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DEFENSE RESOURCE MANAGEMENT STUDY

Final Report

By
Donald B. Rice

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A Report Requested by the President and Submitted to the Secretary of Defense

February 1979

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Defense Resource Management Study.

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Government Printing Office Stock #
008-004-00013-7

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PREFACE

The Defense Resource Management Study (DRMS) was commissioned by the Secretary of Defense in November 1977 in response to a request by the President dated September 20, 1977. The President wanted a "searching organizational review" into several resource management issues.

The Secretary also established the Defense Organization Committee, chaired by the Deputy Secretary, to oversee the DRMS and several other concurrent organization reviews.

The DRMS focused on five topics within the broad area of resource management:

- Resource allocation decision process (PPBS),
- Weapon system acquisition process,
- Logistics support of combat forces,
- Career mix of enlisted military personnel, and
- Military health care system.

Each topic is treated in a separate chapter of this report containing analysis and recommendations for change.

A companion report contains several case studies of logistics support alternatives. These case studies serve as part of the basis for the design principles for logistics activities described in Chapter III. They also illustrate specific opportunities to improve defense logistics activities.

Two additional publications contain staff papers supporting Chapter IV, First-Term Career Mix of Enlisted Military Personnel, and Chapter V, Military Health Care, respectively.

Throughout the course of the Study, the DRMS has worked closely with the OSD staff, the Military Departments, the service staffs, field organizations, the OMB, and former Department officials. The report has undoubtedly benefited immensely from the advice and criticism received from those groups, as well as that received from the Defense Organization Committee. However, the involvement and cooperation of others with the DRMS work in no way signify that they endorse this report. While numerous observations or comments from others have been incorporated in the report, the Study Director bears the sole responsibility for its content.

Donald B. Rice
Study Director

Defense Resource Management Study
Final Report

Executive Summary

The Defense Resource Management Study (DRMS) was commissioned by the Secretary of Defense in response to a request by the President dated September 20, 1977. The President wanted a "searching organizational review," an "unconstrained examination of alternative reforms in organization, management, and decision processes in the Department of Defense" as related to resource management.

Resource management in the DoD is pervasive; it touches defense objectives, the means to achieve them, and the cost of those means. The success of resource management is ultimately measured by the effectiveness and efficiency of defense forces and support activities. The scope of this study is therefore broad, though limited by practical considerations to reviews of:

- The resource allocation *process*, through which means and ends are related, analyzed and funded.
- Four specific *functions*, each involving large resources and contributing directly to defense capabilities:
  - Weapon System Acquisition,
  - Logistics Support,
  - Enlisted Personnel Management, and
  - Military Health Care.

As a result of these reviews, the DRMS has compiled an array of new ideas and processes that it believes are conceptually sound, relevant to real problems, and, in principle, implementable. Recommendations for changes in the resource allocation process and in the four functional areas listed above are summarized here. These five sets of changes are presented in detail, together with their rationale and background material, each in a separate chapter in the final report. The final report is not an implementation plan, however. Further analysis and adaptive adoption of the recommendations remain as future tasks for the DoD.

THE DEFENSE RESOURCE ALLOCATION PROCESS

The Planning, Programming and Budgeting System (PPBS) encompasses the full range of activities that support DoD decisionmaking on the allocation of defense resources and hence is the focus of this review.

Planning includes the definition and examination of alternative defense strategies, the analysis of exogenous conditions and trends, threat and technology assessment, and efforts to anticipate change or to understand the longer-term implications of current choices. Programming includes the definition and analysis of alternative forces, weapon systems, and support systems, together with their resource implications; the

evaluation of options for variation therein; and other staff efforts to construct and understand the Five-Year Defense Plan (FYDP). Budgeting includes formulation, justification to the Congress, execution, and control.

The DRMS proposals for change to the PPBS respond to a number of problems identified by current and recent participants in the process. The following courses of action are recommended:

- Combine the traditionally sequential program and budget reviews into a single annual review.
- Establish a Defense Resources Board (DRB), chaired by the Deputy Secretary, to manage the combined program/budget review.
- Utilize the time in the annual cycle freed up by combining the program and budget reviews to focus additional attention on strategic and resource planning, including resolution of selected major issues prior to the program/budget review.
- Integrate more closely the internal PPBS and the Presidential resource allocation process, enhancing the DoD's capability to support Presidential decision-making.
- Relate the program/budget process and the acquisition process somewhat more closely.

The centerpiece of the DRMS proposals is a conscious "destructuring" of the current PPB cycle through the creation of a *planning window* extending from January to May, and a *combined program/budget review* extending from August to December. These changes would enhance opportunity to focus on major resource questions that can be authentically zero-based while recognizing that programming and budgeting are continuously incremental processes that incorporate selected fundamental reviews.

Secretary of Defense guidance memoranda would constitute a standing document intended to evolve incrementally rather than undergo complete revision each year. The standing document would have three parts:

- Section I: "Rationale for the Defense Program," contains policy and strategic planning guidance and would be closely coordinated with the Secretary's "posture statement" issued in January each year.
- Section II: "Defense Issues," comprises an issue-specific agenda of major unsettled problems, together with assigned responsibilities for work on the issues, and a schedule for resolution by the Secretary.
- Section III: "Program/Budget Guidance," records decisions on issues identified in Section II, lays out the fiscal guidance brackets by service and other categories, and prescribes guidance for submission of the program/budget estimates.

Sections I and II would be issued in January, at the start of the planning window.

Within the four-month planning window, formally prescribed activity is deliberately held to the identification of fundamental issues, the rigorous consideration of alternatives, and resolutions of those issues for incorporation in the revised Section III.

Section III of the guidance document would be issued in early June at the end of the planning window. The services then submit combined program proposals and budget estimates in August, in the form of five-year program proposals with the first year supported in budget detail.

The *combined program/budget review* would then proceed under the direction of the Defense Resources Board (DRB). The mission and program view would receive relatively more attention in the early stages and the budget scrub relatively more in later stages. However, both perspectives would be maintained throughout, with programmers and budgeteers acting in coordinated fashion.

The process must result in a budget approved by the President, formulated in terms of appropriations, and justified from the viewpoint of both mission and purpose as well as program and financial integrity.

The Defense Resources Board would be chaired by the Deputy Secretary of Defense and have four other members: the USD(R&E), the ASD(PA&E), the ASD(C), and the ASD(MRA&L). The CJCS and the Deputy Director of the OMB or the Associate Director for National Security Programs could serve ex officio. The Board would ensure a collaborative review of service program/budget submissions by the OSD officials most directly responsible. The Board could, of course, conduct work sessions without the Chairman having to be present. The ASD(PA&E) or the ASD(C) could preside depending on the subject. The DRB would:

- Manage all aspects of the combined program/budget review, including the guidance for submission and the structure and schedule of the reviews,
- Identify issues requiring resolution,
- Arrange for needed staff work,
- Conduct "cross-cutting" or other reviews necessary to ensure mutual consideration of the perspectives important to each principal,
- Decide minor issues,
- Take major issues to the Secretary,
- Prepare Presidential review materials,
- Hear reclamas, and
- Ensure that final decisions are communicated in multi-year program terms, and that sufficient rationale is provided to update Section I, "Rationale for the Defense Program."

The DRB would be useful even in the current system, but is probably essential to make the combined program/budget review work well. The Board would bridge jurisdictional differences in OSD and offer greater continuity and institutional memory to the PPB process. Above all, it would provide a mechanism through which the cognizant officials could work together on what is the most important resource management process serving the Secretary and the President.

Finally, by adjusting the timing and content of the DoD process, these changes would enable the DoD to respond better to signals emanating from Congressional budget review and to meet Presidential decision requirements.

In addition to the process changes described here, additional recommendations are provided which are intended to:

- Rationalize the relationship between the systems acquisition and the program/budget review processes,
- Strengthen the resource analysis capability in the office of the ASD(PA&E), and
- Increase the level of attention devoted to systematic analysis and programming of support programs and resources.

THE DOD ACQUISITION PROCESS

Weapon-system acquisition drives both near-term demands for development and production resources and long-term "ownership" costs of manning, operations, and maintenance. The DRMS has developed recommendations for increasing the effectiveness and efficiency of the acquisition process, and, especially the potential for improving its treatment of support issues.

Acquisition Policy and Procedure

Although the DRMS found no major deficiencies in existing policies and procedures (an important finding in itself), certain weaknesses and risks are to be avoided in their implementation:

- OMB Circular A-109 and the associated MENS/DSARCO review are intended to improve the process of selecting system candidates for entry into full-scale development. Because this process has not yet been fully implemented, its effects on weapon-system acquisition cannot be fully assessed. DoD management should devote special attention to three problem areas, however, to forestall undesirable outcomes:
  - The carefully prepared, staffed, and approved MENS must not be regarded as "cast in concrete," but instead must be continually reviewed as military needs evolve.
  - The preparation of a MENS, and the effort to obtain DSARCO approval, must not be permitted to interfere with subsystem development progress or to stifle innovation in concept definition.
  - The examination of alternative system concepts to satisfy a MENS should stimulate and exploit the fabrication and testing of experimental and prototype hardware; it should not be permitted to increase reliance on design studies and analysis.
- Troublesome and costly problems often arise from the premature commitment of systems to high-rate production. Two steps that could ameliorate this stubborn problem (both entirely consistent with current policy directives) are to:
  - Delay the approval of high-rate production until the hardware has demonstrated both technical adequacy and operational suitability, including reliability, supportability, and readiness characteristics. (Functional criteria for such achievements must also be developed, preferably on a system-by-system basis.)
  - Encourage the development of major, widely used subsystems independent of final weapon-system development programs, thus reducing the risks of

full system development and enhancing standardization and operability of the equipment. (This "building block" concept is also consistent with current DoD direction; integration responsibilities may have to be reemphasized.)

- A conscious effort should be made to exploit the opportunities created by competition in the acquisition process. Component and subsystem development programs with potential application to existing systems, in addition to competing with each other, create alternatives to new system developments. Product improvement can and should compete with new system designs to provide a hedge against technical problems and a positive incentive to keep down the costs of a new design.

Ownership Considerations in the Acquisition Process

The following recommendations would improve treatment of operating and support issues within and beyond the acquisition process:

- Explicit and measurable system availability goals should be set once a system concept is established, and the needed resources (time, money, and manpower) should then be allocated to achieve these goals.
- Testing and evaluation should be required to verify "supportability" and measure progress toward availability goals (by measuring specific reliability and maintainability parameters, and computing availability);
- The OSD should establish a *Support Analysis Improvement Group* (SAIG), co-sponsored by the ASDs (PA&E) and (MRA&L), which would:
  - Act as a clearinghouse for concepts that should be considered in system design and Integrated Logistics System (ILS) planning:
  - Evaluate ILS plans for the DSARC;
  - Work with the CAIG to improve support-costing capabilities, and with OT&E to ensure that "supportability" and equipment availability are adequately tested;
  - Identify general support issues that should be analyzed in the resource allocation process.
- A full integrated support evaluation should be conducted when adequate experience is accumulated on the fielded equipment and on the effectiveness of its full training and support system. The services should establish institutional mechanisms that provide priority management and funding for prompt, efficient correction of deficiencies in availability and support of newly fielded systems. MRA&L and PA&E should conduct follow-on support reviews of selected recently fielded systems until adequate attention is focused on these problems. These reviews should trigger issue papers where necessary in the combined program/budget review proposed above. They could be conducted by a SAIG or a similarly constituted OSD panel.
- The top-level emphasis given to support in the acquisition process should be further increased by:
  - Insisting that "supportability" be demonstrated before permitting a program to proceed; and

— Encouraging identification and application of innovative support concepts that can increase capability, reduce support costs, or both.

LOGISTICS SUPPORT ALTERNATIVES

Over one-third of the Defense budget is consumed, and a similar fraction of Defense manpower is employed, in the delivery of logistics support. While its resource implications alone make "logistics" important, it commands attention primarily because it is a crucial element of combat capability.

The sheer magnitude of logistics resource requirements has prompted many reviews of separate functions such as distribution, or subfunctions such as maintenance at the depot level. Most of these reviews have sought to save money by improving the *peacetime efficiency* of the logistics support system. Most such reviews have paid insufficient attention to the interdependencies among logistics levels and functions. Their results have sometimes reduced combat flexibility and effectiveness out of proportion to any cost savings.

More recently, the focus of many studies has changed to reflect the Department's increased concern with readiness and sustainability. This shift has led to recommendations intended to increase effectiveness primarily by increasing the level of resources made available to the current support structure. In many cases, this approach will turn out to be prohibitively expensive because current structures try to render combat units highly self-sufficient so that they can be employed in the widest possible range of combat scenarios. Alternatives that involve modifying these structures have received comparatively little attention, despite the fact that innovation in support concepts offers considerable leverage on both combat capability and support costs.

Because of the costliness and the mission importance of logistics, and because current support structures may not conform adequately to the demands of possible future wars nor exploit the leverage noted above, the DRMS conducted five weapon-system-specific case studies that examined logistics delivery alternatives that could increase combat capability at current or reduced costs. The case studies covered: Naval carrier air, strategic bombers and tankers, Air Force tactical fighter aircraft — especially the A-10, Army tracked vehicles — especially tanks, and Army helicopters.

The five case studies, which are reported in detail in a companion volume to this report, serve several purposes. They provide examples of the approach to support resource issues that both the resource allocation and system acquisition reviews found to be needed. They demonstrate the potential leverage that innovation in support concepts can exert on capability and cost. Specific recommendations for change or for further study are summarized in the body of this final report and detailed in the companion volume. Several of the case studies show the potential for significant cost savings, capability increases, or both. The case studies also provide the empirical base for developing some cross-cutting design principles which make a start on a "theory of support."

Four design principles emerge from these case studies that should guide the future evolution of logistics support structures. It is recommended that the DoD:

- Focus the maintenance capability of combat units (Army divisions, Navy and Air Force wings) on quick-turnaround repair, limiting their need to perform off-equipment maintenance. This will free the combat units from a cumbersome logistics burden, making them more able to respond to fluid battle conditions.
- Consolidate off-equipment maintenance at a level that permits capture of economies of scale and reduces the vulnerability of some support resources. The specific design for each weapon system will be dictated by weapon technology, support technology, economics, and the combat task.
- Give theater or fleet commanders the capability to reallocate support resources across combat units, so as to adjust quickly to the rapidly changing wartime environments they are likely to face.
- Reduce, but not eliminate, the dependence of combat units on the CONUS wholesale structure for both maintenance and supply support in order to make the theater somewhat more self-sufficient.

These principles have implications for the design, size, and role of the "wholesale," or depot-level, logistics structure that should be considered in future examinations of the wholesale base. An important lesson from the DRMS review, however, is that the desirability of the numerous proposals for "horizontal" consolidation of depot logistics functions cannot be properly assessed until the "vertical" integration of the depot level with the redesigned intermediate and organizational levels is accomplished. The indicated direction of change is most likely one of somewhat reduced reliance on and resources devoted to the depot level. The specifics of that adjustment depend on more detailed analyses of the relationships between levels than the DRMS has been able to accomplish as well as on the extent to which the DRMS proposals are implemented at the intermediate and organizational levels.

In sum, the DRMS examination of logistics support alternatives, described in this final report and supplemented by a companion volume of case studies, not only points the direction for future logistics structure evolution, but also illustrates the type of support analysis that should be given more emphasis in the resource allocation and acquisition processes.

THE FIRST-TERM/CAREER MIX OF ENLISTED MILITARY PERSONNEL

Most major analyses of defense manpower and personnel policies — since the Gates Commission recommended transition to an all-volunteer force (AVF) in 1970 — have recommended, either implicitly or explicitly, increasing the average experience level of the enlisted personnel inventory. To attract and retain qualified volunteers, significant increases in first-term compensation rates were approved in the early 1970s, thereby increasing the cost of junior enlisted personnel relative to that of senior enlisteds. It was expected that this increase would spur the services to reexamine the personnel mix, find ways to substitute capital for labor, and increase the utilization of less expensive types of manpower.

More recent analyses of defense manpower requirements and the enlisted personnel inventory suggest that the expected changes in the capital and labor mix have not occurred, or have been slow to occur. Included are some aggregate analyses suggesting that substantial cost savings could be realized, without degrading force effectiveness, if the career content of the force were increased.

Increasing the average experience level of the enlisted personnel inventory could also reduce the demand for non-prior-service male accessions, a reduction that may be needed if the services are to meet their manpower requirements as the pool of eligible males begins to contract in the 1980s. Not all occupations would be equally affected, however. Each skill can best utilize a different degree of experience, has a different length of training, faces different levels of labor market competition from the private sector, and generates different levels of job satisfaction, which affect retention rates; hence each should be managed somewhat differently.

In reviewing the first-term/career mix issue, the DRMS examined six occupations from the Army and Air Force[1] to determine whether increases in the career content of the force, either within individual occupations or across the force, would be cost-effective. The analysis concluded that:

- A force with more careerists and fewer first-termers would be cost-effective for many enlisted personnel occupational groups, but not all, based on current organizational structures.
- Controlling the total mix of career personnel and first-termers without reference to occupational differences can be counterproductive.
- Aggregate guidance such as top-six grade controls can lead to less efficient forces.
- DoD should collect needed data and improve methods for determining the appropriate experience mixes of enlisted occupations.
- Personnel policies should be implemented to provide more incentive and opportunity for using experienced personnel in other than supervisory positions.
- The support structures suggested in Chapter III of this final report provide even greater opportunity to exploit a more experienced force. Thus, organizational structure and personnel mix interact and, ideally, should be determined jointly.

MILITARY HEALTH CARE

The law assigns two primary health functions to the DoD: (1) to maintain the peacetime health of the active duty force and to be prepared to attend the sick and wounded in time of war, and (2) to provide a health benefit as a condition of service to eligible beneficiaries.

The DRMS concluded that these two objectives are both legitimate and are mutually supportive in some ways but conflicting in others. This idea of partially "competing" military health care objectives differs dramatically from the conventional view

[1] Navy data were received too late to be included in the analysis.

that the system's primary mission is readiness and that, given the necessary resources to accomplish that mission, the system can satisfy its other objectives.

Readiness

Although the available data strongly indicate a serious wartime resource deficit, the quality of those data precludes any but the most general conclusions based upon them. The current state of medical readiness planning and programming, as evidenced by the service programs, demands immediate OSD and JCS attention. It is clear, however, that under any reasonable set of assumptions, the DoD will require extensive reliance on private sector hospitals and physicians early in a major war. Today, no plans exist to use them.

The OSD and the JCS should take a more active part in medical resource programming. Specifically, the two offices should: (1) take the lead in developing a plan to use non-DoD hospitals in wartime, (2) improve the consistency of service planning factors, (3) either program more resources to meet theater medical requirements or shorten the evacuation policy.

The use of civilian trauma and burn centers should be pursued to help with the peacetime training of DoD physicians for some of their wartime-required skills.

The Benefit Mission

At one time, the military services were generally considered to offer the best medical benefit program in the country. In recent years, however, military personnel, retirees, and dependents appear to be increasingly dissatisfied with it. Unavailability of services, long queues, negative attitudes of providers, administrative mixups, and excessive costs of CHAMPUS, are among the most frequently heard complaints. Civilian employers have improved their health care benefit programs, but the quality of the military benefit may have fallen in absolute as well as in relative terms.

The managers of the system tend to view health care not as a guaranteed benefit at some specified level, but as a by-product of a system whose real purpose is to maintain the health of the active duty force and to provide wartime support. Military beneficiaries, in contrast, have come to expect a guaranteed benefit. The divergence of these two philosophies appears to explain much of the frustration and dissatisfaction with the system.

The following recommendations are designed to enhance the equity, financial protection and covered services of the current benefit. The first four should be treated as a package that will make the benefit more nearly the same for all beneficiaries, at essentially no change in cost to DoD, whether the beneficiary has access to the direct-care system or not, or whether he is active or retired.

- A limit should be instituted on annual maximum cut-of-pocket cost per year. Amounts in the neighborhood of $1000 per person and $2000 per family appear reasonable.
- To provide a more equitable benefit between those able and not able to use the direct-care system, and to discourage unnecessary utilization in the direct-care system, a nominal charge ($3 per visit) for direct-care outpatient visits

should be instituted. Active duty personnel should be exempted from such charges.

- CHAMPUS should be expanded to include well-baby examinations and immunizations up to two years of age using the American Academy of Pediatrics recommended schedule for benefit definition.
- CHAMPUS eligibility should be extended to retirees and their dependents 65 years of age and older, with Medicare designated as first payer.
- To remain competitive, at some point in the future DoD will have to expand CHAMPUS coverage to include dental care for dependents of active-duty personnel with appropriate payout limits and cost-sharing provisions. Given its cost, this change should be undertaken only after the above recommendations have been implemented.
- The DoD should develop a greater understanding of the variables that affect physician participation in CHAMPUS before making further changes designed to increase physician participation.
- DoD should test the concept of offering, to all non-active duty beneficiaries in a particular region, the option to enroll in their choice of health care plans available locally. That recommendation would reduce excessive demand, enhance beneficiary satisfaction, and introduce an element of competition into the direct-care system.
- A referral system should be developed to ensure that patients seeking private-sector care under CHAMPUS find qualified providers, and that the patients are encouraged to return to the referring military physician for follow-up.
- The OSD should establish the necessary policies and procedures to permit hospital and clinic commanders to contract locally with civilian providers (on a pre-negotiated fee schedule or a capitation basis, using CHAMPUS as the source of payment) for certain types of care now referred to other military hospitals.

With respect to the organization of DoD health care, the DRMS opts for the current, decentralized system. If the other recommendations made above are implemented and the system does not improve enough, then the question of consolidation should be reopened. In any event, stronger leadership and more aggressive management by the Secretary of Defense, ASD (Health Affairs) and ASD (Manpower, Reserve Affairs, and Logistics) are clearly warranted.

* * * * *

In all of the DRMS inquiries, the primary focus has been on improving the combat effectiveness of forces, or the efficiency with which resources are used, or both. Some of the recommendations would accomplish this objective by improving the overall resource allocation process. Other recommendations promise to enhance combat effectiveness or save money more directly through alternative uses of manpower

and support resources. These are ends earnestly to be sought. The United States cannot afford to buy less defense capability than it needs; neither should it pay more than necessary for that level of capability it chooses to buy.

Contents

Preface v

Executive Summary vii

List of Figures xxi

List of Tables xxiii

Chapter

I. The Defense Resource Allocation Process 1
- PPBS—A Management System 1
- Brief History of DoD's PPB System 1
- Recent Developments Pertinent to PPBS 4
  - The Congress 4
  - Zero-Base Budgeting 5
  - Internal Changes 6
- Problems With the Current Defense PPBS 6
- Proposed Changes to the Defense PPBS 9
  - Process Changes 9
  - Organizational and Role Changes 19
  - New Capabilities 24

II. The DoD Acquisition Process 27
- Introduction 27
- Acquisition Policy and Procedures 28
  - An Overview of the Acquisition Process 28
  - The DSARC and Acquisition Management 32
  - Mission Element Need Statement and the Acquisition Process 34
- Suggestions for Improving the Acquisition Process 36
- Ownership Considerations in the Acquisition Process 37
  - Approaches to Ownership Issues 38
  - Improving Treatment of Ownership Issues 40
  - Follow-Through in the Production and Deployment Phase 41
  - Recommendations for Improving the Treatment of Ownership Issues 42

III. Logistics Support Alternatives 43
- Introduction 43
- The Wartime Environment and Weapons Technology 45
- Implications for the Theater Logistics Delivery System 47
- Summary of General Support Principles 49
- Case Study Summaries 50

Army Tracked Combat Vehicles 50
Army Helicopters 51
Navy Carrier-Based Air 52
Navy Surface Combatants 53
A-10 Weapon System 54
Air Force Strategic Bombers 56
Implications for the Wholesale Logistics Structure 56
Policy as a Determinant of Maintenance Requirements 60
Summary 61

IV. The First-Term/Career Mix of Enlisted Military Personnel 63
Introduction 63
Background 64
Methods and Data 68
Results 70
Conclusions and Observations 75
Summary 76

V. Military Health Care 79
Overview 79
Elements of the Current System 80
Objectives of Military Health Care 81
Assignment of Objectives 82
Readiness 85
Recent Issues 85
Policy Variables 86
Resource Levels 88
Summary 94
The Benefit Mission 94
Introduction 94
The Benefit Package — How it Compares 95
Truth in Advertising the Benefit Package 101
Recommendations to Improve Competitiveness 101
Implications of the Two Missions 107
Physician Levels 109
Physician Training 111
Organization and Management 111

Figures

I-1. Focus on weapon systems 2

I-2. Total weapon systems cost 3

I-3. Weapons and support perspectives 3

I-4. "Rationale for the Defense Program:" Section I 13

I-5. DRMS—proposed PPBS 15

I-6. Support analysis structure 25

II-1. The acquisition process: Idealized 29

II-2. The acquisition process: Realistic 30

V-1. DoD overseas bed requirements and capabilities—FY 84 90

V-2. DoD CONUS bed requirement and capability—FY 84 90

V-3. DoD physician manpower requirements and capability—FY 84 91

V-4. DoD enlisted medical manpower requirements and capability—FY 84 92

V-5. Strategic aeromedical evacuation requirements and capabilities—FY 84 93

Tables

IV-1. Percentage of first-termers in Army and Air Force enlisted force 65

IV-2. Occupations examined 69

IV-3. Army and Air Force enlisted inventory profiles: first-term/career percentages 71

IV-4. Accession requirements (in thousands) 72

IV-5. Implied vs optimal steady state mix 73

IV-6. Service objective force and optimal objective force first-term/career mix 75

V-1. Functions of the Surgeons General 83

V-2. Comparison of medical benefits provided DoD beneficiaries, Federal employees, and civilian employees 97

V-3. Comparison of DoD wartime and peacetime physician specialty distribution 108

V-4. Projected active duty physician end strengths 109

CHAPTER I
THE DEFENSE RESOURCE ALLOCATION PROCESS

OVERVIEW

This chapter is devoted to the Defense Planning, Programming and Budgeting System (PPBS) as the Department-wide framework for resource allocation. PPB is defined, and a brief history is provided. The emphasis is on current problems identified by the DRMS and a series of recommendations designed to further improve this evolving process.

PPBS — A MANAGEMENT SYSTEM

Any system used to manage the allocation of an organization's resources will be made up of a set of functions and procedures intended to help the leadership decide on its objectives, choose the means to accomplish those objectives, and monitor the subsequent execution and realization of its objectives.

Throughout the report, the term "PPBS" is used to denote the full range of activities (referred to variously as planning, programming, and budgeting) that support the process of making decisions on the allocation of defense resources. For example, planning includes the definition and examination of alternative defense strategies, the analysis of exogenous conditions and trends, threat and technology assessment, and any other tasks associated with looking forward either to anticipate change or to understand the longer-term implications of current choices; programming includes the definition and analysis of alternative forces and weapons/support systems together with their resource implications, the analytical evaluation of options for variation therein, and other staff efforts necessary to construct and understand the Five-Year Defense Plan (FYDP); budgeting includes formulation, justification to the Congress, execution, and control.

The "system" must be sufficiently flexible to permit adapting the specific functions and procedures that accomplish these tasks to the management style of the system's decisionmakers (in this case, the Secretary of Defense and the President). As the following section makes clear, the Defense PPBS has evolved considerably over time, in response to perceptions of style and need.

BRIEF HISTORY OF DOD'S PPB SYSTEM

Since the end of World War II, the defense resource allocation process has evolved through three identifiable stages.

The assistance of John E. Dawson, with Chapter I is gratefully acknowledged.

Throughout the 1950s the system was responsive mainly to fiscal constraints applied one year at a time. Its bias was to service perceptions of needs classified by budget account structure. However, there was no coordinated resource programming; that is:

- Little in the way of integrated interservice planning occurred; and
- Internal service planning in response to threat analysis was disconnected from budgeting.

During the 1960s the Planning, Programming and Budgeting System was instituted, creating a bridge between military planning and budgeting. While the services identified a menu of programmatic options, the bridging process was dominated by the Office of the Secretary of Defense through a series of memoranda setting the size and shape of major programs to be translated into annual budgets. These documents were developed over time in what the public budgeting literature would call a "pre-preparation" phase for top management strategic thinking. The system's bias was to the Secretary's perception of legitimate national needs, classified by program structure.

The program structure was heavily weapons-oriented. Thus, the resource allocation process could work at the point of convergence of the dominant (and still pervasive) reasoning tracks of threat perception and technological development (see Fig. I-1). To meet the twin demands of threat and scarcity, the decision system sought out relatively preferable weapon systems, chosen by comparing effectiveness and cost. The weapon usually set the "system" context for choosing among alternatives. The concept of total system cost (see Fig. I-2) was introduced to set a time dimension for planning and for analysis of options. This same system approach was not adopted to look *across* weapons systems. Originally, PPBS was not designed to be systemic about operations and support costs (see Fig. I-3).

Figure I-1. Focus on weapon systems.

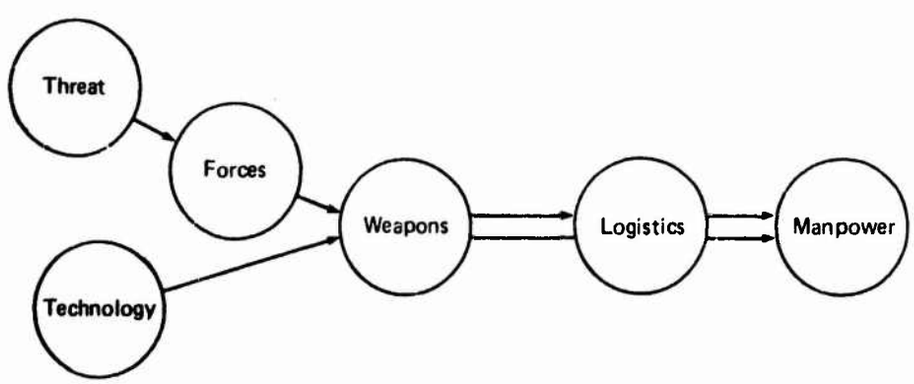


Figure I-2. Total weapon systems cost.

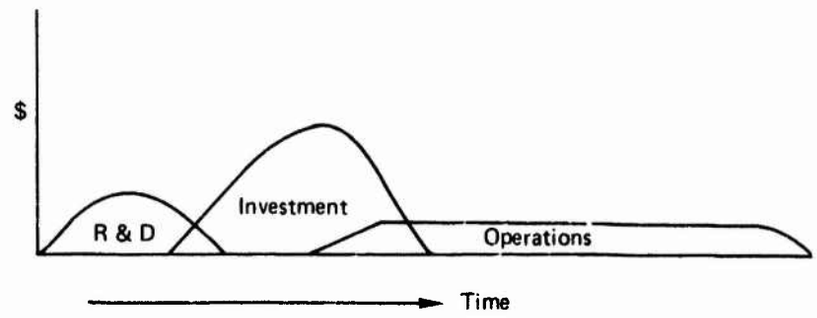
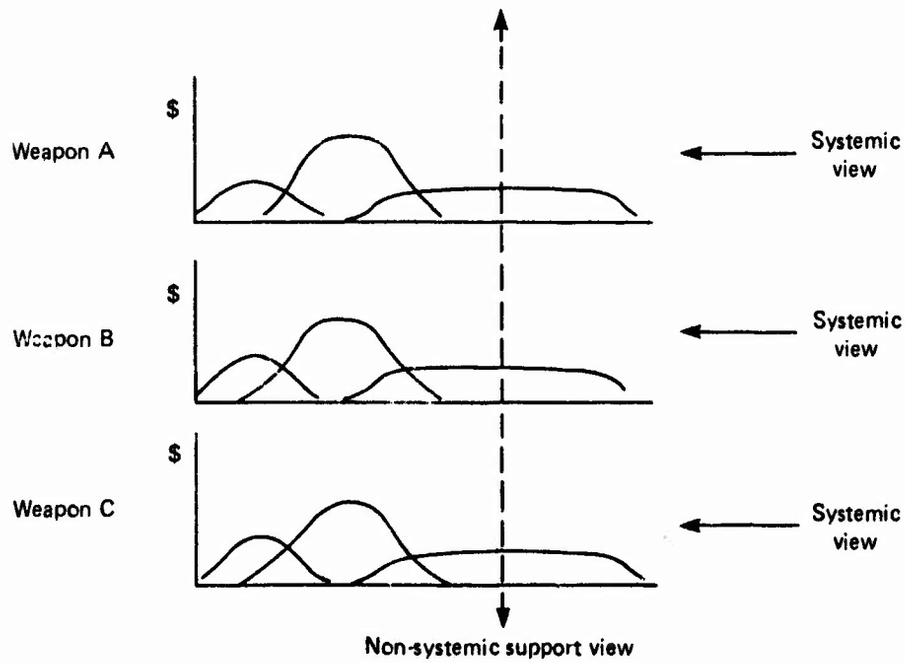


Figure I-3. Weapons and support perspectives.



Despite this flaw, PPBS from its earliest days incorporated the three major public budgeting innovations of the postwar era: multi-year visibility, a mission orientation cutting across organizational lines, and an analytically based capability to reexamine (i.e., zero-base) the need, rationale, and design of major segments of the defense program.

During the late 1960s and early 1970s, four major changes occurred.

First, in 1969-70, the "pre-preparation" strategic planning phase was elevated to the NSC level in the form of interagency reviews which examined a wide range of defense strategies together *with their associated force structures and budget levels.* These reviews, which became the basis for Presidentially approved guidance to DoD on strategy and budget levels for planning, were not continued in later years.

Second, an attempt was made in OSD to develop a capability to examine logistics, manpower, and bases, using as a basis for such analyses an alternative major classification schema. Built on the program structure and using data elements of the FYDP, the classification schema survives today, slightly modified, in the manpower report required annually of the DoD by the Armed Services Committees of Congress.

Third, in response to concerns about overcentralization of control by OSD, the concept of *participative management* was integrated into the PPB System. *Fiscal guidance*, the classic tool with which to conduct major reductions, was provided in exchange for constrained service-justified programs. In a real sense, the PPB System became the Multiyear-Budgeting/Annual-Budgeting System. The out-years of the FYDP, by incorporating service proposals and budget deferrals, developed large fiscal gaps that had to be closed during the succeeding cycle.

Fourth, the weapons acquisition process received special emphasis with establishment of the Defense System Acquisition Review Council (DSARC). Conceived as a vehicle to "discipline" acquisition management, some perceive that the DSARC has (or should) become an out-of-cycle resource commitment process.

RECENT DEVELOPMENTS PERTINENT TO PPBS

The Congress

The Congressional Budget and Impoundment Control Act of 1974 made several changes that affect the Defense resource allocation process:

First, the Administration must submit a *current services budget*, a projection that estimates the budget authority and outlays needed to carry on existing programs and activities for the next fiscal year on a "policy neutral" basis. It specifies the commitment of resources in the ensuing year that would be necessary to sustain decisions made for the current year. The concept is an important innovation, as it distinguishes between future costs stemming from existing policy commitments and future costs associated with new choices. This kind of information had not routinely been available within Defense, or elsewhere in the federal government.

Second, the President's budget submission in January must project, for four years beyond the budget year, funding for major national functions, including national defense. This *public topline* provides the best information available as to public expectations about likely future Defense spending levels.

Third, the DoD must also present its budget request in *mission categories* that display the full cost of missions, including allocated support.

Fourth, by May 15, committees report *bills authorizing new budget authority*, and the Congress adopts the *First Concurrent Budget Resolution*. The latter sets forth levels of total budget authority for the next fiscal year, both in the aggregate and for each major functional category of the Budget. Together, these provide indications of the direction of Congressional thinking.

Last, by September 15, Congress completes action on authorizations and appropriations, and adopts the *Second Concurrent Budget Resolution*.

Zero-Base Budgeting

In 1977, the Carter Administration required federal adoption of Zero-Base Budgeting procedures. Secretary Brown, with OMB agreement, said that DoD would "be able to call from our PPB System the basic data that will be required to assure effective implementation of the ZBB System."

As originally designed and promulgated in the Federal government, ZBB threatened to arrest the major advances of the last 30 years in public budgeting. It is avowedly incremental, not zero-base, in its approach to alternatives. It mistakenly presumes that a uniquely ordered "prioritized" listing of budget increments can describe the preferred allocation of any budget level, thereby presenting the conceptual problems of how to maintain visibility of interdependencies across decision packages and how to recognize and represent major discontinuities in choice of program (not more of A and more of B, but C instead of both). To put it another way, priorities are often a function of how much money is available, rather than the other way around. The use of organizational lines as the budget decision structure makes it difficult, at times impossible, to maintain the needed attention to groupings of interrelated activities (missions, programs, etc.) that cut across organizations. Deciding budgets for organizations of government is not the same as setting budgets for the important purposes of government, which often involve more than one organization. ZBB's emphasis on annual determination of new "minimum" levels and its near-exclusive focus on "prioritized" lists of budget increments combine to encourage one-year-at-a-time decision-making.

ZBB has also broadened participation by agency officials in the decision process, increased recognition of the need for more adequate means of prioritizing choices, and expanded top management attention to the budget process — all beneficial changes.

After two years of experience with the new procedures, the DoD has not yet accommodated its PPBS to the demands of ZBB. Secretary Brown's hopeful prognosis has not been borne out. Instead, special ad hoc exercises have been needed to create the prioritized increments and present them in ZBB formats. These special efforts have run into the very problems that the above discussion of ZBB would suggest. Not surprisingly, the Secretary, the OMB, and, reportedly, the President have all been dissatisfied with the process.

The OMB, by permitting wide latitude to the agencies in applying ZBB "principles," may yet quietly move away from its worst features. Given some latitude, the

DoD may be able to design a budget process that serves the Secretary's decisionmaking needs and that can also meet the needs of the Presidential budget process. The design of such a system is the avowed objective of a later section of this chapter.

Internal Changes

Several recent modifications to Defense PPBS introduced by Secretary Brown demonstrate that the Defense resource allocation process evolves to meet the perceived needs of each period and to accommodate different styles of leadership. Pre-POM[1] documentation is now consolidated into a single "Consolidated Guidance" document to better integrate planning and programming with fiscal guidance. The process changes were intended to facilitate earlier Presidential involvement, accommodate a (partial) return to stronger SecDef leadership, and encourage a strengthened analytic basis for supporting rationale for the major components of the defense program.

While one objective was to shorten and simplify PPBS, the modifications are viewed by many participants as complicating an already busy annual cycle by interposing a third major benchmark for decision, with its accompanying preparation and review processes. Also, the Consolidated Guidance and most of the services' POM preparations are completed before the First Concurrent Budget Resolution.

Significance of Historical Review

This historical review, given its desired brevity, is not even-handed in coverage; it stresses elements of past eras and recent developments that are relevant to *current* perceptions of needs and problems.

PROBLEMS WITH THE CURRENT DEFENSE PPBS

This section discusses nine concerns which, while neither unique nor exhaustive, encompass the major difficulties most often articulated by participants (both past and present) regarding the current PPBS.

Lack of Planning

There is broad agreement that the first "P" in PPBS is silent. As noted above, planning should include the examination of alternative defense strategies, the analysis of exogenous conditions and trends, threat assessment, and any other tasks associated with looking forward either to anticipate change or to understand the longer-term implications of current choices. Well-done strategy reviews (NSSM-247-like terms of reference) are largely missing; long-term trends in international politics, economics, and technology and their influence on defense policies and programs are seldom treated systematically. A process for periodically challenging basic Defense policy is needed. The specific goals of an improved planning process should include: (1) identifying clear options and initiatives, with budgetary impacts, for Presidential review;

[1] POM stands for Program Objectives Memorandum – the detailed program plan of each service prepared pursuant to SecDef fiscal and other guidance.

(2) serving as a barometer for determination of the need for a more fundamental reassessment of national strategy objectives; and (3) perhaps most fundamentally, producing the broad guidance to be used within the DoD. A level removed from these concerns is the need, clearly identified but not resolved in other studies for the Defense Organization Committee, to chart a road map for realistic participation by the JCS, the unified and specified commanders, and the new office of the Under Secretary for Policy within the "pre-preparation" phase of the PPBS.

Inadequate Treatment of Support

Support functions account for one-third or more of the Defense budget, yet PPB does not subject them to the same type of rigorous scrutiny that it applies to forces and weapons. The situation has been improving because of the recent emphasis on readiness, but measures of adequacy and performance standards are either embryonic or nonexistent. A "theory of support" is lacking; wide-ranging support alternatives are seldom pursued. If the overall program is to be both balanced and efficient, support policies and programs must be updated along with defense strategies and force structures.

Lack of Quality Analysis

PPBS is work-intensive, tending to consume the time and talent necessary for pursuit of longer-term, in-depth analysis capable of inventing credible challenges to the current practices or systems. Some good analysis obviously occurs, but there is a widespread perception that not enough does.

Many institutional *disincentives* impede the creation and preservation of a strong analytic capability: the demands of day-to-day brushfires, the concern not to gore one's own ox, etc. The need for good ideas requires, among other things, increasing the volume of high quality analysis, generating more in-cycle concern for how the job is done, and creating incentives for the evaluation of trade-offs.

Fiscal Gap

Fiscal gap refers to the difference between fiscal guidance or the levels of resources needed to carry out "approved" programs, and the actual funding levels that occur in the budget. For example, the FY 1979 budget total was $10 billion lower than the fiscal guidance for FY 1979 provided a few months earlier. In other years, the "approved" program has contained deferrals from prior years and other choices which, all together, total much more than the DoD budget is likely to be. Such fiscal gaps defer the hard decisions beyond the programming phase to budget time, and set up pressures to unbalance the program as a way of coping with budget "cuts" in the final stages of budget review, effectively wasting much of the year's programming effort. In these circumstances, DoD joins many agencies on the domestic side of the federal government that regularly abdicate their responsibilities for the difficult decisions and pass them along to the OMB by constructing and submitting budgets at totals well above fiscal reality. After some drift in this direction, DoD is now trying to restore Defense self-responsibility for fiscal realism.

Decisions Revisited

Many participants observe that the same issues are "decided" in the programming phase and then again in the budget phase. The initial construct of the allocation process into identifiable phases (e.g., planning, programming, budgeting) was intended to insert a connective link between planning and budgeting. In practical terms, no easy mechanical linkage was at hand at that time to join them more closely. Working from distinctly different perspectives (programs *vice* appropriations) the phases have seemed increasingly not to be mutually supportive. To the degree that the Secretary has been personally involved in an issue and has been an active participant in the programming phase, major decisions were generally preserved throughout the sequential review. At other times, especially when fiscal gaps confounded the problem, initial directions of the planning and programming phases were subject to large changes at budget time, with their implications not fully evident to all the major parties to the earlier decision.

Concerned that the nature and content of the fall budget review contributed to this problem, DoD last year sought OMB agreement to measures that would minimize disruption of program balance in the final stages of budget review. In effect, this would require the President to commit to a budget target far earlier than he otherwise has to, and require OMB to play its strongest role in the program (*vice* the budget) review. Since top decisionmakers (the Secretary as well as the President) make hard decisions when they have to, or later, but not before, the real Executive Branch decisions are December decisions. The "system" ultimately must serve this proclivity rather than attempt to tame it.

The recent modification introducing the Consolidated Guidance may have worsened this problem by providing yet a *third* major benchmark for decision, even earlier in the year, with its accompanying preparation and review processes.

Detailed and Voluminous Guidance

The question here is what balance to strike between SecDef initiatives and the need to harmonize across services versus initiatives from the services. Guidance documents that focus on strategies, objectives, and capabilities while maintaining a link to aggregate force and budget levels might be able to instigate dialog on these matters. It seems clear that reviews that require and attempt to use large amounts of programmatic detail will surely lead to discussion of details.

PPB/DSARC Links

The concern is that there is a gray area of mutual interference between these two processes. From one perspective the DSARC *appears* to make allocation decisions; from another, the allocation process appears to disrupt orderly acquisition strategies. The question is: How should these decision processes be linked to help assure that a proper balance is maintained among competing demands for scarce resources?

While it is true that the DSARC lacks a view across all resource competition, it has the potential for a clearer view than the PPBS of the potential downstream effects of program continuation, where the bulk of the costs may lie. An issue is the degree to

which PPBS should consider these longer-range and finer-grain affordability issues and what management vehicle would be appropriate.

Feedback

The PPB System has never had an explicit measurement system for tracking the progress made in implementing approved programs. The heart of this matter is the absence of *objective performance standards.* Program decisions are generally based on comparisons of estimated capabilities associated with alternative resource allocations. Analyses supporting such decision processes incorporate explicit management goals, scenarios, and support assumptions. Reporting systems that key on purchased manpower, equipment, or units (divisions, wings, or ships) are relatively meager reflections of the actual defense capabilities purchased. The ingredients of a combat-ready division stretch from the effectiveness of the recruiting and training command to the intelligence services that assure correct deployment posture — factors exogenous to the unit. Fiscal accounting, oriented to fiduciary responsibilities, does not provide adequate measures of program execution. Better feedback is needed, not only to monitor execution, but also to make adjustments to past decisions that, in turn, will motivate better execution.

Record of Decisions

The system today does not differentiate between the total Defense "program" and that explicitly approved by the SecDef. The out-years are a mix of specific SecDef approvals and service proposals, even though the Program Decision Memorandum (PDM) "approves programs with the following exceptions." There may be utility to keeping a record that distinguishes the out-year resource implications of actual decisions and an explicit "planning wedge" not yet allocated to specific programs. It could serve to minimize the need for total program review each year — one of the factors that influence the work-intensiveness of the cycle.

PROPOSED CHANGES TO THE DEFENSE PPBS

A further stage of conscious evolution in the Defense resource allocation system is needed to overcome the problems discussed above. For purposes of exposition, the proposals are divided into three groups (although they are quite interrelated) as follows: process changes, organizational and role changes, and new capabilities.

Process Changes

Planning Window and Combined Program/Budget Review. The centerpiece of the DRMS proposals is a conscious "destructuring" of the current PPB cycle through the creation of a broad *planning window* extending from late-January to late May, and a *combined program/budget review* extending from late-August to December.

Within the four month planning window, formally prescribed activity is deliberately held to the identification of fundamental issues, the rigorous consideration of alternatives, and resolutions adequate for revising program/budget guidance to the services.

The desirability and feasibility of these changes are based on the following arguments and observations:

- The current PPBS, with its multiple distinct phases and formalized interactions at each phase between the services/agencies and OSD, accentuates format and activity at the expense of enhanced content and dialog.
- The services have developed, or are developing, organizational, mechanical, and attitudinal linkages between their internal programming and budgeting functions. All three Military Departments have the equivalent of program budget review committees, with constant membership but chaired by the programmer or comptroller, depending upon the phase of the cycle. The Air Force has developed mechanical linkages for use by both the program and budget staffs to follow the progress of programs, their rankings, and appropriation implications. Similar efforts at linkage are under way in both the Army and the Navy. These linkages would permit consolidation of the separate program and budget phases. It is noteworthy that OSD has no similar structure, the results being evident in markedly different conceptual approaches in the program and budget phases. The Defense Resources Board (DRB) proposed below is intended to fill this need.
- The movement toward greater unity of effort evident in the services is not mirrored currently in OSD. The desirability of preserving programmatic decisions throughout the process indicates the need for a division of labor through the identification of unique responsibilities, as opposed to the spatial separation of the program and budget functions into distinct, sequential time phases.
- The "busy-ness" of the current process is heightened by an inexplicable feature of the system that insists on total review each year, from guidance through implementing programs.
  - Most policy and planning guidance from OSD can truly be only incremental (not cut from whole cloth each year), and its development largely exogenous to the formal PPBS cycle. That is, there is no magical time for its discovery; the reality of its occurrence is evident only when it occurs. Hence, amendments to a standing document, conveniently linked to significant external benchmarks, seem at least as adequate as the current single guidance document (CG). January (following the signals implicit in the President's budget) and June (following the report of the authorization committees, adoption of the 1st Concurrent Resolution, and the results of the OMB Spring Review) are dates that have a logic of their own in suggesting a timeframe for the planning window.
  - Regarding programming, the acceptance of a five-year program begins with acknowledgment of (or desire for) some greater consistency than that implied by the current DoD process. Defense modernization is a long-term process. Implementing or changing DoD programs requires some stability

of multiyear programs to manage successfully. This, in turn, calls for relying more on incremental changes year to year. Certainly total review is inherent, but not at a fundamental level each year. Increasing the selectivity of fundamental review would permit time and talent to be better focused on specific delineated reviews, making the process less work-intensive but more substantively useful.

- The process must result in a budget, approved by the President, presented in appropriation terms, and justified both in terms of mission and purpose as well as program and financial integrity. The "product" of the process will have to be balanced in general dimensions and from several perspectives.

These observations suggest a process that:

- Eliminates redundant review, both in terms of the number of separate reviews and their scope.
- Takes maximum advantage of the available Presidential or Congressional signals, especially as they might impact on force and fiscal levels.
- Integrates better the efforts within and among organizational layers.

Key milestones of the DRMS-proposed PPBS are as follows:

- Publication of two OSD guidance memoranda, each essentially an update of one standing document, but differently accentuated. *In January*, on the heels of the President's budget and implicit Administration direction, an *Agenda* that marks the start of the planning window and contains:
  - Revisions to current policy and strategic planning guidance.
  - An updated listing of the previously identified major issues ticketed for consideration: to include description, resource impact, primary OSD action office, and schedule for resolution.

  In early June, immediately following the 1st Concurrent Resolution and authorization reports (and the OMB Spring Review) a *Program and Budget Guidance Document* containing:
  - Fiscal guidance, by service and other categories as decided by the SecDef.
  - Any adjustment to guidance contained in the January agenda.
  - Specific programming and budgeting guidance (as elected by the SecDef) expressed as changes to the "SecDef approved" program.
  - Guidelines on format and justification for the program and budget estimates.
  - Identification of the outstanding major issues that the SecDef expects to resolve during the program/budget review.
  - Initial identification of the potential issues for review in subsequent PPB cycles.
- In late August, the services' submission of their *combined program budget estimates and initiation of the combined program-budget review process.*

Content of the Guidance Documents. The two OSD guidance memoranda are viewed as amendments to a consolidated guidance-like document, with some significant twists. First, the standing document would evolve incrementally, rather than undergo

complete revision on an annual basis. Second, its structure would recognize a clear delineation between policy/planning guidance and issues, in contrast with the current CG, which does not adequately fulfill its objective of "an authoritative statement of the fundamental strategy ... and rationale underlying the defense program as seen by the leadership of the Department,"[2] because issues are fused into each chapter's presentation.

The CG's current organization (see Fig. I-4) could serve as the initial framework for the policy and planning guidance section of the foundation document, with its eventual composition to be determined by the Secretary with the assistance of the USD(P) and the ASD(PA&E) based on experience with this process. Hence, the first section of the standing document would evolve from the existing documentation and proceed to the extent of describing the desired force capabilities and the approved force structure, but it would expressly *not* develop programmatic issues. Section I is best described as a "Rationale for the Defense Program." In summary, it is seen as an evolutionary document that:

- Accurately describes adopted positions, policies, and force capabilities from which initiatives are posed; and
- Verbalizes the rationale behind the program and budget displays of the FYDP.

The Secretary's Annual Defense Report (known as his Posture Statement) provides much of the needed documentation. The considerable efforts that go into preparing the posture statement should also provide the basis for Section I, with the addition of extensions needed to deal with out-year issues.

Section II of the standing document would initially be a combination of the issues currently posed within the body of the CG, as well as those issues raised in the CG study plan; that is, it would describe the cogent unsettled problems before the Department, as well as inquiries that the SecDef believes are worthy of analysis and consideration, either near-term or long-range. This section, in its entirety, would comprise an issue-specific agenda that articulates each issue, identifies associated program and budget impacts, appoints the SecDef's major action office, and establishes a time-frame for resolution. Some issues would be scheduled for decision during the planning phase, others reserved to the program/budget review in the fall. The section would be entitled "Defense Issues."

Issues may be posed by the USD(P) (especially as they pertain to policy and planning options, with long-range resource implications), by the USD(R&E), or any ASD in his area of responsibility; and in any resource-related domain by the ASD(PA&E) and ASD(C). The Director of the OMB and the Assistant to the President for National Security Affairs could be invited to suggest issues for incorporation into the Agenda. The SecDef may wish to consult with the President before issuing Sections I or II. High-priority Presidential or OMB issues could be scheduled to mesh with the OMB Spring Preview process.

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[2] *Consolidated Guidance*, March 19, 1978, p. 1.

Figure I.4—"Rationale for the Defense Program:" Section I

A. Overview and Summary
B. Strategic Nuclear Forces
C. Forces for NATO
D. Forces for Asia and the Pacific
E. Forces for the Middle East
F. Forces for the Persian Gulf
G. Theater Nuclear Forces
H. General Purpose Forces
I. Mobility Forces
J. Land Forces
K. Tactical Air Forces
L. Use of U.S. Naval Forces for the Defense of the Sea Lanes
M. Use of U.S. Naval Forces for Power Projection
N. Underway Replenishment and Support Forces
O. Manpower
P. Logistics
Q. C^3I
R. Research, Development, and Acquisition

The ASD(PA&E) should normally coordinate production of the updates to Section II, which accompanies both the January Agenda and June Guidance documents, for the purposes of screening issues for their appropriateness. His judgment would not preclude any ASD from arguing the merits of proposed issues with the SecDef; it is merely intended to dampen the institutional fervor with which the OSD bureaucracy might react to the creation of issues should their production be erroneously interpreted as measures of staff effectiveness.

The third and final section of the standing document would be issued annually in June, and provides program/budget guidance, jointly authored by the ASD(PA&E) and the ASD(C), and signed by the SecDef (or by DepSecDef, as chairman of the DRB). Section III ("Program/Budget Guidance") records the resource decisions which have resulted from deliberations during the planning window on Section II issues, lays out the service fiscal guidance brackets (updated for signals from the OMB Spring Review and Congressional action), and prescribes guidance for submission of the program-budget estimates relating to justification, format, and review schedule.

Appropriate changes to Section I ("Rationale for the Defense Program"), and Section II ("Defense Issues") would be forwarded simultaneously to the services. Normally, this update to Section II would not identify issues for resolution in the current program/budget review; instead, it would provide early guidance for staff work intended to be used in the *next* annual cycle.

The Secretary should choose one of two approaches to setting fiscal guidance levels or "brackets." Normally, asking the services to develop two balanced programs at levels which bracket the President's public topline projections for defense funding should be sufficient to expose choices at the margin, both up and down. However, the alternative of three different levels should be considered to provide a better basis for connecting to the OMB's ZBB rules and the President's apparent preference for a "minimum" level from which to "build up" to the final budget. The middle level would be set at the President's public topline projections, with the other two several billion dollars above and below that funding profile. The lowest level could then serve as the ZBB "minimum" level. No doubt, several decision "bands" between each pair of funding levels would have to be constructed during the combined review process. The extra work would be more than worth the trouble if it made it possible to satisfy the ZBB requirements while retaining information on the multiyear implications of budget-year increments. Under either alternative, the principal purpose is to *bracket the final budget figure* at a sufficiently early stage of the decision process so that the final budget decision can be based on knowledge derived by evaluating differences between *balanced* programs.

The January and June guidance documents formulated as described above, together with the planning activities between them, should lead to several advantages:

- A greater opportunity for planning activities (made possible by reduced work intensity through the elimination of separate program and budget phase reviews).
- More advantageous use of information available from Presidential and Congressional budget processes.
- The stronger likelihood of retaining program integrity, visibility, and balance throughout the process.
- Consistent conceptual approaches through elimination of separate program and budget phase instructions.
- Simplification of separate and growing paperwork demands and reduction in wasted staff effort.
- Explicit recognition that programming and budgeting are continuously *incremental* processes that incorporate selected fundamental reviews.
- Enhanced opportunity to focus attention on major resource allocation questions that can be authentically zero-based.

A schematic of the DRMS-proposed PPBS is shown in Fig. I-5.

Activity Within the Planning Window. The planning window is the time for focused debate and resolution of the current agenda items set out in Section II, "Defense Issues," as updated each January. DoD participants include the service(s) affected by

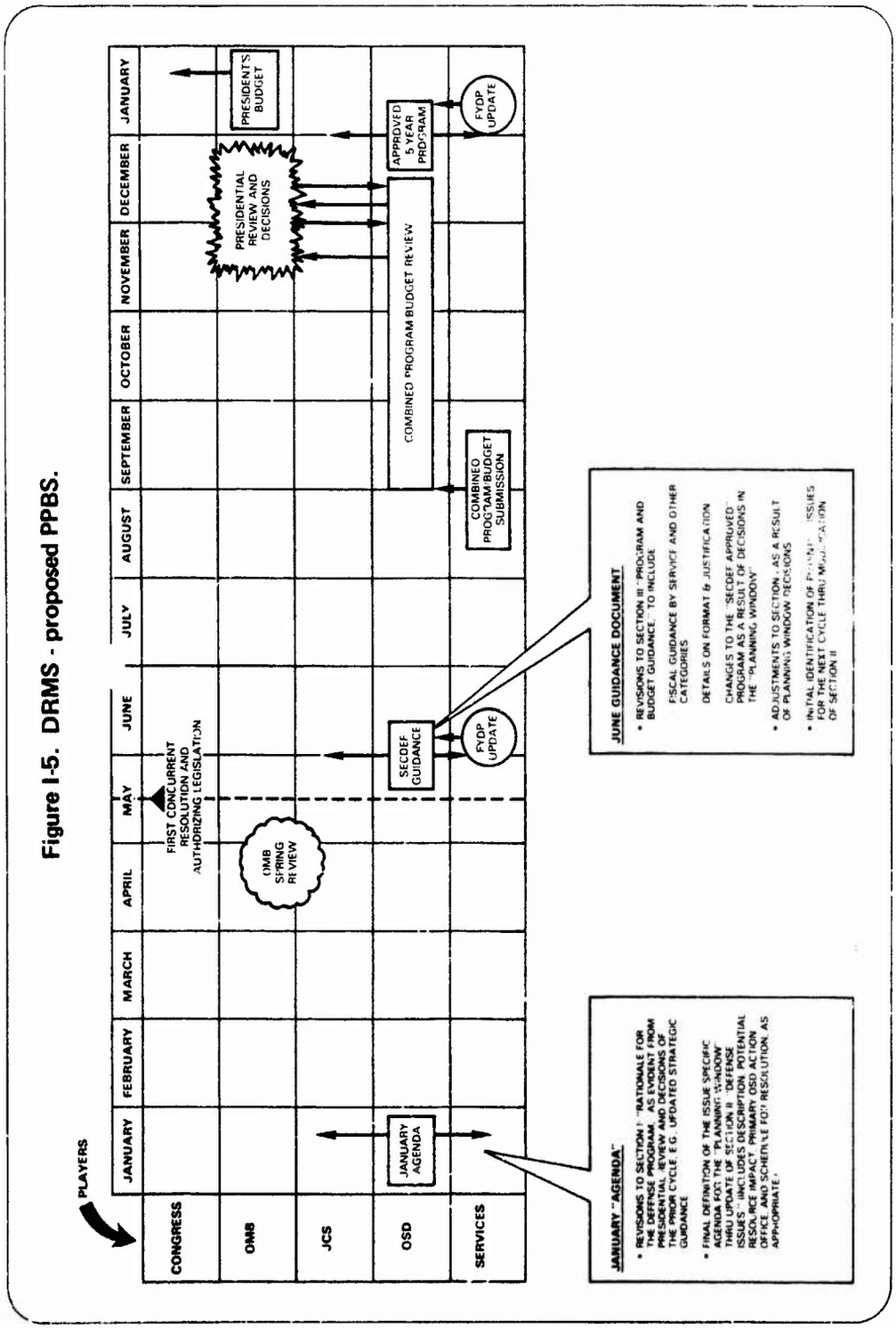

Figure I-5. DRMS - proposed PPBS.

each issue, the JCS, and relevant OSD offices. On selected issues, OMB and NSC officials would also be involved.

In one light, most of what usually occurs within the current system continues to occur, except that the services are not required to submit comprehensive service program proposals, nor is the totality of staffs across the spectrum committed to activity. The major distinction of this period relative to the current system is one of selectivity and focused debate, with incremental decisions released to the services for incorporation into their on-going internal resource allocation processes.

Currently, each service already conducts year-round programming, in anticipation of future cycles with OSD. These internal programming exercises remain essential planning tools. The DRMS recommendation to eliminate a separate OSD program review phase is not intended to curtail internal activities that assist the services in establishing priorities regarding program alternatives over a range of fiscal levels.

All participants enter the planning window with:

- Statements of existing SecDef guidance and his rationale for the existing program. (Posture Statement and amendments to Section I.)
- Identification of issues/initiatives requiring resolution. (Section II.)
- A specified time schedule for each issue and identification of the cast of characters.
- Knowledge of what programs the SecDef has approved and the committed level of resource support (assuming adoption of the proposal for a SecDef approved line discussed below).

Having accomplished an internal review of options over a sufficiently broad range of fiscal levels, and being in possession of the information listed in the preceding paragraph, the services should be able to incorporate the resolution of specific issues raised in the planning window, adjust the program and budget against fiscal guidance brackets provided in early June, and submit combined program/budget estimates about two and one-half months after receiving the June guidance.

While the "Defense Issues" define one aspect of the activity during the planning window, several other selective decision reviews may be appropriate:

- Service proposals to trade off funds between SecDef approved items and service proposals above the line, or service proposals against the planning wedge, could be received by SecDef, decided as incremental changes to the SecDef approved program, and incorporated into the June guidance, Section III.
- An orchestrated OSD review and prioritization of DSARC-approved programs competing for segments of the planning wedge could be completed, with the results also incorporated into Section III as incremental changes to the SecDef approved program or as guidance to the services on program priorities.

Combined Program Budget Review. These proposals contemplate programmers and budgeteers acting in a coordinated fashion on the unified program/budget submitted in August. A Defense Resources Board should be established to manage the combined review process. The Board's functions are described in the next section on organizational and role changes. While important mechanical adjustments will have to be

worked out in detail, *especially those linkages that permit rapid translation between programs and appropriations*, the general prescription is clear: a comprehensive review that retains mission and programmatic oversight while continuing in parallel the honest-broker aspects inherent in the review for pricing, scheduling, consistency, legality, executability, and other aspects of financial saleability, through to final decision by the President.

Program review has center stage during the combined review. Thus, the primary orientation is to missions, capabilities, forces, and readiness. The *costing* review plays an important but supporting role. In this light, the ASD(PA&E) should have responsibility for assuring that the perspective of missions and forces is maintained throughout. Regarding *executability* and other aspects of financial saleability, there is a continuing need for the independent review conducted by the Comptroller (ASD(C)). While the ASD having principal oversight should normally be expected to have considered these aspects, a contrary finding by the Comptroller or PA&E is clearly their legitimate prerogative, and a necessary one, to minimize any bias arising from program advocacy by another OSD office. Also, the Comptroller should keep the appropriations perspective continually up to date through the combined review.

Throughout the review, the DRB would manage the preparation of decision papers keyed to individual multi-appropriations decision packages (generally mission-oriented) that would be used to communicate with the OSD staff, the JCS, and the services. The Board, using ASD(PA&E) and ASD(C) as key staff, must ensure comprehensive coverage of the entire defense program and budget and the conduct of separate "cross-cut" reviews as needed.

Decision documentation should cover the budget year and out-years to ensure consistency with the President's public topline projections and to make the January FYDP update a valid baseline for the next annual cycle.

At the conclusion of the review, a SecDef summary decision document would update appropriate sections of the standing guidance document. Changes to Section I, "Rationale for the Defense Program," would consist mostly of amended summary force and financial tables within the text, with minimal changes to text as needed to reflect new resource allocations. The amended Section I thus would provide some of the essential ingredients for drafting the SecDef Posture Statement. Changes would be posted to Section II, wherever the review raised new fundamental issues that the SecDef wanted pursued.

The stage is thus set for carrying the current program and out-year options to the President for a National Defense Review in November or early December.

As decisions are made throughout the review period, the Comptroller would supervise preparation of justification materials that support the President's budget before the Congress.

SecDef Approved Line. The revised PPB System described above will work best if it is supported by a FYDP that maintains two funding profiles. First, the public topline, or estimated future levels of defense spending, should be consistent with the five-year projections contained in the President's budget and the internal DoD fiscal guidance totals. Second, the SecDef approved program should record the forces, quantities, and

dollars to which the SecDef has formally committed, including the out-year implications of decisions taken to date. The difference between the two is the planning wedge, which exists because SecDef does not decide today what need not be decided until a later cycle. At any point in time, the planning wedge would be filled with service proposals not rejected by the SecDef.

Separate internal identification of a SecDef approved line within the public topline levels would be helpful in several ways:

- To identify the flexibility available to the SecDef within the five-year planning horizon.
- To accord a sense of greater permanence to prior program decisions through the identification of the committed funding, which can, but does not have to, be subjected to subsequent annual review.
- To force an internal discipline on the planning process that consciously recognizes the constraints imposed by a public topline, and consequently rejects an internal record of commitment to total out-year resources inconsistent with the "public topline."

Under the proposal for a combined program/budget review, the services enter the planning window with only a four-year base, with specific fiscal guidance made clear only in June (the far edge of the planning window). Consistent understanding of the out-year implications of SecDef decisions would be furthered if the final SecDef decision documents issued in November-December extended the SecDef approved line through the budget year plus *five* program years. The services and OSD would then have a mutually recognized measure of what is approved for a new five-year period at the beginning of the planning window for the next cycle.

DSARC/PPB Interface. The DSARC was created to "discipline the acquisition process" by directing top management attention to the critical decision points of important acquisition projects It was not designed as a parallel resource allocation process; rather, it was to provide for a structured technical and financial management review of a project and "authorization" for it to proceed, while the PPBS continued to serve the internal "appropriation" function.

Resource allocation was not part of the DSARC's charter for at least two interrelated reasons:

- The acquisition process is event-and-system-oriented rather than strategy-and-resource-oriented. It is directed toward satisfying requirements that are normally defined outside the process (i.e., acquisition projects should be focused on mission needs rather than generating solutions in search of a problem). Because of this process orientation, a DSARC review of any particular system lacks the perspective needed to determine whether funds should continue to be expended on the project. This decision is properly the function of the resource allocation process, wherein the value of ends can be considered in relation to the costs of means, and within which competing demands for funds can be ranked in order of the priority of the strategic or mission need they address.

- While today's acquisition projects will drive a significant fraction of out-year resource requirements, less than one-third of the annual budget is devoted to system development and production. "Fencing" funding for individual projects would unduly constrain efforts in the resource allocation process to balance the program among a variety of competing demands.

Assuming that funds for the apportionment and budget year have been approved, the DSARC can, if system progress warrants, release these funds for continuation of the development effort or commencement of production. It should not be used to approve an increase over budgeted funding levels, nor should the alternative selected by the DSARC drive the funding profile approved in the programming process. Even if near-term budgets can accommodate the development and production costs of a system, and its mission enjoys high priority, the DSARC should not commit resources. The internal "appropriation" function — the decision to proceed with a program — should consider its "affordability" over time in the context of aggregate projections of Defense funding requirements. DSARC decisions should remain permissive authorizations: Proceed if you have, or if you can obtain, the resources needed to continue the project. They should not be considered the control on the money valve that approves funding needed to allow execution of the DSARC decision.

However, the acquisition process would benefit from better links to the budget process. In addition to the June review of DSARC-authorized programs suggested above, three ideas seem worth trying out to improve the linkage:

- The Mission Element Needs Statement (MENS), which proposes initiation of the development and acquisition process for a new system, could be incorporated into the service's combined program/budget submission in August (under the DRMS proposed cycle).
- The question of starting a major new system could be included in Section II, "Defense Issues," of the January guidance document. The MENS could then be prepared as part of the staff work called out on that issue.
- The USD(R&E) could review the major line items of R&D or procurement submitted by the services in August for programmatic integrity and adherence to the acquisition management regulations. If he uncovered problems affecting budget year funding he could then work with the service to provide alternatives for use by the DRB in preparing decision packages during the combined program/budget review.

While these procedures would strengthen ties between the acquisition and budget processes, they should be implemented with care to avoid overloading the budget process.

Organizational and Role Changes

Premises. Clarification of roles of the participants in the process, in practical terms, is difficult. Reality will vary from any prescription. The DRMS proposed changes to the PPBS are based in part on the following premises:

- The preferred procedure is one in which the services generate program proposals, subject to the approval of the SecDef. However, the SecDef should retain and sometimes exercise the capability to generate his own program options.
- The primary foci of the OSD program/budget review should be:
  - Addressing problems that affect more than one service (e.g., strategic force balance, manpower supply constraints, prepositioning versus enhanced mobility).
  - In conjunction with the CJCS, resolving issues concerning the complementarities of combat forces and the mix of service capabilities to be programmed to accomplish a particular mission (e.g., the respective roles of tanks, antitank weapons, artillery, close air support, etc., in the tank killing mission; the appropriate mix of ASW forces.)
  - Ensuring that general guidance for direction of the program is adhered to in service proposals (e.g., carrier size, readiness levels, retaining competition in a particular weapons development).
  - Examining options for improving efficiency by having the services share commonly needed facilities or capabilities (e.g., common training and maintenance requirements) or by developing new approaches to the design of support and readiness resources (see Chapter III).
- Resource allocation decisions should be made only in the resource allocation process. Other processes, such as the acquisition process, can provide input to, but should not drive, the resource allocation process.

Defense Resources Board. To manage the combined program/budget review proposed above, the DRMS *recommends the establishment of a Defense Resources Board,* chaired by the Deputy Secretary of Defense, with four other members: the USD(R&E), the ASD(PA&E), the ASD(C), and the ASD(MRA&L). The CJCS and the Deputy Director of the OMB or the Associate Director for National Security Programs could serve ex officio. The Board would ensure a collaborative review of service program/budget submissions by the OSD officials most directly responsible. The Board could, of course, have work sessions without the chairman having to be present. (The ASD(PA&E) or the ASD(C) could preside depending on the subject.)

The DRB would:

- Manage all aspects of the combined program/budget review, including the guidance for submission and the structure and schedule of the reviews,
- Identify issues requiring resolution,
- Arrange for needed staff work,
- Conduct "cross-cutting" or other reviews necessary to ensure mutual consideration of the perspectives important to each principal,

- Decide minor issues,
- Take major issues to the Secretary,
- Prepare Presidential review materials,
- Hear reclamas,
- Ensure that final decisions are communicated in multi-year program terms, and that sufficient rationale is provided wherever necessary to update Section I, "Rationale for the Defense Program."

The DRB would be useful even in the current system but is probably necessary to make the combined program/budget review work well. The Board would bridge jurisdictional differences in OSD and offer greater continuity and institutional memory to the PPB process. Above all, it would provide a mechanism through which the cognizant OSD officials could work together on what is the most important resource management process serving the Secretary and the President.

Role of the JCS. Textbook descriptions of the present PPB System (in the narrow procedural sense) have typically begun with identification of the threat via the Joint Intelligence Estimate for Planning (JIEP), and continued through the threat appraisal of the Joint Strategic Objectives Plan (JSOP) I, the objective force of JSOP II, and the final joint submission of the Joint Forces Memorandum (JFM), a kind of Joint POM.

The implication to the uninitiated has been that these documents formed an important foundation for the process. In fact, the joint documentation was generally considered irrelevant to the process. The weaknesses of joint staffing cited in the Steadman Study[3] play a role in explaining the reason for this low regard of the product, as do timing of the presentation, the utter impossibility of the assumed tasks (comprehensive *annual* assessments of national military strategy and force structure), and, most seriously, an inability to grapple with alternatives linked to resources.

The JCS, not unaware of these problems, have recast the timing and content of their documentation, partly by including implications of resource constraints. To the degree that the current documentation helps the CJCS to assess the inherent military risks associated with a resource-constrained posture, one legitimate purpose is served. But more is needed if the JCS are to have a credible institutional role in the allocation of resources (the creation of capabilities), notwithstanding recent efforts by Secretary Brown to open the door to greater JCS participation. The planning window provides just such an opportunity for the JCS. A second opportunity would be ex officio participation by the CJCS on the DRB. A third would be an independent prioritization by the CJCS of initiatives above the base or minimum level reflected in the individual services' program/budget review process. Thus, the DRMS-proposed PPB process provides several opportunities, but no guarantees, for effective participation by the Chairman, and by the full JCS to the extent he can bring them along.

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[3] *Report to the Secretary of Defense on the National Military Command Structure* by Richard C. Steadman, July 1978.

OSD Staff Responsibilities. Implicit in the preceding discussion of PPBS problems and proposals for process changes are a number of changes in the roles and capabilities required of the participants. These include:

- The USD(P) would coordinate the *planning* phase of the cycle in conjunction with the ASD(PA&E).
  - The ASD(PA&E) would be responsible for the preparation of Section II, "Defense Issues." He would most likely be named by the Secretary the OSD action office for most of the issues on the planning agenda and, in any event, would contribute analysis of any or all issues on the agenda. He would also provide the resource analysis capability needed to keep a continuous linkage between the value of ends and the cost of means to reach them.
  - The USD(P) would also be the primary point of contact with the JCS for this phase.
  - Beyond the FYDP planning horizon lies an area rich for development by the USD(P) and the ASD(PA&E) in conjunction with the technological prognostications of the USD(R&E), jointly considering the strategic implications of developmental efforts. Careful examination of the potential strategic directions can also impact on directions for research investment. A vehicle for this is suggested in a following section.
- The DRB would manage the combined program/budget review, under the chairmanship of the DepSecDef.
- During the program/budget review phase, the ASD(PA&E) would:
  - Serve as an active member of the DRB, initiate the mission and forces aspects of the combined review process, and ensure a consistent understanding of the relationship of capabilities to resources throughout the formulation and review of the program budget.
  - Focus the bulk of his analytic capability on issues involving missions, forces, and operations crossing service lines. Though not abrogating the policeman's role inherent in OSD's review process, the ASD(PA&E) should upgrade his capability to examine these issues of complementarity and must rebuild the resource analysis capability needed to support all of the major players in the PPB process.
- The ASD(C) would serve on the DRB and perform a *budget* review (pricing, scheduling, executability) of the service program/budget estimates. The Comptroller's existing statutory responsibilities would remain unchanged. He must maintain the essential independent capability for review of pricing, scheduling, consistency, legality, executability, and other aspects of fiscal integrity and financial saleability. He would work to improve the capability to translate between programs and appropriations and to relate the fiscal review more directly to defined missions and objectives. The Comptroller would devise and operate the staff capability to keep a continuing track, as decisions

are made during the combined review, of their net implications in appropriations terms. He would continue principal responsibility for budget justification, execution, and control.

- The USD(R&E) continues as the principal agent of the SecDef in scientific and technical matters (especially as related to weapon systems acquisition), procurement policy, and acquisition management. He would also contribute technological expertise to the planning process and serve on the DRB during the combined review. His statutory responsibilities for RDT&E activities would remain unchanged. As suggested above, he would support the DRB deliberations by conducting a review of the program integrity of major systems development or acquisition programs, including such aspects as schedule, cost-performance specifications, technical risk, and management strategy. He would also play a lead role in preparing substantive reviews for the DRB of Program III (Intelligence and Communications) and Program VI (R&D). This last function raises an important caveat to keep in mind about the USD(R&E) (which also applies to some degree to the ASD (MRA&L)), namely, that he works under conflicting incentives: On the one hand, he is the Secretary's agent, and on the other, he is one of the claimants on the DoD budget. Thus, while the Secretary will want to rely heavily on the USD(R&E), he will also want the independent perspective of PA&E and the Comptroller on many of the same questions.
- The ASD(MRA&L), with assistance of ASD(PA&E), should assume primary responsibility in the development of operations and support issues, and work toward development of a "theory of support" to guide future identification of such issues. The reasoning that led to the merger of the former ASDs (I&L) and (MR&A) into ASD(MRA&L) is the same as that which argues for development of such a theory. The ASD(MRA&L) would serve on the DRB and, in particular, help the DRB deal with readiness and support issues, especially including the approaches described in Chapter III of this report.
- The ASD(PA&E), ASD(MRA&L), and ASD(C) should jointly develop requirements and procedures for the use of feedback information to monitor decision execution and measure mission accomplishment.

The DRMS recommendation to combine the program/budget reviews raises the question of whether the ASD(PA&E) and the ASD(C) should be combined into a single office. This organizational alternative was considered and rejected as causing more problems that it would solve.

The functions are difficult to manage separately; finding a head for the combined function who could master both the analytical functions and the financial management functions would be doubly difficult. Pressures would be strong to tilt toward the short-run budget demands — to the detriment of longer-term independent analysis. The Comptroller's role in explaining and defending the defense program could undermine the credibility of objective analysis produced by the same office. Many of the advantages to the SecDef of an independent analytical capability serving his interests, unencumbered by other functional responsibilities, would be lost.

New Capabilities

Resource Analysis Capability. The proposals to enhance planning efforts, increase attention to support functions, and combine program and costing reviews all depend on in-depth knowledge of resource requirements and trends. For his own needs and to support other OSD offices, the ASD(PA&E) should develop as quickly as possible a resource analysis capability that will permit him to:

- Identify for the Secretary trends and relationships in resource allocation that warrant his attention. The ASD(PA&E) currently has no such capability for either manpower or logistics. Hence, his role as an independent voice for the Secretary is muted in these matters.
- Contribute to fundamental strategy reviews, including those the USD(P) should undertake, by providing credible linkages between the strategy, force, and mission options and the cost of the means to achieve each of them.
- Support ASD(MRA&L) and the Secretary in the identification and analysis of support policy and resource issues and the ultimate development of a "theory of support."
- Monitor national economic indicators and estimate their implications for federal resources to support the Secretary's participation in Presidential review of total Federal spending alternatives and Congressional budget committee reviews. This could be done with minimal staff by drawing on the efforts of other government agencies and private organizations doing economic modeling and other analyses.
- Estimate and maintain continually updated projections of the long-term resource implications of approved and potential commitments to new weapons and support systems, as an input to long-range planning efforts and a contribution to setting priorities on the choice and timing of new systems.
- Monitor aggregate resource use in the DoD, helping to focus debate on such issues as the labor/capital mix or the investment/operating-cost mix and how they respond to changing prices or other incentives.
- Perform analytical assessments of the defense resource commitments of the Soviet Union and other countries of interest to U.S. planners and policymakers.
- In support of PPB and DSARC functions, provide independent estimates of cost and other resource requirements.

The SecDef should authorize PA&E some additional staff to build up the resource analysis function.

Support Programming. The "mission and support" classification developed in 1968 was an early attempt to generate some systematic treatment of support costs in PPB. Based on aggregations of FYDP program elements, the Defense Planning and Programming Categories (DPPC) still form the basis for the annual Defense Manpower Report.

A matrix table (Fig. I-6), with DPPC as row headings and FYDP programs as column headings, formed the basic conceptual structure for the support analysis that was

attempted in 1969-70. The key idea was to display simultaneously the balance between forces and support (down the columns) and the impact of specific support policies (across the rows). In the absence of some better approach, this technique should be resumed and further developed by PA&E and MRA&L.

The effort to develop this approach further will be hindered by lack of comparability and consistency among support PE's across services. The importance of focusing more systematic attention on the programming of support resources dictates getting on with such an effort in the best way possible. In parallel with that, the current FYDP structure should be redesigned through a major effort to create a structure based on data elements that permit comparable and consistent treatment of support and force activities across mission categories and across services. This redesigned structure would also be extremely useful in support of the resource analysis function recommended above. Both of these efforts can be made quite compatible with current efforts to fully allocate support costs to mission categories.

Looking beyond the next incremental step, it would seem wiser to anticipate the eventual adoption of a mission-oriented classification linking forces, manpower, dollars, logistics, and base structure. The Senate Budget Committee and the internal acquisition process are both moving directly to a mission classification without having filled the void existing about support theory. It appears that DoD should actively pursue the long-range goal of a capstone mission orientation, but without omitting development of classification regarding bases/logistics — such development proceeding initially from the current DPPC with its allocative rules.

Figure I-6. Support analysis structure.

	MILITARY PROGRAMS									
DEFENSE PLANNING AND PROGRAMMING CATEGORIES	1 STRAT	2 GEN PUR	3 INTELL & COMM	4 AIR SEA LIFT	5 GUARD & RESERVE	6 R & D	7 GEN SUP & MAINT	8 TRNG MED & PERS	9 ADMIN	10 SPT OTHER NATIONS
STRATEGIC	x	x	x		x	x			x	
TACTICAL/MOBILITY FORCES		x	x	x	x	x				
AUXILIARY MISSIONS			x		x	x				
SUPPORT ACTIVITIES										
BOS	x	x	x	x	x	x	x	x	x	
TRAINING	x	x		x	x	x		x		
LOGISTICS										
MAINTENANCE	x	x		x	x		x	x		
SUPPLY	x	x		x	x		x	x		
MEDICAL					x	x		x		
HQ/MANAGEMENT	x	x	x	x	x	x	x	x	x	x
OTHER			x				x		x	x
INDIVIDUALS								x		

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Chapter II
THE DOD ACQUISITION PROCESS

INTRODUCTION

Weapon system acquisition drives both near-term demands for development and production resources and long-term ownership costs. Chapter I treated the problems of reconciling the often conflicting demands of the resource allocation and acquisition processes and ensuring that a system is affordable in terms of both life-cycle and acquisition costs. Apart from these problems, improvement is needed in the acquisition process and in the way it provides for the future operations and support of a system.

The investment phase of the system life cycle has drawn a great deal of criticism. Some critics contend that the process takes too long to produce systems that are too costly and that often do not perform as expected. Such criticisms stem from an array of difficult problems. One set of these problems is rooted in the understandable desire of the services to modernize equipment inventories to counter the threat. To do so, the services may accelerate the introduction of new weapon systems into the inventory, even at the price of reduced reliability or operability and of increased acquisition and support costs. Further, there is a natural tendency to devote acquisition resources to systems that are nearest to operational use, and slight less mature systems whose contributions to force capability are more distant. The problem is further complicated by the difficulty of projecting requirements very far into the future. Finally, the advocacy process involved in evaluating rival responses to an operational need may quickly limit the number of potential solutions that are considered. As a consequence, many acquisition management decisions become "yes or no" choices, no real alternatives having been preserved.

The development pipeline always contains more potential systems than the nation can realistically expect to procure and operate. Critics who disapprove of that situation seem to assume that the unqualified goal of the acquisition process is to develop and supply the weapons, equipment, and services required to meet U.S. national defense objectives, when needed. Although this is certainly the most important general function of the acquisition process, it has complementary objectives that are best achieved through the development of competitive candidate systems. These include, but are not limited to:

- Hedging against uncertainties of technology, threat, cost, and schedule. Such insurance is advisable because of the many years required to develop most systems, their prospectively long service lives, the changes in threat that can

The assistance of Robert L. Perry, Michael Rich and Giles Smith with Chapter II is gratefully acknowledged.

occur over such a time span, and the technical risks in weapon system development. Parallel development, an acquisition strategy that incorporates the assumption that some systems will be cancelled in favor of others, is not inherently or necessarily wasteful.

- Influencing the future defense "environment." The signals that emanate from our commitment of development resources can influence Soviet resource allocations and thus alter the character of the threat.
- Preserving the national capability to develop modern weapons that can respond effectively to a wide spectrum of threats. Political, economic, technological, and geographic factors have hampered the ability of our allies to develop and produce the weapons needed to cope with Soviet military might. The United States cannot afford to incur similar disabilities.

Because other criticisms of the acquisition process cannot be so easily dismissed, however, this report includes a discussion of acquisition strategy. The discussion revisits a number of major topics that have been the subject of past acquisition process studies. Not intended to be exhaustive, this review focuses on some major policy issues in acquisition management.

The acquisition process serves one important function that is not always recognized: It provides a unique opportunity to develop and introduce innovative operational and support concepts — which must be treated as important system developments in their own right. Owning and operating weapons is expensive (it can account for more than half of the total life-cycle cost) and the combination of employment doctrine and support effectiveness directly influences combat capability. Hence this chapter also discusses the need for devoting careful attention in the acquisition phase to the costs of owning and operating systems.

ACQUISITION POLICY AND PROCEDURES

Past efforts to improve the use of acquisition resources have generally tried to:

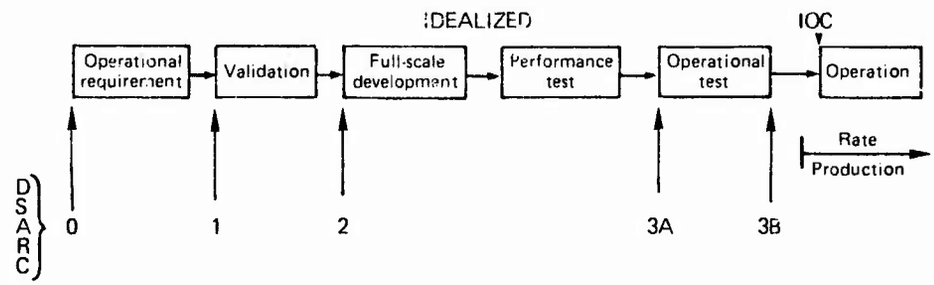
- Identify and eliminate flaws in some part of the acquisition process, or
- Apply, broadly, processes and procedures that have proven beneficial in a specific military or commercial application or that have strong theoretical appeal.

These attempts have produced numerous minor adjustments to acquisition policy and practice, but major changes have occurred only every five or ten years. A brief review of the basic acquisition process and its evolution will provide a foundation for comments on today's policies and procedures.

An Overview of the Acquisition Process

Although in reality the process is considerably more complex, Fig. II-1 adequately depicts the major elements of the weapons acquisition process arrayed as abstract theory often suggests. In this idealized version, system requirements and specifications are established and verified in a first and irreversible step, after which an orderly chain of linked but independent steps leads to an operational capability.

Figure II-1. The acquisition process.



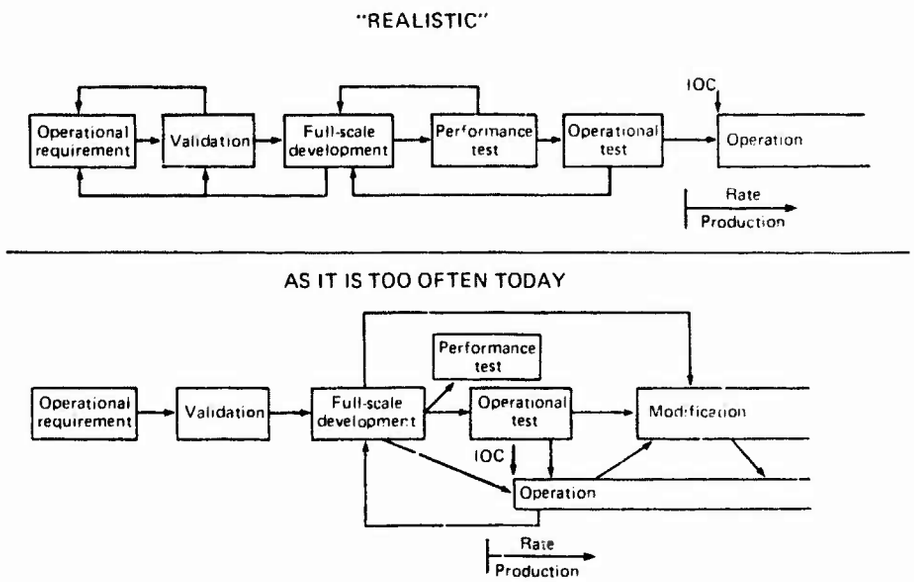
No program ever flows that smoothly, of course. Requirements often change as development continues, and information acquired during one stage of development does and should feed back to earlier phases. Specifications change, new components appear, performance falls short of expectations, retesting is necessary, and other departures from plans are frequent. Nevertheless, it is useful to contrast two aspects of real-world practice with the idealized model.

One important deviation from the ideal is the schedule compression that often occurs once full-scale development (FSD) begins. That is largely brought on by pressures for early operational availability. As shown in Fig. II-2, the effects are twofold. First, a high degree of overlap marks performance testing, operational testing, and early production.

Second, the results of testing often are not reflected in continued development. Initial Operational Capability (IOC) frequently is scheduled to occur well before testing is completed. An almost inevitable consequence is a long (and costly) modification phase, needed because there was insufficient opportunity to detect technical and operational defects, correct them, and incorporate changes before substantial numbers of production articles were delivered. During this phase, which may last for several years, system performance (including operational availability) typically falls well below the desired (and "required") levels. The result is not only that the forces must rely on systems that do not perform as expected (and, presumably, as necessary), but also that the DoD incurs high post-acquisition costs. Post-delivery modifications characteristically cost many times as much as changes incorporated during production. That has been true of such systems and subsystems as the M551 Sheridan, the *VIRGINIA* class of cruisers, engines for the F-14 and A-7, avionics for the F-15 and the F-111, and the structure of the B-58 and C-5.

A different problem arises during the early stages of the acquisition process, before full-scale development (FSD) begins. There, during the concept formulation and validation phases, alternative ways of satisfying an operational need are considered. One

Figure II-2. The acquisition process.



design is usually selected for FSD. Paradoxically, although formal DoD acquisition policy documents devote much attention to the concept and design phases, they are allocated only a minuscule fraction of total acquisition program resources. One consequence is that these phases include little hardware development and demonstration, and many decisions are based on analysis and design studies. This practice encourages the early elimination of options, so that when FSD starts, the principal remaining decisions are whether or not to proceed along a single recommended development path, and how fast.

Yet recourse to demonstration hardware (prototypes) has repeatedly produced impressive results at modest cost. For example, on at least three occasions during the past few years, the flight testing of competitive prototype vehicles during the validation phase led to selection of a design that was almost certainly different from (and in the judgment of most reviewers, consistently better than) the FSD course that would have been chosen at the end of a conventional paper competition. In addition, testing of such prototypes has revealed important design oversights or errors that were readily corrected early in FSD, in contrast to instances in which major flaws become apparent only after the systems entered high-rate production.

Present practices seem to reflect the conviction that: 1) Mission requirements can be firmly specified before development begins or technological capabilities are verified; 2) important configuration decisions and technical specifications can be based reliably on design studies and analyses alone; and 3) subsequent development of the

system will encounter no problems severe enough to upset cost and schedule projections. Unfortunately, there is little historical basis for such faith and considerable evidence that the policy it engenders is not very successful. In one set of 24 systems of the 1960s that embodied these assumptions, typical outcomes included cost growth (in constant dollars) averaging 40 to 80 percent, schedule slippages, and performance shortfalls.[1] A preliminary appraisal of system development experience in the 1970s indicates that similar problems persist, though probably not on quite the same scale. (The sample includes more than 50 systems from all three services.)[2] DoD acquisition policy documents of the 1970s clearly mandate a more cautious and skeptical approach, with greater emphasis on demonstrating results before making major commitments to proceed to the next phase. Yet, notwithstanding evidence and plainly stated policy, program managers frequently find irresistible the temptation to believe analytical findings that promise low-cost, rapid, risk-free development. Recent experience strongly suggests that critical decisions are still made too early on the basis of too little hard data, and options are eliminated too soon, while the following compressed development-production program typically yields a product that falls short of expectations.

That circumstance and what it implies are of particular importance in planning for future acquisition programs that require cooperation with one or more of our major allies. Generally, the larger industrialized NATO states hold that cooperative acquisition programs — the two-way-street concept — must begin with firm, irrevocable commitments to requirements, specifications, and buy quantities, together with agreed allocations of the work. Since such "foreordained" programs are inherently contrary to the efficient management of acquisition resources, U.S. participation should be conditioned on the explicit judgment of top defense leadership that large Alliance benefits would result. Given the attendant uncertainties and risks in such commitments, the United States may nonetheless be obliged to limit its participation in such programs to those where the threat is unlikely to change very greatly, requirements are highly stable, and production quantities are largely determined by the need to replace current "standard" systems.

The concept of early production commitment as a secure road to inventory modernization, technological advance, and operational adequacy has undoubted attractions and may be appropriate in some circumstances, both domestic and international. But like other panaceas that have been proposed and tried from time to time (Concurrency and Total Package Procurement are two examples), that approach also should be used selectively. There is, in fact, no single, generally applicable acquisition strategy that can be applied, unreservedly, to the broad range of requirements that confront the DoD. Flexible planning, option preservation, and adaptive management are no less essential today than they were two decades ago.

Two other broad aspects of acquisition practice deserve attention here. The first concerns the difficulties of simultaneously developing several major subsystems and

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[1] R. L. Perry, *Systems Acquisition Strategies*, The Rand Corporation, R-733-PR/ARPA, June 1971.

[2] Unpublished Rand research, forthcoming.

integrating them into a weapon system. Attempting to advance technology on a broad front and for a wide range of interrelated components vital to an in-development weapon system characteristically brings on schedule slips and cost overruns. and often causes serious problems in operational performance.

Another set of problems arises from the institutional setting in which acquisition is managed and from the personal and career incentives perceived by program managers. A program manager usually serves in a program office for only a portion of the period during which "his" system is in the full development cycle, and his natural instinct is to seek near-term results that will reflect favorably on his abilities. Satisfying prespecified milestone goals for system performance and schedule while living within his allotted budget become dominant objectives, along with ensuring survival of his program in an adversarial environment.

Program managers must be given both the opportunity and the incentives to entertain and act on several currently unpopular policy options. including the recognition that:

- Program cancellation or cutback, schedule slowdown, and milestone slippage are valid program alternatives;
- Prespecified technical goals may not be achievable at an acceptable cost and may have to be altered or abandoned;
- Prespecified performance goals may have to be adjusted to the changing realities of threat, budget, or force structure;
- Program redirection can be a useful, acceptable action;
- The final 10 percent of performance is seldom worth 50 percent of total program cost.

Similarly, the program manager's superiors must recognize and manage from the perspective that:

- Micro-management is extremely costly;
- The incentive structure must permit positive recognition of the intellectual honesty that program managers need if they are to entertain the options listed above. A recommendation for program termination, milestone slippage, or program redirection should not be construed as evidence of management failure, as often appears to be the case for DoD military programs (but, interestingly, not for major commercial R&D programs).

Neither the acquisition problems nor the possible responses suggested above are new. They have been recognized in management studies and reviews for many years. Today, OSD-level management of systems acquisition is built around the DSARC review process, which in turn has recently been modified by addition of a "DSARC O" review. A brief discussion of these two central management features follows.

The DSARC and Acquisition Management

Today's practices are rooted in acquisition policies introduced during the early 1960s. Earlier, the Secretary of Defense lacked the authority to enforce such a policy,

so there was none. However, changes in 1958 strengthened the Office of the Secretary, and the appointment of Robert McNamara in 1961 brought an activist to the post.

Early in 1964, with the publication of DoD Directive 3200.9, the acquisition cycle was divided into four phases. During Concept Formulation, a decision was made about whether a system was needed. The Definition phase included a design competition (usually a paper exercise, although contractors sometimes worked with hardware while preparing a proposal). These two phases were expected to produce firm system specifications and cost estimates, so that Full Scale Development and Production (the third phase) could proceed on a fixed-cost basis. System Operation was the fourth phase. The most extreme implementation of that approach was the Total Package Procurement Concept (TPPC), wherein a contractor undertook, for a fixed price, to perform all development and to produce the initial lot of systems. DoD expected this process to preclude the sort of program cost growth that had characterized the 1950s, and to minimize acquisition time as well.

Experience was not kind to the concepts of the 1960s. Economic and political realities inhibited government enforcement of contract terms and encouraged acceptance of whatever a contractor produced, at a price that kept the contractor from going out of business. Although TPPC was occasionally beneficial (in the case of Maverick, for example), the conspicuous failures (such as the C-5) indicated that both concept and applications were flawed.

When David Packard became Deputy Secretary of Defense in 1969, he made a series of major changes in acquisition policy, most of which remain as the core of today's policy. Packard wanted to decentralize day-to-day management, but to keep OSD informed about the progress of the programs and in control of them. To do this, he mandated three "milestones" or decision points at which formal OSD approval had to be granted before a service could proceed further with acquisition. These occurred at the: 1) initiation of contract definition; 2) beginning of full-scale development; and 3) beginning of production. In addition, cost, performance, and schedule thresholds were to be established for each system. If any of these were breached, SecDef review of the program was again required. Except for these reviews and approvals, management of the program was to be left to the services.

A Defense System Acquisition Review Council (DSARC) was established to conduct milestone reviews. Its function was to "discipline" the acquisition process and ensure that upper levels of the DoD were aware of the progress of costly systems as they moved toward operational readiness. The DSARC was to operate much like a corporate executive committee, reviewing the projects of its divisions and encouraging lower levels to manage their projects properly. Further, as was discussed in Chap. I, the DSARC was not to preempt the resource allocation function from the PPBS; rather, it was to provide for a structured technical and financial management review of a project and "authorize" project continuation. The PPBS continued as the instrument for performing the internal "appropriation" function.

In theory, there were to be only three major DSARC reviews and each was to address only those issues relevant to the decision then to be made. In actual practice,

three soon became many. Today, a typical program will have at least five or six major DSARC reviews, and some programs have been exposed to a dozen.

Nor are these reviews limited to a small number of key issues relevant to one particular milestone. Before the DSARC meeting, the program is reviewed by as many as ten offices in the hierarchy of the responsible service and by the deputies of the DSARC members. Each such audience must be satisfied before the DSARC review can take place, and there is no limit on the number or scope of issues they can raise or the quantity of information each can demand. The result is repeated reviews of virtually every detail of the program.

Holding so many reviews and making them so extensive may have benefits, but it also has costs. Satisfying the requests for information and preparing all the briefings is a large burden on the program offices. For as much as six months before a major DSARC review, major resources of the program office are diverted to preparing for the DSARC meeting and dealing with the reviews preceding it. During that time, only unavoidable program management decisions may be considered.

Another consequence seems to be that some essential issues do not get enough attention. One such issue is the availability of adequate funding for the program being approved. Programs are approved for full-scale development and production when the funds available for those activities, to say nothing of those for operating the system, are known to be inadequate. The usual result is insufficient initial funding, followed inevitably by schedule slips and, eventually, increased program costs. Such an uncertain funding environment also makes program planning very difficult for program managers. (See Chap. I.)

A key issue the DSARC is supposed to consider is whether sufficient testing has been done to evaluate and resolve technical risks before moving on to the next phase. Early testing is necessary not only to evaluate such risks, but to ensure that whatever is learned during testing can be exploited in development. Currently, some systems are approved for production even though key performance characteristics have not been demonstrated.

The DSARC process was an excellent concept. Its drawbacks arise in reviews that are too frequent and too far-reaching, and in the tendency to overlook vital issues while grappling with a multitude of lesser questions.

Mission Element Need Statement and the Acquisition Process

The most recent major innovation in weapon system acquisition has been the introduction of the Mission Element Need Statement (MENS) and the associated restructuring of the initial phases of the acquisition process. When the early stages are conducted properly, the following goals should be achieved:

- The system's performance specifications match its mission;
- Alternative ways of performing the mission are explored before systems are selected;
- A variety of associated technologies and subsystems are considered, and the development of some is initiated, so that the technology will be available to meet new threats and needs.

The recent changes in initial-phase procedures appear to put undue emphasis on the first two goals. When a service determines that there is a need for performing a mission, it must prepare a MENS that describes the need in terms of operational requirements rather than system performance specifications or technical characteristics. This MENS must then be submitted to and approved by the SecDef before any work on choosing or developing a full system can begin. If the SecDef approves the MENS, a program office is established, a program manager is appointed, and exploration of alternative solutions to the mission need begins.

Such a review of mission need is intended to ensure that no system begins development until a need for it has been verified and the chosen system promises to meet that need. The MENS is also intended to help ensure that alternative solutions to the mission need are explored. Because the need is stated in terms of the task to be performed, and the MENS does not specify how it is to be done, it should be possible to explore a wide range of alternatives. However, the services tend to start the acquisition process with a fairly firm notion of what system they want, and some participants seem to view the MENS as no more than an elaboration of the operational requirement statements that the services have traditionally used to justify system starts. Those statements frequently describe one preferred system. Consequently, the establishment of the MENS process is not of itself sufficient to ensure a complete exploration of alternatives before the system selection process begins. If applied properly, however, MENS reviews should promote the first two of the goals listed above.

The MENS process is not directed at the third goal and could easily inhibit its achievement. The MENS seems to have been partly motivated by a desire to lessen the number of "false starts" and eventual program cancellations. But the MENS process does not take sufficient account of the fact that goals, missions, requirements, threats, and priorities change, and that options for coping with such changes must be created and maintained. It may often be important to have a number of systems in varying states of development so that options will be available to meet unexpected threats or to offset technical difficulties in associated programs. The appearance of new technology may warrant an investment in exploratory development, or even building prototypes of critical subsystems, even if no fully validated MENS exist. By the beginning of FSD, the mission need should be established, but it does not seem desirable to require that the mission be narrowly defined (and accepted by the SecDef) before any subsystem development program can begin. If the MENS concept is used in that way, it could inhibit the timely evolution of subsystem technology.[3] In addition to advancing technology, subsystem development can later be used to preserve options for satisfying mission needs. For example, a subsystem can be retrofitted on an existing platform, providing competition for and a hedge against failure of a full system development program.

The "idealized" model of the acquisition process can easily beguile planners into assuming that a requirement, once defined, will remain constant and that the sequential acquisition process merely performs the steps necessary to satisfy it. The MENS

[3] There is no evidence that the intent of the MENS was to inhibit the development of critical subsystem technology, and if appropriately interpreted, it will not.

procedure, which is intended to make the requirements process more orderly and reduce the influence of service and contractor advocacy in deciding what systems to acquire, can help ensure that alternatives for satisfying a mission need are considered. But if misinterpreted, it can also reinforce the perception that a requirement is absolute and that satisfying it is the immutable goal of the acquisition process. There is considerable evidence that, in a DoD setting, virtually no change that implies a diminishing need or urgency will be institutionally acceptable. To slip a schedule, miss a milestone, or acknowledge that some research enterprise is not worth continuing is to admit failure. To shift objectives, particularly if the new goal is less ambitious than the old, is to fail. In essence, the various purposes of acquisition (the one most commonly accepted being to acquire an effective system, at reasonable cost, when needed) have been ritually subordinated to the achievement of institutionally prized goals: schedule adherence and high performance (variously defined), at any cost that the providing agency can be induced to bear. It is thus vital that the threat-updating called for at each DSARC review be more than a mere formality, and that system specifications not be fixed prematurely and irrevocably.

Although there has been little experience with the MENS so far, the basic idea appears sound. It is important in applying it that alternatives really be considered, that new technologies be explored, and that the definition of mission need not be irrevocable, immutable, or premature.

SUGGESTIONS FOR IMPROVING THE ACQUISITION PROCESS

Existing legislation and policy directives governing weapon system acquisition appear to be broadly satisfactory. However, some important problems arise in the implementation of those directives, at all levels of DoD management and in some of the details of application. The following suggestions are directed at the practice of weapon system acquisition rather than at its abstract philosophy.

The existing incentives for effective acquisition management at the program office level are among the weakest elements in an otherwise adequately structured system, and should receive priority attention. It is recommended that DoD undertake to design, test, refine, and install:

- A specialized program manager selection process (perhaps as part of the management training program), and
- A special performance evaluation system (built around criteria relevant to system acquisition) for program managers that will recognize and reward effective leadership of an acquisition program and, equally important, will clearly identify less-than-adequate performance.

Recommendations for lengthened tenure in project management assignments have emerged from every important study of system acquisition over the last twenty years. Implementation of such recommendations still is needed.

OMB Circular A-109 and the associated MENS/DSARC 0 review are intended to improve the process of selecting system candidates for entry into full-scale development. Because this process has not yet been fully implemented, its effects on weapon

system acquisition cannot be fully assessed. Undesirable outcomes could result from this set of procedures, however. Special management attention should be devoted to three problem areas:

- The carefully prepared, staffed, and approved MENS must not be regarded as "cast in concrete," but instead must be continually reviewed ("grease pencil planning") as military needs evolve.
- The preparation of a MENS, and the effort to obtain DSARC 0 approval, must not be permitted to interfere with subsystem development progress or to stifle innovation in concept definition.
- The examination of alternative system concepts to satisfy a MENS should stimulate and exploit the fabrication and testing of experimental and prototype hardware; it should not be permitted to increase reliance on design studies and analysis.

Troublesome and costly problems often arise from the premature commitment of systems to high-rate production. Two steps would ameliorate this stubborn problem (both are entirely consistent with policy directives):

- Delay the approval of high-rate production until the hardware has demonstrated both technical adequacy and operational suitability, including reliability, supportability, and readiness characteristics. (Functional criteria for such achievements must also be developed, preferably on a system-by-system basis.)
- Encourage the development of major, widely used subsystems independent of final weapon system development programs, thus reducing the risks of full system development and enhancing standardization and operability of the equipment. (This "building block" concept is also consistent with current DoD direction; integration responsibilities may have to be reemphasized.)

Finally, a conscious effort should be made to exploit the opportunities created by competition in the acquisition business. Component and subsystem development programs with potential application to existing systems, in addition to competing with each other, create alternatives to new system developments. Product improvement can and should compete with new system designs to provide a hedge against technical problems and a positive incentive to keep down the costs of a new design.

OWNERSHIP CONSIDERATIONS IN THE ACQUISITION PROCESS

The acquisition process has traditionally focused primarily on technical, schedule, and development/procurement cost issues. Recent efforts to increase emphasis on the "ownership" phase of the system life-cycle, the costs of which often exceed those of developing and procuring the system, are spurred by at least three important facts:

- Assessment of the "affordability" of a system requires explicit treatment of "ownership" resource requirements over time;

- The design capability of a system can be realized only if operating and support resource requirements are funded adequately;
- The interaction between design and operating/support concepts must be considered during system development if design capability is to be achieved at an acceptable cost.

The allocation efficiency question — achieving a balance among forces, equipment modernization, and force readiness and sustaining capability — is the key issue that must be resolved within the resource allocation process. Implicitly, this question requires assessment of the "affordability" of acquisition programs.

A system's "affordability" during the operational phase of its life-cycle is a function of its ownership costs and its priority relative to competing demands for funds. These "ownership" costs are driven by three primary factors:

- The organizations and basing structure to be used for operating and supporting the system;
- Support policies that determine what types of support will be rendered, where, and how often;
- The characteristics of the system itself, which determine how often it will fail and how difficult it is to maintain.

The recent increased emphasis on support in the acquisition process should be continued, and the range of "ownership" issues considered should be broadened, thus helping to:

- Increase the probability that design capabilities will be realized;
- Ensure that new systems are supportable (at acceptable costs);
- Exercise control over and, where possible, reduce support costs— because unnecessary expenditures on support reduce the total capability that can be bought with limited Defense budgets.

Approaches to Ownership Issues

The two principal approaches that can be taken to improve "supportability" and reduce support costs are to:

- Improve the hardware characteristics that drive many support requirements (e.g., reliability, maintainability, and other traits sometimes referred to as the "ilities");
- Explicitly consider alternative operational and support concepts and policies that affect resource requirements.

To date, most efforts to increase emphasis on support in the acquisition process have been translated into increased concern with reliability and maintainability. Most DCPs now specify some form of reliability and maintainability goals in terms measurable during test and evaluation. There has also been a recent trend toward specifying availability or capability goals early in development. Achievement of these goals can

be determined through use of demonstrated reliability and maintainability characteristics of the hardware. The time and money needed to demonstrate achievement of these goals, however, have not always been provided.

Efforts to improve system reliability and maintainability are important and can improve system effectiveness, but they are only one of the avenues available for reducing life-cycle costs. The other, innovation in support concepts, can offer much greater leverage on these costs and may demand less front-end investment.

Many studies of life-cycle and weapon system "supportability" include a chart purporting to show that the bulk of a system's life-cycle costs — at least 70 percent, and perhaps up to 90 percent of total costs — are determined prior to DSARC I. Such a chart assumes, however, that the operations and support concepts that have traditionally determined the characteristics of the organizations that will man, operate, and maintain a particular type of platform will also be applied to the new system that is under development. That is, given a set of operating and support organizations and policies, the bulk of life-cycle costs are fixed relatively early in the acquisition process. This leaves only a small fraction of total costs that can be influenced by applying the "ilities."

In fact, "ownership," and hence life-cycle costs, can be influenced significantly through changes in the organizations and policies that govern operations and support. Since the characteristics of support organizations are a major determinant of life-cycle costs, acquisition managers, if they hope to affect these costs, must explicitly consider operational and support organization options. How the equipment will be employed (including tactics), where maintenance will be done, who will conduct training, how manpower and material will be delivered to the system (and how long personnel will stay in the using units), what will be done by the unit owning the equipment — all are critical considerations for the manager concerned with delivering needed capabilities at the lowest possible life-cycle cost.

All these factors interact with systems design and should be considered throughout the development and acquisition process. Concern regarding support — or supportability — at DSARC III is too late to have any significant effect on design, which should take account of the support concept planned for the system.

The program manager and his staff are in a unique position to ensure that the interactions between design and support alternatives receive iterative treatment throughout the process. This is not simply a matter of ensuring that support considerations are reflected in systems design and that support policies take advantage of system design innovations. It is also a matter of ensuring that neither a fixed design nor a predetermined support concept constrains system development. For example, an assumption concerning where (organizationally and geographically) certain maintenance is to be performed can significantly influence requirements for test equipment and skilled manpower. This concept is further developed in Chap. III.

Furthermore, system design considerations, if taken within a constraining support concept, will themselves constrain support concept innovation at a later stage. To illustrate, if it is assumed that extensive test equipment, such as might be available in an intermediate maintenance shop at a central location, will be available at all operating locations, then the system's design and integral fault isolation capability are likely

to reflect the assumption. On the other hand, if it is assumed that intermediate maintenance capability is not available at every location, then the system design may be quite different and result in very different requirements for test equipment, spares, and manpower. Only through an interactive process that conciously seeks to take advantage of innovation in design and support concepts can managers hope to affect the majority of life-cycle costs that are now considered "fixed" prior to DSARC I.

Improving Treatment of Ownership Issues

Current requirements for Integrated Logistics Support (ILS) planning should provide a framework within which both of the approaches to "ownership" issues described above can be applied. ILS plans are supposed to develop alternatives for a variety of functions (e.g., maintenance, manning, and facilities), cost the alternatives, and, most important, integrate functional considerations into a consistent support concept. Thus far, however, ILS planning has not resulted in major improvements in the reliability and maintainability of new systems or the development of innovative operating and support concepts.

The limited impact of the requirement to do ILS planning is attributable, in part, to the fact that support considerations have not been given a great deal of weight in the acquisition decision process, and that program logistics managers have little control over conduct of logistics functions. It may also be attributed to the fact that ILS requirements seem to expect implicitly that each individual program should develop its own operating and support alternatives. While some alternatives may be developed during the development of an individual system, other externally generated alternatives probably also warrant examination. For example, the logistics support concepts discussed in Chap. III, and the approach to the personnel mix issues discussed in Chap. IV, might be relevant for an individual acquisition program, but might not surface during ILS planning unless they were suggested to the program manager.

A clearinghouse of innovative operating and support concepts is needed, together with enough emphasis on these issues in the acquisition process to ensure that the "bank" of ideas is used, and thus to increase the probability that attractive options are considered during system design and ILS planning. Perhaps a Support Analysis Improvement Group (SAIG), co-sponsored by the ASD's (PA&E) and (MRA&L), could both serve this clearinghouse-function and help to focus attention on "ownership" issues during acquisition review. Obviously, these issues transcend the acquisition process. The SAIG could also enhance the ability of the Defense Resources Board (proposed in Chap. I) to treat more "generic" support issues in support of the resource allocation process.

The need to consider equipment availability as a performance parameter — which requires emphasis on such hardware characteristics as reliability and maintainability — is obvious. In spite of the earlier discussion of the interaction between design and support concepts, the need to consider support organizations and policies during development may not be as obvious. In fact, there may be considerable resistance to "reinventing the support wheel" for every new system, as there may be to injecting a

new system with its own support structure into a multisystem environment. Furthermore, many constraints on operating and support concept alternatives are not the prerogative of the program manager, but must be established for a class of systems, force structure, or theater. Unless the program manager has integrated some representatives of the functional organizations responsible for support resource programming and system operation into his program office decision process, it is unlikely that these external constraints can be changed.

A balance must be struck, of course, between the extremes of fitting new systems to the existing support structure and designing unique support structures for each system. It should be recognized, however, that:

- The introduction of a new system offers a unique opportunity to implement a new concept that can be applied to other systems in the development pipeline and "retrofitted" to existing systems;
- The applicability of support alternatives (such as those in Chap. III) that could increase capability or reduce costs requires considerable analysis to aid assessment;
- There is time in the acquisition process to do system-specific support analysis — time that may not be available in the resource allocation process even with the changes to the PPBS proposed in Chap. I;
- A major change in traditional approaches to delivering support may be necessary to make a system affordable. Given current and probable future problems in recruiting, such changes may be needed to make systems supportable even where they are believed to be affordable.

Follow-Through in the Production and Deployment Phase

As was discussed earlier, there will always be limits on how much can be learned through "paper" analyses, including support analyses, and limited testing of only the primary hardware that is accomplished during full scale development. Actual system availability and support effectiveness is known only when the new system is operated and supported in field units by normally trained and assigned personnel under the actual concept of system employment. This point is not usually reached until two or more years after the last DSARC Review. Although much of the production and support funds are not yet committed, and deficiencies could still be corrected by prompt action, there is no requirement or institutional mechanism for a full system analysis and review of "hard" information.

In fact, the existing institutional mechanisms impede integrated support management at this critical juncture. The funds for sustaining engineering, modifications, personnel training, spares provisioning, and other support elements are separately programmed and managed by function across weapon system lines. Key ILS assumptions can be altered in the programming process (e.g., reducing the number of unique skill categories authorized and specially trained) without specifically assessing the impact on the newly fielded system or providing for compensating changes in other elements of the system support plan.

Recommendations for Improving the Treatment of Ownership Issues

A number of recommendations that could improve treatment of operating and support issues within the acquisition process flow logically from the preceding discussion:

- Measurable system availability goals should be set explicitly once a system concept is established, and the needed resources (time, money, and manpower) allocated to achieve these goals;
- Testing and evaluation should be required to verify "supportability" and measure progress toward availability goals (by measuring specific reliability and maintainability parameters, and computing availability);
- The OSD should establish a Support Analysis Improvement Group (SAIG), co-sponsored by the ASD's (PA&E) and (MRA&L), which would:
  - Act as a clearinghouse for concepts that should be considered in system design and ILS planning;
  - Evaluate ILS plans for the DSARC;
  - Work with the Cost Analysis Improvement Group to improve support-costing capabilities and with OT&E to ensure that "supportability" and equipment availability are tested;
  - Work general support issues in support of the resource allocation process.
- A full integrated support evaluation should be conducted when adequate experience is accumulated on the fielded equipment and on the effectiveness of its full training and support system. The services must establish institutional mechanisms that provide priority management and funding for prompt, efficient correction of deficiencies in availability and support of newly fielded systems. MRA&L and PA&E should conduct follow-on support reviews of selected recently fielded systems until adequate attention is focused on these problems. These reviews should trigger issue papers where necessary in the combined program/budget review proposed in Chap. I. They could be conducted by a SAIG or a similarly constituted OSD panel.
- The top-level emphasis given to support in the acquisition process should be further increased by:
  - Insisting that "supportability" be demonstrated before permitting a program to proceed; and
  - Encouraging identification and application of innovative support concepts that can increase capability or reduce support costs, or both.

Chapter III
LOGISTICS SUPPORT ALTERNATIVES

INTRODUCTION

Over one-third of the Defense budget is consumed,[1] and a similar fraction of Defense manpower is employed,[2] in the delivery of logistics support. The bulk of this resource commitment, on the order of $32 billion per year at current budget levels, goes to functions that contribute directly to peacetime readiness, wartime combat sustainability, or both. Important as the resource implications are, logistics commands attention primarily because it is a crucial element of combat capability.

Nevertheless, the sheer magnitude of logistics resource requirements has prompted repeated reviews of individual logistics functions such as distribution, or subfunctions such as maintenance at the depot level. Most of these reviews have sought to save money by improving the *peacetime efficiency* of the logistics support system with insufficient thought for the interdependencies among logistics echelons and functions. Further, emphasis on "tooth to tail" ratios and other simplistic measures obscures the synergistic relationships between combat forces and support. The results of these reviews have sometimes reduced combat flexibility and effectiveness out of proportion to any cost savings.

More recently, the focus of these studies has changed to reflect the Department's increased concern with readiness and sustainability. Their recommendations, however, have sought to increase effectiveness primarily by increasing the level of resources input to the current support structure. This appears to be prohibitively expensive because current structures seek to provide combat units with a high level of self-sufficiency as the means to ensure that forces can be employed in the widest possible range of combat scenarios. Alternatives which involve modifying these structures have received comparatively little attention.

Both Chaps. I and II urge that the DoD devote more analytic attention to support issues. This analysis must consider both the costs and effectiveness of support because:

- As noted above, distinctions between "teeth" and "tail" neglect the relationship between support and combat capability. This relationship demands that support resources be provided in balance with the forces so as to marshal the full combat capabilities of the forces.
- The organization of support activities and the distribution of expenditures across support activities will affect the amount of combat capability that can be obtained for any given funding level. Thus, we must also be concerned with the *efficiency* of support delivery processes.

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[1] *Department of Defense Annual Report, Fiscal Year 1979*, p. 313.
[2] *Manpower Requirements Report for FY 1979*, p. VII-17, Department of Defense.

The DRMS examination of logistics support has three purposes:

- Demonstrate the potential leverage that can be exerted on both combat capability and support costs through innovation in support concepts.
- Provide examples of the type of approach to support issues that chapters I and II have urged.
- Develop specific ideas for improving the organization and management of logistics resources.

The DRMS review focused on maintenance and related supply in support of maintenance—two of the logistics functions which most directly affect combat capability. It shows that alternative support structures exist which:

- Maintain or increase wartime capability and readiness;
- Improve the match between organization and mission;
- Free combat units from responsibility for overhead and indirect support functions that reduce combat flexibility and do not immediately affect combat capability;
- Increase command self-sufficiency in mission-essential support functions;
- Increase the ability of support systems to adapt to the rapid changes characteristic of the dynamic environment likely to prevail in future conflicts;
- Exploit potential economies of scale in certain support functions; and
- Eliminate unnecessary redundancy across organizations.

This chapter summarizes the lessons learned and principles derived from five weapon-system-specific case studies of logistics concepts and policies, in each of which the DRMS team:

- Studied current maintenance systems;
- Reviewed current and recent initiatives to improve the responsiveness of logistics support structures;
- Examined the probable combat environments in which the weapon system is to be employed;
- Postulated the characteristics of a responsive logistics delivery system for that environment; and
- Compared these characteristics with current and evolving logistics concepts.

The case studies in the Companion Report validate several logistics principles that seem to have fairly broad application. This chapter distills these principles and points a direction for future evolution in logistics support systems. It will.

- Describe a likely future wartime environment and the nature of the support problem;
- Discuss the implications of environment and technology for theater logistics delivery systems;
- Explicate the general principles that seem to be consistent with these implications and that appear to apply across a broad range of weapons systems and other equipment;

- Report the results of the five case studies (and provide a brief discussion of the changing concepts for Navy surface ship logistics support) in the form of specific recommendations for change that should be considered for implementation or for further analysis leading to implementation;
- Postulate some of the broader implications of the general principles for logistics and other support systems; and
- Identify policy options that can affect logistics requirements.

THE WARTIME ENVIRONMENT AND WEAPONS TECHNOLOGY

Secretary Brown's Annual Report for fiscal year 1979 noted that:

> What we face increasingly in Europe and elsewhere, is the possibility of attacks launched in the expectation of gaining tactical surprise and quickly defeating the defense with mass, shock, and speed. Emphasis on a modern form of short, intense war is not surprising. Aggressors, however much they may glory in war, rarely have an interest in prolonged campaigns. Under modern conditions, moreover, quick victories may be essential if the risks of nuclear escalation are to be avoided.
>
> We cannot assume, however, that because plans postulate a short war, actual campaigns will fit the model. Nor can we risk substituting the facade for the substance of true combat capability[3]

There is a critical difference between the U.S. defense posture required by the current international environment and the one we have traditionally maintained. Quoting again from Secretary Brown's defense report:

> Our tradition has been one of initial dependence on the efforts of friends while we took the time to convert from a peacetime to a wartime economy, build up our forces, and produce in quantity prototype equipment we have developed between the wars, or even after the new one had begun ... the luxury of a relaxed peacetime posture is no longer open to us; we cannot afford to concentrate our resources on the development and procurement of new weapons at the expense of our ability to maintain and operate them efficiently[4]

This view is reflected in the individual Military Departments' descriptions of contingencies that must be planned for. The accuracy of those descriptions is less important however, than the determination of what support postures *(and they will differ among weapon systems)* will best prepare the DoD for the wartime contingencies it may have to face.

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[3] *Department of Defense Annual Report, FY 1979*, p. 82.

[4] Ibid., p. 84.

Current U.S. defense strategy relies on maintaining, in peacetime, the ability to:

- Maintain peacetime readiness;
- Conduct a forward defense;
- Concentrate firepower;
- Provide reinforcements rapidly;
- Conduct *sustained* operations (recognizing that primary emphasis must be placed, as stated in Army FM 100-5, on "winning the first battle");
- Control the seas; and
- Project power[5]

The fundamental change suggested by this posture—from the traditional U.S. posture to one in which we are in the front lines of defense—changes the nature of both the force-structuring problem and the demand for support. Today's forces must be ready to respond to threats that arise with little or no warning because:

> The first battle of our next war could well be its last battle; belligerents could be quickly exhausted, and international pressures to stop fighting could bring about an early cessation of hostilities. The United States could find itself in a short, intense war—the outcome of which may be dictated by the results of initial combat.[6]

Equally important, the force structure must be able to shift rapidly from a peacetime to a wartime footing, and forces must be mobile and flexible enough so that they can be reallocated rapidly across a continually changing front. These capabilities are required for support resources as well as combat elements.

In summary, the very nature of the defense task has changed. The United States is no longer merely the "arsenal of democracy"; it must maintain a forward defense capability, which demands a ready peacetime force structure rather than a mere cadre that can be augmented during mobilization.

Continual advances in weapon technology further complicate the picture. The complexity of conventional weapons employed by all the services has increased dramatically in the postwar era, as have acquisition and support costs. It appears that all will continue to increase. For example, judged solely by the cost of test equipment, the current generation of tactical aircraft is about an order of magnitude more complex than the already sophisticated generation it replaces. Similarly, the new generation of Army equipment is more sophisticated than that which is currently in the field. This complexity, which drives requirements for personnel training, test equipment, and inventory investment, affects all of the services—perhaps the Army most of all.

"The image is that the Army, unlike the Navy and Air Force, is a manpower intensive, weapons and capital light type of organization; that it is the soul of simplicity and its only real disadvantage is that it costs a lot because people cost a lot".[7] This

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[5] Ibid., pp. 82-87.

[6] Department of the Army, Field Manual 100-5, *Operations*, p. 1-1.

[7] Summary of Gen. William E. DePuy's keynote address at the 1977 Armor Conference, *Armor* July-August 1977, p. 31.

may have been true at one time, but no longer. The Army, too, is becoming a capital-intensive service whose demands for manpower and logistics support are driven by weapon systems.

Support organization and structure are also affected directly by changes in weapon technology. Because these changes increase the requirements for test equipment, personnel skill levels, and the like, and are making support increasingly expensive; we cannot afford to man and equip each individual unit to accommodate potential peak demands. In addition, the skills needed to maintain these complex systems are and will continue to be in short supply. Hence, while technology is strengthening our armed might, it is also increasing the complexity of logistics support. The design of logistics support structures must be revised accordingly.

IMPLICATIONS FOR THE THEATER LOGISTICS DELIVERY SYSTEM

Warsaw Pact forces would outnumber NATO forces in any foreseeable European conflict, sometimes by a considerable margin. Consequently, the availability and utilization rates of NATO equipment are of paramount concern both to combat forces, and to all elements of the support structure. Because the time required to perform maintenance reduces availability, maintenance strategies that minimize system downtime should be employed. These characteristics are even more important in view of the high attrition expected in such a conflict.

If combat units are to be maneuverable and flexible, they should not be encumbered by activities that are not linked directly to their combat mission. Furthermore, combat mission goals should not have to compete with functional goals. To meet this objective, the units should retain responsibility and organic capability for only a limited range and depth of support activities.

Of course, combat units must possess some noncombat resources if they are to accomplish their missions. To promote high rates of availability and utilization, they should be able to perform the bulk of on-equipment[8] repairs. This "quick turnaround" maintenance should emphasize a "remove and replace" maintenance concept, using components supplied from the rear. The degree to which "remove and replace" is feasible depends on system technology (and design), economics, and the system's combat environment. The same factors determine the degree to which consolidation of off-equipment repair could:

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[8] It is useful here to differentiate between the two basic types of maintenance tasks: *On-equipment maintenance*, which requires the presence of the weapon system, and *Off-equipment maintenance*, which can be performed on a part of the weapon system without requiring its presence.

Obviously, these broad categories can be subdivided into finer groupings, but this distinction is adequate as long as it is recognized that there are varying degrees of off-equipment repair. A distinction similar to the one between repairs that do and do not require the presence of the weapon system can be made for components of the system. For example, in a turbine engine, a broken part that is reparable can be removed and replaced with a serviceable part, rapidly restoring the engine to serviceability without delaying to repair the broken part. The capability to repair the part does not have to be colocated with the capability to exchange it. That is, supply can sometimes substitute for maintenance.

- Take advantage of economies of scale;
- Render the repair facility, personnel, and spares less vulnerable to enemy action (while giving units in the forward area more room and capability to maneuver);
- Permit accommodation of varying demand-peaks across units with less resources than would be required to man and equip each unit to handle its own peak demands;
- Facilitate utilization of a more experienced, hence more productive, work force (this topic is treated in more depth in Chap. IV); and
- Provide an environment in which on-the-job training could be conducted more effectively than it can in dispersed units.

Such consolidation of off-equipment repair at the intermediate level would change the economics assumed in most traditional level-of-repair (LOR) analyses that establish where individual components will be repaired. In many instances, these analyses now consider the alternatives of either creating maintenance capabilities in a large number of locations/organizations or evacuating the component to the wholesale level for repair. The option of consolidating maintenance capability somewhere in between could:

- Reduce requirements for expensive, delicate, and scarce test equipment, highly trained personnel, and consumable stockage — now distributed and underutilized at a multitude of units or bases;
- Allow substitution of intermediate repair and intratheater transportation for some supply currently provided from the wholesale system;
- Because of greater scale, higher experience levels, improved training opportunities, and some slight separation from the quick-turnaround goal orientation of combat units, permit improvements in the quality of repair, which would, in turn, lessen total corrective maintenance requirements;
- Increase the responsiveness of the logistics system by placing responsibility for turnaround of reparables in an organization that is directly accountable to the combat commander, rather than within the combat units or in organizations whose primary goal orientation is often inconsistent with wartime combat needs.

This last point is particularly important because the utilization, as well as the level, of resources available is a determinant of the adequacy of logistics support. Given unlimited resources, almost any system could provide effective support, no matter how inefficient; but no system can provide effective support with insufficient resources.

Many combinations of resource inputs are possible between these extremes. Since aggregate resource constraints will not let the DoD man and equip each unit to be self-sufficient, and because wartime demands rise and fall over time, consolidation permits better utilization of costly and otherwise poorly workloaded resources. This is another argument for "pooling" intermediate maintenance capabilities.

Consolidated intermediate maintenance activities could also assume a part of the component repair workload that is now evacuated to the depot. Concentration of needed skills that are in short supply would increase the overall maintenance capability of such activities, and concentrated stockage of test equipment and the repair parts needed for component repair would reduce the amount of material evacuated to the depot because of lack of these resources. The resulting increase in theater self-sufficiency would reduce the cost of the pipeline to the wholesale system. More important, it would allow the theater commander (fleet commander) to control and use his logistics resources to "weight the battle logistically," permitting responsive allocation of overall resources as required by the tactical situation. A CONUS-based wholesale system, because of communication requirements and pipeline times, lacks the information and capability to perform this combat-critical function.

In brief, the nature of the future battlefield environment demands the flexible capability to allocate both combat forces and support resources. Expanded in-theater logistics capabilities, coupled with theater resource control, is an important contributor to this capability. Also essential is a responsive intratheater transportation system. The existing shortage of intratheater transportation assets could severely degrade combat capability given current support structures; it will become more critical as logistics structures evolve to meet the demands of likely future wartime environments.

SUMMARY OF GENERAL SUPPORT PRINCIPLES

The recommended design principles to be used in developing support systems are to:

- Focus the maintenance capability of combat units (Army divisions, Navy and Air Force wings) on quick-turnaround repair, limiting their need to perform off-equipment maintenance;
- Consolidate off-equipment maintenance at a level that permits capture of economies of scale and reduces the vulnerability of support resources (the specific design for each weapon system will be dictated by weapons technology, support technology, economics, and the combat task).
- Give theater or fleet commanders the capability to reallocate resources across combat units; and
- Reduce the dependence of the combat units on the CONUS wholesale structure for both maintenance and supply support.

CASE STUDY SUMMARIES

The general logistics principles articulated above were developed by synthesizing the conclusions of the case studies contained in the Companion Report. Although the proposed design principles seem to have broad application, the case studies differ in at least three important respects:

- The specific application of the principles varies by the weapon system's combat environment and its technology, and depends on the economics of the resupply problem.
- In some instances, the DRMS proposal represents an approach to the logistics delivery problem that differs radically from that applied by the service; in others, our alternatives differ only slightly from the system the service has itself chosen to implement.
- The conclusions themselves vary from positive recommendations for support system change to recommendations for further detailed study leading to implementation plans.

This section briefly describes the current logistics support system in each of the case studies, describes the DRMS alternative based on the general logistics principles, and summarizes the benefits that should be realized through application of the principles to support structure design. These individual summaries also provide recommendations for further analysis and/or positive recommendations for change.

Army Tracked Combat Vehicles

Each armored or mechanized infantry battalion has some 100 tracked combat vehicles distributed over five companies. These units are the basic building blocks of the modern mechanized Army. Each battalion has organic maintenance capability, but also relies heavily on maintenance elements of the division, corps, theater and the CONUS wholesale structure for the maintenance and supply support required to keep its equipment combat ready. This structure results in:

- A low density of skilled personnel at the company level to perform essential on-equipment maintenance.
- A duplication of skills and specialized equipment at multiple echelons above the battalion to perform intermediate maintenance such as component repair.
- A general lack of scale at all levels.

The Army has recently completed, or is in the process of completing, evaluations of a number of promising concepts. The DRMS concluded the Army should consider carrying those ideas still further.

Several benefits may accrue from a maintenance system that places relatively more capability and responsibility at the maneuver battalion for on-equipment work, and at the corps or theater level for off-equipment component repair. The Contingency Maintenance Allocation Chart for the M60A1 tank, for example, recommends such realignments. Maintenance units, however, are not manned, equipped or structured to reflect these reallocations.

The DRMS alternative would, in principle:

- Increase the capability of the maneuver battalion to quickly return weapons to combat (which would increase combat capability).
- Improve utilization of scarce skills, test equipment and repair parts at the consolidated component repair facilities.
- Enhance the capability at the theater level to control and move maintenance and supply assets to weight the battle logistically.
- Reduce combat unit and theater dependence on the CONUS-based wholesale structure.

Army studies indicate that the lack of capability to repair weapons forward, which forces evacuation of weapons, and lack of repair parts would account for two-thirds of the time required for the current system to return weapons to a ready status. Thus the DRMS proposed alternative should significantly improve combat capability. The preliminary indications discussed in detail in the Companion Report warrant further analysis and evaluation by the Army leading to specific changes which would move in the directions indicated by the DRMS analysis.

Army Helicopters

The U.S. Army has about 8000 helicopters assigned to attack, combat assault, transport, and medical evacuation missions. Each aviation company has an organic Aviation Unit Maintenance (AVUM) capability to perform routine servicing and some on-equipment repairs. They are backed up by Aviation Intermediate Maintenance (AVIM) units in the division, corps, and, in Europe, the theater. CONUS depots perform overhauls, some component repair, and other tasks that require more extensive skills, equipment and facilities than are available in the AVIMs.

The DRMS examination of logistics support for Army helicopters confirms that the Army has made significant progress toward implementing a much more efficient and effective, combat-oriented support system. Most of the remaining deficiencies the DRMS considers important are also recognized by the Army as important, and the Army has taken action to correct them. In some cases, it would be desirable to move more quickly; however, it is recognized that political and funding realities constrain rapid implementation of some proposed changes.

Army divisions currently possess only a limited repair capability for aircraft components. In peacetime and in wartime, the divisions rely heavily on corps and theater intermediate maintenance units. The Army is presently reviewing the TOE (Tables of Organization and Equipment) structure for divisional and non-divisional AVIMs. This review should be expanded to reevaluate the current divisional AVIM component repair capability with the objective of reducing this capability to the maximum extent, consistent with aircraft readiness. Removing the limited capability from the division and consolidating it with the corps or theater level units would offer a number of benefits. It would:

- Man and equip the divisions' maintenance units to perform their priority wartime mission of assisting the aviation companies in the rapid turnaround of combat aircraft through remove and replace maintenance.

- Eliminate the need for special tools, test equipment and repair parts in the division, thereby increasing division mobility.
- Increase theater component repair capability.

The increased component repair capability would enable a large reduction in the number of components going through the long depot pipeline; additional assets could then be made available to aviation companies to support remove and replace maintenance at division level and below. Based on the DRMS analysis and factors used in the Army's Depot Roundout Study, such changes would make an additional $43 million worth of spares available to the European theater forces in wartime.

The DRMS case study also leads to the following additional recommendations:

- Army supply stockage and distribution should be based on expected combat requirements, not on peacetime demands as they currently are.
- War Reserve Spares Kits (WRSK), for combat aviation companies based on expected combat requirements, would enhance combat effectiveness, particularly in the early days of conflict when supply and transportation systems are likely to be disrupted.
- A theater level system for expediting movement and repair of critical components and for cross-leveling among Army units would align the supply system to support the quick return of aircraft to combat readiness.

Navy Carrier-Based Air

Aircraft-oriented squadrons are the basic building blocks of the carrier air wing. These squadrons possess aircraft, provide pilots and other crew members, perform organizational level maintenance, and provide intermediate level maintenance technicians to the Aircraft Intermediate Maintenance Department (AIMD) of the carrier or air station at which they are located.

Navy squadrons are very small, with 4 to 12 aircraft. Even though both carrier and air station operations involve a number of squadrons, each squadron is manned and equipped to operate independently. Both carriers and air stations have considerable intermediate maintenance capability, manned primarily with TAD (Temporary Additional Duty) personnel from the supported squadrons.

While the "master base" concept concentrates aircraft of a particular type (e.g., fighter, ASW) in the shore establishment, each carrier has a diverse mix of aircraft, the result of shifting carriers from single specialized missions (e.g., attack, ASW) to multiple missions. The mix produces versatility but also causes troublesome problems.

The small scale of maintenance activities for any one type of aircraft aboard a carrier, coupled with its considerable organic intermediate maintenance capability, results in a proliferation of specialized skill requirements. The scale problem is aggravated by the Navy approach to squadron manning, which prevents consolidation of skill requirements across squadrons, even within an aircraft type (e.g., the F-14).

The DRMS developed alternative would:

- Consolidate fighter and light attack squadrons on the carrier to increase their combat effectiveness while reducing total requirements for (underutilized) skills and for overhead manning.
- Increase the scale of AIMD repair by transferring responsibility for most "black box" and all SRA (Shop Replaceable Assembly) repairs to shore-based AIMDs.
- Enhance the stock distribution system to include more operational information in the distribution process and the assignment of repair priorities to the shore-based AIMDs.
- Establish a more responsive intra-theater transportation system in support of the general move to trade supply and transportation for onboard repair capability (this aspect of the proposal reinforces the Navy requirement for a replacement Carrier On-Board Delivery [COD] aircraft).
- Change AIMD manpower requirements and personnel management by
  - Consolidating requirements for intermediate maintenance skills in a smaller number of (primarily shore-based) activities;
  - Removing intermediate maintenance personnel from the combat squadrons, concentrating them instead in the carrier and shore-based AIMDs; and
  - Giving the Fleet Commander control over all aviation intermediate maintenance personnel, both ashore and afloat.

The readiness and combat capability of carrier-based air units are severely degraded by shortages of spares, critical maintenance skills, and automatic test equipment availability. They cannot conduct independent operations without frequent resupply. The alternative would improve utilization of critical support resources, permit differential allocation of shortages among units, and make the logistics system more responsive to combat-generated demands. It would also reduce the carrier's vulernability to resupply interrupts. Although the DRMS is not prepared to make recommendations for immediate policy and organizational change, the more detailed summary in the Companion Report supports the conclusion that the DRMS-developed alternative to reorganize logistics support of carrier aviation has significant potential to increase combat capability and improve personnel utilization. It therefore merits the attention of the highest levels of the Navy and the DoD.

Navy Surface Combatants

Although the DRMS did not conduct a case study of surface combatant maintenance and supply support, it did note with interest the contrast between the Navy's traditional ship maintenance strategy and the one that is emerging for newer ships, such as the FFG (Guided Missile Frigate).

Most ships now in the fleet were designed under the philosophy that maintenance should be done at the lowest possible organizational level. Ship manpower requirements reflect the reality that many man-hours are consumed in on-equipment repair. Since most installed equipments on older ships have very low fleet-wide densities, the

stockage costs of a component replacement strategy would be prohibitive. Further, these equipments were not designed for such a strategy; fault isolation and maintenance rely on "bit and piece" repair.

The rising costs of manpower, the increasing complexity of hardware, and difficulties in retaining needed skills prompted the Navy to adopt a revised maintenance strategy in designing its newer ships. These ships are to be equipped, insofar as possible, with standardized equipments suited for component replacement maintenance. Manpower requirements have been reduced accordingly.

The move has encountered some problems, but is consistent with the logistics principles outlined in this chapter. There has also been some effort to consolidate management of off-equipment maintenance capabilities through Readiness Support Groups (RSGs). Further evolution could improve matters by (1) specializing the new Shore Intermediate Maintenance Activities (SIMAs), and (2) giving operational commanders greater control over the scheduling of component inductions and stock distribution.

A-10 Weapon System

Traditional tactical Air Force basing and support structures were developed to fit the relatively stable operating environments associated with the post-war strategic bomber and peacetime tactical force training missions. Bases are essentially carbon copies of each other, each possessing a full range of support activities colocated with the aircraft. The resulting proliferation of specialized test equipment and requirements for skilled maintenance and other support personnel is not merely expensive; it also restricts basing options and hampers the mobility and flexibility of tactical air combat units.

There are two notable exceptions to this "traditional" base/support structure in the Air Force:

- PACAF has consolidated intermediate maintenance and distribution control of certain reparables for F-4s on one rearward base which supports the "on-equipment" repair capability maintained at all bases. PACAF has found that consolidating intermediate repair at a centralized location rather than performing it at every location, coupled with a theater distribution system for reparable components, has given the theater a greater repair capability. The number of Line Replaceable Units shipped to the depot has dropped by 50 percent, improved quality of repair has reduced the mean time between failures of components, and supply support to forward based units has improved.
- USAFE plans to consolidate all heavy maintenance and logistics support for A-10s at a rearward Main Operating Base (MOB) in the United Kingdom and to deploy units with very limited maintenance capabilities to forward operating bases/locations (FOBs/FOLs) in Germany.

The A-10 case study conducted by the DRMS confirms that the basing and support plan for A-10s in Europe (an excellent example of application of the principles developed in this Chapter) will simultaneously:

- Reduce the vulnerability of support resources.
- Enhance the mobility and flexibility of combat units.
- Reduce support costs compared to the traditional support concept. The inventory requirement for reparable components is reduced by over $9M even after an additional six days for transportation time to and from the consolidated maintenance facility is included in the computation. The Forward/Rearward support policy eliminates the need for an additional MOB in Europe and therefore avoided about $25M per year in operating and support costs.

A similar structure for CONUS-based units in peacetime would allow those units to train in peacetime for the way they would operate in Europe. One option would be to consolidate the ten TAC squadrons into two MOBs with six independently operating squadrons. This would necessitate higher stockage costs (on the order of 12 to 45 percent, depending on transportation availability) but would reduce operating costs by $50 million annually by eliminating the requirement for two MOBs. The adoption of a Forward/Rearward concept in TAC would result in *reduced costs*, not increased costs, since the recurring savings of $50 million would more than offset the one-time inventory investment costs necessitated by the dispersal of six squadrons of A-10s in CONUS. Access to a responsive transportation system is required to implement this concept. Additional in-theater transportation resources were not part of the current calculations other than the reflection of the increased transportation time on the stockage requirements.

The DRMS analysis of the A-10 Forward/Rearward support policy in Europe confirms that this policy is both cost-effective and promotes better performance. Analysis of the Forward/Rearward basing concept for A-10s in TAC also showed similar savings in Base Operating Support costs and an improvement in performance, although an increase in spares inventory was necessary to achieve equal performance with the "traditional" support system currently used in TAC. The A-10 case also illustrated that, if improvements in repair quality and capability similar to those attained in PACAF are considered, performance is further improved. PACAF experience with a similar support system for the F-4 shows a 20 percent reduction in NRTS (Not Reparable This Station) rates, a 30 percent improvement in the quality of repair, and a 50 percent reduction in the number of reparables shipped to the depot. Improvements of the same kind, though perhaps not of the same magnitude, can be expected for other theaters and other weapon systems. The analysis again points to the need for a theater distribution system that can push spares to the unit with the greatest need.

In summary, relative to the "traditional" basing structure the Air Force should:

- Test the "Forward/Rearward" basing concept for CONUS-based A-10s.
- Develop a theater distribution capability to complement this concept, which would enable the theater commander to "push" spares to the units with greatest need.
- Consider extending the concept to other tactical aircraft in both Europe and CONUS.

Air Force Strategic Bombers

The Air Force departed from traditional basing for the A-10 in Europe primarily because of the potential vulnerability and inflexibility of support resources in a fluid tactical environment. This reflects a recurring theme in the DRMS review: the dynamic nature of the likely future wartime environment. This description seems accurate enough for general purpose forces. However, the nature of the strategic bomber's environment differs markedly. Bombers are kept on alert at a number of bases to make them more survivable, but they require somewhat less flexibility of response because their wartime mission is more programmed.

There is an economic rationale for applying the logistics principles to the strategic bomber force, however, particularly to that part of the force that will be used as Air Launched Cruise Missiles (ALCM) carriers. The B-52 case study suggests that the Air Force could realize significant operating and support cost savings without degrading mission capability and performance, by:

- Centralizing intermediate maintenance, flying training, and other support operations at a small number of large bases.
- Providing decentralized, smaller, much more austere operating bases to ensure a survivable, combat-ready, strategic capability.
- Assimilating within the large bases much of the logistics workload that currently is evacuated to the wholesale system.

The exact amount of savings would, of course, depend on what support requirements are ultimately developed for the ALCM's and a feasible beddown. The DRMS analysis indicates that manpower savings alone would amount to nearly $250 million a year.

The incentive for logistics structure change in the case of strategic bombers, unlike that in the other case studies, is to maintain bomber capability and survivability at significantly lower costs. The Air Force should move aggressively to implement this alternative to support ALCM carriers. Applying it to the remainder of the strategic bomber force would result in further substantial savings in operating costs of that force.

IMPLICATIONS FOR THE WHOLESALE LOGISTICS STRUCTURE

The general principles developed by the DRMS carry implications not only for logistics, but for manpower, personnel, and training requirements; equipment design standards; communications and data processing requirements; and force structuring. The DRMS did not examine these effects. The changes to maintenance and supply concepts below depot level suggested by the principles, however, have a direct impact on the wholesale system. While this impact was not studied in detail, several implications were identified and are discussed below.

These so-called "vertical relationships" among the levels of logistics support are very important for a total system that attempts to manage resources so as to maximize combat capability. Many of the distinctions between depot work and field or below-depot work are based on economic considerations, and preferred mixes will change as

a function of maintenance and supply concepts below depot, as well as the peculiarities of the technology and mission associated with a given weapon system. An understanding of preferred vertical relationships is a prerequisite to determining a preferred horizontal relationship (at the wholesale level).

Because of their size, cost, and importance, the role of depots is a subject for perennial reexamination—an ongoing DoD activity that has received further impetus from external pressures:

- Political pressures to reduce civilian end strength, a large fraction of which is employed in the logistics establishment.
- Executive Branch policy, as expressed in OMB Circular A-76, to rely on the private sector to provide needed goods and services to the Government unless there are compelling reasons for retaining organic capability, such as national security needs or economic advantages.

Such pressures have prevailed for some time, and have led variously to proposals to consolidate portions of the depot system, close depots, and convert depot operations from GOGO (Government Owned Government Operated) to GOCO (Government Owned Contractor Operated) arrangements. These proposals have tended to view the depot system in isolation without recognizing the interdependencies among all the echelons of the logistics system. A change in one may either benefit or damage another, or diminish its importance, or necessitate realignment of its functions. For that reason, implications for the role of depots must be considered if changes are made at lower echelons, such as increasing the scale of intermediate maintenance facilities.

The suggested concepts discussed here have two major goals that would directly affect depot-level maintenance and supply activities: (1) potential workload reductions, and (2) a potential decrease in dependence on the surge capability and responsiveness of the wholesale system. Without a detailed study, it is impossible to quantify this impact and conclude what major changes should be made. Certainly the magnitude of the changes and their impact will vary by service and by weapon system. The following discussion is intended only as an input to future considerations of this issue.

Two types of component repair workload may be reduced by establishing larger-scale facilities and increased capabilities within the operating commands:

- *Components currently coded for field repair.* Because larger-scale maintenance facilities are almost sure to have a more experienced work force, more opportunities for cannibalization, a more production-oriented environment, and greater availability of bits and pieces, the field should be able to repair more of what it is supposed to. In that event, the operating commands should have to send much less work to the depot than they currently do. Over an 18-month test period, a USAF Centralized Intermediate Repair Facility in Okinawa recorded a 20-percent decrease in the rate of components sent on to the depot that were coded base-reparable (not reparable this station—NRTS).[10]

[10] It must be noted that there is a significant element of judgment in deciding to NRTS a component and in explaining why it is being sent off base. Thus, a NRTS 1 code (which normally means

The number of reparables sent to the depot from the bases involved in the test decreased by 50 percent. This was partly due to the NRTS phenomenon and partly to a smaller number of breaks per sortie—possibly attributable to an increase in the quality of repair. This does not imply, however, that changes of this magnitude are to be expected across all weapon systems. In the case of Army tracked vehicles, for example, very few components are evacuated from Europe to CONUS depots for repair. Further, it is not at all clear how these results would compare with those for other weapon systems in other theaters.

- *The level of repair decisions.* A second type of reduction in component repair workload would result from reevaluating the economic Level Of Repair (LOR) decision. Currently, a source-coding decision is made through a combination of judgment and analytical assessments by an ORLA/LOR (Optimum Repair Level Analysis/Level of Repair) type of model. Decision parameters include cost and amount of test equipment, cost of components, failure rates, and pipeline times. A consolidated repair facility in the field would change the economics and drive some component workload from the depot to the field. For example, an ORLA analysis for a sample of 43 B-52G components showed that consolidating nine of the current types of intermediate maintenance activities into two would mean that the number of items that should be sent to the depot for repair decreases by 36 to 56 percent.

These potential workload reductions apply only to component repair; but such repair, depending on the type of system under consideration, can constitute a significant portion of total maintenance.[11] How component repair would be affected, what portion would have to be reallocated to operating commands, and what the net savings (if any) in stockage and manpower would be cannot be estimated without a detailed study. The real significance is that, without spending additional monies on component repair, the system apparently would move in the direction of more responsive repair, which would in turn increase readiness and combat capability.

Another small but noteworthy workload reduction deals with distribution. A theater-level distribution system would decrease the amount of distribution activity the depots perform. This system could make a valuable contribution to combat capability, as previously discussed, but probably would decrease depot man-hours required only slightly, since the wholesale system would still have to ship parts and components to the theater.

The point of this discussion is to emphasize the importance, in terms of combat capability, of the relationship between the operating commands and the wholesale maintenance and support system—referred to as vertical integration. It should be thoroughly examined in the DoD's future studies of the depot system.

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the item is not supposed to be repaired on base) does not necessarily mean the component could not have been repaired in the field.

[11] The Air Force spends just under a billion dollars a year on depot level component repair in support of the depot rework program and the supply system.

Another form of potential reduction in the projected wartime workload derives from the high attrition rates forecast for several of the contingencies DoD must plan for. Attrition reduces the number of end items and components to be repaired, but the effects are not immediate because war reserve equipment or weapon systems held in reserve are brought up to replace the attrited weapon systems. Consequently, active inventory employed in the conflict remains virtually constant for some period of time. Attrition also must be netted out by production rates of new weapon systems and increased workload due to battle damage. This calculation will obviously differ across weapon systems. It appears that this type of workload reduction is potentially more significant for systems for which war reserves are not explicitly maintained (e.g., aircraft) than for other weapon systems (e.g., tanks) that have such reserves.

The other major implication of the suggested support concepts concerns their effect on the surge and responsiveness characteristics of depot maintenance and supply. These in turn are vital factors in determining the preferred organic-contractor workload mix. The arguments traditionally cited for maintaining organic capacity are that:

- It is more flexible and responsive to service needs and missions than contractors are, because the service owns it; and
- It provides a surge capacity to handle increased workloads in wartime, or to respond to sudden or unforeseen requirements, such as resupply of Israeli forces during the 1973 war.

These traditional arguments seem reasonable, but current projections of likely wartime environments weaken them.

If a sizable fraction of the component repair workload is shifted to operating commands, the depot component repair system does not have to be as responsive as previously assumed. And, even if that were not true, contractors have proven that they, too, can be responsive and flexible. They can have overtime provisions written into contracts. They can generate the capability to respond to demands through changing priorities and new hires. In short, this is not a matter of a binary choice. Again, the DoD needs to conduct a careful cost/benefit analysis to estimate how responsive the depot component repair system needs to be and how much that response capability costs.

The surge argument is similarly weakened because of the time it takes for the depot system to repair an evacuated reparable and ship it back to the theater. In the context of a hypothetical NATO/Warsaw Pact war, preliminary analysis indicates that CONUS depot repair of components and engines will have virtually no effect on the theater during the first month of the war. Demands must be satisfied from stocks on hand in the theater or brought over by the deploying forces, since there is no dedicated logistics airlift. It is possible, depending on attrition rates and the number of filler weapon systems, that by the time depot reparables begin arriving in the theater, generations to the depots will have dropped to the point where the depots could meet requirements with a normal overtime schedule of 60 hours a week.

It would be rash to conclude that the depot system would be irrelevant in a NATO conflict. Even if detailed analyses found all these hypotheses to be true, the depots

would still have to meet many other surge workloads in the first few weeks of the war. Repairing components that are already in the depot or in the pipeline is one example. Helping CONUS-based forces increase their material readiness before they deploy is another. A conclusion on the net effect of surge requirements, even if limited to the component repair area (including engines), cannot be reached without detailed study.

POLICY AS A DETERMINANT OF MAINTENANCE REQUIREMENTS

The preceding discussion of logistics principles focused on *corrective* maintenance, the repair of failures that have made equipment inoperative. Much of the maintenance workload, however, consists of *scheduled* maintenance—actions performed to prevent equipment failure. Scheduled maintenance is a subject of considerable interest because it is costly in its requirements for manpower, equipment and component inventories, and test equipment, and, even more important, because it reduces weapon system availability.

A variety of previous studies[12] suggest that scheduled maintenance in all the services can be reduced to increase system availability, with virtually no degradation in reliability. Scheduled maintenance workloads may be overstated for any of the following reasons:

- *Questionable validity of the scheduled maintenance requirement.* Some preventive maintenance tasks, such as changing oil and servicing filters, probably extend equipment service life. Many other scheduled maintenance tasks, however, are specified on the assumption that failure can be predicted with high certainty. In fact, few modern equipments demonstrate the predicted failure probability distribution. The basic cause-and-effect relationships are simply not known at this time. Consequently, a great deal of scheduled maintenance is a function of policy rather than engineering variables. A reasonable approach to reducing the workload, with its associated man-hour and spares requirements, is to increase the interval between scheduled maintenance actions (open-and-inspect, and scheduled part replacement actions).[13] Viewed across the entire fleet of a weapon system, such extensions imply few risks. The transition can be phased so that each group of systems inducted has experienced an interval slightly longer than that of the previous group. Even relatively long extensions of the intervals now specified by policy would then imply relatively short-interval extensions for any given system while the policy change is being implemented.

[12] For example, studies by CNA (Naval aircraft), Lockheed (Navy ships), The Rand Corporation (Air Force aircraft), and the Army (aircraft and combat vehicles).

[13] OSD emphasis on application of Reliability Centered Maintenance (RCM) principles to determine the intervals between tasks have generally tended to increase these intervals. As the engineering analyses are often conservative, further extensions may be warranted.

- *Overlapping maintenance responsibilities.* Some maintenance actions are repeated as a matter of routine at higher levels even though they may already have been performed at lower organizational levels (during scheduled or corrective maintenance actions). Work packages should account explicitly for these overlaps.
- *Deferral options.* It is likely that many, if not most, scheduled maintenance tasks would be deferred in wartime, at least during the early intense phase of a war. Most equipment pipeline buys and workload projections, however, assume that these tasks would continue to be performed much as they are in peacetime

The fact that maintenance requirements can vary significantly with scheduled maintenance *policy* decisions has strong implications for both the size and the distribution of maintenance workload. This potential source of leverage on logistics requirements warrants much more serious attention by OSD and the Services.

SUMMARY

Alternative support concepts, policies, and structures should be sought to strengthen the logistics posture of theater forces, increase their readiness, enable them to generate higher surge rates, and reduce the combat vulnerability of weapons and support resources. The following logistics principles validated in the case studies point the direction for future evolution of logistics support structures:

- Combat units should perform little other than quick-turnaround, on-equipment maintenance;
- Off-equipment maintenance should be consolidated within the theater (the degree of consolidation will vary by weapon system as dictated by weapons and support technology, economics, and the combat task);
- The theater or equivalent level force commander should control logistics resources (including necessary intra-theater transportation) in the theater so that he can allocate them flexibly and responsively;
- The theater should be made more self-sufficient, to reduce the dependence of combat units on the CONUS wholesale system;
- The roles and workloads of the wholesale system should reflect the changes in theater logistics capabilities; and
- The requirements for scheduled maintenance at all levels should be reexamined and aggressive programs should be launched to reduce these requirements (such programs would test the validity of requirements based on engineering analyses).

These actions and their effects should be considered in both the program planning process and the acquisition process. They are clearly not marginal changes; they call for new departures in the performance of support functions that hold promise of reducing costs, increasing effectiveness, and enhancing combat capabilities.

The value of the type of analysis performed here, and of the logistics principles it has identified, does not end at the boundaries of this study. The DRMS recommends

that the DoD adopt this analytical approach and apply it to existing systems, new systems in the development pipeline (as part of the ILS process), and other support functions.

Chapter IV.

THE FIRST-TERM/CAREER MIX OF ENLISTED MILITARY PERSONNEL

INTRODUCTION

The purpose of this chapter is to present an analysis that illustrates an approach for determining the appropriate experience mixes of the enlisted personnel within each of the Military Departments.

Both the current support structure and the alternatives discussed in Chap. III could benefit from attracting and retaining a higher percentage of career personnel in the enlisted work force (career personnel being defined as experienced personnel usually in their second or subsequent tours of service). Such a force, with its higher average levels of experience, could have correspondingly higher average productivity. The force could also be smaller because, in many occupations, a given number of career personnel could substitute for a larger number of first-term personnel. The force might also be more cost-effective than it currently is, not only because of its smaller size and greater efficiency, but also because of lower accession and training costs. Career personnel could also be cross-trained in other specialities, reducing the number of personnel currently required in a diverse array of narrow specialties many of whom are underutilized.

These advantages are not limited to logistics occupations; a higher percentage of career personnel in the force mix could be advantageous in numerous occupations across the services. The major question yet to be resolved, however, is whether the productivity gains from a more experienced force are large enough to allow force reductions that would offset the higher costs associated with more senior personnel.

These are vital issues for the DoD because of the magnitude of manpower costs and because manpower considerations are obviously crucial to combat effectiveness. Partly because of the rising costs of manpower, both civilian and military, the DoD has undergone reductions in manpower authorizations. It therefore confronts the familiar, dual economic problem of seeking ways to reduce costs while maintaining current combat effectiveness, or to increase effectiveness while maintaining current cost levels. Manpower issues are complex, however, and are not easily amenable to aggregate, across-the-board solutions. Among the long list of factors affecting the enlisted force are budget authorizations, the advent of the All Volunteer Force (AVF), the quality of enlistees attracted to military service, retention rates, and the incentives that the military must offer to keep those rates at an effective level. The result of the interactions of these factors is some mix of first-term and career personnel.

The assistance of C. Robert Roll, Jr. and Glenn Gotz with Chapter IV is gratefully acknowledged.

The costs of that mix, and its productivity, depend on the numbers of first-term and career personnel. It is not a pure gain to increase the career content of the force because the average cost of members of the force also increases. Our study of the mix issue sought to explore whether future changes in that mix, either in individual occupations or across the force, would be cost-effective—that is, whether the economies and the higher productivity of a more experienced force would enable force reductions that would offset the costs of moving to a more senior force structure. Further, the study attempts to suggest an approach to planning for occupational mixes.[1] The findings presented below only cover the Army and the Air Force.[2] The results of the study suggest the following:

1. For many enlisted personnel occupational groups, a force with more careerists and fewer first termers would be cost-effective based on current organizational structures.
2. Controlling the total mix of career personnel and first-termers without reference to occupational differences may be counter-productive.
3. Aggregate guidance such as top six grade controls may lead to less efficient forces.
4. DoD should collect needed data and improve methods for determining the appropriate experience mixes of enlisted occupations.
5. Personnel policies should be changed so that more experienced personnel can be used in other than supervisory positions.
6. The reorganized support structures suggested in Chap. III provide even greater opportunity to exploit a more experienced force. Thus, organizational structure and personnel mix interact and, ideally, should be determined jointly.

The following sections describe the major aspects of the study's approach and results. Details of the data and the technical calculations are contained in DRMS Supporting Paper: First-Term Career Mix of Enlisted Personnel, February, 1979.

BACKGROUND

Most major analyses of defense manpower and personnel policies—since the Gates Commission recommended transition to an all-volunteer force (AVF) in 1970—have recommended, either implicitly or explicitly, increasing the average experience level of the enlisted personnel inventory. To attract and retain qualified volunteers, significant increases in first-term compensation rates were approved in the early 1970s, thereby increasing the cost of junior enlisted personnel relative to that of senior enlisteds. It was also presumed that this increase would spur the services to reexamine the personnel mix, find ways to substitute capital for labor, and increase the utilization of less expensive types of manpower.

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[1] The disaggregated approach presented below and some of the results are similar in spirit to those reported by Mark J. Albrecht, *An Analysis of Labor Substitution in the Military Environment: Implications for Enlisted Force Management*, The Rand Corporation, R-2330-MRA&L (forthcoming).

[2] Data concerning training times for all Navy occupations were not received in time to be used for this analysis.

More recent analyses of defense manpower requirements and the enlisted personnel inventory suggest that the expected changes in the capital and labor mix have not occurred, or have been slow to occur.[3] They include some aggregate analyses suggesting that substantial cost savings could be realized without degrading force effectiveness if the career content of the force were increased. Table IV-1 shows that the Army and Air Force have already begun to move in this direction.

Increasing the average experience level of the enlisted personnel inventory for selected occupations could also reduce the demand for non-prior-service male accessions, a reduction that may be needed if the services are to meet their manpower requirements as the pool of eligible males contracts beginning in the 1980s. Not all occupations, however, would be equally affected. Each skill can best utilize a different degree of experience, has a different length of training, faces different levels of labor market competition from the private sector, and generates different levels of job satisfaction, which affects retention rates; hence each should be managed somewhat differently. Aggregate approaches are insufficient. In fact, an across-the-board increase in the career content of the force could increase costs without compensating increases in productivity. Similarly, aggregate constraints used as proxies to control costs, such as top-six grade constraints (limiting the percentage of the force above paygrade E-3), can result in a less cost-effective force.

This study examines the first-term/career mix of the enlisted force by occupation. It provides another example of the type of analysis that the previous chapters indicated is needed in the support area, and illustrates an approach that could be followed by DoD for a more detailed review of the enlisted personnel inventory.

Table IV-1.—Percentage of first-termers in Army and Air Force enlisted force

Fiscal year	Army[1]	Air Force[2]
1973	62.4	49.7
1974	62.0	48.7
1975	59.2	48.4
1976	56.8	47.2
1977	56.2	47.5

Sources: Army Enlisted Force Management Plan, USAF Personnel Plan.

[1] First 3 years of service.

[2] First 4 years of service.

[3] For example: *The Cost of Defense Manpower: Issues for 1977*, Congressional Budget Office, January 1977; *Military Manpower and the All-Volunteer Force*, Richard V. L. Cooper, The Rand Corporation, R-1450-AirPA, September 1977.

As part of its analysis of the potential for substituting volunteers for conscripts, the Gates Commission advanced the concept of "effective force strengths." Its report noted that:

> The size of the active duty forces does not directly reflect defense capability. The servicemen who have already completed basic military and technical training are the ones who provide defense capability. Recruits, instructors, and support personnel at training bases only indirectly contribute to defense by supplying future trained personnel. In addition to these noneffective training billets, other positions in the active force structure must be set aside for personnel in transit between duty assignments or interned as patients or prisoners. With lower personnel turnover, each recruit spends a smaller fraction of a service career in training or in other forms of noneffective status. Because it will have fewer noneffective men, an all-volunteer force can be smaller than a mixed force of conscripts and volunteers but still provide the same strength.[4]

The Gates Commission expected personnel turnover in the AVF to decrease because:

- The average length of the initial tour of service would increase.
- Reenlistment rates of volunteers were expected to be higher than those of draftees or draft-induced volunteers.
- The increase in first-term pay that immediately preceded the end of the draft was accompanied by an increase in pay for careerists to avoid inversions in the pay tables, which should serve to increase retention.

The Commission considered this reduction in personnel turnover to be not only likely, but desirable. It noted that an increase in the percentage of the force with four or more years of service would lead to an increase in the average level of experience of the force. Because a more experienced force would require less on-the-job training, which detracts from productivity, it would be more productive than a less experienced force. Further, reduced turnover would reduce the demand for accessions since the average recruit would serve longer.

Implicit in the Gates Commission's "effective force strength" discussion is the concept of substitution, that is, substituting more highly trained personnel for less-trained personnel and reducing turnover rates, which would allow a reduction in total manpower requirements. Experience also facilitates skill-broadening, another type of substitution. Skill-broadening can help to overcome some of the compartmentalization that has accompanied recent moves toward more emphasis on task-oriented training and can permit substitution of personnel with multiple skills in places where several more people with limited skills are currently assigned. Even where such substitution does not lead to fewer individuals, force effectiveness can increase.

For example, a more experienced force is able to absorb larger numbers of inexperienced personnel, while retaining fighting capability or regaining it in a shorter period of time. In particular, it would be better able to absorb and train new personnel

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[4] *Report of the President's Commission on an All-Volunteer Armed Force*, 1970.

required to reconstitute and sustain the combat forces after the intensive, high-attrition period postulated in most NATO/Warsaw Pact scenarios. Other benefits are also possible through broadening of the skills of personnel in support functions. For example, a carrier air wing requires one or more Digital Data Link Communications Technicians (AT 6607) and Aircraft TACAN Maintenance Technicians (AT 6612) for each of six aircraft types in the wing. The total recorded workload for all aircraft types could be met by fewer men, each possessing more of these skills—if such men were able to repair equipment from different aircraft.

These notions of flexibility and substitution imply some institutional change, in the sense that many of the more senior enlisted personnel would act as technicians instead of supervisors. The following Air Force examples illustrate that a more career-intensive force (in certain skills) could directly increase combat capability.

(1) Increasing the experience level in a pool of flight-line maintenance technicians could dramatically increase a squadron's rapid turnaround capability. Rapid turnaround, as discussed in Chap. III, is a critical factor in achieving the high sortie rates required by many future wartime scenarios. A key task in this turnaround function is diagnosis of reported malfunctions. This is prerequisite to any maintenance actions such as removing and replacing failed components. Absence of critical skills when they are needed delays all subsequent maintenance activity and, consequently, prolongs turnaround time. Diagnostic skills are only partly learned in a formal training program. Experience greatly enhances a technician's ability to recognize patterns, correlate symptoms from different components, and so on. Avionics maintenance is a prime example of a skill in which experience is critical. Currently, it is not unusual to find only a few very experienced personnel (per major avionics subsystem) in a wing. These people are then shared across squadrons as the need arises, and even called in on second shifts if necessary. Wartime operations that call for more squadron deployment (or smaller than wing-size deployments) and for round-the-clock operation—as well as higher sortie rates—increase the need for experienced personnel. This is an example of a resource that is short in peacetime and will be in even greater demand during wartime. The recent trend toward cutting down on flight-line support equipment has put an even greater premium on experienced flight-line mechanics. Having more of them available would not require changes to organizational structures, and would enhance the ability of the current Tactical Air Force (TAF) maintenance structure to do its job. These technicians would have to be used for direct maintenance, however, and not for supervisory jobs.

(2) Component repair at the intermediate maintenance level requires highly skilled personnel. Both the quality and speed of the repair process depends on the availability and experience of personnel. As stated in Chap. III, increases in quality of repair—which are in part related to the relevant experience of the work force—can dramatically reduce mean-times-between-removals because the field reliability of components is increased. This directly improves the force's sortie generation capability. An experienced component repair force could also do more of the repair that is currently coded as depot-level. This would increase theater self-sufficiency and decrease the inventory pipeline investment requirement. Thus, less stock would be required for a given level of performance, or, for a given level of stockage, the number of mission-ready aircraft

would increase. Reducing repair times would also directly decrease the amount of stock required for a given level of readiness. This is a good illustration of a labor/capital tradeoff, substituting personnel skill for supply pipeline investment without increasing the number of people.

Other analytical work suggests that a richer experience mix across the services is perhaps warranted. However, the aggregate work suffers from over-simplicity and a consequent lack of realism. In fact, as will be discussed later, specification of aggregate goals for the mix of first-termers and career personnel can do more harm than good.

Increasing the experience content of the force will incur two types of costs: the economic costs of changing the mix, and other potential costs—which can be translated into economic terms—of decreasing the flow of prior service personnel into the Reserve components. The first set of costs is treated in the next section, which discusses the general principles relevant to the issue of defining the preferred experience mix, by occupation, for each of the services. The second class of costs, which is of interest because of the continuing decline in Selected Reserve and Individual Ready Reserve (IRR) strength, is not treated explicitly. While this area requires further analysis, the effects on current reserve strengths of the changes supported by the results presented here would not seem significant because:

- The change in flow from the active forces would be relatively minor since the results reported below are very close to today's aggregate force sizes and mixes.
- The most significant IRR[5] requirements are for filler personnel in the lower-skilled combat occupations which the following section suggests should continue to be first-term intensive. Consequently IRR strength should not be seriously affected.

METHODS AND DATA

The DRMS analysis of the first-term/career mix focused on six occupational specialties—a low, a medium, and a high skill occupation from the Army and Air Force. Table IV-2 lists the sample skills/occupations and the skill level each represents. for each occupation, the analysis estimates the "steady state"[6] mix of first-term and career personnel that would provide the same level of effectiveness as the actual FY 77 inventory, but at minimum cost.

The analysis was intended to indicate the value of planning for differential first-term/career mixes by military occupation. There do not currently exist adequate data for a comprehensive study of first-term/career mixes for all occupations—hence the

[5] All new enlistees incur a six-year service obligation, regardless of the term of their initial active duty commitment. Three- and four-year obligors who are not affiliated with a Selected Reserve unit after discharge from active duty are members of the IRR pool until this obligation is fulfilled.

[6] A steady-state force is one in which the number and distribution of personnel remain unchanged from year to year.

Table IV-2. —Occupations examined

	Skill code	Occupation	Skill level
Army	11B	Infantryman	Low
	63H	Automotive repairman	Medium
	31E	Field radio repairman	High
Air Force	631	Fuel specialist	Low
	431	Aircraft maintenance specialist	Medium
	304	Ground radio repairman	High

focus on a sample. Under assumptions outlined in the following section, however, implications are drawn for the total enlisted force of each service.

The analysis proceeded as follows:

- Assess the relative productivities[7] of first-term and career personnel in a specialty.
- Simulate the change in relative productivities as the personnel mix is changed.
- Determine the relative cost[8] of first-term and career personnel, recognizing that the cost of substituting careerists rises as the average career content of the overall force is increased.
- Identify and cost the changes in accession and training requirements resulting from a change in the mix.
- Calculate the steady-state costs of maintaining equal-effectiveness inventories containing different percentages of first-term and career personnel.
- Select the equal effectiveness force with the lowest total cost.

[7] The productivity data used were those developed by R. M. Gay of The Rand Corporation in 1975. They provide estimates of the growth of average productivity of a first-term enlistee relative to a journeyman with four years of active service for a sample of Army, Navy, and Air Force occupations. It is based on a survey of enlisted supervisors. The analysis, however, qualifies the productivity estimates for years 1-4 using a function which reflects a one percent increase (decrease) in the first term/career ratio as causing a one percent decrease (increase) in the relative productivity of first term labor.

[8] The costs relevant to this analysis include accession, pay and allowances, bonus, and retirement costs. A detailed discussion of the cost elements considered is contained in the DRMS Supporting Paper: *First-Term Career Mix of Enlisted Military Personnel*, February, 1979.

Several key factors relating to productivity and costs were necessarily uncertain and some simplifying assumptions were required. The analysis also incorporates conservative assumptions made to ensure that outcomes favoring a more career intensive force would be robust:

- All careerists have the same productivity as a person with a full four years of experience (though the productivity of careerists should continue to increase with length of service).
- Changes in the first-term/career mix are achieved by changing only the continuation rate at the end of the first-term through the use of reenlistment bonuses. Continuation rates in earlier and later years of service remain at their FY 77 levels (which may overstate the retirement costs incurred for a more career intensive force).
- As the ratio of careerists to first-termers in the inventory increases, the rate at which careerists can substitute for first-termers decreases by an equal percentage. (Some earlier work suggests that the rate changes more slowly.)
- No additional benefits will accrue from maintaining a more career-intensive force (though greater richness of experience should result in a more flexible personnel inventory).
- In addition to the above assumptions, the study for lack of reliable data had to ignore the savings that reduced flow through training pipelines would produce by "freeing up" people now utilized in training and training support for use in jobs that are more directly related to combat missions. Certainly, decreased training-pipeline flow should decrease the demand for personnel in the training establishment, and the resulting savings would add to the relative attractiveness of a more career-intensive force.

RESULTS

Using the actual FY 77 enlisted inventory as the starting point, a steady-state force was constructed so that its effectiveness was equal to that of the actual FY 77 force in each skill. This is the equal-effectiveness force implied by the retention rates experienced in each of the skills in FY 77, hereinafter referred to as the "implied steady-state force." Any number of other forces could be constructed, with differing first term-career mixes, that also have productivity equal to that of the FY 77 force. Each would have a somewhat different associated cost because of the differing mixes.

The most cost-effective mix is called here the "optimal steady-state force." The optimal first-term/career mix for each occupation cannot be determined without reference to the total DoD accession requirement. That requirement determines the cost per accession, which is an element in the determination of the optimal mix for each occupation. To determine total accessions requires detailed productivity and reenlistment data for each occupation in the military services — data that do not exist. To provide an approximate solution to this accession problem, the distribution of training times for all occupations within each service in this study was divided into three

groups to represent the low, medium, and high skill occupations. For example, Army occupation 11B was assumed to be representative of all those Army occupations with up to eighteen weeks of basic plus initial skill training. It was assumed that percentage changes in the percent first-term, total strength, and accessions for the group would be the same as those for the representative occupation. This made possible the estimation of changes in total accession requirements and costs.

Table IV-3 presents the mix for each of the sample occupations for two equally effective forces: the implied and the optimal steady-state forces. The FY 1977 mixes are also presented as a benchmark.

Table IV-3.—Army and Air Force enlisted inventory profiles: first-term/career percentages

Skill code and level	Implied steady state	Optimal steady state	FY 1977 actual
Army[1]			
11B (L)	57/43	58/42	66/34
63H (M)	60/40	50/50	58/42
31E (H)	54/46	42/58	47/53
Air Force			
631 (L)	51/49	50/50	55/45
431 (M)	46/54	42/58	49/51
304 (H)	49/51	45/55	43/57

[1] Since our steady-state computer model could not examine changes in two continuation rates simultaneously, it was assumed that the Army has only three year initial enlistments. Continuation rates for the third and fourth years of service were adjusted to reflect this. The effect of this change is to slightly overstate first-term percentages for the Army.

In general, the higher-skill occupations have lower optimal first-term/career mixes. As length of training and skill level increase, the lower total end strength required to maintain effectiveness offsets the higher average cost per enlisted member. The exception is Air Force AFSC 304. The estimated average cost per enlisted career member rises more rapidly with increases in career content. The cost of retaining additional personnel, which is related to the intrinsic attractiveness of the skill, service personnel policies, and the external labor market, may rise faster for some occupations than for others.[9] This cost is an essential element in the determination of the lowest-cost mix.

[9] As the career proportion of the inventory is varied, the retention rate required to achieve the desired career proportion varies in the same direction. Reenlistment bonus estimates are used to account for the potential costs of increasing retention. Similarly, increasing accession demands imply in-

The changes in the mix also imply changes in accession requirements. Table IV-4 shows the change in accession requirements for each of the skill/occupations implied by the differing career content of the optimal compared with the implied steady-state force. Note that the accession requirement for the 11B skill increases because of the higher first-term content in the more cost-effective (optimal) force, while the others decline or remain the same.

Table IV-4.—Accession requirements (in thousands)

Skill code and level	Implied steady state	Optimal steady state
Army		
11B (L)	21.4	21.7
63H (M)	1.9	1.6
31E (H)	0.3	0.3
Air Force		
631 (L)	1.1	1.1
431 (M)	7.1	6.5
304 (H)	2.1	1.9

The results for the sample skills were extrapolated to each of the occupational groups using the proportionality assumptions described above. Table IV-5 presents the mixes for the implied and the optimal steady states for each group and for the total force for each service. For convenience, each group has been labelled by the occupation that represents it. The actual mixes for FY 1977 are also provided as a convenient frame of reference.

In the case of the Army, the estimated cost of the optimal force is $350 million less than the implied steady-state force. In the Air Force case, the differences between the two forces are smaller and occur mostly in the least numerous skill category (H). As a result, the cost estimates are approximately the same for both forces. *The important insight to be gained here is that it is more cost-effective to be closer to the optimal mix for each occupation than it is to be close in the aggregate with wide variations from the optimal in individual occupations.* This conclusion is independent of the uncertainty surrounding the individual cost estimates.

creasing marginal accession costs. The supply functions for both accession and continuation reflect estimates of the bonuses required to satisfy the demands for personnel.

The analysis uses FY 77 actual continuation rates, and assumes that they are "on the margin," i.e., an increase in the continuation rates will require an increase in the cost of retaining additional personnel — higher reenlistment bonuses.

Table IV-5.—Implied vs optimal steady state mix

Occupational group (skill level)	First–term/career mix		
	Implied	Optimal	Actual (FY 77)
Army			
11B Group (L)	58/42	59/41	60/40
63H Group (M)	62/38	52/48	60/40
31E Group (H)	49/51	39/61	43/57
Total	58/42	56/44	56/44
Air Force			
631 Group (L)	44/56	43/57	47/53
431 Group (M)	43/57	40/60	47/53
304 Group (H)	56/44	51/49	49/51
Total	47/53	45/55	48/52

Such analyses of steady-state forces have the obvious limitation that they do not consider managing the transition from current to steady-state. The DRMS has, however, examined some implications of the steady-state analysis described above for the late 1980s and 1990s. For each of the sample occupations, the years-of-service distribution was predicted for each fiscal year from 1978 to 2000. It was assumed that the FY 77 continuation rates would stay the same for each occupation. Accessions were based on maintaining FY 77 end strengths.

In certain occupations, substantial variation was found in the numbers of personnel with specific years of service as the forces aged. Beyond 1980 there was stability, however, in the first-term/career mixes and in the numbers of accessions required annually to meet the constant end-strength condition. This, barring exogenous changes, suggests the optimal first-term mixes are attainable.

A serious problem remains, however. The population from which accessions are drawn will begin to decline in the early 1980s. It is estimated that by 1985 the accession age population will be almost 12 percent smaller than the 1977 population and will be roughly 23 percent smaller in 1995.[10] By the year 2000 the population is predicted to rise to a level about 15 percent less than the 1977 level. Since the optimal steady-state mixes are based on accession costs for a population 15 percent

[10] Source: "Projections of the Population of the United States: 1977 to 2050," *Current Population Reports*, Series P-25, No. 704, U.S. Department of Commerce, Bureau of the Census, July 1977. The Bureau of the Census estimates were modified by the set of weights developed by Cooper, op. cit., to obtain accession-aged males.

smaller than 1977, they are too first-term intensive for much of the period between 1977 and 2000. If the services attempted to maintain the accession levels found in the dynamic analysis, pay in the first term would have to rise to a bonus equivalent of about $4500 per accession by 1995. Alternatively, physical or mental standards would have to be relaxed or the female component of the force increased severalfold.

To mitigate this problem, continuation rates into and within the career forces could increase, perhaps by means of reenlistment bonuses. Also, before the accession age population declines to very low levels, accessions could be increased in order to insure an adequate number of careerists in later years. Again, this may be achievable only through an enlistment bonus or increase in first-term pay. The proper methods for managing the force through this period warrant detailed analysis.

In the preceding paragraphs, attention was focused on the implications of today's retention behavior for steady state force mixes. The following paragraphs turn to a consideration of service personnel plans.

The evolution of Army and Air Force personnel plans during the 1970s reveals a definite trend toward planning for more career-intensive objective forces. The Army, in particular, seems to be making a special effort to achieve a more senior force. However, the objective force structures for the Army's career management fields in their most recent plan do not reveal a tendency toward higher career content for the higher skilled fields. Rather, continuation rates from the third to the fourth year of service are the same for each career management field. Neither the desirability nor the cost effectiveness of such a policy is apparent. Planned objective force first-term proportions in Air Force career progression groups do show variations in the appropriate directions with respect to the relative skills of the various occupations. However, the planned first term proportions are higher than this analysis would indicate is most cost-effective.

To indicate these points, Table IV-6 contains the planned first-term proportions of the Army and Air Force objective forces, as well as the optimal steady-state forces presented above in Table IV-3. The Army objective force figures are those for the Career Management Fields (CMFs) within which each specific occupation resides.

Because the objective force characteristics differ from those of today's force (for example, the Army years-of-service distributions within each CMF display significantly lower attrition rates than today's), the optimal steady-state proportions derived from this analysis should only be viewed as indicators of the direction and magnitude of suggested change. Nevertheless, as a consequence of larger differences in first-term proportions than shown in the comparison of the implied and optimal steady states, the estimated cost savings would be correspondingly larger. In moving from the current objective forces to an "optimal" objective force, annual steady-state cost savings, while clearly uncertain, should exceed $1 billion per year, with the majority of that savings coming in the Air Force.[11]

[11] Recall that possible changes in the Navy are not included.

Table IV-6.—Service objective force and optimal objective force first-term/career mix

Occupation	Service[1] objective force	Optimal[2] steady-state force
Army		
11B (L)	52/48	58/42
63H (M)	55/45	50/50
31E (H)	49/51	42/58
Air Force		
631 (L)	79/21	50/50
431 (M)	60/40	42/58
304 (H)	56/44	45/55

[1] Service personnel plans
[2] Table 4.3 above

These results suggest that the Air Force should plan for a more senior enlisted force by emphasizing selected occupations, and that the Army, while about right in the aggregate, should shift emphasis on careerists to the more highly skilled occupations.

Since the Air Force's personnel plans have progressively moved in this direction as evidence continues to mount on the problem of obtaining quality accessions, the Air Force may, of its own accord, move to a more senior force. The dynamic analysis and the implied steady-state both indicate that moving to such a force would not be difficult. The percent of the force in the top six grades would have to be increased, however, in order to maintain retention within the career force at current levels.

A complete analysis of the cost-effective first-term/career mixes across occupations would require broader coverage across occupations, more detailed information on productivities, and more sophisticated analyses of accession and retention behavior. Such information would enable a more detailed and confident identification of the reduced costs associated with a cost-effective objective force. Nevertheless, the potential for improving effectiveness clearly indicates the high value of managing experience mixes by occupation.

CONCLUSIONS AND OBSERVATIONS

The services already differentially manage the occupations represented in their enlisted personnel inventories. Their primary concern, however, is to ensure that viable

career paths are maintained within each specialty and that supervisory requirements will continue to be met. They have not, at the same time, explicitly considered trade-offs between experienced and inexperienced personnel.

The value of managing the force by individual components can be seen most clearly by examining the policies that are used in its absence. Analysis shows, for example, that increasing the proportion of the force in the top six enlisted pay grades may lead to a smaller, lower cost force at the same level of productivity. It has also been demonstrated that it may be preferable to have each occupation's first-term/career mix close to the optimal mix for that occupation than to have the aggregate mix exactly equal the optimal aggregate mix, but have each occupation's mix differ markedly from its cost-effective mix.

The DRMS analysis focused on productivities within a small sample of military occupations. As has been stated, more detailed information on productivities in each occupation and broader coverage across occupations than were available for this study would enable a more detailed and confident identification of cost-effective forces. The occupation, however, need not be the only appropriate level at which to examine the relative productivities of personnel. Concentrating on the work-unit, while more difficult, would allow the examination of productive interrelationships among occupations and would facilitate joint examination of the optimal personnel mix and a cost-effective scale of operations, a problem addressed in the previous chapter. Further, analysis at the work-unit level would permit more appropriate determinations of job content and supervisory responsibilities among career enlisted personnel. Alternatively, it may not always be possible to analyze productivities at the occupation or work unit level. Rather, a higher level of aggregation of personnel types may be amenable to analysis. Determining this level is a problem for OSD and the services to resolve.

A cost-effective force can only be achieved by managing components of the force individually according to their productive relationships and costs. Because of the interrelationships among these components (they draw from the same pool of accession-age youths), management must be centrally coordinated. Improved management will also require increased understanding of supply-of-accession relationships among the services and among occupations. The assumption employed in this analysis—a single, homogeneous pool of accession-age youths—is an oversimplification. It is necessary to understand how demands for accessions by one service or one skill type affect other services or skills to take advantage of these relationships.

SUMMARY

The following resource management policies concerning the experience mix of the active duty enlisted force are indicated:

1. For many enlisted personnel occupational groups, a force with more careerists and fewer first-termers would be cost-effective based on current organizational structures.
2. Controlling the total mix of career personnel and first-termers *without reference* to occupational differences may be counterproductive.

3. Aggregate guidance such as top-six grade controls may lead to less efficient forces.
4. DoD should collect needed data and improve methods for determining the appropriate experience mixes of enlisted occupations.
5. Personnel policies should be changed so that more experienced personnel can be used in other than supervisory positions.
6. The reorganized support structures suggested in Chap. III provide even greater opportunity to exploit a more experienced force. Thus, organizational structure and personnel mix interact and, ideally, should be determined jointly.

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Chapter V
MILITARY HEALTH CARE

OVERVIEW

This chapter examines the fundamental purposes of military health care and assesses how well the system serves those purposes. It recommends changes in the stated functions of the principal military health care organizations and in the structure and management of the system.

The chapter begins with an overview which describes the structure of the military health care system and the broad policies under which DoD delivers health care to its beneficiaries.

Next, the chapter shows how the wartime, or readiness, objectives conflict with the peacetime benefit responsibilities. A major finding is that the peacetime objective of providing a health care benefit needs more emphasis in law, in regulations, and in practice. A larger in-house system is not necessarily implied; an improved CHAMPUS program may be.

The wartime, or readiness, mission is then analyzed. The most important unknown is the number and type of casualties. This uncertainty will remain, but it is important for the services and DoD to understand and resolve fundamental differences in their planning approaches. Given casualties, the next problem is to determine what kinds of medical resources will be required to care for them in an acceptable way. Given the kinds of resources needed, the next question is where they should or can be obtained. Here evacuation policy is crucial, because it is the variable which determines what facilities and people have to be located in theater. This, in turn, determines the options for using CONUS military, federal, and civilian hospitals and personnel.

The chapter then compares the military health-care benefit package with that offered by the Federal Civil Service as well as other typical employers. Health care for active duty personnel may be viewed as a benefit, but the importance lies more in the relationship to readiness. By contrast, health care for retirees and dependents is best viewed as another form of compensation to the serviceman — a form which competing employers provide in some way. This benefit is provided in the form of what may be thought of as two types of insurance: the direct care HMO (Health Maintenance Organization) and CHAMPUS.[1] The purpose of insurance is to limit an individual's

The assistance with Chapter V of David S. C. Chu, Laura I. Critchlow, Susan Hosek, John Ruml, and Albert P. Williams is gratefully acknowledged.

[1] The direct-care system is technically not a Health Maintenance Organization because it has no defined population, requires no prepaid premium and offers no guaranteed package of benefits. Nevertheless, for comparison with private practices, it is useful to think of the direct-care system as an HMO.

exposure to a certain kind of risk, in this case injury or sickness. Premiums for insurance are either borne solely by the individual, by the employer, or shared between them. At present, DoD, in effect, pays the premium for the military health care benefit. Two important characteristics of the benefit are: (1) scope, i.e., what is covered, and (2) cost sharing, i.e., what part of costs the beneficiary has to pay. The chapter makes several recommendations for enhancing these two characteristics of the health benefit as well as removing certain inequities which occur in the current system.

Tailoring the health care system for two missions, a peacetime and a wartime one, poses difficult problems. An ideal wartime system would consist of a physician force heavy in surgical skills, well prepared to deal with trauma, and a number of large hospitals in the United States concentrated near evacuation points. An ideal peacetime system would consist of a physician force heavier in pediatricians and other primary care physicians located in smaller facilities at each military installation.

One of the most frequently discussed problems is a shortage of military physicians. Shortages from wartime requirements must take into account the use of reserves, draftees, civilian physicians, and the important tool of evacuation policy. Increasing the size of the active physician force to enhance wartime readiness represents only one of several, perhaps more attractive, alternatives. Increasing the active physician force to provide more peacetime care represents only one of several possible solutions. Offering an improved CHAMPUS program and an option to join other health care plans can at least partially remedy the perceived doctor shortage.

The chapter discusses, but makes no major recommendations on, the organization of the health care system on the grounds that other more fundamental problems should be solved first.

ELEMENTS OF THE CURRENT SYSTEM

To prepare the general reader for the recommendations that follow, this section presents a brief introduction to the elements that make up Defense medical programs.

Delivery of Benefits

The Defense Department provides care to its eligible beneficiaries[2] either through Army, Navy, and Air Force facilities and medical personnel or through use of civilian providers. In the latter case, the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), funded and managed by the Assistant Secretary of Defense (Health Affairs), partially reimburses the cost of civilian care. A small number of beneficiaries receive their care from facilities administered by the Veterans Administration and the Public Health Service; DoD reimburses the other agency at a prenegotiated rate.

[2] 2.1 million active duty military personnel, 2.9 million dependents of active duty personnel, 1.2 million retirees, 2.3 million dependents of retirees and 0.1 million survivors of members or former members in FY 1977.

A large number of eligible beneficiaries, particularly retirees and their dependents, use none of these sources of care. Many have other health insurance; further, CHAMPUS coverage ceases at age 65.

The Direct Delivery of Care

Facilities. The DoD operates 170 hospitals, of which 129 are in CONUS and 41 are overseas. The Army operates 50, the Navy 37, and the Air Force 83. The normal[3] bed capacity worldwide is 37,069. Operating[4] beds total 20,650, of which 17,636 are in the United States. In CONUS, occupancy rates[5] range from 49 percent to 97 percent; the DoD average is 73 percent. Fifteen Army hospitals, 32 Air Force hospitals, and one Navy hospital are located in remote or underserved geographic areas in CONUS.

In addition to hospitals, there are 302 free-standing clinics and dispensaries and 19 drug and alcohol rehabilitation centers. Care of personnel in operational forces is provided by personnel assigned to their functional units.

Manpower. In FY 1979 there will be an estimated 95,062 military and 38,598 civilian personnel supporting DoD hospitals, dispensaries and clinics, and medical headquarters, and providing specialized and professional training for the three Military Departments. This excludes resources such as medical personnel assigned to tactical units. As of September 1978, 10,819 physicians, 10,221 nurses, 7,431 medical service personnel, 4,936 dentists, and 73,342 enlisted were providing services in the direct-care system.

Reimbursing Civilian Providers of Care

CHAMPUS provides reimbursement for medical services obtained in the private sector by non-active-duty DoD beneficiaries. Reimbursement is made through 12 claims processing contractors for the 50 states and Puerto Rico. CHAMPUS EUR provides reimbursement for care in Europe. CHAMPUS headquarters (OCHAMPUS) in Denver, Colorado, is a field activity of the Secretary of Defense under the policy guidance and direction of ASD(HA).

OBJECTIVES OF MILITARY HEALTH CARE

The law assigns two primary health functions to the Department of Defense. Simply stated, they are: (1) to maintain the peacetime health of the active duty force and to be prepared to attend the sick and wounded in time of war, and (2) to provide a health benefit as a condition of service to eligible beneficiaries.

These two missions can pull the military health care system in different directions. For example, in the United States the wartime mission requires a large number of

[3] Normal bed capacity is the capacity for normal peacetime use of space.

[4] Operating beds are those beds set up and staffed for care of a patient.

[5] Occupancy rate is the number of operating beds divided into the average number of daily occupied beds.

skilled surgeons and a few large medical facilities located near points of arrival for returning wounded, while the peacetime mission requires a larger proportion of family physicians, obstetricians, and pediatricians in smaller hospitals and clinics located at each military installation.

The two missions are neither completely in conflict nor totally separable. By providing for the health care of active-duty personnel in peacetime, the services not only insure the readiness of their troops, but they also provide those troops with a valuable fringe benefit. Dollars spent on active duty health care do two jobs: they provide a benefit and they enhance readiness. Attempts to assign only a single output to such dollars are not only fruitless but unnecessary.

The provision of health care to active-duty personnel illustrates the interrelationship between the two objectives in another way. In order for the services to compete successfully for manpower they must provide a competitive compensation package. Today, essentially all major employers offer some form of health care benefit. To be competitive the military must do the same. But compensation in itself is not the end objective. The ultimate reason for having a compensation package is to provide manpower for a force adequate to deter war or to win a war should deterrence fail. Again, the benefit mission is not totally separable from the readiness mission.

This idea of competing military health care objectives differs dramatically from the conventional view that the system's primary mission is readiness and that, given the necessary resources to accomplish that mission, the system can satisfy its other objectives.

It is a fundamental premise of the DRMS, therefore, that the military health care system has two legitimate objectives or missions, and that the two are interrelated and mutually supportive in some ways but conflicting in others. These two missions are hereinafter referred to as the readiness mission and the benefit mission.

Assignment of the Objectives

The readiness mission is assigned directly to the Department of Defense by law (10 U.S.C. 3062, 5012, 5013, and 8062) and DoD regulations unambiguously transmit that mission to the Medical Departments of the Army, Navy, and Air Force.

DoD responsibility for the benefit mission is assigned by Title 10, United States Code, Chapter 55. DoD Directive 5136.1 delegates to the Assistant Secretary of Defense (Health Affairs) the authority to: " ... issue ... regulations ... to fulfill the Secretary of Defense responsibility to administer ... " the benefit mission.

Army, Navy, and Air Force regulations that assign missions and functions to the respective Surgeons General and to commanders of service medical commands and hospitals fail to assign explicitly the benefit mission. In certain instances the regulations, by inference, implicitly assign the benefit mission. But nowhere in service regulations was the DRMS able to find explicit assignment of the benefit mission to health care managers. For example, Table V-1 summarizes the assigned functions of the Surgeons General.

The absence of an explicit health benefit mission leads to an unnecessarily convoluted logic train in the justification of resources needed to accomplish the benefit mission.

Table V-1.—Functions of the Surgeons General

Army[1]	Navy[2]	
a. Plans, directs and supervises health services for the Army.	a. Develops Navy health care program policy and guidance and provides professional and technical advice on matters pertaining to naval health care.	a. Develops, implements and su
b. Advises the Secretary of the Army, Chief of Staff and Army Staff on health and medical matters.	b. Coordinates, as a sponsor for designated health care programs, with other sponsors in regard to the Navy/Marine Corps health requirements.	b. Provides medical care through Hospitals, base hospitals, and
c. Exercises management authority for the Secretary of the Army over joint health services agencies as assigned.	c. Reviews and appraises the capability of the Navy medical department to respond to contingencies.	c. Provides a dental care progra tive dentistry program for de
d. Exercises technical supervision over all health services facilities and units of the Army.	d. Reviews and appraises the performance of the Navy medical department in safeguarding and protecting the health of authorized beneficiaries.	d. Plans and supervises medical material, radiation producing
e. Exercises career management authority over commissioned personnel of the Army Medical Department.	e. Acts as central point of contact for naval health care matters involving coordination within OPNAV.	e. Develops and implements pla chemical, nuclear, and other
f. Establishes health standards for the Army.	f. Acts as central point of contact for health care matters concerning the Marine Corps.	f. Provides a veterinary program
g. Conducts health services research, development and test and evaluation for the Army.	g. Provides backup for meetings on health care matters.	g. Establishes physical standards of all Air Force personnel. .
h. Exercises Army Staff responsibility for production of Department of Defense medical intelligence.	h. Assists the DCNO (Manpower) (OP-01) in the preparation of plans, policies and studies pertaining to Navy medical manpower requirements.	h. Encourages and supports clin care and clinical techniques a
i. Exercises management authority over programming, planning and technical guidance of construction of Army health facilities.	i. Assists the DCNO (Logistics) (OP-04) in the preparation of plans, policies and studies pertaining to medical logistical support including the Prepositioned War Reserve Material Program.	i. Develops medical support do Medical Service, including aer
	j. Assists OPNAV mission and resource sponsors in programs that have health care impacts.	j. Develops long-range medical medical requirements planni activity for disaster and emer
	k. Advises and assists the CNO in exercising command responsibility over the Bureau of Medicine and Surgery.	k. Formulates and implements p and utilization of Medical Ser istics of medical training aids.
	l. Acts as mission sponsor for Medical.	l. Develops medical manning po requirements.
	m. Acts as resource sponsor for medical and medical training program elements.	m. Develops, reviews and justifie
		n. Develops and supports legisla
		o. Develops, justifies, reviews, c minor construction, alteration
		p. Develops health facilities prog the supporting documents and
		q. Develops, tests, and recommer requirements. . . .
		r. Develops and maintains a bio statistics to accomplish the me
		s. Provides guidance and assis Intelligence.
		t. Develops, implements, and su alcoholism.

[1]OTSG Reg 10-32, 18 August 1976

[2]OPNAV NOTICE 5430 Ser 09/501377, 18 August 1978

[3]Functions statement is not inclu responsible to supervise the Me Service.

Table V-1.—Functions of the Surgeons General

Navy[2]	Air Force[3]
a. Davelops Navy health care program policy and guidance and provides professional and technical advice on mattars pertaining to naval health care.	a. Develops, implements and supervises an aerospace medicine program, which includes: . .
b. Coordinates, as a sponsor for designated health care programs, with other sponsors in regard to the Navy/Marina Corps health requirements.	b. Provides madical care through establishment and operation of Area Medical Centars, Ragional Hospitals, base hospitals, and clinics.
c. Reviews and appraisas the capability of the Navy medical department to respond to contingencies.	c. Provides a dental care program which includes complete dental care for eligible personnel, a preventive dentistry program for dependent children, and an Area Dental Laboratory program.
d. Reviaws and appraises the performance of the Navy medical department in safeguarding and protecting the health of authorized beneficiaries.	d. Plans and supervises madical aspects of Air Force operations involving nuclear weapons, radioactive material, radiation producing equipment, and other forms of radiant energy.
e. Acts as central point of contact for naval health cara matters involving coordination within OPNAV.	e. Develops and implements plans and policies for medical aspects of defense against biological, chemical, nuclear, and other physical agents.
f. Acts as central point of contact for health care matters concerning tha Marine Corps.	f. Provides a vaterinary program. . . .
g. Provides backup for meetings on health care matters.	g. Establishes physical standards for the initial selection, retention, retirement, and other disposition of all Air Force personnel. . .
h. Assists the DCNO (Manpower) (OP-01) in the preparation of plans, policies and studies pertaining to Navy medical manpower requirements.	h. Encourages and supports clinical investigations in medical and dental research to improve patient care and clinical tachniques and to increase the efficiency of the Medical Service.
i. Assists the DCNO (Logistics) (OP-04) in the preparation of plans, policies and studies pertaining to medical logistical support including the Prapositioned War Raserve Material Program.	i. Develops medical support doctrine, policies, plans, and programs for the organization of the Medical Service, including aeromedical evacuation systems.
j. Assists OPNAV mission and resourca sponsors in programs that have health care impacts.	j. Develops long-range medical objactives for the USAF war plans, including Air Reserve Forcas madical requirements planning; and planning for medical support of all phases of Air Force activity for disaster and emergency conditions.
k. Advises and assists the CNO in exercising command responsibility over the Bureau of Medicine and Surgery.	k. Formulates and implements plans for tha procurement, education and training, career management and utilization of Medical Service personnel Establishas qualitative raquirements and characteristics of medical training aids.
l. Acts as mission sponsor for Medical.	l. Develops medical manning policies, manpower standards and associatad criteria, and manpower requiremants.
m. Acts as resource sponsor for medical and medical training program elements.	m. Develops, raviews and justifies financial requirements, and develops cost control procedures.
	n. Develops and supports legislation needed to implemant Medical Service plans and programs.
	o. Develops, justifies, reviaws, coordinates, and defends through all levels of review, programs for minor construction, altaration, repair, and utilization of medical facilities. . . .
	p. Develops haalth facilities programming and space planning criteria for new construction including the supporting documants and design guidance.
	q. Develops, tasts, and recommends stock-listing of medical materiel and determines their requirements. . . .
	r. Develops and maintains a biometric program for racording, assembling, and using medical data and statistics to accomplish the medical service function.
	s. Provides guidance and assistance on medical intelligence matters to Assistant Chief of Staff, Intelligence.
	t. Davalops, implements, and supervises madical aspects of rehabilitation sarvices for drug abuse and alcoholism.

[2]OPNAV NOTICE 5430 Ser 09/501377, 18 August 1978

[3]Functions statament is not included in A.F. Regulation 20-28, 16 May 1975. Rathar they state ha is responsibla to supervise the Medical Service. The functions listed hare are those of the Medical Service.

For example, many pediatricians and other primary care physicians are now justified in one of two ways: (1) They can serve during wartime in other specialties or as general medical officers, or (2) they are needed to provide a more complete environment for physician training programs, the object being to enhance physician satisfaction and thus increase physician retention. While both may be sound reasons for maintaining a certain number of physicians in a particular specialty, a more direct and more important reason can exist, namely, the requirement to provide a first-rate health care benefit.

The benefit mission should be recognized as legitimate and assigned explictly to military health care managers at all levels.

READINESS

The purpose of this section is to highlight key policy variables in medical planning for war, to compare programmed medical resources (beds, physicians, enlisted manpower, and aeromedical evacuation assets) with stated requirements, and to evaluate the state of medical planning and resource allocation in light of the key policy variables and programmed resources. The most important unknown is the number and type of wounded and sick. This uncertainty will remain, but it is important for the services and DoD to understand and resolve fundamental differences in their planning approaches. Given patients, the next problem is to determine what kinds of medical resources will be required to care for them in an acceptable way. Given the kinds of resources needed, the next question is where they should or can be obtained. Here evacuation policy is crucial, because it is the variable which determines what facilities and people have to be located in theater. This, in turn, determines options for using CONUS military, federal, and civilian hospitals and personnel.

A separate component of the readiness mission, to maintain a healthy force ready to go to war, is not addressed here.

Recent Issues

In the last five years medical programs have received increased attention in the service and OSD budget reviews but not in the program reviews. Such attention has focused primarily on narrow budgetary, rather than broad policy, issues. There appears to be a growing sense within the DoD that programmed medical resources provide substantially less than the minimum essential force required to support the combat forces of the four services should war break out. Yet, this increasing uneasiness has resulted in little systematic program review.[6]

Since 1974, the Secretary's program decisions, as recorded in his annual Program Decision Memoranda, have provided little direction of medical programs.

In the 1974 Program Decision Memoranda (PDM), the Secretary directed the services and the JCS to plan to evacuate a larger proportion of wartime patients to

[6] The Nixon Administration commissioned a comprehensive review of the military health care system. The study, which was conducted jointly by OMB, OSD, and HEW, published its report in December 1975. It contained nine recommendations for improving the system; only one of the nine has been implemented to date. The remainder are still under implementation or have been discarded.

CONUS than they had been planning to evacuate. To do this they were to shorten the evacuation policy, the planning factor that determines which patients are to be treated in theater. (A more detailed discussion of evacuation policy may be found below.) Evacuation policy affects virtually every aspect of contingency planning from airlift to engineer construction requirements. It was clear at that time, and remains true today, that the services had programmed too little hospital capability overseas to treat the number of casualties expected to need in-theater treatment under the approved evacuation policy. Shortening the evacuation policy and thereby returning a greater proportion of patients to CONUS offered one solution. The decision would allow limited airlift assets to haul more combat troops and materiel and fewer hospitals and physicians to the front during the early critical days of a war.

After discussion with the Military Departments following the publication of the PDM, the Secretary announced in his Amended Program Decision Memoranda of August 22, 1974, that he had, in effect, changed his mind. The amended decision deleted a number of deploying Army Reserve hospitals from the Army's force structure, but backed off the evacuation policy decision announced a month earlier. The APDM to the Army stated that, "The Army may choose to achieve the objective of providing less medical support in theater and more in the United States with or without changing the present evacuation policy." The evacuation policy was never changed.

The Secretary of Defense raised no major medical issues in the 1975, 1976, or 1977 program reviews. In the summer of 1978, however, the issue of the adequacy of tactical medical support was raised again. Because the available data were contradictory, the Secretary decided to refer the issue to an ad hoc interservice study group, which is to present a coordinated plan for theater medical support concurrent with the FY 81-85 POMs. That study is under way.

Hence, except in two instances, in the last five years the Secretary of Defense has declined to influence substantially any of the service medical programs during his program review.

Policy Variables

As the later sections of this study demonstrate, current and projected levels of medical resources (both manpower and materiel) are inadequate to meet the stated requirements of existing war plans.

Several important policy variables affect the requirements for medical manpower and materiel. This section describes four important and controversial policy variables and some of their effects on resource requirements. The four are: evacuation policy, private-sector reliance, the readiness and strength of the reserve components, and the readiness of the Selective Service System.

Evacuation Policy. Planning for overseas conflicts includes assumptions about the proportion of the sick and wounded to be returned to the United States for treatment. It is expressed in terms of an evacuation policy. Evacuation policy is used as a management tool to regulate patient buildup and flow during wartime operations; it is equally important as a resource planning tool.

For example, a 30-day evacuation policy means that enough resources must be provided in the theater to treat all anticipated patients who would be out of action for 30

days or less. All other patients are evacuated, not after they spend 30 days in theater, but as soon as they are stable enough to travel. Estimates of the distribution of lengths of stay help determine how much evacuation airlift and CONUS resources will be required; estimates of stabilization times help determine when the airlift and CONUS beds will be needed.

BACKGROUND. Evacuation policy has been steadily shortened since World War I. The Army hospitalized World War I patients in theater up to 150 days, but by World War II 60 days was a common limit. During the Vietnam conflict, evacuation policy was set as low as 15 days for extended periods.

Obviously, transportation technology is the most significant reason for the evolution of shorter evacuation policies. A patient no longer has to suffer long rides overland to port facilities, then endure an even longer ocean crossing, perhaps in rough seas, and finally withstand another round of ground transportation before reaching a medical facility in the United States. Today, a patient can be lifted from the front lines by helicopter and continue his evacuation by air to CONUS in as short a time as it may have taken to reach a field hospital in the theater during World War I. By the same token, replacements can be moved today from CONUS to the battlefield in a fraction of the World War I time.

WHAT EVACUATION POLICY DOES AND DOES NOT MEAN. A shorter evacuation policy is often misinterpreted to mean that patients are necessarily moved sooner. In practice, if the attending physician estimates that the duration of a patient's illness will exceed the evacuation policy, the patient is evacuated (from the command) as soon as his physical condition permits. He may be evacuated on the first day if his condition permits; he may not move for several weeks if evacuation would aggravate his condition. Hence, evacuation policy does not define when patients are moved; their conditions determine that. Therefore, a shorter evacuation policy would not lead to higher morbidity and mortality because of patients being moved before they are stable. Nevertheless, it is important to estimate the outcomes of patients who are evacuated under one policy but who would remain in theater under another. The trip can be difficult; on the other hand. CONUS hospitals probably are safer and cleaner than field hospitals.

The proportion of patients DoD plans to treat in theater has a direct bearing on the proportion of its limited early airlift which must be allocated to hospitals and engineer units to build them. A shorter evacuation policy allows relatively more of the early airlift to be allocated to combat units, but it also generates a lift or prepositioning requirement for conversion kits (which configure C-141s for patient evacuation) in the theater. Further, the ground time required to install the evacuation kits reduces aircraft utilization rates somewhat.

The Air Force should consider the development of a simpler conversion kit that, while having fewer patient comfort features, would be more compact and less expensive, and would require less time to install. The potential advantages of such an improved kit merit consideration.

Total physician requirements are essentially independent of evacuation policy, but that policy can be a tool for balancing between CONUS and overseas requirements. A shorter evacuation policy requires fewer physicians overseas and therefore allows more

use of private-sector or DoD hospitals in the United States and the use of a greater proportion of reserve or civilian physicians.

REPLACEMENT REQUIREMENTS. In past conflicts CONUS evacuees have not been returned to theater. To the extent that returning them is difficult, shorter evacuation policies may increase the requirement for replacements. However, under all current plans a sizable military establishment remains in the United States. Evacuated patients, after they are released from CONUS hospitals, could go into the CONUS establishment and free an equal number to go overseas.

SUMMARY. In summary, evacuation policy is an important determinant of overseas requirements in wartime and of the peacetime size and composition of the active and reserve physician force. Setting an evacuation policy involves trade-offs among a number of factors, but offers DoD resource managers important leverage in closing the gaps between stated requirements and resources described below.

Private-Sector Reliance in Wartime. While overseas patients will be treated by uniformed physicians in military hospitals, evacuated patients need not be. The extent to which private-sector, Veterans Administration, and Public Health Service beds and physicians can be used to treat evacuees directly reduces the wartime requirement for uniformed physicians and DoD beds in CONUS. Hence, statements of wartime requirements require assumptions as to how many non-DoD beds and physicians will be used.

Transferring patients to private-sector hospitals presents command and control problems and requires prewar planning, but the alternative — building enough hospitals and acquiring enough physicians to treat all patients in military hospitals — appears to be infeasible. Under current DoD planning assumptions and resource levels, *most* DoD patients in CONUS will have to be treated in to the private sector.

Reserve Readiness and Strength. Acquiring, training, and maintaining reserve manpower and units to meet wartime requirements represents an alternative to certain active duty manpower and units. The relative costs of the two options are an important consideration. While part-time reservists cost less than full-time active duty manpower, active duty health care professionals can provide peacetime care in-house that would otherwise cost CHAMPUS dollars.

The Draft. The peacetime size and scope of the Selective Service System and its activities plays an important role in the determination of the number of physicians required to be on active duty in peacetime. Within limits, the sooner the Selective Service System can deliver physicians to meet expanding early wartime requirements, the fewer physicians are required to be on active duty in peacetime to meet those requirements.

Resource Levels

The purpose of this section is to evaluate the capability of the Military Departments to provide wartime medical support to the sizing scenario described in the Consolidated Guidance. The service Program Objective Memoranda (POM) for FY 80-84 provide the basic data for this analysis. Hospital beds, physicians, enlisted manpower, and strategic aeromedical evacuation capability are used as surrogates for overall resources. All data are for FY 84 and are based upon the approved evacuation policy.

Because the service programs employ different and sometimes inconsistent assumptions and methodologies, an accurate assessment of either requirements or capabilities is difficult. This section is presented to show the current state of planning and resource programming.

Individual service planning by its nature implies service-peculiar methodologies and assumptions. Such differences are to be expected. Inconsistency requires attention only when the differences derive from fundamentally different planning scenarios, have large resource implications, or cannot be rationalized. Consistency, not uniformity, should be the goal.

Hospital Beds. Figure V-1 shows schematically that service statements of beds required overseas substantially exceed their projected capabilities. In the optimistic case, a deficit develops a short time after D-day and persists for several months, reaching a peak equal to 35 percent of the stated requirement. The capabilities shown are optimistic in that they assume: (1) that the Army's deploying hospitals will be fully manned, and (2) that the Air Force and the Navy will execute programs, funded only in the enhanced cases of their POM 80-84, that would provide several thousand prepositioned or deployable beds to the theater by FY 84. The programmed resources case assumes current Army manning levels and no funding of Air Force or Navy hospital programs.

The CONUS bed shortage, Fig. V-2, is likely to be even more drastic than that overseas; DoD hospitals, even after expanding their peacetime capacities, will be able to accommodate only a fraction of the expected patient load. To the extent that the services are unable to satisfy their theater bed requirements, more casualties will be returned to CONUS for treatment, enlarging the CONUS bed deficit from that shown below.

As this chapter documents below, there is considerable reason to doubt the validity of the services' stated requirements. Nevertheless, even if the requirements are off by a substantial margin, two actions are clearly warranted and, therefore, recommended:

- *The services should expand their theater-bed capabilities or OSD should shorten the evacuation policy so as to rely less on theater beds, and*
- *OSD should develop a plan to make large-scale use of private sector, Veterans Administration (VA), and Public Health Service (PHS) beds in wartime. Further, OSD and the JCS should ensure that host-nation support for overseas hospitals is fully exploited.*

Physicians. In wartime the Services require physicians in three general locations: the European theater, other theaters, and CONUS.

Initial overseas requirements must, of course, be met by physicians who in peacetime are on active duty. Later overseas requirements can be met with an increasing number of reserve physicians and even later with draftees. The feasible mix of active, reserve, and drafted physicians to meet theater requirements at each point in time depends, among other factors, upon the readiness and deployment scheduling of reserve physicians, the productivity of a physician draft, and the extent to which active duty

Figure V-1. DoD overseas bed requirements and capabilities--FY 84.

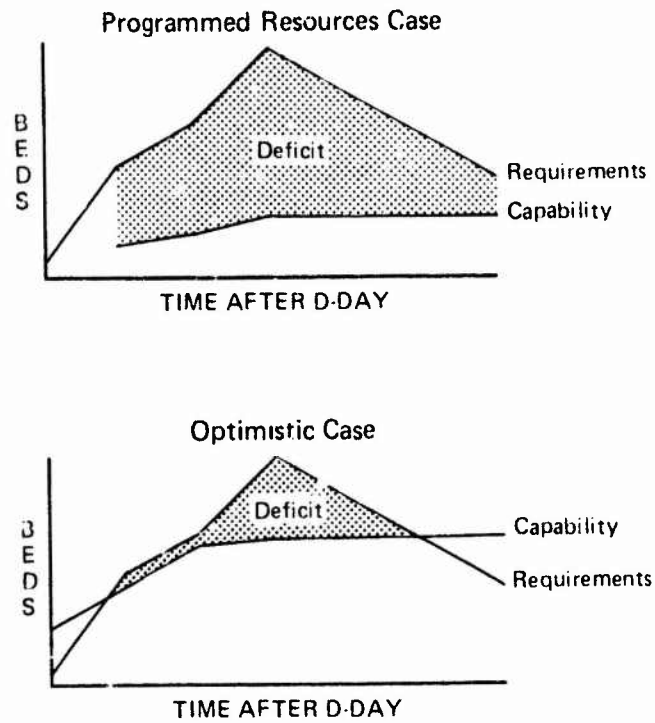
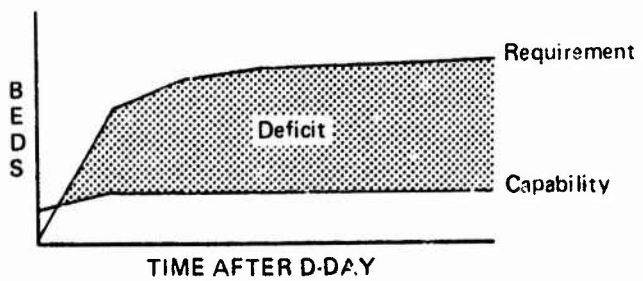


Figure V-2. DoD CONUS bed requirement and capability—FY 84.

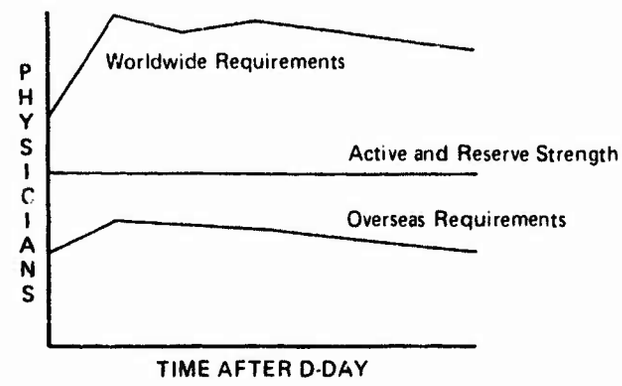


physicians are pulled out of CONUS facilities. While the services estimate these factors, their estimates are uncertain. Nevertheless, as Fig. V-3 suggests, the Military Departments project combined active duty and reserve physician strengths which will exceed (at all times after D-day) the stated aggregate DoD requirements for physicians in the European and other theaters, but fall short when CONUS requirements are included.

While aggregate physician strengths appear adequate to meet stated theater requirements, if they can be deployed in a timely manner, significant shortages in certain key specialties will almost certainly occur early in the war. For example, the Air Force can meet only 15 percent of its stated theater requirement for general surgeons and 9 percent of its stated orthopedic surgeon requirement. Similarly, the Navy could meet only 27 percent and 50 percent of its early theater anesthesiology and general surgery stated requirements, respectively. It is unlikely that new estimates will eliminate shortages of these magnitudes. *The OSD should evaluate various ways to enhance the recruitment and retention of shortage specialties into the Reserve components.*

CONUS physician requirements, as stated in service POMs, assume that all patients returning from overseas as well as all CONUS-based patients will be treated by military physicians. Since the lack of DoD beds will force most patients into non-DoD hospitals, it is not apparent that such patients need to be attended by uniformed physicians. Physician services probably will require separate agreements or contracts. Other options might include drafted or reserve military physicians attending military patients in civilian facilities. The extent to which civilian, rather than military, physicians could be used to treat military patients would reduce the stated physician requirements.

Figure V-3. DoD physician manpower requirements and capability—FY 84.



Regardless of the uncertainties surrounding CONUS physician requirements, the CONUS patient load generates physician requirements that far exceed service capabilities. Since the bulk of CONUS patients apparently must necessarily be treated in civilian, VA, or PHS hospitals, the physicians required to care for such patients need not be in uniform, but DoD-wide plans to secure access to civilian-sector resources are clearly needed.

Enlisted Manpower. The services are faced with significant shortages of enlisted medical manpower as well as physician manpower. Figure V-4 reflects the aggregate DoD shortages of enlisted medical manpower to meet overseas and CONUS requirements.

Physicians may be put in uniform and made useful with a minimum of training. Many enlisted health specialties, on the other hand, have no counterparts in civilian life. Hence, draftees must have considerable training before they can become effective, even if they are drafted from health-related civilian jobs. The services can turn civilian X-ray technicians into uniformed X-ray technicians, for example, with little technical training. No civilian job, though, teaches the skills required of a field medic or a tracked-vehicle ambulance driver. *DoD should have the Reserve components man the less transferable skills at a higher level than the easy-to-convert ones.*

Aeromedical Evacuation. Airlift requirements for the evacuation of patients from theater to CONUS substantially exceed the evacuation capability. Air crews and the kits which convert the C-141s to litter-bearing configuration both represent serious constraints. Figure V-5 shows the requirements for evacuation of patients, the lift capability, and the shortfall.

Figure V-5 is based upon the assumption that the Navy and Air Force theater hospital programs are funded and executed. Without the assets those programs provide, the evacuation deficit would be exacerbated.

Figure V-4. DoD enlisted medical manpower requirements and capability—FY 84.

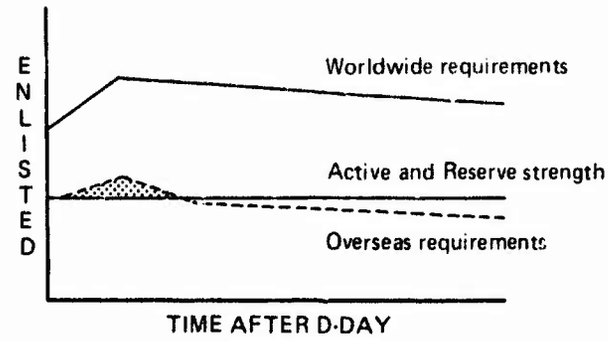
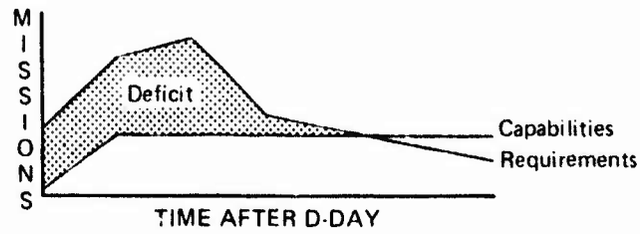


Figure V-5. Strategic aeromedical evacuation requirements and capabilities—FY 84.



The Quality of the Data. Because of differing methodologies and inconsistent assumptions, caution must be used in drawing conclusions from the foregoing analysis. Most notable among the difficulties with the data are:

- Wounded-in-action (WIA) rates are inconsistent across services. For example, during one period several weeks into the war, the Air Force WIA rate (for both air and ground crews) exceeds that of Army divisional troops.
- Physician attrition. Army and Navy physician requirements are understated to the extent that physicians themselves become casualties or are otherwise taken out of action. The Air Force methodology does allow for physician attrition.
- Methodology differences. The Army computes its physician requirements through Tables of Organization and Equipment, using standard manning requirements for each type of hospital. The Air Force computes its physician needs from simple physician-to-patient ratios, one for WIA patients, another for disease and nonbattle injury (DNBI) patients. The Navy methodology is similar to that of the Air Force, but more refined. The differences in resulting requirements are striking. For example, at one point in the war the Air Force shows a requirement for fewer theater beds than the Army but for twice as many physicians.
- Physician specialty mix. Disparities in the mix of physician specialties each service shows as required provide some of the most glaring inconsistencies. For example, one might expect to find each service requiring roughly the same number of anesthesiologists per surgeon. Yet, at one early point in the war the Navy requirements for physicians in theater yield an anesthesiologist-to-surgeon ratio of 1 to 2; the Army, 1 to 9; the Air Force, 1 to 19. (The figures exclude flight surgeons.) Either the services plan to use nurse anesthetists in widely differing ways (in which case the anesthesiologist requirements remain suspect) or the anesthesiologist requirements were in other ways inconsistently developed.

Summary

While the available POM data strongly indicate a serious wartime resource deficit, the quality of that data precludes any but the most general conclusions based upon it. The current state of medical readiness planning and programming, as evidenced by the service programs, dictates immediate OSD and JCS attention. It is evident, though, that under any reasonable set of assumptions, early in a major war the DoD will require extensive reliance on private sector hospitals and physicians. Today no plans exist to use them.

In general, the Office of the Secretary of Defense and the Joint Chiefs of Staff should take a more active part in medical resource programming. Specifically, the two offices should: (1) take the lead in developing a plan to use non-DoD hospitals in wartime, (2) improve the consistency of service planning factors, (3) either program more resources to meet theater medical requirements or shorten the evacuation policy.

THE BENEFIT MISSION

Introduction

Health care has become an essential component of competitive compensation packages among large employers in this country. At one time the military services were generally considered to offer the best medical benefit available. In recent years, though, military personnel, retirees, and dependents appear to be increasingly dissatisfied with their health care benefit. Unavailability of services, long queues, attitudes of providers, administrative mixups, and excessive costs of CHAMPUS, are among the most strident and most frequently heard complaints. Not only have civilian employers improved their health care benefit programs, but the quality of the military benefit may have eroded in absolute as well as in relative terms.

Health care tends to be viewed by the managers of the system not as a guaranteed benefit at some specified level but as a serendipitous by-product of a health care establishment that exists to maintain the health of the active duty force and to provide wartime support. Military beneficiaries, on the other hand, have come to expect a guaranteed benefit. The divergence of these two philosophies appears to explain much of the frustrated expectations and dissatisfaction.

The law provides that dependents of active-duty personnel must be cared for in military facilities *only if space is available.* Retirees and their dependents have no guarantee even if space is available. While the CHAMPUS program reimburses those who are denied in-house care for much of the cost of civilian care, the CHAMPUS program can be distinctly inferior to in-house care in financial protection, covered services, convenience, continuity, and quality of care.

This section compares the military health care benefit with that offered by the Federal Civil Service and other major employers. There is no obvious set of criteria by which the adequacy of the military benefit can be evaluated. A distinctly inferior benefit will hinder recruiting and retention; a distinctly superior one will help. But it is difficult to measure the relative superiority or inferiority of the military benefit. This

study uses three criteria for comparing military and civilian health care programs: financial protection, equity, and covered services. It identifies specific strengths and shortcomings of the military benefit and recommends improvements together with their estimated budget costs.

The reader will not find below, however, estimates of the incremental benefits to the government that such improvements will bring. The recommendations, if implemented, would enhance the attractiveness of the military health care benefit, and to the extent that the identified shortcomings now hinder recruiting, retention, morale, and esprit-de-corps, the recommendations should help. Whether the incremental benefits for the government outweigh the costs will require the judgment of the Secretary of Defense and the President, and, for recommendations that will require legislation, of the Congress as well.

The Benefit Package—How It Compares

Table V-2 compares the covered services and financial protection of the military benefit with that offered by several other major employers, specifically:

- Federal Civil Service
- Typical private firms offering
  - average plans
  - progressive plans
- Selected specific private firms
- A labor union offering a progressive plan

Health care for active duty personnel may be viewed as a benefit, but the importance lies more in the relationship to readiness. By contrast, health care for retirees and dependents is best viewed as another form of compensation to the serviceman — a form which some large employers provide in some way. This benefit is provided in the form of two types of "insurance" — the direct care "HMO" and CHAMPUS. The purpose of insurance is to limit an individual's exposure to a certain kind of risk — in this case cost of illness. Premiums for insurance are either borne solely by the individual or employer or shared between them. At present, DoD "pays the premium" for the military health care benefit. Two important characteristics of the benefits are (1) scope, i.e., what is covered, and (2) cost sharing, i.e., what part of costs the beneficiary has to pay.

Inpatient Care. Both the direct care system and CHAMPUS cover all important services for days hospitalized without limit. Private plans generally limit the number of days covered to 365 days per confinement. Others cover only the first 120 days of hospitalization. Most, however, offer inpatient covered services comparable with the military benefit.

The direct care system requires no inpatient deductible and a nominal daily cost sharing (currently $4.65 a day) for non-active-duty beneficiaries. Active duty personnel are exempt from the daily cost sharing. CHAMPUS requires dependents of active duty personnel to cost share at the same rate as the direct care system ($4.65 a day); retirees and their dependents are required to pay 25 percent of all inpatient charges. It would be an unusual private plan that required an inpatient deductible. Most major

private employers' plans require co-insurance[7] only after a specified number of fully covered inpatient days (usually 365 per confinement).

Thus, while covered services provided in the inpatient setting for all beneficiaries compare favorably with other plans, financial protection for retirees and their dependents is distinctly inferior in that a 25 percent co-insurance is required.

Outpatient care. For all beneficiaries the military outpatient benefit differs in covered services and cost sharing between the direct care system and CHAMPUS. For example, CHAMPUS does not cover immunizations and well-baby examination services generally available in the direct care system. The direct care system requires no deductible or co-payment. CHAMPUS requires both: a deductible ($50 per person, $100 per family per year) and a co-insurance (20 percent for active duty dependents, 25 percent for retirees and their dependents).

CHAMPUS-covered services closely resemble typical private plans. Deductibles in the range of $50 per person or $100 per family are common, but not universal, in other plans, as is co-insurance of 20 percent after the deductible has been met. Health Maintenance Organizations (HMOs) generally require a co-payment (usually $1 to $3 per visit) but no deductible. HMOs include routine preventive care in their covered services.

Hence, because outpatient care is essentially free to all beneficiaries in the direct care system but CHAMPUS beneficiaries pay a deductible and co-payment, the attractiveness and competitiveness of the military outpatient benefit depends upon whether the patient receives his or her care in military facilities or through the CHAMPUS program. But even the CHAMPUS program is not far out of line with progressive private plans.

Coverage and Cost Share Upon Retirement. Coverage and cost share for retirees under 65 years of age have been described above. It would be an unusual company that increased the co-insurance rate of its health plan upon retirement. It is common, however, for private plans to integrate their coverage with Medicare for retirees who are 65 years of age or older. CHAMPUS coverage terminates for military retirees when they reach age 65; there is no Medicare integration.

Catastrophic Coverage and Lifetime Limit. There is no limit on total out-of-pocket expenses that may accrue to DoD beneficiaries. The military package carries no lifetime limit above which CHAMPUS will not pay. The maximum financial risk to Federal employees (excluding premium cost) is $2000 per family per year, usually without a lifetime limit. The typical private plans place no limit on out-of-pocket expense but usually include high-cost health-care items such as inpatient services, outpatient laboratory services, and X-ray studies under the basic plan, which pays 100 percent of charges. Most private plans have an established lifetime limit. Goodyear Tire and Rubber, for example, will pay no more than $200 thousand per person; IBM and Southern Railway both limit the firm's liability to $250 thousand per family.

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[7] The term co-insurance is used here to mean a requirement for a *percentage* sharing by the beneficiary; co-payment is used to mean the requirement for a *dollar amount* of sharing. Hence, while the CHAMPUS program is not technically an insurance program, it does have co-insurance provisions.

Table V-2. —Comparison of medical benefits provided DoD beneficiaries, Federal employees, and civ

	Type of plan	Inpatient: Benefit	Inpatient: Deductible	Inpatient: Other patient cost sharing	Outpatient physician visits (home or office)[7]: Deductible	Outpatient physician visits (home or office)[7]: Other patient cost sharing	Maximum[1] out-of-pocket	Lifetime[2] limit
DOD BENEFICIARIES								
Direct Care All beneficiaries	Group practice	All services	None	$4.65/day	None	None	$4.65/day of inpatient care/ person	None
CHAMPUS – Active Duty Dependents	Modified comprehensive medical plan	All services 365 days/year	None	$25/admission or $4.65/day whichever is greater	$50/person not to exceed $100/ family	20 percent coinsurance	No limit	None
CHAMPUS – Retired and Dependents	Comprehensive medical plan	All services 365 days/year	None	25 percent of charges	$50/person not to exceed $100/ family	25 percent coinsurance	No limit	None
FEDERAL EMPLOYEES								
Blue Cross/Blue Shield–High Option	Basic plan with superimposed major medical	All necessary charges 365 days/ confinement	None	20 percent after 365 days	$100/person not to exceed $200/ family each year[B]	20 percent coinsurance[B]	$1,000 per family per year	$500,000/person inclu $50,000/person for ne mental illness
AETNA Indemnity – High Option	Comprehensive medical plan	100 percent of first $2,000, room and board	None	20 percent of room and board over $2,000, 20 percent of other hospital expenses	$75/person not to exceed $225/family per year	20 percent coinsurance	$1,000/person or $2,000/family per year	None
Group Health Association – High Option	Group practice pre-payment	All necessary services no limit	None	None	None	None, except mental health care which varies by service rendered	Sum of mental health visit charges	None
Kaiser – Northern California	Group practice pre-payment	All services 365 days/year	None	None	None	$1/office visit $3.50/home visit	Sum of visit charges	None
CIVILIAN EMPLOYEES								
Average Company	Basic plan with superimposed major medical	All services first 120 days	None	20 percent of charges after 120 days	$100/family per year	20 percent coinsurance	No limit	$20,000 – office empl $15,000 – non-office employee
Leading Edge Company	Basic plan with superimposed major medical	All services 365 days or more	None	None	$100/family per year	20 percent coinsurance	No limit	$50,000/person
Goodyear Tire and Rubber Company (self-insured)	Basic plan with superimposed major medical	All necessary charges for total of 730 days confinement	None	Max. $750/yr for X-ray, radium, and radiation	$100/person $200/family	20 percent coinsurance[B]	$50,000/year	$200,000/person
IBM	Basic plan with superimposed major medical	All necessary charges for 365 days every 3 years	None	None	$150/year[B]	20 percent coinsurance[B]	Information not available	$250,000/family

ies, Federal employees, and civilian employees

Maximum[1] out-of-pocket	Lifetime[2] limit	Coverage and cost share upon retirement	Premium Cost[3]	Choice of Plan	Dental Coverage	Custodial Care Coverage	Routine Preventive Care
$4.65/day of inpatient care/person	None	No change	None	No	Yes[4]	No	Yes
No limit	None	Not applicable	None	No	No	No	No
No limit	None	Lose CHAMPUS at age 65	None	No	No	No	No
$1,000 per family per year	$500,000/person includes $50 000/person for nervous/mental illness	Medicare B participant has no deductible or coinsurance	Self:[5] $575.90 Family: $1,240.20	Yes	No	No	No
$1,000/person or $2,000/family per year	None	Medicare A & B participant pays deductible but not coinsurance	Self:[5] $480.22 Family: $1,050.66	Yes	Yes (coinsurance varies by service rendered)	No	No
Sum of mental health visit charges	None	No change	Self:[5] $579.80 Family: $1,465.88	Yes	No	No	Yes
Sum of visit charges	None	No change	Self:[5] $404.56 Family: $1,033.76	Yes	No	No	Yes
No limit	$20,000 – office employee $15,000 – non-office employee	No change	Varies	Yes[6]	No	No	No
No limit	$50,000/person	No change	None	Yes[6]	Yes	No	No
$50,000/year	$200,000/person	$200 deductible on medical - dental coverage lapses-integrated with Medicare	None	Yes for Union local as a unit	Yes (20-50 percent coinsurance)	No	No
Information not available	$250,000/family	Integrated with Medicare	Not available	No	Yes (coinsurance varies by service rendered)	No	No

Table V-2. —Comparison of medical benefits provided DoD beneficiaries, Federal employees,

	Type of plan	Benefit	Inpatient Deductible	Inpatient Other patient cost sharing	Outpatient physician visits (home or office)[7] Deductible	Outpatient physician visits (home or office)[7] Other patient cost sharing	Maximum[1] out-of-pocket	
CIVILIAN EMPLOYEES (cont'd)								
United Auto Workers International Union	Basic plan	All necessary charges for up to 365 days confinement and 730 days nursing home care	None	None	None	Varies by type of care	No limit	
					Prenatal care, outpatient psychiatric, substance abuse, pap smears, covered by basic plan. No other outpatient physician visits covered.[8]			
Southern Railway System	Basic plan with superimposed major medical	All necessary charges	None	20 percent after first $10,000	$50/person/illness or quarter	20 percent coinsurance	Information not available	
General Motors (salaried employees)	Basic plan with superimposed major medical	All necessary charges up to 365 days confinement and 730 days nursing home care	None	None	$50 per person $100 per family	20 percent co-payment first $2,500	No limit	$25

[1] The maximum of out-of-pocket expense (for covered services only) before insurance pays 100 percent; also known as catastrophic coverage.

[2] The maximum amount of dollars the insurer will pay towards care.

[3] Family of three or more.

[4] Active duty have free dental care; retirees receive care when space is available; dependents also receive care on space available basis with routine care provided in remote areas and overseas only.

[5] Employee pays from 30 percent to 54 percent of premium depending upon plan selected.

[6] Public Law 93-222 December 29, 1973, Section 1310(a) requires employers of 25 persons or more to offer an option for membership in a qualified H.M.O. in the area in which such employees reside.

[7] Includes services such as diagnostic X-ray and laboratory, outpatient surgery, etc.

[8] Services in footnote 7 are paid in full.

aries, Federal employees, and civilian employees (cont'd)

nt g	Maximum[1] out-of-pocket	Lifetime[2] limit	Coverage and cost share upon retirement	Premium cost[3]	Choice of plan	Dental coverage	Custodial care coverage	Routine preventive care
f ic ts	No limit	None	Integrated with Medicare	Family: $2,366.06	Yes	Yes (coinsurance varies by service rendered)	No	No
	Information not available	$250,000	Integrated with Medicare	Self: $282.96 Family: $947.04	Yes	Yes (20-50 percent co-insurance after deductible)	No	No
	No limit	$25,000 per year	Integrated with Medicare	$2,040.00	Yes	Yes (coinsurance varies with service rendered)	No	No

h remote erees and overseas only.

Inasmuch as retirees and their dependents are required to pay 25 percent of inpatient, laboratory, and X-ray charges without a limit on total out-of-pocket expenses, financial protection offered to this beneficiary group by CHAMPUS is inferior to that offered to Federal civilian employees. On the other hand, many plans, particularly HMOs, mirror the military policy of no lifetime limit.

Premium Sharing. Military beneficiaries pay no premiums. In the most generous private plans the employer pays the entire premium. It is more common for the employer to pay the part of the premium that goes for the employee's health care, requiring the worker to pay the premium for his dependents. The Federal government shares premium costs with its civilian employees.

Summary. The covered services offered by the CHAMPUS benefit package are in line with those offered by leading plans reviewed. The covered services offered within the direct care system are broader than in CHAMPUS but are not always available. Financial protection offered by the CHAMPUS benefit package is inferior for retirees when compared with other plans; on the other hand, no premium charge is assessed. The free outpatient care and modest co-payment required of inpatient care in the direct care system makes the direct care package highly attractive. However, access to direct care is limited.

Truth in Advertising the Benefit Package

Regardless of the quality of an employer's health care plan, frustration and dissatisfaction are likely to result if it is oversold to prospective employees.

A review of military recruiting literature distributed in the past few years reveals vagueness as to precisely what constitutes the military health care benefit and what degree of financial protection is offered. In some cases the literature promises "free" health care for the service member or retiree and his family, but the law has never guaranteed such a benefit. As shown above, military health care is not free, particularly for retirees. Survey data and other studies show that beneficiaries' expectations are frequently frustrated.

Inaccurate, vague, or misleading recruiting and advertising literature appears to have contributed substantially to false expectations and beneficiary frustration. *Immediate action should be taken to communicate accurately: (1) covered services and (2) financial protection. Active duty personnel and retirees should be the targets of periodic information programs to ensure accurate understanding of their benefit package.*

Recommendations to Improve Competitiveness

Maximum Out-of-Pocket Expenses. The lack of a cap on out-of-pocket expenses appears to be an important shortcoming of the existing benefit package. *A limit should be instituted on annual maximum out-of-pocket cost per year. Amounts in the neighborhood of $1000 per person and $2000 per family would appear reasonable and consistent with the Federal employees program.*

This change is estimated to cost $74 million for FY 1980 (assuming a 10 percent inflation rate).

Such a cap would also mitigate the cost to retirees when they participate in the CHAMPUS program rather than the direct-care system.

The Deductible and Co-Insurance Provisions. Two features of the CHAMPUS program, deductibles and co-insurance — both absent in the direct care system — were designed to inhibit unnecessary demand, and to decrease administrative costs by avoiding the processing of large numbers of small claims.

The effects of the deductible are hard to determine for CHAMPUS. Studies using non-CHAMPUS plans suggest that removing the deductible will raise demand.[8] Assuming no increase in demand, removing the CHAMPUS deductible would cost about $45 million more per year. With the probable increases in demand, the cost would be greater. Because of its probable demand-limiting effects, elimination of the CHAMPUS deductible is not recommended.

Co-insurance features have been shown by recent research to effectively reduce utilization.[9] If the results of such research were applied to the military system, a 15 percent co-insurance charge for direct-care outpatient visits, which are now free ($3 per visit at 1977 OMB interagency rates), would reduce visits by 7.5 percent and generate about $74 million in revenues. The savings from reduced visits in the direct care system is a function of incremental cost. An incremental cost equal to 20 percent of the average cost would save about $8 million, putting the total savings at $82 million. If incremental cost equals average cost, the total savings would be $113 million. Assuming the cost of administration to be $6 million, net estimated cost savings from such a co-payment charge would fall between $72 and $107 million.

Because such a change would be viewed in isolation from all the other study recommendations as an erosion of benefits, it is important that the recommendation below be considered as part of a comprehensive package of changes.

To provide a more equitable benefit between those able and not able to use the direct system and to stem unnecessary utilization in the direct-care system, a nominal charge ($3 per visit) for direct-care outpatient visits should be instituted. Active duty personnel should be exempted from such charges.

Well-Baby Care and Immunizations. Preventive services for children, particularly well-baby exams and immunizations, are recognized by the medical community to be both medically and economically sound. Their exclusion under CHAMPUS creates an inequity for those parents who do not have direct care available.

Concern for overutilization would be allayed by carefully defining the upper limits of the benefit, e.g., coverage using American Academy of Pediatrics schedule for well-baby exams and immunizations for children under two years of age. Annual costs

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[8] Joseph P. Newhouse, John E. Rolph, Brant Mori, and Maureen Murphy, *An Estimate of the Impact of Deductibles on the Demand for Medical Care Services*, The Rand Corporation, R-1661-HEW, 1979, pp. 32-34.

[9] Joseph P. Newhouse, *Insurance Benefits, Out-of-Pocket Payments, and the Demand for Medical Care: A Review of the Literature*, The Rand Corporation, P-6134, 1978, pp. 5-7. In another report (R-2167-HEW), Helms, Newhouse, and Phelps conclude that *for a welfare population, facing free inpatient care*, the imposition of outpatient charges would increase inpatient utilization and increase total program costs. Newhouse considers this report inapplicable to military beneficiaries because: (1) We are not dealing with a welfare population, and (2) beneficiaries face a $4 65 a day inpatient charge rather than totally free care.

of including this coverage in CHAMPUS are estimated to fall between $9 and $12 million.

CHAMPUS should be expanded to include well-baby exams and immunizations up to two years of age using the American Academy of Pediatrics recommended schedule for benefit definition.

Extension of CHAMPUS Eligibility to Retirees and Their Dependents 65 Years of Age and Older. To bring the benefit package into line with the Federal employee program and other private plans, *CHAMPUS eligibility should be extended to retirees and their dependents 65 years of age and older with Medicare designated as first payer.* In effect, this would extend the cap on out-of-pocket costs for covered services to retirees and their dependents after their 65th birthday. Costs associated with this recommendation are estimated to be $28 million if beneficiaries are required to buy Part B Medicare for eligibility or $59 million if DoD pays the Medicare Part B premium.

Dental Coverage. Active duty personnel receive a full range of dental services in military facilities. Retirees may receive the same level of care when space, facilities, and staff are available. Dependents may also receive this level of care when they are overseas or in CONUS locations where adequate civilian facilities are unavailable. In all other areas dependents may receive emergency care and care which is an adjunct to medical, surgical, or preventive treatment. As in the case of retirees, all care to dependents is provided on a space-available basis. CHAMPUS excludes routine dental care.

National trends seem to be catching up with the military dental benefit. A growing number of private employers offer a dental package. In 1965 only 1.9 million persons in the United States were covered by dental insurance. In 1977, the figure was 48 million.[10]

A comparison of two Conference Board surveys, administered in 1972-73 and in 1975, and Hay-Huggins surveys for 1977 and 1978 suggests that employers' provision of some form of dental insurance is quickly changing from a "leading-edge" practice to the norm:

	Conference board			Hay-Huggins	
	1972-73		1975	1977	1978
	Office	Non-office			
Presently providing dental insurance (percent)	9	13	19	39	44

Source: Mitchell Meyer and Harland Fox, *Profile of Employee Benefits* (New York: The Conference Board, 1974) Chapter 2; The Conference Board, *Dental Insurance Plans*, 1976; Hay-Huggins, *1977 Non-Cash Compensation Comparison* (Hay Associates, 1977) Section V; Hay-Huggins, *1978 Non-Cash Compensation Comparison* (Hay Associates, 1978) Section V.

[10] American Dental Association, *Fact Sheet: Dental Insurance*, updated.

According to the 1978 Hay-Huggins Survey, dental insurance plans offered by employers tend to be separate plans (71 percent) as opposed to being included in the major medical or comprehensive health care plans (29 percent). Typically, the employer pays full insurance cost for the employee (83 percent) and dependents (68 percent). Over 95 percent of dental insurance plans cover preventive care, fillings, extractions, and endodontia; between 90 and 95 percent cover inlays and crowns, periodontia and prosthodontia; about six out of ten cover orthodontia.

Reasonable and customary fees were identified as the basis for payment of dental expenses in eight of ten dental plans. In about half the plans, beneficiaries pay a separate deductible for dental services. About three in ten have no dental deductible, and the balance include dental expenses in the overall medical deductible. For plans with a separate dental deductible, the deductible amount is $25 per person in half the plans and $50 per person in about two-fifths of the plans. Over half the plans set a maximum family deductible at between $50 and $100 per year. Co-insurance rates typically vary by procedure, with the insurance plan most frequently paying 80 percent of costs for preventive care, fillings, extractions, endodontia, and periodontia and 50 percent of costs for orthodontia, inlays and crowns, and prosthodontia. Virtually all dental plans (94 percent) set an individual maximum payout for dental care at $1000 per year and $5000 per lifetime.

The cost of providing a comparable dental insurance package to active duty dependents is estimated at $139 million in FY 1980.

To remain competitive, at some point in the future DoD will have to include in CHAMPUS coverage dental care for dependents of active duty, with appropriate payout limits and cost-sharing provisions. Given its cost, this change should be undertaken only after the earlier recommendations have been implemented.

CHAMPUS Administration. While the DRMS has gathered no supporting data, anecdotes abound concerning the slowness with which CHAMPUS pays claims. CHAMPUS claim processors are able to process a claim in approximately 13 days. This is of little value if a beneficiary has to submit each claim two or three times (due to beneficiary or processor errors) before payment is received. Slow payment clearly is burdensome to the individual beneficiary. Further, it may partially explain the reluctance of physicians to participate in the CHAMPUS program.

A further irritant is the cumbersome paperwork CHAMPUS requires. The newly adopted claim form still requires the beneficiary or sponsor to fill out 18 separate items each time a bill is submitted. The DRMS has not evaluated the seriousness of this problem; *the ASD(HA) should look into the problem and resolve it.*

Reimbursement Methodology. CHAMPUS reimburses individual physicians (or the patient who used the physician services) on the basis of a system established for Medicare. According to the CHAMPUS regulation, physicians may be reimbursed up to *the lower of:*

- The billed charge;
- The customary (median) charge for similar services by the particular physician;

- The 80th percentile of prevailing customary charges for similar services in the same locale (physician customary charge profiles are updated in July using information on physician charges billed for services rendered during the previous calendar year); or
- Applicable charges for policyholders or subscribers of the contractor under comparable circumstances.

The regulation does allow the ASD(HA) to authorize CHAMPUS contractors to develop alternate methods if the methods will produce reasonable control equal to the above method *and* assure a high level of acceptance by providers.

The third criterion, the 80th percentile of prevailing customary charges, has been the subject of a great deal of controversy within the DoD. In 1976, the percentile was set at 75, the same as Medicare. Many beneficiaries complained that physicians would not accept payment at the 75th percentile and that as a result beneficiaries were forced either to find a physician who would accept such payments or pay the difference between the physician's actual fee and the 75th percentile out-of-pocket. As a result of the public debate the Congress, in its FY 79 legislation, raised the schedule from the 75th to the 80th percentile. Medicare still pays at the 75th percentile.

Beneficiaries are further dissatisfied with the formula used to determine physician customary charge profiles, because it pays from a schedule of fees that is an average of 18 months out of date. Inflation between the time the schedule was prepared and the time physician services are rendered is not taken into account. Hence, the schedules are artificially low. It is currently held by many that this also has contributed to a decrease in physician participation in CHAMPUS.

The DRMS has been unable to substantiate that either the percentile change or the formula has contributed to a decrease in participation by physicians. Unfortunately, CHAMPUS data do not allow participation rates to be determined, and therefore cannot be used to validate a decrease, if any, in participation.

It is financially advantageous for beneficiaries to have participating physicians available. *Therefore, the DoD should develop a greater understanding than this report can provide of the variables which affect physician participation before making further changes designed to increase physician participation.*

Beneficiary Choice of Plan. The direct-care system, constrained by physician and other manpower levels as well as by dollars, will never be large enough or well enough distributed geographically to satisfy all beneficiary demands. Since the CHAMPUS program imposes more out-of-pocket costs on the beneficiary than the direct care system, those who are unable to avail themselves of direct care, for whatever reason, may feel they are treated inequitably. The same package is valued differently by different individuals. Many major employers, including the Federal Civil Service, offer a choice of plans to more nearly accommodate the circumstances and tastes of their employees.

Feelings of inequity would dissipate if beneficiaries were allowed to choose among non-DoD health care programs such as those offered to other Federal employees. *The recent OSD/OMB/HEW Military Health Care Study recommended that DoD consider a test of the concept of offering all non-active-duty beneficiaries in a particular*

region the option to enroll in their choice of health care plans available locally. That recommendation, never implemented by DoD, should be tested in two regions. A beneficiary choice will not only to relieve the pressure of excess demand and to enhance beneficiary satisfaction, but will help introduce an element of competition into the direct-care system. Because patients are captives, the system today lacks institutional incentives for patient satisfaction. A test would allow the DoD medical system to assess the extent of problems associated with relaxing the captive nature of its clientele.

Such a test should require beneficiaries opting for another plan to share in the premium cost as civil servants now do. Without such a provision, many eligible beneficiaries, particularly retirees (51 percent of whom are now enrolled in other plans) might migrate toward a potentially more lucrative plan, increasing DoD health care costs.

Offering a choice is also consistent with national policy. The 1973 Health Maintenance Organization law (P.L. 93-222) requires all employers of more than 25 persons to offer an HMO as a choice.

Continuity of Care. The bifurcation of the health care system into CHAMPUS and direct care allows patients to switch or to be switched from one branch of the system to the other, potentially resulting in harmful or demoralizing discontinuities of care.

Current regulations prohibit military physicians from making direct referrals. Hence, if a local military clinic or hospital lacks the necessary services to treat a beneficiary's illness, the military physician must either refer the patient to a military hospital that offers the required service (even if the hospital is far away from the patient's home), allow the patient to find his own care in the local community without referral advice, or attempt to persuade his or her commanding officer to have the clinic or hospital pay for the civilian referral. In the latter case, there is little advantage to the commanding officer to pay for the care out of his or her own funds when CHAMPUS will pay. In the other cases, the patient suffers. The patient either must be uprooted from home for treatment or must find the right physician or hospital, perhaps in an unfamiliar locale to which the patient happens to be assigned. If the patient chooses to seek local care, the patient may never be referred back to his or her primary military physician, further inhibiting continuity.

Two partial remedies appear to be in order:

- *A referral system should be developed to insure that patients seeking private-sector care under CHAMPUS find the right providers and that the patients are encouraged to return to the referring military physician for follow-up.*
- *The OSD should establish the necessary policies and procedures to permit hospital and clinic commanders to contract locally with civilian providers (on a prenegotiated fee schedule or a capitation basis, using CHAMPUS as the source of payment) for certain types of care now referred to other military hospitals.*

Such a change would benefit those patients now uprooted for treatment at distant military facilities, would reduce the cost of transporting the patients, would enhance the

continuity of care, and would encourage cooperation between the direct care system and CHAMPUS.

IMPLICATIONS OF THE TWO MISSIONS

While readiness and health benefits are to a considerable extent jointly produced in the current system, incremental changes to the current size of the direct-care system to enhance one mission probably will have little effect on the other.

In particular, the wartime mission indicates a need for more orthopedic, thoracic, and general surgeons than are on active duty or in the Reserve components.

Large numbers of additional surgeons in the active force would help solve the wartime surgeon shortages but would not help much in providing for more peacetime care in military hospitals; an enlarged peacetime operation requires a physician increment heavy in pediatricians, obstetricians, and family practitioners—specialties already in excess supply for the early overseas wartime requirements, which must be met with physicians who are on active duty in peacetime. This is not to say, however, that more surgeons could not be used in peacetime; nor is it to say that primary care physicians are useless in wartime. It is to say that the wartime and peacetime missions dictate very different mixes. The differences are most pronounced between the early theater wartime requirements (which must be met primarily with active duty physicians) and the peacetime requirements. Table V-3 displays the differences.

Hence, in order to enhance DoD's capability to meet its early theater requirements, two broad options, in addition to shortening the evacuation policy, could be considered: (1) Increase the size of the active duty force and bring CHAMPUS workload in-house, an option that would require predominantly primary care physicians who could be used in other specialties in wartime, and/or (2) increase the number and readiness of Reserve surgeons and other specialties that are in short supply. The first option — enlarging the peacetime active force, mostly with primary care physicians — would:

- Reduce CHAMPUS costs and increase in-house costs. It is not clear whether a net increase or decrease would result.
- Require additional physician pay, bonuses, or other incentives to attract and retain more physicians.
- Require additional nurse and enlisted manpower to support the added physicians. This would require an increased service end strength or a reallocation of manpower from combat or other support programs.
- Necessitate the use of many of the added primary care physicians as surgeons or other specialists during wartime.
- Require peacetime training of primary care physicians in the surgical or other skills they would need in wartime. Such training would detract from time spent on patient care.

The other option, increasing the number of Reserve physicians in theater shortage specialties, would:

Table V-3.—Comparison of DoD wartime and peacetime physician specialty distribution[1]

	Wartime requirements at D+30 (percent)		Projected peacetime inventory (percent)
	CONUS	THEATER	
Surgeons[2]	41.0	45.4	12.1
Pediatricians, OB/GYN and Family Practioners	4.7	3.6	20.4
General Medical Officers and Flight Surgeons	12.5	21.5	20.8
Other[3]	41.8	29.4	46.7
Total	100.0	100.0	100.0

[1] Excludes residents and interns. Reference May 1978 POM. Data for FY 84.

[2] Includes General Surgeons, Neurosurgeons, Plastic Surgeons, Thoracic Surgeons, Orthopedic Surgeons, Cardiac Surgeons, Colon and Rectal Surgeons and Peripheral Vascular Surgeons. Does not include Flight Surgeons.

[3] Includes all other physician specialties found in the active force or identified in the stated requirements.

- Require additional pay or other incentives to attract more physicians to join and remain in the reserve.
- Provide a physician specialty mix more closely matched to wartime requirements.
- Avoid the requirement for increased support manpower in the active force.
- Provide no significant delivery of health care in peacetime.

Hence, there are advantages and disadvantages to both means of reducing wartime physician deficits. Reserve physicians in the right surgical specialties have an advantage over active duty primary care physicians serving out of their specialty. On the other hand, active duty physicians may save the government peacetime money by providing care in-house rather than through CHAMPUS.

The DRMS has not evaluated the tradeoffs among these two options and the option of reducing the evacuation policy combined with greater reliance on civilian resources in wartime. Professional judgment is required to estimate the seriousness of using primary care physicians in other specialties.

Nevertheless, the service programs indicate that early theater shortages in certain specialties do exist. How best to solve the problem is still an open question deserving concerted attention by the OSD, JCS, and services.

Physician Levels

The foregoing discussion serves as a prelude to a broader discussion of physician requirements, assets, and shortages. The service programs, summarized in Table V-4, indicate that between the end of FY 79 and the end of FY 84 their active duty physician levels will increase by just over 600, with the Army anticipating the largest gain. While there is some uncertainty surrounding asset projections, the other variable in shortage computations, the requirement is far more complex and open to argument.

Statements of active duty physician requirements to meet wartime requirements should take into account:

- The degree to which wartime patients can be treated by civilian or reserve physicians in private sector or other Federal hospitals,
- The ability of the Selective Service System to provide drafted physicians,
- Reserve physician capabilities to fill overseas and CONUS requirements, and
- Evacuation policy.

The DRMS notes that not only are the above factors in question but, as shown earlier in this chapter, there is reason to question the methodology and assumptions that underlie current statements of wartime physician requirements.

Statements of peacetime physician shortages should be evaluated in light of:

- The extent to which the number of physicians devoted to graduate medical education programs rather than direct patient care could be lowered through: (1) programs to enhance physician retention (and therefore reduce the need for graduate medical education) or (2) greater reliance on graduate medical education in civilian institutions.

Table V-4.—Projected active duty physician end strengths

	FY 79	FY 84	Change
Army	4,173	4,746	+573
Navy	3,687	3,670	- 17
Air Force	3,420	3,471	+ 51
DoD	11,280	11,887	+607

- The extent to which administrative and command positions can be converted to non-physician spaces.
- The relative cost and acceptability of providing care through an enhanced CHAMPUS program or alternative health care plans.
- The extent to which physician extenders can enhance the productivity of the physician force.

Some recent DoD work sheds light on the potential for use of physician extenders. In most military hospitals, the bulk of the out-patient workload is seen in the clinics dispensing primary care, including basic internal medicine, pediatrics, and obstetrics. For the delivery of these types of services, the direct care system does not have to rely entirely on physicians. Nurse practitioners have been working in the areas of pediatrics and obstetrics for some time in military hospitals, as in the civilian sector. More recently, physician extenders and primary care nurse practitioners have been trained to handle many of the more straightforward problems in adult medicine. Recent experience in the Air Force shows that the direct care system can deliver high quality primary care to its patients by utilizing physician extenders more heavily and physicians less heavily.

Several Air Force hospitals have participated in a two-year demonstration project designed to evaluate a more intensive use of physician extenders. Primary medical services were delivered by teams of practitioners, each team typically comprising one physician and two or three extenders. This system allowed the clinics to operate effectively, and achieved good patient acceptance. An investigation of the quality of care delivered by the physician extenders has shown that it compared favorably with standards set by the physicians.

If this limited Air Force experience is applicable across the Services, it would be possible to reduce the need for primary care physicians by more than 1000 below the number of physicians required with no extenders at the cost of 1.5 to 2 times that number of physician extenders.

To summarize, the DRMS can not attest to the validity of physician shortages; neither can it confidently refute them.

Nevertheless, military physician strengths will surely be undermined by:

- The relative unattractiveness of the Armed Forces Health Professions Scholarship Program (HPSP) compared with HEW's National Health Service Corps Scholarship Program. HEW stipends increase with inflation; DoD stipends do not. HEW students may receive grants up to $25,000 when they set up practice; DoD students receive none (DoD students obviously need no funds to set up military practices; to offer DoD students a grant to set up a civilian practice after leaving the service would provide a perverse retention incentive). HEW students may be obligated only to practice as civilians in underserved areas; DoD students must serve as uniformed military physicians. HEW students are guaranteed 3 years of postgraduate time for internship and residency. All DoD graduates serve internships, but only half have the opportunity for residency. Also, DoD scholarship graduates are not entitled to any of the bonus or other supplemental pay provided to other DoD physicians. While

the DRMS has not evaluated alternatives for enhancing the program, it clearly requires improvement. Further, the HEW program offers a lucrative source of reserve physician manpower. HEW contracts could be amended to require graduates to serve two or three years in the reserve components, subject to an active duty call only in wartime.

- Physician pay levels. In 1975, the limit on physicians' Variable Incentive Pay (VIP) was raised to $13,500 a year. Three years of inflation has eroded its value. Further, the earnings of civilian physicians are increasing faster than military pay levels.
- Physician pay stability. Because VIP and physician's special pay require periodic legislation, uncertainty is introduced into physician expectations. A more stable legislative package could remove some of the uncertainty and perhaps enhance physician retention.
- A lack of incentives for physicians to affiliate with or remain in the Reserve components.

Physician Training

During the course of this study it was found that, *despite Service plans for extensive wartime cross-utilization of physician specialties, there exist only the most meager peacetime training programs to prepare physicians for their wartime medical tasks. Even physicians who will serve in their primary specialty receive little, if any, training in the wartime-unique aspects of their specialty. The situation requires attention. The use of civilian trauma and burn centers should be pursued to help with the peacetime training of DoD physicians for some of their wartime-required skills. Extra training time clearly detracts from routine daily patient care, yet the health care system must balance its resources to best accomplish both its readiness and benefit missions. Both are important.*

ORGANIZATION AND MANAGEMENT

Several of the numerous previous studies of military health care have recommended some form of consolidation. Energy expanded in the ensuing debate has tended too often to divert attention from other more important issues. The DRMS has not taken up the consolidation question on the grounds that it is not the right place to start; more fundamental questions dealing with roles and missions require attention before the value of consolidation can even be assessed. Moreover, it is difficult to show that either regional commanders or a central DoD agency would substantially improve the efficiency or effectiveness of the health care system, or to show that they would not.

This may well be another question on which the two missions pull in opposite directions. With the benefit mission solely or primarily in mind, consolidation, perhaps even the creation of a single, unified DoD health care agency, seems attractive. But with the readiness mission primarily in mind, the current decentralized system, more closely linked to the deploying forces, seems better. With the realization that desirable objectives can often conflict, *the DRMS opts for a more concerted effort to pursue*

both missions through the current, decentralized system. If the recommendations made earlier in this study are implemented and the system does not improve enough, then the question of consolidation should be reopened.

Nevertheless, *stronger leadership and more aggressive management by the Secretary of Defense, the Assistant Secretary of Defense (Health Affairs) and the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics) are clearly warranted.* Analysis of the service programs shows that wartime medical planning is inconsistent across services. A further serious problem, not entirely unrelated to the lack of top management attention, is the absence of useful management information.

The OMB/DOD/HEW 1975 Study noted that "the MHSS is handicapped by lack of adequate population, workload, and cost data and comparable information systems for the Military Department." The Senate Appropriations Committee, in discussing the Tri-Service Medical Information System (TRIMIS) program, cited a General Accounting Office report which stated, "A lack of medical standard data elements and codes among the services (is) a situation which greatly complicates efforts to design and implement a standardized system." A 1977 study on health facility acquisition stated, "Lack of population definition has resulted in an inability to accurately define or project the size and health characteristics of the population at risk." Such defects continue. They inhibit attempts at both planning and program monitoring, and should be corrected.

The following activities in progress could improve the situation:

- A task force that is working on standardization of data elements and codes.
- An enrollment feasibility study. *(Enrollment is clearly feasible and helpful for management; DoD should implement an enrollment system without delay.)*
- An ongoing contract to develop a Defense Medical Management Information System, resolving existent data differences among the individual services.
- A Health Resources forecasting model, designed to predict demand, that is under development.
- A Uniform Chart of Accounts that has been designed but not yet implemented.

Completion of these activities would mark real progress in management information. They simply proceed too slowly; most have been on the agenda for years. Strong and determined efforts will be required to complete their development and evaluation, and to put the effective ones into use in both planning and program management.