DOCUMENT RESUME

02760 - [A1953030]

Improved Management of Computer Resources Needed to Enhance Marine Corps' Efficiency and Effectiveness. LCD-76-124; B-163074. July 11, 1977. 39 pp. + 5 appendices (10 pp.).

Report to the Congress; by Elmer B. Staats, Comptroller General.

Issue Area: Military Preparedness Plans: Military Communications and Information Processing Needs (803); Automatic Data Processing: Acquiring and Using Resources (102).
Contact: Logistics and Communications Div.
Budget Function: National Defense: Department of Defense - Military (except procurement & contracts) (051); Miscellaneous: Automatic Data Processing (1001).
Organization Concerned: Department of the Navy; Marine Corps.
Congressional Relevance: House Committee on Armed Services; Senate Committee on Armed Services; Congress.
Authority: Federal Management Circular 74-5.

Many Marine Corps' administrative and tactical information processes have been automated, and consequently, whether at an established base or deployed at a remote location, depend on the availability of computer support. Findings/Conclusions: The Corps has separate computer installations for its combat force and its service support units. Thus, it has acquired more computers than it needs, and has developed separate systems for similar purposes. The availability of computer support has been impaired by fragmented management, lack of a comprehensive plan integrating administrative and tactical information needs, and a superficial determination of user requirements. Critical shortcomings were noted in the use of computer systems during emergency deployment. The expenditure of at least $8 million annually to operate separate force computer centers did not seem justified because the computers were not tested to meet the needs of deployment. Corrective actions initiated by the Corps in response to GAO recommendations were found to be generally consistent with these recommendations. Recommendations: The Secretary of Defense should direct the Secretary of the Navy and the Commandant of the Marine Corps to: (1) implement a single office for data processing management; (2) develop an overall plan for integrating systems; (3) reconsider separation of computer installations; (4) improve systems for meeting needs of local users; and (5) assure greater compliance with Government regulations related to data processing requirements, cost evaluations, and competitive procurement. (Author/HTW)

REPORT TO THE CONGRESS

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

Improved Management Of Computer Resources Needed To Enhance Marine Corps' Efficiency And Effectiveness

Department of Defense

Many Marine Corps administrative and tactical information processes have been automated and consequently, whether at an established base or deployed at a remote location, depend on the availability of computer support. However, the fragmented management of its computer resources, the lack of a comprehensive long-range plan integrating administrative and tactical information needs, and a superficial determination of user requirements have impaired the Corps' ability to provide this type of support. The lack of computer support could ultimately impair the Corps' ability to carry out assigned missions.

LCD-76-124

JULY 11, 1977

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-163074

To the President of the Senate and the
Speaker of the House of Representatives

This report discusses weaknesses in the planning and management of the Marine Corps' automated data processing program. Because of these weaknesses, certain aspects of the automated data processing program do not adequately meet user needs and could, therefore, hinder the Corps' operational effectiveness during emergency situations.

Our review was made pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

We are sending copies of this report to the Secretaries of Defense and the Navy and the Commandant of the Marine Corps.

Comptroller General
of the United States

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

IMPROVED MANAGEMENT OF COMPUTER RESOURCES NEEDED TO ENHANCE MARINE CORPS' EFFICIENCY AND EFFECTIVENESS
Department of Defense

D I G E S T

Each year, the Marine Corps spends about $41 million for the design, development, procurement, installation, and operation of computers. Because the Corps has separate computer installations for its combat force and its service support units, it has acquired more computers than it needs and has developed separate systems for similar purposes.

The Corps' dependency on computer support has increased to a point where its operational effectiveness is substantially affected by the availability of this support. The transition from manual processes to automation has been managed by several staff agencies at Corps headquarters, causing fragmented management of computer systems development.

For example, the Corps did not have

--a single office responsible for coordinating all work in data processing and telecommunications (see p. 5),

--coordination and control needed to prevent separate systems for similar uses from being developed (see p. 9),

--overall planning to make sure that resources and competitive procurement are used effectively (see p. 13), and

--control over standard systems needed to reduce costs and exchange information faster (see p. 18).

In addition, the Marine Corps has acquired some of its major systems without fully

determining user requirements for the different peacetime and combat conditions under which the users must operate. (See p. 21.) The costs of alternatives were also not evaluated. (See p. 31.)

As a result, some aspects of the data processing program do not adequately meet the Corps' needs. This could hinder the Corps' effectiveness, especially during emergency deployment of its combat forces, because the Corps is almost completely dependent on computer support whether at an established base or deployed to a remote location.

Some critical shortcomings of the computer systems are:

--Automated data processing is not readily available to combat force commanders during emergency deployment.

--Whether the combat force's computer and its shelter can be moved to a combat or emergency area has not been tested.

--An adequate, self-contained power supply is not available to run the computer in a deployed situation. (See p. 22.)

The continued expenditure of at least $8 million annually to operate separate force computer centers does not seem justified, because the computers have not been tested to meet the needs of deployment. (See pp. 12 and 25.)

GAO recommends that the Secretary of Defense direct the Secretary of the Navy and the Commandant of the Marine Corps to:

--Effectively implement a single office authorized to manage the planning, coordinating, and monitoring of all administrative and tactical data processing and related telecommunications operations.

--Develop an overall, long-range plan integrating tactical, administrative, and related telecommunications systems requirements.

--Reconsider the need to separate the Corps' combat force and service support unit computer installations.

--Improve the effectiveness of the Corps' standard systems for meeting the needs of local users, including, where necessary, redesigning the systems.

--Make sure that there is greater compliance with Government regulations in determining the Corps' data processing requirements, evaluation of costs and benefits available from alternative courses of action, and competitive procurement of computer equipment, including the use of machine-transferable software.

In commenting on the report, the Assistant Secretary of the Navy (Financial Management) stated that several of GAO's recommendations have merit and that the Marine Corps had initiated corrective action. (See p. 35 and app. IV.)

The Marine Corps had identified some of its computer systems development problems. However, prior to GAO's review, the solutions developed and implemented by the Corps were ineffective in resolving problems, primarily because the Corps did not concentrate the management of its automated data processing program in a single office.

In addition, the Assistant Secretary said that there are two broad implications in the report which are inappropriate and reflect adversely on automated data processing management by the Corps. The implications are that the Marine Corps

--has not effectively complied with Government regulations on the acquisition of

computer resources and is overly dependent on one computer manufacturer and

--has not effectively identified or satisfied user requirements.

The Assistant Secretary's statements tend to suggest that Marine Corps policy is in compliance with Government regulations regarding the acquisition of computer equipment. GAO's review showed that the Corps, by its procurement policies and methods, had, in effect, limited the type of free and open competition contemplated by Government policy and regulations.

GAO's review also showed that the Corps also did not perform comprehensive user requirement studies before spending millions of dollars for computer systems. This is one reason why the systems do not fully meet the information needs of Marine commanders and, as such, could hinder their operational effectiveness, especially during emergency deployment situations.

The corrective actions initiated by the Marine Corps, particularly the ones related to automated data processing program responsibility and planning, are generally consistent with GAO's recommendations and if properly implemented, should improve the Corps' management of its data processing resources. (See p. 40 and app. IV.)

Contents

ABBREVIATIONS

ADP	Automated data processing
GAO	General Accounting Office
IBM	International Business Machines Corporation

CHAPTER 1

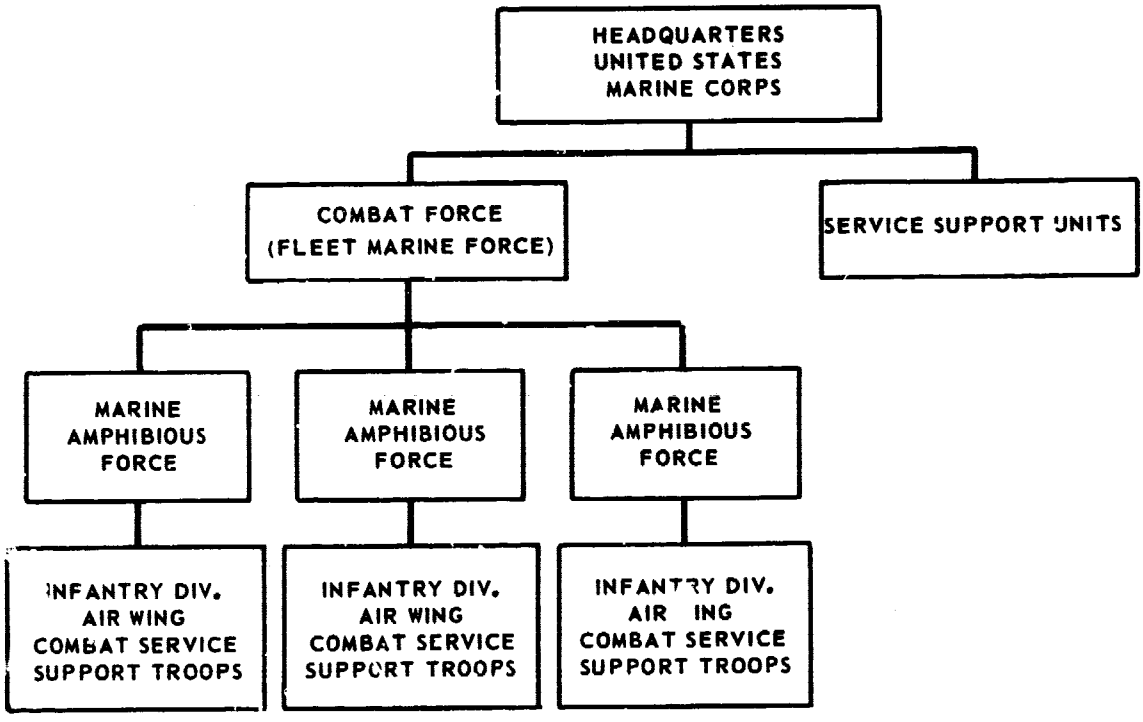
INTRODUCTION

MISSION AND ORGANIZATION OF THE MARINE CORPS

An integral part of the Department of the Navy, the the United States Marine Corps serves with the fleet in seizing or defending advanced bases and in conducting land and air-ground support operations regardless of when or where those operations take place. The Corps may be called on to conduct these operations during a full-scale war or in a combat emergency. To fulfill these duties, the Corps is responsible for developing amphibious warfare doctrines, tactics, techniques, and equipment. In addition, the Corps provides security forces for naval shore installations and ships and American embassies, legations, and consulates in countries throughout the world.

Organizationally, the Corps is composed of a combat force and service support units. The relationship between these two major components is shown schematically in the diagram on the following page. The combat force is called the Fleet Marine Force and consists of three Marine Amphibious Forces. Each Marine Amphibious Force is made up of an infantry division, an air wing, and related troops who provide combat service support functions, such as logistics, maintenance, and engineering. The needs of a particular combat emergency situation determine the size of the forces that will be deployed. This could be a unit of a hundred men or a full Marine Amphibious Force of about 50,000 men.

The Corps' service support units (referred to by the Corps as supporting establishment) recruit and train marines, provide logistical and equipment maintenance support to the Fleet Marine Force when located at established bases, and maintain permanent bases, installations, and schools.



AUTOMATED DATA PROCESSING IN THE CORPS

Since many of the Corps' day-to-day administrative and tactical information applications have been automated, the Corps is almost totally dependent on the availability of computer support whether garrisoned at a permanent base or deployed to a remote location in response to a war or combat emergency. Information applications include such functional areas as personnel, logistics, finance and accounting, intelligence data, fire and air support data, and other information associated with administrative matters, whether used in real or simulated combat operations. Applications such as personnel, logistics, and finance and accounting may have a higher priority and be processed ahead of other applications at service support units. Conversely, the situation may reverse itself in a real or simulated combat operation. For this reason, the degree of workload mix in the processing of these applications is based on the needs of its users at any time.

An important aspect of the Corps' mission is the ability to effectively deploy men and materials to remote locations on short notice. These deployments and the sustaining operations of the Marines are highly dependent on computer support.

Presently, separate automated service centers provide computer support to the combat force and service support units. The Fleet Marine Force automated service centers use computers to process various functional applications, such as supply, maintenance, and personnel. These applications were developed under the force information system concept. This concept is intended to provide Corps commanders at all levels with an information system that contains both administrative and tactical information and responds to their needs regardless of whether they are located at a permanent base or deployed in a war or combat emergency. Some of these applications are standard systems used throughout the Corps, while others are locally developed to meet the needs of Marine Amphibious Force and Air Wing commanders. A total of seven combat force automated service centers have been established to support Fleet Marine Force components.

Similarly, the automated service centers used by the service support units provide computer support to base, station, and depot commanders, as well as tenant commands in the same geographic area. These centers generally process administrative information systems which are similar to those processed on the combat force computers and which include functional areas, such as payroll, personnel, supply, and accounting. Some of these functional applications are standard systems used throughout the Corps and others are locally developed.

While the Marine Corps has been spending only about $41 million annually for the design, development, purchase, installation, and operation of computer information systems, the estimated cost in recent years for the Marine Corps itself, including estimated amounts provided by the Navy, has averaged about $6.8 billion annually and for fiscal year 1977 could exceed $7 billion. Thus, since without computers the Corps cannot function efficiently, effective computer support is much more important than its annual cost of about $41 million would indicate.

SCOPE OF REVIEW

We evaluated the Corps' ability to provide this support at an established base or at a remote location during a war or combat emergency. We reviewed Office of Management and Budget, General Services Administration, Department of Defense, Department of the Navy, and Marine Corps circulars, guidelines, and regulations relating to automated data processing (ADP) program management and planning. We also examined pertinent records and documents at Marine Corps

headquarters, Washington, D.C., and at various Marine Corps installations on the west and east coasts of the United States and interviewed responsible Marine Corps officials.

CHAPTER 2

MANAGEMENT OF THE AUTOMATED DATA PROCESSING PROGRAM SHOULD BE CONSOLIDATED TO IMPROVE CONTROL OVER COMPUTER RESOURCES

The need for improved management of ADP programs within the Department of Defense has been of particular concern to the House Committee on Appropriations. In its September 11, 1972, report (H. Rept. 92-1389), the Committee expressed concern that the Department had not heeded its advice, given several times, to establish a single office responsible for managing its data processing program. It was reported that management of the program continued to be fragmented, especially in the area of systems related to tactical operations. The Committee recommended that the data processing program offices of the Office of the Secretary of Defense and their counterparts at the service headquarters level be given control of the total program to insure the most efficient and economical use of computer resources. These offices were also to be responsible for developing and coordinating long-range planning, to include keeping abreast of industry developments, and providing flexibility in Department ADP programs.

During a war or combat emergency, computer support must be available to accompany the unit being deployed. To provide this support most effectively, the Corps should have a single office responsible for the total ADP and telecommunications program and for managing its computer resources. We found, however, that management of the Corps' administrative and tactical systems development efforts has been fragmented and has impaired the Corps' ability to effectively and efficiently provide needed computer support to its combat force and service support units.

FRAGMENTED MANAGEMENT OF THE CORPS' ADP AND TELECOMMUNICATIONS PROGRAM

The Corps' management of its ADP program has been fragmented among five different offices with overlapping responsibilities for the design, development, implementation, and operation of information systems. Coordination of administrative and tactical system development efforts was either minimal or nonexistent. Consequently, these system

development efforts did not properly identify or consider user information needs for those units that will depend on the computer for support. In addition, new computer equipment has been procured without assurance that it was adequate to meet known and anticipated future information needs.

The five principal offices that had overlapping responsibilities for the design, development, implementation, and operation of information systems were the Information Systems Support and Management Division, the Plans and Operating Department, the Research and Studies Division, the Tactical Systems Support Activity, and the Telecommunications Division.

Information Systems Support and Management Division

This division, hereafter referred to as the information systems division, was responsible for exercising centralized coordinating authority over the development, implementation, and support of information systems. This responsibility was to be fulfilled by coordinating, advising, and assisting the headquarters staff agencies and Marine Corps commands in their system development efforts. However, overlapping duties assigned to the other four offices rendered this division's efforts ineffective.

Plans and Operations Department

This department was responsible for developing and managing the manual and automated systems for the operations and readiness information requirements of the Commandant of the Marine Corps. Thus, this department was responsible for developing and managing automated systems that are responsive to the Corps' operation and readiness information requirements for ground combat operations. However, this responsibility did not make clear whether the department was to develop and manage adminstrative systems, tactical systems, or some combination of the two.

Research Development and Studies Division

This division was responsible for research and development requirements for information systems, particularly tactical information systems. To a great extent, this responsibility was carried out by the Tactical Systems Support Activity. There was no requirement for the division

to coordinate its work with other offices responsible for administrative systems. Thus, there was no assurance that development efforts by this division which may have been of value to nontactical system developments efforts were coordinated with the affected parties, or that system development efforts by other offices were coordinated with this division.

Tactical Systems Support Activity

This activity provided resources to develop and test tactical information systems. These systems include functional areas, such as personnel, logistics, combat operations, intelligence data, and fire control information. Those few systems which are under development or are being field tested are to be used in the 1980-90 time frame. As managed during our review, the Corps did not have any assurance that the work by other activities would be coordinated with and would not duplicate the efforts of this organization.

Telecommunications Division

This division was responsible for all matters related to providing telecommunications capabilities for administrative and tactical information systems. Inherent within this responsibility is the requirement to provide telecommunications systems that are compatible with the Corps' administrative and tactical systems and with those of other services. Because of the decentralized responsibilities of the other four offices, the Corps had no way to assure itself that these telecommunications requirements were being effectively and economically met.

Lack of a single office

Fragmented program management can occur when there is no central office to control information system development efforts. The lack of a single office responsible for the Corps' ADP program has led to the premature acquisition of equipment (see p. 28) and the implementation and operation of systems that are not responsive to user needs (see p. 21). Systems that are not responsive to user needs cannot be considered successful systems no matter how well designed they may be.

Problems associated with a recent test of computers illustrate the need for a single office to control information system development efforts. The information systems

division recently conducted a test using minicomputers to meet the information needs of the combat force. This test was conducted without participation by the Tactical Systems Support Activity. Based on preliminary test results, these minicomputers will probably be purchased by the Corps. Since the Tactical System Support Activity did not participate in these tests, its commanding officer expressed concern that the planned procurement may not meet the Corps' future tactical information needs as being defined and developed by his office. To minimize the possibility of purchasing equipment that will not meet the needs of its users, closer coordination is needed between those offices developing administrative systems and those developing tactical systems.

Some of the problems and deficiencies noted in a May 1975 headquarters staff study report relating to the lack of a single office for all Marine Corps ADP systems were:

--There was no single coordinated approach to the planning, development, procurement, operation, and life cycle support of all Marine Corps ADP systems to insure totally compatible administrative and tactical systems that work.

--There was no existing office for telecommunications and command and control system matters. The responsibility was distributed throughout various staff agencies.

--There was no integrated telecommunications and command and control master plan that establishes common goals, design parameters, and operational concepts to guide the development of such systems.

After a preliminary realignment in response to the May 1975 staff study, overall tactical system coordination responsibility was moved from the Research, Development, and Studies Division to the Plans and Operations Department, which was designated the formal point of contact for all tactical system planning, concept review, and development coordination. The information systems division was given responsibility for providing technical automated data systems support for tactical systems development. No changes were felt necessary in the responsibilities of the Telecommunications Division. In addition to these responsibility changes, a coordinating committee was created with representatives from headquarters offices

to assist the Plans and Operations Department in its tactical command and control responsibilities. So, under this realignment, the Marine Corps still had no single office responsible for the total data processing and telecommunications program.

One problem area resulting from the lack of a single office for these interrelated programs is the difficulty of achieving compatible information processing systems. For example, the headquarters staff report recognized that the realignment of tactical systems management responsibilities did not establish a way to relate tactical and administrative information systems. One alternative considered by the study team that would have satisfied the need to coordinate tactical and administrative information systems was to make the information systems division the coordinator of tactical system development. However, this alternative was rejected because it would greatly extend the authority and control of the information systems division beyond the scope of its basic mission as a coordinating authority over the development, implementation, and support of information systems.

Establishment of a single office

On November 1, 1976, because of the deficiencies identified in our draft report issued August 4, 1976, and the headquarters staff study report issued in May 1975, the Corps realigned its ADP and telecommunications program responsibilities. The newly created office is known as the Command, Control, Communications, and Computer Systems Division, and, if properly staffed and implemented, should help improve program management and resolve many of the problems described in this report.

MANAGEMENT CONTROL OVER PROGRAM RESOURCES SHOULD BE IMPROVED

The Marine Corps maintains separate medium-scale computer installations to process management-type systems for its combat force and service support units. This separation has resulted in the Marine Corps installing and maintaining excess computer capacity and in the development of separate systems for similar applications. (See p. 19.)

Figure 1 illustrates the concentration of Marine Corps' computer installations on the west coast. The minicomputers listed represent planned installation.

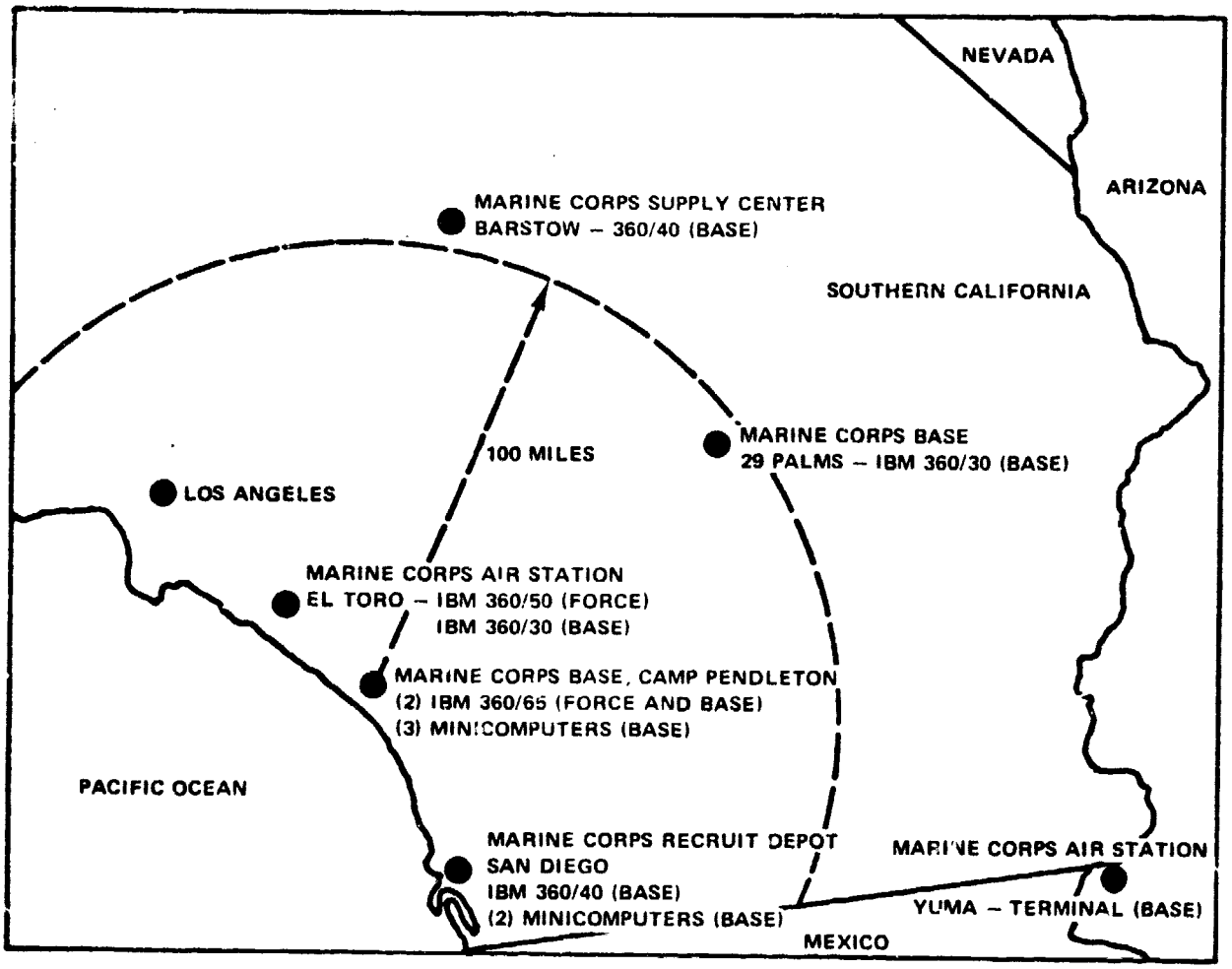


Figure 1. Marine Corps West Coast Computer Installations

Excess computer capacity

The force computers have never been fully used in garrison, and Corps officials recognize that the computers have excess capacity to meet increased workloads during deployment; however, the amount of excess capacity needed has not been specifically determined. The service support unit or base computers also have unused capacity. For example, during the 6 months preceding the initiation of our fieldwork the force computer centers at Camp Pendleton and El Toro were idle and available for productive use an average of 27 hours and 64 hours per week, respectively, while the base computer center at Camp Pendleton was idle and available for productive use 44 hours per week. The idle time does not include time for preventive maintenance, repairs, or other necessary down time. See appendix I for the location of all base and force computer centers.

Marine Corps Bulletin 5230, dated December 3, 1974, presented the concept of consolidating Marine Corps automated data processing service centers as being entirely feasible, with a west coast consolidation as the first step. Further, the consolidation study effort was to consider both service support unit and force data processing requirements. Consolidation of the service support unit and force data processing requirements could

--provide for more efficient and cost-effective data processing support,

--minimize the duplication of programming effort,

--reduce the inventory of data processing equipment and its associated maintenance costs,

--make available data processing equipment for reuse by other Government installations,

--reduce the number of data processing personnel required, and

--reduce the administrative overhead at the local and headquarters levels required to support separate data processing centers.

The Marine Corps study team, however, excluded the consolidation of service support unit and force data processing requirements and recommended that the service support unit computer centers, with the exception of the one at Barstow, be consolidated through the use of telecommunications to an upgraded Camp Pendleton computer center. (See pp. 16 and 32 for discussion of upgrade procurement.) The service support unit computers at El Toro, San Diego, and Twenty-nine Palms were to be retained with less peripheral equipment and operated in a reduced mode as remote job entry devices--a function not normally performed by this type of equipment. The consolidation will, in effect, increase the total data processing capability in southern California.

The procurement of source data entry minicomputers for selected service support units will further increase the computer capacity. (See p. 28.) The Marine Corps plans to install five minicomputers, costing about $200,000 each, at two of the southern California bases. Although these minicomputers will substantially increase the data processing capability at each site, they were not considered in the

above consolidation decision. The total procurement is for 14 minicomputers with an option to purchase 12 more, to be installed at various other supporting establishments.

We believe that the Marine Corps should have considered both the service support unit and force data processing requirements in the west coast consolidation study. The feasibility of this is indicated by the fact that the force and service support unit systems are processed by one data processing facility at Camp Foster, Okinawa. (See p. 32 for economic analysis considerations.) Generally, Marine Corps officials take the position that the Corps must maintain separate force facilities for the [illegible]t Marine Force to provide deployable computer suppo[illegible]r operational responsiveness. However, as discussed in chapter 4, the force computer installations as they exist will not meet the deployment needs of the users.

Although we recognize that computer support is necessary during a deployed situation, we believe that the separate combat force and service support unit computers centers should be consolidated since the combat force computer centers will not meet the deployment needs of the users. For this reason, the continuing annual cost required to maintain separate combat force (about $8 million) and service support unit (about $11 million) computer centers may not be justified.

In addition, the Corps has to strengthen its practices regarding the development of long-range plans integrating administrative and tactical information, the determination of user requirements, and the performance of economic analysis supporting the selection of the best alternative. These issues are discussed more fully in subsequent chapters of this report.

CHAPTER 3

LONG-RANGE PLANNING

COULD BE IMPROVED

The absence over a period of years of a single office to achieve coordinated management of the ADP program has resulted in the development of long-range plans which do not (1) provide a reliable means for coordinating and integrating system development activities, (2) provide a means for identifying measurable program objectives, and (3) insure competitive procurement of computer and related equipment. Moreover, standard systems planned and designed for use throughout the Corps have not worked well.

PROGRAM PLANNING CRITERIA

The Office of the Secretary of Defense and the Department of the Navy have provided the Marine Corps with extensive guidance on the management of its ADP program, including the need for effective overall long-range planning.

In February 1970, the Deputy Secretary of Defense expressed concern about the invariable delays and cost overruns that were being encountered when developing expensive, complex data processing systems. He informed the Secretaries of the military departments that there was an urgent and immediate need to insure that the development, expansion, or implementation of an automated data system goes forward only when the Department can be assured that planning, economic analysis, and system monitoring procedures are comprehensive and well documented. As a result of these needs, the Deputy Secretary of Defense requested that long- and short-range plans and objectives be developed for automated system development efforts by each of the military departments. Specifically, Department of Defense components were to critically review all automated data systems prior to their further development, implementation, or expansion. This was to be accomplished by evaluating, on a case by case basis, their procedures and documentation for planning the system development activity, conducting economic analysis of alternative system development efforts, and evaluating and reviewing ongoing system development efforts. This critical review was intended to help each of the military departments identify those system development activities which should be continued, modified, or terminated.

THE MARINE CORPS' ADP PROGRAM PLANNING PROCESS

Prior to 1969, overall Marine Corps ADP program planning was limited to studies on information system support requirements. In August 1969, a data systems support plan was issued for the acquisition, distribution, and management of computer resources in the Fleet Marine Force and service support unit activities, excluding tactical systems, for fiscal years 1970 through 1972. This plan was to provide a tool to manage resources to gain maximum efficiency and economy. The plan was to be updated annually; however, a revised plan was not issued until January 1975.

At that time, the Marine Corps published its first 5-year automated data system plan (fiscal years 1975-80) in response to a 1971 Department of the Navy requirement. The Navy established the requirement for a 5-year plan to help officials manage ADP resources so that managers could be provided with effective support and overall Government expenditures minimized. The plan was to contain a description of the conceptual and policy basis for the plans, a description of the existing data processing environment, objectives and goals, and the planned action necessary to achieve them.

Planning needs coordination and integration

In addition to the administrative information systems in operation or being developed f the Fleet Marine Force, tactical information systems are being developed for future Marine Corps use. Although needed, the Corps has not developed an overall plan to facilitate the interface and coordination required to achieve proper integration of its tactical and administrative information systems. For the most part, actions to solve problems are being proposed, studied, and evaluated on their own merits, with no long-range goal or plan toward which collective efforts can be directed.

We reviewed the Marine Corps' 5-year ADP plan and found that even though the plan addresses tactical system development, it does not provide an overall plan integrating the development of tactical and administrative information systems with those systems presently installed or under development. Distinct overlaps exist between planned tactical and administrative inform ion systems and duplicate information in these systems. The Tactical System Support Activity has been developing systems which partially duplicate existing or planned information systems in support of the lower Fleet

Marine Force command levels. The duplicate systems include the functional areas of supply, maintenance, personnel, and status of forces.

Marine Corps representatives have been expressing concern about the lack of integration between tactical and administrative information systems for several years. For example, in an August 1972 force information system conference report, it was pointed out that there is no longer a clear distinction between tactical and administative information systems, since it can be said that the business of the Marine Corps today is the skillful management of tactical amphibious warfare. Later, during a March 1975 data processing officer conference, the Director of the information system division at Marine Corps headquarters expressed concern about the lack of tactical and administrative information system integration and reemphasized the need for this integration.

Measurable objectives required for program control

A 1971 Department of Defense memorandum establishing guidelines for economic analysis stated that objectives should (1) be expressed in terms of function, processes, and anticipated outputs related to an identified problem, (2) be related to the performance of the organization's assigned mission, (3) contain explicit criteria for measuring the effectiveness with which the problem is to be solved, and (4) specify the time frame in which the objectives are to be met. For example, statements such as "the objective is to provide management with more accurate and timely information," would not be acceptable.

The Marine Corps' 5-year plan contains 15 objectives for the first 2 years of the plan (fiscal years 1975 and 1976) and 11 additional objectives for the full period of the 5-year defense program. Most of these objectives are general and do not provide a good basis for measurement. For example, some of the objectives were to

--continue to program for the update of computer hardware in the Corps,

--continue efforts to standardize and integrate Navy/Marine Corps common systems, and

--establish the capability for higher headquarters to exercise command and control over deployed forces.

None of these objectives were expressed in terms of anticipated outputs, specific time frames for completion, or a criterion for measuring accomplishments. More detailed objectives should be initially developed at the command level and approved at Corps level.

Nonspecific and unmeasurable objectives were also identified during a Naval Audit Service evaluation begun in December 1973 of the computer system at the First Marine Amphibious Force, Camp Pendleton, California. The Audit Service found that the objectives established by the Marine Corps in December 1971 were stated in such general terms and stipulated such general conditions that they could not be meaningfully evaluated. The Audit Service recommended that the Corps establish more definitive objectives for the Fleet Marine Force computer systems. The Commandant of the Marine Corps did not concur with the Audit Service recommendation and did not address the question of being able to make a meaningful evaluation of the attainment of objectives. The Audit Service did not consider the Marine Corps' comments responsive to this recommendation.

Need for formal planning to insure competitive procurement

The Marine Corps decided to achieve equipment standardization within its automated data processing program by procuring the computers of a single manufacturer. This is generally considered acceptable within the life cycle of the system. However, we believe that the standardization should be the result of effective planning and that competitive procurement of a standard system should comply with good management practice as provided for in Federal management circulars and Department of Defense directives.

Federal agencies are required to follow, to the extent possible, a competitive procurement policy when obtaining computer equipment. This is stated in Federal Management Circular 74-5, which requires that systems specifications be designed to insure free and open competition to all responsible suppliers, manufacturers, and vendors. In addition, Federal Property Management Regulation 101-32.4 requires agencies to obtain full and complete competition in all computer acquisitions, including the renewal of leases and purchases of installed and leased equipment.

As of January 15, 1975, the Marine Corps reported an inventory of 31 computer systems, costing more than $44 million. Twenty-seven (84 percent) of the systems were

those of a single manufacturer. These computer systems were obtained from several sources, including alternate private industry suppliers other than the manufacturer (third-party vendors) and Federal agency release of existing computers (reutilization).

The Marine Corps' overdependence on a single equipment manufacturer can best be shown by comments from selected correspondence:

--The Department of the Navy in February 1973 stated that management determination over a period of time had effectively "locked in" the Marine Corps to a single manufacturer's equipment.

--The General Services Administration, in March 1973, questioned the Marine Corps' proposed sole source equipment selection for a force computer whereby they were precluded from fully carrying out their responsibilities in connection with the procurement of computer equipment on a fully competitive basis.

In August 1975, we submitted a letter to the Department of Defense questioning the Marine Corps' justification for the sole source selection of an IBM 360/65 for the Camp Pendleton base computer center and for its continued practice of limiting competition during acquisition of computer systems. A copy of the letter was also sent to the Administrator of General Services for review and comment.

The Department of the Navy response for the Secretary of Defense, dated October 23, 1975, did not address this issue--it classified the procurement action as an interim upgrade of equipment.

The General Services Administration response to us, dated September 19, 1975, stated that it had been aware of and concerned about the Marine Corps' continued practice of sole source computer equipment selection and had brought this matter to the attention of the Deputy Assistant Secretary of Defense in March 1973. However, due to the claimed urgency of this request and in order to meet the Marine Corps' mission requirements, General Services proceeded with the award. This decision was based partly on a Marine Corps plan provided to General Services which specifies that follow-on requirements will be satisfied by competitive acquisition.

Federal Management Circular 74-5 requires that, if an interim upgrade is acquired noncompetitively the agency shall

commit itself to replace the complete system which the interim equipment is a part of. Such an acquisition is to be based on new specifications and to be accomplished through a competitive procurement within 2 years of the initial acquisition. The agency and the General Services Administration may agree to a longer period when there are unusual circumstances. The Marine Corps has no firm plans regarding the future (2 years) replacement of the service support unit computer system other than a general statement about the replacement of all IBM 360 computers beginning in 1979 (about 4 years from the acquisition).

The commitment by an agency to go competitive within a period not exceeding 2 years should be strictly enforced by the General Services Administration, according to the House Committee on Government Operations. In addition, this competitive procurement should be accompanied by major efforts to streamline and improve the ADP procurement system.

The Marine Corps' primary justification for the sole source selection of computer equipment is that they have a standard family of equipment so that they can avoid any possible reprogramming and personnel training cost. However, Federal Management Circular 74-5 provides that, when considering reprogramming costs, care must be taken to avoid biases which may prejudice competition.

Reprogramming costs can be minimized by considering the use of computers which are designed to use IBM software (the software presently used by the Corps) with minimal reprogramming effort. However, there are only two other brands of computers designed specifically to use IBM software. Thus, competition would be limited to three computer equipment manufacturers and third-party vendors who handle those brands.

If the Corps had generally planned to use software that could be readily adopted to other computers, then the conversion costs to different computers could be minimized. This situation applies particularly to software used for maintaining data bases, because data bases represent an information resource and usually require substantial investment.

We believe that formal planning for future systems based on valid user needs and the development of application (functional) computer programs using machine-transferable

software 1/ could result in more competitive acquisition of computer equipment.

STANDARD SYSTEMS HAVE NOT WORKED WELL

The Marine Corps has developed standard systems to meet the needs of the local users and field activities. However, since the standard systems have not been effective, local systems have proliferated and field activities have spent much time attempting to make standard systems work properly and suit their needs.

Department of the Navy policy requires automated systems to be standardized as much as possible and that such systems be developed and maintained centrally. The purpose of the policy is to facilitate the interchange of information and personnel and to reduce the costs of system design, development, purchase, operation, and maintenance.

In its 5-year data processing plan issued in January 1975, the Corps identified all of the standard systems and local systems implemented, being developed, and under conceptual design. The number of local systems shows that the Corps has a long way to go in developing standard systems to meet users' needs. A schedule of the number of standard and local systems by functional area is provided below.

Functional area	Standard systems	Local systems
Manpower	8	41
Logistics	8	55
Aviation	7	0
Financial	15	55
Operations	2	10
Miscellaneous	0	23
Total	40	184

An example of a standard system not meeting the needs of the users is the financial management system being used by the service support units. The system was implemented to facilitate accounting, budgeting, and financial reporting. It was to have provided the local manager with the

---

1/Machine-transferable software can be used on the equipment of more than one manufacturer without extensive recoding or recompiling.

capability to extract financial data for local management needs through local retrieval programs. However, as evidenced by comments made at a 1975 financial management seminar, local users have not been satisfied with the system. Some of the comments were as follows:

--Locally developed computer reports provide better information that the standard system.

--Portions of the system output are totally useless.

--The system creates poor management tools and is almost useless to cost center managers.

The resource cost and utilization system, another standard system, also has not met the needs of field activities. It was designed to collect, process, and produce computer utilization data for each of the automated service centers and then provide this information to Marine Corps headquarters and the local commanders to assist them in managing data processing resources. However, local commanders have had to rely upon manufacturer-provided computer utilization monitoring systems to satisfy their needs. For example, the resource cost and utilization system does not provide statistics for remote job entry devices. During our review, the Marine Corps was preparing to replace the system with a new standard system.

The Corps has also been implementing standard systems at its field activities before having a fully operational standard system. As a result, field activities have spent a great deal of effort to make the system work. For example, based on supporting establishment conferences held in April and May 1973, it was concluded that between 70 and 90 percent of the local data processing programmer/analyst time is consumed writing local applications to make the standard systems work properly. The Naval Audit Service also found this problem during a 1975 audit of the data processing operations of Camp Pendleton, California. The Audit Service found that substantial field support effort on standard systems was draining local resources. It was concluded that to avoid future unnecessary and disruptive overloads on computer personnel resources at the field activity level, the standard systems should be adequately tested and proved before distribution to user activities.

CHAPTER 4

NEED TO DETERMINE USER REQUIREMENTS

The Marine Corps has developed and installed computer systems without adequately determining user needs. As a result, millions of dollars have been spent for computer systems which do not fully meet the information needs of Marine commanders and could, therefore, hinder their operational effectiveness, especially during emergency deployment situations.

WHY DETERMINE USER REQUIREMENTS?

Determining user information requirements is an important prerequisite to effective computer system acquisition because it allows the critical matching of information needs with the computer resources necessary to meet those needs.

Federal Management Circular 74-5, dated July 30, 1974 (which supersedes the Office of Management and Budget Circulars A-54, dated October 14, 1961, and A-27, dated June 15, 1964), and Secretary of the Navy Instruction 5236.1, dated December 17, 1971, provide policy guidance concerning the planning and studies that should precede selecting and acquiring computer equipment. The regulations specifically state that:

--Identification of the data automation requirements is the first action to be taken in the acquisition process.

--Determination of need shall be based upon well-documented general systems and/or feasibility studies.

The importance of determining user information requirements is best summed up in a March 1973 statement by the Marine Corps Commandant: "* * * time, effort, and money spent to develop any system are worthless, unless the system produces the required results for the 'users' * * *."

Our examination of selected projects implemented or under development showed that formal user requirements studies were not made before major system acquisitions were begun.

FORCE INFORMATION SYSTEM

The force information system is a set of computer application programs that are intended to fulfill the information needs of the force commanders. The Marine Corps has spent more than $9 million to develop and install its force information system concept for the Fleet Marine Force without making formal user requirement studies. As a result, the computer equipment and systems installed under the concept have not adequately met the needs of force commanders, particularly during deployment. According to the assistant director of the information systems division, there were inadequate time and resources available for formally determining user requirements. (See app. I for the locations of the force computers.)

Some of the more critical shortcomings of the system are:

ADP support is not readily available to Fleet Marine Force commanders during emergency deployment situations.

Portability of the computer and its shelter (see p. 23) to a combat or emergency deployment situation is untested.

At the time of our review, an adequate self-contained power supply was not available to run the computer in a deployed situation.

A discussion of each of these areas follows.

Support during deployment limited

The need for computer support was evaluated in a Marine Corps sponsored study conducted by the Stanford Research Institute and reported on in October 1974. According to the study, it is impractical for a Fleet Marine Force to operate with major automated data system support in garrison and then revert to manual operation when deployed. It was concluded that the Fleet Marine Force is rapidly approaching the point where access to computers is mandatory for the successful command and control of task force operations.

When a Marine Amphibious Force commander orders a unit to deploy, computer support is limited to shipboard updating of computer files during the unit's movement to the objective area. The small shipboard computers are not capable

Relocatable Computer Shelter

of processing the major force systems developed to operate on medium-scale IBM 360 computers. After reaching the objective area, the unit moves ashore and establishes a logistics base on the beach. Except for operational aspects, such as air and naval gunfire support, the landing force eventually separates itself from shipboard support. At this point, the only Marine Corps computer support in the area is limited to dedicated Marine aviation computer systems, which are deployed only if Marine air groups take part in the mission.

Even though the Corps is dependent on data processing to support logistics, manpower, and financial management functions, its capabilities for providing that support to deployed commanders are limited to relocating the garrison force computer to the objective area. Marine Amphibious Force officials advised us that this would only be done for major deployments involving an entire amphibious force, and, even then, this support would not be available for 2 or 3 months after the landing since it takes at least that long to relocate a service center. It should be noted that an entire amphibious force carries with it only enough supplies for a limited period of operation. Thus, computer support needed in a deployed environment would not be available in time to help reprovision these troops.

Discussions with amphibious force officials and a review of Marine Corps deployment contingency plans disclosed that, although nearly half of these plans would require units of less than amphibious force size to deploy, the Corps does not have computer resources available to support them. Further, the Marine Corps' 5-year data processing plan dated January 1975 indicates that the Corps may well deploy less than Marine Amphibious Forces size units. For instance, during the past 15 years the Marine Corps has deployed its forces seven times in emergencies. In six of these instances, the Corps deployed less than Marine Amphibious Force size units. (See app. II for descriptions of the deployments.)

Even if the force computer is deployed, there is still a serious gap in the automation cycle which is important to the command and control of men and material. Unlike garrison, deployed units are severed from a centralized computer service center and have no internal data processing or data entry capability. Currently, these units would have to either (1) revert to manual means of accounting for people and material or (2) depend on the naval message

and courier service to transmit data back to the large computer center. Both of these alternatives have proven to be unacceptable. For example, based on Corps experience, if deployed units are engaged, the data and information requirements soon reach unmanageable proportions which cannot be handled manually. Further, the naval message or courier service has been unsatisfactory in meeting the combat commander's need for timely feedback of processed information.

System portability untested

The effectiveness of the force information system concept is dependent on providing mobile computer support to deployed units; yet, the Corps has never tested the feasibility of moving the force computer centers. No tests of the system's portability, vulnerability, or survivability have been performed and the viability of this concept of support has been questioned by Marine Amphibious Force officials and service center directors.

Under the force information system concept, the Corps generally plans to relocate a force computer center to support a deployed unit of Marine Amphibious Force size or larger. This would involve securing a safe area in which to operate a relocated force computer center, dismantling an established center, shipping the computer and shelter to the secured site, reassembling them, and making the system operational. The Marine Corps estimates this would take about 2 or 3 months.

Discussions with Marine Amphibious Force officials indicated that even though it is physically possible to relocate a computer center to support a deployed unit, it is an undesirable task and it would be very difficult to prepare a site, dismantle the "portable" shelter and computer, and reerect it. Some of the officials also believe the Marine Corps may be "putting all its eggs in one basket" by deploying one large computer system which could be "wiped out" in a single enemy attack. They believe it may be better to obtain and deploy small mobile systems. That would improve the portability and survivability of data processing support. Computer center directors also believe it is physically possible to relocate the centers. However, they were more concerned with the portability and environmental protection offered by the "portable" shelter. Typical problems reported to Corps headquarters or discussed at user conferences were as follows:

--The relocatable computer shelters are completely unsuitable because they leak through the roof and the walls and condensation formed at the airconditioning ducts is sprayed into the module and onto the equipment. In addition, some shelters are not deployable due to structural damage. Permanent roofs have been built over these shelters to prevent further damage from the weather.

--Problems with the shelter can be isolated to two areas: roof and sidewall leaks and vulnerability to dust and dirt. These problems are intolerable in garrison and conceivably would be greatly increased in a deployed environment.

--Inadequacies of some of the shelters have resulted in two problems (1) the valuable computer equipment is in danger of sustaining damage or possible total loss and (2) the shelter, in its present condition, is no longer relocatable and, as such, can not support a deployment.

--The shelter's plywood walls offer a distinct fire hazard--even with flame-retardent paint.

As can be seen, these comments by Corps officials leave serious doubts concerning the successful relocation of the force computer centers. (See app. III for additional photographs of the relocatable shelter.)

Although the Marine Corps has recognized the undesirability of relocating the force computer centers, it has procured two additional shelters for about $422,600. These additional shelters were procured because the existing shelters cannot be readily dismantled and reassembled. The shelters will be held in prepositioned war reserve stock to meet contingency needs. The prepositioning of these shelters will not appreciably alter the time required to provide needed computer support in a deployed environment.

Power supply inadequate

At the time of our review, the force computer centers did not have an adequate backup portable power supply to provide garrison and deployed users with uninterrupted service when other sources of electric power are not available. In our opinion, having an adequate portable power supply as a primary source of power is an absolute necessity for

effective data processing support. It is particularly critical during deployment when other sources of power may not be available or dependable.

The necessity of such a portable power supply was recognized by the Corps when the relocatable computer center concept was established. The Marine Amphibious Force equipment inventories for the force computer centers were to include electrical power generators. However, although Marine Corps headquarters was to furnish the generators, they were never made part of the unit's actual inventory of equipment.

In 1974, 2 years after the initial procurement of the force computers, the following comments were made at a force information system users conference:

> "There is currently no emergency backup power for the computer service center in garrison and none is expected since it is normally provided only to hospitals and communications centers. In addition, no specific organizations or generators have been identified to provide power to deployed force computer centers."

In May 1975, 3 years after the initial procurement of the computers, Marine Corps headquarters officials stated:

> "The in garrison force computer centers are powered by commercial electric power with no provision for a backup power supply. The power source when deployed will be engine powered generators, which will be kept in prepositioned war reserves until released by the force commander."

This indicates to us that during deployment emergencies, when data processing support will be critical to mission effectiveness, the force computer center will be forced to compete with other organizations for power sources. In addition, the ability of the present war reserve generators to adequately power the computer and the 14 environmental control air-conditioners has never been tested and is questionable even to Marine Corps headquarters officials. Because of this, the Corps has issued a contract to design and develop a generator which will adequately power the computer center.

Marine Corps solutions to shortcomings

Fleet Marine Force automated support was characterized by Marine Corps headquarters in a May 1975 requirements document as inflexible, highly centralized, inadequate during deployments, and nonresponsive to lower echelon information requirements.

In an attempt to be more responsive to all command levels and to develop adequate deployable computer support, the Marine Corps is now spending additional funds to determine user requirements and test the practicality of using minicomputers to support deployed commanders. The Corps will be performing studies to determine what computer support the user actually needs during deployment and what equipment will best fulfill those needs.

We believe this action is a step in the right direction; however, the continued expenditure of more than $8 million annually to operate separate force computer centers is highly questionable because the installed computers do not adequately meet the deployment needs of the users.

SOURCE DATA AUTOMATION

The Marine Corps initiated a $2.8 million procurement of source data entry computer systems without fully determining the needs of all potential users. At the time of the procurement, the Corps had no assurance that source data automation was feasible or needed.

On December 30, 1975, the Department of dhe Navy awarded a contract to acquire 14 small-scale computer systems at a cost of about $200,000 each. The computer systems will be used to automate portions of the data input function at selected Marine Corps service support units.

The Corps in February 1975 requested prospective service support unit users to determine their need for the computers and to submit the following justification information by April 30, 1975: the functions and applications where source data automation can be used, the system design and flow charts to allow comparison between like systems at different locations, the rough estimates of economic justification, and the type of devices needed to meet their requirements. However, the request for proposal was issued

before Marine Corps headquarters received all the justification packages. At the time the request for proposal was issued, headquarters had received only 3 out of 6 justification packages from those organizations selected to receive the 14 sytems.

CHAPTER 5

NEED TO PERFORM ECONOMIC STUDIES OF ALTERNATIVES

The Marine Corps has been purchasing data processing equipment without either thoroughly performing required economic studies or adequately considering all available alternatives in satisfying user requirements. As a result, the Corps has spent substantial resources for data processing equipment without the added assurance that the most effective service was obtained at the least cost.

ECONOMIC STUDY CRITERIA

Office of Management and Budget policies and guidelines, Federal Property Management Regulations, and Department of Defense and Marine Corps regulations require that well-documented economic studies be performed prior to acquiring data processing equipment. The studies are to include

--a detailed comparative cost analysis for the existing and proposed system and

--an evaluation of benefits and costs of the proposed system design and cost implications of alternatives for satisfying data processing and communication requirements.

In addition, Federal Property Management Regulations (Subpart 101-32.11) require a data communications study to determine the need or types of computer equipment to be acquired when remote terminals are to provide data input and obtain data output.

Accordingly, the study results should provide a sound basis for selecting an alternative which will provide the highest practical degree of effectiveness, efficiency, and operational economy.

We have reported to the Congress on this issue of economic analysis for automated data processing systems. For example, in our report "Ways to Improve Management of Automated Data Processing Resources: Department of the Navy" (LCD-74-110, Apr. 16, 1975), we recommended that the Secretary of the Navy issue more definitive guidance for

making economic analyses and establish a program for educating the field organizations in economic analysis techniques. Further, the guidance should require that the economic analysis be performed before systems are submitted for review and approval by higher management. Provision should also be made for obtaining appropriate assistance from the Naval Audit Service in evaluating the analysis before it is submitted for approval.

ADEQUATE ECONOMIC STUDIES NOT BEING PERFORMED

Fleet Marine Force computer acquisition

The Marine Corps has acquired approximately $9 million in Fleet Marine Force computer equipment, beginning in 1972, without making an adequate economic study of alternative ways to providing service to the users. According to Corps officials, the only economic analysis studies performed prior to the medium-scale computer acquisitions were for the feasibility of automating the force supply and maintenance functions. These functions were two of several potential applications to be operated on the computer. No studies were performed of alternative ways of satisfying the data processing equipment requirements.

The Marine Corps had originally attempted to acquire its force computers through inclusion in the World Wide Military Command and Control System procurement plan of the Office of Joint Chiefs of Staff. However, when the full request could not be met, a plan was adopted to use computers being released by Defense activities participating in the procurement plan (reutilization). Although economic justifications were required by the Joint Chiefs of Staff to acquire computers through their program, once the reutilization plan was approved the Corps made no effort to economically justify the selected alternative. Further, only the first two computers were acquired under the reutilization plan--the remaining five were purchased commercially.

Prior to approval of the reutilization plan, one force commander proposed an alternative solution which may have provided a more cost-effective means of satisfying user needs. He suggested that the Corps upgrade the service support unit installation to accommodate force ingarrison requirements and maintain contingency capability for deployment. However, no detailed economic analysis of this alternative was made. Corps headquarters officials commented

that this alternative was not studied since the action was considered inferior to that of maintaining separate force and service support unit computer facilities to support their distinct missions.

West coast consolidation acquisition

During our review, the Marine Corps replaced an IBM 360 model 50 with a model 65 computer to begin implementing a west coast consolidation plan at Camp Pendleton, California, without making thorough economic studies of alternatives.

In September 1974, a Marine Corps staff study revealed that significant benefits could be obtained through the consolidation of several of its west coast data processing installations. With the current state of the art in data communications, it was recognized that serious consideration needed to be given to consolidating some of the seven computer installations in southern California. (See p. 10 for a map of the computer installations.) Consequently, consolidation was recommended for four of the installations, to be accomplished through an upgrade of the Camp Pendleton's service support unit computer so that the workload of the other three installations could be processed on a central computer through remote terminals. The consolidation was to eliminate at least 21 personnel and save approximately $230,000 annually.

The staff study was primarily concerned with determining the size of a compatible computer needed to process the combined workload of the four installations. The need for a computer the size of an IBM 360/65 was determined by simulating a typical 8-hour workload for each installation. Current workloads and workload scheduling were assumed by the Corps to be valid and each command was to be provided equivalent data processing capability and support as was received before the consolidation.

To implement the consolidation, the Marine Corps decided to downgrade existing IBM 360/30 and 40 computers to operate as remote terminals, even though less expensive and possibly more appropriate terminal equipment may have been available to provide comparable performance for remote job entry processing. As a result of this and the Marine Corps' failure to adequately evaluate other available alternatives, we sent a letter to the Secretary

of Defense, suggesting that specific questions be resolved before the consolidation. Some of the questions were:

--Would a revalidation of workload and data processing requirements result in a reduction of work to be done?

--Could the performance of existing facilities be improved through rescheduling, software changes, improved work center procedures, or extended shift operations?

--Is the point-to-point concept of teleprocessing the most cost-effective alternative?

--Can minicomputers front-end the installed base computer at Camp Pendleton sufficiently to handle the input and output processing workload for some of the overhead or supervisory functions, such as communication and data management?

--Is an IBM 360 computer best for teleprocessing needs in light of increased communication capabilities associated with new lines of processors?

--Can the resources of the Corps' force automated service centers be used, in the interim, until appropriate cost-benefit studies have been conducted and decisions made concerning the use of source data automation which will employ minicomputers?

In addition, the letter pointed out that the Marine Corps, although requested, could not provide a formal data processing and communications study which evaluated the other available alternatives suggested by these questions. Consequently, we expressed our opinion that the Corps had not answered the questions in a manner that would justify the consolidation as the optimum cost-benefit approach.

The Assistant Secretary of the Navy (Financial Management) replied to our letter by concluding that the Marine Corps' consolidation plan was the "most efficient and cost effective alternative for the interim satisfaction of valid support requirements." However, the Navy's reply did not address the questions raised in our letter and appears to have allowed the procurement on the basis of being an interim upgrade before implementing a new computer hardware concept for the 1980s, a concept for which the Marine Corps has no firm plans.

CHAPTER 6

CONCLUSIONS, RECOMMENDATIONS, AGENCY COMMENTS, AND OUR EVALUATION

CONCLUSIONS

The Marine Corps' dependency on automated data processing support has increased to a point where its operational effectiveness is substantially affected by the availability of that support. Even though the Corps has recognized that fragmented program management has not produced a well-coordinated data processing program, it was hesitant to place total program management under a single office as recommended by the House Committee on Appropriations.

We believe the Corps can improve the management of its data processing and telecommunications programs by establishing a single office with responsibility and appropriate authority for total program management and developing a coordinated long-range plan integrating tactical, administrative, and telecommunications systems requirements. Also, with a single office more emphasis can be directed toward assuring conformance with Government regulations dealing with the determination of user requirements, the use of standard systems, the performance of economic analysis of alternatives, and competition during equipment acquisitions.

User requirement studies, if properly performed, give management a basis for deciding how an automated system should be developed to meet the ultimate user's needs. System design problems and program changes always occur during the development of a new system; however, with proper user requirement studies, they can be minimized.

The Corps did not perform formal user requirement studies before spending millions of dollars to develop a deployable automated data system for its Fleet Marine Force units. Deployable computer support is needed when a unit is called to meet an emergency situation outside the continental United States. To date, the Corps has achieved limited success in providing this support and, as a result, has initiated a major project to test the feasibility of providing an alternate means of support. Also, they are determining user needs, the best method for meeting those needs, and how to do so within available resources. We believe these are steps in the right direction; however, the continued expenditure of at least $8 million a year for the operation

of several separate medium-scale computer centers--which in all likelihood will not meet the needs of deployed commanders--does not appear advantageous.

The Corps has not been performing adequate economic analysis of alternative ways of meeting user needs and, when acquiring equipment, has not obtained full competition. Therefore, it has no assurance that the most cost-effective method to provide service was used or that the lowest cost was obtained when procuring the computer equipment.

RECOMMENDATIONS

GAO recommends that the Secretary of Defense direct the Secretary of the Navy and the Commandant of the Marine Corps to:

- --Effectively implement a single office authorized to manage the planning, coordinating, and monitoring of all administrative and tactical data processing and related telecommunications operations.

- --Develop an overall, long-range program plan, integrating tactical, administrative, and related telecommunications systems requirements.

- --Reconsider the need to separate the Corps' combat force and service support unit computer installations.

- --Improve the effectiveness of the Corps' standard systems for meeting the needs of the local users, including, where necessary, redesigning the systems.

- --Make sure there is greater compliance with Government regulations regarding the determination of user data processing requirements, the evaluation of costs and benefits available from alternative courses of action, and the competitive acquisition of computer equipment including the use of machine-transferable software.

AGENCY COMMENTS AND OUR EVALUATION

By letter dated January 10, 1977 (see app. IV), the Assistant Secretary of the Navy (Financial Management), on behalf of the Secretary of Defense, commented on our findings and recommendations. He acknowledged that several of our recommendations have merit and that the Marine Corps has initiated appropriate corrective action. However, the

Marine Corps takes exception to the presentation in the report of problems previously identified by the Corps as though they are GAO audit disclosures. In addition, the Assistant Secretary said that there are two broad implications in the report which are inappropriate and reflect adversely on ADP management by the Corps. The implications are that the Marine Corps

--has not effectively complied with Government regulations on the acquisition of computer resources and is overly dependent on one computer manufacturer and

--has not effectively identified or satisfied user requirements.

The Assistant Secretary stated that the most significant implication concerns compliance with Government regulations on the competitive acquisition of computer resources. He stated that while 27 of the Corp's 31 central processing units are manufactured by a single manufacturer, it should be noted that many of these were purchased from third-party vendors (alternate private industry suppliers other than the manufacturer) or through reutilization of computers released by another Federal agency, and they are not necessarily equipped with the same brand of peripheral equipment. He also stated that it is inaccurate to imply that the Marine Corps is overly dependent on one manufacturer and pointed out that during fiscal year 1975, only 5 percent of the Corps' procurement dollars were spent with the selected manufacturer and that figure dropped to 2 percent during fiscal year 1976.

Our review showed that by procuring the computers of a single manufacturer from 19.. .o 1974, the Marine Corps' procurements have in varying degrees resulted in less than the free and open competition contemplated by Government policy and regulations. The Corps acquired seven medium-scale IBM 360 computers for its force automated service centers, two of which were acquired through the reutilization of computers released by another Federal agency. The remaining five were obtained through third-party vendors. However, the Marine Corps' past and present policy is to assign personnel equally to combat force and service support units. Since the Corps had acquired IBM computers for its service support units, it selected IBM for its force computers so that it could standardize its systems and applications software and the training of data processing personnel. The Corps was also concerned with finding a vendor who would provide maintenance service in combat areas. Confident that, based on the maintenance support it provided during the Vietnam conflict,

IBM would provide such service, the Corps apparently did not evaluate the potential combat support capability of other vendors. This policy, as implemented by the Corps, has the effect of limiting full and free competition as contemplated by applicable law and regulations.

No economic analysis studies were performed of alternative ways of satisfying the force ADP requirements. The only studies made before the force computer acquisitions were for the feasibility of automating the force supply and maintenance functions and a computer simulation analysis to determine the appropriate IBM 360 computer needed. We believe that while there is limited competition in the acquisition of specified make and model computer equipment through third-party vendors, it is clearly not the full and free competition contemplated by applicable law and regulations.

Federal Management Circular 74-5, which is one of the implementing mechanisms of the Brooks Act, requires that effective planning and economic analysis precede the selection of computer resources. After a competitive selection, we believe there should be no objection to requiring that the selected brand of hardware be used for the life of the designated ADP system.

We further believe that the Assistant Secretary's reference to fiscal year 1975 and 1976 procurement data is not illustrative of nondependence on one computer manufacturer for ADP support. The major computer systems operated by the Fleet Marine Force and supporting establishment activities were acquired before fiscal year 1975 and required, over the years, a substantial investment in software to operate them.

We recognize that the Marine Corps has made recent improvements in the competitive procurement of ADP resources. The Marine Corps acquired 14 small-scale computer systems at a cost of about $200,000 each. Through the competitive procurement process, the Corps was able to save about $1.4 million over the estimated cost of the small-scale computer systems. We believe that the Corps could also realize substantial savings on future procurements if they are completed in a fully competitive manner.

The Assistant Secretary said our report implies that user requirements can be completely defined at the outset and will remain static during the several years the system is being developed. He stated that the Corps has defined

user requirements several times during a particular systems development cycle and has experienced several levels of user satisfaction.

We recognize that user requirements do not remain static and must be refined during a system's life cycle. However, determining current and projected information requirements through comprehensive studies is an important prerequisite to effective computer system acquisition because it helps identify the computer resources necessary to meet the current and projected user needs. Our review showed that the Corps did not perform formal user requirement studies before spending millions of dollars for computer systems which do not fully meet the information needs of Marine commanders, and as such, could hinder their operational effectiveness, especially during emergency deployment situations. Many of the present shortcomings of the force computer system may have been identified and avoided or corrected in a more timely manner had comprehensive user requirement studies been made. Therefore, our principal criticism was not that the Marine Corps changes its requirements during systems development. Rather, the Corps had not adequately established initial requirements before making its decision to purchase.

The need to perform comprehensive user requirement studies is also reflected in the Corps' planning and development of standard systems. Our review shows that the Marine Corps has not been entirely effective in developing standard systems to meet the needs of local users. The Marine Corps has developed 40 standard systems, while there are 184 local systems in many of the same functional areas. The number of local systems suggests that the Corps should improve in their planning and development of standard systems to meet user needs.

The Assistant Secretary also said that, during the review, we were provided with internal documentation of several problems previously identified by the Marine Corps. Solutions which had been developed and implemented were also identified. He said that some of the prior problems have been identified in the report as though they are audit disclosures and, accordingly, the Marine Corps takes exception.

Our intent was not to obscure the fact that the Marine Corps had identified some of its own problems. We agree with the Assistant Secretary that the Corps had recognized some of its problems and was taking steps to correct them. However, before our review, solutions developed and implemented by the Corps were ineffective in resolving known problems

primarily because the Corps did not concentrate the management of its automated data processing and telecommunications program into a single office. After our audit and the issuance of a draft of this report, the Corps established on November 1, 1976, a single office to be responsible for this program. This office is known as the Command, Control, Communications and Computer Systems Division, and, if properly staffed and implemented, it should help resolve many of the problems described in this report and help improve program management.

With regard to our recommendations, the Assistant Secretary stated that:

--The Marine Corps implemented on November 1, 1976, the integration of command and control, operations, telecommunications, and information system functions to facilitate the consolidation of resources and improve the management of data processing and telecommunications.

--The development of a long-range program plan integrating all tactical, administrative, and telecommunications systems requirements will follow as a matter of course, upon implementation of the consolidation effort referred to above.

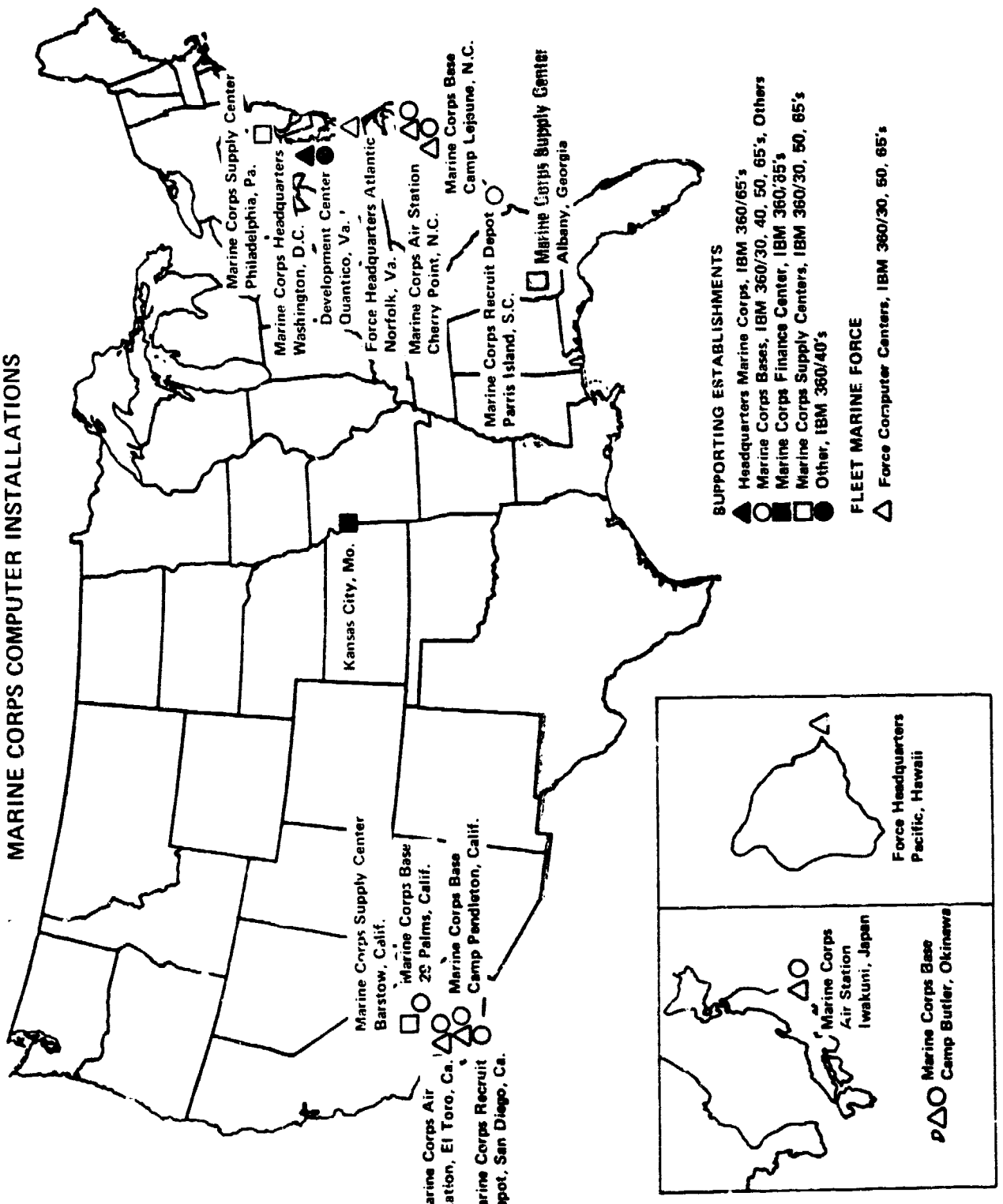
--The Corps has instituted an active investigation of the feasibility of selective consolidation of force and service support unit computer centers.

--The Corps has taken action to improve the effectiveness of standard systems by establishing the source data automation program and the central design and programing activity concept, which, when fully implemented, will be more responsive to the needs of local users.

--The Corps has not only taken action but continues to review policy to assure compliance with established Government regulations regarding the determination of user data processing requirements, the evaluation of costs and benefits available from alternative courses of action, and the competitive acquisition of computer equipment.

These actions, particularly the ones related to ADP program responsibility and planning, are generally consistent with our recommendations and, if properly implemented, should improve the Corps' management of its data processing resources.

APPENDIX I


MARINE CORPS COMPUTER INSTALLATIONS
Marine Corps Supply Center
Philadelphia, Pa.
Marine Corps Headquarters
Washington, D.C.
Development Center
Quantico, Va.
Force Headquarters Atlantic
Norfolk, Va.
Marine Corps Air Station
Cherry Point, N.C.
Marine Corps Base
Camp Lejeune, N.C.
Marine Corps Recruit Depot
Parris Island, S.C.
Marine Corps Supply Center
Albany, Georgia
Kansas City, Mo.
Marine Corps Supply Center
Barstow, Calif.
Marine Corps Base
29 Palms, Calif.
Marine Corps Base
Camp Pendleton, Calif.
Marine Corps Air
Station, El Toro, Ca.
Marine Corps Recruit
Depot, San Diego, Ca.
BUPPORTING ESTABLISHMENTS
Headquarters Marine Corps, IBM 360/65's
Marine Corps Bases, IBM 360/30, 40, 50, 65's, Others
Marine Corps Finance Center, IBM 360/35's
Marine Corps Supply Centers, IBM 360/30, 50, 65's
Other, IBM 360/40's
FLEET MARINE FORCE
Force Computer Centers, IBM 360/30, 50, 65's
Force Headquarters
Pacific, Hawaii
Marine Corps
Air Station
Iwakuni, Japan
Marine Corps Base
Camp Butler, Okinawa

APPENDIX II

MARINE CORPS DEPLOYMENT HISTORY

1960-75

Location	Date	Unit size	Description
Thailand	1961-62	Under Marine Amphibious Force	When a civil war in Laos threatened to spill over into Thailand, a Marine helicopter squadron was deployed to Thailand in March 1961 to provide logistical support to the government. The following year, U.S. forces landed to bolster Thailand against possible aggression by Communist guerrilas from Laos. Marines began landing at Udorn on May 16, 1962, in what was intended to be a show of force. Phased withdrawals of Marines began in late June, and by July 31, 1962, all Marine combat elements had left Thailand.
Cuba	Oct.-Dec. 1962	Under Marine Amphibious Force size	In October 1962, the United States announced a buildup of Soviet arms in Cuba. The first Marine units were alerted by about October 19. Marine units from the west coast sailed through the Panama Canal and remained on board ships in the Caribbean. Other units were air lifted to Guantanamo. East coast air and ground units were deployed to various Caribbean areas and to Florida or were alerted for possible deployment. By the end of December, the crisis had ended and Marine units had returned to home bases.
Dominican Republic	April-June 1965	Under Marine Amphibious Force size	In April 1965 the ruling Dominican junta toppled and leftists attempted a takeover. American lives were endangered, and Dominican military leaders asked the United States for help. Marines began landing on April 28, 1965, to guard the U.S. Embassy and to protect Americans and aid in their evacuation. As tensions eased in Santo Domingo, the Marines began withdrawing. The last Marine unit left the Dominican Republic on June 5, 1965.

APPENDIX II

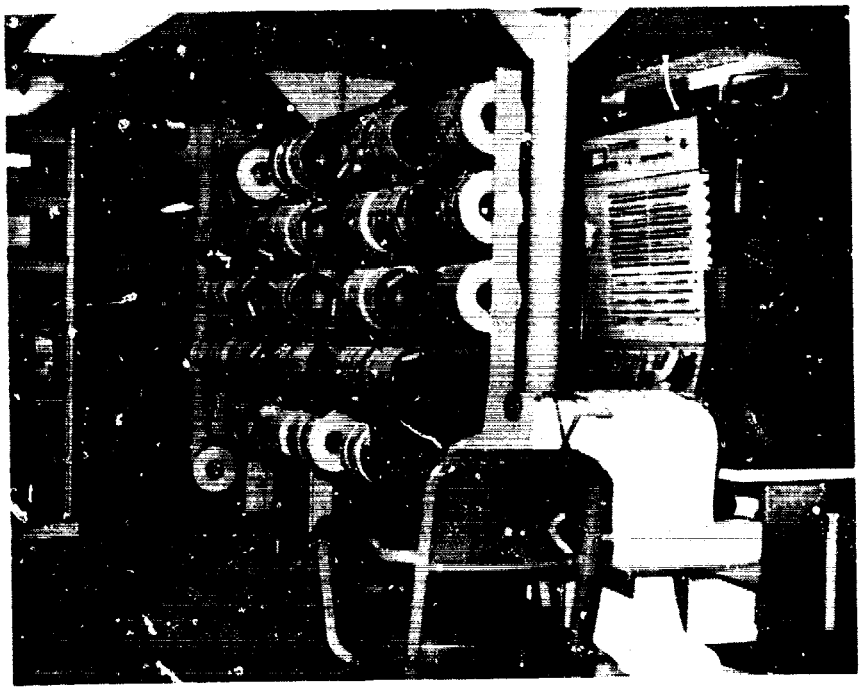
Location	Date	Unit size	Description
Vietnam	1962-75	Above Marine Amphibious Force size	For years the Republic of Vietnam was being threatened by Viet Cong insurgents who had the active support of North Vietnam. Marine helicopter squadrons began deploying to Vietnam on a rotating basis in April 1962. Marine ground units began entering Vietnam in early 1965. Marine units continued to be deployed to Vietnam as the war increased in intensity until the Marines reached a peak strength of about 84,000 men. In 1969, President Nixon announced the phased withdrawal of the United States forces from Vietnam. By November 1969, one Marine division and elements of the aircraft wing had been pulled out. In April 1971, the remaining Marine division and most of the wing and support units left the country. One year later, in April 1972, two Marine aircraft groups were deployed to Thailand and Vietnam for renewed air operations against the Communists. The cease-fire agreement was reached in January 1973, and all American forces were withdrawn by the end of March 1973.
Cambodia Evacuation	April '75	Under Marine Amphibious Force size	As government troops continued to pull back under increasing attacks from Khmer Rouge insurgents, it became apparent that the Cambodian government's chances of survival were slight. Shortly before the fall of Phnom Penh, the Cambodian capital, the United States decided to evacuate the remaining Americans, including the ambassador. On April 12, 1975, Marine helicopters landed a ground security force which formed a defensive perimeter as the civilians boarded the aircraft. All evacuees and Marines were brought out of Cambodia.
Vietnam Evacuation	March-April 1975	Under Marine Amphibious Force size	Communist attacks increased in intensity in the latter part of March, forcing the Saigon government to abandon the northern half of the country.

APPENDIX II

Location	Date	Unit size	Description
			A large fleet of American transport ships arrived off the South Vietnamese coast and began ferrying refugees and government troops from threatened areas. By April 1, 1975, 30,000 to 50,000 people managed to escape from the city of Da Nang by sea. A few weeks later, as Viet Cong and North Vietnamese troops surrounded the South Vietnamese capital of Saigon, the United States decided that the final evacuation of their citizens and endangered Vietnamese would have to take place immediately. Marines evacuated thousands of people in the operation on April 29-30.
Mayaguez Incident	May 1975	Under Marine Amphibious Force size	On May 12, 1975, the S.S. Mayaguez was seized by Cambodian gunboats and towed to Koh Tang Island in the Gulf of Thailand. Two days later Marines were landed from Air Force helicopters on the beaches of Koh Tang and boarded the abandoned Mayaguez. The crew was released shortly thereafter and the Marines returned to their units.

APPENDIX III

INSIDE THE RELOCATABLE COMPUTER SHELTER



Computer Console

Magnetic Tape Drives

DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY
WASHINGTON D C 20350

10 JAN 1977

Mr. Fred J. Shafer, Director
Logistics and Communications Division
U.S. General Accounting Office
Washington, D. C. 20548

Dear Mr. Shafer:

This is in reply to your letter of August 4, 1976 to Secretary Donald Rumsfeld regarding your draft report "Need to Improve Planning and Management of the Marine Corps Automated Data Processing Activities" (OSD Case #4145-A). The Department of Defense's reply is attached.

Sincerely,

G. D. PENISTEN
ASSISTANT SECRETARY OF THE NAVY
(FINANCIAL MANAGEMENT)

Attachment

Department of the Navy Reply
to
GAO Draft Report of 4 August 1976
on
Need to Improve Planning and Management of
the Marine Corps Automated Data Processing Program
(OSD Case # 4145)

1. Introduction. This memorandum summarizes the Department of the Navy comments on the GAO draft report on the Marine Corps Automated Data Processing Program.

2. Summary of the Navy Position. The audit was commenced in April 1975 with the primary focus being the Marine Corps West Coast Data Processing Installations. The scope of the review expanded during the review to include total Marine Corps ADP activities. During the review, GAO was provided with internal documentation of several problems previously identified by the Marine Corps. Solutions which had been developed and implemented were also provided. Some of the prior problems have been identified in the report as though they are audit disclosures and accordingly the Marine Corps takes exception. There are, however, other suggestions which have merit and the Marine Corps has initiated appropriate corrective action. Also, there are two broad implications in the report which reflect adversely on ADP management by the Corps. It is believed that these implications are inappropriate and, in fact, the Marine Corps has managed ADP resources in an exemplary fashion.

It is this latter area which is addressed first and comments on specific recommendations will follow.

3. Broad Implications. The most significant implication concerns compliance with government regulations on the acquisition of computer resources. The GAO implies that the Marine Corps has not complied with regulations on the competitive acquisition of Automated Data Processing Equipment (ADPE). Specifically, the report contends that 27 of the 31 Marine Corps "Computer Systems" are manufactured by IBM. While it is true that 27 of the 31 Marine Corps central processing units were manufactured by IBM, it should be noted that many of these mainframes were purchased from third-party vendors or through reutilization and they are not necessarily equipped with IBM peripheral equipment. Since 1972 this is true of all mainframes acquired. Peripheral devices such as disk drives, tape drives, etc., are comprised of plug-to-plug compatible components manufactured and acquired through various manufacturers. All of these components were chosen on the basis of cost to benefit regardless of manufacturer.

Therefore, it is inaccurate to imply that the Marine Corps is overly dependent on IBM. In this regard, during FY 1975, only five percent of the Marine Corps procurement dollars were spent with IBM, that figure dropped to two percent in FY 1976.

It has been through the extensive use of third-party vendors and reutilization of computers declared excess by other government agencies that the Marine Corps has achieved a higher level of standardization with a resultant "hard dollar" savings for the taxpayer. Solid business management, as practiced by the Marine Corps, dictates that the most cost effective alternative be chosen after consideration of all available alternatives. The Marine Corps actively supports both the word and the spirit of Federal Management Circular 74-5; and, furthermore, uses competitive procurement as the preferred alternative until good and sufficient economic, operational, or technical reasons preclude its use. The point is well supported by the recent SDA procurement for the Supporting Establishment and by the current formal planning for reequippage in the future.

A second issue in the report is the implied lack of identification and satisfaction of user requirements. The report implies that user requirements can be completely defined at the outset and will remain static during the several years the system is being developed. If this were the case, user satisfaction would be easy to attain. In reality, the Marine Corps has defined user requirements several times during a particular systems development cycle and has experienced several levels of user satisfaction. At various stages in this cycle decisions must be made based on the facts known at that point in time. This is the procedure the Marine Corps has used and it is believed that the highest level of user satisfaction was attained at the time of the action.

4. Specific Recommendations. In view of the above and other facts, the response to specific recommendations follow:

a. Recommendation. "Establish a single office with the management responsibility and authority for planning, coordination, and monitoring all data processing and telecommunications efforts."

Comment. Recommend deletion of recommendation. The integration of command and control, operations, telecommunications, and information systems functions was implemented on 1 November 1976 as the result of internal Marine Corps studies begun in 1973. This integration will facilitate the consolidation of resources and improve the Marine Corps management of data processing and telecommunications.

b. Recommendation. "Develop an overall long-range program plan, integrating all tactical, management information, and telecommunications system requiements."

Comment. It should be recognized that this plan will follow, as a matter of course, upon implementation of the consolidation effort referred to above. Therefore, this comment should be deleted.

c. Recommendation. "Reconsider the Marine Corps position regarding the separation of its Fleet Marine Force and supporting establishment in-garrison computer installations, which has resulted in the acquisition of excess computer capacity and the development of separate systems for similar applications."

Comment. Recommend this statement be deleted in its entirety. Recently, due to advances in the technical methodology of providing ADP support to deployed FMF units, and the refinement of ADP support requirements of those units, the Marine Corps has instituted an active investigation of the feasibility of selective base ASC-FASC consolidation. Prior to this report, on 14 November 1975, the 3rd FASC and Camp Butler consolidation was implemented and a study is underway now for further consolidation of Marine installations.

d. Recommendation. "Take action to improve the effectiveness of Marine Corps standard systems to meet the needs of local users."

Comment. Recommend this statement be deleted in its entirety. In addition to the comments provided in the paragraph above, the Marine Corps has taken action in the form of the Source Data Automation Program and the Central Design and Programming Activity concept which when fully implemented will be more responsive to the needs of local users.

e. Recommendation. "Take action to assure compliance with established Government regulations regarding the determination of user data processing requirements, the evaluation of costs and benefits available from alternative courses of action, and the competitive acquisition of computer equipment."

Comment. Recommend deletion of the entire recommendation. The Marine Corps not only has taken action, but continues to review policy, to see that compliance with Government regulations is assured.

APPENDIX V

PRINCIPAL OFFICIALS RESPONSIBLE FOR ACTIVITIES DISCUSSED IN THIS REPORT

	Tenure of office From	To
DEPARTMENT OF DEFENSE		
SECRETARY OF DEFENSE:		
Dr. Harold Brown	Jan. 1977	Present
Donald H. Rumsfeld	Nov. 1975	Jan. 1977
James R. Schlesinger	June 1973	Nov. 1975
William P. Clements, Jr. (acting)	May 1973	June 1973
Elliot L. Richardson	Jan. 1973	Apr. 1973
Melvin R. Laird	Jan. 1969	Jan. 1973
ASSISTANT SECRETARY OF DEFENSE (COMPTROLLER):		
Fred P. Wacker	Sept. 1976	Present
Terence E. McClary	June 1973	Sept. 1976
Donald R. Brazier (acting)	Jan. 1973	June 1973
Robert C. Moot	Aug. 1968	Jan. 1973
DEPARTMENT OF THE NAVY		
SECRETARY OF THE NAVY:		
W. Graham Clayton, Jr.	Feb 1977	Present
Gary D. Penisten (acting)	Feb. 1977	Feb. 1977
Joseph T. McCullum	Feb. 1977	Feb. 1977
David R. MacDonald	Jan. 1977	Feb. 1977
J. William Middendorf II	Apr. 1974	Jan. 1977
John W. Warner	May 1972	Apr. 1974
John H. Chafee	Jan. 1969	Apr. 1972
ASSISTANT SECRETARY OF THE NAVY (FINANCIAL MANAGEMENT):		
Gary D. Penisten	Oct. 1974	Present
Rear Admiral Sam H. Moore	Apr. 1974	Oct. 1974
Robert D. Nesen	May 1972	Apr. 1974
Frank Sanders	June 1971	Apr. 1972
Charles A. Bowsher	Dec. 1967	June 1971
COMMANDANT OF THE MARINE CORPS:		
General Louis H. Wilson	July 1975	Present
General Robert E. Cushman, Jr.	Jan. 1972	June 1975
General Leonard F. Chapman, Jr.	Jan. 1968	Dec. 1971