The Department of Commerce uses more than 300 computer systems for its various programs; in 1977, it spent over $100 million on such systems. The Department could achieve significant savings by improving the management of its planning processes for acquiring and using automated data processing (ADP) resources. Findings/Conclusions: Savings could be attained through consolidation of existing facilities which perform similar functions, by standardization of comparable systems, and by modernizing the systems so that competitive procurements could be made. In 1974, an attempt was made to develop long-range data processing plans, increase compatability of software and hardware, and provide better arrangements for managing and operating computer facilities. These procedures have not eliminated many of the problems because: the central management office did not have sufficient resources or authority, top management was not sufficiently involved, and there was no formal Department-wide plan for coordinating data processing activities. Recommendations: The Secretary of Commerce should: establish a formal planning process that will provide management involvement and accountability at all levels for the direction, coordination, and control of ADP activities and resources; establish an executive ADP management committee chaired by the Secretary or Undersecretary; assign to the Department's Office of ADP Management the responsibility for supporting the executive ADP management committee and controlling ADP planning, budget formulation, and review processes; establish an evaluation and review process that acquires the necessary feedback on plans, provides control information, and establishes accountability for performance; and take direct action to control and operate all computers and computer software presently used primarily for administrative

purposes. (RRS)

REPORT BY THE U.S.

General Accounting Office

Inadequacies In Data Processing Planning In The Department Of Commerce

The Department spends over $100 million annually ѕ tomatic data processing activities and systems. However, it has inadequate management control over these activities and systems because it lacks a formal plan and process for coordinating them with its missions and goals.

Weaknesses in the planning process have resulted in

--duplication of administrative systems and computer facilities,

--long delays and excessive costs in obtaining usable systems, and

--possible adverse impact on the mission of the Bureau of Census.

GAO recommends several improvements to the Secretary of Commerce.

DIVISION OF FINANCIAL AND
GENERAL MANAGEMENT STUDIES

B-115369

The Honorable
The Secretary of Commerce

Dear Madam Secretary:

We have reviewed the planning procedures for the use of
automatic data processing (ADP) activities and systems in
the Department of Commerce. This effort was part of a
Government-wide study directed toward assessing the effec-
tiveness of Department and agency planning for acquisition
and use of data processing resources.

Our work at Department headquarters, the National
Oceanic and Atmospheric Administration, and the Bureau of
the Census showed that the Department could achieve signifi-
cant savings by improving the management of its planning
processes for acquiring and using data processing resources.
We also determined that the Department badly needs to keep
its automated information systems functioning effectively.
Specific findings follow.

The Department uses more than 300 computer systems for
its various programs. In 1977 it spent over $100 million
on such systems.

Since computers are used for processing scientific,
statistical, engineering, research and development, and simi-
lar programs, it is important that the data be processed
efficiently and that the end products be accurate and useful.
Because of the sizable cost involved, it is also important
that careful consideration be given to achieving efficient
and effective use of these facilities at the lowest practi-
cable cost.

We found that the Department is not as economical in
its procurement and use of these facilities as it could be.
Specifically we found that:

--Savings could be attained through consolidation of
existing facilities which perform similar functions.

--Additional savings could be attained by standardization of comparable systems.

--Further savings could be obtained by modernizing the systems so that competitive procurements could be made.

Also, we are concerned about the effect of some of the problems on the 1980 decennial census and several other important statistical programs the Bureau of the Census conducts.

The Assistant Secretary for Administration has overall responsibility for Department-wide policy, planning, and management of ADP resources. In 1972 a general need to improve the management of ADP resources was recognized. In 1974 an attempt was made to develop long-range plans, increase compatibility of software and hardware, and provide better arrangements for managing and operating computer facilities. The procedures established to carry out these efforts have not eliminated many of the problems. We attribute this to:

--The central management office did not have sufficient resources or authority.

--Top management was not sufficiently involved.

--There was no formal Department-wide plan for coordinating ADP activities.

Additional detail is provided in the appendix to this report.

A reorganization of the Office of ADP Management in October 1976 and revisions to Department Administrative Order 212-1 in September 1977 should provide more effective management control of the ADP equipment selection and acquisition process. If supported by management, we believe these actions will go far in preventing recurrences of the acquisition problems.

However, further improvements are needed in (1) the ADP planning structure and process, both at the Department level and within the major operating units, (2) the process by which top management sets ADP objectives, strategy, and priorities, and (3) management's method for holding senior officials throughout the Department accountable for ADP planning and management control.

We recommend that you:

--Establish a formal planning process that will pro-
vide management involvement and accountability at all
levels for the direction, coordination, and control
of ADP activities and resources.

--Establish an executive ADP management committee
chaired by yourself or the Undersecretary (at least
for the first 2 years). This committee should have
a written charter setting forth its authority and
responsibilities for the formulation and execution
of a Department-wide ADP strategy to achieve specific
objectives.

--Assign to the Department's Office of ADP Management
responsibility for supporting the executive ADP
management committee by managing and controlling ADP
planning, budget formulation, and review processes
and coordinating the development of ADP strategy and
objectives.

--Establish an evaluation and review process that
acquires the necessary feedback on plans, provides
needed control information, and establishes account-
ability for performance at all appropriate management
levels.

--Take direct action to control and operate all com-
puters and computer software presently used primarily
for administrative purposes.

Section 236 of the Legislative Reorganization Act of 1970
requires the head of a Federal agency to submit a written
statement on actions taken on our recommendations to the House
Committee on Government Operations and the Senate Committee on
Governmental Affairs not later than 60 days after the date of
the report and to the House and Senate Committees on Appropria-
tions with the agency's first request for appropriations made
more than 60 days after the date of the report.

We are sending copies of this report to the Director of
the Office of Management and Budget and the Chairmen of the
above Committees, the House and Senate Committees on the
Budget, the Permanent Subcommittee on Investigations of the
Senate Committee on Governmental Affairs and its Subcommittee
on Reports, Accounting, and Management, the House Committee
on Post Office and Civil Service, the House Committee on

B-115369

Science and Technology, and the Senate Committee on Commerce, Science, and Transportation.

We appreciate the courtesies and cooperation extended to our representatives during our review. We are looking forward to receiving your comments.

Sincerely yours,
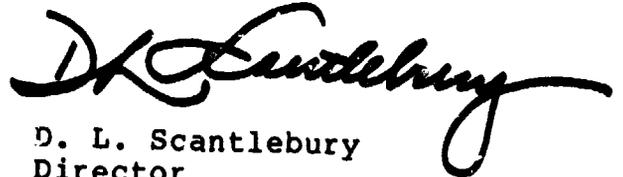
D. L. Scantlebury
Director

ADP PLANNING WITHIN COMMERCE

BACKGROUND

In carrying out its broad responsibility to serve and promote the Nation's economic development and technological advancement, the Department of Commerce depends heavily upon automatic data processing (ADP) resources to accomplish its programs and missions. The Department uses more than 300 computer systems for both general and special management purposes, primarily to support scientific, engineering, and research and development applications; social and economic statistical programs; and administrative support functions. During the past 5 years, the Department has spent approximately $393.4 million--and in the last fiscal year (1977) alone it spent more than $100 million--to acquire, operate, and maintain its computer facilities and other ADP resources.

Congressional committees have expressed concern over the past decade about the failure of the Federal agencies to adequately plan for and use their computer and related resources in what is fast becoming a critical resource area of information and data processing. For example, the House Committee on Government Operations reported in October 1976 that the failure of Federal agencies to prepare effective long-range ADP plans was a major hindrance to achieving economical procurements, a major objective of the Brooks Act (Public Law 89-306).

The importance of departmental planning is emphasized in the Office of Management and Budget Circular A-71. This Circular assigns to the head of each Federal agency the responsibility for the effective and efficient management of their ADP activities, including agencywide planning, coordination, and control of utilization of ADP resources (equipment, software, and personnel). The policy calls for the merger and integration of data systems when cost effectiveness in resource utilization, data systems management, or program accomplishment can be increased. The Brooks Act and the Circular give full authority to the agency head to determine the agency's requirements for ADP resources, subject only to the financial management oversight of the Congress and the Office of Management and Budget. Along with this authority goes the responsibility for planning and control of agency ADP resources so that the greatest cost effectiveness in their procurement and use can be obtained.

Within the Department the overall responsibility for managing these resources lies with the Assistant Secretary

for Administration, who is responsible for policy, planning, and Department-wide management of ADP and associated telecommunications resources.

The policies and arrangements for managing ADP re- sources were originally established in 1963 with an underly- ing philosophy permitting any major operating unit to plan, acquire, and use computers and related resources provided it could justify the requirements. The Department's basic directives for controlling these activities were contained in departmental Administrative Order 212-1, which provided policies and procedures for the selection and acquisition of ADP equipment. This order also provided guidance to departmental organizations regarding essential feasibility studies and economic analyses, sharing of ADP resources, and obtaining outside ADP services.

In 1971 the Department reexamined the adequacy of exist- ing policies and recognized a need for (1) stronger leader- ship at the top management level and (2) more attention to achieving a coordinated growth of computer resources and activities on a Department-wide basis. A general plan to improve the management of ADP resources was established in March 1972 with major objectives being to: (1) accomplish long-range planning of ADP systems and equipment require- ments, (2) increase compatibility of software and hardware, and (3) provide better arrangements for managing and operating computer facilities, including computer service centers where justified.

Our review was directed to evaluating the extent to which the Department was achieving these objectives, par- ticularly the effectiveness of Department-wide ADP planning. Most of our work was performed at departmental headquarters in Washington, D.C., and at two major operating units--the National Oceanic and Atmospheric Administration (NOAA) in Rockville, Maryland, and the Bureau of the Census in Suitland, Maryland.

WEAKNESSES IN ADP PLANNING PRACTICES

The overall management of ADP activities and resources within the Department has not been adequate, and little prog- ress has been made toward meeting the objectives set forth in the 1972 plan. The need for improved management is illus- trated by the Department's inability to effectively plan, coordinate, and control the use of computer equipment, facilities, and related resources.

In 1974 the Department attempted to implement an ADP
planning system. However, the planning information developed
by various bureaus and operating units was incomplete and
varied widely in content and format; therefore the individual
plans were not consolidated into a single Department-wide
ADP plan as originally anticipated. No further plans were
submitted. At the time of our review in late 1977, the
Department had no formal ADP planning process, no plan had
been implemented, and the Department-level role in managing
ADP resources was limited.

A central ADP management office was established to be
responsible for planning and coordinating the Department's
ADP activities but did not have the authority or resources
to adequately plan for and control these activities. Con-
sequently, most ADP planning, management, and control was
performed by the operating units. The central office's in-
volvement with ADP planning was limited primarily to review-
ing and approving feasibility studies submitted by the
operating units.

There was little top management involvement in ADP
activities, even though the need for stronger leadership in
ADP management was known. The Department had not developed
an overall ADP strategy to provide the users and ADP managers
with a basis for planning their long-range requirements,
nor was there a formal process for coordinating ADP programs
with the Department's overall mission and goals. The Depart-
ment had no method for monitoring or tracking ADP projects
under development. During discussion of our findings, we
were informed that under a new program, three installation
reviews had been completed.

Historically, the major operating units within the De-
partment have been separately funded and are virtually auton-
omous. They acquire, operate, and manage their own ADP acti-
vities and resources which are spread over a wide geographical
area. Our review showed that ADP planning practices varied
within these organizations.

PROBLEMS CAUSED BY INADEQUATE PLANNING

Inadequate planning and lack of overall coordination,
control, and central direction have resulted in (1) unsuccess-
ful efforts to achieve uniformity of administrative ADP sys-
tems, (2) duplication of computer facilities, (3) costly
and prolonged acquisition and implementation of ADP equipment
upgrades, and (4) uneconomical procurement of computers and
related equipment.

Lack of uniformity in administrative ADP systems

The ADP Administrative Systems Division has not been successful in standardizing, consolidating, or centralizing ADP systems supporting such administrative functions as payroll, personnel, and accounting. The Department's basic management philosophy allows the major operating units to design, develop, and operate such systems for local needs without regard to the Department's objectives and overall management needs. For example, an automated personnel system was designed centrally; however, operating units were allowed to add local options to meet their individual needs, leading to the development of several independent and nonuniform personnel systems. In addition, several different ADP systems for payroll and accounting were designed, programed, and implemented by the individual operating units which have continued to independently operate and maintain these and other administrative systems with little or no consideration of Department-wide needs and requirements.

Operating and maintaining separate, independent administrative systems has resulted in duplication of effort and high cost. The Department currently has seven personnel systems and six payroll systems being independently operated and maintained by different operating units. In reviewing the operation and maintenance costs, we found a wide disparity between these costs and the number of employees supported by the systems. For example, the estimated ADP costs for operating and maintaining six personnel systems ranged from approximately $18 to $35 per employee in fiscal year 1976, and for six payroll systems the costs ranged from approximately $13 to over $34 per employee.

Further, NOAA's payroll system, which supported approximately 14,400 employees in fiscal year 1976, had estimated computer operating costs of $193,480, or about $13 per employee; whereas, another system supporting only 4,900 employees cost about $161,000 or nearly $33 per employee. According to several officials we interviewed, a payroll or personnel system's unit computer costs per employee would increase little, if any, by expanding its capability to handle additional employees. Thus, by consolidating the payroll and personnel processing requirements on the lower cost systems, the overall cost of computer support for these functions could be reduced.

Software development costs for the separate ADP systems further illustrate duplicative efforts. For example, to

support its 14,400 employees, NOAA spent about $265,000 in development efforts for its existing personnel system during fiscal years 1975 and 1976. During the same period the maritime Administration, with approximately 1,500 employees, spent about $266,000 to develop a new personnel system. Further, NOAA's total cost to maintain both its payroll and personnel systems was about $47,000, while all the other operating units in the Department collectively spent approximately $1 million to maintain their separate payroll and personnel systems.

The duplication of effort and high costs of operating and maintaining these administrative systems have been identified and reported to management on several occasions, but little management attention has been given to these matters. In 1973 an Administrative Systems Division study proposing a uniform administrative system for the Department estimated that total costs for performing administrative functions were about $30 million and reported a wide range in the costs of operating and maintaining the separate administrative ADP systems. The study also found accounting systems had not been uniformly implemented and accounting personnel were performing duplicative functions or using inefficient procedures. The study concluded the Department could save approximately $4.5 million annually if a lower cost system were implemented Department-wide.

Management considered this proposal to be too ambitious, however, and suggested that an integrated payroll and personnel system be considered as a first step toward uniformity in administrative systems. Responding to this suggestion, the Administrative Systems Division performed another study and its report recommended that the Department implement an integrated system for payroll and personnel. This report projected an estimated savings of $400,000 during the first year, $650,000 during the second year, and $750,000 during each succeeding year of operation if such a system was implemented. No followup actions were taken on this proposal. In 1976 a third study was performed by the Administrative Systems Division and it recommended a uniform payroll system for the Department. The report from this study stated that a large amount of ADP administrative systems development effort was taking place throughout the Department but that these efforts had not been coordinated and had varying objectives. The decisions for undertaking these efforts had not always included consideration of benefits relative to costs and had resulted in pressure for more and larger computer hardware to process these applications.

At the time of our review these conditions were con-
tinuing, as illustrated by the following examples:

--One operating unit was converting all of its
administrative software systems to a different
computer at an estimated cost of about $1 million.

--Another operating unit was modifying its payroll
system to correct existing inadequacies at the same
time plans were being made to convert the system
to another unit's payroll system.

--A third unit was planning to develop an entirely
new integrated ADP system to support its adminis-
trative functions, and a report we reviewed estimated
substantial costs would be incurred to reprogram
its existing systems.

--Two other personnel systems were being converted
to a different computer at an estimated cost of about
$70,000.

While the above efforts were taking place, the Adminis-
trative Systems Division, with annual personnel costs exceed-
ing $220,000, was continuing to evaluate the potential for
implementing Department-wide standard, consolidated, or
centralized administrative systems.

The independent and uncoordinated development of these
systems and the resulting lack of uniformity have also led
to problems in meeting management information needs. For
example, the lack of integration between accounting, budget-
ing, personnel, and other management information systems has
created difficulties in summarizing data for consolidated
reporting. Following are examples of other problems we
noted:

--The Office of the Secretary's centralized accounting
system was not being operated in accordance with
the approved system design which resulted in financial
cial reports that were not useful to management.

--Requirements for uniform personnel systems had not
been established which resulted in redundant reports
and nonuniform information that did not meet the
needs of management at all levels.

--Because of weaknesses in internal controls, a payroll
system that serviced eight operating organizations
could not be relied upon to ensure an accurate payroll
or to protect the Government from improper payments.

According to the Department's Chief Accountant, inade-
quate management and duplication of ADP financial systems
have seriously weakened the Department's accounting controls
and ability to respond to financial issues. Several other
officials we interviewed agreed that administrative ADP sys-
tems were not fully meeting management information needs at all
appropriate levels within the Department. During discussion
of our findings with Department officials, we were informed
that actions are now underway to correct some of these prob-
lems in the Office of the Secretary. These actions do not
directly address the Department-wide problems discussed
above.

Duplication of computer facilities

One of the Department's goals in its 1972 management
plan was to consider the advantages of consolidating computer
requirements of different operating units coupled with a plan
to meet those needs through fewer but more versatile instal-
lations. We found, however, the Department had made little
progress toward accomplishing this goal and, while policies
required planning of computer facilities based on the needs
of the Department as a whole, bureaus and operating units were
continuing to acquire ADP resources with little or no con-
sideration of Department-wide needs and requirements.

In 1971 the Department conducted a study to determine
the economic and other advantages of consolidating some of
its computer facilities into a centralized service. The
study pointed out that existing requirements could be handled
through equipment changes or reductions with annual savings
ranging from $500,000 to $1.1 million after the conversion
costs. The study considered several alternatives for con-
solidating four of the Department's computer centers and
recommended an approach that would eliminate two centers
and combine the workload requirements of several operating
units in the remaining facilities. The study report stated
that this alternative would provide significant cost ad-
vantages and increased performance, flexibility, and service
to users. It further stated that the most costly and least
effective alternative was to continue operating each computer
center independently with periodic upgrades to meet increasing
workload requirements. However, the study recommendations
were not adopted because of pending organizational changes.

Despite the potential benefits documented in the study
report, there have been no further Department-wide studies
or efforts to consolidate or centralize computer requirements.
Operating units were allowed to manage, operate, and maintain
computer facilities independently with no overall requirements
plan or procedures for assuring coordination and effective
management control of these resources. The operating units
have continued to acquire additional resources, and computer
facilities and equipment have been upgraded to meet increased
needs of individual operating units without considering
Department-wide requirements.

Three separate computer centers, all located in the same
building at departmental headquarters, Washington, D.C., were
independently managed, operated, and maintained by different
operating units. One center operated by the Office of the
Assistant Secretary for Administration was underutilized by
approximately 30 percent and had a reported operating cost
of over $3 million in fiscal year 1976. The other two centers
were operated by the Maritime Administration and the Economic
Development Administration with fiscal year 1976 operating
costs of $3.9 million and $2.5 million, respectively. Our
analysis showed the total operating costs for these three
centers had increased from $6.5 million in fiscal year 1974
to $9.6 million in 1976 and to $11.2 million for fiscal year
1977--an increase of about 72 percent in 3 years.

Because the Department had not evaluated performance at
any of these facilities and had made no attempt to consolidate
requirements or share resources, it had no assurance that the
cost increases were necessary or that resources were being
used efficiently and effectively.

Our review also showed that several other operating
units within the Department were planning additional upgrades
of their computer facilities. For example, two operating
units (the Bureau of Economic Analysis and the Patent and
Trademark Office), operating similar computers, had already
initiated procurement actions to replace their equipment
with more powerful computers. These procurement actions were
initiated independently, and there were no indications that
the computer requirements were coordinated or that the opera-
ting units had considered meeting their requirements through
sharing or consolidation.

Costly and prolonged acquisition and implementation of ADP equipment upgrades

Inadequate planning; lack of departmental coordination, control, and direction; and insufficient support for funding requests have led the Bureau of the Census to costly and prolonged acquisition and implementation of major upgrades of its computer equipment and facilities.

The Bureau depends heavily upon ADP resources to accomplish its mission of gathering, analyzing, and reporting social and economic statistical information for the decennial censuses, the Department of Commerce, and other Departments and agencies. By early 1977, the Bureau had fallen seriously behind its planned schedule for acquiring and installing the ADP capabilities it deemed necessary to meet mission requirements.

The Bureau's projected workload requirements, expected to reach a peak about 1980-82, may exceed the capabilities of the computer equipment and facilities presently in operation assuming current levels of efficiency continue. In a recent reassessment of its computing requirements for 1977 through 1983, the Bureau reported an immediate need for an additional large computer system. With the short time remaining to acquire and install additional equipment and accomplish the transition to a smooth operational mode, the Bureau is in a difficult situation and its primary missions--to conduct the 1980 decennial census and support important Federal statistical programs--could be adversely affected.

Conducting the 1980 decennial census is a monumental effort, estimated to cost over $885 million, and will require extensive long-range planning and preparation. As we reported in May 1976 in "Programs to Reduce the Decennial Census Undercount" (B-78395), attaining complete, accurate, and timely counting of the population and reducing the undercounts experienced in previous censuses is of paramount importance. The census information has far-reaching effects on Federal, State, and local planning. It also serves a constitutional purpose in determining political representation and is a major factor used to distribute billions of dollars in Federal and State benefits.

Bureau of the census ADP planning efforts

Following the last decennial census in 1970, the Bureau conducted a review of its computer facilities and equipment. This review, conducted in 1973, disclosed that existing

computer equipment and facilities were obsolete and outmoded and in serious danger of not being able to meet the rapidly increasing demands for ADP support, without extensive modernization. Accordingly, a long-range equipment plan was developed with a goal of providing the capacity to keep pace with increasing workloads, while at the same time establishing a fully modern computer facility that could efficiently and reliably handle the processing requirements of the 1980 decennial census.

The Bureau's plan provided for intricately phased but separate acquisitions of additional equipment and facilities. The plan called for a series of competitive procurements of peripheral subsystems while the central computer processors were to be obtained noncompetitively from the incumbent vendor. Each peripheral subsystem to be acquired was highly interrelated with many other items, and, if all went well, the phased acquisitions would provide the necessary capacity at the required time.

Several improvements in the ADP environment were envisioned, and a key element in the plan was to increase the online processing capabilities enabling a more responsive system and providing better and more timely statistics than before. A nationwide computer terminal network involving hundreds of remote terminals was planned for use during the 1980 census. It was hoped that this approach would allow for transmitting preliminary counts for census areas from temporary field offices to the central computer for tallying and comparing against the master reference file and then back to the field offices for review by local officials. The anticipated result would be more timely and accurate census counts with effective followup and resolution of undercounts and other discrepancies being made before the field offices closed. This planned terminal network has since been reduced to an experiment in one district because of problems with its implementation.

To support this terminal network and the various other improvements envisioned, the Bureau planned to acquire an additional large-scale computer along with other types of computers; hundreds of online terminals, an automated tape library; a large amount of core, disk, and mass memory storage, and various other equipment items.

The Bureau's plan was originally submitted through the Department to OMB in October 1973 and, although updated only once, in September 1974 at the request of OMB, it was followed with few deviations until February 1977.

Planning problems encountered
by the Bureau

In reviewing the Bureau's planning efforts, we found that several delays and disapprovals were encountered in acquiring key parts of the planned computer system and major problems were experienced in implementing some of the planned upgrades to the computer equipment and facilities.

Various equipment components requested by the Bureau were delayed by the departmental and OMB budget approval processes, in part because of insufficient justification and and in part because of various issues raised by OMB concerning privacy and OMB Circular A-76 issues. For example, the Bureau's $13 million funding request for fiscal year 1974 was initially reduced by the Department to $9.7 million and then disallowed by OMB in its entirety. Although $5 million of the original request was appealed, only $612,000 was eventually approved.

Because of additional budget reductions in fiscal years 1975 and 1976, acquisition of certain equipment items was delayed as much as 3 years beyond the planned schedule. According to Bureau officials, OMB agreed that improvements of the computer facilities were needed and originally accepted the long-range equipment plan. However, OMB had serious reservations about the Bureau's need for all of the equipment requested, its commitment to the objective of a competitive replacement of the total system, and management's intentions for acquiring and using certain items of equipment, for instance the mass storage mechanism.

OMB questioned the Bureau's plan frequently from its inception in 1973, requested a "demand" study in 1974 to better support the budget, and made numerous inquiries regarding the requests for individual equipment. In January 1975, OMB issued a letter to Commerce expressing serious reservations about the technological feasibility of the plan and other issues. The Bureau prepared comprehensive responses to the questions raised by OMB. However, no decisive steps were taken to resolve the issues until January 1977.

As a result, the acquisition schedule slipped considerably for many items. For example:

--The initial plan containing the concepts involved in
a "back-end" computer (programable control device)
was issued in 1974 in conjunction with a request for
modern tape drives. In February 1977, this planned
procurement had not been consummated and due to the
closeness of the decennial census processing and the
magnitude of the software (programs) that had to be
written to make it operable, this procurement was
canceled.

--A "front-end" processor (small computer) was first
requested in 1973 for inclusion in the 1975 budget
but was not approved until the 1977 budget year,
and, at the time of our review, no procurement
actions had been initiated.

--The Bureau planned to acquire additional disk
storage with an initial procurement in fiscal
year 1973, but this procurement was not fully
approved until October 1976.

In addition to the various delays, other important
planned acquisitions vital to the implementation and overall
success of the plan were disapproved. One of these planned
acquisitions, a mass storage mechanism, was not procured
because of an OMB recommendation. According to a Department
consultant, the loss of the mass memory device resulted in a
system that would not work well in the environment envisioned.
Bureau correspondence indicated that an additional investment
of $11.9 million would be needed to provide the storage
requirements by means other than the mass memory mechanism.

Our review also showed that the Bureau experienced
major problems in implementing some of the acquisitions that
were finally made. For example, approximately 18 months
after a mandatory requirements contract was awarded for core
memory, the Bureau had not fully accepted all the equipment
delivered. According to Bureau officials, changes and modifi-
cations were made to the core memory in an attempt to make
it work properly, but at the time of our review, these prob-
lems had still not been completely resolved. In addition,
technical and contractual problems were encountered in con-
necting disk storage devices through a minicomputer to the
main computer systems. This connection mechanism never
worked within the main computer systems as originally plan-
ned, in part because certain equipment items were not ac-
quired and in part because of technical problems encountered
in implementation.

In our opinion, these and other changes and modifications, coupled with the funding delays and disapprovals, led to a piecemeal pattern of acquiring and installing equipment components. The resulting computer system was fragmented and centered arcund four independently operating, large-scale computer systems with duplicative files and operating software and peripheral equipment from several different manufacturers. In all, 13 vendors were supplying equipment or maintenance services to the Bureau, and the in-house maintenance costs alone were over $1.8 million last year.

Because of the interdependency of the phased acquisitions set forth in the Bureau's ADP plan, the delays, disapprovals, and implementation problems adversely affected the entire planning approach. Yet, the Bureau continued its commitment to the original plan until February of 1977 when Bureau officials told us the plan had failed and would have to be substantially revised and replaced with a more realistic "off-the-shelf" approach.

Consequently, as late as September 1977, the Bureau was still in the process of reevaluating its ADP requirements for the critical 1978-83 period. In . just 1977 the Bureau reported to the Department that it was seriously behind schedule in obtaining the ADP capabilities needed to meet the projected workload requirements. With the short time remaining to acquire and implement additional equipment and facilities, several officials expressed serious reservations about the Bureau's ability to conduct the 1980 decennial census within the desired time and accuracy constraints. The Bureau has since submitted another equipment plan for the 1977-83 period, which indicates an immediate need for an additional large-scale computer system and more peripheral equipment, even though its plan for a nationwide online terminal network has been reduced to a limited experiment in one district. This equipment plan is estimated to cost over $40 million.

Noncompetitive procurement of computers

The Bureau has been unable to obtain competition in acquiring large-scale computers for its ADP facilities. For years, the central computers used by the Bureau have been those acquired from a single manufacturer; by necessity, the various computer components or peripheral equipment making up the overall computer system had to be compatible with these central processing units. OMB and the General Services Administration had sought fuller compliance with the Brooks Act by indicating on several occasions the need for competition in acquiring ADP equipment. Reacting to this

pressure, management initiated actions to put the Bureau
in a position where future major computer systems might be
competitively acquired and did subsequently acquire many
individual items of peripheral equipment competitively. The
Bureau's original ADP plan, as submitted in 1973, provided
for acquiring additional large-scale computers in two stages.
For the near term, the plan stated that requirements could
only be met by the sole-source procurement of computers which
were compatible with the existing equipment. This was due
to:

   --A large percentage of the Bureau's programs were
     written in a language that only the UNIVAC computer
     could process and some time   "ld be required for
     conversion to Federal sta   higher level languages
     (which are adaptable to other vendors' computers).

   --Any equipment used had to be compatible with exist-
     ing outmoded tape drives, and an estimated 3 years
     would be required for converting the Bureau's massive
     tape files once new tape drives were installed.

     The plan was to lease a compatible large-scale computer
on a sole-source basis in 1975 with a fully competitive pro-
curement of modernized and expanded facilities contemplated
for 1978. However, in the revised plan submitted in 1974,
the Bureau reported that the original plan would not provide
sufficient capacity prior to 1980 nor sufficient time for
completing system development and for the effort of de-
bugging prior to the 1980 decennial census processing.
Accordingly, the Bureau decided that two noncompetitively
acquired computers would be needed and that both would have
to be retained through 1982.

     The revised plan also contemplated a competitive procure-
ment of replacement equipment estimated to cost approximately
$25 million but was not planned for installation until 1980.
The Bureau anticipated that this competitive procurement
and the interim equipment would ensure a smooth transition
through the 1980 decennial census and would provide the
necessary processing capabilities until the interim equipment
could be released in 1982.

     The delays and problems encountered subsequent to the
1974 plan, however, did delay the Bureau's ability to obtain
equipment through competitive procurements. Since 1974, the
Bureau has purchased one large-scale computer on a sole-source
basis and has been leasing another large computer system on
an interim sole-source basis. The Department has approved a

fiscal year 1979 budget request of approximately $6.2 million
primarily for leasing various ADP equipment including an addi-
tional large-scale computer system, which, as proposed in the
Bureau's latest plan, was to be acquired noncompetitively.
With the current situation, Bureau officials told us that
a competitive procurement to replace the computer facilities
would not be accomplished until after 1982.

Bureau officials told us the additional costs to com-
plete the latest interim plan to provide computer capacity
from 1977 through 1983 would exceed $40 million, including
rentals. This interim plan is now under study by Department
officials.

Causes of the Bureau's
planning problems

According to Bureau officials, the long-range plan
failed because of the various delays in budget approvals and
difficulties in acquiring and installing equipment and
facilities. However, several other factors contributed to
the Bureau's planning problems.

Our review showed that the plan was developed primarily
by ADP management and, although considered conceptually
sound by some officials, the plan was not practical because
of its complexity, the interdependency of equipment com-
ponents, the unproven nature of some equipment items, and
the strategy of acquiring separate peripheral subsystems
which had to be interconnected to form a system with the
four major computer systems.

The overall goals and objectives of the plan were not
clearly defined and were not fully understood by all offi-
cials because there was not enough communication among top
executives, ADP managers, and users. The Bureau had no
formal systematic planning process and received little cen-
tral direction. The Department did not actively participate
in the Bureau's planning efforts. Its involvement was
limited to reviewing and approving the feasibility studies
that were submitted for each proposed major acquisition.
The Deputy Assistant Secretary for Administration told us
that the technical expertise was not available at the head-
quarters level to answer several questions they had about
the plan's feasibility.

The Bureau's plan was based on a complex concept whereby
each item acquired was to be interdependent with many other

items, and acquisition was to be phased to provide the neces-
sary computer capacity at the required time. The Bureau did
not periodically review and update the plan, however, and
despite several disapprovals and major problems e countered
in acquiring and implementing critical portions of the plan-
ned computer configuration, the plan was not revised to re-
flect these problems and changed requirements. The chief
of the ADP Planning and Management Division agreed that the
plan should have been updated annually, but stated that this
was not done because of insufficient time and resources.
Several officials also agreed that the Bureau may have had
an unnecessary commitment to the specific hardware and soft-
ware configuration set forth in the plan.

We also believe the Bureau's method for identifying
and justifying ADP requirements was inadequate. Projections
of ADP requirements were made by the user organizations and
formed the basis for the equipment and facility upgrades
planned by the Bureau. However, the user organizations had
no formal or uniform method for justifying their requirements.
Projections were not periodically revalidated, which reduced
their usefulness in planning long-range needs.

Our review also indicated that at least two of the
planned major acquisitions were unproven and exceeded the
state of the art, but the risks involved in following such
an unproven and complex approach were not fully assessed,
and few alternatives to the planned computer configuration
were considered. According to the Deputy Assistant Secretary
for Administration, the Department had reservations about the
plan when it was first submitted; however, he agreed the
risks involved were not adequately assessed because no one
at the departmental level had the technical expertise to
critically review the plan.

Uneconomical procurement of computer equipment

The General Services Administration's (GSA's) Federal
Management Circular 74-5 establishes policy for all Federal
executive agencies to follow when acquiring ADP equipment.
The policy for determining the most economical acquisition
alternative includes:

--Choosing the method which offers the greatest
   advantage to the Government.

    --Preparing a comparative cost analysis to determine
      the lowest overall cost to the Government.

    --Considering the residual value of any equipment
      for those alternatives which result in Government
      ownership.

    --Considering all costs of the system's life in terms
      of the present value of money.

NOAA, by not following this prescribed procurement policy,
spent more than was necessary to acquire computer components
for its Suitland computer center. In February 1977, the De-
partment of Commerce awarded a contract for lease and main-
tenance of two memory units compatible with IBM 360/195 com-
puters at NOAA's computer center in Maryland. The sole-
source contracts were negotiated under delegation of procure-
ment authority from GSA and called for a monthly lease rate
of $16,700 per unit and a monthly maintenance charge of
$1,000 per unit. The contract provided that 60 percent of
the lease payments--up to the full purchase price of $621,000--
could be applied toward purchase and purchase could be exer-
cised at any time.

    We performed a lease-versus-purchase analysis which
showed that, during the 8 months of the contract, the De-
partment spent approximately $100,000 more than necessary
by leasing rather than purchasing the equipment, and, by con-
tinuing the current arrangements through 26 months, the two
memory units will cost about $340,000 more than the offered
purchase price.

    Both departmental and NOAA officials agreed that the
most economical method of acquiring the equipment was by
outright purchase, but they said funds were not available
at the time of the contract. However, no attempts were
made to obtain the necessary funds. The NOAA officials
admitted they had not requested additional funds and had
not determined, as required, whether funds for purchase
were available in GSA's ADP fund.

    NOAA did not perform a detailed economic analysis
prior to acquiring the equipment, and present value and
salvage value considerations were not made in the feasibil-
ity study used to justify the additional memory capacity.
An adequate economic analysis using accurate date, dis-
counting to present value, and considering residual value
as required, would have clearly shown that purchasing rather
than leasing was the most economical method of acquiring the
equipment.

In addition, when NOAA submitted its justification for a sole-source procurement, the wrong office approved the request. Noting that future requests should be approved by the Office of ADP Management, this office approved the procurement action without questioning the adequacy of the economic justification.

Based on our findings and recommendation, the Department exercised the contract's purchase option and effective October 1, 1977, purchased the units. The cost was $1,341,532 as opposed to $1,582,660 if the purchase had been delayed until the 26th month. This resulted in a nonrecurring savings of $241,148.

We were informed that a new policy had been established requiring higher level review and approval of economic analyses before future procurements may be made.

CONCLUSIONS

Improvements are needed in the ADP planning structure and process, both at the Department level and within the major operating components. With increased top management involvement; stronger central management direction, coordination, and control; and a workable planning process, the Department could more effectively direct its efforts and resources toward (1) developing and using uniform administrative ADP systems, (2) sharing consolidated computer facilities and other resources, and (3) conforming with applicable law and regulations requiring competitive acquisitions of ADP equipment and services and the proper review and approval of plans, budget justifications, and economic analyses of acquisitions.

Developing and using uniform administrative systems

The Department's uncoordinated and independent development and maintenance of administrative ADP systems have resulted in more resources than necessary being used to develop, maintain, and operate separate but similar ADP systems to accomplish the same functions. Economic savings and other benefits that could be attained through standardization, consolidation, or centralization of these systems are not being realized. Further, the lack of uniformity in these systems has resulted in administrative systems that do not meet management needs for information at appropriate levels within the Department.

Sharing consolidated facilities
and other ADP resources

ADP policies call for planning computer facilities based on Department-wide needs; however, little authoritative effort has been made to consolidate requirements and share computer facilities and other ADP resources among major operating components. We believe this independent and uncoordinated management of computer facilities and other ADP resources does not provide the most effective and efficient use of these resources and results in duplication of computer facilities, underutilized equipment, and high operating costs, as well as imbalances of resources applied to achieving departmental objectives.

Conforming with applicable
laws and regulations

Although the Bureau of the Census has spent several million dollars for equipment and facilities, the quality of computer services has not been as good as could be expected and new projections of workload requirements indicate that additional equipment will be needed to meet its mission requirements through 1983. The Bureau's commitment to the overall planning scheme, which failed in its objective of providing a modern computer facility, plus the changes and modification to equipment on which key ADP operations depended, resulted in a complex system that was difficult and costly to maintain or upgrade. More seriously, the Bureau's mission may be adversely affected.

The benefits from competitive procurements are closely tied to the quality of an agency's ADP plans. Without a well thought out, realistic program that has been approved as a basis for funding, there is substantial risk of negating the benefits of competition and adversely affecting mission performance. Sole-source acquisitions such as those made by the Bureau over the past several years provided only interim solutions and, in the long run, may prevent the economical and efficient procurement of ADP resources. They have not been the most effective solution to the Bureau's needs. In its latest plan to provide interim computer capacity from 1977 through 1983, the Bureau estimated that additional costs would exceed $40 million. These additional costs are due in large part to the prior planning problems and could increase, because the Bureau will still not be prepared to execute a proper competitive procurement, according to these plans, until 1982.

By failing to perform an adequate economic analysis, NOAA spent more than was necessary to acquire computer equipment. This uneconomical procurement could have been avoided had NOAA followed prescribed procurement procedures and review and approval channels both within NOAA and at the Department level.

A primary barrier to successful sharing and consolidation of computer resources in the Department has been lack of communication between the heads of major operating components and an undue emphasis on component requirements at the expense of a Department-wide program.

More effective central control would reduce some of the barriers to efficient and economical use of computer resources, especially those used primarily for administrative functions presently being supported independently by the major operating units.

The Department has depended heavily on computer support for its programs and missions, and its investment in computer support has been growing rapidly. However, overall management of these resources and activities has not been adequate and past planning efforts have been ineffective. Repeated efforts to improve the situation at the Department level were uncoordinated and, more important, were nonauthoritative.

Top management involvement is needed in setting ADP objectives, strategy, and priorities. To assist top management in the planning, coordination, and control of ADP resources and activities on a Department-wide basis, broader responsibilities, needed resources, and the authoritative support of the agency head should be provided the central ADP management office.

RECOMMENDATIONS TO THE SECRETARY OF COMMERCE

We recommend that you:

--Establish a formal planning process that will provide management involvement and accountability at all levels for the direction, coordination, and control of ADP activities and resources.

--Establish an executive ADP management committee chaired by yourself or the Undersecretary (at least for the first 2 years). This committee should have a written charter setting forth its authority and responsibilities for the formulation and execution

of a Department-wide ADP strategy to achieve specific objectives.

--Assign to the Department's Office of ADP Management responsibility for supporting the executive ADP management committee by managing and controlling ADP planning, budget formulation, and review processes and coordinating the development of ADP strategy and objectives.

--Establish an evaluation and review process that acquires the necessary feedback on plans, provides needed control information and establishes accountability for performance at all appropriate management levels.

--Take direct action to control and operate all computers and computer software presently used primarily for administrative purposes.

(91333)