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Report to the Chairman, Subcommittee on Defense, Committee on Appropriations, House of Representatives

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SOFTWARE DEVELOPMENT

Better Management Controls Needed at Navy Regional Data Automation Center

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The Honorable Bill Chappell, Jr.
Chairman, Subcommittee on Defense
Committee on Appropriations,
House of Representatives

Dear Mr. Chairman:

In your August 4, 1986, letter, you asked that we review central design activities (CDAs) in the Department of Defense. As you know, CDAs are facilities that design, develop, test, and maintain automated information system software for use at more than one location. In response to your request, we issued two reports[1] that discuss the number of and cost associated with CDAs.

In August 1987 we agreed with your office to select one CDA and review how effectively it provides system development services to customers by examining its controls for managing system development projects. We selected the Navy Regional Data Automation Center (NARDAC) in Washington, D.C. The following review results pertain only to the Washington, D.C., NARDAC.

NARDAC Washington, D.C., is one of 48 CDAs reported on by Defense in its special budget exhibit (43E-CDA)[2] to the Congress. It provides data processing services and system development support to a variety of Navy commands, which are then billed for the cost of these services.

Our review of NARDAC disclosed weaknesses in two project management control mechanisms that inhibit its ability to effectively provide system development services to its customers. Specifically, we found that

- project status reports do not adequately track and monitor projects and
- the chargeback system, used to accumulate the costs of resources used on a project, does not provide adequate information.

[1]Software Development: Information on Department of Defense Central Design Activities (GAO/IMTEC-87-24FS, May 20, 1987) and Software Development: Update on Department of Defense Central Design Activities (GAO/IMTEC-88-20FS, Mar. 11, 1988).

[2]Military departments are required to provide special budget exhibits, 43E-CDA, for each CDA with expenditures for system software development exceeding $5 million in a fiscal year under the Department of Defense Budget Guidance Manual 7110-1-M.

As a result of these weaknesses, NARDAC does not have an effective means to measure a project's progress or accurately collect cost information associated with the project. Thus, its ability to effectively manage projects is inhibited. For example, NARDAC does not routinely report sufficient information to predict project delays in time to take corrective action. The Navy agreed with our assessment, and has initiated some actions to improve overall management controls. While we commend these steps, we believe that, in pursuing actions to improve management controls, NARDAC needs to ensure that project status and cost reporting are complete and accurate. We believe the weaknesses we found, both of which had been identified in earlier reviews,[3] inhibit the Navy's effectiveness in providing system development services to customers.

We also noted during our review that NARDAC did not include all costs associated with providing system development services in its fiscal year 1988-1989 43E-CDA budget exhibit to the Congress. A Naval Data Automation Command official acknowledged this omission and agreed to include all related system development costs in future budget reports to the Congress.

To determine how effectively NARDAC manages system development projects, we reviewed a sample of 15 projects ongoing in fiscal years 1987 and 1988. Of these 15 projects, 3 accounted for over $10 million of NARDAC's $37 million budget for fiscal year 1988. Our review was performed primarily at NARDAC in Washington D.C., between September 1987 and August 1988. We performed our work in accordance with generally accepted government auditing standards. The views of responsible Navy officials were sought during our review and are incorporated into this report where appropriate. (See app. I for more information on objectives, scope, and methodology.)

Background

The Navy has nine NARDACs under the authority of the Naval Data Automation Command. These centers were established to manage large-scale data processing facilities and to provide to Navy commands data processing and system development services, for which they receive reimbursement. System development services offered include system design, conversion, coding, testing, documentation, maintenance, and application software modification.

[3]Coopers & Lybrand and American Management Systems, Inc., Management Analysis of the Navy Industrial Fund Program: Naval Regional Data Automation Centers Review Report, June 1986; and Naval Audit Service, Automated Cost Accounting System for Naval Regional Data Automation Centers and Naval Data Automation Facilities, June 1987.

NARDAC Washington, D.C., the largest of the nine centers (see app. II for list of centers), estimates orders will total $95 million for fiscal year 1988. Of this, $37 million is expected from orders for system development services and the remaining $58 million is expected from orders for data processing support and other related services. According to NARDAC officials, project management responsibility is shared with the customer. The center must manage and control internal production costs within set restrictions and at approved rates. Customers define system requirements and determine whether to order services from NARDAC or from others. However, customers rely on NARDAC assistance in developing project plans, budgets, and schedules; preparing project status reports; and reporting project costs. NARDAC's major customers include the Military Sealift Command, Naval Sea System Command, and the Naval Military Personnel Command.

Project Management Control Weaknesses Inhibit NARDAC's Ability to Effectively Provide System Development Services

NARDAC's status reports and the chargeback system are supposed to give managers and customers accurate and complete information on project progress and costs. These control mechanisms were developed in response to Defense and Navy requirements that system developers create management controls to track the progress and costs of projects. However, we found problems in NARDAC's project reporting and chargeback system, which inhibit NARDAC's effectiveness in providing system development services to its customers.

Project Status Reports Do Not Adequately Track and Monitor Projects

Department of Defense Standard 2167A, Defense System Software Development, and NARDAC's Instruction 5230.1C, Project Development Manual, require that management controls be established for automated system development to manage and control project cost, schedule, and performance. These requirements emphasize project reporting as an important part of development, to ensure that management and customers receive current information about project status. Further, NARDAC's project manual requires that periodic project status reports include a substantive, detailed description of activities, progress, accomplishments, problem areas, and, if appropriate, a recommended course of action.

We found that NARDAC project leaders submit periodic project status reports to management and customers. The status reports we reviewed for 15 projects generally included a description of work planned, work completed, and problem areas. However, they did not quantify work

accomplished or relate the specific tasks accomplished to the major tasks requested by the customers. As a result, neither NARDAC management nor its customers could determine: 1) progress made in meeting user requirements, 2) percentage of work completed, or 3) whether projects could be completed on time and within budget.

Status reports prepared for the 15 projects we reviewed had insufficient information to predict whether or not the projects would be completed within budget. For example, 2 of the 15 projects we reviewed had cost overruns of over $1.2 million and $84,000. However, the status reports for both projects gave no hint of cost overruns before they occurred. In fact, NARDAC did not discover these overruns until after they occurred when 1) the funds ran out for one project, and 2) a review of the other project's records 6 months after the close of the fiscal year showed that additional costs had been incurred. Of the remaining 13 projects we reviewed, the status reports did not contain enough information to determine if these projects were currently experiencing cost overruns or whether they might experience overruns.

The NARDAC Commanding Officer agreed that status reports do not show whether or not projects will meet their milestones or be delayed. According to the Commanding Officer, NARDAC's project reporting lacks "executive information" that would provide an overall perspective of project status and progress and make it easier to identify problem projects. Such information would include all tasks required to complete a project, the status of each task, and the percentage of work completed. According to NARDAC's Executive Officer, this information has not been available because it would have required changes to existing billing and status reporting procedures. The Executive Officer further stated that a NARDAC task group has been formed to look into ways to add more useful cost and progress information to the current status reports.

Chargeback System Does Not Provide Adequate Information

Defense directive 7045.16 on financial management systems requires that financial information be reported in a way that provides program and administrative support for managers. In addition, the Federal Information Processing Standards Publication 96, Guideline for Developing and Implementing a Charging System for Data Processing Services, a basic reference for developing and implementing automated systems used to charge customers on the basis of resources used, also stresses the importance of reporting costs to management and customers.

NARDAC uses its automated chargeback system to provide management and customers with information on costs charged and reported to customers on the basis of resources used. The system collects cost data of resources used from accounting records, summarizes this information, and reports customer charges based on resources used during the month.

We found that the current chargeback system was not adequate for two reasons. First, although chargeback reports show labor and computer resources used, as required, they do not show the cost of specific tasks completed. For example, in one project we reviewed, the customers stated that they could not relate chargeback costs to completed tasks. In another instance, a customer required cost statements by task and by project to better manage and control costs and schedule. However, the cost reports provided to that customer did not associate costs with specific tasks.

The second problem is that the chargeback system used to capture resource utilization data is incompatible[1] with many of the computers that contain utilization data, and as a result, chargeback reports may contain inaccurate or incomplete data. According to the NARDAC Comptroller, the chargeback system cannot capture all billable charges to ensure that customers are charged accurately for all costs.

The Comptroller told us that the chargeback system's incompatibility problem can be directly linked to the system having been designed only for Unisys systems. Consequently, only Unisys computers directly capture data on resources used for chargeback billings. However, the vast majority of the data on computer resources is contained in IBM-compatible systems. For example, IBM-compatible systems are used (as opposed to Unisys computers) about 90 percent of the time in developing application systems for its customers. So, the majority of the data on resources used in determining system development costs is in IBM-compatible systems and this data cannot be readily processed by the chargeback system. As a result, clerks have to manually interpret and convert the IBM-compatible system data into data files acceptable to the Unisys-based chargeback system.

Because of this problem, managers cannot be sure that customers are accurately charged on the basis of resources used with the current

[1]A term applied to a computer system which implies that the system is not capable of handling both data and programs designed for some other type of computer system.

chargeback system. According to the Comptroller, management has known about this incompatibility problem since 1984, but did not address it until January 1988 because of other priorities. The Commanding Officer said that NARDAC is now acquiring a commercial off-the-shelf software package for use on IBM-compatible systems. He also said that this commercial package is running in test mode, and is scheduled to go into operation on October 1, 1988.

Previous Reviews of NARDAC's Management Controls Noted Similar Problems

Since 1985, two audit organizations, the Naval Audit Service and the public accounting firm of Coopers and Lybrand have conducted reviews of Navy Regional Data Automation Centers. Both audit organizations reported problems similar to those identified in this report. Table 1 summarizes the common findings reported by Coopers and Lybrand in 1986, Naval Audit Service in 1987, and by us in this report. (For more information on the Coopers and Lybrand and the Naval Audit Service reports, see findings in app. III).

Table 1: Comparison of Review Findings at Naval Regional Data Automation Centers

	Source		
	Coopers & Lybrand[a]	Naval Audit Service[b]	GAO
Deficiencies Reported			
Systems do not provide managers with adequate information	X	X	X
Customer bills are not sufficiently informative	X	X	X
Status reports are not sufficiently informative			X

[a]Coopers & Lybrand and American Management Systems, Inc., Management Analysis of the Navy Industrial Fund Program: Naval Regional Data Automation Centers Review Report, June 1986.

[b]Naval Audit Service Southeast Region, Automated Cost Accounting System for Naval Regional Data Automation Centers and Naval Data Automation Facilities, June 1987.

NARDAC Has Initiated Corrective Action to Improve Project Management

During our review, we met with NARDAC management officials to discuss project management control weaknesses discussed in this report. These officials acknowledged the problems we identified and said they have begun making corrections. Specifically, in addition to providing software to improve the system compatibility of the chargeback system, NARDAC is changing its procedures to improve management and cost control for selected projects. These improvements include the following:

- One of NARDAC's system development directorates, which is responsible for the Fleet Modernization Program Management Information System (1 of the 15 projects we reviewed), has developed a system that tracks

all project funds at the time they are obligated. According to NARDAC officials, this procedure helps them avoid committing money that has not yet been authorized, which helps identify and prevent cost overruns.

- NARDAC is now conducting mid-year reviews of all project planning estimates. NARDAC expects that these reviews will enable it to assess project status and identify potential cost overruns.

NARDAC Budget Exhibits Did Not Include All Systems Support Costs

Our review also disclosed that NARDAC did not include all costs associated with systems support services in the amended fiscal year 1988-1989 budget submission to the Congress. The Defense budget manual, DOD 7110-1-M, requires each CDA that spends $5 million or more for systems support services to include, as part of its initial budget submission, an exhibit 43E-CDA containing the estimated costs of providing support services. This exhibit should present the costs of all systems support services in order to ensure effective congressional oversight and control over costs. NARDAC is responsible for submitting budget figures to the Naval Data Automation Command, which prepares the 43E-CDA exhibits for the budget submission to the Congress.

We found that NARDAC did not include about $7.5 million in system support services to the Command. The amended fiscal year 1988-1989 budget exhibit showed a total estimated cost of $28.4 million for fiscal year 1988 services. NARDAC's internal accounting records, however, showed estimated costs for services at about $35.9 million. As a result, the Congress did not have accurate budget information on NARDAC's costs of providing systems support services.

The $7.5 million difference between the figures includes interdepartmental purchase requests ($5.9 million) and general and administrative overhead expenses ($1.6 million). The majority of the $5.9 million, according to the NARDAC Comptroller, consists of computer programming done under an interagency service contract with the Department of Energy's Oak Ridge National Laboratory.

The Defense budget manual requires that the exhibit include costs for interagency services. Therefore, the costs of Oak Ridge's work should have been included in the exhibit. A budget analyst with the Naval Data Automation Command Office of the Comptroller agreed that this cost should have been included in the exhibit. This analyst attributed the omission of this cost to an oversight by the NARDAC Comptroller, who submitted the figures to his command.

In addressing the $1.6 million for general and administrative overhead expenses, a Naval Data Automation Command official told us that although certain overhead expenses are usually listed, these expenses were not included because they are considered uncontrollable indirect costs. According to this official, these expenses are beyond the control of the departments responsible for providing support services and include expenses for such items as commercial activity studies, salaries for administrative staff, and other indirect costs. We found that the Defense budget manual does not specifically address how overhead expenses should be reflected in the exhibit.

Conclusions

NARDAC Washington, D.C., officials do not have sufficient information to effectively manage and control systems development projects. Specifically, we found that project status reports do not adequately track and monitor work completed on major tasks or forecast the impact of changes and delays on final project milestones. In addition, the chargeback system does not accumulate and report current and complete cost information. NARDAC officials recognize these problems and have taken some actions to improve overall management controls. A task force is being formed to address ways to provide more useful project status and cost information and software is being acquired to more accurately capture project cost information. Various internal controls are also being implemented to better manage and control selected projects. While these improvements are noteworthy, it is too early to determine whether they will provide the information necessary to effectively manage and control systems development projects.

In addition, because all costs for support services are not included in NARDAC's budget report (43E-CDA), the information needs of the Congress may not be met. NARDAC needs to take action to ensure that the Congress is fully informed of all costs associated with systems support services.

Recommendations

We recommend that the Secretary of the Navy direct the Commanding Officer, NARDAC Washington, D.C., to ensure that actions taken to improve overall management controls will result in 1) status reports that track and monitor work completed on major tasks and forecast the impact of changes and delays on final project milestones, and 2) a chargeback system that accumulates and reports current and complete cost information.

We also recommend that the required 43E-CDA budget exhibit to the Congress be revised to accurately reflect all system development costs.

We are sending copies of this report to the Senate Committee on Appropriations, the House and Senate Committees on Armed Services, the Secretary of Defense, and the Secretary of the Navy. We will also make copies available to other interested parties upon request.

Sincerely,

Dan White for
Ralph V. Carlone
Director

Contents

Abbreviations

CDA	central design activity
DOD	Department of Defense
GAO	General Accounting Office
IMTEC	Information Management and Technology Division
NARDAC	Naval Regional Data Automation Center

Objectives, Scope, and Methodology

We conducted this review to address the concern of the Chairman, Subcommittee on Defense, House Committee on Appropriations, on whether central design activities (CDAs) in the Department of Defense enhance the likelihood of success of large systems development and modernization. In August 1987, we agreed with the Chairman's office to select one CDA and review its effectiveness by examining its controls for managing system development projects. We selected the Navy Regional Data Automation Center (NARDAC) in Washington, D.C.

Our work focused on the adequacy of NARDAC's project management controls over systems development. To determine the adequacy of project management controls, we selected a sample of 15 projects ongoing in fiscal years 1987 and 1988. In selecting our sample, we considered primarily the size of the projects. Of the 15 projects selected, 3 accounted for about 30 percent of NARDAC's $37 million budget for fiscal year 1988. For each of the 15 projects, we reviewed NARDAC's controls for measuring progress by 1) examining procedures for monitoring project execution, including actual versus budgeted expenditures and actual versus scheduled completion dates, 2) interviewing responsible officials, and 3) reviewing status and chargeback reports.

We also reviewed Defense and Navy system development and project management guidance on managing and controlling system development and modernization projects.

Our work was conducted primarily at the Navy Regional Data Automation Center and the Navy Data Automation Command, its parent organization, both in Washington, D.C. We also worked at the Navy Sea Systems Command in Arlington, Virginia, which is a major customer of NARDAC. Our work was conducted between September 1987 and August 1988. We performed our work in accordance with generally accepted government auditing standards. The views of responsible Navy officials were sought during our review and are incorporated into this report where appropriate.

Navy Regional Data Automation Centers

Center Name	Center Location
NARDAC Washington	Washington, D.C.
NARDAC Norfolk	Norfolk, Virginia
NARDAC Jacksonville	Jacksonville, Florida
NARDAC New Orleans	New Orleans, Louisiana
NARDAC San Diego	San Diego, California
NARDAC Pensacola	Pensacola, Florida
NARDAC San Francisco	Alameda, California
NARDAC Newport	Newport, Rhode Island
NARDAC Pearl Harbor	Pearl Harbor, Hawaii

Results of Coopers and Lybrand and Naval Audit Service Reviews of NARDACs

This appendix briefly summarizes similar deficiencies noted during the Coopers & Lybrand and Naval Audit Service reviews of the NARDACs. It includes for each review 1) an overview, background, and scope of the review; 2) selected findings; and 3) recommendations. All of this material is drawn directly from the reviews.

Coopers & Lybrand

Title: Management Analysis of the Navy Industrial Fund Program: Naval Regional Data Automation Centers Review Report

Report Overview

The Coopers & Lybrand report evaluates information system services provided by the NARDACs. It concludes that the NARDACs need better project management, improved accounting, and better cost and status reporting to their customers.

Background and Scope

In the early 1980s the Navy determined that the NARDACs should operate as Navy Industrial Fund activities. Navy Industrial Fund operation was intended to make the NARDACs operate more efficiently and effectively. Coopers & Lybrand conducted its review to determine the effect of transferring the NARDACs to the Navy Industrial Fund. The review was conducted at the end of the second year of operating under the fund.

Selected Project Management Related Findings and Recommendations

Finding: Customer chargeback reports are not informative in that bills produced by the chargeback system 1) contain great detail but their emphasis is upon resources used rather than upon products produced; 2) do not show how much individual tasks (such as personnel system tasks, versus accounting system tasks) cost; and 3) do not contain the information necessary to forecast future costs or to reduce current costs. It concluded that 1) most customers are not able to detect errors in billing from the current reports, and 2) most project managers and customers were dissatisfied with the reports regarding the billing and reporting of resource utilization.

Recommendation: That customer-oriented bills and reports be produced.

Finding: NARDAC automated systems do not address the needs of NARDAC management and current systems have inherent inefficiencies. Information necessary to position resources, to spot trends, and to take corrective action when necessary is not available. As a result, project managers are not able to analyze planned versus actual costs by project

or task or to track planning estimates that are formalized with customers that show a breakout of projected revenues by resource pool within project and task.

The chargeback system is old, not designed for the current environment, and has been patched so much that it is increasingly difficult to maintain. In addition, the system requires a large amount of manual data entry and much manipulation of data before it is entered into the system. These functions could be automated, reducing errors and saving time.

Recommendation: Develop requirements for and install a new integrated accounting system. Develop a NARDAC executive management information system. Install a NARDAC project management system.

Naval Audit Service

Title: Automated Cost Accounting System for Naval Regional Data Automation Centers and Naval Data Automation Facilities

Report Overview

The review determined the accounting system produced data that would be useful for management purposes. However, system outputs were not always provided in the format or time frame desired by activity managers. It also determined that the chargeback system did not fully support managers' informational needs.

Background and Scope

The Director, Naval Data Automation Command requested the audit of this command's field activities' cost accounting system. The objectives of the audit were to 1) determine if the accounting system produced results useful for management purposes, 2) determine if the accounting system produced accurate costs for use in computing customer bills, and 3) identify necessary changes to the accounting system.

Finding: NARDACs did not follow the Office of Navy Comptroller's guidance requiring that when overruns in excess of specified limitations become evident during the course of work on reimbursable orders, price renegotiations are to be initiated prior to completion of the work. Naval Audit Service reported that the NARDACs performed work for customers without adequate funding when customer orders were not renegotiated when 1) cost overruns became evident or 2) customers failed to fund work on a timely basis. As a result, it reported that about $2.1 million in potential revenue (cost overruns), as of June 30, 1986, was not billed.

Also, customers may not have been given sufficient lead time to restructure their funding plans to recognize the unanticipated additional costs. NARDAC Washington accounted for over one quarter of the $2.1 million or $636,532 in cost overruns.

The Naval Audit Service concluded that timely renegotiation of customer work would achieve improved financial management for the NARDACS and their customers by 1) precluding overruns of available customer funds, and 2) allowing customers the time needed to restructure their financial plans and make additional funds available if they determined the ordered work was essential at the new cost.

Recommendation: That the Naval Data Automation Command require field activities to renegotiate customer work requests prior to exceeding available funds when it becomes apparent that costs will exceed the limitations.

Finding: Billing reports provided to customers contained cost information which was not needed or understood. Naval Audit Service believed that this condition existed because users' information requirements had not been reviewed since the Naval Data Automation Command began Navy Industrial Fund operations. As a result, reports to customers appear to contain data not necessarily useful to customers.

Recommendation: That the Naval Data Automation Command identify customer requirements and ensure that billing and utilization reports are adequate to meet customer information needs.

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