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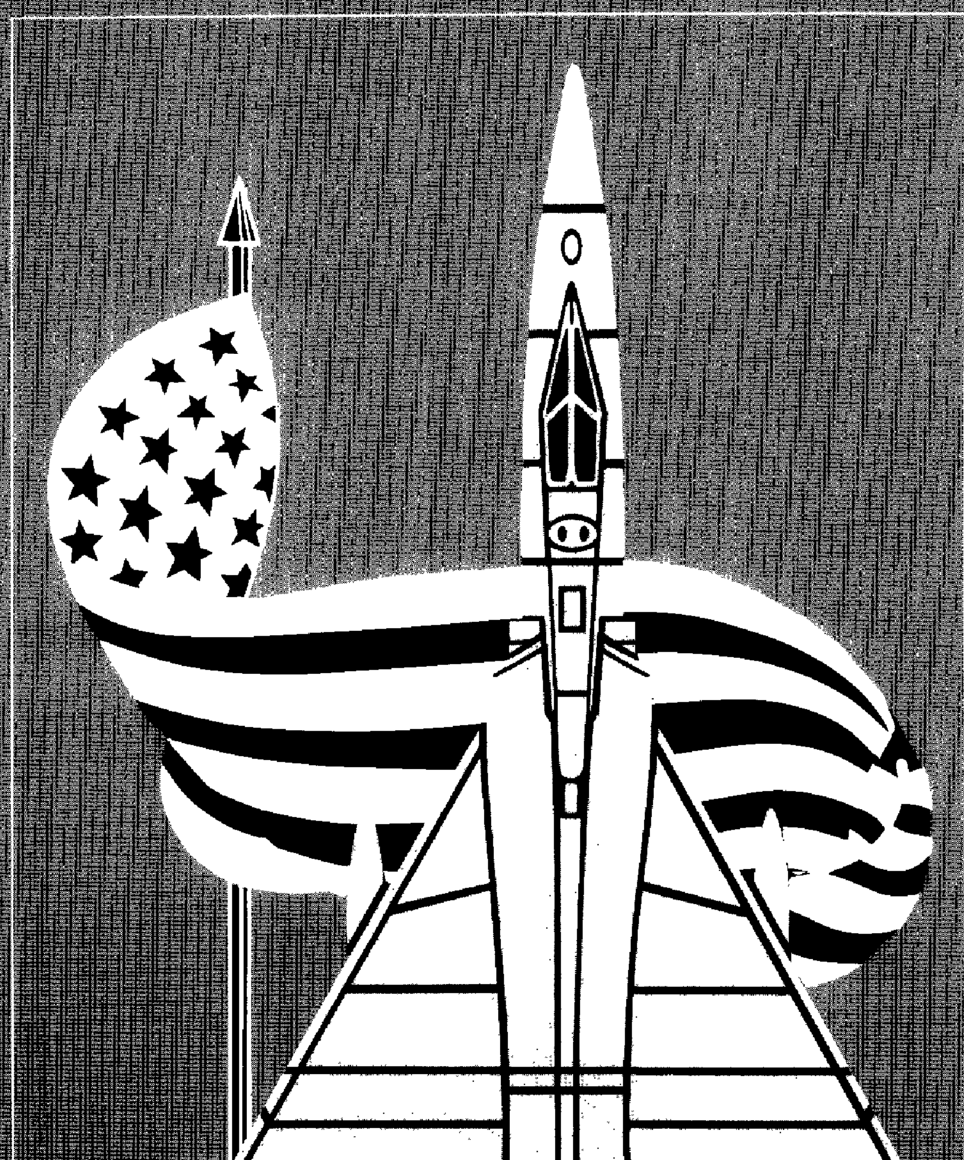
The GAO Review

Toward a Stronger National Security: Major Issues



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Contents

From the Guest Editor, Frank C. Conahan

Mr. Conahan (R) confers with Bill W. Thurman, Deputy Director for Planning and Reporting, NSIAD, and Guest Coeditor of this issue of the ***Review****, and Irene Robertson, Evaluator, NSIAD.*

This issue of *The GAO Review* focuses on GAO's increasing involvement in important and complex national security issues. GAO's defense work is, and must continue to be, current and timely because decisionmakers in both the Congress and the executive branch are relying on GAO more and more. As Assistant Comptroller General for National Security and International Affairs and Guest Editor of this issue of the *Review*, I am proud to be a part of this work and I appreciate the contributions of the staff of the National Security and International Affairs Division (NSIAD), other GAO headquarters units, and regional and overseas offices that participate in it. (The contributions of the overseas offices and regions most active in GAO's defense work are summarized in "On Location.")

GAO's defense work covers many areas, including weapon systems acquisition; logistics; command, control, communications, and intelligence; recruitment and retention of military personnel; force modernization; procurement; the reserve forces; overseas commitments; and the defense budget. Charles W. Thompson presents an overview of these areas in "Toward a Stronger National Security: Major Issues."

At this time of large federal deficits, GAO's defense budget reviews have helped reduce the fiscal year 1986 defense budget by about $7 billion. An article by John Landicho and Joan Hawkins, entitled "GAO's Defense Budget Work: Saving Billions of Dollars," focuses on GAO's Navy budget work.

An equally significant part of GAO's defense work concerns weapon systems acquisition. Readers may be interested in a comparison of U.S. weapon acquisition practices with those of the Soviet Union, as addressed in "Weapon System Acquisition in the Soviet Union," by Timothy D. Desmond. In addition, Carl Wisler's "Topics in Evaluation" discusses evaluating weapon effectiveness.

Today we hear a lot about nuclear deterrence. The credibility of the U.S. strategic nuclear deterrent depends not only on how destructive U.S. forces are but on command, control, and communications systems that control their use. William J. Rigazio's "The Uncertain Link to the Strategic Triad" discusses these special systems.

Over the last 3 years, defense procurement has become one of GAO's largest areas of concern because of recent huge increases in procurement spending. "Defense Procurement Oversight: Greater Demands on GAO," an article by David E. Cooper and John D. Yakaitis, summarizes GAO's work in this area. On a related note, because of sharp increases in defense appropriations and a mounting federal deficit, recent defense legislation has focused on fraud, waste, and abuse. This issue's "Legislative Developments" by Craig Winslow discusses these themes.

When auditing defense programs for any length of time, one eventually hears about "black programs," or those for which a special clearance is required before working on them. Rae Ann Sapp and Robert L. Repasky have written "Auditing Highly Classified Air Force Programs" to demystify these programs and to give information on how to audit them.

"From Our Briefcase" provides information useful to those auditing any defense area. It discusses various national-security-related reference sources.

Finally, to get a Department of Defense perspective on our work, three NSIAD Associate Directors, Henry W. Connor, John Landicho, and Harry R. Finley, interviewed three top level officials in the Departments of the Army, the Navy, and the Air Force. As presented in "Manager's Corner," these interviews were conducted to examine GAO's role, its effectiveness in carrying out its mission, and critical areas of strength or weakness as seen by these executives. Insights gained from these interviews can help us evaluate and improve our work.

I hope readers will enjoy this national security issue of the *Review*. Many thanks to all who contributed in so many ways, particularly Irene Robertson, NSIAD's liasion to the *Review*. ■

From Our Briefcase

In this special national security issue, "Briefcase" is highlighting some resources available to the individual conducting research in national defense and national security issues. Ellen Aronson and Steve Palincsar of the Technical Information Center in the National Security and International Affairs Division (NSIAD), in conjunction with staff from the GAO Technical Library, have selected the items highlighted from a larger and more comprehensive bibliography entitled *National Defense Issues: GAO Research Guide.* Copies of the guide are available from the Technical Library (Room 6536) or the NSIAD Technical Information Center (Room 5001).

On-line Data Bases

Many of the more than 250 on-line bibliographic data bases available through on-line services, such as DIALOG, NEXIS, and SCORPIO, contain information related to national security issues. Featured below are four data bases that are particularly valuable for conducting research in national defense. Literature searches of these data bases are available to GAO personnel through the Technical Library.

Aerospace Database. Available through DIALOG. Produced by the American Institute of Aeronautics and Astronautics and the National Aeronautics and Space Administration.

Aerospace Database is the on-line version of two printed publications: *International Aerospace Abstracts* and *Scientific and Technical Aerospace Reports.* It provides worldwide bibliographic coverage of engineering, scientific, and technical literature. Coverage includes journal articles, conference papers, books, theses, and unpublished report literature. It concentrates on all aspects of aerospace research and development; the support of basic and applied research; and the application of technology to areas such as aircraft design and construction, lasers, spacecraft, communications, and navigation.

Aerospace/Defense Markets and Technology. Available through DIALOG. Produced by Predicasts, Inc.

Aerospace/Defense Markets and Technology offers comprehensive access to defense industry information. International defense journals, such as *Jane's Defense Week, Interavia,* and *International Defense Review,* are indexed and abstracted, as well as defense-related articles from business and trade journals, newspapers, and government reports. Also included is information generated by Department of Defense (DOD) news releases announcing contract awards. All major defense contracts are included, complete with contract number, award date, contractor, agency, type, and dollar amount.

Steve Palincsar and Ellen Aronson of the NSIAD Technical Information Center.

Foreign Trade and Economic Abstracts. Available through DIALOG. Produced by the Netherlands Foreign Trade Agency.

The Foreign Trade and Economic Abstracts data base corresponds closely to the printed index entitled *Economic Titles and Abstracts.* It contains worldwide economic information on market trends, economic developments, international trade, and economic climates. The citations in the data base are from international journals, books, government publications, reports, directories, and reference works.

SCORPIO bibliographic files. Produced by the Congressional Research Service (CRS), Library of Congress.

A file called CITN contains bibliographic citations to journal articles on many aspects of public policy, as well as citations to congressional publications, government documents, independent research studies,

and CRS reports. This file, accessible to GAO staff via dial-up terminals, includes material from 1976 to the present and is updated weekly. Library staff are available to perform searches for patrons and can provide end-user training upon request.

A similar file, BIBL, containing most of the citations found in CITN, except for CRS reports, is available to the public for searching on dedicated terminals at the Library of Congress.

CRS Bibliographies

Compiled bibliographies are usually an excellent starting point for research, and the bibliographies prepared by CRS can be especially useful for GAO staff interested in national security issues. As of mid-August 1986, more than 830 CRS bibliographies were listed in the CITN data base, with new titles being added at the rate of over 18 each month. Over 300 were on issues related to national defense, national security, and foreign policy.

Items listed in CRS bibliographies are selected from entries in the CITN data base. Generally, they are written for the generalist rather than the subject specialist or academic scholar and can be located within the resources of a public or an undergraduate college library.

CRS monitors issues of current concern to the Congress, regularly updating bibliographies on subjects of continuing interest and issuing new titles in anticipation of the need for information. Since congressional requests account for a significant portion of GAO's work, CRS bibliographies can be useful both for their value as information resources and as a window on the Congressional Research Service's assessment of future congressional interest. GAO staff may obtain copies of CRS bibliographies by requesting them from the Technical Library or the NSIAD Technical Information Center. (The public may obtain copies of CRS bibliographies only by requesting them from the offices of Members of Congress.)

Examples of recent CRS bibliographies on national-security-related issues are listed below.

Department of Defense and Defense Spending

McKinley, Nancy. *Defense Spending: Preliminary Bibliography, 1983-1985.* Feb. 4, 1985. (L0406) (LTR85-33)

Shapiro, Sherry. *Defense Department: Selected References, 1976-1985.* Feb. 15, 1985. (Bibliography-in-Brief L0410) (LTR85-145)

_____. *Defense Reorganization: Bibliography-in-Brief, 1976-1985.* Dec. 4, 1985. (L0560) (LTR85-2178)

_____. *Military Compensation: Selected References, 1976-1985.* May 1, 1985. (Bibliography-in-Brief L0459) (LTR85-814)

Chemical, Biological, and Nuclear Warfare

Leskovsek, Valentin. *Chemical and Biological Warfare: Bibliography-in-Brief, 1984-1986.* July 1986. (L0701) (LTR86-1433)

_____. *Nuclear Arms Control Verification: Bibliography-in-Brief, 1984-1986.* July 1986. (L0705) (LTR86-1429)

Shapiro, Sherry. *Nuclear Arms Control: Bibliography-in-Brief, 1980-1985.* Nov. 1985. (L0552) (LTR85-2512)

Military Uses of Space

Leskovsek, Valentin. *Strategic Defense Initiative: Selected References, 1983-1985.* Mar. 4, 1985. (Bibliography-in-Brief L0429) (LTR85-282)

Mangan, Bonnie. *Military Uses of Space: Bibliography-in-Brief, 1982-1985.* Sept. 3, 1985. (L0510) (LTR85-1697)

_____. *Space Militarization and Arms Control: Selected References, 1983-1985.* Feb. 1985. (Report no. 85-581 L) (LTR85-169)

Economic/Security Issues

Kirk, Robert. *Economic Sanctions and Trade Embargoes: Bibliography-in-Brief, 1979-1986.* May 1986. (L0668) (LTR86-885)

Mangan, Bonnie. *East-West Technology Transfer: Bibliography-in-Brief, 1982-1985.* Dec. 1985. (L0577) (LTR85-2292)

DOD Statistical Information

The Directorate for Information Operations and Reports (DIOR) of the Department of Defense prepares a series of reports containing statistics on DOD prime contracts and defense manpower. All DIOR reports are available through the GAO Technical Library and the Government Printing Office (GPO). Large GPO depository libraries may also have them available for loan. Five of the most popular DIOR reports are as follows:

Atlas/State Data Abstract for the United States. Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports. GPO stock number: 008-000-00440-4 (FY 1985 ed.). Price each: $6.00, domestic, and $7.50, foreign.

Contains maps showing the locations of the major military installations in each state. Also includes information on DOD personnel, payroll outlays, and prime contracts over $25,000.

Five Hundred Contractors Receiving the Largest Dollar Volume of Prime Contract Awards for RDT&E. Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports. GPO stock number: 008-000-00452-8 (FY 1985 ed.). Price each: $2.25, domestic, and $2.85, foreign.

Includes an alphabetical list of the top 500 companies and net value of awards to firms, educational and other nonprofit institutions, foreign contractors, and U.S. government agencies. Firms qualifying as small businesses are identified.

One Hundred Companies Receiving the Largest Dollar Volume of Prime Contract Awards. Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports. GPO stock number: 008-000-00447-1 (FY 1985 ed.). Price each: $1.50, domestic, and $1.90, foreign.

Summary data on companies and subsidiaries that were awarded the largest total dollar volume of DOD prime contract awards over $25,000 during the fiscal year, including the name of the company, rank, and net value of awards.

Prime Contract Awards. Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports. GPO stock number: 708-063-00000-2. Price: $13.00.

Presents, in tables and charts, various current and historical data on the net value of DOD prime contract awards. Includes awards by type of contractor; awards publicized to small businesses; awards by procurement program; awards for research, development, test, and evaluation; awards by method of procurement; and awards by type of contract pricing provision.

See Briefcase, p. 45

On Location

GAO's Class of '86 Graduates from the Defense Management Program

Ed. note: The *Review* thanks Fran Tafer, Evaluator, National Security and International Affairs Division (NSIAD), for the following item.

Soon after that final test, the National Security Management Program's Class of '86 was seen huddling together in twos and threes to discuss the toughest, most unexpected, and trickiest questions. They considered themselves survivors, fairly certain that they had passed this fourth and final exam. If only they could get their research papers turned in on time, they might graduate. And graduate they did!

The Class of '86 (L-R): Front row: Maj. Gen. Perry Smith, Pat Martin, Helen Neal (standing in for Wyley Neal), Rosa Johnson, Sherlie Svestka, Diana Glod, Jane-yu Ho Li, Fran Tafer, Rep. Dave McCurdy. Second row: Lee Beaty, Allan Lomax, Jerry Moriarty, Hal Brumm, Tim Desmond, Tim Carr, Cindy Steed. Back row: Bill Wentz, Brian Conniff, Marv Casterline, Dan Gowen, Tom Dorney, Bill McNaught, Rich Davis, Charles Walter.

The 1986 class is the third group of GAO employees to complete the National Security Management Program, a part-time, 2-year program established in 1981. The program is cosponsored by GAO and the National Defense University. GAO provides the classroom space, a seminar director, and discretionary time for weekly meetings for 9 months per year; the university provides the course materials, testing, and advice. The course of study focuses on the strategic, economic, and industrial aspects of national security to prepare participants to take on complex command, management, and staff responsibilities.

Bill McNaught, Group Director of NSIAD's Economic Analysis Group, took top honors as he and 20 other happy GAO defense specialists graduated from the program on June 9, 1986. Representative Dave McCurdy, a member of the House Armed Services and Intelligence Committees; Major General Perry Smith, Commandant of the National War College; and Frank C. Conahan, Assistant Comptroller General for National Security and International Affairs, addressed the graduates at Fort McNair. Milton J. Socolar, Special Assistant to the Comptroller General; Frank Fee, Assistant Comptroller General for Operations; Gregory J. Ahart, Assistant Comptroller General for Human Resources; past graduates; and families, friends, and coworkers of the graduates also attended. NSIAD Associate Director Rich Davis, who served as the 1986 seminar director, also addressed the graduates.

During the program, students took turns "teaching" course materials; bringing in high level defense, other government, and private experts to speak on topics relevant to course studies; and conducting discussion groups to bring out added points, debate the textbook's premises, or update the course materials. At times, students were performing GAO work on subjects related to material being studied. Several GAO personnel, including class members, updated the class on pertinent topics. For example, Alan Bennett and Pat McCracken of NSIAD's Security and International Relations Subdivision briefed the group on U.S. military activities in Latin America, and Bill McNaught discussed the GAO report on the defense budget windfall that occurred when inflation was actually less than predicted (GAO/NSIAD-85-145, Sept. 3, 1985).

The National Defense University considers its GAO course the showcase of its world-

wide correspondence-type curricula. According to university officials, this is because of the high caliber of GAO students and the extra efforts GAO has made to see that the program is a success.

A fourth group of GAO personnel has already begun the National Security Management Program. This group of about 20 students is nearly through the course and expects to graduate in June 1987. Marty Ferber, Associate Director of NSIAD's Manpower, Logistics, and Financial and General Management Subdivision, is the group's seminar director.

Overseas and Regional Offices Support NSIAD Work

Many employees in GAO's overseas and regional offices support the work of NSIAD in national security issues. To highlight their contributions, "On Location" invited the most active field units to describe their audit roles.

European Office

With more than half the U.S. defense budget related to the U.S. commitment to the North Atlantic Treaty Organization (NATO) and roughly 20 percent of U.S. forces located in the European Theater, it is no wonder that over 90 percent of the European Office (EO) work is conducted for NSIAD. During the past year, EO conducted, or now has in progress, 37 defense audits that have taken EO to 3 continents and numerous countries. These audits fall into five major defense areas, including manpower affairs, military readiness, logistics, procurement, and communications. Each area represents billions of dollars committed to defending Europe.

Recently completed audits in the manpower affairs area have looked at how the Air Force determines its manpower requirements and the Army its officer/enlisted force mix. EO staff recently started two important reviews concerning broad policy questions. The first concerns whether reservists can be substituted for full-time active duty service members stationed in Europe, and the second concerns whether the U.S. force structure in Europe can be modified. EO provides a unique perspective on the U.S. military presence in the European Theater that otherwise is not available to GAO for such reviews.

About 20 percent of EO's total effort relates to military readiness. In 1985 and 1986, EO evaluated the effectiveness of the Army's organizational maintenance for wheeled and tracked vehicles, surveyed the Military Airlift Command's strategic airlift mobilization capability, and reviewed the physical security provided at selected military bases in Europe. One EO team reviewed U.S. military access to facilities in Southwest Asia. The team looked at the political difficulties of gaining access to the facilities during both peacetime and wartime and determined what support the host country could provide. In addition to working with high-ranking military and political officials and visiting a number of host country military facilities, EO staff brought back a number of personal experiences that will not soon be forgotten.

One particularly memorable experience began when one team member asked the Saudi Arabian armed forces liaison officer about Arabian cardamom coffee. Since none of the EO staff had ever tried any, the officer invited the entire team to his home not only for Arabian coffee but a traditional Saudi dinner as well. The team was welcomed by their host, dressed in the traditional Saudi thobe—a long, flowing white silk robe, with a greeting in Arabic: "Marhaba! Ahlan wa Sahlan!" (Hello! Most welcome!) The meal consisted of yogurt, dried dates, a vegetable stew, lamb on a platter of rice and nuts, laban (a yogurt drink similar to buttermilk), pomegranates from the mountainous Najran region of Southwest Arabia, and crème caramel. The host's wife joined the team for the meal—a rarity since most Saudi women never eat with male guests.

After the meal, the team members were served cardamom coffee from a brass Arabian coffeepot with a long spout and filter made of palm branch fiber. The coffee was served in one of the two living rooms. Each Saudi house has two living rooms: one for men and one for women. Next, each person was served three cups of mint tea and then three more cups of Arabian coffee. Finally, an incense burner was brought into the room and passed from person to person until everyone had inhaled the mysterious aromas from the frankincense and rare Indian woods.

In the procurement area, EO reviewed Air Force procedures for purchasing chemical protective shelters and identified about $70 million in potential savings. During the past 12 months, EO also (1) surveyed Army procurement contract procedures and (2) conducted several reviews concerning construction of family housing units that showed that fewer units should be built and that savings would total several million dollars. One of EO's more interesting reviews concerned the processes followed by France, the United Kingdom, West Germany, Israel, and the Soviet Union to acquire major weapon systems. EO staff faced the challenge of working with high level foreign government officials, conducting interviews through interpreters, and becoming familiar with broad national defense policies of each nation.

In 1942, Admiral Ernest J. King, Chief of Naval Operations, stated: "I don't know what the hell this logistics is. . .but I want some of it." In EO, logistics means, among other things, working in Germany on the "Schnitzel Circuit." During a recent audit, EO staff evaluated the inventory management practices of the Defense Logistics Agency and the services. As part of the job, EO staff conducted unannounced nighttime visits at selected Army and Air Force installations in West Germany to determine the physical security afforded the supplies. At several locations, gates and doors to warehouses were unlocked and the staff found items such as computer keyboards, modems, computer spare parts, automotive batteries, and electrical wire that could have been taken from the storage areas. The local provost marshall accompanied us on the visits! During 1986, EO also conducted several reviews dealing with the Army's medical equipment capability and identified potential savings of $250 million. EO identified another $52 million in savings on the basis of a review of Allied logistics support.

The command, control, communications, and intelligence (C3I) area has been a consistent part of EO's work load. These systems, worth billions of dollars, are in the planning stages for the European Theater. Recent audits have looked at wartime communications capabilities, Department of Defense (DOD) efforts to improve "friend or foe" identification procedures for military aircraft, tactical communications satellite programs, and frequency approval procedures among the NATO countries. This last review identified $100 million spent by DOD to correct avoidable problems and recommended ways to avoid such waste.

Far East Office

In concert with past and current U.S. administrations' defense strategy of forward deployment, the United States maintains a considerable military presence in the Pacific basin, Southeast Asia, Northeast Asia, the Persian Gulf, and the Indian Ocean. The Commander-in-Chief, Pacific

Command, the senior U.S. military officer in the Pacific, is responsible for all military operations in a vast area stretching from the West Coast of America to the East Coast of Africa and from the Arctic to the Antarctic. It is not surprising, therefore, that GAO's Far East Office (FEO) in Honolulu is a prime contributor to GAO's national security work.

In collaboration with headquarters staff, FEO performs work in all national security issue areas for NSIAD's Army; Navy; Air Force; command, control, communications, and intelligence; and manpower and logistics groups. With a staff of 33 evaluators, FEO performs reviews and analyses ranging from readiness of the U.S. Army in Korea to control of hazardous waste by the Air Force and the Navy in Guam and from formulation and execution of the Navy's operation and maintenance budget to the justification for an Air Force program to dedicate a number of aircraft solely to rapid resupply of spare parts to air bases during conflict.

One recent FEO assignment concerned the interoperability of C3I capabilities among and between U.S. forces and Allies. That work contributed significantly to testimony in August 1986 before the Subcommittee on Legislation and National Security, House Committee on Government Operations, and to a report to be issued by GAO on the subject. The analyses provided by GAO as a result of FEO's work will give the Congress information it needs to make more informed decisions on funding levels and DOD management of this important defense area.

In another case, FEO participated with headquarters and regional staff in reviewing Navy planning for shore facilities requirements. Work in the Pacific was performed at Pearl Harbor, Hawaii, and Subic Bay in the Philippines. The resulting report pointed out that the Navy's criteria for sizing certain kinds of facilities (family service centers, child care centers, and aircraft parking aprons) was inappropriate and could cause inaccurately sized facilities and result in overstating requirements. Specific recommendations were made in the report, and the Navy agreed to take corrective action.

FEO's contributions to national security work are not confined to military activities and functions. Foreign policies and the programs designed to implement them are both directly and indirectly linked to U.S. national security. Much of FEO's work has concerned programs involving trade and finance, developmental assistance, and security and international relations. As with the military assignments, FEO works closely with headquarters staff in reviewing such issues as control over and effectiveness of U.S.-funded bilateral and multilateral assistance programs, defense burden-sharing by our Allies, and the effect of various programs designed to stimulate U.S. exports of agricultural commodities.

The geographical coverage provided by FEO is extensive. For example, during the past year, FEO staff have worked in Australia, the Philippines, Indonesia, Thailand, Taiwan, Hong Kong, Burma, Bangladesh, Pakistan, India, Japan, Guam, American Samoa, and Korea.

The Congress and the current administration have become increasingly aware of the rapidly growing importance of the Pacific nations and their political, economic, and strategic bearing on U.S. defense and foreign policies. Concurrently, the Soviet Union has greatly accelerated its efforts toward extending its influence into this vital area. As a result, FEO can expect to play an even greater role in national security issues in the Pacific.

Atlanta Regional Office

The Atlanta Regional Office (ARO) is a natural for defense work—the region's boundaries encompass about 50 major defense installations that employ hundreds of thousands of people and control budgets totaling more than $25 billion. Defense activities within the region span all the issue areas of interest to NSIAD from the combat readiness of the fighting ships berthed at Charleston, South Carolina, to the training of the Army's infantry soldiers at Fort Benning, Georgia; from the development and acquisition of sophisticated weaponry at the Army's Redstone Arsenal, Alabama, and Eglin Air Force Base, Florida, to the gigantic Marine Corps logistics center at Albany, Georgia; from the tactical air wings at Valdosta, Georgia, and Myrtle Beach, South Carolina, to the Air Force Reserve headquarters at Warner Robins Air Force Base, Georgia.

ARO boundaries encompass important operations of all branches of service, three unified commands under the Joint Chiefs of Staff, and headquarters for the Army's Forces Command and the 9th Air Force. Almost half the Strategic Defense Initiative (SDI) ("Star Wars") budget is managed by the Army's Strategic Defense Command in Huntsville, Alabama.

About one-third of ARO's resources are devoted to defense work. At any one time, ARO has 20 to 25 ongoing NSIAD assignments, employing 50 to 60 staff members. The region's assignments for NSIAD and its predecessor organizations have resulted in significant savings, as well as improvements in the management of defense activities and programs. From fiscal year 1982 through the third quarter of fiscal year 1985, GAO reported almost $2 billion in measurable savings as a result of defense assignments that Atlanta led or contributed to significantly. For example, a 1984 review of the Army and Marine Corps budgets for small missiles resulted in accomplishment reports totaling over $32 million. More recently, an Atlanta-led assignment on duplication of radar jammers resulted in measurable savings of about $192 million.

Two of the National Aeronautics and Space Administration's (NASA) seven field centers, including its East Coast launch facilities, are located within ARO boundaries. Funding for the programs and activities at these two centers constitutes almost 40 percent of NASA's total budget.

Programs like SDI and NASA's resumption of space flights will likely dominate much of the public policy debate in this country, as well as defense work in ARO, over the next few years. ARO is looking forward to its continuing partnership with NSIAD in addressing these important issues.

Cincinnati Regional Office

On September 24, 1986, Neil Wickliffe of one of the Cincinnati region's Dayton Suboffices copiloted an Air Force A-7 tactical fighter to obtain hands-on experience with an infrared night navigation and attack system currently under review by GAO. The purpose of this flight was to put GAO in a better position to brief the Congress on the system's effectiveness compared with that of a similar system being developed by the Air Force for other aircraft. Neil is a former Air Force pilot with over 4,500 hours of flying time.

Neil Wickliffe copilots the Air Force A-7 tactical fighter.

Neil's flight is only one example of Cincinnati's role in reviewing national-security-related programs and activities. Cincinnati has been a major contributor to national security issues for many years, mostly through its Dayton Suboffices. The Suboffices are both located at Wright-Patterson Air Force Base, a major defense installation employing about 27,000 civilian and military personnel and accounting for about $40 billion of the annual Air Force development and procurement budget. One Suboffice deals primarily with major systems acquisitions (B-1 bombers, F-15 and F-16 fighters, etc.). The other focuses primarily on Air Force worldwide logistics and maintenance operations. Additionally, the Cincinnati region also covers the Army's Accounting and Finance Center through its Indianapolis Suboffice, several other major defense installations, and several large defense contractors.

The Cincinnati Regional Office is a very active partner with the operating divisions in GAO's efforts to evaluate defense activities. At any time, for example, about half Cincinnati's 110 professional staff are assigned to defense-related jobs as programmed by NSIAD, the Information Management and Technology Division, and the Accounting and Financial Management Division. These staff have analyzed defense budgets, cost estimates, program schedules, contracting practices, and the technical performance of the Air Force and its contractors.

Because of increased congressional interest in the Air Force management of weapon systems and technology advancements during the past decade, Cincinnati staff have participated in some challenging assignments. Most noteworthy have been the B-1 bomber multiyear procurement, fighter aircraft competition, fighter aircraft engine procurement, aerial combat friend-or-foe identification, T-46 trainer aircraft development, F-16 support equipment procurement, supply system security, and logistics data systems modernization. Through these and many other assignments, the Cincinnati staff have identified opportunities for significant improvement in Air Force programs and management.

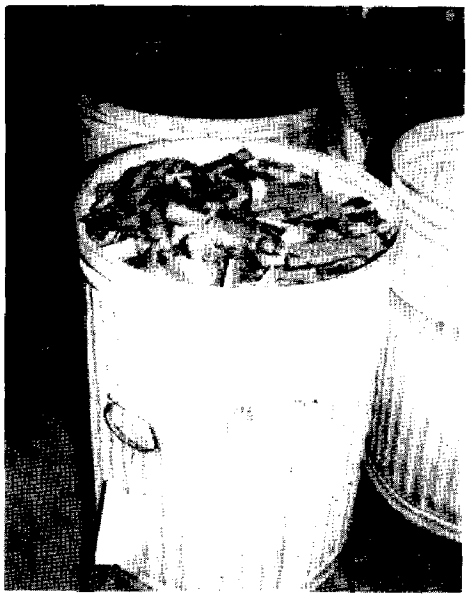
The region's most productive assignments, in terms of the potential to reduce defense expenditures, have been those commonly referred to as "budget scrubs." This work involves analyzing the Air Force budget to determine if program changes or schedule slippages since the budgets were first prepared have reduced the need for current fiscal year funds. Over the past 2 years, Cincinnati staff have identified nearly $3 billion in potential savings through this work.

Dallas Regional Office

The San Antonio Suboffice of the Dallas Regional Office frequently becomes involved in auditing the procurement and management of spare aircraft parts worth billions of dollars. Most of the audit work is done at the Air Logistics Center (ALC) at Kelly Air Force Base, San Antonio.

A recent Suboffice assignment involved repairable high-cost engine turbine blades used on F-15 and F-16 fighter aircraft. Over the past 2 years, a repair contractor had recovered blades valued at over $13 million from scrap metal piles condemned by the Air Force. These blades had been prematurely disposed of.

In addition, blades that cannot be repaired are condemned and sent for disposal. But the contractor had repaired and returned to stock unacceptable blades, including some with defects posing a potential safety problem. Consequently, ALC recalled all the repaired blades from worldwide locations for reinspection, possibly averting a catastrophe.



Unacceptable turbine blades found by GAO staff in an Air Force disposal yard.

During a review of spare parts pricing, the Suboffice staff found that the ALC contracting officer had relied on a formula pricing rate agreement to accept a price of $16,400 for a left-hand link assembly that is part of the C-5A aircraft engine mount. A price analysis showed that the item should cost less than $4,000. Further, there is a right-hand link assembly, and the two assemblies are very much like left and right shoes. (See photo of left- and right-hand assemblies.) The Air Force had been paying $16,400 for the left-hand assembly and less than $5,000 for the right, although the items were almost identical. Because of GAO's work on this assignment, the contractor agreed to refund about $82,000 for the last two purchases of seven link assemblies.

Left- and right-hand link assemblies for the C-5A aircraft.

This example pointed out a weakness in the pricing of replenishment spare parts because contracting officers were placing too much reliance on the existence of formula pricing rate agreements with major defense contractors and were not performing adequate price analyses of the specific parts being procured.

Los Angeles Regional Office

Many Los Angeles Regional Office (LARO) assignments have provided vital information to the Congress on national security policy issues. About 60 percent of LARO's work load is defense related. Each of the services is represented in the region. The Air Force has its Space Division, where the Strategic Defense Initiative is being developed, and the Ballistic Missile Office at Norton Air Force Base, California, which is responsible for the Peacekeeper and small ballistic missiles. The Navy has the China Lake Naval Weapons Center, California, and a huge presence in San Diego. Several important military bases are in the area, such as Edwards and Vandenberg Air Force Bases, the Army's Fort Irwin, and the Marine Corps' Camp Pendleton. Also, one of every five prime defense contracts in the country is in California, and $2 of every $7 in defense prime contract dollars is awarded to contractors in southern California.

LARO staff have provided key testimony during Senate hearings on the development of the Peacekeeper and small ballistic missiles. And one LARO job revealed that defense contractors were overcharging for Navy spare parts, such as the now famous $600 ashtray.

In addition, the Los Angeles staff have participated in several jobs that resulted in significant savings. For example, GAO recommendations on Navy ship-manning practices saved $22 million, and a recent job on defense contracts for consultants and studies identified potential savings of more than $94 million.

The variety of jobs in LARO has afforded its staff some unique opportunities. For example, audit teams at the Space Division have reviewed such exotic phenomena as space lasers, killer satellites, and tactical warning/attack assessment systems. On one Navy job, LARO staff spent time aboard an aircraft carrier at sea. (See "A Week's Worth," Spring 1986.)

On another Navy job, LARO's George Vindigni and Karl Deibel and Tim Stone of NSIAD spent a month in the Far East visiting Pacific Fleet commands and riding on deployed warships to examine records and equipment. To verify readiness reports onboard ships, the team first rode on the cruiser *U.S.S. Halsey* as part of a battle group from Subic Bay in the Philippines toward Sasebo, Japan; then flew by helicopter to Okinawa; and then flew back to Subic Bay. Next, they sailed on the destroyer *U.S.S. O'Brien*, where they observed firing of the close-in weapon system and 5-inch, 54-caliber gun. While they were aboard, the ship rescued about 30 Vietnamese refugee boat people and took them to safety in Singapore. After 3 days in Singapore, the trio flew to Japan and inspected the frigate *U.S.S. Knox* and visited the *U.S.S. Blue Ridge*, flagship of the 7th Fleet, both in Yokosuka. Back home, the on-board work was used as part of a GAO report that showed disparity in the Atlantic and Pacific Fleets' reporting of readiness.

Norfolk Regional Office

Major defense activities of all the services are located within the geographic area covered by the Norfolk Regional Office (NRO), including the largest naval base in the world, Norfolk Naval Base. Over the last few years, NRO's work has centered on Navy inventories, procurement, maintenance, homeporting, readiness, and manpower management; Army training, doctrine, force structure, and vehicle maintenance; Marine Corps mobilization; Air Force staffing standards and flying hours; and DOD testing facilities and industrial funds.

One recent series of NRO reviews concerned the Navy's management of shipboard inventories. These reviews were often conducted aboard ships under considerably difficult conditions. The results, however, were worth the extraordinary effort: more than $700 million in savings and improvements in inventory management and supply readiness of Navy ships.

Another review by NRO of Navy inventories concerned suspended stock. Suspended stock is that which is not ready for issue because there is a question regarding its true condition. The amount of stock in suspension was not known, and the staff had to devise some innovative auditing techniques to determine the true state of the Navy's suspended inventory. NRO found that the Navy had material worth over $200 million in suspension for lengthy periods, some for as long as 2 years. Moreover, while the stock was in suspension, the Navy was buying more of the same types of items. The Navy has formed a task force to implement recommendations in GAO's draft report and has specifically asked GAO to participate in that effort.

A Norfolk review of the Army's fiscal year 1986 budget request for military construction ultimately resulted in considerable savings to the government. The Army had requested $24 million to construct urban-warfare training facilities at six locations and planned to request, in the following fiscal year, another $21 million to build six more such facilities. The audit team found that the Army had not yet determined what its urban-warfare training requirements were, nor had it considered alternatives, such as establishing regional sites or a central training facility. On the basis of this information, the Congress denied the Army's funding request.

San Francisco Regional Office

The San Francisco Regional Office (SFRO), because of the many military installations in the region and the expertise acquired in the region over a number of years, does much of its work in the Army and Air Force issue areas. The region invests significant staff time in the defense procurement and hazardous waste areas.

The region has assigned senior managers to the Army, Air Force, and defense procurement issue areas who have been active in NSIAD's planning process. The partnership between SFRO and NSIAD has paid off in large dollar savings and quick responses to high-visibility congressional requests. Recent examples follow.

- San Francisco's review of defective pricing of defense contracts at FMC Corporation in San Jose, California, revealed $24 million in overpricing. These findings were highlighted during Assistant Comptroller General Frank Conahan's October 3, 1985, testimony before the Subcommittee on Legislation and National Security, House Committee on Government Operations.
- Innovative methodology and detailed computer analysis enabled San Francisco staff to identify ways to reduce inventory management costs at the Air Force's Sacramento Logistics Center. After agreeing with NSIAD to participate in the assignment, the region spent about 35 staff-days in developing the basic issues. On the basis of the results, Tim McCormick, then Regional Manager, sent a letter of inquiry to the Commanding General, Sacramento Logistics Center, questioning the Air Force's use of computer data from an inventory system to compute spare parts requirements. In response, the Center removed erroneous data from its inventory requirements computations and terminated numerous procurements. The net result was a $23 million reduction in requirements.
- During an assignment on Navy supply center effectiveness, the region sent a letter of inquiry questioning the use of maximum inventory levels when computing inventory requirements. The Deputy Comptroller for the Navy Stock Fund responded that corrective action would be taken. As a result, inventory levels will ultimately be reduced by more than $50 million, with recurring annual savings in reduced holding costs of about $12 million.
- SFRO and NSIAD staff conducted time-critical and sensitive briefings for four Congressmen regarding controversial public statements that were extremely critical of the Strategic Defense Initiative's X ray laser experiments. The results of the review, which were accepted by both SDI advocates and critics, clarified issues that are central to the continuing national debate on SDI.
- SFRO has participated in no less than six military hazardous-waste-related assignments and is just beginning another review in this area. Because of the heavy concentration of military facilities in the region and keen interest on the part of the local congressional delegation, the region expects to continue emphasizing hazardous waste work.

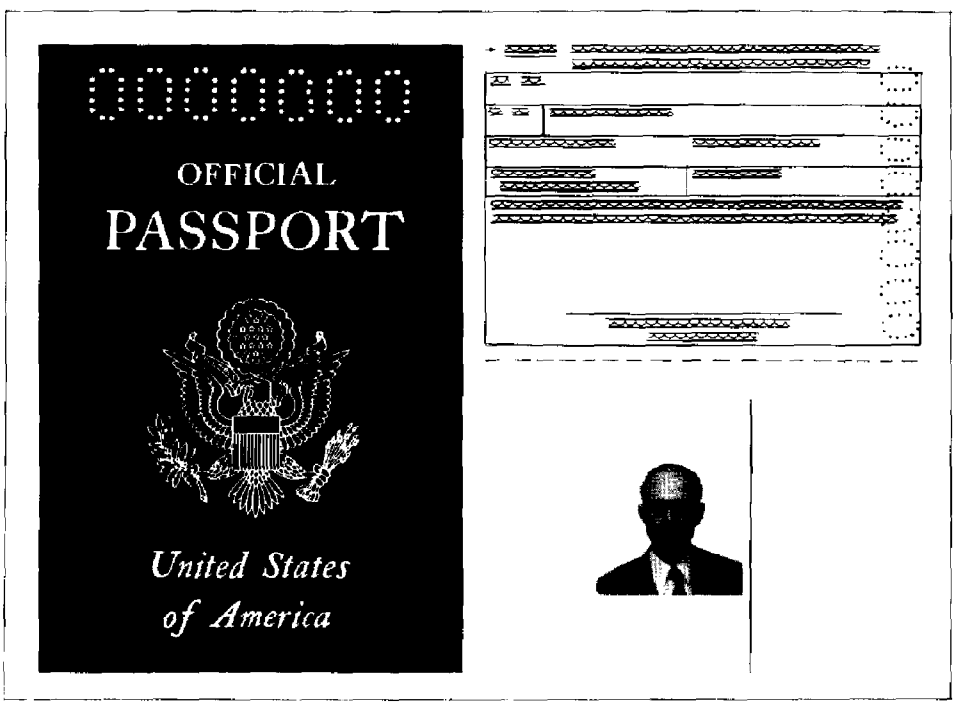
Recent work load trends indicate that SFRO will continue as a key partner in carrying out NSIAD work. San Francisco now has 13 active NSIAD assignments and is providing senior staff on 7 of them.

GAO Observes a Revolution

Ed. note: *The Review thanks David Wise for the following item.*

Mr. Wise joined GAO in 1981 and has been assigned to the Far East Office since 1985. He holds a master's degree in public administration from the University of Pittsburgh's Graduate School of Public and International Affairs. During his tenure in the Far East Office, he has worked in Korea; Guam; the Philippines; and Pearl Harbor, Hawaii.

A number of GAO staff found themselves in the Philippines during the recent election and revolution. Most were from GAO's Far East Office, while the rest were from NSIAD. Two audit teams were working mainly at the U.S. Agency for International Development (USAID). A third team, which intended to perform work at Clark Air Base, arrived the weekend of February 21, 5 days before the departure of President Marcos. Staff members from NSIAD included a Group Director, Ronald Kushner, and an Evaluator-in-Charge, Jerry Herley, while those from FEO included two Evaluators-in-Charge, Sharon Chamberlain and Eaton Clapp; Site Seniors William Kenny and James Cooksey; and Evaluators Ernie Arciello, Edward George, Nancy Pendleton, Geoffrey Johnson, and the author. Most of us were there during the election and, except for Mr. Kushner, were all present during the rebellion and eventual fall of the Marcos government.



Trying to work in Manila during this period required a great deal of patience. For example, Philippine government officials were often hard to find for several weeks before the election, as many were out campaigning for Marcos. In addition, all offices, including the USAID mission, were closed the day before the election and on election day itself.

During the 3 weeks between the election and Marcos' eventual departure, it became more and more difficult to conduct routine business. At the advice of the U.S. Embassy, our teams working at USAID canceled field trips to various parts of the country. Tensions were rising throughout the country as people became increasingly preoccupied with the political situation. Demonstrations and the rebellion of the Defense Minister and the Deputy Chief of Staff brought hundreds of thousands of people into the streets. No one on the audit teams felt physically threatened, but there was considerable uncertainty in those last hectic weeks.

The following chronology is one GAO evaluator's personal account of the pre- and postelection period, concluding with the teams' departure on February 26, 1986, the day after President Marcos and his entourage left the country.

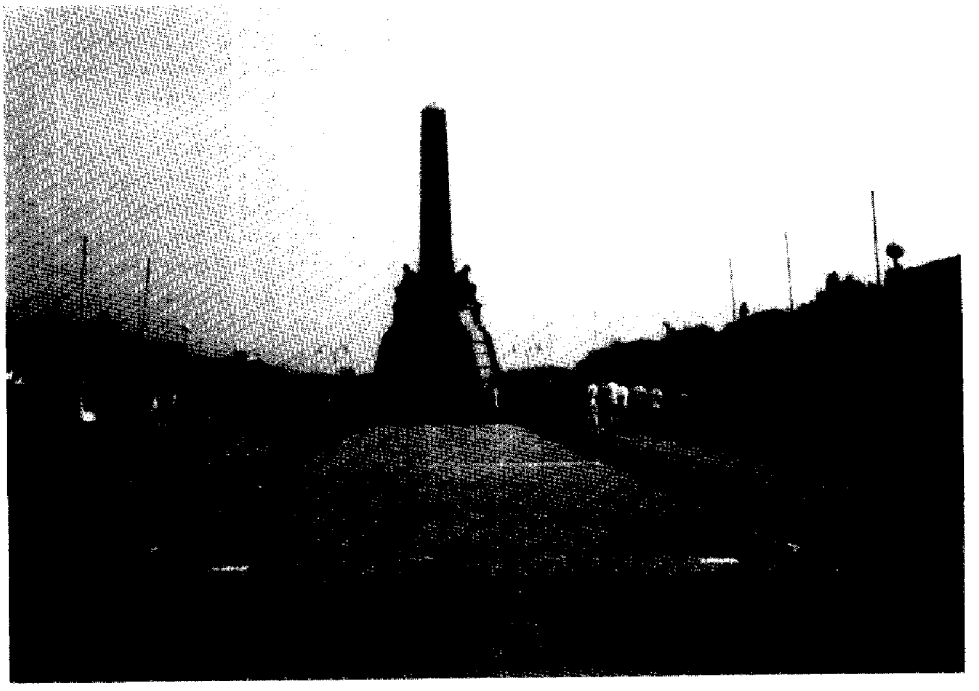
January 24: I meet several Filipino friends for a dinner of barbecued chicken and rice at our favorite open-air restaurant. As usual, we discuss politics. They tell me that if the "snap election" called by President Marcos is fair, Cory Aquino will win. However, they express doubt that Marcos is capable of holding a fair election.

January 25: Somewhat fatigued from political discussions, I invite a friend for a day trip to the exciting Pagsanjan Falls, where many scenes from the movie *Apocalypse Now* were filmed. This is the second time I've made the trip, and I am used to the theatrics of our boatmen who paddle and pull us up the river to the main falls. I assure them that they will receive the obligatory 100 peso ($5) tip, and they seem satisfied. They are also curious to know what I think of the upcoming election.

January 29: The daily papers carry reports of preelection violence on Negros, an island about 450 miles south of Manila. Almost no day passes now without news reports of the Communist New People Army ambushes or political violence perpetrated by one side or another.

January 31: Big flap in the papers over the *New York Times* report that Mr. Marcos was not quite the war hero that he claimed he was. As usual, the press reports are completely different depending on whether one reads *Malaya* (opposition) or *Bulletin Today* (government). The broadcast media, on the other hand, are almost totally government controlled—only Radio Veritas, run by the Catholic Church, carries the opposition's views. The evening news on Channel 4 devotes nearly all its broadcast to that day's campaign activities of the First Family and about 45 seconds to an Aquino rally. The news is usually followed by a 2-hour panel discussion telling the public why Marcos should be reelected. Interestingly, nearly all the media are in English, the "lingua franca" of the country, because many languages are spoken here. I find the whole media scene depressing. Despite our many complaints regarding the media in the United States, at least they are reasonably objective.

February 4: Over a cold beer in a nearby cafe, a Filipino friend tells me that he has heard that Marcos is readying legions of "flying voters" who will be brought in from the provinces to cast illegal votes in metropolitan Manila. That evening, the final Aquino rally takes place at the Luneta and Rizal Park, not far from USAID. Crowd estimates vary greatly, but propably close to a million people attend. I view the rally from our office, and it is an impressive sight. (See photo of park, p. 10.)



Memorial in Rizal Park, Manila, site of many demonstrations during election campaign and revolution.

February 5: The previous day's scene is repeated for the final pro-Marcos rally. We can see that many military and public buses were used to bring people to the rally. Opposition newspapers report that each participant who was bused in from the provinces received 50 or 100 pesos. The press also reports that the mint's printing presses have been going 24 hours a day to print all the new money.

Feburary 7: Election day. The streets around our hotel are very quiet. All shops and offices are closed. The quiet seems odd in a city that is always bustling.

February 8: To one who is used to Dan Rather predicting the winner before the polls close in California, vote tabulation proceeds very slowly. I listen to results on Radio Veritas, but it is reporting results so slowly that I soon lose patience. To complicate the situation, two groups are counting votes—the government's Committee on Election (Comelec) and the National Citizens Movement for Free Elections (Namfrel). This check-and-balance system is intended to ensure honesty.

February 10: We finally return to work. During the day, I bump into a Filipino friend. She had been a Namfrel poll watcher on election day and tells me that at her station, the Namfrel volunteers had to leave 3 hours before the polls closed because of threats from Marcos supporters. I also hear stories of people who mysteriously disappeared from voting lists or who were told that they had to vote at other polling stations. In the meantime, charges and countercharges continue and only about 25 per cent of the votes have been counted. Naturally, Namfrel and Comelec counts differ widely. Probably the biggest news of the day is the walkout by Comelec computer operators who claim that they are being forced to input false voting data to aid Marcos. This walkout seems to add credibility to Namfrel charges of widespread fraud on the government side.

February 11: Confusion reigns. Votes are no longer being counted, and the big tally board on Roxas Avenue is now blank. The whole process seems to be unraveling. The papers also give wide coverage to President Reagan's soon-to-be-modified statement that election fraud was committed by both sides. It is becoming more difficult to get any work done. Our field trip to observe projects in the Bicol region is canceled after the U.S. Embassy advised against all nonessential travel.

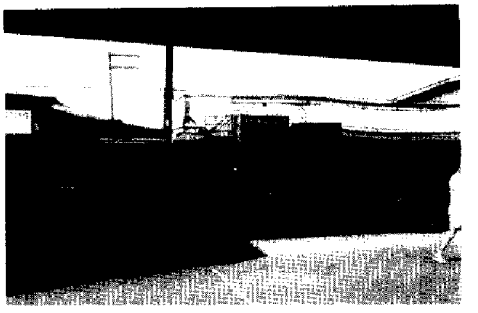
February 13: A few of us decide to attend the movie *Delta Force* currently packing them in at the theater behind the hotel. The audience loves the action, and I'm convinced the country could unite behind Chuck Norris and Lee Marvin.

February 15: Despite the inconclusive results, the National Assembly declares Marcos the winner. This is not surprising, as two-thirds of the Assembly's members are from his party. Some analysts estimate that a fair election would have resulted in a 60-40 Aquino victory and that even an election with a "normal" amount of cheating would still have gone to Aquino 55-45.

February 16: A huge Aquino rally at the Luneta. From our office, it appears that all Rizal Park is full of people with yellow shirts, the Aquino trademark. Mrs. Aquino, refusing to concede, calls for civil disobedience. The issue is far from settled.

February 18: Two of us from the audit team leave for a field trip to Dumaguete, a city in the Visayas (southern) region of the Philippines. Although people there are also talking about the election and its implications, the turmoil and tension of Manila seem much more than a 1-hour flight away. The university and sea resort atmosphere are a welcome relief.

February 22: Upon returning to Manila, I exit from the domestic airline terminal and am immediately besieged by a dozen taxi drivers who all want to drive me to the hotel at 10 times the normal fare. I'm fairly



A "jeipney" on Taft Avenue, Manila—typical Filipino public transportation.

used to this routine after 8 weeks in the country, and I find a metered taxi and pay the normal fare. Later that afternoon, I hear rumors of a coup or a rebellion at the Defense Ministry on the outskirts of Manila. Late in the afternoon, I see three other FEO staff members at the hotel who have just arrived. They intend to go to Clark Air Base, but at this point, they are not sure they will be able to leave Manila. That evening I attend a play with a Filipino friend. She tells me Radio Veritas has reported that the Defense Minister and the Deputy Chief of Staff have indeed rebelled. They are holed up in the Ministry compound and have declared Mrs. Aquino the President. Marcos appears on Channel 4 and reassures us that the rebellion is a minor matter that he will soon crush. Not surprisingly, he fires the two rebels.

See Location, p. 46

Manager's Corner

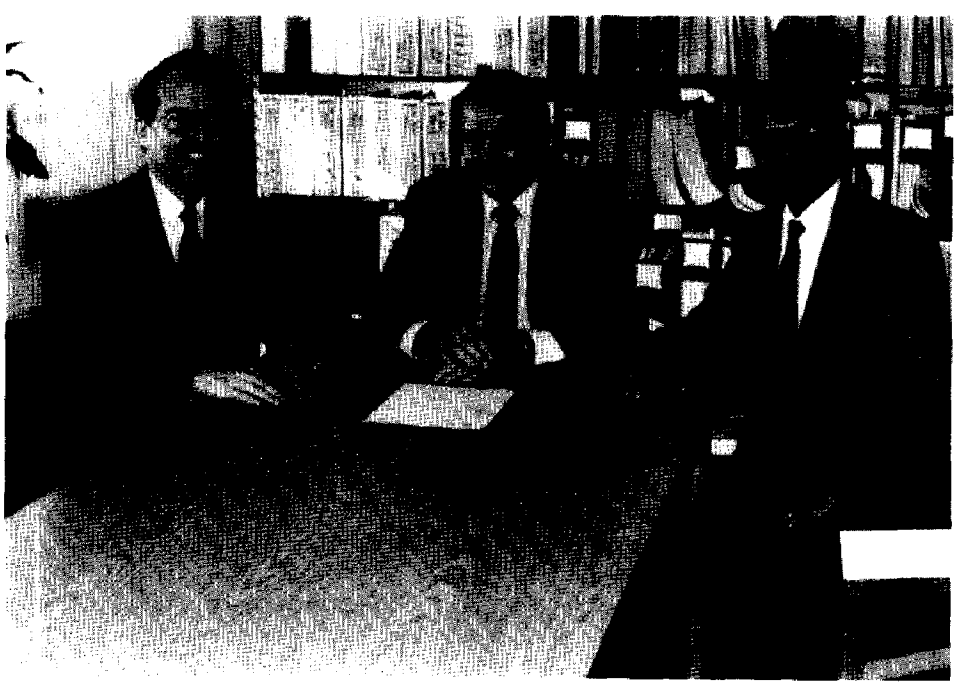
Introduced by David Andersen, Office of Organization and Human Development

Interviews With Top Level Defense Officials

"Manager's Corner" has traditionally been a source of information on current management theory and practice. The purpose of this feature continues to be to expand the knowledge and skills of GAO managers by increasing their awareness of management problems and achievements. In the past, we have most often asked executives and senior level managers to review articles or books written by knowledgeable individuals on topics of current interest.

In contrast, the content of this national security issue's "Manager's Corner" comes from three top level executives in the Departments of the Air Force, the Army, and the Navy who were interviewed by Senior Associate Directors in the National Security and International Affairs Division. The intent of these discussions was to examine GAO's role, GAO's effectiveness in carrying out its mission, and critical areas of strength or weakness as seen by these executives. Information and insights gathered from such an effort can prove valuable in evaluating and improving upon the impact and effectiveness of our work.

The executives interviewed were: Edward C. Aldridge, Jr., Department of the Air Force, interviewed by Harry R. Finley; James R. Ambrose, Department of the Army, interviewed by Henry W. Connor; and Robert H. Conn, Department of the Navy, interviewed by John Landicho.

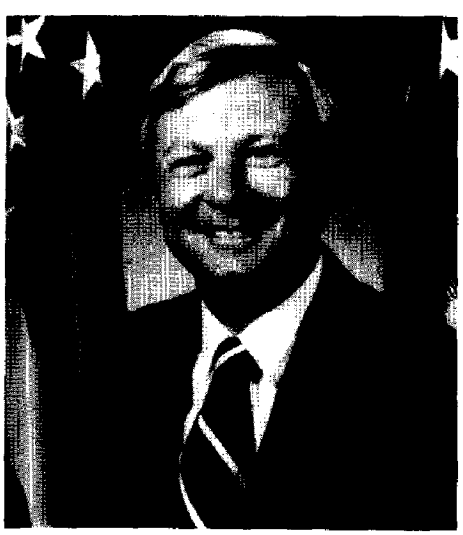


The three NSIAD Associate Directors who interviewed the DOD officials are (L-R) Harry R. Finley (Air Force Subdivision), Henry W. Connor (Army Subdivision), and John Landicho (Navy Subdivision).

The Honorable Edward C. Aldridge, Jr., Secretary of the Air Force

Interviewed by Harry R. Finley

Edward C. "Pete" Aldridge, Jr., became the Secretary of the Air Force in June 1986. Since 1981, Mr. Aldridge served as the Under Secretary of the Air Force, where he provided overall supervision for Air Force space programs. During his career, Mr. Aldridge has held various positions in the Department of Defense (DOD), the Office of Management and Budget (OMB), and private industry. At DOD, positions he held included Director of the Strategic Defense Division in the Office of the Assistant Secretary for Systems Analysis; Deputy Assistant Secretary of Defense for Strategic Programs; and Director of Planning and Evaluation, where he was a principal advisor to the Secretary on planning and evaluating military forces and support structure.



Edward C. Aldridge, Secretary of the Air Force.

Source: U.S. Air Force.

At OMB, Mr. Aldridge was a Senior Management Associate. He has also served in management positions at the Douglas Aircraft Company and the Systems Planning Corporation. Mr. Aldridge received a B.S. in aeronautical engineering from Texas Agricultural and Mechanical University in 1960 and a master's degree, also in aeronautical engineering, from the Georgia Institute of Technology in 1962.

Secretary Aldridge:

I appreciate the opportunity to share my views about auditors—all auditors. Auditors are a valued tool of management. It is only when auditors appear to forget that their primary purpose is to help management that I see no value in them.

1. What do you perceive as the role(s) for GAO?

GAO provides a monitoring and oversight role for the legislative branch of the government. As such, GAO should provide an independent and unbiased review of broad issues that affect DOD and non-Defense agencies. GAO should ensure that laws are accurately translated into policy and that government operations are performed effectively and efficiently. Of course, GAO must also respond to specific issues raised by the various Members of Congress.

I believe GAO also provides a valuable service in the rendering of legal opinions, prescribing accounting and auditing standards, and reviewing accounting systems.

2. How do you differentiate between GAO's role and the services' internal audit/DOD IG roles?

The GAO normally should be more global in perspective to provide the macro view of overall governmental operations and policy implementations of congressional mandates and authorizations. The DOD IG and the Air Force Audit Agency are more limited in view and perspective and should be more attuned to the problems affecting the operational effectiveness, efficiency, and war-fighting capability of DOD and the Air Force. I view the primary difference as whom the various organizations normally receive their taskings from.

The Air Force Audit Agency responds to my needs and to those of my managers. It is an internal resource that can and does address issues of primary concern to us. The Agency evaluates issues on an Air Force-wide basis, as well as at individual locations. Its reports are addressed to the level of management that can address the issue at hand.

3. Have you perceived any changes in GAO-agency relationships in the last 2 to 3 years? What are they and what do you think about them?

A couple of observations seem in order regarding this question.

More of GAO's evaluations within DOD seem to be oriented toward a single service. I realize that the percentage of congressional request audits has dramatically increased in the last few years. I would speculate that the pressures on GAO are equally dramatic. However, this approach could reduce the scope of any problem to its impact on one service and negate or restrict one of the advantages of a GAO review—the ability and opportunity to cut across organizational and service boundaries.

The Air Force has noticed some positive changes in approach among many of GAO's field offices. Often, the people seem more qualified and knowledgeable regarding the areas being reviewed. Also, there seems to be more of a helpful and open attitude as opposed to a more dogmatic approach with headline-oriented report titles, as routinely seen in the past.

Our liaison office tells me that GAO's establishment of an office to function as a GAO single point of contact for Air Force matters has greatly improved communications and working relationships for both the Air Force and GAO. I welcome these initiatives.

4. What do you see as the particular strengths of GAO?

The strength of any organization is the people. By and large, GAO personnel are competent and professional. This fact, added to GAO's ability and charter to provide an independent assessment of a complete process—especially those issues where DOD and civil sectors interact—provides a dynamic opportunity to enhance the effectiveness of our government.

5. Do you think that GAO is objective in reporting the results of its work?

As a general rule, yes, the results of GAO's work are normally a fair presentation of the facts. However, there are several concerns regarding GAO's reporting methodology:

GAO reports are frequently released without providing the Air Force a chance to give GAO official comments. I realize GAO is sometimes working under congressional direction not to release the data to the Air Force. However, I believe that the opportunity to present the total perspective to the Congress and the public should be the paramount objective of GAO and the Congress.

When the Air Force is allowed the opportunity to provide management comments, it seems rather ironic that it is allowed one-half the time to respond to a draft report as it is to the final. Frequently, the Air Force is asked to respond in an extremely expedited manner. As you certainly can appreciate, it takes longer to provide a staffed and coordinated position on an initial draft than on the final. My policy is to provide an Air Force position on any of GAO's reports which are directed to or impact on the Air Force, when given the opportunity to do so.

6. Are you and/or your key managers comfortable with the quality/competency of the GAO staff?

For the most part, we are satisfied with the skills of the GAO staff. Most GAO personnel present a professional demeanor. Occasionally, there is a problem involving a lack of comprehension of the complexities of the Air Force and DOD organization and structure, but we can usually work these out. I get concerned when I hear of instances where GAO has analyzed data and formed conclusions and is reluctant to share this information in order for the Air Force to offer its perspective and insight. However, these instances seem workable.

7. What are some things GAO can do to improve the way it carries out its assignments?

There are several ways to enhance the relationship between GAO and the Air Force and improve the way GAO carries out its assignments.

Comprehensive briefings should be conducted with management prior to the start of an audit. GAO auditors should have a specific written scope of the audit effort. GAO's announcement letters are widely distributed, read, and used. Inclusion of detailed objectives would help us understand GAO's needs.

There should be a more balanced perspective in GAO's reports. GAO should point out the good things the Air Force does, as well as the areas needing improvement.

GAO should work with the Air Force during its evaluations. The Air Force is trying to do its job effectively and in the most-cost-efficient manner. The Air Force makes

mistakes and overlooks the obvious on occasion. However, it is often confronted with a draft report that places it in an adversarial position when prior cooperative efforts between the organizations could have led to corrective efforts. If we had worked together, suitable corrective action could be initiated then. In these fast-paced, fluid times, many things are overcome by events. In many cases, the early appraising of GAO findings could allow the rechanneling of valuable resources rather than risking out-and-out loss or other costly mistakes.

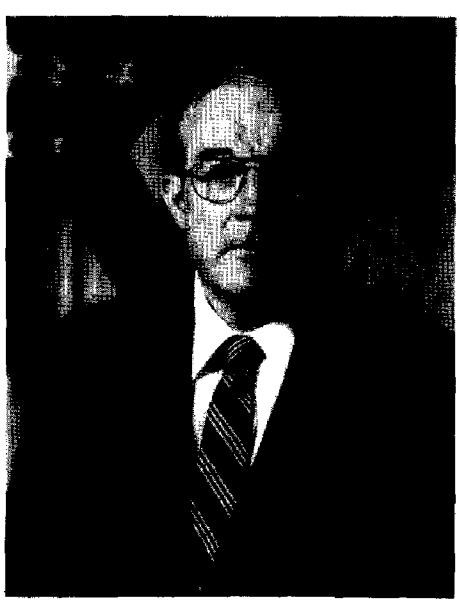
Management comments should be included in all reports, and GAO report turnaround times should allow for development of complete management comments.

GAO's recommendations should be practical and feasible and should afford a realistic opportunity for successful implementation.

The Honorable James R. Ambrose, Under Secretary of the Army

Interviewed by Henry W. Connor

James R. Ambrose became the Under Secretary of the Army on October 13, 1981. As



James R. Ambrose, Under Secretary of the Army. *Source: U.S. Army.*

the second-ranking civilian in the Army, he plays a large role in formulating overall Army policy, procedures, and programs.

Mr. Ambrose graduated with high distinction from the University of Maine in 1943 with a degree in engineering physics. Later he attended Georgetown University, Catholic University, and the University of Maryland where he acquired a substantial part of his postgraduate education in physics and mathematics.

In 1955, Mr. Ambrose joined the newly formed Lockheed Corporation, Missile Systems Division, and later that year became one of the principals in another firm, Systems Research Corporation, which eventually evolved into the Ford Aerospace and Communications Corporation.

Immediately before his appointment, he was Vice-President for Technical Affairs for Ford Aerospace and served as the principal corporate troubleshooter on major contract performance problems.

Under Secretary Ambrose:

Imagine me being offered an opportunity to report to GAO, in its own journal, what I perceive to be its role and its strengths and weaknesses!! When my staff first put this on my calendar, I thought they were pulling a joke on a quiet Friday afternoon.

1. What do you perceive as the role(s) for GAO?

The obvious answer, of course, is that GAO is the eyes and ears of the Congress. But I would like to talk about another role. When I first came here, I read report after report of GAO's. They all talked about events that had happened in the past. If we had done something wrong, we would have to admit it and say that we would try to do better in the future. If we didn't think we had done anything wrong, we'd argue. But it was all about water over the dam. In my earliest meetings with Mr. Bowsher, Mr. Conahan, and you, as I recall, I asked why GAO couldn't get involved earlier—not to lose its independence but to give us independent advice to help us avoid problems for the future. GAO's efforts on the Multiple Subscriber Equipment are a prime example of the benefit that can be achieved by GAO's current involvement in Army programs and activities. GAO was an independent participant helping to keep us on the proper path without compromising its traditional role.

2. How do you differentiate between GAO's role and the services' internal audit/DOD IG roles?

I look at all these organizations as useful management tools. They are able to point out problems with our operations that many times I am unaware of. However, I've got to say that we operators can stand only so much auditing. At that point, the time we must take responding to audits and oversight activities becomes counterproductive. I do think that these organizations have been pretty good about avoiding duplications. It's just that there seems to be an increasing clamor for audits. The clear difference between GAO and the other audit groups is that GAO is, for the most part, reacting to congressional requests.

3. Have you perceived any changes in GAO-agency relationships in the last 2 to 3 years? What are they and what do you think about them?

I've already mentioned the fact that GAO is now undertaking some reviews on a real-time basis where it can be helpful to us in making the right decisions as we go along. I think this is a very positive change. Also, I think our relations are much more open and cooperative than when I first came here. An example comes to mind. Not too long ago, I was visiting Fort Lewis, Washington, when two GAO auditors tracked me down. They wanted to talk to me about a draft report that was with the Army for comments. I had seen the draft and the proposed Army comments, which for the most part were nonconcurring. The report was pointing out problems with a communications system and saying that it couldn't be fielded within the scheduled time frame. I couldn't understand this because the remainder of the program was supposed to involve acquiring off-the-shelf equipment.

The auditors explained that this phase had been turned into a developmental project, a point incidentally that didn't come across in the draft report. I immediately called in the program manager, and when I had verified this, I realigned that program in a hurry. I also changed our comments on the draft report. This type of open communication can benefit us both.

4. What do you see as the particular strengths of GAO?

GAO has a high utility that should be harnessed by the agencies in audits. However, the absolute strongest point GAO has is its credibility with the Congress. There is no way the services can gain this type of credibility.

5. Do you think that GAO is objective in reporting the results of its work?

My perception of GAO's objectivity is mixed. I feel that in some cases, GAO tends to deliver a message that the congressional requester can use as he wants.

I'm not sure I blame GAO. GAO has to walk a fine line when it comes to responding to the Congress.

I also have come to believe that GAO's word processors have no positive words in them. Even when GAO tries to say something positive, it tends to use a double negative. In preparation for this interview, I picked up at random a proposed DOD response to one of GAO's draft reports. One of GAO's findings to which DOD was responding was titled "Acquisition Schedules Are Slipping Less." I guess that's supposed to be positive. Another one was "Cost Savings Can Be Achieved, but Their Magnitude Is Uncertain." But this is characteristic of audit organizations. Auditors are trained to look for flaws. Another concern I have, and I guess it's a matter of objectivity although it certainly doesn't apply to GAO alone, is with the phrase "fraud, waste, and abuse." A few years ago, the DOD Inspector General issued a report in which he estimated that there were in excess of $1 billion of fraud, waste, and abuse in the Department of Defense. All the public hears is the word "fraud."

I would estimate that no more than a few tens of millions of dollars of that amount could have been considered "fraud," a label that has criminal legal implications and definitions to guide its use. I think that the term "fraud" should be separated from "waste" and "abuse," which are the result of mismanagement and are much more diffuse and ill defined but much larger in magnitude.

6. Are you and/or your key managers comfortable with the quality/competency of the GAO staff?

I'm envious of the quality of GAO's staff. I would like to have them over here helping me; then we wouldn't need to be audited. It's generally true, I think, that the more talented people tend to migrate to the oversight organizations, such as GAO, the Office of the Secretary of Defense, Headquarters, the Army Materiel Command, etc., because high grade positions are available.

The one problem I have with GAO and the other audit agencies is that they tend to be number oriented. Their average background is in business administration, accounting, and finance. This sometimes causes problems in such technical areas as weapon systems testing, production decisions, etc.

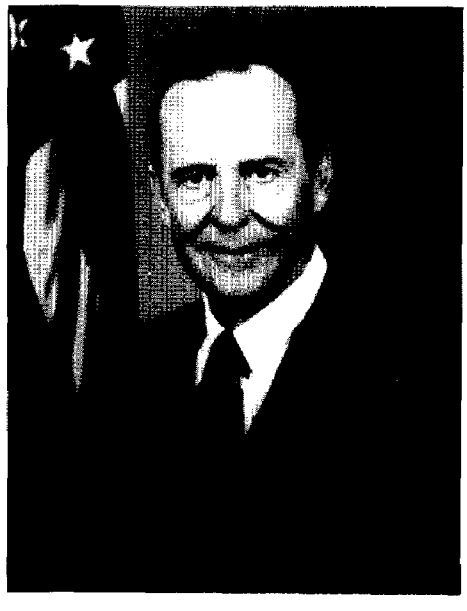
7. What are some things that GAO can do to improve the way it carries out its assignments?

Most important is to continue an open-door policy with us. It would also be nice if GAO, with its expertise in numbers, could bring some perspective to some of the bad things that are said about DOD and the government in general. The Congress and the media keep chasing $400 hammers and toilet seats when in reality these are a very small part of the spare parts budget. And there is not that much money in the spare parts budget when compared with the total budget.

The Honorable Robert H. Conn, Assistant Secretary of the Navy for Financial Management

Interviewed by John Landicho

Robert H. Conn became the Navy's Assistant Secretary for Financial Management, Comptroller of the Navy, and Senior ADP Policy Official in May 1981. He served as a



Robert H. Conn, Assistant Secretary of the Navy for Financial Management.

Source: U.S. Navy.

naval aviator after attending the Navy's flight school from 1943 to 1946. During his naval career, Mr. Conn received a Meritorious Service Medal and a Legion of Merit. He retired at the rank of captain on January 1, 1972.

After his naval career, Mr. Conn became manager of Arthur Andersen & Company's Federal Liaison Division. He was assigned to manage a review of the audit process for the Federal Election Commission. He has authored two books on the election process.

Mr. Conn's educational experiences include studies in business administration at the University of Mississippi, graduate studies in management at the University of Rochester, course work at the U.S. Naval War College, and doctoral studies in management and economics at Indiana University.

Assistant Secretary Conn:

I welcome this occasion to express my views on how GAO carries out its auditing responsibilities.

1. What do you perceive as the role(s) for GAO?

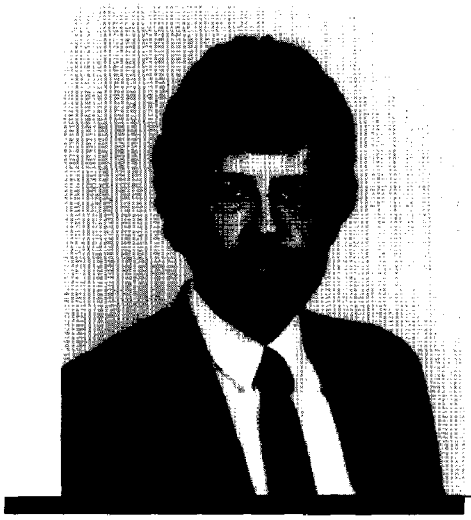
GAO was established to serve as a semiorganic agency for the Congress. Over time, however, its role has been expanded to the point where it is amorphous. It is used, at times, for whatever purpose the Congress considers appropriate, regardless of whether that purpose is related to audit. GAO's study on strategic homeporting is an example. The subjective analyses perormed by GAO were, in my judgment, beyond the scope of the agency's intended mission.

2. How do you differentiate between GAO's role and the services' internal audit/DOD IG roles?

GAO is the audit arm of the Congress, and since the Congress is charged with oversight responsibility for operation of the federal government, GAO's role is all encompassing. The service internal audit role is to assist service management in assuring itself that assets are safeguarded and are being used in the way they were intended and that policies and procedeures are being effectively and efficiently carried out. The Defense Department's audit role is to assist the Secretary of Defense in carrying out his oversight responsibilities across service lines and over the defense agencies. The role of the DOD Inspector General is to prevent waste, fraud, and abuse within the Department of Defense.

3. Have you perceived any changes in GAO-agency relationships in the last 2 to 3 years? What are they and what do you think about them?

See Manager's, p. 46



Topics in Evaluation

Carl E. Wisler

Mr. Wisler is an Associate Director in GAO's Program Evaluation and Methodology Division.

This issue's topic is evaluating weapon effectiveness.

Copperhead is the name of a 155-mm. guided cannon shell (see photo on p. 16) developed by the Department of Defense (DOD) in the 1970's to increase the probability of a hit by a howitzer. Unlike conventional shells, the Copperhead can maneuver by means of airfoil fins. A forward observer directs a laser light beam at a target, such as a tank, and the Copperhead, equipped with a laser detector and an internal guidance system, homes in on light reflected from the target.

Field tests conducted in 1979 showed that the Copperhead scored hits 48 percent of the time, a result judged by DOD to make the shell worthy of consideration for purchase as a combat weapon. However, results like this are not so clear-cut as they often seem. For example, the strength of conclusions from tests depends on how appropriate the "probability of hit" is as an indicator of how good the Copperhead is and on the testing circumstances that led to the 48 percent. This article examines some important considerations in evaluating weapon systems. (The Copperhead, which is now an operational munition, is used only as an example, and no conclusions should be drawn about the shell from the early test results given here.)

Estimating Weapon System Effectiveness

The traditional way to determine whether a new weapon is worth buying is to try it out. And the ultimate trial is one that subjects the weapon to realistic combat conditions. If a missile is likely to be used in the midst of battlefield smoke and dust, the tryout is best conducted under those conditions; otherwise we may be quite surprised when troops try to use the missile in combat. The validity of weapon test results depends heavily on the issue of realism. "Validity," in this context, refers to the degree of correspondence between the test results and the results that would occur if the weapon were used in combat.

As weapon systems become more expensive, there is pressure to do less testing because the tests frequently "use up" costly weapons. Simulations, either by computer or other means, are increasingly used to supplement a small number of actual tests. Although the credibility of weapon effectiveness estimated from simulations is not different in principle from that estimated from real tests, we shall focus on the latter.

Before dealing directly with the issue of test realism, we need to touch lightly upon a venerable topic much discussed by defense analysts: how to measure effectiveness. For example, the broad goal of a defense mission may be to protect national assets from the enemy, but there may be a variety of ways to quantitatively express the attainment of that goal. While the choice among possible measures may be crucial in deciding whether a new weapon system is better than an old one, such considerations are beyond the scope of this article. Here we shall assume that a measure of effectiveness has been chosen and that the aim is to estimate effectiveness from field tests.

The Realism of Weapon Tests

The Copperhead shell was based upon accepted physical principles about laser light. But the weapon developers must find out whether the principles can be applied when conditions are not ideal—when the weather is bad or when battlefield visibility is obscured. If they want to know how the Copperhead works "in general," it must be tested under various conditions. Rain, snow, smoke, and dust prevent the target

from being illuminated; fog or cloud cover prevent the incoming shell's sensor from detecting the reflected laser beam. Even when the sensor picks up a reflection, it may be the wrong one because puddles and rain-soaked objects on the battlefield may catch and redirect the laser beam. And the enemy, of course, may contrive countermeasures to achieve the same results as these natural effects.

The problem in testing weapons before the production decision is to create a set of conditions such that the test results will be close to the results that would be obtained if we actually used the weapons in battle. In evaluation, this is known as the problem of external validity, or generalizability.

In comparing a test with the real world in which a weapon is intended to operate, six factors seem to account for most of the detail-level comparisons needing to be made: the weapon system itself, the human participants, the conditions of weapon use, the enemy threat, the battle scenario, and the environment. For these factors, deviations between the test conditions and the real world may lead to the wrong conclusions about weapon effectiveness. Such deviations are often called threats to the validity or credibility of the test results.

What are some of the possibilities? If the weapon system used in a test does not correspond closely to a production model, it may perform better or worse than what would be expected in combat. Weapons can be built like race cars and the results can be similar: The stock version may not perform as well as the one that competes at "Sebring." Or it may work the other way around: The specially constructed test version might not be able to withstand the rigors of combat use.

Military personnel vary widely in aptitude and skill, as do other professionals. So if the test participants are above average in ability to use a weapon, the results will not be indicative of real world performance. For example, if the forward observers used in the Copperhead tests are not representative of the people who ordinarily perform that function, they might be exceptionally good at illuminating the targets and the hit probability might thereby be affected.

Conditions of use can vary in many ways between a weapon test and the combat situation. One example that arises frequently in weapon tests is that of the practice effect. In the case of the Copperhead, forward observers who participate in tests might acquire considerable skill from repeated trials under particular test scenarios. Consequently, the results might be better than what would be expected in combat, when the observers might have less opportunity to practice their tasks.

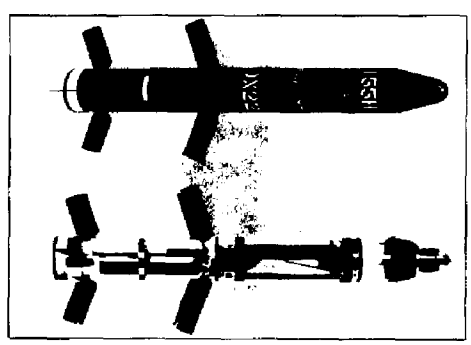
A realistic test must involve a realistic enemy threat. Any deviation between the test threat and the the real thing can potentially distort the results, either in favor of or against the weapon being tested. For example, if the Copperhead test targets differ in profile or reflectivity of light, the test results might not correspond to reality. As weapon systems, both ours and those of potential enemies, have grown more complex, testing against realistic threats has become more difficult.

The battle scenarios used in a test can play a crucial role in determining the credibility of results. For example, if a test is run without enacting the use of countermeasures by the enemy, when such are likely, the results will probably be distorted.

Finally, the test must account for the environment in which a weapon will be used. Weather and terrain are obvious examples of factors that may influence weapon performance; if the test environment is quite different from the likely combat environment, the results may be quite misleading.

Evaluating the Evaluations

Designing and conducting a weapon system evaluation under realistic conditions is challenging, and the foregoing examples are only a small sample of factors that might threaten the validity of the test results. These threats should, of course, be of concern to someone trying to understand and use the test results. Indeed, a list of threats is a logical starting point in critiquing test results.



Copperhead shell. *Source: U.S. Army.*

The reasoning is as follows. For a particular measure of effectiveness, we assume that there is a true combat value and that the aim of the test is to estimate that value. For example, with the Copperhead shell, an important measure of effectiveness might be the probability of hit that would be obtained if the shell were used over a long period of time under specified combat conditions.

Now suppose that T stands for the true hit probability in combat and X for the value estimated from the test. If the test were a microcosm of the real world, X would equal T. However, no testing program is perfect, and any particular threat to validity, the practice effect for example, will make X either larger or smaller than T. And the total discrepancy between X and T will be the net effect of all the factors threatening the results. If some individual discrepancies are large and tend to pile up in the same direction, then the hit probability estimated from the test will be much higher or lower than the true combat value. On the other hand, if the discrepancies are small or the different threats tend to cancel one another out, fortuitously, the test results will be close to the combat results.

In practice, to precisely determine the size of the discrepancies is usually not possible, although the direction of the threat can usually be established and rough judgments can frequently be made about size. Such conclusions can be drawn from a close inspection of how the test was conducted and sometimes by judicious analysis of test data. This kind of analysis can help substantially in deciding whether and how weapon system test results should be used in decision-making.

For More Information

How Well Do the Military Services Perform Jointly in Combat? DOD's Joint Test-and-Evaluation Program Provides Few Credible Answers (GAO/PEMD-84-3, Feb. 22, 1984). A critique of weapon tests using a logical analysis of the threats to credibility.

Quade, E. S., and W. I. Boucher (eds.). *Systems Analysis and Policy Planning: Applications in Defense*. New York: Elsevier, 1968. An introduction to some of the main ideas, such as measures of effectiveness, models, and scenarios, that are common to systems analysis and evaluation.

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See Topics, p. 46

Toward a Stronger National Security: Major Issues

Charles W. Thompson

Mr. Thompson is a Group Director in the Air Force Subdivision of the National Security and International Affairs Division. He Joined GAO's San Francisco Regional Office in 1963. In 1970, San Francisco Regional Office in 1963. In 1970, he was selected to attend the Massachusetts Institute of Technology as part of GAO's Educational Program in Systems Analysis. In 1981, he was selected to attend the National War College.

Mr. Thompson received a B.S. in accounting from San Francisco State College in 1963 and an M.S. from the Massachusetts Institute of Technology in 1971. Mr. Thompson is also a graduate of the National War College (1982) and a certified public accountant (California).

Mr. Thompson received a Special Education Award in 1971, the Comptroller General's Award in 1973, and the Division Director's Award from the former Federal Personnel and Compensation Division in 1975.

American taxpayers are challenging legislators, journalists, and auditors to show how effectively and efficiently the business of government, especially the business of defense, is being carried out. Between fiscal years 1980 and 1986, the budget of the Department of Defense (DOD) doubled from $143 billion to $289 billion. (See fig. 1.) These budget increases came amid a backdrop of rising deficits and increasing public concern about the way defense money is spent. With increasing pressures to reduce the federal deficit, the central challenge facing the Congress is how to contain defense cost growth while maintaining the military strength to protect our national security interests.

As a key player in the equation, GAO has an invaluable role in helping the Congress come to grips with these issues and in giving the public a sense of confidence that public funds are being monitored and accounted for. The purpose of this article is to give the reader a better perspective on the types of national security issues that GAO is addressing.

Defense Budget Reductions

As the Congress grapples with the increasing cost of government, it is looking more and more to GAO to identify ways to reduce the defense budget without seriously degrading our ability to protect national security interests. An important part of GAO's response to this need is to annually review large dollar defense budget line items for savings opportunities. For example, since the 1970's, GAO has annually reviewed the amounts included in the defense budget for ammunition and, over these years, has recommended budget reductions in the billions of dollars. The success of this effort has led to increasing requests from the Congress for similar work on other high dollar budget items. GAO now performs annual budget reviews on major aircraft and other weapon systems in each military service. And these efforts are expanding each year. In fiscal year 1986, GAO's defense budget reviews contributed to about $7 billion in defense budget reductions.

Acquiring Major Weapon Systems

Each year, a sizable portion of the defense budget is used to buy new weapon systems and other defense-related items. DOD's fiscal year 1986 budget, for example, included $97 billion in the Procurement account, an increase of 176 percent since 1980. In fiscal year 1980, the Procurement account represented 24 percent of the defense budget; in fiscal year 1986, it represented 34 percent. (See fig. 2.)

With such large increases in an environment of Gramm-Rudman-Hollings, it is no wonder that the Congress is particularly concerned over the way the Department of Defense (DOD) buys goods and services and is increasingly looking to GAO to help it address the acquisition issues.

Improving the Acquisition Process

GAO's work in the weapon systems acquisition process focuses on individual weapon systems and on systemic issues which crosscut weapon systems.

An area of particular concern is the way DOD acquires major weapon systems and the spare parts that support them. There is a strong perception that the acquisition process does not ensure the selection and development of the most-cost-effective weapons and support systems. Cost growth, prohibitively long and growing acquisition times, and program stretch-outs that result in less efficient production rates

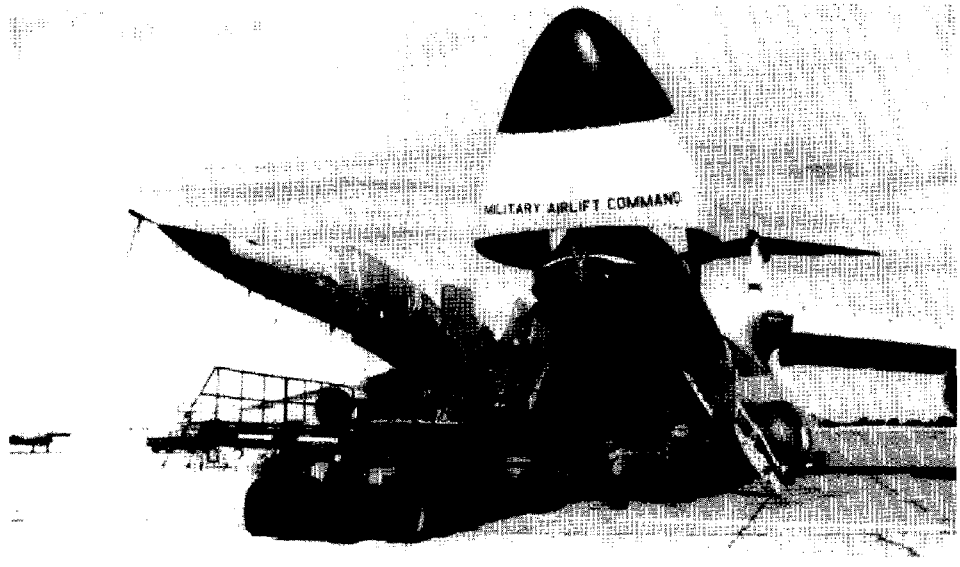
are common problems. These factors, plus others, increase concerns about the current efficiency and effectiveness of DOD's acquisition process. Recent reports on excessively priced spare parts did little to overcome these misgivings.

For many years, GAO has reported annually on how well major weapon systems are meeting their cost, schedule, performance, and supportability goals. GAO has reported on the B-1B bomber, the Trident II submarine, and the Peacekeeper (MX) missile, to cite a few; GAO is increasing its work in this area. Audit work on individual system costs has given the Congress many opportunities to reduce the defense budget. The Congress has acted on these opportunities, and GAO has obtained many of its dollar accomplishments through this type of work.

Concerning the more systemic issues, GAO is looking at whether (1) DOD efforts to increase program stability and reduce program stretch-outs are working, (2) the acquisition process can be shortened without significant adverse effects on performance and costs, (3) weapon systems testing and evaluation are adequate, (4) DOD's contracting policies, procedures, and practices are sound, and (5) DOD's cost estimating for major weapon systems is reliable. Each key area ensures an efficient and effective acquisition process.

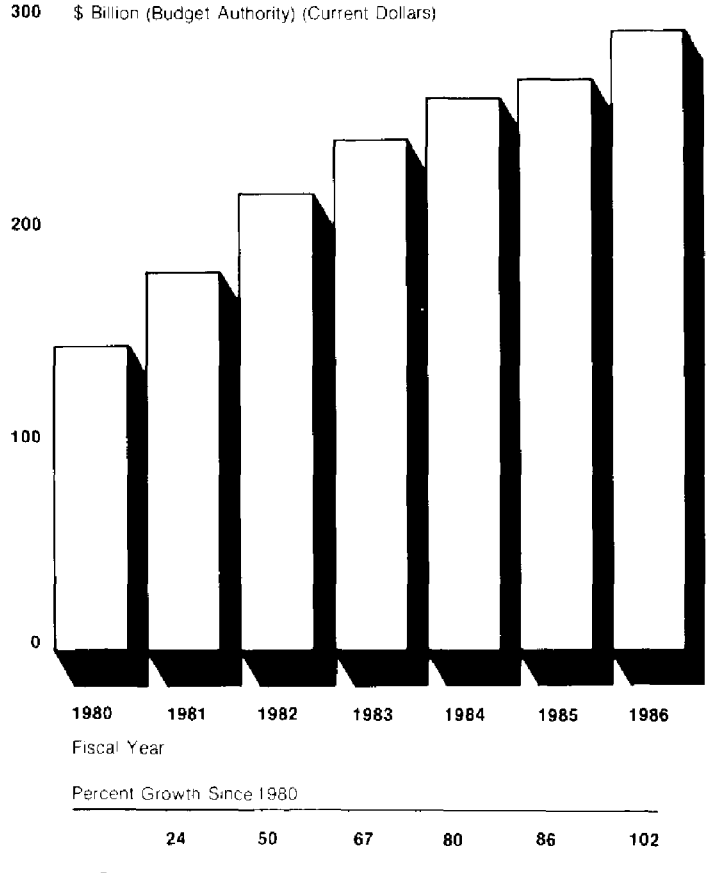
Managing Logistics

Regardless of the size of U.S. forces or how modern U.S. weapons and equipment, if they cannot be moved quickly to where they are needed and then supported and sustained, the United States cannot realize its full deterrent and combat potential. It is estimated that logistics costs represent over one-third of the defense budget. GAO's work in the logistics area is focusing on whether U.S. forces can be de-



Left-front view of an F-5 Tiger II aircraft being loaded aboard a C-5 Galaxy aircraft, McClellan Air Force Base, California. The F-5, partially disassembled, with glass surfaces wrapped in a protective covering, is en route to Jordan.
Source: U.S. Air Force.

Figure 1: The DoD Budget 1980—1986



Source: Department of Defense.

ployed according to plans and, once deployed, how well they can be supported. Given the short time for responding to a crisis, the capability of our strategic airlift system is particularly critical and is being evaluated by GAO.

Operating and supporting new weapon systems being deployed will require large amounts of resources in the late 1980's and beyond. Operating and support costs are generally greater in total than a weapon system's procurement cost and span a much longer time. Since their budgetary effect will not be felt until after the weapons are deployed, these costs tend not to receive as much attention as procurement costs while the new weapons are being developed. However, decisions made during the acquisition process can commit the Congress to funding significant future operation and support costs if the new systems are to be kept in a required state of readiness.

Whether planning and budgeting is adequate to support new weapon systems is a key issue that faces the Congress and one that GAO will address over the next few years. This is a particularly pertinent issue since the military services will field an unprecedented number of new weapon systems as part of their force modernization program.

Recruiting and Retaining Military Personnel

Since the advent of the All Volunteer Force in the early 1970's, recruiting and retaining an adequate supply of high quality personnel have been major concerns of defense managers. Finding the right combination of pay, benefits, and enticements that will provide needed personnel at an affordable price has been and will continue to be a central challenge facing DOD and the Congress. Annual military personnel costs, including retirement, have risen from $43 billion in fiscal year 1980 to $68 billion in fiscal year 1986, currently representing about 23 percent of DOD's budget.

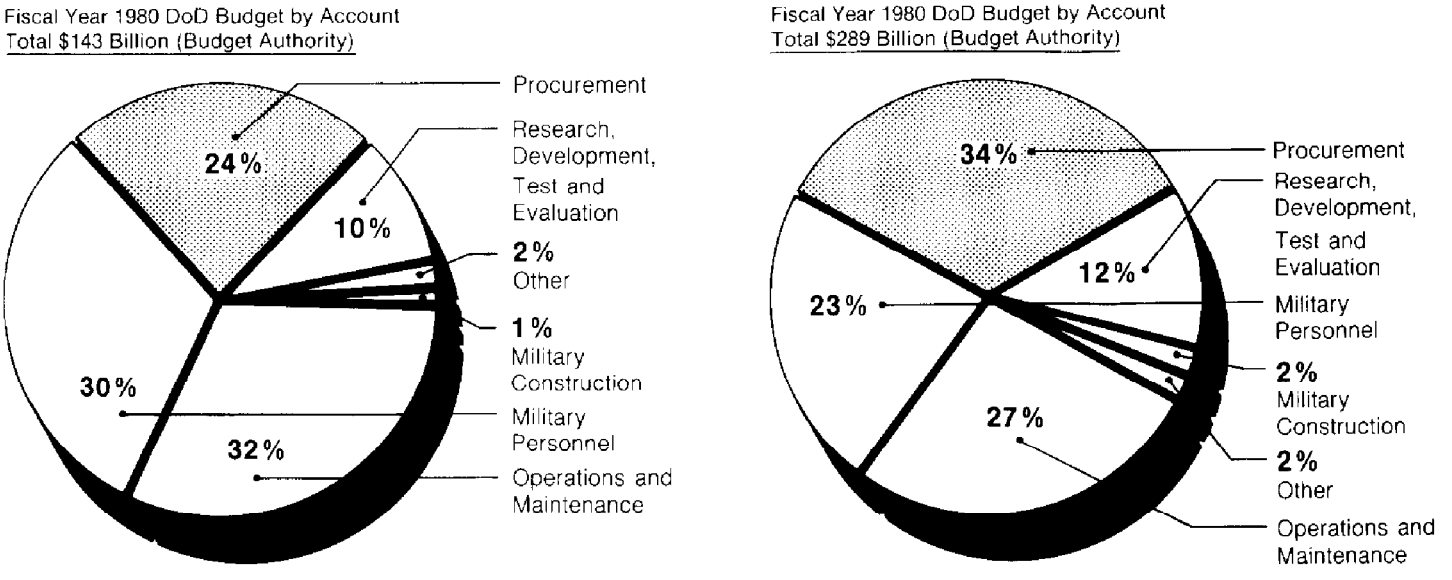
Meeting Future Personnel Needs

The military services' ability to accomplish their missions in time of peace or conflict depends heavily on their ability to recruit and retain sufficiently qualified personnel. In recent years, the services have been able to meet their personnel requirements. However, the future outlook is not encouraging. Besides increasing competition from the civilian sector as the economy improves, the services are also faced with a declining pool of people in the 17- to 23-year-old age group from which they traditionally recruit. Innovative approaches to personnel management will be needed. To assist the Congress on this issue, GAO will examine where the services are likely to have recruiting difficulties and identify alternatives that could allow them to better meet their need for skilled people.

Maintaining the Cost Effectiveness of Military Compensation

The military compensation system remains the key tool by which the services can control the flow of personnel into and through the force. But it must be flexible and it must be effectively managed. GAO has long supported the need for a greater targeting of compensation to specific staffing problems, and DOD has moved in that direction. However, much of the current compensation package is still in the form of entitlements, such as basic pay, allowances, and retirement. This reduces the flexibility that managers have to adjust pay to meet staffing requirements and tends to be less cost effective in overcoming per-

Figure 2: Procurement Account Takes an Increasing Share of the DoD Budget



Note: Fiscal year 1980 percentages do not add to 100 due to rounding.

Source: Department of Defense.

sonnel shortages than targeting pay to specific skills or occupations.

Controlling Military Retirement Costs

With the growth in size of the military career force, there is mounting concern in the Congress over military retirement costs. In recent years, the military retirement system has been the focus of numerous congressional and executive branch studies and a number of comprehensive legislative proposals. Each has recommended major changes, but none has been very successful in getting the more significant of its recommendations adopted. Reducing individual retirement benefits is a difficult option, yet the Congress is moving in that direction.

Another way to reduce future military retirement costs is to reduce the number of personnel eligible for benefits. This could be done by restructuring the military forces to reduce the number who stay beyond the first term. This would ultimately reduce the number of military personnel who stay to retirement, thus reducing retirement costs. Such a change, however, could increase recruiting and training costs. These issues need to be explored, and GAO will examine aspects of them over the next few years.

Increasing Responsibilities of the Reserve Forces

Since the beginning of the All Volunteer Force in the early 1970's, the responsibilities and personnel assigned to the reserve forces have grown substantially. In fiscal year 1980, for example, the selected reserves (those reserve organizations and individuals required to maintain the highest level of readiness) totaled 869,000; they are programmed to grow to about 1.2 million people by fiscal year 1987. With this growth, the reserves are clearly a force to be called upon in any major confrontation.

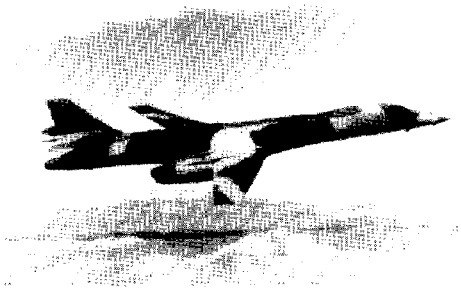
The assignment of increasing responsibilities to the reserves appears to be driven largely by cost considerations, which are not likely to subside in the current budget environment. While cost savings are important, ensuring that such shifts do not result in an unacceptable degradation of force readiness and war-fighting capability is equally important. Where that balance lies is an issue that needs careful study.

GAO has begun a general management review of the reserve forces. This effort focuses on broad policy development, program implementation, and financial and information resource management.

Modernizing and Expanding U.S. Forces

While most areas of defense have received budget increases since 1980, the modernization and expansion programs of each service and the resulting procurement of new weapon systems have received the largest share of the increases. For example,

- The Army is in the process of its largest modernization program in peacetime history. Hundreds of weapons and support systems are being upgraded or replaced. The modernization program will cost billions of dollars and will require more than 10 years to complete.
- The Navy is modernizing and expanding its fleet. It is projected to grow from 542 ships at the end of fiscal year 1985 to 600 ships by 1989.
- The Air Force is modernizing and expanding its tactical forces by replacing aging systems and increasing the size of its forces. Since 1980, the number of tactical air wings has risen from 34 to 37 (each wing typically consists of 3 squadrons of 24 aircraft each). The Air Force goal is to have 40 wings by the 1990's.
- Strategic forces are also being revitalized through procuring the B-1B bomber, the Trident submarine, and the Trident I missile and developing the Advanced Technology Bomber.



B-1 bomber over Edwards Air Force Base, California, during test and evaluation.

Source: U.S. Air Force.

With all the money that has been spent since 1980 and programmed for future years, the key issues are (1) what we have gotten for the money we have spent, (2) what more we can get for the amounts planned for the future, and (3) what the best way is to get it. GAO's work examines aspects of each issue.

Maintaining International Security

A strong defense is not only a national issue but also an international issue. It involves meeting worldwide commitments that protect U.S. security interests and those of our Allies.

Meeting Overseas Commitments

New directions in U.S. foreign policy are influencing the U.S. strategy for meeting overseas commitments. While the North Atlantic Treaty Organization remains the primary defense commitment, current defense planning reflects an increasing need to deal with the Soviet threat on a global basis. U.S. forces must be able to meet any threat wherever it occurs. GAO is examining critical issues concerning the ability of the United States to meet its international commitments. This includes issues such as collective defense arrangements and overseas basing structures.

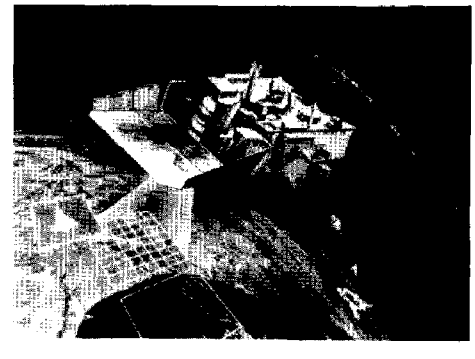
Providing Security Assistance

The United States provides security assistance to help friendly and Allied countries defend themselves, to promote closer military relationships between them and U.S. forces, and to obtain access to overseas facilities.

Since 1980, the cost of U.S. security assistance programs has steadily increased and now exceeds $10 billion a year. In addition to the basic program, many other activities are related to security assistance, such as the Foreign Military Cash Sales program. This program approximates another $12.5 billion in arms flow. GAO's audit work in the security assistance area focuses on whether U.S. security assistance is provided in a manner which reflects the recipient's legitimate needs and U.S. security interests.

Expanding the Military Role in Space

The military's role in space is rapidly becoming one of this decade's most impor-



Artist's concept of the Space Test Program P-80-1 satellite. *Source: U.S. Air Force.*

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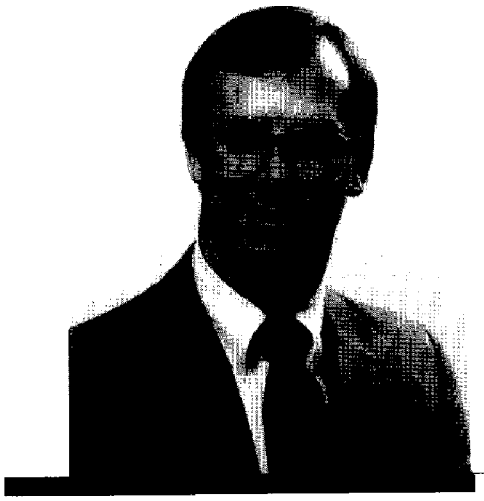
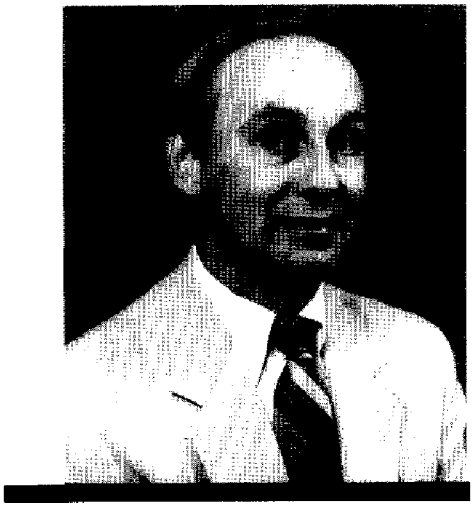
Defense Procurement Oversight: Greater Demands on GAO

David E. Cooper
John D. Yakaitis



Mr. Cooper is a Group Director in the National Security and International Affairs Division's Research, Development, Acquisition, and Procurement Subdivision. He joined GAO's Washington Regional Office in 1970 after graduating from Virginia Commonwealth University with a degree in accounting. Mr. Cooper has also worked in the Procurement, Logistics, and Readiness Division and the Office of Program Planning and on the National Security and International Affairs Division's Planning Staff. Since 1984, Mr. Cooper has been responsible for managing GAO's contract-pricing work at major defense contractors.



Mr. Yakaitis is a Senior Evaluator in the National Security and International Affairs Division. He has a B.S. in accounting from King's College and an M.B.A. in accounting from George Washington University. He joined GAO in 1968 and has worked in several civil and defense issue areas. Mr. Yakaitis has received several GAO awards, including an Outstanding Achievement Award from the National Security and International Affairs Division in 1985.

Exorbitantly priced spare parts, improper contractor billings, excessive contractor profits, and poor quality weapons have put Department of Defense (DOD) procurement in a harsh spotlight for the last several years.

These revelations have come at a time when defense procurement spending has increased dramatically. In 1986, for example, the Pentagon will have spent $112 billion to research, develop, and buy weapons. This represents a dramatic 267-percent increase over 1980 costs and translates to spending, on average, $13 million an hour, 24 hours a day, 7 days a week. Along with the huge increases in procurement spending and disclosures about fraud, waste, and abuse have come intense congressional scrutiny and a demand for greater GAO oversight.

Within GAO, the National Security and International Affairs Division's Research, Development, Acquisition, and Procurement Subdivision is principally responsible for addressing defense procurement issues and responding to the increasing congressional and public concern about Pentagon procurement. Over the last 3 years, defense procurement has become one of GAO's largest areas of concern, with 175 staff-years programmed in 1987. The vast majority of these resources will be devoted to responding to myriad congressional requests and legislatively mandated studies. Some issues that have been and will be addressed are discussed in this article.

GAO Work at Defense Contractor Plants

Preeminent in the area of defense procurement is concern about whether the Pentagon is negotiating fair and reasonable contract prices. In the summer of 1984, at the urging of several congressional committee chairmen, GAO began to emphasize audits of contract pricing and work at defense contractor locations. The work entailed the simultaneous use of 50 regional office auditors to investigate contract pricing practices at 10 major contractors. Rather than dwelling on individual horror stories, the staff focused on identifying systemic problems that affect contract pricing across the board. In a broad sense, the staff's aim was to determine if contractors' systems and Pentagon contract negotiation and administration practices resulted in the efficient and effective spending of public funds.

Initial efforts identified the following five issues that merited additional GAO attention:

- the adequacy and reliability of contractor estimating systems,
- prime contractors' compliance with procurement regulations for pricing major subcontracts,
- extensive and questionable use of unpriced contracts,
- contractor overhead costs, and
- government technical evaluations of contractor price proposals.

These issues have formed the foundation for GAO's contract pricing work over the last 2 years. Results of GAO's initial efforts on estimating systems, subcontracts, and contractor overhead costs were presented to the Subcommittee on Legislation and National Security, House Committee on Government Operations, in October 1985. The testimony identified opportunities for improvements in all three areas. In addition, several reports have been issued to military buying activities recommending contract price reductions where contractors did not comply with the Truth in Negotiations Act. GAO's work on unpriced

An artist's concept of the Navy Trident submarine. *Source: IBM Corporation.*

contracts was reported to the Senate Committee on Governmental Affairs and aided the congressional debate on the Pentagon's questionable use of unpriced contracts, which totaled about $27 billion at the end of fiscal year 1985.

Today, 70 auditors from 12 GAO regional offices are performing contract pricing audits at 19 contractor locations, and GAO's presence is expected to continue. Plans call for 100 staff-years devoted to contract pricing audits in 1987 with emphasis on contractor estimating practices and subcontractors' compliance with the Truth in Negotiations Act.

Spare Parts Horror Stories

Nearly every American has either heard or read about the Pentagon's purchase of spare parts at seemingly outrageous prices. Over the last few years, there seems to have been an endless stream of media disclosures about exorbitantly priced spare parts. The $435 hammer, the $654 toilet seat, and the $7,000 coffeepot are some of the more popularly cited examples of defense procurement waste.

Such stories are not new to GAO. In fact, GAO reports dating back to 1959 have identified problems in purchasing military spare parts. GAO efforts over the last 2 years have been aimed at giving the Congress information on the nature of some of the spare parts horror stories reported in the press. The issue is neither as pernicious as the press leads the public to believe nor so benign as some industry and Pentagon spokespersons portray. Our initial efforts dealing with spare parts explored the causes for the huge growth in their prices and actions taken by DOD buyers to identify and control such increases. More recently, GAO's attention has been on the hundreds of actions initiated by the Pentagon to correct the buying problems associated with spare parts pricing.

Acquisition Improvement

Since early 1981, the major weapon system acquisition process has received widespread attention. In April 1981, the Defense Department announced a series of measures, known as the Carlucci Initiatives, to enhance the process. These initiatives identified program instability as a major constraint to acquiring systems efficiently and economically. More recently, the President established a Blue Ribbon Commission on Defense Management to examine how DOD is organized to carry out its functions. As one part of its charter, the Commission examined the weapons acquisition process. The Commission's recommendations, like the Carlucci Initiatives, focused on ways to enhance the stability of the acquisition process.

GAO recently examined what was achieved under the Carlucci Initiatives between 1981 and 1986. While GAO could not isolate the impact of these initiatives, it did report that

- cost savings of uncertain magnitude had been achieved;
- the rate of schedule delays had decreased;
- readiness and support considerations had received greater attention during the acquisition process;
- program stability had not improved; and
- a need existed for increased authority and tenure for program managers and contracting officers, as well as reduced review layers in the process.

In May 1986, GAO issued a report on the capabilities of two key players—the program manager and the contracting officer—in weapon system acquisition. This report was based on case studies of 17 emerging weapon system programs and helped GAO identify external influences on both roles and performance. GAO recommended modifications in service career programs in order to give program managers adequate intensity and diversity of acquisition experience. The report also discussed changes in the operating environment to enable program managers to more effectively carry out their responsibilities. It was used by the Commission as a basis for its conclusions and recommendations on improving the procurement work force.

In December 1985, in testimony before the Commission, the Comptroller General emphasized the need to move toward an organizational structure designed to promote better decision-making in the acquisition process. While widespread interest in improving the acquisition and management of major weapon programs is encouraging, certain characteristics are necessary if future reform initiatives are to be successful. These include a continuing top level commitment to implementation of reform and the ability to translate this commitment into action at the program office level.

As further evidence of congressional reliance on GAO, the Department of Defense Authorization Act of 1986 directs GAO to conduct a study of all evidence, studies, reports, and analyses concerning the organizational structure for defense procurement. GAO submitted a report *(Defense Organization: Advantages and Disadvantages of a Centralized Civilian Acquisition Agency* (GAO/NSIAD-87-36)) to the Congress on November 7, 1986, identifying the advantages and disadvantages of establishing an agency either within or outside DOD with the mission of coordinating, supervising, directing, and performing all DOD procurement functions.

The study (1) assessed the feasibility of creating a centralized civilian acquisition agency, (2) determined the advantages and disadvantages of consolidating the services' buying commands into such an agency, and (3) developed a list identifying the essential elements of an effective and efficient defense acquisition system and its organizational structure.

GAO is monitoring the actions being taken to implement the Commission's recommendations. The recommendations include some frequently discussed approaches, such as biennial budgeting and milestone budgeting, for enhancing program stability. Future efforts will monitor the other actions.

Test and Evaluation

Test and evaluation results are one of several key considerations in deciding whether to advance multi-billion-dollar DOD weapon systems from one acquisition phase to another. Test and evaluation results identify weapon system performance and risk levels and the need for design modifications.

Since 1970, GAO has issued numerous reports on the adequacy of planning and conducting tests on evaluating and reporting test results. In addition, GAO has issued other reports on individual weapon systems, many of which discussed issues associated with test and evaluation.

Recently issued reports and work under way have identified a multitude of problems, such as

- the tendency to move weapon systems into production, without sufficient test and evaluation, that were later found to be not ready for production;
- major weapon systems not meeting approved technical and operational requirements;
- insufficient test resources, resulting in limited realism of the test environment;
- inaccurate and untimely test results provided to DOD decisionmakers and reported to the Congress;
- weaknesses in planning and management of test and evaluation; and
- limited oversight of the test and evaluation process by the Office of the Secretary of Defense.

GAO reports and testimony have contributed to several DOD actions to improve test and evaluation policies and practices, for example:

- DOD established an Office of Operational Test and Evaluation. The Office, under civilian leadership, was created to strengthen operational test and evaluation and to be principal advisor to the Secretary of Defense on these matters.
- Each service created test agencies, independent of the developer and user, to improve test and evaluation.
- DOD issued policy directives emphasizing the importance of test and evaluation in acquiring major weapon systems.

In addition, GAO has, on numerous occasions, been instrumental in convincing DOD and the Congress to delay weapon system acquisitions until sufficient test and evaluation could be accomplished. In some instances, major weapon systems were terminated partly because of GAO reporting of adverse test and evaluation results.

An AH-1G Cobra gunship flies tactical air support over the Han River estuary during a training and airlift exercise conducted just south of the Korean Demilitarized Zone.

Source: Department of Defense.

Profit Policy

The appropriate level of profit on government contracts has long been a subject of debate. Adequate profit, it is generally agreed, is a prerequisite to contractors' investing shareholder resources to perform government contracts. Further, profits earned under defense contracts can help the defense industrial base to support sustained military operations.

Because of the significant increase in defense spending in recent years and rising concern about contractor profits, GAO—along with others—recommended that the Pentagon conduct a comprehensive review of its profit policy. The Defense Financial and Investment Review (DFAIR), issued by DOD in August 1985, concluded that defense contracting profits were in line with those of comparable commercial manufacturers; however, GAO took exception to this conclusion.

At the request of the Senate Governmental Affairs and House Government Operations Committees, GAO reviewed the Pentagon's study. GAO questioned the study's credibility because the Pentagon had used a methodology that was not consistent with either generally accepted accounting principles and profitability evaluation techniques or prior studies of defense profits. Also, GAO's analysis indicated that contractors' defense business was substantially more profitable than comparable commercial manufacturing during the period 1970 to 1983.

The Comptroller General, in an October 1983 address to the National Security Industrial Association, expressed the need for periodic profit studies to consider those factors that would ensure a fair return to contractors, encourage investment in government programs, and assure taxpayers that their interests were being served. The DFAIR study falls short of this charge.

DOD profit policies have undergone major revision over the last 10 years between ad

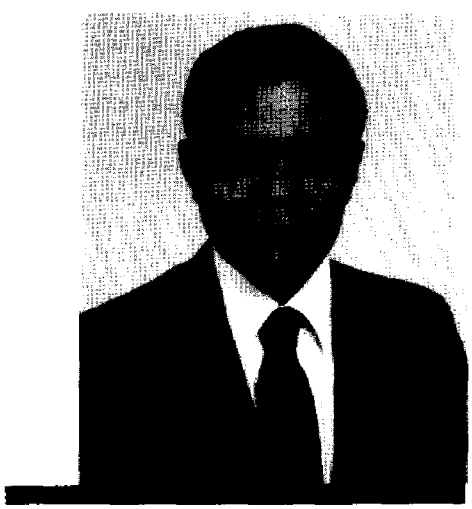
See Procurement, p. 47

GAO's Defense Budget Work: Saving Billions of Dollars

Joan B. Hawkins

John Landicho

Ms. Hawkins is a Group Director in the National Security and International Affairs Division's Navy Subdivision. She is responsible for work on the Navy's aircraft, weapons, and other procurement budget requests and was Evaluator-in-Charge of the aircraft procurement review for its first 2 years. She joined GAO in 1973 and previously worked for the Army Audit Agency. Ms. Hawkins received a B.A. in accounting from the College of William and Mary in 1971 and an M.B.A. from George Mason University in 1976. She is a member of the American Institute of Certified Public Accountants and is a certified public accountant (Virginia). She worked in GAO's Washington Regional Office from 1973 to 1984. She received Certificates of Appreciation from the former Community and Economic Development Division in 1976 and from the Human Resources Division (HRD) in 1980. She received a Certificate of Merit from HRD in 1980 and GAO's Meritorious Service Award in 1975 and 1985.



Mr. Landicho is a Senior Associate Director in the National Security and International Affairs Division's Navy Subdivision. He joined GAO in 1957 after serving in the U.S. Army. He held positions of increasing responsibility in the Defense Division and in 1971 was designated an Assistant Director. In 1973, he was designated an Associate Director in the General Government Division. In 1976, he became an Associate Director in the Community and Economic Development Division. From January 1981 to August 1983, he was Senior Associate Director of the Procurement, Logistics, and Readiness Division in charge of the Readiness Subdivision. He has been involved in ship budget reviews since 1981.

Mr. Landicho received a B.A. in accounting from San Jose State University in 1954. He received advanced education and training at Harvard University's Graduate School of Business Administration, at the Federal Executive Institute, and at the Brookings Institution. He is a member of the Harvard Business School Club and the Federal Executive Institute Alumni Association.

He has received several outstanding performance ratings, GAO's Career Development Award in 1972, and GAO's Distinguished Service Award in 1980 and 1985.

At this time of very large federal deficits, the Congress is actively looking for ways to reduce the federal budget. GAO has helped in this effort through its defense budget work, or so-called "budget scrubs," which are led primarily by the National Security and International Affairs Division's Air Force; Army; Navy; and Command, Control, Communications, and Intelligence Subdivisions. Several regional offices participate in this work. GAO's work has identified areas where the Congress could reduce the defense budget without adversely impacting the defense posture. GAO's defense budget reviews helped reduce the fiscal year 1986 defense budget by about $7 billion.

Background

GAO began looking at defense ammunition budgets in the 1970's. Beginning in 1980, GAO's defense group started a review of the budget request for one ship program. The results of that effort were reported to the House Committee on Appropriations. The success of these reviews led to what is commonly referred to as GAO's budget analysis work.

By 1986, this work had been expanded to include the Navy aircraft, weapons, and other procurement budgets; the Air Force aircraft and missile procurement budgets; and the Army aircraft, wheeled and tracked combat vehicle, and missile procurement budget requests.

The Navy budget work has generated much interest in the Congress. The initial ship work was done as part of GAO's self-initiated work, but the Subcommittee on Defense, House Committee on Appropriations, began requesting it every year and gradually expanded its scope. The Subcommittee on Defense, Senate Committee on Appropriations, started requesting the results of this work in 1982. Similarly, the Navy aircraft work was first requested by the House, but by the second year, there was also a request from the Senate Defense Subcommittee. The Committees on Armed Services are also interested in this work. The House Armed Services Committee has been requesting information from GAO's Navy aircraft budget review, and in April 1986, the Senate Armed Services Committee asked GAO to provide it the results of all Navy budget work.

Factors Affecting the Defense Budget Request

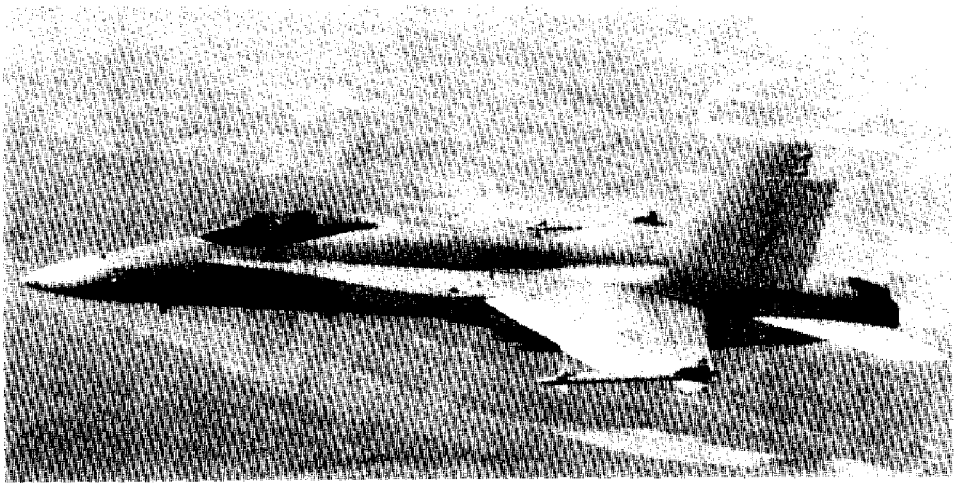
Budget savings result from a number of factors, such as (1) reductions in estimated contract costs due to updated information, (2) delays or changes in programs, and (3) identification of funds not needed for the intended purpose. Much of GAO's budget work involves updating budget estimates that may have been valid at the time of the President's budget submission but which later events have affected. Often, as might be expected, managers include not-

to-exceed or maximum prices in their budget estimates because they do not want to request additional funds later. Also, the Navy has been very successful in its contract negotiations, often negotiating substantial reductions from budgeted costs.

Often, after the President's budget is submitted but before the Congress appropriates funds for the budget, prior year contracts are signed. If a contract being signed is for less than the estimated cost, this can lead to significant reductions in that year's cost as well as estimated contract costs for the future. Through a review of the fiscal year 1986 aircraft procurement budget request, GAO found that signing of prior year contracts for airframe, engine, electronic, and other equipment would result in potential reductions of $354 million in prior year funds and $241 million in fiscal year 1986 funds.

GAO identified and reported on this $595 million to the Subcommittees on Defense, House and Senate Committees on Appropriations; the defense budget was then reduced by $520 million. On the basis of contract analysis of one type of oiler ship, GAO suggested a reduction of $64 million in fiscal year 1986, and $50 million was cut. This suggested reduction included changes in funding costs due to recalculation of other cost categories, in addition to contract savings.

Another significant occurrence that may affect the budget request is a system delay in the research and development phase or design or testing problems. For fiscal year 1986, two systems related to the F/A-18 aircraft (see photo) experienced delays in research and development that were substantial enough to shift some of the F/A-18-related funds from fiscal year 1986 to later years. For the two systems, the Airborne Self-Protection Jammer and the Advanced Medium Range Air-to-Air Missile, GAO identified $141 million in fiscal year 1986 requested funds that would not be needed until later years due to these program delays. The Subcommittees on Defense reduced the F/A-18 budget request by $141 million for these systems. In the fiscal year 1986 budget for nine countermeasure ships, GAO suggested that the program be delayed a year due to ship design problems and engine testing problems being experienced by the program. On the basis of this work, funds for two rather than four of these ships were appropriated in fiscal year 1986, a reduction of $197.5 million.



F/A-18 aircraft. *Source: McDonnell Douglas Corporation.*

There are numerous other examples of reasons for possible reductions, such as identification of funds not needed for the intended purpose. For example, GAO's fiscal year 1986 budget work identified prior year funds that could be used to offset the fiscal year 1985 defense supplemental budget request. On the basis of excess ship escalation funds from fiscal year 1981 (i.e., funds available due to lower than anticipated inflation), the request was reduced by $323 million. For one type of destroyer ship, some items for which advance procurement funds were being requested were not items with long lead times. On the basis of GAO's work, the budget request was reduced by $75 million.

To ferret out possibilities for reduction, evaluators must be alert for circumstances that may have changed since the original budget estimate and follow up on areas that appear to have promise. Also, due to the magnitude of the budget requests, evaluators must assign priorities to programs involving the most dollars and the best opportunities for reductions.

Scope and Demands of Budget Work

GAO looked at most of the defense procurement budget requests for fiscal year 1987, as well as some of the Army and Navy operations and maintenance budget requests.

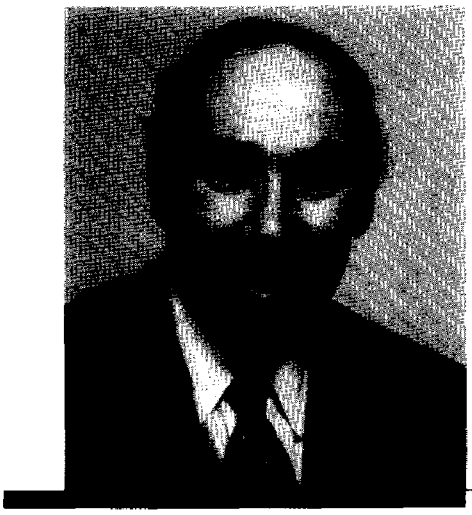
Much of the work is done at the appropriate program offices that manage the acquisition of major weapon systems. Although the Navy program offices are in the Washington, D.C., area, Army and Air Force program offices are scattered across the United States, and thus regional offices are extensively involved in the budget work.

The basic starting point for the budget analysis work is the President's budget and its backup documentation, which is released every February. Much of the work involves going behind those numbers to see what they are for and if any events have occurred that might affect them. GAO analyzes data relating to actual contract costs, program requirements, contract delays, and program status. Before providing information to congressional committees, GAO discusses the facts with DOD to ensure their accuracy.

Congressional staffers are often responsible for analyzing large shares of the budget. For example, one House and one Senate staffer are responsible for both the Navy ship and aircraft budgets—representing over $20 billion annually, as well as segments of other budgets. GAO's ability to provide 2 teams for the ship budget review (11 people) and 1 team for the Navy aircraft budget review (6 people) for the fiscal year 1987 budget reviews greatly increased the breadth of review that could be done.

An unusual characteristic of GAO's budget work reporting is the very severe time constraints that can be involved. The budget is not released until early February, and needed backup documentation is not available until late February. By March and April, questions are needed for congressional hearings held by the requesting committees. From May through September, information is needed on potential reductions—often on very short notice. Once budget information is released, there is only a 3- to 4-month period before information on potential reductions is needed. This can create very intense demands on the staff.

See Budget, p. 48



Weapon System Acquisition in the Soviet Union

Timothy D. Desmond

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Ed. note: *The views in this article are the author's and not necessarily GAO's.*

As requested by the Chairman, Senate Committee on Governmental Affairs, GAO completed a study of the weapon acquisition processes of France, the United Kingdom, West Germany, Israel, and the Soviet Union. (See *Weapons Acquisition: Processes of Selected Foreign Governments* (GAO/NSIAD-86-51FS, Feb. 26, 1986).) This article focuses on the acquisition practices of the Soviet Union.

Introduction

The defense organization and acquisition practices of the Union of Soviet Socialist Republics (U.S.S.R.) offer some interesting contrasts and some instructive approaches to weapon systems design and development. The governing structure of this other superpower and its defense establishment, military missions, and design philosophy are markedly different from those of the United States.

The problem in understanding Soviet ways is the extreme secrecy enveloping the Soviet defense establishment and all its complexity, a degree of secrecy that hobbles communication and coordination within the country itself. For instance, production technology is seldom shared with the civilian sector.[1] Critical journals and public debate on military matters do not exist in the Soviet Union as they do in the United States and other Western countries. The Soviet leadership can make hard decisions with no opposition.

Most information on this side of the Iron Curtain is derived from critical analyses of Soviet literature, defriefings of Soviet emigrés, and analyses of Soviet equipment that comes into our hands. Some writings are contradictory at times, but excellent work has been done in fathoming the Soviet system.

Soviet Leadership

The two governing structures in the U.S.S.R. place great attention on defense. One is the Communist party of the Soviet Union, whose influence permeates the military and all other aspects of Soviet life. The other is the nominal government, which rules through the Council of Ministers. Military requirements have first priority in all Soviet organizations.

The predominance of defense in the state-run Soviet economy is reflected in its share of the gross national product, currently estimated at about 17 percent; in the United States, the corresponding figure is about 6 percent.[2]

The Communist Party and the Politburo

At the top of the Communist party is the Politburo, an inner circle of about two dozen officials from the party's Central Committee. The Politburo has final authority in all national decisions. It approves national plans and quotas for the government to carry out. In defense matters, it judges budgets, large nonrecurring expenditures, new weapon programs, and even system quantities. From time to time, the Politburo has stimulated or mandated new technological approaches in weapon systems.

Practically all defense executives in the Soviet Union are party members. About

[1]Mikheil Agursky and Hennes Adomeit, "The Soviet Military Industrial Complex," *Survey* (Spring 1979), p. 121.

[2]Casper W. Weinberger, Secretary of Defense, *Annual Report to the Congress, Fiscal Year 1987* (Washington: Department of Defense, Feb. 1976), p. 19.

two dozen top military officers are on the prestigious Central Committee of the party. All upper-ranked officers are party members, and about 90 percent of the lower-ranked ones belong to the party or the Komosol, the party youth group.[3] In addition, party and government executives are linked by parallel functioning, transfer from one structure to the other, and long acquaintance.

One advantage of the Soviet weapon acquisition process is the extended tenure (unlike the U.S. experience) of executives who manage the defense establishment. Some chief designers of weapon systems, for example, have been on the job for 25 years or more.[4]

The Government of the Soviet Union

The Chairman of the Council of Ministers is equivalent to a President. Under party direction, the Council consists of about 100 ministers who supervise the production of all goods and services in the Soviet Union. There are nine defense industrial ministries, each in charge of a particular military product line. (See fig. 1.) Salaries in the defense establishment are said to be 20 to 25 percent higher than those for civilian work. Defense industry wages are higher too.[5]

The Soviet Defense Apparatus

The Military Industrial Commission

An implementing, coordinating, troubleshooting group, the Military Industrial Commission sees to it that military priorities and quotas (always first in the Soviet Union) are met, bottlenecks are cleared, and scarce materials are made available for military equipment. The Commission reviews new weapon proposals for technical feasibility, producibility, and scheduling. Its draft decrees, said to be legally binding on all concerned, provide approval of new weapon systems and specify tasks, participants, financing, scheduling, and so on.

Ministry of Defense

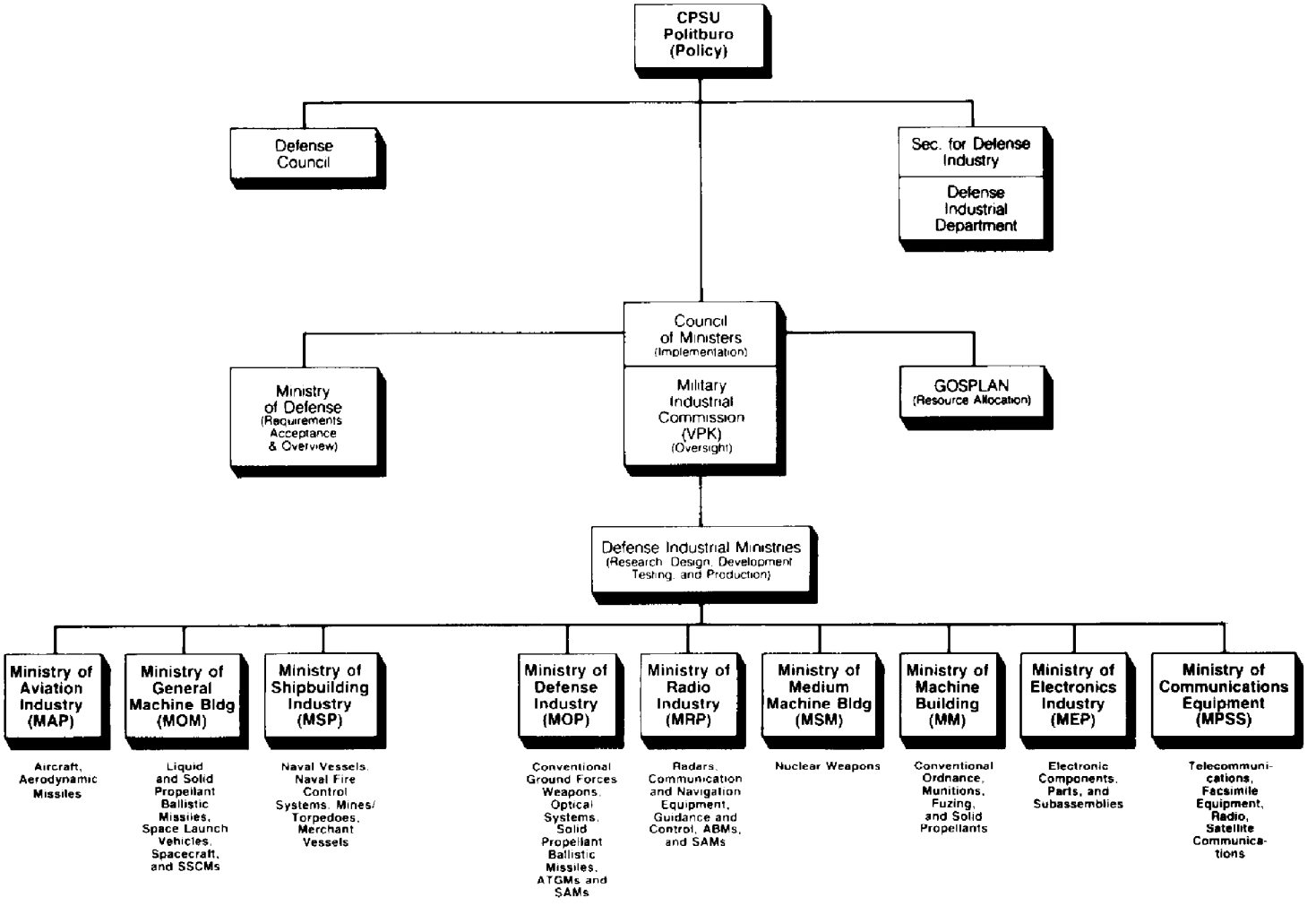
The Ministry of Defense is guided by the Council of Ministers. (See fig. 1.) The De-

[3]Abraham S. Becker, *The Burden of Soviet Defense*, R-2752-AF (Santa Monica, Calif.: The Rand Corporation, Oct. 1981), p. 46.

[4]Paul J. Berenson and Allen J. Carley, *A Comparison of the U.S. and Soviet Major Military Systems Acquisition Processes* (Office of the Under Secretary of Defense, Research and Engineering, Dec. 1984), p. 34.

[5]Agursky and Adomeit, p. 114.

Figure 1: Soviet Organization for Systems Acquisition



Source: Berenson and Carley, p. 34.

fense Minister, a military officer, is in charge of all military forces and defense activities. The next in command is the Chief of the General Staff, or the Warsaw Pact commander. Other deputy ministers of defense are the chiefs of the armed services and a deputy minister for administration. Ministry personnel are mostly military; relatively few civilians are employed.[6]

The Soviet Military Services

There are five armed services in the Soviet Union: the Strategic Rocket Forces, the Ground Forces, the National Air Defense, the Air Force, and the Navy. (See fig. 2.) The services' armament directorates deal directly with the defense industrial ministries in establishing requirements, conducting tests, and observing progress in weapon system development and production. The service academies perform research in operations, system use, and capabilities.[8]

Military officers, specially trained in system acquisition by their service academies, are detailed to production plants to see, for example, that requirements and design quality standards are met. They may also prepare independent cost estimates. The officers have veto power; they can shut down production and refuse to accept the product. If a monitoring officer lets questionable work get through, he may be severely punished.[9] Soviet civilian goods receive little such attention.

The General Staff

The General Staff is an elite supramilitary body exercising operational control over

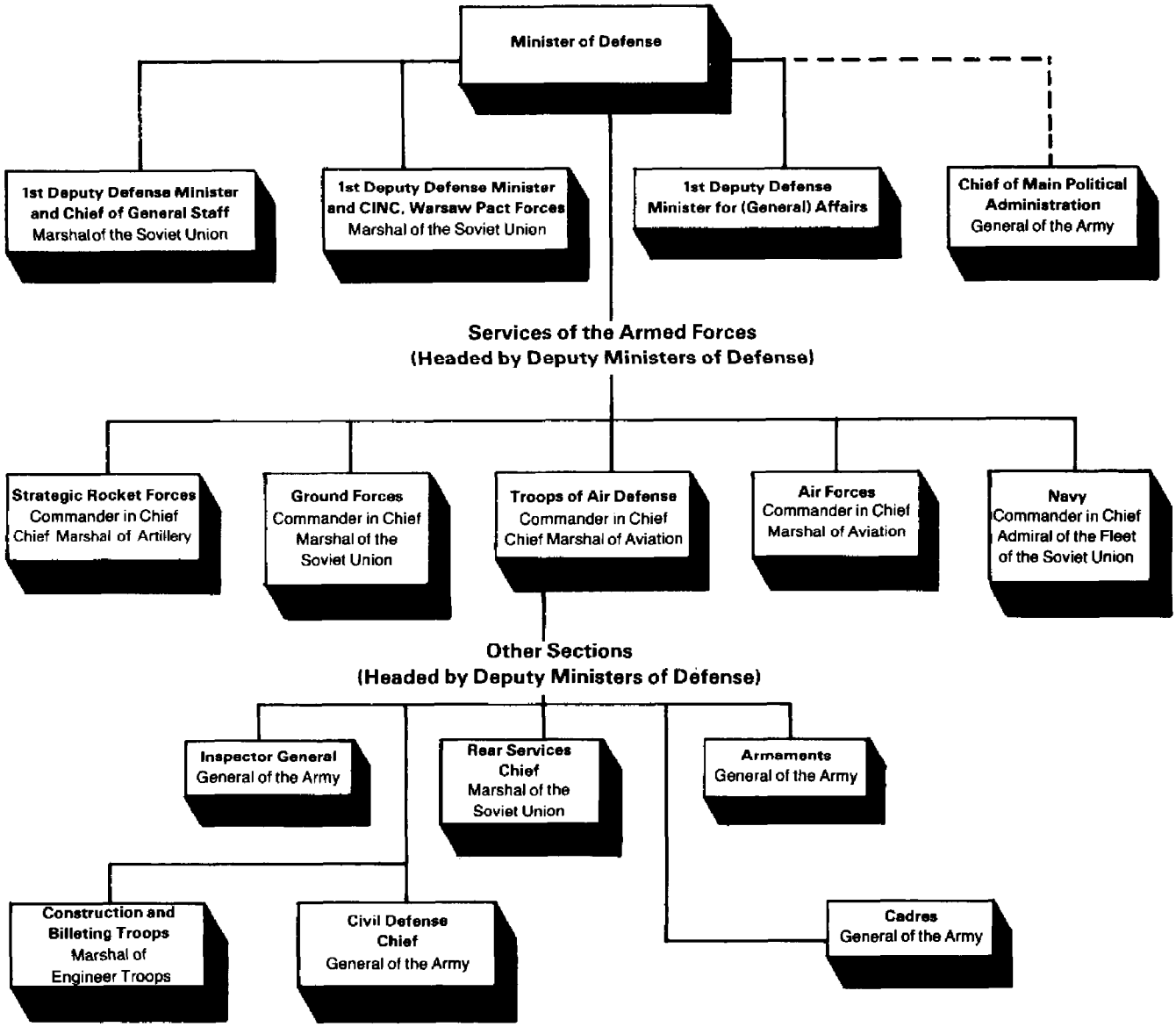
[6]Arthur J. Alexander, *Decision-making in Soviet Weapons Procurement*, Adelphi Papers Nos. 147 and 148 (London: International Institute for Strategic Studies, Winter 1978-1979) p. 16.

[7]"Organization of the Soviet Armed Forces," *Air Force Magazine* (Mar. 1984), p. 105.

[8]"Organization of the Soviet Armed Forces," p. 105.

[9]Alexander, *Decision-making in Soviet Weapons Procurement*, p. 12.

Figure 2: Soviet Military Structure



Source: "Organization of the Soviet Armed Forces," p. 105.[7]

the five armed forces. It is said to have enormous power and influence. Requirements are not issued here, but all such proposals flow through this top military body. The General Staff settles conflicting service demands and makes recommendations to match military needs with procurement goals and budgets.

Defense Industrial Ministries

The nine military production complexes are each headed by a minister. They report to a deputy chairman of the Council of Ministers. The defense ministries have the highest priorities for all resources, and production orders have the force of decrees to all concerned.

The defense ministries are internally departmentalized according to class of product or weapon system produced. They have their own research activities, design bureaus, and production plants, analogous to those of American companies. According to a 1973 report,[10] the Ministry of Aviation Industry included about 6 research institutes and 11 aircraft, helicopter, and aerodynamic missile design bureaus; 5 engine design bureaus; and 30 to 40 production plants.

About 50 design bureaus are devoted to major defense programs in the Soviet Union. Research institutes, design bureaus, and production plants are administered and financed separately from particular weapon systems. Budgets and manpower are stable and are unaffected by cyclical ups and downs. Still, engineer-analysts find evidence of a very uneven technical base.[11]

Research Institutes

Like American defense firms, the Soviet ministries employ scientists and engineers to do applied research on their product lines. Unlike the freedom allowed U.S. researchers, the Soviet policies of conservatism, standardization, and quota accomplishment tend to restrict research to updating the technology in hand. Industry does perform some basic research, however. The institutes provide an array of technical handbooks to guide design bureaus.

For more imaginative work, contracts are let to individual consultants, educational institutes, and civil science centers for basic research, problem solving, and advice on new scientific paths.

Design Bureaus

The main function of these bureaus is to design and develop experimental systems and to upgrade existing ones as proven technology becomes available. American engineers discern a common design character in Soviet ships, aircraft, missiles, and vehicles. Seldom is more than one new technology used in a new or an upgraded system. Prototype building and rigorous testing are standard practices. Decisions to build and test prototypes imply no automatic commitment to production.

Designers work within the constraints of highly detailed technical handbooks produced by various research organizations. They tell designers which (proven) components may be chosen, outline limitations on scarce materials, and specify appropriate manufacturing techniques. Again, no unproven technology may be used unless absolutely necessary.[12]

The Soviet designer's only leeway is in devising synergistic combinations of available off-the-shelf parts. American analysts of Soviet equipment have noted ingenious integrations of interchangeable, sometimes obsolete components. Soviet designers "think poor," it is said.[13]

System design teams in U.S. industry tend to form up for a new program and then break up when the work is over or significantly delayed. Their Soviet counterparts, however, stay together for years, which promotes design consistency and corporate memory. Continuity in the Soviet Union is also supported by funding the design bureaus apart from specific programs, unlike in the United States. Production is kept stable by filling slack periods with civilian work.[14] Finally, the Soviet policy of full employment underwrites long tenure.

Production Plants

Many Soviet aircraft, missiles, vehicles, and electronic devices are single task or single mission and are designed to meet reasonable military requirements and no more. The rule of thumb is, "If it works, don't change it." Complexity avoidance accommodates no-frills manufacture, all-purpose tooling, low technology materials, many interchangeable components, labor-intensive methods (such as hand-wiring), crude finishing in noncritical areas, and long production runs. The mass output generally is technically undemanding, robust equipment suitable for conscript armies (and third world countries).

System Design Philosophies Compared

Soviet and U.S. weapon designers must trade off among system performance, cost, and schedule. They can "get" only by "giving";[15] there are, for example, no magic outcomes, such as high performance, low cost, and quickly delivered equipment in one package. Like other countries, the Soviet Union has had its disappointments, such as the Grifon, the SA-5, and the Galosh anti-ballistic-missile systems, all of which failed expectations.

The United States generally prefers high performance in its systems, accepting larger costs and hence fewer numbers; technology is viewed as a multiplier of capabilities. The Soviets choose modest technology, low cost, and mass quantities. These are generalities, of course, but the core philosophies are there, rationally espoused by both sides. (See table 1.)

Simplicity, standardization, and incremental improvement are often evident in Soviet ships, vehicles, missiles, aircraft, and even civilian equipment. Designs are well within the state of the art, and performance goals are modest. Yet the Soviets develop technologically advanced systems when needed. Similarly, simplicity and standardization can be found in some U.S. systems.

Military Doctrine

The Soviet emphasis is on short rather than protracted combat; mass forces and firepower; and for the technical capability of conscript armies, relatively simple "soldier proof" weapons. The American preference, again, is for economy of force and versatile, technically advanced systems to offset large Soviet quantities.

Design Simplicity

According to U.S. engineers who have analyzed Soviet equipment, the Soviets design only for what is required and no more. Unlike U.S. designers, Soviet designers have seldom sought technological advancement

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[10]Alexander, Arthur J., *Weapon Acquisition in the Soviet Union, United States, and France*, P-4989 (The Rand Corporation, Mar. 1973), p. 2.

[11]J. W. Kehoe and Kenneth S. Brower, "U.S. and Soviet Weapon System Design Practices," *Journal of Defense Research* (Winter 1981), p. 456.

[12]Kehoe and Brower, p. 405.

[13]Kehoe and Brower, p. 466.

[14]Kehoe and Brower, p. 448.

[15]Kehoe and Brower, p. 436.

in most weapon systems except through incremental changes.

Uncomplicated designs maximize standardization opportunities, enhance reliability, cost less, and reduce maintenance training and logistics. A Soviet Tumensky jet engine, for example, has 30 to 40 percent of the parts in similar American engines.[16] The Soviet maintenance hours ratio for surface-to-air missiles was estimated to be two to three times better than that of the United States. American analysts found the SA-6 missile power plant to be ". . . unbelievably simple and effective."[17]

Simplicity has its drawbacks, as well as its virtues. There is risk of stagnation and block obsolescence of large inventory segments due to Western technology leaps. The Soviets cannot be content with their computer capability, for instance, which is said to lag the U.S. capability by 3 years in mainframe computers and 15 years in software. A similar lag has been noted in electronics.

Standardization

The use of common parts and components is pervasive in Soviet equipment. For instance, battle tanks, such as the T-54, the T-55, and the T-62, have interchangeable road wheels, tracks, and transmissions. The MIL-8 and MIL-24 helicopters have the same basic engine, transmission, and rotor. The series of Sukhoi aircraft used common designs for canopies, fuselage, tail assemblies, and avionics. Soviet warships have features in common with merchant ships.[18]

Standardization amounts to a national policy. Standardization monitors are in research centers, design bureaus, and production plants and at the national level. The technical handbooks mentioned earlier also enforce commonality.

One drawback of standardization is that it inhibits the introduction of new equipment, and common components spread common vulnerabilities. On the other hand, mothballed standardized equipment can be reactivated without great logistic and training burdens. It also suits Soviet readiness to deploy systems in great quantity.

In the United States, technological superiority has been the cornerstone of military policy. The American "all new" weapon system idea eschews standardization in favor of specialized components. The military services are multipliers, too, in their resistance to joint acquisitions and by insisting on their own variations.

Table 1: U.S. and U.S.S.R. Design Practice

Element of design	United States	Soviet Union
Design philosophy	Design to maximize performance	Design to functional requirements
Growth philosophy	Advanced technologies; emphasis on growth potential	Low risk design; little growth potential
Reliability	Designed in	Off-the-shelf components; proven technology
Maintainability	By modular replacement	By component replacement
Environment	Full consideration	Limited consideration
Human factors	Strong consideration	Functional consideration
Checkout	Emphasis on automatic checkout	Manual checkout
Modification program	Minor; new hardware to meet new requirements	Extensive modification programs

Source: Kehoe and Brower, p. 447.

Design Inheritance

Unlike weapon systems developed in the United States, those developed by the Soviets rarely include more than one new technology at a time. Similarly, they are cautious in their preference for step-by-step updating of weapons; "bloodlines" can be traced back through several generations. Inheritance or incremental change minimizes development risk and unforeseen costs.

Figure 3 displays the evolution of Mig fighter aircraft, including prototypes (denoted by asterisks), from the Mig 9 of

[16]Kehoe and Brower, p. 436.

[17]"U.S. Finds SA-6 to be Simple, Effective," *Aviation Week and Space Technology* (Dec. 3, 1973), p. 22.

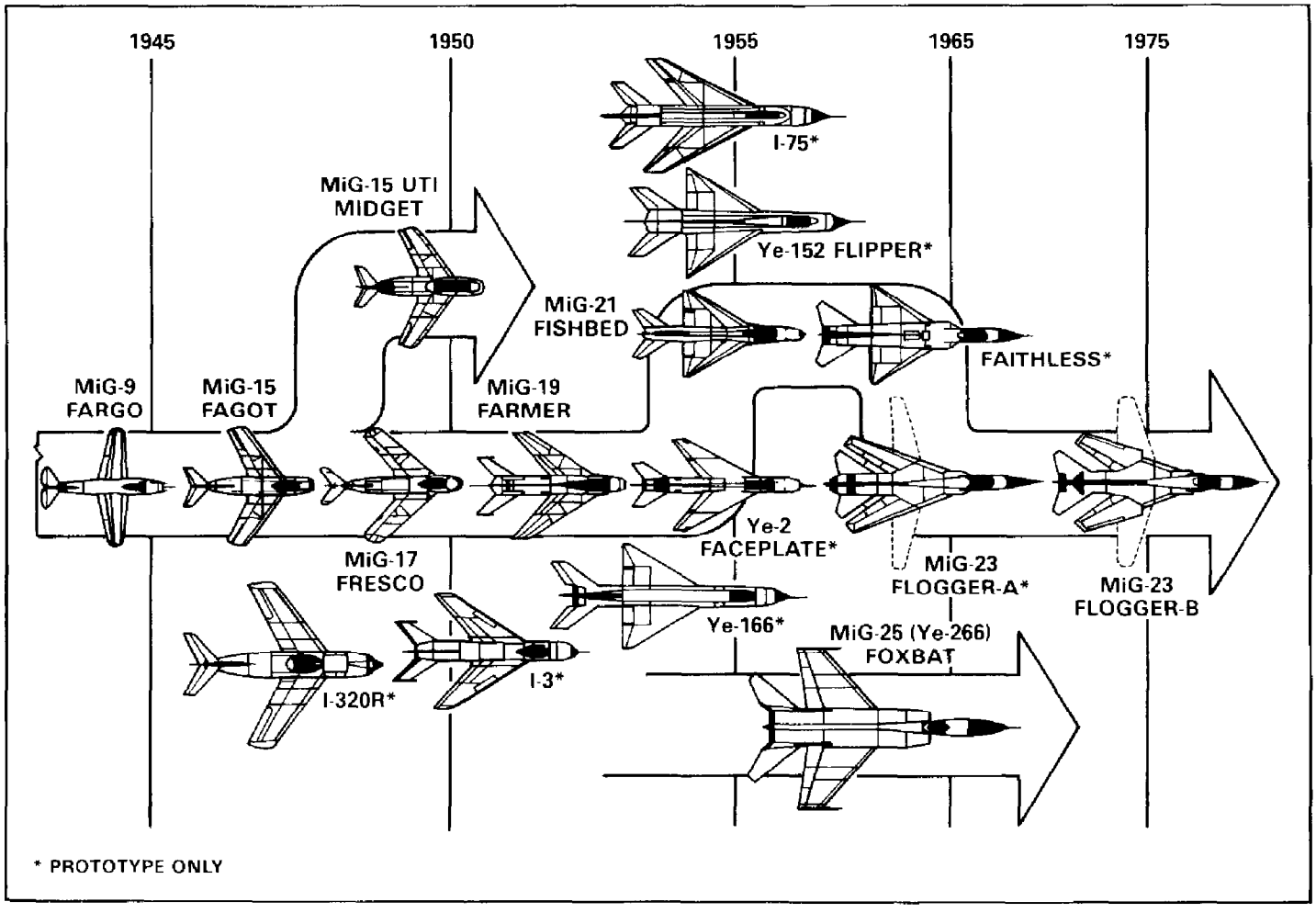
[18]Kehoe and Brower, pp. 431-436.

Table 2: U.S. and Soviet Approaches to Reliability, Availability, and Maintainability

Factor	United States	Soviets
Reliability	High, over a long period	Higher, during a shorter warranty period
Availability	High, after long, continuous peacetime use	Higher, after short, limited peacetime use
Maintainability	Accessible	Limited accessibility
	Emphasis on repair at lowest organizational level possible	Emphasis on factory or depot maintenance
	Highly skilled manpower	Limited skilled manpower but very labor intensive
	Many special tools and test equipment	Simple tools and test equipment
	Extensive supply support	Highly selective supply support

Source: Kehoe and Brower, p. 440.

Figure 3: Chronology of Mig Aircraft



Source: Ward, p. 30.[19]

World War II to the Mig 21 of the late 1970's.

Neither side is hard and fast on the matter of design inheritance. The American F-4 and A-4 aircraft, for instance, went through serial updating. The Soviets occasionally develop an all-new system; the T-64 tank, for example, is a marked departure from its predecessors.

Reliability and Maintenance

By and large, the degree of sustainability and frequency of repair can be designed in. The Soviets expect their equipment to be short lived, but deployment en masse, redundancy, and overlapping coverage are expected to compensate for inferior technology and battlefield losses. "Quantity has a quality of its own," said one Soviet leader.[20] The U.S. and Soviet approaches are shown in table 2.

Redundancy

American and Soviet designers use redundancy to augment reliability but in different ways. For instance, within electronic devices, Americans tend to provide redundancy (backup parts) to protect most vital points within a system itself. The Soviets tend to use optional modes of operation in their single-task systems or bring a mass or a variety of weapons to bear. As one expert describes it:

"Compare, for example, our [U.S.] antiaircraft forces with those of the Soviet Union. We equip all our ground forces with only one type of antiaircraft gun, one type of shoulder-missile, which is supposed to intercept enemy aircraft in a wide band of altitudes, from the very low to the medium-high. The Russians, by contrast, have a wide variety of antiaircraft guns and missiles, each specialized in some way or other, with the low altitude SAM-7's [surface-to-air missiles], SAM-8's, SAM-9's and SAM-10's, the high-altitude SAM-2's, and SAM-5's, and medium-altitude SAM-3's, SAM-4's, and SAM-6's."[21]

American and Soviet Acquisition Procedures

The Soviet acquisition process is a sequence of disciplined, risk-avoiding steps. Tight deadlines are imposed. Approval of

[19]Richard D. Ward, "Soviet Practice in Designing and Procuring Military Aircraft," *Astronautics and Aeronautics* (Sept. 1981), p. 30.

[20]Ward, p. 30.

[21]Edward N. Luttwak, "Why We Need More Waste, Fraud and Mismanagement in the Pentagon," *Commentary* (Feb. 1982), p. 33.

each step completed is marked by the joint signatures of system designers, government monitors, and military customers. Design agreements are legally binding. Accountability is clear.

In the United States, accountability for the system design is diffused; in the Soviet Union, the designer is prominently identified and held directly responsible for success or failure. Successful designers are richly rewarded with country houses, large bonuses, national medals, and household name recognition.

No production in Soviet plants begins until development and testing are finished. Concurrency (overlapping among development, testing, and production) is unheard of, except perhaps in crash programs. Cost overruns are not tolerated by the hierarchy; cost estimates are reportedly padded to guard against them.[22]

On the civilian side of the Soviet economy, consumers have little choice of goods; they must take what they can get. On the military side, however, the customer is king, commanding the highest priority and choicest resources for defense needs.

Defining Military Requirements

As in other countries, the military services and user commands are the main proposers of new requirements. New technical opportunities may be presented by various research organizations and design bureaus. High level political figures seeking parity with the West have ramrodded catch-up programs, such as jet aircraft and helicopters.

Normally, the service armaments directorate converts the proposal to a draft Tactical Technical Instruction, which specifies a new system's rationale, estimated cost, and operational role. It is similar to the Required Operational Capability document in the United States. When approved by the government and military elements, a scientific-technical commission reviews it for feasibility and producibility, possibilities for standardization, and so on. A research institute is next, to do exploratory work. The documentation is then turned over to several design bureaus or teams to lay out their own concepts on paper. The scientific-technical commission then selects the most promising design or designs, acting as a source selection board.

Prototyping

The next step is to convert the designers' concepts into semidetailed drawings and then into working prototypes. These prototypes may embody different technological approaches and compete against one another, especially in aircraft programs. Prototype design and construction methods are also regulated by handbooks.

Manufacturing engineers later prepare production drawings and advise on producibility. Drawings are revised on the basis of test and evaluation results, as necessary. In any case, series production does not begin until the prototype is proven. In the aircraft industry, about two prototypes are made for each aircraft reaching production.[23] Designers are required by law to evaluate alternative system concepts against such criteria as reliability, producibility, and standardization.[24]

Operational Testing

Prototypes undergo extensive laboratory and factory trials conducted by the design team, factor management, and the military customer to check adherence to the Tactical Technical Instruction. The prototype may then be refined before "state trials" begin. State trials of the proposed system are conducted by the defense ministry concerned, the Military Industrial Commission, and the military customer. The trials usually take place on the latter's test grounds. Once the prototype is approved, funds are provided for the entire full-scale development phase.

The design team is not finished with the weapon system when it is turned over to the production plant. A design team engineer accompanies the transfer and is on hand until production is completed. The designer himself has a large say in production and is held chiefly responsible for quality and schedule. He is aware that mistakes on his part can seriously disrupt rigid state planning.

Operational testing can be quite thorough. It may continue through the lifetime of a system to (1) check out production line quality and (2) conduct troop testing. To evaluate delta wing and swept wing aircraft technology (see fig. 3), 25 different variants of Mig-21 aircraft were built for Soviet Air Force evaluation. The ultimate choice was not made until 100 preproduction test planes were produced and tested with the troops. Several versions of the T-72 tank were tried out with the troops. A half dozen Yak-36 preproduction aircraft were also built and tested.[25] Since the Soviets evaluate weapon systems in their full tactical environment, field testing and troop exercises can be extensive.

Observations

The Americans and the Soviets are said to be converging on their military research and development paths and in the application of advanced technology. Recent Packard Commission recommendations would tend to convergence in system acquisition practices as well. The Commission urges DOD to revise or put more stress on some of our old pragmatic methods still on the policy books and still favored by the Soviets. For example, the Commission recommends that DOD take the following actions:

- Requirements, design, production, and cost should be agreed upon internally before full-scale development.
- DOD should make much greater use of off-the-shelf components. New or custom-made items should be used only when clearly necessary.
- Building and testing prototype systems and subsystems before beginning full-scale development should have a high priority. Informal competition of prototype hardware should be extensive.
- Operational testing of prototypes should begin early in advanced development and should continue through full-scale development and into the first items of limited production.[26]

Another idea worth study is a small design team headed by an entrepreneurial chief designer who is held accountable for the final product, as in the Soviet Union. The United States has had signal success with such teamwork, as with long-range reconnaissance aircraft and ballistic missiles. The problem is how to finance and hold teams together during the testing hiatus between contracts and other idle time.

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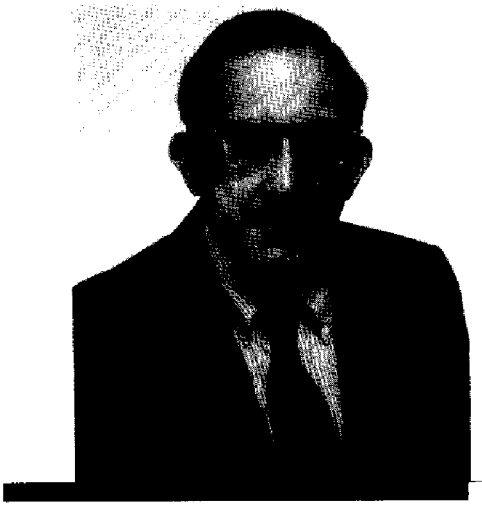
[22]Alexander, *Weapons Acquisition in the Soviet Union, United States, and France*, p. 11.

[23]Alexander, *Weapons Acquisition in the Soviet Union, United States, and France*, p. 7.

[24]Alexander, *The Process of Soviet Weapons Design*, P-6137 (The Rand Corporation, Mar. 1979), p. 29.

[25]Alexander, *The Process of Soviet Weapons Design*, p. 29.

[26]The President's Blue Ribbon Commission on Defense Management, *An Interim Report to the President* (Washington, Feb. 28, 1986), pp. 17-18. ■



The Uncertain Link to the Strategic Triad

William J. Rigazio

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Ed. note: *The views in this article are the author's and not necessarily GAO's.*

The credibility of the U.S. strategic nuclear deterrent depends not only on the destructive power of the forces themselves but also on specially designed systems that effectively control their use. Over the years, strategic offensive forces have been steadily improved; however, less attention has been given to upgrading special command, control, and communications systems (generally referred to as C3 and pronounced see-cubed). This failure to modernize C3 systems, coupled with changes in policies on using nuclear forces, has placed more rigorous demands on these systems than they were designed for. As a result, there is considerable concern that in the event of a nuclear war, we may be unable to effectively communicate with and control our nuclear forces. Recently, programs have been initiated to improve the C3 systems. However, many of these improvements will not be ready until the next decade. Until then, the C3 systems will be the uncertain link to the nation's strategic deterrent.

A Defense Policy Based on Deterrence

The most basic national security objective of the United States is to preserve the nation's freedom with its fundamental institutions and values intact, while remaining at peace throughout the world. To do this, the United States has developed a defense policy designed to (1) deter aggression and coercion against the United States and its Allies, friends, and areas of vital interest and (2) end any conflicts quickly, if deterrence fails, while seeking to limit their scope and intensity.[1]

This policy recognizes the awesome destructiveness of modern warfare. The introduction of nuclear weapons has made prevention of a major conflict imperative. The proliferation of nuclear warheads, combined with the development of effective delivery systems, has made worldwide destruction possible.[2] Eminent scientists have raised the spectre of a major conflict producing a "nuclear winter" that could threaten the continued existence of all plants and animals on earth.[3]

Deterrence is the core of the U.S. strategy. To succeed, the strategy must convince a potential adversary that the risks and costs of aggression will exceed the gains. Friends and foes alike must believe that the United States has the military capability and the political will to carry out its strategy of deterrence.[4]

The Triad

Since the early 1960's, the deterrence strategy has relied on a trio of offensive forces collectively known as the strategic nuclear Triad, or simply the Triad. These forces consist of (1) land-based intercontinental ballistic missiles, (2) long-range manned bombers,[5] and (3) sea-based submarine-launched ballistic missiles. Each leg of the Triad has strengths and weaknesses that complement the strengths of the other two and compensate for their weaknesses.

The land-based intercontinental ballistic missiles are easy to command, have a

[1]Caspar W. Weinberger, Secretary of Defense, *Annual Report to the Congress, Fiscal Year 1986* (Washington: Feb. 1985), pp. 25-26.

[2]Weinberger, pp. 45-46.

[3]Carl Sagan, "The Nuclear Winter," *Parade Magazine* (Oct. 30, 1983).

[4]Weinberger, p. 45.

[5]Congressional Budget Office, *Strategic Command, Control and Communications: Alternative Approaches for Modernization* (Washington: Oct. 1981), pp. 1-2.

quick response time, and can accurately deliver powerful warheads over long distances, thereby putting even the most protected targets at risk. However, their fixed locations are known, and if they are not launched within about 30 minutes of a surprise nuclear attack, they could be destroyed. In addition, once launched, the missiles cannot be retargeted or recalled.

Long-range bombers are the most versatile leg of the Triad. A portion of the bomber fleet can be placed on airborne alert, and bombers on the ground can be launched on warning of an attack. Once launched, they can be redirected or recalled. They can accurately deliver gravity bombs or the recently introduced air-launched cruise missiles. These missiles can be released a considerable distance from the target, which increases mission flexibility and survivability of the bombers.[6] Lastly, the bombers can be reloaded and used for follow-up attacks.[7] However, the bombers are the slowest leg of the Triad and must overcome formidable defensive forces to deliver their weapons.

The sea-based leg of the Triad consists of submarine-launched ballistic missiles and the submarines that carry them. While at sea, they are the most survivable leg of the Triad. Because their missiles are not as accurate as the land-based missiles or the bombers, they cannot be used against "hardened" targets, such as command centers and missile silos that have been placed underground for protection. Instead, they are considered a retaliatory weapon that can be safely held in reserve and used when necessary against "soft" or above-ground targets, such as urban and industrial centers and nonhardened military facilities. Currently, a more capable submarine is being produced, and a new, more powerful and accurate missile is to become available by the end of the decade. This new missile could be used against hardened targets and will make the strategic submarine force even more formidable. A weakness of this leg of the Triad is that communication to these submarines from the national command authorities (the President, the Secretary of Defense, and/or their designated successors) at times can be difficult.

The concept of the strategic nuclear Triad enhances deterrence by significantly complicating a potential adversary's attack plans and efforts to prevent U.S. retaliation. The diversity of the Triad makes it unlikely that our combined deterrent capabilities could be defeated by either a single technological breakthrough or a massive coordinated attack. These forces have served the nation well for several decades, and they are continually being improved to enhance their survivability, response times, endurance, and mission flexibility. The improvements are also increasing their explosive capacity and accuracy for retaliating against hardened targets.[8]

Force Management—The Fourth Element

The destructive power of the Triad is tremendous; however, unless properly directed and controlled, it may fail to achieve its ultimate goal of deterring aggression. Therefore, a fourth element is needed to enable civilian leaders and military commanders to communicate with and direct the Triad's forces. This element is called strategic command, control, and communications systems. C3 systems consist of early-warning satellites and ground-based radars, computer-equipped command centers on land and in airplanes, and elaborate (and duplicate) communications systems. Working together, these systems would alert the national leadership of a possible attack; provide information for assessing its size and the probable targets; and direct the U.S. response of the President, who alone can order launch of the Triad's nuclear forces.

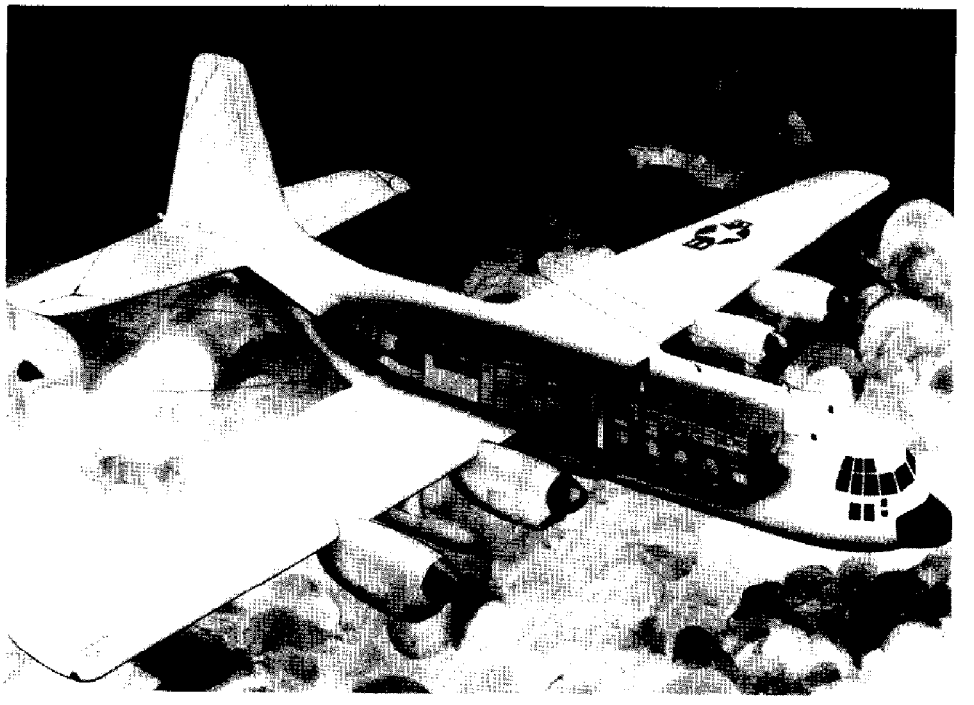
To provide early warning surveillance and attack assessment capabilities, the United States maintains a network of space-based satellites and ground-based radars. The satellites would indicate that an attack was in progress; the radars would confirm the satellite warning data. Satellites are placed in fixed or geosynchronous orbits around the earth to monitor land-based missile fields and likely patrol areas of the strategic missile submarines. These satellites are equipped with sensitive infrared sensors that enable them to spot a ballistic missile soon after its launch.

The ground-based radars are located in the United States, Canada, and the United Kingdom and have overlapping sectors of coverage surrounding the Northern Hemisphere. Essentially, these radars monitor the approach corridors that would be used by incoming missiles or strategic bombers. (The early warning surveillance and attack assessment must be prompt and accurate.) Early warning is essential to the survivability of the bombers and to the timely launch of the land-based missiles, and it gives the President time to consider retaliatory options. Accurate information on the

[6]Weinberger, pp. 51-53, 206-211, and 216-222.

[7]Charles A. Zrakert, "Strategic Command, Control, Communications, and Intelligence," *Science* (June 22, 1984), p. 9.

[8]Weinberger, pp. 52-53, 206-211, and 216-222.



EC-130--The current TACAMO airborne communication relay to the ballistic missile submarines.
Source: Department of Defense.

size and the scope of the attack would be needed to select an appropriate response and to control further actions.

Retaliatory responses would be planned and controlled from a number of command centers located throughout the nation. The national command authorities would probably make a retaliatory decision from one of three command centers specifically intended for their use: the National Military Command Center in the Pentagon, the Alternate National Military Command Center buried in the Catoctin Mountains near Fort Ritchie in Maryland, or the National Emergency Airborne Command Post—a fleet of specially fitted Boeing 747 jet aircraft—stationed at Grissom Air Force Base in Indiana. All these centers are equipped with sophisticated computers and communications equipment.

Communications systems are the glue that bind the elements of C3 together. They connect the warning sensors to the command centers, enable information to be exchanged between command centers, and link nuclear commanders with their forces.[9] The communications systems are many and varied. They include hard-wire land lines, such as telephones and telegraphs; undersea cables; and land-, sea-, air- and space-based radio systems capable of communicating over many radio bands ranging from extremely low to extremely high frequencies.

Each radio band has advantages and disadvantages. For example, extremely low frequency radios are capable of worldwide communications. They are especially important to strategic submarines because the radio signals can be received while the submarines remain several hundred feet underwater, thus making them less vulnerable to detection. However, these radios require considerable power to transmit signals and have a slow transmission rate. High frequency and shortwave radio signals are extremely useful for long-range, relatively fast communications. The radios and antennas are compact and do not require large amounts of power. However, high frequency radios can be disrupted for many hours by nuclear detonations in the upper atmosphere, and they can be located and physically attacked or jammed so that communications cannot be transmitted or received. Also, the number of usable frequency bands is limited.[10]

The Strategic C3 Systems are Vulnerable

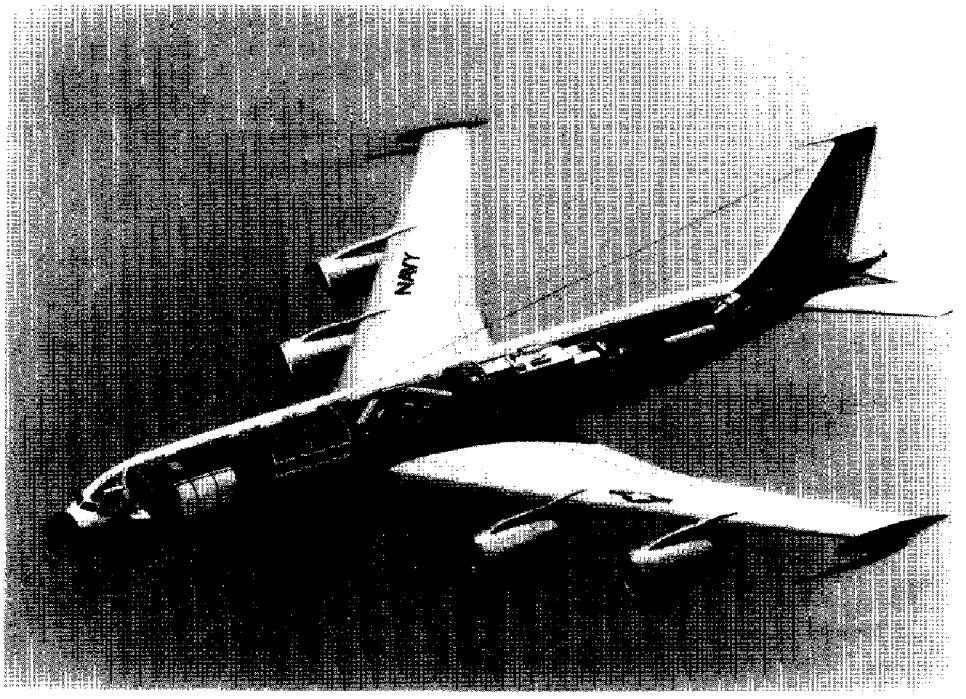
While improvements to offensive nuclear forces have expanded the options for their use, the current C3 systems were conceived in the late 1950's and most became operational during the 1960's. They are essentially peacetime systems that are highly dependent on vulnerable ground communication networks. In today's environment, it is uncertain whether C3 systems will be able to support the effective use of the Triad.

During the 1960's, the United States had nuclear superiority over any potential adversary. The policy for using the Triad provided that any nuclear attack on the United States be anwered with a massive retaliation against military bases and urban and industrial centers and those resources and institutions whose elimination would considerably dealy their recovery. This policy of "assured destruction" was considered an effective deterrent to nuclear war.

The policy envisioned using most of the Triad's strategic nuclear weapons in a single massive response. Under this policy, the C3 systems would detect an attack, assess its size, relay the information to the command centers for selection of a retaliatory response, and relay that response to the nuclear force commanders for execution. Since most of the nation's nuclear arsenal would have been expended in this single massive response, C3 systems would not be needed for an extended period of operation.

The absence of nuclear war during this period suggests that the concept was effective. However, during this same period, the offensive nuclear forces were significantly improved. Launching rockets were built that had greater range, larger explosive capacities, multiple warheads, and greater accuracy. Underground missiles and command centers once considered invulnerable to nuclear attack might now be destroyed during the first hour of a nuclear exchange. An attack that destroyed the unprotected elements of the supporting C3 systems might deprive the United States of its ability to command and control the use of its surviving nuclear arsenal.

Upgrading offensive nuclear forces and improving other defensive capabilities made it more likely that a potential adversary could achieve limited objectives by launching either a very precise surprise nuclear attack or a series of such attacks over a period of days, weeks, or even months. This attack (or attacks) could destroy much of our strategic deterrent forces and cripple the supporting C3 systems. In this situation, the United States could be restricted to two choices: responding with its



E-6A--Replacement for the EC-130.

Source: Department of Defense.

[9]Congressional Budget Office, pp. 3-12.

[10]Office of Technology Assessment, *MX Missile Basing* (Washington: Sept. 1981), pp. 278-281.

remaining nuclear forces or not responding at all. It became readily apparent that a strategic deterrence policy based on assured destruction was no longer credible. Clearly, a new policy was needed.

The policy that emerged continued to depend on Triad forces and their capability to assure destruction of a potential adversary. However, these forces were also required to have the capability for flexible, controlled retaliation against a full range of targets for any level of attack for the duration of the conflict (days, weeks, or months). This policy made it necessary for the forces and their supporting C3 systems to become more survivable, endurable, and flexible.[11]

Before improvements could be made, the vulnerabilities of the current C3 systems had to be identified. Only then could C3 systems be designed to meet the more rigorous demands that the revised deterrence policy placed on them.[12]

Analysis of the components of the existing C3 systems revealed many vulnerabilities. The elements of the C3 systems could be physically destroyed or sufficiently disrupted to render them inoperative when needed. The threats include large-scale direct attack and sabotage, jamming, and secondary nuclear effects.

A direct attack against key elements of the C3 system would be an effective way of disrupting the nation's retaliatory capability. Since many of the existing C3 systems were designed to satisfy the needs of the massive retaliation strategy, little thought was given to making them survivable. Therefore, many of the vital C3 elements are essentially unprotected peacetime systems highly susceptible to direct attack or sabotage.[13]

Electronic jamming of radio transmission poses the same threat to C3 systems as sabotage. Jamming a radio link means transmitting "noise" to receiving antennas to drown out meaningful signals from the transmitting radios. Electronic interference with attack warning information and command communications could be effective for a sufficient period of time to significantly disrupt our attempted response to a nuclear attack. The intensity and effectiveness of enemy jamming efforts could vary according to the situation. However, this capability has been demonstrated and its effect cannot be ignored.

Secondary nuclear effects, particularly from high altitude nuclear bursts, could be the most devastating threat to C3 systems. Some experts believe that a single 1-megaton nuclear warhead detonated several hundred miles above Omaha, Nebraska, could cause nationwide disruption of electronic components—the backbone of strategic C3 systems. This type of nuclear detonation produces an intense surge of electrical energy, which could be collected and channeled by radio antennas, power lines, telephone sytems, and computers. Unprotected electronic components would be rendered inoperable. With one nuclear warhead, we might be deprived of the nation's telephone system on which almost 90 percent of defense communications depend. The loss of computer capabilities would be particularly crippling. In addition, the earth's atmosphere would be temporarily disrupted, and even protected radios could not transmit until the effect was dissipated.[14]

These C3 vulnerabilities clearly demonstrate the need for improvement. This is especially true considering C3's vital role in controlling the strategic nuclear forces in accordance with the more demanding requirements made necessary by the continued improvements to the offensive nuclear forces. Improved weapons and strategic doctrines are meaningless unless the necessary supporting C3 systems are available to ensure their effective use.[15]

Improvements for C3 Systems

The extent of the C3 vulnerabilities became evident during the late 1970's. In 1981, the Reagan administration made modernization of the strategic C3 systems the top priority in its strategic modernization program. This program also includes improvements to the nuclear forces of the Triad. In February 1985, the Secretary of Defense sent the following message to the Congress for consideration during the fiscal year 1986 budget process:

". . .Strategic C3 systems must be capable of supporting an initial U.S. retaliation against a nuclear attack; they also are essential to the effective management of nuclear reserve forces. The FY 1986-90 program will correct most of the deficiencies in strategic C3 capabilities that were identified at the outset of this Administration. The program will upgrade and augment existing capabilities, increase the survivability of C3 systems, protect them against nuclear effects, and provide redundant communications and control. . . ."[16]

For the next several years, the Department of Defense plans to spend more than $4 billion a year to upgrade strategic C3 systems.[17]

Some of the improvements include the following:

- North American Air Defense Master Plan, which will upgrade the distant early warning line of radars across Alaska and Canada and close gaps in continental U.S. missile surveillance.[18]
- Consolidated Space Command Center, a new partially underground satellite operations center that will complement the current center in Sunnyvale, California.[19]
- MILSTAR, an extremely high frequency jam-proof two-way communications satellite system. When launched at the end of the decade, MILSTAR's constellation of satellites will provide the primary means for the President to direct nuclear and conventional forces during a nuclear conflict.[20]
- ELF, an extremely low frequency system for submarine communications. ELF will send simple word codes by a signal generated in miles of wiring at two transmitter sites in Michigan and Wisconsin. This system will make it easier for the strategic submarines to escape detection. It can advise submarines of the outbreak of hostilities and alert them to the possible receipt of a nuclear execution order.
- GWEN (ground wave emergency network), an unstaffed network of electromagnetic-pulse-protected radio relay stations distributed across the country. This system will improve wartime communications between the national command authorities, command centers, intercontinental ballistic missile fields, and the strategic bomber air bases.[21]

Summary

The importance of strategic C3 systems to the support of the nation's strategic deterrence policy is now being widely recognized. More importantly, their vulnerabilities are being identified and programs to overcome them are being designed and funded. These programs, if successful, will certainly improve the ability of C3 systems to effectively support the forces of the Triad. However, it is unlikely that the improvements will solve all the problems. As a result, C3 systems will require continued monitoring and assessment. Improvements

See Uncertain, p. 48

Auditing Highly Classified Air Force Programs

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When auditing defense programs for any length of time, one eventually hears about "black programs," programs for which a special clearance is required before one can be introduced to them. These programs, generally referred to as SAR (special access required) programs, are so highly classified that even their basic budgets are hidden deep in the Department of Defense (DOD) appropriation. People who work on these programs quickly become aware of what it means to audit under very tight security provisions. There is plenty of excitement, but there also are combination locks, code words, and an enormous sense of responsibility. When we recently began work on a SAR program, we had no idea of what would be involved. What follows is an account of what happened. We hope it will demystify these programs and provide information on how to audit them.

Prologue

For a number of months, a small group of Cincinnati Regional Office evaluators at Wright-Patterson Air Force Base, Ohio, had shut themselves off from the rest of the office. Other staff could only guess at what was going on. Faced with questions about what they were discussing, these individuals would respond with only very noncommittal answers. All this mystery only piqued the curiosity of other regional staff, trained as they'd been since their first days with GAO to seek out condition, criteria, cause, and effect.

Our real introduction to "black" programs came in the form of a congressional request from the House Committee on Armed Services. In anticipation of such a request, we had begun several months earlier to develop information on the program. The Committee asked us to evaluate the Air Force's cost and performance estimates of two major programs. This was not an unusual request in itself except that one of the programs was a SAR program. Most congressional requests typically begin just as this one had. And as usual and by necessity, the job would have to be fast-tracked: Our first reporting deadline was in 4 weeks. As it turned out, though, the request and its timetable were probably the only typical features of the assignment.

As could be expected, DOD at first had been somewhat reluctant to grant us the number of clearances we felt we needed to examine the cost, schedule, and performance of a major weapon system in this highly classified world. With the congressional request, however, DOD was more receptive to our request for additional clearances. Once they were granted, we were in a good position to provide an invaluable service to the Congress since the secrecy surrounding black programs can require the Congress to appropriate billions of tax dollars without the benefit of independent program evaluations. With a strong sense of responsibility and some trepidation, we began our work.

Our initiation into this strange environment was an Air Force program security briefing; this warned us that we were entering an area of vault-enclosed rooms and highly classified information. These programs are known only to a few members of the defense establishment and, though we sometimes had heard rumors concerning them in our daily activities, working on them would be like deep-sea diving with the Air Force operating the air supply.

To enter the remote area where we would find the detailed information we needed, we had to dial a special number from a plain-looking phone outside a very plain but heavy door, then wait for a serious-looking official to identify us and allow us to enter. Beyond that door was a series of locked doors that eventually led to our

new office space. This would be our home for the duration of the assignment. Due to security restrictions, we couldn't tell anyone precisely where this office was located.

The Job

Our goal on this assignment was to prepare testimony for a closed hearing before the Committee, with an expanded statement for the record. The Assistant Comptroller General (ACG) for National Security and International Affairs was to be the official GAO spokesperson. This testimony was to focus on our opinion of Air Force cost and performance estimates for two competing multi-billion-dollar programs.

The highly classified nature of this work required that we approach data collection and analysis in a new way. To begin with, all our documentation and workpapers had to remain with the Air Force at the audit site. In addition, all analysis, writing, review, and typing were done there. Finally, when our Group Director visited us to review our progress, we could discuss the job only at the audit site and he could not take any program information with him back to Washington.

Before receiving this request, we had concentrated on monitoring the research and development efforts of the Air Force on the program. Our objective was to remain abreast of the program status and be in a position to immediately respond to any congressional concerns. Therefore, when asked to formulate our position on the Air Force's cost and performance estimates, we were positioned to quickly examine the estimating methodology and their underlying assumptions. We also performed a sensitivity analysis to determine the impact Air Force assumptions had on the final projected cost. Our immediate task was to transform this analysis into suitable testimony.

Review channels for this information are extremely limited. Few GAO personnel have the appropriate clearances to even see such highly classified material. In our case, none of our regional management had been cleared. As a result, there was no buffer between our product and division review; we were responsible directly to these people for answers about what we did and how we had arrived at our conclusions.

Therefore, we scrutinized every word, both in our product and in its documentation, and discussed the contents and results of our analysis with the Air Force in an attempt to minimize any problem areas. We also extracted key unclassified workpapers and placed them in a backup book to help jog our memories during the upcoming hearings. We were now prepared to present this information to the three people in Washington cleared for the program—the Group Director, the Associate Director, and the ACG. As we braced ourselves for the coming week, we made the necessary arrangements to get the classified data to Washington.

The Logistics

Traveling with classified information can make some routine things a little more difficult and others impossible. For instance, courier procedures require that two people be in continuous control of classified material. This required careful planning and some inconveniences. We survived, of course, but once in Washington began to feel the other inconveniences of working under such tight restrictions. For most of the day, we were sequestered in a secure conference room with no view to the outside world; there we brought management of the National Security and International Affairs Division up to date on our work and planned the upcoming testimony.

By the end of the meeting, several questions had been identified that needed to be resolved, as well as several changes that needed to be made to our testimony. Such seemingly small matters became problems. Everything had to be typed by Air Force support personnel since our secretaries and word-processing equipment had not been cleared to handle this level of classified information. As we realized that significant retyping would be necessary, we contacted Air Force personnel in the Pentagon to arrange for staff and equipment.

We began the next day—the day before the hearings—where we had ended the previous day, with a stop at the Pentagon to retrieve our documents. Under DOD's security rules, none of the material could be kept in the GAO Building. We spent the

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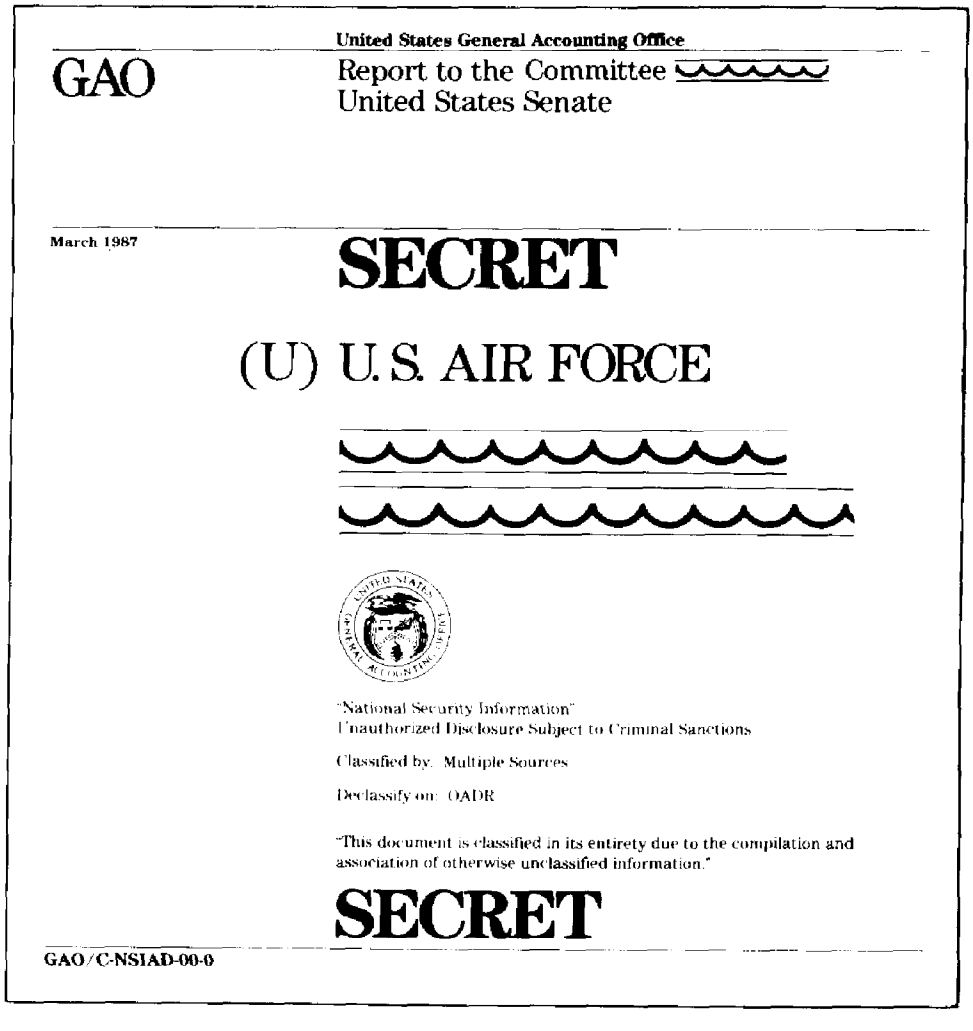

United States General Accounting Office

GAO

Report to the Committee
United States Senate

March 1987

SECRET

(U) U.S. AIR FORCE

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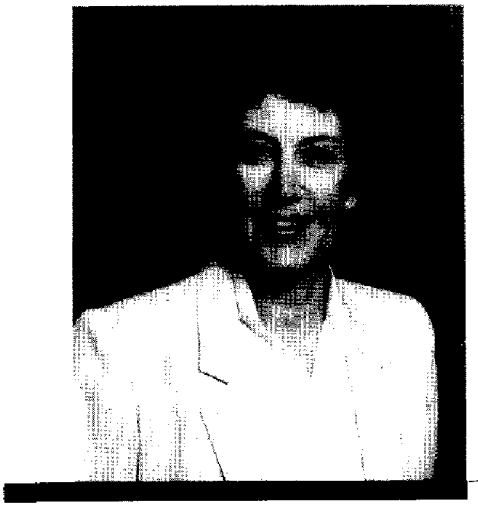

A Week's Worth

Nancy Ragsdale

Ms. Ragsdale joined the National Security and International Affairs Division (NSIAD), Security and International Relations Subdivision, as a Writer-Editor in March 1984 and currently serves there as a Reports Analyst. Previously, she worked as Assistant to the Speechwriter in the Office of the Chief of Staff, Army, in the Pentagon. Ms. Ragsdale belongs to the Woodbridge Honors Organization at Northern Virginia Community College (NVCC), where she is seeking an associate degree in liberal arts. She received an honors award from NVCC in 1986 and a Special Commendation Award and an Outstanding Achievement Award from NSIAD in 1985.

Nervous excitement describes my feeling as I walked through those automatic doors leading to the National Security and International Affairs Division 3 years ago to take a position as Writer-Editor. Compared with the sometimes claustrophobic halls of the Pentagon, where I had worked as an Assistant to the Speechwriter for the Army Chief of Staff, GAO seemed spacious and airy. Instead of sharing one cramped, insipid green office, including three desks, numerous dusty safes, bookshelves, and a gurgling coffeepot, I was now to have a cubicle with bright orange walls, a wooden-topped desk (okay, so it was fake wood), a long work table with bookshelves, and a file cabinet—all to myself. I have learned much since then. For instance, I've learned that handling two or three reports at one time, each at different stages of processing, is not unusual here, and that each day brings unexpected interruptions. However, I don't mind. The unanticipated happenings of the day make my work even more challenging. I've also learned that versatility, organization, and negotiation are necessary skills for a writer-editor in GAO. Though each day is always somewhat different, I've tried to show what a typical workweek looks like for me.

Monday

Getting myself up in the dark at 5 a.m. for an hour-long commute from Dale City, Virginia, to Washington would definitely be out of the question if I weren't a morning person. Fortunately, my brain functions best at this time of day. So I am at my desk at 7:30 a.m., editing a report on the nuclear winter theory. Several months ago, I attended two brainstorming sessions to talk about the report's organization with Group Director Val Bielecki, Evaluator-in-Charge Barry Holman, and Evaluators Paul Bollea and Tony Pierce. It was obvious from these meetings that this team was dedicated to creating an effective report. The team rejected my suggested report title—*Nuclear Winter: A Chilling Prospect*—but that began a flurry of equally "cool" titles, and the humor helped ease the tension when two different perspectives were being discussed with each of the parties having very strong convictions. After many more meetings and rewrites, a little shouting, and some gnashing of teeth, the team produced a well-written report that required little reorganization. I begin to copyedit it (correcting grammar, punctuation, spelling, and format problems). As I read the report, I find myself wishing that scientists knew more about the theory than they seem to. The worst-case scenario described in the report makes a postnuclear future (if indeed there would be a future) look even more bleak than I had thought possible.

At 10:30 a.m., Evaluator Pierre Toureille comes to see me with a draft of one appendix to his report on the National Endowment for Democracy (NED). He has been composing the report on one of our new personal computers and plans to insert my editing corrections as soon as I review each section. He wants to give our Associate Director, Joan McCabe, the report with my changes already incorporated. I have reservations about reviewing the draft piecemeal, but Pierre assures me that I will see the complete draft before he gives it to Joan to review.

I usually review a draft in its entirety because it is much easier to spot organizational problems and message flaws. I can then answer the questions that arise from this review. For instance: Does the report answer the request? Does the evidence support the findings and conclusions? Is the message logically and clearly stated?

After a turkey sandwich in the cafeteria and a walk around the building at noon, I attend a meeting of a committee set up to revise the *GAO Style Manual.* The manual covers various details about GAO's writing policy on—among other things— footnotes, bulleted items, and sexist language. The committee members, headed by Jean Knowles from our Writing Resources Branch, are congenial and hardworking. The exchange on mutual editing problems, as well as problems pertinent to each division, has been a beneficial learning experience for me.

At our meeting today, we discuss the draft of chapter 1 of the manual, which covers words—preferred spelling, proper word division, and how to make and use compounds. We work steadily to finish this chapter so that it can be distributed to writer-editors in the divisions and regions for comment.

When I return to my office from the meeting, I continue to work on Pierre's draft appendix. The rest of the afternoon passes quickly; as I begin to pour one last cup of coffee, I see that it is almost time to go home.

On my way to the elevator, I am thinking about my Monday evening American literature class. We will be discussing Hemingway's writing style tonight—a refreshing change from my daily reading.

Tuesday

Since Frank Conahan, Assistant Comptroller General for National Security and International Affairs, will testify on the Hill tomorrow at 2 p.m., I know that today will be hectic. Tomorrow's testimony will be his third on humanitarian assistance to Nicaragua—a topic that's been debated in the *Washington Post* for months. Even the comic strip "Doonesbury" has commented on GAO's contribution to the discussion on Contra aid.

By 9 a.m., Group Director Stew Tomlinson and Evaluator Pat McCracken have arrived from the Pentagon audit site and we are poring over the final draft. As it turns out, the "final" draft needs further revision. The tension begins to build, and the pace quickens as time passes and more changes are necessary. A copy of the testimony must be taken to the Hill 24 hours in advance. As often happens, we are working on the final version up to the last minute. As 12:30 p.m. approaches, Joan is in the Micom room, reading changes to Brenda Washington, one of our secretaries, as Brenda types them into the text. As soon as the pages are printed, I am reading them and making corrections. Brenda makes repeated revisions on the word processor, but I've never heard her say, "You mean you're making changes on that draft *again?*"

After reading through the testimony one more time, the draft is ready for Mr. Conahan's approval. We are all relieved that his changes are minor; copies are made and quickly hand-delivered to the Hill and the Office of Congressional Relations. Although it is almost 3 p.m., I ask Shirley Smith at the control desk for the rest of the copies (350) to be printed by 10 a.m. tomorrow. Shirley keeps her composure but gives me a skeptical look. However, I know from past experience that the job will be done on time.

Wednesday

I am not surprised when Shirley calls at 8:30 a.m. to say that copies of the testimony are ready. I hurry to deliver the testimony to the Office of Public Information and Jean Saunders, secretary to Mr. Conahan, and then bring the remainder of the copies to our office.

Joan McCabe and I have a meeting at 9:30 a.m. with Group Director John Payne and Evaluators John Gallant and Joe Brown of the State Department audit site. We will be discussing a draft report about ship travel for State Department and U.S. Information Agency employees who are returning to the United States for leave or for reassignment from overseas. One family's trip up the Mississippi by riverboat has resulted in a congressional inquiry. John and Joe have thoroughly investigated the subject and have gathered an extensive amount of detailed information. John goes over the findings with us, and after some discussion, we all agree that a letter report with appendixes containing the details will be the best way to present the facts. John and I will work together to come up with an outline.

After our meeting, I join several evaluators from the site for lunch in the State Department cafeteria. We enjoy a leisurely meal while exchanging news from each of our offices, and then I head back to the main building.

As soon as I arrive back at my desk, Pierre brings me two draft pie charts for his NED report. By this time, Pierre is addressing me as "the Ed" (short for editor), and he has become "Mr. Ned." I visit Julio Luna in the Visual Communications Branch to discuss the figures. After we agree on which layout will best serve the report, I turn the figures over to him.

H. C. Young, an Evaluator from our Crystal City audit site, is waiting for me with 20 pages that he wants made into view-graphs for a briefing on a draft report on Southwest Asia. The view-graphs will be classified, so I check with the Office of Security and Safety on appropriate security procedures before heading back to Julio for instructions on how to make them.

View-graphs done, I prepare for an 8 a.m. conference on Thursday with an evaluator

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Evaluator Davi D'Agostino (L) confers with the author about a draft audit report.

Legislative Developments

Craig Winslow

Mr. Winslow joined GAO as a Legal Intern with the Office of the General Counsel in May 1986 and will become a Staff Attorney when he completes law school at Catholic University in 1987. Before coming to GAO, Mr. Winslow was an Extension Agent with the Virginia Cooperative Extension Service and worked for the American Psychiatric Association. He holds a B.S. and an M.S. in management, housing and family development from Virginia Polytechnic Institute and State University.

The author is flanked by Senior Attorneys Raymond J. Wyrsch (L) and Richard Kasdan (R), both of whom helped to prepare this article.

Control of Waste, Fraud, and Abuse: A Common Theme in Recent DOD Legislation

A common theme of recent legislation concerning the Department of Defense (DOD) has been an effort to control waste, fraud, and abuse. This drive has come in the wake of sharp increases in DOD appropriations and a mounting federal deficit. Highly publicized instances of waste, fraud, and abuse have given DOD critics support in their efforts to curtail DOD funding. Revelations about overbilling by defense contractors have led to indictments. Concerns have arisen that activities of individuals within DOD and the private sector defense industry indicate conflict-of-interest problems. Cost overruns and inflated prices for spare parts and small items have contributed to these concerns. Consequently, the perception has arisen that reforms are needed. As President Reagan said when he announced formation of the President's Commission on Defense Management (Packard Commission) to study the problem, "Waste and fraud by corporate contractors are more than a ripoff of the taxpayer—they're a blow to the security of our nation. And this the American people cannot and should not tolerate."

Because DOD is unique, it often must operate differently than other government agencies. For example, for DOD to follow

the same procurement procedures as other agencies is not always feasible. However, in recent years, there has been an effort to introduce more competition into defense acquisitions as a way to combat waste, fraud, and abuse.

The 99th Congress devoted substantial time and effort to addressing issues related to waste, fraud, and abuse. This article highlights some provisions in legislation passed by the 99th Congress to deal with these issues.

Defense Procurement Improvement Act of 1985

The Defense Procurement Improvement Act of 1985 (title IX of the Department of Defense Authorization Act, 1986, P.L. 99-145), passed in the first session, contains various measures intended to improve the efficiency and integrity of the DOD procurement process. Measures calculated to combat waste, fraud, and abuse include those discussed below.

Unallowable Costs. When submitting proposals for settlement of indirect costs, contractors are required to certify that the proposal contains only costs allowed by specified cost principles.[1] If the proposal includes unallowable costs, the Secretary of Defense shall assess a penalty against the contractor in an amount equal to the unallowed cost plus interest. Unallowable costs include expenses for entertainment, alcoholic beverages, and country club memberships. If a contractor knowingly requests reimbursement for unallowable costs, the Secretary shall assess a penalty, in addition to the above, in an amount equal to two times the costs, plus an additional penalty of not more than $10,000 per proposal.

Acquisition Strategies. Recognizing that competition often promotes cost effectiveness, the act directs the Secretary to develop and report to the House and Senate Committees on Armed Services on an acquisition strategy before beginning full-scale development on any major defense acquisition program. Such strategies must provide for competitive alternative sources for the system and each major subsystem. The Secretary is directed to adhere to the strategy and may implement revisions in it only after notifying the Committees and waiting 60 days. The Secretary is also directed to establish and report annually to the Congress goals for the percentage of defense procurements that will be awarded competitively during that year.

Spare Parts. Acknowledging that management problems (e.g., purchasing parts in very small and thus highly uneconomical quantities) have "in some instances" caused DOD to pay unreasonably high prices for spare parts, the Congress also directed the Secretary to report to the Committees the actions taken to remedy this problem. If the Secretary finds that remedies have not been effective, he is to issue proposed regulations or, if necessary, submit proposed legislation. These provisions were in addition to earlier requirements in the Department of Defense Authorization Act, 1985 (P.L. 98-525) that the Secretary promulgate regulations regarding allocation of overhead costs by defense contractors in the pricing of spare parts.

DOD had urged the Congress to withhold enactment of legislation and to leave it to DOD to resolve problems of waste, fraud, and abuse in acquiring spare parts. These provisions, however, suggest the Congress' disappointment with DOD's progress in this area.[2]

Should-Cost Analysis. The Secretary was also instructed to report plans for performing should-cost analyses on major defense acquisition programs. Should-cost is a technique for evaluating ongoing production programs to identify inefficiencies in the contractor's management and operation. Many experts believe that such analyses, which are particularly valuable in continuing sole-source procurements, can help program managers negotiate the most favorable prices on major weapon systems.

Cost and Price Management. The act requires DOD to ensure that in certain situations, contractors' proposed and negotiated cost and pricing data are recorded for such categories of expenses as labor, materials, subcontracts, and administration. Contractors are required to provide a bill of labor to reflect industry standards and an estimate of the labor required. Such records are intended to prevent contractors from reaping windfalls when their costs turn out to be less than originally anticipated and to highlight instances where labor costs exceed estimates. Because of concerns expressed about increased paperwork, language was included to specify that no contractor may be required to submit information that the contractor did not already collect for its own use.

Contracted Advisory and Assistance Services. The legislation requires the Secretary to establish accounting procedures to identify and control the cost of advisory and assistance services provided by contract to the military departments. These costs are to be specified fully in documents presented in support of the DOD annual budget. In the past, monitoring such costs has been difficult because they were not separately identified and there were no precise definitions for their sources.

Conflicts of Interest. To deter a DOD procurement official from favoring a contractor in connection with a particular procurement, the legislation establishes certain restrictions on the postemployment opportunities of that official. A presidential appointee who acts as a primary government representative in negotiating a government contract is prohibited from accepting employment from that contractor for 2 years after terminating such activity. A conviction for a knowing violation may result in a fine or a jail term for the employee. In addition, all contracts must provide for liquidated damages to be paid by the contractor in the event of such a conviction.

The Congress also upgraded the reporting and disclosure requirements for former DOD employees who continue their careers in the private sector defense industry. Another section provided that if a defense official involved in procurement is in contact with a defense contractor regarding future employment, the official must promptly report such contact and be disqualified from further participation in procurement related to that contractor.

Additional Provisions

The Department of Defense Authorization Act, 1986, includes several additional measures reflecting efforts to combat waste, fraud, and abuse.

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[1]Subsequently, in the Department of Defense Appropriations Act, 1986 (P.L. 99-190), revisions were made requiring the Secretary to report any substantive changes in unallowable cost regulations and directing the Comptroller General to evaluate the Secretary's implementation of the provisions.

[2]For an evaluation of DOD's efforts to improve its acquisition process, see these reports: *DOD's Defense Acquisition Improvement Program: A Status Report* (GAO/NSIAD-86-148, July 23, 1986) and *Acquisition: Status of the Defense Acquisition Improvement Program's 33 Initiatives* (GAO/NSIAD-86-178, Sept. 23, 1986).

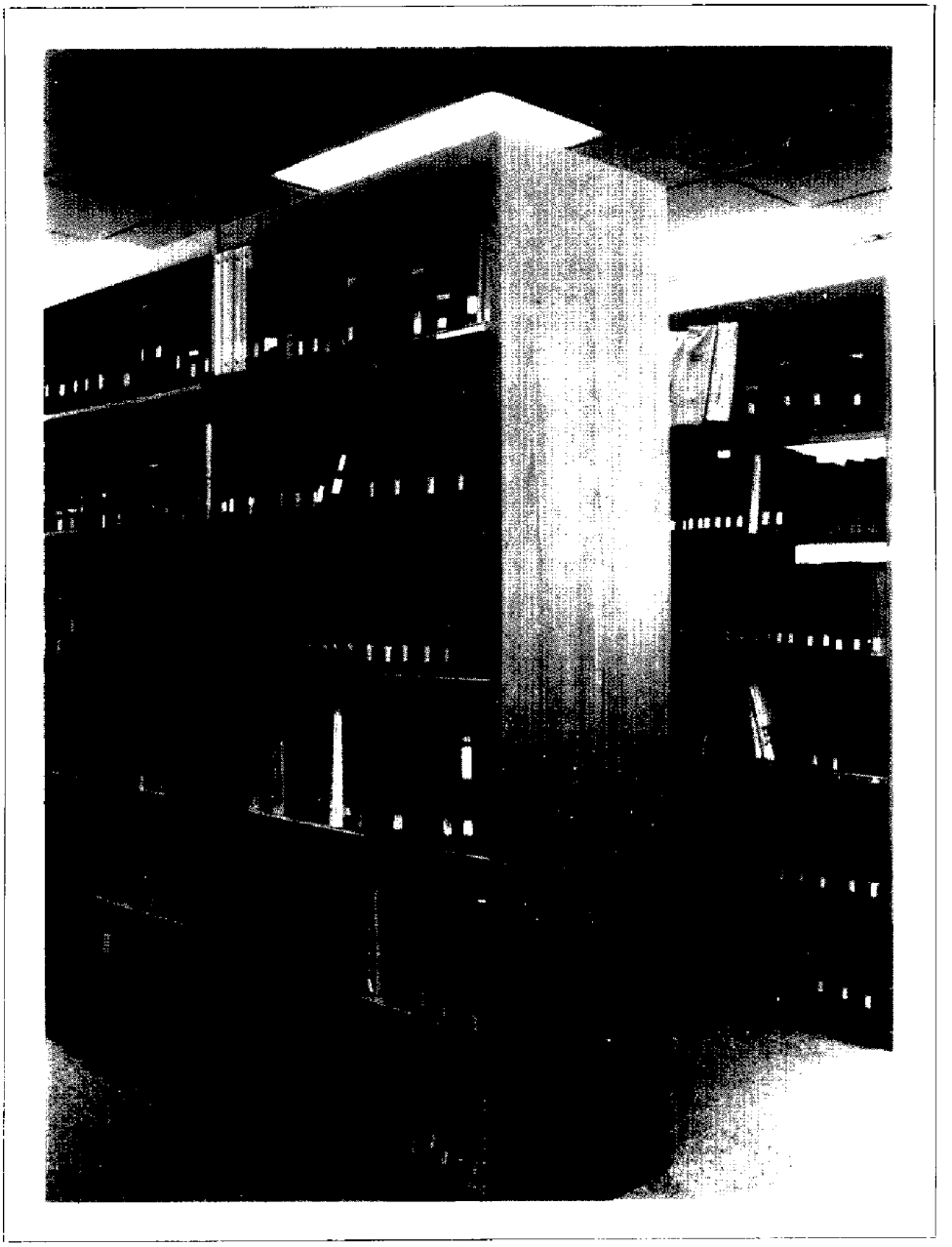
Certification Requirements. One strategy employed to promote cost-effectiveness of major defense acquisitions is the use of certification requirements. The act directs the Secretary to certify to the Congress that specific goals (e.g., design completion, cost reduction, weapons testing) have been achieved before additional funds may be obligated. Such requirements establish the Secretary's accountability for progress made on the acquisition and give all parties an incentive to attain timely results in project development and testing.[3]

Selected Acquisition Reports. Since 1969, a Selected Acquisition Report (SAR) has been a primary way that DOD has reported to the Congress on the status of major weapon system acquisitions. The SAR contains information on the cost, schedule, and performance of such systems compared with previously established baseline values. DOD recently revised the SAR format and deleted some items. In the Department of Defense Authorization Act, 1986, the Congress mandates that SARs include specific information, such as descriptions of systems and missions and information about ceiling prices on current contracts, that the Committees have found helpful in evaluating DOD acquisitions.[4]

Defense Acquisition Improvement Act of 1986

During the second session of the 99th Congress, this act[5] was passed. It represents a major attempt to promote integrity and efficiency in the DOD procurement process. It implemented many Packard Commission recommendations. The Commission's final report, issued in June 1986, was prepared to help the President and the Congress initiate a wide range of management improvements at DOD.[6]

Under Secretary for Defense Acquisition. The new law defines the role of the Under Secretary of Defense for Acquisition (USD-A), whose position was established by the Military Retirement Reform Act of 1986 (P.L. 99-348). The USD-A will be appointed from civilian life by the President,



[3]GAO was recently asked to report on such a certification and issued these reports: *Missile Development: Advanced Medium Range Air-to-Air Missile (AMRAAM) Certification Issues* (GAO/NSIAD-86-124BR, July 9, 1986) and *Missile Development: Status of Advanced Medium Range Air-to-Air Missile (AMRAAM) Certification* (GAO/NSIAD-86-66BR, Feb. 18, 1986).

[4]In the conference report (H. Rept. 99-235), GAO was directed to submit comments and recommendations to the Congress for improving the SAR format. See *Selected Acquisition Report: Suggested Approaches for Improvement (GAO/NSIAD-86-118, July 17, 1986)*. DOD subsequently recommended specific revisions in the SAR format that were later incorporated into law. Also, Committee members have suggested that further revisions may be mandated after further review.

[5]Its legislative history is particularly interesting. It was first passed by the Congress as title IX of the National Defense Authorization Act for Fiscal Year 1987 (P.L. 99-661), but it was also incorporated into the DOD portion of the continuing resolution (P.L. 99-500) that was signed by the President first. After the latter was signed, it was discovered that several pages were missing; the act was reassembled and signed again (P.L. 99-591).

[6]The main points of the Packard Commission's report were discussed by its Chairman in a recent article. See David Packard, "Improving Weapons Acquisition: What the Defense Department Can Learn from the Private Sector," *Policy Review*, Summer 1986, pp. 11-15.

by and with the advice and consent of the Senate. The USD-A will be responsible for setting overall acquisition policies related to procurement, research and development, logistics, developmental testing, and contract administration. While the authority of the Inspector General to establish audit policy is maintained, the USD-A will work with the Inspector General to coordinate such policy with the oversight of contractor activities to prevent duplication of effort.

Enhanced Program Stability. New provisions require that a military department establish a baseline description for each major acquisition program that enters full-scale engineering development or full-scale production. The baseline for the full-scale development stage must include performance goals for the weapons, their technical characteristics and configurations, total developmental cost, and a schedule of developmental milestones. For the production stage, the baseline must include a description of the performance of the weapon system, its technical characteristics and configurations, the number of end items, a schedule of developmental milestones, testing results, initial provisioning, and total procurement costs. A deviation report must be prepared whenever there is reasonable cause to believe that there will be a departure from the baseline description.

Streamlined Acquisitions. In response to recommendations made by the Packard Commission, the act includes measures for selecting three defense acquisition programs to be expedited by use of streamlined procedures. These procedures include a shortened chain of command, less program review, and personnel evaluations directly related to achieving program objectives.

In addition, once a major acquisition program is ready for full-scale engineering development or full-scale production, the Secretary may designate it to be considered for milestone authorization. If a program is approved by the Congress for such status, funds shall be authorized for full funding on the engineering development or production stage for up to 5 years. More stable funding should enable DOD to use management techniques designed to improve cost control and scheduling.

Nondevelopmental Items. To establish a preference for the purchase of items already in the commercial marketplace, which are usually much cheaper than items developed solely for DOD, the act specifies that procurement requirements be described such that nondevelopmental items can be used (i.e., the requirements are stated in terms of functions to be performed). The Comptroller General must independently evaluate the Secretary's actions in complying with this requirement.

Undefinitized Contractual Actions. The new law places a 10-percent limit on the proportion of total funds that may be committed for undefinitized contractual actions (UCAs). A "UCA" is defined as a new procurement for which the price, contractual terms, or specifications are not determined before performance begins. However, several types of contracts, such as those for foreign military sales, purchases of less than $25,000, and congressionally mandated long-lead procurements, are excluded from this definition. The Secretary may waive the limitations for national security or public safety concerns but must notify the Committees of such waivers.

Competitive Prototype Strategies. Another device employed by the Congress to promote efficiency is a requirement that the Secretary use a competitive prototype strategy in developing any major weapon system. This requires that each contract be entered into with not less than two contractors using the same combat performance requirements, for the competitive design and manufacture of a prototype system for developmental testing and evaluation. Subsequent testing of such systems must be done in such a manner as to facilitate accurate comparisons. In addition, each contractor must submit full-scale cost estimates before testing begins.

Survivability, Lethality, and Operational Testing. The act requires that major conventional weapon systems undergo specific tests before proceeding beyond low-rate initial production. These requirements include (1) a realistic survivability test for any major system or one with features designed to protect users, (2) in the case of major munition or missile programs, realistic lethality tests, and (3) for any major defense acquisition, operational tests and evaluation. Each category of weapons and each type of tests are described at length in the act.

Commercial Pricing Information. The act clarifies existing legislation requiring contractors to certify, when other than competitive procedures are being followed, that their offering prices are no greater than their lowest prices for commercial customers. The act clarifies these requirements in the following respects:

- The provisions apply only to spare or repair parts rather than all items of supply.
- Sales to the federal government may be excluded in calculating a contractor's lowest commercial price.
- Contracts made using simplified small purchase procedures are exempt.

Conflicts of Interest. The act also strengthened the conflict-of-interest provisions applicable to DOD procurement personnel. Former DOD officers or employees above a certain rank or being paid above a certain rate are forbidden to accept compensation from a contractor for 2 years after leaving federal service if they fall within one of the following three categories:

- people who on a majority of their working days during their last 2 years of service performed a procurement function principally at a site or plant owned or operated by the contractor,
- people who participated personally and substantially in procurement functions (e.g., decision-making) related to a major defense contract and in this capacity had contact with the contractor, or
- people who acted as primary DOD representatives in negotiating a settlement of a contract with the contractor or an unresolved contractor claim exceeding $10 million.

Anyone who knowingly violates these restrictions may be fined up to $250,000. In addition, an employer who knows or should have known that such employment was prohibited may be fined up to $500,000. However, these new restrictions do not apply to contractors with aggregate total DOD contracts under $10 million.

The act also requires defense contractors to include in each contract valued in excess of $100,000 a provision not to compensate anyone violating the conflict-of-interest restrictions. Knowing violation of such a clause makes the contractor liable to pay liquidated damages of $100,000 or three times the compensation paid. Detailed reporting requirements related to employment of former DOD employees are also imposed.

"Whistleblower" Protection. In providing greater protection for "whistleblowing" employees of defense contractors, the act prohibits contractors from discharging or otherwise discriminating against em-

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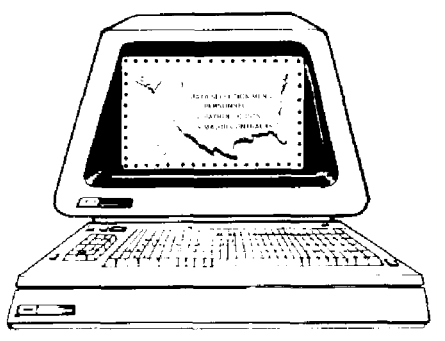
Briefcase (continued from page 3)

Selected Manpower Statistics. Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports. GPO stock number: 008-000-00451-0 (FY 1985 ed.). Price each: $9.50, domestic, and $11.90, foreign.

Provides current and historical manpower data on active military, civilian, and retired military personnel of DOD according to military department and/or DOD component.



Special Periodical Issues

Special issues of periodicals often provide a unique and valuable source of reference information. Updated annually, their scope ranges from directories of manufacturers and equipment to photographs of senior military officers. Some of the most significant special issues of periodicals in the military and national defense field are listed below.

Air Force Magazine. USAF Almanac issue. Published annually in May.

Contains information on the composition and activities of the Air Force and includes reports from the major commands and Air Force departments. Also includes guides to Air Force weapons, bases, and research and development facilities.

Aviation Week and Space Technology. Aerospace Directory. Published annually in December.

Analyzes legislation that sets rules and regulations regarding procurement. Contains an index of aerospace equipment, components, materials, and services. Lists the names and locations of aerospace product manufacturers.

Army Magazine. Army Green Book. Published annually in October.

Contains status reports on Army commands. Features a directory of Army posts worldwide.

Defense. Almanac issue. Published annually in September.

Contains an evaluation of the national defense structure and presents organization charts (including photographs) of all branches of DOD.

National Defense. Partners in Preparedness. Published annually in May.

Lists American corporations belonging to the American Defense Preparedness Association, with photographs and statements of their executives.

Proceedings—U.S. Naval Institute. International Navies issue. Published annually in March.

Contains reports and articles about foreign navies and their organization and capabilities.

Proceedings—U.S. Naval Institute. Naval Review issue. Published annually in May.

A review of naval operations, personnel, and weapons. Includes portraits of officers of flag rank in the Navy, the Coast Guard, and the National Oceanic and Atmospheric Administration and general officers of the Marine Corps.

There are many other reference sources for research in national defense issues, ranging from documents such as congressional hearings, budget justifications, Selected Acquisition Reports, and service regulations to commercial loose-leaf services and annual volumes describing individual weapon systems. For a selected list of additional information resources available to GAO personnel through the Technical Library, refer to *National Defense Issues: GAO Research Guide.* ■

Location (continued from page 10)

February 23: Radio Veritas broadcasts an appeal to the people to form a human barricade around the Defense Ministry compound in order to show their support of the rebels. Within hours, thousands of people respond to the appeal, closing the roads outside to traffic. That evening, the hotel desk clerk informs me that Marcos has already left Manila for Clark Air Base, but this rumor turns out to be false.

February 24: Rebels take over Channel 4. In fact, Marcos is in the middle of a press conference when they pull the plug. The next day, Channel 4 returns to the air—a woman wearing a yellow headband appears on the screen and says simply, "Welcome to the new Channel 4, the people's station."

February 25: Since it seems we are not going to do any more auditing, all parties agree the time has come to say our goodbyes and head back to Honolulu and Washington, D.C. However, not many planes are flying. Packed and ready to go, we stay near the hotel. While sitting around the hotel pool, we observe a couple of F-5's flying overhead. No one seems to know whose side they are on, but they buzz around for awhile and fly off. Incredibly, that afternoon, Marcos holds his inauguration that his Vice-President chooses not to attend. Channel 9 is broadcasting the inauguration when it, too, goes blank. At this point, I think all of us feel somewhat like we're in the middle of a Fellini film, with events swirling around us.

That night, apparently convinced by the U.S. government that his fall is inevitable, Marcos flees the Philippines via Clark Air Base.

February 26: I go outside early to buy the morning papers. Huge headlines greet me: "IT'S ALL OVER, MARCOS FLEES." The Embassy informs us that we are now booked to leave that afternoon on a Japan Air Lines flight. I phone friends to say goodbye—we all feel a bit shell-shocked from the recent events but hope that life will improve under the new government.

February 26, 1:10 p.m. We depart Manila for Tokyo via Japan Air Lines flight 742. ■

Manager's (continued from page 14)

GAO has made a concerted effort to communicate more freely with the Department of the Navy than in the past. The new spirit of cooperation has permitted the Navy to work with GAO rather than against it. The services would have a more positive relationship with other audit/inspection agencies if those agencies were to adopt the free and open communication policy fashioned by GAO.

Other constructive, helpful changes include
- reduction in "inflammatory" audit report titles,
- increase in audit entry/exit conferences,
- participation in the Executive Exchange Program,
- participation in executive orientation tours and briefings, and
- attendance at the Naval War College.

Programs such as the Executive Exchange Program, in which GAO's Senior Executive Service members participate, and the Naval War College educate both groups—GAO and the Navy—to appreciate the efforts of all involved.

Entrance and exit conferences have improved tremendously. Entrance conferences are important because they tell the Navy exactly what GAO is looking for. Exit conferences are even better because here GAO provides the Navy the opportunity to ensure that GAO has obtained all the facts. Both parties can separate the facts from subjective judgments. If the Navy agrees with GAO on the facts, then conclusions and recommendations will fall into place. The importance of exit conferences with GAO is also stressed with Navy staff. These conferences can benefit the Navy. There should be no surprises in the audit report. Interim meetings and informal discussions are also good.

I see things moving in a very positive direction, but a few staff are still operating under the old scheme of things. GAO and the Navy need to open up communication channels and let the information flow back and forth with each other instead of dealing at arm's length.

4. What do you see as the particular strengths of GAO?

Among the most significant strengths of GAO are the breadth and depth of experience that characterize the GAO staff, its accessibility to all areas of the federal government, and its recently adopted policy of communicating freely with the services at all levels of management.

5. Do you think that GAO is objective in reporting the results of its work?

Generally speaking, GAO reports present a balanced picture of the issue at hand. A notable exception was the GAO study of strategic homeporting, cited earlier, which appeared to be less than fair in that it failed to address the validity of the underlying purpose of the homeporting plan. Rather, it dealt with the plan strictly from a cost point of view and did not comment on the fact that the Navy had never conceived the strategic homeporting proposal as an economy measure.

Another example of less than fair treatment was a GAO study on the Navy personnel pay system. The study was subjective, and some of the findings were outside the scope of the audit.

6. Are you and/or your key managers comfortable with the quality/competency of the GAO staff?

Generally, yes. Some members of the GAO staff are more competent than others. Also, some staff members have not embraced the new GAO philosophy of open communication.

7. What are some things that GAO can do to improve the way it carries out its assignments?

A variety of items come to mind. These include the following:
- Do not duplicate the efforts of other audit/inspection agencies. Work with these agencies and if there is an overlap, share the work and the product. We need better coordination at the audit planning phase and utilization of service internal audit work instead of service duplication.
- Maintain and increase productive communication channels between GAO and the services.
- Expand recent initiatives.

GAO and the Navy need to institutionalize and gather momentum. Great strides have been made in the area of objectively assisting Navy management to improve as opposed to subjectively finding fault. The greatly improved climate of cooperation is producing tangible results. The Navy is in a position of using GAO's products to improve the way in which it manages rather than spending its time trying to refute GAO's subjective findings. There are still some notable exceptions to the above, but they are decreasing in frequency. ■

Topics (continued from page 16)

erly Hills, Calif.: Sage, 1982. The ideas of gross and net outcomes of social pro-

grams, outlined in chapter 5, are in the same spirit as those applied here.

Tsipis, K. "A Question of Quality: U.S. Military R&D," in Tsipis, K., and P. Janeway (eds.), *Review of U.S. Military Research and Development: 1984*. Washington, D.C.: Pergamon-Brassey's, 1984. An overview of some early test results for the Copperhead shell, as well as those for several other weapons. ■

Stronger (continued from page 20)

tant and controversial issues. While DOD's investment in space activities has increased substantially in recent years, past investments will look pale compared with what could be spent developing and deploying future space weapons. Interest in the military's use of space will likely continue to grow as issues surrounding the militarization of space evolve and funding requirements increase.

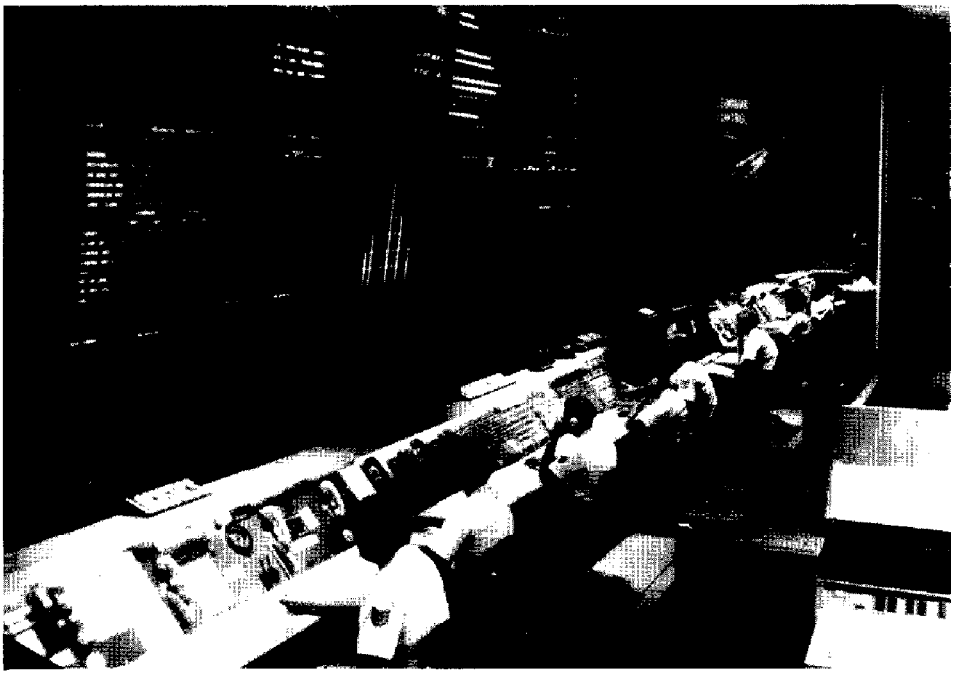
The Air Force and the Navy have created space commands to carry out operational management of their space systems. All three services are involved in research and development to improve existing and developing space systems to support strategic offensive and defensive missions.

GAO is increasingly involved in space-related issues, including assessing the adequacy of U.S. planning for the military use of space and determining whether these plans are being effectively implemented and coordinated. It is also reviewing DOD's hardware demonstration experiments to determine the feasability of developing and deploying ballistic missile defense systems.

Managing Command, Control, and Communications Systems

Command, control, and communications (C3) systems are vital links in an effective U.S. military capability. These systems enable civilian and military commanders to assess enemy attacks and direct and control military forces and weapons. They constitute a network of command centers, sensors, computers, communication links, and other support systems. Over the next 5 years, DOD will be asking for over $100 million for C3 programs.

In its audit work, GAO will focus on issues related to the survivability and interoperability of C3 systems and the effectiveness of electronic combat countermeasures.



Command post area of Strategic Air Command Headquarters, Offutt Air Base, Nebraska.

Source: U.S. Air Force.

Concluding Comments

Where public funds are spent, the U.S. system of government requires accountability. It is in the asking and answering of questions on the efficacy and management of public programs that efficiency and effectiveness are judged and accountability is achieved. GAO has a very important role to play in assisting the Congress in its oversight function. As we look to the future, we see a continuing struggle to balance the need for fiscal constraint with the need for a sound and effective defense. This is the overriding issue facing the Congress, and it is increasingly looking to GAO for help.

I have tried to briefly describe the many issues that the National Security and International Affairs Division of GAO addresses as it attempts to fulfill its responsibilities. The issues are by no means complete, but they do adequately show the breadth of the work we do. Anyone interested in a more complete discussion of the major defense issues is encouraged to read *Major Defense Issues Being Addressed by the General Accounting Office* (GAO/NSIAD-85-42, Mar. 1, 1985). ■

Procurement (continued from page 23)

hoc studies. GAO believes legislation is needed to establish a profitability reportin, system to collect consistent and verifiable data from contractors annually. Reporting would be mandatory. The repository of this data should be an executive branch entity, and proprietary data should be protected. In November 1986, GAO published for comment an exposure draft setting forth in some detail a proposal for a program to study the profitability of government contractors.

The data would need to be accessible for use in auditing the implementation of the studies and their substantive results. GAO is working on the framework for such a system. The data collected through such a system could be used for periodic evaluations of the results of DOD's profit policy and provide the basis for formulating future policy.

Competitive Contracting

Historically, the Congress has encouraged greater competition in defense contracting. DOD, however, frequently awards noncompetitive, or sole-source, contracts. In fiscal year 1985, the Pentagon awarded $164 billion in contracts, of which $96 billion worth (or 59 percent) was noncompetitive.

In response to concerns over unnecessary sole-source procurement, the Congress enacted the Competition in Contracting Act of 1984. The act seeks to reduce the number of sole-source contracts by requiring full and open competition and establishes enforcement mechanisms to ensure compliance. **See Procurement, p. 48**

Procurement (continued from page 47)

GAO played a significant role in developing this legislation. GAO issued reports demonstrating the need for more competition in defense and civil agencies' contracting. GAO staff worked closely with the Senate Committee on Governmental Affairs and the House Committee on Government Operations for 2 years in drafting and refining this legislation and providing extensive testimony. In a letter expressing his "deep appreciation," Congressman Jack Brooks stated that "Without a doubt, this is the most important procurement legislation enacted in several decades."

In August 1985, GAO reported that governmentwide acquisition regulations were not consistent with the act's requirements or congressional intent. GAO also concluded that many agencies had not revised their own acquisition regulations to conform to the act. In response to GAO's recommendations, governmentwide regulations have been revised to (1) limit noncompetitive awards based on follow-on contracts and the acceptance of unsolicited proposals, (2) conform to several statutory requirements for publicizing proposed contract actions, (3) modify various provisions concerning reporting contract awards to the government's procurement data base, (4) require notification of all unsuccessful offerors, and (5) adopt several other GAO recommendations. In addition, eight executive agencies have revised their agency level regulations in response to GAO's recommendations. In the future, GAO will concentrate on reviewing agencies' contracting practices to determine whether they comply with the act.

What the Future Holds

How much should the United States spend on defense? With the growing federal deficit and the administration's commitment to continuing its emphasis on defense, this question will receive much attention in the months and years ahead. Certainly, a major part of the debate will focus on how efficiently and effectively the Pentagon procurement system functions. Defense contractors and Pentagon procurement practices will continue to be intensely scrutinized by the Congress. GAO will play a role major by assisting the Congress in its oversight activities. GAO's work at contractor locations and in such areas as profit policy, competition, and acquisition reform will be invaluable to the Congress, the Pentagon, and the public as the search continues for ways to make defense procurement spending more efficient and effective. ■

Budget (continued from page 25)

Factors That Can Enhance Budget Work

Several GAO groups in Washington and the field are developing experienced budget review staffs. Another factor that is helpful in budget work is the use of computers. GAO has developed spreadsheets comparing budget amounts that show at a glance where line item amounts have varied significantly by dollar amount or percentages from year to year or from budget submission to budget submission. GAO has also computerized other tasks, such as escalating contract amounts to future years and analyses concerning the Balanced Budget and Emergency Deficit Control Act of 1985 (popularly known as Gramm-Rudman-Hollings). GAO uses the computer for all Navy procurement budget work and for operations and maintenance budget work as well.

The Gramm-Rudman-Hollings Factor

The passage of Gramm-Rudman-Hollings to force reduction of the federal budget deficit has created increased congressional interest in GAO's budget reviews. Congressional committees responsible for the defense budget prefer to make cuts in specific programs rather than making large general reductions. GAO's work identifies reductions that can be made without adversely affecting defense posture. ■

Uncertain (continued from page 36)

must be made as needed, or strategic C3 will remain the uncertain link to the strategic Triad.

[11]*Countervailing Strategy Demands Revision of Strategic Force Acquisition Plans* (GAO/MASAD-81-35, Aug. 5, 1981), pp. 1-2.

[12]*Report of the President's Commision on Strategic Forces* (Washington: Apr. 1983), p. 10.

[13]*Countervailing Strategy Demands Revision of Strategic Force Acquisition Plans*, pp. 21-24.

[14]Congressional Budget Office, pp. 15-16.

[15]Ashton B. Carter, "The Command and Control of Nuclear War," *Scientific American* (Jan. 1985), p. 1.

[16]Weinberger, p. 216.

[17]Bruce G. Blair, *Strategic Command and Control - Redefining the Nuclear Threat*, The Brookings Institute (Mar. 1985), p. 246.

[18]Michael A. Learner and Mary Lord, "Our Archilles' Heel," *Newsweek* (May 2, 1983), p. 36.

[19]"Keeping the Lines Open During a Nuclear War," *Business Week* (Feb. 7, 1983), p. 116.

[20]Lerner and Lord, p. 36.

[21]Weinberger, pp. 211 and 219. ■

Auditing (continued from page 38)

morning following up on the ACG's comments and questions from the previous day. By noon, we had finished our work and met with him to go over the revised product and discuss the changes.

This second round of discussions resulted in additional changes to the testimony and the statement for the record. With the hearings less than 24 hours away and some lengthy revisions to be made, we returned to the Pentagon to get the final version typed. We reviewed each page as it left the typewriter and had copies made for distribution at the hearing. We then secured the documents at the Pentagon and rendezvoused at the GAO Building for our rush-hour commute back to our motel.

The Results

On the day of the hearings, we went to the Pentagon before 7 a.m. to combine the unclassified portions of our testimony with the classified. This done, we went to GAO headquarters for a morning strategy session with the ACG before the hearings that afternoon.

As we were leaving the Pentagon, the program security officer stopped us to explain that GAO, instead of the Air Force (as originally planned), would be responsible for distributing and collecting the classified testimony. The Air Force's reasoning was a little sketchy, but we had no choice but to accept this change and take responsibility for the material.

Since our Office of Congressional Relations contact was not cleared to attend the hearings and none of us knew all the Committee members who would receive copies of the classified testimony, we anticipated difficulties in controlling distribution. We needed to develop a quick, surefire plan to distribute and, most importantly, retrieve

See Auditing, p. 49

Auditing (continued from page 48)

all copies of the testimony. Our only viable alternative was to persuade the Committee staff member who was in charge of the hearing and with whom we were working closely but who was extremely busy to help us identify the Committee members. Once we had cleared that hurdle, we waited for the Chairman to convene the hearing.

The hearing went very well. Because security restrictions prohibited using microphones, a casual atmosphere prevailed. In order to hear, everyone sat close to the speakers. The Air Force presented its information on the two programs by using slides and videotape. We then delivered our testimony and fielded questions from the Committee members. This is where our extensive preparations began to pay off.

Some questions had been anticipated in our strategy session. As a result, we had prepared very convincing backup information. Our responses won no praise from the Air Force but certainly seemed to satisfy the Committee. A few representatives, however, asked our opinion on some totally unexpected topics. We fielded these questions also.

Epilogue

This story ends in the same place it began, at Wright-Patterson Air Force Base. With three more congressional requests ahead of us, we are beginning to believe that vaults, secrecy, and high pressure are standard operating procedures. However, firsthand experience has taught us many practical lessons. Most importantly, we have learned that congressional personnel believe that a GAO presence in these programs is essential. Eventually, these programs will be open to public scrutiny. Until then, we will continue to assist those in the Congress who must make decisions on these multi-billion-dollar programs. ■

Week's Worth (continued from page 40)

whose draft report I reviewed last week. I gave him my suggested changes then, and we are going over them in the morning. I want to read the draft briefly again before our meeting.

On the way home, I read for only a short while when my eyelids begin to droop. One advantage of being in a vanpool is that I can take a nap. A little sleep, I hope, will help me to be alert (and eager) in my Spanish class later on tonight.

Thursday

My 8 a.m. meeting goes smoothly. Although the evaluator and I have a lengthy session, we eventually agree on several changes and a shorter report.

Now I begin reading and editing an article on Soviet weapons procurement for this issue of *The GAO Review.* When Irene Robertson from our Report Review staff asked me to write "Week's Worth," she also asked me to help edit some of the articles from our division as they became available. Today she has brought me four articles—offering me a great opportunity to see the diversity of work done in other subdivisions. I read until a telephone call reminds me that the noon hour is here.

A couple of friends and I have lunch at an art gallery nearby. It is a gloriously sunny day, and we relax in the center courtyard amidst the giant oaks and multicolored flowers. In this atmosphere, it's hard to believe we are in busy downtown Washington.

The remainder of the afternoon brings several of the usual minor interruptions—picking up a coverplate at the control desk, looking over typeset page proofs of a draft report and explaining to the evaluators how to mark the pages, and answering their editing questions when they stop by my desk. Coordinating with people on report processing and administrative tasks are a part of my daily routine. Nancy Boward, Joan's secretary, has been especially helpful in explaining administrative details to me. She has answered (with patience) my numerous questions on forms, correspondence, and office security.

We have a lively discussion in the van tonight about the virtues of country, rock and roll, and classical music. We each have our own preferences, but our vanpool driver decides the issue (for the time being at least) since he is controlling the dial.

Friday

At 8 a.m., Joan comes to me with a draft report to reorganize and rewrite. We talk over its problems and the general direction she thinks it should take. I am looking forward to working on it.

Writing is difficult for almost everyone, and I'm no exception. Each article, letter, report, staff study—whatever—usually requires more than one or two revisions. After a careful review of the draft report that Joan has given me, I begin to organize my thoughts on how I am going to rewrite it. This is one of the most fascinating aspects of my work—gathering all the pieces of information and moving them about until they fit together as a cohesive whole. It's like putting together an intricate puzzle. I feel a great sense of satisfaction when that last piece goes into place and I have a beautiful picture before me. The evaluators generally have all the facts, but they must be presented in the best possible way. I spend the day working on this report, totally absorbed, as I concentrate on writing, rewriting, arranging, and rearranging material.

At 4:15 p.m., I leave for a relaxing weekend at Williamsburg, the historical colonial village in Virginia. An 18th-century atmosphere—with its spicy smell of ginger cakes baking; the bittersweet taste of a cold, dark ale; and the sound of horses' hooves clip-clopping through cobbled streets—will offer me a welcome change. ■

Legislative (continued from page 44)

ployees who expose "substantial violations" of law related to a defense contract, including the competition for or negotiation of such a contract. Complaints of such forbidden reprisals are to be made to the Inspector General, who must investigate and then report the findings to the Secretary, the employer, and the employee. While no sanctions are specified, the legislation states that the statutory protections should not be construed to modify or derogate any right or remedy otherwise available to the employee.

Truth in Negotiations Amendments. The act amended the Truth in Negotiations Act (P.L. 90-321, title I), which was intended to prevent unearned and excessive contractor profits. Offerors, contractors, and subcontractors must make cost and pricing data available to support new contracts or the exercise of an option or modification of an existing contract if the price is expected to exceed $100,000. The amendments define "cost and pricing data" to include information that is verifiable and could reasonably be expected to affect price negotiations but to exclude judgmental information or estimates.

Such persons are also required to certify that to the best of their knowledge and belief, the cost or pricing data submitted are accurate, complete, and current. Agency heads may waive these requirements, and contracts are exempt where prices are

See Legislative, p. 50

Legislative (continued from page 49)

based on adequate competition, established commercial prices, or legal requirements.

Contract prices may be adjusted at any time to reflect accurate data if an agency head determines that defective data were submitted. Contractors are liable for interest on overpayments resulting from defective cost or pricing data. A contractor that knew that the information was defective may be assessed a penalty equal to the overpayment.

Other Relevant Provisions

Several additional measures were also enacted in the second session in an attempt to improve DOD management. For example, in the National Defense Authorization Act for Fiscal Year 1987 (P.L. 99-661), several measures are included that offer further evidence of the Congress' determination to reduce waste, fraud, and abuse in DOD.

Weapons Testing and Oversight. As mandated in the first session, the Secretary must meet certification requirements before funds for some weapon systems may be obligated. In addition, limitations and testing requirements are mandated for several weapon systems. Such requirements establish accountability for the decision to continue funding with the Secretary and are calculated to prevent large sums from being obligated before it has been determined that a weapon system will be practical and feasible.[7]

For example, funds for the Bigeye binary chemical bomb may not be obligated for procurement before October 1, 1987. The Secretary must certify that this weapon is necessary to maintain national security and that the design, planning, and environmental requirements have been satisfied. The Comptroller General is assigned to monitor DOD's implementation of these provisions and report back to the Congress.

In addition, a test plan is specified for testing and evaluating the Bradley Fighting Vehicle. After this plan is developed, the Secretary must certify that it is "the most realistic and suitable plan." Once again, the Comptroller General is charged with reviewing DOD's implementation and reporting back to the Committees. The Comptroller General must include specific opinions on the adequacy of the tests and the Secretary's recommendations.

Manpower Reports on Major Defense Acquisition Programs. To deal with an inability to properly consider the manpower requirements associated with major defense acquisitions, the Congress also mandated that the Secretary report on manpower requirements for a program at least 90 days before proceeding with development or production. This estimate is in addition to an independent estimate of program costs previously required. This new requirement, it is hoped, will facilitate more knowledgeable decisions concerning program acquisitions and expenditures.

Goldwater-Nichols Reorganization Act of 1986

The Goldwater-Nichols Department of Defense Reorganization Act of 1986 (P.L. 99-433) is intended, among other things, to provide more efficient use of defense resources. The initiative focuses on the organization and structure of the Joint Chiefs of Staff (JCS) and strengthening the role of its Chairman. Because the Chairman will have broader powers and responsibilities for all services, the new structure is expected to reduce interservice rivalry. Critics claimed that the previous arrangement providing for each JCS member to have a turn as Chairman and to issue only consensus advice had led to poor decisions in procurement and other matters. ■

[7]Cost in weapon systems was discussed in "Understanding the Costs of Major Weapon Systems: Are Reforms on the Way?" *The GAO Review*, Spring 1986.

Senior GAO Staff Changes

Ed. note: The staff changes below and in the following sections occurred during the approximate period April to June 1986.

David A. Hanna

Mr. David A. Hanna assumed the position of Regional Manager, Denver Regional Office, in June 1986. Mr. Hanna began his career in GAO in 1960 and has worked in the San Francisco, Chicago, and Kansas City Regional Offices. He was previously appointed Regional Manager in Kansas City in 1977.

Mr. Hanna received his B.B.A. in accounting from Armstrong College in 1959 and attended the Stanford University Executive Program in 1975. He is a certified public accountant in Illinois. Mr. Hanna has received several awards at GAO, including GAO's Career Development Award and a Distinguished Service Award. In 1985, the Comptroller General conferred on him the rank of Meritorious Executive.

Donald E. Day

Mr. Donald E. Day retired in June 1986 after 28 years of consecutive service with GAO. Mr. Day joined GAO in 1958. In 1972, he was appointed Assistant Director in the Procurement and Systems Acquisition Division, where he assisted in the annual planning and managing of investigations of the management and acquisition of major systems in the Department of Defense and civil agencies.

In 1975, Mr. Day was designated as the Assistant Director for Operations in the governmentwide program area of science and technology; in 1978, he was appointed Associate Director. In that capacity, Mr. Day was responsible for planning, executing, and reporting on management efficiency and program results of science and technology programs.

In 1981, Mr. Day was appointed Senior Associate Director in the former Mission Analysis and Systems Acquisition Division, which became part of the National Security and International Affairs Division in 1983.

Mr. Day is a graduate of the University of Maryland and the National War College at Fort McNair. He served in the U.S. Marine Corps in Korea and is a certified public accountant in Maryland.

Kenneth M. Mead

Mr. Mead was named to the Executive Candidate Development Program in June 1985. Before assuming the duties of his new position, Mr. Mead was serving as a Group Director in the transportation area with the Resources, Community, and Economic Development Division.

Mr. Mead joined GAO in 1975 as an Attorney with the Office of the General Counsel (OGC). He was assigned to OGC's Special Studies and Analysis Section and provided legal support to each GAO audit division. In 1980, Mr. Mead was designated Senior Attorney, with responsibility for providing legal counsel to the General Government Division and serving as counsel on GAO's Single Audit Initiative and Block Grants Steering Committee. In 1983, Mr. Mead joined the newly created Office of Quality Assurance, where he served as Assistant Director for Report Review.

He graduated with a B.A. from the University of Southern Connecticut and received his J.D. in 1975 from the University of South Carolina. Mr. Mead has completed several senior level management courses, including Eckerd College's Leadership De-

(cont. on p. 52)

Mead (cont.)

velopment Program and, more recently, the Federal Executive Institute's Executive Excellence Program.

Mr. Mead received the General Government Division Director's Award in 1980, the GAO Meritorious Service Award in 1982, and an Outstanding Achievement Award in 1984.

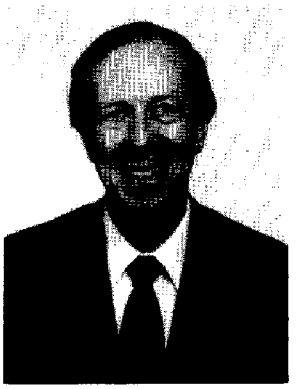
Edwin J. Monsma

Mr. Edwin J. Monsma retired from GAO in May 1986. He joined GAO in 1958 as an Attorney-Advisor in the Office of the General Counsel. He began work on civilian personnel issues in early 1959 and remained in that assignment area until January 1970. He left GAO at that time to work with civilian employee travel regulations and other management matters at the former Bureau of the Budget. In July 1972, he returned to GAO as a Senior Attorney and was assigned to the Civilian Personnel Section. In July 1973, he was named Deputy General Counsel for Civilian Personnel.

Mr. Monsma was appointed Assistant General Counsel for Military Personnel in July 1974. In October 1978, upon reorganization of personnel law groups, he was designated Assistant General Counsel for Personnel Law, with responsibilities in the civilian personnel law area, as well as in the military personnel law area.

Mr. Monsma graduated from calvin College, Grand Rapids, Michigan, in 1953 and received a J.D. with honors from George Washington University Law School in 1956. He attended the Federal Executive Institute in 1975 and the Harvard University Law School Program of Instruction for Lawyers in 1985. Mr. Monsma is a member of the bar in the District of Columbia and an inactive member of the Michigan bar. He is also a member of the Federal Bar Association.

A photo of Mr. Monsma was unavailable.



Larry E. Rolufs

Mr. Larry E. Rolufs joined GAO in April 1986 as Director of the Office of Publishing and Communications. Mr. Rolufs came to GAO from the Department of the Treasury, where he managed the recent Olympic Coin Program, which netted over $72 million in contributions for the Olympic committees. He also served as Deputy Director of the United States Mint and Assistant Director for Operations at the Bureau of Engraving and Printing.

Mr. Rolufs joined the federal government in 1967, holding positions of increasing responsibility at the Internal Revenue Service, the U.S. Geological Survey, and the Department of Commerce. He earned his undergraduate and graduate degrees in printing management from California State Polytechnic College and South Dakota State University. ■

Other GAO Staff Changes

Additional Staff Change

Name	Division/Office	Title
Aliferis, Peter V.	Office of International Audit Organization Liaison	Director

New Staff Members

Name	Division/Office	From
Wiseman, Karen R.	General Government	North Carolina Central University
Ernest, Victoria M.	General Government	George Mason University
Holtzman, Melissa L.	National Security and International Affairs	Department of the Army
Grady, Jeffery L.	Program Evaluation and Methodology	Econometric Research, Inc.
Mines, Richard A.	Program Evaluation and Methodology	Oakland U.S.D.
Sawyer, Darwin O.	Program Evaluation and Methodology	University of Maryland
Sonnefeld, Joseph L.	Program Evaluation and Methodology	Self-employed
Whiteside, Richard A.	Program Evaluation and Methodology	U.S. Army Environmental Hygiene Agency
Riback, Scott H.	General Counsel	University of Pittsburgh School of Law
Felts, Fannie	Financial Management	St. Elizabeth's Hospital

New Staff Members (cont.)

Name	Division/Office	From
Reig, Gwendolyn	Financial Management	Social Security Administration
Kelly, Margo	Information Resources Management	National Oceanic and Atmospheric Administration

Name	Regional Office	From
Silva, Rosemarie R.	Boston	Perkins School for the Blind
Lee, Danita C.	Washington	University of Maryland
Meixner, Jeannette T.	Washington	College of St. Teresa
Santos, Maria	Washington	Villanova University

Attritions

Name	Division/Office	Title
Beachy, Karin L.	Accounting and Financial Management	Accountant
Doerning, Gregory	Accounting and Financial Management	Writer-Editor
Greene, Elizabeth	Accounting and Financial Management	Information Processing Clerk
Guzman, Nydia	Accounting and Financial Management	Evaluator
Menear, Teresa	Accounting and Financial Management	Accountant
Mutari, Ellen	Accounting and Financial Management	Writer-Editor
Plegge, Carol	Accounting and Financial Management	Evaluator
Snoke, Melodee	Accounting and Financial Management	Accountant
Zlamal, Charles E.	Accounting and Financial Management	Accountant
Lee, Elizabeth	General Government	Secretary
Katcher, Robert A.	General Government	Group Director
Manigault, Gwendolyn O.	General Government	Secretary

Attritions (cont.)

Name	Division/Office	Title
Morris, Purri D.	General Government	Evaluator
Philip, Constance	General Government	Secretary
Thomson, James B.	General Government	Economist
Chan, Robert	Human Resources	Evaluator
Burton, Eve	National Security and International Affairs	Evaluator
Swann, Cherita	Acquisition Management	Secretary
Giarrusso, Keith	Facilities and Property Management	Space Management Specialist
Jones, Michael	Facilities and Property Management	Property Disposal Clerk
Proctor, Michelle	Financial Management	Voucher Examiner
Weiss, Lisa	Security and Safety	Investigator

Name	Regional Office	Title
Farbstein, Kenneth M.	Boston	Evaluator
Westerheide, Donna	Cincinnati	Evaluator
Coronado, Avelardo S.	Denver	Evaluator
Gambles, Laura A.	Denver	Evaluator
Gonzales, Floyd A.	Denver	Evaluator
Torres, Matthew J. G.	Denver	Evaluator
Mackey, Mary	Los Angeles	Evaluator
Raheb, Walter	Los Angeles	Evaluator
Haun, Lisa	San Francisco	Administrative Clerk

Attritions (cont.)

Name	Division/Office	Title
Monahan, Michael	San Francisco	Evaluator
Zweig, Robert	San Francisco	Evaluator
Kim, Susie H.	Washington	Evaluator
Powell, Wayne A.	Washington	Evaluator

Retirements

Name	Division/Office	Title
Davis, Clifford D.	General Government	Evaluator
Long, Elizabeth	General Government	Claims Examiner
Millstein, Herbert S.	General Government	Evaluator

Name	Regional Office	Title
Walker, Kathleen M.	Boston	Secretary
Judge, Joseph R.	Cincinnati	Evaluator
Stewart, Myrton T., Jr.	Cincinnati	Evaluator
Jeffers, William E.	Denver	Supervisory Evaluator
Sas, Walter J.	Denver	Evaluator
Edmonson, Kenneth W.	Seattle	Assistant Regional Manager for Planning and Reporting

Deaths

Name	Division/Office	Title
Oliver, Samuel E., Jr.	Accounting and Financial Management	Group Director
Blue, Tip S.	National Security and International Affairs	Evaluator
Hudson, Jeanne	Financial Management	Lead Accounting Technician

Name	Regional Office	Title
Goetz, Charles M.	Denver	Senior Evaluator

Professional Activities

Ed note: GAO staff engaged in the following professional activities during the approximate period April to June 1986.

Office of the Comptroller General

Charles A. Bowsher, Comptroller General, addressed the following groups on financial management in the federal government and related subjects, such as the Gramm-Rudman-Hollings legislation:

National State Board of Accountancy, Washington, Apr. 29.

President's Commission on White House Fellowships, Washington, May 8.

Third Annual Accounting and Auditing Conference for Local Governments, Virginia Beach, May 16.

1986 Government Contractors Conference, Alexandria, VA, May 20.

Global Economic Action Institute, Washington, May 22.

Sixth annual meeting of the Intergovernmental Audit Forum, Seattle, June 10.

Annual meeting of the National Association of State Auditors, Phoenix, June 12.

International Association for Financial Planning, Washington, June 17.

Business-Government Relations Council, Washington, June 24.

Annual awards banquet of the Association of Government Accountants, Baltimore, June 25.

Harry S. Havens, Assistant Comptroller General:

Was a panelist at the spring symposium of the American Association for Budget and Program Analysis. The theme of the symposium was "The 1987 Budget, Gramm-Rudman-Hollings and Reality," Washington, Apr. 7.

Spoke at the Brookings Institution conference on "Understanding Federal Government Operations," Washington, Apr. 7.

Spoke on "The Gramm-Rudman-Hollings Act" at the Public Affairs Career Day at George Mason University, Fairfax, VA, Apr. 8.

Spoke to the Midwestern Intergovernmental Audit Forum on the Gramm-Rudman-Hollings legislation, Indianapolis, Apr. 23.

Participated in the Third National Conference on Management Accountability and Controls in the Current Federal Environment. The conference was sponsored by the George Washington University School of Government and Business Administration and the U.S. Professional Development Institute. His topic was "Implementing Budget Cuts," Washington, May 19.

Spoke at Florida International University's Impact 86 session on "Causes and Consequences of Current Federal Revenue Dilemmas," Miami, May 20.

Spoke on the budget cuts and how they might affect governmental audit agencies in doing their business under Gramm-Rudman-Hollings at the Mid-American Forum on Improving Audit Quality, Kansas City, MO, May 22.

Participated in a seminar sponsored by the 1970-73 President's Advisory Council on Management Improvement. His topic was "Gramm-Rudman," Washington, May 23.

Was one of two recipients of the National Distinguished Service Award given by the American Association for Budget and Program Analysis. This award is given annually to professionals who have shown outstanding leadership and excellence in the fields of budgeting, policy analysis, and program evaluation, Washington, June 10.

Accounting and Financial Management Division

Frederick D. Wolf, Director:

Addressed the American Society of Public Administration's 47th national conference, Anaheim, Apr. 14.

Spoke to members of the San Francisco Chapter of the Association of Government Accountants, San Francisco, Apr. 15.

Spoke to participants at a meeting of the Federal Financial Management Council, San Francisco, Apr. 16.

Addressed the Midwestern Intergovernmental Audit Forum, Indianapolis, Apr. 22.

Addressed the American Institute of Certified Public Accountants' Government Contracting Committee, Washington, May 7.

Spoke to participants at an Office of Personnel Management seminar on the federal executive's responsibilities in administering money and material resources, Denver, May 16.

Addressed participants of the U.S. Professional Development Institute's Management Accountability and Controls Conference, Bethesda, MD, May 20.

Addressed participants at the Arthur Andersen & Co. Fourth Annual Public Officials Seminar on key trends for the future, Wethersfield, CT, May 29.

Participated in a Securities and Exchange Commission roundtable on financial reporting and the role of independent auditors, Washington, June 3.

Spoke to participants at a Department of Defense Financial Management Conference on "Meeting the FY 1988 Challenge: Improving DOD Accounting Systems," Alexandria, VA, June 18.

Edward P. Henderson, Special Assistant to the Director:

Spoke, along with **Dennis Duquette, Associate Director for Financial Audit; Bill Broadus, Group Director for Audit Policy; and Dave Clark, Group Director for Audit Oversight,** on GAO's financial management initiatives, financial auditing in the federal government, generally accepted governmental auditing standards update, and the quality of CPA audits of federal programs, at the New York State Management Audit Executive Seminar, Monticello, May 14.

Spoke on "The Auditor's Relationship to Prosecutors—When Does Auditing End and Investigation Begin?" at the 80th annual conference of the Governmental Finance Officers Association, Los Angeles, June 1.

Virginia B. Robinson, Associate Director:

Spoke on women and the public executive at the University of Southern California, Public Affairs Center, Washington, June 10.

Participated in a panel discussion on "Strategic Planning in Government: Real or Fantasy?" at the Association of Government Accountants' Annual Professional Development Conference, Baltimore, June 24.

Was appointed a member of the Board of Governors, Institute of Internal Auditors, Washington Chapter, 1986-89.

Paul S. Benoit, Computer Specialist, was elected President, Patuxent Chapter, of the Association for Systems Management, 1986-87.

General Government Division

William J. Anderson, Assistant Comptroller General for General Government:

Spoke before the American Productivity Center's Federal Productivity Workshop on "GAO's Role in Improving Federal Productivity," Silver Spring, MD, May 5.

Participated in a panel discussion with the President's Council on Integrity and Efficiency on "The Executive Branch's Productivity Improvement Program," Harpers Ferry, WV, June 5.

Participated on an advisory panel established by the Auditor General in connection with a review of the Canadian Postal Corporation, Ottawa, Canada, June 9.

Rosslyn Kleeman, Senior Associate Director:

Participated in the American Society for Public Administration's national conference, Anaheim, Apr. 12-14.

Discussed GAO's work with the Congress before a Department of Agriculture Graduate School seminar on congressional operations, Washington, May 22.

Discussed federal personnel issues before the National Academy of Public Administration's Public Service Panel, Washington, June 6.

Spoke on federal government training activities before the Internships and Placement Committee of the National Association of Schools of Public Affairs and Public Administration, Washington, June 17.

Discussed federal personnel issues at the Office of Personnel Management's Executive Seminar Center, Kings Point, NY, June 23.

Brian L. Usilaner, Associate Director:

Conducted training seminars for government officials on the importance of productivity, productivity measurement concepts, tools for improving productivity, and approaches to motivating the work force for the government of Trinidad, Apr. 14-17.

Spoke on "Overcoming Obstacles to Productivity Improvement" at the Productivity Conference, Washington, Apr. 28.

Spoke on prospects for improving productivity in the federal government at the Federal Executive Institute, Charlottesville, VA, Apr. 30.

Spoke on the "President's Productivity Improvement Program" at the Department of the Interior's Managers' Conference, Charlottesville, VA, June 5.

Spoke on "Productivity Improvement—A Subject That Shouldn't Go Away" at the Association of Government Accountants' Professional Development Conference, Baltimore, June 23.

Ronald King, Group Director, participated as an invited expert in the National Academy of Sciences' Building Research Board 1986 Workshop on Integrated Data Base Development for Building Design, Engineering, and Operation, Woods Hole, MA, June 15-20.

John Leitch, Group Director:

Attended monthly meetings of the American Productivity Management Association, Chesapeake Council, March 24 to May 29.

Attended a conference on "Productivity in the U.S." sponsored by the Japan-America Society and the Georgia Productivity Center, Atlanta, June 19.

William Bosher, Evaluator, attended a conference sponsored by the Maryland Productivity Center on "Making Productivity Work for Everybody" at the University of Maryland, College Park, May 7.

Charlie Daniel, Evaluator, participated in the 1986 National Association of Black Accountants Convention, Dallas, May 21-25.

Richard Groskin, Evaluator, discussed predicting extraordinary violence before the Section on Criminal Justice of the American Society for Public Administration, Anaheim, Apr. 14.

Annette Hartenstein, Evaluator, was coconvenor for the annual membership meeting of the National Capital Area Chapter of the American Society for Public Administration, Washington, May 20.

Jay Meyers, Evaluator, attended a conference sponsored by the Office of Management and Budget on productivity measurement, Washington, May 14.

Human Resources Division

Murray Grant, Chief Medical Advisor, spoke on GAO's study of U.S. graduates of foreign medical schools before the Federation of State Medical Boards of the United States, Minneapolis, May 3.

Bill Gainer, Associate Director; Sigurd Nilsen, Labor Economist; and Bob Rogers, Evaluator, Detroit, discussed a GAO survey on business closures and permanent layoffs at a meeting of business and labor leaders and representatives of state employment and training programs

cosponsored by GAO and the Office of Technology Assessment, Washington, Apr. 30. They also presented a similar briefing to the Private Sector Response Subcommittee of the Department of Labor Task Force on Plant Closings, Washington, May 6.

Patricia Cole, Evaluator, discussed "A National Perspective on Work/Welfare Programs" before Pennsylvania welfare employment officials, Pittsburgh, Apr. 23.

Susan Kladiva, Evaluator, spoke before a planning conference on the "Effect of Medical Malpractice on the Delivery of Maternal and Child Health Care" sponsored by the National Academy of Sciences' Institute of Medicine, Washington, Apr. 1.

William J. Kelly, former staff member, is the senior author of a new book entitled *Energy Research and Development in the U.S.S.R.* published by Duke University Press, 1986. Dr. Kelly, who served in the Human Resources Division as a faculty fellow during 1975 and 1976, now is employed as a principal research economist by Battelle Memorial Institute, Columbus, Ohio.

National Security and International Affairs Division

Frank C. Conahan, Assistant Comptroller General for National Security and International Affairs:

Addressed the Midwestern Intergovernmental Audit Forum on "GAO's Approach to Auditing Defense and International Programs," Indianapolis, Apr. 23.

Addressed the National Cryptologic Familiarization Course for senior defense officials on "GAO's Auditing Activities Within the Intelligence Community" at the National Cryptologic School, Fort Meade, MD, May 28.

Addressed the President's Export Council Subcommittee on "Export Administration," Washington, June 13.

Addressed Coopers and Lybrand's seminar for financial and operating executives on "GAO's Defense Oversight Role and Current Efforts to Combat Waste, Fraud, and Mismanagement in Federal Programs," San Mateo, CA, June 19.

Paul Math, Associate Director:

Spoke on DOD profit policy, cost accounting principles, and other procurement issues before the Electronics Industry Association, Washington, May 29.

Spoke on GAO's agenda in the acquisition and procurement arena at the Association of Government Accountants' Professional Development Conference, Baltimore, June 23.

Phil Thomas, Group Director:

Discussed GAO's work on agricultural trade before the National Commission on Agricultural Trade and Export Policy, Washington, Apr. 11.

Addressed the American Enterprise Institute on the changing structure of the international agricultural market, Washington, May 1 2.

Bill Wright, Senior Evaluator, briefed faculty members from the University of Hamburg on "How GAO Conducts Program Results Reviews," Hamburg, West Germany, Apr. 27.

George Jahnigan, Evaluator, spoke on recent congressional initiatives to improve the management of property furnished by the government to defense contractors before the National Property Management Association, Arlington, VA, June 3.

Irene Robertson, Evaluator, received a B.S. in business administration, cum laude, from Bowie State College, May 10. This degree was the culmination of over 8 years of weekend and evening studies.

John Yakaitis, Evaluator, discussed congressional efforts to reinstitute the Cost Accounting Standards Board at the Logistics Management Center, Fort Lee, VA, May 2.

Program Evaluation and Methodology Division

Eleanor Chelimsky, Director, delivered the keynote speech to the Sixth International Symposium on Forecasting, focusing on the linkages between prospective and retrospective analysis and how they can assist each other, Paris, June 17.

Ray C. Rist, Deputy Director, was appointed to the International Board of Consultant Editors for a new journal, *Journal of Education Policy*, published in London. Mr. Rist is one of eight persons designated as Consultant Editor.

Margaret S. Boone, Social Science Analyst, presented a paper entitled "Policy Analysis and Program Evaluation: A Comparison of Two Methods to Assess Prenatal Services for Disadvantaged Blacks" to the Society for Medical Anthropology, Wrightsville Beach, NC, Apr. 24.

Frederick V. Mulhauser, Social Science Analyst, discussed a report, "Pell Grant Validation Imposes Some Costs and Does Not Greatly Reduce Award Errors: New Strategies Are Needed" (GAO/PEMD-85-10), on errors in the Pell grant student aid program before the American Education Research Association meeting, San Francisco, Apr. 17.

Office of the General Counsel

Harry R. Van Cleve, General Counsel, spoke before the Legal Education Institute's Basic Contracts Seminar on mistakes in bids/remedies of unsuccessful offerors/bid protests, Washington, June 11.

Rollee H. Efros, Associate General Counsel:

Spoke before the annual seminar of the National Conference of Boards of Contracts Appeals on "New Concepts in Cost Allowability," Rosslyn, VA, Apr. 11.

Spoke before the Judge Advocate General's School on "Fiscal Control and the General Accounting Office," Charlottesville, VA, May 14.

Spoke before the Basic Contracts Seminar sponsored by the Legal Education Institute, Department of Justice, on "Appropriations Law and the GAO," Washington, June 11.

Seymour Efros, Associate General Counsel, spoke before the Basic Contracts Seminar sponsored by the Legal Education Institute, Department of Justice, on "The Procurement Process," Washington, June 11.

Ronald Berger, Assistant General Counsel:

Spoke before the Mid-Maryland Material Contract Management Association on "GAO's Bid Protest Role and Experience Under the Competition in Contracting Act" (CICA), Rockville, MD, Apr. 8.

Spoke before the Taurus Users Group on "CICA and Gramm-Rudman-Hollings—What Next?" Crystal City, VA, June 25.

Addressed the Council for Educational Development and Research on "How GAO Resolves Bid Protests," Washington, June 26.

Ronald Wartow, Group Managing Attorney, spoke before the Bethesda Medical Chapter of the National Contract Medical Association on "Recent Developments in Research and Development Contracting," Bethesda, MD, Apr. 16.

Paul Edmondson, Senior Attorney, addressed the New England Intergovernmental Audit Forum on "GAO's Role Under Gramm-Rudman," Sturbridge, MA, May 1.

Office of Information Resources Management

George Liao, Computer Systems Specialist, and LaRonda Parker, Office Automation Analyst, participated as panelists in a workshop, "Micro Computer Software Tools for Statistical Analyses and Graphics," at the National Press Conference, Washington, Apr. 4.

Office of International Audit Organization Liaison

Carol A. Codori, International Auditor Fellowship Program Director, participated as a coinstructor with **Harry Ostrow, Senior Policy Adviser,** Office of Policy, in a workshop entitled "Managing the Operational Audit" at the 1986 Professional Development Conference of the Association of Government Accountants, Baltimore, June 23-25.

Alberta Ellison, International Auditor Fellowship Program Deputy, convened a panel entitled "Marketing Your Skills" at the Society for Public Administration's 47th national conference, Anaheim, Apr. 14.

Joint Financial Management Improvement Program

David Dukes, Executive Director:

Cochaired a senior financial executives forum at the Eighth Annual Cash Managers Conference, Rosslyn, VA, Apr. 3.

Spoke to the Department of Defense's Inter-Service Financial Improvement Program Commanders' Conference on "Federal Financial Management Initiatives," Denver, May 6.

Addressed the Department of Energy's Financial Managers Conference on "Current Directions of the Joint Program," Scottsdale, AZ, May 19.

Doris Chew, Assistant Executive Director:

Spoke on "Financial Management Under Gramm-Rudman" at the Office of Personnel Management's Western Region Executive Seminar, Denver, May 13.

Moderated a session on "Financial Software Alternative Solutions (What Works)" at the Association of Government Accountants' Professional Development Conference, Baltimore, June 25.

Was named Chairperson of the Education Committee for the Washington Chapter, Association of Government Accountants, 1986-87.

Kenneth Winne, Senior Project Director, moderated a session on "OMB Agenda on Reform '88 - FMFIA [Federal Managers' Financial Integrity Act] Implementation" at the Association of Government Accountants' Professional Development Conference, Baltimore, June 24.

Regional Offices

Atlanta

Bill Ball, Evaluator, as a member of the University of Georgia's Co-op/Intern Advisory Board, participated in a panel discussion on the merits of the co-op program at the University of Georgia, Athens, Apr. 17.

Boston

William M. Reis, Technical Assistance Group Manager, spoke on the evaluation of internal controls in automated systems at a seminar sponsored by the Department of Labor, Framingham, MA, May 20.

Jennifer Arns, Technical Information Specialist, attended the annual meeting of the American Library Association, New York, June 29-July 2. She participated in the formation of a committee on information technology and will be one of five members serving on it during 1987.

Denver

James A. Reardon, Senior Evaluator:

Spoke before the Society of Government Meeting Planners, Colorado Chapter, on "The Gramm-Rudman Legislation—How It Is Designed to Work and Its Potential Impact on Government Agencies," Denver, May 13.

Together with **Billie J. North, Senior Evaluator,** spoke before the Mountain and Pacific States Regional Meeting of the National Association of State Boards of Accountancy on "Federal, State, and Local Government Audit Organizations and the Intergovernmental Audit Forums—How They Are Organized, the Work That They Do, and Their Present Concerns About the Quality of Non-Federal Audits," Jackson, WY, June 30.

Detroit

William F. Laurie, Evaluator:

Gave a presentation on "Eligibility for Federal Programs: Simple or Complex?" at the 95th annual meeting of the Ohio Academy of Science at the University of Toledo, Apr. 26.

Became Editorial Advisor to the *Journal of Accountancy*, June 30.

Francis L. Reynolds, Evaluator, was appointed Regional Vice President of the Association of Government Accountants' Detroit and Ohio Region, June 30.

Robert T. Rogers, Evaluator:

Participated in an Office of Technology Assessment/GAO workshop on plant closings, Washington, Apr. 30-May 1.

Was elected President of the Association of Government Accountants' Detroit Chapter, June 30.

Lawrence W. Stochl, Evaluator, gave a presentation on "Pain Relief: More Ohio Elderly Electing Bone Replacements" at the 95th annual meeting of the Ohio Academy of Science at the University of Toledo, Apr. 26.

Kansas City

George L. Jones, Evaluator, made a presentation to the EDP Auditors Association, Saint Louis Chapter, on "EDP Audit Trends in the Federal Government," Saint Louis, Apr. 16.

Susanne Valdez, Executive Director, Mid-America Intergovernmental Audit Forum:

Became "Professor for a Day" at the University of Missouri and addressed two governmental accounting and auditing classes on "The Evaluation of the Single Audit," Columbia, Apr. 17.

Spoke at the Missouri Society of CPAs' Annual Governmental Seminar on "The Mid-America Intergovernmental Audit Forum—Update on Current Activities" and chaired a panel at the seminar on "Quality of Audits," Jefferson City, Apr. 24.

Los Angeles

Vic Ell, Assistant Regional Manager:

Spoke before the Pasadena Exchange Club on "GAO's Accomplishments," Apr. 1.

Spoke before the graduate class at the University of Southern California on "Your Public Watchdog," Los Angeles, Apr. 16.

Participated in a panel discussion at the University of Southern California's Conference on Ethics in the Accounting Profession, Los Angeles, May 7.

Moderated a panel on "Electronic Work Papers" before the 1986 Intergovernmental Audit Forum Conference, Seattle, June 10.

Taught an intensive course at the University of Southern California entitled "Government Problems: Auditing the Performance of Management," Los Angeles, May-June.

Fred Gallegos, Manager, Management Science Group:

Coauthored "Bibliography of Selected Publications for EDP Auditors" with **Dan Ortiz, Technical Information Specialist,** for Auerbach Publishers' EDP Audit Series, Apr.

Coauthored "What Every Auditor Should Know About Computer Information Systems" for Auerbach Publishers' EDP Audit Series, May.

Spoke before the 4th Annual Conference on Software Maintenance on "Maintenance Controls and Risks," San Francisco, May 5.

Spoke before the EDP Auditors Association, Los Angeles Chapter, on "The Computer Information Systems Auditor and the Office of the Future," May 13.

Spoke before the 14th Annual EDP Auditors Conference on "EDP Audit Career Path Planning," Miami, June 24.

Coauthored "Reader Survey—Impact of Micros" in *EDP Auditor Update*, Vol. II, June.

Taught a graduate course on "Security and Privacy of Information Systems" at California State Polytechnic University, Pomona, spring quarter.

Received the EDP Auditors Association/ EDP Auditors Foundation Outstanding Performance Award for 1986 from the President, Miami, June.

New York

Anindya Bhattacharya, Economist, presented a paper on "The Crisis in Commodity Prices" at the annual meeting of the Eastern Economic Association, Philadelphia, Apr. 10-12.

Jim Van Blarcom, Evaluator, coauthored an article entitled "Superfund: The Search for Consistency," in the Apr. 1986 issue of *Environment* magazine.

San Francisco

Jim Mansheim, Assistant Regional Manager, and Valerie Lau, Evaluator, participated in the Sixth Joint Conference of the Intergovernmental Audit Forum, Seattle, June 10-12, and the Association of Government Accountants' Professional Development Conference, Baltimore, June 23-25.

Perry Datwyler and Valerie Lau, Evaluators, gave presentations at an all-day seminar sponsored by the Accounting Association and Beta Alpha Psi at California State University, Hayward, May 17. Mr. Datwyler presented an overview of GAO's financial management work, and Ms. Lau discussed her experiences conducting a financial audit at the Leavenworth Federal Penitentiary.

Belinda Jones, Evaluator, taught a course on operational and program auditing for the California Association of Auditors for Management, Emeryville, CA, Apr. 23-25.

Seattle

John P. Carroll, Regional Manager, chaired the Seattle Federal Executive Board annual awards ceremony, a program that honored 62 outstanding federal employees for 1985 in professional, technical, administrative, and public service categories. **Sterling Leibenguth, Senior Evaluator,** helped organize the ceremony, Apr. 8.

Stephen J. Jue, Technical Assistance Group Manager, spoke on "Lapsize Microcomputers: The GAO Evaluation Project and Recent Developments" at a technical session hosted by the Los Angeles Chapter, EDP Auditors Association, Los Angeles, May 13.

Keith C. Martensen, Senior Evaluator:

Discussed various methodologies used on GAO assignments with a research and evaluation methods class in public administration, Seattle University, Apr. 1

Was seated on the National Council and appointed to the National Membership Development and Chapter Development Committees of the American Society for Public Administration (ASPA) conference, "Celebrating America," Anaheim, Apr. 12-16.

Was reelected to a 2-year term on ASPA's Evergreen Chapter Council and appointed the chapter's 1986-87 Membership Committee Chairman, Seattle, May.

Sherry A. Davis, Evaluator:

Was nominated for the Seattle Federal Executive Board Outstanding Community Service Award for 1985 for her volunteer activities in organizing and leading athletic, tutorial, health, and social enrichment programs for disadvantaged children, Apr. 8.

Received the King County Boys & Girls Club 1985 Volunteer of the Year Award for her "devoted service and unselfish contributions of time" to the Rainier Vista Boys & Girls Club, Seattle, Apr. 17.

Brian A. Estes, Evaluator, was elected 1986-87 incoming President and appointed as Program Committee Chairman, Evergreen Chapter, American Society for Public Administration, Seattle, May 21.

Janet E. Frisch, Evaluator, was elected to the 1986-87 Board of Directors, Seattle Chapter, Association of Government Accountants, June.

Julie A. Rachiele, Technical Information Specialist, spoke to the Federal Librarians of Seattle on "The GAO Documents Database," Seattle, Apr. 23.

Washington

Ron Lauve, Regional Manager, discussed GAO's internal operations at Wayne State University's seminar on politics in education, Washington, June 20.

Elizabeth Toiya Nyang and Linda Demoret, Technical Information Specialists, coauthored a paper entitled "Prepackaging Search Strategies and Post Processing the Results." Ms. Nyang presented the paper at the National Online Conference, New York, May 8.

Dennis L. O'Connor, Writer-Editor:

Spoke on "Building a Community of Trust Through Writing" before faculty and students of the Writing Institute, University of Maryland-Baltimore County, Catonsville, Apr. 14.

Addressed a meeting of Presidential Management Interns on "Writing and Authenticity Within a Bureaucracy," Department of State, Washington, Apr. 17. ■

Awards for the Best Articles Published in *The GAO Review*

Cash awards of $500 each are presented each year (see GAO Order 1551.1) for the best two articles written by GAO staff and published originally in *The GAO Review*. Staff through grade GS-15 at the time they submit the article are eligible for these awards. A noncash award is available for best article by a member of the Senior Executive Service (SES) or candidate pool. The awards are presented during the GAO Awards Program held annually in Washington, D.C.

The awards are based on recommendations of a panel of judges that is independent of *The GAO Review* staff. The panel of judges is chaired by the Director, Office of Policy (OP), who, together with the Director, Office of Public Information, serves as a permanent panel member. Two other SES-level panel members will be selected for a 1-year term by the Director, OP. These selections will be made from among the members of GAO's Office-wide Awards Committee. The judges evaluate articles from the standpoint of their overall excellence, with particular concern for the following:

- Originality of concepts and ideas. (The authors demonstrated imagination and innovation in selecting and developing a topic.)
- Degree of interest to readers. (The article, by virtue of the topic and its treatment or its relevance to GAO's mission, was of special interest to GAO staff.)
- Quality and effectiveness of written expression. (The article was well organized and written in polished prose.)
- Evidence of individual effort expended.

Statement of Editorial Policy

This publication is prepared primarily for use by the staff of the General Accounting Office and outside readers interested in GAO's work. Except where otherwise indicated, the articles and other submissions generally express the views of the authors and do not represent an official position of the General Accounting Office.

The GAO Review's mission is threefold. First, it highlights GAO's work from the perspectives of subject area and methodology. (The *Review* usually publishes inherently interesting or controversial articles on subjects generated by GAO audit work and articles related to innovative audit techniques.) Second, and equally important, the *Review* provides GAO staff with a creative outlet for professional enhancement. Third, it acts as historian for significant audit trends, GAO events, and staff activities.

Potential authors and interested readers should refer to GAO Order 1551.1 for details on *Review* policies, procedures, and formats.

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