MANAGEMENT CHALLENGES OF THE 2010 U.S. CENSUS

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ABSTRACT

This paper gives an insider's perspective on the management approaches used to manage the 2010 Census during its operational phase. The approaches used, the challenges faced (in particular, difficulties faced in automating data collection), and the solutions applied to meet those challenges are described. Finally, six management lessons learned are presented.

Keywords: Census, Program Management, Risk Management

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INTRODUCTION

The U.S. Census, begun in 1790, is the longest continuously administered periodic census in the world. Managing the 2010 Census over its 15-year life cycle (1998-2013) is a huge undertaking, ranging from planning and supervising the research necessary to determine the design, to software development and testing, to major procurements of hardware and services, to managing large-scale field tests, to actually carrying out the census, and finally to dissemination of its results. This paper will cover the management challenges faced by the senior executives in charge of the decennial census program during the 2008-2010 period, during which final testing was completed, a major replan of field automation and related activities including a reduction in scope of a major contract was accomplished partly through software development supported by a different contractor, and the actual field operations of the census conducted. The replan was based on improved management practices, increased testing, and strong contingency planning. A general overview of the organization and administration of the 2010 census can be found in Weinberg and Thompson (2011) and is not repeated here.

This paper attempts to organize events during the immediate pre-and post-census period (2008 through 2010) in a coherent narrative within a broader management context. That context does not include its place in U.S. society. Thus I deliberately ignore such activities as the paid advertising campaign and other aspects of Census outreach like organizational partnerships. While hard scientific evidence is sparse, as a senior executive participating in real time in the process, I hope that my perspective and the implications I draw for future censuses

are more than just idiosyncratic, though inevitably others involved will have different perspectives and draw different conclusions.

The political context of taking a census is also important, but was less so for the 2010 Census than for the 1990 and 2000 Censuses. According to the U.S. Constitution, the Census must be taken every ten years "in such Manner as [Congress] shall by Law direct." For the 2000 Census, the design was the subject of heated debate and lawsuits, with planning proceeding on two tracks, and the final design determined less than a year ahead of operations by a January 1999 decision by the U.S. Supreme Court ruling out the use of sampling for non-response follow-up. Also controversial was the issue of whether to adjust the counts for under-counted (and over-counted) persons, ruled out by the Secretary of Commerce in late 2000, based on a technical recommendation by Census Bureau staff, just before the apportionment counts by State were released.

During the 15-year 2010 Census time frame, there were four directors of the Census Bureau confirmed by the U.S. Senate (plus acting directors from the career civil service during periods without a political appointee) – two appointed by a Democratic President and two by a Republican: Kenneth Prewitt, appointed by President Clinton, serving from October 1998 to January 2001; C. Louis Kincannon and Steven Murdoch, both appointed by President Bush and serving from March 2002 to January 2008 and January 2008 to January 2009, respectively; and Robert Groves, appointed by President Obama, who began his service in July 2009. Also relevant is the political composition of Congress, revealing the potential for conflict and compromise as the majority parties changed. This composition is shown in Table 1. It is perhaps surprising that despite so many changes in party control during the decade, most of the political

discussions took place without the controversy that was part of the previous two decades' debate. I attribute that lack of rancor to two particular events -- the Supreme Court's January 1999 ruling that sampling for non-response was illegal, and a decision by Director Kincannon to rule out adjustment for the purposes of apportionment and redistricting (stated in an April 2002 interview with *The Washington Post,* and formally announced in February 2003 in the fiscal year 2004 budget submission to Congress; see also U.S. Census Bureau 2004). The Senate has recently passed S. 679, the "Presidential Appointment Efficiency and Streamlining Act of 2011" which in section 3 sets a fixed term of 5 years for new Census Bureau Directors (starting in years 2 and 7 of each decade), potentially reducing the turnover and allowing one person to oversee the bulk of Census operations should it become law.

Because of the scope of the decennial census, the U.S. Census Bureau includes a separate organizational unit (called a directorate, each with subsidiary divisions) devoted to the conduct of that program, which also includes administration of the American Community Survey (ACS) -- a continuous household survey begun in 2005 of nearly 3 million addresses per year designed to collect the information formerly collected from a sample of the population using the "long form" census from 1940 to 2000. The Associate Director for Decennial Census reports to the Director of the Census Bureau (a political appointee) through the Deputy Director (a career official acting as Chief Operating Officer). That Associate Director is assisted by an Assistant Director for ACS and Decennial Census, who supervises several division chiefs, the most central of whom for the purpose of managing the decennial census is the Chief of the Decennial

Management Division.[1] See Figure 1 for a simplified organizational structure diagram for the Census Bureau's management of the 2010 Census.

SETTING THE STAGE

In brief, the goals of the 2010 Census were to improve accuracy, reduce risk, and contain costs, when compared to Census 2000 (see U.S. Census Bureau 2008a for more detail). Balancing cost, risk, and quality was at the heart of all program design and management decisions. To accomplish all three goals, the 2010 Census was conceived as a "reengineered" census.[2] The Census Bureau attempted to make three major changes in census-taking between 2000 and 2010 and was fully successful in two of those changes, but only partly successful in the third.

The first major change was to eliminate the long form – roughly 50 questions asked only of a sample of the population. As noted above, this was accomplished by launching the ACS. By accumulating data from the ACS from 5 consecutive years, estimates are provided for geographic areas as small as block groups, as well as for small population groups. Since this is an ongoing survey, long form-equivalent information is available starting in 2010 every year (for the prior 5-year period) for every size of geography, instead of just once a decade.

The second change was to update the geographic framework of the census – both the Master Address File (MAF) and the Topologically Integrated Geographic Encoding and

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[1] The Decennial Management Division (DMD) provided overall direction for program planning and coordination of the decennial census; assigned functional responsibility to divisions; determined program priorities; and developed budget requirements, schedules, and a cost and progress reporting and control system. DMD also ran the census risk management, issues management, and change control processes (among others) and chaired the Census Integration Group of division chiefs. See below for more discussion of these roles.

[2] This description of the re-engineered 2010 Census is adapted from Weinberg and Thompson (2011).

Referencing (TIGER) spatial (map) digital database. The MAF is the framework for the entire census. It identifies all living quarters and links each to a spatial location and a specific geographic location in the Census Bureau's TIGER database. Post-2000 semi-annual updates from the U.S. Postal Service's Delivery Sequence File (for city-style addresses) and by using the Census Bureau's Community Address Updating System (for rural addresses) were supplemented by the 2007-2008 Local Update of Census Addresses (LUCA) partnership program. In LUCA, the Geography Division sent the then-existing MAF listings and maps to participating state, local, and tribal government representatives for areas under their jurisdiction to obtain information to correct or further update the MAF. The addresses the LUCA participants supplied and the existing address and street locations in the MAF and spatial TIGER locations were verified, and GPS coordinates added, during the March to July 2009 Address Canvassing operation. Further updates to the MAF were made during the 2010 Census itself, as enumerators identified missed units, and as local governments provided lists of new construction.[3]

TIGER was updated between 2003 and 2008 with the assistance of a contractor to align all the street centerlines and some features in every U.S. county, and in Puerto Rico and all Island Areas, with Global Positioning System (GPS) coordinates to 7.6-meter accuracy. Then the 2009 Address Canvassing operation obtained GPS coordinates for approximately 86.1 percent of the housing units (the residual received "manual" map spots, collected electronically).[4]

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[3] There were several other sources of updates as well, including appeals from LUCA participants about the results of Address Canvassing that were adjudicated by an office run by the Office of Management and Budget.

[4] Since housing units were both added and removed by later operations, approximately 86.5 percent of the final 133,341,676 housing units in the 2010 Census have GPS coordinates.

Once the address file was ready, the country was divided geographically into collection blocks. Roughly 90 percent of housing units were in dense-enough areas that they received their census form by mail and were asked to mail it back. Roughly 90 percent of the remainder (9 percent of the total) had their form hand-delivered and were also asked to mail it back. The remaining 1 percent of housing units (and all group quarters, such as prisons) did not receive a questionnaire but were visited by an enumerator (enumerators also visited those in the first two groups who did not mail back their questionnaire). In 2010, only 74 percent of occupied housing units were enumerated by mail returned to a scanning center. The remaining 26 percent, plus all vacant housing units, had to be visited in person to complete the enumeration in the Non-response Follow-Up (NRFU) operation. Figure 2 shows the 2010 Census work flow.

The third major change to census-taking was built on the first two changes in order to a more fully automate the data collection process. By mid-decade, this had become a plan to fully automate three key 2010 Census operations (Address Canvassing, NRFU, and the Census Coverage Measurement Personal Interview) using hand-held computers (HHCs). While automated processing of the actual census forms has been around for quite a while (for example, for the 1960 Census the Census Bureau invented FOSDIC – Film Optical Sensing Device for Input to Computers), the intention was to push technology to the field. After assessment of the results of testing off-the-shelf HHCs and Census Bureau-designed data collection software and systems, census planners decided to acquire custom-built HHCs and software via contracting. Problems encountered with the contractor-developed HHC software in the 2007 Dress Rehearsal for the Address Canvassing operation led to the Secretary of Commerce approving a Census Bureau plan to revert to a paper-based response data collection for NRFU,

the same methodology that had been used for several decades.[5] This change added to the cost of the 2010 Census but was adopted to reduce the risk of an unsuccessful census.

It is this third part of the re-engineering that led to many of the management challenges, and thus it is on that part that the discussion in the penultimate section below is focused. As background, Appendix A discusses the organizational structure used to manage, at its peak, the approximately 600,000-strong field army of enumerators. Few problems were encountered in that aspect of the census.

THE USE OF CONTRACTORS

Because of the cyclical nature of decennial census work and its concomitant cyclical funding (roughly three-quarters of the 15-year life-cycle cost is spent in just 2009 and 2010), and because of rapidly evolving technology, it is necessary to supplement the permanent headquarters and field staffs and the existing enterprise systems of the Census Bureau with both temporary employees and contractors, and to use contractor-provided solutions. To carry out the 2010 Census, the Census Bureau awarded seven major contracts, as summarized in Table 2. Each large contract is managed by a Project Management Office -- a team of technical professionals (some of whom are also contractors), supervised by and supplemented with Census Bureau program and acquisition professionals. Training in project management and contract surveillance is encouraged and valued (and often required).[6]

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[5] Prior to that change, to relieve pressure on the contractor, the Census Bureau had moved the Census Coverage Measurement Personal Interview data collection operation to laptop computers programmed in-house.

[6] Each of the chief project managers for the major contracts had a Master's Certificate in Project Management, a Project Management Professional certification, or both, as well as level III certification to act as the Contracting Officer's Technical Representative (COTR) or Assistant COTR.

Federal government contracting fulfills multiple purposes. Often, it is used to purchase commodities or services that are readily available in the commercial sector, such as copy paper or transportation. This kind of contracting was used in the 2010 Census for such items as forms printing and telephone questionnaire assistance. A second type of contracting is to alleviate the need to hire permanent employees for temporary responsibilities. While temporary federal workers can be hired, and were indeed hired to carry out almost all short-term census field operations, it is difficult to hire, train, and retain some high-skilled workers that are needed for several years. This kind of contracting was used for the MAF-TIGER Accuracy Improvement Project. A third kind of contracting, and the one most difficult for the government to manage, is to acquire technologically advanced services for which existing government workers are not well-suited or for which corporate vendors have a comparative advantage. For the 2010 Census, this included contracts for software development, such as the Field Data Collection Automation and Data Access and Dissemination System contracts, and for creative advertising services, part of the contract for an Integrated Communication Program.

While most of these large contracts awarded for the 2010 Census gave the Census Bureau few management challenges beyond some early funding issues and normal but intensive monitoring and modification as circumstances changed, two were of particular difficulty and are discussed at length below – the Field Data Collection Automation (FDCA) contract awarded to Harris Corporation, and the software development support contract for a Paper-Based Operations Control System awarded at the "last minute" to ICS Nett Inc. when automated

collection of information from non-respondents was removed from the FDCA contract.[7] This latter change led to the 2008 replan of the Non-Response Follow-Up operation.

MANAGEMENT INITIATIVES

As part of the 2008 replan of the 2010 Census and in response to the perceived management problems that contributed to the difficulties with the FDCA contract, the Census Bureau worked closely with the Department of Commerce, the Office of Management and Budget, and oversight bodies to finalize long-planned management controls already under development for the decennial program. Consequent to the identification of the 2010 Census as a high-risk program by the U.S. Government Accountability Office in March 2008, the decennial directorate developed a *2010 Census High-Risk Improvement Plan* briefed to the Department of Commerce, the Office of Management and Budget, and Congress (U.S. Census Bureau 2008a). The plan focused on a range of challenges including program management, risk management, integration, and testing.

Program management plan. The *2010 Census Program Management Plan* version 1.0 was issued in March 2008 to codify procedures and inform decennial census staff and contractors, and oversight bodies, how decisions are to be made and issues are to be resolved regarding the 2010 Census (version 5.0 is U.S. Census Bureau 2009c). The documented processes included risk management (version 3.0 is U.S. Census Bureau 2010b), schedule management (version 1.2 is U.S. Census Bureau 2009d), issue management (version 1.5 is U.S. Census Bureau 2009b), and change management (version 1.3 is U.S. Census Bureau 2009a).

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[7] There were also early problems with the MAF-TIGER Accuracy Improvement Project. That contract eventually finished on time and under budget in 2008.

Divisions are the key operational components of the Census Bureau – it is division staff who were charged with operational responsibility. Integration took place through cross-divisional (that is, integrated) operation and system teams, reporting to the primary governance group – the Census Integration Group of division chiefs chaired by the Chief of the Decennial Management Division. Census Bureau divisions involved in decennial census programs and operations were all responsible for resource management within their budgets established by Decennial Management Division. This included both resource balancing to ensure sufficient resources were applied to the highest priority operations and activities as well as succession planning to remove the unacceptable risk of having single points of failure in their staffing plan. Division Chiefs were to make every effort to resolve issues escalated to them from the team leaders before raising the issue to the Census Integration Group. For the limited number of issues for which the Census Integration Group could not reach resolution, conflicts were escalated to the Decennial Leadership Group of more senior managers chaired by the Associate Director for Decennial Census, or more rarely to the Director and Deputy Director.[8] Figure 3 illustrates the decision-making roles of the various groups.

Decennial Census integrated schedule. The 2010 Census was organized as 44 interdependent operations with nearly 19,000 separate activities that are managed through an integrated schedule.[9] The schedule was baselined in May 2008 and was monitored and

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[8] During the operational phase of the Census, the Decennial Leadership Group typically consisted of the Associate Directors of Decennial Census and Field Operations, the Assistant Director for ACS and Decennial Census, and the Chiefs of the Decennial Management and Field Divisions. Of course, there were some issues escalated by the Director to the Under Secretary and Secretary of Commerce for decision.

[9] This figure is actually an under-estimate as (1) activities prior to 2003 were not included in the integrated schedule, and (2) teams and contractors had more detailed operation-specific schedules, only summarized in the

managed weekly through an alert process that included senior managers up to the Director. The "Schedule Alert Report" tracked the schedule at a high level – focusing on roughly 70 key schedule lines. Since the schedule was integrated, any delays in predecessor operations affected those key activities, and the causes of potential schedule issues could be tracked down and resolved.

Monthly status reports. Oversight for the Census Bureau is the responsibility of several organizations. In the direct chain of command, the Census Bureau's Director reports to the Department of Commerce (DOC) Under Secretary for Economic Affairs, who reports to the Secretary of Commerce, who reports to the President. In addition, both houses of the legislative branch have oversight responsibilities. Each of these oversight organizations has agents who attempt to gather the information necessary for effective oversight. Within the Department of Commerce, that function is served by the Office of the Inspector General (OIG); for the President it is the Office of Management and Budget (OMB); for the Congress, it is the Government Accountability Office (GAO).

Beginning as a result of GAO's designation of the Census as high risk (rescinded in January 2011), Decennial Directorate senior management, along with senior field, administrative, and IT managers, began briefing the DOC and OMB on a monthly basis, reporting on the status of the budget, schedule, risks, and issues affecting the 2010 Census, as well as recent accomplishments, upcoming activities, and the performance for each of the major decennial

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integrated schedule. Of the 18,878 activities in the integrated schedule on July 27, 2011, 9,136 dealt with the 2003-2008 tests, and 9,742 dealt with the 2010 Census and its aftermath.

contracts (monthly briefings were discontinued in late 2010).[10] The decennial leadership also briefed the Commerce Under Secretary for Economic Affairs weekly, and provided a weekly status report to the Secretary of Commerce. The Monthly Status Reports were used by OMB, GAO, and OIG to monitor progress toward meeting milestones and metrics established in response to the designation as "high risk"; GAO and OIG were provided with other documents (such as decision memoranda) on a regular basis. The Monthly Status Reports were also shared with staff of the relevant Congressional committees.[11]

Risk management plan. A *risk* is a possible event or condition affecting the accomplishment of key program objectives that *may occur* in the course of a project. A realized risk (a possible event that has actually occurred) is an *issue*. The Decennial Directorate senior management team implemented a risk management plan in May 2008 that included the development of risk mitigation strategies (to avoid issues) and risk contingency plans (to deal with issues should they arise); these were managed through weekly meetings of a risk review board and documented on a risk register. Program-level risks are high-level risks that involve a large-scale threat to the 2010 Census; these were managed by a group of senior (division chief-level) managers as the 2010 Census Risk Review Board.[12] In contrast, project-level risks, while linked

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[10] Each *Monthly Status Report* was intended to present a comprehensive overview of 2010 Census activities, including Status of Key Issues; Recent Accomplishments; Upcoming Activities; Operational Update; Schedule Status; Program Budget/Costs; Program-Level Risks; an Overview (as a performance dashboard); Field Data Collection Program Integration; and Contract Performance for each major contract.

[11] The two oversight and the two appropriations committees: the House of Representatives Appropriations Committee, and its Committee on Oversight and Government Reform/Subcommittee on Information Policy, Census, and National Archives; the Senate Appropriations Committee, and its Committee on Homeland Security and Governmental Affairs/Subcommittee on Federal Financial Management, Government Information, Federal Services, and International Security.

[12] For example, in version 37 of the risk register dated July 12, 2010, there were 25 program-level risks being managed. These included such risks as "Litigation that Threatens the Delivery of Apportionment and Redistricting

to program-level risks, are confined to a specific operation or system and typically do not represent a serious threat to the overall success of the 2010 Census; these were managed by a team. (Project-level risks were sometimes called team-level or operation-level risks.) The Program Management Offices and major contractors also maintained risk registers. All of the program-level risks had *mitigation* plans and most had *contingency* plans associated with them (those that did not instead had plans in place to establish "rapid response" action teams should the need arise). The senior risk review board reviewed project-level risks as part of the quarterly Project Management Reviews of each team's activities.

Contingency funds. As a risk mitigation strategy, Decennial Directorate management requested contingency funds as part of the Fiscal Year 2009-2011 budgets to address unanticipated events (e.g., the potential impact of the economy on census operations, natural disasters). These were appropriated by the Congress, but in the end, very few of those funds were needed and as a result were returned to the Treasury.[13]

Field Data Collection Automation (FDCA) program integration. As part of the replan, in the Spring of 2008, the Census Bureau established a new senior position reporting to the Associate Director for Decennial Census to ensure integration of the FDCA program (that is, of both the FDCA contractor and of all de-scoped activities carried out by others) across all decennial projects and contractors. The new manager's responsibility was to oversee issues of architecture, scope, schedule, cost, risk, quality, and change management, and to coordinate the work of the new contractor brought on board to develop the Paper-Based Operations

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Data", "H1N1 Influenza Affecting Regional Census Centers and Local Census Offices Activities", and "Continued Operations of Critical Infrastructure During Disasters".

[13] A total of $1.87 billion of appropriated funds were returned to the Treasury in fiscal year 2010.

Control System, as well as the internal staff working on related projects (such as the Decennial Applicant, Personnel, and Payroll System).[14]

The decennial testing program. At that time, the Associate Director also established a second new position – Decennial Chief Testing Officer – to serve as an independent point of accountability for an enhanced testing program that followed life-cycle software development principles and practices. His efforts were focused on new programs and on activities that the Census Bureau did not have the opportunity to test in the truncated 2008 Dress Rehearsal. All planned and new testing requirements were documented in a program-level testing plan also shared with GAO. Testing activities were organized into three components – operations, systems, and interfaces – and included developer, system, user, and regression testing. The testing plans and metrics were reviewed by senior management at least biweekly and also as part of all quarterly Project Management Reviews; having such a consolidated plan allowed prioritization, identification of gaps, and schedule adjustments.

Additional managerial improvements compared to Census 2000. Beyond the program documentation, contract management, and testing aspects emphasized above, additional changes in managerial practice since Census 2000 included:

- Creation of an enterprise architecture compliant with statutory standards and federal guidelines to guide system design and development, and provide governance of all

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[14] The Decennial Applicant, Personnel, and Payroll System supported personnel and payroll administration for temporary, intermittent Census employees participating in the 2010 Census, such as enumerators. A system separate from the normal biweekly payroll system was needed to enable weekly salary and expense reimbursement payments.

decennial systems.[15] Its system design followed state-of-the-art software design principles. The 2010 Census Architecture is documented on the internal electronic Census Operations Center site. Despite substantial investment in developing the architecture, in the end it proved inadequate to fully guide software development and hardware procurement.[16]

- Documentation of the 2010 Census goals, objectives, and strategies that are fully traceable in the *2010 Census Integrated Program Plan* (version 2.0 is U.S. Census Bureau 2008b)*.*

- Development of a high-level *2010 Census Operational Plan* (version 3.0 is U.S. Census Bureau 2010a) that summarizes all 44 operations, and a *Detailed Operational Plan* for each in a standardized format (documented in the *2010 Census Information Memoranda Series*).

As the 2010 Census moved from planning to operations, it was increasingly important for individuals and groups to communicate quickly with one another about incipient problems and about hot issues. A regular series of meetings served this purpose (these meetings are

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[15] *Businessdictionary.com* defines enterprise architecture as the "Design or 'blueprint' of a business that depicts the components of [an organization] employed in its operations, interrelationships of those components, information flows, and how each component supports the objectives or the strategy of the enterprise." [Accessed 25 February 2011]

[16] Though not specifically referring to the FDCA program, the Government Accountability Office (GAO) reported in 2005 that the Census Bureau was "at increased risk of not adequately managing major IT investments and is more likely to experience cost and schedule overruns and performance shortfalls" because the agency did not fully and consistently perform standard IT practices. GAO restated this finding in its 2006 report on census acquisition planning, noting that although the Census Bureau generally followed leading practices for federal acquisition planning, the FDCA project office did not have the full set of capabilities to effectively manage the acquisition, which increased the risks of cost overruns, schedule delays, and performance shortfalls. (See U.S. Government Accountability Office 2005, 2006.)

described in Appendix B). These meetings were supplemented by regular information postings on the electronic internal-use-only Census Operations Center.

IDENTIFYING THE AUTOMATION PROBLEM

The data capture (Decennial Response Integration System or DRIS) contract was awarded in October 2005 and the field automation (FDCA) contract was awarded in April 2006. Immediately upon award, both contractors had to replan their proposed baselines and shrink the scope of software development to account for the fact that the government had underestimated the funds needed in the early planning and preparatory years of the contracts when the life cycle budget for the 2010 Census was established in 2000. These replans added risk to both contracts in that early development work had to be pushed later into the decade and in retrospect should have alerted the program management offices to enhance their contract monitoring. However, the impact on DRIS was smaller than on FDCA since the 2010 Census was the second time that Lockheed-Martin had provided data capture services to the census (and they had provided similar services to other countries in the interim) while the 2010 Census was the first experience with a census for the Harris Corporation.

Another source of risk was the fact that the Census Bureau had not determined its final design or its program management and system engineering controls for the 2010 Census at the time of the FDCA award in 2006, and all federal agencies operated in an environment with ever-changing IT security requirements. At the urging of agency, departmental, and oversight acquisition professionals, the FDCA contractor in particular was to be held to less deterministic performance goals ("solution-based" contracting) and allowed the latitude to determine the

best approaches to meeting the agency's needs. The Census Bureau did provide high-level requirements but as detailed requirements were developed and the schedule was baselined, the new information meant contractors had to quickly and accurately accommodate several rounds of changes, which increased cost and risk.

A third source of risk was the FDCA contractor's lack of Decennial Census operational knowledge and experience (much of its previous experience had been in the defense arena). For example, their proposal for "on-the-fly" self-designed management reports was an unacceptable solution for a workforce of newly hired and trained supervisors. A fourth source of risk was the failure of the FDCA Program Management Office to establish aggressive contractor oversight and stringent change control early in the contract (though a natural complement to the performance-oriented acquisition strategy) along with inadequate information exchange and therefore inadequate integration between the contractor and the agency staff who would be the customers of its products and software.

These risks became issues when they led to noticeable under-performance on the first major field testing activity that used FDCA-supplied hardware and software – the Address Canvassing Dress Rehearsal in the Spring and Summer of 2007. Despite a major reduction in requirements, and despite the delay in contract award and consequent replan to align schedule and budget which led to slower than desirable software development and inadequate testing, the FDCA-provided software mostly worked for many of the high-level requirements, albeit with significant performance and data problems. Identification of these software problems raised concerns within the agency about its ability to provide even more detailed requirements for the control system for all operations and about the contractor's ability to complete the rest

of its responsibilities to automate Non-Response Follow-Up and the Census Coverage

Measurement Personal Interview.

In March 2007, the associate director for the decennial census asked the MITRE

Corporation, a Federally Funded Research and Development Center with expertise in project

management, to conduct an independent assessment of the FDCA program.[17] In its June 2007

report, MITRE concluded that FDCA was at significant risk of cost and schedule overruns and

potentially omission of essential requirements.

These concerns, coupled with the failure of the October 2007 Continuing Resolution

covering the beginning of federal fiscal year 2008 to include (as an "anomaly") additional funds

recognizing the increasing cost of the census versus 2007, led to the cancellation of many of the

remaining 2008 Dress Rehearsal activities. As a first step to reduce pressure on the FDCA

contractor, activities related to the Census Coverage Measurement Program were removed

from the contract in December 2007 and reassigned to Census Bureau staff while Census

Bureau officials determined whether additional changes were needed.[18]

To determine the next steps, several major activities were undertaken in the Fall of 2007.

Prior to that time, no "red flags" had been posted by the FDCA program management office nor

were senior management officials fully aware of the potential issues with FDCA. First, a Census

Bureau team was charged with developing the detailed requirements that the FDCA contractor

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[17] MITRE was already a 2010 Census contractor and had contributed to a number of management improvements, including development of the 2010 Census enterprise architecture.

[18] The Census Coverage Measurement Program (CCM) is basically a separate, independent census of a subset of the country used to measure the coverage of the population by the entire census. A sample of blocks containing about 160,000 housing units was drawn and an independent address list was prepared for these blocks and used to conduct independent personal interviews. The CCM results will be compared to the census results to determine under- and over-counts; results will be available in the Summer of 2012. The Census Bureau had automated this operation in-house in 2000.

would need its products and software to meet in order to successfully carry out the remaining tasks. This was, in effect, a repudiation of the plan to use performance-based contracting. The FDCA contractor had demanded these on very short notice and after negotiations, delivery of the detailed requirements for the 2009 Address Canvassing operation was completed in November 2007, with delivery of all remaining detailed requirements for the 2010 Census completed in January 2008.[19]

Second, after receiving a new and unexpectedly large cost estimate from the Harris Corporation to fulfill the remaining January 2008 detailed requirements, a task force was established, led by a former Deputy Director of the Census Bureau, with daily oversight by a team of senior Department of Commerce officials, to determine the appropriate course of remediation to recommend to the Director and the Secretary of Commerce. The task force report was reviewed by an independent panel of experts who made individual recommendations to the Secretary of Commerce. As a result of those inputs, the Director of the Census Bureau and the Secretary decided to significantly reduce the scope of the FDCA contract, focusing the contractor's resources on completing the automation of the Address Canvassing operation, completing the operations control system for all paper-based operations, and supplying the IT infrastructure for the 494 Local Census Offices (LCOs), along with an effort to revert to the paper-based data collection approach used for Non-Response Follow-Up in the 2000 Census.

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[19] This was a major effort of Census Bureau staff, requiring much overtime and delay of other planning activities. It was however the inevitable result of the specific research and development strategy adopted earlier in the decade which put off critical design decisions as long as possible in order to take full advantage of evolving technology and research results.

To implement the recommendations of the task force, the Census Director appointed a new Associate Director for the Decennial Census and the Directorate leadership created a "get-well" plan with short deadlines for certain key activities. Components of this get-well plan were implemented by five "action officers". As part of the replan, an "Integrated Product Team" brought together senior staff from all stakeholders to integrate all FDCA-related operational decisions, assisted by MITRE. The team also identified personnel to embed with the FDCA contractor to minimize communications difficulties. Shortly after this decision was made, further assessment by the Decennial Directorate leadership based on input from the Integrated Product Team led to moving the development of a Paper-Based Operations Control System (PBOCS) for all operations after Group Quarters Validation to a new contractor. At that point, there were less than 2 years remaining before the first paper-based production operation needed to go into the field – data collection in "Remote Alaska" was scheduled to begin in January 2010.[20] To get the additional funding that this alternative required, the Secretary testified before Congress.

To carry out the PBOCS development, the Decennial Directorate established a new software development project management team in an established division (the Decennial Systems and Processing Office), hired knowledgeable consultants with extensive software development experience to advise the development team, and hired a new contractor to provide the programmers needed to implement revised software requirements that replaced the ones supplied to FDCA in January 2008. Because of the critical nature of the work and the aggressive

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[20] The FDCA contractor had less time than that to get into the field for its first field operation, the Dress Rehearsal of Address Canvassing.

time frame for development, the plans included close coordination with primary stakeholders (in particular the Field Division which managed the collection operation), embedded security specialists, "agile programming" with many short-cycle iterations, frequent check-ins with stakeholders, and one pre-production and three production software releases, each with enhanced functionality.

During the Census's operational phase that began in early 2010, the development team also included representatives from the three major vendors – Egenera (hardware), Oracle (database software), and Red Hat (operating system software) – who were responsible for monitoring their systems, diagnosing problems, and assisting with issues resolution. In addition, the Census Bureau established an independent assessment team of senior IT executives and consultants, led by the Census Bureau's Chief Information Officer, to provide an ongoing independent and objective view of the status of the program and associated risks, and to propose mitigation strategies. When significant issues began to arise, the assessment team embedded some of its members into the development team and reported to the Associate Director and the Deputy Director weekly.

According to Mueller (2007), "Agile programming breaks down an application development project into small modularized pieces. Each piece, addressed one at a time in a very short time frame, adds to the application and represents a complete part of the functionality. You can deploy the partial application and expect people to accomplish some level of work with it, even if the application doesn't do everything you intend it to do in the long run." Further, "Each piece is an iteration that lasts from one to four weeks. As a result, you know immediately when a particular piece of an application proves troublesome. … The customer (user) is involved with

the project at the outset, which means that the development team makes fewer wrong assumptions about how the user will interact with the application and the steps required to perform a particular task." Agile programming met the need for the Census Bureau – as Mueller notes, "managers often use agile programming techniques to rescue projects that are in trouble." The choice of an iterative process was deliberate and supplemented by an attempt to design program modules that allowed for reuse. However, because of "just-in-time" delivery of application functionality and schedule constraints, key activities such as load, performance, and interface testing, and integration with the overall technology infrastructure, were not adequately performed.[21]

Despite reassuring results from a few "Decennial Applications Load Tests" in late 2009 and early 2010 that involved testers from about 400 LCOs (those that had opened by then), PBOCS continued to be unreliable and unstable. To improve the situation, the Associate Director established an Application Reliability and Infrastructure Stability workgroup and a PBOCS Performance workgroup to resolve technical, schedule, requirements, performance, and user issues; these included members of all stakeholders as well as system performance specialists and vendor technology specialists. To help solve performance problems, substantial additional hardware was installed that significantly increased the capacity of the PBOCS environment. Even though performance monitoring software was also installed, due to lack of time PBOCS could not be sufficiently performance-tuned.

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[21] For example, because of inadequate testing, every component of the technology infrastructure (including both hardware and software) required multiple changes after PBOCS was in production. These infrastructure changes were happening in parallel with the repair of defects and the delivery of new functionality.

Determining why agile programming did not work well for PBOCS development is beyond this author's expertise. Contributors are however likely to include a failure to plan properly, an inadequate initial architecture, the relatively long (6-week) period between software iterations, the lengthy list of initial requirements that later had to be pared down in a relatively ad hoc rather than a thoughtful manner, and the failure to relate the PBOCS software architecture fully to the functional requirements and the Census Bureau's IT systems.

When the large-volume Non-Response Follow-Up (NRFU) operation began, PBOCS performance declined significantly and it could not produce either assignments or management reports quickly, particularly when users were permitted to access software for more than one operation. As noted by the GAO (U.S. Government Accountability Office 2010, p. 20), "despite efforts to upgrade its hardware and software, PBOCS continued to experience system outages, slow performance, and problems generating and maintaining timely progress reports." As noted in the report, according to the Census Bureau, these issues were due, in part, "to the compressed development and testing schedule, as well as to the inadequate performance and interface testing."

To actually accomplish the NRFU and subsequent field work, the Census Bureau implemented many workarounds, such as moving the printing of assignments to the PBOCS testing server, moving the NRFU shipping function to other software, restricting the number of users and hours of system availability (the latter to allow for software upgrades), off-line batch report generation, and developing contingency software for certain operations (actually adopted for the later Field Verification operation). Nevertheless, the performance issues led to backlogs of many millions of paper questionnaires sitting at LCOs waiting to be checked in

before they could be shipped to the Paper Data Capture Centers (which in turn were operating below capacity due to the delays). These issues likely led to some inefficiencies and extra costs throughout the system, with the most impact probably in the LCOs.

In sum, the Census Bureau "muddled through" with less-than-perfect software mainly via the dedication of staff and contractors to mission success. Operations were completed on time and mostly under budget, the apportionment data were delivered to the President 10 days early, and all deadlines for delivery of redistricting data were met.

MANAGEMENT LESSONS LEARNED

While most of the discussion above has been linked to events, this section is more introspective and in consequence subjective, rather than solely evidence-based. With that caveat, I nonetheless believe that there are six major lessons to be learned about management of a decennial census from the 2010 Census experience.

First and primary is that information and more importantly, the exchange and integration of that information, is key. This is a major challenge given the stove-piped nature of the Census Bureau, the number of operations, and the number of systems supporting those operations. Issues can be identified early and mistakes rectified only if decision makers are aware and engaged. Daily operational briefings at the height of the 2010 Census helped ensure that information flowed, anomalies were identified, and decisions were made expeditiously. To assist in keeping all participants informed, an electronic Census Operations Center was established. Some information on the site (e.g., "Key Issues") was restricted to those with a need-to-know, but all Census Bureau staff could browse the site for much of the information

needed to understand progress and plans. I recommend that the 2020 Census have a

knowledge manager as a key position.

Second, decision makers must stay abreast of information and be ready to make quick

decisions, even if based on incomplete information. Too many layers can delay decisions, so

having daily briefings of senior management during the heart of the census cycle is invaluable.

Also valuable is the presence of a contingency fund, even one controlled by OMB (as was the

case for the 2010 Census). Since the Congress approved contingency funds as part of the

budget, there was usually sufficient time to alert the Department of Commerce and OMB to the

need to spend contingency funds on unexpected activities (such as universal fingerprinting of

temporary employees, not part of the original budget request) and get approval reasonably

quickly. This stands in contrast to the need for supplemental appropriations to complete the

1990 enumeration (because mail response did not meet initial expectations and the wages paid

to enumerators did not sufficiently control staff turnover).[22] Furthermore, since the Census

Bureau showed it can use contingency funding responsibly, it's possible that Congress would

approve its inclusion in the operational budgets for the 2020 Census, especially for hard-to-

forecast operations, and I recommend that OMB allow the Census Bureau to do so.[23]

Third, the program management processes systematized and implemented in 2008 when

the program was in extremis proved valuable, both in the control and in the knowledge it gave

senior managers at the Census Bureau, but also in the reassurance it gave oversight officials in

the ability of the Census Bureau to keep its house in order and complete the census

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[22] While no legislation moves quickly those funds were made available in time by the Congress.

[23] I also endorse GAO's call for the Census Bureau to adopt better cost estimation procedures (see for example U.S. Government Accountability Office 2008).

successfully. But these processes must be in place early – during the research and testing phase. It is likely though of course not certain that had mature management controls, in particular an active risk management program and an integrated schedule under change control, been in place earlier in the process, such as when the key support contracts were put in place in 2005 and 2006, that some of the later management challenges faced by the Census Bureau might have been less severe.

The need for robust program management includes a wide range of activities, from issues management and change control, to acquisition strategies and risk management.[24] Without arguing that the risk management process used in the 2010 Census was perfect, I believe it can be a springboard for instituting risk management for other major Census Bureau and indeed Department of Commerce programs. In commenting on the Census Bureau's briefing on its high-risk improvement plan (after singling out the risk management process in particular for praise), Clay Johnson III, the Deputy Director of OMB for Management wrote to senior Census Bureau officials to say "Again, I am very impressed with the path you are now on with regards to the Census. As you all said, it is not over till it's over and there are many risks to be managed to acceptable levels. But I'm betting on you." [Johnson 2008] That bet paid off – the Census Bureau returned $1.87 billion in appropriated funds.

Fourth, more care, consistency, and accountability in applying existing project management and systems engineering best practices must be taken in managing contracts, especially those contractors with little experience in working on a decennial census. In one corner was a contractor with little experience on Census projects – Harris Corporation – attempting to do

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[24] See U.S. Census Bureau (2010d) for a discussion of early strategies for managing the 2020 Census.

something which had not ever been done before – automating three major census field

operations. In another corner was Lockheed-Martin, mostly doing what it had done before for

the 2000 Census (capturing data), though certain new but not unique telephone-oriented tasks

were included (telephone questionnaire assistance and telephone-based coverage follow-up).

The former had major problems with costs and meeting the government's needs in a fluid

environment, while the latter had few problems, finishing on time despite needing to adapt to

changing needs (e.g., the need to capture enumerator-filled forms). Contractors need to

become part of the census team, and not managed at arm's-length. A key lesson learned is that

if you are doing large-scale contracting, then you need to have a highly skilled staff of contract

managers, preferably with experience on a prior census.

Much of the timeline for and problems with the PBOCS development mimicked what

happened with FDCA software development prior to the 2008 Dress Rehearsal and for the data

capture contractor prior to the 1998 Dress Rehearsal for the 2000 Census. Systems need to be

in place early for testing and they need time to mature -- but it is essential to put in place

comprehensive requirements including load and architecture before the contractor starts

writing code. The problems arose from a combination of contractor inexperience with the

massive business of taking a census, the lack of early detailed requirements, and insufficient

time to address issues as they arose. The major lesson that we relearn each decade is to award

large and complex contracts early in the decade. Of course, that means making design decisions

earlier also. Since responsible decision-making requires adequate testing and experimentation,

sufficient funds must be made available for research and development early in each decennial

census cycle, and decision-makers must be willing to accept potentially sub-optimal solutions to

reduce risk, and resist the temptation to adopt the latest technology, untested in a census environment.

Fifth, the Census Bureau needs integration of technology with business and operational needs focusing on the insertion, acquisition, testing, and deployment of technology, based on a well-thought-out plan for purchasing what it can get from the market at the latest possible moment while developing what it cannot. Whether it adopts private cloud computing or something else, the Census Bureau's Chief Information Officer needs to work closely with the Associate Director for Decennial Census in developing a viable and flexible enterprise IT platform based on standards and using best practices to securely host the decennial census while allowing adaptability to changed circumstances. Clear identification of roles and responsibilities coupled with an extensive and rigorous testing program for all hardware and software components and configuration management are all key ingredients for success. The first warning signs of trouble with data collection automation should not have been the 2007 Address Canvassing Dress Rehearsal. In fact, it is likely that the Census Bureau will abandon the practice of a formal Dress Rehearsal 2 years before a census, in the sense that the name suggests that no further changes to procedures will be made afterwards, and replace it with an end-to-end test of some kind. At the very least, software continues to change to correct problems and reflect changed requirements, as does the Internet (likely to be a major data collection mode in 2020), implying that flexibility will be important. In addition, the Census Bureau should strive to put its operational control system for the next census in production well before 2020 by implementing prototype systems for current multi-mode surveys like the American Community Survey early in the decade.

Nevertheless, I believe that it will never be the case that the Census Bureau can fully specify the detailed specifications of each operation planned for the 2020 Census more than 5 years ahead of its implementation, which would be required were it to follow IT "best practices" to minimize risk in software development. Tested, acceptable census methods will evolve, as do the cultural attitudes of society towards the government and towards the Census, as well as perhaps privacy concerns, and thus programmers will need to be flexible enough to adapt to those changes. For example, Internet and smart phone technology as of 2020 will not be the same as that of 2018, let alone 2015; yet the Census Bureau will be expected by the public and the Congress to take full advantage of Internet connectivity and smart phone capabilities in both carrying out and managing the 2020 Census. The next Census has to use the technology that exists and has been proven in the marketplace, yet remain flexible enough to adopt improvements as they come forward as late as 2019.

Sixth, the human and knowledge capital to do a census is held by only one organization in the country, the Census Bureau. It should carefully determine where its expertise lies and focus its resources there, allowing others (such as contractors) to supply "commodity services" and products which require less program-specific knowledge, or can be accomplished under the direct supervision of knowledgeable staff. For example, it worked well to contract out (that is, no problems were encountered in) telephone questionnaire assistance and the purchase and placement of standard desktop computers; that should continue.

As mentioned above, these conclusions are subjective and thus need to be validated by others reflecting on their management experiences with the 2010 Census program. Yet I hope

that some of the lessons learned from the 2010 Census will translate into a better 2020 Census.

Of course, there remain unanswered questions that others might address. These include:

- When during the decennial cycle should the Census Bureau move from an experimental research and planning mode into a more formal testing and management mode?

- Which of the many meetings and management processes were most useful and which were redundant and unnecessary?

- How should one organize the field data collection operation – in other words, are there cost efficiencies to be gained from radical change?

- Can one develop an up-front IT architecture that will guide the census throughout its 15-year life-cycle?

- How does one design an effective software testing structure?

Table 1. Political Leadership of the U.S. Executive and Legislative Branches, 1999-2012

Congress	Years	President (party)	Majority Party in the	
			Senate	House of Representatives
106th	1999-2000	Clinton (D)	Republican	Republican
107th	2001-2002	Bush (R)	Democrat	Republican
108th	2003-2004	Bush (R)	Republican	Republican
109th	2005-2006	Bush (R)	Republican	Republican
110th	2007-2008	Bush (R)	Democrat	Democrat
111th	2009-2010	Obama (D)	Democrat	Democrat
112th	2011-2012	Obama (D)	Democrat	Republican

NOTES: D=Democrat; R=Republican

TABLE 2. Major 2010 Census Contracts

| Major Contracts	Prime Contractor	Contract Value
Data Response Integration System	Lockheed-Martin Corporation	$1,019,512,000
Field Data Collection Automation	Harris Corporation	$790,036,000
Integrated Communications Program	DraftFCB	$361,966,000
MAF-TIGER Accuracy Improvement Project	Harris Corporation	$270,676,000
Data Access and Dissemination System	International Business Machines Corporation (IBM)	$111,653,000
Printing (multiple awards)	R.R. Donnelley (the main contractor; 69% of total)	$75,973,000
Paper-Based Operations Control System Software Development	ICS Nett, Inc.	$30,771,000

Notes: All contracts of $25 million or more included. These are rounded estimates as of May 25, 2011 and are subject to change. The Data Access and Dissemination System contract handles improvements to and maintenance of *American FactFinder*, the Census Bureau's main dissemination vehicle for more than just the decennial census data. That contract ends in September 2016.

TABLE A-1. Organizational Comparison of the 2010 Census and the U.S. Army

| 2010 Census Field Organization	U.S. Army Field Organization
~12 Enumerators, supervised by a Crew Leader (CL), assisted by Crew Leader Assistants	Squad=4-10 Privates, headed by a Staff Sergeant, assisted by Corporals
8 CLs, supervised by a Field Operations Supervisor (FOS)	Platoon=3-4 Squads, headed by a Lieutenant (Lt.)
8 FOSs, supervised by an Assistant Office Manager	Company=3-4 Platoons, headed by a Captain
5 Assistant Managers, supervised by a Local Census Office (LCO) Manager	Battalion=3-5 Companies, headed by a Lt. Colonel
6 LCO managers, supervised by an Area Manager	Brigade= 3+ Battalions, headed by a Colonel
2-4 Area Managers, supervised by an Assistant Regional Census Manager	Division=3 Brigades, headed by a Major General
4 ARCMs supervised by a Regional Director (RD)	Corps=2-5 Divisions, headed by a Lt. General
12 RDs, supervised by Chief, Field Division	Field Army= 2-5 Corps, headed by a General
Field Directorate (3 Chiefs), supervised by Associate Director for Field Operations	U.S. Army, supervised by Army Chief of Staff

Note: Regional Directors receive temporary (3-year) promotions to the Senior Executive Service during each census.

Figure 1. Census Bureau Organizational Structure for Key Decennial Census Participants
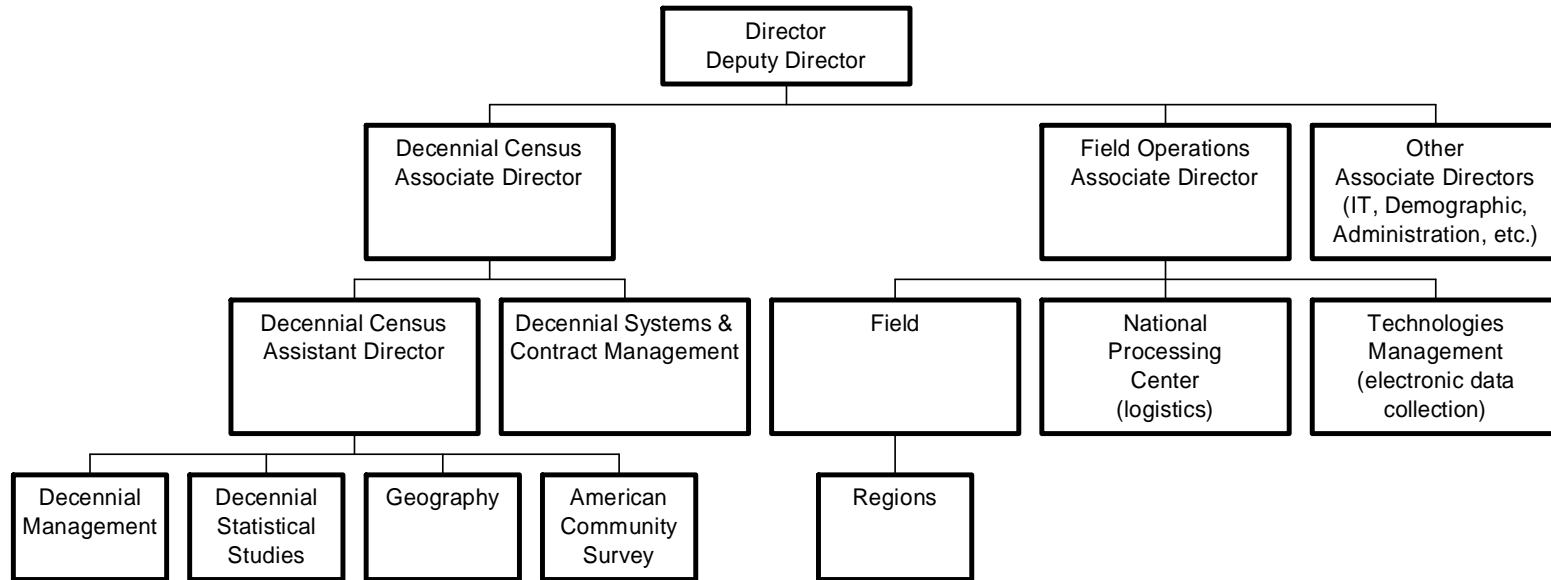
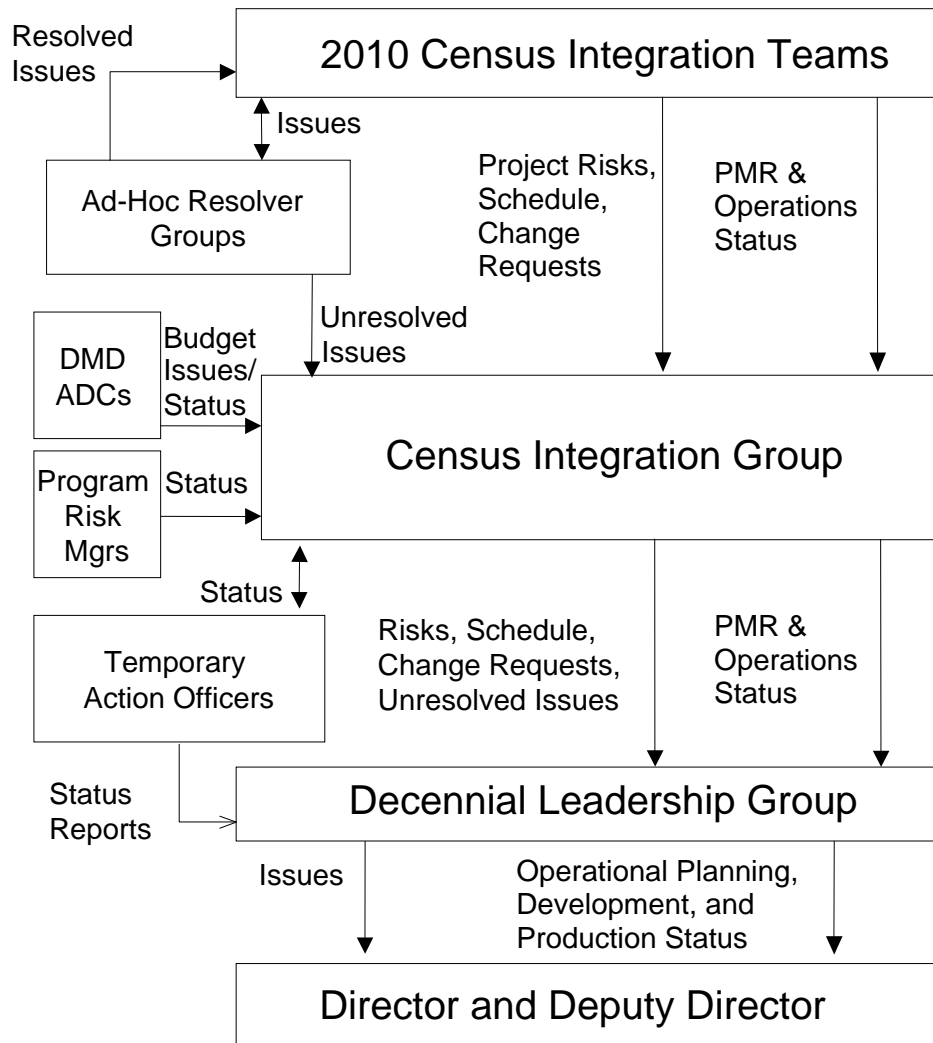

Source: Adapted from U.S. Census Bureau 2009c.

Figure 2. 2010 Census Key Operations, 2009-2010
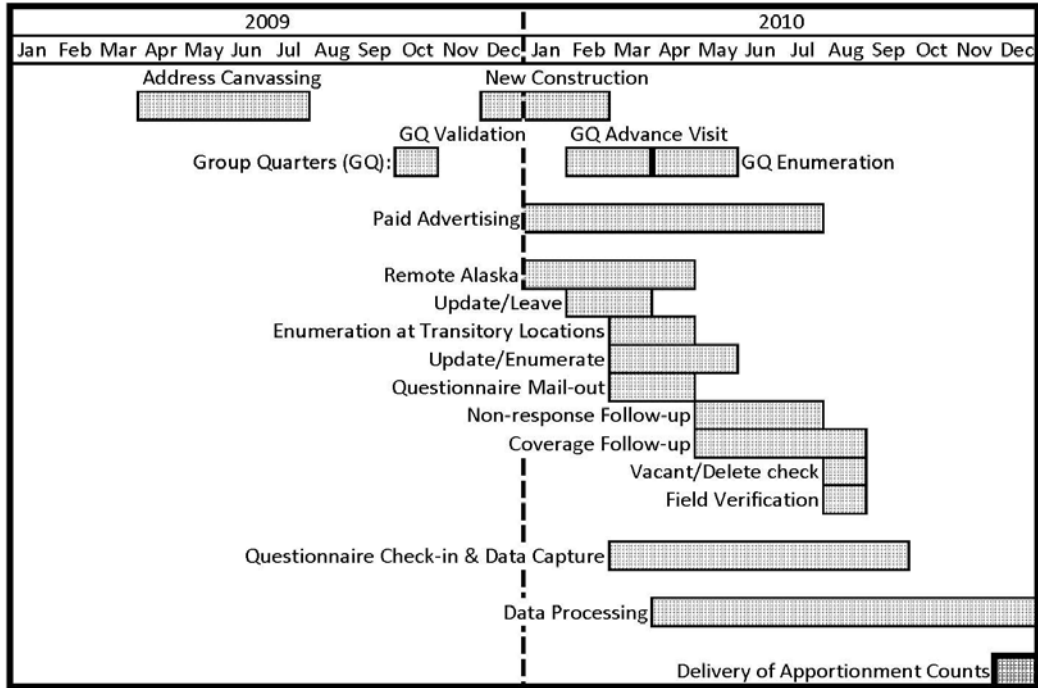
Note: Excludes Census Coverage Measurement activities.
Source: U.S. Census Bureau 2010a.

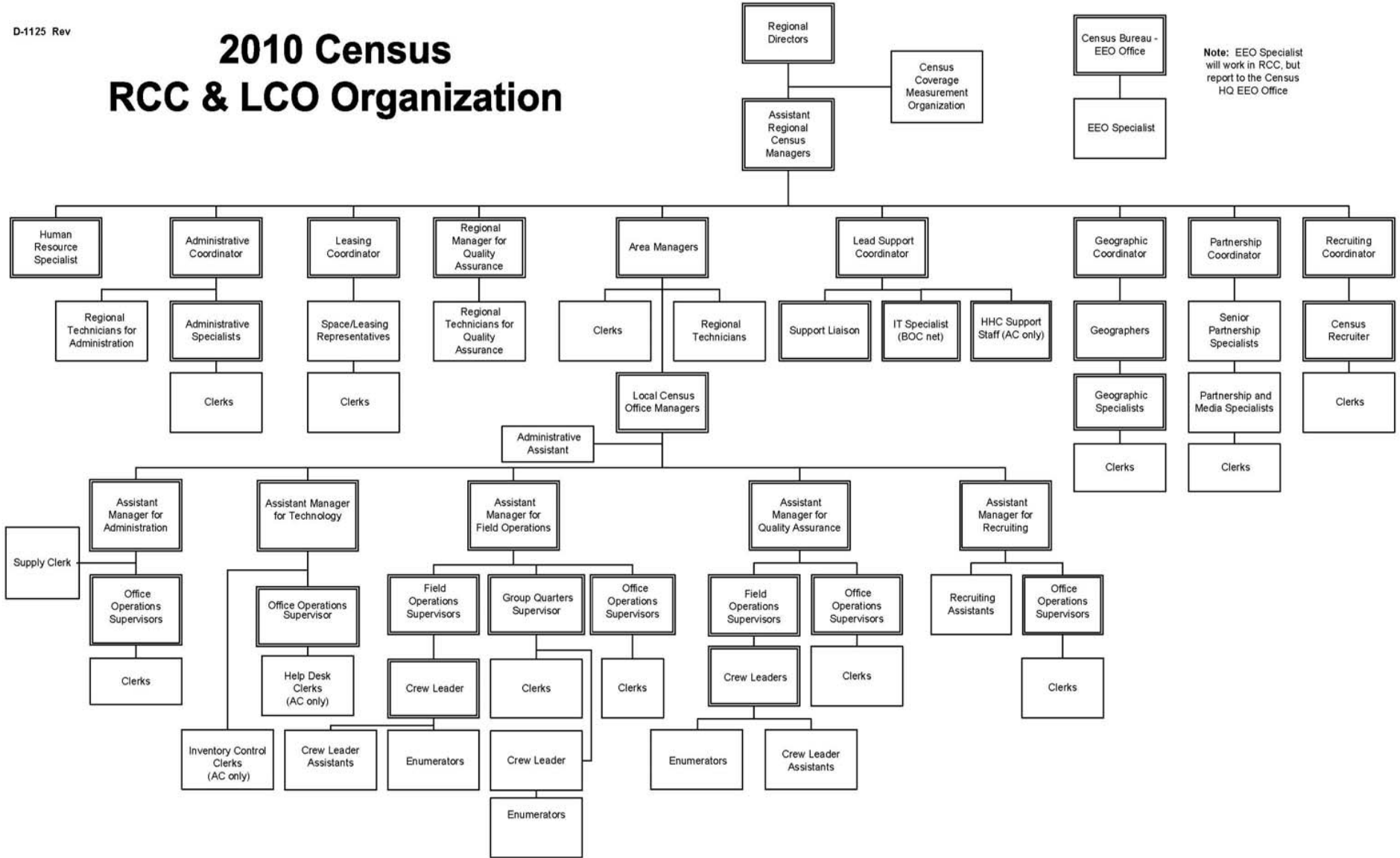Figure 3. 2010 Census Governance Structure

Note: DMD ADCs = Decennial Management Division Assistant Division Chiefs; PMR = Project Management Reviews.
Source: U.S. Census Bureau 2009c.

Figure A-1.

Notes: AC = Address Canvassing; BOC = Bureau of the Census; EEO = Equal Employment Opportunity; HHC = hand-held computer; IT = information technology; LCO = Local Census Office; RCC = Regional Census Center. Source: U.S. Census Bureau, Field Division.

APPENDIX A. ORGANIZATION OF FIELD DATA COLLECTION

The Census Bureau has a permanent regional office structure of 12 offices to collect data for its ongoing surveys.[25] As in 2000, to manage the 2010 Census it set up a separate parallel system of 12 Regional Census Centers, supplemented by 1 Puerto Rico Area Office and 494 Local Census Offices (LCOs) in the U.S. and Puerto Rico (fewer than in 2000), plus 5 more LCOs in the four Island Areas.[26]

A typical Regional Census Center was staffed by one regional director and one deputy; three assistant regional census managers; up to 15 functional managers who supervised LCOs and partnership staff (more than 3,000 nationwide), among other responsibilities; 75 specialists, supervisors, and technicians; and 122 support staff. This staff was responsible for management of field activities, including hiring, training, and oversight of LCO managers; all partnership activities; all independent Census Coverage Measurement activities; quality assurance oversight; IT support (backed up by a central headquarters help desk); geographic activities; leasing of LCO space; and administrative and human resource functions including recruiting and weekly payroll.[27] A typical Local Census Office was staffed by one LCO manager; five assistant LCO managers (for field operations, quality assurance, recruitment, technology, and

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[25] In July 2011, the Census Bureau announced plans to reduce the number of regional offices to six.

[26] The Census Bureau provided the funding for, and assisted the governments of the four U.S.-affiliated Island Areas in conducting, their own censuses in 2010. These areas are the U.S. Virgin Islands, American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands. The Census Bureau also handles the tabulation and dissemination of results for those areas.

[27] Partnership and advertising activities were coordinated by Census Bureau headquarters staff, assisted by the Integrated Communications Program contractor. Partnership specialists and assistants were employed by the Regional Census Centers, but often deployed to work directly with Local Census Offices. They were not employed directly by LCOs as many operated across larger geographic areas, focusing on specific subgroups of the population. National partnerships were handled by headquarters staff.

administration); 60 or more support staff; 20 or more field operations supervisors; 60 or more crew leaders; and 1,000 or more temporary field staff (enumerators). This staff was responsible for office operations and administration; technology support and inventory control; quality assurance; recruiting; and training. See Figure A-1 for a depiction of the RCC and LCO management structure.

The best analogy for the human resource management model used by the Census Bureau's field organization is the U.S. Army. Table A-1 aligns decennial census field organizational practice with the Army's organization. Of course there are some differences from the Army – "basic training" for a census was only a week; enumerators had daily meetings with supervisors but operated mostly on their own with only periodic observation (only a few teams are used); independent quality assurance was done on their work; enumerators must supply their own transportation (and were reimbursed); jobs were temporary (though people could be and the best were rehired for other operations); wage rates differed geographically (there was however no combat pay); and the Census Bureau did not issue guns!

Due in large part to the high unemployment rate of 9.3 percent in 2009, competitive wages offered to temporary hires (based on Bureau of Labor Statistics survey-based estimates of location-specific wages), and targeted recruiting, the field offices were able to hire a highly qualified workforce that worked more hours per day than had been expected. As a result, most field operations ended ahead of schedule and under budget.

Independent and robust quality control and quality assurance operations helped ensure a quality census (see Reichert et al. 2010). Official assessments are still being prepared, but operational data indicators pointed to a high quality census. For example, the initial Master

Address File going into the census appeared to be of higher quality (when compared to an independent listing for randomly selected census blocks) than in 2000, and fewer falsifications (leading to enumerator terminations) occurred than in 2000. Only one serious breach of field procedures occurred – in Brooklyn NY. In one office there, the Local Census Office manager and an Assistant Manager for Field Operations were accused by a LCO employee of using Internet sources to complete questionnaires rather than using the required field procedures for interviewing. After a rigorous internal investigation, the management and staff involved were terminated, six employees were reinstated, and field rework was done to complete the cases in the prescribed manner.[28]

In addition to the field work, the Field Operations Directorate includes the Technologies Management Office, which designs all non-decennial census computer-based data collections, and the National Processing Center, which hosted one of the three paper data capture centers and handled most of the logistics for the 2010 Census with the exception of the technology infrastructure (computers, routers, peripherals, and telecommunications for the LCOs were handled by the FDCA contractor).

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[28] On July 19, 2010, the House Committee on Oversight and Government Reform held a hearing in Brooklyn entitled "Is Brooklyn Being Counted? Problems With the 2010 Census," to examine the incident. See <http://oversight.house.gov/index.php?option=com_content&task=view&id=5030&Itemid=2> for testimony and a webcast of the hearing.

APPENDIX B. DECISION-MAKING RHYTHM

A number of meetings were held or reports provided on a daily, weekly, or biweekly as-needed basis; frequent ad hoc meetings was the norm for issues management. These meetings included:

- Cost and Progress, Issues Status, for *ongoing* operations: 1-5 days per week at 1:00 PM depending on the pace of operations (supplemented by telephone conferences on weekends if needed).

- Director and Deputy Director daily "4:30" [PM] briefing focusing on progress and issues.

- A written biweekly detailed summary prepared by the Decennial Management Division of recent accomplishments, upcoming activities, and issues; this was used as the key input to *Monthly Status Report* (used mainly for DOC and OMB briefings) and the weekly *Executive Report* for the Under Secretary and Secretary of Commerce.

- Team meetings (typically weekly). There were 27 teams, many responsible for more than one of the 44 census operations, and many including sub-teams (see U.S. Census Bureau 2009c for a list).

- Testing managers meeting (status, accomplishments, plans; biweekly).

- Associate Directors/Deputy Director briefing on upcoming activities (biweekly).

- Associate Director for Decennial Census with Assistant Director (daily at 5:30 PM).

- Risk Review Board monthly review of all program-level risks including the status of mitigation strategies and contingency plans.

Second, regularly scheduled meetings occurred as follows:

- Monday

  o Associate Director and Assistant Director "check-in" meeting with Decennial Management Division Chief and Assistant Division Chiefs (status, "hot" issues, potential problems, information-sharing)

- Tuesday

  o Risk Review Board

  o Decennial Management Division budget review

- Wednesday

  - Project Management Reviews (team leader reports to senior management)

  - Census Integration Group of senior managers (status reports, review of *Schedule Alert Report*, issues, briefings on assessment and evaluation study plans)

- Thursday

  - Briefing of senior Bureau management on schedule issues

  - Decennial Directorate-Field Directorate interchange meeting

  - Decennial Leadership Group (as needed for issue resolution)

- Friday

  - Briefing of Commerce Department management (Under Secretary weekly, Secretary biweekly)

  - "Look ahead", budget issues (Associate Director and Assistant Director with Decennial Management Division Chief)

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