



OIG Flash Report

US Department of Commerce
Office of Inspector General



August 2009

Operation: U.S. Census Bureau, Large Block Operation

Risk Areas: Cost

Schedule

Performance/Quality

Census 2010: Problems Encountered in the Large Block Operation Underscore the Need for Better Contingency Plans (OIG-19171-02)

The Office of Inspector General has been identifying risk areas related to the 2010 Census that require continuing oversight. One area is the Census Bureau's address canvassing operation. This report discusses the findings from our review of the large block portion of this operation and follows up on our finding in a previous report that the large block solution had not been sufficiently tested for the decennial environment.¹

During the dress rehearsal address canvassing operation in 2007, Census found the handheld computers (HHCs) did not meet its operational needs when used to list blocks containing over 720 addresses. Although Census worked with its Field Data Collection Automation (FDCA) contractor to improve the HHC's performance, it considered the risk associated with blocks containing 1,000 addresses or more too high based on performance testing results. This problem required Census to rapidly develop an alternative method for address canvassing of large blocks. Our review found several issues related to Census's approach. Specifically, (1) inconsistencies with primary address canvassing procedures increased the likelihood of errors, (2) the delayed quality control operation prevented early identification of poorly performing listers, and (3) use of invisible block boundaries on Automated Listing Mapping Instrument (ALMI) maps and ALMI's lack of GPS affected the accuracy of map and address updates.

Large blocks are defined in two categories: (1) predetermined large blocks—those the bureau identified prior to address canvassing field operations that had more than 1,000 addresses; and (2) blocks that Census listers found to have more than 2,000 addresses during address canvassing². This report addresses issues we observed in the canvassing of predetermined large blocks. The objective of this review was to determine whether large block address canvassing procedures, technology, and operations were effective.

Although large blocks represent only about two percent of all addresses, the large block canvassing operation, carried out between January and June 2009, provided OIG an early opportunity to review a decennial field operation. Our review uncovered flaws that could affect the accuracy of the address file, and underscores the need for Census to accelerate and improve

¹ U.S. Department of Commerce Office of Inspector General, February 2009, *2010: Delays in Address Canvassing Software Development and Testing, Help Desk Planning, and Field Office Deployment Have Increased Operational Risk Final Report OIG-19171*, Washington, D.C.: Department of Commerce OIG.

² The Census Bureau and its contractor performed additional testing of the handheld solution that allowed Census to mitigate the risk of a significant number of additional large blocks being identified once the field operations had begun.

its contingency planning process for other decennial operations. In addition, all aspects of address canvassing are consequential, as an accurate address list is fundamental to an accurate count. As the Census Bureau has stated, “an accurate, comprehensive, and timely [address] list” is “one of the best predictors of a successful census.”

We conducted our fieldwork at local census offices in Richmond, Denver, Los Angeles, Seattle, Palm Beach, Atlanta, Miami, and Seat Pleasant, Maryland. Our observations were limited in number and not conducted on a statistically drawn sample. Therefore, they cannot be considered representative of the entire operation. However, our observations revealed aspects of the maps and canvassing procedures that were likely to cause common problems.

Need for a Quickly Developed Contingency Plan Increased the Opportunity for Errors

Census had no contingency plan for the inadequate performance of the HHCs noted in dress rehearsal. Therefore, it quickly considered three options for listing large blocks and finalized a plan only 4 months prior to the start of the large block field operation. Two of the options included the use of pencil and paper and were deemed not feasible. The option chosen was to use ALMI. Since 2003, Census has regularly employed ALMI in its field operations to update addresses for several non-decennial demographic household surveys. ALMI runs on laptop computers and is capable of updating several thousand addresses per block. The Census Bureau conducted three tests of the ALMI software program in 2008 in preparation for the large block operation. The first test was conducted at Census headquarters in Suitland, Maryland, in June to test the software’s performance when listing large blocks. A second test was conducted during July and August in New York City and in Prince William County, Virginia, to verify the software’s performance. Finally, the bureau conducted a larger operational field test of ALMI in November and December in North Carolina that served as a dry-run for the operation itself. However, none of these tests simulated the entirety of events that occur during a decennial operation, even one as specialized as large blocks.

Census preliminarily estimated a workload of about 1.2 million addresses to be accomplished by 400 experienced listers and 700 new hires. Census preferred to use as many experienced listers as available because ALMI is complicated, especially as compared to the HHCs, and updating address and map information in large blocks can be a complex task. The magnitude of the large block effort was not fully understood by the bureau until late October 2008, less than 3 months before the start of the operation in January 2009. After the bureau completed the Local Update of Census Addresses³ operation, and other address and geographic assignment programs, it determined that the true workload was more than 3.7 million addresses. Given the substantial growth in its workload estimates, the bureau actually employed 600 experienced listers and hired and trained 2,000 listers with no prior ALMI work experience, increasing the risk that a less accurate address list would be developed.

³ The Local Update of Census Addresses (LUCA) is an operation in which tribal, state, and local governments review and provide updates to the bureau’s master address file.

Inconsistencies with Primary Address Canvassing Procedures Increased the Likelihood of Errors

We observed inconsistencies between procedures prescribed for large blocks and those for the primary address canvassing operation. The primary address canvassing procedures included the use of handheld computers and required listers to knock on doors and attempt to make contact at every structure that contained a living quarters. However, for the large block operation, listers needed only to conduct interviews at housing units with missing house numbers or with the managers of large multi-unit apartments and mobile home parks. The primary purpose of address canvassing is to update the address list which includes the addition of living quarters that may have gone unnoticed by prior Census operations, the postal service, or local governments. We observed instances where the combination of not walking the route and not talking to residents increased the possibility of missing housing units or other living quarters. For example, some listers who mostly drove their assignments bypassed possible living quarters because they did not stop to inquire at the nearest housing unit, or placed map spots on the wrong side of the street. In some cases the listers missed housing units in their block because they were going too fast to identify the unit or understand the map.

During some of our observations we found that technical limitations of the ALMI laptops caused the potential for further inconsistencies with primary address canvassing procedures. For example, the laptops' short battery life caused listers who conducted their assignments on foot to carry extra batteries and change them during the listing operation. Each battery lasted 40 minutes or less. In addition, listers had to stop working on an assignment so they could recharge their batteries at a facility with public access to electrical outlets, such as a coffee house. These interruptions took the listers away from an orderly, clockwise canvassing around the block, a basic procedure of address listing used to ensure that housing units would not be missed.

Some listers drove their cars around their assignment areas and plugged the laptops into a car outlet. While this avoided the problem of short battery life, driving rather than walking was not consistent with the procedures prescribed for the primary address canvassing operation and precluded a thorough canvassing. The weight of the laptop in addition to short battery life may have discouraged listers from walking in less densely populated areas.

Delayed Quality Control Operation Prevented Early Identification of Poorly Performing Listers

The large block operation included a quality control process intended to identify listing errors and was scheduled to follow closely after production listing operations. The purpose of this timing was to quickly check a sample of completed assignments in order to improve accuracy by identifying poorly performing listers and providing them with additional training or other remedies as needed.

The bureau decided to also use ALMI for quality control. While successfully used in non-decennial surveys by listers with single assignment areas, ALMI was never designed to accommodate listers with multiple assignment areas as practiced in the decennial. The bureau's repurposing of ALMI did not account for these situations prior to fielding the instrument and exposed a software problem that delayed the start of quality control for several weeks. In late

February, at the point where 75 percent of production listing had been completed for assignment areas, only 4 percent of those areas had been quality checked. With the quality control process lagging well behind production listing for the bulk of the operation, listers could continue to make errors before their work was checked, thus increasing the potential for address listing errors.

Depiction of Boundaries on ALMI Maps Affected the Accuracy of Map and Address Updates

Since 2002, Census has invested \$200 million to complete a GPS-alignment of the road network contained on its maps. This activity, combined with use of HHCs equipped with GPS, was intended to facilitate the development of a more accurate address list and the location of living quarters in subsequent operations. However, the ALMI laptops did not have GPS capability and the maps included on the laptops were based on tabulation geography that included invisible lines (i.e., boundaries not based on physical features such as local government or other legal boundaries). The lack of GPS capability and the use of tabulation geography in large block canvassing caused the following problems:

- Listers had to use approximations and judgment to determine the location of invisible map boundaries on the ground and which housing units to include in their assignment area.
- When adding missing roads without GPS, listers attempted to conform to map features, but found it difficult to maintain their true shape or location; and
- Housing unit map spots were sometimes placed approximately—often for the purpose of enhanced legibility rather than accurate placement.

Extending the Use of the HHCs to Subsequent Operations Could Improve the Quality of the Decennial Census

Incorrect placement of housing unit map spots jeopardizes Census's ability to ensure that living quarters are recorded within the correct census block. This, in turn, affects the efficiency and accuracy of enumerating the population and its tabulation in geographic areas. This accuracy is particularly important for redrawing congressional and state legislative districts.

The large block issues discussed in this report reinforce the value of having GPS. We therefore take this opportunity to revisit another circumstance where the lack of GPS was detrimental to an operation: the 2006 test of update/enumerate on the Cheyenne River Reservation in South Dakota. We recommended in our report on this test⁴ that the bureau explore the use of a GPS-enabled device to help enumerators not get lost as they are prone to do in sparse terrain. Although the bureau agreed to examine the costs, potential benefits, and risks associated with providing GPS-enabled handheld computers to enumerators, it subsequently said that it was too focused on the contracted handheld computer to complicate its efforts with more technology.

⁴ U.S. Department of Commerce Office of Inspector General, September 2007, *2010 Census: Key Challenges to Enumerating American Indian Reservations Unresolved by 2006 Census Test*, OSE-18027, Washington, D.C.: Department of Commerce OIG.

Continued use of the HHC's GPS capability as a locating device to avoid confusion in finding streets and housing units in rural areas could improve quality and reduce costs of operations such as update/leave, update/enumerate, and non-response follow-up. Census does not have enough HHCs for the entire non-response follow-up operation, where approximately 580,000 enumerators will knock on doors of households that did not mail back their census form. But, since it is generally easier to find addresses in urban areas, Census could reuse the 150,000 devices employed in address canvassing to target several remaining decennial operations in rural areas. The bureau could improve the efficiency and effectiveness of selected remaining 2010 decennial rural operations and obtain greater value for its technology investment by reemploying the handheld computers as geographic locator devices. This approach would require minimal additional effort since the HHC procedures employed in the primary address canvassing operations could be reused, and the marginal cost would be limited to the installation of new maps in the HHCs and redeployment of the devices.

Problems with Large Block Address Canvassing Demonstrate Need for Improved Contingency Planning

Problems associated with the large block operation underscore the need for a well thought out contingency plan. In the case of large blocks, the need to use ALMI was the result of problems with the FDCA contract that caused Census to deploy a contingency plan that had been developed quickly and was not fully tested. At present, the bureau lacks completed contingency plans for all of the critical operations coming up in the decennial calendar including delivery of the questionnaires, enumerating households not responding by mail, and enumerating the homeless. Census needs to have these plans well developed and documented so they can be implemented with as little impact as possible to the accuracy, efficiency, and stability of the 2010 Census in the event potential risks are realized.

Recommendations

To prepare for future critical operations and maximize the accuracy of the address list, we recommend that the Census Bureau take the following actions:

1. Immediately complete contingency plans for future critical 2010 operations. These plans must provide enough detail to ensure the accuracy, efficiency, and stability of the operation.

Synopsis of Census Bureau's Response

Census stated that currently all 24 program-level risks have mitigation plans, and 11 of these risks require contingency efforts. It noted that while not as far along as it wishes to be, it has established a prioritized schedule for the development, review, and approval of program-level contingency plans.

OIG Comment

We will monitor the bureau's progress against its schedule.

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2. Conduct a quality review of the address list for areas where boundaries are not based on physical features to determine if housing units have been missed or incorrectly located.

Synopsis of Census Bureau's Response

The Census Bureau stated that it concurs that there could be errors related to the positional accuracy of map spots as a result of collection blocks being used on the handheld computers, and tabulation blocks used in the ALMI. However, it believes that implementing our recommendation would yield a small gain and incur great risk and cost.

OIG Comment

As we have reported in our prior work, this issue is not confined to large blocks. Rather, large blocks are a specific example. A review of addresses listed and map spotted in all collection blocks with invisible boundaries would, in our view, help ensure that living quarters are recorded within the correct census block.

3. Consider using the handheld computers for their GPS locating capacity for operations such as update/leave, update/enumerate, and non-response follow-up to take greater advantage the technology developed under the FDCA contract and achieve a more accurate address list and enumeration.

Synopsis of Census Bureau's Response

Census stated it considered reusing the handheld computers but discarded this idea as not being feasible. It described the many steps that would be required to implement this recommendation and stated that it would add significant risk to the 2010 Census.

OIG Comment

The bureau has rejected this recommendation without providing evidence or analysis to support its decision or seeking alternative approaches to achieving its objective. Because of the improvements in accuracy afforded by use of GPS locating capacity and the desirability of obtaining additional utility from the large investment in handheld computers, we urge Census to reconsider its conclusion.

The Census Bureau provided additional comments on our observations. The bureau's written comments are posted in their entirety in OIG's Census Reading Room at http://www.oig.doc.gov/oig/reports/census_reading_room/index.html

BACKGROUND

The Office of Inspector General has been identifying risk areas related to the 2010 Census that require continuing oversight. One of these areas is the Census Bureau's large block operation, which we reviewed in the field. Our review has recently identified issues that could affect the quality and cost of the decennial. We discussed these issues with Census officials and provided recommendations.

The purpose of this flash report is to promptly communicate issues in a manner that provides Census the ability to effect rapid corrective actions. We made revisions to this report based on comments we received from the Census.

This is a flash report, not an audit conducted in accordance with Government Auditing Standards, and is significantly reduced in scope. Our work was performed in accordance with the *Quality Standards for Inspections* (rev. January 2005) issued by the President's Council on Integrity and Efficiency, and under authority of the IG Act of 1978, as amended, and Department Organization Order 10-13 (dated August 31, 2006).