

GAO

Report to the Chairman, Legislation and  
National Security Subcommittee,  
Committee on Government Operations,  
House of Representatives

May 1989

# AUTOMATED INFORMATION SYSTEMS

## Schedule Delays and Cost Overruns Plague DOD Systems



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United States  
General Accounting Office  
Washington, D.C. 20548

Information Management and  
Technology Division

B-234718

May 10, 1989

The Honorable John Conyers, Jr.  
Chairman, Legislation and National  
Security Subcommittee  
Committee on Government Operations  
House of Representatives

Dear Mr. Chairman:

Since September 1988, we provided your Committee six reports on automated information systems being developed by the Army, Air Force, Navy, and Defense Logistics Agency. The reports, which contained information on eight systems, are listed on the last page of this report. In discussions with your office during February 1989, we were asked to provide a report highlighting the information contained in the six reports. Following are the highlights we believe to be particularly significant:

- All eight systems have experienced significant cost growth, some in the hundreds of millions of dollars. As of September 1988, the estimate to develop and deploy the systems totaled about \$2 billion—almost twice the original estimated cost. Individual cost growth estimates ranged from a low of \$31 million for the Army's Civilian Personnel System, to a high of \$446 million for the Navy's Standard Automated Financial System (STAFS).
- Four of the eight systems have been in development for at least 8 years and two of the systems' development efforts were abandoned after spending about \$237 million. The completion dates for all but one of the remaining 6 systems have been delayed by 3 to 7 years, and none of the systems are scheduled to be fully deployed until the 1990s.
- Budget submissions to the Congress have underestimated the total life cycle costs for some of the systems because the Department of Defense (DOD) components have not provided current, accurate, and complete cost information.<sup>1</sup> The Navy, for example, understated the life cycle costs for three systems by \$1.9 billion.
- The Major Automated Information System Review Council (MAISRC) within the Office of the Secretary of Defense (OSD) has not rigorously enforced established policies, procedures, and criteria for reviewing

<sup>1</sup>Life cycle costs include the costs to operate and maintain an automated system throughout its useful life, as well as the costs to develop and deploy the system.

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major systems. OSD's MAISRC is responsible for reviewing major automated information systems to identify and resolve system development problems, and curb cost growth and implementation delays. As of December 1988, three of the eight systems we reviewed had not been subjected to MAISRC oversight, even though they clearly met OSD guidelines requiring MAISRC review.

These highlights are discussed in more detail below. Also discussed are the reasons given by OSD and the DOD components for delays and cost growth noted during our reviews of the eight systems. We did not independently verify the cost data and reasons for cost growth.

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## Background

In a September 13, 1988, hearing on the Navy's progress in developing STAFS, it was noted that STAFS had experienced cost growth of \$446 million during its development.<sup>2</sup> As a result of the hearing, OSD provided the Subcommittee cost estimates for seven other automated systems that had also experienced significant growth in the 18 to 24 months preceding the hearing. The Defense components pointed out that some of the cost estimates reported to the Subcommittee by OSD were not accurate, and that the dates of the estimates did not consistently cover the 18 to 24 months preceding the hearing. Table 1 shows the cost estimates and growth identified as a result of the September 13, 1988, hearing for all eight systems.

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<sup>2</sup>Hearing on Management of the Navy's Standard Automated Financial System before the Subcommittee on Legislation and National Security, House Committee on Government Operations, Sept. 13, 1988.

**Table 1: Reported Cost Growth for Eight DOD Systems**

Dollars in millions

System	Change in Cost Estimates		
	From	To	Difference
Army Civilian Personnel System (ACPERS)	\$65	\$96	\$31
Air Force Contract Data Management System	34	74	40
Defense Logistics Agency's Defense Logistics Services Center	123	177	54
Navy's Integrated Disbursing and Accounting System	91	167	76
Naval Aviation Logistics Command Information System (NALCOMIS)	525	614	89
Air Force Requirements Data Bank	140	248	108
Air Force Depot Maintenance Management Information System	85	242	157
Navy's Standard Automated Financial System (STAFS)	33	479	446
<b>Total</b>	<b>\$1,096</b>	<b>\$2,097</b>	<b>\$1,001</b>

Source: OSD testimony before the Legislation and National Security Subcommittee, September 13, 1988.

In our six reports on the eight systems we provided (1) a description of each system and the acquisition approach being followed; (2) the current status of each system; (3) a description of each system's cost growth including a comparison between current cost estimates and information provided in budget exhibits to the Congress; (4) the reasons for the cost growth; and (5) a description of actions taken by OSD and the DOD components to control costs.

## Increased Costs and Delays Have Been Attributed to a Variety of Problems

All eight systems experienced significant cost growth, and seven of the eight experienced development delays. Reasons given for cost growth and delays include underestimation of the systems' original costs, design failures, program redirection, and enhancements to the original project scope.

For example, the Navy began its development of NALCOMIS in 1977 to automate record-keeping and reporting requirements for aircraft repair, maintenance, and supply functions at 503 locations. The Navy initially planned to have the system implemented in 1992. However, in 1983 the Navy determined that the software it had developed would not meet functional requirements. As a result, the Navy decided to redesign the software. While the software was being redesigned and tested, an existing inventory management system was deployed at 33 sites to meet

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record-keeping needs. By December 1988, the Navy had spent \$233 million for NALCOMIS, and the redesigned software was operating at only 4 locations. Program officials estimate that the system will be operational at 103 of the 503 sites by 1999, and OSD reported that the cost estimate to develop and deploy the system to all 503 sites increased by \$89 million between 1987 and 1988.

The Defense Logistics Agency's program to modernize the Defense Logistics Services Center has also experienced cost growth. In June 1988, the program's cost estimate was increased by \$54 million—from \$123 million to \$177 million. The increase was attributed to a refinement of the earlier estimate and additional costs for training and program management not previously included in the modernization estimate. The additions occurred after OSD directed program officials to reassess and update the estimate of software development costs.

All three of the Air Force systems experienced cost growth and implementation delays. One, the Depot Maintenance Management Information System, was started in the early 1980s to improve depot management and maintenance functions, at an estimated cost of \$85 million. By August 1988, the Air Force had spent \$52 million, the deployment schedule had slipped more than 4 years, and the project's cost estimate had almost tripled.

For two of the systems—STAFS and ACPERS—the problems proved so severe that the systems' development efforts were abandoned. STAFS was initiated in 1980 to improve the accounting and financial management of 14 Naval engineering centers and research laboratories, and was to be implemented at those sites by late 1986, at an estimated cost of \$33 million. By September 1988, however, the system had not been fully tested, was not fully operational at any center or laboratory, had grown well beyond its intended purpose, and was opposed by many users. Over time, STAFS' functional requirements grew beyond its original scope as an accounting and financial management system to include functions such as automated generation of procurement documents, electronic preparation of travel orders, and electronic mailing of documents. The added features made STAFS a "Cadillac" system, and contributed to the system's \$446 million estimated cost increase for development and deployment.

In January 1989—subsequent to your Subcommittee's September 13, 1988, hearing, and after investing about \$230 million—the Navy abandoned its 9-year effort to develop STAFS. Instead, the Navy opted to

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enhance its existing systems because this alternative proved to be the least costly, least risky, and most timely course of action.

Similarly, the Army, after considering a number of alternatives for a single civilian personnel administration system—including using the Air Force's personnel system—decided to design and develop its own system (ACPERS) at an estimated cost of \$65 million. In late 1987, after spending more than two-and-a-half years designing and developing ACPERS, the Army identified significant software engineering problems. An Army study team, assembled to analyze the development effort and evaluate alternatives, determined that the ACPERS software was useless and that developing new software would take about 4 years. The study team concluded that adopting the Air Force personnel system would generally meet the Army's needs in the shortest amount of time because this system was fully tested and operational. In 1988, after spending almost \$7 million to develop its own system, the Army abandoned its development effort and adopted the Air Force's system.

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## Accurate Cost Estimates Have Not Been Provided to the Congress

Although the DOD components are responsible for reporting each major automated system's life cycle cost estimate in annual budget submissions, the Congress has not been provided current, accurate, and complete cost information for some of the systems we reviewed. Table 2 compares the systems' life cycle cost estimates provided by DOD to the Congress in its amended fiscal year 1988/1989 budget submission with the life cycle cost estimates that existed within the DOD components.

**Table 2: Estimated Life Cycle Costs in Relation to Congressional Budget Submissions**

Dollars in millions

<b>System</b>	<b>Life Cycle Costs Reported to the Congress, Amended 1988/1989 Budget Submission</b>	<b>DOD Components' Estimated Life Cycle Cost</b>
Integrated Disbursing and Accounting System	\$91	\$879
NALCOMIS	912	1,400
STAFS	184	843
Defense Logistics Agency's Defense Logistics Services Center	<sup>a</sup>	414
Depot Maintenance Management Information System	295	295 <sup>b</sup>
Contract Data Management System	87	87 <sup>b</sup>
Requirements Data Bank	376	376 <sup>b</sup>
ACPERS	150 <sup>c</sup>	

<sup>a</sup>Life cycle costs were not separately identified in the budget submission, as they were included in estimates submitted for the Logistics System Modernization Program.

<sup>b</sup>Life cycle costs are being revised in accordance with OSD instructions to reflect more current and accurate estimates. The estimates are expected to increase.

<sup>c</sup>Represents the life cycle cost estimate for the Army-designed ACPERS. The estimate for use of the Air Force personnel system is being developed.

As table 2 shows, the life cycle cost of the Navy's Integrated Disbursing and Accounting System was estimated at \$879 million. However, because the Navy had not officially approved this 1987 estimate, the amended fiscal year 1988/1989 budget submission identified the system's life cycle cost as \$91 million—about one-tenth the Navy's 1987 estimate. Similarly, the Navy's budget submission for STAFS only reflected the cost to develop and deploy the system to a limited number of sites. The Navy's internal estimate to develop, deploy, operate and maintain STAFS at all 14 locations was \$843 million.

The Navy's amended fiscal year 1988/1989 budget submission for NALCOMIS only included the cost to develop, deploy, operate, and maintain the system at 103 of the planned 503 sites. If the costs for the additional 400 sites were included, the correct life cycle cost estimate would have been about \$1.4 billion.

The Air Force is revising its life cycle cost estimate for the Contract Data Management System because the \$87 million estimate provided in



the fiscal year 1988/1989 budget submission was understated. The estimate included in the budget submission did not include the cost to operate and maintain the system during its expected 8-year useful life. Similarly, the life cycle costs for the Air Force's Requirements Data Bank and Depot Maintenance Management Information System are being revised to reflect more current and accurate estimates.

## **MAISRC Is Not Rigorously Enforcing Established Policies**

Recognizing the need for structured management oversight and prudent fiscal management in the acquisition of major automated information systems, OSD established MAISRC in the late 1970s to oversee the development of systems when costs exceed \$25 million in 1 year, \$100 million in total, or OSD designates the system as special interest. Representing the Secretary of Defense, the Council, which is made up of senior-level DOD officials, is responsible for reviewing major systems during the development cycle, and deciding whether they should be continued, redirected, or terminated. All eight systems we reviewed were identified by OSD as major automated information systems.

DOD policies, established in 1978, called for MAISRC review and approval of major automated information systems at four key milestones prior to system deployment. However, this requirement was formally relaxed in June 1983 when OSD announced that the DOD components could be delegated the approval authority to move from the design phase to the development phase (Milestone II) and to move from the development phase to the deployment phase (Milestone III). When oversight authority for a major system is delegated to the component level, MAISRC is still expected to keep abreast of the development activities by receiving in-process reviews. In addition, MAISRC is supposed to revoke the delegated authority if unfavorable circumstances—including cost growth of 25 percent or more, or a 6-month schedule slippage—occur during a system's development.

Our work has shown that MAISRC is not rigorously enforcing established policies and criteria pertaining to milestone and in-process reviews. As of December 1988, three of the eight major systems we reviewed had not been subjected to MAISRC milestone or in-process reviews.

In December 1983, the Navy estimated that it would cost \$91.4 million to develop and deploy its Integrated Disbursing and Accounting System. In June 1987, the Navy advised OSD that the cost estimate was growing

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and would exceed the threshold for MAISRC review. By this time, the system had been in development for 10 years, the estimated implementation date had slipped by 4 years, the Navy's cost estimate had almost doubled, and the system had never been reviewed by MAISRC.

In 1987 OSD delegated the approval authority for STAFS to the Navy. STAFS had been in development for 7 years, the implementation date had slipped by 3 years, the cost estimate had grown from \$33 to \$282 million, the Navy had failed to successfully implement the system at any site, and MAISRC had never conducted a milestone or in-process review. Although the Navy subsequently notified OSD to arrange for a MAISRC milestone review, one was not held prior to the Navy's decision to terminate STAFS.

The authority to approve the development of the Army Civilian Personnel System was delegated to the Army until October 1988. OSD revoked the delegation and designated ACPERS as a major automated information system to be reviewed by MAISRC after the Army abandoned its unsuccessful development effort and adopted the Air Force personnel system. As of December 1988, a MAISRC meeting was planned to discuss OSD approval of the Army's use of the Air Force personnel system, but a date had not been set.

Although MAISRC conducted milestone or in-process reviews of the remaining five systems, they all experienced significant cost growth and four of the five experienced schedule delays. The Air Force's Depot Maintenance Management Information System, started in the early 1980s, intended to improve depot management and maintenance functions, at an estimated cost of \$85 million. Although the system had been subjected to six in-process reviews and constant Air Force oversight, by 1988 the Air Force had spent \$52 million, the deployment schedule had slipped more than 4 years, and the project's cost estimate had almost tripled. The other two Air Force systems we reviewed experienced similar cost growth and schedule delays despite MAISRC and Air Force oversight.

During the fiscal year 1986 appropriations process, concern over the lengthy development of the Naval Aviation Logistics Command Information System led the Committee on Appropriations to direct that the system be reviewed—for the first time—by MAISRC. When the system was reviewed in 1986, it had been in development 9 years and full implementation was more than 4 years behind schedule. Although MAISRC concluded that the Navy had proper management controls in place, it

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directed the Navy to accelerate the implementation schedule. During a March 1988 in-process review of the system MAISRC found that the implementation schedule had slipped 2 years, and, as a result, subsequently revoked the Navy's oversight authority for the system. By this time the Navy had spent about \$233 million on system development.

The Defense Logistics Agency's program to modernize the Defense Logistics Services Center also experienced cost growth while subject to MAISRC oversight. In June 1988, the program's cost estimate was increased by \$54 million—from \$123 million to \$177 million. The increase was attributed to a refinement of the earlier estimate and additional costs for training and program management not previously included in the modernization estimate. The additions occurred after MAISRC directed program officials to reassess and update the estimate of software development costs.

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## Conclusions

In reviewing the eight automated information systems discussed in this report, we found a disturbing pattern of significant cost increases, schedule slippages, performance shortfalls, and redirected development and acquisition strategies. The eight systems suffered the problems to varying degrees, and over the last few years our audits of other major automated information systems being acquired by DOD have uncovered a similar pattern of problems. The systems, which generally cost hundreds of millions of dollars, are critical to the DOD components' support missions and will be relied upon to individually and collectively control billions of dollars in logistics and personnel resources.

The pattern of problems identified in our reviews of automated information system acquisitions is similar to that experienced by DOD in its acquisition of major weapon systems. In recent years, the persistent revelations of these problems have led the public and the Congress to seriously question DOD's ability to effectively manage its acquisition programs. As a result, DOD has initiated a number of actions to prevent future problems and improve the acquisition process. However, the underlying causes of the problems—underestimation of costs, poorly defined requirements, and redirected strategies—are complex and long-standing deficiencies that will not be easily or quickly corrected.

DOD recognizes the importance of management accountability and oversight in the acquisition of major automated information systems and its policies, directives, and instructions provide a relatively comprehensive definition of the management control and decision making process for

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systems development. However, the pattern of problems identified by our work raises serious questions about the effectiveness of the mechanisms DOD has in place to manage and oversee major system development efforts. Specifically, our work indicates that the DOD components have not effectively managed system development acquisitions and that MAISRC has not rigorously enforced established policies.

For example, three of the eight major automated information systems we looked at had not been reviewed by MAISRC. All three systems experienced development problems resulting in lengthy development efforts, significant cost growth, and implementation delays that should have warranted MAISRC oversight. Since the problems did not occur overnight, and were the result of years of development troubles, it is difficult to understand why MAISRC did not become involved.

Although the other five systems were reviewed by MAISRC, they also experienced significant cost growth, and, in most cases, development delays. In fact, the three Air Force systems that have been subjected to numerous MAISRC in-process reviews experienced cost growth ranging from 77 percent to 185 percent, and delays of 3 to 5 years. Only one of the eight systems we looked at had a higher cost growth. These numbers indicate that MAISRC has not been effective in controlling cost growth and development delays through the use of in-process reviews.

We are also concerned that the Congress may not be adequately informed about the cost of automated information systems because DOD has not fully disclosed total system costs. We believe that this lack of full disclosure has occurred primarily because of DOD's failure to develop, revise, or approve accurate, current, and complete life cycle cost estimates. For example, the total life cycle cost estimate of \$1.2 billion in the amended fiscal year 1988/1989 budget submission for the three Navy systems discussed in this report was understated by at least \$1.9 billion. Additionally, we found that the cost estimates OSD provided in response to your Subcommittee's September 13, 1988, hearing contained errors or were inconsistent with the DOD components' estimates.

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## Recommendation to the Secretary of Defense

Since our work was not designed to assess the effectiveness of the management and oversight process for major automated information systems, we are not able to determine the underlying cause for the apparent ineffectiveness of the process. We also did not assess the actions taken by OSD in the last year to improve its knowledge of, and control over, major automated information systems being developed by

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DOD components. However, given the pattern of problems identified by our work, the importance of the systems being acquired, the prospect for constrained or no-growth budgets, and the resulting need to reduce defense costs, we recommend that the Secretary of Defense review and revise, as appropriate, the management control and decision making process for major automated information systems development. As a starting point, we believe that the Secretary should give special attention to:

- rigorously enforcing established policies;
- establishing an early warning system to identify problems in automated information system development efforts;
- examining the role of MAISRC, including its policies for conducting milestone reviews during the development phase, delegating oversight responsibility to DOD components, and relying on in-process reviews; and
- ensuring that the Congress is consistently provided accurate, current, and complete cost information for major automated information systems, including timely notification when internal DOD cost estimates exceed the initial cost estimate by 25 percent or more.

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## Objectives, Scope, and Methodology

The results of our reviews of the eight Department of Defense systems were documented in six reports issued from September 1988 to March 1989 (see the last page of this report). In February 1989 we were asked to provide the Subcommittee Chairman with a report that highlighted information contained in the six reports. During February and March 1989, we performed the work necessary to synthesize the data for this report. We did not independently verify the cost data and reasons for cost growth provided by OSD and the DOD components.

We discussed the contents of the individual reports that have been summarized in this report with representatives of OSD and the DOD components, and incorporated their comments where appropriate, but we did not obtain official agency comments on a draft of this report.

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As arranged with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from its issue date. We will then send copies to the Chairmen, Senate Committee on Governmental Affairs, and Senate and House Committees on

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Appropriations; the Director, Office of Management and Budget; and the Secretary of Defense. We will also make copies available to others on request.

The major contributors to this report are listed in the appendix.

Sincerely yours,

A handwritten signature in black ink that reads "Ralph V. Carlone". The signature is written in a cursive, flowing style.

Ralph V. Carlone  
Assistant Comptroller General



# Major Contributors to This Report

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# Related GAO Products

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## Reports Summarized in Current Review

ADP Acquisition: Air Force Logistics Modernization Projects (GAO/IMTEC-89-42, Apr. 21, 1989).<sup>1</sup>

ADP Acquisition: Defense Logistics Services Center Modernization Program (GAO/IMTEC-89-32, Mar. 20, 1989).

ADP Acquisition: Army Civilian Personnel System (GAO/IMTEC-89-22FS, Mar. 3, 1989).

ADP Acquisition: Naval Aviation Logistics Command Management Information System (GAO/IMTEC-89-21FS, Feb. 23, 1989).

ADP Acquisition: Navy's Efforts to Develop an Integrated Disbursing and Accounting System (GAO/IMTEC-89-20FS, Feb. 8, 1989).

Computer Procurement: Decision Needed on Navy's Standard Automated Financial System (GAO/IMTEC-88-47, Sept. 13, 1988).

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## Reports From Previous Reviews

ADP Systems: Army Decision to Use Air Force Military Pay System Appears Advantageous (GAO/IMTEC-89-28, Mar. 1, 1989).

Computer Systems: Navy Needs to Assess Less Costly Ways to Implement Its Stock Point System (GAO/IMTEC-89-2, Dec. 14, 1988).

Computer Procurement: Navy CAD/CAM Acquisition Has Merit but Management Improvements Needed (GAO/IMTEC-88-22, May 11, 1988).

ADP Procurement: Army Accounting System Modernization (GAO/IMTEC-88-14BR, Dec. 28, 1987).

Computer Systems: Navy Stock Point ADP Replacement Program Needs Better Management Controls (GAO/IMTEC-87-30, Sept. 17, 1987).

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<sup>1</sup>This report discusses development of the Air Force Contract Data Management System, Air Force Requirements Data Bank, and the Air Force Depot Maintenance Management Information System.