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**Reasons for Growth in the
Bosnia Cost Estimates**

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PREFACE

This document was prepared by the Institute for Defense Analyses (IDA) for the Office of the Comptroller, Department of Defense, under a task entitled "Cost of Contingency Operations." The objective of the task was to research and document the cost-estimating processes used for Operation Joint Endeavor (OJE). This document describes the processes used for contingency cost estimating, identifies reasons for growth in the cost estimate for OJE, and makes recommendations for improvement.

This work was reviewed within IDA by Stanley A. Horowitz, A. Martin Lidy, and Michael Leonard.

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SUMMARY

SUMMARY

Cost estimating processes that had served reasonably well for contingency operations in Somalia and Haiti proved inadequate for the U.S. involvement in Operation Joint Endeavor (OJE) in Bosnia. Early estimates of the incremental costs for one-year of OJE operations were low by about \$1.8 billion. This report examines the evolution of DoD's cost estimates from early November 1995, prior to the signing of the Dayton Accords, through August 1996, when the costs of the first year of operations were well understood. We explain why OJE costs went up and provide recommendations for improving DoD's ability to estimate the costs of future contingency operations.

A. GROWTH IN COST ESTIMATES

The November 10, 1995, estimate of \$1.5 billion, prepared by the Office of the Under Secretary of Defense, Comptroller (OUSD)(C), and the Force Structure, Resource, and Assessment Directorate (J-8) of the Joint Staff (JS), was used as a starting point for comparing subsequent estimates. Figure S-1 shows the costs and calendar dates of the six estimates examined, ending with the August 1996, estimate of \$3.3 billion. The figure shows growth by categories of Personnel, Personnel Support, Operations Support, and Transportation. More than 60 percent of the \$1.8 billion total growth was in the Operations Support category. Personnel costs grew 43 percent while each of the other three categories increased by over 100 percent.

The November 29, 1995, estimate of \$2 billion accounted for the increased use of reserves and additional active-duty troops. The December 29, 1995, estimate grew to \$2.3 billion primarily because of further adjustments in estimating factors as the character of the OJE operation became better understood.

The three later estimates (January, May, and August 1996) reflected the continued growth in Reserve Component (RC) and a broader DoD Agency participation in OJE. By August 1996, the cost estimate had stabilized at \$3.3 billion. These later estimates incorporated data on actual expenditures.

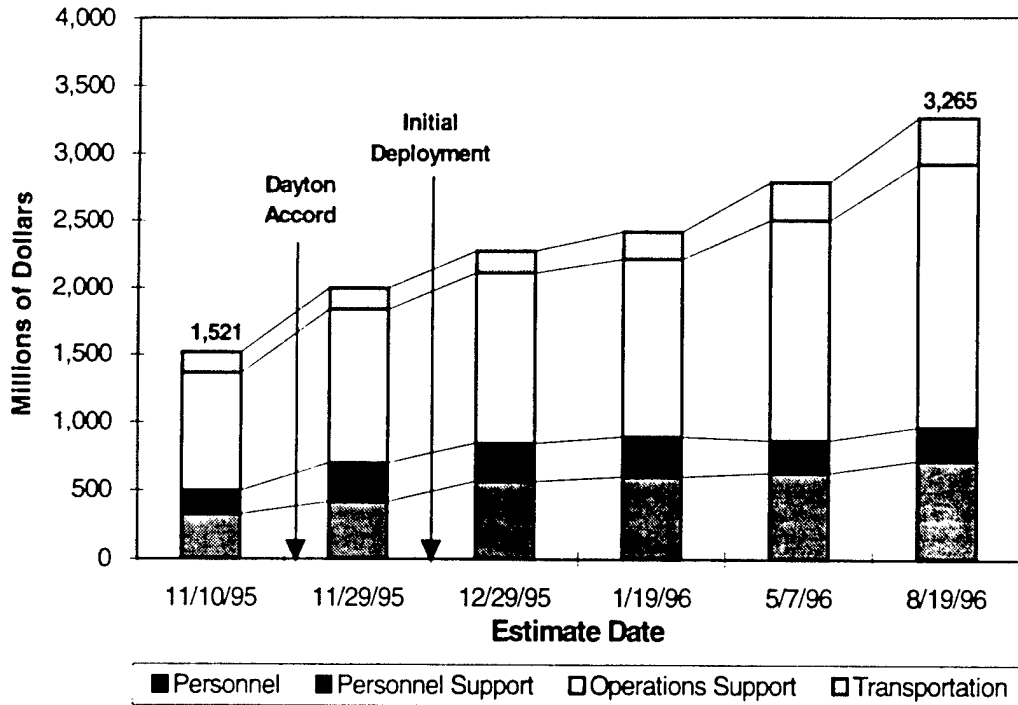


Figure S-1. Cost Estimates for Operation Joint Endeavor by Major DFAS Category

B. PRINCIPAL REASONS FOR GROWTH

Some of the reasons for cost increases include:

- Increases in the size and composition of the force deployed to Bosnia and to the so-called rim countries (Hungary, Croatia, and Italy), as well as increases in the number of people sent to Western European countries to backfill for deploying personnel. Because the full costs of Reservist pay and allowances are considered incremental costs, increases in RC forces accounted for most of the growth in Personnel costs.
- Additional pre-deployment training to prepare troops for their role as peacekeepers.
- Increases in Personnel and Personnel Support costs to compensate for the difficult terrain and weather and to mitigate the effects of extended deployments on the troops and their families back home.
- Increases in logistics costs associated with base construction in Bosnia. The initial plan called for construction of 12 base camps, roughly half by military units and half by contractors. Instead, 24 camps were built, three-fourths of them by contractors under the Army's Logistics Civil Augmentation Program

(LOGCAP). Weather conditions in Bosnia and quality-of-life considerations for the troops contributed to the higher than expected construction costs.

- Increases in the costs of communications and supporting information systems and the use of Joint Surveillance Target Attack Radar System (JSTARS) aircraft surveillance. These enhancements were made to improve the mission capabilities of deploying forces, particularly with respect to command, control, communications, intelligence, surveillance, and reconnaissance (C4ISR) systems.
- Increases in the use of war reserve equipment (e.g., bridging gear), including subsequent equipment refurbishment and redeployment to storage sites.

C. BROAD CAUSES OF COST GROWTH

We examined the changes in the individual cost components between the initial and the final estimate and grouped them by the following broad causes of cost growth:

- **Operations or Policy Changes**—changes caused by shifts in mission operations or existing policies.
- **Problems with Estimating**—changes to a part of the estimate that had not been correctly estimated the first time.
- **Not Estimated**—changes caused by activities that were omitted from the original estimate.

We found that “Problems with Estimating” accounted for 42 percent of the total dollar growth of \$1,745 million, “Operations or Policy Changes” accounted for 31 percent, and “Not Estimated” accounted for the remaining 27 percent, as shown in Figure S-2.

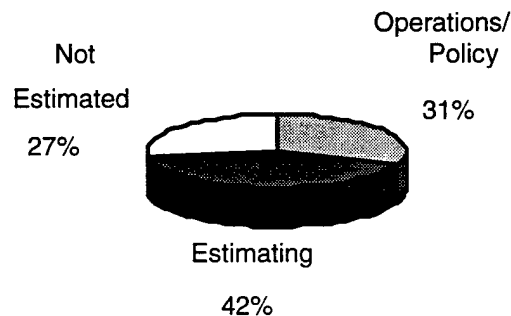


Figure S-2. Reasons for Growth in OJE Estimates

D. CONCLUSIONS

Based on the foregoing analyses, we identified the following problems that affect DoD's ability to estimate accurately the costs of contingency operations.

- Cost estimates continually change as the mission evolves.
- Each contingency operation is unique.
- DoD does not employ a common cost-estimating structure.
- Uncertainties in Executive Agent funding responsibility can result in estimating errors.
- Cost estimate and cost report formats are not consistent.

E. RECOMMENDATIONS

To improve the DoD's ability to estimate future contingency costs, we recommend:

- Establishing a standard cost breakdown structure (CBS) with clear and concise definitions for use by all DoD components for estimating the costs of contingencies.
- Requiring systematic documentation of cost estimates for contingency operations.
- Developing tools to help the cost analyst provide more accurate and timely cost estimates.

I. INTRODUCTION

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A. BACKGROUND

The experiences in Bosnia for Operation Joint Endeavor (OJE) provided new challenges for DoD cost analysts. While the Department of Defense (DoD) had participated in large operations like Desert Shield/Desert Storm and smaller operations like Somalia, Haiti, and Panama during the last decade, the character and scope of activities in OJE were considerably different. Cost estimating processes that served reasonably well in previous contingencies were not adequate to meet the estimating requirements for OJE. As a result, initial cost estimates for OJE proved to be off the mark by a significant amount.

Because of the nature of contingency operations, initial cost estimates often must be made quickly, with an incomplete understanding of detailed mission requirements and operational concepts. Subsequent estimates are based on more complete information and, over time, begin to include experience gained from observing the actual costs of the early phases of the operation. As this process evolves, cost estimates improve as overlooked items are identified and inaccurate estimating relationships are refined. Also, sometimes new policies that affect the costs of an operation are implemented. Each of these factors affected DoD's estimates of OJE cost.

B. OBJECTIVE

The Institute for Defense Analyses (IDA) was asked to examine the cost estimates prepared for the first year of OJE and to identify the reasons for growth in these estimates. Each estimate—from the initial to the final—was to be examined for accuracy and completeness. To the extent feasible, estimates were to be compared to the actual costs being reported. Finally, recommendations were to be made to improve the process of estimating the costs of contingency operations.

C. SCOPE

The study examined the estimated incremental costs of OJE, which covered the first year of Bosnia deployments over the last three quarters of fiscal year (FY) 1996 and

the first quarter of FY 1997. Both DoD and Service estimates were examined. The initial estimate was prepared by the Office of the Under Secretary of Defense, Comptroller (OUSD)(C) and the Force Structure, Resources, and Assessment Directorate (J-8) of the Joint Staff (JS) using the DoD Deployment Cost Model. The Services used other estimating tools for their estimates. Several subsequent estimates were examined for completeness and consistency and were compared to the initial estimate. When differences were identified, the reasons for differences were assigned to one of the following categories:

- *Operations or Policy Changes*—changes caused by shifts in mission operations or existing policies.
- *Problems with Estimating*—changes to a part of the estimate that had not been correctly estimated the first time.
- *Not Estimated*—changes caused by activities that were omitted from the original estimate.

Assigning cost increases to one of these categories involved a degree of subjectivity. In some cases, more than one of these three general explanations applied. When this situation arose, the reason for change was assigned to the most dominant category. Although other analysts examining the same data might have different opinions on some of the reasons for cost growth, we do not believe these differences would significantly affect the study's conclusions.

D. APPROACH

The first 3 months of the study were spent collecting data. The DoD Deployment Cost Model was examined in detail. Cost factors were compared with known costs, and an effort was made to assign estimated costs to a single, consistent cost breakdown structure (CBS). The IDA team met with OUSD(C), JS, and Service representatives to understand how estimates were made and to compare the results obtained. Concurrently, the data were analyzed, and the reasons for growth in the estimates were assigned. This categorization proved to be iterative as additional information was obtained and a better understanding of the data emerged.

Chapter II provides an overview of the evolution of the cost estimates and describes the CBS used for the analysis. Chapter III provides a detailed description of the changes that occurred in each part of the cost estimates between November 1995 and August 1996 (the final estimate for OJE). Chapter IV provides our view of the general

problems associated with estimating contingency operation costs and offers several recommendations for improving processes and tools.

II. EXAMINATION OF COST ESTIMATES

II. EXAMINATION OF COST ESTIMATES

A. DATA SOURCES

Several OJE cost estimates were reviewed in this study. Four of the estimates were examined thoroughly. The first estimate to contain sufficient detail for analysis was for \$1.5 billion and was dated November 10, 1995. Subsequent cost estimates reflected the changing nature of the operation, corrected estimating errors, included cost elements overlooked initially, and incorporated actual cost data as these data became available. Figure II-1 reflects the total cost and the calendar date of the estimates used for this study.

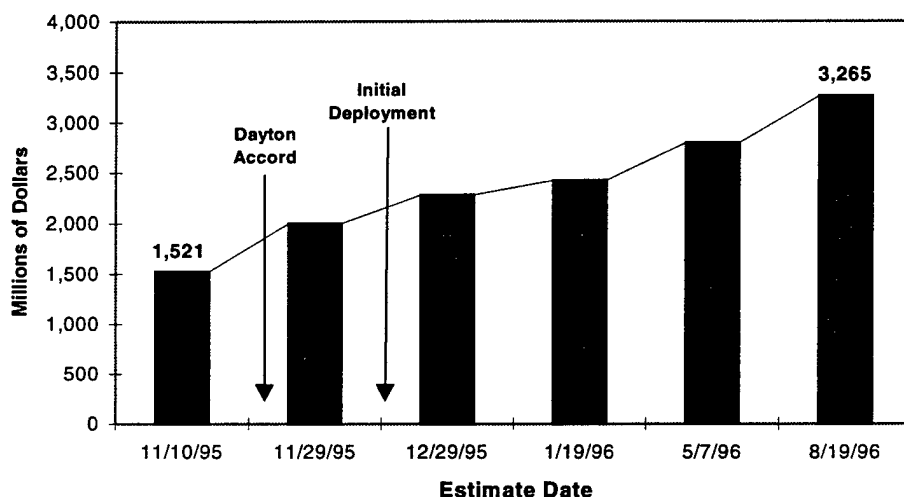


Figure II-1. Cost Estimates for Operation Joint Endeavor

B. COST ESTIMATING AND REPORTING STRUCTURE

No single CBS was common to all the estimates examined. The first step in evaluating the changes in the estimates was to ensure that costs for similar activities were assigned to the same category in each of the estimates. For example, if one estimate included Temporary Duty (TDY) costs as a part of Personnel Support costs and other estimates included these costs as part of Personnel costs, the estimates were restructured to have the same content for our analysis.

Since the estimates prepared by the OUSD(C)/JS and the Services used different formats, we had to select a structure and make the necessary adjustments to the individual estimates to analyze the cost changes on a consistent basis. Further complicating the analysis was the fact that none of the estimating structures used by OUSD(C) or the Services matched the Defense Finance and Accounting Service (DFAS) format used to report expenditures. To compare all the estimates on the same basis, the DFAS CBS was used for the analysis. Table II-1 identifies the individual components of the four main DFAS categories: Personnel, Personnel Support, Operations Support, and Transportation.

Table II-1. DFAS Contingency Operations Cost Breakdown Structure

Personnel	Operations Support
Military Personnel	OPTEMPO (Fuel, Other POL, Repair Parts)
Reserve Call-up	Equipment Procurement
Reserves on Active Duty	Equipment Maintenance
Other Guard/Reserve	Other Supplies and Equipment
Imminent Danger Pay	Vehicle Cost Reimbursement
Family Sep Allowance	Reconstitution
Foreign Duty Pay	Services (Communications, Utilities, etc.)
Other MILPERS	
Operation and Maintenance	
TDY/TAD	
Civilian Overtime	
Civilian Temporary Hires	
Other Personnel	
Personnel Support	Transportation
Subsistence	Airlift
Consumables	Sealift
RC Activation	Ready Reserve Fleet
Hospital/Supply Ships	Port Handling/Inland Transportation
Medical Support	Other Transportation
Other Support	

C. INCREMENTAL COSTS

DoD uses incremental costs when determining the cost of contingency operations. This method was also followed in OJE. Since this study examined the incremental costs associated with OJE, it is important to define "incremental costs." Incremental costs are additional costs to DoD appropriations that would not have been incurred if the contingency operation had not been supported. Incremental costs include, but are not limited to, the costs of:

- military entitlements such as premium pay, family separation allowance, or other payments made above and beyond normal monthly payroll costs;

- reserve components called to active duty, to include their basic pay and allowances;
- travel and per diem in support of the contingency;
- transportation for moving personnel, material, equipment, and supplies to and from the contingency;
- rents, communications, and utilities attributable to the contingency;
- work, services, training, and material procured under contract to support the contingency; and
- increased operational tempo (OPTEMPO).

D. GROWTH IN COST ESTIMATES

Causes of growth were analyzed for each of the component parts and were attributed to one of the following reasons:

1. **Operations or Policy Changes.** These reflect unanticipated changes to mission operations or existing policies. These changes included the increased use of Reserve Components (RCs) to augment the active forces beyond those originally planned, curtailment of Deny Flight operations, and more extensive quality-of-life (QOL) support that provided for storage of household goods and child care facilities.
2. **Problems with Estimating.** These reflect changes to individual elements in the CBS that were not correctly estimated initially, for one of several reasons. An example was the cost increase for inland transportation. Haiti and Somalia had incurred insignificant costs for inland transportation, but those operations proved to be a poor model for OJE.
3. **Not Estimated.** These reflect changes needed to incorporate the costs of activities that were omitted from the original estimate. These costs were not caused by operations or policy changes; they were simply not recognized.

E. ESTIMATES EVALUATED

The November 10, 1995, estimate of \$1.5 billion was the first estimate with sufficient detail to be evaluated. Since its costs were essentially the same as the previous estimates prepared in late October, we selected it as the baseline or initial position. After the Dayton Accords were signed, another estimate of \$2 billion was prepared on November 29, 1995. This estimate included the increased use of reserves and additional

active duty troops deploying to the region, mostly in support units located in countries near Bosnia. After the initial deployment began in December 1995, an estimate of \$2.3 billion was incorporated in a Program Budget Decision (PBD) document prepared on December 29, 1995. This estimate is significant because it is the first estimate to contain direct Service inputs (even though the PBD subsequently modified them). The three subsequent estimates reflected the continued growth in RCs and other DoD Agency participation that culminated in a final estimate of approximately \$3.3 billion. The accuracy of these later estimates was aided in some respects by the fact that actual expenditures were being reported. Figure II-2 shows the total costs separated into the four DFAS contingency operations cost-reporting categories used for the study.

Chapter III focuses on the specific changes that occurred between the November 1995 and August 1996 estimates. The changes will be shown, the possible causes for the changes will be discussed, and then each of the individual changes will be associated with one of the three fundamental causes described previously.

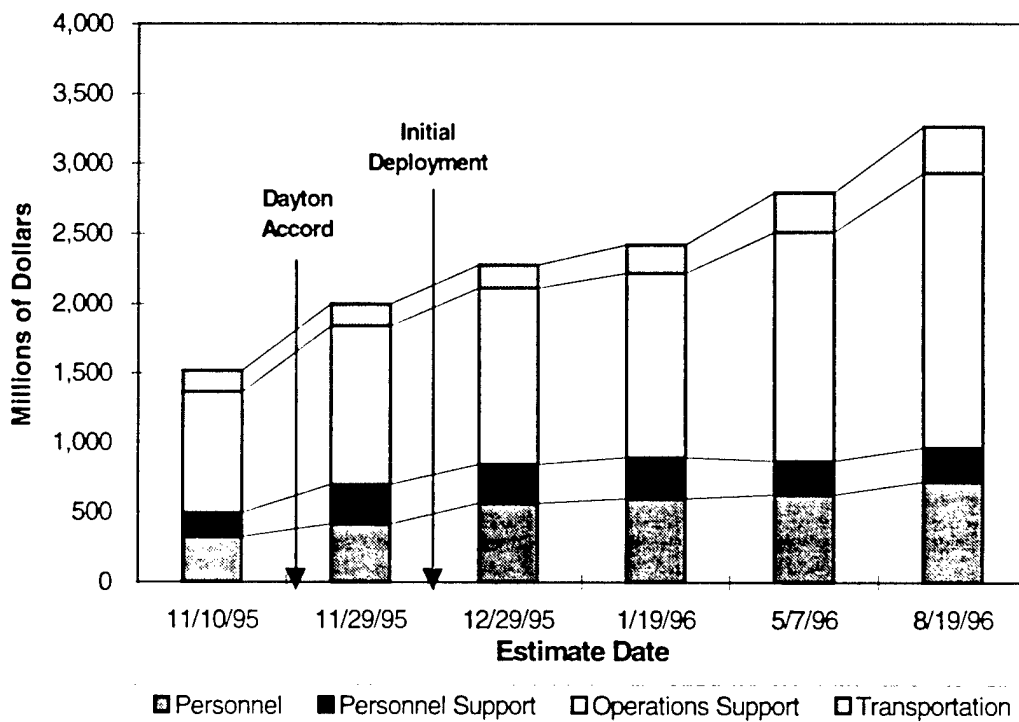


Figure II-2. Cost Estimates for Operation Joint Endeavor by Category

III. EXPLANATIONS OF ESTIMATE GROWTH

III. EXPLANATIONS OF ESTIMATE GROWTH

This chapter examines and explains changes in each component of the DoD Bosnia cost estimate. It is organized using the DFAS cost-reporting structure described in Chapter II.

Figure III-1 shows where the estimate growth occurred among the four major DFAS reporting categories. Operations Support costs were the largest contributor to the growth in the OJE estimate, accounting for more than 60 percent of the growth in the final estimate.

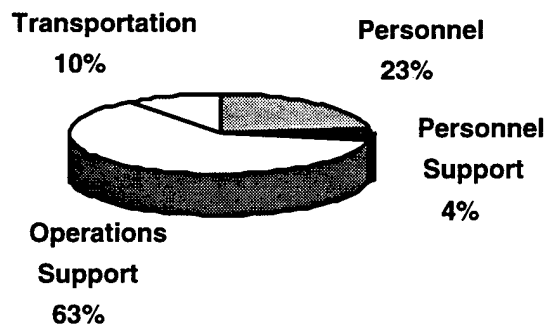


Figure III-1. Distribution of Growth in Cost Estimates

Figure III-2 shows a comparison of the original and the final estimates. The Personnel, Operations Support, and Transportation estimates each grew by more than 100 percent from November 1995 to August 1996.¹ Personnel grew from \$325 million to \$722 million, Operations Support grew from \$883 million to \$1,963 million, and Transportation grew from \$157 million to \$335 million. Personnel Support grew only 43 percent, from \$172 million to \$246 million.

¹ This chapter refers to the November 10, 1995, estimate as the initial estimate or the November 1995 estimate. The August 19, 1996, estimate is called either the last estimate or the August 1996 estimate.

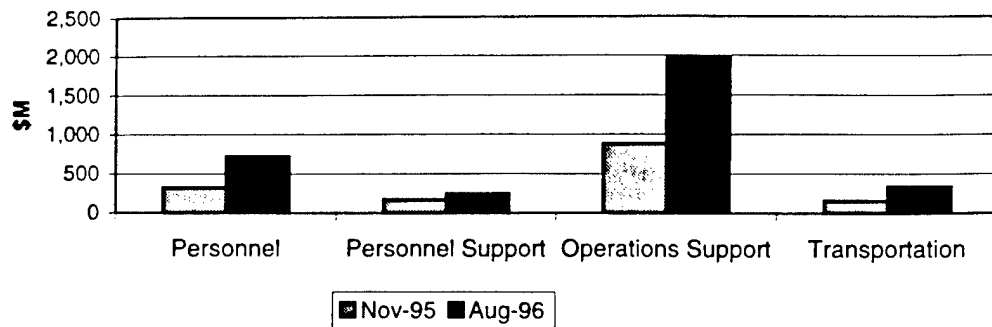


Figure III-2. Sources of Estimate Growth

A. BACKGROUND OF THE GROWTH ANALYSIS

A review of the important changes that occurred between the first and last estimates will put the remainder of this chapter in better perspective.

Because of lessons learned in previous contingencies and the complexity of the situation in Bosnia, a concerted effort was made before deployment to prepare and train the troops for their role as peacekeepers. Troop preparation costs, however, were not anticipated when the initial cost estimate was made.

After the Bosnia operation started and troops began to arrive in the area, DoD made policy changes to compensate for the difficult terrain and weather conditions and to mitigate the effects of the extended deployment on personnel. Some of these changes were targeted at improving the QOL for soldiers in the field while others addressed situations with which their families had to cope at home.

The initial estimate was based on the assumption that 12 base camps would be built—roughly half by U.S. forces and half by a contractor. By August 1996, 24 camps had been constructed—about three-fourths of those by the Logistics Civil Augmentation Program (LOGCAP) contractor. Weather conditions in Bosnia and QOL considerations adversely affected camp construction costs. Many of the constructed facilities had to be refurbished during the year to bring them up to a standard not anticipated in the beginning. Operational changes in the type of units deployed during the first 12 months and subsequent personnel rotation plans also caused increases in personnel and transportation costs.

From a cost estimating point of view, the most important change was the increase in the size and composition of the force, especially the larger than anticipated use of RC

personnel. These changes affected Personnel, Personnel Support, Operations Support, and Transportation costs. The November 1995 estimate was based on a commitment of 25,000 troops, including 2,800 RC personnel. This estimate assumed that 2,000 RC backfills in the European commands would replace personnel moved forward to support the Bosnia operation. By August 1996, DoD's estimates had grown to 32,000 troops, including 7,800 RC personnel, many of whom were subsequently used as backfills. These increases in numbers and type (e.g., RCs) of people had a major impact on cost changes in all areas, albeit more significantly in the Personnel category.

A few caveats are appropriate before continuing with the explanation of the causes for growth in the cost estimates. First, detailed information on the November 1995 estimate is limited. The only available documentation of the initial estimate for the Implementation Force (IFOR) is a three-page copy of the estimate summary spreadsheet. To supplement this limited detail, other estimates prepared in the November 1995 time frame were sought. When estimates that were contemporaneous with the November 1995 estimate were found, additional information that could be gleaned from that data was used to illuminate the November 1995 estimate. When the cost data of one of these proximate estimates were close to the November data and contained additional details, the proximate data's internal relationships were used to estimate the details behind the November 1995 estimate. However, even with this additional information, the details of some cost elements, such as the Deny Flight operations estimate, could not be reconstructed with a high level of confidence.

B. ESTIMATE GROWTH BY CATEGORY

Growth in the estimates was examined using the four major DFAS reporting categories described in Chapter II: Personnel, Personnel Support, Operations Support, and Transportation. The remainder of this chapter follows that structure.

1. Personnel

Personnel costs provided funds to pay Reservists on active duty, for TDY, for special allowances associated with the duty location, and for miscellaneous incremental costs of DoD civilian activities. The \$325 million November 1995 estimate grew to \$722 million—a 122 percent increase. Table III-1 reflects the details.

**Table III-1. Changes in Estimates of Bosnia Personnel Costs
(Dollars in Millions)**

DFAS Cost Item	Initial Estimate			Growth	Final Estimate	Reason
	IFOR	Deny Flight	Total			
Reserve Pay	113		113	174	287	Additional Reserves
Allowances	69	45	114	5	119	Additional Actives & Reserves
Temporary Duty	38	60	98	21	119	Additional Actives & Reserves
Civilian Pay				180	180	Backfill and NATO Support
				2	2	Civilian Overtime DMA ^a
				15	15	Civilian Border Monitors
	220	105	325	397	722	

^a DMA stands for Defense Mapping Agency, now the National Imagery and Mapping Agency (NIMA).

Increases in RC personnel significantly impacted the growth of the Personnel cost estimate. When the number of active duty personnel increased, the primary cost implication was not for their pay² but for their special allowances. The increased use of reserves caused a much greater cost increase since their full pay and special allowances were incremental costs for the operation.

The largest increases in Personnel costs were for RC pay (\$174 million) and for TDY and Temporary Active Duty (TAD) pay (\$201 million). The RCs grew by 5,000 personnel above the initial 2,800 anticipated in November 1995, and all of their pay was an incremental cost. On average, Reservists cost about \$3,900 per month. The policy decision to call up additional reserves, which was made after the initial estimate had been prepared, had a significant impact on the cost growth in Personnel costs.

The Active Component (AC) also grew by approximately 7,000 personnel, most of whom were assigned in the rim countries.³ These troops were not authorized as much in special allowances as those deployed into Bosnia and Croatia, and thus, this change did not have a large effect on the final estimate of Personnel costs.

A sizable portion of the TDY growth was attributed to the low initial estimate of the number of forces that would be required for backfill. Furthermore, the initial estimate assumed a TDY cost for all personnel appropriate for Bosnia, while actual TDY costs were incurred for a large number of rear area backfills, which were significantly more

² Active duty basic military pay is not considered an incremental cost, since it would have been incurred regardless of the Bosnia operation.

³ Hungary, Croatia, and Italy.

costly. Most of the supporting troops in the rim countries stayed in government facilities and received the minimum per diem of \$3.50 per day. The cost increase for these activities amounted to \$21 million. On the other hand, the troops who backfilled Europe and provided North Atlantic Treaty Organization (NATO) support were housed on the economy because of the limited space in the government quarters. These personnel incurred per diem costs of about \$170 per day. The cost increases for these activities amounted to \$180 million.

Civilian pay increases included overtime costs for the additional civilian border monitors (\$15 million) and for the Defense Mapping Agency (DMA) overtime (\$2 million) that was necessary to produce maps for the entire region. Neither of these costs were estimated initially.

2. Personnel Support

Personnel Support costs provided funds to activate the RCs and to provide food, medical, and other consumables for the deployed forces. The November 1995 estimate of \$172 million grew by 43 percent—the smallest increase of the four categories—to the final estimate of \$246 million. Table III-2 reflects the details.

**Table III-2. Changes in Estimates of Bosnia Personnel Support Costs
(Dollars in Millions)**

DFAS Cost Item	Initial Estimate		Growth	Final Estimate	Reason	
	Deny IFOR Flight	Total				
Activate Reserves			2	2	Cost To Activate RC	
Subsistence	143	143	-1	142	Prepackaged vs. Fresh Food	
Medical	24	24	-20	4	DHP funded	
Consumables & Other	5	5	31	36	Force Growth	
				31	31	Force Growth
				31	31	QOL Services
	172	0	172	74	246	

RC activation costs were required to process reservists onto and off of active duty status. These costs—which were not included in the initial estimate—were estimated to be \$2 million in the final estimate.

Subsistence costs actually decreased by \$1 million, representing the offsetting effects of force size growth and changes in how the troops were fed. The troops were put

on regular rations earlier than planned. This reduced the costs relative to the original plan of relying on prepackaged rations for a longer period. In addition, feeding the forward-deployed force was changed from the more expensive T (tray) rations to the less expensive A and B rations. The change in the costs of subsistence was categorized as an estimating error.

The Medical cost estimate reflects a decrease of \$20 million from the initial to the final estimate.⁴

The Consumables and Other cost estimate grew by \$93 million for several reasons. The deployed forces needed more personal care and medical items (\$31 million) than originally planned. Funds were also added for a rest and relaxation (R&R) program (\$17.5 million) for the forward-deployed personnel. Additional funds were also authorized for the storage of household goods and cars (\$7.7 million) to prevent thefts at home stations. Family support centers at home stations also provided Service members' families additional support and counseling (\$6 million). Finally, environmental factors, increases in force size, and the high visibility of the operation led to the distribution of additional uniforms and other personal items of equipment (\$31 million).

3. Operations Support

Operations Support costs provided funds for unit Operating Tempo (OPTEMPO), equipment and supplies, communications, intelligence, engineering, preparation of troops for deployment, and many other services. The Operations Support estimate grew \$1,080 million between November 29, 1995, and August 19, 1996. The final estimate of \$1,963 million was 122 percent higher than the initial estimate of \$883 million. Table III-3 reflects the details.

OPTEMPO costs for the Air Force increased by \$27 million. Reductions in Deny Flight operations (-\$2 million) did not offset increases in the Joint Surveillance Target Attack Radar System (JSTARS) operations (\$29 million). Army OPTEMPO cost grew by \$13 million to support the JSTARS ground stations. The Navy, like the Air Force, reduced its estimate of the amount of the flying support for Deny Flight, and the associated costs decreased by \$9 million. Special Operations costs for ground and air

⁴ The actual medical costs reported by Defense Health Program (DHP) through DFAS were \$42 million for the first 9 months of operation. This apparent anomaly is explained by the fact that DHP was already funded in their budget for the operation, and funds were reduced in later estimates to reflect that fact. In reality, medical costs were accounted for outside of these estimates and resulted in the final cost estimate attributed to Personnel Support to be understated by at least \$38 million.

operations grew by \$30 million. The original estimate did not include Special Operations Command (SOCOM) operations.

**Table III-3. Changes in Estimates of Bosnia Operations Support Costs
(Dollars in Millions)**

DFAS Cost Item	Initial Estimate			Growth	Final Estimate	Reason
	IFOR	Deny Flight	Total			
Operations–Air Force		46	46	-2	44	Reduced Deny Flight
	35		35	29	64	Increased JSTARS
Operations–Army	282		282	13	295	Army JSTARS & Airdrop
Operations–Navy	0	61	61	-9	52	Reduced Deny Flight
Operations–SOCOM	0		0	30	30	Ground and Air Operations
Equipment & Supplies	0			33	33	Equipment Maintenance
				9	9	Ballistic Protection Kits
				23	23	Containers
				41	41	Personal Equipment
				62	62	Building Supplies
Reconstitution	0		0	122	122	AWR Equipment Repair & Cleaning
Communications	84		84	104	188	BC2A
				9	9	WWMCCS
Intelligence	0		0	101	101	Intelligence Increase
Engineering			0	61	61	LOGCAP Mission
	329		329	146	475	LOGCAP Estimating
		46	46	33	79	Air Force Site Operations
			0	38	38	Forward Presence
			0	50	50	NATO Common Engineering
Troop Preparation	0		0	76	76	Pre-Deployment Training
Other Services				29	29	Miscellaneous
				11	11	Mapping Services
	0		0	10	10	Range Operations
				12	12	Language Training
				13	13	NATO Headquarters
				36	36	Additional Logistics Support
	730	153	883	1,080	1,963	

Equipment and Supplies grew for the several reasons. Contractor maintenance for aircraft and other equipment increased by \$33 million, and ballistic protection kits (bullet- and shrapnel-proof covers) to protect some of the vehicles added \$9 million. Since the Army did not have enough containers available, containers to move supplies and equipment into the area of operations required an additional \$23 million. Additional

organizational equipment—cold weather clothing and body armor—was procured for \$41 million. Individual units do not normally stock body armor. Costs for building supplies were underestimated by \$62 million.

The Reconstitution costs were not included in the November 1995 estimate. Later, \$122 million was added to repair and return Army War Reserve (AWR) equipment (bridges) and to inspect them before returning them to storage. Lessons learned in Desert Storm highlighted the need to repair any equipment damage and to clean the equipment properly before returning it to storage.

Communications and Intelligence cost estimates were incomplete. No identifiable estimates for intelligence activities were available, and communications costs were underestimated by \$113 million. Part of the problem with the initial estimate was that no one expected that the new command and control (C2) system [i.e., the Bosnia Command and Control Augmentation (BC2A)] would be deployed. Additional costs were added to the estimate when it became known that World Wide Military Command and Control System (WWMCCS) support would have to be extended past its planned termination to support the operation until the BC2A component of the Global Command and Control System (GCCS) could be made operational. Intelligence activities included Defense Intelligence Agency (DIA), National Security Agency (NSA), satellites, and special Air Force programs. However, intelligence support that accounted for \$101 million in the final estimate was not included in the November 1995 estimate. This study does not include information on the specific nature of the costs of intelligence activities.

LOGCAP was used in the Bosnia operation to augment the support activities of the Services for facility construction and maintenance, food service support, and the other base operations support functions. The November 1995 estimate did not explicitly include LOGCAP under the heading "Engineering." Planning efforts in Europe by the U.S. forces and the LOGCAP contractor clearly envisioned using LOGCAP to provide much of the operations support for OJE. For this reason, the initial estimates for the LOGCAP effort have been treated as part of the November 1995 estimate even though they did not appear in detailed form until December 1995.

The original Engineering estimates anticipated that 12 base camps would be built in Bosnia. The December LOGCAP rough order of magnitude estimate envisioned that U.S. forces would build seven camps and the LOGCAP contractor would build five camps. However, when the troops were fully encamped, 24 camps had been built, mostly by LOGCAP contractor support. LOGCAP costs increased by \$61 million for

construction and operation of additional campsites. Severe weather was also a major factor in these increased costs of camp construction. An additional \$146 million of the increased engineering costs were attributed to reinstating the LOGCAP capabilities that were reduced by PBD action in late December 1995. We categorized these as estimating errors.

The first Army estimate included \$350 million for the LOGCAP contract support; PBD 711 reduced this to about \$170 million. Most of the reduction was made because OUSD(C) was unable to substantiate the Army's first estimate. Subsequent Army estimates provided more justification for the LOGCAP costs and DoD's estimate of the OJE went up accordingly.

NATO does not have a source of funds to support contingency operations. Costs that NATO incurs for communications terminals, computers, administrative vehicles, and transportation are shared among the allies. Currently, the U.S. share of these costs is about 30 percent. Additional engineering costs of \$88 million were added to later OJE estimates to cover the U.S. share of NATO and the European Command (EUCOM) forward support. The initial estimate did not anticipate these costs.

While Army troops are regularly trained for combat missions, they are not routinely trained for peacekeeping or riot control roles. To minimize the likelihood of mistakes in handling this sensitive mission, pre-deployment training was required for all personnel. Troop Preparation costs grew \$76 million for pre-deployment training.

Operations Support costs grew for several other reasons. Policy decisions to keep the troops combat qualified necessitated use of the firing ranges in Hungary, which cost \$10 million. Additional courses in the Serbo-Croatian languages added \$12 million. The U.S. contribution to the operation of NATO Headquarters was \$13 million. Additional logistics teams added to provide depot-level support on the forward-deployed equipment cost \$36 million. Additional costs for miscellaneous Army efforts (e.g., painting vehicles from desert camouflage colors to woodland green; morale, welfare, and recreation; and hazardous material disposal) cost \$29 million. Other defense-wide costs, such as the increased costs of \$11 million for mapping services, accounted for the remainder of the cost growth.

4. Transportation

Transportation costs provided for the movement of people, equipment, and supplies to and from the theater of operation by air, sea, and land. The November 1995

estimate of \$157 million grew 113 percent by August 1996 to a final estimate of \$335 million. Table III-4 reflects the details.

**Table III-4. Changes in Estimates of Bosnia Transportation Costs
(Dollars in Millions)**

DFAS Cost Item	Initial Estimate			Growth	Final Estimate	Reason
	IFOR	Deny Flight	Total			
Airlift	131	16	131	-78	53	Deployment & Re-Supply Flights
			0	38	38	SOF Transportation
			0	7	7	Reshape Force
Sealift	8	16	16	6	22	Deny Flight
			8	-2	6	Deploy
				4	4	Sustain
Inland Transportation	2	2	2	12	12	Redeployment
			21	23	Deploy	
			85	85	Army War Reservess	
Other	0	0	60	60	60	Redeployment
			16	16	Other	
			9	9	9	APO Post Exchange
	141	16	157	178	335	

From the initial estimate, the cost estimate for airlift decreased by \$27 million, which represented the net effect of a series of changes in airlift plans. The initial estimate was intentionally conservative and assumed a high level of airlift to move troops to Bosnia and to sustain the force throughout the operation. When it appeared in early December that a rapid build-up of forces would not be required, the assumption about the use of airlift was reduced. Shortly after the peace accord was signed on December 20, 1995, a decision was made to deploy forces as quickly as possible. This led to another increase in the assumed use of airlift. Ground transportation was delayed by weather and train strikes in France, which further increased the use of airlift. Eventually, however, sustainment re-supply by air was greatly reduced. The net effect of these changes was a \$78 million decrease between the November 1995 and August 1996 estimates for deployment and re-supply by air.

Since Special Operations Forces (SOF) were not considered for the first estimate, airlift costs grew by \$38 million when the decision was made to include SOF in the operation. Reshape the Force, designed to respond to the changing nature of the Bosnia

mission, added \$7 million to the estimate. Changes to the Deny Flight re-supply requirements added another \$6 million.

Sealift costs for deployment decreased by \$2 million, and the use of channel boats for sustaining the force increased by \$4 million. The estimate of redeployment costs increased by \$12 million in large part because they were not estimated well by the DoD Contingency Model used for the initial estimate.

Inland transportation was not a significant cost in the other contingency operations that were used to develop and validate the DoD Deployment Cost Model. As a result, the initial estimate of \$2 million grew to more than \$180 million for this service. An additional \$21 million was required for deployment to cover the increased costs to cross the international borders and for changing train engines and crews. An additional \$85 million was needed to move AWR equipment and bridging from Western Europe to Bosnia. Redeployment costs to move units back to Germany and the AWR equipment back to the pre-positioned sites added another \$60 million to the estimate. Finally, \$16 million was estimated to be the cost of getting the troops home from Reshape the Force. In the other category, costs were underestimated by \$9 million for transporting mail and Post Exchange items.

C. THE CAUSE OF ESTIMATE GROWTH

“Problems with Estimating” accounted for 42 percent of the growth in the estimate between November 1995 and August 1996, the largest of the three causes. “Operations or Policy Changes” were next with 31 percent, and “Not Estimated” accounted for the remaining 27 percent of the growth (see Figure III-3). The total dollar growth was \$1,745 million.

“Problems with Estimating” included such items as TDY pay for the troops backfilling in Europe, LOGCAP support not part of an operation or policy change, and the transportation of war reserves from Europe to Bosnia. Figure III-4 and Table III-5 summarize these changes by DFAS category.

“Operations or Policy Changes” included the increased use of reserve components and growth in the size of the force. Pre-deployment training and the use of SOCO MILLIONS forces and improved QOL support of deployed troops. Figure III-5 and Table III-6 summarize these changes by DFAS category.

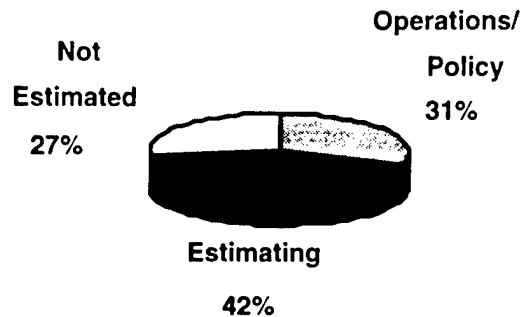


Figure III-3. Reasons for Growth in OJE Estimates

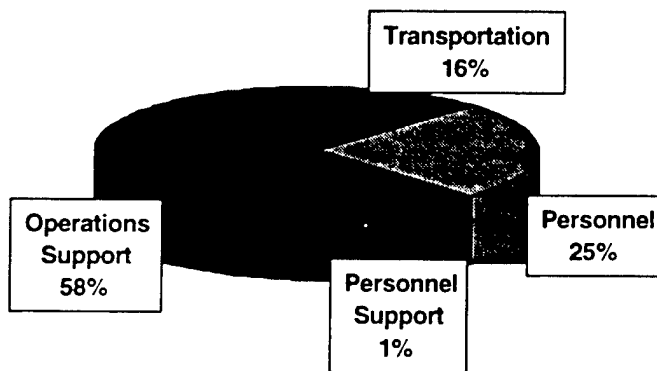


Figure III-4. Distribution of Cost Growth Attributed to Problems with Estimating

Costs “Not Estimated” initially included maintenance costs for refurbishment after use in Bosnia, intelligence activities, personal equipment and body and vehicle armor, and establishing the headquarters for a EUCOM forward presence. Figure III-6 and Table III-7 summarize these changes by DFAS category.

Another way to look at the growth in the OJE estimate is to separate the costs by Service and Defense Agency. The initial estimate focused on the principal participants: the Army, Navy, and Air Force. By the time the final estimate was completed, \$262 million was added for activities and services performed by the Defense Agencies. Even though this amount represents only 8 percent of the final cost of the OJE’s first year, it accounts for 15 percent of the cost growth, as shown in Table III-8.

**Table III-5. Cost Growth Attributed to Problems with Estimating
(Dollars in Millions)**

DFAS Cost Item	Initial Estimate			Growth	Final Estimate	Reason
	IFOR	Deny Flight	Total			
Personnel						
Temporary Duty				180	180	Backfill and NATO Support
Personnel Support						
Subsistence	143		143	-1	142	Prepackaged vs. Fresh Food
Medical	24		24	-20	4	DHP
Consumables & Other	5		5	31	36	Force Growth
Operations Support						
Operations—Army	282		282	13	295	Army JSTARS & Airdrop
Operations—Navy	0	61	61	-9	52	Reduced Deny Flight
Equipment & Supplies	0			33	33	Equipment Maintenance
Equipment & Supplies				62	62	Building Supplies
Communications	84		84	104	188	BC2A
Communications				9	9	WWMCCS
Engineering	329		329	146	475	LOGCAP Estimating
Engineering		46	46	33	79	Air Force Site Operations
Other Services				36	36	Additional Logistics Support
Transportation						
Airlift	131		131	-78	53	Deployment & Channel Flights
Sealift	8		8	-2	6	Deploy
Sealift				4	4	Sustain
Sealift				12	12	Redeployment
Inland Transportation	2		2	21	23	Deploy
Inland Transportation				85	85	AWR
Inland Transportation				60	60	Redeployment
Other	0			9	9	APO Post Exchange
	1,008	107	1,115	728	1,843	

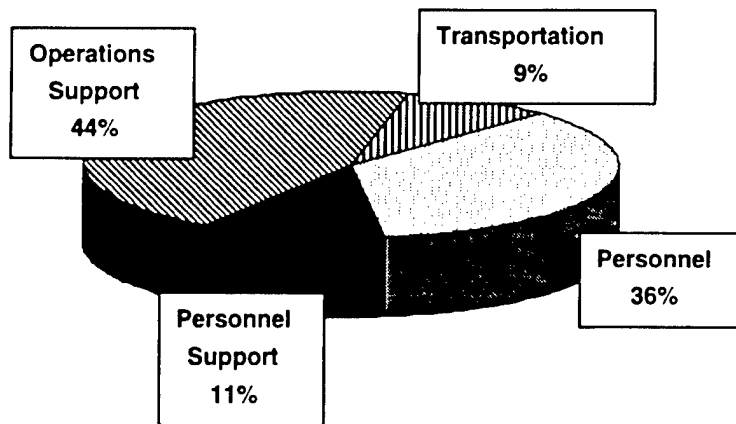


Figure III-5. Distribution of Cost Growth Attributed to Operations or Policy Changes

Table III-6. Cost Growth Attributed to Operations or Policy Changes
(Dollars in Millions)

DFAS Cost Item	Initial Estimate			Growth	Final Estimate	Reason
	IFOR	Deny Flight	Total			
Personnel						
Reserve Pay	113		113	174	287	Additional Reserves
Allowances	69	45	114	5	119	Additional Actives & Reserves
Temporary Duty	38	60	98	21	119	Additional Actives & Reserves
Personnel Support						
Consumables & Other				31	31	QOL Services
Consumables & Other				31	31	Force Growth
Operations Support						
Operations—Air Force		46	46	-2	44	Reduced Deny Flight
Operations—Air Force	35		35	29	64	Increased JSTARS
Operations—SOCOM	0		0	30	30	Ground and Air Operations
Engineering			0	61	61	LOGCAP Mission
Troop Preparation	0		0	76	76	Pre-Deployment Training
Other Services	0		0	10	10	Range Operations
Other Services				12	12	Language Training
Transportation						
Airlift			0	38	38	SOF Transportation
Airlift			0	7	7	Reshape Force
Airlift		16	16	6	22	Deny Flight
	255	167	422	529	952	

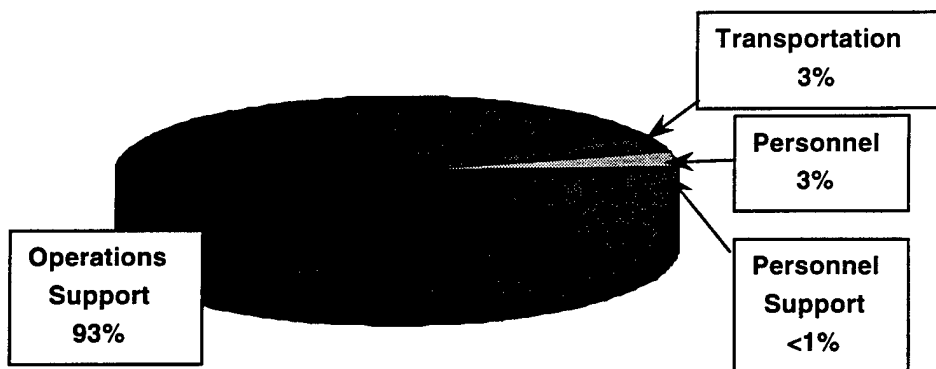


Figure III-6. Distribution of Cost Growth Attributed to Items Not Estimated Initially

Table III-7. Cost Growth Attributed to Items Not Estimated Initially
(Dollars in Millions)

DFAS Cost Item	Initial Estimate			Growth	Final Estimate	Reason
	IFOR	Deny Flight	Total			
Personnel						
Civilian Pay				2	2	Civilian Overtime DMA
Civilian Pay				15	15	Civilian Border Monitors
Personnel Support						
Activate Reserves	0			2	2	Cost To Activate Reserve Component
Operations Support						
Equipment & Supplies				9	9	Ballistic Protection Kits
Equipment & Supplies				23	23	Containers
Equipment & Supplies				41	41	Personal Equipment
Reconstitution	0		0	122	122	AWR Replacement Equip Cleaning
Intelligence	0		0	101	101	Intelligence Increase
Engineering			0	38	38	Forward Presence
Engineering			0	50	50	NATO Common Engineering
Other Services				29	29	Miscellaneous
Other Services				13	13	NATO Headquarters
Other Services				11	11	Mapping Services
Transportation						
Inland Transportation				16	16	Other
	0	0	0	472	472	

**Table III-8. Cost Estimates for OJE by Service and Defense Agency
(Dollars in Millions)**

Service or Agency	Initial Estimate	Final Estimate	
Army	1,227	2,246	74.3%
Air Force	233	443	13.6%
Navy	61	129	4.0%
Marines		5	0.1%
DISA		104	3.2%
SOCOM		89	2.7%
NSA		19	0.6%
DIA		18	0.6%
DMA		18	0.6%
Defense-Wide (DLA, WHS, etc.)			
DHP			
Other Activities	0	262	8.0%
	1,521	3,265	100%

IV. CONCLUSIONS AND RECOMMENDATIONS

IV. CONCLUSIONS AND RECOMMENDATIONS

Based on the Bosnian data, the study team has drawn several conclusions related to the overall process of estimating the costs of contingency operations. We have focused on the basic causes of the estimating errors rather than the specifics detailed in Chapter III. Our recommendations are intended to help DoD develop better cost estimates for future contingencies.

We also need to point out that DoD is now working on—and in some cases, has already fixed—some of these problems, in part, because of the preliminary results of this study briefed previously to DoD representatives.

A. PROBLEMS WITH ESTIMATING CONTINGENCY OPERATIONS COSTS

1. Evolutionary Nature of Cost Estimates as Mission Evolves

As in Bosnia, future contingency operations might be characterized by constantly changing and evolving activities. Initial cost estimates that consist of just financial numbers associated with general cost categories—even in an accepted standard structure—could lose meaning as new operational concepts are implemented. A minimal level of documentation should be prepared for all cost estimates. Basic assumptions that support the major cost elements (e.g., the number of people or the number of aircraft flying hours, units involved in the operation, timing of the operational phases, and situations that occurred that caused additional costs to be incurred) will prove invaluable in later stages of the operation as the nature of the activities evolves. The lack of documentation on any of the estimates not only hindered this analysis but also made it harder for the cost analysis community to improve its performance by learning from the past. At a minimum, documentation should be improved to identify the numbers of people actually deployed at each location.

In this study, we attempted to compare the estimates prepared for the OJE with estimated (or actual) costs for other contingencies. We found that reliable historical data that could help explain the costs of past contingency operations are limited. The lack of descriptive information on the cost drivers used for the estimates—prepared by different

agencies in some cases—prevented us from determining a definitive cause for a change in an estimate.

2. Uniqueness of Each Contingency Operation

Estimating the costs of contingency operations is difficult because new contingencies almost always involve activities that go beyond past experience or at least beyond the experience of those developing the cost estimates. No source material exists to check estimates for completeness, other than the collective corporate memory of those involved with the initial estimate. Changes in personnel and the absence of a systematic body of contingency operation cost information contribute to the likelihood that analysts could initially overlook items that, in retrospect, seem to be obvious sources of incremental costs of contingency operations. Until analysts have sufficient information available to formulate or review their cost estimates, this source of errors is likely to continue.

3. Lack of a Common Cost-Estimating Structure

Estimating the costs of contingency operations typically involves a fairly broad spectrum of participants from the Office of the Secretary of Defense (OSD), the JS, the Services, and Defense Agencies/Activities. Even though initial cost estimates of an operation may start within OUSD(C), they quickly become corporate efforts. Consistency in the structure used to build and update estimates is essential. The process used to develop and manage contingency cost estimates during the OJE was not well integrated and contained inconsistencies. OUSD(C)/JS tended to estimate costs using the DFAS standard categories (i.e., Personnel, Personnel Support, Operations Support, and Transportation), while the Service estimates tended to address specific tasks by the phase of the operation (e.g., Pre-deployment, Deployment, Operations, Re-deployment, and Reconstitution).

Although the DoD Deployment Cost Model generally used the four major DFAS reporting categories, some cost elements were inadvertently placed in the wrong categories.⁶ These differences highlight the problem: no common cost estimating structure is used throughout DoD for making cost estimates for contingency operations.

⁶ The IDA team discovered that TDY costs were included in the Personnel Support category in the initial OSD estimate even though the DFAS structure in force at the time put these costs in the Personnel category. The data were adjusted for this analysis.

In addition, the initial estimate tended to focus on the contributions expected from the Services without regard for contributions needed from the Defense Agencies.

4. Uncertainties in Executive Agent Funding Responsibilities

Finally, some ambiguities in funding responsibilities were observed. This was probably more of an annoyance than a serious problem in OJE, but it has the potential to be significant. This problem occurs when one Service is executive agent for a common service, such as facility operations or communications. An example cited by one observer involved the Army's support to the Air Force for BOS. In this instance, the Army definition of BOS did not match the Air Force's expectation. Each Service funded different services through its BOS account.⁷ As a result, the Air Force did not include the costs of these services in its estimate, assuming they were included in the Army's estimate. Similar problems can arise over the funding responsibilities of the Agency designated as the executive communications agent, where the range and depth of support perceived by the provider could differ from those who received the services.

5. Inconsistency of Cost Estimates and Cost Report Formats

A related problem exists for reporting the expenditures that the Services and Agencies incur in support of contingencies. The current DoD accounting system requires the Services and Agencies to report costs to the DFAS using a prescribed CBS.⁸ While this is a good practice, two problems are associated with the reporting of incremental costs incurred. The first problem is that estimates of an operation's costs are generally not prepared using the same structure that is subsequently used for reporting. As a result, it is difficult to relate estimates to subsequent expenditures. The second problem arises because not all Services interpret the DFAS reporting requirements in the same way, perhaps because the structure is just a list without definitions or explanatory comments. This creates problems in getting consistent estimates across the Services and Agencies. For example, the Air Force reported the costs of JSTARS operations in OJE under the Personnel Support category when others might have considered these costs more likely to appear as part of the Operations Support category since other major system operating costs are reported there.

⁷ The issue here was vehicle leases.

⁸ DoD Financial Management Regulation Volume 12, Chapter 23.

B. RECOMMENDATIONS

Estimating the costs of contingency operations will never be routine. The changing nature of the operations that the United States chooses to support and the fluid environment of decision-making during the early stages create an environment that can severely stress the cost estimating community. Earlier in this chapter, we reported our observations of the types of problems that we found in the OJE estimates. In the remainder of the report, we will suggest some improvements that can strengthen the process. Because some of the suggestions contribute to solving multiple problems, we have not tried to align our recommendations one-for-one with the reported problems.

1. Establishing a Standard CBS for Contingency Operations

In the future, analysts could be required to provide cost estimates for operations in unfamiliar parts of the world. At the time the first estimates are requested, the force requirement might be only generally known. Moreover, the analyst might not have sufficient time to verify estimating assumptions. Inputs might be merged from multiple sources with little opportunity for extensive coordination and discussion of assumptions. With this in mind, establishing a standard CBS—with clear and concise definitions—to be used by all DoD components for estimating the costs for contingencies tops our list of recommendations.

Use of a common structure would simplify the integration of Service and Agency estimates and facilitate subsequent evaluation of those estimates. In short, a common CBS should build confidence in estimates by removing disparities caused by cost elements being interpreted differently among the Services and Agencies. Developers of this standard CBS need to ensure consistency across Service and Agency boundaries and compatibility with existing accounting and reporting systems.

The use of executive agents to provide common services to multiple Services will not diminish in the future. Typically, executive agents are designated to provide a general service, such as facility support or communications. Establishing clearer definitions of the common services will reduce the need to modify estimates after the operation has begun.

Also a standardized CBS could highlight or draw attention to costs that might otherwise be overlooked. For this reason, the CBS should be reviewed periodically for completeness and clarity. Such a CBS could guide those who prepare estimates.

2. Documenting the Estimated and Actual Costs of Contingency Operations

Next, a policy to require the systematic documentation of cost estimates and actual costs for contingency operations would provide long-term benefits. Analysts making future contingency estimates could learn from the experiences documented for other operations. In addition, cost estimating factors used for one operation could be improved for the next operation by comparing the estimate with the reported expenditures. Prior estimates could serve as a checklist to ensure the inclusion of all pertinent costs for the new operation. The need to archive descriptive data of the operation is also important: How many people were in the area of operations? How long were they there? How did they move (air, sea, land)? What was the approximate OPTEMPO (e.g., flying hours and so forth)? Without feedback and a process for learning from past experience, substantial improvements in cost estimating will be more difficult to achieve.

3. Building Improved Tools for Estimating Contingency Costs

Finally, the results of this study point to a significant opportunity for improving future estimates through the development of improved tools for estimating contingency costs. Figure IV-1 indicates that operational and policy changes made after the initial estimate account for approximately one-third of the growth in the initial OJE estimate. No cost model could fully anticipate these kinds of changes. However, we could improve future estimates by addressing the sources of estimating errors and by incorporating activities not estimated initially in OJE, which in combination accounted for two-thirds of the OJE cost growth.

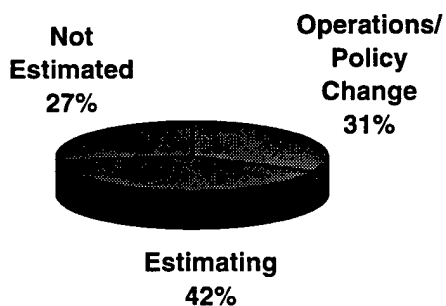


Figure IV-1. Reasons for Growth in the OJE Estimate

A critical part of improving the estimating process for contingency operations involves developing tools to aid the cost analyst. When the initial estimates are required, timely development of these estimates is essential. Proper tools, a standard CBS, and

immediate access to standard cost data that draws on the experience gained from past contingency operations can provide a much needed help to the cost analyst. Improvements made to the analytical methods and implemented in models for all to use can significantly improve the accuracy and timeliness of cost estimates for contingency operations.

ABBREVIATIONS

AC	Active Component
APO	Army Post Office
AWR	Army War Reserve
BC2A	Bosnia Command and Control Augmentation
BOS	base operating support
C2	command and control
CBS	cost breakdown structure
DFAS	Defense Finance and Accounting Service
DHP	Defense Health Program
DIA	Defense Intelligence Agency
DISA	Defense Information System Agency
DLA	Defense Logistics Agency
DMA	Defense Mapping Agency
DoD	Department of Defense
EUCOM	European Command
FY	fiscal year
GCCS	Global Command and Control System
IDA	Institute for Defense Analyses
IFOR	Implementation Force
JS	Joint Staff
JSTARS	Joint Surveillance and Track Radar System
LOGCAP	Logistics Civil Augmentation Program
MILPERS	Military Personnel
NATO	North Atlantic Treaty Organization
NIMA	National Imagery and Mapping Agency
NSA	National Security Agency
OJE	Operation Joint Endeavor
OPTEMPO	Operating Tempo
OSD	Office of the Secretary of Defense
OUSD(C)	Office of the Under Secretary of Defense, Comptroller
PBD	Program Budget Decision

POL	Petroleum, Oil, Lubricant
QOL	quality of life
R&R	rest and relaxation
RC	Reserve Component
SOCOM	Special Operations Command
SOF	Special Operations Forces
TAD	Temporary Active Duty
TDY	Temporary Duty
WHS	Washington Headquarters Service
WWMCCS	World Wide Military Command and Control System

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