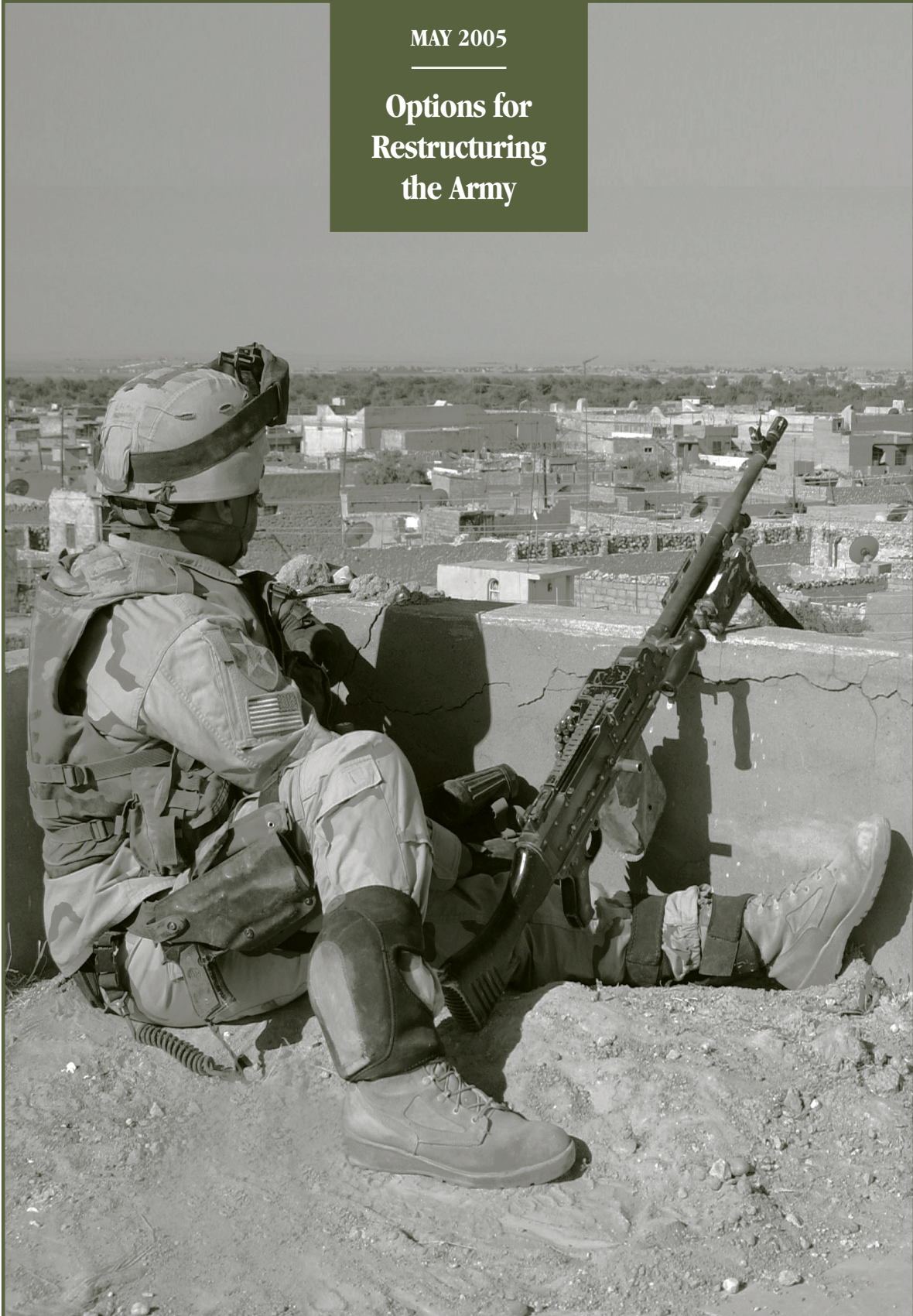


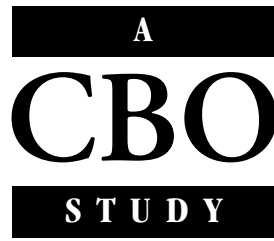
CONGRESS OF THE UNITED STATES
CONGRESSIONAL BUDGET OFFICE

A
CBO
STUDY

MAY 2005

Options for
Restructuring
the Army





Options for Restructuring the Army

May 2005

Notes

Unless otherwise indicated, all dollar figures in this report are in 2006 dollars of budget authority, and all years are federal fiscal years (which run from October 1 to September 30).

Numbers in the text and tables may not add up to totals because of rounding.

The Congressional Budget Office's (CBO's) estimates of defense investment and operations costs through 2022 are based on the fiscal year 2005 Future Years Defense Program, on CBO's projections of the long-term implications of that program, and on widely used cost relationships and methods. However, such long-term projections are inherently uncertain.

The cover photo, showing a member of the Army's 2nd Infantry Division in Tall Afar, Iraq, was taken by Sgt. Jeremiah Johnson. It is used courtesy of the U.S. Army.



Preface

The U.S. Army has seen its missions grow in number and intensity in recent years with the global war on terrorism and the invasion and occupation of Iraq. The resulting levels of stress that have been placed on the Army's active and reserve components have generated public debate about whether the Army's present organization is adequate for the roles that the service is playing now and will play in the foreseeable future. At the same time, the Army has begun an extensive restructuring effort, called "modularity," that is designed to significantly alter how the service is organized and how it operates in the field.

This Congressional Budget Office (CBO) study—prepared at the request of the House Committee on Armed Services—examines the Army's capability to fight wars, sustain long deployments, and deploy rapidly to overseas operations, as well as its dependence on personnel and units in the reserve component. This study also analyzes eight options for restructuring the Army, each of which would either increase the Army's ability to perform some types of missions or decrease its reliance on the reserve component. The options offer a broad overview of the general types of policy choices and trade-offs that decisionmakers will face when considering the size, structure, and capability of any plan for reorganizing the Army. In keeping with CBO's mandate to provide impartial analysis, this study makes no recommendations.

Adam Talaber of CBO's National Security Division wrote the study, under the general supervision of J. Michael Gilmore. Jason Wheelock and David Newman of CBO's Budget Analysis Division prepared the cost estimates, under the general supervision of Jo Ann Vines. Frances Lussier provided guidance and advice during the writing of this report, and Douglas Hamilton, David Moore, Barbara Edwards, Arlene Holen, and Elizabeth Robinson provided thoughtful comments on an earlier draft. In addition, Andrew Krepinevich of the Center for Strategic and Budgetary Assessments and John Tillson of the Institute for Defense Analyses offered valuable insights and comments. (The assistance of external participants implies no responsibility for the final product, which rests solely with CBO.)

Janey Cohen and Christian Spoor edited the study, and Christine Bogusz proofread it. Cindy Cleveland produced drafts of the manuscript. Maureen Costantino produced the cover and prepared the study for publication, and Annette Kalicki and Simone Thomas prepared the electronic version for CBO's Web site (www.cbo.gov).

Douglas Holtz-Eakin
Director

May 2005

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Summary

Military operations associated with the global war on terrorism, especially the invasion and occupation of Iraq, have greatly increased the number and intensity of the Army's missions. With the exception of the 2nd Infantry Division (which is stationed in South Korea), all 10 combat divisions in the active component of the Army have been deployed at least once to Afghanistan or Iraq, and many have returned there or are scheduled to return. In addition, the Army has mobilized and deployed an increasing number of combat brigades from the National Guard; it now depends on the Guard's combat forces to a degree not seen in the more than 50 years since the Korean War. That dependence, combined with the Army's need to mobilize and deploy support units from the Army Reserve and National Guard, has required the Army to sustain a higher level of mobilization than the modern reserve system has experienced before.¹

As it conducts operations, the Department of Defense (DoD) is seeking to increase the speed with which Army forces can be deployed overseas. Concerns about speed arose with the lengthy deployment required for Operation Desert Storm in the early 1990s; those concerns arose again during the U.S. intervention in Kosovo in 1999 and, more recently, when difficulties arose in deploying the 4th Infantry Division to Operation Iraqi Freedom. Deployment speed is directly related to the size, weight, and flexibility of Army formations. Some observers believe that those formations are not agile enough to prosecute the sorts of military operations that are likely in the future.

Concerns about the pace of operations and about deployment speed have led numerous Members of Congress, DoD officials, and outside analysts to question whether the current size and composition of the Army is appropriate. In particular, they ask:

- Does the Army have enough forces, and the right kind of forces, to respond to contingencies that may arise other than the missions in Afghanistan and Iraq—that is, does the Army have sufficient ability to fight wars?
- Does the Army have enough forces, of the right kind, to sustain the occupation of Iraq or to conduct a similar operation requiring the stabilization and reconstruction of a sizable country—that is, does the Army have sufficient “peacekeeping” ability?
- Should the Army be structured to rely heavily on reserve personnel for the long periods that are associated with stabilization and reconstruction operations?
- Is the Army capable of responding to crises and deploying to distant theaters of operations quickly?

The concerns underlying those questions have led defense officials and lawmakers to take a number of actions in recent years. The Army's Chief of Staff, General Peter Schoomaker, has launched a reorganization plan—called “modularity”—that is intended to increase the number of combat units available to the Army while making those units more flexible, more self-contained, and faster to deploy. In addition, two of the Army's ongoing efforts—to introduce Stryker armored vehicles and eventually to replace the current mix of tanks and armored vehicles with families of light armored vehicles through the Future Combat Systems (FCS) program—are intended to increase the responsiveness and deployment speed of Army units. To help carry out the modularity plan, the Secretary of Defense has given the Army temporary authority to add up to 30,000 soldiers to the active component. Subsequently, in the 2005 defense authorization act, lawmakers authorized the Army to increase the permanent end strength of the active component by 20,000 personnel.

In addition, the Secretary of Defense has ordered all of the military services to find ways to reduce dependence

1. As used in this study, “reserve” refers to the Army's reserve component (the Army Reserve and the Army National Guard), and “active” refers to the service's active component.

on their reserve components. DoD has also adopted a new set of Joint Swiftness Goals that establish very challenging targets for how fast forces must be able to deploy to operations.

This study by the Congressional Budget Office (CBO) examines various ways in which the Army could be restructured to address the concerns outlined above. CBO's analysis compares the costs of alternative force structures as well as quantitative measures of their capability for warfighting, peacekeeping, reliance on the reserves, and deployment speed. The analysis points to several general conclusions about the possibilities for restructuring the Army:

- Alternatives that would significantly improve the capabilities measured by CBO would require more personnel and have higher costs. Within current budgetary and personnel constraints, there is only limited potential to increase the Army's warfighting and peacekeeping capabilities substantially, to trade one kind of capability for another, or to decrease the service's reliance on the reserves.
- The modularity initiative will boost the number of combat forces available to the Army by up to 5 percent. But it may require an additional 60,000 personnel to do so (or twice the temporarily authorized increase), and it will make the Army more reliant on reserve support units. Moreover, modularity is unlikely to lead to substantial improvements in deployment times.
- The number of support forces that the Army normally uses with major combat units means that even relatively small increases in combat units would require significant increases in personnel. The Army could boost the number of major combat units without adding many personnel by reducing the level of support provided to combat units. However, doing that would raise the level of risk in warfighting, according to present Army doctrine.
- In its current structure, the Army is dependent on reserve forces for conducting even relatively small operations.² Eliminating that dependence so that the active

Army could operate without extensive reserve mobilization would require either greatly increasing the size of the active Army or substantially lessening its combat power. However, the service could reduce the level of reserve mobilization needed to sustain peacekeeping operations by reallocating the types of support units that are located in the active and reserve components.

- Proposals to create dedicated "peacekeeping" formations in the Army would be unlikely to produce a sizable increase in the number of soldiers that the Army could deploy to peacekeeping operations. Such formations might have qualitative advantages, but CBO found that converting combat forces to peacekeeping forces would not significantly increase the number of soldiers that the Army could sustain in extended deployments.
- Proposals to field "medium-weight" formations equipped with Stryker vehicles would not improve deployment times substantially.
- Proposals to restructure the Army to employ fewer, smaller, lighter combat units equipped with advanced weaponry (such as the FCS) could improve deployment times slightly. However, those proposals would significantly decrease the number of soldiers that the Army could deploy to peacekeeping operations.
- Proposals to eliminate some layers of command structure (such as the corps level) would be unlikely to reduce the size of the Army or speed up deployment as long as the general types and numbers of support units included in those command levels were retained.
- The Army could improve deployment times substantially by investing in additional sealift assets (transport ships), prepositioning more equipment closer to potential theaters of operations, and making some organizational changes. Although such steps would entail up-front costs, they would be less expensive over the long run than the Army's current plans.

The Army's Force Structure Before Modularity

Before the Army began making changes as part of its modularity plan (described below), its force structure had been relatively stable since the mid-1990s. That structure was based around fielding 10 active divisions, eight Na-

2. Although the Army has begun implementing the changes associated with modularity, in this study the "current" force refers to the premodular force, for simplicity.

Summary Table 1.**Number of Army Personnel and Units**

	Active Army	Army Reserve	Army National Guard	Total Army
Personnel^a				
Divisions and Separate Brigades	170,000	0	170,000	340,000
Corps- and Theater-Level Support Units	140,000	145,000	145,000	430,000
Administrative Units and Individuals ^b	175,000	60,000	35,000	270,000
Total	485,000	205,000	350,000	1,040,000
Units				
Divisions	10	0	8	18
Brigades ^c				
Heavy	17	0	22	39
Medium	3	0	0	3
Light	13	0	14	27
Total	33	0	36	69

Source: Congressional Budget Office.

- a. Personnel numbers are rounded to the nearest 5,000.
- b. Includes people in training or between assignments.
- c. Heavy brigades are equipped with tanks and other armored vehicles. Medium brigades are equipped with the Army's new Stryker light armored vehicle. Light brigades consist of various types of infantry without armored vehicles, including airborne and air assault units. The numbers shown here include brigades that are part of divisions as well as separate brigades.

tional Guard divisions, and numerous separate brigades (see Summary Table 1). When combat divisions or brigades are deployed to a major operation, they require significant numbers of support units that perform various functions, such as units for logistics, field hospitals, communications networks, construction engineers, additional artillery, and many others. Those support units are generally grouped under higher-level commands, such as the corps (intended to support two to five divisions) or the theater (intended to support one or more corps). The Army also has a large number of personnel who are not assigned to combat or support units. They include trainees, "transients" (people in transit between assignments), and personnel assigned to administrative units.

The Army's combat units are categorized by how they are equipped and trained to fight. "Heavy" units are equipped with tanks and other armored vehicles; they are intended for combat against other armored forces in relatively open terrain. "Light" units are various types of infantry without armored vehicles, including airborne and air assault units, such as the 82nd Airborne Division.

"Medium" units are relatively new and are equipped with the Army's new Stryker light armored vehicle. The Army introduced medium forces in the past few years in part because of concerns about the deployability of heavy forces, which require significant lift assets (transport planes and ships) to move, and about the firepower of light forces, which are not equipped for the most intense combat.

Since the 1970s, the Army has integrated its active and reserve components under what is known as the Total Force Policy. The Army's implementation of that policy has involved concentrating combat units in the active component and units that support combat units in the reserve component. Consistent with that policy, the Army Reserve does not contain any combat units but instead is organized entirely to support units in the active component. The Army National Guard includes eight combat divisions. In general, the Army does not plan to deploy those divisions to combat theaters; instead, they are given missions such as homeland defense or forming part of the strategic reserve. As such, the Army does not

field support units for most of those divisions. The rest of the National Guard consists of separate combat brigades, which the Army does plan to deploy to combat theaters, and support units, which are intended to support either the separate Guard brigades or active units. The result of that division of responsibility is that combat units in the active Army depend heavily on support units in the reserves, and it is extremely difficult for the Army to engage in any major operation without mobilizing reserve personnel.

In CBO's analysis, active and National Guard combat brigades for which the Army has a full set of support units are referred to as "supported brigades." National Guard combat brigades for which the Army does not have a full set of support units are referred to as "unsupported brigades." All brigades are considered either supported or unsupported.

Planned Changes to the Army's Force Structure

In February 2004, the Chief of Staff of the Army announced a plan to reorganize the Army's forces into a larger number of smaller, more "modular" combat brigades. That plan envisions increasing the number of combat brigades in the active Army from 33 to 43 (and possibly to 48, pending future decisions) while reducing the number of combat brigades in the National Guard from 36 to 34. Each of the new modular brigades would have one-third fewer subordinate combat units than traditional brigades do but would have more support units, thus theoretically allowing the brigades to be deployed in a more independent manner. To establish the new brigades, the Secretary of Defense has given the Army authorization for up to 30,000 additional soldiers. Currently, that authorization is only temporary, since the Army intends to find other areas where it can reduce the number of required personnel by an equivalent amount. In 2004, the Army began the process of reorganizing units and adding the brigades.³

Besides reorganizing its forces, the Army is planning to reequip them by replacing most of its current ground combat equipment with the Future Combat Systems. According to the Army, the FCS will include a network of

sensors, munitions, and communication links that would enable a force of medium-weight armored vehicles to fight with the power and survivability of today's heavy forces. When the FCS is fully fielded, the Army expects units equipped with it to require fewer personnel and deploy more quickly than current units do. The Army expects to equip existing units with some FCS sensors and networks fairly soon, but it anticipates that fully equipping all combat brigades with the FCS will take several decades. CBO estimates that once the FCS program enters full production, it will cost about \$7 billion to \$9 billion per year to procure until the Army is fully equipped.

Alternatives for Restructuring the Army

The Army could respond in many different ways to the concerns that have been raised about its ability to fight wars, its peacekeeping capability, its dependence on the reserves, and its deployment speed. This analysis examines eight alternative approaches to reorganization that would address those concerns (see Summary Table 2). Some of the alternatives would alter the size of the Army; others would change the distribution of units between the active and reserve components or create new types of units. The options incorporate features of proposals made by various participants in the public debate. Those features illustrate some of the important trade-offs and constraints involved in restructuring the Army.

None of the alternatives are based on the Army's modularity plan because that plan has not been developed in enough detail to allow CBO to analyze it fully. To date, the Army has not announced the number or type of support units that modularity will require, nor has it incorporated modularity into its more detailed budget plans, such as the Future Years Defense Program (FYDP).⁴ For that reason, CBO's analysis compares each alternative with the Army's preexisting structure (before the changes being made as part of the modularity reorganization). However, the analysis does look at the potential implications of modularity for each alternative. (In addition,

3. As of this writing, DoD has not yet decided how to respond to the permanent increase of 20,000 in end strength included in the 2005 defense authorization act.

4. DoD did not include modularity costs in the 2005-2009 FYDP, and it plans to include only limited cost information in the 2006-2011 FYDP. DoD has decided that substantial funding for modularity over the next few years should come from supplemental appropriations, but to date, supplemental requests have not provided details about funding requirements for modularity.

Summary Table 2.**Alternative Force Structures Examined in This Analysis**

Alternative	Major Changes	Issues Addressed	Trade-Off
1A: Add Two Active Divisions	Adds two active combat divisions Increases active and reserve end strength	Warfighting Peacekeeping	Cost
1B: Add Two Active Divisions by Reducing Support Forces	Adds two active combat divisions Reduces artillery and air-defense support units	Warfighting Peacekeeping	Risk from having less support
2: Reallocate Support Forces Between the Active and Reserve Components	Converts peacekeeping support units to active units Converts warfighting support units to reserve units Eliminates Total Force Policy for peacekeeping	Dependence on reserves Peacekeeping	Relatively high dependence on reserves for fighting wars
3: Eliminate the Army's Dependence on Reserve Support Units	Adds active support units and personnel Reduces reserve support units and personnel Completely eliminates Total Force Policy	Dependence on reserves	Cost
4: Organize Stabilization and Reconstruction Divisions	Creates five "peacekeeping" divisions Cuts two active combat divisions May yield qualitative improvements in peacekeeping	Peacekeeping	Loss of warfighting ability
5: Convert to a Brigade-Based Army	Changes Army into a mix of combat and support groups Eliminates corps and division May yield qualitative improvements in warfighting	Deployment speed Warfighting	Relatively high risk from having less support
6: Convert to an Expeditionary Army	Structures the Army to resemble the Marine Corps Buys additional sealift assets and prepositioned materiel	Deployment speed	Up-front cost
7: Convert to a Transformational Army	Emphasizes light units with greater firepower Cuts four active combat divisions May yield qualitative improvements in warfighting	Deployment speed Warfighting	Loss of peacekeeping ability

Source: Congressional Budget Office.

Appendix B presents more information about modularity and some of the issues it may involve.)

Because the details of the Army's modularity plan are still fluid, CBO estimated the costs of the alternatives relative not to that plan but to the costs of forces in DoD's 2005 FYDP and in CBO's long-term projection of the implications of that program.⁵ CBO divided the estimate for each option into investment costs, which include the costs of developing and purchasing equipment for units, and operation and support (O&S) costs, which include compensation for military personnel and the peacetime costs of units' day-to-day operations. For each option, CBO also estimated the annually recurring O&S costs

that would continue after the projection period. If the Army retained its current force structure, its investment costs would total \$605 billion through 2022, and its O&S costs would total \$1,488 billion. (All estimates are in 2006 dollars.) By the end of that period, annual O&S costs would amount to about \$100 billion. The alterna-

5. CBO's projections of DoD's long-term spending plans are contained in Congressional Budget Office, *The Long-Term Implications of Current Defense Plans: Summary Update for Fiscal Year 2005* (September 2004), and *The Long-Term Implications of Current Defense Plans: Detailed Update for Fiscal Year 2005* (September 2004). The 2005 FYDP runs through 2009, and CBO's long-term projections run through 2022.

Summary Table 3.

Comparison of Alternatives with the Army’s Premodular Force Structure

	Active Personnel	Reserve Personnel	Supported Combat Brigades	Total Combat Brigades	Support Ratio ^a	Costs or Savings (Billions of dollars) ^b
Premodular Force Structure						
Current Force	482,400	555,000	55	69	1.76	2,092
Alternatives That Would Increase the Size of the Army						
Alternative 1A	+57,000	+21,000	+6	+6	No change	+127
Alternative 1B	+6,000	No change	+6	+6	-0.15	+54
Alternatives That Would Reduce Dependence on the Reserve Component						
Alternative 2	+28,000	-24,000	No change	No change	No change	+27
Alternative 3	+312,000	-260,000	+1	+1	No change	+333
Alternatives That Would Create New Types of Units						
Alternative 4	-2,000	-9,000	-6	-6	No change	-32
Alternative 5	No change	-383,000	-26	-40	-0.85	-314
Alternative 6	+21,000	+20,000	+15	+1	-0.46	-34
Alternative 7	-115,000	No change	No change	-14	+0.73	-190

Continued

Source: Congressional Budget Office.

- a. The ratio of support personnel to combat personnel in a full combat force. Higher values indicate that combat units have access to greater levels of support.
- b. Total investment and operation and support costs between 2006 and 2022, in 2006 dollars. For the current force, those costs are based on the 2005 Future Years Defense Program and on CBO’s long-term projection of its implications.

tives in this analysis would range from costing an additional \$333 billion over the 2006-2022 period to saving \$314 billion (see Summary Table 3).

CBO also developed measures to compare each alternative’s force structure with the Army’s premodular force structure in several areas besides cost:

- The total number of combat brigades in the Army and the number of fully supported combat brigades that would be available for warfighting;
- The total number of personnel that could be sustained overseas for extended peacekeeping deployments;
- The number of reserve personnel who would have to be mobilized to support extended peacekeeping deployments; and
- The time that the Army would need to deploy a brigade, a division, a corps, or a full theater’s worth of forces to a combination of distant theaters.

Those measures are intended to permit a quantitative comparison between alternatives. They do not, and cannot, encompass all of the possible effects of reorganizing the Army. Proponents of particular changes to the Army might argue that qualitative effects are the most important elements of their proposals. However, CBO’s analysis focuses on quantitative measures and does not incorporate those effects.

Alternatives That Would Increase the Size of the Army

The first two options that CBO analyzed illustrate the effects of expanding the Army. Many observers believe that expansion is necessary to improve the Army’s ability to deal with missions like the occupation of Iraq, to respond to other threats that may arise during that occupation, or to reduce stresses on the reserve component. Alternatives 1A and 1B would both expand the Army by two divisions, but in different ways.

Alternative 1A—Add Two Active Divisions. This option would increase the size of the Army’s combat forces by

Summary Table 3.**Continued**

	Maximum Number of Personnel for Sustained Deployment	Reserve Mobilization for Sustained Deployment ^c	Deployment Time (Days) ^d		
			First Division	First Corps	First Theater
Premodular Force Structure					
Current Force	138,000	90,000	20	53	102
Alternatives That Would Increase the Size of the Army					
Alternative 1A	+14,000	+5,000	No change	No change	No change
Alternative 1B	+12,000	+11,000	No change	-6	-7
Alternatives That Would Reduce Dependence on the Reserve Component					
Alternative 2	+1,000	-22,000	No change	No change	No change
Alternative 3	+11,000	-32,000	No change	No change	No change
Alternatives That Would Create New Types of Units					
Alternative 4	+3,000	-2,000	No change	No change	No change
Alternative 5	-45,000	-69,000	No change	-26	-49
Alternative 6	+12,000	+6,000	-7	-23	-46
Alternative 7	-32,000	-21,000	No change	-24	-20

c. Assuming that the entire active force is committed.

d. CBO represented a corps as containing three divisions plus an armored cavalry regiment (10 combat brigades) and a theater as containing two such corps (20 combat brigades) and theater assets. Alternatives 5 and 7 use a smaller-sized force (60 percent of what the other alternatives use) to illustrate the potential qualitative benefits that proponents claim for those alternatives.

adding two divisions, with a total of six combat brigades, to the active component. CBO examined this option because it is a relatively common proposal in the public debate, especially among observers who worry that current missions are overstressing the Army.

One of the new divisions would be a heavy division, and the other would be a light division. Together, they would require a total of about 29,000 additional active personnel. This alternative would also add the full range of support units associated with two divisions (including corps support groups, corps artillery brigades, and so forth). Those support forces would include active and reserve units—preserving the Army's current distribution of support units between the active and reserve components—and would require another 12,000 active and 18,000 reserve personnel. In addition, this option would increase the number of personnel assigned to the Army's administrative units and the size of its account for individuals not assigned to units by about 15,000 active and 3,000 reserve personnel to allow for the greater administrative

workload and for an increase in the number of trainees, transients, and students. In all, those changes would require the Army to add about 78,000 personnel—57,000 active and 21,000 reserve (see Summary Table 3).

Outfitting the new divisions with current equipment and continuing to modernize them thereafter would cost a total of \$31 billion over the 2006-2022 period. Operating and supporting those units would cost another \$95 billion over that period and almost \$7 billion a year after 2022.

Creating two new divisions would give the Army more combat brigades for fighting wars and would improve its ability to sustain long deployments. If the additional divisions were structured like current forces, they would not be any easier or harder to deploy.

Increasing the size of the Army would not directly reduce the level of reserve mobilization needed to fight wars or sustain deployments, since the majority of the Army's

support units would remain in the reserves, and the active component would still need to mobilize those units for nearly all operations. Indirectly, however, a larger Army would be capable of maintaining a higher level of sustained deployments before it needed to mobilize reserve combat units to augment active forces. (Summary Table 3 shows an increase in reserve mobilization under this alternative because with a larger active force, the number of reserve personnel mobilized would rise if that entire force was committed to deployments.)

Alternative 1B—Add Two Active Divisions by Reducing Support Forces. Like the previous option, this alternative would add two divisions to the active component, but it would do so without appreciably increasing the overall size of the Army. Instead, it would make room for additional combat units by eliminating some support units from the Army's current structure. CBO examined this alternative because some analysts have suggested that the Army has more support units than it needs and could shift personnel to more-useful combat units without unduly damaging its ability to wage wars.

This alternative would create room for two active divisions by eliminating all short-range air-defense (SHORAD) units and some corps-level artillery units from the Army's force structure. CBO chose those support units for elimination because some observers have suggested they may not be necessary and because the Army has taken similar steps as part of its current reorganization plans. In addition, this option would do away with the logistical support units associated with the eliminated SHORAD and field artillery units, thus freeing up a total of 50,000 personnel to be used in the two new divisions. With fewer support units, divisions would be slightly smaller in this option than in the previous alternative. Even so, 50,000 troops would not be quite enough to fully staff the new divisions and their support units, so this option would require increasing the size of the active Army by 6,000 personnel (see Summary Table 3).

Outfitting the new divisions with current equipment and continuing to modernize them thereafter would cost slightly more than in Alternative 1A: a total of \$34 billion through 2022.⁶ However, because this option would

eliminate various support units, it would increase the Army's operation and support costs to a far smaller extent than the previous option would: by \$20 billion rather than \$95 billion over the 2006-2022 period. After that, this alternative would add a little more than \$1 billion annually to O&S costs, compared with nearly \$7 billion under Alternative 1A.

Adding two divisions to the Army by reducing SHORAD and field artillery units would have almost the same advantages as simply increasing the size of the Army under the previous alternative. But it would carry some additional risks, since units would have less artillery support and no short-range air-defense capability. With slightly smaller divisions that would need fewer support units, this option would produce a smaller increase in the number of peacekeepers that the Army could deploy than would be the case in Alternative 1A. Deployment times would be faster, however.

Alternatives That Would Reduce Dependence on the Reserve Component

The next two approaches that CBO analyzed are intended to show how the Army could reduce its dependence on mobilizing reserve units to support active combat units. Both Alternatives 2 and 3 would effectively eliminate the need to deploy reserve units overseas to support active units in extended peacekeeping missions; Alternative 3 would also eliminate the need to deploy reserve units to support active units in major combat operations.

Implementing those alternatives, however, would not necessarily mean that no reserve personnel would be mobilized for peacekeeping or major combat operations, for two reasons. First, the Army's overall capability to maintain extended deployments includes the personnel that would be available if the Army mobilized National Guard combat forces (and reserve support units for those combat forces). Presumably, the Army would generally attempt to carry out its missions by using active forces first, but some operations or combinations of operations could require enough troops that the Army would also mobilize National Guard combat forces—as it is now doing in Iraq. Using National Guard forces in that way would, of course, require mobilizing reserve personnel.

Second, the Army generally mobilizes some reserve personnel to fill in at the home bases of active units that have been deployed. That practice, known as "backfill," allows

6. Investment costs are higher for this option because CBO increased purchases of precision munitions to compensate for the reduction in artillery units.

bases to keep functioning normally when their units are deployed (for example, reserve personnel might be called up to provide guards for the bases). Although the number of reserve personnel mobilized to provide backfill is smaller than the number of active personnel who have been deployed, that practice can still lead to a significant level of reserve mobilization if the active force is heavily committed.

Alternative 2—Reallocate Support Forces Between the Active and Reserve Components. Responding to criticism of the Army's practice of relying on extensive and extended reserve mobilizations for peacekeeping missions and the occupation of Iraq, this option would shift support units between the active and reserve components. Units that are especially necessary for long peacekeeping operations (such as military police) would be moved from the reserve component to the active component, and units that are not essential for those operations (such as artillery units equipped with missile launchers) would be moved from the active Army to the reserves. As a result, virtually all of the support units needed for peacekeeping would be in the active component, and virtually all of the support units needed for warfighting would be in the reserve component.

All told, the number of personnel in combat and support units in the active Army would increase by 20,000 under this option, and the number of personnel in such units in the reserves would shrink by an equal amount. With individuals in administrative units, in training, or between assignments included, this alternative would increase the active Army by a total of 28,000 people and decrease the reserve component by 24,000 people (see Summary Table 3).

Those changes would greatly reduce the level of reserve mobilization necessary to conduct extended peacekeeping operations. The Army would still depend heavily on support units in the reserves for fighting wars and providing backfill for deployed active forces, but unless National Guard combat units were mobilized and deployed, peacekeeping operations would require far less sustained reserve mobilization in peacetime.

This option would not alter the Army's investment costs over the 2006–2022 period because it would shift units rather than create or eliminate them. However, the increased number of active-duty personnel would raise

operation and support costs by a total of \$27 billion through 2022 and by \$2 billion per year thereafter.

Reallocating the Army's support forces between the active and reserve components would not affect the service's ability to fight wars because the Army would still have access to all of the combat divisions and support units that it has now. Similarly, such a reallocation would have only a minimal effect on the Army's ability to support long deployments.

This alternative would not affect deployment times directly, since the same equipment would have to be transported whether a particular unit was in the active or reserve component. This option might affect deployment times indirectly, however, because many types of support units (such as artillery units with missile launchers) would exist only in the reserves, and reserve units typically require at least a month for mobilization. However, that situation also exists for some types of units, such as civil affairs units, under the Army's current structure.

Alternative 3—Eliminate the Army's Dependence on Reserve Support Units by Increasing the Size of the Active Component. This option would eliminate the Army's reliance on support units in the reserve component by adding enough personnel to the active Army to create support units for all 10 of its divisions. The option is included in this analysis because it illustrates the full cost associated with ending the Army's current dependence on the reserves to support major deployments.

Besides creating new support units in the active component, this alternative would turn one of the Army's four corps, which is now composed almost entirely of reserve units, into a fully active corps; provide an active armored cavalry regiment (ACR) for each corps; and shift all of the Army's reserve special forces groups into the active component. To create the full set of support units needed for the four corps, 10 divisions, and 35 combat brigades that would be in the active Army under this alternative, an additional 312,000 personnel would be necessary. The reserve component could shrink by 260,000 personnel because it would no longer have to support active combat forces (see Summary Table 3).

The Army's investment costs would not change under this option because, for all of the support units created in the active component, identical units would be eliminated from the reserves. However, this option would have

a larger impact on operation and support costs than any other alternative that CBO examined, increasing those costs by a total of \$333 billion through 2022 and by about \$26 billion per year thereafter.

Increasing the size of the active Army to a level that would eliminate its dependence on reserve support units would not significantly affect the service's ability to fight wars, since the Army would have almost the same type and number of combat formations as it does now. That change would, however, improve the Army's ability to sustain peacekeeping operations. The number of soldiers the Army can keep on extended deployment is limited by the fact that, according to DoD policy, reserve personnel cannot be deployed as frequently as active personnel. In this option, transferring a corps, the ACRs, and the special forces groups to the active component would allow those units to rotate through deployments at the higher rate used for active personnel rather than the lower rate used for reserve personnel.

The main benefit of this alternative is that the Army would not need to deploy reserve units overseas for major combat operations or long deployments. Reserve personnel would still need to be mobilized to provide backfill for active forces that were deployed, but no reservists would need to be deployed themselves. In the case of a very large peacekeeping deployment—larger than the active Army's forces could sustain alone—the Army might need to mobilize and deploy National Guard combat troops (and support forces for those combat troops). But for any level of commitment less than that, reserve units would not need to be sent overseas.

Since this option would not alter the types of units in the Army, it would not directly change deployment times. However, because reserve units typically require at least a month for mobilization, the Army might be able to deploy faster in some circumstances since it would not have to wait for reserve units to mobilize.

A potential variation on this option would be to eliminate enough active combat forces that the active Army would have sufficient personnel to support all of its combat units—in other words, to hold the size of the active component constant rather than hold the number of active combat units constant, as in this option. Doing that would require the Army to cut a corps, four divisions, and an ACR from the active component. Although that change would eliminate the active Army's dependence on

the reserves in the same way that increasing the size of the Army would, it would substantially reduce the number of forces available for warfighting and extended deployments.

Alternatives That Would Create New Types of Units

The rest of the options in this analysis would restructure the Army in ways that emphasize different types of units, in response to a variety of concerns and proposals. Alternative 4 reflects a proposal by the National Defense University to create special "stabilization and reconstruction" divisions dedicated to peacekeeping. Alternative 5 would implement the frequently cited ideas of retired Army Colonel Douglas MacGregor, who has proposed converting the Army into flexible, autonomous brigade-sized combat groups. Alternative 6 would improve deployment speed by changing the Army's organization to more closely resemble that of the Marine Corps. Finally, Alternative 7 reflects the ideas of some leading proponents of "military transformation" in an attempt to show, in concrete detail, what a transformational force might look like.

Alternative 4—Organize Stabilization and Reconstruction Divisions. Many observers have argued that the Army should improve its peacekeeping capabilities relative to its warfighting capabilities. In keeping with those arguments, this option would convert some of the Army's combat divisions into dedicated peacekeeping divisions, or what a study by the National Defense University calls stabilization and reconstruction (S&R) divisions.⁷

In this alternative, the Army would eliminate two active combat divisions (one heavy division and one light infantry division) along with their associated support units. It would use the personnel freed up to organize five S&R divisions, four in the active component and one in the reserve component. Those S&R divisions would include military police, engineer, medical, civil affairs, and psychological operations units—which have been in great demand for peacekeeping operations—as well as a single medium-weight Stryker brigade. Overall, the number of personnel freed up by eliminating the combat divisions and their support units would be larger than the S&R divisions would require, which means that the Army

7. Hans Binnendijk and Stuart Johnson, eds., *Transforming for Stabilization and Reconstruction Operations* (National Defense University, Center for Technology and National Security Policy, November 12, 2003).

would need 2,000 fewer active personnel and 9,000 fewer reserve personnel (see Summary Table 3).

Those changes would decrease the Army's total investment costs by almost \$14 billion over the 2006-2022 period—both because of the smaller number of combat divisions that the Army would need to modernize and because of a reduced emphasis on high-technology weapons intended for conventional warfighting. The changes would also save \$18 billion in operation and support costs through 2022 and \$1 billion annually thereafter.

This alternative would reduce the Army's ability to fight wars because the service would have six fewer combat brigades available for contingency operations. In addition, the option would yield only a small increase in the total number of personnel that the Army could sustain on extended deployments, because the number of soldiers in the new S&R divisions would be roughly the same as the number in forces used for peacekeeping operations today. (The small increase would result from converting some units that are intended to support high-intensity combat to units better suited for peacekeeping.) Qualitatively, the mix of soldiers in each S&R division might be superior to the Army's current combat forces for peacekeeping, given their specialties and the historical demand for those types of units in peacekeeping missions. But CBO is unable to assess that potential superiority quantitatively.

This option would yield a slight decline in the level of reserve mobilization needed to sustain extended deployments because each active S&R division could be deployed without the reserve support units associated with combat divisions. That reduction would be lessened, however, if the Army needed to mobilize and deploy the S&R division in the reserve component.

Since S&R divisions are not intended for major combat operations, they would most likely not be deployed to fight a war. Thus, their creation would not affect the speed with which the Army could deploy its combat forces.

Alternative 5—Convert to a Brigade-Based Army. This option would restructure the Army in the manner suggested by retired Army Colonel Douglas MacGregor: eliminating higher-level command structures and organizing the Army's forces into a number of autonomous brigade-sized combat groups.⁸ Some elements of Mac-

Gregor's proposals are similar to the Army's currently planned modularity reorganization.

This option would eliminate divisions, corps, and theaters (and the traditional support structures associated with them) and create a set of large, semiautonomous brigade-sized combat groups in the active component. As in MacGregor's proposals, it would create a total of 25 combat groups in the active force and four in the reserves. The traditional forms of support provided by higher-echelon units would instead be provided by a mix of support groups, including aviation, artillery, air-and-missile-defense, surveillance, reconnaissance, engineering, logistics, and other types of units. This option would reduce the total number of combat brigades available to the Army from 69 to 29, but all of them would be fully supported.⁹ Most of that reduction would come from eliminating almost all of the National Guard's combat forces.

This alternative was constructed to adhere as closely as possible to MacGregor's plan for restructuring the Army; as such, it differs from most of the other alternatives that CBO analyzed. It is the only option that does not use the Army's rules for allocating support units, does not include a theater level of command, and does not include significant combat forces in the reserve component. This alternative would not change the number of active personnel but would require 383,000 fewer reserve personnel (see Summary Table 3).

In keeping with MacGregor's intent to improve the combat power of heavy forces as they are now equipped, this option would significantly alter the Army's investment plans. It would terminate the Future Combat Systems program (which is intended to replace current heavy platforms) while continuing various initiatives to rebuild, remanufacture, and upgrade the Army's heavy equipment. Those changes, combined with the smaller number

8. See Douglas A. MacGregor, *Breaking the Phalanx: A New Design for Landpower in the 21st Century* (Westport, Conn.: Praeger Publishers, 1997), and *Transformation Under Fire: Revolutionizing How America Fights* (Westport, Conn.: Praeger Publishers, 2003). Alternative 5 addresses only a small subset of the reforms that MacGregor has proposed. In particular, CBO's analysis does not evaluate the changes in Army warfighting doctrine, culture, or personnel policies that MacGregor believes would be at least as important as—if not much more important than—the organizational changes discussed in this analysis.

9. In addition, all of the combat brigades in the active component would be supported by active support units.

of brigades that would need to be modernized under this option, would decrease the Army's investment costs by a total of \$176 billion through 2022. They would also save \$138 billion in O&S costs over the projection period and \$10 billion per year thereafter.

By reducing the number of combat troops in the Army and emphasizing support units that would not be useful in peacekeeping (such as aviation or artillery strike groups), this option would leave the Army much less able to sustain extended deployments. However, because those combat troops would not depend on reserve support units, the forces that the active Army could sustain in peacekeeping operations would not require significant levels of reserve mobilization.

MacGregor suggests that an Army with only 25 active combat brigades, structured as he proposes, would be better able than the current force to deploy quickly and engage in fast-moving operations that would overwhelm conventional enemies. Based on CBO's assumptions about what a corps- or theater-sized force would look like in an Army modeled on MacGregor's concepts, this alternative would improve deployment times by more than one-and-a-half months (from three-and-a-half months to less than two months) for a theater-sized force. That improvement would be achieved both by the smaller force that would be deployed (just 60 percent of the brigades used for current forces) and by the reduced number of support units associated with each combat group (compared with an equivalently sized force composed of current units).

That improvement, however, would occur only if it proved feasible to engage in sustained combat operations with substantially lower levels of support than are used in today's Army. The improvement would also depend on the feasibility of eliminating the theater level of command, which performs a number of functions (such as seaport operations) that are important to other services operating in a theater. In that case, the other services might need to increase the size of their forces to compensate for the lack of support from the Army.

Because this alternative would greatly reduce the need for personnel in the reserve component, a number of variations on this option could be constructed that would restore the theater level of command or permit a larger number of National Guard combat units. Making such changes would reduce the savings from this option as well

as some of the improvement in deployment speed, but it would increase the Army's overall ability to fight wars and sustain extended deployments.

Alternative 6—Convert to an Expeditionary Army. This alternative illustrates how the Army might be able to improve its deployment speed by adopting some organizational structures and practices used by the Marine Corps. This option would eliminate the corps as a command structure, reorganize the Army into a series of expeditionary forces (similar to Marine expeditionary forces), and purchase more sealift ships as well as additional sets of equipment that would be prepositioned on ships near potential areas of conflict.

In this alternative, each Army expeditionary force would consist of a division with four combat brigades (as currently sized and structured), an expanded aviation group, and a support group with logistics, communications, and other support units.¹⁰ Each expeditionary force would have one more combat brigade and slightly more personnel than a current division and its full set of combat and support units (43,000 people versus 39,000). In this option, the active Army would contain five heavy expeditionary forces and four light expeditionary forces. The reserve component would have four heavy and two light expeditionary forces and would retain 10 of the National Guard's current separate brigades. This option would also provide a full set of support units for all National Guard combat forces. In total, those changes would require 21,000 additional active personnel and 20,000 additional reserve personnel (see Summary Table 3).

To provide more sealift and prepositioned equipment, CBO developed a very different investment program for this alternative than the Army currently envisions. This option would terminate the Future Combat Systems program (which has been developed, in part, to improve deployment speed) and would replace it with various programs to rebuild, remanufacture, and upgrade the Army's current heavy equipment. The resulting investment program would be more expensive than the one in the previous alternative, both because this option would result in a larger heavy force and because it would have the Army

10. Marine Corps divisions do not have four subordinate combat brigades, but maneuver units make up a larger share of a Marine division than they do of an Army division. For this alternative, CBO approximated that difference by adding a fourth brigade to each division.

procure several additional sets of equipment to preposition on ships. The Army would also buy 20 more large, medium-speed roll-on/roll-off ships (LMSRs) to transport equipment and to establish new flotillas of prepositioned equipment in the Mediterranean Sea and the Pacific Ocean.

This option would decrease the Army's investment costs by \$87 billion over the 2006–2022 period, primarily from ending the FCS program. It would add \$9 billion to the costs of the National Defense Sealift Fund, for a net savings of \$79 billion over the projection period. This alternative would also increase O&S costs by a total of \$45 billion through 2022 and by just over \$3 billion annually after that period.

Converting to an expeditionary Army would produce a small positive change in the number of brigades available to the Army for fighting wars. It would increase the total number of combat brigades available by one, but it would better support the remaining National Guard combat formations, thus raising the number of fully supported combat brigades by 15. This option would also improve the Army's ability to sustain extended deployments and would slightly change the level of reserve mobilization needed to support those deployments.

The major advantage of switching to an expeditionary Army is that it would greatly reduce deployment times for large forces, such as a corps or theater. At the theater level, deployment times would decline from the current three-and-a-half months to less than two months. That improvement would result from the increased number of LMSRs, the additional flotillas of prepositioned materiel (which arrive in a theater sooner than materiel from the continental United States would), the reduced levels of support units, and the elimination of units associated with the corps. That last effect is relevant because deploying a corps to support and control multiple divisions requires about as much lift as each division does. For that reason, deploying three expeditionary forces (with 12 combat brigades) would actually require less lift than a current corps (with 10 combat brigades) does.

Alternative 7—Convert to a Transformational Army. The final alternative that CBO analyzed attempts to illustrate the type of force that many defense experts, such as DoD's former Director of Force Transformation, Arthur Cebrowski, have suggested would be “transforma-

tional”—that is, would take full advantage of recent advances in communications networks, precision-guided munitions, and sensors. Such experts typically stress the virtues of small, light ground formations that can be deployed rapidly and that depend on long-range, precision firepower instead of their own weaponry for effectiveness.

Under this alternative, the Army would have fewer divisions (although the corps structure would remain), and the mix of divisions would be shifted to lighter forces and special forces groups. Specifically, the active Army would consist of two heavy, two air assault, and two light infantry divisions. The National Guard would have a similar structure, with four heavy and two light infantry divisions (as well as its current separate brigades). Each division would receive significantly more attack and reconnaissance helicopters, cannon artillery, and missile-launcher artillery than current divisions have. In addition, some support units would be shifted between the active and reserve components. Overall, that restructured force would require 115,000 fewer active personnel than the Army currently has (see Summary Table 3).

Even with the emphasis on high-technology weapons, this option would lower the Army's investment costs by a total of \$24 billion through 2022 because of the reduced number of combat divisions that the Army would need to modernize. In addition, that smaller force would cost \$166 billion less to operate and support over the 2006–2022 period than the currently planned force and \$12 billion less per year thereafter.

Supporters of military transformation argue that for a combat force equipped with modern communications, sensors, and precision munitions, size is not a good measure of fighting ability. In their view, military capability is more closely related to the ability of a force to identify and destroy targets (requiring superior intelligence and precision) than to the overall size of the force. Some supporters would even argue that smaller forces may be superior to larger forces because they are faster to deploy, more capable of surprising the enemy, and better able to disperse. This option would reduce the total number of available combat brigades by 14 (or about 20 percent), but if supporters' claims for improved warfighting ability are true, the Army might be capable of engaging in more simultaneous conflicts. However, CBO cannot assess such claims about the qualitative improvement that a transformational Army might provide.

Since the overall Army would be much smaller under this option than it is today, its ability to keep large numbers of personnel deployed for extended peacekeeping operations would be significantly reduced—by about 32,000 personnel—for two reasons. First, a smaller force cannot keep the same levels of personnel deployed as a larger force. Second, this option emphasizes long-range firepower, which is generally not useful for peacekeeping operations, so a smaller percentage of the Army's total support units would be suited to peacekeeping.

This option would not alter the degree to which the active Army relies on reserve units for support, so it would not change the level of reserve mobilization needed to sustain any given level of extended deployment (although if the Army was fully committed, reserve mobilization would rise). Since the Army would be smaller in this alternative, however, it would be more likely to need to mobilize and deploy National Guard combat units to sustain peacekeeping operations.

Supporters of military transformation claim that because a transformational Army would be able to fight wars with fewer but more-capable forces, it would be able to deploy to operations more quickly. CBO assessed that claim by assuming that corps- or theater-sized forces would be 40 percent smaller in this option than they are today. In that case, deployment times would decline by about 20 percent (or almost three weeks) for a theater-sized force. The reduction in deployment time is not as large as the reduction in size because with the emphasis on long-range firepower, each division would actually require more support units than the current force does. Artillery units, in particular, require significant logistical support, so the focus on long-range firepower in this option largely offsets the benefits of a smaller force. As a result, a theater-sized force that had 60 percent of the combat brigades used for current forces would require about 70 percent of the lift needed for current forces.

The Army's Current and Planned Structure

The Army is responsible for providing the majority of the land forces needed to carry out U.S. national security strategy. The Army's current structure was largely determined by reactions to the end of the Cold War as well as policy decisions made during the downsizing of the military that occurred in the early to mid-1990s. However, the Administration has substantially altered the U.S. national security strategy since 2001 and has entered into several military operations associated with the war on terrorism. Taken together, the largest of those operations, Operation Enduring Freedom in Afghanistan and Operation Iraqi Freedom in Iraq, have required the Army to engage in a higher level of overseas commitment than was envisioned during the 1990s.

The Army's current level of overseas commitment and the resulting stresses imposed on a force not explicitly designed to perform such missions have given rise to debate about how large the Army should be and how it should be structured. The number and type of units in the Army, the types of equipment those units use, and the allocation of units between the active and reserve components of the Army all affect the service's capability to perform different types of missions in the current national security environment.

In this analysis, the Congressional Budget Office (CBO) developed measures of the Army's capability to perform several types of missions and explored various options for changing the Army's structure to improve its performance in certain areas. Those options illustrate how different elements of the Army's structure are connected and affect one another, as well as the costs and trade-offs associated with proposals for restructuring the Army.

The Army's Force Structure Prior to Modularity

The Army can be divided broadly into deployable and nondeployable units. Deployable units can be further divided into combat units and support units. There also are important differences in the ways the Army structures and uses its active and reserve components.

This section describes the Army as it was organized at the beginning of 2004. The Army's structure is continually changing, and several major initiatives have been announced since then, the most important of which would involve an extensive restructuring effort to convert the Army to a set of "modular" combat and support brigades. However, those initiatives have not yet been incorporated into the Department of Defense's (DoD's) detailed budget plans, and as such, CBO is not able to fully assess their effects.¹

Nondeployable Units

The Army's nondeployable units, referred to as Table of Distribution and Allowances (TDA) units, are generally administrative or overhead organizations responsible for manning, training, and equipping the Army's forces. Examples include the Human Resources Command, Training and Doctrine Command, and Army Materiel Command. The majority of TDA units are in the active component of the Army, although both the Army Reserve and Army National Guard have TDA elements. Reserve-component TDA units are largely manned with Active Guard/Reserve personnel ("full-time" reserve-component personnel). In this study, TDA units are referred to as administrative units.

1. Although the Army has begun implementing the changes associated with modularity, for convenience, CBO sometimes refers to the premodular force as the current force in this study.

The Army also maintains a pool of individual soldiers who are, for a variety of reasons, not assigned to any unit (and are not deployable). That pool, referred to as the trainees, transients, holdees, and students (TTHS) account, includes soldiers who are in basic or advanced training, in schools, moving between assignments, or in other situations that do not permit them to be assigned to a unit. Currently, only the active component of the Army has a TTHS account. In this study, TTHS personnel are referred to as individuals.

Deployable Units

The remainder (and majority) of the Army's personnel are in deployable units, referred to as Table of Organization and Equipment (TOE) units. TOE units are organized according to a template—a TOE document—that establishes the type of personnel and equipment for each type of unit.² The Army has several hundred different types of units, varying greatly in size and type. The two primary classes of TOE units are the major combat units (divisions, separate brigades, and armored cavalry regiments, or ACRs) and support units assigned to higher command echelons (corps- and theater-level support units).

The major combat units include several types of forces. The Army distinguishes between maneuver units such as armor or infantry—which can close with and destroy the enemy—and all other units, which are intended, directly or indirectly, to support maneuver units.³ The major combat units are differentiated by their maneuver units, which largely determine the types of support that the combat units need. “Heavy” units—based on mechanized infantry and armor units—are equipped with tanks and other armored vehicles and are intended for combat in relatively open terrain against other armored forces. “Light” units—based on light infantry, airborne, or air assault units—are various types of units without armored vehicles and are intended for combat in more complex

terrain (urban areas, jungles, or mountains) against enemies with only limited armored forces. “Medium” units—equipped with the Army's new Stryker light armored vehicle—are relatively new and are intended to be more easily deployed than heavy forces but more lethal than light forces.

Some types of support units are directly associated with particular types of combat units. Heavy forces, for example, receive self-propelled howitzer battalions and tracked-rocket-launcher battalions for artillery support, whereas light forces receive towed howitzer battalions and wheeled-rocket-launcher battalions for artillery support. Other types of support units are associated with the different demands of the various combat units—heavy forces simply require more fuel-transport, ammunition-transport, and maintenance units. Still other kinds of support units are essentially common to all types of combat units—for example, heavy and light forces require the same numbers of legal services teams or water purification units. Overall, the support package associated with heavy units is somewhat larger (in terms of number of personnel) and heavier (in terms of the weight of its equipment) than the support package associated with light units.

Components

The Army's components are the active Army and the reserves, which include the Army Reserve and the Army National Guard.⁴ All three are integrated together in accordance with DoD's Total Force Policy in a manner that is sometimes referred to as the Abrams Doctrine (after former Chief of Staff of the Army Creighton Abrams, its major proponent). The core of that integration is the idea that the active Army's major combat units should be heavily dependent on reserve support units.

The Army has implemented the Total Force Policy by concentrating combat units in the active component and support units in the reserves. Consistent with that policy, the active Army's deployable forces are primarily major combat units, whereas the Army Reserve is entirely organized to support active units and does not include any major combat units. The Army National Guard includes both combat and support forces, although some of those combat forces do not have support units associated with

2. The Army sometimes makes a distinction between TOE documents, which are templates for actual units, and actual units, which almost always vary somewhat from the templates. When making that distinction, the Army refers to actual units as modified TOE (MTOE) units.

3. The distinction between maneuver and support units is not the same as the distinction between combat-arms, combat-support, and combat-service-support units. CBO did not employ the latter distinction in this study, although it is a common way of discussing Army units.

4. Collectively, the entire Army is sometimes referred to as the “total Army” to avoid confusion stemming from the common practice of referring to only the active component as “the Army.”

them and most likely would not be deployed to major combat operations. Overall, about two-thirds of the Army's supported combat brigades are in the active component, and about two-thirds of the Army's support units are in the reserves. Different types of support units, however, are more or less concentrated in one component or the other. More than 95 percent of the Army's civil affairs units, for example, are reserve units.

The overall effect of the division of responsibility between the Army's components is that active Army combat formations are heavily dependent on reserve support; thus, it is extremely difficult for the Army to engage in any major operation without mobilizing reserve personnel. The policy establishing that structure was adopted in the mid-1970s, when many Army leaders and defense policymakers believed that one of the causes of the failure of the U.S. effort in Vietnam was the loss of public support. In their view, the decision by political leaders not to mobilize large numbers of reserve personnel for the Vietnam War—a higher level of commitment than deploying active forces—showed that they were unwilling to take actions that would strongly commit the United States to the war. According to that line of thought, if reserves had to be mobilized for any future conflict, political leaders would either be less likely to engage the United States in conflicts that would not command broad public support or would be more likely to ensure that public opinion was fully mobilized and in support of any future major military operation.

How Army Units Are Used in the Field

Army units are generally organized so that each combat unit has three major subordinate combat units and a mix of subordinate support units (see Box 1-1). As such, any combat unit larger than a company will include some subordinate support units. However, it is convenient, for a variety of reasons, to differentiate between the support units included in the major combat units (divisions, separate brigades, and ACRs) and the support units included in higher-echelon commands (corps and theaters).

Prior to the changes associated with modularity, divisions—which typically have about 15,000 personnel and three subordinate combat brigades—were organized for combat into three brigade combat teams (BCTs) by using units from support brigades in the division to reinforce the division's combat brigades. The remaining divisional support units are sometimes referred to as the “division

base” (including all of the division's aviation assets). Separate brigades and ACRs are always organized as BCTs with all of their support units. All BCTs (divisional, separate, and ACR) of a given type—light, medium, and heavy—are essentially identical in size and combat power. (See Appendix A for more details on the composition of the major combat units.)

Corps- and theater-level support units—referred to as echelons-above-division (EAD) units—provide either direct or general support to the major combat units.⁵ Such support varies from augmenting the firepower of major combat units with attack helicopters or artillery to providing capabilities that major combat units do not include (such as civil affairs or construction engineering), as well as medical and logistics support that is very limited in major combat units.

Except in the smallest and most limited operations, the Army's major combat formations are not capable of engaging in sustained military operations without EAD support units. Any time the Army deploys combat forces to a major operation, it must also deploy a corresponding package of support units. The Army has doctrinal rules for what those support packages should include and designs its force structure in accord with those rules.⁶ In actual operations, the Army will tailor the specific mix of support units on the basis of the theater and mission, but when designing its force, the Army assumes that those rules describe a typical force package. Thus, it is possible to determine what units and how many personnel the Army assumes will be needed to support each type of combat brigade or division (about 15,000 support personnel per division), as well as the size of the “fixed-cost” support package associated with deploying a corps (about 25,000 support personnel) or a theater (about 35,000

5. Theater-level units are sometimes referred to as echelons-above-corps units. The major difference between a corps and a theater is that the theater provides certain strategic forms of support (such as operating port facilities or strategic communications) that benefit a wide range of units, whereas the corps provides more-direct support to the major combat units. (See Appendix A for more details about the types of support units associated with the corps and theater.) The theater also provides support to other services, including detention of enemy prisoners of war, intratheater water transportation, and port management.

6. That practice is the heart of the Army's biennial Total Army Analysis process. See U.S. Army War College, *How the Army Runs: A Senior Leader Reference Handbook, 2003-2004* (Carlisle, Pa., 2003).

Box 1-1.**Army Command Levels**

Squad/Section: The smallest tactical unit. A squad is commanded by a sergeant and has about eight to 15 personnel (or two vehicles, in the case of a section).

Platoon: The basic tactical unit of a company. A platoon is commanded by a lieutenant and includes varying numbers of subordinate squads or sections. It has about 16 to 50 personnel. Heavy platoons have four armored vehicles.

Company/Troop/Battery: The basic tactical unit of a battalion. A company is commanded by a captain and includes two to five subordinate platoons (usually three or four). It has about 60 to 200 personnel. Heavy companies have 14 armored vehicles. Cavalry companies are called troops; artillery companies are called batteries.

Battalion/Squadron: The smallest tactically independent unit in the Army. A battalion is commanded by a lieutenant colonel and includes two to five combat companies (usually three or four) and, depending on the type, some support companies. It has about 400 to 800 personnel. Heavy battalions have 44 to 58 armored vehicles. Cavalry battalions are called squadrons.

Brigade/Regiment/Group: Brigades can be either separate or subordinate to a division. A separate brigade is commanded by a brigadier general, whereas a divisional brigade is commanded by a colonel. Both in-

clude two to five combat battalions (usually three). Brigade combat teams (BCTs) are combat brigades that have been tactically organized to include an artillery battalion, an engineer battalion, and a logistics battalion. Brigades have about 2,000 to 3,500 personnel, and BCTs have about 2,500 to 5,000 personnel. Cavalry brigades are called regiments. Some types of support brigades are called groups.

Division: The primary tactical unit in the Army. A division is commanded by a major general and includes two to five combat brigades (usually three), an aviation brigade, an artillery brigade, an engineer brigade, and a logistics brigade. Divisions may also command separate brigades. Divisions have about 12,000 to 16,000 personnel.

Corps: The largest tactical unit in the Army. A corps is commanded by a lieutenant general and includes two to five divisions, an armored cavalry regiment, and numerous support brigades and commands. Corps may also command separate brigades. Corps have about 80,000 to 200,000 personnel.

Theater: The highest command level in the Army. It is an element of the joint command structure, with a general as the Army service component commander. A theater is established to support one or more corps (usually two) and includes numerous support brigades and support commands. It has no standard number of personnel.

support personnel). Given that the Army deploys a corps for every two to five divisions and a theater for every one to two corps, a large force will deploy about 40,000 to 45,000 personnel for each division. Those numbers match well with the Army's actual practices, since the Army deploys an average of a bit more than 40,000 personnel for every division it deploys.⁷

7. That average, also referred to as the "division slice," has been very stable since the Army began using modern divisions in the early 20th century.

Concerns with the Premodular Structure

A wide variety of defense analysts, Administration officials, and policymakers have expressed concerns about the Army's current size, structure, and ability to perform its missions. Those concerns focus on, among other things, the Army's capability to support extended deployments or to engage in multiple major combat operations, the need to rely on reserve units, and the time it takes to deploy Army units to distant theaters.

Capability to Sustain Extended Deployments

The occupation of Iraq has required the Army to sustain a large occupation force there, potentially for an indefinite period. In addition, the Army has other commitments—including in Afghanistan, the Balkans, and South Korea—that it must sustain. Whether the Army is able to meet all of those commitments and remain capable of responding to other contingencies that might arise has been a subject of debate.

Concerns that the Army's forces in Iraq are too small have been raised persistently in public debate. However, as it is currently sized and structured, the Army is not capable of indefinitely sustaining a larger force in Iraq while maintaining high levels of readiness and quality of life for soldiers.⁸ Many advocates of a larger occupation force believe that the Army should be made larger to allow for a greater pool of forces to draw upon.

Other advocates of a larger Army believe that the United States is likely to need to engage in extensive stabilization and reconstruction missions after most future conflicts. In that view, a larger force would allow the United States either to engage in more such missions concurrently or perform such missions without placing as much stress on personnel, equipment, and units. In particular, such advocates argue that the need to maintain the Iraq occupation force is putting unacceptable levels of stress on the Army and may lead to serious problems with recruiting, retention, or readiness.

Some observers argue that the peacekeeping missions associated with extended deployments do not so much require more forces as they do forces that are designed for peacekeeping as a primary mission. The vast majority of Army forces are primarily intended for high-intensity combat, although the Army views them as capable of performing peacekeeping missions when needed. Several public proposals have called for some form of dedicated peacekeeping force, with proponents claiming that such force would be qualitatively better than conventional combat forces.

Capability to Engage in Major Combat Operations

Prior to the invasion of Iraq, there was significant public debate about whether U.S. forces could engage in two major combat operations simultaneously or nearly simul-

taneously. DoD's 2001 Quadrennial Defense Review (QDR) renounced the 1990s-era "two major theater war" strategy but did require U.S. forces to be capable of simultaneously "swiftly defeating enemy attacks" in two theaters. However, because almost all Army forces are currently deployed, preparing to deploy, or recovering from deployment, there has been substantial debate about how capable the United States would be of responding should any new contingency arise.

Numerous defense analysts and Members of Congress have expressed the belief that the Army would not currently be capable of fully responding to any new contingency (for example, should the United States become engaged in military operations against Iran or North Korea) and that the size of the Army should be increased as a result. Other analysts would argue that the ability to simultaneously engage in at least two major combat operations is a desirable goal that would contribute to deterring potential U.S. adversaries. The 2001 QDR strategy does appear to commit DoD to a formal goal of being able to fight two major combat operations while maintaining other commitments.

However, other defense experts argue that maintaining sufficient ground forces to conduct multiple major combat operations, as traditionally understood, might not be necessary or desirable. Some of those experts argue that air power or naval power can substitute for ground forces. Others contend that in the event of a major combat operation, the United States should simply prioritize among commitments—perhaps pulling forces out of lower-priority commitments to fight a major combat operation. Finally, some defense experts believe that recent technological developments in computers, communications, and networking have allowed the United States to transform the way it fights wars, enabling very small U.S. forces to defeat even relatively large and formidable opponents. That view holds that a small force equipped with advanced communications networks and access to long-range, precision-guided weapons would be more capable than a larger force because it could move and react more rapidly.

One element of the Army's structure that particularly affects its ability to fight wars is that the Army National Guard has maintained two classes of units over the past decade. The National Guard's separate brigades are kept at a relatively high level of manning and readiness, are included in operational plans for conflicts, and are being

8. See Congressional Budget Office, *An Analysis of the U.S. Military's Ability to Sustain an Occupation of Iraq* (September 2003).

deployed to Afghanistan and Iraq. The National Guard's divisions, by contrast, are maintained at relatively low levels of manning and readiness, are not included in operational plans for conflicts, and have only been deployed to lower-intensity missions, such as those in Bosnia, Kosovo, or the Sinai.

In accordance with the low priority that the Army has placed on National Guard divisions, many of those divisions' subordinate brigades are unsupported (in other words, the Army lacks sufficient support units to deploy those brigades to combat operations). Not all observers regard that situation as problematic, and the Army has frequently described the National Guard divisions as having missions (such as providing homeland security or a strategic reserve) that suggest they might not need a full set of support units. However, other observers argue that those unsupported divisions represent deadweight in the Army's force structure since they cannot be deployed overseas or participate in the full range of Army missions.⁹ Each unsupported division would require about 15,000 personnel in EAD support units. CBO estimates that between four and six of the National Guard divisions are unsupported, suggesting that the Army would need an additional 60,000 to 90,000 personnel to fully support those divisions.

Use of the Reserve Component

Military operations associated with the war on terrorism have required the Army to mobilize more reserve personnel, and keep them mobilized, than the modern all-volunteer force has ever experienced before. Although many reserve personnel were mobilized for Operations Desert Shield and Desert Storm, those operations did not require repeated large-scale mobilizations and extended tours of duty. The Army has not seen the current level of extended reserve mobilization since the Korean War. As a result, some policymakers and defense experts question whether the Army is using its reserve component in an appropriate manner and whether the reserves as currently structured can sustain large and extended mobilizations. Partly in response to those concerns, DoD recently an-

nounced a policy that reserve units should not be mobilized and deployed more than once every six years.

The modern reserve system is intended, in effect, to provide relatively low-cost surge capacity to the Army. As such, many elements of it appear poorly suited to augmenting the Army's capability to sustain extended deployments. For example, reserve units have traditionally received equipment handed down from the active component after it received more-modern equipment, trained less in peacetime than their active counterparts, and expected to be mobilized infrequently and for short durations. Those circumstances have led some critics of the Army's current policies to argue that reserve units should not be used in extended peacetime operations but rather only for major combat operations. Other critics, however, argue that if the Army intends to employ reserve units in extended peacetime operations, the standard of equipment and training for those units must be raised to match that of active units.

Some critics believe that a part-time, citizen-soldier model for the reserve component is incompatible with the Army's implementation of the Total Force Policy. Because the Army's implementation of that policy effectively requires the service to mobilize reserve personnel for any significant operation, it guarantees that the Army cannot conduct "active-only" operations. Other critics, however, contend that with proper management of the reserve component and some limited reforms, the Army could avoid placing an undue burden on individual reservists.

Deployment Speed

After Operation Desert Storm, DoD became concerned with the time required to deploy large forces to distant theaters of operations. That concern involved the belief that Operation Desert Shield included a lengthy period of time during which Iraqi forces could have invaded Saudi Arabia, seizing critical airfields and ports and preventing U.S. forces from easily deploying to the theater. That view holds that in any future scenario, opponents would realize that allowing the United States to build up overwhelming forces would guarantee their defeat, and thus they would rapidly move to seize the infrastructure on which U.S. forces depend for deployment. To counter that potential strategy, DoD made numerous improvements to the deployment process in the mid-1990s, including purchasing C-17 cargo airplanes; large, medium-

9. Strictly speaking, those divisions could be deployed if they were given support units normally assigned to other forces. However, that would render the other forces nondeployable and produce an equivalent effect—the Army would not be able to deploy all of its forces simultaneously.

speed roll-on/roll-off cargo ships; and sets of equipment that could be stored (prepositioned) in potential combat theaters and on flotillas of ships. However, in some subsequent operations, especially the deployment of Task Force Hawk to Kosovo, it became apparent to DoD that U.S. forces still frequently required many months to deploy combat units. Most of the focus on improving deployment speed is concentrated on the Army because transporting Army units generally requires more strategic lift assets than does transporting the units of any other service.

The Administration has laid particularly heavy stress on improving the speed with which the United States can deploy forces to distant combat theaters, emphasizing that goal in the 2001 Quadrennial Defense Review and numerous other policy and planning documents. DoD's formal objective, expressed in the Joint Swiftness Goals, is to be able to defeat the efforts of any potential enemy within 10 days after the beginning of a conflict, defeat that enemy fully within the next 30 days, and be prepared to engage a second potential enemy 30 days after that. Since U.S. forces are not currently able to deploy significant numbers of ground units within 10 days, those goals have inspired numerous initiatives, such as the Navy and Marine Corps' sea-basing concept, that may improve deployment speed.¹⁰

Many defense experts believe that improving deployment speed is necessary for the United States to respond effectively to numerous potential threat scenarios. They contend that both Operation Desert Storm and Operation Iraqi Freedom were highly anomalous and have taught potential U.S. opponents that they cannot passively allow the United States to build up overwhelming forces nearby. Such experts tend to believe that the extremely difficult task of deploying ground forces to Afghanistan might be more representative of future conflicts and indicates a need for more cargo airplanes, smaller and lighter units, and advanced deployment concepts.

Other defense experts, however, question the extent to which increased deployment speed matters. They note that the United States has effectively had great discretion and flexibility in choosing when to initiate military operations over the past few decades. In many scenarios, U.S.

naval and air power, which is capable of deploying much faster than ground units, may be sufficient to deal with enemy threats during the early phases of a conflict.

Quadrennial Defense Review

The Department of Defense will conduct another QDR in 2005. That review, according to press accounts, will consider how well U.S. military forces are structured to meet a variety of challenges. According to those accounts, DoD is currently considering a planning framework that will employ several scenarios, grouped under a rubric of four classes of threats.

- *Traditional threats.* Those threats are envisioned as scenarios involving major combat operations ("conventional warfare"), similar to Operation Desert Storm and Operation Iraqi Freedom, or traditional scenarios involving the defense of South Korea.
- *Irregular threats.* Those threats are envisioned as scenarios that require the United States to suppress insurgencies or combat guerrilla tactics, similar to what was previously referred to as "unconventional" or "asymmetric" warfare.
- *Catastrophic threats.* Those threats are envisioned as scenarios with extreme, highly damaging attacks against the United States or its allies. The most frequently discussed scenarios in that category revolve around the use of chemical, biological, radiological, or nuclear weapons against the U.S. civilian population.
- *Disruptive threats.* Those threats are envisioned as relatively improbable, but potentially dramatic, events that might completely alter the balance of power in the modern world, such as if hostile nonstate actors gained access to technology much more advanced than that available to DoD. CBO is not aware of any discrete scenario being used to assess that category of threat.

For numerous reasons, CBO did not attempt to incorporate the QDR planning framework into this study. First, the framework is intended to examine the entire department's ability to respond to that set of threats, whereas this study focuses only on the Army. Second, DoD's scenarios for the QDR are classified and have not been released to the public. Finally, by their nature, some of the threats being considered do not appear amenable to quantitative analysis.

10. For more details about sea basing, see Congressional Budget Office, *The Future of the Navy's Amphibious and Maritime Prepositioning Forces* (November 2004).

Planned Changes in the Army's Structure

In February 2004, the Chief of Staff of the Army (CSA), General Peter Schoomaker, announced a plan that would involve an extensive restructuring effort to convert the Army into a set of modular combat and support brigades. That modularity reorganization—in addition to some other (more limited) planned changes—will alter the size and structure of the Army over the next few years.

The major elements of the modularity plan are to increase the number of combat brigades in the Army, standardize the types of combat and support brigades somewhat, convert the division to a more flexible echelon with variable numbers of subordinate combat and support brigades, and merge the functions currently performed by the corps and theater levels of command. According to the Army, modularity will improve the service's combat power and permit it to be more flexible and rapidly deployable. (See Appendix B for a more detailed discussion of the modularity plan and some of the potential issues associated with it.)

Other initiatives that will change the Army over the next few years include a temporary increase in the size of the Army, ordered by the Secretary of Defense; a permanent increase in the size of the Army, authorized by the Congress; a directive to move some forms of support units from the reserve component to the active component, ordered by the Secretary of Defense; a continuing initiative—the Army National Guard Divisions' redesign study—to convert some unsupported National Guard combat brigades into support forces, undertaken by the Army; and a plan to establish "individuals" accounts (TTHS accounts) in the Army Reserve and National Guard, also undertaken by the Army. In addition, the Army's modernization plans call for a long-term shift toward units equipped with light armored vehicles.

Modularity

CSA Schoomaker's modularity initiative is most noteworthy for his plan to increase the number of combat brigades in the active Army from 33 to either 43 or 48. However, the initiative calls for other changes as well, and successfully executing those changes will require making numerous adjustments to the Army's EAD support units.

Under the modularity plan, combat brigades (called "Units of Action" in the plan) would be standardized as

light, medium, or heavy, with two subordinate combat battalions and a more robust set of support units included in the brigades.¹¹ The premodular force, by contrast, contains numerous types of combat brigades—including armored, mechanized infantry, Stryker, light infantry, airborne, and air assault, each with its own structure—with each brigade including three subordinate combat battalions and a more limited set of support units. (See Appendix A for a detailed comparison of the different types of brigades.) Although the active Army will have a larger number of combat brigades under the modularity plan, the number of combat battalions in the active Army component either will not increase much (from 98 to 102) or will decrease (to 92) because each brigade will have fewer subordinate combat battalions.¹² That effect would be offset, however, by an increase in the number of combat companies in each battalion in the modular plan. Overall, once the effects of differently sized units have been removed, it appears that the 48-brigade plan would increase the Army's combat forces by about 5 percent, whereas the 43-brigade plan would produce almost no change in the amount of combat forces available to the Army.¹³ In both the 43- and 48-brigade

11. The new light and heavy brigades would have two subordinate combat battalions each. The medium Stryker brigades would remain in their current configuration, with three battalions. Some Army planning documents indicate that the Army may seek to add a third battalion to the light and heavy brigades at some point, if feasible. In addition, the Army still plans to introduce Future Combat Systems brigades with three subordinate combat brigades beginning in 2015.

12. Those numbers differ slightly from the results of multiplying the number of brigades by the number of battalions per brigade because in the Army's current structure, one brigade (the 173rd Airborne) has only two battalions. In the modular force, the Army will retain Stryker BCTs in their current structure, with three battalions per BCT, and may retain ACRs in their current structure, with three squadrons (battalion-sized units) per ACR.

13. That comparison is based on maneuver units. There does not appear to be a strict definition of such units, but they are generally accepted to be front-line combat units capable of closing with the enemy by means of fire and maneuver. CBO assumed—on the basis of units' composition and missions—that armor and infantry companies count as maneuver forces, as do armored cavalry troops from armored cavalry regiments. It is possible to argue that other types of units (such as attack helicopter units, other reconnaissance troops, and so on) should also be considered maneuver units. Including those units would alter the results of this comparison. In particular, including reconnaissance troops would suggest that the 43-brigade force would have about 19 percent more, and the 48-brigade force about 27 percent more, combat units than the current force.

Table 1-1.

Number of Major Combat Units and Personnel in Those Units in Premodular and Modular Forces

	Active Component	Reserve Component	Total Army
Brigades			
Current force	33	36	69
43-brigade force	43	34	77
48-brigade force	48	34	82
Battalions			
Current force	98	108	206
43-brigade force	92	70	162
48-brigade force	102	70	172
Companies			
Current force	297	327	624
43-brigade force	353	265	618
48-brigade force	393	265	658
Personnel^a			
Current force	170,000	170,000	340,000
43-brigade force	195,000	150,000	345,000
48-brigade force	215,000	150,000	365,000

Source: Congressional Budget Office.

Notes: For more details about the numbers in this table, see Tables B-1 and B-2 in Appendix B.

Combat units include armored, mechanized infantry, light infantry, airborne, air assault, and Stryker brigades, battalions, and companies, as well as armored cavalry regiments, squadrons, and troops. (These numbers assume that the 3rd Armored Cavalry Regiment is retained in its current form.)

a. Personnel numbers are rounded to the nearest 5,000.

forces, however, more of the Army's combat power would be concentrated in the active component than is the case today, with the active Army's combat forces increasing by either 19 percent or 32 percent and the National Guard's combat forces decreasing by 19 percent (see Table 1-1). Presumably, that change would also make the active Army even more dependent on reserve support units than it is currently.

In addition to changing the number and type of combat brigades in the Army, the modularity plan envisions eliminating the traditional division structure. Instead, divisions (called "Units of Employment (X)" in the plan) would consist of a relatively small headquarters element that would command a set of interchangeable combat

and support brigades. Most divisions would have a standard set of brigades, with four combat brigades, an artillery brigade (for heavy divisions), an aviation brigade, and a support brigade (with logistics and maintenance units). Although that structure would be relatively similar to today's division—which has three combat brigades, an artillery brigade, an aviation brigade, an engineer brigade, a support brigade, and a variety of different battalions (called the division troops)—it would, in theory, be simpler to alter by changing the number and mix of brigades in response to different missions.

Similarly, the Army plans to merge the corps and theater levels of command into a single level (called a "Unit of Employment (Y)" in the plan) that would consist of a small and flexible headquarters element commanding a flexible set of divisions and support brigades. The support brigades would be standardized to permit more flexible tailoring of any given force to a specific theater and mission.¹⁴

The Army has announced the design of the new combat and aviation brigades that will be used in the modularity plan, but it has not announced the design of the majority of support brigades. More important, the Army has not announced how many support brigades of each type the modularity plan will require. Converting the Army's combat brigades (and increasing their number to 48) will require 25,000—or possibly 45,000—additional active personnel. The Army will probably require more support brigades for the additional combat brigades. Therefore, unless the Army dramatically reduces the level of support units it has traditionally needed in the past, it may also face an increased need for EAD support personnel under the modularity plan.

The Army has received permission from the Secretary of Defense to increase its size by 30,000 temporarily, thus enabling it to convert its combat brigades and grow to 43 or perhaps 48 combat brigades. To avoid a permanent increase in size, however, the Army has said it will identify 30,000 personnel positions that could be eliminated (ideally, from TDA or TTHS positions) by 2011. How-

14. The Army also appears to have decided that it may require an intermediate command level between the Unit of Employment (X) and the Unit of Employment (Y) for larger theaters and has described a possible "Three-Star" Unit of Employment (X) to fill that role. That level would be commanded by a lieutenant general and presumably would fill the role of the current corps.

ever, it is unclear whether the Army will be able to successfully identify sufficient positions, whether it can grow to 48 combat brigades without additional personnel, or how future decisions on the support units needed for modularity might affect the Army's overall personnel requirements. If the Army requires additional personnel for the full 48-brigade force, cannot identify sufficient TDA and TTHS positions to eliminate, and requires levels of support in line with historical norms, the Army might need as many as 60,000 additional personnel overall (although not all of those personnel would necessarily need to be in the active component). Even under those circumstances, the Army would still lack sufficient units to fully support all National Guard major combat units.

Some proponents of the modularity plan have argued that modular brigades will be easier to deploy than pre-modular ones. The equipment associated with modular brigades weighs about as much as the equipment associated with current brigades, so it is unlikely that deploying modular BCTs will be any easier than deploying current BCTs. However, if modular brigades require fewer support units to be deployed with them, the weight of all the equipment in the package of combat and support units could be less than that used by the current force and thus make the modular forces easier to deploy.

Increased End Strength

To implement the modularity plan, the Secretary of Defense has granted the Army temporary authority to increase its size beyond the 482,400 active personnel it was allowed by law in 2004. The authority allows the Army to increase by 30,000 personnel through 2007.

In the 2005 defense authorization act, the Congress increased the Army's authorized maximum and minimum end-strength levels to 502,400 active personnel.¹⁵ However, the authorization was enacted after the Congress had provided appropriations for 2005, which included funds for only 482,400 active-duty personnel, so any increase in personnel above that level will have to be funded with supplemental or reprogrammed appropriations. The authorization act also formally conferred power on the

15. End strength is the number of personnel in the Army at the end of the fiscal year. Although the Congress sets both a maximum and a minimum level, those levels have traditionally been the same number. The Army is allowed to vary by no more than 3 percent from that level of personnel (referred to as the "operating strength deviation").

Secretary of Defense to authorize a temporary 30,000 increase in the size of the Army, granting that authority through 2009. It is unclear how those Congressional actions will affect the Army's modularity plan or whether the 20,000 permanent increase in end strength will offset the Army's 30,000 temporary increase.

Active- and Reserve-Component Reallocation

In response to DoD's policy of not mobilizing reserve personnel more often than one year out of every six and a stated goal by the Secretary of Defense of not needing to mobilize reservists within the first 15 days of a conflict, the Army has embarked on a limited program of moving some units from one component to the other. That initiative will shift about 10,000 positions between the active and reserve components.¹⁶ Some of those shifts will simply move units between components (in other words, an active unit will be deactivated, and the same type of unit will be activated in the reserves). However, some unit changes will be achieved by eliminating certain types of support units (including field artillery and short-range air-defense artillery units) that the Army believes it does not need as much as other types of support units.

Army National Guard Division Redesign Study

The Army National Guard Division Redesign Study is an initiative that began in the late 1990s in response to situations in which the Army does not have sufficient numbers of support units to mobilize and deploy all of the National Guard divisions. The initiative was originally intended to convert 12 combat brigades from the National Guard divisions into multifunctional support brigades, thus providing support for more of the remaining combat brigades in the National Guard divisions. That plan was intended to proceed in four phases, with each phase converting three combat brigades. Only Phases I and II ever received funding, however. Phase I is now largely complete, and Phase II is scheduled to take place in 2006. To some degree, the ongoing initiative will complement the Army's modularity redesign, which also envisions reducing the number of combat brigades in the National Guard.

Reserve-Component TTHS Accounts

Traditionally, only the active Army had a TTHS account, but recent Army plans include establishing such individu-

16. The Army has also announced that it will seek to shift up to 100,000 additional positions over the next few years.

als accounts on a small scale for both the Army Reserve and the Army National Guard. To free up sufficient personnel slots to establish those accounts, the Army will have to eliminate some reserve units. However, the units that remain will probably be better manned, because they will no longer need to maintain personnel on their unit rosters who are not actually available.

Stryker Brigades and Future Combat Systems

The Army is currently investing significant funds to develop and procure two types of new light armored vehicles. The first type, the family of Stryker vehicles, is intended to allow the Army to convert five active and one National Guard combat brigades to a medium-weight configuration. Two of those conversions have been completed, and one is currently under way.

The second type of light armored vehicle would be developed under a much more extensive initiative known as the Future Combat Systems (FCS) program. The FCS program is intended to develop many new technologies and types of equipment for the Army, including communications networks, computer technologies, unmanned aerial vehicles, and intelligent munitions. One of the program's central elements is a proposed new family of light armored vehicles. The Army ultimately intends to replace all, or nearly all, of its combat brigades with FCS-equipped medium brigades, eventually eliminating heavy and light forces (with the possible exception of airborne forces).

The FCS program not only would alter the types of brigades in the Army but also could alter their size. Although the Army does not currently envision fielding an entire FCS-equipped combat brigade until the end of calendar year 2015, the Army's Training and Doctrine Command has developed preliminary unit designs showing that FCS brigades could have about 2,200 personnel, and FCS divisions could have about 10,000 personnel. Because those units would be about two-thirds of the size of existing units and would, if the Army's plans for the FCS are fully realized, require much less of certain types of support (such as maintenance), the FCS program might lead to a significant reduction in the Army's personnel requirements.

Although they are not the only justification for medium-weight units, the Army's arguments for the Stryker and FCS have laid great emphasis on their potential to reduce the time it takes Army forces to deploy. That reduction

could come in two ways. First, the lightly armored vehicles in such units simply weigh less than the heavily armored vehicles the Army currently fields. Second, because heavy units require more support units than light units do, medium units should require fewer support units than heavy units do and require correspondingly less lift.

CBO found that although the difference in unit equipment weight among light, medium, and heavy forces is large, the difference in the time needed to deploy fully supported light, medium, and heavy forces is not very large. Heavy brigades using equipment prepositioned on ships require about twice as much time to deploy as light units do. For larger formations, however, a full package of heavy units generally requires only about 10 percent to 25 percent more time to deploy than does a full package of light units.

For air deployment, the weight of unit equipment is the primary factor affecting deployment speed. The equipment associated with a light BCT weighs about 4,000 tons; with a Stryker BCT, about 13,000 tons; and with a heavy BCT, about 25,000 tons.¹⁷ Similarly, the equipment associated with a light division weighs about 20,000 tons, whereas the equipment associated with a heavy division weighs about 100,000 tons. (Currently, there are no medium divisions, but CBO estimates that a medium division would have about 60,000 tons of equipment.) However, when those units are deployed with their associated support units (as they almost always are), the difference in the weight of all the unit equipment that must be shipped with each BCT—light, medium, or heavy—becomes much less significant because many types of support units are common to all types of forces and do not vary. In fact, the weight of the total force package (with combat and support units) is about 80,000 tons for a light division and 180,000 tons for a heavy division. (CBO estimates that a medium division would have about 120,000 tons of equipment with its support package.) The relatively large differences in weight among types of BCTs do not produce similarly large differences in weight among force packages. Thus, equipping combat units with lighter equipment does not reduce deployment timelines by a great deal.

17. The term ton in this study refers to a short ton, which weighs 2,000 pounds.

The United States does not generally deploy combat units by air, because any sizable, fully supported unit tends to have so much equipment that deployment by sea is faster. Since a C-17 cargo plane will generally transport about 45 tons per sortie, deploying large units can easily require thousands of sorties. For sea deployment, the primary factor affecting speed is the square footage needed to stow unit equipment. The differences in that square footage for light and heavy units are somewhat smaller than the differences in how many tons of equipment those units have. A light division requires about 600,000 square feet to stow its equipment, whereas a heavy division requires about 1.4 million square feet.¹⁸ As with tons, those figures are larger when the full set of support units is included, and the difference between light and

heavy units becomes less pronounced. In addition, because the U.S. fleet of sealift ships can transport very large amounts of cargo (the primary types of cargo ship can transport about 380,000 square feet of equipment each), deploying a single light or single heavy division by sea does not require appreciably different amounts of time—the U.S. fleet of cargo ships is capable of transporting either type of unit without multiple trips.

18. When units are measured in square footage, heavy divisions require a bit more than twice as much lift capacity as light divisions, compared with five times as much when measured in tons. That difference results because unit equipment in heavy divisions is, on average, considerably denser than that in light units.

Alternatives for the Army's Force Structure

As discussed in the previous chapter, critics have raised concerns about the Army's current size and structure, its ability to fight wars and sustain extended deployments, its dependence on reserve units, and the speed with which it can deploy. This chapter examines ways to address those concerns by altering the Army's size and structure. The Congressional Budget Office analyzed eight alternatives, evaluating the costs, advantages, and disadvantages of each.

Policy Choices and Their Implications

Any proposed alternative force structure for the Army will require trade-offs, either because it will incur additional costs or because it will reduce the Army's ability to perform some mission. To demonstrate the effects of changing the Army's force structure, CBO examined the implications of varying three attributes of the current force structure:

- The overall size of the Army, as measured in major formations (theaters, corps, divisions, and brigades);
- The distribution of combat and support forces between the active and reserve components of the Army; and
- The types of major combat forces and the levels of support forces associated with them.

Increasing the Size of the Army

Increasing the overall size of the Army is the most direct way to address concerns about its ability to fight more than one conflict simultaneously or its ability to sustain large forces on extended deployments. By adding combat forces to the Army, along with the echelons-above-division support forces that those combat forces would need, the Army would gain more combat units that could be used for warfighting or peacekeeping missions. Alter-

natively, if the Army must sustain any given level of commitment for extended deployments, having a larger Army would provide a larger pool of forces that would be available to meet that commitment, reducing the frequency with which any given unit would need to be deployed (thus reducing stress on personnel and units).

The primary disadvantage associated with increasing the size of the Army is cost. Adding active divisions to the Army requires about 40,000 personnel per division (about 15,000 for the division; 15,000 for EAD support units; and 10,000 for Table of Distribution and Allowances positions and trainees, transients, holdees, and students positions). Additional personnel generate significant recurring costs, some of which (such as health care and pensions) generate long-term obligations for the government. Furthermore, adding units to the Army would incur one-time costs to purchase equipment for the new units. In this study, CBO also assumes that the Army would modernize any new forces over time, so its procurement budget would increase to allow the Army to purchase newer, more advanced equipment as time went on.

It is also possible to create more combat forces by reducing the amount of support forces in the Army. To illustrate the potential for different policy choices, several of CBO's alternatives create additional combat forces by either reducing the levels of some types of EAD support units or by eliminating some echelons (such as the corps). In those alternatives, the costs for increasing the number of combat forces would be reduced, but the resulting force would be somewhat less capable of some types of warfighting.

Reducing Dependence on the Reserve Component

Although the Army's current structure makes active combat units very dependent on reserve EAD support units, that dependence could be reduced by increasing the

number of units in the active component, according to critics of the Army's need for extensive reserve mobilization. The Army could achieve that result through two distinct approaches. First, the Army could simply create additional EAD support units in the active force, reducing the need to mobilize reserve EAD support units. Second, the Army could swap units between components, using the personnel freed up in one component to create a unit equivalent to the one disbanded in the other component. Although the latter method would not reduce the overall dependence on reserve units, it could reduce the Army's need for reserve mobilization in peacekeeping operations by concentrating units necessary for such operations (such as military police) in the active component, while concentrating units that are not needed for such operations (such as artillery) in the reserve component.

The primary disadvantage of reducing dependence on the reserves is the cost associated with creating additional EAD support units in the active force. Such costs are similar to those associated with increasing the size of the Army. However, CBO assumed that if the number of active EAD support forces were increased, the number of reserve EAD support forces could be decreased by an equivalent amount, offsetting the costs of adding active EAD units somewhat. (Active units, however, cost more than equivalent reserve units.)

Creating New Types of Units

Numerous proposals to reform the Army to better address current concerns involve creating new types of units. The Army frequently reorganizes its forces and is now engaged in one such restructuring. CBO generated alternatives that would respond to four major proposals that have been made in public debate:

- “Peacekeeping” formations. Many observers have suggested that the Army's practice of using combat forces for peacekeeping operations may be inappropriate. A number of defense experts have suggested creating formations oriented around military police, civil affairs, engineers, and other types of units that have been in high demand for peacekeeping operations.
- “Brigade-based” formations. Many critics have argued that the Army's command echelons, which are large and inflexible, date back to World War II. Some defense experts have argued that by constructing rela-

tively independent brigades and eliminating one or more of the higher echelons (division, corps, or theater), the Army might be able to wage war more rapidly and effectively.

- “Expeditionary” formations. Many defense analysts argue that the ability to rapidly deploy requires changes in organization, not just equipment. Some defense experts argue that the Marine Corps' structure of Marine expeditionary forces offers an example of “best practices” for organizing land forces to be able to rapidly deploy to distant conflicts and that the Army could be restructured in a manner more similar to the Marine Corps.
- “Transformational” formations. In recent years, a large section of the defense community has argued that advances in precision-guided munitions, sensors, and communications networks have made it possible for relatively small, high-technology forces to defeat much larger conventional opponents. Many defense experts within that community have argued that smaller, lighter ground forces equipped with long-range precision firepower would have superior abilities to fight wars compared with traditional Army forces.

Each type of formation has various advantages and disadvantages, many of which are connected with how the force that uses the new formations is designed. For example, the number of additional personnel the Army can sustain in extended deployments using peacekeeping formations depends in part on the design of the peacekeeping units but also on how many of them the Army might establish.

Measures for Evaluating the Effects of Changing the Army's Force Structure

To show the specific advantages and disadvantages of changing the Army's force structure, CBO designed and analyzed eight alternative force structures. They are divided into three groups that focus on each major type of change—increasing the size of the Army, reducing dependence on the reserve component, or creating new types of units. The alternatives include a wide array of policy choices, ranging from those that would represent relatively limited changes to the current force to those that would represent relatively dramatic changes to the current force.

Table 2-1.
Size and Composition of the Premodular Army

	Active Component	Reserve Component	Total Army
Personnel	482,400	555,000	1,037,400
Corps	3	1	4
Divisions	10	8	18
Total Brigades	33	36	69
Supported brigades	33	22	55

Source: Congressional Budget Office.

None of the alternatives, however, reflect the Army's current modularity plan. As discussed in the previous chapter, CBO does not have sufficiently detailed descriptions of those plans, including their budgetary implications, to fully analyze the Army's proposed changes. In particular, the Army has not yet decided exactly how many major combat units it will have, nor has the Army released any details about the support forces that will be needed for a modular Army. In an effort to combine CBO's limited understanding of the modularity plan with this analysis, CBO briefly assessed how modularity might affect each alternative. For example, although CBO is not sure exactly what support forces will be needed for modular divisions, the alternative presented here to add divisions to the Army would require similar trade-offs in a modular Army (gaining more capability to wage wars and sustain extended deployments by increasing the size of the Army and incurring additional costs).

CBO used several measures to compare the alternatives with one another and with the Army's current force structure. The first set of measures describes the overall size and composition of the force (see Table 2-1). It includes:

- The number of active- and reserve-component personnel required for the force;
- The total number of corps, divisions, and brigades in the force; and
- The number of fully supported combat brigades the Army could deploy overseas to a military contingency.

The second set of measures describes the estimated cost of the force (see Table 2-2). It includes:

- The five-year (2006-2010), 10-year (2006-2015), and entire long-term projection-period (2006-2022) costs for procuring equipment for the force and for continuing to modernize that equipment over time; and
- The five-year, 10-year, long-term, and recurring costs for military personnel and for the force's operations and maintenance.

The third set of measures describes the force's ability to fight wars (see Table 2-3). It includes:

- The number of combat brigades and personnel the Army would use for a notional major combat operation;
- The number of support personnel who could be provided for combat personnel in a major combat operation;
- The number of reserve personnel who would be mobilized for a major combat operation;
- The number of major combat operations the force could simultaneously conduct; and
- The speed with which the force could deploy a single brigade, division, corps, or theater overseas.

Table 2-2.
Cost of the Premodular Army

(Billions of 2006 dollars)

	Total Costs			Annual Recurring Costs in 2022
	2006-2010	2006-2015	2006-2022	
Investment	129	334	605	n.a.
Operation and Support	398	826	1,488	99
Total	527	1,160	2,092	99

Source: Congressional Budget Office.

Note: n.a. = not applicable.

Table 2-3.
The Premodular Army’s Ability to Fight Wars

	Current Force
Deployment for a Major Combat Operation	
Personnel	285,000
Brigades	20
Ratio of Support Personnel to Combat Personnel	1.76
Reserve-Component Personnel Mobilized and Deployed	109,000
Number of Major Combat Operations Possible	
Active Army only	1.65
Total Army	2.75
Deployment Time (Days)	
First brigade	14
First division	20
First corps	53
First theater	102

Source: Congressional Budget Office.

The fourth set of measures describes the force’s ability to sustain extended deployments (see Table 2-4). It includes:

- The number of personnel and brigades that could be sustained in extended deployments while using only active combat forces and the number of reserve personnel who would be mobilized to support those deployments; and
- The number of personnel and brigades that could be sustained in extended deployments while using active and National Guard combat forces and the number of reserve personnel who would be mobilized to support those deployments.

In analyzing the Army’s premodularity force structure, CBO used a notional force for a major combat operation. That notional force, composed of one theater, two corps, six divisions, and 20 combat brigades, is not identical to the specific forces used in any operational plans or recent military operations, although it approximates the size and composition of forces assumed in war games as necessary to prevail in a major conflict. By comparison, Operation Desert Storm was conducted with 23 Army brigades, whereas Operation Iraqi Freedom was conducted with

about eight Army brigades. (Both operations included Marine Corps and allied forces as well.)

In two alternatives, CBO adjusted the size of the notional force to reflect the potential qualitative improvements in warfighting that those alternatives might have. Proponents of both the brigade-based Army and the transformational Army claim that a smaller force structured in the manner they describe would be as effective as a much larger force without those structures. Although CBO was unable to assess the validity of such qualitative claims, it evaluated a notional force that was only 60 percent of the size of the notional force used in other alternatives to illustrate the potential benefits that such claimed improvements could offer. In those cases, it is possible for a force to be less capable of fighting wars overall (in the sense of having fewer combat brigades), but more capable of fighting multiple wars simultaneously (in the sense that the number of brigades required for a major combat operation would be smaller).

Similarly, for deployment times, CBO estimated an average time to deploy a given force. That average includes several different scenarios, with forces originating from different points (the East and West coasts of the United States) and being deployed to different points (in Africa, Asia, and the Middle East). As with the notional major combat operation force, that deployment time approximates the time to deploy a force but is not identical to specific timelines used in operational plans or recent military operations. Ground forces used for Operation Desert Storm required about five-and-a-half months to deploy,

Table 2-4.
The Premodular Army’s Ability to Sustain Extended Deployments

	Active Army Only	Total Army
Maximum Sustained Deployment		
Personnel	89,000–111,000	111,000–138,000
Brigades	8.3–10.3	12.3–15.1
Reserve-Component Personnel Mobilized	52,000–57,000	86,000–90,000

Source: Congressional Budget Office.

Table 2-5.
Sizes of Past U.S. Peacekeeping and Occupation Forces

Location	Peak Size of Force	Duration
West Germany	1,600,000	1945–1952
Japan	350,000	1945–1952
Somalia	28,000	1992–1994
Haiti	21,000	1994–1996
Bosnia	20,000	1995–2004
Kosovo	15,000	1999–present
Afghanistan	18,000	2001–present
Iraq	180,000	2003–present

Source: Congressional Budget Office based on information from the RAND Corporation.

Note: The information in this table is an updated version of Table S.1 from James Dobbins and others, *America's Role in Nation-Building: From Germany to Iraq*, MR-1753-RC (Santa Monica, Calif.: RAND, 2003). The data represent peak sizes of the U.S. forces involved in the operations, but such forces tended to vary substantially over time.

whereas ground forces used for Operation Iraqi Freedom required about three-and-a-half months to deploy (not including the continuing flow of units that were deployed during combat operations in Operation Iraqi Freedom—the 4th Infantry Division, 3rd Armored Cavalry Regiment, and 1st Armored Division).

Finally, CBO's estimates of the size of the force the Army could sustain for extended deployments is a maximum size force the Army could sustain absent any other commitments. The Army, however, currently has a number of such commitments, including those in South Korea, Kosovo, the Sinai Peninsula, and Afghanistan. Maintaining those commitments would reduce the Army's ability to sustain large numbers of forces for extended deployments. The United States historically has been involved in numerous extended deployments, but those deployments have varied greatly in size and duration (see Table 2-5 for historical peak sizes of U.S. peacekeeping and occupation forces).

Additional Considerations

In order for CBO's analysis to fully reflect the changes that any given alternative would have on the entire Army's force structure, CBO made some additional technical assumptions about how changes in each alternative would affect each measure of performance. (See

Appendix C for additional detail about the measures CBO used in this analysis.)

Increasing the Size of the Army. For alternatives that increased the size of the Army, CBO created only fully supported combat formations. In those alternatives, the size of the increase in personnel the Army required included three components: personnel to man the additional combat forces, personnel to man the EAD support units for those additional combat forces, and additional personnel to account for increased overhead for a larger force. Because of the inclusion of those components, the number of additional personnel required to increase the size of the Army is always larger than the nominal size of the combat units added.

The increase in overhead personnel is necessary because the number of TDA and TTHS personnel the Army requires has historically varied with the total size of the Army.¹ That relationship results because a larger Army, with more units and equipment, simply requires more personnel managers, more equipment managers, more trainers, and so forth. Similarly, a larger Army must recruit more personnel, leading to more soldiers in basic or advanced training; has more soldiers with temporary medical disabilities; and has more soldiers moving between assignments. In each option where CBO varied the overall size of the Army, it included a factor to allow for the additional (or reduced) number of personnel required for TDA units and for TTHS personnel. It is possible that the ratio of the Army's overhead personnel to deployable units could change in the future, but CBO had no basis to assume that the Army would achieve any greater level of efficiency in any of the alternatives examined in this paper.

Reducing Dependence on the Reserve Component. For alternatives that altered the active Army's dependence on reserve support units, CBO's measures of how many reserve personnel would need to be mobilized or deployed depended on a number of factors. There were three conceptually separate categories that could require reserve personnel to be mobilized:

- Mobilized and deployed overseas;

1. See John R. Brinkerhoff, *The Institutional Army, FY1975–FY2002*, Document No. D-2695 (Alexandria, Va.: Institute for Defense Analyses, April 2002).

- Mobilized and in training, preparing to deploy overseas; and
- Mobilized to fill in for deployed active-component units at U.S. bases.

The first category of reserve personnel is relatively easy to estimate, since it is simply the number of reserve personnel in units required to support active units, in addition to any National Guard combat forces and reserve support units that may be employed.

The second category of reserve personnel is primarily relevant for peacekeeping operations, which may last for many years. In such operations, if reserve units are deployed, at some point a new set of reserve units must be mobilized and trained to full proficiency to replace the deployed units.² To smoothly transition from the deployed unit to its replacement unit, the latter must be mobilized some months before the transition to allow time for training and deployment. Thus, the number of reserve personnel mobilized for such an operation will frequently be greater than the number of reserve personnel deployed (as has been the case with operations in Iraq and Afghanistan). That would not generally be the case for a purely warfighting operation, however, where a deployment would not need to be sustained over long periods.

The third category of reserve personnel is associated with the Army's practice of mobilizing some reservists to fill in for deployed active units at their home bases. That practice, known as "backfill," allows bases to continue functioning in a normal manner when their units are deployed (for example, reserve personnel might be called up to provide guards for the installation). Although the number of reservists mobilized for that purpose is smaller

2. The Army generally assumes that a reserve unit will require about a month for mobilization activities (such as medical checks). Some types of units (transportation units and other such support units, for example) generally do not require extensive post-mobilization training and can be deployed relatively rapidly. Other units, especially combat units, generally require extensive post-mobilization training (such as a rotation to the National Training Center) and may need up to an additional six months before they can be deployed. Reserve units also generally remain mobilized for a period of time after returning from a deployment, allowing reserve personnel to take leave accumulated while deployed and engage in some post-deployment activities.

than the number of active-component personnel for whom they backfill, reserve-component mobilization can be significant if the active force is heavily committed. Thus, even if the Army was able to conduct an operation by deploying only active units, it would probably still mobilize reserve personnel (although it would not deploy those personnel overseas).

The level of reserve mobilization that CBO analyzed in this study does not necessarily correspond to the number of individual reservists who would be mobilized. Instead, it represents the average number of reservists who would be mobilized in an entire year (and thus is analogous to man-years). In certain cases, more individual reservists might be mobilized than the average level of reserve mobilization—for example, if reserve units were deployed for six months to a peacekeeping deployment and continually replaced, two individuals would be mobilized for each man-year of mobilization.

Creating New Types of Units. When CBO created new types of units, it estimated the size of the support forces those new units would require and the weight of the equipment those units would include.

In general, CBO created new units by building up new combinations of existing units. For example, the peacekeeping divisions CBO analyzed are a new type of division, but they are composed entirely of existing types of battalions. Therefore, CBO could estimate the support requirements and equipment weight of those units using existing Army units as a guide.

An additional type of change that CBO made in one alternative (to create expeditionary units) was to increase sealift assets and prepositioned equipment sets on ships that the Army could use. Additional sealift assets improve the time it takes to deploy Army forces by simply providing more capacity to ship forces overseas. Prepositioned equipment—sets of Army equipment loaded onto large cargo ships permanently stationed near potential conflict zones—speeds Army deployment because the equipment in those sets is already loaded on ships that are generally stationed closer to potential conflicts than ships coming from U.S. ports.

CBO did not increase the amount of airlift assets in any alternative because the United States generally does not transport unit equipment by air; airlift can only lift a very

limited fraction of what sealift can; and in many potential scenarios, the infrastructure available for airlift is poor enough that the existing fleet of cargo aircraft could not be fully employed.

Costs. All of CBO's costs were estimated using the forces in DoD's Future Years Defense Program for fiscal years 2005-2009 as a base. Costs for alternatives represent the incremental change in funding required compared with that base. Operation and support (O&S) costs were estimated using various sources of budgetary data and included, among other things, the costs associated with pay and benefits for personnel, spare parts, and fuel. All costs are in billions of 2006 dollars.³

CBO separately estimated investment costs, which represent the costs to develop and acquire new weapon systems and equipment; operation and support costs, which represent the costs for pay and day-to-day operations; and construction costs, which represent the costs to build and maintain military facilities. Investment costs beyond 2009 were estimated against CBO's long-term projection of defense plans.⁴ (See Appendix D for additional details about how CBO developed costs for the alternatives.)

Alternatives That Would Increase the Size of the Army

CBO's first two alternatives illustrate the costs and effects associated with increasing the size of the Army. Many observers have suggested that a larger Army is needed to improve the Army's ability to deal with stressful missions such as the occupation of Iraq, respond to other threats that could arise during the occupation of Iraq, or reduce the stress on the reserve component. In the past year, the Secretary of Defense has authorized a temporary increase in the size of the Army (by 30,000 personnel), the Congress has authorized an increase of 20,000 active person-

nel, and many external observers have called for a larger Army.

Alternatives 1A and 1B would both increase the size of the Army by two divisions but do so in different ways. Alternative 1A would increase the overall size of the active Army, offering greater warfighting and peacekeeping capabilities at greater costs. Alternative 1B would increase the size of the active Army's combat forces by reducing some types of support units, offering greater warfighting and peacekeeping capabilities, but potentially increasing the risk associated with some types of missions.

CBO's alternatives specifically examined the effects of adding two divisions to the Army, but adding a single division or more than two divisions would involve similar considerations. CBO chose to consider the addition of two divisions because it is a relatively popular suggestion in public discussion.

Some observers have questioned whether the Army would be able to recruit sufficient personnel for additional forces. CBO did not analyze the potential likelihood that the Army might be incapable of recruiting additional personnel. In the 1980s, the Army was about 60 percent larger than it currently is, the national youth cohort was slightly smaller than it currently is, and the Army was able to recruit all of the personnel it required on a voluntary basis. However, in the 1980s, the United States was not engaged in large, ongoing military operations, and the prospect of being deployed to such operations might deter some fraction of potential enlistees from joining the Army.

Alternative 1A—Add Two Active Divisions

This alternative would increase the size of combat forces in the Army by adding two divisions with a total of six combat brigades to the active component. One of those new divisions would be a heavy division (with three heavy brigades), and the other would be a light division (with three light brigades). Overall, this option would add about 78,000 personnel to the Army—57,000 active and 21,000 reserve (see Table 2-6).

Those two divisions would require a total of about 29,000 additional active personnel. This option also would add the full range of support units associated with

3. Although discounting costs over time to generate the net present value of policy choices is a common analytic practice, CBO chose not to develop net-present-value calculations for this study. Although such calculations are generally appropriate for any stream of costs that vary over time, their use is rare in the context of national defense and would be difficult to compare with standard sources of information about DoD's budget.

4. Congressional Budget Office, *The Long-Term Implications of Current Defense Plans: Summary Update for Fiscal Year 2005* (September 2004).

Table 2-6.
Effects of Alternative 1A on the Size and Composition of the Army

	Active Component	Reserve Component	Total Army
Premodular Army			
Personnel	482,400	555,000	1,037,400
Corps	3	1	4
Divisions	10	8	18
Total Brigades	33	36	69
Supported brigades	33	22	55
Effects of Adding Two Active Divisions			
Personnel	+57,000	+21,000	+78,000
Corps	No change	No change	No change
Divisions	+2	No change	+2
Total Brigades	+6	No change	+6
Supported brigades	+6	No change	+6

Source: Congressional Budget Office.

two divisions (including corps support groups, corps artillery brigades, and so forth). Those support units would preserve the Army’s current mix of active- and reserve-component support units and would require about 12,000 additional active and 18,000 additional reserve personnel. This option also would increase the number of personnel assigned to the Army’s administrative units and the size of its individuals account by about 15,000 active and 3,000 reserve personnel to allow for increases in administrative workload and in the number of trainees, transients, holdees, and students.

Costs. Relative to the cost of maintaining the current force, CBO estimates the cost to implement this option would require an additional \$31 billion to provide the new divisions with current equipment and to continue modernizing them over the 2006-2022 projection period. It would also require just over \$95 billion in O&S and construction costs through 2022 and just under \$7 billion annually thereafter (see Table 2-7).

The primary benefit of this alternative would be to increase the Army’s ability to fight wars and to sustain ex-

tended deployments. Its primary disadvantage would be the costs associated with a larger force.

Effects. With additional divisions and combat brigades, the Army would be more capable of fighting multiple wars simultaneously (see Table 2-8). Adding divisions also would allow the Army to send more forces to any given conflict, thus increasing its chances of prosecuting conflicts successfully or succeeding more rapidly with fewer casualties.

The Army also would be more capable of sustaining extended deployments for peacekeeping missions (see Table 2-9). With more forces, the Army would be capable of sustaining a larger force deployed to any single commitment or maintaining a larger number of commitments overall. The additional forces available in this option would be roughly sufficient to assume one additional commitment of about the size of the U.S. commitment to Afghanistan. Alternatively, if the Army had a larger pool of units to draw upon for the same level of commitments, it would be able to rotate individual units and personnel through deployments at a lower pace, reducing stress on personnel and equipment. It would also be less

Table 2-7.
Effects of Alternative 1A on the Cost of the Army

(Billions of 2006 dollars)

	Total Costs			Annual Recurring Costs in 2022
	2006-2010	2006-2015	2006-2022	
Premodular Army				
Investment	129	334	605	n.a.
Operation and Support	398	826	1,488	99
Total	527	1,160	2,092	99
Effects of Adding Two Active Divisions				
Investment	+17	+19	+31	n.a.
Operation and Support	+21	+50	+95	+7
Total	+37	+69	+127	+7

Source: Congressional Budget Office.

Note: n.a. = not applicable.

Table 2-8.**Effects of Alternative 1A on the Army's Ability to Fight Wars**

	Current Force	Effects of Adding Two Active Divisions
Deployment for a Major Combat Operation		
Personnel	285,000	No change
Brigades	20	No change
Ratio of Support Personnel to Combat Personnel	1.76	No change
Reserve-Component Personnel Mobilized and Deployed	109,000	No change
Number of Major Combat Operations Possible		
Active Army only	1.65	+0.3
Total Army	2.75	+0.3
Deployment Time (Days)		
First brigade	14	No change
First division	20	No change
First corps	53	No change
First theater	102	No change

Source: Congressional Budget Office.

likely to have to mobilize National Guard combat units for peacekeeping missions, thus reducing the level of reserve mobilization that would be needed.

Increasing the size of the Army would not directly reduce the level of reserve mobilization the Army would need to fight wars or sustain extended deployments, since this alternative preserves the current level of active-component dependence on reserve EAD support units. An active combat force deployed to a theater of operations for conflict would still require mobilizing about the same number of reserve support units, and an extended deployment of any given size would still require about the same proportion of reserve units. Because this alternative would permit the Army to sustain larger forces deployed overseas for extended periods and would increase the size of the reserve component, more reserve personnel would need to be mobilized on average to maintain the maximum level of sustained deployment. (Sustaining the maximum deployment would also require additional reserve personnel to backfill for active units.) Conversely, the Army would be more likely to be able to meet any given level of commitment with active forces only, thus reducing the need for reserve-component mobilization.

Adding divisions to the Army, structured in the same manner as current forces, would not affect their ability to deploy.

Implications for the Modular Army. Although this alternative was measured against the premodular force structure, it would produce many of the same changes when applied to the modular Army. Adding two modular divisions would increase the Army's ability to fight wars (by providing additional combat forces) or sustain extended deployments (by increasing the pool of available units and personnel). Adding two modular divisions would also require additional personnel and increase costs for investment, O&S, and construction. Since the Army's modular divisions will be larger than premodularity divisions and include four brigades (versus three), adding two modular divisions would probably produce a larger benefit to warfighting and peacekeeping abilities but cost more in terms of required personnel and funding.

Alternative 1B—Add Two Active Divisions by Reducing Support Forces

This alternative would add two active-component divisions to the Army (as in the previous option) but would do so without appreciably increasing the overall size of the Army. Instead, it would make room for additional

Table 2-9.
Effects of Alternative 1A on the Army's Ability to Sustain Extended Deployments

	Active Army Only	Total Army
Premodular Army		
Maximum Sustained Deployment		
Personnel	89,000–111,000	111,000–138,000
Brigades	8.3–10.3	12.3–15.1
Reserve-Component Personnel Mobilized	52,000–57,000	86,000–90,000
Effects of Adding Two Active Divisions		
Maximum Sustained Deployment		
Personnel	+12,000–15,000	+12,000–14,000
Brigades	+1.5–1.9	+1.5–1.9
Reserve-Component Personnel Mobilized	+5,000	+4,000–5,000

Source: Congressional Budget Office.

combat units by eliminating some support units from the Army's current structure. Overall, this option would add about 6,000 active personnel to the Army (see Table 2-10).

This alternative would create the two additional active divisions by eliminating all short-range air-defense (SHORAD) units and some corps-level field artillery units from the Army's force structure while restructuring the remaining field artillery units. One of those new divisions would be a heavy division (with three heavy brigades), and the other would be a light division (with three light brigades). Specifically, this option:

- Eliminates all divisional, corps-, and theater-level SHORAD batteries and battalions;
- Eliminates all corps-level self-propelled howitzer artillery battalions and brigades;
- Eliminates the support units associated with the eliminated SHORAD and field artillery units;
- Restructures divisional self-propelled howitzer field artillery battalions into eight-gun batteries;

- Restructures divisional and corps-level rocket-launcher artillery battalions into nine-launcher batteries;
- Reduces the level of logistics units associated with supplying field artillery units; and
- Adds one light and one heavy division, along with EAD support units.

CBO chose to eliminate those support units because, according to some observers, they may not be needed and because the Army has taken some steps along those lines as part of its current reorganization. The reorganization of field artillery batteries into larger-sized batteries would change the Army from its current six-gun/six-launcher pattern of organization, which was adopted in 1995. Reverting to the prior pattern for artillery would eliminate a large number of headquarters batteries, battalions, and brigades (by having fewer, larger units). The justification for eliminating corps-level artillery brigades would be that precision munitions have vastly improved artillery

Table 2-10.
Effects of Alternative 1B on the Size and Composition of the Army

	Active Component	Reserve Component	Total Army
Premodular Army			
Personnel	482,400	555,000	1,037,400
Corps	3	1	4
Divisions	10	8	18
Total Brigades	33	36	69
Supported brigades	33	22	55
Effects of Adding Two Active Divisions by Reducing Support Forces			
Personnel	+6,000	No change	+6,000
Corps	No change	No change	No change
Divisions	+2	No change	+2
Total Brigades	+6	No change	+6
Supported brigades	+6	No change	+6

Source: Congressional Budget Office.

Table 2-11.
Effects of Alternative 1B on the Cost of the Army

(Billions of 2006 dollars)

	Total Costs			Annual Recurring Costs in 2022
	2006-2010	2006-2015	2006-2022	
Premodular Army				
Investment	129	334	605	n.a.
Operation and Support	398	826	1,488	99
Total	527	1,160	2,092	99
Effects of Adding Two Active Divisions by Reducing Support Forces				
Investment	+16	+19	+34	n.a.
Operation and Support	+7	+12	+20	+1
Total	+23	+31	+54	+1

Source: Congressional Budget Office.

Note: n.a. = not applicable.

capability to the extent that fewer cannons are needed to produce the same effect.⁵ Reducing the level of logistics units associated with supplying field artillery units would be in line with a historical trend toward lower rates of artillery fire.⁶

CBO estimates that eliminating SHORAD units would free up about 14,000 personnel positions, and eliminating the field artillery units would free up about 16,000 personnel positions. Reductions in support forces would free up another 20,000 personnel positions, yielding

5. The use of precision munitions, such as the Excalibur cannon round, or the Guided Multiple Launch Rocket System round that the Army is currently introducing, should greatly reduce the number of rounds the Army will need to fire to destroy any target on the battlefield. Experience with such munitions in other contexts (such as the Air Force's Joint Direct Attack Munition guided bomb kit) indicates that that effect reduces the need for launch or firing platforms, since each such platform can effectively "service" a larger number of targets.

6. Many of those points about field artillery are made in more detail in Office of the Secretary of Defense, *Achieving a Transformation in Fire Support: Report to the Congress on Indirect-Fire Systems* (June 2002).

50,000 personnel positions that could be used to create additional combat forces and their support units. In this option, creating two new divisions would require about 54,000 personnel slots, slightly more than the number of personnel slots freed up.⁷ Allowing for increased numbers of overhead positions, creating two new divisions in that manner would require 6,000 more active personnel.

Costs. Implementing this option would cost an additional \$34 billion to provide the new divisions with today's equipment and to continue modernizing them over the 2006-2022 period.⁸ It would increase the Army's O&S costs by \$20 billion over that same period and by just over \$1 billion annually thereafter (see Table 2-11).

Effects. The primary benefit of this alternative would be to increase the Army's ability to fight wars and to sustain extended deployments, in a manner similar to Alternative 1A (see Tables 2-12 and 2-13). Its primary disadvantage would be the potential risks the Army would face in conducting operations with a significant aerial threat to Army forces or operations that required high volumes of cannon artillery fire.

The benefits in this option are virtually identical to those in Alternative 1A. The slight reduction in personnel available to sustain extended deployments (compared with the change produced by Alternative 1A) and the reduction in personnel associated with conducting a major combat operation both result from this option's somewhat smaller divisions and EAD support units. As such, under this option, the 20-brigade notional major combat operation force would require fewer personnel. Similarly, the size of the pool of units and personnel available for sustaining extended deployments is somewhat smaller.⁹

7. In this alternative, two divisions and their EAD support units require 54,000 personnel, compared with the 59,000 personnel required in the previous option. Each division and its associated EAD support units require fewer personnel than in Alternative 1A because the new divisions, like all other divisions in this option, would not have SHORAD units but would have the restructured field artillery.

8. Investment costs are higher for this option because CBO increased purchases of precision munitions to compensate for the reduction in artillery units.

9. The size of that reduction is, however, limited by the fact that CBO did not consider EAD air defense or field artillery units useful for peacekeeping. Thus, eliminating some of those units would not reduce the pool of units the Army could draw on for sustaining extended deployments.

Table 2-12.**Effects of Alternative 1B on the Army's Ability to Fight Wars**

	Current Force	Effects of Adding Two Active Divisions by Reducing Support Forces
Deployment for a Major Combat Operation		
Personnel	285,000	-21,000
Brigades	20	No change
Ratio of Support Personnel to Combat Personnel	1.76	-0.15
Reserve-Component Personnel Mobilized and Deployed	109,000	-1,000
Number of Major Combat Operations Possible		
Active Army only	1.65	+0.3
Total Army	2.75	+0.3
Deployment Time (Days)		
First brigade	14	No change
First division	20	No change
First corps	53	-6
First theater	102	-7

Source: Congressional Budget Office.

This alternative would increase the active Army's dependence on the reserve component slightly. The positions freed up by reducing support units would come disproportionately from reserve units (35,000 of the 50,000 positions). Creating two new active-component divisions using those positions would require transferring about 19,000 positions from active EAD support units to the reserve component. Because of that transfer of personnel, this alternative would require higher levels of reserve mobilization to support extended deployments (compared with either the current force or with Alternative 1A).

This option would improve the speed with which the Army could deploy forces overseas. Each division and its associated EAD support units would be slightly smaller and have less equipment to transport. With less equipment to move, units would be able to finish deploying faster than the current force could.

Implications for the Modular Army. Although this alternative was measured against the premodularity force structure, it would probably produce many of the same changes when applied to the Army's new modular structure. Adding two modular divisions would increase the Army's ability to fight wars (by providing additional combat forces) or sustain extended deployments (by increas-

ing the pool of available units and personnel). Adding two modular divisions would also require additional personnel and would increase costs for investment, operations and support, and construction. The Army's modular divisions will be larger than premodularity divisions and include four brigades (versus three), but CBO does not know what EAD support units those divisions will require. Some of the changes in the modular division, such as eliminating the divisional SHORAD battalion and returning to an eight-gun artillery battery, suggest that the Army may be able to create some of the additional brigades associated with modularity by eliminating support units in a fashion similar to this alternative.

Alternatives That Would Reduce Dependence on the Reserve Component

CBO's second two alternatives illustrate the costs and effects associated with reducing the active Army's dependence on mobilizing reserve units to support active combat units. That dependence has been the focus of sustained public and Congressional concerns since the mid-to late 1990s, when increased numbers of reserve personnel were mobilized to assist in a number of extended deployments (including Bosnia, Kosovo, and Operations

Table 2-13.
Effects of Alternative 1B on the Army's Ability to Sustain Extended Deployments

	Active Army Only	Total Army
Premodular Army		
Maximum Sustained Deployment		
Personnel	89,000–111,000	111,000–138,000
Brigades	8.3–10.3	12.3–15.1
Reserve-Component Personnel Mobilized	52,000–57,000	86,000–90,000
Effects of Adding Two Active Divisions by Reducing Support Forces		
Maximum Sustained Deployment		
Personnel	+10,000–13,000	+10,000–12,000
Brigades	+1.5–1.9	+1.5–1.9
Reserve-Component Personnel Mobilized	+11,000–12,000	+10,000–11,000

Source: Congressional Budget Office.

Northern Watch and Southern Watch to enforce the no-fly zones over Iraq). The war on terrorism, particularly the occupation of Iraq, has greatly increased the levels of reserve mobilization needed to assist in military operations. That mobilization, however, is frequently disruptive and unwelcome to reserve personnel, can potentially interfere with the National Guard's state missions, and is seen by some observers as inconsistent with the spirit and mission of the reserve components.

Alternatives 2 and 3 would both effectively eliminate the need to deploy reserve EAD units to support active combat units in sustained deployments. Alternative 2 would reallocate EAD support units between the active and reserve components, thus eliminating reserve mobilization for peacekeeping efforts, whereas Alternative 3 would create sufficient active EAD support units for the entire active force, thus eliminating reserve mobilization for both peacekeeping and major combat operations.

Implementing those alternatives, however, would not preclude several situations where reserve personnel would need to be mobilized, either for peacekeeping operations

or for major combat operations. For example, the Army might need to mobilize National Guard combat forces for very stressful combat operations or for very large sustained deployments (as the Army is currently doing in Iraq). Further, as discussed previously, the Army routinely mobilizes reserve personnel to backfill for deployed active-duty units.

Alternative 2—Reallocate Support Forces Between the Active and Reserve Components

This alternative would eliminate the active Army's dependence on reserve support units for peacekeeping by shifting support units between the active and reserve components of the Army. Support units that are crucial in extended peacekeeping operations, such as military police, military intelligence, or civil affairs, would be transferred from the reserve component to the active component to minimize the need to mobilize reserve personnel to sustain extended deployments. To offset the shift in support units to the active component, units that are not essential to extended peacekeeping operations, such as field artillery, attack aviation, or air-defense artillery, would be transferred from the active component to the reserve component. Overall, this option would add about 28,000 active personnel to the Army and reduce reserve personnel by 24,000 (see Table 2-14).

This alternative would make a distinction between units that are needed to support extended deployments and those that are not. Historically, the Army has deployed about 40,000 personnel to a combat theater for every division it has deployed, reflecting the size of the full "slice" of support units the Army needs for high-intensity combat operations. In peacekeeping operations, however, which generally require less sustained combat, several forms of support units (primarily those intended to augment the firepower of combat divisions) are not as necessary. In addition, those operations place much lower demands on the Army's logistics system and require fewer support units to provide adequate logistics supplies. (Peacekeeping operations also allow the Army to augment its logistics capabilities with civilian contractors.) Because all Army forces are tailored to their specific missions, however, the level of support forces that would be provided in any given peacekeeping operation may vary. The occupation of Iraq involves significantly more intense combat than the stabilization force in Kosovo, for example, and thus, Army units in Iraq receive more support units than those in Kosovo. CBO's distinction between

Table 2-14.
Effects of Alternative 2 on the Size and Composition of the Army

	Active Component	Reserve Component	Total Army
Premodular Army			
Personnel	482,400	555,000	1,037,400
Corps	3	1	4
Divisions	10	8	18
Total Brigades	33	36	69
Supported brigades	33	22	55
Effects of Reallocating Active and Reserve Support Forces			
Personnel	+28,000	-24,000	+4,000
Corps	No change	No change	No change
Divisions	No change	No change	No change
Total Brigades	No change	No change	No change
Supported brigades	No change	No change	No change

Source: Congressional Budget Office.

units needed only for warfighting and those needed for both peacekeeping and warfighting is intended to represent a typical level for sustained deployments.

In this alternative, the entire set of EAD units necessary to support active combat units in peacekeeping missions would be in the active component. The remaining EAD support units needed for those divisions, which would be primarily deployed for warfighting missions, would be entirely in the reserve component. This option would not change the level of reserve mobilization the Army would require for major combat operations (where both sets of units are needed) but would eliminate the need to mobilize reserve EAD support units for active combat forces to sustain extended deployments. Because the size of the set of EAD support units needed for active combat forces is larger than the number of personnel spaces available in the active component, this alternative would shift 20,000 personnel spaces from the reserve component to the active component. Allowing for changes in the number of overhead positions required for the different component, this option results in an increase of 28,000 active personnel and a reduction of 24,000 reserve personnel.

Costs. Implementing this option would not change the Army’s investment program over the 2006-2022 period, since it would not create or eliminate any units—only shift units between components. The alternative would increase the Army’s operation and support costs by \$27 billion over that same period and by nearly \$2 billion annually thereafter (see Table 2-15).

Effects. The primary benefit of this alternative would be to reduce the Army’s need to mobilize and deploy reserve personnel to support active combat forces in extended deployments. Its primary disadvantages would be the costs associated with adding active-component personnel, the need for potentially time-consuming reserve-component mobilization of many types of EAD support units in wartime, and potential inefficiencies in the personnel process.

Implementing this option would have essentially no effect on the Army’s ability to either fight wars or sustain extended deployments (see Tables 2-16 and 2-17). It does not create or eliminate any units but instead swaps units between the active and reserve components, leaving the

Table 2-15.
Effects of Alternative 2 on the Cost of the Army

(Billions of 2006 dollars)

	Total Costs			Annual Recurring Costs in 2022
	2006-2010	2006-2015	2006-2022	
Premodular Army				
Investment	129	334	605	n.a.
Operation and Support	398	826	1,488	99
Total	527	1,160	2,092	99
Effects of Reallocating Active and Reserve Support Forces				
Investment	No Change	No Change	No Change	n.a.
Operation and Support	+9	+16	+27	+2
Total	+9	+16	+27	+2

Source: Congressional Budget Office.

Note: n.a. = not applicable.

Table 2-16.**Effects of Alternative 2 on the Army's Ability to Fight Wars**

	Current Force	Effects of Reallocating Active and Reserve Support Forces
Deployment for a Major Combat Operation		
Personnel	285,000	No change
Brigades	20	No change
Ratio of Support Personnel to Combat Personnel	1.76	No change
Reserve-Component Personnel Mobilized and Deployed	109,000	No change
Number of Major Combat Operations Possible		
Active Army only	1.65	No change
Total Army	2.75	No change
Deployment Time (Days)		
First brigade	14	No change
First division	20	No change
First corps	53	No change
First theater	102	No change

Source: Congressional Budget Office.

total Army's set of units unchanged. The Army would still have access to all of the same combat divisions and the same set of support units.

This alternative would reduce the Army's need to mobilize and deploy reserve personnel to support active units. For an extended deployment that used the entire active Army's combat forces, the Army would need to mobilize, on average, 30,000 to 35,000 reserve personnel, compared with the 52,000 to 57,000 personnel the current force would need to mobilize (see Table 2-17). The vast majority of those mobilized personnel would provide backfill for deployed active units and would not be deployed overseas. The remaining reserve personnel, who would be mobilized and deployed for extended deployments, would be associated with National Guard special forces groups or other specialized communities and would not be needed to support active combat forces.¹⁰

10. Special forces groups, for example, are not a required part of a combat division's support package. Instead, they are employed independently. Employing those units is a separate policy decision from employing conventional combat units. Given the utility of special forces in stabilization and reconstruction missions, those forces would presumably be employed to sustain any extended deployment.

This alternative would not reduce the Army's need to mobilize reserve personnel to engage in major combat operations. For such operations, the Army would need to mobilize and deploy EAD support units from the reserve component for warfighting, and the number of personnel affected would be the same as for the current force.

This alternative would not directly affect deployment timelines, since the weight of the equipment that has to be transported is not affected by whether the unit is in the active or reserve component. But this option might indirectly affect deployment timelines because many types of support units would exist only in the reserve component, and reserve units typically require at least a month for mobilization. However, that situation is already the case under the Army's current structure for some types of units (such as civil affairs units).

This option has the potential to cause some problems for the reserve personnel systems. Currently, the reserve components recruit former active-duty personnel, and such recruits (with prior service) make up a significant portion of the reserves' personnel. Such personnel are attractive, in part, because they have already completed the military training the reserves require. However, if entire classes of units were concentrated in one component almost exclu-

Table 2-17.
Effects of Alternative 2 on the Army’s Ability to Sustain Extended Deployments

	Active Army Only	Total Army
Premodular Army		
Maximum Sustained Deployment		
Personnel	89,000–111,000	111,000–138,000
Brigades	8.3–10.3	12.3–15.1
Reserve-Component Personnel Mobilized	52,000–57,000	86,000–90,000
Effects of Reallocating Active and Reserve Support Forces		
Maximum Sustained Deployment		
Personnel	+1,000	+1,000
Brigades	No change	No change
Reserve-Component Personnel Mobilized	-22,000	-22,000

Source: Congressional Budget Office.

sively, the reserve component would be less able to recruit prior service members with the appropriate training. Similarly, personnel with prior service would be less able to find a unit requiring skills that they already had and would need to be retrained, or they might find the idea of starting a new military specialty unappealing. CBO was unable to assess the likelihood or magnitude of that potential issue.

Implications for the Modular Army. Although this alternative was measured against the premodularity force structure, its reallocation of support forces to reduce the active Army’s dependence on the reserves may well apply to a modular Army. The Army has already been engaged in a limited rebalancing of support forces, for example, by retraining National Guard field artillery battalions as military police units. However, the Army has not announced details about the modular Army’s EAD support structure. If, as seems probable, the increased number of combat units in the modular Army forces the Army to rely more heavily on reserve combat forces, then the modular Army will require even more reserve personnel to be mobilized to support extended deployments. In that case, the mod-

ular Army would also benefit from reallocating support forces, but the number of personnel positions that would have to be transferred from the reserve to the active component would be even greater.

Alternative 3—Eliminate the Army’s Dependence on Reserve Support Units by Increasing the Size of the Active Army

This option would eliminate the active-component Army’s dependence on reserve-component support units for peacekeeping and warfighting by adding enough personnel to the active Army to create support units for all of its combat units. That action would effectively terminate the Total Force Policy and sever the tight operational linkage between components that the Army has maintained for the past three decades. Under this alternative, the active Army would be able to engage in the full range of military operations without needing to mobilize and deploy reserve personnel. Overall, implementing this option would add about 312,000 active personnel to the Army and eliminate 260,000 reserve personnel (see Table 2-18).

Table 2-18.
Effects of Alternative 3 on the Size and Composition of the Army

	Active Component	Reserve Component	Total Army
Premodular Army			
Personnel	482,400	555,000	1,037,400
Corps	3	1	4
Divisions	10	8	18
Total Brigades	33	36	69
Supported brigades	33	22	55
Effects of Increasing the Active Army’s Size			
Personnel	+312,000	-260,000	+52,000
Corps	+1	-1	No change
Divisions	No change	No change	No change
Total Brigades	+2	-1	+1
Supported brigades	+2	-1	+1

Source: Congressional Budget Office.

Table 2-19.
Effects of Alternative 3 on the Cost of the Army

(Billions of 2006 dollars)

	Total Costs			Annual Recurring Costs in 2022
	2006-2010	2006-2015	2006-2022	
Premodular Army				
Investment	129	334	605	n.a.
Operation and Support	398	826	1,488	99
Total	527	1,160	2,092	99
Effects of Increasing the Active Army's Size				
Investment	No Change	No Change	No Change	n.a.
Operation and Support	+51	+158	+333	+26
Total	+51	+158	+333	+26

Source: Congressional Budget Office.

Note: n.a. = not applicable.

In this alternative, the size of the active Army would be increased to create the entire set of warfighting and peacekeeping EAD units needed to support active Army combat units. The corresponding reserve-component EAD units that were previously intended to support active units would be eliminated. In addition, this option would:

- Transfer all units associated with I Corps from the reserve component to the active component.
- Transfer the 278th Armored Cavalry Regiment from the reserve component to the active component.
- Convert the 11th Armored Cavalry Regiment from a mixed-component unit to a fully active-component unit.
- Transfer both National Guard special forces groups from the reserve component to the active component.

Those transfers would result in an active Army with four active corps, an active ACR for each corps, and 35 fully

supported combat brigades, all with active-component support units.

Costs. Implementing this option would not change the Army's investment program over the 2006-2022 period, since it would not create or eliminate any units. It would increase the Army's O&S costs by about \$333 billion over the same period and by about \$26 billion annually thereafter (see Table 2-19).

The primary benefit of this alternative would be to eliminate the Army's need to mobilize and deploy reserve personnel to support active combat forces, either for major combat operations or in extended deployments. Its primary disadvantage would be the costs associated with adding active-component personnel.

Effects. This option would not change the Army's ability to fight wars. It would not create or eliminate any units but instead swap units between the active and reserve components, leaving the total Army's set of units unchanged (see Table 2-20). The Army would still have access to all of the same combat divisions and the same set of support units.¹¹

However, this option would improve the Army's ability to support extended deployments (see Table 2-21). The number of soldiers the Army can sustain in extended deployments is limited by the policy that reserve personnel cannot be deployed as frequently as active-component personnel can be. In this option, transferring a corps, the ACRs, and the special forces groups to the active component allows those units to rotate through deployments at the higher rate for active personnel rather than the lower rate for reserve personnel.

This alternative would eliminate the Army's need to mobilize and deploy reserve personnel to support active units. For an extended deployment that used the entire

11. The net increase of one combat brigade in this option reflects converting the 11th ACR to a fully active unit. Currently, the 11th ACR has an active portion, which normally is assigned the mission of Opposing Force at the Army's National Training Center, and a reserve-component support portion. Because of that mission and structure, CBO followed Army practice and did not generally count the 11th ACR as a combat unit. In this option, however, the unit would be converted to a fully active unit capable of being employed in the same manner as any other ACR. CBO transferred the ACRs to the active component to allow the active Army to have the one ACR per corps that Army doctrine requires.

Table 2-20.**Effects of Alternative 3 on the Army's Ability to Fight Wars**

	Current Force	Effects of Increasing the Active Army's Size
Deployment for a Major Combat Operation		
Personnel	285,000	No change
Brigades	20	No change
Ratio of Support Personnel to Combat Personnel	1.76	No change
Reserve-Component Personnel Mobilized and Deployed	109,000	-109,000
Number of Major Combat Operations Possible		
Active Army only	1.65	+0.1
Total Army	2.75	+0.05
Deployment Time (Days)		
First brigade	14	No change
First division	20	No change
First corps	53	No change
First theater	102	No change

Source: Congressional Budget Office.

active Army's combat forces, the Army would need to mobilize, on average, 22,000 to 27,000 reserve personnel, compared with the 52,000 to 57,000 personnel the current force would need to mobilize (see Table 2-21). All the personnel who were mobilized would be used to provide backfill for deployed active units and would not be deployed overseas.

If the Army needed to mobilize and deploy National Guard combat forces, either for a very stressful major combat operation or to sustain a very large extended deployment, it would still need to mobilize and deploy reserve personnel. But even under those circumstances, the number of reserve personnel mobilized and deployed would generally be greatly reduced from the levels associated with the current force.

This alternative would not directly affect deployment timelines because the weight of the equipment that has to be transported would be the same whether the unit was in the active or reserve component. This option might indirectly affect deployment timelines, however, because it places all EAD support units for active forces in the active component, thus eliminating the need for potentially time-consuming post-mobilization activities. However, the Army has been able, in the past, to deploy active support units first and complete post-mobilization activi-

ties for reserve units in a timely manner. Therefore, the link between the time required to mobilize reserve units and the time required to deploy Army forces is unclear.

Implications for the Modular Army. Although this alternative was measured against the premodularity force structure, the creation of a full set of active support forces to eliminate the active Army's dependence on the reserve component would also be possible under the Army's new modular structure. Although the Army has not announced details of the modular Army's EAD support structure, the modular Army will have more active combat units and thus will probably need to rely more heavily on reserve combat forces to support major combat operations or extended deployments. As such, the modular Army would also benefit from having a full set of active support forces, but the size of the increase in the number of active personnel positions that would be required to establish those units (and the corresponding decrease in the number of reserve-personnel positions that would be required) would be even greater.

This alternative would eliminate the active Army's dependence on the reserve component by adding sufficient personnel to the active Army to allow it to create a full set of EAD support units for all of its combat units. It does so while holding the active combat unit force structure con-

Table 2-21.
Effects of Alternative 3 on the Army's Ability to Sustain Extended Deployments

	Active Army Only	Total Army
Premodular Army		
Maximum Sustained Deployment		
Personnel	89,000–111,000	111,000–138,000
Brigades	8.3–10.3	12.3–15.1
Reserve-Component Personnel Mobilized	52,000–57,000	86,000–90,000
Effects of Increasing the Active Army's Size		
Maximum Sustained Deployment		
Personnel	+10,000–12,000	+9,000–11,000
Brigades	+0.5–0.6	+0.4–0.5
Reserve-Component Personnel Mobilized	-30,000	-32,000

Source: Congressional Budget Office.

stant. Conversely, a potential variation on this option would remove enough combat units from the Army's force structure to eliminate the active Army's dependence on the reserves while holding the number of personnel in the Army constant. If the option were implemented in that way, the Army would have to eliminate one active corps, four active divisions, and 13 active combat brigades. Although CBO did not examine the costs and full effects of that approach, such cuts in combat forces available to the Army would produce significant reductions in the Army's ability to conduct major combat operations or sustain extended deployments.

Alternatives That Would Create New Types of Units

The last four alternatives all restructure the Army but in ways that emphasize different types of units and thus reflect a variety of concerns and proposals. The Army has frequently reorganized its units in the past, creating new types of units or engaging in large-scale organizational reform. Such reorganizations are generally associated with either evolving concepts about how to best fight wars or

changes in U.S. military strategy that emphasize different potential opponents or types of wars.¹² In recent years, public debate and various defense experts have considered potential reorganizations that would improve various aspects of the Army in response to perceived shifts in war-fighting methods and national strategies.

The Army's current modularity reorganization is one version of plans to restructure the Army by creating new types of units. To some degree, all of the options CBO examined present ways to reorganize the Army by creating different, nonmodular types of units. However, modular units will have many similarities to current units, and all of the restructuring plans CBO analyzed have elements that would also be applicable to a modular Army.

The last four alternatives CBO analyzed are intended to show how the Army could be restructured with new units to meet different visions of how future conflicts will be waged and what types of conflicts the United States may need to engage in. Alternative 4, which would create peacekeeping divisions, is intended to illustrate the potential to restructure the Army to focus more on stabilization and reconstruction missions. Such missions have consumed a large and increasing share of the Army's forces in recent years and are arguably central to current U.S. national strategy. Alternative 5, which attempts to implement the ideas of retired Army Colonel Douglas MacGregor by creating a brigade-based Army, is intended to illustrate the potential for the heavy forces of today's Army to operate more rapidly and more independently. Those ideas were arguably influential in the Army's current modularity plan and respond to the perception that the Army's heavy forces are not well suited to the fast pace of modern warfare. Alternative 6, which would create expeditionary forces, is intended to illustrate the potential to greatly improve the speed with which the Army can deploy to distant theaters. The time required to deploy U.S. forces has been of concern to DoD and many defense experts since Operation Desert Storm, and reducing that time is widely considered to be crucial to future U.S. strategy. Finally, Alternative 7, which would create trans-

12. Combat Studies Institute, *Sixty Years of Reorganizing for Combat: A Historical Trend Analysis*, Report No. 14 (Fort Leavenworth, Kan.: U.S. Army Command and General Staff College, December 1999); and John B. Wilson, *Maneuver and Firepower: The Evolution of Divisions and Separate Brigades*, Army Lineage Series (Washington, D.C.: U.S. Army Center of Military History, 1998).

Table 2-22.
Effects of Alternative 4 on the Size and Composition of the Army

	Active Component	Reserve Component	Total Army
Premodular Army			
Personnel	482,400	555,000	1,037,400
Corps	3	1	4
Divisions	10	8	18
Total Brigades	33	36	69
Supported brigades	33	22	55
Effects of Organizing S&R Divisions			
Personnel	-2,000	-9,000	-11,000
Corps	No change	No change	No change
Divisions	-2	No change	-2
Total Brigades	-6	No change	-6
Supported brigades	-6	No change	-6

Source: Congressional Budget Office.

Note: S&R = stabilization and reconstruction.

formational forces, is intended to illustrate what a small, light force that depends on long-range, precision-guided firepower would look like. Those attributes form some of the core themes of the idea of military transformation that has become central to most debates about the future of the U.S. military.

Alternative 4—Organize Stabilization and Reconstruction Divisions

This option would convert two active Army divisions into dedicated peacekeeping divisions. It is based on a proposal from the National Defense University that describes the organization and structure of a potential stabilization and reconstruction (S&R) division.¹³ Those S&R divisions would include military police, engineer, medical, civil affairs, and psychological operations units, all of which have been in high demand for peacekeeping

13. Hans Binnendijk and Stuart Johnson, eds., *Transforming for Stabilization and Reconstruction Operations* (National Defense University, Center for Technology and National Security Policy, November 12, 2003).

operations, along with a single medium-weight Stryker brigade. This option would eliminate one heavy and one light infantry division from the active component (along with their associated EAD support units) and would create four active-component S&R divisions and one reserve component S&R division. Overall, implementing this option would reduce the Army’s active personnel by 2,000 and reserve personnel by 9,000 (see Table 2-22).

Costs. Implementing this option would reduce the costs for the Army’s investment program by \$14 billion over the 2006-2022 period, since the Army would have fewer combat divisions that would need to be modernized. It also would reduce the Army’s O&S costs by \$18 billion over the same period and by about \$1 billion annually thereafter because the S&R divisions would have lower costs than combat divisions do (see Table 2-23).

The primary benefit of this alternative would be to provide the Army with dedicated peacekeeping forces specializing in the sorts of missions associated with extended deployments. Its primary disadvantage would be the reduction in combat forces.

Table 2-23.
Effects of Alternative 4 on the Cost of the Army

(Billions of 2006 dollars)

	Total Costs			Annual Recurring Costs in 2022
	2006-2010	2006-2015	2006-2022	
Premodular Army				
Investment	129	334	605	n.a.
Operation and Support	398	826	1,488	99
Total	527	1,160	2,092	99
Effects of Organizing S&R Divisions				
Investment	+2	-3	-14	n.a.
Operation and Support	-4	-10	-18	-1
Total	-2	-13	-32	-1

Source: Congressional Budget Office.

Note: n.a. = not applicable; S&R = stabilization and reconstruction.

Table 2-24.**Effects of Alternative 4 on the Army's Ability to Fight Wars**

	Current Force	Effects of Organizing S&R Divisions
Deployment for a Major Combat Operation		
Personnel	285,000	No change
Brigades	20	No change
Ratio of Support Personnel to Combat Personnel	1.76	No change
Reserve-Component Personnel Mobilized and Deployed	109,000	No change
Number of Major Combat Operations Possible		
Active Army only	1.65	-0.3
Total Army	2.75	-0.3
Deployment Time (Days)		
First brigade	14	No change
First division	20	No change
First corps	53	No change
First theater	102	No change

Source: Congressional Budget Office.

Note: S&R = stabilization and reconstruction.

Effects. With fewer divisions and combat brigades, the Army would be less capable of fighting multiple wars simultaneously (see Table 2-24). It also might have to send fewer forces to any given conflict. Alternatively, if the Army had significant peacetime commitments, it might have to abandon some of those commitments during a conflict because of high-priority combat needs.

This option would slightly increase the Army's ability to sustain extended deployments for peacekeeping missions (see Table 2-25). The additional S&R divisions increase the pool of personnel and units available for rotations to extended deployments, but that increase only slightly offsets the decrease produced by eliminating two combat divisions and their EAD support units. The overall size of the Army would not change significantly in this option; the increase in personnel that the Army could sustain on extended deployments comes from converting EAD support units that would not have been used in peacekeeping into S&R units that would be. However, since such units form only a fraction of all of the units involved in two combat divisions and their full set of EAD support units, the benefit of converting them is limited.

The mix of soldiers and units in each S&R division might be qualitatively superior to the Army's current combat

forces for peacekeeping missions, given their specialties and the historic demand for such types of units in those missions. Historically, the Army has treated S&R missions as a limited subset of the full range of missions that combat units may face and must be prepared to conduct. However, many observers and military personnel have argued that the missions and equipment of many combat units are inappropriate for S&R missions, which frequently require skills similar to those of police forces. They believe the Army's more powerful combat units, with their heavy armor and firepower, are poorly suited to patrol neighborhoods, develop contacts with the local civilian population, provide essential services (such as public works), or conduct other duties associated with peacekeeping. In contrast, units such as civil affairs (which are trained to establish basic governing structures for occupied civilian populations) or construction engineers (which are trained to engage in various construction and civil engineering tasks) are more useful in peacekeeping settings than armored battalions. However, S&R missions historically have stressed establishing secure conditions in an area as the precondition for successful stabilization and reconstruction efforts. In this view, the Army's combat units are more capable of establishing secure conditions than are support units, which often require combat units to protect them in insecure environments. CBO

Table 2-25.

Effects of Alternative 4 on the Army's Ability to Sustain Extended Deployments

	Active Army Only	Total Army
Premodular Army		
Maximum Sustained Deployment		
Personnel	89,000–111,000	111,000–138,000
Brigades	8.3–10.3	12.3–15.1
Reserve-Component Personnel Mobilized	52,000–57,000	86,000–90,000
Effects of Organizing S&R Divisions		
Maximum Sustained Deployment		
Personnel	+1,000	+2,000–3,000
Brigades	-1.5–1.9	-1.5–1.9
Reserve-Component Personnel Mobilized	-3,000–4,000	-1,000–2,000

Source: Congressional Budget Office.

Note: S&R = stabilization and reconstruction.

was unable to quantitatively assess what mix of types of units might be most effective in peacekeeping.

This option would produce a slight decrease in the level of reserve mobilization needed to sustain extended deployments, since each active S&R division could be deployed without the reserve support units associated with combat divisions. However, that reduction would be lessened if the Army needed to mobilize and deploy the reserve-component S&R division.

Adding peacekeeping divisions to the Army would not affect the ability of Army forces to deploy. Although the S&R divisions are structured differently from Army combat forces—for example, they have less equipment to transport—S&R divisions would not be sent to a major combat operation. Such formations might be deployed after a major combat operation or even during combat operations, but the speed with which the Army could deploy any given set of combat units to a theater would not be affected by the composition of the follow-on S&R divisions.

Implications for the Modular Army. Although this alternative was measured against the premodularity force structure, its creation of dedicated peacekeeping formations by eliminating some combat formations would also be possible for a modular Army. Since the Army's modular divisions will be larger than premodularity divisions, a modular Army would be able to create slightly more S&R forces by eliminating combat forces, but the overall effect of trading combat forces for peacekeeping forces would be similar.

Alternative 5—Convert to a Brigade-Based Army

This option would reorganize the Army in the manner suggested by Colonel MacGregor by eliminating higher-level command structures and organizing the Army into a number of autonomous brigade-sized combat groups.¹⁴ It would eliminate divisions and corps (and the traditional support structures associated with them) and create a set of 25 large, semiautonomous, brigade-sized combat groups for the active component. Types of support currently provided by higher-echelon formations would instead come from a mix of support groups. This alternative would not change the number of active personnel in the Army but would reduce reserve personnel by 383,000 (see Table 2-26).

This option would eliminate all currently existing divisions and brigades, all corps, and the Army's theater-level structures. It would replace those units with the following units (all composed entirely of active personnel):

- Three light reconnaissance strike groups, similar to the light cavalry configuration of the Army's 2nd ACR;
- Nine airborne/air assault groups similar to brigades of the Army's 101st Air Assault Division;
- Thirteen combat maneuver groups, similar to the heavy cavalry configuration of the Army's 3rd ACR;

14. Douglas A. MacGregor, *Breaking the Phalanx: A New Design for Landpower in the 21st Century* (Westport, Conn.: Praeger Publishers, 1997), and *Transformation Under Fire: Revolutionizing How America Fights* (Westport, Conn.: Praeger Publishers, 2003). It should be noted that this alternative addresses only a relatively small subset of the reforms Colonel MacGregor proposes. CBO was unable to evaluate the extensive discussion of changes in Army warfighting doctrine, culture, or personnel policies that Colonel MacGregor believes would be at least as important as, if not much more important than, the organizational changes discussed in this study.

Table 2-26.
Effects of Alternative 5 on the Size and Composition of the Army

	Active Component	Reserve Component	Total Army
Premodular Army			
Personnel	482,400	555,000	1,037,400
Corps	3	1	4
Divisions	10	8	18
Total Brigades	33	36	69
Supported brigades	33	22	55
Effects of Converting to a Brigade-Based Army			
Personnel	No change	-383,000	-383,000
Corps	n.a.	n.a.	n.a.
Divisions	n.a.	n.a.	n.a.
Total Brigades	-8	-32	-40
Supported brigades	-8	-18	-26

Source: Congressional Budget Office.

Note: n.a. = not applicable.

- Nine aviation combat groups, similar to the Army's corps-level aviation brigades;
- Six air-and-missile-defense groups, equipped with Patriot and Terminal High Altitude Area Defense missile;
- Six command-and-intelligence groups—composite units with signals, military intelligence, and psychological operations units;
- Three chemical-response groups, intended to help respond to biological or chemical warfare;
- Three early-deploying support groups, to provide logistics functions;
- Four engineer groups, to provide engineering support; and
- Five late-deploying support groups, to provide more robust logistics functions.

This option would also create the following units in the reserve component:

- Two air assault groups;
- Two combat maneuver groups;
- Five aviation groups;
- One air-and-missile-defense group;
- One command-and-intelligence group;
- Two engineer groups; and
- Five later-deploying support groups.

Because this option would create a full set of combat and support units using active-personnel positions freed up by eliminating the active Army's existing units, active combat forces would not need to rely on reserve EAD support forces.¹⁵

All of the combat groups in this alternative are larger, but more autonomous, than current combat brigades. Under this alternative, the Army would structure a combat force with a relatively small headquarters element commanding a collection of combat groups and a mix of support groups appropriate to the situation. That structure would be smaller and more flexible than current combat forces, which require division- and corps-level headquarters and layers of support units and which maintain many essential support functions at a relatively high command level. However, with 25 active maneuver brigades—CBO considered only the first three types of groups as combat units, the remaining groups being analogous to current EAD support units—that force would have fewer combat brigades than the current Army does.

In addition to the organizational changes outlined in this option, CBO chose to change the Army's investment program considerably. MacGregor's work illustrates how

15. Colonel MacGregor does not discuss the composition of the reserve component extensively in his published material. The composition of the reserve forces specified above is CBO's best estimate of the type of forces that Colonel MacGregor has explicitly advocated, but it is possible that his proposal would include a more robust set of reserve units to deal with missions such as homeland security that are not the primary focus of his work and, as such, are not discussed extensively.

the Army’s current heavy forces, with the combination of the M1 Abrams tank and M2/3 Bradley infantry fighting vehicles, can be made more deployable, flexible, and lethal. As such, the Army’s Future Combat Systems program, which is intended to produce similar effects, might not be necessary if this option achieved its goals. To reflect that possibility, this option would terminate the FCS program and replace it with various initiatives to rebuild, remanufacture, and upgrade the Army’s heavy equipment. Among other things, the investment program in this option would:

- Continue the Abrams tank conversions under the M1A2 system enhancement program at a steady-state rate indefinitely into the future;¹⁶
- Continue the upgrades under the Abrams common engine program until the entire tank fleet had received new engines;
- Continue various programs to remanufacture and upgrade the M2/3 Bradley fighting vehicle at a steady-state rate indefinitely into the future;
- Restart the program to upgrade the M270A2 multiple-launch rocket system and modernize all of the Army’s rocket-launcher artillery platforms;
- Continue the program to upgrade the AH-64D Longbow and modernize all of the Army’s attack helicopters; and
- Continue the program to remanufacture the UH-60 L/M Blackhawk helicopter at a steady-state rate indefinitely into the future.

The cumulative effect of those conversion and remanufacturing programs would be to maintain the Army’s current fleet of heavy armored vehicles and helicopters in a viable state for the indefinite future while continuing several low-cost evolutionary upgrades that would maintain U.S. forces’ technological superiority over potential opponents.¹⁷

16. The steady-state rate is the rate at which all of the Army’s platforms would be converted or remanufactured frequently enough to stabilize the average age of the fleet at half of the desired service life for the platform.

Table 2-27.
Effects of Alternative 5 on the Cost of the Army

(Billions of 2006 dollars)

	Total Costs			Annual Recurring Costs in 2022
	2006-2010	2006-2015	2006-2022	
Premodular Army				
Investment	129	334	605	n.a.
Operation and Support	398	826	1,488	99
Total	527	1,160	2,092	99
Effects of Converting to a Brigade-Based Army				
Investment	-14	-78	-176	n.a.
Operation and Support	-28	-71	-138	-10
Total	-42	-149	-314	-10

Source: Congressional Budget Office.

Note: n.a. = not applicable.

The primary benefit of this alternative would be to provide the Army with more flexible and autonomous combat forces that could be deployed more rapidly. Its primary disadvantage would be a reduction in the number of combat forces available to the Army.

Costs. CBO estimates that implementing this option would reduce the costs for the Army’s investment program by \$176 billion over the 2006-2022 period, primarily as a result of terminating the FCS program but also because the Army would have fewer combat forces to modernize. It also would reduce the Army’s O&S costs by about \$138 billion through 2022 and by \$10 billion annually thereafter (see Table 2-27).

17. Some supporters of the FCS might argue that this alternative would fail to advance U.S. technological superiority over its potential opponents significantly. However, opponents of the FCS could note that many elements of the Army’s plan for the FCS appear well suited for high-end conventional warfare but largely irrelevant for missions such as suppressing insurgencies, which may become more important to the Army in the future.

Table 2-28.**Effects of Alternative 5 on the Army's Ability to Fight Wars**

	Current Force	Effects of Converting to a Brigade-Based Army
Deployment for a Major Combat Operation		
Personnel	285,000	-166,000
Brigades	20	-8
Ratio of Support Personnel to Combat Personnel	1.76	-0.85
Reserve-Component Personnel Mobilized and Deployed	109,000	-109,000
Number of Major Combat Operations Possible		
Active Army only	1.65	+0.43
Total Army	2.75	-0.33
Deployment Time (Days)		
First brigade	14	+2
First division	20	0
First corps	53	-26
First theater	102	-49

Source: Congressional Budget Office.

Effects. With fewer combat brigades in this option, the total Army would be less capable of fighting multiple wars simultaneously (see Table 2-28).¹⁸ It also could have to send fewer forces to any one conflict. Alternatively, if the Army had significant peacetime commitments, it might have to abandon those commitments during a conflict because of the reduced number of combat forces available.

A brigade-based Army would also have a smaller pool of personnel and units to draw on for sustaining extended deployments (see Table 2-29). As such, it would be less capable of sustaining larger numbers of personnel or combat brigades through rotational deployments. The reduction in forces available in this option would be roughly equivalent to about three to four commitments the size of the current U.S. commitment to Afghanistan.

Supporters of this option would argue that although it would decrease the overall number of combat brigades in the active Army, it would improve the Army's ability to fight wars overall. Colonel MacGregor suggests that such

forces would be able to deploy faster and engage in fast-moving operations that would overwhelm conventional enemies with far fewer forces than current structures require. CBO was not able to assess such claims about the qualitative improvement in warfighting that a brigade-based Army might provide. However, to illustrate the potential of such an effect, CBO assumed that the brigade-based Army could deploy a corps-sized force of six combat brigades (as opposed to 10 for the current force) and a theater-sized force of 12 combat brigades (as opposed to 20 for the current force). If that were the case, then under this option, the active Army would be capable of prosecuting nearly as many conflicts simultaneously, even though it had far fewer combat brigades. Even with that assumption, however, this option's large reduction in National Guard combat forces would mean that the total Army would still be less capable of fighting multiple wars simultaneously.

Detractors of this option might argue that the Army would be structured with small, possibly inadequately supported combat forces. Some observers do not believe that it would be plausible to engage in sustained combat operations with such limited levels of support; others argue that attempting to do so would incur an unacceptable level of risk. Historically, the Army's combat divisions, along with their EAD support units and slice of

18. The Army would be less capable of fighting wars if it experienced no qualitative improvement in the ability of each brigade. Supporters of this option would argue that it would produce such an effect.

Table 2-29.

Effects of Alternative 5 on the Army's Ability to Sustain Extended Deployments

	Active Army Only	Total Army
Premodular Army		
Maximum Sustained Deployment		
Personnel	89,000–111,000	111,000–138,000
Brigades	8.3–10.3	12.3–15.1
Reserve-Component Personnel Mobilized	52,000–57,000	86,000–90,000
Effects of Converting to a Brigade-Based Army		
Maximum Sustained Deployment		
Personnel	-20,000–25,000	-37,000–45,000
Brigades	-2.0–2.5	-5.6–6.8
Reserve-Component Personnel Mobilized	-43,000–44,000	-68,000–69,000

Source: Congressional Budget Office.

corps and theater assets (in other words, the size of the corps or theater divided up among the subordinate divisions), have each required about 40,000 personnel in a theater, suggesting that the Army has, in the modern era, always required more than one EAD support soldier for every one divisional combat soldier (varying between 1.3:1 and 1.7:1, depending on the type of division).¹⁹ This option would reduce that EAD ratio to slightly more than 0.9:1, much lower than any other option in this paper. Although some observers consider that level to be unrealistically low, others have been enthusiastic about MacGregor's restructuring proposal.

Detractors of this option also might note that MacGregor's plan assumes that the Army would be capable of eliminating the theater level of command, which performs a number of functions important to other military services operating in a theater (such as seaport opera-

tions). If that plan was implemented, the other services might need to be enlarged to compensate for the lack of support from the Army. In addition, because many theater-level tasks are currently assigned to the Army as part of its legal roles and missions, changes to those tasks would require revisions to title 10 of the U.S. Code.

Because the combat and support groups created in this option are entirely active-component units, it would make the active Army much less dependent on reserve EAD support units, whether for peacekeeping or for warfighting missions. The Army might still choose to mobilize some reserve personnel for major combat operations and would still mobilize some reserve personnel for peacekeeping operations (such as National Guard special forces groups), but in general, unless the Army needed to mobilize National Guard combat forces, reserve-component mobilization in this option would be minimal.

Converting to a MacGregor-style brigade-based Army would generally make the Army easier to deploy. Although at the level of a single brigade, the brigade-based Army would take longer to deploy (since each brigade would be larger and have more equipment), deploying a force equivalent to a division, corps, or theater would be faster. The increased speed would result partly because the corps- and theater-sized forces in this option would be smaller and partly because they would not need to deploy division- and corps-level command echelons and the large number of support units associated with them. When current forces are deployed, the units associated with a corps or a theater have about as much equipment and personnel as an entire heavy division with all of its supporting units. A brigade-based force that would not require deploying a corps (and did not include equivalent elements) would have much less equipment to transport and could be deployed more rapidly.

Implications for the Modular Army. Although this alternative was measured against the current force structure, converting the modular Army to a MacGregor-style brigade-based Army would produce essentially the same effects because the core of this option is to eliminate all of the Army's existing units and create an entirely new set of units. However, many elements of the Army's current modularity plan are similar to the brigade-based Army, including the emphasis on more-autonomous brigades, the creation of more-flexible division structures, and the decision to merge the corps and theater levels of com-

19. That level will tend to be lower for actual forces sent to actual conflicts, where the Army can tailor a force to meet the specific mission. In contrast, Army planning numbers tend to assume that the Army must have sufficient forms of support to engage in all potential missions, a considerably more demanding goal.

mand into one echelon. Nonetheless, the Army's modularity plan creates a larger number of smaller brigades (as opposed to this alternative's creation of a smaller number of larger brigades) and retains some of the command levels that MacGregor would simply eliminate.

Because this alternative would greatly reduce the reserve component's need for personnel positions, it would allow for a number of variations using those personnel positions—for example, restoring the theater level of command or increasing the number of National Guard combat units. Using personnel in those ways would decrease the cost savings that might be achieved by this alternative, but it would also increase the Army's overall ability to fight wars and to sustain extended deployments. For example, all of the National Guard's current major combat formations (and sufficient EAD units to fully support them) could be retained, thus significantly reducing the overall decrease in combat forces. If this option was modified in that manner, it would result in about 10,000 fewer reserve-component personnel than the current force has (as opposed to 383,000 fewer personnel), thus costing more but having about the same number of combat brigades as the current force.

Alternative 6—Convert to an Expeditionary Army

This alternative illustrates how the Army might be able to improve its deployment speed by adopting some organizational structures and practices used by the Marine Corps. It would eliminate the corps as a command structure, reorganize the Army into a series of expeditionary forces (similar to Marine expeditionary forces), and purchase additional sealift assets and additional sets of equipment that would be prepositioned on ships near potential theaters of conflict. Overall, this option would add 21,000 active personnel and 20,000 reserve personnel to the Army (see Table 2-30).

The Marine Corps does not employ a corps or theater level of command for its units. Instead, Marine Corps units are organized into a series of Marine air-ground task forces. Each task force has a command element (normally a small headquarters), a ground-combat element, an air-combat element, and a combat-service-support element. The task forces are distinguished by the size of the ground-combat element. The largest type of task force is the Marine expeditionary force, with a division, an air wing, and a force-service-support group.²⁰ Marine divisions, unlike Army divisions, are composed almost

Table 2-30.
Effects of Alternative 6 on the Size and Composition of the Army

	Active Component	Reserve Component	Total Army
Premodular Army			
Personnel	482,400	555,000	1,037,400
Corps	3	1	4
Divisions	10	8	18
Total Brigades	33	36	69
Supported brigades	33	22	55
Effects of Converting to an Expeditionary Army			
Personnel	+21,000	+20,000	+41,000
Corps	n.a.	n.a.	n.a.
Divisions	-1	-2	-3
Total Brigades	+3	-2	+1
Supported brigades	+3	+12	+15

Source: Congressional Budget Office.

Note: n.a. = not applicable.

entirely of combat units, with support units (such as aviation or logistics) in the air-combat or combat-service-support elements.

In this option, Army forces would be structured in a manner similar to Marine expeditionary forces. Because the Army maintains both heavy and light forces (unlike the Marines), there would be separate types of light expeditionary forces and heavy expeditionary forces. Each expeditionary force would include:

- A command element, with headquarters and signals units;

20. The Air Force also has recently developed air expeditionary forces, which are intended to combine different types of aircraft together into a single, easily deployed force. Since Navy ships are, in essence, also self-contained expeditionary forces, this option would bring the Army's forces more in line with the broader direction of all of the military services.

- A ground-combat element, equivalent to a division with four combat brigades;²¹
- An air-combat element, with six to 11 battalions of helicopters, maintenance units, and Patriot missile units; and
- A support group, with engineer, military police, military intelligence, medical, and logistics units.

A heavy expeditionary force would have two armored and two mechanized infantry brigades in its division and a smaller aviation group emphasizing attack helicopters. It would have about 43,000 personnel. A light expeditionary force would have three light brigades and one Stryker brigade in its division and a larger aviation group emphasizing reconnaissance, utility, and cargo helicopters. It would have about 39,000 personnel.²²

In this option, the active Army would have five heavy and four light expeditionary forces, and the National Guard would have four heavy and two light expeditionary forces. The option would also retain the Army's current theater structure and 10 of the National Guard's current separate brigades. All of the National Guard forces would be fully supported combat forces, with sufficient EAD support units to simultaneously deploy all National Guard combat units to combat operations. As in the current force, active expeditionary forces would depend on reserve support units (which would be part of the expeditionary forces), although to a somewhat more limited degree than the current force does.

Finally, this alternative would greatly expand the Army's current program of prepositioning sets of equipment on board ships stationed near potential theaters. Prior to Operation Iraqi Freedom, the Army used eight large, medium-speed roll-on/roll-off ships (LMSRs) to store a single heavy brigade's worth of combat equipment and equipment for some theater-level units in the Indian Ocean.²³ Currently, the Army is moving toward using six

21. Marine Corps divisions do not have four subordinate combat brigades but do contain a higher fraction of maneuver units than Army divisions do. CBO approximated the larger number of maneuver units by adding a fourth brigade to each division in this alternative.

22. Along with the theater structure, this alternative would maintain the Army's level of support at the lower end of the historical range of about 1.3 EAD support personnel for every divisional soldier.

Table 2-31.

Effects of Alternative 6 on the Cost of the Army

(Billions of 2006 dollars)

	Total Costs			Annual Recurring Costs in 2022
	2006-2010	2006-2015	2006-2022	
Premodular Army				
Investment	129	334	605	n.a.
Operation and Support	398	826	1,488	99
Total	527	1,160	2,092	99
Effects of Converting to an Expeditionary Army				
Investment	+25	-17	-79	n.a.
Operation and Support	+10	+23	+45	+3
Total	+35	+6	-34	+3

Source: Congressional Budget Office.

Note: n.a. = not applicable.

LMSRs to establish three flotillas, each with a single heavy brigade's worth of combat equipment, in the Mediterranean Sea, Indian Ocean, and Pacific Ocean. This alternative would expand the size of those flotillas, and the shipping capacity available to DoD, by purchasing 20 additional LMSRs (doubling the size of Military Sealift Command's LMSR fleet). Some of those LMSRs would be used to establish larger flotillas, each carrying two heavy brigades' worth of equipment. The remainder would be used to transport equipment from the United States to combat theaters.

In addition to the organizational changes outlined in this option, CBO chose to change the Army's investment program considerably. Because this alternative would greatly increase the speed with which the Army could deploy its forces, as in the previous option, the Army's FCS pro-

23. LMSRs are very large cargo ships designed to transport vehicles. They are sometimes described as floating parking garages. They are the preferred type of ship for transporting most Army units' equipment, as the majority of Army vehicles cannot be shipped in the standard shipping containers that dominate the civilian shipping market.

Table 2-32.**Effects of Alternative 6 on the Army's Ability to Fight Wars**

	Current Force	Effects of Converting to an Expeditionary Army
Deployment for a Major Combat Operation		
Personnel	285,000	-37,000
Brigades	20	No change
Ratio of Support Personnel to Combat Personnel	1.76	-0.46
Reserve-Component Personnel Mobilized and Deployed	109,000	-26,000
Number of Major Combat Operations Possible		
Active Army only	1.65	+0.15
Total Army	2.75	+0.75
Deployment Time (Days)		
First brigade	14	-5
First division	20	-7
First corps	53	-23
First theater	102	-46

Source: Congressional Budget Office.

gram, which is intended to produce similar effects, might not be necessary if this option achieved its goals. To reflect that possibility, this option would terminate the FCS program and replace it with a series of various programs to rebuild, remanufacture, and upgrade the Army's current heavy equipment. Those programs are the same as in the previous alternative, but because this alternative would establish an Army force structure with more heavy combat vehicles (for the larger number of heavy brigades and the additional sets of prepositioned equipment), those programs would have larger annual purchase requirements, offsetting more of the savings from canceling the FCS.

The primary benefit of this alternative would be to allow the Army to deploy much more rapidly than the current force can. Its primary disadvantage would be the costs associated with increased numbers of active-component personnel.

Costs. Implementing this option would reduce the costs for the Army's investment program by \$87 billion over the 2006-2022 period, primarily as a result of terminating the FCS program. It would add \$9 billion in costs for the National Defense Sealift fund (a Navy account that would be used to purchase the additional LMSRs), yielding total savings of \$79 billion for DoD's investment pro-

gram over the same period. Finally, the option would increase the Army's O&S costs by about \$45 billion through 2022 and by \$3 billion annually thereafter (see Table 2-31).

Effects. With additional divisions and combat brigades, the Army would be more capable of fighting multiple wars simultaneously (see Table 2-32). It also could send more forces to any given conflict, thus increasing the likelihood that the Army could prosecute conflicts with a greater chance of success or succeed more rapidly with fewer casualties. Alternatively, if the Army had significant peacetime commitments, the additional combat forces might allow the Army to maintain those commitments during a conflict when it might otherwise be necessary to withdraw forces from lower-priority commitments.

The Army would also be slightly more capable of sustaining extended deployments for peacekeeping missions (see Table 2-33). The additional forces available in this option would, however, be less than sufficient to assume one additional commitment of about the size of Bosnia or Kosovo at their height or of the U.S. commitment to Afghanistan.

Because this alternative would increase the size of the active Army slightly, it would reduce the active Army's

Table 2-33.

Effects of Alternative 6 on the Army's Ability to Sustain Extended Deployments

	Active Army Only	Total Army
Premodular Army		
Maximum Sustained Deployment		
Personnel	89,000–111,000	111,000–138,000
Brigades	8.3–10.3	12.3–15.1
Reserve-Component Personnel Mobilized	52,000–57,000	86,000–90,000
Effects of Converting to an Expeditionary Army		
Maximum Sustained Deployment		
Personnel	+4,000–5,000	+9,000–12,000
Brigades	+0.8–0.9	+0.5–0.7
Reserve-Component Personnel Mobilized	-2,000	+6,000

Source: Congressional Budget Office.

dependence on reserve EAD units somewhat. That effect would be relatively limited, however, since some of the additional active Army personnel would also be used to establish new combat brigades. In addition, all National Guard combat forces would be fully supported under this option. Thus, if the Army was required to mobilize National Guard combat forces to sustain extended deployments, the National Guard would be able to mobilize and deploy additional support units. That action would increase the number of personnel the Army could sustain overseas in an extended deployment but would also require more reserve mobilization.

Converting to an expeditionary Army would greatly improve the speed with which the Army could deploy. The larger number of prepositioned equipment sets in this alternative contributes to improving the speed with which smaller forces (brigades and divisions) could be deployed, since prepositioned equipment sets would already be loaded on ships at the beginning of a conflict and would be closer to potential theaters. In this option, having more prepositioned equipment in larger flotillas dispersed near more potential theaters is the major factor in improving deployment speed for smaller units. For larger

units, the increased number of LMSRs in the military fleet would allow the Army's equipment to be transported in a shorter period of time. Finally, deployment speed would also benefit from the elimination of the corps structure. When current forces are deployed, the units associated with a corps or a theater have about as much equipment and personnel as an entire heavy division with all of its supporting units. An expeditionary force that would not have to deploy a corps thus would have much less equipment to transport and could be deployed more rapidly. Because each expeditionary force in this option would have significantly fewer support units than a current force (including the corps), deploying three expeditionary forces (with 12 combat brigades) would actually require somewhat less lift than a current corps (with 10 combat brigades).

Implications for the Modular Army. Although the alternative to convert to an expeditionary Army was measured against the current force, converting a modular Army to an expeditionary Army would produce many of the same benefits and incur many of the same costs. The expeditionary Army would improve deployment timelines when compared with timelines for the current force by increasing the amount of sealift available to the force, increasing the number of equipment sets prepositioned on ship flotillas, and eliminating the large corps structure. Because it would require about the same amount of lift as the premodularity force, a modular force would benefit equally from the increased sealift and prepositioned equipment available under this alternative and would see its deployment timelines reduced by roughly equivalent amounts. Although the Army has not announced the details of what the corps structure will look like in the modular Army, one of its goals is to merge the corps into the theater, making them more flexible structures. If the modular Army can achieve that goal, it will produce an effect similar to this alternative's restructuring of EAD support.

Alternative 7—Convert to a Transformational Army

This alternative illustrates the type of force that many defense experts, including DoD's former Director of Force Transformation Arthur Cebrowski, have suggested would be transformational—that is, reorganized to take full advantage of recent advances in communications networks, precision-guided munitions, and sensors. Such experts typically stress the virtues of small, light ground formations that can be rapidly deployed and that depend on long-range, precision firepower instead of their own

Table 2-34.
Effects of Alternative 7 on the Size and Composition of the Army

	Active Component	Reserve Component	Total Army
Premodular Army			
Personnel	482,400	555,000	1,037,400
Corps	3	1	4
Divisions	10	8	18
Total Brigades Supported brigades	33	36	69
	33	22	55
Effects of Converting to a Transformational Army			
Personnel	-115,000	No change	-115,000
Corps	-1	+1	No change
Divisions	-4	-2	-6
Total Brigades Supported brigades	-12	-2	-14
	-12	+12	No change

Source: Congressional Budget Office.

weaponry for effectiveness. This alternative would have fewer divisions, and the mix of divisions would be shifted to lighter forces and special forces groups, with each division having access to more long-range firepower, especially attack helicopters and artillery. Overall, this option would reduce the number of active personnel in the Army by 115,000 (see Table 2-34).

For this alternative, CBO designed a smaller, lighter combat force than the current Army. Specifically, the alternative:

- Shifts one corps from the active component to the reserve component;
- Eliminates four active heavy divisions;
- Restructures the remaining active Army divisions to have two heavy divisions, two light infantry divisions, and two air assault divisions;
- Creates three new active special forces groups and two new National Guard special forces groups;

- Eliminates two National Guard heavy divisions;
- Restructures the remaining National Guard divisions to have four heavy divisions and two light infantry divisions, all fully supported with EAD support units;
- Preserves the current National Guard separate brigades; and
- Provides twice the Army's current level of rocket artillery and aviation assets to each division.

Those changes would make the Army much smaller, with a lighter mix of units than it has currently, but each unit would be more capable of delivering the types of long-range, precision firepower that advocates of transformation argue would make it possible for very small forces to defeat much larger forces without access to such technology. This option was designed so that both the active and reserve components would each have two corps with three divisions and an ACR each (in addition to the National Guard separate brigades). Each of those forces would be roughly equivalent to the Army's contribution to Operation Iraqi Freedom, which successfully achieved the goal of destroying the Iraqi regime in a very short period. Proponents of transformation forces see such combat operations as the type that will be more likely in the future, with small, rapidly moving lethal U.S. forces easily overwhelming an opponent's much larger conventional forces.

This alternative also would change the Army's investment program. In addition to reducing the quantities of equipment that the Army would need to procure for its smaller forces, this alternative emphasizes numerous Army programs that would improve the Army's ability to precisely deliver long-range firepower. The Army has a variety of such programs, including the Excalibur projectile for cannon artillery, the guided rockets for rocket artillery, and Longbow upgrades for the Apache helicopter.

The primary benefit of this alternative would be the cost savings from reductions in the number of active-component personnel. Its primary disadvantage would be the reduction in the number of combat forces available to the Army.

Costs. Implementing this option would reduce the costs for the Army's investment program by \$24 billion over the 2006-2022 period, primarily because the Army

Table 2-35.
Effects of Alternative 7 on the
Cost of the Army

(Billions of 2006 dollars)

	Total Costs			Annual Recurring Costs in 2022
	2006- 2010	2006- 2015	2006- 2022	
Premodular Army				
Investment	129	334	605	n.a.
Operation and Support	398	826	1,488	99
Total	527	1,160	2,092	99
Effects of Converting to a Transformational Army				
Investment	-6	-14	-24	n.a.
Operation and Support	-34	-86	-166	-12
Total	-40	-100	-190	-12

Source: Congressional Budget Office.

Note: n.a. = not applicable.

would have fewer combat forces to modernize. It would reduce the Army's O&S costs by about \$166 billion over the same period and by about \$12 billion annually thereafter (see Table 2-35).

Effects. With fewer combat brigades in this option, the Army would be less capable of fighting multiple wars simultaneously (see Table 2-36).²⁴ It also could be less capable of sending additional forces to any given conflict. Alternatively, if the Army had significant peacetime commitments, it might have to abandon some of those commitments during a conflict because of high-priority combat needs.

Supporters of this option would argue that although it would decrease the overall number of combat brigades in the active Army, it would improve the Army's ability to fight wars overall. Transformation advocates often argue that the size or mass of a combat force is largely irrelevant

24. The Army would be less capable of fighting wars if it experienced no qualitative improvement in the ability of each brigade. Supporters of this option would argue that it would produce such an effect.

to its combat power but that the capability to precisely deliver firepower is central to success in modern conflicts. This alternative would give the Army fewer forces, but those combat forces would have access to twice as much long-range firepower as current forces do.²⁵ Thus, transformation advocates would suggest that this option would create a force that would be at least as capable as today's larger, more expensive force. CBO was not able to assess such claims about the qualitative improvement in warfighting that a brigade-based Army might provide.

However, to illustrate the potential that such an effect might have, CBO assumed that the transformational Army could deploy a corps-sized force of six combat brigades (compared with 10 for the current force) and a theater-sized force of 12 combat brigades (compared with 20 for the current force). If that were the case, then under this option, the Army would be capable of prosecuting more conflicts simultaneously, even though it had fewer combat brigades.

A transformational Army would, however, have a smaller pool of personnel and units to draw on for sustaining extended deployments (see Table 2-37). As such, it would be less capable of sustaining larger numbers of personnel or combat brigades through rotational deployments. The reduction in forces available under this option would be roughly equivalent to two or three times the size of the U.S. commitment to Bosnia or Kosovo or to the U.S. commitment to Afghanistan. It also is unlikely that transformational forces would be qualitatively superior in peacekeeping operations, since the additional firepower provided to them is unlikely to be useful in such operations—in some respects, transformational forces would have the opposite advantages and disadvantages as the dedicated peacekeeping forces of Alternative 4.

This alternative would not change the degree to which active forces would depend on reserve EAD units for support, so the number of reserve personnel the Army would need to mobilize for any given operation would not change appreciably. However, since the Army would be considerably smaller in this option, it would be unable to sustain extended deployments as large as the current force can. As a result, it would need to mobilize fewer reserve personnel overall to support the smaller number of active units that it could sustain overseas.

25. That large amount of additional firepower is reflected in the higher support ratio shown for this option in Table 2-36.

Table 2-36.**Effects of Alternative 7 on the Army's Ability to Fight Wars**

	Current Force	Effects of Converting to a Transformational Army
Deployment for a Major Combat Operation		
Personnel	285,000	-67,000
Brigades	20	-8
Ratio of Support Personnel to Combat Personnel	1.76	+0.73
Reserve-Component Personnel Mobilized and Deployed	109,000	-18,000
Number of Major Combat Operations Possible		
Active Army only	1.65	+0.1
Total Army	2.75	+1.85
Deployment Time (Days)		
First brigade	14	No change
First division	20	No change
First corps	53	-24
First theater	102	-20

Source: Congressional Budget Office.

Converting to a transformational Army would improve the speed with which the Army could deploy. Although at the level of a single brigade or division the transformational Army would need about the same amount of time to deploy (since each brigade would be about the same size as current brigades), corps- or theater-level forces would deploy faster, primarily because they, as defined in this option, would be smaller and have less equipment.

Each deployed force in this alternative also would include a higher fraction of light units than the current force has, further hastening deployment. However, each division in this alternative, along with its EAD support units, actually would have somewhat more unit equipment than a division in the current force, and the extra weight they would carry would reduce the benefits from improved deployment speed somewhat.

Implications for the Modular Army. Although the alternative to convert to a transformational Army was measured against the current force, converting a modular Army to a transformational one would produce many of the same benefits and incur many of the same costs. A smaller, lighter modular Army with access to more long-range precision firepower would have many of the same advantages in the sort of warfare that transformation proponents believe will characterize future conflicts. It would also have the same drawback regarding the forces' ability to support extended deployments, since much smaller Army forces are simply incapable of supporting very large extended deployments.

The aviation structure for this alternative was designed to match the Army's available number of helicopters to specific combat units. It would not change the overall number of helicopters in the Army.

Table 2-37.

Effects of Alternative 7 on the Army's Ability to Sustain Extended Deployments

	Active Army Only	Total Army
Premodular Army		
Maximum Sustained Deployment		
Personnel	89,000–111,000	111,000–138,000
Brigades	8.3–10.3	12.3–15.1
Reserve-Component Personnel Mobilized	52,000–57,000	86,000–90,000
Effects of Converting to a Transformational Army		
Maximum Sustained Deployment		
Personnel	-28,000–36,000	-26,000–32,000
Brigades	-3.0–3.8	-3.2–4.0
Reserve-Component Personnel Mobilized	-24,000–26,000	-20,000–21,000

Source: Congressional Budget Office.

Note: n.a. = not applicable.

A

Detailed Descriptions of Current and Proposed Army Units

This appendix provides detailed descriptions and diagrams of the major types of units now in the Army or planned under the Army's "modularity" reorganization. It also describes several types of units that would be created under the options analyzed in this study. The descriptions focus on the Army's structure in descending order of size: at the theater, corps, division, and brigade levels.

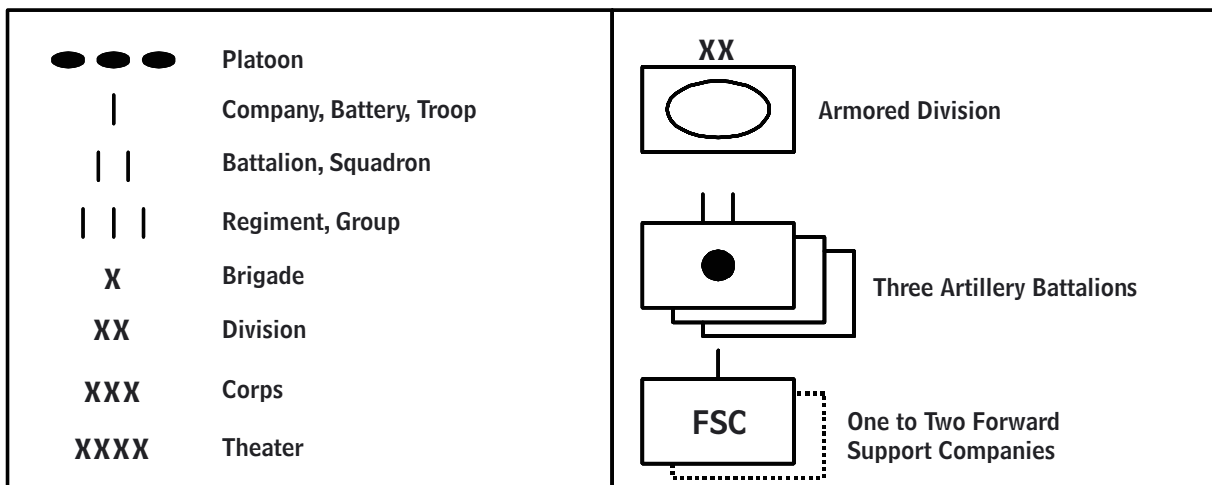
Divisions and brigades come in several types—light, medium, and heavy—as well as in different generations. In the early 1980s, the Army reorganized its units according to an initiative called the Army of Excellence (AoE). Since then, the Army has announced two other genera-

tions of unit types, the Force XXI design and modularity, although it is still phasing AoE units out. (For more details about modularity, see Appendix B.) This appendix describes some units from all three generations, as well as the stabilization and reconstruction divisions discussed in Alternative 4 and the light and heavy Army expeditionary forces discussed in Alternative 6.

The diagrams in this appendix that illustrate units' structure employ a standardized symbolic format, which is widely used in the Army and is based on a military standard used throughout the Department of Defense

Figure A-1.

Symbols of Unit Size



Source: Congressional Budget Office.

Figure A-2.

Symbols of Unit Type

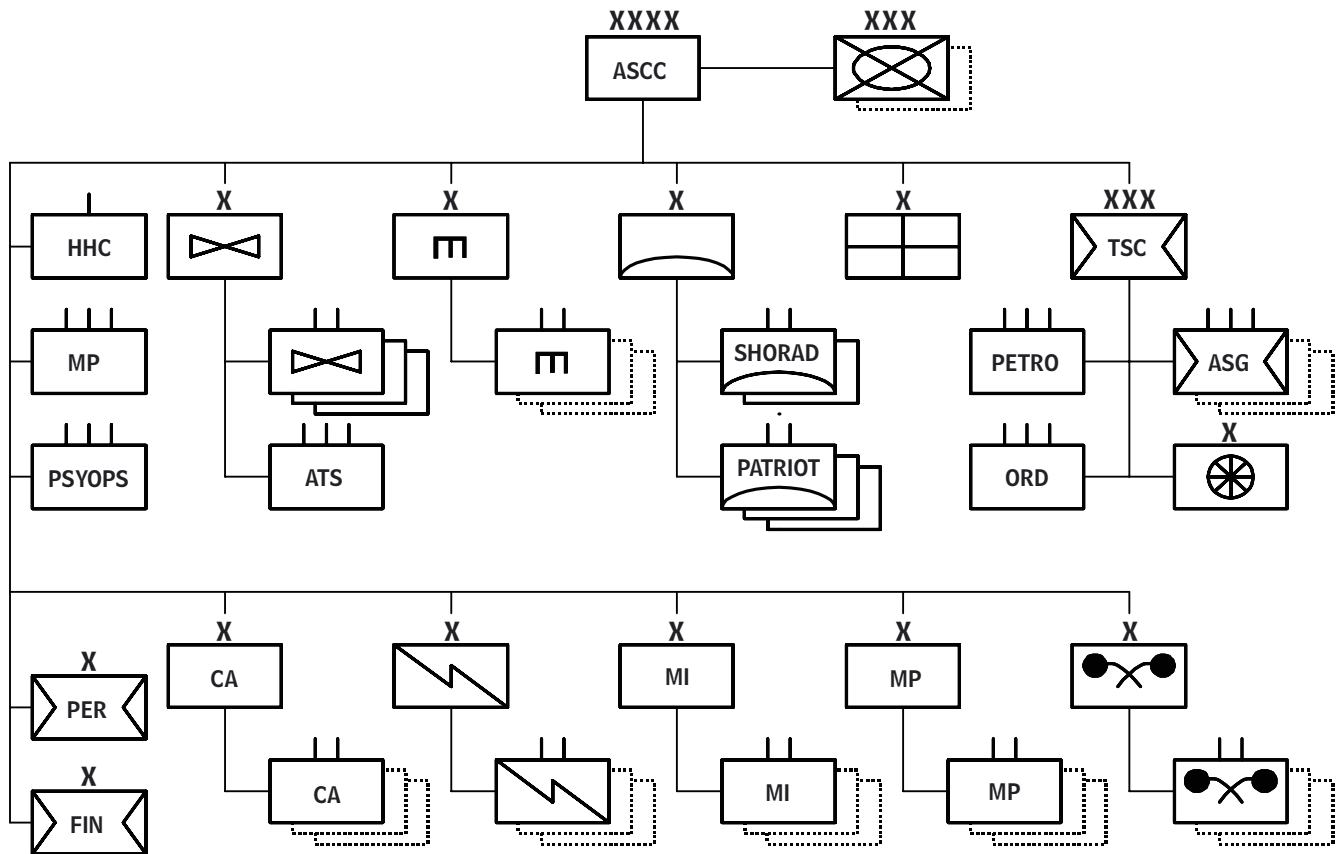
	Light Infantry		Engineers		Aviation Maintenance Company
	Mechanized Infantry		Armored Engineers		Aviation Maintenance Troop
	Stryker Infantry		Stryker Engineers		Air Defense
	Light Infantry, Heavy Weapons		Stryker Antitank		Unmanned Aerial Vehicles
	Armor		Aviation		Counterbattery Radar
	Armored Cavalry		Attack Aviation (AH-64 Apache)		Signals (Communications)
	Stryker Recon.		Recon. Aviation (OH-58 Kiowa)		Chemical
	Motorized Recon.		Utility Aviation (UH-60 Blackhawk)		Supply/Distribution
	Light Recon.		Cargo Aviation (CH-47 Chinook)		Maintenance
	Towed Howitzer		General Support Aviation Battalion		Medical
	Self-Propelled Howitzer		Aviation Support Battalion		Transportation
	Rocket Launcher (MLRS, HIMARS)		Division Aviation Support Battalion		

Source: Congressional Budget Office.

Note: Recon. = reconnaissance; MLRS = multiple-launch rocket system; HIMARS = High-Mobility Artillery Rocket System.

Figure A-3.

Structure of an Army Theater



Source: Congressional Budget Office.

Note: ASCC = Army service component command; ASG = area support group; ATS = air traffic services; CA = civil affairs; FIN = finance; HHC = headquarters and headquarters company; MI = military intelligence; MP = military police; ORD = ordnance; PER = personnel; PETRO = petroleum; PSYOPS = psychological operations; SHORAD = short-range air defense; TSC = theater support command. (Other symbols are defined in Figures A-1 and A-2.)

(DoD).¹ In that format, all ground units are depicted with a rectangular box: a symbol inside the box indicates the type of unit, and a symbol above the box indicates the unit's size (see Figure A-1 on page 47 and Figure A-2 on page 48 for a guide to those symbols). Multiple units of a given type and size are shown with silhouette boxes. Dashed boxes indicate that the number of units is variable.

1. Army Field Manual 101-5-1, *Operational Terms and Graphics*, contains an extensive library of those symbols and a discussion of their proper usage and meaning. The Congressional Budget Office has simplified some of the symbols, substituting Army abbreviations for less familiar symbols.

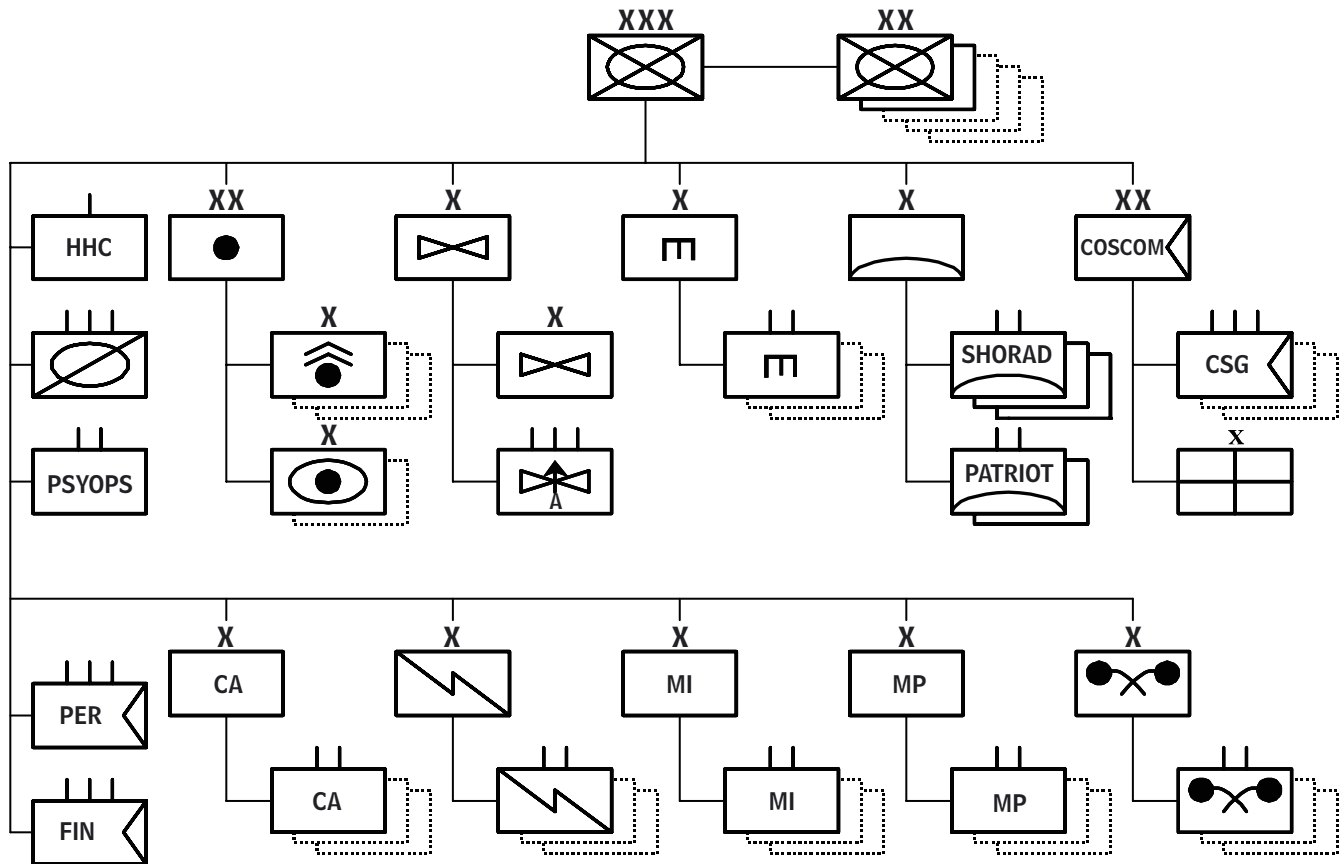
Theaters

The Army's theater structure is an element of the joint command structure for an entire theater of operations. The theater commander, normally a general, would also be the Army service component commander. The theater would normally be used to command and support one or two corps.

The largest single element of the theater structure (besides the subordinate corps) is the theater support command, which includes a number of area support groups to provide rear-area logistics support, a petroleum group, an ordnance group, a transportation command, and potentially a medical command (see Figure A-3). Those logistics commands establish and maintain the theater

Figure A-4.

Structure of an Army Heavy Corps



Source: Congressional Budget Office.

Note: CA = civil affairs; COSCOM = corps support command; CSG = corps support group; FIN = finance; HHC = headquarters and headquarters company; MI = military intelligence; MP = military police; PER = personnel; PSYOPS = psychological operations; SHORAD = short-range air defense. (Other symbols are defined in Figures A-1 and A-2.)

logistics system, which provides support to other services' units (such as Marine expeditionary groups) as well as to the Army. The size of those elements is largely determined by the size of the forces they need to support.

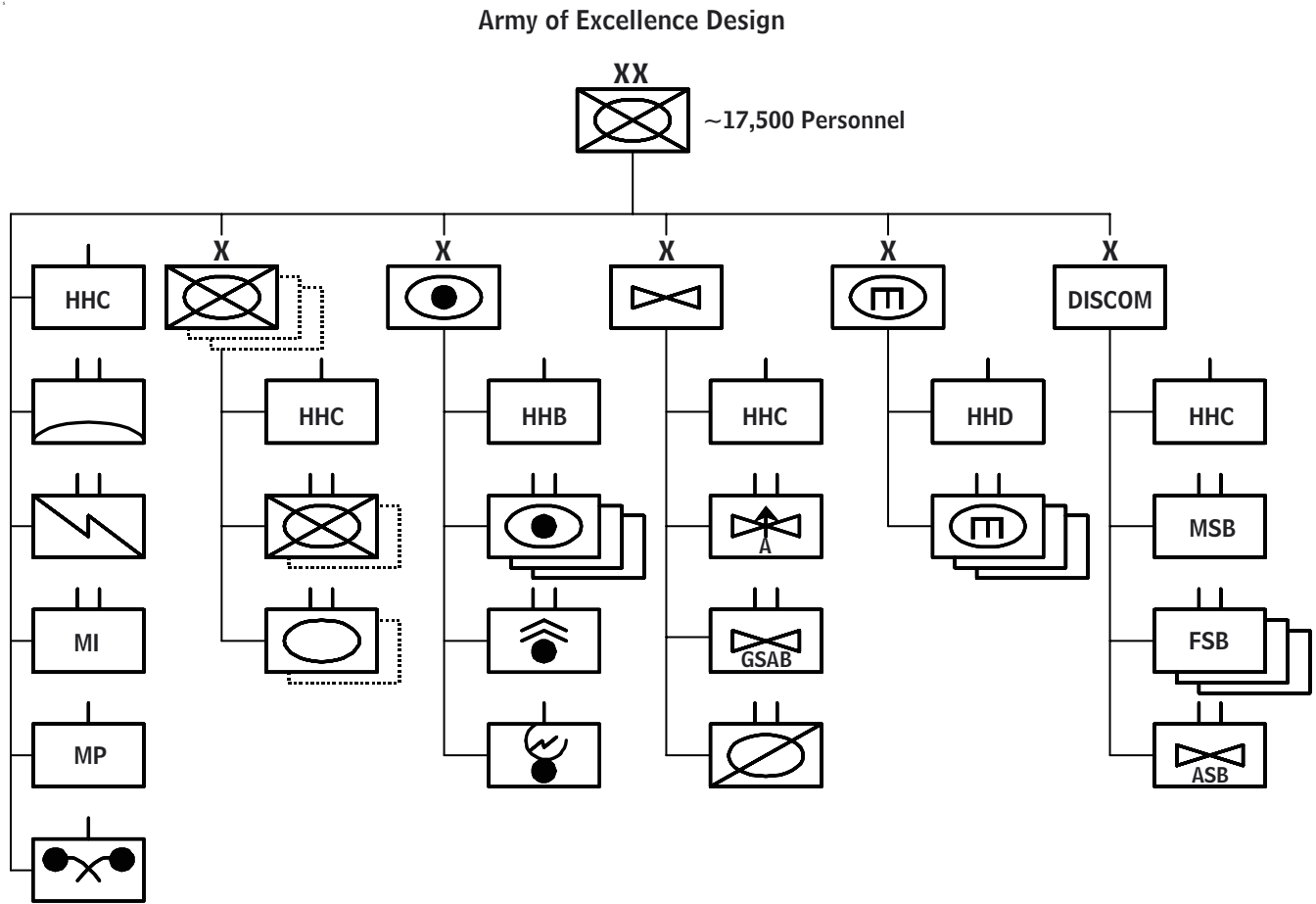
The rest of the theater structure consists mainly of various support commands, brigades, and groups, with a variable number of subordinate battalions. The number of subordinate battalions in any command depends on the number of subordinate corps and divisions assigned to the theater as well as on operational factors. The support units include engineer, chemical, military police, military intelligence, signals, personnel, finance, civil affairs, and psychological operations units.

The remaining theater units include such fixed elements as the theater aviation brigade and the theater air and missile defense command. They provide special high-level support functions, such as air traffic services or theater missile defense.

Corps

The corps, commanded by a lieutenant general, is the Army's largest tactical formation. A corps commands and supports two to five divisions and an armored cavalry regiment. Slight variations exist between a heavy corps (such as III Corps) and a light corps (such as XVIII Airborne Corps), but those differences are generally minor, and all corps are capable of including heavy or light subordinate divisions. (Figure A-4 illustrates the structure of a full heavy corps.)

Figure A-5.
Structure of an Army Heavy Division Under Various Designs



Continued

The largest single element of the corps structure (other than the subordinate divisions) is the corps support command, which includes a corps support group (CSG) for the corps itself, one CSG for each subordinate division, and a medical brigade. CSGs are multifunction logistics commands with a variety of subordinate logistics battalions.

Most of the rest of the corps's structure consists of combat-support brigades and groups, each with a variable number of subordinate battalions depending on the number of subordinate divisions assigned to the corps and on operational factors. The combat-support brigades include engineer, chemical, military police, military intelligence, signals, personnel, finance, and civil affairs brigades.

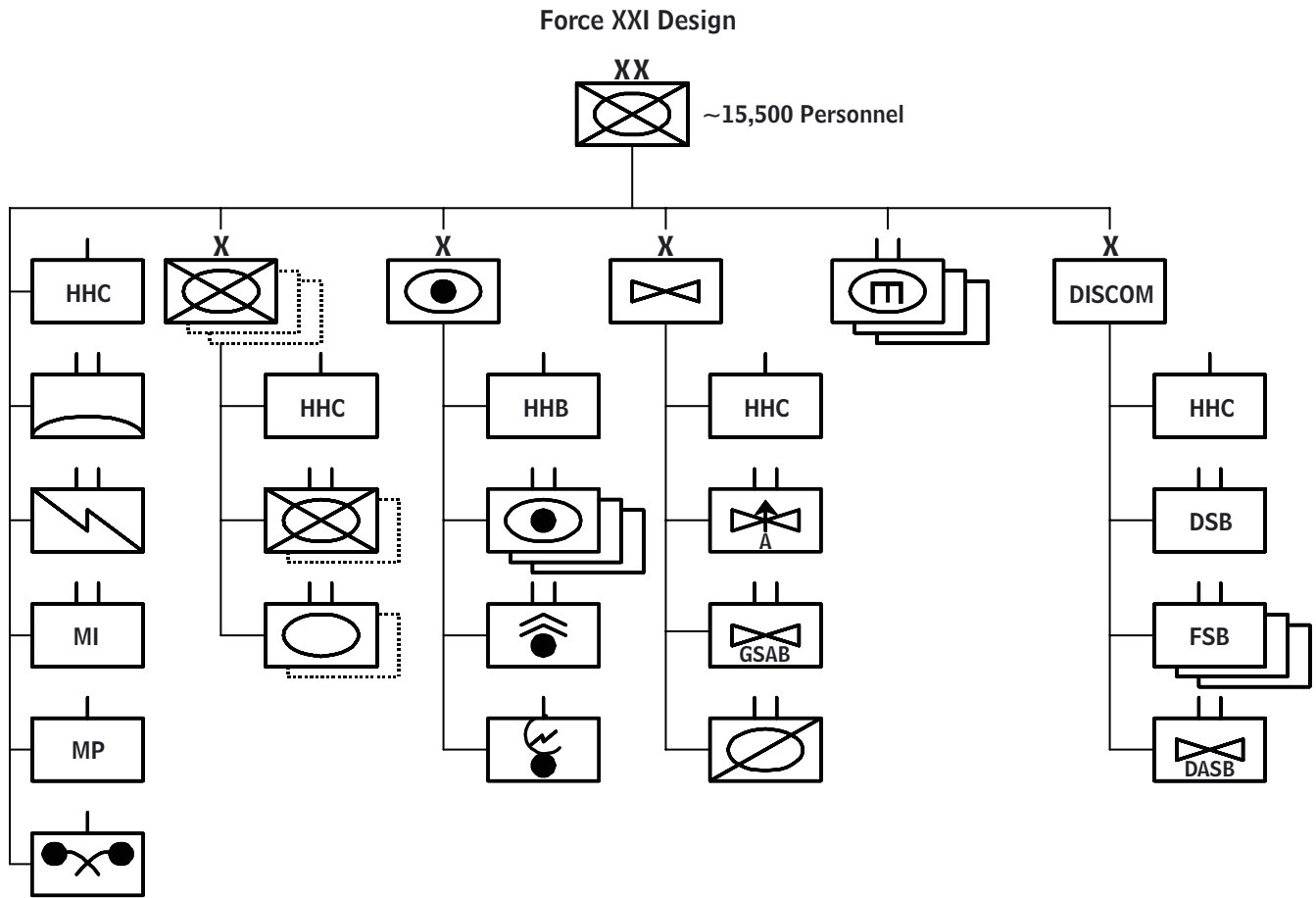
The corps includes the bulk of the Army's artillery fire-power, with a corps artillery commanding a variable number of artillery brigades. Each corps has an artillery brigade for the corps itself and one or two artillery brigades for each subordinate division. In addition, a corps contains an aviation brigade, an air-defense brigade, and a psychological operations battalion, which are unlikely to vary in size.

According to Army doctrine, separate brigades are normally attached to a corps. However, in recent rotations for Operation Iraqi Freedom, the Army has opted to attach separate brigades to divisions.

Divisions

The division, commanded by a major general, is the Army's primary tactical formation. Its main elements are

Figure A-5.
Continued



Source: Congressional Budget Office.

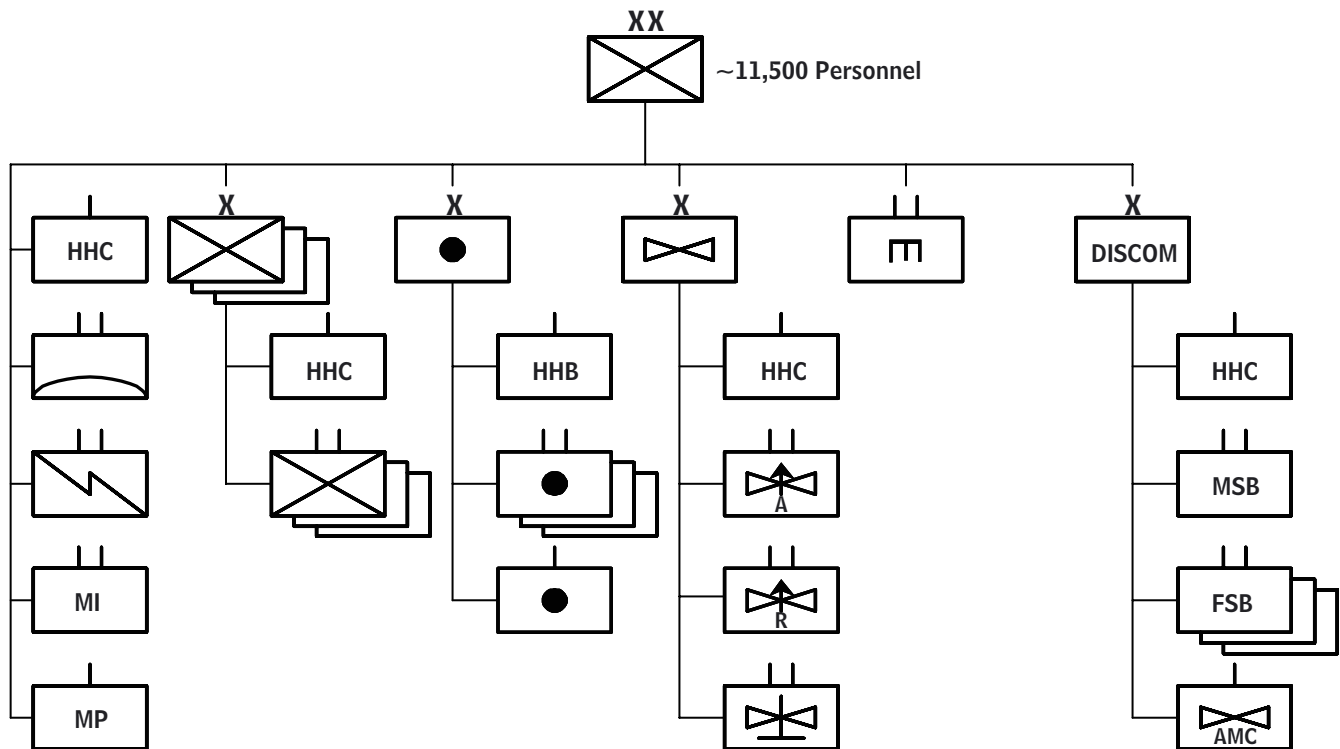
Note: DISCOM = division support command; DSB = division support battalion; FSB = forward support battalion, HHB = headquarters and headquarters battery; HHC = headquarters and headquarters company; HHD = headquarters and headquarters detachment; MI = military intelligence; MP = military police; MSB = main support battalion. (Other symbols are defined in Figures A-1 and A-2.)

three subordinate maneuver brigades. In heavy divisions, the Army mixes armored units and mechanized infantry units in ratios of 2:1. Thus, an armored division contains two armored brigades and one mechanized infantry brigade, whereas the pattern is reversed for a mechanized infantry division. Each brigade follows the same pattern with its subordinate battalions (that is, an armored brigade has two armored battalions and one mechanized infantry battalion). Since the resulting mix of battalions has either a 5:4 or 4:5 ratio of armor to mechanized infantry, both armored divisions and mechanized infantry divisions are referred to generically as heavy divisions.

The three maneuver brigades in a division are organized for combat into brigade combat teams (BCTs) with sup-

port units from the division's other brigades and battalions. The units that are not associated with the BCTs are known as the division base. The various support battalions that are not grouped under a brigade headquarters are called the division troops.

Two generations of heavy divisions exist in today's Army (see Figure A-5). The Army of Excellence design is roughly 20 years old, although it has been revised slightly during that period. The Force XXI design dates to the late 1990s. A Force XXI heavy division differs from an AoE heavy division by having different BCTs, a different logistics command, and a different cavalry squadron. Those distinctions are relatively minor at the division level; they are much more apparent at the BCT level.

Figure A-6.**Structure of an Army Light Division Under the Army of Excellence Design**

Source: Congressional Budget Office.

Note: DISCOM = division support command; FSB = forward support battalion; HHB = headquarters and headquarters battery; HHC = headquarters and headquarters company; MI = military intelligence; MP = military police; MSB = main support battalion. (Other symbols are defined in Figures A-1 and A-2.)

In both cases, the division base includes division headquarters, a division aviation brigade, a rocket-launcher battalion, and some division troops. It is also reinforced with support units from the corps, including a CSG and one or two artillery brigades. But whereas the division base for an AoE heavy division includes a main support battalion and an aviation support battalion, the base for a Force XXI heavy division includes a division support battalion and a division aviation support battalion.

Like heavy divisions, light divisions consist of three subordinate maneuver brigades. However, those brigades are all of the same type (light infantry, airborne, or air assault) rather than a mix. The only major difference between types of light divisions, other than the training of their soldiers, is that an air assault division (of which the Army has only one, the 101st Air Assault Division) has many more aviation assets than other light divisions do.

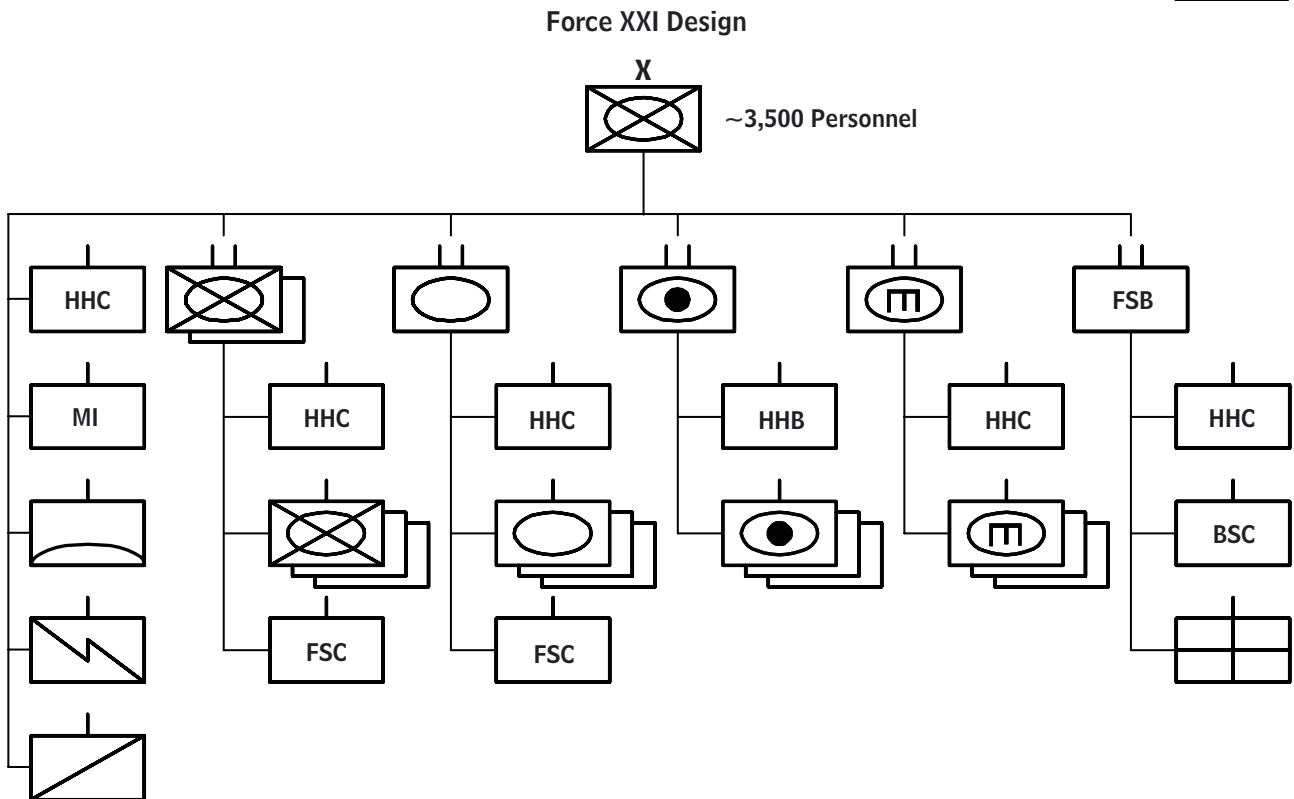
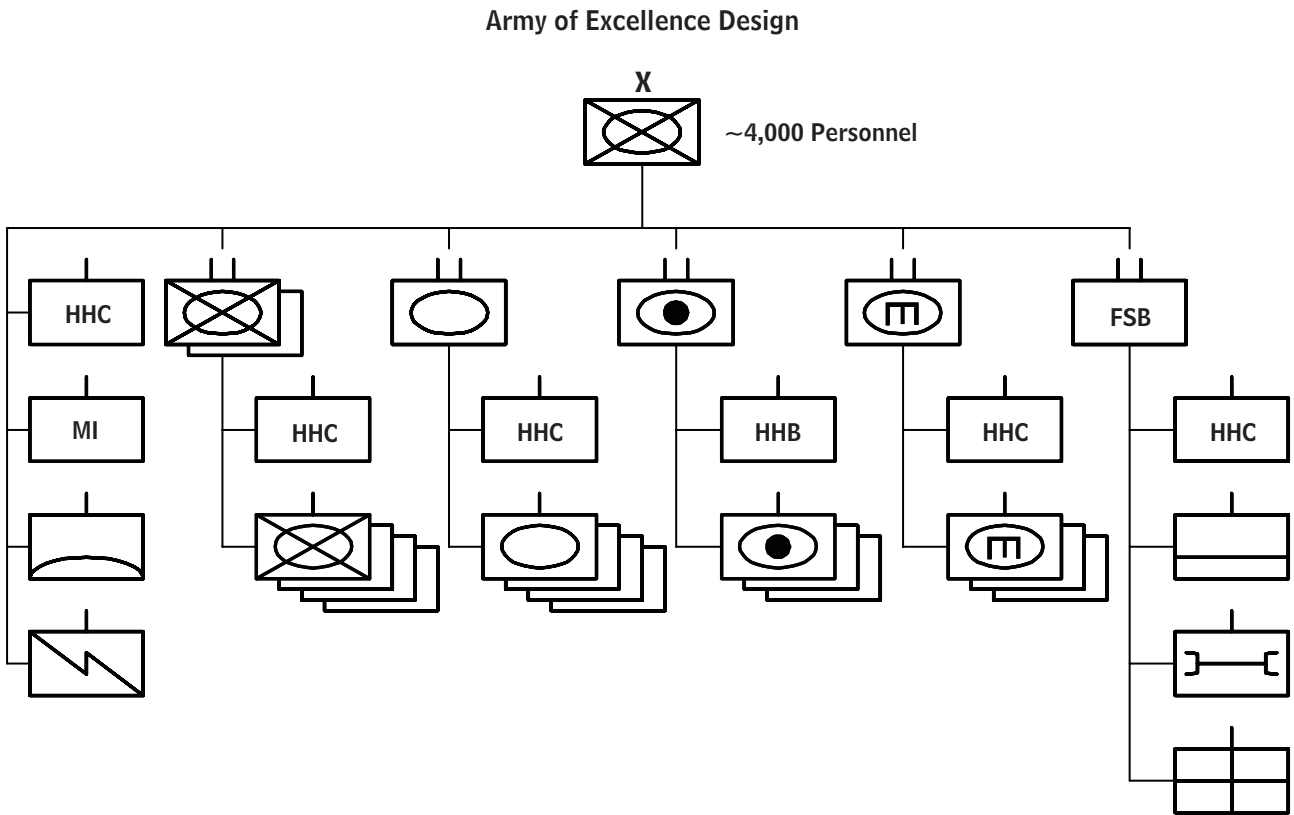
The Army never developed a Force XXI light division but instead continued to evolve the AoE design (shown in Figure A-6). Until the Army finishes its modularity conversions, light AoE divisions will persist in the Army.

A light division's base includes division headquarters, a main support battalion, an aviation maintenance company, a division aviation brigade, a battery of 155-millimeter towed artillery, and some division troops. As in a heavy division, that base is reinforced with support units from the corps, including a combat support group and one or two artillery brigades.

Brigades

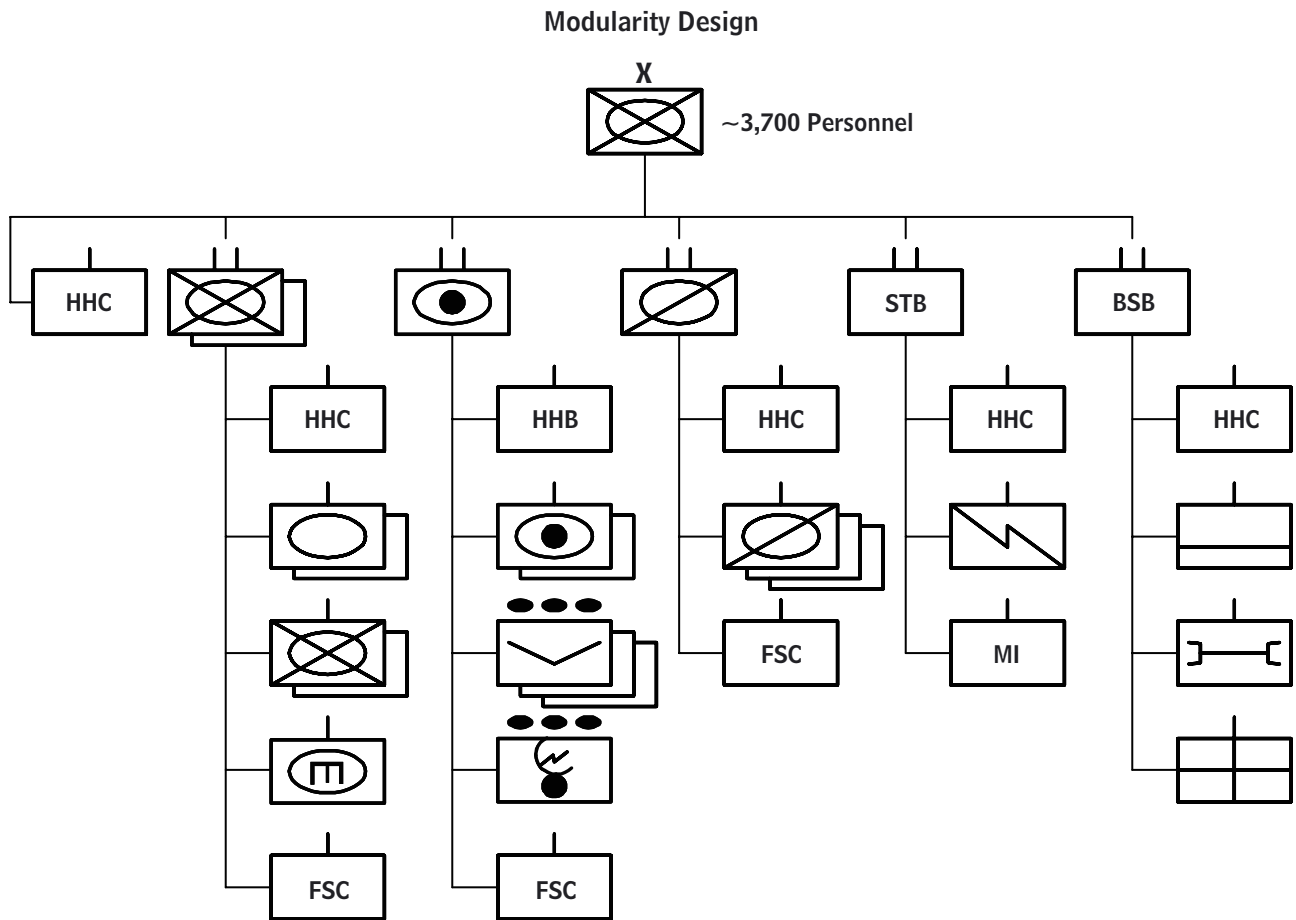
A brigade combat team—commanded by a colonel if the brigade is part of a division or by a brigadier general if it is separate—is the primary unit of analysis in this study. Just as divisions contain three subordinate maneuver brigades, BCTs contain three subordinate maneuver battal-

Figure A-7.
Structure of an Army Heavy Brigade Under Various Designs



Continued

Figure A-7.
Continued



Source: Congressional Budget Office.

Note: BSB = brigade support battalion; BSC = base support company; FSB = forward support battalion; FSC = forward support company; HHB = headquarters and headquarters battery; HHC = headquarters and headquarters company; MI = military intelligence; STB = special troops battalion. (Other symbols are defined in Figures A-1 and A-2.)

ions. (The number of battalions will decline to two under the Army's planned modularity reorganization.) BCTs come in heavy, armored cavalry, medium, and light versions.

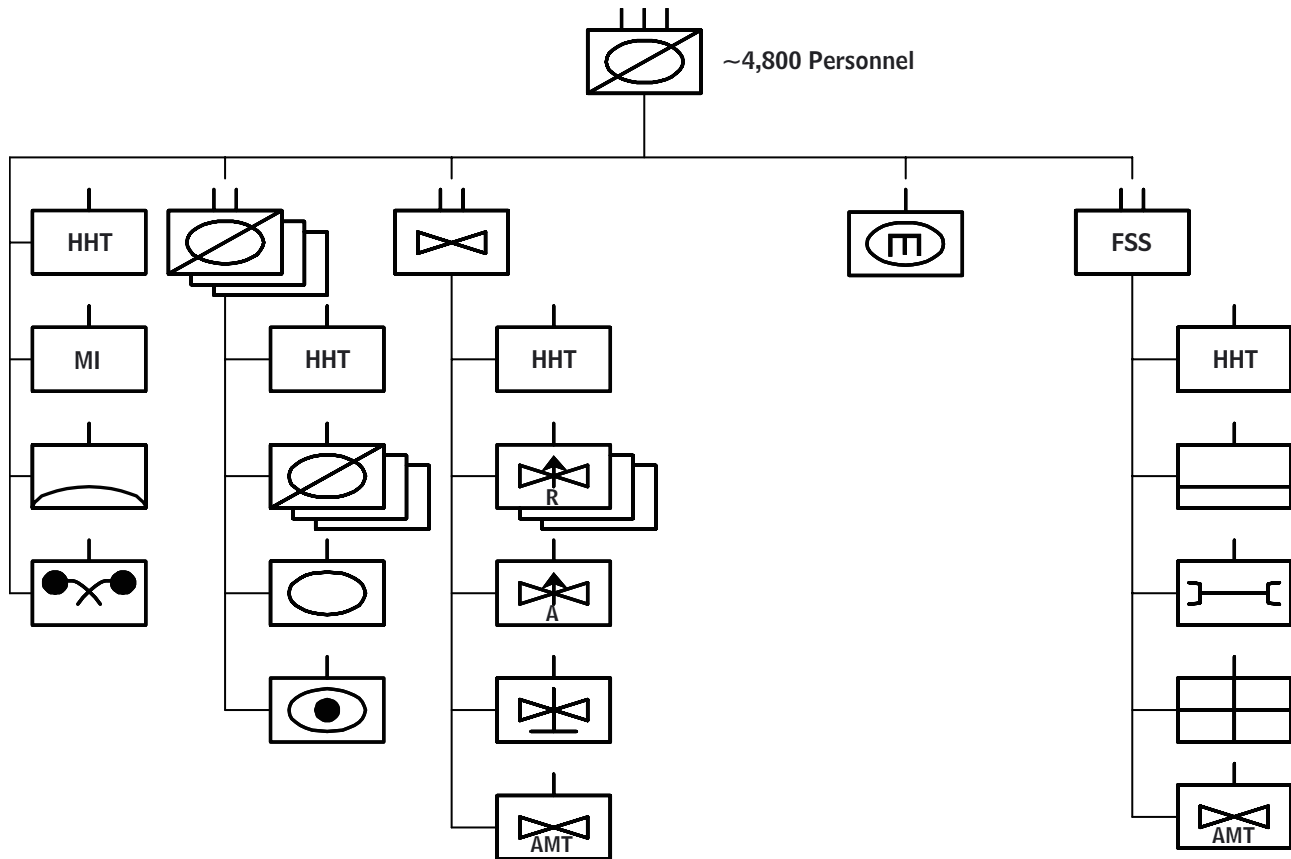
Heavy Brigade Combat Teams

As described earlier, the Army has two types of heavy BCTs: armored BCTs (with two armored battalions and one mechanized infantry battalion) and mechanized infantry BCTs (with two mechanized infantry battalions and one armored battalion). Under the Army of Excellence design, heavy BCTs are robust units relative to other units and Army tradition: each armored or mechanized infantry battalion contains four companies instead of three, and each artillery battery has eight guns rather

than six, as in other units and past Army practice (see Figure A-7).

Heavy BCTs of the more recent Force XXI design follow the usual structure by having three companies per armored or mechanized infantry battalion. Thus, those BCTs differ from their AoE predecessors by having nine maneuver companies instead of 12. They also include more support units, such as a brigade reconnaissance troop and forward support companies for each maneuver battalion.

Under its current plans, the Army will convert all of its BCTs to a modular configuration by 2008. Modular heavy BCTs, the Army's newest series of units, are the

Figure A-8.**Structure of an Army Armored Cavalry Regiment**

Source: Congressional Budget Office.

Note: FSS = forward support squadron; HHT = headquarters troop; MI = military intelligence. (Other symbols are defined in Figures A-1 and A-2.)

centerpiece of the modularity initiative spearheaded by the Chief of Staff of the Army, General Peter Schoomaker. They will differ from previous BCTs in numerous ways. A modular heavy BCT will contain only two maneuver battalions—each one comprising two armored and two mechanized infantry companies—rather than three or four battalions. Thus, it will include just eight maneuver companies, instead of nine or 12, and an equal mix of armored and mechanized infantry units, eliminating the current difference between armored BCTs and mechanized infantry BCTs. The new heavy brigades will also have a much larger set of support units, including some types of units (such as unmanned aerial vehicles and counterbattery radars) that were previously found only in divisions. In addition, the modular BCTs will have a reconnaissance squadron that is larger and more robust than the brigade reconnaissance troop in a Force XXI

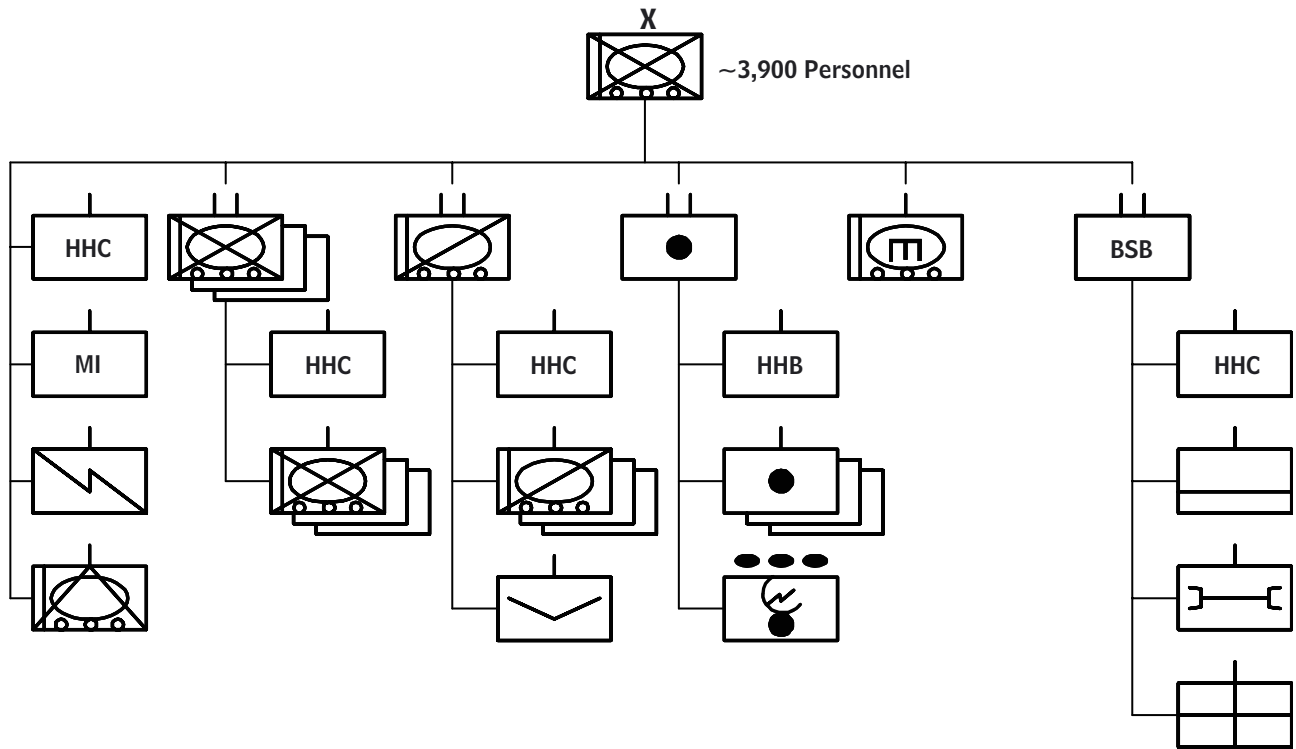
heavy BCT. Modular BCTs are also designed to separate easily into battalion-sized combat teams, should that prove necessary, thereby increasing the Army's flexibility.

Armored Cavalry Regiments

An ACR, which is commanded by a brigadier general, contains three subordinate armored cavalry squadrons (see Figure A-8). Unlike other Army cavalry units, those squadrons are large, robust, include armor and artillery, and are intended to be capable of engaging enemy forces directly. Thus, CBO considers ACR squadrons to be maneuver units (unlike other cavalry squadrons).

Armored cavalry regiments are designed to be deployed with a corps to scout ahead of the corps or secure its flanks. For that reason, they are relatively large, self-contained, and powerful compared with other Army

Figure A-9.
Structure of an Army Medium (Stryker) Brigade



Source: Congressional Budget Office.

Note: BSB = brigade support battalion; HHC = headquarters and headquarters company; MI = military intelligence. (Other symbols are defined in Figures A-1 and A-2.)

BCTs. They also require more personnel than any other kind of BCT. In addition, they are the only type of BCT to include an aviation troop. That troop can have more than half as many helicopters as a division does, giving ACRs access to much more firepower than most BCTs have.

Today’s ACRs are all structured according to the Army of Excellence design. Under the Army’s plan for modularity, those ACRs may be converted to heavy BCTs.

Medium Brigade Combat Teams

The Army currently has two brigade combat teams, called Stryker BCTs (SBCTs), that are considered medium brigades (see Figure A-9). SBCTs are intended to provide the Army with a force that is lighter and easier to deploy than heavy BCTs but has more combat capability than light BCTs. The main elements of an SBCT are three subordinate infantry battalions, equipped with

Stryker vehicles. Those battalions include the Mobile Gun System Stryker variant for increased firepower.

By design, SBCTs have extremely limited logistics capabilities. The Army has a dedicated type of corps-level support battalion, referred to as the “corps plug,” for each SBCT (that battalion is not included in Figure A-9). Employing an SBCT would almost always require deploying at least the corps plug in addition to the SBCT.

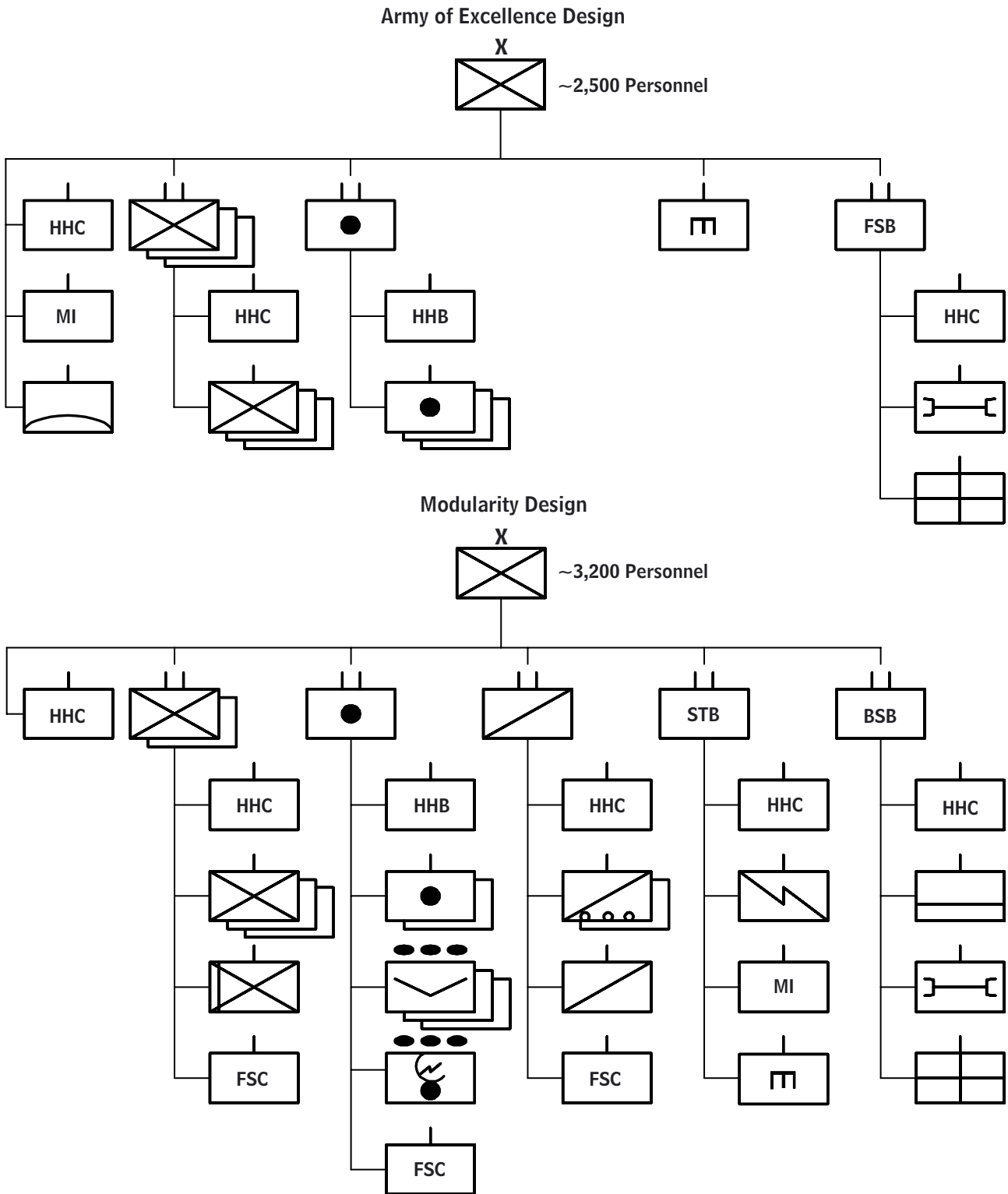
The Army is in the process of converting four more brigades to the SBCT structure. All SBCTs are considered Force XXI units, and the Army’s current plan for modularity does not call for changing their structure. Most of the new SBCTs will be divisional brigades, despite the fact that there are no medium or Stryker divisions.

Light Brigade Combat Teams

As explained above, the main elements of a BCT are its subordinate maneuver battalions. In light BCTs of the

Figure A-10.

Structure of an Army Light Brigade Under Various Designs

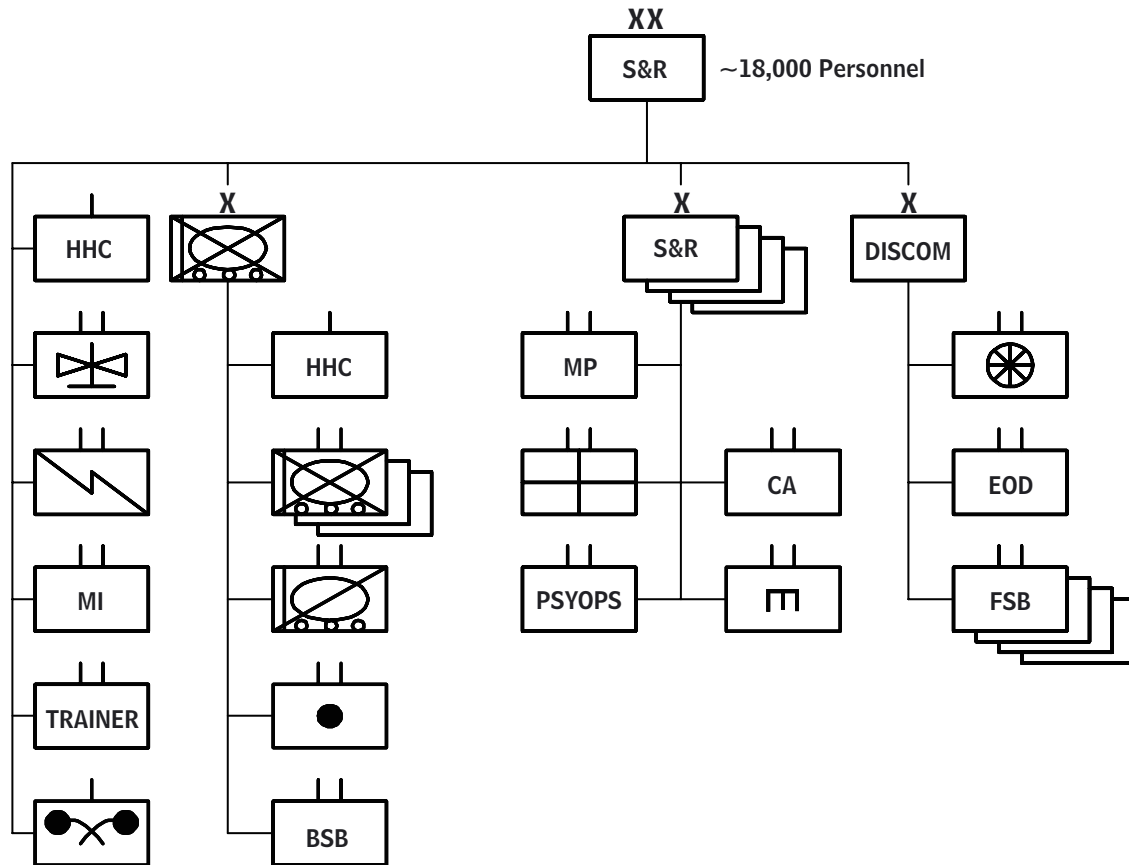


Source: Congressional Budget Office.

Note: BSB = brigade support battalion; FSB = forward support battalion; FSC = forward support company; HHB = headquarters and headquarters battery; HHC = headquarters and headquarters company; MI = military intelligence; STB = special troops battalion. (Other symbols are defined in Figures A-1 and A-2.)

Figure A-11.

Structure of a Notional Stabilization and Reconstruction Division



Source: Congressional Budget Office.

Note: BSB = brigade support battalion; CA = civil affairs; DISCOM = division support command; EOD = explosive-ordnance disposal; FSB = forward support battalion, HHC = headquarters and headquarters company; MI = military intelligence; MP = military police; PSYOPS = psychological operations; S&R = stabilization and reconstruction; TRAINER = training assistance. (Other symbols are defined in Figures A-1 and A-2.)

Army of Excellence design, those battalions consist of three light infantry, airborne, or air assault battalions (see Figure A-10). An AoE light BCT has extremely limited logistics capabilities and contains less firepower than any other kind of BCT; however, it includes more infantry personnel than other BCTs do.

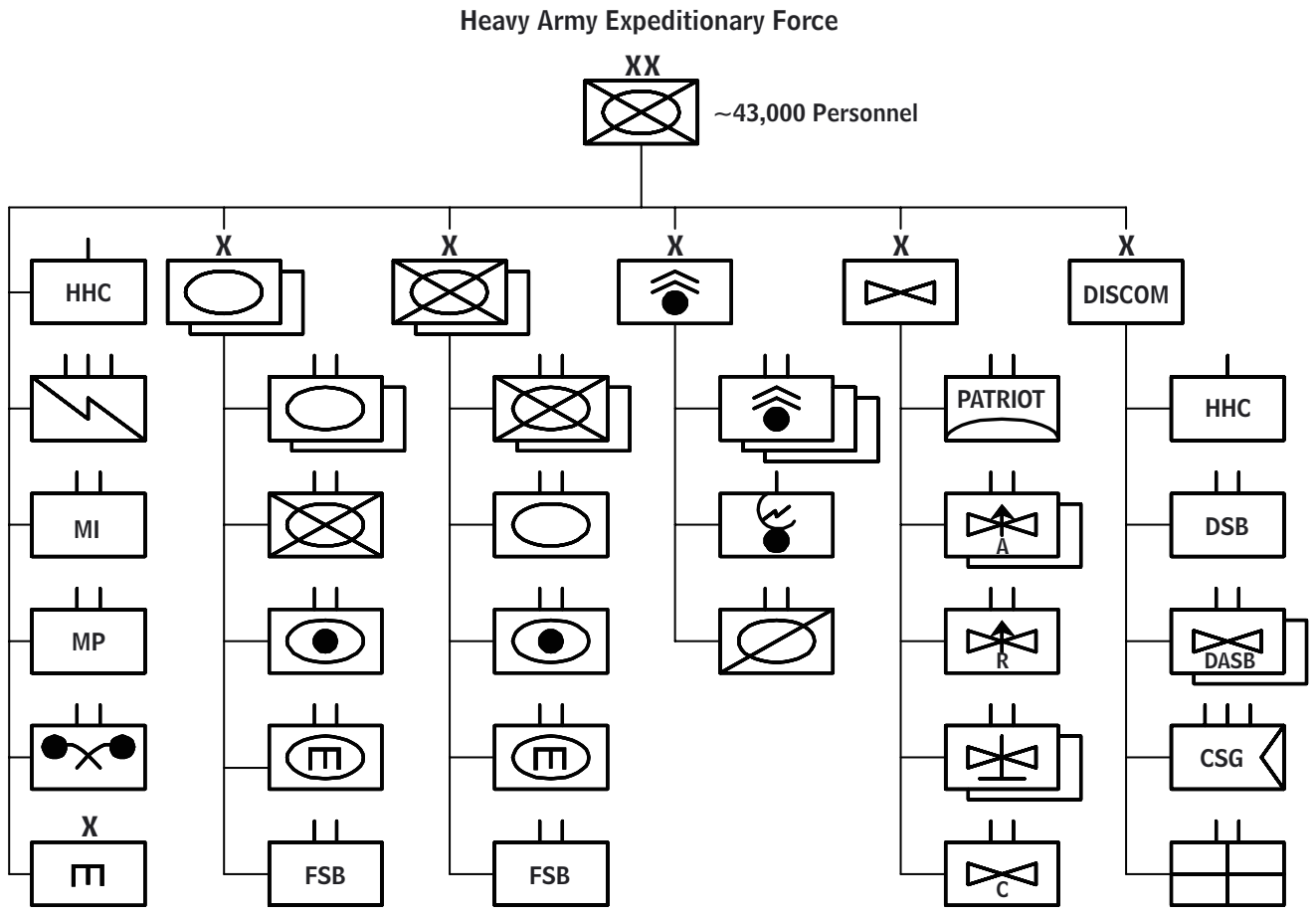
The Army is converting its AoE light BCTs into modular light BCTs, a process it plans to finish in 2007. (The Army never developed Force XXI light brigades.) Modular light BCTs have two subordinate maneuver battalions rather than three, each with three subordinate light infantry companies and a heavy-weapons company armed with antitank missiles, mortars, and machine guns. As with

other light forces, under the modularity plan, there will be no difference among light infantry, airborne, and air assault light BCTs except for the training their personnel receive.

Although modular light BCTs have fewer maneuver companies than their AoE predecessors do (eight instead of nine), they have a much larger set of support units—including some types, such as unmanned aerial vehicles and counterbattery radars, that were previously found only in divisions. They also, unlike their predecessors, include a reconnaissance squadron. Modular light BCTs have the added flexibility of being easy to separate into battalion-sized combat teams.

Figure A-12.

Structure of Notional Heavy and Light Army Expeditionary Forces



Continued

New Units from the Options in This Analysis

Some of the alternative reorganization plans discussed in Chapter 2 envision creating new types of Army units. The rest of this appendix describes several of those units.

Stabilization and Reconstruction Divisions

Under Alternative 4, the Army would establish five so-called stabilization and reconstruction (S&R) divisions—along the lines of a proposal made in a study by the National Defense University—that would be intended for peacekeeping tasks. The major elements of an S&R division would consist of a Stryker BCT (to provide combat power), four S&R brigades, and a support command (see Figure A-11 on page 59). The Stryker BCT would have the same structure as those now in the Army. The S&R groups would comprise military police, medical, civil affairs, engineer, and psychological operations battal-

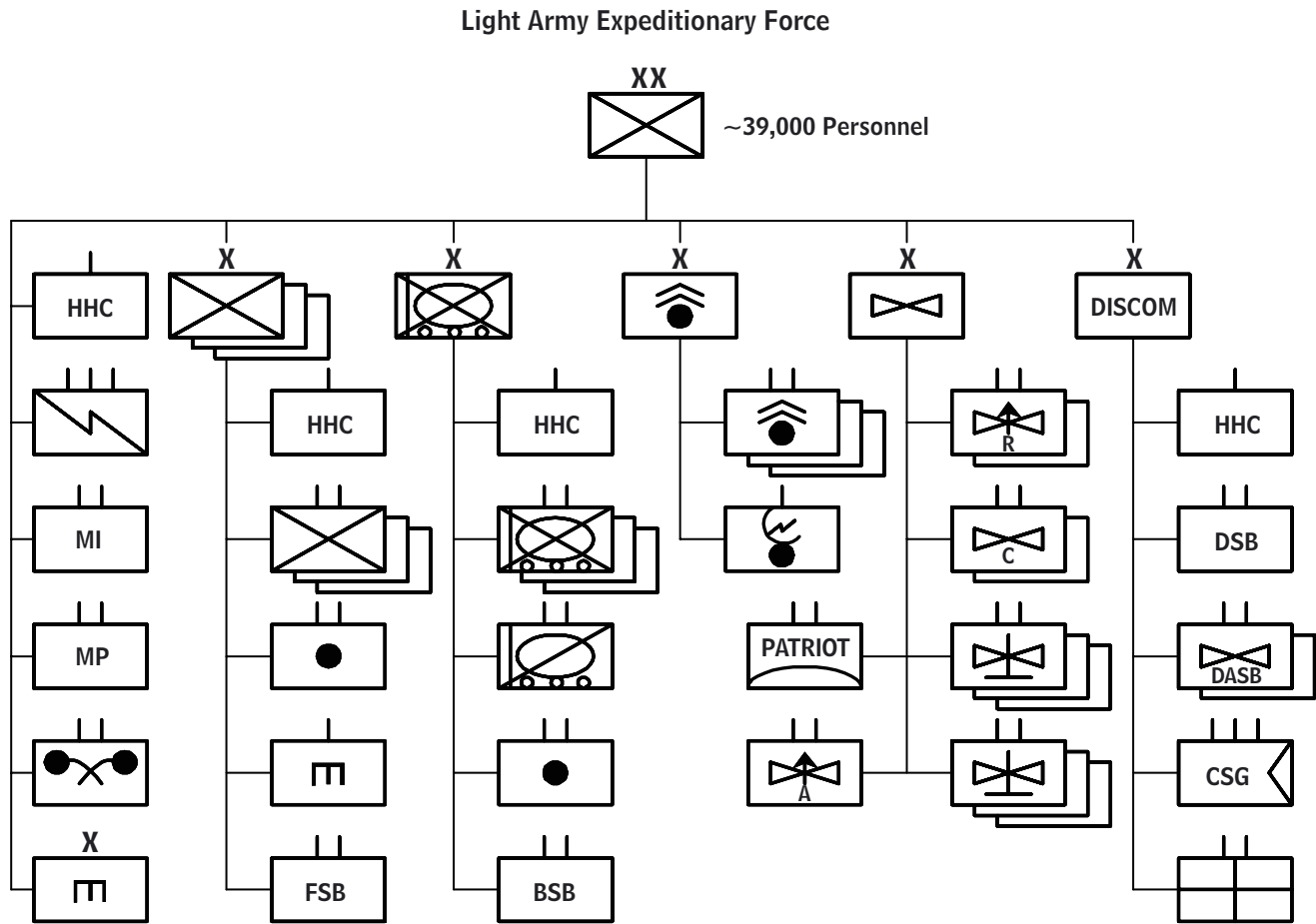
ions. The support command would include an area support battalion for each S&R group. The division base for an S&R division would feature an explosive-ordnance-disposal battalion and a training-assistance battalion as well as more-common support elements.

Heavy and Light Army Expeditionary Forces

Alternative 6 would reorganize the Army into a series of expeditionary forces (similar to Marine expeditionary forces). Each force, heavy or light, is intended to be self-contained and rapidly deployable (see Figure A-12).

A heavy expeditionary force would contain a ground combat element (with two armored BCTs and two mechanized infantry BCTs), an air combat element (with six squadrons of helicopters and Patriot missile air-defense units), and a support group (with support elements like those included in a division support command and corps

Figure A-12.
Continued



Source: Congressional Budget Office.

Note: BSB = brigade support battalion; CSG = corps support group; DISCOM = division support command; DSB = division support battalion; FSB = forward support battalion; HHC = headquarters and headquarters company; MI = military intelligence; MP = military police. (Other symbols are defined in Figures A-1 and A-2.)

support group). It would also include numerous types of echelons-above-division (EAD) support units that are now maintained at the corps level, such as additional rocket-launcher artillery battalions, engineer battalions, and other types of support units. (Some of those other EAD units are not shown in Figure A-12 because of their large number and small size.)

A light expeditionary force, by comparison, would also contain a ground combat element (but with three light BCTs and one Stryker BCT), an air combat element (with 11 squadrons of helicopters as well as Patriot missile air-defense units), and a support group (with support elements like those included in a division support command and corps support group). Like its heavy counter-

part, a light expeditionary force would also include numerous EAD support units currently maintained at the corps level, such as additional rocket-launcher artillery battalions, engineer battalions, and other types of support units (some of which are not included in Figure A-12).

The command levels and arrangements displayed in Figure A-12 are notional. The Army might prefer that such expeditionary forces be equivalent to a corps-level command—with division-level ground, air, and support commanders—or some other arrangement. Those changes would not materially affect the size or composition of such a formation, and the Congressional Budget Office is not able to evaluate what types of command arrangements would be superior to others.

B

The Army's Plan for Modularity

As described in Chapter 1, the Army is currently undertaking a large-scale reorganization, known as modularity. The Congressional Budget Office (CBO) does not have enough information about that reorganization plan to analyze it in the same manner that CBO analyzed the Army's previous force structure or the various alternatives examined in Chapter 2. Parts of the plan that deal with combat forces have been announced; parts that deal with support forces have either not yet been decided or not made public. This appendix describes the modularity plan as CBO understands it and outlines the limited conclusions that CBO has been able to draw about the implications of modularity.

For the purposes of CBO's analysis, the core elements of a force structure are the number and types of major combat units, including the number of echelons-above-division (EAD) support units required by those combat units; the distribution of combat and support units between the active and reserve components; and the size of the forces and weight of the equipment that would be deployed to a contingency. Having descriptions of those elements allowed CBO to quantitatively evaluate the measures of warfighting, peacekeeping, dependence on the reserves, and deployment speed that are used in this study. Because CBO did not have access to a full set of those descriptive elements for the modular Army, it could not evaluate the modular Army in terms of those measures. This appendix describes some reasonable assumptions that could be made to fill in the gaps in CBO's understanding of modularity and estimates how well the modular force might perform, according to those measures, if the assumptions proved true.

Overview of Modularity

CBO has four primary sources of information about the Army's modularity plan. The first is a series of briefings and press reports that the Army has provided to the pub-

lic and the Congress. Army briefings generally address high-level topics and lack extensive details, but they do establish the service's broad goals and policy initiatives. The second source of information is an Army database, WebTAADS, which is used to manage units at a high level of detail.¹ WebTAADS provides information only about changes in the Army's structure that have been formally decided—and thus is of limited use for describing future changes—although it does offer a large amount of detail about unit changes that have been approved. The third source is a database of Table of Organization and Equipment (TOE) documents (the templates that describe unit designs) maintained by the Army Force Management Support Agency's Requirements Division.² TOE documents can be used for a variety of purposes, but CBO primarily used them to determine how much equipment various types of units would have and thereby estimate how much a unit's equipment would weigh and how easily the unit could be transported and deployed. The last source of information about modularity is a large Army paper called *Army Comprehensive Guide to Modularity*.³ The guide currently consists of a volume that describes major combat units and command relationships. The second volume, describing higher-echelon units and support units, has not yet been published.

1. WebTAADS is an Internet version of The Army Authorization Document System (TAADS), which the Army uses to manage its units. That system is extremely detailed since it is used to establish authorized levels of personnel and equipment for tens of thousands of units, subunits, and other elements of the Army.
2. Those templates differ slightly from actual units; in essence, they describe how any type of unit "should" be structured. For a variety of reasons, actual units tend to deviate from the exact TOE pattern in terms of number of personnel, equipment, subordinate units, and so forth. However, most units are similar enough to the TOE pattern that TOE documents are useful for analyzing them.
3. U.S. Army Training and Doctrine Command, *Army Comprehensive Guide to Modularity*, version 1.0 (October 8, 2004).

The overriding goal of the modularity reorganization is to convert the Army's combat brigades into a series of units with new designs that, according to Army briefings, will be more capable of independent operations. In addition, the number of combat brigades in the active Army will rise from 33 at the beginning of 2004 to either 43 or 48 by the end of the decade. (The Army will not decide the exact number for several years.)

That overall plan includes the following specific changes:

- Creating a new type of heavy brigade and new type of light brigade, each with two maneuver battalions, a reconnaissance battalion, and other units.⁴ (Those new brigades are illustrated in Appendix A.)
- Converting all combat units other than Stryker brigades and scout groups to the new heavy or light brigade configuration. (Stryker brigades and the Army's one scout group, which is in the National Guard, would keep their current configurations.)
- Organizing all combat brigades (both divisional and separate) into permanent brigade combat teams rather than the current practice of task-organizing divisional brigades into brigade combat teams on an ad hoc basis as specific tasks require.
- Creating new active combat brigades by increasing the number of combat brigades in active divisions to four (exclusive of any Stryker brigades). If the Army grows to 48 combat brigades, it will have 10 active divisions—each with four combat brigades as well as five Stryker brigades, a separate heavy brigade (or an armored cavalry regiment), and two separate airborne brigades.⁵ If the Army grows only to 43 combat bri-

4. Several sources, such as Department of the Army, *2004 Army Transformation Roadmap* (July 2004) and some Army briefings, indicate that the Army may seek to add a third combat battalion to each of those brigades, if feasible. Most other Army sources, including the *Army Comprehensive Guide to Modularity* and Web-TAADS, do not indicate such plans.

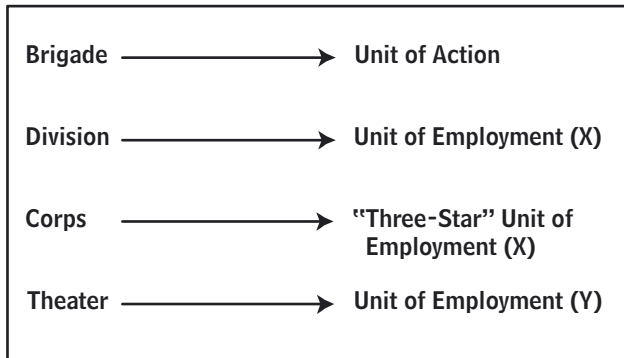
5. Those last items are somewhat unclear. The Army is apparently still debating whether to convert the 3rd Armored Cavalry Regiment to a standard heavy brigade configuration, although the general statement about modularity is that there will be only three types of combat units: heavy, light, and Stryker. Most Army briefing charts show a new airborne brigade being created in 2007, but at least one chart shows an infantry brigade. Those units would be structured the same but trained slightly differently.

gades, the 1st Infantry Division and 1st Armored Division will have three brigades apiece, the 2nd Infantry Division will have two brigades (exclusive of any Stryker brigades), and the Army will have just one separate airborne brigade.

- Reducing the number of combat brigades in the Army National Guard and consolidating all of the existing separate brigades within National Guard divisions. The National Guard will have eight divisions, each with four combat brigades, as well as a separate Stryker brigade and separate scout group. Over time, heavy National Guard brigades will be converted to light brigades.
- Redefining the current brigade level of command as the "Unit of Action." That level will continue to be identified with current brigade headquarters, flags, and insignia and can be referred to as the brigade level (see Figure B-1).
- Merging the command responsibilities of the current division level and some of the command responsibilities of the current corps level into a "Unit of Employment (X)," or UE(X), level of command. That level will be identified with current division headquarters, flags, and insignia and can be referred to as the division level.
- Converting current corps headquarters into a "Three-Star UE(X)" to be used for command and control in larger theaters. That level will be identified with current corps headquarters, flags, and insignia and can be referred to as the corps level.
- Merging the command responsibilities of the current theater level and some of the command responsibilities of the current corps level into a "Unit of Employment (Y)," or UE(Y), level of command. That level will be identified with current "named Army" headquarters (such as U.S. Army Europe or U.S. Army Pacific, but not the 7th Army or 8th Army), flags, and insignia and can be referred to as the theater level.
- Converting divisions into a flexible headquarters element with a set of combat brigades and support brigades. The support brigades will generally be the same as those found in current divisions (in some cases with new names, such as a "fires brigade" instead of a "divi-

Figure B-1.

Army Command Levels Before and After Modularity



Source: Congressional Budget Office.

sion artillery"), with the exception of an as-yet-undefined "maneuver enhancement" brigade.

- Converting all corps- and theater-level support units into a standardized set of support brigades that can be allocated more flexibly. The UE(Y) will include some of the traditional theater-level organizations (such as the theater support command, medical command, and aviation brigade) as well as some new organizations (such as the theater network command).
- Establishing a trainees, transients, holdees, and students (TTHS) account for both the Army Reserve and Army National Guard.
- Collecting Army Reserve support units into 10 to 12 "Army Reserve expeditionary packages" similar to the concept of air expeditionary forces used by the Air Force.
- Temporarily increasing the size of the active Army by 30,000 personnel. Those personnel would be available through at least 2007 and would be used to create the additional active combat brigades. After 2007, the Army intends to identify enough nondeployable (Table of Distribution and Allowances, or TDA) units and TTHS positions that could be eliminated to return to its permanent end-strength level by 2011. That would be achieved by getting rid of some overhead positions, hiring civilians to perform certain administrative functions that are now performed by soldiers, and reducing the frequency with which sol-

diers are assigned to new units. (The permanent end-strength level is assumed to be 482,400, until the impact of the 2005 defense authorization act, which increased the Army's size, is incorporated into the Army's plans.)

- Assigning two National Guard divisions to the mission of strategic reserve and the other six to homeland security or peacekeeping missions.

To perform a detailed analysis of that plan, CBO would need information about various elements that either have not been decided or have not been announced. That information includes answers to such questions as, What types and designs of support brigades, and how many of each type, will this force require? Will support forces continue to be organized according to a doctrine-based set of rules that includes fixed ratios of support units to combat units? Will support forces still be organized so that higher-level headquarters have fixed elements that must be deployed for any large operation? How will the theater-level commands be organized, and how large will they be? Will the Three-Star UE(X) include any distinct support elements? Will all existing types and levels of support be maintained? What level of support units will be required for National Guard divisions? Will the Army find 30,000 TDA and TTHS positions to cut in order to return to its normal end strength? And can the Army expand to 48 active combat brigades without additional personnel beyond the 30,000 required to attain a size of 43 active combat brigades?

Assumptions About the Impact of Modularity on the Army's Force Structure

Because the Army's modularity plan includes an indeterminate number of combat brigades (either 43 or 48 in the active component and 34 in the National Guard) and does not fully describe the EAD support requirements that those combat brigades will entail, it is unclear exactly how many personnel the Army will require for modularity. Other factors also make it difficult to estimate the final size of the Army under the modularity plan, such as the question of whether the Army will be able to identify 30,000 TDA/TTHS positions for elimination and the possible effects of Congressional action to change the size of the active component.

Table B-1.**Potential Size of the Modular Army**

	Personnel per Unit	43-Brigade Force				48-Brigade Force			
		Number of Units		Number of Personnel		Number of Units		Number of Personnel	
		Active	Reserve	Active	Reserve	Active	Reserve	Active	Reserve
Brigades									
Heavy UA	3,675	19	18	69,825	66,150	21	18	77,175	66,150
Light UA	3,250	18	14	58,500	45,500	21	14	68,250	45,500
Stryker	3,875	5	1	19,375	3,875	5	1	19,375	3,875
ACR ^a	4,750	1	0	4,750	0	1	0	4,750	0
Scout	1,800	0	1	0	1,800	0	1	0	1,800
Subtotal	n.a.	43	34	152,450	117,325	48	34	169,550	117,325
Division Support									
Heavy UE(X)	1,050	6	6	6,300	6,300	6	6	6,300	6,300
Heavy artillery	550	6	6	3,300	3,300	6	6	3,300	3,300
Heavy aviation	2,175	6	6	13,050	13,050	6	6	13,050	13,050
Heavy support	425	6	6	2,550	2,550	6	6	2,550	2,550
Light UE(X)	975	4	2	3,900	1,950	4	2	3,900	1,950
Light aviation	2,650	5	2	13,250	5,300	5	2	13,250	5,300
Light support	475	4	2	1,900	950	4	2	1,900	950
Subtotal	n.a.	n.a.	n.a.	44,250	33,400	n.a.	n.a.	44,250	33,400
Total	n.a.	43	34	196,700	150,725	48	34	213,800	150,725

Source: Congressional Budget Office.

Notes: "Reserve" refers to the reserve component (the Army National Guard and Army Reserve).

UA = Unit of Action; ACR = armored cavalry regiment; n.a. = not applicable; UE(X) = Unit of Employment (X).

a. These numbers assume that the Army retains the 3rd Armored Cavalry Regiment in its current form.

CBO has estimated a range of potential outcomes for the modular Army on the basis of various assumptions about force structure described below. The resulting estimates of the potential size of the Army and of the possible distribution of forces between the active and reserve components underlie CBO's attempt to evaluate how well the modular Army might perform according to the measures of capability used in this study.

Combat Forces

The first element of the Army's plan is a new combat brigade structure. In addition, according to the WebTAADS database, the Army is planning new structures for the 3rd Infantry, 4th Infantry, 10th Light Infantry, and 101st Air Assault Divisions. CBO used that information to estimate the total size of the Army's combat forces under the modularity plan (see Table B-1).

CBO's estimate assumes that modular divisions will either be heavy or light. A heavy division will resemble the

pattern of the modular 3rd and 4th Infantry Divisions as detailed in WebTAADS, and a light division will resemble the pattern of the modular 10th Light Infantry and 101st Air Assault Divisions. The 101st Air Assault Division will have two aviation brigades (as is the case for the current force), and all other light divisions will have a single aviation brigade. The six heavy divisions and four light divisions in the active component will all retain their current status, and the National Guard will have six heavy and two light divisions.⁶ All heavy divisions will have a heavy UE(X) headquarters, support command, artillery brigade, and aviation brigade. All light divisions will in-

6. Most current National Guard divisions have a mixed type of division base and mixed light and heavy subordinate combat brigades—a setup that makes it difficult to meaningfully categorize National Guard divisions. If CBO's assumption about the mix of light and heavy National Guard division bases is incorrect, the National Guard's personnel requirement will decline by about 100 for every additional division base that is light instead of heavy.

clude a light UE(X) headquarters, support command, and aviation brigade. CBO's estimate is based on the mix of combat brigades that is now planned for 2007, when active modularity conversions will be complete and the decision about whether to have 43 or 48 brigades will have been made.

Currently, the Army has about 170,000 active personnel and a similar number of National Guard personnel in major combat units. If CBO's assumptions are correct, the modularity plan will imply a different pattern of personnel distribution. The active component will need about 25,000 to 45,000 additional positions for major combat units, whereas the National Guard will need 20,000 fewer such positions. Since the 43-brigade force requires 25,000 additional active personnel, the Army will probably be able to achieve that force using the temporary increase of 30,000 in its size. The 48-brigade force, however, requires more than 45,000 additional active personnel, which means that the Army will need to make other changes to free up personnel positions for major combat units if it wants a force of that size. In both cases, the share of the Army's combat personnel that are in the active component will increase.

Echelons-Above-Division Support Forces

The second major element of any force structure is the size and type of EAD support forces that the major combat units will require. CBO does not have quantitative details about the modular Army's requirements for EAD support. For the purposes of this analysis, it may be plausible to assume that major combat units in the modular Army will need roughly the same levels of support forces that current units do.⁷

The Army's current force requires about 170,000 personnel to fill out the support positions associated with its two theaters and four corps. Another 20,000 personnel are associated with special forces units that do not vary with the number of combat forces in the Army. The rest of the Army's approximately 430,000 EAD positions are associated with units that provide more-direct support to major combat units (and are required under the Army's current set of doctrinal rules). Those 240,000 personnel, however, are significantly less than the Army would need if all of the National Guard divisions were fully supported. Combat divisions require about one soldier in an EAD

support unit for each soldier in the division itself.⁸ CBO estimates that the Army lacks about 75,000 personnel positions that would be required to fully support all of the National Guard combat divisions.

If the modular Army retains some type of higher-echelon formation that provides support similar to that of the current corps and theater levels, and if its modular divisions and brigades continue to require the present ratio of EAD support personnel to major combat personnel, the Army can expect to need another 5,000 to 25,000 personnel in EAD support units for the modular force (in other words, the 25,000 to 45,000 additional active combat personnel minus the 20,000 fewer National Guard combat personnel). That addition would not change the presumed 75,000-person gap between the current number of Army support units for National Guard divisions and the number required to fully support those divisions.

Because the modular Army will have more active personnel and fewer reserve personnel in major combat units and will require more EAD units to support those active combat units (and fewer EAD units to support National Guard combat units), it is reasonable to assume that the Army will transfer EAD support units from the active component to the reserve component as part of modularity. That shift would reduce the requirement for active personnel by taking advantage of the reduced requirement for reserve personnel. It would also make active combat units far more dependent on reserve EAD support units. Currently, the active Army contains about 40 percent of the EAD support units it requires, CBO estimates. If the Army grows to 48 active combat brigades, CBO's assumptions about EAD support requirements are correct, and the active Army does not permanently increase in size, that fraction will decline to about 30 percent.

The Army's overall requirement for personnel in EAD support units could change if the Army altered the levels of support provided to National Guard combat forces. As noted above, the Army has suggested that two National

7. In this discussion, the current force refers to the Army's structure prior to modularity.

8. Separate brigades, however, require far fewer EAD support personnel, according to the Army's rules. That is not because separate brigades are expected to fight without support. It is because the rules assume that a separate brigade will be assigned to a corps or division that will use its support units to support the separate brigade. About 65,000 of the National Guard's combat personnel are in separate brigades.

Guard divisions will be designated as a strategic reserve under the modularity plan and that six National Guard divisions will be designated for performing peacekeeping missions and homeland security duties. If the divisions allocated to the strategic reserve received a full set of EAD support units but the others were not supported, the requirement for EAD support units would be similar to that under the Army's current structure.

At the same time, however, Army briefings from January and February 2004 indicate that the Army planned to increase the number of National Guard separate brigades maintained at higher levels of manning and readiness. Although more-recent Army sources do not discuss the issue, the earlier briefings may indicate that the Army is planning to increase the level of support provided to National Guard combat formations.

Administrative Units and Individuals

Under the modularity plan, the Army intends to offset the increase in its requirement for personnel in TOE units by reducing the number of personnel in TDA or TTHS positions. One factor complicating that intention is that the Army has begun implementing plans to create small TTHS accounts in both the Army Reserve and the Army National Guard. CBO assumes that those accounts will require about 10,000 additional positions in the reserve component.⁹

If CBO's assumptions about the size of the Army's major combat units and the Army's requirement for EAD support forces are correct, the Army will need an additional 10,000 to 50,000 personnel positions for TOE units. With those numbers added to the Army's requirement for 10,000 additional positions to establish TTHS accounts in the reserves, the Army will need to eliminate 20,000 to 60,000 positions—either from active TDA/TTHS positions or from reserve TDA positions. The Army has announced a strategy for reducing end strength that relies on eliminating 30,000 active TDA/TTHS positions, as

9. CBO made that assumption because it is unclear from Army sources how many positions the service intends to create. At least one Army briefing suggests that the service may try to create an account as large as 80,000. However, because adding a TTHS position requires either increasing the size of the reserve component or eliminating a personnel position in a unit, such a large account seems unlikely. CBO's figure of 10,000 is a fairly conservative estimate. If the Army created a larger TTHS account than CBO assumes, it would require a greater number of additional personnel.

well as achieving other efficiencies. If it meets that goal, it should be able to have a 43-brigade force without a permanent increase in size.

If the Army cannot manage to cut at least 20,000 active TDA/TTHS positions, or if it wants a 48-brigade force, it will need more personnel (assuming that CBO's assumptions are correct). The 48-brigade Army would require 40,000 more positions than the 43-brigade Army, which means that the service could potentially require another 60,000 personnel.

The Army might be able to offset that requirement by reducing the level of support it provides to National Guard combat units. Alternatively, it could request that the temporary 30,000-person increase in size be made permanent. Finally, it is possible that the modular Army might not need higher-echelon formations similar to the corps or theater, which would greatly reduce its total requirement for EAD support units.

Overall Force Structure

On the basis of its assumptions and the considerations discussed above, CBO estimates that the Army's modularity plan could require up to 60,000 additional personnel—depending on whether the Army opts for a 43-brigade or 48-brigade force and whether it makes its desired TDA/TTHS reductions. A 43-brigade force could be achieved with no extra personnel, but it is unlikely that a 48-brigade force could be achieved with less than 30,000 additional personnel. If the Army executes its modularity plan without a rise in the number of active personnel, that plan will increase the active Army's dependence on the reserve component for support units.

Implications for Warfighting

Modularity will affect the Army's warfighting ability by changing the number and size of the service's combat brigades. However, because modular brigades will be significantly different from premodular forces, simply comparing the number of combat brigades in the premodular and modular Army is misleading.

Directly measuring the combat capability of units is difficult, and the most sophisticated attempts to do so use extensive computer models that CBO does not have access to. But modular units will be manned with the same types of soldiers as current units and will employ the same types of equipment that the Army uses now. Thus,

the easiest way to compare different brigades is to assume that either the number of personnel or the number of some type of subordinate unit (such as a battalion or company) can be used to normalize the differing sizes of the different brigade types.

Most modular brigades (other than the Stryker brigades and perhaps the 3rd Armored Cavalry Regiment) will have two subordinate maneuver battalions, as opposed to three in most current brigades. However, those modular battalions will generally contain four subordinate maneuver companies, in contrast with the three companies in most current battalions. CBO chose to normalize modular and current brigades using the company, whose definition does not appear to have changed under the modularity plan, as opposed to the battalion, which has been redefined.¹⁰

In fully normalized terms, the Army's current force structure contains about 624 maneuver companies. The 43-brigade modular Army would have 618 maneuver companies, whereas the 48-brigade modular Army would have about 658 maneuver companies (see Table B-2). By that measure, the 43-brigade modular Army would have slightly less combat power than the current force, but the 48-brigade Army would have about 5 percent more combat power than the current force (equivalent to slightly

10. That comparison is based on maneuver units. There does not appear to be a strict definition of such units, but they are generally accepted to be front-line combat units capable of closing with the enemy by means of fire and maneuver. CBO assumed—on the basis of units' composition and missions—that armored and infantry companies count as maneuver forces, as do armored cavalry troops from armored cavalry regiments. It is possible to argue that other types of units (such as attack-helicopter units, other reconnaissance troops, and so on) should also be considered maneuver units. Including those units would alter the results of this comparison.

Some analysts have argued that other reconnaissance troops in the modular force should also be considered maneuver units because of the growing importance of intelligence and reconnaissance capabilities in conducting modern warfare. However, such units differ in various ways—including their small size, limited weaponry, and narrow range of missions—from more-traditional considerations of what constitutes a "combat" unit.

If all reconnaissance companies were considered maneuver units, the 43-brigade force would have about 19 percent more combat units than the premodular force, and the 48-brigade force would contain about 27 percent more combat units than the premodular force.

more than three current combat brigades). Comparing the number of personnel required for combat units in the modular Army yields a similar result: the 43-brigade force would have essentially the same amount of combat power as the current force, whereas the 48-brigade Army would have over 7 percent more combat power than today's force.

In both the 43- and 48-brigade modular forces, a higher percentage of the Army's combat units would be in the active component than is the case today. Thus, the Army would clearly have more active combat forces. Because the Army has not employed National Guard combat units in major combat operations since the Korean War, a larger number of active combat units might mean a larger number of combat units that could effectually be used in major combat operations.¹¹

Those comparisons omit the effect that support forces have on a unit's combat power. Although maneuver units are the core of the Army's forces, their ability to fight effectively depends on extensive amounts of support. Two identical maneuver units with differing levels of support can have very different capabilities in combat. Almost all types of support units contribute in relatively obvious ways to improved combat capability—for example, additional artillery units provide extra firepower, military intelligence units can identify new targets or objectives, additional logistics units allow combat units to sustain a higher pace of operations without running out of fuel or ammunition, and so forth. It is possible that the modularity plan will either improve or degrade the level of support that Army units receive (and thus their combat capability relative to this comparison). However, as noted above, CBO does not know what level of EAD support the Army intends to give modular forces.

A final factor in comparing combat capability is that some proponents of modularity argue that modular brigades would be qualitatively superior to current brigades—despite having fewer combat companies—because of their design, structure, or equipment. CBO is unable to evaluate such claims. If they are true, the modularity plan may increase combat power to a greater ex-

11. The Army deployed the National Guard's 42nd Infantry Division to Iraq in the 2005 rotation of forces. However, that deployment included only the division base, not the division's brigade combat teams.

Table B-2.**Number and Types of Brigades in Premodular and Modular Forces**

Type of Brigade	Number per Brigade			Number of Brigades		Number of Companies	
	Battalions	Companies	Personnel	Active	Reserve	Active	Reserve
Premodular Force							
Heavy	3	9	3,500	16	21	144	189
Light	3	9	2,600	13	14	114 ^a	126
Stryker BCT	3	9	3,875	3	0	27	0
ACR	3	12	4,750	1 ^b	1	12	12
Scout ^c	0	0	1,800	0	1 ^d	0	0
Total	n.a.	n.a.	n.a.	33	36	297	327
43-Brigade Force							
Heavy UA	2	8	3,675	19	18	152	144
Light UA	2	8	3,250	18	14	144	112
Stryker BCT	3	9	3,875	5	1	45	9
ACR	3	12	4,750	1	0	12	0
Scout	0	0	1,800	0	1	0	0
Total	n.a.	n.a.	n.a.	43	34	353	265
48-Brigade Force							
Heavy UA	2	8	3,675	21	18	168	144
Light UA	2	8	3,250	21	14	168	112
Stryker BCT	3	9	3,875	5	1	45	9
ACR	3	12	4,750	1	0	12	0
Scout	0	0	1,800	0	1	0	0
Total	n.a.	n.a.	n.a.	48	34	393	265

Source: Congressional Budget Office.

Notes: "Reserve" refers to the reserve component (the Army National Guard and Army Reserve).

BCT = brigade combat team; ACR = armored cavalry regiment; n.a. = not applicable; UA = Unit of Action.

- a. This number is three companies fewer than the number of brigades multiplied by the number of companies per brigade because one of the Army's airborne brigades, the 173rd, currently has only two battalions.
- b. Assumes that the Army retains the 3rd Armored Cavalry Regiment in its current form.
- c. CBO did not count the National Guard scout group as a maneuver brigade for the purposes of this analysis. That formation is shown here only to simplify comparisons with the Army's public statements.
- d. This scout group is not counted in the total since CBO did not include it as part of the 36-brigade force discussed in this analysis.

tent than this comparison suggests. However, the Army has frequently reorganized its forces in the past, and CBO is not aware of historical research showing that such reorganizations have generally increased combat power independently of other changes (such as new equipment).¹² In at least one case, research suggests that a reorganization significantly degraded the Army's combat power.¹³

Implications for the Army's Ability to Sustain Extended Deployments

The effect that modularity will have on the Army's peace-keeping ability is related to the number of additional units and personnel that the service will have available for extended deployments. Because CBO assumed that all combat forces are useful for sustaining extended deployments, the modularity plan should have a roughly similar effect on the Army's ability to sustain forces overseas as it does on the Army's ability to fight wars. That effect will be slightly larger, however, because the modularity plan shifts more major combat units into the active component. Active units can be rotated through deployments at a higher rate than reserve units can. As such, the additional 25,000 to 45,000 active personnel in major combat units produce a greater improvement—on a per-soldier basis—in the Army's ability to sustain an extended deployment than the 20,000 fewer reserve personnel in major combat units decrease that ability.

CBO estimates that with a 43-brigade force, about 5,000 to 7,000 additional personnel could be sustained overseas for extended deployments, and with a 48-brigade force,

about 9,000 to 11,000 additional personnel would be available. Those numbers represent improvements of about 5 percent and 8 percent, respectively, in the peace-keeping ability of the current force.

If the Army requires additional EAD support forces for the increased number of modular units—as is likely—some of those support forces can also be used to sustain extended deployments. However, it is also likely that the modularity plan will require the Army to depend more on the reserves to provide EAD support units. Those units will rotate through extended deployments at the lower rate used for reserve units and will contribute relatively little to the total number of personnel who can be sustained overseas for an extended deployment. The exact effect will depend greatly on how the Army achieves modularity—whether it receives additional end strength, whether it finds TDA/TTHS positions to eliminate, and how it chooses to support National Guard forces.

Another consideration is that at some level of dependence on the reserve component, the Army would no longer be able to rotate active combat units at the higher active-component rate while supporting them with reserve EAD units that rotated at a slower rate. (Such a system would require either that the Army have more reserve EAD support units than active combat units or that it rotate reserve units as frequently as active units, which would not be sustainable.) At that point, the Army would need to choose between having the deployment of active combat units be “bottlenecked” by the available supply of reserve EAD support units or rotating reserve units at a pace comparable with that of active units.

Implications for the Army's Dependence on the Reserve Component

As discussed above, the modularity plan will increase the degree to which combat units in the active Army rely on EAD support units in the reserve component, unless the Army receives a substantial increase in active end strength or greatly reduces the number of personnel required to provide EAD support to combat units. Under CBO's assumptions about the level of support that a modular force might require, up to 70 percent of the personnel needed to support the Army's active combat forces would come from the reserve component, as opposed to 60 percent for the current force.

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12. That statement is not to imply that no reorganization has improved combat capability, only that it does not appear to be the case that reorganizations usually improve combat capability. The development of armored divisions, in particular, is widely considered to have greatly increased the combat power of formations equipped with tanks. Some historians also believe that the air-mobile divisions of the Vietnam War era were similarly important for the combat power of formations equipped with helicopters.
13. In particular, the Pentomic division of the 1950s has subsequently been regarded as a seriously deficient organization plan. In U.S. Army Command and General Staff College, Combat Studies Institute, *Sixty Years of Reorganizing for Combat: A Historical Trend Analysis*, CSI Report No. 14 (Fort Leavenworth, Kan.: CSI, December 1999), an Army general is quoted as saying: “Every time I think of . . . the Pentomic Division I shudder. Thank God we never had to go to war with it.” That report assessed the Pentomic division as lacking “the capacity and capabilities to perform the basic warfighting functions necessary in combat.”

In general (without considering the other possible effects of modularity), that increase in dependence would represent an additional 18,000 to 19,000 reserve personnel who would have to be mobilized and deployed for a major combat operation. Similarly, it would increase the number of reserve personnel who would need to be mobilized to support extended deployments by 3,000 to 4,000 if the Army was fully committed (that is, if all of its forces were doing peacekeeping all of the time). That effect could be increased or decreased, however, by decisions that the Army might make. If the Army required additional active personnel to achieve its modularity plan, that effect would be greatly reduced. If the Army tried to expand to a 48-brigade force within its current end-strength limits, that effect would be increased.

Implications for Deployment Speed

To evaluate how modularity may affect the speed with which the Army can deploy forces, CBO used TOE data to compare the number of wheeled and tracked vehicles in current brigades and modular brigades. Those vehicles account for 75 percent to 80 percent of the weight of a heavy combat brigade, so such a comparison provides a reasonable way to assess whether the unit equipment in modular brigades will weigh more or less than that in current brigades.

According to the Army's TOE data, a current armored brigade combat team (BCT) has about 1,100 wheeled and tracked vehicles, weighing a total of about 19,500 tons. A current mechanized infantry BCT has roughly

the same number of vehicles but with a total weight of about 17,500 tons. In the modular Army, a heavy BCT will have about 1,200 wheeled and tracked vehicles, weighing about 18,500 tons. Those numbers suggest that at the brigade level, modularity will not make the Army appreciably easier or more difficult to deploy.¹⁴

The situation is different at the division level. Modular divisions will have essentially the same division base as current divisions, but they will also have four BCTs instead of the current three BCTs. Each brigade and division base will have about the same weight of unit equipment in the modular force as in the current force, which suggests that if a modular division deployed with all four brigades, it would be more difficult to deploy than a current division with three brigades.

Because CBO does not know how the Army will allocate EAD support units to modular units, it is impossible to evaluate whether fully supported divisions, or entire corps, will be easier or more difficult to deploy than current forces are. If the Army allocates fewer support forces to each modular division and has a smaller, more flexible corps, the modular force as a whole may be much easier to deploy. If, however, the Army does not make substantial reductions in those support forces and corps, the modular force is unlikely to be easier to deploy than current forces are—and may even be harder to deploy.

14. Comparing those units by the square footage of their vehicles produces comparable results.

C

The Measures of Army Capability Used in This Study

To analyze current and illustrative Army force structures, the Congressional Budget Office (CBO) used several different quantitative measures. This appendix discusses how the measures were generated and their significance.

The measures used in this analysis can be divided into four sets:

- *The overall size and composition of the force*—the number of personnel required in the active and reserve components; the total number of corps, divisions, and brigades in the force; and the number of fully supported combat brigades that the Army could deploy overseas to a contingency.
- *The cost of the force*—costs for military personnel, operations and maintenance, procurement of equipment, and continued modernization of that equipment, over four time periods: five years (2006 to 2010), 10 years (2006 to 2015), CBO’s long-term projection period (2006 to 2022) and annually once a force structure has been implemented (also known as recurring costs).
- *The force’s ability to fight wars*—the number of combat brigades and active and reserve personnel that the Army would use for a notional major combat operation; the number of such operations that could be conducted simultaneously; and the average speed with which a single brigade, division, corps, or theater could be deployed to various locations overseas.
- *The force’s ability to sustain extended deployments*—the number of personnel and brigades that could be de-

ployed for long periods using combat forces only from the active component or from both the active and reserve components, and in either case, the number of reserve personnel who would be mobilized to support those deployments.

Size and Composition of the Force

CBO’s measures of the size of the force show the number of major units in the force, with combat brigades separated into those that would be fully supported (that is, for which the Army would have a complete set of echelons-above-division, or EAD, support units) and the total number of combat brigades (regardless of whether they would be fully supported). CBO’s measures also show the total number of personnel required, for the active and reserve components, to fully man the force. The total personnel requirement includes all major combat units, all EAD support units, all administrative and overhead units, and the allowance for trainees, transients, holdees, and students (TTHS).

To determine the number and type of personnel needed to man any given force, CBO constructed a model of the Army’s force structure. The model uses the number and types of major elements (brigades, divisions, corps, and theaters) as inputs, generating the number of personnel in major combat units, EAD support units, administrative units, and TTHS positions as outputs. To the maximum degree possible, the model was based on the Army’s own rules and processes for determining personnel requirements.

The main sources for the model were Army databases containing the sizes of existing units and the Army’s allo-

cation rules for the Total Army Analysis (TAA) process.¹ The TAA process takes high-level guidance from the Office of the Secretary of Defense and uses it to generate a detailed blueprint for all of the Army's units. That guidance generally takes the form of directives such as "The Army will maintain 10 active divisions" or "The Army will maintain 33 active combat brigades." The TAA process allocates support units to Army forces using a series of rules for how EAD support units should be allocated, according to Army doctrine, and thus generates a total personnel requirement, along with a list of what types of units are needed in what quantities.² The final result of the process is the Army Structure Message, which incorporates the Army's final decisions and is used to order changes to the Army's set of units.

CBO's model works by using various Department of Defense (DoD) and Army databases to establish the number of personnel required for each type of Army unit. It then uses the TAA allocation rules to determine the full set of support units necessary for each type of major combat unit.³ Most of the allocation rules are based on fixed ratios—such as one corps support group per division—and can be easily calculated. Some of the rules, however, are based on workload factors that are more difficult to determine. CBO was unable to obtain the Army's set of workload factors and thus had to make assumptions about the appropriate values for those factors.⁴ With that

done, it is possible to determine the marginal "cost"—in terms of personnel positions required—for each type of major combat unit. CBO's model separates that cost into the number of personnel in the major combat unit itself and the number of personnel in the EAD support units.

CBO's model includes the following types of units as major combat units:

- The theater (technically, the Army service component command headquarters),
- The corps (technically, the corps headquarters and headquarters company),
- The heavy division (technically, the arithmetic mean of the personnel requirement and the weight of the unit equipment in a Force XXI armored division, Force XXI mechanized division, Army of Excellence armored division, and Army of Excellence mechanized division),
- The heavy brigade (technically, the same arithmetic mean of the same types of brigades as was used for the heavy division),
- The light infantry division,
- The light infantry brigade,
- The airborne division,
- The airborne brigade,
- The air assault division,
- The air assault brigade,

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1. The TAA process is a biennial process that the Army engages in to determine how many personnel and units it needs, of what types, and in which components. The process is described in more detail in U.S. Army War College, *How the Army Runs: A Senior Leader Reference Handbook, 2003-2004* (2003), and John C.F. Tillson, John R. Brinkerhoff, and Robert Macgruder, *Total Army Analysis 2009 (TAA09): A Critical Review*, IDA Document D-2809 (Alexandria, Va.: Institute for Defense Analyses, January 2003). The heart of the process is a large set of rules that attempts to formally codify Army doctrine.
 2. CBO obtained a copy of those unpublished rules from the Army's Force Development Directorate.
 3. That process requires some iteration because many of the rules form extensive "chains." For example, there are rules that specify how many and what type of artillery brigade headquarters should go with each division. Then there are second-order rules that specify how many and what type of artillery battalions should go with each artillery brigade headquarters. Then there are rules that specify how many and what types of signals, maintenance, ammunition, and other units should go with each artillery battalion. Ultimately, the presence of a requirement for a division will generate a requirement for all of those subordinate units, but the formal modeling involved is more complex.

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4. The workload factors fall into three sets. The first set includes such workloads as the total number of Army personnel in a theater or the total tons of equipment that must be moved through a port. Those factors can be estimated using information available elsewhere in the model. The second set includes such workloads as estimated fuel consumption per day, the length of the main supply route, or the number of enemy prisoners of war taken. CBO estimated those by using Army planning documents, historical data, and other methods to make reasonable assumptions about what the correct values might be. The third set includes factors that CBO cannot estimate, such as the number of man-hours required for electronics maintenance or construction tasks. In those cases, CBO adjusted the relevant values so the model's outputs would match the Army's existing set of units.

- The armored cavalry regiment,
- The heavy separate brigade (a National Guard heavy separate brigade),
- The separate infantry brigade (a National Guard light separate brigade),
- The Stryker brigade combat team, and
- The special forces group.

To properly capture the personnel positions required by unsupported National Guard combat forces, CBO also made provisions in the model to add combat units without support forces. To capture the personnel required for administrative and overhead positions, CBO added such positions at a set ratio (different for the active and reserve components) that reflected the relatively stable historical ratio of overhead and TTHS positions to deployable forces.

Thus, to establish the total personnel requirement for a force structure, it is only necessary to enter into CBO's model the number of major combat units, by type and component, and which of those units are supported (or unsupported) and to set what fraction of the EAD support units required by active combat units are in the active force (or the reserve component). When values corresponding to the Army's current force are entered, the model produces the personnel levels of the current force.⁵

Cost of the Force

CBO used two primary approaches to estimate the costs of each alternative force structure.⁶ The first approach employed various sources of budgetary data to estimate

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5. Input values for the current force use the same premodularity structure of two theaters, four corps, 18 divisions, and 69 combat brigades described in Chapter 1. One corps is in the reserve component, as are eight divisions and 36 combat brigades. Fourteen National Guard brigades are left unsupported, with 15 separate brigades, a Stryker brigade, and three National Guard divisions considered fully supported. There are also five active and two National Guard special forces groups. Forty percent of the EAD support units required by active combat units are themselves in the active component. The result is 485,000 active personnel and 555,000 reserve personnel.
 6. CBO's methods of estimating costs for this analysis are described in more detail in Appendix D.

the incremental cost of establishing and maintaining new units or eliminating current units. CBO estimated all of the operation and support costs for a force structure, including the costs associated with pay and benefits for personnel, spare parts, fuel, and other needs to operate and maintain forces. It also estimated the up-front costs of purchasing equipment for a new unit—effectively, the one-time, nonrecurring procurement costs for the new unit.

CBO used a second approach to estimate the long-term costs of developing and purchasing new equipment to sustain the force. The Army's investment program is intended to modernize units by giving them newer and better equipment than current forces have. Over time, that newer equipment replaces current equipment in the force. If the Army created or disbanded units, its need for investment funding over the long term would increase or decrease accordingly. Those investment costs are distinct from the up-front costs to equip a new unit initially.

By way of illustration, if the Army created a heavy division, it would need to spend money to equip the division with heavy armored vehicles, such as M1 Abrams tanks or M2 Bradley fighting vehicles. Those purchases would be one-time, up-front costs necessary to establish the division. Over time, however, the division would be modernized with newer equipment that is not yet developed and fielded, such as the equipment being developed as part of the Future Combat Systems program. The costs of modernizing equipment are longer term in nature. Similarly, if the Army eliminated a division, the costs of executing its investment program over the long term would decline because fewer pieces of new equipment would be needed to modernize a smaller force.

Ability to Fight Wars

Gauging the Army's warfighting capability involves analyzing two key factors: the size of the force package (units and personnel) needed to conduct one or more major combat operations and the speed with which elements of that package can reach the theater of operations.

Force Package

CBO measured warfighting ability by defining the size of the force necessary to fight a notional major combat operation and comparing that with the size of a particular force structure. For this analysis, a major combat operation is defined as one that requires a full theater, two

corps (each with an armored cavalry regiment), and six divisions, for a total of 20 combat brigades. The number of personnel associated with that force—and thus the number required for a major combat operation—could vary because the size of those elements and their support forces differ in the various alternatives that CBO analyzed.

The number of personnel from the reserve component who would need to be mobilized and deployed for that major combat operation is based on the assumption that all of the combat units used in the operation would come from the active component. Consequently, the number of reserve personnel who would have to be mobilized and deployed to support the operation would include however many reserve personnel would need to be mobilized for EAD support units. Alternatives that place greater or lesser reliance on the reserve component for EAD support units will have greater or lesser need for reserve mobilization. Similarly, alternatives that require a smaller number of EAD support units will require less reserve mobilization. Because this measure includes only reserve personnel who would be mobilized and deployed, it excludes personnel backfilling for deployed active forces. As long as the Army continues the practice of backfilling, any major combat operation will necessitate that some reserve personnel be mobilized (but not deployed overseas) for that purpose.

In each alternative, the number of reserve personnel mobilized and deployed would have to be much greater if major combat units from the National Guard were used for the combat operation. Although the Army has not done that since the Korean War, it would be necessary in many of the alternatives that CBO analyzed if the Army had to engage in two major combat operations simultaneously. Thus, a second major combat operation would require proportionately more reserve personnel to be mobilized and deployed than the first operation would.

The number of major combat operations that a given force could execute equals the number of fully supported combat brigades in that force divided by the number of brigades required for a single major combat operation. Although that measure simply restates information given elsewhere in the analysis, CBO included it because it provides a different way of characterizing the Army—for instance, it is sometimes more helpful to think of the Army as having the ability to fight more than two wars than as having 55 fully supported combat brigades.

In actual practice, conducting a major combat operation requires corps and theaters as well as combat brigades. The Army's current force—and most of the alternatives that CBO examined—do not have the additional corps and theaters that would be needed to fight more than two such operations. Even without those elements, however, the Army could reap substantial benefits from having more combat brigades and divisions than it needed to execute two major combat operations simultaneously. The first benefit is that a larger force would be able to use more active combat brigades and divisions and thus would not need to mobilize as many National Guard combat forces to fight simultaneous combat operations. The second benefit is that the Army could maintain peacetime commitments that it might otherwise not be able to carry out. For example, in the event of two simultaneous major combat operations, an Army with just 40 combat brigades that had a three-brigade commitment in Afghanistan and the Balkans would have to choose between conducting one of the combat operations with fewer forces or terminating one of its other commitments and redeploying the forces that were employed there. A larger Army would not face that choice and would be able to maintain more peacetime commitments during major combat operations. In addition, since a significant goal of the U.S. military is to deter potential adversaries, a larger force may be seen as more credible and hence as a superior deterrent force.

For some alternatives, CBO reduced the size of the force assumed to be necessary for a major combat operation. It did so for alternatives whose proponents claim that the policies they advocate would allow much smaller ground forces to be as effective as—if not more effective than—larger forces structured like the current force. For example, both Alternative 5 (the brigade-based Army) and Alternative 7 (the transformational Army) envision a corps-sized force of six combat brigades and a theater-sized force of 12 combat brigades.

CBO cannot evaluate the validity of claims about the qualitative improvement that such policy choices might produce. However, reducing the size of the force for a major combat operation can illustrate the benefits for deployment speed and for the number of major combat operations that the Army could fight at one time. Of course, if those alternatives did not produce significant qualitative improvements in warfighting capacity, they would probably require larger force packages, potentially

eliminating the quantitative improvements in deployment speed or warfighting indicated in this analysis.

Deployment Speed

CBO's measure of deployment speed shows the time that would be required, once a decision to deploy troops had been made, to deploy a complete Army force to a distant theater of operation. That measure is an aggregate approximation in several respects:

- It includes only the time required to deploy an Army force. In an actual military operation, units from other services would almost certainly be employed. The need to transport Air Force or Marine Corps units to a theater would increase the overall requirement for strategic lift, boosting the total time necessary to deploy a force.
- It averages the time required to deploy various types of Army forces for 10 different combinations of origins and destinations. Forces are assumed to come from the West Coast, Gulf Coast, or East Coast of the United States or from Europe. They are assumed to be deployed to various regions, represented by South Korea, the Philippines, Nigeria, Azerbaijan, Djibouti, and Uganda. CBO also considered deployment of light, medium, and heavy forces (although not all alternatives include all three types of forces).
- It covers the time needed to deploy all of the unit equipment and personnel associated with a particular force but assumes no additional time for other activities. Some military operations can begin before a force is fully deployed (as was the case with Operation Iraqi Freedom). Other operations may require a lengthy period after unit equipment and personnel have been deployed to build up stocks of fuel, ammunition, spare parts, and other items necessary to sustain the operation.

Using an approximate, aggregate measure of deployment speed, rather than estimating detailed deployment timelines for a number of specific scenarios, offers numerous benefits. The most important is that the aggregate measure incorporates a broad mix of destinations, which reduces the problem of dependence on extreme scenarios. Different deployment scenarios produce different results for a given policy change. For example, deployment destinations that are far inland favor airlift as a mode of transport, whereas deployment destinations on coasts favor

sealift. Likewise, destinations can be close to or far away from prepositioned equipment. Thus, it is relatively easy to select a single scenario that will favor almost any particular policy choice. For instance, a scenario involving deployment to Azerbaijan—which has good air infrastructure but poor access to seaports, is far inland, and is relatively removed from prepositioned equipment—makes the deployment of light or medium forces by air appear to be an attractive choice. By contrast, a scenario involving Djibouti—which has a coastal location with relatively good seaport access and is near a prepositioned set of equipment—makes afloat prepositioning of heavy equipment appear to be a good choice. A force that is optimized for one of those particular scenarios, however, may perform poorly in a different scenario. Since it is extremely difficult to predict where the next major U.S. military operation will be conducted, a force that is capable of performing well in a wide variety of scenarios is generally more useful than one optimized for any single scenario. By using the average of several origins and a wide variety of destinations, CBO's measure of deployment speed is not scenario-specific.

No matter the analytical approach used, actual deployment times will always vary from any modeled deployment timeline. Actual forces tend to be deployed to unpredictable locations, are customized to meet the needs of unpredictable contingencies, and generally experience random incidents that increase the time required for deployment.⁷

Modeling Deployment. CBO began its modeling of deployment by evaluating whether a force could be deployed more quickly between a given origin and destination purely by airlift or with a mixture of airlift and sealift. Pure airlift deployment is a superior option in only a very small number of cases, involving a single light or medium brigade and specific combinations of origins and destinations. For that reason, almost all of CBO's modeling used mixed airlift and sealift deployments.

7. For example, during the deployment of the 24th Infantry Division to Saudi Arabia for Operation Desert Shield, an engine failure on one of the fast sealift ships carrying equipment delayed the arrival of much of the division's equipment by nearly a month. In Operation Iraqi Freedom, the arrival of the 4th Infantry Division and the 3rd Armored Cavalry Regiment was significantly delayed by the Turkish government's decision not to allow U.S. forces to use its territory. Such events are effectively impossible to predict, and major deployments occur rarely enough that it is not useful to try to use statistical methods to estimate the effects of such events.

CBO modeled airlift using planning factors and equations from the Air Force's Air Mobility Command.⁸ A critical factor in analyzing air deployment is the quality of air infrastructure in the destination theater. That quality is generally captured in a measure called "maximum on ground" (MOG), which represents the number of cargo aircraft that can usefully be accommodated at an airport at any one time. MOG is an abstract measure, because airports differ in ways that can be difficult to capture in a standardized set of objective measurements. Airports may be limited in their ability to receive aircraft by the number of parking spaces available for aircraft, the materiel-handling equipment available, or other factors. In addition, with enough time, Air Force engineering units can generally increase an airport's MOG.

Over short periods, however, MOG is the primary limit on the speed with which the U.S. military can airlift cargo or passengers to a distant theater. The reason is that the U.S. fleet of strategic airlifters—with about 100 C-5 Galaxy aircraft, 180 (programmed) C-17 Globemaster III aircraft, and potentially several hundred aircraft from the Civil Reserve Air Fleet—is very large relative to the air infrastructure in most potential theaters of operation. As such, the United States' ability to deliver cargo for military operations in a single theater is generally limited not by the number of cargo aircraft available but by the quality of the air infrastructure in that theater.⁹ For that reason, CBO's analysis does not consider alternatives that would increase the size of the U.S. strategic airlift fleet—such an increase would not improve deployment times to MOG-limited theaters.

CBO modeled sealift using data provided by the Navy's Military Sealift Command (MSC).¹⁰ That modeling assumes that the majority of unit equipment will be transported by either fast sealift ships (FSSs) or large, medium-speed roll-on/roll-off ships (LMSRs). FSSs are large, high-speed vessels with the capacity to transport containers and vehicles; LMSRs are large, medium-speed vessels with the capacity to carry vehicles.¹¹ MSC also

maintains a fleet of slower, smaller roll-on/roll-off ships, but they take longer to activate (most MSC ships are not kept in a fully active status during peacetime), carry less, and move more slowly than FSSs and LMSRs do. Thus, they contribute relatively little to MSC's capability to deploy large numbers of vehicles—which make up the bulk (by weight) of an Army unit's equipment that would need to be deployed in any major military operation.

In CBO's model, deployment by sealift requires time to activate ships, time to move the ships to the relevant ports, time for units to reach the ports (if that takes longer than activating and moving the ships to port does), time to load the ships, time to sail them to their destination ports, time to unload the ships, time to reorganize units (matching personnel up with equipment), and time for the units to move from the port to their area of operations. Prepositioned sets of equipment are modeled as ships that begin in a different location and that do not require movement to port, loading time, or time for the units to move to port (since prepositioned equipment remains stored on ships during peacetime).

CBO established the requirement for strategic lift in its modeling by dividing that requirement into two portions: passengers and unit equipment. The number of passengers for a given force equals the number of personnel in the force, and all passengers are assumed to be airlifted to a theater (consistent with the military's practice in most recent operations). Unit equipment has both a weight requirement, used for air deployment, and a square-footage requirement, used for sea deployment.¹² CBO consulted

8. Department of the Air Force, Air Mobility Command, *Air Mobility Planning Factors*, Air Force Pamphlet 10-1403 (December 18, 2003), available at www.e-publishing.af.mil/pubfiles/af/10/afpam10-1403/afpam10-1403.pdf.

9. It is, however, true that the United States' ability to deliver cargo to multiple theaters can be limited by the number of cargo aircraft available.

10. Those data include the fact sheets available at www.msc.navy.mil/factsheet/.

11. Roll-on/roll-off cargo ships are sometimes described as floating parking garages. They are the preferred type of ship for transporting most of an Army unit's equipment, as the majority of Army vehicles cannot be shipped in the standard containers that dominate the civilian shipping market. The capacity of roll-on/roll-off shipping is generally the main constraint in deploying Army forces—the civilian shipping industry has relatively little roll-on/roll-off capacity compared with the Army's needs, and the Army requires relatively little container capacity compared with the capacity of the civilian sector.

12. Technically, cargo aircraft are limited in how much they can carry either by the weight of the equipment or by the size of the equipment. Equipment that is light but bulky is said to "cube out" an aircraft, meaning that it fills up the cubic volume of an airlifter. To reflect that, CBO followed Air Mobility Command's planning factors, which use an average payload that airlifters could realistically be expected to carry, rather than using the maximum payload that airlifters could theoretically carry. A similar factor is necessary for sealift to reflect the fact that equipment cannot be packed in ships at the maximum density possible but must instead be spaced widely enough to allow for walkways, tie-downs, and so forth.

a variety of DoD and Army databases to determine the weight and square footage of each of the units that would compose any given force and aggregated them to calculate the total weight or square footage of the force.¹³

CBO avoided creating completely new types of units for the alternatives in this study. In most cases, the different types of units were created by building up larger, higher-level units (such as divisions and corps) from smaller “building blocks” (such as battalions) that exist in the current force. The only exception was Alternative 5 (converting to a brigade-based Army), in which the units described by retired Army Colonel Douglas MacGregor could not easily be built up from existing units. For that alternative, CBO used averages of unit equipment weight and square footage per person for different types of units. For example, that option’s combat maneuver group, with 5,000 personnel, uses a per-person factor for equipment weight that represents the average for all existing armored units in the Army. Similarly, that option’s early-deploying support group uses a per-person factor that is based on all existing Army logistics units.

Illustrating Deployment. For illustrative purposes, CBO compared cumulative deliveries of equipment over a six-month period by airlift or sealift (see Figure C-1).¹⁴ The notional comparison uses a fleet of 180 C-17 aircraft and MSC’s fleet of FSSs and LMSRs to transport cargo from Savannah, Georgia, to Djibouti. The set of Army equipment prepositioned at Diego Garcia in the Indian Ocean is also assumed to be used. Airlift is assumed to operate either with or without constraints. With no MOG limitations in the theater, the C-17 fleet could transport about 5,000 tons of equipment per day; with a MOG of three (fairly typical for a poorly developed or small country), the C-17 fleet could deliver about 1,000 tons a day.

Because of the nature of sealift, significant time can elapse before any sealift ships arrive in a theater. When they do arrive, however, they deliver large quantities of cargo. Given the relatively limited number of ships that carry most of the cargo for an operation and the relatively long

times needed for a ship to make a first, second, or third trip, the amount of materiel delivered by sealift over time shows a pronounced stair-step pattern in Figure C-1, as opposed to the smooth pattern produced by smaller but more-frequent airlift deliveries.

Figure C-1 helps illustrate several points about deployment. First, it shows why mixed air and sea deployments—rather than pure air deployments—are used for any large force. The capacity of sealift is so big relative to that of airlift that beyond the first two weeks of an operation (when no ships will have arrived yet), sealift will always provide a greater percentage of the total lift capacity than airlift will. That is especially true in real-world situations with limited MOG. In this example, a heavy division plus all of its EAD support units, with about 180,000 tons of unit equipment, require about 25 to 30 days to deploy, using prepositioned equipment. Attempting to deploy the same force purely by air would take 35 to 40 days in the absence of MOG limitations and 180 to 185 days with MOG limitations.

Second, Figure C-1 shows why using sealift can greatly reduce the differences between the times needed to deploy various kinds of units. In essence, the reason is that ships travel at the same speed regardless of what type of unit equipment they carry. In this scenario, between day 25 and day 30, more than 400,000 tons of equipment would arrive in the theater by ship (excluding prepositioned equipment). That arrival time would be roughly the same (with some small difference because of loading time) regardless of whether the ships were carrying the equipment of a light unit or a heavy unit. About 400,000 tons would be enough to encompass either a light division or a heavy division, which means that there would be no meaningful difference between the times required to deploy the two types of divisions by sea.¹⁵

Finally, Figure C-1 illustrates the effect of prepositioning sets of equipment on ships. Such sets do not increase MSC’s total transport capability over long periods of time, but they accelerate the point at which the first deliveries of unit equipment arrive in a theater. The long time gap before any transport ships arrive is one of the primary disadvantages of sealift. Prepositioning sets of

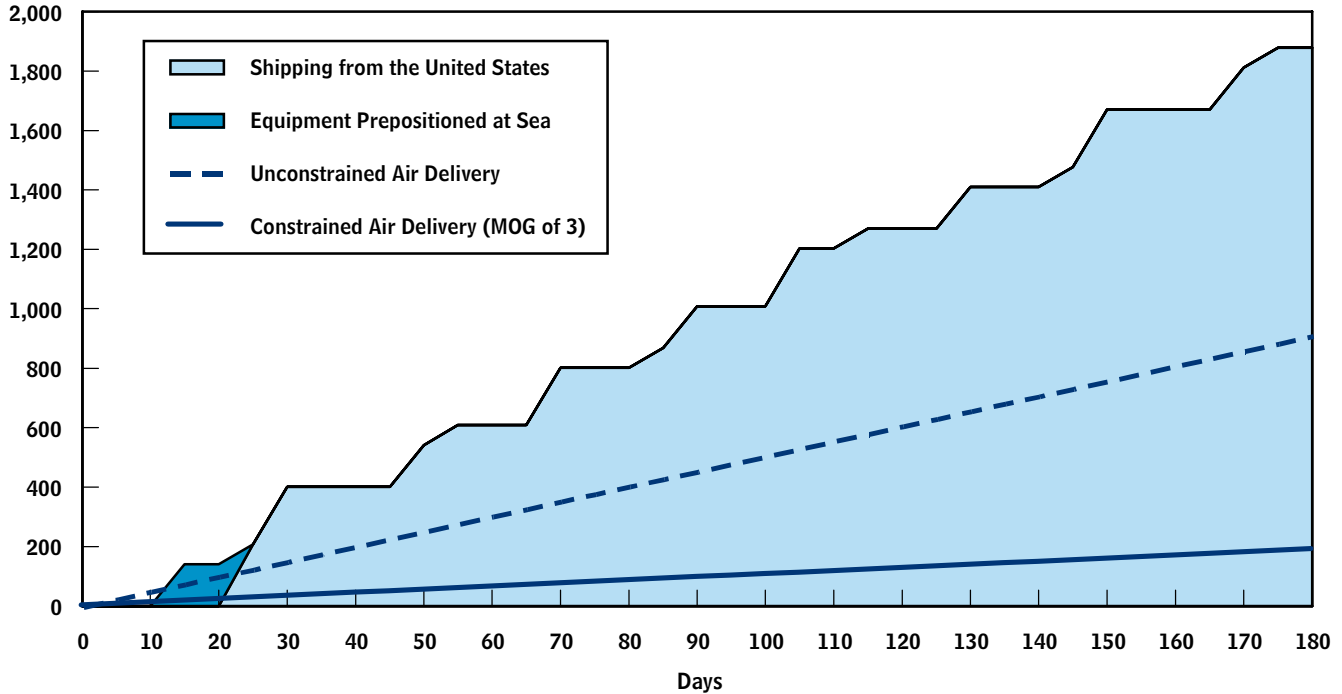
13. Those sources include the Conventional Forces Database (CFDB), the Type Unit Characteristic (TUCHA) database, and Department of the Army, Military Traffic Management Command, Transportation Engineering Agency, *Deployment Planning Guide: Transportation Assets Required for Deployment*, Pamphlet 700-5 (May 2001).

14. To make the comparison, CBO converted the square footage of the equipment transported by ships into tons. Such a conversion is an approximation used for purposes of simplicity.

15. Because this is a notional example, the discussion excludes the possibility that Djibouti’s seaports could experience capacity constraints (similar to the effect of MOG on airports). Such capacity constraints can exist for seaports, although they are rarer and generally less severe than for airports.

Figure C-1.**Amount of Equipment Deployed over Time by Airlift or Sealift**

(Thousands of tons)



Source: Congressional Budget Office.

Notes: MOG = maximum on ground (a measure that represents the number of cargo aircraft that can usefully be accommodated at an airport at any one time).

This figure shows deliveries from Savannah, Georgia, to Djibouti in East Africa using 180 C-17 aircraft or Military Sealift Command's fleet of fast sealift ships and large, medium-speed roll-on/roll-off ships. Prepositioned equipment is assumed to come from Diego Garcia in the Indian Ocean.

equipment on ships narrows the gap greatly, reducing that disadvantage of sealift. In fact, because such prepositioned sets are normally configured for heavy forces, and because large light forces are generally deployed by sea, in some cases prepositioned heavy units could arrive in a theater before light units did.

Ability to Sustain Extended Deployments

The final set of measures in this analysis—ability to sustain a long deployment—were calculated using the method described in CBO's September 2003 paper *An Analysis of the U.S. Military's Ability to Sustain an Occupation of Iraq*. Unlike in that paper, however, the number of brigades and personnel that can be sustained for extended deployments in this study reflects the total capacity of the Army, not the additional capability beyond what the Army is already using to sustain its current commitments. In addition, this analysis excludes the Marine Corps' abil-

ity to contribute to extended deployments (because it does not examine policy options for the Marine Corps).

The total number of personnel and brigades that the Army could keep deployed indefinitely reflects certain assumptions about how the Army would manage long deployments. In particular, this set of measures assumes that the Army would use rotational deployments of units (in other words, that the Army would deploy entire units for a certain period, at which point a new unit would be deployed to replace the first unit). The Army has used rotational deployments for all of its peacekeeping and occupation missions in the recent past, although it does use other forms of deployment for some of its commitments.¹⁶

16. For example, the Army permanently bases several units (the 8th Army and the 2nd Infantry Division) in South Korea but rotates individual personnel through those units. Most of those personnel serve one-year tours unaccompanied by their families.

This set of measures also assumes that Army deployments would be limited by the need to rotate units out of a theater and provide them with enough time at their home station to recover from their deployment (allowing personnel to take leave, refurbish equipment, and so forth) and to prepare for their next deployment (including completing the extensive series of training exercises that the Army requires of units before certifying them as fully ready). For active units, that assumption means that the Army would be able to keep one unit deployed for every three or four units in the force. (The exact ratio that the Army needs is uncertain, which is why CBO used a range for that value.) For units in the reserve component, the Army is bound by a DoD policy that such units should not be mobilized more than once in six years. The Army could rotate active and reserve units through theaters at higher rates, but that practice is generally considered unsustainable by the Army, DoD, and most external observers because it can lead to problems with retaining personnel and maintaining the readiness of units. Thus, although higher rates are possible, they would be appropriate only for operations that were fairly short or in which force levels were expected to decline over time.

In this analysis, the level of reserve mobilization needed to support an extended deployment assumes that the Army would commit the maximum level of forces that could be sustained. If the Army committed less than that, the necessary level of reserve mobilization would be lower. In general, the Army prefers to use active units before mobilizing and employing reserve units. As such, if the Army had a relatively small set of commitments, the fraction of a deployed force that would be composed of reserve units would be lower than for a deployed force that required the Army's full ability to sustain extended deployments.

If the Army had to provide larger forces to sustain commitments, the fraction of its deployed force that would be composed of reserve units would rise steadily, but slowly, until the point at which the Army had used all of the capability that active combat units could provide. At that point, all additional capability would have to come from employing National Guard combat units. Since such units are composed entirely of reserve personnel, employing them would greatly increase the fraction of reserve personnel that the Army would need to mobilize to sustain a deployment.

D

How CBO Estimated the Costs of Options for Restructuring the Army

The cost estimates for the options described in this study have two major components: the investment costs or savings that would arise over the 2006-2022 period from equipping and modernizing the forces postulated in each option, and the operation and support (O&S) costs or savings associated with the day-to-day operations of the restructured forces. This appendix describes how the Congressional Budget Office (CBO) estimated those costs. The estimates represent incremental changes—the costs or savings that would result from an option relative to the cost of maintaining and modernizing the Army’s premodularity force structure. (The changes are not relative to the cost of the Army’s plans for a modular force because specific details about those plans were not available to CBO.)

All of the estimates are presented in 2006 dollars. Although that treatment removes the effects of inflation, it does not account for the fact that a dollar is worth less today than it will be tomorrow (because of the possibility of investing and earning a return on that dollar in the interim). A common analytic practice, for a stream of costs that vary over time, is to discount the costs to estimate their net present value (that is, the size of the equivalent lump sum today).¹ However, CBO chose not to develop net-present-value calculations for this analysis because such calculations are rarely used in the context of national defense and would be difficult to compare with standard sources of information about the Department of Defense’s (DoD’s) budget.

CBO collected data from a wide range of sources to construct cost factors and estimates for the alternatives in this study. Because the actual costs or savings from restructuring the Army depend on specifics about the size and type of units involved (see Appendix C), and because this analysis includes a large number of options and unit types, CBO developed both detailed methods and generalized cost factors that could be applied to all of the options.

Methods for Estimating Investment Costs

Investment costs include the cost of developing and buying weapon systems to modernize Army forces as well as the cost of purchasing today’s equipment (including such items as generators and trucks) for newly formed units. CBO estimated both types of investment costs using data from DoD’s Future Years Defense Program for fiscal years 2005 to 2009, Congressionally mandated reports (called Selected Acquisition Reports) prepared by DoD for major weapon systems, and current-year and prior-year budget-justification materials.

Costs of Equipment to Modernize the Force

For each option in this study, CBO estimated the costs of developing and buying new equipment to sustain the force over the long run (through 2022) by modifying CBO’s long-term projection of the Army’s investment requirements (as published in *The Long-Term Implications of Current Defense Plans: Detailed Update for Fiscal Year 2005*, September 2004). In that report, CBO projected the individual resource demands for major weapon systems over the 2005-2022 period using the Army’s long-term plans for specific programs as spelled out in the sources described above. Investment costs for other items

1. The calculation of present value depends on the rate of interest. For example, if \$100 is invested on January 1 at an annual interest rate of 5 percent, it will grow to \$105 by January 1 of the next year. Hence, with a 5 percent annual interest rate, the sum of \$105 payable in a year has a present value of \$100.

(such as artillery rounds, radios, and relatively low cost modifications to systems already in use) were estimated on the basis of trends in their funding since 1980 and the relationship between that funding and spending for major programs.

CBO developed projections for the alternatives in this study by altering the individual programs that make up the Administration's plans according to how they would be affected by the force structure in each alternative. For example, CBO increased the quantities of major systems to be purchased when an alternative proposed adding forces—and reduced them when an alternative proposed cutting forces—by adjusting the number of years of full-rate production. (For most programs, a year of full-rate production is equivalent to about the amount of equipment required to equip one to two divisions.)

That general rule did not apply in some cases, however. In most of the alternatives, CBO did not modify the Army's development and procurement plan for the Future Combat Systems (FCS) program. Because of the large annual funding requirements and length of that program, CBO assumed that it would not be feasible to increase or decrease the planned long-term procurement rate of two brigade sets a year over the 2006-2022 period. For options that would terminate the FCS program (Alternatives 5 and 6), CBO assumed that the Army would remanufacture existing ground combat vehicles and modernize them at rates needed to sustain equipment levels at a "steady state."² CBO used a similar assumption to estimate requirements for the UH-60 Blackhawk helicopter program in all of the options.

In the options that would emphasize precision munitions (Alternatives 1B and 7), CBO increased the annual quantities of munitions such as the Guided Multiple-Launch Rocket System rocket and the Excalibur artillery munition. Procurement quantities for other systems, such as electronics, were adjusted by scaling projected annual funding by the change in the number of active combat brigades under the option. In cases in which the procurement quantity of a weapon system is not closely tied to the size of combat forces, CBO did not change the projection of funding.

2. For each alternative, CBO estimated the total inventory of systems that the force would require and constructed a procurement profile that would keep the average age of that inventory stable indefinitely.

Costs of Current Equipment for New Units

A number of alternatives in this study would increase the size of the Army by creating new units. CBO estimated the cost to equip those units using the Army's Tables of Organization and Equipment (TOEs), which list all of the equipment that each specific unit needs to perform its mission, and equipment prices found in Army budget materials or supply catalogs. For options (such as Alternatives 4 and 6) that would create new types of divisions, CBO developed a substitute TOE by combining TOEs for existing units to estimate the requirement for new equipment.

Methods for Estimating Operation and Support Costs

The estimates of O&S costs or savings in this study represent the difference between the costs for routine day-to-day operations and maintenance of the Army's current force and those costs for each alternative. The estimates do not include any costs for contingency operations that might arise. CBO estimated three categories of O&S costs:

- **Personnel costs** include pay and allowances for all personnel assigned to a unit. CBO calculated those costs using the number of personnel authorized for each unit and data from Army pay tables. Personnel costs also include the cost to recruit and train new service members over time as assigned personnel transfer to other units or leave the Army. CBO calculated the cost to recruit and train personnel by deriving per capita costs from Army budget data and multiplying them by the number of personnel expected to rotate into units.
- **Equipment operating costs** are the costs to run and maintain a unit's equipment, including expenses for fuel, consumable supplies (such as air filters and seals), repair parts, and ammunition. Data on the costs to operate each type of equipment were derived from the Army's Operating and Support Management Information System, a relational database that contains information about historical O&S costs for more than 500 weapon systems used in Army units (active, Guard, and Reserve).
- **Other unit and indirect support costs** are indirect expenses that are allocated to units as well as training costs other than those to operate equipment. This cat-

egory includes such costs as base operations, facilities maintenance, utilities, civilian labor, contracted services, administrative and overhead functions, mission travel, and other logistics services. CBO estimated those costs using per capita factors developed from Army budget data.

Results of the Cost Analysis

Using the methods described above, CBO estimated both types of investment costs and all three categories of operation and support costs for each of the alternatives in this analysis. Those costs are detailed in the rest of this appendix and summarized in Table D-1.

Alternatives That Would Increase the Size of the Army

As explained in Chapter 2, the first set of options would expand the Army's combat forces by adding two divisions to the active component.

Alternative 1A would add about 78,000 personnel to the Army: 57,000 active and 21,000 reserve. CBO estimates that the investment costs associated with implementing Alternative 1A would total \$31 billion over the 2006-2022 period—about \$16 billion to outfit the new units with current equipment and \$15 billion to modernize them thereafter. With the time needed to create the units accounted for, the additional O&S costs associated with this option would total \$21 billion between 2006 and 2010, \$95 billion over the 2006-2022 period, and almost \$7 billion annually thereafter, CBO estimates. Of the \$95 billion in added O&S costs through 2022, personnel costs would account for about \$62 billion, or 65 percent.

Alternative 1B would add two divisions to the active component without appreciably increasing the size of the Army by eliminating all short-range air-defense units, doing away with some corps-level field artillery units, and restructuring the remaining field artillery units. Overall, those changes would add about 6,000 active personnel to the Army. CBO estimates that the net investment costs associated with implementing Alternative 1B would total \$34 billion over the 2006-2022 period—about \$15 billion to outfit the new units with today's equipment and \$19 billion to modernize them later. Additional O&S costs for those units—net of savings from not operating the eliminated units—would total \$7 billion over the 2006-2010 period (after accounting for the time needed to create the units), a little more than \$20 billion over the

2006-2022 period, and just over \$1 billion per year thereafter. Equipment operating costs and other unit and indirect support costs account for about 60 percent (\$12 billion) of the additional operation and support costs over the 2006-2022 period.

Alternatives That Would Reduce Dependence on the Reserve Component

Alternatives 2 and 3 would lessen the Army's need to mobilize reserve units to support combat units in the active component.

Alternative 2 would move support units that are necessary for peacekeeping operations (such as military police) from the reserve component to the active Army and transfer units that are less useful for peacekeeping (such as artillery units) to the reserves. Overall, this option would increase the number of personnel in the active component by about 28,000 and reduce the number of reserve personnel by 24,000. Alternative 2 would not require additional investment beyond that projected for the current force, but it would result in higher operation and support costs, on net. Those additional costs would total almost \$9 billion over the 2006-2010 period (accounting for the time needed to implement the changes), \$27 billion over the 2006-2022 period, and almost \$2 billion a year thereafter, CBO estimates. About \$26 billion of the incremental cost through 2022 represents personnel costs. Equipment operating costs for the force would decline by \$11 billion, because units with high equipment operating costs would move to the reserves, and support units with lower equipment operating costs would be placed in the active Army. However, other unit and indirect support costs would increase by \$11 billion. About \$4 billion of that rise would result from higher health care costs (\$2 billion) and higher military construction costs (\$2 billion)—both related to shifting more personnel into the active component. The other \$7 billion would result from the fact that the units moving to the active Army have higher indirect support costs than the units moving to the reserve component and from the fact that some other indirect expenses increase when personnel levels in the active component rise.

Alternative 3 would eliminate the active Army's dependence on reserve support units for both peacekeeping and warfighting by adding enough personnel to the active component to create support units for all of its combat units. Overall, this option would add about 312,000 personnel to the active Army and cut 260,000 reserve per-

Table D-1.**Summary of Incremental Costs or Savings for Options to Restructure the Army**

(Billions of 2006 dollars)

	Total Costs		Annual Recurring Costs in 2022
	2006-2010	2006-2022	
Current (Premodular) Force			
Investment	129	605	a
Operation and support	398	1,488	99
Total	527	2,092	99
Alternative 1A: Add Two Active Divisions			
Investment	+17	+31	a
Operation and support	+21	+95	+7
Total	+37	+127	+7
Alternative 1B: Add Two Divisions by Reducing Support Forces			
Investment	+16	+34	a
Operation and support	+7	+20	+1
Total	+23	+54	+1
Alternative 2: Reallocate Support Forces Between the Active and Reserve Components			
Investment	0	0	a
Operation and support	+9	+27	+2
Total	+9	+27	+2
Alternative 3: Eliminate the Army's Dependence on Reserve Support Units			
Investment	0	0	a
Operation and support	+51	+333	+26
Total	+51	+333	+26
Alternative 4: Organize Stabilization and Reconstruction Divisions			
Investment	+2	-14	a
Operation and support	-4	-18	-1
Total	-2	-32	-1
Alternative 5: Convert to a Brigade-Based Army			
Investment	-14	-176	a
Operation and support	-28	-138	-10
Total	-42	-314	-10
Alternative 6: Convert to an Expeditionary Army			
Investment	+25	-79	a
Operation and support	+10	+45	+3
Total	+35	-34	+3
Alternative 7: Convert to a Transformational Army			
Investment	-6	-24	a
Operation and support	-34	-166	-12
Total	-40	-190	-12

Source: Congressional Budget Office.

- a. CBO did not project recurring investment costs because they depend on a host of decisions that CBO could not estimate or predict. (Unlike military pay or operations and maintenance costs, future modernization plans can be highly variable and are influenced by such things as technological advances, defense strategy, and actions by other nations or groups.) CBO's estimates of investment costs through 2022 are based on the Administration's current plans, but those plans do not extend indefinitely into the future.

sonnel. Alternative 3 would not require further investment beyond that projected for the current force because it would not create additional units. It would result in higher O&S costs, however. CBO estimates that those added costs would total \$51 billion over the 2006-2010 period (accounting for the necessary transition time), \$333 billion over the 2006-2022 period, and \$26 billion annually after that. Personnel costs would make up more than 70 percent (almost \$240 billion) of the additional O&S costs through 2022.

Alternatives That Would Create New Types of Units

The last four options that CBO analyzed (Alternatives 4 through 7) would restructure the Army by creating different types of units that reflect a variety of concerns and proposals.

Alternative 4 would convert two active Army divisions into several dedicated peacekeeping divisions. Overall, this option would cut 2,000 personnel from the active component and 9,000 from the reserves. Implementing this alternative would produce investment savings of approximately \$14 billion over the 2006-2022 period, CBO estimates. Although initially outfitting the new units would cost almost \$5 billion, the Army's modernization costs would be reduced by \$19 billion because the force that would eventually have to be modernized would be smaller and less focused on high-technology weaponry intended for conventional warfighting. O&S costs would also be lower under this alternative, CBO estimates—not only because the force would be smaller but also because the equipment in the peacekeeping divisions would be less costly to operate. As a result, this option would reduce the Army's O&S costs by just over \$4 billion through 2010 (once the option had been implemented), \$18 billion over the 2006-2022 period, and a little more than \$1 billion per year thereafter. Of the \$18 billion reduction over the 2006-2022 period, about \$5 billion would result from lower personnel costs, \$7 billion from lower equipment operating expenses, and \$6 billion from lower costs for other unit expenses and indirect support.

Alternative 5 would reorganize the Army by eliminating its higher-level command structures and organizing the service into a number of autonomous brigade-sized combat groups. This option would not affect the number of active-duty personnel in the Army but would reduce the number of reserve personnel by 383,000. Those changes would produce total investment savings of \$176 billion over the 2006-2022 period, CBO estimates, primarily

from canceling the Future Combat Systems program as well as from having fewer combat forces to modernize in the future. Because Alternative 5 would cut the size of the reserves significantly, operation and support costs would also decline—by a total of \$28 billion through 2010 (accounting for the time needed to reduce reserve forces), \$138 billion over the 2006-2022 period, and \$10 billion annually after that. Of the \$138 billion in O&S savings over the 2006-2022 period, \$69 billion would result from lower personnel costs, \$23 billion from lower equipment operating expenses, and \$46 billion from lower costs for other unit expenses and indirect support.

Alternative 6 would eliminate the corps as a command structure and reorganize the Army into a series of expeditionary task forces similar to Marine expeditionary forces. Those changes would add 21,000 active personnel and 20,000 reserve personnel to the Army. This option would also purchase additional sealift assets and sets of equipment to preposition on ships near potential theaters of conflict. CBO estimates that the investment savings associated with implementing this alternative would total almost \$80 billion over the 2006-2022 period. Outfitting the new units and buying prepositioned equipment would together cost \$21 billion, and purchasing additional sealift ships would cost almost \$9 billion; those costs would be more than offset by savings from canceling the Future Combat Systems program. Although this option would reduce investment costs, it would increase operation and support costs, CBO estimates, because of the higher personnel levels and the larger number of sealift ships. Those additional O&S costs would total \$10 billion over the 2006-2010 period (once units had been reorganized), \$45 billion through 2022, and \$3 billion per year thereafter, CBO estimates. Personnel costs would account for about 55 percent (\$24 billion) of the additional O&S costs over the 2006-2022 period.

Alternative 7 would reorganize the Army to take advantage of recent advances in communications networks, precision-guided munitions, and sensors. The Army would have fewer divisions, and the mix of divisions would be shifted to lighter forces and special forces groups. Overall, those changes would reduce the number of active personnel by 115,000 but leave the number of reserve personnel unchanged. Implementing Alternative 7 would lower the Army's investment costs by \$24 billion over the 2006-2022 period, CBO estimates, primarily because there would be fewer combat forces to modernize. Reducing the number of active personnel would also

lower O&S costs—by a total about \$34 billion through 2010 (accounting for the necessary transition time), \$166 billion over the 2006-2022 period, and \$12 billion annually thereafter, CBO estimates. Of that \$166 billion in

O&S savings, approximately \$103 billion would result from lower personnel costs, \$16 billion from lower equipment operating expenses, and \$46 billion from lower costs for other unit expenses and indirect support.

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