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Ramping Up Large, Non-Routine Projects: Lessons for Federal Managers from the Successful 2000 Census

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Transformation of Organizations Series

IBM Center for
The Business of Government

TRANSFORMATION OF ORGANIZATIONS SERIES

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FOREWORD

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On behalf of the IBM Center for The Business of Government, we are pleased to present this report, "Ramping Up Large, Non-Routine Projects: Lessons for Federal Managers from the Successful 2000 Census," by Nancy A. Potok and William G. Barron, Jr.

Government often manages large efforts, such as issuing tens of millions of benefit and tax-refund checks. These efforts are largely routine in nature. However, government is increasingly being called upon to address large, non-routine projects, such as those needed in the aftermath of Hurricanes Katrina and Rita.

In this report, two former Census Bureau executives who helped lead Census 2000 share their story. The planners of future census activities will benefit from their experiences, as will the managers of other large, non-routine government programs that must ramp up and down quickly.

Interestingly, some of the themes of the Census story closely parallel an earlier Center report by Syracuse University Professor Harry Lambright on the challenges of managing "big science." Some of his observations and lessons crop up again in this report, suggesting that when managing large, non-routine projects, there are common lessons that reach across boundaries.

We trust that this report will be informative and useful to federal executives seeking to increase the federal government's ability to take on projects of immense proportions that only government can do. Potok and Barron's stories and experiences provide an inspirational set of lessons learned to support them.

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EXECUTIVE SUMMARY

This report is the story of a management success: Census 2000. Census 2000 counted the largest number of people in the history of the census. Data was provided to government leaders on time and under the projected budget. More than 3.7 million census takers were recruited during the course of the census to reach recruiting goals and prepare for turnover, with more than 860,000 hired, trained, mobilized, and supporting the census at its peak. The Census Bureau partnered with other federal, state, local, and nonprofit agencies to open and equip nearly 550 temporary regional and field offices, and printed 20 million maps for field workers to find people who had not responded by mail. Several major computer systems were developed, deployed, and integrated with other Census Bureau systems to provide the needed technical support for data collection, storage and dissemination, payroll, and project management.

This success was achieved despite daunting odds and varying levels of stakeholder support. The 1990 census was widely perceived as a failure; this perception led to increased supervision by more than seven different oversight bodies and difficulties obtaining funding in the years preceding the census so that activities could ramp up according to plan. By 1997, the General Accounting Office (GAO)—now known as the Government Accountability Office— had listed the 2000 census as "high risk," and GAO officials were testifying just weeks before the census that it was likely to fail.

Despite the initial pessimism, the implementation phase of the 2000 census has been described by oversight bodies, end users of the data, and the Census Bureau leadership as a tremendous success. This report shares the story and experiences of two key former Census executives who had a hand in leading Census 2000. Their story will not only benefit the planners of future census activities, but also provides practical advice to managers of other large, non-routine government programs that must ramp up and down quickly. The report shares the key strategies for success, from significant policy and procedural changes implemented in the human capital arena to the smaller steps taken to preparing standardized packets for census enumerators that added up to a successful implementation.

One overriding strategic approach was the Census Bureau's emphasis on the use of partnerships. The Census Bureau recognized that in addition to the many experts within its own organization, there

Key Recommendations Applicable to Other Large, Non-Routine Projects

1. **Communicate plans and status with stakeholders—**over-communicate, if possible.
2. **Create a strong contract management team** to best leverage the skills and potential outcomes with partners.
3. **Emphasize management integration** across agency organization, skill sets, and operations.
4. **Seek early funding support for partnership activities** and ensure this support is part of the ongoing process.
5. **Extend and support the involvement of others who have a stake in your success** by helping them understand joint interests and benefits as well as challenges.
6. **Coordinate outside oversight** in order to improve the efficiency of the oversight itself.

was tremendous expertise residing with other agencies in the federal government, as well as in the private sector, that could be tapped. Rather than trying to go it alone, the Census Bureau partnered with other federal agencies whenever possible to leverage the full array of federal knowledge, skills, and abilities. This proved to be a successful strategy, and other federal agencies were more than willing to collaborate with the Census Bureau to help assure that the goals of the census were achieved. The Census Bureau also partnered extensively with the private sector, especially in the technical arena.

While there have been other large, non-routine federal projects—the Manhattan Project to create the nuclear bomb, the Apollo project to put a man on the moon, and the Human Genome Project to map the human gene—none are repeated on a consistent basis like the decennial census. Dr. W. Henry Lambright of Syracuse University wrote a report for the IBM Center in 2003 on large-scale science projects, "The Challenge of Coordinating 'Big Science.'" He concluded that the success of these kinds of projects was because the "goals were technically realistic, the program well-funded and well-led, and the team of organizations effectively coordinated." In many respects, his observations parallel those of the experiences of the leaders of Census 2000.

Like the Lambright recommendations, the Census 2000 goals were clear: a complete, accurate count of the nation's residents (citizens, legal residents, and the undocumented), including the assignment of all individuals counted into their correct location, down to the level of a census block (which in urban areas roughly corresponds to a city block). Although these may seem like clearly defined goals, they encompass a wide range of subtasks that depended heavily on a well-founded organization and management structure, strong human capital strategies, effective information technology, flexible procurement and contract management strategies, strong public outreach and promotion efforts, and the effective management of a supply chain of both materials and information.

This report does not address the statistical design issues for either 2000 or 2010, or the strategies for improving the coverage and the quality of the actual enumeration.

Background: Ramping Up Large, Non-Routine Projects

The decennial census is the largest peacetime mobilization in the United States. The 2000 census mobilized more than 860,000 census takers at its peak. The Census Bureau worked with other federal, state, local, and nonprofit agencies to open and equip nearly 550 temporary regional and field offices, and printed 20 million maps for field workers to find people who had not responded by mail.

The 1990 census was widely perceived as a costly failure. It cost far more than was budgeted, and the accuracy of the resulting census numbers was questioned. The 2000 census was widely perceived as a success—on time and under budget—even in the face of a number of daunting management challenges not under its control, such as the Y2K computer challenge and congressional wrangling over the design of the census itself.

What Else Does the Census Bureau Do?

Most Americans only think of the Census Bureau in terms of its decennial census. However, its responsibilities are broader. The mission of the Census Bureau is to serve as "the leading source of quality data about the nation's people and economy."[1] In addition to conducting the decennial census, the Census Bureau conducts numerous other surveys and censuses. These include:

- The American Community Survey, a new program being rolled out as a replacement to the decennial census "long form." This survey will contact 250,000 U.S. households every month starting in January 2005 and request information on topics such as income, employment, home values, education levels, commute to work, and national origins. A five-year average of 15 million households will first be available in 2010 and annually thereafter, providing more timely data for the same small geographic areas as available in the decennial census, but at a fraction of the cost.
- An economic census every five years that supplies in-depth information about the nation's business establishments.
- A census of governments, also conducted every five years, that collects information about the nation's governmental units including their organization, employment, and finances.
- Several ongoing economic surveys that collect information on a monthly, quarterly, and annual basis to provide the majority of the information that makes up the Gross Domestic Product and other economic indicators.
- Several demographic surveys that collect household information on subjects such as income, poverty, healthcare, crime victimization, employment, prices, and other topics that provide information for a number of federal programs.

To support these efforts, the Census Bureau has requested a $789 million budget for fiscal year 2006 to support its ongoing programs, and expects to employ about 10,500 full-time staff.

What did the leaders of Census 2000 do differently?

This report examines how the Census Bureau managed the 2000 census, with the view that it holds lessons for managers of other large, non-routine federal projects. It specifically draws on the experiences of several key managers of Census 2000. While management can be challenging for any large federal organization, some initiatives are particularly difficult to address when workload surges or is cyclical. For example, the decennial census ramps up and down every 10 years. During the 2000 cycle, the annual budget of the Census Bureau grew from about 12,000 staff and a $400 million budget in the late 1990s to more than 860,000 employees and a $4.5 billion budget in 2000, then shrank back to $500 million in 2002.

Large, Non-Routine Federal Projects

While there have been other large, non-routine federal projects—the Manhattan Project to create the nuclear bomb, the Apollo Project to put a man on the moon, and the Human Genome Project to map the human gene—none are repeated on a consistent basis like the decennial census. An earlier IBM Center study in 2003 on large-scale science projects, by Professor W. Henry Lambright of Syracuse University, concludes that the success of these kinds of projects was because the "goals were technically realistic, the program well-funded and well-led, and the team of organizations effectively coordinated."[2] In many respects, his observations parallel those of the experiences of the leaders of Census 2000.

Like the Lambright recommendations, the Census 2000 goals were clear: a complete, accurate count of the nation's residents (citizens, legal residents, and the undocumented), including the assignment of all individuals counted into their correct location, down to the level of a census block (which in urban areas roughly corresponds to a city block). Although these may seem like clearly defined goals, they encompass a wide range of subtasks that depended heavily on a well-founded organization and management structure, strong human capital strategies, effective information technology, flexible procurement and contract management strategies, strong public outreach and promotion efforts, and the effective management of a supply chain of both materials and information.

How Big Is 'Large'?

- In 1998, the Census Bureau's budget was $400 million and jumped to $4.5 billion by 2000. Two years later, it was down to $500 million.
- In 1998, the Census Bureau's staff was 12,000; in 2000, it jumped to 860,000.
- To reach its hiring goals, Census recruited nearly 3.7 million people.
- In 1998 and 1999, about 40,000 Census employees were used to check 93 million urban housing units to ensure correct addresses.
- In 1998 and 1999, about 65,000 Census employees were used to check 23.5 million rural housing unit addresses.
- Census grew from 12 regional offices to include an additional 545 temporary offices.
- Census employed 690 full-time "partnership specialists" who forged partnerships with 141,082 government and community organizations, 301 national organizations, and 320 companies and businesses to encourage participation.
- By Census Day—April 1, 2000—the Census Bureau's production center had shipped 9,457,667 standardized enumerator kits, of which there were 295 varieties (these included pencils, notepads, etc.)
- To advertise the importance of participation, ads appeared in 3,000 outlets, in 17 different languages, targeting 99 percent of adults with more than 50 messages each.
- Census established 23,556 questionnaire assistance centers, staffed with 15,100 volunteers and 11,200 paid staff.
- In an eight-week period in 2000, enumerators visited 42.4 million households who had not returned their mailed questionnaires.
- For people without an address, enumerators visited 6,655 emergency shelters; 2,027 soup kitchens; and 4,911 other non-sheltered outdoor locations.

This report does not address the statistical design issues for either 2000 or 2010, or the strategies for improving the coverage and the quality of the actual enumeration.

Census 2010: Preparing for the Next Large, Non-Routine Project

One of the strategic goals of the Census Bureau is to re-engineer the 2010 decennial census so that it is cost-effective, provides more timely data, improves coverage accuracy, and reduces operational risk.[3] The plan of the Census Bureau is to build on the success of the 2000 census and to take advantage of new technologies that will be available in 2010.

The 2010 census is projected to cost over $11 billion. Census 2000 cost more than $6.5 billion. To successfully conduct an effort this size in 2000, the Census Bureau developed a variety of management approaches that were effective, flexible, auditable, and easily used by a large number of managers with a variety of backgrounds, skills, and experiences. These approaches, improved from the 2000 experience, are now being used to plan, develop, and implement Census 2010.

An overriding strategic approach for Census 2000 was the emphasis on partnerships. The Census Bureau recognized that in addition to the many experts within its own organization, there was tremendous expertise residing within the federal government, as well as in the private sector, that could be tapped. Rather than trying to go it alone, the Census Bureau partnered with other federal agencies whenever possible to leverage the full array of federal knowledge, skills, and abilities. This proved to be a successful strategy, and other federal agencies were more than willing to collaborate with the Census Bureau to help assure the goals of the census were achieved. The Census Bureau also partnered extensively with the private sector.

Management Challenges That Faced Census 2000

This look at successful management strategies for large organizations starts with an examination of the major management challenges of Census 2000. The magnitude of this complex undertaking made for some difficult logistical hurdles. But this already-difficult task was made infinitely harder by several external factors outside of the Census Bureau's control such as:

- The Year 2000 computer challenge to update millions of lines of software to fix how information is coded to reflect the turn of the century
- A dropping response rate on the mailed-out census questionnaires
- Sometimes partisan oversight and other scrutiny from stakeholders including Congress; the executive branch; state, local, and tribal governments; and various ethnic and racial groups
- An annual budget process that often did not provide timely or adequate funding
- Deadlines for deliverables that were written into law

In addition, the rising cost of each decennial census has put pressure on the Census Bureau to look for ways to increase the efficiency of census taking without sacrificing accuracy.

Describing the strategies the Census Bureau used to tackle the logistics of Census 2000, and the lessons learned, are the emphasis of this report. The authors believe these lessons are applicable in other agencies facing similarly large management challenges.

Overcoming the Perceived Failure of Census 1990

Almost from the start, Census 2000 planning and budgeting had to avoid being mired in the continuing controversy surrounding the 1990 census—a remark-

Some Uses of Decennial Census Data

- The Constitution requires that the census population count be used to apportion the seats of the House of Representatives.
- The population data are used to design congressional districts, a process known as redistricting. Legislation enacted over the years has made the accuracy of the count critical, because the census data serve many purposes.
- Census data are used to allocate over $100 billion annually in federal grants to states and communities.
- Businesses use the numbers to decide where to locate factories, shopping centers, banks, and offices.

able effort that earned the title of the "failed" census. The 1990 census cost far more than planned and had sizable undercounts for many significant population subgroups, primarily minorities, that were higher than those measured in 1980. As a result, throughout the 1990s, the controversy that had dogged the 1990 census effort seemed destined to overwhelm the 2000 census as well.

As a result, Census 2000 was closely watched. Congress commissioned a special study by a blue ribbon panel of the National Academy of Sciences to study the 1990 census and make recommendations for Census 2000. There was also a second panel at the National Academy of Sciences established by the Census Bureau to review the proposed design for Census 2000. And in 1997, the Government Accountability Office (GAO) placed the 2000 census on its list of "high risk" programs. Aside from the efforts of GAO, a number of oversight bodies closely examined the Census Bureau's activities:

- The Commerce Department's Office of Inspector General
- A legislatively established Census Monitoring Board (with staff, appointed by Congress and the president, co-located along with the Census Bureau in office space at the Census Bureau's Suitland, Maryland, headquarters)
- An assortment of Commerce Department staff representing the Office of the Secretary and high-level politically appointed officials at Commerce
- The Office of Management and Budget statistical policy and budget staffs
- A congressionally established House special oversight committee on the census
- The members and staff of both the Senate and House Appropriations subcommittees
- An assortment of personal staff to various members of Congress (House and Senate)
- An assortment of Census 2000 advisory committees established by the secretary of commerce and the director of the Census Bureau

Abbreviations and Acronyms

ACE	Accuracy and Coverage Evaluation
CCB	configuration control board
COTS	commercial off-the-shelf
DCS 2000	Data Capture System
ESA	Economics and Statistics Administration
GAO	Government Accountability Office
GIS	geographic information system
GPS	global positioning system
LCO	Local Census Office
MAF	Master Address File
OCR	optical character recognition
OCS 2000	Operational Control System
OPM	Office of Personnel Management
PAMS/ ADAMS	Pre-Appointment Management System/Automated Decennial Administrative Management System
RCC	Regional Census Center
RFP	Requests for Proposals
RIF	Reduction-in-Force
SES	Senior Executive Service
TANF	Temporary Assistance to Needy Families

From a program management perspective, the high level of oversight for Census 2000 and its resulting visibility presented special challenges to senior Census Bureau staff.

The spillover of the problems that occurred during the 1990 census and the resulting oversight also had a major effect on the process for obtaining funding, particularly early in the decade for Census 2000. These funding challenges were compounded by a substantial policy disagreement, which developed partisan overtones, over the basic design of the census: Should the census conduct a traditional "complete count," an expensive procedure in which every household that does not mail back a questionnaire is given a personal visit, or should it be based on statistical sampling, which has scientifically demonstrated accuracy and could save substantial amounts of money? The basic design question was further complicated by the controversial question of whether the Census Bureau should use statistical methods to adjust the basic population count to increase its accuracy. Because of this disagreement and the resulting unwillingness of Congress to commit to funding a single design until the very last minute, the Census Bureau staff was left with the resource-intensive and difficult-to-manage task of planning two census designs. Two different designs were needed because the Census Bureau did not know whether the federal courts would find the Census Bureau's preferred design constitutional, after members of the House of Representatives filed a lawsuit challenging that design.

Although the Census Bureau had expressed a strong preference for a design that maximized the use of statistical techniques to increase the accuracy of the population count and hold down costs, some members of Congress and some partisan groups strongly disagreed with this approach and filed lawsuits in 1998 to prevent the Census Bureau from executing parts of its design. As a result, the Supreme Court ruled in January 1999 against the use of the methodology often referred to as "sampling" in the production of population counts needed for apportionment of the House of Representatives—just 15 months before Census 2000 was to be conducted.

Other studies and reports (for example, the National Academy of Sciences, GAO, the Department of Commerce's Office of Inspector General) described the immense uncertainty that surrounded the last-minute efforts of the Census Bureau to plan and budget for the 2000 census, as well as the stunningly successful results of the implementation phase of Census 2000.

Because of these immense uncertainties, GAO Director Christopher Mihm was strongly pessimistic about success. In testimony before Congress just weeks before the census was to be conducted, he painted a dire picture and concluded that "substantial challenges to a successful census remain."[4]

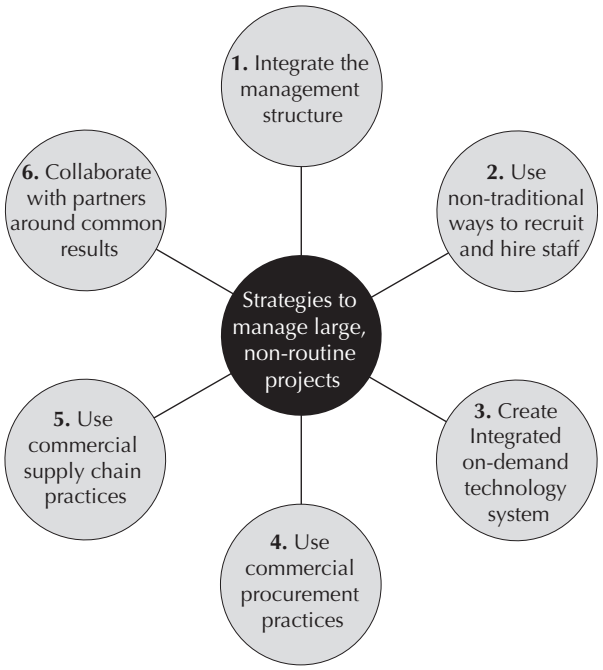
Yet, given the enormity of these management challenges, the Census Bureau's performance clearly exceeded almost all expectations and delivered a census that for almost all major operations was on time, was within budget, and produced high-quality data results. In fact, GAO's Mihm publicly retracted his earlier pessimistic assessment. How did they do it?

Management Strategies Used in Census 2000

Planning for a decennial census starts almost before the previous census is complete. In planning for Census 2000, bureau senior executives took a close look at the hierarchical organizational approach and other management strategies that failed in 1990 and applied those lessons to the design of Census 2000. They also looked at management best practices in other fields and adapted them to Census operations. Finally, Census Bureau executives learned as they were going along, adapting operations that worked in one area more broadly across the bureau.

This report aims to briefly describe some of the key strategies used by Census Bureau executives to ramp up a large project. These may have broader applicability to other large projects that federal managers across the government seem to be facing with more frequency. Following are six strategies that evolved during the course of the 1990s that contributed to the success of Census 2000, even in the midst of the environmental and political uncertainties facing the Census Bureau during that period. These strategies are depicted in Figure 1.

Figure 1: Key Strategies for Managing Large, Non-Routine Projects in Government



Strategy 1: Integrate the Management Structure to Manage a Cyclical Workload

Because of its enormity, decennial census activities cut across the Census Bureau's organizational lines. This requires extra planning and effort to effectively coordinate activities and implement decisions made by the decennial census management team. The Census Bureau has a permanent directorate dedicated to the planning and management of decennial censuses. However, this directorate, as well as the permanent field operations directorate, grows rapidly and tremendously during the latter half of the decade. To manage Census 2000, the bureau's senior leadership team created within itself a separate project management team to create accountability and authority, and to integrate efforts across the project. In addition, the decennial census directorate built up a project management division that drew resources from the core Census Bureau staff as needed, with these staff returning to their regular duties when Census 2000 demands receded. Because the field component is so massive for the decennial census, the field operations directorate also created a new parallel organization dedicated solely to the decennial census, which was a part of the decennial census project management team.

Create Clear Lines of Authority and Communication

Because there were so many parts of the Census Bureau supporting the decennial census, all census activities were coordinated at meetings held by a Decennial Census Executive Steering Committee at least one morning a week. The Steering Committee also had a subgroup of the bureau's top career executives who also met at least one morning a week. Having two separate meetings, one focusing on internal operations and the other on the interface between the internal and external stakeholders, also increased the effectiveness of each group by maintaining the proper focus.

The broader Steering Committee included the top non-career staff—the director and the associate director for public and congressional affairs—and other career public affairs staff. In this way, key management officials were kept informed and were able to identify and solve problems early.

Getting disparate personalities to mesh into a productive management group was not something that happened without conscious effort. The career management group went through team-building sessions at the outset of the implementation phase of Census 2000 to help assure that it could work together successfully. Delegations of authority and respective roles and responsibilities, in addition to personality styles and work approaches, were discussed and agreed upon. In fact, the ability of the entire top management team to work together in an effective, focused, tightly knit group was a significant factor in the success of the census.

At the operational level, steps were taken to assure that the decennial census program would get sufficient administrative support. Key personnel from the administrative support areas of the Census Bureau, such as procurement, IT, and budgeting staff, were co-located with the decennial program staff, giving the top-level decennial census managers more control over the timing and extent of support being received. These support personnel acted as the decennial census liaisons between the centralized administrative support offices that also supported the other ongoing programs of the Census Bureau and decennial census management.

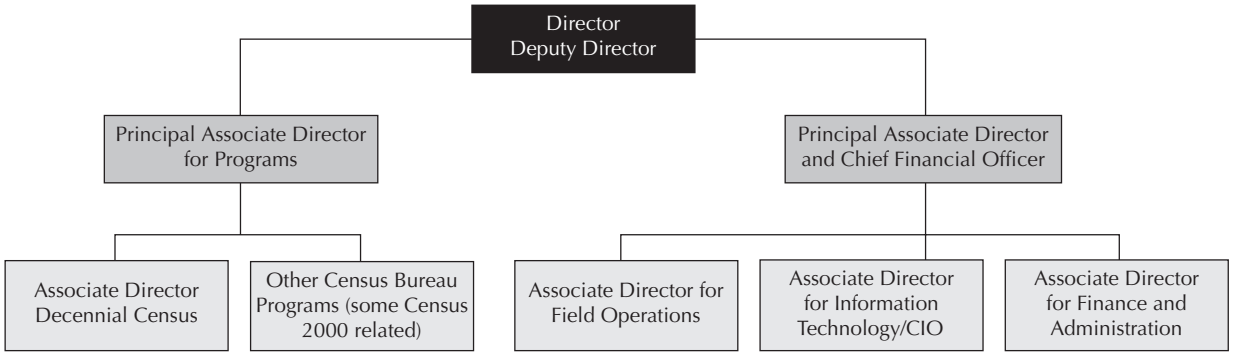
To reinforce this, the bureau's chief financial officer (CFO) was given authority over the full spectrum of support and infrastructure functions. This created greater clarity and accountability for all support functions and improved their integration at the field level. Although the overall responsibility for Census 2000 lay in the decennial census directorate, a large amount of work needed to be accomplished under the leadership and management of the field, administrative, and IT services directorates, all of whom reported to the CFO.

For Census 2000, the Census Bureau initially attempted to manage its decennial census activities through a matrix structure. That is, decision making was delegated to functional groups made up of team members from across the Census Bureau who played a role in decennial census activities. However, this matrix structure did not work in an organization with a long history of hierarchical management. Without a more traditional command-and-control structure, decisions were often delayed, activities were not well coordinated, communications were strained, and productivity lagged.

As a result, the management structure was revamped, with more control centralized within a separate decennial census management organization (see Figure 2 on page 14). The lead person for the decennial census program, an executive-level manager at the associate-director level, was given clearer authority over all aspects of the program. His counterpart, the associate director for field operations, exercised authority in the areas directly under his purview. This arrangement still required extensive coordination and cooperation between the decennial census and the field operations management areas, particularly when methodologies developed in the decennial census area had to be operationalized by field personnel. However, this worked better than the earlier matrix structure.

Create a temporary field management structure. The geographically dispersed census operations were delegated to senior field managers to carry out. In addition to its headquarters, the Census Bureau operates 12 permanent regional offices. These offices support all door-to-door surveys requiring in-person interviews conducted by the Census Bureau. Recruiting, training, and monitoring of interviewers take place out of these offices throughout the decade.

Figure 2: Decennial Census Management Structure

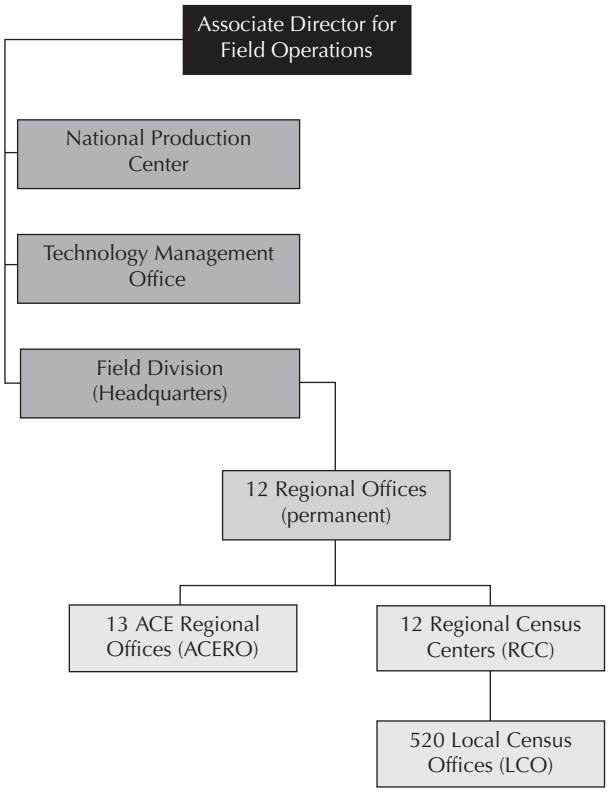


During the buildup to Census 2000, the Census Bureau also set up 12 additional temporary Regional Census Centers (RCCs) that were co-located in the same cities with the Census Bureau's permanent regional offices (see Figure 3). This allowed the 12 regional directors to manage both the ongoing activities as well as new activities related to the decennial census. In recognition of the additional responsibilities the regional directors were taking on during the census, they were given temporary promotions into the Senior Executive Service (SES) during the 1999–2000 period. The regional directors also received customized executive training at the Federal Executive Institute in Charlottesville, Virginia.

For Census 2000, 520 Local Census Offices (LCOs), managed by the RCCs, were set up throughout the country. The LCOs each had a manager who reported to the RCC, whose head, in turn, reported to the regional directors. The regional offices also set up 13 offices (in 12 regions and Puerto Rico) to conduct the Accuracy and Coverage Evaluation (ACE), a survey of approximately 315,000 households to separately assess the accuracy and coverage of the census. This operation had to be conducted separately from the other census field activities to maintain its independence as an evaluation of the quality of the data collected during the census.

The RCCs, under the authority of the regional directors, were responsible for setting up, staffing, and training the managers of the LCOs in their region. Once these management positions were filled and the employees trained, the LCOs assumed the duties of hiring and managing the clerical staff and enumerators for each locale. In all, the Census Bureau hired approximately 12,000 recruiters, recruiting assistants, and recruiting telephone clerks. Partnership activities were coordinated and managed out of the RCCs, as was technical support. Technical support was primarily needed for the RCC automation, LCO office automation, and support for the ACE enumerators, who used laptop computers to conduct interviews during the coverage evaluation survey.

Figure 3: Decennial Census Field Structure



Create a Project Management Culture

Both GAO and OMB have long advocated that agencies develop better project managers to improve the success of large-scale projects. This was especially crucial to the census. Beginning in 1998, the Census Bureau invested in training a cadre of certified project managers, a professional credential widely recognized in both the public and private sectors. By 2003, 400 Census Bureau employees had been trained in project management and received a master's certificate.

Determined that project management would not be another passing fad, Census Bureau leaders began to support courses to orient those peers who interact with project managers.

- A short half-day course was developed for top executives to introduce the conceptual framework of the curriculum.
- A three-day course was developed for mid-level managers on how to supervise project managers and the role of the supervisor in helping project managers succeed.
- Another three-day course was developed for team members who would probably never be project managers, but needed to understand the concepts and vocabulary to contribute effectively to their projects.

As an incentive for staff to be certified, the chief financial officer instituted a rule that unless project managers were certified or in the process of being certified, they could not run projects over a certain dollar value, with rare exceptions.

Other steps taken to institutionalize the project management approach throughout the Census Bureau included setting up a network of certified managers who were able to meet, share ideas, and support each other on a regular basis.

- Program managers had access to a list of certified personnel who could be tapped to run projects.
- A project management portal was set up online that project teams could use to access templates, best practices, lessons learned from other projects, and other materials, including links to the Project Management Institute and other related sites.
- The portal also allowed project teams to set up password-protected project sites on which to store and access all project documents.

Building a cadre of trained program managers contributed to smoother management of the overall decennial census and also helped in the management of other Census Bureau projects.

Lessons Learned from Strategy 1

- **Create a parallel organization to manage a temporary but large non-routine project.** It is difficult, but crucial to mission success, to find the right balance between a hierarchical management structure and matrix management when undertaking major projects that cross an organization's functional lines. Chain-of-command relationships need to be clearly delineated, and authority for decision making should be delegated in writing. Creating a parallel organization allows this to happen, and it can use a different operating style until the project is over.
- **Manage change proactively.** Managing the changes that will occur throughout the organization as a result of rapid and massive growth is a key element of mission success. This type of management needs to be supported by the top program managers and agency leadership. It begins with conscious, directed planning and communication about how both the program and the larger organization are being affected, and what steps need to be taken to assure smooth operations and avoid major disruptions to the extent possible.
- **Integrate support functions.** Large projects in large organizations can benefit significantly when there is a top-level manager who can both effectively operate across stovepiped parts of the organization and have a large stake in the management of the project. A natural person for

this is the CFO, when the CFO has been given sufficiently broad authority in the agency, and when the agency's chief operating officer may be occupied with the external aspects of managing the agency.

- **Build leadership cohesion early.** When many parts of an organization are responsible for the mission's success, the top management team must work together closely on a regular basis to share information and solve problems. Formal team-building training can help overcome everyday barriers to close coordination. The top leadership must set the tone for how the organization will overcome the limits of the institutional culture to eliminate barriers to cooperation between functional units.

Strategy 2: Use Non-Traditional Approaches to Staff Large Projects

The primary human capital challenge for the Census Bureau was recruiting, hiring, training, and supervising a temporary workforce that would peak at 860,000 employees, most of whom would work for approximately eight weeks conducting door-to-door enumeration of residents who had not mailed back their forms. These enumerators[5] visited 42.4 million households between April 27 and June 27, 2000. Nearly 3.7 million people were recruited to reach the hiring goals, and, in total, 960,000 employees were hired throughout the census (although some of these employees left before completion of the project due to a variety of reasons).

Applicants had to pass a skills test as well as a criminal background check before they could be hired, because many would be going door-to-door gathering sensitive information on behalf of the federal government or handling sensitive payroll information for others in the temporary workforce. This workforce was located in the 545 temporary offices throughout the country. In addition to learning their management responsibilities, the temporary office managers and supervisors had to become knowledgeable about federal equal employment opportunity practices and sexual harassment policies.

Developing Innovative Approaches to Working Within Existing Government Personnel Systems

To accomplish these tasks, the Census Bureau needed to identify innovative approaches to recruiting, hiring, and training that moved beyond the standard government approach. Working closely with the Office of Personnel Management (OPM) and other agencies, the Census Bureau developed innovative approaches to accomplishing its recruiting and hiring goals. This resulted in four initiatives:

- Allowing federal dual employment
- Recruiting welfare recipients under the Welfare-to-Work program
- Hiring non-citizens
- Providing post-employment assistance

In addition to these four initiatives, the Census Bureau partnership with OPM was productive in several other areas:

- OPM research psychologists revalidated the tests used to screen applicants for temporary census positions.
- The Census Bureau also contracted with OPM to use its toll-free telephone facility to handle the large number of calls from applicants during the time before the Census Bureau's own system was set up and ready to handle the calls.
- OPM granted several special authorities to the Census Bureau. These included authority both to pay recruitment, relocation, and retention allowances to certain temporary employees, and to waive Selective Service registration requirements.
- OPM and the Census Bureau jointly developed publicity strategies to aid recruiting. OPM promoted census jobs on the USAJOBS website and posted census fact sheets.

In addition, the Census Bureau commissioned a study of wages and turnover during the 1990 census, with the goal of finding ways to keep turnover in 2000 under 80 percent. Turnover in 1990 had reached 200 percent, which was costly and time-consuming. The study recommended that local wages be set to 80 percent of the prevailing wage as measured by the Bureau of Labor Statistics. This ensured that the census would be able to attract and retain potential workers in all locales by paying competitive wages.

In fact, the Census Bureau was able to exceed its recruiting goals by 23 percent. To combat costly turnover and attrition, competitive wages were combined with a technique called "frontloading," consisting of hiring almost two enumerators for every vacant position. This allowed the Census Bureau to keep operations going at the fast pace needed throughout the eight-week field data collection period without costly interruptions when enumerators quit early.

Federal employee dual employment. Federal regulations prohibit federal employees from holding two federal jobs. Census was able to work with OPM to create a temporary exception to this rule. The revisions enabled federal employees to hold two federal jobs—their regular permanent job and a temporary job with the Census Bureau—a situation known as "dual employment."

Once this exception was in place, 80 federal agencies (including the U.S. Postal Service) signed dual employment agreements, creating a pool of more than 2.4 million experienced workers. In addition, the U.S. Department of Agriculture National Finance Center, which handles payroll on a contract basis for many federal agencies, put recruiting notices on all payroll slips. Other federal agencies included articles in their newsletters, sent e-mails to their employees, and made applicant testing sites available. As a result, almost 73,000 federal employees were recruited, of which 30 percent were hired. The Department of Defense was the largest source of dual employment appointments (7,463), followed by the U.S. Postal Service (5,755).

Welfare-to-work. Census saw the welfare population as another source of temporary employees, but again federal and state regulations created issues. If welfare recipients worked for eight weeks on the census, they might permanently lose their welfare benefits. Census set out to work with a wide range of agencies to put exemptions in place so it could recruit from this population as well.

In 1990, the Census Bureau worked with public assistance agencies to waive income caps or offsets, which had been a successful effort. However, the 1996 welfare reform bill, called the Temporary Assistance to Needy Families (TANF) program, gave states much greater control over the design and implementation of social welfare programs. Therefore, the Census Bureau had to negotiate separate agreements with each state government, rather than with the federal Department of Health and Human Services. Census also set out to convince state and tribal governments to waive any Census 2000 earnings from their determinations for welfare recipient eligibility. Under the welfare law, earnings from any job would lower the amount of benefits a recipient would be eligible to receive, possibly discouraging workers from seeking temporary census employment. Half the states, and a handful of Indian tribes, agreed to waivers.

The Census Bureau also worked with the federal Health Care Financing Administration (now the Centers for Medicare & Medicaid Services) to jointly encourage temporary Census 2000 employment and promote the Children's Health Insurance Program. The federal healthcare agency encouraged states to exempt temporary census income from eligibility determinations for medical assistance under Medicaid and the child health program, and developed an expedited process for processing waiver requests from state and tribal governments. More than half the states received medical assistance waivers and almost as many states exempted income earned by working for Census 2000 from the child health program's eligibility determinations.

The Census Bureau worked with other federal agencies to change their rules as well:

- The Department of Housing and Urban Development issued a nationwide exemption of census income from public and Section 8 housing eligibility determinations.
- The Department of Agriculture allowed states to exempt census income from food stamp eligibility determinations.
- The Department of Labor established a grant program to encourage organizations to work directly with temporary workers to help them apply for census jobs and subsequently to transition to permanent employment.

In addition, non-governmental organizations, such as the National Governors Association, the American Public Human Services Association, and others, also encouraged states to grant or apply for waivers.

The net results of these combined efforts were remarkable. In less than three years, the Census Bureau was able to hire 37,000 welfare recipients. In addition, the Census Bureau was able to extend these various waivers to its contractors, because temporary census income was also being paid to these employees.

The hiring of non-citizens. One area that garnered significant attention was the hiring of non-citizens as census enumerators. The Census Bureau thought that it might need to hire non-citizens to assist with the enumeration of certain population groups that had recently relocated to the United States. The State Department keeps a list of countries from which it is illegal to hire non-citizens but authorizes the hiring of non-citizens from other countries. The Census Bureau used this authority to hire almost 32,000 non-citizens to assist with Census 2000.

Post-employment services. In addition to the workers employed an average of eight weeks, Census 2000 employed many other temporary workers for a period of up to three years. These were the employees who helped set up the 520 temporary local offices, established partnerships with local communities, and recruited and trained the enumerator workforce. Recognizing that many of these longer-term employees would be eligible to collect unemployment payments after the census was completed but were also experienced, well-trained, and skilled workers, the Census Bureau partnered with the Department of Labor to provide post-employment services. For these temporary employees, knowing that these services would be available helped serve as a retention strategy.

This effort included giving information packets to employees and coordinating workshops directed toward these employees on career transition topics. The workshops were coordinated by Labor-funded state rapid response specialists or local one-stop career center operators in coordination with regional Census Bureau staff. They addressed topics such as understanding the local labor market, interviewing, coping with unemployment, and writing a résumé. The program was planned jointly by the Census Bureau and the Department of Labor headquarters staff, but the details of implementation were developed at the regional level by both agencies. In this way, the programs were tailored to the local labor market.

Structuring a Workforce with Term Appointments

Early in the Census 2000 build-up cycle, the Census Bureau's CFO brought together a group of senior program directors to begin projecting staffing needs through the remainder of the decade, including the skills that would be needed to accomplish the agency's day-to-day mission, not just the decennial census. The group anticipated that many Census employees working on ongoing programs would want to transfer to the decennial census program area both for the work experience and for temporary promotions being offered, and that movement needed to be managed so that the other program areas would have sufficient time to hire and train replacements.

In the past, the Census Bureau had hired many permanent or long-term-appointment employees to backfill vacancies created by the temporary decennial assignments. Following the 1980 census, this resulted in a Reduction-in-Force (RIF) at the Census Bureau when Congress drastically cut back funding at the end of the decennial census cycle. As is the case with most RIFs, this was highly disruptive to Census Bureau operations and morale for a long period of time. Many at the Census Bureau in the 1990s still remembered the aftermath of the 1980 RIF and worked with the CFO to avoid a similar situation after 2000. After the 1990 census, there had not been a RIF, but the movement of headquarters staff between the temporary decennial positions and their permanent positions had been disruptive to the ongoing work of the bureau.

After top management at the Census Bureau determined that avoiding both major disruption and a RIF after Census 2000 was a high-priority goal for the bureau's longer-term strategic workforce planning effort, the CFO led early efforts to set up a system that was based on hiring new employees for limited-term appointments that generally ran two to three years, but could be extended up to five years. All new hires throughout the Census Bureau were made aware that their terms would expire at the end of the set period, which was timed for the end of the census, when permanent employees on temporary assignments would be returning to their old jobs.[6] In addition, all promotions were granted on a temporary basis, except SES-related promotions.

Some program directors initially resisted this approach because they didn't want to invest in training temporary employees, and they also believed that recruiting would be difficult if the Census Bureau wasn't offering permanent employment. Both fears proved misplaced. In fact, most college students and recent graduates being recruited for jobs at the Census Bureau were not looking for assurances of lifetime job security and had no qualms taking term appointments. Current federal employees with permanent positions who wanted to transfer from other agencies to the Census Bureau were looked at on a case-by-case basis, and, in most instances, waivers to the term-limit policy were granted.

This strategy worked. There were no major staffing disruptions in the Census Bureau during that time, nor were there major layoffs of permanent employees following the census. The ongoing programs of the Census Bureau were able to continue without disruption. Due to attrition and early Census 2010 planning money appropriated to the Census Bureau, many term employees who wanted to continue on at the Census Bureau after the census was over were able to find permanent positions. This strategy has potential implications for other federal agencies who may want to consider term appointments for finite projects, such as the recovery efforts associated with Hurricanes Katrina and Rita.

Training a Temporary Workforce

Training the 500,000 enumerators was all done by local staff using a train-the-trainers method. A verbatim training curriculum was developed by the Census Bureau that required each trainer to deliver exactly the same training everywhere in the country. The purpose was to ensure that the methodology being used to take the census was consistent, in order to assure data quality. In practice, it was hard to ensure that every trainer at every session was sticking to the verbatim training. This also caused the training to be somewhat monotonous at times, because some trainers merely stood at the front of the room and read out of the training manual. The Census Bureau local managers observed all training sessions and intervened when training quality was suffering; however, both GAO and the Department of Commerce inspector general have noted that training is an area that should be evaluated with an eye to improvements for the next census.

Lessons Learned from Strategy 2

- **Focus on strategic workforce planning to achieve short-term mission success and long-term agency viability.** This is particularly true when managing cyclical programs that incorporate surges in staffing. It should be incorporated into management thinking about how rapidly growing or shrinking projects will interact with the rest of the agency's ongoing work.
- **Develop a surge capability for staffing demand through early planning.** This capability should include multiple strategies such as term appointments, contracting out, and temporary employees. Looking in unconventional places to meet workplace needs, such as welfare-to-work programs, and enlisting the help of state employment and social welfare agencies can add valuable resources.
- **Partner with other agencies whenever possible.** Leveraging other agencies' expertise and resources may require more work up front, but ultimately can save time and resources, and help avoid duplication of effort when one agency has already developed expertise in an area.
- **Take advantage of all the hiring flexibilities available under current law.** Working directly with OPM to develop viable approaches will allow agencies to implement innovative procedures that directly support their mission.
- **Ensure workforce planning is comprehensive.** That is, it should include changes needed in supporting operations, professional training requirements (such as project management), and post-employment assistance rather than just staffing numbers and descriptions.
- **Build in quality control for training.** The need to make training content and delivery consistent for large numbers of people presents special challenges for quality control. Agencies need to have comprehensive monitoring and on-the-spot evaluation in place, and strive for interesting and effective delivery modes.

Strategy 3: Create Integrated, On-Demand Technology Systems

Census 2000 relied on over a dozen interrelated computer systems. Some of these were developed and maintained in-house while others were

developed and maintained by contractors. This combination required a substantial coordination and integration effort that was uneven but, with a lot of perseverance, ultimately successful. Creating an integrated governance system up front, defining the right strategies for acquiring technology, and applying commercial best practices in managing implementation were all hallmarks of Census 2000's success in the technology arena.

Creating an Integrated IT Governance Approach

Responsibility for the decennial census's computer systems was split into four areas: (1) the decennial census program, (2) the field operations program, (3) the Census Bureau's centralized information technology (IT) organization, and (4) the administrative support areas. This was integrated at the operating level through the decennial program management organization, which included representatives from all responsible areas, as well as through the coordination of the career executives on the Executive Steering Committee.

1. The decennial census program managers were responsible for a series of mission-related IT systems:
    - The overall decennial census management information system, which ran the project-management-related software and provided both detailed and executive-level management information on the cost and progress of the census. The decennial program was also responsible for setting up the hardware, software, and communication lines in 545 field locations, as well.
    - Systems related to the questionnaires themselves, including tracking the forms, capturing the data on the questionnaires, editing that data, and, finally, processing it to prepare all the data products that were released.
    - The geographic information systems (GIS) that compiled the Master Address File of all the addresses in the country, and integrated them into a database that contained all the geographic features in the country such as streets, rivers, and other boundaries. This system produced the paper maps used by enumerators.
    - The publicly available census data dissemination system, commonly called the "American FactFinder" (www.factfinder.census.gov).

    Many of these systems were contracted out for development and maintenance.
2. The field operations program managers were responsible for systems primarily related to case management for field enumerators (that is, keeping track of the status of cases being worked on) and administrative systems used for hiring and paying the enumerators. This included the system used to coordinate with the FBI to conduct criminal background checks on prospective temporary employees. The field operations staff also programmed the laptop-computer-based questionnaire used for the follow-up survey of approximately 315,000 households included in the Accuracy and Coverage Evaluation.
3. The Census Bureau's chief information officer and his centralized IT staff were responsible for ensuring that planning and implementation of all technology procurements were in compliance with federal requirements. In addition, the Census Bureau's central IT organization provided the network backbone upon which the systems had to operate.
4. The bureau's administrative support program managers had to ensure that the decennial census personnel, budget, and payroll systems complied with all federal requirements and were integrated with the central financial management systems of the Census Bureau.

Relying on Varied IT Acquisition Strategies

In each of these four arenas, the Census Bureau used three different approaches to IT development: contracting out an entire system; a hybrid approach that involved contracting major parts of the system that were integrated with custom in-house modules; and complete in-house development. Each of these had varying degrees of success.

Contracting out data capture was successful. One system that was completely contracted out was the Data Capture System, or DCS 2000. This system digitally scanned completed Census 2000 questionnaires using optical character recognition (OCR) technology and optical mark recognition. This

enabled automated interpretation of handwritten responses. The system had to be fast, accurate, and reliable, and it was. Over 160 million paper questionnaires were scanned into the census database between April and August of 2000 at the four production centers located around the country.

The award-winning DCS 2000 effort was a model of public-private partnership. The Census Bureau formed a working group that included the following partners:

- Its own in-house experts
- Vendors for the software and the scanners
- The Rochester Institute of Technology (the research and development partner)
- The Government Printing Office

The partners discussed imaging issues, such as paper and printing. The working group was created and charged with assuring that the printed forms would conform to the specifications of the scanners. This was particularly important because the Census Bureau was looking for a minimum recognition rate of 50 percent, with a high accuracy rate, something that had never been achieved when the procurement began.

Amazingly, there were no missteps on form development, and a recognition rate of 81.23 percent, with an overall data accuracy rate of 99.29, was achieved. Through a different contract, another vendor was brought in to operate three of the four production centers where the scanning took place. The Census Bureau worked closely with its vendors to integrate the various contracted functions. Through this highly cooperative relationship between the Census Bureau and its vendors, over 160 million forms were processed and scanned on time, providing the highest-quality data ever achieved in a modern census.

Using a hybrid approach for recruiting and payroll was problematic. The human resources management system used for the massive recruiting and hiring effort was a hybrid system, consisting of a highly customized, commercial off-the-shelf (COTS) product maintained by a vendor that interfaced at the front and back end with existing in-house personnel system components.

The Census Bureau made two decisions early on that would prove critical in shaping the IT management and development efforts for this system. First, the Census Bureau determined that there would need to be a weekly, rather than the standard federal biweekly, paycheck for the temporary workers. This was based on the 1990 census experience, which showed that many of the temporary workers, particularly those coming from the ranks of the unemployed, could not afford to wait two weeks between paychecks. However, a weekly payroll precluded the Census Bureau from using its existing payroll information systems.

Second, Census decided to integrate into one system the pre-appointment screening information on applicants, the personnel information used in hiring, and the payroll information such as hours worked and travel expenses. The resulting system was called the Pre-Appointment Management System/Automated Decennial Administrative Management System, or PAMS/ADAMS. The Census Bureau used a COTS human resources management product that it thought would require only slight modification. A contractor estimated that 95 percent of census needs could be met with a COTS system. However, by the time the system went into production, it had been 80 percent customized. This created problems down the road, which will be discussed below.

Briefly, the pre-appointment part of the system (PAMS) contained background data on all 3.7 million applicants that linked to the FBI's database to identify any matches with known criminals. Based on these checks, a determination was then made as to whether that applicant was eligible for hiring. PAMS also contained information on the applicants' test scores, availability for work, geographic location, and other pertinent information.

Once an applicant passed the screening process, the information in PAMS automatically rolled over into the payroll system, ADAMS. This automatic rollover was intended to save enormous amounts of time and cut down on errors by eliminating the need to re-key in information on new employees. It also kept track of personnel actions such as promotions, transfers, and terminations.

PAMS/ADAMS was a complicated system that could have benefited from early testing and development.

However, the Census Bureau started relatively late in the decade to develop the requirements and seek contractor support for this system. Because of the delays in planning and funding the census during the 1990s, much of the systems development was pushed back farther than desirable. As a result, the first field testing of the system took place during the dress rehearsal of census operations in 1998. The dress rehearsal turned into the first major systems test, and, as might be expected, several glitches were detected. For example, the Census Bureau initially wanted to use applicant, personnel, and payroll forms that could be scanned directly into the database using OCR. Field testing showed it didn't work. Only original forms with blue backgrounds could be successfully scanned. However, out in the field, recruiters often used forms that had been electronically copied in black and white when they ran out of original forms or didn't have any originals handy. As a result, Census managers decided to create an in-house work-around system and key in the information off the forms. This in-house system was appended onto the front end of the purchased COTS system.

Although the extensive modifications to the COTS product were seen by Census as necessary to meet the requirements of Census 2000, they created at least one undesirable situation. During the four-year period between the Census Bureau's purchase of the COTS product and related support and maintenance services from the vendor and the actual implementation of the system, the vendor moved to a new version of the software. Because the COTS product had been 80 percent customized, moving to the new version would have required massive reprogramming and testing just as census operations were beginning. To assure continued support of the now outdated version, the Census Bureau had to ask the secretary of commerce to convince the president of the vendor firm to continue to support the old version, albeit at a somewhat higher price. But the lesson was clear regarding the dangers of over-customization of a product that is being supported as a COTS product, with new versions released by software developers more frequently than fits comfortably within a multi-year project lifespan.

In-house development of the Census Bureau's Operational Control System was successful. The Operational Control System, or OCS 2000, was developed completely in-house, although some contract programmers were used. The system tracked the many different field operations that were taking place during the census and reported back daily cost and production progress information. The reports were used daily by local and regional managers and headquarters staff and management. In addition, the system was able to provide printouts of the census address listings by block; print address labels, bar codes, and assignment directories; and track and manage the shipping of all materials, such as census questionnaires, from the 520 temporary local offices to the four data capture centers around the country that scanned and keyed the questionnaires into the census database.

The OCS 2000 system had three major components:

- The front end was a graphical user interface that resided on the user's personal computer and had components on local and regional network servers.
- The second component allowed users in the temporary local offices to enter operational data through the interface, which was then saved to a database.
- The third component generated production and management reports.

The back-end applications ran on servers located in each of the 12 temporary regional offices. The information on each of the 12 identically configured servers was then compiled nationally when the data were transmitted to headquarters each night. Without OCS 2000, it would not have been possible to manage the census operations in a timely, efficient way.

It is important to note that not everything went smoothly with the in-house development efforts. The Department of Commerce Office of Inspector General, in a 2002 report, expressed concerns about late efforts during the time leading up to the census and in evaluations done afterward: "An operation as huge and complex as the decennial census requires long lead times to allow for proper development and testing of the project design and software, and to procure systems." The inspector general reported throughout Census 2000 that the Census Bureau needed to improve its development approach for in-

house systems by using more of the well-established standards for software specifications and design, increasing the rigor and independence of its testing methods, and using effective evaluation methods.

Although the late start and funding delays precluded much of this for Census 2000, the Census Bureau was determined to press for an early start for 2010, in part to reduce IT-related risks. Of equal importance, the Census Bureau has become convinced of the need for its IT contractors to demonstrate their own ability to meet recognized standards for software development, IT security, and project management.

Using Industry Standard Practices

The Census Bureau used a series of industry standard practices for development and implementation of PAMS/ADAMS, OCS 2000, and other IT systems that was a critical part of making them successful. These practices included:

- **Getting user input up front.** To ensure useful and adequate stakeholder input, the Census Bureau used joint application design sessions attended by programmers, systems designers, and subject-matter experts. From the start, the Census Bureau determined that it would: (1) get stakeholder input right from the design stage; (2) test the systems thoroughly in a real-world environment before using them in production; and (3) assure that all systems were properly supported and maintained throughout the production cycle.
- **Testing systems in a real-world environment.** The Census Bureau determined that extensive testing of field systems would be needed to help reduce the risk of failure during production. An alpha/beta testing regime was adopted in which the alpha, or initial, testing took place during programming and development using automated testing tools. If successful, the application then went through testing at the Census Bureau's beta site in Suitland, Maryland. The beta site replicated exactly the conditions in the LCOs and RCCs. The beta testing caught many errors that would have been costly and time-consuming to fix once the software was released to field production. Use of rapid application development also was helpful in getting software to the field quickly and correcting problems efficiently.
- **Using object-oriented programming.** Rapid application development was possible because the Census Bureau used object-oriented programming for functions that were identical in different applications, such as the relationship between the LCOs and RCCs. These were set up and saved as objects, which were then used in a number of different applications. Object-oriented programming allowed the Census Bureau to quickly repair problems and have the fixes take effect systemwide, wherever an object was present. This also saved enormous amounts of programming time and allowed quick fixes of bugs that were found. In addition, the Census Bureau used software that allowed access to all computers on the network remotely so that technical problems could often be resolved from headquarters. Because the beta site had exact replicates of the LCO setup, it was much easier to diagnose and fix problems remotely, saving time and money.
- **Creating a 24/7 technology help desk.** After several systems were tested during the dress rehearsal in 1998, the Census Bureau realized that it needed a comprehensive help desk function that would be available to field personnel 24 hours a day, seven days a week. An office was established with about 25 experienced technicians and developers who were reachable from anywhere in the country through an 800 number. The 24/7 two-tiered support system caught and fixed problems promptly, before they became big problems. The field users of the help desk were uniformly pleased with the level of support provided, and technical glitches never became a factor that slowed or compromised production.
- **Using a configuration control board.** The Census Bureau also used a configuration control board (CCB) to set priorities and give final approval to any application changes or updates. CCB, composed of senior representatives of the software users and developers, was effective in keeping everyone informed and making key decisions in an orderly, organized, and efficient way.
- **Building-in IT security up front.** One area that has grown significantly in importance since the conclusion of Census 2000 is IT security. Although the Census Bureau took effective

actions to safeguard the census data, the design for 2010 calls for more use of automation in data collection than was used in 2000. In addition, there are many more government requirements for IT security than existed during the 1990s, when the Census Bureau systems were being developed. Planning and funding for major systems now needs to build in consideration of these increased security requirements.

Lessons Learned from Strategy 3

- **Define IT governance up front.** When multiple parts of an organization are being held responsible for different systems that ultimately need to communicate with each other, lines of responsibility and accountability have to be clearly defined. Special attention should be paid to how the various groups will communicate with each other; who has responsibility for systems integration, with its attendant authority, should be clear to all project participants. These lines of authority and communication should be determined as part of developing the overall system architecture.
- **Begin early in order to mitigate risk in major IT projects.** Sufficient time and funding needs to be built in for planning, risk mitigation, testing, and revision.
- **Consider the risks of hybrid computer systems.** It is possible for an agency to successfully combine systems that are developed in-house with systems that are provided by contractors, and to customize COTS software. However, these combinations greatly increase the complexity of systems integration and therefore increase the cost and risk to projects. If an agency decides to go this route, a solid risk mitigation plan needs to be developed, and the costs accounted for up front.
- **Require the use of established commercial software development practices.** While initially expensive, using well-established practices for software development is ultimately cost beneficial, and agencies should incorporate the upfront resources needed into their planning and budgeting process. If an agency is not capable of implementing repeatable, documented methods, it should use contractors who have demonstrated outstanding performance in this area. This type of approach is consistent with what OMB typically requires for systems development.

Strategy 4: Use Life Cycle Procurement and Contract Management Practices

The Census Bureau entered into several major contracts, in addition to many smaller ones, during the conduct of Census 2000. This was a significant cultural change for the Census Bureau, which had always carried out census activities using in-house resources. However, during the early 1990s, the Census Bureau recognized that many of the functions could be outsourced as long as the procurements were structured in a way that would minimize risk and help ensure their success. This was particularly appropriate in areas where the expertise needed was not in the Census Bureau's core mission area (such as IT and advertising) or a huge surge capacity was needed (such as telephone assistance centers for census respondents). As a result of these insights by senior managers, the Census Bureau in 1996 volunteered to serve as a pilot for a Department of Commerce effort to re-engineer the procurement process. This effort integrated and streamlined the various stages of procurement and contract management so that a contract was managed on a life cycle basis by a team, beginning with the competitive bid process and continuing through the contract implementation and closeout. The Census Bureau also began treating its vendors more as partners in achieving program goals. These shifts in approach and thinking were incorporated into the Census 2000 procurement strategy. By re-engineering its procurement process, the Census Bureau was able to put complex contracts in place in a record six months.

Based on its favorable experience in Census 2000, the Census Bureau has decided to again rely on a contracting-out strategy and integrate several of these contracts into three large contracts for 2010.

The Census Bureau also had entered into two contract-like arrangements with other government agencies. The Government Printing Office contracted with printers on behalf of the Census Bureau to print the questionnaires. And the Census Bureau entered into a Memorandum of Understanding with the General Services Administration to lease space,

Census 2000's Major Contracts

- **The Data Capture System** (DCS 2000) to scan census questionnaires.
- **Data Capture Services** to set up and manage three of the four production centers where the DCS 2000 was operated.
- **Telephone Questionnaire Assistance,** which was in six languages for households that wanted to call an 800 number to receive assistance in completing the census questionnaire.
- **Automation Infrastructure** for the regional offices. This included setup and maintenance of personal computers, servers, telephone lines, and other equipment.
- **The Data Access and Dissemination System** to develop the web-based American FactFinder that integrated data from multiple Census Bureau data sources.
- **Paid advertising** coordinated by a professional agency to promote the census on TV, radio, billboards, posters, and other media.
- **The Pre-Appointment Management System/ Automated Decennial Administrative Management System,** or PAMS/ADAMS, for recruiting and payroll.

build out, and provide furniture for its 545 temporary field offices, and then close them down at the end of the census.

The Census Bureau was also sensitive to addressing the need to engage small businesses in the conduct of the census. Although the bureau knew that many of its contracted functions would need to be done by large companies with experience in managing large projects, it was also committed to including large subcontracting components within the prime contracts to assure that small, small and disadvantaged, and women-owned businesses would be able to participate. Working closely with the prime contractors to ensure success, the Census Bureau met all of its small-business subcontracting goals.

Incorporating the Elements of Contracting Success

During the pre-award phase of each of the major contracts, the Census Bureau undertook three activities to make the acquisition process faster, simpler, and more inclusive. All three were based on the assumption that results, not process, was the key to success.

Element 1: Using cross-functional teams to draft and manage acquisition proposals. Cross-functional teams were used to develop the Requests for Proposals (RFPs) and to conduct technical evaluations of the bids. The teams had high-level management support and received joint training on performance-based contracting and operating in a team environment. Each team developed a project agreement that described the overall project goals, milestones, budget, and resources, and that was signed by key management officials. The teams were composed of a project manager, program area representative, legal counsel, procurement and budget representatives, and customers of the required product.

Element 2: Fostering open communication with the vendor community. Open communication with industry and vendors was given a high priority. The teams conducted market research to assess industry capabilities before drafting the RFPs. The Census Bureau also wanted to assess market conditions that could result in cost savings. As a result, the Census Bureau ended up buying more standard commercial products and fewer uniquely specified items. In addition, vendor input was used to determine best solutions. The draft RFPs also included a process that allowed vendors to ask questions and clarify requirements. Vendors were also encouraged to use oral proposals in lieu of detailed written proposals. This helped establish mutual trust and open communication. It also helped streamline the evaluation process and reduced costs associated with preparing and evaluating proposals. During oral proposals, vendors were asked to respond to a specific set of questions to ensure fair consideration of all competitors. Vendors responded very positively to this process and found it helped them manage their proposals efficiently.

Element 3: Using performance-based contracts. The census teams used performance-based statements of work, basing requirements on performance standards rather than prescribing how the work would be done. This allowed the vendors to add ideas. In addition, performance incentives were built into the contracts as appropriate.

Ensuring Results-Oriented Contract Management

A contract management office was established in the decennial census program area to oversee the management and administration of the major contracts. Staff from the Census Bureau's central procurement office were assigned to the decennial program office to assist the program staff on a full-time basis. The decennial contract management office also had a section that served as the integrator for the census automated systems and conducted the beta testing, because there was a lot of overlap between the contracted and in-house systems.

The contract managers adopted several standard project management approaches to assure the desired results were achieved with each contract. The cross-functional teams used cost control, configuration management, risk management, and open communications with each other and the vendors. Although scheduling and budgeting were important factors, risk management was key; contractors were being used to carry out some of the most essential functions of the census. The Census Bureau contract managers conducted several risk management activities, such as identifying and recording program and contract risks; assessing and prioritizing risks; identifying risk resolution or mitigation factors; tracking risks; and reviewing and reassessing each contract on an ongoing basis.

The Census Bureau developed a database to track, store, and distribute information and documents about the contracts. The detailed performance-based approach ensured that the Census Bureau and its private sector partners successfully met the predefined goals for Census 2000. The contracts were completed on time and within budget, and none of the contract awards were protested.

Of particular note is that having sufficient oversight and involvement from government employees in both the program and procurement office was critical to the success of these contracts. This is a major issue for many federal agencies and will be for the Census Bureau as it nears 2010. The government has a shortage of trained contracting personnel who have sufficient experience to manage big contracts. Yet, these are the people who are key to successfully contracting out functions that were formerly done in-house by agencies, as the Census Bureau did in 2000. Agencies that are examining how far to go in outsourcing their procurement activities may want to look further into the Census Bureau's formula for success and the balance it found between government and contractor personnel. However, finding enough government personnel to fulfill these roles has been a major challenge.

Lessons Learned from Strategy 4

- **Consider outsourcing, even for mission-critical activities, to provide needed expertise and surge capacity.** This is especially true when the need is temporary or the skills needed are not part of the agency core mission. For many agencies, this requires a major change in the organizational culture. However, based on the experience at Census, this change can be successfully managed.
- **Use a life cycle approach for managing large acquisitions.** Agencies should take the time to re-examine the acquisition process they are using to determine how it might be streamlined and improved, particularly if major acquisitions will be coming through the pipeline. The "cradle-to-grave" approach can save time and result in a better product by managing acquisitions through their entire life cycle with a consistent, multidisciplinary team.
- **Use performance-based contracting.** Performance-based contracting can provide outstanding benefits to the agency. However, these types of contracts need to be managed by trained, experienced government contracting experts if the benefits are to be realized by both agencies and vendors. Contracts need to be closely managed by the agency on an ongoing basis by teams with both contracting and programmatic expertise.
- **Treat major vendors as partners rather than adversaries.** Vendors and agencies that work in collaboration on major projects have the best chance of meeting an agency's needs and avoiding unproductive interactions. In that way, both the agency and the vendor can contribute their strengths to achieving the desired result.
- **Develop a well-planned, open process for awarding major contracts.** When there is easy access to information on the web about a proposed acquisition and sufficient interaction

occurs between the agency and the bidders, vendors can make creative contributions that result in developing proposals that will best aid the success of the project or program being supported. The agency should plan on an early start so that time is built in for conducting market research, developing a clear and articulate RFP, and establishing an organized contract management database.

Strategy 5: Use Supply Chain Management Approaches During Deployment

Although supply chain management is often associated with large businesses or the military, it was crucial to the timely completion of Census 2000. Between January and August 2000, Census's 520 local census offices had to be supplied with everything needed to recruit, test, hire, and train over 500,000 temporary enumerators, as well as with the supplies needed for the household enumeration.

The Census 2000 logistics approach ensured that supplies, training, and paper questionnaires were in the right place at the right time, and that the all-important questionnaires were carefully tracked from the moment they were printed, through the point at which their contents were scanned in at the processing centers, and, ultimately, until they were shredded and burned after completion of the census. Some of the specific actions taken included bar coding all questionnaires and establishing specific check-in points to track them; bar coding major inventory items such as computers; shipping questionnaires via FedEx in trackable packages; and setting up the Census Bureau's National Processing Center in Indiana as the central staging point for packing and shipping items such as advertising posters and enumerator kits to temporary offices and enumerators.

Decentralized purchase of standard office supplies. The Census Bureau made a decision early on that it would not try to centrally purchase and ship standard office supplies to the temporary local offices. Instead, key managers were entrusted with purchase cards and trained in their appropriate uses so that supplies could be purchased locally as needed. While this worked well for the most part, the Census Bureau needed to put strict accounting controls in place to make certain that the cards were not misused. The Census Bureau's internal control system, wherein all purchases regularly were reviewed by permanent staff in the regional offices before being approved for payment, quickly caught discrepancies. The few employees that misused the cards were either retrained or fired. By using the cards, the Census Bureau was able to save tremendously on shipping costs and improve productivity in the temporary local offices.

Outsourced the supply of office furniture. Buying and disposing of furniture for the 520 temporary local census offices was a major headache for the Census Bureau in 1990. To avoid that problem in Census 2000, furniture was supplied and disposed of by the General Services Administration as part of its agreement to supply leased space for the temporary offices. This worked well and relieved the Census Bureau of a major administrative burden.

Centralized preparation of standard packets of enumerator supplies. Enumerator supplies for interviewing, on the other hand, needed to be completely standard. Well before Census Day, April 1, 2000, the official launch of the census, the Census Bureau's Jeffersonville, Indiana, National Production Center had packaged and shipped 9,457,667 enumerator kits. There were 295 different types of kits for various census operations. These kits contained such things as pencils, notepaper, job aids, and other items that an enumerator needed for the various operations, such as visiting a household, listing addresses, conducting the coverage measurement survey, or carrying out other operations. In addition, standard sets of personnel forms for applicants were shipped to the local offices. Packing and shipping all these materials required 685 temporary shipping clerks supplemented by 1,385 permanent production center employees working 82,300 hours of overtime in the four months leading up to the 2000 census "D-Day" of April 1.

Used frequent quality checks. During the household interviewing operations, the enumerators gathered information on paper questionnaires. It was important to catch errors early, before these completed questionnaires were shipped back to the production centers for processing into the electronic database. Enumerators turned in their questionnaires to their

crew leaders, who, in turn, brought the questionnaires to the local offices. There they were reviewed for quality and then boxed and shipped via FedEx to the processing centers. All shipments were tracked carefully and checked in at the production center upon arrival.

This process served two purposes: It got the questionnaire data to the right location for processing, and it afforded the frontline supervisors and quality-control staff an opportunity to look over the work of each enumerator every day. By reviewing work frequently, unacceptable work behavior and products could be caught and corrected quickly.

Used on-demand maps and work assignments. One of the most technically complex logistical supply operations was providing maps and work assignments to enumerators. The Census Bureau's central geographic database—which contains all the addresses in the country geo-coded onto maps—is developed, maintained, and operated by the bureau's geography division at its headquarters in Suitland, Maryland. In addition to keeping this database current, the geography division is responsible for creating maps that enumerators use to locate housing units in their assigned areas. The maps show the location of each housing unit in the census database, which is critical to census completeness and accuracy.

Although the Census Bureau received regular address updates in an electronic file from the U.S. Postal Service, the quality of information varied unpredictably. So the Census Bureau conducted two major address listing field operations during 1998 and 1999. These operations required "listers" to walk the ground and check the accuracy of the address list everywhere in the country. About 40,000 field staff in the urban/suburban operation checked 93 million housing units during this operation, which took place in three six-week waves. In rural areas, listers actually drew in missing housing units on paper maps that were later digitized. Approximately 65,000 field staff listed 23.5 million housing units during the rural operation, which also took place in three six-week waves.

To supply the listers, and later the enumerators, with maps, Census Bureau regional geographers used electronic files and special equipment to print maps of various sizes that could be used to plan and manage individual work assignments. During the census, the local office staff set up work assignments and assembled packages for enumerators based on which households had not mailed back their questionnaires and required an in-person visit. Packages for the enumerators contained needed questionnaires, maps, and address information. The packages were then disseminated to individual enumerators through their supervisors.

Lessons Learned from Strategy 5

- **Decentralize purchase of common goods such as regular office supplies when possible.** Even with a large temporary workforce, good training and strong internal controls can make this a cost-effective alternative to central purchasing and shipping.
- **Don't rent or buy commodities yourself if someone else can do it better.** If provision of certain supplies or furniture can be included as part of other contracts or outsourced separately, the agency can be freed up from burdensome routine tasks that are not part of the core mission.
- **Centralize the assembling and shipping of goods when it is important that materials be identical, no matter where they are being used.** If items are being assembled and shipped from a central location, it is important to have quality-control and inventory procedures at the points of departure and receiving, as well as the ability to track shipments. There should be open and clear lines of communication established between the shipping and receiving points so that corrections or additional orders can be taken care of promptly.
- **Build quality control into the work process.** It should include numerous checkpoints for measuring the performance of both line workers and managers. Not everyone will perform perfectly, but it is important to be able to catch and correct errors quickly.
- **Use on-demand strategies for handling core work processes.** When the work is variable and unpredictable, and cannot be pre-planned, use on-demand strategies to print maps and schedule work assignments.

Strategy 6: Collaborate with Others Who Have a Stake in Your Success

In an attempt to increase the response rate for Census 2000, the Census Bureau undertook a major effort to reach out to state, local, and tribal governments; community groups; non-governmental organizations; the media; and private sector industries. This effort peaked over the three-year period leading up to Census 2000, and employed 690 "partnership specialists" working in all 12 regions. These partnership specialists comprised a diverse workforce ethnically and racially, and represented 36 different language groups. The Census Bureau forged partnerships with 141,082 government and community organizations, 301 national organizations, and 320 national companies and businesses. The national organizations and companies disseminated information to their local chapters and affiliates, throughout their workforces, and to their customers. For example, corporations put information in their employee newsletters, and some companies printed material about the census for distribution on shopping bags or other in-store items.

The Census Bureau's efforts to reach out to everyone in the nation took many forms. The census questionnaires themselves were translated in multiple languages. In addition, 23,556 Questionnaire Assistance Centers were established in communities with large segments of the population that were considered hard to enumerate. The centers were staffed by 15,100 local volunteers and 11,200 paid staff, and they assisted people with questions about the census and how to complete the questionnaire.

The Census Bureau also established Complete Count Committees, which consisted of community members appointed by elected officials in local jurisdictions. The job of these committees was to create a local plan for increasing census awareness and encouraging local residents to participate. By having the local community leaders involved in formulating a plan, it was hoped that the message would most effectively reach diverse local residents.

To ensure that all residents had access to a questionnaire, the Census Bureau established 28,983 "Be Counted" sites. These sites were stores, libraries, and other easily accessible areas where people who did not receive a questionnaire in the mail could pick up the forms. Although this caused the Census Bureau to build in special checks so households were not double counted, it ensured that if the Census Bureau had missed any households on its address list, people could still get questionnaires.

Examples of Census 2000 Outreach Initiatives

- *Census in the Schools* provided informational materials to schools and teachers for use in the classroom, English as a Second Language and adult literacy classes, and Head Start programs.
- *The Religious Initiative* provided religious leaders with materials to distribute in houses of worship.
- *The In-Kind Support fund* assisted local community efforts to promote the census.
- *How America Knows What America Needs* provided elected officials with tools to promote the census.
- *Specialized Initiatives* supplied community-based organizations with customized materials to promote the census among residents with language, cultural, and physical challenges.
- *The Road Tour* consisted of special vans equipped with exhibits, videos, and promotional materials that set out from 12 regional locations and reached over a million people across the country.

For the first time in 2000, the Census Bureau conducted an extensive paid advertising campaign. During the 1990 census, advertising was limited to public service announcements that played on TV and radio during the late-night hours, and thus were seen by a limited audience. For Census 2000, the Census Bureau hired a nationally known advertising firm that partnered with four firms that specialized in reaching specific ethnic markets. The advertising team designed ads for TV, radio, billboards, magazines, and newspapers. The ads were in 17 different languages and appeared in over 3,000 outlets. According to Census Bureau evaluations, the campaign reached 99 percent of targeted adults more than 50 times. The paid advertising campaign was managed out of headquarters.

The Census Bureau decided to use the temporary regional offices as the base for outreach and pro-

motion activities rather than the temporary local offices. The regional directors played a key role in Census Bureau outreach activities throughout the decade and were attuned to conditions in their local communities. This role greatly expanded as the census neared.

To keep track of all the partnership and outreach activities, the Census Bureau created a centralized, web-based data system that ran on its intranet. The system allowed Census staff to strategize, track, and analyze activities nationwide. About 1,600 Census Bureau staff had access to the data and used it to provide up-to-date outreach information to partners across the country.

Before the census questionnaires were distributed, the Census Bureau conducted an operation to update local addresses by sharing its address lists with representatives of local and tribal governments. These entities reviewed the list and gave corrections and updates to the Census Bureau. Many local and tribal governments participated in the update effort, but the process had many kinks, often due to the incompatibility of shared electronic address files and information. However, this type of electronic sharing has great potential for 2010, particularly if compatible electronic files can be used.

The Census Bureau also conducted some targeted field operations to enumerate special populations, such as the homeless. This included sending enumerators to 6,655 emergency or transitional shelters; 2,027 soup kitchens; 163 regularly scheduled mobile food vans; and 4,911 targeted non-sheltered outdoor locations.

Lessons Learned from Strategy 6

- **Include many diverse partners.** The investment in paid partnership specialists was returned many times over by the contributions of the partners in the effort to get the populace engaged in civic participation.
- **Invest in long-term relationship building.** Building successful partnerships is an ongoing effort. If partnerships and outreach activities are to make a meaningful contribution to a program, sufficiently long lead times need to be built in to develop these relationships.
- **Use multiple outreach methods to reach residents with different cultural and demographic backgrounds.** The regional directors and their partnership specialists spent significant amounts of time determining who were the opinion leaders in various communities and then working in concert with them. Materials were tested on small groups before being released more generally. It was an important element of their effectiveness that many materials were able to be adapted to the local situation to increase their effectiveness in imparting the census message.

Applying Lessons Learned to the Planning of Census 2010 and Other Large, Non-Routine Projects

Seemingly against all odds, Census 2000 was seen as successful. The period up to and including the initiation of Census 2000 was marked by political infighting and divisiveness concerning census methodologies. This made the development and testing of new approaches for Census 2000 operations very difficult to undertake.

Fortunately for Census 2000, the Census Bureau had the right mix of talent, resources, experience, and skill needed to do just that—focus, put out a heroic effort, and, as a result, get the job done. However, depending on good luck is not a good management strategy. Census Bureau leaders understood that the need for early decision making and testing was the basic risk mitigation strategy, and the Census Bureau has, over the past several years, made a strong case to both Congress and the president for its 2010 decennial census strategy.

While the Census Bureau has already received plenty of recommendations from its official auditors and oversight bodies, such as GAO and the Commerce Department's inspector general, these recommendations are rooted in the personal experiences of the authors from helping lead Census 2000. And, while they are directed to the leaders of Census 2010, they could be applied to many other large, cyclical federal programs.

Recommendations

1. Communicate plans and status with stakeholders.
2. Create a strong contract management team.
3. Emphasize management integration.
4. Seek early funding support for Census 2010 partnership activities.
5. Extend and support the involvement of others who have a stake in your success.
6. Coordinate outside oversight.

Recommendations

Recommendation 1: Communicate plans and status with stakeholders.
The Census Bureau has earned the support of influential leaders in the executive branch, Congress, and the census user community. Its leaders, managers, staff, and supporters are moving ahead with important new programs that have received significant financial support in an extremely difficult budget environment. The current leadership of the Census Bureau, including the director, deputy director, and the undersecretary for the Economics and Statistics Administration (ESA) at the Department of Commerce, as well as the associate director for decennial census programs, have worked hard and successfully to build widespread, ongoing support for the 2010 program.

However, serious operational and technical challenges to a 2010 census still lie ahead. To maintain the remarkable level of support developed to date, the Census Bureau needs to over-communicate—if that is possible—in terms of its plans, progress, and accomplishments. Clearly, the dedicated champions of the effort to "succeed again in 2010" deserve regular and recurring reports on 2010 planning, testing, and progress.

Recommendation 2: Create a strong contract management team.
The Census Bureau is experiencing the same difficulties as many federal agencies—a shortage of well-trained, experienced mid-level contract management staff. Yet, much of the outcome of 2010 will

be riding on a few large contracts. Census 2000 was so successful, in part due to the effective contract management strategies and procedures used by the Census Bureau. To repeat that success, the bureau needs to devote the same creativity it directs toward hiring the temporary enumerator staff to hiring contract management staff.

Recommendation 3: Emphasize management integration.
As touched on earlier, one of the big challenges facing the Census Bureau is management integration, which was achieved largely by creating a temporary, parallel organization within the Census Bureau to operate Census 2000. Typically, responsibility for decennial census activities continues to be dispersed throughout various divisions and directorates. The leaders of the 2010 census will need to be assured that all major components come together successfully in a timely way. This is not new to the Census Bureau, but the structure of the 2010 census may make this particularly difficult because the new technology and the new procurement strategy will require new management approaches.

In particular, the decennial census management should establish a mechanism where all components can come together and calibrate the schedule, budget, and operations to ensure activities are aligned. Establishing intermediate critical milestones that serve as checkpoints can help the decennial census leadership keep everyone in sync at these points. This can allow managers to have some autonomy without drifting too far from the master schedule and budget. It will also help maintain a cooperative atmosphere, which is essential if all component organizations of the 2010 census effort are to buy in to the new elements of the plan.

Recommendation 4: Seek early funding support for Census 2010 partnership activities.
Funds need to be provided earlier in the decade for partnership activities. There is a long lead time to effectively bringing in local leaders who can encourage participation. Ideally, the Census Bureau should be working with state and local governments early enough that local funding for initiatives can work its way through those governmental budget cycles. Local involvement can't be approached on an ad hoc basis. The Census Bureau needs the resources to identify the right local leaders early on and to show that there is involvement throughout the decade.

Recommendation 5: Extend and support the involvement of others who have a stake in your success.
Some of the more serious challenges in 2010 exist in the area of designing an effective, constructive means of local government involvement and participation in technical aspects of the census that extend beyond the standard outreach to the community. The Census 2000 efforts for the Local Update of the Census Address file, while well intentioned, were widely misunderstood and criticized by oversight bodies as well as some participants. A better means of securing the constructive input of local officials may be possible if such an effort begins soon. Such an effort could be centered around joint interest in an accurate, up-to-date address file. Modernizing the mapping and street address system presents tremendous opportunities for expanded, successful partnerships that the Census Bureau should use to its advantage, as well as the advantage of its partners, all of whom stand to gain from a more accurate address list.

Recommendation 6: Coordinate outside oversight.
The authors recognize that accomplishing this recommendation is not within the purview of the Census Bureau. However, it is a situation that very likely affects many federal agencies that are conducting high-visibility programs. Complex, expensive, and high-stakes programs deserve and benefit from oversight from funders, auditors, advisors, and evaluators. This type of activity is expected and predictable. However, it becomes expensive and difficult to manage in its own right when the oversight is conducted by multiple organizations that do not communicate with each other. Activities are not timed to complement each other, and demands on program managers are sometimes repetitive and resource intensive, thus detracting from the very efforts they are designed to improve.

We make a plea here for the establishment of some sort of coordinating body for legislative and executive branch oversight efforts of the 2010 census that could serve as a model for coordinating oversight efforts for other large, high-visibility government programs. Although this would be complicated to establish, due to varying jurisdictions and legal authorities, it would save time and money for both the oversight agents and the Census Bureau if these efforts could be planned and coordinated in advance.

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Appendix: Recommendations Specific to Census 2010

The architects of the 2010 decennial census plan adopted the performance results of the 2000 census as a performance benchmark against which 2010 progress and achievements would be evaluated. To meet or exceed this benchmark, the Census Bureau has proposed a new approach to census taking. The three key elements of the Census 2010 plan involve:

1. Replacement of the census long-form questionnaire with the launching of the new annual American Community Survey; this allows the Census Bureau to use a short, easily automated questionnaire for the 2010 census.
2. Re-engineering of the Census Master Address File and the Census Bureau's geographic database, including adoption of new software, correction of errors, and the use of new technology to maintain the accuracy of the census address file.
3. Early testing, evaluation, and planning for 2010, so that the massive process changes envisioned in this vastly more modern decennial census plan could be implemented with confidence in terms of program performance and cost.

Aside from the expansion of the American Community Survey as a substitute for the long form, the other major innovations that make up the Census 2010 plan rely heavily on technology improvements. This creates a great need for the Census Bureau to build on the project and contract management skills gained during the 2000 census, and to institute an early and rigorous testing program. Re-engineering the Master Address File and the geographic database involves a combination of contracted and in-house work and requires extensive coordination between all the Census Bureau's users and the developers. This multi-year project, however, is essential to maintaining and possibly improving the accuracy of the census.

Risk Management Strategies for Census 2010

The Census Bureau has also put together a plan for Census 2010 that incorporates multiple risk mitigation strategies. These are largely based on lessons learned from the successful Census 2000 approaches, as described earlier in this report.

Start Early

Launching the 2010 census planning process before Census 2000 was finished represented a critically important step forward in improving the census-taking process. Responding to the criticism heard often during the course of Census 2000 that the Census Bureau never had a good, new idea about the decennial census, the Census Bureau FY 2003 budget proposed several fundamentally new and innovative approaches. The need for early decision making and testing was the basic risk mitigation strategy, and the Census Bureau has, over the past several years, made a strong case for its 2010 decennial census strategy. To date, careful planning and prioritization has secured the support needed to obtain funding.

Test Extensively

The key elements of the Census Bureau strategy for 2010 are to improve response to the census, improve accuracy and coverage, and streamline the census-taking process. Elimination of the census long form through implementation of the American Community Survey is now possible given the fund-

ing levels approved by Congress for 2005 and proposed and sought by the administration for 2006. This clears the way for the Census Bureau to prioritize and focus on the tasks critical to maintaining and improving census accuracy for a short-form-only 2010 census, including the remaining site tests and other tests planned by the Census Bureau.[7]

Partner with the Private Sector

The Census Bureau intends to build on the successful partnerships it developed in Census 2000 for 2010. It has consolidated many of the functions in the seven major Census 2000 contracts into three major contracts for 2010, which places more of the integration responsibility with the contractors. The Census Bureau will need to be highly skilled in managing each of these contracts due to their increased complexity and the likely number of vendors that will make up the winning team. Thus, while partnerships with the private sector constitute a significant risk mitigation strategy, management of the contracts poses its own new set of risks.

Anticipate New Management Challenges

The environment in which the Census Bureau is planning Census 2010 is different in some significant ways from 2000, posing particular challenges for census management. These environmental changes include much more extensive IT contracting and security requirements, as well as the need to implement major shifts in organizational culture in the field organization to move from a paper-based to a computer-based enumeration. Although the field organization has adapted very well to technological innovation in the past, the sheer magnitude of the decennial census and the use of temporary workers will require changes on an unprecedented scale.

Measure What Matters to Key Stakeholders

If the adage "what gets measured gets done" is right, it is important to develop those measures of success early—especially in conjunction with the various stakeholders and oversight bodies. Following are what the authors believe are five key areas in developing such measures.

Measure 1: Cost growth. No matter how successful Census 2000 was from an operational point of view, the architects of the 2010 census know that any new plan would have to address explicitly the historical pattern of dramatic increases in the overall costs of conducting a census from decade to decade. Indeed, with Census 2000 not yet finished, and with the memory of its costs still fresh in the minds of all budget reviewers and oversight entities, any proposal to immediately commence work on the 2010 census was going to have to address this issue head on in order to receive serious consideration. At every level of review, one key fact stood out: The Census 2000 plan had required funding estimated at about $6.7 billion, about $4 billion over the 1990 census cost and more than double the cost of the 1980 census.

Public response rates are the key driver to the cost of the decennial census. Pending some breakthrough on how to improve public response to the census, no one at the Census Bureau is currently willing to predict further improvements in census response rates beyond the levels attained during Census 2000. Public cooperation and civic engagement could easily continue to decline over the decade.

Although the Census Bureau cannot control public attitudes, it did attempt to radically re-engineer the structure of the decennial census in ways that would help contain costs by eliminating the "long form" version of the census questionnaire and use only the short six-question version.

In its place, the Census Bureau has begun the American Community Survey, which collects the long-form data annually, through a rolling nationwide survey of 3 million households. This more extensive information is required by other federal agencies to administer programs and distribute grants. An additional benefit of this approach is that such data would be more current than just once every 10 years.

Measure 2: Census response rates. The complex and demanding process of managing a decennial census has led to the evolution of a variety of relatively unique management techniques by Census Bureau managers and staff. In Census 2000, as in other modern census efforts, the difficult and costly process of sending enumerators to collect data from those households that have not mailed back their census form is based on what Census Bureau staffs call the response rate—a rate obtained by dividing the number of mailed-back census forms by the

number mailed out. In a nation with 120 million households, a 1 percent change in the response rate can produce a 1.2 million housing unit change in Census workload. An investment in increasing the response rate can make a huge difference. For now, though, the Census 2010 planners are using the 2000 response rate as the goal for Census 2010 unless improved partnership, outreach, and advertising programs, as well as the elimination of the long form, offer improved opportunities.

Measure 3: Differential undercount. A key factor that resulted in the 1990 census being referred to as the "failed" census was the fact that even with expenditure of (at that time) a record level of funding, the 1990 census resulted in measured undercounts for minorities that exceeded the measured undercounts recorded for the 1980 census. This differential, in which some minorities are undercounted at a higher rate than the majority white population, has been a problem plaguing the census as far back as the 1940s, when the undercount was first measured.

Eliminating this differential has been a high-priority goal for each census, because it has serious repercussions for communities that are undercounted. During 1990 and 2000, the Census Bureau attempted to employ a statistical methodology that would first measure and then adjust for this differential undercount. However, this statistical adjustment was seen as controversial. Still, Census 2000 estimates of coverage are seen as the most reasonable benchmark for Census 2010. Particularly challenging will be integrating business process changes in the field organization that arise out of the new technology being introduced (handheld computers for enumerators) and ensuring that these major changes affecting the organizational culture are successfully managed.

Measure 4: Timeliness and relevance of census long-form data. The Census Bureau should continue to advance the American Community Survey to its next phase in order to provide annual updates to the long-form data collected during the census. Congress appropriated increased funding for this survey in FY 2004, to begin the necessary operational expansion during the last quarter of the year. However, there does not seem to be a sustained political commitment for this effort. For FY 2005, Congress initially did not appropriate sufficient funds to continue a national program for another year. Had Congress not restored funding for a full program in the FY 2005 appropriations bill, the census plan for 2010 itself would have been in jeopardy. To date, the FY 2006 funding message from Congress has been mixed. Now that the funds have been made available, it is up to the Census Bureau to demonstrate that this survey can be an operational success and provide the high-quality data that has been promised. However, this experience illustrates the continuing difficulties of establishing a multi-year program through the annual appropriations process.

Measure 5: Meet the legal deadlines for delivery of census results. This measure is the obvious bottom line. As noted earlier, the delivery dates for the results of the decennial census are specified by law. For the purpose of reapportioning the House of Representatives, the Census Bureau must deliver official state population counts to the president on or before December 31 in the year in which the census is taken. By April of the following year, the Census Bureau must deliver the data needed for each state to redraw congressional districts as well as the districts required for state legislatures.

Endnotes

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2. W. Henry Lambright, "The Challenge of Coordinating 'Big Science'" (IBM Center for The Business of Government) July 2003, p. 25.

3. U.S. Census Bureau Strategic Plan FY 2004–2008.

4. GAO, Census 2000: Status of Key Operations (GAO/T-GGD/AIMD-00-91) February 15, 2000, p. 11.

5. Enumerators are the census enumerators that go door-to-door conducting the census interviews. They are called enumerators because the Constitution calls for an "enumeration" of the population every 10 years.

6. The only exception to this was the mathematical statistician job series. Because this is a difficult position to fill in government, these employees were granted permanent status when they were hired.

7. The Census Bureau conducted an operational test in two sites during 2004. The outreach and partnership efforts were very successful. Recruitment for temporary staff exceeded goals. The 40 percent mail-back response rate goal for questionnaires was exceeded in Queens, which achieved a 42 percent rate. However, in Georgia, where the goal was 50 percent, the response rate was 46 percent, short by 4 percentage points. Because of the demographic mix of the population in Queens, materials promoting the test were printed in 15 languages. This was not done in the Georgia site, which encompassed three rural counties and had a less diverse population. The Census Bureau plans another small test in 2006, and a full dress rehearsal in three sites in 2008.

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