

GAO

Report to the Administrator of the
National Aeronautics and Space
Administration

August 1991

FINANCIAL
MANAGEMENT

Actions Needed to
Ensure Effective
Implementation of
NASA's Accounting
System



144678

**Accounting and Financial
Management Division**

B-243962

August 21, 1991

The Honorable Richard H. Truly
Administrator, National Aeronautics
and Space Administration

Dear Admiral Truly:

This report provides the results of our review of the National Aeronautics and Space Administration's (NASA) efforts to design and develop the NASA Accounting and Financial Information System (NAFIS). NAFIS is planned to standardize NASA's accounting systems at Headquarters and its nine field Centers. Our work on NAFIS was performed as part of a broader review of NASA's accounting and financial management systems and operations. We are providing this report on NAFIS at an early stage in its development so that NASA can address concerns identified before they adversely impact the system's implementation and operation.

Results in Brief

NASA's current accounting and reporting systems are costly and outdated and are not in compliance with the Office of Management and Budget's (OMB) mandate for a single, integrated financial management system. The NAFIS project has been undertaken by NASA to improve these systems. However, NASA's planning for the project was inadequate in the following areas: (1) it did not identify all NAFIS development costs and milestones or the approach for interfacing all related financial systems, (2) some of its analyses to support NAFIS development decisions were inaccurate, incomplete, or not performed at all, and (3) it did not finalize and approve a project plan for overall management of NAFIS, including conversion and implementation efforts, to ensure the timely and effective completion of the NAFIS system.

NASA's original cost estimate in December 1988 for full implementation of NAFIS was \$25.9 million. As of April 1991, this estimate increased to \$45.7 million but still did not include all costs, such as the total costs for hardware, software, data conversion, data cleanup, in-house personnel, and travel. NASA planned to fully implement the accounting system portion of NAFIS at its nine field Centers by June 1996, although its 5-year financial systems plan for fiscal year 1992 does not identify specific system conversion and implementation dates between the completion of system design in October 1992 and full accounting systems implementation in June 1996. Moreover, NASA's Office of Inspector General (OIG) has not been involved in the NAFIS effort to provide needed oversight of the

system development process. If properly implemented, NAFIS could improve NASA's current accounting and reporting systems. However, due to inadequate planning and analysis, NAFIS (1) will cost significantly more and take longer to fully implement than currently estimated and (2) will not meet OMB's mandate for an integrated financial management system.

Background

In 1987, NASA initiated a project for developing NAFIS to standardize its accounting systems agencywide, achieve potential cost savings, and meet OMB's mandates for financial systems improvements. NAFIS program and project management is provided by the Office of the Comptroller, while it is being developed under the auspices of the Automated Information Management Program¹ within NASA's Office of Management. The project includes the development of the standardized Installation-level Accounting System, which is to operate at each of NASA's nine field Centers, and a redevelopment of the existing Agencywide Reporting System, which is to be used by NASA Headquarters to consolidate and report financial data received from the Centers. NAFIS is to provide standard, agencywide accounting for and control over seven functions: funds control, general ledger, accounts payable, accounts receivable, travel, property, and collection register.

Prior to initiating the development of NAFIS, NASA surveyed the primary accounting systems at each of its Centers and at Headquarters. The survey showed that (1) most system designs were based on outdated technology, thereby making major system changes difficult, (2) common hardware and software were not in use, which prevented the exchange of applications software among Centers, (3) maintenance of unique Center-level systems was costly, (4) many nonintegrated functions necessitated redundant data entry and manual reconciliations, and (5) most Centers were planning major upgrades to their systems. Based on these results, NASA performed a project feasibility study and a cost/benefit analysis, including an alternatives analysis, to form the basis for the recommended approach to designing and developing NAFIS.

According to NASA, the implementation of NAFIS will result in a number of benefits. For example, in addition to standardizing accounting and implementing the Standard General Ledger, NASA believes the system will (1) reduce manual effort and redundancies, (2) improve control

¹The Automated Information Management Program was created in 1984 to provide NASA-wide automated administrative information systems.

over funds and other accounting transactions, (3) increase end-user accessibility to data, (4) result in more timely and consistent implementation of new technology and NASA and federal policy, (5) provide interfaces with other standard NASA systems, and (6) reduce software maintenance and new systems development funding requirements.

NASA's approach to the NAFIS accounting system standardization effort has been to use the existing Marshall Accounting and Resource Tracking System, currently in operation at the Marshall Space Flight Center, as a functional baseline for defining requirements for the new Installation-level Accounting System. The Marshall system is an integrated accounting system that operates on the agency-approved IBM-compatible hardware and ADABAS/NATURAL software.² The Installation-level Accounting System is to be implemented at each Center location using separate IBM-compatible hardware and a copy of the standard ADABAS software. The Agencywide Reporting System redevelopment is underway to allow NASA Headquarters to receive standard Installation-level Accounting System data from the Centers.

Objectives, Scope, and Methodology

The objectives of our review were to determine whether (1) NASA's efforts to develop NAFIS were in conformance with federal guidance and requirements, (2) NAFIS development was adequately planned, and (3) any lack of conformance with system development guidelines we identified would jeopardize the successful implementation of NAFIS.

We reviewed NASA's documentation on the NAFIS design and development, including installation-level predefinition study reports, the project feasibility study and cost/benefit analysis, the draft NAFIS project plan, and the functional requirements documents to determine whether NASA followed federal agency guidance and requirements for planning, designing, and developing financial management systems. Appendix I lists the specific federal system development guidance pertinent to our review. We reviewed NASA's fiscal year 1991 and 1992 5-year financial systems plans to determine if NASA had complied with requirements of OMB Circular A-127³ in reporting on the NAFIS project. We also considered

²ADABAS is a widely accepted database management system software, and NATURAL is a fourth-generation programming language.

³OMB Circular A-127, "Financial Management Systems," December 19, 1984, prescribes policies and procedures to be followed by executive agencies in developing, operating, and reporting on financial management systems.

whether NAFIS, as designed, would satisfy the financial system requirements of the Chief Financial Officers (CFO) Act of 1990 (Public Law 101-576).

We supplemented these reviews by interviewing NASA financial managers, NAFIS project officials, representatives of NASA's Office of Inspector General, and Automated Information Management Program officials. Because NASA does not intend for NAFIS to be fully operational for several years, we did not attempt to predict whether it would operate as envisioned or contain adequate internal controls.

We have been monitoring the NAFIS project since the inception of our broader NASA financial systems and operations review in February 1990. Our in-depth audit work, however, was conducted between January 1991 and May 1991, primarily at NASA Headquarters, Washington, D.C., and at the Marshall Space Flight Center, Alabama. NAFIS project officials at these locations are responsible for making top management decisions and maintaining NAFIS documentation. We also performed limited work to define the current financial systems environments and conversion needs at the Goddard Space Flight Center in Greenbelt, Maryland; the Johnson Space Center in Houston, Texas; and the Kennedy Space Center, Florida. Our review was performed in accordance with generally accepted government auditing standards. The NASA Office of Inspector General and the NASA Office of the Administrator provided written comments on a draft of this report. These comments are presented in appendixes II and III, respectively.

NASA Has Not Adequately Planned the NAFIS Project

GAO's Policy and Procedures Manual for Guidance of Federal Agencies, Title 2, appendix III, states that it is critical that financial systems be developed as part of an overall plan which (1) addresses agencies' needs for financial information and (2) provides a structured approach to designing an integrated financial management system. Agencies' systems development projects must meet requirements of laws, accounting principles and standards prescribed by the Comptroller General, and OMB's Circular A-127 as a means for setting priorities and allocating resources. In addition, the CFO Act requires that agencies' financial systems plans be developed as part of a comprehensive financial management plan.

NASA did not initiate the NAFIS project under the framework of an overall financial management plan that would provide a structured, agencywide approach for developing its financial management systems. NASA's

5-year financial systems plans for fiscal years 1991 and 1992 required by OMB did not identify all NAFIS costs and milestones or adequately describe its approach for interfacing related financial systems as a means for setting priorities and allocating resources. In addition, the NAFIS project will not result in a system that achieves OMB or CFO Act requirements to integrate or interface⁴ budgeting and accounting systems.

Some NAFIS Costs and Milestones Omitted

OMB Circular A-127 requires that detailed information on costs and milestone dates to support management decisions, project monitoring, and budget requests be reported in agencies' 5-year financial systems plans. In 1988, NASA estimated the cost of NAFIS to be \$25.9 million. In its fiscal year 1992 5-year plan, NASA reported that the project would cost about \$38.2 million. This estimate was recently revised to \$45.7 million, but does not include all costs for hardware, software, in-house personnel, travel, data conversion, and current financial system improvements. The NAFIS predefinition study, which cost nearly \$1 million, was also excluded from the 5-year plan cost estimate. According to NAFIS project officials, a large portion of the increase is the result of a better understanding of the technical requirements and associated costs of the project, not the inclusion of new requirements.

When we questioned NASA officials regarding the excluded costs, they advised us that the cost of hardware for the developmental Center—the Marshall Space Flight Center—was included in the 5-year plan. However, costs of application-specific hardware and hardware supporting multiple administrative applications at other Centers were not included. NAFIS officials told us that the information on these costs would be difficult to identify because the use of standardized hardware for several systems makes it difficult to segregate costs by individual system. According to NAFIS officials, the costs of software development, testing, and implementation for both the Installation-level Accounting System and the Agencywide Reporting System were included in the plan, but software costs for interfacing the installation-level system with Center-unique systems were excluded. NASA officials told us that they do not accumulate costs for in-house personnel and travel. In addition, we found that NASA does not have a cost code for recording NAFIS costs in its accounting systems.

⁴An integrated system would supply data for several different requirements from a common source or data base, whereas an interfaced system would permit data from separate sources or systems to be transferred between systems.

Other costs and milestones associated with the development effort, such as the Centers' costs to correct current systems data and to convert to the new accounting system, are also not included, according to NAFIS officials, because these efforts were not directed by Headquarters and are the Centers' responsibility. Further, NASA's fiscal year 1992 5-year plan does not contain detailed milestones for NAFIS between the completion of the detailed system design phase in October 1992 to the completion of the coding and testing phase in January 1995. Neither have specific milestones been included in the plan for full implementation at each Center of the Installation-level Accounting System by 1996.

The fact that NASA has not identified all NAFIS costs or associated milestones indicates that NAFIS will cost significantly more and take longer to fully implement than currently estimated. Unless NASA identifies and reports all NAFIS project costs, it cannot ensure that adequate resources will be available to implement NAFIS within appropriate time frames.

All System Interfaces Not Identified

NASA's 5-year financial systems plan does not adequately identify all NAFIS interfaces with other planned or existing financial systems as required by OMB Circular A-127. An example is the Control Tracking System which is a planned financial system that is intended to automate issuance of allotments and resource authority for budgetary funds control and program management by interfacing with NAFIS. The need to automate this function was identified in 1988 in the NAFIS predefinition study reports. NASA does not have firm cost or milestone information for the Control Tracking System which ties to NAFIS implementation. Also, NASA has not discussed in its fiscal year 1992 5-year plan its approach for interfacing NAFIS with other existing or planned agencywide financial-related systems such as the NASA Equipment Management System, the NASA Supply Management System, the NASA Property Disposal Management System, or its procurement and purchasing systems. Currently, financial data entered into these systems must be separately entered into the accounting systems. One of the requirements of OMB Circular A-127 is that agencies interface their accounting systems with financial-related systems such as property, procurement, and purchasing.

NAFIS Will Not Comply With All OMB Financial System Mandates

The NAFIS project, as currently planned, will not achieve full compliance with all OMB mandates for a standard, integrated financial management system. OMB Circular A-127 requires that agencies develop a single, integrated financial management system for planning, budget formulation

and execution, and program and administrative accounting. The CFO Act also requires that agencies develop modern financial management systems which integrate budgeting and accounting systems as part of an overall governmentwide strategy for improving financial systems. Our review of the NAFIS project disclosed that although NAFIS is intended to standardize NASA's accounting systems and implement the Standard General Ledger, it will not provide for integration of accounting and budgeting information.

At this time, NASA has no standardized system for planning and budget formulation. Planning and budget data must currently be entered separately into accounting and budgeting systems at each of the nine NASA Centers. Timing differences in entering changes in funding allotments and resource (program/project) authority into the various budgeting and accounting systems complicate funds control, program and resource management, and financial reporting.

NAFIS project officials informed us that they recognize the importance of having an integrated financial management system, but efforts to standardize and integrate both budgeting and accounting at the same time were not feasible because of the large systems involved. NAFIS officials advised us that they would consider standardizing planning and budgeting systems after NAFIS implementation. They stated that they would favor interfacing budgeting and accounting systems over integrating the systems. OMB officials informed us that it is acceptable for agencies to electronically interface systems as an alternative to integrating systems. NASA, however, currently has no written plans for standardizing planning and budget formulation systems, or for integrating or interfacing standardized budget planning and formulation systems with NAFIS.

NASA Did Not Perform Complete NAFIS Project Analyses

NASA did not perform some analyses, or adequately perform other analyses, needed to support NAFIS system design and development decisions. According to guidance developed by the Department of Commerce's National Institute of Standards and Technology (NIST), analyses should be performed in order for management to select the most feasible alternative based on a need for the system improvement and the risk to assets and resources and on a comparison of costs and benefits. While NASA performed the required feasibility study and cost/benefit analysis, its assessment of alternatives was not adequate.

Hardware and systems software needs were not assessed because, in 1984, NASA established an agencywide standard that all administrative systems be developed to run on IBM-compatible hardware and ADABAS software. Our May 1990 report⁵ concluded that NASA did not perform adequate analyses of available hardware and database management systems software to support this policy decision. NASA began to perform hardware capacity studies for the NAFIS project in August 1990. However, at that time, the decision had already been made based on the cost/benefit analysis to develop a standard, decentralized system. Our review of three capacity studies done by NASA between August 1990 and February 1991 showed that significant upgrades to existing systems hardware will need to be made before the systems can accommodate NAFIS as well as other current and future financial systems operating on the same hardware. As a result, NASA will, in all probability, incur additional costs to increase hardware capabilities at its nine Centers.

NASA's cost/benefit analysis for NAFIS provides limited information for determining which of four systems alternatives⁶ would likely be the most cost-beneficial. According to Federal Information Processing Standards (FIPS) Publication 64, the purpose of a cost/benefit analysis is to "provide managers, users, designers, and auditors with adequate cost and benefit information to analyze alternative approaches." Our review of NASA's analysis disclosed, that of the 47 system development and operation cost elements, 35 (76 percent) did not change regardless of the alternative. Also, 8 of the 47 cost elements (including automated data processing (ADP) hardware and software costs for the Agencywide Reporting System) showed zero costs across all alternatives. Recurring personnel costs (both functional and ADP-related), which represented over 50 percent of total costs for each of the four alternatives, and costs for nonrecurring telecommunications equipment would be expected to differ in a centralized environment versus a decentralized environment. However, we found these cost estimates to be identical for all alternatives.

Finally, total estimated costs for two of the alternatives were mathematically incorrect and understated the system development life cycle costs identified for the NASA-developed centralized and the cross-servicing

⁵Administrative Systems: NASA Should Reassess Its AIM Program and Rescind Its IBM-Compatible Policy (GAO/IMTEC-90-41, May 1, 1990).

⁶The four systems alternatives evaluated by NASA were: NASA-developed, decentralized; NASA-developed, centralized; off-the-shelf, decentralized; and cross-servicing, where one agency provides data processing and accounting services for one or more other agencies.

alternatives by about \$7 million and \$5 million, respectively. As a result of inadequate project analyses, NASA cannot ensure that it has chosen the most feasible alternative for the design and development of NAFIS.

NASA Has Not Fully Addressed Other NAFIS Development Issues

NASA has not finalized and approved a NAFIS project plan to guide the overall management of the system development effort through completion. An approved project plan would also provide support for NAFIS data in the 5-year financial systems plan. Much of the project remains to be defined and, at present, the responsibility for determining how the efforts will be undertaken and ensuring that sufficient funding is available lies primarily with NASA's Centers. NAFIS officials have not issued formal guidance to the Centers for (1) ensuring the timely correction of Center-level inaccurate and unreconciled accounting data, (2) preparing system conversion plans, including funding, staffing, and training requirements for the Centers, or (3) formulating plans for defining and implementing the Agencywide Reporting System.

NAFIS Project Plan Not Approved

As of July 1991, NASA management had not finalized, and the NASA Comptroller had not approved, a NAFIS project plan. NASA has been attempting to prepare a NAFIS project plan since at least 1989 in response to the requirements of its Automated Information Management Program. The Program requires that a project plan be prepared for all administrative system development projects after the initiation phase is concluded. The project plan represents the basic planning document for overall management of a systems project. Title 2, appendix III, calls for preparation of a project plan to guide the systems development effort, its budget, staffing, and scheduling. The guidance also addresses the need to ensure that (1) reliable and complete data are converted from the existing system to the new system, and (2) realistic costs and milestones are established for ensuring that potential problems are minimized and timely and effective systems conversion and implementation takes place.

According to NAFIS officials, a previous attempt to prepare a plan failed due to a lack of necessary information. We determined that the draft NAFIS project plan does not fully identify costs, milestones, interfaces with related financial systems, and systems conversion needs. The draft project plan states that a conversion plan will be developed, without specifying a time frame, and that a conversion method will be dependent upon the operating environment at each installation. A project plan

which addresses these issues is needed to guide the NAFIS implementation.

Unreliable Data Need Correction Prior to NAFIS Implementation

NAFIS implementation is to encompass operation of a standard Installation-level Accounting System at each NASA Center and operation of the Agencywide Reporting System at NASA Headquarters. Efforts to convert to the installation-level system at each NASA Center should entail a cleanup of incorrect and unreconciled data at some Centers. An assessment of the level of effort needed to move from the Centers' current systems environments to the standard Installation-level Accounting System should also be undertaken.

We identified inaccuracies resulting in unreliable accounting data reported by accounting systems in operation at three of the four Centers where we performed limited work to determine conversion needs. These inaccuracies were the result of (1) remaining cleanup work still needed at one Center from a prior system conversion effort and (2) unreconciled differences in accounting data at two additional Centers. The unreconciled differences were caused by the need to enter data separately into multiple, nonintegrated systems. Some of these data discrepancies are over 10 years old and may be difficult to resolve due to their age. We did not identify problems in unreliable accounting data at the fourth Center. While the individual Centers currently have efforts underway to correct these data, there are no established milestones for completing the efforts.

In addition, NASA Headquarters has not been able to resolve discrepancies in reimbursable reporting by the Centers. Reimbursable reporting covers work performed by one Center for another Center or another government agency, such as the Air Force, where costs are to be repaid by the organization requesting the work. These discrepancies are caused by the entry of data at various levels of detail into separate accounting systems. Currently, fiscal year-end reconciliations are not always performed at all locations on the data. Title 2, appendix III, stresses the importance of ensuring that reliable data are converted from existing systems to the new system as a key element to successful system implementation.

NASA Has Not Fully Assessed Centers' System Conversion Needs

NAFIS project officials have not fully assessed the Centers' needs for converting to NAFIS. Instead, the responsibility for accounting system conversion, including budgeting for this effort, has been placed with the Centers because the unique accounting systems at each Center will require different conversion considerations. This process is to involve installing NAFIS hardware and software and converting existing data files to the format required by NAFIS. Detailed planning and control over systems conversion efforts will be needed to ensure that potential problems are minimized and unnecessary costs are avoided. Realistic schedules for equipment installation, data file conversion, system testing, and personnel training are key to successful system conversion and implementation.

NAFIS project officials advised us that plans for systems conversion, including milestones and budget estimates, will not be formulated by the Centers until site implementation plans are prepared in mid-1992. NASA has placed the responsibility with each of its Centers for identifying resource requirements and milestones for data cleanup, staffing and training, and hardware. However, NASA has not yet provided overall guidance to the Centers for identifying and reporting these items.

NASA Has Not Fully Addressed Agencywide Reporting System Redevelopment

The redevelopment of the existing Agencywide Reporting System is important to the success of NAFIS to enable NASA's financial reporting systems to be compatible with the standardized, Installation-level Accounting Systems. According to NASA officials, the Agencywide Reporting System will be made up of three subsystems: the General Ledger Accounts System, the Financial and Contractual Status System, and the Agency Reimbursable Reporting System. These subsystems are to consolidate, reconcile, and report financial data received from the Centers. In addition, the general ledger subsystem is to implement the Standard General Ledger.

NASA's current, nonintegrated reporting systems at Headquarters and the Centers result in duplicate data entry and processing, and the need for manual review and adjustments before financial reports can be issued to users. NAFIS officials advised us that the Agencywide Reporting System redevelopment is intended to provide program, project, and functional users at Headquarters with more timely and accurate information and eliminate two reporting systems currently in use.

Although NASA recognizes the importance of the Agencywide Reporting System redevelopment and the need to implement it in concert with

Center-level accounting system conversion efforts, it has not fully assessed what the upgrade will entail. For example, plans for automation of certain reporting processes and for converting programming languages have not been prepared.

Because NASA has not identified what the reporting system redevelopment will entail or identified the Centers' systems conversion needs beyond those of the developmental Center, it cannot ensure that the reporting system's implementation will be complete at the time of the Centers' implementation of the Installation-level Accounting System.

NASA's Office of Inspector General Has Not Been Involved in the Project

While NASA has relied on Headquarters and Center-level managers and accounting system personnel to plan and define the systems requirements and needs of prospective users, NASA's Office of Inspector General (OIG) has not been involved in the system design or in reviewing or overseeing the development of the NAFIS project. Title 2, appendix III, states that involvement of internal auditing/inspector general organizations is important to the success of any system development project.

During our financial management reviews, we have consistently emphasized that agencies' internal auditors or OIG staff can provide a valuable oversight function throughout the life cycle of a financial system development project. While system development project officials have responsibility for ensuring that the system design is cost-effective, that adequate internal controls are built into the system, and that the system has appropriate audit trails for determining if it is operating as designed and in accordance with applicable policy, the auditor provides quality assurance over the development effort. In addition, auditors can assess system test programs to help ensure that they include sufficient provisions to adequately test the system prior to implementation.

We questioned the lack of auditor participation in the NAFIS project with representatives of both the NAFIS project and the OIG. These officials informed us that the OIG performs very little accounting systems work. Also, NAFIS project and OIG officials told us that they did not feel that OIG staff have expertise in the systems development area. Because of this, NASA did not have any plans to involve the OIG staff in future NAFIS development and implementation efforts. Without the involvement of OIG staff possessing the requisite expertise, NASA runs the risk that NAFIS may not be subject to the scrutiny needed to ensure development of an acceptable operational system. Also, if the OIG lacks systems expertise, it will not be able to audit the automated system when completed.

Conclusions

If properly implemented, NAFIS could provide NASA with a significant improvement over the costly, outdated, and nonintegrated accounting and financial reporting systems currently in place. However, NASA's planning for the NAFIS project does not identify all systems development costs, milestones, and related system interfaces, and NASA has not adequately performed all analyses or finalized and approved a project plan to guide systems development, conversion, and implementation. To date, the NAFIS development effort has been undertaken without the involvement of NASA's OIG. Because of this, NASA runs the risk that the NAFIS project has not been afforded the quality assurance and scrutiny needed for a major systems development effort. Due to NASA's inadequate planning and analysis, NAFIS will cost significantly more and take longer to fully implement than currently planned and will not meet OMB's mandate for an integrated financial management system.

Recommendations

We recommend that you direct the Comptroller to ensure that the agency's 5-year financial systems plan discloses

- all project costs and milestones for developing and implementing NAFIS, including those for hardware and software, data cleanup, and data conversion of the Installation-level Accounting System and the Agencywide Reporting System;
- all costs and milestones for the Control Tracking System project and other financial-related NAFIS system interfaces; and
- NASA's plans to standardize its planning and budgeting systems, and integrate or interface these systems with NAFIS, to achieve the governmentwide mandate for a single, integrated financial management system.

We also recommend that you direct the Comptroller to ensure the approval, and subsequent implementation of, a NAFIS project plan which addresses all costs, requirements, and milestones for conversion to and implementation of the Installation-level Accounting System and the Agencywide Reporting System.

Finally, we recommend that the Inspector General develop the necessary expertise within the OIG staff to ensure the performance of reviews and oversight of the NAFIS development project, as well as reviews of NASA's automated financial systems.

Agency Comments and Our Evaluation

NASA's Office of Inspector General agreed with our recommendation to develop the necessary financial systems oversight and review expertise within its staff and has begun efforts to assume this responsibility. The Inspector General's letter is included in appendix II.

NASA's Office of the Administrator generally agreed with our recommendations. It also agreed that NASA's 5-year financial systems plan did not include all costs and milestones related to the NAFIS project, but stated its plan complied with OMB requirements. However, NASA's 5-year plan did not include some required costs and milestones. For example, NASA agrees that it did not include costs and milestones for the Control Tracking System. NASA's Office of the Administrator's comments and our response are included in appendix III.

This report contains recommendations to you. As you are aware, the head of a federal agency is required by 31 U.S.C. 720 to submit a written statement on actions taken on these recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations no 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.

We are sending copies of this report to the Director, Office of Management and Budget, and other interested parties. Please contact me at (202) 275-9449 if you have any questions concerning this report. Major contributors to this report are listed in appendix IV.

Sincerely yours,



Donald R. Wurtz
Special Assistant to the
Assistant Comptroller General

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Abbreviations

ADP	automated data processing
CFO	Chief Financial Officer
FIPS	Federal Information Processing Standards
GAO	General Accounting Office
NAFIS	NASA Accounting and Financial Information System
NASA	National Aeronautics and Space Administration
NIST	National Institute of Standards and Technology
OIG	Office of Inspector General
OMB	Office of Management and Budget

System Development Guidance Pertinent to Our Review

The following are the federal system development guidelines and requirements that we used to evaluate NASA's conformance in developing the NAFIS project and to assess how any lack of conformance would jeopardize the successful implementation of NAFIS.

1. Guidelines for Documentation of Computer Programs and Automated Data Systems for the Initiation Phase, FIPS 64, Department of Commerce, National Institute of Standards and Technology, August 1, 1979.

Provides guidance in determining the content and extent of documentation needed for the initiation stage of the software life cycle.

2. Title 2, appendix III of the General Accounting Office's Policy and Procedures Manual for Guidance of Federal Agencies, August 1987.

Prescribes accounting system standards and requirements that agency heads must observe in establishing, maintaining, and reporting on their systems of accounting and internal controls as required by 31 U.S.C. 3512.

3. Critical Factors in Developing Automated Accounting and Financial Management Systems, General Accounting Office, January 1987.

Presents 14 major factors that are critical in developing automated accounting and financial management systems including systems methodology, functional requirements, documentation, overall plan, management commitment, and quality assurance review.

4. Federal Information Resources Management Regulations, General Services Administration.

Prescribe requirements for the acquisition and management of information resources, including determination of need and requirements and analysis of alternatives.

5. "Financial Management Systems," OMB Circular A-127, December 19, 1984.

Prescribes policies and procedures for executive agencies to follow in developing, operating, evaluating, and reporting on financial management systems.

Comments From NASA's Office of Inspector General

NASA

National Aeronautics and
Space Administration

Washington, D.C.
20546

Reply to Attn of: Office of Inspector General

JUN 21 1991

Mr. Donald H. Chapin
Assistant Comptroller General
Accounting and Financial
Management Division
General Accounting Office
Washington, D.C. 20548

Dear Mr. Chapin:

This is the National Aeronautics and Space Administration (NASA), Office of Inspector General's (OIG) response to the General Accounting Office (GAO) draft report GAO/AFMD-91-74 titled, "Financial Management: Actions Needed to Ensure Timely and Cost Effective Implementation of NASA's Accounting System," dated June 1991.

The draft report provides an assessment of NASA's efforts to design and develop the NASA Accounting and Financial Information System (NAFIS). One of the draft report's recommendations is that the "Inspector General develop the necessary expertise within the OIG staff to ensure the performance of reviews and oversight of the NAFIS development project, as well as reviews of NASA's automated financial systems."

We recognize that this office has a responsibility for the oversight of NASA computer systems under development, including NAFIS. We will be developing the expertise and experience necessary to conduct these technical audits. In October 1990, we established the Information Technology Audit Division, which is now being staffed. Their first task is to survey the NASA information resources management environment. This will permit us to determine where we should focus resources.

Recognizing that the standardization of administrative systems through NASA's Automated Information Management (AIM) program is important, we included an EDP audit of this area in our FY 1991 Audit Plan. Our intent is to focus on the NAFIS portion of AIM, but the scope has not yet been determined.

**Appendix II
Comments From NASA's Office of
Inspector General**

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Of immediate concern to my office in the financial management/systems area is meeting our responsibilities under the Chief Financial Officers Act. We are establishing a core staff to carry out these responsibilities. It is likely that they also will be involved in evaluating automated financial systems.

In summary, we agree with the recommendation and believe our current and planned actions will satisfy its intent. We look forward to working with your staff in improving financial management through better financial systems and audited financial statements.

Sincerely



Bill D. Colvin
Inspector General

Comments From NASA's Office of the Administrator

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



National Aeronautics and
Space Administration

Washington, D.C.
20546

Office of the Administrator

JUL 17 1991

Mr. Donald H. Chapin
Assistant Comptroller General
of the United States
General Accounting Office
Washington, DC 20546

Dear Mr. Chapin:

Thank you for your June 18, 1991, letter soliciting NASA's comments on the draft GAO Report entitled FINANCIAL MANAGEMENT: Actions Needed to Ensure Timely and Cost Effective Implementation of NASA's Accounting System (AFMD 91-74). We agree with the need for proper planning for important projects such as the development of the NASA Accounting and Financial Information System (NAFIS). We believe we have put in place the necessary planning activities to have NAFIS be successful and we believe we have been responsive to OMB in the preparation of the required Five-Year Financial Systems Plans.

The following comments first address the recommendations and then the Report in general.

Recommendation 1 - Concerning Disclosure of All Project Costs and Milestones

We agree that proper planning for the NAFIS project requires that all cost and milestones are known and planned for in an appropriate timeframe. We do not believe that this translates into a need for all of the costs and milestones to be contained in OMB Five-Year Financial Systems Plans produced at the beginning of a project. The system development methodology being used for the NAFIS Project contains phased planning and costing activities throughout the lifecycle as necessary information is available and requirements known. Also, the Five-Year Plan only calls for certain costs and milestones to be included (e.g., inception-to-date costs are not requested by OMB).

The Five-Year Plan includes, for the years referenced, the cost of developing the software, testing, and implementation for both the Installation Level Accounting System and the Agencywide Reporting System. The estimate also includes the cost of the Independent Validation and Verification (IV&V) contractor. The cost of hardware for the Development Installation was included and application-specific hardware will be included if, and when a firm requirement is established. All milestones as requested

See comment 1.

by OMB were provided. Detailed milestones regarding such activities as individual installation implementation activities cannot be developed at this time as all of the planning information is not available. Implementation will not occur for four years.

It is our understanding that the Five-Year Plan was designed to only include additive costs. Therefore, the Five-Year Plan does not represent the full cost of NAFIS. For example, the cost of sustaining engineering is not included. Since NASA did not request additional civil service positions or travel for NAFIS, these costs were also not included in the Five-Year Plan. Mainframe hardware for other installations was not (and should not be) included since this equipment supports multiple administrative applications and is not therefore NAFIS specific. Conversion costs were not included since our methodology provides for the development of a Site Implementation Plan in a later phase of the project which will result in the estimation by each installation of these costs. The cost of data cleanup was not included since it is considered a routine function performed by our accounting offices. Predefinition costs were not included in the Five-Year Plan since they did not occur in any of the years referenced by the Five-Year Plan. Also, the predefinition costs were incorrectly stated in the report to be \$3.2 million. The correct predefinition costs were \$993 thousand.

See comment 2.

See comment 3.

We agree the milestone chart in the Five-Year Plan and the Project Plan should be expanded. While some milestones were not provided in these documents, they were available in detailed (lower-level) schedules and plans utilized by program and project management. Detail schedules concerning conversion and implementation will be developed later in the project upon completion of the Site Implementation Plans.

In summary, while this recommendation is not consistent with the requirements of the OMB Five-Year Plan, all costs and milestones for the NAFIS effort will be addressed at the appropriate time by the appropriate organization (Headquarters or the receiving installations).

Recommendation 2 - Concerning Costs and Milestones for the Control Tracking System and Other NAFIS Interfaces

The costs and milestones for the Control Tracking System (CTS) have not been included in the Five-Year Plan. In the past, the Five-Year Plan included only systems being developed under the auspices of the Automated Information Management (AIM) Program. Information on CTS will be included in future Five-year Plan submissions.

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See comment 4.

The functional interfaces of NAFIS with other Agencywide systems have been described in all appropriate documentation; i.e., Functional Requirements Documents, System/Software Requirements Specifications, Project Plans, and the Five-Year Plan. In addition, the detailed requirements for the interfaces will be documented in "interface contracts" between NAFIS and each of these systems. Copies of the Functional Requirements Documents describing the system interfaces were provided to GAO.

Recommendation 3 - Concerning the Development of an Integrated Financial Management System

The decision to exclude budget formulation and planning was based on the need to control the scope of the project. In reviewing other Government efforts to develop similar systems, the primary cause of failure was the inability to put reasonable limitations on system scope. NASA has an Agencywide coding system that is used for budgeting and accounting which would facilitate the interfacing of these systems at a later date. Upon completion of the NAFIS Project, a study will be conducted to determine the cost/benefit of initiating the development of a standard budget formulation and planning system.

Recommendation 4 - Concerning the Approval of a NAFIS Project Plan

See comment 5.

We agree with the need for an approved NAFIS Project Plan. We do not agree that we have been working on the current Project Plan since 1989. The Project Plan currently being proposed for approval has been prepared in accordance with our standard methodology which requires it be completed at the end of the definition phase. The Project Plan has been under review for several months due to the need to resolve significant budget problems.

Other General Comments

See comment 6.

The Report alludes to significant cost growth by comparing a cost estimate done before predefinition was initiated to the current estimate. The initial cost figure of \$25.9 million was done before hardly any information was available on the project and was only done at that time because it was necessary to respond to an external reporting requirement.

See comment 7.

The Report makes the statement that NAFIS has not been afforded the quality assurance needed for a major systems development effort. We do not agree with this statement, especially in light of the significant IV&V effort we are applying to the NAFIS Project. We have established an

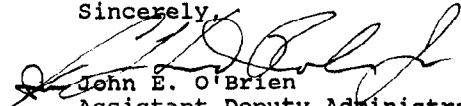
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independent group which will review the procedures and the products (on a sampling basis) of the NAFIS development effort to ensure that the NASA objectives are being met. Information is being provided to GAO on our IV&V effort. We think this effort along with the quality assurance function of the development contractor greatly enhances our prospects for delivering a quality system.

NASA appreciates the opportunity to address some of the points raised in the Report.

Sincerely,


John E. O'Brien
Assistant Deputy Administrator

The following are GAO's comments on NASA's Office of the Administrator's letter dated July 17, 1991.

GAO Comments

1. NASA did not report the costs and milestones associated with the Control Tracking System; costs for application-specific hardware, hardware supporting multiple administrative applications, software for interfacing the installation-level system with Center-unique systems; or costs and associated milestones for data conversion and data cleanup. NASA has agreed that these costs and milestones were omitted, and that it will include information on the Control Tracking System in future 5-year financial systems plans and will address other costs and milestones later in the development effort.

In addition to reporting such costs and milestones to OMB in its 5-year financial systems plans, it is important that NASA management identify the total costs and related milestones to effectively monitor and manage the NAFIS project. This would include not only those agreed to by NASA, but total costs and milestones, including those for in-house personnel, travel, and data cleanup. These costs and milestones should be included in the project plan, revised as necessary as the project is further defined, and used as a basis for reporting under OMB Circular A-127.

2. NASA's systems contain inaccuracies that are over 10 years old, some of which are the result of cleanup work still needed from a prior system conversion effort. Thus, the data cleanup necessary for the NAFIS project cannot be considered a routine function and associated costs should be addressed in NASA's 5-year financial systems plan.

3. We have changed the cost figure in our report based on documentation provided to us by NASA officials after the conclusion of our audit work. NASA officials, however, were unable to provide us documentation showing that the cost of the predefinition study was included in prior years' 5-year financial systems plans.

4. Although detailed documentation was available, the interface diagram NASA provided in its 5-year plan was not sufficiently detailed to show its approach for accomplishing the systems interfaces.

5. Although NASA has not been working on the current version of the project plan since 1989, it has been attempting to prepare a plan since 1989, according to discussions with, and documentation provided by, NAFIS officials.

6. The exclusion of costs such as those for in-house personnel, travel, certain hardware and software, and other costs, which NASA has agreed were excluded from its 5-year plan submissions, caused us to conclude that the NAFIS project would cost more than estimated. This conclusion was not based on a comparison of the initial cost estimate to the current estimate.

7. We believe that OIG involvement together with NASA's use of the Independent Validation and Verification contractor could provide the necessary scrutiny and quality assurance over the NAFIS project. However, the services provided by the contractor should not substitute for OIG involvement.

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