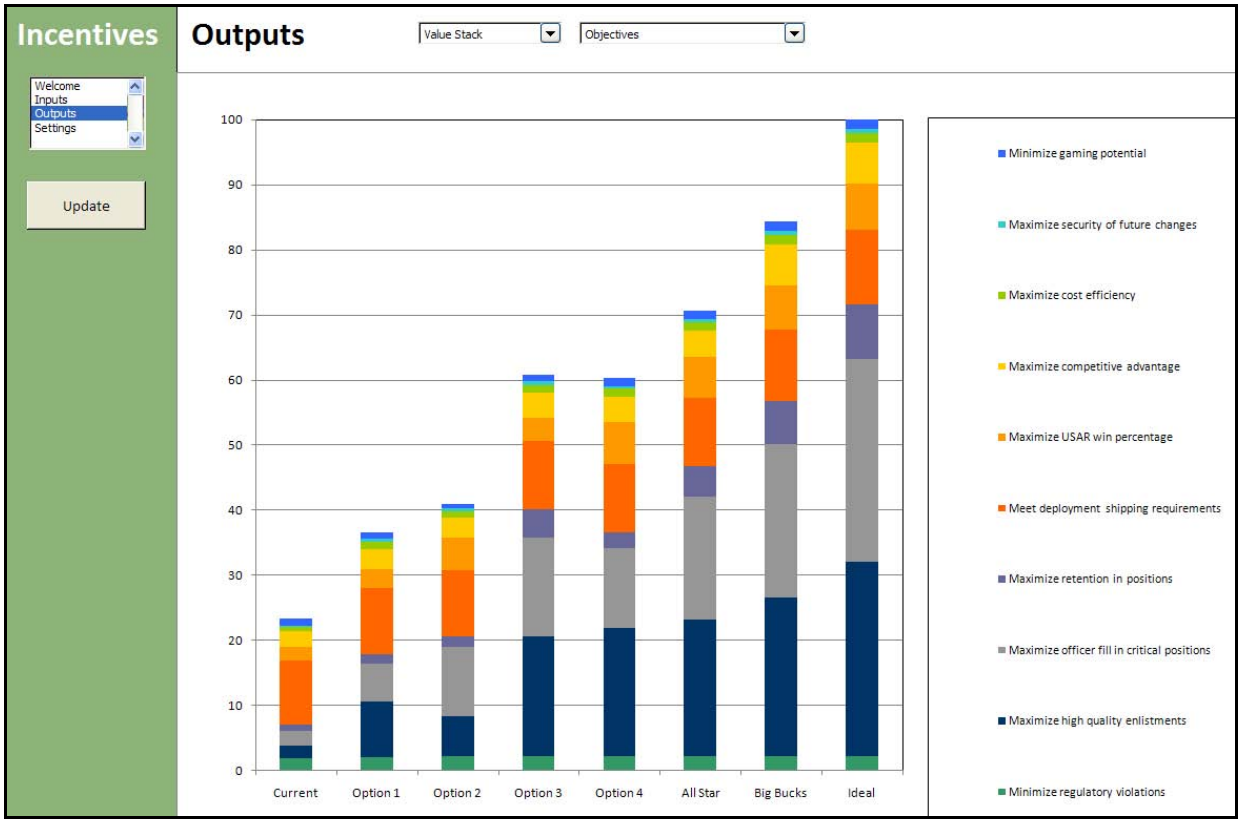


Figure 17. VBEST Stacked Column Output Chart.

An example of a "Value Tradeoff" screen is shown in Figure 18. This screen presents deterministic trade-space charts with total value as the dependent variable (i.e., y-axis) and the raw performance scores of the chosen measure as the independent variable (i.e., x-axis). Recall that the user identifies the independent variables in the input screen by leaving the weight blank. In the figure, the user chose cost as the independent variable. The pull-down menu that appears to the right of the outputs pull-down menu allows the user to switch between the independent variables (if more than one has been identified in the inputs screen).

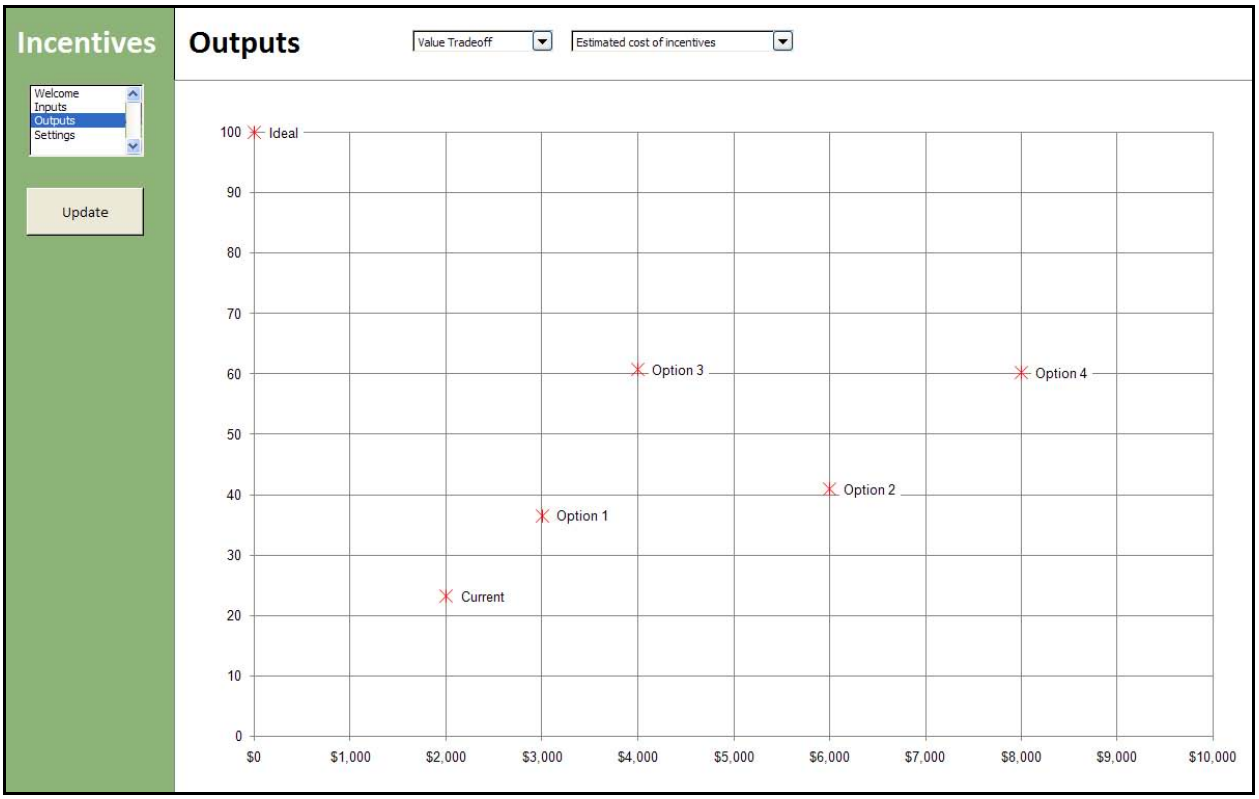


Figure 18. VBEST Deterministic Value Tradeoff Chart.

The final output view is the "Criteria Sensitivity" view, shown in Figure 19. In this view, VBEST displays a chart with total value scores on the y-axis and value measure weight (normalized) on the x-axis. There is one such chart for each value measure, which can be chosen via the pull-down menu on the right. Each line in the chart represents an alternative. The vertical dashed line represents the original weight of the value measure. The chart is used to show how changes in the weight of a single value measure will affect the total value scores of each of the alternatives. The points where lines (alternatives) intersect represent the value measure weight at which both alternatives are equally valuable to the decision maker. From that the user can determine how small changes in the value measure weight will impact the comparative rankings of the alternatives. This view is useful for helping the user and decision maker understand the impact of uncertainty in the value measure weights. In future versions, we hope to have another sensitivity analysis functionality that allows the user to change multiple weights at once and see the impact on the total value scores.

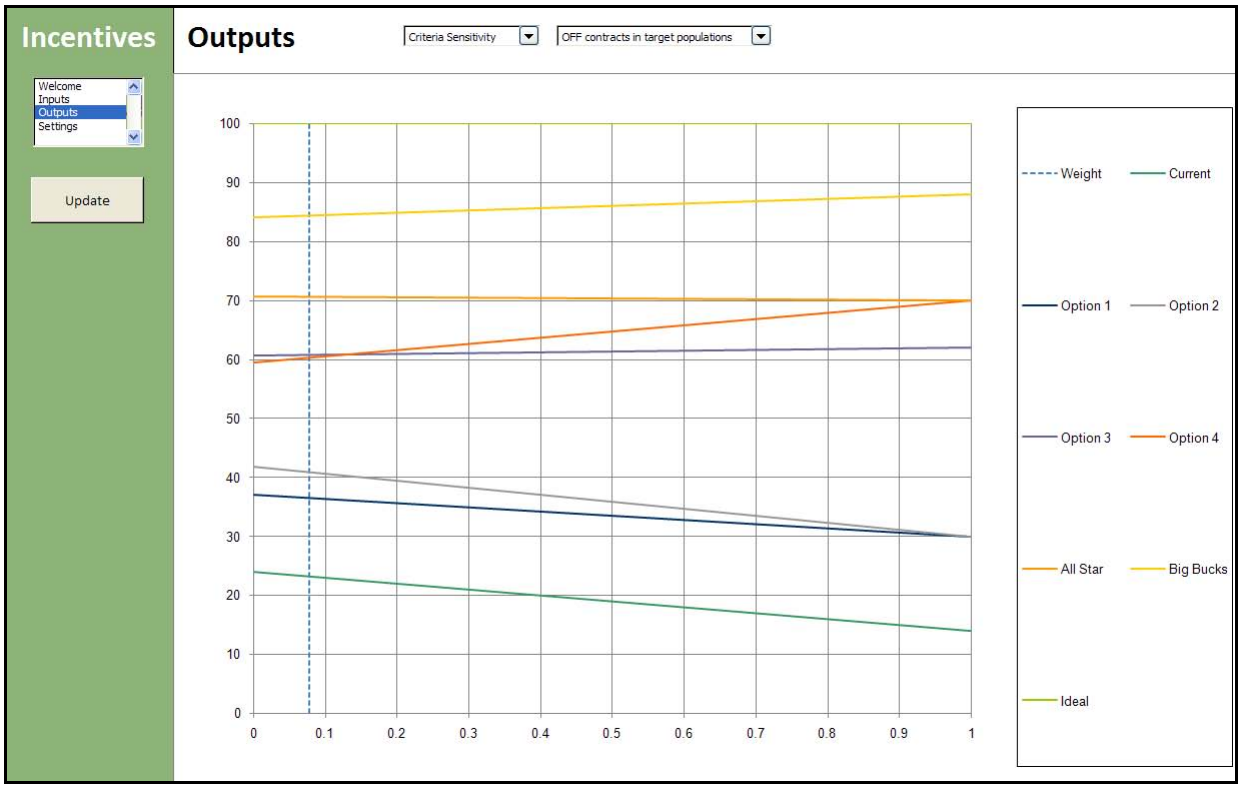


Figure 19. VBEST Value Measure Sensitivity Chart.

The final view within VBEST is the settings screen, shown in Figure 20. This screen allows the user to change the views associated with the tool. There are three display modes that can be chosen: "Full," "Normal," and "Developer." The user can change the settings of the zoom level for the "Full" display mode using the "Full Zoom" setting and the zoom level for the "Normal" display mode using the "Normal Zoom" setting. Users can also change the application skin for the left panel of each screen. They can change both the color and the name displayed. Finally, users can choose to change the name of the criteria to whatever name they are most comfortable with (e.g., value measures, evaluation measures, measures of performance, measures of effectiveness, metrics, etc.). Similarly, the user can change the name of the alternatives (e.g., options, incentive packages, potential solutions, etc.). Changes to these latter two parameters will update the names throughout the tool. Similar to the outputs screen, the "Update" button is used to activate the changes.

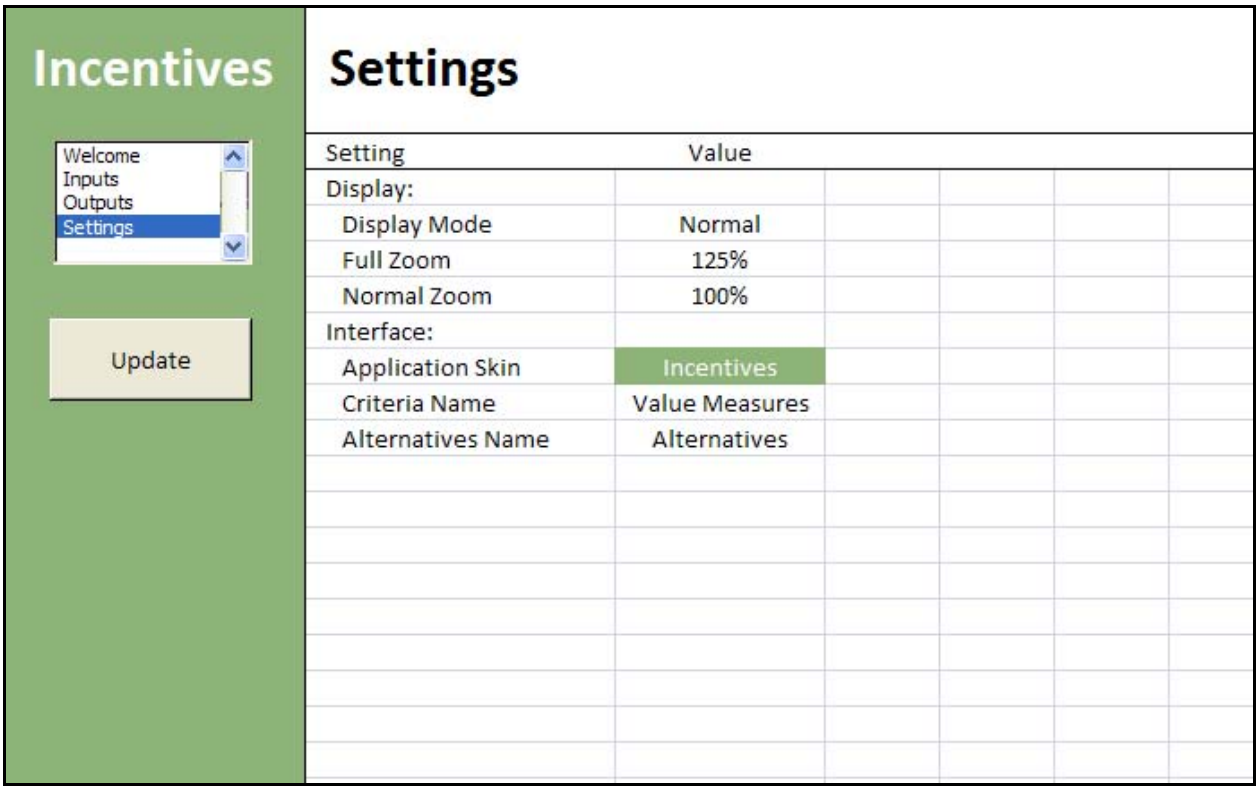


Figure 20. VBEST Settings Screen.

5.3. Planned Improvements

In addition to the improvements discussed in the tool description above, we plan to continue the development of the tool to increase its functionality. Some of the planned improvements include:

- Ability to implement numerous weighting techniques.
- Ability to factor in uncertainty in alternative performance using standard probability distributions and analyze that uncertainty using Monte Carlo simulation.
- Additional output views (e.g., tornado diagrams, Pareto charts, etc.).
- Ability to link the output to an optimization to facilitate portfolio analysis over a specified time horizon.

Section 6 – Conclusions

As a result of our background research, methodology comparison, and proof-of-principle application, we believe that a Value Focused Thinking (VFT) approach, as specifically implemented in the Systems Design Process (SDP), shows the most promise in solving the POM resource allocation problem for the Army. The methodology allocates resources based upon the value returned by the programs, evaluating each as an entity to determine how it fairs against other programs in terms of its value from the Army's perspective. Thus, it identifies what is expected of a program to make it successful to the organization. Additionally, the method possesses the key required characteristics; it is qualifiable, quantifiable, auditable, reproducible, and defensible, and can account directly for decision risk.

The approach is not without its challenges. Some of the key challenges include incorporating the many political considerations intrinsic to the Army resource allocation problem; developing meaningful measures that will apply across programming elements; choosing the appropriate level of programming elements to compare; and gaining senior-level leader acceptance of the approach.

We recommend that the sponsor solicit buy-in from the key stakeholders in the PPBES process if they wish to implement this approach. To do this, we recommend applying the technique first to a subset of the POM to demonstrate its usefulness, potentially within a PEG. Such a successful demonstration of value on a more limited scale will facilitate consensus-building among key stakeholders.

The proof-of-principle applied to a USAR accession and retention incentives problem demonstrated the usefulness of the approach to a more narrowly-focused problem and provided value directly to the USAR by capturing the comprehensive quantitative and qualitative model of the problem and valuable cost estimation methodologies.

Overall, the following study deliverables are a result of a significant effort within a large, multi-disciplinary team.

- Annotated bibliography documenting the literature review conducted by the Library of Congress Federal Research Division on potential approaches for resource allocation in government, industry, and academia (Appendix C).
- Documented interview and survey results involving 25 personnel from numerous Army organizations and PEGs (Section 2.2 and Appendix E).

- Analytic identification, evaluation, and comparison of potential resource allocation approaches (Section 3).
  - Identified numerous potential approaches which were narrowed down to the four most promising.
  - Evaluated the approaches based upon their potential for solving the resource allocation problem and the risk to implementation.
- Proof-of-principle application of the value-focused thinking approach to a USAR accession and retention incentive problem.
  - Developed a value model based upon stakeholder interviews (Section 4.4 and Appendix H).
  - Demonstrated the value-focused thinking approach by applying it to the incentives problem (Section 4.4).
  - Developed a comprehensive spreadsheet value model that can be updated further to accommodate additional stakeholders or changing values (not included in this report).
  - Extrapolated the results to a larger POM resource allocation problem (Section 4.5).
- Cost estimation methodologies for costing potential incentive programs with example estimates.
  - Provided a detailed report of the methodologies and results (Section 4.3 and Skaggs [2008]).
  - Developed accompanying spreadsheet that can be manipulated and updated based upon new data (not included in this report).
  - Provided direct support to the TRAC-LEE AR EA study (still underway).
- Prototype decision support tool to support a value-focused thinking approach to decision-making and resource allocation (Section 5).
  - Can be used to support a wide range of decisions.
  - Open-source software that can be further developed to meet user needs.

This study should be viewed as a preliminary step to solving the Army resource allocation problem. Further efforts need to be conducted to demonstrate and prove the value of the recommended approach.

Appendix A – Original Study Proposal

PROPOSAL FOR FY2007 HQDA ARMY STUDY PROGRAM

FY: 2007

Command: Office of the Chief, United States Army Reserve

Project Title: Army Reserve Capabilities Based Prioritization

Office Symbol: DAAR-DRM-PAE

Agency Ranking: 1

Category: Study

Method: In-house and Contract

Type Contract: Competitive

Desired Start Date: 1 Oct 2006 **Desired Completion Date:** 30 Sep 2007

Expected Performer: TBD

Sponsor Organization & Office Symbol:
Sponsor's Action Officer (POC): LTC Kevin Vink
Office Symbol: DAAR-RMP-PAE
Telephone: 703-601-3517
Email Address: kevin.vink@us.army.mil

Synopsis/Problem Statement:

The United States Army Reserve needs a reproducible, quantifiable, qualifiable and auditable, methodology to optimize the prioritization of allocation of finite resources. Methodology must balance risk and investment under a range of Army Reserve Expeditionary Force/Army Force Generation Model scenarios in the 2010 time-frame.
Currently there is:

- No universally accepted and adopted lexicon or taxonomy for components or methodology for prioritization.
- Secure, data base repository of appropriate bins, criteria or metrics for prioritization.
- Reproducible, auditable, quantifiable and qualifiable methodology for prioritization.

The Principal Deputy Undersecretary of Defense for Policy, at the 2004 Military Operations Research Society Symposium workshop: Capabilities Based Planning - The Road Ahead, identified the need for Capabilities Based Planning (CBP) which encompasses "a top-down, competitive approach for weighing options across a spectrum of challenges with careful regard for resource constraints." This need is most keenly witnessed in planning and determining the optimal allocation of resources IAW dynamic strategic guidance (as found in the National Defense Strategy, Army Campaign Plan and Quadrennial Defense Review) and response requirements, generated by external, and sometimes unexpected, scenarios of variable scope and severity.

a. Study Questions:

1) What previous related research has been conducted on this subject?

2) What was an overview of the findings, recommendations and suggestions for future research?

3) What is the appropriate lexicon and taxonomy for the components and actions in the process?

4) What are the linkages and interrelationships and nesting between components of the system or system of systems?

5) What are the capability gaps, redundancies, opportunities in linkages, interrelationships and nesting mapped in the process?

6) What are the optimal, comprehensive, collectively exhaustive and appropriate groups, bins, criteria and metrics used?

7) What are the upper and lower bounds on risks to programs?

8) To what extent will allocation, meet strategic guidance under different scenarios?

9) What are the gaps between strategic guidance requirements and the groups/bins?

b. Data: Data from literature review, National Guard, HQDA PAE, Army Reserve Program Evaluation Groups (PEGs) and most extensively, Army Reserve Resource Management and Program Analysis and Evaluation Directorate. Collect relevant critical data from internal and external organizations to include but not limited to: subject matter expert (SME) panels, past, present and projected program and execution data, studies, after action reviews (AAR), lessons learned, reports, strategic guidance documents (National Defense Strategy, Army Campaign Plan, Quadrennial Defense Review, Program Office Memorandum, Management Decision Packages, 1-N list), Department of the Army (DA) and Army Reserve Regulations and DA pamphlets.

c. Why this Study Has Not Yet Been Performed/Funded: The Department of the Army ceased using 1-N Prioritization process in 2006. The need for Capabilities Based Planning has not been linked from National strategic guidance to resource allocation.

d. Why this Study has not been programmed in the POM: The taxonomy or lexicon has never been universally established. The 1-N list has previously been the standard for prioritization.

Significant Benefit to the Army:

a. Statement of Benefits: This study will support the Global War on Terrorism in sustaining a campaign-capable expeditionary Army by providing the methodology to resource AREF and support ARFORGEN not only for the short term but for the foreseeable future. The study will make optimization of limited Army Reserve resources possible, while minimizing risk to programs. The study will constitute a base line for resource allocation methodology, providing decision makers with a clearly defined audit trail and roadmap from strategic guidance to allocation. The data base repository will be the first of its kind in resource prioritization eliminating redundancy and data merging problems.

b. Impact of Not Doing the Study: GWOT and Modularization have presented new and undefined challenges on finite resources manning, equipping and sustaining the force with finite resources. This will hinder the optimal use of Army Resource Dollars.

Scope of Work:

a. Literature Review Plan: Quadrennial Defense Review, The study team will collect relevant critical data from internal and external organizations to include but not limited to: Defense Department related Capabilities Based Planning literature, subject matter expert (SME) panels, past, present and projected program and execution data, studies, after action reviews (AAR), lessons learned, reports, strategic guidance documents (National Defense Strategy, Army Campaign Plan, Quadrennial Defense Review, Program Office Memorandum, Management Decision Packages, 1-N list), Department of the Army (DA) and Army Reserve Regulations and DA pamphlets.

b. Initial Assessment and Assumptions: Army Reserve resources are not directly linked or prioritized by capability.

c. Approach: This study effort will require a literature review, close coordination and data sharing with the National Guard, HQDA PAE, Army Reserve Program Evaluation Groups (PEGs) and most extensively, Army Reserve Resource Management and Program Analysis and Evaluation Directorate. The study team will collect relevant critical data from internal and external organizations to include but not limited to: subject matter expert (SME) panels, past, present and projected program and execution data, studies, after action reviews (AAR), lessons learned, reports, strategic guidance documents (National Defense Strategy, Army Campaign Plan, Quadrennial Defense Review, Program Office Memorandum, Management Decision

Packages, 1-N list), Department of the Army (DA) and Army Reserve Regulations and DA pamphlets.

Addresses Army Campaign Plan (ACP) Objective:
2-11 Resource balancing of AC and RC force structure to reduce or eliminate high demand/low density (HD/LD) unit disparities.
3-3 Reform and establish RC Personnel, administrative, and legislative policies to support a joint and expeditionary Army.
4-1 Fully man the force (UAs, UEs, and critical TDA units) to required skill and grade.

Estimated Cost: $250K, Appropriation: OMA, Funding Source 2514

Coordination: DAMO-CIR, COL Robert Stenrauf (703) 692-7327; DAAR-Comptroller,, COL T. Brown (703) 601-0916; USARC-G8, Mr. Stephen Farmer, (404) 464-8508; DAAR-G3

Appendix B – Planning, Programming and Budgeting Phases of the PPBES Process and the Key Elements of the JCIDS Process

NOTE: This appendix was developed by Mr. Andrew Cherry, TRAC-LEE, in support of this study. It is a stand-alone appendix, with its own glossary of terms and list of references.

1. Purpose. The purpose of this appendix is:

a. To describe the major components of the Planning, Programming and Budgeting Phases of the Planning, Programming, Budgeting and Execution System (PPBES) process, with emphasis on capability determination and prioritization, and to a lesser extent, funding recommendations and allocations.

b. To describe key components of the Joint Capabilities Integration and Development System (JCIDS) and highlight differences, relevant to the intent of this study, when compared to the PPBES process.

2. Background.

a. Although PPBES has been continuously criticized over the past four decades, it has been retained as the basic structure for defense strategy, program, and budget development through eight presidential administrations. It is, in practice, an evolving process with influencers throughout the Department of Defense (DoD) chain of command in general, and the Headquarters, Department of the Army (HQDA) chain of command, specifically. However, despite its challenges, it remains one of three major decision support systems for defense acquisition, the other two being the JCIDS process and the Defense Acquisition System process (see Flanagan [2007]).

b. According to Alain Enthoven and Wayne Smith, two of Secretary McNamara's designers of the PPBES process in the 1960s, the fundamental idea behind PPBES was decision making based on explicit criteria of the national interest in defense programs, as opposed to decision making by compromise among various institutional, parochial, or other vested interests in the Defense Department. The original purpose of the PPBES process was to develop explicit criteria, openly and thoroughly debated by all interested parties, that could be used by the Secretary of Defense, the President, and the Congress as measures of the need for and adequacy of defense programs. The current objectives of the PPBES process follow:

(1) Provide essential focus and priorities for the Army.
(2) Develop the force to support the National Military Strategy (NMS).
(3) Distribute manpower, dollars and materiel.
(4) Request congressional authorization and appropriations.
(5) Apply resources and adjust resource requirements.
(6) Manage and account for funds.

c. Planning, Programming, Budgeting and Execution is a biennial process which in the On-Year produces a Defense Planning Guidance (DPG), approved Program Objective Memorandum (POM) for the Military Departments and Defense Agencies covering six years, and the DoD portion of the President's Budget (PB) covering two years. In the Off-Year, **Budget Change Proposals (BCPs)** and **Program Change Proposals (PCPs)** are used to adjust the Future Years Defense Program (FYDP) to take into account "fact of life changes," inflation, new programmatic initiatives, and the result of congressional enactment of the previously submitted PB (see Figure 21 from Morris [2006] below).

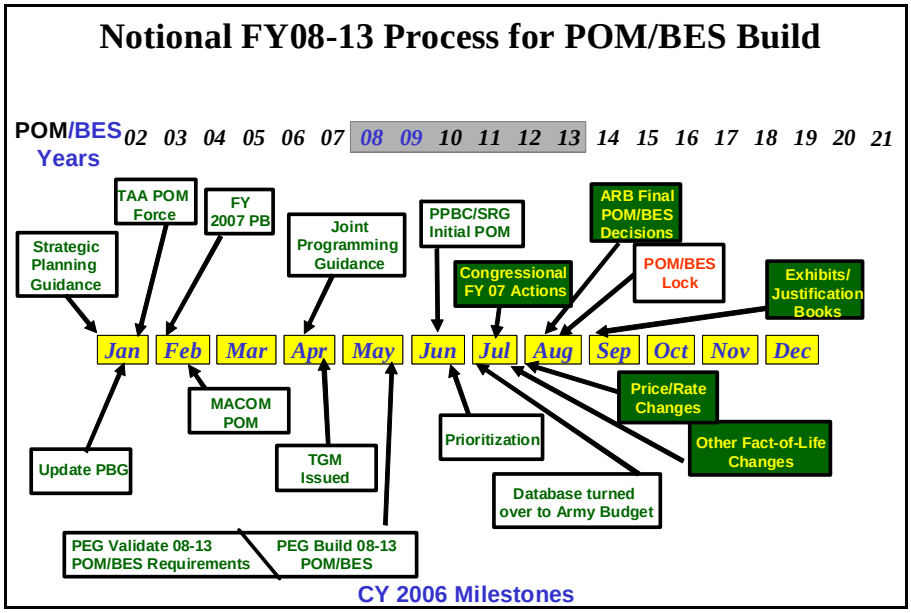


Figure 21. POM/BES Process Timeline.

e. The PPBES process is the Army's primary resource management system. A major decision-making process, the PPBES process interfaces with Office of the Secretary of Defense (OSD) and Joint planning and links directly to OSD programming and budgeting. The PPBES process develops and maintains the Army portion of the defense program and budget. It supports Army planning, and it supports program development and budget preparation at all levels of command. It supports execution of the approved program and budget by both headquarters and field organizations. During execution, it provides feedback during the planning, programming, and budget phases (See AR 1-1, paragraph 1-21). <u>The PPBES process ties strategy (i.e., National Military Strategy (NMS)), program, and budget together</u>. It helps build a comprehensive plan in which <u>budgets flow from programs, programs from requirements, requirements from missions, and missions from national security objectives</u>. The patterned flow – from end purpose to resource cost – defines requirements in progressively greater detail. The planning, programming and budgeting phases of the PPBES process is managed by senior-level HQDA general officers (GOs) and senior executive service (SES) civilians, reporting directly to the Army Chief of Staff and Secretary of the Army (see Figure 22 from Morris [2006]).

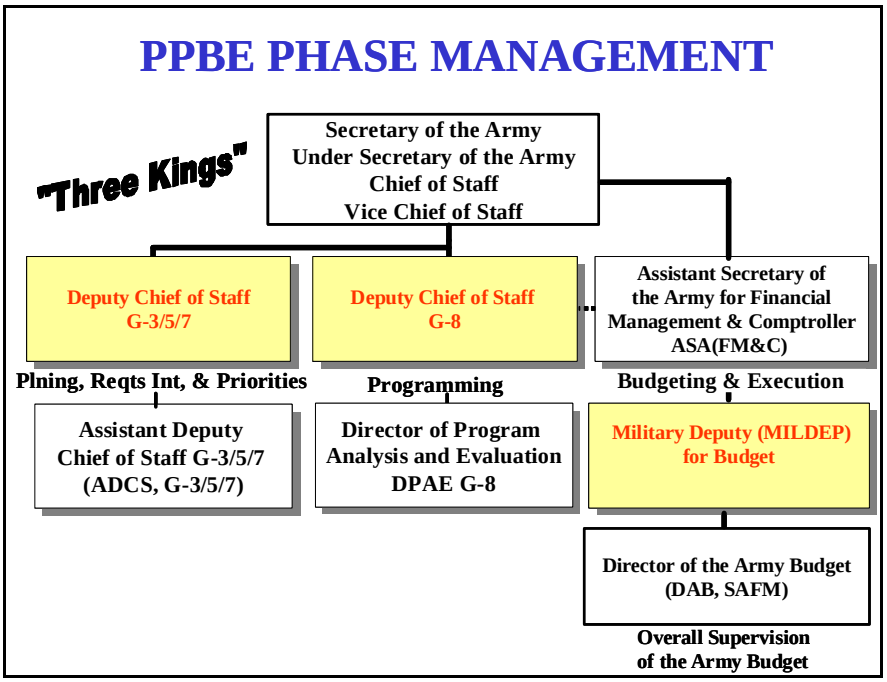


Figure 22. PPBE Phase Managers.

f. Despite the impacts and implications of the PPBES process with regard to Army requirements determination and resource allocations, up-to-date procedural documentation used in executing the PPBES process appears sparse and outdated (i.e., the most recent TAA Army Regulation (AR 71-11) is dated 29 Dec 95; and the most recent PPBES Regulation (AR 1-1) is dated 30 Jan 94). During literature searches on the process, most of the detailed procedural information about how the process works appeared outdated (i.e., the MDEP Procedures Guide on the PAED web site is dated 8 Aug 01, and the most recent published guide is dated 1 Mar 94) when compared to the information received from action officers and managers during interviews and from survey responses. Given the fact that hundreds of people are involved in managing and executing the process, many of which are military members subject to the Army's rotation policies, one would expect that the establishment and maintenance of an up-to-date set of procedural guidelines to be more of a priority.

g. Generally speaking, there are four primary groups of staff managers and sponsors with responsibility for executing the PPBES process, as detailed below.

(1) Managers for manpower and force structure issues, responsible for coordinating instructions to the field, and the processing of request from the field, for manpower or force changes; align and balance manpower and unit information among the Structure and Manpower Allocation System (SAMAS), The Army Authorization Documents System (TAADS), the PPBES Data Management System (Probe), and the FYDP; and provide lead support on manpower issues to the chairs of Program Evaluation Groups (PEGs).

(2) Managers for functional requirements, responsible for determining the scope, quantity, and qualitative nature of functional requirements for planning, programming, and budgeting; checks how commands and agencies apply allocated manpower and dollars to make sure their

use fulfills program requirements; reviews unresourced programs submitted by major commands (MACOMs), program executive office (PEOs), program managers (PMs), and other operating budget; resolves conflicts involving unresourced requirements or decrements on which MACOMS, PEOs, PMs and other operating agencies fail to reach agreement in developing the program or budget; recommends to the Planning, Programming and Budget Committee (PPBC) the allocation of projected resources, unresourced programs, and offsetting decrements; during program and budget reviews, and throughout the process, coordinates resource changes with agencies having proponency for affected Management Decision Packages (MDEPs).

(3) Managers for program and performance, responsible for the functional programs and monitor their performance; acts with the appropriation sponsor or helps him or her perform the duties; translates budget decisions and approved manpower and funding into program changes and makes sure that data transactions update affected MDEPs; checks budget execution from the functional perspective listed.

(4) Appropriation sponsors, responsible for controlling the assigned appropriation or fund; serves as Army spokesperson for appropriate resources; helps resource claimants solve manpower and funding deficiencies; issues budget policy, instructions, and fiscal guidance; during budget formulation, responsible for Probe updates, and prepares and justifies budget estimates; testifies before Congress during budget justification; and manages financial execution of the appropriation and reprograms allocated funds to meet unforeseen contingencies during budget execution.

(5) This document addresses the first three groups, and provides only consequential linkages to the appropriation sponsors.

5. The Planning Phase of the PPBES Process.

a. The planning phase of the PPBES process includes the definition and examination of alternative strategies, the analysis of changing conditions and trends, threat, technology, and economic assessments, and efforts to understand both change and the long-term implications of current choices. **Basically, it is a process for determining requirements.**

b. At the OSD and Joint levels, PPBES planning examines the military posture of the United States (US) in comparison to national security objectives and resource limitations. At this level, planning develops the national military strategy and identifies the force level necessary to achieve this strategy. Increasingly, this process is becoming “capability-driven.”

c. In the cold war era, planners were able to focus on the former Soviet Union and plan for a force structure capable of deterring and, if necessary, defeating the Soviet military. Now, potential threats are far less defined. Attempting to maintain a purely threat-driven model of planning is not feasible in such an environment. Instead, planners have moved toward a capability-driven model of planning – focused on the development of a broad set of capabilities able to meet threats known and unknown (see Flanagan [2007]). With regards to the latter, the JCIDS process also employs a capabilities-based methodology for deriving requirements and capability gaps (see model comparison in Figure 23, adapted from Morris [2006]).

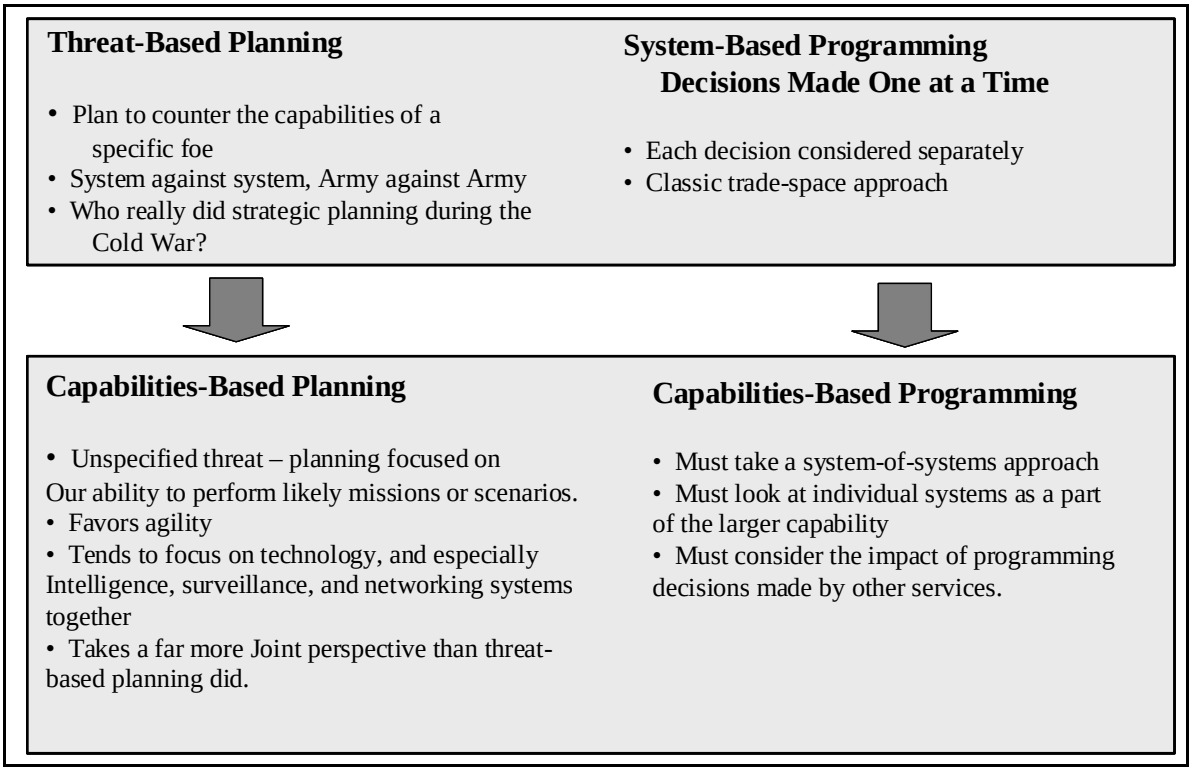


Figure 23. Comparison of Threat-Based and Capabilities-Based Processes.

d. Army planning has undergone a similar transition. Since the 1980s, The Army Plan (TAP) has been the service's key planning document (with significant influence on programming as well). In 1997, the Army reengineered TAP to place more emphasis on **"what" needs to be done** – a move towards capabilities-based planning.

6. The Programming Phases of the PPBES Process.

a. Programming includes the definition and analysis of alternative forces, weapon systems, and support systems, together with their multi-year resource implications and the evaluation of various tradeoff options. **Basically, it is a process for balancing and integrating resources among the various programs according to certain priorities.**

b. Programming translates strategy and capabilities into a comprehensive and detailed allocation of forces, manpower, and funds for the six year program (POM) that are derived through the development of stand-alone functional packages (i.e., management decision packages (MDEPs)). Individually, a MDEP describes a particular organization, program, or function, and records manpower and total obligation authority over 9 fiscal years. System MDEPs also show item quantities over the same period. An individual MDEP applies uniquely to one of the following <u>six management areas</u>: (1) missions of modified table of organization and equipment (MTOE) units; (2) missions of table of distribution and allowances (TDA) units and Army-wide standard functions; (3) mission of standard installation organizations (SIOs); (4) acquisition, fielding, and sustainment of weapon and information systems. (Linkages to units exists through HQDA decision support systems, such as Force Builder, Single Army Battlefield

Requirement Evaluator, and Logistics DSS); (5) Special visibility programs (SVPs); and (6) Short term projects (STPs).

c. Early in the PPBES process, the resource management architecture distributes program and budget resources to MDEPs by appropriation and program element. MDEPs serve as a resource management tool used internally by the Army. Taken collectively, MDEPs account for all Army resources, and, in essence, describe the capability of the Total Army – Active, Guard, and Reserve.

7. The Budgeting Phases of the PPBES Process. The budgeting phase includes formulation, justification, execution, and control of the budget. **Basically, it is a process for convincing OSD and Congress to provide the necessary resources and then balancing the checkbook to ensure we spend our resources in accordance with the law.** Budgeting expresses resource requirements, in terms of manpower and dollars, for the first two years of the program (i.e. President's budget).

8. How the Total Process Works.

a. Strategic Planning.

(1) The initiating document for the whole process is the **National Security Strategy (NSS)**, produced by the president and his national security team, for the purpose of providing clear and unambiguous guidance on what will be the international role of the US and what foreign policy goals and aims are to be attempted. The NSS is aimed not only at the DoD, but all agencies that play a role in US foreign policy. The NSS usually is released in the December-January time frame. However, the current administration has published only two versions of this strategy during its tenure.

(2) Using the NSS as their starting point, the Office of the Joint Chiefs of Staff (OJCS) begins a Joint Strategy Review (JSR) which leads to the development of the **National Military Strategy (NMS)**. The NMS describes how US military assets will be used in support of the NSS. Congress requires it to be released by mid-February of even-numbered years. It also provides guidance for the **Joint Strategic Capabilities Plan**, the document that instructs the Combatant Commanders to prepare war plans for their respective areas of operations.

(3) The **Strategic Planning Guidance (SPG)** is issued by the Secretary of Defense and usually includes programmatic guidance on the issue he deems most important. The **Joint Programming Guidance (JPG)** is developed using an enhanced planning process (EPP) that began in 2003. Teams are formed that will present the Secretary of Defense with alternatives to support joint programs so that he can make decisions early enough in the process to influence the individual services. The primary product of the OSD planning phase, the **Defense Planning Guidance (DPG)** identifies key planning and programming <u>priorities</u> to carry out the **National Military Strategy (NMS)**.

(4) OSD then gives guidance to all the services and various defense department agencies. The SPG is the method OSD uses to tell the services which specific tasks they must include in

their **Program Objective Memorandum (POMs)**. The JPG tells each service what it must fund and contains mostly Joint programs. Its directives clearly dictate how the services should prioritize so that they know what risks they can afford to take, ensuring that each service adheres to the Secretary's early decisions. This is essential since each service will be given a target for its share of the DoD budget for each year of the 6-year period of the POM.

b. Headquarters, Department of the Army (HQDA) Planning. Following guidance from OSD, HQDA publishes a series of guidance to its Combatant Commanders (COCOMs), MACOMs, Agencies, and Activities involved in the process. A brief detailing and explanation of the guidance published by HQDA follows:

(1) The Army Plan (TAP). The purpose of the TAP is to provide Army strategic goals and objectives (section I), risk guidance and capability priorities (section II), and programming guidance at the resource task level (section III). TAP identifies and prioritizes the essential and enduring capabilities the Army requires now and in the future, defining what the Army needs to do to meet the requirements of the combatant commanders and thereby fulfill the United States' national security objectives (see Figure 24, adapted from Morris [2006] for TAP description).

Purpose:

a. Army's blueprint/vision of the future.
b. Sets Army's goals, objectives and tasks.
c. Developed in four stand-alone sections (modules)

Sections:

Section I. Army Strategic Planning Guidance (ASPG)
Section II. Army Planning Priorities Guidance (APPG)
Section III. Army Program Guidance Memorandum (APGM)
Section IV. Army Campaign Plan (ACP)

Responsible Staff Agencies:

Sections I, II, and IV responsibility of DCS, G-3/5/7.
Section III responsibility of DPAE, G-8.

ARB - Approves each section of TAP
SRG - Provides final recommendation for each section
PPBC - Oversees development

Figure 24. TAP Summary Description.

(2) The Director, Programming, Analysis and Evaluation (DPAE) prepares the **Army Program Guidance Memorandum (APGM)** (TAP Section III) and **The Army Campaign Plan (ACP)** (Section IV). It completes the succession of guidance from strategic planning to mid-term planning to programming. Guided by planning priorities, the APGM translates operational tasks known as core competencies to resource tasks to perform Army Title 10 functions. It then prescribes other, non-operational task requirements to assure carrying out the three interdependent components of the Army Vision (People, Readiness and Transformation).

(3) The **Technical Guidance Memorandum (TGM)**, prepared by DPAE, complements the APGM and outline program intent with respect to resourcing the Army Vision. It provides coordinating instructions to guide PEGs during POM build. In addition, PEG-by-PEG guidance lays out programming priorities for specific programs set by the Secretary of the Army (SECARMY) and the Chief of Staff of the Army (CSA) and, for some programs, specifies a particular level of funding.

(4) Program Evaluation Groups (PEGs) help develop for publication in the APGM resource planning guidance that translates planning objectives into a prioritized plan for what the Army hopes to achieve in the POM. Long-range planning creates a vision of the Army 10 to 20 years into the future. In the 2- to 15-year mid-term, long-range macro estimates give way to a specified size, composition, and quality of combat and support forces. Derived from joint strategic planning and intermediate objectives to achieve long-range goals, this base force provides the planning foundation for program requirements. **DPAE then apportions the total obligation authority (TOA) to the PEGs for building their portion of the program.**

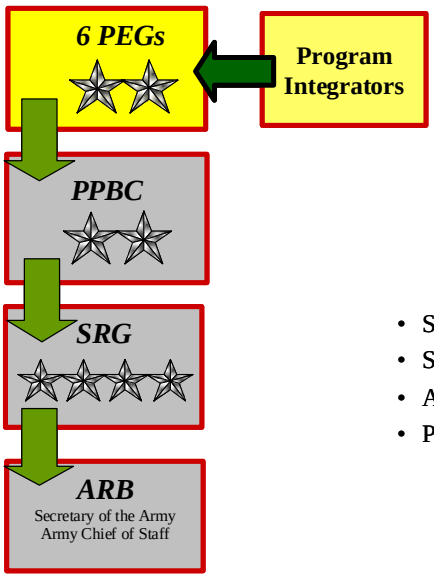
c. OSD Programming. Each service has its own methodology for translating the guidance given to it by OSD and OJCS into its POM. It is a prolonged, complicated, and contentious process that requires tradeoffs to be made among readiness, personnel, construction, procurement, research and development, and force structure. Draft POMs are then submitted back to OSD where they are reviewed by the staff over several months to ensure that the services adhered to the guidance issued. If expectations were not met and agreement cannot be reached at the staff level, program reviews are held at the most senior level during the summer to ascertain what course of action should be taken. It is then up to the Secretary of Defense (SECDEF) to issue **Program Decision Memorandums (PDMs)** that direct the services to make changes to their POMs.

d. HQDA Programming.

(1) Guided by base force requirements, primarily from the Total Army Analysis (TAA) process, and still in the mid-term, programming distributes available resources. It seeks to support priorities and policies of the senior Army leadership while achieving balance among Army organizations, systems and functions. Programming is, in essence, the application of resources on prioritized programs that links to the NMS, necessitated by a requirement that was based on a mission that required a capability to enable the national security objectives. These capabilities are detailed in 400-600 capability packages called MDEPs. MDEPs are used to record data in the automated PPBES Data Management System, called Probe. Probe gathers, organizes, records and translates the nine years of programming and budgeting resource data used n the PPBES process.

(2) HQDA uses six PEGs and three Program Integrators to support the initial stages of the planning, programming and budgeting processes. Each PEG programs and monitors resources to perform Army functions assigned by Title 10, US Code, within one of the following groupings: Manning (MM PEG), Training (TT PEG), Organizing (OO PEG), Equipping (EE PEG), Sustaining (SS PEG), and Installations (II PEG). The Director, Army National Guard (DARNG), Chief, Army Reserve (CAR), and Director of Information Systems for Command,

Control, Communications, and Computers (DISC4) serve as Program Integrators. Program Integrators provide technical assistance to the PEGs. DARNG and CAR help integrate into the Army program the statutory, Defense, and Army requirements of the Army National Guard (ARNG) and US Army Reserve (USAR). DISC4 helps integrate information technology programs and priorities (see Table 3, adapted from Morris [2006] for the PEGs and Co-chairs).



Title X Function	Co - Chairs
Manning	ASA(M&RA) & G-1
Equipping	ASA(ALT) & G-8
Training	ASA(M&RA) & G-3
Organizing	ASA(M&RA) & AASA
Sustaining	ASA(ALT) & G-4
Installations	ASA(I&E) & ACSIM

- Six Program Evaluation Groups (PEGs) are used to support PPBE
- Secretariat & functional proponent co-chair each PEG
- ARNG, OCAR, and G-6 serve as Program Integrators within each PEG
- PEGs, assisted by the Program integrators,
  - ✓ **Build Section III of The Army Plan (TAP)**
  - ✓ **Administer a set of Management Decision Packages (MDEP)**
  - ✓ **Set the scope, quantity, priority, and qualitative nature of requirements**
  - ✓ **Build the POM and convert the programs into budget-level detail**
  - ✓ **Help defend program during the review process**
  - ✓ **Track program during execution.**

* DARNG and CAR SERVE AS BOTH MACOM AND APPROPRIATION SPONSOR

Figure 25. PEGs and Senior Review Panels.

(3) Each of the 400 – 600 MDEPs is assigned to one of the six Title 10 PEGs to help build and track the Army POM that forms the Army portion of the DoD FYDP. MDEPs are used to help the CSA and SA determines military requirements; develop programs to support requirements; and carry out approved programs. MDEPs are also used to link Probe, SAMAS and TAADS; and individual training programs in the Army Individual Training Requirement (ATRRS) and the Army program for individual training (ARPRINT).

(4) Title 10 PEGs administer assigned MDEPs. They set the scope, quantity, priority, and qualitative nature of resource requirements that define each PEG program. They monitor PEG resource transactions, making both administrative and substantive changes to their MDEPs as required. Other PEG-level duties include, but are not limited to, the following:

(a) Reviews assigned MDEPs in terms of TOA guidance received from OSD and distributed by DPAE in coordination with G-3. They also review command and agency POMs together with Combatant Commander's integrated priority lists (IPLs) and Army Service Component Command (ASCC)-developed requirements supporting them. PEGs relate these command operating requirements to HQDA guidance as well as to existing MDEPs and new initiatives.

(b) Builds an executable program for its assigned function, making sure its program is reasonable and has continuity and balance. In the process, the PEGs:

(1) Validates field POMs submitted by MACOMs, PEOs, and other operating agencies and assign levels of resourcing risk (see Figure 26, from Morris [2006], below for risk levels associated with program validation).

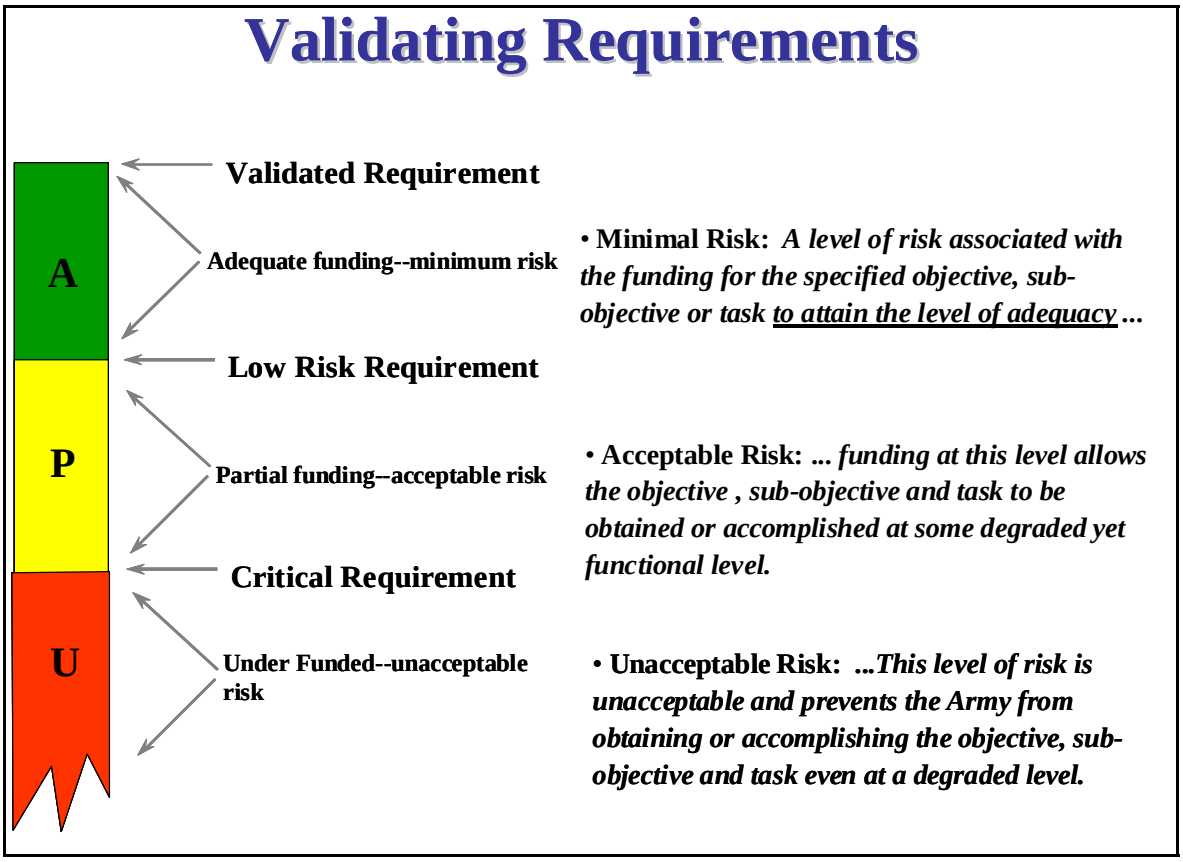


Figure 26. Validation Risk Levels.

(2) Reconciles conflicts involving un-resourced requirements or decrements on which commands fail to reach agreement.

(3) Recommends the allocation of available resources and offsetting decrements to support approved un-resourced programs.

(4) Rank orders validated but un-resourced programs.

(5) Evaluates HQDA, command, and other agency zero-sum realignments that reallocate programmed resources to meet existing shortfalls and changed requirements.

(6) Coordinates resource change with appropriate Service, DoD, and non-DoD agencies when required.

(7) Makes sure that proposed reallocations conform to legal restraints and Army policy and priorities; avoid imprudently high risk; maintain the executability of mandatory programs and subprograms.

(8) Validates functional requirements.

(9) Enforces fully funding civilian manpower levels per Army priorities.
(10) Integrates statutory, Defense, and Army requirements of the ARNG and USAR.
(11) Helps build the Army program and catalog the program in the Army POM.

e. OSD Budgeting Phase. Once the services have resubmitted their POMs, the OSD comptroller repackages them into the FYDP, which is the 6-year defense plan. **The first 2 years of the POM serve as the Budget Estimate Submissions (BES).** Near the end of December, OSD submits the finalized plans to the **Office of Management and Budget (OMB)** where they are combined with the rest of the Executive Branch's budget proposal, and offered to Congress by the first Monday in February at the President's budget submission.

f. HQDA Budgeting Phase. Program and Budget Guidance (PBG) is issued by DPAE after each PPBES phase. The PBG provides resource guidance to MACOMs, PEOs, PMs, and other operating agencies. The guidance instructs commands and agencies in addressing resource requirements, such as those related to flying hours; ground operating tempo (OPTEMPO), rates for fuel, inflation, and foreign currency.

9. Roles of Other Key Commands and HQDA Staff Managers Involved in the Programming Phase.

a. COCOMs, MACOMs, and the field Army – Identify requirements and develop capability solution packages (i.e., MDEPs) for satisfying the requirement, to include new acquisitions using the JCIDS process, needed to achieve Army and DoD objectives and guidelines. The majority of the MDEPs are originated at this level, based on a set of specific analytical guidelines for identifying, decomposing, developing courses of action, developing a data collection plan, conducting the investigation, answering the set of related questions, coordinating with stakeholders, packaging the results and submitting the package to DPAE for consideration (see Paragraph 10.d. below for a description of the MDEP development process).

b. Army G-37 - Since overall prioritization is the responsibility of the Army G-37, resource integration and prioritization across PEGs is his responsibility. However, the DPAE for G-8, with the Deputy Assistant Secretary of the Army for Budget (DASA-B) for the Assistant Secretary of the Army (ASA) Financial Management and Comptroller (FM&C), and the Assistant G-3, guide and integrate the work of the PEGs throughout the planning, programming, budgeting, and execution process.

c. **Senior Review Board (SRG), Army Resource Board (ARB) and Executive office of the Headquarters (EOH) -** Final approval of allocated resources (see Figure 27, adapted from Morris [2006], below for a graphical depiction of PPBE process flow).

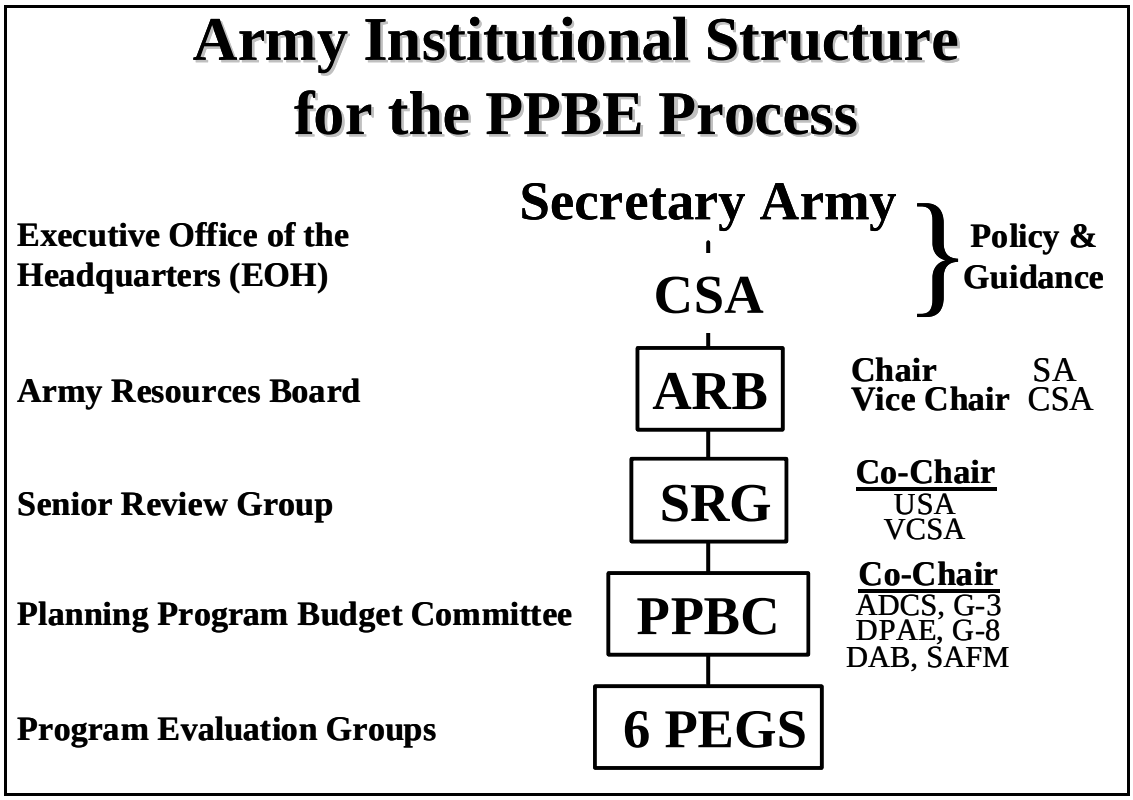


Figure 27. Institutional Structure for the PPBES Process.

d. The Army Resource Board (ARB) – The ARB, chaired by the Secretary of the Army, sets policy and approves guidance and priorities; approves the prioritization of Army programs; and selects resources allocation alternatives. In addition the ARB approves The Army Plan, the Combined POM and BES for forwarding to OSD.

e. The Senior Review Group (SRG) – The SRG, co-chaired by the Under Secretary of the Army (USA) and the Vice Chairman for the Secretary of the Army (VCSA), resolves resource allocation and other issues; provides recommendations to ARB regarding prioritization of programs and resource allocation alternatives; monitors ARB decision implementation; provides final recommendations on TAP, POM, BES and other issues of importance to HQDA as determined by the USA and Vice Chief of Staff of the Army VCSA.

f. The Planning Program Budget Committee (PPBC) – The PPBC, co-chaired by the DPAE, G-8 (Program Lead), the Director of Army Budget (DAB), Assistant Secretary of the Army (Financial Management and Comptroller (SAFM) (Budget Lead) and ADCS, G-3 (Planning Lead), serves both coordinating and executive advisory role in PPBES; provides a continuing forum in which planning, program and budget managers review, adjust and recommend courses of action on relevant issue; utilizes the PEGs in PPBES; and coordinate and provide advice on program change proposals (**PCPs**) and budget change proposals (**BCPs**).

10. Other Major Processes Influencing the Identification and Prioritization of Army Requirements.

a. ***The Total Army Analysis (TAA) Process*** - The TAA process is the start point for determining requirements and thus Army capabilities. The TAA, supported by modeling and simulation (M&S), is conducted by the Center for Army Analysis (CAA) using the 9-year planning horizon of the PPBES. The requirements for Army force structure is determined by decomposing the guidance in the NSS and NMS, Strategic Planning Guidance and the Joint Programming Guidance, the strategic documents that communicates to services the threats which the US must be capable of defending against and defeating. In addition, operational scenarios from COCOMs, force structure and equipment from field commanders and modernization actions from PEOs are also factored into the modeling and simulations. The primary outputs from the TAA process yields the required force structure, without regards to unit ownership by Army Components, and the initial POM force structure required to satisfy the strategic guidance, but within the constraints of the statutory end-strengths.

(1) Based on telephone interviews with several CAA SMEs involved in the TAA process, there are very few people (approximately eight Army-wide) who truly understand the TAA process, and, like the PPBES process, current regulations and procedural guidelines do not reflect the details of the current processes used.

(2) General Overview. The old 1-4-2-1 assumes a "simultaneity stack" where all potential threats initiate operations against the US interest at once, as if we were in World War III. Although applied for force years 2009 – 2013, the 1-4-2-1 construct will no longer be used in the TAA M&S in the future (see Figure 28 from Morris [2006]). Results of the Quadrennial Defense Review (QDR) for 2006 included a new "Force sizing construct" that involves a seven-year look into the future based on 76 (classified) scenarios. CAA is still deciding how exactly to apply this new construct. In between TAAs, force structure decisions are made by G3 Force Management (FM) using SAMAS as well as Foreign Forces Database (FFDB). The next TAA is 'TAA 15', which will investigate the Army force structure needed for force years 2010 to 2015, and will apply the new QDR 2006 force sizing construct.

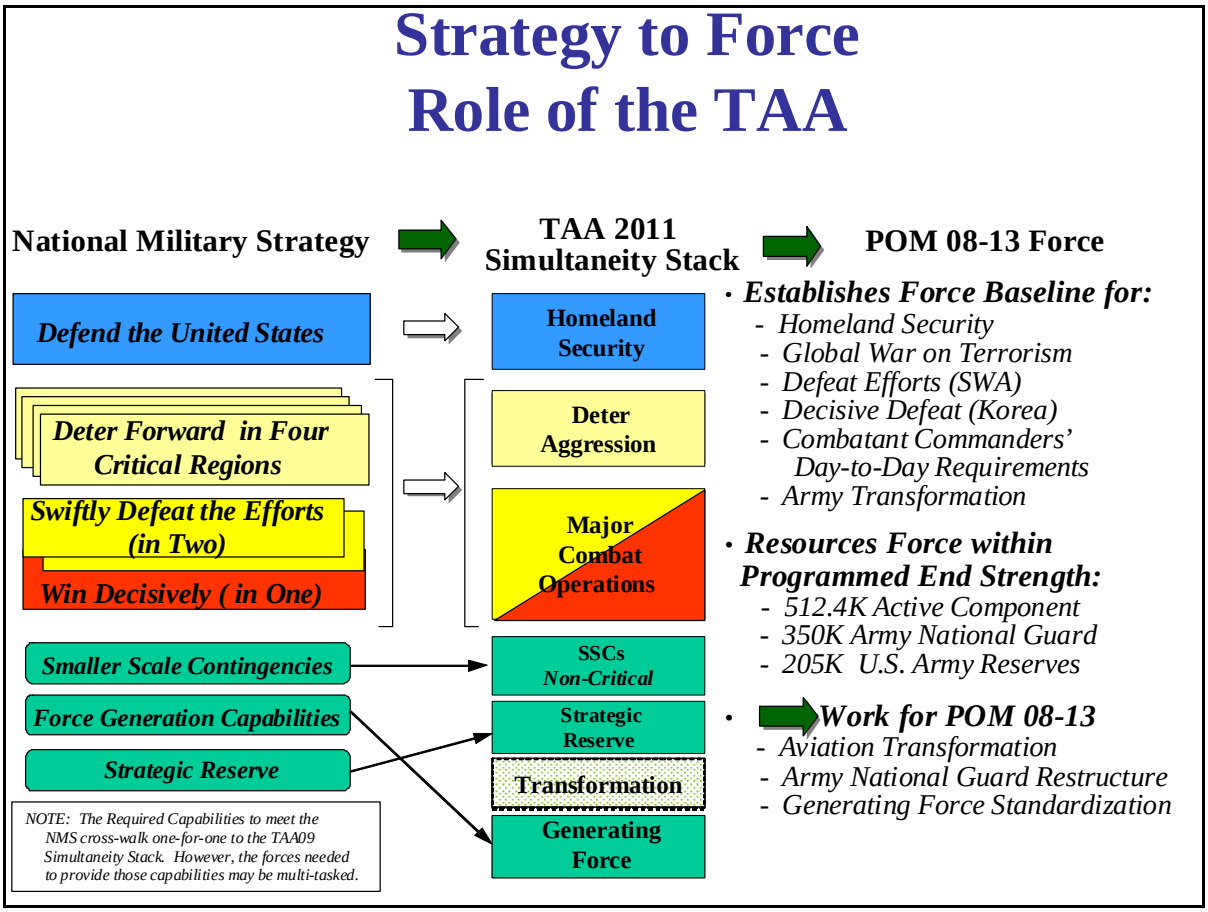


Figure 28. Prior-QDR 2006 TAA Process.

(3) The TAA process determines total Army force requirements, generated with the assumption that all threats will occur simultaneously. The force requirement is then compared to the authorized end strength imposed by Congress and the difference becomes an unfunded force requirement. Although the quantified difference is classified information and was not obtained during the telephone interview, Center for Army Analysis (CAA) SMEs stated that the difference is significant. Within the confines of the Army end-strength, force adjustments are made to achieve force balance within a zero-sum game construct (i.e., the Army may trade one unit for another, but cannot exceed its statutory end-strength). After the force balancing process is completed, it is followed by discussions and decisions among Army components (COMPOs) about unit ownership. A brief description of some of details comprising the TAA process follows:

(a) Using field provided source requirement codes (SRCs) and MTOE quantities, types and 'capability statements' that identify what a unit can accomplish (e.g., Section 1 of a TOE might state that the unit is capable of traversing 102,365 miles of road), capabilities are run against allocation rules, planning factors, ports/airfields, and other scenario considerations using such models as Joint Integrated Contingency Model (JICM) and FORGE (the CAA Campaign model that estimates CSS and force requirements after the fight). For smaller scenarios, organizational integrators (OIs) who are uniquely familiar with smaller scenarios, collaborate to identify force structure requirements by matching new mission requirements/scenarios with one

from a library set of fictitious scenarios, and use their military and proponent-level expertise to estimate force structure requirements. They assist CAA in ensuring the unit identification (source requirement code (SRC) level) and operational utilization (i.e., staying true to operating concepts and unit capabilities) are satisfied during M&S and when generating force requirements for the set of smaller scale contingencies.

(b) Results from the TAA process is sent to the Army G8 (Force Feasibility Review (FFR)). The FFR is conducted annually and considers (a) equipping) (b) manning and (c) training associated with the Army force structure. The output from the FFR is a strategy for moving the Army Force Structure from its current state (Current Modular Force) to its desired future state (Future Modular Force), throughout the FYDP.

(c) The Branch proponents assist in deciding which compo buys which SRC (e.g., if medium truck companies increase from 48 to 50, then the owning component must purchase the additional two companies, offsetting with current capability to ensure end-strength balance). These decisions are then vetted through Council of Colonels (CoCs) and General Officer Steering Committees (GOSCs). In addition, "behind the scenes" work occurs throughout the process and is negotiated at the proponent branch levels. However, facilities, stationing (installation), and training aren't usually explicitly considered.

(e) The results are then published in the Army Structure (ARSTRUC) Message.

b. ***The Integrated Priority List (IPL).*** The COCOMs IPLs also influence force structure requirements and decisions, priorities and resulting resource allocations.

(1) The IPL is a list of a combatant commander's highest priority requirements defining shortfalls in key programs that, in his judgment, adversely affect his command's ability to accomplish his assigned missions. The IPL provides the combatant commander's recommendations for programming funds in the PPBES process, and represent the initial step in identifying critical warfighter capability shortfalls that need to be addressed in the FYDP.

(2) IPLs are usually not service specific nor are they resource constrained. That said, each IPL capability issue will impact one or more services and the associated recommended programmatic solutions will emphasize programming that can be linked to individual services. Recommended solutions can reach to manpower, systems and/or programs, and monetary. IPLs are not resource constrained, yet they allow the Services to develop their own programmatic solutions to meet the identified capability shortfalls (see Table 5 from Morris [2006] below for description and utility).

Integrated Priority List (IPL)

Each Combatant Command builds an Integrated Priority List, representing the Combatant Commander's top warfighting needs while highlighting program deficiencies that impact warfighting capability and providing the Combatant Commander's recommendations on curing these deficiencies

Description:

- **Published annually by each command**
- **Identifies and prioritizes capability issues that:**
  - **Preclude achievement of a command mission**
  - **Require development during POM build**
- **Provides recommended programmatic solutions**
- **Usually 7-10 issues; classified**
- **Influences CJCS in developing JPD, CPR and CPA; Influences SPG/JPG; Critical input into Program/Budget Review**

HQDA Utility:

- **Provide insight into COCOM warfighting needs not currently being met by the Program**
- **Intended to influence development of Service POM/BES**
- **HQDA must be concerned about the current year's IPL and the prior year's IPL – both will influence development of the POM/BES and the OSD Program and Budget Review**
- **Satisfaction of IPL important source of POM/BES justification – if there is an IPL for your program, you must explain how it was responded to**

Figure 29. Summary of the Integrated Priority List.

(3) Army's Service Component Commands (ASCC), during the integrated POM/BES data call, must be matched to IPLs to ensure that the PEGs can report on their ability to satisfy COCOM IPLs.

c. ***The Quadrennial Defense Review (QDR)*** – The QDR is a comprehensive examination of America's defense needs to include potential threats, strategy, force structure, readiness posture, military modernization programs, defense infrastructure, and information operations and intelligence that is conducted by law every four years at the beginning of a new administration. The QDR is scheduled every four years and was mandated by Congress in the late 1990s and directs the SECDEF to assess defense strategy and force structure every four years on a 20-year planning horizon. The intent is for the Pentagon to produce a product that defines a 20-year road map which addresses DoD's strategy toward force structure, force modernization, infrastructure, and budget. The QDR released in 2006 was the first one conducted entirely after 9/11 and the Iraq War and classified threats in categorical groupings (i.e., traditional, irregular, catastrophic, or disruptive) and charted the likelihood of each type of threat and America's vulnerability to each. Figure 30, from Morris (2006), provides a summary overview of the QDR.

Quadrennial Defense Review (QDR)

The QDR fulfills the Government Performance and Results Act (GPRA) of 1993 requirement that DoD submit to the Office of Management and Budget and to the Congress a strategic plan for agency program activities. DoD meets the requirement using the Quadrennial Defense Review (QDR)

Description:
- **Published by DoD every 4 years**
- **Benefits from extensive consultation with the President of the United States**
- **Outlines the key changes needed to preserve America's safety and security in the years to come**
- **Particular emphasis is given to homeland defense, surprise, preparing for asymmetric threats, to the need to develop new concepts of deterrence, to the need for a capabilities-based strategy, and to the need to balance the different dimensions of risk.**

HQDA Utility:
- **Should be used to determine the strategic direction and planning principles for all Army planning efforts**
- **Impacts most significantly on Army Modernization Plan and TAP Sections I and II**
- **Requirements and program defense and/or justification should cite specific QDR passages when possible**

Figure 30. Summary of the QDR.

The 2006 QDR also sets forth a specific series of recommendations for implementing the goals and objectives of the NSS and NMS. These recommendations are specific capabilities-based recommendations for each service of the DoD that take into account current capabilities and future projected military requirements that will be needed to implement the NSS, NMS, and provide for global security and the nation's strategic interests. Based on this assessment, the DoD reorients its capabilities to better meet national security demands.

d. *MDEP Development, Classification, Use and Update.*

(1) MDEP Description. MDEPs represent the translation of Army total requirements into stand-alone functional and validated capability packages. Individually, a MDEP describes a particular organization, program, or function, and (a) specifies the military and civilian manpower and dollars associated with a program undertaking; (b) displays resource requirements across Army commands and appropriations; and (c) justifies the resource expenditure.

(2) MDEP Development. New MDEPs are developed as a result of changing requirements based on decisions reflected in the TAP and guidance from the SECDEF and Army leadership. These changes fall into four general categories as follow: (a) MDEPs that are initiated from the field; (b) MDEPs directed by HQDA; (c) MDEPs initiated by HQDA; and (d) MDEPs directed by the SECDEF in the Defense Planning Guidance (i.e. Compliance MDEPs). A brief explanation of each of these categories follows:

(a) *Field-initiated MDEPs* respond to program initiatives and other requirements or displays submitted typically through command POMs. POMs of MACOMs serving as the Army component of a combatant command include combatant commander's requirements.

(b) *HQDA-directed MDEPs* cover needs identified in the TAP, and address deficiencies that significantly hinders the Army in performing its mission. These deficiencies are determined through the TAA process, or through policy thrusts stated in the program Decision Memorandum. DA-directed MDEPs are prepared by the effected commands to record the resources needed to meet their respective requirements, and are not subject to TOA constraints imposed on field-initiated MDEPs.

(c) *HQDA-initiated MDEPs* are prepared by functional proponents to fill program gaps not covered by existing MDEPs and other new MDEPs. This MDEP category includes Technical MDEPs to support technical management and pricing during programming and budgeting; and military pay MDEPs that reflect military manpower authorizations contained in functional MDEPs.

(d) *Compliance MDEPs* are prepared by HQDA staff agency functional proponents. Compliance MDEPs adjust Army functional programs mainly to meet requirements mandated by Defense Planning Guidance (DPG) to overcome inadequacies in the overall defense program.

(3) MDEP Development Process. Generally speaking, the development of a MDEP follows the Army's problem solving model, but has a resource mapping orientation. The MDEP development process follows:

(a) Define the problem (phrase the problem as the resource question to be resolved). Study the issue (literature review) and determine objectives to be achieved and constraints on what's to be done.

(b) Determine inter-relationships between your problem and other programs and functions. Consider possible approaches to solve the problem, to include the time limits for completing the action.

(c) Confer with SMEs and functional experts, action officers and others. Determine the staff agencies and MACOMs affected and ask them how they understand manning and funding for the issue and what MDEPs might apply.

(d) Ask where other manpower and funds invisible to your functional and subject matter experts might also reside.

(e) Assemble relevant documents that concern the issue and study and analyze each aspect of the issue.

(f) Consider what, who, why, when, where and how. For example, ask: What commands and agencies relate to the issue; what functions or program; what goods or services do they provide; what kinds of resources apply; who have interest in the issue; who programs the

resources; who spends them; who benefits; why is this an issue; why important; when do resource requirements begin and end; where do I find the information I need; how can I get it.

(4) Executing the MDEP development process. The steps for developing a MDEP follow:

(a) Clarify the resource-mapping problem posed by the issue. Dissect the issue into separate parts for analysis (issue decomposition). Consider programs and functions that relate to the overall issue or its defined parts.

(b) Having clarified the problem part by part, now define it. In specific and detailed terms, spell out the resource question you must resolve and develop alternatives for resolving it (i.e., develop a data collection plan). The idea is to determine which approach makes the most fiscal sense.

(c) Answer the questions in the data collection plan, tracking such things as expenditure lead times, affected MDEPs, APEs and OSDPE, stakeholders, manning and funding.

(d) Compare the alternatives. After collecting and analyzing the data, prepare a report answering the resource question you've defined. Make sure to distinguish any unfinanced requirements. Often the short time available or other constraints will restrict the thoroughness of your solution. When this occurs, state the conditions and describe how the limitations they impose affect the results. Also describe any premises or assumptions underlying the study.

(e) Determine future action. To complete the solution, determine what future action is required. Depending on the nature of the issue, you typically have three options.

- Consolidate the resources found into a single permanent MDEP covering the resource issue.
- Consolidate the resources into a single temporary MDEP either as a special visibility program or short term project.

- Continue to account for resources in multiple MDEPs. In this case, document the mapping procedure both to allow incremental improvement and also to allow you or your successor to reproduce the analysis when changes warrant.

(g) Verify the solution. On completing the solution for the resource issue, coordinate the report with your stakeholders, including all program managers and MDEP and PEG POCs having an interest in your conclusions. Ensure to verify (or fail to verify) the various components of the solution with the stakeholders, amending the report as required.

(5) Classification of MDEPs. MDEPs are classified into one of six resource management areas as follow: (a) MTOE units; (b) TDA units; (c) Standard Installation Organizations (SIO); (d) Systems Acquisition; (e) Special Visibility Program (SVP); and (f) Short Term Project (STP).

(a) The first three areas may be grouped as organizational MDEPs. The grouping relates resources of (1) MTOE units to warfighting missions; (2) TDA units and standard functions to MTOE support; and (3) Garrison installations to populations served.

(b) *Organization MDEPs* are derived from the force structure (TAA by CAA) and are aligned with individual force units, allowing the programming process to correspond with the way that commands execute the budget.

(c) *MTOE MDEPs* link resources to the wartime mission of an organization and its assigned MTOE units. An MTOE MDEP will contain funds for mission operations and training including fuel, other mission and training related supplies, and unit transportation. It will contain military manpower and can also contain civilian augmentation manpower and pay. MTOE MDEPs cover all MTOE units of the Active Army and Reserve Components.

(d) *TDA MDEPs* and Armywide Standard Function MDEPs relate TDA resources to the mission of a unique agency or command (e.g., MACOM, PEO, PM, HQDA, etc). A standard function MDEP identifies resources for functions as the disposition of remains, or printing and publishing.

(e) *Standard Installation Organizations (SIO) MDEPs* concerns operations of Army posts, camps, and stations worldwide. They cover resourced devoted to base support funded through operation and maintenance and other appropriations as well as those devoted to standard workload and performance factors (e.g., supply operations, personnel support and utility services).

(f) *System Acquisition MDEPs*, the fourth area, relates MDEP resources to acquiring, fielding, and sustaining information systems, weapon systems, and other materiel. MDEP can contain the resources needed to develop, procure, field, or sustain new systems. It can also contain resources for research and development activities unrelated to specific systems. For example, Weapon and Materiel Systems MDEPs, and Information System MDEP

(g) These first four areas provide a permanent structure for managing MDEPs. The remaining two, which cover special visibility program (SVP) and short term program (STP) MDEPs, provide a temporary structure.

(h) An ***SVP MDEP*** cuts across two or more management areas (i.e., MTOE units, TDA units, Standard Installation Organizations (SIO), Systems Acquisition, Special Visibility Program (SVP), and Short Term Project (STP)) and allows HQDA staff to define and protect resources for an area having high-level interest (e.g., military personnel, retired pay accrual, or an issue that is subject of a report required by Congress, OSD or the Army leadership). These are periodically reviewed to determine if a permanent MDEP designation can be assigned.

(i) An ***STP MDEP*** defines and protects resources for a designated project of specified duration (e.g., a base closure or force structure realignment). An STP MDEP can also define a resource wedge, an aggregate resource total for planning that over time must be spread in the

required detail to specific MDEPs. These are periodically reviewed to determine if a permanent MDEP designation can be assigned

(6) MDEP Usages.

(a) First, MDEPs are used to help the SECARMY and CSA discharge their responsibilities by providing visibility and information needed to: (a) determine military requirements; (b) develop programs to support the requirements; (c) carry out approved programs; and (d) check program results.

(b) Secondly, MDEPs are used by the SECARMY and CSA to link decisions and their priorities to accounts that record Service positions in the FYDP; and accounts in the Army Management Structure (AMS) that record funding transactions in Army activities and installations.

(c) Thirdly, MDEPs are used to link the Probe database with other key systems and programs, to include: (1) The Structure and Manpower Allocation System (SAMAS) and The Army Authorization Document System (TAADS); (2) The Army Individual Training Requirements and Resources System (ATRRS) and Army Program for Individual Training (ARPRINT), the ATTRS product that shows valid training requirements and associated training programs; and (3) depot maintenance programs.

(d) Lastly, and for investment accounts, managers for construction, for procurement, and for research, development, test and evaluation, first allocate program and budget resources by Army and OSD program elements (APE and OSDPE), project number, and Budget Line item Number (BLIN). They then distribute the resources to MDEPs within MDEP management areas (see sample MDEP management areas at Figure 5 below).

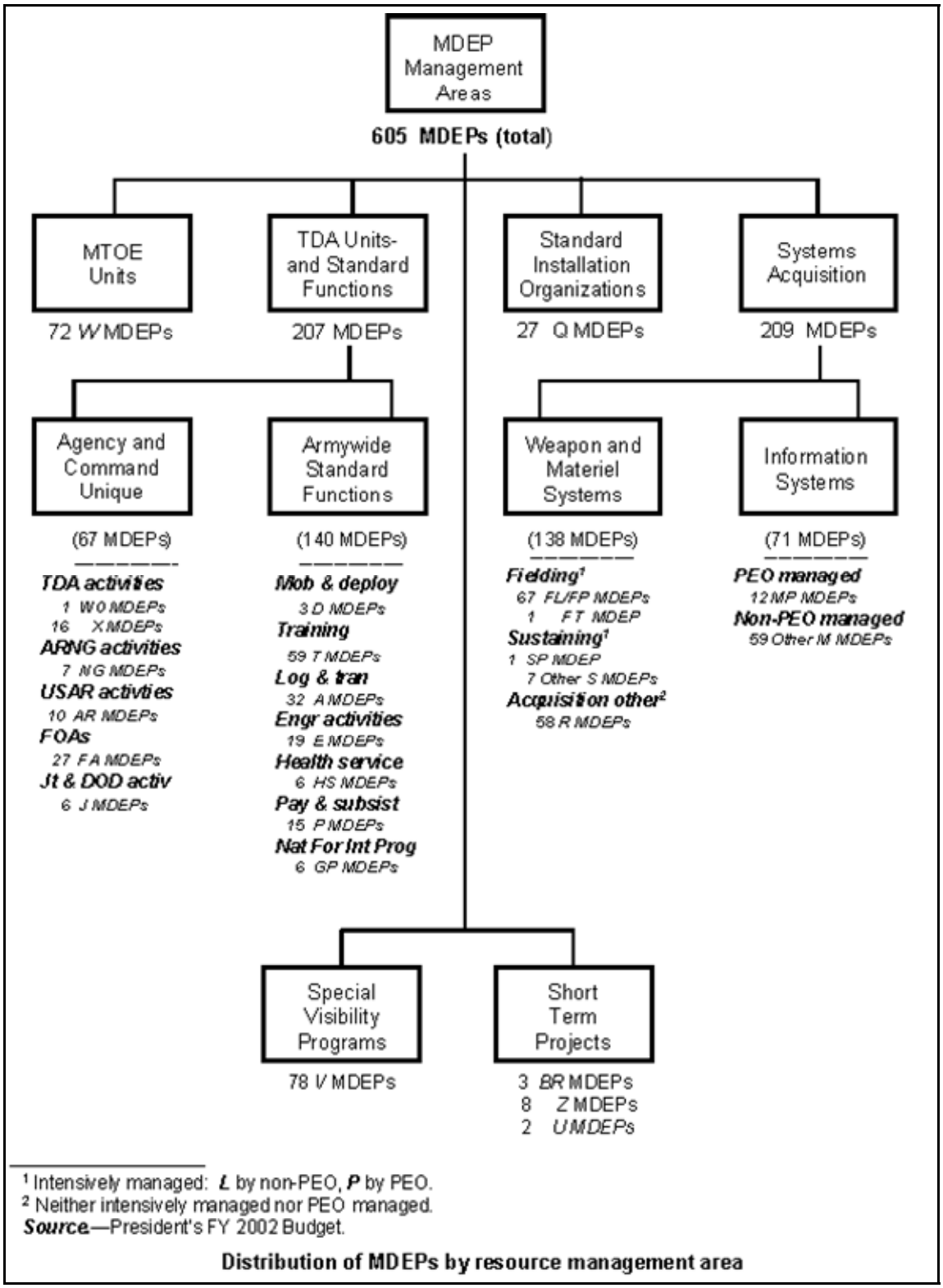


Figure 31. MDEP Management Structure.

(7) **MDEP Updates**. Functional proponents must continually update MDEPs through their respective feeder systems to reflect the position of the last program or budget event. The functional proponent and the PEG administrator owning the MDEP must continually weigh how the stream of program and budget actions affect the MDEP and how a change in the program year or budget year portion of the package may affect the other part.

- Potential questions to ask when updating a MEP include the following. In what ways do the changes: (1) Alter MDEP resource levels; (2) Shift resources between years; and (3) Affect resources in related MDEP.

10. The Joint Capabilities Integration and Development System (JCIDS). The JCIDS methodology implements a capabilities-based approach that leverages the expertise of all government agencies, industry and academia to identify improvements to existing capabilities and to develop new warfighting capabilities. This approach requires a collaborative process that utilized joint concepts and integrated architectures to identify prioritized capability gaps and integrated Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities (DOTMLPF) solutions (materiel and nonmaterial) to resolve those gaps. The JCIDS process is executed using a series of interrelated functional analyses, conducted within the framework of a joint operational environment (JOE). A brief explanation of these analyses follows:

(a) The Functional Area Analysis (FAA) identifies the operational tasks, conditions, and standards needed to achieve military objectives. It uses the national strategies, Joint Operating Concepts (JOCs), Joint Functional Concepts (JFCs), Joint Integrating Concepts (JICs), integrated architectures, the Universal Joint Task List (UJTL), the anticipated range of broad capabilities that an adversary might employ, and other sources as input. Its output is the tasks to be reviewed in the follow-on functional needs analysis. The FAA includes capability-based analysis in identifying the operational tasks, conditions and standards.

(b) The Functional Needs Analysis (FNA) assesses the ability of the current and programmed joint capabilities to accomplish the tasks that the FAA identified under the full range of operating conditions and to the designated standards. Using the tasks identified in the FAA as primary input, the FNA produces as output a list of capability gaps or shortcomings that require solutions and indicates the time frame in which those solutions are needed. It may also identify redundancies in capabilities that reflect inefficiencies. The FNA must include supportability as an inherent part of defining capability needs.

(c) The Functional Solution Analysis (FSA) is an operational based assessment of all potential DOTMLPF approaches to solving (or mitigating) one or more of the capability gaps (needs) previously identified. The order of priority for potential solutions is: (1) integrated DOTMLPF changes that leverage existing materiel capabilities; (2) product improvement to existing materiel or facilities; (3) interagency or foreign materiel solutions; and (4) initiation of new materiel programs.

11. Defining, Validating and Prioritizing a Capability in JCIDS.

a. In a capabilities-based approach, JCIDS attempts to establish a common understanding of how a capability is conceived and how it is expressed. The top down capabilities identification methodology provides a method to identify gaps in warfighting capabilities and assess associated risk(s).

b. A capability in JCIDS represents the ability to execute a specified course of action. It is defined by an operational user and expressed in broad operational terms in the format of an initial capabilities document or a DOTMLPF change recommendation. In the case of material proposals, the definition will progressively evolve to DOTMLPF performance attributes identified in the capability development document (CDD) and the capability production document (CPD).

(1) Capability Development Document (CDD) – A document that captures the information necessary to develop a proposed program(s), normally using an evolutionary acquisition strategy. The CDD outlines an affordable increment of militarily useful, logistically supportable and technically mature capability.

(2) Capability Production Document (CPD) – A document that addresses the production elements specific to a single increment of an acquisition program.

c. In describing capabilities to resolve identified gaps, the following guidelines apply:

(1) Capability definitions must contain the following elements: key attributes with appropriate measures of effectiveness, supportability, time, distance, effect (including scale) and obstacles to be overcome.

(2) Capability definitions should be general enough so as not to prejudice decisions in favor of a particular means of implementation, but specific enough to evaluate alternative approaches to implement the capability.

d. Functional Capabilities Boards (FCB). Each FCB implemented by the Joint Requirements Oversight Council (JROC) is responsible for all aspects, materiel and nonmaterial, of its assigned functional area(s). Each FCB will work as the lead coordinating body to ensure that the joint force is best served throughout the JCIDS and acquisition process. Each FCB will: "At least annually, review and endorse a prioritized list of DOTMLPF warfighting capability gaps within its assigned functional area(s), as recommended by the FCB Working Group."

e. Director, J-8, Joint Staff. Director, J-8, is the appointed JROC Secretary whose staff makes up the JROC Secretariat. Major responsibilities within the Directorate include:

(1) The Vice Director, J-8 will serve as the **"Gatekeeper"** of the JCIDS process. VDJ-8, with the assistance of J-6, J-7, the FCB Working Group leads and US Joint Forces Command (USJFCOM), will assign a Joint Potential Designator (JPD) and evaluate all JCIDS documents. The Gatekeeper will make the initial determination on the following:

- JPD assignment and who has validation and/or approval authorities.
- The lead and supporting FCBs.
- Assigned J-8 Capabilities and Acquisition Division lead.
- Ensure DOTMLPF change requests are addressed in accordance with established guidelines.

f. Within the JCIDS process, the sponsor is expected to lead the JCIDS analyses (to including the FNA and FSA, develop the initial capabilities document (ICD), while engaging and collaborating with appropriate organizations.

Annex I – Key Definitions.

1. **Army Program Element (APE)** – A data element that inter-relates programming, budgeting, accounting, and manpower control through a standard classification of Army activities and functions. APEs cross MDEPs and PEGs. APEs are referred to as Army Management Structure Codes (**AMSCO**) to comptrollers. There are also Office of the Secretary of Defense Program Elements (OSDPEs) which are OSD-level program elements. (APEs and OSDPEs do not match). Source - PPBES 101 Training, DAAR-RMP, 26 October 2006.

2. **Capabilities-Based Assessment (CBA)** – The JCIDS analysis process that includes four phases: the Functional Area Analysis (FAA); the Functional Needs Analysis (FNA), the Functional Solution Analysis (FSA), and the Post-Independent Analysis (PIA).

3. **Capability** – the ability to execute a specified course of action. It is defined by an operational user and expressed in broad operational terms in the format of an initial capabilities document or a DOTMLPF change recommendation. In the case of material proposals, the definition will progressively evolve to DOTMLPF performance attributes identified in the Capabilities Development Document (CDD) and the Capabilities Production Document (CPD). (CJCSM 3170.01A, 12 Mar 04).

4. **Center for Army Analysis (CAA)** - A Field Operating Agency of the Chief of Staff, Army, reporting to the Deputy Chief of Staff for Programs, the Army G-8. CAA maintains special expertise in the analysis of issues pertaining to theater-level operations and Army-wide processes, especially those involving resource allocations.

5. **Component (COMPO)** – Component refers to the subcomponents of the approved force structure as detailed below:

a. COMPO 1 – Active Army (AC).
b. COMPO 2 – Army National Guard (ARNG).
c. COMPO 3 – US Army Reserve (USAR).
d. COMPO 4 – Unresourced (primarily combat service support units deliberately not resourced so that available resources can be applied to higher priority peacetime needs).
e. COMPO 5 – Units not "matched" (represents the delta between on-hand and programmed forces and required forces as determined through the Total Army Analysis (TAA) process.
f. COMPO 6 – Army Pre-positioned Sets (APS).
g. COMPO 7 – Direct Host Nation Offsets (DHNS).
h. COMPO 8 – Indirect Host Nation Offsets (IHNS).
i. COMPO 9 – Logistics Civil Augmentation Program (LOGCAP) (support and services augmentation through contract with domestic and foreign firms).

6. **Cost Estimating Relationship (CER)** – A mathematical relationship that defines cost as a function of one or more parameters such as performance, operating characteristics, physical characteristics, etc. (DAU 11th Edition Glossary, Sep 03).

7. **Director of Program Analysis and Evaluation (DPAE) (G-8) –** For G-8, helps the Assistant Secretary of the Army (Financial Management and Comptroller) (ASA (FM&C)) manage the Planning, Programming, Budgeting and Execution System (PPBES). With the Deputy Assistant Secretary of the Army for Budget (DASA-B), manages the PPBES integrated programming and budgeting phrase. Co-chairs the Planning Program Budget Committee (PPBC).

8. **Functional Area –** A broad scope of related Joint warfighting skills and attributes that may span the range of military operations. Specific skill groupings that make up the functional areas are approved by the JROC (CJCS Instructions, 3170.01D, Mar 04).

9. **Functional Capabilities Board (FCB) –** A permanently established body that is responsible for the organization, analysis, and prioritization of joint warfighting capabilities within an assigned functional area (CJCS Instructions, 3170.01D, Mar 04).

10. **Future Years Defense Program (FYDP) –** A massive DoD database and internal accounting system that summarizes forces and resources associated with programs approved by the Secretary of Defense (SECDEF). Its three parts are the organizations affected, appropriations accounts (Research, Development, Test and Evaluation (RDT&E), Operation and Maintenance (O&M), etc.), and the 11 major programs (strategic forces, mobility forces, R&D, etc). The FYDP allows a "crosswalk" between DoD's internal system of accounting via 11 major programs and congressional appropriations. The primary data element in the FYDP is the Program Element (PE). The FYDP is updated twice during an On-Year Planning, Programming, Budgeting and Execution (PPBE) Process cycle: submission of the combined Program Objectives Memorandum (POM) /Budget Estimate Submission (BES) (usually August/September), and submission of the President's Budget (PB) (early February the year following). It is also updated by Program Change Proposals (PCPs) during the Off-Year PPBE cycle. (DAU 11th Edition Glossary, Sep 03).

11. **Increment –** A militarily useful and supportable operational capability that can be effectively developed, produced or acquired, deployed and sustained. Each increment of capability will have its own set of threshold and objective values set by the user (CJCS Instructions, 3170.01D, Mar 04).

12. **Issue Decomposition –** The process of developing essential elements of analysis (EEA) and measures of merit (MOM) using the study issue. (Developed by TRADOC and TRAC analysts) – Note: This definition can also be extended to requirements and capabilities.

13. **Joint Capabilities Integration and Development System (JCIDS) –** A joint concept-centric capabilities identification process that will allow joint forces to meet the full range of military challenges of the future. The procedures established in the JCIDS support the Chairman of the Joint Chiefs of Staff (CJCS) and the Joint Requirement Oversight Council (JROC) in identifying, assessing and prioritizing joint military capability needs. (Adapted from the "purpose" and "policy" paragraphs in CJCSI 3170.01E, Mar 05).

14. **Joint Potential Designator (JPD)** – A designation assigned by the Gatekeeper to specify JCIDS validation, approval and interoperability expectations (CJCS Instructions, 3170.01D, Mar 04).

15. **Major Program** – 1. A term synonymous with Major Defense Acquisition Program (MDA). 2. In the context of the FYDP, a Major Program is an aggregation of Program Elements (PEs) which reflects a force or support mission of DoD and contains the resources necessary to achieve an objective or plan. It reflects fiscal time-phasing of mission objectives to be accomplished and the means proposed for their accomplishment. The FYDP is comprised of 11 major programs as shown below. Those considered combat forces programs are marked by an asterisk below (DoD 7045.7-H).

a. Program 1 – Strategic Forces
b. Program 2 – General Purpose Forces
c. Program 3 – Command, Control, Communications, Intelligence and Space
d. Program 4 – Mobility Forces
e. Program 5 – Guard and Reserve Forces
f. Program 6 – Research and Development
g. Program 7 – Central Supply and Maintenance
h. Program 8 – Training, Medical and other General Personnel Activities
i. Program 9 – Administration and Associated Activities
j. Program 10 – Support of Other Nations
k. Program 11 – Special Operations Forces

16. **Management Decision Package (MDEP) -** A stand alone functional package that describes a particular organization, program or function capturing total resources over a 9 year period for the Army (Active, Guard, Reserve and civilian work force).

17. **Measure** – A quantitative, qualitative, or categorical value that describes an attribute and that is drawn from a defined set (e.g., the real numbers, true/false). (Developed by TRADOC and TRAC analysts).

18. **Measure of effectiveness (MOE)** – A qualitative or quantitative measure of a system's performance or a characteristic that indicates the degree to which it performs the task or meets a requirement under specified conditions. MOEs should be established to measure the system's capabilities to produce or accomplish the desired result.

19. **Metric** – A defined (most often by an analyst) relationship that translates one or more sets of qualitative or quantitative observations into a set that can be measured. An analyst uses metrics to obtain measures on operational characteristics that inform answering essential elements of analysis (EEA) and issues. (Note: the metric defines the relationship. The value that results from applying the metric is the measure. For example, one aspect of military operations to measure is how Blue does against the Threat. A metric for describing this aspect is obtained by dividing the number of blue kills by the number of red kills, which leads to a measure that is drawn from the set of positive real numbers). (Developed by TRADOC and TRAC analysts). (2) <u>Metrics = MOE</u> – a qualitative or quantitative measure of a system's performance or a

characteristic that indicates the degree to which it should be established to measure the system's capabilities to produce or accomplish the desired result.

20. **National Military Strategy (NMS)** – Joint Strategic Planning System (JSPS) document developed by the Joint Staff. Provides the advice of the Chairman, Joint Chiefs of Staff (CJCS), in consultation with the other members of the JCS and the Combatant Commanders (COCOMs), to the President, the National Security Council (NSC), and the Secretary of Defense (SECDEF) on the NMS. It is designed to assist the SECDEF in preparation of the Defense Planning Guidance (DPG). (DAU 11th Edition Glossary, Sep 03)

21**. Planning, Programming, Budgeting and Execution (PPBES) Process** - The primary Resource Allocation Process (RAP) of DoD. It is one of three major decision support system for defense acquisition along with Joint Capabilities Integration and Development System **(JCIDS)** and the Defense Acquisition System. It is a formal, systematic structure for making decisions on policy, strategy, and the development of forces and capabilities to accomplish anticipated missions. PPBES is a biennial process which in the On-Year produces a Defense Planning Guidance (DPG), approved Program Objective Memorandums (POMs) for the Military Departments and Defense Agencies covering six years, and the DoD portion of the President's Budget (PB) covering two years. In the Off-Year, Budget Change Proposals (BCPs) and Program Change Proposals (PCPs) are used to adjust the Future Years Defense Program (FYDP) to take into account "fact of life changes," inflation, new programmatic initiatives, and the result of congressional enactment of the previously submitted PB. (DAU 11th Edition Glossary, Sep 03).

22. **President's Budget (PB)** – The Federal Government's budget for a particular Fiscal Year (FY) transmitted no later than the first Monday in February to the Congress by the President in accordance with the Budget Enforcement Act of 1992. It includes all agencies and activities of the executive, legislative, and judicial branches.

23. **Priority** – Precedence in rank, order, or importance. Relative priorities for developing the POM provide guidance on the risk the senior Army leadership is willing to accept as follows:

a. Priority 0 – A must-fund task or interest, not included in priorities 1-3, that requires a specified level of performance.

b. Priority 1 – A task that significantly affects Army ability to perform its missions with very little risk.

c. Priority 2 – A task that significantly affects a Title 10 function accepting some risk.

d. Priority 3 – A task that enables key elements of a Title 10 function accepting moderate risk.

24. **Probe** – The Army program and budget database, the official database of the Planning, Programming, Budgeting, and Execution System (PPBES). Army uses Probe to prepare the Army Program Objective Memorandum (POM), Budget Estimate Submission (BES) to the Office of the Secretary of Defense (OSD), the President's Budget and all associated Future Year

Defense Programs (FYDPs), as well as Program Budget Guidance (PBG) to major Army commands (MACOMs).

25. **Program Analysis and Evaluation** – An office within OSD which evaluates programs of all services for priority of funding. An office within the Office of the Chief of Staff of the Army which evaluates Army programs for affordability and priority within Army funding limits. (TRADOC PAM 11-8)

26. **Program Objective Memorandum (POM)** – A biennial memorandum in prescribed format submitted to the Secretary of Defense (SECDEF) by the DoD Components (e.g., Army) heads which recommends the total resource requirements and programs within the parameters of SECDEF's fiscal guidance. The POM is a major document in the PPBES process system, and the basis for the component budget estimates. The POM is the principal programming document which details how a component proposes to respond to assignments in the Defense Planning Guidance (DPG) and satisfy its assigned functions over the FYDP. The POM shows programmed needs six years hence (i.e., in FY 2004, POM 2006 – 2011 will be submitted).

27. **Quadrennial Defense Review (QDR)** – A comprehensive examination of America's defense needs to include potential threats, strategy, force structure, readiness posture, military modernization programs, defense infrastructure, and information operations and intelligence that is conducted by law every four years at the beginning of a new administration.

28. **Qualitative Data** – A data value that is a non-numeric description of a person, place, thing, event, activity, or concept. (DoD 8320.1-M-1, "Data Element Standardization Procedures," January 15,1993).

29. **Quantitative Data** – Numerical expressions that use numbers, upon which mathematical operations can be performed. (DoD 8320.1-M-1, "Data Element Standardization Procedures, "January 15, 1993).

30. **Requirements** – As used in programming, describe resource elements of a program or initiative. Requested requirements represent those submitted by a command or functional proponent. Validated requirements represent those accepted by senior Army leadership as meeting leadership guidance and priorities.

31. **Risk** – Possibility of jeopardizing ability to achieve an objective or sub-objective or to carry out a task. As used in programming, levels of risk or funding are as follows:

a. Minimum risk/adequate funding (A) – Allows performance at a satisfactory level.

b. Acceptable risk/partial funding (B) – Allows performance at some degraded yet functional level.

c. Critical risk/funding – Allows performance at a minimum level with acceptable risk.

d. Unacceptable risk/underfunded (U) – Precludes performance even at a degraded level.

32. **Subject Matter Expert (SME) –** A person who has extensive training, knowledge or experience in a particular area. A professional, a specialist in a specific area (Adapted from TRADOC Pam 11-8).

33. **Total Obligation Authority (TOA) –** Total value of the direct defense program in a given fiscal year. Equates to all funding available for obligation within a fiscal year. Refers during programming to the total funds expected to be available for building the program. May refer to funding available across all program years.

34. **Validation –** Validation in the JCIDS process refers to the review of doc122987umentation by an operational authority other than the user to confirm the operational capability (CJCS Instructions, 3170.01D, Mar 04). Validation in PPBES process refers to the review of analysis and documentation by an authority other than the user to confirm that the analysis substantiates the capability needed and balances with the resources requested at various levels of risk.

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Appendix C – LOC FRD Annotated Bibliography

This appendix contains the complete report provided by the Library of Congress Federal Research Division (LOC FRD). The only changes made were to the pagination (and thus the Table of Contents as well), in order to synchronize this appendix with the remainder of the report.

STRATEGIC PLANNING TOOLS AND TECHNIQUES

An Annotated Bibliography Prepared by the Federal Research Division,
Library of Congress
under an Interagency Agreement with the
U.S. Army TRADOC Analysis Center

August 2007

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π 59 Years of Service to the Federal Government π
1948 – 2007

PREFACE

This annotated bibliography lists materials on strategic planning, focusing primarily on private- and public-sector organizational planning since the year 2000 and the use of limited organizational resources to meet strategic goals. The bibliography also includes material published before 2000 that was particularly informative or innovative.

The researcher used a number of information sources, including the holdings of the Library of Congress; journal databases such as JSTOR, ABI Inform, Proquest, and Emerald; syllabi for courses in strategic management and planning at Harvard, MIT, Wharton, and other business schools; reports of think tanks such as the IBM Center for the Business of Government, the National Academy of Public Administration, and the Urban Institute; and publications of U.S. government agencies such as the General Accounting Office, the Office of Management and Budget, and the National Archives. In addition, the researcher contacted numerous individuals at these organizations for recommendations on relevant material for this bibliography.

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KEY FINDINGS

- The Balanced Scorecard has received positive reviews as a tool for developing, implementing, and evaluating strategic plans. Numerous private- and public-sector organizations, including the Defense Finance and Accounting Service, have used the technique.
- The Harvard Policy Model, the strategic planning model most commonly used by state government agencies, has generally received positive assessments.
- Strategic Principles, Strategy Maps, and techniques for communicating strategic planning to managers and employees have received positive reviews for improving the implementation of strategic plans.
- Private-sector companies and government agencies, including the Department of Transportation, have given positive assessments of the strategic planning technique of Scenario Planning.
- Both private- and public-sector organizations have reviewed positively the Five Forces Model strategy.
- The use of alternative project proposals, based on different funding scenarios, to allocate resources and innovate programs has received limited, but positive, assessment.
- Despite its frequent use by private-sector companies, the SWOT (strengths, weaknesses, opportunities, and threats) technique has received mixed reviews as a tool for strategic planning formulation and implementation.
- Much of the strategic planning literature discusses best practices and processes to be included in strategic plans, rather than strategic planning techniques and tools.
- Many analysts contend that no particular strategic planning tool or technique has been consistently found to be effective. They suggest that organizations should craft strategic plans based on their own circumstances, goals, and resources.

ANNOTATED BIBLIOGRAPHY

Armstrong, J. Scott. "Does Formal Strategic Planning Really Help?" Contribution to ELMAR (Electronic Marketing) List, American Marketing Association, March 16, 2005, http://marketing.wharton.upenn.edu/people/faculty/armstrong/ELMAR/Formal%20Strategy%20Planning.pdf.

J. Scott Armstrong, a professor of marketing at the Wharton School of Business, contends that many well-known methods of formal strategic planning have not proven consistently effective for organization performance. Based on comparative empirical research of corporate planning methods, Armstrong argues that any effective strategic planning process include the following five steps: determining the firm's long-range objectives, generating alternative strategies, evaluating those strategies, monitoring strategy implementation and outcomes, and gaining the commitment of plan stakeholders.

Armstrong, J. Scott. "Don't Do SWOT: A Note on Marketing Planning." Classroom Material, Marketing Department, Wharton School of Business, University of Pennsylvania, July 31, 2004, http://marketing.wharton.upenn.edu/ideas/pdf/Armstrong/Educational%20Materials/Don't_do_SWOT3.pdf.

Armstrong argues that research on strategic planning methods provides no evidence indicating that businesses derive any benefit from using the SWOT strategic planning tool, which is based on analysis of a company's strengths, weaknesses, opportunities, and threats. Although SWOT is widely lauded, Armstrong argues that this technique suffers from a number of inherent problems. These defects cause a reduction in the range of strategy alternatives under consideration and fail to promote a return on investment for strategy alternatives. Armstrong contends that studies support his own five-step process for strategic planning, as outlined in his article "Does Formal Strategic Planning Really Help?" (described above).

Berry, Frances Stokes, and Barton Wechsler. "State Agencies' Experience with Strategic Planning: Findings from a National Survey." *Public Administration Review* 55, no. 2 (1995): 159–68.

Frances Berry and Barton Wechsler conducted a national survey of 548 state government agencies, examining the types of strategic planning processes used, the objectives of those processes, and their outcomes. The authors found that state government agencies most commonly use strategic planning models based on elements of the Harvard Policy Model. Most of these plans cover one to four years and eventually become part of quality management programs. In addition, the study results indicate that most state agencies find it beneficial to link strategic planning to their budgetary process, with the strategic plan often completed before the budgetary process. Although the authors discuss the benefits of

strategic planning in general, they do not examine the benefits of specific types of strategic planning.

Best Practices Benchmarking Report: Best Practices in Resource Allocation. Chapel Hill, NC: Best Practices, LLC, 2001.

Based on analyses of the resource allocation practices of many public and private entities, this report presents findings regarding the methods organizations use to allocate limited resources, thereby meeting their objectives and maximizing economic returns. After summarizing 10 key findings of best practices in resource allocation, the report illustrates each finding with concisely written examples from organizations ranging from Bridgestone to the United Nations Federal Credit Union. Key findings about methods organizations employ in resource allocation include the use of a standardized resource allocation process and quarterly or semi-annual budget cycles. A 36-page analysis of the integrated resource allocation systems that Best Practices produced for Glaxo Wellcome supplements this 30-page report.

Bryson, John M., and William D. Roering. "Applying Private-Sector Strategic Planning to the Public Sector." In *Handbook of Strategic Planning*, edited by Roger L. Kemp, 99–119. East Rockaway, NY: Cummings and Hathaway Publishers, 1995.

In a brief, richly informative comparison of strategic planning approaches, John Bryson and William Roering examine the applicability of different types of strategic plans for public-sector organizations, offering distinctive ways of understanding and approaching strategic planning. The article first outlines how organizations formulate, implement, and evaluate strategic plans and then analyzes the strengths and weaknesses of six strategic planning approaches, explaining how these approaches apply to public-sector organizations. Among the strategic planning approaches the authors examine are strategic issues management, process strategies, and the Harvard Policy Model. The authors do not endorse a specific strategic planning approach, emphasizing instead how different approaches are appropriate to different organizations. In addition, the authors show how to combine components of different strategic planning approaches, creating a hybrid approach appropriate for an organization's particular situation and objectives.

Campbell, Colin. *Corporate Strategic Planning in Government: Lessons from the United States Air Force*. Washington, DC: IBM Center for the Business of Government and the PricewaterhouseCoopers Endowment for the Business of Government, 2000.

In this 36-page report, Colin Campbell, a professor of public policy at Georgetown University, analyzes the strategic planning of the United States Air Force (USAF), a process established by General Ronald Fogleman in 1996 and continued by General Michael Ryan.

The author describes the failure of the USAF to meet its strategic plan expectations and the efforts it made to improve its strategic planning performance. Based on this analysis, the author recommends best practices for organizations to adopt in their own strategic planning activities. The report also includes a brief discussion of strategic planning in U.S. government agencies, as well as a brief assessment of best practices for private- and public-sector entities.

Dettmer, H. William. *Strategic Navigation: A Systems Approach to Business Strategy*. Milwaukee, WI: American Society for Quality Press, 2003.

The author offers a strategic planning model synthesizing ideas from a wide range of sources, including strategic planning models for business and military strategy concepts. William Dettmer's approach to strategic planning, which he calls the Constraint Management Model, rests on the idea that certain factors are necessary for business success, and that successful strategy identifies and builds upon these factors. The model's approach includes seven processes: identifying factors necessary for success; analyzing mismatches between current conditions and performance; creating a strategy to address the mismatch; verifying that the strategy will obtain the desired results; planning the strategy's execution; deploying the strategy; and, finally, evaluating the strategy. Each of the seven processes receives a chapter-length explanation in the book. The volume also contains a step-by-step guide to using the model. In addition, several appendices detail the author's proposed strategic planning approach, providing examples of how it might be implemented.

Franklin, Aimee L. "An Examination of Bureaucratic Reactions to Institutional Controls." *Public Performance and Management Review* 24, no. 1 (2000): 8–21.

Aimee Franklin, a professor at the University of Oklahoma, examines why some state government agencies successfully pursue strategic planning while other agencies have been less successful in their strategic planning efforts. The research assessed factors influencing government agencies to comply with or to demonstrate commitment to legally mandated strategic planning and evaluation goals. Based on the observations of participants in strategic plans, as well as on interviews conducted at government agencies in Arizona and Texas, the author found that agencies tend to exhibit commitment to strategic planning when an individual in the organization acts as a strong advocate of the process; when employees perceive planning and budgeting to be the same process; when agencies are able to implement strategic planning flexibly, allowing for strategic thinking and for addressing agency idiosyncrasies; and when employees perceive that internal and external decision makers actually use the information they provide for strategic plans.

Gadiesh, Orit, and James L. Gilbert. "Transforming Corner-Office Strategy into Frontline Action." In *Harvard Business Review on Advances in Strategy*, 71–94. Boston: Harvard Business School Press, 2002.

The authors, consultants for Bain and Company, discuss the Strategic Principle method, which promotes coherent strategic objectives and actions, especially in organizations with decentralized decision making, in which many individuals influence strategic plans. According to this method, strategic principles are short, pithy phrases that provide employees with a clear, concise, consistent, and easily memorized understanding of organizational strategy, thereby focusing employees' actions on common objectives. Basing their conclusions on their observation of private companies, Orit Gadiesh and James Gilbert contend that the Strategic Principle technique tests the strategic soundness of specific practices, promotes balance among competing resource demands, and establishes boundaries within which employees may exercise initiative. In addition, based on their observations of companies that have used the technique, such as Dell and Southwest Airlines, the authors suggest ways to design and implement strategic principles.

Grant, Robert M. *Contemporary Strategy Analysis*. 5th ed. Malden, MA: Blackwell Publishing, 2005.

Contemporary Strategy Analysis, a textbook on strategic management concepts and techniques, has a well-written chapter (Chapter 5) on the analysis of resources and capabilities, a subject for which the author, Robert Grant, is well noted. Operating on the premise that organizations are essentially pools of tangible, intangible, and human resources, which are the primary determinants of an organization's capabilities, the author identifies ways for organizations to use and augment available resources to develop an organizational strategy that gives them a competitive advantage in the marketplace. The text provides frequent examples from private-sector companies, as well as some case studies to illustrate resource allocation techniques. The volume also includes informative chapters on strategic management trends and organizational design.

Hammer, Michael. "The 7 Deadly Sins of Performance Measurement." *MIT Sloan Management Review* 48, no. 3 (2007): 19–28.

In a survey of company managers, Michael Hammer found widespread dissatisfaction with performance measurement practices, but no consensus on the cause of the problem. Based on his analysis, the author found that companies frequently make errors defining and using performance metrics. The article discusses these errors, offering recommendations for improvement. Among the common problems that Hammer found were competing performance measurements among company subunits and the use of performance measures that were easily and inevitably fulfilled. The article also contains half-page discussions of performance measurement problems, with recommended solutions written by representatives of seven companies, including Boeing, Tetra Pak, and Proctor and Gamble.

Kaplan, Robert S., and David P. Norton. "Having Trouble with Your Strategy? Then Map It." In *Harvard Business Review on Advances in Strategy*, 71–94. Boston: Harvard Business School Press, 2002.

Robert Kaplan and David Norton discuss the technique of Strategy Maps used to implement strategic plans. The authors created this technique as a complement to their Balanced Scorecard method of strategic planning. Based on their experience creating these tools for many companies, the authors explain how to implement Strategy Maps. They also focus on a case study of a division of Mobil Oil, which used Strategy Maps to transform its organizational structure and achieve strategic plan goals. Strategy Maps employ a technique aimed at communicating strategic plan elements to managers and employees and explaining to them how to use their capabilities to achieve strategic plan objectives. Strategy Maps are distinguished from other techniques by their use of cause-and-effect diagrams, which clearly communicate to employees ways to use innovation, skills, information technologies, and other intangible resources to implement and evaluate strategic plans.

Kaplan, Robert S., and David P. Norton. *The Strategy-Focused Organization: How Balanced Scorecard Companies Thrive in the New Business Environment*. Boston: Harvard Business School Press, 2001.

Kaplan and Norton observe that it is often more difficult to implement strategic plans than to formulate them. The authors created the Balanced Scorecard technique, which has proved useful in translating strategy into operational terms that are clear to employees and in linking the strategies of organizational subunits through shared objectives. Based on their wide experience as consultants, the authors assert that many companies successfully use the Balance Scorecard method of measuring strategic performance to implement their strategic plans. The text includes many case studies of organizations using the Balance Scorecard, including the Department of Defense and the Veterans Benefit Administration. The book, a practical hands-on guide for using the Balanced Scorecard method, includes a chapter on adapting the technique for use by federal government agencies.

Liner, Blaine, Harry P. Hatry, Elisa Vinson, Ryan Allen, and Pat Dusenbury. *Making Results-Based State Government Work*. Washington, DC: Urban Institute, 2001.

This book examines the practices employed in state governments for programmatic and policy-level decision making, providing recommendations related to performance measurement and management, including strategic planning and budgeting. The authors conducted detailed examinations of numerous agencies in five states, as well as analyzing particular agencies in 45 other states, interviewing citizens, agency staff, and government officials. Several chapters describe individual practices, including strategic planning, but the authors do not evaluate the results of these practices. However, each chapter contains

recommendations for strategic planning, budgeting, and other government practices. An appendix summarizes all of the recommendations listed in the chapters.

Mankins, Michael C., and Richard Steele. "Turning Great Strategy into Great Performance." In *Harvard Business Review on the High-Performance Organization*, 23–44. Boston: Harvard Business School Press, 2006.

Under the auspices of the consultancy firm Marakon Associates, Michael Mankins and Richard Steele examine private-sector companies to determine why they achieved or failed to achieve the financial and other objectives outlined in their strategic plans. The research focuses on the planning, execution, and evaluation of strategic plans, based on a 2004 worldwide survey of 197 companies, conducted in collaboration with the Economist Intelligence Unit. The authors found that companies that matched their performance to their strategic plans share a number of common practices. One such practice is the use of cross functional teams. These teams, drawn from various departments, debate the economic assumptions, rather than the forecasts of the strategic plan, basing forecasts and executable plans on the level and timing of critical deployments, while continuously monitoring performance. The authors discuss how Dow Chemical, Roche, and other companies have employed these practices to execute successfully their strategic plans. They also examine the practices of companies that did not meet their strategic objectives.

Mathys, Nicholas J., and Kenneth R. Thompson. *Using the Balanced Scorecard: Lessons Learned from the U.S. Postal Service and the Defense Finance and Accounting Service*. Washington, DC: IBM Center for the Business of Government, 2006.

Nicholas Mathys and Kenneth Thompson examine how two federal agencies have used the Balanced Scorecard technique and recommend several ways for other organizations to use this method. The first chapter provides an overview of the Balanced Scorecard, including its different uses in private- and public-sector entities. The following two chapters explain how the Defense Finance and Accounting Service (DFAS) and the United States Postal Service (USPS) have used the Balanced Scorecard method. In the fourth and final chapter, Mathys and Thompson provide several step-by-step recommendations for using the Balanced Scorecard format. The authors found that the Balanced Scorecard technique was instrumental in helping DFAS and USPS management identify, focus on, and achieve performance goals, thereby increasing productivity, reducing costs, and improving organizational morale.

National Academy of Public Administration. *Aligning Resources and Priorities at HUD: Designing a Resource Management System*. Washington, DC: NAPA, 2000, http://www.napawash.org.

The National Academy of Public Administration (NAPA) examines the effort of the Department of Housing and Urban Development (HUD) to meet its organizational objectives despite a reduction in resources, including a 25 percent decrease in total personnel. The report describes HUD's administrative and management reforms and the agency's resource management systems, examining HUD's and NAPA's research on other agencies' approaches to resource management. In addition, NAPA presents a framework for resource management, concluding its report with several recommendations on how HUD might implement NAPA's proposed resource management system. These recommendations include allocating departmental responsibilities for estimating resources and prioritizing tasks based on available resources.

National Academy of Public Administration. *Equal Employment Opportunity Commission: Organizing for the Future*. Washington, DC: NAPA, 2003, http://www.napawash.org.

This study, conducted at the request of the Equal Employment Opportunity Commission (EEOC), explores ways for the EEOC to enhance its organizational effectiveness and its use of scarce resources. The report examines EEOC's successes and failures in strategy and in matching its budget to its mission. The authors also discuss how EEOC might change its organizational structure, performance management, and other processes, thereby improving organizational and individual performance levels. Although NAPA wrote the report for EEOC, its recommendations on strategic planning may prove useful to other organizations.

National Academy of Public Administration. "An Overview: Results of the FY 2000 Annual Performance Reports and Round Two Strategic Plans–Higher Expectations." NAPA Report. Washington, DC, 2000, http://www.napawash.org.

This four-page document summarizes findings presented at a FY 2000 panel on government agencies' performance and strategic plans. The panel was composed of representatives of the Office of Management and Budget (OMB), the Department of Transportation (DOT), and the National Academy of Public Administration (NAPA). The DOT representative reported that the agency decided in 1998 to use Scenario Planning, a method that DOT has found beneficial. Scenario Planning has stimulated innovation and increased participation of stakeholders in the agency's strategic planning. The representative from NAPA, a professor at the University of Southern California, suggested ways for federal agencies to revise their strategic plans, using performance evaluations and logical models in their revisions.

National Academy of Public Administration. *US Patent and Trademark Office: Transforming To Meet the Challenges of the 21st Century*. Washington, DC: NAPA, 2005. http://www.napawash.org.

At the request of Congress, the National Academy of Public Administration (NAPA) examined the initial performance of the US Patent and Trade Office (USPTO) in its FY 2003 strategic plan. The 2003 plan emphasized changes in USPTO's organizational processes and structure, intended to address the agency's substantial growth in workload. NAPA examined USPTO's staff skills, the agency's organizational and human capital structures, and the timeliness and quality of its services. The report includes many recommendations specific to USPTO's needs, although some recommendations relate to general problems of resource allocation in meeting organizational goals. USPTO is designated by Congress as a performance-based organization, incorporating within its structure components of both private- and public-sector organizations. Thus, the report's findings and recommendations about USPTO's strategic planning may be of interest to federal government agencies wishing to learn from other agencies' experiences in adopting elements of private-sector organizations.

Neely, Andy, and Mohammed Al Najjar. "Management Learning Not Management Control: The True Role of Performance Management." *California Management Review* 48, no. 3 (2006): 101–14.

Andy Neely and Mohammed Al Najjar contend that performance measurement better serves organizational strategy if used not only to control business operations, but also to learn about them. The authors argue that performance measurement helps clarify and communicate strategy, achieve organizational alignment, and generate insights into performance. If used in these ways, performance measurement challenges assumptions about business strategy and operations, subsequently contributing to their improvement. The authors illustrate their argument with a description of the use of performance measurement by British Airways to challenge assumptions supporting its strategy, thereby improving its organizational performance. Neely and Al Najjar illustrate the integration of various performance measures into a single framework to analyze a company's overall performance.

Nohria, Nitin, William Joyce, and Bruce Robertson. "What Really Works." *Harvard Business Review* 81, no. 7 (July 2003): 43–52.

Based on an analysis of 200 management tools and techniques used by 160 companies over a five-year period, Nitin Nohria, William Joyce, and Bruce Robertson found that only four types of management practices lead to improved business performance. Those practices include a clearly defined and well-understood strategy; a flawless execution of operations; a performance-oriented culture; and a simple, flexible organizational structure promoting the exchange of information across the company. In addition to these four basic practices, successful companies also adopted at least two of four secondary practices: a talented workforce, innovative ideas, leadership committed to the organization, and growth through mergers and partnerships. The article is distinctive in focusing, not on particular types of practices, but on characteristics of practices. For example, the authors did not find that any

particular strategy is better than others are, determining instead that successful strategies share certain common characteristics.

Schoemaker, Paul J.H. "Scenario Planning: A Tool for Strategic Thinking." *MIT Sloan Management Review* 36, no. 2 (1995): 25–40.

Paul Schoemaker, a professor at the Wharton School of Business, examines the strategic planning technique of Scenario Planning, which evaluates factors critical to meeting specific goals and identifies actions necessary to developing an organization's capacity to meet its goals. Using this approach, planners first explore the joint impact of multiple variables and potential occurrences and then identify patterns in possible outcomes. Schoemaker provides clearly written steps for implementing Scenario Planning, analyzing its use by the advertising agency Interpublic and by South Africa's Anglo-American Corporation, a company involved in mining and banking. The article includes a brief discussion of the use of Scenario Planning by U.S. government agencies, Royal Dutch/Shell, and other organizations.

Sharpe, Paul, and Tom Keelin. "How SmithKline Beecham Makes Better Resource-Allocation Decisions." *Harvard Business Review* 6, no. 2 (1998): 45–57.

Paul Sharpe, a consultant, and Tom Keelin, a vice president, both at SmithKline Beecham, discuss how that company addressed problems with its resource allocation decisions. SmithKline Beecham's innovative process of determining funding decisions incorporated alternative project funding scenarios and systematic dialogue. In the first stage of the process, project teams created alternative project proposals based on different funding scenarios, submitted those proposals to neutral peer review, and then revised the proposals based on the feedback received. In the second stage, project teams worked with management to determine the relative value of alternative proposals. Management then chose the combination of proposals providing the greatest relative benefits. In the last phase, senior management reviewed the combinations of project funding proposals submitted, making final funding decisions. Using alternative proposals helped generate ideas across projects, instilling in project teams a better understanding of project components. The article clearly illustrates the resource allocation process, using easy-to-read descriptions and charts.

Thompson, Arthur A., A. J. Strickland, and John E. Gamble. *Crafting and Executing Executive Strategy: The Quest for Competitive Advantage; Concepts and Cases*. 15th ed. Boston: McGraw-Hill/Irwin, 2007.

In this textbook, intended for courses on strategic planning, Arthur Thompson and co-authors discuss strategic planning concepts and cases, emphasizing throughout the resource-based theory of the firm. The volume includes several chapters on the concepts, creation, and execution of strategic planning, and the authors give the Five Forces Model and SWOT

analysis very favorable coverage. Chapters on the creation and implementation of strategic plans consistently emphasize resource allocation and methods of matching strategies to resources. The book includes 33 case studies of strategic planning at Google, Merck-Vioxx, and other private-sector companies. Each case study examines a particular facet of strategic planning, such as strategy creation, strategy implementation, or ethics. Most of the cases examine the relationship between a company's resources and the creation and implementation of its strategic plans.

United States. General Accounting Office. *Agencies' Annual Performance Plans Under the Results Act*. General Accounting Office report GAO/GGD/AIMD–10.1.18. Washington, DC: GAO, 1998.

This volume provides guidance on what federal agencies are required to include in strategic and performance plans. The General Accounting Office (GAO) wrote the report to help members of Congress and their staffs understand and evaluate federal agencies' annual performance plans. Beginning in FY 1999, federal agencies were required to submit their annual plans to Congress. The report identifies three elements that agencies must include in performance plans: performance goals and measures used to program activities; strategies and resources used to meet performance goals; and proposed procedures to verify and validate performance data. The report also suggests questions that can be used in evaluating specific functions of plans, such as proposals for connecting resources to strategy, and includes brief synopses of strategic plans, annual performance plans, and annual performance reports.

United States. General Accounting Office. *Agency Performance Plans: Examples of Practices that Can Improve Usefulness to Decisionmakers [sic]*. General Accounting Office report GAO/GGD/AIMD–99–69. Washington, DC: GAO, 1999.

The General Accounting Office (GAO) examines the annual performance plans of several government agencies for FY 1999, identifying 21 beneficial practices that agencies should emulate in their annual performance plans. Performance plans should include clear explanations of goals and measurement criteria for the annual plan and identifying internal and external sources of data for performance evaluation. An example from a federal government agency is used to illustrate each recommended practice. The brief report is a rich source of information on useful practices related to performance plans and strategic planning.

United States. General Accounting Office. *An Evaluation Culture and Collaborative Partnerships Help Build Agency Capacity*. General Accounting Office report GAO–03–454. Washington, DC: GAO, 2003.

Examining the practices of five federal agencies successful in evaluating performance, including the Coast Guard and the National Science Foundation, the General Accounting Office (GAO) found that these agencies create collaborative partnerships with private- or public-sector agencies to gain access to expertise in research methods and performance plan assessments. In addition, GAO found that these agencies successfully used creative strategies to overcome various obstacles in developing and improving their methods of organizational evaluation of the agency. Besides collaborative partnerships, strategies include other practices, such as the development of an organization-wide evaluation culture. The report discusses these strategies in detail, also describing the obstacles that impede these agencies from developing the capacity to conduct better evaluations.

United States. General Accounting Office. *Executive Guide: Creating Value Through World-Class Financial Management*. General Accounting Office report GAO/AIMD–00–134. Washington, DC: GAO, 2000.

Under the auspices of the General Accounting Office (GAO), the Director of Defense Audits examines the financial management reform efforts of nine private- and public-sector organizations, including Boeing, Chase Manhattan Bank, General Electric, and three state governments, to determine how those organizations improved their financial management and reduced their costs. Successful financial reforms strongly emphasize strategic planning and performance evaluation. The report includes chapters on methods of linking financial reform to the support of mission objectives, strategic decision-making, and performance analysis. The report also recommends ways for federal government agencies to adopt similar practices.

United States. General Accounting Office. *Major Management Challenges and Program Risks: Department of Defense*. General Accounting Office report GAO–03–098. Washington, DC: GAO, 2003, http://www.gao.gov/pas/2003/d0398.pdf.

In FY 2003 the General Accounting Office (GAO) evaluated the strategic and performance plans of the Department of Defense, revealing numerous problems, such as the unsatisfactory prioritizing of funds. This GAO report criticizes DOD's strategic planning, dedicating several chapters to examining particular problem areas, such as DOD's budgeting processes and personnel management, as well as other practices. Each chapter includes recommendations for rectifying DOD's strategic planning problems.

United States. General Accounting Office. *Managing for Results: Enhancing Agency Use of Performance Information for Management Decision Making*. General Accounting Office report GAO–05–927. Washington, DC: GAO, 2005.

The General Accounting Office (GAO) analyzes the use of performance information in the management decisions of five federal agencies, the Departments of Commerce, Labor, Transportation, Veterans Affairs, and the Small Business Administration. In addition, the report investigates the practices these agencies have used to improve their use of performance information in management decisions. Based on analyses of these agencies, the report identifies four categories of management decisions for which performance information can be used and five types of practices that can lead to increased use of performance information. The categories of management decisions are to identify problems and take corrective action; develop strategy and allocate resources; recognize and reward performance; and identify and share effective approaches. The five practices are demonstrating management commitment; aligning agency-wide goals, objectives, and measures; improving the usefulness of performance information; developing capacity to use performance information; and communicating performance information frequently and effectively.

United States. General Accounting Office. *Results-Oriented Cultures: Insights for U.S. Agencies from Other Countries' Performance Management Initiatives*. General Accounting Office report GAO–02–862. Washington, DC: GAO, 2002.

In this report, the General Accounting Office (GAO) examines the strategic use of performance management methods by foreign government agencies. According to the report, government agencies in Australia, Canada, New Zealand, and the United Kingdom have successfully used performance management to create a results-oriented culture, applying individual efforts to achieve organizational goals and creating organization-wide performance management. GAO examines in separate chapters four successful performance management methods. One of these methods aligns the daily activities of individuals employed in an agency with the agency's goals. Another method links performance expectations to goals, transcending the boundaries of organizational subunits, and even the boundaries of the organizations.

United States. General Accounting Office. *Results-Oriented Government: GPRA Has Established a Solid Foundation for Achieving Greater Results*. General Accounting Office report GAO–04–38. Washington, DC: GAO, 2004.

The General Accounting Office (GAO) examines the influence of the Government Performance and Review Act (GPRA) on government agencies' practices, analyzing challenges and improvements in their strategic and performance plans. The GAO argues that GPRA has improved the links between agencies' resources and their achievements. However, GAO criticizes federal managers' efforts to satisfy various GPRA requirements. GAO researchers pay special attention to performance planning and measurement in strategic and performance plans. The report includes evaluations of the performance planning and measurement practices of six federal agencies, including the Departments of Education, Energy, and Transportation. Although GAO researchers did not evaluate the results of those

six agencies' strategic plans, the report recommends that other agencies use certain components of the plans in drafting their own strategic and performance plans.

United States. Executive Office of the President. Office of Management and Budget. *Examples of Performance Measures*. OMB, The White House, http://www.whitehouse.gov/omb/part/performance_measure_examples.html (accessed August 10, 2007).

This Web site provides brief descriptions of performance measures that the Office of Management and Budget (OMB) describes as exemplary "because they are meaningful in the context of the program and capture most important aspects of a program's mission and priorities." OMB uses most of these measures in its Program Assessment Rating Tool (PART) to evaluate outcomes of particular federal agency programs. The performance measures, statistical measures of program outcomes, such as "cost per trademark registered" and "percentage of rural telecommunications subscribers receiving new or improved service," help OMB assess strategic planning and other program components. The OMB Web site lists each measure with the program it evaluates, including an explanation of the program components that the measure assesses. While the Web site is immediately relevant to program performance measures, the information is also useful in strategic planning evaluation.

United States. Executive Office of the President. Office of Management and Budget. *Performance Measurement Challenges and Strategies*. OMB, The White House, http://www.whitehouse.gov/omb/part/challenges_strategies.html (accessed August 10, 2007).

In this brief and informative Web site, the Office of Management and Budget (OMB) suggests strategies for addressing problems that federal government agencies commonly experience in designing performance measures for strategic and performance plans. The first section of the Web site defines various performance measurement concepts, providing some examples of well-crafted performance measures. The following section describes six performance measurement problems with strategies for solving them. For example, a suggested strategy for overcoming the difficulty of measuring program outcomes is to craft performance measures using the answers to questions about the program's importance, such as: "If the program were fabulously successful, what problems would it solve? How would you know?" OMB wrote the Web site as a guide to federal agencies on the Program Assessment Rating Tool (PART), which OMB uses to evaluate federal programs. Thus, the Web site's information may be beneficial in strategic planning evaluation and similar activities.

United States. Executive Office of the President. Office of Management and Budget. *What Constitutes Strong Evidence of a Program's Effectiveness?* OMB, The White House, http://www.whitehouse.gov/omb/part/2004_program_eval.pdf (accessed August 10, 2007).

In this 18-page document, the Office of Management and Budget (OMB) describes methods of evaluating outcomes of federal government programs. The paper was written as a guide for federal government agencies, explaining the evaluation methods that are used in OMB's

Program Assessment Rating Tool (PART), a program evaluation tool used collaboratively by OMB and the agency in assessing the effectiveness of that agency's programs. Among the topics addressed in the paper are how PART approaches program evaluation; common methods of evaluating program performance; research methods that provide strong evidence of program effectiveness; and the applicability of particular types of research methods. The guide discusses the use of experimental, qualitative, and quantitative research methods to evaluate program effectiveness. Each method is described briefly, providing information about how to select an appropriate testing method. The choice of the type of test depends on the available evidence and on the outcome that the agency is studying. Although the discussion of program evaluation is technical, in general, the paper is aimed at non-experts interested in how to evaluate federal government programs and strategic plans.

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Appendix D – Stakeholder Survey

Background: This is an opinion survey. The results will be used, primarily, to develop PEG-level point papers and a summary document that explains the processes used in determining and prioritizing capabilities within the PPBES construct, with particular emphasis on the interface with and integration of the Reserve Component.

Intent: The intent of this opinion survey is to capture your experiences and opinions about how the planning, programming and budgeting processes actually work during execution. My primary interests are specific to capability determination and prioritization, and their linkages to funding recommendations and allocations throughout the PPBES process.

Instructions: Please provide short-answer responses to the below questions from the perspective of the PEG that you are affiliated and return the completed survey to me NLT 9 October 2007. In completing the survey, feel free to distributed survey questions among members of your staff having the most knowledge about the respective areas of interest. If further explanation about survey responses is required, I will solicit additional comments during my interview sessions with the USAR PA&E staff (see page 13). Lastly, please do not share the survey questions with potential HQDA- and Joint-level interviewees. I will use the combined set of survey responses to identify and tailor questions specifically for these interviewees.

Section I: Background Questions.

1. What is your PEG affiliation?

_____ Manning _____ Training _____ Organizing

_____ Equipping _____ Sustaining _____ Installations

_____ I am not specifically affiliated with a PEG.

2. How many MDEPs comprise your affiliated PEG? _____

3. How long have you been involved in the PPBES process? _____

4. Generally describe your duties and responsibilities with respect to the PPBES process.

_____
_____
_____
_____
_____
_____

Section II. Capability Determination and Decomposition.

2. **(True or False)** Generally speaking, Army requirements are published in the Army Campaign Plan and are translated into capabilities during the planning phase of the PPBES process. With respect to new capabilities, after conducting analysis to determine the best option for satisfying a particular requirement, the best capability option is then coordinated with stakeholders, adjusted accordingly, and documented as a MDEP, which represents a capability solution with associated funding requirements. This MDEP is then categorized and aligned under one of the Title 10 PEGs and later prioritized and recommended for funding.

True False

If "**False**," please explain: _____
_____
_____
_____

3. Briefly explain the process used, within your affiliated PEG, to determine that a new MDEP is required.

4. Briefly explain the process used, within your affiliated PEG, to translate an Army requirement into the capabilities described within a MDEP.

5. What process or methodology is used to decompose a capability?

6. What process is used to ensure that the decomposition of a capability is complete?

7. Is the process used to decompose a capability consistent within your affiliated PEG?

Yes No

If "**No**," please explain. _____
_____
_____
_____
_____
_____.

8. What process is used within your PEG to validate MDEP requirements?

9. What process is used within your PEG to prioritized MDEP requirements?

Section III: MDEP Development and Management.

10. Have you ever developed an MDEP?

Yes No

11. Do you currently manage, or serve as a POC for a MDEP?

Yes No

12. How many MDEPs do you manage, or help manage? _____

13. Briefly explain the general process used by MDEP managers/POCs to track changes and maintain visibility between an APE, MDEP, the Army priorities, and its linkage to budgeting decisions.

14. Within your PEG, does MDEP construction and scope coincide with the definition of an MDEP as defined in the MDEP Procedures Guide (i.e., "A description of a particular organization, program, or function and records the resources needed to get an intended output" and which allows the Army to evaluate whole programs")?

Yes No

If "**No**," please identify explain why a MDEP may not satisfy the strict interpretation of its published definition. _____
_____
_____
_____
_____

15. To what extent does the failure of an MDEP to distinctly address a particular organization, program or function impacts the ability to manage the program (e.g., track and post the changes to the applicable database, effectively brief the program, coordinate with stakeholders, etc.)?

No Extent Minor Extent Moderate Extent Great Extent

If you answered **"Moderate Extent," or "Great Extent,"** please explain._____
_____
_____
_____
_____

16. How are MDEP-level capabilities determined?

17. In your experience, how often are MDEP descriptions contextually changed by the PEG administrator or his/her chain of supervisors?

Never Seldom Often Very Often

If you answered "**Often**", or "**Very Often**," please explain. _____
_____
_____
_____
_____

18. To keep the number of MDEPs manageable, the Army sometimes combined new MDEPs with existing ones. In your opinion, what are some of the advantages and disadvantages of MDEP consolidation from a MDEP management and prioritization perspective?

a. Advantages:

b. Disadvantages:

19. In your opinion, to what extent does effectively performing your duties and responsibilities influence the prioritization and funding recommendations actually made regarding your programs (MDEPs)?

Prioritization: No Extent Minor Extent Moderate Extent Great Extent

Funding: No Extent Minor Extent Moderate Extent Great Extent

If you answered "**Moderate**, or "**Great**" extent, please explain. _____
_____
_____
_____
_____

Section IV: Funding Allocation and Budgeting.

20. In your opinion, is the competitive funding process an effective way of ensuring funding is allocated to the Army's highest priority programs?

Yes No

If "No," please explain. _____
_____
_____

21. In your opinion, to what extent do Army priorities lose their prioritized relevance to the "competition for funding" process?

No Extent Minor Extent Moderate Extent Great Extent

If you answered **"Moderate Extent," or "Great Extent,"** please explain. _____
_____
_____
_____
_____

22. In your opinion and with respect to the effective management of previous programs (MDEPs), to what extent did the recommended allocation of funding (PEG level) correspond to where your program fell within the Army priorities, as detailed in the Army Campaign Plan, or other authorized sources?

No Extent Minor Extent Moderate Extent Great Extent

If you answered **"Moderate Extent," or "Great Extent,"** please explain. _____
_____
_____
_____
_____

23. In your opinion and based on your experience with the PPBES process, to what extent will effectively performing your duties and responsibilities likely influence the funding decisions actually made regarding your programs (MDEPs)?

No Extent Minor Extent Moderate Extent Great Extent

If you answered **"Moderate Extent,"** or **"Great Extent,"** please explain. _____
_____
_____
_____
_____

24. In your opinion, is the Army **budgeting process** predominately an objective or subjective process in practice?

Mostly Objective Mostly Subjective

If you answered "**Mostly Subjective**," please explain. _____
_____
_____
_____
_____

25. What criteria, objectives, or attributes are used by the PEG in making resource allocation recommendations?

Section V: Process Assessment.

26. In your opinion, how adequate is the time available to perform the tasks associated with developing and managing a MDEP (i.e., identifying the issue (capability), decomposing the issue, developing courses of action, developing a data collection plan, conducting the investigating, answering the set of related questions, coordinating with stakeholders, packaging the results, staffing the results, entering the MDEP is the database and defending the results)?

Adequate Somewhat Adequate Somewhat Inadequate Inadequate

If you answered **"Somewhat Inadequate,"** or **"Inadequate,"** please explain. _____
_____
_____
_____
_____

27. (**True or False**) Generally speaking, a capability represents the ability to execute a specified course of action, whereby the most feasible alternative for satisfying the course of action has been captured in an MDEP, based on analysis, and can be linked back to one of the Army priorities as detailed in the Army Campaign Plan.

True False

If "**False**," please explain: _____
_____
_____
_____
_____
_____

28. As a MDEP manager/POC, how difficult is it to develop and monitor MDEPs at the APE level across MDEPs and PEGs, track changes and update program variables as they occur, and effectively defend the program throughout the PPBES process?

Not Difficult Somewhat Difficult Very Difficult Nearly Impossible

If you answered "**Very Difficult**, or "**Nearly Impossible**" please explain your response.
_____
_____
_____
_____
_____
_____

29. In your opinion, what aspects of the planning and programming processes are the most challenging? (Please identify all that apply **in priority order**, making comments as necessary for clarity)

a. _____ Reading and understanding the series of planning and programming documents.
b. _____ Developing a MDEP.
c. _____ Decomposing and defining the capability.
d. _____ Coordinating with all stakeholders throughout the process.
e. _____ Identifying and tracking the cause and effect relationships among associated programs resulting from program changes.
f. _____ Attending and defending the program during all of the relevant APE, MDEP, and PEG stakeholder meetings.
g. _____ Keeping the MDEP updated in the PROBE and associated databases.
h. _____ Influencing the competitive funding negotiation process.
i. _____ Other (please identify and explain) _____
_____
_____.

30. In your opinion, is the Army **planning process** predominately an objective or subjective process in practice?

Mostly Objective Mostly Subjective

If you answered "**Mostly Subjective**," please explain. _____
_____
_____
_____
_____

31. In your opinion, is the Army **programming process** predominately an objective or subjective process in practice?

Mostly Objective Mostly Subjective

If you answered "**Mostly Subjective**," please explain. _____
_____
_____
_____
_____

32. In your opinion, to what extent does your ability to "effectively" defend a MDEP at the various stakeholder meetings and forums materially impacts its position with respect to prioritization within the PEG and the eventual funding received to execute the program?

Prioritization: No Extent Minor Extent Moderate Extent Great Extent

Funding: No Extent Minor Extent Moderate Extent Great Extent

If you answered "**Moderate Extent**, or "**Great Extent**," please explain. _____
_____
_____
_____
_____

Section VI: Metrics and Measures.

33. What criteria, objectives, or attributes are used to quantifiably measure the completeness of a capability resident in the MDEP/APE construct?

34. What criteria, objectives, or attributes are used to prioritize MDEPs within PEGs?

35. In your opinion, can quantifiable performance criteria, objectives, or attributes be applied to all MDEPs within your PEG?

Yes No

Please explain your response. _____
_____
_____
_____
_____

Section VII: Analytical Tools and Techniques.

36. What analytical tools and techniques do you **<u>use,</u> or <u>access</u>** to perform your duties and responsibilities? (Please identify all that apply)

a. Planning and Programming Tools:

(1) PROBE database
(2) Program Prioritization Profile (P3)
(3) Civilian Manpower Integrated Costing System (CMICS)
(4) Resource Formulation System (RFS)
(5) Web-Schedules
(6) Select and Native Programming (SNaP)
(7) Army Installation Management – Headquarters Information (AIM-HI)
(8) Institutional Training Resources Model (ITRM)
(9) Training Resource Model (TRM)
(10) Requirements Builder (R-Builder)
(11) Man-day Model (MRM)
(12) Ground Training Resource Models (TRM)
(13) Flying Hour Management System (FHMS)
(14) Institutional Training Resource Model (ITRM)
(15) Manday Resource Model (MRM)
(16) Battalion Level Training Model (BLTM)
(17) Structure and Manpower Allocation System (SAMAS)
(18) Training and Doctrine Developments Model (TD2)
(19) Course Level Training Model (CLTM)
(20) Mission Area to Programming Integration Tool (MAPIT)
(21) TAP MAS Planning Database
(22) The Army Authorization Documentation System (TAADS)
(23) Army Training Requirement and Resource System (ATRRS)
(24) Army Program for Individual Training (ARPRINT)
(25) Others (please identify)

b. Analytical Techniques:

(1) Input/Output Models
(2) Casual Loop Diagrams
(3) Flow Charts
(4) Literature Review
(5) Tree Diagram
(6) Value System Design Model
(7) Analytical Hierarchy Process
(8) Multi-Attribute Utility Theory
(9) Multi-Criteria Decision Making
(10) Data Collection Management Plan

(11) Stakeholder Analysis
(12) Sensitivity Analysis
(13) Optimization Models
(14) Decision Analysis
(15) Simulation
(16) Forecasting
(17) Markov Analysis
(18) Project Planning and Control
(19) Aggregate Planning
(20) Other (please specify)

Appendix E – Stakeholder Survey and Interview Results

Background: This is an opinion survey. The results will be used, primarily, to develop PEG-level point papers and a summary document that explains the processes used in determining and prioritizing capabilities within the PPBES construct, with particular emphasis on the interface with and integration of the Reserve Component.

Intent: The intent of this opinion survey is to capture your experiences and opinions about how the planning, programming and budgeting processes actually work during execution. Primary interests are specific to capability determination and prioritization, and their linkages to funding recommendations and allocations throughout the PPBES process.

Section I: Background Questions.

1. What is your PEG affiliation?

"Manning"
"Training"
"Organizing"
"Equipping"
"Sustaining"
"Installations"
"Program Integration"
"HQDA G8 (PA&E)"
"USAR EE Liaison"

2. How many MDEPs comprise your affiliated PEG?

"5-Sustaining and 5-Equipping USAR related MDEPs."
"NA"
"24 USAR related MDEPs."
"31 USAR related MDEPs."
"41 USAR related MDEPs."
"31 for USAR, All of TT PEG have about 125 MDEPs worth over $40 Billion."
"6 USAR related MDEPs."

3. How long have you been involved in the PPBES process?

"One year"
"Approximately 10 years"
"Five years"
"One year"
"Three years"
"Two years"
"Two years"

4. Generally describe your duties and responsibilities with respect to the PPBES process.

"Prepare and defend requirements from USARC for area including Logistics Automation Second Destination Transportation and Prepositioned Equipment. Analyze changes in program throughout cycle and propose alternatives where appropriate. Monitor funding status of programs to ensure requirements are met and in line with other components."

"Serve as the authoritative source for Army Reserve elements of the Future Years Defense Program (FYDP). Responsible for the Programming phase of the Army's Planning, Programming, Budgeting and Execution (PPBE) process for the Army Reserve. Provide the Director, Resource Management (DRM) with independent net assessments of program alternatives and priorities. Interact with Army, OSD, and Joint Staffs to translate planning decisions, strategic guidance, and the Chief Army Reserve's strategic priorities into comprehensive and detailed allocation resources."

"I manage a staff of seven analysts who monitor and participate with the HQDA MM PEG regarding manning issues."

"I am the training branch chief. I oversee the resourcing of the USAR TT PEG associated MDEPs."

"The USAR interface with the « Big Army « regarding all equipment except sustainment automation equipment and associated NET related training."

"I was previously the Chief, Training Resources Branch of the Army Reserve PAE. Drew Cherry asked me to reply to this survey in that role. Chief of Training Resources Management and Senior Training Analyst for Army Reserve (AR) Program Analysis and Evaluation (PAE) Division. Responsible for AR Training Resources in the Army Program Objective Memorandum (POM) and DoD Future Years Defense Program (FYDP). Prepare AR long-range resource strategy for training and manage programming phase of Planning, Programming, Budgeting, and Execution (PPBE) process while actively engaged in planning, budgeting, and execution phases. Responsible for 31 Management Decision Packages (MDEPs) exceeding $1.4 Billion annually to provide critical capabilities in Ground OPTEMPO, Flying Hour Program, Full Time Support, Institutional Training and Training Support. Supervise seven Officers, Civilians and Contractors. Responsible for AR portion of Army Training Models contract with 19 people costing $3.9M /yr."

"I initiated this study and was the Study Project/Program Manager prior to starting a new job at HQDA G8 PAE as an analyst over Reserve Component (RC) programs aligned with the MM PEG."

"Installation Branch Chief for AR PAE. Responsible for 41 USAR MDEPs. Program requirements, ensure criticality of requirements, compete for funding and ensure program critical funding is met."

“Build requirements; assess OO PEG impacts from leadership guidance; coordinate any changes to OO PEG and analyze execution. The majority of the six MDEPs are either linked to statutory or directive requirements.”

Section II. Capability Determination and Decomposition.

2. **(True or False)** Generally speaking, Army requirements are published in the Army Campaign Plan and are translated into capabilities during the planning phase of the PPBES process. With respect to new capabilities, after conducting analysis to determine the best option for satisfying a particular requirement, the best capability option is then coordinated with stakeholders, adjusted accordingly, and documented as a MDEP, which represents a capability solution with associated funding requirements. This MDEP is then categorized and aligned under one of the Title 10 PEGs and later prioritized and recommended for funding.

True False

“True”
“Generally speaking this is True”
“True”
“True”
“False**.** There is a lot of truth to the statement above and generally speaking in an ideal sense it is somewhat true and what should happen though there are few absolutes in life and it is not so ideal and straight-forward. The ACP captures the high-level (higher level) capabilities and attempts to be exhaustive but for organization sake, capabilities / requirements are categorized into bins or higher level capabilities. And though we would like to have them mutually exclusive, there is overlap. Determining what is best may be easy or may be difficult and subjective. The hierarchy of bins, higher capabilities, subordinate capabilities / requirements, attributes, metrics, thresholds, etc. varies regarding stakeholders.”
“True.”
“False. Requirements are not published in the ACP, they are generated as a result of meeting the ACP’s expectation of provided capability.”

3. Briefly explain the process used, within your affiliated PEG, to determine that a new MDEP is required.

“Higher-level guidance is reviewed and MDEPs are created/deleted/modified accordingly.”
“NA”
“Can it be squeezed into an existing MDEP; if yes, do so; if not, create MDEP. Ideally, we do not want to create new MDEPs.”
“First it must be shown that new requirements cannot fit into a current MDEP. Unfortunately, I am not familiar enough with my PEG to know the exact process used to create a new MDEP. I have yet to have gone through a full POM and have only worked with the TT PEG since July.”
“I have not been part of creating a new MDEP; however, MDEPs are frequently updated and changed. I believe the process of creating new MDEPs is similar to updating in that there are reviews / validation at various levels.”
“I have not been through a POM where a new MDEP was required.”
“Identify a historical requirement not fitting into a program.”

4. Briefly explain the process used, within your affiliated PEG, to translate an Army requirement into the capabilities described within a MDEP.

"New requirements are presented to the PEG with a request for an MDEP to be formed if an existing one cannot be used. We propose our requirements during an MDEP briefing at which time the PEG Executive validates or rejects the requested requirement."
"NA"
"Unknown"
"The process is the MDEP briefing in which the Program Manager justifies to the PEG the resources required to have or maintain the requirement."
"Each MDEP has a manager, usually a Major or LTC or DA Civilian who will review and modify the current definition. It's a subjective process but should use objective descriptions. The use of "capabilities" is relatively new and is part of the JCIDS process (see CJCSI 3170.01 in DTIC). PPBE does not currently use JCIDS. The requirement may be very easy or difficult depending on the program. Parts are usually expressed in required dollars, manpower, time, or other resources. The manager / action officer will gather relevant info, staff it, and raise it up through the channels until it gets approved."
"No experience."
"PPBES process takes a plan and translates it into a needed capability. We then program requirements of these needed capabilities."

5. What process or methodology is used to decompose a capability?

"Haven't done it."
"Not certain what you mean by this."
"Unknown."
"Don't understand this question, what do you mean by decompose?"
"There's not really a formalized process in PPBE that I'm aware so it's determined by the personalities involved and may be very good or not depending on the skill of the personnel, the complexity, the requested dollar amount, and numerous other factors."
"No experience."
"Situationally dependent."

6. What process is used to ensure that the decomposition of a capability is complete?

"Haven't done it."
"Again, not certain what you mean by this."
"Unknown."
"No response."
"Same train of thought as 5 above."
"No experience."
"No response."

7. Is the process used to decompose a capability consistent within your affiliated PEG?

Yes No

“No.”
“NA.”
“Unknown.”
“No response.”
“No.”
“No experience.”
“No.”

If “**No**,” please explain.

“Haven’t done decomposition yet.”
“Unknown”
“See number 5 above.”
“No experience.”
“Not all capabilities are created equally.”

8. What process is used within your PEG to <u>validate</u> MDEP requirements?

“Requirements are presented during a briefing with supporting arguments. PEG Executive validates or rejects the requests and issues a validation letter. Validated requirements are then entered into Probe.”
“NA”
“Information is loaded into RBuilder a week prior to MDEP briefing. Analysis from MM PEG, G8, G3, USAR, ARNG and G6 listen to a 30 minute pitch from MDEP briefer then questions are asked. Lead analyst from MM PEG provides input and then presents his analysis to the PEG Chair.”
“Again, I have not been through a POM with my PEG, but from what I understand, it is how the Program Manager presents the MDEP requirements to the PEG and how well he/she make their case on how the requirements relate back to the Army Campaign Plan.”
“Criteria and thresholds established by staffing among stakeholders and the process of running through committees begin. Usually there is some sort of “murder board” followed by MDEP briefs with O-6 co-chairs (for TT it’s a Colonel in G-3/5/7 and a Colonel from ASA(M&RA)). If items cannot be solved at this level, recommendations for decisions are sent to the GO/SES level. A criterion could potentially be cost-affordability and levels of risk are defined. Sometimes there just isn’t enough money.”
“All requirements are to be submitted to the MDEP manager. They determine if that would be valid within the context of the MDEP. If so, it will be part of the requirement brief. At the brief, OO PEG also determines whether the requirement is valid.”
“PEG Executive RDT.”

9. What process is used within your PEG to <u>prioritized</u> MDEP requirements?

“G3- Prioritization Matrix is used and a 1-N list generated.”

“NA; however, in general PEGs do not prioritize MDEP requirements – they only validate them. DAMO CIR prioritizes MDEPs in the APPG; however, it is typically the Army Leadership that decides which programs with unfunded requirements will be funded.”
“TGM Guidance.”
“Based on what I understand, it comes down to statutory “must funds” and what is spelled out in the Technical Guidance Memorandum.”
“Internal determinations. See question #5 above.”
“I am not sure, but I would imagine must funds such as reimbursable are at the top, and nice to have are at the bottom; subjective determination perhaps.”
“G3 prioritize all requirements.”

Section III: MDEP Development and Management.

10. Have you ever developed a MDEP?

Yes No

“No”
“No”
“No”
“No”
“Yes and no. I haven’t created a new MDEP but have been part of developing and managing requirements for an MDEP.”
“No”
“No”

11. Do you currently manage, or serve as a POC for a MDEP?

Yes No

“No”
“No”
“No”
“No”
“Yes”
“Yes”
“No”

12. How many MDEPs do you manage, or help manage?

“10 (oversee) – 5 EE and 5 SS”
“NA”
“0”
“0”
“Previously oversaw 31 for TT PEG. Now personally manage 14 MDEPs for MM PEG.”
“6 (oversee)”

"41"

13. Briefly explain the general process used by MDEP managers/POCs to track changes and maintain visibility between an APE, MDEP, the Army priorities, and its linkage to budgeting decisions.

"Probe allows managers to see changes as they occur at various levels of detail. Managers can select two or four-position delta report and can an analyze programs in various levels of detail."
"I track changes using Access, Excel or Army PPBES Tools (web site). I primarily utilize my own access database. For just changes between APE and MDEP I will look at the audit trail. There is no current visibility of Army Priorities linked to the current databases (unless DAMO CIR maintains something)."
"For the most part the PPBE database, PPBES tools, is what is used to track changes and maintain visibility."
"It depends on a variety of factors. Sometimes there is only one APE associated with an MDEP and sometimes more. Positions in Probe database reflect numerous changes that occur throughout the cycle and the manager must be aware of any and all changes that occur and why. Much of this work revolves around relationships. You need to know who the people are that influence the process and stay connected and know the programs that you manage. Some priorities are clear and straightforward while others are very subjective. There is both an art and a science to understanding, analyzing, synthesizing, and articulating the essential needs of a program."
"Use PPBE tools to track changes. I generally receive information from others to determine what Army priorities are."
"All requirements are linked to the TAP."

14. Within your PEG, does MDEP construction and scope coincide with the definition of an MDEP as defined in the MDEP Procedures Guide (i.e., "A description of a particular organization, program, or function and records the resources needed to get an intended output and which allows the Army to evaluate whole programs")?

Yes No

"Yes; in logistics automation, new systems will require changes in MDEP definitions."
"NA"
" No; combination of unlike programs to minimize MDEPS: i.e., ARIM has both IRR and IMA Programs."
"Yes"
"Yes"
"Yes"
"Yes"

15. To what extent does the failure of a MDEP to distinctly address a particular organization, program or function impacts the ability to manage the program (e.g., track and post the changes to the applicable database, effectively brief the program, coordinate with stakeholders, etc.)?

No Extent Minor Extent Moderate Extent Great Extent

“Minor Extent; There are some component-specific parts of a program that may not be covered in the generic definition and make justification difficult at higher levels.”
“NA”
“No Extent”
“Minor Extent”
“Really not applicable. Each MDEP will be a program.”
“Great Extent”
“Moderate Extent”

If you answered **“Moderate Extent,” or “Great Extent,”** please explain

“If you don’t have a clear distinction of what the MDEP is paying for, then at least, I wouldn’t be able to effectively brief and defend the program.”

16. How are MDEP-level capabilities determined?

“Analysis at lower levels is compiled and directed to higher levels and decided at PEG Executive level.”
“Not certain what you are asking for here.”
“How they relate back to the Army Campaign Plan (ACP).”
“They are identified because there is a need for the capability with resources. Although it depends on a variety of factors, there is likely to be brainstorming of sorts.”
“Not sure of question meaning.”

17. In your experience, how often are MDEP descriptions contextually changed by the PEG administrator or his/her chain of supervisors?

Never Seldom Often Very Often

“Seldom”
“In my experience, the PEG reviews the MDEP descriptions during every full POM based on recommendations by the MDEP POC/MDEP briefer. Not certain where this fits in to your choice selection.”
“Seldom”
“Seldom”
“Our environment changes and MDEPs change with the times.”
“Seldom”
“Seldom”

18. To keep the number of MDEPs manageable, the Army sometimes combined new MDEPs with existing ones. In your opinion, what are some of the advantages and disadvantages of MDEP consolidation from a MDEP management and prioritization perspective?

a. Advantages:

"Simplicity and potential elimination of duplication."
"I don't think you are stating this correctly – the Army sometimes combines one or more MDEPs into an existing MDEP or into one new MDEP. They don't combine new MDEPs with existing ones (not to my knowledge)."
Similar functions are easier to manage and may score higher in the prioritization process.
"Less is better from a tracking perspective."
"Fewer MDEPs are easier to manage."
"It depends - if it makes more sense and is manageable then they should be combined."
"More flexibility in managing programs."
"Aggregation and decentralization."

b. Disadvantages:

"Tracking changes in a program may be difficult since a manager may have to look at several MDEPs to get a picture of how a program is performing."
"Functions that may be similar but not the same may lose their visibility – execution data is almost impossible to trace once consolidated."
"Different programs have different levels of prioritization (ARIM = IRR + IMA)"
"Lose some of the uniqueness of an MDEP when it is combined. Additionally, trying to keep an audit trail becomes difficult."
"It depends - if the consolidation negatively affects the ability to resource the requirements then it is disadvantageous."
"Lose track of what MDEP is suppose to pay for."
"Aggregation and decentralization."

19. In your opinion, to what extent does effectively performing your duties and responsibilities influence the prioritization and funding recommendations <u>actually made</u> regarding your programs (MDEPs)?

Prioritization:

"Moderate Extent"
"Minor Extent"
"Minor Extent"
"Minor Extent"
"Great Extent"
"Minor Extent"

Funding:

"Moderate Extent"
"Moderate Extent"
"Minor Extent"
"Minor Extent"

“Great Extent”
“Great Extent”

If you answered “**Moderate**, or “**Great**” extent, please explain.

“The ability to clearly articulate and defend my positions helps my office get a fair share of the TOA.”
“One of my “functions” for the Army Reserve is to socialize the Army Reserve official position. If I am successful, then prioritization and funding may improve or at least not degrade.”
“It depends – someone could fail to do their job and still have great resourcing due to circumstances but there is a lot of competition for the same resourcing so a managers ability to do his or her job will better position the capabilities such that they will be a higher priority and have better funding.”
“If I am effectively coordinating with DA counterpart, then more than likely I would have more success defending funding.”

Section IV: Funding Allocation and Budgeting.

20. In your opinion, is the competitive funding process an effective way of ensuring funding is allocated to the Army’s highest priority programs?

Yes No

“Yes”
“Yes”
“Yes”
“Yes”
“No. It is not consistent, does not have a good audit trail, is difficult to reproduce, and is extensively laborious and subjective.”
“No. Under competitive funding, every MDEP is briefed to be the most important program, and all programs are briefed as though it should be funded 100 percent of requirements. All MDEP manager briefs their MDEP as the most important. That may be due to the fact that they may not be aware of what other MDEPs are paying for. Competitive funding is not an exact science. Unfortunately, it may be the best option.”

21. In your opinion, to what extent do Army priorities lose their prioritized relevance to the “competition for funding” process?

No Extent Minor Extent Moderate Extent Great Extent

“Minor Extent”
“Great Extent; I don’t think the Army actually prioritizes programs (i.e. develop a 1-N list of prioritized programs) – most of the unfunded program decisions are made by the Army Leadership.”
“Minor Extent”
“Minor Extent”

"Moderate Extent. There's huge discrepancy in size, scope and composition. Some capabilities may be extremely expensive while others are small and "below the radar". The problem is, how do you prioritize the next incremental amount of funding? Some priorities are subordinate enablers to others. Some items are declared must fund by leadership and do not compete."
"Moderate Extent. Can't determine if last dollar of the most important program is more important than 1st dollar of 2nd most important program."

22. In your opinion and with respect to the effective management of previous programs (MDEPs), to what extent did the recommended allocation of funding (PEG level) correspond to where your program fell within the Army priorities, as detailed in the Army Campaign Plan, or other authorized sources?

No Extent Minor Extent Moderate Extent Great Extent

"Moderate Extent"
"NA (I did not manage any MDEPs). The Army Campaign Plan (Section IV of The Army Plan) does not prioritize MDEPs. The Army Planning Priorities Guidance (APPG – section II of The Army Plan) provides a list of approved and prioritized MDEPs."
"Minor Extent"
"Minor Extent"
"Great Extent. Priorities and funding generally go hand-in-hand though there are exceptions."
"Minor Extent"

23. In your opinion and based on your experience with the PPBES process, to what extent will effectively performing your duties and responsibilities likely influence the funding decisions actually made regarding your programs (MDEPs)?

No Extent Minor Extent Moderate Extent Great Extent

"Moderate Extent"
"Isn't this the same as Q19?"
"Minor Extent"
"Minor Extent"
"Great Extent. Some MDEPs are basically must-fund like statutory Pay and Allowances. But in general, there is not enough funding to go around and a program needs to clearly demonstrate how much they need and why they should be considered above others (implied)."
"Moderate Extent. I would imagine, better coordination you make, better briefs or data you provide, you will be able to better defend your funding level."

24. In your opinion, is the Army **budgeting process** predominately an objective or subjective process in practice?

Mostly Objective Mostly Subjective

"Mostly Objective"
"Mostly Objective"

“Mostly Objective”
“Mostly Objective”
“Mostly Objective”
“Most Subjective. Some are very objective, but leadership tells what needs to be funded. Not sure if those decisions are always objective decisions.”

25. What criteria, objectives, or attributes are used by the PEG in making resource allocation recommendations?

“Priority of program with relation to Army objectives and past execution.”
“Depends on the PEG but many require detailed explanation of the program (drivers and factors level of detail) and linkage to the ACP or law.”
“Pay is first; everything else is second; can it be paid for by a supplemental.”
“Statutory ‘Must Fund’; Guidance provided in the Technical Guidance Memorandum.”
“Cost affordability, link to the ACP and senior guidance, previous funding and execution, numerous others.”
“Must fund bills (contracts) and civilian pay.”

Section V: Process Assessment.

26. In your opinion, how adequate is the time available to perform the tasks associated with developing and managing a MDEP (i.e., identifying the issue (capability), decomposing the issue, developing courses of action, developing a data collection plan, conducting the investigating, answering the set of related questions, coordinating with stakeholders, packaging the results, staffing the results, entering the MDEP is the database and defending the results)?

Adequate Somewhat Adequate Somewhat Inadequate Inadequate

“Somewhat Adequate”
“Adequate”
“Adequate”
“Somewhat Adequate”
“Somewhat Adequate”
“Somewhat Adequate”

If you answered **“Somewhat Inadequate,”** or **“Inadequate,”** please explain

27. (**True or False**) Generally speaking, a capability represents the ability to execute a specified course of action, whereby the most feasible alternative for satisfying the course of action has been captured in a MDEP, based on analysis, and can be linked back to one of the Army priorities as detailed in the ACP.

True False

“True”
“True”
“True”

“True”
“True”
“False. I can’t say all of my programs are directly linked to ACP. Some of OO PEG MDEPs are indirectly linked to ACP, such as injury compensation, and transit subsidy.”

28. As a MDEP manager/POC, how difficult is it to develop and monitor MDEPs at the APE level across MDEPs and PEGs, track changes and update program variables as they occur, and effectively defend the program throughout the PPBES process?

Not Difficult Somewhat Difficult Very Difficult Nearly Impossible

“Not Difficult”
“Not Difficult”
“Not Difficult”
“Somewhat Difficult”
“Somewhat Difficult”
“Somewhat Difficult”

29. In your opinion, what aspects of the planning and programming processes are the most challenging? (Please identify all that apply in priority order, making comments as necessary for clarity)

j. _____ Reading and understanding the series of planning and programming documents.

“#1”
“#4”
“#4 (tie)”
“#2”
“#6”
“#7”

k. _____ Developing a MDEP.

“#5”
“#1”
“#1”
“#7”
“#8”

l. _____ Decomposing and defining the capability.

“#1; #1 indicates these are challenging to me because I don’t really know what you mean by them.”
“Not sure what this means**.”**
“#8”
“#9”

m. _____ Coordinating with all stakeholders throughout the process.

“#4”
“#2”
“#4 (tie)”
“#3”
“#3”
“#3”

n. _____ Identifying and tracking the cause and effect relationships among associated programs resulting from program changes.

“#3”
“#1; #1 indicates these are challenging to me because I don’t really know what you mean by them.”
“#4 (tie)”
“#2”
“#2”

o. _____ Attending and defending the program during all of the relevant APE, MDEP, and PEG stakeholder meetings.

“#3”
“#3”
“#4”
“#1”
“#4”

p. _____ Keeping the MDEP updated in the Probe and associated databases.

“#6”
“#4 (tie)”
“#5”
“#6”

q. _____ Influencing the competitive funding negotiation process.

“#2”
“#1; #1 indicates these are challenging to me because I don’t really know what you mean by them.”
“#2”
“#4”

"#5"

_____ Other (please identify and explain)

"Quantifying capabilities, so it passes the …so what test. (i.e., the program pays for 100 computers. So what happens if we only have 80? What is the impact of that?)"

30. In your opinion, is the Army **planning process** predominately an objective or subjective process in practice?

Mostly Objective Mostly Subjective

"Mostly Objective"
"Mostly Objective"
"Mostly Objective"
"Mostly Objective"
"Mostly Subjective; plans generally look into the deep fight, say 20 years and are strategic in nature. There is a need to have a vision of the challenges and threats we will face and create a forecast or prediction of what we will need."
"Mostly Subjective (pure guess)."

31. In your opinion, is the Army programming process predominately an objective or subjective process in practice?

Mostly Objective Mostly Subjective

"Mostly Objective"
"Mostly Objective"
"Mostly Objective"
"Mostly Objective"
"Most Objective**;** though mostly objective, there are many subjective portions. Pay and allowances and other "must fund" items take up a lot of total obligation authority (TOA). The other items can be extremely subjective."
"Combination answer – some requirements are developed using hard numbers and some are developed by best guess."

If you answered "**Mostly Subjective**," please explain.

32. In your opinion, to what extent does your ability to "effectively" defend a MDEP at the various stakeholder meetings and forums materially impacts its position with respect to prioritization within the PEG and the eventual funding received to execute the program?

Prioritization:	No Extent	Minor Extent	Moderate Extent	Great Extent
Funding:	No Extent	Minor Extent	Moderate Extent	Great Extent

Prioritization:

“Moderate Extent”
“NA”
“Minor Extent”
“Minor Extent”
“Great Extent. It depends but there is generally an art and science aspect requiring sound analysis that is properly communicated. There are exceptions but many people are trying to capture the same dollars.”
“Minor Extent”

Funding:

“Moderate Extent”
“NA”
“Minor Extent”
“Minor Extent”
“Great Extent. It depends but there is generally an art and science aspect requiring sound analysis that is properly communicated. There are exceptions but many people are trying to capture the same dollars.”
“Moderate Extent”

Section VI: Metrics and Measures.

33. What criteria, objectives, or attributes are used to quantifiably measure the completeness of a capability resident in the MDEP/APE construct?

“Execution history, percentage of funding to critical requirements.”
“Establishment of the critical requirement? Not certain what you are looking for here.”
“Unknown.”
“It depends and varies widely.”
“I don’t think there is any measurement for completeness of a capability within the MDEP.”

34. What criteria, objectives, or attributes are used to prioritize MDEPs within PEGs?

“Prioritization matrix, resource formulation guidance, TGM and APGM”
“Again – PEGs do not prioritize MDEPs. They may use the MDEP prioritization provided in the APPG to inform their initial funding spread though.”
“Unknown.”
“Statutory; Technical Guidance Memorandum.”
“Subjective and changing.”
“Not sure how PEG does this. Perhaps from must fund/civilian pay to nice to have items.”

35. In your opinion, can quantifiable performance criteria, objectives, or attributes be applied to all MDEPs within your PEG?

Yes No

"Yes, Execution data can be used to see how well money was obligated in a program. Under execution leaves a program vulnerable to reductions."
"I don't work any MDEPs nor am I associate with a PEG but I believe that all MDEPs can/should be quantifiable as to what they provide. Unfortunately, the details as to what the MDEP provides are not captured in the Probe database. One has to go back to the MDEP POC or the PEG to get this detail."
"Yes. Execution date is one aspect that can be quantified."
"Yes. Each MDEP should have some quantifiable measure associated with it."
"Yes. It's not easy but can be done."
"No. I don't think you can quantify year of execution MDEPs and leadership's high visibility MDEPs."

Section VII: Analytical Tools and Techniques.

36. What analytical tools and techniques do you <u>use,</u> or <u>access</u> to perform your duties and responsibilities? (Please identify all that apply)

a. Planning and Programming Tools:

(1) Probe database – **5**
(3) Civilian Manpower Integrated Costing System (CMICS) **- 1**
(4) Resource Formulation System (RFS) **- 1**
(6) Select and Native Programming (SNaP) **- 2**
(8) Institutional Training Resources Model (ITRM) **- 2**
(9) Training Resource Model (TRM) **- 2**
(10) Requirements Builder (R-Builder) – 4
(11) Man-day Resource Model (MRM) **- 3**
(12) Ground Training Resource Models (TRM) **- 2**
(13) Flying Hour Management System (FHMS) **- 2**
(14) Battalion Level Training Model (BLTM) **- 2**
(15) Structure and Manpower Allocation System (SAMAS) **- 3**
(21) Army Training Requirement and Resource System (ATRRS) **- 2**
(22) Army Program for Individual Training (ARPRINT) **- 2**

(23) Others (please identify)
(a) Integrated Resource Management Information System (IRMIS) **- 1**
(b) Resource Requirements Management System (R2MS) **- 1**
(c) PPBES Tools (Web based tool) **- 1**

b. Analytical Techniques:

(1) Input/Output Models - **2**
(3) Flow Charts - **1**
(4) Literature Review - **2**
(5) Tree Diagram - **1**
(7) Analytical Hierarchy Process - **1**
(8) Multi-Attribute Utility Theory - **1**
(9) Multi-Criteria Decision Making - **1**
(10) Data Collection Management Plan - **1**
(11) Stakeholder Analysis - **2**
(12) Sensitivity Analysis - **2**
(13) Optimization Models - **2**
(14) Decision Analysis - **2**
(15) Simulation - **1**
(16) Forecasting - **1**

Comments from PEG-level SMEs and other senior stakeholders:

1. How helpful is the Army Planning Priorities Guidance (APPG) of the The Army Plan (TAP) for your planning and programming efforts?

Documents are often published late requiring action officers to stay in a reactionary mode, thus degrading the efficiency and effectiveness of their work.

Although the above is true on occasion, the documents and data bases provide adequate guidance for action actions to develop their products. The key however, is ensuring that the senior leadership has the appropriate information for making informed decisions, that is, requirements identification, decomposition, and related funding should be conducted at a level of detail to enable senior military leaders to explain the impacts of funding shortfalls and the value of funding to requirements.

2. What are its shortcomings? What would be more helpful/how could it be improved to help your programming efforts?

All requirements should enter the system at one centralized point to disallow circumventing the system. COCOMs have access to Chief of Staff and can do direct negotiating for their requirements and thus cause a ripple effect throughout the process.

(1) Publish the documents earlier to allow action officer to perform decent work; (2) Establish and maintain continuity within the civilian workforce involved in the process. (3) RC should become more involved in the strategic planning process to ensure that their interests are captured in the priorities and guidance.

USAR representatives oversee the management of six MDEPs, which all relate to TDA management HQs (OCAR and USARC). The HQDA OO PEG counterpart is Mr. Doug Young. The six MDEPs are related to the following functions: HQ management (90 percent of the requirement), Information Systems in HQ, Public Affairs, Command Museum, TDY, injury compensation, transit subsidy, civilian pay, and administrative supplies. The civilian personnel are capped by HQDA and represent the full-time civilian staffing requirement for these HQs. Approximately 2 percent of the TOA is allocated to the OO PEG and the AR historically receives approximately 2 percent of the OO PEGs allocation. Generally, LTC Deroma stated that the 2 percent allocations appears fair and gets the job done without major shortfalls in mission success.

Adamant about several aspects of the process as summarized below:

a. The identification of new requirements is the responsibility of the HQDA G3 and is communicated via the G3 prioritization matrix.
b. There appears to be a lot of frustration associated with delays associated with the receipt of strategic guidance which, in turn, delays the publication of all of the guidance documents that is produced after that.
c. The RC should become more involved in the Strategic Planning process to ensure that their requirements are addressed in the series of strategic planning documents. Without such a "hook," it becomes difficult to trace AR requirements back to published priorities and subsequent funding recommendation and allocations.
d. Insufficient personnel continuity within the PPBES process results in inexperienced action officers and executor. This inexperienced translates into weakened ability to defend programs, conduct analysis, understand the culture, know the people, get programs validated and receive adequate funding levels.

Most interesting comment made, in my opinion, was: The community should concentrate on providing the senior military leadership the very best products (e.g., metric- based analysis that is used to quantify requirements) to enable coherent conversations about the risk associated with funding shortfalls and the benefits associated with providing required funding.

General Comments based on review of MM PEG MDEP briefings:

a. Comment #1 - "In reviewing the PEG analysts comments on the program, it appears that the reductions were due to the functionals not fully explaining their requirements. While there may be validated requirements in their requests, until they can fully articulate what their needs are, the requirements should not be validated. As justification for the various issues is presented, the requirements should be validated."
b. Comment #2 – "It is disappointing to read that the MDEP managers/staff were unable to provide sufficient details and justification in their rBuilder submission to enable the MDEP Analyst to validate the fiscal requirements associated with the key functional requirements this MDEP must fund in the near future. It is troubling to see that the validated requirements fall far below the current funding stream of an already underfunded program. The CIO/G-6 staff and community stand ready to continue to

work with the PT staff and MM PEG to ensure a defensible and credible program for Personnel Transformation.

Based on the above, funding is partially a function of acceptable analysis that creates the foundation from which funding requests are solidified. In addition, ensuring the Probe database is up-to-date is also a confining factor.

The strength of the planning process is the linkage to the TAP, which now includes the Army Campaign Plan.

Capability decomposition is not standardized and thus uses a subjective approach in quantifying Army capability needs.

The competitive resource allocation process fails to account for total capability as discernable entities that links back to a whole.

Army requirements, from a resourcing perspective, are constrained to the statutory end-strength and the TOA. The goals is to apply the resourcing in the best way to achieve the Army's most important priorities, in a way that balances the programs, functions, and organizations such that incremental coherency in capabilities are achieved. That is, balance the force within the confines of statutory and programming constraints imposed by DoD.

Each executive agent body (Congress, DoD, OSD, HQDA, PEGs and DPAE) can alter the priority from that which preceded it. Although the process is executed using a top-down approach, there are gatekeepers with the authority to make decisions within the confines of the guidance provided by the next superior body. As a result, there is no single standard used, no single point of entry for requirements, no single process for decomposing and evaluating requirements, and thus no single process for prioritizing and allocating resources.

COCOMs, as executors of the NMS, submit integrated priority list (IPLs) that appears to rise to the top of the priority list.

Appendix F – Key Stakeholder Comments

This appendix includes key stakeholder comments by general category. The individual names associated with the comments have been removed to ensure non-attribution. We must point out that these results *are based upon the opinions of the interviewees and survey respondents* and should be read in that context.

Strategic Planning

- Strategic planning documents are not always published in accordance with the publication timeline.
- Action officers reported difficulty tracking requirements and priorities throughout the series of strategic planning documents. All appear to use slightly different methodologies for grouping and categorizing capability requirements, prioritizing them, and ensuring balance between and among programs.
- Priorities do not appear to be linked to programs in the various automated databases used by action officers.
- Action officers report that linking program resourcing to strategic and Army guidance and priorities is challenging, and often affects their ability to defend their programs during validation.
- The most useful strategic planning documents are the G3 Prioritization Matrix, Army Planning Priority Guidance, and Technical Guidance Memorandum.
- The strength of the planning process is its linkage to The Army Plan (TAP), particularly the Army Campaign Plan (ACP).

Total Army Analysis (TAA)

- Statutory end-strength limits the effectiveness of the TAA process and, by extension, prevents the Army from determining its true requirements.
- Army Components must negotiate within the end-strength limit to derive the 'best' force structure within budget and acceptable risk.
- TAA is based upon the 1-4-2-1 force structure construct.
  - Force requirements for major contingency operations (MCO) are determined using force-on-force modeling and simulation.
  - Non-MCO scenario requirements are determined by professional military judgment using a "library of fictitious scenarios."
  - Results are integrated, constrained to the end-strength, and negotiated to achieve the POM force structure requirements.
- The force structure construct produced by the 2006 Quadrennial Defense Review (QDR) identified 76 threat scenarios for future TAA, most of which are non-MCO.

- Envisioned to be a closer accounting of the current operating environment and should be more representative of Army future requirements.
- CAA is still developing the new TAA methodology to evaluate this new force structure construct.
- Improved analytical methodology for non-MCO scenarios may also be required to ensure force structure estimates better match mission requirements and resulting capabilities captured in functional Management Decision Packages (MDEP).

Programming (MDEP Development)

- There is an apparent gravitation away from the original definition of an MDEP.
  - The number of MDEPs has decreased from 1400 to approximately 600.
  - HQDA directed that new requirement proposals be incorporated into existing MDEPs, when feasible.
- The current trend in MDEP consolidation has, in many cases:
  - Required changes in MDEP descriptions.
  - Increased size and resource requirements for the MDEP.
  - Made prioritizing the MDEPs more difficult.
  - Made tracking, understanding, evaluating, briefing, and defending the program more challenging for action officers.

Programming (MDEP Management)

- Competitiveness of the resourcing process appears counter to achieving the intended purpose of resourcing prioritized programs while achieving force balance.
- According to a majority of SMEs surveyed, the most challenging aspects of their job are:
  - Coordinating with all stakeholders throughout the process.
  - Identifying and tracking cause and effect relationships among associated programs resulting from program changes.
  - Attending and defending the program during all of the relevant Army Program Element (APE), MDEP and PEG-level stakeholder meetings.
  - Influencing the competitive funding negotiation process.
- Lack of staff continuity and experience negatively impacts the quality of action officer products.
- Inexperience translates into a weakened ability to defend programs, conduct analysis, understand the culture, know the people, get programs validated and receive adequate funding levels.

Programming (MDEP Validation)

There were several strategies mentioned by interviewees, taken singularly or combined, for obtaining validation and resourcing for individual programs. The following list identifies those most often identified.

- Link to other, higher priority requirements.
  - Statutory requirement.
  - Directed requirement.
  - Combatant Command (COCOM) Integrated Priority List (IPL).
- Link to strategic planning guidance: National Security Strategy (NSS), National Military Strategy (NMS), or TAP.
- Determine if the program can be resourced with a supplemental.
- Study, brief and defend the program well, providing analytical evidence.
- Establish a relationship with key stakeholders and members involved in the process to strengthen the likelihood of program resourcing.
- Resource program in small amounts over several years versus a large amount in one year (small bills are better; larger programs appear to get more scrutiny).

Programming (Program Prioritization)

- All requirements should enter the system at one centralized point and be evaluated, prioritized, and resourced based purely on their merit.
- Most survey respondents feel that effectively performing their jobs has a minor to moderate impact on the prioritization and decisions made regarding their programs.
- Prioritization is too subjective in practice; should be a more objective, analytically-based process.
- PEGs often indicated that they do not prioritize, but depend upon the priorities developed at higher levels.
- Prioritization loses some relevance during the validation process.
  - Linkage to priorities during validation sessions not emphasized; all action officers brief their program as though it was the number one priority.
  - SMEs commented that validation and resource recommendation decisions depend significantly upon action officers' abilities to brief and defend their programs.
    - If an action officer does well, the program is validated and recommended for funding.
    - If not, the opposite might occur, regardless of its linkage to a priority.

Operational Environment

- Senior leadership must have the appropriate information for making informed decisions.
- Process must enable senior leaders to explain the impacts of funding shortfalls and the value of funding to required levels.
- In practice, each executive agent body, such as Congress, the Office of the Secretary of Defense (OSD), HQDA, the PEGs, and the Director of Program Analysis and Evaluation (DPAE), can alter program prioritization from that which preceded it.
  - Although a top-down process, gatekeepers can make decisions within the confines of the guidance provided by the next superior body.
  - There are various funding strategies and stakeholders capable of 'circumventing' the established process.
  - As a result, there does not appear to be a single standard used for prioritizing, a single point of entry for program validation, a single process for decomposing and evaluating requirements, and thus no single process for allocating resources.
- Prioritization is 'reshuffled' at each executive management level from the PEGs to the Secretary of the Army and beyond.
  - Due, in part, to new guidance and other fact-of-life changes.
  - Continues throughout the POM cycle and appears to be primarily driven by available resources as opposed to realigning priorities.
  - Driven, in part, by personality.

Appendix G – Incentives Screening Matrix

Incentives	Rank from Surveys						In Top 10	Clearly Defined	Major Cost Element	Specific to AR
	Enlisted			Officer						
	AR	NG	AC	AR	NG	AC				
More training.	4	4	4				Y	N		
Better professional development.							N			
Opportunity to change MOS/AOC.	6	9	8				Y	Y	N	
Opportunity to move back and forth between Active and Reserve components.				5	9		Y	Y	N	
More support for families.			10				Y	N		
eDrilling (Drill at a local National Guard/Reserve Center over the network).							N			
Transfer Montgomery GI Bill (MGIB) entitlement to a dependent.			7				Y	Y	Y	Y
Increased availability of child care services.							N			
Increased basic pay.	1	1	1	1	1	1	Y	Y	Y	N
Increased special pay.						9	Y	Y	Y	N
Lump sum re-enlistment bonuses.	2	3	3	9	5		Y	Y	Y	Y
Being given 4 or more years advance notice of eligibility to deploy.						10	Y	Y	N	
Transfer of tuition assistance benefits to family.							N			
More time with family.	9		2	7	7	2	Y	N		
Better promotion opportunities.	3	2	4	6	8	4	Y	N		
Higher quality of NCO leadership.	8	5	5				Y	N		
Higher quality of officer leadership.						5	Y	N		
Better access to healthcare.							N			
Full Student Loan Repayment.	5	7		3	4	7	Y	Y	Y	Y
TRICARE coverage for Soldier and family (reduced for TPU and free when mobilized).	7	8		8	10		Y	Y	Y	Y

Incentives	Rank from Surveys						In Top 10	Clearly Defined	Major Cost Element	Specific to AR
	Enlisted			Officer						
	AR	NG	AC	AR	NG	AC				
Being assigned to a unit closer to home.			6			6	Y	Y	N	
Monetary support to offset some child care costs during training and deployments.							N			
Reduce retirement age by 1 year for every 2 years served in the RC past 20.		10		2	2		Y	Y	Y	Y
Double retirement points for time served in the combat zone.		6		10	6	8	Y	Y	N	
Army supplement to cover civilian health care insurance.							N			
1 year of graduate school in school and degree of choice.	10		9	4	3	3	Y	Y	Y	Y
TSP matching funds	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y

Appendix H – Incentive Proof-of-Principle Value Hierarchy

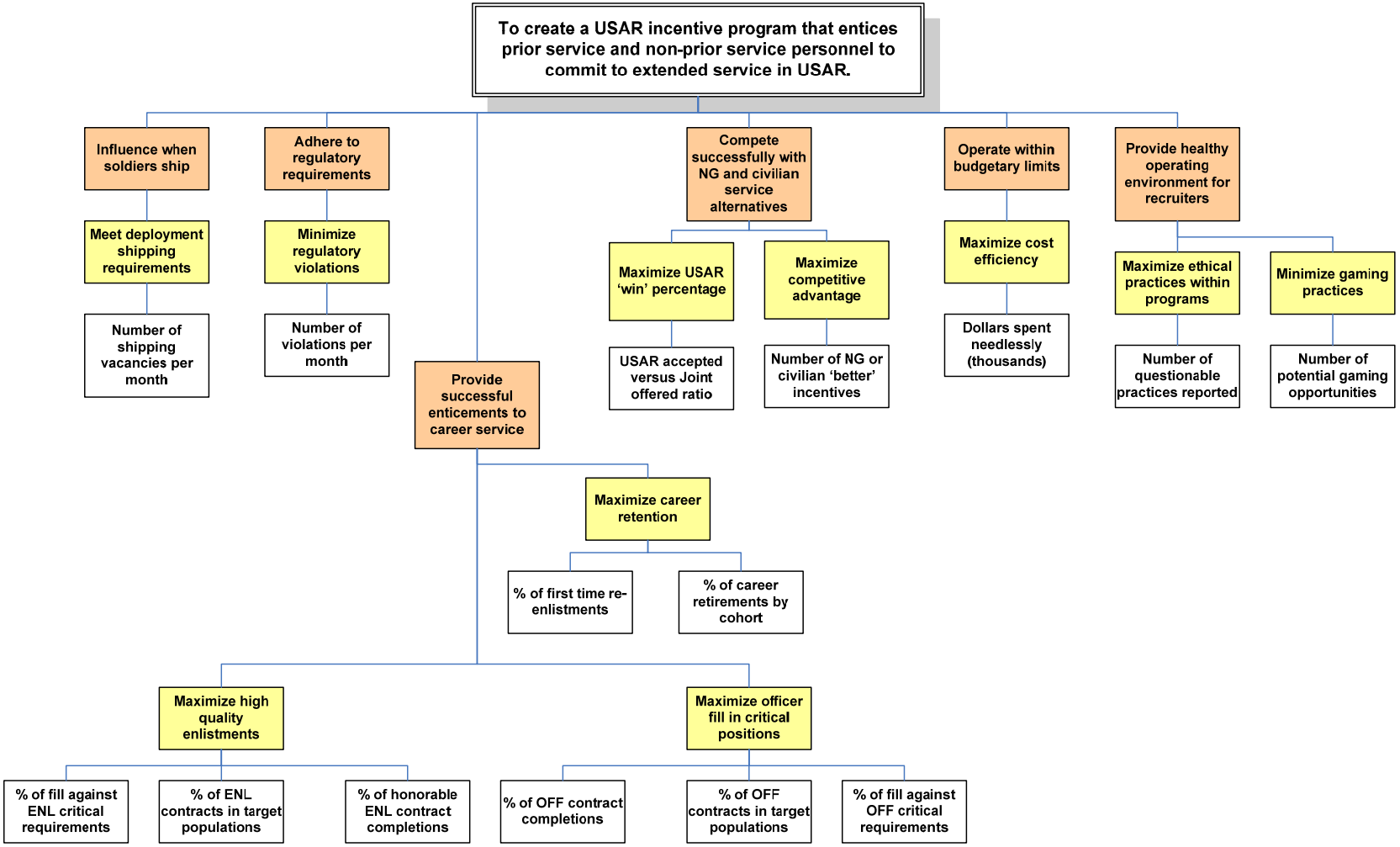

Figure 32. Incentive Proof-of-Principle Value Hierarchy.

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Appendix I – List of References

This appendix contains a list of the references cited in this report, with the exception of those resources identified separately in Appendix B, the overview of PPBES and JCIDS, and in the annotated bibliography in Appendix C.

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Appendix J – Initial Distribution List

1. US Army Training and Doctrine Command Analysis Center
   PO Box 8695
   Monterey, CA 93943-0692

2. US Army Training and Doctrine Command Analysis Center
   401 1st Street
   Fort Lee, VA 23801-1511

3. US Army Training and Doctrine Command Analysis Center
   255 Sedgwick Avenue
   Fort Leavenworth, KS 66027-2345

4. US Army Reserve, Program Analysis and Evaluation (PA&E)
   1421 Jefferson Davis Highway
   Arlington, VA 22202

5. Headquarters, Department of the Army, G-8
   Army Study Program
   700 Army Pentagon
   Washington, DC 20310-0700

6. Defense Technical Information Center
   ATTN: DTIC-O
   8725 John J. Kingman Rd, Suite 0944
   Ft. Belvoir, VA 22060-5422

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Glossary of Acronyms

AASA	Administrative Assistant to the Secretary of the Army
AC	Active Component
ACP	Army Campaign Plan
ACSIM	Assistant Chief of Staff for Installation Management
ADCS	Assistant Deputy Chief of Staff
AIM-HI	Army Installation Management – Headquarters Information
ALO	Authorized Levels of Organizations
ALT	Acquisition, Logistics and Technology
AMSCO	Army Management Structure Code
APE	Army Program Element
APGM	Army Program Guidance Memorandum
APPG	Army Planning Priorities Guidance
AR	Army Regulation
AR	Army Reserve
ARB	Army Review Board/Army Research Board
ARFORGEN	Army Force Generation Model
ARNG	Army National Guard
ARPRINT	Army Program for Individual Training
ARSTRUC	Army Structure
ASA	Assistant Secretary of the Army
ASCC	Army Service Component Command
ASPG	Army Strategic Planning Guidance
ATRRS	Army Individual Training Requirement
BCP	Budget Change Proposal
BCT	Brigade Combat Team
BES	Budget Estimate Submission
BLTM	Battalion Level Training Model
CAA	Center for Army Analysis
CAR	Chief, Army Reserve
CBA	Capability Based Assessment

C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CDD	Capability Development Document
CER	Cost Estimating Relationship
CJCS	Chairman, Joint Chiefs of Staff
CLA	Constraints, Limitations and Assumptions
CLTM	Course Level Training Model
CMICS	Civilian Manpower Integrated Costing System
CoC	Council of Colonels
COCOM	Combatant Commander
COL	Colonel
CPB	Capabilities Based Prioritization
CPD	Capability Production Document
CS	Chief of Staff
CSA	Chief of Staff of the Army
DA	Department of the Army
DAB	Director, Army Budget/Defense Acquisition Board
DAC	Department of the Army Civilian
DARNG	Director, Army National Guard
DASA-B	Deputy Assistant Secretary of the Army for Budget
DCS	Deputy Chief of Staff
DHP	Defense Health Program
DISC4	Director of Information Systems for Command, Control, Communications and Computers
DoD	Department of Defense
DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities
DPAE	Director of Program Analysis and Evaluation
DPG	Defense Planning Guidance
DRM	Director, Resource Management
DSE	Department of Systems Engineering
DTO&E	Doctrine, Training, Organization and Equipment
EE	Equipping

EEA	Essential Element of Analysis
EOH	Executive Office of the Headquarters
EPP	Enhanced Planning Process
FAA	Functional Area Analysis
FCB	Functional Capabilities Board
FFDB	Foreign Forces Database
FFR	Force Feasibility Review
FHMS	Flying Hour Management System
FM	Field Manual/Force Management
FM&C	Financial Management and Comptroller
FNA	Functional Needs Analysis
FSA	Functional Solution Analysis
FY	Fiscal Year
FYDP	Future Year Defense Program
G4	Logistics
GO	General Officer
GOSC	General Officer Steering Committee
HQ	Headquarters
HQDA	Headquarters, Department of the Army
ICD	Initial Capabilities Document
I&E	Installation and Environment
II	Installation
IMA	Individual Mobilization Augmentee
IPL	Integrated Priority List
IPR	In-Progress Review
IRMIS	Integrated Resource Management Information System
IRR	Individual Ready Reserve
ITRM	Institutional Training Resource Model
JCIDS	Joint Capabilities Integration and Development System
JCS	Joint Chiefs of Staff
JFC	Joint Functional Concept
JIC	Joint Integrating Concept
JICM	Joint Integrated Contingency Model

JOC	Joint Operating Concept
JOE	Joint Operating Environment
JPG	Joint Planning Guidance
JPD	Joint Potential Designator
JROC	Joint Requirements Oversight Council
JSPS	Joint Strategic Planning System
JSR	Joint Strategy Review
LTC	Lieutenant Colonel
LOC FRD	Library of Congress Federal Research Division)
MACOM	Major Command
MAPIT	Mission Area to Programming Integration Tool
MCO	Major Combat Operations
MDEP	Management Decision Package
MGIB	Montgomery GI Bill
MILDEP	Military Deputy
MM	Manning
MOM	Measure of Merit
MOS	Military Occupational Specialty
M&RA	Manpower and Reserve Affairs
MRM	Man-day Resource Model
M&S	Modeling and Simulation
MTOE	Modified Table of Organization and Equipment
NCA	National Command Authority
NG	National Guard
NMS	National Military Strategy
NPS	Naval Postgraduate School
NSC	National Security Council
NSS	National Security Strategy
OE	Operational Environment
OI	Organizational Integrator
OJCS	Office of the Joint Chiefs of Staff
O&M	Operation and Maintenance
OMB	Office of Management and Budget

OO	Organization
OPTEMPO	Operational Tempo
OR	Operational Readiness
OSD	Office of the Secretary of Defense
OSDPE	Office of the Secretary of Defense Program Element
PA&E	Program Analysis and Evaluation
PB	President's Budget
PBG	Program and Budget Guidance
PCP	Program Change Proposal
PEG	Program Evaluation Group
PIA	Post-Independent Analysis
PM	Program Manager
PMJ	Professional Military Judgment
POC	Point of Contact
POE	Program Executive Office
POM	Program Objective Memorandum
PPBC	Planning, Programming and Budgeting Committee
PPBE	Planning, Programming, Budgeting and Execution
PPBES	Planning, Programming, Budgeting and Execution System
P3	Program Prioritization Profile
QDR	Quadrennial Defense Review
QFD	Quality Functional Diagramming
R-Builder	Requirements Builder
RC	Reserve Component
RDT&E	Research, Development, Test and Evaluation
RFS	Resource Formulation System
R2MS	Resource Requirement Management System
SAFM	Assistant Secretary of the Army, Financial Management and Comptroller
SAMAS	Structure and Manpower Allocation System
SDP	Systems Design Process
SECARMY	Secretary of the Army
SECDEF	Secretary of Defense
SES	Senior Executive Service

SIO	Standard Installation Organization
SME	Subject-Matter Expert
SNaP	Select and Native Programming
SoS	System of Systems
SPG	Strategic Planning Guidance
SRC	Source Requirements Code
SRG	Senior Resource Group
SS	Sustaining
STP	Short Term Project
SVP	Special Visibility Program
SWA	Southwest Asia
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TAA	Total Army Authorization
TAADS	The Army Authorization Document Systems
TAP	The Army Plan
TAP-MAS	The Army Plan Management Analysis System
TCP	Transformation Campaign Plan
TD2	Training and Doctrine Development Model
TDA	Table of Distribution and Allowances
TGM	Technical Guidance Memorandum
TOA	Total Obligation Authority
TOE	Table of Organization and Equipment
TRAC	TRADOC Analysis Center
TRAC-LEE	TRADOC Analysis Center - Fort Lee
TRAC-MTRY	TRADOC Analysis Center - Monterey
TRADOC	US Army Training and Doctrine Command
TRM	Training Resource Model
TSP	Thrift Savings Plan
TT	Training
TTHS	Trainees, Transients, Holdees and Students
UIC	Unit Identification Code
UJTL	Universal Joint Task List
US	United States

USA	Under Secretary of the Army
USAR	United States Army Reserve
USARC	United States Army Reserve Command
USJFCOM	United States Joint Forces Command
USMA	United States Military Academy
VBEST	Value-Based Evaluation Support Tool
VCSA	Vice Chairman for the Secretary of the Army
VFT	Value-Focused Thinking
YOS	Years of Service

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