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The mission budget concept offers significant potential for alleviating problems with the way the Federal budget is currently presented and the limitations it imposes on congressional review. The common complaint with the present system is that Congress gets a great mass of detail but not a coherent picture of what the money is for and why it is needed. A mission budget structure links an agency's basic responsibilities, or "missions," to its activities and their proposed funding. Descending levels of the structure then focus more sharply on specific purposes, needs, and programs to satisfy them. Recommendations: Congress should begin to experiment with mission budgeting in carrying out its budget review, authorization, and appropriation functions because the concept has significant potential for: helping the President and Federal agencies formulate budgets according to end purposes, needs, and priorities; strengthening congressional policy review and program oversight; achieving greater public accountability in the use of Federal funds; providing one budget system oriented to both executive and congressional needs; clarifying mission responsibilities of the Federal agencies and keeping them relevant to national policies and needs; and serving as a structural foundation for "zero-base" and "sunset" reviews as well as for governmental reorganization. (Author/SC)

REPORT TO THE CONGRESS

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

Mission Budgeting: Discussion And Illustration Of The Concept In Research And Development Programs

GAO is recommending that the Congress begin to experiment with a new concept called "mission budgeting" in carrying out its budget review, authorization, and appropriation functions because the concept has significant potential for:

--Helping the President and Federal agencies formulate budgets according to end purposes, needs, and priorities.

--Strengthening congressional policy review and program oversight.

--Achieving greater public accountability in the use of Federal funds.

--Providing one budget system oriented to both executive and congressional needs.

--Clarifying mission responsibilities of the Federal agencies and keeping them relevant to national policies and needs.

--Serving as a structural foundation for "zero-base" and "sunset" reviews as well as governmental reorganization.

Traditional budgeting focuses on *how* public monies are to be spent. Mission budgeting, first, answers the questions: *What* are the monies for? *Why* are they needed? And then, *how* are they to be spent?

Three of the largest fiscal year 1978 research and development funding requests (energy, defense, and space) are used in the report to discuss the concept and illustrate how it works.

PSAD-77-124

JULY 27, 1977

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-160725

To the President of the Senate and the
Speaker of the House of Representatives

This report discusses and illustrates a new concept called mission budgeting, using energy, defense, and space research and development budgets. It also presents matters for the Congress to consider in deciding whether the mission concept should be used to review, authorize, and fund Federal agency budget requests.

Our review was made pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), the Accounting and Auditing Act of 1950 (31 U.S.C. 67), and the Congressional Budget Act of 1974 (88 stat. 297).

The mission concept, if adopted, will have an impact on the formulation and presentation of the President's budget and on budget justifications of the Federal agencies. It could also be a structural foundation for "zero-base" budgeting, congressional "sunset" reviews, and governmental reorganization. We are therefo[illegible]ending copies of this report to the Director, Office of Management and Budget, and the Secretary of the Treasury.

Copies are also being sent to the Director, Congressional Budget Office, and the heads of departments and agencies whose budgets are used to illustrate the mission concept.

Comptroller General
of the United States

COMPTROLLER GENERAL'S REPORT TO THE CONGRESS

MISSION BUDGETING: DISCUSSION AND ILLUSTRATION OF THE CONCEPT IN RESEARCH AND DEVELOPMENT PROGRAMS

D I G E S T

There has been growing concern in the Congress about the way the Federal budget is presented and the limitations it imposes on congressional review. The common complaint is that the Congress gets a great mass of detail, not a coherent picture of what the money is for and why it is needed. (See p. 1.)

Similar concerns have been expressed elsewhere. Several distinguished groups have complained that purposes of funding requests are too obscure in the present budget. (See p. 2.)

To alleviate these problems, a congressional Commission on Government Procurement recommended a new concept called mission budgeting. (See p. 3.)

At congressional request, GAO is following up on the Commission's recommendations. Also, the 1974 Budget Act charges GAO to help the Congress meet its budgetary information needs.

Fiscal year 1978 research and development (R&D) budget requests in three major national areas of need (energy, defense, and space) are converted to a mission approach to illustrate the impact of this new concept on congressional budgeting. (See pp. 29, 44, and 67.)

THE MISSION CONCEPT

A mission budget structure links an agency's basic responsibilities, or "missions," to its activities and their proposed funding. Descending levels of the structure then focus more sharply on specific purposes, needs, and programs to satisfy them. Mission budgeting is both a top down and a bottom up approach.

The first thing a mission budget does is to focus the congressional budget process on policy review; it then reinforces this policy review with a new approach to program oversight.

Congressional policy review

Policy decisions determine the broad thrust of Federal actions and are made by executive agency administrators, the President, and the Congress. (See p. 9.)

Traditional budgets draw congressional attention to unrelated agency activities and their detailed management and funding and away from the end purposes of the activities and policy decisions.

Mission budgets direct congressional attention to:

--Agency end purposes and their consistency with national policy.

--Agency roles, responsibilities, and approaches for carrying out the missions.

--Agency current performance capabilities, needs, priorities, and other matters. (See pp. 10 and 26.)

Mission budgets also direct congressional attention to the funding that is appropriate for each mission. Funding of particular missions can be raised or lowered in accordance with congressional views of the mission's relevance and importance to national needs (their worth) and in accordance with the agency's current capability to perform the missions. (See p. 11.)

Congressional judgments on mission funding levels are then refined through oversight of specific programs.

Congressional program oversight

When an R&D program first emerges into view as a line item in the present budget, crucial decisions have been made and the program is well underway. The solution to the need has been decided and development, procurement, and downstream operating costs are predetermined. The program already has momentum. At this

point, few decisions are open to the Congress. The review of program management details thus becomes the principal oversight activity. (See pp. 1, 2, and 13 to 15.)

In mission budgeting, linkage is established between an activity proposed for funding and an agency mission. This linkage is the "mission need." When funding the need, the Congress authorizes the start of a new R&D program. By entering the picture this early, the Congress can assess the need and its priority well before the program acquires momentum. (See pp. 11, 14, and 15.)

Also, by funding a need expressed in mission terms rather than a specific activity, mission budgeting stimulates exploration of differing and innovative solutions to Government problems. It funds competition early when the cost is relatively small but, because of the magnitude and ultimate impact of early decisions, the benefits will be maximized. (See p. 15.)

When the most promising approach is chosen for development, it would represent a line item and be subject to the same congressional controls as today. (See p. 19.)

In mission budgeting, a base of new technological knowledge is funded separately from specific programs. By clearly segregating the funding of these two, there can be sustained support for developing new knowledge for future innovation while guarding against the use of technology base funds to predetermine solutions of new programs and lock-out competition. (See pp. 13 and 14.)

Mission budgeting would also permit the Congress to focus on few critical decisions which are major turning points in the evolution of any new program. The Congress could evaluate progress at these turning points as a basis for funding the program's next step. (See p. 16.)

In traditional budgets, programs with common purposes are scattered under various organizational, product, and technology

groupings. In mission budgeting, programs with common purposes will be grouped together.

Program overlap--whether intentional or not--would be more evident. The new visibility would extend down through the agency organization and across to other Federal agencies having similar missions. (See pp. 10 and 11.)

OUTSIDE VIEWS

Executive branch views on the mission concept, as well as those of some outside observers, both pro and con, are summarized in appendix IV.

PRELIMINARY ACTIONS

Two congressional committees have taken up the mission idea; the Congressional Budget Act calls for a presentation in the President's budget of agency missions by national needs starting next year; and Federal agencies are now required to procure new major systems on a mission basis. (See p. 27.)

RECOMMENDATION TO THE CONGRESS

The mission budgeting concept offers significant possibilities. GAO is recommending that the Congress begin to experiment with the concept in carrying out its budget review, authorization, and appropriation functions because:

--Mission budgeting would help the President and Federal agencies formulate and present budgets according to their end-purpose responsibilities, priorities, and needs.

--Mission budgeting groups and would help to coordinate or reorganize Government agencies and functions according to major purposes.

--Mission budgeting would strengthen congressional policy review and oversight of Federal programs.

--With mission budgeting, agencies can be held accountable for end-results achieved, that is, for the level of mission performance funded by the Congress. (See p. 26.)

--Presently, some agencies use one budget system for management purposes and another for the Congress. Mission budgeting can satisfy both executive and congressional needs. (See p. 26.)

--Mission budgeting encourages periodic congressional reviews to clarify what agency mission responsibilities are or should be, in view of changing national policies and needs. (See p. 26.)

--The President has asked executive agencies to develop a "zero-base budgeting" system and the Congress is actively considering "sunset" legislation. These new initiatives are compatible with and could be reinforced by a mission budget structure. (See pp. 23 to 25.)

A prudent course of action might be to test the concept's practical application and usefulness initially on a small scale. (See p. 28.)

The Office of Management and Budget believes further exploration of the mission concept is desirable but is reserving official comment pending congressional action. (See p. 28.)

Contents

GLOSSARY

Mission	A basic end purpose of an agency.
Mission area	Any subordinate purpose, sub-mission, part, or segment of an agency's mission expressed in end-purpose terms.
Mission need	A deficiency in or a better way of achieving the desired level of mission performance expressed in end-purpose terms.
Program	Generally defined as an organized set of activities directed toward a common purpose, objective, or goal undertaken or proposed by an agency in order to carry out responsibilities assigned to it. In practice, however, the term "program" has many usages and thus does not have a well-defined standardized meaning in the legislative process. "Program" has been used as a description for agency missions, "program," activities, services, projects, and processes.
Acquisition or research and development program	An organized set of activities directed toward developing or acquiring a new capability to meet a mission need.
Acquisition or research and development program goals	Desired results of an acquisition or research and development program expressed as a capability needed, time required, and cost-worth within which alternative solutions can be explored to meet a mission need.

ABBREVIATIONS

DOD	Department of Defense
ERDA	Energy Research and Development Administration
GAO	General Accounting Office
NASA	National Aeronautics and Space Administration
OMB	Office of Management and Budget
R&D	Research and Development

CHAPTER 1

CONCERNS ABOUT FEDERAL BUDGETING

In recent years, Senators and Representatives alike have increasingly voiced concerns about the presentation and congressional review of the Federal budget. Similar concerns have also been expressed by others outside the Congress.

CONGRESSIONAL

Some Members of Congress feel the budget is not a useful document. They express frustration with the type of information included and with the way it is presented. They describe the budget as "mind boggling," "incredibly complex," and a "hodgepodge of unrelated elements."

A common complaint is that the Congress does not get a coherent picture of why expenditures are needed and that it lacks the time, staff, and expertise to deal with the thousands of unrelated budget items. The budget, they say, is too involved for Members of Congress and the public to readily understand.

Members have described the review process as "piecemeal" and "crisis oriented." They believe the mass of detail diverts the Congress from making informed decisions on questions of policy and from translating those decisions into meaningful budget adjustments.

Excerpts of comments made by individual Members of Congress are shown in appendix I.

Reports published by congressional committees expand on these concerns. A House Science and Technology Subcommittee concluded that research and development (R&D) continues to be viewed "as a large number of unrelated projects and programs." 1/

A report of another committee contained a study of congressional authorizing procedures for R&D expenditures. It highlighted congressional preoccupation with details resolvable at the program-manager level in the agency (see p. 48).

1/Special Oversight Report No. 1, House Science and Technology Subcommittee on Domestic and International Scientific Planning and Analysis, 94th Cong., 2d sess., April 1976, p. 3.

In still another report covering the Defense Department fiscal year 1978 budget, the Senate Armed Services Committee identified as one of the reasons for reduced U.S. technological lead:

> "The Congress is not without fault * * *. The temptation [is] to try to manage the details of a specific program rather than wrestle with the more complex issues of policy and direction for our national defense posture * * * the net result is not enough emphasis on the major policy issues and too much emphasis on detailed project management." 1/

EXECUTIVE/PRIVATE SECTOR

Concerns from outside the Congress have been voiced for three decades. The two Hoover Commissions, in the 1940s and 1950s, for example, urged that Federal budgets reveal the purpose for which requested funds are needed. 2/ In the late 1960s a private group of 200 leading businessmen and educators issued a statement on national policy saying:

--Basic purposes, as well as choices between alternative means to achieve those purposes, tend to get lost in a staggering mass of budget documentation.

--Emphasis has been placed on numbers of people, contracts to be let, grants or subsidies to be given, and things to be purchased instead of on serving purposes or gaining results.

To have meaning and validity, the group said, budgets must be reviewed in terms of basic purposes. It concluded that Federal budgeting allows agency activities to linger on and even to expand when they are obsolete, duplicative of others, or of declining importance. In the early 1970s, the same group issued additional national policy statements on congressional budgeting and Federal programs. They included such observations as:

1/Report No. 95-129, 95th Cong., 1st sess., May 10, 1977, p. 76.

2/The Budget and Accounting Procedures Act of 1950 sought to carry out the Hoover Commission recommendation by requiring an executive budget based on governmental functions and activities. A problem with this legislation is that " * * * the terms 'program,' 'performance,' 'activity,' and 'function' are all used more or less interchangeably." Program Budgeting: Program Analysis And The Federal Budget, David Novick, Editor, Harvard University Press, Cambridge, Mass., 1966, p. 34.

--The extent of overlaps of activities among Federal agencies is not visible in budgets traditionally submitted to the Congress.

--The Congress cannot oversee the entire Federal budget each year on an item-by-item basis.

--The Congress is involved in program details to the point of interfering with executive responsibility.

--There is a need to set program objectives, consider alternate courses of action, evaluate whether Federal programs are achieving their objectives, and increase accountability to the public. 1/

More recently, an authority described the current budget process as weighted down by masses of detailed numbers for every conceivable type of expenditure. He said that the process does not permit the Congress to react to changing situations because the process does not ask:

--Are current activities in the budget efficient and effective?

--Should current activities be eliminated or reduced to fund higher priority new programs or to reduce the current budget? 2/

PROCUREMENT COMMISSION

A bipartisan congressional Procurement Commission, with members from Government and business, expressed similar concerns about the budget process. The Commission said that it is virtually impossible for the Congress to review R&D budgetary requests effectively because:

1/See Statements on National Policy by the Research and Policy Committee of the Committee for Economic Development, "Budgeting for National Objectives, Executive and Congressional Roles in Program Planning and Performance," Jan. 1966, p. 12; "Making Congress More Effective," Sept. 1970, pp. 32-33; "Improving Federal Program Performance," Sept. 1971, pp. 7-11, 51-52.

2/Testimony of Peter A. Phyrr, "The Zero-Base Approach to Government Budgeting," at Hearings Before the Subcommittee on Intergovernmental Relations of the Senate Government Operations Committee on Mar. 15, 1976, p. 326.

--Traditional budgetary information overburdens the Congress with detailed reviews of technical projects that obscure the overall pattern.

--There are too many projects for the Congress to review.

--Many projects are not related to needs and do not show the purpose for which the activity is being undertaken.

--Many projects forego alternatives and set the course for what later emerges as a noncompetitive major system development with a budget of several hundred million dollars.

The Commission observed that, in attempting to understand agency budget requests, the Congress had been demanding more detailed information. The Commission believed this route would only intensify the problem, and to confront the executive branch on a technical plane would not only require enormous staffing on the legislative side but also deny latitude to those responsible for executing programs.

As a means of correcting the problem, the Commission recommended a mission end-purpose approach to budgeting. At congressional request, we are charged with following up on Procurement Commission recommendations. 1/ Under Title VIII of the 1974 Congressional Budget Act, we also have a responsibility for improving congressional budget information.

PAST EFFORTS

In noting these criticisms of the Federal budget process, it must be recognized that the process has not remained static. There have been a number of efforts to improve the process, most of which have been aimed at providing more visibility to the policy issues associated with end purposes and avoiding drowning policy officials in a flood of microscopic detail. These reforms have gone under many names: program budgeting, Management by Objectives (MBO), and so on. Each effort represented a step forward. When the budget today is viewed in its totality, there is more focus on end purposes than was the case years back when the Federal budget was presented almost exclusively on a line-item basis.

1/The Commission made 149 recommendations to the executive branch and the Congress. We have issued six overall progress reports and several others on specific subjects to date. The next overall progress report is planned for release in winter 1977.

The essence of this report is that there is still room for substantial improvement. There are still too many situations in which attention is focused on means, rather than ends. The concept of mission budgeting appears to be one way of overcoming that problem.

ORGANIZATION OF REPORT

This report is divided into two parts. Part I offers an overview of the mission budgeting concept and related matters for congressional consideration. Part II illustrates application of the mission concept to fiscal year 1978 budget requests of three agencies--Energy Research and Development Administration (ERDA), Department of Defense (DOD), and National Aeronautics and Space Administration (NASA).

PART I - OVERVIEW

CHAPTER 2

THE MISSION BUDGETING CONCEPT

This chapter overviews the mission budgeting concept as applied to Federal Research and Development.

For fiscal years 1977 and 1978, the President requested from the Congress $24 billion and $26.6 billion in R&D budget authority as shown in figure 2-1.

FIGURE 2-1

R&D BUDGET AUTHORITY REQUESTED BY THE PRESIDENT (note a)

Department or agency	1977	1978
	(billions)	
Department of Defense	$10.9	$12.0
Energy Research and Development Administration	4.6	5.4
National Aeronautics and Space Administration	2.8	3.0
Department of Health, Education, and Welfare	2.5	3.0
National Science Foundation	0.8	0.9
All others	2.4	2.3
Total	$24.0	$26.6

a/The amounts shown represent the agency's principal appropriation request for R&D activities. They do not include pay and allowances for R&D personnel or the cost for construction of R&D facilities.

Federal R&D spending exceeds all private industry R&D. As in industry, Federal agencies undertake R&D to develop new or improved capabilities.

In the earliest phases of R&D, there is great uncertainty about the potential of any particular concept or

technical approach. Should a particular approach prove feasible and also superior to others, there is still uncertainty about the money necessary to develop and procure it in the quantity needed.

Due to these uncertainties and because commitments to a particular design concept may involve hundreds of millions or billions of dollars, considerable information must be gathered in early R&D phases about potential solutions.

The basic structure used by the Federal agencies to present R&D funding requests to the Congress is determined by the agencies, the Office of Management and Budget (OMB), 1/ and by the particular congressional committees which review them.

CURRENT BUDGET 2/

Current agency budgets are presented on a "line item" basis; that is, broken down and itemized by different kinds of proposed R&D projects. Line-item budgets are input oriented: they direct attention to the means or how money is to be spent. They are usually categorized by the kinds of products and technical work involved. The projects are far too numerous for the Congress to review individually. The natural tendency is to look at higher dollar amounts and at proposed increases in dollar expenditures from year to year. The budget reviewer is more inclined to challenge a particular approach to an R&D project than its end purpose because end purposes are not normally shown.

Congressional reviews often result in either increasing, reducing, denying, or deferring line-item expenditures. Sometimes cuts are made on an overall basis with agencies consulted about which line-item expenditures should be reduced, eliminated, or deferred.

Once the R&D budget is approved, agencies consult with congressional committees if funds are to be utilized for purposes other than those contemplated at the time of appropriation. That is, if early technical projects do not proceed

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1/OMB Circulars A-10, A-11, and A-34.

2/For a more detailed discussion of the current budget and of the congressional role in R&D budgeting, see "Research And Development In The Federal Budget: FY 1978," a report prepared for the American Association for the Advancement of Science, by Willis H. Shapely, Don I. Phillips, Herbert Roback, May 1977.

as planned and agencies require more money than anticipated or have to add new projects, their congressional committees are consulted.

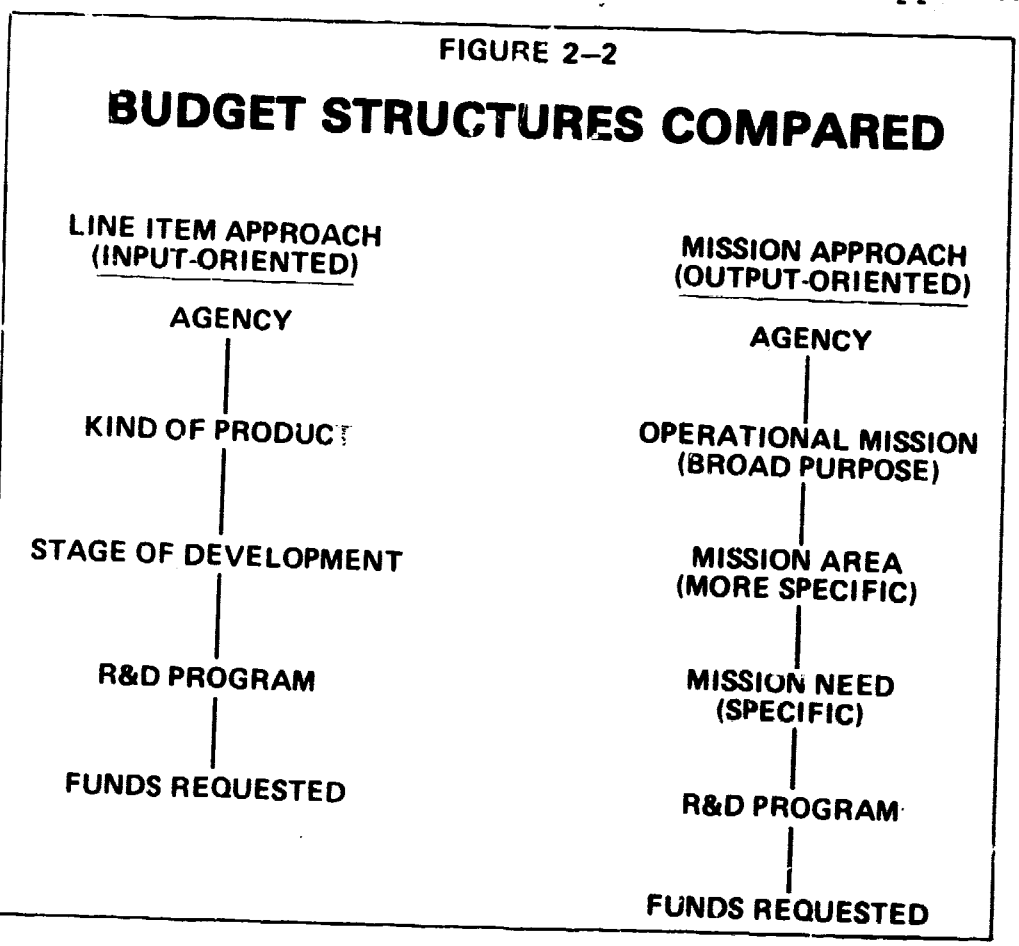
A MISSION APPROACH

A mission budget assembles and groups various kinds of expenditures according to their end purposes. Mission budgets focus initially on what the money is for and why it is needed, and then on how the money is to be spent. Missions at the highest level in the budget structure represent basic end-purpose responsibilities assigned to an agency. Descending levels in the budget structure give an increasingly closer look at the mission purpose and at the need to spend the money. At the lowest levels are the individual activities--the means decided upon to satisfy the need.

Figure 2-2 compares the line-item and mission approaches.

FIGURE 2–2

BUDGET STRUCTURES COMPARED

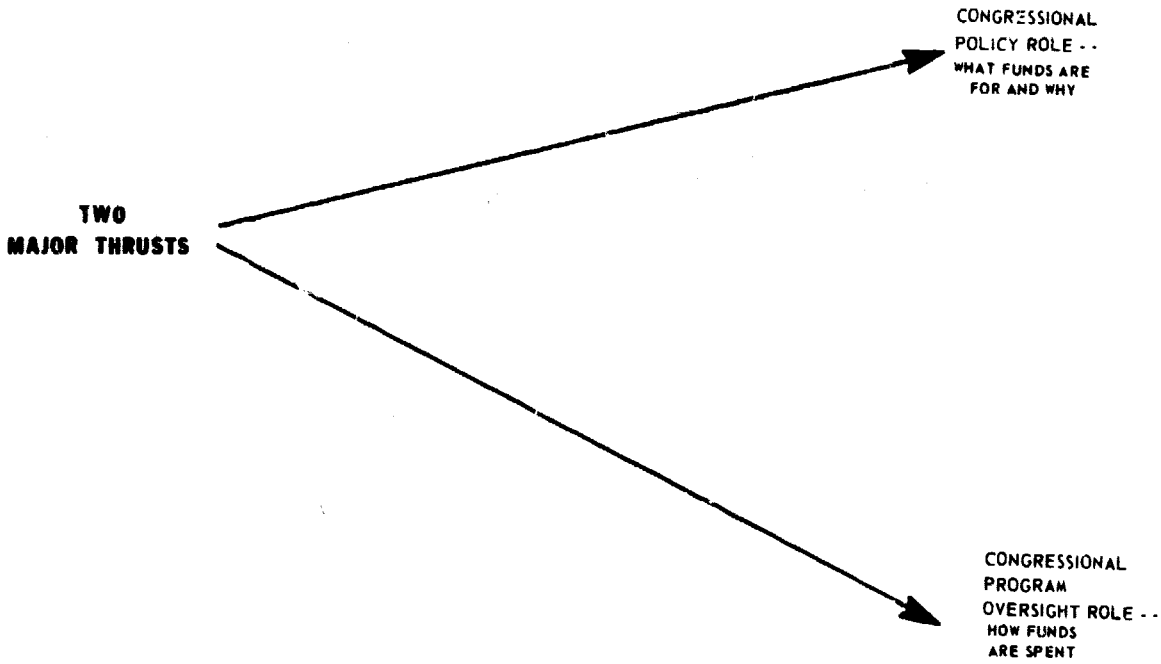


Mission budgeting has two main thrusts: congressional policy review--what funds are for and why, and congressional program oversight--how funds are being spent. Each thrust has

several dimensions which are identified later in expanded versions of figure 2-3.

FIGURE 2-3

MISSION BUDGETING



CONGRESSIONAL POLICY ROLE

Certain kinds of decisions determine the broad thrust of Federal action and can or should be made only by the highest authority. These are decisions made by executive agency administrators, the President, and the Congress through the legislative and budget processes.

A mission budget initially directs congressional attention to an agency's basic responsibilities by displaying them in the budget structure in end-purpose terms and by connecting these mission responsibilities to agency activities and their proposed funding. This kind of a budget structure directs congressional review to such policy matters as

1. Clarifying agency mission purposes and deciding their relevancy to current national policy and needs.

2. Assessing agency roles and responsibilities for the missions and approaches for carrying them out.

3. Raising or lowering mission funding based on

   --Resources required for missions versus their "worth."

   --The agency's current capability to perform the missions.

   --Priority needs of each mission.

Clarifying agency missions

The first step in congressional review is to clarify what agency mission purposes are, or should be, in terms of current national policy. Without this clear understanding of why activities are being conducted, there is danger that individual programs and activities will become "missions" unto themselves. As a basis for this congressional review, agencies would submit information on their missions and on existing and needed capabilities to perform them.

Presently, none of the agencies, whose budgets are used for illustrative purposes in this report, are sure about how best to describe their missions in a mission budget structure. (See pp. 26, 32, 49, and 70.) The structure defines the end purposes of all agency activities and helps to determine what issues and funding allocations are to be addressed in budget reviews and which will be submerged. Some difficulty can therefore be expected in reaching a consensus on the budget structure.

Mission roles and responsibilities

As in the case of any agency with several operational components, rivalry often exists for preeminence in agency missions. The tendency is for one component to assume primary responsibility for a mission and undertake development of a mission capability based on its own operational mode and preferences. (See p. 54, for example, about repeated concerns of the Appropriations Committee over military service duplication.)

Mission budgeting would help to harness intra-agency rivalry by exposing to reviewers programs serving common purposes and the same needs and by clarifying component roles and resporsibilities at the very outset of programs. Intra-agency competition could still be used, when desirable,

to solve critical needs. Overlaps in programs would be purposeful and any imbalances in mission funding would be exposed.

Mission funding

With agency missions and responsibilities clarified, congressional review would then begin to consider the funding appropriate for each mission. Funding levels hinge on the relative importance of each mission and the priority of their needs. With mission funding, the mission's potential worth or contribution to meeting a pressing national need would be considered as opposed to relying on past cost trends. Assessing funding of an agency's missions includes inquiry into such things as:

--Relevance of the missions--how do they respond to the Nation's most critical needs and how do they compare to congressional views of national policy?

--Assignment of agency roles and responsibilities--is there uncontrolled rivalry and unwarranted duplication with too little funding of some missions and too much of others?

--Approaches to carry out missions--are there better ways?

--Relative value of missions--how do their contributions compare with past and future required resources?

--The agency's ability to execute its missions--in what missions are capabilities most needed? Should related programs be accelerated or phased out?

Mission needs

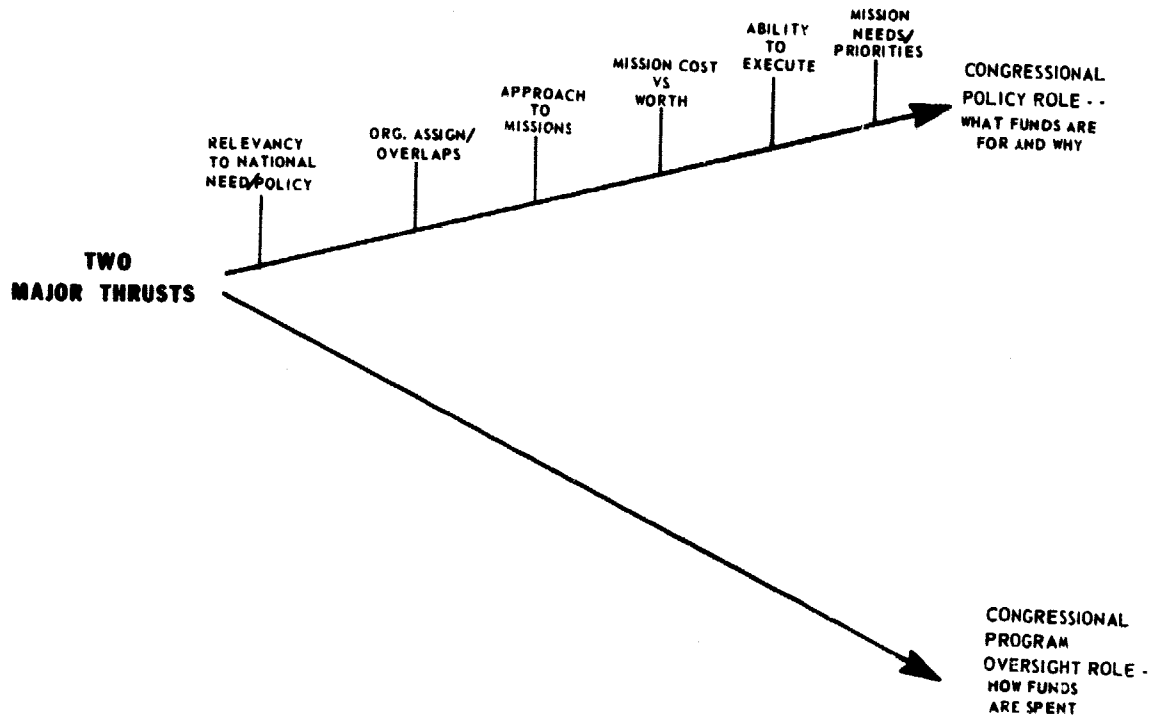
A major factor influencing mission funding is the extent of additional capability needed to achieve desired mission performance, that is, a "mission need." Tied to a mission need is a program and related funding aimed at developing the additional capability. When funding a mission need for the first time, the Congress is authorizing, in effect, the start of a program to acquire a new or improved capability. In this way, the Congress affirms that the need for a capability is pressing enough to justify earmarking relatively scarce R&D funds.

If desirable, these mission capabilities may be multipurpose in nature, that is, serve more than one area of a mission.

Figure 2-4 summarizes various dimensions of the congressional policy role in mission budgeting.

FIGURE 2-4

MISSION BUDGETING



Final congressional judgments as to whether funding of missions should be raised, lowered, or left unchanged depend also on the outcome of individual program reviews.

CONGRESSIONAL PROGRAM OVERSIGHT ROLE

The second major thrust of mission budgeting is concerned with how funds are spent and recognizes that "front-end" decisions during a program's infancy are the most important even though the funds involved are small.

By stating needs in mission end-purpose terms, alternative ways of meeting the needs can be explored at the beginning of new programs, before an agency makes a large investment and commits itself to any one design concept and technical approach. At the very outset of any new program, therefore, the exact means of accomplishing it would not be shown.

The extent of congressional review of individual programs under the mission approach would be entirely flexible but would tend to focus on:

--Clearly separating technology base funding to develop new knowledge from mission-oriented funding of new programs.

--Linking new programs to affirmed mission needs.

--Funding exploration of competing alternatives before programs become locked into single solutions.

--Reviewing progress at critical turning points common to all programs, as a basis for funding the next step.

Separating technology base from mission funding

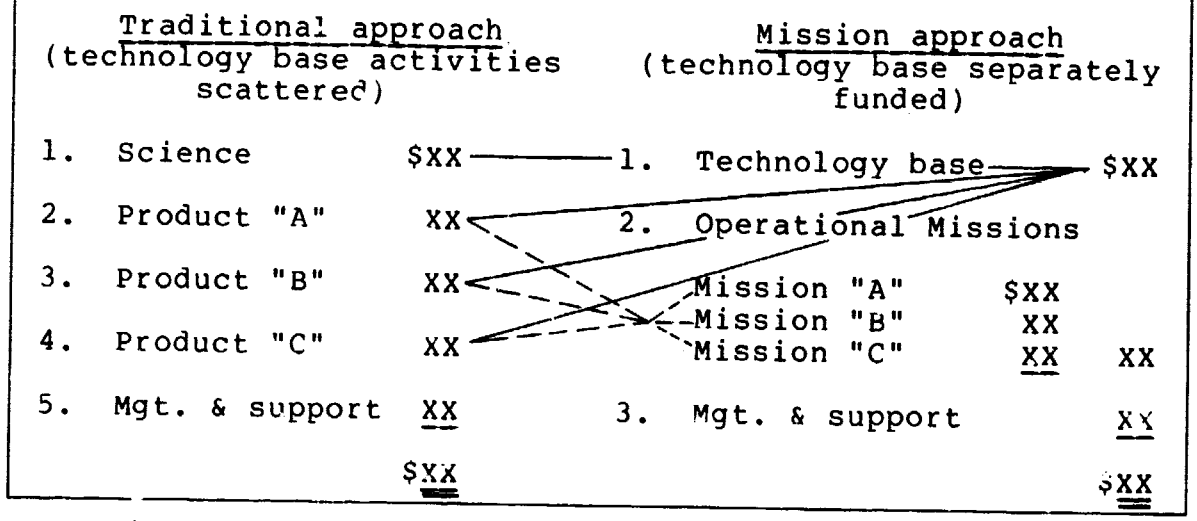
The purpose of funding a "technology base" is to allow new knowledge to be pursued as a source of future innovation, not to design specific new capabilities.

Under traditional budgeting, the design solution is frequently advanced before the program itself is submitted to the Congress for approval. This advance design work or beginnings of new programs is not visible in congressional appropriations. In line-item budgets, it is found in numerous, seemingly minor technology base R&D projects whose technical descriptions obscure their purpose. (For examples, see pp. 59, 60, 69, and 73 to 77.)

Figure 2-5 illustrates how technology base funding is diffused and scattered in a line-item budget and how these same funds would be collected in a mission budget and treated as a separate category for funding purposes.

FIGURE 2-5

SEPARATING TECHNOLOGY BASE FROM MISSION-ORIENTED WORK



The purpose of this separate category is to help insure that technology base work is sufficiently funded but to guard against extending the work into the design of predetermined solutions. Until technology base and program funding are clearly separated, executive administrators and congressional committees will not be able to control the purposes of R&D and the evolution of new programs. 1/

Congressional review of the technology base would be concerned with its size and nature and whether the most promising technologies are being adequately funded. This review might consider such criteria as how new or how old the technologies are, their potentials, and the priorities of the problems facing an agency such as in the case of the new Department of Energy.

Linking new programs to mission needs

Under traditional line-item budgeting, the beginnings of new R&D programs often escape top agency and congressional review (see pp. 59 and 75). Thus, the formative decisions on

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1/Report of the Commission on Government Procurement, Vol. 2, Part C, pp. 78 and 114 to 117.

needs, priorities, and real alternatives are long past when a program emerges into view. Mission budgeting, however, links funding of new programs to mission needs whose validity and priority have been affirmed by top agency administrators and exposed to congressional review. This is done by funding a mission need instead of a solution. And, an agency need not commit itself prematurely to a solution in order to gain congressional funding.

Funding exploration of alternatives, introducing competition

Funding needs, expressed as mission purposes, encourages the creation and exploration of alternative concepts and technical approaches before a new R&D program is locked into a solution. In mission budgeting, the Congress helps to make sure this is done by explicitly funding competing approaches having the greatest potential before commitments are made to any single concept and technical approach.

Alternative solutions would be created and explored in the frontend of programs where it is the least expensive to do so and where the most important decisions on concepts, technical approaches, and costs are made. After studies and experiments are evaluated, less-promising alternative candidates and those that are too costly would fall out.

This wide open approach at the beginning of new programs is expected to lead to less program advocacy and more credible information being presented to the Congress. If, on the other hand, the agency wants to concentrate its resources early on a single design, that desire would have to be justified to the agency head and disclosed to the appropriate committees. 1/

Congressional review of programs in their early stages might inquire, for example, into:

1/OMB Circular A-109 (par. 15) on major system acquisitions already requires congressional disclosure of the basis for an agency decision to proceed with a single system design concept without competitive selection and demonstration.

--What level of innovation, new technology, and risk are permitted to enter candidate systems and whether smaller firms are barred from participation?

--What is the extent to which candidate systems lose their identify (integrity) by allowing the best features of each to be merged (blended) into a single Government solution, thereby:

(1) creating a reluctance on the part of developers to promote their most innovative, competitive, and technically advanced ideas and

(2) losing accountability for total system design and performance?

--What criteria is used by the agency to select a design solution for full development? Are mission effectiveness, testing of critical hardware, performance reliability, and total cost (rather than initial price) included?

Overseeing crucial program turning points

Each R&D program is managed differently and has its own success criteria (capability, time, and cost goals). But there are a few basic steps common to the evaluation of all programs. Present budget data is not oriented to these basic steps, nor does it disclose if one is being bypassed. (For illustrations, see pp. 41, 63, and 78.)

In mission budgeting, budget data is tailored to these basic steps which are crucial turning points in the evolution of a program.

First: The mission need and goals which initiate the program and shift it into the exploration and demonstration of alternative approaches.

Second: The choice of a design concept for full development.

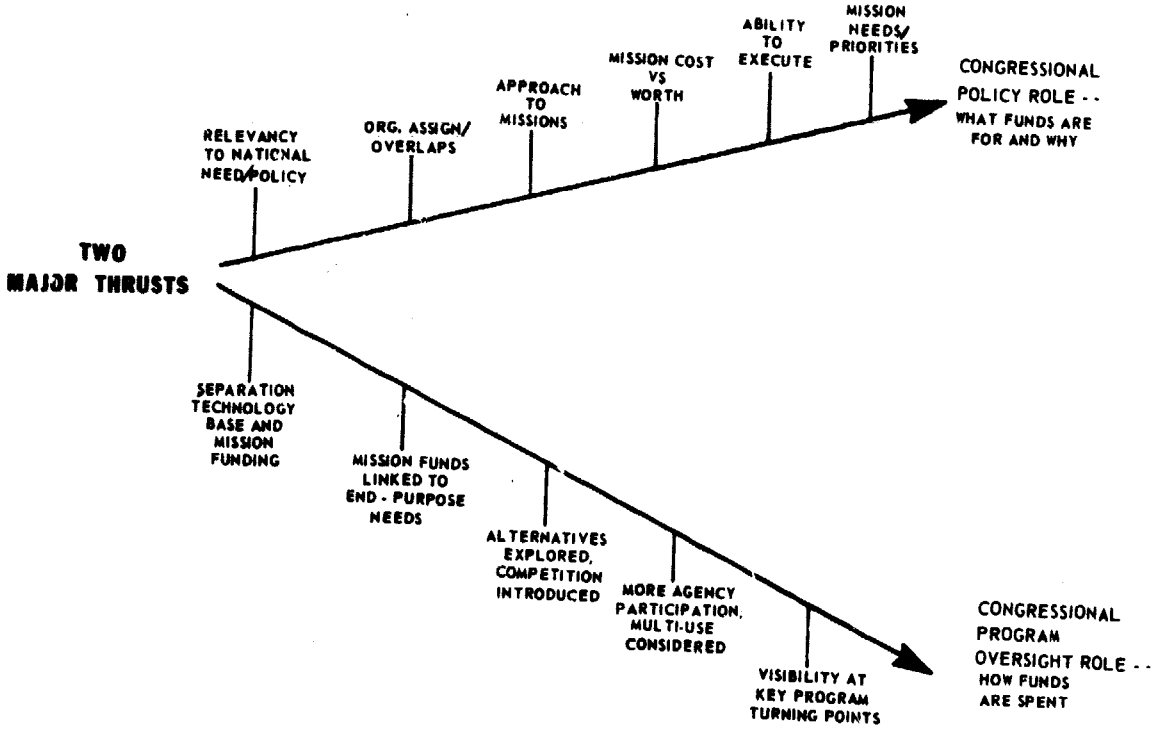
Third: The commitment of the program to production.

Basic program steps represent a central focus for congressional review. Congressional committees would be in position to assess whether the next program step should be funded based on progress made in preceding steps. The intensity of congressional review would vary with the agency's difficulty in accomplishing particular program steps.

Figure 2-6 summarizes the various dimensions of mission budgeting.

FIGURE 2-6

MISSION BUDGETING



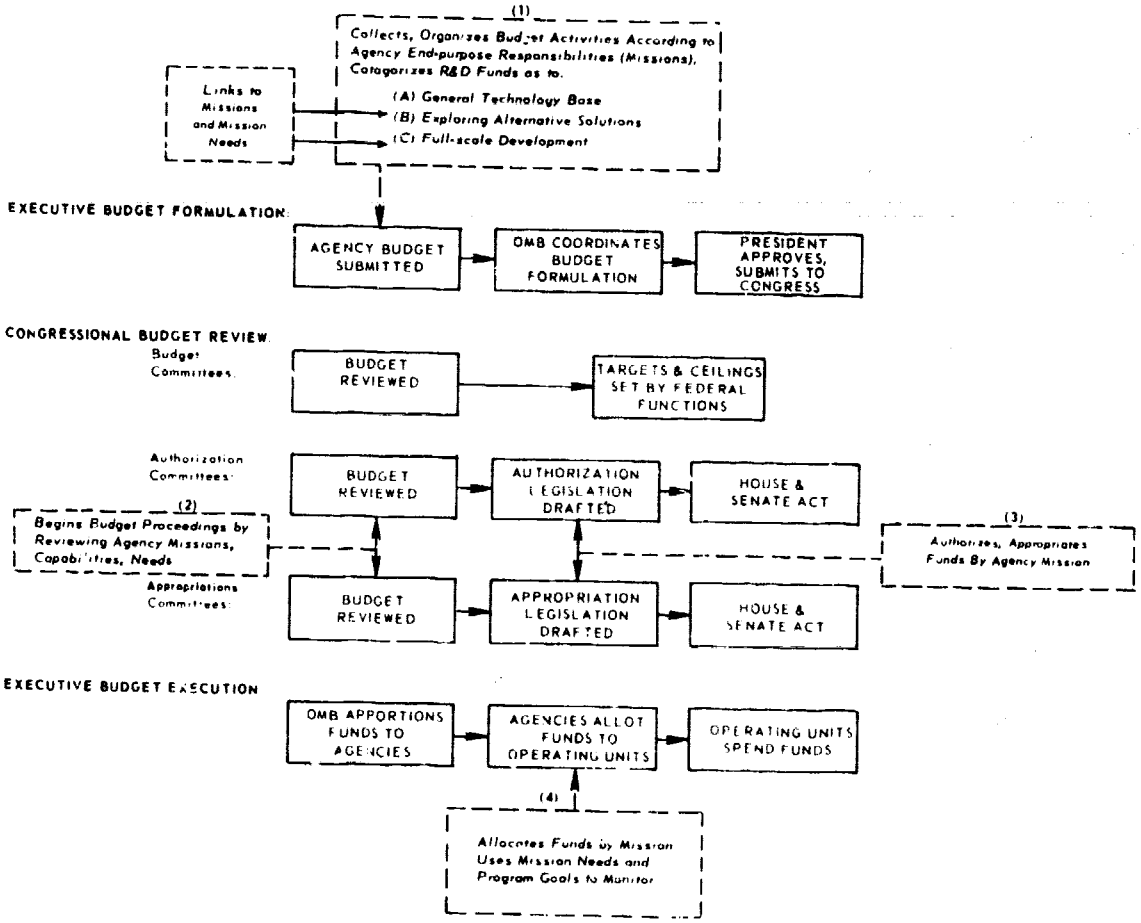
IMPACT ON BUDGET PROCESS

The Congress makes three different kinds of budgetary reviews. Initially, budget committees set total spending levels for each broad national need or governmental function. More or less concurrently, Senate and House Authorization Committees review activities of individual agencies to determine if they should be funded. A third review, by House and Senate Appropriations Committees, decides the extent of this funding.

Figure 2-7 highlights this congressional budget process and the impact of mission budgeting.

FIGURE 2-7

IMPACT OF MISSION APPROACH ON CURRENT BUDGET PROCESS

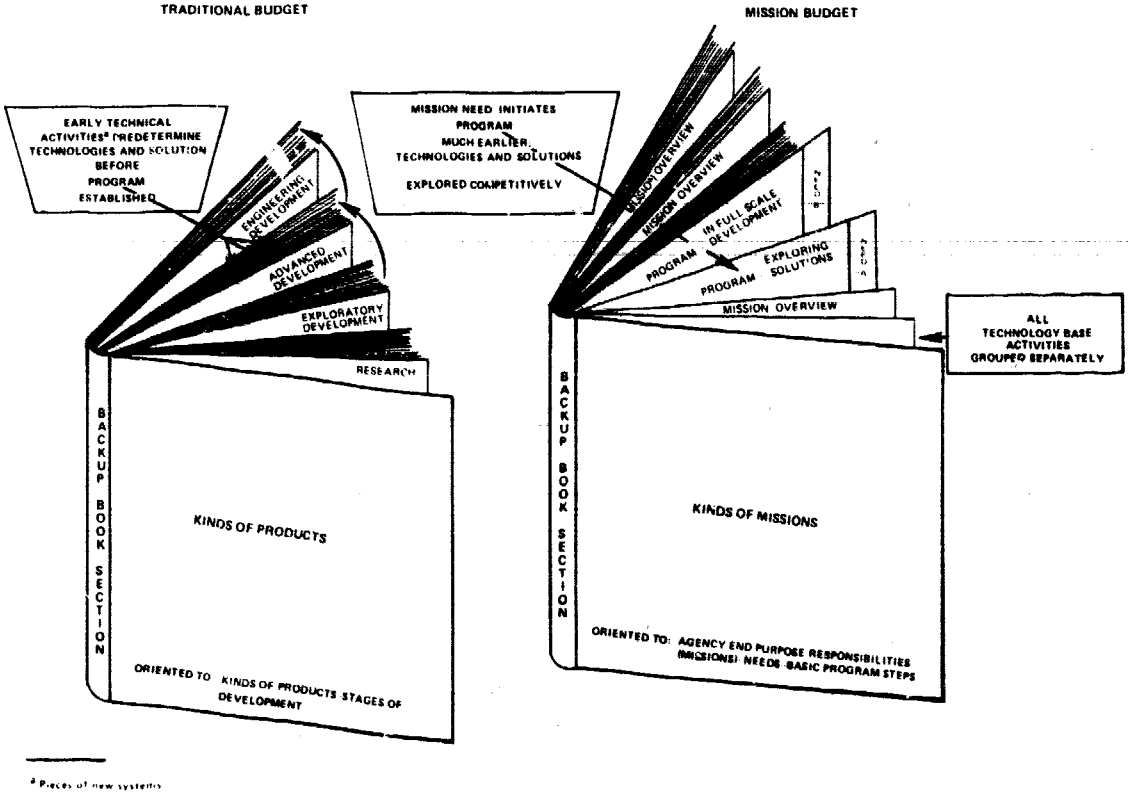


Agency budget justifications

Figure 2-8 compares an agency budget justification book with the way that justification might be organized for mission budgeting. The new justification would give an overview of the mission, describe the need, and show the basic step in a program's evolution to meet that need. It would also keep technology base activities separate from program activities. The differences between the two approaches to justification have major implications for overseeing agency programs.

FIGURE 2–8

AGENCY BUDGET JUSTIFICATION



[a] Pieces of new systems

Reprograming

After the Congress approves the budget, agencies would continue to consult cognizant committees on any significant changes in use of funds from that contemplated (reprograming). However, for new programs, the primary focus would be in terms of mission purposes and needs since the means for accomplishing them would not as yet have been decided. Whenever a particular R&D design concept has been chosen for full development, it would represent a line-item expenditure and be subject to the same congressional controls as today. Reprograming actions are discussed in more detail in part II illustrations of the mission concept.

Illustrations of mission budgeting

Figure 2-9 summarizes the rationale for using the mission approach in funding the technology base and new development programs. It also displays a format used in part II of this report to convert budget requests of three agencies to a mission basis. This mission format distinguishes between portions applicable to policy review and portions applicable to program oversight. In practice, however, these congressional reviews would tend to reinforce each other.

FIGURE 2–9

MISSION BUDGETING

RATIONALE

FUNDING TECHNOLOGY BASE

TRADITIONAL APPROACH

PROBLEMS:

- NECESSITY TO DEFEND A SPECIFIC SOLUTION IN ORDER TO OBTAIN R&D FUNDING.
- LIMITED FUNDS FOR ACQUIRING NEW KNOWLEDGE USED TO DESIGN PRECONCEIVED SOLUTIONS FOR NEW PROGRAMS.

EFFECTS:

- LOSS OF CONTROL OVER PURPOSE OF FUNDS I.E. WHETHER FUNDS ARE USED FOR ADVANCING KNOWLEDGE OR FOR STARTING NEW PROGRAM
- SINGLE DESIGN APPROACHES INITIATING NEW PROGRAMS BYPASS NEED AND PRIORITY DECISIONS AND CONSIDERATION OF COMPETING CONCEPTS/TECHNICAL APPROACHES.
- TENDENCY TOWARD FAMILIAR SOLUTIONS OF WELL ESTABLISHED FIRMS AND AWAY FROM THOSE OF INNOVATIVE FIRMS.
- OLD TECHNOLOGIES STRETCHED TOO FAR, LEADING TO MARGINAL IMPROVEMENTS AT DISPROPORTIONATE COST.

MISSION APPROACH

ACTION:

- CLEARLY SEPARATE FUNDING OF TECHNOLOGY BASE FROM FUNDING OF NEW PROGRAMS

BENEFITS:

- FUNDS SPECIFICALLY EARMARKED FOR DEVELOPING NEW KNOWLEDGE
- INNOVATION, NEW TECHNOLOGY ENCOURAGED
- INCREASED POTENTIAL FOR MORE EFFECTIVE, SIMPLER, AND LESS EXPENSIVE SOLUTIONS TO FUTURE NEEDS

FUNDING DEVELOPMENT PROGRAMS

TRADITIONAL APPROACH

PROBLEMS:

- AGENCY BUDGET REQUESTS GIVE FRAGMENTED, YEAR-BY-YEAR GLIMPSES OF MANY TECHNICAL ACTIVITIES.
- NEW PROGRAMS OBSCURE IN THEIR INITIAL YEARS, DEPRIVING CONGRESS OF POLICY REVIEW OF WHAT FUNDS ARE FOR AND PROGRAM OVERSIGHT ON NEEDS, PRIORITIES, AND WHETHER ALTERNATIVES EXPLORED.

EFFECTS:

- BUDGET PRESENTATION CONFRONTS CONGRESS IMMEDIATELY WITH TECHNICAL DETAILS INSTEAD OF PURPOSE OF THE PROGRAM AND WHY IT IS NEEDED.
- PROGRAM NEED, SOLUTION, COST ARE LOCKED IN BEFORE CONGRESS CAN REVIEW THEM.
- FOCUS ON TECHNICAL DETAILS CURTAILS EXECUTIVE FLEXIBILITY.

MISSION APPROACH

ACTIONS:

- REQUIRE BUDGET REQUESTS BE ORGANIZED BY AGENCY END PURPOSE RESPONSIBILITIES.
- LINK FUNDING REQUESTS FOR NEW CAPABILITIES TO ORGANIZED REVIEW OF AGENCY MISSIONS AND MISSION NEEDS.
- AUTHORIZE, APPROPRIATE, OVERSEE FUNDS BY AGENCY MISSION

BENEFITS:

- BUDGETS WILL REVEAL END PURPOSES THAT ACTIVITIES ARE INTENDED TO SERVE AND THE EVOLUTION OF NEW PROGRAMS
- CONGRESS CAN LINK PRIORITY NEEDS TO R&D FUNDING REQUESTS, DETECT VOIDS OR DUPLICATION, AND CONSIDER COST VS. WORTH OF EACH MISSION.
- AGENCIES ENCOURAGED TO EXPLORE ALTERNATIVE SOLUTIONS COMPETITIVELY WITH FLEXIBILITY TO COPE WITH DYNAMIC, HIGHLY TECHNICAL ACTIVITIES
- PREMATURE COMMITMENT TO SINGLE APPROACH AVOIDED AND PUBLIC ACCOUNTABILITY STRENGTHENED BECAUSE
  (1) NEW PROGRAM STARTS HIGHLY VISIBLE
  (2) PROGRAM APPROACHES COMPETED, CRITICAL NEW FEATURES DEMONSTRATED BEFORE EXPENSIVE DEVELOPMENT UNDERTAKEN.

ILLUSTRATIVE MISSION BUDGET (R&D)

PRESIDENTIAL SUBMISSION

1.	TECHNOLOGY BASE		$XX
2.	AGENCY OPERATIONAL MISSIONS (END-PURPOSE RESPONSIBILITIES)		
	MISSION "A"	$XX	
	MISSION "B"	XX	
	MISSION "C"	XX	
	MISSION "D"	XX	
	MISSION "E"	XX	XX
3.	MANAGEMENT AND SUPPORT		XX
			$XX

CONGRESSIONAL BUDGET JUSTIFICATION DATA

MISSION "A"-POLICY OVERVIEW

1.	MISSION FUNCTIONS (AREAS)	
2.	MISSION CAPABILITIES, NEEDS	
3.	PROGRAM FUNDS FOR DEVELOPING NEW CAPABILITIES	
	(a) EXPLORING COMPETING ALTERNATIVES	$XX
	(b) FULL DEVELOPMENT	XX
		$XX

PROGRAM OVERSIGHT

1.	AGENCY MISSION NEED	
2.	PROGRAM COST, TIME, CAPABILITY GOALS	
3.	WHETHER EXPLORING ALTERNATIVES OR IN FULL DEVELOPMENT	
4.	KEY PROGRAM TURNING POINTS	
5.	PROGRESS, FUNDS REQUESTED	$XX

CHAPTER 3

MATTERS FOR THE ATTENTION OF THE CONGRESS

In concluding part I of this report, this chapter is intended to assist the Congress in further evaluating the potential of the mission budgeting concept for budget review, authorization, and appropriation functions. According to a recent congressional study, "The true level of Congressional interest in mission budgeting is as yet unknown." 1/

A number of people in the R&D and budgetary fields were asked to review material in this report (see app. III). Their views--favorable and unfavorable--are outlined in appendix IV.

Mission budgeting, although originally proposed for the funding of Federal R&D, is not peculiar to any one type of expenditure and may have general application. In evaluating whether to proceed further with the concept, congressional attention is invited first to some overall implications, and then to actions already taken and remaining to put the concept into effect.

SOME OVERALL IMPLICATIONS

Relationship to "zero-base budgeting"

In February 1977 President Carter directed the heads of executive departments and agencies to develop a zero-base budgeting system. According to the author of zero-base budgeting, a mission-like budget structure that organizes agency activities by end purposes, needs, and programs to satisfy them, can serve as a "building block" or foundation for the zero-base budgeting system. (See app. IV.) Like mission budgeting, zero-base budgeting is a relatively new planning and budgeting technique. It has been adopted in some form by a number of business firms and State governments. The underlying idea is to examine the entire budget, not just the amount above current spending levels. It asks operational managers the following kinds of questions:

--What purpose does the operation serve?

--How can effectiveness of the operation be measured?

1/Lt. Peter John Henning, Navy-Congressional Interactions and the Response to Mission Budgeting (Naval Postgraduate School, Mar. 1977).

--What are the consequences of not performing the operation?

--Are there better ways of performing the operation?

--Using the best way, should spending levels be increased, decreased, or left as they are?

--What is the relative rank or importance of each operation so that those making the least contribution can be screened out?

Figure 3-1 compares zero-base and mission budgeting and shows their similarities and differences. The two most striking differences are the requirements of zero-base budgeting to:

--Analyze the effects of higher or lower funding levels of an operation.

--Formally rank the importance of each operation so that those with fewer benefits can be screened out.

FIGURE 3–1

ZERO-BASE AND MISSION BUDGETING COMPARED

ZERO-BASE BUDGETING	MISSION BUDGETING (R&D)
• GROUPS ORGANIZATIONAL ACTIVITIES INTO OUTPUT ORIENTED TERMS ACCORDING TO GOALS AND OBJECTIVES TO BE ACHIEVED	• GROUPS AGENCY ACTIVITIES INTO A MISSION END-PURPOSE STRUCTURE. THE STRUCTURE IS TIED TO MISSION NEEDS THAT ARE EXPRESSED IN TERMS INDEPENDENT OF ANY SOLUTION
• ENUMERATES ALTERNATIVE WAYS OF ACHIEVING THE OBJECTIVES AND PROBABLE COSTS AND BENEFITS OF EACH	• PROVIDES FUNDING TO CREATE AND EXPLORE ALTERNATIVE SOLUTIONS ABLE TO COMPETE WITHIN ESTABLISHED PROGRAM COST, TIME, CAPABILITY GOALS
• SELECTS BEST WAY USING COST/ BENEFIT ANALYSIS	• FUNDS A PREFERRED SOLUTION BASED ON MISSION BENEFIT/COST ANALYSIS AND TEST DEMONSTRATIONS
• PROVIDES DIFFERING FUNDING LEVEL OPTIONS, PROBABLE COSTS AND BENEFITS OF EACH LEVEL, AND CONSEQUENCES OF ELIMINATING THE ACTIVITY	• (NOT CONTEMPLATED)
• RANKS ACTIVITIES ACCORDING TO THEIR COST/BENEFIT VALUE, SCREENS OUT LOW PRIORITY ITEMS	• ELIMINATES AGENCY ACTIVITIES WHICH DO NOT HAVE AN APPROVED MISSION NEED OR SUFFICIENT PRIORITY
• PROVIDES TOP MANAGEMENT APPROVAL OF LEVEL OF PERFORMANCE. SUBSEQUENTLY, OPERATING MANAGEMENT IS ACCOUNTABLE FOR ACHIEVING THE EXPECTED PERFORMANCE	• EXPOSES MISSION PERFORMANCE FUNDED IN BUDGET TO PUBLIC ACCOUNTABILITY AND PROVIDES CONGRESSIONAL CHECKS AT KEY PROGRAM TURNING POINTS

Relationship to "sunset" legislation

During the current congressional session, a number of bills have been reintroduced calling for special reviews of agency budget requests by authorization committees. These bills have come to be known as "sunset bills," so called because the sun would set on agency programs with unfavorable reviews. Unless specifically reauthorized, a program would expire.

One of the bills reintroduced in January 1977 (S-2) requires House and Senate authorizing committees to make systematic sunset reviews of virtually all Federal agency programs within their jurisdiction over a 6-year period. Agency programs would be grouped by their purpose and reviews would be of a zero-base nature. Each committee would submit to the Senate and the House a report:

--Identifying needs to be satisfied by the program.

--Showing objectives, anticipated accomplishments, and any other programs with similar, conflicting, or duplicative objectives.

--Assessing consequences of eliminating the program, consolidating it with another program, or funding it at higher or lower levels than requested.

As indicated during recent sunset legislation hearings, a budget structured according to an agency's mission responsibilities would be useful in implementing both sunset legislation and zero-base budgeting.

> "I see them [sunset review, zero-base budgeting, and mission budgeting] as all being really not separate entities at all, but all part of the same kind of scope, and from our standpoint trying to help us be able to make our decisions on a sounder, more rational basis and at a different level than in many instances we have been making

those decisions in the past * * * I do not see how you zero-budget someone if you do not have a mission budget to start with." [A Department of Defense witness added] " * * * you simply cannot divorce them." 1/

Eliminating dual budget systems

Presently, an agency may use one budget system for the Congress and another for management purposes. Mission budgeting can replace dual systems because it is oriented to policy analysis, forward planning, program review, and resource allocation. In other words, it can be used simultaneously for executive management purposes and congressional budget deliberations.

Accountability for use of funds

Under mission budgeting, agencies are accountable for end results achieved in terms of the mission performance level the Congress has funded. This would mean a shift from an input to an output orientation in public accountability. It is possible that this shift in accountability to end results achieved would also slow down the yearend rush in Federal Government agencies to obligate funds of expiring appropriations.

Review of agency missions essential

Mission structures displayed in part II of this report are used only for illustrative purposes. In the agencies visited, no consensus was found as to their missions or as to how to best describe them in a mission budget structure. Irrespective of whether the concept of mission budgeting is adopted, we believe it is essential that the Congress periodically review agency missions to clarify what they are or should be, and to keep them relevant to changing national policies and needs. Further discussion of this problem can be found in part II of this report, pages 32, 49, and 70.

ACTIONS TAKEN AND REMAINING

The executive branch and the Congress have taken some initial steps to move in the direction of mission budgeting.

1/Senator Chiles at hearings on S.2, Sunset Act of 1977, before the Senate Governmental Affairs Subcommittee on Intergovernmental Relations, March 22 to 24, 28 to 30, 1977.

A recent Office of Management and Budget Circular (A-109) provides that Federal agencies are to acquire and budget new major systems along mission lines. Also DOD has taken a first step toward a mission approach in its fiscal year 1978 budget (see part II, p. 66).

In addition, three actions have been taken by the Congress:

--The Senate Armed Services Committee reoriented its fiscal year 1978 budget hearing format toward a mission approach (see p. 66).

--The Senate Budget Committee is experimenting with a mission format as a basis for recommending spending ceilings for DOD and Health, Education, and Welfare (see p. 66.).

--The Congressional Budget Act provides that, starting in fiscal year 1979, a presentation is to be included in the President's budget of agency missions by national needs. 1/

Appendix II compares the Procurement Commission's recommendations on mission budgeting with existing legislative/executive branch requirements. If mission budgeting is adopted, several additional steps will need to be taken.

Executive:

--Designing primary budget structures for agency funding requests that correspond with their end-purpose mission responsibilities.

--Grouping agency activities according to this mission structure and linking them to mission needs as a basis for funding.

Congressional:

--Reviewing, authorizing, and appropriating funds by agency mission responsibilities.

1/Congressional Budget Act of 1974, sec. 601 (i).

--Securing accountability for agency use of Federal funds based on the level of mission performance funded by the Congress.

RECOMMENDATION TO THE CONGRESS

Mission budgeting appears to offer significant possibilities for (1) strengthening congressional policy review and program oversight and (2) helping the executive agencies to formulate budgets according to end purposes, to be achieved with Federal funds; needs; and priorities. We recommend that the Congress begin to experiment with mission budgeting. As it is untested, and adaptability problems could arise, a prudent course of action might be to test its practical application and usefulness. This could be done by using mission budgeting on a small scale, such as by testing and phasing in the approach gradually by agency component, budget activity, agency mission, or appropriation.

Although only the Congress can decide whether it should review, authorize, and appropriate agency funding requests on a mission basis, we gave OMB an opportunity to have its views included in this report. OMB told us that mission budgeting is worth further exploration; however, it is reserving official comment pending congressional action.

PART II

ILLUSTRATIVE AGENCY APPLICATIONS

CHAPTER 4

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

(PLANNED TO BE PART OF DEPARTMENT OF ENERGY)

As a direct outgrowth of the energy crisis, ERDA was created by the Energy Reorganization Act of 1974 (Public Law 93-438) for the specific purpose of solving the national need for energy. The agency is comprised of elements formerly under the Atomic Energy Commission, Department of the Interior, National Science Foundation, and Environmental Protection Agency. ERDA became operational in early 1975 and in 1977 expects to be made part of a new Department of Energy.

ERDA has been referred to as a potential giant in the Federal R&D community. The agency's 1978 budget request of $5.4 billion is already the second largest in the Federal Government. 1/ This may be only a token amount compared to the probable resources that will be required to meet national energy needs. Since energy is one of the most important domestic issues confronting the country, the purposes for which R&D funds are requested and how the funds are spent by this agency will be of increasing importance to the Nation and the Congress in the years ahead.

CURRENT BUDGET

ERDA's fiscal year 1978 budget request is broken down into 22 budget activities. Many of these activities describe kinds of energy sources or products the agency plans to develop or demonstrate. For example, funds are requested to develop energy sources such as fossil, solar, and geothermal. Other activities describe basic research or technologies, such as nuclear fusion, or products, such as the liquid metal fast breeder reactor.

1/These funds are not exclusively for R&D; some, for example, are for production of nuclear materials.

Figure 4-1 displays the 1978 ERDA budget and shows the energy source and product/technology-oriented nature of its budget activities. The amount of $5.44 billion proposed by President Ford was subsequently modified by President Carter to $5.7 billion.

FIGURE 4–1

EXCERPT FROM PRESIDENT'S FY 1978 BUDGET

(millions)

1.	CONSERVATION RESEARCH AND DEVELOPMENT	$ 136
2.	FOSSIL ENERGY DEVELOPMENT	463
3.	SOLAR ENERGY DEVELOPMENT	199
4.	GEOTHERMAL ENERGY DEVELOPMENT	66
5.	FUSION POWER RESEARCH AND DEVELOPMENT	294
6.	FUEL CYCLE RESEARCH AND DEVELOPMENT	264
7.	LIQUID METAL FAST BREEDER REACTOR	578
8.	NUCLEAR RESEARCH AND APPLICATION	171
9.	NUCLEAR REGULATORY COMMISSION SAFETY FACILITIES	22
10.	ENVIRONMENTAL RESEARCH AND DEVELOPMENT	173
11.	LIFE SCIENCES RESEARCH AND BIOMEDICAL APPLICATIONS	37
12.	HIGH-ENERGY PHYSICS	186
13.	NUCLEAR PHYSICS	66
14.	BASIC ENERGY SCIENCES	138
15.	NUCLEAR MATERIALS SECURITY AND SAFEGUARDS	33
16.	NAVAL REACTOR DEVELOPMENT	220
17.	NUCLEAR EXPLOSIVES APPLICATION	1
18.	URANIUM ENRICHMENT	1,005
19.	NATIONAL SECURITY (NUCLEAR WEAPONS)	1,511
20.	PROGRAM MANAGEMENT AND SUPPORT	329
21.	COST OF WORK FOR OTHERS	18
22.	OTHER COSTS AND CREDITS	0
	TOTAL	$5,910
	DEDUCT: NET COLLECTIONS/REIMBURSABLES	−470
		$5,440

In addition to this initial budget breakdown of activities, ERDA submitted budget justification data to congressional committees in the form of "backup books." ERDA's backup books consist of several volumes. They have the same kind of energy source and product orientation as the budget

request except that they are broken down in finer detail. Within this structure, data is provided on energy demonstration projects as to their (1) technical objectives, (2) accomplishments, and (3) requested funding.

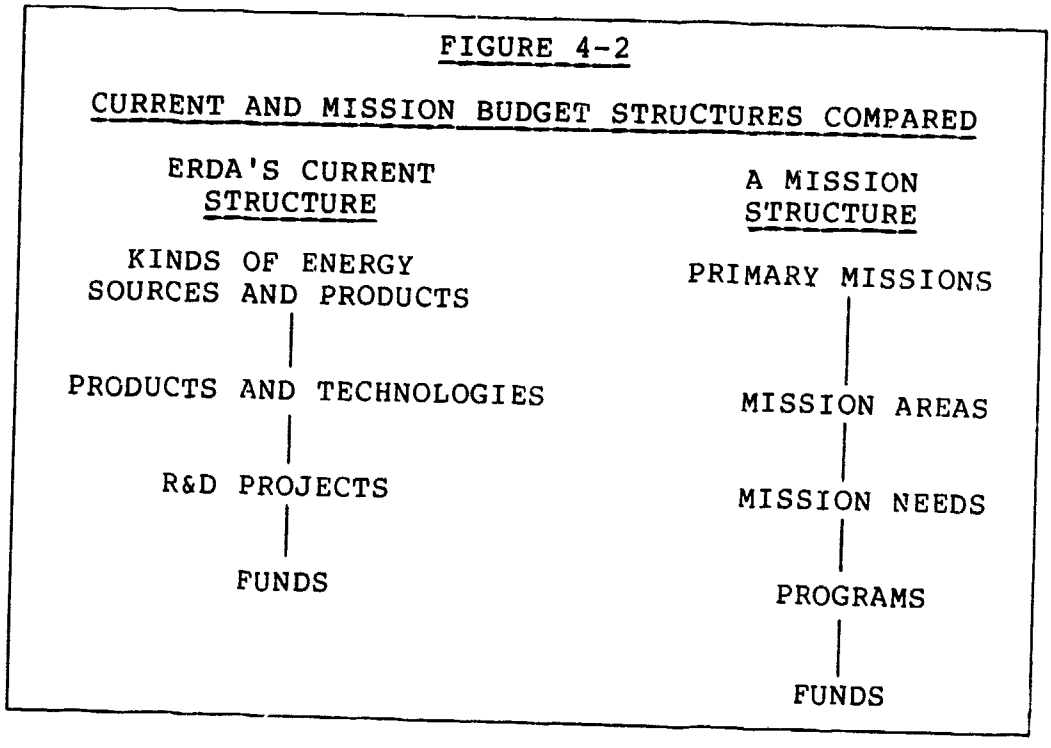
A MISSION APPROACH

In mission budgeting, ERDA's activities are described in terms of the agency's end-purpose responsibilities rather than in technical terms, such as the type of energy source, technology, or product. Defining budget activities in this way represents a basic change from ERDA's current approach in that a mission budget does not, at the outset, endorse any particular energy source, technology, engineering approach, or product. Mission budgeting also groups related budget activities according to the end purpose they serve. Each succeeding level in the mission budget structure then takes a more specific look at ERDA's end purposes and at the needs to be met. Finally, the lowest part of the budget structure reveals particular energy sources, conservation measures, or other means chosen to accomplish the end-purpose needs.

Figure 4-2 compares the two budget structures--the one used in ERDA's 1978 budget request and a mission-oriented one.

FIGURE 4-2

CURRENT AND MISSION BUDGET STRUCTURES COMPARED



The grouping of ERDA's activities shown on the left side of figure 4-2 draws congressional attention to particular energy sources, products, or technology solutions--and to their funding and detailed management--before ERDA's end purposes and national energy policy can be considered.

The grouping of ERDA's activities shown on the right side of figure 4-2 draws congressional attention first, to ERDA's mission end purposes and related policy matters--a policy review role--and then to the means to accomplish these purposes--a program oversight role.

Policy review

Policy review is directed at decisions that should only be made at the highest level in the executive branch or by the Congress. In the case of ERDA, these policy decisions are concerned about the consistency of its mission end purposes with national energy policy, the effectiveness of its organizational structure and approaches in accomplishing its missions, its current performance capabilities, and the priorities and funding levels of its missions.

Review of ERDA missions

At the outset, congressional review would consider ERDA's missions in the context of national energy policy. This would focus debate on the critical first step of what is or should be the Nation's energy policy. 1/ Relating ERDA's missions to national energy policy would also provide overall direction to missions, the degree of importance or priority attached to each one, and thus, some idea as to what the relative magnitude of funding should be.

As in the case of other Federal agencies contacted in this effort, we received differing views from ERDA officials as to mission purposes. In ERDA particulary, uncertainty existed as to what its missions were and how its mission structure might best be described.

1/For further discussion see our reports entitled: "National Energy Policy: An Agenda For Analysis" (EMD-77-16, Jan. 27, 1977); "Energy: Issues Facing the 95th Congress" (EMD-77-34, Apr. 28, 1977); and "The National Energy Act of 1977" (EMD-77-45, June 8, 1977).

Whereas the mission structure in figure 4-3 below is based on information obtained from ERDA, it does not represent a consensus within the agency or our views.

FIGURE 4-3

A PARTIAL ERDA MISSION STRUCTURE

Missions	Mission areas
Energy sources	Expand supply of commonly used resources
	Develop new resources
	Use more abundant resources
	Convert resources to desirable forms
	Increase use of inexhaustible resources
Conservation	(Not yet developed by ERDA)
Special nuclear applications	Military
	Space
	Civilian

Using the mission structure in figure 4-3 for illustrative purposes only, figure 4-4 shows how the first level in ERDA's 1978 budget request would be reconstructed on a mission basis.

FIGURE 4-4

CONVERTING TO A MISSION APPROACH

CURRENT APPROACH (FY 1978)	(billions)
1. CONSERVATION RESEARCH AND DEVELOPMENT	$ XX
2. FOSSIL ENERGY DEVELOPMENT	XX
3. SOLAR ENERGY DEVELOPMENT	XX
4. GEOTHERMAL ENERGY DEVELOPMENT	XX
5. FUSION POWER RESEARCH AND DEVELOPMENT	XX
6. FUEL CYCLE RESEARCH AND DEVELOPMENT	XX
7. LIQUID METAL FAST BREEDER REACTOR	XX
8. NUCLEAR RESEARCH AND APPLICATION	XX
9. NUCLEAR REGULATORY COMMISSION SAFETY FACILITIES	XX
10. ENVIRONMENTAL RESEARCH AND DEVELOPMENT	XX
11. LIFE SCIENCES RESEARCH AND BIOMEDICAL APPLICATIONS	XX
12. HIGH ENERGY PHYSICS	XX
13. NUCLEAR PHYSICS	XX
14. BASIC ENERGY SCIENCES	XX
15. NUCLEAR MATERIALS SECURITY AND SAFEGUARDS	XX
16. NAVAL REACTOR DEVELOPMENT	XX
17. NUCLEAR EXPLOSIVES APPLICATION	XX
18. URANIUM ENRICHMENT	XX
19. NATIONAL SECURITY (NUCLEAR WEAPONS)	XX
20. PROGRAM MANAGEMENT AND SUPPORT	XX
21. COST OF WORK FOR OTHERS	XX
22. OTHER COSTS AND CREDITS	XX
TOTAL	$54

MISSION APPROACH			(billions)
1. TECHNOLOGY BASE			$ XX
2. MISSIONS			
ENERGY SOURCES		XX	
CONSERVATION		XX	
SPECIAL NUCLEAR APPLICATIONS			
MILITARY	XX		
SPACE	XX		
CIVILIAN	XX	XX	XX
3. MANAGEMENT & SUPPORT			XX
TOTAL			$54

Congressional review of ERDA's mission structure deserves particular attention in view of the uncertainty surrounding it, the recent emergence of a national energy policy, and ERDA's pending reorganization as part of a new Department of Energy. In further considering ERDA's missions, it would seem desirable to define them in broad enough terms to admit any feasible energy exploration or conservation measure to be explored or developed in competition. Broadening missions in this way would encourage the new Department to identify first, the Nation's most pressing needs, and then to constantly look at differing approaches to reducing those needs or to meeting them through developing additional energy sources.

In reporting out legislation on a new Department of Energy, the Senate Committee on Governmental Affairs expressed an intent to obtain budget requests from the new Department in terms of "* * * mission categories, showing

how the funds requested will be applied to achieving agency end-purposes * * *." 1/

Review of mission funding

Once ERDA's missions are clarified, congressional review in mission budgeting would center on mission priorities and funding levels necessary to perform the missions. Congressional review might be concerned with such matters as:

--What are ERDA's approaches to particular missions and are there better ways?

--How do ERDA's mission priorities match the Nation's most critical energy shortages in the near and far term?

--How does the potential contribution of each mission compare with its required resources?

--Is there an imbalance in funding among the missions?

Congressional assessments of mission funding levels are further reinforced with reviews of individual energy programs.

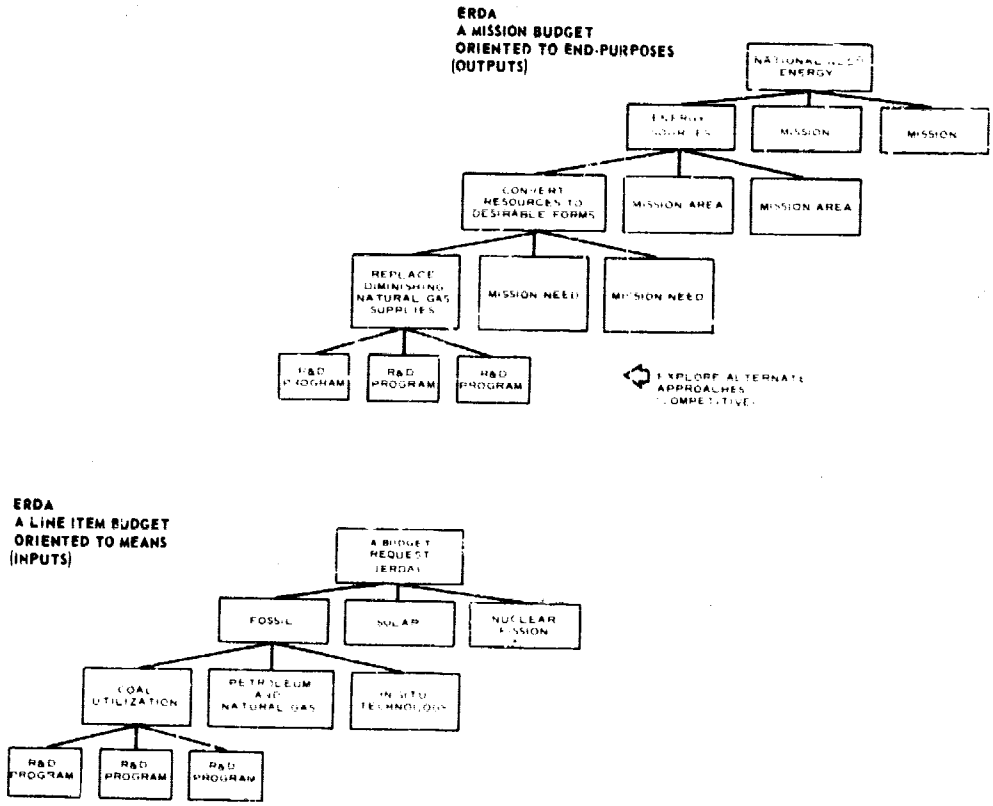
Program oversight

A program is a level of activity directed toward satisfying an energy need. A fully defined need sets in motion a program to be funded. Fully defined needs are those which are clearly related to legitimate mission end purposes affirmed by the agency, and stated independently of any preconceived solutions.

1/Report No. 95-164 of the Senate Committee on Governmental Affairs to accompany the Department of Energy Organization Act, 95th Cong., 1st sess., May 14, 1977, p. 58.

Figure 4-5 displays the linkage of missions, mission areas, mission needs and programs, and contrasts this structure with the current ERDA budget structure.

FIGURE 4-5
BUDGET APPROACHES COMPARED



The linkage above provides the groundwork for the second thrust of the mission approach--program oversight.

The emphasis in congressional program oversight is on:

--Insuring the separation of funds for gaining new knowledge from those financing new programs.

--Linking mission funding to affirmed needs.

--Insuring that competition is used to explore alternative design concepts and technical approaches.

--Monitoring the progress of program development at key turning points as a basis for funding the next step.

Funding the technology base

For the reasons cited in part I, it is important that new knowledge--the technology base--be funded separately.

In view of the pressing national need, the Department of Energy may need a large technology base as compared to that of some other agencies. The Congress provided the initial impetus to begin developing a strong technology base by requiring that activities be established for major energy sources, such as fossil and solar (Energy Reorganization Act of 1974, Public Law 93-438).

The level of funding for the technology base is a difficult value judgment. The Congress may wish to review the Department's criteria for proposed funding and solicit expert views about which technologies have the greatest potential and about funding levels. Part I of this report suggests other matters for congressional review of technology base funding. (See p. 14.)

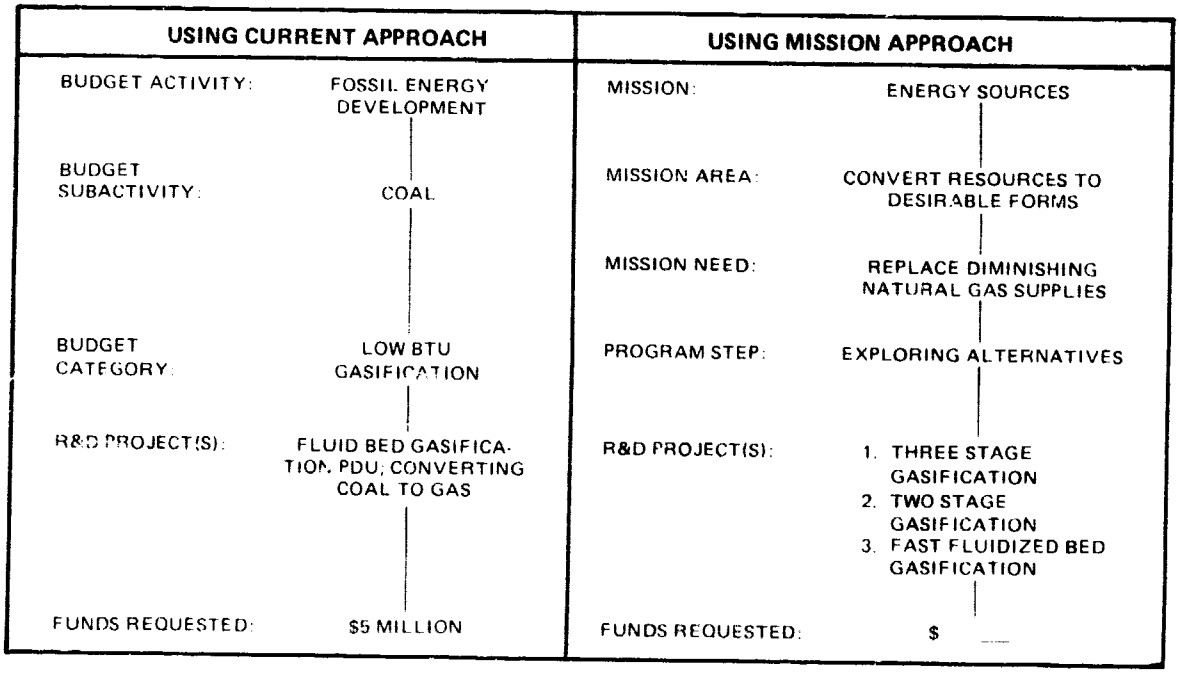
New information category added--mission need

A mission approach requires that a mission need approved by top agency administrators precede the start of a new program and be linked with funding requests.

Using an R&D project in ERDA's 1978 budget request, figure 4-6 compares the current budget presentation in technical terms with one based on a mission approach. As shown, funding is tied, in the revised budget structure, to (1) a mission (energy sources), (2) a mission area or function (convert resources to desirable forms), (3) a mission need (replace diminishing natural gas supplies), and (4) a program to meet that need.

FIGURE 4–6

ERDA ILLUSTRATION



With this kind of mission-oriented information, congressional review can oversee whether funding of R&D projects is tied to real needs of energy missions and whether these needs have sufficient priority to justify earmarking public funds to satisfy them.

Competitive exploration of alternatives

Exploring and demonstrating alternatives involves the search for specific solutions having the greatest potential to meet mission needs. Financing this effort with mission funding helps Congress to insure that no program

is allowed to evolve without first exploring alternative solutions competitively.

Much of ERDA's work ends with demonstration of a technological process. Because of the large expenses involved, funding of competing alternative solutions prior to this demonstration may be restricted to developing and testing elementary hardware. Beyond this elementary stage, for example, a decision to fund a pilot demonstration might cost about $60 million; a full demonstration plant might cost between $200 million and $600 million depending on plant size. 1/

Investments of these magnitudes, however, justify introducing competition early and evaluating competing design concepts before commitment to any one. This promotes fair competition in industry and avoids premature selection of solutions, which may later prove to be enormously costly or ineffective.

Previous figure 4-6 illustrated how a need couched in end-purpose terms opens the process to consideration of alternatives. Under the current approach used in ERDA's 1978 budget, a single R&D project is submitted for funding; under the mission approach several alternatives can actively compete for funding until sufficient evidence is available to justify a major investment in one.

Figures 4-7 and 4-8 illustrate R&D projects that did not openly compete with other design alternatives to enter a demonstration stage. In mission budgeting, if R&D resources are to be concentrated early on a particular solution, such actions are specially justified to agency management and disclosed to the cognizant congressional committees. 2/

1/Construction and operating costs of coal demonstration plants are shared by ERDA and industry on a 50/50 basis.

2/See also OMB Circular A-109, par. 15.

FIGURE 4–7

ERDA ILLUSTRATION

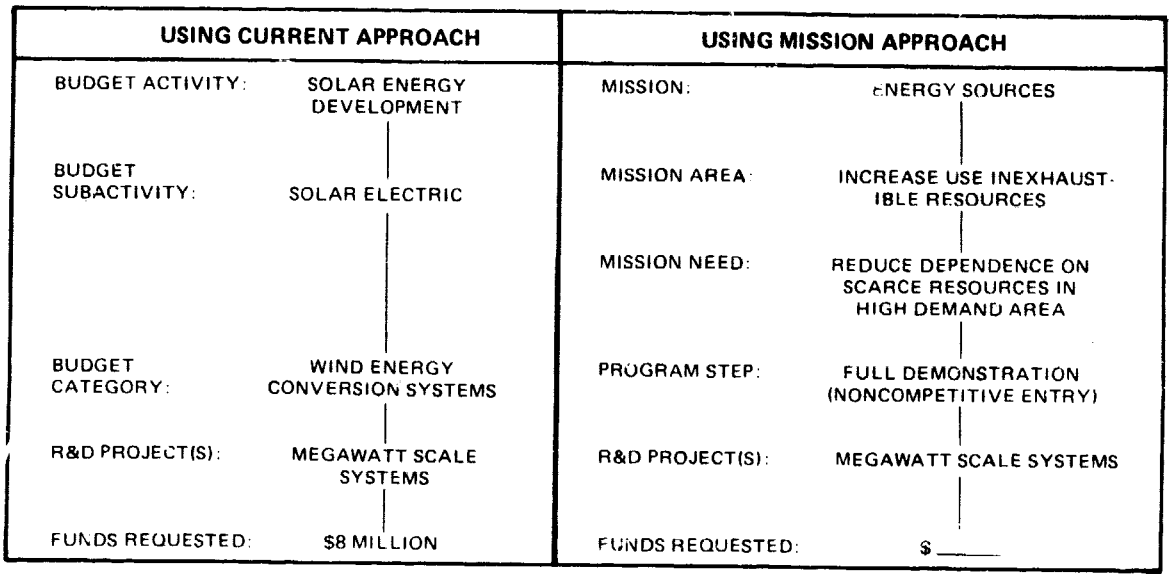
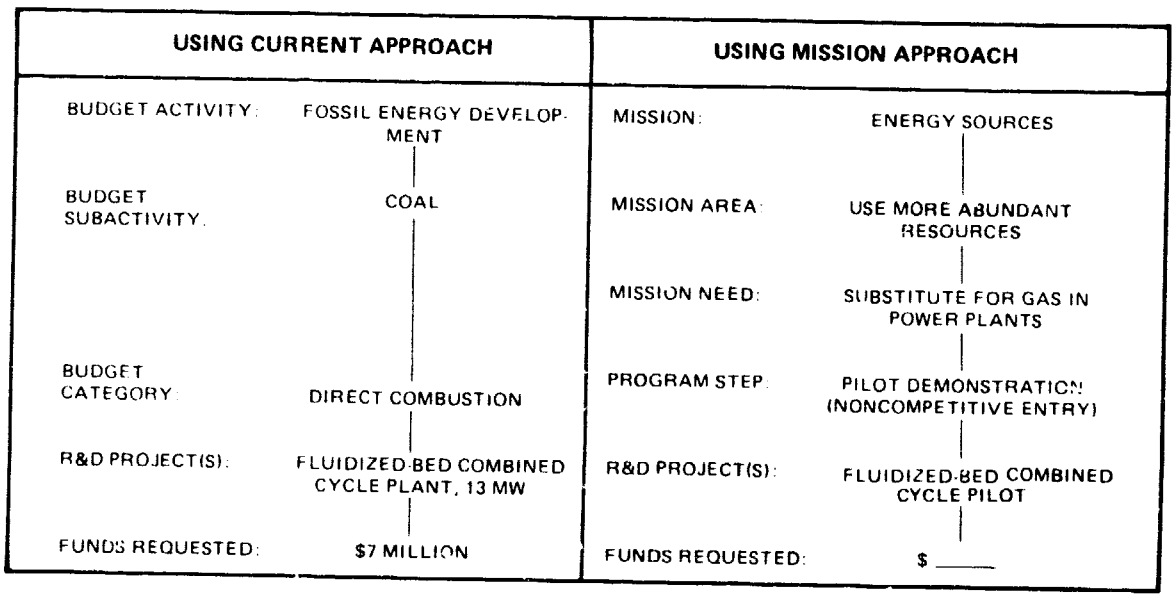


FIGURE 4–8

ERDA ILLUSTRATION



Separate funding in mission budgeting for exploring alternatives also involves a commitment on the part of ERDA to maintain an open competitive environment and to expend funds to seek truly innovative, wide-ranging alternatives. At the same time, any component in ERDA with an attractive candidate solution for a particular need ought to be able to compete for exploratory funding. Congressional review of this activity could inquire into the level of competition being sought and the criteria being used for selecting energy solutions for pilot or full demonstration (for additional matters of inquiry, see part I, p. 15 and 16).

Overseeing key program turning points

Program oversight in mission budgeting concentrates on the end-purpose need for the program, the goals the program is attempting to achieve, and key turning points in evolution of the program. Because much of ERDA's work ends with demonstrating the feasibility of various technological processes, the basic steps in program evolution are somewhat different than those of agencies which produce a product for their own use.

As pointed out previously, ERDA may choose to limit the program step of exploring alternatives to developing and testing elementary hardware and small scale demonstrations because decisions to proceed to advanced stages of demonstration (pilot plants or full demonstration plants) require enormous investments. ERDA's basic program steps or key turning points would seem to be:

--Establishing a mission need which initiates the exploration of competing alternatives.

--Selecting a technical approach for investment in pilot plant demonstration.

--Selecting a technical design for investment in full demonstration. 1/

Congressional scrutiny of these program steps could vary in intensity depending upon the circumstances. For example, the progress made at each step above could form the basis for funding the next one--which would be a major turning point in evolution of the program.

1/If the new department sponsors industry development beyond full demonstration, such a decision would also be a key program turning point.

Figure 4-9 illustrates conversion of another ERDA project to a mission approach, and its basic program step.

FIGURE 4–9

ERDA ILLUSTRATION

USING CURRENT APPROACH		USING MISSION APPROACH	
BUDGET ACTIVITY:	SOLAR ENERGY DEVELOPMENT	MISSION:	ENERGY SOURCES
BUDGET SUBACTIVITY:	SOLAR ELECTRIC	MISSION AREA:	INCREASE USE INEXHAUSTIBLE RESOURCES
		MISSION NEED:	REDUCE DEPENDENCE ON SCARCE RESOURCES FOR GENERATING ELECTRICITY
BUDGET CATEGORY:	SOLAR THERMAL ELECTRIC CONVERSION	PROGRAM STEP:	PILOT DEMONSTRATION
R&D PROJECT(S):	CENTRAL STATION	R&D PROJECT(S):	CENTRAL STATION
FUNDS REQUESTED:	$12.3 MILLION	FUNDS REQUESTED:	$ ____

Impact on congressional process

ERDA budget requests are submitted to four congressional committees. The newly formed Senate Committee on Energy and Natural Resources and the House Committee on Science and Technology separately review ERDA's budget to determine if appropriations should be authorized. The Senate and House Appropriations Committees review the budget to decide if such authorizations should be funded and to what extent.

If ERDA wants to spend more money than contemplated or for other purposes, it must consult with these committees. The procedures for doing so vary with the particular committee, the type of activity, and the amount involved; and are too complicated to discuss here.

As discussed in chapter 2, mission budgeting does not alter the current budget process. However, it does change how congressional data is presented and reviewed, and it revises authorizations and appropriations to a mission basis. Committees are still consulted regarding significant changes in the use of funds except that the focus in new programs is on any change in the mission need since a particular solution would not normally have been decided.

CHAPTER 5

DEPARTMENT OF DEFENSE

DOD is charged with maintaining the Nation's defenses. It fields several kinds of capabilities to deter and defend against enemy attacks and to retaliate.

Some of these capabilities serve strategic missions and others serve tactical or general-purpose missions. The purpose of strategic missions is to deter nuclear attack or use of coercion. Tactical mission objectives are to deter or counter a conventional attack, short of nuclear conflict in areas vital to the United States. For example, typical tactical objectives are to maintain open sea lanes to our allies and to be able to engage in a high intensity land war in central Europe.

Military capabilities can be multipurpose in nature, that is, serve in several mission areas or they may have secondary uses.

The seedbed of new and improved mission capabilities is R&D work undertaken by the three military departments and other defense agencies such as the Defense Advanced Research Projects Agency. Their work is conducted under the overall direction of the Director of Defense, Research and Engineering, who reports to the Secretary of Defense.

Figure 5-1 shows the DOD budget authority requested of the Congress for both fiscal years 1977 and 1978, including R&D.

FIGURE 5-1

DEPARTMENT OF DEFENSE -- MILITARY BUDGET

	FY 1977	FY 1978
	(billions)	
Military personnel	$ 25.4	$ 26.2
Retired military personnel	8.4	9.0
Operation and maintenance	31.9	34.2
Procurement	29.3	35.1
Research, development, test and evaluation	10.9	12.0
Military construction	2.3	1.4
Family housing	1.2	1.3
Revolving and management funds and other	0.3	0.1
Net allowances for pay raises	1.6	2.4
Total	$111.3	$121.7

Source: President's FY 1977 and FY 1978 budgets.

CURRENT BUDGET

The amounts of $10.9 and $12.0 billion requested for defense R&D are the largest in the Federal Government. 1/ They are made up of individual requests from the Army, Navy, Air Force, plus the Director of Test and Evaluation Directorate and defense agencies. Each receives a separate appropriation. The requests are broken down initially into a number of major budget activities.

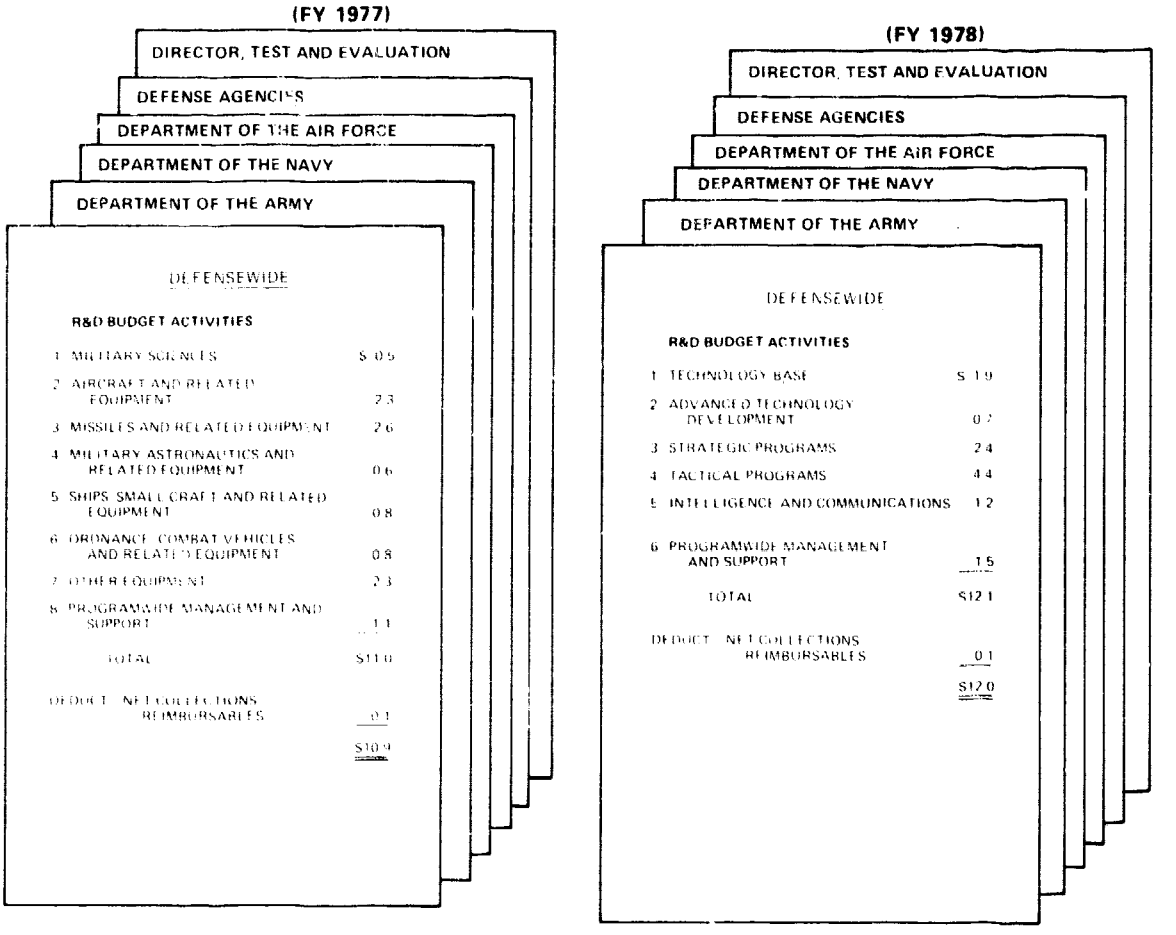
1/The $12 billion requested for fiscal year 1978 by President Ford was subsequently modified by President Carter to $11.7 billion.

These budget activities represented different kinds of products in the 1977 budget. But in the 1978 budget they represent different kinds of missions. Note the contrast in figure 5-2.

FIGURE 5-2

EXCERPT FROM PRESIDENT'S BUDGET

(BILLIONS OF DOLLARS)

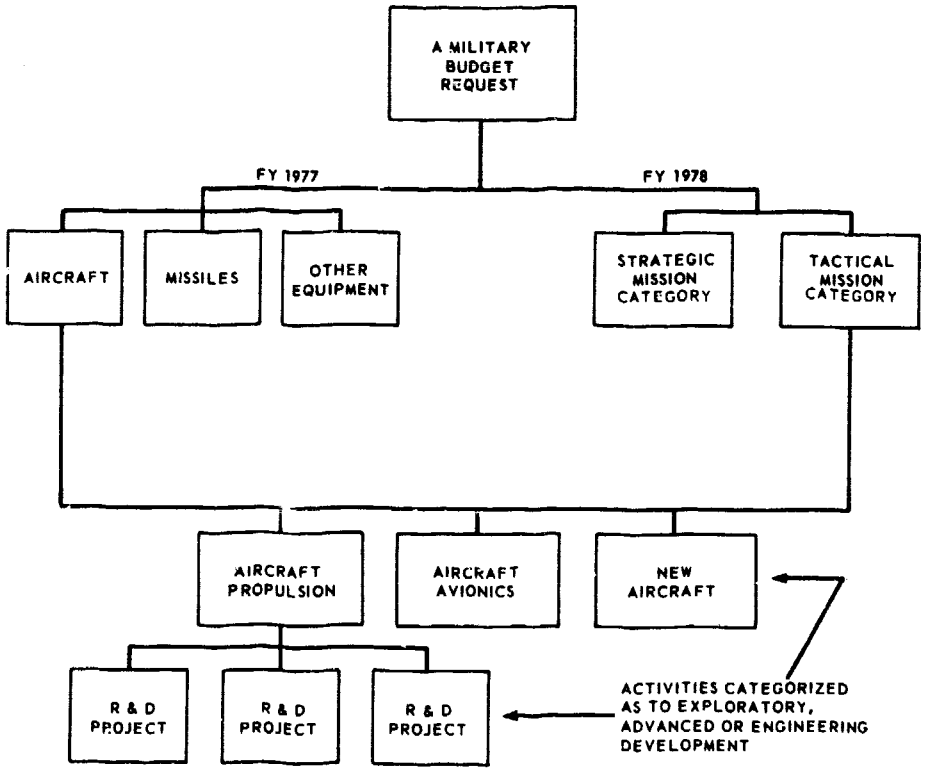


There are 10 large R&D volumes of congressional backup or justification data. These "backup books" list product- or technology-oriented subactivities which in budget jargon are called "line items" and which DOD calls program elements. These subactivities and related R&D projects are categorized by their stage of development--exploratory, advanced, and

engineering development. Those over a certain dollar amount are summarized. 1/

For fiscal year 1978 the DOD budget submission and backup books do not follow a consistent pattern. The initial breakdown is by mission category, but succeeding breakdowns are still product oriented in much the same way as the previous year, as shown in figure 5-3. As discussed later, a DOD mission structure beyond the initial breakdown is still unresolved.

FIGURE 5-3
BREAKDOWN OF CONGRESSIONAL BUDGET JUSTIFICATION DATA



A product-oriented budget structure stresses product solutions and oversight of their development. In this connection, during fiscal year 1978 budget reviews, Secretary of

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1/The summaries include, depending on the stage of product development, brief description, basis for fiscal year request, basis for increase over previous fiscal year, personnel impact, detailed background and description, related activities, work performed where and by whom, program accomplishments and future programs, and test and evaluation data.

Defense Brown complained that adjustment of a large number of R&D line items--often without rationale--involved the Congress in detailed management of individual programs. He said this constrains effective management, consideration of technological and engineering options, and cost-control efforts. His predecessor observed during the fiscal year 1977 budget review that detailed and numerous committee line-item adjustments require modification of existing contractual arrangements and programs at considerable cost and

> " * * * divert the continuing discussion between the Department and the Congress from the considerably more important fundamental and substantive issues."

A congressional study following the DOD 1977 budget cycle concluded that congressional review is occupied with details that should normally be resolved in DOD at the level of the program manager. 1/

A MISSION APPROACH

In mission budgeting, upper levels in the budget structure show DOD basic responsibilities expressed as end purposes. Mission budgeting groups all DOD activities serving common purposes regardless of the type of product or organization involved. Lower tiers in the budget structure take a closer look at the end purposes to be served and at the needs to be met. The lowest level then shows the types of activity or means to accomplish end purposes and the progress being made on specific programs.

The mission focus enhances congressional policy review and program oversight in several respects.

Policy review

Policy review concerns decisions of executive branch administrators and the Congress. In the case of DOD, such policy review covers:

1/"Senate Procedures For Authorizing Military Research and Development," Louis Fisher, Congressional Research Service, A Compendium of Papers on Priorities and Efficiency in Federal Research and Development, submitted to the Subcommittee on Priorities and Economy in Government, Joint Economic Committee, Oct. 29, 1976, pp. 42 and 43.

--DOD's mission purposes and their consistency with congressional and executive views of defense and foreign policy.

--Mission responsibilities within DOD and approaches to executing missions.

--Kinds and levels of mission capabilities to be maintained and degree of readiness.

--Important capabilities that should be developed, their mode of use, and the extent of their overseas deployment.

Although the use and level of specific mission capabilities concern both defense and foreign policy, the selection of individual product solutions (specific weapons) to provide such capabilities is rarely a matter of policy. 1/

To make way for the kind of mission policy review outlined above, congressional committees must first get an overview of DOD missions, capabilities, deficiencies, and needs for new programs reconciled with total resources available for each mission. Annual posture statements of the Secretary of Defense and the Director, Defense Research and Engineering, could be retailored to serve this purpose.

Review of DOD missions

The first step in congressional policy review under mission budgeting would be to get clear and consistent statements of what are, or should be, DOD mission end purposes. Presently, there are several mission structures in DOD, each one different. The Director, Defense Research and Engineering, for instance, uses one mission structure to oversee military service R&D programs. The Joint Chiefs of Staff use another, and the three military services have their own variants. See figure 5-4.

1/For further discussion of policy review, see "Incentives and Information, Quality in Defense Management," J.A. Stockfisch, R-1827--Defense Advanced Research Projects Agency, Rand, Santa Monica, Cal., August 1976, p. 52.

FIGURE 5—4

DOD MISSION STRUCTURES COMPARED

MISSION CATEGORIES	DIRECTOR OF DEFENSE, RESEARCH AND ENGINEERING		JOINT CHIEFS OF STAFF		ARMY		NAVY (NOTE:)		AIR FORCE	
	MISSIONS	MISSION AREAS	MISSIONS	MISSION AREAS	MISSIONS	MISSION AREAS	MISSIONS	MISSION AREAS	MISSIONS	MISSION AREAS
STRATEGIC	OFFENS	LAND-BASED STRIKE SEA-BASED STRIKE AIRBORNE STRIKE AND PEN AIDS	OFFENSE	LAND-BASED MISSILES SEA-BASED MISSILES STRATEGIC AIRCRAFT			PROJEC-TION	SEA-BASED STRATEGIC PROJECTION	OFFENSE	LAND-BASED STRIKE AIRBORNE STRIKE AND PEN AIDS
	DEFENSE	BALLISTIC MISSILE DEFENSE STRATEGIC AIR DEFENSE SPACE DEFENSE	DEFENSE	BALLISTIC MISSILE DEFENSE AIR DEFENSE SPACE DEFENSE	DEFENSE	BALLISTIC MISSILE DEFENSE	SUPPORT		DEFENSE	ATMOSPHERIC DEFENSE MISSILE DEFENSE SPACE DEFENSE
	CONTROL	STRATEGIC C^3 WARNING AND ATTACK ASSESSMENT							STRATEGIC C^3	
	THEATER NUCLEAR FORCES	BATTLEFIELD SEA DENIAL THEATER								
TACTICAL	LAND WARFARE	BATTLE SURVEILLANCE CLOSE COMBAT FIRE SUPPORT FIELD ARMY AIR DEFENSE AMPHIBIOUS AND SPECIAL WARFARE LAND MINE WARFARE	LAND WARFARE	AREA DENIAL AND BARRIERS ARMORED OPERATIONS FIRE SUPPORT AIR DEFENSE	LAND WARFARE	CLOSE SUPPORT FIRE SUPPORT AIR DEFENSE				
	OCEAN CONTROL	MULTIMISSION NAVAL SYSTEMS SURF. OCEAN SURVEILLANCE UNDERSEA SURVEILLANCE ANTI-SURFACE WARFARE ANTI AIR WARFARE AND EW ANTI-SUBMARINE WARFARE NAVAL MINE WARFARE	NAVAL WARFARE	AMPHIBIOUS OPERATIONS FLEET OFFENSE FLEET AIR DEFENSE ANTI-SUBMARINE WARFARE AREA DENIAL			SEA CONTROL	ANTI-AIR WARFARE ANTI-SUBMARINE WARFARE ANTI-SURFACE WARFARE		
							SEA-BASED POWER PROJECTION	AMPHIBIOUS WARFARE TACTICAL AIR WARFARE SHORE BOMBARDMENT		
	AIR WARFARE	AIR SUPERIORITY INTERDICTION AIR DEFENSE SUPPRESSION TACAIR RECONNAISSANCE	AIR WARFARE	COUNTERAIR INTERDICTION DEFENSE SUPPRESSION CLOSE AIR SUPPORT					AIR WARFARE	COUNTERAIR INTERDICTION CLOSE AIR SUPPORT
	COMBAT SUPPORT	AIRLIFT/MOBILITY LOGISTICS/GENERAL COMBAT SUPPORT TACTICAL COMMUNICATIONS TACTICAL COMBAT INTEGRATION ELECTRONIC WARFARE/COUNTER C^3 NAVIG., POSITIONING PHYSICAL SECURITY AIRCRAFT SURVIVABILITY CHEMICAL BIOLOGICAL DEFENSE/CHEM. WFRE.	COMBAT SUPPORT	MOBILITY LOGISTICS ELECTRONIC WARFARE SEARCH AND RESCUE	OTHER COMBAT SUPPORT		COMBAT SUPPORT	FLEET SUPPORT AND MOBILITY GENERAL SUPPORT AND LOGISTICS COMMAND CONTROL AND COMMUNICATIONS	RECONNAISSANCE AIRLIFT TACTICAL C^3	
MISSION SUPPORT										
MANAGEMENT AND SUPPORT										

NOTE: THE NAVY'S INTERNAL BREAKDOWN OF MISSION AREAS IS NOT SEGREGATED AS TO STRATEGIC AND TACTICAL CATEGORIES.

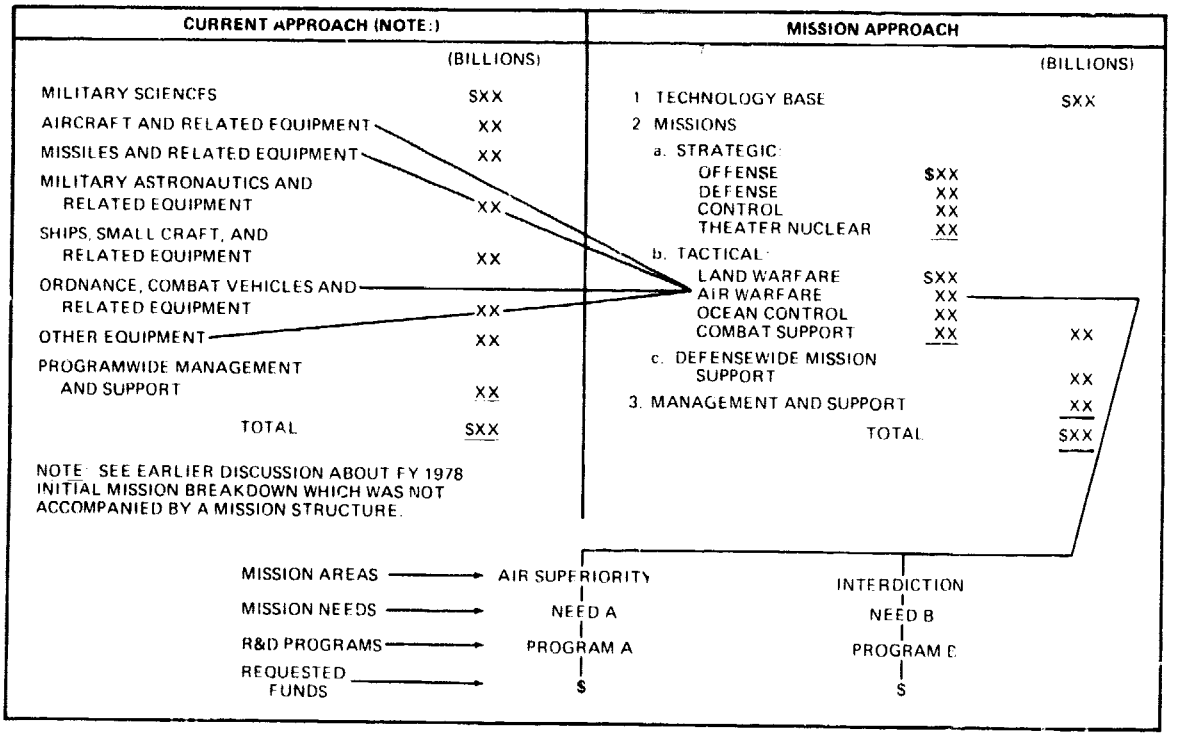
SOURCE: OFFICE OF DIRECTOR, DEFENSE RESEARCH AND ENGINEERING

In mission budgeting, the executive branch and the Congress would insist on a commonly understood mission structure, one that could be reviewed annually in the light of current defense and foreign policy. 1/ More rapid responses to defense policy changes and to new needs and priorities in the funding process should be possible.

Figure 5-5 shows conversion of the usual DOD congressional budget to a mission format. To illustrate the mission approach, the structure presently used internally by the Director, Defense Research and Engineering, is shown; one mission (tactical air warfare) has been extended to show how it links with funding requests.

FIGURE 5-5

CONVERTING TO A MISSION APPROACH
DEPARTMENT OF DEFENSE



1/New policy requires the Secretary of Defense and the military services to establish a mission structure " * * * to reflect the several operating categories essential to accomplish the Defense mission." DOD Directive 5000.2, Jan. 1977, p. 4.

As figure 5-5 shows, some parts of four different product activities in the current approach on the left side (aircraft, missiles, ordnance and other equipment) belong in the air warfare mission on the right side. Similarly, these and other product development endeavors on the left side have activities that belong to other missions on the right side.

As noted previously, DOD classified budget activities in its fiscal year 1978 budget initially by strategic and tactical mission categories but, at levels below this, shifted back to the usual product-oriented budget structure. The top categorization, therefore, was not accompanied by a mission structure or tied to mission needs. Other actions that need to be taken to missionize the DOD budget are identified at the end of this chapter.

Mission roles and responsibilities

Historically, R&D solutions and new programs have been shaped by the individual military Department's own particular views of their defense missions and priorities. Interservice rivalry tends to play a major role in shaping defense needs and capabilities and either can be useful or destructive. By starting a new weapon development, for example, responsibility for the mission is assumed. Rushing its development will help insure or expand the service's role or obtain for it a share of the other service's role (and budget). 1/

DOD has been making greater use of multiservice capabilities, such as air-to-air missiles. The House Appropriations Committee, however, is dissatisfied with the progress. In its report on the DOD fiscal year 1977 budget, the Committee said:

> "This year's hearings identified * * * developing hardware that duplicates equipment already in the inventory or under development by another service. The Committee has admonished the Department [of Defense] in the past * * * yet duplication continues to occur."

The Committee said that existing mechanisms in the Office of the Secretary of Defense to review and eliminate duplication are not working effectively. As a result, the Committee

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1/The problem of mission rivalry and overlap is discussed at length in the Procurement Commission Report; see, for example, part II of that report, pp. 76 to 77, 101, and 105. Also, see "Incentives and Information, Quality in Defense Management," J. A. Stockfisch, R-1827--Defense Advanced Research Projects Agency, Rand, Santa Monica, Cal., August 1976, p. 64.

asked for much additional detail in future budgets of the military services. 1/

The mission approach is intended to help agency administrators and the Congress use interagency rivalry productively. First, it would make mission responsibilities explicit and assignments visible at the inception of new agency programs and, second, interservice competitions would be purposeful and controlled. As all R&D funding of new capabilities is tied to DOD mission responsibilities, congressional committees would be in better position to surface unwarranted duplications or voids in capabilities.

Mission funding

After congressional policy review of DOD missions and responsibilities for them, deciding the level of funding for each mission is the crucial next step. Inquiry is made, for example, into:

--DOD approaches and plans for carrying out missions and whether there are better ways.

--DOD's ability to execute the missions and priority needs for new capabilities.

--Situations in which the new DOD capabilities will be used, and how this usage relates to mission responsibilities and foreign policy.

--What other DOD components and programs share the same missions and contribute to the same capabilities.

--How the "worth" of particular mission or multimission capabilities compare to their required funding.

Such inquiries are intended to help congressional committees decide whether mission end purposes and needs to be funded in the DOD budget are compatible with congressional views of defense policy and priorities, whether funding is being earmarked for the most pressing needs, and whether overall funding for each mission is appropriate. Individual program reviews will then help to refine these judgments.

1/H.R. 94-1231, U.S. Congress, House Committee on Appropriations, Department of Defense Appropriation Bill, 1977 Report, 94th Cong., 2d sess., p. 120.

Program oversight

The final link in the mission-oriented budget structure is a mission need. Its emergence sets in motion a program and funding. Like the budget structure itself, the need is expressed in DOD end-purpose responsibility terms and is stated apart from any solution. In mission budgeting, congressional oversight of individual R&D programs tends to concentrate on:

--Keeping the funding of new knowledge separate from program funding.

--Linking program funding to affirmed mission needs.

--Investing early program funding in industry competition to explore alternative design concepts and technical approaches.

--Looking at a few key turning points in the evolution of programs as a basis for funding the next step.

Funding the technology base

In the current DOD budget, obtaining new knowledge about such things as materials, optics, and electronics is funded through work done in the basic sciences and as part of each product-oriented budget activity (see figs. 2-5 and 5-2). As discussed in part I of this report, funding of technology base work should be clearly separate from mission-oriented work. This is intended to provide a knowledge base for the future but, at the same itme, avoid any diversion of these funds to sponsor preconceived designs that lock out competition.

The magnitude of technology base funding is essentially judgmental. Levels of funding may vary depending on how new and promising or how old and strained the particular technology is and how pressing DOD's problems are. The Congress may wish to hear a spectrum of views on the particular technologies being proposed and their funding.

New information category added--mission need

In mission budgeting, new programs are triggered by needs affirmed by agency top management. Figure 5-6 illustrates the direct linkup between a DOD mission, a mission area, a mission need, a program to satisfy that need, and several R&D candidate solutions to be explored. With this information, Congress can assess mission needs and their priorities as well as oversee evolution of new programs to satisfy the needs.

FIGURE 5-6
A MISSION APPROACH

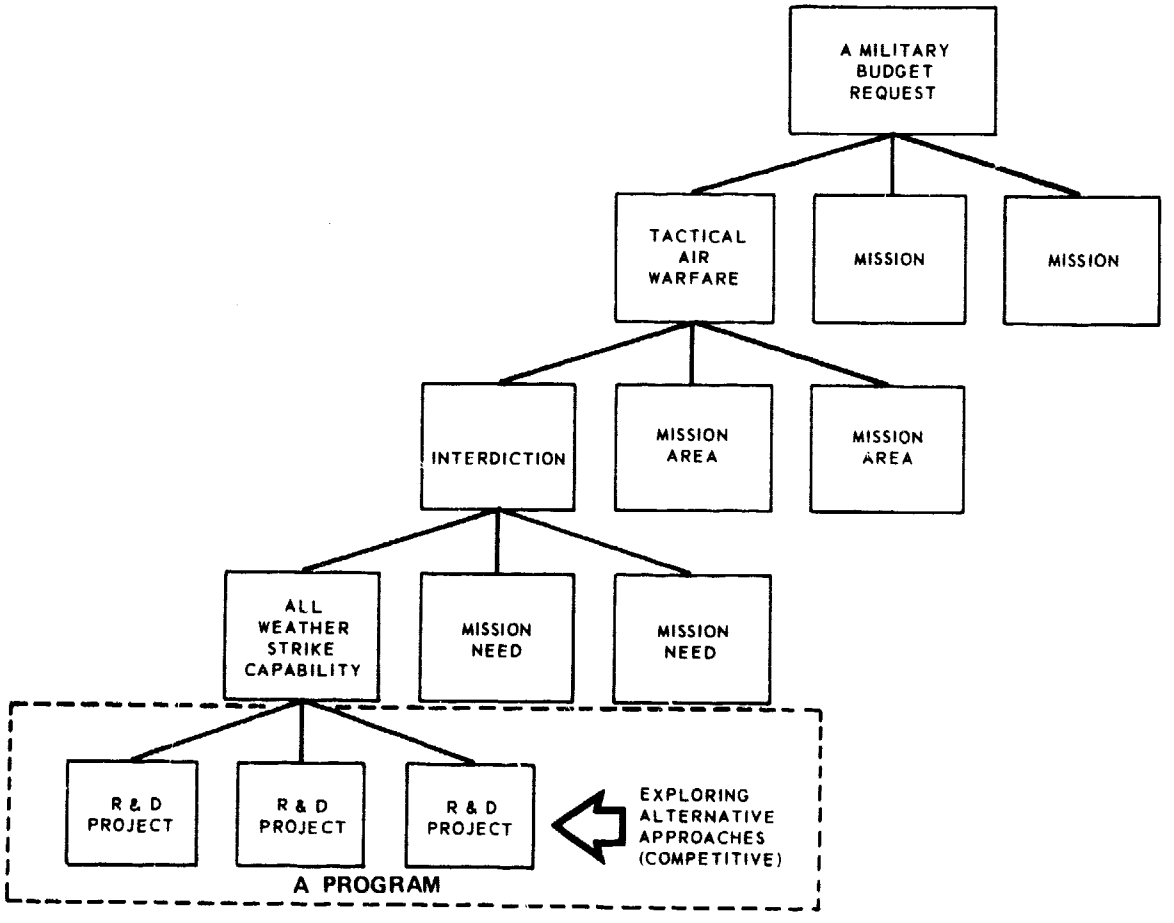
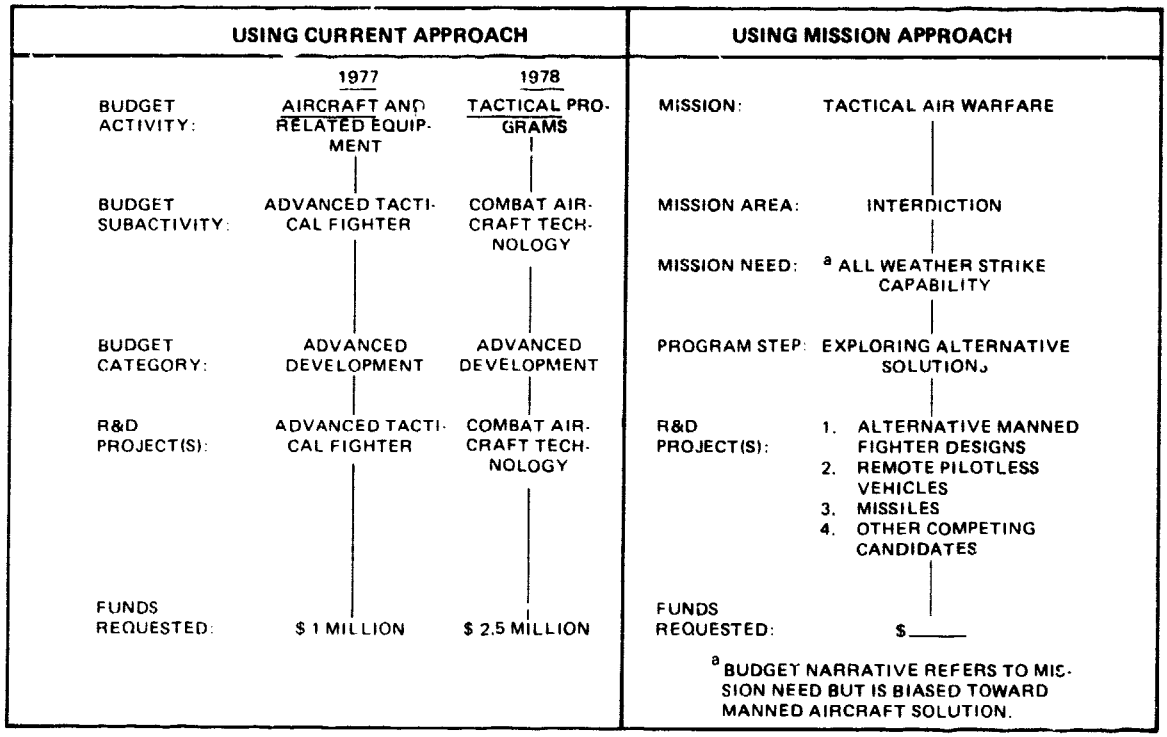


Figure 5-7 presents an actual R&D project taken from DOD's current budget. Presentation of that project is converted to a mission approach to illustrate the linkage between a mission, a mission area, a mission need, and R&D funding.

FIGURE 5–7

DOD ILLUSTRATION



Competitive exploration of alternatives

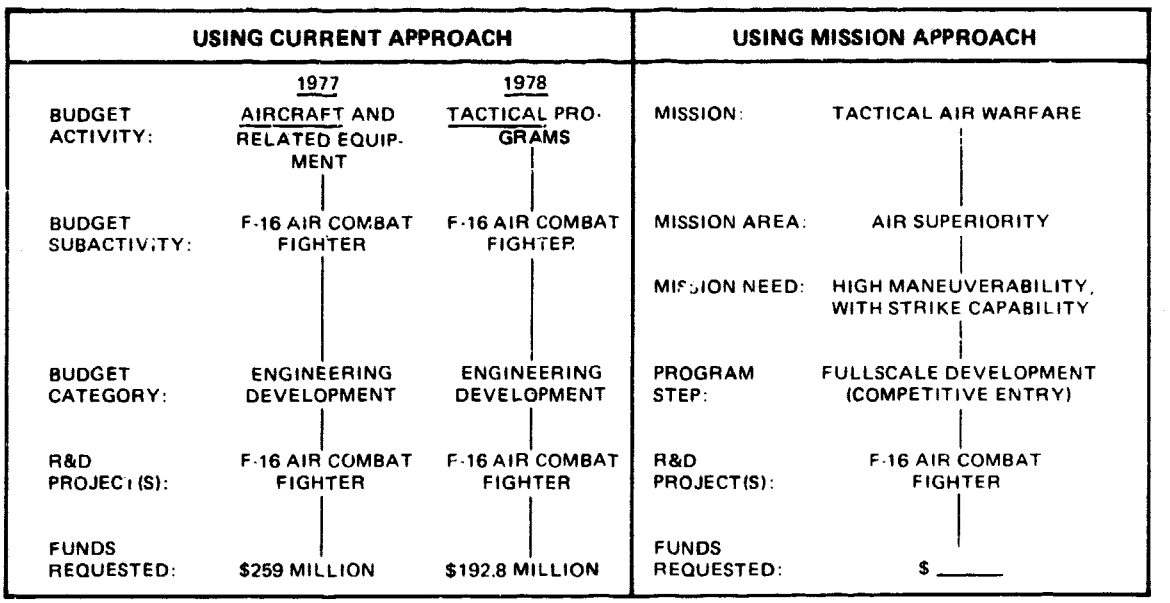
By funding exploration of an end-purpose mission need rather than a specific solution, mission budgeting should stimulate differing and innovative responses and ideas. The most promising alternatives are explored with mission funding under competitive arrangements. This competitive exploration occurs early in the program when small design teams are limited to building and demonstrating elemental hardware, the funding itself is fixed, and the cost is relatively small.

Figure 5-7 above shows an R&D project for combat aircraft technology in the DOD 1978 budget and how a statement of need couched in mission end-purpose terms opens up a

number of interesting alternatives that are not limited to aircraft. Figure 5-8 presents another R&D project in the 1978 budget--the F-16 air combat fighter. Here, DOD subjected alternative designs to competitive demonstration before it chose one for full-scale development.

FIGURE 5-8

DOD ILLUSTRATION



Illustrations of R&D projects in the 1978 budget that did not compete to enter full-scale development are shown in figures 5-9, 5-10, and 5-11.

The first one is the Pershing II missile system. Its design was pursued for about 3 years, in a technology base activity entitled "Radar Area Correlation." It was a part of a budget line item called "Terminal Homing Systems." 1/ Following this period of relatively obscure development, the missile surfaced as a separate line item in 1975 for large-scale funding. Under a mission approach, such a project

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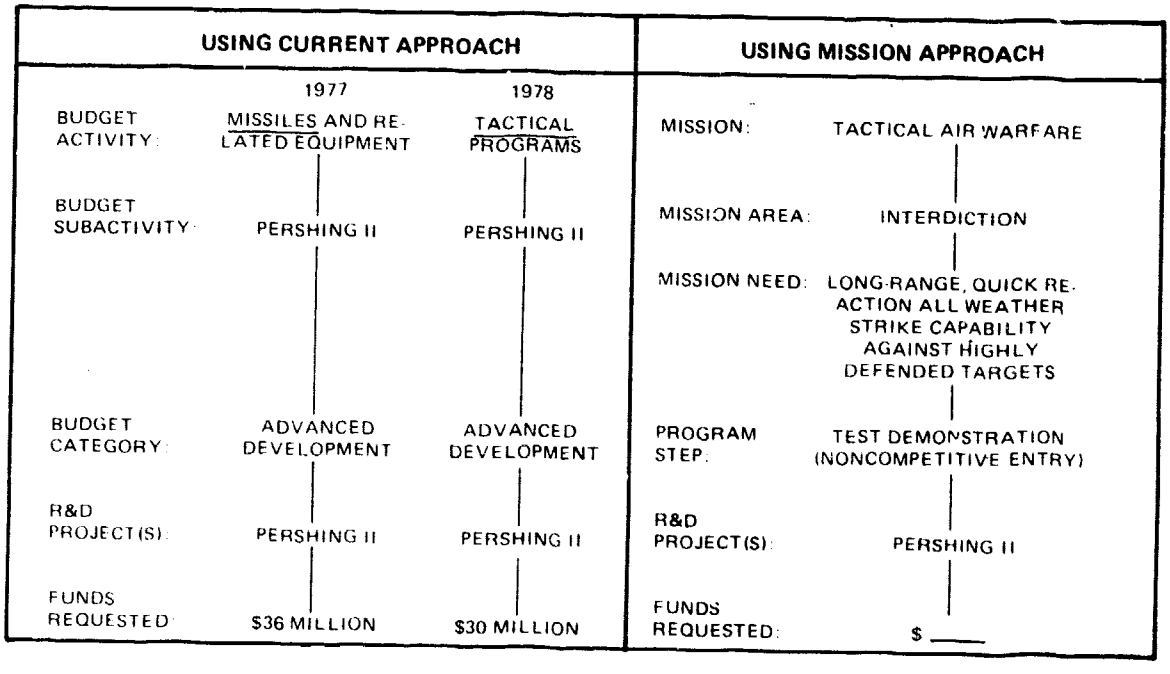
1/See our report on the Pershing II (PSAD-77-51, Jan. 24, 1977, pp. 17 and 23).

would compete openly from the start with other design concepts, including those of other military services. Conversely, if a decision is made to concentrate R&D resources early on a single design concept, special agency justification and congressional disclosure are made in advance. 1/

FIGURE 5–9

DOD ILLUSTRATION



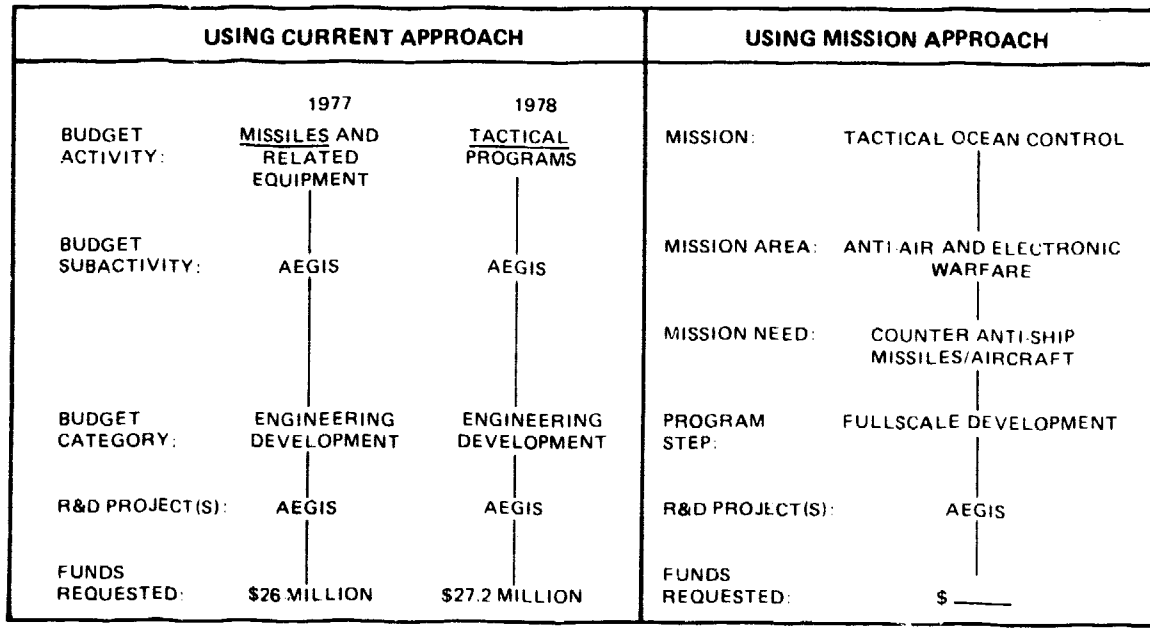
1/This is now required for new major systems; see OMB Circular A-109, par. 15.

Figures 5-10 and 5-11 depict two additional R&D projects in the DOD 1978 budget that are in full-scale development--the Aegis and Patriot missile systems. Neither of these projects competed with other possible design concepts for meeting the mission need. The two systems, if deployed, are expected to cost several billion dollars. 1/

Investments of such magnitude justify creation and evaluation of competing design concepts before commitment to any single one. Under a mission approach, the mission need opens up the process to exploring competing alternative candidates and test demonstrations as a qualification for full-scale development. Additional matters for congressional inquiry in this budget activity are outlined in part I. (See pp. 15 and 16.)

FIGURE 5-10

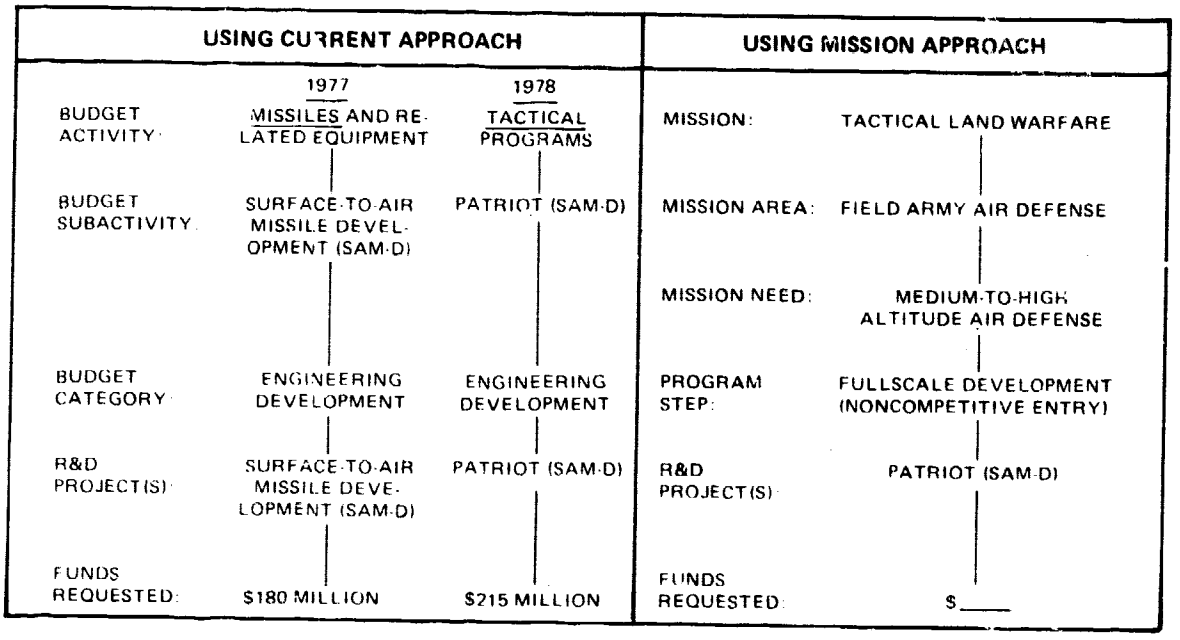
DOD ILLUSTRATION



1/For analysis of Aegis system, see our report entitled, "Information on Fleet Air Defense," classified "Secret," (PSAD-77-82, Apr. 25, 1977).

FIGURE 5–11

DOD ILLUSTRATION



Multiservice use of capabilities

In the past, separate military programs for developing similar products and capabilities have brought into question whether common (multiservice) solutions were possible if the programs had started from ground zero differently. This question has haunted several major aircraft and missile programs in the past, and rarely has the answer been conclusive.

A recent example is the Navy F-18 aircraft (see fig. 5-12) which prompted congressional hearings because of a similar aircraft (F-16) already under development by the Air Force (see fig. 5-8).

FIGURE 5-12

DOD ILLUSTRATION

USING CURRENT APPROACH			USING MISSION APPROACH	
	1977	1978		
BUDGET ACTIVITY:	AIRCRAFT AND RELATED EQUIPMENT	TACTICAL PROGRAMS	MISSION:	TACTICAL AIR WARFARE
BUDGET SUBACTIVITY:	F-18 AIRCRAFT	F-18 AIRCRAFT	MISSION AREA:	AIR SUPERIORITY
			MISSION NEED:	SEA BASED AIR SUPERIORITY/STRIKE
BUDGET CATEGORY:	ENGINEERING DEVELOPMENT	ENGINEERING DEVELOPMENT	PROGRAM STEP:	FULLSCALE DEVELOPMENT (NONCOMPETITIVE ENTRY)
R&D PROJECT(S):	F-18 AIRCRAFT	F-18 AIRCRAFT	R&D PROJECT(S):	F-18 AIRCRAFT
FUNDS REQUESTED:	$347 MILLION	$627 MILLION	FUNDS REQUESTED:	$____

Using common mission language allows the military services to state their needs in common terms. Design capabilities can be created and explored for both inter- and intra-service use. Combining the efforts of the military services in this way increases the span of knowledge and creative design work that can be applied to a given defense need.

Overseeing key program turning points

In mission budgeting, the central focus of program oversight is the mission need and the basic step of, or next turning point, in the program to be funded. These steps are the:

--Exploration of competing alternatives.

--Design choice which commits the program to its development.

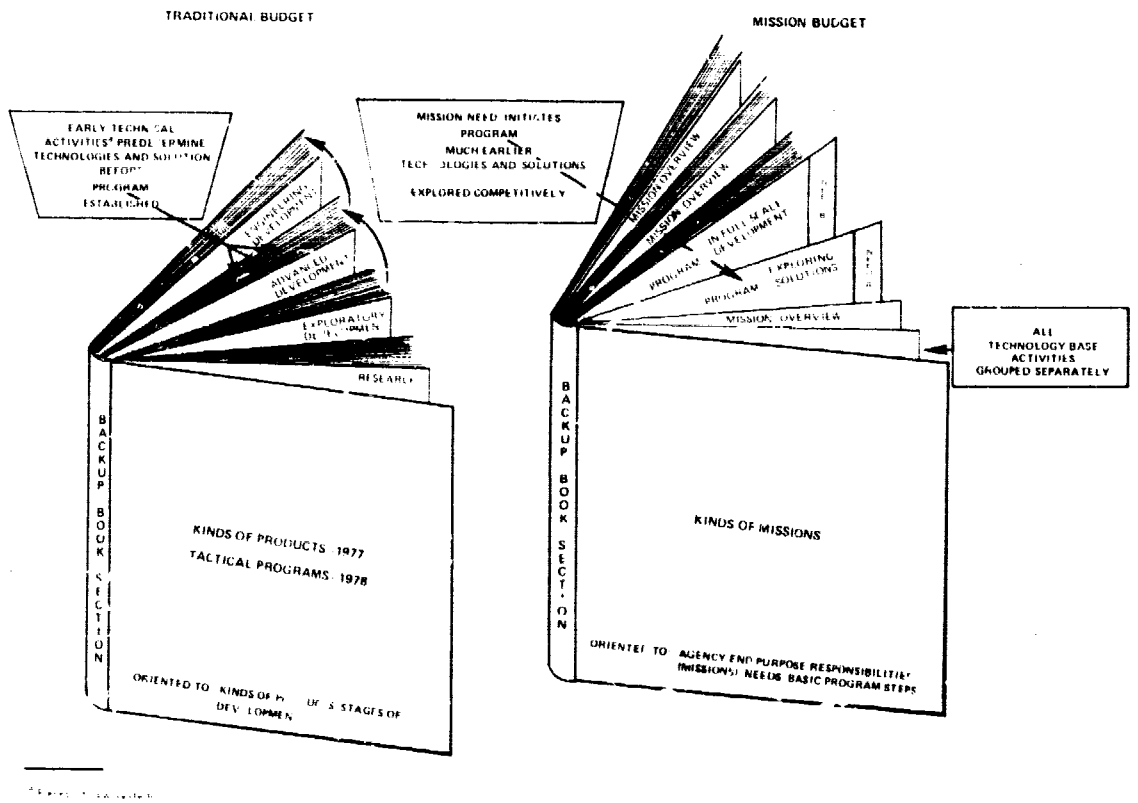
--Commitment to full production.

Previous illustrations converting R&D projects in the DOD 1978 budget to a mission approach show these basic program steps. Progress made in each basic step of the program would signal whether the next step or program turning point should be funded. More intensive congressional review could vary with the difficulty experienced by DOD in accomplishing a particular program step.

As to current backup data, committees could retain whatever features seem useful, as well as ask for breakdowns of data other than by missions. Conversion of the DOD congressional backup book to a mission approach is illustrated in figure 5-13. The figure highlights major implications for congressional oversight of R&D programs.

FIGURE 5-13

AGENCY BUDGET JUSTIFICATION



Impact on congressional process

DOD budget requests and backup data are submitted to four congressional committees. The House and Senate Armed Services Authorization Committees separately review the data to determine if appropriations should be authorized to support defense activities. 1/ Similarly, the House and Senate Appropriations Committees review the same data to decide if authorized activities should be funded and at what level. The end result of these congressional reviews is an R&D appropriation of a lump sum for each DOD component.

The most frequent question asked by DOD officials is whether or not mission budgeting requires one appropriation as opposed to separate appropriations for the military services. The number of appropriations for DOD is for the Congress to decide. If individual appropriations for each DOD component continue to be used, then it would be important to assign lead responsibilities to DOD components for mission areas shared with others.

As discussed more fully in part I, mission budgeting complements rather than alters congressional budget procedures. It recasts DOD's product-oriented presentation in mission-oriented terms; it focuses congressional attention on mission end purposes, needs, and mission funding levels; and it anchors congressional authorization and funding to agency missions.

Following budget approval, DOD would be accountable for the level of mission performance funded by the Congress. Committees would continue to be consulted on significant changes in the funding of missions or on changes that alter the purposes for which the funding was approved. Early in new programs, such consultations would focus on changes in purposes of expenditures, since the means of satisfying a particular need would not as yet have been decided.

1/The current Armed Services' authorization process actually stems from concerns in the late 1950s over the purpose, or "mission," of various Army, Navy, and Air Force missiles (the missile rivalry). Although the concerns involved overlapping purposes, or missions, the legislated funding categories were based instead on particular kinds of products. Report of the Commission on Government Procurement, Vol. 2, Part C, p. 107.

CONGRESSIONAL/DOD ACTIONS

For fiscal year 1978 the Senate Armed Services Committee revised its hearing format so that some DOD mission areas could be covered. Its authorization report includes a brief analysis by mission category. 1/ As noted previously, DOD's 1978 budget contained only an initial breakdown of mission categories, not a true mission structure. (See pp. 46 and 47.) Also, several other actions remain to be taken before that budget would qualify for a mission approach. These include:

--Incorporating the remaining portions of the mission structure, including mission areas that have DOD-wide acceptance.

--Linking to this mission structure the mission needs and stating them in end-purpose terms as a basis for funding of R&D activities.

--Eliminating the advanced technology development budget category (see fig. 5-2) by transferring nonmission work to the technology base category and mission work to the appropriate mission category. Rationale for this segregation is in part I, see page 13.

The Senate Budget Committee in recent years has been attempting to set ceilings on national defense with mission-oriented budgets. In spring 1977 hearings, Secretary of Defense Brown pledged to that Committee some form of a mission budget for fiscal year 1979. He said:

> "* * * whatever the reasons, [DOD] simply has not done enough homework on the substantive issues to produce what I would regard as an acceptable format * * * I would like to make sure that when we do it [produce a mission budget], we do it right."

1/Senate Report No. 95-129 on "Authorizing Appropriations For Fiscal Year 1978 for Military Procurement, Research and Development, Active Duty, Selected Reserve, and Civilian Personnel Strengths, Civil Defense, and for Other Purposes," Committee on Armed Services, 95th Cong., 1st sess. May 10, 1977.

CHAPTER 6

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA was created by the National Aeronautics and Space Act of 1958 (Public Law 85-568). Its purpose was to engage in civilian-related aeronautical and space activities. In aeronautics, NASA is responsible for contributing to the usefulness, performance, speed, safety, and efficiency of civilian and military aircraft. The agency's responsibilities in space include acquiring scientific knowledge, developing space vehicles and other equipment for conducting scientific investigations, and demonstrating technology applications for civilian and military needs.

Explorations in space provide new knowledge of the universe. Satellites launched into orbit have opened new roads in communications and weather forecasting. For the future, NASA has identified possible endeavors, such as converting sunlight to electrical power and transporting people to live and work in space.

Considering the potential impact of NASA's R&D activities on the Nation's economic advancement and well being, the Congress is expected to have a continuing interest in the purposes for which NASA requests R&D funding.

CURRENT BUDGET

President Ford requested nearly $2.8 billion in fiscal year 1977 and $3 billion in fiscal year 1978 budget authority to directly support NASA's R&D activities. NASA is the third largest user of R&D funds.

Figure 6-1 depicts the 1978 request using NASA's current budget structure. The amount shown, requested by President Ford, was subsequently modified by President Carter to $3.026 billion.

FIGURE 6-1

EXCERPT FROM PRESIDENT'S

FISCAL YEAR 1978 BUDGET (note a)

(millions)

	FY 1978
1. Space flight:	
(a) Space shuttle	$1,349
(b) Space flight operations	268
(c) Expendable launch vehicle development and support	82
2. Scientific investigations in space:	
(a) Physics and astronomy	251
(b) Lunar and planetary exploration	162
(c) Life sciences	33
3. Space applications	243
4. Space research and technology	98
5. Aeronautical research and technology	231
6. Energy technology applications	4
7. Supporting activities:	
(a) Tracking and data acquisition	282
(b) Technology utilization	8
Total	$3,011

a/Although the President's and NASA's budgets agree in total, the individual amounts differ for items 1 (c), 2 (a), (b), and 3.

NASA provides the Congress with backup or justification data in support of its budget requests. The initial part of NASA's budget structure, to some extent, follows a mission approach. Succeeding levels, however, begin to focus on well-defined system products and activities. These system products typically emerge for funding when the executive

branch chooses to identify them as "new starts." The new starts may already be well beyond the program steps of defining needs and exploring alternatives. They are usually at the point where NASA is seeking funds for final design and hardware development.

During the several preceding years when program needs and solutions are being defined and preliminary design work is being conducted, this NASA activity is neither visible as new programs in its budget presentation nor funded as such. Rather, the early funding is provided under other budget activities such as supporting activities.

A MISSION APPROACH

The mission approach invites earlier and more manageable congressional attention to matters of policy review and program oversight than has been the case with traditional budgeting.

Mission budgeting would relate each level of the budget structure to NASA missions defined in terms of end-purpose responsibilities. The first or highest level in the structure would show NASA's broad responsibilities for meeting specified national needs or goals. Upper levels of the mission budget structure, for example, would not contain references to specific system products such as NASA's space shuttle. Descending levels of the budget structure would provide a sharper focus on the end purposes to be served and specific needs to be met. The lowest levels of the budget structure would then indicate the type of activity being funded or means to accomplish the end purposes and the progress being made on specific programs.

Policy review

Policy reviews are the basis for decisions which should be made by the highest authorities in the executive branch and by the Congress. In NASA's case, policy reviews would consider:

--What are NASA's mission end purposes?

--What are NASA's approaches to and organizational responsibilities for executing its missions?

--What are the important capabilities that should be developed within each NASA mission?

--Within what time frame should those capabilities be developed?

--How much of the national budget should be allocated to NASA missions within this time frame to meet those needs?

To make way for such policy reviews, an overview of NASA's missions, capabilities, deficiencies, and needs for new programs would accompany the mission budget presentation.

Review of NASA missions

NASA enjoyed wide public support for a definite goal (a man on the moon) during its first decade of existence. In recent years, the direction in which NASA is headed has been less precise with some questioning as to how its activities relate to national needs. As in the case of other agencies contacted in converting traditional budgets to a mission approach, some uncertainty exists in NASA about how best to describe its end purposes in a mission structure. It would be useful to the agency and to the Congress to clarify any ambiguity or lack of agreement that might exist about what NASA's missions are, or should be, as well as to make every effort to have them described in the clearest possible terms. The result would be a better understanding of what requested funds are for and why they are needed.

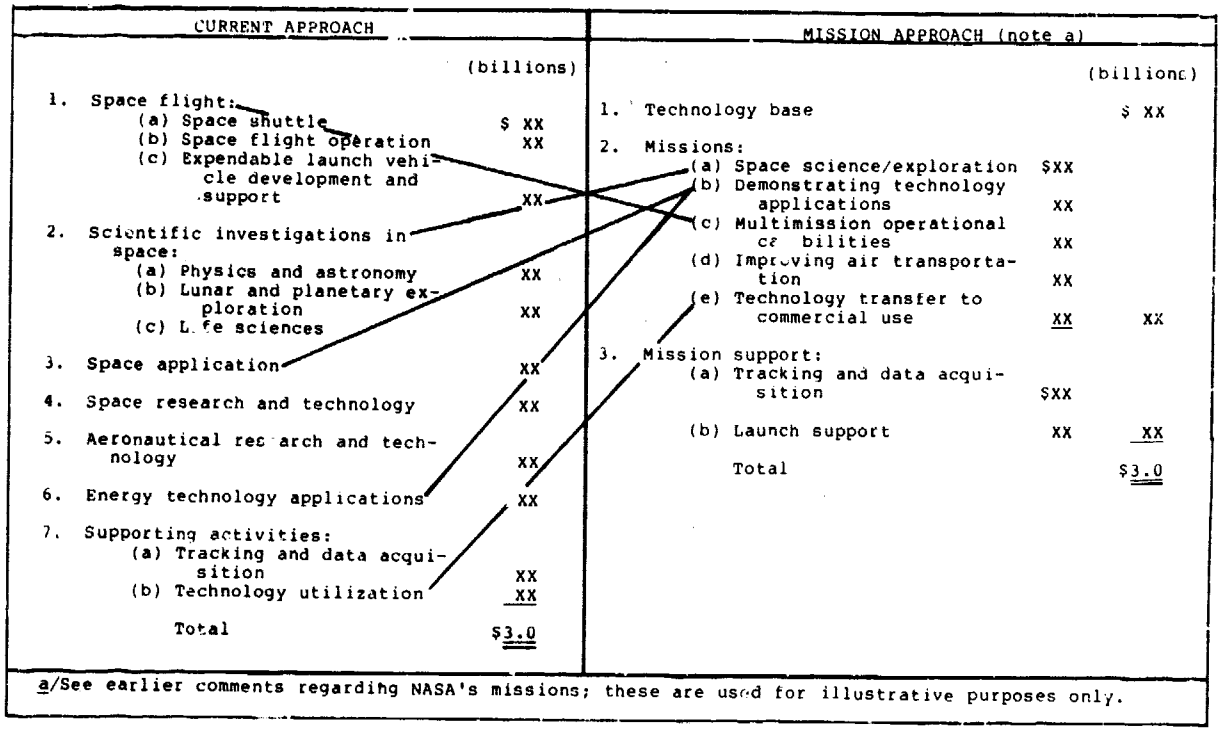
As previously noted, NASA's current budget already provides some degree of mission orientation. Figure 6-2 compares NASA's major R&D activities as they were shown in the President's 1978 budget presentation with how they might be shown using a mission approach. The missions shown are for illustrative purposes only. A formal statement of NASA missions would require NASA, OMB, and congressional review and approval. 1/

1/The illustrated mission approach uses NASA's 1978 budget request which includes activities in direct support of its R&D efforts. There are two other NASA appropriations directly related to R&D. They involve funds for salaries, tra[illegible], construction of facilities, and general operation and maintenance. If the Congress decides to further explore the mission approach, one of the alternatives to be considered would be merging the three appropriations into one.

FIGURE 6-2

CONVERTING TO A MISSION APPROACH

NASA



a/See earlier comments regarding NASA's missions; these are used for illustrative purposes only.

Several categories cited under the illustrated mission approach require some explanation to show how they were derived from NASA's current budget. The first category of space science/exploration is comparable to the second one in NASA's current budget and is one of the reasons, if not the primary one, why NASA was established. The second mission category merely combines at the first level the separate space and energy applications shown in NASA's budget.

The third category of multimission operational capabilities is a category recognizing the need for space transportation and other operational capabilities in space serving more than one mission. Their cost cannot be readily assigned to individual missions during development because the extent of their use for particular missions, such as the first two discussed above, is not yet known. Much of this multimission activity is now funded under Space Flight in NASA's current budget. At the next level in the mission budget structure, the multimission category would distinguish between capabilities being developed to (1) transport differing payloads to space and (2) conduct operations in space.

Another mission, improving air transportation, recognizes NASA's role in improving the civil and military usefulness of aircraft. As a mission beyond basic technology, it reflects efforts to demonstrate and test solutions to civilian and military aircraft problems, such as the need for quieter, less polluting, and more fuel-efficient engines.

What is now called "technology utilization" under a supporting activity, is, under the mission approach, shown as a separate mission--"technology transfer to commercial use." It is cited as a mission because it is an end purpose required by NASA's basic statute.

As noted earlier, the missions cited are for illustrative purposes only and are intended to show an end-purpose orientation for congressional policy review under mission budgeting.

Review of mission funding

After overviewing NASA's mission purposes and how they are carried out, congressional policy review shifts to mission performance capabilities, needs, priorities, and funding levels.

Here, mission budgeting stresses needs affirmed by top agency management and initial funding to explore solutions. Whenever solutions are being explored or developed to achieve NASA's end purposes, the corresponding design or development work is funded under the appropriate mission category. Also stressed is the early recognition of emerging acquisition programs in response to needs or problems, rather than waiting until larger funding is needed for development of specific solutions.

In reviewing funding levels for NASA's missions, congressional review would explore such matters as:

--How requested new capabilities fit in with NASA's mission responsibilities and existing capabilities.

--Whether there are better ways to perform the missions.

--How funding levels of each mission compare with (1) their contributions to national needs and (2) congressional views of NASA's mission priorities.

-- ow the worth of a particular mission capability compares to its requested funding.

At each level of the budget structure, funding requests are related to NASA mission purposes, needs, and priorities. Any voids or overlaps in mission responsibilities and activities should become visible. Ultimately, it should also become clear whether R&D funding is being earmarked for the most pressing needs of the missions and whether their end purposes are compatible with congressional views of national policy and priorities. Congressional judgments that are beginning to form about appropriate magnitude of each mission's funding are then examined further through reviews of specific NASA programs.

Program oversight

A critical link in program oversight under a mission-oriented budget structure is the mission need. It is the basis upon which program funds are requested and results are measured. The need, like the mission it serves, is expressed in end-purpose terms independent of any solution. As indicated in part I, this provides a framework for considering various alternative solutions and encouraging innovation on the part of industrial competitors. More effective implementation of this approach is possible and congressional oversight is enhanced through congressional review to insure that:

--Funding of new knowledge (technology base) is separated from program funding.

--Program or mission-oriented funding is linked to affirmed needs.

--Competition is used to explore alternative design concepts and technical approaches.

--Progress is examined at key turning points in a program before funding the next one.

Funding the technology base

The current budget categories of space research and technology and of aeronautical research and technology contain some, but not all, of NASA's technology base efforts. Other technology base efforts are within and a part of individual budget activities, such as space flight and scientific investigations (see fig. 6-1). Under a mission approach, all technology base activities are grouped together as a separate category for funding purposes.

As discussed in part I, technology base funding under a mission approach is intended to provide a wide base of knowledge for future needs and, at the same time, avoid using

these resources on design work that predetermines new program hardware solutions. Early concentration of resources on a single approach tends to lock out alternatives and competition.

The funding level of this technology base would be highly subjective in nature. Congressional review might consider, for example, NASA's selection of technologies, its criteria for funding levels, and the current level of national needs and problems being addressed by the agency.

A new information category added--mission need

Once a mission need is approved by NASA's top management, a direct link should then evolve in the budget presentation between a mission and a specific operational need for an R&D program. Figure 6-3 below illustrates the flow from a NASA mission, a related mission area, a mission need, a program to satisfy the need, and activity being pursued as a solution to the need. budget information would spell out the basis fo ssion need and why it exists.

FIGURE 6-3

NASA ILLUSTRATION

USING CURRENT APPROACH		USING MISSION APPROACH	
BUDGET ACTIVITY	SPACE FLIGHT PROGRAMS	MISSION	MULTI-MISSION OPERATIONAL CAPABILITIES
BUDGET SUBACTIVITY	SPACE FLIGHT OPERATIONS	MISSION AREA	SPACE OPERATIONS
		MISSION NEED	BASE TO OPERATE FROM IN SPACE
BUDGET CATEGORY	ADVANCED PROGRAMS	PROGRAM STEP	EXPLORING ALTERNATIVES
R&D PROJECT(S)	SPACE STATION CONCEPTUAL STUDIES	R&D PROJECT(S)	SPACE STATION DESIGN ALTERNATIVES (NONCOMPETITIVE EXPLORATION)
FUNDS REQUESTED	NOT BROKEN OUT BY PROJECT	FUNDS REQUESTED	$ ____

With the information on mission needs, the Congress would have the opportunity to assess validity and priority of mission needs and oversee the evolution of each need into a solution. That evolution is reflected on the mission budget format beside the caption called "Program Step." It initially reflects the step of exploring alternatives and ultimately "full-scale development" once a preferred solution has been found.

Competitive exploration of alternatives

By funding an end-purpose mission need rather than a solution, mission budgeting is intended to stimulate differing and innovative responses from which the most promising ones can be explored competitively and a final design choice ultimately made. A program would not wait several years to be recognized as a new acquisition. Early design work and the exploration of alternatives is performed with mission funds based on an affirmed need as opposed to using basic technology funds.

Previous figure 6-3 depicts activity presented to the Congress in the fiscal year 1978 budget as an advanced systems study. This activity is not yet recognized by NASA as being a "new start project," although one study task underway as early as fiscal year 1976 involved indepth definition of selected space station concepts and subsystem analysis. 1/

Under a mission approach, such system activity is accomplished in the program step of exploring alternatives competitively--and within the constraints of a mission need and program capability, time, and cost-worth goals.

Figure 6-4 illustrates what NASA in its fiscal year 1977 budget considered to be a future development project--a large space telescope. In recent years, NASA has funded various contractor design studies associated with the project. This early activity involved definition of the project, preliminary design, and advanced technological development. The request for proposal for final development will integrate the results of these early industry design efforts. The Congress had an earlier awareness of this project and asked NASA to look at lower cost options.

1/In hearings before the Senate Committee on Aeronautical and Space Sciences in 1976, NASA said its planning is directed toward a space station "new start" in fiscal year 1979.

Under a mission approach, such a project would proceed first through the program step of exploring alternative candidates and demonstrating critical hardware elements. This would be done as a prelude to choosing a preferred system for full-scale development.

As shown in figure 6-4, NASA has requested funding in its fiscal year 1978 budget for developing the space telescope. In the budget justification data, it is described as a "new initiative."

FIGURE 6–4

NASA ILLUSTRATION

USING CURRENT APPROACH			USING MISSION APPROACH	
	1977	1978		
BUDGET ACTIVITY	SPACE SCIENCE PROGRAMS	SPACE SCIENCE PROGRAMS	MISSION	SPACE SCIENCE/ EXPLORATION
BUDGET SUBACTIVITY	PHYSICS AND ASTRONOMY	PHYSICS AND ASTRONOMY	MISSION AREA	PHYSICS AND ASTRONOMY
			MISSION NEED	ASTRONOMICAL OBSERVATIONS NOT DEGRADED BY ATMOSPHERIC CONDITIONS
BUDGET CATEGORY	SUPPORTING ACTIVITIES	SPACE TELESCOPE	PROGRAM STEP	FULL SCALE DEVELOPMENT
R&D PROJECT(S)	SPACE TELESCOPE ADVANCED TECHNOLOGICAL DEVELOPMENT	ST SPACECRAFT ST EXPERIMENTS MISSION OPERATIONS AND DATA ANALYSIS	R&D PROJECT(S)	SPACE TELESCOPE (NONCOMPETITIVE ENTRY)
FUNDS REQUESTED	[a] $ 0	$36 MILLION	FUNDS REQUESTED	$ ____

[a] DUE TO BUDGET CONSTRAINTS, FY 1977 FUNDING FOR THIS PROJECT WAS NEITHER REQUESTED NOR PROVIDED. HOWEVER, CONGRESSIONAL APPROVAL WAS PROVIDED FOR NASA TO PROCEED WITH SELECTION OF THE CONTRACTORS FOR FINAL DESIGN/DEVELOPMENT.

Figure 6-5 shows an acquisition recognized by NASA as a "new start project" in the fiscal year 1977 budget ready for final design and development. At that time, it had been evolving in-house for 8 years. This project, like the one illustrated in figure 6-4, evolved without significant competitive exploration and demonstration of alternatives as a prelude to choosing the optimum approach for full-scale development. Under the mission approach, focusing agency resources early on a single system solution requires agency head approval and congressional disclosure. 1/

FIGURE 6–5

NASA ILLUSTRATION

USING CURRENT APPROACH		USING MISSION APPROACH	
BUDGET ACTIVITY:	SPACE SCIENCE PROGRAMS	MISSION:	SPACE SCIENCE/ EXPLORATION
BUDGET SUBACTIVITY:	PHYSICS AND ASTRONOMY	MISSION AREA:	PHYSICS AND ASTRONOMY
		MISSION NEED:	TO UNDERSTAND RELEASE OF ENERGY IN SOLAR FLARE PROCESS
BUDGET CATEGORY:	SOLAR MAXIMUM MISSION	PROGRAM STEP:	FULL-SCALE DEVELOPMENT (NONCOMPETITIVE ENTRY)
R&D PROJECT(S):	SPACECRAFT EXPERIMENTS MISSION OPERATION AND DATA ANALYSIS	R&D PROJECT(S)	SOLAR MAXIMUM
FUNDS REQUESTED:	$30.6 MILLION	FUNDS REQUESTED	$ ___

Congressional reviews of acquisition programs in their early stages under mission budgeting consider the extent to which alternatives are being explored and demonstrated, and the criteria for choice of a preferred system for full scale development. Additional matters for review are outlined in part I of this report (see pp. 15 and 16).

1/See also OMB Circular A-109, par. 15.