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ASSESSMENT REPORT

10-07

FEDERAL DIGITAL SYSTEM (FDSYS) INDEPENDENT VERIFICATION AND VALIDATION - ELEVENTH QUARTER REPORT ON RISK MANAGEMENT, ISSUES, AND TRACEABILITY

June 18, 2010

**Date**

June 18, 2010

To

Chief Information Officer

From

Assistant Inspector General for Audits and Inspections

Subject**Federal Digital System (FDsys) Independent Verification and Validation (IV&V) – Eleventh Quarter Report on Risk Management, Issues, and Traceability
Report Number 10-07**

The Government Printing Office (GPO) Office of Inspector General (OIG) is conducting independent verification and validation (IV&V) of GPO's Federal Digital System (FDsys)¹ implementation. The OIG contracted with American Systems² to conduct IV&V for the public release of FDsys.³ As part of its contract with the OIG, American Systems is assessing the state of program management, technical and testing plans and other efforts. American Systems is required by the contract to issue to the OIG a quarterly Risk Management, Issues, and Traceability Report, providing observations and recommendations on the program's technical, schedule, and cost risks as well as requirements traceability of those risks and the effectiveness of the program management processes in controlling risk avoidance. Additionally, at the end of each FDsys release phase, American Systems is required to issue a release phase summary program management report that addresses delivery of the technical baseline per the FDsys Master Program Schedule and the risks that affect the schedule's critical path to the next phase.

¹The FDsys program is a multimillion dollar effort that GPO is funding and managing to modernize the GPO information collection, processing, and dissemination capabilities it performs for the three branches of the Federal Government.

²American Systems, located in Chantilly, Virginia, is a large information technology company with significant experience in the realm of IV&V for Federal civilian and Defense agencies, including the Department of State, the Navy, and the U.S. Agency for International Development.

³American Systems IV&V methodology is referenced to the framework established by the Institute of Electrical and Electronic Engineers (IEEE) Standard 1012-2004, the IEEE Standard for Software Verification and Validation.

The enclosed report is American Systems' quarterly report for the period January 1, 2010 to April 6, 2010. During this period, IV&V did not identify any new technical, cost, or schedule risks. As a result, we did not make any new recommendations and therefore, did not request a response to the report from the FDsys Program Management Office. The report does however, discuss issues and concerns that were addressed in previous quarterly report recommendations.

The final report distribution is in Appendix A.

If you have questions concerning this report or the IV&V process, please contact Mr. Brent Melson, Deputy Assistant Inspector General for Audits and Inspections at (202) 512-2037, or me at (202) 512-2009.

A handwritten signature in black ink that reads "Kevin J. Carson". The signature is written in a cursive, flowing style.

Kevin J. Carson
Assistant Inspector General for Audits and Inspections

Enclosure

cc:
Chief Acquisition Officer
Chief Management Officer
Chief Technology Officer

IV&V RISK MANAGEMENT, ISSUES, AND TRACEABILITY REPORT	
TO:	Brent Melson
FROM:	David Harold
IV&V OF:	Quarterly Report (Final - Document Number 02-012)
SUBJECT:	January 01, 2010 - April 06, 2010 Quarterly Report
DATE:	May 11, 2010
CC:	Dan Rose, Jon Valett, John Best, Shawn O'Rourke

Background:

This report presents the critical technical, schedule, and cost risks identified for the Government Printing Office (GPO) Federal Digital System (FDsys) Program. Specifically, it provides a high-level overview of the key risks and issues that Independent Verification & Validation (IV&V) has identified during the quarter ending March 31, 2010.

This is the eleventh IV&V quarterly report and covers the period from January 1, 2010 to April 6, 2010. In agreement with the Office of the Inspector General (OIG), the period covered by this quarterly report was expanded to April 6, 2010 to include IV&V's briefing to the Public Printer.

During this reporting period, the FDsys Program Management Office (PMO) completed the deployment of several post-Release 1 production builds and prepared/updated FDsys technical documentation. The production builds are summarized below along with the other events that occurred during the second quarter of Fiscal Year (FY) 2010.

References:

- a. *FDsys Continuity of Operations (COOP) Design Review (slide deck), 21 January 2010*
- b. *FDsys COOP System Design Document (SDD), (version 1.2.1), 16 January 2010*
- c. *FDsys Release 1 Completion Plan, 26 March 2010*
- d. *FDsys Package Creation Tool Requirements Document, 26 January 2010*
- e. *FDsys Metadata Editing Tool Requirements Document, 16 October 2009*
- f. *FDsys XForms Metadata Editor System Design Document, 30 September 2009*
- g. *FDsys COOP Implementation Plan, 28 January 2010*
- h. *FDsys FY'09 Review and Program Update (slide deck), 9 December, 2009*
- i. *IV&V Quarterly Report for October 01, 2009 - December 31, 2009, dated March 03, 2010*

Summary:

Release 1.8.0.389:

- The PMO continued to work on Production build 1.8.0.389 during the reporting period. Six (6) new collections were targeted for this build: United States Code, Senate Manual, House Rules and Manual, United States Statutes at Large, Commerce Business Daily (bulk data only), and Supreme Court Decisions (bulk data only). Support for the GPO Federal Publications collection was also included. Build 1.8.0.389 resolves a total of ninety-nine (99) Program Tracking Reports (PTRs) that have been written to document various software deficiencies, as well as, enhancements needed for FDsys. This PTR total includes the resolution of seven (7) Severity 1 (i.e., Critical) problems.¹

Release 1.7.4.385:

- The deployment of Production build 1.7.4.385 occurred on February 4, 2010. This build contained the processors' component and fixes to PTR 404 and PTR 407.

Release 1.7.4.384:

- The deployment of Production build 1.7.4.384 occurred on January 28, 2010. This build fixed two (2) Severity 1 (i.e., Critical) PTRs: PTR 399 and PTR 2722.

Release 1.7.4.383

- The deployment of Production build 1.7.4.383 occurred on January 21, 2010. This build contained the Searchwebapp components and a fix for PTR 2699.

Release 1.7.4.382:

- The deployment of Production build 1.7.4.382 occurred on January 14, 2010. The build contained the Webapp components (FDsys and Processor profiles) and a fix for PTR 2687.

Continuity of Operations Design Review:

The PMO conducted an *FDsys Continuity of Operations (COOP) Design Review (reference a)* on January 21, 2010. This Review summarized the development and deployment strategy for the FDsys COOP Instance. The information presented during the Design Review was taken from the *FDsys COOP System Design Document (reference b)*. As excerpted from the COOP SDD, *"The goals of FDsys COOP instance are therefore to serve as a disaster recovery site. It replicates the full dataset for the repository component to maintain a consistent system record. Upon failover, manual raw data recovery is expected for content not yet completely processed and stored in the repository. The instance supports the FDsys operations*

¹ According to the FDsys Test Plan, a Severity 1 PTR is defined as follows: **Severity 1: Critical – Prevents the accomplishment of an operational or mission-essential capability specified by the requirements. From a user perspective, a severity code of 1 indicates an operational situation that is intolerable in a fielded system and for which a solution is urgently needed.**

transparently to the end users, and provides manual failback capability once the primary site is recovered.” Thus, the PMO intends to deploy a COOP capability that provides all FDsys functionality. During the Design Review, the PMO described the planned COOP implementation, as well as an alternative (lower risk) approach if this implementation is not feasible.

FDsys Technical Documentation:

The PMO produced technical documentation to support FDsys development. This documentation included the Requirements Documents for the FDsys Package Creation Tool and FDsys Metadata Editor Tool, and the System Design Document (SDD) for the FDsys XForms Metadata Editor. In addition, seven (7) new Data Management Documents (DMDs) were developed, as well as updates to a number of existing DMDs. The PMO also developed the *FDsys Release 1 Completion Plan (reference c)*.

Key IV&V Efforts:

- IV&V attended the FDsys COOP Design Review meeting conducted by the PMO on January 21, 2010. As mentioned above, this review summarized the technical details and issues contained in the current version of the COOP SDD.² Since July 2009, the PMO has devoted a substantial amount of time to the COOP design. Conceptually the design seems feasible; however, there are still a number of unknowns and concerns. The COOP design is not final until the PMO builds/prototypes and tests the implementation. Since IV&V’s initial review of the COOP SDD, the PMO has added some additional design details. Most noteworthy, the use of the FlexCone will certainly aid the testing and maintenance of the COOP instance.
- IV&V reviewed the *FDsys Package Creation Tool Requirements Document (reference d)* and the *FDsys Metadata Editing Tool Requirements Document (reference e)*. Because of their preliminary status, IV&V did not send comments to the PMO. These documents are the result of the **initial** requirements elicitation effort by the FDsys team. IV&V found that there is no context provided as to how the Package Creation Tool will be used to support FDsys operations. To date, there is no SDD to describe how this tool will be incorporated into the current FDsys design. Additionally, there are identical requirements in both the Package Creation Tool Requirements Document and the Metadata Editing Tool Requirements Document; and, many of these requirements will still need to be refined. There are compound requirement issues as well as requirements that are not completely defined. For example, one requirement states: “*The tool shall validate that entries for date-time fields conform to date-time input standards*”; yet, the Input Standards themselves are not called out/referenced.

² IV&V reviewed the initial version of the COOP SDD and provided comments to the PMO on November 18, 2009. The PMO did not respond to these comments, and many of them have not addressed in the current SDD.

- IV&V reviewed the *XForms Based Architecture for FDsys Metadata Editor System Design Document (reference f)* and provided comments to the PMO on February 17, 2010. IV&V believes that this document needs to be updated to reflect the decision that has been made to develop this second implementation using the XForms architecture. The document lacks specificity in a number of areas.
- IV&V reviewed the *FDsys COOP Implementation Plan (reference g)* and provided comments on February 19, 2010. This Plan describes a series of Test Scenarios that will be used to verify the individual concepts incorporated into the COOP design, as well as the procedures needed to validate the failover/failback processes. As written, the Test Scenarios are incomplete, high level, and do not encompass all aspects of the COOP design. In addition, the Plan contains no schedule and/or time estimates for the test efforts described.
- The OIG requested that IV&V review the Persistent Uniform Resource Locator (PURL) requirements targeted for implementation in FDsys. PURLs are Web addresses that act as persistent identifiers in the face of an ever-changing Web infrastructure. PURLs are persistent because once established, a PURL doesn't change even though a Webpage may change. IV&V reviewed the PURL requirements and other related system requirements originally specified by the GPO Information Technology and Services Group (IT&S), and compared them to existing FDsys documentation including the Concept of Operations (ConOps) and Requirements Document (RD). The OIG and IV&V met with the Acting Superintendent of Documents on March 8, 2010 to discuss the results of the review. IV&V prepared a table of the existing FDsys requirements (established in December 2007) associated with PURLs and other functionality needed by IT&S (e.g., the Integrated Library Services (ILS) interface). The table listed each requirement along with the FDsys Release targeted for its implementation. Based on the information contained in this table, the PMO does not plan to perform the development work for PURLs and the ILS in the near timeframe.
- The OIG and IV&V met with the Public Printer and Deputy Public Printer on April 6, 2010. The purpose of this briefing was to discuss the OIG's open recommendations, and to present the OIG's major concerns for the FDsys Program in the areas of program management, technical design, functionality, testing, COOP capability, and schedule.

1. Technical Risks Identified

Since January, the PMO has concentrated its efforts on deployment of the FDsys Releases summarized above. Although IV&V did not identify new technical risks, there are several concerns/issues that should be noted.

- The PMO completed the development and testing of FDSys Production build 1.8.0.389 at the end of this reporting period. The PMO successfully deployed this build on April 12, 2010. During formal testing of this product (i.e., from March 16 to April 12), the Test Team created 174 new PTRs, 5 of which were classified as Severity 1 (i.e., Critical) problems. Fixes to the 5 new Severity 1 PTRs, as well as, another 46 of these new PTRs were included in build 1.8.0.389. Thus, 123 new PTRs were added to the PTR database by the test effort. As a result, with this deployment the current FDSys contains 123 new deficiencies. In addition, even though build 1.8.0.389 resolved a total of 99 PTRs, it actually increased the size of the database by another 75 PTRs (i.e., $174 - 99 = 75$).
- The implementation of a COOP capability for FDSys is a pre-requisite for the PMO to transition from GPO Access to FDSys as the GPO “system of record”. At the *FDSys FY '09 Review and Program Update Meeting (reference h)* held in December 2009, the PMO targeted COOP stand-up for completion by September 30, 2010. The current Release 1 completion schedule identifies the implementation of a Continuity of Access (COA) capability by September 2010. This capability, which is still being designed, appears to provide a temporary failover capability for only the Access portion (i.e., public website) of FDSys. Recent planning information indicates that the full COOP capability for the entire FDSys (i.e., both the Access System and the Content Management System (CMS)) will not be completed until mid-February 2011. At that time, the COA capability will be disabled. Thus, the full COOP capability for Release 1 will not be available by the end of this Fiscal Year. This jeopardizes the PMO’s ability to “sunset” GPO Access in FY10. If “sunset” does not occur, GPO must continue to maintain both FDSys and GPO Access.
- In the previous *IV&V Quarterly Report (reference i)*, it was recommended that the PMO clearly define the near term and long term goals for FDSys and determine what the final system needs to do for both internal and external users. IV&V also recommended that the PMO develop a realistic plan to achieve the final system, including realistic milestones and the expected total cost to complete the system. In their response, the PMO disagreed with the concept of a final system. The PMO stated that the development of FDSys will continue as new features and functionalities are identified by stakeholders. Using this information, the PMO will identify requirements for future releases and develop plans to deliver these releases on a release by release basis. Based on this PMO response, FDSys has transitioned to an open-ended development effort with objectives (e.g., new functionality) that will be defined by stakeholder inputs and PMO identified requirements. The lack of a well defined “final system” for FDSys is problematic. More importantly, it seems that the existing FDSys Concept of Operations (dated May 2005) and the Requirements Baseline (dated December 2007) no longer define the FDSys functionalities and capabilities that the PMO plans to build and deploy.
- In late March, the PMO produced a Completion Plan that includes the major tasks required to finish FDSys Release 1 by the end of FY 2010. However, this Plan does not delineate the sub-tasks and activities that comprise these major tasks (i.e., there

is no work breakdown structure). As a result, the detailed efforts needed to accomplish each major task have yet to be assigned to specific engineering groups or individuals. In its present form, therefore, this Plan creates two immediate problems. First, the PMO will be unable to effectively track cost, schedule, and manpower/resources to ensure that Release 1 is completed on time. Second, the PMO will find it difficult to determine the cause and accountability if/when major tasks are not met.

2. Schedule Risks Identified

For this reporting period, no new schedule risks have been identified. However, IV&V has repeatedly cited the lack of a program plan/master integrated schedule as a Program Risk, and recommended its development in a number of past Quarterly Reports. The lack of a comprehensive and specific Plan, including the breakdown and assignment of all tasks and activities continues to hinder the FDsys Program with respect to meeting its objectives and identifying/controlling costs. Having a comprehensive Plan would enable the PMO to effectively manage the Program, make adjustments when required, and assess the impacts to ongoing FDsys efforts when enhancements are requested and/or mandated (e.g., from the Administration). In addition, a detailed Plan would clearly define to others (i.e., GPO management, FDsys development team, users, stakeholders, Congress) the evolution of FDsys in terms functions and capabilities, and give credence to funding requests.

3. Cost Risks Identified

IV&V identified no new cost risks during this reporting period.

4. Recommendations

This Quarterly Report does not contain new recommendations. The issues and concerns discussed herein are already encompassed by open recommendations provided to the PMO via previous IV&V Quarterly Reports.

Appendix A. Report Distribution

Public Printer
Deputy Public Printer
Chief Acquisition Officer
Chief Information Officer
Chief Management Officer
Chief Technology Officer