

2020 Census Detailed Operational Plan for: 35. Update Leave Operation (UL)

A New Design for the 21st Century

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Approvals

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1. Document Purpose

The purpose of the 2020 Census Update Leave (UL) Detailed Operational Plan is to inform U.S. Census Bureau staff, contractors, and other internal and external stakeholders on the details of the UL operation for the 2020 Census. This document includes the operational design and processes developed to execute the UL operation.

Anticipated uses of this document include the following:

- Communication—Documents operational design details for internal and external stakeholders.
- Planning—Documents planning assumptions and key milestones.
- Staffing—Documents staffing needs and strategies.
- Design—Describes operations and flows, which inform design of IT systems, manual processes, and training.
- Development—Identifies business rules and required capabilities to be developed.
- Testing—Provides a basis for developing integrated test plans for IT systems and processes.

This document complements the 2020 Census Operational Plan, which presents the complete 2020 Census operational design and covers all operations required to execute the 2020 Census.

This document will be updated over time to reflect changes in strategies that result from 2020 Census planning, research, and testing activities.

2. Operational Overview

2.1 Operation Purpose

The Update Leave operation (UL) is designed to occur in areas where the majority of housing units either do not have mail delivered to the physical location of the housing unit, or the mail delivery information for the housing unit cannot be verified. The purpose of the operation is to update the address and feature data for the area assigned, and to digitally link and leave a 2020 Census Internet Choice Questionnaire Package at every housing unit (HU) identified to allow the household to self-respond. The 2020 Census Internet Choice Questionnaire Package will optimize self-response by enabling people to respond via multiple modes, including internet, paper, or telephone.

The primary functions of UL include:

- Updating and/or verifying the address list and feature data.
- Determining the type and address characteristics for each living quarter (LQ).
- Leaving a 2020 Census Internet Choice Questionnaire Package at every HU.

UL can occur in geographic areas that:

- Do not have city-style addresses.
- Do not receive mail through city-style addresses.
- Receive mail at post office boxes or at drop points.
- Have been affected by major or natural disasters.
- Have high concentrations of seasonally vacant housing.

2.2 Background

It is estimated that up to 9.7 million HUs in the 50 states, District of Columbia (DC), and Puerto Rico are in areas that require the UL methodology to ensure effective and efficient enumeration. To accomplish this, UL will recruit, train, and manage approximately 30,000¹ field staff.

This document provides an overview of the UL approach for the 2020 Census, a brief summary of UL in 2010, and highlights the improvements and innovations made since the 2010 Census. Through reengineered field infrastructure, innovative data collection and processing technology, and smart data driven project management, the Census Bureau is intent on planning a lean, digital, and streamlined 2020 Census. Section 2.2 presents the UL approach for the 2010 Census, summarizing the paper-based data collection methods and the traditional field infrastructure, with sections 2.3, 2.4, and 3.0 presenting the planned UL approach for the 2020 Census, and providing contrast between past methods of data collection and field infrastructure and innovative future methods.

2.2.1 2010 Census

2.2.1.1 2010 Census Field Operations

In the 2010 Census, regional census centers (RCCs) were temporary offices that managed the 2010 Census within a geographic jurisdiction. RCCs were established in 12 cities where permanent Census Bureau regional offices were located. In addition, there was an area census office (ACO) established to manage all 2010 Census work in Puerto Rico. The 12 RCCs managed 494 local census offices (LCOs) that supervised decennial operations in specific areas. Each LCO reported to the RCC that was responsible for its area. LCO staff consisted of both office staff and field staff. Office staff worked on a variety of operations conducted out of the LCO and received specific training for each operation. The UL operation required the following field staff positions: Field Operations Supervisor (FOS), Crew Leader (CL), Crew Leader Assistant, and enumerators. The hierarchy of the field and office staff, for both production and quality control (QC), is shown in Figure 1. This was the structure for UL and other field operations in 2010. For the 2020 Census, field infrastructure will be streamlined with more direct communication between field staff and ACO management. Figure 4 shows the planned 2020 Field Staff Infrastructure.

¹The 2020 Census Life Cycle Cost Estimate projects 28,775 enumerators and 1,375 census field supervisors are needed.

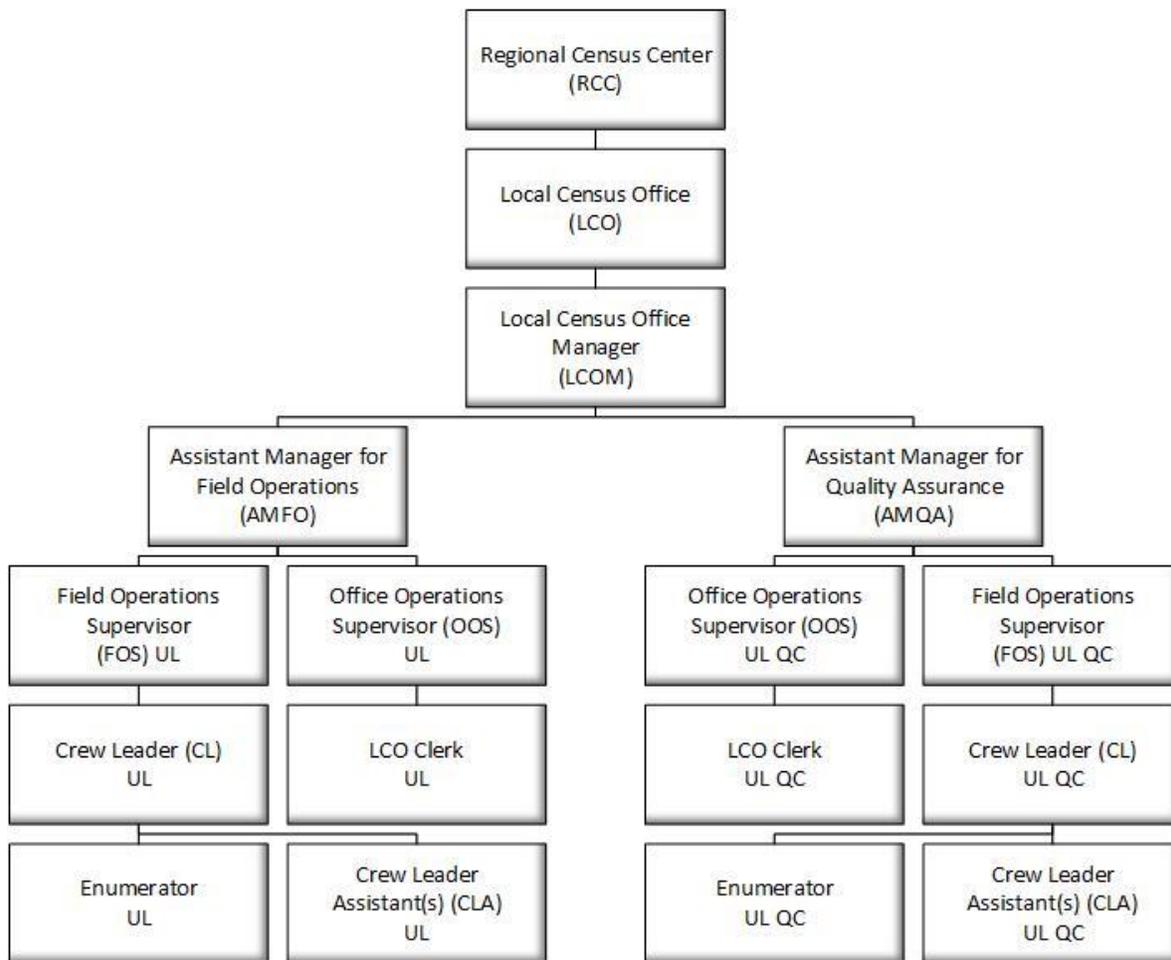


Figure 1: Organizational Chart for the 2010 Census Update Leave Operations Staff

The field data collection process for the 2010 Census was entirely paper-based, with paper-based workload and workforce management, and digital response processing.

Enumerators received an assignment area (AA) binder from their CL that contained address listing pages, census maps, questionnaires, and other materials. The enumerator was responsible for canvassing each block in the AA and verifying the address that he or she found on the ground to the address listed in the AA binder (or book). As the enumerators canvassed an AA, they updated the listing pages (correcting, adding, or deleting addresses to reflect changes), updated census maps, and hand-delivered 2010 Census Questionnaires (D-1) to all households.

LCO staff assembled UL binders (with binder register labels), usually one binder per AA, to include the following materials:

- Cover page/Quality Assurance Review page.
- Special Notice page (provided instructions/reminders).

- Block List (D-114).
- Address Listing and Add pages.
- Map envelopes with AA map, AA locator, and block maps (also sheets of Processing IDs for added cases).
- Questionnaires labeled with Census IDs.
- Unlabeled questionnaires for added cases.

LCO clerks checked out AA binders to CLs. CLs then distributed work to enumerators, documenting assignment history on the cover page. Assignment history was documented using the Paper-Based Operational Control System (PBOCS).

As an enumerator completed their assignments, they delivered the completed AA binders along with their payroll form (D-308) to the CL, usually on a daily basis.

Once the completed fieldwork was returned to the LCO, clerks checked in the fieldwork results keyed this and update information into PBOCS.

2.2.1.2 2010 Census TEA Delineation

The Census Bureau uses Type of Enumeration Area (TEA) to determine how to most efficiently enumerate people living in various parts of the country. TEAs were defined by geography staff in the RCCs, based on housing unit information contained in the Census Bureau's Master Address File (MAF). For the 2010 Census, Type of Enumeration Area (TEA) 1 represented Mailout/Mailback, TEA 2 represented Update Leave (UL), TEA 3 represented Remote Update Enumerate, TEA 4 was Remote Alaska (RA), and TEA 5 was Update Enumerate (UE). Figure 2 displays the distribution of the various TEAs nationwide. UL was conducted in the tan areas.

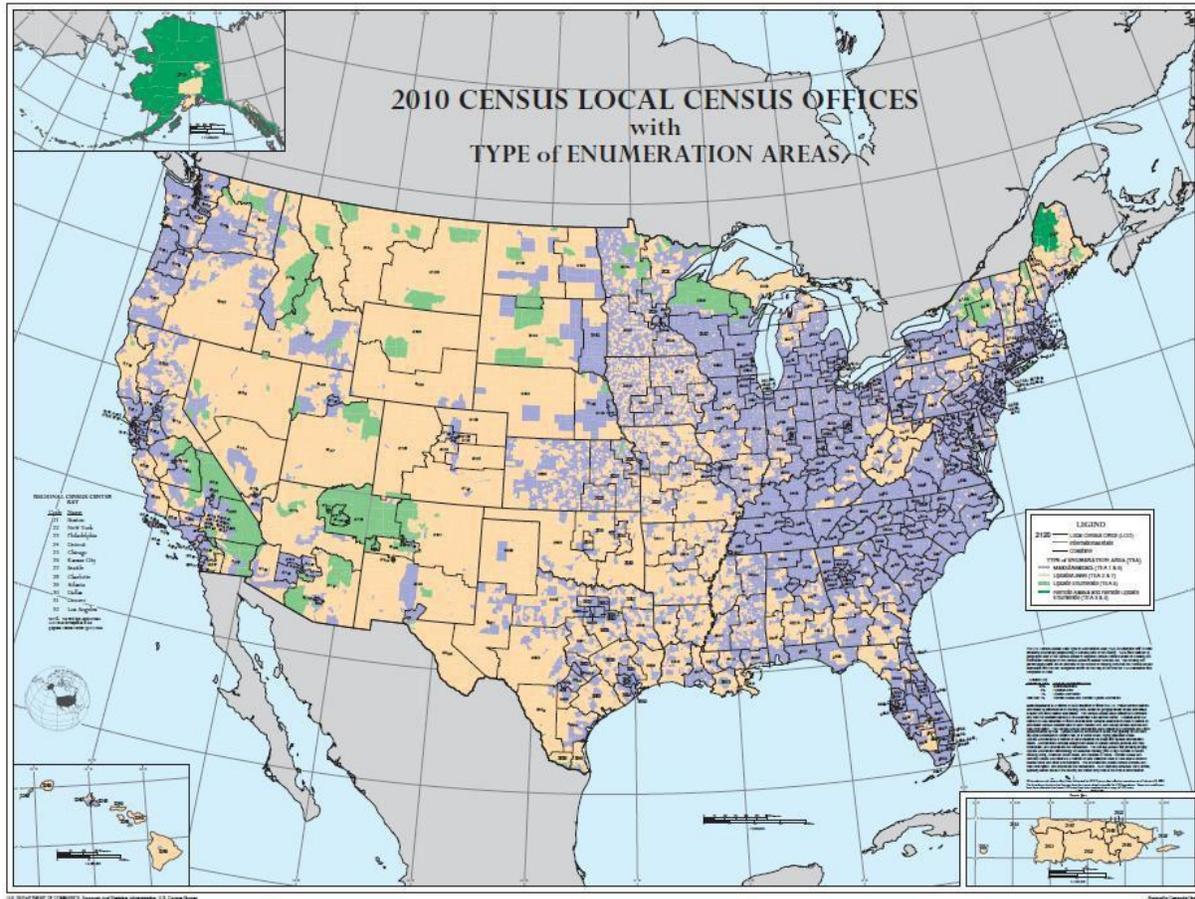


Figure 2: 2010 Census TEA Delineation Map

2.2.1.3 2010 Census Update Leave Operation Overview

The 2010 Census UL operation had two components:

- UL & Urban Update Leave (UUL) Production.
- Update Leave Quality Control (UL QC).

The UL operation was conducted in communities and areas where the majority of HUs did not have traditional mailing addresses (for example, no house number or street name), and the geography was very remote or rural. UUL was a subset of UL and was conducted in urban areas where the Census Bureau was not confident in accurate mail delivery. UUL tended to occur in areas with multiunit buildings where the United States Postal Service (USPS) delivers the mail to a drop point instead of individual unit designations and urban communities with city-style addresses where many residents pick up their mail at a post office box.

During the UL/UUL operation, enumerators canvassed the blocks in their AAs, updated the address lists and census maps, determined if the HU exists and is residential, and delivered preaddressed census questionnaires to each valid HU.

UL contained a quality control (QC) component intended to identify and correct data errors detected during the listing phase. UL QC was a distinct operation, with separate staff, that started shortly after UL Production started.

2.2.1.4 2010 Census Update Leave Field Operation

In 2010, UL production and QC was conducted from March 1 to April 2, meeting the original 20 business days of planned production.

UL areas were included as part of the Address Canvassing operation in the fall of 2009 in which enumerators physically verified, added, or updated the 2010 Census address list. UL verified and delivered questionnaires at 12,830,371 HUs.

Crew leaders assigned AAs to the enumerators. There were 52,903 production enumerators and 12,508 quality control enumerators, completing 202,890 AAs, resulting in approximately 3.1 AAs per enumerator. Given the HU workload mentioned above, there were approximately 63.2 HUs per AA.

A separate staff conducted UL QC. The objective of the program was to monitor that UL procedures were followed to ensure quality. This objective was accomplished through initial observations, periodic CL reviews, a Dependent Quality Control, and a Delete Verification.

2.2.1.5 2010 Census Update Leave Operation Group Budget and Cost

For the initial release of the UL DOP, 2020 UL budgeted costs have not been finalized. Estimates for the 2020 UL budget may be provided in a later version of the UL DOP. Table 1 contains the budget results from the UL operations in the 2010 Census.

Table 1: 2010 UL Group Budget and Actual Costs

	Budgeted HU Workload	Budgeted Cost	Actual HU Workload	Actual Cost	Cost Variance	Percent Cost Variance
Total UL	15,088,516	\$133,598,547	14,385,072	\$105,855,049	\$27,743,498	20.8%
UL	12,830,371	\$112,606,885	12,552,247	\$85,317,253	\$27,289,632	24.2%
UL QC	2,258,145	\$20,991,662	1,832,825	\$20,537,796	\$453,866	2.1%

Source: 2010 Census Update Leave Operations Assessment Report

2.2.2 2020 Census Update Leave (UL) Operations Overview

The UL operation was not originally planned as an operation for the 2020 Census. UL was added in May 2017 after the Enterprise Censuses and Surveys Enabling Platform Address Listing and Mapping (ECaSE ALM) solution was descoped because of development setbacks and technical systems restructuring. The areas originally planned for Updated Enumerate (UE) will now be split between the new UL operation and the reengineered UE operation. UE was intended to list and enumerate all HUs in Type of Enumeration Area (TEA) 6, TEA2, and TEA4. After the descoping of ECaSE ALM, UE became a paper-based listing and enumeration operation for all eligible HUs in TEA2 (formerly RUE areas) and all eligible HUs in TEA4 (Remote Alaska). UL was created to list and deliver a 2020 Internet Choice Questionnaire Package to all eligible HUs in TEA6.

2.2.2.1 Type of Enumeration Area 6 Description

In an effort to ensure the most cost-effective and efficient process to enumerate households, every basic collection unit (BCU) in the United States is assigned to a TEA. The TEA determines the methodology used to enumerate the households within the BCU. The TEA assignment uses a variety of information to identify the most cost-effective enumeration approach for all of the United States, including Washington, DC; Puerto Rico; and the Island Areas.

The enumeration universe is the complete set of addresses for LQs that will be enumerated for the 2020 Census. The UL universe is a subset of the enumeration universe. It comprises all of the addresses in TEA 6.

The 2020 Census TEA values are as follows:

- TEA 1: Self-Response.

- TEA 2: Update Enumerate.
- TEA 3: Island Areas.
- TEA 4: Remote Alaska.
- TEA 5: Military.
- TEA 6: Update Leave.

Table 2 shows the post 2017 TEA delineation estimates, including number of HUs and percent of total enumeration universe estimates for each TEA. The estimated number of HUs in UL (TEA 6) in Table 2 is 9,700,000. This represents 6.79 percent of the estimated total 2020 Census enumeration universe. New TEA delineation estimates will be released in 2018.

Table 2: Post 2017 TEA Delineation Estimates

TEA	Number of HUs	Percent of Total Enumeration Universe
TEA 1 – Self-Response	133,000,000	92.94%
TEA 2 – Update Enumerate	100,000	0.07%
TEA 3 – Island Areas	*	*
TEA 4 – Remote Alaska	29,000	0.02%
TEA 5 – Military	261,000	0.18%
TEA 6 – Update Leave	9,700,000	6.79%
Total	143,100,000	100%

*Current HU estimates are not available for TEA 3 – Island Areas.

2.2.2.2 Update Leave Cost Reduction Efforts for 2020

The 2010 Census cost more than \$13 billion. Based on recommendation from the 2010 studies and reviews, several key cost reduction innovations are planned for the 2020 Census. Below are the four Key Innovation Areas planned for the 2020 Census:



Figure 3: Census 2020 Key Innovation Areas

Improve the Address Frame

In-Office Address Canvassing

In-Office Address Canvassing conducts analysis and review of information in the Master Address File (MAF) compared with imagery and other data sources (representing conditions “on- the-ground”) to validate the completeness and accuracy of the MAF. This in-office review and analysis is a new element in the Census Bureau’s address canvassing methodology to validate completeness and accuracy of the MAF for BCUs. In previous decades, validation was only conducted in the field through direct, on-the-ground observation.

Increase and Streamline Self-Response

UL is working to optimize self-response through the delivery of a 2020 Census Internet Choice Questionnaire Package to every HU identified, to allow the household to self-respond. The package will include a paper questionnaire, a letter, a census questionnaire assistance insert, a frequently asked questions insert, and a return envelope. The paper questionnaire will have a preprinted questionnaire ID and can be mailed upon completion using the return envelope. The letter will provide instructions on the three methods to respond to the census. The first method is to respond online using the Uniform Resource Locator (URL) provided and entering the questionnaire ID printed on the enclosed questionnaire. The second method is to complete and mail back the enclosed questionnaire in the postage-paid envelope provided. The return envelope for the completed paper questionnaire is preaddressed to return to a central processing center for data capture. The third method is to respond via telephone by calling the Census Questionnaire Assistance (CQA) Center.

Incorporate Administrative Records and Third-Party Data

Administrative Records

The decision to conduct two mailings during the UL operation allows for the implementation of administrative records for UL HUs. The use of administrative records and third-party data for UL is to reduce the field workload for follow-up operations. These data will be used to identify vacant households and to reduce the number of contact attempts for an occupied household if high-quality data exists that could be substituted for enumeration. The Census Bureau will use data from external sources, such as the U.S. Postal Service (USPS), the Internal Revenue Service (IRS), and the Centers for Medicare and Medicaid Services to identify vacant and occupied HUs and remove them from the NRFU 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.

Innovate Field Operations

Improve the efficiency of the operation

The Reengineered 2020 Census Field Operations concept includes an updated field operational model. The overall goal is achieving cost savings through efficiency of the field operations and supporting structures and activities.

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

- New field staff roles and staffing ratios.
- Automation for:
 - Optimization of daily enumerator assignments.
 - Near real-time operation information for decision-making.
 - Enhanced operational control system.
 - Payroll submission and approval processing.
 - Training of enumerators and managers.

On a daily basis, the enumerator will receive a work assignment that is based on an enumerator's home location, work availability, the location of the UL workload, and other operational business rules. Enumerators will locate and travel to their work assignment. Enumerators will use an automated data collection application on a mobile device to make any modifications to the census address list and to link the 2020 Census Internet Choice Questionnaire Package to HUs.

Training of enumerators and CFSs will include both classroom and computer-based online training. Computer-based training ensures uniform training of all UL procedures across all regions and offices. Enumerators can train at their own pace, which adds to the efficiency of the training. Classroom training enhances the computer-based training by providing an environment for interactive learning through scenarios and for trainees to ask questions about elements that are unclear.

Reengineering field operations is intended to increase the efficiency of all field operations, including UL, allowing managers and field staff to be more productive and effective. As shown in Figure 3, the 2020 Census will streamline the UL field operation and management structure by using automation for increased efficiency. Enumerators will use automated instruments to

receive assignments and collect census data, allowing for near real-time case status updates and transmission of listing data.

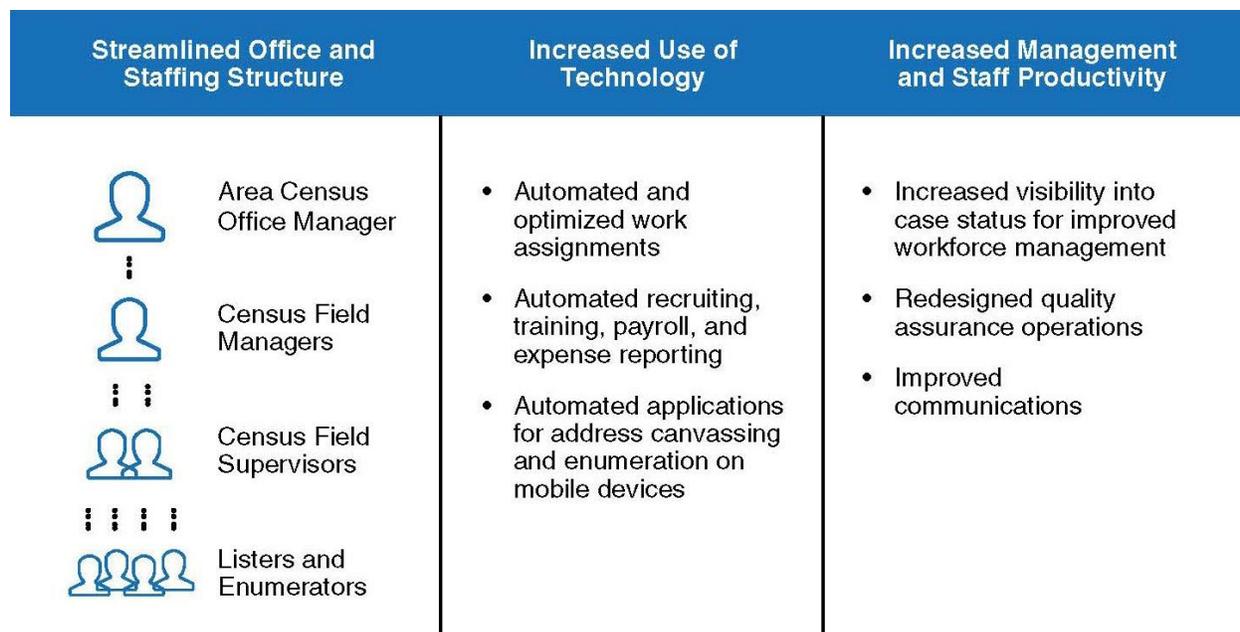


Figure 4: Summary of Reengineering Field Operations

With the use of automated instruments, census field supervisors (CFS) will be able to work remotely and easily communicate with their staff. A new operational control system will enable field supervisors to:

- Automatically assign workloads based on availability.
- Optimize enumerator routes in the field.
- Monitor and manage enumerators’ work with daily tracking of progress and real-time alerts about performance issues.

This increased use of technology to manage fieldwork more effectively enables a more efficient office and staffing structure. For example, by making it easier for supervisors to monitor and manage their staff, the number of enumerators for each supervisor can increase. The automation of recruiting, training, and payroll and expense reporting will also reduce the need for office staff. The 2010 Census had 494 LCOs. The new field operations design for the 2020 Census has a maximum of 250 ACOs.

Table 3 summarizes planned UL differences between the 2010 Census and the 2020 Census that are expected to reduce costs.

Table 3: Comparison of UL in 2010 Census versus 2020 Census

Topic	UL in 2010	UL in 2020
Mailings (See section <u>3.3.8.1</u>)	No mailing strategy.	2 mailings, a reminder letter and a reminder postcard to all mailable addresses.
Administrative Records and Third-Party Data (See section <u>3.3.8.2.</u>)	Not used for the UL operation in the 2010 Census for the purpose of workload management.	These data will be used to reduce the NRFU workload by identifying vacant households and by reducing the number of contact attempts, if high-quality data exists for an occupied household.
Listing (See section <u>3.3.2.1</u>)	Paper-based listing; used paper maps and paper address registers; mailed paper maps and address registers to central processing center to be processed.	Enumerators will use automated instruments to collect and update the census address list, allowing for near real-time updates and transmission of listing data. Global Positioning System (GPS) fed maps will be incorporated into the devices to show real-time location and location of the address with routing capability.
Enumeration (See section <u>3.3.3</u>)	Used paper maps to locate addresses; left a 2010 Census questionnaire for the household to fill out and return by mail.	Use an automated mobile device to locate the address. Enumerators will link and leave a 2020 Census Internet Choice Questionnaire Package at every housing unit (HU) identified to allow the household to self-respond by internet, by mailing a completed questionnaire, or by telephone.
Training (See section <u>3.1.4</u>)	In person classroom training.	Combination of online/self-study and classroom.
Contact Method or Type	UL had one contact attempt.	UL will only have one on-the-ground contact attempt. HUs where a response was not received will be added to the NRFU universe.
Field management structure (See section See Section 2.2.2.2, Subsection <u>Innovate Field Operations</u>)	494 local census offices (LCOs).	248 planned area census offices (ACOs).
Multiunits (See section <u>3.3.4</u>)	All multiunits treated similar to other households.	Initial visit to multiunit manager will assist with updating the address list.
In-Field Address Canvassing	In-field address canvassing was conducted everywhere including in the UL TEAs.	In-field address canvassing will not be conducted in the UL TEAs. UL will be responsible for its own listing.

2.2.2.3 Factors that Could Increase the Update Leave Cost in the 2020 Census

While concerted efforts are being taken to reduce the cost of the UL operation and overall workload, several factors cannot be controlled. Identified risks, described below, include:

- High number of non-ID responses.
- Unrealized technical innovations.
- Strong economic conditions negatively impacting the ability to hire UL enumerators.
- Natural or major disasters that increase UL Workload.

UL occurs simultaneously with Internet Self-Response (ISR). During ISR, a larger than anticipated number of self-responses without Census IDs or addresses not found in the MAF would increase the number of non-ID cases. If the non-ID responses cannot be linked to addresses, then there is a burden on the public to respond a second time.

Technical innovations, such as assignment optimization, are key elements to the operational design for conducting a more efficient UL operation. If any aspect of the planned technical innovations does not perform as expected, then the operational design for UL may not be as successful as anticipated.

Technical innovations are expected to reduce the cost of the UL operation, but the cost of the operation can be greatly impacted by economic conditions beyond the Census Bureau's control. A strong economy can result in a more difficult hiring environment for field staff. If economic conditions are reflective of this at the time of the 2020 Census, then the costs to implement the UL operation may prevent the expected cost savings from being realized. A natural or major disaster can change the TEA classification of large geographic areas, increasing the UL workload and operational costs.

2.3 Design Overview

The following sections present the high-level design for UL. Refer to the 2020 Census Operational Plan for a complete inventory of design decisions for all 2020 Census operations.

2.3.1 High-Level Operational Design

The design of the UL operation for the 2020 Census includes four major operational activity areas:

- UL Planning and Preparation.
- UL Operational Workload Management.
- UL Data Collection.
- UL Operation Closeout.

Each of these major activity areas is summarized below. Together, these activities represent the complete set of work that needs to be performed in order to conduct this operation.

2.3.1.1 Update Leave Planning and Preparation

UL will conduct the planning and preparation needed for the 2020 Census operation. The UL Integrated Project Team (IPT) will determine effective field procedures and corresponding business rules for the 2020 Census. Based, in part, on these field procedures and business rules, UL systems requirements will be developed and approved. UL will determine staff needs and performance metrics for all UL field activities, and by working with Field Infrastructure (FLDI), will prepare and perform UL-specific training.

2.3.1.2 Update Leave Operational Workload Management

UL will receive the UL universe and updates from RPO. The initial universe will consist of all BCUs and all their associated addresses located in TEA6 area. Updates to the universe will include corrections, verifications, and adds in production and listing QC. The Enterprise Censuses and Surveys Enabling Platform Operational Control System (ECaSE OCS), in conjunction with the Assignment Optimizer, will create optimized work assignments based on this universe and track parameters such as the status of 2020 Census questionnaire package deliveries and the status incoming self-responses. UL will monitor progress based on the performance metrics set as part of UL preparation and resolve issues that affect the processing of the operational workload.

2.3.1.3 Update Leave Production (Canvass and Leave) Data Collection

The UL enumerators will visit every place in TEA 6 where people could live or stay and compare what they see on-the-ground with the existing census address list. Enumerators will verify, correct, and add address and location information based on their on-the-ground observations. Much like the Address Canvassing operation, enumerators will classify each LQ as a HU, a GQ, a transitory location (TL), or as nonresidential. LQs classified as GQs or TLs will be assigned to the appropriate enumeration operation. If the unit is not classified as a LQ, GQ, or TL, it is marked as a delete and removed from the list to avoid further enumeration efforts. At each eligible HU, an enumerator will attempt to leave a 2020 Census Internet Choice Questionnaire Package. If someone answers the door, the enumerator will provide a confidentiality notice, ask about the address to verify or update the information, link the paper questionnaire ID inside the package to the HU, write in the HU address on the questionnaire, and then hand the respondent a 2020 Census Internet Choice Questionnaire Package. The enumerator will also ask if there are any additional LQs in the structure or on the property and collect or update that information. If no one is home at an eligible HU, the enumerator will link and leave a

2020 Census Internet Choice Questionnaire Package inviting a respondent to self-respond via the internet, paper, or telephone.

2.3.1.4 UL Operational Closeout

When the operation nears completion, UL will begin closeout with the handling of any remaining BCUs. As the workload reduces, UL will work with FLDI to reduce staff and collect devices. Closeout will include an operational assessment and analysis of data and paradata collected as well as lessons learned to be applied to the 2030 Census.

The full hierarchy of activities for the UL operation is provided in Appendix C in the form of an activity tree. In the activity tree, each major operational activity area listed above is numbered and then decomposed into a numbered set of subactivities, some of which are further decomposed into more detailed numbered subactivities or steps. For a full description of the operational subactivities that comprise the UL operation, see the Detailed Process Description discussions in Section 3.

2.4 Update Leave Operational Context

The UL operational activities described in Section 2.3 are conducted within the context of other 2020 Census operations and other programs or data sources that are external to the 2020 Census Program. One way to depict an operational context is by using a “Context Diagram,” which shows the boundary of the operational process, the operational activities it contains, and the information exchanged with its neighbor operations (or other entities), as well as the resources (mechanisms) needed to conduct the operational work.

Figure 5 is a top-level context diagram for the UL operation represented as an Integrated Definition, Level 0 (IDEF0) model. An IDEF0 model of a process (or operation) shows the Inputs, Controls, Outputs, and Mechanisms of the process. These IDEF0 model elements are summarized below and described further in the sections that follow.

The yellow box in the center of the IDEF0 model lists the major operational activity areas for the operation, numbered as given in the UL Operation Activity Tree in Appendix C. Specific Information Exchanges (IE) are shown in different colored boxes to represent the Inputs (green boxes on left side), Outputs (orange boxes on right side), Controls (purple boxes on top), and Mechanisms (blue boxes on the bottom). Boxes to the left of the Inputs indicate the *Provider* of the inputs to the operation (typically another 2020 Census operation or an external source). The Provider of the Controls is noted in the box itself. Boxes to the right of the Outputs indicate the *Receiver* of the outputs (typically another 2020 Census operation or external entity). Each Information Exchange has a name and a unique number for identification purposes.

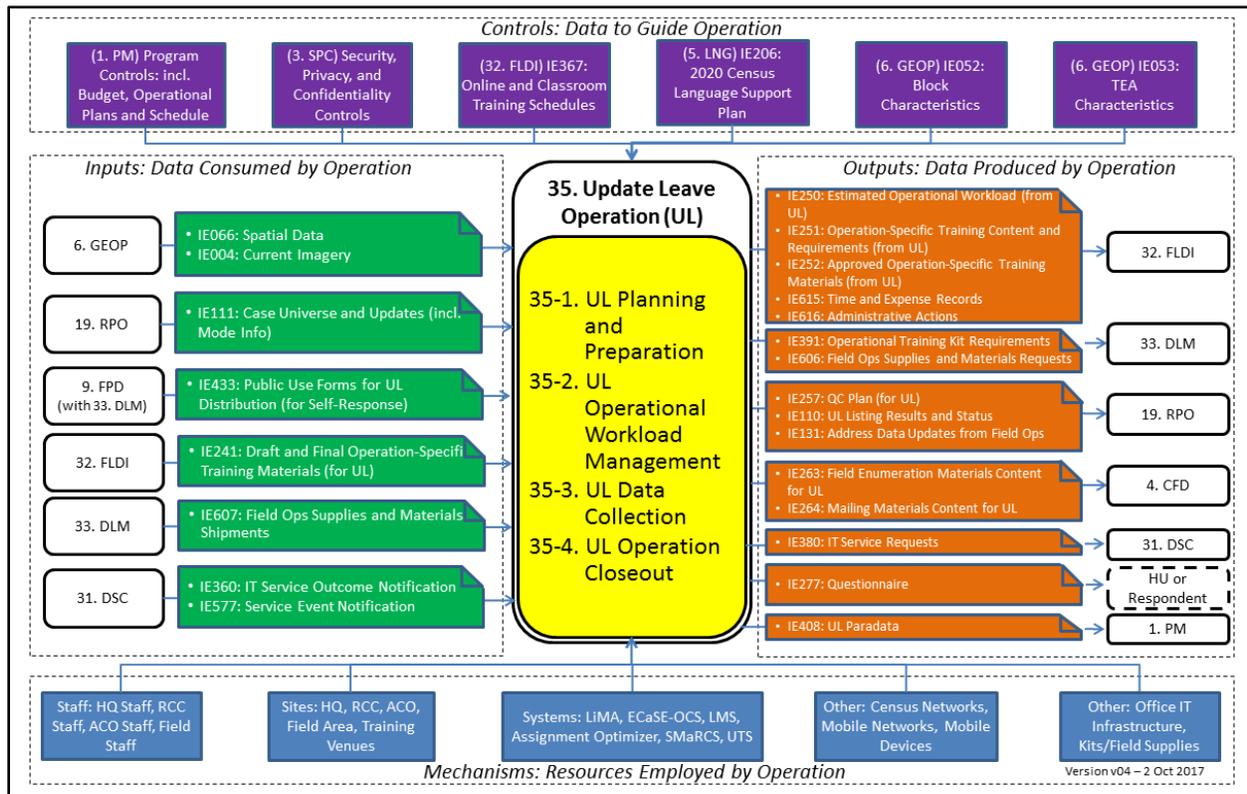


Figure 5: Update Leave Operation (UL) Context Diagram

For detailed descriptions of the Inputs, Controls, Outputs, and Mechanisms used by the UL operation, see the sections that follow.

2.4.1 Update Leave Operational Inputs

Inputs are the data that are consumed by the operation. The inputs define the amount of operational work that needs to be performed. Table 4 lists the inputs to the UL operation.

Table 4: UL Operational Inputs

Provider	Information Exchange	Description
6. Geographic Programs operation (GEOP)	IE066: Spatial Data	Spatial data from MAF/TIGER, includes: <ul style="list-style-type: none"> • Map data. • Collection Geography Delineations for BCUs and TEAs. • Field Management Area (FMA) Delineations for operational use.
	IE004: Current Imagery	Imagery data from GEOP for operational use.
19. Response Processing Operation (RPO)	IE111: Case Universe and Updates (incl. QC BCU Sample)	The set of BCUs to be listed. For UL, this includes production and QC BCUs within the UL TEA.
9. Forms Printing and Distribution operation (FPD) (with 33. Decennial Logistics Management operation (DLM))	IE433: Public Use Forms for UL Distribution (for Self-Response)	Paper questionnaires that are left by the UL operation at identified Housing Units to allow occupants to self-respond.
32. Field Infrastructure operation (FLDI)	IE241: Operation-Specific Training (for UL)	All materials needed to conduct the online and classroom training for UL-specific operational activities. This includes course content, instructor materials, and student handouts.

Provider	Information Exchange	Description
33. Decennial Logistics Management operation (DLM)	IE607: Field Ops Supplies and Materials Shipment	Shipment of additional supplies and materials required to support the field operation. Provided in response to requests made by the field operations to DLM.
31. Decennial Service Center operation (DSC)	IE360: IT Service Outcome Notification	Notifications and status updates of IT service results provided to the users (requesters).
	IE577: Service Event Notification	Notifications to all users of a service event such as routine operations updates/changes, system problem/incident status or privacy/security incident status. Typically, these are provided as part of the standard message users receive when they call in for help.

2.4.2 Update Leave Operational Controls

Controls are the data that guide the behavior of the operation. They are not consumed by the operation, but rather they provide guidance, models, limits, criteria, cutoff dates, or other information that controls the way in which the operational work is performed.

Table 5 lists the controls for the UL operation.

Table 5: UL Operational Controls

Provider	Information Exchange	Description
1. Program Management operation (PM)	Program Controls	Program Control information including: <ul style="list-style-type: none"> • Budget. • Operational Plans and Schedule.

Provider	Information Exchange	Description
3. Security, Privacy, and Confidentiality operation (SPC)	Security, Privacy, and Confidentiality Controls	Laws, policies, regulations, and guidelines related to physical security, IT security, data security and privacy and confidentiality impacts, analyses, and processes. These include but are not limited to Title 13, Title 26, and other laws and policies related to protection of personally identifiable information.
4. Content and Forms Design operation (CFD)	IE226: Content Specifications for Field Materials	Content (English and non-English) for field materials and additional content-related guidance, such as response option wording, skip patterns, and help text (includes GQ requirements).
32. Field Infrastructure operation (FLDI)	IE367: Online and Classroom Training Schedules	Schedules for UL-specific online and classroom training classes.
5. Language Services operation (LNG)	IE206: 2020 Census Language Support Plan	Document that specifies the number of languages and level of support for each language to be included in the 2020 Census.
6. Geographic Programs operation (GEOP)	IE052: BCU Characteristics	<p>Geographic Programs Controls including BCU Characteristics:</p> <ul style="list-style-type: none"> • BCU Delineation. • Special Land Use Areas. • Ungeocoded Records. • Availability of local GIS data and the ASE status. • 2020 Local Update of Census Addresses operation (LUCA) concerns.

Provider	Information Exchange	Description
6. Geographic Programs operation (GEOP)	IE053: TEA Characteristics	Geographic Programs Controls including TEA Characteristics: <ul style="list-style-type: none"> • TEA and Address Characteristic Type Code. • Type of Enumeration Area (TEA) Delineation.

2.4.3 Update Leave (UL) Operational Outputs

Outputs are the data produced by the operation. The outputs constitute the results of operational work that has been performed. Outputs produced may be used as inputs or controls to other operations.

Table 6 lists the outputs from the UL operation.

Table 6: UL Operational Outputs

Consumer	Information Exchange	Description
32. Field Infrastructure operation (FLDI)	IE250: Estimated Operational Workload (from UL)	Estimate of number of UL addresses by geographic area. This information is used by FLDI to create a model for estimating the staffing needs by location.
	IE251: Operation-Specific Training Content and Requirements (from UL)	Course content and other training requirements for the UL-specific classroom training materials and online training modules developed by FLDI.
	IE252: Approved Operation-Specific Training Materials (from UL)	Reviewed and approved training content and materials used to conduct online and classroom training for UL-specific operational activities.
	IE615: Time and Expense Records	Information regarding staff time and reimbursable expenses. Used by FLDI to pay employees.

Consumer	Information Exchange	Description
	IE616: Administrative Actions	Decisions regarding administrative changes for field and office staff made by field operation management. For example, field operations may decide to transfer an employee to another location. FLDI is responsible for documenting these actions in the appropriate systems.
33. Decennial Logistics Management operation (DLM)	IE391: Operational Training Kit Requirements	A list of the contents that should be included in the kits provided to the field staff in support of UL.
	IE606: Field Ops Supplies and Materials Requests	Requests for additional supplies and materials required to support the field operation once the initial supplies provided in the operational training kit have been depleted.
19. Response Processing Operation (RPO)	IE257: QC Plan (for UL)	<p>Plans for conducting Field Data Collection quality control.</p> <p>For UL this includes sample selection methodologies and rates for relisting, listing matching thresholds used to determine need for rework and rework processes, and systems used.</p>
	IE110: UL Listing Results and Status	<p>Listing results for all housing units included in UL TEAs. This includes production and relisting cases as well as data collected during Production Listing and Listing QC.</p> <p>Listing results are provided at the BCU level. Listing QC may be performed either in the office by NPC clerks or in the field by enumerators.</p>

Consumer	Information Exchange	Description
	IE131: Address Data Updates from Field Ops	Address data updates provided by the field operations. This could include newly identified addresses, deletes when an address listed in the MAF is determined to no longer exist, and changes in living quarter type (e.g., housing unit to group quarter).
4. Content and Forms Design operation (CFD)	IE263: Field Enumeration Materials Content for UL	Content for the nonquestionnaire field materials that support enumeration. For UL, these are any nonquestionnaire materials (e.g., Confidentiality Notices, CQA Insert, etc.) included in the package that is left at the door.
	IE264: Mailing Materials Content for UL	Content for any reminder mailings delivered to addresses within the UL TEA.
31. Decennial Service Center operation (DSC)	IE380: IT Service Requests	Requests for information or advice, or for a standard change (a preapproved change that is low risk, relatively common and follows a procedure) or for access to an IT service.
Housing Unit (HU) or Respondent	IE277: Questionnaire	Questionnaire that respondent can submit through U.S. mail.
1. Program Management operation (PM)	IE408: UL Paradata	Status and progress data related to the listing process. This includes administrative and procedural data describing the data collection and management process in all automated systems.

2.4.4 Update Leave Operational Mechanisms

Mechanisms are the resources (people, places, and things) that are used to perform the operational processes. They include Staff Resources, Infrastructure Sites, Systems, and other Technology Infrastructure.

Staff Resources

Table 7 identifies the Staff Resources employed for the UL operation.

Table 7: Staff Resources used within UL Operational Activities

Staff Resources	Description/Role
HQ Staff	HQ staff who manage the UL operation and coordinate activities with the RCC staff, ACO staff, and field staff.
RCC Staff	RCC/Puerto Rico Area Office (PRAO) staff who manage all UL field operations within their designated Census region.
ACO Staff	ACO staff who manage all UL field operations within their designated area. The area census office manager (ACOM) manages multiple ACOs and the work of the following staff: CFMs and support staff, assistant managers (technical and administrative), office clerks, and office operations supervisors.
Field Staff	Enumerators and CFSs who perform UL operational activities in the field.
NPC Staff	Clerks at the NPC who perform the initial analysis and research of incoming UL paper questionnaire self-response cases.
CQA Customer Service Representative (CSR)	The staff provided by the CQA contractors who provide telephone support for self-responding UL interviews. These representatives will collect census data on behalf of respondents via telephone interviews.

Infrastructure Sites

Table 8 identifies the Infrastructure Sites employed for the UL operation.

Table 8: Infrastructure Sites for UL Operational Activities

Infrastructure Site	Description/Role
Census Headquarters (HQ)	HQ site for office work conducted in support of the UL operation. This permanent site in Suitland, Maryland manages the operation throughout the country.
Regional Census Center (RCC)	RCCs manage all operations within their assigned geographic area. The RCCs oversee the activities of the ACOs. Each RCC will manage a number of ACOs. This also includes the PRAO, which manages activities and operations unique to Puerto Rico and the ACOs on the island.
Area Census Office (ACO)	ACOs are responsible for managing all of the field operations and support activities within their designated area.
Field Area	The geographic area within which field staff perform listing activities.
Training Venues	Sites where field staff receive classroom training on both general administrative topics and UL-specific topics. These sites are coordinated by the ACO staff in FLDI.

Systems and other Technology Infrastructure

Table 9 identifies the Systems employed for the UL operation.

Table 9: Systems used within UL Operational Activities

System	Description
Listing and Mapping Application (LiMA)	A single, scalable, automated corporate instrument that enables Field Representatives (FRs) to capture and provide accurate listing and mapping updates to the MAF/TIGER System. LiMA will display an address record for each known living quarter in the assigned BCU. LiMA will also display a map of the BCUs in the surrounding area to orient the FR and allow for the collection of a MAF structure point (MSP), or “map spot.”
Enterprise Censuses and Surveys Enabling Platform (ECaSE)	Enterprise solution that supports 2020 Census operational work. For UL, ECaSE OCS is used for work assignment, schedule management, processing of completed work, and matching of responses to addresses.
Learning Management System (LMS)	System that hosts online training modules for the field staff.
MOJO Assignment Optimizer	Enterprise solution that optimizes the routing used by field staff to navigate to and between assigned fieldwork locations (i.e., case locations for enumeration and BCU locations for listing).
Sampling, Matching, Reviewing, and Coding System (SMaRCS)	Application supporting QC for field operations during the 2020 Census Research and Testing program and the 2020 Census. The SMaRCS application specifically supports QC operations designed to determine whether field listers and enumerators are using validated procedures and collecting accurate data. The SMaRCS application will facilitate QC operations by providing a mechanism for selecting QC samples. SMaRCS will also serve as a major control component for QC operations by managing the selection of QC samples for field follow-up related to both census and Coverage Measurement (CM) operations.

System	Description
Unified Tracking System (UTS)	<p>A data warehouse that combines data from a variety of Census Bureau systems, bringing the data to one place where the users can run or create reports, which allows them to analyze survey and resource performance. This role-based system provides case-level tracking across modes and drill-down capability, and pulls cost data into the same system for more efficient cost impact assessment. The UTS extracts data from data collection and operational control systems daily, providing the users near real-time data.</p> <p>UTS has two components: Paradata Repository and Cost & Progress. UL will use reports from the Cost & Progress component to manage and monitor UL.</p>

Other Technology Infrastructure employed for the UL operation includes:

- Office IT Infrastructure at headquarters, RCCs, and ACOs for conducting UL operational work. This infrastructure is provided by the IT Infrastructure (ITIN) operation.
- Census network connectivity for data transmission between operational systems and operational sites. This connectivity is provided by ITIN.
- Mobile network for listing activities using the automated instruments. This network is provided by ITIN.
- Automated instruments used by the field staff to record listing or relisting results and status and to link IDs for questionnaires left at the door to the address ID. These devices are provided by ITIN.
- Kits/Field Supplies that field staff will use for listing activities. These kits/field supplies are provided by the Decennial Logistics Management (DLM) operation.

2.5 Update Leave Data Flow and Operational Influences

Figure 6 is an Integrated Operations Diagram, which describes the design concepts for the response data collection operations for the 2020 Census (stateside and Puerto Rico). This diagram assumes that the frame has been developed and Address Canvassing operations are complete. The diagram shows RPO as the hub of data collection and RPO’s interactions with all the other 2020 Census operations that have a role in data collection. The discussion below walks the reader through the diagram, using the circled numbers to help the reader follow the flow.

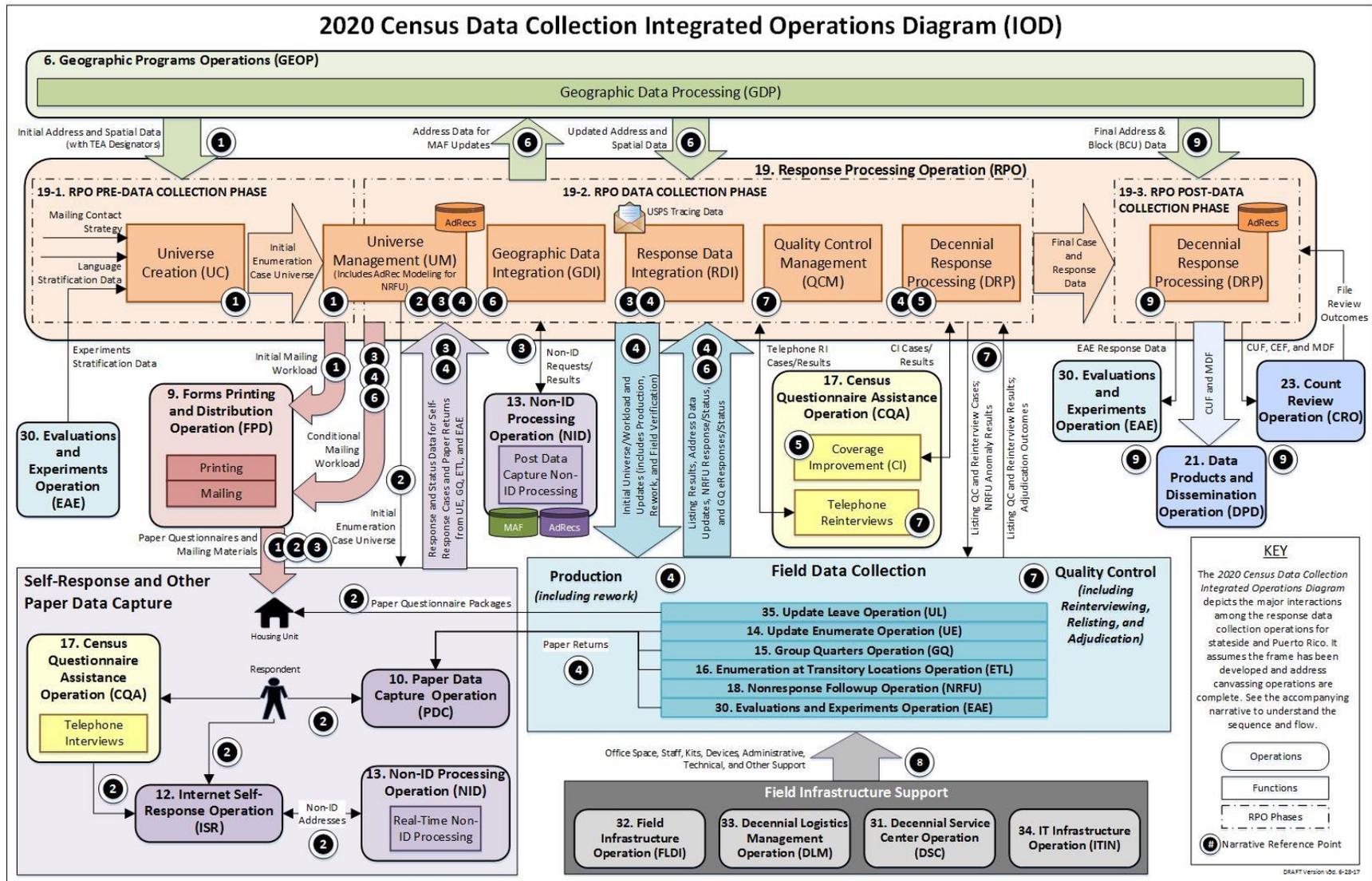


Figure 6: 2020 Census Data Collection - Integrated Operations Diagram (IOD)

Pre-Data Collection

① Before the start of data collection, the Geographic Data Processing (GDP) component of the Geographic Programs operation (GEOP) sends initial address and spatial data, including the TEA designations, to RPO so it can create the Initial Enumeration Case Universe. RPO also receives the mailing contact strategy (i.e., strategy for self-response stratification) so it can identify which housing units receive which kinds of mailings, language stratification information so it knows which language to use, and experimentation stratification data so it knows which housing units are to be included in what types of experiments. The creation of the Initial Enumeration Case Universe and application of the stratification data are done as part of the RPO Universe Creation function.

Based on the stratifications, the RPO Universe Management (UM) function creates the initial mailing workload and sends it to the Forms Printing and Distribution Operation (FPD), which prints and then mails the appropriate materials to mailable housing units for the Self-Response (SR) and Update Leave (UL) TEAs. The first two of the five potential mailings for the SR TEA are sent unconditionally to all housing units in this TEA. These mailings are sent in English or English and Spanish based on the language stratification data and may include letters or—based on the self-response stratification—questionnaires. There is only one mailing for the UL TEA.

During Data Collection

② Once the RPO Universe Creation work is complete, the Initial Enumeration Case Universe is managed by the RPO UM function, which tracks changes to the enumeration universe for future mailings and for the data collection operations.

People living in housing units are encouraged to self-respond through a partnership and communications campaign (not shown on this diagram), through mailings sent by FPD, and through paper questionnaires left at housing units as part of the Update Leave operation (UL).

To make it easy for people to respond and to reduce the paper workload, the Census Bureau is using an internet first strategy for most housing units. Respondents can go to the internet and enter their response using the internet instrument as part of the Internet Self-Response operation (ISR). The internet option offers additional flexibility and allows people to respond in multiple languages. If a respondent calls CQA, a customer service representative may offer to collect the respondent's information by telephone. The information collected from these telephone interviews is entered by a customer service representative using an ISR instrument similar to the public-facing instrument used by respondents.

Respondents can also mail paper questionnaires. These questionnaires are received by the Paper Data Capture operation (PDC), which uses scanning and imaging technology to capture the information from these questionnaires.

ISR receives the Initial Enumeration Case Universe from the RPO UM function and uses it to link responses provided through the internet instrument to the appropriate case. If respondents do not have their unique Census ID available, they are still able to complete the census questionnaire as a non-ID response using the ISR instrument. The Non-ID Processing operation (NID) first attempts to match the address entered by the respondent or customer service representative to a known census address in real-time. For addresses that do not match, the response is still collected and is subject to later Non-ID processing.

③ Response and status data collected through the various self-response data collection operations are sent (in digital format) to RPO's Response Data Integration function. Any responses collected through PDC or ISR that are submitted in languages other than English or Spanish are translated by staff at the Tucson call center on behalf of these operations before being sent to RPO. RPO's UM function uses the response status data to determine the appropriate actions for the case.

During self-response data collection, reminder mailings are sent to HUs in the SR TEA. The first reminder is sent to all HUs in the SR TEA using the initial mailing workload, as discussed above. Subsequent reminders are conditional and are only sent to those housing units that have not yet responded. The RPO UM function sends a Conditional Mailing Workload to the FPD operation for these nonresponding units.

Any remaining Non-ID cases are sent by RPO to NID for post real-time Non-ID processing, which attempts to match addresses provided by respondents to known addresses in the MAF using automated and clerical procedures. As needed, administrative records (AR) are used to supplement the matching process. Most of these non-ID cases will be from internet responses that could not be matched during real-time Non-ID processing. In addition, post data capture Non-ID processing will be required for paper questionnaires for which the Census ID could not be read during data capture. The results of post real-time Non-ID matching are sent back to RPO. Based on predefined business rules, some of the responses that cannot be matched through NID are sent to the field for verification as part of NRFU.

④ The discussion above covers self-responses for people living in housing units. Special operations also exist to collect data from people living in other types of living quarters or for whom self-response is not a viable option:

- The GQ operation enumerates people living in group quarters (e.g., dormitories, correctional facilities, and nursing/skilled-nursing facilities) as well as people

experiencing homelessness and receiving services at service-based locations such as soup kitchens. GQ also enumerates people living on maritime vessels and receives administrative records for people living in the Military TEA, which includes both on-base group quarters and on-base housing units.

- The ETL operation enumerates people who are living in special locations--such as recreational vehicle parks, campgrounds, racetracks, circuses, carnivals, marinas, hotels, and motels--and who do not have a UHE.
- The UE operation lists and enumerates housing units in areas that pose unique challenges to the standard self-response data collection operations. These housing units are in the UE and Remote Alaska TEAs, which cover remote areas of the country and other small selected areas.

NRFU is another special operation whose primary purposes are to determine the housing unit status of addresses in the SR and UL TEAs for which a self-response was not received and to enumerate those that are believed to be occupied. As mentioned in number 3 above, NRFU also performs a field verification activity to verify selected addresses for Non-ID self-responses that could not be matched to known addresses through NID.

Based on the universe case type (derived from TEA and living quarter type), RPO sends the Initial Enumeration Case Universe/Workload to the GQ, ETL, and UE operations. GQ uses this universe to perform an advance contact activity to collect general information and determine the preferred method of enumeration. ETL also performs an advance contact activity to schedule appointments for enumerating its universe of cases.

NRFU does not require advance contact activities. For NRFU, the RPO UM function creates an Initial Case Universe/Workload based on an AR modeling activity. Four possible status outcomes result from this modeling for a given address:

- AR Vacant: No one lives there.
- AR Delete: There is no housing unit at that address.
- AR Occupied: There is a high probability that someone lives there and the Census Bureau has high-quality data about that housing unit.
- AR No Determination: Administrative data are not sufficient to help determine the housing unit status.

Only those addresses that are determined to be AR Occupied or AR No Determination are included in the initial NRFU workload. AR Vacant and AR Delete housing units receive an additional mailing from FPD. The RPO UM function provides this additional mailing workload to FPD (as another type of conditional mailing).

For AR Occupied and AR No Determination cases, NRFU sends to RPO information regarding the success of an enumeration attempt as part of the response status data. Housing units that have been determined through administrative records modeling to be occupied are visited only once

during NRFU. If these cases have not been successfully enumerated from this one visit (attempt), then RPO triggers one final mailing to these homes (from FPD) to encourage these households to self-respond. These housing units are removed from the follow-up workload.

SRs can continue to arrive at any time during NRFU. Accordingly, RPO flags housing units in the follow-up workload for which RPO has received a self-response or tracing information from the USPS that indicates that a return is on its way to one of the paper data capture facilities. NRFU is notified about these flagged households as soon as the information is available so that it can remove the housing units from the daily workload, if possible. Any self-responses that are flagged but later found by RPO to have insufficient enumeration data are added back to the NRFU workload for continued enumeration attempts. The RPO UM function tracks this information and uses it to determine what to include in the next day's follow-up workload. Housing units that have been successfully enumerated are not included in subsequent follow-up workloads.

For NRFU, field data are collected on electronic devices. The electronic data are sent to the RPO Response Data Integration function, which subsequently provides this information to the Decennial Response Processing function for further processing. Paper questionnaires are used to enumerate at living quarters during UE and at transitory locations during ETL. These paper questionnaires are checked-in at ACOs and then sent to the paper data capture facilities, where they are scanned and imaged by PDC. PDC sends the captured data and case status information to RPO in digital format.

GQ is primarily a paper operation. Group quarter responses collected on paper questionnaires are checked-in at the ACOs and sent to PDC for scanning and imaging before being transmitted to RPO. Case status updates are sent to RPO as part of the check-in process. GQ data provided in electronic files (eResponses) require additional processing to prepare the data before they are electronically transmitted to RPO. GQ data collected on paper rosters are entered by clerks into the same file format that is used for eResponses. These response data are then sent electronically to RPO.

As part of the Evaluations and Experiments (EAE) operation, the Census Bureau may test different questionnaire content and data collection methodologies during the 2020 Census to help evaluate content and modes for the 2020 Census and inform design changes for the 2030 Census. Addresses that are selected to be part of these experiments are identified in the initial universe (see number 1 above). For those addresses, the EAE operation collects the data and provides responses and status of responses to the RPO Response Data Integration function, which subsequently provides this information to the Decennial Response Processing function. Any responses collected by EAE on paper returns are processed by PDC and sent by that operation to RPO.

5 RPO's Decennial Response Processing function performs coding and other preparation steps on incoming response data. In addition, special activities are performed to identify possible fraudulent returns.

The RPO UM function also supports a Coverage Improvement (CI) activity, the goal of which is to ensure a high-quality census by conducting telephone follow-up for households where there could be coverage issues on submitted responses. CI is a follow-up activity and is therefore considered a component of NRFU; however, the CI telephone interviews are performed by CQA. CQA receives from the RPO UM function a set of cases with potential coverage issues and provides the results of these cases back to RPO's Response Data Integration function.

6 As noted above, universe and address updates occur during field operations. Census Bureau field staff may uncover changes to addresses as they perform their daily assignments in any field operation. For example, a UL or UE enumerator may add an address or find an error in the address or geographic data based on the listing activities, or a NRFU enumerator or a UL enumerator may go to an address and find an additional unit such as a garage apartment located on the premises. All listing results and other address changes are sent to the RPO Geographic Data Integration function, which passes the information on to the GDP function in GEOP.

Changes to the address list may also come from other sources, such as appeals from the Local Update of Census Addresses operation (LUCA), the review of addresses performed by the Count Review Operation (CRO), and updated files from the postal service. The Geographic Data Processing function within GEOP updates the address data and sends these RPO is UM function, which provides these cases to the appropriate operation. Depending on the timing, living quarter type, and TEA designation, RPO may initiate one or more mailings to these new addresses through FPD to encourage self-response.

7 All field operations (GQ, UL, ETL, UE and NRFU) include quality control (QC) functions. For GQ, the RPO Quality Control Management function creates and sends a sample of the field enumeration cases to ACO staff, who conduct telephone reinterviews (RIs), for this sample set of cases, to confirm that a GQ enumerator visited the site and that the total population count is correct.

For UL, the RPO Quality Control Management function selects a sample set of basic collection units (BCUs) for relisting. The QC Listing Results are sent back to the RPO Quality Control Management function for further processing. RPO does not send any changes resulting from UL listing to GEOP until the enumerator has passed the QC check. Further, if the QC activities result in a hard fail, BCUs already worked may require relisting. RPO includes this rework in subsequent UL production workloads.

QC methods for ETL and UE will be performed primarily in the field, tailored to meet the circumstances of these unique paper-based operations.

NRFU includes multiple methods for ensuring high-quality data collection. Several of these are integrated into the staff management activities. In addition, samples of field follow-up cases are selected for RI, a process whereby the response data are collected again and compared to the original collected data. The RPO Quality Control Management function creates the RI workload and sends it to the CQA or NRFU operation. Those RI cases for which a valid telephone number has been provided are contacted by CQA on behalf of NRFU. The remaining RI cases, as well as those that cannot be reached by telephone, are handled by NRFU field staff. The RI results are sent to the RPO Quality Control Management function, which performs an automated comparison of the RI data against the original data. Anomalies are sent back to NRFU, where additional research is conducted to determine how these cases should be handled. The results of this review (adjudication outcomes) are sent back to the RPO Quality Control Management function. In some cases, the adjudication requires that previous cases performed by the enumerator at fault be reworked. RPO puts these cases back into the NRFU workload as appropriate.

8 NRFU, UE, UL, ETL, and parts of the GQ operation are performed in the field. Several operations provide the support for these field data collection activities. The FLDI operation recruits, hires, onboards, trains the staff needed to conduct these operations, and operates the field offices during production. The DLM operation provides the space and logistics support (e.g., supplies, kits, etc.) for the offices and the field staff. The Decennial Service Center operation (DSC) provides technical support for field and field office staff. Finally, the ITIN operation provides the hardware and software used by the field staff and field offices.

Post-Data Collection

9 Once data collection is complete, additional processing occurs to prepare the counts for use in apportionment and the data used by the Data Products and Dissemination Operation (DPD) to create data products for redistricting and other purposes. The RPO Decennial Response Processing function handles this post-data collection processing, which includes multiple activities:

- Supplementing response data with administrative records for those cases that had been identified as AdRec Occupied but for which a Nonresponse Followup attempt was unsuccessful and no subsequent self-response was received.
- Determining the final enumeration universe by reconciling or applying final address and block data from the GDP component of GEOP.

- Determining the returns of record for situations where multiple responses have been received for the same housing unit.
- Performing count and status imputations.
- Performing consistency editing and characteristic allocation supplemented with administrative records data.
- Applying tabulation geography.
- Performing disclosure avoidance (Note: This is done by RPO for Island Areas Censuses data only. Disclosure avoidance for Stateside/PR data is handled by DPD).

Similar processing occurs for responses from group quarters. Responses collected through the EAE operation may require slightly different activities.

Through these processing activities, the RPO Decennial Response Processing function creates multiple files for Stateside/PR response data, including the Decennial Response File (DRF), the Census Unedited File (CUF), and the Census Edited File (CEF). RPO also creates an Island Areas CUF (IA-CUF), Island Areas CEF (IA-CEF), and Island Areas Microdata Detail Files (IA-MDF) for the Island Areas Censuses (IAC) response data. Each of these files is reviewed within the Census Bureau before the data are sent to the next stage of processing: Some of these reviews are done as part of the CRO. The CUF, the CEF, the IA-CUF, and the IA-MDF are sent to DPD via the Census Data Lake (CDL). DPD uses these files as inputs for data products creation and also creates the Stateside/PR MDFs using the CEF as input. RPO also sends data collected as part of EAE back to the EAE operation for further analysis.

2.6 Update Leave (UL) Design Assumptions

The UL operational plan is designed with the following assumptions:

- There will be an automated UL data collection using LiMA on the 2020 Census device.
- 2020 Census Internet Choice Paper Questionnaire packages will be physically delivered to HUs in the UL workload.
- There will be an automated field operational control system.
- A reengineered field structure will be used to streamline UL operations.
- There will be two UL mailings that will inform the administrative records modeling and allow for the removal of vacant HUs through the undeliverable-as-addressed (UAA) status.
- Administrative records modeling will be used to reduce the NRFU workload.

3. Update Leave Operation Detailed Process Description

Figure 7 is a top-level Business Process Model (BPM) showing the Level 1 activity areas within the UL operation. BPMs for the 2020 Census follow industry-standard Business Process Model and Notation (BPMN). An explanation of how to read the BPMN notations and a full sized copy of all of the BPMN diagrams for this operation are provided separately.

This top-level BPM serves as the Context Model for the UL operation. A BPMN Context Model displays the high-level activities within the operation and relationships between them, whereas the IDEF0 Context Diagram shown earlier depicts the boundaries of the operation or activity and the interfaces between the operation or activity and other operations and activities with which it is associated.

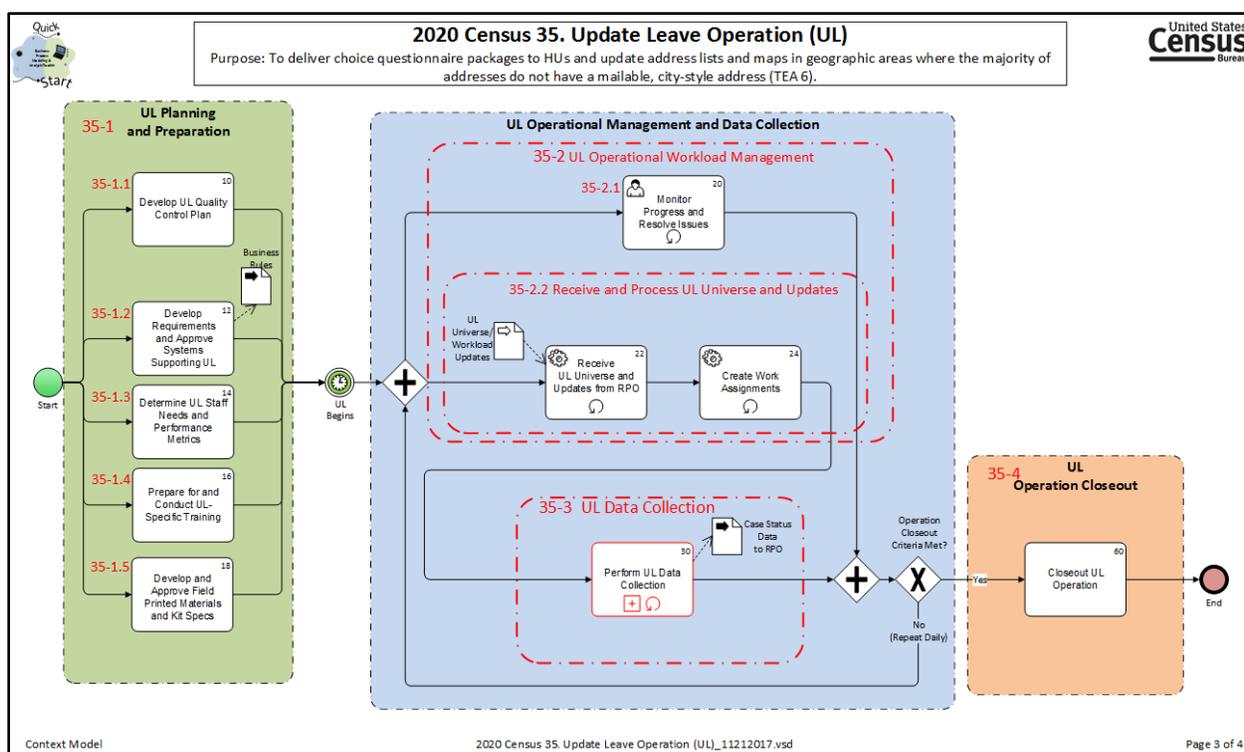


Figure 7: UL Operation Context Model

The UL operation is subdivided into the following Activity Areas:

- UL Planning and Preparation [35-1].
- UL Operational Workload Management [35-2].
- UL Data Collection [35-3].
- UL Operation Closeout [35-4].

The business processes for each of these Level 1 activity areas are discussed along with their inputs and outputs in the following subsections.

3.1 Update Leave Planning and Preparation [UL 35-1]

Figure 88 shows the BPM for the UL Planning and Preparation [UL 35-1] activity area (area within the gray rounded rectangle) and its constituent activities within the overall context of the UL operation.

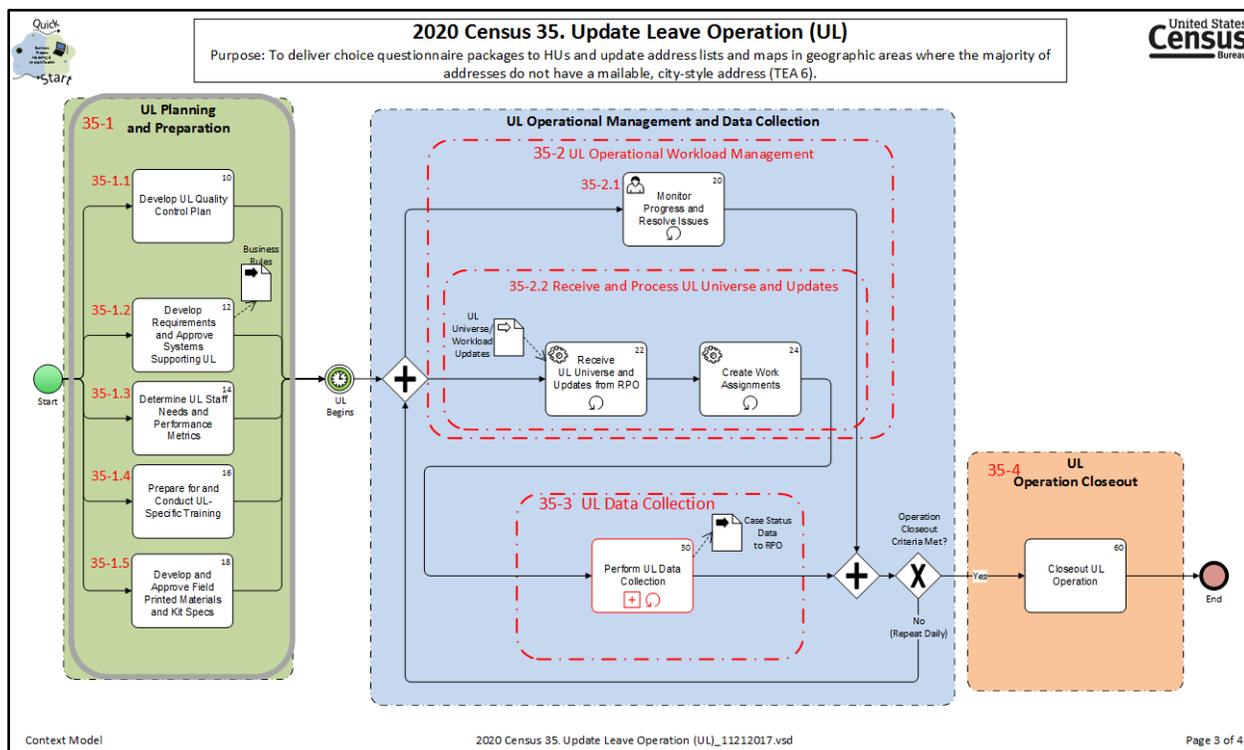


Figure 88: UL Planning and Preparation [UL 35-1] Constituent Activities

The UL Planning and Preparation activity area is subdivided into the following operational subactivities:

- UL Planning and Preparation [UL 35-1].
 - Develop UL Quality Control Plan [UL 35-1.1].
 - Develop Requirements and Approve Systems Supporting UL [UL 35-1.2].
 - Determine UL Staff Needs and Performance Metrics [UL 35-1.3].
 - Prepare for and Conduct UL-Specific Training [UL 35-1.4].
 - Develop and Approve Field Printed Materials and Kit Specs [UL 35-1.5].

UL will perform planning and preparation activities in advance of its 2020 Census operation. UL will develop a quality control plan that will ensure accurate production and account for UL

enumeration procedures. UL will develop processing requirements to send to Enterprise Censuses and Surveys Enabling Platform Operational Control System (ECaSE OCS) and Assignment Optimizer for UL universe creation and procedures for fieldwork assignments. UL will develop internet choice questionnaire package delivery strategies and corresponding business rules to define operational tracking parameters, such as the delivery status. The requirements and business rules are used in the following activities:

- UL applies these business rules in the development and approval of systems requirements, for example, when the address is a housing unit provide a screen in the Listing and Mapping Application (LiMA) system to link the questionnaire ID to that particular address.
- Response Processing Operation (RPO) applies these business rules when creating the Nonresponse Followup operation (NRFU) universe, for example, how to process various UL forms of household self-responses in order to ensure an accurate NRFU workload.
- ECaSE OCS tracks the parameters defined in these business rules to determine that a 2020 Census Internet Choice Questionnaire Package was correctly linked and delivered to a household and work has been complete, or when an enumerator was unable to work an address or a BCU.

UL determines the performance metrics for field staff as well as for the entire UL field operation. Preparation also includes determining the needs for field staff at the ACO level. After FLD Address Coverage Operations Branch (FLD ACOB) develops the training materials, UL IPT approves the materials, and then FLD delivers the in-classroom training to field staff. FLD ACOB determines the supplies and materials for field staff through interaction with the Decennial Logistics Management (DLM) operation.

The subsequent sections describe the UL Planning and Preparation operational subactivities in detail.

3.1.1 Develop Update Leave Quality Control Plan [UL 35-1.1]

The UL IPT develops a plan for selecting the sample of basic collection units (BCUs) for QC as described in this subsection. Any completed UL BCU is a candidate for QC. To select BCUs for QC, RPO samples the completed BCUs using Sampling, Matching, Review, and Coding System (SMaRCS). RPO will select BCUs from the sufficient or completed UL Production BCUs based on prespecified conditions from the UL QC plan. The UL QC plan includes information for RPO on:

- Listing QC Sample Completion Rules.
- Fieldwork Rules.
- QC Components:

- String or Sample Check.
- Delete Check.
- Recanvas.
- Anomalies Determination Rules (Thresholds).
- Rework Rules (selection of cases for rework).

The UL QC plan relies on a scoring system that will run each BCU through various checks, and each check will award a specified point score. A BCU with a high point score will be more likely selected for QC. The values in Table 10 are the baseline parameters used for the Update Leave checks:

Table 10: Update Leave (UL) QC Sampling Checks

Update Leave Listing QC Sampling Checks		
Condition: BCU has...	Points Awarded	Notes
More than 75 percent of addresses fall in multiunit structures.	10	Multiunits appear to contribute to errors.
More than 1 percent of addresses are marked unable to work.	10	Unable to work should be used rarely.
More than 38 percent of addresses are marked as delete, duplicate, or exists in fringe.	10	Deletes are prone to error.
More than 12 percent of addresses are added.	10	Added units are prone to error.
An average strand length (distance between manual and GPS coordinates) minus GPS accuracy is more than 20 meters.	10	The enumerator appears to be far from the units they are listing.
An average strand length (distance between manual and GPS coordinates) minus GPS accuracy between 12 and 20 meters.	5	The enumerator appears to be away from the units they are listing but not a long distance away.
One or more curbstoning clusters, defined as 6 or more addresses within	10	The enumerator appears to be listing many addresses from the same physical

7.6 meters (multiunit structure counts as one address).		location, a sign of falsification, or curbstoning.
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BCU selection for QC will fall into three categories:

1. BCUs with a score above 29 points will be sent immediately for QC.
2. A systematic sample of BCUs with a score above 19 but less than or equal to 29 will be sent for QC.
3. From the remaining BCUs with a score less than or equal to 19, a small systematic sample of BCUs at a lower rate than the other groups will be selected.

The systematic sampling based on the scoring will be completed as follows:

1. The groups are defined as:
 - a. Middle group: BCUs with a score above 19 and less than or equal to 29.
 - b. Low group: BCUs with a score less than or equal to 19.
2. Within each group, sort the list of BCUs received each day by the following fields: RCC, ACO, State, County, and BCU ID.
3. From that list, select one of the first k BCUs in each group at random.
4. Then, select every k^{th} BCU in each group thereafter:
 - c. Middle group: $k = 10$.
 - d. Low group: $k = 20$.
5. Send selected BCUs for QC follow-up.
6. Maintain the sampling pattern across days. Do not restart the systematic sampling each day.

For each BCU selected for QC, SMaRCS will also determine the following:

- A randomly selected intersection at which the QC enumerator will start.
- QC sample size and number of errors allowed.
- Deleted address information.

SMaRCS automation enhances the selection of the QC sample using field data, paradata from ECaSE, and paradata from the Census Data Lake (CDL), a central data repository for data from various systems. Technical innovations will ensure that production enumerators will never QC their own work, and allows for rapid detection of fraudulent production data through the sampling check and the three stage QC process.

3.1.2 Develop Requirements and Approve Systems Supporting Update Leave [UL 35-1.2]

Refer to Figure 8 for a view of the activity that makes up the “Develop Requirements and Approve Systems Supporting UL” operational subactivity.

UL will work with several stakeholders, including the Decennial Census Management Division (DCMD), Population Division (POP), Decennial Statistical Studies Division (DSSD), and Field Division (FLD) to develop and review requirements for the systems that support UL operations. These systems include LiMA, ECaSE, and the Assignment Optimizer. System requirements are developed from user stories and specifications. The Content and Forms Design (CFD) operation maintains the requirements that include content (English and non-English) and additional content-related guidance such as response option wording, skip patterns, and help text.

3.1.3 Determine Update Leave Staff Needs and Performance Metrics [UL 35-1.3]

The “Determine UL Staff Needs and Performance Metrics” operational subactivity is subdivided into the following constituent activities:

- Determine UL Staff Needs and Performance Metrics [UL 35-1.3].
 - Determine Estimated UL Operational Workload by Geographic Area [UL 35-1.3.1].
 - Define UL Operational Performance Metrics and Targets [UL 35-1.3.2].
 - Provide Requirements for UL Staff Supplies and Materials [UL 35-1.3.3].

Refer to Figure 8 for a view of the activity that makes up the “Determine Staff Needs and Performance Metrics” operational subactivity.

UL will estimate the UL operational workload by geographic area to enable FLDI to determine staffing needs in all locations and plan recruiting efforts. DLM also receives requirements for UL staff supplies and materials, known as kits for each staff role, to provision the staff for the operation. UL also defines performance metrics and targets to be used to monitor and manage the staff and the operation as it progresses. These performance metrics are different from the parameters around ECaSE OCS alerts described in the Innovate Field Operations section.

The subsequent sections describe the Determine Staff Needs and Performance Metrics operational subactivities in detail.

3.1.3.1 Determine Estimated Update Leave Operational Workload by Geographic Area [UL 35-1.3.1]

Based on estimates of the operational workload (UL cases) for geographic areas and staff ratios from UL, FLD CAB determines staffing needs.

Geographic area estimates will be determined on a national, RCC, ACO, tract and BCU level. Workload estimates are based on TEA delineations, with the workload being derived by the number of valid decennial addresses in the MAF TIGER Database (MTDB) for UL TEA6. The workload estimation will also involve input from stakeholders, results from previous censuses and census tests, identified self-response rates, and geographic characteristics. FLD Contracts and Budgets (FLD CAB) will use the UL workload estimates, expected production rates, expected hours worked, and length of the operation to determine staffing needs. Based on the staffing needs produced by FLD CAB, FLD Recruiting will determine the recruitment goals and timeline. FLD CAB provides the staff requirements to DLM for determining the number of kits and to IT Infrastructure (ITIN) for procuring automated instruments.

3.1.3.2 Define Update Leave (UL) Operational Performance Metrics and Targets [UL 35-1.3.2]

Metrics and targets are defined at different administrative levels of the UL operation. Through UTS reports and ECaSE OCS progress tracking, HQ staff will measure the performance of the RCCs for progress and cost of the operation in their regions. The RCCs will measure the performance of the ACOs in their region. An example of an ACO performance metric would be the overall BCU closure rate, or the rate of completed BCUs worked. The Census Field Managers (CFMs) measure the performance of their CFSs. Through ECaSE OCS reports, CFSs measure the status and progress of the enumerators.

3.1.3.3 Provide Requirements for UL Staff Supplies and Materials [UL 35-1.3.3]

The “Provide Requirements for UL Staff Supplies and Materials” operational subactivity is subdivided into the following constituent activities:

- Provide Requirements for UL Staff Supplies and Materials [UL 35-1.3.3].
 - Provide Field Enumeration Materials Content [UL 35-1.3.3.1].
 - Provide Kit Requirements [UL 35-1.3.3.2].

UL provides CFD with the requirements for self-response enumeration materials. FLD ACOB provides DLM with requirements for assembling field staff supplies and materials into kits.

The subsequent sections describe the Provide Requirements for UL Staff Supplies and Materials operational subactivities in detail.

Provide Self-Enumeration Materials Content [UL 35-1.3.3.1]

UL will provide CFD with the requirements of the following field enumeration materials:

- **Internet Choice Questionnaire Package** – To be handed directly to a respondent or left at a HU by an enumerator if there is no respondent at home. The package will contain:
 - Paper Questionnaire – The 2020 Census paper questionnaire included within the 2020 Census Internet Choice Questionnaire Package.
 - Invitation Letter – A letter inviting the HU to respond to the 2020 Census, and instructing to reply via ISR or using the paper questionnaire within the package.
 - Language Insert – An insert providing assistance for respondents with language barriers. The insert provides instructions on how to contact the census for assistance in eight different languages.
 - FAQs Insert – An insert answering the six most common questions respondents may have.
 - Outbound Envelope – A stamped preaddressed envelope that respondents will use to mail back their completed paper questionnaire.
 - Choice Questionnaire Package Envelope – The envelope containing all the respondent facing materials.
- **Confidentiality Notice** – For an enumerator to refer to or to provide to a respondent during a successful contact attempt and address validation, and to help the respondent understand the Census Confidentiality policy act. The confidentiality notice will be available in both English and Spanish.

CFD provides the print files for the field enumeration materials to DLM after UL specifies the kit requirements. RPO provides the list of addresses for the administrative record removal postcards to Forms Printing and Distribution.

Provide Kit Requirements for Update Leave Staff Supplies and Materials [UL 35-1.3.3.2]

UL will provide DLM with the requirements for assembling the materials for the following types of kits:

- **UL Instructor Kit** – includes forms such as for a Daily Pay and Work Record, Decennial Applicant Personnel and Payroll System (DAPPS) Update, and a Thank You Letter for donated space as well as supplies such as a Census bag, name cards, pens, and a power supply kit.
- **UL Census Field Supervisor Kit** – includes forms such as the Security Incident Report and Special Sworn Status, documents such as the CFS Handbook (electronic only), and an accident reporting kit.

- **UL Enumerator Kit** – includes the mobile device(s), Official Business Sign, 2020 Census Internet Choice Questionnaire Packages, Confidentiality Notices, a Census bag, a writing utensil, and documents such as the Job Aid.

Note: ITIN acquires automated instruments for FLDI to distribute to UL field staff during training. CFSs receive tablets to use ECaSE OCS to monitor case assignments and enumerators, as well as automated instruments to have access to LiMA. Enumerators receive automated instruments to use LiMA for receiving and performing their data collection assignments.

3.1.4 Prepare for and Conduct Update Leave (UL)-Specific Training [UL 35-1.4]

The “Prepare for and Conduct UL-Specific Training” operational subactivity is subdivided into the following constituent activities:

- Prepare for and Conduct UL-Specific Training [UL 35-1.4].
 - Prepare for UL-Specific Training [UL 35-1.4.1].
 - Conduct UL-Specific Training [UL 35-1.4.2].

Refer to Figure 8 for a view of the activity that makes up the “Prepare for and Conduct UL-Specific Training” operational subactivity.

To prepare for UL-specific training, FLD ACOB provide a verified vendor with the requirements and course content for the training. The vendor develops the online and classroom training on UL-specific topics based on these requirements and the content. Various areas within Field Division will develop online and classroom training on general topics such as administrative functions.

FLD develops the training materials, provides the venues for the training based on the training schedule that FLDI creates, and delivers the actual classroom training for the UL-specific topics. FLD is responsible for administering the general and UL-specific online training that is an essential component of the UL classroom training.

The subsequent sections describe the Prepare for and Conduct UL-Specific Training operational subactivities in detail.

3.1.4.1 Prepare for Update Leave-Specific Training [UL 35-1.4.1]

The “Prepare for UL-Specific Training” operational subactivity is subdivided into the following constituent activities as described below.

- Prepare for UL-Specific Training [UL 35-1.4.1].
 - Provide UL-Specific Training Content and Requirements [UL 35-1.4.1.1].
 - Review and Approve UL-Specific Training [UL 35-1.4.1.2].

DCMD and FLD will provide content and requirements for UL-specific training to FLDI and the Decennial Data Collection Training Branch. Based on this input, FLDI contractors will develop the classroom training materials and online course modules. UL will review and approve these materials and modules.

The subsequent sections describe the Prepare for UL-Specific Training operational subactivities in detail.

Provide Update Leave (UL)-Specific Training Content and Requirements [UL 35-1.4.1.1]

DCMD and FLD will provide training content and requirements to FLDI for the UL-specific training of field staff such as:

- Enumerators.
- Census Field Supervisors.

FLD will develop the training for the following staff:

- Census Field Managers.
- Area Census Office Managers (ACOM).

FLDI will use these requirements and content to develop UL-specific classroom training materials and online training modules. FLDI will also develop and approve the general field staff training that is provided in conjunction with the UL-specific training.

Review and Approve Update Leave (UL)-Specific Training [UL 35-1.4.1.2]

UL will review and approve the training developed by FLDI operations based on the requirements and content provided by UL.

3.1.4.2 Conduct UL-Specific Training [UL 35-1.4.2]

Based on operational start dates, FLD will establish nationwide training to ensure the staff are properly trained before UL begins. RCC and ACO staff will seek to identify free public space to deliver classroom trainings. In accordance with the training schedule and using the training materials developed and printed by the vendor, FLD will conduct training that includes instruction for:

- Enumerators using LiMA to verify and update address information.
- Enumerators using LiMA to link a 2020 Census Internet Choice Questionnaire Package to a HU and to status the assigned addresses.
- CFSs using the automated ECaSE OCS to support and monitor enumerators and complete the UL workload.

- CFMs using the automated ECaSE OCS to support and monitor CFSs as they support the enumerators.

CFSs will first receive enumerator training as part of their training. Then they will be responsible for administering that training to enumerators.

3.1.5 Develop and Approve Field Printed Materials and Kit Specs [UL 35-1.5]

The “Develop and Approve Field Printed Materials and Kit Specs” subactivity for UL includes processes and procedures essential to the development, review, and assembly of field printed materials, and the creation of enumerator kit specs. UL will coordinate with FLD and CFD in designing, reviewing, and approving the field printed materials, and in determining which materials will be part of the UL enumerator field kits.

3.2 Update Leave (UL) Operational Workload Management [UL 35-2]

Figure 9 shows the BPM for the UL Operational Workload Management [UL 35-2] activity area (area within the gray rounded rectangle) and its constituent activities within the overall context of the UL operation.

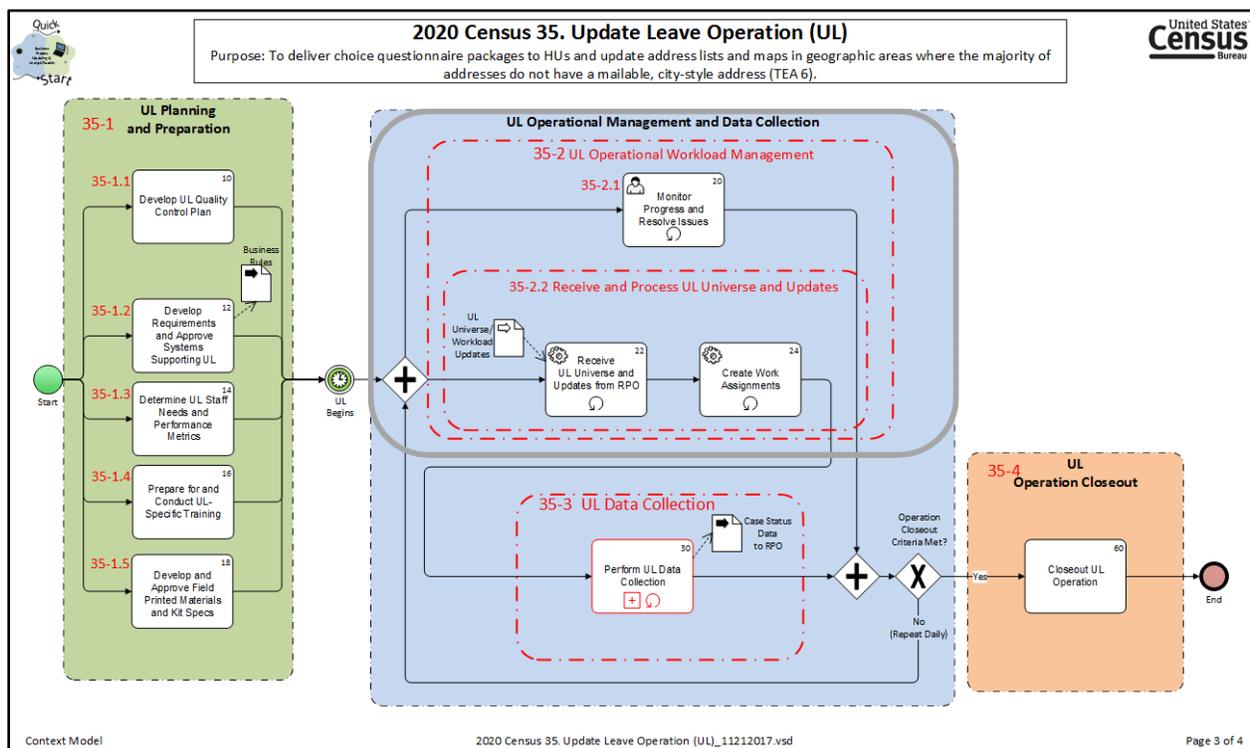


Figure 9: UL Operational Workload Management [UL 35-2] Constituent Activities

The UL Operational Workload Management activity area is subdivided into the following operational subactivities:

- UL Operational Workload Management [UL 35-2].
 - Monitor Progress and Resolve Issues [UL 35-2.1].
 - Receive and Process UL Universe and Updates [UL 35-2.2].

UL will receive its initial universe from RPO, as well as continuous updates to the universe throughout the operation. As addresses are worked, UL monitors progress and resolves operational and performance issues.

Subsequent sections describe the UL Operational Workload Management operational subactivities in detail.

3.2.1 Monitor Progress and Resolve Issues [UL 35-2.1]

Refer to Figure 9 for a view of the activity that makes up the “Monitor Progress and Resolve Issues” operational subactivity.

Monitoring progress and resolving issues includes the following subactivities:

- HQ and RCC review of cost, progress, and status. This review includes comparison of current versus projected or budgeted cost, progress, and status; identifying offices that require special attention or assistance; and inquiry through UTS and ECaSE OCS reporting to find operational outliers, identify areas of concern, and compare progress toward defined performance metrics such as:
 - CFM review of noncompletion conditions such as an unable to work status, and enumerator-identified dangerous situations. For enumerator identified dangerous situations, the CFM may determine that the best action is to send another enumerator to make an attempt or to close the case. If the CFM is unable to resolve a certain situation, the CFM may ask the area census office manager (ACOM) to escalate the request to the RCC.
 - CFS review of enumerators using LiMA results displayed on their mobile device (i.e., tablet or laptop). Alerts are generated when performance and conduct metrics are not being met by the enumerator. Alerts include performance and conduct indicators such as too many unable to work cases and potential overcharge of mileage.
 - CFM review of CFS using ECaSE OCS alerts. Alerts include indicators such as low alert resolution rates, and performance indicators in the previous bullet, aggregated to all of the staff reporting to the CFS.
- Integration with RCCs and ACOs about staffing needs and employee performance and conduct, including terminating poor performers, identifying quality enumerators, and assigning them to work difficult/or complex BCUs or assignments.

UL will be providing metrics and UL operational workload information to the Program Management (PM) operation for it to use in managing performance across the 2020 Census.

3.2.2 Receive and Process Update Leave (UL) Universe and Updates [UL 35-2.2]

A detailed view of the constituent activities that make up the “Receive and Process UL Universe and Updates” operational subactivity is given in Figure 10.

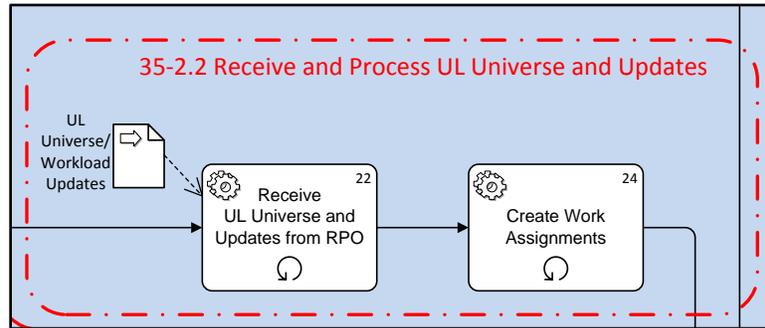


Figure 10: Receive and Process UL Universe and Updates

3.2.2.1 Receive Update Leave (UL) Universe and Updates from Response Processing Operation (RPO)

The UL universe is the complete set of addresses for living quarters (LQs) that are to be worked in the field during the 2020 Census. The UL universe is a subset of the enumeration universe and comprises the addresses for all LQs that are HUs in TEA 6.

The UL workload will initially be the same as the UL universe and will decrease as cases are worked. Cases may also be added to the workload as they are detected by the UL operation or by other operations, for instance:

- HUs added to the address list during UL Production.
- HUs identified in the GQ and ETL field operations.

RPO will send the full production universe of addresses to UL.

The UL Production universe includes the following types of cases:

- UL Production cases [See Section 3.3.2 and Section 3.3.3].
- Multiunit (MU) Manager Visit cases [See Section 3.3.4].
- QC-related cases (Listing QC) [See Section 3.3.5].

RPO will update the universe to include:

- Removal of self-responding addresses and other work status changes, for example, stop works and temporary holds on cases.
- More current administrative record modeling information.
- Characteristic updates for cases (e.g. dangerous situations).
- Listing QC cases and cases identified for rework based on QC results. Cases needing relisting will be assigned to a different enumerator from the one who conducted the original listing.

Updates to the universe including the application of administrative records modeling outcomes are made on a recurring flow basis throughout the course of the operation.

3.2.2.2 Create Work Assignments

ECaSE OCS, in conjunction with the Assignment Optimizer, will create work assignments from the UL universe, based on the following inputs:

- Applicable operational business rules.
- Field staff profile that includes starting address.
- Work availability entered by field staff.
- Geographic location of all eligible cases.

The Assignment Optimizer is an algorithm designed to minimize cost in terms of time and mileage required to complete the operation.

3.3 Update Leave Data Collection [UL 35-3]

Figure 11 shows the BPM for the UL Data Collection [UL 35-3] activity area (area within the gray rounded rectangle) and its constituent activities within the overall context of the UL operation.

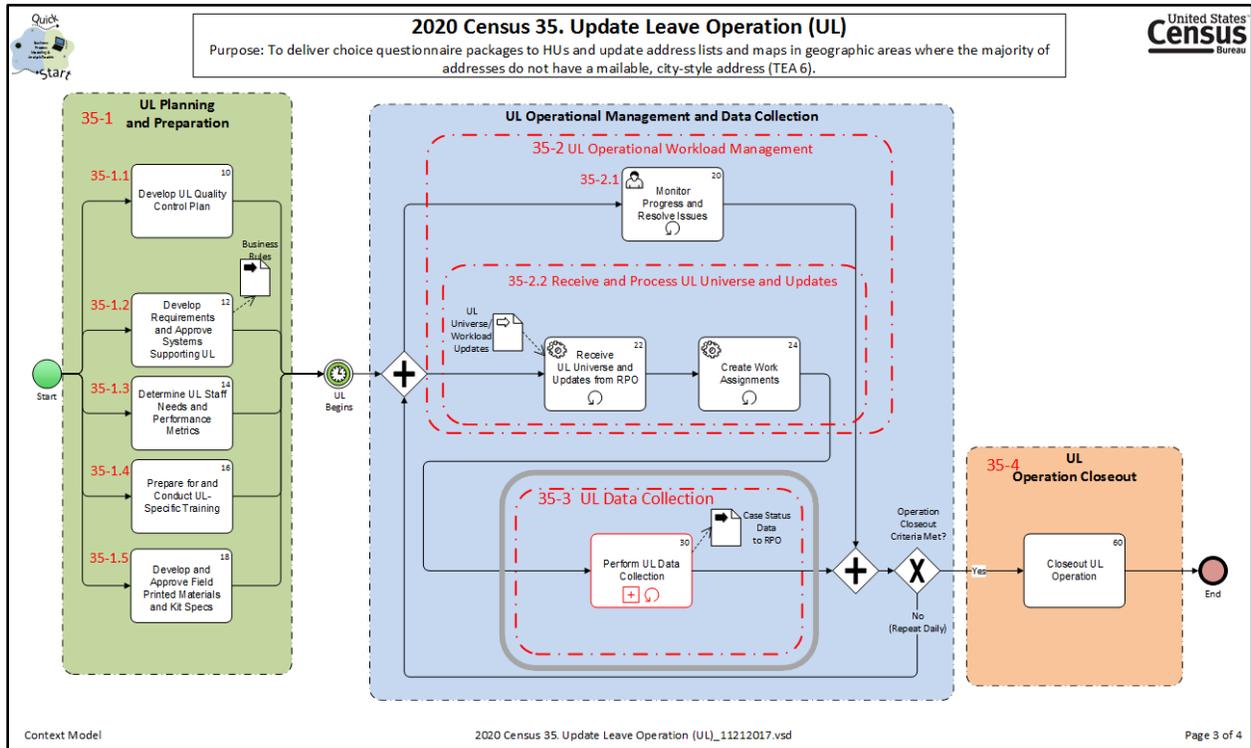


Figure 11: UL Data Collection [UL 35-3] Constituent Activities

A detailed view of the constituent activities that make up the “UL Data Collection” operational subactivity is given in Figure 12.

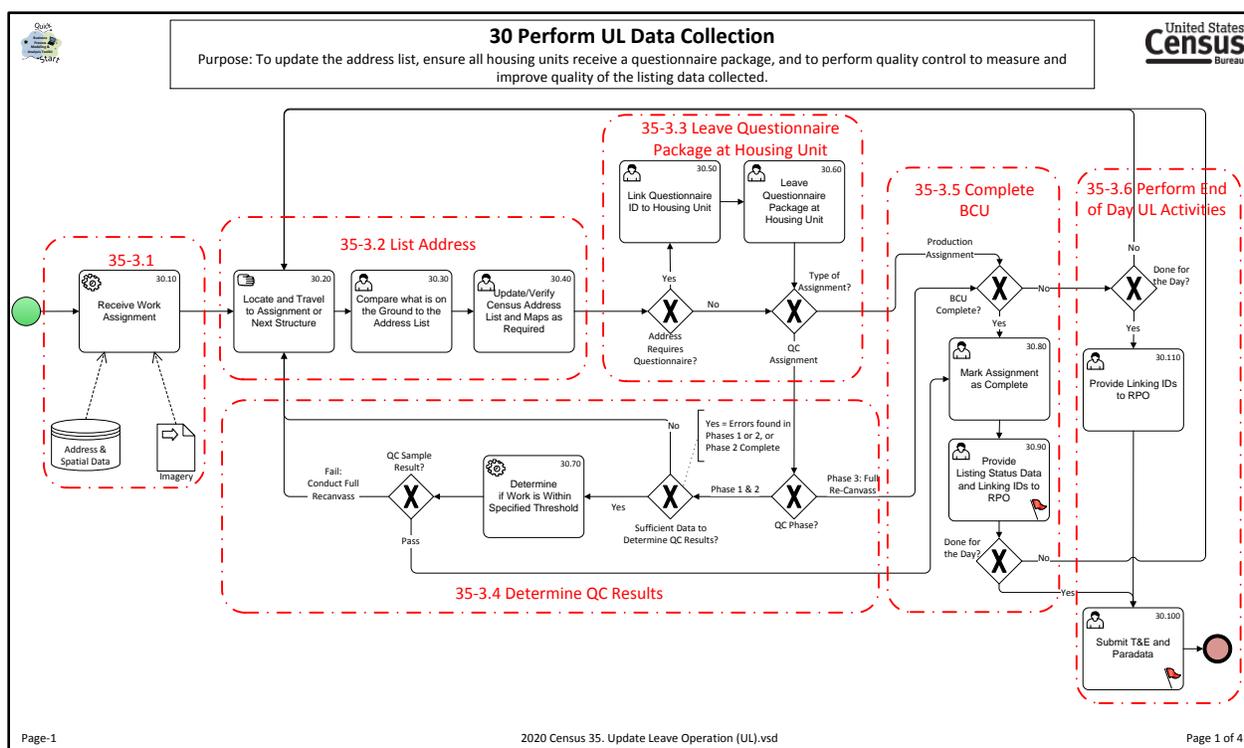


Figure 12: UL Data Collection

The UL Data Collection activity area is subdivided into the following operational subactivities:

- UL Data Collection [UL 35-3].
 - Receive Work Assignment [UL 35-3.1].
 - List Address [UL 35-3.2].
 - Leave Questionnaire Package at Housing Unit [UL 35-3.3].
 - Determine QC Results [UL 35-3.4].
 - Complete BCU [UL 35-3.5].
 - Perform End of Day UL Activities [UL 35-3.6].

Enumerators receive their work assignments for the day as a list in LiMA on their automated instruments. The work assignment will be a BCU and all the addresses currently listed within the BCU. Enumerators will canvass the assigned BCU, update the address list, and deliver a 2020 Census Internet Choice Questionnaire Package to each HU. LiMA designates the address as complete and sends status, paradata, and any collected data to RPO.

Subsequent sections describe the UL Data Collection operational subactivities in detail.

3.3.1 Receive Work Assignment [UL 35-3.1]

A detailed view of the constituent activities that make up the “Receive Work Assignment” operational subactivity is given in Figure 13.

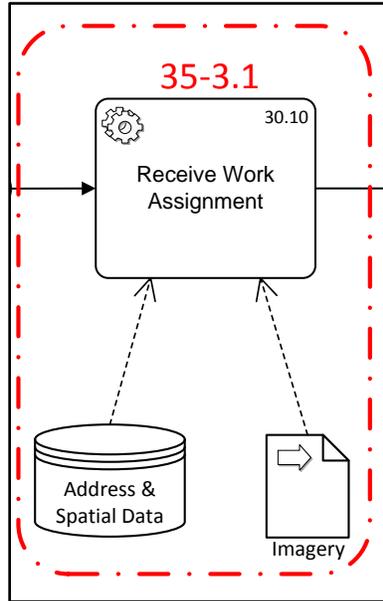


Figure 13: Receive Work Assignment

ECaSE OCS sends work assignments to enumerators’ automated instruments, as assignments becomes available. Enumerators are expected work their list of assignments (or cases) in the order they are received.

Enumerators can switch from a view of the case list to a map interface with the location of each corresponding address within the BCU, with the currently selected address highlighted on the map.

3.3.2 List Address [UL 35-3.2]

A detailed view of the constituent activities that make up the “List Address” operational subactivity is given in Figure 14.

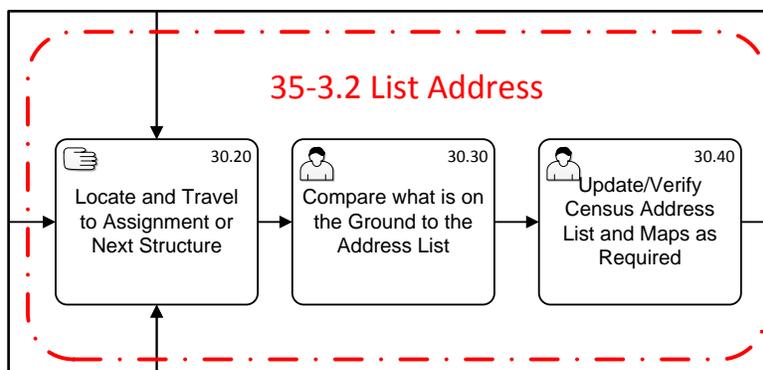


Figure 14: List Address

Every BCU in UL Production will require listing. During UL Production listing, an enumerator will locate and travel to the work assignment. Starting with the first structure in the assigned BCU, the enumerator will compare what is on-the-ground to the address list, and update the census address by either verifying or correcting the address and location information. Listing is comprised of the components outlined in Section 3.3.2.1.

3.3.2.1 Listing

UL Listing consists of enumerators visiting every place where people could live or stay, comparing what they see on-the-ground to the existing census address list and either adding, updating, deleting, or verifying the address and location information. At each structure they encounter on-the-ground, the enumerator identifies the location address based on visual observation or by talking to a knowledgeable person. Enumerators then look for the same address in the address list for the BCU. In general, the field staff complete the following tasks:

- If the address is on the address list, they will confirm the existing information and provide updates as necessary.
- If the address is not on the address list, they will add it.
- If addresses remain on the list that they did not encounter during their ground listing, they will either:
 - Mark the address as a “move to an adjacent BCU” in the fringe area, or outside the limits, of the BCU they are listing (e.g. the address is across the street and beyond the confines of the BCU), or
 - Identify the address as a delete/does not exist in the BCU.
- They will also collect/verify location coordinates for existing LQs and update the maps as necessary by adding or updating street names.
- UL instructs enumerators to visit each HU only once. UL will reuse processes and procedures from Address Canvassing for listing to the extent feasible. UL will also look

to leverage improved listing field procedures and technical system innovations developed and successfully tested by Address Canvassing during the 2018 End-to-End Census Test.

Address Status

Enumerators will verify the address status of every address in the UL workload. For each address, the enumerator can classify the address status as:

- HU.
- GQ.
- TL.
- Uninhabitable.
- Under construction.
- Empty trailer pad/mobile home site.
- Nonresidential.
- Does not exist.
- Unable to work.
- Duplicate.
- Exists in fringe.

If an address is not classified as a HU, it is removed from the workload for the subsequent NRFU operation. Addresses classified as GQ or TL in UL Production are reassigned to the appropriate enumeration operation.

Structure Type

After the address status has been verified, the enumerator will confirm the structure type. For each HU, the enumerator can classify the structure type as:

- Single family home.
- MU structure.
- Trailer/mobile home.
- Boat, tent, etc.

Address Information

For each LQ, the enumerator reviews the location address information and updates as necessary. Each LQ should have either a city-style address (house number and street name) or a location/physical description such as split-level ranch house with two-car garage. A location/physical description is only required when the enumerator cannot determine the house number and street name for the structure. The enumerator may also collect the mailing address when verifying the HU address with a present respondent.

Collect Group Quarters or Transitory Location Information

If the enumerator encounters a GQ or TL address on-the-ground, they will attempt to make contact with a manager or some other knowledgeable person to collect specific GQ or TL information. This information includes:

- GQ or TL category.
- GQ or TL type.
- GQ or TL name/facility name.
- Contact information for the manager or other knowledgeable person (includes name, title, phone number, email address, website, and office location).
- Maximum capacity (e.g., number of beds) or number of units (for TL).

The enumerator attempts to collect this information only once, the first time they encounter the address. If the enumerator is unable to make contact with someone the first time, they will look for contact information posted on or near the building. Otherwise, the enumerator will fill in the information to the best of their ability by observation only. The address is then reassigned to the Group Quarters (GQ) operation or the Enumeration at Transitory Locations (ETL) operation for enumeration.

Mapspot

Enumerators will collect or verify mapspots for every structure in the UL workload. A mapspot indicates within the map the general location of the address on-the-ground. The enumerator stands at the primary entrance for the structure to collect or verify the mapspot. This is the preferred location; however, in cases where the global positioning system (GPS) is not available, enumerators may choose to stand at a secondary entrance, driveway, or pathway leading to the structure.

The enumerator collects the mapspot in the mobile device by tapping on the map at the relative location of the structure or at the location of the You Are Here Indicator (YAH) when GPS is available. When the enumerator collects the mapspot, two sets of geographical coordinates are collected:

- The manual (or relative) coordinates where the enumerator tapped the screen.
- The GPS coordinates based on where the enumerator is standing.

During the mapspot collection, LiMA conducts a long strand test comparing the manual coordinates location to the GPS coordinates or some other location information available through Wi-Fi and the cellular network when GPS is not available. If the distance between the two data points is outside of an acceptable range, the enumerator receives an alert through the mobile device that they appear to be standing too far away from the location they want to mapspot.

However, the enumerator is not stopped from collecting coordinates at this location, as there may be a good reason to do so.

3.3.3 Leave Questionnaire Package at Housing Unit [UL 35-3.3]

A detailed view of the constituent activities that make up the “Leave Questionnaire Package at Housing Unit” operational subactivity is given in Figure 15.

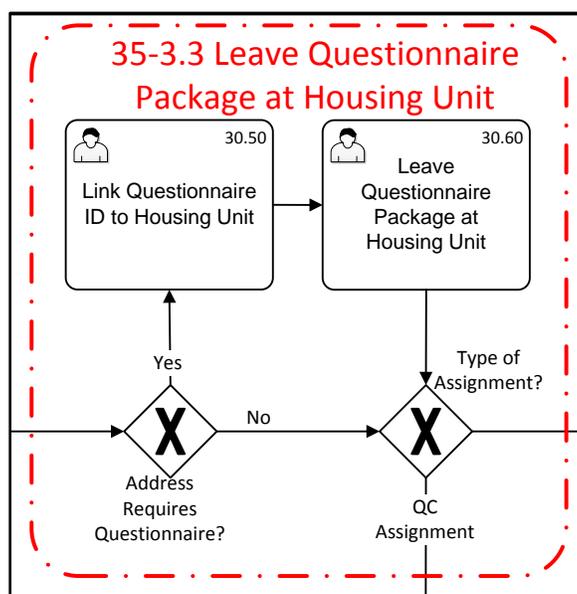


Figure 15: Leave Questionnaire Package at Housing Unit

For each LQ or HU, after completing the canvassing portion of UL Production, an enumerator attempts to initiate contact.

An enumerator attempts to contact a household member at the address. Enumerators will attempt to make contact and deliver a 2020 Census Internet Choice Questionnaire Package to every habitable HU in their workload, unless special circumstances prevent a contact or package delivery (see list of special circumstances or situations that prevent a contact in the next paragraph). If someone answers the door, the enumerator will present the respondent a confidentiality notice while verifying the address, and then hand the respondent a 2020 Census Internet Choice Questionnaire Package. If no one is home at a nonresponding HU, the enumerator will link and leave the 2020 Census Internet Choice Questionnaire Package, inviting a respondent to self-respond on the internet, by filling out and mailing the paper questionnaire, or by calling the CQA phone number provided on the paper questionnaire.

A screen in LiMA directs the enumerator to link the 2020 Census Internet Choice Questionnaire barcode ID to an address. The enumerator keys-in the census questionnaire barcode ID that is preprinted on the 2020 Census paper questionnaire (located within the 2020 Census

Questionnaire Package), writes in the HU address in the appropriate fields on the 2020 Census paper questionnaire, and leaves the field materials, adhering to FLD procedures, at the entrance of the attempted address. The address the enumerator collected is now linked to that questionnaire, ensuring that the response will be linked to the address record in processing.

When an enumerator attempts a contact, one of the following situations may occur that prevents a contact and the delivery of the 2020 Census Internet Choice Questionnaire Package:

- Dangerous situation, such as the respondent threatens the enumerator with bodily harm.
- Enumerator is unable to locate the HU, or the HU is not visible from the street.
- Enumerator is unable to physically access or is unable to work the HU because of a barrier, security, or a natural/major disaster.

In each of these situations, the case is marked with the reason to trigger the appropriate action such as manager review, reassignment of the case to another enumerator, or reassignment for future follow-up by NRFU. Upon completion of manager review, the address will be either sent back for additional fieldwork or removed from the field follow-up workload

3.3.4 Multiunit Housing Units

During UL Production, an enumerator may have to work HUs that belong to a MU structure. The enumerator attempts to contact the manager of the MU structure before working the units belonging to the MU. The objective of contacting the manager is to receive supplemental information to assist the enumerator while working the MU, and to inform the manager that census enumerators will be present in the building. The manager may provide a map or a list of addresses to help the enumerator while listing, as well as provide accessibility to the MU.

One method of innovating the UL field operation is to conduct Multiunit (MU) Manager Visits every time a new MU is encountered. During a MU Manager Visit, the enumerator will review the address list with the manager and request any available supplemental information. The manager may provide a map of the complex and provide listing tips. If the MU Manager Visit is unsuccessful, the enumerator will proceed to canvass and deliver questionnaire packages to the entire MU.

3.3.5 Determine QC Results [UL 35-3.4]

A detailed view of the constituent activities that make up the “Determine QC Results” operational subactivity is given in Figure 16.

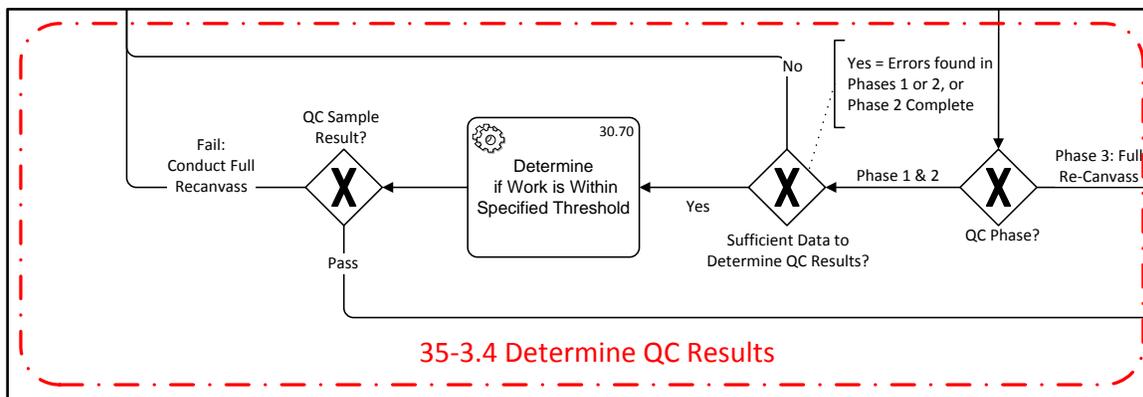


Figure 16: Determine QC Results

QC staff will receive their work assignment of an enumerator’s listing based on the sample selection described in Section 3.1.1. The QC staff verifies the addresses of the QC sample (Phase 1) and conducts a delete check (Phase 2). If the sample and delete check pass QC, the listing data are provided to RPO. If the sample or delete check fail QC, the QC staff conducts a full recanvass (Phase 3) of the BCU. When complete, the listing data are provided to RPO.

3.3.5.1 Quality Control Plan and Procedures

UL will include a QC plan that will ensure the quality of the data collected during the listing activity of UL Production. To achieve this goal, the following activities are implemented:

- Identify field staff in need of additional training to correct behavior and performance.
- Identify fieldwork that was erroneous and must be reworked.
- Reports or alerts for field supervisors to monitor the operation and take action, as appropriate.

The QC plan for UL relies on a scoring system in which each BCU will be run through various checks, and each check will award a specified point score. A BCU with a high point score will be more likely selected for In-Field QC.

Once a BCU is selected for Listing QC, it will be assigned to a QC enumerator. For UL, a separate staff will perform QC. A production enumerator should never QC their own work.

Listing QC is a three-phase process. The first two phases check a sample of each production enumerator’s work, and the third phase is the recanvassing of the entire BCU. The third phase is only conducted if one of the previous phases fails. During the first phase, the QC enumerator is given a random location at which to start the QC, although they can override this information if the situation is unsafe or inaccessible. The QC enumerator then follows the normal listing rules— list to the right, for example—and updates the address list for each unit they encounter on-the ground. LiMA instructs them to stop when the sample size, as specified during sampling,

is reached. If the sample passes the first phase, it moves on to the second phase. If the sample fails the first phase, it moves directly to the third phase.

During the second phase (or delete check), LiMA instructs the QC enumerator to check a sample of deleted units in the BCU (assuming there are deleted units in the BCU; if not, this step is skipped). If the sample of deleted units is found to have errors, LiMA instructs the QC enumerator to conduct the third phase, and to recanvas the entire BCU. If the sample passes the delete check, the QC enumerator is finished with the BCU.

If the QC sample fails to meet data quality standards, the QC enumerator will conduct the third phase and recanvas the entire BCU.

3.3.6 Complete BCU [UL 35-3.5]

A detailed view of the constituent activities that make up the “Complete BCU” operational subactivity is given in Figure 17.

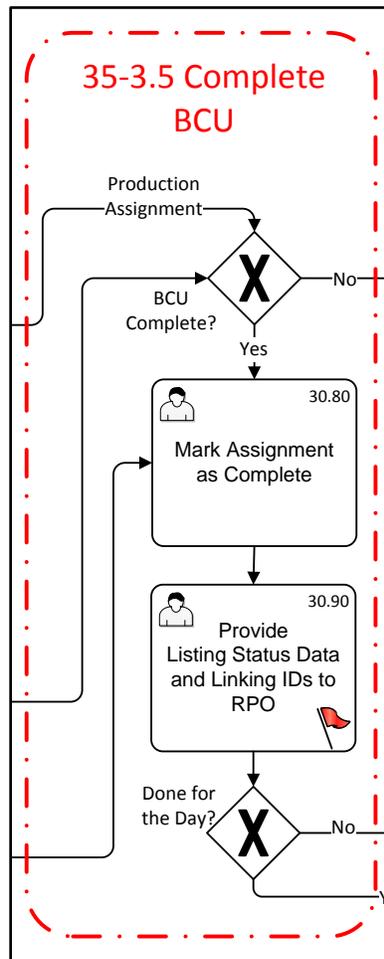


Figure 17: Complete BCU

3.3.6.1 Mark Assignment as Complete

Once an enumerator completes their assigned BCU, they will mark the assignment as complete. Enumerators will not be able to designate completion until all the address cases in their assignment have been worked and closed out or worked and appropriately statused. During QC, enumerators will mark an assignment as complete once they have successfully completed their QC sample or once they have completed a full recanvas for a failed sample. If the enumerator has additional work assignments to complete for the day, they will continue to the next assignment once they have designated completion and transmitted the data collected to RPO.

3.3.6.2 Provide Listing Status Data and Linking IDs to RPO

After designating an assignment as complete, enumerators will be required to provide listing status data and 2020 Census Internet Choice Questionnaire linking IDs to RPO. Enumerators must transmit all status data and questionnaires' linking IDs immediately upon assignment completion to ensure timely processing and efficient matching of self-responses.

3.3.7 Perform End of Day Update Leave Activities [UL 35-3.6]

A detailed view of the constituent activities that make up the “Perform End of Day UL Activities” operational subactivity is given in Figure 18.

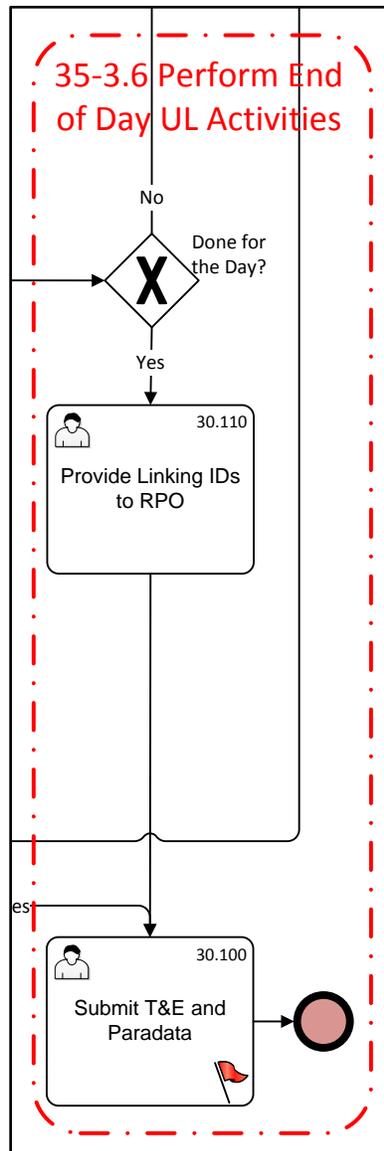


Figure 18: Perform End of Day UL Activities

Each day the enumerator must submit the hours they worked and all expenses accrued during the day, including mileage, parking, tolls or mass transit expenses. If the enumerator successfully completed the BCU, the enumerator must submit all address updates, mapspot updates, and any questionnaires' linking IDs that were established during their work. To ensure timely and efficient matching of self-responses to the linking IDs, the linking data must be transmitted alongside all address and mapspot updates immediately upon completion of the BCU. Depending on BCU size, this is the last activity of the day that an enumerator performs.

3.3.8 Administrative Records Modeling and Tailored Contact Attempt Strategy

3.3.8.1 Tailored Contact Attempt Strategy

There will be two mailings during the UL operation. The first mailing, on or around April 1, 2020, will be a reminder letter to all mailable addresses in the UL universe. The second mailing, on or around April 20, 2020, will be a reminder postcard to all mailable addresses in the UL universe. Both mailings serve as reminders that a census enumerator has recently left or will soon leave a 2020 Census Internet Choice Questionnaire Package, and as requests to respond to the 2020 Census. Both mailings will also contain an ID that the respondent can use to complete an online self-response. The intent of the mailings is to allow for accurate administrative records modeling (complementing the administrative data with USPS mailing data), to bolster self-response, and to reduce the number of HUs that will require follow-up visits by NRFU.

3.3.8.2 Administrative Records Modeling

By implementing two mailings during the UL operation, the census can conduct administrative records modeling with a high degree of confidence; utilizing the results of the mailings to complement the administrative records. The application of mailing results in conjunction with administrative records creates a very accurate method for the identification of vacant HUs. When both mailings return with an Undeliverable-As-Addressed (UAA) result, the Census Bureau uses administrative records to finalize the HU status, and to confidently designate the status of the HU as vacant. Administrative records modeling will be performed on all UL cases after the fieldwork is complete. The results of this modeling will give each case one of three modeled status outcomes:

- Occupied.
- Vacant.
- No determination.

These modeled statuses will have direct implications on the follow-up operation, NRFU, in the following ways:

- All cases modeled as “vacant” will be immediately removed from the NRFU workload. These will be referred to as vacant removals.
- All cases modeled as “occupied” that have not self-responded by the end of UL production will remain in the NRFU workload.
- All cases modeled as “no determination” will also remain on the NRFU workload.

On the start date of NRFU field operations and weekly thereafter, a mail file containing all the addresses for which a self-response has not been received will be generated. Once these cases

have a completed mailing status, they will receive no further contact attempts or mailings from NRFU.

3.4 Update Leave (UL) Operation Closeout [UL 35-4]

Figure 19 shows the BPM for the UL Operation Closeout [UL 35-4] activity area (area within the gray rounded rectangle) and its constituent activities within the overall context of the UL operation.

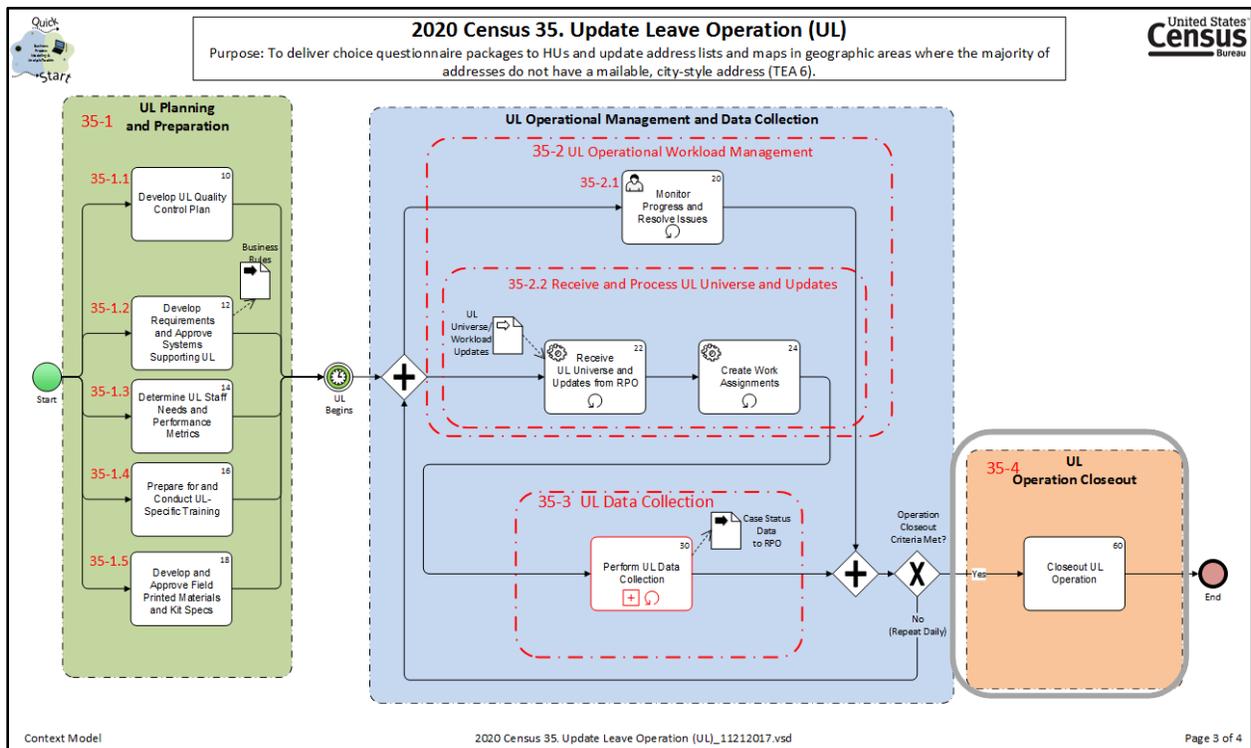


Figure 19: UL Operation Closeout [UL 35-4] Constituent Activities

The UL closeout operation will include the following activities:

- Interacting with FLDI to reduce staff as workload reduces, including collecting materials such as automated instruments.
- Performing operational assessments such as cost and progress reporting, lessons learned, and data analysis.

4. Cost Factors

The investment in UL is projected to have minimal influence on the 2020 Census overall costs and quality. While the UL operation is not a major cost driver for the 2020 Census, the following mechanisms from the IDEF0 Context Diagram represent the resources used to support this operation and comprise part of the 2020 Census cost elements:

Staff

- Headquarters (HQ) Staff.
- Regional Census Center (RCC) Staff.
- Area Census Office (ACO) Staff.
- Field Staff.
- National Processing Center (NPC) Staff.
- Census Questionnaire Assistance (CQA) Customer Service Representative (CSR).

Sites

- HQ.
- RCC.
- ACO.
- Field Area.
- NPC.
- Training Venues.

Systems

- Listing and Mapping Application (LiMA).
- Enterprise Censuses and Surveys Enabling Platform Operational Control System (ECaSE-OCS).
- Learning Management System (LMS).
- Assignment Optimizer.
- Sampling, Matching, Review, and Coding System (SMaRCS).
- Unified Tracking System (UTS).
- Listing and Mapping Mobile Case Management (LiMA MCM).

Other

- Census Networks.
- Mobile Networks.
- Automated Instruments.

- CQA Contractor IT Infrastructure.
- HQ Office IT Infrastructure.
- Kits/Field Supplies.

5. Measures of Success

For the 2020 Census operations, the corresponding Measures of Success will be documented in the operational assessment study plans and final reports. The operational assessment study plan documents the criteria that will be used to define successful completion of the operation. The operational assessment report will provide results on whether the criteria were met.

In general, operational assessments report on planned to actual variances in budget, schedules, and production and training workloads. The corresponding Measures of Success (as documented in the operational assessment study plan) include variances that exceed established thresholds. See *Content Guidelines for the 2020 Census Operational Assessments* for the potential scope of assessment.

Types of success measures include:

- **Process Measures** that indicate how well the process works, typically including measures related to completion dates, rates, and productivity rates.
- **Cost Measures** that drive the cost of the operation and comparisons of actual costs to planned budgets. Costs can include workload as well as different types of resource costs.
- **Measures of the Quality** of the results of the operation, typically including things such as rework rates, error rates, and coverage rates.

See the corresponding operational assessment study plan and report for the UL operation for details on the measures of success.

Appendix A – Acronyms and Terminology

Table 11 lists the acronyms and abbreviations used within this Detailed Operational Plan document.

Table 12 lists a Glossary of Terms used within this Detailed Operational Plan document.

Additional Decennial terminology can be found on the Census Intranet under the [TBD] portal.

Table 11: Acronyms and Abbreviations List

Acronym	Meaning
AA	Assignment Area
ACO	Area Census Office
ACOM	Area Census Office Manager
AR	Administrative Records
BCU	Basic Collection Unit
BPM	Business Process Model
BPMN	Business Process Model and Notation
CASS	Coding Accuracy Support System
CDL	Census Data Lake
CEF	Census Edited File
CFD	Content and Forms Design operation
CFM	Census Field Manager
CFS	Census Field Supervisor
CI	Coverage Improvement
CQA	Census Questionnaire Assistance
CL	Crew Leader
CRO	Count Review Operation

Acronym	Meaning
CUF	Census Unedited File
DAPPS	Decennial Applicant Personnel and Payroll System
DCMD	Decennial Census Management Division
DLM	Decennial Logistics Management operation
DOP	Detailed Operational Plan
DPD	Data Products and Dissemination operation
DRF	Decennial Response File
DSC	Decennial Service Center operation
DSSD	Decennial Statistical Studies Division
EAE	Evaluations and Experiments operation
ECaSE	Enterprise Censuses and Surveys Enabling Platform
ECaSE OCS	Enterprise Censuses and Surveys Enabling Platform Operational Control System
ETL	Enumeration at Transitory Locations operation
eResponse	Electronic Response
FLD	Field Division
FLD ACOB	Field Division Address Coverage Operations Branch
FLD CAB	Field Division Contract and Budgets
FLDI	Field Infrastructure operation
FPD	Forms Printing and Distribution operation
FOS	Field Operations Supervisor
GDP	Geographic Data Processing
GEOP	Geographic Programs operation

Acronym	Meaning
GPS	Global Positioning System
GQ	Group Quarters / Group Quarters operation
HQ	Headquarters
HU	Housing Unit
IA	Island Areas
IAC	Island Areas Censuses operation
IDEF0	Integrated Definition, Level 0
IE	Information Exchanges
IOD	Integrated Operations Diagram
IPT	Integrated Project Team
IRS	Internal Revenue Service
ISR	Internet Self-Response operation
ITIN	IT Infrastructure operation
LCO	Local Census Office
LiMA	Listing and Mapping Application
LMS	Learning Management System
LQ	Living Quarter
LUCA	Local Update of Census Addresses operation
MAF	Master Address File
MDF	Microdata Detail File
MU	Multiunit
NPC	National Processing Center

Acronym	Meaning
NID	Non-ID Processing operation
NRFU	Nonresponse Followup operation
PBOCS	Paper-Based Operational Control System
PDC	Paper Data Capture operation
PM	Program Management operation
POP	Population Division
PR	Puerto Rico
QC	Quality Control
RCC	Regional Census Center
RI	Reinterview
RPO	Response Processing Operation
SMA RCS	Sampling, Matching, Review, and Coding System
SR	Self-Response
TEA	Type of Enumeration Area
TL	Transitory Location
UAA	Undeliverable-as-Addressed
UHE	Usual Home Elsewhere
UE	Update Enumerate operation
UL	Update Leave operation
UL QC	Update Leave Quality Control
UM	Universe Management
URL	Uniform Resource Locator

Acronym	Meaning
USPS	United States Postal Service
UTS	Unified Tracking System
UUL	Urban Update Leave

Table 12: Glossary of Terms

Term	Meaning
Assignment Optimizer	An algorithm designed to minimize cost in terms of time and mileage required to complete UL by optimizing the routing used by field staff to navigate to and between assigned fieldwork locations (i.e., case locations).
Enterprise Censuses and Surveys Enabling Platform (ECaSE)	<p>Enterprise solution that provides the following functionality:</p> <ul style="list-style-type: none"> • Supports field data collection for address listing/mapping and enumeration work. • Creates and manages the universe for all enumeration operations. • Maintains operational workloads as data collection proceeds. • Supports work assignment and schedule management for field data collection operations for in-office and mobile users. • Supports self-response data collection from the internet for survey and census respondents and for call center agents on behalf of respondents. • Supports questionnaire design and metadata maintenance. <p>For UL, ECaSE is used for field listing and mapping, enumeration, and parts of operational control.</p>

Term	Meaning
ECaSE Operational Control System (OCS)	<p>The function of ECaSE that manages the data collection universe for all enumeration operations. ECaSE OCS creates the initial universe, receives status updates and response data, and maintains operational workloads as data collection proceeds.</p> <p>Leverages the Assignment Optimizer for routing used by field staff to navigate to and between assigned fieldwork locations (i.e., case locations for enumeration and BCU locations for listing).</p> <p>Leverages computational models and standard deviations for providing certain alerts.</p>
Multiunit Manager Visit	<p>A field interview to collect status of units from the manager of a multiunit structure before individual unit enumeration is attempted.</p>
Paradata	<p>Auxiliary data collected during a sample survey, census, or other data collection that provide information about the data collection process. Paradata are used to evaluate and manage the survey process and may be used for both research and production activities, including adaptive design, at the Census Bureau.</p>
Rework	<p>An enumerator's past cases added to the UL universe as rework cases because falsification by that enumerator was detected by QC.</p>
Type of Enumeration Area (TEA)	<p>A set of BCUs that are expected to be enumerated using the same methodology. The Initial 2020 Census TEA values are as follows:</p> <ul style="list-style-type: none"> • TEA 1 – Self-response • TEA 2 – Update Enumerate • TEA 3 – Island Areas • TEA 4 – Remote Alaska • TEA 5 – Military • TEA 6 – Update Leave
UL Contact Strategy	<p>The predefined strategy for contacting housing units that are part of the UL universe. This could include mailings as well as a number of attempted visits.</p>

Term	Meaning
UL Universe	A subset of the enumeration universe that comprises the set of addresses for living quarters that are housing units in the Update Leave Type of Enumeration Area (TEA).

Appendix B – References

Appendix B lists the documents or other resources used during the development of this Detailed Operational Plan document.

U.S. Census Bureau (2016), "[2020 Census Operational Plan](#)," Version 3.0, October 27, 2017.

U.S. Census Bureau (2016), "Operational Assessment Content Guidelines for the 2018 End-to-End Census Test and the 2020 Census," Draft, May 10, 2016.

U.S. Census Bureau (2012), "2010 Census Update Leave Operations Assessment," final report, September 17, 2012.

U.S. Census Bureau (2016) "[2020 Census Detailed Operational Plan for 8. Address Canvassing Operation \(ADC\)](#)," Version 2.0, May 9, 2018.

U.S. Census Bureau (2016) "[2020 Census Detailed Operational Plan for 18. Nonresponse Followup Operation \(NRFU\)](#)," Version 1.0, April 16, 2018.

Appendix C – Activity Tree for Update Leave Operation

This appendix presents the Activity Tree for the Update Leave (UL) operation. An Activity Tree uses an outline structure to reflect the decomposition of the major operational activities in the operation. Each activity is numbered according to its position in the outline. For example, for the current operation numbered “OpNumber,” the first activity would be numbered OpNumber-1. Subactivities under this activity would be numbered sequentially, starting again with the number one. For example, the first subactivity under the first activity would be numbered OpNumber-1.1 the second subactivity as OpNumber-1.2. The second activity would be numbered OpNumber-2, etc.

UL Activity Tree:

- 35-1 UL Planning and Preparation
 - 35-1.1 Develop UL Quality Control Plan
 - 35-1.2 Develop Requirements and Approve Systems Supporting UL
 - 35-1.3 Determine UL Staff Needs and Performance Metrics
 - 35-1.3.1 Determine Estimated UL Operational Workload by Geographic Area
 - 35-1.3.2 Define UL Operational Performance Metrics and Targets
 - 35-1.3.3 Provide Requirements for UL Staff Supplies and Materials
 - 35-1.3.3.1 Provide Field Enumeration Materials Content
 - 35-1.3.3.2 Provide Kit Requirements
 - 35-1.4 Prepare for and Conduct UL-Specific Training
 - 35-1.4.1 Prepare for UL-Specific Training
 - 35-1.4.1.1 Provide UL-Specific Training Content and Requirements
 - 35-1.4.1.2 Review and Approve UL-Specific Training
 - 35-1.4.2 Conduct UL-Specific Training
 - 35-1.5 Develop and Approve Field Printed Materials and Kit Specs
- 35-2 UL Operational Workload Management
 - 35-2.1 Monitor Progress and Resolve Issues
 - 35-2.2 Receive and Process UL Universe and Updates
- 35-3 UL Data Collection
 - 35-3.1 Receive Work Assignment
 - 35-3.2 List Address
 - 35-3.3 Leave Questionnaire Package at Housing Unit
 - 35-3.4 Determine QC Results
 - 35-3.5 Complete BCU
 - 35-3.6 Perform End of Day UL Activities
- 35-4 UL Operation Closeout