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Best Practices in Defense Resource Management

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Wade P. Hinkle, Project Leader

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Executive Summary

This paper presents the results of an Institute for Defense Analyses study of best practices in defense resource management. It supports a United States Department of Defense program, Defense Resource Management Studies (DRMS), that since the early 1990s has assisted more than thirty U.S. security partners around the world in improving their defense resource management capabilities. The primary purposes of this paper are to:

- Offer senior governmental officials a realistic perspective on the benefits of and obstacles to adopting comprehensive processes for managing defense resources; and
- Provide an organized context for thinking about the ongoing evolution of established systems.

This paper focuses on problems in defense resource management that, by reason of their scope or policy implications, are of concern to the most senior government officials. The practices it identifies are those required to shape and integrate a nation's most critical defense capabilities. (The same practices are, of course, useful in resource management for individual Military Services or defense agencies.) It does not examine the political considerations that must influence important decisions: rather, it takes as a given that senior decision-makers in the executive branch of government must weigh those considerations, and correctly calculate their implications.

"Defense resource management," as used here, spans a range of activities, from the definition of mid- to long-term defense objectives, through the formulation of intermediate plans to achieve those objectives, to the development and execution of annual budgets that implement the plans, and, finally, to the collection and review of data on the results of actual expenditures and the adjustment of the plans to recognize those results. Major defense decisions obligate resources over a period of years, and sometimes of decades. Sound resource management demands that these future obligations be recognized and balanced against other commitments.

Most attempts to establish systematic processes for defense resource management have failed. Recognizing the well-demonstrated difficulties inherent in creating and maintaining rational defense management systems, this paper derives principles of best practice from the lessons of failure, as well as from the conceptual framework that has, under favorable circumstances, produced success.

The goal of defense resource management is to achieve a cost-effective allocation of resources among the nation's national security objectives. This paper focuses on principles and

processes that can produce cost-effective resource allocation: the activities of planning for and conducting military operations are beyond its scope, except insofar as the plans or operations reveal the need for additional military capabilities.

The resource management practices identified in this paper are grounded in the principles of the Planning, Programming, and Budgeting System installed in the United States Department of Defense in 1961:

- Defense decision making should be based on explicit criteria of national interest, rather than on compromise among institutional interests.
- Needs and costs must be considered simultaneously: because the nation's resources are limited, major defense decisions are, inevitably, made at the margin of available resources.
- Major decisions should be made by choices among explicitly-stated, balanced, feasible alternatives.
- Active use of an independent analytical staff at the top policy-making levels is needed to provide decision-makers with balanced and relevant decision data and an unbiased perspective on the issues.
- A multi-year force and financial plan is required to project into the future the consequences of current decisions.
- Open and explicit analysis, available to all the parties, must form the basis for decisions.[1]

In practice, these principles must be applied in three fundamental activities:

1. Establishing achievable defense objectives;
2. Developing a comprehensive multi-year force and financial plan based on realistic projections of future defense resources and its revision in light of the actual results of planned expenditures;
3. Applying independent analysis to develop and evaluate balanced, feasible alternatives for achieving the nation's defense objectives and to assess its progress toward doing so.

These three activities must be supported by a transparent system for tracking and reviewing actual resource commitments and recording their effects.

Defense objectives are expressions of national policy. To be effective, defense objectives must be consonant with other policy objectives, affordable, and specific enough to guide resource allocation and management. They must also meet Russell Murray's criterion of good

[1] Alain C. Enthoven and K. Wayne Smith, *How Much is Enough? Shaping the Defense Program, 1961-1969 (*New York: Harper & Row, Publishers, Inc., 1971). Republished by RAND, 2005. These principles are the subheadings of "Chapter 2: New Concepts and New Tools to Shape the Defense Program."

policy: that you can distinguish by their actions those who have read it from those who have not.[2]

Good—that is, achievable—objectives cannot be developed without explicit attention to their costs: they must be affordable with the resources available. Because the costs are seldom if ever known at the beginning of policy development, policy-makers must adjust their objectives as their costs become evident. This iterative process inevitably reduces the scope of the objectives.[3]

Objectives cannot be refined, nor can plans be made for achieving them, unless current and future costs are fully itemized and projected. The costs, moreover, must be arrayed so as to support planning for future activities as well as the execution of current budgets. Even with complete data, however, there will always remain uncertainty in the plan, if only because the costs in the present and immediate future will always be more precisely known (or estimated) than later costs.

The theory and practice of constructing multi-year force and financial plans—properly known as program budgets—have been elaborated over decades. The central principle is clear:

> The right question in developing a multi-year program budget is…how to project future resource and money requirements in such a manner—
>
> a. that the program structure focuses attention on the key policy decisions affecting resource requirements;
>
> b. that the programmed requirements can be used as (or translated into) budget categories.[4]

Under these terms, a well-designed program structure transparently incarnates major policy decisions and is easily translated into budgetary categories.

The resource allocation decisions that shape a program budget rely on estimates of future costs and performance. Because even the best estimates embody risks that actual costs will be higher than projected or performance lower, the program budget requires annual adjustment to reconcile it with reality.

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2 Bernard Rostker and Lewis Cabe, *Naval Studies Group Proceedings, Conference on the Defense Planning, Programming, and Budgeting System (PPBS): Past, Present, and Future*, ed. Walter Golman (Alexandria, VA: Center for Naval Analyses, 1982), 135. Russell Murray was Principal Deputy Assistant Secretary of Defense (Systems Analysis) in the 1960s, Assistant Secretary of Defense (Program Analysis and Evaluation) 1977-1981. He later served on the staff of the House Armed Services Committee.

3 Russell Murray and Les Aspin, *Searching for a Defense Strategy* (Washington, DC: U.S. House of Representatives, 1987).

4 Charles J. Hitch, "The Systems Approach to Decision-Making in the Department of Defense and the University of California," in "Decision-Making," special conference issue, *Operational Research Quarterly* 19 (April 1968): 41.

Developing annual budgets requires myriad decisions that cannot be made by the senior leadership for want of time and detailed information. Only sub-components of the defense establishment—the individual Military Services and the defense agencies—have the detailed information and the understanding of particular practical realities of management required to make the adjustments necessary to produce budgets that can be faithfully executed. The inescapable tensions between major decisions and budgetary realities can be reduced but not eliminated by scrupulous attention to fiscal constraints in making major decisions and appropriate deference to the decisions in producing budgets: the residual conflicts require review and resolution by the senior leadership.

Except in very rare circumstances, demand for defense resources exceeds supply, and those responsible for allocating resources must adjudicate among claims that are, in total, unaffordable. The allocators cannot rely on the claimants' arguments—not because the arguments are calculated or false, but because they are partial—and so must seek impartial assessments from a disinterested source. Establishing and maintaining an organization capable of providing independent analysis is the single most difficult, contentious, and important initiative in instituting effective defense resource allocation.

The success of these three fundamental activities depends on the operation of a transparent system for tracking actual resource commitments and evaluating the effects of those commitments. Without such a system it is impossible to develop achievable defense objectives, construct a program budget, or conduct the analyses that produce realistic alternatives for programmatic decision-making. To be useful in refining resource allocation decisions, the evaluations must be organized in the same categories as the program budget.

It is important to maintain the distinction between resource allocation, which attempts to get the broad outlines of major decisions "roughly right," and detailed financial management, which ensures that resources are committed, in a transparent and auditable way, to the purposes for which they were allocated. The processes are complementary, but they operate at different levels of detail, and attempts to combine them preclude effective planning and defeat meticulous accounting.

In a comprehensive and effective defense management system, the elements identified above interact through four related processes: strategic planning, capability planning, resource planning, and acquisition planning. They operate in the following overlapping domains:

Strategic planning identifies security challenges and defines defense objectives, subject to the discipline of the multi-year force and financial plan and the constraints imposed by the projected availability of defense resources.

Capability planning assesses the ability of the existing and planned force to achieve defense objectives and develops alternatives for strengthening weaknesses and for reducing the emphasis on development of forces that exceed projected needs. Capability planning is also constrained by resource availability. It relies on feedback from performance reviews to increase

the effectiveness of future resource allocations. ("Capability planning," so used, is synonymous with "requirements identification.")

Resource planning allocates money among defense objectives. Through rigorous cost-effectiveness analyses, it ensures that marginal increments in defense resources yield the highest possible increases in defense capabilities.

Resource planning is conducted in two phases, programming and budgeting. Programming allocates future resources, usually for a period of five years. Its goal is to get the resource requirements "roughly right," as noted above, since the estimates for the later years are decreasingly reliable. Budgeting refines the next year of the program for actual execution, taking into account fact-of-life changes (such as changes in fuel costs) and the actual current performance of ongoing initiatives. These activities can create destructive confusion if programmers ignore fiscal reality or budgeters disregard programmatic decisions.

Acquisition planning refines the products of capability planning into recommendations about which systems should be acquired, in what quantities, and on what schedule. These recommendations, once reconciled with fiscal realities, are incorporated into the program budget.

The installation of a comprehensive resource management system must begin with the creation of a program budget and the organization of a process for translating national security objectives into an executable program for achieving them. The model recommended in the *Joint Defense Capabilities Study* [5] provides the best framework for action. It requires the development of resource-informed joint strategic guidance, the refinement of that guidance into resource-constrained joint programming guidance in an enhanced planning process that involves all stakeholders, further refinement of the programmatic guidance into annual budgets in a streamlined resourcing process, and detailed feedback on the results of budget execution to support refinement of the next planning guidance. The process is overseen by the senior (or second-senior) official in the defense establishment, with advice from selected other officials and the senior officer in each Military Service. The daily operations of the enhanced planning process are managed by an independent analytic office that reports directly to the senior official in the defense establishment.

5 Joint Defense Capabilities Study Team, *Joint Defense Capabilities Study Final Report* (Washington, DC: U.S. Department of Defense, January 2004).

Defense Resource Management Studies Program

This paper was produced in support of the DRMS Program described in Appendix B.

Other Defense Resource Management Studies (DRMS) Publications

This paper, *Best Practices in Defense Resource Management*, represents only a portion of the work that IDA has pursued with the Department of Defense regarding Defense Resource Management Studies (DRMS). The following publications document other aspects of IDA's work in this area.

Defense Resource Management Studies (DRMS): Introduction to Capability and Acquisition Planning Processes. IDA Document D-4021. Mark E. Tillman, Alfred H. Gollwitzer, Gregory H. Parlier, Charles V. Fletcher, Wade P. Hinkle. Alexandria, VA: Institute for Defense Analyses. August, 2010. Draft-Final.

Planning, Programming, and Budgeting System (PPBS)/Multi-Year Programming Reading Guide. IDA Document D-4057. Milton L. Tulkoff, C. Vance Gordon, Rachel D. Dubin, Wade P. Hinkle. Alexandria, VA: Institute for Defense Analyses. September 2010.

Contents

Appendices

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1. Overview

This paper will present the best current understanding of the elements of successful defense resource management. It is grounded in the fifty-year history of the Planning, Programming, and Budgeting System (PPBS) of the United States Department of Defense (DOD), in experience in assisting over forty other nations in their efforts to establish systems suited to their needs, and in an exhaustive review of the literature on the topic.[1]

It is intended primarily to offer senior governmental officials a realistic perspective on the benefits of and obstacles to adopting comprehensive processes for managing defense resources, and secondarily to provide an organized context for thinking about the ongoing evolution of established systems.

This paper focuses on problems in defense resource management that, by reason of their scope or policy implications, are of concern to the most senior government officials. The practices it identifies are those required to shape and integrate a nation's most critical defense capabilities. (These same practices are, of course, useful in resource management for individual Military Services or defense agencies.) It does not examine the political considerations that must influence important decisions: rather, it takes as a given that senior decision-makers in the executive branch of government must weigh those considerations, and correctly calculate their implications.

As will be discussed at length in later chapters, the goal of defense resource management is to achieve a cost-effective allocation of resources among the nation's national security objectives. This paper focuses on principles and processes that can produce cost-effective resource allocation: the activities of planning for and conducting military operations are beyond its scope, except insofar as the plans or operations reveal needs for additional military capabilities. The paper will consider principles first, and turn later to problems of organization. Thus, for example, it will discuss the needs to specify national objectives and to estimate the resources required to achieve those objectives without at first identifying which governmental elements should be responsible for those activities.

[1] Wade P. Hinkle, Milton L. Tulkoff, C. Vance Gordon, and Rachel D. Dubin, *Planning, Programming, and Budgeting System (PPBS)/Multi-Year Programming Reading Guide*, IDA Document D-4057 (Alexandria, VA: Institute for Defense Analyses, September, 2010).

Any discussion of this topic must acknowledge at the outset that most attempts to establish systematic processes for defense resource management have failed. Even the PPBS, which has endured for fifty years, has been harshly criticized throughout its existence for failings real and illusory. Recognizing these well-demonstrated difficulties inherent in creating and maintaining rational defense management systems, this paper will derive principles of best practice from the lessons of failure, as well as from the conceptual framework that has, under favorable circumstances, produced success.

The paths to failure, which are described in later chapters, include:

a. Unconstrained Planning (Chapter 2):
b. Enigmatic or Flawed Planning, Budgeting, Financial, and Performance Measurement Data Systems (Chapter 3)
c. Partial or Biased Testimony (Chapter 4):
d. Launching Unaffordable Programs (Chapter 4)

To these must be added the lack of a talented staff capable of producing independent analysis to support major resource management decisions.[2]

The remainder of this chapter identifies the basic principles and essential elements of effective resource management systems and the activities needed to implement them. Subsequent chapters explore the characteristics of the essential elements in greater depth, describe the tools that have been developed to support them, and provide examples of success and failure in maintaining and improving them. The concluding chapter describes how the components might interact in producing and executing an effective defense program and explores the avenues that lead to failure. Appendix A traces the changes in the concepts of planning, programming, and budgeting over the last fifty years.

We begin with a definition. "Defense resource management," as used here, includes a range of activities, from the definition of mid- to long-term defense objectives, through the formulation of intermediate plans to achieve those objectives, to the development and execution of annual budgets that implement the plans, and finally to the collection and review of data on the results of actual expenditures and the adjustment of the plans to recognize those results. Thus, a nation's decision to strengthen control over its territory (an objective) may lead to a decision to add a squadron of tactical aircraft to its forces (a plan), which in turn will require funding over a period of years for the procurement and operation of the aircraft, recruitment and training of air and ground crews, construction and maintenance of infrastructure, and numerous other associated activities. Sound resource management demands that these future obligations be recognized and balanced against other commitments. The plan must be refined in each year's budget to recognize the economic realities of the moment.

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[2] See Charles J. Hitch, "Management Problems of Large Organizations," *Operations Research* 44, no. 2 (March-April 1996).

As the example above suggests, achievement of defense objectives depends on the integration of multiple management activities that must operate at different levels of detail. In particular, multi-year plans are by their nature less precise than execution-ready budgets: the plans, for one thing, must rely on estimates of future costs and assumptions about future conditions, while the budget must serve as the foundation for audit and review, as well as provide for the next increment in the implementation of the plan. It is the planner's responsibility to get the over-all picture "roughly right;" it is the budgeter's to ensure that the resources for the upcoming budget year are fully and effectively distributed; and it is the manager's to ensure that the resources are expended efficiently.

A. Principles of Successful Defense Resource Allocation

Charles J. Hitch, who laid the foundation for and directed the installation of the PPBS, summarized its design with characteristic concision: "PPBS is simply systems analysis and program budgeting:

- Systems analysis says: In planning, look broadly at costs and benefits of alternative plans, measurable and nonmeasurable.
- Program budgeting says: Link planning and budgeting, so that planning is realistic and effective and leads, rather than follows the budget."[3]

Expanding on this theme, Alain C. Enthoven and K. Wayne Smith, two of Hitch's principal lieutenants in establishing and operating the PPBS, identified six fundamental principles of defense resource management in their classic book, *How Much is Enough?* [4]:

- Defense decision making should be based on explicit criteria of national interest, rather than on compromise among institutional interests.
- Needs and costs must be considered simultaneously: because the nation's resources are limited, major defense decisions are, inevitably, made at the margin of available resources.
- Major decisions should be made by choices among explicitly-stated, balanced, feasible alternatives.
- Active use of an independent analytical staff at the top policy-making levels is needed to provide decision-makers with balanced and relevant decision data and an unbiased perspective on the issues.

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[3] Ibid., 261.

[4] Alain C. Enthoven and K. Wayne Smith, *How Much is Enough? Shaping the Defense Program, 1961-1969*, New York: Harper & Row, Publishers, Inc., 1971. Republished by RAND, 2005.These principles are the subheadings of "Chapter 2: New Concepts and New Tools to Shape the Defense Program."

- A multi-year force and financial plan is required to project into the future the consequences of current decisions.
  - Open and explicit analysis, available to all the parties, must form the basis for decisions.

In practice, these principles are applied in three fundamental activities:

1. Establishing achievable defense objectives;
2. Developing a comprehensive, executable multi-year force and financial plan; and
3. Applying independent analysis to support decisions by top management.

These three activities must be supported by a transparent system for tracking and reviewing actual resource commitments and recording their effects. The following paragraphs describe the vital characteristics of each activity. The descriptions are deliberately abstract: complexities of implementation and operation are explored in later chapters

B. Establishing Achievable Defense Objectives

Defense objectives are expressions of national policy. In the United States, as in many other countries, there is a hierarchy of documents specifying objectives, ranging downwards from broad statements of national security strategy through narrower statements of general defense and military strategy to specific guidance documents that direct the acquisition of equipment and disposition of forces. To be effective, defense objectives must be consonant with other policy objectives, affordable, and specific enough to guide resource allocation and management. They must also meet Russell Murray's[5] criterion of good policy: that you can distinguish by their actions those who have read it from those who have not.[6]

Good—that is, achievable—objectives cannot be developed without explicit attention to their costs: they must be affordable with the resources available. Because the costs are seldom if ever known at the beginning of policy development, the policy-makers must adjust their objectives as their costs become evident. This iterative process inevitably reduces the scope of the objectives.

C. Developing a Comprehensive Multi-year Force and Financial Plan

Objectives cannot be refined, nor can plans be made for achieving them, unless current and future costs are fully itemized and projected. The costs, moreover, must be arrayed so as to

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5 Russell Murray was Principal Deputy Assistant Secretary of Defense (Systems Analysis) in the 1960s, and Assistant Secretary of Defense (Program Analysis and Evaluation) 1977-1981. He later served on the staff of the House Armed Services Committee.

6 Bernard Rostker and Lewis Cabe, *Naval Studies Group Proceedings, Conference on the Defense Planning, Programming, and Budgeting System (PPBS): Past, Present, and Future*,.ed. Walter Golman (Alexandria, VA: Center for Naval Analyses, 1982), 135.

support planning for future activities as well as the execution of current budgets. Thus, the decision-maker contemplating the additional tactical fighter squadron mentioned above will need all of the cost data described, and must be able to see the effects those commitments will have on the availability of resources for other priorities. Even with complete data, however, there will always remain uncertainty in the plan, if only because the costs in the present and immediate future will always be more precisely known (or estimated) than later costs.

The theory and practice of constructing multi-year force and financial plans—properly known as program budgets—have been elaborated over decades, and will be presented at length in Chapter 3. The central principle, however, is clear:

> The right question in developing a multi-year program budget is…how to project future resource and money requirements in such a manner—
>
> (a) that the program structure focuses attention on the key policy decisions affecting resource requirements;
>
> (b) that the programmed requirements can be used as (or translated into) budget categories.[7]

The construction of a program budget requires a foundation of assumptions about future resources. History verifies that such assumptions are often far from accurate, for a variety of reasons: national policy may change, for example, or economic forces may limit spending, or old adversaries may diminish in power or new ones increase, or the projections may be deliberately inflated. The important, indeed the vital, contribution of the program budget is that, if supported by rigorous analysis, it provides resource allocators with the means to deal with change in a systematic way and to make the adjustments required to achieve new objectives.

Incorrect assumptions about future resources are sometimes introduced as a matter of policy. The last three changes of administration in the United States, for example, have been marked by assertions that the preceding administration had bequeathed an unexecutable program to its successor. Here too, the combination of rigorous analysis and a sound budget structure has proven able to restore realism to the program. These problems will be further explored in Chapter 3.

The resource allocation decisions that shape a program budget rely on estimates of future costs and performance. Because even the best estimates embody risks that actual costs will be higher than projected, or performance lower, the program budget requires annual adjustment to reconcile it with reality. The difficulties of this task, which are described in Chapter 4, are frequently compounded by overestimates of future resources.

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[7] Charles J. Hitch, "The Systems Approach to Decision-Making in the Department of Defense and the University of California," in "Decision-Making," special conference issue, *Operational Research Quarterly* 19 (April 1968): 41.

The purpose of the program budget is to assist the nation's senior leaders in making major decisions that shape the nation's defenses. Developing annual budgets, however, requires myriad other decisions that cannot be made by the senior leadership for want of time and detailed information. Only the operating components of the defense establishment have the detailed information and understanding of the particular practical realities of management required to make the adjustments necessary to produce budgets that can be faithfully executed. The inescapable tensions between major decisions and budgetary realities can be reduced but not eliminated by scrupulous attention to fiscal constraints in making major decisions and appropriate deference to the decisions in producing budgets: the residual conflicts require review and resolution by the senior leadership.

D. Applying Independent Analysis to Issues in Resource Management

Except in very rare circumstances, the demand for defense resources exceeds supply, and those responsible for allocating resources must adjudicate among claims that are, in total, unaffordable. The allocators cannot rely on the claimants' arguments—not because the arguments are calculated or false, but because they are partial—and so must seek impartial assessments from a disinterested source. As will be shown in Chapter 4, establishing and maintaining an organization capable of providing independent analysis is the single most difficult, contentious, and important initiative in instituting effective defense resource allocation.

The alternatives to analytic rigor include allocation by historical share ("the Navy has always had this proportion of the budget, and should therefore continue to have it…"), by current enthusiasm, or by commercial interests. Analytical rigor cannot by itself defeat such forces, but it can make evident their workings and their costs. Above all, analysis can identify *cost-effective* means for achieving defense objectives.

The success of these three fundamental activities depends on the operation of transparent systems for tracking actual resource commitments and for evaluating the effects of those commitments. Without such systems it is impossible to develop achievable defense objectives, construct a program budget, or conduct the analyses that produce realistic alternatives for programmatic implementation.

To be useful in refining resource allocation decisions, the feedback must be provided in the categories in which the program budget is organized. Thus, in the case of our tactical aircraft squadron, the feedback should include the actual expenditures on aircraft procurement and the number of aircraft procured, as well as the actual expenditures on construction and the progress of construction, and so on. The difficulties inherent in establishing a reliable, transparent system of this kind will be discussed in Chapter 5.

It is important to maintain the distinction between resource allocation, which attempts to get the broad outlines of major decisions "roughly right," and detailed financial management, which ensures that resources are committed in a transparent and auditable way to the purposes for

which they were allocated. The processes are complementary, but they operate at different levels of detail, and attempts to combine them preclude effective planning and defeat meticulous accounting.

E. Planning Activities

In a comprehensive, effective defense management system, the elements identified above interact through four related processes: strategic planning, capability planning, resource planning, and acquisition planning. They operate in the following overlapping domains:

Strategic planning identifies security challenges and defines defense objectives, subject to the constraints imposed by the projected availability of defense resources.

Capability planning assesses the ability of the existing and planned force to achieve defense objectives and develops alternatives for strengthening weaknesses and for reducing emphasis on development of forces that exceed projected needs. Capability planning is likewise constrained by resource availability. It relies on feedback from performance reviews to increase the effectiveness of future resource allocations. ("Capability planning," so used, is synonymous with "requirements identification.")

Resource planning allocates money among defense objectives. Through rigorous cost-effectiveness analyses, it ensures that the marginal increases in defense resources yield the highest possible increases in defense capabilities.

Resource planning is conducted in two phases, programming and budgeting. Programming allocates future resources, usually for a period of five years, and projects forces over a longer period to make clear the results of the resource commitments. Its goal is to get the resource requirements "roughly right"— since, as noted above, the estimates for the later years are decreasingly reliable. Budgeting refines the next year of the program for actual execution, taking into account fact-of-life changes (such as changes in fuel costs) and the actual current performance of ongoing initiatives. Programming and budgeting interact destructively when programmers ignore fiscal reality or budgeters disregard programmatic decisions.

Acquisition planning refines the products of capability planning into recommendations about which systems should be acquired, in what quantities, and on what schedule. These recommendations, once reconciled with fiscal realities, are incorporated into the program budget.

Regarding these processes, three points bear emphasis: first, they cannot successfully be conducted as separate, sequential activities, but must be integrated and iterated; second, they are not naturally coordinated, but require the constant supervision of senior leaders to work effectively in concert; and third, their success depends on their timeliness. To put it simply: strategic planners are disinclined to permit fiscal constraints to hamper their vision; capability planners prefer more capable and expensive weapons systems to less capable and more affordable ones; resource planners subordinate plans and capabilities to fiscal reality; and

acquisition planners are continually tempted to assume that systems will cost less and be ready sooner than history says is likely. Given these tendencies, the direct attention of senior leadership is crucial to overcoming bureaucratic frictions, forcing naturally divergent processes to focus on the achievement of coherent outcomes, and, finally, bringing contentious issues to the point of decision. Without that attention there is great risk that the strategy will be developed and implemented too late to serve the nation's needs.

As noted above, the chapters that follow expand on this overview of best practices. A concluding chapter offers recommendations on the installation of a systematic, rational process for defense resource management. Appendix A traces changes in the meanings of critical terms and concepts in the PPBS over time. Appendix B discusses the objectives, origins, and operation of the DRMS program. Appendix C is a glossary of terms. Appendix D is a list of references and Appendix E a list of abbreviations.

2. Establishing Achievable Defense Objectives

As previously stated, defense objectives are statements of national policy, generated through the nation's chosen strategic planning process. Because each nation's strategic planning process reflects its traditions, governmental organization, strategic circumstances, and a number of other factors, this discussion will focus on the general properties of good objectives and on the basic models for producing them, rather than on the organizations involved in their production. It offers a prescription for establishing sound objectives and follows it with descriptions of two basic models for communicating them.

A. Establishing Sound Objectives: The Murray-Aspin Model

To create sound defense objectives, planners must from the outset constrain their strategic ambitions to match their resources. Failure to do so risks the generation of Military Services that are incapable of implementing the announced strategy and may, in the worst case, prove incapable of implementing any coherent strategy. The mechanism of failure works as follows:

- Without considering the costs of its implementation, the national command authority decides on a national security policy intended to safeguard the nation against future threats;
- The capabilities required to support the policy are identified without consideration of their aggregate costs;
- Plans are developed to acquire the capabilities on the schedule demanded by the policy; and
- The available resources prove inadequate to support the acquisition of the capabilities on the demanded schedule.

Under such circumstances, senior defense officials can:

- Stretch out the acquisition schedules of some or all of the needed capabilities, thereby postponing the creation of the force required to support the policy; or
- Reduce the costs of the planned capabilities by reducing their performance requirements or procurement quantities, at the risk of the ability to implement the policy.

Thus, unconstrained planning puts the nation at risk of having to execute, not its preferred policy but some other policy, using the forces it actually has. The result is that the forces dictate the policy, rather than the policy the forces.

To avoid such failures, strategic planners must be supported by experts who can estimate the resources required to implement proposed policies, and, when the proposed policies are ambiguous, assist the planners in clarifying them to the point where they can support estimates. As elaborated by Russell Murray and Les Aspin,[8] this approach ideally begins with a preliminary analysis conducted in eight steps: [9]

1. The national leadership formulates a draft national security policy for further deliberation.
2. Friendly and opposing forces are estimated for each circumstance under which the draft policy might require the application of military force.
3. The balance between friendly and opposing forces is estimated, and any additional forces required to achieve the objectives of the national security policy are identified.[10]
4. The costs of the additional forces required to achieve the objectives are estimated.
5. Allies are consulted to determine what forces they might provide, and to gauge the likelihood that they would do so.
6. Provisional decisions are made regarding how quickly any requisite new forces should be added, given the risks of delay and the costs to other national objectives.
7. The year-by-year costs of augmenting the nation's forces are clearly laid out.
8. The effects of the planned increase in defense expenditures on the nation's economy are projected.

Murray and Aspin emphasize that the process outlined above creates a *foundation* for development of alternative policies:

> Once having worked through the implications of the first tentative national security policy, the President would almost certainly want to explore some

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8 Russell Murray was Principal Deputy Assistant Secretary of Defense (Systems Analysis) in the 1960s, and Assistant Secretary of Defense (Program Analysis and Evaluation) 1977-1981. He later served on the staff of the House Armed Services Committee. Representative Les Aspin (D-Wisconsin), a Reserve Officer Training Corps (ROTC) product, had been assigned to Systems Analysis as a junior Army officer. He later served as Chairman of the House Armed Services Committee (1985-1992) and as Secretary of Defense (1993-1994).

9 Russell Murray and Les Aspin, *Searching for a Defense Strategy* (Washington, DC: U.S. House of Representatives, 1987).

10 Enthoven notes that, "Estimating the balance of forces requires a great deal of rigorous analysis by independent analysts. As we described in *How Much is Enough?*, there was great overstatement of Soviet-Bloc forces and a lot of analytical work was needed to clarify the rules for counting and how to make comparisons. We brought in comparative cost analysis. We and/or the Central Intelligence Agency estimated that we could make three MIG-21s in our factories for the cost of one F-4, and argued that comparative cost ought to equal comparative effectiveness, or we were buying the wrong planes. Then one of our analysts led in converting it all into payloads at standard ranges and target destruction capability, taking into account our superior avionics and smart bombs, and could demonstrate that our numerically smaller forces were much more effective." Alain C. Enthoven, memo to C. Vance Gordon, January 12, 2011.

> variations before making any final choice. Perhaps he might want to modify the objectives, or the amount of risk he would be willing to accept in the military force balances, or the time to build the new force, or the assumptions regarding allied contributions, or any of the other factors affecting ends and means.[11]

At every level of action, the achievement of objectives requires iterative adjustments of goals and resources: the strategy must be adjusted to meet the realities of costs; the performance requirements for new weapons systems must be adjusted to ensure that the systems will be affordable in sufficient quantities to execute the strategy; and, finally, the strategy must be readjusted in light of the success or failure of the acquisition processes, the actual capabilities of the resulting forces, and the inevitable changes over time in the challenges facing the nation. Successful strategic plans cannot be developed without integrating these strategic concepts with capability planning and resource planning. As Hitch pointed out, any other approach is an exercise in wish non-fulfillment. Successful integration depends, in turn, on the vigorous involvement of the most senior officials and on the rigorous analysis of assertions about needs, costs, schedules, and capabilities. Failure in this effort guarantees a cost-ineffective defense–which the advocates of unconstrained guidance unwittingly embrace.[12]

B. Alternative Approaches to Establishing Sound Objectives[13]

The Murray-Aspin approach is almost always modified in practice. In most cases the national command authority delegates the responsibility for translating national objectives into military capabilities to senior defense officials. The tasks of refining the objectives so that they are achievable, of identifying the capabilities required to achieve them, and of allocating resources to acquire the capabilities remain unchanged. The question becomes, how can the tasks best be performed?

In the evolution of the Planning, Programming, and Budgeting System, there have been four distinct approaches to this problem:

- The first, which was part of the original design of the PPBS, was the practice from 1961 to 1969. In it, the Secretary of Defense acted for the President in implementing the Murray-Aspin approach. Major issues were presented for his decision after rigorous

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11 The Murray-Aspin process demands a major investment of time, and in all likelihood of political capital, by top decision-makers. It was the norm during the 1960s, but has since been applied only once in its full form. In that instance, it shepherded the successful development and adoption of a new U.S. strategy in 1968-1969. That effort modified U.S. military posture toward China, emphasized increased reliance on alliances, and supported significant adjustments in the size and allocation of the Defense budget. For a full description of the development and implementation of the strategic changes, see Robert L. Bovey, *National Security Study Memorandum 3 (NSSM-3): A Pivotal Initiative in U.S. Defense Policy Development*, IDA Document D-2147, (Alexandria, VA: Institute for Defense Analyses, September 1998).

12 Their failure to recognize explicitly the opportunity costs of their enthusiasms imposes the result.

13 For amplification of the historical summary that follows, see C. Vance Gordon, David L. McNicol, and Bryan C. Jack, "Revolution, Counter-Revolution, and Evolution: A Brief History of the PPBS," (unpublished paper, n.d. 2002).

analysis led by his staff (in which he actively participated). Then his decisions were entered directly into the Department's resource plan and budget. This approach was attacked on the grounds that it usurped the prerogative of senior military officers to set requirements.

- The second approach, which was adopted in 1969, delegated to the Military Departments the responsibility for developing proposals for achieving national security objectives, subject to two sets of guidance: fiscal guidance, which constrained the resources at their disposal, and programmatic guidance, which—to a greater or lesser degree—directed the contents of their proposals. The Secretary's staff was tasked to review the proposals for compliance with the guidance and to develop programmatic alternatives to them. The Secretary's decisions on the issues were entered directly into the Department's resource plan and budget. This approach suffered from a lack of connection between fiscal and programmatic guidance, which increasingly imposed on the military departments guidance they lacked the resources to obey.
- The third approach, adopted in 1976, combined elements of the first two. The Secretary made decisions on major issues following rigorous analysis led by his staff (again, with his participation). These decisions were incorporated as mandatory elements of the guidance and ultimately entered directly into the Department's resource plan and budget. The fiscal and programmatic guidance were issued as a single consolidated document, and great effort was expended in ensuring that they were in balance. Like the first approach, it was attacked for violating military prerogatives.
- The fourth approach, adopted in 1981 and still in place, restored the practices of the second, augmented from time to time by major studies conducted outside of the guidance-proposal-review cycle. Over the period the responsibilities for strategic planning, capability planning, acquisition planning, and resource planning have become increasingly compartmentalized and the means for integrating them far weaker. As a consequence, the time required to develop and implement strategic initiatives has progressively increased.

These approaches differ primarily in how they assign the initiative for proposing the contents of the Defense program. In principle, any of them could work; in practice, however, it is very difficult to formulate sound guidance without extensive prior analysis, and equally difficult to enforce compliance when the guidance has broad programmatic implications.

3. Developing a Comprehensive Multi-year Force and Financial Plan

Charles Hitch described the program budget in these terms:

> The function of the program budget is to link the substantive planning of the organization with its fiscal planning, and its long-range planning with its annual budget. It is both a long-range plan and a multi-year budget. It projects, as far as is necessary, all the resources and money requirements necessary to carry out the programs of the organization. By linking substantive and fiscal planning it keeps the substantive planning "feasible" and "balanced."[14]

Any major defense resource allocation decision obligates expenditures in future years. The obligations can extend over several decades for major weapon systems, and even longer for benefits such as lifetime medical care. A primary purpose of a comprehensive multi-year force and financial plan, or program budget, is to clarify both the constraints imposed on current decisions by prior resource commitments and the constraints that current commitments will impose on future decisions. A well-designed program budget associates the funding data with the systems, commodities, or Services funded, so that decision-makers can easily understand the capabilities at their disposal and their costs. In the case of the tactical aircraft squadron in our example, a properly-constructed program budget would identify, for each year, the costs of designing, developing, producing, and operating the aircraft, and would also specify the numbers of aircraft and the numbers of officers and enlisted personnel in the squadron.

Over time, the program budget becomes a historical record that is invaluable in assessing the success of programmatic initiatives. The DOD program budget is updated to reflect actual resource commitments as they become known. The historical Five Year Defense Plan (FYDP)[15] is a chronological record of actual forces and expenditures from 1962 through 2009 that and supports comparisons between the planned resource commitments for each year (and their planned consequences) and what actually happened. No resource management system can be improved without such a record.

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[14] Charles J. Hitch, "The Systems Approach to Decision-Making in the Department of Defense and the University of California," in "Decision-Making," special conference issue, *Operational Research Quarterly* 19 (April 1968): 37-45.

[15] From the mid-1960s through the mid-1980s, FYDP was the abbreviation for "Five-Year Defense Plan." In the 1980s, the definition was changed to "Future Years Defense Program."

In designing the DOD's multi-year force and financial plan, Hitch sought a program structure that "would have two characteristics—

- It would reflect the goals or missions of the Department of Defense and the means of achieving them.
- It would allocate to the elements of the program all the resources and dollars required by the Department."[16]

The program elements were designed to be mutually exclusive and collectively exhaustive, and to capture fully each discrete component of the Department's activities. They were grouped into nine Major Force Programs (MFPs), each of which encompassed a largely distinct sphere of activity:

I. Strategic Retaliatory Forces

II. Continental Defense Forces

III. General Purpose Forces

IV. Airlift and Sealift

V. Reserve and Guard

VI. Research and Development

VII. General Support

VIII. Retired Pay

IX. Military Assistance

The number of MFPs has varied over the years to reflect changes in emphasis in national security policy. New ones have been added and old ones have been removed. To a very large extent, however, today's MFPs are the direct descendants of those established in the early 1960s. They are:

I. Strategic Forces

II. General Purpose Forces

III. Command, Control, Communications, and Intelligence

IV. Mobility Forces

V. Guard and Reserve Forces

VI. Research and Development

VII. Central Supply and Maintenance

[16] Ibid., 38.

VIII. Training, Medical, and Other Personnel Activities

IX. Administration and Associated Activities

X. Support of Other Nations

XI. Special Operations Forces

The durability of the MFPs testifies to the wisdom of their designers and to the persistent nature of the nation's defense objectives.

MFPs were originally tailored to aggregate program elements that could serve as complements to or substitutes for one another in meeting specific national security objectives. This design provides two major advantages: it affords top management with a clear view of the resource commitments (both historical and planned) dedicated to each major defense objective; and it provides orderly access to all the elements that should be considered in evaluating the nation's capabilities to achieve its various objectives. Thus, the MFPs provide a convenient system for cataloging both current plans and records of historical performance.

The program budget also serves a dual purpose: it records decisions for the period it covers (usually five or six years), and provides the basis for the preparation of the budget to be executed in the first year of its span. This duality requires careful attention, because programming—that is, the process of assembling the program budget for its full period—and budgeting—the process of refining the first year of the program—must be recognized and conducted as distinct activities. The distinction is embodied in the fact that they describe resources in different ways: The program associates resources with program elements, which are the *outputs* of resource commitments, and the budget associates resources with budget categories, which serve as the *inputs* for generating the capabilities captured by the program elements. This distinction is analogous to that between the menu offered in a restaurant (which specifies the outputs of the kitchen and their prices) and the bills the restaurant must pay to buy, prepare, and serve the food.[17]

The program and budget not only treat resources differently, they deal with them at different levels of detail. The program records decisions intended to shape the nation's defense capabilities in accordance with projections of future resources; the budget records decisions—including, sometimes, modifications to previous programmatic decisions—made necessary by immediate realities. Failure to recognize the distinction produces unfortunate consequences, the most immediate example of which is offered by the attempt to unify the programming and budgeting processes in 2003.

Before 2003, major programming decisions were made in the summer, and the first year of the resulting program was refined into the next year's budget in the fall. Persuaded that the

[17] This useful comparison was developed by Wade Hinkle in 2003, during the DRMS project for Croatia.

processes were redundant, the Secretary of Defense authorized[18] a concurrent process, in which both major programmatic decisions and budget refinement were to take place in the fall. The predictable result was that budgeting concerns swamped programmatic ones, and major programmatic decisions went un-made. Early examination of major issues was not formally re-established until 2010.

The designers of the PPBS were soon aware of another peril: that the program budget would become a management system. Enthoven wrote in 1963:

> Thus, the Programming system started out as a convenient, simple, flexible aggregate device, but it has moved far in the direction of becoming a detailed system for financial control. And the result now seems to be that it is combining the disadvantages of both; too detailed to be useful in the over-all review of forces, not detailed enough for the real job of financial control.[19]

The attempt to consolidate the programming and budgeting systems renewed this peril. In the years following 2003, it became customary to specify funding in the final years of the FYDP to the nearest thousand dollars (in a $600 billion annual budget)—a degree of precision in estimation three orders of magnitude greater than what is realistically attainable.

The program structure suitable for the United States is determined by its defense objectives, which differ in nature and scope from those of other nations. A nation establishing a program budget should not, therefore, adopt the United States' structure wholesale, but should instead organize its program around its own concerns and objectives. The choices that must be made in designing a program structure and the problems the choices inevitably introduce are a primary subject in the DRMS curriculum. They are summarized here at a level appropriate for policy-makers.

There are four distinct ways to organize a program budget: by missions, functions, forces, and hybrids of the first three. Each has strengths and imposes difficulties.

A mission-based program structure might be organized thus:

- Internal Security
- External Security
- Veterans' Welfare
- Nation-Building

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[18] Management Initiative Decision (MID) 913, May 22, 2003. MID 913 also provided for a biennial cycle in which a new program would be developed every other year (in even-numbered years), and the intervening year would be dedicated to execution reviews, and to the continuing implementation of the preceding year's program. MID 913 did not survive its first contact with the reality that, in the United States, presidential elections are held in even-numbered years and can change the party in power.

[19] Draft memorandum from Alain C. Enthoven to Charles J. Hitch, 1963. Enthoven does not recall writing it, but he does subscribe to its contents.

- Central Policy and Direction

This structure fits well with the way senior decision-makers think about defense objectives and is easily related to national strategy and budgets. It is, however, difficult to align with military structure because many military elements will have responsibilities to support more than one mission. For the same reason, it is extremely difficult to develop and manage a mission-based program.

A functionally-based program structure might be organized thus:

- Personnel and Units
- Logistics and Support
- Command, Control, Communications, and Intelligence
- Training and Operations
- Facilities
- Procurement
- Central Administration

This structure fits well with the typical organizational structures of ministries of defense and Military Services, and is easy to relate to budgetary categories. It is, however, very difficult to extract from it the information needed to support analyses of the balance between force structure, investment, and readiness. In addition, because each military unit is represented in almost every category, it is very difficult to sort out the effects of changes in any one category on the requirements for resources in the others, or to identify the costs of particular military capabilities.

A force-based program might be organized thus:

- Land Forces
- Air Forces
- Maritime Forces
- Central Command, Control, and Combat Support
- Central Administration

This structure fits well with military organizational structure, and the budgets it produces are therefore easily implemented and monitored. It also makes it easy to identify the costs of specific systems. It does not, of itself, support easy analysis of capabilities involving more than one force category, and its organization may lead to the assumption that the analysis of possible trade-offs between force categories violates defense objectives. These disadvantages can be overcome by vigorous management.

Hybrid program structures combine two or more of the basic structures by adding levels of detail. In one such structure, the force categories constitute the MFPs and the mission categories constitute program elements. For example, a hybrid force/mission structure might be organized thus:

1. Land Forces
    a. Territorial Integrity
        1) Region 1
        2) Region 2
        3) Etc.
    b. Territorial Defense
    c. Etc.

Each military unit is then assigned to a program element. The resulting structure supports ready assessment of the capabilities and resources allocated to each mission, and thus of the ability of the nation's forces to accomplish that mission. It suffers, however, from the weakness that any particular military unit may be required to serve multiple missions, but this problem, too, can be overcome by vigorous management. In practice, the hybrid model has proven effective, and is a central feature of the DRMS curriculum.

Experience and analysis have provided overwhelming evidence that *any* program structure has weaknesses that require careful attention by senior decision-makers. Hitch himself anatomized the strengths and weaknesses of the system he created, and concluded that they are inherent in the structure of military forces.[20] At the program element level, he wrote:

> The model fits the Air Force best. The Air Force consists of large weapon systems—B-52s, Minuteman Missiles, F-4-Cs, etc.—which are distinct, largely self-contained, and designed for a specific mission. They are natural program elements. But note that even here the B-52, an element of the Strategic Retaliatory Major Program, is dropping most of the bombs over Vietnam in a limited war.
>
> The Navy also consists mainly of large weapon systems, but here the fit is not as good, for most Navy systems, excepting Polaris, are not as self-contained or single-purpose. We were immediately confronted in 1961 with the problem of the carrier task force, which consists of (a) the carrier itself, (b) its aircraft, and (c) escort vessels—to say nothing of support ships. We decided, correctly I think, to designate each type of carrier, each type of aircraft, and each type of escort vessel as a separate program, even though this violated our definition of a program

[20] Charles J. Hitch, "The Systems Approach to Decision-Making in the Department of Defense and the University of California," in "Decision-Making," special conference issue, *Operational Research Quarterly* 19 (April 1968): 37-45.

element as "an integrated combination of men, equipment, and installations whose effectiveness can be related to national security objectives."

I say "correct" because only in this way could attention be focused on the decisions affecting the Navy. Decisions about numbers and types of carriers are not enough. Numbers and types of aircraft and escorts have to be decided too. There are no "fixed coefficients." In fact, the aircraft and the escort vessels can be and are used in some circumstances without the carrier. So in the Navy we have complex interdependencies even among the combat program elements.

For the Army the fit was poorest of all. As someone said (with slight exaggeration) the Navy and Air Force consist of weapon systems, but the Army is people. Moreover, most of the weapons and equipment the Army has are general purpose, assigned in varying proportions to all sorts of Army units–men, rifles, machine-guns, trucks and personnel carriers; even tanks and artillery pieces.

We decided in 1961 to make the combat organization unit–Divisions by type, independent Brigades and Battalions by type, etc.–the basic Army program elements. Equipment costs were prorated among such units. This was not an altogether happy solution. For one thing, the organizational units were constantly being reorganized–changing in size and structure. More units meant that the critically important decisions on numbers and types of Army weapons and equipment were buried deep within the program structure instead of being highlighted by it for the attention of top management. This became such an obvious defect that we grafted onto the Five Year Program a so-called "procurement annex" which was simply the old Procurement appropriation–and much of the "program" review each year was devoted to equipment decisions in terms of the old budget format, which were then prorated to program elements by formula. What was needed was a more appropriate program structure tying the Army's requirements for future resources and dollars to the important decision variables, which should probably have been:

Size of forces (essentially, numbers of combat and support personnel).

Geographical deployment (to which costs were quite sensitive).

Numbers and types of all important items of equipment, weapons and ammunition.

Such a program structure could not easily be fitted into the Major Program/ Program Element model. It would be multi-dimensional.[21]

The database systems available in the 1960s were two-dimensional and relatively inflexible. It was not until the mid-1990s that the FYDP was converted to a relational database that supported rapid creation of what were called "virtual MFPs." This advance greatly increased the FYDP's ability to support analyses across MFP boundaries. For example, when the Secretary of Defense demanded a comprehensive accounting of the resources the Department had committed to space, it supported the production of a Space MFP in two weeks.

[21] Ibid., 39-40.

Although the advantages of a relational database FYDP become increasingly important as a nation's defense objectives becomes more complex, it must be noted that the FYDP served the United States as an effective management tool for thirty-plus years as a flat-file database of less complexity than that provided by desktop spreadsheets today.

4. Applying Independent Analysis to Issues in Resource Management

As noted in Chapter 1, decision-makers must rely on independent analysis to produce balanced, feasible alternatives because they cannot obtain them from any other source.[22] Because rigorous analysis by its nature counters the biases of institutions, however, it excites their resistance. History therefore records that it is extraordinarily difficult to establish and preserve independent analytic organizations, and that their very survival depends on their vigilant protection by the decision-makers. With that cautionary introduction, this chapter will describe the roles of independent analysis in support of strategic planning, program development (also known as "capability planning"), acquisition planning, and resource planning, and will offer recommendations about the proper scope of its application.

A. Analysis in Support of Strategic and Capability Planning

The role of analysis in setting strategic objectives begins with establishing the fundamental realities of the challenges facing the nation. The first question that must be answered is, "What is the balance between the friendly and opposing forces in each circumstance where the draft policy would require the application of force?" There will almost always be disagreement over the most basic facts. For example, to minimize the risks of defeat, senior military officers will feel duty-bound to estimate the strength of the potentially opposing forces at its highest possible level and to assume the worst about the strength of their own and allied forces. In addition, there is a tendency for each Military Service to acknowledge the capabilities of the others, but to plan to prevail in its sphere of operations without significant assistance from them. In combination, these practices generate estimates of military requirements that are unaffordable and strongly resistant to modification.

The fact that differences among estimates of enemy threats can persist for decades, as they did throughout the Cold War, does not relieve the nation's leaders of the responsibility to adopt a strategy and decide on the forces required to implement it. The role of analysis is to support the decisions by developing independent estimates and making it clear *why* they differ from other estimates. This function is often opposed on the grounds that it reduces the discussion of issues that are really matters of judgment to arguments over numbers, and thus devalues military

[22] Enthoven and Smith devote an entire chapter in *How Much Is Enough?* to the question: *"Why Independent Analysts?*

experience in favor of quantitative legerdemain. Enthoven and Smith countered this argument with the following observation:

> If an individual must lay out clearly all his assumptions, objectives, and calculations, both his critics and the decision maker can see what was done and whether the analysis overemphasized quantitative factors, if indeed it did. But if he is allowed to keep it all in his head, in an appeal to experience and judgment, others have no way of knowing what factors were emphasized. Our own experience suggests that the intuitive judgment of the experienced professional often rests on at least as great an oversimplification of important aspects as that of the most quantitative-prone systems analyst.[23]

The selection of the forces best suited to implement the nation's defense strategy falls in the realm of what is now called "capabilities planning." It is not a new process; in fact, the best example in the public record of the role of analysis in shaping and implementing strategy dates back to 1962.[24] It is an analysis of the United States' strategic retaliatory forces, prepared by the Systems Analysis office at the direction of the Secretary of Defense. Although no nation now faces the strategic problem then confronting the United States, the elements of the analytic process described below are relevant to myriad present-day problems.

The analysis was undertaken to assess the proper mix of bombers, missiles, and ballistic missile submarines in the U.S. nuclear force posture. It was undertaken under two under well-defined conditions. First, the United States had a clear policy with regard to its principle adversary: it was a policy of containment, intended to prevent further expansion of the Soviet empire, which was adopted on the basis of a conclusion that the internal weaknesses of the Soviet system would, given time, destroy it. Second, the policy had clearly understood implications for military strategy: the objective was to *deter* aggression by the Soviet Union and its allies. Given these conditions, the question for analysis could be refined to determining the mix of forces that would maximize the likelihood of sufficient deterrence.

In this case, the criterion of success was whether a given mix of forces could inflict unacceptable damage on the Soviet Union following a successful Soviet first strike, and the secondary analytic problem was to find the mix of forces that could do so at the least cost. The analysis was complicated by a secondary effect: forces of bombers and missiles large enough to survive a Soviet first strike in sufficient numbers to retaliate could, in Soviet eyes, constitute a U.S. first-strike capability that they could counter only by increasing their own forces. Increasing the size of the bomber-missile force was thus inherently destabilizing.

At that time, ballistic missiles launched from submarines were too inaccurate to be used to destroy Soviet bombers and missiles in a first-strike, and were therefore targeted on population

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[23] Alain C. Enthoven and K. Wayne Smith, *How Much is Enough? Shaping the Defense Program, 1961-1969* (New York: Harper & Row, Publishers, Inc., 1971), 71. Republished by RAND, 2005.

[24] Office of the Secretary of Defense, Office of Systems Analysis, "Recommended FY 1964-FY 1968 Strategic Retaliatory Forces (U)," Draft Memorandum for the President, November 21, 1962.

centers. Moreover, being immune to a Soviet first strike when at sea, submarines could provide deterrence with far fewer warheads than either bombers or missiles. Thus submarines alone promised deterrence without destabilization, and on that basis the Secretary of Defense decided to increase the size of the submarine fleet and to reject, as a matter of national policy, the Air Force's proposal to develop a first-strike capability. Four facts are notable about this decision: it was based on criteria of national interest, rather than on the narrower interests of the Navy and Air Force; it was driven by very careful thought about the desired effect of the nation's investment in strategic retaliatory forces; it focused on considerations of effectiveness that in the end dictated investment in submarines *despite* the fact that they were the element of the retaliatory force with the highest unit cost; and its essential elements did not depend on detailed quantitative analysis (that came later, in working out the right numbers of bombers, missiles, and submarines).

The analysis that supported this decision effectively married strategic planning to capability planning. In addition, it explicitly addressed the problem of diminishing returns in working out the numbers of each force element, arriving at explicit judgments of how much of each was "enough."

B. Analysis in Support of Acquisition Planning and Resource Planning

The marriage of strategic and capability planning begets requirements for forces and equipment. If the process works well, those requirements are affordable and roughly balanced against other obligations, so that all essential functions of the national defense are adequately funded. Even given this foundation of feasibility, however, two major problems remain to be worked out: first, the costs of the capabilities must be refined to produce programmatic and budgetary detail; and second, the resulting expenditures must be scheduled so that, without doing violence to other obligatory programmatic activities, they produce the needed capabilities in time to serve their intended functions.

These problems are exacerbated by the tendency of organizations to underestimate the costs of acquisition programs at their outset and by failure to recognize the future costs of commitments to other defense activities that can, over time, reduce the total funding available for acquisitions. Two sorts of analysis are therefore needed in support of acquisition and resource planning: cost analysis, which produces estimates of the costs of development, procurement, and operation of weapons systems; and affordability analysis, which examines the defense program as a whole in the context of its projected future resources. The first refines the actual costs of proposed systems; the second evaluates whether the nation can afford the systems it desires *given its other commitments*.

Although the technical aspects of cost analysis are beyond the scope of this paper, four of its most important features can be stated almost qualitatively:

1. Most uncertainties about the costs of developing and producing new systems derive from the incorporation of new technologies. As the technologies become more mature the uncertainties decrease markedly: at the extreme, where the system is purchased "off-the- shelf," they vanish.
2. Costs estimates are, nonetheless, critical even in off-the-shelf purchasing, where they provide valuable insights into the vendor's negotiating room regarding price.
3. Quality in cost estimation is strictly dependent on the quality of the historical cost data from similar systems used to formulate initial estimates, and the accuracy and timeliness of the reports of actual costs as development and production proceed. For off-the-shelf purchases, the quality of estimates depends on knowing the actual development and production costs of the item.
4. It is not in the interest of those who develop and sell systems to provide data that will support critical cost analysis. Those responsible for acquisition planning and management must therefore develop, and strictly and vigilantly enforce, explicit requirements for the timely submission of accurate cost data.[25]

Acquisition planning requires a perspective longer than that provided by a five- or six-year program budget. A major acquisition program may easily take a dozen years (the F-22 aircraft program took twenty-four years), and control must be exercised to keep the aggregate costs of all acquisition programs within prospective funding throughout the period. Failure to constrain aggregate acquisition costs in the years beyond the program period creates a "bow wave" in which costs will exceed funding. In ensuing years the program (and finally the budget) must reduce the costs to match the available funding by stretching out system development, reducing procurement quantities, delaying fielding, or other undesirable expedients.[26]

In the United States, the need to maintain a longer perspective is met through the Defense Planning Projection, which projects defense expenditures for fifteen years beyond the FYDP. In its current projections, the bow wave is starkly visible early in the period, and the growth of other costs that will (absent changes in policy or force structure or both) greatly constrain the availability of funds for acquisition looms ominously later on. Careful attention to such long-range projections is an essential element of best practices at every level of defense resource management.

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[25] During the height of the acquisition reform initiative in the mid-1990s, it was argued that advances in acquisition management rendered historical cost data irrelevant and that the costs of capturing data on the actual results of the new processes were unaffordable. The resulting cost over-runs spelled the end of acquisition reform.

[26] Defenders of the bow wave maintain that it constitutes a prudent recognition that some programs will be canceled and their costs vanish, bringing the acquisition program back into balance with its funding. The historical record defeats this argument.

Questions of affordability must be addressed not only for the acquisition portfolio as a whole, but for the sub-portfolios of capabilities that it comprises. Just as the cost and effectiveness of every element of strategic retaliatory capability was considered in the example cited above, so too must the cost and effectiveness of every element of tactical airpower, or anti-submarine warfare, or ground combat, be considered in analyzing the alternatives for achieving national objectives in those aspects of warfare. Finally, the costs of decisions regarding force structure and modernization must be incorporated into the defense program—a process that often requires additional decisions about priorities.

Analysis is also of fundamental importance in producing realistic estimates of future levels of defense funding. The analysis must begin with a thorough examination of the state of the nation's economy and of competing demands on the government's resources, and must proceed to skeptical scrutiny of currently projected demands for defense resources. The stakes in this game are very high because overestimates of future resources must eventually be corrected by more drastic measures of the same kind that address shortfalls in acquisition funding–measures that can, in the extreme, vitiate the strategy based on the overestimates.[27]

[27] There is a school of thought that the responsibility of senior defense officials is to maximize the defense budget, without regard to competing national priorities. Members of this school are readily and regularly placated by the promise of future increases in funding–with inevitable and damaging consequences.

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5. Installing a Defense Resource Management System

The preceding chapters have addressed the question, "What are the best practices in Defense Resource Management?" This chapter turns to the problem of establishing a system in which those practices can be exercised, and in particular to the order in which the elements of that system should be created. To succeed, the process requires four preconditions:

1. The Chief of State and his senior advisors must be committed to the task.
2. If in the beginning there is no program budget, there *is* a defense accounting system that is sufficiently transparent and complete to support the construction of one.
3. If one does not already exist, an independent analytic office can be promptly established.
4. An intellectual foundation for analysis exists or can be promptly created.

These conditions are important *because* they are simple. The history of attempts to install planning, programming, and budgeting systems outside the United States Department of Defense is predominantly one of over-ambitious failure. Hitch attributed the failures to two primary factors: attempts to apply the "whole Pentagon-developed bag of tricks, its accidental as well as its essential activities" in the absence of the decades of preparatory work that formed the foundation for the PPBS in DOD; and a lack of trained manpower to manage the desired level of detail.[28]

Naturally, the nation's leaders will wish to begin shaping its strategy immediately, and will need a clear accounting of the costs and effectiveness of its current defense posture to do so. At the most primitive level, they need to know where the resources are dedicated (and obligated), and what the results are. Beyond that, they need, as soon as possible, at least a roughed-in program budget to illuminate their latitude for decision. Work on establishing a program budget must, therefore, begin at once, and accompany, rather than follow, the development of strategic options.

Next, the leadership must think of the process and organization(s) that will support its strategy and program development. The models available for this effort were described in

[28] Charles J. Hitch, "Management Problems of Large Organizations," *Operations Research* 44, no. 2 (March-April 1996): 261.

Chapter 2: here we recommend a variant (Figure 1) developed in the Joint Defense Capabilities Study of 2004, which is consistent with the Murray-Aspin model.[29]

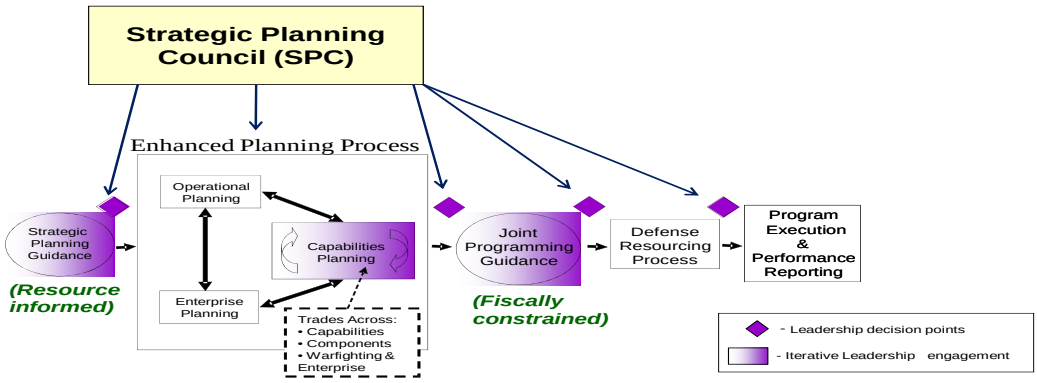

Figure 1. Joint Defense Capabilities Decision Process

The process is directed by the senior official in the defense establishment, with advice from selected other officials and the leadership of the defense components. The group convenes as the Strategic Planning Council to review the process at each decision point and to guide it between them. The process begins with the development of Strategic Planning Guidance (SPG), which is deliberately constrained by resource limitations. The SPG provides the framework for developing programmatically substantive guidance in the iterative fashion required to ensure a feasible and cost-effective program.

The first task, as noted above, is the generation of a program budget with a structure that is related to the major challenges facing the nation's defenses. The first SPG should accordingly direct the participants in the Enhanced Planning Process (EPP) to do two things: first, to identify the resources associated with each major challenge; and second, to develop feasible, balanced alternatives for improving the nation's ability to respond to the most immediately critical of the challenges. The number of challenges examined in this first pass must be small if their examination is to be fruitful since the process is new and the issues controversial. Above all, *every stakeholder in the decisions must be an active participant in the process, and the nation's senior leadership must actively supervise and direct it*. This paramount need for commitments of time and attention by the senior leadership provides the criterion for selection of the issues to be examined: they must warrant the commitments, and must therefore be few in number.

The EPP is designed to drive the policies identified in the SPG into the defense program. Because it must also ensure that all of the essential activities of the defense establishment are

[29] Joint Defense Capabilities Study Team, *Joint Defense Capabilities Study Final Report* (Washington, DC: U.S. Department of Defense, January 2004).

adequately funded, it will inevitably be forced to modify the policies to make them affordable. To the extent that the strategic guidance fully recognized resource constraints, these modifications will be minor; in any case, they must be explicit. The resulting Joint Programming Guidance (JPG) should include a section that specifically addresses the adequacy of funding for new initiatives, previous obligations, and ongoing baseline costs. This fiscal sobriety test is necessary to ensure that the JPG is executable.

Although Figure 1 suggests that the planning-programming-execution cycle naturally falls within a single year, it is clear that many EPP issues will take much longer to develop and decide. The correct interpretation is that the EPP is an ongoing, year-round process in which issues are decided as they become ripe for decision, and that the decisions are then recorded in the next annual JPG.

The issues addressed in the EPP will be complex, contentious, and important (sometimes critical) to the nation's welfare and safety. Their importance demands that they be presented as formal, written documents, rather than as briefings. There are several reasons for this dictum: first, briefings are very poor vehicles for complex arguments;[30] second, the oral element of a briefing is impossible to capture clearly, so that the record of the basis for decision is inevitably incomplete; and third, only formal papers provide a structure that arrays complex arguments so that decision-makers can evaluate the treatment of facts and the merits of arguments. The formal papers used to resolve issues in the U.S. Department of Defense in the 1960s survive to this day, and provide a clear record both of the decisions themselves and of the basis on which they were reached. There is no such record for the period since briefings became the vehicles for decisions.

In the first year, the EPP must bear the dual burden of establishing a structure for the program budget and developing the major issues designated in the SPG. As the program structure stabilizes in subsequent years, more time can be devoted to issue development. Yet even in a mature system there is good reason to limit the issues to a number that does not go beyond the willingness of the senior leadership to invest its time and political capital. In the eight years of the Kennedy-Johnson administrations there were just over 100 Draft Presidential Memorandums. It is unlikely that any senior defense official who lacks the vast authorities granted Secretary of Defense Robert S. McNamara will be able to match that record. The threshold for consideration of an issue in the EPP should be high because every issue considered will tax the time and political capital of the senior leadership.

The senior leadership cannot manage the day-to-day activities of the EPP, nor can it constantly supervise the development of even an appropriately limited number of major issues: it must delegate those tasks to a disinterested party. The independent analytic organization is the natural (and perhaps the only) candidate to fill this role, but it does so at considerable risk. It has no natural constituency other than the senior leadership, and, insofar, as the leadership's decisions on issues create winners and losers among powerful claimants for resources, it will be

[30] Edward R. Tufte, *The Cognitive Style of Powerpoint* (Cheshire, CT: Graphics Press, 2003).

blamed by the losers and viewed with distrust even by the winners–who will fear that another day the decisions may go the other way. These risks cannot be eliminated, but can be mitigated by three measures: first, the leadership must make it abundantly clear that it *owns* the process and that it, not the independent analytic organization, is responsible for its results; second, the analytic organization must take scrupulous care that the process is open, explicit, and inclusive; and third, any objections raised by any participant regarding the process or its outcomes must be fully and openly dealt with.

If the EPP functions properly, the resulting JPG is fully executable within available resources, and the defense resourcing process is greatly simplified. Even in the best of circumstances, however, much remains to be done in working out the myriad details of the next year's budget and making the minor adjustments needed to accommodate the decisions in the JPG. This work cannot be done at the highest levels of defense; only the defense components that will execute the budget have command of the details needed in its preparation. Once this work is done, another review by the senior leadership is needed to ensure that no unnecessary violence has been done to the JPG. This final review should be governed by the principle of *stare decisis*: issues decided in the JPG should not be revisited in the absence of proof that the assumptions that underlay the decisions were in error–that is, in the absence of changes in the nation's strategic circumstances or in other over-riding fiscal realities. This principle should also, of course, apply to decisions reached in previous years.

In addition to the major issues considered in the EPP, many small issues will be raised during the defense resourcing process. Unless they are managed carefully, these small issues can create unaffordable demands on the senior leadership's time. On this score, the historical record provides no clear path to success. The establishment of thresholds for consideration can reduce the number of issues but still leaves too many for attention by senior leadership. Relegating minor issues to the budget process diminishes the demands on senior leadership, but risks inattention to significant programmatic problems. Delegation of decision authority to second-tier officials can succeed if the senior leadership endorses the decisions, but begets too many appeals for review. This problem is chronic: the best that can be done is to keep it under reasonable control.

The quality of the data available to the EPP, and thus the quality of the decision information available to senior leadership, is absolutely dependent on the processes adopted for monitoring budget execution and performance. Senior leadership must therefore require that the components of the Defense establishment respond promptly and fully to requests for data. There are two pitfalls in the forward path for this process: the first is the temptation to measure everything and to treat programmatic data as a subset of detailed accounting data; the second is the natural reluctance of subordinate managers to report slow progress (or failure) while there is still a hope of overcoming the problems. The first threatens to drown decision-makers in detail; the second, to delay recognition of problems until it is too late.

There should be a formal process that provides regular reports to the leadership regarding the health of acquisition programs–their costs and adherence to schedule, and the performance of the systems. Similarly, there should be reports on the progress of capital investments and on the costs of major activities, including the costs of military and civilian pay and benefits. Taken individually, these reports direct the attention of the senior leadership to emerging problems; taken together, they provide an index of the health of the program as a whole, and of the resources available for new initiatives.

The procedure offered above for establishing a rational defense resource management system is deliberately simplified to its bare essentials. Experience has shown that over-complication is fatal to the process, as is fragmentation of control over its elements. If, in isolation, organization A drafts policy, organization B identifies requirements, organization C conducts acquisition planning, and organizations D and E build programs and budgets, it is certain that the policies will be unsupportable, the requirements unaffordable, the acquisition plans too ambitious in particular and in the aggregate, and the programs and budgets unguided by a coherent set of objectives.

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Appendix A
The Planning, Programming, and Budgeting System Then and Now

The current Planning, Programming, and Budgeting System (PPBS) is unlike the one created by Charles J. Hitch and Alain C. Enthoven in the 1960s. Their system focused on the development of cost-effective solutions to complex problems and had little room for elaboration of policy and none for the development of guidance. The differences extend to the meanings of the fundamental terms. Hitch defined "planning" as follows:

> The first phase [planning]… we envisioned as a continuing year-round operation involving the participation of all appropriate elements of the Defense Department in their respective areas of responsibility. We expected that the Joint Chiefs of Staff organization and the planners in the military departments would play a particularly important role in this phase. *What we were looking for here were* not just requirement studies in the traditional sense but *military-economic studies which compared alternative ways of accomplishing military objectives and which tried to determine the one that contributes the most for a given cost or achieves a given objective at the least cost. These are what we call "cost-effectiveness studies," or systems analyses…* [emphasis added][1]

In the 1960s, "programming" scheduled resource allocations over the program period to implement planning decisions, and "budgeting" refined programmatic resource allocation decisions for execution.

Today, "planning" refers to the definition of strategic (and sometimes programmatic) goals, "programming" to the development and refinement of programmatic proposals for achieving the goals, and "budgeting" to the further consideration of programmatic issues, as well as to the refinement of the budget for execution.

Capability planning and acquisition planning, which were intrinsic elements of the PPBS in the 1960s, are today conducted separately–capability planning through the Joint Capabilities Integration and Development System, and acquisition planning under the authority of the Under Secretary of Defense (Acquisition, Technology, and Logistics). This dispersion of authorities creates inconsistencies that must be worked out, sometimes painfully, in the development of programs and budgets.

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[1] Charles J. Hitch, "The Systems Approach to Decision-Making in the Department of Defense and the University of California," in "Decision-Making," special conference issue, *Operational Research Quarterly* 19 (April 1968): 30-31.

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Appendix B
Defense Resource Management Studies Program

The Defense Resource Management Studies (DRMS) program contributes to the United States Department of Defense's broader, worldwide, bilateral program to strengthen a host country's defense resource management practices. The Office of the Under Secretary of Defense for Policy (OUSD (P)) and the Office of the Secretary of Defense, (Program Analysis and Evaluation) (OSD (PA&E)) (recently reorganized and renamed Cost Assessment and Program Evaluation (CAPE)) established the Defense Resource Management Studies program in the early 1990s to help the United States' security partners increase their military capabilities through improved defense resource management.

The program has three primary objectives:

- Assisting key security partners in meeting security challenges through more effective and efficient resource management practices;
- Strengthening and enhancing the defense linkages between the United States and its partners through professional exchanges at the staff and senior levels;
- Enhancing transparency and accountability in partner countries through appropriate management and decision-making processes.

Origin of DRMS

The DRMS program evolved from a request for U.S. assistance from the Egyptian Ministry of Defense in 1990. OSD (PA&E) was asked by OUSD (P) to develop analytic techniques to assist the Egyptians in formulating an affordable multi-year plan for defense capabilities in light of the significant U.S. security assistance program. Shortly after the work in Egypt concluded, the North Atlantic Treaty Organization (NATO) asked its aspirant members in Eastern Europe to improve their capacities for defense resource management. In the early 1990s, OSD (PA&E) was asked to build on its Egyptian experience to devise ways to assist the NATO effort. Over the next decade, DRMS teams worked with their counterparts in all of the new NATO member and Partnership for Peace member countries except for Russia and Belarus. The program was subsequently extended to include U.S. security partners in other regions of the world. In total, the Institute for Defense Analyses (IDA) DRMS teams have conducted programs in thirty-nine countries in Europe, Asia, the Middle East, and Latin America.

How Defense Resource Management Studies Are Conducted

Since each country's defense resource management needs are unique, practices used in one country cannot be transferred in cookie-cutter fashion to another. In particular, the Planning, Programming, Budgeting, and Execution System (PPBES), as practiced in the United States, is complex and staff-intensive. As a result, DRMS adapts the principles used in U.S. defense resource management to the scale and circumstances of the host nation. These same principles are utilized in other defense ministries that employ modern management practices, and are also advocated by many international institutions that specialize in public resource management.

The program continually assesses the lessons DRMS country teams have learned from their experiences working with host nations. IDA has synthesized these lessons into a "standard" methodology that is complemented by materials that support work in new countries. This modular concept provides a four-phase, building block approach to management reform. The four phases are:

1. **Assessment:** A DRMS country program typically begins with a detailed assessment of the host country's current approach, including force, resource, and budget planning activities to document how well the existing system functions and identify opportunities for improvement.
2. **Preparation and Skill-Building:** The next phase focuses on suggestions to improve existing systems and procedures while concurrently preparing the host country to implement new management processes and procedures. A critical part of this phase involves identifying the personnel and organizational realignment needed to implement the new processes, and assisting in the development of specialized skills and information systems.
3. **Implementation:** The host country creates its first resource-constrained, multi-year program and budget using the new processes and procedures. The host country creates or modifies management and implementation directives to align with necessary adjustments.
4. **Sustainment:** Finally, a sustainment effort supports institutionalization of the defense reform effort, primarily from an advisory role.

The duration of a full DRMS program with a host nation that encompasses all four phases shown above, will vary from country to country, but it could be on the order of three years or more. (See Figure B-1 for a notional timeline.)

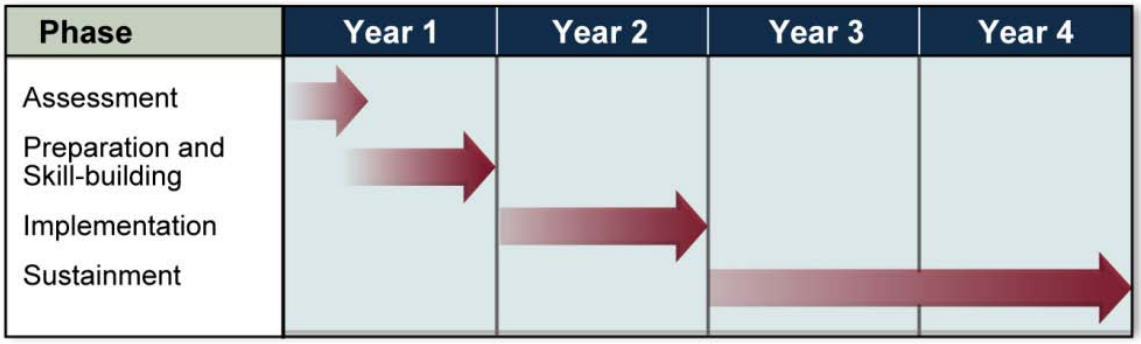

Figure B-1. Modular Approach Time Line

A complete set of supporting materials has been developed to present concepts and principles common to effective defense planning as it is practiced in many countries. The materials illustrate the steps needed in an integrated process from national-level policy-making through submission of the annual budget request. The materials consist of separate "modular" packages that include concept briefings, seminar-like skill-building exercises, and assessment questionnaires. They are complemented by computer-assisted simulations and skill-building analytic seminars.

Together, the materials are used to introduce concepts, assist the host country in exploring how best to design its internal management and decision-making process, build the staff skills necessary to implement the system, and begin analyzing the real-world resource issues confronting the host country's military and its budget. The modular approach is structured so that a host country need not commit itself at the outset to devising and implementing a completely revised management process. The host country can use results from the first two phases to determine the desirability and scope of such "process re-engineering," or simply elect to make a more targeted set of improvements.

In some countries, DRMS work is constrained in scope from the outset. These projects are shorter in duration (typically about six months) and are centered on introducing modern management concepts, skill-building, and demonstrating techniques. They can involve seminars, workshops, and staff exercises using materials adapted from the standard DRMS "modular" package, or off-the-shelf materials that previous DRMS teams have developed on specialized topics. Shorter-duration visits can also be used to assist host countries in completing specific studies of resource issues or to create specialized spreadsheet tools for analysis of particular issues.

All DRMS materials are designed to be used either early in the engagement with the host country, to present the broad concepts leaders need to understand the benefits of adopting these practices, or later, after a country has decided to implement these practices, to inform staffs of the specific process steps and analyses. In addition, the materials balance the broad concepts and theoretical underpinnings of resource management with specific drills and practice. The latter

focus on specifics is, arguably, more immediately useful to staffs because it enables them to more fully appreciate roles and workloads.

Throughout their engagements, the DRMS teams are careful to not press a host country into adopting U.S. practices or to adopt a U.S. Government policy position. Instead, the teams suggest a set of international best practices. These practices represent what has worked best from DRMS program experiences in more than thirty countries.

Products Typically Used by DRMS Country Teams

Resource management in many countries is centered on the well-known PPBES process flow, originally developed in the early 1960s under U.S. Secretary of Defense Robert S. McNamara (January 21, 1961 – February 29, 1968). In many countries, work on a core and improved PPB system begins first. This was true for the NATO expansion countries that were initially the focus of IDA's DRMS efforts. To support this work, the DRMS program developed its first teaching simulation to demonstrate possible improvements in resource management.

Once a host country, with DRMS team assistance, has determined the types of improvements it desires in its resource management process, the DRMS team assists in the development of a work plan to introduce those improvements in a way that is culturally sensitive and most likely to produce the desired results within the project's timeframe. The work plan helps to achieve these common, essential objectives:

1. **Building Know-How:** Improving the skills and introducing the tools needed for sound practices.
2. **Organizing for Success:** Thinking through shifts in office organization, rules, and functions that are likely to result from the desired improvements.
3. **Developing Products and Obtaining Decisions:** Formulating recommendations and linking new analytic products to improvements in senior-level decision making processes.

To help accomplish these objectives, DRMS teams generally use three types of products (described below), based on the stated need and the lead time associated with the product (part of the approved work plan).

1. **Seminars:** Developed specifically for a country or adapted from a generic product and tailored for a country's specific needs. Generally, seminar development requires longer lead times as preparation and coordination can be extensive.
2. **Opportunity Instruction:** Developed in-country to address specific time-sensitive questions, these classes can be formal, but are, more often, informal and ad hoc. Generally, these needs are not well known in advance so lead times will be short and can involve intense, overnight preparation.

3. **Real-World Document Preparation:** Developed both in- and out-of-country to support a host country's actual implementation of DRMS. This process is continuous and teams can be drawn into these activities with little notice.

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Appendix C
Glossary

Acquisition Encompasses a wide range of activities related to acquiring equipment, facilities, and services, including setting requirements, procuring those items, and supporting them through the entire life cycle.

Budget Guidance Information typically issued by the Ministry of Defence chief financial officer that provides detailed instructions for preparing and submitting the annual budget request to all defense establishment budget-submitting components.

Budget Planning The process of translating the completed resource plan into an annual budget request.

Capability (General) An organization's ability to preplan and accomplish an objective and achieve the effects desired in a specified time period and operating environment. Capability is generally a function of organizational structure, including personnel and equipment on hand, the readiness of personnel and equipment, training, and sustainment.

Capability (Military) A military unit's ability to preplan and accomplish a mission and achieve the effects desired in a specified time, operational environment, and state of preparedness, where preparedness is the sum of readiness and sustainment.

Capability Planning A deliberate process that provides a coherent basis for (1) implementing the major missions or objectives assigned in a strategic plan; (2) assessing the capability [see also Capability] to accomplish assigned major defense missions or objectives; and (3) developing broadly stated non-materiel or materiel-related approaches that address the most important capability-related challenges.

Cost Analysis	An economic evaluation process involving a wide range of techniques, including gathering (and assessing the accuracy and reasonableness of) cost-related data, and disaggregating, aggregating, categorizing, and analyzing cost information to obtain insights on relevant cost issues**.**
Crosswalk (in program budget context)	A tabular display that relates output-oriented program categories to input-oriented budget categories.
Defense Acquisition System	A systematic approach for assessing potential materiel options and developing affordable acquisition proposals that are designed to meet broadly stated operational needs in a timely manner and at a reasonable price.
Defense Budget Request	An agency or department's formal submission to headquarters seeking resources to operate for the coming year and providing formal justification for the requested level of funding.
Defense Capability Analysis	An assessment and evaluation of a military organization's ability to accomplish an objective and achieve the effects desired in a specified time period and operating environment. Capability is generally a function of organizational structure, including personnel and equipment on hand, the readiness of personnel and equipment, training, and sustainment.
Defense Planning Guidance	A principal consolidated document within Planning, Programming, and Budgeting systems used by the defense establishment leadership (typically Minister of Defence) to provide guidelines to the Military Services and other defense components for preparing their multi-year defense program proposals.
Defense Program	A program for the defense establishment as a whole, developed from a review, assessment, and consolidation of the approved programs of all of the individual major components of the defense establishment.
Defense Systems Analysis	A systematic interdisciplinary approach to assessing the implications of defense policy issues.

Fiscal Guidance	A document typically issued by the senior leadership or chief financial officer that specifies the annual aggregated funding level to be used in resource planning by major components of the defense establishment for a multi-year medium-term planning period (e.g., three to six years).
Fiscal Transparency	An important attribute of well-designed resource planning processes that enables stakeholders to readily comprehend major functions and results and obtain clear information on key aspects of those processes.
Force Planning	Process of identifying forces and capabilities needed to implement national policy and strategy.
Joint Strategic Planning System	The process used by the U.S. Chairman of the Joint Chiefs of Staff to give strategic direction to the nation's Military Services and to provide advice to the President and the Secretary of Defense on defense capability requirements, programs, and budgets.
Major Program	Within Planning, Programming, and Budgeting systems, a set of program elements that comprises a major defense capability, reflecting a key defense establishment mission or support function and including the resources needed to accomplish its mission or function objectives.
Major Program Structure	Within Planning, Programming, and Budgeting systems, a list of the Major Programs that comprise all of the components, activities, and resources of the defense establishment.
Multi-year programming	One of several terms used to describe a defense resource management process comparable to the Planning, Programming, and Budgeting System process.
Multi-year resource management	One of several terms used to describe a defense resource management process comparable to the Planning, Programming, and Budgeting System process.
National (Military) Strategy	The overarching basis for developing military plans and applying military power during peace and war to attain national objectives.
Operations Plan	A plan for accomplishing a stated objective using assigned and attached forces.

Participatory Management	Terminology used by former U.S. Secretary of Defense Melvin Laird to describe the decentralized management concept he introduced within the Department of Defense when he succeeded Robert McNamara as Secretary of Defense in 1969.
Partnership for Peace (PfP)	Partnership program between NATO and individual European and former Warsaw Pact countries and former Soviet Union republics, aimed at enhancing security and stability and addressing such issues as terrorism, disaster response, and proliferation of weapons of mass destruction. Current PfP countries are: Armenia, Austria, Azerbaijan, Belarus, Bosnia and Herzegovina, Finland, Former Yugoslav Republic of Macedonia, Georgia, Ireland, Kazakhstan, Kyrgyzstan, Malta, Moldova, Russia, Serbia, Sweden, Switzerland, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.
Planning, Programming and Budgeting System (PPBS)	A systematic, calendar date-driven process for identifying and funding defense and security-related needs; and assessing results achieved against established programmatic and financial management objectives.
Program Budget	One of several terms used to describe a defense resource management process comparable to the Planning, Programming, and Budgeting System process.
Program Element	The smallest aggregation of functional or organizational entities and related resources that are needed to perform a specific mission. For programming and budgeting purposes, each program element should be mutually exclusive and only assigned to one defense mission area. For mission area assessment purposes, “multi-purpose” program elements (e.g., units that can perform more than one mission) can be identified and attributed to more than one defense mission area.
Program Objective Memorandum (POM)	The Service-proposed multi-year defense program based on fiscal guidance targets and program development guidance issued by the U.S. Secretary of Defense within the U.S. Planning, Programming, and Budgeting System process. The POM typically encompasses a comprehensive collection of data and narrative material, including a cover memorandum that summarizes the objectives of the program that is being proposed.

Program Package	Another term for major program. Within Planning, Programming, and Budgeting System processes, a set of program elements that comprises a major defense capability, reflecting a key defense establishment mission or support function and including the resources needed to accomplish its mission or function objectives.
Public Expenditure Management	The process the government of a country uses to orchestrate the expenditure of resources to provide for the needs of the nation and its populace.
Resource Forecast	Within Planning, Programming, and Budgeting systems (and similar resource management processes), the analytical activity of projecting funding expected to be available to the defense establishment for the multi-year planning period to ensure that resource planning is financially realistic.
Resource Management	The process by which the resources (funding, personnel, equipment, facilities, etc.) of an organization are used in the most efficient and effective manner to achieve desired objectives.
Resource Planning	A systematic basis for identifying the resources required to accomplish assigned or potential objectives or provide a capability [see also Capability]. In resource-constrained environments it usually entails developing multi-year plans or annual budget proposals that allocate limited resources to the highest-priority objectives.
Service Budget Proposal	A proposed budget submitted by each of the Military Services.
Service Program	The total set of related activities and resources a Military Service has been authorized to implement to achieve specific capabilities or performance-based objectives.
Smart Procurement Initiative	The United Kingdom Ministry of Defence defense-acquisition concept intended to transform process and organizational structures to achieve faster, cheaper, and better procurement of defense equipment.
Strategic Planning	A deliberate process that identifies mid- and long-term challenges and planning options.

Systems Analysis	A systematic interdisciplinary approach to assessing the implications of defense policy issues.
Threat assessment	An estimate/evaluation of the potential defense capabilities foes could draw on to threaten or attack a country or group of countries.
Transparency in government expenditures	An important attribute of well-designed resource planning and government expenditure processes that enables stakeholders to readily comprehend major functions and results and obtain clear information on key aspects of those processes.

Appendix D
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Appendix E
Abbreviations

DOD	Department of Defense
DRMS	Defense Resource Management Studies
EPP	Enhanced Planning Process
FYDP	Five-Year Defense Plan, Future Years Defense Program
JPG	Joint Programming Guidance
IDA	Institute for Defense Analyses
MFP	Major Force Program
NATO	North Atlantic Treaty Organization
OSD (PA&E)	Office of the Secretary of Defense, Program Analysis and Evaluation
OUSD (P)	The Office of the Under Secretary of Defense for Policy
PPB	Planning, Programming, and Budgeting
PPBES	Planning, Programming, Budgeting, and Execution System
PPBS	Planning, Programming, and Budgeting System
SPG	Strategic Planning Guidance

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14. ABSTRACT

The goal of defense resource management is to achieve a cost-effective allocation of resources among the nation's national security objectives. This paper offers senior governmental officials a realistic perspective on the benefits of and obstacles to adopting comprehensive processes for managing defense resources. It provides an organized context for thinking about the ongoing evolution of established systems and identifies the practices required to shape and integrate a nation's most critical defense capabilities. The resource management practices identified in this paper are grounded in the principles of the Planning, Programming, and Budgeting System installed in the United States Department of Defense in 1961. Defense resource management, as used in the paper, spans a range of activities, from the definition of mid- to long-term defense objectives, through the formulation of intermediate plans to achieve those objectives, to the development and execution of annual budgets that implement the plans, and, finally, to the collection and review of data on the results of actual expenditures and the adjustment of the plans to recognize those results. This paper focuses on the principles and processes that can produce cost-effective resource allocation.

15. SUBJECT TERMS

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