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

May 1988

COMPUTER PROCUREMENT

Navy CAD/CAM Acquisition Has Merit but Management Improvements Needed

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GAO

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

Information Management and
Technology Division

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May 11, 1988

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

Dear Mr. Chairman:

This report completes our response to your January 22, 1987, request to review the Navy's planned acquisition of Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) equipment. As agreed with your office, we responded in part to your request in a March 3, 1988, report addressing the technical specification for the Navy's CAD/CAM acquisition. This second report addresses the questions raised in your request letter concerning (1) the Navy's management of the acquisition, (2) the Navy's budgetary treatment and reporting of the acquisition, and (3) the Office of the Secretary of Defense's oversight of the acquisition. While we believe that the acquisition's overall goals and approach have merit, the report contains recommendations to the Secretary of the Navy in chapter 5 for improving management of the acquisition.

As arranged with your office, we are providing copies of this report to the Secretary of Defense, the Secretary of the Navy, and the Director, Office of Management and Budget. We are also providing copies to the House and Senate Armed Services Committees, the House Government Operations Committee, the Senate Governmental Affairs Committee, and the House and Senate Appropriations Committees. We will make copies available to other interested parties upon request.

Sincerely yours,

Daniel C. White for
Ralph V. Carlone
Director

Executive Summary

Purpose

The Navy is conducting a large and complex procurement of state-of-the-art Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) equipment. Commonly called CAD/CAM II because it is the Navy's second large procurement of this technology, it will likely span five Navy system commands and cost hundreds of millions of dollars.

Because of the procurement's scope and size and because of past Navy problems in acquiring the equipment, the Chairman, Defense Subcommittee, House Appropriations Committee, asked GAO to determine if

- the Navy has followed applicable acquisition regulations,
- the Navy has the correct organizations conducting the acquisition,
- the Navy has fully disclosed the acquisition in its budget requests, and
- the Office of the Secretary of Defense is adequately overseeing the acquisition.

The Chairman also asked GAO to address two other questions concerning Navy management of the acquisition, each of which is addressed in the report. (See pp. 8 to 9.)

Background

CAD/CAM is a tool for automating the engineering functions used in designing, manufacturing, and maintaining items such as ships, submarines, aircraft, and buildings. Using this technology, the cost and time to develop and maintain products can be reduced while product quality and reliability can be enhanced. The Navy represents a major user of the technology.

CAD/CAM II is designed to award umbrella contracts, possibly one for each of the Navy's five system commands, from which users can buy state-of-the-art, off-the-shelf hardware, software, and related services. It is a single, Navy-wide procurement intended to satisfy the unique mission needs of autonomous commands while also providing standard system features across commands.

Results in Brief

GAO believes that the Navy's centrally managed, Navy-wide approach to CAD/CAM II has merit because it provides opportunities for equipment standardization across commands and reduced unit costs through large-scale contracts. However, the Navy has not followed Defense regulations governing information system acquisitions and, therefore, has not ensured that it is pursuing the optimal system solution.

Since October 1987, the Navy has twice changed the CAD/CAM II program office and program manager. While the organizations that have conducted the acquisition are reasonable choices, GAO believes that these changes coupled with delays in resolving certain program issues have slowed program progress. Because of the delays, some users have initiated localized purchases to partially satisfy their respective needs and have thereby increased the risk of interoperability problems with equipment later purchased under CAD/CAM II.

Computer acquisitions like CAD/CAM systems are not readily visible in the Navy's formal budget submissions. As a result, the Navy prepares supplemental budget documents to highlight them. However, some of these documents for CAD/CAM are not complete and accurate and may, therefore, impair congressional oversight.

The Office of the Secretary of Defense has taken preparatory steps to oversee CAD/CAM II through its Major Automated Information Systems Review Council process. Further, the Office and the Navy are overseeing the acquisition through the Defense-wide Computer Aided Acquisition and Logistics initiative.

Principal Findings

Adherence to Defense Acquisition Regulations

The Navy's acquisition management approach for CAD/CAM II has been to give priority to developing a technical specification and then focus on a business or management plan to guide the acquisition. Such an approach does not ensure that the most feasible, cost effective, and low risk system is acquired. It is also not consistent with Defense acquisition management regulations, which provide a structured and controlled acquisition process to reduce both the cost and performance risks associated with information system acquisitions. These regulations require that user needs be established and validated, alternative solutions be evaluated, and a management plan for guiding an acquisition be developed, respectively, before a system solution is defined in a technical specification. According to Office of the Secretary of Defense guidance, the acquisition process for information systems should not bypass essential steps. (See pp. 13 to 18.)

Unresolved Issues and Program Changes

CAD/CAM II has progressed slowly because of a combination of events including (1) difficulties in resolving management issues and (2) program office and program manager changes. For example, the Navy began considering a proposed contract award and administration framework in April 1987, and in February 1988, when GAO concluded its review, the Navy had yet to fully resolve the issue. The Navy does not plan to release a Request for Proposals until it has obtained the necessary approvals from the Office of the Secretary of Defense. The Navy in turn does not plan to seek these approvals until it resolves the management issues. When GAO concluded its review, the target date for seeking the approvals had slipped 9 months, and program officials were unable to project when they would seek them. (See pp. 18 to 22.)

Budget Disclosure

The Navy's normal budget process inherently limits the visibility of computer acquisitions like CAD/CAM. To enhance visibility of both CAD/CAM in general and CAD/CAM II in particular, the Navy supplements its formal budget submissions with (1) special budget exhibits, and (2) at the request of the House Appropriations Committee, special budget information papers. In reviewing these supplemental documents for the fiscal year 1988-1989 budget cycle, GAO found that (1) the exhibits do not separately identify funding for all Navy CAD/CAM and (2) the information papers omit and incorrectly categorize some CAD/CAM purchases. For example, the latest paper, dated August 1987, understates purchases for fiscal year 1989 by about $12 million, or almost 25 percent. Additionally, it categorizes all CAD/CAM purchases for the Naval Sea Systems Command as relating to CAD/CAM II. However, GAO found six field installations within this command conducting localized purchases apart from CAD/CAM II. These purchases ranged from $40,000 to $2 million over 5 years. (See pp. 23 to 27.)

Office of the Secretary of Defense Oversight

The Office of the Secretary of Defense is providing oversight of CAD/CAM II. Although the review date for the Major Automated Information Systems Review Council has slipped by at least 9 months and thus it has yet to exercise its authority to either approve or redirect the acquisition, preparatory meetings to identify management issues requiring the council's attention have been held. However, given that the council's involvement in CAD/CAM II is still in its early stages, GAO cannot comment on its adequacy. Additionally, the Computer Aided Acquisition and Logistics Support organizations in both the Office of the Secretary of Defense and the Navy have been adequately involved in the acquisition to ensure adherence to certain technical standards. (See pp. 28 to 30.)

Recommendations

GAO recommends that the Secretary of the Navy direct the Assistant Secretary of the Navy for Financial Management to ensure that:

- the Request for Proposals for CAD/CAM II is not released until the program office has complied with applicable provisions of Defense acquisition regulations; specifically, the program office should conduct an evaluation of alternative system solutions based on validated user requirements;
- future program office and program manager changes to the acquisition are minimized and program management issues are quickly resolved; and
- funding for all Navy CAD/CAM is completely and accurately disclosed in special budget information papers to the Congress. (See p. 32.)

Agency Comments

As requested by the Chairman's office, GAO did not obtain official agency comments on a draft of the report. However, GAO discussed the report's factual content with Navy and Office of the Secretary of Defense officials and has incorporated their comments where appropriate.

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Tables

Abbreviations

ADPSO	Automatic Data Processing Selection Office
CAD/CAM	Computer Aided Design/Computer Aided Manufacturing
CALS	Computer Aided Acquisition and Logistics Support
GAO	General Accounting Office
IMTEC	Information Management and Technology Division
MAISRC	Major Automated Information Systems Review Council
NAVSEA	Naval Sea Systems Command

Introduction

The Navy competes in a world market for the design, repair, overhaul, and modernization of ships, submarines, aircraft, and shore-based support facilities. Prior to the 1960s, the Navy relied on manual techniques to support these functions. However, since the 1960s the Navy has used Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) technology.

The Navy is following a three-phased acquisition approach to satisfy its long-term CAD/CAM needs. The Computer Aided Engineering and Documentation System acquisition, which is now complete, is the first phase. This phase automated isolated engineering tasks. Under this phase, the Navy acquired over 400 CAD/CAM workstations for 64 Navy installations at a cost of about $100 million. The Navy's current acquisition constitutes the second phase, CAD/CAM II. Its focus is to automate groups of engineering tasks within each system command. The third phase is intended to take the Navy into the next century by integrating engineering tasks not only vertically within each system command, but also horizontally among Navy engineering data users.

In 1986, we reviewed selected aspects of the Navy's Computer Aided Engineering Documentation System acquisition and reported several contract management and administration problems.[1] These problems include a lack of required approvals for some contract actions, failure to follow procurement regulations, and a lack of adequate payment controls. We concluded that, unless corrected, these problems could recur in future CAD/CAM acquisitions.

On January 22, 1987, the Chairman, Subcommittee on Defense, House Committee on Appropriations, expressed concern about the Navy's second CAD/CAM acquisition, particularly in light of our report on the Computer Aided Engineering Documentation System. As a result, he requested that we address six questions concerning the acquisition's management (see app. I for request letter). On the basis of subsequent discussions with the Chairman's office, we agreed to determine if

1. the Navy is complying with applicable acquisition regulations,

2. the Navy has considered the needs of all its CAD/CAM users,

3. the Navy has established adequate contract administration controls,

[1] Navy Contracting: Improving Management of Procurements for Computer-Aided Equipment (GAO/NSIAD-87-60; Dec. 30, 1986).

4. the Navy has the correct Navy organizations conducting the acquisition,

5. the Navy has fully disclosed the acquisition in its budget requests, and followed normal budget processes, and

6. the Office of the Secretary of Defense is providing adequate oversight of the acquisition through its MAISRC process and its CALS initiative.

The Chairman's office also asked us to review the technical specification for the Navy's CAD/CAM acquisition and identify any issues that the Navy may want to consider. We reported separately to the Chairman on the technical specification.[2] This report responds to the Chairman's six questions. The first four items are addressed in chapter 2; items five and six are discussed in chapters 3 and 4, respectively. For item five, we addressed all Navy CAD/CAM acquisitions, rather than solely CAD/CAM II because (1) while reviewing the Navy's budgetary disclosure of CAD/CAM II, we found problems with the Navy's reporting of other acquisitions, and (2) the Chairman's office expressed interest in the disclosure of these other acquisitions.

A detailed explanation of our approach and methodology for addressing the Chairman's concerns is contained in appendix II. In brief, we interviewed Navy program officials responsible for the day-to-day management of the acquisition as well as Navy officials in support and oversight roles. We also interviewed officials in the Office of the Secretary of Defense responsible for reviewing and monitoring the acquisition. Our focus was the overall acquisition approach for CAD/CAM II, including compliance with Defense acquisition management regulations, the framework for awarding and administering the planned contracts, the involvement of Navy users in the acquisition, the roles of the respective Navy organizations participating in the acquisition, and the extent of Navy and Office of the Secretary of Defense oversight being provided. We gathered and analyzed available program management and budget documentation as well as minutes of meetings to corroborate information obtained during interviews. Our review was done between April 1987 and February 1988, primarily at Defense headquarters offices in Washington, D.C., and selected Navy field installations. It was performed in accordance with generally accepted government auditing standards.

[2]Computer Procurement: Issues Concerning Technical Specification for Navy's CAD/CAM Acquisition (GAO/IMTEC-88-16BR; Mar. 3, 1988).

What Is CAD/CAM?

CAD/CAM is a tool for automating the architectural, civil, structural, mechanical, and electrical engineering functions used in designing, manufacturing, and maintaining plants and equipment. Using this tool, the costs and time involved in developing and maintaining things such as buildings, ships, electronic systems, and airplanes can be reduced while product quality and reliability can be enhanced. According to a 1985 Navy report, the private sector's use of this technology has resulted in product cost, labor, and time savings ranging from 25 to 87 percent and a reduction in product test failures of between 70 and 80 percent.

In engineering, the product drawing or graphic is the primary communication medium. Traditionally, these drawings were prepared using conventional paper and pencil techniques—a time consuming approach, allowing only limited design options and usually requiring a prototype for testing and analysis. With CAD/CAM, an item is quickly drawn and easily modified on a computer screen. The computer models each version of the item so that the product design, manufacture, and logistics support functions can be optimized before beginning the production process.

Following product design, CAD/CAM allows for automated product manufacture by directly translating digitized engineering data into instructions to guide computerized machine tools. Once an item is manufactured, CAD/CAM provides a computerized record to facilitate post-production maintenance, repair, and modification. This record provides an engineering data base that is accessible to multiple users and requires minimal storage space.

The Navy's Second CAD/CAM Acquisition

CAD/CAM II is designed to be a Navy-wide procurement of off-the-shelf, state-of-the-art hardware, software, and related services. The Navy's goal is to award umbrella contracts, possibly one for each system command, from which individual users can purchase CAD/CAM equipment. The five system commands are the Naval Sea Systems Command (NAVSEA), Naval Air Systems Command, Naval Facilities Engineering Command, Naval Supply Systems Command, and Space and Naval Warfare Systems Command. Each of the contracts will be tailored to the unique mission needs of the respective commands. Each will also provide for certain standards to permit data transfer among users, minimize interdependence between software and hardware, and reduce differences in how users interact with the system. The contracts are planned to span 8 years, 5 years of procurement and an additional 3 years of maintenance and support.

Size of the Acquisition

CAD/CAM II will likely span five system commands employing over 40,000 potential users. Additionally, it may include the Marine Corps. As described by the Navy's Automatic Data Processing Selection Office (ADPSO), it is by far the most complex, highly valued, nontactical computer acquisition the Navy has attempted.

Commercial publications estimate the contracts' dollar value between $1 billion and $5 billion. While Navy officials would not officially specify the price range that the Navy plans to request from the General Services Administration in a delegation of procurement authority, the first program manager unofficially told us that the minimum will be around $125 million and the maximum will be at least $5 billion, depending on the number of workstations purchased. He also told us that the most likely size of the acquisition would be $2.5 billion. However, the Navy is currently reviewing the acquisition's size, and although program officials would not specify a dollar value, they stated that it will probably be less than earlier estimates. Commercial estimates of the acquisition's reduced contract value range from less than $100 million up to $500 million.

History and Status

The acquisition began in 1983 when NAVSEA tasked its Information Systems Improvement Program with formulating and managing a Navy-wide CAD/CAM program. The resultant program was termed the Navy Integrated Computer-Aided Design, Manufacturing, and Maintenance program. Its objective was to centrally manage and procure standardized equipment for the Navy.

In 1984, the Navy began drafting a technical specification defining the desired Navy Integrated Computer-Aided Design, Manufacturing, and Maintenance system. In January 1985, the first draft was completed. This draft was revised during the next year by a group of Navy users. During this time, the Navy restructured the program, separating it into three acquisitions—Computer Aided Engineering Documentation System, CAD/CAM II, and a third acquisition. A key feature of this restructuring was to initiate action to award the CAD/CAM II umbrella contracts.

In January 1986, the Navy's Assistant Secretary for Financial Management granted "approval in concept to initiate a CAD/CAM program." The following month, the draft specification was released as a Request for Information to industry and Navy users. On the basis of oral and written comments, the specification was revised and released for comment as a second Request for Information in January 1987.

Since this time, the specification has been revised and published as a Request for Information closure document (that is, comments are no longer requested). Additionally, the Navy has been working to resolve certain program management issues and finalize related documents. Once the program office has completed and forwarded the specification and related documents through the Navy chain of command to the Office of the Secretary of Defense, the Major Automated Information Systems Review Council (MAISRC)[3] will review CAD/CAM II. The Navy does not plan to release its Request for Proposals until after this MAISRC review. Given that a number of program management issues remain to be resolved, program officials were unable to provide us a target date for the MAISRC review and the Request for Proposals release; however, they did state that the Director, Information Systems Division, Chief of Naval Operations, has told industry that the Request for Proposals will be released by September 30, 1988.

[3]MAISRC is a senior-level Defense review board responsible for guiding and directing major resource investments in general-purpose computer systems.

Navy Management of CAD/CAM II Causing Increased Program Risk and Slow Progress

In managing CAD/CAM II, the Navy has not adhered to key provisions of Defense information system acquisition regulations. The Navy's overall acquisition management approach has focused first on developing a technical specification and then on resolving management issues and completing certain management documents. In contrast, Defense and Navy acquisition regulations require certain management actions and documents before and concurrent with developing a specification so that the problem (mission need) is defined before a solution (system specification) is chosen and developed. As a result, the Navy has increased the system cost and performance risks that the acquisition regulations are designed to minimize. Although the Navy prematurely began defining the details of its CAD/CAM system before it evaluated alternative system concepts and chose the optimal system solution, to its credit, it has involved users in the specification's development.

CAD/CAM II has recently undergone considerable program management change. The organizational placement of the program office changed twice between October 1987 and February 1988, and a change in program managers has accompanied each move. More importantly, however, the program management changes have also produced different management philosophies concerning the application of Defense acquisition management regulations. We believe that such organizational and management changes impede the continuity and progress of information system acquisitions like CAD/CAM II.

As a result of the acquisition approach and program management changes, the Navy has yet to fully resolve key program management issues. For example, at the time we concluded our review in February 1988, the Navy had not fully defined its contract award and administration framework, so we could not fully respond to the Chairman's question concerning the adequacy of contract administration controls. Linked to the management changes and the delays in resolving management issues, are slippages in the acquisition's schedule. These slippages have in turn caused Navy users to purchase equipment locally to satisfy immediate needs, and to postpone satisfying their full CAD/CAM needs until the umbrella contracts are awarded.

Acquisition Approach Not Consistent With Defense Regulations

Within the Defense Department, an information system project is subject to prescribed acquisition management regulations. Navy regulations are based on Department of Defense Directive 7920.1, "Life Cycle Management of Automated Information Systems," and are contained in Secretary of the Navy Instruction 5231.1B, "Life Cycle Management Policy

and Approval Requirements for Information System Projects." The regulations provide a structured process for planning, developing, reviewing, and approving information system projects. They are designed to control, manage, and evaluate an information system project to minimize the cost and performance risks associated with acquiring an effective system.

Defense and Navy regulations structure the acquisition management process into five broad phases—Mission Analysis/Project Initiation, Concept Development, Definition/Design, System Development, and Deployment/Operation. Each phase culminates in a milestone decision point. Table 2.1 shows the purpose of each phase. It also highlights the principal management documents that must be prepared and summarized in a system decision paper. The system decision paper is a management summary of an acquisition as well as a document upon which a designated approval authority bases milestone decisions.

Table 2.1: Defense Acquisition Management Phases

Mission Analysis/ Project Initiation	Concept Development	Definition/Design	System Development	Deployment/Operation
Purpose				
Identify mission element need (set of requirements) Validate need Recommend exploration of ways to meet need	Synthesize and evaluate (solicit) alternative ways to meet need Recommend one or more concepts for further study	Define functional needs (system and subsystem specifications) and design an operational system	Develop integrate, test, and evaluate the system	Install the system(s), continue approved operations, budget adequately, control changes, and maintain the system for its remaining life
Documentation and Action				
Mission Element Needs Statement	Project management charter Plan of actions and milestones System alternatives Economic analysis Acquisition strategy General functional requirements Validation of user needs	Functional description Data requirements System/subsystem specifications Program specifications Data base specifications Test and evaluation plan	Users manual Computer operations manual Program maintenance manual Prototype testing System integration testing	Periodic reviews
Mission Elements Need Statement	System Decision Paper I	System Decision Paper II	System Decision Paper III	System Decision Paper IV

(continued)

Mission Analysis/ Project Initiation	Concept Development	Definition/Design	System Development	Deployment/Operation
Milestone				
Approval ends milestone 0	Approval ends milestone I	Approval ends milestone II	Approval ends milestone III	Approval indicates system performance is acceptable, milestone IV

CAD/CAM II Acquisition Management Approach

The Navy's acquisition management approach for CAD/CAM II has not been consistent with Defense acquisition management regulations. As explained by the current acting program manager, the overall approach has been to give priority to developing a technical specification and then to focus on a business or management plan to guide the acquisition. This approach is not consistent with Department of Defense Directive 7920.1 or Navy Instruction 5231.1B, which require that a need be established and an approach for satisfying that need be developed before a system solution is defined. According to Office of the Secretary of Defense guidance,[1] the management process followed in acquiring information systems is not supposed to bypass essential steps.

As explained by program officials, the regulations are not well tailored to acquisitions like CAD/CAM II, which are efforts to award umbrella contracts for off-the-shelf equipment. They said that strict adherence to the letter of these regulations does not occur until the umbrella contracts are in place and users attempt to purchase equipment off of the contracts. Prior to this point, the process of putting the umbrella contracts in place is managed according to an undocumented, Navy "philosophy." In our opinion, waiting until the contracts are in place before, for example, evaluating alternative system solutions to satisfying a CAD/CAM need, unnecessarily increases the cost and performance risks associated with the acquisition. More specifically, it increases the chances that system features not linked to validated user requirements will be included in the contracts, features that add system complexity, and thus increase system risks and unit costs.

Examples of Noncompliance With Acquisition Regulations

The Navy's noncompliance with Defense acquisition management regulations is exemplified by the timing of acquisition actions and the absence of certain management documentation. For example, the purpose of the Mission Analysis and Project Initiation phase is to identify a mission deficiency or an opportunity that is a valid concern,

[1] "MAISRC Guidelines for Program Managers," June 1987.

mission-related, and worth addressing. The Mission Element Need Statement is the management document prepared at the conclusion of this phase (milestone 0) to document a mission need and provide approval to proceed to the next phase and explore alternative concepts. For CAD/CAM II, all three program managers told us that milestone 0 approval was given in January 1986 based on a draft specification, a document not normally prepared under the process until the Definition/Design phase. The Mission Element Needs Statements were not approved until mid-1986. The authority to explore and develop alternative concepts was given, therefore, before the required documents defining the mission deficiency were approved.

During our February 1988 exit conference, Navy officials told us that milestone 0 approval did not occur until the Mission Element Needs Statements were approved. The officials stated that the January 1986 approval represented only "approval in concept to initiate a CAD/CAM procurement," rather than approval to begin the concept development phase. Regardless, the Navy selected and defined a system solution in a technical specification well before it stated the mission problem/need and explored alternative system concepts to solve the problem. According to officials at a NAVSEA user installation, this "cart before the horse approach is characteristic of CAD/CAM II management." In contrast, program officials told us that for acquisitions like CAD/CAM II, which they said are efforts to put umbrella contracts in place rather than traditional systems development projects, developing a Mission Element Needs Statement and a technical specification concurrently is good management.

As another example, certain management actions and documents are required during the Concept Development phase. Principal among these is an evaluation of alternative approaches for addressing validated user requirements. Such an evaluation allows the pros and cons of potential system solutions to be determined and the optimal solution to be chosen using uniform criteria such as system implementation time, system risks and uncertainties, system cost (total and operations/maintenance), and system satisfaction of validated user needs. Without such an evaluation, the Navy has no assurance that the detailed system features defined in its technical specification relate to an overall CAD/CAM system concept that is the most feasible, cost effective, and low-risk alternative.

An evaluation of alternatives has not been done for CAD/CAM II. According to a draft system decision paper, five alternatives existed. They were (1) do nothing, (2) purchase state-of-the-art equipment, (3) lease

equipment, (4) augment existing equipment, and (5) use service centers/ resource sharing. The Navy selected alternative 2. However, the first program manager told us that he was not aware of any formal analysis of the above alternatives. Further, he stated that he does not see a need for such analysis because the Navy has used CAD/CAM for years and this experience has led the Navy to conclude that CAD/CAM II is the only alternative that will satisfy long-term needs.

During our February 1988 exit conference with the Navy, program officials stated that a CAD/CAM II program management plan being developed will evaluate alternative approaches. Program officials also stated that alternative approaches have been discussed orally throughout the specification development process and although tentative positions have been reached and are reflected in the specification, a final system solution has not been decided. Additionally, the officials stated that once the contracts are in place and users begin seeking the appropriate approvals to buy equipment off of them, alternative system solutions for each user will be evaluated and the umbrella contracts will represent one alternative to be considered.

Users Involved in Specification Development

The Navy has taken a series of positive actions to involve users in the CAD/CAM II technical specification development process. While one system command's user participation in developing the specification was limited, our interviews of users at 34 Naval installations from the other four commands indicates that users were involved in developing the specification. Despite the users' involvement, the specification nevertheless represents a detailed definition of an overall Navy CAD/CAM system concept that, as noted above, may not be the most feasible, cost effective, and low risk overall system solution.

The development of the technical specification has been an iterative process, involving various Navy users and, to date, spanning 3 years. The initial draft of the specification was completed in January 1985, primarily by the current acting program manager. Following a series of meetings involving about 40 users, this initial draft was revised and released to industry and the Navy CAD/CAM community in February 1986 as a Request for Information. Included in the Request for Information was a 100 page questionnaire designed, in part, to solicit user input. Using the results of this information request and oral discussions held between the CAD/CAM industry and some Navy users, the Navy revised the specification and released it again for comment in January 1987. Following another series of user meetings to revise the specification, the

Navy issued a Request for Information closure document to industry and Navy users in May 1987.

Although user involvement by one of the five system commands was limited, users from the other four commands were involved. Of the 34 installations we contacted, 5 do not use CAD/CAM. Of the remaining 29 installations that do use the technology, officials at 24, or about 83 percent, told us they were involved in developing the specification. Of these 24 that were involved, all received and commented on the different versions of the specification. On the basis of descriptions of how each of the 24 was involved, 18 can be described as extensively involved. Further, officials at 13 of the installations told us they participated in the September 1986 oral discussions with industry. However, because users for the fifth command that had limited involvement, the Naval Supply Systems Command, did not have any experience with or knowledge of the technology, the command's CAD/CAM II project coordinator stated that their involvement in developing the specification was confined primarily to herself, one headquarters representative, and one field user.

Frequent Program Office Changes Have Been Made

Both the program office and the program manager for CAD/CAM II changed twice between October 1987 and February 1988. Along with these shifts in management responsibility have been changes to the acquisition management approach. While we do not question the propriety of any one of the organizations tasked to manage the acquisition, we do believe that moving it from one organization to another has contributed to slow program progress and has hindered program continuity. Program officials agreed during our February 1988 exit conference that these changes have caused delays in the acquisition.

In July 1983, the now defunct Naval Material Command designated NAVSEA as the lead system command for managing a Navy CAD/CAM program. NAVSEA in turn assigned program coordination and management responsibility to its Information Systems Improvement Program, a staff office reporting to the Vice Commander. In October 1987, the CAD/CAM program manager was replaced and the program was moved to another NAVSEA organization, the Deputy Commander for Acquisition Planning and Appraisal. A NAVSEA memorandum stated that the organizational move was due to (1) the nature of the issues being experienced, (2) the required degree of coordination with all echelons of the Defense Department, and (3) the intensive oversight being experienced. The move was intended to provide the acquisition with comprehensive management focus and control. While we believe that the Deputy Commander for

Acquisition Planning and Appraisal is a reasonable choice for managing CAD/CAM II, the necessity for the change is unclear, particularly given its disruptive effect. The program manager change, according to the Head, Systems Assessment Branch, Information Systems Division, Chief of Naval Operations, was a result of the Goldwater-Nichols Department of Defense Reorganization Act of 1986 requiring a reduction in military billets in Defense headquarters.

In February 1988, the Navy moved the CAD/CAM program office to the Naval Data Automation Command and designated a new program manager. According to program officials, this change was made because NAVSEA lacked sufficient resources to manage the acquisition. Again, we believe that the Naval Data Automation Command is a reasonable choice for managing the acquisition. In fact, although this change takes program management responsibility and control away from the users of CAD/CAM equipment, the system commands, it places it in an organization whose mission includes the acquisition of automated data processing and data communications equipment, software, and service contracts. However, we believe that this change in program management has again disrupted program continuity and further contributed to delays in the acquisition.

The program management changes have produced different management philosophies in applying Defense acquisition management regulations. For example, under the first program manager's leadership, we were told that all provisions of the regulations did not apply to CAD/CAM II. As a result, a project management plan and a project charter were not prepared. When the acquisition was transferred in October 1987, however, the new program management leadership began developing both documents in an effort to comply with Defense acquisition requirements.

Key Program Management Issues Yet to Be Resolved

The Navy has yet to resolve various program management issues. One important issue is the contract award and administration framework, which is the subject of one of the Chairman's six questions. Other examples include the acquisition's scope, approach, and funding sources. The Navy is attempting to resolve each issue to the satisfaction of each system command. According to program officials, efforts to resolve these issues have taken considerable time and have caused the acquisition to progress slowly. As an example, the Navy has been discussing a proposed contract award and administration framework since April 1987,

and as of February 1988, when we concluded our review, the issue had not been fully resolved.

Release of a Request for Proposals will not likely occur until the Navy resolves these issues. The Navy does not plan to release this solicitation document until a MAISRC review is held. This review, however, cannot occur until the Navy provides MAISRC with an approved system decision paper and related documentation. However, the Navy does not yet have an approved consolidated decision paper or management plan, and even if it did, it does not plan to submit these documents to MAISRC until it has a coordinated position among the five system commands on the unresolved management issues. Because of delays in resolving issues and finalizing program management documentation, the MAISRC review had slipped 9 months as of February 1988, and program officials were unable to project a future date for the review. To gain this coordinated position, the Navy has recently formed a senior CAD/CAM II steering board with representation from each system command to, among other things, resolve conflicts and issues.

Contract Award and Administration Is a Key Unresolved Issue

One of the Chairman's six questions asked whether the Navy had established adequate contract administration controls. As of February 1988, when we concluded our review, the Navy had yet to fully define how it will award and administer its five planned contracts. As a result, we could not evaluate the adequacy of contract controls. However, we did compare the overall contract management framework the Navy was considering at the time of our review with the framework employed on the Navy's Computer Aided Engineering Documentation System contract. We found that the Navy is considering lessons learned from this earlier CAD/CAM acquisition in defining its contract management structure for CAD/CAM II.

In April 1987, the Navy's Information Systems Division Director established a strategy for the CAD/CAM acquisition naming ADPSO, under the Director's supervision, as having procurement responsibility for the five contracts. As stated in the Director's strategy, ADPSO is designated the contracting office and will oversee contract source selection in coordination with the CAD/CAM program office, each system command, and appropriate field activities. Further, ADPSO will use personnel from each system command during the pre-award phase. Post-award contract administration will be conducted by the respective system commands. The CAD/CAM program office will coordinate contract modifications and approve all delivery orders before these actions are executed.

Some system commands have objected to the proposed contract management framework and until recently have questioned the proposal. According to a program office document generated under the first and second program managers' tenures, having a NAVSEA program office with a warranted contracting officer is a preferred approach because CAD/CAM equipment is complex and technical and buying it is different from the mainframe purchases for business and logistics applications to which ADPSO is accustomed. Additionally, the Naval Air Systems Command CAD/CAM project manager told us that the system commands objected to the idea of ADPSO using system command personnel to fulfill ADPSO responsibilities as a contracting office. According to a Naval Air Systems Command memorandum, having a system command provide contract resources so that ADPSO can perform its mission establishes a bad precedent. Because of this issue, both the Naval Air Systems Command and the Space and Naval Warfare Systems Command considered withdrawing from the acquisition.

During our February 1988 exit conference with the Navy, program officials stated that the framework for managing the planned contracts has been settled since the acquisition's transfer to the Naval Data Automation Command. They also stated that the CAD/CAM II management plan now being developed will address the details of contract management.

The Navy is considering lessons learned from its Computer Aided Engineering Documentation System experience in its contract management approach for CAD/CAM II. Specifically, the Navy's Assistant Secretary for Financial Management has stated that these lessons will be applied. Also, the Assistant Secretary of Defense (Comptroller) has cited examples of lessons to be applied, including using automated support for administering delivery orders and having early program auditing to maintain budget and approval integrity. Finally, during our discussions with Navy and Office of the Secretary of Defense officials, we found them to be mindful of ensuring that the previous problems are not repeated.

To illustrate the Navy's consideration of these lessons learned, the overall contract management framework assigns post-award contract management to each system command, with assistance from the CAD/CAM program office. In contrast, the Computer Aided Engineering Documentation System contract was managed by a Naval Regional Contracting Center and a Naval laboratory. According to CAD/CAM program management, the system commands provide a proven capability to perform the contract management functions. As another example, ADPSO will be the

contracting office as opposed to a Naval Regional Contracting Center, which was used in the prior acquisition. ADPSO's charter justifies its appropriateness as the contracting office by stating that it has capabilities not normally found in regional contracting centers, which make it uniquely suited for general-purpose, nontactical information system acquisitions.

Effect of CAD/CAM II Delays

Because of slow program progress, Navy users have delayed satisfying their individual CAD/CAM needs and thus missed opportunities to benefit from the technology. To mitigate the effect of the delays, some Navy users are buying or planning to buy equipment locally to partially satisfy their respective needs. However, delays in satisfying a user's total requirements equate to delays in fully benefiting from the productivity gains that the technology offers. Further, having Navy users independently buying equipment on an interim basis increases the risk of interoperability problems between this equipment and the CAD/CAM II equipment.

On the basis of our user interviews at 29 Navy installations, we found that 20 are making or plan to make interim purchases. These purchases range from a few microcomputers running drafting software to 26 powerful engineering workstations costing around $2 million. The primary reason users cited for making the interim purchases was not being able to wait for the umbrella contracts. Officials at a NAVSEA installation explained that they have waited 3 years for the CAD/CAM II equipment and cannot afford to wait any longer. Their installation is a business, and CAD/CAM offers a means of improving productivity. They stated that they are better off buying some equipment on their own now and benefiting from the associated productivity gains, than waiting indefinitely for the umbrella contracts in hopes of getting larger gains.

The interim equipment purchases caused by program delays will also increase the risk of interoperability and data exchange problems between the interim equipment and the equipment later acquired under the umbrella contracts. As stated in a program office document, different CAD/CAM equipment and system software can omit and distort physically and operationally important data details. The larger the number of different systems used, the greater the probability of error. Controlling the number of Navy systems will reduce the danger of this problem. This difficulty associated with data exchange between different systems was also a concern voiced by Navy users that we interviewed.

CAD/CAM Budget Visibility Limited and Disclosure in Some Documents Incomplete and Inaccurate

The Navy has followed its normal budget process in reporting funding for planned CAD/CAM buys in its formal budget submissions to Congress. However, this process inherently limits the visibility of such computer acquisitions. As a result, the Navy prepares (1) special budget exhibits to highlight its computer acquisitions, and (2) special budget information papers, at the request of the House Appropriations Committee, to separately identify its planned CAD/CAM buys. While we did not review the adequacy of the Navy's disclosure of such computer acquisitions in its formal budget submissions, we did review the fiscal year 1988-1989 budgetary disclosure of all Navy CAD/CAM purchases in special budget exhibits and information papers. We found that (1) the special budget exhibits do not separately identify funding for all such purchases, and (2) the special information papers omit and incorrectly categorize funding for these purchases.

This chapter addresses the Navy's budgetary treatment and disclosure of all Navy CAD/CAM purchases, rather than solely CAD/CAM II as specified in the Chairman's request letter. We included all purchases because (1) we found shortcomings in the Navy's reporting of these purchases, and (2) the Chairman's office expressed interest in their budgetary disclosure.

Normal Budget Process Followed but Not Designed to Separately Identify CAD/CAM

The Navy has a defined process for developing its budget for computer related purchases and for incorporating the resultant budget amounts in its formal budget submissions. While it appears that the Navy has adhered to this process in developing the CAD/CAM portion of its fiscal year 1988 budget submissions, this process is inherently not designed to separately identify CAD/CAM. Instead, it merges CAD/CAM with other computer purchases as the budget documents are aggregated.

Navy Comptroller Instruction 7102.2A and related guidance detail the Navy's process for developing its computer budget exhibit. Our review of the development of the CAD/CAM portion of the Navy's fiscal year 1988 computer budget exhibit indicates that each of the system commands is adhering to this guidance. The process takes individual computer related requests from each Navy field activity and combines them into generalized totals in building a Navy computer budget. As a result, specific computer items like CAD/CAM become less and less visible as the budget is developed. The process does not allow for CAD/CAM or any specific computer acquisition to retain its identity for either the appropriated or nonappropriated (industrial fund) accounts.

Where Is CAD/CAM in Navy's Formal Budget Submissions?

CAD/CAM is spread throughout the Navy's formal budget submissions, making the total funding associated with it difficult to identify. Although currently funded primarily out of Navy Industrial Funds, it potentially could be included in any line item within any appropriation account. According to the second program manager, CAD/CAM is viewed as incidental to the acquisition of a naval weapon system, platform, or shore-based support facility. Therefore, funding for it can be embedded in the line item budget request for any weapon system and could involve any appropriation account as well as nonappropriated Navy Industrial Funds. As examples, officials at two Naval Air Systems Command installations stated they plan to purchase CAD/CAM equipment using aircraft program funds. According to these officials, the equipment purchased will be used expressly for the reworking of specific aircraft, and the funding sources will be Other Procurement—Navy and Operations and Maintenance—Navy.

Although CAD/CAM acquisitions are scattered throughout the Navy's formal budget submissions, budget analysts in the Naval Data Automation Command's Comptroller Directorate told us that about 90 percent of all CAD/CAM acquisitions are funded through the Naval Industrial Fund's Asset Capitalization Program. Similarly, officials we interviewed at 19 of the 29 field installations stated that they are funding their CAD/CAM purchases through this program. Under the Asset Capitalization Program, computer acquisitions compete with other capital purchases for available program funds.

The Navy Industrial Funds budget submission to the Congress, Industrial Funds Overview, does not specifically identify CAD/CAM. Instead, it provides an aggregate figure for all capital acquisitions. Further, our review of the industrial fund budget development process revealed that at no point in the process is CAD/CAM visible within an aggregated Asset Capitalization Program line item.

Supplemental Budget Documents Enhance CAD/CAM Visibility but Some Are Inaccurate and Incomplete

To make CAD/CAM more visible, House Appropriations Committee Report 99-793 on the Department of Defense's fiscal year 1987 appropriations bill, H.R. 5438, directed that the Navy's special budget exhibits for computer systems identify and justify large acquisitions like CAD/CAM II. Additionally, during the Navy's fiscal year 1988 appropriations hearings, the House Appropriations Committee, Defense Subcommittee, requested that the Navy provide special budget information papers identifying Navy funding for all planned CAD/CAM purchases. We found that the Navy's fiscal year 1988-1989 special budget exhibits do not

identify all Navy CAD/CAM funding, including funding for CAD/CAM II; however, the process being followed for the fiscal year 1989 budget exhibit update should allow for all CAD/CAM II funding to be disclosed. We also found that the special budget information papers prepared during fiscal year 1987 do not accurately identify all planned CAD/CAM purchases.

Fiscal Year 1988-1989 Budget Exhibits Do Not Identify All CAD/CAM

The Navy supplements its formal budget submissions with a series of special budget exhibits. These exhibits are designed to break out the Navy's funding requests for computer systems that are embedded in the formal budget submissions. The exhibits provide a compilation of all computer related funding requests as well as separate breakouts of key information system acquisitions. In our review of the Navy's fiscal year 1988-1989 exhibits, we found that all Navy CAD/CAM purchases are not visible. Our observation was confirmed by a budget official in the Naval Data Automation Command's Comptroller Directorate. We found that while one of the exhibits specifically pertains to the CAD/CAM II acquisition, it does not provide proposed funding levels, and it does not include purchases apart from CAD/CAM II. Further, while two other exhibits identify some CAD/CAM purchases, they are limited to purchases of more than $1 million in one year or more than $8 million over 5 years.[1]

Process for Preparing Next Special Budget Exhibit Should Provide for Disclosure of CAD/CAM II Funding

One of the Navy CAD/CAM special budget exhibits pertains exclusively to CAD/CAM II. Navy Comptroller Instruction 7102.2A requires the development of such a special budget exhibit for each requirements or indefinite-quantity contract with expected costs greater than $10 million in any one year of the contract. CAD/CAM II is one of several contracts for which such an exhibit is required.

The Navy's process for developing this particular exhibit should allow for reporting all CAD/CAM II funding in the fiscal year 1989 budget exhibit update. According to Navy instructions on the process, each field activity must identify all planned CAD/CAM II acquisitions and the associated funding requests, regardless of amount, by funding source (appropriation account or industrial fund) and by fiscal year. These acquisitions are later to be consolidated by the Naval Data Automation Command's Comptroller Directorate to produce a Navy budget exhibit. Since the Navy had not reported specific funding on CAD/CAM II to the Congress at the time we concluded our review in February 1988, we

[1]The $1 million one-year threshold has been raised to $2 million for future budget cycles.

could not test Navy compliance with this process. However, our review of the process indicates that it should provide for the reporting of all CAD/CAM II funding in the fiscal year 1989 budget exhibit update.

Special CAD/CAM Budget Information Papers Not Accurate or Complete

During fiscal year 1987, the House Appropriations Committee, Defense Subcommittee, asked the Navy to provide two special budget information papers identifying all CAD/CAM funding. Our review of the papers disclosed that neither is complete. The first omitted major categories of CAD/CAM acquisitions. The second provided figures for all categories; however, some of the figures were understated and incorrectly categorized.

The first information paper was prepared in March 1987 and entitled "Department of Defense Information Paper." It responded to the subcommittee's request for CAD/CAM budget figures by fiscal year and by appropriation account. However, the paper was limited to CAD/CAM II and Computer Aided Engineering Documentation System budget figures for fiscal years 1986-1989. According to budget analysts in the Naval Data Automation Command's Comptroller Directorate, it did not include Navy proposed funding for CAD/CAM localized purchases or a contract awarded by the Long Beach Naval Shipyard.[2] Funding in fiscal years 1988 and 1989 for these two omitted categories, according to the second information paper, are $7.9 million and $5.5 million, respectively.

The second information paper updated and expanded on the first. It was prepared in August 1987 and entitled "CAD/CAM Technology." This paper lists the funding levels by system command for fiscal years 1986-89 for (1) the Computer Aided Engineering Documentation System, (2) Long Beach Naval Shipyard, (3) CAD/CAM II, and (4) other localized CAD/CAM buys. However, it understates the total funding levels for fiscal years 1988 and 1989 by about $600,000 and $12 million, respectively.

The fiscal year 1988 total of $18.2 million is understated in the second paper by about $600,000. This understatement is due to the omission of Space and Naval Warfare Command localized CAD/CAM purchases. According to Navy budget analysts, the omission reflects a collection of such purchases that individually do not exceed certain reporting thresholds.

[2]In August 1985, the Navy awarded a $13.4 million contract for CAD/CAM equipment at the Long Beach Naval Shipyard. This contract was awarded to meet high-priority CAD/CAM needs within several of the shipyards.

The paper's fiscal year 1989 total of about $41.2 million is understated by about $12 million. This understatement includes about $1.8 million in Space and Naval Warfare Command localized purchases that the command omitted for the same reason cited above. It also includes CAD/CAM II purchases totaling about $100,000 for the Naval Supply Systems Command and $10.1 million for NAVSEA. According to Navy budget analysts, the Naval Supply Systems Command and the NAVSEA omissions occurred because these commands did not submit their funding plans in time for inclusion in the paper.

In addition to these understatements, the breakout of funding by category (CAD/CAM II, Computer Aided Engineering Documentation System, Long Beach Naval Shipyard, and localized purchases) is not correct. For example, the paper identifies NAVSEA fiscal year 1989 funding for CAD/CAM II as $20 million and shows no funding for localized purchases. However, six of the nine NAVSEA field installations we contacted were conducting localized purchases apart from CAD/CAM II. According to officials at these six installations, the size of these purchases range from about $40,000 to $2 million over a 5-year period. NAVSEA budget analysts told us that they did not identify any localized purchases for NAVSEA because they considered all purchases for fiscal year 1989 and beyond to be CAD/CAM II related.

Defense Providing Oversight of CAD/CAM II

Two mechanisms through which the Office of the Secretary of Defense oversees computer acquisitions like CAD/CAM II are the MAISRC process and the Computer Aided Acquisition and Logistics Support (CALS) initiative. MAISRC is a senior Defense review board responsible for guiding and directing major resource investments in general-purpose computer systems. It focuses on compliance with Defense acquisition management regulations. MAISRC's oversight process for CAD/CAM II is underway; however, it has not progressed sufficiently for us to comment on its adequacy.

CALS is a joint initiative between the Defense Department and industry to improve weapon systems' design, manufacture, and logistics support through the use of computer technology. CAD/CAM II is but one of many efforts under the Defense-wide initiative. It is concerned primarily with systems' adherence to certain technical standards. CALS is providing adequate technical oversight of CAD/CAM II, both at the Office of the Secretary of Defense and the Navy level, but the CALS' roles and responsibilities at both levels are still evolving.

MAISRC Process Under Way

MAISRC serves as the Defense Department's senior management oversight and decision-making body for general-purpose, major information systems. It has authority to approve, redirect, or recommend cancellation of a system it reviews. It executes its mission by reviewing a system's compliance with the acquisition management principles set forth in Department of Defense Directive 7920.1, "Life Cycle Management of Automated Information Systems" and Department of Defense Instruction 7920.2, "Major Automated Information Systems Approval Process." Examples of program areas addressed include system mission, management, costs, design, architecture, acquisition strategy, and implementation.

Because of congressional interest in CAD/CAM II, MAISRC first scheduled a review of the acquisition for May 1987. However, as of February 1988, when we concluded our review, the review had not been held. The reason for the review's postponement is Navy delays in gaining internal approvals on its program management documents. Office of the Secretary of Defense officials stated that the review cannot occur until MAISRC officially receives these documents. Navy officials told us that they did not know when the documents would be ready, and as a result, could not estimate when the review would be held.

Despite the delays, representatives for MAISRC members have held preparatory meetings to understand the acquisition and identify potential issues requiring the members' attention. Through a review of the minutes for these meetings, we verified their occurrence and found that the discussions were consistent with the meetings' purposes. However, because these efforts are only preparatory and MAISRC has yet to exercise its authority to, for example, approve or redirect the acquisition, we cannot comment on the adequacy of the oversight performed.

MAISRC's role beyond its planned review is uncertain. Navy officials stated that this matter has not been decided. They added that their preferred position is for MAISRC to delegate approval authority to the Navy for individual purchases of equipment from the five planned contracts. The MAISRC action officer for CAD/CAM II stated that while the council's future role has not been decided and probably will not be until the planned review is held, there will probably be some type of involvement beyond that review.

CALS Providing Oversight

CALS is a Department of Defense initiative begun in 1985 to institute an automated, integrated, and standardized "system of systems" to create, transmit, and use technical information in the design, manufacture, and support of Defense weapon systems and equipment. It is to provide the means for designing better weapon systems, platforms, and support facilities in less time by moving from a paper-based logistics and technical data structure to a computer-based structure. CAD/CAM II is but one of many projects that fall under this initiative.

A framework for overseeing CAD/CAM II is in place. Both the Office of the Secretary of Defense and the Navy have established management structures to, among other functions, ensure that efforts like CAD/CAM II are consistent with and contribute to CALS standards and objectives. While the management frameworks for both are still evolving, we found evidence indicating that adequate management oversight by both organizations is occurring. For example, both Office of the Secretary of Defense and Navy CALS officials stated that they hold periodic meetings and discussions with the program office. We verified the meetings' occurrence by reviewing meeting minutes.

As another example, a primary CALS oversight function is to establish, coordinate, and implement a set of technical standards for data exchange among systems. To this end, the Office of the Secretary of Defense CALS Policy Office has published in draft its Phase I.0 CALS Core

Requirements defining text and graphics data standards for engineering drawings and technical manuals. The Navy CALS Steering Board has in turn directed that these Phase I.0 Core Requirements be incorporated in the CAD/CAM II technical specification.

Further, the Office of the Secretary of Defense CALS Policy Office, through a contract it has with the National Bureau of Standards, has reviewed the CAD/CAM II technical specification and provided written comments to the Navy. Officials from the CALS Policy Office told us they also attended specification writing sessions to ensure that their comments were incorporated. Additionally, these officials stated that to support the planned MAISRC review, they are reviewing the specification for compliance with the Phase I.0 CALS Core Requirements, and they will report their review results to the Assistant Secretary of Defense for Production and Logistics, who is a MAISRC member. They also stated that they plan to review the CAD/CAM II Request for Proposals and the planned benchmark tests in light of these CALS core requirements.

Conclusions and Recommendations

Conclusions

We believe that the Navy's fundamental goals and approach for its CAD/CAM II acquisition have merit. CAD/CAM is a proven tool for building and maintaining products better, faster, and cheaper, and the Navy represents a potential major benefactor of this technology. The Navy's overall approach of conducting a centrally planned and managed acquisition to satisfy its collective needs offers the opportunity to achieve (1) data transfer among Navy users through standardization of equipment, and (2) economies of scale in the purchase, training, and maintenance costs of the equipment.

Both the Office of the Secretary of Defense and the Navy have information system acquisition management regulations to ensure that major automated information systems are effectively and efficiently managed. However, the Navy has not followed key provisions of the regulations. By not fully complying, the Navy is increasing both the cost and performance risks associated with the acquisition. For example, the Navy developed a system specification to be included in a Request for Proposals before analyzing available alternative system solutions. As a result, the Navy has not ensured that the system defined in its specification is the optimal solution in terms of such decision criteria as development costs, maintenance costs, availability date, and user satisfaction.

The Navy is facing several unresolved management issues. For example, the Navy has yet to fully define its framework for awarding and administering the planned contracts. Because this issue is not resolved, we could not fully respond to the Chairman's question concerning the adequacy of contract controls. However, we did find that the Navy is considering lessons learned from its previous major CAD/CAM contract in defining its contract management structure for CAD/CAM II.

The Navy's attempts to resolve program management issues to the satisfaction of the participating system commands have contributed to slow progress on the acquisition. Additionally, although any one of the three Navy organizations that have been responsible for conducting the acquisition are reasonable choices, the organizational movement and associated managerial changes have not promoted program continuity and have further slowed progress.

Although the House Appropriations Committee wishes to increase its oversight of CAD/CAM II through its budget review process, such oversight is difficult because CAD/CAM is not visible in the Navy's formal budget submissions, and some of the Navy's special budget submissions

to highlight CAD/CAM funding and thereby facilitate congressional oversight are incomplete and inaccurate.

The Department of Defense is providing oversight of CAD/CAM II. The Office of the Secretary of Defense has begun efforts to review the management of the acquisition through its MAISRC process. However, this process is only in its early stages, and as a result, it is too early for us to comment on its adequacy. Although MAISRC involvement beyond the currently scheduled review is not decided, we found no reason to believe that it will not continue. Additionally, both the Office of the Secretary of Defense and the Navy have CALS organizations in place through which they are providing adequate oversight of the acquisition.

Recommendations

We recommend that the Secretary of the Navy direct the Assistant Secretary of the Navy for Financial Management to ensure that:

- the Request for Proposals for CAD/CAM II is not released until the program office has complied with applicable provisions of Defense acquisition regulations; specifically, the program office should conduct an evaluation of alternative system solutions based on validated user requirements before making a system choice;
- future program office and program manager changes to CAD/CAM II are minimized and program management issues are quickly resolved; and
- funding for all Navy CAD/CAM is completely and accurately disclosed in special budget information papers to the Congress.

Request Letter

Congress of the United States
House of Representatives
Committee on Appropriations
Washington, DC 20515

January 22, 1987

Honorable Charles Bowsher
Comptroller General
General Accounting Office
Washington, D. C. 20548

Dear Mr. Bowsher:

The Committee is concerned about the Navy's planned procurement of Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) equipment. While the Committee generally endorses the use of modern technology to improve Defense operations, we would like assurances that proper planning has been accomplished in this acquisition, whose cost may well exceed a billion dollars, prior to significant expenditure of funds. This is especially important in view of your recent audit on the Navy's current CAD/CAM program that disclosed a number of irregularities.

I request GAO to determine if Navy's proposed new CAD/CAM acquisition:

1. Is fully disclosed in budget requests to the Congress;

2. Follows federal, DOD, and Navy procurement regulations;

3. Has been subject to the requisite oversight reviews by the Office of the Secretary of Defense and fully complies with DOD ADP and computer aided logistics requirements;

4. Has adequate planning, programming, and budgeting procedures;

5. Has established adequate program management and contract administrative controls to prevent the problems surfaced in the recent GAO audit of Navy CAD/CAM procurement from recurring;

6. Is being conducted by the correct Navy organizations and fully considers the needs of all Navy users of this type of equipment.

Please provide periodic briefings to my staff on your progress and a final report by October 1, 1987. Thank you for your assistance.

Sincerely,

Bill Chappell

Bill Chappell, Jr.
Chairman
Defense Subcommittee

Objectives, Scope, and Methodology

Because our report on the Navy's Computer Aided Engineering Documentation System procurement[1] disclosed several contract administration irregularities, the Chairman, Subcommittee on Defense, House Committee on Appropriations, asked us to review the Navy's second CAD/CAM acquisition (see app. I for the request letter). On the basis of the Chairman's request and subsequent discussions with his office, we agreed to determine if

1. the Navy is complying with applicable acquisition regulations,

2. the Navy has considered the needs of all its CAD/CAM users,

3. the Navy has established adequate contract administration controls,

4. the Navy has the correct Navy organizations conducting the acquisition,

5. the Navy has fully disclosed the acquisition in its budget requests and followed normal budget processes, and

6. the Office of the Secretary of Defense is providing adequate oversight of the acquisition through its MAISRC process and its CALS initiative.

The first four points are addressed in chapter 2; points five and six are discussed in chapters 3 and 4, respectively.

To evaluate the Navy's compliance with applicable regulations, we discussed the framework for managing CAD/CAM II with Navy program officials as well as Navy and Office of the Secretary of Defense officials in oversight roles. We also obtained and reviewed available program management and related documentation. Additionally, we determined applicable regulations governing the design, development, and procurement of CAD/CAM II. Through examination of Navy program justifications, plans, and related management documentation and through discussions with Navy program officials, we determined the Navy's compliance with regulations and reasons for any noncompliance.

To determine whether Navy user needs have been considered, we reviewed available documentation on the process followed in determining user needs and discussed this process with program officials. We

[1] Navy Contracting: Improving Management of Procurements for Computer-Aided Equipment (GAO/NSIAD-87-60, Dec. 30, 1986).

then judgmentally selected and interviewed representatives from 34 of the Navy's 124 potential user installations (see table II.1) to determine the users' involvement in the acquisition and their plans for purchasing equipment. The field installations covered all five system commands except the Naval Supply System Command. We excluded this command because its CAD/CAM II project coordinator told us that essentially none of its field installations are involved in the acquisition. In selecting the field installations in the other four system commands, we selected a variety of users defined in terms of missions performed and activity size. The results of our interviews with the field installations are not statistically projectable.

Table II.1: 34 Naval Field Installations Contacted

Naval Air Systems Command
Naval Air Technical Service Facility; Philadelphia, Pennsylvania
Naval Air Test Center; Patuxent River, Maryland
Naval Aviation Depot; Pensacola, Florida
Naval Aviation Depot; Cherry Point, North Carolina
Naval Aviation Depot; Norfolk, Virginia
Naval Aviation Depot; San Diego, California
Naval Aviation Depot Operations Center; Patuxent River, Maryland
Naval Aviation Engineering Service Unit; Philadelphia, Pennsylvania
Naval Facilities Engineering Command
Chesapeake Division, Naval Facilities Engineering Command; Washington, D.C.
Northern Division, Naval Facilities Engineering Command; Philadelphia, Pennsylvania
Southern Division, Naval Facilities Engineering Command; Charleston, South Carolina
Norfolk Public Works Center; Norfolk, Virginia
San Diego Public Works Center; San Diego, California
Naval Sea Systems Command
Charleston Naval Shipyard; Charleston, South Carolina
Long Beach Naval Shipyard; Long Beach, California
Norfolk Naval Shipyard; Portsmouth, Virginia
Philadelphia Naval Shipyard; Philadelphia, Pennsylvania
Puget Sound Naval Shipyard; Bremerton, Washington
Naval Inactive Ship Maintenance Facility; Bremerton, Washington
Naval Explosive Ordnance Disposal Technology Center; Indian Head, Maryland
Naval Ordnance Station; Indian Head, Maryland
Naval Ordnance Station; Louisville, Kentucky
Naval Sea Support Center, Pacific; San Diego, California
Naval Weapons Station; Yorktown, Virginia
Seasparrow Project Support Office; Washington, D.C.

(continued)

Space and Naval Warfare Command
Naval Air Development Center; Warminster, Pennsylvania
Naval Coastal Systems Center; Panama City, Florida
Naval Electronic Systems Engineering Activity; St. Inigoes, Maryland
Naval Electronic Systems Engineering Center; Vallejo, California
Naval Electronic Systems Engineering Center; Charleston, South Carolina
Naval Electronic Systems Engineering Center; San Diego, California
Naval Electronic Systems Engineering Center; Portsmouth, Virginia
Naval Ship Research Center; Bethesda, Maryland
Naval Surface Weapons Center; Dahlgren, Virginia

To determine whether the Navy has established adequate contract administration controls, we interviewed Navy program, contracting, and information system oversight officials and obtained and reviewed available documentation on the Navy's plans for contract award and administration. We also discussed with Navy officials their planned application of contract administration lessons learned from the Navy's Computer Aided Engineering Documentation System acquisition.

In examining whether the correct Navy organizations were conducting the acquisition, we reviewed program management documentation and interviewed Navy and Office of the Secretary of Defense officials to identify the principal organizations involved in the acquisition. We then examined their respective roles and responsibilities in light of their charters and the acquisition's objectives.

To address the Navy's treatment and disclosure of the acquisition in budget submissions, we focused on all Navy CAD/CAM rather than solely CAD/CAM II because (1) while reviewing the Navy's budgetary disclosure of the latter, we found problems with the Navy's reporting of other acquisitions, and (2) the Chairman's office expressed interest in the budgetary disclosure of these acquisitions. In doing so, we analyzed fiscal year 1988 and 1989 documents prepared throughout the budget process and discussed with Navy officials the development of budget submissions. In our analysis, we compared system command budget development processes and documents for consistency and compliance with Navy requirements. We also identified potential and actual funding sources for CAD/CAM as well as the funding levels in the Navy's latest budget submissions. Additionally, we discussed with Navy installation officials their CAD/CAM funding plans to determine if the Navy's budget submissions were accurate and complete.

In determining oversight by the Office of the Secretary of Defense, we focused on two mechanisms discussed with the Chairman's office: the MAISRC process and the CALS initiative. For both oversight mechanisms, we interviewed Office of the Secretary of Defense and Navy officials and reviewed available documentation concerning their oversight role in acquisitions like CAD/CAM II, their processes and frameworks in providing guidance and direction, and their past and planned involvement specifically in CAD/CAM II.

We performed our review from April 1987 to February 1988, primarily at Navy headquarters offices in Washington, D.C., and at selected Navy field installations. The principal Navy headquarters offices include the CAD/CAM program office originally located in NAVSEA and now located in the Naval Data Automation Command, the CAD/CAM offices in each of the five system commands, the CALS office in the Naval Supply Systems Command, and offices within the Naval Data Automation Command, ADPSO, and the Information Systems Division. The principal offices in the Office of the Secretary of Defense include the Information Resources Management System Directorate within the Office of the Assistant Secretary of Defense (Comptroller), and the Computer Aided Acquisition and Logistics Steering Board and Policy Office within the Office of the Assistant Secretary of Defense (Production and Logistics).

We discussed key facts in this report with Navy and Office of the Secretary of Defense officials and have incorporated their comments where appropriate. However, in accordance with the requester's wishes, we did not obtain official agency comments on a draft of the report. We performed our review in accordance with generally accepted government auditing standards.

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