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Report to the Acting Secretary of the Navy

September 1992

ADP PROCUREMENT

Prompt Navy Action Can Reduce Risks to SNAP III Implementation

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Information Management and
Technology Division

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September 29, 1992

The Honorable Sean C. O'Keefe
The Acting Secretary of the Navy

Dear Mr. Secretary:

This report presents the results of our risk assessment of the Navy's efforts to upgrade its Shipboard Non-Tactical ADP Program (SNAP). We identified potential acquisition risks and tested our recently developed risk assessment methodology, which incorporates critical factors identified in our model of the information technology acquisition process.[1] The methodology is designed to provide an early warning to agency management so they can take timely action to address potential risks.

We selected this acquisition, known as SNAP III, because of its large life-cycle cost, estimated at about $600 million,[2] and because it is in an early stage in the procurement cycle, where corrections are easier and cheaper to make. Our review focused on the role of senior managers in system development and the Navy's plans for implementing SNAP III. Details of our objectives, scope, and methodology are discussed in appendix I.

Results in Brief

The Navy's current management structure does not adequately support the SNAP III project. Although SNAP III has a program manager and a program sponsor, neither has authority or control over the development and funding for the SNAP III system. Instead, 12 different commands have authority over the development, funding, and procurement of the major systems that comprise SNAP III. Without a central authority, the Navy cannot prevent multiple, incompatible hardware and software systems from being developed and installed. These redundant development efforts require excessive financial resources and increase the amount of training and maintenance needed to support the different systems.

The Navy also lacks a strategic information resources management (IRM) plan for SNAP III. Such a plan is critical to a project's success because it identifies and defines key characteristics, such as the system's hardware,

[1]Information Technology: A Model to Help Managers Decrease Acquisition Risks (GAO/IMTEC 8.1.6, Aug. 1990).

[2]SNAP III life-cycle costs are subject to change pending the outcome of the Navy's downsizing efforts, which include the decommissioning of an unknown number of ships.

software, and interface standards, and presents a structured approach for achieving them. Instead, the Navy is addressing these key characteristics on an ad hoc basis. For instance, the Navy was planning to acquire SNAP III nontactical hardware from a future tactical hardware contract without first defining the required hardware performance and capacity or preparing a contingency plan in case this procurement cannot be used. The Navy is also developing upgraded software that does not adhere to federal standards and is continuing to install old and incompatible systems aboard the Navy's newest ships.

On the basis of our findings, the Vice-Chief of Naval Operations and the Chief of Naval Operations' (CNO) Chief Information Officer agreed to (1) consolidate all shipboard nontactical ADP programs under a single command with authority and control over the funding and development, and (2) develop a strategic plan for all shipboard nontactical ADP programs.

Background

The SNAP mission is to reduce the administrative burden on sailors, and includes all afloat and shore-based automated initiatives. SNAP consists of six major automated systems that support the maintenance, supply/financial, aviation, pay/personnel, administration, and medical/dental functions.

The SNAP program was originally implemented as two distinct systems, both installed in the early 1980s. SNAP I, using Honeywell DPS-6 computers, was installed aboard the Navy's largest vessels, such as aircraft carriers and tenders. SNAP II, which uses Harris H-300 computers, was installed on smaller surface vessels and submarines. Although both systems perform the same functions, they were developed independently, have different operating systems, and are not compatible with one another.

SNAP I and SNAP II are characterized by

- high training and maintenance costs,
- saturated or limited capacity,
- proprietary operating systems, and
- obsolete 1970s hardware.

Recognizing the limited capacity of both systems, as well as the unnecessary training and maintenance needs they create, the Navy initiated a replacement effort—SNAP III. SNAP III is to be a unified system

that will incorporate all nontactical shipboard systems, allow users to access the functional applications from any terminal, use a standard operating system, and interconnect via the ship's computer network. SNAP III goals include

- reduced training and maintenance costs,
- increased system access,
- elimination of redundant applications software and multiple operating systems,
- the use of open systems, and
- the use of fiber optics.

The concept development phase of SNAP III is scheduled for completion in September 1992, with deployment scheduled to start in 1994.

Autonomous Commands Prevent Effective Development Of SNAP III

Our model and audit methodology stress that to be effective, agencies should be organized in such a way that a single manager (1) has complete authority over all phases of the acquisition process and (2) is responsible and accountable for ensuring that the acquisition is effectively and efficiently conducted. The manager's responsibility should include authority over program funds and implementation of the system.

While several top-level Navy officials are involved with SNAP III, no single manager or organization is directing the development or controlling SNAP's deployment. As a result, the Navy has redundant development efforts in process. These multiple efforts result in incompatible systems that require excessive funding and an increased amount of training and maintenance.

Numerous commands are involved with the SNAP program. The Space and Electronic Warfare Directorate is SNAP's program sponsor, while the Space and Naval Warfare Systems Command (SPAWAR) is the SNAP program manager. Further, 12 separate commands serve as either functional sponsors or managers for SNAP's six major systems.

The program sponsor serves as an advocate for system development. A significant responsibility of the program sponsor is to ensure that funds are available to support SNAP. In addition, the program sponsor is responsible for coordinating with the functional sponsors, functional managers, and fleet users to ensure that SNAP systems adhere to the Navy's objectives, priorities, functional requirements, and the anticipated operating environment.

SPAWAR, as program manager, is responsible for planning and managing the overall SNAP program. Its overall responsibility is ensuring that SNAP complies with Navy standards and meets users' needs. The program manager is also responsible for establishing and maintaining configuration control procedures for SNAP hardware and software, and coordinating the installation of SNAP hardware on Navy ships. SPAWAR also has a software development group that is responsible for maintaining and enhancing existing SNAP software.

While both the SNAP program sponsor and program manager have critical responsibilities, neither has the authority to ensure that these responsibilities are met. Instead, the 12 commands in which the six functional sponsors and six functional managers reside have authority over systems supporting their area of responsibility and control both system development and funding. Consequently, 12 separate commands have autonomy over the development and funding of SNAP's major systems. The following examples show how a lack of a central authority over programs and their funding can result in multiple, inefficient systems.

Development of Multiple Maintenance Systems

While SPAWAR's responsibilities include maintaining and enhancing the SNAP maintenance system, SPAWAR cannot (1) prevent other maintenance systems from being developed and implemented outside of the SNAP program, or (2) control the types of computers that are installed to support these systems.

Because the maintenance functional manager, the Naval Sea Systems Command (NAVSEA), was not satisfied with the existing SNAP maintenance system, it used its autonomy to spend about $70 million (through the end of calendar year 1991) developing its own maintenance system. NAVSEA procured new computers, developed new maintenance software, and intended to connect its system to SNAP's electronically. NAVSEA developed its system during the same period that SPAWAR upgraded the existing SNAP maintenance software. As a result, the Navy ended up with two independently developed systems that replicate functions and are incompatible with one another.

On March 20, 1992, SPAWAR sent a memorandum to NAVSEA stating that because the NAVSEA system interface was not in compliance with SPAWAR's military standard (MIL-STD-461) required for connection to the SNAP

system, it should not be installed until this standard was met.[3] However, on March 23, 1992, NAVSEA had SPAWAR's upgraded maintenance software removed from the SNAP system on an Atlantic Fleet tender and installed its own computers to replace the SNAP maintenance function.

Because the NAVSEA system did not meet the SNAP interface standard, the two systems (which resided in the same room) could not be connected electronically. Instead, data had to be batched on magnetic tape and hand carried between the NAVSEA and SNAP computers. This manual processing increased the time required to process material requisitions from 10 seconds using SPAWAR's upgraded SNAP maintenance system to 48 hours using the NAVSEA system. As of the end of August 1992, the interface problem had not been solved and the Navy was continuing to use two inefficient systems to support its SNAP functions.

Moreover, NAVSEA installed three different hardware and software versions of its maintenance system in the Pacific and Atlantic Fleets. This occurred because various commands insisted that the system be installed on computers that met their individual needs.

This redundant approach to maintenance automation is contrary to SNAP III's goal of developing a standard system on all Navy ships. However, the program coordinator informed us that the NAVSEA system will be installed on several additional ships because funds are already obligated. He added that the strategic IRM plan for SNAP III will address how the NAVSEA maintenance system will transition to the new environment.

Development of an Incompatible System

Another project that demonstrates the risks inherent in the Navy's decentralized management structure is Micro-SNAP II. Initiated in 1986, Micro-SNAP II is an effort to automate small ships and shore sites using microcomputers and SNAP II functions. Micro-SNAP II is not compatible with SNAP III's goals.

Micro-SNAP II is being designed using Microsoft's disk operating system, which is not compatible with the UNIX open system standard the Navy selected for SNAP III. Also, Micro-SNAP II is not being installed with fiber optics and does not adhere to approved Navy security standards. The SNAP program sponsor told us the software used for Micro-SNAP II would be scrapped when SNAP III is implemented, but that the hardware would be

[3]MIL-STD-461 defines electromagnetic emission and susceptibility requirements for the control of electromagnetic interference.

retained. Other Navy officials characterized Micro-SNAP II software as a "throw-away" system. Thus, in a period of declining resources, the Navy is simultaneously developing Micro-SNAP II and the system that will replace it.

At the end of August 1992, the SNAP program manager said the Navy planned to continue with the development and eventual installation of Micro-SNAP II systems. For example, he said his office is in the process of obtaining security accreditation of the Micro-SNAP II system. However, he did not anticipate receiving this accreditation for at least 6 months. He added that fiber optics would be used on future installations of the Micro-SNAP II system. He also said the systems are needed aboard ships not currently automated and that ongoing planning efforts will describe how the system will transition to the SNAP III environment.

Absence of Strategic Plan Prevents an Efficient Approach to SNAP Development and Implementation

Our model reflects the importance of a strategic IRM plan to help agencies define and implement systems that meet their needs. The plan should describe the hardware, software, and communications that will be needed to meet the mission most cost-effectively. In addition, a plan should identify how management will transition from old to new systems.

Implementation of the Navy's SNAP III project reflects the lack of a strategic IRM plan. For example, the SNAP III project manager planned to use an existing tactical procurement contract to obtain nontactical SNAP hardware. However, SPAWAR did not develop a contingency plan or identify hardware capacity needs—factors that would be addressed in a strategic IRM plan. SPAWAR justified this approach by stating that (1) the existing hardware was extremely antiquated; any new hardware would be better than the existing hardware, and (2) senior management officials had planned to obtain a waiver from federal regulations in order to obtain nontactical hardware from a tactical Navy contract.

SPAWAR had not considered the possibility that senior Navy officials would be unable to obtain a waiver from federal regulations and thus did not develop any contingency plans for SNAP III's hardware acquisition. By not establishing alternative acquisition approaches, the Navy is at risk of significantly delaying the SNAP III project.

In addition, no plan has been developed to ensure that compatible software is provided for all nontactical systems. Without a plan, the Navy's Central Design Activity for nontactical systems is continuing to develop

and maintain incompatible SNAP software for more than four different SNAP operating systems.

Further, because the Navy has not established communications standards, multiple, incompatible networks are being installed. Some ships have two or more networks that are incompatible. Also, while the Navy has established a SNAP III communications goal of equipping all ships with fiber optics, it has no plan showing how this will be achieved.

Without a strategic IRM plan, the Navy continues to install antiquated SNAP II systems on its newest vessels. Under this approach, the Navy does not know whether the additional costs that will be incurred to remove this old equipment and replace it with the new SNAP III system are justified.

At our suggestion, the Navy has begun to develop a strategic IRM plan for meeting its SNAP III goals. According to the program sponsor, the strategic IRM plan will address the issues we raised regarding software, communications, and the transition from old to new systems. He also told us that the Navy would request a delegation of procurement authority (DPA) from the General Services Administration to obtain SNAP III hardware. However, as of the end of August 1992, a DPA had not been requested. In addition, the program manager told us in August 1992 that the Navy had begun to identify the SNAP III hardware capacity needs and reach agreement on the communications standard to be used for all shipboard networks.

Conclusions

The success of information system acquisitions can be measured by their cost effectiveness in assisting agencies in carrying out their missions and by the timeliness of delivery. Success with the SNAP III acquisition requires that the Navy act responsibly to manage and control acquisition risks.

The Navy is not currently providing sufficient managerial oversight to minimize SNAP III risks. This has resulted in incompatible systems, which require different hardware and software to perform similar functions, being installed aboard ships. Continued implementation of incompatible systems is contrary to the Navy's goal of creating an integrated environment for all shipboard nontactical systems. A single authority over the development and funding of all shipboard nontactical programs is needed to ensure that all ongoing and planned efforts support this goal.

Furthermore, the Navy lacks a strategic IRM plan for SNAP III implementation. Without a plan specifying standards for hardware, software, and system interfaces, all efforts to integrate the shipboard environment will be at high risk for schedule delays, cost overruns, and poor performance. Lacking a strategic IRM plan with a detailed transition approach, the Navy cannot determine whether continued installation of old systems on new ships is justified.

Recommendations

In order to minimize SNAP III risks, we recommend that the Acting Secretary of the Navy suspend all nontactical ADP development until the Navy completes

- restructuring of the management over shipboard nontactical programs to provide a single manager with authority over funding and development for all shipboard nontactical ADP programs, and
- development of a strategic IRM plan for all shipboard nontactical ADP programs which describes the transition from the current environment to SNAP III. This plan should include sections which identify hardware capacity needs; contain alternative technical and procurement approaches; and include standards for hardware, software, and shipboard networks.

Agency Comments and GAO's Evaluation

Navy officials agreed in general with our recommendations and stated they are taking action to address them. For example, the Vice-Chief of Naval Operations has initiated action to provide a single authority over all shipboard nontactical ADP initiatives. The Navy's action designating the Director, Space and Command, Control, Communications and Computer Systems Requirements as the single resource sponsor should significantly decrease the risks associated with attempts to provide an integrated system on Navy ships. Finalizing and implementing a strategic IRM plan will also help the Navy achieve its SNAP III goals.

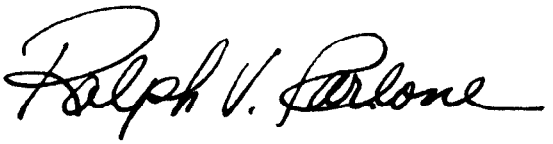
These actions by themselves, however, do not guarantee an efficient and effective system. The Navy must carefully manage SNAP III throughout its life cycle to ensure it is implemented successfully.

As you know, 31 U.S.C. 720 requires the head of a federal agency to submit a written statement on actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on

Government Operations not later than 60 days after the date of this letter. A written statement must also be submitted to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of this letter.

We are sending copies of this report to the Chairmen of the Senate and House Committees on Appropriations; the Chairmen of the Senate and House Committees on Armed Services; the Director, Office of Management and Budget; and the Secretary of Defense. Copies also will be made available to other interested parties upon request.

We performed our work in accordance with generally accepted government auditing standards from October 1991 through August 1992, in Washington, D.C., and Norfolk, Virginia. This work was performed under the direction of Jack L. Brock, Jr., Director, Governmentwide Information and Financial Management, who can be reached at (202) 512-6406. Other major contributors to this report are listed in appendix II.



Ralph V. Carlone
Assistant Comptroller General

Objectives, Scope, and Methodology

We reviewed the Navy's Shipboard Non-Tactical ADP Program (SNAP) replacement effort as part of our responsibility to ensure that federal agencies acquire and use information technologies in a cost effective manner. Our objectives were to (1) identify potential risks related to the SNAP III systems development, and (2) test a risk assessment methodology we are developing. We chose to review the SNAP project because it had a projected cost of more than $600 million over the system's life cycle, and the project is currently in the concept development phase, where suggested improvements can be made more easily and cheaply.

Our review focused on issues relating to the upgrade of existing SNAP I and SNAP II systems and the role of Navy managers in planning and implementing a new shipboard computer environment. We used our acquisition audit methodology and GAO's acquisition model to assess whether the project had any major risks that should be addressed by Navy management.[1]

We interviewed functional managers and sponsors in Washington, D.C., for each of SNAP's major systems including the maintenance, supply/financial, aviation, pay/personnel, administration, and medical/dental functions. We reviewed key SNAP program briefing documents and transcripts of SNAP III meetings. We also met with staff from the Navy Audit Service and the General Services Administration's Office of Information Resources Management Policy regarding their efforts associated with the SNAP program. In Norfolk, Virginia, we met with officials at the Commander-in-Chief, Atlantic Fleet headquarters where we observed operational SNAP systems on four types of ships—the USS John F. Kennedy (aircraft carrier CV 67), the USN Baltimore (submarine SSN 704), the USS Shenandoah (tender AD 44), and the USS Yorktown (cruiser CG 48).

[1](GAO/IMTEC 8.1.6, Aug. 1990)

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