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Fact Sheet for the Chairman, Subcommittee on Defense, Committee on Appropriations, House of Representatives

October 1986

NAVY SUPPLY SYSTEMS

Status of Two Projects for Improving Stock Point Operations

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similar changes have contributed to an estimated cost of $2.3 billion as of October 1985, more than double the initial estimate of $945 million in March 1983. SPAR estimated dates for completing various developmental activities have slipped several months.

The Naval Data Automation Command, which is responsible for reviewing documentation prepared for higher approval authority, has identified many instances in which SPLICE and SPAR were not in compliance with the life cycle management policies prescribed by the Department of Defense. Navy project approval officials approved the advancement of SPLICE and SPAR through life cycle management development phases while noting their shortcomings and requiring correction in later phases. The SPLICE project began in 1977 and was approved for deployment, the final life cycle management phase, in 1985. SPAR began in 1980 and has been approved for system development, the phase immediately preceding deployment.

In performing our review, we analyzed project documentation showing system requirements, costs, schedules, acquisition strategies, and development plans. In addition, we received briefings from and held interviews with Navy officials at the Naval Supply Systems Command, who are responsible for managing the development of the SPLICE and SPAR projects, as well as officials at the Fleet Material Support Office, who are responsible for project design and software development. We also discussed the project's compliance with life cycle management process requirements and reviewed project files at the Naval Data Automation Command. The information contained in this fact sheet is current as of August 1986.

As arranged with your office, we did not discuss the fact sheet with Navy officials; nor did we request official agency comments on a draft of this document. We are providing copies of this fact sheet to the Secretary of the Navy, the Administrator of General Services, the Director of the Office of Management and Budget, and others upon request. If you have any questions regarding the enclosed document, please contact Mr. Theodore Gearhart, Group Director, on 275-3188.

Sincerely yours,

William Franklin

William Franklin
Associate Director

GAO

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

Information Management and
Technology Division

B-224720

October 9, 1986

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

Dear Mr. Chairman:

In response to your March 7, 1986, request, we are evaluating two Department of the Navy stock point supply system automated data processing development initiatives. Navy stock points provide supply and support services to fleet units and shore activities. The two initiatives are the Stock Point Logistic Integrated Communications Environment (SPLICE) project and the Stock Point ADP Replacement (SPAR) project. The SPLICE project is being developed to provide telecommunications support and interactive processing for stock points. SPAR is being developed to improve and modernize stock point operations by replacing the current systems with new hardware and software. Initially, SPAR will use software converted from the current system. Eventually, new software will be developed.

You requested that we provide you with a status report in September 1986. As agreed with your office, this fact sheet presents information on (1) the planning process for the two systems, (2) the progression of each project through the various phases of the automated information system life cycle management process, and (3) the status of each project's current cost and schedule as compared against its original cost and schedule projections.

The Navy has made many changes to its initial plans for developing SPLICE and SPAR. According to the Navy, these changes and other factors have caused project cost growth and schedule extensions. In the SPLICE project, for example, requirements changes and the addition of new sites have contributed to increased estimated cost from $83.5 million in January 1980 to $256.6 million in September 1985. Further, schedule revisions have resulted in a 4-year delay in completing installations. For SPAR,

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ABBREVIATIONS

ADP	automated data processing
FY	fiscal year
SPAR	Stock Point ADP Replacement
SPLICE	Stock Point Logistic Integrated Communications Environment

INTRODUCTION

Navy supply system stock points, located at Navy and Marine Corps facilities throughout the world, provide supply and support services to fleet units and shore activities. In performing this mission, the Navy stocks and maintains an inventory of approximately 2 million items valued at about $23 billion and annually processes some 23 million requisitions for supplies and services. Accounting for the inventory and related financial transactions at the stock points depends heavily upon the use of automated information systems.

During the mid- to late 1970's the Navy began to experience problems within its supply management system. Audits by internal and external audit organizations identified problems such as inaccurate inventories, numerous inventory adjustments, and differences in inventory and financial transactions. The Navy also found that its computer systems were saturated due to workload growth and the addition of new processing functions. Although the Navy was acquiring a number of different minicomputers to support the newer processing functions at the different stock points, the minicomputer and programs being used were not fully integrated with the existing system, thus contributing to inaccurate inventory and financial accounting information.

The Navy recognized, during this same period, that growing demands on the stock point computer systems would require enhanced telecommunication capabilities and also projected that its computers would not be able to support the stock points' workload growth into the 1990's. The Navy realized that the lack of integrated planning between the supply operation improvement efforts would result in the generation of unique solutions when a common standardized solution would be more economical to design, develop, maintain, and operate.

TWO NAVY PROJECTS TO IMPROVE STOCK POINT INFORMATION SYSTEMS

To improve its stock point operations and consolidate several different projects into a coordinated, integrated telecommunications system, the Navy first initiated the Stock Point Logistic Integrated Communications Environment (SPLICE) project in 1977. The concept of SPLICE was to use a single minicomputer hardware and software configuration in conjunction with the existing systems. The project was intended to support the telecommunications needs of the Navy stock points for at least 12 years.

While the needed telecommunication capabilities to the existing system were to be accomplished through the SPLICE initiative, the Navy recognized that advances in computer technology had made the currently installed hardware components

obsolete and that computer equipment was available that could process more information at a greatly reduced relative cost. As a result, the Navy initiated the Stock Point ADP Replacement (SPAR) project. The SPAR project was based on Navy determinations that the existing system needed to be replaced to provide the necessary technical capabilities required to modernize the stock point operations into a state of the art computer information system.

LIFE CYCLE MANAGEMENT POLICIES FOR DEVELOPING AUTOMATED INFORMATION SYSTEMS

Within the Department of Defense, a major automated information system's development process, such as the Navy's SPLICE or SPAR project, is guided by a set of prescribed Defense policies and procedures for managing a system through its life cycle. Life cycle management policies, prescribed by the Department of Defense Directive 7920.1 and implemented by the Secretary of the Navy's Instruction 5231.1A, provide a structured process for planning, developing, reviewing, and approving an automated information system. The process is designed to control, manage, and evaluate a project's development to produce an effective system.

Defense and Navy regulations organize the life cycle of an automated information system into five broad phases: Mission Analysis/Project Initiation, Concept Development, Definition/Design, System Development, and Deployment/Operation. Each phase is culminated by a major milestone decision point. Table I.1 shows the purposes of each phase. It also highlights many, but not all, of the pertinent issue documents which must be prepared for a system decision paper prior to obtaining a milestone decision to proceed to the next phase. A milestone approval is dependent upon not only what has been achieved prior to the milestone, but also what is expected to be achieved during the next phase and how it will be achieved.

Defense policy provides that the Office of the Secretary of Defense is to be the final approval authority for major systems (those expected to cost over $100 million) such as SPLICE and SPAR. Defense delegated the authority for approving these two projects to the Navy. Within the Navy, the Assistant Secretary of the Navy (Financial Management) is the approval authority, and the Naval Data Automation Command is responsible for assuring compliance with the life cycle management process.

Table I.1: Life Cycle Management Phases

PHASE	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 & ACTION	Prepare: Mission Element Needs Statement to identify mission area describe mission deficiency describe existing capabilities identify constraints	Prepare: Project Management Charter Plan of Actions and Milestones System Alternatives Economic Analysis Acquisition Strategy General Functional Requirements	Prepare: Functional description Data Requirements System/Subsystem Specifications Program Specifications Data Base Specifications Test & Evaluation Plan	Prepare Manuals for: Users Computer operations Program maintenance Perform: Prototype Test System Integration Test	Periodic Reviews
		Update previously prepared documents as needed.			
	Mission Elements Need Statement	System Decision Paper I	System Decision Paper II	System Decision Paper III	System Decision Paper IV
	Approval ends Milestone 0	Approval ends Milestone I	Approval ends Milestone II	Approval ends Milestone III	Approval Indicates System Performance Is Acceptable Milestone IV

STOCK POINT LOGISTIC INTEGRATED COMMUNICATIONS ENVIRONMENT (SPLICE) PROJECT

BACKGROUND AND STATUS

SPLICE project development began in 1977 under Navy procedures for the management of automated data systems. In 1980, the project made a transition to the new life cycle management development policies and procedures established by the Department of Defense in 1978. In December 1981, the project completed the Definition/Design phase and received Navy approval to progress to the System Development phase. In June 1984, the Navy began deployment. The Navy approval for deployment was not obtained until September 1985. As of August 1986, the completion of deployment was 4 years behind its original schedule. The Navy's latest (September 1985) life cycle cost estimate for the project is $256.6 million.

The Navy has made many planning and system requirement changes to SPLICE since the initial requirements document was approved. For example,

-- The project was originally planned and justified as a telecommunications system. Over time, SPLICE computers have been used to process supply operations in addition to their use as a telecommunications system. Further, throughout the development and deployment phases of the project, new applications continue to be added.

-- The project, under life cycle management procedures, was initially approved for 31 mandatory sites. Currently the Navy plans to deploy SPLICE at 41 mandatory sites with potential expansion to a total of 62 sites.

-- The Navy initially selected a computer system for SPLICE and obtained General Services Administration's approval for acquisition. The Navy later requested that this approval be cancelled when it decided to competitively acquire new computer systems based on functional needs. The General Services Administration approved the revised acquisition plan.

NAVY'S APPLICATION OF LIFE CYCLE MANAGEMENT PROCESS

The SPLICE project received approval to proceed to subsequent phases of the life cycle management process although necessary analyses and studies had not been completed or adequately documented. We extracted the following examples of deviations from life cycle management policy from the Navy's project files.

Early system development efforts

In January 1980, program officials submitted an Automated Data System Development Plan for SPLICE to the Naval Data Automation Command. The plan estimated program costs at $83.5 million and included plans to install the project at 44 operating sites by August 1984. In reviewing the plan, Naval Data Automation Command officials noted several problems with the cost estimates. The cost inadequacies were not resolved. Because SPLICE had made the transition from Automated Data System Development procedures to life cycle management procedures, the Navy considered the Automated Data System Plan to be no longer pertinent. Project costs were re-estimated for the next program documentation submission.

Completion of system design

In making the transition from automated data systems procedures to the life cycle management approach, Navy officials responsible for managing the SPLICE project determined that prior development efforts satisfied project initiation and concept development phase requirements. When requesting design phase approval in November 1980, project planners prepared updated cost and schedule targets and an updated economic analysis to evaluate the cost of alternatives to satisfy the stock point telecommunications needs. In its review of the economic analysis, the Naval Data Automation Command noted that the costs were not well defined, were incorrectly computed, and were understated.

When the Assistant Secretary of the Navy (Financial Management) approved completion of the SPLICE Definition/Design phase on December 29, 1981, he noted that the economic analysis was deficient and that the number of computers and other hardware required for SPLICE sites was not firm and had to rely on future planning to size the system for implementation. The Assistant Secretary directed project developers to correct the oversights during the System Development phase and to highlight these issues in the next system decision paper.

As directed, project developers prepared a revised economic analysis for the system development phase, and the Navy performed sizing studies for many of its site implementations.

In approving the Definition/Design phase for SPLICE, the Assistant Secretary also directed that post-installation evaluations be performed during the system deployment phase. These evaluations to determine system performance and productivity have not been done. The Navy has conducted limited evaluations that could be used to monitor system use. According to the current program officer, system-wide monitoring is planned.

Completion of development

The life cycle management process requires that development and testing of a prototype system be completed prior to system deployment. However, the Navy did not develop and test a prototype system prior to requesting permission to deploy SPLICE. Navy's explanation for the deviation from life cycle management requirements was that SPLICE is unique in that no one site can be defined as "the" prototype for all other sites. The decision paper to obtain approval for deployment referred to flexibility in the life cycle management discipline, which allowed deviations of this nature. The Navy chose to use site testing as a means to determine acceptability of the "unique" SPLICE systems when they are installed. Although the Navy had planned to do acceptance testing at each site, testing was done at only 2 of 18 operational sites installed by August 1986.

The life cycle management process also requires system development approval before deploying the system. When the Navy Project Office requested approval for deployment in March 1985, SPLICE systems had already been installed at four stock points. By September 1985, when project officials received approval to deploy those systems, four additional systems had been installed. The installation of SPLICE prior to deployment approval occurred because of a contract delivery commitment. Navy project officials expected approval for system deployment to be obtained before the systems were to be delivered.

The SPLICE hardware contract was awarded to Federal Data Corporation, in November 1983, with a ceiling of $548.4 million, based on installations at 41 mandatory and 21 optional sites. Under the terms of the contract, the contractor provides all hardware, operating software, and hardware and software maintenance. The SPLICE contract is also being used to acquire hardware for other stock point programs. Navy officials stated that the contract ceiling is greater than the anticipated cost of the project to allow maximum flexibility in buying SPLICE systems and would be reached only if all options were exercised at all sites.

In its review of SPLICE program documentation, the Naval Data Automation Command noted that the contract value far exceeded the approval granted by the Assistant Secretary of the Navy (Financial Management). In addition, the Naval Data Automation Command noted that the program's cost, $256.6 million, was not accurate because it did not include costs for the optional sites as required by life cycle management procedures. Naval Data Automation Command officials further advised us that maintenance costs, which are about 40 percent of a contract's value, were not included in the SPLICE cost estimate.

In their approval of the System Development phase on September 17, 1985, Navy officials indicated that the program documentation did not reflect total program costs, including all

options, and directed the project developers to provide more complete cost data in the Deployment/Operation phase. Navy policy requires that project costs estimated in the system development phase be compared to cost estimates for the project's Deployment/Operation phase and an explanation of cost increases be given.

CURRENT STATUS OF COST AND SCHEDULE TARGETS

Changes the Navy has made to its initial plans for SPLICE development, and other factors, have increased the project's cost and extended its deployment schedule.

Increases in program costs

SPLICE program cost changes are summarized below.

Stock Point Logistic Integrated Communications Environment Program Cost Changes

Document	Estimated Cost
Automated Data System Development Plan January 1980	$ 83.5 million
Economic Analysis for System Decision Paper II March 1981	$ 74.6 million
Economic Analysis for System Decision Paper III September 1985	$256.6 million

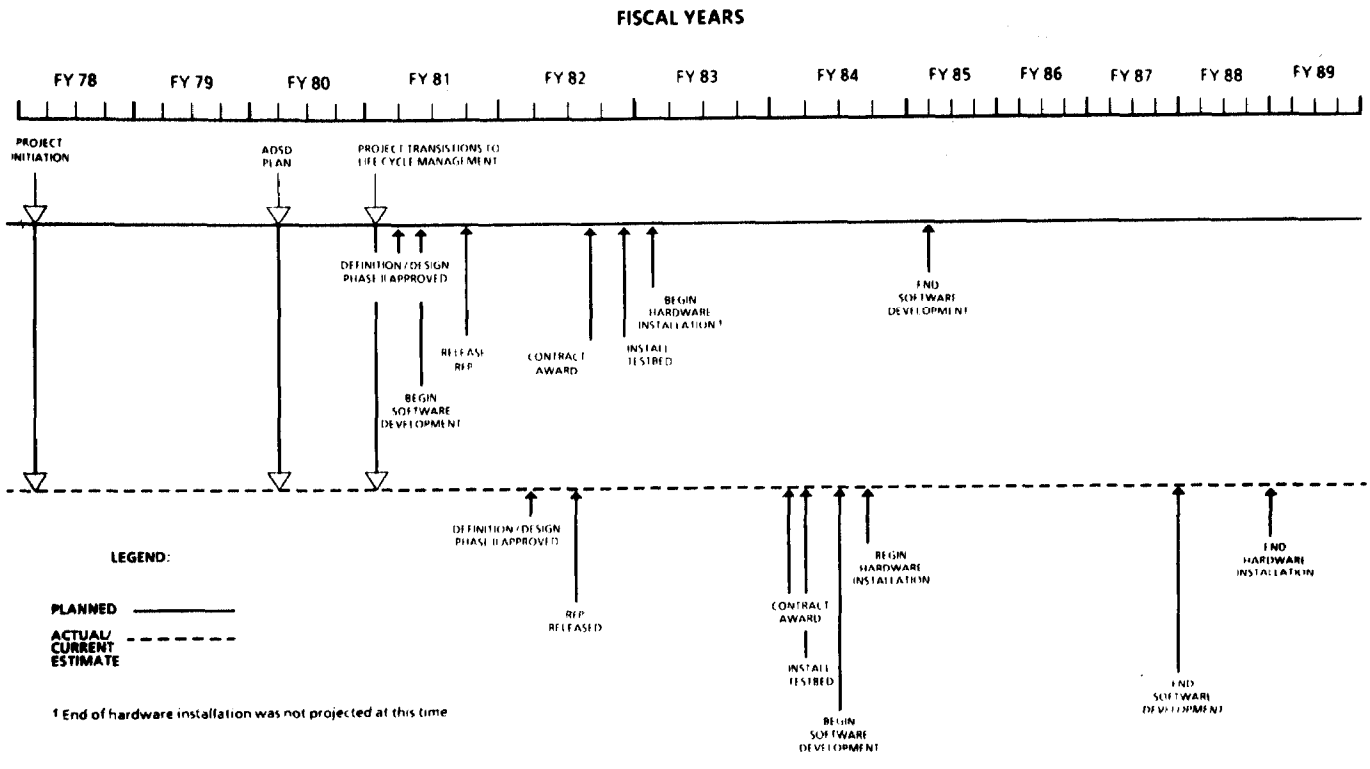
NOTE: The SPLICE contract, awarded in November 1983, has a ceiling of $548.4 million. The contract ceiling covers all possible options at all sites.

The project files did not contain an explanation for the decrease in program cost from the Automated Data System Development Plan to the economic analysis for System Decision Paper II. The current project officer speculated that the decrease may have resulted from the Navy's decision to change the acquisition strategy from a brand name or equal acquisition to a competitive acquisition based on functional requirements. The Navy attributed the cost increase from System Decision Paper II to System Decision Paper III to (1) an increase in the number of sites from 31 to 41 mandatory sites and (2) workload growth, resulting in increased configuration sizing.

Schedule changes in development

SPLICE project files did not include explanations for schedule revisions. However, program officials advised us that the change in acquisition strategy and delays in software development contributed to development schedule revisions. Figure II.1 illustrates schedule changes in the development of SPLICE. Details on some of the schedule revisions that the Navy made are discussed below.

Figure II.1: SPLICE Project Planned and Actual Development and Deployment Dates



The SPLICE request for proposal was released in April 1982, 9 months later than originally scheduled in the Plan of Actions and Milestones prepared in November 1980. Also, the contract was awarded in November 1983, 16 months later than projected, and SPLICE was installed at the testbed site in February 1984, 15 months later than projected.

Approval for SPLICE deployment was received two months before system implementation was planned to be completed, according to a schedule contained in the Functional Description prepared in May 1980. Initially, installation and system implementation were

planned at the first operational site, the Naval Supply Center, Norfolk, in November 1982 and February 1983 respectively. The site was changed to the Navy Regional Data Automation Center, Jacksonville, and the first operational system was installed and implemented in June and October 1984 respectively. This was a delay of 19 months, for both installation and implementation, from the dates projected in May 1980.

Originally, the Automated Data System Development Plan projected SPLICE installations to be completed by August 1984. Current documentation reflects initial installations to continue to September 1988, representing a 4-year schedule extension.

SPLICE hardware expenditures were originally planned through fiscal year 1985 in the decision paper for system design. Current estimates show hardware expenditures through fiscal year 1991, representing a 6-year schedule extension in the hardware acquisition plan. Hardware expenditures extend beyond the 1988 date of the last planned installation to provide for periodic upgrades to previously installed SPLICE systems.

STOCK POINT ADP REPLACEMENT (SPAR) PROJECT

BACKGROUND AND STATUS

The Navy initiated the development of SPAR in 1980 and completed the Definition/Design phase of the life cycle management process in October 1984. The addition of sites to the project required an update to the original request for Definition/Design phase approval. The update, submitted in October 1985, was still being evaluated by the Navy as of August 1986. Although SPAR development activities leading to system deployment have experienced schedule changes delaying planned completions by several months, the scheduled May 1988 deployment date has not changed. The Navy estimated project life cycle costs at $1.4 billion. The October 1985 update increased estimated life cycle costs to $2.3 billion.

Currently, the Navy is evaluating contractors' responses to its request for proposals and plans to award a competitive hardware contract by June 1987. The Navy plans to (1) acquire new hardware, (2) convert existing application software to run on the hardware, and (3) redesign functions and develop new software for the new hardware. Plans provide for contractors to convert the software by March 1989 and for the Fleet Material Support Office to redesign the software by January 1990.

The Navy has made many planning changes to SPAR, and the system's requirements have changed since approval of the initial requirements document--the Mission Element Need Statement.

-- SPAR was initially justified as a hardware acquisition and software conversion program. It was envisioned that the stock point software would simply be converted to run on new computer equipment. The Navy later decided that the functions and applications for the stock points needed to be modernized.

-- The project, approved initially for 27 sites, has since been approved for 41 sites.

The Navy has also changed the project's development plans.

-- The Navy had an approved program to lease the hardware for its new system but later changed to a purchase plan. The Navy invoked the Warner amendment, exempting the SPAR acquisition from the General Services Administration evaluation and approval process on the basis that supply systems provide direct support to the Navy's operating forces.

-- In 1982, responding to stock point inventory accuracy problems, the Navy accelerated SPAR's development process

by moving the hardware acquisition and software development schedules ahead by about one year. Program officials believed that the acceleration was unrealistic, and the program has experienced delays that now align the current schedule more closely with the original.

-- SPAR program officials now believe revision of the entire modernization schedule will be needed because the modernized system will be too large and complex to implement in one step, as initially planned. Installation of the modernized software on a phased-basis is being studied.

NAVY'S APPLICATION OF LIFE CYCLE MANAGEMENT PROCESS

Navy management officials responsible for automated system developments approved the completion of SPAR's Definition/Design phase in October 1984. Program officials, however, advised us that some aspects of SPAR's development exhibited less than full compliance with life cycle management policy. Also, the Naval Data Automation Command has recently raised questions about SPAR's latest program change--the addition of sites for implementation. Details on these matters are provided below.

In his October 1984 letter, approving the Definition/Design phase, the Assistant Secretary of the Navy (Financial Management), noted that additional sites were being added to the program and that the additions were undefined. The approval allowed SPAR project development officials to include the additional sites in the SPAR solicitation document, but the Assistant Secretary required project officials to sufficiently define the new needs and include them in an updated request for Definition/Design phase approval.

In October 1985, the Naval Data Automation Command reviewed program documentation for the updated request. The Naval Data Automation Command raised the following issues, which were directed to SPAR program officials for resolution.

-- SPAR development costs were understated, i.e., only costs incurred up until the first site is fully operational were included. This costing procedure contradicts life cycle management regulations which, according to the Naval Data Automation Command, specify that developmental costs accrue to the point at which each individual site is declared operational.

-- While 17 optional sites were included in the update, increasing the total number of SPAR sites to 58, the Navy did not request approval for the optional sites nor did it include the optional sites in the update's cost analysis, as required by life cycle management regulations. The Naval Data Automation Command stated approval for the

optional sites must be requested, and the optional sites must be costed and included in a revised cost analysis for the program.

-- The scope of the SPAR project was expanded to include other automated system initiatives. The Naval Data Automation Command noted that the expanded scope was not included in the definition of the SPAR project.

-- While the SPAR project has a life of 24 years, the planned contract is for 8 years. Thus, it was unclear to the Naval Data Automation Command whether the development and contract costs for the project were understated.

-- All quantifiable and non-quantifiable benefits were not provided, making evaluation of the project's economic worth difficult.

-- The inclusion of the new activities and the expansion elements, such as office automation, caused the Naval Data Automation Command to question the applicability of the Warner Amendment to the project because the additional activities may not be providing direct support to the fleet.

According to the Naval Data Automation Command, these issues had not been resolved as of August 1986.

SPAR program officials acknowledged that the project does not strictly adhere to the life cycle management process. They advised us that some of the detailed planning for transferring the current system's operations to SPAR had not been completed to support the overall development schedule for SPAR. Also, they said that workload projections used for the SPAR request for proposals were not validated as they should have been, prior to issuing that solicitation document. Subsequent analysis, they said, supports the workloads projected for and included in the solicitation document. According to project officials, no changes are planned in the workload data, which also will be used for benchmark testing of contractors' proposals.

CURRENT STATUS OF COST AND SCHEDULE TARGETS

The Navy has made many changes to SPAR's development that have increased the project's costs and extended its schedule.

Increases in program costs

The growth of SPAR life cycle costs is illustrated below.

Stock Point ADP Replacement
Program Cost Changes

Document	Estimated cost
ORIGINAL COST ESTIMATE System Decision Paper I March 1983	$945.1 million
System Decision Paper II October 1984	$ 1.4 billion
System Decision Paper II Update October 1985 (Submitted for approval)	$ 2.3 billion

In its System Decision Paper II documentation, the Navy noted that the SPAR cost increase from the original estimate in March 1983 was due to underestimated hardware requirements, which resulted in understated hardware costs.

The Navy attributed cost increases from the System Decision Paper II to the System Decision Paper II Update to (1) the increase in the number of sites from 27 to 41, (2) the consolidation of separate budgets for user work stations into the SPAR budget (an action previously included in the System Decision paper for Definition/Design phase approval), and (3) the addition of staff years to support the modernization effort.

Schedule changes in development

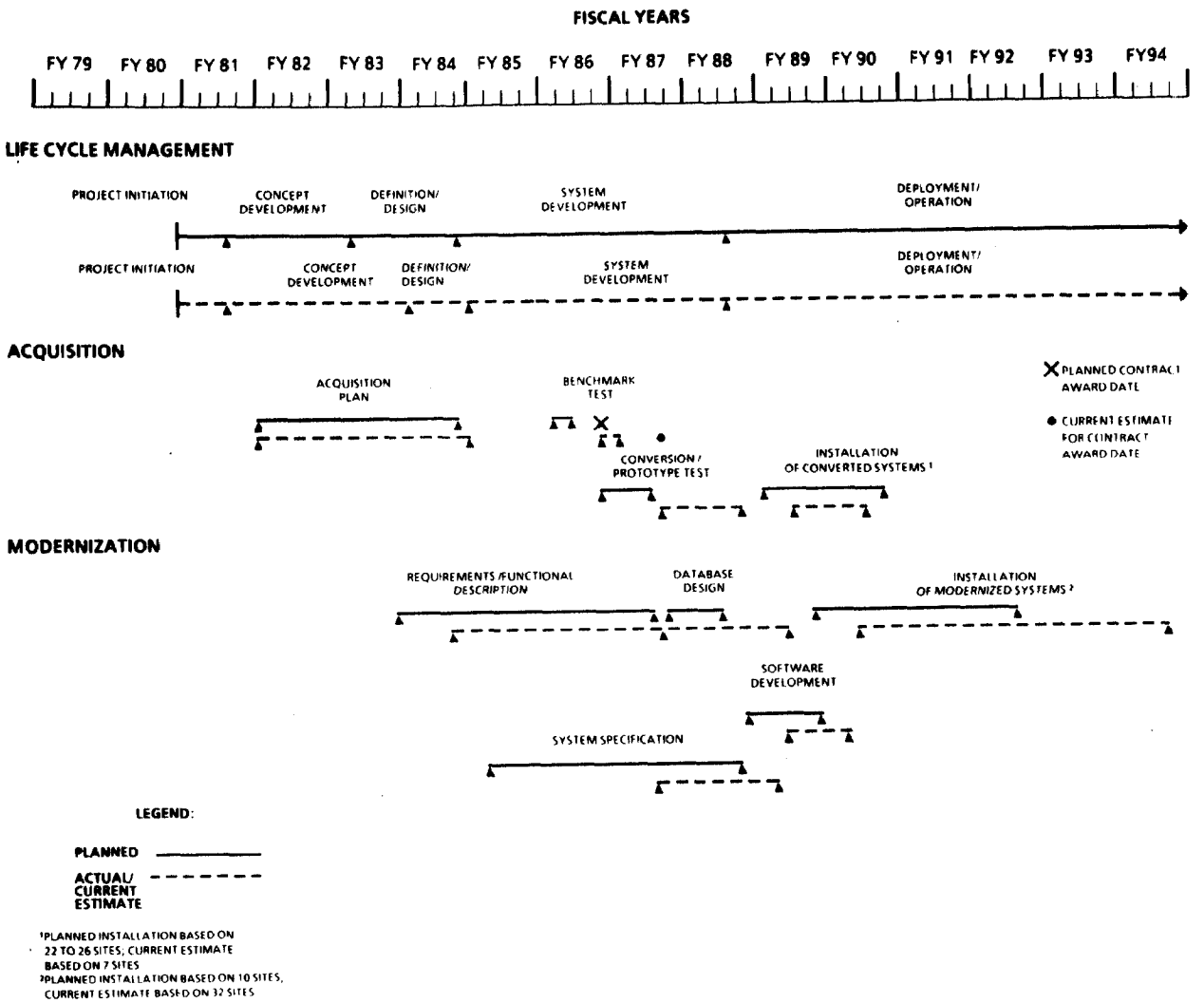
SPAR program milestones were established in an internal Navy Plan of Action and Milestones schedule dated April 1980. However, as part of its response to the stock point's inventory accuracy problems, the Navy accelerated program milestones, moving up the hardware contract award date. The accelerated milestone dates are included in the System Decision Paper for the Concept Development phase, approved by the Assistant Secretary of the Navy (Financial Management) in November 1983.

While the project's deployment approval date, May 1988, has not changed, current milestone date estimates for completion of development activities leading up to deployment reflect slippages from 1 to 18 months. For example, the contract award date, originally scheduled for August 1986, is now estimated for award in June 1987. The benchmark test, scheduled to be completed in February 1986, has slipped to November 1986. The prototype test date for the converted system has slipped 16 months to July 1988.

The modernized system's prototype test date has slipped 1 month to October 1989.

SPAR officials stated that the schedule changes are a result of two factors. First, the original Plan of Action and Milestones schedule was unrealistic and project officials believed the milestone dates were unachievable. Second, when the solicitation document was released, several contractors requested extensions for submitting their bids, and, to retain competition, the Navy granted the extensions. The result was a relaxing of the development schedule. Figure III.1 shows schedule changes in the development of SPAR.

Figure III.1: SPAR Project Planned and Actual Development and Deployment Dates



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