United States General Accounting Office

GAO

National Security and International Affairs Division

March 1994

Desert Shield and Desert Storm Reports and Testimonies: 1991-93

GAO/NSIAD-94-134W

Foreword

On August 7, 1990, 5 days after Iraq's invasion of Kuwait, the President ordered the deployment of U.S. forces to the Persian Gulf area. This deployment, Operation Desert Shield, and the follow-on military action to liberate Kuwait, Operation Desert Storm, constituted the largest U.S. military action since the Vietnam War. The two operations provided an environment for testing U.S. modern military capabilities and served as indicators of the military forces and equipment that would be needed for future contingencies.

To assist policymakers, government administrators, and legislators in making decisions for the future, GAO planned a body of work on military, domestic, and international issues that emanated from the two operations. For the last 3 years, at the request of numerous committees and members of Congress as well as on its own initiative, GAO has reported on the financial aspects of the conflict, mobilization and deployment, logistics and maintenance operations, military weapons and related systems, and foreign relations and international trade.

This bibliography summarizes 72 unclassified reports and testimonies GAO issued concerning the Persian Gulf War. While many of these were intended to provide information, various reports contained a total of 76 recommendations to the Secretary of Defense and others aimed at correcting problems that could arise in similar future conflicts. Highlights of this body of work are included in the following five sections.

Financing the Conflict

Liberating Kuwait was an extremely costly endeavor. In addition to appropriations by the U.S. Congress, contributions were provided by foreign governments, private groups, and individuals to finance Operations Desert Shield and Desert Storm. In fiscal year 1991, Congress established the Defense Cooperation Account to receive contributions of cash and the proceeds from the sale of any in-kind support such as equipment and transportation. As of November 15, 1991, allied countries had pledged about $54 billion in cash and in-kind support to the United States and had provided about $50.5 billion, or 94 percent of their pledges. During fiscal year 1992, foreign governments, private groups, and individuals contributed and the Department of Defense deposited about another $5 billion to the Defense Cooperation Account. GAO found that the Department had administered these funds in accordance with legal and accounting requirements. Based on GAO's recommendation, the Congress rescinded almost $15 billion that it had appropriated in case foreign

contributions were insufficient, because the Department did not need it. (See pp. 6-11.)

Mobilization and Deployment

Operations Desert Shield and Desert Storm involved a large deployment halfway around the world under crisis conditions. All of the services faced a number of problems associated with the call-up and deployment of their troops. In many areas, if there had been less than 6 months of preparation time before the start of hostilities, U.S. forces would have been sorely pressed to meet all requirements. Given the current military restructuring and drawdown, the services have the opportunity to resolve many of the issues reported on by GAO. Typical problems discussed in these reports included the poor state of military medical readiness, shortcomings in pre- and post-deployment training, and military force structure. Although these problems involved both active and reserve forces, a great deal of GAO's work focused on the ability of the Reserve and National Guard to respond to this crisis situation. GAO reported on serious problems affecting the ability of some National Guard and Reserve units to quickly deploy and meet their missions. (See pp. 11-22.)

Logistics and Maintenance Operations

The United States faced the significant task of supporting deployed forces without the benefit of an established logistical infrastructure in the Persian Gulf area. GAO reported on many of the issues confronting the military, such as the development of war plans, the infrastructure, contract services, the industrial base, and the effectiveness of logistics and maintenance operations. GAO's reports showed that the Department had not fully integrated civilian maintenance personnel into wartime plans, and the military had largely lost accountability over materiel during redeployment. Other reports covered the Air Force's procedures related to logistics supply, the transportation and distribution of supplies, and the services' efforts to provide logistics support for selected weapon systems. (See pp. 22-31.)

Weapons and Related Systems

Operation Desert Storm provided the opportunity to demonstrate the success or failure of various deployed weapons and related systems. GAO provided insight into the strengths, weaknesses, and efficiency of many of the major weapons and related systems used during the Persian Gulf War. In general, GAO found that U.S. weapons systems performed very well. In the case of the Patriot missile, however, GAO reported that its effectiveness was less than originally reported and data is not available to conclusively

establish its success rate. GAO also reported on safety problems related to depleted uranium, unexploded submunitions, and friendly fire incidents. Even on the systems that performed well—such as the Bradley and Abrams armored vehicles, the B-52 bombers, the Hellfire missile, and the Apache helicopter—GAO made numerous observations and recommendations for implementing lessons learned from the Desert Storm experience. (See pp. 31-40.)

Foreign Relations and International Trade

The Persian Gulf crisis required the United States to deal with various foreign relations and trade issues. GAO reported on several of these issues, including the U.S. relationship with Jordan during the crisis because of Jordan's ties to Iraq, the rapid worldwide increase in oil prices due to Iraq's invasion of Kuwait in 1990, the International Energy Agency's response to mitigate the effect of an oil supply disruption, the investigation of allegations that the Export-Import Bank financed exports of restricted chemicals to Iraq, and the provision of refugee and humanitarian relief. (See pp. 40-42.)

Questions regarding the abstracted reports discussed in this booklet should be directed to Neal P. Curtin, Director of Reporting, at the U.S. General Accounting Office, room 5055, 441 G Street N.W., Washington, D.C. 20548, or by telephone on (202) 512-6152. Readers interested in ordering documents or in requesting bibliographic searches on a specific topic should call the Document Handling and Information Service, (202) 512-6000, or fax a request to (301) 258-4066. Forms are included in the back of this booklet to facilitate document orders.

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Abbreviations

DOD	Department of Defense
GAO	General Accounting Office
OSI	Office of Special Investigations
OMB	Office of Management and Budget
VA	Department of Veterans Affairs

Reports and Testimonies Concerning Operations Desert Shield and Desert Storm

The remainder of this booklet contains abstracts of 73 reports and testimonies. They have been arranged in descending order by issue date according to the previously highlighted sections: financing the conflict, mobilization and deployment, logistics and maintenance operations, weapons and related systems, and foreign relations and international trade.

Financing the Conflict

Financial Management: Fiscal Year 1992 Audit of the Defense Cooperation Account

GAO/NSIAD-93-185, Aug. 13, 1993

During fiscal year 1992, foreign governments, private groups, and individuals contributed more than $5 billion to the Department of Defense (DOD), mainly to defray the costs of Operations Desert Shield and Desert Storm. The contributions were to be placed in the Defense Cooperation Account, which Congress established in fiscal year 1991 to receive contributions from foreign countries. GAO found that DOD credited all cash contributions to the account and administered these funds in accordance with legal and accounting requirements. Through various memorandums, DOD also established procedures for tracking, reporting, and valuing in-kind support. DOD corrected reporting discrepancies that GAO had noted in an earlier report (GAO/NSIAD-92-144, May 11, 1992). DOD's fiscal year 1992 reports to Congress reflected adjustments to the estimated value of in-kind contributions. DOD has not issued formal regulations on the Defense Cooperation Account and related contributions of cash and goods. This lack of formal guidance may have contributed to initially depositing the proceeds from the sale of contributed goods into an account other than the Defense Cooperation Account.

Persian Gulf: U.S. Business Participation in the Reconstruction of Kuwait

GAO/NSIAD-93-69, Nov. 18, 1992

The Department of Commerce's failure to meet the June 1992 reporting deadline on the extent of contracts awarded U.S. companies for rebuilding Kuwait was due to several factors. First, the President did not assign responsibility for the report until after it was due. Second, after Commerce prepared the report, the interagency review process took several months to complete; Commerce had to update the information, further delaying

publication. According to the first Commerce report, the Kuwaiti government awarded U.S. business more than $2 billion in contracts in 1991—about half of all reconstruction business. The second report said that the U.S. share of reconstruction contracts through July 1992 topped $4 billion—also about half of reconstruction contracts. In preparing the reports, Commerce faced several constraints, including (1) incomplete information from the Kuwaiti government needed to identify the dollar values for contracts Kuwait awarded to foreign companies, (2) the reluctance of the U.S. and Kuwaiti private sectors to provide information, and (3) the lack of a central source for this information. Commerce was able to obtain more complete information from the U.S. Army Corps of Engineers. To meet the urgently needed emergency services and cleanup in Kuwait, the Corps awarded restoration contracts without using full and open competition. Also, the Kuwaiti government told the Corps to award several contracts to preferred firms. As a result, the Corps awarded about 87 percent of its prime contracts with less than full and open competition.

Operations Desert Shield/Storm: Foreign Government and Individual Contributions to the Department of Defense

GAO/NSIAD-92-144, May 11, 1992

As of September 30, 1991, DOD had accepted about $48.7 billion in contributions from foreign governments and $687,000 from private U.S. and foreign individuals. Foreign contributions consisted of cash and in-kind support, such as equipment and transportation, to defray the costs of Operations Desert Shield and Desert Storm. Major contributors were Saudi Arabia, Kuwait, the United Arab Emirates, Japan, Germany, and Korea. Individual contributions consisted of cash donations to defray the costs of Desert Shield and Desert Storm and to meet other DOD needs. As of April 10, 1992, foreign contributions had increased to $53.7 billion, and individual contributions had increased to $688,000. DOD credited all cash contributions to the Defense Cooperation Account and administered these funds in accordance with applicable legislative and accounting requirements. DOD also established procedures for tracking, reporting, and valuing in-kind support. GAO found some reporting discrepancies, which DOD corrected. Because data from contributing countries were not always available, DOD estimated the value of some contributions, and as a result, the estimated value may differ from the actual cost incurred by the contributor.

Operation Desert Shield/Storm: Update on Costs and Funding Requirements

GAO/NSIAD-92-194, May 8, 1992

By the end of fiscal year 1992, the Defense Cooperation Account should hold about $2.3 billion. This amount will not fully cover the estimated incremental costs or funding requirements of Operations Desert Shield and Desert Storm. Incremental costs incurred but not funded by the account total at least $4.3 billion. DOD requested that the account also finance operation-related maintenance for fiscal year 1993. However, the cost estimates for this maintenance were uncertain because of the difficulty in distinguishing operation-related maintenance from normal maintenance, particularly as time passes. DOD also estimated that under Public Law 102-25, veterans of the operations and their survivors would be eligible for $3.9 billion in benefits that should come from the account. GAO believed that the Congress should consider (1) returning the $2.3 billion to the general account of the Treasury and using the funds to pay for incremental costs already incurred and (2) terminating the Persian Gulf Regional Defense Fund, which was designed to supplement the Defense Cooperation Account. DOD would then gradually absorb any remaining costs for maintenance and benefits.[1]

Persian Gulf: Allied Burden Sharing Efforts

GAO/NSIAD-92-71, Dec. 30, 1991

As of November 15, 1991, allied countries had pledged about $54 billion in cash and in-kind support to the United States and contributed about $50.5 billion, or 94 percent of their pledges. Major contributors were Saudi Arabia, Kuwait, the United Arab Emirates, Japan, Germany, and Korea. As of October 31, 1991, DOD had reported receipts of in-kind support valued at about $5.6 billion. In valuing the support, DOD officials generally relied on information from the contributing countries. In some cases, however, such data were unavailable, and as a result, the officials estimated values that might have differed from the actual cost incurred. In addition to contributions to the United States, allied contributors provided various other types of support during the crisis. The European Commission and 24 nations participated in the Gulf Crisis Financial Coordination Group, established by the U.S. President, and pledged about $16.2 billion in economic assistance to countries affected by the crisis. As of

[1]Congress subsequently rescinded about $15 billion that it had appropriated for the Regional Fund.

October 1991, actual contributions totaled about $10.6 billion. Allied countries also became part of the multinational military force and provided financial and other assistance, through bilateral arrangements, to affected countries and international organizations involved in refugee relief efforts.

Operation Desert Shield/Storm: Costs and Funding Requirements

GAO/NSIAD-91-304, Sept. 24, 1991

The Office of Management and Budget's (OMB) estimate of $47.5 billion needed to fund Operations Desert Shield and Desert Storm appeared to be overstated. The estimate reflects (1) higher-than-actual costs incurred by the revolving fund accounts, (2) overestimated maintenance needs, (3) replacement of recoverable munitions, and (4) procurements that were canceled due to the operations' short duration. Foreign contributions to the Defense Cooperation Account should fully cover the operations' funding requirements; therefore, the $15 billion appropriated to the Persian Gulf Regional Defense Fund will not be needed. Foreign commitments for cash contributions totaled $48.3 billion, or about $800 million more than OMB's estimate; 88 percent of the amount pledged had already been contributed. Tracking incremental costs for the operations was difficult because the services captured the total costs only at the unit level and did not subtract the costs they would have normally incurred had there been no crisis in the Persian Gulf. These adjustments were made at the higher reporting levels. Also, cost data were aggregated into broad and general categories that made it hard to verify whether specific costs had been properly charged to the operations.

Allied Contributions in Support of Operations Desert Shield and Desert Storm

GAO/T-NSIAD-91-52, July 31, 1991

GAO testified that OMB reports for the most part accurately reflected the status of allied pledges and contributions. Some pledges had been revised, however, and the reported value of in-kind support was in some cases based on estimated rather than actual costs. GAO believed that allies' cash contributions would be enough to pay for the incremental costs of the war in the Persian Gulf and that funding by U.S. taxpayers would not be needed. GAO noted that DOD's funding requirements would be less than OMB's estimate of incremental costs because, for example, some equipment

lost during the war would not be replaced, and other costs would be satisfied through in-kind support furnished by U.S. allies.

Cost of Operation Desert Shield and Desert Storm and Allied Contributions

GAO/T-NSIAD-91-34, May 15, 1991

GAO testified that although DOD's and OMB's estimate of the costs of Operations Desert Shield and Desert Storm through May 1991 was for the most part reasonable, the estimate of future costs was unsupported and appeared high. More important, GAO believed that incremental funding requirements would be substantially less than OMB's cost estimate and that fiscal year 1991 incremental funding needs could be fully financed through allied contributions to the Defense Cooperation Account.

The Administration's Proposal for Financing Operations Desert Shield and Desert Storm

GAO/T-NSIAD-91-9, Feb. 27, 1991

In testimony on the administration's cost estimates and financing proposal for Operations Desert Shield and Desert Storm, the Comptroller General stressed three main points. First, Operation Desert Storm must be funded so as to ensure that U.S. troops in the Persian Gulf would receive all the support they need. Second, rather than delivering an "open check book" for war expenses, Congress should provide needed money through periodic supplemental appropriations. Third, funds to prosecute the war should come first from allied pledges; taxpayer dollars should be appropriated only if they are needed to supplement allied pledges. GAO believed that a $17 billion appropriation, which should be drawn from funds deposited in the Defense Cooperation Account, would cover the anticipated funding requirements of Gulf operations for the first half of fiscal year 1991. Congress, however, should place limits on its use by clearly stating that incremental costs would not include the higher fuel costs DOD incurred outside the Middle East. GAO also believed that to ensure the appropriate disposition of funds and assets made available for Gulf operations, a full accounting of expenditures should take place at the war's end.

Cost and Financing of Operation Desert Shield

GAO/T-NSIAD-91-3, Jan. 4, 1991

The Comptroller General testified that the total U.S. cost of Operation Desert Shield could exceed $130 billion in fiscal year 1991. This estimate consists of three components: the baseline cost of the U.S. forces committed to Desert Shield ($100 billion); the incremental cost of mounting the operation, including troop deployment, calling up the reserves, and providing required additional support for the forces ($30 billion); and related costs like debt forgiveness for Egypt and humanitarian assistance ($7 billion). The first component involves funds that would be spent whether the troops were in the Middle East or elsewhere. To date, 35 countries have furnished troops and equipment. Yet contributions to defray U.S. expenses are small relative to the total U.S. cost of the operation; DOD reported the receipt of cash contributions of about $4.3 billion and in-kind contributions of about $379 million. As a result of Operation Desert Shield, DOD obligated its fiscal year 1991 appropriations at a rapid pace and will exhaust some of these funds by spring. A supplemental appropriation to cover the costs of Operation Desert Shield seems inevitable, the Comptroller General testified. Because of many uncertainties in the cost estimates, however, GAO believed that it would be inappropriate to provide a lump sum supplemental now. Instead, Congress should provide periodic appropriations during the fiscal year, as actual costs become clearer. Some of the uncertainties are (1) the unknown value of offsets like assistance in kind, including fuel and water; (2) inadequate DOD guidance on what constitutes Desert Shield costs (an important factor in any emergency appropriations under the Budget Enforcement Act); and (3) other factors like a decision to implement a rotation policy.

Mobilization and Deployment

Operation Desert Storm: Problems With Air Force Medical Readiness

GAO/NSIAD-94-58, Dec. 30, 1993

The medical and evacuation units provided by the Air Force during Operation Desert Storm would have been unable to handle the projected number of casualties. Further, even though actual casualty rates fell short of the predicted number, the units still had a hard time accomplishing their missions. Units did not have enough or the right mix of people; supplies

were often incompatible with the equipment, missing, or outdated; many personnel were inadequately trained; and the system used to regulate the movement of patients did not work. According to Air Force personnel, the Air Force's system of forming teams to meet staffing requirements was biased and caused low troop morale.

Conscientious Objectors: Number of Applications Remained Small During the Persian Gulf War

GAO/NSIAD-94-35, Nov. 9, 1993

During fiscal years 1988-90, the Pentagon processed up to 200 applications for conscientious objector status each year and approved about 80 to 85 percent. During the 1991 Persian Gulf War, the number of applications rose to 447, about 61 percent of which were approved. Applicants were generally young junior enlisted personnel. Given that more than 500,000 troops were sent to the Persian Gulf, coupled with the fact that the services deployed some applicants, conscientious objectors had no measurable impact on the readiness of the all-volunteer force.

Operation Desert Storm: Army Medical Supply Issues

GAO/NSIAD-93-206, Aug. 11, 1993

Of 15 Army hospitals that GAO reviewed, the 10 with available data reported shortages of some medical supplies during the buildup for the ground offensive for Operation Desert Storm. Items in short supply included flu vaccines, morphine, and antibiotics as well as certain lab reagents and X-ray film. The initial shortages arose because hospitals were shipped to the Persian Gulf without their full complement of medical supplies. Commercial medical suppliers filled most requisitions during the war, but they could not meet the deadlines for some large orders. Four medical items—three of which are related to nerve agent exposure—posed problems for the industrial base, although none of the hospitals GAO reviewed reported shortages of these four items. The Army plans new initiatives for meeting hospital supply needs during future contingencies.

Operation Desert Storm: Improvements Required in the Navy's Wartime Medical Care Program

GAO/NSIAD-93-189, July 28, 1993

Navy medical units that supported Operations Desert Shield and Desert Storm were assigned wartime missions they were unprepared for. They were neither staffed nor equipped to care for the numbers of casualties they were told to expect, provide noncombat medical care, support the evacuation of casualties out of theater, or receive large numbers of chemically contaminated casualties. The personnel information systems used to assign individuals to Navy medical units contained incomplete and outdated information. Many doctors and nurses who were scheduled to deploy did not do so for a variety of reasons. In addition, medical personnel had not trained during peacetime for their wartime missions. Personnel also raised concerns about their ability to obtain equipment and supplies needed to treat mass casualties and to perform other missions. Fortunately, the 6-month interval between deployment and the start of the ground war allowed individuals to prepare for their wartime roles. By most accounts, medical units supplied by the Navy provided adequate care for those in need. However, had the Navy incurred the predicted number of casualties, or had the ground war started earlier or lasted longer, the care provided by these units might have fallen short.

Women in the Military: Deployment in the Persian Gulf War

GAO/NSIAD-93-93, July 13, 1993

Of the more than half million U.S. troops sent to the Persian Gulf during Operations Desert Shield and Desert Storm, about 7 percent were women. The deployment of so many women renewed debate about whether the ban on women in combat should be lifted. GAO visited 10 support units sent to the Persian Gulf with both men and women to learn of their experiences. Overall, the unit commanders with whom GAO spoke were generally positive about women's performance in the war. Women in the military units GAO visited worked on a broad variety of assignments during the deployment, and men and women endured equally harsh encampment facilities and conditions. Health and hygiene problems during the deployment were considered inconsequential for both sexes. Cohesion in mixed-gender units was generally considered to be effective during the deployment, and unit commanders often described cohesion as being best while the units were deployed. Pregnancy was cited as a cause for women

returning early from deployment or not deploying at all, but the groups GAO spoke with generally identified few actual cases.

Desert Shield/Storm: Air Mobility Command's Achievements and Lessons for the Future

GAO/NSIAD-93-40, Jan. 25, 1993

The Air Force Air Mobility Command performed well under demanding circumstances during Operations Desert Shield and Desert Storm, showing flexibility in its response to unforeseen difficulties associated with the airlift operation. The Air Force's ability to transport sustainment cargo—the material required to supply deployed troops—and units to the theater of operations efficiently was taxed by several factors, some of which were beyond the Air Force's control. These difficulties, however, were largely offset by the lengthy buildup period between August 1990 and January 1991. By the start of Desert Storm, DOD and the Air Force had devised ways of alleviating these problems to a large degree. Yet even with the Air Force's flexibility in working around problems, the lack of available aircrews prompted the Air Force to extend allowable hours for flight times; regulations normally limit these hours because of the dangers associated with aircrew fatigue. Further, the long distances and lack of an in-theater recovery base forced the Air Force to rely extensively on Air Reserve Component volunteer aircrews before the official call-up of the Reserves was authorized. Finally, the Air Force's decision to activate partial, rather than complete, Reserve units caused confusion about command structure and administrative procedures.

Military Airlift: Changes Underway to Ensure Continued Success of Civil Reserve Air Fleet

GAO/NSIAD-93-12, Dec. 31, 1992

The Civil Reserve Air Fleet program, which uses commercial aircraft to augment military planes during emergencies, is an important, yet relatively inexpensive, component of the Air Force's airlift capability. If fully used, the program can provide more than 30 percent of the Air Force's cargo airlift capability and more than 90 percent of its passenger capability. The program allows the government to avoid the large costs involved in acquiring and supporting a substantial Air Force fleet during peacetime. The Pentagon pays for the airlift as it is used and at predetermined compensation rates. The fleet played a major role in Operations Desert

Shield and Desert Storm and is expected to be a big part of DOD's airlift capability for the foreseeable future. Although the fleet's efforts in the Persian Gulf were a success, the carriers identified several problems with the program after the activation, and some suggested that they might reduce future participation unless changes were made. The Air Force and the carriers have worked to resolve many of those concerns in negotiations for future contracts. Carriers believed that future fleet activations would be more likely because of the success of the first activation. Also, while carriers were more aware of the direct and indirect costs associated with the activations, the traditional incentive for program participation—peacetime DOD business—has decreased.

Operation Desert Shield: Problems in Deploying by Rail Need Attention

GAO/NSIAD-93-30, Nov. 13, 1992

To rapidly deploy its forces in wartime, the Army depends on the rail system to transport its equipment from installations to ports of embarkation. The rail facilities and loading operations at Army mobilization stations are therefore focal points for deployment, and they are expected to become increasingly critical as Army units in Germany, Korea, and other locations return to the United States. At the six mobilization stations GAO visited, the Army transported unit equipment to ports as scheduled during the 6-month period covered by Operation Desert Shield, but deteriorated rail facilities at some mobilization stations constrained loading operations. Future conflicts could easily require the deployment of even greater numbers of U.S. forces during shorter periods of time. The Army began a program in fiscal year 1986 to repair rail facilities, but the effort's effectiveness has been severely hampered by program management problems. Also, the Pentagon and the Army have not corrected many deployment problems that GAO identified in 1987.

Military Afloat Prepositioning: Wartime Use and Issues for the Future

GAO/NSIAD-93-39, Nov. 4, 1992

A key part of the U.S. mobility strategy, known as afloat prepositioning, is to keep ships continuously loaded with combat equipment and support items. These ships are anchored near potential trouble spots so that they can quickly respond to developments during wartime. Operations Desert

Shield and Desert Storm provided the first major challenge to the concept of afloat prepositioning. The concept worked to a degree: equipment and supplies were delivered to Saudi Arabia 8 days after the war began and almost 2 weeks before they could have been sealifted from the United States. However, some of the supplies most needed by the Marine Corps were not on the ships, and systems to track supplies were inadequate. GAO found that while the Marine Corps had partially corrected these problems, the Department of Defense needed to address issues related to the planned expansion of its sealift capabilities. These issues include (1) the alternative of prepositioning material on land near potential conflict sites, which could reduce the need for afloat prepositioning and, in turn, costs; (2) the locations of sites for more prepositioned ships; (3) the advantages of owning versus chartering ships; and (4) the Army's ability to provide and maintain additional prepositioned equipment.

Operation Desert Storm: War Highlights Need to Address Problem of Nondeployable Personnel

GAO/NSIAD-92-208, Aug. 31, 1992

Many active and reserve personnel were unable to deploy for Operations Desert Shield and Desert Storm, but a lack of data made it impossible to accurately gauge the total number. The causes of nondeployability ranged from incomplete training to varying medical conditions or personal problems. Although the Pentagon claimed that nondeployable personnel were not a serious problem because the services were able to call up other personnel, available data suggested that the number of nondeployables was sizable. The data also indicated that nondeployability problems were aggravated by systemic weaknesses in the peacetime screening of active and reserve personnel and the inadequate reporting of nondeployables as part of normal readiness reporting. Steps must be taken to minimize future recurrences, particularly when there will be few active and reserve forces from which to tailor and substitute personnel to meet force requirements.

Operation Desert Storm: War Offers Important Insights Into Army and Marine Corps Training Needs

GAO/NSIAD-92-240, Aug. 25, 1992

When Iraq invaded Kuwait in August 1990, many U.S. military officials considered American ground forces to be in top form. Past training exercises, however, pointed to some weaknesses that needed attention.

The training just prior to and during the war focused on individual, small unit, and battle staff training. The emphasis on battle staff training was credited with much of the success in the command and control of maneuver forces. Experiences during the war accentuated the need to emphasize training in joint operations, deployment, and logistical and other support functions.

Operation Desert Storm: Full Army Medical Capability Not Achieved

GAO/NSIAD-92-175, Aug. 18, 1992
GAO/T-NSIAD-92-8, Feb. 5, 1992

In both a report and testimony, GAO reported that because of the high number of U.S. casualties expected during the Persian Gulf War, the Army shipped 23,000 medical personnel and millions of dollars in medical supplies to the region. To make medical units operational before the start of the ground war, the Army had to overcome significant problems, including (1) inadequate data in the personnel information systems used to identify doctors and nurses for active duty assignments and (2) a lack of peacetime training to prepare doctors and nurses for their wartime roles. The Army also faced equipment and other logistical support problems. For example, even with a massive effort to provide equipment and supplies to hospital units, many did not receive equipment or received only partial shipments. Equipment and transportation shortages also affected hospital mobility, and the evacuation of casualties was hampered by long distances, poor communications, and a lack of navigational equipment. Had the war started earlier or lasted longer or had the predicted number of casualties occurred, the Army's ability to provide adequate care would have been doubtful.

Operation Desert Storm: Race and Gender Comparison of Deployed Forces With All Active Duty Forces

GAO/NSIAD-92-111FS, June 25, 1992

The proportion of blacks in the active duty force deployed in Operations Desert Shield and Desert Storm was 3 percent higher than their proportion in the total active duty force. The proportion of whites deployed was 4 percent lower than their proportion in the total active duty force. The deployed active duty force also contained a higher proportion of men than the active duty force as a whole. Men also comprised a considerably

higher proportion of both total and deployed active forces than they represented in the general population. Women, on the other hand, made up more than half of the U.S. population and 11 percent of the active duty forces yet represented only 6 percent of the active duty deployed personnel. Pentagon officials attributed this situation to the combat exclusion restrictions that reduce the number of women assigned to units and job categories most likely to be included in a hostile deployment.

Defense Health Care: Physical Exams and Dental Care Following the Persian Gulf War

GAO/HRD-93-5, May 15, 1992

The Department of Veterans Affairs (VA) may have a hard time deciding the disability claims of soldiers who served in the Persian Gulf War because physical exams were not routinely given to all discharged personnel and reservists. VA considered these exams to be crucial in deciding claims for service-connected disability payments. VA and DOD must reconcile VA's need for medical information with DOD's need to expedite the separation processing of service members. This could be achieved by establishing a minimal, uniform separation physical examination that carefully catalogs any health problems experienced during active duty. Denial of access to VA dental treatment for Persian Gulf War veterans did not appear to be widespread, but at least several hundred veterans were denied dental treatment because of incorrect paperwork linked to the rapid processing of large numbers of personnel. The dental access problem could be avoided in the future if DOD did not have to specify on discharge papers whether dental care was provided. Because VA could use its own dental examinations and veterans' dental records to establish eligibility for the benefit, the removal of the DOD certification requirement—a move requiring legislation—would not significantly change the nature or scope of the dental benefit.

Operation Desert Storm: Army Guard Combat Brigade War Lessons Reflect Long-Standing Problems

GAO/T-NSIAD-92-36, May 5, 1992

If the Army is to confidently rely on its National Guard combat forces in future conflicts, it must work to correct the fundamental problems that have hampered these reserves since long before the Persian Gulf War. During post-mobilization training, the Army discovered major deficiencies

in the abilities of National Guard brigade units, which remained in a training status until the war was over. GAO testified that peacetime training did not adequately prepare the brigades for their wartime roles, the Army's readiness information greatly underestimated the amount of post-mobilization training needed to ready the brigades for deployment, and adverse impacts resulted from the incompatibility of the National Guard's peacetime systems with those of the active Army.

Operation Desert Storm: Army Had Difficulty Providing Adequate Active and Reserve Support Forces

GAO/NSIAD-92-67, Mar. 10, 1992

Support forces were critical to the success of Operations Desert Shield and Desert Storm. However, unreliable data on unit readiness, the unanticipated extended period that the limited reserve call-up remained in effect, and the incremental way in which DOD ran the call-up created an extensive force selection process that might have posed problems had there been less time to prepare for combat. Many units needed additional people, equipment, and training. The Army lacked specific plans for correcting personnel and equipment shortages under a limited call-up and had to extensively transfer resources among units. The long lead time for the buildup, modern ports and airstrips, host nation support, and the war's short duration allowed the Army to provide most of the needed support forces. Despite these favorable conditions, the Army ran out of some types of units and had no contingency plans for creating new ones when shortages were forecast. Ad hoc measures filled some gaps, but remaining deficiencies could have had serious consequences had events unfolded differently. In revising its force structure, the Army is adding some active support forces for its contingency force and is considering substituting additional active support forces for reserves in this force. GAO believed that the Army should examine and address the factors that led reserves to be excluded from this war to preserve as many roles as possible. Improved mobilization procedures might make it feasible for more reserve support forces to participate in the contingency force.

Army Reserve Components: Accurate and Complete Data Are Needed to Monitor Full-Time Support Program

GAO/NSIAD-92-70, Dec. 30, 1991

Several hundred Army Reserve and National Guard units were activated for Operations Desert Shield and Desert Storm, yet some full-time support personnel holding key positions in these units reportedly did not serve with them. GAO found that the Army could not effectively monitor the full-time support program because it lacked an accurate, complete personnel database and had not adequately defined the information it needed for effective program oversight and analysis. As a result, the Army did not know how many full-time support personnel never served with their units during Operation Desert Storm, whether due to medical reasons or personal hardships. Although a program objective is to help Army Reserve units shift from peacetime to wartime operations, full-time support personnel were not sufficiently trained on the active Army's personnel and supply systems to provide that essential assistance. An earlier GAO report (GAO/NSIAD-91-263, Sept. 24, 1991) noted that this lack of knowledge had hampered units' transition to wartime operations.

Operation Desert Shield: Problems Encountered by Activated Reservists

GAO/NSIAD-91-290, Sept. 27, 1991

GAO surveyed 40 reservists about their activation during Operation Desert Storm. These reservists cited a broad range of problems associated with their activation. These problems stemmed more from what they perceived as inequities in the services' call-up and assignment policies, coupled with what they saw as inadequate conditions at the installations where they were assigned, rather than from losses in income. Half the reservists GAO interviewed experienced a drop in income, however. About three-quarters of the 40 reservists said that the problems they encountered lowered their morale, and about one-quarter said that they would not reenlist.

National Guard: Peacetime Training Did Not Adequately Prepare Combat Brigades for Gulf War

GAO/NSIAD-91-263, Sept. 24, 1991

During Operations Desert Shield and Desert Storm, thousands of Army reservists and National Guard members were sent to the Persian Gulf for both combat and support missions. GAO found that the Army did not adequately prepare its National Guard roundout brigades to be fully ready to deploy quickly. When the three brigades were activated for the war, many soldiers were not completely trained to do their jobs; many

noncommissioned officers were not adequately trained in leadership skills; and Guard members had difficulty adjusting to the active Army's administrative systems for supply and personnel management, which are very different from those the National Guard uses in peacetime. Also, when activated, many soldiers had serious medical or dental conditions that would have delayed or prevented their deployment. The activation of the three roundout brigades also revealed that the post-mobilization training plans that they prepared during peacetime underestimated the training needed for them to be fully combat ready. After the brigades were activated, the Army developed revised training plans calling for more than three times the number of training days estimated in the readiness report and requiring the support of almost 9,000 active Army trainers and other personnel.

Army Reserve Forces: Applying Features of Other Countries' Reserves Could Provide Benefits

GAO/NSIAD-91-239, Aug. 30, 1991

Given the changed security environment and significantly reduced budgets for defense spending, the Army plans to cut its active and reserve forces by about 250,000 over 3 years. To reduce costs, the Army is considering whether to rely more heavily on reserves to meet its needs, as many other countries do. GAO examined the military structure of five countries that rely heavily on reserves and found that certain features in the way they organize and train these forces merit consideration. In organizing its forces, the Army might consider (1) assigning reserves both combat and support roles, (2) using reserves to round out active forces at the battalion and company level rather than the brigade level, and (3) integrating reserves with more intensively trained active forces. Features of training that warrant consideration include placing reservists in positions related to prior active duty service and varying the amount of training required of reservists based on need.

Operation Desert Shield/Storm: Use of Navy and Marine Corps Reserves

GAO/NSIAD-91-244, June 14, 1991

The Navy activated 21,109 reservists, or 17 percent of the Navy reservists available, for call-up during Operations Desert Shield and Desert Storm. These reservists were mainly called up for their individual skills; medical

reservists, for example, accounted for about half of the Navy reservists activated. The Marine Corps activated 25,710 reservists, or 61 percent of the reservists available, from the Select Reserve. These individuals were primarily called up by unit, rather than by individual skill, and served in combat and combat support units that augmented active units. The remaining reservists were in combat support units like logistics. Some Navy and Marine Corps reservists were activated after the cease-fire to provide logistical support in the redeployment of personnel and equipment to the United States.

Military Personnel: Composition of the Active Duty Forces by Race or National Origin Identification and by Gender

GAO/NSIAD-91-134FS, Feb. 1, 1991

In response to congressional interest, GAO examined the racial or ethnic composition and gender of troops deployed during Operation Desert Shield. GAO found that minorities were represented in the operation in about the same proportions as their representation in the total force. In 1990 men comprised 89 percent of the active force and women 11 percent. Blacks made up 20.8 percent, Hispanics 4.6 percent, whites 70.4 percent, and others 4.2 percent of the active force.

Logistics and Maintenance Operations

Operation Desert Shield/Storm: Impact of Defense Cooperation Account Funding on Future Maintenance Budgets

GAO/NSIAD-93-179, June 10, 1993

In earlier reports (GAO/NSIAD-92-194 and GAO/NSIAD-91-304), GAO stated that DOD might have overstated estimates of maintenance funding requirements for equipment used in Operation Desert Storm. Early inspections showed that equipment initially returned from Operation Desert Storm would need little maintenance beyond that normally planned and budgeted for. Equipment returned later was in much worse shape, however, because of exposure for lengthy periods to harsh desert conditions. DOD thus used the Defense Cooperation Account to fund maintenance and repairs on this equipment. For fiscal years 1991-92, the services allocated about $7.1 billion from the account for maintenance, broken out as follows: the Army, $4.2 billion; the Navy, $1.8 billion; the Air Force, $0.9 billion; and the Marine Corps, $0.2 billion. GAO suggested that Congress require DOD to

report the effect of this funding on future maintenance needs and reduce future years' maintenance budgets appropriately.

Army Maintenance: Strategy Needed to Integrate Military and Civilian Personnel Into Wartime Plans

GAO/NSIAD-93-95, Apr. 29, 1993

With the demise of the Warsaw Pact and the dissolution of the Soviet Union, the U.S. Army must develop effective combat and support strategies to meet new threats to the nation's security. GAO doubts, however, that the Army's general support maintenance strategies will be effective in future conflicts. The strategy does not reflect the changed threat environment, existing military maintenance capabilities, and actual maintenance practices used in past conflicts. Specifically, the strategy relies on military units for general support maintenance, while in practice the Army uses civilian maintenance workers to do this work, as was the case in the Persian Gulf War. The Army's strategy does not consider using civilians to do general support maintenance during wartime. Of particular concern is the strategy's failure to address regional conflict scenarios in which civilians could likely be used. As a result, the Army must make ad hoc general support maintenance arrangements. Although the Army had enough warning time to arrange for essential repairs during the Persian Gulf War, the timing may not be as favorable during the next conflict, and maintenance support operations could be jeopardized. The Army is considering changing its approach for general support maintenance during various conflict scenarios, but none of the proposals being reviewed addressed how to effectively incorporate both military maintenance forces and civilians or how to mix and match these forces with the conflict scenarios being considered.

Operation Desert Storm: DOD's Funding Actions Relating to Leftover Inventories

GAO/NSIAD-93-143FS, Apr. 26, 1993

Operations Desert Shield and Desert Storm resulted in residual or excess "secondary items" such as aircraft and ship components, medical and construction supplies, and clothing. The Office of the Secretary of Defense estimated the value of these items at $3.4 billion. Its estimate was based on figures derived in three parts: (1) the value of material ordered or on the way to Southwest Asia for the two operations, (2) the value of material

needed for 45 days in Saudi Arabia, and (3) the value of material expected to be returned to the United States, based on historical peacetime returns. The services could not tell exactly how much material was returned because they used some of it in normal operations and did not keep track of how much they used. They did reassess peacetime requirements and levels of demand to try to make an estimate: the Army's estimate was $1.7 billion; the Marine Corps' estimate was $155 million. The Navy and the Air Force said they had no excess material. On the basis of its calculations, the Office of the Secretary of Defense reduced the services' budgets for fiscal years 1993-95 by about $3.1 billion: $2.5 billion for the Army, $448 million for the Air Force, $102 million for the Navy, and $68 million for the Marine Corps.

Materiel Disposal: Alleged Improper Disposition and Destruction of Serviceable Material and Supplies in Saudi Arabia

GAO/NSIAD-93-139R, Mar. 11, 1993

After Operation Desert Storm, seven soldiers alleged that serviceable equipment and supplies had been burned and buried in Saudi Arabia. Interviews with other Army personnel, as well as a review of Army documents, showed no evidence that such incidents occurred or were authorized. However, GAO and other Army organizations had reported previously that materiel was vulnerable to loss, improper disposal, and destruction because of the Army's poor accountability over equipment sent to the Persian Gulf. Because of this vulnerability and the allegations of the soldiers, GAO referred the matter to the DOD Inspector General for further investigation.

Operation Desert Storm: Disposal and Sale of Excess Items

GAO/NSIAD-93-18FS, Oct. 13, 1992

This fact sheet discusses the results of an auction of materiel sent to Saudi Arabia during the Persian Gulf War and later turned over to the disposal system. In general, items sold during phases I and II of the auction included vehicles from other governments and damaged or unusable U.S. vehicles. Other equipment sold, including tents, cable, kitchen equipment, scrap metal, and aluminum, tended to be heavily caked with sand. Empty ammunition boxes and demilitarized brass casings were also sold. During phase III of the auction, scheduled for November 1992, the military will try to sell the remaining excess property, mainly vehicle scrap and

condemned ammunition containers. The value of the U.S.-manufactured equipment held in Saudi Arabia at the end of May 1992 was about $11 million versus almost $199 million for materiel donated by foreign governments. The majority of the equipment sold was in "H" condition, which the Pentagon defined as unserviceable or condemned. Foreign equipment did not meet environmental protection or safety standards and could not be brought into the United States. Through a program to recover usable property, $139.6 million worth of the materiel was reused through the end of May 1992.

Operation Desert Storm: Lack of Accountability Over Materiel During Redeployment

GAO/NSIAD-92-258, Sept. 23, 1992

In response to congressional concerns that large amounts of supplies and materiel from Operation Desert Storm may have been lost or misused, GAO examined whether military assets were adequately safeguarded and properly accounted for. GAO found that the Army did not have oversight and control over materiel sent back to the United States. Specifically, it lost track of materiel during the deployment to the Middle East, did not establish basic accountability over the materiel during the redeployment process, and began accounting for the materiel only after it was returned and processed at the final destinations. This situation left most of the materiel vulnerable to loss and theft as it was being shipped to and from the Middle East and used by U.S. forces in the region.

Operation Desert Storm: No Evidence That Foreign Suppliers Refused to Support War Effort

GAO/NSIAD-92-234, Sept. 2, 1992

In spite of its intensive efforts, GAO found no evidence to substantiate reports that foreign suppliers refused to expedite deliveries of parts and components needed in the Persian Gulf War. During the Gulf crisis, the Department of Commerce, which ran the system for speeding up deliveries of defense-related orders, received five requests from defense contractors located in the United States asking for help in accelerating deliveries from foreign suppliers. GAO found that the foreign suppliers in these five cases cooperated in an expeditious manner. Federal agency records show that the U.S. government contracted with foreign governments to expedite orders of needed parts in two of these five cases. Of the remaining three

cases, the foreign suppliers accelerated deliveries because of actions taken by the U.S. company in two cases and as a result of a U.S. government contract with a U.S.-based representative of the foreign supplier in one case. DOD does not have a policy on the use of domestic second sources of parts and components that the military depends on foreign suppliers to provide.

Defense Inventory: Procurement Transaction During Operations Desert Shield and Storm

GAO/NSIAD-92-268, Aug. 1, 1992

The Pentagon's procurement of supplies and equipment during a 3-year period encompassing the Persian Gulf War was relatively stable. Procurement rose during fiscal year 1991 but did not reach the peak level of 2 years earlier. DOD procurement for supply and equipment items fell from $73.1 billion in fiscal year 1989 to $71.7 billion in fiscal year 1990 and rose again to $73 billion in fiscal year 1991. From fiscal years 1990 to 1991, procurements by the Army, the Air Force, and the Defense Logistics Agency increased 6.6, 4.4, and 24.7 percent, respectively; Navy procurements declined 12.2 percent. Overall procurements increased $1.3 billion, or 2 percent, during this period and were spread over most federal supply class categories. Commodities with significant increases included motor vehicles, electrical and electronic equipment, fuels, lubricants and oils, subsistence, and clothing and individual equipment.

Operation Desert Storm: Comparing Peacetime and Wartime Unit Price Change Patterns

GAO/NSIAD-92-196, June 18, 1992

In response to concerns about price gouging by contractors in the wake of the Persian Gulf War, GAO reviewed the unit prices associated with about 69 percent of the purchases DOD made to support Operations Desert Shield and Desert Storm. GAO found that of the $4.6 billion spent to purchase the items reviewed, about $1.4 billion, or 30 percent, in items purchased exceeded peacetime prices. About 75 percent of those purchases increased 25 percent or less during the war, and $34 million, or less than 1 percent of total Desert Storm purchases, was spent on items that were more than 100 percent higher than the highest recorded unit price during peacetime. The primary reason for increased prices was the cost of speeding up deliveries for urgently needed items. Other reasons were

(1) differences in the unit of measure for peacetime versus wartime items, (2) negotiated changes to contractors' pricing agreements, (3) changing market conditions, and (4) drawing or engineering changes.

Operation Desert Storm: Increased Work Loads at Army Depots Created Supply Backlogs

GAO/NSIAD-92-152, Apr. 10, 1992

During the Persian Gulf War, the Army moved more than 519,000 tons of supplies to Southwest Asia, much of which passed through two main depots: the New Cumberland and Red River Army Depots. This movement substantially increased the two depots' workloads, and backlogs in processing increased. These backlogs increased because (1) at the same time the workload was increasing, the Army was reducing its workforce; (2) not all of New Cumberland's new automated storage and retrieval systems were operating; and (3) the depots' optimal storage capacity was exceeded. In addition, the Army did not properly oversee the movement of supplies to and in the Persian Gulf area. GAO believes that resolving these problems will require the unwavering commitment of DOD officials.

Operation Desert Storm: Improved Air Force Procedures Are Needed for Special Project Supply Orders

GAO/NSIAD-92-81, Jan. 31, 1992

Air Force units did not always cancel outstanding backorders authorized for Desert Storm operations as soon as they should have. Four months after combat ceased, Desert Storm backorders valued at more than $50 million were still outstanding. As a result of GAO's review, the Air Force (1) canceled about $3.7 million in backorders for items no longer needed and (2) redirected about $4.4 million in backorders, originally authorized to support Desert Storm, to meet other needs. The failure to detect or cancel these invalid backorders resulted from weaknesses in Air Force procedures and practices. Special project codes are routinely authorized for Air Force units, and backorders will continue to be established for special projects. Unnecessary procurement, repair, and transportation costs could be avoided in the future by establishing procedures and practices to ensure that invalid backorders are promptly canceled.

Desert Shield/Storm: U.S. Transportation Command's Support of Operation

GAO/NSIAD-92-54, Jan. 9, 1992

During Operation Desert Shield, actual deliveries of troops and supplies lagged behind the requirements of the Central Command, which oversaw the planning and movement of needed troops, equipment, and supplies. However, the Transportation Command, which supported the Central Command, was able to substantially meet requirements before the armed conflict with Iraq began. Due to the absence of hostilities during deployment, the Transportation Command had more than 5 months to overcome initial problems and deliver the needed supplies and forces before offensive operations started. The Transportation Command did not support the deployment needs of the Central Command, however, as rapidly, efficiently, and effectively as intended. The Transportation Command's management of wartime theater transportation was hampered by the lack of (1) an operational plan for a Desert Shield-type contingency; (2) agreed-upon operating procedures and lines of responsibility for a wartime situation among the Command, its components, and the services; and (3) a fully implemented central deployment database with accurate and complete transportation information. Despite these problems, the airlift and sealift moved thousands of personnel and millions of tons of cargo. Overall, the component units of the Transportation Command performed responsively, at a high operating tempo, and with an overall high utilization and reliability of aircraft and ships. DOD has prepared several proposals to address the problems it encountered during the deployment.

Operation Desert Storm: Transportation and Distribution of Equipment and Supplies in Southwest Asia

GAO/NSIAD-92-20, Dec. 26, 1991

As Operation Desert Storm began, the military services made a major push to move equipment and supplies to the Persian Gulf area. The accessibility of excellent Saudi Arabian seaport and airport facilities made this movement highly successful. At the same time, however, only a small group of logisticians were initially sent to the area to receive and store this equipment and set up logistical systems to support the combat units. Once systems were set up, the Army and Marine Corps had problems in transporting equipment within the area because of the distances between the main supply base and other military and logistic bases. These

distances, in turn, created communications problems because the services' equipment was designed for much shorter ranges. In addition, the services were far short of heavy equipment transporters and had to rely on host nation and coalition support. They used third-country nationals to drive tractor trailers, but these drivers were not inclined to deliver equipment to northern logistics bases. U.S. officials maintained that there were no notable instances of theft or diversion of supplies at ports of entry, from warehouses, and during transportation during the operation.

Desert Shield/Storm Logistics: Observations by U.S. Military Personnel

GAO/NSIAD-92-26, Nov. 13, 1991

DOD's movement of massive amounts of troops and materiel for Operations Desert Shield and Desert Storm was a significant achievement. As might be expected of such an enormous undertaking, however, not all went smoothly. U.S. military personnel offered observations on logistical problems and the ingenuity used to overcome many of these problems. During Operation Desert Storm, service units' readiness rates on equipment averaged 90 to 97 percent despite a lack of information on the location and the distribution of parts and supplies, transportation delays, and the use of newly fielded weapons systems. These rates were attributable to the flexibility and ingenuity of unit personnel, who obtained needed parts from other units, rebuilt and reused parts, bought parts and services from local businesses, used parts from nonmission-capable equipment, and managed transportation intensively to help lessen delays in obtaining needed parts. Regarding soldiers' food, the type and variety depended on units' locations. The Army, which used more packaged rations than the Air Force, introduced a morale booster called the "wolfmobile," which served hamburgers, hot dogs, and french fries. Uniforms, boots, and chemical gear were available but not in all sizes and amounts needed. Units purchased some items—such as food, potable water, fuel, and heavy transportation equipment—in Saudi Arabia to (1) provide units items that were not in the U.S. supply system, (2) reduce the burden on the transportation system, and (3) provide items quickly.

Operation Desert Storm: Army's Use of Water Purification Equipment

GAO/NSIAD-91-325, Sept. 26 1991

By mid-January 1991, the Army had set up sufficient reverse osmosis water purification unit equipment to supply most of its water needs during Operation Desert Storm. However, the Army could not have detected and resolved potential problems with units because it did not adequately monitor their production and performance. The Army's projection of water purification capability was based on flawed and unrealistic assumptions regarding the level of usage and availability of equipment and personnel, among other things. Despite incomplete equipment testing, the Army expedited production of the 3,000-gallon water purification unit. Currently, the Army is considering waiving several water decontamination requirements because the reverse osmosis system probably cannot meet them.

Operation Desert Storm: The Services' Efforts to Provide Logistics Support for Selected Weapon Systems

GAO/NSIAD-91-321, Sept. 26, 1991

The military services were generally able to attain and maintain high equipment operational capability rates for the systems deployed in support of Operations Desert Shield and Desert Storm. The services initially had to give priority to the deployed forces and, to varying degrees, reduce the mission capability of the nondeployed forces. To ensure that the high mission capability rates continued, the services employed a wide range of logistics support initiatives, including expedited deliveries, expedited contract awards, and increased maintenance and repair capability. While some of these added logistics measures would be used only in wartime because of the costs involved, others have a peacetime application and could be incorporated into the day-to-day logistics structure. If the conflict had gone on for a protracted period, sustainability could have become a major problem for the Army's air and ground systems. The Army, the Marine Corps, and the Air Force experienced problems with their rotary-wing aircraft systems operating in desert conditions. The Army had known about some of these problems for as long as 8 years but had not corrected them because of higher priority funding requirements. As a result, modification work orders had to be expedited when the problems recurred during Operation Desert Shield.

Navy Contracting: Military Sealift Command Contracts for Operation Desert Shield

GAO/NSIAD-91-198, May 14, 1991

Responding to congressional interest in the cost of ocean freight transportation service contracts used in Operation Desert Shield, GAO reviewed the Military Sealift Command's contracting practices used during that time. In general, the Military Sealift Command (1) complied with procurement procedures, which were modified due to urgent sealift requirements, and (2) obtained adequate competition by electronically transmitting solicitations to known shipowners and brokers. Given the market conditions and time constraints, costs were reasonable. However, attempts to compare prices before and after Operation Desert Shield were inconclusive, due to the lack of established rates on some cargo prior to Operation Desert Shield, as well as to differences among specific types of cargo.

Weapons and Related Systems

Operation Desert Storm: An Assessment of Aerial Refueling Operational Efficiency

GAO/NSIAD-94-68, Nov. 15, 1993

During Operation Desert Storm, a large coalition tanker fleet shipped more than 700 million pounds of fuel during roughly 50,000 refuelings to about 2,000 aircraft. Although these results suggest a notable success, the tankers were used inefficiently—an average of nearly 40 percent of their fuel went unused. Had the tankers been used more efficiently, more combat missions could have been flown. Also, more tankers were supporting operations than were needed on the basis of fuel requirements alone. The policy of giving priority to refueling strategic bombers left a gap in both the capability and knowledge necessary to support a large conventional contingency. Accordingly, the tanker force faces several challenges as it switches from a predominately conventional role. The Pentagon will have to decide, in light of the smaller post-Cold War force, the proper size and capability of the tanker fleet. Although Desert Storm may not be a prototype for future tanker operations, it offers lessons that may be helpful in making that decision.

Joint Military Operations: DOD's Renewed Emphasis on Interoperability Is Important but Not Adequate

GAO/NSIAD-94-47, Oct. 21, 1993

GAO has for years been reporting on the Pentagon's efforts to achieve command, control, and communications systems interoperability—the

ability of systems, units, or forces to exchange services, enabling them to work together effectively. This report discusses DOD's efforts to overcome persistent interoperability problems. GAO focuses on system (equipment) and operational (doctrine, tactics, procedures, and training) interoperability associated with command, control, communications, computers, and intelligence. GAO reported that DOD has been confronted with interoperability problems for at least 25 years and although DOD has worked to achieve greater interoperability, it continued to experience these problems during the most recent major joint military operations—the Persian Gulf War in 1991.

Minimizing Friendly Fire: The Army Should Consider Long-Term Solution in Its Procurement Decision on Near-Term Needs

GAO/NSIAD-94-19, Oct. 22, 1993

The Army's casualties and equipment losses due to friendly fire during Operation Desert Storm underscored the need for a more effective means of distinguishing friendly from hostile forces. The Army is working to develop and field a system to better provide immediate, positive identification of enemy targets. GAO examined the Army's plans to spend up to $100 million on 1,520 systems to equip some "first-to-fight" forces, including ground vehicles and helicopters, as a near-term solution. However, these systems will not provide sufficient coverage in large conflicts or any conflict involving fixed-wing aircraft. In addition, they may be discarded if they cannot be integrated into a more complex system that will be designed as a long-term solution. GAO believed that other recently upgraded systems could satisfy interim military needs until DOD and the Army are certain that the near-term system can be integrated into a system developed for the long term.

Operation Desert Storm: Casualties Caused by Improper Handling of Unexploded U.S. Submunitions

GAO/NSIAD-93-212, Aug. 6, 1993

During Operation Desert Storm, at least 25 U.S. military personnel were killed by U.S. submunitions, and many others were injured. The Army attributed 16 of the deaths to inappropriate handling of the unexploded submunitions. The Army did not gather data on dud rates during the operation, but previous tests showed that half of one of the Army's submunition-bearing rockets had exceeded its 5 percent dud rate. GAO

reported that although soldiers were repeatedly warned about the danger of unknown or dangerous debris, they were not trained to recognize unexploded submunitions. In some cases, soldiers collected these submunitions as souvenirs. The Army's use of submunitions in the operations was reasonable, given the fact that they quickly destroyed enemy targets, minimizing the number of combat deaths. However, the Army failed to adequately consider the increased risk of injury or death to its own soldiers. The Army has taken action to reduce the dud rate and to increase soldiers' awareness of the danger of submunitions and their use in combat.

Naval Aviation: The Navy Is Taking Actions to Improve the Combat Capabilities of Its Tactical Aircraft

GAO/NSIAD-93-204, July 7, 1993

The performance-enhancing systems used by naval aircraft during Operation Desert Storm missions often lacked key capabilities, although Navy aviation officials were aware of most equipment limitations before Desert Storm and initiated some actions to resolve them. Limitations, which affected Navy and Marine Corps pilots of F/A-18 and fighter F-14 aircraft, included (1) lack of key infrared targeting systems and other systems, which resulted in reduced ability of Navy and Marine Corps pilots to locate, identify, and attack targets, and (2) lack of adequate warning and defensive countermeasure systems to effectively protect crews from approaching antiaircraft missiles.

Operation Desert Storm: Apache Helicopter Fratricide Incident

GAO/OSI-93-4, June 30, 1993

In an incident involving friendly fire during the Persian Gulf War, two American servicemen were killed and six were wounded by missiles fired by an Apache helicopter. Concerns were raised about the cause of the incident, the possibility that the Army tried to mislead Congress about the Apache's performance, and the improper release of information to the press. GAO's Office of Special Investigations (OSI) found that the primary cause of the incident was human error on the part of the Apache's battalion commander. The commander read the navigation system wrong and as a result thought the vehicles the soldiers were in were enemy targets. When the Apache's gun jammed, he fired two Hellfire missiles at the vehicles. The commander was relieved from command after the

incident for becoming personally engaged in the fighting instead of exercising command and control over the Apache team. OSI found no evidence that equipment failure caused the incident or that the Army tried to mislead Congress about the Apache's performance. OSI also concurred in the Army Inspector General's conclusion that Army public affairs officers did not act improperly by releasing information about the commander to the press.

Naval Air Operations: Interservice Cooperation Needs Direction From Top

GAO/NSIAD-93-141, May 19, 1993

In a review of the performance of naval aircraft during Operations Desert Shield and Desert Storm, GAO found that some Navy units had not received training in other services' tactics, procedures, and weapons during Operation Desert Shield. As a result, these units encountered problems during joint operations. One problem was an inability to receive and transmit mission orders because of inexperience with the air tasking and coordination system used. Another problem was that the Marine Corps controlled most of the airspace within its area of responsibility. This control complicated the operations of other aircraft, which not only had to comply with air tasking instructions but also had to coordinate with Marine Corps' command and control centers. These problems prevented the most effective use of naval forces and allowed enemy aircraft to escape. After the war, the Navy and the Marine Corps improved their capabilities for interoperability by establishing joint operations courses at tactical training schools, establishing a command to integrate joint and naval doctrine, participating in multiservice organizations and task forces, and forming a naval strategy stressing the importance of joint operations. Still, GAO believed that the Navy should develop a plan that includes (1) joint training goals and objectives that specify how the Navy will fulfill its new strategy; (2) specific steps, time frames, and funding needed to meet its goals; and (3) a means of measuring its progress toward meeting its goals.

Operation Desert Storm: Limits on the Role and Performance of B-52 Bombers in Conventional Conflicts

GAO/NSIAD-93-138, May 12, 1993

The limited role of strategic bombers in Operation Desert Storm, coupled with employment, equipment, and training problems, precludes a definitive assessment of the contribution they can make in a conventional war. The B-52 was intended to undermine the morale of Iraqi ground forces through periodic bombardment. The sheer number of other aircraft attacking the same targets and inadequate battle damage assessments, however, made it hard to isolate the B-52's contribution. GAO did note several issues that should be addressed in deciding the future of the bomber force. First, because the B-52 was often employed like a tactical fighter aircraft, Desert Storm did not make full use of its conventional capabilities. Second, the nuclear orientation of the B-52 force made the plane inadequately prepared for the demands of conventional missions in the Persian Gulf. Finally, B-52 support during Desert Storm was at the same time a notable success and an object lesson in the magnitude of the effort required to sustain B-52 operations overseas. GAO believed that the need for theater commanders to play a major active peacetime role in identifying bomber equipment and training priorities was a major lesson learned during Desert Storm. But the bomber priorities embodied in the Air Force road map, such as fixed targets and long-range, autonomous operations, do not reflect the theater commanders' use of B-52s in Desert Storm. The Air Force did not seek input from theater commanders in developing its road map.

Operation Desert Storm: Army Not Adequately Prepared to Deal With Depleted Uranium Contamination

GAO/NSIAD-93-90, Jan. 29, 1993

During the Persian Gulf War, a number of U.S. combat vehicles were contaminated by depleted uranium after being struck by munitions or when ammunition stored on board was ignited by accidental fires. Although the Army did not know the full extent to which personnel were exposed to depleted uranium—a radioactive, chemically toxic metal—GAO discovered that at least several dozen U.S. soldiers, some unknowingly, either breathed it in, ingested it, or were hit by contaminated shrapnel. Army and Nuclear Regulatory Commission officials believed, however, that the exposure levels did not exceed allowable limits set by the Commission. Although the Army's policy is to minimize individuals' exposure to radiation, it has not effectively educated its personnel about the hazards of depleted uranium contamination or about proper safety measures. What little information is available has not been widely disseminated. The military has begun to test crew members who were

injured in Abrams tanks and Bradley Fighting Vehicles contaminated by munitions hits, along with an Army National Guard unit that claimed exposure while working with contaminated vehicles in the Persian Gulf, but the Army had no plans to medically evaluate other personnel who might have been exposed. The Army lacked a formal plan to ensure that contaminated vehicles were decontaminated, disposed of, and repaired in an efficient way. These issues may be relevant to the other services.

Military Airlift: Structural Problems Did Not Hamper C-141 Success in Desert Shield/Storm

GAO/NSIAD-93-75, Dec. 29, 1992

The C-141 aircraft, long considered the backbone of the Air Force's strategic airlift, is approaching the end of its service life. The Air Force is trying to keep the aircraft in operation as long as possible by flying it fewer hours and limiting the weight of cargo flown. Although the C-141 performed well in Operations Desert Shield and Desert Storm, it has serious technical and structural problems. Moreover, the effort to extend the service life of the airplane continues to be delayed because of technical problems and higher funding priorities. If the Air Force sticks with current plans to keep much of the C-141 fleet in active inventory until at least 2010, major work will be required to prevent continued deterioration; even then, use of the aircraft may have to be constrained severely. The physical deterioration of the C-141 fleet and the slow pace at which the service life is being extended will lead to reduced airlift capacity. The problem is exacerbated by delays in the C-17 program, which will not significantly contribute to airlift capacity until the late 1990s at the earliest.

Operation Desert Storm: Data Does Not Exist to Conclusively Say How Well Patriot Performed

GAO/NSIAD-92-340, Sept. 22, 1992

The U.S. armed forces relied heavily on the Patriot missile to intercept incoming Iraqi Scud missiles during the Persian Gulf War. Because the Army did not collect performance data, however, it is impossible to know with any precision how well the Patriot did in hitting battlefield targets during Operation Desert Storm. About 9 percent of Patriot launches produced strong evidence, such as disabled Scuds embedded with Patriot fragments, that the target was destroyed. Another 16 percent of the

engagements produced less convincing evidence of success: for example, radar tracking data show that the Patriots came close to the Scuds but do not prove that the Patriots destroyed or diverted the Scuds.

Operation Desert Storm: Apache Helicopter Was Considered Effective in Combat, but Reliability Problems Persist

GAO/NSIAD-92-146, Apr. 20, 1992

The Apache—the Army's $14 million premier attack helicopter—received its first real test under combat conditions during the Persian Gulf War. In past reports, GAO highlighted reliability and logistical support problems with the Apache that could hinder the helicopter's effectiveness during actual combat. In the views of Apache pilots and commanders GAO interviewed, however, the Apache proved its effectiveness by destroying 278 tanks and about 900 other targets and by providing the Army with timely intelligence data. The Apache flew mostly armed reconnaissance missions during the air campaign, while during the 100-hour ground war, it flew mostly attack missions, its primary role. During the war the Apache flew only a few missions—a total of 83—mainly because of the perceived enemy threat to low-flying helicopters during the air campaign and because ground commanders opted against using the Apache more often. The Apache's key weapons and other vital subsystems did experience reliability problems, which were intensified by the harsh desert environment. Logistical problems, such as parts shortages, also arose, grounding some Apache aircraft. Nevertheless, Apache pilots and commanders said that the Apache completed all assigned missions.

Operation Desert Storm: DOD Met Need for Chemical Suits and Masks, but Longer Term Actions Needed

GAO/NSIAD-92-116, Apr. 7, 1992

Although U.S. armed forces in the Persian Gulf did not experience shortages of chemical protective suits, masks, or mask filters, DOD was not adequately prepared for chemical warfare. Reserve stocks of chemical equipment have been below authorized levels for years, and many troops were issued outdated suits and masks. Had the conflict lasted longer and chemical weapons been used, worldwide stockpiles of suits could have been severely depleted, placing U.S. forces in other areas at greater risk. Chemical suit shortages and chemical mask fielding problems are long-standing. The Persian Gulf war underscored the problems that DOD

has had in finding enough manufacturers able and willing to produce suits at a price DOD is willing to pay and in ensuring that the manufacturers of both suits and masks meet scheduled delivery dates. DOD has started to address these problems, but a more comprehensive approach is needed.

Operation Desert Storm: Project Manager's Assessment of Patriot Missile's Overall Performance Is Not Supported

GAO/T-NSIAD-92-27, Apr. 7, 1992

The Army and supporting contractors overcame significant obstacles to provide tactical missile defense in Saudi Arabia. A project manager's assertion in February 1992 that the Patriot was successful against 70 percent of Iraqi Scuds was unsupported, however, as it relied on documents with significant limitations. Additional information, such as the number of Patriot missiles needed to destroy or divert the Scud and the significance of false targets, could provide a more complete understanding of the Patriot's performance. Project officials have also recognized limitations in their supporting data and are reworking their assessment.

Operation Desert Shield/Desert Storm: Observations on the Performance of the Army's Hellfire Missile

GAO/NSIAD-92-156, Mar. 30, 1992

During Operation Desert Storm, basic Hellfire missiles were effective against a variety of targets, not just enemy tanks. Some Apache units using the system, however, reported difficulty hitting their targets, and five Hellfire missiles were launched from Apaches without a launch command—four during training and one during ground maintenance. The Army is reevaluating the Hellfire's capabilities to determine whether the missile should be used against targets other than tanks. It is also trying to solve the reported problems with accuracy and uncommanded launches.

Operation Desert Storm: Early Performance Assessment of Bradley and Abrams

GAO/NSIAD-92-94, Jan. 10, 1992

During the Persian Gulf War with Iraq, 2,200 Bradley Fighting Vehicles and Abrams Main Battle Tanks—the Army's premier ground combat vehicles—were sent to the Gulf. According to tank crews, the vehicles'

overall performance in lethality, mobility, and survivability was good, and mission capability rates were high. Bradley crews had some problems and suggested system improvements such as a higher reverse speed and a laser range finder. Abrams crews found that the tank's range was limited because of frequent stops to refuel and to clean air filters. In addition, both crews had problems obtaining repair parts, and many had exhausted their supply of some parts by the end of the war. Had the war lasted longer, the Army's ability to sustain these vehicles would have been a major problem. Finally, many of the Army vehicles used to support the Bradley and Abrams—such as the M109 and M113—were unreliable and slowed movement of main tank forces. The Army is working to overcome some of these problems.

Apache Helicopter: Reliability of Key Components Yet to Be Fully Demonstrated

GAO/NSIAD-92-19, Oct. 3, 1991

In a previous report (GAO/NSIAD-90-294, Sept. 28, 1990), GAO found that the fully-mission-capable rates for the Apache helicopter fell short of the Army's peacetime goal of 70 percent and decreased as Apache battalions accumulated flying hours. This report addresses the current status of the Army's efforts through August 1991 to improve the reliability of seven hardware components as well as to improve the Apache's maintenance capabilities. Although some progress has been made in resolving key problems, the improved components have not fully demonstrated their reliability. In addition, structural cracking in the tail boom has emerged as a potentially catastrophic problem as the aircraft accumulate flying hours, and the FM antenna reception problem has degraded the Apache's communication performance.

Foreign Relations and International Trade

Jordan: Suspension of U.S. Military Assistance During Gulf Crisis

GAO/NSIAD-92-343, Sept. 25, 1992

Since 1951, the United States has given Jordan over $3.5 billion in economic and military aid. However, during the Persian Gulf War, Jordan distanced itself from the United States and its allies and continued importing Iraqi oil. In the fall of 1990, the State Department began taking actions to suspend military aid to Jordan, based on reports that Jordan was shipping defense material to Iraq. However, these efforts were of short duration and poorly implemented. For example, suspension of licenses and other written approvals to export defense articles to Jordan lasted only 1 month. State Department communication concerning the suspension was erratic, as it relied on telephone rather than written communication with DOD. Consequently, military departments were not notified until March 4, 1991—3 days before the suspension ended. During that time, military depots delivered nearly 700 items worth over $550,000, among which were spare parts for the F-5 and C-130 aircraft. The State Department was not legally required to notify Congress of its actions to suspend military aid to Jordan; however, the information that officials did give Congress was inaccurate.

International Energy Agency: Response to the Oil Supply Disruption Caused by the Persian Gulf Crisis

GAO/NSIAD-92-93, Jan. 21, 1992

The rapid increase in worldwide oil prices after Iraq's invasion of Kuwait in 1990 focused renewed attention on how members of the International Energy Agency could use emergency oil stocks to mitigate the effects of a disruption in the oil supply. The U.S. long-standing policy is to rely on market forces to determine oil prices and use excess strategic petroleum reserve oil as a partial supplemental supply. As a member of the International Energy Agency, the United States would encourage its oil

companies to voluntarily share their oil with other member countries rather than impose a fair-sharing system. Such a system would require all oil companies to bear the same burden of sharing oil to meet the Agency's obligations.

The U.S. Export-Import Bank: No Evidence of Financing Restricted Chemical Exports to Iraq

GAO/NSIAD-91-284, Sept. 30, 1991

No evidence was found in the documents GAO reviewed to suggest that the Export-Import Bank (Eximbank) financed the export of dual-use chemicals (chemicals with both commercial and military applications that could be used for chemical weapons) to Iraq between January 1987 and August 1990. Iraq and the Eximbank completed about 190 transactions during this period; GAO focused its review on 8 transactions involving pesticides. While the Eximbank was not responsible for monitoring the export of chemicals or any other commodities, it had developed specific procedures to review applications for financing chemical exports. Such procedures, however, were not in place when the Eximbank approved the applications for seven of eight pesticide transactions that occurred between January 1987 and August 1990.

Refugee-Related Issues in Turkey and the Soviet Union

GAO/T-NSIAD-91-35, Sept. 23, 1991

In testimony, GAO reported on recently completed reviews on Iraqis and others who fled to Turkey before and during the Persian Gulf War, a U.S.-funded project for Bulgarian refugees in Turkey, and the U.S. processing of Soviet refugees. In 1988, 27,000 Kurds fled to Turkey because of poison gas attacks; during the Persian Gulf crisis, 5,000 Iraqis sought refuge in Turkey; in 1991, 4,100 Iraqi Kurds and others fled to Turkey; and 2,000 Iraqi soldiers deserted and fled to Turkey. Many of them returned to Iraq after the war or resettled elsewhere. The United States had agreed before the war to admit 3,000 Kurds, but the processing of their entry was delayed by the war. Canada, the Netherlands, Australia, and possibly Finland also agreed to admit some of these people. In addition to helping Iraqis and Kurds, the Turkish government has provided hundreds of millions of dollars in housing, food, and other assistance to over 320,000 Bulgarian Ethnic Turks who fled to Turkey in 1989. The United States contributed $10 million to assist Turkey in assimilating these

refugees. Regarding the processing of Soviet refugees, GAO believed that 35,000 to 40,000 Soviets would be admitted to the United States in fiscal year 1991—falling short of the 50,000 target. The shortfall was believed to be due to refugees' inability to obtain the Soviet government's approval to leave. This problem could be alleviated by recent Soviet emigration legislation and a bilateral U.S.-Soviet arrangement.

Persian Gulf Crisis: Humanitarian Relief Provided to Evacuees From Kuwait and Iraq

GAO/NSIAD-91-160, Mar. 12, 1991

In the wake of the August 1990 Iraqi invasion of Kuwait, more than one million people fled into neighboring countries, mainly Jordan. Many of these people, often third country nationals from Middle Eastern or Asian countries who had sought work in either Iraq or Kuwait, became destitute and were in immediate need of food, shelter, and medical attention. The United Nations Disaster Relief Organization coordinated a relief effort for these people, obtaining pledges for contributions in cash, commodities, and services worth more than $500 million. Major donors were international entities; the governments and relief organizations of Jordan, Turkey, and Syria; and the United States. Overall, the people were successfully cared for and repatriated. On January 11, 1991, the U.N. relief organization updated a plan for handling another surge of evacuees from Iraq to neighboring countries.