National Archives and Records Administration

Date : May 5, 2010

Reply to
Attn of : Office of Inspector General (OIG)

Subject : Advisory Report No. 10-12, Similar Developmental Issues Exist for both NARA's Electronic Records Archives Program and the FBI's Sentinel Project

To: David S. Ferriero, Archivist of the United States (N)

This advisory report serves to inform you as to the status of the "Base"[1] Electronic Records Archives (ERA) Program. This is the third report resulting from our continuing effort to evaluate and report on government and contractor efforts associated with developing the Electronic Records Archives. This initiative focuses on assessing whether (a) the ERA Program is meeting cost and schedule requirements, and (b) National Archives and Records Administration (NARA) and contractor management officials are taking timely action to correct any actual or potential problems with program performance.

In our opinion, if the issues discussed in this report are not remedied or appropriately addressed, NARA runs the risk of winding up with a system that is overpriced, unsecured, and unable to satisfy the agency's requirements. As the relationship between Lockheed Martin and NARA enters its final two years, it is imperative that NARA officials act decisively to address and mitigate the risks identified to program success identified below, while planning for the eventuality that the final deliverable will fail to meet baseline requirements.

In several ways, NARA's experience with developing the ERA system is similar to that of the Federal Bureau of Investigation's (FBI's) development of the Sentinel information and investigative case management system. On March 16, 2006, the FBI announced the award of a $305 million contract to Lockheed Martin Services, Incorporated, as part of a $425 million project to develop the Sentinel system. In its original plan, the FBI expected to develop Sentinel in four overlapping phases, each lasting 12 to 16 months. Each phase, when deployed, was to provide a stand-alone set of capabilities upon which subsequent phases would add further capabilities. The FBI originally scheduled the fourth and final phase of Sentinel to be completed by December 2009.

After more than 3 years and $334 million expended on the development and maintenance of Sentinel, the cost to Sentinel is rising, the completion of Sentinel has been repeatedly delayed, and the FBI does not have a current schedule or cost estimate for completing the project.

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[1] The *Base* ERA will provide basic electronic records management capability for NARA legacy data and records and for current transactions of other federal agencies.

Like the ERA, Lockheed Martin is developing the Sentinel system for the FBI. In reports of the FBI's implementation of the Sentinel Project, the U.S. Department of Justice (DOJ) OIG has expressed concerns about Sentinel's overall progress, aggressive schedule, increased costs, and inability to satisfy user requirements, similar to the concerns we have about the ERA Program[2].

The DOJ auditors reported that the FBI has had difficulty establishing and maintaining a strict cost and schedule for the Sentinel Project. The FBI originally estimated the project would cost $425 million and be completed by December 2009. However, Sentinel's overall project completion date had been extended to September 2010, nine months later than originally planned, and the total projected cost of the project was $451 million, $26 million more than originally planned.

The DOJ auditors' concerns about the FBI's ability to complete Sentinel in a timely and cost-effective manner have escalated. As of March 2010, the FBI did not have official cost or schedule estimates for completing Sentinel. The remaining budget, schedule, and work to be performed on Sentinel are currently being renegotiated between the FBI and Lockheed Martin. According to the auditors, while the FBI does not yet have official estimates, FBI officials have acknowledged that the project will cost more than its latest revised estimate of $451 million and will likely not be completed until 2011.

Our reviews of the ERA Program have revealed commonalities with the Sentinel Project in the following areas:

System Development Methodology

In its review of the FBI's implementation of the Sentinel Project, the DOJ OIG auditors reported a change in the development methodology for that system, which is being developed by the Lockheed Martin Corporation. According to their report, as a result of lessons learned during the development of Phase 1, the FBI and Lockheed Martin replanned the remaining phases of Sentinel before developing Phase 2. During this replanning, the FBI and Lockheed Martin adopted an incremental development methodology for the remaining portions of Sentinel that divided Phases 2 through 4 into segments, which were further divided into increments.

Apparently, the change in development methodology was not advantageous, because the FBI spent an additional $780,000 of discretionary operations and maintenance funds to correct Phase 2 defects after it accepted the product as delivered in December 2009. The DOJ auditors reported that a major reason for switching to this incremental development model was the FBI's desire to deliver new capabilities to users every 3 to 6 months. However, the FBI is having difficulty in ensuring that the Sentinel program is meeting established requirements, particularly in meeting user needs.

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[2] For additional details of the problems with the Sentinel Program, see U.S. Department of Justice OIG audit report no. 10-22, Status of the Federal Bureau of Investigation's Implementation of the Sentinel Project, dated March 2010.

We were advised that a new system development methodology proposed by Lockheed Martin, known as "Agile," has been employed for ERA work performed under increment 3[3]. The Agile approach is based on providing smaller, discrete deliverable units of software. This methodology introduces a new set of processes and procedures that minimize formal documentation in comparison to the methodology used in prior ERA increments 1 and 2. As a result of minimizing documentation, (a) a new level of risk is introduced in that the agency may lack adequate documentation with which to oversee the project, and (b) the ability of NARA to clearly trace requirements to software deliverables is limited.

In addition, this new system development methodology is being introduced without substantiation of (a) Lockheed's ability to implement it, and (b) NARA's ability to evaluate contractor compliance with contract requirements.

A senior-level NARA official told us that the agency was not happy with the contractor's Agile methodology, but having accepted the contract, NARA accepted the methodology. Another NARA official added that the contract gives the contractor flexibility in deciding what development methodology to use.

Senior-Level Program Management

In its report, the DOJ OIG expressed concerns about project personnel turnover. The DOJ OIG auditors reported that, as of October 2009, the Sentinel Project Management Office (PMO) had 76 full-time employees who were charged with ensuring that Sentinel addresses FBI users' needs and that the contractor, Lockheed Martin, meets its contractual obligations. According to them, due to the scope and importance of the project, Sentinel requires a highly-skilled and experienced Sentinel PMO staff. From December 2008 through October 2009, however, the Sentinel PMO experienced a 26 percent turnover rate. In light of the FBI's aggressive development and deployment schedule for Sentinel, they were concerned that a continuation of high staff turnover would negatively affect the Sentinel PMO's ability to properly oversee the project.

We have also witnessed the same trend here at NARA. Within the past eight months, several senior-level program management officials were transferred out of the ERA Program. The positions affected included the Program Director, the Executive Officer, the Principal Technologist, and the Director, Nationwide Implementation and User Support Communications. We have similar concerns that the ERA Program could be adversely impacted as a result of losing these senior-level officials' extensive program knowledge, experience, and management capability.

These officials were transferred to NARA's new Center for Advanced Systems and Technologies (NCAST). The Center will serve as NARA's lead technology organization for advanced and applied research in the fields of computer science, engineering, and archival science. Its mission is to discover and promote archival technologies to NARA's offices through technical know-how.

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[3] The ERA is being developed incrementally over several years. According to NARA's 2010 ERA Expenditure Plan, Increment 3 will include new Congressional and Public Access systems. It is also to augment the base system with commercial off-the-shelf technology to increase flexibility and scalability. NARA plans to complete this increment by June 2010.

NARA's web site is http://www.nara.gov

However, relative importance of this office does not mask that these key NARA officials will no longer have focal cognizance over ERA Program development.

Program Costs

The DOJ OIG reported a cost increase and schedule delay for Phase 2 Segment 4 Sentinel Project effort. The cost increase and schedule delay occurred for several reasons. First, there were significant problems with the usability of electronic forms that were developed for Sentinel. Second, there were 26 critical issues related to the functionality of Sentinel that required resolution before deployment. Third, Sentinel's utilization and compatibility with network security features in the FBI's Public Key Infrastructure (PKI) did not meet the FBI's expectations. Fourth, an independent review conducted at the FBI's request concluded that Lockheed Martin had deviated from accepted systems engineering processes in developing the software code for Sentinel.

As a result, a stop-work order was issued for Phase 4 of Sentinel. Forms were redesigned and Segment 4 of Phase 2, a decision that increased the cost of Phase 2 by $2.9 million.

NARA program officials must be vigilant to ensure that a similar situation does not develop for the ERA Program. At the ERA Combined Monthly Status Review, March 4, 2010, contractor officials revealed that a program metric indicated slower than planned progress for software development and software architecture, which could result in increased program costs and/or schedule delays.

Program Schedule

According to the DOJ auditors, the FBI and Lockheed Martin had encountered considerable challenges in deploying deliverables, and that the FBI had deferred deployment of some deliverables to later stages of the Sentinel project.

For example, they reported that FBI officials had accepted delivery of Sentinel's Phase 2 Segment 3, that the FBI and Lockheed Martin had encountered considerable challenges in deploying these deliverables, and that the FBI had deferred deployment of some of these deliverables to later stages of the Sentinel project. On March 3, 2010, because of significant issues regarding Phase 2 Segment 4's usability, performance, and quality delivered by Lockheed Martin, the FBI issued a partial stop-work order to Lockheed Martin for portions of Phase 3 and all of Phase 4.

Like the Sentinel Project, the ERA Program has incurred schedule problems. A review of ERA Program documentation revealed that Increment 3 effort includes the following business functionalities deferred from prior Instances:

- Creation of Appraisal Report;

- Identification of records to access;

- Public review of records schedule;

- User capability to create business rules;

- Ability of users to configure their workbench to have multiple views;

- Scalability of total storage without major design changes;

- Deletion of assets from storage;

- Archival descriptions

- Attachments to Business Objects (Records Schedules, Transfer Requests, Legal Transfer Instruments, Transfer Plans);

- Full workflow management of the creation, review, and approval of preservation plan;

- Replication of data from the Archival Research Catalog (ARC);

- Navigation of the archival hierarchy;

- Ability to search and view descriptions; ;

- Enhanced output and presentation of assets; and

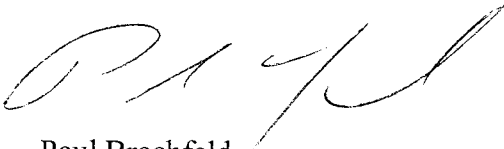- Enable interfaces between ERA and other NARA systems.

In addition, work on Increment 3 was originally scheduled to begin on October 1, 2008. However, contract negotiations for the effort, originally scheduled for March 2008, began in May 2009, and were not completed until September 2009.

In addition, the following functions, originally scheduled for completion in Increment 1, have been deferred to Increment 4:

- enforcement of appropriate access rules and present alternate options if access denied;

- basic workflow management for the creation an approval of access review determinations;

- coverage for systematic processing or part of a special request/FOIA process;

- ability to capture and version a review determination status;

- notification of review determinations to stakeholders;

- ability to capture redaction event metadata and the reasons for redaction;

- ability to ingest redacted version into ERA; and

• ability to monitor and execute disposition of electronic records.

We believe the issues, i.e., shortcomings and delays, discussed in this report, as well as the FBI's experience with Lockheed's performance related to developing the Sentinel System, are indicators of a program whose success is in jeopardy. Based on the current status of the ERA Program, we continue to have significant concerns that, if the issues discussed in this status report are not adequately addressed by contractor and NARA program management office officials, the agency will not have acquired a system that meets all of its requirements for storing and managing electronic records and for managing the lifecycle of paper records and other holdings. If you have any questions concerning the information presented in this Advisory Report, or there are other areas of the ERA Program that you would like for us to review, please do not hesitate to contact me.

Paul Brachfeld
Inspector General

cc: NH (M. Morphy)