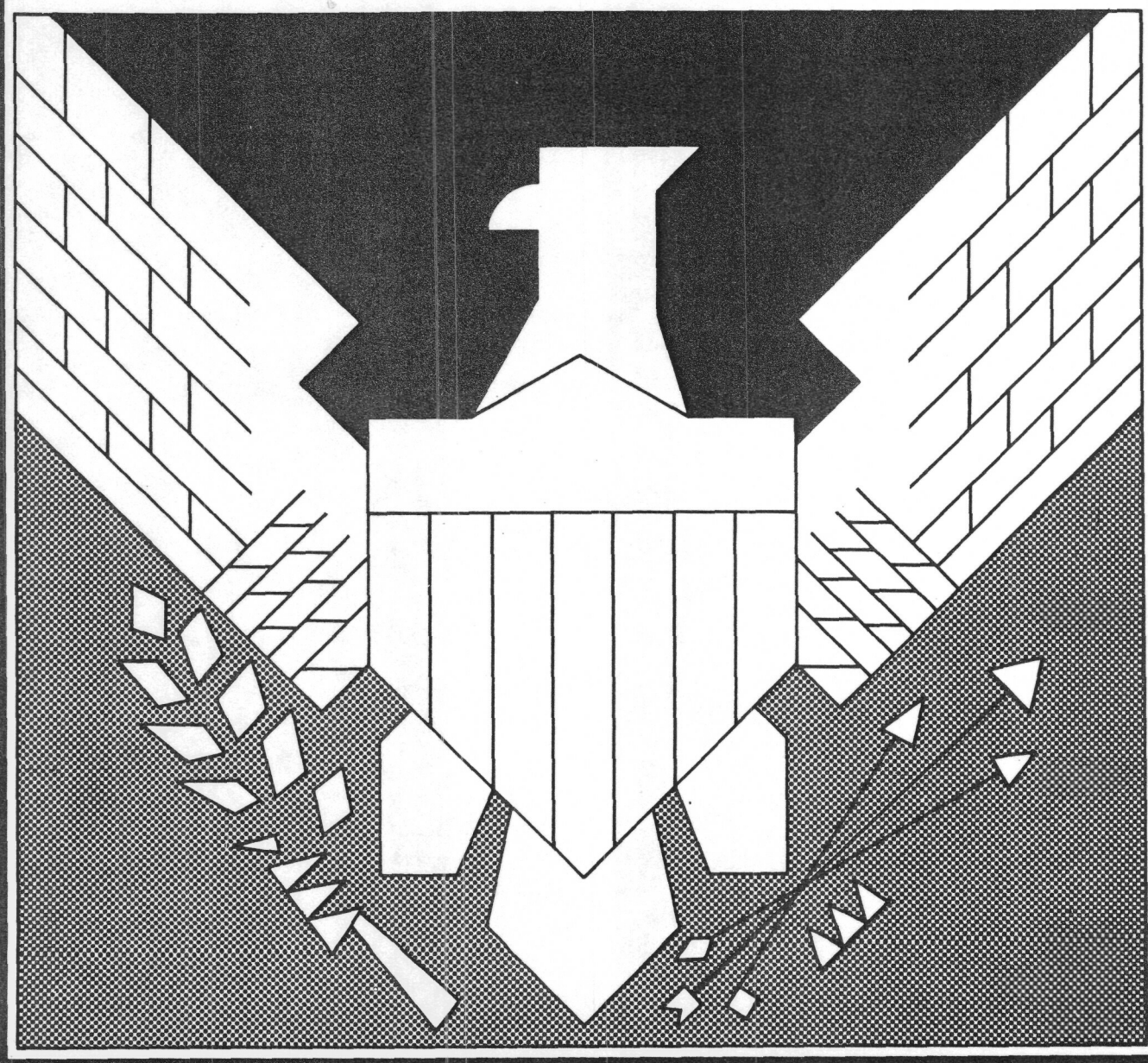
CONGRESS OF THE UNITED STATES
CONGRESSIONAL BUDGET OFFICE
DECEMBER 1986

The Army of the Nineties: How Much Will It Cost?



CBO STUDY

THE ARMY OF THE NINETIES:

HOW MUCH WILL IT COST?

The Congress of the United States
Congresssional Budget Office

NOTES

All years in this report are fiscal years, unless otherwise indicated.

Unless otherwise noted, all dollar amounts in this paper are in fiscal year 1987 dollars.

Unless otherwise specified, "reserves" include both the Army Reserve and the Army National Guard.

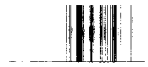
PREFACE

The current Administration has made a concerted effort to modernize and improve the Army, investing $415 billion (in fiscal year 1987 dollars) from 1980 through 1986 in new equipment, better pay and benefits for its soldiers, repairs and maintenance of its facilities, and stockpiles of war reserves. The Army still has, however, areas that it feels could be further improved. This analysis, requested by the Subcommittee on Procurement and Military Nuclear Systems of the House Committee on Armed Services, projects future Army budgets that would be required to meet the goals that the Army has established for itself for the period from 1987 through 1991. It also examines the effects that lower rates of budget growth might have on the Army's plans and future force structure. In keeping with CBO's mandate to provide objective and nonpartisan analysis, this study makes no recommendations.

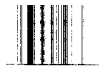
Frances M. Lussier of CBO's National Security Division prepared the study under the general supervision of Robert F. Hale and John D. Mayer, Jr. The author gratefully acknowledges the contributions of William R. Thomas, V. Lane Pierrot, Tasha Wallis, and Sandra Christensen of CBO and of Lawrence J. Korb of the University of Pittsburgh. (The assistance of an external reviewer implies no responsibility for the final product which rests with CBO.) Patricia H. Johnston edited the manuscript and Rebecca J. Kees prepared it for publication. Nancy H. Brooks provided editorial assistance.

Rudolph G. Penner
Director

December 1986



CONTENTS



SUMMARY

In a statement to the Congress in the spring of 1980, then Army Chief of Staff General E. C. (Shy) Meyer called for greatly increased budgets to rectify the "hollow Army"--one that needed both modern equipment and additional operating personnel. From 1980 through 1985, the Army enjoyed annual real budget increases averaging nearly 10 percent and was able to improve the quality and capability of its troops and equipment. Nevertheless, the Army has not yet attained all its goals, including further enhancements of its readiness and sustainability, modernization of its equipment, and increases in the size of its reserves. This study estimates that attaining these goals by 1991 would require average annual real increases in the Army's budget of about 6 percent. (In some cases these goals, and hence their costs, may differ from those in the Army's latest budget proposal.)

Serious questions arise regarding the likelihood of continued budget growth for the Army. For the past two years, budget constraints have led the Congress to cut the Defense Department's--and the Army's--budgets in real terms, and large increases may not be possible in the near future. Thus, this study assesses several alternatives that would be compatible with more limited budgets.

THE ARMY'S GOALS FOR THE 1987-1991 PERIOD

The Army feels that its first priority during the next five years is to maintain or improve the current state of readiness of its forces--that is, the ability to fight effectively on short notice. In descending priority, the Army would also like to improve its sustainability (the ability to fight a protracted conflict), to continue to modernize its equipment, and to maintain its current force structure while increasing the number of reserve soldiers. In response to a query from the Congressional Budget Office (CBO), the Army provided specific details on its goals for improvements in the four areas outlined above. Key Army goals in these areas include:

- Continued increases in training time, especially for pilots;
- Continued increases in stockpiled war reserves, especially ammunition;

- o Continued modernization of equipment, with the emphasis shifting from weapon systems, such as tanks and armored fighting vehicles, to systems for communications, intelligence, and target acquisition; and

- o Maintenance of 28 divisions (18 active and 10 reserve) with the current number of active-duty soldiers and 7 percent more reserve personnel. (An Army division consists of 10,000 to 17,000 troops and associated equipment).

In addition to these broad goals, the Army supplied many more detailed measures and milestones for each of the four broad categories.

The Army's goals are intended to prepare its forces to react quickly to a serious threat, to maintain intense combat for an extended period of time, to equip its troops with equipment capable of defeating the most sophisticated potential threat--the Soviet Union--and to increase the ability of the reserves to reinforce active troops. These capabilities would be important in defending Central Europe against a Soviet invasion which is a high priority mission, if not the highest, for the U.S. Army. Not all would agree that added Army capability is worth the cost, however, especially considering the seemingly low chance of such an invasion. Resolution of this debate is beyond the scope of this paper.

COSTS OF MEETING THE ARMY'S GOALS

The CBO used various methods to estimate the costs associated with meeting these Army goals. Within the investment portion of the Army's budget, the procurement account is by far the largest and so its projections received greater emphasis than the other two investment appropriations. Estimates for procurement funds were based in part on the needs of 10 major programs for which the Army supplied detailed modernization goals--specifically, fielding schedules for the 10 systems. Army plans were also available as a basis for estimating costs in most of the rest of the procurement account. 1/ The other, smaller investment expenses--for research and development and for military construction--were assumed to retain their recent levels of 6.5 percent and 2.1 percent, respectively, of the total Army budget.

1. In addition to the 10 programs for which the Army supplied fielding schedules, the Congress and CBO have detailed five-year procurement data on most of the Army's current programs. Indeed, CBO has detailed five-year budget data for programs that account for 98 percent of the Army's 1987 procurement budget.

Costs to operate the Army--called operating and support costs (O&S)--include those for military personnel (MILPER), for operation and maintenance (O&M), and for family housing. Military personnel costs through 1991 were provided to CBO by the Army and include the cost associated with increasing the number of both part-time reservists and those who actually work full-time in their reserve units.

The CBO used two methods to project the costs associated with the day-to-day operations of the Army that are included in the operation and maintenance appropriation. One method was based on published Army cost factors and the other on a historically derived fraction of the total value of the Army's capital stock, referred to as the ratio-to-force-value (RFV) approach. Broad-based methods were used because the specific goals supplied by the Army--such as increasing the total number of hours that Army aircraft fly per year--represent only a small part of the total O&M budget. The use of two methods to project O&M costs reflects the uncertainty in estimating the size of such an important but diverse account.

Finally, needs for family housing, like those for military construction and research and development, were based on a constant share of the total Army budget, equal to 1.9 percent in the case of family housing. Continued growth in this account is intended to offset the Army's current shortfall in these facilities. Thus, funds for family housing would increase over the five-year period, even in the absence of an increase in the number of active-duty personnel.

Combinations of these projection methods suggest that the Army would need significant real growth by 1991 to meet all its goals; specifically, it would need to receive between 5.8 and 6.6 percent average annual real growth from 1988 through 1991. Under these assumptions, the Army's budget, in fiscal year 1987 dollars, would grow from $74.2 billion in 1987 to between $93 billion and $96 billion in 1991, with the range of estimates reflecting the difference between the two methods for estimating future O&M costs (see Summary Table 1).

There is, of course, uncertainty in these estimates because the goals supplied by the Army do not fully determine needs for all types of spending. The CBO assumes, based on historical relationships, that several categories of spending--accounting for 11 percent of the Army's 1987 budget--maintain their budget share. The Army could, of course, make different decisions. If, for example, the Army held those categories of spending constant in real terms through 1991 (and, therefore, allowed their share of the budget to decline), required growth would be lower by one and a half percentage points.

These projected budgets would be consistent with the Army's stated emphasis on maintaining or improving the current level of readiness--which is often associated with spending for operating and support. The present balance between funding for the Army's investment accounts and funding for operating and support functions would be maintained, ending a recent trend of placing a growing portion of Army funds into the investment accounts. Operating and support funds have decreased as a portion of the Army's total budget from 73 percent in 1980 to 66 percent in 1986. The CBO's projected budgets would hold the portion of the Army budget devoted to operation and support to about 65 percent.

One policy change discussed recently in the Congress could further increase Army budget needs. Specifically, the Congress has expressed concern over the Army's plan to cease procurement of the M1 tank, Bradley Fighting Vehicle, and Apache helicopter in the next two to four years. With

SUMMARY TABLE 1. BUDGET REQUIRED TO ATTAIN ARMY GOALS (By fiscal year, in billions of fiscal year 1987 dollars)

Account	Appropriated 1987	Projected 1988	Projected 1991
Operating and Support (O&S)			
Personnel	28.0	29.4	30.3
Operation and Maintenance	22.5	25.8-26.0	27.8-30.5
Family Housing	1.6	1.6	1.8
Subtotal, O&S	52.1	56.8-57.0	59.9-62.6
Investment			
Procurement	16.0	21.1	24.9
RDT&E a/	4.6	5.7	6.2-6.4
Military Construction	1.5	1.8	2.0
Subtotal, Investment	22.1	28.6	33.1-33.4
Total	74.2	85.4-85.6	93.0-96.0

SOURCE: Congressional Budget Office.

NOTE: Ranges reflect the two estimating techniques used to project these accounts. Numbers may not add to totals because of rounding.

a. RDT&E = research, development, testing, and evaluation.

no Army purchases, the producers could conceivably close the only production lines for these major land-based weapons. In order to avoid the potential loss of these lines, the Congress has raised the possibility of maintaining these three programs through at least 1991. Continued procurement of these expensive items would add significant costs to the Army's investment accounts in 1990 and 1991. In fact, maintaining these major weapons production lines through 1991 could add almost another percentage point to the average annual budget growth needed to meet the Army's goals.

THE IMPACT OF ZERO BUDGET GROWTH ON THE ARMY'S ABILITY TO MEET ITS GOALS

The Army's budgets during the years from 1980 through 1985 grew at rates significantly higher than 6 percent in real terms. Indeed, average annual real growth rates approached 10 percent during these years. That growth has stalled in recent years, however, with budgets in 1986 and 1987 declining, in real terms, by 6 percent and 1 percent, respectively, from preceding years.

Although it is not possible to predict the actual level of growth the Army's budget will experience during the next five years, it is useful to examine the effects that growth levels significantly lower than 6 percent might have on the Army's ability to achieve its goals. The CBO has examined the effects that zero real budget growth could have on the Army over the next five years. This examination is not meant to suggest that zero growth is the most appropriate level of growth for this period, or that it is the most likely. Nevertheless, it is the level used in CBO's baseline deficit estimates and has become more commonly acknowledged as a distinct possibility. Indeed, Undersecretary of the Army James R. Ambrose recently indicated that he feels that the Army's future holds budgets of "zero or less than zero" growth.

In the absence of real growth in its budget, the Army would be forced to choose among its goals, since it obviously could not afford them all. Using the assumption of zero real growth from 1987 through 1991, this report examines three approaches to allocate resources between the operating and support and the investment accounts.

Option I--Emphasize Operating and Support Funding

The first option would attempt to maintain the Army at a high state of readiness by emphasizing funding for personnel and operation and maintenance. Enough funding to support the Army's planned increase in both part-

time and full-time reserve personnel would be provided and O&M funding would be set at the higher level estimated using the RFV method. Family housing would continue to be funded at the 1987 level. The investment accounts would be reduced proportionally to offset the resultant growth in O&S funding.

The consequence of this strategy would be an Army with increasing numbers of reserve personnel and a continued emphasis on readiness, but with significantly less modern equipment. Such a force might be consistent with the assumption that the Army must always be prepared to fight in a major war on short notice.

An examination of the distribution of funds within the Army's budget demonstrates the far-reaching effects of this approach. The portion of the budget allotted to operating and support costs would rise dramatically, from about 70 percent in 1987 to 81 percent in 1991. The remainder of the budget, devoted to investment funding, would fall equally dramatically, from 30 percent in 1987 to 19 percent in 1991. If reductions in investment were shared proportionately among all three of the accounts, the procurement appropriation in 1991 would be funded (in 1987 dollars) at about 63 percent of its 1987 level.

Such a reduction would greatly affect the Army's modernization plans, especially for systems that the Army is just now starting to procure. For example, the Army would fall short of its goals by 12 tank battalions, 26 mechanized infantry battalions and armored cavalry squadrons, and 3 attack helicopter battalions (see Summary Table 2). Nevertheless, for these programs--all of which were started in the late 1970s or early 1980s--the Army could achieve 80 percent to 90 percent of its modernization goals. For those programs that are only now getting underway, such as the SINCGARS radio or MSE field telephone system, the impact would be much greater--with only 50 percent to 60 percent of the goal achievable.

In the area of sustainability, which includes stockpiling munitions for a protracted war, the Army would not be able to achieve its goal of filling 80 percent of its objective for munitions war reserve stocks by 1991. Indeed, it might need more than its annually purchased ammunition for peacetime training and so might make reductions to its current level of war reserve stockpiles (see Summary Table 2).

This approach would also produce what could be viewed as an unbalanced Army budget. By 1991, 81 percent of the budget would be devoted to operating and support funds. Although the Army might need to devote considerable funding to O&S in order to maintain the large amount of sophisti-

SUMMARY TABLE 2. IMPACT OF THREE OPTIONS ON THE ARMY'S GOALS AS OF FISCAL YEAR 1991 a/

	Status as of 1987 a/	Goal	Option I (Operating and Support Emphasis)	Option II (Investment Emphasis)	Option III (Balanced Emphasis)
Force Structure (Personnel at Year End)					
Active	780,800	781,000	781,000	728,000	781,000
Reserve	785,500	812,100	812,100	732,100	785,500
Modernization (Number of Units Equipped)					
M1 tank battalions	66	89	77	80	79
Bradley fighting vehicle battalions and cavalry squadrons	60	102	76	81	79
AH-64 attack helicopter battalions	26	34	31	32	31
UH-60 helicopter companies	44	54	49	50	50
Multiple launch rocket system batteries	30	47	39	41	40
Patriot air defense batteries	52	93	68	73	71
M9-ACE battalions	1	25	13	17	15
SINCGARS radio division sets	1	15	7	9	9
MSE corps sets	1	5	3	4	4
Remotely piloted vehicle batteries	0	10	5	7	6
Readiness Funding (Percent Annual Growth in O&M, 1987 through 1991)	n.a.	5.4-7.9	6.0	3.8	3.9
Sustainability--Munitions in War Reserve Stocks (Percent of Objective Met)	69	80	67	72	71

SOURCE: Congressional Budget Office, based on data contained in a letter from Lt. Gen. Carl G. Vuono, Deputy Chief of Staff for Operations and Plans, to Robert Hale, CBO, February 1986.

NOTE: n.a. = not applicable.

a. Based on the funded delivery period, not actual inventories in 1987 or 1991.

85-410 O - 88 - 2

cated equipment purchased since 1980, the level of funding for O&S in fiscal year 1987 was 70 percent and the average over the past 10 years has been 69 percent. Even at the height of the Vietnam War, when modernization was curtailed to operate a large wartime force, only 77 percent of the Army budget was devoted to O&S. In light of historical evidence, devoting this high percentage of funds to operations might not leave enough funds to invest in the new hardware needed to maintain and upgrade the Army's capability.

Option II--Emphasize Investment

In contrast with the first approach, this option would minimize reductions in future investment accounts at the expense of operating and personnel funding. The emphasis on investment, rather than day-to-day operations, might be consistent with the assumption that the chance of a major war in the next few years is relatively small.

Specifically, under this approach, the O&M appropriation that provides for day-to-day training and maintenance would continue to receive significant annual increases to finance the operation and maintenance of new equipment. The O&M account, however, would grow at the lower rate predicted by the Army factors method, rather than at the rate forecast by the RFV used in Option I. All the other O&S accounts, including military personnel (MILPER), would be subject to proportional cuts to offset the growth in O&M and to maintain a constant budget of $74.2 billion in 1987 dollars. As a result, by 1991 the MILPER appropriation would suffer a reduction of 7 percent relative to 1987 funding. Compensating for this funding reduction by a proportional reduction in active and reserve personnel would result in an active Army of 728,000 (53,000 below 1987 levels) and a reserve of 732,100 (about 53,400 below 1987 levels).

Investment would also be reduced 7 percent below 1987 levels. By devoting more funds to investment than did the first option, this approach would provide for more modernization and a higher level of sustainability, although the Army still could not meet its goals in these areas. For example, compared with Option I, this approach would, by 1991, supply modern equipment to three more tank battalions, five more mechanized infantry battalions, and one more attack helicopter unit. Furthermore, the Army would be 5 percentage points closer to its war reserve goal for munitions by 1991 than under Option I.

Finally, this alternative would produce a budget that would be more balanced by historical standards. The O&S costs would make up 72 percent

of the Army budget by 1991, much closer to the current level of 70 percent than the 81 percent resulting from the first option. This option would fail, however, to retain the current number of military personnel.

Option III--Place a More Balanced Emphasis

The last option would attempt to strike a balance between the two previous ones. It would fund O&M at the same level as the second approach, maintain the current size of the active and reserve forces, and require larger reductions in investment accounts. Thus, an Army of today's size would be modernized slowly over the next five years.

With O&M funds increasing and personnel costs held constant, the burden of achieving zero real growth would fall most heavily on the investment accounts. Indeed, by 1991 the investment accounts would be reduced in real terms by 16 percent below their 1987 levels, less than the Option I reduction of 37 percent but more than Option II's 7 percent. As in all the approaches accommodating zero budget growth, fewer units would be equipped with modern weapons than envisioned in the Army's goals. Again, Option III occupies a middle position, with Option II, which emphasizes investment, providing more modernized units, and Option I fewer (see Summary Table 2).

CONCLUSION

During the 1987-1991 period, the Army would like to continue to improve its readiness and sustainability, to field more new weapons, and to expand the size of its reserve force. Specifically, the Army would like to fly its aircraft more hours per month; to increase the size of its stockpiles of munitions and repair parts; to continue to equip its troops with newer, more capable tanks, attack helicopters, and radios; and to add almost 51,000 reservists to its forces. The CBO estimates that, in order to meet these goals by 1991, the Army would need average annual real growth in its budgets of about 6 percent.

Obviously, the Army would be unable to meet all of its goals--or even come near meeting them--if its budget does not increase in real terms. If the Army wished to maintain its current numbers of personnel and high level of readiness spending in the absence of budget growth, then it would face substantial reductions--on the order of 16 percent below 1987 levels--in its investment accounts. Avoiding the reduction in investment while maintaining high readiness spending, could require cuts from the 1987 numbers of reserve or active-duty personnel.

CHAPTER I

INTRODUCTION

In fiscal year 1986, the U.S. Army received $72.4 billion dollars in budget authority--or $74.9 billion in fiscal year 1987 dollars--to pay for personnel, operating costs, and new investments in weapons, real property, and other equipment. This amount represented 20 percent real growth over the 1982 Army budget of $52.2 billion--the equivalent of $62.2 billion in 1987 dollars. The increase has underwritten a wide variety of improvements in Army equipment and personnel. But these enhancements, important as they are, have not met all of the Army's specified goals. Over the next five years, the Army seeks, among other things, to maintain a high level of readiness, to increase its ability to sustain combat, to continue modernization of its equipment, and to augment its reserve personnel.

The Congress has asked the Congressional Budget Office (CBO) to estimate the cost of meeting the Army's self-imposed goals during the period from 1987 through 1991. Since meeting these goals would require implementing and enhancing numerous separate Army programs, the actual cost would depend on the specific means chosen to fulfill the various objectives and on the timetable established for realizing their attainment. In general, however, the Army would need funds to purchase more and better weapons, to improve troop training, and to maintain the high quality of its personnel. Meeting the goals, therefore, would undoubtedly require increasingly larger annual budgets from 1987 through 1991.

In recent years, however, the Congress has not approved any real growth in the Army's budget. The budget for 1986 was 6 percent less in real terms than it was in 1985, and the budget approved for 1987 is 1 percent lower in real terms than that for 1986. In view of this trend, it is questionable whether the Congress will appropriate sufficient funds to achieve the Army's goals and, if not, what strategies might be used to allocate the limited funds that would be available under the constraint of no real growth in the Army's budget from 1987 levels.

IMPROVEMENTS FROM 1982 THROUGH 1986

During the five years from 1982 through 1986, the Army received $358.9 billion in appropriated funds as measured in constant 1987 dollars. The

money was used to support Army personnel and operations and to buy the items needed to equip a modern Army. Although the exact impact of the expenditure of these funds on the state of the Army is difficult to quantify, four commonly used characteristics can describe the condition of a military unit: readiness, sustainability, modernization, and force structure.

The Army's main priority during the early 1980s was to improve the readiness of its forces by investing in the maintenance of its equipment and facilities, by emphasizing realistic training methods, and by improving the quality of its recruits. The Army also emphasized building up its stocks of munitions and spare parts to provide reserves in the event of a protracted war. In addition, the Army attempted to redress the numerical imbalance between the Warsaw Pact and NATO forces by buying more, technically superior weapons. Finally, the Army was able to increase the total number of combat units without adding active personnel to its force.

Readiness

The ability of a force to perform its mission on short notice is referred to as readiness. Training to keep the troops alert and proficient at their missions, providing equipment that is reliable and easily maintained, and stationing war-fighting equipment in likely trouble spots all contribute to a high level of readiness. In his *Annual Report to the Congress, Fiscal Year 1983,* Secretary of Defense Caspar W. Weinberger emphasized his commitment to increasing both the personnel and material readiness of U.S. conventional forces. To that end, the Army has significantly bettered the quality of the people in its forces. For example, the fraction of Army recruits with high school diplomas increased from 86 percent in 1982 to 90 percent in 1986. Similarly, the portion of new Army recruits scoring in the lowest acceptable category on the Army's placement test (Category IV) has decreased from 19 percent in 1982 to 10 percent in 1986. In short, the quality of the Army recruit--and thus the Army as a whole--has improved since 1982.

In addition, the Army has attempted to improve the competence of its soldiers by increasing the amount and realism of training they receive. The Army has increased the average number of hours a crew flies per month. Furthermore, more crews are flying more aircraft in the Army now, and the total number of annual aircraft flying hours has increased by almost 16 percent--from about 1.6 billion in 1982 to 1.8 billion in 1986.

Prepositioning equipment increases readiness by reducing the amount of equipment that would have to be shipped overseas in the event of war, thereby freeing transport aircraft to carry troops, rather than equipment.

The Army's program to place equipment in Europe was initiated in 1961 and is referred to as POMCUS (for Pre-positioned Materiel Configured to Unit Sets). From 1982 through 1986, the Army added 130,000 short tons of equipment to its POMCUS stocks and progressed about a fifth of the way to its objective of storing equipment for six divisions in Europe.

Finally, during the 1982-1986 period, the Army has improved the condition of its depots and other real property and reduced the backlog of facilities needing maintenance. An indirect benefit of such maintenance work is improved troop morale, which ultimately results in increased readiness. In terms of real property maintenance, the Army's backlog was reduced from $2.4 billion in 1982 to $1.4 billion in 1986; family housing backlog was reduced from $0.9 billion to $0.5 billion.

Sustainability

The ability of a force to sustain wartime operations for extended periods depends on the size and availability of its supplies and on its capability to repair damaged equipment. Thus, the size of munition and spare parts stockpiles and the adequacy of maintenance and repair facilities affect a force's sustainability.

Improvements in sustainability also received attention from the Army during the past five years, specifically in terms of increased ammunition procurement. From 1982 through 1986, $12.7 billion was budgeted for ammunition, and as a consequence, the Army increased the percentage of its war reserve stocks of munitions--measured in dollar terms--from 75 percent to 85 percent of its desired objective. 1/ Similar increases in other war reserve stocks, such as those of spare parts, were also attained--from 36 percent to 57 percent of the objective from 1982 through 1986. In addition, depot maintenance and repair facilities were upgraded. As a consequence of these expenditures, the Army has improved its ability to sustain combat for extended periods.

---

1. Although a more appropriate measure of war reserve stocks would be to tabulate quantities of various types of munitions, it would be very difficult to consolidate varying levels of many munitions into one quantitative value. The Army, therefore, determined how much it would cost to amass the appropriate number of each munition and measured its progress in terms of cumulative funds spent toward filling the stocks. The Army has since developed an alternative method that attempts to take into account the varying levels of many different types of munitions (see p. 13).

Modernization

In 1982, the Army accelerated its ambitious program to modernize its equipment. Among other things, it intended to replace many of its tanks, personnel carriers, utility and attack helicopters, and anti-aircraft guns with newer weapons. Specifically, from 1982 through 1986, the Army purchased 4,040 M1 tanks, 3,171 Bradley Fighting Vehicles (a replacement for the older M113 personnel carrier), and 440 UH-60 and 453 AH-64 helicopters. 2/ In addition, the Army has continued to field new and more sophisticated air defense missiles, like Stinger and Patriot, and is beginning to update its communications systems (see Table 1).

All told, the Army spent almost $83 billion to procure modern weapons during the 1982-1986 period. The impetus for this initiative was to counter perceived increases in numbers and capability of Soviet and Warsaw Pact forces. As a result of the more than $80 billion invested in modern equipment, the Army feels that it is better prepared today if it should have to fight an intense war with the Warsaw Pact in Central Europe.

Force Structure

Force structure refers to the number of soldiers in the Army and the units to which they are assigned. In fiscal year 1982, the Army included 780,400 active military personnel and 664,300 reservists, organized into 16 active and 8 reserve divisions. (The following box defines terms used in describing force structure and other aspects of the Army's organization.) By reorganizing its 16 existing active divisions, the Army was able to add two new active light infantry divisions (LIDs) to its force structure without increasing the total number of its active-duty personnel. 3/ Thus, the Army now has 18 active divisions--two more than in 1982--but the active Army's strength at the end of the year (end strength) has remained roughly constant at about 780,000 (see Table 2). On the other hand, the size of the reserves has grown from 664,300 in 1982 (including both the Army Reserve and the

---

2. The pieces of equipment purchased by the Army in any given year may not actually enter the Army's inventory until two to three years later, because of the time needed to produce a weapons system. Thus, some of the weapons purchased in 1986 may not actually enter the Army's stores until 1988.

3. Reported by Secretary of Defense Caspar W. Weinberger, *Annual Report to the Congress, Fiscal Year 1985*. The LID is a stripped-down version of the existing Infantry Division, including approximately 10,000 rather than 17,000 soldiers.

Army National Guard) to 761,200 personnel today, an increase of 15 percent. During this period, the reserves also added two new divisions.

Budget Trends, 1982-1986

Compared with the Army of 1982, today's Army is certainly a more modern and more capable force that could sustain combat for longer periods. These

TABLE 1. CUMULATIVE QUANTITIES OF MODERN WEAPONS SYSTEMS PROCURED FROM FISCAL YEARS 1982 THROUGH 1986

Weapons System	Beginning 1982	End of 1986
M1 Tank	968	5,008
Bradley Fighting Vehicle	500	3,671
UH-60 Utility Helicopter	337	777
AH-64 Attack Helicopter	0	453
Multiple Launch Rocket System (Rockets/ Launchers)	3,714/ 44	188,322/ 348
Stinger Shoulder-Launched Air Defense Missile	4,535	15,089
Patriot Long-Range Air Defense Missile (Missiles/ Launchers)	247/ 10	2,175/ 67
Hellfire Antitank Missile	0	20,832
SINCGARS Radios a/	0	12,500
5-Ton Trucks	971	18,322
10-Ton Trucks	638	6,853

SOURCES: Congressional Budget Office from testimony by Dr. Jay R. Sculley, Lt. Gen. James H. Merryman, Maj. Gen. Louis C. Menetrey, and Brig. Gen. Ellis Parker before the Subcommittee on Tactical Warfare of the Senate Armed Services Committee (March 1982); *Department of the Army Procurement Programs, Congressional Data Sheets in Support of the FY 1987 President's Budget* (February 1986); and Department of Defense, *Selected Acquisition Reports* (December 1985).

a. SINCGARS = single-channel ground and airborne radio system.

ARMY TERMS

Active--The portion of the Army that includes full-time military personnel and units that perform their mission 24 hours a day, 365 days a year, in peacetime as well as in war.

Reserves--The portion of the Army including both the Army Reserve and the Army National Guard, formed primarily by part-time personnel who are ready to report for full-time duty in the event of a national emergency. A portion of reserve personnel are full-time reservists who provide training and administration.

Corps--An administrative organization staffed and equipped to control two to five divisions. The corps' artillery battalions, communications units, supply, medical, maintenance, engineer, and other units provide divisions with the support they need to fight.

Division--A unit consisting of 10,000 to 17,000 personnel and associated equipment.

Light Infantry Division--A unit designed to be deployed rapidly where needed, typically with few armored weapons and a high ratio of combat to support personnel. The active Army now contains four light infantry divisions.

Heavy Division--A unit equipped with armored vehicles such as tanks and armored personnel carriers. The active Army currently includes 10 heavy divisions.

Brigade--An organizational unit within a division capable of controlling up to five battalions, such as tank or infantry battalions.

Separate Brigade--A unit consisting of three or four combat (for example, tank, mechanized infantry, or light infantry) battalions. It is not assigned permanently to any specific division, but can be used to reinforce an individual division or corps when needed.

Battalion--A unit of several hundred personnel with a single function--for example, an artillery battalion, a tank battalion, or an air defense battalion.

Special Forces Group--An organization of about 3,000 people who are uniquely suited for limited objective operations primarily behind enemy lines or in support of guerrilla operations.

improvements came, of course, at a cost. From 1982 through 1986, the Army budget totaled $325.1 billion of budget authority, or $358.9 billion in 1987 dollars. Over the 1982-1986 period, the annual budget increased by 20 percent in real terms, an average annual growth rate of 4.8 percent (see Figure 1).

Despite this growth, the Army has not met all its goals. One reason is that the capabilities of the most formidable threat that the Army would have to face in a future conflict, the Warsaw Pact, continues to improve. In order to maintain the balance of military power, therefore, the Army would have to increase its capability and modify its goals. Also, goals established previously have not been met fully because the Army budget has fallen in real terms in the last two years (see Figure 1). Indeed, in real terms, the 1986 Army budget was 6 percent less than the budget appropriated in 1985 and 11 percent below the level requested by the Army. If the Army had additional funds to make the improvements it feels are needed, what would it do?

ARMY GOALS, 1987-1991

In response to a query from CBO, the Army specified its goals for further improvements from 1987 through 1991, in the areas of readiness, sustain-

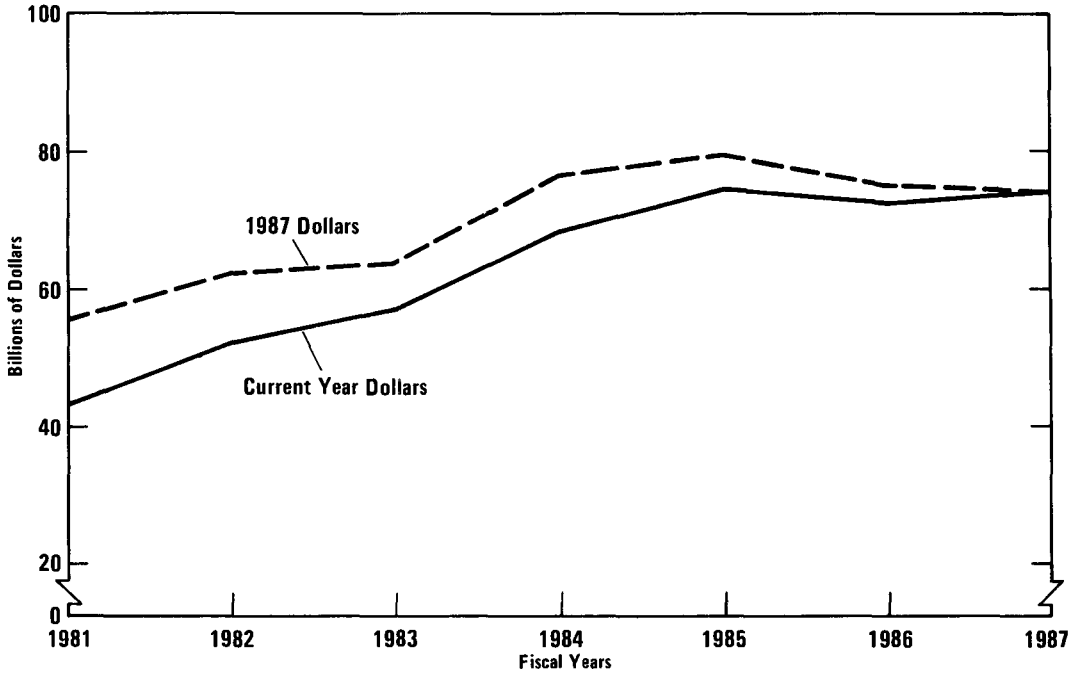
TABLE 2. ARMY FORCE STRUCTURE, FISCAL YEARS 1982 AND 1986

Force Structure	1982	1986
Number of Divisions		
Active	16	18
Reserve a/	8	10
End Strength		
Active	780,400	780,800
Army Reserve	256,700	310,700
National Guard	407,600	450,500

SOURCE: Comptroller of the Army, *The Army Budget, Fiscal Years 1985* and *1987* (February 1984 and 1986).

a. Includes divisions in both the Army Reserve and the Army National Guard.

Figure 1.
Army Budgets, Fiscal Years 1981-1987



SOURCE: Congressional Budget Office based on Office of the Assistant Secretary of Defense (Comptroller), *National Defense Budget Estimates for FY 1987* (May 1986).

ability, modernization, and force structure. 4/ The Army also provided some quantitative measures (for example, operating tempos) by which to assess improvements in each of the four categories. The CBO request did not specify that any particular fiscal limits had to be observed. Rather, broad goals--analogous to the Navy's goal of 600 ships or the Air Force's desire for 40 tactical fighter wings--were sought. Presumably the resulting goals reflect the forces and capabilities that the Army feels would be needed to ensure reasonable confidence of prevailing in future conflicts, tempered by some notions of what funds might possibly be available. On the other hand, these goals do not necessarily reflect near-term budget limitations that may be placed on the Army. Thus, the forces discussed below are not always consistent with those discussed in documents submitted in support of the President's budget.

4. Letter from Lt. Gen. Carl E. Vuono, Deputy Chief of Staff for Operations and Plans, to Mr. Robert Hale, CBO, February 1986.

The Army's goals, to be met between now and 1991, include:

- Continued increases in training time for selected units, especially for pilots;
- Continued increases in stockpiles of war reserves, with a goal of meeting 80 percent of the ultimate munitions objective by 1991;
- Continued modernization of equipment, with emphasis shifting from attack systems to those that communicate and locate targets; and
- Maintenance of 28 divisions--18 active and 10 reserve--with current numbers of active-duty soldiers but an increase of 7 percent in reserve personnel.

The Army's plan for the remainder of the 1980s is to maintain the same priorities for allocation of its resources that it has followed for the early part of the decade. Improvements in readiness have received and will, therefore, continue to receive emphasis through 1991. Next, the Army plans to increase its war reserve stocks and enhance its sustainability. Modernization of the Army's equipment will continue in order to maintain a technical edge over potential enemies. Finally, the Army will attempt to expand its reserve force structure. The remainder of this chapter describes these goals in more detail.

Readiness

The Army has framed its first priority goal of improving force readiness between now and 1991 in terms of several specific measures. These include the operating tempos of aircraft and ground fighting vehicles, the amount of funds allotted to property maintenance, the amount of material stored overseas in the POMCUS program, and the number of battalions training each year at the Army's National Training Center.

Operating Tempos. Time spent flying aircraft, driving a tank, or becoming familiar with equipment should increase a soldier's preparedness for battle. By extension, the more a unit trains together and the more realistic the training conditions, the more ready that unit will be to go to war. Thus, increasing operating tempos should increase the Army's readiness.

The Army plans to increase the average number of monthly hours each crew flies for both the active and reserve components (see Table 3). The

TABLE 3. AIRCRAFT OPERATING TEMPOS, FISCAL YEARS 1986 THROUGH 1991

Tempos	1986	1987	1988	1989	1990	1991
Average Flying Hours per Crew per Month						
Active	14.0	16.8	18.0	18.8	19.5	19.5
Reserve	11.2	11.2	11.5	11.8	12.4	12.5
Total Flying Hours per Year (In thousands)						
Active	1,497	1,538	1,647	1,648	1,681	1,703
Reserve	413	459	495	518	557	576

SOURCE: Letter from Lt. Gen. Carl E. Vuono, Deputy Chief of Staff for Operations and Plans, to Mr. Robert Hale, CBO, February 1986.

most significant increase--5.5 hours per crew per month, or almost 40 percent from 1986 through 1991--is planned for the active component. The reserve monthly flying rate would increase only 1.3 hours per crew, or 12 percent, during the same period. The reserve component's total yearly flight hours, however, are scheduled to increase by a much greater fraction than those of the active component during the same time period (almost 40 percent for the reserves, compared with 14 percent for the active Army), reflecting the introduction of more aircraft and crews into the reserves during the next five years.

The Army does not intend to increase the operating tempos of its tanks and fighting vehicles. Rather, the number of miles that the Army drives systems such as the M1 and M60A3 tanks and Bradley Fighting Vehicles each year will remain relatively constant through 1991. 5/

Real Property Maintenance. The Army owns many facilities, including some family housing units, that it must maintain. Well-maintained facilities improve troop morale by providing pleasant and efficient working and living

5. Operating tempos for ground systems for the active Army, National Guard, and Army Reserve will be maintained at 800 to 850 miles per year, 288 to 306 miles per year, and 200 to 213 miles per year, respectively.

areas. Rarely, however, does the Army have enough money to maintain all its facilities at desired levels. Therefore, a backlog of needed repairs to both real property and family housing, totaling nearly $2 billion dollars in fiscal year 1986, has accumulated.

At a minimum, the Army wants to reduce the backlog for real property maintenance and repair to $1.1 billion by 1991; a more ambitious goal would reduce the backlog to 20 percent of its annual recurring maintenance requirements or about 0.8 billion by 1991. Based on the latter goal, the Army projects the need for maintenance funding and resultant backlog levels summarized in Table 4.

The situation in Army family housing is similar to that of all the other facilities: because it had to defer repairs, the Army has created a backlog in needed maintenance. In an effort to prompt a reduction in these backlogs, the Congress has set a maximum, or containment, level for acceptable backlogs. The Army's goal is to reduce the level of deferred maintenance and repair for family housing below the Congressional containment level of $294 million in current year dollars (which by 1991, would be equivalent to $261 million in 1987 dollars) and, more ambitiously, below $80 million (or $71 million in 1987 dollars) by 1991. Army projected funding and backlog levels for family housing show that the Army does not expect to meet the more ambitious goal, but plans to achieve the more modest Congressional target (see Table 4).

TABLE 4. ARMY MAINTENANCE GOALS (By fiscal year, in millions of fiscal year 1987 dollars)

	1986	1987	1988	1989	1990	1991
Real Property Maintenance and Repair						
Required Funding	1,727	1,790	1,863	2,006	2,153	2,100
Resulting Backlog	1,449	1,296	1,202	1,002	875	819
Family Housing Maintenance and Repair						
Required Funding	583	615	754	625	563	576
Resulting Backlog	506	397	175	95	93	90

SOURCE: Letter from Lt. Gen. Carl E. Vuono, Deputy Chief of Staff for Operations and Plans, to Mr. Robert Hale, CBO, February 1986.

POMCUS. The Department of Defense (DoD) initiated the POMCUS program to speed deployment of U.S. reinforcements to Europe in the event of war by permanently storing in Europe the equipment associated with six Army divisions. Should these reinforcing divisions be needed in Europe, their personnel can be transported rapidly to Europe where a duplicate set of equipment would be waiting for them. The transferred personnel could then begin to fight shortly after arriving without waiting for their heavy, bulky equipment to arrive from the United States.

Not all the equipment for six divisions has yet been stored in Europe; indeed, in 1986, only 62 percent was in place. In 1984, the Congress, however, restricted the rate at which equipment can be placed in POMCUS. Concerned that diverting equipment to the POMCUS program could deprive some active and reserve units of modern equipment needed for training, the Congress directed the Army to defer supplying POMCUS for the 5th and 6th reinforcing divisions until active-duty units have at least 70 percent of their equipment and reserve units at least 50 percent. The Army's goal is to procure and place in POMCUS by 1991 an additional 25 percent of the requisite equipment, bringing the cumulative amount in storage to 87 percent of the final objective, while observing Congressional restrictions.

Training. Another Army goal affecting overall readiness concerns training of Army units, typically battalions, at the Army's National Training Center (NTC). This installation--covering 500,000 acres at Fort Irwin, California--enables entire Army units, such as tank battalions, to take part in simulated combat against sizable opposing forces employing tactics typical of Soviet units. Large-scale simulated battles, including supporting aircraft and live fire, enable combat units, most of whose members typically have not experienced actual combat, to train under the most realistic possible conditions short of war. Electronic devices record simulated "kills" using low-powered lasers to mimic bullets. Each side can evaluate its performance at the end of the day based on a detailed recording of everybody's movements and "shots" for the entire battle. This experience should provide Army units with invaluable preparation for actual combat, and the Army plans to continue sending 28 battalions to the NTC each year.

Sustainability

The ability to perform in combat for extended periods of time, referred to as sustainability, is another area receiving high priority for improvement. If U.S. forces became involved in a protracted conflict that involved intense combat, large amounts of ammunition, spare parts, and replacement equip-

ment would be needed. Reserves of such important components are designed to fill the Army's supply requirements until domestic facilities can begin to produce them in large quantities.

The most likely scenario that would include extended and intense fighting would pit NATO forces against those of the Warsaw Pact in Central Europe. Many doubts exist, however, about the likelihood of a Soviet invasion of Central Europe and the ultimate length of the ensuing combat if such an invasion should occur. The only recent examples of high intensity warfare, all limited to the Middle East, have been of short duration. Because one of the main purposes of U.S. conventional forces is to deter Soviet encroachment in Central Europe, however, the Army feels it must prepare adequately for such an eventuality, no matter how improbable. The Army has identified specific goals in the area of sustainability for the next five years. The following discussion of a few of the goals illustrate the Army's plans.

The need to stockpile munitions, and the Army's efforts to do so, was discussed above. By 1986, the Army had attained 85 percent of the dollar value of its total goal. That same year, however, the Army redefined its objective and, therefore, reevaluated its progress with respect to meeting that objective. Before 1986, the Army had assigned a total dollar value to the stock of munitions it felt were needed to sustain a war for a specified number of days. (The actual number of days in the Army's objective is classified.) Using this definition, the Army measured its progress toward its objective by the total dollar value of the ammunition it had stockpiled compared with the value of its ultimate goal, which was established by the Secretary of Defense. Recently, however, the Army has devised a scheme whereby it can compare its differing stocks of various munitions with its ultimate goal and assess how far it has progressed toward this end. Based on this new assessment method, the Army now feels that it has met only 65 percent of its total target for war reserves of munitions. In five years, the Army plans to have achieved 80 percent of this objective.

The Army has also identified other goals aimed at raising its ability to sustain combat. These include adding to the war reserve stocks of items such as spare aircraft and tank engines, transmissions, generators, and other reparable pieces of equipment known as "secondary items." The Army hopes to raise its war reserves of these items from the current level of 57 percent of its objective to 70 percent by 1991. The Army also plans to increase the amount of money it spends annually for maintaining and repairing equipment at its depots--referred to as depot maintenance and repair (DMAR)--from $1.7 billion in fiscal year 1986 to $2.1 billion in 1991. Finally, starting in

85-410 0 - 88 - 3

1988, the Army wants to fund a minimum of 93 percent of its depot material maintenance (DMM) program. 6/ The total level of DMM funding was $1.7 billion in fiscal year 1986, which represented almost 100 percent of the requirement.

Modernization

Most of the major programs to modernize weapons initiated during the first half of the decade--for example, the M1 tank, the Bradley Fighting Vehicle, the AH-64 and UH-60 helicopters, and the multiple launch rocket system (MLRS)--will continue to be deployed in the field through the next five years (see Table 5). In addition, several new systems, primarily for communications or intelligence gathering, will also begin to appear in U.S. Army units. These new, electronically sophisticated systems will become the focus of the Army's modernization effort during the next decade. Many of these new systems, particularly those for communications and target acquisition, are needed to support many of the weapons that the Army has bought during the past decade. Since the Army's latest weapons are faster and able to shoot further than their predecessors, Army commanders will now need timely information on the enemy's whereabouts and will then need to relay that information rapidly to the appropriate individual weapon system. In fact, the previous commander of the Army's Training and Doctrine Command, Gen. William R. Richardson, stated that his candidates for the Army's five most important new weapon systems included only one attack system. Four of his preferred systems would be used for locating targets, combining data from various sources, and communicating among various units in the Army. 7/

The Army plans to field three of General Richardson's candidates by 1991. Specifically, the Army plans to equip several units with the Army tactical missile system (ATACMS), the single-channel ground and airborne radio system (SINCGARS), and the mobile subscriber equipment (MSE) communication system. Deployment plans for these plus seven other new systems are described in Table 5. Within the next few years, the Army also

---

6. As opposed to the depot maintenance and repair program which maintains the actual depots themselves, the DMM program reconditions items, such as tank engines, so that they can be returned to the supply system.

7. General Richardson identified the Army tactical missile system (ATACMS), joint surveillance and target attack radar system (JSTARS), all-source analysis system (ASAS), mobile subscriber equipment (MSE), and single-channel ground and airborne radio system (SINCGARS) as the five major new hardware developments in the Army in an interview published in the *Armed Forces Journal* (May 1986).

TABLE 5. ARMY WEAPONS MODERNIZATION (By fiscal year)

System	Assigned Army Unit	Number of Systems Per Unit	Cumulative Number of Units Fielded (Including those for Active, Reserve, and POMCUS) 1986	1987	1988	1989	1990	1991
M1 Tank	Battalion	58	35	46	58	70	80	89
Bradley Fighting Vehicle	Battalion or Cavalry Squadron	50-54	25	31	37	44	55	68
AH-64 Helicopter	Battalion	18	2	9	16	21	30	34
UH-60 Helicopter	Company	15	34	38	41	47	53	54
MLRS/ATACMS a/	Battery	9	12	27	30	37	41	45
Patriot Missile Fire Unit b/	Battery	1	21	30	42	54	64	72
M9-ACE c/	Engineer Battalion	25	1	1	1	3	8	15
SINCGARS d/	Division	4,439	0	0	2	4	4	5
MSE e/	Corp	9	0	0	0	1	3	4
RPV f/	Battery	13	0	2	4	6	8	9

SOURCE: Letter from Lt. Gen. Carl E. Vuono, Deputy Chief of Staff for Operations and Plans, to Mr. Robert Hale, CBO, February 1986.

a. MLRS/ATACMS = multiple-launch rocket system/Army tactical missile system.
b. Includes allied units.
c. The M9-ACE is an armored bulldozer designed to construct defensive earthworks for tanks and fighting vehicles. The reserves will receive only company-size units equipped with 10 M9-ACEs beginning in fiscal year 1991. Active infantry divisions will receive only 19 M9-ACEs per battalion, and light infantry divisions will have 10 M9-ACEs per battalion.
d. SINCGARS = single-channel ground and airborne radio system.
e. MSE = mobile subscriber equipment.
f. RPV = remotely piloted vehicle.

hopes to field a remotely piloted vehicle (RPV) to fly over the battlefield and locate enemy units. (See the following box for brief descriptions of these 10 Army systems.)

ARMY SYSTEMS

M1 Abrams Tank--The newest Army tank, which entered production in 1979, weighs 60 tons and has a 105mm main gun. A modified version, currently being fielded in Europe, has a 120mm main gun capable of more accurate, longer-range shots.

Bradley Fighting Vehicle--This new vehicle for the Army's infantry units first produced in 1980, can carry a nine-man squad. It is also equipped with a 25mm gun capable of penetrating light armor and an antitank missile launcher. The Bradley, with a top road speed of 42 mph, is capable of keeping up with the M1 tank.

UH-60 Black Hawk Helicopter--The Black Hawk is the Army's new utility helicopter, replacing the smaller, Vietnam-era UH-1 "Huey." It can carry 11 combat equipped troops or 2,640 pounds of cargo at a speed of 145 knots for 2.3 hours.

AH-64 Apache Helicopter--The Apache is the Army's newest attack helicopter, having entered production in 1982. It is equipped with the latest target finding equipment and can operate both day and night. The Apache is armed with Hellfire antitank missiles, rocket pods, and a 30mm gun.

Patriot Air Defense System--Patriot has replaced the Nike-Hercules as the Army's long-range air defense weapon. It is capable of guiding missiles to several targets simultaneously. Patriot forms the front line of defense against high performance aircraft in the central European theater.

Stinger Missile--Stinger is a shoulder-fired missile that can be used to destroy aircraft flying at low altitudes. It is a short-range missile, guided to its target by heat emissions from the aircraft's

In addition to buying and fielding the modern weapons discussed above, the Army hopes to continue improving its existing weapons and to develop new, improved systems. To this end, the Army wants to achieve 5 percent

engine's and is used to defend deployed troops or specific high-value targets, such as supply depots.

Multiple-Launch Rocket System (MLRS)--The MLRS is a truck-mounted system that can fire 12 free-flight rockets to ranges over 30 kilometers (km) in less than one minute. Its primary targets are enemy artillery, air defense weapons, and other light material and personnel targets, such as assembly areas and command posts.

Single-Channel Ground and Airborne Radio System (SINCGARS)--The SINCGARS family of radios will provide the Army with a lightweight and secure means of transmitting both voice and data signals. As the name suggests, SINCGARS radios will come in models suitable for transportation in backpacks, ground vehicles, and aircraft.

Army Tactical Missile System (ATACMS)--The ATACMS missile will be launched from unmodified MLRS launchers. It is currently in development, not yet in production, and is designed to attack enemy targets far behind enemy lines. Unlike the free-flight MLRS rocket, the ATACMS missile will be guided to its target where it will fire one or more submunitions.

Mobile Subscriber Equipment (MSE)--The MSE, which entered production in December 1985, is a field telephone system, similar to mobile automobile telephones, that will be capable of transmitting voice, data, or facsimile messages throughout the battle area.

Remotely Piloted Vehicle (RPV)--The Army's current RPV system, the Aquila, is a small, propeller-driven pilotless aircraft with a 13-foot wingspan. It is controlled through a radio link by an operator located in a mobile ground station. The RPV can relay television pictures taken by a camera under its fuselage back to the operator, who controls the direction and magnification of the camera. The Aquila also carries a laser to designate targets for artillery.

TABLE 6. ARMY PERSONNEL, FISCAL YEARS 1987 AND 1991

	Beginning 1987	End 1991
Active	780,800	781,000
National Guard	450,500	492,100
Army Reserve	310,700	320,000
Total Reserves	761,200	812,100
Total Personnel	1,542,000	1,593,100

SOURCE: Letter from Lt. Gen. Carl E. Vuono, Deputy Chief of Staff for Operations and Plans, to Mr. Robert Hale, CBO, February 1986.

real growth in its research and exploratory development accounts; these fund the basic research designed to produce advanced technologies that could be applied to weapons. 8/

The Army's continuing modernization effort is designed to address the perceived imbalance between the Warsaw Pact and NATO conventional forces available for a conflict in Central Europe. The Army feels that technologically sophisticated weapons could help U.S. forces overcome the Warsaw Pact's numerical superiority. The Army's newest weapons and supporting systems--including air defense missiles, radios, and target-finding systems--are designed to operate in an intense battle where the enemy would employ sophisticated countermeasures such as jamming and decoys. The Army's modernization effort is, therefore, aimed at improving its ability to defend Europe in the event of a Soviet attack.

Force Structure

The Army envisions little change in its force structure over the next five years. Specifically, it plans to maintain its current organization of 18 active and 10 reserve divisions. Within this overall structure, however,

8. The engineering development and advanced development accounts provide funds, primarily to contractors, to design and build prototypes of specific new weapon systems.

smaller units will be added or disbanded. Specifically, three separate brigades will be formed--one in the active force and two in the reserves; an additional Special Forces Group will be created in the active Army; and two armored cavalry regiments in the reserves will be dissolved.

The Army is planning to form these additional units while keeping the active Army end strength at about 781,000 through 1991. Active personnel to fill the additional active combat units, therefore, will have to come from units currently performing support roles, such as transport or ammunition handling units. Units will still be needed to perform support missions, however. The Army's solution has been to transfer many of the support missions to the reserves. Indeed, should war break out in Europe, the reserves would provide 90 percent of all fuel supply units; 75 percent of all ammunition handling units; and 65 percent of all medical services. The Army, therefore, plans to increase the size of its reserve forces (see Table 6). The Army National Guard, which currently has 450,500 personnel, is scheduled to expand to 492,100 people by 1991. The Army Reserve, with an end strength of 310,700 in 1986, would grow to 320,000 by 1991. Thus, the reserve forces, which make up slightly less than half of today's total Army, would constitute the majority by 1991.

CHAPTER II

ESTIMATING THE COSTS OF THE ARMY'S GOALS FOR 1987-1991

Achieving the goals enumerated in the previous chapter obviously carries associated costs. The CBO has estimated the total funding requirements for meeting these goals for fiscal years 1987 through 1991. These estimates are not necessarily the funds that the Congress provided the Army in 1987 nor those the Army will request and receive from 1988 through 1991. Funds actually appropriated in 1987 reflected more stringent fiscal limits than those assumed in formulating the goals, and future Army requests may also have to balance the desirability of some goals against limits on available funds.

ESTIMATING METHODS USED

In projecting the required Army budgets from 1988 through 1991, CBO based them as much as possible on the direct costs of meeting the Army's goals. There were, however, large portions of these budgets that could not be tied directly to any of the Army's stated goals. In particular, the appropriation that pays for day-to-day operations--operation and maintenance--could not be projected based solely on the Army's goals for improving readiness, the area most directly associated with O&M funding. Furthermore, there are no satisfactory methods available to project requirements for future Army O&M needs. (See Appendix A for a more thorough discussion of methods for estimating O&M costs.) Several other, smaller appropriations are also difficult to project--research, development, testing, and evaluation (RDT&E); military construction (MILCON); and family housing--given the lack of specific Army goals relating to these appropriations. The CBO, therefore, used at least two methods to project costs in those accounts that were not amenable to detailed costing. Although the methods used were not totally satisfactory, they did yield budget projections that provide reasonable estimates of the funds that the Army would need to achieve its goals.

Various methods were used to ascribe costs to those Army goals that could be quantified and tied directly to monetary needs. The total Army budget was constructed from six major appropriations--military personnel; operation and maintenance; procurement; RDT&E; MILCON; and family housing. (See box for definitions of the appropriations.) The rest of this

chapter discusses the methods used to project the funds required by each appropriation through 1991 and the detailed results. Readers wishing to concentrate only on the overall funding estimates can skip to page 38.

DEFINITION OF BUDGET APPROPRIATIONS

Operations and Support Appropriations

Military Personnel (MILPER)--This appropriation includes funds for the salaries of all military personnel, both active and reserve. In addition, funds for moving soldiers and their households when they change assignments, housing allowances, and retired pay accrual are also included in this appropriation.

Operation and Maintenance (O&M)--Funds in this appropriation pay for the day-to-day operations of the active and reserve Army. This appropriation includes money to pay for heating facilities, supply operations, training, medical support, utilities, fuel, and civilian support contracts.

Family Housing--Money appropriated for family housing pays for the planning, designing, building, and maintaining of the Army's facilities for housing soldiers and their families. The rent of any leased dwellings is also paid for out of this appropriation.

Investment Appropriations

Procurement--The procurement appropriation provides funds for the purchase of major items--such as aircraft, tanks, missiles, radios, and ammunition--that the Army needs to equip its soldiers.

Research, Development, Testing, and Evaluation (RDT&E)--This appropriation funds all the Army's efforts to design, develop, and test new weapons. Funds to maintain the Army's test ranges are also included here.

Military Construction (MILCON)--All Army major construction, except that associated with family housing, is paid for out of this account. This appropriation also covers all plant improvements, such as new troop housing, dining halls, and maintenance sheds.

Military Personnel

The military personnel appropriation provides pay and allowances for personnel in the active Army, Army Reserve, and Army National Guard. Requirements for funding depend primarily on the number of people in each of these components. The size of the active component of the Army is not currently scheduled to change significantly between now and 1991. Therefore, the size of the account for active military personnel should remain roughly constant for the next five years, except for pay raises. (There would, of course, be changes in personnel costs less directly related to numbers of people--such as travel or changes in pay grade. These changes are not likely to be large, however, and are beyond the scope of this aggregate analysis.) If pay raises keep pace with inflation--a likely prediction for the next five years--then the active military personnel account should remain at roughly the same level, in fiscal year 1987 dollars, from 1987 through 1991. 1/

According to the Army's goals, the reserve component of the Army, in contrast with the active portion, would experience some growth (about 3 percent in end strength) during the next five years. In particular, the number of Army Reserve and National Guard personnel employed full-time by the Army would increase over the next five years--by 7,300 people, or almost 60 percent, for the Army Reserve and 19,900 personnel, or almost 80 percent, for the National Guard. 2/ Full-time reserve personnel provide training and administrative support for the part-time soldiers in reserve units. In addition, full-time reservists provide liaison to the active forces with which the reserve units would fight in the event of a crisis. Both of these factors would contribute to growth in the funds for Army reserve personnel. The total funding required for the planned increase in numbers of reserve personnel and full-time reservists for each of the next five years was supplied to CBO by the Army.

The total funding needed by the Army over the next five years for its military personnel appropriations can be determined by combining the active and reserve portions (see Table 7). Solely because of the planned growth in the size of the reserve component and the accompanying 41 percent real growth in reserve personnel funding from 1987 through 1991, CBO projects

---

1. Current accounting practices set the deflator for the military personnel account equal to the military pay raise. Thus, even if pay raises exceeded the rate of inflation or fell below it, personnel costs would remain constant in real terms.

2. Based on data contained in an Information Paper supplied by the Army to CBO on December 13, 1985.

TABLE 7. MILITARY PERSONNEL FUNDING, FISCAL YEARS 1986-1991 a/
(In billions of 1987 dollars)

	Appropriated		Projected			
	1986	1987	1988	1989	1990	1991
Active	21.8	22.4	22.4	22.4	22.4	22.4
Reserves						
Army Reserve	2.2	2.3	2.8	2.9	3.0	3.0
National Guard	3.2	3.3	4.2	4.5	4.7	4.9
Total	27.2	28.0	29.4	29.8	30.1	30.3

SOURCE: Congressional Budget Office projections based on data in Department of Army Information Paper (December 13, 1985).

a. Includes retirement accrual.

that the total military personnel appropriation would grow 8 percent from 1987 through 1991 with an average annual real growth of about 2 percent. This growth is based on Army data and reflects the changes deemed necessary to meet Army goals over the 1987-1991 period. 3/

Operation and Maintenance

The operation and maintenance appropriation (O&M) pays for a diverse group of activities. About 32 percent of the 1986 funds appropriated for O&M paid for most of the Army's civilian employees; the remainder funded, among other things, the nonpay costs of training; equipment maintenance; recruiting; fuel; base operations including utilities, heating, and food services; medical support; and the distribution of supplies. It would be impossible to project such a diverse account based solely on the Army's stated goals which cover only a few of these many areas. Indeed, the major goal related to this account is the Army's desire to increase helicopter flying hours. To obtain the Army's objective of 19.5 hours per crew per month by 1991 for its active duty pilots (as compared with the 1986 level of 14 hours per crew per

3. Note that the funds for 1986 and 1987 have already been appropriated.

month), the Army would have needed to increase funds for helicopter operations from slightly more than $300 million allotted for flying hours in 1986 to $345 million in 1991. The Army's total O&M budget in 1987 was $21.1 billion, however. Thus, achieving the Army's helicopter operations goal would require an insignificant increase in the Army's overall O&M budget.

Unfortunately, accepted analytic techniques do not exist for estimating the total costs of a service's O&M. Most approaches to estimating O&M costs focus on specific portions of the budget rather than the total. 4/ The CBO, however, did not attempt to determine the needs for each particular type of funding, but rather estimated how much might be required in the aggregate if the Army managed the O&M account on the whole as it has in the past. To derive these estimates, CBO used two separate approaches: the ratio-to-force-value estimation and the Army factors method.

Ratio-to-Force-Value (RFV) Estimation. The cost of maintaining and operating the Army should depend, in part, on its size--that is, the more people and associated pieces of equipment that the Army has, the more it is likely to cost to operate, assuming no major change in the types of equipment or operating tempo. Since the number of Army personnel has been and will continue to be relatively constant, any growth in O&M funding that has occurred recently or will be needed in the future would result primarily from an increase in the amount of equipment owned and operated by the Army and, to a lesser extent, from increased aircraft training tempo and the operation of additional bases. 5/ Another possible cause for increased Army operating expenses could be the growing sophistication and complexity of Army weaponry. The modern weapons that the Army is now fielding could require more expensive diagnostic equipment and spare parts, thus costing more on the whole to operate and maintain than older, less sophisticated equipment.

If O&M costs are related primarily to increases in the number and complexity of Army equipment, one could project future O&M costs by as-

---

4. See Appendix A for further discussion of the problems associated with estimating O&M costs.

5. Even though in the next five years the Army plans to increase the operating tempo of its aircraft and to buy more communications and electronics equipment than traditional weapons, such as tanks and missiles, the Army's overall operating tempo should remain roughly constant, barring a major conflict, and the bulk of its equipment should continue to consist of tanks, helicopters, and missile systems.

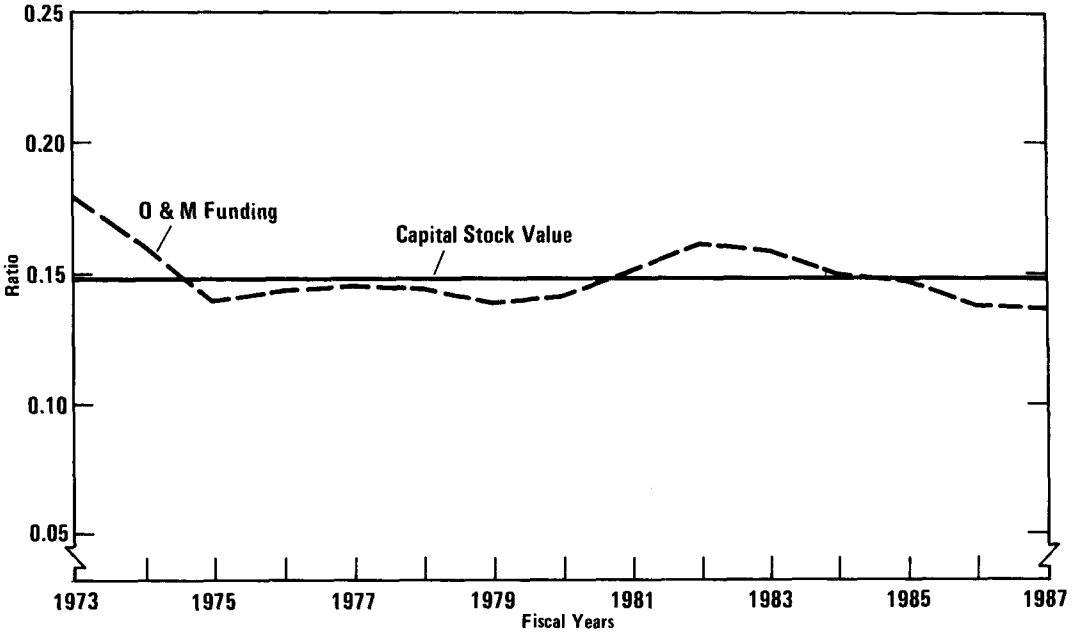
suming that they are proportional to the total value of the Army's equipment, or its capital stock. A direct relationship between O&M funding and the value of the Army's capital stock might seem without strong theoretical support. Indeed, an increase of, say, 10 percent in the value of equipment should not necessarily require 10 percent more funds for bases or medical support because some fixed costs should not have to be incurred. Nor does a relationship between O&M and the capital stock allow for efficiencies that may hold down costs even if weapons' values grow. On the other hand, the historical relationship between O&M and capital stock has been relatively constant since 1973, with total O&M funding for all components of the Army averaging about 15 percent of the total value of the Army's capital stock (see Figure 2). This fairly constant ratio might also reflect the costs of increasing weapons complexity that offset economies achieved by having more weapons or, perhaps, bureaucratic politics that tend to leave shares of a budget unchanged.

Whatever the reason, the constancy of the historical relationship suggests that one possible approach to estimating O&M funding is to assume that Army O&M costs in a given year are equal to about 15 percent of the total value of the Army's capital stock when measured in constant dollars. The resulting estimates should not be interpreted as "needs" for O&M funding that have been derived from a detailed analysis of the Army's goals. Rather, such projections should be treated as a rough estimate of likely costs of O&M, provided that the Army manages its O&M account generally as it has in recent years and continues to operate it at about the same tempo. 6/

The CBO projected the value of the Army's capital stock through 1991 based on the planned introduction of major equipment into the Army's inventory. The resultant real growth in capital stock value from 1987 through 1991 was almost 25 percent. Moreover, the 1987 level of O&M funding was somewhat below the historical average of almost 15 percent--13.7 percent in 1987 versus a 15-year historical average of 14.9 percent. As a consequence of the growth in capital stock and increases that would return the funding level to 15 percent of the value of the capital stock, growth in O&M funding, from the 1987 level through 1991, is projected to be 36 percent, an average annual real growth of 7.9 percent. In budget terms, the Army's

6. Despite the fact that the Army hopes to increase the training tempo of its aircraft, helicopter flying costs account for only a small part of the Army's overall O&M budget. Furthermore, the training tempo for the Army's ground vehicles is projected to remain constant through 1991. Because the Army has many more ground vehicles than aircraft (the Army owned about 15,600 tanks, 18,300 fighting vehicles and armored personnel carriers, and 8,400 helicopters in 1986), the increase in helicopter operating tempo will not greatly affect the Army's **overall** operating tempo.

Figure 2.
Ratio of Operation and Maintenence Funding to Capital Stock Value, Fiscal Years 1973-1987



SOURCE: Congressional Budget Office based on Department of Defense data.

funds for O&M will need to grow from the 1987 level of $22.5 billion to $30.5 billion in 1991.

Army Factors Method. An alternative method for estimating O&M needs is based on data included in the Army's *OMA and MPA Cost Factor Handbook* published in December 1984. 7/ This method for calculating annual O&M costs for active Army forces combines several factors to account for the different aspects of Army operations. One part of the operating cost is related to the number of active-duty personnel, and was set at $8,600 per person (in 1987 dollars) in the Army handbook. This per capita assessment includes funds to pay for training, travel, and medical expenses. Although the Army would like to increase training for helicopter pilots, the portion of the $8,600 allotted to an average soldier's training is relatively small and even a 40 percent increase over five years would have a very small effect on the overall O&M budget. 8/

7. OMA = Operation and Maintenance, Army; MPA = Military Personnel, Army.

8. The 40 percent increase corresponds to the increase in monthly flying hours from 14 in 1986 to 19.5 by 1991.

Another portion of the cost, as in the previous method, was related to the value of the Army's equipment but at a lower ratio--3.5 percent. This factor is related to maintaining the Army's equipment and could increase with operating tempo. Again, however, the portion related to increasing helicopter flying hours would be small.

Yet another portion of annual O&M costs included in the Army's handbook is the depot maintenance program. For this, Army estimates of required funding for the next five years were used. Finally, the Army handbook did not provide a basis for estimating the cost of operations and maintenance performed by civilian personnel. The CBO assumed that the level of funding for civilian salaries included in the Army's O&M account would remain constant at the 1987 level of $6.7 billion through 1991.

The factors discussed above apply only to operation and maintenance for active-duty personnel. Reserve and Guard operations are funded separately and cannot be estimated on the same basis, since the reserve components have completely different operating tempos and procedures from the active Army. Based on the historical relationship between reserve O&M funding and reserve personnel accounts, O&M funding for the reserves was projected for each year at a level equal to 50 percent of the reserve personnel funding for the same year. In this case, the impact of increased total flying hours was assumed to be reflected in the increase in total and full-time reserve personnel.

Using this alternative method based on Army factors, CBO projected that $27.8 billion would be needed for O&M funding in 1991. Although lower than the funding level projected by the previous method (ratio-to-force-value), this amount would represent a 24 percent increase over 1987 levels, and 5.4 percent average annual real growth from 1987 through 1991.

There is no analytical basis for determining which method best estimates likely future O&M costs. Therefore, both methods were used to project a range of Army O&M costs that might be included in total Army budgets to meet Army goals through 1991. It is interesting to note that the latest detailed Army estimates of O&M needs available to CBO (from the Army's Five-Year Defense Plan--or FYDP--for Fiscal Year 1987) fall between the projections resulting from these two methods (see Figure 3). 9/ This might suggest that the two methods bracket likely needs for O&M. On the other hand, as was noted earlier, Army budget estimates reflect not only

9. The FYDP, prepared with the help of the services, is the basis for the Department of Defense's total budget, and describes each service's budget plan for the ensuing five years.

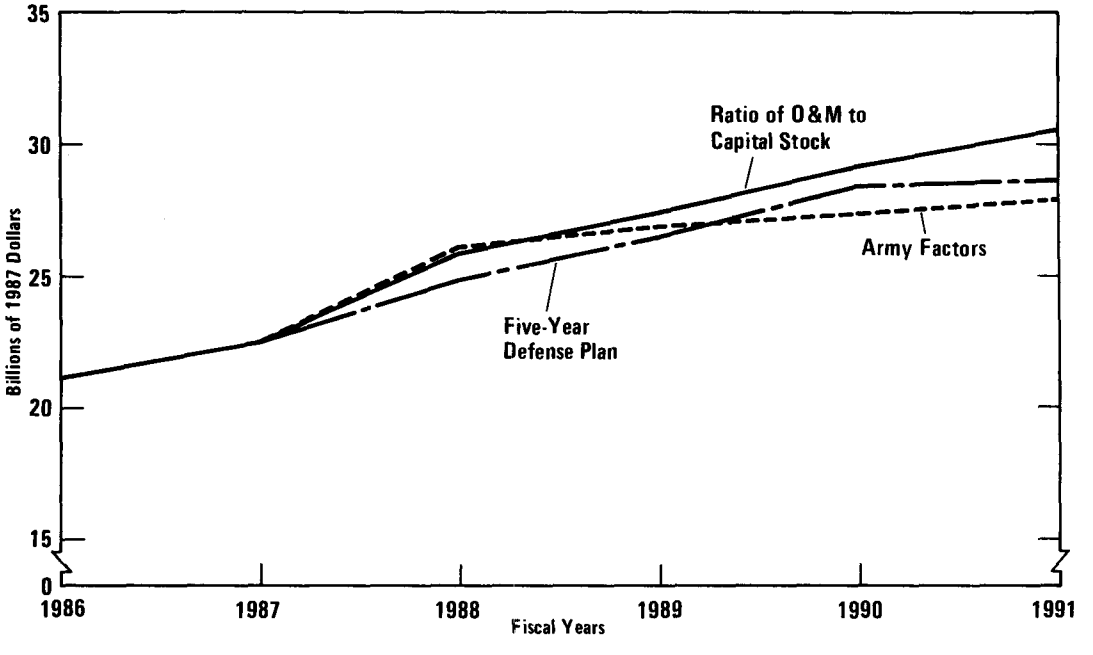
needs (goals) but also fiscal restraints levied on the service by the Administration and the Congress. Therefore, the budget estimates may not fully reflect the Army's objectives as provided to CBO.

Procurement

The procurement appropriation, which has received about a quarter of the Army's total budget for the past few years, is divided into five major accounts: aircraft procurement (APA), missile procurement (MIPA), weapons and tracked combat vehicles (WTCV), procurement of ammunition (PAA), and other procurement (OPA). Each of these accounts is divided into individual line items that contain funds for particular programs, like the M1 tank. Some accounts have a relatively small number of individual programs (for example, APA with only 40 individual items); others, like PAA and OPA, are divided into numerous small programs (PAA with 121 line items in the fiscal year 1987 budget and OPA with 343 items).

The Army provided CBO with modernization goals that laid out the Army's fielding plan for items such as the M1 tank, the Bradley Fighting

Figure 3.
Three Projections for Operation and Maintenence Funding, Fiscal Years 1986-1991



SOURCE: Congressional Budget Office.

Vehicle, the AH-64 helicopter, and seven other major weapons systems. Because weapons must be bought before they can be fielded, the Army's goals dictated the procurement schedules for 10 major programs for the next five years. The CBO ultimately projected costs for these 10 programs based on the Army's fielding goals. These programs, however, constitute about a third of the Army's overall procurement budgets for 1984 through 1988. Furthermore, procurement of 3 of these 10 programs (the M1 tank, the Bradley Fighting Vehicle, and the AH-64 helicopter) is scheduled to be completed by 1990, and, therefore, will not contribute to the 1991 procurement account at all. Clearly, the Army's procurement needs for the years from 1987 through 1991 cannot be predicted solely on the basis of these 10 individual programs.

Projecting Programmed Procurement. The CBO based the bulk of its procurement estimates on requests for funding for all the Army's weapons' programs as spelled out in various documents submitted in support of the President's budget for fiscal year 1987. 10/ These requests reflect the Army's goals for all of its programs *as modified by fiscal restraints*, but they provide the best available data on the hundreds of Army programs for which CBO does not have detailed fielding goals. The budget detail available for programs included in the 1987 budget accounted for 98 percent of the total procurement budget for that year. The procurement budget through 1991 was projected by drawing upon historical precedent.

The programs contained five years ago in the President's budget for fiscal year 1983 accounted for 97 percent of the 1983 procurement account. By 1987, however, these same programs accounted for only 89 percent of the total procurement account. The reason for the reduced fraction is the fact that some Army programs were funded in the fiscal year 1983 procurement budget but not in the 1987 budget since they no longer exist. The CBO, therefore, projected the procurement accounts for 1987 through 1991 based on the assumption that the current Army programs would retain shares similar to those that the 1983 programs held for the subsequent five years.

A similar situation is likely to occur in 1991. Army programs will be introduced between now and 1991 that will require procurement funds, while some current programs will be dropped or phased out. It can be postulated that each budget year will see the introduction of additional Army pro-

10. Sources include *Congressional Data Sheets, Selection Acquisition Reports,* and *Committee Staff Procurement Backup Books.*

grams. Thus, the programs that exist today will probably form a decreasingly smaller share of the Army's total procurement account with each procurement budget submitted after fiscal year 1987. In order to get a rough idea of how the share held by today's Army programs might decrease over the next few years, procurement spending from 1983 through 1987 was examined to see how the share decreased in years subsequent to 1983 (see Table 8).

The programs in the accounts that include the major weapon systems--aircraft, missiles, and weapons and tracked combat vehicles--remain relatively constant, with 1983 programs accounting for almost 100 percent in 1983 and at least 90 percent of the corresponding account for all years from 1984 through 1987. The other procurement account, which purchases all of the Army's noncombat systems, behaves differently, however. The OPA programs for which CBO has detailed data made up only 93 percent of the total OPA budget in 1983 and their portion rapidly decreased to less than 75 percent by 1987.

Each procurement account was projected separately. The share attributed to those programs for which CBO has detailed five-year data in

TABLE 8. PERCENT OF EACH APPROPRIATION ACCOUNT DEVOTED TO LINE ITEM SUMS FOR SPECIFIED PROGRAMS a/
(By fiscal year)

Procurement Appropriation Accounts	1983	1984	1985	1986	1987
Aircraft	97	100	95	100	98
Missiles	98	88	89	89	91
Weapons and Tracked Combat Vehicles	100	96	96	94	95
Other	93	85	80	75	74
Tactical and Support Vehicles	99	97	99	92	92
Communications and Electronics	90	85	78	74	74
Other Support Equipment	90	74	61	65	65

SOURCE: Congressional Budget Office, based on data in documents submitted in support of the President's budgets for fiscal years 1983, 1984, 1985, 1986, and 1987.

a. Based on programs included in the President's budget for fiscal year 1983.

each account was assumed to be the same for that account in years subsequent to 1988 as the 1983 programs accounted for in corresponding years after 1984. The other procurement account was divided into its three subactivities to try to treat independently the different types of equipment--vehicles; electronic gear; and other support equipment, such as trailers, bulldozers, and chemical masks. Finally, it must be remembered that only a small portion of each procurement account is projected based on a share of that account rather than on detailed budget data. 11/ The maximum percentage of a single account or subactivity that was projected on a share basis was 35 percent for other support equipment--a subactivity in the OPA account--for 1990 and 1991. When combined with the other OPA subactivities, the unspecified portion of the OPA account would comprise 26 percent of the total OPA account in 1990 and 1991. 12/ Taken together, however, only 15 percent of the total Army procurement account in 1990 and 1991 was projected using this method which, in turn, ultimately would represent about 4 percent of the total Army budget in 1990 and 1991.

The results of these projections are summarized in Table 9. It can be seen that the Army's procurement in these four procurement accounts is projected to grow from $14.0 billion in 1987 to $20 billion in 1991. The account that would experience the most significant growth would be the OPA, which includes the Army's communciations and electronics gear (see Figure 4). This increase reflects the Army's plans during the next five years to shift away from procuring more combat weapons and toward purchasing systems that support those weapons.

Two more conservative approaches to projecting the Army's procurement account would hold either the share or the dollar amount of unspecified funds in each specific procurement account constant at the fiscal year 1987 level. The effect of these approaches would be to stifle the growth in the OPA account, in particular, and in the procurement budget as a whole. Table 10 presents a comparison of 1991 funding in the four major procurement accounts, using three different methods of projecting Army procurement through 1991.

Using the more conservative methods would reduce 1991 procurement funding in these four procurement accounts from the $20.0 billion estimated

---

11. The 3 percent of procurement that was projected without any supporting detailed data accounted for only 0.5 percent of the total Army budget for 1987.

12. Unspecified funds refer to those that are not based on detailed data from documents supporting the President's budget for fiscal year 1987.

using the first method, to $17.9 billion with the share for unspecified funding held constant and $17.4 billion with the total amount of dollars for unspecified funding held constant. Since it is likely that the Army will continue to introduce new procurement programs into its budget, particularly in the other procurement account, subsequent discussions in this paper will use the procurement projections produced by the varying share method.

Fielding Goals. An additional adjustment was made to align individual program funding for the 10 programs for which the Army provided detailed fielding goals. The funding levels summarized in Table 9 reflect the Army's planned procurement as of the President's fiscal year 1987 budget submission and are not totally in agreement with the Army's fielding goals for the 10 major systems. Indeed, the Army's planned procurement of some of the weapons, such as the M1 tank and Bradley Fighting Vehicle, provides more

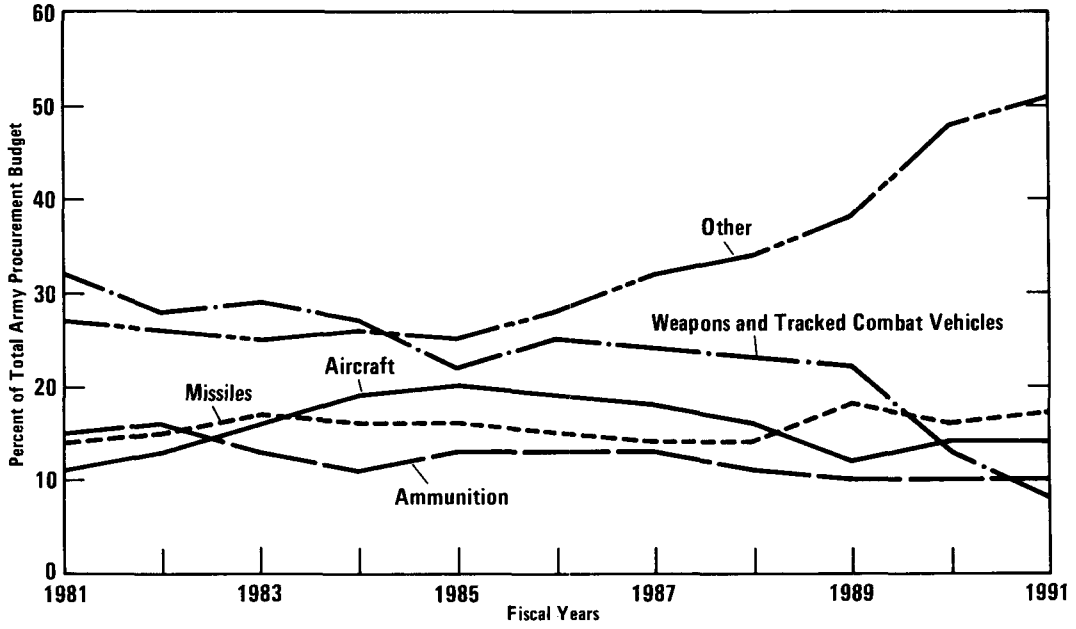
TABLE 9. PROJECTED FUNDING NEEDS IN PROCUREMENT, FISCAL YEARS 1986-1991 a/
(In billions of 1987 dollars)

Procurement Appropriation Accounts	Appropriated b/ 1986	Appropriated b/ 1987	Requested c/ 1988	Projected 1989	Projected 1990	Projected 1991
Aircraft	3.5	2.8	3.3	2.6	3.0	3.2
Missiles	2.9	2.2	2.9	3.9	3.4	3.7
Weapons and Tracked Combat Vehicles	4.6	3.8	4.8	4.9	2.8	1.7
Other						
Tactical and Support Vehicles	0.9	0.8	1.0	0.9	1.6	1.7
Communications and Electronics	2.9	3.1	4.2	5.1	6.0	6.6
Other Support Equipment	1.3	1.3	1.7	2.4	2.7	3.1
Subtotal, Other	5.1	5.2	6.9	8.4	10.3	11.4
Total	16.1	14.0	17.9	19.8	19.5	20.0

SOURCE: Congressional Budget Office, based on documents submitted in support of the President's fiscal year 1987 budget.

a. Does not include the ammunition account.
b. Funding levels reflect those actually appropriated by the Congress.
c. Funding levels reflect those requested in the President's fiscal year 1987 budget.

Figure 4.
Distribution of Army Procurement Funds, Fiscal Years 1981-1991



SOURCE: Congressional Budget Office based on Office of the Assistant Secretary of Defense (Comptroller), *National Defense Budget Estimates for FY 1984* through *FY 1987;* and budget documents in support of the President's budget for fiscal year 1987; and letter from Lt. Gen. Carl E. Vuono Deputy Chief of Staff for Operations and Plans to Congressional Budget Office, Robert Hale (February 1986).

modern weapons at earlier dates than called for by its fielding goals. This apparently reflects an Army desire to introduce modern tanks and fighting vehicles into its inventory as rapidly as possible. On the other hand, the Army's programmed procurement of AH-64 helicopters would not provide enough new helicopters to meet the fielding goals. Therefore, CBO adjusted the Army's planned procurement of the 10 major weapons systems to bring it into alignment with the specific deployment goals provided by the Army. This adjustment yielded some changes to the overall procurement funding levels (see Table 11). The net result of aligning individual weapons programs with the goals for their deployment is a slight increase in procurement spending in fiscal year 1988 and more substantial increases in the subsequent years. 13/

Ammunition War Reserves. The ammunition account of the procurement appropriation provides funding to purchase all of the Army's ammunition for

13. Adjustments to individual programs assumed that the cost of individual weapons systems would remain at the 1987 level, regardless of the number of systems purchased annually. Although changing annual procurement quantities might affect the weapon's unit cost, the overall effect would be insignificant.

TABLE 10. COMPARISON OF NEEDED 1991 PROCUREMENT FUNDING USING THREE DIFFERENT PROJECTION METHODS a/
(In billions of fiscal year 1987 dollars)

Procurement Appropriation Accounts	Method Used b/		
	Varying Share	Constant Share	Constant Amount
Aircraft	3.2	3.2	3.2
Missiles	3.7	3.4	3.4
Weapons and Tracked Combat Vehicles	1.7	1.7	1.7
Other			
Tactical and Support Vehicles	1.7	1.6	1.6
Communications and Electronics	6.6	5.5	5.2
Other Support Equipment	3.1	2.5	2.3
Subtotal, Other	11.4	9.6	9.1
Total	20.0	17.9	17.4

SOURCE: Congressional Budget Office, based on documents submitted in support of the President's fiscal year 1987 budget.

a. Excludes ammunition account.
b. Method used to project the funding of unspecified portion of the procurement budget beyond 1988.

weapons of all sizes, from the M16 rifle to the large caliber howitzers. The Army buys over 140 different types of ammunition, primarily for two purposes: training and stockpiling for war reserves. The Army has publicly stated its funding needs in both of these areas, and these requirements were used to adjust the funding in the ammunition account.

The annual expenditure required for training ammunition was estimated by the Army to be about $1.7 billion in fiscal year 1987. 14/ The

14. Testimony of Maj. Gen. Donald S. Pihl before the Subcommittee on Preparedness, Senate Armed Services Committee, 98:2 (March 1984).

TABLE 11. ADJUSTMENTS REQUIRED TO BRING PROCUREMENT IN LINE WITH DEPLOYMENT GOALS, FISCAL YEARS 1988-1991 a/
(Changes to planned Army funding in millions of fiscal year 1987 dollars)

Procurement Appropriation Accounts	1988	1989	1990	1991
Aircraft	-29	+714	-105	0
Missiles	+168	+168	+564	+564
Weapons and Tracked Combat Vehicles	-795	-795	+1,258	+810
Other				
Tactical and Support Vehicles	0	0	0	0
Communications and Electronics	+752	+410	+350	+450
Other Support Equipment	0	+70	+70	+70
Subtotal Other	+752	+480	+420	+520
Total	+96	+567	+2,137	+1,894

SOURCE: Congressional Budget Office, based on data contained in a letter from Lt. Gen. Carl E. Vuono, Deputy Chief of Staff for Operations and Plans, to Mr. Robert Hale, CBO, February 1986.

a. Excludes ammunition account.

Army also has a stated goal to increase its filled war reserve stocks (WRS) of munitions from 65 percent of its ultimate objective in 1986 to 80 percent by 1991. The Army planned to spend a total of $2.8 billion on ammunition for its WRS in 1986 and 1987 combined. This expenditure would have increased the amount of its filled objective from 65 percent to 72 percent. If it is assumed that each percentage increase in WRS filled is related to a constant expenditure of ammunition funds, the desired 15 percentage point increase in filling the WRS objective between 1986 and 1991 would require $6.0 billion over this period. 15/ Since $2.6 billion was appropriated in 1986

15. This is obviously a simplistic method for determining the cost of ammunition to fill the Army's reserve stocks. An optimum method would estimate the cost of each type of munition to be bought in the appropriate quantities. The CBO does not have access to data on the specific types and quantities of ammunition needed, however, and so adopted a method often used by the Army in public discussions of this topic.

and 1987, funding for the remaining $3.4 billion would be required from 1988 through 1991.

The combined funding needed to meet Army goals for ammunition for training and war reserve stocks is summarized in Table 12. The table also includes the Army's planned spending on ammunition as reported in press accounts and contained in its internal budget document. Obviously, the programmed level of funding fails to meet the Army's stated needs for both training and the goal of 80 percent of WRS filled by 1991.

Research, Development, Testing, and Evaluation, Military Construction, and Family Housing

The three remaining large Army appropriations--RDT&E, MILCON, and family housing--made up 10.3 percent of the total Army budget in 1987. RDT&E is by far the largest of the three, typically accounting for almost 6.5 percent of the total Army budget.

The Army's funding goal for its research and exploratory development accounts would provide for 5 percent annual real growth. These two accounts, however, encompass less than 20 percent of the total RDT&E budget; advanced development and engineering development--for which the Army has not provided a stated goal--claims the majority of RDT&E funds. Therefore, a 5 percent increase in the two smaller accounts would yield only a 1 percent overall increase in the RDT&E budget, if all other RDT&E accounts were funded at a constant level. Thus, the expressed Army goal for RDT&E might understate the likely funding needs for the entire account. Similarly, the goals for military construction and family housing did not permit direct estimates of total funding needed through 1991.

Therefore, CBO assumed that a constant share of the overall Army budget, equal to 6.5 percent, was allotted to RDT&E in each of the years from 1988 through 1991. A similar approach was used to project the funding in the Army's military construction and family housing accounts, allotting 2.1 percent and 1.9 percent of the total budget, respectively, to these two activities. This assumption reflects recent history, since these accounts have enjoyed roughly constant shares of the Army budget in recent years (see Table 13). 16/

16. As with the procurement accounts, an alternative method would hold funding for RDT&E, MILCON, and family housing constant at fiscal year 1987 levels through 1991. The impact of using this method, rather than the one outlined above, on overall Army budget needs through 1991, will be discussed in the next section.

TABLE 12. AMMUNITION FUNDING REQUIREMENTS, FISCAL YEARS 1986-1991
(In billions of fiscal year 1987 dollars)

	Appropriated a/		Projected			
	1986	1987	1988	1989	1990	1991
Projected to Meet Goals	2.5	2.1	3.0	3.2	3.6	2.9
Programmed	2.5	2.1	2.4	2.2	2.1	2.2

SOURCE: Congressional Budget Office, based on Army goals data, press accounts, and Department of the Army, Program Objectives Memorandum (February 1986).

a. Ammunition funds already appropriated by Congress.

THE COST OF MEETING THE ARMY'S GOALS

Using the methods described earlier in this chapter, CBO projected the funding levels that the Army would need over the period from 1987 through 1991 to meet all its goals. 17/ At a minimum, these projections suggest that the Army's budget for the six appropriations included in CBO's analysis would have to grow from $74.2 billion in 1987 to a level of $93.0 billion by 1991, suggesting a need for rates of annual average real growth of 5.8 percent (see the "all goals met" section of Table 14). This level assumes that needs for operation and maintenance funds are best determined by the Army factors method. If, on the other hand, O&M requirements are best predicted by holding constant the relationship between O&M and the capital stock, as roughly has been the case in the last 10 years, then using the RFV method would predict that the budget would have to grow to a level of $96.0 billion by 1991, yielding an average annual rate of real growth of 6.6 percent through 1991. 18/

17. Although most projections of future budgets include five years of growth, the Army supplied CBO with goals through 1991 only. Since the Army budget for fiscal year 1987 has already been appropriated, this paper will discuss only those budgets which the Congress has yet to consider--those for 1988 through 1991.

18. If all the portions of the budget projected on the basis of a budget share--unspecified portions of procurement, RDT&E, MILCON, and family housing--were held constant at fiscal year 1987 levels, the resultant fiscal year 1991 budget would range from $88.1 billion to $90.8 billion, with annual real growth rates of 4.3 percent to 5.1 percent.

The budgets associated with achieving all the Army's goals would also tend to maintain the current balance between operating and investment funds. Operating and support funds--defined here as those for operation and maintenance, personnel, and family housing--decreased from 73 percent of the Army budget in 1980 to 66 percent in 1986. (O&S funding in 1987 accounted for 70 percent of the Army's budget.) Under the budgets needed to achieve Army goals, these funds would account for about 65 percent of the total budget for 1988 through 1991.

Estimates of the cost of meeting goals in 1987 also suggest how much fiscal restraints have affected the Army's ability to meet its goals. In 1987, CBO estimates that the Army would have needed $80.1 billion to meet its goals. The Army requested $81.5 billion, but the Congress actually appropriated only $74.2 billion.

MODIFYING ARMY GOALS

History and recent policy statements suggest that certain of these Army goals are particularly likely to be modified. The effects of two such modifications are examined here. Chapter III explores broader changes in the Army goals that would be needed to hold down increases in spending.

Historically, the Army has not achieved the increases in ammunition called for in its goals. Those advocating increases in stocks of ammunition point out that they would be critical in the event of war; weapons without

TABLE 13. PERCENT OF THE ARMY BUDGET APPORTIONED TO RDT&E, MILCON, AND FAMILY HOUSING, FISCAL YEARS 1981-1987

	1981	1982	1983	1984	1985	1986	1987	Average
RDT&E	7.2	6.9	6.7	6.1	5.9	6.4	6.1	6.5
MILCON	2.3	2.1	1.8	1.9	2.3	2.4	2.0	2.1
Family Housing	a/	a/	1.8	1.8	1.8	1.9	2.2	1.9

SOURCE: Congressional Budget Office, based on historical budget data.

a. Family housing for all services was paid out of a single Defense Department appropriation before 1983.

ammunition would not be useful. On the other hand, given the seemingly low probability of a major war, one could argue that the Army should spend scarce resources buying the weapons, which generally take longer to produce, and should build up ammunition stocks only if a conflict seemed more imminent. It must be kept in mind, however, that as long as two years could be needed even to begin to accumulate significant quantities of some munitions.

If the Army does not build up its stocks, but rather stays at today's levels, costs to meet the Army's goals would fall by $3.0 billion over the period from 1988 through 1991. The range of needed annual real growth for meeting the other goals would be 5.2 percent to 6.0 percent a year from now through 1991, depending on needs for O&M, rather than the range of 5.8 percent to 6.6 percent noted above in meeting all Army goals (see Table 14).

While a decision not to build up ammunition stocks could hold down cost growth, a decision to keep open production lines for weapons could

TABLE 14. COSTS ASSOCIATED WITH MEETING THE ARMY'S GOALS
(In billions of fiscal year 1987 dollars)

Goals Met	O&M Estimation Method	Appropriated a/ 1986	Appropriated a/ 1987	Projected 1988	Projected 1989	Projected 1990	Projected 1991
All	RFV	74.7	74.2	85.5	90.4	94.6	96.0
	Army Factors	74.7	74.2	85.7	89.8	92.6	93.0
No Ammo. Increase	RFV	74.7	74.2	85.3	89.7	92.3	93.9
	Army Factors	74.7	74.2	85.6	89.2	90.3	90.8
All and Extend Production Lines	RFV	74.7	74.2	85.5	90.4	95.4	98.4
	Army Factors	74.7	74.2	85.7	89.8	93.4	95.4

SOURCE: Congressional Budget Office.

NOTES: O&M = operation and maintenance;
RFV = Ratio-to-Force value estimation.

a. Funds actually appropriated by the Congress.

increase needed costs. The Congress has expressed concern over the Army's plans to complete purchases of the M1 tank, the Bradley Fighting Vehicle, and the Apache helicopter within the next few years. 19/ Without continuing U.S. Army purchases, it is probable that production lines for these weapons would shut down, leaving a void in U.S. production capability and causing a long delay should more of these weapons be needed in time of war. Thus, national security concerns could dictate maintaining active tank, fighting vehicle, and attack helicopter production lines. Indeed, Congressional committees have requested studies of the cost and desirability of maintaining these production lines. 20/

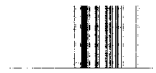
Maintaining production lines of such expensive items, even at the level the Army believes is the minimum economic level of production, would entail considerable cost. The CBO estimates that the cost, in fiscal year 1987 dollars, of maintaining the lines at annual production rates of 600 M1 tanks, 540 Bradley Fighting Vehicles and 72 Apache helicopters through 1991 would be $0.7 billion in 1989, $2.2 billion in 1990, and $3.0 billion in 1991. These costs are additional to the procurement plans contained in the President's budget for 1987. Aligning the procurement programs with the Army's fielding goals, however, extended the Apache production line to 1989, the M1 line to 1990, and the Bradley line through 1991. Thus, costs in addition to those already attributed to meeting the Army's goals would be $0.7 billion in 1990 and $2.2 billion in 1991. The requirement to keep these three lines open through 1991 would push up the average annual real growth needed through 1991 to meet Army goals to a range of 6.5 percent to 7.3 percent, again depending on needs for O&M (see Table 14).

In sum, the cost of meeting Army goals would depend partly on how much would have to be spent for operation and maintenance and also on certain key goals that could easily change. Nonetheless, the range always suggests that the Army would require five years of annual real growth of at least 4 percent to meet its goals and could require annual increases averaging 6 percent. Since the Army budget did not grow at all, in real terms, between 1986 and 1987, annual real increases of 5 percent to 7 percent would be required to meet the Army's goals by 1991.

---

19. The Army currently plans to terminate the M1 line in 1989, the Bradley line in 1990, and the Apache line in 1988.

20. *National Defense Authorization Act for Fiscal Year 1987*, Report No. 99-331, Senate Armed Services Committee, 99:2 (1986); *Department of Defense Appropriations Bill, 1987*, Report No. 99-793, House Appropriations Committee, 99:2 (1986); and *National Defense Authorization Act for Fiscal Year 1987*, Report No. 99-718, House Armed Services Committee, 99:2 (1986).



CHAPTER III

THE IMPACT OF ZERO BUDGET GROWTH ON THE ARMY'S ABILITY TO MEET ITS GOALS

The CBO projects that the Army would need 4 percent to 6 percent annual real growth in its budget from fiscal years 1986 through 1991 in order to meet most or all of its goals (see Chapter II). Since the Congress did not provide any real growth in the Army's 1987 budget, attaining the Army's goals by 1991 would require about 6 percent annual real growth in the Army budget between 1987 and 1991. From 1980 through 1985, the Army's budget grew at even higher rates, with average annual real growth approaching 10 percent. But that growth has stalled in recent years as the Congress has reduced the defense budget. Indeed, in 1986 and 1987, annual real reductions in the Army's budget averaged 3 percent. This chapter examines the possible effects of no budget growth over the next five years on the Army's ability to meet its goals.

Illustrating the effects of zero real growth does not suggest that this level of growth is the most likely outcome for the next five years, or that it is the appropriate level of growth. The appropriate level, whether zero or a higher or lower number, depends on national security needs and fiscal concerns that go beyond the scope of this report. Actual changes in the Army's budget over the next five years will reflect a detailed budget debate, the outcome of which cannot be forecast. Army Undersecretary James R. Ambrose, however, recently indicated that he feels that the Army's future holds budgets of "zero or less than zero" growth and is, thus, encouraging the Army to consider ways of altering its plans to accommodate leaner fiscal times. 1/

In the absence of real budget growth, the Army would be forced to choose among its goals, as it obviously would not be able to afford them all. The rest of this chapter examines three approaches that the Army might take to allocate limited funds in the event that it receives a constant level of funding for the next five years. The three approaches emphasize different portions of the Army's budget:

- Option I gives priority to operating and support (O&S) funds (military personnel--MILPER--operation and maintenance, and family housing);

1. *Washington Post*, November 19, 1986, p. 1.

- Option II emphasizes investment accounts (procurement, research, development, testing, and evaluation--RDT&E--and military construction--MILCON);

- Option III attempts to place balanced emphasis on funding for both investment and operating and support accounts.

All the analysis in this chapter is in real terms and costs are expressed in fiscal year 1987 dollars that adjust for the effects of inflation. For this reason, this chapter ignores a favorite way of reducing defense budgets in recent years--financing changes, which include use of past overestimates of inflation to fund current needs (spending the so-called inflation dividend) and reductions in estimates of future inflation. The CBO cannot estimate how much, if any, of the inflation dividend remains to be spent on future needs. Nonetheless, given the large amounts of the dividend that has already been used and the inflation rates of 2 percent to 3 percent now being assumed in future budgets, it seems unlikely that these financing changes would be sufficient to avoid most of the real reductions discussed in this chapter.

OPTION I--EMPHASIZE OPERATING AND SUPPORT FUNDING

Many expressed concern during the late 1970s and early 1980s that the Army had become ineffective because of several deficiencies: insufficient training, lack of spare parts and facilities needed to maintain and operate equipment already deployed, and a deteriorating physical plant. One well-known critic, General E. C. (Shy) Meyer, coined the phrase "hollow Army" to describe his view of these conditions in 1980. Since then, many feel that increased spending for operating expenses has resulted in an Army that is ready and able to fight effectively. In its latest annual report, the Army states that it has improved its readiness significantly since 1980 by improving the quality of its soldiers, increasing the amount and realism of their training, increasing war reserve stocks, and reducing maintenance and repair backlogs. As a consequence, the Army feels that the high priority it placed on building a ready and capable Army has been justified. 2/ Furthermore, the Army still considers that maintaining, and even improving, its current state of readiness should be its first priority when allocating resources.

2. John A. Wickham, Jr., and the Honorable John O. Marsh, Jr., *The Posture of the United States Army for Fiscal Year 1987* (Department of the Army, February 1986).

Recent Congressional actions reflect the same priorities. The largest reductions made to the President's request for the Army's 1987 budget were realized in the investment accounts. Indeed, while the Army's military personnel and O&M appropriations received 3 percent and 7 percent real growth, respectively, over 1986 levels, the procurement and RDT&E accounts were reduced 14 percent and 4 percent, respectively, in real terms.

This approach would minimize the chances of returning to a hollow Army in the late 1980s and early 1990s by providing ample funds for the Army's operating accounts which support personnel and day-to-day maintenance and operations. Specifically, it would fund the Army's goal to increase reserve personnel, including the number of full-time reservists. The Army has stated that, by creating new, more combat-intensive divisions, it has shifted many support missions to the reserves and, therefore, needs more reserve personnel. Under this approach the Army reserve forces could continue to grow and provide additional support to the active Army's 18 divisions. As a result, personnel funding would rise from $28.0 billion in 1987 to $30.3 billion in 1991.

Furthermore, operation and maintenance funds that pay for day-to-day operations would be allocated using the ratio-to-force-value (RFV) method discussed in Chapter II, which provides the higher level of funding. 3/ This approach should furnish support at levels consistent with policies of recent years, which have held O&M roughly constant as a fraction of capital stock. 4/

Finally, the family housing account would maintain its constant share of the budget (and current relationship with the number of active personnel, since that also would remain constant), thereby providing the Army with funds to continue its 1987 level of maintenance and improvements to its stock of houses. These assumptions mean that total operating and support funds would increase markedly over the next five years, from $52.1 billion in 1987 to $60.3 billion in 1991 (see Table 15).

---

3. This same approach, using the alternate Army factors method for projecting future O&M costs, would result in essentially the same outcome. Appendix B includes additional details on the sensitivity of results to projection methods.

4. The level of procurement spending possible within the constraints of a zero growth, five-year budget with full O&S funding would be significantly below that currently programmed by the Army or dictated by the Army's modernization goals. As a consequence, the total value of the Army's accumulated equipment would not grow quite as rapidly as it would have with an unconstrained budget. Therefore, O&M costs, which are based on approximately 15 percent of the total force value, would also be somewhat less than those predicted during a period of significant budget growth (see Chapter II).

On the other hand, the remaining, or investment, portion of the Army budget would be cut enough under this approach so that the total budget would experience no real growth. This would mean that investment would fall from $22.1 billion in 1987 to only $13.9 billion by 1991, a reduction of 37 percent below 1987 levels and almost 60 percent below the level needed to achieve the Army's goals.

What would such drastic reductions in investment mean to the Army? To illustrate the possible effects, this study assumes that each investment account is cut proportionately and that the procurement reductions are

TABLE 15. FUNDING FOR VARIOUS ACCOUNTS WITH ZERO GROWTH IN THE ARMY BUDGET AND EMPHASIS ON OPERATING AND SUPPORT, FISCAL YEARS 1986-1991
(In billions of fiscal year 1987 dollars)

Account	Appropriated a/ 1986	1987	Projected 1988	1989	1990	1991
Operating and Support (O&S)						
Personnel	27.2	28.0	29.4	29.8	30.1	30.3
O&M	21.1	22.5	25.7	26.8	27.6	28.4
Family Housing	1.4	1.6	1.6	1.6	1.6	1.6
Subtotal, O&S	49.7	52.1	56.7	58.2	59.3	60.3
Investment						
Procurement	18.6	16.0	12.7	11.6	10.8	10.1
RDT&E	4.8	4.6	3.6	3.3	3.1	2.9
MILCON	1.6	1.5	1.2	1.1	1.0	0.9
Subtotal, Investment	25.0	22.1	17.5	16.0	14.9	13.9
Total	74.7	74.2	74.2	74.2	74.2	74.2

SOURCES: Congressional Budget Office, based on data from Office of the Assistant Secretary of Defense (Comptroller), *National Defense Budget Estimates for Fiscal Year 1987* (May 1986); and *Making Continuing Appropriations for Fiscal Year 1987*, Conference Report, 99-1005, 99:2 (1986).

NOTE: Numbers may not add to totals because of rounding.

a. These funds have already been appropriated by the Congress.

spread proportionately over each procurement program. This approach ignores obvious choices that the Army might make when distributing scarce procurement funds among its many programs. The Army might choose to fund preferentially those noncombat systems that it feels are necessary to support the many weapons it purchased earlier in the decade. It is impossible, however, for CBO to make knowledgeable decisions concerning which items are necessary for the Army to fight effectively. All programs, therefore, received equal priority when limited procurement funds were allocated. The study also ignores unit cost increases that would occur as procurement funds are cut and fewer tanks or aircraft or other weapons are bought at each production plant. 5/ Under these assumptions, CBO estimated the number of Army units that would be equipped with major new weapons when all new weapons purchased through 1991 had been delivered (see Table 16).

For major ongoing programs, the drastic cut in procurement funds would not have effects nearly as marked as the drop in funds. By 1991, for example, the M1 tank would be fielded to 77 tank units under this approach, compared with the Army's goal of 89 units. The Bradley Fighting Vehicle (BFV) would equip 76 units compared with 102 units under the Army's goals. These relatively modest changes would occur because some programs, like the M1 tank and Bradley Fighting Vehicle, are well under way--indeed would be completed over the next few years--and so would not be greatly affected by the cutbacks.

Other, newer programs, however, would be severely affected. The SINGCARS radio, the mobile subscriber equipment (MSE) communications system, and the M9 ACE combat bulldozer are examples. This result emphasizes the long-run aspect of this approach; it would be felt most heavily in the 1990s when new systems not purchased over the next five years would otherwise play an important role in improving Army capability. The long-run effects of this approach are reinforced by the sharp cutback in research funds under this option. The Army would not only procure fewer of its newest weapons, but by 1991 it would have 40 percent fewer dollars to develop the weapons to maintain or improve its forces in the 1990s and beyond.

Another effect of greatly reduced spending for investment would be lack of funds for ammunition. Low levels of ammunition funding could prevent the Army from adding further to its munitions war reserve stocks.

---

5. The effect of reduced production rates and resultant unit cost increases, though small, would be to retard even more the Army's progress toward meeting its goals.

Indeed, very low levels of funding for ammunition could force the Army to remove ammunition from its war reserve stocks for training, thus causing it to fall even further from its ultimate WRS objective.

This approach would also produce what some might view as an unbalanced Army budget. By 1991, operating and support funds would consume fully 81 percent of the Army's budget under this approach, compared with 70 percent in 1987 and an average level of 69 percent over the past 10 years.

TABLE 16. IMPACT OF OPTION I ON THE ARMY'S GOALS AS OF FISCAL YEAR 1991 a/

	Goal	Option I
Force Structure (Personnel at Year End)		
Active	781,000	781,000
Reserve	812,100	812,100
Modernization (Number of Units Equipped)		
M1 battalions	89	77
BFV battalions and cavalry squadrons	102	76
AH-64 battalions	34	31
UH-60 companies	54	49
MLRS batteries	47	39
Patriot batteries	93	68
M9-ACE battalions	25	13
SINCGARS division sets	15	7
MSE corps sets	5	3
RPV batteries	10	5
Readiness Funding (Percent Annual Growth in O&M, 1987 through 1991)	5.4-7.9	6.0
Sustainability-- Munitions in War Reserve Stock (Percent of Objective Met)	80	67

SOURCE: Congressional Budget Office, based on data contained in a letter from Lt. Gen. Carl E. Vuono, Deputy Chief of Staff for Operations and Plans to Mr. Robert Hale, CBO, February 1986.

a. Based on funded delivery period, not actual inventory in 1991.

If history is a guide, such a large percentage of funds devoted to operations might not leave enough funds to invest in new hardware required to maintain Army capability. On the other hand, it might be the kind of budget that the Army would need to support all of the equipment that it purchased during the 1980 through 1986 period.

OPTION II--EMPHASIZE INVESTMENT

The mission that most influences the need for so large an Army, and hence so large a budget, is a major war in Europe against the Warsaw Pact. This approach, which emphasizes future investment at the expense of operating funds and personnel, might be consistent with the seemingly small chance of such a war in the next few years, and might suggest that the Army should build for the future. On the other hand, even those wishing to emphasize investment would not ignore the need for continuing adequate operations. A cadre of soldiers must be trained in peacetime to ensure that they can operate the Army's weapons and to provide the basis for expansion of forces in event of war.

Thus, this option, even with its emphasis on investment, would not simply provide all of the investment dollars needed to achieve the Army's goals and absorb, in the operating appropriations, all the cuts necessary to maintain a constant total budget. Instead, the O&M account that provides for day-to-day training and maintenance would continue to receive some of the increases in funding needed to operate new equipment. All other accounts would be reduced proportionately and sufficiently to ensure that the total budget would not grow.

Specifically, the O&M account would receive the annual real growth of 3.8 percent that is suggested by the Army factors method described in Chapter II. 6/ This growth rate, however, could not maintain the historical relationship between O&M and the Army capital stock. Thus, this approach poses a greater risk than Option I that the Army would have to cut back on maintenance or day-to-day training. Nonetheless, O&M would receive substantial real growth and O&S funding would continue to account for 68 percent to 70 percent of the total Army budget. Furthermore, throughout the period from 1988 through 1991, O&S would be funded at a level significantly higher than during the five years from 1975 through 1980, when about $40 billion in 1987 dollars was appropriated annually for O&S.

---

6. The impact of using the alternate method to project O&M funding, the RFV method, on the Army's zero growth budget is discussed in Appendix B.

While training and operations would be maintained at a relatively high level, this approach would reduce the Army's peacetime personnel by 7 percent below 1987 levels. The Army could adapt to such cuts in various ways: by emphasizing cuts in the reserves rather than the active forces, by cutting more officers than enlisted personnel, by cutting back on real pay levels with resultant reductions in quality, or by reducing nonpay costs within the personnel account such as those for travel. Indeed, since the active portion of the Army has not grown since 1980, the Army might wish to make greater reductions in reserve personnel than active. Again, CBO is not in a position that enables it to make such choices and, therefore, chose to illustrate one possible approach by assuming that the 7 percent reduction is applied equally to all personnel areas, with the cuts in pay and allowances being achieved by reducing numbers of soldiers rather than real levels of pay. As a result, active-duty strengths in the Army would fall to 728,000 by 1991; reserve strengths would fall to about 732,100--about 15 percent below the planned 1991 level of 812,100 that would be achieved if the Army goals were met (see Table 17).

These personnel reductions would probably thwart the Army's plan to maintain 28 active and reserve divisions. The Army might, for example, have to return to its 1985 force of 25 divisions (16 active and 9 reserve) and also reduce troops assigned outside the divisions in combat and support roles. In terms of wartime capability, this approach would mean fewer active-duty troops that could be brought to bear quickly in a war and fewer reserves to back them up. Thus, in wartime the Army would have to depend more heavily on drafting civilians and training them as soldiers, which takes months. In peacetime, this approach could require some reduction in overseas commitments; or, alternatively, the smaller number of active-duty soldiers would have to spend more time overseas.

Compared with Option I, fewer soldiers would have more and newer equipment. Under this approach, the investment accounts would also decrease about 7 percent below their 1987 level, but would be 40 percent below the levels that CBO estimated would be needed to achieve the Army's goals. This decrease means that, relative to Army goals, fewer units would be equipped with the newest equipment (see Table 18). For example, 81 units would be equipped with M1 tanks, compared with the 89 units that the Army hoped to equip with M1s by 1991.

On the other hand, this option would not have the drastic effects on some newer systems that would occur under Option I with its very large cuts in investment. For example, 9 divisions would be equipped with the new

SINCGARS radio by 1991, compared with the seven divisions possible under the first approach and the Army's goal of 15 divisions equipped by 1991.

This approach would also allow some improvements in the stocks of weapons, spare parts, and ammunition that allow the Army to sustain combat in a prolonged war. These stocks would grow from the 1987 level of about 69 percent of objectives filled to about 72 percent by 1991. This compares with 80 percent of objectives achieved by 1991 under the Army's goals, and a regression to 67 percent under the first option.

TABLE 17. FUNDING FOR VARIOUS ACCOUNTS WITH ZERO GROWTH IN THE ARMY BUDGET AND EMPHASIS ON INVESTMENT, FISCAL YEARS 1986-1991
(In billions of fiscal year 1987 dollars)

Account	Appropriated a/ 1986	1987	Projected 1988	1989	1990	1991
Operating and Support (O&S)						
Personnel	27.2	28.0	26.6	26.4	26.2	26.1
O&M	21.1	22.5	25.1	25.5	25.7	26.1
Family Housing	1.4	1.6	1.5	1.5	1.5	1.5
Subtotal, O&S	49.7	52.1	53.2	53.4	53.5	53.6
Investment						
Procurement	18.6	16.0	15.2	15.1	15.0	14.9
RDT&E	4.8	4.6	4.4	4.3	4.3	4.3
MILCON	1.6	1.5	1.4	1.4	1.4	1.4
Subtotal, Investment	25.0	22.1	21.0	20.8	20.7	20.6
Total	74.7	74.2	74.2	74.2	74.2	74.2

SOURCES: Congressional Budget Office, based on data from Office of the Assistant Secretary of Defense (Comptroller), *National Defense Budget Estimates for Fiscal Year 1987* (May 1986); and *Making Continuing Appropriations for Fiscal Year 1987*, Conference Report, 99-1005, 99:2 (1986).

NOTE: Numbers may not add to totals because of rounding.

a. These funds have already been appropriated by the Congress.

Finally, this alternative might produce a more balanced Army budget than did Option I. Under this alternative, operating and support costs would constitute 72 percent of the Army budget by 1991, which would be slightly more than the 1987 level and come close to the historical average. By contrast, operating and support costs would consume 81 percent under the first approach.

TABLE 18. IMPACT OF OPTIONS I AND II ON THE ARMY'S GOALS AS OF FISCAL YEAR 1991 a/

	Goal	Option I	Option II
Force Structure (Personnel at Year End)			
Active	781,000	781,000	728,000
Reserve	812,100	812,100	732,100
Modernization (Number of Units Equipped)			
M1 battalions	89	77	80
BFV battalions and cavalry squadrons	102	76	81
AH-64 battalions	34	31	32
UH-60 companies	54	49	50
MLRS batteries	47	39	41
Patriot batteries	93	68	73
M9-ACE battalions	25	13	17
SINCGARS division sets	15	7	9
MSE corps sets	5	3	4
RPV batteries	10	5	7
Readiness Funding (Percent Annual Growth in O&M, 1987 through 1991)	5.4-7.9	6.0	3.8
Sustainability-- Munitions in War Reserve Stocks (Percent of Objective Met)	80	67	72

SOURCE: Congressional Budget Office, based on data contained in a letter from Lt. Gen. Carl E. Vuono, Deputy Chief of Staff for Operations and Plans to Mr. Robert Hale, CBO, February 1986.

a. Based on funded delivery period, not actual inventories in 1991.

OPTION III--PLACE A MORE BALANCED EMPHASIS

The third approach would attempt to strike a compromise between the first two options. It would fund O&M at a modest level, maintain the current strength of the active and reserve forces, and require some reduction in investment accounts. In this way, an Army of today's size would be slowly modernized over the next five years.

Like Option II, this one would provide O&M funding based on estimates using the Army factors method. 7/ Because using this method results in O&M funding levels that fall as a percent of the Army's capital stock, this alternative would raise some risks that day-to-day training and maintenance would not be maintained at the current level. Nonetheless, O&M would grow substantially from now to 1991.

Unlike the previous approach, this one would maintain current strengths in the active and reserve portions of the Army. Without an increase in the size of the reserves, however, the Army may not be able to support fully its recent expansion to 28 divisions. Nevertheless, with its current level of personnel, the Army should retain its wartime ability to bring troops to bear quickly in a conflict. This option should also avoid any need to decrease peacetime commitments in Europe. Furthermore, maintaining active strengths at today's level would accord with one of the Army's strongly stated goals--to maintain an active Army of about 781,000 troops. Holding the reserves at the level approved in the fiscal year 1987 continuing appropriation, however, would run counter to a mandate by the Congress to increase the number of reserves. Nonetheless, at their current strength of 775,000, the Army reserve components are larger than they were in 1980 when they contained 573,200 soldiers.

With O&M increasing and personnel costs held constant, the burden of achieving zero real growth would fall more heavily on the investment accounts than under Option II, but less heavily than under Option I. Under this approach, by 1991 the investment accounts would be 16 percent below their 1987 level and 46 percent below the level required to achieve the Army's investment goals (see Table 19). This means that, relative to those goals--or even relative to Option II, which included reductions in numbers of troops--fewer units would be equipped with the most modern equipment. For

7. A discussion of the results of this approach using the RFV method to project O&M funding is included in Appendix B.

example, 10 fewer units would be equipped with M1 tanks in 1991 than the Army's goal of 89 and one fewer than under Option II (see Table 20). On the other hand, this approach would not require the very large reductions in equipment that would occur under Option I, which emphasized operating and support costs at the expense of investment. For example, in 1991, two more units would be equipped with M1 tanks, if this approach were followed rather than Option I.

TABLE 19. FUNDING FOR VARIOUS ACCOUNTS WITH ZERO GROWTH IN THE ARMY BUDGET AND BALANCED EMPHASIS, FISCAL YEARS 1986-1991
(In billions of fiscal year 1987 dollars)

Account	Appropriated a/ 1986	Appropriated a/ 1987	Projected 1988	Projected 1989	Projected 1990	Projected 1991
Operating and Support (O&S)						
Personnel	27.2	28.0	28.0	28.0	28.0	28.0
O&M	21.1	22.5	25.2	25.7	25.9	26.2
Family Housing	1.4	1.6	1.4	1.4	1.4	1.3
Subtotal, O&S	49.7	52.1	54.6	55.1	55.3	55.6
Investment						
Procurement	18.6	16.0	14.1	13.8	13.7	13.5
RDT&E	4.8	4.6	4.1	4.0	3.9	3.9
MILCON	1.6	1.5	1.3	1.3	1.3	1.3
Subtotal, Investment	25.0	22.1	19.6	19.1	18.9	18.6
Total	74.7	74.2	74.2	74.2	74.2	74.2

SOURCES: Congressional Budget Office, based on data from Office of the Assistant Secretary of Defense (Comptroller), *National Defense Budget Estimates for Fiscal Year 1987*, (May 1986); and *Making Continuing Appropriations for Fiscal Year 1987*, Conference Report, 99-1005, 99:2 (1986).

NOTE: Numbers may not add to totals because of rounding.

a. These funds have already been appropriated by the Congress.

Similarly, this approach falls between the first and second in terms of meeting goals for sustainability in a prolonged war. This option meets 71 percent of the objectives for sustainability compared with 67 percent and 72 percent, respectively, under the first and second alternatives.

TABLE 20. IMPACT OF THREE OPTIONS ON THE ARMY'S GOALS AS OF FISCAL YEAR 1991 a/

	Goal	Option I	Option II	Option III
Force Structure (Personnel at Year End)				
Active	781,000	781,000	728,000	781,000
Reserve	812,100	812,100	732,100	785,500
Modernization (Number of Units Equipped)				
M1 battalions	89	77	80	79
BFV battalions and cavalry squadrons	102	76	81	79
AH-64 battalions	34	31	32	31
UH-60 companies	54	49	50	50
MLRS batteries	47	39	41	40
Patriot batteries	93	68	73	71
M9-ACE battalions	25	13	17	15
SINCGARS division sets	15	7	9	9
MSE corps sets	5	3	4	4
RPV batteries	10	5	7	6
Readiness Funding (Percent Annual Growth in O&M, 1987 through 1991)	5.4-7.9	6.0	3.8	3.9
Sustainability--Munitions in War Reserves Stocks (Percent of Objective Met)	80	67	72	71

SOURCE: Congressional Budget Office, based on data contained in a letter from Lt. Gen. Carl E. Vuono, Deputy Chief of Staff for Operations and Plans to Mr. Robert Hale, CBO, February 1986.

a. Based on the funded delivery period, not actual inventories in 1991.

CONCLUSION

Obviously, the Army would be unable to meet all its goals--or even come near meeting them--if its budget does not increase in real terms. The options outlined here represent only three of the many approaches that the Army could follow if forced to adjust to zero real growth. Nonetheless, the three options illustrate a fundamental choice between numbers of soldiers and size of investment that would confront the service regardless of the details of its approach. If the Army wishes to maintain its current numbers of personnel and level of readiness, then, in the absence of budget growth, it would face substantial reductions--on the order of 16 percent below 1987 levels--in its investment accounts. Avoiding that reduction would require cuts from the 1987 numbers of reserve or active-duty personnel.

APPENDIXES

APPENDIX A

METHODS FOR ESTIMATING OPERATION AND MAINTENANCE COSTS

A large portion--historically about a third--of the Army's budget has been devoted to costs associated with everyday operation and maintenance. This portion of the budget pays for many diverse expenses associated with running the Army. These include costs for training, medical services, maintaining the supply system, providing utilities and maintenance for all installations, purchasing some spare parts, and, finally, salaries of most civilian employees.

Several models have been developed to estimate the O&M needs of the military. The Resource Dynamics Model (RDM), developed at George Washington University to estimate naval support costs, was used by CBO to determine the ultimate cost of a 600-ship Navy. 1/ In this model, O&M projections are made by combining separate estimates for the costs associated with maintaining ships and aircraft and operating ships and aircraft. Maintenance costs are calculated as a function of the value and age of the Navy's ships and aircraft. Costs associated with operating ships are estimated based on historical data concerning ship tonnage, generating capacity, steaming hours, and value. Similarly, operating costs for aircraft are projected based on statistically derived relationships that include aircraft characteristics such as weight, thrust, flying hours, and value.

Another model which the CBO has used in the past to project the cost of both Air Force and Navy O&M is the Defense Resources Model (DRM). 2/ This model uses a "program factor" approach to budget estimating--that is, it relates support costs to forces by assigning an annual support cost to each major force unit. For the Navy, major units are things like ships or aircraft squadrons. For the Air Force, the DRM calculates the annual cost of operating aircraft squadrons. Also for the Air Force and Navy, the costs to

---

1. Congressional Budget Office, *Future Budget Requirements for the 600-Ship Navy* (September 1985).

2. Congressional Budget Office, *Future Budget Requirements for the 600-Ship Navy* (September 1985); and *Tactical Combat Forces of the United States Air Force: Issues and Alternatives* (April 1985).

operate new types of ships and aircraft are different from the cost to operate older equipment.

Neither of these models is particularly well-suited for determining future O&M needs for the Army. The RDM, for example, could not easily be adapted because of the large number and types of equipment that the Army operates all over the world. On the other hand, the DRM does not have sufficient detail to provide O&M estimates, given current Army plans. For the Army, the major unit used by DRM is a division and the cost of operating each division is a function of the number of people in that division, not the equipment. Thus, the impact of the introduction of new, more sophisticated weapons into an Army unit on the cost to operate that unit is not estimated by the DRM. Furthermore, if the total number of Army personnel is held constant, the DRM will not reflect any cost increase associated with operating more smaller units at more numerous bases, rather than fewer larger units at fewer bases. Thus, the DRM will not reflect costs associated with adding many smaller, nondivisional units to the Army's force structure if there is no increase in the total number of soldiers in the Army.

Recognizing the shortcomings of available models for projecting future O&M needs, the Army is developing a detailed model to aid in making its own budget projections. The model has been written, is being tested, and data are being collected in order to use the model in constructing the Army's budget plan for 1989 through 1993. It was not available to CBO, however, at the time that this paper was prepared.

The methods used in this paper to project Army O&M costs, although not ideal, have been used in the past by CBO or the Army to prepare budget estimates. The ratio-to-force-value (RFV) method was used by CBO, along with the RDM and DRM models, to project Navy support costs. This method, while lacking in program detail, does correspond roughly to the level of O&M funding historically provided to the Army. The Army factors method (AFM) relies upon Army estimates to determine the annual O&M costs which are a combination of a cost and an equipment related cost. The cost assigned per soldier is a combined cost of all the many programs included in O&M. The cost ascribed to operating and maintaining equipment is small and, as in the RFV method, is related to the total value of Army equipment. The AFM is based, however, on the published method that the Army itself uses to project annual O&M costs associated with large Army units. 3/

3. U.S. Army Cost and Economic Analysis Center, *U.S. Army OMA and MPA Cost Factors*, (December 1984).

These last two methods, although each unsatisfactory in some ways, provide the best available means of estimating future Army O&M costs. The absolute value associated with either model should not be considered an exact prediction of future Army O&M budgets. Rather, the projections should be viewed as lower and upper estimates for the funds that the Army would need--assuming that past management practices continue--to maintain and operate its equipment at the same level and roughly the same tempo as it has for the past ten years.

APPENDIX B

IMPACT OF TWO METHODS FOR PROJECTING O&M FUNDING ON OPTIONS FOR ZERO GROWTH BUDGETS

Chapter III described three options to allocate the Army's budget, assuming that it remained constant from 1987 through 1991. These options were designed to emphasize funding in differing parts of the total budget. The methods used to project operation and maintenance (O&M) funding in each option reflected the emphasis of that particular approach--that is, the option that directed more funds to operating and support (O&S) relied on the ratio-to-force-value (RFV) method for projecting O&M funding, since it yielded the higher estimate. Conversely, the option that stressed investment funding used the Army factors method (AFM) for determining future O&M funding since this method yielded lower future O&M costs.

This appendix provides the results of each of the three options using both methods to project O&M funding. Results are presented in terms of funding for the six major Army accounts for 1988 through 1991 (see Tables B-1 through B-3) and in terms of the impact of each of the options on the Army's ability to attain its goals (see Table B-4).

TABLE B-1. FUNDING FOR VARIOUS ACCOUNTS WITH ZERO GROWTH IN THE ARMY BUDGET AND EMPHASIS ON OPERATING AND SUPPORT, USING TWO PROJECTION METHODS
(By fiscal year, in billions of fiscal year 1987 dollars)

			Projected							
	Appropriated		AF Method				RFV Method			
Account	1986	1987	1988	1989	1990	1991	1988	1989	1990	1991
Operating and Support (O&S)										
Personnel	27.2	28.0	29.4	29.8	30.1	30.3	29.4	29.8	30.1	30.3
O&M	21.1	22.5	26.0	26.7	27.0	27.4	25.7	26.8	27.6	28.4
Family Housing	1.4	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Subtotal, O&S	49.7	52.1	57.0	58.1	58.7	59.3	56.7	58.2	59.3	60.3
Investment										
Procurement	18.6	16.0	12.5	11.6	11.2	10.8	12.7	11.6	10.8	10.1
RDT&E	4.8	4.6	3.6	3.3	3.2	3.1	3.6	3.3	3.1	2.9
MILCON	1.6	1.5	1.2	1.1	1.0	1.0	1.2	1.1	1.0	0.9
Subtotal, Investment	25.0	22.1	17.2	16.1	15.4	14.5	17.5	16.0	14.9	13.9
Total	74.7	74.2	74.2	74.2	74.2	74.2	74.2	74.2	74.2	74.2

SOURCE: Congressional Budget Office.

NOTE: Numbers may not add to totals because of rounding.

TABLE B-2. FUNDING FOR VARIOUS ACCOUNTS WITH ZERO GROWTH IN THE ARMY BUDGET AND EMPHASIS ON INVESTMENT, USING TWO PROJECTION METHODS
(By fiscal year, in billions of fiscal year 1987 dollars)

			Projected							
	Appropriated		AF Method				RFV Method			
Account	1986	1987	1988	1989	1990	1991	1988	1989	1990	1991
Operating and Support (O&S)										
Personnel	27.2	28.0	26.6	26.4	26.2	26.1	26.2	25.4	24.9	24.4
O&M	21.1	22.5	25.1	25.5	25.7	26.1	25.8	27.2	28.3	29.2
Family Housing	1.4	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.4	1.4
Subtotal, O&S	49.7	52.1	53.2	53.4	53.5	53.6	53.5	54.1	54.5	54.9
Investment										
Procurement	18.6	16.0	15.2	15.1	15.0	14.9	15.0	14.5	14.2	13.9
RDT&E	4.8	4.6	4.4	4.3	4.3	4.3	4.3	4.2	4.1	4.0
MILCON	1.6	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.3
Subtotal, Investment	25.0	22.1	21.0	20.8	20.7	20.6	20.7	20.1	19.7	19.3
Total	74.7	74.2	74.2	74.2	74.2	74.2	74.2	74.2	74.2	74.2

SOURCE: Congressional Budget Office.

NOTE: Numbers may not add to totals because of rounding.

TABLE B-3. FUNDING FOR VARIOUS ACCOUNTS WITH ZERO GROWTH IN THE ARMY BUDGET AND BALANCED EMPHASIS, USING TWO PROJECTION METHODS
(By fiscal year, in billions of fiscal year 1987 dollars)

	Appropriated		Projected							
			AF Method				RFV Method			
Account	1986	1987	1988	1989	1990	1991	1988	1989	1990	1991
Operating and Support (O&S)										
Personnel	27.2	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
O&M	21.1	22.5	25.2	25.7	25.9	26.2	25.8	27.2	28.1	29.0
Family Housing	1.4	1.6	1.4	1.4	1.4	1.4	1.4	1.3	1.2	1.2
Subtotal, O&S	49.7	52.1	54.6	55.1	55.3	55.6	55.1	56.5	57.4	58.1
Investment										
Procurement	18.6	16.0	14.1	13.8	13.7	13.5	13.8	12.8	12.2	11.6
RDT&E	4.8	4.6	4.1	4.0	3.9	3.9	4.0	3.7	3.5	3.3
MILCON	1.6	1.5	1.3	1.3	1.3	1.3	1.3	1.2	1.1	1.1
Subtotal, Investment	25.0	22.1	19.6	19.1	18.9	18.6	19.1	17.7	16.8	16.1
Total	74.7	74.2	74.2	74.2	74.2	74.2	74.2	74.2	74.2	74.2

SOURCE: Congressional Budget Office.

NOTE: Numbers may not add to totals because of rounding.

TABLE B-4. IMPACT OF THREE ZERO GROWTH OPTIONS ON THE ARMY'S GOALS AS OF 1991, USING TWO PROJECTIONS METHODS

		Option I		Option II		Option III	
	Goal	AF Method	RFV Method	AF Method	RFV Method	AF Method	RFV Method
Force Structure (Personnel at Year End, in thousands)							
Active	781	781	781	728	681	781	781
Reserve	812	812	812	732	685	785	785
Modernization (Number of Units Equipped)							
M1 battalions	89	77	77	80	79	79	78
BFV battalions and cavalry squadrons	102	77	76	81	80	79	78
AH-64 battalions	34	30	31	32	31	31	31
UH-60 companies	54	49	49	50	50	50	49
MLRS batteries	47	39	39	41	41	40	40
Patriot batteries	93	68	68	73	72	71	70
M9-ACE battalions	25	13	13	17	16	15	14
SINCGARS division sets	15	7	7	9	9	9	8
MSE corps sets	5	3	3	4	4	4	3
RPV batteries	10	5	5	7	6	6	6
Readiness Funding (Percent Annual Growth in O&M, 1987 through 1991)	5.4-7.9	5.0	6.0	3.8	6.7	3.9	6.6
Sustainability--Munitions in War Reserve Stocks (Percent of Objective Met)	80	68	67	72	71	71	69

SOURCE: Congressional Budget Office, based on data contained in a letter from Lt. Gen. Carl G. Vuono, Deputy Chief of Staff for Operations and Plans, to Robert Hale, CBO, February 1986.

a. Based on the funded delivery period, not actual inventories in 1991.