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REPORT BY THE U.S.

# General Accounting Office

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## IRS Can Better Plan For And Control Its ADP Resources

IRS has made significant progress in managing its computer operations. Recent measures planned or already implemented will improve the effectiveness of the agency's ADP resources considerably. GAO recommends additional actions to the Commissioner of IRS which would enhance these improvements even further.



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UNITED STATES GENERAL ACCOUNTING OFFICE

WASHINGTON, D.C. 20548

GENERAL GOVERNMENT  
DIVISION

B-137762

The Honorable Jerome Kurtz  
Commissioner of Internal Revenue  
Department of the Treasury

*ABE 000-04*

Dear Mr. Kurtz:

This report suggests ways to increase the efficiency and effectiveness of the Internal Revenue Service's automatic data processing operations. Although IRS has made significant improvements in the past several years, more needs to be done to increase management's involvement in and control over (1) long-range ADP planning, (2) the development of data processing systems, (3) ADP equipment procurement, and (4) computer performance management.

We are pleased with the willingness of the Service to be responsive to our concerns and with the spirit of cooperation exhibited by Service officials toward our staff. We look forward to continually working with the Service to further improve its management of ADP resources.

As you know, 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 Senate Committee on Governmental Affairs and the House Committee on Government Operations not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report. Accordingly, we are sending copies of this report to the Chairmen of the previously mentioned Committees.

Sincerely yours,

A handwritten signature in cursive script that reads "Allen R. Voss".

Allen R. Voss  
Director



D I G E S T

The Internal Revenue Service (IRS) is one of the largest users of computers in the Federal Government. The annual processing of millions of tax returns is highly dependent on automatic data processing (ADP). Almost a quarter of IRS' total operating costs are ADP expenses. A third of its 86,000 employees are assigned to ADP operations either in a direct capacity or to ADP related tasks such as preparing and entering data. Proper management of IRS' ADP resources is crucial for assuring that the Nation's tax laws are administered in the most efficient and effective manner. (See ch. 1.)

IRS has recently made significant improvements in its ADP operations in response to problems identified in internal studies and our previous reports. As a result, IRS is in a much better position than it was several years ago to plan, develop, and implement new ADP systems. However, management's planning and control over the acquisition and application of ADP resources could be improved even more.

LONG-RANGE PLANNING, SYSTEMS DEVELOPMENT,  
AND PROCUREMENT NEED IMPROVEMENT

IRS has shown considerable initiative and concern in evaluating its ADP operations and moving to take corrective action. Numerous internal studies have identified such problems as a lack of participation in the planning process by ADP users resulting in a rapid growth of data processing systems and equipment. In response to these problems, IRS has recently instituted an ADP Policy/Resource Board. Membership is composed of assistant commissioners who represent all IRS functions and are responsible for setting priorities for the use of ADP resources in IRS.

To provide an agencywide perspective to the Board's decisions, it is important that the Commissioner and Deputy Commissioner be actively involved and participate with the Board in its deliberations. This has not always been the case. (See pp. 5 to 8.)

IRS also plans to implement a cost accounting system that will measure how ADP staff resources are utilized to develop and implement new systems. The Board will use this information as a basis for allocating these resources among IRS functions.

These resources, however, are only a small fraction of IRS' ADP costs. In fact, 95 percent of the Service's ADP resources, those required to operate computerized systems after installation, will not be accounted for or allocated to ADP users. As a result, IRS does not currently have a basis for determining the full cost of new systems, the relative worth of existing systems, and the total ADP cost of IRS programs, a situation not unique in the Federal Government. Recently, however, a study group was established to develop the overall concept and requirements for measuring and allocating all of IRS' ADP costs. (See pp. 8 to 11.)

IRS previously experienced considerable delays in designing and implementing data processing applications. This was due partly to inadequate management review at major decision points so that critical phases in the development process were not properly completed before the next step was initiated.

Although they have been used in the past, IRS does not have a formal policy requiring two commonly used methods to provide greater management control over installing new systems: Standardized and formalized system development procedures and project managers. Implementing these controls would help assure that data processing applications

are developed consistently, key activities are performed properly, and management has a mechanism for evaluating progress and establishing accountability. (See pp. 12 to 14.)

Despite recent improvements, IRS needs to make further efforts to encourage adequate competition when procuring ADP equipment. Project managers designated for systems in the development phase should also be accountable for assuring that applicable government and agency policies are adhered to during the subsequent procurement phase. ADP equipment that is not the result of systems development should also have project managers designated to increase management control over the procurement function. (See pp. 14 and 15.)

#### ADP EQUIPMENT CAN BE USED MORE EFFICIENTLY AND EFFECTIVELY

IRS has recently taken action to establish a centralized computer performance function and, as an interim measure, has contracted for performance studies of its major computer systems. These actions, if properly implemented, should correct past problems such as inconsistent and unreliable computer performance information and the lack of a coordinated and systematic program to improve the efficiency of IRS computers. As a result of these problems, IRS could not be certain what its current computer capability was, nor assure that computer products met users' needs. Also as a result, some IRS requests for additional capacity were not adequately supported. (See ch. 3.)

#### RECOMMENDATIONS

GAO recommends that the Commissioner of Internal Revenue:

- / --Develop and implement a cost accounting system to measure all of IRS' ADP resources by user and specific application.

- Formalize standard system development procedures for Data Services and user organizations to serve as a control mechanism with appropriate information provided to management at key decision points.
- Require that project managers be formally designated for major systems development activities and for computer procurements. (See p. 16.)
- Establish a comprehensive ADP performance management program to evaluate and improve the efficiency and effectiveness of IRS' computer operations. (See p. 26.)

#### IRS COMMENTS

The Commissioner agreed with GAO's recommendations and stated that he and his deputy would be actively involved in formulating ADP decisions including the review of Board decisions. Although IRS either plans or has taken steps to improve the planning and control of ADP resources, it needs to implement specific actions before GAO can fully assess the extent to which its recommendations are carried out. (See pp. 17 and 26.)

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### ABBREVIATIONS

ADP	automatic data processing
GAO	General Accounting Office
IRS	Internal Revenue Service



## CHAPTER 1

### INTRODUCTION

The Internal Revenue Service (IRS) processed over 136 million tax returns and collected about \$400 billion in fiscal year 1978. This huge undertaking would be virtually impossible without automatic data processing (ADP).

The Service's ADP operations have grown continuously and considerably since the program was begun in the early 1960s. As could be expected with any large computer operation, IRS experienced problems in developing its data processing capability but recently has done well in making appropriate improvements. This report discusses the problems IRS has experienced with its ADP operations, the improvements that have been planned or implemented, and our recommendations for further actions to assure greater management control over the planning, acquisition, and use of ADP resources.

### SIZE AND ORGANIZATION OF ADP OPERATIONS IN IRS

IRS is one of the largest ADP users in the Federal Government. In fiscal year 1978, the total cost of the Service's data processing operations was estimated at over \$476 million. This accounted for 24 percent of IRS' total operating cost of \$1.97 billion. IRS has 142 computer systems in operation across the country, of which 56 are owned by the agency and 86 are leased from commercial sources. Thirty-three percent of the Service's approximately 86,000 employees--almost 28,000 people--are assigned to ADP activities. About 3,400 employees are assigned to such ADP operations as systems analysis, design, programming, and operating the computers. The remaining staff are assigned to ADP-related tasks such as data preparation and entry.

ADP operations in IRS are organized on both a centralized and decentralized basis. Each year, tax returns are delivered to 10 service centers across the country and are transcribed onto magnetic tape. These tapes are sent to the IRS National Computer Center in Martinsburg, West Virginia, where the information is posted to master accounts for every taxpayer. Afterwards, selected tax information is returned to the service centers on magnetic tapes and maintained on computers available for immediate retrieval or updating through an extensive system of terminals. In addition to its tax processing systems, IRS operates a Data Center in Detroit, where the payroll and many management information reports are produced.

Overall responsibility for the Service's data processing activities is divided. Service center directors report to regional commissioners who, in turn, report directly to the Deputy Commissioner and Commissioner. However, the Assistant Commissioner for Data Services, with a staff of approximately 740 at IRS headquarters, is responsible for providing technical guidance to the service centers and has line authority over the National Computer Center and the Data Center.

Managing the Service's ADP program requires constant monitoring and evaluation. IRS has done well in this regard. Over the years, the Service has made a commendable effort at reviewing ADP operations, identifying problems, and moving to correct them. For example, one 1976 internal review reported such problems as fragmented and duplicative system development efforts and a proliferation of noncompatible and even unnecessary computer equipment. The report's recommendation that the ADP function be centralized within IRS rather than dispersed throughout the agency was implemented the following year with the creation of the Office of Assistant Commissioner for Data Services.

Similarly, a 1977 internal audit identified problems in the procurement of ADP systems and equipment. The auditors' recommendations for improved management controls over the procurement process were implemented soon afterwards. In 1978, a major evaluation of the Service's management information systems identified deficiencies in the collection, dissemination, and utilization of data needed for planning and controlling IRS programs. The report's recommendations were accepted and are currently being acted on. Despite these and other efforts, however, problems still exist in planning and controlling the agency's ADP resources.

The difficulties IRS has experienced are by no means unique. Congressional committees have expressed concern over the past decade about the failure of 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.

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 the agency's ADP activities. The circular gives the agency

head full authority 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 controlling agency ADP resources so that the greatest cost effectiveness in their procurement and use can be obtained. This report notes several areas in the Service's ADP operations where this responsibility can be better met.

## CHAPTER 2

### IRS NEEDS TO FURTHER IMPROVE ADP LONG-RANGE

#### PLANNING, SYSTEMS DEVELOPMENT, AND ADP PROCUREMENT

In addition to improvements planned or already implemented, IRS can do more to perfect its overall strategy for acquiring and applying data processing resources. The Service has shown considerable initiative and concern in evaluating its ADP operations but actions taken or planned to remedy the problems identified still do not provide for sufficient involvement of the Commissioner's Office in formulating ADP plans. In addition, action is needed to provide better accountability and control over long-range ADP planning, systems development activities, and procurement. Overcoming these problems will enable IRS to carry out its computer operations more effectively.

#### IRS NEEDS TO IMPROVE ITS LONG-RANGE ADP PLANNING SYSTEM

Although IRS has rectified many of the problems in ADP planning identified by various internal reviews, recommendations by these and other reviews for more senior management involvement and accountability and full cost accounting for data processing resources have not been implemented. Both are critical elements of an effective long-range ADP planning system.

IRS has devoted considerable resources to evaluating the method used to forecast, review, evaluate, and approve the agency's ADP requirements. Since 1975, numerous studies and proposals have been made under the direction of the Assistant Commissioner for Planning and Research, the Assistant Commissioner for Data Services, and the Internal Audit Division. Other studies have been done by special task forces, study groups, and consultants. These evaluations consistently demonstrated that IRS lacked a formal ADP planning system capable of assuring senior management's involvement and participation, allocating ADP resources equitably among using organizations, assigning priorities to requests for new applications, and fostering cost-consciousness among ADP users.

Inadequate planning for ADP requirements has resulted in the Service proposing new systems and equipment with questionable justification. Another result has been the uncoordinated development of new ADP applications, producing increased management information systems among IRS organizations and unachievable backlogs of new applications. For example,

until a recent inventory by a special study group, the Service could not be certain what systems were in operation and what information was being collected and produced. IRS has recognized these problems and has been moving to remedy them. More, however, needs to be done to improve management's overall control over planning for ADP resources.

ADP planning needs more active involvement  
by the Commissioner's Office

At the conclusion of our field work, in March 1979, IRS established an ADP Policy/Resource Board. This Board, the result of a number of internal studies, replaced a former ADP Review Board that had approved projects on an individual basis. The new Board consists of higher level management and is responsible for budgeting and controlling the agency's overall computer needs. The new Board's procedures also increased user participation in the formulation of the Service's ADP plans so that members will be more aware of the costs of the data processing resources they request. We support these efforts. They will do much to alleviate many of the problems IRS has experienced in the past. More could be done, however, to assure top management's participation in the planning process.

The ADP Policy/Resource Board consists of the Service's assistant commissioners and serves as the agency's focal point for making policy decisions on all ADP matters. The Board is also responsible for setting priorities for the use of ADP resources by formulating a coordinated Servicewide long-range plan based on requests submitted by Board members. The Board is chaired by the Assistant Commissioner for Data Services.

In our opinion, designating the Assistant Commissioner for Data Services as chairman of the ADP Policy/Resource Board could limit the participation and involvement of top management in ADP planning and thereby curtail the Board's ability to make agencywide decisions that consider the overall needs of IRS.

As the agency's chief operating officer, the Deputy Commissioner is responsible for assisting and acting for the Commissioner to accomplish the overall planning, direction, control, and coordination of IRS policies and programs. This responsibility makes it imperative that management at this level be actively involved and participate in formulating the agency's long-range plans, especially ADP plans, since IRS' ADP operations account for almost a quarter of IRS' total operating costs and a third of its total personnel.

the recently enacted procedures, while requiring the Commissioner and Deputy Commissioner to be briefed on Board decisions, does not provide for their active participation in the decisionmaking process. In some instances, such involvement is necessary to facilitate the Board's deliberations and provide an agencywide perspective to the decision-making process.

Although the Board's chairman has been formally delegated the authority to officiate over proceedings subject to the review of the Commissioner and Deputy Commissioner, the Assistant Commissioner for Data Services functions at the same management level as other Board members with responsibility limited to data processing matters. Because Board actions have a far-reaching effect on all IRS activities, his authority for making Servicewide decisions is less likely to be commonly recognized and accepted than that of an official with higher authority and responsibility for all of the Service's programs. For example, in discussing the proposed Board leadership with some of the other assistant commissioners, we were told that they would not accept unfavorable Board decisions, but would take their cases to the Deputy Commissioner for resolution.

The primary function of the Board is to provide policy guidance and set priorities for the use of the ADP resources by IRS. The active leadership of top management is necessary to objectively evaluate ADP proposals of the various IRS functions on a Servicewide basis. The Board, more specifically the Board's chairman, must select the optimal policy on an overall basis after objectively considering the positions of the members. The Office of the Assistant Commissioner for Data Services, although having the ADP expertise to evaluate the impact of user proposals on IRS' data processing operations, does not have the organizational perspective to evaluate proposals on a Servicewide basis. Proposals to use ADP resources must be ranked in order of priority, and the total amount of ADP resources to be committed must be weighed against other Service requirements. A foremost consideration in these decisions is that computer resources are limited. The chairman must therefore have cross-functional authority with a thorough understanding of IRS' overall needs and objectives to make these decisions.

Our reservations about the ability of the Board to function effectively with an assistant commissioner as chairman can be illustrated by the way past and current ADP problems have had to be solved. For the past several years,

the Service has faced a backlog of proposed computer applications awaiting action. For example, at the beginning of the fiscal year, Data Services had received almost 600 separate requests for ADP developmental work to be done in fiscal year 1979. These ranged from relatively minor modifications to existing applications to proposals for large and complex new systems and additional equipment to process them. Data Services lacked the staff resources to begin work on about half of these requests. Additionally, the Detroit Data Center faced a shortage in meeting the existing workload of 201 staff years, almost a 20-percent deficit. In addition to these backlogs, one of the Service's major computer systems, the Integrated Data Retrieval System, is, according to Data Services, approaching maximum capacity.

In response to these problems, the Assistant Commissioner for Data Services and the other assistant commissioners moved to reduce the workload in much the same way as the ADP Policy/Resource Board will function. The Assistant Commissioner for Data Services requested the other assistant commissioners to reassess the necessity for their current applications at the Data Center and on the Integrated Data Retrieval System and limit requests for new services to projects specifically requested by the Commissioner, the Congress, or other agencies and maintenance of existing programs. Through numerous and frequent meetings and discussions over a 3-month period, the Data Center's workload and Integrated Data Retrieval System applications were reduced to a point where they could be met within budgetary and machine constraints, and new requests were reduced. We were told that the process was a long and tedious one due to the natural reluctance of ADP users to relinquish services they were receiving. Although the assistant commissioners were able to reduce the workload without the direction and participation of top management, in our opinion, the process would have been facilitated had the Commissioner or Deputy Commissioner been more actively involved.

As another example, IRS had been attempting to determine the role and composition of the ADP Policy/Resource Board since the need for such a Board was identified in a May 1976 internal study. Two additional internal studies issued in May 1978 advanced conflicting proposals on how the Board would allocate ADP resources to users and approve ADP projects. These documents engendered much discussion among the assistant commissioners. However, not until the Deputy Commissioner directed resolution of the issues in November 1978 was action taken to do so.

As discussed above, the fact that Data Services had faced an unachievable and unrealistic workload is strong evidence that IRS needs to: (1) rank projects in the order that best meets the overall needs of the Service and (2) plan and control ADP projects according to the availability of resources needed to implement them. The ADP Policy/Resource Board will meet some of these needs by involving users in the budgeting of ADP resources. However, for maximum effectiveness, the Board requires leadership of recognized and accepted authority to set ADP policy and objectively consider requests for ADP support based on the overall needs of IRS.

A previous internal review had recommended that the Board be chaired by the IRS Deputy Commissioner because of the multifunctional and financial impact of the matters the Board would be called upon to decide. This proposal, however, was not implemented at the direction of the Deputy Commissioner. The Deputy Commissioner told us he rejected the recommendation that he chair the Board because he had neither the time nor ADP technical expertise and because significant Board decisions would require his or the Commissioner's final approval anyway. He also doubted whether his office could objectively evaluate any proposal which he had helped formulate. Finally, it was his opinion that the Board should be allowed to operate on a trial basis before deciding on the need for his participation and involvement.

We continue to believe that designating the Deputy Commissioner as chairman of the Board would help assure that agencywide priorities are properly balanced and that the Board functions expeditiously. At a minimum, the decisions of the Board as currently constituted should be considered tentative subject to final approval by the Deputy Commissioner--even during the test period desired by him.

#### IRS needs to measure total ADP costs

Under the recently approved procedures for the ADP Policy/Resource Board, the Board is also responsible for allocating developmental ADP resources to IRS functions. Developmental resources are the staff necessary for the design, maintenance, analysis, and modification of computer programs. In fiscal year 1978, we estimate that IRS' total ADP costs were about \$476 million of which \$24 million, or 5 percent, were developmental costs. The remainder was for operational resources, the equipment and operators required to process ADP applications after they are developed, and for ADP

related costs such as document processing and handling. The basis for allocating developmental costs will be a cost accounting system which will measure developmental resource expenditures for individual applications, determine resource availability, and produce various management decision data. The system will also provide early warning notification of potential problems such as cost overruns. The estimated annual cost of the system is \$125,000.

IRS' plans to allocate and measure developmental ADP costs are a step in the right direction. More, however, is needed to provide for full management control over the planning for and operation of its computer resources. In 1978, GAO published "Guidelines For Accounting For Automatic Data Processing Costs," the fourth in a series of Federal Government accounting pamphlets. These guidelines offer advice on how to implement an accounting system that accumulates total ADP costs, by user and by specific application. Such a system is necessary to

- assess the full cost of requests for computer services including the resources required to process applications as well as design them;
- evaluate the relative worth of current and proposed applications on the basis of their total cost and their benefit to the organization's mission and programs;
- make informed investment decisions as to whether systems should be designed and operated in-house or by outside sources;
- measure the effectiveness, and also the efficiency, of Data Services in meeting data processing requirements;
- determine the allocation of support needed to meet new and existing program needs; and
- foster cost consciousness among ADP users.

One practical effect of the lack of an ADP cost accounting system is that ADP resources are treated by users as a "free asset" thus opening the door for questionable applications which lead to questionable ADP procurements. For example, one internal IRS study found numerous computer-produced management information reports of questionable value because of duplication, lack of timeliness or limited

utilization. Also, in a March 1, 1978, report to the Congress, 1/ we pointed out that many of the stated requirements justifying the proposed Tax Administration System were of questionable or marginal value in helping IRS to accomplish its missions. The current backlog of requests awaiting action by Data Services is further evidence that computer resources are treated as a free asset. Also, as discussed in chapter 3, there are numerous opportunities for IRS to make more efficient use of its computers. Allocating and measuring total ADP costs, as IRS internal reviews have already recognized, will foster a greater cost consciousness among ADP users and, thereby, should assure more efficient use of current resources as well as limit requests for additional services.

IRS has already recognized the need for a full ADP cost accounting system. For example, in commenting in September 1977 on our recommendation in a Government-wide report 2/ that total ADP costs be accumulated and charged to users, IRS agreed that cost accounting is an effective process for making users aware of data processing costs for their various programs. IRS cited the then ongoing review efforts of an interfunctional task group as evidence that the Service was taking steps towards meeting the recommendations set out in our report. The task group's report, issued in May 1978, fully agreed with our report and recommended, among other things, that IRS implement a full cost accounting system for measuring and allocating ADP resources.

Despite IRS' agreement in September 1977 that a full ADP cost accounting system is needed, and the task group's recommendation in May 1978 that the Service should implement such a system, IRS' immediate plans are limited to a system that will measure only developmental resources. IRS officials told us that the Service had not completely rejected the need for full cost accounting for ADP resources, but immediate plans were for implementing a cost accounting system for developmental resources only. However, at the conclusion of our audit in March 1979, IRS established a study group to, among other things, develop requirements for a cost accounting system for all of IRS' ADP costs. We believe this is evidence of IRS' commitment to eventually establish full cost accounting for all of the

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1/"An Analysis Of IRS' Proposed Tax Administration System: Lessons For The Future" (GGD-78-43, Mar. 1, 1978).

2/"Accounting For Automatic Data Processing Costs Needs Improvement" (FGMSD-78-14, Feb. 7, 1978).

agency's computer resources. We support this commitment provided that the group's efforts result in a cost accounting system capable of providing cost information specific enough to effectively assist management in decisionmaking.

The extent to which ADP users in IRS can measure the costs of services they request, evaluate the effectiveness and efficiency of these services, and make informed judgments as to how they can make the best use of resources allocated them, is directly related to the degree of specificity and completeness of the accounting system implemented. IRS needs to provide as full an accounting system as possible. At a minimum, such a system should capture and accumulate the agency's total data processing costs by user and by specific application. The reasons advanced by IRS for allocating and measuring ADP developmental costs are also valid for the remaining ADP costs, only more so. The relative size of operational and ADP-related costs, compared to developmental costs, makes it that much more critical that these resources be placed under management's control.

We recognize that the development and installation of an ADP cost accounting system is a large, complex, and expensive undertaking. However, our studies in this area have clearly shown that good cost data is rarely available for the costly decisions that must frequently be made on data processing activities. Further, incorrect decisions may be made by ADP users simply because they do not know the cost of the services they receive either. Accordingly, we believe this type of cost accounting is needed for all computer operations and have urged all agency heads to see that it is established.

IRS NEEDS TO FURTHER IMPROVE MANAGEMENT  
CONTROL AND ACCOUNTABILITY OVER SYSTEM  
DEVELOPMENT ACTIVITIES

Once an effective long-range ADP planning system has been instituted, management must assure that plans are properly carried out. Individual projects approved by the Service's planning mechanism need management's control during the design and development stage to ensure that systems are implemented in a timely manner, at a minimum cost, and are responsive to users' needs. IRS has recently evaluated its management information systems and identified such problems as duplicative data collection and systems that are no longer needed or fail to meet users' expectations. This shows that the Service is moving to improve the situation.

However, IRS has not adopted policies formally requiring two commonly accepted methods of assuring successful system design efforts: standardized system development procedures and formal designation of project managers to assure that proper procedures are carried out in a timely manner.

System development procedures should be standardized and formalized

IRS needs to standardize and formalize system development procedures for assurance that major data processing systems are developed consistently, that key activities are done properly, and that management is provided a mechanism for evaluating progress. We identified several instances where IRS experienced considerable delays and, in some cases, was completely unsuccessful in implementing new systems or obtaining additional equipment because of inadequate management review at major decision points. Standardized and formalized system development procedures, detailing the results to be achieved at each step in the process, would provide management with a means of reviewing and approving proposed applications at each stage of the development cycle.

The development of an ADP system encompasses numerous tasks and multiple phases which are characterized by the type of work performed and the end products produced. A widely used and proven approach in system development is to divide the overall work into a logical and systematic sequence of manageable phases, such as problem definition, evaluation, design, programming, testing, and maintenance. A standard product-oriented approach, with well-defined phases, provides management with an effective mechanism for controlling projects. It includes appropriate review points enabling management to continuously monitor and assess the project's progress and performance and, where necessary, reevaluate, reschedule, or even terminate development work. It assures mutual understanding and agreement between users and developers regarding the scope and definition of the system, what has to be done, and what is to be achieved before proceeding to the more technical steps of actually implementing the system. Each phase should be successfully and fully completed, reviewed, and approved by appropriate managers before the next phase is begun.

In the past, IRS has failed to obtain new computer equipment and data processing systems because key development activities were not properly accomplished or controlled by management. For example, in our previously mentioned March 1, 1978, report to the Congress on the Tax Administration System, we pointed out that the cost/benefit study

supporting the proposed \$1.8 billion system was deficient because about 50 percent of the anticipated benefits were unsupported, unrealistic, or otherwise questionable. Similarly, IRS had to drastically revise the scope of a proposed Collection Management Information System because, upon implementation, it was found that IRS lacked the computer capacity to handle the system. More recently, the Service dropped plans to acquire additional computer capacity at its service centers after the workload projections to support them were questioned by a congressional committee and IRS' Internal Audit Division.

In our opinion, these problems might have been avoided if management, both in Data Services and in the customer organizations, had a review process available to assure that the required developmental steps had been performed fully and effectively. For example, had the Tax Administration System cost/benefit analysis been subjected to a critical management review before requesting funds for the System, IRS would not have been placed in the position of supporting the System with a questionable justification. Similarly, management should have determined that IRS' computers were capable of handling the proposed Collection Management Information System before attempting to implement it. Standardized and formalized system development procedures provide a mechanism to assure management review and approval of the separate phases of the system development process.

As discussed previously, IRS has recently approved plans for a management information system that will capture and track resources expended on ADP projects in the developmental stage. In our opinion, the Service could derive greater benefits from the proposed system by stipulating that it be structured along a logical sequence of key activities, with regular reports for both Data Services and customers produced at the completion of appropriate phases. These decision points would correspond with those in a formalized document specifying what action is to be accomplished by Data Services and requesters in what sequence and what the product of the phase should consist of.

Project managers could be designated  
for new ADP applications

Another method commonly used to exercise control over major systems during their design and implementation is to formally designate a project manager responsible and accountable for assuring that proper procedures are carried out in a timely manner. While this concept is often utilized in practice, the Service does not have procedures specifically requiring it and several major systems have

been implemented without a project manager having been designated. Although there were no indications that these systems had experienced any specific problems due to the lack of a project manager, the concept is a sound management practice that would improve control and accountability during the system development process.

Each major data processing system should have a full-time project manager assigned as a central point of authority to provide day-to-day direction, coordination, and control for the development effort. The project manager should be given full authority to make decisions on allocating personnel resources; establishing plans, schedules, and budgets; and conducting most technical activities. He should be responsible for coordinating the various interrelated functions involved in system development and providing direction and leadership for the project team. He is the key person in negotiating tradeoffs during the course of a project and arranging meetings with the ADP Policy/Resource Board to keep them informed of project status, obtain required approvals, and refer problems outside his authority. Such matters usually relate to conflicting priorities, resource requirements not being met, schedule slippages, or events requiring a major change in project direction.

The project manager should be responsible for insuring that applicable Government and agency regulations are followed, pertinent Federal standards are applied, and that total system requirements are met. Generally, the project manager should be a user representative with a solid background in ADP and have a formal charter of authority defining his specific duties and responsibilities.

#### FURTHER EFFORTS NEEDED TO INCREASE COMPETITION IN ADP PROCUREMENT

IRS has recently instituted several corrective actions to improve management controls over the procurement of ADP equipment. Despite these efforts, securing adequate competition still appears to be a problem.

In November 1977, IRS' internal auditors reported several deficiencies in the Service's procedures for the procurement of ADP equipment. Among other things, the auditors found that there was a need for more competition in 8 of the 12 ADP procurements reviewed. In six of the eight procurements, there was no evidence that competition was sought--the contract specialists had accepted the contentions of the requestors that only one vendor could meet the needs. In the remaining two cases, negotiations

were conducted in such a manner that competition was limited to one vendor. Corrective action was promised in March 1978 to establish procedures increasing controls over procurements so that applicable policies, practices, and regulations would be followed.

Nevertheless, in May 1978, a computer equipment manufacturer protested the proposed awarding of a sole-source contract to another supplier on the grounds that IRS had not made sufficient efforts to encourage competition. GAO, in a decision dated October 27, 1978 (B-191949), sustained the protest agreeing that IRS had restricted competition.

Policies and procedures for Government agencies in acquiring major systems, including computer equipment, are set forth in Office of Management and Budget Circular A-109, dated April 5, 1976. Among other requirements, the circular provides for establishing clear lines of authority, responsibility, and accountability for the management of major acquisitions by formally designating a project manager to integrate and unify the management processes involved in the procurement process and to monitor implementation of the policies and practices set forth in the circular. Despite this requirement, IRS does not have procedures calling for project managers for major ADP procurements. However, while not formally required, the concept is used to some extent. For example, a project manager has been designated for the Service's program to enhance and update the major computers at the Service Centers.

By failing to comply with the circular and formally require project managers to supervise agency procurement actions, including securing adequate competition, IRS has not assured management's control and accountability over all major procurements.

IRS should require the designation of a project manager for each major procurement. The appointment of one individual to coordinate the various functions necessary to award contracts would better assure that the procurement meets all necessary requirements and would clearly establish accountability for actions taken. In those instances where equipment must be procured for a new system, the same individual designated project manager for developing the system could also serve as project manager during the procurement process.

## CONCLUSIONS

IRS has shown considerable initiative and concern in evaluating its computer operations. In the past several years, studies have been conducted internally and by outside consultants that have identified problems with how the Service plans for, acquires, and utilizes its ADP resources. In the past, these deficiencies have resulted in proposed acquisitions that were not properly justified, a proliferation of data processing systems that were sometimes duplicative or failed to meet users' requirements, and an unrealistic workload for Data Services that did not recognize the limited nature of the Service's ADP resources. While IRS has made significant progress towards improving its data processing operations in these areas, more can be done to increase accountability and control in the areas of ADP planning, system development, and procurement. Specifically, IRS needs to provide for more active involvement by the Commissioner's Office in the decisionmaking activities of the ADP Policy/Resource Board, measure all of its ADP costs, exercise greater management control over the development of data processing systems, and make further efforts to assure competition in its ADP procurements.

## RECOMMENDATIONS

We recommend that the Commissioner, Internal Revenue:

- Develop and implement a cost accounting system to measure total ADP costs, by user and specific application. This system should be designed to conform with GAO's guidelines for accounting for ADP costs, issued in 1978.
- Establish formalized and standardized system development procedures for Data Services and customer organizations that: (1) specify what actions are to be accomplished in what sequence and with what results, and (2) provide management a review mechanism with appropriate data furnished at key decision points.
- Establish procedures that will require the formal designation of project managers for major system development activities and for procurements of computer equipment.

## IRS COMMENTS AND OUR EVALUATION

By letter dated May 29, 1979, the Commissioner of Internal Revenue agreed with our recommendations regarding the planning, development, and procurement of ADP resources. (See app. I.) However, in commenting on our report, he was unclear as to the nature and extent of the actions IRS will take to implement the recommendations.

The Commissioner stated that he and the Deputy Commissioner would be actively involved in the formulation of policies and decisions relating to ADP, including the review of all major issues that have been considered by the ADP Policy/Resource Board. He disagreed, however, that the Deputy Commissioner should serve as the Board's chairman or participate with the Board in all of its deliberations. On the basis of the Commissioner's assurance that he and the Deputy will be actively involved in the key decisions of the Board, we are changing our position and have eliminated our earlier recommendation that the Deputy Commissioner serve as the Board's chairman.

IRS agreed with our recommendations that the Service measure ADP costs by user and specific application, establish formalized and standardized system development procedures, and require the formal designation of project managers for the development and procurement of major systems. As we have noted, the fact that IRS has already taken steps to implement these recommendations is commendable. However, care must be taken to insure that the recommendations are implemented properly and the additional measures discussed in this chapter are taken into account. IRS' comments were unclear as to what specific actions would be taken to implement recommendations.

In any event, IRS is moving in the right direction. How far it goes in this direction, however, remains to be seen, and can be better determined after the agency has had additional time to fully implement our recommendations.

## CHAPTER 3

### IRS NEEDS A COMPREHENSIVE ADP PERFORMANCE

#### MANAGEMENT PROGRAM

IRS needs a comprehensive ADP performance management program, centrally directed and controlled, to measure and evaluate the efficiency and effectiveness of its ADP operations, provide a basis for justifying future requests for ADP equipment, and assure greater control over the use of ADP resources. IRS has recognized this need and has recently established a centralized computer performance management program. For the program to operate effectively, IRS needs to address several problems. Computer performance data is often unreliable, inconsistent, and dispersed throughout the organization without coordination of its collection and use. Moreover, critical elements necessary for a comprehensive performance management system are lacking. As a result, some computers operate inefficiently and requests for additional computer capacity have not been adequately supported.

#### IRS NEEDS TO IMPROVE COMPUTER PERFORMANCE MANAGEMENT FUNCTIONS

IRS needs to establish a coordinated and systematic approach towards ADP performance management. While some computer programs (software) have been refined to improve efficiency and thus reduce the processing time required by the computer, these actions are not taken on a routine or systematic basis. Consequently, we found instances where IRS' computer software is inefficient and requires more computer capacity than is necessary. In addition, reports on equipment utilization produce unreliable and noncomparable data so that requests for new equipment cannot be properly supported. While IRS has made some improvements in measuring ADP performance, further efforts are needed to provide more coordinated, systematic, and effective evaluations of the Service's computer operations.

#### Computer performance management efforts need to be centrally controlled and coordinated

IRS' efforts to improve the efficiency and effectiveness of its ADP operations were not systematic or coordinated and did not provide a comprehensive evaluation of the Service's data processing activities. Centralizing the ADP performance management function at the headquarters level would facilitate the development of a system of Servicewide

ADP evaluations and significantly improve IRS' current performance management activities.

No one organization is responsible for computer performance management for all of IRS. Instead, each ADP facility is responsible for assuring its operations are conducted in the most efficient and effective manner. As discussed in chapter 1, IRS' 10 service centers are decentralized operations. While the Assistant Commissioner for Data Services and his staff at the national office are responsible for providing technical guidance and expertise to ADP activities in the field, direct authority over service center operations rests with the regional commissioners. To improve the coordination between Data Services and the regions, in September 1977, IRS established ADP program managers in each region responsible for, among other things, ensuring that computer operations and support activities in the region are efficiently managed. The effectiveness of the program managers in improving the Service's ADP operations is limited, however, because their specific functions and responsibilities concerning ADP performance management have not been clearly defined nor are their efforts in this regard centrally directed and controlled.

The Assistant Commissioner for Data Services agreed that performance management is an integral part of ADP operations and needs to be better implemented in IRS. Data Services submitted a proposal to the IRS Deputy Commissioner in January 1979 to establish a central ADP performance management group. The proposed group would evaluate performance from the viewpoint of hardware, software, systems design, and operational effectiveness and would make recommendations where warranted. As an interim measure, IRS would contract with the Federal Computer Performance Evaluation And Simulation Center to study its major computer systems. This proposal was approved at the conclusion of our audit in March 1979. We support IRS' efforts in this regard, however, we could not evaluate the potential effectiveness of the newly established unit since the specific functions and role of the unit have not yet been defined.

In defining the role of the newly created computer performance unit, IRS needs to give it responsibility for the design and implementation of a continuing program of coordinated and systematic evaluations of the efficiency and effectiveness of the Service's data processing operations. This program should be designed so as to make maximum use of the regional ADP program managers and specify their duties and responsibilities and their role in the performance management program.

As discussed below, although elements of computer performance evaluation already exist in IRS, computer software is not regularly assessed for efficiency, equipment utilization data is inaccurate and inconsistent, and some critical elements are missing. A well-defined, comprehensive ADP performance management program as well as a clear role for a centralized group in administering the program on a Service-wide basis would, in our opinion, provide an overall assessment of the efficiency of all of IRS' computer operations.

Computer software should be regularly assessed for improved efficiency

Data Services needs to utilize its newly established computer performance management group to evaluate new computer software for maximum efficiency before implementation. Existing software should be assessed on a routine basis, especially in cases where programs have been repeatedly modified or were originally designed for older equipment. Currently, Data Services does not regularly evaluate software to identify situations where efficiency can be improved. We were informed that resources are limited and priority must be given to developing new programs and modifying existing software to meet users' requirements. While systematic and regular software efficiency assessments may require additional resources, we believe that the resulting increase in the Service's computer capacity will justify the expense.

We learned of several instances where the efficiency of IRS software could be improved, thus increasing the Service's computer capacity. While we did not attempt to measure the extent to which the efficiency of all of IRS' software could be improved or the increase in computer capacity that would result, Data Services officials generally acknowledged that significant opportunities did exist for IRS to maximize software efficiency.

For example, IRS ADP managers told us that one major IRS computer application needing attention is the Information Returns Program, which compares information from businesses and organizations required to report wages, interest, dividends, and other payments to the recipient's tax master file at the National Computer Center. The purpose of the Program is to verify that all income has been reported. Currently, almost 270 million items are processed on the computer annually. However, when the Program was initiated in the 1960s, only a few million

items were to be processed annually. We were informed that the original computer software was used as a training vehicle for new programmers and, consequently, software efficiency was minimized. Although the Program has since grown tremendously in size and use, the software has not been refined to the extent necessary to optimize efficiency. The effects of the inefficient original software have been multiplied many times with the increased number of items processed.

In another instance, from 1965 to 1969, IRS replaced the computers used for master file processing at the National Computer Center with newer ones. Instead of rewriting the software to take advantage of the new computers' technological improvements which would reduce processing time, IRS continued to use software designed for older computers on the new computers. As a result, the capability of the newer computers to improve processing efficiency is not being achieved.

In addition, we were told software for the Direct Data Entry System, used at the service centers to convert tax returns to magnetic tape, could be refined to improve efficiency. The System was originally designed to input data in the same manner as computer punchcards which limits the amount of data that the computer can read at one time. Entering data in this manner is inefficient because it results in unnecessarily large files which require more time for the computer to read and write them. Since the system is technically capable of handling data at a much faster rate, the software could be revised to take advantage of these capabilities. Moreover, the files created by the Direct Data Entry System become the input for another service center computer system which results in the same limitations. Therefore, software revisions would not only improve the efficiency of the Direct Data Entry System but would also improve the efficiency of the other service center computer.

The experience of one IRS unit in testing some of its computer programs used at the National Computer Center illustrates the efficiencies achievable by improving computer software. By modifying the computer instructions used to rearrange the sequence of a file, IRS was able to reduce by 24 percent the time required to do the job. In another computer program, IRS reduced computer time by 13 percent and file size by 18 percent. This was achieved by increasing the amount of data read from the file by the computer at one time. Similar reductions in processing time were achieved by modifying

other computer programs to eliminate unneeded computations, processing only those portions of taxpayers' records which needed processing, and by processing only those portions of a file which were required to be processed.

Utilization data must be made comparable and reliable

IRS lacks a centrally coordinated and accurate system of reporting equipment utilization. Currently, utilization data is not comparable or reliable enough to provide an accurate measurement of day-to-day computer operations. The lack of such a system makes it difficult to adequately justify the need for additional ADP equipment.

Data Services and the service centers produce different equipment usage statistics which are not comparable or reliable. Each unit's computer programs often interpret the data differently even though each uses the same raw information. In addition, Data Services' equipment utilization reports do not differentiate between program and idle time, so usage levels can be overstated.

For instance, the following table compares the Cincinnati Service Center's computer utilization statistics for one computer system in June 1978 with data recorded by Data Services.

<u>Categories</u>	<u>Data Services</u>	<u>Cincinnati Service Center</u>
	<u>Percentages</u>	
System downtime (maintenance periods)	9.1	9.1
Idle time (time available to run programs but not used )	69.1	9.4
Program time (computer running programs)		64.7
No available data	7.6	-0-
Power off	<u>14.2</u>	<u>14.2</u>
Total time accounted for	<u>100.0</u>	<u>97.4</u>

Both Data Services and the Cincinnati Service Center statistics have reliability shortcomings, particularly with regard to idle time and program time. Data Services cannot indicate excess computer capacity because it does not separately account for program time and idle time. The Cincinnati Service Center does not account for time when no machine utilization data was available. This contributes to the fact that total time accounted for in Cincinnati was less than 100 percent.

Because IRS lacks a good ADP performance program, the Service was unable to justify a recently proposed procurement of additional computers for the service centers. A congressional committee successfully challenged IRS' assessments of the productivity of the existing computers. One contributing factor was that IRS did not account for computer idle time in its equipment utilization reporting system. This omission made the existing computer systems appear to be used more than they really were.

Also, in a March 1979 report, IRS internal auditors agreed that the acquisition of these computers was unwarranted because the Service could not support its computer workload estimates and existing service center computers could be managed more efficiently. Future workload estimates were based on a historical workload growth rate which included growth resulting from the addition of new computer applications. Moreover, computer usage measurements were based on elapsed clock time which is not an appropriate measure of the workload processed by a computer. The report also suggested ways in which existing computers at the service centers could be managed more efficiently. These included:

- Extending the time periods the computers are in use and leveling out the workload over the workday.
- Transferring some of the workload to another computer.
- Controlling and limiting new applications.
- Removing unneeded current applications.
- Determining the capacity of the current equipment. For example, IRS assumed that the computer system in question could only handle 30,000 transactions per hour. Internal audit tests, however, indicated that this figure was understated.

ADDITIONAL PERFORMANCE MANAGEMENT  
FUNCTIONS SHOULD BE ESTABLISHED

IRS needs to establish additional functions to make its newly established performance management program comprehensive. These functions include establishing performance goals and standards and evaluating the need for computer products. Without these additions, any ADP performance management program that is implemented cannot fully assure IRS of efficient and effective ADP operations.

Performance goals are needed  
to assess productivity

After developing reliable and consistent utilization data, IRS could use this information to establish goals and standards for acceptable levels of performance. IRS could then compare actual performance with standards, analyze material discrepancies, and provide incentives for improved operations. Currently, except for timeliness standards for producing computer output, IRS does not have a clear indication of acceptable levels of ADP performance.

Since neither detailed ADP performance goals nor comparative performance data are available, the service centers do not have an adequate system of measuring ADP performance or assessing the relative efficiency of ADP operations. This problem is further compounded by the lack of an accurate equipment utilization reporting system as discussed earlier in this chapter, which would serve as the foundations for establishing goals and standards.

Computer products should  
be reviewed for effectiveness

Data Services lacks a means of routinely assessing the effectiveness of computer products. Such assessments should be systematic and should measure the extent to which quality, availability, and timeliness requirements established by users are met. They will help assure that IRS' limited ADP resources are producing effective and useful products.

Although not on a routine basis, IRS has made limited studies of the usefulness of computer-produced management information reports. For example, in 1976, an internal ad hoc study group identified general user complaints but did not identify specific problem reports. Since then, another internal review group has spent considerable time and effort in determining information needs at various levels of management and whether these needs were being

met. In May 1978, they reported that some computer products were difficult to understand, untimely, incomplete, no longer needed, or contained excessive information.

While we did not attempt to determine the amount of ADP resources used to produce these products, apparent user dissatisfaction with them suggests that IRS needs to provide a systematic and comprehensive review mechanism to evaluate ADP systems after they are implemented. Systems and computer products should also be evaluated on a periodic basis to determine if they continue to meet users' needs.

The review process would increase the efficiency of IRS' ADP operations and improve effectiveness. Refining and modifying existing computer applications to better meet users' requirements would reduce requests for new computer products. Computer resources being used for marginally effective or unnecessary products could be redirected towards new systems.

#### CONCLUSIONS

While some efforts were made in the past to evaluate and improve the efficiency and effectiveness of the Service's computer operations, they were not systematically applied and resulted in noncomparable and unreliable measurements. Moreover, critical elements of an ADP performance management program, such as performance goals and periodic assessments of computer products, were not conducted. As a result, IRS could not be certain that its data processing operations were as efficient as possible or that proposals for additional ADP capacity were adequately supported.

The comprehensive computer performance management program recently established by IRS, if properly implemented, should help to alleviate the conditions described in this chapter.

The size and importance of computer operations in IRS makes management's control over these resources vital. Management needs reliable information as to what the current ADP capacity is and whether these resources are being used at maximum efficiency in order to properly plan for and justify additional ADP resources. A comprehensive computer performance management program, centrally directed and consistently applied, is a means of providing management this information.

## RECOMMENDATIONS

We recommend that the Commissioner of Internal Revenue have the recently approved computer performance evaluation unit at the national office develop and implement a comprehensive ADP performance management program on an agencywide basis. This unit should be responsible for a systematic, coordinated, and comprehensive approach towards performance management with sufficient authority and independence to insure the efficient and effective use of ADP resources.

Some of the specific functions of this unit should be to:

- Set priorities to accomplish performance management work.
- Develop a systematic approach towards assessing software and computer output for efficiency and effectiveness and set priorities for needed modifications. In carrying out this function, the benefits of improving software and computer output should be weighed against the costs of doing so.
- Improve the comparability and accuracy of equipment utilization data.
- Develop and implement performance goals and standards.
- Assure proper justification of new equipment.
- Consult on the design of new applications to assure maximum efficiency and effectiveness.
- Specify the duties and responsibilities of the regional ADP program managers and their role in the performance management program.

## IRS COMMENTS AND OUR EVALUATION

In his written comments on our report, the Commissioner agreed that a comprehensive ADP performance management program was needed. As noted in this chapter, IRS has recently established a centralized group at the headquarters level to administer such a program. However, the specific functions of this group as well as the elements of the program they are to administer have not been defined.

IRS' response was unclear as to whether the ADP performance management program the agency plans to implement will incorporate the features discussed in this chapter.

We continue to believe these aspects of measuring computer performance are necessary for an effective management program and urge IRS to assure that they are taken into account when the program is designed.

## CHAPTER 4

### SCOPE OF REVIEW

We did our review at the IRS National Office in Washington, D.C., and the Cincinnati, Ohio, service center and regional and district offices. We reviewed various internal evaluations of ADP operations and the corrective actions taken and interviewed management at the national and field level. We coordinated our work with ongoing reviews being conducted by the Internal Audit Division, the Offices of the Assistant Commissioner for Planning and Research and Data Services, and others.

## COMMISSIONER OF INTERNAL REVENUE

Washington, DC 20548

MAY 15 1979

Mr. Richard Fogel  
Associate Director  
General Government Division  
U.S. General Accounting Office  
Washington, DC 20548

Dear Mr. Fogel:

This letter is in response to your request for our comments on a draft of GAO Report GGD-79-48. The matters covered in your report parallel those covered in recent IRS studies and Internal Audit reports. As you acknowledge, IRS has already launched efforts aimed at making substantial improvements in its management and control of ADP resources.

I have the following comments concerning your major recommendations beginning on page iii of your report.

- I can assure you that the Deputy Commissioner and I will remain actively involved in the formulation of policies and decisions relating to ADP, including the review of all major issues considered by the ADP Policy/Resource Board. I do not agree, however, that the Deputy Commissioner should serve as Chairman of the ADP Policy/Resource Board or participate as a member of that Board in all of its deliberations.
- I agree that the Service needs a system to measure ADP resources by user and specific application, and as you recognize in your report, we have begun to develop such a system.
- I agree that the Service needs formal standard system development procedures. A comprehensive project control system that monitors the programs of a project through the "development pipeline" from systems synopsis through systems acceptability testing and installation was recently installed. This action supplements longstanding standard operating procedures that define the duties and responsibilities of our systems analysts and programmers, including the reporting of status against significant milestones.

Mr. Richard Fogel

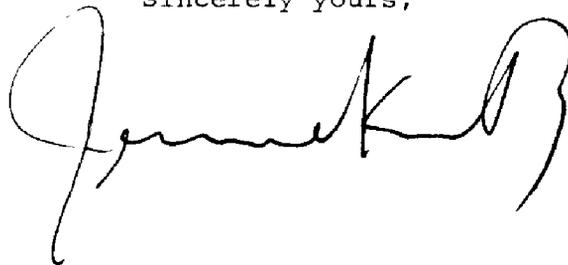
- I agree that the Service needs formally-designated project managers for major acquisitions, and, in fact, project managers have been employed for such projects as the Equipment Replacement Program (ERP), the Servicewide MIS program and the Information Returns Program (IRP). However, I believe that the project manager must share responsibilities with the contracting officer during the contract negotiation and contract administration phases of the acquisition of new equipment systems.
- I agree that a comprehensive ADP performance management program is required, and as you have noted in your report, IRS has established such a program.

Our general agreement with most of your major recommendations should not be taken as agreement with all of the explanatory material in your report. Our staffs have discussed these differences and since they do not appear to affect either your recommendations or our reaction to them, there is no point in pursuing the matter further.

I very much appreciate the work you have done in this important area and we will take your comments and observations into account in our continuing efforts to improve the management of our ADP resources.

With kind regards,

Sincerely yours,

A handwritten signature in black ink, appearing to read "James K. B.", written in a cursive style.

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