



Testimony

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Security and Governmental Affairs,
U.S. Senate

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2020 CENSUS

Actions Needed to Mitigate Key Risks Jeopardizing a Cost-Effective Enumeration

Statement of Gene L. Dodaro,
Comptroller General of the United States

GAO Highlights

Highlights of [GAO-18-215T](#), a testimony before the Committee on Homeland Security and Governmental Affairs, U.S. Senate

Why GAO Did This Study

One of the Bureau's most important functions is to conduct a complete and accurate decennial census of the U.S. population. The decennial census is mandated by the Constitution and provides vital data for the nation. A complete count of the nation's population is an enormous undertaking as the Bureau seeks to control the cost of the census, implement operational innovations, and use new and modified IT systems. In recent years, GAO has identified challenges that raise serious concerns about the Bureau's ability to conduct a cost-effective count. For these reasons, GAO added the 2020 Census to its High-Risk list in February 2017.

In light of these challenges, GAO was asked to testify about the reasons the 2020 Census was placed on the High-Risk List. To do so, GAO summarized its prior work regarding the Bureau's planning efforts for the 2020 Census. GAO also included observations from its ongoing work on the 2018 End-to-End Test. This information is related to, among other things, recent decisions on preparations for the 2020 Census; progress on key systems to be used for the 2018 End-to-End Test, including the status of IT security assessments; execution of the address canvassing operation at the test sites; and efforts to update the life-cycle cost estimate.

What GAO Recommends

Over the past decade, we have made 84 recommendations specific to the 2020 Census to address the issues raised in this testimony and others. The Bureau generally has agreed with our recommendations. As of October 2017, 36 recommendations had not been implemented.

View [GAO-18-215T](#). For more information, contact Robert Goldenkoff at (202) 512-2757 or goldenkoffr@gao.gov or David A. Powner at (202) 512-9286 or pownerd@gao.gov.

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2020 CENSUS

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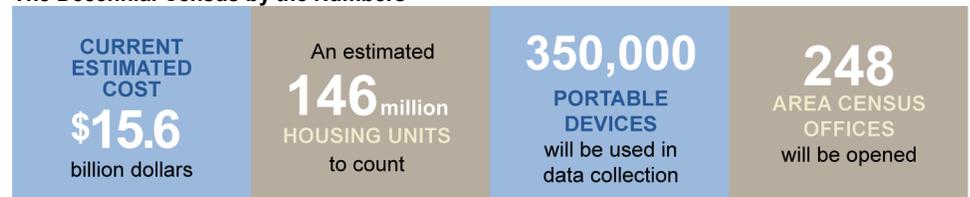
What GAO Found

GAO added the 2020 Census to its high-risk list because of challenges associated with (1) developing and testing key innovations; (2) implementing and securing IT systems; and (3) controlling any further cost growth and preparing reliable cost estimates. The Census Bureau (Bureau) is planning several innovations for the 2020 Decennial Census, including re-engineering field operations by relying on automation, using administrative records to supplement census data, verifying addresses in-office using on-screen imagery, and allowing the public to respond using the Internet. These innovations show promise for controlling costs, but they also introduce new risks, in part because they have not been used extensively in earlier enumerations, if at all. As a result, robust testing is needed to ensure that key systems and operations will function as planned. However, citing budgetary uncertainties, the Bureau canceled its 2017 field test and then scaled back its 2018 End-to-End Test. Without sufficient testing, operational problems can go undiscovered and the opportunity to improve operations will be lost, as key census-taking activities will not be tested across a range of geographic locations, housing types, and demographic groups.

The Bureau continues to face challenges in managing and overseeing the information technology (IT) programs, systems, and contracts supporting the 2020 Census. For example, GAO's ongoing work indicates that the system development schedule leading up to the 2018 End-to-End test has experienced several delays. Further, the Bureau has not addressed several security risks and challenges to secure its systems and data, including making certain that security assessments are completed in a timely manner and that risks are at an acceptable level. Given that certain operations for the 2018 End-to-End Test began in August 2017, it is important that the Bureau quickly address these challenges. GAO plans to monitor the Bureau's progress as part of its ongoing work.

In addition, the Bureau needs to control any further cost growth and develop cost estimates that reflect best practices. Earlier this month, the Department of Commerce (Department) announced that it had updated the October 2015 life-cycle cost-estimate and now projects the life-cycle cost of the 2020 Census will be \$15.6 billion, more than \$3 billion (27 percent) increase over its earlier estimate. The higher estimated life-cycle cost is due, in part, to the Bureau's failure to meet best practices for a quality cost-estimate. The Bureau and Department are still finalizing the documentation used to develop the \$15.6 billion cost-estimate. Until these documents are complete and made available for inspection, GAO cannot determine the reliability of the estimate.

The Decennial Census by the Numbers



Source: GAO analysis of Census Bureau and Department of Commerce information. | GAO-18-215T

Chairman Johnson, Ranking Member McCaskill, and Members of the Committee:

I am pleased to be here today to discuss the U.S. Census Bureau's (Bureau) progress in preparing for the 2020 Decennial Census. Conducting the decennial census of the U.S. population is mandated by the Constitution and provides vital data for the nation. The information that the census collects is used to apportion the seats of the House of Representatives; redraw congressional districts; allocate billions of dollars each year in federal financial assistance; and provide a social, demographic, and economic profile of the nation's people to guide policy decisions at each level of government. Further, businesses use census data to market new services and products and to tailor existing ones to demographic changes.

For 2020, a complete count of the nation's population is an enormous undertaking as the Bureau seeks to control the cost of the census while it implements several innovations and manages the processes of acquiring and developing new and modified information technology (IT) systems. In recent years, we have identified challenges that raise serious concerns about the Bureau's ability to conduct a cost-effective count of the nation, including issues with the agency's research, testing, planning, scheduling, cost estimation, systems development, and IT security practices. Over the past decade, we have made 84 recommendations specific to the 2020 Census to help address these and other issues. The Bureau has generally agreed with those recommendations; however 36 of them had not been implemented as of October 2017. We also added the 2020 Decennial Census to GAO's High-Risk List in February 2017.¹ As preparations for 2020 ramp-up, addressing the risks jeopardizing the 2020 Census by implementing our recommendations is more critical than ever.

The Bureau is currently conducting the 2018 End-to-End Test, which began in August 2017 and runs through April 2019. It is the Bureau's final opportunity to test all key systems and operations to ensure readiness for the 2020 Census.

¹GAO, *High-Risk Series: Progress on Many High-Risk Areas, While Substantial Efforts Needed on Others*, [GAO-17-317](#) (Washington, D.C.: Feb. 15, 2017). GAO maintains a high-risk program to focus attention on government operations that it identifies as high risk due to their greater vulnerabilities to fraud, waste, abuse, and mismanagement or the need for transformation to address economy, efficiency, or effectiveness challenges.

My testimony today will describe (1) why we added the decennial census to our high risk list, and (2) the steps the Department of Commerce and the Bureau need to take going forward to mitigate the risks jeopardizing a cost-effective census.

The information in this statement is based primarily on prior work regarding the Bureau's planning efforts for 2020.² For that body of work, we reviewed, among other things, relevant Bureau documentation, including the 2020 Census Operational Plan, recent decisions on preparations for the 2020 Census, and outcomes of key IT milestone reviews. Other details on the scope and methodology for our prior work are provided in each published report on which this testimony is based. We also discussed the status of recommendations with Department of Commerce and Bureau staff.

In addition, we included information in this statement from our ongoing work on the 2018 End-to-End Test. For our ongoing work examining the address canvassing operation, we reviewed plans for and the execution of the address canvassing portion of the 2018 End-to-End Test at each of the three test sites—in Pierce County, Washington; Providence County, Rhode Island; and Bluefield-Beckley-Oak Hill, West Virginia.³ Across the three test sites, we observed 18 census workers conduct address canvassing operations and interviewed local office staff at each location. These observations are not generalizable.

²For example, GAO, *2020 Census: Continued Management Attention Needed to Oversee Innovations, Develop and Secure IT Systems, and Improve Cost Estimation*, [GAO-18-141T](#) (Washington, D.C.: October 12, 2017); *2020 Census: Bureau Is Taking Steps to Address Limitations of Administrative Records*, [GAO-17-664](#) (Washington, D.C.: July 26, 2017); *2020 Census: Bureau Needs to Better Leverage Information to Achieve Goals of Reengineered Address Canvassing*, [GAO-17-622](#) (Washington, D.C.: July 20, 2017); *2020 Census: Sustained Attention to Innovations, IT Systems, and Cost Estimation Is Needed*, [GAO-17-584T](#) (Washington, D.C.: May 3, 2017); *2020 Census: Additional Actions Could Strengthen Field Data Collection Efforts*, [GAO-17-191](#) (Washington, D.C.: Jan. 26, 2017); *Information Technology: Better Management of Interdependencies between Programs Supporting 2020 Census Is Needed*, [GAO-16-623](#) (Washington, D.C.: Aug. 9, 2016); *2020 Census: Census Bureau Needs to Improve Its Life-Cycle Cost Estimating Process*, [GAO-16-628](#) (Washington, D.C.: June 30, 2016); and *2020 Census: Additional Actions Would Help the Bureau Realize Potential Administrative Records Cost Savings*, [GAO-16-48](#) (Washington, D.C.: Oct. 20, 2015).

³The purpose of address canvassing is to deliver a complete and accurate address list for enumeration purposes.

For our ongoing work on the readiness of the Bureau's IT systems, we collected and reviewed documentation on the status and plans for system development, testing, and security assessments for the 2018 End-to-End Test. This includes the Bureau's integration and implementation plan, solution architecture, and memorandums documenting outcomes of security assessments. We also interviewed agency officials.

We provided a copy of the new information we are reporting in this testimony to the Bureau for comment on October 19, 2017. The Bureau provided technical comments, which we addressed as appropriate.

We conducted the work on which this statement is based in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit 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.

Background

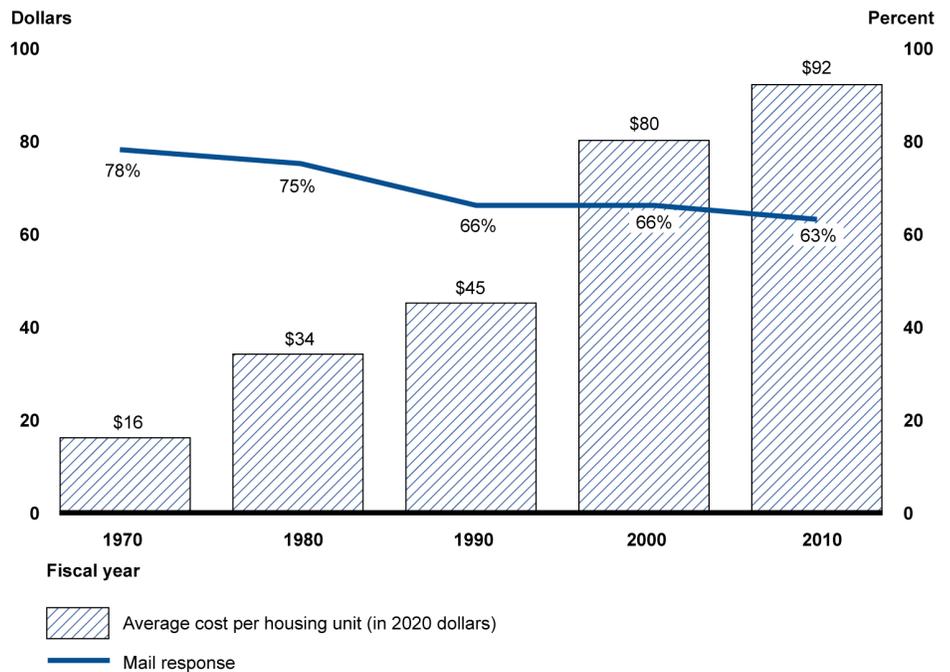
The cost of the census has been escalating over the last several decennials. The 2010 decennial was the costliest U.S. Census in history at about \$12.3 billion, and was about 31 percent more costly than the \$9.4 billion 2000 Census (in 2020 dollars).⁴ The average cost for counting a housing unit increased from about \$16 in 1970 to around \$92 in 2010 (in 2020 dollars). According to the Department of Commerce (Department), the total cost of the 2020 Census is now estimated to be approximately \$15.6 billion dollars, more than \$3 billion higher than previously reported by the Bureau.

Meanwhile, the return of census questionnaires by mail (the primary mode of data collection) declined over this period from 78 percent in 1970 to 63 percent in 2010 (see figure 1). Declining mail response rates—a key indicator in determining the cost-effectiveness of the census—are significant and lead to higher costs. This is because the Bureau sends temporary workers to each non-responding household to obtain census data. As a result, non-response follow-up is the Bureau's largest and

⁴According to the Bureau, these figures rely on fiscal year 2020 constant dollar factors derived from the Chained Price Index from "Gross Domestic Product and Deflators Used in the Historical Tables: 1940–2020" table from the Fiscal Year 2016 Budget of the United States Government.

most costly field operation. In many ways, the Bureau has had to invest substantially more resources each decade to conduct the enumeration.

Figure 1: The Average Cost of Counting Each Housing Unit (in 2020 Dollars) Has Escalated Each Decade, While the Percentage of Mail Response Rates Has Declined



Source: GAO analysis of Census Bureau data. | GAO-18-215T

Achieving a complete and accurate census is becoming an increasingly daunting task, in part, because the nation’s population is growing larger, more diverse, and more reluctant to participate. When the census misses a person who should have been included, it results in an undercount; conversely, an overcount occurs when an individual is counted more than once. Such errors are particularly problematic because of their impact on various subgroups. Minorities, renters, and children, for example, are more likely to be undercounted by the census.⁵

⁵GAO, *2010 Census: Key Efforts to Include Hard-to-Count Populations Went Generally as Planned; Improvements Could Make the Efforts More Effective for Next Census*, GAO-11-45 (Washington, D.C.: Dec. 14, 2010).

The challenges to an accurate count can be seen, for example, in the difficulties associated with counting people residing in unconventional and hidden housing units, such as converted basements and attics. In figure 2, what appears to be a small, single-family house could contain an apartment, as suggested by its two doorbells. If an address is not in the Bureau's address file, its residents are less likely to be included in the census.

Figure 2: Single or Multi-Unit Housing?



Source: GAO. | GAO-18-215T

The Bureau Plans to Rely Heavily on IT for the 2020 Census

The Bureau plans to rely heavily on both new and legacy IT systems and infrastructure to support the 2018 End-to-End Test and the 2020 Census operations. For example, the Bureau plans to deploy and use 43 systems in the 2018 End-to-End Test. Eleven of these systems are being developed or modified as part of an enterprise-wide initiative called Census Enterprise Data Collection and Processing (CEDCaP), which is managed within the Bureau's IT Directorate.⁶ This initiative is a large and complex modernization program intended to deliver a system-of-systems

⁶The Bureau is pursuing enterprise-wide technology solutions intended to support other major surveys the Bureau conducts as well, such as the American Community Survey and the Economic Census.

to support all of the Bureau’s survey data collection and processing functions, rather than continuing to rely on unique, survey-specific systems with redundant capabilities.⁷ According to Bureau officials, the remaining 32 IT systems are being developed or modified by the 2020 Census Directorate or other Bureau divisions.

To support the 2018 End-to-End Test, the Bureau plans to incrementally deploy and use the 43 systems for nine operations from December 2016 through the end of the test in April 2019. These nine operations are: (1) in-office address canvassing, (2) recruiting staff for address canvassing, (3) training for address canvassing, (4) in-field address canvassing, (5) recruiting staff for field enumeration, (6) training for field enumeration, (7) self-response (i.e., Internet, phone, or paper), (8) field enumeration, and (9) tabulation and dissemination.

Key Risks are Jeopardizing a Cost-Effective Enumeration

We added the 2020 Census to our list of high-risk programs in February, 2017, because (1) innovations never before used in prior enumerations will not be fully tested; (2) the Bureau continues to face challenges in implementing and securing IT systems; and (3) the Bureau needs to control any further cost growth and develop reliable cost estimates.⁸ Each of these key risks are discussed in greater detail below; if not sufficiently addressed, these risks could adversely impact the cost and/or quality of the enumeration. Moreover, they compound the inherent challenges of conducting a successful census such as the nation’s increasingly diverse population and concerns over personal privacy.

Key Risk #1: Reduced Operational Testing Limits Confidence in 2020 Census Innovation Areas

The basic design of the enumeration—mail out and mail back of the census questionnaire with in-person follow-up for non-respondents—has been in use since 1970. However, a key lesson learned from the 2010 Census and earlier enumerations, is that this “traditional” design is no longer capable of cost-effectively counting the population.

In response to its own assessments, our recommendations, and studies by other organizations, the Bureau has fundamentally re-examined its

⁷Importantly, as a result of the Bureau’s challenges in implementing key IT internal controls and its rapidly approaching deadline, we identified CEDCaP as an IT investment in need of attention in both our February 2015 and February 2017 high-risk reports.

⁸[GAO-17-317](#).

approach for conducting the 2020 Census. Specifically, its plan for 2020 includes four broad innovation areas: re-engineering field operations, using administrative records, verifying addresses in-office, and developing an Internet self-response option (see table 1).

If they function as planned, the Bureau initially estimated that these innovations could result in savings of over \$5 billion (in 2020 dollars) when compared to its estimates of the cost for conducting the census with traditional methods. However, in June 2016, we reported that the Bureau's life-cycle cost estimate of \$12.5 billion,⁹ developed in October 2015, was not reliable and did not adequately account for risk.¹⁰ As discussed earlier in this statement, the Department has recently updated this figure and now estimates a life-cycle cost of \$15.6 billion. At this higher level, the cost savings would be reduced to around \$1.9 billion.

⁹The historical life-cycle cost figures for prior decennials provided by the Department differ slightly from those reported by the Bureau previously. According to Department documents, the Department's figures were "inflated to the current 2020 Census time frame (FY 2012-2023)." In October 2017 the Department reported that Oct 2015 estimate for the 2020 Census was \$12.3 billion; this is slightly different than the \$12.5 billion the Bureau had reported. We requested further information in order to better understand the differences. The Department has not provided us with that information.

¹⁰[GAO-16-628](#).

Table 1: The Census Bureau (Bureau) Is Introducing Four Innovation Areas for the 2020 Census

| Innovation area | Description |
|--------------------------------|---|
| Re-engineered field operations | The Bureau intends to automate data collection methods, including its case management system. |
| Administrative records | In certain instances, the Bureau will reduce enumerator collection of data with administrative records (information already provided to federal and state governments as they administer other programs). |
| Verifying addresses in-office | To ensure the accuracy of its address list, the Bureau will use “in-office” procedures and on-screen imagery to verify addresses and reduce street-by-street field canvassing. |
| Internet self-response option | The Bureau will offer households the option of responding to the survey through the Internet. The Bureau has not previously offered such an option on a large scale. |

Source: GAO analysis of Census Bureau data. | GAO-18-215T

While the planned innovations could help control costs, they also introduce new risks, in part, because they include new procedures and technology that have not been used extensively in earlier decennials, if at all. Our prior work has shown the importance of the Bureau conducting a robust testing program, including the 2018 End-to-End Test.¹¹ Rigorous testing is a critical risk mitigation strategy because it provides information on the feasibility and performance of individual census-taking activities, their potential for achieving desired results, and the extent to which they are able to function together under full operational conditions. To address some of these challenges we have made several recommendations aimed at improving reengineered field operations, using administrative records, verifying the accuracy of the address list, and securing census responses via the Internet

The Bureau has held a series of operational tests since 2012, but according to the Bureau, has scaled back recent tests because of funding uncertainties. For example, the Bureau canceled the field components of the 2017 Census Test including non-response follow-up, a key census

¹¹[GAO-17-622](#).

operation.¹² In November 2016, we reported that the cancelation of the 2017 field test was a lost opportunity to test, refine, and integrate operations and systems, and that it put more pressure on the 2018 End-to-End Test to demonstrate that enumeration activities will function under census-like conditions as needed for 2020. However, in May 2017, the Bureau scaled back the operational scope of the 2018 End-to-End and, of the three planned test sites; only the Rhode Island site would fully implement the 2018 End-to-End Test. The Washington and West Virginia state test sites would test just one field operation, address canvassing. In addition, due to budgetary concerns, the Bureau decided to remove three coverage measurement operations (and the technology that supports them) from the scope of the test.¹³

Without sufficient testing, operational problems can go undiscovered and the opportunity to improve operations will be lost, in part because the 2018 End-to-End Test is the last opportunity to demonstrate census technology and procedures across a range of geographic locations, housing types, and demographic groups.

Operational Issues Observed in the End-to-End Test Will Need to Be Addressed

On August 28, 2017, temporary census employees known as address listers began implementing the in-field component of address canvassing for the 2018 End-to-End Test. Listers walked the streets of designated census blocks at all three test sites to verify addresses and geographic locations. The operation ended on September 27, 2017. As part of our ongoing work, we visited all three test sites and observed 18 listers conduct address canvassing. Generally, we found that listers were able to conduct address canvassing as planned. However, we also noted several challenges. We shared the following preliminary observations from our site visits with the Bureau:

- Internet connectivity was problematic at the West Virginia test site. We spoke to four census field supervisors who described certain areas as dead spots where Internet and cell phone service were not available. We also were told by those same supervisors that only certain cell service providers worked in certain areas. In order to

¹²In non-response follow-up, if a household does not respond to the census by a certain date, the Bureau will conduct an in-person visit by an enumerator to collect census data using a mobile device provided by the Bureau.

¹³Coverage measurement evaluates the quality of the Census data by estimating the census coverage based on a post-enumeration survey.

access the Internet or cell service in those areas, census workers sometimes needed to drive several miles.

- The allocation of lister assignments was not always optimal. Listers were supposed to be provided assignments close to where they live in order to optimize their local knowledge and to limit the numbers of miles being driven by listers to and from their assignment area.¹⁴ Bureau officials told us this was a challenge at all three test sites. Moreover, at one site the area census manager told us that some listers were being assigned work in another county even though blocks were still unassigned closer to where they resided. Relying on local knowledge and limiting the number of miles can increase both the efficiency and effectiveness of address canvassing.
- The assignment of some of the large blocks early in the operations was not occurring as planned. At all three 2018 End-to-End Test sites Bureau managers had to manually assign some large blocks (some blocks had hundreds of housing units). It is important to assign large blocks early on because leaving the large blocks to be canvassed until the end of the operation could jeopardize the timely completion of address canvassing.
- According to Bureau officials, during the test, completed address and map updates for some blocks did not properly transmit. This happened at all three test sites, and included data on 11 laptops for 25 blocks. The address and map information on seven of the laptops was permanently deleted. However, data on four laptops were still available. The Bureau is examining those laptops to determine what occurred that prevented the data from being transmitted. In Providence, Rhode Island, where the full test will take place, the Bureau reconvassed those blocks where data were lost to ensure that the address and map information going forward was correct. It will be important for the Bureau to understand what happened and ensure all address and map data is properly transmitted for the 2020 Census.

We have discussed these challenges with Bureau officials who stated that overall they are satisfied with the implementation of address canvassing but also agreed that resolving challenges discovered during address canvassing, some of which can affect the operation's efficiency and effectiveness, will be important before the 2020 Census. We plan to issue a report early in 2018 on address canvassing at the three test sites.

¹⁴The Bureau pays listers for the time it takes to drive to and from assignment areas as well as reimbursing them for mileage.

Key Risk #2: The Bureau Continues to Face Challenges Implementing and Securing IT Systems

We have previously reported that the Bureau faced challenges in managing and overseeing IT programs, systems, and contractors supporting the 2020 Census. Specifically, it has been challenged in managing schedules, costs, contracts, governance and internal coordination, and security for its IT systems. As a result of these challenges, the Bureau is at risk of being unable to fully implement key IT systems necessary to support the 2020 Census and conduct a cost-effective enumeration. We have previously recommended that the Bureau take action to improve its implementation and management of IT in areas such as governance and internal coordination.¹⁵ We also have ongoing work reviewing each of these areas.

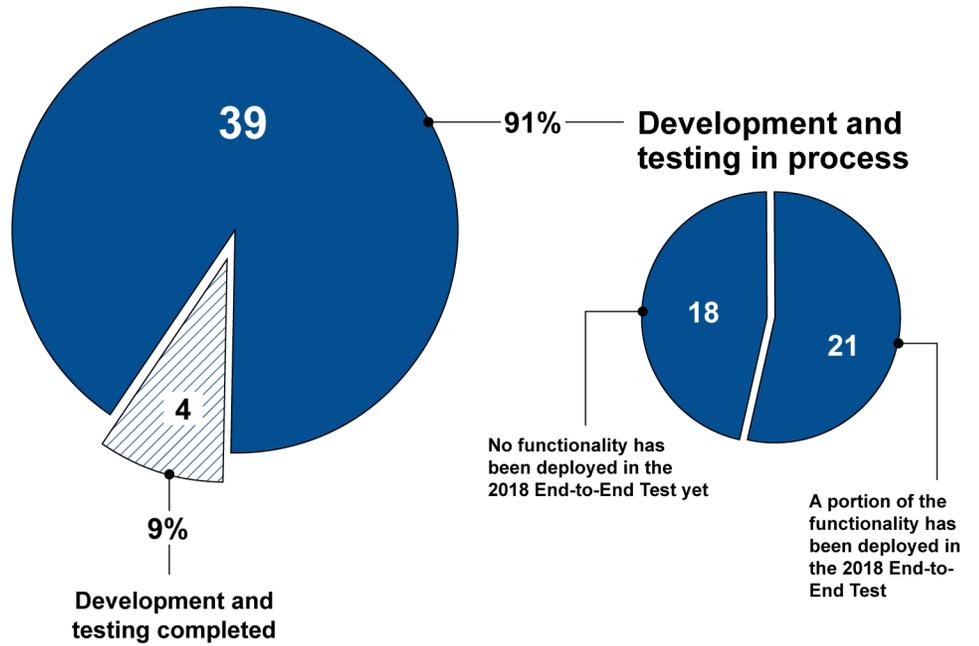
Schedule management

Our ongoing work has indicated that the Bureau faces significant challenges in managing the schedule for developing and testing systems for the 2018 End-to-End Test that began in August 2017. In this regard, the Bureau still has significant development and testing work that remains to be completed. As of August 2017, of the 43 systems in the test, the Bureau reported that 4 systems had completed development and integration testing, while the remaining 39 systems had not completed these activities.

Of these 39 systems, the Bureau reported that it had deployed a portion of the functionality for 21 systems to support address canvassing for the 2018 End-to-End Test; however, it had not yet deployed any functionality for the remaining 18 systems for the test. Figure 3 summarizes the development and testing status for the 43 systems planned for the 2018 End-to-End Test.

¹⁵[GAO-16-623](#).

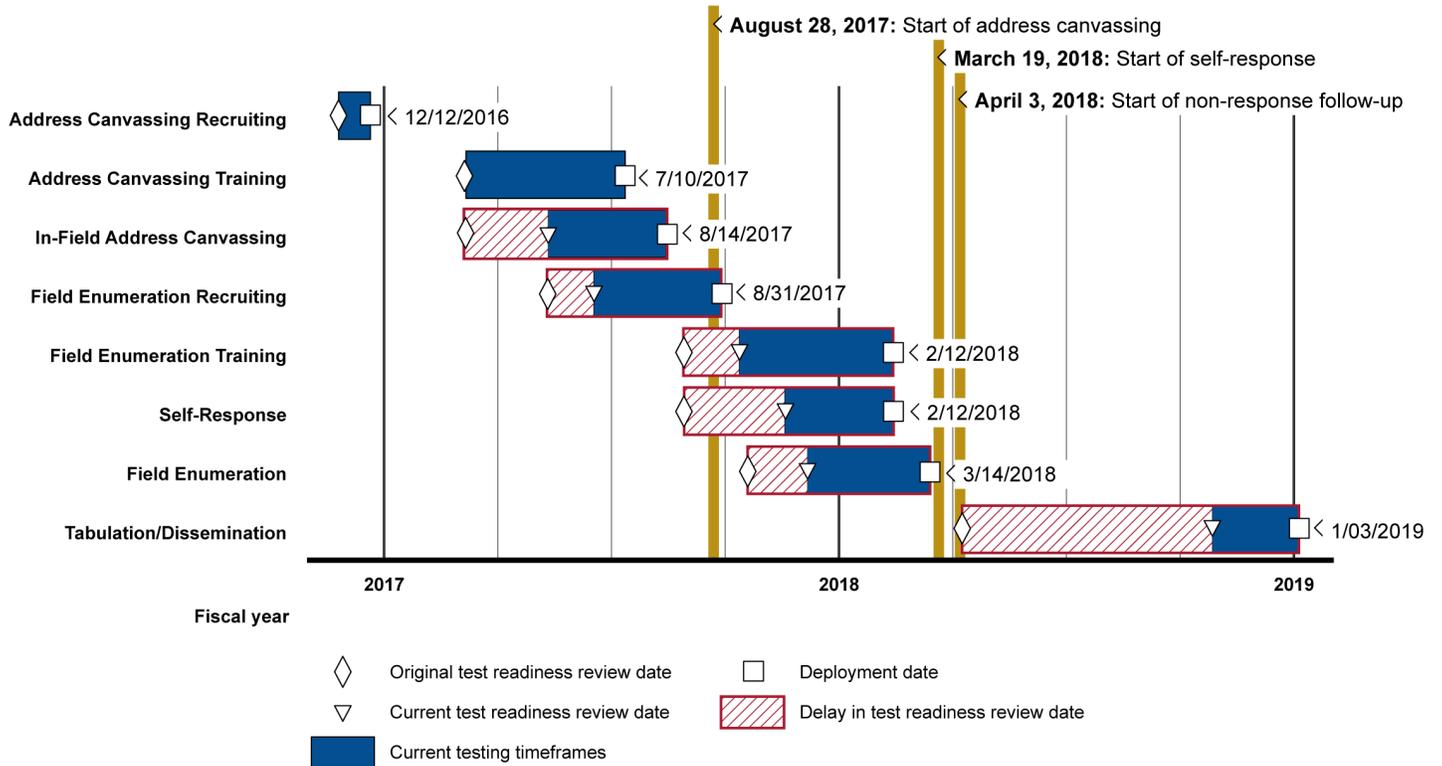
Figure 3: Development and Testing Status for the 43 Systems in the 2018 End-to-End Test, as of August 2017



Source: GAO analysis of Bureau data. | GAO-18-215T

Moreover, due to challenges experienced during systems development, the Bureau has delayed key IT milestone dates (e.g., dates to begin integration testing) by several months for several of the systems in the 2018 End-to-End Test. Figure 4 depicts the delays to the deployment dates for the operations in the 2018 End-to-End Test, as of August 2017.

Figure 4: Delays in Key Information Technology Milestone Dates for System Operations in the 2018 End-to-End Test, as of August 2017



Source: GAO analysis of Census Bureau data. | GAO-18-215T

Note: The Bureau's original plans for these operations were to include one test readiness review milestone and one deployment date for all systems in the operation. However, more recently the Bureau has been splitting the test readiness review and deployment milestones into multiple milestone dates. For the purposes of this graphic, we included the first test readiness review date and the final deployment date for each operation, to denote when all testing is expected to begin and end for that operation.

Our ongoing work also indicates that the Bureau is at risk of not meeting the updated milestone dates. For example, in June 2017 the Bureau reported that at least two of the systems expected to be used in the self-response operation (the Internet self-response system and the call center system) are at risk of not meeting the delayed milestone dates. In addition, in September 2017 the Bureau reported that at least two of the systems expected to be used in the field enumeration operation (the enumeration system and the operational control system) are at risk of not meeting their delayed dates.

Combined, these delays reduce the time available to conduct the security reviews and approvals for the systems being used in the 2018 End-to-End Test. We previously testified in May 2017 that the Bureau faced similar challenges leading up to the 2017 Census Test, including experiencing delays in system development that led to compressed time frames for security reviews and approvals.¹⁶ Specifically, we noted that the Bureau did not have time to thoroughly assess the low-impact components of one system and complete penetration testing¹⁷ for another system prior to the test, but accepted the security risks and uncertainty due to compressed time frames. We concluded that, for the 2018 End-to-End Test, it will be important that these security assessments are completed in a timely manner and that risks are at an acceptable level before the systems are deployed.

The Bureau noted that, if it continues to be behind schedule, key field operations for the 2018 End-to-End Test (such as non-response follow-up) could be delayed or canceled, which may affect the Bureau's ability to meet the test's objectives. As we stated earlier, without sufficient testing, operational problems can go undiscovered and the opportunity to improve operations will be lost. Bureau officials are evaluating options to decrease the impact of these delays on integration testing and security review activities by, for example, utilizing additional staff. We have ongoing work reviewing the Bureau's development and testing delays and the impacts of these delays on systems readiness for the 2018 End-to-End Test.

IT cost growth

The Bureau faces challenges in reporting and controlling IT cost growth. In April 2017, the Bureau briefed us on its efforts to estimate the costs for the 2020 Census, during which it presented IT costs of about \$2.4 billion from fiscal years 2018 through 2021. Based on this information and other corroborating IT contract information provided by the Bureau, we testified in May 2017 that the Bureau had identified at least \$2 billion in IT costs.¹⁸

¹⁶GAO, *2020 Census: Sustained Attention to Innovations, IT Systems, and Cost Estimation Is Needed*, [GAO-17-584T](#) (Washington, D.C.: May 3, 2017).

¹⁷NIST defines penetration testing as security testing in which evaluators mimic real-world attacks in an attempt to identify ways to circumvent the security features of an application, system, or network. Penetration testing often involves issuing real attacks on real systems and data, using the same tools and techniques used by actual attackers.

¹⁸[GAO-17-584T](#).

However, in June 2017, Bureau officials in the 2020 Census Directorate told us that the data they provided in April 2017 did not reflect all IT costs for the 2020 program. The officials provided us with an analysis of the Bureau's October 2015 cost estimate that identified \$3.4 billion in total IT costs from fiscal years 2012 through 2023. These costs included, among other things, those associated with system engineering, test and evaluation, and infrastructure, as well as a portion of the costs for the CEDCaP program.¹⁹

Yet, our ongoing work determined the Bureau's \$3.4 billion cost estimate from October 2015 did not reflect its current plans for acquiring IT to be used during the 2020 Census and that the related costs are likely to increase:

- In August 2016, the Bureau awarded a technical integration contract for about \$886 million, a cost that was not reflected in the \$3.4 billion expected IT costs.²⁰ More recently, in May 2017, we testified that the scope of work for this contract had increased since the contract was awarded; thus, the corresponding contract costs were likely to rise above \$886 million, as well.
- In March 2017, the Bureau reported that the contract associated with the call center and IT system to support the collection of census data over the phone was projected to overrun its initial estimated cost by at least \$40 million.
- In May 2017, the Bureau reported that the CEDCaP program's cost estimate was increasing by more than \$400 million—from its original estimate of \$548 million in 2013 to a revised estimate of \$965 million in May 2017.
- In June 2017, the Bureau awarded a contract for mobile devices and associated services for about \$283 million, an amount that is about

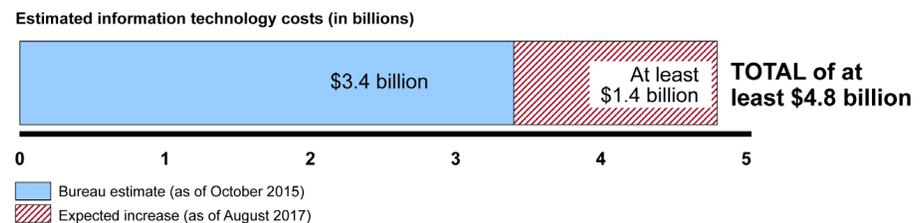
¹⁹The 2020 program pays for a portion of the costs for the CEDCaP program. According to the October 2015 estimate, the portion of CEDCaP costs associated with the 2020 Census was estimated at \$328 million of the \$548 million total program estimate.

²⁰In September 2017, Bureau officials told us that a portion of this integration work was included in the October 2015 cost estimate, but the Bureau assumed the work would be done in-house, rather than with contractors. However, the Bureau did not provide documentation to support this assertion.

\$137 million higher than the cost for these devices and services identified in its October 2015 estimate.²¹

As a result of these factors, the Bureau's \$3.4 billion estimate of IT costs is likely to be at least \$1.4 billion higher, thus increasing the total costs to at least \$4.8 billion. Figure 5 identifies the Bureau estimate of total IT costs associated with the 2020 program as of October 2015, as well as anticipated cost increases as of August 2017.

Figure 5: Total Information Technology Costs Estimated by the Census Bureau (Bureau) and Expected Cost Increases, as of August 2017



Source: GAO analysis of Census Bureau data. | GAO-18-215T

IT cost information that is accurately reported and clearly communicated is necessary so that Congress and the public have confidence that taxpayer funds are being spent in an appropriate manner. However, changes in the Bureau's reporting of these total costs, combined with cost growth since the October 2015 estimate, raise questions as to whether the Bureau has a complete understanding of the IT costs associated with the 2020 program. In early October 2017, the Secretary of Commerce testified that he expected the total IT costs for the 2020 Census to be about \$4.96 billion. This estimate of IT costs is approximately \$1.6 billion higher than the Bureau's October 2015 estimate and further confirms our analysis of expected IT cost increases discussed above. As of late October 2017, the Bureau and Department were still finalizing the documentation used to develop the new cost estimate. After these documents are complete and made available for inspection, as part of our ongoing work, we plan to evaluate whether this updated IT cost estimate includes the cost increases, discussed above, that were not included in the October 2015 estimate.

²¹This increase is due, in part, to the Bureau's decision to procure mobile devices for its enumerators, rather than have enumerators use their own personal devices for non-response follow-up activities.

Contract management

Our ongoing work also determined that the Bureau faces challenges in managing its significant contractor support. The Bureau is relying on contractor support in many key areas of the 2020 Census. For example, it is relying on contractors to develop a number of key systems and components of the IT infrastructure. These activities include (1) developing the IT platform that is intended to be used to collect data from those responding via the Internet, telephone, and non-response follow-up activities; (2) procuring the mobile devices and cellular service to be used for non-response follow-up;²² and (3) developing the infrastructure in the field offices. According to Bureau officials, contractors are also providing support in areas such as fraud detection, cloud computing services, and disaster recovery.

In addition to the development of key technology, the Bureau is relying on contractor support for integrating all of the key systems and infrastructure. The Bureau awarded a contract to integrate the 2020 Census systems and infrastructure in August 2016. The contractor's work was to include evaluating the systems and infrastructure and acquiring the infrastructure (e.g., cloud or data center) to meet the Bureau's scalability and performance needs. It was also to include integrating all of the systems, supporting technical testing activities, and developing plans for ensuring the continuity of operations. Since the contract was awarded, the Bureau has modified the scope to also include assisting with operational testing activities, conducting performance testing for two Internet self-response systems, and technical support for the implementation of the paper data capture system.

However, our ongoing work has indicated that the Bureau is facing staffing challenges that could impact its ability to manage and oversee the technical integration contractor. Specifically, the Bureau is managing the integration contractor through a government program management office, but this office is still filling vacancies. As of October 2017, the Bureau reported that 35 of the office's 58 federal employee positions were vacant. As a result, this program management office may not be able to

²²In non-response follow-up, if a household does not respond to the census by a certain date, the Bureau will send out employees to visit the home. The Bureau's plan is for these enumerators to use a census application, on a mobile device provided by the Bureau, to capture the information given to them by the in-person interviews.

provide adequate oversight of contractor cost, schedule, and performance.

The delays during the 2017 Test and preparations for the 2018 End-to-End Test raises concerns regarding the Bureau's ability to effectively perform contractor management. As we reported in November 2016, a greater reliance on contractors for these key components of the 2020 Census requires the Bureau to focus on sound management and oversight of the key contracts, projects, and systems.²³ As part of our ongoing work, we plan to monitor the Bureau's progress in managing its contractor support.

Governance and internal coordination

Effective IT governance can drive change, provide oversight, and ensure accountability for results. Further, effective IT governance was envisioned in the provisions referred to as the 2014 Federal Information Technology Acquisition Reform Act (FITARA),²⁴ which strengthened and reinforced the role of the departmental CIO. The component CIO also plays a role in effective IT governance as subject to the oversight and policies of the parent department or agency implementing FITARA.

To ensure executive-level oversight of the key systems and technology, the Bureau's CIO (or a representative) is a member of the governance boards that oversee all of the operations and technology for the 2020 Census. However, in August 2016 we reported on challenges the Bureau has had with IT governance and internal coordination, including weaknesses in its ability to monitor and control IT project costs, schedules, and performance.²⁵ We made several recommendations to the Department of Commerce to direct the Bureau to, among other things, better ensure that risks are adequately identified and schedules are aligned. The Department agreed with our recommendations. However, as of October 2017, the Bureau had only fully implemented one recommendation and had taken initial steps toward implementing others.

²³GAO, *Information Technology: Uncertainty Remains about the Bureau's Readiness for a Key Decennial Census Test*, [GAO-17-221T](#) (Washington, D.C.: Nov. 16, 2016).

²⁴*Carl Levin and Howard P. 'Buck' McKeon National Defense Authorization Act for Fiscal Year 2015*, Pub. L. No. 113-291, div. A, title VIII, subtitle D, 128 Stat. 3292, 3438-50 (Dec. 19, 2014).

²⁵[GAO-16-623](#).

Further, given the schedule delays and cost increases previously mentioned, and the vast amount of development, testing, and security assessments left to be completed, we remain concerned about executive-level oversight of systems and security. Moving forward, it will be important that the CIO and other Bureau executives continue to use a collaborative governance approach to effectively manage risks and ensure that the IT solutions meet the needs of the agency within cost and schedule. As part of our ongoing work, we plan to monitor the steps the Bureau is taking to effectively oversee and manage the development and acquisition of its IT systems.

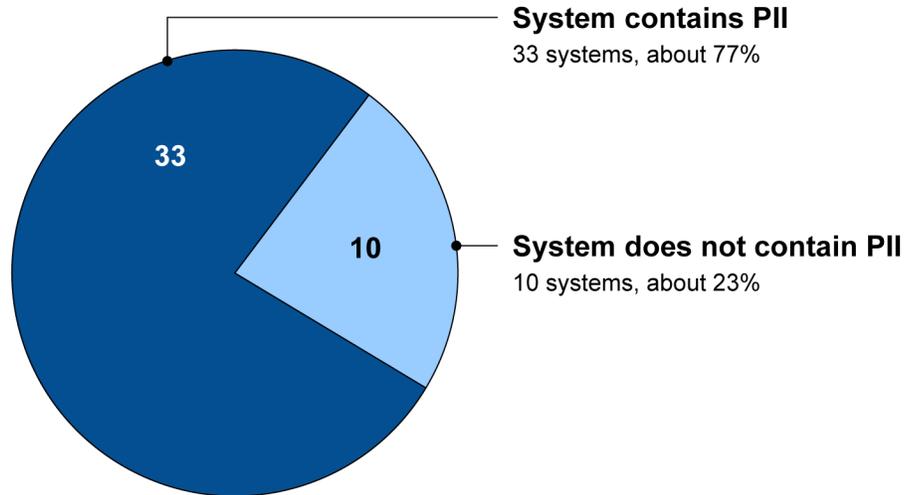
Information security

In November 2016, we described the significant challenges that the Bureau faced in securing systems and data for the 2020 Census, and we noted that tight time frames could exacerbate these challenges.²⁶ Two such challenges were (1) ensuring that individuals gain only limited and appropriate access to the 2020 Census data, including personally identifiable information (PII) (e.g., name, personal address, and date of birth), and (2) making certain that security assessments were completed in a timely manner and that risks were at an acceptable level.²⁷ Protecting PII, for example, is especially important because a majority of the 43 systems to be used in the 2018 End-to-End Test contain PII, as reflected in figure 6.

²⁶[GAO-17-584T](#).

²⁷[GAO-17-221T](#).

Figure 6: Personally Identifiable Information (PII) in Systems for the 2018 End-to-End Test, as of June 2017



Source: GAO analysis of Census Bureau data. | GAO-18-215T

To address these and other challenges, federal law and guidance specify requirements for protecting federal information and information systems, such as those to be used in the 2020 Census. Specifically, the Federal Information Security Management Act of 2002 and the Federal Information Security Modernization Act of 2014 (FISMA) require executive branch agencies to develop, document, and implement an agency-wide program to provide security for the information and information systems that support operations and assets of the agency.²⁸

Accordingly, the National Institute of Standards and Technology (NIST) developed risk management framework guidance for agencies to follow in developing information security programs.²⁹ Additionally, the Office of Management and Budget's (OMB) revised Circular A-130 on managing federal information resources required agencies to implement the NIST

²⁸The Federal Information Security Modernization Act of 2014, Pub. L. No. 113-283, 128 Stat. 3073 (Dec. 18, 2014) largely superseded the Federal Information Security Management Act of 2002, enacted as Title III, E-Government Act of 2002, Pub. L. No. 107-347, 116 Stat. 2899, 2946 (Dec. 17, 2002).

²⁹NIST, *Guide for Applying the Risk Management Framework to Federal Information Systems: A Security Life Cycle Approach*, SP 800-37, Revision 1 (Gaithersburg, Md.: February 2010).

risk management framework to integrate information security and risk management activities into the system development life cycle.³⁰

In accordance with FISMA, NIST guidance, and OMB guidance, the Office of the CIO established a risk management framework. This framework requires that system developers ensure that each of the systems undergoes a full security assessment, and that system developers remediate critical deficiencies. In addition, according to the Bureau's framework, system developers must ensure that each component of a system has its own system security plan, which documents how the Bureau plans to implement security controls. As a result, system developers for a single system might develop multiple system security plans which all have to be approved as part of the system's complete security documentation. We have ongoing work that is reviewing the extent to which the Bureau's framework meets the specific requirements of the NIST guidance.

According to the Bureau's framework, each of the 43 systems in the 2018 End-to-End Test will need to have complete security documentation (such as system security plans) and an approved authorization to operate³¹ prior to their use in the 2018 End-to-End Test. However, our ongoing work indicates that, while the Bureau is completing these steps for the 43 systems to be used in the 2018 End-to-End Test, significant work remains. Specifically, as we reported in October 2017:

- None of the 43 systems are fully authorized to operate through the completion of the 2018 End-to-End Test. Bureau officials from the CIO's Office of Information Security stated that these systems will need to be reauthorized because, among other things, they have additional development work planned that may require the systems to be reauthorized; are being moved to a different infrastructure environment (e.g., from a data center to a cloud-based environment);

³⁰OMB, Revision of OMB Circular A-130, *Managing Federal Information as a Strategic Resource* (Washington, D.C.: July 28, 2016).

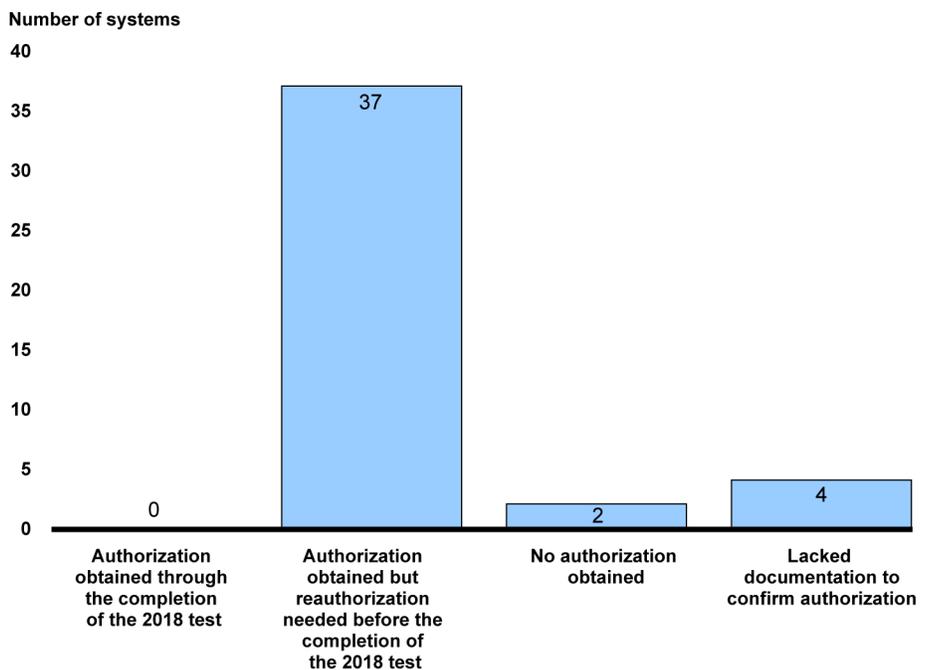
³¹According to the Bureau's framework, systems are to obtain security authorization approval from the authorizing official in order to operate. Specifically, the authorizing official evaluates the security authorization package and provides system authorization if the overall risk level is acceptable. In addition, according to the Bureau's information technology security program policy, the issuance of an authorization to operate for a system required support of both the technical authorizing official (i.e., the CIO) and the business authorizing official responsible for funding and managing the system (i.e., the Associate Director for Decennial Census Programs).

or have a current authorization that expires before the completion of the 2018 End-to-End Test. The amount of work remaining is concerning because the test has already begun and the delays experienced in system development and testing mentioned earlier reduce the time available for performing the security assessments needed to fully authorize these systems before the completion of the 2018 End-to-End test.

- Thirty-seven systems have a current authorization to operate, but the Bureau will need to reauthorize these systems before the completion of the 2018 End-to-End Test. This is due to the reasons mentioned previously, such as additional development work planned and changes to the infrastructure environments.
- Two systems have not yet obtained an authorization to operate.
- For the remaining four systems, the Bureau has not yet provided us with documentation about the current authorization status.

Figure 7 depicts the authorization to operate status for the systems being used in the 2018 End-to-End Test, as reported by the Bureau.

Figure 7: Authorization to Operate Status of 43 Systems for the 2018 End-to-End Test, as of September 2017



Source: GAO analysis of Census Bureau data. | GAO-18-215T

Because many of the systems that will be a part of the 2018 End-to-End Test are not yet fully developed, the Bureau has not finalized all of the security controls to be implemented; assessed those controls; developed plans to remediate control weaknesses; and determined whether there is time to fully remediate any deficiencies before the systems are needed for the test. In addition, as discussed earlier, the Bureau is facing system development challenges that are delaying the completion of milestones and compressing the time available for security testing activities.

While the large-scale technological changes (such as Internet self-response) increase the likelihood of efficiency and effectiveness gains, they also introduce many information security challenges. The 2018 End-to-End Test also involves collecting PII on hundreds of thousands of households across the country, which further increases the need to properly secure these systems. Thus, it will be important that the Bureau provides adequate time to perform these security assessments, completes them in a timely manner, and ensures that risks are at an acceptable level before the systems are deployed. We plan to continue monitoring the Bureau's progress in securing its IT systems and data as part of our ongoing work.

Key Risk #3: Lack of Reliable Costs Estimates Limits Support for 2020 Census Funding

Earlier this month, the Department announced that it had updated the October 2015 life-cycle cost estimate and now projects the life-cycle cost of the 2020 Census will be \$15.6 billion, more than a \$3 billion (27 percent) increase over the Bureau's earlier estimate. The higher estimated life-cycle cost is due, in part, as we reported in June 2016, to the Bureau's failure to meet best practices for a quality cost-estimate. Specifically, we reported that, although the Bureau had taken steps to improve its capacity to carry out an effective cost estimate, such as establishing an independent cost estimation office, its October 2015 version of the estimate for the 2020 Census only partially met the characteristics of two best practices (comprehensive and accurate) and minimally met the other two (well-documented and credible). We also reported that risks were not properly accounted for in the cost estimate.³²

We recommended that the Bureau take action to ensure its 2020 Census cost estimate meets all four characteristics of a reliable cost estimate, as well as properly account for risk to ensure there are appropriate levels for

³²[GAO-16-628](#).

budgeted contingencies. The Bureau agreed with our recommendations. In response, the Department of Commerce reported that in May 2017, a multidisciplinary team was created to evaluate the 2020 Census program and to produce an independent cost estimate. Factors driving the increased cost-estimate include changes to assumptions relating to self-response rates, wage levels for temporary census workers, as well as the fact that major contracts and IT scale-up plans and procedures were not effectively planned, managed, and executed. The new estimate also includes a contingency of 10 percent of estimated costs per year as insurance against “unknown-unknowns”, such as a major cybersecurity event.

The Bureau and Department are still finalizing the documentation used to develop the \$15.6 billion cost-estimate. Until these documents are complete and made available for inspection, we cannot determine the reliability of the estimate. We will review the documentation when it is available. In order for the estimate to be deemed high quality, and thus the basis for any 2020 Census annual budgetary figures, the new cost-estimate will need to address the following four best practices, and do so as quickly as possible given the expected ramp-up in spending:

- **Comprehensive.** To be comprehensive an estimate should have enough detail to ensure that cost elements are neither omitted nor double-counted, and all cost-influencing assumptions are detailed in the estimate’s documentation, among other things, according to best practices. In June 2016, we reported that, while Bureau officials were able to provide us with several documents that included projections and assumptions that were used in the cost estimate, we found the estimate to be partially comprehensive because it was unclear if all life-cycle costs were included in the estimate or if the cost estimate completely defined the program.
- **Accurate.** Accurate estimates are unbiased and contain few mathematical mistakes. We reported in June 2016 that the estimate partially met best practices for this characteristic, in part because we could not independently verify the calculations the Bureau used within its cost model, which the Bureau did not have documented or explained.
- **Well-documented.** Cost estimates are considered valid if they are well-documented to the point they can be easily repeated or updated and can be traced to original sources through auditing, according to best practices. In June 2016, we reported that, while the Bureau

provided some documentation of supporting data, it did not describe how the source data were incorporated.

- **Credible.** Credible cost estimates must clearly identify limitations due to uncertainty or bias surrounding the data or assumptions, according to best practices. In June 2016, we reported that the estimate minimally met best practices for this characteristic in part because the Bureau carried out its risk and uncertainty analysis only for about \$4.6 billion (37 percent) of the \$12.5 billion total estimated life-cycle cost, excluding, for example, consideration of uncertainty over what the decennial census’s estimated part will be of the total cost of CEDCaP.

Continued Management Attention Needed to Keep Preparations on Track and Help Ensure a Cost- Effective Enumeration

2020 Challenges Are Symptomatic of Deeper Long-Term Organizational Issues

The difficulties facing the Bureau’s preparation for the decennial in such areas as planning and testing; managing and overseeing IT programs, systems, and contractors supporting the enumeration; developing reliable cost estimates; prioritizing decisions; managing schedules; and other challenges, are symptomatic of deeper organizational issues.

Following the 2010 Census, a key lesson learned for 2020 we identified was ensuring that the Bureau’s organizational culture and structure, as well as its approach to strategic planning, human capital management, internal collaboration, knowledge sharing, capital decision-making, risk and change management, and other internal functions are aligned toward delivering more cost-effective outcomes.³³

³³GAO, *2010 Census: Preliminary Lesson Learned Highlight the Need for Fundamental Reforms*, [GAO-11-496T](#) (Washington, D.C.: Apr. 6, 2011).

The Bureau has made improvements over the last decade, and continued progress will depend in part on sustaining efforts to strengthen risk management activities, enhancing systems testing, bringing in experienced personnel to key positions, implementing our recommendations, and meeting regularly with officials from its parent agency, the Department of Commerce. Going forward, our experience has shown that the key elements needed to make progress in high-risk areas are top-level attention by the administration and agency officials to (1) leadership commitment, (2) ensuring capacity, (3) developing a corrective action plan, (4) regular monitoring, and (5) demonstrated progress. Although important steps have been taken in at least some of these areas, overall, far more work is needed.

On the one hand, the Secretary of Commerce has taken several actions towards demonstrating **leadership commitment**. For example, the previously noted multidisciplinary review team included members with Bureau leadership experience, as well as members with private sector technology management experience. Additional program evaluation and the independent cost estimate was produced by a team from the Commerce Secretary's Office of Acquisition Management that included a member detailed from OMB. Commerce also reports senior officials are now actively involved in the management and oversight of the decennial. Likewise, with respect to **monitoring**, the Commerce Secretary reports having weekly 2020 Census oversight reviews with senior Bureau staff and will require metric tracking and program execution status on a real-time basis.

On the other hand, demonstrating the **capacity** to address high risk concerns remains a challenge. For example, our ongoing work has indicated that the Bureau is facing staffing challenges that could impact its ability to manage and oversee the technical integration contractor. Specifically, the Bureau is managing the integration contractor through a government program management office, but this office is still filling vacancies. As of October 2017, the Bureau reported that 35 of 58, or 60 percent, of the office's federal employee positions were vacant. As a result, this program management office may not be able to provide adequate oversight of contractor cost, schedule, and performance.

In the months ahead, we will continue to monitor the Bureau's progress in addressing in each of the 5 elements essential for reducing the risk to a cost-effective enumeration.

Leadership Continuity Will Be Critical For Keeping Efforts on Track

At a time when strong Bureau management is needed, vacancies in the agency's two top positions—Director and Deputy Director—are not helpful for keeping 2020 preparations on-track. These vacancies are due to the previous director's retirement on June 30, 2017, and the previous deputy director's appointment to be the Chief Statistician of the United States within the Office of Management and Budget in January 2017. Although interim leadership has since been named, in our prior work we have noted how openings in the Bureau's top position makes it difficult to ensure accountability and continuity, as well as to develop and sustain efforts that foster change, produce results, mitigate risks, and control costs over the long term.

The census director is appointed by the President, by and with the advice and consent of the Senate, without regard to political affiliation. The director's term is a fixed 5-year term of office, and runs in 5-year increments.³⁴ An individual may be reappointed and serve 2 full terms as director.³⁵ The director's position was first filled this way beginning on January 1, 2012, and cycles every fifth year thereafter. Because the new term began on January 1, 2017, the time that elapses until a new director is confirmed counts against the 5-year term of office. As a result, the next director's tenure will be less than 5 years.

Going forward, filling these top two slots should be an important priority. On the basis of our prior work, key attributes of a census director, in addition to the obvious ones of technical expertise and the ability to lead large, long-term, and high risk programs, could include abilities in the following areas:

- **Strategic Vision.** The Director needs to build a long-term vision for the Bureau that extends beyond the current decennial census. Strategic planning, human-capital succession planning, and life-cycle cost estimates for the Bureau all span the decade.
- **Sustaining Stakeholder Relationships.** The Director needs to continually expand and develop working relationships and partnerships with governmental, political, and other professional officials in both the public and private sectors to obtain their input, support, and participation in the Bureau's activities.

³⁴13 U.S.C. § 21(a)-(b)(1).

³⁵Id.

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- **Accountability.** The life-cycle cost for a decennial census spans a decade, and decisions made early in the decade about the next decennial census guide the research, investments, and tests carried out throughout the decennial census. Institutionalizing accountability over an extended period may help long-term decennial initiatives provide meaningful and sustainable results.

Further Actions Needed on Our Recommendations

Over the past several years we have issued numerous reports that underscored the fact that if the Bureau was to successfully meet its cost savings goal for the 2020 Census, the Bureau needs to take significant actions to improve its research, testing, planning, scheduling, cost estimation, system development, and IT security practices. Over the past decade, we have made 84 recommendations specific to the 2020 Census to help address these and other issues. The Bureau has generally agreed with those recommendations; however 36 of them had not been implemented as of October 2017. We have designated 20 of these recommendations as a priority for the Department of Commerce and 5 have been implemented. In August 2017, we sent the Secretary of Commerce a letter that identified our open priority recommendations at the Department, 15 of which concern the 2020 Census.³⁶ We believe that attention to these recommendations is essential for a cost-effective enumeration. The recommendations included implementing reliable cost estimation and scheduling practices in order to establish better control over program costs, as well as taking steps to better position the Bureau to develop an Internet response option for the 2020 Census. Appendix I summarizes our priority recommendations related to the 2020 Census and the actions the Department has taken to address them.

On October 3, 2017, in response to our August 2017 letter, the Commerce Secretary noted that he shared our concerns about the 2020 Census and acknowledged that some of the programs had not worked as planned, and are not delivering the savings that were promised. The Commerce Secretary also stated that he intends to improve the timeliness for implementing our recommendations.

We meet quarterly with Bureau officials to discuss the progress and status of open recommendations related to the 2020 Census. We are encouraged by the actions taken by the Department and the Bureau in

³⁶The 15 priority recommendations for the 2020 Census cover the period from November 2009 to January 2017.

addressing our recommendations. Implementing our recommendations in a complete and timely manner is important because it would improve the management of the 2020 Census and help to mitigate continued risks.

In conclusion, while the Bureau has made progress in revamping its approach to the census, it faces considerable challenges and uncertainties in (1) implementing key cost-saving innovations and ensuring they function under operational conditions; (2) managing the development and security of key IT systems; and (3) developing a quality cost estimate for the 2020 Census and preventing further cost increases. Without timely and appropriate actions, these challenges could adversely affect the cost, accuracy, and schedule of the enumeration.

For these reasons, the 2020 Census is a GAO high risk area. Going forward, continued management and Congressional attention—such as hearings like this one—will be vital for ensuring risks are managed, preparations stay on-track, and the Bureau is held accountable for implementing the enumeration as planned.

We will continue to assess the Bureau's efforts to conduct a cost-effective enumeration and look forward to keeping Congress informed of the Bureau's progress. Chairman Johnson, Ranking Member McCaskill, and Members of the Committee, this completes my prepared statement. I would be pleased to respond to any questions that you may have.

GAO Contacts and Staff Acknowledgments

If you have any questions about this statement, please contact Robert Goldenkoff at (202) 512-2757 or by e-mail at goldenkoffr@gao.gov or David A. Powner at (202) 512-9286 or by e-mail at pownerd@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. Other key contributors to this testimony include Lisa Pearson (Assistant Director); Jon Ticehurst (Assistant Director); Katherine Wulff (Analyst in Charge); Mark Abraham; Brian Bothwell; Jeffrey DeMarco; Hoyt Lacy; Jason Lee; Ty Mitchell; LaSonya Roberts; Kate Sharkey; Andrea Starosciak; Umesh Thakkar; and Timothy Wexler.

Appendix I: Priority Recommendations from GAO's Work Related to the 2020 Census

The Department of Commerce and Census Bureau have taken some actions to address our recommendations related to implementation of the 2020 Census; however, a large number of recommendations remain open. Since just prior to the 2010 Census, we have made 84 recommendations in 23 reports to the Department of Commerce and Census Bureau aimed at helping the Bureau prepare for and implement a successful 2020 Census (table 1). Of those 84, the Department of Commerce and the Census Bureau have implemented 48 recommendations. Thirty-six recommendations require additional action.

Table 1: Status of GAO's Recommendations Related to the 2020 Census, as of October 2017

| Fiscal Year | Census Bureau - Implemented | Census Bureau – Not implemented | Total |
|--------------|-----------------------------|---------------------------------|-----------|
| 2007 | 0 | 1 | 1 |
| 2008 | 1 | 0 | 1 |
| 2009 | 3 | 0 | 3 |
| 2010 | 5 | 1 | 6 |
| 2011 | 11 | 7 | 18 |
| 2012 | 15 | 4 | 19 |
| 2013 | 3 | 0 | 3 |
| 2014 | 4 | 4 | 8 |
| 2015 | 4 | 2 | 6 |
| 2016 | 2 | 11 | 13 |
| 2017 | 0 | 6 | 6 |
| Total | 48 | 36 | 84 |

Source: GAO analysis of past reports. | GAO-18-215T

Note: Recommendations are presented by the fiscal years in which they were made.

Of these 84 recommendations, we have designated 20 as priorities for Commerce to address. The Census Bureau has taken some action on our priority recommendations, implementing 5 of the 20 priority recommendations we have made.

The following table presents each of the 20 priority recommendations along with a summary of actions taken to address it.

Table 2: 20 Priority Recommendations from GAO's Work Related to the 2020 Decennial Census

| Recommendation | Implementation Status |
|---|--|
| <p>GAO-17-191. 2020 Census: Additional Actions Could Strengthen Field Data Collection Efforts (Jan 26, 2017).</p> | <p>Not Implemented – Commerce agreed with this recommendation. Evaluation data and studies of the 2016 Census Test experience could provide insight on what operational procedures, training, business rules, or other circumstances resulted in the higher-than-expected number of non-interviews. Making changes as needed, if any, in advance of the 2018 End-to-End Test would provide an opportunity to test them and better ensure that high rates of non-interviews do not adversely affect 2020 Census data quality.</p> |
| <p>GAO-16-628. 2020 Census: Census Bureau Needs to Improve Its Life-Cycle Cost Estimating Process (Jun 30, 2016).</p> | <p>Not Implemented – Commerce agreed with this recommendation. The Bureau needs to provide a cost estimate more current than the October 2015 estimate, and should ensure that the estimate is comprehensive, well-documented, accurate, and credible. In doing this the Bureau should consult GAO's cost assessment guide (GAO-09-3SP) and Standards for Internal Control in the Federal Government (GAO-14-704G). High-quality estimates will explicitly consider all life-cycle costs and assumptions, offer a clear step-by-step account of the methods and data sources used to compile the estimate, ensure the proper estimation techniques are used, reconcile any variances between actual and estimated costs, and allow cross-checking with independent cost estimates as verification of results.</p> |
| <p>3. To further ensure the credibility of data used in cost estimation, the Secretary of Commerce and Under Secretary for Economic Affairs should direct the Census Bureau to establish clear guidance on when information for cost assumptions can and should be changed as well as the procedures for documenting such changes and traceable sources for information being used.</p> | <p>Not Implemented – Commerce agreed with this recommendation. The Bureau should implement processes for controlling and changing cost assumptions. These processes should include methods for evaluating the justification for any changes and documentation requirements that clearly show the information changed and the basis for the change.</p> |

**Appendix I: Priority Recommendations from
GAO's Work Related to the 2020 Census**

| Recommendation | Implementation Status |
|---|---|
| <p>4. To ensure Bureau and congressional confidence that the Bureau's budgeted contingencies are at appropriate levels, the Secretary of Commerce and Under Secretary for Economic Affairs should direct the Census Bureau to improve control over how risk and uncertainty are accounted for and communicated with the Bureau's decennial cost estimation process, such as by implementing and institutionalizing processes or methods for doing so with clear guidance.</p> | <p>Not Implemented – Commerce agreed with this recommendation. The Bureau should ensure that its budget for contingencies reflects an accurate accounting of risk and uncertainty. In doing this, the Bureau should improve controls over risk and uncertainty accounting, ensure that risk accounting informs any relevant budgets and cost estimates, and institutionalize these controls by providing clear methods for their use.</p> |
| <p>GAO-16-48. 2020 Census: Additional Actions Would Help the Bureau Realize Potential Administrative Records Cost Savings (Oct 20, 2015).</p> | |
| <p>5. To help ensure the Bureau focuses its resources on those activities that show promise for substantially reducing enumeration cost, the Secretary of Commerce should direct the Under Secretary of the Economics and Statistics Administration and the Director of the U.S. Census Bureau to establish clearly documented deadlines for making final decisions about which records to use for what purposes, particularly for purposes not yet demonstrated as feasible or involving records it does not already have access to, such as the National Directory of New Hires and KidLink.</p> | <p>Implemented – In its October 2015 action plan the Bureau wrote that the decision points and dates for making final decisions about which records to use for what purposes, were included in the 2020 Census Operational Plan. In June 2017, the Bureau committed to operationally test most of these remaining uses in the 2018 End-to-End Test, and also to make final decisions on all of their uses in September 2018 following the test. After September 2018, the Census Bureau will not pursue the acquisition of further sources.</p> |
| <p>6. To help ensure the Bureau focuses its resources on those activities that show promise for substantially reducing enumeration cost, in advance of the 2016 Census Test and later tests, the Secretary of Commerce should direct the Under Secretary of the Economics and Statistics Administration and the Director of the U.S. Census Bureau to, ensure systematic capture of information about fieldwork cases that experience problems by including information in enumerator training about where to record the issues, who to contact, what details to include, and the importance of doing so.</p> | <p>Not Implemented – Commerce agreed with this recommendation. Bureau officials provided us with training documents used in its 2016 Census Test that they believe addressed the recommendation, but our observations during that test were similar to the ones we made initially that prompted the recommendation. To fully implement this recommendation, the Census Bureau needs to identify what information from tests on a case-by-case basis it finds valuable to have from its enumerators-such as the incidence of specific technical problems with the survey instrument or mobile device-and ensure that during tests enumerators and their first-line supervisors are made aware of the importance of recording such information and how to do so.</p> |
| <p>GAO-15-225. 2020 Census: Key Challenges Need to Be Addressed to Successfully Enable Internet Response (Mar 9, 2015).</p> | |
| <p>7. To ensure that the Bureau is better positioned to deliver an Internet response option for the 2020 Decennial Census, the Secretary of Commerce should direct the Under Secretary for Economic Affairs to direct the Director of the Census Bureau to ensure that the estimated costs associated with the Internet response option are updated to reflect significant changes in the program and to fully meet the characteristics of a reliable cost estimate.</p> | <p>Not Implemented – Commerce neither agreed nor disagreed with this recommendation. To fully implement this recommendation, the Bureau's updated cost estimate needs to reflect significant changes in the program as they relate to the Internet response option and fully meet the characteristics of a reliable cost estimate.</p> |

**Appendix I: Priority Recommendations from
GAO's Work Related to the 2020 Census**

| Recommendation | Implementation Status |
|---|--|
| <p>8. To ensure that the Bureau is better positioned to deliver an Internet response option for the 2020 Decennial Census, the Secretary of Commerce should direct the Under Secretary for Economic Affairs to direct the Director of the Census Bureau to ensure that the methodologies for answering the Internet response rate and IT infrastructure research questions are determined and documented in existing or future project plans in time to inform key design decisions.</p> | <p>Not Implemented – Commerce neither agreed nor disagreed with this recommendation. The Bureau has developed the methodologies for answering IT infrastructure research questions in its 2020 Census Enterprise Architecture and Infrastructure Transition Plan, which describes the Bureau's multiyear plan for evolving the IT infrastructure to support all 2020 Census operations. However, to fully implement this recommendation the Bureau needs to provide documentation that describes the methodology for determining the Internet response rate for the 2020 Census.</p> |
| <p>GAO-15-21. 2020 Census: Census Bureau Can Improve Use of Leading Practices When Choosing Address and Mapping Sources (Oct 2, 2014).</p> | |
| <p>9. To help ensure that the Bureau more rigorously considers data sources and remains on schedule to meet its address and mapping needs, in order to better ensure the Bureau meets its address and mapping needs for 2020 and stays on schedule, the Secretary of Commerce and Undersecretary of Economic Affairs should direct the Census Bureau to (1) develop a detailed integrated plan that includes items such as measurable goals (e.g., estimated numbers of addresses expected or needed from state, local, and tribal governments under GSS-I); schedules and deadlines; and progress monitoring and reporting, and (2) establish a timeline identifying when remaining data source decisions need to be made.</p> | <p>Implemented – The Bureau agreed with this recommendation stating it understood the importance of establishing a detailed plan to determine the amount of data needed and a schedule for the data source decisions. In April, 2017, the Bureau provided us with evidence that collectively represented an integrated plan. It included: the goals the Bureau tracks through its balanced scorecard and E-300 reporting; measurable goals for addresses and how they are reported; the data that are currently in-house and planned dates for data not yet acquired; and a schedule with the associated deadlines to detail a plan for measuring the progress of the data acquisition.</p> |
| <p>GAO-14-389. 2020 Census: Prioritized Information Technology Research and Testing Is Needed for Census Design Decisions (Apr 3, 2014).</p> | |
| <p>10. To ensure that the Bureau is better positioned to make a well-informed design decision for the 2020 Decennial Census, the Secretary of Commerce should direct the Under Secretary of Economic Affairs to direct the Director of the Census Bureau to prioritize the research and testing that the Bureau needs to complete in order to support the operational design decision by the end of fiscal year 2015.</p> | <p>Implemented – In response to our recommendation, in September 2014, the Census Bureau released a document referred to as the "Path to the 2020 Census Design Decision," which outlined four key design areas for the 2020 Census and the key research and testing priorities for each of those design areas. As a result, the Bureau is better positioned to focus its research and testing on high priority redesign areas.</p> |

**Appendix I: Priority Recommendations from
GAO's Work Related to the 2020 Census**

| Recommendation | Implementation Status |
|---|--|
| <p>GAO-14-59. 2020 Census: Bureau Needs to Improve Scheduling Practices to Enhance Ability to Meet Address List Development Deadlines (Dec 19, 2013).</p> | |
| <p>11. To help maintain a more thorough and insightful 2020 Census development schedule in order to better manage risks to a successful 2020 Census, the Secretary of Commerce and Undersecretary of Economic Affairs should direct the U.S. Census Bureau to improve the comprehensiveness of schedules, including ensuring that all relevant activities are included in the schedule.</p> | <p>Not Implemented – Commerce agreed with this recommendation. To fully implement this recommendation, the Bureau needs to include within its integrated master activity schedule at lower levels the activities and milestones it has already identified as needed throughout the 2020 Census lifecycle. We are beginning an audit of the Bureau's scheduling practices this summer and plan to review actions the Bureau may have taken to address this recommendation.</p> |
| <p>12. To help maintain a more thorough and insightful 2020 Census development schedule in order to better manage risks to a successful 2020 Census, the Secretary of Commerce and Undersecretary of Economic Affairs should direct the U.S. Census Bureau to improve the construction of schedules, including ensuring complete logic is in place to identify the preceding and subsequent activities as well as a critical path that can be used to make decisions.</p> | <p>Not Implemented – Commerce agreed with this recommendation. To fully implement this recommendation, the Bureau needs to ensure linkage between activities and the estimated resources needed to complete them. We are beginning an audit of the Bureau's scheduling practices this summer and plan to review actions the Bureau may have taken to address this recommendation.</p> |
| <p>13. To help maintain a more thorough and insightful 2020 Census development schedule in order to better manage risks to a successful 2020 Census, the Secretary of Commerce and Undersecretary of Economic Affairs should direct the U.S. Census Bureau to improve the credibility of schedules, including conducting a quantitative risk assessment.</p> | <p>Not Implemented – Commerce agreed with this recommendation. To fully implement this recommendation, the Bureau needs to conduct quantitative schedule risk analyses with the resulting schedule. We are beginning an audit of the Bureau's scheduling practices this summer and plan to review actions the Bureau may have taken to address this recommendation.</p> |
| <p>GAO-12-626. 2020 Census: Additional Steps Are Needed to Build on Early Planning (May 17, 2012).</p> | |
| <p>14. To improve the Bureau's process of organizational transformation, long-term planning, and strategic workforce planning for the 2020 Census, and thus better position the Bureau to carry out a cost-effective decennial census, the Secretary of Commerce should require the Under Secretary for Economic Affairs who oversees the Economics and Statistics Administration, as well as the Director of the U.S. Census Bureau to, in order to ensure prioritization and timely completion of all necessary research and testing efforts, as well as timely transition to later 2020 Census phases, develop and implement a long-term planning schedule that includes key milestones and deadlines, including (1) deadlines for decisions that directly affect activity in later 2020 Census phases; (2) a schedule for creating, revising, or updating governance, program management, and system engineering and architecture plans to be used in later 2020 Census phases beyond research and testing; and (3) expected times of delivery for Bureau-wide enterprise tools, processes, and standards that 2020 Census planning would be expected to use.</p> | <p>Not Implemented – Commerce agreed with this recommendation. To fully implement this recommendation, the Census Bureau needs to finalize program management and other governance documents applicable to the current and later phases of the decennial lifecycle, as well as finalizing schedules for delivery of Bureau-wide enterprise tools, processes, and standards. As of July 2017, Bureau officials reported they were working to provide artifacts they believe may address this recommendation.</p> |

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| Recommendation | Implementation Status |
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| <p>15. To improve the Bureau's process of organizational transformation, long-term planning, and strategic workforce planning for the 2020 Census, and thus better position the Bureau to carry out a cost-effective decennial census, the Secretary of Commerce should require the Under Secretary for Economic Affairs who oversees the Economics and Statistics Administration, as well as the Director of the U.S. Census Bureau to, in order to inform congressional decision-making related to the 2020 Census, develop and implement an effective congressional outreach strategy, particularly on new design elements the Bureau is researching and considering as well as on cost-quality trade-offs of potential design decisions.</p> | <p>Implemented – In November 2014 the Bureau provided us with a "congressional engagement plan" that describes many of the activities the Bureau undertakes to communicate externally, including with the Congress. For example, the plan describes regular briefings of oversight committee staff as well as the Bureau's public quarterly "program management reviews." The plan by itself did not describe strategies the Bureau might use to encourage productive public dialogue about issues the Bureau's design changes for 2020 Census raise, such as privacy or cost-quality tradeoffs. Yet in the interim, the Bureau has taken significant steps demonstrating a strategic approach to raising potentially sensitive issues externally. For example, the Bureau's October 2015 operational plan for 2020 Census included discussion of cost-quality tradeoffs for its design innovation areas. In June 2016 the Bureau took an unprecedented step by announcing in the federal Register its proposed criteria for determining residency status at different locations, such as prisons, college dormitories and military bases. In August 2016 the Bureau's Associate Director for Communications described to us internal documents the Bureau would prepare to better ensure that key issues were elevated internally for external communication. In September 2016 the Bureau provided us with an updated engagement plan. Such a strategic approach will help contribute to public understanding and acceptance of changes the Bureau is planning for its national headcount in 2020.</p> |
| <p>16. To improve the Bureau's process of organizational transformation, long-term planning, and strategic workforce planning for the 2020 Census, and thus better position the Bureau to carry out a cost-effective decennial census, the Secretary of Commerce should require the Under Secretary for Economic Affairs who oversees the Economics and Statistics Administration, as well as the Director of the U.S. Census Bureau to, in order to improve the Bureau's process for following up on Bureau and oversight agencies' recommendations to improve the 2020 Census, (1) assess the status of recommendation follow-up at regular intervals, such as every 12 months; and (2) periodically report on the status of recommendation follow-up--such as on the Bureau's intranet or Internet pages.</p> | <p>Not Implemented— Commerce agreed with this recommendation. To fully implement this recommendation, the Census Bureau needs to implement mechanisms to capture lessons learned from its ongoing research and testing experience for recommendations in its database, and periodically report on the status of all open recommendations. The Bureau has implemented an internal knowledge management system to help capture its internal lessons learned and has begun quarterly meetings with us to discuss open GAO recommendations. When the status of its own internal recommendations—such as from evaluations of its earlier tests—is more visible inside and outside the Bureau, the Bureau's knowledge management will be better positioned to help the Bureau achieve goals of a cost-effective census.</p> |

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| Recommendation | Implementation Status |
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| <p>GAO-12-80. Decennial Census: Additional Actions Could Improve the Census Bureau's Ability to Control Costs for the 2020 Census (Feb 23, 2012).</p> | |
| <p>17. To improve the Bureau's ability to control costs for the 2020 decennial and balance cost and quality, the Secretary of Commerce should direct the Under Secretary of the Economics and Statistics Administration, as well as the Director of the U.S. Census Bureau, to analyze data from key census-taking activities to determine their marginal costs and benefits, and use this information to inform decisions on developing more cost-effective methods.</p> | <p>Implemented – The Bureau released an Operational Plan for the 2020 Census in November 2015 that summarizes the potential lifecycle cost savings in each of several key innovation areas of its proposed redesign, compared to the estimated cost of a 2020 Census relying on traditional methods. The areas of innovation include reengineering address canvassing, optimizing self response to the census, increasing use of administrative records and third party data, and reengineering field operations. Additional detail we were able to obtain from the Bureau also demonstrated the specific changes in key assumptions within the Bureau's underlying cost model that led to the calculated savings in each of these areas. This comparison by the Bureau, and, specifically, the documentation of the underlying assumptions as they relate to the specific design decisions the Bureau is making, better positions the Bureau to understand where it can control cost.</p> |
| <p>18. GAO previously recommended that the Secretary of Commerce direct the Bureau to establish guidance, policies, and procedures for cost estimation that would meet best practice criteria. To help ensure that the Bureau produces a reliable and high-quality cost estimate for the 2020 Census, the Bureau should finalize guidance, policies, and procedures for cost estimation in accordance with best practices prior to developing the Bureau's initial 2020 life cycle cost estimate.</p> | <p>Not Implemented – Commerce neither agreed nor disagreed with this recommendation. To fully implement this recommendation, the Bureau needs to implement specific controls over its cost estimation process for the 2020 Census, such as guidance that documents who is responsible for what and when, and what information flows where and when. This effort needs to include clear guidance on what documentation is needed to enable independent tracing from cost estimates produced back to the assumptions used and their support or justification. Documentation needs to also include what risk and uncertainty is accounted for by whom and where in the cost estimation process, as well as comply with other leading practices documented in the GAO Cost Estimating and Assessment Guide. In a related audit in 2016 (GAO-16-628 above) we found that the Bureau still lacked adequate guidance.</p> |
| <p>GAO-11-45. 2010 Census: Key Efforts to Include Hard-to-Count Populations Went Generally as Planned; Improvements Could Make the Efforts More Effective for Next Census (Dec 14, 2010).</p> | |
| <p>19. To help improve the effectiveness of the Bureau's outreach and enumeration efforts, especially for HTC populations, should they be used again in the 2020 Census, and to improve some of the Bureau's key efforts to enumerate HTC populations, the Secretary of Commerce should require the Under Secretary for Economic Affairs as well as the Director of the U.S. Census Bureau to evaluate the extent to which each special enumeration activity improved the count of traditionally hard-to-enumerate groups and use the results to help inform decision making on spending for these programs in 2020.</p> | <p>Not Implemented – Commerce generally agreed with this recommendation. To fully implement this recommendation, the Census Bureau needs to demonstrate how it is relying on how various special enumeration activities of historically hard-to-enumerate groups contributed to Census coverage in 2010 as it deliberates its approach for 2020. In April 2017 Bureau officials provided us with evaluation results of the Bureau's 2010 communication efforts and other documents related to ongoing efforts to reduce errors in the census. As of mid-July 2017, Bureau officials reported they were working to provide other artifacts they believe may demonstrate that recommendation has been addressed.</p> |

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| Recommendation | Implementation Status |
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| GAO-10-59 . 2010 Census: Census Bureau Has Made Progress on Schedule and Operational Control Tools, but Needs to Prioritize Remaining System Requirements (Nov 13, 2009). | |
| 20. To improve the Bureau's use of its master schedule to manage the 2020 decennial census, the Secretary of Commerce should require the Director of the U.S. Census Bureau to include estimates of the resources, such as labor, materials, and overhead costs, in the 2020 integrated schedule for each activity as the schedule is built, and prepare to carry out other steps as necessary to conduct systematic schedule risk analyses on the 2020 schedule. | Not Implemented – Commerce neither agreed nor disagreed with this recommendation. To fully implement this recommendation, the Bureau needs to include estimates of the resources needed to complete specific tasks within its master integrated schedule for the 2020 Census and carry out systematic analysis of the risk to cost and schedule. The Bureau has provided us with copies of its schedule, but not yet satisfactory evidence of having completed such an analysis. We are beginning an audit of the Bureau's scheduling practices this summer and plan to review actions the Bureau may have taken to address this recommendation. |

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