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INDIAN TRUST FUNDS

Challenges Facing
Interior's
Implementation of New
Trust Asset and
Accounting
Management System

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G A O

Accountability * Integrity * Reliability

Messrs. Chairmen and Members of the Committees:

Thank you for inviting me to participate in today's hearing on the Department of the Interior's effort to improve its management of a reported \$3 billion in Indian trust funds and about 54 million acres of Indian land. As you know, this effort is focused on correcting long-standing trust fund management weaknesses, which include inadequate accounting and information systems; untrained and inexperienced staff; backlogs in appraisals, ownership determinations, and recordkeeping; the lack of a master lease file and an accounts receivable system; inadequate written policies and procedures; and poor internal controls. Earlier this year, at the request of the Senate Committee on Indian Affairs, we reported on Interior's improvement plan to assess whether it provided an effective solution to addressing these long-standing problems.¹ In particular, we assessed whether one of the most critical improvement projects—the acquisition of a new service for managing Indian assets and land records known as the Trust Asset and Accounting Management System or TAAMS—would cost effectively meet trust management needs.

Today, I will discuss how we conducted our assessment of the TAAMS acquisition efforts, the results of our evaluation and our recommendations to Interior to address our findings, the current status of TAAMS, and the challenges still confronting Interior's implementation of this important system.

What Is TAAMS?

The Department of the Interior has the responsibility for managing Indian trust lands as well as accounting for income derived from those lands. The purpose of the TAAMS project—part of the overall Interior effort to improve the management of Indian trust funds and assets—is to obtain a modern, integrated information system for managing these income producing activities, distributing income to owners, and maintaining title and ownership records. The other projects that make up this effort, which were defined in Interior's July 1998 High Level Implementation Plan, are described in appendix I to this testimony.

Interior intended to acquire TAAMS as a commercial-off-the-shelf (COTS) system. With this goal in mind, in May 1998, Interior issued a Request for

¹Indian Trust Funds: Interior Lacks Assurance That Trust Improvement Plan Will Be Effective (GAO/AIMD-99-53, April 28, 1999).

Information. The responses from vendors were evaluated using a standardized form assessing data in 15 categories. After this survey was completed, Interior decided to combine the TAAMS project with another improvement project aimed at enhancing Interior's Land Records Information System (LRIS) and to obtain the needed functionality of these combined projects by acquiring a trust asset information management service using a COTS system. Under this approach, a contractor would manage Interior-provided land and trust account data in a contractor-owned and maintained data center while Interior would perform its trust management functions by accessing contractor-provided applications that run in the data center.

On December 1, 1998, Interior awarded the TAAMS contract. As part of its improvement effort, Interior expects to spend about \$60 million on developing and improving information systems, including TAAMS.

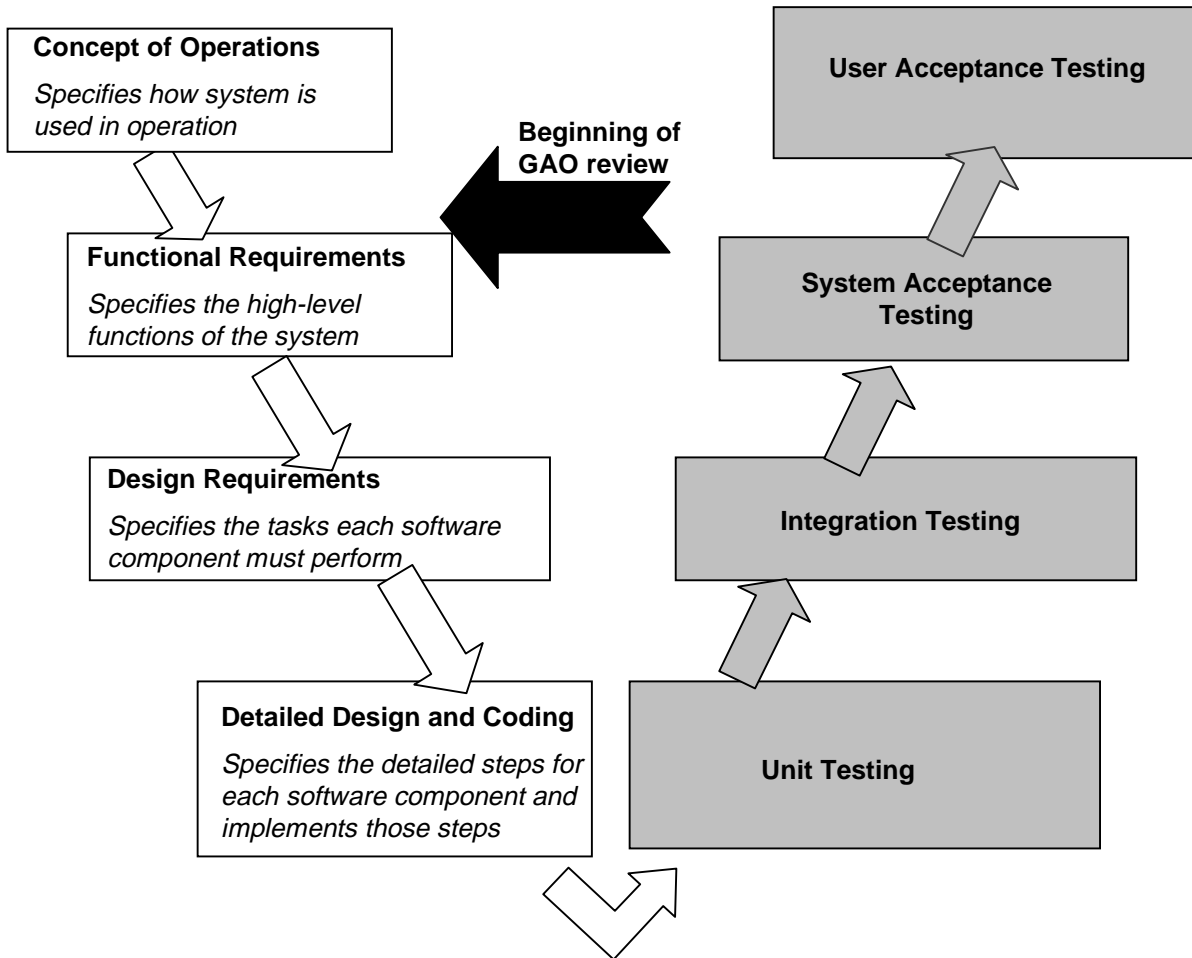
Our Assessment of TAAMS

We began our assessment of TAAMS in July 1998 while Interior was in the process of specifying the system's functional requirements. Figure 1 illustrates where our review began in the acquisition and development process.

Figure 1: Key System Development Processes and GAO's Review

Stages of system development

Stages of testing



When we review systems at this point in development, we normally assess whether agencies are following sound software development and acquisition practices. In this regard, the critical questions are the following.

- *Before embarking on its development effort, did the agency define an integrated architecture for its business operations to ensure that the system it is building and acquiring will not be duplicative or*

incompatible with other agency systems and, therefore, unnecessarily costly to maintain and interface?

- *Before choosing a certain system or service, did the agency assess the value and risks of a sufficient range of alternatives for solving its business problem?*
- *After selecting a system or service, did the agency take prudent steps to minimize acquisition and development risks?*

The processes and controls we expect agencies to adopt that will help them to answer these and other questions are called for in best practice literature² or in legislative requirements, such as the Clinger-Cohen Act of 1996, and federal policy governing acquisition efforts, including Office of Management and Budget guidance and National Institute of Standards and Technology Federal Information Processing Standards.

To assess whether Interior was following sound development and acquisition practices, we reviewed Interior's documents relating to the acquisition, including the Request for Information, vendor responses, and the Request for Proposals. We also met with senior Interior officials responsible for acquiring the service, including Interior's Chief Information Officer; Assistant Secretary for Policy, Management and Budget (Interior's Chief Financial Officer); Special Trustee; and the Interior contractor who assisted in the acquisition of the new service.

Subsequent to our report, we continued to monitor the status of the TAAMS project by attending status meetings, interviewing the TAAMS project manager, reviewing TAAMS project documentation, and observing a TAAMS test on July 7 and 8, 1999, at the contractor's Dallas, Texas, facility. This work has been performed in accordance with generally accepted government auditing standards.

²For example, the Software Engineering Institute's Software Acquisition Capability Maturity Model SM (Capability Maturity ModelSM is a service mark of Carnegie Mellon University, and CMM® is a registered trademark) that provides a logical and widely accepted framework for baselining an organization's current process capabilities (i.e., strengths and weaknesses) and assessing whether an organization has the necessary process discipline in place to repeat earlier successes on similar projects. The Institute of Electrical and Electronics Engineers, Inc., also issues guidance on practices to reduce system development and acquisition risks.

Results of Our Evaluation of the TAAMS Acquisition Efforts

With regard to Interior's initial systems acquisition efforts, our April 1999 report found that Interior was not following sound practices that would (1) help ensure that TAAMS cost effectively met trust management needs and (2) reduce development risks. First, although Interior planned for its components, such as the TAAMS and Trust Funds Accounting System, to independently improve information systems or acquire information services, at a cost of about \$60 million, it had not defined an integrated architecture for Indian trust operations. Architectures are comprehensive "construction plans" that systematically and completely describe an organization's target business environment, both in logical (e.g., missions, business functions, and information flows) terms and technical (e.g., software, hardware, and communications) terms. The Clinger-Cohen Act requires the Chief Information Officer to develop and maintain an information systems architecture. Without one, agencies are at risk of building and buying systems that are duplicative, incompatible, and unnecessarily costly to maintain and interface.

Our previous reviews at the Federal Aviation Administration (FAA), Customs Service, Department of Education, Internal Revenue Service, and National Oceanic and Atmospheric Administration³ have shown that, while the absence of a complete architecture does not guarantee the failure of system modernization efforts, it does greatly increase the risk that agencies will spend more money and time than necessary to ensure that systems are compatible and in line with business needs.

For example, in February 1997, we found that the FAA's lack of a complete architecture resulted in incompatibilities among air traffic control systems that (1) required higher-than-need-be system development, integration, and maintenance costs and (2) reduced overall system performance. Further, without having architecturally defined requirements and standards governing information and data structures and communications, FAA was forced to spend an additional \$38 million to acquire a system dedicated to overcoming incompatibilities among systems.

³See [Air Traffic Control: Complete and Enforced Architecture Needed for FAA Systems Modernization](#) (GAO/AIMD-97-30, February 3, 1997); [Customs Service Modernization: Architecture Must Be Complete and Enforced to Effectively Build and Maintain Systems](#) (GAO/AIMD-98-70, May 5, 1998); [Student Financial Aid Information: Systems Architecture Needed to Improve Program's Efficiency](#) (GAO/AIMD-97-122, July 29, 1997); [Tax Systems Modernization: Management and Technical Weaknesses Must Be Corrected If Modernization Is To Succeed](#) (GAO/AIMD-95-156, July 26, 1995); and [Weather Forecasting: Systems Architecture Needed for National Weather Service Modernization](#) (GAO/AIMD-94-28 March 11, 1994).

Similarly, in July 1997, we reported that because it lacked a system architecture, the Department of Education had made limited progress in integrating its National Student Loan Data System with other student financial aid databases. Moreover, without an architecture, the department could not correct long-standing problems resulting from a lack of integration across its student financial aid systems.

We concluded that until Interior defines the logical characteristics of its business environment and uses them to establish technical standards and approaches, it runs the risk that TAAMS and other information technology investments will be redundant and incompatible and out-of-sync with Indian trust management requirements. We therefore recommended that Interior develop an information systems architecture for Indian trust operations before making major investments in information technology systems.

Second, in undertaking its effort to acquire TAAMS, Interior did not follow a sound process for (1) ensuring that the most cost-effective technical alternative was selected and (2) reducing acquisition risks. Specifically, Interior did not do the following.

- Assess the desirability of satisfying its requirements by (1) modifying existing legacy systems, (2) acquiring a COTS product and using existing Interior infrastructure resources, (3) building a system that would provide the necessary capability, or (4) acquiring a service. The Clinger-Cohen Act of 1996 requires agencies to establish a process to assess the value and risks of information technology investments, including the prioritizing of alternative projects.
- Perform a gap analysis in surveying the availability of COTS products. This analysis would systematically and quantitatively compare and contrast COTS products against Interior's requirements based on functional, technical, and cost differences.
- Require the contractor to demonstrate that the COTS system could work with Interior-provided data or that the system could interface with other Interior systems.
- Develop a risk management plan to address the possibility that the new service would not meet performance or business requirements, be able to work with Interior systems, and/or be delivered on schedule and within budget.

Again, by not following these accepted best practices for technology service acquisitions, Interior was not necessarily dooming TAAMS to

failure. Rather, it was further elevating the risk of encountering problems in the development stages that could delay implementation or unnecessarily increase costs. Thus, we recommended that Interior develop and implement an effective risk management plan and ensure that all project decisions are based on objective data and demonstrated project accomplishments, and are not schedule driven.

In commenting on a draft of our April 1999 report, Interior's Assistant Secretary for Policy, Management and Budget recognized that there were still problems to overcome with TAAMS, but expressed concern about some of our conclusions. However, in a subsequent letter to the Congress describing actions taken in response to our recommendations, Interior stated in July 1999 that the report has been helpful in causing the department to intensify its efforts to complete a systems architecture and identify the complete functional requirements for TAAMS. Interior further stated that it was in the process of developing a departmentwide enterprise target architecture that would contain the items recommended in our report (which included a high-level description of Interior's mission and target concept of operations, the business functions to be performed and the relationships among functions, the improvement projects to be undertaken and how they are interrelated, and the specific standards and approaches that will be used to build or acquire systems). However, Interior stated that this effort has been slowed by the need to address the Year 2000 computing problem. Interior said that it plans to include a request for additional funding in its fiscal year 2001 budget request to complete the architecture.

Also, Interior officials are working on revising Interior's High Level Implementation Plan to add more details about each of the projects and to include realistic project time frames. The revised plan is expected to be provided to the Secretary of the Interior for his approval by July 31, 1999.

The Current Status of TAAMS

According to the TAAMS project manager, the TAAMS contractor has already modified its COTS product to provide the functionality called for in the TAAMS contract. Currently, the contractor is in the process of testing this product. It expects to complete testing by mid-September.

During the week of June 14, the contractor performed integration testing of the initial version of TAAMS, and, the following week, Interior initiated a

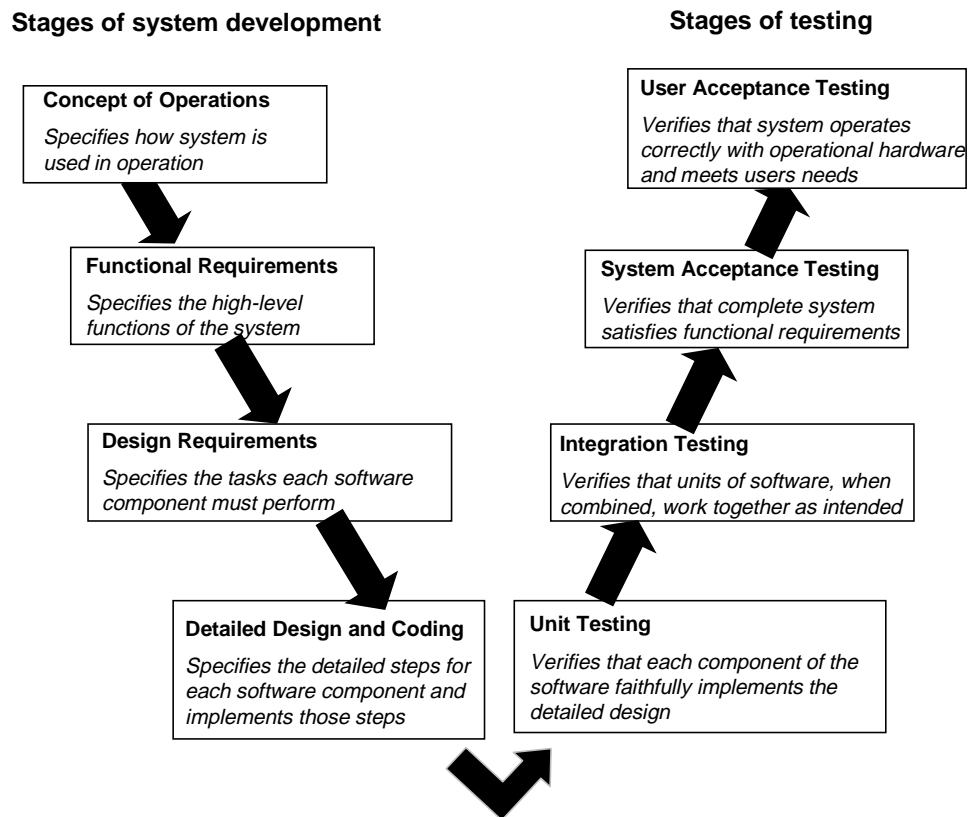
TAAMS pilot at the Billings, Montana, area office. The purpose of software integration testing is to verify that units of software, when combined, work together as intended. On July 7 and July 8, the contractor conducted preliminary user acceptance tests at the contractor's facility in Dallas, Texas. We attended and observed these tests.

Interior has also engaged an independent verification and validation (IV&V) agent who will verify that system testing is performed in accordance with generally accepted guidelines. When the IV&V assessment is done in September 1999, Interior will decide whether or not to proceed with implementing TAAMS.

Upcoming Expectations and Challenges for TAAMS

It is critical for Interior to follow sound practices during the testing phase for TAAMS. Along these lines, I would like to highlight our expectations for the next few months beginning first with an illustration (figure 2) of the stages of system testing that we would expect Interior and its contractor to follow.

Figure 2: Major Stages of System Development and Testing



In considering this illustration, it is important to keep in mind that complete and thorough testing is essential to provide reasonable assurance that new or modified systems process information correctly and will meet an organization's business needs. To ensure that tests are *thorough*, organizations should perform tests in incremental steps. That is, they should first verify that each component of the software faithfully implements the detailed design. Once this is done, they should verify that combined units of software work together as intended. From there, they should verify that a complete system satisfies functional requirements using quantitative tests. Finally, they should verify that the system addresses the users' needs. To ensure tests are *complete*, organizations should have well-defined functional and detailed requirements. If a requirement has not been defined, it is unlikely that a test will uncover a defect.

We would also expect Interior and its contractor to establish an effective management framework for testing. At a minimum, roles, responsibilities, and expectations for testing should be defined; a test and evaluation plan should be written; and guidance defining policies, principles, strategies, standards, and processes relevant to planning, executing, and reporting on each level of testing should be issued. We would further expect the IV&V contractor to ensure that test standards and guidance are being met.

As we review TAAMS, we will evaluate whether an effective management framework has been established for tests and whether the tests themselves are planned and conducted in a structured, disciplined, and incremental fashion. However, evaluating TAAMS based solely on testing will not ensure that Interior's trust needs will be met. First, it is likely that the system testing phase will not uncover all errors in the modified COTS system. In fact, testing performed through the system test phase often catches less than 60 percent of a program's defects.⁴ The remaining errors are found through other quality assurance practices, such as code inspections, or by end-users after the software has been put into production. Thus, it will be important for Interior to implement a quality assurance program that is both rigorous and well-structured.

Second, even if TAAMS works as intended, Interior will still need to ensure the integrity of the data that are loaded into the system; establish adequate policies, procedures, and controls for operation of the system; and provide timely training and equipment to system users. Without any one of these essential ingredients, the success of the TAAMS project could be undermined.

Third, in going forward, it will still be vital for Interior to define a systems architecture. Without blueprints to guide and constrain TAAMS and future information system development efforts, Interior will not have a systematic way to preclude either inconsistent systems design or development decisions or the resulting suboptimal performance and added costs associated with incompatible systems.

Messrs. Chairmen, this concludes my statement. I will be pleased to respond to any questions that you or other members of the Committees may have at this time.

⁴Rapid Development: Taming Wild Software Schedules, Bruce McConnell (Microsoft Press 1996).

Contact and Acknowledgements

For information about this testimony, please contact Keith Rhodes at (202) 512-6415. Individuals making key contributions to this testimony included Naba Barkakati, Cristina Chaplain, Michael Koury, and Chris Martin.

Thirteen Projects for Improving Indian Trust Management

To address long-standing problems with its management of Indian trust funds and assets, Interior established a Trust Management Improvement Project (TMIP) and issued a High Level Implementation Plan for the TMIP on July 31, 1998. The 13 projects identified in the High Level Plan are directed at improving systems; enhancing the accuracy and completeness of Interior's data regarding the ownership and lease of Indian lands; and correcting deficiencies with respect to records management, training, policies and procedures, and internal controls within 3 years. For each project, the plan assigns management responsibility and identifies some supporting tasks, critical milestones, and resource estimates.

Interior estimates that it will spend \$147.4 million from fiscal years 1997 through 2000 on this effort. About \$60 million of this amount is to be spent on developing and improving information systems, \$54 million on data cleanup, \$17 million on records management, \$8 million on training, and \$8 million on all other activities.

Table I.1 describes the 13 separate projects included in Interior's High Level Implementation Plan.

**Appendix I
Thirteen Projects for Improving Indian Trust
Management**

Table I.1: Thirteen Projects for Improving Indian Trust Management

Project	Description
1. Office of the Special Trustee for American Indians (OST) Trust Financial Records Cleanup	OST will standardize and verify Individual Indian Monies (IIM) system data for trust resource records and correct and establish an inventory of hard copy records for each trust fund account.
2. Bureau of Indian Affairs (BIA) Trust Resource Records Cleanup	BIA trust resource records will be cleaned up to ensure timely ownership and land status data. Processing backlogs will be worked off to update existing and future trust resource management systems data essential to ensure that income distribution and resource management functions can operate from timely data.
3. BIA Probate Backlog	BIA will inventory, identify, and develop action plans and procedures to eliminate probate backlog.
4. Office of Hearings and Appeals (OHA) Probate Backlog	OHA will inventory, identify, and develop action plans and procedures to eliminate OHA probate backlog.
5. BIA Appraisal Program	This project includes an assessment of the present BIA appraisal program, policies, and procedures; reviews of staff qualifications; determination of the adherence to uniform Standards of Professional Appraisal Practices; and development of corrective action plans, as appropriate.
6. Trust Funds Accounting System	A proven COTS trust accounting system will be acquired, using a service bureau approach, to replace the present BIA IIM accounting module.
7. TAAMS	The department will evaluate, acquire, and pilot standardized, proven COTS general trust management system technology (Master Lease, Billings and Accounts Receivable, and Collection subsystems) to the extent practicable. Following successful testing and piloting, the TAAMS system will proceed to full implementation across BIA, replacing the present BIA Integrated Records Management System.
8. BIA LRIS Enhancements	This project contemplates the modernization of BIA's official title system to provide on-line and up-to-date legal and beneficial title ownership and encumbrance for all Indian lands and resources, including automated calculation of data storage of fractional interests and automated chain-of-title processes and information.
9. Minerals Management Service (MMS) System Reengineering	MMS will design, develop, and implement new core business processes for its royalty management functions, with supporting systems.

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10. Records Management	A joint records management solution for Interior trust records will be developed and implemented, involving OST, BIA, MMS, Bureau of Land Management (BLM), OHA, and other relevant Interior offices. The project scope includes Indian trust records management, storage, access, control, and disposition and contemplates electronic recordkeeping, including imaging technology.
11. Policy and Procedures	Interior trust policies and procedures will be inventoried, reviewed, and, where appropriate, revised or established. This project specifically involves and includes representatives of OST, BIA, MMS, BLM, OHA, and other departmental offices involved in Indian trust management.
12. Training	This project will plan and deliver both trust management and employee skills training relevant to delivery of Interior's trust fiduciary responsibilities to American Indians. Training will be provided across the Interior trust workforce and include tribes and participating contractors.
13. Internal Controls	This project will systematically address documented internal control deficiencies in Indian trust management, item by item, that have been identified through internal and external audit, congressional oversight, and outside reviews. Corrective actions will be validated and/or designed to assure resolution of all internal control weaknesses.

Source: Department of the Interior July 1998 High Level Implementation Plan.

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