# 2020 Census Operational Plan

*A New Design for the 21st Century*

Issued November 2015
Version 1.1

United States™ Census Bureau

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

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# 1. Introduction

## 1.1 PURPOSE

The U.S. Census Bureau's 2020 Census Operational Plan documents the current design for conducting the 2020 Census. As the initial version of an emerging concept of operations, it reflects and supports evidence-based decision making by describing design concepts and their rationale, identifying decisions still to be made, and describing significant issues and risks related to the implementation of the Operational Plan.

## 1.2 DESIGN APPROACH

As shown in Figure 1, the operational design comprises a set of design decisions that drive how the 2020 Census will be conducted. These design decisions are informed through research, testing, and analysis of the cost and quality impacts of different design options. The operational design also drives the requirements for Information Technology (IT) capabilities and acquisitions.

The 2020 Census is being designed and developed on a rolling schedule. Accordingly, this process is iterative. Preliminary design decisions have been made based on early research, testing, and analysis, and these have been used to determine initial requirements for capabilities and acquisitions. As the design matures and more decisions are finalized, the requirements will be updated to reflect the revised design.

An important aspect of the design approach for the 2020 Census is an increased reliance on enterprise standards and solutions. Specifically, the design of all information technology capabilities adheres to the Enterprise Systems Development Life Cycle (eSDLC) and IT Guiding Principles. Furthermore, the 2020 Census Program's budget, schedule, and work activities align with the eSDLC/Mission Enabling and Support Work Breakdown Structure (WBS). The 2020 Census design also leverages enterprise-shared services, including the

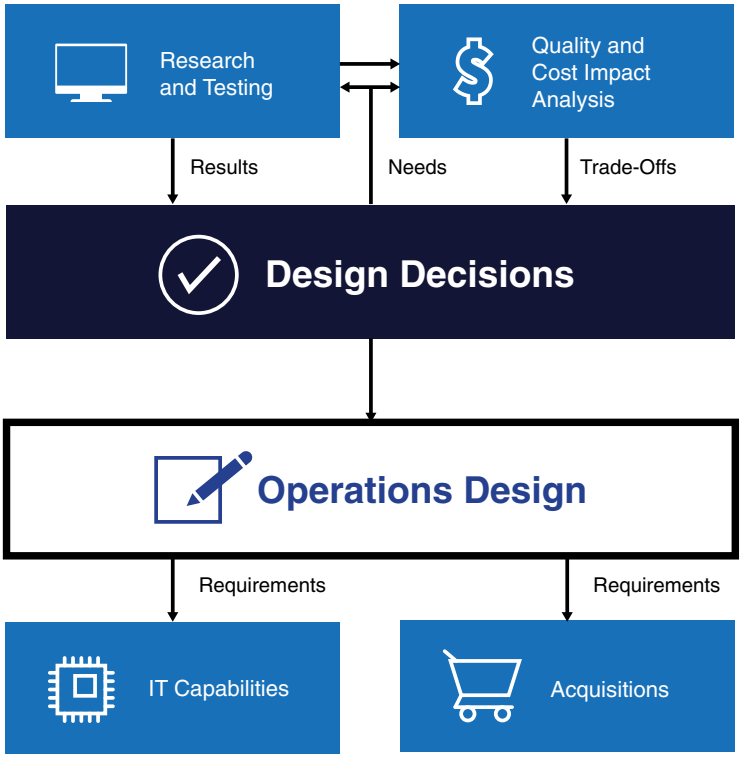


**Figure 1: Approach to the Operational Design**

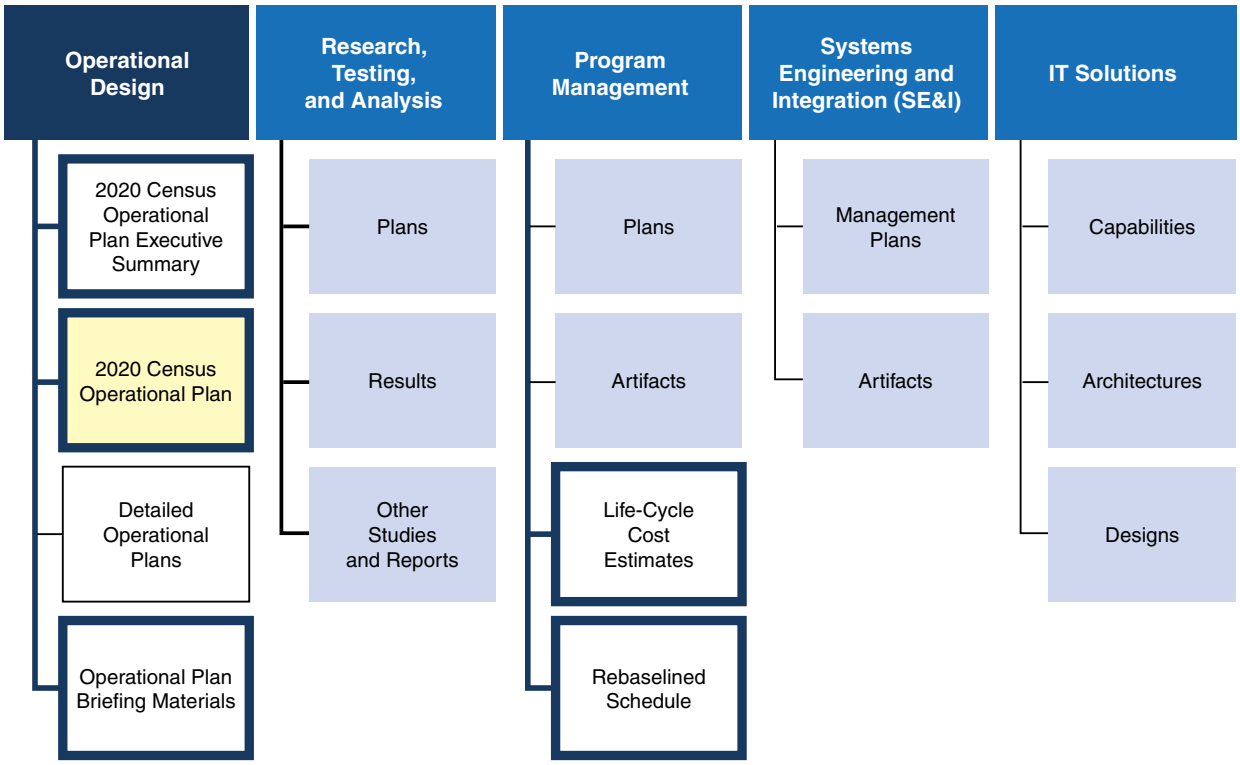


**Figure 2: 2020 Census Program Documentation Structure**

Census Enterprise Data Collection and Processing (CEDCaP) solution and the Center for Enterprise Dissemination Services and Consumer Innovation (CEDSCI) solution.[1] These two initiatives provide the technology solutions required to support significant portions of the innovations for the 2020 Census.

## 1.3 DOCUMENT SCOPE

This document is the initial baseline version of the 2020 Census Operational design and covers all operations required to execute the 2020 Census, starting with precensus address and geographic feature updates, and ending once census data products are disseminated and coverage and quality are measured. It describes what will be done during the 2020 Census and, at a high-level, how the work will be conducted. Additional specifics of how each operation will be performed are documented in individual detailed operational plans, which are being created on a rolling schedule. These detailed plans will include the business process models and requirements that have been developed for each operation.

While this document is a comprehensive plan, the initial research and testing phase focused on those areas that provided the greatest opportunity for cost savings. The maturity level of the plan varies by operation. For each operation, the plan presents the decisions made to date and the decisions that still need to be made. Research and testing to refine and improve all operations will continue through the end-to-end test in 2018.

As shown in Figure 2, this Operational Plan, shaded in yellow, is part of a broader set of documentation for the 2020 Census Program that will be developed as the Program matures. Those items outlined in dark blue (i.e., the 2020 Census Operational Plan Executive Summary, the Operational Plan Briefing Materials, the Life-cycle Cost Estimates, and the Rebaselined Schedule) are being completed in conjunction with this Plan.

[1] Throughout this document references are made to specific systems that are part of CEDCaP. These are the systems being used to support the early 2020 Census tests; however, final decisions on production systems have not been made.

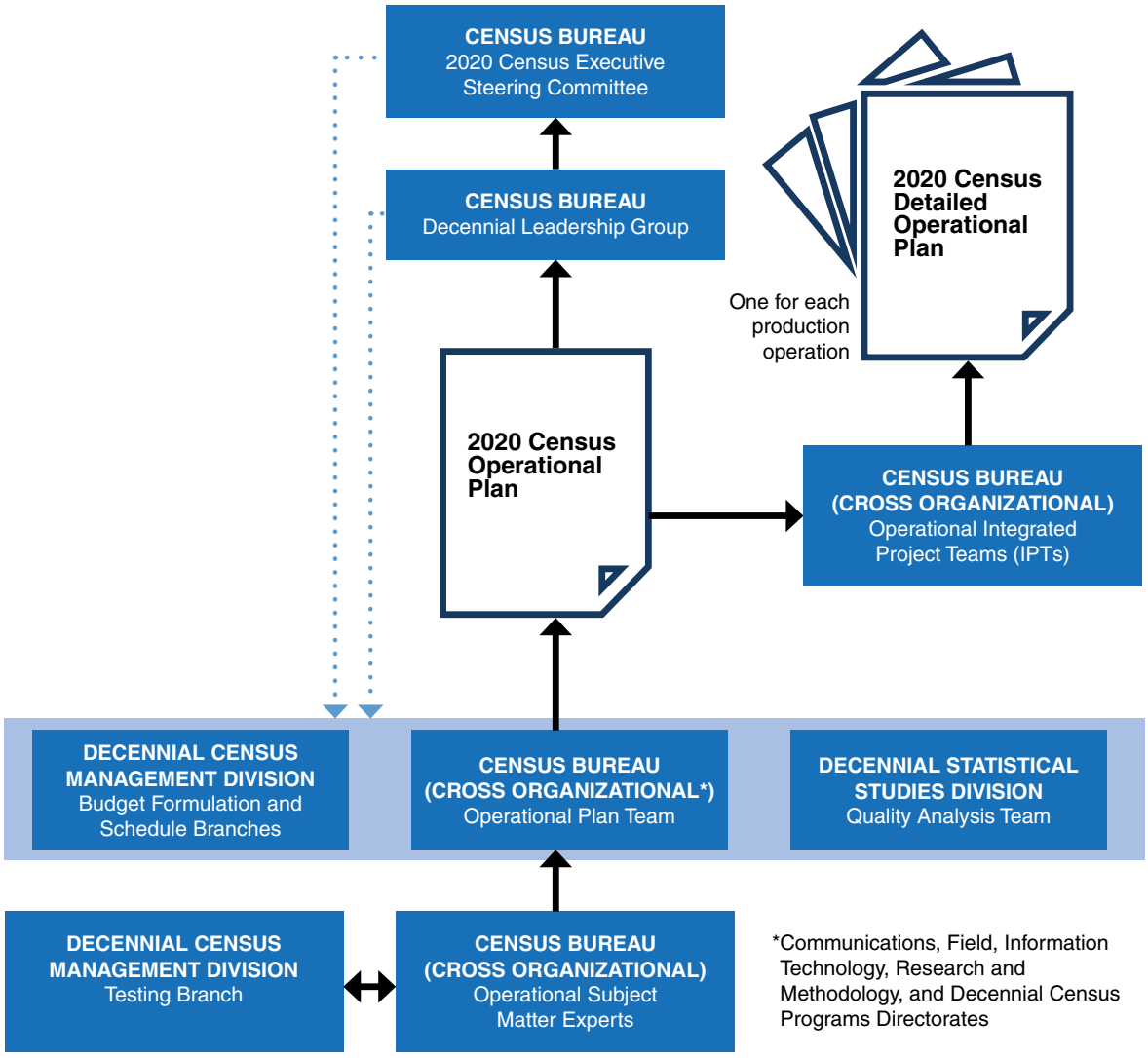


**Figure 3: Organizations and Governance Boards for the 2020 Census Operational Plan**

## 1.4 DOCUMENT DEVELOPMENT PROCESS

Many organizations across the Decennial Census Directorate and the Census Bureau have been involved in developing the 2020 Census operational design. Figure 3 illustrates these organizations. The Operational Plan Team consists of subject matter experts from the key Census Bureau organizations with significant roles in supporting the 2020 Census. This team, supplemented with additional subject matter experts from across the Census Bureau, plays a key role in identifying research needs, preparing for and analyzing the results of tests, and recommending design decisions. The Decennial Census Management Division is leading the development of the schedule, life-cycle cost analysis, and the testing. The Decennial Statistical Studies Division is leading the quality analysis. The 2020 Census Operational Plan has been reviewed and approved by both the Decennial Leadership Group and the 2020 Census Executive Steering Committee. Over the next 2 years, Operational Integrated Project Teams are developing detailed Operational Plans for each production operation.

## 1.5 DOCUMENT ORGANIZATION

This document is organized into eight sections:

1. Introduction
2. The 2020 Census Overview
3. The Four Key Innovation Areas
4. Key Tests, Milestones, and Production Dates
5. The 2020 Census Operations
6. Key Program-Level Risks
7. Quality Analysis
8. Life-Cycle Cost Estimate

Section 5 describes each of the 34 census operations and constitutes the bulk of this Operational Plan.

# 2. The 2020 Census Overview

## 2.1 PURPOSE, GOAL, AND CHALLENGE

The purpose of the 2020 Census is to conduct a census of population and housing and disseminate the results to the President, the states, and the American people. The goal of the 2020 Census is to count everyone once, only once, and in the right place, and the challenge is to conduct a 2020 Census at a lower cost per household (adjusted for inflation) than the 2010 Census, while maintaining high quality results.

## 2.2 USES OF DECENNIAL DATA

As the operational design of the 2020 Census is finalized, it is important to keep in mind the purpose of the 2020 Census and how the data will be used.

The primary requirement of the decennial census is the apportionment of seats allocated to the states for the House of Representatives. This requirement is mandated in the U.S. Constitution:

> Article I, Section 2, "*The actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent Term of ten Years*"
>
> Fourteenth Amendment, Section 2, "*Representatives shall be apportioned among the several States according to their respective numbers, counting the whole number of persons in each State*"

Decennial data at the census block level are used by governmental entities for redistricting, i.e., defining the representative boundaries for congressional districts, state legislative districts, school districts, and voting precincts. Additionally, decennial data are used to enforce voting rights and civil rights legislation.

The Census Bureau also uses the decennial census results to determine the statistical sampling frames for the American Community Survey (ACS), which replaced the long form in the decennial census and is part of the Decennial Program, and the dozens of current surveys conducted by the Census Bureau. The results of these surveys are used to support important government functions, such as appropriating federal funds to local communities (an estimated $400 billion annually); producing monthly unemployment, crime, and poverty rates; and publishing health and education data.

Finally, decennial data play an increasingly important role in U.S. commerce and the economy. As people expand their use of data to make decisions at the local and national levels, they increasingly depend on data from the Census Bureau to make these decisions. Today, local businesses look at data provided by the Census Bureau on topics like population growth and income levels to make decisions about whether or where to locate their restaurants or stores. Similarly, a real estate investor, who is considering investing significant funds to develop a piece of land in the community, relies on Census Bureau data to measure the demand for housing, predict future need, and review aggregate trends. Big businesses also rely heavily on Census Bureau data to make critical decisions that impact their success and shape the economy at the national level. As noted above, the decennial census is the foundation for the Census Bureau's demographic survey data.

The decennial data must meet high quality standards to ensure good decision-making and to continue building confidence in the government, society, and the economy. Studying the balance between cost and quality is an increasing focus of the census design in the 2016–2018 years.

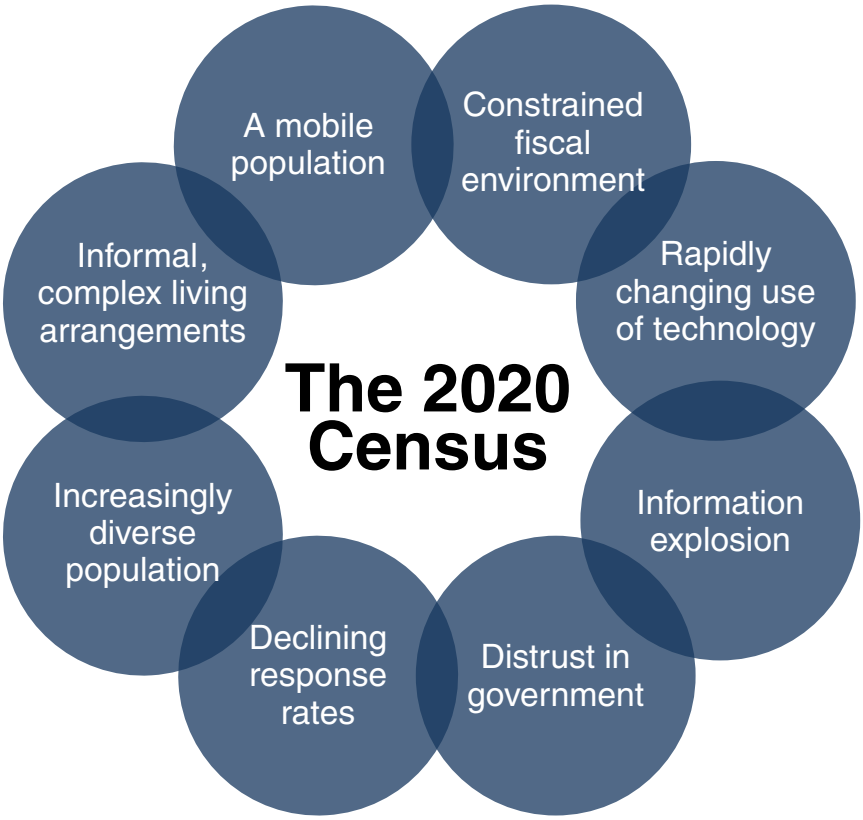


**Figure 4: 2020 Census Environment**

## 2.3 THE CHANGING ENVIRONMENT AND ESCALATING COSTS

The 2020 Census challenge is exacerbated by multiple environmental factors that have the potential to impact its success. The Census Bureau is committed to proactively addressing the challenges that follow (see Figure 4):

- **Constrained fiscal environment:** Budget deficits place significant pressure on funding available for the research, testing, design, and development work required for successful innovation.
- **Rapidly changing use of technology:** Stakeholders expect the decennial census to use technology innovation, yet the rapid pace of change makes it challenging to plan for and adequately test the use of these technologies before they become obsolete.
- **Information explosion:** Rapid changes in information technology create stakeholder expectations for how the Census Bureau interacts with the public to obtain and disseminate data products.
- **Distrust in government:** Concerns continue to grow about information security and privacy, the confidentiality of information given to the government, and how government programs will use the information it collects. This makes it more difficult to collect important demographic survey information.
- **Declining response rates:** Response rates for Census Bureau surveys, and for surveys and censuses in general, have declined as citizens are overloaded with requests for information and become increasingly concerned about sharing information.
- **Increasingly diverse population:** The demographic and cultural make-up of the United States continues to increase in complexity, resulting in a growing number of households and individuals who do not speak English as their native language, who have a wide variety of cultural traditions and mores, and who may

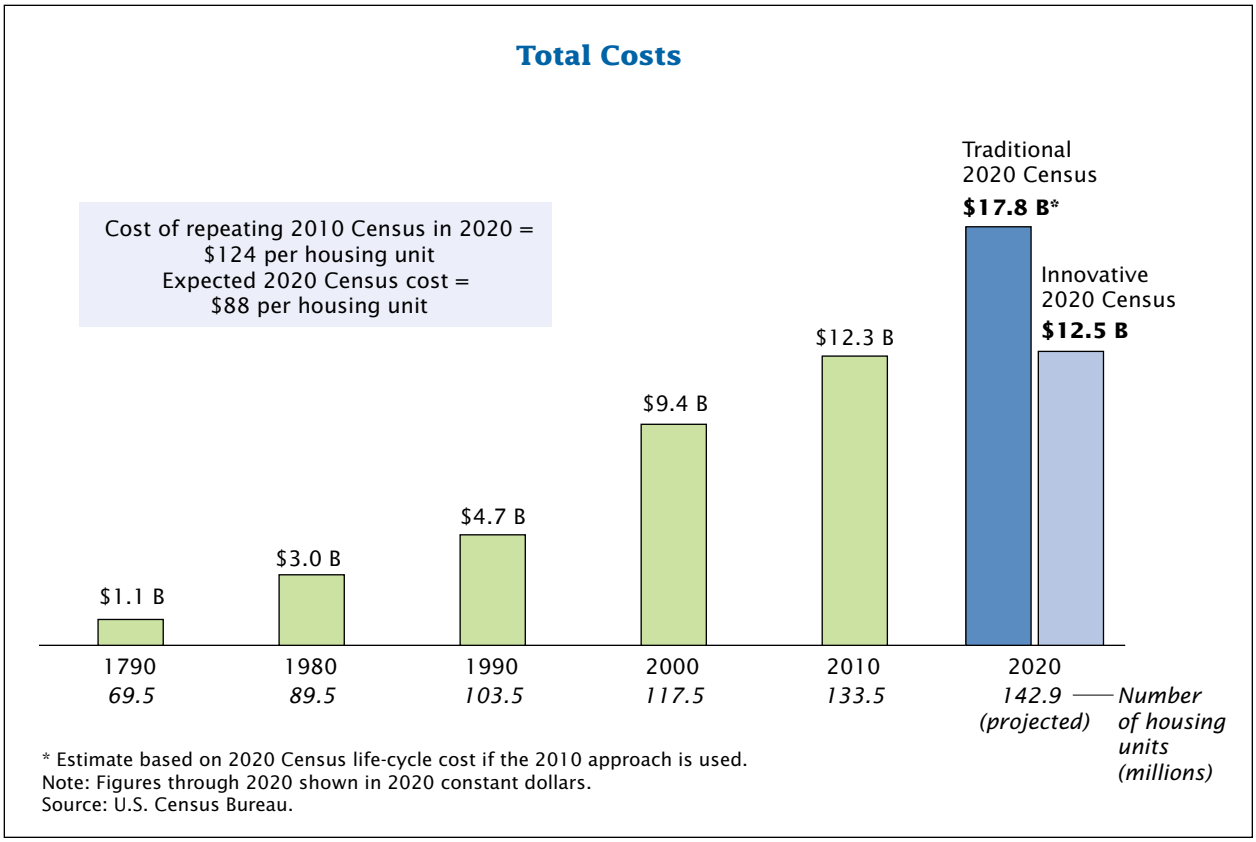


**Figure 5: Costs—Traditional vs Innovative 2020 Census**

have varying levels of comfort with government involvement.

- **Informal, complex living arrangements:** Households are becoming more diverse and dynamic, making it a challenge to associate an identified person to a single location. For example, blended families may include children who have two primary residences. Additionally, some households include multiple relationships and generations.
- **A mobile population:** The United States continues to be a highly mobile nation as about 12 percent of the population moves in a given year, based on results from the ACS conducted in 2012–2013 and 2013–2014. Continued growth in the use of cellular telephone technology and an associated reduction in landline telephones tied to physical locations may also complicate enumeration.

Several of the societal, demographic, and technological trends listed above can result in a population that is harder and more expensive to enumerate. As it becomes more challenging to locate individuals and solicit their participation through traditional methods, the Census Bureau must decade after decade spend more money simply to maintain the same level of accuracy as in previous censuses. As shown in Figure 5, on average, the total costs—in constant dollars—of conducting the decennial census have increased significantly each decade. Initial estimates for expected total costs for the 2020 Census are $17.8 billion if the Census Bureau repeats the 2010 Census design and methods. With the innovations described in this Operational Plan, the Census Bureau estimates that it can conduct the 2020 Census for $12.5 billion.

## 2.4 FOUR KEY INNOVATION AREAS

With cost reductions in mind, the 2020 Census team focused on four Key Innovation Areas:


Field costs associated with Address Canvassing and Nonresponse Followup operations comprise the most expensive parts of the 2020 Census. All four innovation areas are aimed at reducing the costs of fieldwork. A reengineered Address Canvassing operation is expected to reduce the field workload for address updating by 75 percent. Self-response innovations, which are aimed at generating the largest possible self-response rate, coupled with the use of administrative records and third-party data, are intended to reduce the field workload associated with Nonresponse Followup. Finally, the reengineered field operations are intended to increase the efficiency of those operations, allowing managers and fieldworkers to be more productive and effective.

Each innovation area is described further in Section 3.

## 2.5 A NEW DESIGN FOR THE 21ST CENTURY

Figure 6 describes at a high-level how the 2020 Census will be conducted. This design reflects a flexible approach that takes advantage of new technologies and data sources while minimizing risk.

The first step in conducting the 2020 Census is to identify all of the addresses where people could live, or **Establish Where to Count**. An accurate address list helps ensure that everyone is counted. For the 2020 Census, the Census Bureau will begin an in-office review of 100 percent of the nation's addresses in September 2015 and continually update the address list based on data from multiple sources, including the U.S. Postal Service, tribal, state, and local governments, satellite imagery, and third-party data providers. This office work will also determine which parts of the country require fieldwork to verify address information. While fieldwork will begin in 2016 on a small scale for address coverage measurement, the bulk of the In-Field Address Canvassing will begin in 2019 and is anticipated to cover approximately 25 percent of all addresses, a significant reduction from the 100 percent that were reviewed in the field during the 2010 Census.

As noted on page 6, response rates to surveys and censuses have been declining. To **Motivate People to Respond**, the 2020 Census will include a nationwide communications and partnership campaign. This campaign is focused on getting people to respond on their own (self-respond) as it costs significantly less to process a response provided via the Internet or through a paper form than it does to send a fieldworker to someone's home to collect their response. Advertising will make heavy use of digital media, tailoring the message to the audience.

The Census Bureau **Counts the Population** by collecting information from all households, including those residing in group or unique living arrangements. The Census Bureau wants to make it easy for people to respond anytime and anywhere. To this end, the 2020 Census will offer and encourage people to respond via the Internet and will not require people to enter a unique Census identification with their response. Online responses will be accurate, secure, and convenient. If people are at the bus stop, waiting at the doctor's office, or watching TV and do not have their Census ID handy, they can provide their address instead.

For those who do not respond, the Census Bureau will use the most cost-effective strategy for contacting and counting people. The goal for the 2020 Census is to reduce the average number of visits by using available data from government administrative records and third-party sources. These data may be used to identify vacant households,

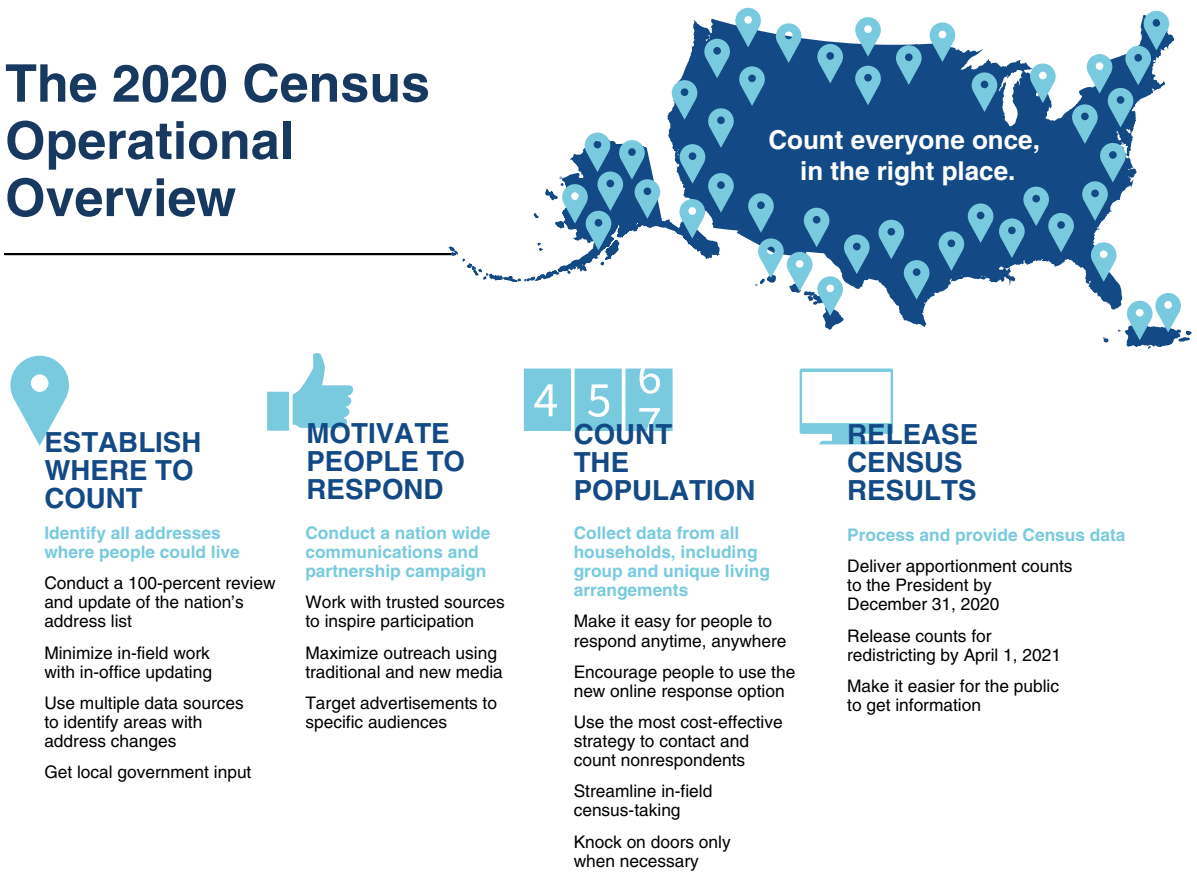


**Figure 6: The 2020 Census—A New Design for the 21st Century**

determine the best time of day to visit a particular household, or to count the people and fill in the responses with existing high-quality data from trusted sources. A reduced number of visits will lead to significant cost savings. It can also allow the Census Bureau to focus its field resources to achieve consistent response rates across geographic areas and demographic groups.

Additional cost savings are expected to result from the use of automation to streamline in-field census taking. Fieldworkers will use handheld devices for collecting the data. Operations such as recruiting, training, and payroll will be automated, reducing the time required for these activities. New operational control centers will rely on automation to manage the work, enabling more efficient case assignment, automatic determination of optimal travel routes, and reduction of the number of physical offices. In general, a streamlined operation and management structure is expected to increase productivity and save costs.

The last step in the 2020 Census is to **Release the 2020 Census Results**. The 2020 Census data will be processed and sent to the President (for apportionment) by December 31, 2020, to the states (for redistricting) by March 31, 2021, and to the public beginning in December 2021.

## 2.6 THE 2020 CENSUS OPERATIONS

The 2020 Census includes 34 operations that are organized into eight major areas that correspond with the Census Bureau standard WBS. The term operation refers to both support and business functions. For example, Program Management is considered a support function, and Address Canvassing is considered a business function. Table 1 provides a high-level purpose statement for each operation.

## Table 1: Operations and Purpose

| Operations | Purpose |
|---|---|
| Program Management | |
| Program Management | Define and implement program management policies, processes, and the control functions for planning and implementing the 2020 Census. |
| Census/Survey Engineering | |
| Systems Engineering and Integration (SE&I) | Manage the delivery of a system of systems that meets the 2020 Census Program business and capability requirements. Implement and manage the full eSDLC for systems supporting the 2020 Census. |
| Security, Privacy, and Confidentiality | Ensure that all operations and systems used in the 2020 Census adhere to the appropriate systems and data security, respondent, and employee privacy and confidentiality policies, and regulations. |
| Content and Forms Design | Identify, research, and finalize content and design of questionnaires and other nonquestionnaire materials, ensure consistency across data collection modes and operations, and promote high response rates and accurate and consistent responses across modes. |
| Language Services | Assess and support language needs of non-English speaking populations for all modes and other mailing and field materials, determine the number of languages and level of support required, optimize non-English content, and ensure cultural relevancy and meaningful translation of non-English materials. |
| Frame | |
| Geographic Programs | Provide the geographic foundation in support of the 2020 Census data collection and tabulation activities, including delineation of boundaries in the Master Address File (MAF)/Topologically Integrated Geographic Encoding and Referencing (TIGER) System, delivery of address and spatial extracts from the MAF/TIGER System, and updates to the MAF/TIGER System. |
| Local Update of Census Addresses (LUCA) | Provide an opportunity for tribal, federal, state, and local governments to review and improve the address lists and maps used to conduct the 2020 Census as required by Public Law (P.L.) 103-430. |
| Address Canvassing | Deliver a complete and accurate address list and spatial database for enumeration and determine the type and address characteristics for each living quarter. |

**Table 1: Operations and Purpose**—Con.

| Operations | Purpose |
|---|---|
| Response Data | |
| Forms Printing and Distribution | Print and distribute Internet invitations, reminder postcards, and questionnaire mailing packages to support the 2020 Census mailing strategy and enumeration of the population. |
| Paper Data Capture | Capture and convert data from the 2020 Census paper questionnaires, including document preparation, scanning, Optical Character Recognition, Optical Mark Recognition, Key From Image, editing, and checkout. |
| Integrated Partnership and Communications (IPC) | Communicate the importance of participating in the 2020 Census to the entire population of the 50 states, the District of Columbia, and Puerto Rico. Motivate people to self-respond, preferably via the Internet, and raise and keep awareness high throughout the entire 2020 Census. |
| Internet Self-Response | Collect response data via the Internet to reduce paper and Nonresponse Followup and maximize online response to the 2020 Census via contact strategies and improved access for respondents. |
| Non-ID Processing | Make it easy for people to respond anytime, anywhere to increase self-response rates by providing response options that do not require a unique Census ID. |
| Update Enumerate (UE) | Update the address and feature data and enumerate housing units in certain designated geographic areas with special enumeration needs (e.g., areas that do not have city-style addresses and areas with unique challenges associated with accessibility). |
| Group Quarters (GQ) | Enumerate people living or staying in group quarters, people experiencing homelessness, and people receiving service at service-based locations. |
| Enumeration at Transitory Locations (ETL) | Enumerate individuals in occupied units at transitory locations, such as recreational vehicle parks, campgrounds, tent cities, racetracks, circuses, carnivals, marinas, hotels, and motels, who do not have a usual home elsewhere. |
| Census Questionnaire Assistance (CQA) | Provide questionnaire assistance for respondents by answering questions about specific items on the census form or other frequently asked questions about the 2020 Census and provide an option for callers to complete a census interview over the telephone. |
| Nonresponse Followup (NRFU) | Determine housing unit status for nonresponding addresses and enumerate housing units for which a census response was not received. |
| Response Processing | Establish the initial 2020 Census universe, assign the specific enumeration strategy for each census case based on case status and associated paradata, create and distribute workload files required for enumeration operations, track case enumeration status, and run postdata collection processing actions in preparation for producing the final 2020 Census results. |
| Federally Affiliated Americans Count Overseas | Obtain counts by home state of U.S. military and federal civilian employees stationed or deployed overseas and their dependents living with them. |

**Table 1: Operations and Purpose**—Con.

| Operations | Purpose |
|---|---|
| Publish Data | |
| Data Products and Dissemination | Prepare and deliver the 2020 Census population counts to the President of the United States for Congressional apportionment, tabulate and disseminate 2020 Census data products for use by the states for redistricting, and tabulate and disseminate 2020 Census data for use by the public. |
| Redistricting Data | Provide to each state the legally required P.L. 94-171 redistricting data tabulations by the mandated deadline of 1 year from Census Day: April 1, 2021. |
| Count Review | Enhance the accuracy of the 2020 Census by implementing an efficient and equitable process for Federal State Cooperative Population Estimates members to identify missing housing units and missing or geographically misallocated large group quarters. |
| Count Question Resolution (CQR) | Provide a mechanism for governmental units to challenge their official 2020 Census results. |
| Archiving | Provide 2020 Census records deemed permanent, including files containing individual responses, to the National Archives and Records Administration for archiving and to the National Processing Center (NPC) to use as source materials to conduct the Age Search Service. |
| Other Censuses | |
| Island Areas Censuses (IA) | Update and enumerate all living quarters in the Pacific Island Area of American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and the U.S. Virgin Islands, collectively known as the Island Areas. |
| Test and Evaluation | |
| Coverage Measurement Design and Estimation | Develop the survey design and sample for the postenumeration survey for the 2020 Census. Produce coverage error estimates and independent assessment of coverage via demographic analysis. |
| Coverage Measurement Matching | Identify matches and nonmatches between the 2020 Census and the Census Coverage Measurement Survey for the enumerated housing units and people. |
| Coverage Measurement Field Operations | Collect person and housing unit information (independent from the 2020 Census operations) for the sample of housing units in the Census Coverage Measurement Survey. |
| Evaluations and Experiments | Measure the success of critical 2020 Census operations. Formulate and execute an experimentation program to support early planning and inform the transition and design of the 2030 Census. |
| Infrastructure | |
| Decennial Service Center (DSC) | Support 2020 Census Field Operations and handle all service requests initiated by field staff. |
| Field Infrastructure | Coordinate space acquisition for and lease management of the Regional Census Centers and field offices and provide the administrative infrastructure for data collection operations covering the 50 states, the District of Columbia, and Puerto Rico. |
| Decennial Logistics Management | Provide logistics management services to include procuring warehouse space, warehousing, inventory management, kit assembly, deployment of materials, and receiving and accessing materials. |
| IT Infrastructure | Provide the IT Infrastructure to support the 2020 Census, including enterprise systems and applications, 2020 Census-specific applications, field IT infrastructure, and mobile computing. |

Figure 7 presents a graphic representation of the 34 operations organized into the eight areas described above. A separate area, Other Censuses, was added to account for the Island Areas Censuses operation, which is unique to the Decennial Census Programs. See Section 5 for details about the design and decisions for each of these operations.

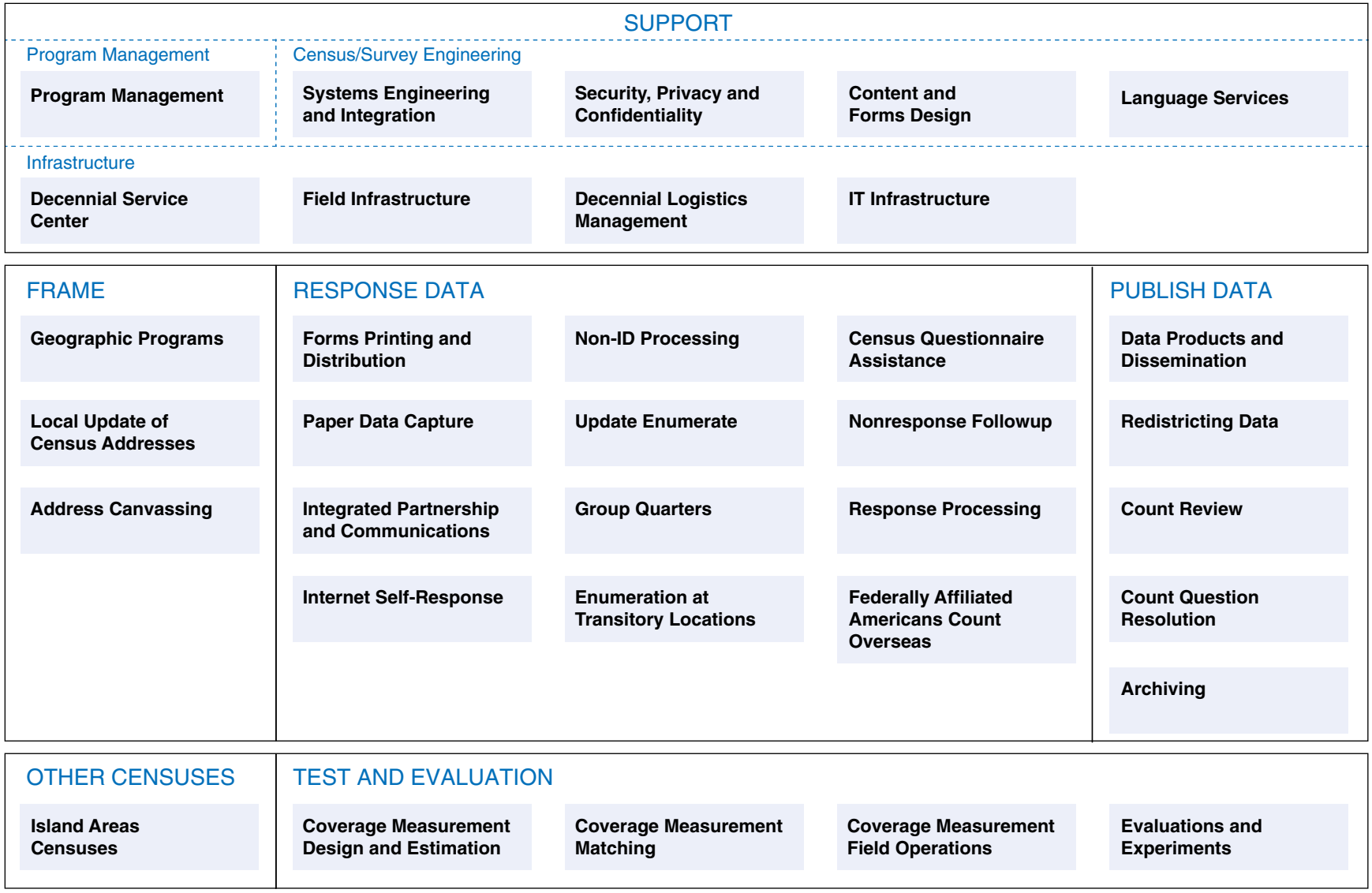


**Figure 7: Operations by Work Breakdown Structure**

# 3. The Four Key Innovation Areas

The 2020 Census is designed to cost less per housing unit than the 2010 Census (when adjusted for inflation), while continuing to maintain high quality. The Census Bureau plans to achieve this by conducting the most automated, modern, and dynamic decennial census in history. The 2020 Census includes sweeping design changes in four key areas, including new methodologies to conduct Address Canvassing, innovative ways of optimizing self-response, the use of administrative records and third-party data to reduce the Nonresponse Followup (NRFU) workload, and the use of technology to reduce the manual effort and improve productivity of field operations. The primary goal is to achieve dramatic cost savings by:

- Adding new addresses to the Census Bureau's address frame using geographic information systems and aerial imagery instead of sending Census employees to walk and physically check 11 million census blocks.
- Encouraging the population to respond to the 2020 Census using the Internet, reducing the need for more expensive paper data capture.
- Using data the public has already provided to the government and data available from commercial sources, allowing realized savings to focus additional visits in areas that have been traditionally hard to enumerate.
- Using sophisticated operational control systems to send Census employees to follow up with nonresponding housing units and to track daily progress.

The Census Bureau estimates that conducting a 2020 Census that includes these major cost-saving innovations has the potential to save approximately $5.2 billion compared with repeating the 2010 design in the 2020 Census.

## 3.1 REENGINEERING ADDRESS CANVASSING

The goal of Reengineering Address Canvassing is to eliminate the need to canvass every block. Instead, the Census Bureau is developing innovative methodologies for updating the MAF/TIGER System throughout the decade. Figure 8 highlights the key concepts in the Reengineering Address Canvassing approach.

Continual research and updating will be conducted through an In-Office Address Canvassing operation that will begin in September 2015 and continue through the 2020 Census. Clerks will start with the 2015 Census address list and update it based on new information from the United States Postal Service (USPS), and data from tribal, state, and local governments and third parties (i.e., commercial vendors). Clerks will review satellite imagery to determine where changes in addresses are occurring, and based on these changes, the Census Bureau will develop a plan for capturing those changes. This plan will include an In-Field Address Canvassing operation where address updates cannot be obtained or verified or in areas undergoing rapid change. The number of addresses requiring In-Field Canvassing is expected to be approximately 25 percent of the total number of addresses. These design changes have the potential to save the Census Bureau an estimated $900 million.

The operations shaded in darker blue in Figure 9 include innovations related to Reengineering Address Canvassing.

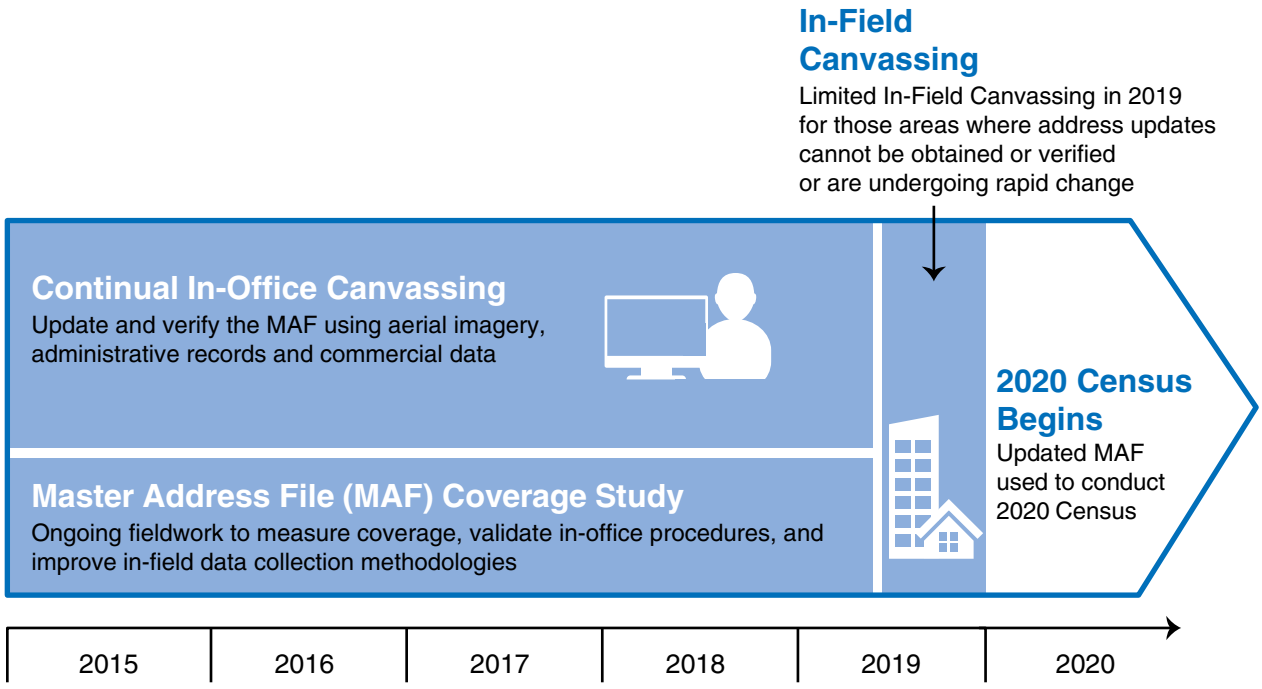


**Figure 8: Summary of Reengineering Address Canvassing**

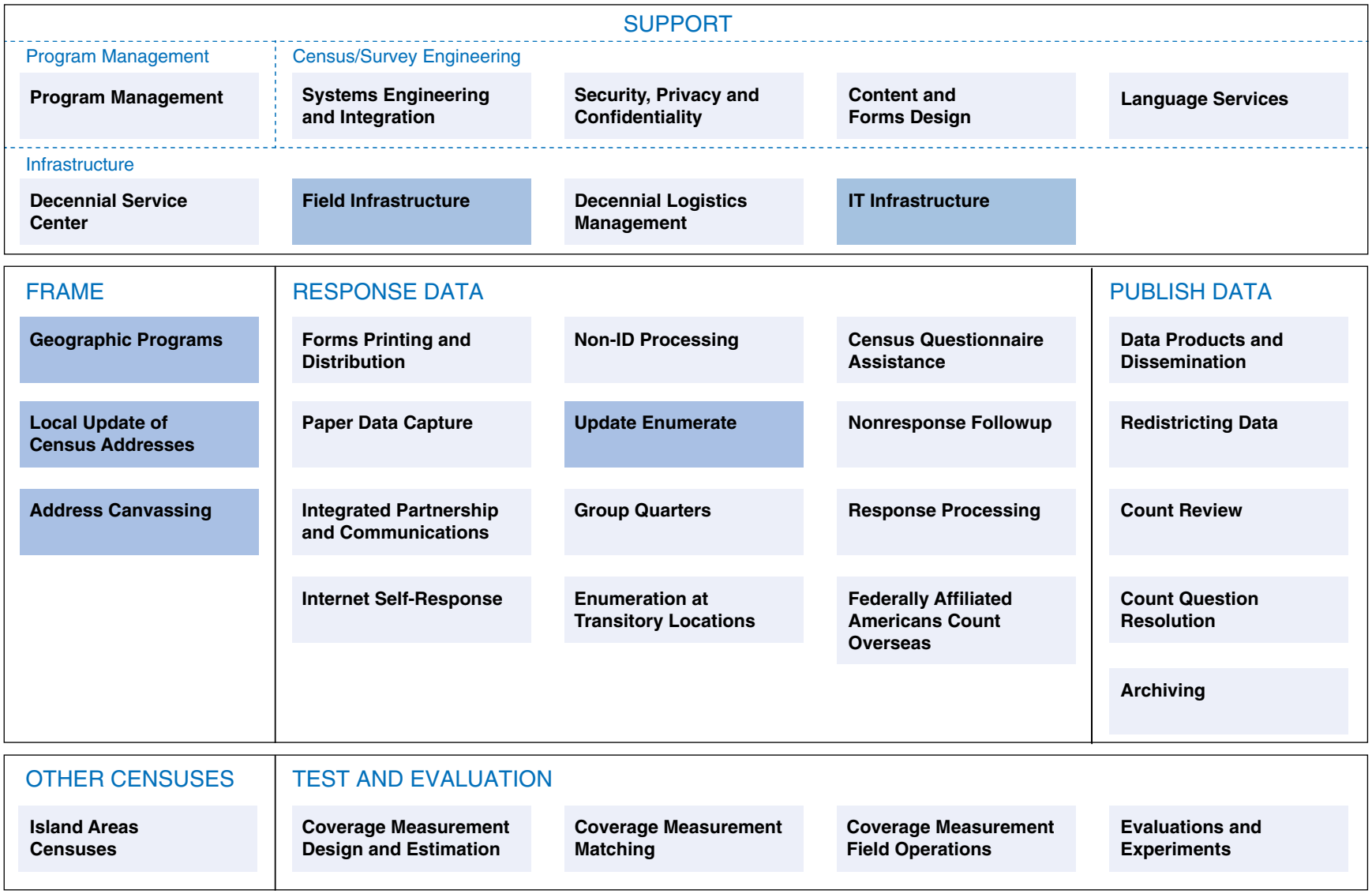


**Figure 9: Operations That Contribute to Reengineering Address Canvassing**

Documented below are brief descriptions of how each operation contributes to the Reengineering Address Canvassing innovation area:

### Table 2: Description of Operations That Contribute to Reengineering Address Canvassing

| Operation | Contributions |
|---|---|
| Geographic Programs | Simplified collection geography.<br>Simplified Type of Enumeration Area delineation.<br>More data sources to validate and augment the frame.<br>More frequent engagement with partners to improve quality of the MAF/TIGER System. |
| Local Update of Census Addresses | LUCA submissions validated as part of In-Office or In-Field Address Canvassing. |
| Address Canvassing | 100 percent address canvassing conducted in-office.<br>Target 25 percent of living quarters for In-Field Address Canvassing.<br>Ongoing in-office and in-field improvement process.<br>Classification of living quarter types during in-office review.<br>Increased productivity of field staff due to automated case assignment and route optimization. |
| Update Enumerate | Geography in UE areas not included in the in-field workloads. |
| Field Infrastructure | Reduced office infrastructure needed for In-Field Address Canvassing.<br>Automated administrative functions. |
| IT Infrastructure | Listing applications for In-Field Address Canvassing with flexibility to support government-furnished equipment, personally owned devices, and Device as a Service.<br>Enterprise solutions with flexible architecture.<br>Additional IT infrastructure to support In-Office Address Canvassing. |

Additional operations that contribute to Reengineering Address Canvassing include: Decennial Service Center; Security, Privacy, and Confidentiality; Integrated Partnership and Communications (IPC), and the Systems Engineering and Integration (SE&I).

## 3.2 OPTIMIZING SELF-RESPONSE

The goal of this innovation area is to communicate the importance of the 2020 Census to the U.S. population and generate the largest possible self-response, reducing the need to conduct expensive in-person follow-up with those households.

As shown in Figure 10, the Census Bureau plans to motivate people to respond by using technology and administrative records and third-party data to target advertisements and tailor contact strategies to different demographic groups and geographic areas. The Census Bureau also plans to utilize its partnership program, providing information to government agencies and hosting events at community, recreation, and faith-based organizations. Communication and contact strategies will encourage the use of the Internet as the primary response mode through a sequence of invitations and postcard mailings. In addition, when Census fieldworkers visit a house and no one is home, the notice of visit will encourage self-response.


**Figure 10: Summary of Optimizing Self-Response**

A second key aspect of Optimizing Self-Response is to make it easy for people to respond from any location at any time. This is done in several ways:

- By enabling people to respond via multiple modes (Internet, paper, or telephone if they call the Census Questionnaire Assistance [CQA] Center).
- By allowing respondents to submit a questionnaire without a unique identification code.
- By providing online forms in multiple languages.

For these innovations to be successful, respondents must know that their personal information is protected. Thus, a key element of this innovation area is to assure respondents that their data are secure and treated as confidential.

These design changes have the potential to save the Census Bureau an estimated $400 million.

The operations shaded in darker blue in Figure 11 include innovations related to Optimizing Self-Response.

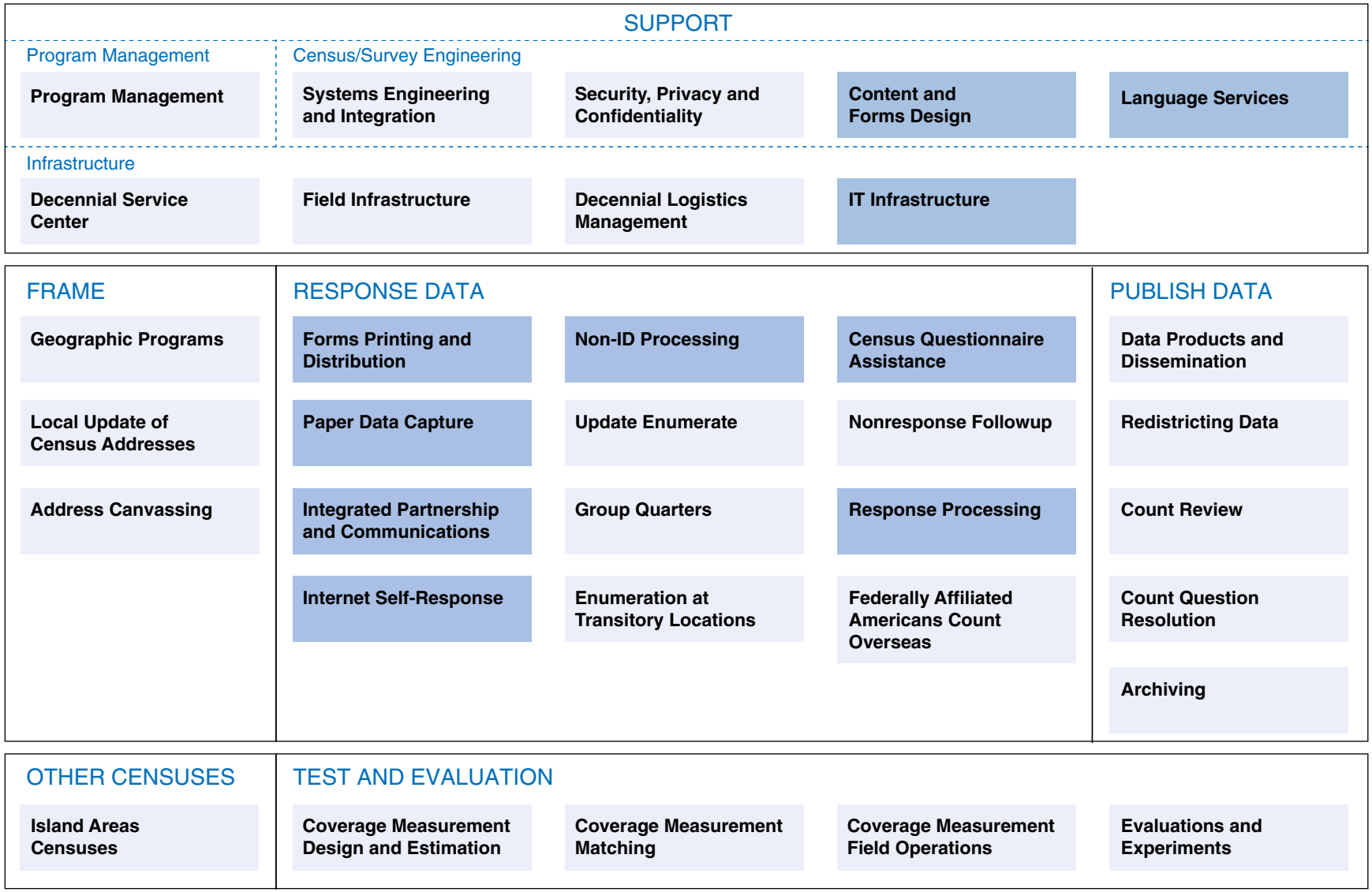


**Figure 11: Operations That Contribute to Optimizing Self-Response**

Documented below are brief descriptions of how each operation contributes to the Optimizing Self-Response innovation area:

### Table 3: Description of Operations That Contribute to Optimizing Self-Response

| Operation | Contributions |
|---|---|
| Content and Forms Design | Questionnaire designed for multiple modes and devices. |
| Language Services | Non-English questionnaires available across modes.<br>Non-English content development of contact materials (e.g., invitation letters and postcards). |
| Forms Printing and Distribution | Census mailing that encourages people to respond via the Internet. |
| Paper Data Capture | Paper available as a response mode. |
| Integrated Partnership and Communications | Micro-targeted advertising.<br>Multi-channel outreach.<br>Integrated Partnership and Communications program adjusted based on customer response, behavior, and feedback.<br>National and local partnerships promoting self-response.<br>Educational awareness campaign via traditional and new media sources (e.g., social media). |
| Internet Self-Response | Multi-mode contact approach (e.g., postcard, e-mail, phone, and text).<br>Optimized for mobile devices.<br>Multiple languages available.<br>Contact approach tailored to demographic and geographic areas based on administrative records, third-party data, and paradata analysis.<br>Real-time edits for Internet Self-Response to improve quality. |
| Non-ID Processing | Public can respond anytime, anywhere without a unique Census ID.<br>Real-time geocoding of responses.<br>Real-time validation of responses without a unique Census ID.<br>Real-time soft edits and checks for addresses.<br>Administrative records and third-party data used to validate identity and validate and augment address data. |
| Census Questionnaire Assistance | Flexible and adaptive language support.<br>Web chat.<br>Respondent-initiated telephone response collection. |
| Response Processing | Single operational control system that tracks case status across all modes. |
| IT Infrastructure | Infrastructure built and sized to meet demand and ensure adequate performance for Internet Self-Response.<br>Secure Internet response capability. |

In addition, the Security, Privacy and Confidentiality operation and the Systems Engineering and Integration operation contribute to the Optimizing Self-Response innovation area.

## 3.3 UTILIZING ADMINISTRATIVE RECORDS AND THIRD-PARTY DATA

The goal of this innovation area is to use information people have already provided to improve the efficiency and effectiveness of the 2020 Census, and in particular reduce expensive in-person follow-up activities. Administrative record data refers to information from federal and state governments. Third-party data refers to information from commercial sources. As shown in Figure 12, data from both sources can help improve the quality of the address list (frame), increase the effectiveness of advertising and contact strategies, validate respondent submissions, and reduce field workload for follow-up activities.

As has been done in prior decades, administrative data from the U.S. Postal Service and other government records are used to update the address frame and reflect changes that occur over time. Additional administrative records sources, as well as third-party data from commercial companies will also be used for this purpose. In addition, these data sources will be used to validate incoming data from tribal, federal, state, and local governments.

To increase the effectiveness of advertising and contact strategies, the Census Bureau will use demographic and geographic information from various administrative record and third-party data sources to help target the advertising to specific populations. These data will also be used to create a contact frame that includes e-mail addresses and telephone numbers. A contact frame with this additional information enables the Census Bureau to expand its contact methods beyond traditional postal mail.

| | | |
|---|---|---|
| **Improve the quality of the address list** | Update the address list | Validate incoming data from tribal, federal, state, and local governments |
| **Increase effectiveness of advertising and contact strategies** | Support the micro-targeted advertising campaign | Create the contact frame (e.g., e-mail addresses and telephone numbers) |
| **Validate respondent submissions** | Validate respondent addresses for those without a Census ID and prevent fraudulent submissions | |
| **Reduce field workload for follow-up activities** | Remove vacant and nonresponding occupied housing units from the Nonresponse Followup workload | Optimize the number of contact attempts |

**Figure 12: Summary of Utilizing Administrative Records and Third-Party Data**

Administrative records and third-party data will also be used to validate respondent addresses for those who respond without providing a unique Census ID. This will help prevent fraudulent and erroneous submissions.

Finally, a primary use of administrative records is to reduce field workload for follow-up activities. To this end, the Census Bureau will use data from internal and external sources, such as the 2010 Census, the USPS, the Internal Revenue Service, and the Centers for Medicare and Medicaid Services to identify vacant and nonresponding occupied housing units and remove them from the Nonresponse Followup workload. The Census Bureau plans to continue acquiring and testing data from other sources, including the National Directory of New Hires, the Supplemental Nutrition and Assistance Program, and state-administered programs such as Temporary Assistance for Needy Families to better understand how these data sources can help reduce follow-up field workload.

These design changes have the potential to save the Census Bureau an estimated $1.4 billion. The operations shaded in darker blue in Figure 13 include innovations related to Utilizing Administrative Records and Third-Party Data.

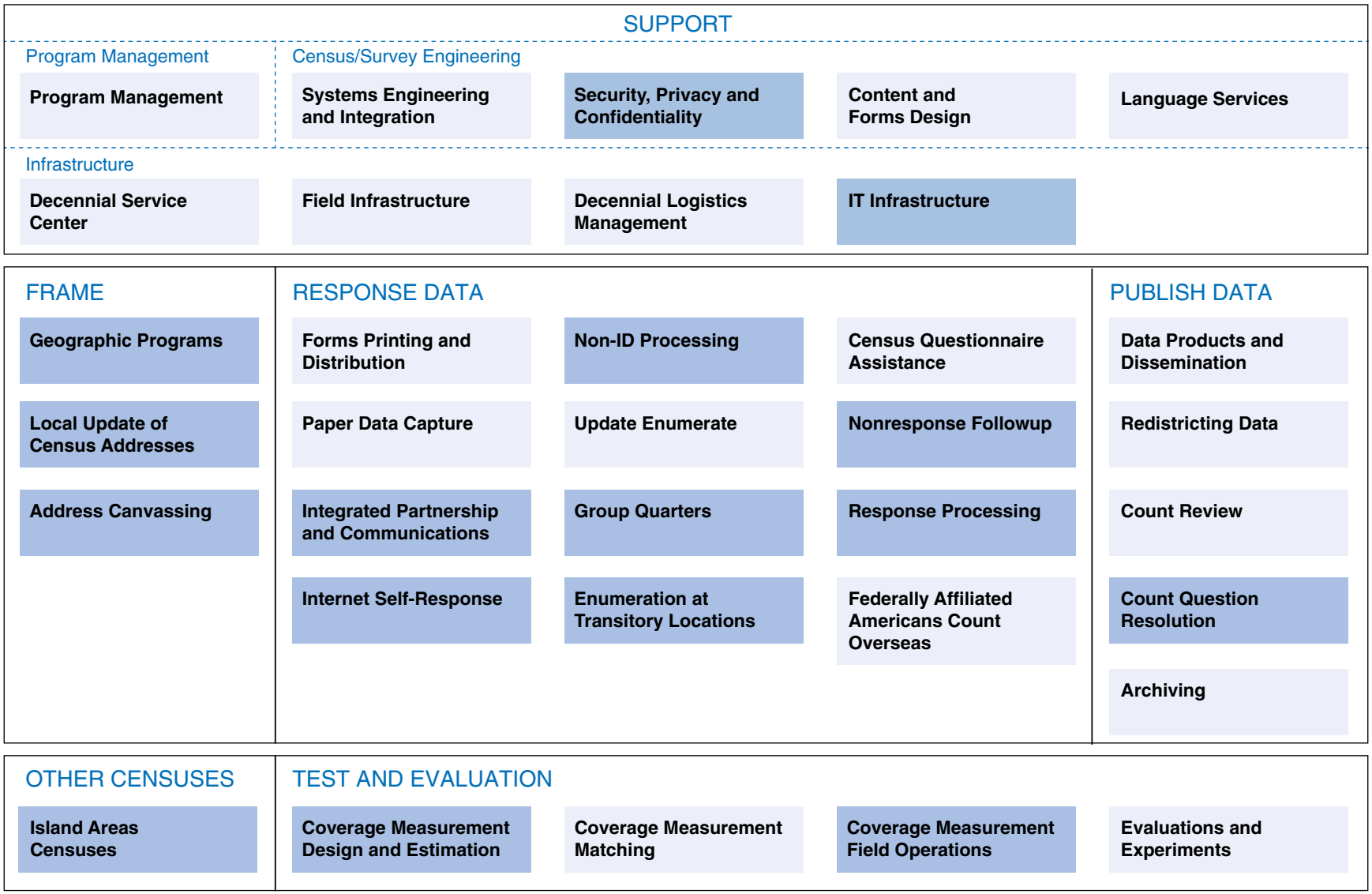


**Figure 13: Operations That Contribute to Utilizing Administrative Records and Third-Party Data**

Documented below are brief descriptions of how each operation contributes to the Utilizing Administrative Records and Third-Party Data innovation area:

### Table 4: Description of Operations That Contribute to Utilizing Administrative Records and Third-Party Data

| Operation | Contributions |
|---|---|
| Security, Privacy, and Confidentiality | Ongoing monitoring of public perception on decennial application of administrative records and third-party data. |
| IT Infrastructure | Use of administrative records require that systems be Title 13 and Title 26 compliant. |
| Geographic Programs | Administrative records and third-party data used to determine types of enumeration areas, basic collection units, and geographic boundaries. |
| Local Update of Census Addresses | Administrative records and third-party data used to validate incoming data from tribal, federal, state, and local governments. |
| Address Canvassing | Additional sources of administrative records and third-party data used to update the frame. |
| Integrated Partnership and Communications | Expanded use of administrative records and third-party data to support micro-targeted Integrated Partnership and Communications program. |
| Internet Self-Response | Administrative records and third-party data used to create the contact frame.<br>Administrative records and third-party data used to tailor the contact strategy. |
| Non-ID Processing | Administrative records and third-party data used to validate and augment address data and validate identity for submissions missing a unique Census ID. |
| Group Quarters | Electronic transfer and expanded use of administrative records and third-party data to enumerate group quarters where possible. |
| Enumeration at Transitory Locations | Administrative records and third-party data used to update addresses of transitory locations. |
| Nonresponse Followup | Expanded use of administrative records and third-party data to remove vacant and occupied housing units from the NRFU workload.<br>Administrative records and third-party data used to reduce the number of contact attempts made.<br>Administrative records and third-party data used to tailor work assignments based on language and “best time of day” for contact. |
| Response Processing | Increased use of administrative records and third-party data to impute response data (in whole or in part).<br>Increased use of libraries from past surveys and censuses to support editing and coding.<br>Increased use of administrative records and third-party data to enhance libraries for primary selection algorithm and Invalid Return Detection. |
| Count Question Resolution | Administrative records and third-party data used to resolve CQR challenges. |
| Coverage Measurement Design and Estimation | Administrative records and third-party data used for demographic analysis.<br>Administrative records and third-party data used for estimation.<br>Administrative records and third-party data used for sample design. |
| Coverage Measurement Field Operations | Administrative records used and third-party data to reduce the number of contact attempts made.<br>Administrative records and third-party data used to tailor work assignments based on language and “best time of day” for contact. |
| Island Areas Censuses | Administrative records and third-party data used where appropriate to support both listing and enumeration. |

Additional operations that contribute to utilizing Administrative Records and Third-Party Data include: Field Infrastructure, Federally Affiliated Americans Count Overseas, and the Systems Engineering and Integration.

## 3.4 REENGINEERING FIELD OPERATIONS

The goal of this innovation area is to use technology to efficiently and effectively manage the 2020 Census fieldwork, and as a result, reduce the staffing, infrastructure, and brick and mortar footprint required for the 2020 Census. Figure 14 shows the three main components of the reengineered field operations: streamlined office and staffing structure, increased use of technology, and increased management and staff productivity.

The 2020 Census field operations will rely heavily on automation. For example, the Census Bureau plans to provide fieldworkers with the capability to work completely remotely and perform all administrative and data collection tasks directly from a handheld device. Supervisors will also be able to work remotely and communicate with their staff via these devices. These enhanced capabilities significantly reduce the number of offices required to support 2020 Census fieldwork. In the 2010 Census, the Census Bureau established 12 regional Census centers and nearly 500 area Census offices. The agency hired over 516,000 enumerators to conduct Nonresponse Followup activities. The new design for the 2020 Census field operations includes six regional census centers with up to 250 Administrative Support Operation Centers.

In addition, automation enables significant changes to how cases are assigned and the supervision of field staff. By making it easier for supervisors to monitor and manage their workers, the ratio of workers to supervisor can be increased, reducing the number of supervisors required. This streamlines the staffing structure. Other design changes include optimized case assignment and routing.

All administrative functions associated with field staff will be automated, including recruiting, hiring, training, time and attendance, and payroll. Finally, the new capabilities allow for quality to be infused into the process through alerts to supervisors when there is an anomaly in an enumerator's performance (e.g., the Global Positioning Satellite indicator on fieldworker's handheld device indicates that she or he is not at the assigned address) and real-time edits on data collection. Accordingly, the quality assurance process used in the 2010 Census is being reengineered to account for changes in technology.

In total, these design changes have the potential to save the Census Bureau an estimated $2.5 billion.

The operations shaded in darker blue in Figure 15 include innovations related to Reengineering Field Operations.

| Streamlined Office and Staffing Structure | Increased Use of Technology | Increased Management and Staff Productivity |
|---|---|---|
| Area Manager of Operations<br>Census Field Managers<br>Census Field Supervisors<br>Listers and Enumerators | • Automated and optimized work assignments<br>• Automated recruiting, training, payroll, and expense reporting<br>• Ability to conduct address updates and enumeration on same device<br>• Reduced paper and manual processing | • Increased visibility into case status for improved workforce management<br>• Redesigned quality assurance operations<br>• Improved communications |

**Figure 14: Summary of Reengineering Field Operations**

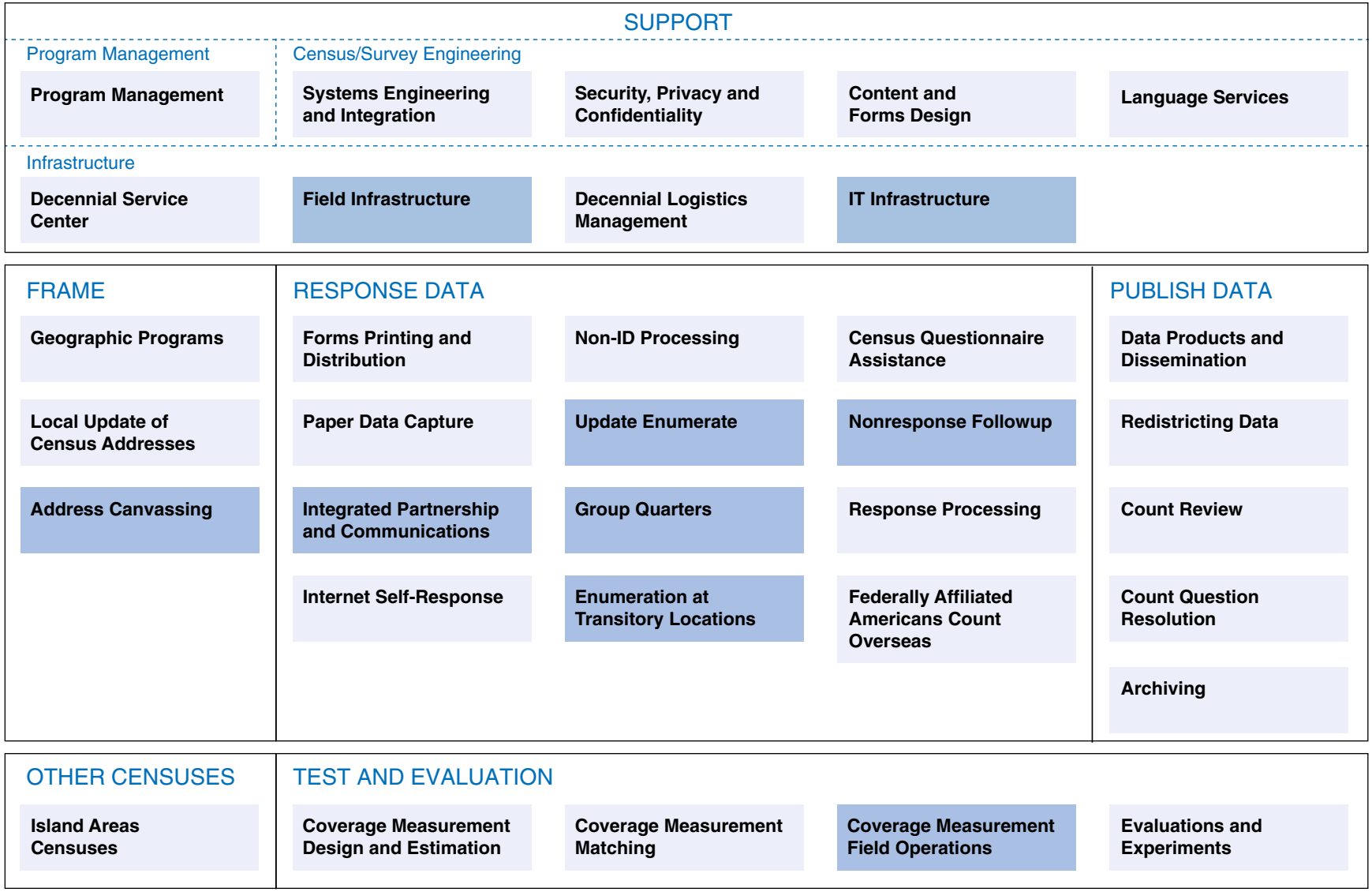


**Figure 15: Operations That Contribute to Reengineering Field Operations**

Documented below are brief descriptions of how each operation contributes to the Reengineering Field Operations innovation area. The field data collection operations are grouped together as they all contribute similarly.

### Table 5: Description of Operations That Contribute to Reengineering Field Operations

| Operation | Contributions |
|---|---|
| Field Infrastructure | Streamlined staffing structure.<br>Automated use of real-time data by the field operations control system to enable better management of the field workforce.<br>Automated training for field staff.<br>Automated administrative functions, including recruiting and payroll.<br>Supervisory support for fieldworkers available during all hours worked. |
| IT Infrastructure | Enterprise solutions with flexible architecture.<br>Listing and enumeration applications with flexibility to run on government-furnished equipment, personally owned devices, and Device as a Service. |
| Integrated Partnership and Communications | Enhanced communications to support field recruitment. |
| Field Data Collection Operations:<br><br>Address Canvassing<br>Update Enumerate<br>Group Quarters<br>Enumeration at Transitory Locations<br>Nonresponse Followup<br>Coverage Measurement Field Operations | Rapid reclassification of living quarter type (under review).<br>Reduced paper; number of attempts tailored based on the availability of administrative records, third-party data, and paradata.<br>Reduced field workload as measured by cases and attempts.<br>Near real-time case status updates.<br>Automated and optimized assignment of work.<br>Declaration of work availability and case assignments.<br>Flexibility built into work assignment process based on in-field feedback or observations.<br>Data on household language and “best time of day to contact” standardized and available at central location for work assignments.<br>Redesigned quality assurance process.<br>Ability to update address list and enumerate on a single device with a suite of integrated applications.<br>Ability for addresses not identified during Address Canvassing to be enumerated when identified. |

Additional operations that contribute to utilizing Reengineering Field Operations include Decennial Service Center, Island Areas Censuses, and the Systems Engineering and Integration.

## 3.5 SUMMARY OF INNOVATIONS

This section summarizes the key innovations planned for the 2020 Census. Innovations are considered significant changes to the operational design as compared with the 2010 Census.

The operations shaded in darker blue in Figure 16 are those that have the most significant innovations.

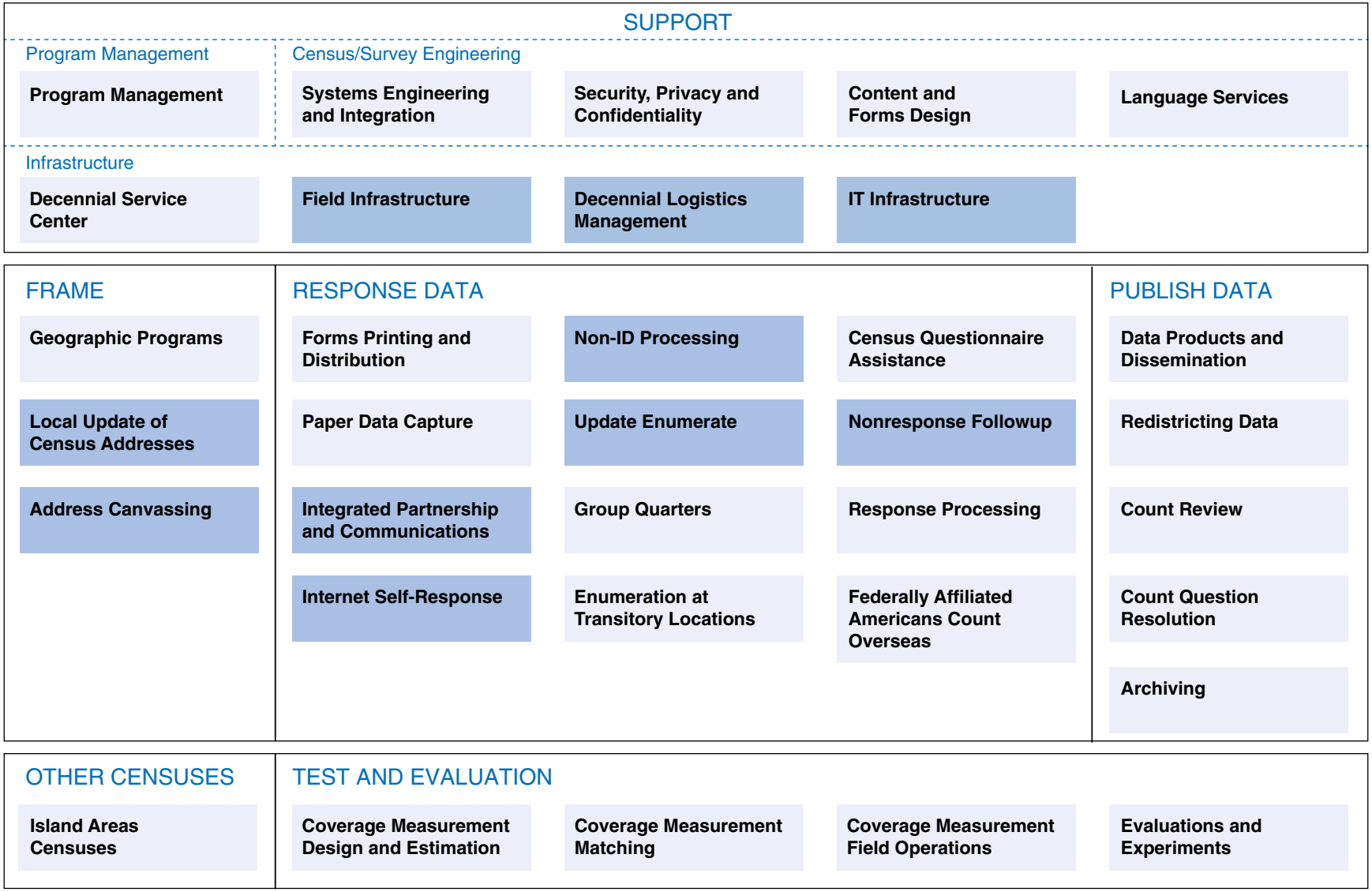


**Figure 16: Operations With Significant Innovations Since the 2010 Census**

The specific innovations planned for each of these operations are listed in Table 6 below. Note that these innovations are dependent upon funding and decisions on the final design.

### Table 6: Summary of Key Innovations by Operation

| Operation | Contributions |
|---|---|
| Local Update of Census Addresses | Reduced complexity.<br>Elimination of the full address list submission options to improve quality and reduce burden and cost. |
| Address Canvassing | Use of a combination of in-office and in-field methods to achieve a 100 percent Address Canvassing (target of 25 percent of addresses going to the field).<br>Use of automation and data (imagery, administrative records, and third-party data) for In-Office Address Canvassing.<br>Ongoing fieldwork (Master Address File [MAF] Coverage Study) to validate in-office procedures, measure coverage, and improve in-field data collection methodologies.<br>Use of reengineered field management structure and approach to managing fieldwork, including new field office structure and new staff positions. |
| Integrated Partnership and Communications | Microtargeted messages and placement for digital advertising, especially for hard-to-count populations.<br>Advertising and partnership campaign adjusted based on respondent actions.<br>Expanded predictive modeling to determine propensity to respond by geographic areas.<br>Expanded use of social media. |
| Internet Self-Response | Internet data capture, providing real-time edits, ability to capture unlimited household size entries, and multiaccess methods across different technologies (e.g., computers, phones, tablets, kiosks).<br>Online questionnaires available in multiple languages and non-Roman alphabets.<br>Multimode contact approach tailored to demographic or geographic area.<br>A contact frame, including e-mail and phone numbers, developed from administrative records and third-party data to allow for follow-up if required (e.g., missing or illegible information and reinterview for quality assurance). |
| Non-ID Processing | Ability for public to respond anytime, anywhere.<br>Real-time matching and geocoding of responses.<br>Validation of non-ID response data.<br>Use of administrative records and third-party data to validate identity and validate and augment address data for non-ID submissions. |
| Update Enumerate (planned innovations dependent on funding of this operation) | The 2010 Census Update Leave and UE Operations combined into a single operation.<br>Single visit with enumeration or push to Internet Self-Response.<br>Use of single device for both listing and enumeration.<br>Use of reengineered field management structure and approach to managing fieldwork, including new field office structure and new staff positions. |

**Table 6: Summary of Key Innovations by Operation**—Con.

| Operation | Contributions |
|---|---|
| Nonresponse Followup | Use of administrative records and third-party data to remove vacant housing units from the NRFU workload.<br>Use of administrative records and third-party data to remove nonresponding occupied housing units from the NRFU workload.<br>Use of reengineered field management structure and approach to managing fieldwork.<br>Use of a variable contact strategy and stopping rules to control the number of attempts made for each address (based on paradata).<br>Assignment and route optimization.<br>Automated training for field staff.<br>Automation of the field data collection.<br>Automation of administrative functions such as recruiting, onboarding, and payroll.<br>Reengineered quality assurance approach. |
| Field Infrastructure | Reduced number of Regional Census Centers (RCC) managing a reduced number of Area Census Offices tasked with managing field operations and support activities.<br>Automated job application and recruiting processes, payroll submission and approval process, and other administrative processes resulting in reduced staffing requirements.<br>Automated training.<br>Reduced number of enumerators and supervisors due to reengineered design for field operations. |
| Decennial Logistics Management | Implementation of an online, real-time Enterprise Resource Planning system with extended access for the RCC and field offices.<br>Implementation of a wireless network and bar code technology that will automate inventory transactions. |
| IT Infrastructure | Early development of solutions architecture.<br>Use of enterprise solutions as appropriate.<br>Iterative deployment of infrastructure aligned with and based on testing.<br>Implementation of alternatives to providing government-furnished equipment, such as Bring Your Own Device or Device as a Service.<br>Use of demand models to help predict Internet response volume, Census Questionnaire Assistance center staffing, etc.<br>Scalable design.<br>Agile development of applications. |

# 4. Key Tests, Milestones, and Production Dates

The 2020 Census has multiple decision points, milestones, and production dates that must be met to deliver the final apportionment and redistricting data. Informing the decisions points are a series of tests. These tests are documented in the 2020 Census Research and Testing Management Plan, which provides the overarching management and analysis framework for executing research and testing projects and integrating the results across projects. More detailed information about each test is captured in formal research and test plan documents and in an integrated master schedule, facilitating the integration and coordination of activities across tests and operations. Refer to Figure 2 in Section 1.2 for how this documentation fits into the broader set of documentation for the 2020 Census program. Detailed test plans and results are available for review upon request.

The first part of this section describes the tests used to inform the operational design and prepare for conducting the Census. The second section highlights key decision points and milestones beginning with the research and testing phase in Fiscal Year (FY) 2012 through the completion of the Census in 2023. The third section provides the planned production timeline for the primary 2020 Census operations, and the final section shows an integrated schedule of the tests, milestones, and production operations.

## 4.1 TESTS TO INFORM THE OPERATIONAL DESIGN AND PREPARE FOR CONDUCTING THE CENSUS

As shown in Figure 17, the tests conducted early in the decade (2012–2015) are aimed at answering specific research questions (objectives) needed to make decisions on important aspects of the operational design for the four key innovation areas. Starting in 2016, the focus shifts to validating and refining the design by testing the interactions across operations and determining the proposed methodology for the operations. In addition, testing of production systems begins during this time-frame and continues through 2018, with final performance testing to ensure scalability occurring in 2019. An end-to-end test in 2018 will test the integration of all major operations and systems.

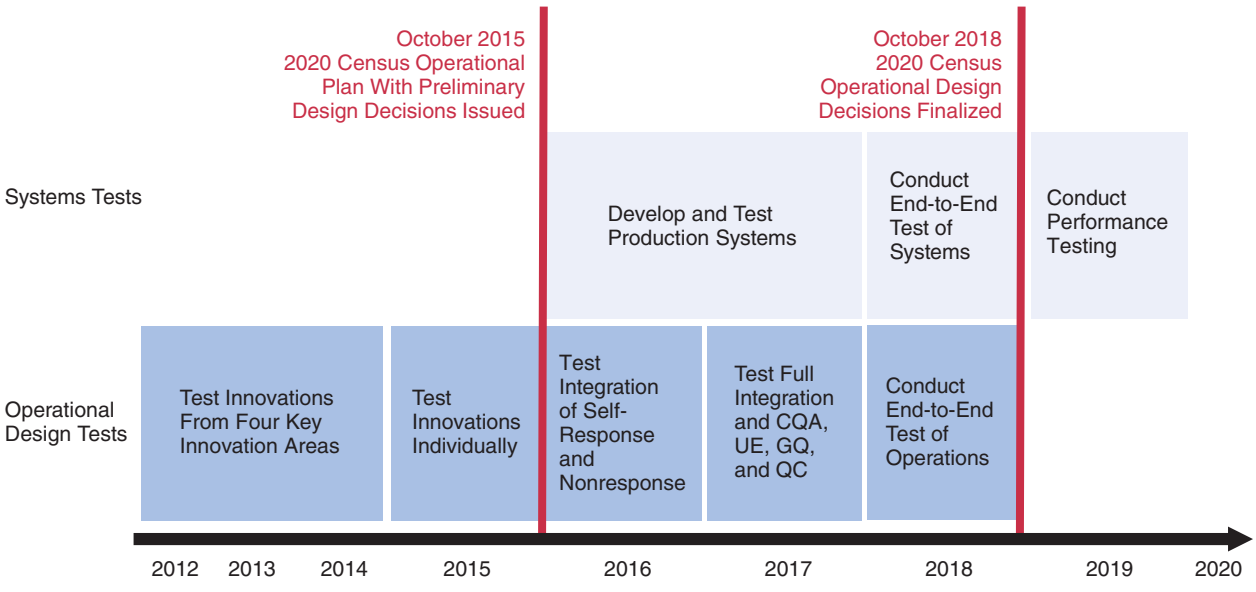


**Figure 17: High-Level View of Tests**

Table 7 lists the operational tests executed or planned for the 2020 Census.

**Table 7: Operational Tests**

| Calendar Year | Test |
|---|---|
| 2012 | Public-Opinion Polling (ongoing as needed throughout the decade).<br>2012 National Census Test. |
| 2013 | 2013 National Census Contact Test.<br>2013 Census Test. |
| 2014 | 2014 Census Test.<br>Continuous Small-Scale testing (ongoing as needed throughout the decade).<br>LUCA Focus Groups.<br>2014 Human-in-the-Loop Test. |
| 2015 | Address Validation Test (starts in late 2014).<br>2015 Optimizing Self-Response Test.<br>2015 Census Test.<br>2015 National Content Test. |
| 2016 | 2016 Census Test.<br>2016 Address Canvassing Test. |
| 2017 | 2017 Census Test. |
| 2018 | 2018 Census End-to-End Test. |
| 2019 | Post End-to-End Testing. |

The following sections describe the tests listed above. Tests for Calendar Years 2012 through 2014 are combined into one section. For the past and current tests, a short description of the purpose, scope, and timing is presented, followed by a table with objectives of the tests, findings, and, where applicable, design implications based on these findings. For future tests, only the purpose, scope, timing, and objective are provided. These may change since future test plans are based on availability of funding as well as the analysis of prior tests.

### 4.1.1 Tests in 2012–2014

As shown in Figure 18, eight tests were conducted between 2012 and 2014.

#### *4.1.1.1 Public Opinion Polling*

The Public Opinion Polling Test is a public opinion survey of attitudes toward statistics produced by the federal government that focuses on trust in the federal statistical system, the credibility of federal statistics, and attitudes toward and knowledge of the statistical uses of administrative records and third-party data. The Census Bureau is using the Nightly Gallup Polling for this survey, and collects data by telephone from 850 nationally representative housing units per week. Data collection started in February 2012 and will continue on an ongoing basis as needed.

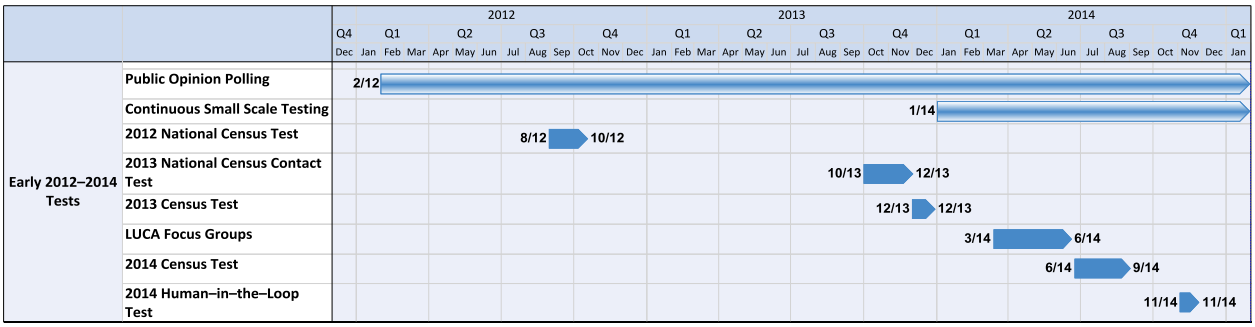


**Figure 18: Tests in 2012–2014**

| Public-Opinion Polling Test | |
|---|---|
| Objectives | Determine if the public's perception of the Census Bureau's commitment and ability to protect privacy and confidentiality are impacted if administrative records are used in the 2020 Census design.<br>Determine what the public is most concerned about with regard to privacy and confidentiality, in general and as related to government data collection. |
| Findings | Reported belief in the credibility of statistics predicts reported trust in federal statistics.<br>Questions regarding administrative record and third-party data use have shown, when framed to indicate that the use of records can save the government money or provide a social good, then respondents are more likely to favor using administrative records and third-party data. |
| Design Implications | Continue to pursue research and testing related to the use of administrative records and third-party data. |

#### 4.1.1.2 2012 National Census Test

The 2012 National Census Test studied overall self-response rates and Internet self-response rates. The test was conducted from August 2012 to October 2012 and included 80,000 nationally representative housing units.

| 2012 National Census Test | |
|---|---|
| Objectives | Assess relative self-response rates and Internet self-response rates.<br>Evaluate the performance of combined race and origin questions on the Internet.<br>Assess the Telephone Questionnaire Assistance operation. |
| Findings | Total self-response rate was 56.9 percent, and the Internet self-response rate was 36.5 percent.<br>An advance letter resulted in no significant difference in overall response rate as compared with no advance letter.<br>Providing a telephone number in the initial mailing resulted in no significant difference in overall response, but an increase in telephone interviews.<br>A second reminder to answer the 2012 National Census Test performed well.<br>Tailoring the content of the reminder materials resulted in no significant difference in overall response.<br>Response distributions of the combined race and origin questions were similar across the two question versions.<br>Results did not indicate expected benefit of enhanced reporting of detailed race and origin groups.<br>Of the calls to the Telephone Questionnaire Assistance operation, 69 percent were because the respondent did not have a computer or Internet access. |
| Design Implications | Continue tests to determine response rates and optimal contact strategies.<br>Further study of the collection of detailed race and origin groups in a national mailout test.<br>The 2020 Census Questionnaire Assistance operation must account for increased call volumes. |

### 4.1.1.3 2013 National Census Contact Test

The 2013 National Census Contact Test studied two key areas related to strategies for contacting respondents: the quality of the Contact Frame (a list of supplemental contact information such as e-mail addresses and phone numbers, built from third-party data sources) and automated processing of census responses lacking a preassigned census identification number (Non-ID Processing). The study included 39,999 nationally representative addresses.

| 2013 National Census Contact Test | |
|---|---|
| Objectives | Evaluate the quality of phone and e-mail contact information acquired from third-party data sources.<br>Test proposed enhancements to automated processing of responses lacking a preassigned Census identification number. |
| Findings | Respondents were not able to validate contact information for other household members.<br>The use of administrative records and third-party data was effective in enhancing non-ID addresses to allow for a match to the MAF. |
| Design Implications | Continue testing the quality of the Contact Frame.<br>Continue enhancing the functionality associated with Non-ID Processing. |

### 4.1.1.4 2013 Census Test

The 2013 Census Test was an operational study of Nonresponse Followup procedures. This test was conducted in late 2013 and involved 2,077 housing units in Philadelphia, Pennsylvania.

| 2013 Census Test | |
|---|---|
| Objectives | Evaluate the use of administrative records and third-party data to identify vacant housing units and remove them from the NRFU workload.<br>Evaluate the use of administrative records and third-party data to enumerate nonresponding occupied housing units to reduce the NRFU workload.<br>Test an adaptive design approach for cases not enumerated with administrative records and third-party data.<br>Test methods for reducing the number of enumeration contact attempts as compared with the 2010 Census.<br>Test the use of the telephone to make initial enumeration contact attempts. |
| Findings | Successfully used administrative records and third-party data to identify vacant and occupied housing units and removed cases from the NRFU workload.<br>Successfully used administrative records and third-party data as part of an adaptive design approach to designate cases for one to three contact attempts.<br>Adaptive design strategies as implemented did not work.<br>Design added complexity to training of enumerators. |
| Design Implications | Continue refinement of adaptive design methods and administrative records and third-party data usage.<br>Continue refinement of training methods. |

### 4.1.1.5 2014 Census Test

The 2014 Census Test was an operational study of self-response and Nonresponse Followup procedures. For this test, Census Day was assumed to be July 1, 2014. The test involved 192,500 housing units in portions of Montgomery County, Maryland, and Washington, DC.

| 2014 Census Test | |
|---|---|
| Objectives | Test various self-response modes, including the Internet, CQA, and paper and to respond without a preassigned Census identifier.<br>Evaluate the value of a preregistration option using "Notify Me" (a Web site that allows respondents to indicate a preferred mode of contact for the 2020 Census).<br>Test the use of mobile devices for Nonresponse Followup enumeration in the field.<br>Test the use of Bring Your Own Device to conduct enumeration in the field.<br>Continue evaluating the use of administrative records and third-party data to remove cases (vacant and nonresponding occupied housing units) from the Nonresponse Followup workload.<br>Test the effectiveness of applying adaptive design methodologies in managing the way field enumerators are assigned their work.<br>Examine reactions to the alternate contacts, response options, administrative record use, and privacy or confidentiality concerns (including how the Census Bureau might address these concerns through micro- or macro-messaging) through focus groups. |
| Findings | Total self-response rate was 65.9 percent, the Internet self-response rate was 50.6 percent.<br>E-mail contact attempts did not work due to large number of incorrect e-mail addresses (bounce-backs).<br>The address collection interface in the Internet instrument yielded a much greater proportion of higher quality address data from respondents without a unique Census ID than in 2010.<br>Use of administrative records and third-party data matching improved the overall address matching rate.<br>"Notify Me" had low participation with only about 3 percent of the sample choosing to preregister.<br>Higher than projected in-bound phone workloads due to respondent questions and issues primarily related to Internet access.<br>Problems with coordinating contact with gated communities resulting in inefficient enumeration.<br>Need to strengthen training and procedures on contacting nonresponding housing units, specifically as related to proxy interviews.<br>Need improved business rules and improved rule-based models for administrative records and third-party data. |
| Design Implications | Conduct another test of "Notify Me" to determine if more people use this capability when advertising is used to inform the public about the 2020 Census, and specifically about the "Notify Me" option.<br>Determine optimal use of adaptive design and administrative records and third-party data.<br>Further explore the use of Bring Your Own Device. |

### 4.1.1.6 Continuous Small-Scale Testing

The Continuous Small-Scale Testing is a study of respondent and nonrespondent reactions to new modes of decennial census contact and response. The study focuses on reactions related to privacy and confidentiality of these modes. This study started in January 2014 and is ongoing as needed. It included e-mails to 1,000–2,200 housing units sampled from an opt-in frame.

| Continuous Small-Scale Testing | |
|---|---|
| Objectives | Determine how new contact and response modes will impact the public's perception of the Census Bureau's commitment and ability to protect privacy and confidentiality.<br>Determine how the public feels about each new mode being tested, specifically with regard to privacy and confidentiality. |
| Findings | A text-based e-mail out performed graphical e-mails.<br>Longer e-mail content with "Dear Resident" and signature of the Director outperformed a shorter e-mail invitation without the greeting and signature.<br>Respondents report preferring reporting online to a decennial census with a mailed invitation with the link over all other options. |
| Design Implications | Continue to monitor respondent and nonrespondent reactions to various contact and response modes. |

### 4.1.1.7 LUCA Focus Groups

The LUCA Focus Groups collected input on potential LUCA models for the 2020 Census. Focus groups consisted of eligible LUCA participants representing various sizes and types of governments across the nation. Forty-six governmental entities participated. The focus groups were conducted from March 2014 through June 2014.

| LUCA Focus Groups | |
|---|---|
| Objectives | Obtain feedback on potential LUCA models for the 2020 Census through a series of focus groups with 2010 Census LUCA participants. |
| Findings | Continue the 2010 Census LUCA Program improvements that were successful.<br>▪ Continue to provide a 120-day review time for participants.<br>▪ Continue the 6-month advance notice about the LUCA program registration.<br>▪ Continue a comprehensive communication program with participants.<br>▪ Continue to provide a variety of LUCA media types.<br>▪ Continue to improve the partnership software application.<br>▪ Continue state participation in the LUCA program.<br>Eliminate the full address list submission options that were available in 2010 LUCA (Options 2 and 3). This will:<br>▪ Reduce the number of deleted LUCA records in field verification activities.<br>▪ Reduce the burden and cost of processing addresses and LUCA address validation.<br>Reduce the complexity of the LUCA Program.<br>Include census housing unit location coordinates in the census address list and allow partners to return their housing unit location coordinates as part of their submission.<br>Provide any ungeocoded United States Postal Service (USPS) Delivery Sequence File (DSF) address to state and county partners.<br>Provide the address list in more standard formats.<br>Conduct an in-office validation of LUCA submitted addresses.<br>Utilize Geographic Support System Initiative data and tools to validate LUCA submissions.<br>Encourage governments at the lowest level to work with higher level governments to consolidate their submission.<br>Eliminate the Block Count Challenge.<br>Eliminate the use of the asterisk (*) designation for multiunits submitted without unit designations.<br>Encourage LUCA participants to identify addresses used for mailing, location, or both. |
| Design Implications | Develop in-office validation processes, procedures, and tools.<br>Define relationship between Address Canvassing and LUCA, taking into consideration the timing of LUCA feedback and the appeals operation.<br>Determine the feasibility of technical recommendations for the 2020 Census LUCA operation.<br>▪ Use of background imagery on paper maps.<br>▪ Ability to provide structure locations within LUCA materials.<br>▪ Feasibility of web-based registration.<br>Determine feasibility of using areas where the Census Bureau has planned field activities to validate LUCA records. |

#### 4.1.1.8 2014 Human-in-the-Loop Test

The 2014 Human-in-the-Loop Test consisted of a simulation of reengineered field operations using an Operational Control Center and the enhanced operational control system. The purpose was to test proposed devices, systems, and the field structure for staff and management processes. The Simulation Experiment (SIMEX) occurred in November 2014. Eighty-seven field and office staff tested real-time field operations and field management structure in this test.

| Human-in-the-Loop Test | |
|---|---|
| Objectives | Exercise field reengineering methods (staffing ratios and enhanced operational control system) in a simulated environment.<br>Refine methods and get input from field staff to improve business processes prior to the 2015 Census Test. |
| Findings | The new design for managing field operations was successful, including the use of an Operational Control Center and operational control system to manage the Nonresponse Followup workload.<br>The ratio of enumerators to supervisors can be increased from the 2010 Census.<br>Instant notification to enumerators and supervisors is feasible and serves as a successful means of communication. |
| Design Implications | Employ the new design for reengineered field operations during the 2015 Census Test.<br>Increase the ratio of enumerators to supervisors. |

### 4.1.2 Tests in 2015

A key milestone in October 2015 is the release of the preliminary operational design for the 2020 Census as documented in this plan and supporting materials. This design is informed by tests conducted from 2012 through 2015. Future tests will be used to refine the design.

Figure 19 shows the schedule for the four tests in 2015 and the 2020 Census Operational Plan milestone. Each test is described below.

#### 4.1.2.1 Address Validation Test

The Address Validation Test was conducted to assess the performance of methods and models that will help develop the 2020 Census address list, and to estimate the In-Field Address Canvassing workloads for the 2020 Census. The test contained two components, the MAF Model Validation Test (MMVT) and the Partial Block Canvassing (PBC) Test.

##### *MAF Model Validation Test*

The MMVT evaluated methods that are part of the reengineered Address Canvassing innovation area. The test was conducted from September 2014 to December 2014 and included 10,100 nationally representative blocks (100 blocks with no addresses), which included approximately 1.04 million addresses in the sample blocks.

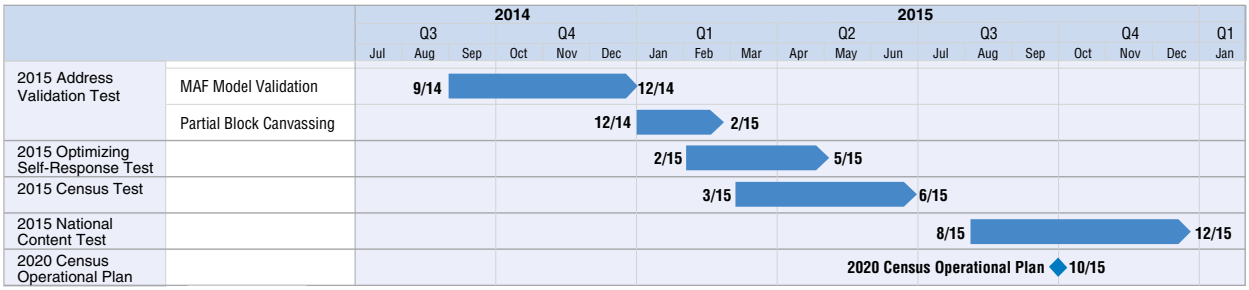


**Figure 19: Tests and Key Decisions in 2015**

| MAF Model Validation Test | |
|---|---|
| Objectives | Test In-Office and In-Field Address Canvassing procedures.<br>Determine the ability to ensure an accurate MAF.<br>Assess the ability of two sets of statistical models to predict blocks that have experienced address changes. |
| Findings | In-Office Address Canvassing was effective.<br>Statistical models were not effective at identifying blocks with changes.<br>Statistical models were not effective at predicting national coverage errors. |
| Design Implications | Statistical models are not being pursued for determining blocks with change or MAF coverage.<br>Continue with In-Office and In-Field Address Canvassing approaches. |

### *Partial-Block Canvassing*

The PBC Test evaluated the feasibility of canvassing portions of blocks, rather than entire blocks using both in-office and in-field methods. This test was conducted from December 2014 to February 2015. The staff conducted an interactive review of aerial imagery over time and geographic quality indicators. Six hundred and fifteen blocks with national distribution were listed by 35 professional staff.

| Partial Block Canvassing | |
|---|---|
| Objectives | Measure unrecorded changes in blocks and identify portions of blocks where change is likely.<br>Determine ability to accurately canvass partial blocks.<br>Evaluate an interactive review of various materials—primarily aerial imagery over time and geographic quality indicators. |
| Findings | Operationally feasible to canvass portions of blocks.<br>In-office imagery review of blocks has utility. |
| Design Implications | Continue PBC work in conjunction with in-office review.<br>Determine cost benefit of partial-block methods against full-block canvass. |

### *4.1.2.2 2015 Optimizing Self-Response Test*

The 2015 Optimizing Self-Response Test was an operational study of self-response procedures. For this test, Census Day was April 1, 2015. In the Savannah, Georgia, media market, 407,000 housing units were included in this test, with 120,000 sampled self-responding housing units.

| 2015 Optimizing Self-Response Test | |
|---|---|
| Objectives | Determine use of digital and targeted advertising, promotion, and outreach to engage and motivate respondents.<br>Test value of "Notify Me" when partnerships and traditional and targeted advertising are used to promote early engagement of respondents.<br>Offer opportunity to respond without a Census ID (Non-ID Processing) and determine operational feasibility and potential workloads around real-time non-ID processing.<br>Determine self-response and Internet response rates. |
| Findings | The total response rate was 47.5 percent, and the Internet response rate was 33.4 percent.<br>An additional 35,249 Internet responses from housing units not selected in mail panels as a result of advertising and promotional efforts.<br>Continued low participation in "Notify Me".<br>Successful implementation of real-time non-ID processing, matching 98.5 percent of cases.<br>A new postcard panel, designed to test how housing units not originally included in the sample would respond to an invitation after being exposed to advertising, generated response of approximately 8 percent. |
| Design Implications | Discontinue "Notify Me."<br>Continue testing related to partnerships, advertising, and promotional efforts.<br>Continue use of offering non-ID opportunity to respondents. |

#### *4.1.2.3 2015 Census Test*

The 2015 Census Test was an operational study of Nonresponse Followup procedures. Census Day was assumed to be April 1, 2015. This test included 165,000 sampled housing units in Maricopa County, Arizona.

| 2015 Census Test | |
|---|---|
| Objectives | Continue testing of fully utilizing a field operations management system that leverages planned automation and available real-time data, as well as data households have already provided to the government, to transform the efficiency and effectiveness of data collection operations.<br><br>Begin examining how regional offices can remotely manage local office operations in an automated environment, the extent to which enumerator and manager interactions can occur without daily face-to-face meetings, and revised field staffing ratios.<br><br>Reduce Nonresponse Followup workload and increase productivity with use of administrative records and third-party data, field reengineering, and adaptive design.<br><br>Test operational implementation of Bring Your Own Device.<br><br>Explore reactions to the Nonresponse Followup contact methods, administrative records and third-party data use, and privacy or confidentiality concerns. |
| Findings | Total self-response rate was 54.9 percent; Internet self-response rate was 39.7 percent.<br><br>Field Staff Training.<br><br>▪ Combination of online and classroom training provided standardization of the information, provided tracking capabilities, and offered various learning methods.<br><br>▪ Reduced training hours compared with the 2010 Census Nonresponse followup enumerator training from 32 hours to 18 hours.<br><br>▪ Deployment of YouTube videos to quickly and efficiently provide supplemental training to enumerators.<br><br>▪ Identified topics requiring additional training in future tests.<br><br>Field Reengineering.<br><br>▪ Area Operations Support Center and staffing of the Area Operations Support Center successful.<br><br>▪ Electronic payroll successful.<br><br>▪ Entry of availability for work and workload optimization were effective.<br><br>▪ Operational Control System alerts effective in bringing attention to situations that required follow-up and possible corrective action.<br><br>▪ Optimized routing was overall successful, but uncovered where modifications to the routing algorithm are needed.<br><br>Census Operations Mobile Platform for Adaptive Services and Solutions (COMPASS) (application used for enumerating nonresponding housing units).<br><br>▪ Application was easy to use.<br><br>▪ Experienced crashes and freezes of the application; further investigation into root causes is needed.<br><br>▪ Coverage questions added to respondent burden.<br><br>Field Test Procedures.<br><br>▪ Work needed to define a coordinated approach to enumeration within multiunits and gated communities.<br><br>▪ Refinement to data collection application “pathing” needed to better assist enumerators in cases on proxy responses and noninterviews.<br><br>Bring Your Own Device.<br><br>▪ Training was fairly labor intensive.<br><br>Based on observations, no adverse respondent reactions to the device being used for data collection. |
| Design Implications | Employ the use of automated training.<br><br>Continue to test the use of administrative records and third-party data in reducing the Nonresponse Followup workload.<br><br>Optimize the number of visits and phone contacts for enumeration of nonresponders.<br><br>Make at least one contact for nonresponding housing units.<br><br>Continue to test field procedures for contacting nonresponding housing units.<br><br>Test the use of Device as a Service as a possible alternative or supplement to government-furnished equipment and Bring Your Own Device. |

### *4.1.2.4 2015 National Content Test*

The 2015 National Content test evaluated and compared different census questionnaire content. It assumed a Census Day of September 1, 2015. The test included 1.2 million nationally representative households, including 20,000 households in Puerto Rico and 100,000 reinterviews.

| 2015 National Content Test | |
|---|---|
| Objectives | Evaluate and compare different census questionnaire content, including questions on Race and Hispanic origin (e.g., combining Race and Hispanic origin into a single question versus using separate questions, and introducing a Middle Eastern North African category), relationship (introducing same-sex relationship categories), and within-household coverage (streamlined approach for ensuring accurate within-household coverage).<br><br>Refine estimates of national self-response and Internet response rates.<br><br>Continue to test self-response modes and contact strategies (see 2014 Census Test objectives).<br><br>Reinterview a subsample of respondents to further assess the accuracy and reliability of the question alternatives for race, Hispanic origin, and within-household coverage. |
| Findings and Design Implications | To be determined once the test is completed. |

### 4.1.3 Tests in 2016

In 2016, the Census Bureau plans to move from small scale individual tests using proof of concept and prototype systems to more refined tests and the building of systems that will support the 2020 Census. These tests are dependent on funding.

Specifically, as shown in Figure 20, two tests are planned for 2016. The 2016 Census Test focuses on the integration of Self-Response and Nonresponse Followup operations. The 2016 Address Canvassing Test expands early address canvassing tests to refine the in-office and in-field methods. Each test is described below.

The following operations and systems will be tested in 2016 through these two tests:

| Key Innovation Area | Operations | Systems |
|---|---|---|
| Reengineering Address Canvassing | Address listing. | Enterprise Listing and Mapping System/ Listing and Mapping Instrument. |
| Optimizing Self-Response | Internet Response.<br>Telephone Response.<br>Paper Response.<br>Non-ID Processing. | PRIMUS Prototype, using cloud infrastructure.<br>Census Bureau Call Centers.<br>iCADE (Integrated Capture and Data Entry).<br>Real-time non-ID processing using cloud infrastructure. |
| Utilizing Administrative Records and Third-Party Data | Identification of vacant and occupied units.<br>Removal from the NRFU workload. | Headquarters' servers.<br>Control and Response Processing Data System. |
| Reengineering Field Operations | Workload Control.<br>Enumeration.<br>Quality Assurance. | MOJO (in-field operational control system) prototype begins interfacing with Multi-mode Operational Control System.<br>COMPASS Prototype. |

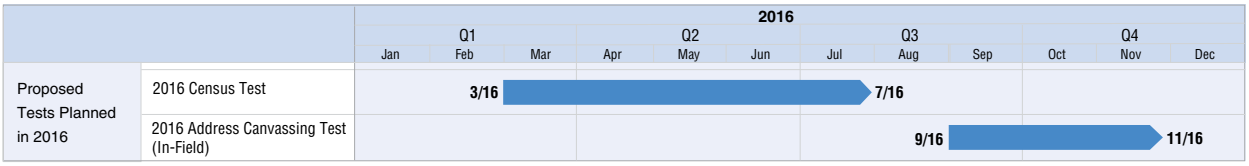


**Figure 20: Tests Planned in 2016**

### *4.1.3.1 2016 Census Test*

The 2016 Census Test is planned to be an operational study of both self-response and Nonresponse Followup procedures. It will have a Census Day of April 1, 2016, and will include approximately 225,000 housing units per site in Los Angeles County, California, and Harris County, Texas.

| 2016 Census Test | |
|---|---|
| Objectives | Self-Response.<br>▪ Test provision of language support to Limited English Proficient populations through partnerships and bilingual questionnaires.<br>▪ Test ability to reach demographically diverse populations.<br>▪ Refine Real-Time Non-ID Processing methods, including respondent validation.<br>▪ Test cloud-based infrastructure for self-response and Non-ID Processing.<br>Nonresponse followup.<br>▪ Refine the reengineered field operations.<br>▪ Refine the field management staffing structure.<br>▪ Test enhancements to the Operational Control System and COMPASS.<br>▪ Refine the path in COMPASS to conduct proxy interviews.<br>▪ Test improved procedures for multiunit accessibility and contact.<br>Reengineered quality assurance.<br>▪ Evaluate the use of paradata and Global Positioning Satellite points collected during interview.<br>▪ Test reinterview functionality.<br>Measure the systems' abilities to manage a significant number of concurrent users during self-response.<br>Test a combination of Bring Your Own Device, government-furnished equipment, and Device as a Service strategies for supplying enumerators with hardware devices.<br>Test scalability of Internet and non-ID processing during self-response using enterprise solutions. |
| Findings and Design Implications | To be completed once the test is conducted. |

### *4.1.3.2 2016 Address Canvassing* Test

The 2016 Address Canvassing Test is planned to be an operational study of In-Office and In-Field Address Canvassing procedures. It will begin in the fall of 2016 and will continue into 2017. This test will cover various sites across the nation with a specific focus on areas required to support the 2017 Census Test (i.e., one urban area, two American Indian Reservations, and Puerto Rico).

| 2016 Address Canvassing Test | |
|---|---|
| Objectives | Test new In-Office and In-Field Address Canvassing methods.<br>Test the use of Listing and Mapping Instrument.<br>Test the use of the Basic Collection Unit instead of traditional collection geography.<br>Test updates to the MAF/TIGER system with address and spatial data.<br>Test reengineered methods for quality assurance.<br>Test address updating and matching software for Puerto Rico. |
| Findings and Design Implications | To be completed once the test is conducted. |

## 4.1.4 Tests in 2017

The 2017 Census Test is the single test to be conducted in 2017. This test comprises multiple operations, including Group Quarters (GQ), Update Enumerate (UE), Internet Self-Response, and NRFU. This test and its scope are dependent on funding. The planned schedule for testing each of these operations as part of the 2017 Census Test is shown in Figure 21.

### *4.1.4.1 2017 Census Test*

The 2017 Census Test is planned to be an operational study of address canvassing, self-response, and Nonresponse Followup procedures. It will have a Census Day of April 1, 2017 and will cover various geographic areas across the nation with a specific focus on one urban area, two American Indian Reservations, and Puerto Rico.

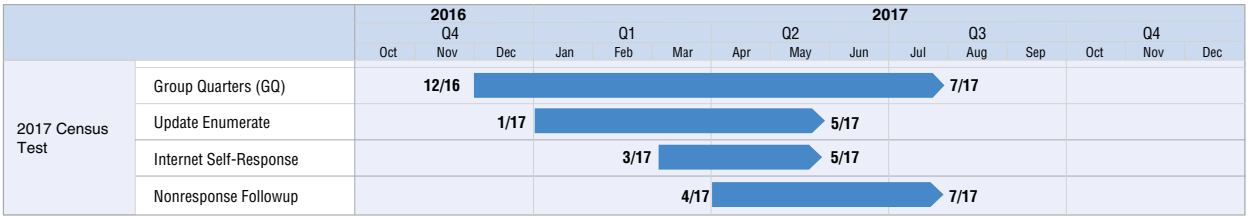


**Figure 21: Schedule for the 2017 Census Test**

| 2017 Census Test | |
|---|---|
| Objectives | Evaluate cross-operation impacts of innovations including Address Canvassing, Communications, Self-Response, Non-ID Processing, GQ, UE, and NRFU.<br>Test communications for promoting recruiting and language support.<br>Test UE and GQ operations.<br>Test UE using an integrated set of tools (i.e., using the same mobile device to list addresses and enumerate nonresponding housing units).<br>Determine the use of administrative records and third-party data as applied to group quarters populations.<br>Test the reengineered Quality Control process for field operations.<br>Measure workloads and improve workload models.<br>Test the performance management dashboard. |
| Findings and Design Implications | To be completed once the test is conducted. |

### 4.1.5 Tests in 2018

One test is planned for 2018, the 2018 Census End-to-End Test. The goal is to have the entire operational design for seven major operations (see below) ready for production—from a systems, operational, and architectural perspective. This test and its scope are dependent on funding. The 2018 Census End-to-End test will include significant field data collection components, and the timing of the field operations will mimic the 2020 Census (see Figure 22).

This test is in the early planning stages. Findings from the 2016 Address Canvassing Test and the 2017 Census Test will be used to develop the test plans. Other efforts in preparation of this test include introducing CEDCaP systems that were not in place for earlier tests, expanding and enhancing those systems already in use, and expanding and enhancing the systems using cloud technologies.

Any problems found during the 2018 Census End-to-End Test will be addressed using careful regression testing and change control procedures in 2019.

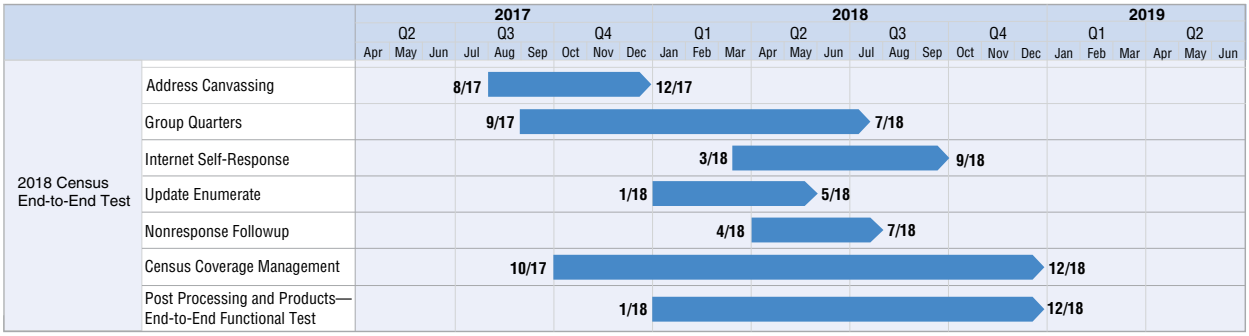


**Figure 22: Schedule for the 2018 Census End-to-End Test**

### *4.1.5.1 2018 Census End-to-End Test*

The 2018 Census End-to-End Test is planned to test seven major threads that cover the vast majority of the 2020 Census requirements: Address List Development, Self-Response, UE, NRFU, GQ, Census Coverage Measurement, and Post Processing. This test will have a Census Day of April 1, 2018, with the Address Canvassing operation to be conducted in the prior calendar year. It will include a sample that represents urban and rural areas, Puerto Rico, and group quarters.

| 2018 Census End-to-End Test | |
|---|---|
| Objectives | Test critical systems and operations together to ensure proper integration and conformance with the requirements.<br>Test all systems and operations to ensure readiness. |
| Findings and Design Implications | To be completed once the test is conducted. |

## 4.1.6 Tests in 2019

As shown in Figure 23, two types of tests are planned for 2019, Defect Resolution Testing and Post End-to-End Performance Testing. These tests and their scope are dependent on funding. The Defect Resolution Testing will ensure that any changes made to fix defects in the systems tested in the 2018 End-to-End Test are correctly resolved. This final performance testing in 2019 minimizes the risk of system crashes and delays in processing respondent Internet submissions and phone calls. Components of performance testing will be done according to best practices.

## 4.2 KEY DECISION POINTS AND MILESTONES

Figure 24 shows the key decision points and milestones for the full life cycle of the 2020 Census. Milestones include public facing milestones, such as launching the communications campaign, as well as delivery of 2020 Census products to the President, states, and the public.

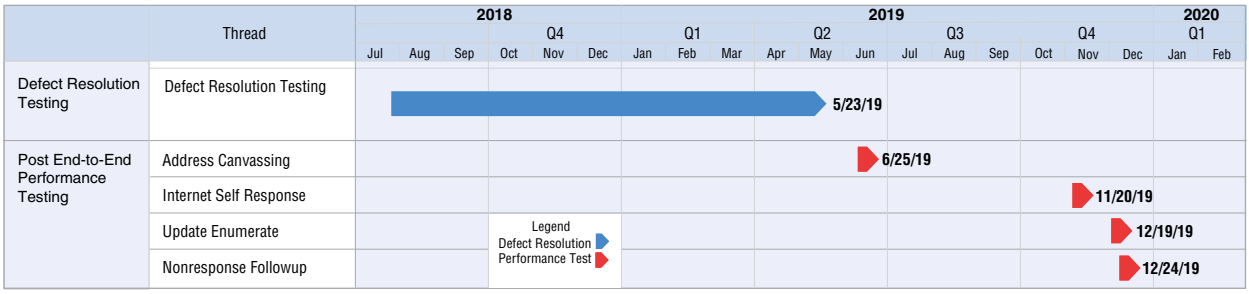


**Figure 23: Defect Resolution and Performance Tests in 2019**

| | Decision | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Q2 Q3 Q4 | Q1 Q2 Q3 Q4 | Q1 Q2 Q3 Q4 | Q1 Q2 Q3 Q4 | Q1 Q2 Q3 Q4 | Q1 Q2 Q3 Q4 | Q1 Q2 Q3 Q4 | Q1 Q2 Q3 Q4 | Q1 Q2 Q3 Q4 | Q1 Q2 Q3 Q4 | Q1 Q2 Q3 Q4 | Q1 Q2 Q3 Q4 | Q1 Q2 Q3 Q4 Q1 |
| Key Decision Points/ Milestones | Begin 2020 Census | 11/11 Begin 2020 Census | | | | | | | | | | | | |
| | Launch 2020 Census Web site | | | | 1/15 Launch 2020 Census Web site | | | | | | | | | |
| | 2020 Census Operational Plan | | | | | 10/15 2020 Census Operational Plan | | | | | | | | |
| | Award Census Questionnaire Assistance Contract | | | | | | 6/16 Award Census Questionnaire Assistance Contract | | | | | | | |
| | Award Communications Contract | | | | | | 8/16 Award Communications Contract | | | | | | | |
| | Census Topics to Congress | | | | | | | 4/17 Census Topics to Congress | | | | | | |
| | Deliver Final Residence Rules | | | | | | | 12/17 Deliver Final Residence Rules | | | | | | |
| | Open Regional Census Centers | | | | | | | 12/17 Open Regional Census Centers | | | | | | |
| | Census Questions to Congress | | | | | | | | 4/18 Census Questions to Congress | | | | | |
| | Open Field Offices | | | | | | | | 1/19 Open Field Offices | | | | | |
| | Group Quarters Operations Begin | | | | | | | | | 2/20 Group Quarters Operations Begin | | | | |
| | 2020 Census Day | | | | | | | | | 4/20 2020 Census Day | | | | |
| | NRFU Complete | | | | | | | | | | 8/20 NRFU Complete | | | |
| | Count Review Complete | | | | | | | | | | 11/20 Count Review Complete | | | |
| | Deliver Counts to the President | | | | | | | | | Deliver Counts to the President 12/20 | | | | |
| | Deliver Redistricting Counts to States | | | | | | | | | Deliver Redistricting Counts to States 3/21 | | | | |
| | Complete LUCA | | | | | | | | | | Complete LUCA 9/21 | | | |
| | Release Final 2020 Data Products | | | | | | | | | | | Release Final 2020 Data Products 4/23 | | |
| | Complete 2020 Census | | | | | | | | | | | | Complete 2020 Census 9/23 | |

**Figure 24: Key Decision Points and Milestones**

## 4.3 2020 CENSUS PRODUCTION OPERATIONAL SCHEDULE

Figure 25 describes the planned timing for the major production field operations for the 2020 Census. This schedule represents the current baseline and may change based on available funding and final design decisions.

Figure 26 provides an integrated schedule for the tests, key milestones, and production operations in one chart. Different types of tests (research, readiness, performance, end-to-end, and post end-to-end) are shown in different colors as noted in the legend. Key milestones, including the baseline of the 2020 Census Operational Plan, the delivery of topics and questions to Congress, Census Day, and the delivery of apportionment counts and redistricting data are also shown.

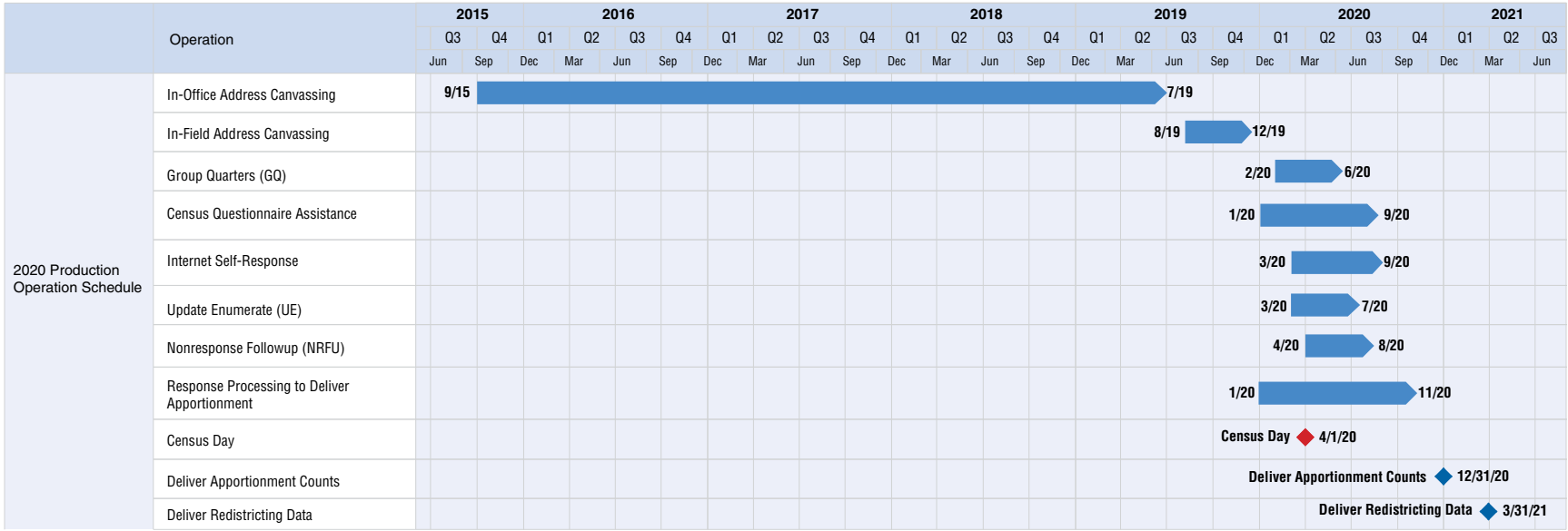


**Figure 25: 2020 Census Operations—Production Timeline**

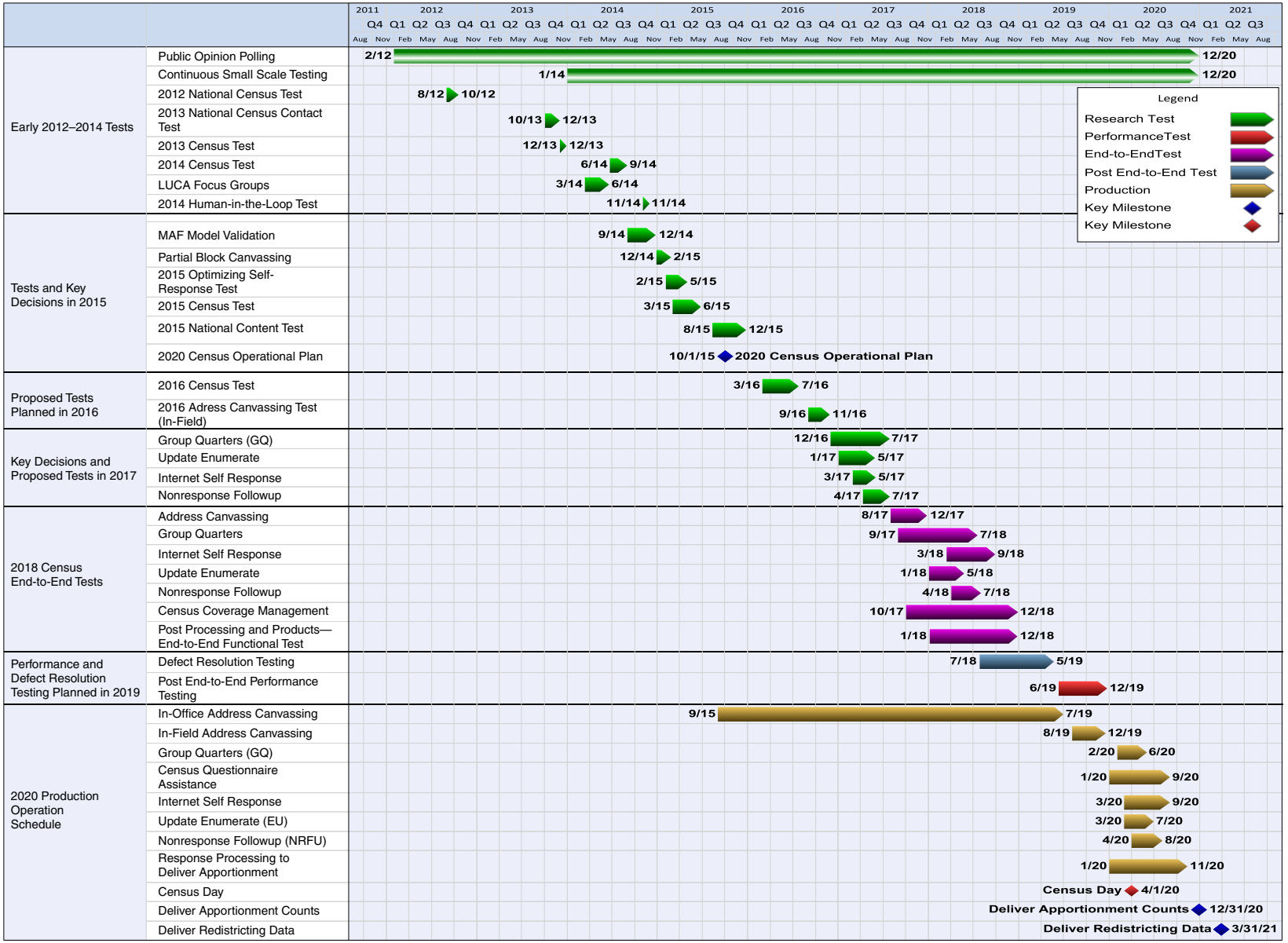


**Figure 26: High-Level Integrated Schedule**

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# 5. The 2020 Census Operations

This section of the document provides the current state of the operational design. An overview of the 34 operations is presented, followed by more detailed descriptions of each operation that include the following:

- **Purpose:** A concise description of the operation.
- **Lessons Learned:** Selected lessons learned from the 2010 Census or tests or studies that have occurred since the 2010 Census.[2]
- **Opportunities to Innovate:** Major planned innovations for this operation.
- **Description of Operation:** A basic description of the operation.
- **Research and Design Decisions:** Research completed through the Research and Testing phase of the 2020 Census Program (2012–2015) and the major findings from and decisions made based on this research.
- **Design Issues to Be Resolved:** Outstanding design components and when and how they will be addressed.
- **Cost and Quality:** The expected cost and quality impacts of the proposed design (or alternative designs) for this operation. Only cost impacts of $100 million or more are reflected.
- **Risks[3]:** The top risks associated with this operation.
- **Milestones:** Important dates associated with this operation to include decision points and production dates.

For support and similar operations that do not require a research-based design, the sections on research and design decisions focus on work completed or to be completed and general decisions and issues.

Note that throughout this document references are made to specific systems that are part of CEDCaP. These are the systems being used to support the early census tests; however, final decisions on production systems have not been made.

## 5.1 OPERATIONS OVERVIEW

Figure 27 illustrates all 34 operations organized by the 2020 Census WBS elements. As noted by the shading on the diagram, the degree to which detailed planning has been conducted for each operation varies. The maturity of the operational design for the 34 operations also varies based on the amount of planning conducted to date.

Although each operation is presented separately, the operations must work together to achieve a successful census. Information flows among the operations as the census proceeds from frame development through collection of response data to the publishing and release of the data.

The integration of these business operations requires integration of the information technology systems that support them. This is a significant effort and is underway. All of the interfaces for the 2020 Census are not fully defined at this time; however, the Systems Engineering and Integration operation will detail those interfaces as the Research and Testing phase ends and systems are built for production.

The information flows among the primary business operations are highlighted in the diagram below (Figure 28). Major interactions and flows are shown via the arrows in the diagram and the key external interfaces are depicted in blue text.

[2] The Knowledge Management Database contains the lessons learned from the 2010 Census and is available for review upon request.

[3] Each operation has its own project-level risk register, which includes the full list of project risks. These are available upon request.

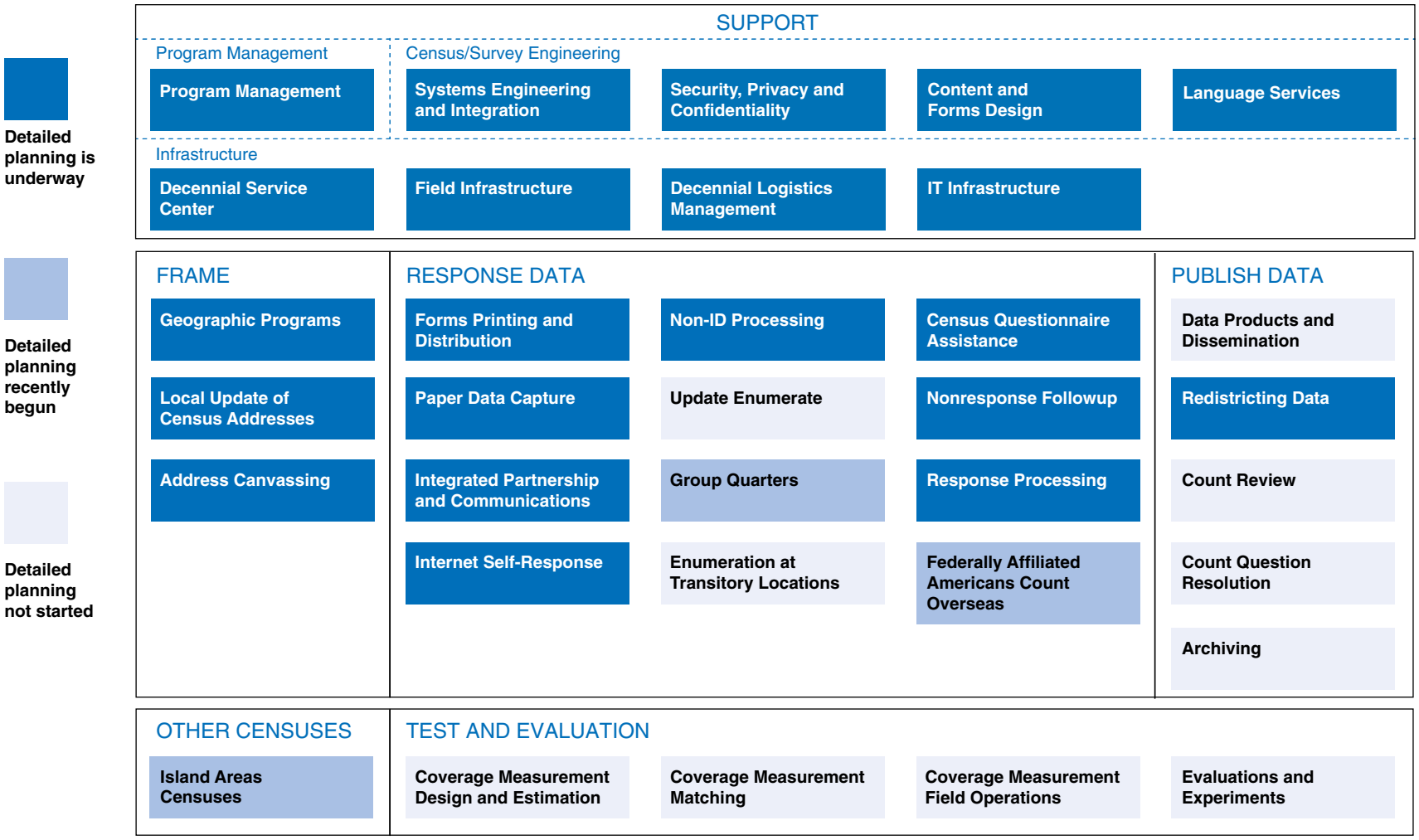



**Figure 27: Operational Overview by Work Breakdown Schedule**

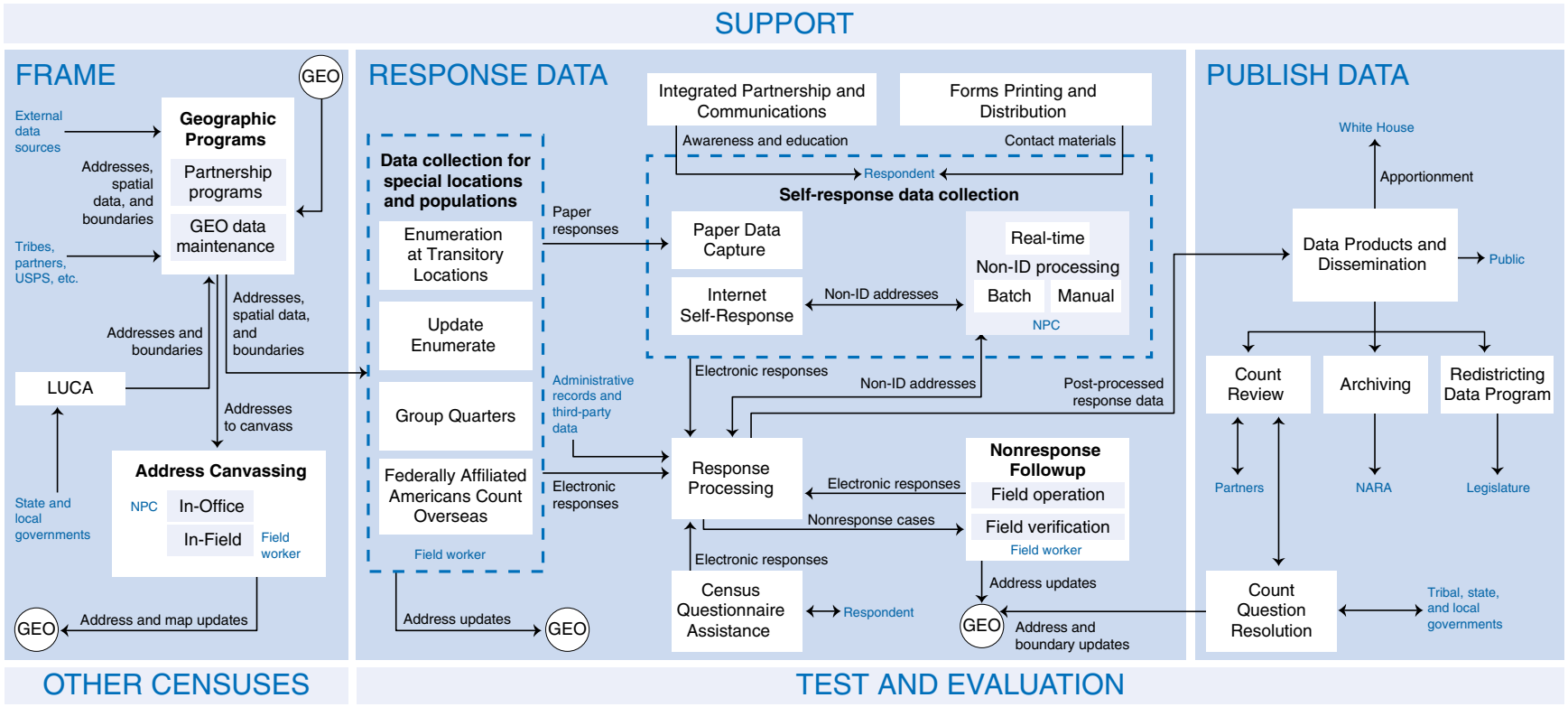



**Figure 28: High-Level Integration of Operations**

### 5.1.1 Frame

As shown in Figure 28 from the previous page, the basic flow of information begins in the frame area with the **Geographic Programs** operation that receives addresses, spatial data, and boundary information from tribal, federal, state, and local governments. An additional method for updating the frame is the review of the address and boundary information through the **Local Update of Census Addresses (LUCA)** program. Updates through Geographic Programs and LUCA typically include adding missing living quarters, deleting erroneous living quarters, and modifying or correcting existing records. The most current address list is provided to the **Address Canvassing** operation where staff make updates to the list via in-office and in-field procedures. These updates are processed on an ongoing basis throughout the decade. Once the frame updates are complete, the initial universe of living quarters is used for enumeration operations in the *Response Data* area.

The Geographic Programs operation allocates the universe of addresses into different methods and modes for the following operations:

- **Enumeration at Transitory Locations:** Enumerate individuals in occupied units at transitory locations, such as recreational vehicle parks, campgrounds, tent cities, racetracks, circuses, carnivals, marinas, hotels, and motels, who do not have a usual home elsewhere.
- **Update Enumerate:** Update the address and feature data and enumerate housing units in certain designated geographic areas with special enumeration needs (e.g., areas that do not have city-style addresses and areas with unique challenges associated with accessibility). (This operation crosses Frame and Response Data Collection in the graphic and in the WBS).
- **Group Quarters:** Enumerate people living or staying in group quarters, people experiencing homelessness, and people receiving service at service-based locations.
- **Federally Affiliated Americans Count Overseas:** Obtain counts by home state of U.S. military and federal civilian employees stationed or deployed overseas and their dependents living with them. All responses from these operations are collected electronically. Some of these operations (e.g., UE or ETL) may find addresses that were not in the initial universe.

Address updates collected during these operations are sent back to the **Geographic Programs** operation for processing.

### 5.1.2 Response Data

A key goal for the 2020 Census is to optimize self-response. **Integrated Partnership and Communications** and **Forms Printing and Distribution** create awareness for and send contact materials to the respondents, directing them to the online questionnaire or to a paper questionnaire. During **Internet Self-Response**, some respondents will not have a Census ID, the Census Bureau will do real-time (during the interview) processing to identify the correct block for the respondent's address using methods in the **Non-ID Processing** operation. The respondents that do not respond on the Internet will be given the opportunity to respond via **Paper Data Capture**. Some respondents will call with questions, and the Census Bureau will offer to collect their response via the telephone through the **Census Questionnaire Assistance** operation. All the responses from each of the Response Data Collection operations will go to the **Response Processing** operation, which manages the status of cases across the universe. Addresses for which the Census Bureau did not receive a response are sent to the **Nonresponse Followup** operation, which determines the most cost-effective way of enumerating those households (personal visit, use of administrative records and third-party data, proxy responses, or imputation). Any new addresses identified during Nonresponse Followup are sent to the **Geographic Programs** operation for processing.

### 5.1.3 Publish Data

Response Processing delivers the edited data to the **Data Products and Dissemination** operation to prepare the final 2020 Census data products. This operation delivers:

- Apportionment counts to the White House and statistical data to the public.
- State counts to the **Redistricting Data Program** for dissemination to the state legislatures so state governments can define the geographic boundaries for Congressional and legislative districts.

- Final counts to the **Count Review** operation for Federal-State Cooperative Population Estimates (FSCPE) members to ensure the accuracy of the 2020 Census.
- Final counts to the **Count Question Resolution** (CQR) operations so challenges to Census Counts can be resolved.
- Every questionnaire to the **Archiving** operation for public release 72 years after the census.

This description of all 34 operations and the basic integration only depicts high-level data flow and interaction. The detailed Business Process Models (BPM) found in the Detailed Operational Plans for each operation show how information flows within operations.

## 5.2 PROGRAM MANAGEMENT

### 5.2.1 Program Management

| Detailed Planning Status: | **Underway** |
|---|---|

#### *Purpose*

The Program Management operation defines and implements program management policies, processes, and the control functions for planning and implementing the 2020 Census in order to ensure an efficient and well-managed program.

#### *Lessons Learned*

Based on lessons learned from the 2010 Census and other reviews, the following recommendations were made:

- Develop a life-cycle schedule for the 2020 Census, and complete it earlier in the decade.
- Place more emphasis and resources on updating cost and schedule estimates throughout the life cycle.
- Obtain independent cost estimates and use them to validate cost estimates (that include contingency reserves) developed by stakeholder organizations.
- Improve strategic planning and early implementation of the 2020 Census Risk Management process.
- Align system development schedules with operational deadlines to allow adequate time to test systems before their deployment.
- Reevaluate the practice of frontloading and develop a better process for developing workload and cost assumptions.
- Rethink and rework stakeholder engagement, education, and management. The Census Bureau needs to better define, and then clearly articulate, its expectations with regards to roles and responsibilities between the Census Bureau, contractors, and stakeholder groups.
- Set a clear and publicly announced goal to reduce the inflation-adjusted per housing unit cost relative to 2010 Census totals.

#### *Opportunities to Innovate*

Following an analysis and review of the 2010 Census program management practices, the 2020 Census improved its program management capabilities and defined program management processes earlier in the decade to support 2020 Census Research and Testing activities. New and improved program management practices integrated into the 2020 Census that were not part of the 2010 Census include the following:

- Iterative operational planning to allow for periodic design refinements based on findings from research and testing, as well as external changes in legislation and technology.
- Evidence-based decision-making to ensure that operational designs are based on solid evidence from research, testing, analysis, and prior survey and census experience.
- Integration of schedule, scope, and budget using a common WBS.
- An integrated life-cycle master schedule that uses best practices based on the Government Accountability Office (GAO) schedule assessment guide.
- Cost and schedule estimates updated throughout the 2020 Census life cycle based on GAO best practices:
  - Publication GAO-09-3SP Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs.
  - Publication GAO-12-120G Schedule Assessment Guide: Best Practices for Project Schedules.

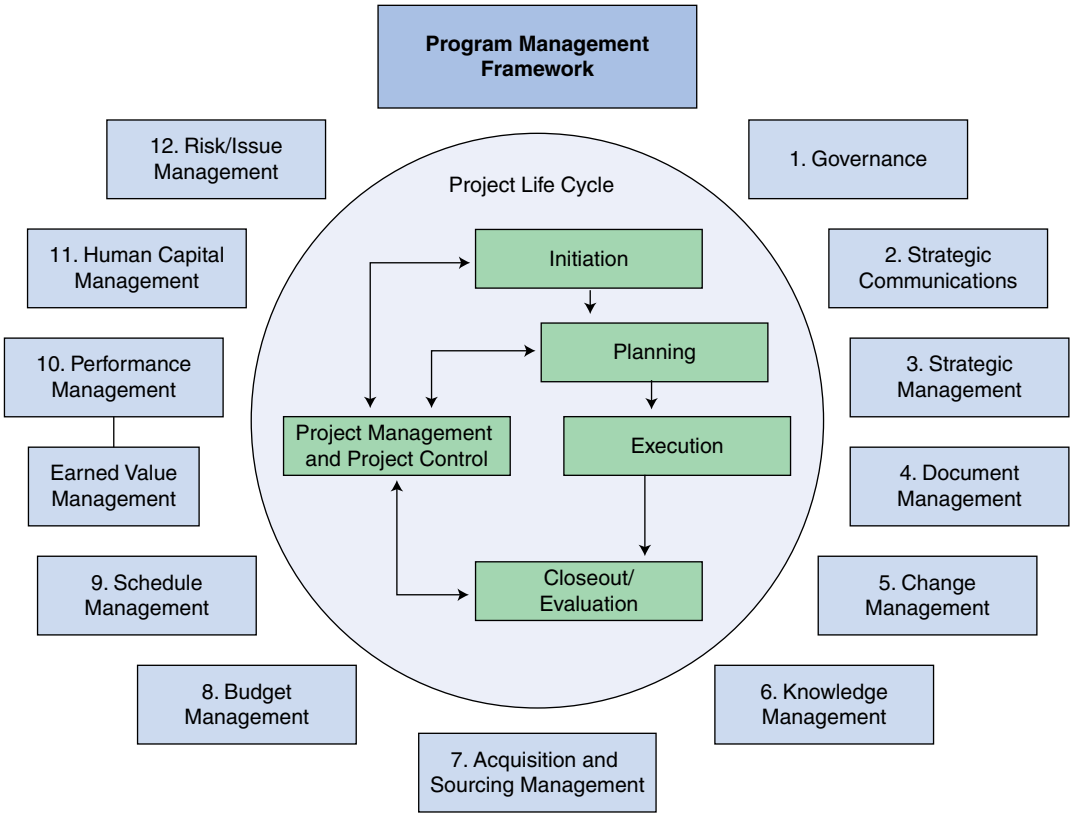



**Figure 29: Program Management Framework**

- A Knowledge Management process and database for lessons learned from the 2010 Census, 2020 Census Research and Testing Program, advisory committees, and audit and oversight reports.
- Alignment with the Census Bureau's approach to implement activity-based management and earned value management techniques.
- Formal risk management kicked off earlier in decade (2012) and occurs at both the program-level and project-level.
- Increased transparency and collaboration with internal and external stakeholders about the 2020 Census.
- Increased international stakeholder communications to leverage learnings of other countries' census efforts and to share the Census Bureau's best practices and challenges.
- Governance that bridges organizational silos.
- Performance Management focused on key cost drivers.
- Workforce that is appropriately skilled and trained.

### *Description of Operation*

The Program Management operation is responsible for the planning and implementation of the 2020 Census. Specifically, this operation defines the overall 2020 Census program and project management policies, framework, and control processes used across the entire 2020 Census and all projects established within the program.

The established Program Management framework is shown in Figure 29.

General activities are required to manage multiple, ongoing, interdependent projects in order to fulfill the 2020 Census mission and objectives. The Program Management operation defines and

manages the following 12 program management processes:

1. **Governance:** The overall management structure, decision-making authority, priority setting, resource utilization, and performance verification at each level of the program.
2. **Strategic Communications:** The engagement with internal and external stakeholders, including Congress and the general public, in the planning, research and analysis, progress, and decisions related to the 2020 Census. This activity also includes collaboration with international organizations, particularly the International Census Forum and the United Nations Statistics Division (for the global view of censuses) and the United Nations Economic Commission for Europe (for the regional view).
3. **Strategic Management:** The process for determining and documenting the 2020 Census strategic direction regarding strategies, goals, objectives, performance, and investments.
4. **Document Management:** Activities for consistent and centralized management of program documentation produced in support of the 2020 Census program.
5. **Change Management:** Activities for managing and controlling the 2020 Census strategic baseline, including control of charters, process plans, design documents, operational plans, project plans, requirements, and schedules.
6. **Knowledge Management:** Practices used to identify, create, represent, distribute, and enable adoption of insights and experiences.
7. **Acquisition and Sourcing Management:** Activities to provide and support acquisition principals and guidelines.
8. **Budget Management:** Activities used to establish and manage future-year budget formulations, current-year budget execution, and cost estimating and cost modeling.
9. **Schedule Management:** Activities used to identify and schedule activities required to produce program deliverables, identify interdependencies between activities, and determine activity resource requirements and duration.
10. **Performance Measurement and Management:** Practices used to monitor the progress of the 2020 Census in order to identify variances, assign corrective actions, and make timely changes.
11. **Human Capital Management:** Activities to ensure that human competencies and skills are present and available to the organization.
12. **Risk and Issue Management:** Activities to facilitate the identification, analysis, mitigation, and contingency planning for risks and issues related to achieving the program's objectives.

Each component of the framework is documented in detail in a separate process plan. Program Management process plans are revised based primarily on lessons learned, other feedback received from process owners and users, and as the program evolves.

### *Work Completed*

The following work has been completed for this operation:

The program management processes listed above were approved in 2011, funded, established, and utilized during the 2020 Census Research and Testing Phase. They will continue to be used for the remaining phases of the 2020 Census.

### *Decisions Made*

The following decisions related to the 2020 Census Program Management operation have been made:

- ✓ Strategies for each program management element were defined and approved in 2011 and formed the basis for the management of the 2020 Census Program.
- ✓ The 2020 Census will be managed by using a fully integrated master schedule designed and built using best practices based on the GAO schedule assessment guide (GAO-12-12G, May 2012).
- ✓ The 2020 Census will follow the Enterprise Systems Development Life Cycle process for all decennial IT projects. The Census Bureau Project Life Cycle will be followed for all projects (IT and non-IT projects).
- ✓ The 2020 Census will manage program-level risk at the Portfolio Management Governing

Board-level and project-level risks at the project team level.

- ✓ The program will have a finalized and integrated governance and performance measurement reporting mechanism.
- ✓ The risk management plan includes both the program and project-level processes.
- ✓ A formal memorandum series will be used to document significant program decisions.
- ✓ The program will actively engage with stakeholders and advisors on major aspects of the 2020 Census.
- ✓ Quarterly 2020 Census Program Management Reviews will be conducted—including live Webcast, so stakeholders can watch live or on demand later.
- ✓ The 2020 Census Monthly Status Reports will be delivered to key oversight entities.
- ✓ A Decennial Policy Team will be developed and managed to ensure interdisciplinary, inter-directorate communication in regard to legal, policy, and IT security sensitivities.
- ✓ The 2020 Census Web site will be developed and supported.
- ✓ Frequently Asked Questions about the test program will be developed along with other supporting materials.
- ✓ Talking Points for customer assistance for internal phone and correspondence support centers will be developed.
- ✓ A directorate representative to Census Bureau's International Collaboration Steering Committee will be appointed to communicate and coordinate international collaboration across the agency.
- ✓ The Census Bureau will actively participate with international and national statistical and geographic organizations for key learnings and to share the Census Bureau's experiences.

### *Issues to Be Resolved*

The Program Management operation needs to continue to establish and refine particular areas. Key activities include the following:

- Maturing and ensuring full utilization of performance management to better facilitate early identification and correction of problems.
- Maturing change management processes to better ensure impact assessment.
- Maturing human capital management to better plan, facilitate, and monitor a workforce that has required competencies and skills.
- Maturing schedule tool approach for using Primavera for the program and MS Project interaction for the enterprise.
- Maturing integration of 2020 Census schedules with enterprise efforts and enterprise schedules.
- Defining the role and processes for using SharePoint in performance management.
- Defining the detailed earned-value management methodology.
- Defining methods to link risk mitigation actions to the master integrated schedule.

### *Cost and Quality*

Strong program management ensures an efficient 2020 Census. Specific examples are noted below. A down arrow indicates a reduction in cost and an up arrow indicates an increase in cost as compared with the 2010 Census through:

- 🡻 Investment in establishing a robust and formal program management office that develops and manages processes that minimize potential negative cost, schedule, and scope impacts.
- 🡻 Ongoing stakeholder engagement reduces the likelihood of unplanned design changes late in the decade, which can prevent additional costs.

Program management does not directly impact the quality of the 2020 Census results.

### *Risks*

The Program Management operation identifies and manages all program-level risks. The risks listed below are specific to this operation.

Commitment by the 2020 Census senior managers to improve the program management process used for the 2010 Census program requires resources and staff with certain skill sets. **IF** the skilled resources are not available and funded to implement program management, **THEN** critical functions such as schedule, budget, scope, and risk management will be jeopardized, leading to negative impacts to cost and schedule.

As part of the 2020 Census Program Management operation, a framework of various program management processes have been developed for ensuring the implementation of consistent and thorough program management controls. **IF** staff working on the 2020 Census operations do not follow the program management processes, **THEN** the 2020 Census projects may lack sufficient scope, schedule, budget controls, and risk management, increasing the likelihood of negative impacts to cost and schedule.

Performance measurement is a critical function needed by managers to track the status of planning, development, and implementation of the 2020 Census program and operations. **IF** performance measures are inadequately defined and/or monitored, **THEN** managers will have difficulty assessing and reporting accurate cost and progress status.

### *Milestones*

| Date | Activity |
|---|---|
| September 2010 | Baseline the initial 2020 Census Strategic Plan. |
| June 2011 | Baseline the initial 2020 Census Life Cycle Rough Order of Magnitude Cost Estimation (or Estimate). |
| September 2011 | Develop and gain approval for 2020 Census Program Management Process Strategies for each component described in this operation. |
| September 2012 | Baseline the initial 2020 Census Program-Project Management Plans for each component described in this section. |
| December 2012 | Begin the quarterly 2020 Census Program Management Reviews. |
| May 2013 | Baseline the initial 2020 Census Mission-level Requirements. |
| April 2014 | Baseline the initial 2020 Census Life Cycle Integrated Schedule. |
| October 2015 | Issue the Baseline of the 2020 Census Operational Plan. |
| October 2015–September 2018* | Baseline the Detailed 2020 Census Operational Plans (one for each operation). |
| Annually | Refresh and reissue strategic program documentation and the 2020 Census Operational Plan based on lessons learned, test results, and other feedback. |
| Annually | Conduct project management process training to process users. |

* The dates for each of the Detailed Operational Plans vary depending on the timing of the operation. For example, the Detailed Operational Plan for the Address Canvassing operation is due in October 2015 and the Detailed Operational Plan for the Archiving operation is due in 2018.

## 5.3 CENSUS/SURVEY ENGINEERING

The support operations in this area provide the foundation for conducting the 2020 Census. This area consists of four operations: Systems Engineering and Integration; Security, Privacy, and Confidentiality; Content and Forms Design; and Language Services. Each is described below.

### 5.3.1 Systems Engineering and Integration

| Detailed Planning Status: | **Underway** |
|---|---|

#### *Purpose*

- Manages the delivery of a system of systems that meets 2020 Census Program business and capability requirements.
- Implements and manages the full Enterprise Systems Development Life Cycle for systems supporting the 2020 Census.

#### *Lessons Learned*

Based on lessons learned from the 2010 Census and other reviews, the following recommendations were made:

- Need to have a well-documented plan that describes the development of the business architecture and the solution architecture. The architecture plan must have buy-in and adoption by all stakeholders.
- Consider greater flexibility for requirements configuration management in the early design and development processes to help minimize the necessity to make subsequent corrections, potentially saving resources and costs associated with unplanned resource needs.

#### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Application of the Census Bureau's Enterprise Systems Development Life Cycle.
- Integration with the Census Bureau's Enterprise Architecture.
- Implementation of performance measurement.
- Integration with Enterprise systems, as appropriate.
- Dedicated resources from the IT Directorate for key positions, including Chief Architect, Chief Systems Engineer, and Chief IT Security Engineer.

#### *Description of Operation*

The scope of the SE&I operation is to implement and manage the full eSDLC for the 2020 Census. There are five major components of SE&I, including: Requirements Engineering, Solution Architecture, Solution Development and Technical Integration, Test and Evaluation, and Deployment and Operations and Maintenance. As part of all of these efforts, SE&I will utilize the following standard program management concepts to manage these tasks: Schedule Management, Risk Management, Issue Management, Configuration Management, and Quality Assurance.

##### *Requirements Engineering*

Based on the design of the 2020 Census and plans documented in the 2020 Census Operational Plan, the SE&I operation defines and executes a requirements engineering approach for the 2015–2018 Census Tests and 2020 Census that aligns with the Census Bureau's eSDLC, meets agency and Department of Commerce standards and guidelines, and emphasizes consistency in approach across the portfolio of 2020 Census projects. The scope of the Requirements Engineering effort includes the following:

- Ensure the controlled and consistent application of a standardized approach to requirements engineering throughout the program and project life cycles.
- Conduct early and more frequent user testing and engagement, employing the use of prototypes, models, and simulations wherever practicable and avoiding an "over the fence" approach to requirements engineering.
- Establish the requirements engineering methodology and tools that must be applied across the decennial and supporting programs:
  - Develop BPM in concert with subject matter experts for each operation for each of the 2015–2018 Census Tests and the 2020 Census as a tool to begin the requirements elicitation process.
  - Extract Project-Level Business Requirements (PLBR) and draft Capability Requirements (CAP) from the BPM and review with subject

matter experts to finalize the initial baseline of PLBR and CAP.

- Facilitate broad program and project level understanding of needs for all phases of the 2020 Census.
- Develop 2015–2018 Census Tests and 2020 Census Workload Demand Models, which will aid the 2020 Census Operational Integrated Project Teams in identifying the nonfunctional performance PLBR and CAP.

As the incremental baselines of the PLBR and CAP for 2015–2018 Census Tests and 2020 Census are complete, they will be allocated to the projects for decomposition down to the detailed solution and specification levels. At this point in the process, the role of the SE&I operation is to provide technical oversight and monitoring to ensure that solutions appropriately address the business requirements and specifications.

### *Solution Architecture*

The SE&I operation develops the 2020 Census Solution Architecture and Application and Interface Inventory. The development of the solution architecture is comprised of the following:

- Build upon lessons learned from the 2010 Census, as well as the results and findings of the 2020 Census Research and Testing phase.
- Review and revise BPM developed as part of the requirements engineering effort to create the Business Architecture.
- Create the Solution Architecture document including the Application and Interface Inventory based on the "to be" business processes and capabilities.
- Provide technical oversight of the 2020 Census IT Project Portfolio to ensure conformance to the prescribed solution architecture.
- Refine and deliver subsequent baselines of the 2020 Census Solution Architecture and Application and Interface Inventory.
- Mediate gaps in capabilities between solution providers and operations representatives where required, and subsequently refine architecture to represent output of mediation.

### *Solution Development and Technical Integration*

During solution development, the requirements, architecture, and low-level technical design are used to develop the end-product and required interfaces. As part of Solution Development and Technical Integration, the SE&I operation performs the following activities:

- Provide support as it relates to interpretation of PLBR and CAP.
- Ensure development is completed within the structure of the solution architecture.
- Oversee the Solution Development process to ensure that the overall solution is developed within cost and schedule constraints in compliance with the Census Bureau's eSDLC process.
- Conduct a weekly systems integration meeting to ensure progress (teams for each system report status, issues, and risks).
- Oversee Interface Working Groups to ensure the systems as developed will function cohesively when they are exercised in an end-to-end fashion.
- Work with the CEDCaP and CEDSCI programs to ensure that they are meeting the 2020 Census time, budget, and functional requirements.

### *Test and Evaluation*

As part of Test and Evaluation area, SE&I will perform the following:

- Oversee tests of programs that are comprised of multiple projects (CEDCaP, CEDSCI, etc.).
- Oversee tests of individual projects that are not part of a larger enterprise program or collection of projects.
- Conduct Integration and Test activities across programs and independent projects to ensure the 2020 Census system, as a whole, performs as expected. This level of testing could comprise many different types of tests to include: Cross Program and Project Integration, Data Quality, and System Performance.
- Document measures for acceptance in the Test and Evaluation Master Plan and document end-to-end system readiness in a Test Report.

### *Deployment and O&M*

The SE&I operation provides oversight and structure around the deployment of systems as well as O&M activities. As part of the Deployment and O&M activities, the SE&I operation will perform the following activities:

- Provide oversight to ensure that all systems are deployed and ready to support 2015–2018 Census Tests and 2020 Census activities.
- Provide oversight to ensure all supporting organizations are deployed and ready to support all operational activities.

## *Work Completed*

The following work has been completed for this operation:

- Business process models and business and capability requirements are baselined for all applicable business operations (does not include certain support operations such as Program Management and Security and IT Infrastructure).
- Solutions for the 2015 Optimizing Self-Response Test, 2015 Census Test, and the 2015 National Content Test were delivered.
- The solution architecture for the 2016 Census Test is baselined.
- The eSDLC Phase Gate Review process is being used.

## *Decisions Made*

The following decisions have been made for this operation:

✓ Key IT Directorate roles, such as the 2020 Census Chief Architect, Chief Systems Engineer, and the Chief IT Security Engineer, will be funded by and matrixed to the 2020 Census Program.

✓ The 2020 Census Program will leverage the enterprise infrastructure and enterprise solutions as appropriate.

## *Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

What tools and test materials are required to support the integrated tests (Performance Test Services, Representative Test Data, etc.)?

- **Approach:** Look at the functional and non-functional capabilities and examine the solution architectures and perform analysis of alternatives. Align the decennial architecture with the enterprise architecture as appropriate.
- **Decision by:** September 2016

What is the sourcing approach for each capability supporting the 2020 Census?

- **Approach:** Conduct an analysis of alternatives for each capability.
- **Decision by:** June 2016

## *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

Given the complexity of the 2020 Census, SE&I activities are critical to a successful census. Since so many of the innovations that are aimed at reducing the cost of the census rely on information technology solutions, the effectiveness of this operation could impact the cost of the census as compared with the 2010 Census.

Quality impacts of this operation on overall 2020 Census quality include the following:

↑ Increase quality by setting up robust processes for system development.

## *Risks*

The risks listed below are specific to this operation.

Testing of the systems supporting the 2020 Census requires adequate resources (i.e., staffing, budget, and documentation) in order to be properly conducted. **IF** there is insufficient resources to support the integrated test efforts, **THEN** system defects may not be identified and fixed in time for 2020 Census production.

The systems supporting the 2020 Census need to be scalable enough to adjust to unexpected peaks in the workload. **IF** system scalability is not tested and validated, **THEN** systems may not function as required or meet the performance requirements needed to support the volume expected for the 2020 Census.

### *Milestones*

| Date | Activity |
|---|---|
| 2012 | Baseline the initial 2020 Census Systems Engineering and Integration Plans for each component described in this section. |
| 2013 | Create Architecture and requirements artifacts for the 2014 Census Tests. |
| 2014 | Initial Baseline Project-Level Business Requirements and Capability Requirements (to be updated as design matures). |
| 2015 | Establish Baseline 1 of Solution Architecture.<br>Establish Baseline 1 of PLBR and CAP, which includes requirements for 2016 Census Test.<br>Determine the approach for conducting integrated tests for 2016, 2017, and 2018 Census Tests (Design Decision 1).<br>Determine tools and test materials required to support the integrated tests (Performance, Test Services, Representative Test Data, etc.) (Design Decision 2). |
| 2016 | Conduct Integrated Test for 2016.<br>Establish Baseline 2 of Solution Architecture.<br>Establish Baseline 2 of PLBR and CAP, which includes requirements for 2017 Census Test. |
| 2017 | Conduct Integrated Test for 2017.<br>Establish Baseline 3 of Solution Architecture.<br>Establish Baseline 3 of PLBR and CAP, which includes requirements for 2018 Census End-to-End Test. |
| 2018 | Conduct Integrated Test for 2018.<br>Establish Baseline 4 of Solution Architecture.<br>Establish Baseline 4 of PLBR and CAP, which includes Lessons Learned from 2018 Census End-to-End Test. |
| 2019 | Deploy production systems.<br>Conduct Final Performance Testing. |
| 2020 | Develop final, as-built, and Operated Solution Architecture. |
| Annually | Refresh and reissue strategic program documentation and the 2020 Census Operational Plan based on lessons learned, test results, and other feedback. |

## 5.3.2 Security, Privacy, and Confidentiality

| Detailed Planning Status: | **Underway** |
|---|---|

### *Purpose*

The Security, Privacy, and Confidentiality operation ensures that all operations and systems used in the 2020 Census adhere to the following policies and regulations:

- Appropriate systems and data security.
- Respondent and employee privacy and confidentiality.

### *Lessons Learned*

Based on lessons learned from the 2010 Census and other reviews, the following recommendations were made:

- Ensure IT systems and applications supporting the 2020 Census have the proper security authorization prior to start of operations.
- Ensure all 2020 Census accepted IT security risks are in alignment with the Census Bureau's security program policies.
- Ensure all of the 2020 Census IT system security risks are monitored by the 2020 Census Risk Review Board, as well as an Information System Security Officer and the Office of Information Security.
- Embed an Office of Information Security security engineer in the 2020 Census Program to ensure compliance with the IT security program and integration with the Census Bureau's Enterprise environments.
- Ensure all employees supporting IT security are certified in accordance with the Census Bureau's IT security program.

### Opportunities to Innovate

Opportunities to innovate include the following:

- Implement an IT Security Program Risk Management Framework in accordance with National Institute of Standards and Technology guidelines.
- Hire a 2020 Census Chief IT Security Engineer to support application development, mobile computing, and enterprise systems.
- Increase staff in the Census Bureau Office of Information Security to provide penetration testing services and more extensive scanning for vulnerabilities and configuration management.
- Align all Privacy Impact Assessments and Privacy Threshold Assessments to the System Security Plans.

### Description of Operation

The Security, Privacy, and Confidentiality operation ensures that all operations and systems used in the 2020 Census adhere to the appropriate systems and data security, respondent and employee privacy and confidentiality policies, and regulations. Specific requirements are outlined below.

#### *Security*

Ensure Compliance with the following laws and Census Bureau policies:

- IT Security Program Policy: Ensure all 2020 Census systems meet federal, Department of Commerce, and Census Bureau IT security policy requirements as identified in the Census Bureau IT Security Program Policy and relevant National Institute of Standards and Technology documentation.
- Data Stewardship Policies: Ensure that the 2020 Census complies with the Census Bureau's Data Stewardship (DS) polices including:
  - Control of Personally Identifiable Information (DS-007).
  - Record Linkage (DS-014).
  - Respondent Identification (DS-016).
  - Privacy Impact Assessments (DS-019).
  - Data Breaches (DS-022).
- Ensure that the 2020 Census only collects information necessary for complying with the 2020 Census mission and legal requirements.
- Ensure all 2020 Census systems have an Authority to Operate.
- Ensure each system has a designated Information System Security Officer.
- Ensure all 2020 Census Program systems are covered by the Risk Management Framework, which includes processes to ensure systems undergo a security review prior to testing and a full security assessment prior to obtaining an Authority to Operate.
- Ensure Appropriate Suitability Screening Processes are in place.

#### *Privacy and Confidentiality*

- Ensure decennial Privacy Impact Assessments and Privacy Threshold Analyses are current.
- Ensure that each system of record has an appropriate System of Record Notice published in the Federal Register.
- Establish a System of Record Notice for Bring Your Own Device (BYOD) and Device as a Service technology to be used in the 2020 Census.
- Align the Privacy Impact Assessments and Privacy Threshold Assessments to security plans as part of the accreditation process; work with training operations to ensure 2020 Census managers and staff are prepared to notify the respondents about the purpose and planned statistical uses of the information collected.
- Ensure that all people handling or reviewing Title 13 and Title 26 materials are Special Sworn Status certified.
- Ensure Personally Identifiable Information Incident Handling process is operational.

### Work Completed

The following work has been completed for this operation:

#### *Encryption*

- Researched securely managing data on mobile devices using Mobile Application Manager (MAM) software solution.

#### *Cloud Technology*

- Adopted the "Cloud First" strategy.

- Examined the requirements of the applications and underlying infrastructure from a security compliance perspective.
- Examined the requirements for hybrid cloud capabilities to allow flexibility in leveraging cloud technology to meet future program requirements.
- Enabled the deployment of cloud-based services.

*BYOD Technology*

- Obtained a waiver to allow sensitive personal data to be collected and stored on personally owned devices to be used in the 2014, 2015, and 2016 Census Tests.
- Established a BYOD Acceptable Use Policy for 2020 Census testing purposes.
- Implemented a MAM solution for securing data residing on personally owned devices.
- Granted authorization to test applications and technologies prior to a full authorization to operate.

### Decisions Made

The following decision has been made for this operation:

✓ The 2020 Census will access Title 13 and Title 26 data, including administrative records and third-party data, remotely using the Virtual Desktop Infrastructure.

### Issues to Be Resolved

Additional work is required to make decisions on the following questions:

Will a MAM solution be used in lieu of Mobile Device Management to support mobile data collection?

- **Approach:** Researched during the 2015 Census Test.
- **Decision by:** March 2016

### Cost and Quality

The investment in Security, Privacy, and Confidentiality will have minimal[4] impacts on the cost and quality of the 2020 Census as compared with the 2010 Census.

### Risks

The risk listed below is specific to this operation.

In accordance with the Census Bureau's security policy, all IT systems must undergo an independent security assessment and acquire the authorization to operate prior to operating in the production environment. In addition, all systems must meet the Census Bureau's Risk Management Framework continuous monitoring requirements. **IF** an IT system supporting the 2020 Census encounters an unexpected configuration change which affects the system's security posture, **THEN** additional security assessments are required which may result in an increase in security support costs, an increase in the system security risk rating, and schedule delays.

[4] Minimal impact means that this operation does not directly impact the cost of the life-cycle cost of the 2020 Census (as compared with the 2010 Census) by more than $100 million, based on the current life-cycle cost estimate.

### *Milestones*

| Date | Security Activity |
|---|---|
| April 2015 | Monitor security of systems used in the 2015 Census Test. |
| January 2016 | Conduct security reviews and assessments on system releases for the 2016 Census Test. |
| September 2016 | Release Security, Privacy, and Confidentiality Detailed Operational Plan. |
| October 2016 | Conduct security reviews and assessments on system releases for the 2017 Census Test. |
| October 2017 | Conduct security reviews and assessments on system releases for the 2018 Census End-to-End Test. |
| October 2018 | Conduct security reviews and assessments on system releases for the defect resolution testing and post end-to-end performance testing in 2019. |

## 5.3.3 Content and Forms Design

| Detailed Planning Status: | **Underway** |
|---|---|

### *Purpose*

The Content and Forms Design operation performs the following activities:

- Identify, research, and finalize content and design of questionnaires and other non-questionnaire materials.
- Ensure consistency across data collection modes and operations, including (but not limited to) questionnaire content, help text, mailing materials, and field materials.
- Provide the optimal design and content of the questionnaires to encourage high response rates.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Develop an enterprise repository that includes questionnaire content and design elements for questionnaires and nonquestionnaire materials.
- Ensure sufficient time for testing the questionnaire content. Also include testing of nonquestionnaire materials.
- Consider forms design elements (size, color, spacing implications, etc.), mode, and language when finalizing questionnaire content and design. Also test for successful data capture before implementation.
- Conduct comprehensive testing of optimized content in the usability lab and in a field test to prevent unanticipated negative impacts on data quality.
- Determine if a bilingual initial or replacement questionnaire in bilingual selected tracts is beneficial.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Create a central, electronic repository of 2020 Census content (questionnaire and nonquestionnaire materials).
- Create consistent content for automated data collection instruments needed for Self-Response and Nonresponse Followup.
- Redesign the bilingual paper questionnaires from swim lane to flip-style.
- Create questionnaires and nonquestionnaire materials in languages beyond English and Spanish.

### *Description of Operation*

Content and Forms Design is responsible for creating, refining, and finalizing instrument specifications for all data collection modes—Internet, paper, Census Questionnaire Assistance (the telephone), and NRFU (in-person interview). This is a significant departure from the 2010 Census, which primarily relied on paper for data collection.

The goal is to finalize the content of the questionnaire and other mailing and field materials for the 2020 Census so that the 2020 Census topics can be submitted to Congress by April 2017, with the final questionnaire wording submitted by April 2018.

To meet important deadlines, key elements of the Content and Forms Design operation include the following:

- Developing instrument specifications for all data collection modes: Internet, NRFU, CQA, and Paper.
- Pretesting questionnaire content (e.g., cognitive testing, focus groups) prior to making final decisions on questionnaire topics and wording.

- Finalizing content development and design of questionnaires across all modes: Internet, CQA, Paper, and NRFU.
- Finalizing content development and design of nonquestionnaire materials deployed during self-response and NRFU operations, including postcards, letters, field materials, and envelopes.
- Developing print specifications for all questionnaire and nonquestionnaire materials, including postcards, letters, and envelopes.
- Optimizing questionnaire designs for each mode and all supporting materials, in alignment with systems specifications.
- Ensuring questionnaire content and supporting materials are accurate, appropriate, consistent, inviting, and easy to understand across self and nonresponse data collection modes.

### *Research Completed*

The following research has been completed for this operation:

- Qualitative Research on Content:
  - Conducted qualitative research on alternative questionnaire wording for the following topics: Race and Hispanic origin, Relationship, Within-Household coverage.
    - Findings: Informed questionnaire wording (for content variations) being tested in the 2015 National Content Test and other Research and Testing Phase testing.
  - Conducted expert review of paper questionnaire design and inclusion of write-in fields for all race categories.
    - Findings: Informed layout of paper questionnaire design for the 2015 National Content Test.
- Usability and Systems Testing:
  - Conducted usability testing of automated data collection instruments (Internet, NRFU).
    - Findings: Informed final instrument layout and navigation for 2014, 2015, and 2016 Census Tests and the 2015 National Content Test.
  - Conducted testing on data capture of paper questionnaire responses.
    - Findings: Informed paper questionnaire layout for the 2014, 2015, and 2016 Census Tests and the 2015 National Content Test.
  - Conducted 2014 Census Test (relationship response categories).
    - Findings: Continue testing new relationship response categories.
  - Conducted 2015 Census Tests (content and questionnaire design).
    - Findings: Coverage questions added to respondent burden (based on observations of field operations and respondents' reactions to questionnaire content).
- The 2015 National Content Test (content and questionnaire design).
  - Finalized content to be tested during the 2015 National Content Test.
  - Test panels and analysis plans for 2015 National Content Test.
  - Internet data collection instrument specifications for the 2015 National Content Test.
  - English and Spanish bilingual paper questionnaires (10 versions: 8 for stateside, 2 for Puerto Rico).
  - Computer Assisted Telephone Interview instrument specifications for the 2015 National Content Test Race and Coverage Reinterview.
  - Implementation of the 2015 National Content Test.

### *Decisions Made*

The following decisions have been made for this operation:

- ✓ Flip-style bilingual paper questionnaires will be used for household enumeration.
- ✓ Coverage questions will be streamlined to reduce respondent burden while maintaining data quality (based on 2014 and 2015 Census Test field observations).

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

What are optimal designs of questionnaires (including size and page layout) and nonquestionnaire materials for the 2020 Census?

- **Approach:** Based on results of field tests, other ongoing research, and input from advisory committees.
- **Decision by:** Initial October 2017; Final August 2018

What are the final content topics for the 2020 Census?

- **Approach:** Based on results of the 2015 National Content Test, other ongoing research, and input from advisory committees.
- **Decision by:** December 2016
- **Delivered to Congress by:** April 2017

What is the final questionnaire wording for the 2020 Census?

- **Approach:** Based on results of the 2015 National Content Test, other ongoing research, and input from advisory committees.
- **Decision by:** December 2017
- **Delivered to Congress by:** April 2018

What is the paper questionnaire layout for respondents living in residences other than households (e.g., group quarters and transitory locations)?

- **Approach:** Coordinate with the operations and gather the content; test in the 2016 and 2017 Census tests.
- **Decision by:** September 2017

### *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

Investment in Content and Forms Design will have minimal impact on the cost of the 2020 Census, as compared with the 2010 Census.

Quality impacts of this operation on overall 2020 Census quality include the following:

↑ Internet questionnaire design is anticipated to improve the quality of self-response.

↑ Automated NRFU instrument anticipated to improve quality of response (under review).

### *Risks*

The risk listed below is specific to this operation.

Changes in the content of the 2020 Census questionnaire may be requested after the content has been finalized in 2017. **IF** changes are approved for the final 2020 Census questionnaire content in 2017 or later, **THEN** the English and non-English material will need to be redesigned and reprinted, requiring additional time in the schedule and potentially delaying deliverables.

### *Milestones*

| Date | Activity |
|---|---|
| May 2015 | Complete cognitive testing of paper questionnaire content for 2015 National Content Test (English, Spanish).<br>Complete cognitive testing of paper questionnaire content and nonquestionnaire materials in multiple languages. |
| August 2015 | Complete cognitive testing of Internet questionnaire content for 2015 National Content Test for English and Spanish.<br>Start conducting the 2015 National Content Test. |
| October 2015 | Complete the 2015 National Content Test (data collection).<br>Final questionnaire content for the 2016 Census Test: Race, Relationship, Coverage Baselined instrument specifications for the 2016 Census Test. |
| February 2016 | Complete cognitive and usability testing of Chinese and Korean Internet and NRFU instruments and nonquestionnaire materials. |
| June 2016 | Receive analysis of 2015 National Content Test results.<br>Cognitive testing of possible additional topics (e.g., tribal enrollment). |
| August 2016 | Receive results from cognitive test of possible additional topics (e.g., tribal enrollment). |
| September 2016 | Release the Content and Forms Design Detailed Operational Plan. |
| October 2016 | Analysis of the 2016 Census Test results.<br>Finalize questionnaire content for the 2017 Census Test.<br>Baselined instrument specifications for the 2017 Census Test. |
| April 2017 | Submit 2020 Census topics to Congress. |
| October 2017 | Finalize questionnaire content for the 2018 Census End-to-End Test.<br>Baselined instrument specifications for the 2018 Census End-to-End Test. |
| April 2018 | Submit 2020 Census question wording to Congress. |
| October 2018 | Analysis of the 2017 Census Test results. |
| May 2019 | Finalize 2020 Census paper questionnaires for print.<br>Finalize 2020 Census questionnaires design and layout across all modes. |
| March 2020 | Deploy 2020 Census questionnaires across all modes. |

## 5.3.4 Language Services

| Detailed Planning Status: | **Underway** |
|---|---|

### *Purpose*

The Language Services operation performs the following activities:

- Assess and support language needs of non-English speaking populations.
- Determine number of non-English languages and level of support for the 2020 Census.
- Optimize non-English content of questionnaires and nonquestionnaire materials across data collection modes and operations.
- Ensure cultural relevancy and meaningful translation of questionnaires and nonquestionnaire materials.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Conduct further research on language selection criteria.
- Conduct cognitive testing earlier in the decade to allow for high quality translation of questionnaires and nonquestionnaire materials.
- Optimize non-English materials to ensure cultural relevance for intended audiences.
- Allow Internet responses in English and other languages.
- Test a Spanish version of the questionnaire on the Internet.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Automated data collection instruments available for Internet Self-Response and NRFU in multiple non-English languages.

### *Description of Operation*

The Language Services operation supports the goal of an accurate and cost-effective census by creating awareness and facilitating participation of respondents with Limited English Proficiency. It also identifies ways to reduce barriers to enumeration of

this hard-to-count population. The use of multiple languages is an important part of creating a census climate that facilitates goodwill and cooperation among census partners and the public at large, thereby increasing self-response, saving money, and increasing quality.

To achieve the goals of assisting and creating multiple modes of collecting information from non-English speaking respondents, the Language Services operation conducts research on language needs and trends and relies on socio/psycholinguistic approaches to provide language operations and assistance and to identify, create, and refine non-English materials for Limited English Proficiency respondents. The operation also includes a National Advisory Committee Language Working Group for National Advisory Committee members and subject matter experts to jointly strategize on language operations for the 2020 Census.

With language testing planned for 2016 and 2017, this operation identifies ways to encourage completion of the questionnaire online in multiple non-English languages. In addition, it provides accessible, alternative means of response for those without access to the Internet.

Specific activities include the following:

- Optimizing the census questionnaire for each mode as appropriate for Limited English Proficiency populations.
- Ensuring culturally and functionally appropriate questionnaire design and content across translations (e.g., through pretesting).
- Enabling language research by maximizing the ability for data collection systems to incorporate non-English languages.
- Analyzing ACS data to see if trends have changed in language need.
- Optimizing mailing strategies to: (1) ensure non-English speakers receive the same message as English speakers prior to going online; (2) determine whether non-English speakers respond differently to number and ordering of contacts than English speakers: and, (3) determine whether or not adding multi-language Public Use Forms increases participation by non-English speakers.
- Conducting usability testing of how questionnaires can be best adapted for use in multiple modes in non-English languages and the types of challenges that occur when adapting translated questionnaires to new modes.
- Determining alternative response methods for the visually impaired.
- Expanding previously used tools, such as the Language Reference Dictionary, and providing earlier in the decade for partnerships and regions to accurately reflect census terminology.
- Determining the number of non-English languages and level of support during the 2020 Census.

### *Research Completed*

The following research has been completed for this operation:

- Qualitative Research on Non-English Content:
  - Tested for accuracy and cultural appropriateness of translated questionnaire content for the following languages: Spanish, Chinese, Korean, Vietnamese, Russian, Arabic.
    - Findings: Informed questionnaire wording for 2015 National Content Test and other mid-decade testing.
- In-House Review of Materials:
  - Conducted expert review of field materials in non-English languages.
    - Findings: Informed translated content of Notice of Visit for the 2015 Census Test; Revised Language Identification Flashcard to include Chinese-spoken dialects.
- Language Needs Assessment:
  - Assessed current language needs using ACS data.
    - Findings: Informed non-English support for 2015 and 2016 Census Tests and 2015 National Content Test.
- Research on Translation Technology:
  - Conducted research on translation machines (e.g., Google Translate).
    - Findings: Machine translations generally show severe structural, grammatical, and contextual errors and should not replace human translations.

- Usability and Systems Testing:
  - Conducted usability testing of Spanish automated data collection instruments (Internet, NRFU).
    - Findings: Informed final instrument layout and navigation for the 2014, 2015, and 2016 Census Tests and the 2015 National Content Test.
  - Conducted testing on data capture of Spanish paper questionnaire responses.
    - Findings: Informed paper questionnaire layout for the 2014, 2015, and 2016 Census Tests and the 2015 National Content Test.

### *Decisions Made*

The following decisions have been made for this operation:

✓ Flip-style bilingual paper questionnaires will be used instead of the swim lane style.

✓ The Language Services Operation will utilize a National Advisory Committee Language Working Group for early engagement on language assistance plans for the 2020 Census.

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

What are the number of non-English languages and level of support needed for the 2020 Census?

- **Approach:** Based on an assessment of language needs and input from advisory committees. Also based on the determination of infrastructure and IT requirements to provide language support. Results of the 2016 and 2017 Census Tests will inform this decision.
- **Decision by:** September 2017

### *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

Investment in Language Services is expected to have minimal cost impacts on the 2020 Census, as compared with the 2010 Census.

Quality impacts of this operation on overall 2020 Census quality include the following:

↑ Automated data collection instruments in non-English languages anticipated to improve quality of responses from non-English speaking respondents.

↑ Culturally appropriate, translated questionnaires and nonquestionnaire materials anticipated to improve quality of responses of non-English speaking respondents.

### *Risks*

The Internet data collection instrument used for the census tests is currently only available for use by English and Spanish speakers. **IF** the Internet data collection instrument is not designed for languages outside of English and Spanish, **THEN** there will not be online self-response options for non-English and Spanish speaking respondents for the 2020 Census.

Any content changes made after the English questionnaire for the 2020 Census is finalized will have to be replicated for the non-English questionnaires. **IF** the final English content changes after April 2018, **THEN** there will not be adequate time in the schedule to translate, design, and produce non-English questionnaires for the 2020 Census.

### *Milestones*

| Date | Activity |
|---|---|
| March 2016 | Deploy Internet and NRFU instruments in Spanish, Chinese, and Korean for the 2016 Census Test.<br>Deploy bilingual paper questionnaire and associated nonquestionnaire materials in Spanish, Chinese, and Korean for the 2016 Census Test. |
| September 2016 | Release the Language Services Detailed Operational Plan. |
| March 2017 | Deploy Internet and NRFU instruments in Spanish, Chinese, Korean, Vietnamese, and additional non-English language(s) (to be determined) for the 2017 Census Test.<br>Deploy bilingual paper questionnaire and associated nonquestionnaire materials in Spanish, Chinese, Korean, Vietnamese, and additional non-English language(s) (to be determined) for the 2017 Census Test. |
| September 2017 | Determine number of non-English languages and level of support for the 2020 Census. |
| 2016–2019 (ongoing) | Conduct qualitative research on data collection instruments and materials in additional languages. |
| March 2020 | Deploy 2020 Census non-English data collection instruments and materials. |

## 5.4 FRAME

The operations in this area have the goal of developing a high-quality geospatial frame that serves as the universe for the enumeration activities. This area consists of three operations: Geographic Programs, Local Update of Census Addresses (LUCA), and Address Canvassing. Each is described below.

### 5.4.1 Geographic Programs

| Detailed Planning Status: | **Underway** |
|---|---|

#### *Purpose*

The Geographic Programs operation provides the geographic foundation in support of the 2020 Census data collection and tabulation activities within the Master Address File/Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER) System. The MAF/TIGER System (software applications and databases) serves as the national repository for all of the spatial, geographic, and residential address data needed for census and survey data collection, data tabulation, data dissemination, geocoding services, and map production.

Components of this operation include:

- Geographic Delineations.
- Geographic Partnership Programs.
- Geographic Data Processing.

#### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Consider consolidation of field operations, and Type of Enumeration Area (TEA) values used to support field operations.
- To the greatest extent possible, attempt geographic reconciliation activities of boundaries on an ongoing basis throughout the decade.
- To the greatest extent possible, geographic extracts and updates should be made in an electronic form to reduce the production, shipping, and handling of paper maps and paper listings by the Census Bureau and its program participants.
- Update the MAF through partnership programs in order to increase the Census Bureau's ability to geocode addresses from the USPS Delivery Sequence File (DSF).

#### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Use of varied data sources (e.g., imagery and third-party data) to validate and augment the MAF/TIGER System throughout the decade:
  - As part of the Geographic Support System Initiative (GSS-I) the Census Bureau has obtained address and road center-line data from state and local partnerships and has updated the MAF/TIGER System with these data since 2013.
  - Ongoing investigation of potential use of third-party data sources.
- Development of a modular, multimode, Geographic Update Partnership Software (GUPS) to streamline partners' participation.

- Delineation of Basic Collection Units to:
  - Eliminate operation specific Assignment Area delineations.
  - Incorporate data and information not previously used in delineation such as predominant housing unit characteristics (e.g., single unit, group quarters, mobile homes).

### *Description of Operation*

The Geographic Programs operation includes components of the 2020 Census that are geographic in nature. The components of the Geographic Programs project fall into three general categories as shown in Figure 30:

- Geographic Delineations.
- Geographic Partnership Programs.
- Geographic Data Processing.

#### *Geographic Delineations*

The Geographic Delineation component of the Geographic Programs determines, delineates, and updates the geographic area boundaries for 2020 Census data collection and data tabulation. Census data collection relies on the delineation of various geographic areas, known as "collection geography," to support the capture of data during Census activities. This includes both the delineation of the methods used to enumerate households and the definition of field management areas. The following collection geography is delineated during the 2020 Census:

- **Type of Enumeration Area:** In an effort to ensure the most cost effective and efficient process to enumerate households, every block in the United States is assigned to one specific type of enumeration area or TEA. The TEA reflects the methodology used to enumerate the households within the block. The TEA assignment utilizes a variety of information to identify the most cost effective enumeration approach for all of the United States, District of Columbia, Puerto Rico, and the Island Areas.
- **Basic Collection Unit (BCU):** BCU serves as the smallest unit of collection geography for all 2020 Census listing operations. The BCU replaces both the collection block and assignment area geographies used for the 2010 Census.
- **Special Land Use Area:** A key component of collection geography is the delineation of land areas that may require unique field treatment or tabulation. This includes military areas, group quarter areas (e.g., correctional facilities and colleges and universities), and public lands. The main purpose of the special land use delineation is to improve tabulation block boundaries, to allow field operations to manage special land use areas in the field effectively, to assist in maintaining the GQ address list, to allow for public lands to be removed from

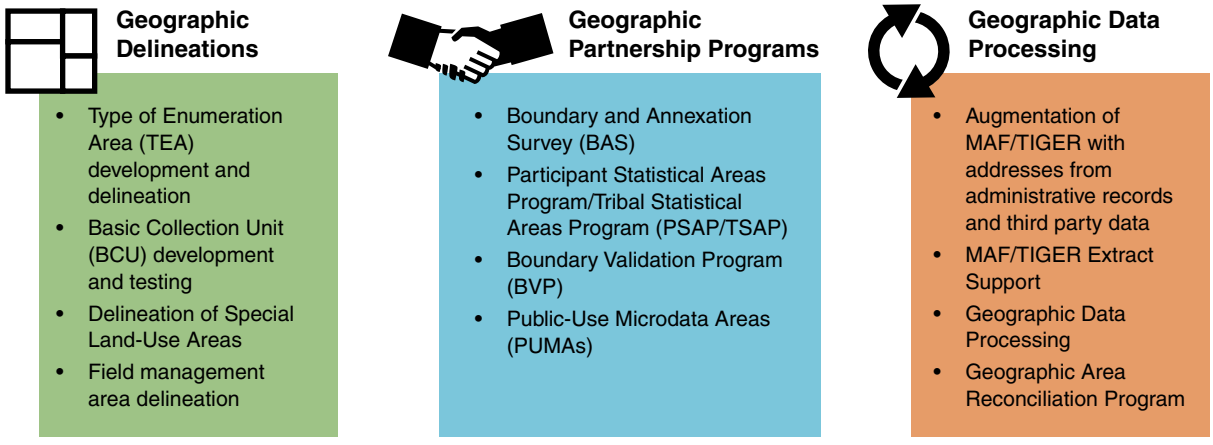



**Figure 30: Summary of Geographic Programs Components**

In-Field Address Canvassing (see Section 5.5.3) and other field operations, and to maintain relationships between these areas and other geographic entities such as incorporated places and American Indian Areas.

- **Field Management Area Delineation:** This component of collection geography includes delineation of geographic areas, other than BCU and TEA, which are necessary to manage and accomplish fieldwork for the 2020 Census. In past censuses this has included Crew Leader Districts, Field Operation Supervisor Districts, and Area Census Office boundaries.

Census results are dependent on the delineation of various geographic areas to both tabulate and report person and household statistics. The delineation of these geographic areas, known as "tabulation geography" is based on input from partnership programs (such as the Participant Statistical Areas Program/Tribal Statistical Areas Program [PSAP/TSAP] program), or internally defined tabulation criteria, such as the Urbanized Area delineation. After rules are defined or tabulation geographies are proposed by partners, the tabulation geography is delineated in the MAF/TIGER System through a series of batch and interactive delineations and then followed by a series of data integrity validations, renumbering, and certification steps. Once the tabulation geographic areas are certified, they are loaded into the MAF/TIGER database and used for the tabulation of statistical data and as the base for various geographic data products that support the 2020 Census. Tabulation geography planned for the 2020 Census includes:

- American Indian Areas
- Metropolitan and Micropolitan Statistical Areas and Related Statistical Areas
- Counties
- County Subdivisions
- Census Designated Places
- Census Tracts
- Block Groups
- Blocks
- Congressional Districts
- State Legislative Districts
- Voting Districts
- School Districts
- Traffic Analysis Zones
- Zone Improvement Plan Code Tabulation Areas
- Urban Areas

These geographies are used to tabulate and disseminate data from the Decennial Census, the ACS, and other censuses and surveys, and are used outside of the Census Bureau by other government agencies in program administration and in determining program eligibility and fund allocation.

### *Geographic Partnership Programs*

Prior to the 2020 Census, the Census Bureau conducts geographic partnership programs to make the address list as up-to-date as possible and ensure complete coverage of all housing units. The Partnership Programs also help define statistical geographic area boundaries that will provide meaningful data from the 2020 Census. Following are the 2020 Census Geographic Partnership Programs:[5]

- **Boundary and Annexation Survey:** An ongoing survey for collecting and maintaining information about the inventory of the legal boundaries for, and the legal actions affecting the boundaries of counties and equivalent governments, incorporated places, Minor Civil Divisions, Consolidated Cities, Urban Growth Areas, Census Areas of Alaska, Hawaiian Homelands, and federally recognized legal American Indian and Alaska Native areas (including the Alaska Native Regional Corporations). This information provides an accurate identification and depiction of geographic areas for the Census Bureau to use in conducting the decennial and economic censuses and ongoing surveys such as the ACS.
- **Participant Statistical Areas Program/ Tribal Statistical Areas Program:** Programs that allow designated participants, following Census Bureau guidelines, to review and suggest modifications to the boundaries of block groups, census tracts, Census County Divisions, and Census Designated Places. Participants can also propose new Census Designated Places based on specific criteria. The 2020 Census PSAP includes all tribal statistical boundaries, which were administered through the TSAP in the 2010 Census, combining the two programs. The TSAP

[5] Components of the Redistricting Data Program and the Local Update of Census Addresses are also Geographic Program Partnership Programs, but they are covered in other sections of this document.

geographies are Oklahoma Tribal Statistical Areas, Tribal Designated Statistical Areas, State Designated Tribal Statistical Areas, tribal census tracts, tribal block groups, statistical tribal subdivisions, Alaska Native Village Statistical Areas, and for administrative purposes, one legal area, state reservations.

- **Boundary Validation Program:** The intent of the Boundary Validation Program is to provide the Highest Elected Official a last opportunity to review the entity boundary, and any address range breaks where the boundary of their jurisdiction intersects a road, before the tabulation of census data.
- **Public Use Microdata Areas:** Geographic units used for providing statistical and demographic information. Public Use Microdata Areas do not overlap, and are contained within a single state.

### *Geographic Data Processing*

The Geographic Data Processing component of Geographic Programs includes all activities that relate to the extract, update, and maintenance of the features, boundaries and addresses in the MAF/TIGER System. Geographic data captured as part of the 2020 Census, including address updates, structure coordinate locations, boundaries, and roads data will be processed to ensure that the MAF/TIGER System is up to date. Following are the major geographic data processing activities that will occur in the 2020 Census:

- **Frame Development** includes the receipt and processing of various address records from sources such as the USPS, state and local governments, and third-party data sources. These data help ensure accurate address coverage within the 2020 Census Frame.
- **MAF/TIGER Extract Support** includes activities related to preparing extracts or services enabling 2020 Census systems access to addresses from the MAF/TIGER System, as well as activities related to the production of spatial extracts or services for use in various field data collection instruments and control systems and printing of paper.
- **Geographic Data Processing** includes activities related to extract above from and update to the features, boundaries and addresses within the MAF/TIGER System. The MAF/TIGER updates include any changes to the features, addresses, or boundaries that result from 2020 Census data collection operations, or geographic partnership programs. The geographic data processing activities establish benchmarks from the MAF/TIGER System by taking a snapshot of the database at various points during the decade. Each benchmark becomes the foundation on which future updates are applied. These benchmarks support the collection, tabulation, and dissemination of census and survey information and for providing geocoding services and geospatial data products.
- **Geographic Area Reconciliation Program** includes editing and reconciliation of boundaries within the MAF/TIGER System. This reconciliation resolves boundary and feature discrepancies provided by separate partnership programs at different points in time or updates prior to release of 2020 Census tabulation products.

## ***Research Completed***

The following research has been completed for this operation:

- Research conducted and completed within the initial phases of the GSS-I program:
  - **Findings:** Demonstrated that administrative records from local governments are a valuable source of address and spatial information.
- Research on use of public lands data:
  - **Findings:** Demonstrated that public lands data will be useful in the delineation of 2020 Census TEAs and collection geography.
- Post Census analysis of 2010 Assignment Area definitions.
  - **Findings:** Helped lay the foundation for establishing a consistent assignment unit—the BCU.

## ***Decisions Made***

The following decisions have been made for this operation:

### *Geographic Delineations:*

- ✓ BCUs will be used beginning in the 2016 Address Canvassing Test.
- ✓ Special Land Use Areas and Public Lands will be used in the delineation of collection geographies.

- ✓ The Statistical Areas Program (PSAP/TSAP) will be used in the delineation of 2020 Census tabulation geography.
- ✓ The 2020 Census will include delineation of:
  - º Tabulation geography (Blocks, Block Groups, Tracts, etc.).
  - º Zone Improvement Plan Code Tabulation Areas.
  - º Traffic Analysis Zones.
  - º Urban Areas as defined by the 2020 Census Urban Area Delineation Program.

*Geographic Partnership Programs:*

- ✓ The geographic programs conducted in the 2010 Census will occur in the 2020 Census (the approach for adding new construction is yet to be determined).
- ✓ The GUPS will support:
  - º All geographic partnership programs (i.e., Boundary and Annexation Survey [BAS], PSAP/TSAP, Boundary Validation Program, and Public Use Microdata Areas).
  - º Redistricting Data Program (RDP).
  - º Local Update of Census Addresses.
  - º Count Question Resolution.
- ✓ Partnership programs will offer limited paper materials.
- ✓ Data received from partnership programs will be processed from a central location.

*Geographic Data Processing:*

- ✓ Enterprise solutions will be used to capture relevant geographic data.
- ✓ Imagery will be available as a backdrop in field listing and field enumeration instruments.
- ✓ The MAF/TIGER System will leverage a Service Oriented Architecture for dissemination products and tools.
- ✓ The USPS DSF will continue to be used as the primary source of address updates for the MAF/TIGER System.
- ✓ Frame development will include the receipt and processing of administrative records and third-party data sources.
- ✓ Boundary reconciliation within the MAF/TIGER System will be ongoing.

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

*Geographic Delineations*

How will the MAF/TIGER System be used in support of reengineered field operations? For example, what are the data input and output processing and timing requirements and the work flows needed to support field data collection operations?

- **Approach:** Resolve when planning the 2016 Address Canvassing Test and 2017 Census Test.
- **Decision by:** October 2017

What types of TEA are required for the 2020 Census?

- **Approach:** Resolve using results from 2016 Address Canvassing Test and 2017 Census Test.
- **Decision by:** October 2017

*Geographic Partnership Programs*

Will there be a separate New Construction Program or will the GSS-I Program continue to collect new construction addresses for the 2020 Census?

- **Approach:** Resolve as part of GSS-I Planning and the Geographic Partnership Program Planning.
- **Decision by:** June 2017

*Geographic Data Processing*

How will the MAF/TIGER System interact with other 2020 Census systems to support 2020 Census operations?

- **Approach:** Resolve as part of 2016 Address Canvassing Test and 2017 Census Test Planning.
- **Decision by:** January 2016

In what 2020 Census operations will addresses and features be updated and added? What are the expectations for the capture and availability of field updates? Available in real time? Available with the timeframe of the operations? Available for the next operation? Available for the final tabulation?

- **Approach:** Resolve as part of 2016 Address Canvassing Test and 2017 Census Test Planning.
- **Decision by:** August 2017

What is the source data (TIGER, commercial, or both) for map displays in the 2020 Census data collection and field management applications?

- **Approach:** Research during the 2016 Address Canvassing Test and the 2017 Census Test.
- **Decision by:** March 2017 (Preliminary); October 2017 (Final)

### *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

Investment in Geographic Programs will have minimal impact on cost to the 2020 Census as compared with the 2010 Census.

Quality impacts of this operation on overall 2020 Census quality include the following:

↑ Address and spatial data in the MAF/TIGER System are validated using multiple data sources.

↑ Address and spatial data in the MAF/TIGER System are updated continuously and are more current.

↑ Ongoing reconciliation of boundaries across programs, such as the BAS and the Redistricting Data Program, will result in higher quality tabulation boundaries.

### *Risks*

A timely decision on the final 2020 Census operations will help in keeping the type of TEA delineation on schedule. **IF** there is a significant delay in finalizing the 2020 Census operations and requirements, **THEN** the TEA delineation may be delayed.

Using attribution in Basic Collection Units increases their benefits and usefulness. **IF** attribution related to address coverage risk, optimal contact and enumeration strategy, and production rate and workload cannot be applied to the Basic Collection Unit, **THEN** the ability for Basic Collection Unit to act as a planning tool and to be dynamically assigned in the field is limited.

The GUPS contract states there will be a Web-based and stand-alone version of GUPS. **IF** a Web-based version of GUPS is not developed, **THEN** it will significantly add to the resources required to update partnership programs for the 2020 Census.

### *Milestones*

Figure 31 below depicts the high-level timing of each component within the Geographic Programs operation.

## 5.4.2 Local Update of Census Addresses

| Detailed Planning Status: | **Underway** |
|---|---|

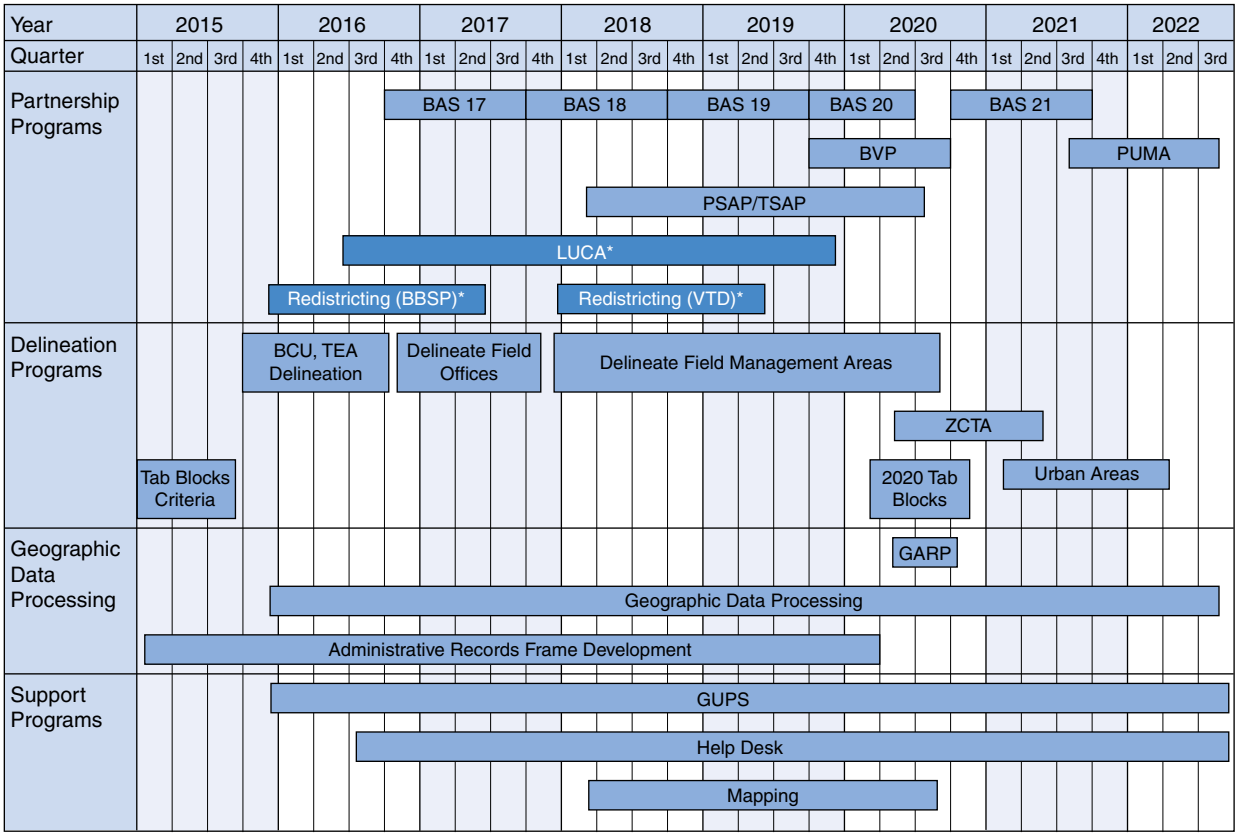
### *Purpose*

The Local Update of Census Addresses operation provides an opportunity for tribal, federal, state, and local governments to review and improve the address lists and maps used to conduct the 2020 Census. This operation is required by the Census Address List Improvement Act of 1994 (Public Law (P.L.) 103-430).

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Provide program materials (i.e., address lists and maps) in standard, off-the-shelf commercial software formats.
- Simplify the process for small (6,000 or fewer housing units), lower-level governments (such as minor civil divisions and places).
- Explain the definition and use of addresses and housing units better, so that participants will understand why post office boxes and rural route numbers are not in scope for the Census Bureau's LUCA Program.




*LUCA and Redistricting are Partnership Programs that are managed outside of the Geographic Programs Team.

**Figure 31: Geographic Programs Timeline**

### *Opportunities to Innovate*

Considering recommendations from the 2010 Census and the 2020 Census Research and Testing Phase, and the design of a reengineered 2020 Census, opportunities to innovate include the following:

- Reduce the complexity of the LUCA Program as compared with the 2010 program.
- Eliminate the full address list submission options that were available in 2010 Census LUCA in order to:
  - Reduce the number of deleted LUCA records during verification activities.
  - Reduce the burden and cost of processing addresses and LUCA address validation.

### *Description of Operation*

The LUCA provides the opportunity for tribal, federal, state, and local governments to review and comment on the Census Bureau's address list and maps to ensure an accurate and complete enumeration of their communities. The Census Address List Improvement Act of 1994 (P.L. 103-430) authorized the Census Bureau to provide individual addresses to designated local officials of tribal, federal, state, and local governments who agreed to conditions of confidentiality in order to review and comment on the Census Bureau's address list and maps prior to the decennial census. The basic process for LUCA includes:

- Census Bureau provides address list and maps to the governmental entities.
- Governmental entities review and add, delete, or change address records or features.
- Census Bureau incorporates the updates to MAF/TIGER System.
- Census Bureau validates the updates via Address Canvassing.
- Census Bureau provides feedback to the governmental entities.
- Governmental entities can appeal the Address Canvassing validation outcomes.

### *Research Completed*

The following research has been completed for this operation:

- The LUCA Program Improvement Project completed their recommendations for the 2020 Census LUCA operation. The research focused on improving the LUCA operation with research by the following four research areas (2020 Census LUCA Program Recommendations 4/13/2015):
  - Looking back at previous LUCA and related programs.
    - Findings: Simplify the 2020 Census LUCA program as the 2010 Census LUCA program was too complicated.
  - Validating LUCA records without Address Canvassing.
    - Findings: It is possible to validate LUCA addresses in an office environment.
  - Utilizing GSS-I for LUCA.
    - Findings: Data and tools used for the GSS-I should be used and repurposed for the LUCA program.
  - Focus Groups.
    - Findings: Focus group participants agreed with the proposal to remove the full address list submission options for the 2020 Census LUCA program.
- As part of the 2020 Census R&D efforts staff evaluated the 2010 LUCA and 2010 lessons learned and conducted a series of focus groups with former LUCA participants. This effort resulted in 12 major recommendations for the 2020 Census LUCA operation. (Note: These recommendations are described in more detail in the 2020 Census Local Update of Census Addresses Project Improvement Report):
  1. Continue the 2010 Census LUCA Program improvements that were successful:
     - Continue to provide a 120-day review time for participants.
     - Continue the 6-month advance notice about the LUCA program registration.
     - Continue a comprehensive communication program with participants.
     - Continue to provide a variety of LUCA media types.
     - Continue to improve the Partnership Software application.

- Continue state participation in the LUCA program.

2. Eliminate the full address list submission options that were available in 2010 LUCA. This will:
   - Reduce the number of deleted LUCA records in field verification activities.
   - Reduce the burden and cost of processing addresses and LUCA address validation.
3. Reduce the complexity of the LUCA Program as compared with the 2010 Census program.
4. Include census structure coordinates in the census address list and allow partners to return their structure coordinates as part of their submission:
   - Benefits participants and the Census Bureau in the review of materials because it enables more information about each address to be considered in both the participants review and the Census Bureau's validation of the submitted addresses.
5. Provide ungeocoded USPS DSF addresses to state and county partners in LUCA materials:[6]
   - Provides more complete data for participants to review.
   - May result in participants being able to geocode previously ungeocoded addresses for the Census.
   - Should reduce the number of duplicate addresses submitted by LUCA participants.
6. Provide the address list in more standard file formats so that lists are easier to load into common software packages.
7. Include an in-house verification of LUCA submitted addresses to align with the reengineered Address Canvassing.
8. Utilize and modify existing GSS-I tools and data to validate LUCA submission.
9. Encourage governments at the lowest level to work with larger governments to consolidate their submission.
10. Eliminate the Block Count Challenge, as previously this did not result in useful information for the Census to determine specifically what addresses were missing from a block.
11. Eliminate the option for participants to use an asterisk (*) for multiunits submitted without unit designations.
12. Encourage LUCA participants to identify E-911 Addresses used for mailing, location, or both addresses so that Census has more information available during MAF update.

### *Decisions Made*

The following decisions have been made for this operation:

- ✓ Conduct a comprehensive communication program with LUCA participants.
- ✓ Include census structure coordinates in the census address list and allow partners to return their structure coordinates as part of their submission.
- ✓ Provide ungeocoded addresses to state and county partners in LUCA materials.
- ✓ Provide the address list in more standard file formats so that lists are easier to load into common software packages.
- ✓ Encourage governments at the lowest level to work with larger governments to consolidate their submissions.
- ✓ Provide a variety of LUCA media types.
- ✓ Simplify the 2020 Census LUCA program and make it compatible with the GSS-I and Address Canvassing.
- ✓ Utilize administrative records and third-party data to improve validation process.
- ✓ Use the GUPS to support automated exchange of information for LUCA participants.

[6] This component is under legal and policy review and is subject to change.

✓ Validation of LUCA submissions will occur primarily during In-Office Address Canvassing, with minimal validation occurring early in the In-Field Address Canvassing operation.

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

How will the Census Bureau register LUCA participants over the Internet, and are there opportunities to use Title 13 e-signature capability so that it can be done online?

- **Approach:** Investigate whether existing systems can meet the need and if not, evaluate options (e.g., mail/paper or new automated solution).
- **Decision by:** December 2015

To what extent does LUCA need to capture the use of the address (i.e. mailing, location, or both)?

- **Approach:** Determine the requirements for LUCA submissions.
- **Decision by:** July 2016

What is the strategy for communicating late decade GSS-I activities during LUCA?

- **Approach:** Work with GSS-I to resolve.
- **Decision by:** October 2016

What is the 2020 Census LUCA Appeals process?

- **Approach:** Work with Office of Management and Budget to develop a 2020 Census LUCA Appeals process, defining the appropriate appeals office will largely depend on the design of LUCA.
- **Decision by:** October 2016

To what extent can administrative records and third-party data be used to validate addresses submitted by LUCA participants?

- **Approach:** Study the feasibility of using administrative records and third-party data, as well as CARRA administrative records and third-party data.
- **Decision by:** June 2017

### *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

Investment in LUCA will have minimal impact on cost to the 2020 Census as compared with the 2010 Census.

Quality impacts of this operation on overall 2020 Census quality include the following:

↑ Removing the full address list submission options, thereby reducing the number of addresses that need to be validated.

↑ Use of administrative records and third-party data to validate incoming addresses from tribal, federal, state, and local governments to independently validate submitted addresses prior to adding them to the MAF.

### *Risks*

To protect Title 13 data on computer-readable materials, all local government LUCA liaisons and LUCA reviewers are required to sign a Confidentiality Agreement and abide by the Census Bureau's security guidelines. However, lessons learned from previous censuses show that not all stakeholders reviewing the Title 13 materials possess the skills necessary to meet IT requirements. **IF** participants are required to take additional efforts to meet the Census Bureau's IT Title 13 requirements, **THEN** there needs to be adequate support in a help desk environment for responding to IT Title 13 issues.

The Census Bureau needs to work with the Office of Management and Budget to determine the requirements for the LUCA Appeals Office. **IF** the LUCA Appeals Office is not planned in coordination with the Office of Management and Budget by the summer of 2016, **THEN** the Census Bureau will be required to play a larger role in the development of the LUCA Appeals Office.

### *Milestones*

| Date | Activity |
|---|---|
| September 2016 | Release the LUCA Detailed Operational Plan. |
| January 2017 | Mail Advance Notice Package. |
| July 2017 | Mail Invitation Package. |
| October 2017 | Mail Review Materials. |
| August 2018 | Complete Initial Processing of LUCA submissions for delivery to Address Canvassing. |
| June 2019 | Complete Address Canvassing validation of LUCA addresses. |
| August 2019 | Deliver Feedback Materials. |
| March 2020 | Complete the processing of LUCA Appeal addresses. |
| September 2021 | Complete LUCA. |

## 5.4.3 Address Canvassing

| Detailed Planning Status: | **Underway** |
|---|---|

### *Purpose*

The Address Canvassing operation serves two purposes:

- Deliver a complete and accurate address list and spatial database for enumeration.
- Determine the type and address characteristics for each living quarter.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Continuously update the maps and address lists throughout the decade, supplementing these activities with Address Canvassing at the end of the decade.
- Allow more time in the schedule to fully develop and test the listing instrument.
- Improve the Address Canvassing training to emphasize working from the ground to the Handheld Computer.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- 100-percent Address Canvassing conducted In-Office.
- Target 25 percent of living quarters for In-Field Address Canvassing.
- Use of automation and data (imagery, administrative records, and third-party data) for In-Office Address Canvassing.
- Ongoing MAF Coverage Study to validate In-Office Address Canvassing procedures, measure coverage, and improve In-Field Address Canvassing data collection methodologies.
- Use of reengineered field management structure and approach to managing fieldwork, including new field office structure and new staff positions.

### *Description of Operation*

The Census Bureau needs the address and physical location of each living quarter in the United States to conduct the census. During Address Canvassing, the Census Bureau verifies that its master address list and maps are accurate so the tabulation for all housing units and GQ is correct. A complete and accurate address list is the cornerstone of a successful census.

The Census Bureau has determined that while there will be a full Address Canvassing of the nation in 2020, a full In-Field Address Canvassing of the nation is no longer necessary. Advancements in technology have enabled continual address and spatial updates to occur throughout the decade as part of the In-Office Address Canvassing effort. This has made it possible to limit In-Field Address Canvassing to only the most challenging areas. The scope of the Address Canvassing operation for the 2020 Census includes:

- In-Office Address Canvassing: Process of using empirical geographic evidence (e.g., imagery, comparison of the Census Bureau's address list to partner provided lists) to assess the current address list. Also removes geographic areas from the In-Field Address Canvassing workload based on the availability of administrative data sets (e.g., military lands, national forests) and the method of enumeration planned for the 2020 Census (e.g., UE). Detects and identifies change from high quality administrative and third-party data sources to reduce the In-Field Address Canvassing workload. Determines the In-Field Address Canvassing universe.
- In-Field Address Canvassing: Process of doing a dependent listing in the field to identify where people live, stay, or could live or stay.
- Quality Assurance: Process of reviewing the work of field and office staff. Both In-Field Address Canvassing and In-Office Address Canvassing work will be validated using quality assurance techniques.
- MAF Coverage Study: An ongoing field activity that validates In-Office procedures, measures coverage, improves In-Field data collection methodologies, and updates the MAF on a continuous basis.

### Research Completed

The following research has been completed for this operation:

- September 2014: Released the *Address Canvassing Recommendation Report.*
  - Findings: A recommendation was made to not walk every block and implement the reengineered Address Canvassing (In-Field and In-Office).
- February 2015: Completed the 2015 Address Validation Test, which consists of the MMVT and the PBC Test.
  - Findings:
    - The statistical models were not effective at identifying specific blocks with many adds or deletes.
    - The statistical models were not effective at predicting national totals of MAF coverage errors.
    - PBC was successfully implemented as an alternative field data collection methodology; future work will determine how the PBC method impacts cost and quality.
    - Imagery Review successfully identified areas requiring updates; future research is needed to refine the process and determine impacts on quality.

### Decisions Made

The following decisions have been made for this operation:

- ✓ The Address Canvassing Operation consists of:
  - In-Office Address Canvassing.
  - In-Field Address Canvassing.
  - Quality Assurance.
  - MAF Coverage Study.
- ✓ Administrative records and third-party data sources will be used to validate addresses within each block.
- ✓ GQ will be identified and classified during Address Canvassing.
- ✓ Geographic areas (e.g., living quarters and feature) which are included in downstream operations will no longer have to be canvassed in the field (e.g., UE and Remote Alaska).
- ✓ At most 25 percent of the living quarters will be canvassed in the field.
  - Target as of September, 2015; continued study through additional testing.
- ✓ Production Address Canvassing begins September 2015.
- ✓ Address Canvassing provides training for both production and quality assurance processes for in-office work.
- ✓ Address Canvassing relies on automated training for production and quality assurance processes for in-field work.
- ✓ Address Canvassing updates the Census Bureau's address list using a dependent canvass (from ground to list).
- ✓ Address Canvassing validates and collects coordinates for every structure with a living quarter.
- ✓ The MAF Coverage Study will be conducted throughout the decade.

- ✓ In-Office Address Canvassing creates the universe for In-Field Address Canvassing.
- ✓ In-Office Address Canvassing will review public lands.
- ✓ Geographic areas designated for In-Office Address Canvassing can move to the In-Field Address Canvassing universe and vice versa.
- ✓ In-Field Address Canvassing can identify additional in-field work.
- ✓ Statistical modeling will not be used in Address Canvassing.
- ✓ Imagery will be available on the Listing and Mapping Instrument to use during In-Field Address Canvassing.
- ✓ Address Canvassing will validate LUCA submissions.
- ✓ Validation of LUCA submissions will occur primarily during In-Office Address Canvassing, with minimal validation occurring early in the In-Field Address Canvassing operation.

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

Is PBC more cost-effective than Full Block Canvassing?

- **Approach:** Researched in 2016 Address Canvassing Test.
- **Decision by:** January 2017

How will the field reengineering concepts tested for NRFU be used for In-Field Address Canvassing?

- **Approach:** Researched in 2016 Address Canvassing Test.
- **Decision by:** January 2017

How will Quality Assurance be handled?

- **Approach:** Researched in 2016 MAF Coverage Study and 2016 Address Canvassing Test.
- **Decision by:** January 2017

What are the business processes for handling Transitory Locations[7] during Address Canvassing?

- **Approach:** Researched in 2016 Address Canvassing Test.
- **Decision by:** January 2017

Will the Census Bureau be able to meet the 25-percent In-Field Address Canvassing goal without sacrificing quality?

- **Approach:** Researched in 2016 MAF Coverage Study and 2016 Address Canvassing Test.
- **Decision by:** January 2017

How will ungeocoded addresses be resolved as part of Address Canvassing?

- **Approach:** Researched in 2016 Address Canvassing Test.
- **Decision by:** March 2017

What is the business process to meet spatial accuracy requirements for capturing features and living quarter coordinates during In-Field Address Canvassing if the devices are unable to meet these requirements?

- **Approach:** Research during the 2016 Address Canvassing Test.
- **Decision by:** March 2017

What feature data, if any, should be collected during an In-Field Address Canvassing?

- **Approach:** Researched in 2016 MAF Coverage Study and 2016 Address Canvassing Test.
- **Decision by:** March 2017

[7] Transitory Locations are recreational vehicle parks, campgrounds, hotels, motels, marinas, racetracks, circuses, and carnivals.

### *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

Investment in Address Canvassing will reduce the cost of the 2020 Census as compared with the 2010 Census through:

- ↓ Reduction in the amount of In-Field Address Canvassing and associated infrastructure by implementing In-Office Address Canvassing.
- ↓ Use of additional sources of administrative records and third-party data to validate the frame.
- ↓ Partial block canvass (under review).

In addition:

- ↑ Address Canvassing is expected to require additional people, process activities, data, technology, and facilities to support In-Office Address Canvassing and the resolution of ungeocoded responses.

Quality impacts of this operation on overall 2020 Census quality include the following:

- ↑ Continuous in-field improvement process to:
  - Test in-field methodologies.
  - Verify in-office methodologies.
  - Update MAF with results.
- ↑ Use of additional sources of administrative records and third-party data to validate the frame.
- ↓ Missed changes in address list resulting from new Address Canvassing approach.

### *Risks*

In-Office Address Canvassing is a new approach for the 2020 Census, and there are concerns that some local governments may believe an In-Field Address Canvassing may yield a greater "quality" canvassing than In-Office Address Canvassing, and they may be concerned about the lack of census jobs within their jurisdiction because of a decreased In-Field Address Canvassing**. IF** the Census Bureau is unable to gain stakeholder acceptance for the proposed Address Canvassing methodology, **THEN** the workload for In-Field Address Canvassing may increase dramatically.

The LUCA program provides addresses to the Address Canvassing workload that need to be validated. The redesigned LUCA program is intended to resolve more addresses and lessen the potential for increased In-Field Address Canvassing work. **IF** LUCA provides addresses to In-Office Address Canvassing that are unresolvable at a higher than expected rate, **THEN** there will be an increased workload for In-Field Address Canvassing.

### *Milestones*

| Date | Activity |
|---|---|
| August 2015 | Release Address Validation Test Results. |
| September 2015 | Release Address Canvassing Detailed Operational Plan. |
| September 2015 | Begin 2020 Census Address Canvassing (In-Office). |
| April 2016 | Begin MAF Coverage Study (In-Field). |
| September 2016 | Begin 2016 Address Canvassing Test (In-Field).<br>Release the LUCA Detailed Operational Plan. |
| September 2017 | Begin In-Field Address Canvassing for 2018 Census End-to-End Test. |
| August 2019 | Begin In-Field Address Canvassing for 2020 Census. |

## 5.5 RESPONSE DATA

The Response Data area includes all operations associated with the collection of responses, management of the cases, and initial processing of the data. This area consists of 12 operations that are described in the following sections:

1. Forms Printing and Distribution
2. Paper Data Capture
3. Integrated Partnership and Communications
4. Internet Self-Response
5. Non-ID Processing
6. Update Enumerate
7. Group Quarters
8. Enumeration at Transitory Locations
9. Census Questionnaire Assistance

10. Nonresponse Followup
11. Response Processing
12. Federally Affiliated Americans Count Overseas

### 5.5.1 Forms Printing and Distribution

| Detailed Planning Status: | **Underway** |
|---|---|

#### *Purpose*

The Forms Printing and Distribution operation prints and distributes the following paper forms to support the 2020 Census mailing strategy and enumeration of the population:

- Internet invitation letters.
- Reminder postcards.
- Questionnaire mailing packages.
- Materials for other special operations, as required.

Other materials required to support field operations are handled in the Decennial Logistics Management or Field Infrastructure operations.

#### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Use USPS tracing data to monitor large scale inbound and outbound census mailings.
- Provide a comprehensive 2020 Census forms list to be used by the contractor for printing planning.
- Identify an owner for every field on the questionnaires.

#### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Shifting from paper questionnaires to the Internet as the primary response mode to the Census, thus reducing the amount of paper printing and distribution required as compared with 2010.
- Paper questionnaires will be used mainly for the enumeration of Internet nonrespondents and targeted areas or populations with low Internet usage.

#### *Description of Operation*

The Forms Printing and Distribution operation is responsible for the printing and distribution of mailed Internet invitations, reminder or postcards, and questionnaire mail packages in multiple languages as determined by the Language Services operation.

- The contact strategy will include printing and mailing of paper invitations and postcards.
- Paper questionnaires will be printed and mailed to some portion of the population.
- Printing and mailing will be contracted through the Government Publishing Office.
- A serialized barcode will be printed on each sheet of a questionnaire to ensure all pages for a household are properly captured.
- All or most of the mailing items or packages will be addressed in near real time to minimize distribution to households who have engaged in the digital or other nonpaper response channels.

#### *Research Completed*

The following decisions have been made for this operation:

- Multiple studies on the use of USPS tracing:
  - 2010 Census Paper: Optimizing Integrated Technologies and Multimode Response to achieve a Dynamic Census, February 29, 2012.
  - 2010 Census Assessment: 2010 Census Postal Tracking Assessment, April 2, 2012.

- Cost assessment for the paper data capture check-in operation.
  - Findings:
    - USPS tracing data are cost-effective and accurate.
    - Postal tracing services are deemed reliable and can be used on a nationwide scale in lieu of check-in.

### *Decisions Made*

The following decisions have been made for this operation:

✓ Paper questionnaires, in at least English and Spanish, will be printed and mailed to some portions of the population as part of the initial contact strategy.

✓ Printing and mailing of 2020 Census invitation letters, reminder postcards, and questionnaires will be contracted out through Government Publishing Office.

✓ USPS barcodes will be used for various postal services, such as tracing and identification of vacant or other undeliverable addresses.

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

What is the printing and mailing workload as part of the Optimizing Self-Response contact strategy and NRFU Operation?

- **Approach:** Researched in the 2014 Census Test, the 2015 Optimizing Self-Response Test, the 2015 Census Test, the 2015 National Content Test, and the 2016 Census Test.
- **Decision by:** Initial workload projection October 2015 and final October 2016

What is the timing for the various mailings?

- **Approach:** Researched in the 2014 Census Test, the 2015 Optimizing Self-Response Test, the 2015 Census Test, the 2015 National Content Test, and the 2016 Census Test.
- **Decision by:** October 2016

What is the "on demand" printing process?

- **Approach:** Researched in the 2014 Census Test, the 2015 Optimizing Self-Response Test, the 2015 Census Test, the 2015 National Content Test, and the 2016 Census Test.
- **Decision by:** October 2016

What other census operations have paper printing requirements (e.g., UE, Puerto Rico and Island Areas Censuses, GQ enumeration)?

- **Approach:** Based on UE, Puerto Rico, Island Areas, and GQ operational design.
- **Decision by:** October 2017

### *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

The investment in Forms Printing and Distribution will have minimal impact on the cost of the 2020 Census as compared with the 2010 Census.[8]

Quality impacts of this operation on overall 2020 Census quality include the following:

↑ Robust printing quality assurance measures have a direct positive impact on the quality of data from paper data capture.

### *Risks*

The printing products and address files needed to support the 2020 Census need to be finalized in time so that subsequent planning and development for the printing operation can take place. **IF** printing products and address files are not finalized on schedule, **THEN** the printing operation will be unable to plan print contracts and production in the most fiscally responsible way, resulting in extra mailing costs and schedule delays.

[8] Printing costs may increase from the 2010 Census due to the requirement for increased on-demand addressing and mailing.

The final design for the 2020 Census paper questionnaire needs to be within the established USPS thresholds in order to take advantage of mailing discounts. **IF** the final 2020 Census questionnaire design pushes the weight, size, or shape of a mailing piece over established USPS thresholds, **THEN** the Census Bureau will be unable to maximize use of USPS mailing discounts, adding extra mailing costs.

### *Milestones*

| Date | Activity |
|---|---|
| September 2016 | Release the Forms Printing and Distribution Detailed Operational Plan. |
| October 2016 | Receive final contact strategies from the Internet Self-Response operation.<br>Receive questionnaire designs from the Content and Forms Design operation.<br>Define the printing and mailing workload estimates. |
| October 2018 | Refine the printing and mailing workload estimates. |
| March 2018–March 2019 | Start print contract planning.<br>Start USPS mailing planning. |
| June 2019–April 2020 | Implement printing, addressing, and mailing of paper questionnaire packages. |

## 5.5.2 Paper Data Capture

| Detailed Planning Status: | **Underway** |
|---|---|

### *Purpose*

The Paper Data Capture operation captures and converts data from 2020 Census paper questionnaires. This operation includes:

- Document preparation.
- Scanning.
- Optical Character Recognition (OCR).
- Optical Mark Recognition (OMR).
- Key From Image (KFI).
- Editing and checkout.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- A timely and comprehensive forms list is required.
- Every field on a questionnaire must have an owner.
- Realistic and timely contingency planning is essential in order to properly estimate the paper data capture workload.
- Use postal tracing to monitor large-scale inbound and outbound mailings.
- Barcode serialization is an essential automated quality component to data capture operations.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Significant reduction in paper data capture operations and associated infrastructure due to Internet Self-Response and automated field operations.
- Use of in-house systems Integrated Capture and Data Entry (iCADE) for paper data capture.
- USPS tracing data used to identify questionnaires prior to arrival.

### *Description of Operation*

The Paper Data Capture Operation is responsible for the capture and conversion of data from paper questionnaires. Paper forms delivered by the USPS are processed by the National Processing Center (NPC). Questionnaires go through several steps as shown in Figure 32. Note that questionnaire images are archived. The paper questionnaires themselves are stored until verification that data are received by Headquarters and then they are destroyed per security regulations.

The Paper Data Capture operation is driven largely by the timing of the questionnaire mail out, volume of forms received, timing of the nonresponse workload universe cut, and any priority capture

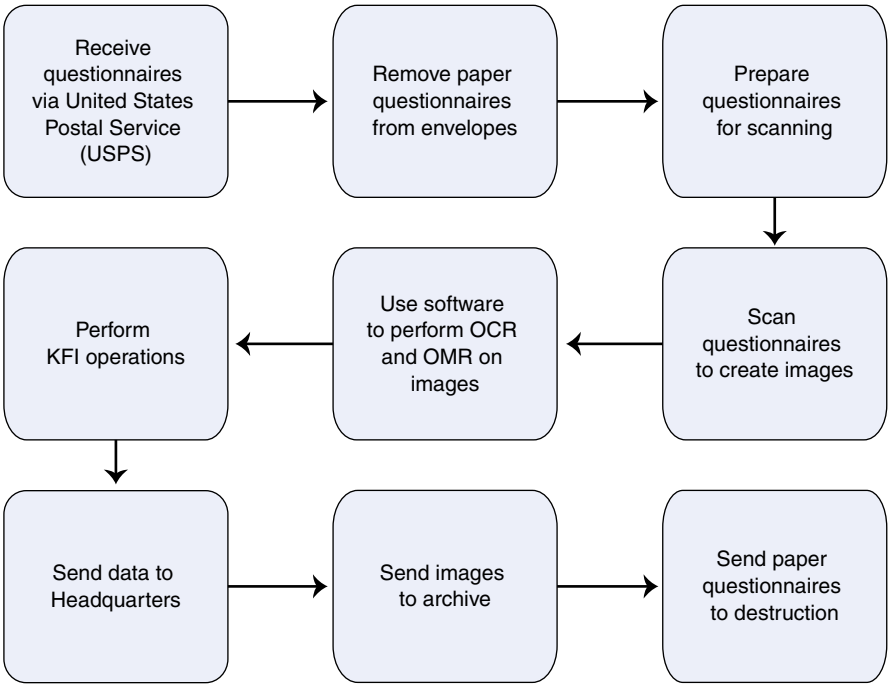



**Figure 32: Paper Data Capture Flow**

requirements needed for the 2020 Census. Data are captured from the paper forms in the most efficient manner possible, and both data and images of the forms are maintained. The data are sent to the Response Processing operation area for further work. The images are sent to the Archiving operation.

Mail returns are identified using USPS postal tracing to indicate that a form is en route to the processing office. Upon receipt at the processing office, mail return questionnaires will be processed in First-In-First-Out order, unless otherwise specified.

The document preparation area removes mail returns from the envelopes and prepares them for scanning. Damaged forms are transcribed to new forms of the same type and a new barcode label (same ID) is affixed to the new form. Booklet forms have the binding (spine) removed.

The questionnaires are delivered to scanning to begin the data capture process. All questionnaires are scanned by iCADE (no key from paper). Once scanned, the physical paper forms move on to the checkout operation. Forms await confirmation that the data have been received at Headquarters (see Response Processing in Section 5.6.12).

Scanned images are sent forward for further processing using the iCADE system where OMR and OCR are performed. Data fields with low confidence OMR and OCR results are sent to the KFI process. Both data and images are maintained (data are sent to response processing and images are archived). Once all data have been received at Headquarters, the questionnaires can be checked out to ensure each form has been fully captured. These forms are then eligible for destruction.

### *Research Completed*

The following research has been completed for this operation:

- Conducted Improving Operational Efficiency technical evaluation project:
  - Expanding the use of iCADE system to support the 2020 Census.
    - Findings: iCADE has the capability to be the paper capture solution for the 2020 Census.

- Multiple studies on the use of USPS tracing:
  - 2010 Census Paper: Optimizing Integrated Technologies and Multimode Response to achieve a Dynamic Census, February 29, 2012.
  - 2010 Census Assessment: 2010 Census Postal Tracking Assessment, April 2, 2012.
  - Cost assessment for the paper data capture check-in operation.
    - Findings: USPS tracing data are a cost-effective and accurate alternative to a check-in operation for the 2020 Census.

### *Decisions Made*

The following decisions have been made for this operation:

- ✓ iCADE is the planned paper capture system for the 2020 Census.
  - *Dev 8 Assessment, submitted February 2014 and updated January 2015.
  - *iCADE is part of CEDCaP.
- ✓ Paper questionnaires will be mailed to targeted areas or populations with low Internet usage as part of the initial contact strategy and to Internet nonrespondents.
- ✓ All questionnaires are booklets that require separation.
- ✓ USPS tracing data will be used to identify questionnaires prior to arrival (no laser sorter check-in operation).
- ✓ All questionnaires will be scanned by iCADE (no key from paper).
- ✓ The 2010 Census target quality levels will be used for OMR (99 percent), OCR (97 percent) and KFI (99 percent).
- ✓ There will be two paper data capture centers.

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

What is the 2020 Census Paper Capture workload, questionnaire size and shape?

- **Approach:** Researched during the 2015 Optimizing Self-Response Test, the 2015 National Content Test, and the results of the demand model.
- **Decision by:** October 2016

What does the reengineered NRFU operation require from Paper Data Capture? Will there be priority capture requirements for Nonresponse Followup? Is the universe cut schedule different?

- **Approach:** Based on decisions for the detailed design of the NRFU Operation.
- **Decision by:** October 2016

Which operations will use paper questionnaires as a contingency in the event that the Internet Self-Response, NRFU and other operations cannot be executed as planned?

- **Approach:** Based on risk analysis of alternative options for each relevant operation.
- **Decision by:** October 2016

What other operations have paper data capture requirements (e.g., UE, Puerto Rico, and GQ)?

- **Approach:** Based on decisions on paper data capture requirements for other operations.
- **Decision by:** October 2017

### *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

The investment in Paper Data Capture will reduce the cost of the 2020 Census as compared with the 2010 Census through:

- ↓ The use of an enterprise solution iCADE for paper data capture.
- ↓ The provision of a low-cost response mode (other than the Internet) to increase self-response rates.

Quality impacts of this operation on overall 2020 Census quality include the following:

- ↔ Plan to maintain the same quality level as the 2010 Census for OCR, OMR, and KFI.

### *Risks*

In order to make informed decisions regarding paper capture facilities and equipment, timely guidance must be provided on the workloads

for questionnaire capture. **IF** guidance regarding questionnaire capture workloads is not provided on time, **THEN** paper capture facility and equipment decisions will be negatively impacted.

The size of the final 2020 Census questionnaire affects the cost of processing paper forms as it determines the number of form faces that must be managed. **IF** the final 2020 Census questionnaires is in a booklet format, **THEN** additional equipment and storage space may be needed to accommodate the format, adding time, cost, and complexity to the paper data capture process.

The Census Bureau is considering significant innovations to conduct the 2020 Census. These innovations (e.g., enterprise IT solutions, data collection via the Internet and mobile devices) are expected to drastically reduce the need for paper for many of the operations. **IF** the innovations being developed to reduce the use of paper for the 2020 Census do not get implemented as planned, **THEN** operations may need to be fully or partially paper-based, which will require a more robust solution than currently planned, resulting at a minimum in additional cost and schedule delays.

### *Milestones*

| Date | Activity |
|---|---|
| September 2016 | Release the Paper Data Capture Detailed Operational Plan. |
| October 2016 | Develop paper data capture Nonresponse Followup plan.<br>Develop paper data capture contingency planning guidance. |
| October 2017 | Design other operations that may require paper data capture. |
| March–August 2020 | Conduct Paper Data Capture operation. |

## 5.5.3 Integrated Partnership and Communications

| Detailed Planning Status: | **Underway** |
|---|---|

### *Purpose*

The Integrated Partnership and Communications operation communicates the importance of participating in the 2020 Census to the entire population of the 50 states, the District of Columbia, and Puerto Rico to:

- Engage and motivate people to self-respond, preferably via the Internet.
- Raise and keep awareness high throughout the entire 2020 Census to encourage response.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Integrate Census Bureau subject matter experts into all phases of the 2020 Census Integrated Partnership and Communications Program.
- Improve coordination of communications among the Decennial, Field, and Communications Directorates and others.
- Align timing, funding, and design decisions between the development of the Integrated Partnership and Communications Program Plan and the Census Bureau's operational milestones to effectively support all phases of the 2020 Census.
- Establish more specific program metrics for the Integrated Partnership and Communications Program to assist in evaluation and assessment.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Microtargeted messages and placement for digital advertising, especially for hard-to-count populations.
- Advertising and partnership campaign adjusted based on respondent performance.
- Texting and e-mailing to motivate self-response.
- Expanded predictive modeling to determine the propensity to respond.
- Expanded use of social media to encourage response.
- Localized advertising to encourage response.

### *Description of Operation*

Inspiring every household in the country to complete the census is an enormous, increasingly complex, and unparalleled challenge. What was once a widely accepted civic exercise has become much

more difficult over the past several decades. With an increasingly diverse population and a drop in public participation, an effective communications strategy is critical to the success of the census.

The Integrated Partnership and Communications Program must reach every household in the nation, delivering the right messages to the right audiences at the right time. It must allocate messages and resources efficiently, taking care not to over-allocate resources to reach households that will readily respond, and to dedicate additional appropriate resources to reach households that need more encouragement. It is a delicate balance that must be informed by timely research. Critical to this is ensuring consistent messaging, as well as look and feel, across all public facing materials across communication efforts as well as operations.

An Integrated Partnership and Communications Program contractor will be engaged to support the 2020 Census Program from recruitment through data dissemination. At a minimum, the Program will offer the following components:

- Partnership including both Regional and National efforts.
- Advertising using print, radio, digital, television, and out of home.
- Social Media to include blogs, Facebook, Twitter, and etc.
- Statistics in Schools.
- Rapid Response.
- Earned Media.
- Thank you campaign.
- Public Relations.

Together these eight major components of the Integrated Partnership and Communications operation will communicate the importance of participating in the 2020 Census to the entire population.

### *Research Completed*

The following research has been completed for this operation:

- The 2015 Optimizing Self-Response Test:
  - Promote "Notify Me," allowing individuals to provide contact information to receive future e-mail and text message notifications when it is time to participate in the test.
    - Findings: "Notify Me" is not a successful contact strategy as designed and tested with a very low percent of mail panel responding.
  - Test microtargeted digital advertising on response rates associated with "Notify Me" and survey completion.
    - Findings: 2015 Optimizing Self-Response Test Report due December 2016.
  - Test multiple communications elements, including earned media, social media, partnership and outreach, and telephone, radio, print, billboards, and digital advertising; as well as automated telephone messaging by local influencers.
    - Findings: 2015 Optimizing Self-Response Test Report due December 2016.
  - Test of effectiveness of partnerships in motivating self-response.
    - Findings: Partnerships were effective.

### *Decisions Made*

The following decisions have been made for this operation:

- ✓ The 2020 Census will use partnerships to communicate the importance of the 2020 Census to the U.S. population and encourage self-response.
- ✓ The 2020 Census will use digital advertising and social media targeting.
- ✓ The 2020 Census will use texting and e-mailing to motivate self-response.
- ✓ The 2020 Census will use traditional advertising methods, including the use of local advertising.
- ✓ An online portal will be developed that will allow for posting and downloading materials, providing online fulfillment, and sharing experiences.
- ✓ Integrated Partnership and Communications Internet kiosks will be made available in public spaces for respondents to complete their Census questionnaire on line.

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

What are the components and materials required for implementing the Integrated Partnership and Communication (IPC) operation?

- **Approach:** Census will work with IPC operation contractor upon contract award in September 2016 to develop an IPC Program Plan.
- **Decision by:** March 2017

What is the approach for audience and market segmentation models?

- **Approach:** Census will work with IPC operation contractor upon contract award in September 2016 to determine the appropriate approach based on best practices and available data.
- **Decision by:** April 2017

What metrics will be used to evaluate the success of the IPC operation as well as each individual component? Microtargeted digital advertising? Automated telephone messaging by local influencers? Providing donated thank you incentives to respondents? Social media? E-mail?

- **Approach:** Based on when the Independent Evaluation Contract for the IPC operation is awarded. This contractor needs to work with the Census Bureau and the IPC operation contractor to determine metrics.
- **Decision by:** April 2017

### *Cost and Quality*

Costs impacts of this operation on overall 2020 Census quality include the following:

🡻 A campaign aimed at promoting the Internet as the primary response option reduces census data collection costs.

Quality impacts of this operation on overall 2020 Census quality include the following:

🡹 Increase in overall self-response rates.

🡹 Potential increase in self-response from traditional hard-to-count populations.

🡹 Ability to adjust advertising using real-time metrics.

### *Risks*

The Integrated Partnership and Communications operation may not be able to use newly emerged communication channels as it may be too late to incorporate these new technologies. In addition, internal policies may not be flexible enough to accommodate new communication channels. **IF** the Integrated Partnership and Communications operation is unable to leverage new communication channels to encourage the public to complete the 2020 Census, **THEN** messages may not get to some segments of the population, resulting in lower self-response rates.

### *Milestones*

| Date | Activity |
|---|---|
| January 2015 | Launch the 2020 Census Web site. |
| August 2016 | Award the Integrated Partnership and Communications contract. |
| September 2016 | Release the Integrated Partnership and Communications Detailed Operational Plan. |
| October 2016 | Kick off the Integrated Partnership and Communications contract. |
| June 2017 | Start the 2020 Census Partnership program. |
| June 2017 | Start the 2020 Census recruiting campaign. |

## 5.5.4 Internet Self-Response

| Detailed Planning Status: | **Underway** |
|---|---|

### *Purpose*

The Internet Self-Response operation performs the following functions:

- Maximize online response to the 2020 Census via contact strategies and improved access for respondents.
- Collect response data via the Internet to reduce paper and Nonresponse Followup.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Determine optimal contact strategies for eliciting responses to the 2020 Census for Internet and response modes.
- Optimize the instrument for mobile devices to provide for better user experiences and to improve overall response rates.
- Determine if a bilingual initial or replacement questionnaire in bilingual selected tracts is beneficial.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Internet Data Capture:
  - Real-time edits.
  - Ability to capture unlimited household size entries.
  - Multiaccess methods across different technologies (e.g., computers, smart phones, tablets, kiosks).
  - Online questionnaires available in multiple languages and non-Roman alphabets.
- Multimode contact approach (e.g., postcard, e-mail, phone, and text) tailored to demographic or geographic area, designed to encourage Internet self-response, and tied to the messaging from the Integrated Partnership and Communication operation.
- A contact frame, including e-mail and phone numbers, created from administrative records and third-party data.

### *Description of Operation*

Two significant pieces of the program reside in this operation: Internet Self-Response and Contact Strategies.

#### *Internet Self-Response*

The Census Bureau has set a goal of 55 percent of U.S. households responding to the 2020 Census via the Internet. High Internet response is critical for cost savings and major efforts are underway to minimize the amount of self-response via telephone, paper questionnaire, and in-person visits.

Internet response was not available in previous decennial censuses and therefore represents a substantial innovation for the enterprise. The Census Bureau recognizes that the Internet response option is not feasible or acceptable to the entire population. Therefore, alternate modes will be provided for respondents to complete their 2020 Census such as the paper methods used in the past.

Planning and development activities to support self-response have focused on two primary areas: optimizing the respondent experience and maximizing data quality. Each is discussed below.

Ensuring a positive experience for users is one way to facilitate high rates of Internet self-response. The overall experience includes factors such as usability, convenience, speed, and the general "look and feel" of a Web site. To meet this broad range of expectations, respondents will be offered multiple avenues to complete their census online. The questionnaire Web site will be optimized for use on mobile devices. This provides a higher level of convenience as well as ensures the broadest access possible to those without traditional Internet service.

Internet questionnaire screens must be easy to complete and responses must be processed quickly to eliminate wait time between screens. Additionally, all systems developed to support Internet Self-Response must have the capacity to handle the anticipated response loads and provide security protections for Title 13 data.

The option to respond online must be available to those without personal Internet access. Through the Census Bureau's planned partnership and other community-level efforts, free-standing or mobile devices will be available for use by the public, and assistance will be provided to those who cannot complete the form themselves. Additional information on the Census Bureau's Integrated Partnership and Communications Campaign is described in section 5.6.4.

Similarly, language needs must be addressed. The Census questionnaire will be available for Internet completion in English, Spanish and other languages as determined by the prevalence of the need. Additional information on the Language Services program is described in section 5.4.4.

Internet Self-Response should also lead to improvement in overall data quality. The data collection systems will include preprogrammed edit checks to identify user error prior to submission. Real-time or post hoc respondent validation checks are also possible with Internet respondents.

To further improve data quality, assistance will be available to respondents who are having difficulty completing their 2020 Census online through Census Questionnaire Assistance agents who will facilitate successful submissions of questionnaires and reduce the number of incoming telephone calls for assistance. Additional guidance will be available in static form on the Census Bureau or 2020 Census Web site, including step-by-step guides and Frequently Asked Questions for completing the Census.

### *Contact Strategies*

All attempts by the Census Bureau to make direct contact with individual households are referred to as "contact strategies." These are complimentary but distinct from the community-level outreach described under the Integrated Partnership and Communications operation. Types of contact strategies include invitation letters, postcards, and questionnaires mailed to households; electronic correspondence (both e-mail and text messages); and telephone calls:

- Mailings have traditionally been sent via the USPS. The Census Bureau is also exploring supplementing deliveries through additional options, including express delivery or private couriers, if they achieve rates of response high enough to justify added costs and operational complexity.
- The Census Bureau is exploring different options for individual-level contact, including the use of e-mail and text messaging to cell phone numbers.
- The Census Bureau is exploring the use of telephone contacts to landline or cell phone numbers to encourage self-response.

Each type or mode of contact may be used for multiple purposes: advance notification of upcoming contact, invitation to participate in the 2020 Census, remind prompting to nonresponders, or to complete the questionnaire in an alternative mode.

Prior to the 2010 Census, research yielded distinct attitudinal segments or messaging mindsets. Research was also conducted and continues to be refined with cluster analysis of mail return rates from the 2010 Census and the ACS with demographic, housing, and economic variables to understand and plan for response propensities. A primary objective of the 2020 Census is for a majority of respondents to complete their Census questionnaire online. Communication of this objective to individual households is the purpose of the Census Bureau's contact strategies. The Census Bureau is looking to develop a contact approach that produces an "actionable" response on the part of the respondent. For example, receipt of an e-mail with a hyperlink to the Census Web site should lead respondents to click on the link and complete the questionnaire.

One approach termed "Internet push" has been developed to encourage respondents to use the Internet. Currently this model includes the mailing of a letter inviting respondents to complete the questionnaire online, two follow-up reminders via mailed postcard, and if necessary, a mailed hard-copy questionnaire. All correspondence will contain a telephone number for respondents to call to complete the questionnaire over the telephone.

This approach, however, may not be appropriate for all respondent types and the Census Bureau is actively working to understand the optimal contact strategies for different segments of the population; exploring variations on the timing, mode, and frequency of contacts on response. For instance, some respondents may be less likely to react to mailings, but will notice an e-mail invitation or text message sent to a cell phone. Research is underway to understand whether these nontraditional methods of contact are acceptable and produce the intended results.

## ***Research Completed***

The following research has been completed for this operation:

- ACS Internet Self-Response Research.
  - Findings:
    - People living in areas with lower Internet usage and accessibility require paper and or telephone questionnaire assistance.

    - Certain messaging strategies are more effective in motivating self-response.
- 2012 National Census Test tested contact strategy and Internet option.
    - Findings:
        - Initial contact to invite participation, followed by two reminder prompts as needed, and subsequent mailing of a paper questionnaire was a promising strategy (Internet push).
        - Advance letter was not shown to improve response rates.
        - Telephone assistance needed for respondents without Internet access.
- 2014 Census Test tested "Notify Me" mailed invitation, contact strategies, and Internet option.
    - Findings:
        - Neither e-mail nor automated voice messages showed a significant impact on response rates.
        - Low participation rate for "Notify Me" component, but high questionnaire completion rate among those who preregistered.
- The 2015 Optimizing Self-Response Test offered an Internet response option, including real-time non-ID processing, and again tested the "Notify Me" option, along with advertising and partnerships support.
    - Findings:
        - The total response rate was 47.5 percent, and the Internet response rate was 33.0 percent.
        - An additional 35,249 Internet responses from housing units not selected in mail panels as a result of advertising and promotional efforts.
        - "Notify Me" again had low participation.
        - A new postcard panel, designed to test how housing units not originally included in the sample would respond to an invitation after being exposed to advertising, generated response of approximately 8 percent.
- Small-scale opt-in e-mail testing experimented with e-mail messaging, including subject lines, timing of delivery, and look and feel.
    - Findings:
        - A text-based e-mail out-performed graphical e-mails.
        - Short e-mail subject lines that include the "10-minute" burden and the "U.S. Census Bureau" name seem to perform better than other subject lines, especially those including the word "Help" as the first word in the subject line.
        - Longer e-mail content with "Dear Resident" and signature of the Director e-mail outperformed a shorter e-mail invitation without the greeting and signature.
        - Response rates did not differ by link type (whether the full Uniform Resource Locator (URL) or "Click here") with this population.
        - The time of day the e-mail is sent did not appear to have a big impact on the response rate.
        - Respondents prefer a mailed invitation, including a link to respond over all other options.

### *Decisions Made*

The following decisions have been made for this operation:

*Internet Self-Response:*

- ✓ An Internet self-response option will be provided for the 2020 Census.
- ✓ Invitation letters and mailed materials will encourage people to respond using a unique Census identifier; however, the 2020 Census will allow people to respond without a unique Census ID.
- ✓ The Census Bureau will offer Internet questionnaires in a small number of languages other than English and Spanish, including those requiring non-Roman alphabets. The languages selected will be based on national prevalence rates of low-English proficiency households and the available technology.

*Contact Strategy:*

- ✓ An advance letter will not be used; the first letter will be an Internet push letter inviting response to the Census to most of the housing units. We will provide a paper questionnaire (including bilingual forms) for populations

where Internet access and usage prompts us to offer Internet Choice (questionnaire and Internet invitation) and for whom language assistance optimizes self-response.

✓ The 2020 Census will offer alternative response options to respondents without Internet access.

✓ Messaging will be coordinated with the Integrated Partnership and Communications Campaign.

✓ A formal "Notify Me" option will not be offered.

✓ Respondents will receive direct contacts inviting their participation in the Census. Contacts may include some of all of the following: postcard mailings, letter mailings, e-mails, text messages, prerecorded telephone messages, questionnaire mailings, and in-person visits by an enumerator.

*Other Self-Response:*

✓ Text messaging will not be used as a data collection mode.

✓ Housing units from whom an Internet questionnaire is not received will be mailed a paper questionnaire.

### Design Issues to Be Resolved

Additional work is required to make decisions on the following questions:

*Internet Self-Response:*

Will the Census Bureau provide a mobile application for Internet Self-Response?

- **Approach:** Based on technical research and cost and benefit analysis.
- **Decision by:** January 2016

In what languages will Internet self-response be available?

- **Approach:** Determined in conjunction with Language Services using ACS data and input from advisory committees, taking into consideration Census Enterprise Data Collection and Processing capabilities.
- **Decision by:** September 2017

What type of Internet form design will facilitate high quality self-response data collection in GQ?

- **Approach:** Researched in the 2016 and 2017 Census Tests.
- **Decision by:** October 2017

*Contact Strategy:*

What is the optimal combination of individual (e.g., housing unit) level contact strategies used in the 2020 Census and how will these be tailored based on demographic and geographic areas?

- **Approach:** Researched in the 2014, 2015, and 2016 Census Tests.
- **Decision by:** October 2016

How can USPS barcode technology be used to optimize the respondent access to Internet in mail materials?

- **Approach:** USPS/Census Bureau Interagency Working Group 2015–2017.
- **Decision by:** October 2017

What are the benefits and risks associated with using the Census contact frame to reach respondents via e-mail and text messages?

- **Approach:** Research as part of the 2016 and 2017 Census Tests and coordinate with the 2020 Census Integrated Partnership and Communications design.
- **Decision by:** October 2017

*Other Self-Response*

What are the response rate projections for all self-response modes?

- **Approach:** 2015 Census Test, 2015 National Content Test, 2016 Census Test, and external demand model projection for Internet use.
- **Decision by:** October 2017

### Cost and Quality

Cost impacts of this operation on overall 2020 Census costs include the following:

The investment in Internet Self-Response will reduce the cost of the 2020 Census as compared with the 2010 Census through:

🡻 Reduced amount of self-response via paper questionnaire and the infrastructure for paper data capture.

🡻 Increased self-response, which will decrease the Nonresponse Followup workload, thereby reducing field costs.

In addition:

- ↑ Internet Self-Response is expected to increase the workload for Census Questionnaire Assistance.

Quality impacts of this operation on overall 2020 Census quality include the following:

- ↑ Increase in overall self-response rates.
- ↑ Real-time edits to respondent data.
- ↑ More complete self-response for large households.
- ↑ Potential increase in self-response from traditionally hard-to-count populations.

### *Risks*

Data collection for the 2020 Census will include Internet data submission from respondents for the first time on a large scale. **IF** the business rules, requirements, and assumptions for the data collection instrument, including usability of the user interface, are not correctly defined, developed, and tested, **THEN** there could be a failure in our ability to successfully conduct cost-effective self-response enumeration in the 2020 Census.

### *Milestones*

| Date | Activity |
|---|---|
| January 2016 | Decide on the use of mobile applications as a self-response mode. |
| March 2016 | Begin the 2016 Census Test. |
| September 2016 | Release the Internet Self-Response Detailed Operational Plan. |
| March 2017 | Develop the strategy to optimize self-response for those living in group quarters.<br>Begin the 2017 Census Test. |
| March 2020 | Begin 2020 Census Internet Self-Response data collection. |
| September 2020 | End 2020 Census Internet Self-Response data collection. |

## 5.5.5 Non-ID Processing

| Detailed Planning Status: | **Underway** |
|---|---|

### *Purpose*

The Non-ID Processing operation is focused on making it easy for people to respond anytime, anywhere to increase self-response rates. The operation accomplishes this by:

- Providing response options that do not require a unique Census ID.
- Maximizing real-time matching of non-ID respondent addresses to the Census MAF.
- Accurately assigning nonmatching addresses to census blocks.
- Conducting validation of all non-ID responses.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- The automated and manual non-ID processes should be planned and developed in parallel, rather than sequentially, as was done when preparing for the 2010 Census Non-ID Processing operation.
- Involve NPC throughout the life cycle of the 2020 Census Non-ID Process.
- The delivery of addresses from non-ID processing that require independent verification should occur on a flow basis during self-response and Nonresponse Followup rather than at the end of these operations.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Public can respond anytime, anywhere without a unique Census ID.
- Mechanism to increase self-response from traditionally hard-to-count populations.
- Real-time matching and geocoding of responses.
- Use of administrative records and third-party data to validate non-ID responses.
- Use of administrative records and third-party data to validate and augment respondent-provided address data.

### *Description of Operation*

During the self-response phase, the Non-ID Operation will allow respondents to complete a questionnaire without a Census identification code (non-ID). By collecting the address from the respondent and then matching it real-time to the MAF/TIGER System, the Census Bureau will attempt to get the ID and confirm the geographic information with the respondent. The address collection

interface facilitates obtaining complete and accurate data from a non-ID response.

Key capabilities of non-ID are:

- Address standardization and a feedback loop with the respondent to confirm the address data they provide.
- Automated address matching during the response.
- Automated address geocoding during the response.
- Respondent address geocoding real time via a map interface.
- Response validation; both during the response, as well as via back-end processing.
- For non-ID cases not matched in real time, use of administrative records and third-party data to confirm or supplement respondent-provided address data, followed by an additional address matching attempt.
- Manual matching and geocoding when automated Non-ID Processing has not determined an acceptable match or geocode.

### *Research Completed*

The following research has been completed for this operation:

- 2013 National Census Contact Test:
  - Findings: The use of administrative records and third-party data was effective in enhancing non-ID addresses to allow for a match to the MAF/TIGER System.
- 2014 Census Test on Non-ID Processing.
  - Findings:
    - The address collection interface in the Internet instrument yielded a much greater proportion of higher quality address data from non-ID responses than in 2010.
    - Use of administrative records and third-party data matching improved the overall address matching rate.
    - There was no significant benefit to applying the administrative record matching process to all non-ID responses. Therefore, the use of administrative records and third-party data matching should follow an initial matching attempt using the MAF/TIGER System.

### *Decisions Made*

The following decisions have been made for this operation:

- ✓ The 2020 Census will offer a non-ID option for self-response and telephone agent-assisted response.
- ✓ The 2020 Census Internet self-response instrument and the Census Questionnaire Assistance interviewer instrument will utilize capabilities and requirements for the address collection interface as specified for non-ID responses, as used in the 2014 and 2015 Census Tests.
- ✓ The non-ID work flow will include real-time matching and geocoding, post real-time processing that will utilize administrative records and third-party data, and manual (interactive) matching and geocoding.

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

How can non-ID respondents help confirm the location of their living quarters?

- **Approach:** Informed from Optimizing Self-Response 2015 Test, 2016 Census Test, and Carnegie Mellon research.
- **Decision by:** September 2016 (Initial recommendations; evaluation will continue through 2018 testing)

What methodology will be used to conduct non-ID response validation?

- **Approach:** Currently researching a solution that utilizes commercial and federal data sources; the Census Bureau will test alternate methods in the 2016 and 2017 Census Tests to determine methods to be used in the 2018 Census End-to-End Test.
- **Decision by:** September 2016 (Initial recommendations; evaluation will continue through 2018 testing)

How will administrative records and third-party data be used to improve matching in Non-ID Processing?

- **Approach:** Continue to refine methods in the 2016 and 2017 Census Tests in preparation for the 2018 Census End-to-End Test.
- **Decision by:** September 2017

At what proportion did office resolution confirm the existence and location of nonmatching addresses?

- **Approach:** Currently conducting office-based address verification for eligible records from the 2014 and 2015 Census Tests. The Census Bureau will continue to test methods in the 2016 and 2017 Census Tests to determine specific methods to be used in the 2018 Census End-to-End Test.
- **Decision by:** September 2017

If the proportion of non-ID responses increases in the 2020 Census, can the Census Bureau accommodate the corresponding increase in workload for downstream operations such as manual matching and geocoding or address verification (office and field-based)?

- **Approach:** Contributing to workload modeling efforts for upcoming tests, as well as for the 2020 Census. Initial model available September 2015, but to be revisited each year following the 2016 and 2017 Census Tests, as well as after the 2018 End-to-End Test.
- **Decision by:** September 2018

What is the expected scale of the 2020 Census Non-ID workload?

- **Approach:** Contributing to workload modeling efforts for upcoming tests, as well as for the 2020 Census. Initial model available September 2015, but to be revisited each year following the 2016 and 2017 Census Tests, as well as after the 2018 End-to-End Test.
- **Decision by:** September 2018

### *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

The investment in Non-ID Processing will reduce the cost of the 2020 Census as compared with the 2010 Census through:

- ↓ Increased self-response rates.
- ↓ Improved coverage through self-response.

Quality impacts of this operation on overall 2020 Census quality include the following:

- ↑ May increase self-response from traditionally hard-to-count populations.
- ↑ May increase overall self-response rates, which can contribute to higher quality for the overall census.

### *Risks*

The primary reason for conducting real-time Non-ID Processing is to provide respondents the opportunity during the response to resolve non-ID cases that are not matched and/or not geocoded. Any non-ID case that is successfully matched to a valid record in the census address inventory and is geocoded can be considered a complete response. In other words, it would not be necessary to manually match/geocode the respondent address or to send an enumerator to the housing unit if the non-ID case can be fully resolved during the response. **IF** the IT infrastructure is not adequately scaled to support real-time Non-ID Processing, **THEN** fewer addresses from non-ID responses will be matched in real time, negatively affecting the speed at which cases are removed from the manual processing workload or NRFU workload.

The option of submitting a non-ID response via the Internet instrument could potentially lead to an increase in fraudulent responses. A final solution that will implement identity validation during self-response has not been determined. **IF** the 2020 Census program is unable to determine prior to the 2020 Census an acceptable means to confirm that the identity of a respondent without a unique Census ID is valid during the Internet self-response, **THEN** the non-ID Internet self-response option will not be made available to the large segment of the population it is anticipated would choose to use it.

### Milestones

| Date | Activity |
|---|---|
| April 2015 | Deliver real-time address matching and geocoding for the 2015 OSR Test. |
| April 2016 | Deliver real-time processing in the cloud, manual matching and geocoding at the NPC, and utilize multiple respondent validation methods for the 2016 Census Test. |
| September 2016 | Release the Non-ID Processing Detailed Operational Plan. |
| April 2017 | Deliver all components for the 2017 Census Test, and include functionality for Puerto Rico addresses. |
| April 2018 | Conduct the 2018 Census End-To-End Test. |
| April–July 2020 | Conduct the 2020 Census Non-ID Processing. |
| August 2021 | Complete the 2020 Census Non-ID Assessment Report. |

## 5.5.6 Update Enumerate

| Detailed Planning Status: | **Not Started** |
|---|---|

Detailed planning for this operation has not started. The narrative that follows represents the Census Bureau's preliminary thoughts as of the release of this document.

### Purpose

The Update Enumerate operation updates the address and feature data and enumerates the following:

- Areas that do not have city-style addresses.
- Areas that do not receive mail through city-style addresses.
- Areas that receive mail at post office boxes.
- Areas with city-style addresses but mail is delivered to another drop point.
- Areas affected by natural disasters.
- Areas with high concentrations of seasonally vacant housing.
- Some American Indian Reservations.
- Settlements along the Mexican-American border (Colonias).
- Other areas with unique challenges associated with accessibility.
- Communities with a population from several hundred to just a few people.

### Lessons Learned

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Determine ways to closely track the fieldwork during the Update and Leave field operation in order to monitor any falsification or procedural issues that may arise during production.

### Opportunities to Innovate

Opportunities to innovate include the following:

- Combine enumeration methodologies from the 2010 Update Leave, Remote Update/Enumerate, and UE Operations.
- Single attempt to enumerate with push to Internet Self-Response (a notice of visit form is left when no one is home, which invites a respondent to go online with an ID to complete the 2020 Census or call the Census Questionnaire Assistance Center).
- Use of single device for both listing and enumeration.
- Use of reengineered field management structure and approach to managing fieldwork, including new field office structure and new staff positions.

### Description of Operation

The UE operation combines three operations from the 2010 Census: Update/Leave, Update/Enumerate, and Remote Update/Enumerate. As noted above, detailed planning for the UE operation has not yet started; however, the current plans for this operation (which will be tested in the 2017 Census Test) are that the UE fieldworker will update the address list and map and attempt to conduct an interview for each housing unit. If no one is home, the fieldworker will leave a notice of visit form inviting a respondent for each household to go online with an ID to complete the 2020 Census Questionnaire. The design does not currently include a return personal visit or telephone call back; however, this will be tested in the 2017 Census Test. The expectation is that nonresponding units become part of the NRFU workload.

The UE operation will take full advantage of all of the innovations associated with the reengineered field operations, including use of a handheld device to collect the data, automated training, automated

administrative processes, the operational control system, and streamlined staffing structures.

The 2020 Census UE operation includes a quality assurance component. The details of this component have yet to be defined but could include a combination of methodologies such as the use of alerts, paradata, and administrative records and third-party data, as well as fieldwork.

### *Research Completed*

Because detailed planning for this operation has not yet started, research that directly supports this operation has not yet been completed.

### *Assumptions Made*

Based on planning of other operations, the following assumptions have been made:

- UE consists of production and quality assurance components.
- UE utilizes a reengineered field management structure.
- UE utilizes integrated automated listing and enumerations tools and systems to facilitate data collection.
- UE collects coordinates (latitude and longitude) for each structure with a living quarter.
- UE utilizes automated systems and logistics to monitor cost and progress.
- No In-Field Address Canvassing for UE areas.
- The notice of visit form will provide both the 2020 Census URL and the phone number for CQA.
- UE will employ real-time or near-real time data processing.
- There will be validation of vacant living quarters during UE.

### *Design Issues to Be Resolved*

In addition to validating the assumptions above, the following decisions need to be made to design this operation, test it in the 2017 Census Test, and refine the design in the 2018 Census End-to-End Test:

What automated instruments do the enumerators need to access if group quarters are enumerated during UE?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** December 2015

What automated instruments do the enumerators need to access if transitory units are enumerated during UE?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** December 2015

How are Census IDs from the address list associated with or linked to the notice of visit forms?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** December 2015

How are Census IDs generated or assigned to newly identified units not found on the address list?

- **Approach** Determined through the development of the Detailed Operational Plan.
- **Decision by:** December 2015

Are there any geographic areas where a paper questionnaire should be left in lieu of the notice of visit form, (i.e., Puerto Rico)?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** March 2016

Will UE contact living quarters through mail and other contact strategies?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** March 2016

What is the content on the notice of visit form?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** June 2016

What actions are taken on the address list at the time of update (i.e., moves across block or into a different Type of Enumeration Area)?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** June 2016

Does the UE operation enumerate group quarters or are they provided to a different 2020 Census operation for enumeration?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** June 2016

Does the UE operation enumerate transitory units found at transitory locations or are they provided to a different 2020 Census operation for enumeration?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** June 2016

Will enumerators leave an invitation at known UE addresses asking the household to update their address online?

- **Approach:** Researched in the 2017 Census Test.
- **Decision by:** September 2017

Will enumerators leave an invitation at known UE addresses asking the household to update their address online?

- **Approach:** Researched in the 2017 Census Test.
- **Decision by:** September 2017

At what time of day is the operation actually performed (i.e., during business hours or when most people are likely to be home)?

- **Approach**: Researched in 2017 Census Test.
- **Decision by**: October 2017

Can administrative records and third-party data be used to validate units in Quality Control?

- **Approach:** Researched in 2017 Census Test.
- **Decision by:** October 2017

What is the cost/benefit to only visiting the living quarter once?

- **Approach:** Researched in 2017 Census Test.
- **Decision by:** October 2017

Is there a benefit of doing a phone call in UE versus NRFU doing the follow-up?

- **Approach:** Researched in 2017 Census Test.
- **Decision by:** October 2017

How will Remote Alaska be handled?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** December 2017

### *Cost and Quality*

Investment in UE will have minimal impact on the cost and quality of the 2020 Census as compared with the 2010 Census.

### *Risks*

By this point in the decade, planning for all major 2020 Census operations should be underway. Budget reductions in FY 2013 through FY 2015 delayed planning for this operation. **IF** planning efforts are not initiated at the start of FY 2016, **THEN** there may not be sufficient time to implement innovations related to this operation.

### *Milestones*

| Date | Activity |
|---|---|
| October 2015 | Begin detailed planning Update Enumerate. |
| March 2017 | Begin UE for 2017 Census Test. |
| September 2017 | Release the UE Detailed Operational Plan. |
| March 2018 | Begin UE for the 2018 Census End-to-End Test. |
| January 2020 | Begin UE for the 2020 Census in Remote Alaska. |
| March 2020 | Begin UE for 2020 Census. |
| July 2020 | End UE for 2020 Census. |

## 5.5.7 Group Quarters

| Detailed Planning Status: | **Recently Begun** |
|---|---|

### *Purpose*

The Group Quarters operation enumerates peoples living or staying in group quarters, people experiencing homelessness, and people receiving service at service-based locations.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Integrate GQ frame validation and enumeration data collection methodologies.

- Research and test automation to collect GQ data to reduce data capture and processing time, which incorporates tracking and linkage capabilities (eliminates manual transcription of administrative records and third-party data onto paper instrument).
- Explore ways to reduce the number of visits on military installations. (Research and test the enumeration of military personnel through the use of administrative records and third-party data.)
- Maintain consistent answer categories regarding the question on having a usual home elsewhere on all census data collection instruments, the Individual Census Report, and Shipboard Census Report.
- Conduct outreach to professional organizations such as education, health care, and tribal organizations as part of the 2020 Census GQ planning.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Use of an integrated approach including administrative records and third-party data and Address Canvassing (In-Field and In-Office) to improve the GQ frame.
- Use of multiple modes of enumeration that include: electronic exchange of group quarters and client-level administrative records and third-party data; Internet self-response; and automated field listing and enumeration.
- Integration of Group Quarters Validation and enumeration in all field operations that allow for accurate classification of living quarters.
- Staff will be trained in multiple operations for increased efficiency.
- Use of both in-office and in-field methods for enumeration.

### *Description of Operation*

Before group quarters can be enumerated, the Census Bureau must validate the GQ frame. This validation activity is part of the 2020 Census Address Canvassing operation.

The 2020 Census GQ operation consists of two components:

- **Group Quarters Advance Contact (known as Group Quarters Advance Visit in the 2010 Census):** For the 2020 Census, this will primarily be an in-office function (although some in-field work may be required in limited areas), which includes:
  - Verifying the group quarters' name, address information, contact name, and phone number, obtaining an agreed-upon date and time to conduct the enumeration.
  - Collecting an expected Census Day population count, addressing concerns related to privacy, confidentiality and security.
  - Inquiring about whether the group quarters has an administrative record or third-party data file that can be transmitted electronically to the Census Bureau.
- **Group Quarters Enumeration:** This includes enumeration of all group quarters through in-field visits or via administrative records and third-party data.

The residence rules for the 2020 Census will determine what is considered a group quarters. The Federal Register Notice has been published and the Census Bureau is reviewing comments. Final residence rules will be determined in late 2017.

Pending a final determination on residence rules, the following types of enumeration will be included in this operation:

- **General Group Quarters Enumeration:** Enumeration of people living in group living arrangements that are owned or managed by an entity or organization providing housing or services for the residents (e.g., college residence halls, residential treatment centers, skilled nursing facilities, group homes, correctional facilities, workers' dormitories, and domestic violence shelters).
- **Service-Based Enumeration:** Enumeration of people experiencing homelessness or utilizing transitional shelters, soup kitchens, regularly scheduled mobile food vans, and targeted non-sheltered outdoor locations.
- **Military Group Quarters Enumeration:** Enumeration of people living in GQs on military installations, defined as a fenced, secured area used for military purposes.
- **Military and Maritime Vessel (Shipboard) Enumeration:** Enumeration of people residing on U.S. military ships or on U.S. maritime vessels in operation at the time of the 2020 Census.

### *Research Completed*

- Issued Federal Register Notice on May 20, 2015, requesting public comment on the 2020 Census residence rule and residence situations. Expect to publish the final 2020 Census residence rule and residence situations in late 2017.
- Ongoing partnership with the Department of Defense's Defense Manpower Data Center to discuss 2020 Census goals and objectives for enumerating personnel living on stateside military installations.
  - Findings:
    - Census Bureau received a sample of administrative record from one military installation.
    - Defense Manpower Data Center identified military installations for administrative record testing.

### *Design Decisions*

The following decisions have been made for this operation:

- ✓ The GQ frame development and validation will be integrated with the Address Canvassing operation.
- ✓ The GQ operation will allow an individual to self-respond and self-identify the group quarters type for the facility in which he or she resides.
- ✓ An electronic data exchange of group quarters and client-level administrative records or third-party data will be part of the GQ methodology.
- ✓ The Census Bureau will design a standardized system that will accept electronically transmitted administrative records or third-party data in multiple formats.
- ✓ During field enumeration operations, newly identified group quarters will be validated and enumerated using a combination of in-office and in-field methodologies.
- ✓ Current goals for various types of group quarters include the following:
  - Enumerate 75 to 80 percent of people residing in group quarters through in-office methodologies (i.e., electronic transfer of administrative records or third-party data and Internet self-response) and the remainder in the field.
  - Enumerate military group quarters using administrative records and third-party data.

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

What varying computing capabilities and multiple formats for administrative records and third-party data can be integrated into a standardized Census Bureau system for processing?

- **Approach:** Researched in 2016.
- **Decision by:** June 2016

What is the optimal linkage methodology to ensure self-response data are linked to the correct group quarters?

- **Approach:** Researched in the 2016 Census Test.
- **Decision by:** October 2017

How will varying administrative records or third-party data formats be processed?

- **Approach:** Conduct a survey to determine which group quarters will participate in the automatic transfer of administrative records and third-party data and what type of data or systems they have. Build the appropriate data transfer systems to test in the 2017 Census Test.
- **Decision by:** December 2017

How much in-field Group Quarters Enumeration will be required?

- **Approach:** Researched in 2017 Census Test.
- **Decision by:** December 2017

How will quality assurance be handled?

- **Approach:** Researched in 2017 Census Test.
- **Decision by:** December 2017

How will field reengineering concepts be used for integrating group quarters with multiple housing unit enumeration operations (e.g., NRFU and UE)?

- **Approach:** Researched in 2017 Census Test.
- **Decision by:** December 2017

What administrative records and third-party data files exist for service-based locations, such as soup kitchens and regularly scheduled mobile food vans?

- **Approach:** Researched in the 2017 Census Test.
- **Decision by:** December 2017

What is the impact on quality and productivity of field staff if they are required to conduct multiple operations?

- **Approach:** Researched in the 2017 Census Test.
- **Decision by:** December 2017

### *Cost and Quality*

The investment in GQ will have minimal impact on cost of the 2020 Census as compared with the 2010 Census.

Quality impacts of this operation on overall 2020 Census quality include the following:

↑ Electronic transfer of administrative records and third-party data reduces transcription errors.

↑ Administrative records and third-party data may provide more comprehensive demographic information.

↓ Administrative records and third-party data may provide less current data than data received through Internet Self-Response or in-field Enumeration.

### *Risks*

Converting the Group Quarters Enumeration Questionnaire from paper to an automated version is a resource intensive process that requires a great deal of programming and testing. **IF** the content of the GQ paper questionnaire is not successfully replicated on the enterprise data collection device, **THEN** the GQ field operations will have to be performed entirely using a paper form.

The enterprise data collection device for listing and enumerating housing units should also be capable of listing and enumerating group quarters. **IF** housing unit and group quarters functionality is not integrated on the enterprise data collection device, **THEN** field staff may require more than one visit to certain group quarters.

The person record of the group quarters must be linked to the address of the group quarters. **IF** a link between each person record and the group quarters at the same address cannot be achieved, **THEN** the count of people residing at each group quarters would not be accurate.

### *Milestones*

| Date | Activity |
|---|---|
| December 2015 | Conduct Electronic Transfer Capability Survey—Stateside. |
| December 2015 | Conduct Electronic Transfer Capability Survey—Puerto Rico. |
| February 2017 | Conduct the 2017 Census Test (Conduct GQ Advance Contact). |
| March 2017 | Conduct the 2017 Census Test (Conduct Service-Based Enumeration). |
| April 2017 | Conduct the 2017 Census Test (Conduct Group Quarters Enumeration). |
| September 2017 | Release the GQ Detailed Operational Plan. |
| April 2018 | Conduct the 2018 Census End-to-End Test. |
| February 2020 | Conduct GQ Advance Contact. |
| March 2020 | Conduct Service-Based Enumeration. |
| April 2020 | Conduct Group Quarters Enumeration. |

## 5.5.8 Enumeration at Transitory Locations

| Detailed Planning Status: | **Not Started** |
|---|---|

Detailed planning for this operation has not started. The narrative that follows represents the Census Bureau's preliminary thoughts as of the release of this document.

### *Purpose*

The Enumeration at Transitory Locations operation enumerates individuals in occupied units at transitory locations who do not have a usual home elsewhere. Transitory locations include recreational vehicle parks, campgrounds, tent cities, racetracks, circuses, carnivals, marinas, hotels, and motels.

### *Lessons Learned*

Based on lessons learned from the 2010 Census, the following recommendations were made:

- Automate the questionnaire and all related sources of paradata used to record contact details during an interview.
- Learn more about the living situations of people counted in the ETL operation.
- Clearly define and identify transitory locations, as well as procedures on how to list transitory

units appropriately in operations that feed the ETL universe.

- Conduct intercensal testing of the ETL population.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Use of reengineered field management structure, staff positions, and approach to managing fieldwork.
- Use of automation and technology for data collection.

### *Description of Operation*

The operational description provided below is based primarily on the operational design of the 2010 Census ETL Program. The goal of the ETL program is the enumeration of individuals in occupied units at transitory locations who do not have a Usual Home Elsewhere.

The ETL operation will:

- Use automation to facilitate data collection and streamline operations.
- Use reengineered staffing and management of the field operation.
- Use in-person enumeration as the primary mode of data collection.
- Have Quality Assurance infused throughout workload management and data collection.

### *Research Completed*

Because detailed planning for this operation has not yet started, research that directly supports this operation has not yet been completed.

### *Assumptions Made*

Based on planning of other operations, the following assumptions have been made:

- Establish the 2020 Census ETL Integrated Project Teams in FY 2016.
- The 2020 Census ETL operation will include a Quality Assurance function.
- The 2020 Census ETL operation will utilize automated tools and systems to facilitate the enumeration of transitory locations.
- The 2020 Census ETL operation will leverage the approaches to field office structure and management of field assignments resulting from the Field Reengineering efforts.
- The 2020 Census ETL operation will use adaptive design (routing and dynamic case management) to allocate resources efficiently.

Although no specific decisions for the design of the 2020 Census ETL Program have been made, the operational design of the ETL operation is dependent on understanding the operational design and timing for other operations, such as Address Canvassing, LUCA, and Field Infrastructure (e.g., the number of field offices, staffing structures).

### *Design Issues to Be Resolved*

The following decisions need to be made for this operation:

What are the objectives and scope of the 2020 Census ETL Program?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2017

What does success for the 2020 Census ETL Program look like and how is it measured?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2017

Given other aspects of the 2020 Census design, what is the operational timing for the 2020 Census ETL Program?

- **Approach:** Coordination and integration with other relevant operations.
- **Decision by:** September 2017

What will the quality assurance approach for the Enumeration at Transitory Location Program involve (in-field, use of paradata, etc.)?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2017

What is the impact of self-response via the Internet and Non-ID Processing on ETL?

- **Approach:** Researched during the 2017 Census Test.
- **Decision by:** September 2017

Are there administrative records or third-party data sources that could be used for the frame development by type?

- **Approach:** Researched during the 2017 Census Test.
- **Decision by:** September 2017

### *Cost and Quality*

Investments in the ETL Program will have minimal impact on the cost and quality of the 2020 Census as compared with the 2010 Census.

### *Risks*

By this point in the decade, planning for all major 2020 Census operations should be underway. Budget reductions in FY 2013 through FY 2015 delayed planning for this operation. **IF** planning efforts are not initiated at the start of FY 2016, **THEN** there may not be sufficient time to implement innovations related to this operation.

### *Milestones*

| Date | Activity |
|---|---|
| October 2015 | Initiate the 2020 Census ETL Integrated Product Team. |
| March 2017 | Begin ETL for 2017 Census Test. |
| September 2017 | Release the ETL Detailed Operational Plan. |
| March 2020 | Begin 2020 Census ETL enumeration. |
| April 2020 | Conclude 2020 Census ETL enumeration. |
| April 2021 | Issue 2020 Census ETL operational assessment. |

## 5.5.9 Census Questionnaire Assistance

| Detailed Planning Status: | **Underway** |
|---|---|

### *Purpose*

The Census Questionnaire Assistance operation has two primary functions:

- Provide questionnaire assistance for respondents by answering questions about specific items on the Census form or other frequently asked questions about the Census;
  - Tier 1: Provide telephone assistance via an Interactive Voice Response (IVR).
  - Tier 2: Provide real-time assistance over the telephone or other electronic channels (Web chat and e-mail) via CQA agents.
- Provide an option for respondents to complete a Census interview over the telephone.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- CQA operation requires very specialized contact center personnel throughout the development and operational cycles.
- CQA operations needs to be synchronized with the Integrated Partnership and Communications Program.
- Agent desktop applications need to have the ability to easily update FAQ content so that all relevant information is in one place.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Integration with the Internet questionnaire development team to deliver assistance via Web chat and e-mail.
- Speech and text analytics to determine what is trending in real-time across CQA.

### *Description of Operation*

The main objectives of CQA are to assist Internet and paper self-respondents by answering questions coming from telephone, Web chat and e-mail. CQA will provide support for:

- A toll free telephone number for respondents to call for help completing the 2020 Census questionnaire.
- IVR to resolve basic questions from respondents calling on the telephone to limit the need for additional agents.
- Respondent questions on the Internet via real-time Web chat functionality.
- Callers (inbound) to complete the 2020 Census questionnaire over the telephone (with and without a unique Census ID).
- IVR capability for the 2020 Census Jobs Line.

- Outbound telephone calls made by agents to respondents for quality follow-up (under review).
- Outbound telephone calls made by agents to respondents for NRFU quality assurance component (under review).

Scope and Timing of 2020 Census CQA includes:

- Multichannel contact center with a central command functionality.
  - Voice channel (telephone via IVR and agents).
  - Nonvoice channels (Web chat and e-mail).
- Staffing of contact center.
- Training of contact center staff.
- Assistance in multiple languages.
- Assistance for individuals with special needs (visual or hearing impaired).
- Assistance for individuals in Puerto Rico.
- Assistance for individuals receiving experimental forms.
- Utilization of an IVR system.
- Integration with the Internet questionnaire development team to deliver assistance.
- Integration with the hiring and recruiting team to determine contact center roles.
- Determination of expected call volumes (inbound and outbound), Web chat, and e-mail—including timing of peak volumes and a rollover plan for unanticipated volumes.

### *Research Completed*

The following research has been completed for this operation:

- Market Research:
  - Conducted vendor meetings to benchmark contact center industry and identify best practices.
  - Released a Request for Information to identify industry capabilities.
    - Findings: Most large contact center providers have the capacity to provide all services identified in the Request for Information. Small businesses do not have the facilities, staff, or experience to meet the full range of services and size required by CQA. However, the Census Bureau will specify small business goals within the Request for Proposal and allow the contact center service providers and system integrators to determine how to best meet the small business goals.
- Call Workload Modeling:
  - Looked at call data from the 2010 Census, the ACS, the 2014 Census Test, and the 2015 Optimizing Self-Response Census Test to assist in forecasting workload for the 2020 Census.
    - Findings: The mailing strategy of pushing respondents to answer the Census on the Internet has created an increase in assistance calls, specifically related to lack of Internet access and technical issues.

### *Decisions Made*

The following decisions have been made for this operation:

- ✓ CQA will use an acquisition with the Request for Proposal release date of November 2015.
- ✓ CQA will complete interviews by telephone.
- ✓ CQA will provide respondent assistance relating to specific items on the questionnaire.
- ✓ CQA will handle calls relating to general questions on 2020 Census processes and frequently asked questions.
- ✓ CQA telephone number will be provided in selected materials.
- ✓ The contractor will be required to provide an adaptive infrastructure (e.g., staffing levels and communications capabilities) that can be adjusted on demand as data collection occurs.
- ✓ The contract will include options to provide flexibility to support future operations and or capabilities that have not yet been fully defined.
- ✓ The 2020 Census CQA will utilize and integrate nonvoice channels, such as Web chat, e-mail, and texting to support in-bound questions.
- ✓ The Request for Proposal will require the vendor to develop the application that the agents use to respond to calls, including the data collection instrument to complete the questionnaire.
- ✓ CQA will not mail paper questionnaires to people who call to request them, but they will refer people to materials on the Web site or collect the interview.

- ✓ CQA agents will be available to provide assistance and complete 2020 Census questionnaires for all specified languages.
- ✓ CQA will assist individuals with special needs (visual- or hearing-impaired).
- ✓ CQA will not collect 2020 Census questionnaire information via text, e-mail text, or Web chat.
- ✓ CQA will not accept e-mails with PDF attachments, faxes, or Internet uploads of completed 2020 Census questionnaire. Respondents will be directed to mail their responses.
- ✓ CQA will not support centralized outbound calling for NRFU production cases. (NRFU quality assurance component is still under consideration.)
- ✓ CQA will include the ability to offer respondents an option to check on the status of the questionnaire they submitted.
- ✓ CQA will handle calls about technical issues (e.g., Internet problems, lack of access to Internet) by offering to complete the 2020 Census questionnaire instead of offering technical assistance to respondents.
- ✓ The CQA will offer a Web chat functionality to provide assistance to respondents while completing their questionnaire on line.

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

What are the specific service level agreements for the contractor?

- **Approach:** Based on Internal research, 2010 Census past experiences, and researching industry standards.
- **Decision by:** November 2015

What are the assumptions for the language requirements that will be specified within the Request for Proposal?

- **Approach:** Based on requirements provided by the Languages Services operation.
- **Decision by:** November 2015

Will the 2020 Census CQA utilize IVR as a data collection mode (full or partial) to complete questionnaire items?

- **Approach:** Based on 2017 Census Test results.
- **Decision by:** April 2016

Will CQA include a Quality Outbound Operation?

- **Approach:** Based on decisions related to 2017 Census Test.
- **Decision by:** June 2016

What languages will be supported by the CQA?

- **Approach:** Based on 2014–2017 Census Test results.
- **Decision by:** June 2016 (Initial decision for contract; revised if necessary based on the 2017 Census Test)

Will CQA handle centralized outbound calling for NRFU quality assurance component?

- **Approach:** Based on decisions related to the 2016 Census Test for NRFU quality assurance component.
- **Decision by:** September 2016

When and how will the CQA as a response mode be communicated to the public?

- **Approach:** Based on the Integrated Partnership and Communications operation design.
- **Decision by:** April 2017

What is the impact of the mailing strategy on CQA workload?

- **Approach:** Based on data from 2015 Census Test, 2016 Census Test, and 2017 Census Test.
- **Decision by:** November 2017

When do CQA operations start and end? By component?

- **Approach:** Based on requirements for field operations and Internet Self-Response.
- **Decision by:** January 2018

Will CQA take calls to support field enumerators who are having language issues?

- **Approach:** Based on cost/benefit analysis.
- **Decision by:** January 2018

### *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

The investment in Census Questionnaire Assistance will reduce costs as compared with the 2010 Census through:

- ↓ Increased self-response rates.
- ↓ Decreased Nonresponse Followup workload, thereby reducing field costs.
- ↓ Reduced amounts of paper questionnaires, thereby reducing the infrastructure for paper data capture.

In addition:

- ↑ Internet Self-Response is expected to increase the workload for Census Questionnaire Assistance.

Quality impacts of this operation on overall 2020 Census quality include the following:

- ↑ Increase in overall self-response rates.
- ↑ Real-time edits to respondent data.

### *Risks*

Adequate staffing is required in order to properly manage the contract supporting the CQA operation. **IF** approval for funding of program management staff is not in place, **THEN** the contract may not be managed properly due to the scope and complexity of the project.

In order to participate in the 2017 Census Test, the systems involved need to be approved by security oversight and receive certification. The contractors working on the CQA operation cannot be brought on board until the approval has been given. **IF** approval and certification from security oversight is not received or takes longer than anticipated for multiple IT systems, **THEN** the contractor may miss the opportunity to participate in the 2017 Census Test.

The staff working on the CQA operation must undergo a security background check before they can be brought on board. **IF** the Census Bureau is unable to process a large number of contact center agents and support staff through security background checks in a short time frame for CQA, **THEN** the contractor may not be appropriately staffed to handle the anticipated workload.

### *Milestones*

Program milestone dates for 2020 Census CQA will be determined after contract award. For acquisition purposes, the major milestone dates are:

| Date | Activity |
|---|---|
| November 2015 | Release Request for Proposal for 2020 Census Questionnaire Assistance acquisition. |
| June 2016 | Award contract for 2020 Census Questionnaire Assistance. |
| September 2016 | Release the Census Questionnaire Assistance Detailed Operational Plan. |
| April 2017 | Participate in 2017 Census Test (under review). |
| April 2018 | Participate in 2018 Census End-to-End Test. |
| January–September 2020 | Conduct CQA operations. |
| To Be Determined | Other CQA milestone dates will be determined after the contract has been awarded. |

## 5.5.10 Nonresponse Followup

| Detailed Planning Status: | **Underway** |
|---|---|

### *Purpose*

The NRFU Operation serves two purposes:

- Determine housing unit status for nonresponding addresses.
- Enumerate housing units for which a 2020 Census response was not received.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Traditional enumeration and management of workload, as implemented in the 2010 Census, is no longer viable in an era of an ever evolving, demographically, culturally, and technologically diverse nation.
- Reduce the maximum number of NRFU contact attempts.

- Include the use of a handheld enumeration device that would have the ability to track when an enumerator opens a case.
- Explore additional sources and criteria for inferring occupancy status and population size of housing units from administrative records or third-party data.
- Avoid having to add late-planned operations and procedures.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Use of administrative records and third-party data to remove vacant housing units from the NRFU workload.
- Use of administrative records and third-party data to remove occupied housing units from the NRFU workload.
- Use of a reengineered field management structure and approach to managing fieldwork.
- Use of a variable contact strategy and stopping rules to control the number of attempts made for each address (based on paradata).
- Assignment and route optimization.
- Automated training for field staff.
- Automation of the field data collection.
- Automation of administrative functions, such as recruiting, onboarding, and payroll.
- Implementation of alternatives to providing government-furnished equipment, such as BYOD or Device as a Service.
- Reengineered quality assurance approach.

### *Description of Operation:*

For the 2020 Census, the NRFU operation will be dramatically different from the NRFU operation conducted in the 2010 Census. The Census Bureau will implement a NRFU operational design that utilizes a combination of the following:

- Administrative records and third-party data usage to reduce the workload.
- Reengineering of staffing and management of field operations.
- Use of adaptive design methodologies.
- Automation to facilitate data collection.

After giving the population an opportunity to self-respond to the 2020 Census, addresses for which the Census Bureau did not receive a self-response will form the initial universe of addresses for the NRFU operation. Prior to any fieldwork, vacant addresses will be removed from the NRFU workload using administrative records. Undeliverable-As-Addressed information from the USPS will provide the primary administrative records source for the identification of vacant units.

Addresses will also be removed from the workload, throughout the course of the NRFU operation, as late self-responses are received. Addresses may be added to the NRFU workload from other census operations, such as addresses from the LUCA appeals process and addresses received through the non-ID operation that require a field visit for final resolution.

After an initial attempt to contact nonresponding housing units, the NRFU workload will be further reduced through the removal of cases where administrative records and third-party data are available and usable to enumerate the occupied housing units. The NRFU operational design will use administrative records and third-party data to enumerate occupied housing units where it makes sense and is feasible. Examples of sources of administrative records and third-party data used to enumerate occupied housing units include: Internal Revenue Service Individual Tax Returns, Internal Revenue Service Information Returns, and Center for Medicare and Medicaid Statistics Medicare Enrollment Database. A more comprehensive list of administrative records and third-party data sources is provided in the Design Decisions Made section below.

Addresses removed from the NRFU workload as either vacant or occupied will receive a final mailing that encourages occupants to self-respond to the 2020 Census. After each phase of the administrative records modeling, those addresses that are determined to be vacant will immediately be mailed a final letter encouraging self-response; for those addresses that are determined to be occupied and are incomplete after one personal visit attempt, a final letter encouraging self-response will be mailed after 7 days.

The NRFU operation will use a reengineered field management structure and approach to managing fieldwork, which includes:

- Using automation for:
  - Optimization of daily enumerator assignments.
  - Near real-time operations information for decision making.
  - Enhanced operational control system.
  - Payroll submission and approval processing.
  - Training of enumerators and managers.
- New field structure, including field staff roles, work schedule, and staffing ratios.

On a daily basis, based on an enumerator's home location, his or her availability to work, and the availability and location of NRFU workload, the enumerator will be assigned addresses and will work the addresses in a prescribed order to determine the Census Day status of the housing unit, and when occupied, enumerate the housing unit. Enumerators will use an automated data collection application on a handheld device, to record the Census Day housing unit status and to enumerate occupied housing units. If a respondent is not at home, a notice of visit will be left directing the respondent to the Internet or Census Questionnaire Assistance to self-respond.

Unlike the 2010 Census, the 2020 Census NRFU operation will use an adaptive design, which includes a variable contact strategy and stopping rules to control the number of attempts made for each address. The number of contacts will vary by geographic area. Fewer attempts will be made in some geographic areas, whereas more attempts will be made in others with the goal of achieving a consistent response rate across all geographic areas (and within geographic areas for key demographic characteristics.) Decisions about when proxy responses are acceptable will also be made as part of the variable contact strategy.

The 2020 Census NRFU operational design will infuse quality throughout the workload management and data collection processes. Examples of aspects of the NRFU operation designed to maintain or improve quality:

- Use of real-time paradata and editing capabilities will increase accuracy and quality check data.
- Use of a Best Time to Contact model (used for the first time in the 2015 Census Test) in the making of assignments will increase the likelihood of finding respondents at home.
- Capabilities available through an enhanced operational control system will provide early opportunities to identify and take corrective action in defined situations.

In addition, the NRFU operation will include a reinterview component designed to deter and detect enumerator falsification. The details of this component are in development and could include a combination of approaches such as use of paradata and fieldwork.

### *Research Completed*

The following research has been completed for this operation:

- The 2013 Census Test (Philadelphia, PA) explored methods for using administrative records and third-party data to reduce the NRFU workload:
  - Findings:
    - The Census Bureau was able to remove approximately 8 percent of vacant units and 31 percent of occupied units prior to NRFU using administrative records and third-party data.
    - The use of administrative records and third-party data and the implementation of an adaptive design case management approach have the potential to reduce costs.
- The 2014 Census Test (Montgomery County, MD and Northwest Washington, DC) built upon the results of the 2013 Census Test specific to administrative records and third-party data usage to reduce the NRFU workload:
  - Findings: A high self-response rate of 65.7 percent resulted in a NRFU universe of 46,247 housing units. The Census Bureau was able to identify approximately 4 percent of the NRFU cases as vacant and 55 percent of NRFU cases as occupied based on administrative records and third-party data.
- The 2014 Human-in-the-Loop SIMEX.
  - Findings:
    - The field management structure can be streamlined and ratios increased.

- Messaging and alerts within the operational control system provide real-time and consistent communication.
- The enhanced operational control system or MOJO is intuitive—users were able to use the system with a small amount of up-front training.
- Smart phones were usable by all people—even those with little technology experience were able to adjust and adapt.

- The 2015 Census Test (Maricopa County, AZ) explored the reengineering of the roles, responsibilities, and infrastructure for conducting field data collection. It also tested the feasibility of fully utilizing the advantages of planned automation and available real-time data to transform the efficiency and effectiveness of data collection operations. The test continued to explore the use of administrative records and third-party data to reduce the NRFU workload and tested the technical implementation of a BYOD option.
  - Findings:
    - A high self-response rate of 54.9 percent resulted in a NRFU universe of 72,072 housing units. The Census Bureau was able to identify approximately 12 percent of the NRFU cases as vacant and 20 percent of NRFU cases as occupied based on administrative records and third-party data.
    - Successfully removed vacant housing units and enumerated occupied housing units using administrative records and third-party data.
    - A combination of automated online training and classroom training enabled a reduction in the overall number of training hours, compared with the 2010 Census NRFU operation, from 32 to 18 hours.
    - Management of the field data collection utilizing new roles, responsibilities, and staffing ratios were successfully implemented.
    - Entry of enumerator work availability, workload optimization, and electronic payroll were effective and efficient.
    - Use of a BYOD option did not generate any observable concerns from respondents.

### *Decisions Made*

The following decisions have been made for this operation:

- ✓ The NRFU operation will consist of production and quality assurance components.
- ✓ The NRFU operation will utilize automated tools and systems for:
  - Recruiting, onboarding, and training.
  - Time and attendance and payroll.
  - Case load management.
  - Data collection.
  - Cost and progress monitoring.
- ✓ The NRFU operation will utilize a reengineered field management and staffing structure.
- ✓ Administrative records and third-party data will be used to identify vacant units.
- ✓ Administrative records and third-party data will be used to enumerate nonresponding housing units, as appropriate.
- ✓ A contact attempt will be made prior to using administrative records or third-party data for enumeration of occupied units.
- ✓ A final letter, encouraging self-response, will be mailed to NRFU cases that are removed from the workload based on the administrative records modeling.
- ✓ Telephone contact attempts from a central location (i.e., Census Questionnaire Assistance) will not be part of the initial NRFU contact strategy.
- ✓ All administrative records and third-party data will be used in compliance with data use agreements.
- ✓ The core set of administrative records and third-party data to support the 2020 Census NRFU operations include the following:
  - Internal Revenue Service Individual Tax Returns.
  - Internal Revenue Service Information Returns.
  - Center for Medicare and Medicaid Statistics Medicare Enrollment Database.
  - Indian Health Service Patient Database.
  - Social Security Number Identification File.
  - USPS DSF.
  - USPS Undeliverable-As-Addressed Information.

- Targus Federal Consumer File.
- 2010 Census Data.
- ACS Data.

### *Design Issues to Be Resolved*

For each of the core administrative record and third-party datasets, what is the allowable use, required timing, and acquisition approach for the data?

- **Approach:** Analysis and research of policies.
- **Decision by:** September 2016

To what extent can the Census Bureau minimize the error associated with use of administrative records and third-party data for the removal of vacants and occupied housing units?

- **Approach:** Research conducted in the 2013, 2014, 2015, and 2016 Census Tests.
- **Decision by:** September 2016

What is the approach for ingest, initial processing, use, post processing, and tabulation associated with administrative records or third-party data for enumeration?

- **Approach:** Research conducted in the 2013, 2014, 2015, and 2016 Census Tests and the 2014 and 2015 SIMEX.
- **Decision by:** September 2016

Will statistical modeling, a rules-based approach, or a combination be used for determination of housing unit status?

- **Approach:** Research conducted in the 2013, 2014, and 2015 Census Tests.
- **Decision by:** September 2016

When are proxy responses used in the NRFU operation?

- **Approach:** Research conducted in the 2014, 2015, and 2016 Census Tests.
- **Decision by:** September 2016

What is the final field management staffing structure (including staffing ratios) for the NRFU operation?

- **Approach:** Research conducted in the 2015 and 2016 Census Tests, the 2014 SIMEX; refinements may result from tests conducted in 2017.
- **Decision by:** September 2016

What is the final approach for the use of variable contact strategies and stopping rules to balance the goal of reducing the number of attempts against having consistent response rates across demographic groups and geographic areas?

- **Approach:** Research conducted in the 2013, 2014, 2015, and 2016 Census Tests, and the analysis of cost and quality trade-offs of different options.
- **Decision by:** September 2016

Should decentralized telephoning (i.e., attempts made by an enumerator) and appointments be incorporated into the Nonresponse Followup contact strategy?

- **Approach:** Research conducted as part of the 2016 Census Test.
- **Decision by:** September 2016

What is the best approach for coordinating enumeration of nonresponding addresses in multiunits and gated communities?

- **Approach:** Research conducted in the 2016 Census Test.
- **Decision by:** September 2016

How will any field verification of unmatched but geocoded non-ID response be integrated into the NRFU operation?

- **Approach:** Research conducted in the 2017 Census Test.
- **Decision by:** September 2017

Given potential for infusing quality throughout the Nonresponse Followup systems and procedures, what is the operational design for the NRFU quality assurance component?

- **Approach:** Research conducted as part of the 2016 and 2017 Census Tests.
- **Decision by:** September 2017

To what extent and how will vacant addresses and addresses found to not exist, discovered during the In-Field Nonresponse Followup, be verified?

- **Approach:** Research conducted as part of the 2017 Census Test.
- **Decision by:** September 2017

To what extent and how can a last-resort data collection be implemented within the controlled environment that exists with the reengineered workload optimization and management capabilities?

- **Approach:** Research conducted as part of the 2017 Census Test.
- **Decision by:** September 2017

Will fieldworkers enumerate adds found during Nonresponse Followup and if so, how does the Census Bureau incorporate real-time non-ID into the process?

- **Approach:** Research conducted as part of the 2017 Census Test.
- **Decision by:** September 2017

What are the business rules for optimizing case assignments?

- **Approach:** Research conducted as part of the 2015, 2016, and 2017 Census Tests.
- **Decision by:** September 2017

Given other aspects of the 2020 Census operational design, what is the operational timing for the 2020 Census NRFU operation?

- **Approach:** Coordination and integration with other relevant operations.
- **Decision by:** September 2017

What are the sources that contribute to the NRFU universe (e.g., LUCA Appeals, late DSF adds, and nonresponding UE addresses)?

- **Approach:** Coordination and integration with other relevant operations.
- **Decision by:** September 2017

What are the best enumerator performance indicators?

- **Approach:** Review of existing indicators built into the operational control system to determine need for additional performance alerts.
- **Decision by:** September 2017

What is the final set of administrative records and third-party data (including state-level data sources) that are necessary to support the 2020 Census NRFU operation?

- **Approach:** Research conducted in the 2013, 2014, 2015, 2016, 2017, and 2018 Census Tests, building upon other research.
- **Decision by:** September 2018

For each of the final administrative record and third-party datasets, what is the allowable use, required timing, and acquisition approach for the data?

- **Approach:** Analysis and research of policies and due diligence.
- **Decision by:** September 2018

### *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

The investment in NRFU, which includes administrative records and third-party data usage and field reengineering, will reduce the cost of the 2020 Census as compared with the 2010 Census through:

- ↓ Reduced field workload by:
  - Using administrative records and third-party data to remove vacant living quarters from the Nonresponse Followup workload.
  - Using administrative records and third-party data to reduce the number of contact attempts.
  - Using administrative records and third-party data to enumerate nonresponding housing units.
  - Removal of late self-responses.
- ↓ Improved productivity of field staff by:
  - Streamlining staffing structure through the use of automation.
  - Automating and optimizing the assignment process.
  - Using language information from the planning database to determine work assignments.
  - Using administrative records and third-party data to determine the best time of day for contact attempts.
- ↓ Reduced reinterview workload through a reengineered quality assurance approach.
- ↓ Reduced number of hours devoted to training through the use of automation.

Quality impacts of this operation on overall 2020 Census quality include the following:

- ↑ Use of an improved contact strategy to increase the likelihood of self-response.

- ↑ Use of an automated data collection application for conducting NRFU.
- ↑ Use of real-time paradata and editing capabilities to sanitize and quality check data.
- ↑ Use of Best Time to Contact model in the assignment optimization to increase the likelihood of finding respondents at home.
- ↑ Use of Notice of Visit to push to self-response.
- ↑ Use of follow-up postcard mailing to push to self-response in the case of administrative records and third-party data vacant removal and occupied removal.
- ↓ Using administrative records and third-party data to remove vacant and occupied housing units from the NRFU workload may impact housing unit coverage.
- ↓ Using administrative records and third-party data to reduce the number of contact attempts may decrease the quality of responses.
- ↔ Use of new or revised methodologies will change results in ways not yet determined.
- ↔ Use of adaptive design protocol and proxy rules may impact the quality of response data in ways not yet determined.

### *Risks*

Many aspects related to the Nonresponse Followup operational design and the infrastructure necessary to support it are based on workload assumptions. A key input to those workload assumptions is the self-response rate. **IF** the 2020 Census self-response rate falls below expectations, **THEN** the initial NRFU workload will be higher than expected and the infrastructure to support an increased field data collection volume may be insufficient.

Natural disasters in the form of hurricanes, floods, epidemics, etc., are uncontrolled events that could affect the population's willingness and ability to participate in the decennial census, as well as having detrimental impact on the Census Bureau's ability to conduct the NRFU operation. **IF** a natural disaster occurs at or around the time of the 2020 Census, **THEN** it will be difficult to conduct NRFU in the impacted geographic areas due to the problems gaining access to the populations living in those areas.

The NRFU workload will be impacted by other operations that are striving to develop and improve the coverage and quality of the address frame used for the 2020 Census. **IF** there is an increase in the NRFU operational workload due to the results of the up-stream address frame operations, **THEN** the expected cost savings from the NRFU operation may not be realized.

Technical innovations such as assignment optimization and Bring Your Own Device are key elements to the operational design for conducting NRFU. **IF** any aspect of the planned technical innovations does not perform as expected, **THEN** the operational design for NRFU may fail.

Technical innovations are expected to reduce the cost of the NRFU operation, but the cost of the operation can be greatly impacted by economic conditions beyond the Census Bureau's control. **IF** economic conditions are not favorable at the time of the 2020 Census, **THEN** the costs to implement the NRFU operation may prevent the expected cost savings from being realized.

The utilization of administrative records and third-party data to reduce the NRFU workload is a foundational tenet on which the 2020 Census program expects to realize cost savings. **IF** the Census Bureau is unable to use administrative records and third-party data as planned, **THEN** increased costs will be incurred to conduct NRFU.

### Milestones

| Date | Activity |
|---|---|
| November 2013 | Begin NRFU for 2013 Census Test. |
| August 2014 | Begin NRFU for 2014 Census Test. |
| November 2014 | Conduct 2014 SIMEX. |
| May 2015 | Begin NRFU for the 2015 Census Test. |
| September 2015 | Determine preliminary NRFU Design. |
| December 2015 | Conduct 2015 SIMEX. |
| May 2016 | Begin NRFU for 2016 Census Test. |
| September 2016 | Determine strategy for use of administrative records and third-party data in NRFU.<br>Release the Nonresponse Followup Detailed Operational Plan. |
| May 2017 | Begin NRFU for 2017 Census Test. |
| May 2018 | Begin NRFU for 2018 Census End-to-End Test. |
| April 2020 | Begin NRFU data collection for the 2020 Census. |
| August 2020 | End NRFU data collection for the 2020 Census. |
| August 2021 | Issue operational assessment of the 2020 Census NRFU operation. |

## 5.5.11 Response Processing

| Detailed Planning Status: | **Underway** |
|---|---|

### Purpose

This operation supports the three major components of the 2020 Census: predata collection activities, data collection activities, and post-data collection activities:

Specifically, it includes the following:

- Establish the initial 2020 Census universe of living quarters.
- Assign the specific enumeration strategy (i.e., contact strategy and follow-up approach) for each living quarter based on case status and associated paradata.
- Create and distribute workload files required for enumeration operations.
- Track case enumeration status.
- Run post-data collection processing actions in preparation for producing the final census results.

### Lessons Learned

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Make response data available as soon as possible to the data review teams in order to facilitate a more thorough review.
- Include more staff members from more areas in the Primary Selection Algorithm determination process. This will result in broader expertise for design planning, rather than limiting to a small team of mathematical statisticians or analysts.
- Make user testing of the Quality Control program component part of the schedule for residual coding, to facilitate development of procedures and training of data coding staff.

### Opportunities to Innovate

Opportunities to innovate include the following:

- Use of enterprise-developed tools to facilitate intelligent business decisions prior to and during data collection:
  - Conduct mode-level case assignment activities.
  - Interface with all printing systems for production of paper products.
  - Serve as the overall integration "manager" of response data collection, including Internet, telephone, and paper data capture.
  - Create models based on established business rules to determine the appropriate course of enumeration action for cases (e.g., person visit, use of administrative records and third-party data, or imputation) and assign each case to the specific mode for data collection.
- Expanded use of administrative records and third-party data in post-data collection processing activities to support improved data coverage.

### Description of Operation

#### *Predata Collection Activities*

During predata collection activities, the Response Processing operation applies criteria to create the initial 2020 Census universe used to support early census operations, assigns and manages specific contact strategies for each living quarter based

on defined criteria, and creates and distributes universe files required for various enumeration operations.

### *Data Collection Activities*

For data collection activities, the Response Processing operation starts with receiving and managing updates to the initial 2020 Census universe. These updates come from various address frame update operations including Address Canvassing, LUCA, UE, and some Geographic Programs activities. The results from the address updates establish a revised 2020 Census self-response universe. The Response Processing operation uses this universe to control and track questionnaire response data. Modeling techniques using established business rules determine the appropriate course of enumeration action for cases and assigns the cases to the specific modes for processing (adaptive design). As responses are received, cases containing a Census ID are removed from the self-response universe. Cases returned without Census IDs are sent to the Non-ID Processing operation for matching and geocoding. All cases are returned to the Response Processing operation and those that were successfully resolved are removed from the enumeration universe.

For nonresponding cases, the Response Processing operation supports the NRFU operation by determining the most effective enumeration strategy, including removing cases from the workload based on established "stopping rules."

### *Post-Data Collection Activities*

The Response Processing operation supports post-data collection activities by preparing the data for tabulation. As the data are received, write-in responses (i.e., hand-written responses provided when respondents do not select an option from the questionnaire) are coded for tabulation purposes. Coding is conducted by both automated and computer-assisted manual processes. In addition, checks are run to detect invalid (fraudulent) returns. Response Processing applies computer-based person matching software to unduplicate multiple responses for the same person across census records. Then, a Primary Selection Algorithm is run to establish the single enumeration record for a case when multiple responses are received. Following the Primary Selection Algorithm, imputations are applied and missing data resolved to fix discrepancies between household population counts and person data. This output is called the Census Unedited File. The Census Unedited File is used as a data source for coverage measurement operations and a final independent count review operation. Finally, the Census Unedited File is the source used to produce the apportionment counts delivered to the President of the United States via the Data Products and Dissemination operation.

The next steps are to perform preliminary and complex consistency edits, apply Disclosure Avoidance techniques, and produce a Hundred Percent Detail File for delivery to the Data Products and Dissemination operation and then used for creation of the P.L.94-171 Census Redistricting Data File and dissemination of data to the public. As part of a final closeout, Response Processing prepares census response data for delivery by the Archiving operation to the National Archives and Records Administration (NARA) for the Title 13 proscribed 72-year secured storage.

| Predata Collection Activities | Data Collection Activities | Postdata Collection Activities |
|---|---|---|
| • Receive address and geographical input data for all known living quarters<br>• Apply criteria to create the initial 2020 Census enumeration universe<br>• Assign the specific contact strategy for each living quarters based on defined criteria | • Receive updates to the initial 2020 Census Universe<br>• Create the 2020 Census self-response universe<br>• Create and distribute workloads to data collection modes based on modeling results or specification criteria<br>• Record response data and enumeration case status<br>• Deliver response data to Postdata Collection Activities | • Apply data codes to write-in responses to facilitate data tabulation<br>• Identifying potential invalid returns<br>• Resolve potential duplicate responses<br>• Identify the return of record for housing units with multiple returns<br>• Repair missing or conflicting data<br>• Provide final census results |

**Figure 33: Response Processing Operation**

Figure 33 summarizes the Response Processing operation by component.

### *Research Completed*

The following research has been completed for this operation:

- The 2014 Census Test evaluated the interface between the response processing system and the matching and geocoding system. In addition, it tested the data file exchange.
  - Findings: The tests concluded with no major system or workload-related issues.
- The 2015 Optimizing Self-Response Test and the 2015 Census Test included processing of non-ID cases in real time (during response collection for Internet and telephone data collection modes).
  - Findings: The tests concluded with no major system or workload-related issues.

### *Decisions Made*

The following decisions have been made for this operation:

✓ The Response Processing operation will use the enterprise-developed system solutions (Control and Response Data System and Multimode Operational Control System) for universe creation, data collection control and management, and final data processing.

✓ The enterprise-developed Concurrent Analysis and Estimation System and its modeling output will use established business rules to determine the appropriate course of enumeration action for cases and assign the case to the specific mode for data collection to improve efficiency and reduce cost.

✓ Administrative records and third-party data will be used to improve post-data collection activities, such as coding and editing, primary selection algorithm, Invalid Return Detection (IRD), and imputation.

✓ The Response Processing operation will comply with Title 13 and Title 26 security requirements.

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

What are the methodologies, processes, and systems needed for Residual Coding, Primary Selection Algorithm, IRD, Editing/Imputation, Edit Review System, and Hundred Percent Detail File?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** December 2015

How will administrative records and third-party data be specifically used with response processing operations?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** December 2015

What character set(s) will be supported for write-in responses?

- **Approach:** Design of the Languages Services and Content and Forms Designs operations.
- **Decision by:** December 2015

What are the number of write-in questions, the final coding dictionary entries and rules, the maximum number field lengths for write-ins, and the required character set (if there is potential expansion to include special characters or multilingual language characters) that will be used for the purposes of developing the response file layout?

- **Approach:** Research in the 2016 and 2017 Census Tests.
- **Decision by:** May 2016

What will be the estimated workload of post-capture Non-ID Processing?

- **Approach:** Researched in 2014 Census Test, all 2015 Tests, the 2016 Census Test, and the 2017 Census Test.
- **Decision by:** September 2017

### *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

Investment in Response Processing will decrease the cost of the 2020 Census as compared with the 2010 Census through:

- ↓ Universe adjusted in "real-time" based on response status and use of administrative records and third-party data.
- ↓ Flexible, rule-based decisions on most cost-effective approach for collecting responses (expected to reduce in-field workloads).

Quality impacts of this operation on overall 2020 Census quality include the following:

- ↑ Use of administrative records and third-party data to improve imputation, editing and coding, primary selection algorithm, and IRD processing.

### *Risks*

Special characters may present difficulty in automated data processing. **IF** it is not defined how special characters will be handled during automated data processing, **THEN** individual systems and system interfaces may not support final character sets, allowing for corruption of nonstandard characters and loss of data and/or data context.

### *Milestones*

| Date | Activity |
|---|---|
| March 2015 | Establish the develop, test, beta, staging, and production environments for Response Processing. |
| December 2015 | Go live to support the 2016 Census Test universe creation and response tracking. |
| September 2016 | Release the Response Processing Detailed Operational Plan. |
| December 2016 | Go live for the 2017 Census Test. |
| January 2017 | Deliver revised 2020 Census business requirements for Response Processing. |
| September 2018 | Deliver final 2020 Census business requirements for Response Processing. |
| October 2019 | Create the initial 2020 Census enumeration universe for early census operations. |
| January 2020 | Create the 2020 Census self-enumeration universe. |
| January 2020 | Begin the 2020 Census Response Processing operation. |
| November 2020 | Deliver the 2020 Census Unedited File for apportionment counts. |
| March 2021 | Deliver the 2020 Census Microdata Detail File for Tabulation. |

## 5.5.12 Federally Affiliated Americans Count Overseas

| Detailed Planning Status: | **Recently Begun** |
|---|---|

### *Purpose*

The Federally Affiliated Americans Count Overseas operation obtains counts by home state of U.S. military and federal civilian employees stationed or deployed overseas and their dependents living with them.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Explore new technology, including an Internet option for collecting data on the federally affiliated population living overseas.
- Automate this operation fully.
- Consider new data fields to identify the residency of the military personnel living overseas.
- Maintain a strong relationship with the Department of Defense.

### *Opportunities to Innovate*

The primary opportunity to innovate for this operation is to create a secure interactive database for Department of Defense to submit their enumeration counts.

### *Description of Operation*

For the 2020 Census, overseas is defined as anywhere outside the 50 states and the District of Columbia. Counts are obtained from administrative records and are used to allocate the federally affiliated population living overseas.

The Federally Affiliated Americans Count Overseas operation performs the following activities:

- Compile address list of federal agencies with personnel overseas.
- Prepare enumeration materials.
- Request the name of a contact person for each agency.
- Obtain agencies' overseas counts by state.
- Submit final counts in the apportionment counts.

### *Research and Design Decisions Completed to Date*

Research Completed.

- Market Research:
  - Met with the Defense Manpower Data Center in March 2014 to discuss any suggested updates from the 2010 Census enumeration.
    - Finding: U.S. Air Force is again using the Home of Record field for its military personnel.

Because detailed planning for this operation has recently started, research that directly supports this operation has not yet been completed. However, based on the design from previous censuses, the following assumptions have been made:

- Continuously engage and communicate the Census Bureau's methodology and procedures with the Defense Manpower Data Center.
- Establish an online site for communicating with participating federal agencies and for collecting responses on a form that can be completed electronically.
- Use data from the Department of Defense Personnel System to enumerate the military and their dependents and Department of Defense federal civilian employees overseas in the following order: Home of Record, Legal Residence, and Last Duty Station.
- Use the Defense Enrollment Eligibility Reporting System as an additional source of data to enumerate the military and their dependents and Department of Defense federal civilian employees overseas.

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

What other data sources are available for tabulating the overseas counts?

- **Approach:** Based on ongoing discussions with federal agencies.
- **Decision by:** January 2018

How will the Census Bureau use electronic transmissions to obtain the data?

- **Approach:** Based on ongoing discussions with federal agencies.

- **Decision by:** January 2018

### *Cost and Quality*

Investment in the Federally Affiliated Americans Count Overseas will have minimal impacts on the cost and quality of the 2020 Census as compared with the 2010 Census.

### *Risks*

The Federally Affiliated Americans Count Overseas operation will add new data sources to improve data collection for the 2020 Census overseas count. **IF** new ways of collecting data are not researched and tested prior to implementation for the 2020 Census, **THEN** there may be a negative impact on data quality.

The Federally Affiliated Americans Count Overseas operation plans to use an external-facing portal as an automated collection system for the 2020 Census overseas count. **IF** the external-facing portal does not meet the Census Bureau's IT security requirements and cannot be used for the automated collection system, **THEN** collection methods used for the 2010 Census may have to be reused for the 2020 Census overseas count.

### *Milestones*

| Date | Activity |
|---|---|
| February 2014 | Establish contact with Defense Manpower Data Center. |
| February 2017 | Review final guidelines for counting federally affiliated Americans living overseas. |
| September 2017 | Release the Federally Affiliated Americans Count Overseas Detailed Operational Plan. |
| March 2018 | Obtain Office of Management and Budget clearance. |
| May 2018–February 2020 | Design, prepare, send contact letters, count letters and instructions, and follow-up count request. |
| September 2019 | Obtain from the Office of Personnel Management the most recent Federal Civilian Workforce Statistics publication. |
| July 2020 | Prepare and review overseas counts. |
| August 2020 | Deliver overseas counts to include in apportionment count. |

## 5.6 PUBLISH DATA

Response Processing delivers the edited data to the **Data Products and Dissemination** operation to prepare the final 2020 Census data products. This operation delivers:

- Input to the **Count Review** operation to ensure the counts appear correct.
- Apportionment counts to the President of the United States.
- State counts to the **RDP** for dissemination to the state legislatures so state governments can define the geographic boundaries for Congressional and legislative districts.
- Final counts to the **Count Question Resolution** operations so challenges to Census Counts can be resolved.
- All response data to the **Archiving** operation for public release 72 years after the census.

### 5.6.1 Data Products and Dissemination

| Detailed Planning Status: | **Not Started** |
|---|---|

Detailed planning for this operation has not started. The narrative that follows represents the Census Bureau's preliminary thoughts as of the release of this document.

### *Purpose*

Data Products and Dissemination operation performs three primary functions:

- Prepare and deliver the 2020 Census apportionment data for the President of the United States to provide to Congress by December 31, 2020.
- Tabulate 2020 Census data products for use by the states for redistricting.
- Tabulate and disseminate 2020 Census data for use by the public.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Provide an approach to restructure and enhance data dissemination activities across the entire agency.
- Improve customer satisfaction.
- Expand the Census Bureau's audience and customer base.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Use of enterprise solutions for preparing the 2020 Census data products and disseminating the information to the public.
- Enhancements to existing tabulation systems to support 2020 Census tabulation as an enterprise solution.
- Leveraging new solutions to allow data users greater flexibility in using 2020 Census data for research, analytics, application development, etc. The focus is on user-centric capabilities and dissemination functionality.

### *Description of Operation*

The Data Products and Dissemination operation takes the processed response data, tabulates, goes through the necessary Disclosure Avoidance procedures, and prepares it for delivery to the President, the states, and the public.

A set of enterprise-level systems will provide access to data via an interactive Web site, allowing users to access prepackaged data products, application programming interfaces, and metadata documentation. These include:

- CEDSCI dissemination platform.
- Tabulation System.
- Customer Experience Management System.

### *Research Completed*

Because detailed planning for this operation has not yet started, research that directly supports this operation has not yet been completed.

### *Assumptions Made*

Based on planning of other operations, the following assumptions have been made:

- The apportionment for the 2020 Census will be calculated using the method of equal proportions, according to the provisions of Title 2, U.S. Code. Congress decides the method used to calculate the apportionment. This method has been used in every census since the 1940 census.
- This operation will:
  - Define data products.
  - Define metadata.
  - Generate metadata and mapping for Application Programming Interfaces.
  - Generate data products (Apportionment and Redistricting) and associated data documentation.

### *Design Issues to Be Resolved*

The following decisions need to be made for this operation:

How will the Census Bureau develop the 2020 Census data user interface through CEDSCI?

- **Approach:** Requirements for a P.L. 94-171 Redistricting Data Prototype will be included as a use case in system and user interface development starting with the release of the CEDSCI Alpha prototype.
- **Decision by:** November 2015

Which system will provide the 2020 Census Tabulation solution?

- **Approach:** ACS testing and a feasibility recommendation for 2020 Census tabulation processing.
- **Decision by:** July 2016

What will be the mix or array of standardized data products?

- **Approach:** Design and propose the standardized data products for public comment through <www.census.gov>.
- **Decision by:** March 2017 (Tentative)

### *Cost and Quality*

Investments in the Data Products and Dissemination operation will have minimal impact on the cost and quality of the 2020 Census as compared with the 2010 Census.

### *Risks*

The scope of CEDSCI includes providing tabulation services for the 2020 Census program starting in

2018. **IF** the 2020 Census is depending on CEDSCI to provide tabulation services prior to 2018, **THEN** the scope of CEDSCI will be larger than what is feasible to accomplish.

The 2020 Census program is dependent on CEDSCI to develop and deliver a data dissemination system. **IF** CEDSCI is unable to deliver a dissemination system for the 2020 Census, **THEN** a new data dissemination system will not be available and traditional systems will have to be explored for reuse.

### *Milestones*

| Date | Activity |
|---|---|
| March 2014 | Release the concept of operations for a more customer-centric, streamlined, and flexible enterprise solution for data dissemination. |
| July 2014 | Establish the Center for Enterprise Dissemination Services and Consumer Innovation. |
| September 2017 | Release the Data Products and Dissemination Detailed Operational Plan. |
| September 2018 | Deliver final 2020 Census business requirements to support 2020 Census Data Product Plan. |
| December 2018–April 1, 2019 | Deploy tabulation system and deploy dissemination platform for production and release of the P.L. 94-171 Redistricting Data Prototype. |
| December 2020 | Provide apportionment counts to the President of the United States. |
| By April 1, 2021 | Complete the release of the P.L. 94-171 Redistricting Data to the states, the District of Columbia, and Puerto Rico. |
| May 2021–September 2022 | Deliver 2020 Census statistical data to the enterprise data dissemination platform for the release of quick tables and application programming interfaces. |
| April 2023 | Release final data products. |

## 5.6.2 Redistricting Data Program

| Detailed Planning Status: | **Underway** |
|---|---|

### *Purpose*

The purpose of the RDP operation is to provide to each state the legally required P.L. 94-171 redistricting data tabulations by the mandated deadline of 1 year from Census Day: April 1, 2021.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Provision of a prototype product is necessary.
- The ability to provide legal boundary updates is needed.
- Delivery of the data prior to public release is necessary.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Separation of the program's Block Boundary Suggestion Project from the Voting District Project to allow greater external participation.
- Inclusion of a BAS component to capture and improve underlying geography.
- Processing at Headquarters and the NPC to provide states with consistent guidance, to enhance coordination between BAS and RDP, and to reduce burden on the Geographic Area Reconciliation Program.
- State legislative district updates captured at time of collection of Congressional district updates reducing the need for multiple efforts.

### *Description of Operation*

The RDP Operation provides the 50 states, the District of Columbia, and Puerto Rico with the opportunity to identify, delineate, and update geographic boundaries for data tabulation. It also allows for continuous process improvement through an evaluation of the program with recommendations for the next cycle that is in an official publication called "The View From the States."

The five major components in the 2020 Census RDP include:

- Phase 1—Block Boundary Suggestion Project.
- Phase 2—Voting District Project.
- Phase 3—P.L. 94-171 data and geographic support products design and delivery.
- Phase 4—Collection of changes to Congressional and State Legislative Districts.
- Phase 5—Evaluation of the 2020 Census RDP and recommendations for the 2030 RDP.

### *Research Completed*

The following research has been completed for this operation:

- January 2015: Released the *Designing P.L. 94-171 Redistricting Data for the Year 2020 Census—The View From the States.*
  - Findings:
    - Need for a "one number" Census.
    - Need for a prototype data product.
    - Need for data delivery prior to public release.
    - Need for GQ data.
    - Need for support products using most current (2020) geography.
    - Need for tabulation block and voting district data.
    - Need for states to have the option to use their resident GIS systems for program participation.

### *Decisions Made*

The following decisions have been made for this operation:

- ✓ Prototype P.L. 94-171 redistricting data tabulations and geographic support products from the 2018 Census End-to-End Test will be generated and distributed to official liaisons by April 1, 2019.
- ✓ Use the GUPS as one of the methods for interaction with and collection of partner updates.
- ✓ GQ tabulations by race for the seven main group quarters types will be included as part of the official P.L. 94-171 redistricting data file.

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

Can the Census Bureau produce 2010 Census to 2020 Census block, block group, and tract relationship files for release on the same schedule as the P.L. 94-171 redistricting data?

- **Approach:** Research and test using the Block Boundary Suggestion Program verification prototype blocks produced in December 2016.
- **Decision by:** April 2017

What changes, if any, to the structure of the P.L. 94-171 redistricting data file may result from research on changing the separate race and ethnicity questions to a single question and the possible inclusion of a Middle Eastern North African category?

- **Approach:** Research using the outcomes of the 2015 National Content Test results.
- **Decision by:** June 2017

Can the Census Bureau produce Citizen Voting Age Population by Race tabulations in early 2021 using the new 2020 Census tabulation geography?

- **Approach:** Research and test using the 2013–2017 ACS 5-year estimates run using the 2018 geographies for simulated release by February 1, 2019.
- **Decision by:** March 2019

What IT capabilities and data distribution methodology will be used (including maps)?

- **Approach:** Research through prototype delivery in March 2019.
- **Decision by:** June 2019

### *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

- The investment in Redistricting Data Program will have minimal impact on the cost of the 2020 Census as compared with the 2010 Census.

Quality impacts of this operation on overall 2020 Census quality include the following:

- ↑ Consistent messaging and guidance to participants.
- ↑ Consistent processing of incoming files.
- ↑ Improvement of incoming file quality due to expanded participation timeline.
- ↑ Improvement in underlying geography through iterated update cycles—update, apply, view, refine, update.

### *Risks*

The GUPS being developed is a critical tool in ensuring that all states can participate in the program regardless of their ownership of Geographic Information System software. **IF** the GUPS modules are not ready for use by the start date of each stage of the RDP update project, **THEN** participants will have unequal opportunities for participation, violating the principles of P.L. 94-171.

As part of its mission to provide the states with the small area tabulations needed to conduct legislative redistricting and to deliver that product within 1 year of Census Day, the Census Bureau produces a full prototype product and delivers that product within the same time constraints. This prototype and process is used to validate both the product and the processing. **IF** the systems for producing products from the 2018 Census End-to-End Test are not ready, **THEN** a P.L. 94-171 prototype product will not be generated within the timeframe required (before April 1, 2019) and stakeholders will not be able review and provide feedback as to the acceptability of the product in meeting the Census Bureau's legal mandate.

### *Milestones*

| Date | Activity |
|---|---|
| July 2014 | Submit Federal Register Notice proposing the 2020 Census Redistricting Data Program. |
| January 2015 | Publish "Designing P.L. 94-171 Redistricting Data for the Year 2020 Census—The View From the States." |
| December 2015–May 2017 | Conduct Phase 1: Block Boundary Suggestion Project. |
| September 2016 | Release the Redistricting Data Program Detailed Operational Plan. |
| October 2017 | Finalize the P.L. 94-171 Prototype Products Design. |
| December 2017–May 2019 | Conduct Phase 2: The Voting District Project. |
| March 2019 | Deliver P.L. 94-171 Prototype Products. |
| November 2020–March 2021 | Conduct Phase 3: Data Delivery for the 2020 Census Redistricting Data Program. |
| April 1st 2021 | Deliver the P.L. 94-171 data (legal deadline). |

## 5.6.3 Count Review

| Detailed Planning Status: | **Not Started** |
|---|---|

Detailed planning for this operation has not started. The narrative that follows represents the Census Bureau's preliminary thoughts as of the release of this document.

### *Purpose*

The Count Review operation enhances the accuracy of the 2020 Census by:

- Implementing an efficient and equitable process to identify missing housing units.
- Identifying and correcting missing or geographically misallocated large group quarters.

### *Lessons Learned*

Based on lessons learned from the 2010 Census, the following recommendations were made:

- Planning for the Count Review Program needs to begin earlier in the decennial planning cycle to be more easily and fully integrated with decennial census operations.
- Address-level precision is essential to an effective count review program.
- Consider working with E911 system, tax assessor records, and other federal agencies to develop a common format and address updating protocol.
- Have both group quarters and housing unit address information available during the review.

### *Opportunities to Innovate*

No specific opportunities to innovate have been identified to date for this operation.

### *Description of Operation*

The operational description provided below is based primarily on the operational design of the 2010 Census Count Review operation. When the 2020 Census Count Review operation is funded, a primary focus should be on determining what the objectives of the 2020 Census Count Review operation should be based on other aspects of the 2020 Census operational design. The focus should be on defining the Count Review operation for the 2020 Census that is integrated with other census operations, fully tested, and is designed to resolve count issues identified by the program. Under the joint-partnership authority, an FSCPE and 2020 Census Working Group was established to explore opportunities to leverage the knowledge and experience of the FSCPE network to the benefit of the 2020 Census Program. Membership of the working group includes representatives from the FSCPE Steering Committee, as well as Census Bureau subject matter experts.

The Count Review operation consists of the following:

- A partnership with the FSCPE members for a housing unit count review.
- A partnership with the FSCPE members for a GQ count review focusing on large group quarters (missing and misallocated).
- Review of the following for systematic or large anomalies in population and housing units:
  - Census Unedited File.
  - Census Edited File.
  - Microdata Detail File.

The design and schedule for the Count Review Program will consider the necessary inputs and outputs to ensure a smooth transition to downstream operations, such as the Count Question Resolution operation.

### *Research Completed*

Because detailed planning for this operation has not yet started, research that directly supports this operation has not yet been completed. However, discussions are underway as part of the scope of the FSCPE and 2020 Census Working Group.

### *Assumptions Made*

Based on planning of other operations, the following assumptions have been made:

- The Count Review operation will leverage the knowledge and experience of the FSCPE network.
- The Census Count Review operation will leverage existing software and systems to accomplish its goals and objectives.
- The FSCPE and Census Bureau staff will review population, housing unit, and group quarters counts.

### *Design Issues to Be Resolved*

The following decisions need to be made for this operation:

How will the 2020 Census Count Review Program leverage the knowledge and experience of the FSCPE network for conducting housing unit, group quarters, and population count review?

- **Approach:** On-going discussions with the FSCPE and 2020 Census Working Group.
- **Decision by:** end of FY 2016

What are the objectives, scope, and operational timeline of the 2020 Census Count Review Program?

- **Approach:** Determined through the development of the Detailed Operational Plan.

- **Decision by:** September 2017

What does success for the 2020 Census Count Review Program looks like and how is it measured?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2017

What is the appropriate level of geography for conducting housing unit, group quarters, and population count review?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2017

What is the timing of the Count Review? Can the Census Bureau conduct the Count Review in time to impact the counts?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2017

How can Count Review improve the GQ universe before enumeration?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2017

What approach will be used for validating missing housing units provided by FSCPEs? For example, fieldwork? Aerial imagery?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2017

What approaches will be used for validating group quarters count discrepancies?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2017

### *Cost and Quality*

Investments in the Count Review Program will have minimal impact on the cost and quality of the 2020 Census, as compared with the 2010 Census.

### *Risks*

No risks have been identified to date for this operation.

### *Milestones*

| Date | Activity |
|---|---|
| October 2015 | Initiate the 2020 Census Count Review Program Integrated Product Team. |
| September 2017 | Release the Count Review Detailed Operational Plan. |
| February 2020 | Conduct 2020 Census Housing Unit Count Review. |
| August 2020 | Conduct 2020 Census GQ Count Review. |
| November 2020 | Conduct 2020 Census Review of Census Unedited File, Census Edited File, and Microdata Detail File. |
| August 2021 | Issue 2020 Census Count Review Program Operational Assessment. |

## 5.6.4 Count Question Resolution

| Detailed Planning Status: | **Not Started** |
|---|---|

Detailed planning for this operation has not started. The narrative that follows represents the Census Bureau's preliminary thoughts as of the release of this document.

### *Purpose*

The Count Question Resolution operation provides a mechanism for governmental units to challenge their official 2020 Census results.

### *Lessons Learned*

Based on lessons learned from the 2010 Census, studies and reviews, the following recommendations were made:

- Create a milestone schedule and ensure it is followed.
- Meet early and often so that all stakeholders involved make decisions up front, before beginning to program control systems or write procedures.
- Make sure planning tasks are completed on time and everyone is aware of key decisions.

### *Opportunities to Innovate*

No specific opportunities to innovate have been identified to date for this operation.

### *Description of Operation*

The CQR operation provides a mechanism for governmental units to challenge the accuracy of their final 2020 Census counts.

The CQR operation includes the following activities:

- Draft proposed process and rules and publish in the Federal Register.
- Finalize process and rules and publish in the Federal Register.
- Identify staffing needs and make temporary appointments and reassignments.
- Receive, investigate, and respond to all challenges, including correcting errors found within the established guidelines of the program.

### *Research Completed*

Because detailed planning for this operation has not yet started, research that directly supports this operation has not yet been completed.

### *Assumptions Made*

Based on initial discussions, the following assumption has been made:

- This program will be conducted in a similar manner to both the 2000 and 2010 Censuses.

### *Design Issues to Be Resolved*

The following decisions need to be made for this operation:

What is the approach for addressing unexpected issues related to count or geographic discrepancies? For example, in the 2010 Census, there were some very specific issues with the way the Census Bureau geocoded Navy ships in U.S. harbors.

- **Approach:** Incorporate 2010 lessons learned into CQR Detailed Operational Plan. Establish and monitor CQR Risk Register, which includes migration and contingency planning activities.
- **Decision by:** September 2018

Will the Census Bureau require challenging governments to provide location information for each housing unit they provide on their list?

- **Approach:** Evaluate the 2020 Census frame building processes, including frequency and quality of location information provided by governmental units.
- **Decision by:** September 2018

What types of challenges will be in-scope?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2018

What documents and systems will be needed to research and respond to challenges?

- **Approach:** Interdivisional teams will meet and make recommendations on these matters. Federal Register input will help determine final decisions on types of challenges that will be in scope.
- **Decision by:** Publish the initial Federal Registration Notice in 2020, and the final Federal Registration Notice in 2021 so that challenges can be accepted as soon as state and sub-state data are published (approx. June 2021).

### *Cost and Quality*

Investment in Count Question Resolution will have minimal impact on the cost and quality of the 2020 Census as compared with the 2010 Census.

### *Risks*

No risks have been identified to date for this operation.

### Milestones

| Date | Activity |
|---|---|
| January 2017 | Begin planning and development of program schedule, process, and initial Federal Register Notice. |
| September 2018 | Release the Count Question Resolution Detailed Operational Plan. |
| May 2020 | Publish initial Federal Registration Notice identifying process and types of challenges to be considered. |
| March 2021 | Publish final Federal Registration Notice to establish process, timing, and types of challenges in scope for the program. |
| June 2021 | Begin accepting challenges from governmental units. |
| 2021–2023 | Issue revised certified counts as appropriate and make available on census.gov through American FactFinder (or similar dissemination system). |
| June 2023 | Deadline for governmental units to submit challenges. |
| Sept 2023 | End program and issue assessment and lessons learned report. |

## 5.6.5 Archiving

| Detailed Planning Status: | **Not Started** |
|---|---|

Detailed planning for this operation has not started. The narrative that follows represents the Census Bureau's preliminary thoughts as of the release of this document.

### Purpose

The Archiving operation performs the following functions:

- Provide records deemed permanent, including files containing the individual responses to the 2020 Census, to NARA.
- Provide similar files to the NPC to use as source materials to conduct the Age Search Service.

### Lessons Learned

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Make sure staff are regularly reminded of their records management responsibilities. They need to understand the distinction between permanent and temporary record, and the Census Bureau's legal obligation to archive permanent records.
- Start archiving planning (with an interdivisional team) earlier in the life cycle—suggest FY 2018 at the latest.
- Keep a log or spreadsheet on the materials that the records schedule requires to be sent to NARA, how they will be sent, dates promised, and actual transfer date.

### Opportunities to Innovate

No specific opportunities to innovate have been identified to date for this operation.

### Description of Operation

The Census Bureau must provide copies of the individual responses to the 2020 Census (including names and addresses) to the NARA. The specific format, media, and timing for the delivery will be negotiated between the Census Bureau and NARA later in the decade. Because the primary use of this information is for genealogical searches (to be released no sooner than 72 years after Census Day), the Census Bureau must also provide a linkage between the individual response data and the copies of questionnaires on paper, microfilm, or electronic images. This operation also provides similar data to support the Census Bureau Age Search Program at NPC.

### Research Completed

Because detailed planning for this operation has not yet started, research that directly supports this operation has not yet been completed.

### Decisions Made

No decisions have been finalized for this operation.

### Design Issues to Be Resolved

The following decisions need to be made for this operation:

What are the format, media, and timing for the delivery of individual responses to NARA?

- **Approach:** Census Bureau will work with NARA to review records and make determinations of permanent records.
- **Decision by:** July 2021

### *Cost and Quality*

Investment in Archiving will have minimal impact on the cost and quality of the 2020 Census as compared with the 2010 Census.

### *Risks*

No risks have been identified to date for this operation.

### *Milestones*

| Date | Activity |
|---|---|
| Annually, beginning in 2016 | Update official records plan performed by Records Manager for each participating division. |
| June 2018 | Begin identification and review of all records that will be generated by or for the 2020 Census. |
| September 2018 | Release the Archiving Detailed Operational Plan. |
| April 2019 | Begin negotiations with NARA to make preliminary determinations of which records will be deemed permanent, so must be archived. |
| April 2021 | Develop final records schedule with NARA and submit for approval by Archivist. |
| July 2022 | Begin transfer of permanent records to NARA. |
| January 2023 | Complete transfer of all permanent records to NARA. Complete destruction of all temporary records no longer needed by Census Bureau. |

## 5.7 OTHER CENSUSES

Other Censuses comprises all functions associated with the decennial censuses for the Pacific Island Area of American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and the U.S. Virgin Islands, collectively known as the Island Areas. There is one operation in this area: Island Areas Censuses.

### 5.7.1 Island Areas Censuses

| Detailed Planning Status: | **Recently Begun** |
|---|---|

### *Purpose*

The purpose of the Island Areas Censuses operation is to update and enumerate all living quarters in American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and the U.S. Virgin Islands, collectively known as the Island Areas (IA).

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- The contracts with the IA's local governments need to stipulate the roles and responsibilities of the census office managers, the onsite Census Advisors, the officials of the local governments, and the officials at Census Bureau headquarters.
- The IA data collection operations and data processing needs to be more in-line with stateside operations and data processing.
- The planning phase of the IA's censuses should involve data processing staff who can help create testing strategies.

### *Opportunities to Innovate*

- Use of enterprise solutions optimized for the 2020 Census and the ACS for preparing 2020 Census IA data products and disseminating the information to the public.

### *Description of Operation*

The Census Bureau will conduct the 2020 Census of the Island Areas through partnerships with local government agencies in American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the U.S. Virgin Islands. The Census Bureau will provide the materials and guidance to the local government agencies that are then responsible for recruiting and hiring the staff to conduct the data collection phase. The data collection phase will consist of:

- Opening and closing LCOs.
- Address Canvassing.
- Enumerating residents.
- Follow-up operations.
- Local Count Review.
- Shipping completed materials to data processing sites.

A contract agreed upon by the parties will outline the specific responsibilities of the Census Bureau and the local government agencies. Following the completion of the data collection phase, Census Bureau staff will prepare the data and disseminate the information to the public.

### *Research Completed*

Because detailed planning for this operation has recently started, research that directly supports this operation has not yet been completed. However, based on the 2010 Census design and planning of other operations, the following decisions have been made:

### *Decisions Made*

The following design decisions are based on the 2010 Census design for this operation:

- ✓ Continuously engage and communicate the Census Bureau's plans with liaisons in the local IA's governments, and with the Office of Insular Affairs in the Department of Interior.
- ✓ Revise maps with geospatial updates from the 2010 Census data, local data, site visits, and satellite imagery.
- ✓ Establish contracts with the local IA's governments to conduct the census data collection.
- ✓ Establish five local census offices: two in the U.S. Virgin Islands and one in each of the other Island Areas.
- ✓ Use a "long-form like" questionnaire.

Changes that will be made for the design of this operation for the 2020 Census include the following:

- ✓ Build and maintain a first-ever MAF for each of the IA for use in the 2020 Census and in subsequent censuses.
- ✓ Use the ACS form with minor wording changes to accommodate time reference differences, incorporating the final 2020 Census questions.
- ✓ Use stateside systems whenever possible; some modifications may be needed.
- ✓ Deploy Census Advisors to the local census offices in 2019 to provide guidance throughout the data collection process and to report back to Headquarters—one advisor for each of the Pacific Island Areas (American Samoa, Commonwealth of the Northern Mariana Islands, and Guam), and two advisors for the U.S. Virgin Islands (one for St. Thomas and St. John, and one for St. Croix).

### *Design Issues to Be Resolved*

The following decisions need to be made for this operation:

Will the IA TEA use an Update/Enumerate strategy?

- **Approach:** Based on the Census Bureau's ability to create and update a MAF for the IA.
- **Decision by:** September 2017

To what degree will online self-response be available for IA's respondents?

- **Approach:** Investigate feasibility based on analysis of Internet access and speed and applicability of existing Internet and non-ID capabilities to support unique IA addresses.
- **Decision by:** September 2017

Which enterprise systems can be used to support the IA Censuses operation and what modifications are needed to these systems?

- **Approach:** Research during separate proposed test of IA operations in FY 2016. Based on test results, work with the IT staff to incorporate Island Area requirements into existing systems.
- **Decision by:** September 2017

How will the IA questionnaire differ from the then current ACS form?

- **Approach:** Work with internal and external stakeholders in fiscal years 2015 through 2017 to determine the final content of the questionnaire.
- **Decision by:** December 2017

### *Cost and Quality Measures*

Investment in the 2020 Census of the IA will have minimal impacts on the cost and quality of the 2020 Census as compared with the 2010 Census.

### *Risks*

The goal for the IA 2020 Censuses is to implement an UE operation that requires an existing address frame in the form of a MAF. **IF** adequate resources are not allocated to develop the IA MAF, **THEN** the design of the field listing and enumeration methodologies cannot be finalized in time to meet the milestone of releasing the IA Censuses Detailed Operational Plan.

The IA Censuses operation has many unique requirements and may not be able to leverage enterprise solutions without significant modifications. **IF** the IA team cannot identify a stateside system capable of processing Island Areas data by September 2017, **THEN** the IA team will have to find an alternate data processing system and resources, which will increase the cost and affect the schedule of the IA 2020 Censuses.

### *Milestones*

| Date | Activity |
|---|---|
| September 2013 | Establish quarterly contact with IA's government officials. |
| September 2017 | Release the IA Censuses Detailed Operational Plan. |
| March 2018 | Decide what, if any, stateside systems can be used for the 2020 IA's Census operations. |
| March 2018 | Obtain Office of Management and Budget clearance for data collection materials. |
| June 2018 | Finalize plans for the IA's Census operations. |
| September 2018 | Award contracts with the IA's governments. |
| June 2019 | Open Area Census Offices in American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and St. Thomas and St. Croix of the U.S. Virgin Islands. |
| September 2020 | Close the Area Census Offices in the IA and their contracts. |
| December 2020 | Publish the IA's population counts. |
| September 2023 | Complete IA's detail data publications. |

## 5.8 TEST AND EVALUATION

The Test and Evaluation area performs two primary functions:

- Evaluate the quality of the 2020 Census.
- Prepare for the 2030 Census.

This area includes four operations:

- **Coverage Measurement Design and Estimation:** Designs the post-enumeration survey, including sampling and estimation, and demographic analysis.
- **Coverage Measurement Matching:** Identifies matches and nonmatches between the 2020 Census and the Census Coverage Measurement (CCM) Survey for the enumerated housing units and people.
- **Coverage Measurement Field Operations:** Collects person and housing unit information (independent from the 2020 Census operations) for the sample of housing units in the Census Coverage Measurement Survey.
- **Evaluations and Experiments:** Measure the success of critical 2020 Census operations. Formulate and execute an experimentation program to support early planning and inform the transition and design of the 2030 Census.

Each operation is described below.

### 5.8.1 Coverage Measurement Design and Estimation

| Detailed Planning Status: | **Not Started** |
|---|---|

Detailed planning for this operation has not started. The narrative that follows represents the Census Bureau's preliminary thoughts as of the release of this document.

#### *Purpose*

The Coverage Measurement Design and Estimation operation develops the survey design and sample for the post-enumeration survey for the 2020 Census. It also produces coverage error estimates and independent assessment of coverage via demographic analysis.

#### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Simplify the sampling operations, the data collection, the matching operations, and the estimation by eliminating the creation and use of block cluster, provided the basic collection unit concept is similar to 2010 block cluster.
- Follow best practices from the 2010 Census Coverage Measurement operations where the Census Bureau anticipated potential changes in implementing the sample design, allowing changes to sample design requirements to be easily handled given the implementation approach.
- Use of the Planning Database for designing the Census Coverage Measurement sample.

### Opportunities to Innovate

No specific opportunities to innovate have been identified to date for this operation.

### Description of Operation

The description below is based primarily on the operational design of the 2010 Census Coverage Measurement Program.

The Coverage Measurement Design and Estimation operation performs the following functions:

- Develop the survey design for the post-enumeration survey for the 2020 Census.
- Design and implement the sample to support the estimation of coverage estimates in the 2020 Census for the United States and Puerto Rico, excluding Remote Alaska.
- Produce estimates of net coverage error and the components of census coverage for housing units and persons living in housing units for the United States and Puerto Rico, excluding Remote Alaska.
- Produce independent assessments of census coverage via demographic analysis, using population and housing unit benchmarks in support of the 2020 Census and the evaluation of the 2020 Census.

### Research Completed

Because detailed planning for this operation has not yet started, research that directly supports this operation has not yet been completed.

### Assumptions Made

Based on the 2010 Census design and planning of other operations for the 2020 Census, the following assumptions have been made:

- Use the capture-recapture, dual-system estimation methodology, similar to the 2010 CCM approach, to measure the 2020 Census coverage.
- Maintain the independence of the Coverage Measurement Survey operations from the 2020 Census operations.
- Automate all Coverage Measurement Survey data collection instruments.
- Take advantage of directorate and enterprise automation processes.
- Continue to use Demographic Analysis as an input to coverage measurement estimation as in the 2010 Census.
- The Demographic Analysis program will be the primary source for administrative records-based estimates of the total population by age, sex, and the Demographic Analysis race categories for comparison with the 2020 Census counts.

### Design Issues to Be Resolved

The following decisions need to be made for this operation:

Are estimates of component error a goal for the 2020 Coverage Measurement Design and Estimation Program?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** December 2015

What are the effects on estimates of potential operational and systems changes?

- **Approach:** Research with 2010 Census data and conduct operational simulations and tests.
- **Decision by:** March 2016

When should the Coverage Measurement Design and Estimation Operation estimates be released?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2016

How can vital statistics be better used, or combined with other data sources to improve the Demographic Analysis estimates by age and sex, and to better estimate or expand the race and Hispanic origin categories for which the Demographic Analysis estimates are produced?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2016

What is the optimal sampling plan that balances estimation plans and operational considerations?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2016

At what level of geography will the Coverage Measurement Design and Estimation Operation produce estimates?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2016

How will the Census Bureau ensure independence between the coverage measurement survey and the census?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2016

When will the first test of the 2020 Census Coverage Measurement Design and Estimation Operation be conducted?

- **Approach:** Researched in the 2017 Census Test (proposed).
- **Decision by:** September 2017

### *Cost and Quality:*

The Coverage Measurement Design and Estimation Operation will have minimal impact on the cost and quality of the 2020 Census as compared with the 2010 Census.

### *Risks*

By this point in the decade, planning for all major 2020 Census operations should be underway. Budget reductions in FY 2013 through FY 2015 delayed planning for this operation. **IF** planning efforts are not initiated at the start of FY 2016, **THEN** there may not be sufficient time to implement innovations related to this operation.

### *Milestones*

| Date | Activity |
|---|---|
| October 2016 | Start Coverage Measurement Design and Estimation. |
| September 2017 | Release the Coverage Measurement Design and Estimation Detailed Operational Plan. |
| August–September 2019 | Start 2020 Census Coverage Measurement Design and Estimation Sample Design. |
| February–April 2019 | Select Coverage Measurement Design and Estimation Sample BCUs. |
| January 2020 | Conduct Small BCUs Subsampling. |
| March–April 2020 | Identify Coverage Measurement Design and Estimation Person Interview Sample. |
| December–January 2021 | Generate Coverage Measurement Design and Estimation Person Estimates. |
| January–February 2021 | Generate Coverage Measurement Design and Estimation Housing Unit Estimates. |
| January–March 2021 | Produce Estimation Reports. |
| April 2021 | Release Estimation reports.<br>End Coverage Measurement Design and Estimation. |

## 5.8.2 Coverage Measurement Matching

| Detailed Planning Status: | **Not Started** |
|---|---|

Detailed planning for this operation has not started. The narrative that follows represents the Census Bureau's preliminary thoughts as of the release of this document.

### Purpose

The purpose of this operation is to identify matches and nonmatches between the 2020 Census and the Census Coverage Measurement Survey, for both housing units and people, including computer and clerical components.

### Lessons Learned

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Simplify the Coverage Measurement clerical matching tasks.
- Rely more on the automated matching systems than the clerical matchers.
- Move housing unit matching and follow-up operations closer to the listing operation.
- Automate the assignment of status codes and address information where possible.

### Opportunities to Innovate

No specific opportunities to innovate have been identified to date for this operation.

### Description of Operation

The description below is based primarily on the operational design of the 2010 CCM Matching Program.

The Coverage Measurement Matching operation includes:

- Housing Unit Matching: Links the housing unit addresses in the sample and the initial census addresses in the MAF using automated computer matching and clerical matching techniques.
- Person Matching: Links the persons in the sample and the census using automated computer and clerical matching techniques.
- Final Housing Unit Matching: Links the housing unit addresses in the sample and the final census addresses using automated computer matching and clerical matching techniques.

Housing Unit, Person, and Final Housing Unit Matching utilize two different methods:

- Computer matching of addresses or persons is conducted using software that assigns a probability that the addresses or people match. A threshold is identified to indicate cases that are definite matches, another to indicate cases that are definite nonmatches, and the cases in between these points are considered possible matches. When the intent is to identify duplicates, a similar process is used, resulting in a set of duplicate cases, nonduplicate cases, and possible duplicate cases.
- Clerical matching is conducted by clerical matchers utilizing the matching software. The software displays the results of computer matching and allows the matchers to review and correct any results. Matchers must review and code all the possible matches or duplicates and can also correct cases determined as linked or nonlinked by the computer matcher. In addition, clerical matchers must geocode new addresses collected that are not computer geocoded and assign residence status codes and housing unit status codes. The clerical matchers are provided the actual respondent information from follow-up activities, so they can review a whole household composition and any interviewer notes about the cases to help with their analysis.

### Research Completed

Because detailed planning for this operation has not yet started, research that directly supports this operation has not yet been completed and no decisions have been finalized.

### Decisions Made

No decisions have been finalized for this operation.

### Design Issues to Be Resolved

The following decisions need to be made for this operation:

What computer matching and clerical matching systems will be used for CCM?

- **Approach:** Determined through the development of the Detailed Operational Plan.
- **Decision by:** September 2016

When will the first test of the 2020 Census Coverage Measurement Operations be conducted?

- **Approach:** Researched in the 2017 Census Test (proposed).
- **Decision by:** September 2017

### *Cost and Quality*

Investment in Coverage Measurement Matching will have minimal impact on the cost and quality of the 2020 Census as compared with the 2010 Census.

### *Risks*

By this point in the decade, planning for all major 2020 Census operations should be underway. Budget reductions in FY 2013 through FY 2015 delayed planning for this operation. **IF** planning efforts are not initiated at the start of FY 2016, **THEN** there may not be sufficient time to implement innovations related to this operation.

### *Milestones*

| Date | Activity |
|---|---|
| September 2017 | Release the Coverage Measurement and Matching Detailed Operational Plan. |
| January–February 2020 | Conduct Initial Housing Unit Computer Matching. |
| February–April 2020 | Conduct Initial Housing Unit Clerical Matching. |
| August–September 2020 | Conduct Person Computer Matching. |
| September–November 2020 | Conduct Person Clerical Matching. |
| November 2020 | Conduct Final Housing Unit Computer Processing. |
| November–December 2020 | Conduct Final Housing Unit Clerical Matching. |

## 5.8.3 Coverage Measurement Field Operations

| Detailed Planning Status: | **Not Started** |
|---|---|

Detailed planning for this operation has not started. The narrative that follows represents the Census Bureau's preliminary thoughts as of the release of this document.

### *Purpose*

The Coverage Measurement Field Operations collects person and housing unit information (independent from 2020 Census operations) for the sample of CCM Survey housing units. CCM collects the same data as the 2020 Census for both housing units and persons. Additional information is collected by CCM to help us understand coverage and to detect erroneous enumerations.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Automate all Coverage Measurement data collection instruments.
- To ensure more accurate data, minimize the time lag between the follow-up operations where beneficial.
- Consider including an early telephone phase prior to personal visit for the Person Interview operation.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- To the extent feasible and practical, the CCM Field Data Collection Operation will leverage the use of automation and the field reengineering concepts under development for In-Field Address Canvassing and Nonresponse Followup operations.

### *Description of Operation*

This operation collects person and housing unit information for the sample of CCM Survey housing units. The description below is based primarily on the operational design of the 2010 Census Coverage Measurement Program. When detailed planning begins, it will focus on determining the objectives of the 2020 CCM Program, taking into consideration other aspects of the 2020 Census operational design. The focus should be on defining the CCM Program for the 2020 Census that is integrated with other census operations, fully tested, and is designed to resolve issues identified by the Program.

Based on the 2010 Coverage Measurement Program design, this operation includes the following five CCM Survey field data collection sub-operations:

- **Independent Listing:** In this operation listers walk all areas of the sample BCUs and list all the housing units in the sample area from scratch, that is, no MAF information is used in this operation. This is an independent listing. Listers knock on all housing units to inquire if there are

more than one housing unit at the addresses listed (like a basement or garage apartment) and these are listed separately.

- **Initial Housing Unit Follow-Up:** The list of CCM housing unit addresses in the sample are matched to the Initial census MAF list of addresses in the same sample areas to identify matches and possible matches between the two lists, duplicates and possible duplicates in either list, and nonmatches in either list. The cases (addresses) that are in one list and not the other (nonmatches) and those identified as possible matches or possible duplicates are sent back for an Initial Housing Unit Follow-Up interview. Out of this operation an additional matching using the follow-up results is conducted. The results identify the list of housing units in the CCM sample to be included in the CCM person operations.
- **Person Interview:** Collects person information for the CCM Survey sample housing units by performing in-person interviews using a computer-assisted data collection instrument. The enumerators collect data similar to that collected in the 2020 Census, as well as additional data about persons in the household to determine if any of these people may have been counted at other addresses on Census Day.
- **Person Follow-Up:** Collects additional information in the follow-up operation when lacking sufficient information for estimation. The list of CCM housing unit people in the sample are matched to the people listed in the census in the same sample areas to identify matches and possible matches between the two lists, duplicates and possible duplicates in either list, and nonmatches in either list. The nonmatched persons (that are in only one list and not the other) and those identified as possible matches or possible duplicates are sent back for the Person Follow-Up interview to obtain additional information. The collected information is used after follow-up matching to resolve the cases and the results are used in the estimation of person coverage.
- **Final Housing Unit Follow-Up:** After completion of census operations, the updated MAF list of addresses is matched to the CCM list of addresses to identify additional matches, nonmatches, or duplicates. Cases unresolved are sent back to the field to conduct the Final Housing Unit Follow-Up operation. The resulting data are sent to the Final Housing Unit Matching and then used in the housing unit coverage estimation.

As the Census Bureau designs this operation, it will consider whether any of the address listing can be done using in-office methods (similar to In-Office Address Canvassing) and whether administrative records and third-party data can be used to support person interviews, recognizing that the same administrative records and third-party data sources used during Nonresponse Followup cannot be used for CCM to ensure an independent evaluation.

### *Research Completed*

Because detailed planning for this operation has not yet started, research that directly supports this operation has not yet been completed; however, the Coverage Measurement Field Operations will leverage research conducted to support other field operations such as In-Field Address Canvassing and Nonresponse Followup.

### *Assumptions Made*

Based on planning of other operations, the following assumptions have been made:

- CCM housing unit data collection will use the Listing and Mapping Instrument enterprise solution instrument.
- The CCM Survey operations will be maintained independently of the 2020 Census.
- All CCM Survey data collection will be automated and leverage systems and tools used in other field operations where feasible.
- Directorate and enterprise automation processes will be leveraged whenever possible.

### *Design Issues to Be Resolved*

The following decisions need to be made for this operation:

Will the CCM person data collection instruments need a larger Form-Factor (possibly a tablet) for automated instruments instead of a smartphone?

- **Approach:** Operation design.
- **Decision by:** September 2016

Will there be an additional telephone operation that is needed before the CCM Person Interview?

- **Approach:** Operation design.
- **Decision by:** September 2016

When will the first test of the 2020 Census Coverage Measurement Operations be conducted?

- **Approach:** Researched in the 2017 Census Test (proposed).
- **Decision by:** September 2017

### *Cost and Quality*

Investment in Coverage Measurement Field Operations will have minimal impact on the cost and quality of the 2020 Census as compared with the 2010 Census.

### *Risks*

By this point in the decade, planning for all major 2020 Census operations should be underway. Budget reductions in FY 2013 through FY 2015 delayed planning for this operation. **IF** planning efforts are not initiated at the start of FY 2016, **THEN** there may not be sufficient time to implement innovations related to this operation.

### *Milestones*

| Date | Activity |
|---|---|
| September 2017 | Release the Coverage Measurement Field Operations Detailed Operational Plan. |
| October–December 2019 | Conduct CCM Independent Listing and Quality Control. |
| March–April 2020 | Conduct Initial Housing Follow-Up and Quality Control. |
| May–June 2020 | Conduct CCM Person Interview and Quality Control. |
| October–November 2020 | Conduct CCM Person Follow-Up and Quality Control. |
| November–December 2020 | Conduct Final Housing Follow-Up and Quality Control. |

## 5.8.4 Evaluations and Experiments

| Detailed Planning Status: | **Not Started** |
|---|---|

Detailed planning for this operation has not started. The 2020 Census Evaluations and Experiments operation is unlike other 2020 Census operations in that, at its start, the Census Bureau will follow a process to establish and reach consensus on the set of evaluations and experiments to be conducted as part of the 2020 Census Program. The details that follow address various aspects of the planning process more so than the detailed scope of the 2020 Census evaluations and experiments themselves. The detailed scope of evaluations and experiments will result from the formulation process. The initial planning, formation of governing bodies, solicitation of input, and the agreement on scope of the 2020 Census Evaluations and Experiments operation is dependent upon funding.

### *Purpose*

Evaluations document how well the 2020 Census was conducted; evaluations analyze, interpret, and synthesize the effectiveness of census components and their impact on data quality and/or coverage. Experiments identify potential designs of early 2030 Census life-cycle research and testing; experiments are quantitative or qualitative studies that must occur during a decennial census in order to have meaningful results to inform planning of future decennial censuses. In general, experiments involve response comparisons between tests, new or modified methods, or procedures against 2020 Census production methods or procedures.

The Evaluations and Experiments operation performs the following functions:

- Measures success of critical 2020 Census operations and processes.
- Formulates a 2020 Census experimental program that will further refine 2030 Census operational design options.
- Contributes to the formulation of the 2030 Census Research and Testing phase objectives.
- Develops a transition plan and appropriate organizational structures to establish 2030 Census life-cycle planning.
- Initiates other early planning activities for the 2030 Census, including the monitoring of policy concerns and technological, societal, and public cooperation trends.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations associated with the development and management of the 2020 Census Evaluations and Experiments operation were made:

- Deployment of a Knowledge Management database to capture and track 2010 Census recommendations, recommendations from oversight bodies, and early 2020 Census research and testing results would be valuable for connecting past experiences and research to future research and planning objectives.
- Dedicated resources are needed earlier in the 2020 Census life cycle to initiate 2030 Census life-cycle planning efforts to enable a smooth transition from the 2020 Census implementation to the 2030 Census research.

### *Opportunities to Innovate*

At its core, the scope of the 2020 Census Evaluations and Experiments operation will focus on aspects of the 2020 Census design that could lead to 2030 Census innovations. As the 2020 Census operational design solidifies, the Evaluations and Experiments operational process will define the 2020 Census Evaluations and Experiments, identify data requirements, and document methods to address research objectives.

To date, opportunities to innovate, as documented below, focus primarily on aspects of the planning and scope definition process. These opportunities to innovate include the following:

- Implementing a Knowledge Management system and application for the 2020 Census Directorate.
- Formulating 2020 Census evaluations and experiments that are more formally guided by the decisions on the 2020 Census operational design and the 2030 Census planning and objectives.
- Formulating Fiscal Years 2022–2024 Research and Testing objectives that are more formally guided by 2030 planning and objectives.
- Formulating 2030 Census life-cycle budget simulations that are more formally aligned with strategic planning and research objectives.

### *Description of Operation*

To initiate the formulation of the 2020 Census Evaluations and Experiments operation, an understanding of the 2020 Census operational design is necessary. In general, what is in-scope for the 2020 Census operations sets the landscape from which evaluations will be identified. The 2020 Census design options made out-of-scope provides the initial canvass for potential experiments. The formulation phase involves:

- Executive Staff guidance on strategic principles and high level research targets.
- Feedback from internal Program Managers, operational subject matter experts, and Senior Researchers/Methodologists.
- Feedback from oversight groups, advisory committees, the international collaboration consortium, the National Academy of Science, and other external experts.
- Recommendations from census research and testing, as captured in the Knowledge Management application.
- Establishing parameters (e.g., cost, quality, risks, and visibility) and criteria for selecting evaluations and experiment proposals.

Following formulation of the 2020 Census Evaluations and Experiments operation are development, implementation, program control, closeout, and coordination activities. These phases of the operation will be clearly described in future versions of the operational plan.

### *Research Completed*

Because detailed planning for this operation has not yet started, research that directly supports this operation has not yet been completed and no decisions have been finalized.

### *Decisions Made*

No decisions have been finalized for this operation.

### *Design Issues to Be Resolved*

The following decisions need to be made for this operation:

What are the strategic principles and high-level research targets for guiding formulation of evaluations and experiments during the 2020 Census?

- **Approach:** Addressed once the working group is chartered and the plan is developed and approved by the Executive Staff.
- **Decision by:** December 2016

What are the parameters (cost, quality, risks, visibility, etc.) and criteria for selecting and prioritizing evaluation and experimentation proposals?

- **Approach:** Addressed once the working group is chartered and the plan is developed and approved by the Executive Staff.
- **Decision by:** December 2016

Given the strategic principles for guiding formulation of evaluations and experiments and the parameters and criteria for selecting and prioritizing evaluation and experimentation proposals, what is the defined set of 2020 Census Evaluations and 2020 Census Experiments?

- **Approach:** Solicitation of feedback and application of principles, parameters, and criteria to defining the scope of the Evaluations and Experiments.
- **Decision by:** December 2018

### *Cost and Quality*

Investment in Evaluations and Experiments will have minimal impact on the cost and quality of the 2020 Census as compared with the 2010 Census.

### *Risks*

The Evaluations and Experiments operation for the 2010 Census was launched in October 2006 (FY 2007) with the establishment of a governing Executive Steering Committee to provide guidance on key research objectives for the 2010 Census program and seek out feedback from external stakeholders. **IF** the 2020 Census Evaluations and Experiments operation is not established and funded in FY 2016, **THEN** the decreased lead time to formulate experiments and evaluations, including getting feedback earlier from external stakeholders, will jeopardize having a robust and meaningful operation to inform research and testing beyond the 2020 Census.

Opportunities to evaluate the 2020 Census and conduct experiments to inform the design of the 2030 Census are extensive, requiring a governing body to establish scope. **IF** an Executive Steering Committee is not established to govern evaluations and experiments for the 2020 Census program, **THEN** the program will lack the necessary guidance on scope, have reduced external visibility, and affect overall program endorsement.

### *Milestones*

| Date | Activity |
|---|---|
| December 2016 | Baseline research plans for 2020 Census Experiments.* |
| September 2017 | Release the Evaluations and Experiments Detailed Operational Plan. |
| October 2018 | Receive Office of Management and Budget clearances for 2020 Census Evaluations. |
| December 2018 | Baseline research plans for 2020 Census Evaluations.* |
| July 2019 | Begin issuing results for 2020 Census Evaluations. |
| October 2019 | Receive Office of Management and Budget clearances for 2020 Census Experiments. |
| July 2020 | Baseline 2030 Census alternative design options for research. |
| August 2020 | Begin issuing results for 2020 Census Experiments. |
| October 2020 | Finalize objectives for the 2030 Census research and testing phase. |
| October 2021 | Begin the 2030 Census research and testing phase. |
| July 2022 | Finalize research results for 2020 Census Experiments. |
| April 2023 | Finalize research results for 2020 Census Evaluations. |

*Research plans pertain to detailed study plans for individual evaluations and experiments. The Detailed Operational Plan for Evaluations and Experiments pertains to high-level research objectives, the Business Process Model, systems, locations, and staffing strategy to support and implement the program.

## 5.9 INFRASTRUCTURE

The following four operations support the infrastructure of the 2020 Census:

- **Decennial Service Center:** Supports 2020 Census field operations and handles all service requests initiated by field staff.
- **Field Infrastructure:** Coordinates space acquisition for and lease management of the Regional Census Centers (RCC) and field offices

and provides the administrative infrastructure for data collection operations covering the 50 states, the District of Columbia, and Puerto Rico.

- **Decennial Logistics Management:** Provides logistics management services to include procuring warehouse space, warehousing, inventory management, kit assembly, deployment of materials, and receiving and excessing materials.
- **IT Infrastructure:** Provide the IT Infrastructure to support the 2020 Census, including enterprise systems and applications, 2020 Census-specific applications, field IT infrastructure, and mobile computing.

Each operation is described below.

### 5.9.1 Decennial Service Center

| Detailed Planning Status: | **Underway** |
|---|---|

#### *Purpose*

The Decennial Service Center (DSC) will support 2020 Census field operations and handle all service requests initiated by field staff.

#### *Lessons Learned*

Based on lessons learned from the 2014 and 2015 Census Tests, the following recommendations are made:

- Having the Service Center open during annual Census tests provides insight into potential issues which may arise during full 2020 Census operations.
- Having Service Center staff involved in User Acceptance Tests helps them gain a better understanding of possible issues which may occur in the field.
- Fund support staff from the beginning of testing through 2020 Census production; otherwise, there is no knowledge transfer from one test to the next. DSC is only funded on a year-to-year basis so all contractors are dismissed at the end of the contract. Training of Service Center staff absorbs a significant amount of time and resources that are lost if the Service Center is closed during periods when field operations are not under way.

#### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Centralized service center system to provide a call management system, incident, and service management system supporting decentralized Service Center technicians (e.g., technicians based in Area Census Offices answering any call to the DSC).
- Online service center technician training. Provide online training for service center technicians as opposed to classroom training. Online training is more accessible than classroom training.
- Cloud technology for call management and incident management. Cloud technology will support the centralized service center system.
- Introduction of additional means for requesting support:
  - Online live chat: DSC customers will be able to report problems via online live chat.
  - Texting: DSC customers will be able to report problems via text.
  - Smartphone applications: field staff will be able to report problems via smartphone applications.

#### *Description of Operation*

The overall goal of the 2020 Census DSC operation is the design and deployment of an integrated service center, which will support field operations and handle all help or service requests initiated by field staff during the 2020 Census. These services include the following:

- Password resets for all 2020 Census applications including LUCA.[9]
- Resolution of software and hardware issues from field offices and field staff, such as those experienced by users of the Decennial Applicant Payroll and Personnel System and mobile devices.
- Security incident management, such as petty theft, injuries, and stolen equipment.
- Communications to and from field offices to address such things as outages or software releases.

Major functions of the DSC include the following:

- Provide three major functions supporting 2020 Census Field Operations:

[9] DSC is only providing password reset for LUCA; no further DSC support is anticipated for LUCA.

- Receive requests for service.
- Respond to requests for service.
- Report on requests for service.

- Provide Tier-1 support during the 2020 Census Tests.
  - Tier-1 support will consist of resolving simple issues from the field in a specified period of time, such as password resets.
- Provide Tier-1 and Tier-2 support during the 2020 Census field operations.
  - In addition to the Tier-1 support described above, Tier-2 support will consist of more complex issues requiring troubleshooting by specially trained staff with expertise in 2020 Census applications, such as MOJO, COMPASS, and Listing and Mapping Instrument.
- Provide Implement service-level agreements with Tier-3 support based on current operational standards of practice.
- Serve in a coordination and communication role in the event that a field office executes a Continuity of Operations Plan.
- Archive electronic records generated by the DSC in accordance with Census Bureau archiving policies.

### *Work Completed*

The following research has been completed for this operation:

- Tested DSC use as part of the 2014 and 2015 Census Tests.
  - Findings:
    - Changes to PIN and password configurations for enumerators have reduced the number of calls expected for password resets.
    - As the fingerprint vendor, USPS needs to be prepared to cover the expected call volume.[10]
    - There was a lower-than-expected call volume for online training-related issues.

### *Decisions Made*

The following decisions related to the 2020 Census DSC operation have been made:

- ✓ The DSC will be limited to providing service center support for 2020 Census staff with technical issues related to 2020 Census enterprise organization applications.
- ✓ The DSC will provide support to field staff for the 2020 Census systems and applications.
- ✓ The DSC will provide support for various types of mobile devices and mobile operating systems.[11]

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

What is the impact of automated training on call volume and call types?

- **Approach:** Researched in the 2015 Census Test.
- **Decision by:** February 2016

What is the impact on call volume of not having on-site IT support staff available during the Control Panel enumerator training?

- **Approach:** Researched in the 2015 Census Test.
- **Decision by:** February 2016

What new contracts will need to be awarded for the 2020 Census?

- **Approach:** Based on analysis of support operations during the annual Census Tests (2014–2017).
- **Decision by:** January 2017

What is the optimal service center staffing structure for the 2020 Census? Centralized or decentralized? Optimal staff ratios? Type of technical support needed in local field offices? Impact on services rendered of the number of field offices that are deployed, and number of field staff hired? Impact on services rendered of using wireless connectivity in the field offices?

- **Approach:** Based on comparison of annual test data (2014–2017) with data from the 2010 Census and an assessment of data from each of the annual Census Tests (2014, 2015, 2016, 2017).
- **Decision by:** January 2017

[10] DSC is not planning to support this function for the 2020 Census.

[11] For BYOD, DSC will provide support for 2020 Census applications installed on personally owned devices; however, DSC will not support the personal device itself.

What methods will be available for contacting the DSC (e.g., live online chat, texting, and smartphone applications)?

- **Approach:** Based on pilot tests of new technologies during the annual Census Tests (2014–2017).
- **Decision by:** January 2017

### *Cost and Quality*

Investment in the DSC will have minimal impact on the cost of the 2020 Census as compared with the 2010 Census (under review).

Quality impacts of this operation on overall 2020 Census quality include the following:

↑ Providing an efficient DSC operation will enhance quality of data collection by enumerators during the 2020 Census.

### *Risks*

The number of staff hired for the DSC will be heavily based on the expected volume of calls received. **IF** call volumes are not accurately forecast, **THEN** staffing levels for the DSC may be inaccurate.

Adjustments to DSC staffing levels and roles are based on the schedule and scope for the 2020 Census field operations. **IF** late or frequent changes to the 2020 Census field operations schedule or scope occur, **THEN** there may not be sufficient time to hire and train additional DSC staff as needed.

### *Milestones*

| Date | Activity |
|---|---|
| September 2015 | Open DSC to support the 2016 Census Test. |
| September 2016 | Start support for the 2017 Census Tests. |
| January 2017 | Release the DSC Detailed Operational Plan.<br>Award the 2020 Census DSC contract. |
| September 2017 | Start support the 2018 Census End-to-End Test. |
| December 2017 | Start support for the 2020 Census RCC. |
| January 2019 | Start support for the 2020 Census Area Census Offices. |
| June 2021 | Close the DSC. |

## 5.9.2 Field Infrastructure

| Detailed Planning Status: | **Underway** |
|---|---|

### *Purpose*

The Field Infrastructure operation performs the following functions:

- Coordinate space acquisition for, and lease management of, the RCC and Area Census Offices.
- Provide the administrative infrastructure for data collection covering the 50 states, the District of Columbia, and Puerto Rico including:
  - Recruiting.
  - Hiring and onboarding.
  - Personnel and payroll administration.
  - Training.
  - Partnership support.
  - Management and supervision.
  - Clerical support.
  - Materials supply.
  - Printing and plotting.

### *Lessons Learned*

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Establish an interagency working group to identify and develop effective strategies for space acquisition and build communication among stakeholders.
- Opening some field offices earlier than the others allowed for a "test" run of implementation in the space acquisition effort and improved the process for opening the remaining (majority) of offices.
- Streamline and automate the job application process to replace the paper-based recruitment and testing process.

### *Opportunities to Innovate*

Opportunities to innovate include the following:

- Streamlined field management structure through the use of automation and technology to manage the Nonresponse Followup caseload.

- Automation of the job application and recruiting processes, payroll submission and approval process, and other administrative processes to streamline personnel processes and reduce staffing requirements and related costs.
- Use of automation for training, including providing newly hired staff with electronic training modules.

### *Description of Operation*

Field Infrastructure includes:

- Space acquisition or leasing, provisioning (specifications, schemas, designs, etc.), building-out, and supplying the RCC and field offices that will open to support field operations.
- Providing human resources and personnel management support functions, including recruiting, hiring and onboarding (i.e., suitability and background checks), training, payroll, and outprocessing (i.e., separation management).

### *Research Completed*

The following research has been completed for this operation:

- Review of other countries' census field infrastructure.
  - Findings: Best practices include consolidation of support functions in the field, specifically payroll, recruiting, and other administrative functions.
- Develop a new concept of operations for field infrastructure and test in the 2015 Census Test.
  - Findings: Field Staff Training:
    - Combination of online and classroom training provided standardization of the information, provided tracking capabilities, and offered various learning methods.
    - Reduced training hours compared with the 2010 Census Nonresponse Followup enumerator training from 32 to 18 hours.
    - Deployment of YouTube videos to quickly and efficiently provide targeted training to enumerators.
    - Identified topics requiring additional training in future tests.
  - Findings: Field Reengineering.
    - Area Operations Support Center and staffing of the Area Operations Support Center successful.
    - Electronic payroll successful.

### *Decisions Made*

The following decisions related to the 2020 Census Field Infrastructure operation have been made:

- ✓ The 2020 Census field office infrastructure will include six RCC.
- ✓ The RCC will be located in the same metropolitan areas as the Regional Offices.
- ✓ Separate office space will be needed in the RCC to support and manage Census Coverage Measurement Operations.
- ✓ The preliminary RCC staffing model is as follows:
  - General Management: one Regional Director and one Deputy Regional Director.
  - Data Collection: two Assistant Regional Census Managers and one Regional Manager for Operations, who oversees five Census Operations Managers located in different field offices.
  - Administrative Functions: one Assistant Regional Census Manager, one Recruiting Coordinator, two Administrative Coordinators, one Space, Leasing, and Supplies Coordinator, and one Lead Technical Support Coordinator (under review).
  - Geography Partnership and Quality: one Assistant Regional Census Manager, one Regional Manager for Quality Assurance, two Partnership Coordinators, and one Geographic Coordinator.
- ✓ The 2020 Census field office infrastructure will include up to 250 field offices, a small subset of which will open a few months early to support early census operations, including In-Field Address Canvassing.
- ✓ The preliminary field office staff model is as follows:
  - General Management: one Census Operations Manager (reporting to the Regional Manager for Operations at the RCC), one Manager for Support Operations and one Manager for Field Operations.

- Data Collection: multiple Field Managers for Operations, Local Supervisors for Operations, Trainers, and Enumerators; specific numbers based on workload; supervisory ratios to be determined.

✓ In-Field Address Canvassing will be managed out of the field offices.

✓ Recruiting activities will be automated.

✓ The job application and assessment (testing) process will be automated.

✓ Field staff training will employ the use of online training capabilities.

✓ The training pay rate will be lower than the production pay rate.

✓ The time and expense recording and approval process for data collection field staff will be automated for field operations.

✓ As part of the solution, the USPS will assist with onboarding processing for field staff.

### *Design Issues to Be Resolved*

Additional work is required to make decisions on the following questions:

What is the approach for the recruiting and onboarding process?

- **Approach:** Research based on the 2015 and 2016 Census Tests.
- **Decision by:** January 2017

Where will the field offices be located?

- **Approach:** Based on analysis of the estimated In-Field Address Canvassing and Nonresponse Followup workload.
- **Decision by:** January 2017

### *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

The investment in Field Infrastructure will have considerable cost impacts on the cost of the 2020 Census as compared with the 2010 Census through:

🡻 Reduced office infrastructure for In-Field Address Canvassing and NRFU operations.

🡻 Increased efficiencies due to automated administrative functions, including recruiting, onboarding, training, and payroll.

🡻 Increased cost savings due to reduced field staffing.

Quality impacts of this operation on overall 2020 Census quality include the following:

🡹 Fewer enumerator errors resulting from use of automation to improve training methodology and supervision capabilities.

🡹 Automated Job Application and Employment Assessment Testing.

🡹 Automated Personnel and Payroll Administration (e.g., Time and Attendance Submission).

### *Risks*

The infrastructure put in place to support the 2020 Census field operations is expected to manage the workload regardless of how large it may be. **IF** the field infrastructure is not sufficient to support the work for the 2020 Census, **THEN** there is significant risk of not being able to effectively or efficiently manage the associated field workload, which could have an impact on cost and data quality.

The number of offices and staffing levels are heavily based on the expected workload for the field operations that support the 2020 Census. **IF** late design changes occur that impact the workload for the field operations, **THEN** the number of offices and staffing levels may need to increase.

### Milestones

| Date | Activity |
|---|---|
| December 2015 | Approve final field staff recruiting and training approaches. |
| March 2016 | Finalize RCC space requirements.<br>Finalize number of field offices. |
| September 2016 | Release the Field Infrastructure Detailed Operational Plan. |
| January 2017 | Finalize locations of field offices. |
| December 2017 | Finalize field office space requirements. |
| December 2017 | Begin opening RCCs. |
| January 2019 | Begin opening field offices. |
| December 2020 | Complete closing of all field offices. |
| June 2021 | Complete closing of all RCCs. |

## 5.9.3 Decennial Logistics Management

| Detailed Planning Status: | **Underway** |
|---|---|

### Purpose

Decennial Logistics Management will provide logistics management services including procuring warehouse space, warehousing, inventory management, kit assembly, deployment of materials, and receiving and excessing materials.

### Lessons Learned

Based on lessons learned from the 2010 Census studies and reviews, the following recommendations were made:

- Purchase and deploy an Integrated Logistics Management System to gain cost benefits generated from bulk purchasing and significantly improve inventory control.
- Utilize barcode technology entirely, in conjunction with an Integrated Logistics Management System, to improve inventory control and reduce costs.
- Conduct training at local offices for inventory control, in conjunction with use of an Integrated Logistics Management System.
- Continue the belt-driven kit assembly line process.

### Opportunities to Innovate

Opportunities to innovate include the following:

- Implementation of an online, real-time Enterprise Resource Planning system.
- Implementation of a wireless network and bar code technology will automate inventory transactions.
- Extended implementation and access to the ERP system to RCC and field offices.
- Policy and procedure to require full material and supply inventory accounting throughout the Census using ERP system.

### Description of Operation

The Decennial Logistics Management operation for the 2020 Census consists of:

- Setting up a warehouse and office to support RCC and field office deployments.
- Recruiting, hiring, and training human resources to support NPC logistics operations.
- Providing the means to provision RCC, field offices, and field staff with supplies.
- Providing the RCC and field offices with operating materials, supplies, and equipment.
- Providing other support functions (e.g., printing, shipping, kitting, non-IT equipment).

### Work Completed

The following research has been completed for this operation:

- Study of current literature regarding Third-Party Logistics Organizations.
  - Findings: Given deadlines imposed by Third-Party Logistics Organizations, this approach is not consistent with the iterative development of 2020 Census requirements.
- Study of current literature on other logistics support models that may fit the characteristics of the 2020 Census:
  - Findings:
    - No new logistics models that align with the major characteristics of the 2020 Census: limited and short duration, high variety and high mix of Operating Materials and Supplies per operation, evolving

data availability regarding quantities of Operating Materials and Supplies.

  - Distributed warehousing will likely not work for the 2020 Census. The strong implication with distributed warehousing is that whatever is needed in each warehouse is well known ahead of time, which is not characteristic of a decennial census.

- The National Processing Center has implemented the first phase of the Integrated Logistics Management System project, to include inventory management. The product, Syteline, is operational. The contractor and the Office of Information Security continue working to complete requirements for full Authority to Operate, anticipated by the end of September 2015.

### *Decisions Made*

The following decisions related to the 2020 Census Decennial Logistics Management operation have been made:

✓ Logistics support for procurement, assembly, receiving, and deployment of non-IT operating materials, supplies, and equipment will be conducted by the NPC.

✓ Field Logistics support conducted by the NPC will occur at an off-site location due to space limitations within the current facility.

### *Design Issues to Be Resolved*

What are the preliminary plans for the Operating Materials and Supplies required to support the 2020 Census Operational design?

- **Approach:** Assess impact of operational design for other operations on Operating Materials and Supplies requirements through document review and conversations with operation team leads.
- **Decision by:** December 2015

What are the preliminary plans for quantities of Operating Materials and Supplies required to support operations?

- **Approach:** Assess impact of operational design for other operations on Operating Materials and Supplies requirements through document review and conversations with operation team leads.
- **Decision by:** December 2015

What role will NPC have in IT deployments?

- **Approach:** Develop a list of logistical responsibilities for NPC by operation.
- **Decision by:** March 2016

### *Cost and Quality*

The investment in Logistics improvements will have considerable cost impacts on the 2020 Census as compared with the 2010 Census through:

🡻 Online, real-time inventory transaction updates.

  º Better, and up-to-date, information for decision-making regarding on-going procurement activities.

🡻 Material requirements planning and resource requirements planning.

  º Generate better information about space requirements and staff required to manage inventory, and support field operations.

🡻 Production planning and scheduling of logistics activities via proven, automated system features instead of manual processes.

  º Reduces the reliance on spreadsheet management by providing automated planning and scheduling capabilities for this volatile census environment.

### *Risks*

NPC will deliver baselined space requirements for the logistics operation to GSA by April 1, 2016, to accommodate an 18-month lead time before occupancy. Major changes to these requirements could mean issues with space available, or the need to increase the amount of space to meet the changes in material requirements. **IF** the NPC receives significant changes to requirements for Operating Materials and Supplies after the requirements for warehousing logistics have been baselined, **THEN** this may affect a change in space requirements necessitating additional warehousing space, or may result in underutilizing space already leased.

The more information NPC receives about operational requirements early on in the planning and development stages tends to mitigate the need for, and the magnitude of, additional resources and costs. **IF** the NPC receives changes to operational requirements as the 2020 Census work progresses, **THEN** this may change the cost of logistics operational support, due to the need to add staff or implement overtime to avoid schedule delays.

### *Milestones*

| Date | Activity |
|---|---|
| April 2016 | Initiate search and build out activities for Logistics Space. |
| September 2016 | Release the Decennial Logistics Management Detailed Operational Plan. |
| March 2017 | Initiate Equipment Leases for Logistics Functions. |
| October 2017 | Occupy Logistics Space: installations complete and ready to operate. |
| May 2021 | Close down Logistics Operations. |

## 5.9.4 IT Infrastructure

| Detailed Planning Status: | **Underway** |
|---|---|

### *Purpose*

The purpose of the IT Infrastructure operation is to provide the information technology-related infrastructure support to the 2020 Census, including:

- Enterprise systems and applications.
- Decennial specific systems, applications, and interfaces.
- Field IT infrastructure (RCC and field offices).
- Mobile computing.

### *Lessons Learned*

Based on lessons learned from the 2010 Census, as well as the 2014 and 2015 Census Tests, the following recommendations are made:

- Provide nonfunctional and functional requirements that drive the design of the infrastructure (e.g., performance, availability, information about the users, monitoring, printing, reporting, and security).
- Use of prototypes and a test local census office helps validate the design of the IT infrastructure.
- Opening some field offices earlier than the others allowed for a "test" run of the deployment of the IT infrastructure, including the equipment and the telecommunications.
- IT Infrastructure Readiness preparation and assessment process for the 2015 Census Test was instrumental and should continually be used to improve remaining tests for the 2020 Census.
- Improvements are needed in assessing and approving requested changes to business and technical requirements.

### *Opportunities to Innovate*

Opportunities to Innovate include the following:

- Early development of solutions architecture.
- Use of enterprise solutions.
- Iterative deployment of infrastructure aligned with and based on testing.
- Use of workload demand models to size IT solutions appropriately.
- Scalable solutions.
- Agile development of applications.

### *Description of Operation*

Each component of the IT Infrastructure operation is described below.

**Enterprise Systems and Applications:** This support area includes the planning and implementation of all hardware and software to support operations for the 2020 Census, as well as the management and monitoring of those systems, including but not limited to:

- CEDCaP Systems.
- CEDSCI Systems.
- Shared Services (Virtual Desktop Infrastructure, etc.).

**Decennial Specific Applications:** This support area includes the planning and implementation of all hardware and software to support operations for the 2020 Census, as well as the management and monitoring of those systems. Including but not limited to:

- Recruiting, hiring, and on-boarding tools (including training).
- Personnel and payroll applications (e.g., Decennial Applicant Personnel Payroll System).
- Census Hiring and Employment Check and fingerprinting.

**RCC and Field Office IT Infrastructure:** This support area covers the deployment of IT capabilities in the form of office automation services to any RCC, field office, facility, or work location opened as part of the 2020 Census operations. It includes support for all field data collection

operations through automated recruiting, hiring, staffing, training, fingerprinting, and mobile device support including:

- Definition of functional and nonfunctional solution requirements for field offices.
- Development of the IT computing environment design.
- Procurement of circuits and IT equipment for the census field offices.
- Shipping, configuration, testing, and staging of IT equipment for the census field offices.
- Tear-down and disposition of IT equipment and circuits at the conclusion of the 2020 Census activities.

Field IT infrastructure requirements will provide, at a minimum, for the following:

- Decennial Service Center.
- National Processing Center.
- Regional Census Centers.
- Area Census Offices.
- Partnerships, if needed.
- Mobile offices and vehicles, if needed.
- Offices for outlying areas (Island Areas).
- Regional technicians.

**Mobile Computing:** By leveraging technology innovations such as MAM programs, secure applications, provided via BYOD or Device as a Service, the Census Bureau will implement a flexible and efficient acquisition strategy to procure mobile devices and services for fieldworkers.

### *Work Completed*

The following work has been completed for this operation:

- Established the Field IT infrastructure for the 2014 Census Test, 2014 SIMEX, and 2015 Census Test.
- Established the Headquarters IT infrastructure to support the 2014 Census Test, 2014 SIMEX, and 2015 Census Tests. Mapped the IT infrastructure to each operational component being tested to evaluate and ensure readiness.
- Used Mobile Device Management solution and MAM solution to push and securely manage mobile applications on mobile devices.
- Provided infrastructure to support testing of:
  - Internet Data Collection.
  - Real-Time Non-ID Processing.

### *Decisions Made*

The following decisions related to the 2020 Census IT Infrastructure operation have been made:

- ✓ An incremental approach will be used to define, deploy, and test the IT Infrastructure.
- ✓ Mobile devices will be used for field data collection.
- ✓ Whenever technically feasible and cost effective, enterprise solutions will be used in support of the 2020 Census.
- ✓ A hybrid cloud design will be used for all 2020 Census systems requiring scaling wherever possible.
- ✓ Virtual Desktop Infrastructure will be used for all RCC and field office staff.

### *Design Issues to Be Resolved*

What cloud services are required to support the 2020 Census operational design (to include CEDCaP and non-CEDCaP)?

- **Approach:** Testing in FY 2016 with some key 2020 Census systems—acquisitions being put in place to meet these needs and those beyond 2016; output of demand models will be used to develop performance requirements.
- **Decision by:** June 2016

What is the projected demand that the IT infrastructure and systems need to accommodate?

- **Approach:** External and internal demand models being developed and matured through testing.
- **Decision by:** June 2016 (to support acquisition of cloud computing services)

What is the solutions architecture (applications, data, infrastructure, security, monitoring, and service management) for the 2020 Census, including use of enterprise solutions?

- **Approach:** Maturation of the business architecture and solutions architecture in line with the refinements of the Operational Plan and test results.
- **Decision by:** September 2016

To what extent will BYOD and Device as a Service be used to support field operations?

- **Approach:** Testing in FY 2015 and FY 2016 will provide key insights into use of BYOD for the 2020 Census.
- **Decision by:** September 2016

What is the plan for the use of mobile devices for the 2020 Census? Security Platform for Mobile Devices (BYOD and Device as a Service)? BYOD Acceptable Use Policy? BYOD Reimbursement Policy?

- **Approach:** Based on analysis of the performance of solutions fielded and tested.
- **Decision by:** October 2017

### *Cost and Quality*

Cost impacts of this operation on overall 2020 Census costs include the following:

The investment in IT Infrastructure will decrease the cost of the 2020 Census through:

- ↓ Leverage enterprise solutions.
- ↓ Leveraging cloud computing to address peak performance requirements.

Quality impacts of this operation on overall 2020 Census quality include the following:

- ↑ Use of automation to collect real-time data, enabling better monitoring and management of the data collection activities.
- ↑ Automated Training and Knowledge Base.
- ↑ Sufficient mobile and networking infrastructure to effectively support field operations.
- ↑ Sufficient IT infrastructure to provide necessary levels of performance, to include acceptable interactions by the public, partners, and others.
- ↑ Robust processes for system development.

### *Risks*

The IT infrastructure built to support the 2020 Census operations is dependent on the Business Process Models and Business Requirements developed by each operation. **IF** there are potential gaps in business representation in the development of Business Process Models and Business Requirements, **THEN** the appropriate IT Infrastructure may not be in place to support the 2020 Census operations.

The technical solutions that will support the 2020 Census operations are dependent on the business requirements developed by each operation being further broken down into detailed solution-level technical and performance requirements. **IF** business requirements are not appropriately decomposed into solution-level technical and performance requirements, **THEN** technical solutions may not be designed and built in a timely manner to support the 2020 Census operations.

### *Milestones*

#### *IT Infrastructure Milestones*

| Date | Activity |
|---|---|
| September 2016 | Release the IT Infrastructure Detailed Operational Plan.<br>Finalize Definition of Field IT Infrastructure Solution Requirements. |
| December 2016 | Award Contract for Field IT Infrastructure.<br>Finalize Field Office IT Infrastructure Design. |
| November 2017 | Begin Installation of IT Infrastructure for the Regional Census Centers. |
| June 2019 | Begin Installation of IT Infrastructure for the Area Census Offices. |

### *Cloud Testing and Readiness Milestones*

| Date | Activity |
|---|---|
| January 2015 | Identify cloud computing as the assumed technical solution in support of the CEDCaP Decennial Infrastructure Scale-Up Project. |
| June 2015 | Conduct initial testing of Internet Self-Response using cloud computing services. |
| September 2015 | Acquire cloud computing services in place to support the 2016 Census Tests.<br>Deliver initial output from the 2020 Census workload demand models, including Internet Response. |
| December 2015 | Deliver initial baseline of decomposed 2020 Census solution-level performance requirements provided by 2020 Census Integrated Project Teams. |
| March 2016 | Complete 2020 Census technical solution-level requirements, including performance requirements. |
| June 2016 | Deliver analyses of alternatives and recommended solutions architecture, to include cloud computing as a solution alternative, in support of technical solution-level requirements. |
| September 2016 | Acquire cloud computing services to support the 2017 Census Tests and future Census Tests. |
| June 2017 | Leverage cloud computing in support of 2017 Census Test and analyze test results. Modify workload demand models and technical solution architecture. |
| June 2018 | Leverage cloud computing in support of 2018 Census End-to-End Test and analyze test results. Modify workload demand models and technical solution architecture. |
| September 2019 | Ensure readiness of final cloud computing solution for 2020 Census. |

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# 6. Key Program-Level Risks

The 2020 Census Risk Management process consists of activities performed to reduce the probability and consequences of events that could negatively affect the 2020 Census Program's ability to meet its objectives. The goal of the risk management process is to ensure a common, systematic, and repeatable assessment approach at both the program- and project-level so that risks can be effectively identified and managed, as well as clearly communicated to management, stakeholders, and executive-level decision-makers. Risk management is iterative and designed to be performed continuously throughout the 2020 Census Program's Research and Testing, Development, and Implementation phases.

Figure 34 shows the current risk matrix for all risks in the 2020 Census Program Risk Register, as of August 31, 2015.

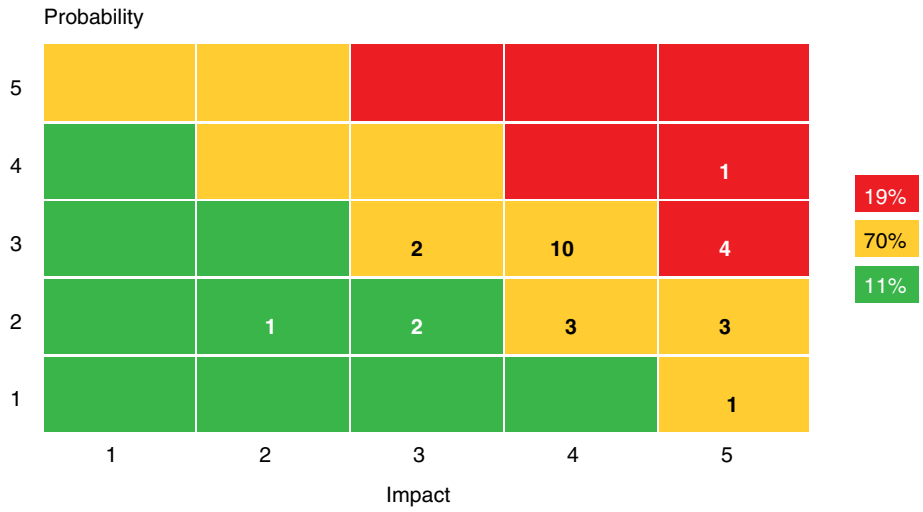



**Figure 34: 2020 Census Program-Level Risk Matrix**

From the 2020 Census Risk Register, 11 key program-level risks are highlighted in the sections below. These risks were selected from the risk register because members of the 2020 Census Risk Review Board agreed these 11 key risks represent the major concerns that could affect the design or the successful implementation of the 2020 Census.

Along with the risk statement, the probability rating, the impact rating, the risk exposure, and the risk color are provided for each risk. Mitigation strategies are also provided. For information about all the program-level risks, the full program risk register is available upon request.

## 6.1 FUNDING REQUESTS NOT REALIZED

To execute a 2020 Census that reduces cost while maintaining quality, the Census Bureau requires appropriate funding during the entire life cycle of the program.

**IF** the funding appropriated for each fiscal year during the 2020 Census life cycle is less than requested or not provided at the start of each fiscal year, **THEN** the Census Bureau will have to reprioritize the projects, which may affect the ability to reengineer the systems and operations supporting the 2020 Census.

| | |
|---|---|
| Probability 4<br>(Likely) | Impact 5<br>(Major impact)<br>**HIGH** |

Mitigation Strategies include the following:

- Formulate and submit robust cost estimates (including contingencies for known and unknown risks) for planned 2020 Census activities per fiscal year.
- Develop strong budget justifications that demonstrate the negative impact of insufficient funds for 2020 Census activities per fiscal year.
- Prioritize research, testing, and implementation activities per fiscal year to focus on those areas that can significantly impact cost and quality, and develop contingency plans to quickly respond to budget cuts.

## 6.2 REENGINEERING ADDRESS CANVASSING OPERATION

For the 2010 Census, a near 100-percent Address Canvassing operation in the field was used to update and validate a complete and accurate inventory of addresses, which forms the basis for the census enumeration. For the 2020 Census, a variety of in-office techniques are being tested for use in updating and validating the completeness of the address inventory. These in-office techniques are expected to reduce the areas that require fieldwork while achieving an equal or greater result, thereby reducing costs and improving quality for the overall 2020 Census program.

**IF** the established threshold of addresses to update and validate through in-office techniques is not achieved with the expected level of quality and cost, **THEN** the 2020 Census program objectives may not be met.

| | |
|---|---|
| Probability 3<br>(Moderately likely) | Impact 5<br>(Major impact)<br>**HIGH** |

Mitigation Strategies include the following:

- Establish the objectives for In-Office Address Canvassing through the development of the 2020 Census Operational Plan.
- Baseline the techniques for In-Office Address Canvassing through the development of the Address Canvassing Detailed Operational Plan.
- Test the techniques by conducting In-Office Address Canvassing beginning in September 2015.
- Evaluate In-Office Address Canvassing techniques and results through the MAF Coverage Study, which is a continuous field activity beginning in April 2016.
- Update, as necessary, the In-Office Address Canvassing techniques from lessons learned and recommendations.

## 6.3 ADMINISTRATIVE RECORDS AND THIRD-PARTY DATA—EXTERNAL FACTORS

The Census Bureau is planning to use administrative records and third-party data to reduce need to follow up with nonrespondents through the identification of vacant and deleted housing units (those that do not meet the Census Bureau's definition of a housing unit) and the enumeration of nonresponding housing units.

**IF** external factors or policies prevent the Census Bureau from utilizing administrative records and third-party data as planned, **THEN** the Census Bureau may not be able to fully meet the strategic goal of containing the overall cost of the 2020 Census.

| | |
|---|---|
| Probability 3<br>(Moderately likely) | Impact 5<br>(Major impact)<br>**HIGH** |

Mitigation Strategies include the following:

- Identify external stakeholders that have an interest in Census Bureau policies regarding administrative record and third-party data usage.
- Develop a stakeholder communications plan for identified external stakeholders.
- Regularly communicate to and seek feedback from identified external stakeholders on design decisions and research and testing results related to the use of administrative records and third-party data for the 2020 Census.
- Assess impacts of any changes to the design based on feedback from external stakeholders and update plans accordingly.
- Monitor external factors and policies that may impact the Census Bureau's planned use of administrative records and third-party data for the 2020 Census.

## 6.4 PUBLIC PERCEPTION OF ABILITY TO SAFEGUARD RESPONSE DATA

The accuracy and usefulness of the data collected for the 2020 Census are dependent upon the ability to obtain information from the public, which is influenced partly by the public's perception of how well their privacy and confidentiality concerns are being addressed.

**IF** a substantial segment of the public is not convinced that the Census Bureau can safeguard their response data against data breaches and unauthorized use, **THEN** response rates may be lower than projected, leading to an increase in cases for follow-up and cost increases.

| | |
|---|---|
| Probability 3<br>(Moderately likely) | Impact 5<br>(Major impact)<br>**HIGH** |

Mitigation Strategies include the following:

- Develop a communications strategy to build and maintain the public's confidence in the Census Bureau's ability to keep their data safe.
- Research other Census Bureau divisions, other government agencies, and the private sector to understand how they effectively mitigate the issue of public trust and IT security.
- Continually monitor the public's confidence in data security in order to stay abreast of their probable acceptance of the Census Bureau's methods for enumeration.
- Prepare for rapid response to mitigate public concerns regarding any incidents that occur that could affect public perception of the Census Bureau's ability to safeguard response data (e.g., breach of data from another government agency).

## 6.5 CYBERSECURITY INCIDENTS

Security breaches could happen to the Census Bureau's Internet data collection instrument, mobile devices used for fieldwork, and data processing and storage systems. IT security controls will be put in place to block attempts from outside infiltration, as well as to prevent any negative impacts to services or data, such as network disruption (denial of services), technical malfunctions, and stolen or corrupted data.

**IF** a cybersecurity incident (i.e., breach) occurs to the systems or devices being utilized for the 2020 Census, **THEN** additional technological efforts will be required to repair or replace the systems and devices affected in order to maintain secure services and data.

| | |
|---|---|
| Probability 3<br>(Moderately likely) | Impact 5<br>(Major impact)<br>**HIGH** |

Mitigation Strategies include the following:

- Monitor system development efforts to ensure the proper security guidelines are followed during the system development phase.
- Research other Census Bureau programs, other government agencies, and the private sector to understand how they effectively mitigate cybersecurity incidents.
- Audit systems and check logs to help in detecting and tracing an outside infiltration.
- Contract with third-party testers to perform threat and vulnerability analysis.
- Prepare for rapid response to address any detected cybersecurity incidents.

## 6.6 ENTERPRISE IT SOLUTIONS

The Census Bureau, wherever feasible, will leverage cross-program IT solutions and has begun the work necessary to ensure this is achieved. However, enterprise solutions may not address all of the 2020 Census requirements or late changes may be required after key development milestones. In these cases, impacts must be identified and proper actions taken to resolve the situation.

**IF** enterprise IT solutions cannot meet the 2020 Census requirements or late changes are required, **THEN** existing systems may require substantial modifications or entirely new systems may have to be developed, adding complexity and increasing risk for a timely and successful 2020 Census.

| | |
|---|---|
| Probability 3<br>(Moderately likely) | Impact 4<br>(Substantial impact)<br>**MEDIUM** |

Mitigation Strategies include the following:

- Engage with enterprise efforts to ensure that solutions architectures align and provide continued support for 2020 Census requirements development and management.
- Participate in agency-wide solution development (i.e., avoid custom solutions where enterprise or off-the-shelf solutions will suffice) and ensure that contingencies (i.e., off-ramps) are developed early and exercised when necessary.
- Determine the extent existing systems from the 2010 Census can be modified and reused if necessary.
- Ensure IT solutions are sufficiently scalable to adjust to unexpected peaks in the workload.
- Design IT solutions that are flexible enough to incorporate design changes.
- Establish a change control management process to assess impacts of change requests to facilitate decision-making.
- Prepare for rapid response to implement change based on the results of the change control process.

## 6.7 TECHNOLOGICAL INNOVATIONS SURFACING AFTER DESIGN IS FINALIZED

Technological innovations inevitably surface, but the 2020 Census program must move forward toward building the operational design, which will be finalized and put into production for the 2018 Census End-to-End Test.

**IF** technological innovations surface after the design for the 2020 Census has been finalized, **THEN** development and testing life-cycle phases must be compressed if the innovations are adopted, resulting in less time to mature innovations in census methodologies and systems.

| | |
|---|---|
| Probability 3<br>(Moderately likely) | Impact 4<br>(Substantial impact)<br>**MEDIUM** |

Mitigation Strategies include the following:

- Build versatile operations and systems design.
- Keep team members and management aware of evolving technological innovations.
- Devote dedicated resources to track and communicate innovations.
- Dedicate funds to incorporate innovations into the design.

## 6.8 DATA QUALITY

The planned innovations for the design of the 2020 Census aspire to save significant taxpayer dollars by making data collection and field operations more efficient.

**IF** the innovations implemented to meet the 2020 Census cost goals result in unanticipated negative impacts to data quality, **THEN** additional unplanned efforts may be necessary in order to increase the quality of the census data.

| | |
|---|---|
| Probability 3<br>(Moderately likely) | Impact 4<br>(Substantial impact)<br>**MEDIUM** |

Mitigation Strategies include the following:

- Perform cost and quality trade off analysis on data collected during field tests.
- Review results of cost and quality trade off analysis, and determine the most cost-effective

methods, if any, for increasing quality without sacrificing cost savings.

## 6.9 LATE OPERATIONAL DESIGN CHANGES

After key planning and development milestones are completed, stakeholders may disagree with the planned innovations behind the 2020 Census and decide to modify the design, resulting in late operational design changes.

**IF** operational design changes are required following the completion of key planning and development milestones, **THEN** the 2020 Census program may have to implement costly design changes, increasing the risk for a timely and successful 2020 Census.

| | |
|---|---|
| Probability 3<br>(Moderately likely) | Impact 4<br>(Substantial impact)<br>**MEDIUM** |

Mitigation Strategies include the following:

- Identify external stakeholders that have an interest in the 2020 Census operational design.
- Develop a stakeholder communications plan for identified external stakeholders.
- Regularly communicate to and seek feedback from identified external stakeholders on design decisions and research and testing results.
- Assess impacts of any changes to the design based on feedback from external stakeholders and update plans accordingly.
- Monitor external factors and policies that may impact the Census Bureau's planned innovations for the 2020 Census operational design.
- Establish a change control management process to assess impacts of change requests to facilitate decision-making.
- Prepare for rapid response to implement change based on the results of the change control process.

## 6.10 ADMINISTRATIVE RECORDS AND THIRD-PARTY DATA—ACCESS AND CONSTRAINTS

The Census Bureau is planning to use administrative records and third-party data to reduce the need to follow up with nonrespondents through the identification of vacant and deleted housing units (those that do not meet the Census Bureau's definition of a housing unit) and the enumeration of nonresponding occupied housing units. The use of administrative records data requires special handling and security protocols that affect the development of the systems and infrastructure supporting the 2020 Census.

**IF** the Census Bureau does not have timely and continual access to administrative records and third-party data, or the data providers place constraints on the use of the data that conflicts with planned 2020 Census operations, **THEN** the Census Bureau may not be able to fully meet the strategic goal of containing the overall cost of the 2020 Census.

| | |
|---|---|
| Probability 2<br>(Not likely) | Impact 5<br>(Major impact)<br>**MEDIUM** |

Mitigation Strategies include the following:

- Identify all required administrative records and third-party data sets needed for the 2020 Census program, including data providers and points-of-contact.
- Review data sharing agreements/contracts in order to understand all the conditions assigned to the administrative records and third-party data sets and to ensure conditions are appropriate.
- Ensure requirements for administrative records and third-party data usage are developed and documented.
- Inform data providers that data agreements/contracts need to be updated.

- Disseminate updated data agreements/contracts to internal stakeholders.
- Negotiate with the source providers to ensure required administrative records and third-party data are available when needed.
- Ensure the build-out for all systems supporting the 2020 Census takes into account the handling of administrative records and third-party data.
- Ensure the security requirements, including physical security, for all systems supporting the 2020 Census cover the handling of administrative records and third-party data.
- Ensure staff has been trained in the proper handling of administrative records and third-party data.

## 6.11 POLICY IMPACTS

The Census Bureau is introducing significant innovations to conduct the 2020 Census. Some of these innovations may be contingent upon interpretation of current policies or the development of new policies where gaps exist.

**IF** policies prevent the 2020 Census program from implementing the proposed innovations, **THEN** the 2020 Census program may not be able to meet the strategic goals and objectives of the program.

| | |
|---|---|
| Probability 2<br>(Not likely) | Impact 3<br>(Moderate impact)<br>**LOW** |

Mitigation Strategies include the following:

- Actively engage key internal and external stakeholders to build support for the use of new or modified activities and operations for enumeration in the 2020 Census.
- Determine if current or new policies, both internal and external, will affect the implementation of the proposed innovations.

# 7. Quality Analysis

As the Census Bureau continues to evaluate the 2020 Census operational design, an analysis of the impact on the quality of the census results is required to ensure that innovations designed to reduce cost do not have an unacceptable impact on quality. This section describes the analysis performed to date on the quality impacts of three of the four key innovation areas: Reengineering Address Canvassing, Optimizing Self-Response, and Utilizing Administrative Records and Third-Party Data. The analysis related to administrative records and third-party data focuses on the impact of these innovations on Nonresponse Followup (NRFU) as that operation is where the innovations are expected to provide the greatest cost savings.

Accordingly, this section is organized as follows:

- Quality impacts for Reengineering Address Canvassing
- Quality impacts for Optimizing Self-Response
- Quality impacts of Utilizing Administrative Records and Third-Party Data for NRFU
- Future plans to assess quality impacts of 2020 Census innovations

The quality of the 2010 Census was measured using the Census Coverage Measurement Survey.[12] The CCM was a post-enumeration survey designed to assess the coverage of the census for housing units and persons, including estimates of omissions and erroneous enumerations. The CCM estimated a net over-count of 0.01 percent, or 36,000 persons. There were an estimated 10.0 million erroneous enumerations for the household population and 16.0 million omissions. To identify the potential cost and quality implications of the 2020 Census, the Census Bureau does not yet have the benefit of a post-enumeration survey. However, this analysis uses some findings from the CCM survey to make assumptions about what to expect given the 2020 Census design plans. In addition, census test results and simulations with 2010 Census data are used to assess potential cost and quality effects.

[12] The scope of the 2010 CCM survey excluded people living in group quarters and in Remote Alaska.

## 7.1 REENGINEERED ADDRESS CANVASSING

The primary question being examined related to the quality of the reengineered Address Canvassing operation is:

- What are the quality impacts of the use of the reengineered Address Canvassing innovations that use in-office methods for updating the majority of addresses?

The quality of the 2010 Address Canvassing operation compared well to that of the 2000 operation, but as expected, there were some errors. Johnson and Kephart[13] evaluated the accuracy of the address frame after the Address Canvassing operation. Using the results of the 2010 CCM results, they estimated the percentage of housing units correctly added (or added in error) and correctly deleted (or deleted in error) by census operations. Of the addresses added in the 2010 Address Canvassing operation, 16.4 percent were added erroneously. This represented approximately 1.2 percent of the records processed in the Address Canvassing operation. Meanwhile, of the addresses that the Address Canvassing operation deleted, 4.3 percent were deleted or identified as duplicated erroneously. This represented approximately 0.5 percent of the records processed in the Address Canvassing operation. The evaluation concluded that the higher added-in-error rate was due to listers being encouraged to add addresses even when there was doubt about their status.

The impact of In-Office Address Canvassing innovations on the overall quality of the operation is still uncertain. The following analysis assesses the potential implications of conducting 17.5 percent, 25.0 percent, and 32.0 percent of Address Canvassing in the field, and the remainder in the office only. There are currently two key quality metrics for this operation: missed adds and missed deletes.

To measure the rate of missed adds and missed deletes for the 2010 Census, the Census Bureau

[13] Johnson, N. and Kephart, K., *2010 Census Evaluation of Address Frame Accuracy and Quality*, 2010 Census Planning Memoranda Series No. 252, 2013.

used the results of the 2010 CCM Initial Housing Unit Matching Operation. This operation matched the addresses of the CCM Independent List to census addresses after Address Canvassing. Because it excluded updates from census enumeration operations, it was a good representation of the correctness of the frame after the Address Canvassing operation. Using the match rate as a proxy for the success rate for capturing adds, the rate of missed adds in 2010 was 3.5 percent. Using the percent of correct enumerations as a proxy for the success rate of identifying deletes, the rate of missed deletes was 3.7 percent.

The Census Bureau has estimated missed adds and missed deletes based on the plan for the 2020 Census, with the combination of in-office and in-field work. This required some assumptions about success rates for in-office and in-field procedures, and the proportion of add and delete actions in the initial address frame. These assumptions were developed using the results of the 2015 Address Validation Test, 2010 CCM survey results, and expert opinion. (See Table 8 below.) It shows missed adds and deletes, given 32.0 percent, 25.0 percent, or 17.5 percent In-Field Address Canvassing in late 2019. For example, if the Census Bureau limits in-field work to approximately 25 percent of the total addresses, Address Canvassing may fail to add an estimated 1.4 million addresses, or 0.96 percent of the total addresses. The Address Canvassing operation may also fail to identify 2.9 million addresses that should be deleted, or 1.94 percent of the total addresses. These estimated error rates increase with decreased In-Field Address Canvassing.

### Table 8: Estimated Missed Adds and Missed Deletes by Percentage of In-Field Address Canvassing

| Amount of In-Field Address Canvassing | Percentage of In-Field Address Canvassing | Error Rates | |
|---|---|---|---|
| | | Missed Adds | Missed Deletes |
| ≈ **32.0%** | 31.89 | 693,129<br>(0.47%) | 2,102,976<br>(1.43%) |
| ≈ **25.0%** | 24.89 | 1,415,541<br>(0.96%) | 2,856,198<br>(1.94%) |
| ≈ **17.5%** | 17.56 | 2,145,944<br>(1.46%) | 3,624,283<br>(2.47%) |

The estimated rates of missed adds and deletes would also vary given the In-Office Address Canvassing success rate of capturing adds and deletes. (In Table 8 above, success rates of 95 percent for capturing adds and deletes are assumed for each of the three scenarios.) Table 9 shows that with 24.89 percent In-Field Address Canvassing, if the in-office procedures are 100-percent successful, rates of missed adds and deletes may be limited to 0.75 percent and 1.72 percent, respectively. However, if in-office procedures are only 85 percent successful, the rate of missed adds and deletes may increase to 1.38 percent and 2.39 percent, respectively. As expected, this also varies given the percentage of In-Field Address Canvassing. Given a17.5 percent In-Field Address Canvassing rate, if the in-office procedures are 100-percent successful, rates of missed adds and deletes may be limited to 1.25 percent and 2.24 percent, respectively. If the in-office procedures are merely 85-percent successful, these rates of missed adds and deletes may increase to 1.88 percent and 2.92 percent, respectively.

## Table 9: Estimated Missed Adds and Missed Deletes by In-Office Address Canvassing Success Rate

| In-Office Success Rate | Percentage of In-Field Address Canvassing | Error Rates | |
|---|---|---|---|
| | | Missed Adds | Missed Deletes |
| **32.0% In-Field Address Canvassing** | | | |
| **100.0%** | 31.89 | 387,065 (0.26%) | 1,776,686 (1.21%) |
| **95.0%** | 31.89 | 693,129 (0.47%) | 2,102,976 (1.43%) |
| **90.0%** | 31.89 | 999,192 (0.68%) | 2,429,267 (1.65%) |
| **85.0%** | 31.89 | 1,305,256 (0.89%) | 2,755,557 (1.87%) |
| **25.0% In-Field Address Canvassing** | | | |
| **100.0%** | 24.89 | 1,107,721 (0.75%) | 2,526,845 (1.72%) |
| **95.0%** | 24.89 | 1,415,541 (0.96%) | 2,856,198 (1.94%) |
| **90.0%** | 24.89 | 1,723,361 (1.17%) | 3,185,551 (2.17%) |
| **85.0%** | 24.89 | 2,031,181 (1.38%) | 3,514,905 (2.39%) |
| **17.5% In-Field Address Canvassing** | | | |
| **100.0%** | 17.56 | 1,836,384 (1.25%) | 3,291,848 (2.24%) |
| **95.0%** | 17.56 | 2,145,944 (1.46%) | 3,624,283 (2.47%) |
| **90.0%** | 17.56 | 2,455,503 (1.67%) | 3,956,718 (2.69%) |
| **85.0%** | 17.56 | 2,765,063 (1.88%) | 4,289,153 (2.92%) |

The estimated rates of missed adds and missed deletes are also affected by the percentage of address add and delete actions expected in the initial frame, that is, the frame at the beginning of fiscal year 2016, as described in Table 10. Given 25 percent In-Field Address Canvassing, if 4.0 percent of the actions are adds and 5.4 percent are deletes, there may be an estimated 0.96 percent final rate of missed adds and 1.94 percent final rate of missed deletes. (Table 8 and Table 9 assume 4.0 percent adds and 5.4 percent deletes. These numbers are based on results from the Address Validation Test.) However, these errors decrease to 0.60 percent for missed adds and 1.44 percent for missed deletes if the proportion of add and delete actions only 3.0 percent and 4.0 percent, respectively.

## Table 10: Estimated Missed Adds and Missed Deletes by Percentage of Added and Deleted Addresses in the Initial Frame

| Initial Frame | Percentage of In-Field Address Canvassing | Error Rates | |
|---|---|---|---|
| | | Missed Adds | Missed Deletes |
| **32.0% In-Field Address Canvassing** | | | |
| **3.0% Adds / 4.0% Deletes** | 31.89 | 438,777 (0.30%) | 1,526,927 (1.04%) |
| **4.0% Adds / 5.4% Deletes** | 31.89 | 693,129 (0.47%) | 2,102,976 (1.43%) |
| **5.0% Adds / 6.8% Deletes** | 31.89 | 2,122,883 (1.44%) | 4,104,632 (2.79%) |
| **25.0% In-Field Address Canvassing** | | | |
| **3.0% Adds / 4.0% Deletes** | 24.89 | 888,923 (0.60%) | 2,110,553 (1.44%) |
| **4.0% Adds / 5.4% Deletes** | 24.89 | 1,415,541 (0.96%) | 2,856,198 (1.94%) |
| **5.0% Adds / 6.8% Deletes** | 24.89 | 2,846,495 (1.94%) | 4,859,533 (3.31%) |
| **17.5% In-Field Address Canvassing** | | | |
| **3.0% Adds / 4.0% Deletes** | 17.56 | 1,686,682 (1.15%) | 2,808,592 (1.91%) |
| **4.0% Adds / 5.4% Deletes** | 17.56 | 2,145,944 (1.46%) | 3,624,283 (2.47%) |
| **5.0% Adds / 6.8% Deletes** | 17.56 | 3,577,958 (2.43%) | 5,629,103 (3.83%) |

This analysis suggests that missed adds for the 2020 Census may range from 0.60 percent to 1.94 percent, given 25 percent rate of In-Field Address Canvassing. Missed deletes may range from 1.44 percent to 3.31 percent. Given the 2010 Census proxy missed add and delete rates of 3.5 and 3.7, respectively, these estimates suggest that the 2020 Census Address Canvassing operation may maintain the level of quality of the 2010 Census operation as defined by these metrics.

The above analysis will be refined to include results from tests conducted over the next several years. The next step is to analyze the results of the 2015 Address Validation Test and incorporate these findings into the error estimates.

### *Address Canvassing Downstream Impacts*

The cost and quality implications of planned changes to the Address Canvassing operation have been assessed separately from the other major operations, but Address Canvassing could have important impacts on other operations downstream. If there are more missed adds, i.e., Address Canvassing methods fail to identify additional addresses, there would be a negative impact on the coverage of the census if other operations fail to identify them as well. In the 2010 Census, more than 800,000 housing units were added to the address frame from the NRFU and Vacant Delete Check operations. However, a reengineered approach to NRFU field operations may limit the Census Bureau's ability to detect new addresses. In the 2010 Census, NRFU enumerators were assigned areas to contact and were instructed to get interviews at any addresses that appeared to be missing from their list. In the 2020 Census, enumerators will be given a specific list of addresses to visit. This issue will need to be addressed. If additional missed adds can be captured through NRFU or other field operations, the census would maintain good coverage, but there could be negative cost implications.

Missed adds may also be captured through non-ID responses. In the 2010 Census, non-ID responses were limited to "Be Counted" forms and some Telephone Questionnaire Assistance responses. But the introduction of the Internet is expected to increase the number of non-ID responses. Any addresses missed by the Address Canvassing operation that are captured through non-ID would maintain or increase coverage. The addition of these addresses through non-ID could have negative cost implications, however, by increasing the workload for manual matching, manual geocoding, or address verification.

There are potential cost and quality implications downstream for missed deletes as well. If the Address Canvassing operation fails to identify addresses that should be deleted, there is the potential for over-coverage. However, similar to missed adds, it is likely that missed deletes will be identified in other operations. Missed deletes could be identified in NRFU or other field operations, resulting in proper coverage, but with a negative impact on costs. However, missed deletes may also be identified with administrative records and third-party data and removed from the NRFU workload. If administrative records and third-party data correctly identify an address as a delete, rather than vacant or occupied, the census could maintain coverage without negative cost implications.

## 7.2 OPTIMIZING SELF-RESPONSE

The primary question being examined related to the quality of the Optimizing Self-Response operation is:

- What are the quality impacts of the widespread use of the Internet for self-response?

For the 2010 Census, the primary method of self-response was a paper-based questionnaire. The final national mail response rate, defined as the number of unduplicated nonblank mail returns divided by the number of housing units in the mailback universe, was 66.5 percent. The use of the Internet may improve the quality of responses and is expected to generate significant cost savings relative to paper questionnaires. The use of the Internet will also include real-time processing. This will allow late self-responses to be removed from the NRFU workload, eliminating unnecessary and expensive contact attempts. Internet self-response may also increase the percentage of telephone responses, as well as the related costs. Respondents who are unsuccessful submitting their information online may contact Census Questionnaire Assistance and provide information over the phone. Responses from paper, Internet, and CQA are all considered self-response for the purposes of this report.

The 2010 CCM survey estimated that 284.7 million enumerations, or 94.7 percent of the 300.7 million census enumerations, were correct. The percentage of correct enumerations varied by certain characteristics, including whether the response was obtained through self-response (mail) or a NRFU operation. (See Table 11 below.) Note that self-response enumerations have a higher percentage of correct enumerations than NRFU enumerations. Among NRFU enumerations, those provided by a member of the household have the highest percentage correct.

### Table 11: 2010 Census Correct Enumerations by Operation

| | Portion of the Census Person Count | Total Correct Enumerations |
|---|---|---|
| Self-Response | 0.729 | 97.3% |
| NRFU Field Operation, Householder Response | 0.204 | 93.4% |
| NRFU Field Operation, Proxy Response | 0.054 | 70.1% |
| NRFU Field Operation, Unknown Respondent Type | 0.002 | 68.2% |
| NRFU, Other | 0.011 | 69.7% |

Source: 2010 Census Coverage Measurement Estimation Report: Components of Census Coverage for the Household Population in the United States.

As this will be the first census with widespread use of the Internet as a response option, the Census Bureau has limited information regarding what the response rates will be in 2020. One source of information is the ACS, a national survey that has been using Internet responses since 2013. While the ACS provides information regarding the use of the Internet, it is different from the census in several key ways. The ACS questionnaire is much longer than the 2020 Census questionnaire, there is no advertising for ACS, and it is an ongoing survey rather than a once-per-decade event. All of these factors may lead to somewhat different expectations for the response rates. In addition to ACS results, the Census Bureau has census test results that have been used as the basis of projections (see the Internet Self-Response section 5.5.4 of the Operational Plan for more information). The results of the 2015 National Content test will allow additional refinements next year.

There is also limited information regarding the quality of the Internet responses themselves. There are reasons to expect that Internet responses will be of greater quality than paper responses, such as the use of real-time edits. However, there is the potential that respondents may break off and not complete the online form, which could also impact quality.

To assess the potential impact of Internet in 2020, the percentage of correct enumerations are estimated based on possible response rates. For the purposes of this analysis, it is assumed that responses by Internet, CQA, and mail are all of equal quality. The potential use of administrative records and third-party data in NRFU are not considered here. If the Internet increases the response rate, this will increase the proportion of responses from self-response rather than NRFU, and increase the percentage of correct enumerations overall. (See Table 12 below.)

**Table 12: Estimated Correct Person Enumerations**

| | Self-Response | Total Correct Enumerations |
|---|---|---|
| 2010 Census Self-Response Rate | 66.5% | 94.7% |
| 2020 Baseline Self-Response Rate | 66.5% | 94.7% |
| 2020 with +5% Self-Response Rate | 71.5% | 95.2% |
| 2020 with +10% Self-Response Rate | 76.5% | 95.6% |

Source: 2010 Census Coverage Measurement Estimation Report: Components of Census Coverage for the Household Population in the United States; 2010 Census Mail Response/Return Rates Assessment Report.

Upcoming tests in 2016 and 2017 will better measure expected impacts of innovations like non-ID processing on self-response rates.

## 7.3 UTILIZING ADMINISTRATIVE RECORDS AND THIRD-PARTY DATA FOR NONRESPONSE FOLLOWUP

The primary question being examined related to the quality of the NRFU operation is:

- What are the quality impacts of the use of administrative records and third-party data on NRFU?

To assess the quality implications of using administrative records and third-party data for the NRFU Operation, the Census Bureau has simulated their use as applied to data and tabulations from the 2010 Census. This simulation focuses on self-response and NRFU. It uses the 2010 Census universe reflecting full Address Canvassing as completed in the 2010 Census. It does not reflect potential differences in fieldwork or quality based on innovations in the Address Canvassing operation for the 2020 Census. The results of this simulation are compared to the results from the 2010 Census and the 2010 CCM. To identify impacts at the national level, the following metrics are generated: the size of the household population, the number of occupied housing units, the number of vacant housing units, the total number of units in the NRFU workload, the number of household visits, and the resolution of cases.

The Census Bureau is also interested in the implications of administrative records and third-party data usage for the identification of race and Hispanic origin. The following simulation projects potential percent of the household population missing both race and Hispanic origin characteristics. For the potential range of occupied units, comparisons are made only to the 2010 Census results, as there are no comparable CCM estimates for this group.

### *Simulation Design Assumptions*

The following assumptions are used in the 2020 Census cost estimate and are based on census tests and research that uses 2010 Census data. The simulation work assumes a self-response percentage to determine the universe eligible for NRFU of 63.5 percent, with a possible range extending from a minimum of 58.5 percent to a maximum of 68.5 percent. This reflects the use of Internet push, reminder mailings, and paper questionnaires to encourage people to respond. This implies that on average 36.5 percent of the census universe will be eligible for NRFU.

The simulation also incorporates assumptions about the use of administrative records and third-party data and how field visits will be conducted during the 2020 Census NRFU. These assumptions are based on research with administrative records and third-party data to reduce contacts for units suspected to be vacant or occupied. It also reflects a possible contact strategy based on research from the 2015 Census Test that used the field operations system.

The research has considered three basic approaches for using administrative records and third-party data to reduce NRFU contacts. This simulation reflects the decision to focus on the "hybrid administrative record use" approach. Figure 35 shows its NRFU work flow. First, administrative records and third-party data are used to identify units that are likely to be vacant before the start of the NRFU operation. These cases receive no visits during the NRFU operation. Second, administrative records and third-party data are used to identify units that are likely to be occupied, and to develop a roster of persons from administrative records sources. These addresses are kept in the NRFU fieldwork and receive one visit during the NRFU operation. During the visit, the unit can (1) respond by completing the interview with the enumerator, or (2) use the information on the Notice of Visit left on their doorstep to go online or call CQA to respond. If the unit does not respond in one of these ways, the administrative record information is used. The simulation reflects this approach for using administrative records and third-party data to identify vacant and occupied units.

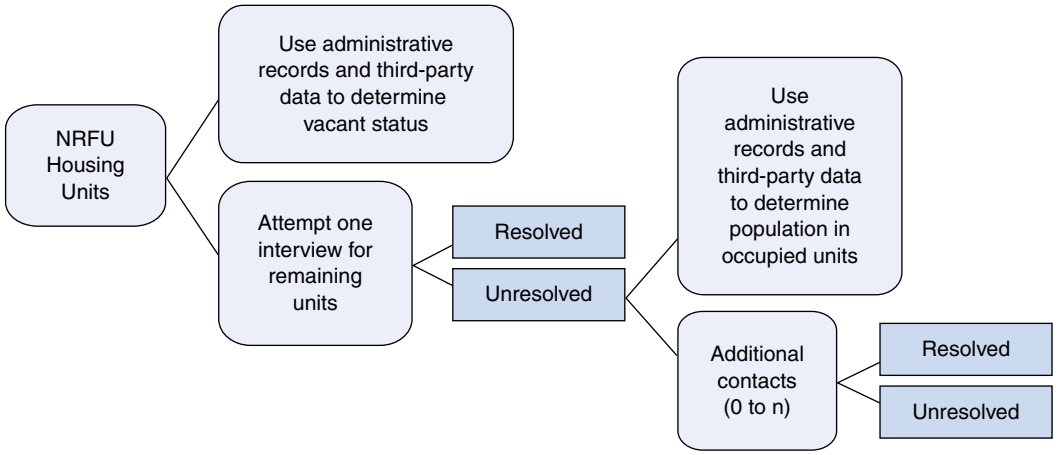



**Figure 35: The Hybrid Administrative Records Use**

The following assumptions on administrative records use were made for this simulation. The methodology developed for the 2015 Census Test is applied to the 2010 Census universe. This national application provided the amount of administrative records identification for simulation purposes.

- Of the universe eligible for NRFU, 10.7 percent could be identified as vacant based on information from administrative records and third-party data. This value ranged from 9.9 percent to 11.6 percent in the simulation.
- Of the universe eligible for NRFU, about 15.0 percent could be identified as occupied based on administrative records and third-party data. After the removal of the administrative records vacant cases, this resulted in about 16.3 percent of the NRFU workload. The simulation drew from a binomial distribution with this percentage. Similar to the census testing, these cases did not receive proxy interviews to resolve their occupancy status.

Increased productivity from the reengineered field operations and the number of proxy and unresolved enumerations observed in the 2015 Census Test led to the consideration of a larger number of contacts in 2020 than was used in the 2015 Census Test.

The 2015 adaptive design approach was modified to increase the average number of maximum contacts allowed. The adaptive design approach attempted to minimize the variability of the proxy reporting based on an input average number of desired contacts. For the 2015 Census Test, an average of three visits was used. Based on the increase in productivity, the allocation of the maximum number of visits was increased to an average of four. This increased the maximum allowable contacts for nonadministrative record cases before conducting a proxy to be more than in the 2015 approach. This design still reflects conducting a proxy enumeration only on the last visit.

For each address, the simulation allowed five potential outcomes when an attempt was made:

1. Occupied with a household member
2. Occupied with a proxy respondent (building manager, neighbor, etc.)
3. Vacant
4. Delete
5. Unresolved

The probabilities of resolution (any of 1 through 4), and of completing an interview on a given contact, were based on initial overall results of the resolution per attempt from cases in the experimental and control panels of the 2015 Census Test. The control panel was one of the panels that used the Research and Testing Operational Control System and the 2010 Census field management approach to implement the address in that panel.

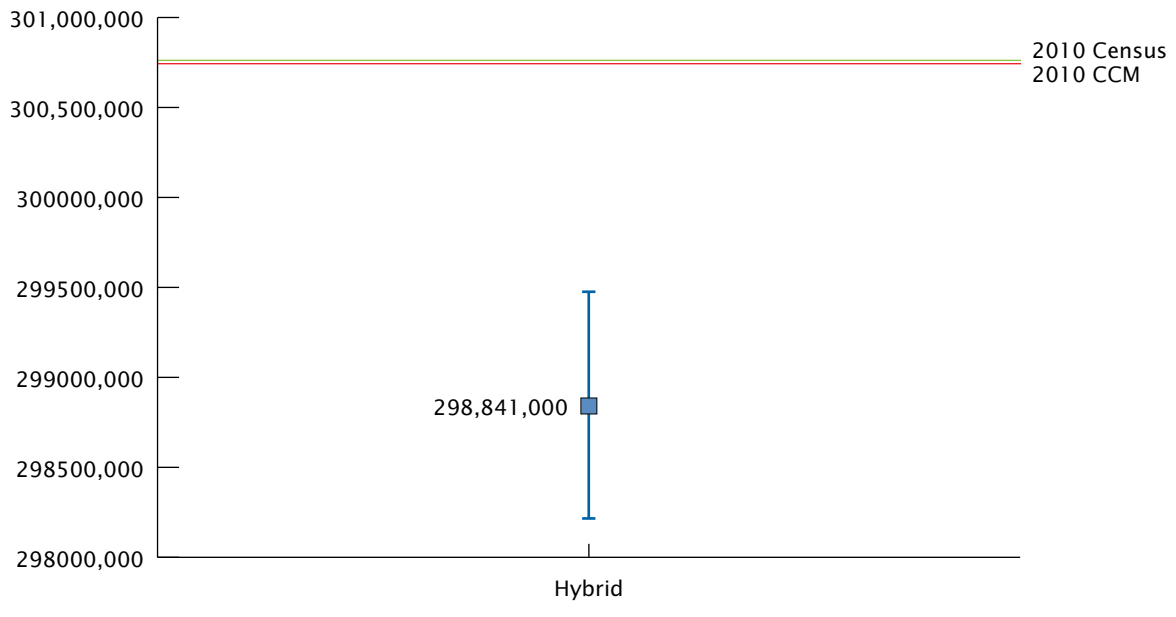
The following parameters for resolution results were used in the simulation runs.

- Occupied resolution with a household member was set to vary between 0.2 and 0.3.
- Occupied resolution with a proxy member varied between 0.25 and 0.75.
- Vacant resolution varied between 0.2 and 0.3.
- Delete resolution varied between 0.2 and 0.3.

An additional part of the simulation accounts for unresolved addresses after all NRFU contacts had been attempted. This simulation implemented a simplified version of the count imputation procedure. If a specified number of addresses were still unresolved after the sixth contact, the simulation used the results of the last contact to impute the number of addresses that were occupied, vacant, and delete.

### *Simulation Results*

Figure 36 provides in a boxplot the simulated distribution of the total household population under the "hybrid administrative record use" approach. The simulation shows an average household population of 298,841,000, about 1.9 million below both the count from the 2010 Census and the estimate from the 2010 CCM. The bars show the 90 percent interval over the simulation. (Due to CCM constraints, this universe does not include people living in group quarters or in Remote Alaska in the 2010 Census.)




Bars show 90 percent intervals.
CCM does not include Remote Alaska household population.

**Figure 36: Simulated Household Population Distribution**

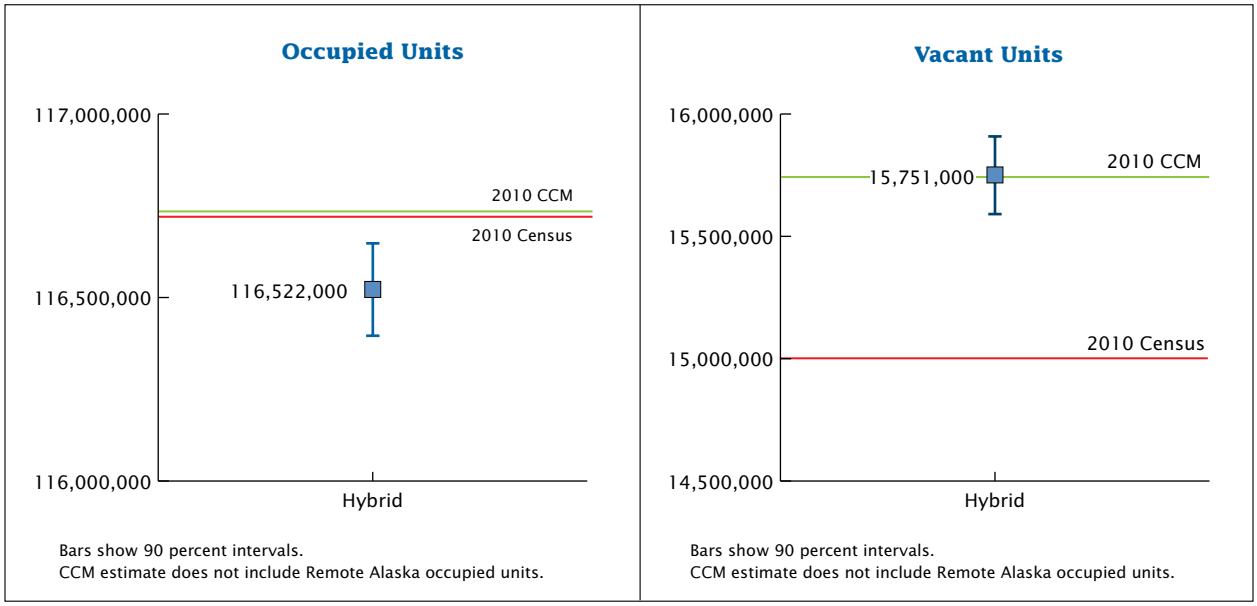



**Figure 37: Simulated Occupied and Vacant Distribution**

Figure 37 depicts the projected numbers of occupied and vacant housing units, respectively. The scenario projected an average of 116,522,000 occupied units, about 200,000 lower than the 2010 Census and the 2010 CCM results. The scenario projected an average of 15,751,000 vacant units. The interval is higher than the census count of 15.0 million vacant units but covers the CCM estimate of 15.7 million vacant units.

Figure 38 shows the projected workload of NRFU cases as applied to the 2010 Census. The scenario projected an average of 44,605,000 NRFU fieldwork cases. This is about 5.3 million fewer than the actual 2010 Census NRFU workload. Using administrative records and third-party data to identify vacant units could reduce the NRFU fieldwork by about 5.3 million addresses.

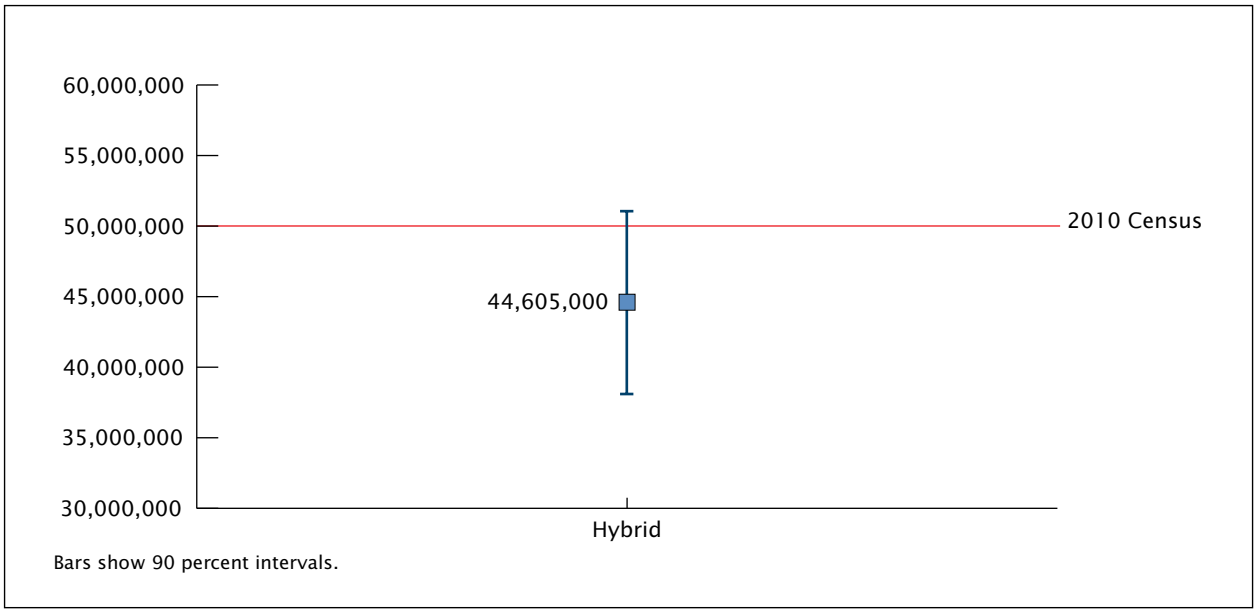



**Figure 38: Simulated Distribution of 2010 NRFU Fieldwork Cases**

Figure 39 provides the projected number of household contacts in the 2010 NRFU under the simulated scenario. The simulation projects an average of 112,851,000 household visits with a standard deviation of 10.7 million. The 90 percent interval ranges from 95 million to 130 million visits. This range includes the number of household visits recorded in the 2010 Census—about 110 million. This includes personal and telephone contacts.

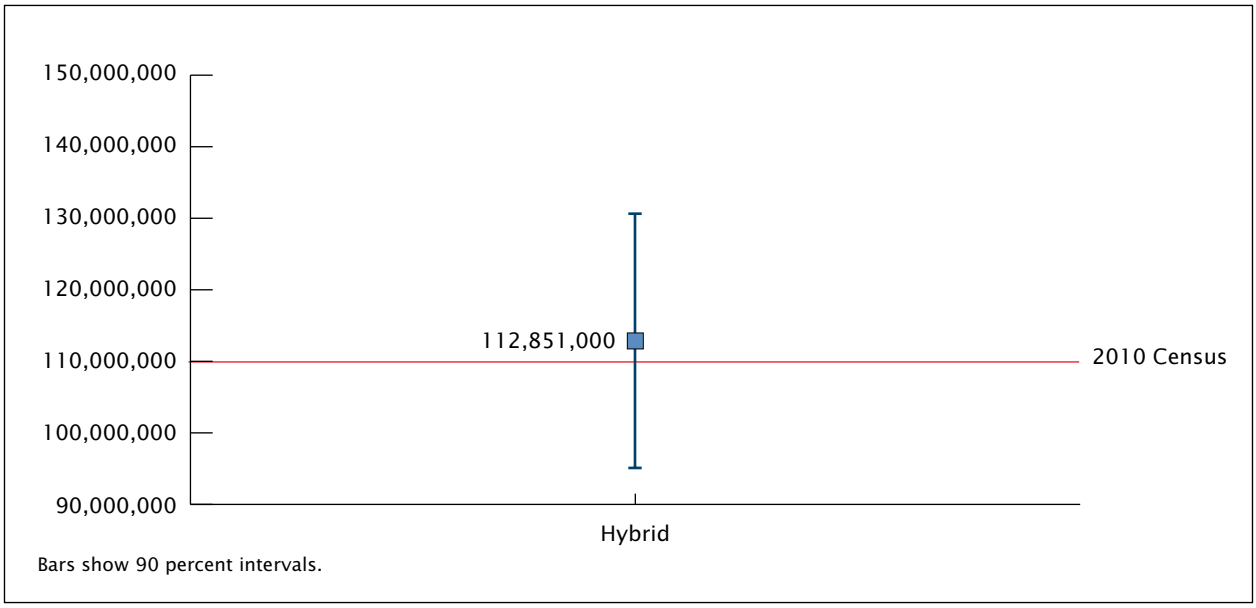



**Figure 39: Simulated 2010 Number of Contacts**

Table 13 shows the distribution of resolution status. Self-response had an average of 86.677 million with a 90 percent interval from 80 million to 93 million. There was an average of 5.3 million cases resolved using administrative records and third-party data after an unsuccessful resolution on the first contact. The simulation projects 4.475 million unresolved units after the completion of all of the fieldwork.

### Table 13: Resolution Status Projection

| Level | Simulated Average | Standard Deviation |
|---|---|---|
| Self-Response | 86,677,000 | 3,875,000 |
| Adrec Vacant | 5,318,000 | 388,000 |
| Adrec Occupied | 5,313,000 | 504,000 |
| NRFU Occ HH | 18,722,000 | 2,815,000 |
| NRFU Occ Proxy | 2,906,000 | 562,000 |
| NRFU Vacant | 9,257,000 | 503,000 |
| NRFU Delete | 3,931,000 | 127,000 |
| NRFU Unresolved | 4,475,000 | 1,961,000 |

Figure 40 shows the percentage of time that both race and Hispanic origin are not reported for an enumeration. For this analysis, the two characteristics were combined to see if a person reported either one during their enumeration. This analysis includes self-responses as well. For persons enumerated via administrative records, it was determined whether the past census, government sources of administrative records, or third-party sources could provide race or Hispanic origin for the person. On average over the simulations, both characteristics were not reported 5.2 percent of the time. The 90 percent interval covers the observed 3.6 percent in the 2010 Census.

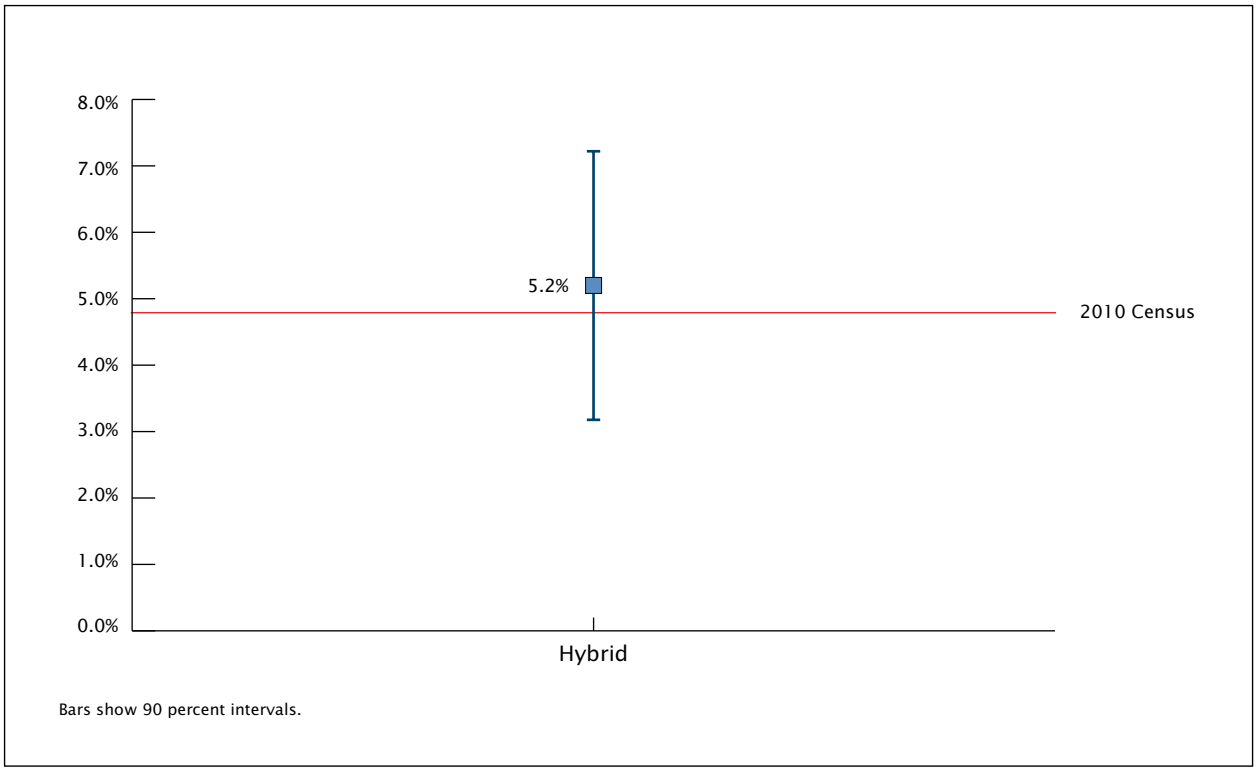



**Figure 40: Both Race and Hispanic Origin Not Reported**

### *Additional Design Features*

The previous results use data from the 2010 Census and summarize potential quality implications for the 2020 Census. Other design features are being proposed or considered. They have potential implications on the quality results shown here.

One possibility is that units designated as vacant or occupied via administrative records and third-party data will receive an additional mailing during the NRFU operation. This mailing would notify the addresses that, while a field enumerator may not be coming to visit their address, they can still respond to the census by Internet or mail. This self-response might lessen some of the observed undercounts.

A second possibility is the Census Bureau's use of records from other potential administrative records and third-party data sources. The Supplemental Nutrition Assistance Program could help address the potential under-coverage observed in the simulations. Another possible source to augment census coverage could be the National Directory of New Hires.

A third facet is the projected resolution rate in occupied units for conducting an interview with a householder. The simulation applied a value between 0.2 and 0.3. This produced about 4.5 million possibly unresolved addresses. This resolution rate might be higher in the actual census implementation, compared to those observed during a census test. Any increase should lead to fewer unresolved units.

The results shown were based on the productivity improvements observed in the 2015 Census Test. If the productivity were less than that observed in the test, then changes in the fieldwork procedures, as applied in this simulation, could be needed.

Another consideration is the further use of administrative records and third-party data to identify vacant and occupied units beyond those used in this simulation, such as during the NRFU operation, at the end, or even after the NRFU operation. For example, one might use administrative records and third-party data as an alternative to count imputation. This might reduce the amount of unresolved cases and the amount of missing race and Hispanic

origin characteristics. Additional research has shown that possibly 31 percent of the 4.5 million unresolved cases could be resolved by additional usage of administrative records.

A final possible change is in the imputation procedures to account for unresolved addresses and person characteristics. Research continues on how to adapt to account for the missing data situation, using administrative records and third-party.

## 7.4 FUTURE PLANS

The Census Bureau will continue to identify opportunities to improve the data used to assess the trade-offs between cost and quality. As a result, the 2020 Census design will be refined. The next steps include the following:

- *Analyze 2015 Test Data*. The Census Bureau will complete the analysis of the 2015 Census Test in Savannah, GA, and Maricopa, AZ, and the 2015 Address Validation Test results. There may be additional findings that inform methodologies for the 2020 Census. For example, additional analysis of the Address Validation Test results may help us better predict the effectiveness of In-Office Address Canvassing methods compared to In-Field Address Canvassing.
- *Fall 2015 and 2016 Tests*. The Census Bureau will identify findings from the 2015 National Content Test and 2016 tests next fiscal year. This will allow the Census Bureau to enhance methodologies, such as mailing strategies for self-response.
- *2016 Master Address File (MAF) Coverage Study.* The Census Bureau will use the results of the MAF Coverage Study to improve the error rate estimates for In-Field Address Canvassing methods.
- *Local Update of Census Addresses.* The Census Bureau will investigate methods to assess the effectiveness of the LUCA program.
- *Identify Metrics*. The Census Bureau will continue to identify and evaluate additional cost and quality metrics as needed.
- *Quantify Downstream Impacts*. In the future, Address Canvassing will be linked with the other major operations in order to better assess the potential downstream impacts. This will allow the Census Bureau to measure how any changes in the number of adds or deletes missed in the Address Canvassing operation may influence NRFU workloads.
- *Analysis of Other Operations*. As procedural plans are developed for census operations beyond the main ones studied in this section, the Census Bureau will need to assess the cost and quality implications of them as well.

# 8. Life-Cycle Cost Estimate

The 2020 Census Life-Cycle Cost Estimate is pending clearance. This section will be populated at a later date.

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# 9. Approval Signature

*Lisa M. Blumerman (signed)* *October 1, 2015*

**Lisa M. Blumerman** Date

Associate Director for Decennial Census Programs

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# 10. Document Logs

## 10.1 SENSITIVITY ASSESSMENT

This table specifies whether or not the document contains any administratively restricted information.

| Verification of Document Content |
|---|
| This document does not contain any:<br>▪ Title 5, Title 13, or Title 26 protected information<br>▪ Procurement information<br>▪ Budgetary information<br>▪ Personally identifiable information |

## 10.2 REVIEW AND APPROVALS

This 2020 Operational Plan document has been reviewed and approved for use.
This table documents the necessary approvals leading up to the point of baselining.

| Document Review and Approval Tier: Operational Plan | | |
|---|---|---|
| **Name** | **Area Represented** | **Date** |
| Ann G. Wittenauer | 2020 Census Operational Plan Team | 9/8/2015 |
| **2020 Census Operational Plan Team Leadership Group:** | | |
| Lisa M. Blumerman | Associate Director for Decennial Census Programs | 9/8/2015 |
| Shirin A. Ahmed | Assistant Associate Director for Decennial Census Programs | 9/8/2015 |
| Deirdre D. Bishop | Chief, Decennial Census Management Division | 9/8/2015 |
| Patrick J. Cantwell | Chief, Decennial Statistical Studies Division | 9/8/2015 |
| Timothy F. Trainor | Chief, Geography Division | 9/8/2015 |
| Phani-Kumar A. Kallori | Chief, Decennial IT Division | 9/8/2015 |
| | Decennial Leadership Group | 9/8/2015 |
| | 2020 Census Executive Steering Committee | 9/8/2015 |

## 10.3 VERSION HISTORY

The document version history recorded in this section provides the revision number, the version number, the date it was issued, and a brief description of the changes since the previous release. Baseline releases are also noted.

| Rev # | Version | Date | Description |
|---|---|---|---|
| Final | V 1.0 | October 1, 2015 | Original baseline |
| Final | V 1.1 | November 6, 2015 | Conversion of Operational Plan content into Communications Directorate Desktop Publisher. Converted all figures and updated figures 8 and 28. Also added Section 8—Lifecycle Cost Estimate and Appendices. |
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# Appendix: List of Acronyms

| Acronym | Definition |
|---|---|
| ACS | American Community Survey |
| BAS | Boundary and Annexation Survey |
| BCU | Basic Collection Unit |
| BPM | Business Process Models |
| BYOD | Bring Your Own Device |
| CAP | Capability Requirements |
| CCM | Census Coverage Measurement |
| CEDCaP | Census Enterprise Data Collection and Processing |
| CEDSCI | Center for Enterprise Dissemination Services and Customer Innovation |
| CM | Coverage Measurement |
| COMPASS | Census Operations Mobile Platform for Adaptive Services and Solutions |
| CQA | Census Questionnaire Assistance |
| CQR | Count Question Resolution |
| DS | Data Stewardship |
| DSC | Decennial Service Center |
| eSDLC | Enterprise Systems Development Life Cycle |
| ETL | Enumeration at Transitory Locations |
| FSCPE | Federal-State Cooperative Population Estimate |
| FTE | Full Time Equivalent |
| FY | Fiscal Year |
| GAO | Government Accountability Office |
| GQ | Group Quarters |
| GSS-I | Geographic Support System Initiative |
| GUPS | Geographic Update Partnership Software |
| IA | Island Areas Censuses |
| iCADE | Integrated Capture and Data Entry |
| IPC | Integrated Partnership and Communications |
| IT | Information Technology |
| IVR | Interactive Voice Response |
| KFI | Key From Image |
| LUCA | Local Update of Census Addresses |
| MAF | Master Address File |
| MAM | Mobile Application Manager |
| MMVT | MAF Model Validation Test |
| MOJO | In-field operational control system |
| NARA | National Archives and Records Administration |
| NPC | National Processing Center |

| Acronym | Definition |
|---|---|
| NRFU | Nonresponse Followup |
| OCR | Optical Character Recognition |
| OIG | Office of Inspector General |
| OMR | Optical Mark Recognition |
| PBC | Partial Block Canvassing |
| PL | Public Law |
| PLBR | Project-Level Business Requirements |
| PSAP | Participant Statistical Areas Program |
| RCC | Regional Census Center |
| RDP | Redistricting Data Program |
| SE&I | Systems Engineering and Integration |
| SIMEX | Simulation Experiment |
| TEA | Type of Enumeration Area |
| TIGER | Topologically Integrated Geographic Encoding and Referencing System |
| TSAP | Tribal Statistical Areas Program |
| UE | Update Enumerate |
| URL | Uniform Resource Locator |
| USPS | United States Postal Service |
| WBS | Work Breakdown Structure |