MITRE

House Committee on Oversight and Government Reform

and the

Subcommittee on Information Policy, Census, and National Archives

April 9, 2008

2010 Census: Progress on the Development of the Field Data Collection Automation (FDCA) Program and the Decennial Response Integration System (DRIS)

Jason F. Providakes, Ph.D.

Senior Vice President and General Manager

Center for Enterprise Management

The MITRE Corporation

Table of Contents

1 Introduction

The MITRE Corporation is a not-for-profit organization chartered to work in the public interest. MITRE manages three Federally Funded Research and Development Centers (FFRDCs): one for the Department of Defense, one for the Federal Aviation Administration, and one for the Internal Revenue Service. A Federally Funded Research and Development Center (FFRDC) is a unique organization that assists the United States government with scientific research and analysis, development and acquisition, and/or systems engineering and integration. FFRDCs address long-term problems of considerable complexity, analyze technical questions with a high degree of objectivity, and provide creative and cost-effective solutions to government problems.

Governed by Part 35.017 of the Federal Acquisition Regulations, FFRDCs' operate in the public interest with objectivity, independence, freedom from conflict of interest, and full disclosure of their affairs to their respective sponsors.

Because the Decennial Census is such an enormous undertaking, the Census Bureau has often turned to technology-based solutions to improve quality and efficiency. However, technology itself is not a panacea. The technology requires changes in the roles of the people and the processes they implement. Planning, acquisition, and coordinating the changes to this combination of people, processes, and technology is very complex and filled with risk. Because of this complexity, the Census Bureau requested MITRE assistance in 2004.

MITRE has been working for the Census Bureau since 2004. MITRE's support to the Census Bureau on FDCA falls into roughly four phases: preparation, cost estimation, independent assessments, and support.

FDCA Preparation: For about nine months beginning in March 2004, MITRE assisted the Census Bureau with feasibility assessments of handheld computers, recommendations for the FDCA acquisition strategy, and analysis of risks and mitigations to the FDCA program. This is described in further detail in Section 2.

FDCA Cost Estimation: From February 2005 until August 2007, MITRE's role on FDCA was limited to developing Independent Government Cost Estimates and assisting with the evaluation of cost proposals. This is described in further detail in Section 3.

FDCA Independent Assessments: From March 2007 through June 2007, MITRE was asked to perform assessments of the overall FDCA program, the handheld computers, and the security of the handheld computers. This is described in further detail in Section 4.

FDCA Support: Since August 2007, MITRE has been asked to provide acquisition and system engineering support to the FDCA program. This is described in further detail in Section 5.

The Committee also requested information on MITRE's involvement with the Decennial Response Integration System (DRIS). MITRE has had little direct involvement with this program and has performed no assessments of DRIS, so MITRE has no products or comments to provide about the program.

2   FDCA Preparation

MITRE initiated work on the Field Data Collection Automation (FDCA) program on March 4, 2004 when it was asked to conduct an independent assessment of the feasibility of using a handheld computer for field operations for the 2010 Decennial Census. MITRE surveyed stakeholders within Census Bureau headquarters, reviewed 2010 planning documents, and applied MITRE experience from programs and technologies relevant to field automation. MITRE developed an initial, quick-look report in which the team stated that using handheld computers was technically feasible, but there were many risks. MITRE also delivered a set of recommendations on an acquisition strategy for handheld computers.

On July 28, 2004, MITRE delivered an Independent Assessment of the Use of Handheld Computers for the 2010 Decennial Census that was based on additional research and observations by MITRE engineers on the operation of a prototype handheld computer that was developed by the Census Bureau's Technologies Management Office. Non-response follow-up (NRFU) field operations were observed in Queens, New York and Thomasville, Georgia as part of the 2004 field test. MITRE concluded that the handheld computer approach was technologically feasible, but that an evaluation of operational feasibility depended on the final scope and concept of operations for the 2010 Decennial Census. Included in the report was a Roadmap for Mitigating Risks and Increasing the Accuracy of Costs and Benefits.

MITRE was additionally tasked to assist in the development of several documents that helped define the early stages of the FDCA program. These documents included a program alternatives analysis, program scope, processes, and automation considerations. The scope and alternatives documents were prepared as part of a bidders library to assist with information transfer between the Census Bureau and potential bidders. MITRE assisted the Chief of the Acquisition Division in planning and conducting an Industry Day to provide additional information to potential bidders. Subsequently, discussions were held between individual vendors and Census Bureau personnel to answer questions regarding procurement and to improve understanding of the Census field operations.

Following the Roadmap contained in the Independent Assessment of the Use of Handheld Computers, MITRE conducted further analyses and presented the results to the Associate Director for the Decennial Census in a series of Checkpoint reviews. Three reviews were conducted on September 30, 2004, November 30, 2004, and January 12, 2005. The Checkpoint reviews were used to identify the risks and the costs of risk mitigation activities for different levels of automation of field operations.

During the summer and fall of 2004, MITRE was asked to assist in developing the scope and identifying deliverables for the FDCA Statement of Work that would be included with the Request for Proposals as part of the FDCA contracting process. MITRE also assisted with preliminary planning of the structure and procedures for the FDCA Program Management Office (PMO) and the schedule for the procurement and fielding of the handheld computers. MITRE's support to the PMO was discontinued following the arrival of a new FDCA Program Manager in January 2005.

3   FDCA Cost Estimation

MITRE was requested to develop the Independent Government Cost Estimate for the FDCA procurement. MITRE used the results of the Checkpoint analyses to determine the scope of the procurement. MITRE developed a detailed cost model that addressed the full range of services that would be requested from the winning vendor. Because a set of FDCA requirements had not been developed (and MITRE was not involved in requirements definition), MITRE had to postulate a systems architecture to support the cost estimate. MITRE applied the assumptions (e.g.: number of local Census offices, number of enumerators) that were contained in the budget model maintained by the Census Decennial Management Division (DMD). MITRE conducted research on available and expected handheld computer technology to estimate a unit cost for the handheld computers. Estimates of software costs were based on the experiences of the Census Technologies Management Office in developing software that was used for the 2004 Field Test. Estimates of the magnitude of software development for the FDCA system were used with commercial software cost estimating models to estimate the level of effort needed to develop the software in a commercial environment. Expected labor rates were applied to the estimated level of effort to determine the expected costs.

MITRE was not involved in evaluation of the technical proposals submitted by the three competing vendor teams in early 2006. MITRE did, however, assist with evaluation of the cost proposals and compared them against the final Independent Government Cost Estimate.

During June and July 2007, MITRE was requested by the Chief of the Acquisition Division and the FDCA PMO to assist with the cost evaluation of Engineering Change Proposals (ECPs) received from Harris. The ECPs were changes to the basic contract that resulted in cost decreases and increases. MITRE provided comments to the PMO to assist in negotiating the final price of the ECPs.

4 FDCA Independent Assessments

In March 2007, the Associate Director for the Decennial Census requested that MITRE conduct an independent "Red Team" assessment of the FDCA program after Harris reported that previously established milestones and budgets were at risk due to the unanticipated number of actual requirements emerging from detailed requirements decomposition. The MITRE Red Team conducted confidential, non-attributable interviews of Census Bureau personnel and their contractors and other stakeholders to develop an assessment of the root causes of the program variances. MITRE reviewed program management procedures and documentation, requirements, budgets, schedules, resources, work breakdown structures, and other related information. MITRE was asked to develop recommendations for corrective actions. Interim versions of the findings were briefed to the Associate Director, and the final version of the Red Team report was delivered to both the Associate Director and the Deputy Director on June 6, 2007. The report concluded that "FDCA is at significant risk of cost and schedule overruns, omission of essential requirements, and increased oversight unless major changes are made quickly." A set of recommendations was provided for each of the findings in the report.

In April 2007, MITRE was tasked to examine the general application functionality and performance of the handheld computers. Given the limited availability of handheld computers, only a cursory examination was performed. A second MITRE team was asked in May 2007 to conduct a security vulnerability assessment to determine the likelihood of Title 13 data being compromised.

On November 27, 2007 the Deputy Director requested meetings with MITRE and other stakeholders to discuss the state of FDCA. MITRE met with the Deputy Director on November 29 and left behind a set of talking points indicating major areas of risk around schedule, requirements, testing and acceptance, and cost. The talking points concluded: "FDCA is in serious trouble. It is not clear that the system will meet Census' operational needs and quality goals. The final cost is unpredictable. Immediate, significant changes are required to rescue the program. However, the risks are so large considering the available time that we recommend immediate development of contingency plans to revert to paper operations."

The Deputy Director convened a meeting of his senior managers and MITRE on December 4 and reviewed the major points from the November 29 meeting. All key stakeholders were present with the exception of a representative from the Harris Corporation. A preliminary decision was made to transfer the development of the software for the Coverage Measurement operation from Harris to the Census Bureau's Technologies Management Office. The Deputy Director also stated that he wanted a final set of requirements delivered to Harris by the middle of January. MITRE contributed to development of the final set of requirements, as described in the next section.

5 FDCA Support

MITRE submitted to the Census Bureau an FDCA Recovery Roadmap in August ,2007. This followed the Red Team assessment completed in June.

On August 23, 2007 the new FDCA Program Manager, requested MITRE assistance with FDCA requirements and schedule definition. On August 28, 2007, MITRE provided recommendations for updating the FDCA requirements for the 2010 Census. Subsequently, MITRE provided support to update the workflows, narratives, and requirements clarifications for 2010 operations to the Census Bureau for delivery to Harris. This included NRFU, Address Canvassing, and paper-based operations. MITRE facilitated sessions to clarify requirements, analyze issues, determine the approach for resolving issues, and package the final documentation.

In December 2007, MITRE developed a minimum set of requirements and recommended changes for Section C of the FDCA contract as a step to restructure and re-baseline the FDCA contract. Initial results were presented to the Associate Director for Decennial Census on December 17, 2007. MITRE was directed to provide a copy to the Chief of the Decennial Management Division, and the copy was delivered on December 18, 2007.

The pace of activities increased during the months of December and January to meet the mid-January completion date specified by the Deputy Director. MITRE continued to work with both the Decennial Management Division and the FDCA PMO to clarify issues with the requirements that were delivered to Harris on January 16, 2008.

In January 2008, MITRE was asked to provide several software engineering experts to participate in a Census "Blue Team" to review Harris' software architecture and software development processes. The Chief of the Census Technologies Management led the team, and MITRE provided five engineers to assist with the analysis. The team visited Harris software development locations in Largo, Maryland and Melbourne, Florida. The team conducted numerous interviews, observed software development and testing procedures and conducted analysis of the code that was being produced by Harris. The team leader presented results to the Director of the Census Bureau on January 31, 2008. A similar briefing was conducted at the Department of Commerce for the Deputy Secretary and Chief Financial Officer on February 1. The team concluded that given the current schedule, budget, processes, and status, they had low confidence that all of the planned capabilities would be delivered on time, on budget, and to the degree of quality needed.

On February 5, 2008, the Secretary of Commerce and the Director of the Census Bureau commissioned a FDCA Risk Reduction Task Force to examine alternatives to reduce the high risk of continuing with the FDCA baseline. MITRE was asked to provide assistance in evaluating the risks and the costs associated with a range of alternatives that included going to paper-based operations in place of using the handheld computers in the 2010 Decennial Census. MITRE used a decision tree approach to formulate the possible alternatives that

were provided to the Task Force members for analysis and comment. MITRE worked with personnel from the Decennial Management Division budget office to estimate the costs of each alternative. Risks for each alternative were identified and quantified to aid in determining the relative severity of the risks. The Task Force recommended that the Census Bureau adopt Alternative 2 that called for using paper forms for the Non-Response Follow-Up operation in place of the handheld computer. The Task Force stated that this alternative contained less risk than the baseline of continuing with the Harris plan of using handheld computers for Non-Response Follow-Up.

On about March 17, the Assistant Secretary of Commerce requested an independent MITRE assessment regarding the path forward on the FDCA contract. MITRE provided an assessment on March 20 that reflected information provided by Harris and the FDCA Program Management Office subsequent to the completion of the FDCA Risk Reduction Task Force. The assessment concluded that both the baseline and Alternative 2 were feasible, but both required improvements in management, testing, and communications.

MITRE subsequently worked with a large group of stakeholders, including Harris, to conduct a detailed analysis of the risks. The conclusions of this effort determined that Alternative 2 is less risky than the baseline alternative. Based on the detailed risk analysis, it became clear that Alternative 2 using paper for Non-Response Follow Up is less risky because it uses well-understood paper-based operations and appears to have a similar cost. Therefore, MITRE recommends Alternative 2 as the best approach for the Census Bureau.

On March 31, 2008, MITRE presented the Director of the Census Bureau with a set of recommendations for implementing a successful program. The recommendations have also been discussed with the Deputy Director and with the Associate Director for Decennial Census. The recommendations include:
- Establish a command center to oversee management of the selected alternative
- Develop a Roadmap, an integrated schedule at the executive level, of activities for the next 60 days
- Identify and assign action officers to high priority activities
- Develop a communications strategy to increase transparency, collaboration, and teamwork
- Communicate the Roadmap to both internal and external stakeholders

MITRE remains committed to helping the Census Bureau overcome the current challenges to implement a successful FDCA program that will enable a successful 2010 Decennial Census.

Appendix   Acronyms

DMD   Decennial Management Division

DoC   Department of Commerce

DRIS   Decennial Response Integration System

DSAT   Decennial Systems Architecture Review Team

ECP   Engineering Change Proposal

FDCA   Field Data Collection Automation

GAO   Government Accountability Office

HHC   Handheld Computer

IG   Inspector General

IGCE   Independent Government Cost Estimate

NRFU   Non-Response Follow Up

PM   Program Manager

PMO   Program Management Office