

September 2004

RECORDS
MANAGEMENT

Planning for the
Electronic Records
Archives Has
Improved



G A O

Accountability * Integrity * Reliability



Highlights of [GAO-04-927](#), a report to congressional committees

Why GAO Did This Study

Since 2001, the National Archives and Records Administration (NARA) has been working to develop the policies and plans to build the Electronic Records Archives (ERA), a major information system that is intended to preserve and provide access to massive volumes of all types and formats of electronic records. Senate Report 108-146 directed GAO to provide a progress report on NARA's development of the ERA system. Specifically, GAO's objective was to determine the agency's progress in implementing recommendations from previous assessments.

What GAO Recommends

To reduce the risks associated with NARA's efforts to acquire ERA, GAO recommends that the Archivist direct the ERA Program Director to design and implement a process to ensure that recommendations from contractor reviews are addressed and incorporated into program policies and plans. In commenting on a draft of this report, the Archivist of the United States generally agreed with the overall findings and recommendation, and provided an update on NARA's actions to implement the recommendations in this and prior GAO reports.

www.gao.gov/cgi-bin/getrpt?GAO-04-927.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Linda D. Koontz at (202) 512-6240 or Koontzl@gao.gov.

RECORDS MANAGEMENT

Planning for the Electronic Records Archives Has Improved

What GAO Found

NARA has made progress towards addressing GAO's prior recommendations: four of the eight recommendations have been fully addressed, and NARA is making progress in addressing the three recommendations on staffing, enterprise architecture, and information security (see table).

NARA is making less progress in addressing the recommendation to revise acquisition policies and plans to meet relevant industry standards. None of the eight key acquisition policies and plans fully complies with the standards selected by the agency. A contributing cause has been that although contractor staff assessed these policies and plans against standards, NARA had not established a process to ensure that the identified weaknesses were addressed and incorporated into subsequent versions. Making program policies and plans compliant before contract award is important to ensure that the agency has the information it needs to manage the acquisition and that the contractors have sufficient information on which to base the design of the system.

Summary Status of NARA's Progress in Addressing GAO Recommendations

Prior recommendation	Status	Progress
1. Work breakdown structure	Addressed	Completed a comprehensive work breakdown structure.
2. Dependency among predecessor and successor tasks	Addressed	Defined dependencies among predecessor and successor tasks.
3. Use of earned value management	Addressed	Implemented earned value management for the program.
4. IT investment management	Addressed	Implemented an IT investment management process.
5. Acquisition program policies and plans	Not addressed	None of the policies and plans were fully IEEE compliant.
6. Staffing	Partially addressed	Hired 25 of 27 positions; however, two key positions—security officer and quality assurance specialist—remain unfilled.
7. Enterprise architecture	Partially addressed	While the enterprise architecture has been strengthened, several elements are incomplete, including the target architecture.
8. Information security	Partially addressed	While improved, weaknesses remain in information security.

Source: GAO, based on NARA data.

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Abbreviations

ASC	American Systems Corporation
ERA	Electronic Records Archives
ICE	Integrated Computer Engineering, Inc.
IT	information technology
NARA	National Archives and Records Administration

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United States Government Accountability Office
Washington, D.C. 20548

September 23, 2004

The Honorable Richard C. Shelby
Chairman
The Honorable Patty Murray
Ranking Minority Member
Subcommittee on Transportation, Treasury and General
Government
Committee on Appropriations
United States Senate

The Honorable Ernest J. Istook, Jr.
Chairman
The Honorable John W. Olver
Ranking Minority Member
Subcommittee on Transportation, Treasury and Independent
Agencies
Committee on Appropriations
House of Representatives

The National Archives and Records Administration (NARA) is responsible for the oversight of government records management and archiving, which increasingly involves dealing with documents that are created and stored electronically. Since 2001, the agency has been working to develop the Electronic Records Archives (ERA) system. This major information system is intended to preserve and provide access to massive volumes of all types and formats of electronic records. NARA plans to develop the system in five increments, with the first increment expected to be completed in 2007 and the fifth in 2011.

We have issued two prior reports¹ assessing NARA's acquisition of the ERA system. Our assessments identified several weaknesses in the acquisition process and made eight recommendations to the agency that, if addressed, would reduce the risks in acquiring the ERA system. These recommendations were to

¹GAO, *Information Management: Challenges in Managing and Preserving Electronic Records*, GAO-02-586 (Washington, D.C.: June 17, 2002) and *Records Management, National Archives and Records Administration's Acquisition of Major System Faces Risks*, GAO-03-880 (Washington, D.C.: Aug. 22, 2003).

-
1. develop a schedule that is based on a comprehensive work breakdown structure (including associated costs and other resources),
 2. establish schedule dependencies among successor and predecessor tasks,
 3. use earned value management to capture and monitor progress for the entire acquisition,
 4. revise acquisition policies and plans to conform to Institute of Electrical and Electronics Engineers, Inc. standards,
 5. fill vacant key program positions,
 6. develop an enterprise architecture,
 7. improve information security, and
 8. implement an IT investment management process.

Senate Report 108-146 directed GAO to provide a progress report on NARA's development of the ERA system. Our objective was to determine the agency's progress in implementing our prior recommendations. To achieve this objective, we assessed and reviewed related plans and schedules to determine the level of progress since our last report and we interviewed key NARA officials and contractor staff. We selected eight key policies and plans for review; we assessed seven of these in our 2003 review. We added an eighth—the Program Management Plan—that had been completed since the 2003 review. We reviewed NARA's progress in filling all government and contractor positions and conducted interviews of senior NARA officials to determine the status of the agency's efforts to establish a capability in IT investment management, develop an enterprise architecture, and strengthen the agency's information security program. We also reviewed the contractor's verification and validation reports associated with the eight policies and plans. We performed our work from February 2004 to May 2004 at NARA's College Park, Maryland, location in accordance with generally accepted government auditing standards.

In June 2004 we provided your staff with a briefing on the results of our study, which included procurement-sensitive information. The slides from that briefing—with procurement-sensitive information removed—are included as appendix I. The purpose of this report is to provide the

published briefing slides to you and to officially transmit our recommendation to the Archivist of the United States.

In summary, our briefing made the following points:

NARA has made progress toward addressing our prior recommendations; four of the eight recommendations have been fully addressed. Specifically, the ERA schedule is now based on a comprehensive work breakdown structure, dependencies have been established among predecessor and successor tasks, earned value management is being used to capture and monitor progress for the entire acquisition, and an IT investment management process has been implemented. In addition, NARA is making progress in addressing the three recommendations on staffing, enterprise architecture, and information security.

NARA is making less progress in addressing the recommendation to revise acquisition policies and plans to meet relevant industry standards. Such policies and plans are essential for managing the acquisition and providing critical guidance to the contractors who will be designing the system. However, none of the eight key acquisition policies and plans fully complies with the standards. A contributing cause has been that, although contractor staff performed verification and validation reviews to assess these policies and plans against standards, NARA had not established a process to ensure that the weaknesses identified in these reviews were addressed and incorporated into the subsequent versions. Making acquisition policies and plans compliant before contract award is important to ensure that the agency has the information it needs to manage the acquisition and the contractors have adequate information on which to base the design of the system.

Recommendation for Executive Action

To reduce the risks associated with NARA's efforts to acquire ERA, we recommend that the Archivist direct the ERA program director to design and implement a process to ensure that recommendations in verification and validation reviews are addressed and incorporated into acquisition policies and plans.

Agency Comments and Our Evaluation

In providing written comments on a draft of this report (reprinted in app. II), the Archivist of the United States stated that NARA was pleased to note our recognition of the progress that it has made and that actions were well

under way to address all outstanding recommendations. The Archivist also provided an update on the status of the four recommendations in the report that had not been fully addressed. In response to a technical comment concerning the status of the requirements document, we have amended the briefing slides to clarify that this document contains a complete set of high level system requirements.

We are sending copies of this report to the Chairmen and Ranking Minority Members of the Subcommittee on Transportation, Treasury and General Government, Senate Appropriations Committee, and the Subcommittee on Transportation, Treasury and Independent Agencies, House Appropriations Committee. We are also sending copies to the Archivist of the United States. We will make copies available to others on request. In addition, the report will be available at no charge on the GAO Web site at <http://www.gao.gov/>.

If you or your staff have any questions concerning this report, please call me at 202-512-6240 or Mirko Dolak, Assistant Director, at (202) 512-6362. We can also be reached by e-mail at koontzl@gao.gov and dolakm@gao.gov, respectively. Key contributors to this report were Timothy Case, Nancy Glover, and Kush Malhotra.



Linda D. Koontz
Director, Information Management Issues

Briefing Slides



Planning for the Electronic Records Archives Has Improved

Briefing for Staff Members of the
Subcommittee on Transportation, Treasury and General Government
Committee on Appropriations
United States Senate
and the
Subcommittee on Transportation, Treasury and Independent Agencies
Committee on Appropriations
House of Representatives¹

June 1, 2004

¹ Procurement-sensitive information included in the original briefing slides has been removed and various technical clarifications have been made.



Outline of Briefing

Introduction

Objective, Scope, and Methodology

Results in Brief

Background

Implementation Status of GAO Recommendations

- Work Breakdown Structure
- Dependencies Among Successor and Predecessor Tasks
- Earned Value Management
- Information Technology Investment Management
- Acquisition Policies and Plans
- ERA Staffing
- Enterprise Architecture
- Information Security

Conclusions

Recommendation

Agency Comments



Introduction

The mission of the National Archives and Records Administration (NARA) is to ensure “ready access to essential evidence” for the public, the President, the Congress, and the Courts. NARA is responsible for oversight of records management and archiving, which increasingly involves dealing with documents that are electronically created and stored. Accordingly, it plans to acquire the Electronic Records Archives (ERA) system to address critical issues in the creation, management, and use of electronic records. NARA envisions it to be a major information system with the ability to authentically preserve and provide access to massive volumes of all types and formats of electronic records that are free from dependency on any specific type of hardware or software.

In 2001, the agency hired a contractor to develop the policies and plans to build the ERA system. NARA selected the standards of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) to guide the overall acquisition of the system.

During the period of our assessment, NARA indicated that it expected to award two contracts for system design by May 28, 2004. In its comments on our draft briefing slides, NARA indicated that the process to select the design contractors has taken longer than expected; the contracts are now expected to be awarded by July 30, 2004. The agency plans to select one of these contractors to build the system in five increments, with the first increment scheduled to be completed in 2007 and the fifth, and final, increment scheduled to be completed in 2011.



Introduction

In June 2002, we issued a report that assessed NARA's acquisition of the ERA system and the agency's information technology (IT) investment management, enterprise architecture, and information security.² As we noted in that report, acquiring this major system is a significant challenge for a relatively small organization like NARA, whose IT management capabilities are relatively limited.

In our report, we recommended that NARA

- develop an enterprise architecture,³
- improve information security, and
- implement an IT investment management process.

²U.S. General Accounting Office, *Information Management: Challenges in Managing and Preserving Electronic Records*, GAO-02-586 (Washington, D.C.: June 17, 2002).

³An enterprise architecture provides a description—in useful models, diagrams, and narrative—of the mode of operation for an agency. It describes the agency in logical terms, such as interrelated business locations and users, and in technical terms, such as hardware, software, data, communications, and security attributes and standards. It provides these perspectives both for the “as is” environment (baseline) and for the “to be” environment (target). It also consists of a plan to transition from the baseline to the target environment.



Introduction

In August 2003, we issued a second report that updated our 2002 assessment of NARA's organizational capabilities for acquiring a major information system.⁴ As we noted in the report, we identified several weaknesses in the program; these weaknesses included acquisition policies and plans that did not meet IEEE standards, several unfilled key government positions, and an incomplete schedule. We recommended that NARA

- Revise policies and plans to conform to IEEE standards.
- Fill vacant key positions.
- Address weaknesses in tracking cost and schedule by developing a schedule that
 - is based on a comprehensive work breakdown structure (including associated costs and other resources),
 - establishes dependencies among successor and predecessor tasks, and
 - uses earned value management to capture and monitor progress for the entire acquisition.

⁴U.S. General Accounting Office, *Records Management: National Archives and Records Administration's Acquisition of Major System Faces Risks*, GAO-03-880 (Washington, D.C.: August 22, 2003).



Objective, Scope, and Methodology

Objective

Senate Report 108-146 directed that GAO provide a progress report on NARA's development of the ERA system and that we report our findings by May 22, 2004. As agreed with staff of the Subcommittee on Transportation, Treasury and General Government, Senate Committee on Appropriations, and the Subcommittee on Transportation, Treasury and Independent Agencies, House Appropriations Committee, our objective is to determine the agency's progress in implementing recommendations from our previous assessments.

Scope and Methodology

To accomplish our objective, we

- Assessed the schedule's work breakdown structure to determine if tasks included associated costs and resources.
- Reviewed the schedule to determine if it identified dependencies among successor and predecessor tasks.
- Assessed the system's use of earned value management to monitor progress.
- Interviewed NARA information resource management and ERA officials and contractor staff to understand the scope and contents of agency IT management documents.



Objective, Scope, and Methodology

- Selected eight key policies and plans for review; we assessed seven of these in our 2003 review. We added an eighth—the Program Management Plan—that had been completed since that time. We also reviewed the contractor’s verification and validation reports associated with the eight policies and plans.
- We did not conduct detailed assessments of the *ERA Acquisition Strategy*, the *ERA Program Management Plan*, the *ERA Life Cycle*, and the *ERA Requirements Document*. NARA acknowledged that these four policies and plans were incomplete.
- Conducted detailed assessments of four of the eight key policies and plans to determine their compliance to IEEE standards: *ERA Concept of Operations*, *ERA Risk Management Plan*, *ERA Configuration Management Plan*, and *ERA Quality Management Plan*.
 - To assess how well the policies and plans complied, we analyzed the standards and identified 108 applicable subject areas for the four documents. Each subject area included specific requirements that must be met for compliance with the standard. We considered any subject area that was dependent on the completion of the ERA design as “not applicable” and did not include it in our assessment.
 - We assessed compliance with each subject area using a three-point scale: (1) fully satisfied (policy or plan conformed to all of the requirements of the subject area); (2) partially satisfied (policy or plan conformed to at least one of the requirements, but fell short in one or more of the remaining requirements); and (3) not satisfied (policy or plan did not meet any of the requirements).



Objective, Scope, and Methodology

- Discussed the details of the results of our assessments with the officials, specialists, and contractor staff responsible for their development.
- Assessed the program's process to develop, review, revise, and finalize policies and plans, and interviewed ERA officials, the contractor's senior manager, and the contractor staff responsible for verification and validation.
- Reviewed the hiring plan, schedule, and organizational charts and interviewed the senior managers responsible for hiring staff to determine if efforts to fill all government and contractor positions were complete.
- Obtained and evaluated IT investment management policies and reports, NARA's enterprise architecture, information security assessments and plans, and conducted interviews of senior NARA officials to determine the status of the agency's efforts to establish a capability in IT investment management, develop an enterprise architecture, and strengthen the agency's information security program.
- We performed our work from February 2004 to May 2004 at NARA's College Park, MD location in accordance with generally accepted government auditing standards.



Results in Brief
Status of Recommendations

NARA has made progress toward addressing our prior recommendations (table 1).

Table 1: Summary Status of NARA's Progress in Addressing GAO Recommendations

Prior Recommendation	Status	Progress
1. Work breakdown structure	addressed	Completed a comprehensive work breakdown structure.
2. Dependency among predecessor and successor tasks	addressed	Defined dependencies among predecessor and successor tasks.
3. Use of earned value management	addressed	Implemented earned value management for the acquisition.
4. IT investment management	addressed	Implemented an IT investment management process.
5. Acquisition policies and plans	not addressed	None of the policies and plans were fully IEEE compliant.
6. Staffing	partially addressed	Hired 25 of 27 positions; however, two key positions—security officer and quality assurance specialist—remain unfilled.
7. Enterprise architecture	partially addressed	While the enterprise architecture has been strengthened, several elements are incomplete, including the target architecture.
8. Information security	partially addressed	While improved, weaknesses remain in information security.

Four of the eight recommendations have been addressed. In addition, NARA is making progress in addressing the three recommendations on staffing, enterprise architecture, and information security.



Results in Brief
Status of Recommendations

However, NARA has made less progress in addressing the recommendation to revise acquisition policies and plans to meet industry standards. Such policies and plans are essential for managing the acquisition and providing critical guidance to the contractors who will be designing the system. However, none of eight key acquisition policies and plans fully complies with the standards selected by the agency. A contributing cause is that, although contractor staff assessed these policies and plans against the requirements in the standard, NARA had not established a process to ensure that the weaknesses identified were incorporated into the final versions. Agency officials agreed with our assessment and stated that they would revise the policies and plans before contract award. Making acquisition policies and plans compliant before contract award is important to ensure that the agency has the information it needs to manage the acquisition and the contractors have adequate information on which to base the design of the system.

To reduce the risks associated with the ERA acquisition, we are recommending that the Archivist develop a process to ensure compliance with industry standards.

In commenting on a draft of these briefing slides, the Archivist generally agreed with our findings, conclusions, and recommendation.



Background Acquisition Strategy

NARA is seeking a system that balances the use of commercial off-the-shelf with new software development. However, as agency officials have indicated, there is no single commercial solution available today that meets the full end-to-end requirements for ERA. As a result, the system requires the development of an advanced architecture for the conversion and preservation of electronic records.

To guide its acquisition of the system, NARA has adopted IEEE standards for software life cycle processes.⁵ The standards establish a common framework for the acquisition of software products and services and define processes and activities that are to be tailored and applied during the acquisition, supply, development, operation, and maintenance of a system.

⁵The Institute of Electrical and Electronics Engineers, 12207.0 Standard for Information Technology—Software Life Cycle Processes; 12207.1 Standard for Information Technology—Software Life Cycle Processes—Life Cycle Data; and 12207.2 Standard for Information Technology—Software Life Cycle Processes—Implementation Considerations.



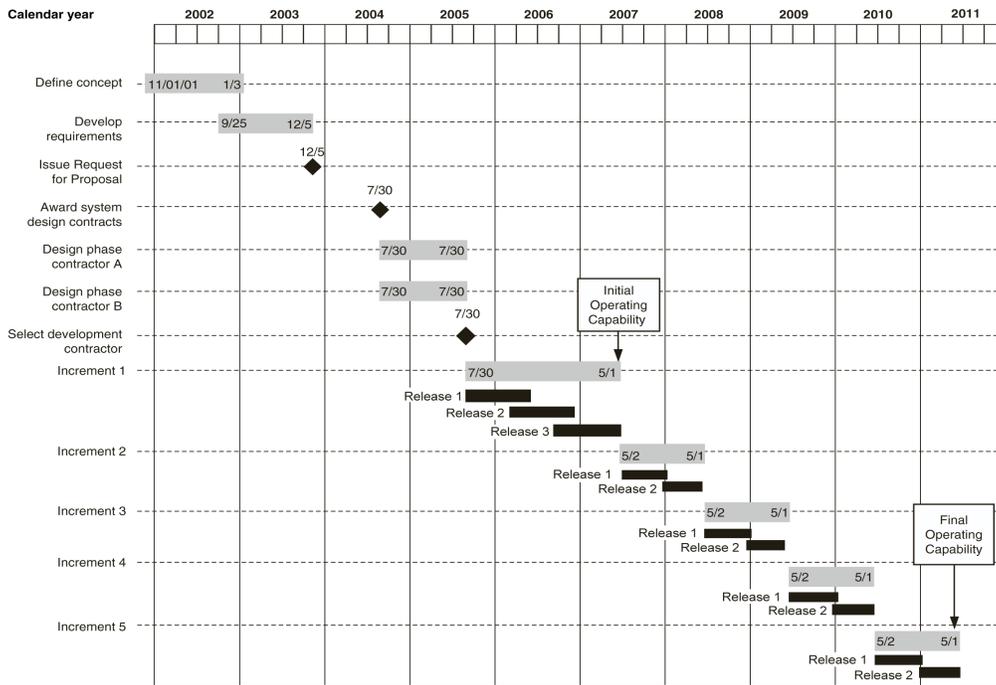
Background Acquisition Strategy

To date, the ERA program has completed three major milestones: defining the concept on January 3, 2003; releasing a request for proposal; and completing high-level ERA requirements on December 5, 2003. Future plans include

- awarding two contracts for a design competition by July 30, 2004 (fig. 1),
- requiring each contractor to produce a full set of detailed system requirements defining the ERA system (requirements will be decomposed from the conceptual requirements), and
- selecting a single contractor that will develop the system in five increments. The first increment is planned for completion in 2007 (fig. 1), and the expected completion date of the system is 2011.



Figure 1: ERA System Acquisition Schedule



Source: GAO analysis of agency data.

Note: Software release date ranges for each increment are an approximation.



Background Program Management

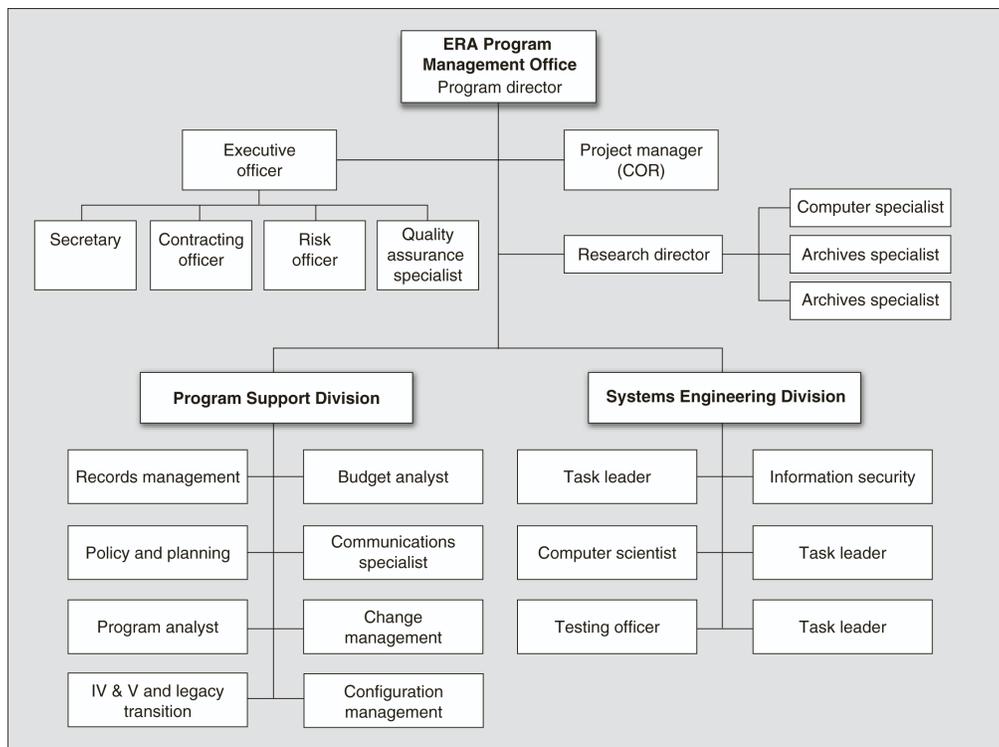
The ERA Program Management Office is responsible for the development of policies and plans for the ERA acquisition.

- In 2001, NARA hired a contractor, Integrated Computer Engineering (ICE), Inc.,⁶ to assist in developing the capability to design, acquire, and manage the ERA system. ICE staffs the Program Management Support Team.
- ICE is responsible for developing policies and plans and for validating and verifying that they conform to IEEE standards for content and structure.
- The agency also intends to hire an independent verification and validation contractor to assess work performed by development contractors.
- Figure 2 shows the organizational chart for the ERA Program Management Office.

⁶On January 15, 2002, American Systems Corporation (ASC) announced its acquisition of ICE, Inc. According to the ERA project manager, this change does not affect the status of NARA's contract with ICE, Inc.



Figure 2: ERA Program Management Office Organization Chart



Source: NARA.



Implementation Status of GAO Recommendations Work Breakdown Structure

In our prior report, we noted that the schedule for developing ERA lacked a comprehensive work breakdown structure, which is a prerequisite to effective program tracking. We recommended that NARA develop a schedule based on a comprehensive work breakdown structure including associated costs and other resources.

In response, NARA developed a comprehensive work breakdown structure for the program this year. This structure appropriately links tasks with associated costs and other resources. As a result, the schedule's completion dates have been pushed back to a more realistic timeframe, but are several months later than previously reported.

Basing its schedule on a comprehensive work breakdown structure allows ERA to develop realistic completion dates for tasks and to manage risks to its cost and schedule goals.



Implementation Status of GAO Recommendations Dependencies Among Successor and Predecessor Tasks

In our prior report, we also found that the schedule did not show dependencies between successor and predecessor tasks and recommended that NARA develop a program schedule establishing these relationships.

NARA subsequently revised the program's schedule to link successor and predecessor tasks.

Establishing dependencies among work activities allows ERA to develop a critical path for the schedule, thus significantly improving the capability to manage its cost and schedule goals.



Implementation Status of GAO Recommendations Earned Value Management

In our prior report, we noted that NARA had planned to use earned value management—a technique that allows managers to track the budget against schedule—to assess performance programwide; it did not plan to implement this before 2004. We recommended that NARA use earned value management immediately to monitor progress for the entire acquisition.

In response, NARA now uses earned value management. Specifically, it has

- hired a government earned value management specialist,
- purchased specialized software, and
- uses the software to manage the entire acquisition.

By using earned value management techniques, NARA has improved its ability to track the budget against the schedule and identify problems in time to correct them.



Implementation Status of GAO Recommendations Information Technology Investment Management

We previously reported that, while NARA had taken action to strengthen its investment management process, its efforts were not yet complete. We recommended that NARA implement a mature IT investment management process.

NARA has established a mature investment management process. Specifically, it

- established policy guidance for all three phases of IT investment management: select, control, and evaluate;
- established an agency senior management decision-making body to select proposed IT projects based on costs, benefits, and risks and to review and track the progress of ERA and other approved IT projects; and
- required ERA to develop and present comprehensive quarterly status reports to the office of the chief information officer.

Establishing an IT investment management capability strengthens NARA's management oversight of ERA, helps it determine if the acquisition is having schedule or other problems, and ensures that corrective actions are taken.



Implementation Status of GAO Recommendations Acquisition Policies and Plans

We previously reported that NARA had developed acquisition policies and plans to guide its acquisition but that they did not conform to the IEEE standards selected by the agency. These policies and plans are essential for managing the acquisition and providing critical guidance to the contractors who will be designing the system. As a result, we recommended that NARA revise these policies and plans to conform to the standards. NARA has not fully addressed this recommendation; none of eight key policies and plans fully satisfy IEEE standards.

NARA officials acknowledged that these four key policies and plans are incomplete, and, therefore, do not provide the information needed to manage the acquisition and contractors:

- acquisition strategy,
- program management plan,
- life cycle, and
- requirements document.

Further, based on our review, these other four key policies and plans do not meet IEEE standards and lack information needed by the program to acquire the system and manage the contractors:

- concept of operations,
- risk management plan,
- configuration management plan, and
- quality management plan.



Implementation Status of GAO Recommendations Acquisition Policies and Plans

ERA Acquisition Strategy

An acquisition strategy is a description of how an organization plans to acquire a system. It establishes the framework by which detailed acquisition planning and program execution will be accomplished and communicated to key stakeholders.

According to the director of the ERA program support division, the *ERA Acquisition Strategy* is incomplete and does not fully comply with IEEE standards, but will be revised to meet the standards by June 30, 2004.

A reason the *ERA Acquisition Strategy* is not fully IEEE compliant is that, while it underwent a verification and validation review by contractor staff to assess compliance, a process had not been established to ensure that the results are addressed and incorporated into the strategy.

Until the *ERA Acquisition Strategy* is fully compliant, ERA may not have the information needed to manage the acquisition and NARA increases the risk that the contractors will lack the information needed to design the system.



Implementation Status of GAO Recommendations Acquisition Policies and Plans

ERA Program Management Plan

A program management plan is used to manage a software project; it defines the technical and managerial processes necessary to develop software work products that satisfy requirements.

According to NARA, this plan is incomplete and does not fully comply with IEEE standards, but will be revised to meet the standards by June 30, 2004.

A reason the *ERA Program Management Plan* is not fully IEEE compliant is that, while it underwent a verification and validation review by the contractor staff to assess compliance, a process was not established to ensure that the results are addressed and incorporated into the document.

Until the *ERA Program Management Plan* is fully compliant, ERA may not have the information needed to manage the acquisition and NARA increases the risk that the contractors will lack the information needed to design the system.



Implementation Status of GAO Recommendations Acquisition Policies and Plans

ERA Life Cycle

The acquisition life cycle of the ERA system is documented in the *ERA Life Cycle*. According to IEEE, it should define, at a high level, the processes for acquiring, supplying, operating, and maintaining ERA products and services.

According to NARA, the *ERA Life Cycle* is incomplete and does not fully comply with IEEE standards, but will be revised to meet the standards by July 30, 2004.

A reason the *ERA Life Cycle* document is not fully IEEE compliant is that, while it underwent a verification and validation review by the contractor staff to assess compliance, a process had not been established to ensure that the results of the review are addressed and incorporated in the final version.

Until the *ERA Life Cycle* is fully compliant, ERA may not have the information needed to manage the acquisition and NARA increases the risk that the contractors will lack the information needed to design the system.



Implementation Status of GAO Recommendations Acquisition Policies and Plans

ERA Requirements Document

Requirements provide the blueprint that system developers and program managers use to design, develop, and acquire a system. One of the primary reasons software projects fail is because requirements are incomplete or incorrect. Incomplete or defective requirements result in inaccurate product descriptions and erroneous cost and schedule estimates.

According to NARA, this document is not complete and does not fully comply with IEEE standards.

While NARA originally intended to develop full system requirements for the ERA system in house, it has completed only high-level requirements. NARA has revised its acquisition approach so that ERA requirements will be used to guide the development of detailed system requirements specifications by contractors during a design phase (see fig. 1). NARA also intends to hire an independent verification and validation contractor to ensure the contractor's requirements for ERA are compliant with IEEE standards.⁷

According to NARA, ERA requirements will be completed 6 months after contract award and will be IEEE compliant.

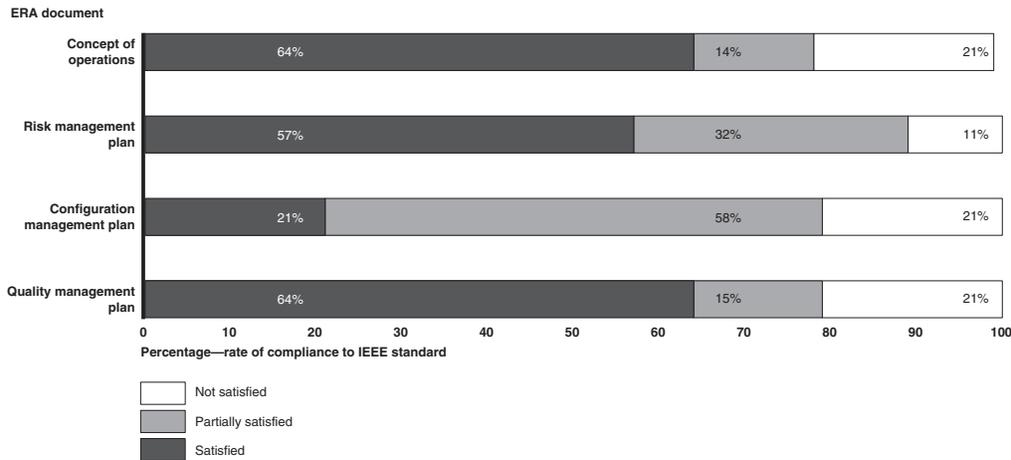
⁷In providing written comments on the draft of the report transmitting this briefing, the Archivist of the United States indicated that the final ERA Requirements Document released with the ERA Request for Proposal outlines a complete set of high-level system requirements. The Archivist noted that these high-level requirements will be used by the ERA development contractor to generate a detailed system requirements specification that will be delivered to the government 6 months after the contract award.



Implementation Status of GAO Recommendations Acquisition Policies and Plans

The following figure summarizes the results of our assessment of the remaining four acquisition policies and plans. Our assessment of each of them follows the figure.

Figure 3: Compliance of Selected ERA Program Documents with IEEE Standards



Source: GAO analysis of agency data.

Note: We assessed each policy and plan for compliance with the IEEE subject areas applicable to the document. The graph depicts the percentages of subject areas that are compliant, partially compliant, and not compliant. Not all subject areas are necessarily of equal importance. The Concept of Operations figures do not add to 100 percent due to rounding.



Implementation Status of GAO Recommendations

Acquisition policies and plans

ERA Concept of Operations

The *ERA Concept of Operations* describes the characteristics of a proposed system from the users' viewpoint. The IEEE standard for a concept of operations has 28 applicable elements, including a description of the current system and a justification for the proposed system. The description of the current system should include details on items such as major system components, operational risk factors, interfaces to external systems, operational policies and constraints, the current support environment, and performance characteristics such as speed, throughput, volume, and frequency. The standard also requires information on the proposed system including background, objectives, and scope; operational policies and constraints; and changes considered, but not included, for the proposed system. In addition, charts should be used to depict inputs, outputs, and data flows for both the current and proposed systems.

Overall, the *ERA Concept of Operations* satisfied 18 (64%), partially satisfied 4 (14%), and did not satisfy 6 (21%) of the 28 applicable subject areas in the IEEE standard.

The document fully satisfied the standard in several areas, including information on the proposed system such as

- background, objectives, and scope,
- operational policies and constraints, and
- a justification for its development.



Implementation Status of GAO Recommendations Acquisition policies and plans

The *ERA Concept of Operations*, however, only partially satisfied other aspects of the standard. For example, while the description of the current system includes major system components and interfaces to external systems, it lacks items such as

- operational risk factors,
- performance characteristics such as speed, throughput, volume, frequency, and
- charts and accompanying descriptions of inputs, outputs, data flows, control flows, and manual and automated processes sufficient to understand the current system from the user's point of view.

The *ERA Concept of Operations* does not satisfy IEEE standards in several other areas, including

- a description of the current support environment, and
- changes considered, but not included, for the proposed system.

The director of the ERA Program Support Division agreed with our assessment and indicated that the *ERA Concept of Operations* would be revised to meet IEEE standards by July 30, 2004.

A reason the *ERA Concept of Operations* is not IEEE compliant is that NARA had not established a process to ensure that the recommendations in the verification and validation report are addressed in its final version.

Until the *ERA Concept of Operations* is fully compliant, ERA may not have the information needed to manage the acquisition and NARA increases the risk that the contractors will lack the information needed to design the system.



Implementation Status of GAO Recommendations

Acquisition policies and plans

ERA Risk Management Plan

In systems acquisition, risk management is a process for identifying potential problems before they occur and adjusting the acquisition to mitigate problems and to decrease the chances of their occurrence in the first place.

According to IEEE, a risk management plan should include elements such as

- a risk management overview specific to the acquisition,
- how risks are to be treated,
- risk management policies to include how risk management is to be implemented, administered, and supported by staff, and how risk information is to be communicated,
- a risk management process description (type of risk analysis required, risk thresholds, scales to be used to estimate risk likelihood and consequences, and types of measures to track and monitor the state of the risks),
- a process for improving risk management,
- risk management organization (define the function or organization assigned responsibility for risk management), and
- risk management orientation and training.



Implementation Status of GAO Recommendations Acquisition policies and plans

Overall, the *ERA Risk Management Plan* satisfied 16 (57%), partially satisfied 9 (32%), and did not satisfy 3 (11%) of the 28 applicable subject areas in the IEEE standard.

The *ERA Risk Management Plan* fully satisfies many elements of the standard, and includes

- a risk management overview that is written to be specific to the acquisition,
- a risk treatment section that fully describes how risks are to be treated, and
- a defined process for improving risk management.

The *ERA Risk Management Plan*, however, only partially satisfies other areas of the standard. For example

- while risk management policies include how risk management is to be implemented, administered, and supported by management and staff, a Web tool for coordinating and communicating risks with stakeholders has not been implemented, and
- the section on the risk management organization is presented graphically, but it is confusing and the lines of responsibility are unclear.

The plan does not satisfy IEEE standards in several other areas. For example, the plan did not include

- risk thresholds (a metric used to classify risks), and
- risk management orientation and training information.



Implementation Status of GAO Recommendations

Acquisition policies and plans

The director of the ERA Program Support Division agreed with our assessment of this plan and indicated that it would be revised to meet IEEE standards by July 16, 2004.

A reason the *ERA Risk Management Plan* is not IEEE compliant is that NARA has not established a process to ensure that the recommendations in the verification and validation review by the contractor staff are addressed in the final version.

Until the *ERA Risk Management Plan* is fully compliant, ERA may not have the information needed to manage the acquisition and NARA increases the risk that the contractors will lack the information needed to design the system.



Implementation Status of GAO Recommendations

Acquisition policies and plans

ERA Configuration Management Plan

A configuration management plan establishes and maintains the integrity and control of the products through their life cycles. The IEEE standard for configuration management plans has elements that include configuration activities and configuration schedules. Configuration activities include

- listing items to be placed under configuration control;
- procedures for approving or disapproving changes;
- a system for naming configuration items;
- verifying and implementing approved changes;
- assembling information for documenting a completed change;
- configuration status accounting (including data elements to be tracked, types and frequency of reports, how information is to be collected, stored, processed, and reported, and how access to status data is to be controlled); and
- analysis and evaluation of change requests; subcontractor control; and configuration audits and reviews.

Overall, the *ERA Configuration Management Plan* fully satisfied 4 (21%), partially satisfied 11 (58%), and did not satisfy 4 (21%) of the 19 applicable subject areas in the IEEE standard.



Implementation Status of GAO Recommendations

Acquisition policies and plans

Some important activities of the *ERA Configuration Management Plan* were well defined, including procedures for approving or disapproving changes and a system for naming configuration items.

The *ERA Configuration Management Plan*, however, only partially satisfies other areas of the standard, including, for example

- the plan specifies the activities for verifying and implementing approved changes, but it does not specify any of the information needed to document completion of a change, and
- while it includes some of the information required for configuration status accounting, such as data elements to be tracked and types and frequency of reports, it does not mention the specific software package used to collect, store, process, and report the status of items under configuration control or how access to status data is to be controlled.

The plan does not satisfy several important aspects of the IEEE standards, including

- having a schedule for configuration management activities and for all events affecting the plan's implementation,
- specifying how subcontractor configuration management activities are to be monitored, and
- including definitions of configuration audits and reviews such as the configuration items under audit or review, procedures for conducting the audit, and approval criteria.



Implementation Status of GAO Recommendations

Acquisition policies and plans

The director of the ERA Program Support Division agreed with our assessment of this plan and indicated that it would be revised to meet IEEE standards by June 30, 2004.

A reason the *ERA Configuration Management Plan* is not IEEE compliant is that NARA has not established a process to ensure that the recommendations in the verification and validation review by the contractor are addressed in the final version.

Until the *ERA Configuration Management Plan* is fully compliant, ERA may not have the information needed to manage the acquisition and NARA increases the risk that the contractors will lack the information needed to design the system.



Implementation Status of GAO Recommendations

Acquisition policies and plans

ERA Quality Management Plan

In IT acquisitions, quality assurance describes processes for providing an independent assessment of the requirements and processes for developing and producing a system or software. The IEEE standard requires that quality management plans include elements such as

- quality reviews and audits (including software verification and validation reviews, functional audits, and the configuration management plan review);
- problem reporting and corrective action;
- records collection, maintenance, and retention;
- control over code, media, and suppliers;
- standards for conducting quality assurance (such as documentation, coding, and testing standards and metrics for quality assurance products and processes);
- tools to support quality assurance (including software tools, techniques, methods and how they are to be used); and
- risk management for the portion of the life cycle covered by the plan.

The plan satisfied 21 (64%), partially satisfied 5 (15%), and did not satisfy 7 (21%) of the 33 applicable subject areas in the IEEE standard.



Implementation Status of GAO Recommendations

Acquisition policies and plans

Several elements in the plan were well defined and satisfied the standard, including

- problem reporting and corrective action,
- code control, and
- records collection, maintenance, and retention.

Other elements of the plan did not fully satisfy the requirements of the standard, including

- while it identified several of the standards to be used in conducting quality assurance, such as documentation, coding, and testing standards, it omitted quality assurance products and process metrics, and
- special software tools, techniques, and methodologies that support quality assurance were described, but how they are to be used was not defined.

The plan did not satisfy important aspects of the IEEE standard, including

- the list of quality assurance audits and reviews did not include the required software verification and validation review, functional audits (held prior to software delivery to verify all requirements have been met), the configuration management plan review, and
- the risk management for quality assurance is not included.

The director of the ERA Program Support Division agreed with our assessment and indicated that the plan would be revised to meet IEEE standards by June 30, 2004.



Implementation Status of GAO Recommendations

Acquisition policies and plans

A reason this plan does not meet the IEEE standard is that NARA lacks a process to ensure that the results of the contractor's verification and validation review are addressed and incorporated.

Until the *ERA Quality Management Plan* is fully compliant, ERA may not have the information needed to manage the acquisition and NARA increases the risk that the contractors will lack the information needed to design the system.



Implementation Status of GAO Recommendations ERA Staffing Needs

We previously reported that staffing might pose a risk to the ERA acquisition. At that time, nine of the authorized government positions remained vacant. To reduce this risk, we recommended that NARA take action to fill these positions.

Although not fully implemented, NARA has made good progress in addressing our recommendation.

The agency has completed hiring 25 of the 27 government staff positions. However, the two unfilled government positions—the quality assurance specialist and the security officer—are important to the success of the acquisition. According to the senior ERA official who has responsibility for hiring staff, the security officer position has been posted for several months, but a qualified candidate has not yet been found. The quality assurance specialist position is now vacant due to a resignation; NARA has posted the opening, and expects to fill the vacancy by the middle of June 2004. In the interim, the ERA program’s quality assurance activities are being performed by the program’s configuration management specialist.

Until the agency fills both positions, the program may not have the resources necessary to manage the acquisition.



Implementation Status of GAO Recommendations Enterprise Architecture

In our prior report, we noted that NARA had taken action to develop an enterprise architecture but its efforts were incomplete. We recommended that NARA strengthen its IT management capabilities by developing an enterprise architecture.

Although not fully complete, NARA has made good progress in addressing our recommendation.

An enterprise architecture provides a description—in useful models, diagrams, and narrative—of the mode of operation for an agency. It describes the agency in logical terms, such as interrelated business locations and users, and in technical terms, such as hardware, software, data, communications, and security attributes and standards. It provides these perspectives both for the “as is” environment (baseline) and for the “to be” environment (target). It also consists of a plan to transition from the baseline to the target environment.

While NARA has strengthened its enterprise architecture, its target architecture is only a framework, and therefore, is incomplete.

Until the ERA target enterprise architecture is complete, NARA may have difficulty ensuring that the ERA system is defined according to the requirements of the enterprise target architecture.



Implementation Status of GAO Recommendations Information Security

We previously reported that NARA was improving its information security, having recognized that it had various weaknesses. We recommended that NARA further improve in this area.

NARA has made progress towards addressing our recommendation that it improve its information security, but weaknesses remain.

Federal legislation and guidance for information security require organizations to, among other things, establish an information security program that includes the following activities: develop information security policy and procedures; develop system security plans for networks, facilities, and systems or groups of information systems; perform risk assessments; determine the sensitivity and criticality of systems; and establish certification and accreditation programs for information systems.

Since our report last year, NARA has strengthened its information security program in several areas, including

- conducting a risk assessment of its information security program,
- revising and improving its information security program plan,
- identifying security vulnerabilities, and
- developing plans of action and milestones for identified weaknesses in the 44 systems.



Implementation Status of GAO Recommendations Information Security

According to the Office of Inspector General, however, weaknesses in NARA's information security remain, including

- Compliance testing by a contractor of all the systems on NARA's network revealed 9 weaknesses, and NARA did not develop plans of action to address those weaknesses⁸.
- NARA's classified systems are not centrally controlled, and the agency does not have the necessary assurance that these systems are adequately protected.

Because of continuing weaknesses, information security at the agency remains a material weakness. While NARA's information security remains incompletely developed, the security weaknesses do not appear to be a significant risk to the ERA program at this time.

⁸ In commenting on a draft of these briefing slides, NARA indicated that eight of the nine weaknesses have been corrected and the ninth will be addressed by August 31, 2004.



Conclusions

In the past year, NARA has strengthened key oversight and technical capabilities for acquiring the ERA system. The schedule for acquiring the system is now based on a work breakdown structure that includes dependencies between tasks and uses earned value management techniques. As a result, management within the program and the agency's overall ability to maintain control over acquisition processes have been strengthened. Oversight of the acquisition has also improved through the implementation of IT investment management reporting requirements from the program to the agency's senior management.

However, basic elements essential for the successful management of the ERA system are not fully in place. Acquisition policies and plans intended to define the project, establish the strategy for acquiring the system, and manage the day-to-day operations and those of the design contractors do not yet comply with industry standards. In particular, the lack of a process to ensure that the results of verification and validation reviews are incorporated into their respective policy or plan has significantly contributed to these weaknesses. Until key policies and plans conform to industry standards, the risk is increased that the agency will not be able to effectively manage the program and the contractors.

While NARA has made good progress in hiring key personnel, the information security and quality assurance positions are unfilled, and without these staff members, the agency may not be fully capable of managing the program and the activities of the design contractors.



Conclusions

Finally, two programmatic areas fundamental to ERA success in which the agency continues to make progress—information security and an enterprise architecture—remain incomplete. While the risks to ERA from weaknesses in information security may not appear to be significant at this time, any decline in NARA’s continuing efforts to strengthen information security is likely to increase the risk to the schedule and cost goals. Because the enterprise target architecture is incomplete, NARA may have difficulty ensuring that the ERA system is designed according to the requirements of the enterprise architecture.

If NARA continues to make progress on implementing our recommendations on an enterprise architecture, information security, and staffing, the agency should be better positioned to successfully acquire the ERA system.



Recommendation

To reduce the risks associated with NARA's efforts to acquire ERA, we recommend that the Archivist direct the ERA program director to design and implement a process to ensure that recommendations from verification and validation reviews are addressed and incorporated into acquisition policies and plans.



Agency Comments

The Archivist provided us with written comments on a draft of this briefing. The agency generally agreed with our findings, conclusions, and recommendation.

Regarding information security, the Archivist further stated that the agency had addressed eight of nine weaknesses identified through security compliance testing and would address the ninth by August 31, 2004; however, substantiating documentation was not provided. As a result, we were unable to verify that these actions have been completed.

NARA officials also provided updated information and technical comments, which we have incorporated into the briefing slide materials as appropriate.

Comments from the National Archives and Records Administration

National Archives at College Park



8601 Adelphi Road College Park, Maryland 20740-6001

AUG 3 2004

General Accounting Office
Managing Director of Information Technology Team
Mr. Joel C. Willemsen
441 G Street, NW #4T31
Washington, DC 20548

Dear Mr. Willemsen:

We thank you for the opportunity to review and comment on the draft report entitled *Information Management: Planning for the Electronic Records Archives Has Improved (GAO-04-927)* before it is issued in final form. We are pleased to note the recognition of the progress made towards implementing the recommendations provided in GAO's report of August 2003, *Records Management: National Archives and Records Administration's Acquisition of Major System Faces Risks (GAO-03-880)*.

Most of the steps NARA has taken to implement GAO's recommendations are acknowledged in the report. However, some of our efforts were just getting started at the time of the GAO review and therefore are not reflected in the report. We would like to take this opportunity to update you on the status of the four recommendations in the report with a partially addressed or not addressed status. As you will see, we are well underway to implementing all the recommendations in the report. Following are our comments.

Enterprise Architecture: Although the specifications for NARA's target architecture are not fully complete in the version 2.0 release (September 2003), the framework for the target Enterprise Architecture (EA) is in place for each major view of the EA to include Business, Data, Applications, Systems, Operations, and Security. Significant progress will be reflected in the 3.0 release of the EA which will be completed on September 2, 2004. Specifically, the following areas are being improved:

- The Business Architecture will provide "to be" business process specifications for several of NARA's key business areas within the Records Lifecycle Management function. Additionally, an updated transition plan based on the gap analysis of the baseline and the target architectures will be provided.
- The Enterprise Conceptual Data Model (CDM) will incorporate the ERA domain model.
- The agency's security architecture and IT security program will be aligned with FISMA and NIST guidance for IT security.

National Archives and Records Administration

We would like to clarify that the ERA system design must conform to the Enterprise Target Architecture and not the other way around. The functional specifications for NARA's target systems, data, and applications will be improved as the agency's business architecture continues to develop.

Information Security: Eight of the nine weaknesses identified through our contractor's compliance testing have been corrected. Enclosure (1) outlines a description of the weaknesses and the corrective actions taken. Creation of a control log to illustrate what ports are closed, filtered, or open on each subnet is the only weakness that has not been addressed. This log will be implemented by August 31, 2004.

In response to the issue regarding central control of classified systems, it is important to note that the current classified systems are physically secure, are not attached to a network, and have security plans in place. We are taking the following steps to improve the security posture of the classified systems:

- Revising NARA 101, NARA Organization and Delegation of Authority. Responsibilities for NA and NH will be re-defined to ensure that NARA classified computer systems are centrally managed by technically qualified personnel by October 1, 2004.
- Developing and implementing information systems security education, training, and awareness programs relating to national security systems for NARA information security personnel by September 30, 2004. NARA will provide additional training as needed for agency-wide security information system security professionals, system administrators, information systems security officers, and system certifiers, to ensure their knowledge of communications security and computer security is up-to-date.
- Updating the NARA Information Security Manual (INFO. SECURITY 202) with NAS support to provide technical guidance for securing automated classified information systems, including both classified systems applications and their support networks by December 31, 2004.
- Revising NARA 804, Information Technology (IT) Systems Security to include NARA classified IT systems. A draft will be prepared by August 31, 2004; the final to be issued by December 31, 2004.
- Completing an up-to-date inventory of all existing NARA classified systems by October 1, 2004.
- Completing an initial Certification and Accreditation (C&A) for each NARA classified system including a risk assessment, systems security plan, security controls testing and vulnerability analysis, and contingency by October 1, 2004.

Acquisition Program Policies and Plans: Although the scheduled date for contract award was May 28, 2004, actions to mitigate risks related to potential protests resulted in schedule changes during the acquisition process. The Source Selection Team has taken a conservative approach to the Source Selection activities to minimize any risks of protests. This approach resulted in a longer timetable for Source Selection activities. Currently, a decision was made by July 30, 2004 and the contract will be awarded on August 3, 2004.

Appendix II
Comments from the National Archives and
Records Administration

Five of the documents identified were updated and have undergone Verification and Validation (V&V) to ensure IEEE compliance prior to contract award. Enclosure (2) includes copies of the updated documents and their respective V&V reports.

As indicated in previous correspondence, the Requirements Document will not be updated. Reallocation of resources to finalize the ERA contract source selection activities impeded completion of the update to the Risk Management Plan and the Life Cycle Document. These two documents are undergoing final editorial review and will be delivered for government review by August 6, 2004.

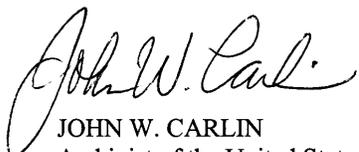
More importantly, a temporary process was put in place that incorporated verification and validation activities through out the entire document development process. Enclosure (3) describes the temporary process. The process will become permanent when we finalize the Standard Operating Procedures (SOPs) document currently under development.

ERA Staff: We have hired the replacement for the quality assurance position. The security position remains unfilled. We have advertised the position through regular government channels and in the Washington Post. Hundreds of applications have been reviewed but no qualified candidates have surfaced. As we continue to search for an ERA Security Specialist we have the support of the National Security Agency (NSA) and a staff member from NARA's Office of Human Resources and Information Services.

Finally, we would like to clarify a point from the report. The ERA Requirements Document section implies that the Requirements Document is not complete. The final ERA Requirements Document released with the ERA Request for Proposal (RFP) on December 5, 2003, outlines a complete set of high level system requirements. These high level requirements will be used by the ERA development contractor to generate a detailed System Requirements Specification that will be delivered to the government six months after contract award.

Again, we thank you for this opportunity and look forward to our future interactions as we continue the ERA acquisition process.

Sincerely,



JOHN W. CARLIN
Archivist of the United States

Enclosures

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