Innovative Technologies Ensure a Complete and Accurate 2020 Census

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Building on Established Technologies for the Most Advanced Solutions Today

The 2020 Census is the first decennial census with a full Internet option and the first to extensively use technology—instead of paper—to manage and conduct field work. We build on established technologies to use the most advanced and viable solutions today. We continually research and upgrade methods and technology to safeguard data and protect confidentiality of responses through secured systems.

Addresses & Maps

We've enhanced the integrated address and spatial data system (known as MAF/TIGER) with imagery and sophisticated geospatial technology. Using this imagery and technology allows us to verify 70 percent of addresses from our office instead of verifying all of them in the field as we did in the past. This greatly reduces operational costs. In 2020, we'll use tablets and laptops to verify addresses in the field, building on the use of handheld devices for address listing in the last census.

Outreach

We're building on the success of using paid advertising and audience segmentation in recent decades. We'll communicate about the 2020 Census based on advanced modeling techniques to increase awareness and self-response. For the first time, we'll reach specific audiences using digital advertising.

Self-Response

Previous censuses asked the public to respond primarily by mail, with limited options for phone. The 2020 Census will offer multiple ways to respond. For the first time, the Internet will be the primary response option, making it easy for the public to respond from any location at any time. New adaptive design techniques enable more flexible and seamless self-response options than for previous censuses.

Nonresponse Followup

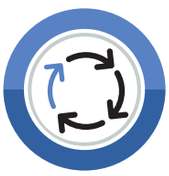
Using administrative records (i.e., data from other government agencies) enables us to identify millions of vacant or nonexistent housing units and reduce the need and cost of knocking on doors to verify and/or enumerate. In 2010, these housing units accounted for nearly 30 percent of the 48 million total. For the first time, we'll use full-scale smartphone technology to capture responses in the field. We'll also take advantage of automation to efficiently manage and route on-the-ground field staff.

Data Capture

Handwritten responses to the census require labor-intensive data entry. In recent decades, while we made this data entry more efficient by using "optical character recognition" on a massive scale, the 2020 Census will be the first to capture a large percentage of responses electronically online, rather than through data entry or "optical character recognition."

Cybersecurity

We're implementing enhanced security architecture and technology based on the Department of Homeland Security (DHS) Continuous Diagnostic and Mitigation program to protect the confidentiality, integrity, and availability of the 2020 Census data, processes, and systems.



Response Processing

We're applying rigorous quality assurance methods to ensure complete and accurate census counts. The 2020 Census will use secure Cloud technology for the first time to rapidly scale up infrastructure to handle peak response periods.

Data Dissemination

Consistent with prior censuses, we'll deliver apportionment counts to the President and redistricting counts to the states. We'll also build upon efforts in recent decades to give the public greater access to the data. We'll provide flexible tools, allowing the public to view 2020 Census data any way they want. Improvements will include visualizations, easier search functionality, and improved access to data tables and data sets.

United States™ Census Bureau

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Technological Evolution of the Decennial Census Throughout the Decades

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Components of the Census	2000	2010	2020
Addresses & Maps	▪ Used TIGER (Topologically Integrated Geographic Encoding and Referencing System)—the first nationwide digital map of roads, boundaries, and other features. ▪ Created for the 1990 Census, TIGER was the foundation for today's GPS navigation systems. ▪ Used our Master Address File (MAF). ▪ Together, MAF and TIGER contain all of the spatial, geographic, and residential address data needed to conduct the census and produce results.	▪ Combined MAF and TIGER into one system. ▪ Used handheld devices to verify all addresses and pinpoint locations, eliminating paper maps and reducing errors. ▪ Proprietary hardware developed exclusively for the Census Bureau used in the operation.	▪ Using aerial and street-view imagery to review addresses from the office and updating most MAF/TIGER data remotely, substantially cutting in-person workload. ▪ Using commercially available laptops and tablets for address listing and mapping. ▪ Leverage workload models and technology to efficiently manage and route on-the-ground staff assignments for Address Canvassing.
Outreach	▪ First use of paid advertising and Census in Schools Program.	▪ First integrated campaign approach across all outreach channels. ▪ First use of modeling techniques to segment audiences for outreach. ▪ First use of social media. ▪ Greatly expanded and enhanced partnership program.	▪ Adding digital advertising to target and tailor messages to various audiences.
Self-Response	▪ Paper census forms by mail. ▪ Tested Internet response option on a small scale.	▪ Paper census forms by mail. ▪ No Internet response option. ▪ Added limited telephone response option.	▪ Paper census forms by mail. ▪ Full Internet response option. ▪ Full telephone response option.
Nonresponse Followup	▪ Paper-based operations used by staff interviewing nonresponding households (i.e., paper maps, assignments, census forms, and payroll).	▪ Paper-based operations repeated. ▪ Vacant housing units identified; large households requiring coverage follow-up identified.	▪ Using handheld devices to capture interview data. ▪ Leveraging automation to efficiently manage and route on-the-ground field staff, as well as manage case assignment and the number of contact attempts. ▪ Using administrative records (i.e., data from other government agencies) to identify vacant and nonexistent housing units.
Data Capture	▪ Relied on outside contractor to digitize paper forms—first use of "optical character recognition."	▪ Continued use of outside contractor for digital conversion.	▪ With new online response option, there will be less paper to process and most responses will be digital from the beginning. ▪ Digitizing paper responses in-house, not outsourcing.
Cybersecurity	▪ Secure internal Census Bureau systems. ▪ Secure field data collection on laptops on mobile network. ▪ Secure self-response mode for paper with physical and technical security at processing sites and systems.	▪ Secure internal Census Bureau systems. ▪ Secure field data collection on mobile devices on mobile network (tablets). ▪ Secure self-response mode for paper with physical and technical security at processing sites and systems.	▪ Secure internal Census Bureau systems. ▪ Secure field data collection on mobile devices on mobile network (tablets and smartphones). ▪ Secure self-response mode for paper with physical and technical security at processing sites and systems. ▪ Secure self-response modes for public-facing Internet data collection (using Cloud-based security and performance) and Census Questionnaire Assistance.
Response Processing	▪ Built and used a one-time-only, outside system to tabulate results for both "short" and "long" forms.	▪ Leveraged innovations in data processing and interfaces with other headquarters systems as short-form responses were edited and prepared for tabulation.	▪ Innovations in data processing and interfaces with other headquarters systems include on-premises and Census Data Lake (Cloud resources) as short-form responses are edited and prepared for tabulation.
Data Dissemination	▪ First census to release results online via new digital data tool on Census Bureau Web site (American FactFinder [AFF]), allowing the Census Bureau to combine traditional print media with a variety of digital media formats.	▪ Made further enhancements to AFF to standardize the enterprise data providers' interfaces to upload data. ▪ Expanded functionality for tables, mapping, and download of data sets. ▪ Moved away from traditional print media to always accessible Internet tables.	▪ Releasing results on a new, user-oriented Web platform featuring easier search, visualizations, and navigation to enhance dissemination and increase access to data through <data.census.gov>.

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Source: U.S. Census Bureau.