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UNITED STATES GENERAL ACCOUNTING OFFICE  
WASHINGTON, D.C. 20548

PROCUREMENT AND SYSTEMS  
ACQUISITION DIVISION

B-163074

MAY 22 1972



Dear Mr. Secretary:

The General Accounting Office has reviewed the practices of the Naval Ship Systems Command related to the procurement of the AN/UYK-7(V) computer system. We wanted to find out whether the Navy was effective in managing the development and procurement of this multipurpose computer system.

Computers are an integral and important part of modern weapon systems. As a part of these systems, computers help to aim guns at oncoming targets, guide missiles, locate enemy ships and planes, and perform a host of other similar functions.

AN/UYK-7(V) is such a computer. It is described as a general-purpose, high-performance, third-generation digital computer system. According to the Navy the computer will provide greater reliability, faster processing speeds, and greater data processing capabilities than any other military computer presently in service.

AN/UYK-7(V) had its beginning in mid-1967 when discussions took place between the Navy and a contractor for the development of a new computer. Cognizant Navy officials said that the AN/UYK-7(V) development had been given approval on the basis of plans for its use in a single shipboard system. Plans for multiapplication of the computer followed only a short time later.

By the time the development contract was awarded late in 1967, the AN/UYK-7(V) effort had been directed toward meeting the needs of four new major programs: (1) a program for the procurement of an advanced surface-missile system called AEGIS, (2) a program for the Landing Helicopter Assault (LHA) ship, (3) a program for a conventionally powered destroyer, and (4) a program for a nuclear-guided-missile frigate. Later, in mid-1968, the development contract was modified to

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include the computer needs of still another program--the Junior Participating Tactical Data System.

Since its conception potential application of this computer system has continued to grow. Navy planning documents indicated that the computer would be a significant component of more than 40 different Navy systems or programs, including most of the Navy's new ships and submarines.

Our review of the procurement of the AN/UYK-7(V) computer system revealed problems concerning the acquisition of its associated programming equipment and the planning for the acquisition of computers for training purposes. Inadequate financial planning for these requirements was the source for both of these problems. There was no meaningful overall plan to provide for financing of the AN/UYK-7(V) computer program as a whole.

The costs for developing the AN/UYK-7(V) computer and its associated programming equipment were funded, in part, under a tactical data system development program and under several different weapon systems programs which would make use of this computer. The time required to accumulate funds from different programs to finance the development of the associated programming equipment delayed its availability. This, in turn, resulted in a delay and cost increase to at least one weapon system program. Also adequate funds had not been provided for AN/UYK-7(V) computer training programs. Details concerning these matters are set forth below.

#### DELAYED DEVELOPMENT OF COMPUTER PROGRAMMING EQUIPMENT

Programming of computers with machine instructions needed to accomplish a given task can be both time consuming and costly. Equipment to assist in the programming of the AN/UYK-7(V) computer systems consists of a compiler which was to have been developed concurrently with the computer. The compiler converts instructions into the type of electrical

impulses which the computer hardware can use to perform the desired processing operations.

In its financial planning, the Navy planned separately for the funds needed for development of the AN/UYK-7(V) computer and the compiler. The Navy proceeded with the hardware development without interruption. However, funds for the compiler were requested under a number of activities or programs which subsequently were reduced or eliminated during the budgetary process.

For example, funds to be used for compiler development apparently were included for the fiscal year 1968 budget under a request for operating the Navy Electronics Laboratory Center but were subsequently eliminated when the congressional budget request was prepared. According to a Navy official, funds for the compiler were then included in the fiscal year 1969 budget request for the DXGN ship program; but the amount requested for the compiler was cut during the budget appropriation process.

Funds for the development of the compiler were ultimately accumulated from five data systems and weapon or ship programs and were provided in November 1969, about 2 years after the development of the hardware was funded.

To effectively utilize the AN/UYK-7(V) computer, the subsystem compiler must be available with the computer; however, the contract for the development of the compiler was not awarded until after the initial production models of the AN/UYK-7(V) computer had been delivered.

This out-of-phase development and procurement of the computer and compiler has affected the LHA ship program. The Navy was committed under the LHA contract to furnish its contractor with the compiler for use in conjunction with contractor-furnished AN/UYK-7(V) computers. The compiler was not available when needed, and the LHA contractor had to use

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other means to satisfy the need which the compiler was intended to fulfill. This work-around may add about \$2.3 million to the cost of the LHA program.

We believe that the development of the AN/UYK-7(V) computer and its associated programming equipment should have been treated as an integral program because of their interdependence.

#### COMPUTER FOR TRAINING PURPOSES NOT AVAILABLE

The Navy cannot make effective use of new equipment unless it has personnel trained to operate, maintain, and repair that equipment. Such personnel must be available simultaneously with the introduction of the equipment into operating use; otherwise the readiness of the weapon systems that employ the new equipment will be affected.

As of December 1970 adequate funds had not been provided for AN/UYK-7(V) computer training programs. The Navy scheduled training programs to begin in fiscal year 1972 but did not provide for the acquisition of the computers needed to conduct the training. According to a Navy official, the cognizant training facility will have to supply its own funds for the purchase of AN/UYK-7(V) computers. We were advised by a Navy official that, due to the cost of the AN/UYK-7(V) computer, training facility funds could not support the acquisition of the number of AN/UYK-7(V) computers needed for training. As a result, unless appropriate changes are made, those designated to undergo such training will have to use textbooks to learn how to operate and maintain an AN/UYK-7(V) computer and will have no opportunity to practice on one.

Since the computers are to be installed on the LHA and DD-963 ships in fiscal year 1973, it is important to Navy readiness that proper training be provided to those who will be required to operate and maintain the AN/UYK-7(V) computer systems aboard these ships.

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### CONCLUSIONS

Meaningful financial management of all aspects of an acquisition program is essential to ensure economical development and efficient usage of new equipment. In the case of the AN/UYK-7(V) computer, funding for all aspects was not provided. As a result of the fragmented funding, important aspects were delayed with consequent impairment in the planned use of the computer.

We believe that acquisitions of important general-usage equipment, such as the AN/UYK-7(V) computer, should be managed as individual programs just as the Navy manages its weapon systems acquisitions. This concept of acquisition management provides the means for managing and controlling all aspects of an acquisition program as a whole and for ensuring timely availability and effective introduction of new equipment into the fleet.

### RECOMMENDATION

We recommend that the Navy manage its acquisitions of tactical computer systems intended for multishipboard usage as individual programs using a management concept similar to that used by the Navy to manage its weapon systems acquisitions.

If you desire, we shall be glad to discuss this matter in greater detail with you or with your staff.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "Hassel B. Bell". The signature is fluid and cursive, with the first name "Hassel" being the most prominent.

For, Director, Procurement and Systems  
Acquisition Division

The Honorable  
The Secretary of the Navy