

GAO

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2010 CENSUS

Efforts to Build an Accurate
Address List Are Making
Progress, but Face Software
and Other Challenges

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GAO

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Highlights of [GAO-10-140T](#), a testimony before the Subcommittee on Information Policy, Census, and National Archives, Committee on Oversight and Government Reform, House of Representatives

Why GAO Did This Study

The decennial census is a constitutionally mandated activity that produces data used to apportion congressional seats, redraw congressional districts, and help allocate billions of dollars in federal assistance. A complete and accurate master address file (MAF), along with precise maps—the U.S. Census Bureau’s (Bureau) mapping system is called Topologically Integrated Geographic Encoding and Referencing (TIGER®)—are the building blocks of a successful census. If the Bureau’s address list and maps are inaccurate, people can be missed, counted more than once, or included in the wrong location. This testimony discusses the Bureau’s readiness for the 2010 Census and covers: (1) the Bureau’s progress in building an accurate address list; and (2) an update of the Bureau’s information technology (IT) system used to extract information from its MAF/TIGER® database. Our review included observations at 20 early opening local census offices in hard-to-count areas. The testimony is based on previously issued and ongoing work.

What GAO Recommends

GAO is not making new recommendations, but past reports recommended improvements to the Bureau’s address-building procedures, as well as to the management and testing of the MAF/TIGER® system. The Bureau generally agreed with these recommendations and has taken steps to implement some of them.

[View GAO-10-140T or key components.](#)
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What GAO Found

The Bureau has taken, and continues to take measures to build an accurate MAF and to update its maps. From an operational perspective, the Local Update of Census Addresses (LUCA) and address canvassing generally proceeded as planned, and GAO did not observe any significant flaws or operational setbacks. Group quarters validation got underway in late September as planned. A group quarters is a place where people live or stay that is normally owned or managed by an entity or organization providing housing and/or services for the residents (such as a boarding school, correctional facility, health care facility, military quarters, residence hall, or dormitory).

LUCA made use of local knowledge to enhance MAF accuracy. Between November 2007 and March 2008, over 8,000 state, local, and tribal governments participated in the program. However, LUCA submissions generated a relatively small percentage of additions to the MAF. For example, of approximately 36 million possible additions to the MAF that localities submitted, 2.4 million (7 percent) were not already in the MAF. The other submissions were duplicate addresses, non-existent, or non-residential.

Address canvassing (an operation where temporary workers go door to door to verify and update address data) finished ahead of schedule, but was over budget. Based on initial Bureau data, the preliminary figure on the actual cost of address canvassing is \$88 million higher than the original estimate of \$356 million, an overrun of 25 percent. The testing and improvements the Bureau made to the reliability of the hand held computers prior to the start of address canvassing played a key role in the pace of the operation, but other factors were important as well, including the prompt resolution of technical problems and lower than expected employee turnover. The Bureau’s address list at the start of address canvassing consisted of 141.8 million housing units. Listers added around 17 million addresses and marked about 21 million for deletion. All told, listers identified about 4.5 million duplicate addresses, 1.2 million nonresidential addresses, and about 690,000 addresses that were uninhabitable structures. The overall quality of the address file will not be known until later in the census when the Bureau completes various assessments.

While the Bureau has made some improvements to its management of MAF/TIGER® IT such as finalizing five of eight test plans, GAO continues to be concerned about the lack of finalized test plans, incomplete metrics to gauge progress, and an aggressive testing and implementation schedule going forward. Given the importance of MAF/TIGER® to an accurate census, it is critical that the Bureau ensure this system is thoroughly tested.

Mr. Chairman, Ranking Member McHenry, and Members of the Subcommittee:

I am pleased to be here today to report on the U.S. Census Bureau's (Bureau) progress in building a complete and accurate address list. As you know, a complete and accurate address list, along with precise maps, are the fundamental building blocks of a successful census. An accurate address list is critical because it both identifies all households that are to receive a census questionnaire and serves as the control mechanism for following up with households that fail to respond to the initial mailout questionnaire. Precise maps are critical for counting the population in their proper locations—the basis of congressional reapportionment and redistricting. If the Bureau's address list and maps are inaccurate, people can be missed, counted more than once, or included in the wrong location. The Bureau's database of the nation's approximately 140 million addresses is called the Master Address File (MAF); and the Bureau's mapping system is the Topologically Integrated Geographic Encoding and Referencing (TIGER®) database.¹

On its face, it would appear that building an accurate address list would be a relatively straightforward task given the obvious nature of many dwellings and the availability of postal addresses. However, people do not always reside in conventional housing units, and in fact can reside in "hidden" housing units such as converted attics and basements, as well as cars, boats, trailers, labor camps, and other less traditional locations. Although these types of dwellings have always existed, the large number of foreclosures the nation has recently experienced, as well as the natural disasters that have hit the Gulf Coast and other regions, have likely increased the number of people doubling-up, living in motels, tent cities, and other types of less conventional housing. The Bureau has found that such individuals are at greater risk of being missed in the census. Moreover, in addition to housing units (which include single family homes, apartments, and mobile homes), many other people reside in prisons, dormitories, nursing homes, and similar group living arrangements known as "group quarters."

One of the Bureau's long-standing challenges has been reducing the differential impact of errors in the census. Minorities, renters, and children, for example, are more likely to be missed by the census while

¹TIGER is a registered trademark of the U.S. Census Bureau.

more affluent groups, such as people with vacation homes, are more likely to be enumerated more than once. Because the success of the census, including reducing the differential undercount, rests, in large part, on the quality of the Bureau's address list and maps, the Bureau goes to great lengths over the course of the decade to ensure the accuracy of MAF/TIGER using multiple operations that include partnerships with the U.S. Postal Service and other federal agencies; state, local, and tribal governments; and local planning organizations. In all, the Bureau's operational plan includes 11 operations that contribute to the accuracy of the address list.

Nevertheless, because of the diversity and complexity of living arrangements in our nation, compiling an accurate address file is no easy task. During the 2000 Census, for example, Bureau evaluations estimated that of the 116 million housing units in the final census count, about 2.3 million housing units were incorrectly included in the census and about 2.7 million housing units were missed.

As requested, my testimony will describe the Bureau's progress in building an accurate address file for the 2010 Census, paying particular attention to the Bureau's preliminary results of three MAF-building operations that can help locate hidden housing units and other traditionally hard-to-count populations: the Local Update of Census Addresses (LUCA) program, the Address Canvassing operation, and Group Quarters Validation (an initial phase of a multistep effort to ensure these types of dwellings are properly located and counted). The Bureau has completed LUCA and Address Canvassing, while Group Quarters Validation just got underway a few weeks ago (each of these operations are described in greater detail later in my statement). I will also provide an update on the information technology (IT) system the Bureau will use to update and extract information from its MAF/TIGER database. In our prior work, we noted that the system faced challenges because of an aggressive testing schedule.

My remarks also include observations that could help inform the design of the next decennial census. Rigorous planning and perhaps even a fundamental reexamination of the census might be required because the current approach to the national enumeration may no longer be financially sustainable. Indeed, the cost of conducting the census has, on average, doubled each decade since 1970 in constant 2010 dollars. If that rate of cost escalation continues into 2020, the nation could be looking at a \$30 billion census.

My testimony today is based on our ongoing and completed reviews of the Bureau's efforts to build an accurate address file and maps, as well as our reviews of the Bureau's testing and implementation of selected IT systems. We completed our review of the Local Update of Census Addresses and the Address Canvassing operation in October and our findings are included in this testimony. Our review of the Group Quarters Validation operation began in September and is ongoing.

To evaluate the preliminary results of address building operations, we reviewed and analyzed scheduling, budget, design, operational and testing plans for the 2010 Address Canvassing operation and interviewed cognizant Bureau officials at headquarters and early opening local census offices.² In addition, our reviews of the Bureau's efforts to build an accurate address file included on-site observations at a number of locations across the country. For example, for address canvassing, we conducted 38 observations of address listers and crew leaders as they went door to door and interviewed local census office managers in 20 urban, suburban, and rural census offices. We selected these early opening local census offices because they were located in hard to count areas as determined by data from the 2000 Census. To make these selections, we also used other factors such as their percentage of rural population to obtain diversity in urban/rural populations and proximity to hurricane-affected areas. The locations chosen for observations were not a random selection, and thus results may not be generalizable nationwide. We collected data on the Bureau's preliminary results of its MAF building activities during interviews and follow-up meetings with the Bureau. Based on our limited examination of this information thus far, we consider these data sufficiently reliable for providing current information on MAF building activities for this testimony. Finally, in order to provide an update on the IT system, we relied on previously published GAO work.

We conducted our work in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audits to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

²The Bureau managed the Address Canvassing and Group Quarters Validation operations out of 151 early opening local census offices.

In summary, the Bureau has, and continues to take extraordinary measures to build an accurate address list and update its maps. Further, from an operational perspective, LUCA and address canvassing generally proceeded as planned (and in fact, address canvassing finished ahead of schedule), and we did not observe any significant flaws or major operational setbacks. Group Quarters Validation got underway in late September as planned. Importantly, however, the overall quality of the address file will not be known until later on in the census when the Bureau completes various assessments. Identifying valid housing units, especially hidden housing units and other nontraditional housing stock, is an inherently complex task. While the Bureau has made some improvements to its management of MAF/TIGER IT, we continue to be concerned about the lack of finalized test plans, incomplete metrics to gauge progress, and an aggressive testing and implementation schedule going forward.

Background

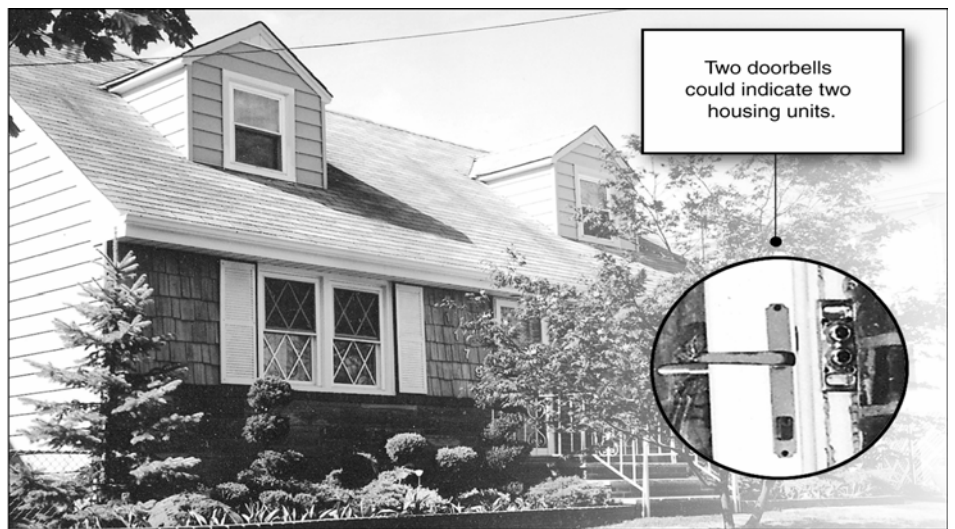
As you know, Mr. Chairman, the decennial census is a constitutionally mandated enterprise critical to our nation. Census data are used to apportion seats and redraw congressional districts, and to help allocate over \$400 billion in federal aid to state and local governments each year.

We added the 2010 Census to our list of high-risk areas in March 2008, because improvements were needed in the Bureau's management of IT systems, the reliability of handheld computers (HHC) that were designed in part to collect data for address canvassing, and the quality of the Bureau's cost estimates. Compounding the risk was that the Bureau canceled a full dress rehearsal of the census that was scheduled in 2008, in part, because of performance problems with the HHCs during the address canvassing portion of the dress rehearsal, which included freeze-ups and unreliable data transmissions. In response to our findings and recommendations, the Bureau has strengthened its risk management efforts, including the development of a high-risk improvement plan that described the Bureau's strategy for managing risk and key actions to address our concerns. Overall, since March 2008, the Bureau has made commendable progress in getting the census back on track, but still faces a number of challenges moving forward.

One of the Bureau's long-standing challenges has been building an accurate address file, especially locating unconventional and hidden housing units, such as converted basements and attics. For example, as shown in figure 1, what appears to be a single-family house could contain an apartment, as suggested by its two doorbells. The Bureau has trained address listers to look for extra mailboxes, utility meters, and other signs

of hidden housing units, and has developed training guides for 2010 to help enumerators locate hidden housing. Nonetheless, decisions on what is a habitable dwelling are often difficult to make—what is habitable to one worker may seem uninhabitable to another.

Figure 1: Single or Multiunit Housing?



Source: GAO.

If the address lister thought the house in figure 1 was a single family home, but a second family was living in the basement, the second family is at greater risk of being missed by the census. Conversely, if the lister thought a second family could be residing in the home, when in fact it was a single family house, two questionnaires would be mailed to the home and costly nonresponse follow-up visits could ensue in an effort to obtain a response from a phantom housing unit.

LUCA Submissions Generated a Small Percentage of Additions to the MAF

Under the LUCA program, the Bureau partners with state, local, and tribal governments, tapping into their knowledge of local populations and housing conditions in order to secure a more complete count.³ Between November 2007 and March 2008, over 8,000 state, local, and tribal governments provided approximately 42 million addresses for potential addition, deletion, or other actions. Of those submissions, approximately 36 million were processed as potential address additions to the MAF—or what the Bureau considers “adds.”⁴

According to Bureau officials, one reason LUCA is important is because local government officials may be better positioned than the Bureau to identify unconventional and hidden housing units due to their knowledge of particular neighborhoods, or because of their access to administrative records in their jurisdictions. For example, local governments may have alternate sources of address information (such as utility bills, tax records, information from housing or zoning officials, or 911 emergency systems). In addition, according to Bureau officials, providing local governments with opportunities to actively participate in the development of the MAF can enhance local governments’ understanding of the census and encourage them to support subsequent operations.

The preliminary results of address canvassing show that the Bureau added relatively few of the address updates submitted for inclusion in the MAF through LUCA. Of approximately 36 million addresses submitted, about 27.7 million were already in the MAF. Around 8.3 million updates were not in the MAF and needed to be field-verified during address canvassing. Of these, about 5.5 million were not added to the MAF because they did not exist, were a duplicate address, or were nonresidential. Address canvassing confirmed the existence of around 2.4 million addresses submitted by LUCA participants that were not already in the MAF (or about 7 percent of the 36 million proposed additions).⁵

³Census Address List Improvement Act of 1994, Pub. L. No. 103-430.

⁴For 2010 LUCA, there were three options for participation, one of which enabled localities to submit the entire address list for their entity without comparing it to the Bureau’s list of addresses. The Bureau processed these submissions as “adds” in order to match and unduplicate the records against those in the MAF. Therefore, the 36 million adds includes every address for those entities that submitted their entire address list to the Bureau for matching.

⁵The remaining 438,722 addresses could not be resolved and were included in the census.

Bureau officials have indicated that they began shipping out detailed feedback to eligible LUCA participants on October 8, 2009, that includes information on which addresses were accepted. On November 1, 2009, the Office of Management and Budget is scheduled to open the LUCA appeals office that will enable LUCA participants who disagree with the Bureau's feedback to challenge the Bureau's decisions. This appeals process allows governments to provide evidence of the existence of addresses that the Bureau missed. If the government's appeal is sustained, then Bureau will include those addresses in later enumeration activities, and enumerate them if they are located in the field.

The LUCA program is labor intensive for both localities and the Bureau because it involves data reviews, on-site verification, quality control procedures, and other activities, but produced marginal returns. While these were unique additions to the MAF that may not have been identified in any other MAF-building operation, they were costly additions nonetheless. As a result, as the Bureau prepares for the 2020 Census, it will be important for it to explore options that help improve the efficiency of LUCA, especially by reducing the number of duplicate and nonexistent addresses submitted by localities.

The Bureau Generally Completed Address Canvassing Ahead of Schedule but Went Over Budget

The Bureau conducted address canvassing from March to July 2009. During that time, about 135,000 address listers went door to door across the country, comparing the housing units they saw on the ground to what was listed in the database of their HHCs. Depending on what they observed, listers could add, delete, or update the location of housing units.

Although the projected length of the field operation ranged from 9 to 14 weeks, most early opening local census offices completed the effort in less than 10 weeks. Moreover, the few areas that did not finish early were delayed by unusual circumstances such as access issues created by flooding. The testing and improvements the Bureau made to the reliability of the HHCs prior to the start of address canvassing, including a final field test that was added to the Bureau's preparations in December 2008, played a key role in the pace of the operation; but other factors, once address canvassing was launched, were important as well, including the (1) prompt resolution of problems with the HHCs as they occurred and (2) lower than expected employee turnover.

With respect to the prompt resolution of problems, the December 2008 field test indicated that the more significant problems affecting the HHCs had been resolved. However, various glitches continued to affect the HHCs

in the first month of address canvassing. For example, we were informed by listers or crew leaders in 14 early opening local census offices that they had encountered problems with transmissions, freeze-ups, and other problems. Moreover, in 10 early opening local census offices we visited, listers said they had problems using the Global Positioning System function on their HHCs to precisely locate housing units. When such problems occurred, listers called their crew leaders and/or the Bureau's help desk to resolve the problems. When the issues were more systemic in nature, such as a software issue, the Bureau was able to quickly fix them using software patches.

Moreover, to obtain an early warning of trouble, the Bureau monitored key indicators of the performance of the HHCs, such as the number of successful and failed HHC transmissions. This approach proved useful as Bureau quality control field staff were alerted to the existence of a software problem when they noticed that the devices were taking a long time to close out completed assignment areas.

The Bureau also took steps to address procedural issues. For example, in the course of our field observations, we noticed that in several locations listers were not always adhering to training for identifying hidden housing units. Specifically, listers were instructed to knock on every door and ask, "Are there any additional places in this building where people live or could live?" However, we found that listers did not always ask this question. On April 28, 2009, we discussed this issue with senior Bureau officials. The Bureau, in turn, transmitted a message to its field staff emphasizing the importance of following training and querying residents if possible.

Lower than expected attrition rates and listers' availability to work more hours than expected also contributed to the Bureau's ability to complete the Address Canvassing operation ahead of schedule. For example, the Bureau had planned for 25 percent of new hires to quit before, during, or soon after training; however, the national average was 16 percent. Bureau officials said that not having to replace listers with inexperienced staff accelerated the pace of the operation. Additionally, the Bureau assumed that employees would be available 18.5 hours a week. Instead, they averaged 22.3 hours a week.

The Bureau's address list at the start of address canvassing consisted of 141.8 million housing units. Listers added around 17 million addresses and marked about 21 million for deletion because, for example, the address did not exist. All told, listers identified about 4.5 million duplicate addresses, 1.2 million nonresidential addresses, and about 690,000 addresses that

were uninhabitable structures. Importantly, these preliminary results represent actions taken during the production phase of address canvassing and do not reflect actual changes made to the Bureau’s master address list as the actions are first subject to a quality control check and then processed by the Bureau’s Geography Division.

The preliminary analysis of addresses flagged for add and delete shows that the results of the operation (prior to quality control) were generally consistent with the results of address canvassing for the 2008 dress rehearsal. Table 1 compares the add and delete actions for the two operations.

Table 1: Percentage of Add and Delete Lister Actions (Prior to Quality Control or Bureau Processing) for 2010 Address Canvassing and 2008 Dress Rehearsal Address Canvassing

| | 2010 Address Canvassing | 2008 Dress Rehearsal Address Canvassing |
|---------|-------------------------|---|
| Adds | 10.8% | 8.5% |
| Deletes | 13.2% | 12.8% |

Source: GAO analysis of U.S. Census Bureau data.

Address Canvassing Costs Exceeded Budget Because of Unanticipated Workload and Hiring

According to the Bureau’s preliminary analysis, the estimated cost for address canvassing field operations was \$444 million, or \$88 million (25 percent) more than its initial budget of \$356 million.⁶ As shown in table 2, according to the Bureau, the cost overruns were because of several factors.

⁶Address canvassing costs for field operations include training, work hours, and mileage for temporary field staff. These costs do not include recruiting, large block canvassing, office infrastructure, management or technical support staff, IT contracts, and partnership program or communication campaign activities.

Table 2: Bureau’s Preliminary Analysis of Address Canvassing Costs Exceeding Budget

| Reasons for exceeding budget | Estimated costs (in millions) |
|---|--|
| Increased initial workload | \$41 |
| Underestimated quality control workload | 34 |
| Training additional staff | 7 |
| Fingerprinting (funded separately) | 6 |
| Total | \$88 |

Source: U.S. Census Bureau.

One such factor was that the address canvassing cost estimate was not comprehensive, which resulted in a cost increase of \$41 million. The Bureau underestimated the initial address canvassing workload and the fiscal year 2009 budget by 11 million addresses. Further, the additional 11 million addresses increased the Bureau’s quality control workload, where the Bureau verifies certain actions taken to correct the address list. Specifically, the Bureau did not fully anticipate the impact these additional addresses would have on the quality control workload, and therefore did not revise its cost estimate accordingly. Moreover, under the Bureau’s procedures, addresses that failed quality control would need to be recanvassed, but the Bureau’s cost model did not account for the extra cost of recanvassing addresses. As a result, the Bureau underestimated its quality control workload by 26 million addresses which resulted in \$34 million in additional costs, according to the Bureau.

Bringing aboard more staff than was needed also contributed to the cost overruns. For example, according to the Bureau’s preliminary analysis, training additional staff accounted for about \$7 million in additional costs.⁷ Bureau officials attributed the additional training cost to inviting additional candidates to initial training due to past experience and anticipated no show and drop out rates, even though (1) the Bureau’s staffing plans already accounted for the possibility of high turnover and (2) the additional employees were not included in the cost estimate or budget.

⁷Officials clarified that training costs should exclude training hours spent for fingerprinting and conducting 4 hours of actual production work as part of training.

The largest census field operation will be next summer's nonresponse follow-up, when the Bureau is to go door to door in an effort to collect data from households that did not mail back their census questionnaire. Based on the expected mail response rate, the Bureau estimates that over 570,000 enumerators will need to be hired for that operation. To better manage the risk of staffing difficulties while simultaneously controlling costs, several potential lessons learned for 2010 can be drawn from the Bureau's experience during address canvassing. For example, we found that the staffing authorization and guidance provided to some local census managers were unclear and did not specify that there was already a cushion in the hiring plans for local census offices to account for potential turnover. Also, basing the number of people invited to initial training on factors likely to affect worker hiring and retention, such as the local unemployment rate, could help the Bureau better manage costs.

According to Bureau officials, they are reviewing the results from address canvassing to determine whether they need to revisit the staffing strategy for nonresponse follow-up and have already made some changes. For example, in recruiting candidates, when a local census office reaches 90 percent of its qualified applicant goal, it is to stop blanket recruiting and instead focus its efforts on areas that need more help, such as tribal lands. However, in hiring candidates, the officials pointed out that they are cautious not to underestimate resource needs for nonresponse follow-up based on address canvassing results because they face different operational challenges in that operation than for address canvassing. For example, for nonresponse follow-up, the Bureau needs to hire enumerators who can work in the evenings when people are more likely to be at home and who can effectively deal with reluctant respondents, whereas with address canvassing, there was less interaction with households and the operation could be completed during the day.

Problems with accurately estimating the cost of address canvassing are indicative of long-standing weaknesses in the Bureau's ability to develop credible and accurate cost estimates for the 2010 Census. Accurate cost estimates are essential to a successful census because they help ensure that the Bureau has adequate funds and that Congress, the administration, and the Bureau itself can have reliable information on which to base decisions. However, in our past work, we noted that the Bureau's estimate lacked detailed documentation on data sources and significant assumptions, and was not comprehensive because it did not include all

costs.⁸ Following best practices from our *Cost Estimating and Assessment Guide*, such as defining necessary resources and tasks, could have helped the Bureau recognize the need to update address canvassing workload and other operational assumptions, resulting in a more reliable cost estimate.⁹

The Bureau Needs to Improve Its Policies for Fingerprinting Temporary Employees

To better screen its workforce of hundreds of thousands of temporary census workers, the Bureau plans to fingerprint its temporary workforce for the first time in the 2010 Census.¹⁰ In past censuses, temporary workers were subject to a name background check that was completed at the time of recruitment. The Federal Bureau of Investigation (FBI) will provide the results of a name background check when temporary workers are first recruited. At the end of the workers' first day of training, Bureau employees who have received around 2 hours of fingerprinting instruction are to capture two sets of fingerprints on ink fingerprint cards from each temporary worker. The cards are then sent to the Bureau's National Processing Center in Jeffersonville, Indiana, to be scanned and electronically submitted to the FBI. If the results show a criminal record that makes an employee unsuitable for employment, the Bureau is to either terminate the person immediately or place the individual in nonworking status until the matter is resolved. If the first set of prints are unclassifiable, the National Processing Center is to send the FBI the second set of prints.

Fingerprinting during address canvassing was problematic. Of the over 162,000 employees hired for the operation, 22 percent—or approximately 35,700 workers—had unclassifiable prints that the FBI could not process. The FBI determined that the unclassifiable prints were generally the result of errors that occurred when the prints were first made. Factors affecting the quality of the prints included difficulty in first learning how to

⁸GAO, *2010 Census: Census Bureau Should Take Action to Improve the Credibility and Accuracy of Its Cost Estimate for the Decennial Census*, [GAO-08-554](#) (Washington, D.C.: June 16, 2008).

⁹GAO, *GAO Cost Estimating And Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, [GAO-09-3SP](#) (Washington, D.C.: March 2009).

¹⁰The National Crime Prevention and Privacy Compact, enacted in 1998, generally requires that fingerprints be submitted with all requests for criminal history record checks for noncriminal justice purposes, 42 U.S.C. § 14616. For the 2000 Census, the FBI did not have the capacity to timely process the fingerprints of Census's temporary workforce, so they were subject to only a name background check.

effectively capture the prints and the adequacy of the Bureau's training. Further, the workspace and environment for taking fingerprints was unpredictable, and factors such as the height of the workspace on which the prints were taken could affect the legibility of the prints.

Consistent with FBI guidance, the Bureau relied on the results of the name background check for the nearly 36,000 employees with unclassifiable prints.¹¹ Of the prints that could be processed, fingerprint results identified approximately 1,800 temporary workers (1.1 percent of total hires) with criminal records that name check alone failed to identify. Of the 1,800 workers with criminal records, approximately 750 (42 percent) were terminated or were further reviewed because the Bureau determined their criminal records—which included crimes such as rape, manslaughter, and child abuse—disqualified them from census employment.

Projecting these percentages to the 35,700 temporary employees with unclassifiable prints, it is possible that more than 200 temporary census employees might have had criminal records that would have made them ineligible for census employment. Importantly, this is a projection, and the number of individuals with criminal backgrounds that were hired for address canvassing, if any, is not known.

Applying these same percentages to the approximately 600,000 people the Bureau plans to fingerprint for nonresponse follow-up, unless the problems with fingerprinting are addressed, approximately 785 employees with unclassifiable prints could have disqualifying criminal records but still end up working for the Bureau.¹²

Aside from public safety concerns, there are cost issues as well. The FBI charged the Bureau \$17.25 per person for each background check, whether or not the fingerprints were classifiable.

The Bureau has taken steps to improve image quality for fingerprints captured in future operations by refining instruction manuals and providing remediation training on proper procedures. In addition, the

¹¹The Bureau will re-fingerprint employees with unclassifiable prints if they are rehired for another operation.

¹²The approximately 600,000 workers to be fingerprinted for nonresponse follow-up include over 570,000 enumerators and other field staff, such as crew leaders and field operation supervisors.

Bureau is considering activating a feature on the National Processing Center's scanners that can check the legibility of the image and thus prevent poor quality prints from reaching the FBI. These are steps in the right direction. As a further contingency, it might also be important for the Bureau to develop a policy for re-fingerprinting employees to the extent that both cards cannot be read.

The Bureau Used Enhanced Training and Guidance for Canvassing Hurricane Affected Areas

The scale of the destruction in those areas affected by Hurricanes Katrina, Rita, and Ike made address canvassing in parts of Mississippi, Louisiana, and Texas especially challenging (see fig. 2). Hurricane Katrina alone destroyed or made uninhabitable an estimated 300,000 homes. Recognizing the difficulties associated with address canvassing in these areas because of shifting and hidden populations and changes to the housing stock, the Bureau, partly in response to recommendations made in our June 2007 report,¹³ developed supplemental training materials for natural disaster areas to help listers identify addresses where people are, or may be, living when census questionnaires are distributed. For example, the materials noted the various situations listers might encounter, such as people living in trailers, homes marked for demolition, converted buses and recreational vehicles, and nonresidential space such as storage areas above restaurants. The training material also described the clues that could alert listers to the presence of nontraditional places where people are living and provided a script they should follow when interviewing residents on the possible presence of hidden housing units.

¹³GAO, *2010 Census: Census Bureau Has Improved the Local Update of Census Addresses Program, but Challenges Remain*, [GAO-07-736](#) (Washington, D.C.: June 14, 2007).



Source: GAO.

Figure 2: Locating and Counting People Displaced by Storms Presents a Challenge

Additional steps taken by the city of New Orleans also helped the Bureau overcome the challenge of canvassing neighborhoods devastated by Hurricane Katrina. As depicted in figure 3 below, city officials replaced the street signs even in abandoned neighborhoods. This assisted listers in locating the blocks they were assigned to canvass and expedited the canvassing process in these deserted blocks.

Figure 3: Replacement Street Signs Facilitated Address Canvassing in New Orleans



Source: GAO.

To further ensure a quality count in the hurricane-affected areas, the Bureau plans to hand-deliver an estimated 1.2 million questionnaires (and simultaneously update the address list) to housing units in much of southeast Louisiana and south Mississippi that appear inhabitable, even if they do not appear on the address list updated by listers during address canvassing. Finally, the Bureau stated that it must count people where they are living on Census Day and emphasized that if a housing unit gets rebuilt and people move back before Census Day, then that is where those people will be counted. However, if they are living someplace else, then they will be counted where they are living on Census Day.

Validating the Group Quarters Address List Is Important for Reducing Potential Duplicates and Other Errors

To help ensure group quarters are accurately included in the census, the Bureau is conducting an operation called Group Quarters Validation, an effort that is to run during September and October 2009, and has a workload of around 2 million addresses in both the United States and Puerto Rico.¹⁴ During this operation, census workers are to visit each group quarter and interview its manager or administrator using a short questionnaire. The goal is to determine the status of the address as a group quarter, housing unit, transitory location, nonresidential, vacant, or delete. If the dwelling is in fact a group quarter, it must then be determined what category it fits under (e.g., boarding school, correctional facility, health care facility, military quarters, residence hall or dormitory, etc.), and confirm its correct geographic location. The actual enumeration of group quarters is scheduled to begin April 1, 2010.

According to the 2005-2007 American Community Survey 3-year estimates, more than 8.1 million people, or approximately 2.7 percent of the population, live in group quarter facilities. Group quarters with the largest populations include college and university housing (2.3 million), adult correctional facilities (2.1 million), and nursing facilities (1.8 million). The Bureau drew from a number of sources to build its list of group quarters addresses including data from the 2000 Census, LUCA submissions, internet based research, and group quarters located during address canvassing.

During the 2000 Census, the Bureau did not always accurately enumerate group quarters. For example, in our prior work, we found that the population count of Morehead, Kentucky, increased by more than 1,600 when it was later found that a large number of students from Morehead State University's dormitories were erroneously excluded from the city's population when the Bureau incorrectly identified the dormitories as being outside city limits and in an unincorporated area of Rowan County. Similarly, North Carolina's population count was reduced by 2,828 people, largely because the Bureau had to delete duplicate data on almost 2,700 students in 26 dormitories at the University of North Carolina at Chapel Hill. Precision is critical because, in some cases, small differences in population totals could potentially impact apportionment and/or redistricting decisions.

¹⁴According to the Bureau, group quarters are "places where people live or stay in a group living arrangement that are owned or managed by an entity or organization providing housing and/or services for the residents."

The Bureau developed and tested new group quarters procedures in 2004 and 2006 that were designed to address the difficulties the Bureau had in trying to identify and count this population during the 2000 Census. For example, the Bureau integrated its housing unit and group quarters address lists in an effort to reduce the potential for duplicate counting as group quarters would sometimes appear on both address lists. Moreover, the Bureau has refined its definition of the various types of group quarters to make it easier to accurately categorize them. The operation began on September 28, as planned, in all 151 early opening local census offices and was 95 percent complete as of October 16, 2009. We have begun observations and will report our findings at a later date.

It Will Be Important for the Bureau to Determine Return on Investment for Each MAF-Building Activity

With the cost of enumerating each housing unit continuing to grow, it will be important for the Bureau to determine which of its multiple MAF-building operations provide the best return on investment in terms of contributing to accuracy and coverage. According to the Bureau, it is planning to launch over 70 evaluations and assessments of critical 2010 Census operations and processes, many of which are focused on improving the quality of the MAF. For example, the Bureau plans to study options for targeted address canvassing as an alternative to canvassing every block in the country. The Bureau considered two major criteria for determining which studies to include in their evaluation program—the possibility for significant cost savings in 2020 and/or the possibility of significant quality gains in 2020. As the Bureau makes plans for the 2020 Census, these and other studies could prove useful in helping the Bureau streamline and consolidate operations, with an eye toward controlling costs and improving accuracy.

Completing Testing for MAF/TIGER System Will Be a Challenge

Automation and IT systems will play a critical role in the ability of MAF/TIGER to extract address lists, maps, and provide other geographic support services. In our prior work, however, we have called on the Bureau to strengthen its testing of the MAF/TIGER system. In March 2009, for example, we reported and testified that while the MAF/TIGER program had partially completed testing activities, test plans and schedules were incomplete and the program's ability to track progress was unclear.¹⁵

¹⁵GAO, *Information Technology: Census Bureau Testing of 2010 Decennial Systems Can Be Strengthened*, [GAO-09-262](#) (Washington, D.C.: Mar. 5, 2009) and GAO, *Information Technology: Census Bureau Needs to Strengthen Testing of 2010 Decennial Systems*, [GAO-09-413T](#) (Washington, D.C.: Mar. 5, 2009).

Specifically, while the Bureau had partially completed testing for certain MAF/TIGER products (e.g., database extracts)¹⁶ related to address canvassing, subsequent test plans and schedules did not cover all of the remaining products needed to support the 2010 Census. Further, Bureau officials stated that although they were estimating the number of products needed, the exact number would not be known until the requirements for all of the 2010 Census operations were determined. As such, without knowing the total number of products and when the products would be needed, the Bureau risked not being able to effectively measure the progress of MAF/TIGER testing activities. This in turn increased the risk that there may not be sufficient time and resources to adequately test the system and that the system may not perform as intended. At that time we recommended that the MAF/TIGER program establish the number of products required and establish testing plans and schedules for 2010 operations.

In response to our recommendations, the Bureau has taken several steps to improve its MAF/TIGER testing activities, but substantial work remains to be completed. For example, the MAF/TIGER program has established the number of products and when the products are needed for key operations. Furthermore, the program finalized five of eight test plans for 2010 operations, of which the testing activities for one test plan (address canvassing) have been completed; three are under way; and one has not yet started. Lastly, the program's test metrics for MAF/TIGER have recently been revised; however, only two of five finalized test plans include detailed metrics. While these activities demonstrate progress made in testing the MAF/TIGER system, the lack of finalized test plans and metrics still presents a risk that there may not be sufficient time and resources to adequately test the system and that the system may not perform as intended.

Given the importance of MAF/TIGER to establishing where to count U.S. residents, it is critical that the Bureau ensure this system is thoroughly tested. Bureau officials have repeatedly stated that the limited amount of time remaining will make completing all testing activities challenging.

¹⁶For MAF/TIGER, testing activities are defined by products needed for key activities, such as address canvassing and nonresponse follow-up.

Concluding Observations

The Bureau recognizes the critical importance of an accurate address list and maps, and continues to put forth tremendous effort to help ensure MAF/TIGER is complete and accurate. That said, the nation's housing inventory is large, complex, and diverse, with people residing in a range of different circumstances, both conventional and unconventional. The operations we included in this review generally have proceeded as planned, or are proceeding as planned. Nevertheless, accurately locating each and every dwelling in the nation is an inherently challenging endeavor, and the overall quality of the Bureau's address list will not be known until the Bureau completes various assessments later in the census. Moreover, while the Bureau has improved its management of MAF/TIGER IT systems, we continue to be concerned about the lack of finalized test plans, incomplete metrics to gauge progress, and an aggressive testing and implementation schedule going forward. Given the importance of MAF/TIGER to an accurate census, it is critical that the Bureau ensure this system is thoroughly tested.

On October 15, 2009, we provided the Bureau with a statement of facts for our ongoing audit work pertaining to this testimony, and on October 16, 2009, the Bureau forwarded written comments. The Bureau made some suggestions where additional context or clarification was needed and, where appropriate, we made those changes.

Mr. Chairman and members of this Subcommittee, this concludes my statement. I would be happy to respond to any questions that you might have at this time.

If you have any questions on matters discussed in this statement, please contact Robert N. Goldenkoff at (202) 512-2757 or by e-mail at goldenkoffr@gao.gov. Other key contributors to this testimony include Assistant Director Signora May, Peter Beck, Steven Berke, Virginia Chanley, Benjamin Crawford, Jeffrey DeMarco, Dewi Djunaidy, Vijay D'Souza, Elizabeth Fan, Amy Higgins, Richard Hung, Kirsten Lauber, Andrea Levine, Naomi Mosser, Catharine Myrick, Lisa Pearson, David Reed, Jessica Thomsen, Jonathan Ticehurst, Kate Wulff, and Timothy Wexler.

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