

2020 Census Enterprise Architecture and Infrastructure Transition Plan

Appendix A: Acronyms

The following acronyms and abbreviations have been used throughout this document.

Table 9 Acronyms and Abbreviations

Acronym	Definition
ABR	Active Block Resolution
ACA	Affordable Care Act
AdCan	Address Canvassing
AoA	Analysis of Alternatives
API	Application Programming Interface
ATAC	Automated Tracking and Control System
ATO	Authority to Operate
BARCA	Block Assessment, Review and Classification Application
BCU	Basic Collection Unit
BHS	Business Help Site
BPM	Business Process Management
CAES	Concurrent Analysis and Estimation System
CAFE	Census Automated Forms Engine
CAPI	Computer Assisted Personal Interviews
CARAT	Census Automated Recruiting and Administrative Tools
CARDS	Control and Response Data System
CARMN	Cost and Response Management Network
CATI	Computer-Assisted Telephone Interviewing
CEAITP	Census Enterprise Architecture and Infrastructure Transition Plan
CEDaR	
CEDCaP	Census Enterprise Data Collection and Processing
CEDSCI	Center for Enterprise Dissemination Services and Consumer Innovation
CEM	Customer Experience Management
CExB	Census Experiments Branch
CFD	Content and Forms Design
CHEC	Census Hiring and Employment Check System
CIO	Chief Information Officer
CIRA	Census Image Retrieval
CM	Coverage Measurement
COMET	Content Metadata
COOP	Continuity of Operations
COTS	Commercial Off the Shelf applications
CQA	Census Questionnaire Assistance
CQR	Count Question Resolution
CTO	Chief Technology Officer
DAPPS	Decennial Applicant Personnel and Payroll System
DART	Decennial Architecture Requirements Team
DB	Database
DMS	Data Management System

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Acronym	Definition
DOC	Department of Commerce
DSSD	Decennial Statistical Studies Division
DSSD (ARMS)	Decennial Statistical Studies Division (Administrative Records Modeling System)
EDITE	Enterprise Development, Integration, and Test Environment
EDM	Enterprise Data Model
ERP	Enterprise Resource Planning
ESB	Enterprise Service Bus
ESDLC	Enterprise System Development Life Cycle
ETL	Enumeration at Transitory Locations Field Operation
FIPS	Federal Information Processing Standards (FIPS)
FISMA	Federal Information Security Management Act
FTP	File Transfer Protocol
FPD	Forms Printing and Distribution
FY	Fiscal Year
GEO	Geography Division
GEO (RTNP)	Geography Div. (Real Time Non-ID Processing)
GIS	Geographic Information Systems
GPS	Global Positioning System
GQ	Group Quarters
HR	Human Resources
HU	Housing Unit
iCADE	Integrated Capture and Data Entry
ICD	Interface Control Document
IDMS	Identity Management System
IEPD	Information Exchange Package Documentation
IPTS	IMB Postal Tracking System (barcode)
ISR	Internet Self-Response
IT	Information Technology
ITIL	Information Technology Infrastructure Library
LiMA	Listing and Mapping Application
LMS	Learning Management System
LUCA	Local Update of Census Addresses
MAF	Master Address File
MAF/TIGER	Master Address File / Topologically Integrated Geographic Encoding and Referencing System
MCM	Mobile Case Management
MCS	Master Control System
MES	Mission Enabling System
MFT	Manage File Transfer
MMDC	Multi-Mode Data Collection
MOCS	Multi-Mode Operational Control System
MOJO	MOJO OCS (Operational Control System)
MTDB	MAF/TIGER database
NCT	National Content Test

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Acronym	Definition
NIEM	National Information Exchange Model
NIST	National Institute of Science and Technology
NPC	National Processing Center
NRFU	Nonresponse Followup
OCR	Optical Character Recognition
OCS	Operational Control System
OIS	Office of Information Security
OPA	Oracle Policy Automation
PIA	Privacy Impact Assessment
PTA	Privacy Threshold Analysis
QA	Quality Assurance
QC	Quality Control
RAT&E	Recruiting Assistant Time and Expense
RCC	Regional Census Centers
RDP	Redistricting Data Program
RI	Re-interview
RMF	Risk Management Framework
RPS	Response Processing System
SDLC	System Development Life Cycle
SLC	Survey Life Cycle
SMaRCS	Sampling, Matching, Reviewing, and Coding System
SME	Subject Matter Expert
SOA	Service Oriented Architecture
STEPS	Standard Economic Processing System
TCO	Total Cost of Ownership
TIGER	Topologically Integrated Geographic Encoding and Referencing
TOGAF	The Open Group Architecture Framework
TQA	Telephone Questionnaire Assistance
TRM	Technical Reference Model
US	United States
USPS	United States Postal Service
UTS	Unified Tracking System
WBS	Work Breakdown Structure
WebFRED	Web-based Field Representative Earning Data

Appendix B: Glossary

Table 10 Glossary

Term	Definition
Administrative Records	Information from external sources (e.g., Internal Revenue Service, Social Security Administration, and Departments of Motor Vehicles) used to help create the frame, augment existing frame information, and/or augment response information.
Business Rules Management (BRM)	The operational processes (e.g., creation, testing) and management controls (e.g., change management) to manage business rules over their life cycle as census and survey needs evolve.
Census	A business operation, requiring people, processes and systems, to comprehensively and accurately count (enumerate), and subsequently create a comprehensive, authoritative list of all known people, residential facilities or organizational entities, and their attributes. Because of challenges inherent to enumerating a large population and their attributes, the enumeration effort may identify less than 100% of the population. The information collected during a census is captured in a data repository and is considered a frame (i.e., the known population).
Fault-Tolerance	The property that enables a system to continue operating properly in the event of the failure of (or one or more faults within) some of its components.
Instrument	Refers to: the set of questions to be asked in a census or survey and its associated medium, e.g., a paper survey form, an online survey form, an electronic Blaise form. Instruments include the predefined response options/choices presented to the survey respondent, the skip pattern associated with specific survey questions (e.g., "if the response to question 5 is Yes, skip questions 6 and 7"), and the metadata created by an Instrument Authoring System. The Instrument is a source of metadata used by Census Bureau systems to determine how to interpret and process survey questions and survey responses.
Instrument Authoring System	System used to create an instrument, e.g., Blaise
Instrument Metadata	Information that describes the content of a census or survey questionnaire. Information that describes how to interpret and process survey responses.
Metadata	Data that describes or provides information about other data. In the context of Census Bureau data collection systems, this refers to information attributes that describe or help to explain operational data collected, created, or otherwise managed during a census or survey. Metadata is particularly important when information is being exchanged between systems; it enables the system that is receiving information to correctly interpret and process that information. Examples of metadata include column headings in a table, and extensible markup language (XML) tags. The COMET initiative is currently developing XML standards to improve future interoperability between Census Bureau systems.
Mode	A mode is comprised of three primary components: the method for contacting a Reporting Unit; the means of administering the Instrument or questionnaire; and the medium of recording the response (e.g., paper). Examples of survey data collection modes are telephone (CATI), face-to-face in person (CAPI), Internet self-response through Web-based forms, and mailed paper questionnaires (PAPI).

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Term	Definition
Mode Level Operation Control Systems	Systems that directly perform and manage survey data collection with a specific Mode, during the Data Collection phase of a survey or census. Examples of current Census Bureau Mode Level Operation Control Systems are WebCATI (for telephone-interview mode), ROSCO for face-to-face personal-interview mode), and Centurion (PRIMUS) (for Internet self-response, using Internet-based Web forms). Sometimes paper mode systems are included in this category; these include Paper Capture systems (iCADE), MailOut systems (DocuPrint), and Paper Control systems (ATAC).
Mode Systems	Class of systems that directly perform and manage data collection using paper survey forms, Internet-based web forms, telephone interviews, and face-to-face personal interviews
Paradata	Data about the process of collected survey or census data; usually considered administrative data about the survey itself. Paradata is important for reporting on key census and survey performance indicators to monitor during the data collection process to predict census or survey response success rates, and to determine when and how to best intervene in the data collection process to maximize data quality and cost effectiveness.
Response	Information received via a mode from a reporting unit or respondent. Most often the information is a response to a solicitation received by the reporting unit. Alternate types of responses include a question, inquiry, or assistance request. Response information may be received in physical form (e.g., completed paper response form, via a face-to-face interview, via an electronic submission (e.g., Internet self-response), and/or other means.
Response Processing Systems	Class of systems that process survey response data after data collection activities are concluded. Systems that perform data editing, coding, imputation and estimation, e.g., CaRDS.
Sample	The result of applying selection criteria to a frame to select a random selection of people, residential facilities, or organizational entities from the frame. A subset of a frame. A list of people, residential facilities, or organizational entities that are to be surveyed.
Sample System	A system that selects the sample for a given survey from the frame.
Survey	A business operation, requiring people, processes, and systems, to accurately count (enumerate), and determine the attributes of a subset of a universe (as determined via a census) through a data collection effort. Requires, as a starting point, creation of a sample. Requires a survey instrument. The largest administratively defined group of reporting units or target respondents for which data collection is to occur. The highest level at which data collection status is reported for a group of reporting units. A collection of reporting unit groups. May contain one, a few or many reporting unit groups, depending on the needs and preferences of a given census or survey. In the context of MOCS, the survey owner will determine the scope of the survey. For example, a monthly ACS panel could be considered a single survey. Alternatively, the 12 monthly ACS panels within a calendar year may also be considered a single survey.
Universe	The complete, real-world population of all potential Reporting Units, (i.e., people, residential facilities or organizational entities). The goal of a census is to enumerate this population and record their attributes in a data repository. However, because of challenges inherent to enumerating a large population and their attributes, the enumeration effort may identify a representative subset of

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Term	Definition
	population, or a Frame. Note that some surveys use the terms universe and frame interchangeably.
Workload	A collection of reporting units or respondents that are part of the same reporting unit group and for which a data collection operation is to be performed via a single mode. The unit of data collection work transmitted from an operational control system (e.g., MOCS) to an Interview Operation Control System (e.g., MOJO).

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Appendix C: References

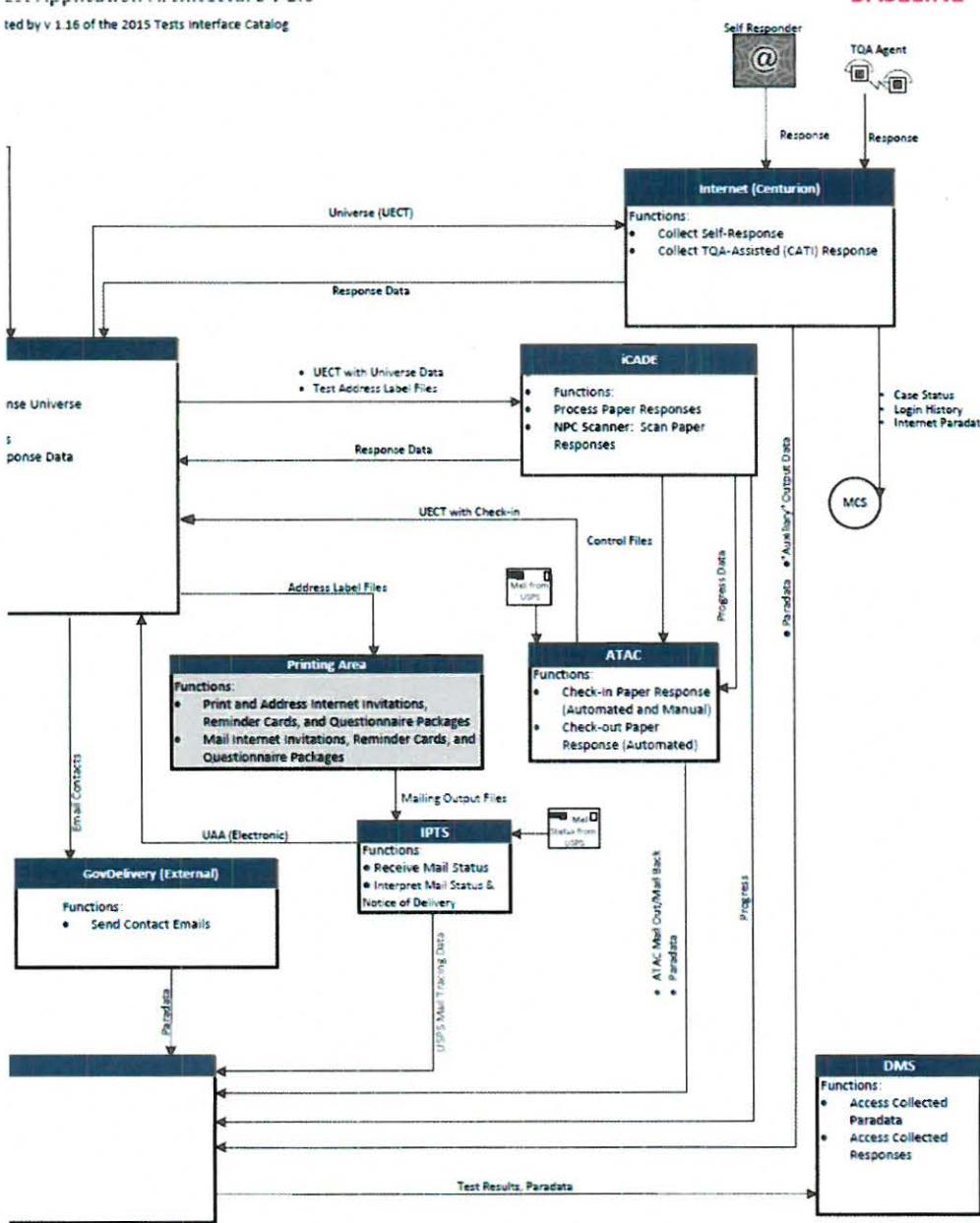
The following documents were referenced in the preparation of this transition plan.

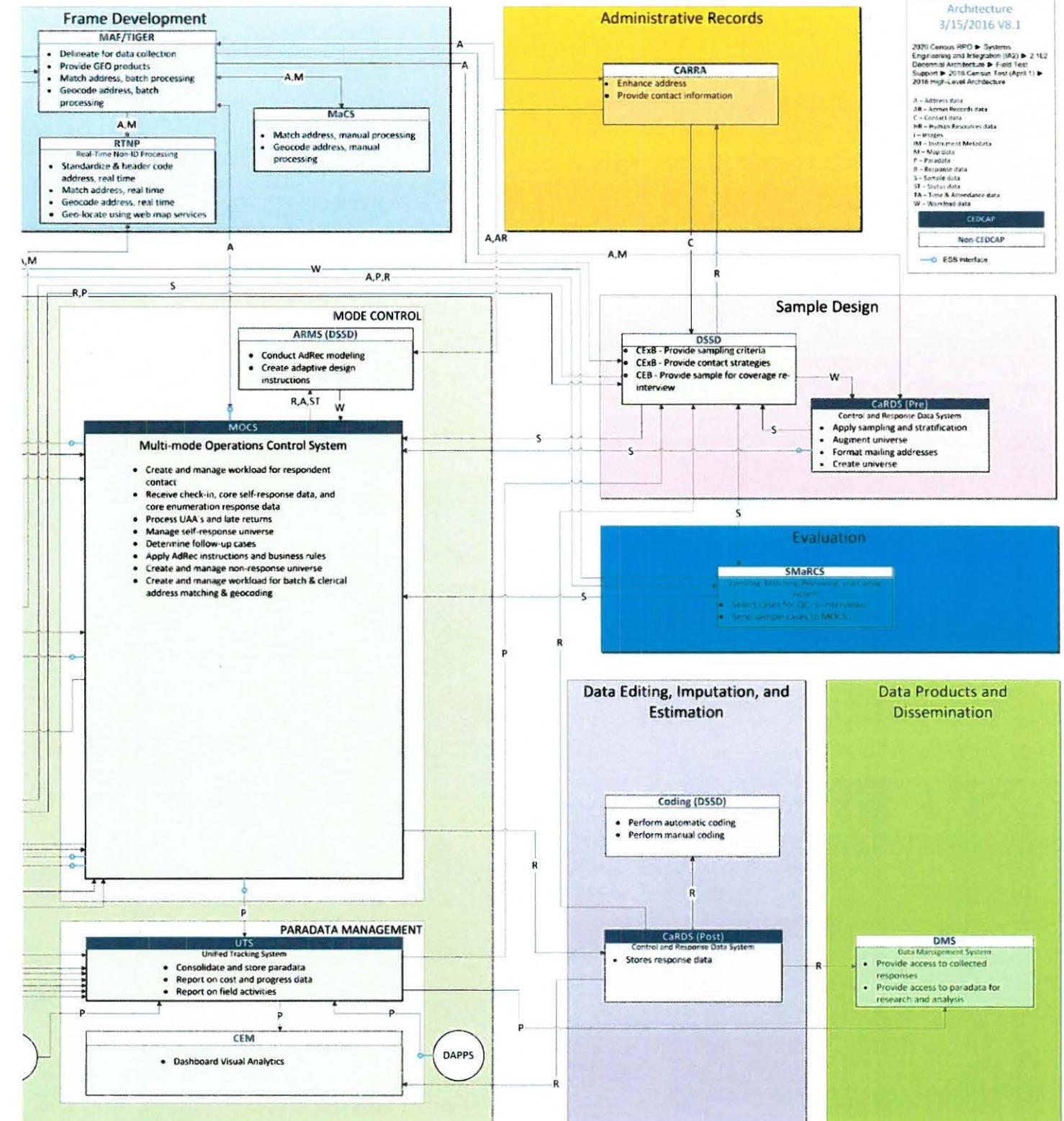
Table 11 Census Documents

Document
2020 Decennial Census IT Infrastructure Strategy and Roadmap (draft)
2020 Census Architecture, Version 1.0, 1/7/2016
2020 Census Interface Catalog,
2020 Census Operational Plan, Issued November 2015, Version 1.1
Census Enterprise Data Collection and Processing (CEDCaP) Segment Architecture, Version 2.3, 07/29/2015
Census Enterprise Data Collection and Processing (CEDCaP)Transition Plan, Version 2.4, 01/19/2016
Integration and Implementation Plan (draft)
US Census Bureau's Risk Management Framework Methodology, Version 3.7, 05/23/2013

Table 12 Other Documents

Supporting Document	Link
NIST Risk Management Framework, Special Publication 800-37, Rev.1, June 5, 2014	<u>NIST Special Publication 800-37 Revision 1</u>





Census Day: 09/01/2016
Line of Business Solution

Architecture

3/16/2016 V2.1

2020 Census RPO ► Systems
 Engineering and Integration (IAZ) ► 2.102
 Decennial Architecture ► Field Test
 Support ► 2016 Census Test (April 1) ►
 2016 High-Level Architecture

A – Address data
 AR – Annex Records data
 C – Contact data
 HR – Human Resources data
 I – Images
 IM – Instrument Metadata
 M – Map data
 P – Paradata
 R – Response data
 S – Sample data
 ST – Status data
 TA – Time & Attendance data
 W – Workload data

CEDCAP

Non-CEDCAP

□ ESB interface

Frame Development

- MAF/TIGER**
- Delineate for data collection
 - Provide GEO products
 - Match address
 - Geocode address
 - GeoJSON service
 - GATRES - Active BCU resolution

BARCA

- Interactive BCU review
- BCU Tracking

A,M

A,P

W

ST

S

Evaluation**SMarCS**

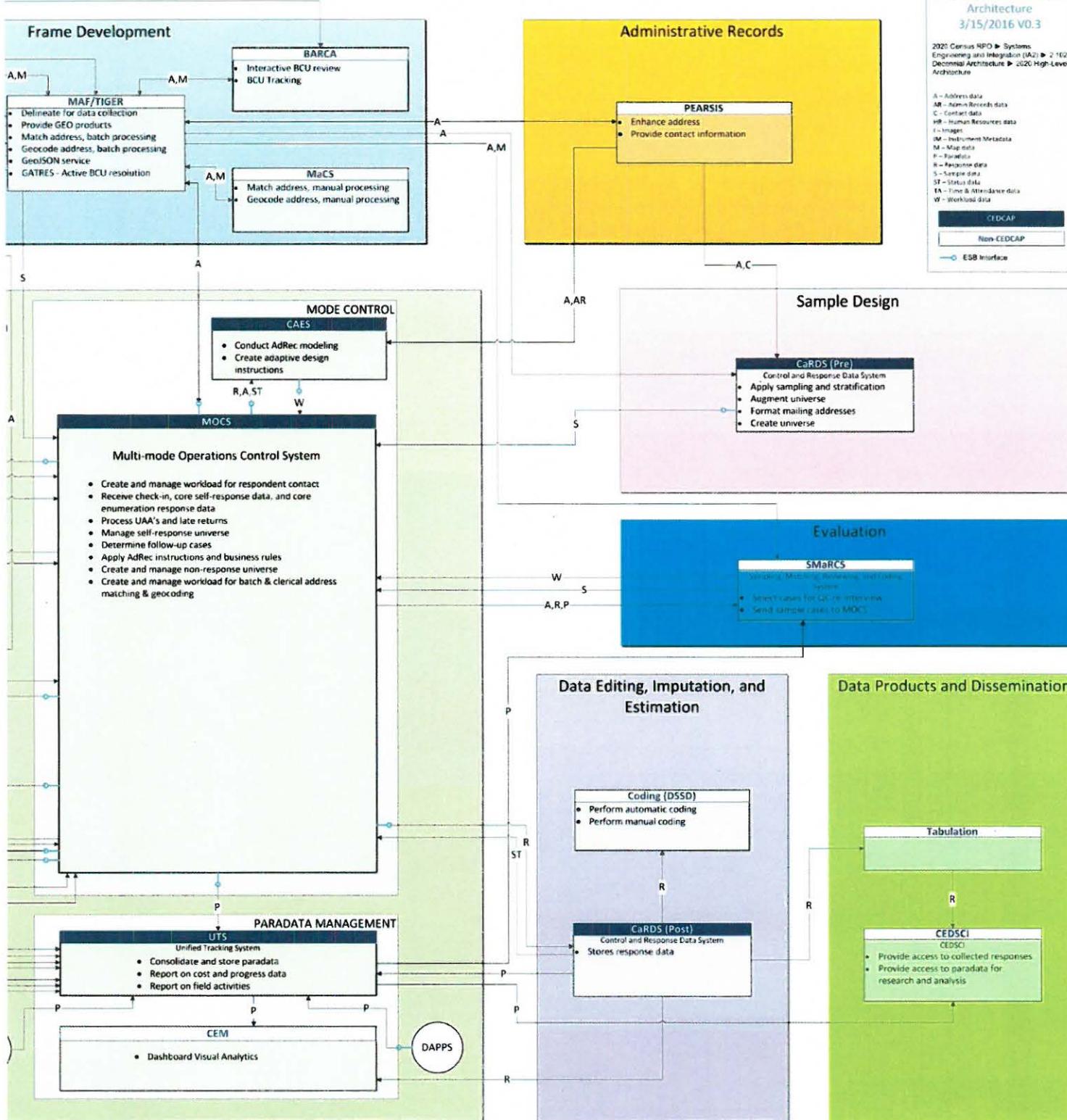
- Sampling, Matching, Archiving, and Coding System
- Select cases for relisting
 - Send sample cases to MOJO

PARADATA MANAGEMENT**UTS**
Unified Tracking System

- Consolidate and store paradata
- Report on cost and progress data
- Report on field activities

CBS

P



Line of Business Solution Architecture

3/15/2016 V2.1

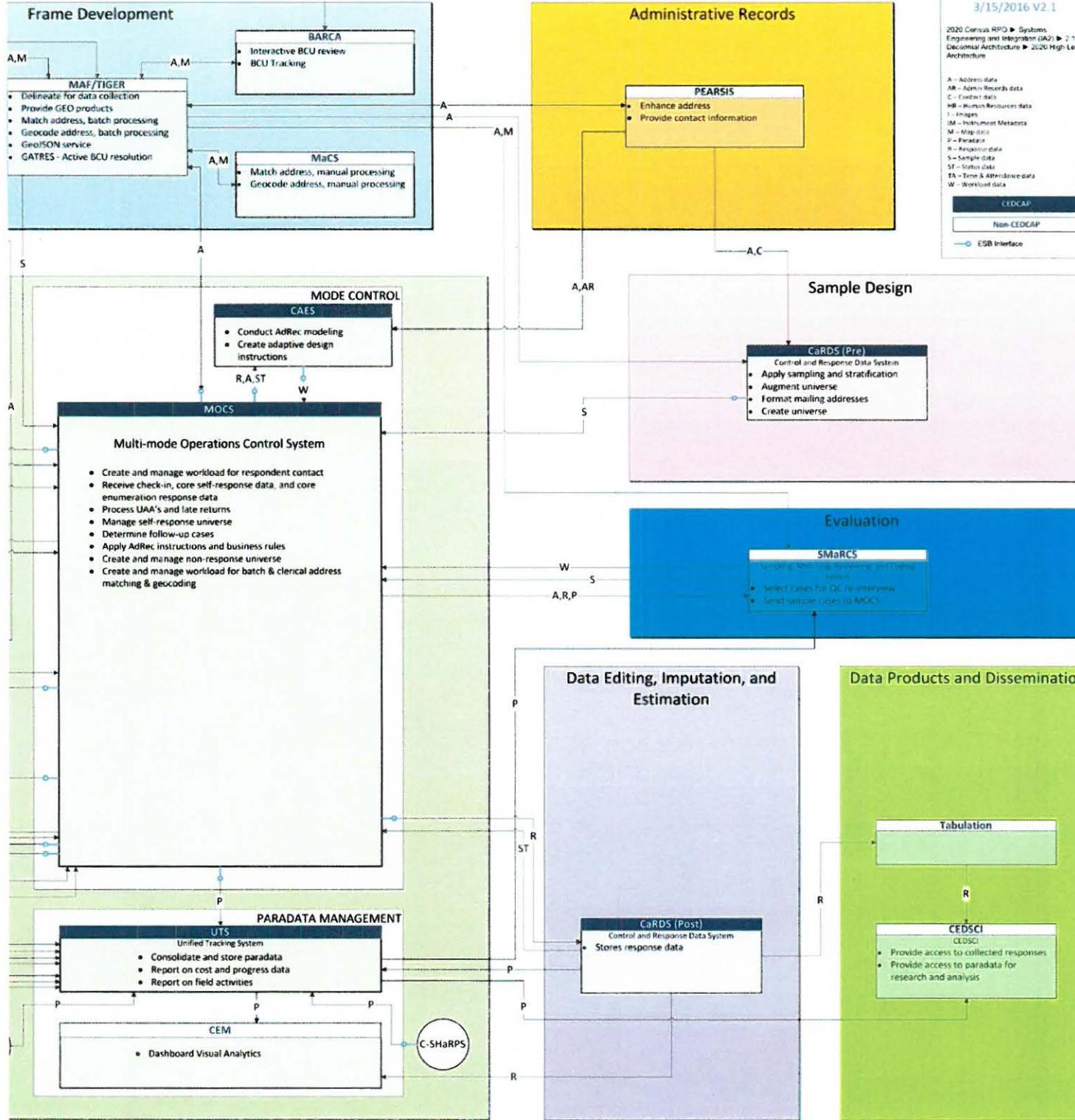
2020 Census RPD ► Systems Engineering and Integration (IA2) ► 2.102 Decimal Architecture ► 2020 High-Level Architecture

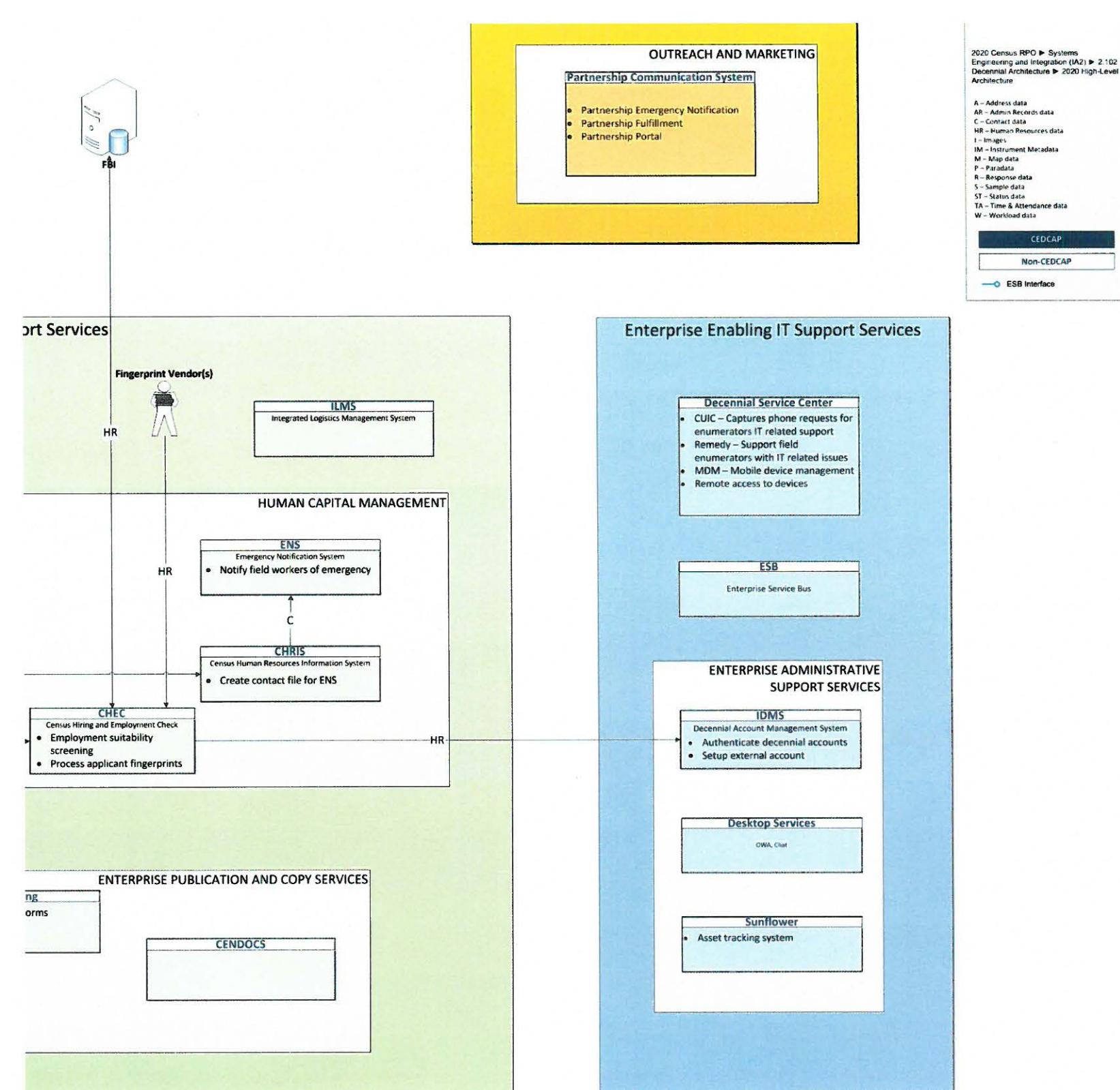
A – Address data
AR – Admin Records data
C – Contact data
HR – Human Resources data
I – Inventory
IM – Instrument Metadata
M – Map data
P – Personas
R – Response data
S – Sample data
ST – Status data
TA – Time & Attendance data
W – Workload data

CEDCAP

Non-CEDCAP

ESB Interface





Appendix I: 2020 Census Systems List

Table 13 System List

System Name	Long Name	System Description
ATAC	Automated Tracking and Control	<p>ATAC provides customer, employee, and workflow management by automating the business and support processes associated with customer support, communications, case assignment, case management, escalation, and closure. Tracks and controls data generated by the automated and manual paper check-in applications, and manages and controls the form batching process prior to the iCADE paper processing system. Can also be the source for providing reporting metrics that can be used by management. Materials include, but are not limited to: Address Listing Pages, Questionnaires, HU Continuation Forms, Correctional Facility Continuation Forms, and Maps. Currently maintained by the NPC IT staff.</p> <p>FUTURE PLAN</p> <p>This is a valid NPC-resident system; not intended to be used in 2020 but will be used in tests through 2016.</p>
BARCA	Block Assessment, Research and Classification Application	<p>BARCA is an interactive review tool, which supports imagery review for In-Office Address Canvassing. The interactive review module allows staff to determine whether a block has undergone growth (either address or spatial), or needs existing address or spatial problems to be fixed. BARCA maintains the review history and has a reporting component.</p> <p>The other part of BARCA is the block-tracking database. BARCA will have Active Block Resolution (ABR) allowing it to be used alongside GATRES, see where the pins were dropped during the review phase, make spatial updates to the MAF/TIGER database (MTDB), and prepare an MTDB address update output. One of the enhancements to ABR will be to convert the tool from block to Basic Collection Unit (BCU) and migrate the completed block reviews to BCU level.</p>
CAES	Concurrent Analysis and Estimation System	CAES will be an enterprise modeling platform that stores data and uses it to execute statistical models in support of survey flow processing, analysis, and control.

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System Name	Long Name	System Description
CaRDS (Post)	Control and Response Data System	<p>CaRDS (Post) provides:</p> <p>Universe determination for the Decennial, Post data collection response processing, Interfaces to MOCS and other external systems, and a term data store.</p> <p>FUTURE PLAN</p> <p>Will deliver a system that is the front and back door to data collection. The CaRDS will pull personal or business data from the Census Master Address File and send it to MOCS.</p>
CaRDS (Pre)	Control and Response Data System	<p>CaRDS (Pre) provides:</p> <p>Universe determination for the Decennial, Post data collection response processing, Interfaces to MOCS and other external systems, and a term data store.</p> <p>Introduced October 2015.</p>
CBS	Commerce Business System: Jeffersonville Activity Reporting System	<p>CBS collects and reports labor hours and costs for the activities that NPC performs. Outputs weekly production statistics for time and attendance and monthly incentive awards for NPC staff who work on production standard related tasks. FUTURE PLAN (CBS)</p> <p>Maybe modernized to a new system; This is a system of systems; Per Cathy Ayoob, APMS is part of CBS until we move to Sunflower</p>
CEDSCI	Center for Enterprise Dissemination Services and Consumer Innovation	<p>Center for Enterprise Dissemination Services and Consumer Innovation (CEDSCI) is an enterprise system; its diverse membership is also composed of technologists, scientists, and analysts from Decennial, Economic, Demographic, Communications, Research and Methodology, and other offices. Their challenge is to modernize our technology platforms and leverage existing innovations to provide a set of shared dissemination services that enable both Census staff and our data consumers to do more with the massive content we publish year round.</p> <p>Their process will be to rapidly prototype, test and deploy the transition steps necessary to move us from the current architecture to a new permanent model. Their goal is to broaden and enhance the use of existing systems and tools and to build new features that will integrate across programs and surveys.</p> <p>CEDSCI's core principles in the Federal Digital Strategy are</p>

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System Name	Long Name	System Description
		founded upon on the working papers developed by the Census Bureau's Data Dissemination Task Force
CEM	Customer Experience Management	<p>CEM is a flexible & extensible platform that captures customer interactions from multiple data stores and is presented via a visual analytics dashboard to create opportunities for a better understanding of patterns and trends of customer experiences that can lead to actionable improvement plans, and establish a framework and foundation for customer experience data integration. Completed Proof Of Concept in CAT Lab. Now in Pilot Phase, i.e., deployment to a dev/test/prod environment</p> <p>FUTURE PLAN: CEDaR will replace CEM and UTS</p>
CENDOCS	Census Document System	<p>CENDOCS is a Web-based system for requesting:</p> <ul style="list-style-type: none"> • Forms design services from Forms and Mail Management Branch. • Publications and graphics services from Publications Services Branch. • Printing services through commercial vendors (which includes CD-ROM replication).
CExB (DSSD)		<p>CExB (DSSD) provides Sampling Criteria, contact strategies and sample for re-interview Manage 2020 experiments program FUTURE PLAN Will not be part of the 2020 Census operation.</p>
CHEC	Census Hiring and Employment Check System (Fingerprinting)	<p>CHEC is an administrative system that automates clearance processing of all personnel at Census Bureau Headquarters, the Bureau of Economic Analysis (BEA), The Regional Offices (RO's), the National Processing Center (NPC), and two Computer Assisted Telephone Interview (CATI) sites. Supports fingerprint processing with the Federal Bureau of Investigation (FBI), the Office of Personnel Management (OPM), the Department of Homeland Security (DHS), the Office of Management and Budget (OMB) and the Department of Commerce (DOC).</p>
CHRIS	Census Human Resources Information System	CHRIS creates the contact file for ENS
CIRA	Census Image Retrieval	CIRA stores Decennial census images as well as raw and edited data and provides a user interface for reviewing

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System Name	Long Name	System Description
		the images and data. Used for age match research at NPC; scanned images are stored here
Coding		Coding is an application to perform manual coding of the response data, transforming data elements into standard code.
COMET	Content Metadata System	<p>The COMET system develops a user interface for project registration and content entry, standardizes the content entry process and data elements for all modes of data collections, develops a business process model including governance approval process for question content, delivery of metadata and business rules to MOCS for each mode of data collection; and provides record layout functionality.</p> <p>Census Automated Forms Engine (CAFE) is part of COMET.</p> <p>Deployed its first release in July 2015.</p>
Commercial Printing	Public Use Printing	Commercial Printing will print and address internet invitations, reminder cards, and questionnaire packages. Mail invitations, reminder cards, and questionnaire packages.
COMPASS	Census Operations Mobile Platform for Adaptive Services and Solutions	<p>COMPASS is a mobile application, framework and platform for supporting on-device, server components and interfaces for mobile data collection implementing enrollment services, authentication services, and the secure management, collection, exchange, storage and processing of data. Also includes seamless integration of all on-device functionality required by Enumerators including: manage, schedule, locate and navigate to and between assigned cases. Performs designated CAPI and related interviews associated with each assigned case and provide other location services.</p> <p>FUTURE PLAN</p> <p>Reference this as CEDCaP Enumeration System, which is TBD based on alternative analysis; WebFRED functionality for enumerators to enter their time and expense currently occurs here.</p>
Count Review System		<p>Count Review System supports the Count Review operation.</p> <p>Note: According to the 2020 Operation Plan, Detailed Planning of this operation has not started.</p>

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System Name	Long Name	System Description
Coverage Measurement		<p>Coverage Measurement supports the Coverage Measurement Operations for Design and Estimation, and support Computer and Clerical Matching and Field Operations.</p> <p>Note: According to the 2020 Operation Plan, Detailed Planning of this operation has not started.</p>
CQA	Census Questionnaire Assistance	<p>Census Questionnaire Assistance</p> <p>Collects response data via inbound respondent-initiated calls, assist respondents with completing their questionnaire or just answering questions, agent-initiated data collection for outbound calls, online help in real-time, and reconciliation of inconsistencies/follow-up for questionnaires.</p>
C-SHaRPS	Census Schedule A Hiring, Recruiting and Payroll System	C-SHaRPS is a to-be new enterprise system that will support Schedule A hiring, recruiting and payroll.
DAPPS	Decennial Applicant, Personnel and Payroll Systems	DAPPS is the "system of record" supporting personnel, time and expenses, and payroll administration for temporary, intermittent Census Bureau employees participating in Census Tests, Special Censuses and ultimately the 2020 Census. Employees in DAPPS have no fixed work schedule and are hired under a temporary appointment in the excepted service. Employees hired through this system are paid on a weekly basis.
Decennial Service Center		<p>The Decennial Service Center is a suite of systems that includes the following:</p> <ul style="list-style-type: none"> Remote Access to Devices MDM (Mobile Device Management) CUIC (Cisco Unified Intelligence Center) Remedy
Desktop Services		The Desktop Services is a suite of systems that includes the following: OWA, Chat, SharePoint
DMS	Data Management System	DMS is an enterprise level application, and its features include: Registry of Internal, Administrative Record, & Third-Party Datasets; Registry of Internal and External Projects; Registry of Access Permissions: User-Dataset-Project; Streamlines processes to Find, Request, and Access data; Improves security of sensitive internal data using automated processes.
eCorrespondence		eCorrespondence will replace the Business Help Site (BHS). For 2020, it provides customer registration, bulk email, and online assistance capabilities-including respondent confirmation of receipt of their census response. The functionality previously provided by SalesForce for the 2010-2016 IPDatabase is now being

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System Name	Long Name	System Description
		<p>supported in eCorrespondence.</p> <p>FUTURE PLAN</p> <p>CEDCaP new system; first release scheduled for 2017</p>
ENS	Emergency Notification System	ENS is used to notify field workers of emergency
Enumeration		Enumeration is the future CEDCaP system used to perform designated CAPI and related interviews associated with each assigned case and provide other location services.
ESB	Enterprise Service Bus Service Oriented Architecture	<p>FUTURE PLAN</p> <p>The Enterprise Service Bus (ESB) is an enterprise system that will be used first by CEDCaP.</p> <p>CEDCaP new system; scheduled to be ready to support the 2016 Census Test.</p> <p>Depicted on the architecture diagram as ESB interfaces (services)</p>
GUPS	Geographic Update Partnership Software	<p>The Geographic Update Partnership Software (GUPS) system allows partners to provide geographic updates. GUPS will support:</p> <ul style="list-style-type: none"> o All geographic partnership programs (i.e., Boundary and Annexation Survey (BAS), PSAP/TSAP, Boundary Validation Program , and Public Use Microdata Areas); o Local Update of Census Addresses; o Redistricting Data Program (RDP); o Count Question Resolution.
iCADE	Integrated Computer Assisted Data Entry	The Integrated Computer Assisted Data Entry (iCADE) system is used to process paper based survey response.
IDMS	Account Management System	Identity and account Management System is used to manage accounts
ILMS	Integrated Logistics Management System	The Integrated Logistics Management System is used to manage logistics and resource planning, based on the SyteLine product.
IPTS	Intelligent Mail Barcode (IMB) Confirm Service® Postal Tracking System	<p>The Intelligent Mail Barcode (IMB) Confirm Service® Postal Tracking System is a mail tracking system developed by the Census Bureau / U.S. Postal Service (USPS) system to trace individual mail pieces through USPS. Received mail is scanned at the postal center and receipt info is sent to Census prior to opening and scanning that is then received and processed by ATAC.</p> <p>A service for which we obtain data from the postal service.</p>

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System Name	Long Name	System Description
LiMA	Listing and Mapping Application	<p>The Listing and Mapping Application (LiMA) meets the address and map feature collection needs of the Census Bureau and its address/map capture programs. The LiMA provides the process of address capture by allowing field users to collect address data in the field in on- and off-line environments. The application is built to run on multiple operating systems, devices, and device form factors. The application utilizes the base maps TMO receives from Geography Division.</p> <p>FUTURE PLANS</p> <p>CEDCaP CLMS subsystem Introduced for the Address Canvassing Test Adding QC functionality in FY2018.</p>
LMS	Learning Management System	<p>The Learning Management System (LMS) is the system that hosts training modules for the field representatives. Currently it is based on the Oracle Taleo cloud product.</p>
MACS	Matching and Geocoding Software	<p>The Matching and Geocoding Software is an interactive application that allows clerical matching and geocoding. This application is used in Non-ID Processing.</p>
MAF/TIGER	Master Address File/Topologically Integrated Geographic Encoding and Referencing Database	<p>The Master Address File/Topologically Integrated Geographic Encoding and Referencing Database (MAF/TIGER DB) is a database with associated utilities and tools that contains, manages and controls an extensive repository of spatial and non-spatial data used to provide extracts to define census operations, provide maps, and support Web applications.</p> <p>A systems of systems that includes: Geo Services, BCU Tracking, Site Maps, Applicant Geocoding System (AGS), Geographic Delineations (TEA, LCO, Stat Areas, etc.), GAADS, GRF-C, GRF-N, Web Map Service, MAF Extract ArcGIS Infrastructure, Batch Non-ID Geocoding System, Geocoding Services, Imagery Service, Transaction Files (Address based), Geographic Programs Quality Control and Plotting System (GPQCPS) - large and small format map QC and plotting system, Production map creation (large and/or small format), LUCA, GATRES (to be replaced by GENIUS), GPP, Control systems.</p>
MCM	Mobile Case Management	<p>The Mobile Case Management (MCM) system will provide mobile device level survey case management and dashboard for disconnected mode.</p>

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System Name	Long Name	System Description
MOCS	MultiMode Operational Control System	<p>MOCS will be a major component of the adaptive survey design initiative to improve the Census Bureau's ability to prepare cost-effective economic and social statistics by providing survey and Census owners with new capabilities, allowing them to predict, with a high level of confidence in advance, whether expenditures improve the quality of survey and census data.</p> <p>FUTURE PLAN</p> <p>Introduced for the 2016 Census Test</p>
MOJO	MOJO OCS (Operational Control System)	<p>The MOJO OCS (Operational Control System) is the next generation, operational control system for managing fieldwork, currently being developed to support 2015 field test operations. OCS has an automated case assignment engine that utilizes road networks, case locations, enumerator locations, enumerator availability and language specialties for making assignments automatically.</p> <p>Desktop Case Management is a subsystem under MOJO</p>
NPC Printing	Printing at the National Processing Center	NPC Printing is used to merge static form and variable data. Print Forms and Spray Address.
Partnership Communications System	Partnership Communications System	<p>The Partnership Communications System is a new suite of applications including:</p> <ul style="list-style-type: none"> Partnership Emergency Notification Partnership Fulfillment Partnership Portal
PEARSIS	Production Environment for Administrative Records Staging, Integration and Storage	<p>Production Environment for Administrative Records Staging, Integration and Storage (PEARSIS) is a new system to manage Administrative Records and provide services associated with those records.</p> <p>Introduced for the 2017 Census Test</p>

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System Name	Long Name	System Description
PRIMUS	Internet data Capture	<p>The PRIMUS (replaces Centurion for Decennial) secure Internet data exchange system is a web-based framework for the design, delivery, and execution of surveys, censuses, and other data collection and data exchange efforts over the Internet.</p> <p>Allows respondents to provide response data via the Internet. Internet response data will be delivered daily for the duration of the production period. DCMD provides requirements to Application Services Division (ASD) for application development. ASD will deploy and maintain this system throughout production. All response data captured by the PRIMUS instrument is sent to MOCS/CaRDS for data integration similar to NRFU and paper response data. Database schema requirements will be provided by ESB. PRIMUS will provide Internet report metrics to CeDAR via ESB product services.</p> <p>FUTURE PLAN</p> <p>Existing system PRIMUS that may need to be updated/modified to support 2020.</p>
RAT&E	Recruiting Assistant Time and Expense	The Recruiting Assistant Time and Expense (RAT&E) is a system for field Recruiting Assistants to submit Time and Expenses.
RTNP	Geo Coding Services	<p>The RTNP is a system to provide geographic coding services for Standardize and Header code:</p> <ul style="list-style-type: none"> - Address, Real-time - Match Address, Real-time - Geocode Address, Real-time - Geo-locate Using Web Map Services
SMaRCS	Sampling, Matching, Reviewing, and Coding System	<p>Sampling, Matching, Reviewing, and Coding System (SMaRCS) is an application supporting quality control for field operations during the 2020 Census Research and Testing program and the 2020 Census. The SMaRCS application specifically supports quality control operations designed to determine whether field listers and enumerators are using validated procedures and collecting accurate data. The SMaRCS application will facilitate quality control operations by providing a mechanism for selecting quality control samples, validating production interview data against administrative records sources, and by providing a tool for clerical matching to compare the production interview data against RI data. SMaRCS will also serve as a major control component for quality control operations by managing the selection of quality control samples for</p>

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System Name	Long Name	System Description
		<p>field follow-up related to Census and CM operations and tracking the progress of the RI work through the matching, field, and resolution processes.</p> <p>Census MaRCS will be replaced by SMaRCS; It interfaces with CLMS and MOJO; Implemented for Decennial in 2016.</p> <p>Will include enhancement to provide listing QC. SMARCS will also be used for QC of CM data collection for Independent Listing, Person Interview, Person Follow-up and Initial and Final Housing Unit Follow-up QC operations as appropriate.</p>
Sunflower		Sunflower is an IT Asset Management system.
Tabulation		<p>Tabulation is a system for tabulating Census response data that are to be used by CEDSCI system. This system is needed when CEDSCI comes online.</p> <p>Currently, testing is being done on an ACS system to assess its performance and ability to process the load of 2020 Census data. The outcome of this testing may result in more enhancements to Tabulation.</p>
UTS	Unified Tracking System	<p>The Unified Tracking System (UTS) is a data warehouse that combines data from a variety of Census 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, drill down capability, and most importantly, pulls cost data into the same system for more efficient cost impact assessment. The UTS extracts data from the following feeder systems daily, providing the users near real-time data:</p> <ul style="list-style-type: none"> - CARDS, MOCS, MOJO, DAPPS, WebTQA, ATAC, iCADE, IPTS, GovDelivery <p>TMO's UTS has two components: Paradata Repository and Cost & Progress</p> <ul style="list-style-type: none"> - Paradata Repository: UTS will provide storage and collect paradata during the 2015 CENSUS Test for later analysis. An Oracle database will store and transfer data from the system providers to the UTS using Oracle database links. - Cost & Progress: UTS will maintain data collected during the 2015 CENSUS Test in an Oracle data warehouse. Also, produce cost and progress reports that will be used to manage and monitor 2015 CENSUS Test operations. <p>FUTURE PLAN</p> <p>CEDCaP; Reporting Cost and Progress and the Data</p>

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System Name	Long Name	System Description
		repository; Interface with MOCS CEDaR will replace CEM and UTS
WebFRED	Web-based Field Representative Earning Data	The Web-based Field Representative Earning Data (WebFRED) application provides expenditures (costs) related to fieldwork (progress), providing average costs per unit of work, and survey performance data, which enable cost analysis and cost modeling resulting in informed cost management.

Appendix J: Outstanding Decisions with Potential Impact on the Census Architecture

The list of outstanding 2020 Census operational design decisions as of March 23, 2016.

Table 14 Outstanding Decisions with Potential Impact on the Census Architecture

ID #	Outstanding Decision
ADC-22	How will [Address Canvassing] Quality Assurance be handled? SMaRCS expanded; Listing QC will be introduced for the MAF Coverage Study first, then for Address Canvassing (both in-office and in-field).
ARC-01	What are the format, media, and timing for the delivery of individual responses to NARA? There are Archiving solutions yet to be identified.
CQA-19	What are the specific service level agreements for the contractor?
CQA-24	Will CQA handle centralized outbound calling for NRFU quality assurance component? The assumption should be that CQA will provide the solution for centralized outbound calling for NRFU RI. Use this information to show transition from WebTQA, and WebCATI to CQA.
CQA-28	Will CQA take calls to support field enumerators who are having language issues?
CQA-22	Will CQA include a Quality Outbound Operation?
CFD-06	To what extent will paper questionnaires be needed to support the GQ and ETL operations? Note: Impacts iCADE.
CQR-04	What documents and systems will be needed to research and respond to challenges? There are 4 CQR unanswered questions that all could impact systems – 04 is the broadest.
CRO-01-08	There are 8 Count Review questions whose answers won't be known until FY18.
CMDE-02	What are the effects on estimates of potential operational and systems changes? There are 7 Coverage Measurement Design and Estimation unanswered questions that could impact systems – 02 is the most direct.
CMFO-01	Will the CM person data collection instruments need a larger Form-Factor (possibly a tablet) for automated instruments instead of a smartphone?
CMFO-02	Will there be an additional telephone operation that is needed before the CM Person Interview?
CMM-01	What computer matching and clerical matching systems will be used for CM?
DPD-01	How will the Census Bureau develop the 2020 Census data user interface through CEDSCI?
DPD-02	Which system will provide the 2020 Census Tabulation solution? Notes: ACS testing and a feasibility recommendation for 2020 Census tabulation processing.
DPD-03	What will be the mix or array of standardized data products?
ETL-06	Are there administrative records or third-party data sources that could be used for the frame development by type?
ETL-04	What will the quality assurance approach for the Enumeration at Transitory Location Program involve (in-field, use of paradata, etc.)? Is this envisioned to be part of Listing QC handled by SMaRCS?
EAE-03	Given the strategic principles for guiding formulation of evaluations and experiments and the parameters and criteria for selecting and prioritizing evaluation and

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ID #	Outstanding Decision
	experimentation proposals, what is the defined set of 2020 Census Evaluations and 2020 Census Experiments?
FAA-2	How will the Census Bureau use electronic transmissions to obtain the [Federally Affiliated Americans Count Overseas] data?
FAA-1	What other data sources are available for tabulating the overseas counts?
FPD-07	What other census operations have paper printing requirements (e.g., UE, Puerto Rico and Island Areas Censuses, GQ enumeration)? Similar to CFD-06; potential iCADE enhancement.
GEOP-18	How will the MAF/TIGER System interact with other 2020 Census systems to support 2020 Census operations? The question is about cadence.
GEOP-20	What is the source data (TIGER, commercial, or both) for map displays in the 2020 Census data collection and field management applications?
GEOP-19	In what 2020 Census operations will addresses and features be updated and added? What are the expectations for the capture and availability of field updates? Available in real time? Available with the timeframe of the operations? Available for the next operation? Available for the final tabulation?
GEOP-15	How will the MAF/TIGER System be used in support of reengineered field operations? For example, what are the data input and output processing and timing requirements and the workflows needed to support field data collection operations? Notes: it's noted in the spreadsheet that this is a duplicate of GEOP-19; there are similarities, but there are some subtle differences.
GQ-07	What varying computing capabilities and multiple formats for administrative records and third-party data can be integrated into a standardized Census Bureau system for processing?
GQ-08	What is the optimal linkage methodology to ensure self-response data are linked to the correct group quarters?
GQ-11	How will quality assurance be handled?
GQ-09	How will varying administrative records or third-party data formats be processed?
IPC-07	What are the components and materials required for implementing the Integrated Partnership and Communication (IPC) operation? Notes: Census will work with IPC operation contractor upon contract award in September 2016 to develop an IPC Program Plan.
ISR-11	Will the Census Bureau provide a mobile application for Internet Self-Response?
IA-11	To what degree will online self-response be available for Island Areas' respondents?
IA-13	How will the Island Areas (IA) questionnaire differ from the then current American Community Survey (ACS) form? Notes: The plan is to use the 10 questions from the stateside instrument added to the rest of the ACS questionnaire, changing only the reference periods as needed.
ITIN-06	What cloud services are required to support the 2020 Census operational design (to include CEDCaP and non-CEDCaP)? Notes: The lead time required to capture use cases and implement a strategy will be substantial, as it will involve a significant acquisition, as well as time to stage and deploy IT resources, etc. Contract for cloud computer services needs to be in place by Sept 2016. This contract is required to support the 2017 Census Tests, future Census Tests, and the 2020 operations.
LUCA-11	How will the Census Bureau register LUCA participants over the Internet, and are there

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ID #	Outstanding Decision
	opportunities to use Title 13 E-signature capability so that it can be done online? Notes: Investigate whether existing systems can meet the need and if not, evaluate options (e.g., mail/paper or new automated solution)
LUCA-15	To what extent can administrative records and third-party data be used to validate addresses submitted by LUCA participants?
NID-06	How will administrative records and third-party data be used to improve matching in Non-ID Processing?
NRFU-20	How will any field verification of unmatched but geocoded Non-ID response be integrated into the NRFU operation?
NRFU-27	What are the sources that contribute to the NRFU universe (e.g., LUCA Appeals, late DSF adds, non-responding UE addresses, etc.)?
RDP-07	What IT capabilities and data distribution methodology will be used (including maps)?
RPD-06	How will administrative records and third-party data be specifically used with response processing operations? Notes: Needs to be determined during the beginning of the design phase of Response Processing systems for the 2017 Census Test.
RPD-05	What are the methodologies, processes, and systems needed for Residual Coding, Primary Selection Algorithm, IRD, Editing/Imputation, Edit Review System, and Hundred Percent Detail File?
SPC-02	Will a Mobile Asset Management (MAM) solution be used in lieu of Mobile Device Management to support mobile data collection?
SEI-04	What is the sourcing approach for each capability supporting the 2020 Census?
UE-04	How are Census IDs generated or assigned to newly identified units not found on the address list?
UE-02	What automated instruments do the enumerators need to access if transitory units are enumerated during UE?
UE-06	Will UE contact living quarters through mail and other contact strategies?
UE-10	Does the UE operation enumerate transitory units found at transitory locations or are they provided to a different 2020 Census operation for enumeration?
UE-14	Can administrative records and third-party data be used to validate units in Quality Control?
CFD-03	What are optimal designs of questionnaires (including size and page layout) and non-questionnaire materials for the 2020 Census?
ISR-13	What type of Internet form design will facilitate high quality self-response data collection in GQ?

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Appendix K: Architecture Transition Table

This includes the major tests and will not include smaller scale tests.

Appendix K.1: Business Architecture: Operations

Table 15 Business Architecture: Operations

Operation	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End- to-End	2020 Decennial
ADC - Address Canvassing			x	x	x	x	x
ARC - Archiving							x
CFD - Content and Forms Design	x	x		x	x	x	x
CMDE - Coverage Measurement Design and Estimation						Solution TBD	Solution TBD
CMFO - Coverage Measurement Field Operations						Solution TBD	Solution TBD
CMM - Coverage Measurement Matching						Solution TBD	Solution TBD
CQA - Census Questionnaire Assistance	x	x		x	x	x	x
CQR - Count Question Resolution							x
CRO - Count Review							x
DLM - Decennial Logistics Management		x	x	x	x	x	x
DPD - Data Products and Dissemination						x	x
DSC - Decennial Service Center		x	x	x	x	x	x
EAE - Evaluations and Experiments							x
ETL - Enumeration at Transitory Locations							x
FAA - Federally Affiliated Overseas Count							x
FLDI - Field Infrastructure		x	x	x	x	x	x
FPD - Forms Printing and Distribution	x	x		x	x	x	x
GEOP - Geographic Programs	x	x	x	x	x	x	x

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Operation	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End- to-End	2020 Decennial
GQ - Group Quarters						X	X
IAE - Island Areas Enumeration							X
IPC - Integrated Partnerships and Communications		X		X	X	X	X
ISR - Internet Self-Response	X	X		X	X	X	X
ITIN - IT Infrastructure		X	X	X	X	X	X
LNG - Language Services		X		X	X	X	X
LUCA - Local Update of Census Addresses							X
NID - Non-ID Processing	X	X		X	X	X	X
NRFU - Nonresponse Followup		X			X	X	X
PDC - Paper Data Capture	X	X		X	X	X	X
RDP - Redistricting Data Program						X	X
RPO - Response Processing	X	X		X	X	X	X
UE - Update Enumerate				X	X	X	X

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Appendix K.2: Application Architecture: Systems

The systems are divided into separate tables by segment.

Table 16 Systems in the Survey Design/Instrument Development Segment

Survey Design/Instrument Development	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
COMET – Content Metadata System				x	x	x	x	

Table 17 Systems in the Frame Development Segment

Frame Development	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
AdCan Solution			x	x	x	x	x	
BARCA – Block Assessment, Research and Classification Application			x	x	x	x	x	Online since October 2015. Indirectly supports the other tests by feeding updates to MAF/TIGER.
GUPS - Geographic Update Partnership Software							x	Online, but not directly involved in all tests. Indirectly feeds LUCA
MACS - Matching and Geocoding Software		x		x	x	x	x	Introduced in 2016
MAF/TIGER - Master Address File/Topologically Integrated Geographic Encoding and Referencing Database	x	x	x	x	x	x	x	

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Frame Development	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
RTNP - Geo Coding Services		x		x	x	x	x	

Table 18 Systems in the Admin Records Segment

Admin Records	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
CARRA – Center of Administrative Records Research and Applications	x	x		CARRA Replaced by PEARSIS for 2017 and beyond	CARRA Replaced by PEARSIS for 2017 and beyond	CARRA Replaced by PEARSIS for 2017 and beyond	CARRA Replaced by PEARSIS for 2017 and beyond	
PEARSIS - Production Environment for Administrative Records Staging, Integration and Storage				Replaces CARRA in 2017 and beyond				

Table 19 Systems in the Sample Design Segment

Sample Design	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
CaRDS (Pre) – Control and Response Data System		x		x	x	x	x	
CexB (DSSD)	x	x		x	x	x	x	

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Table 20 Systems in the Evaluate Segment

Evaluate	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
CEE (Evaluation and Experiments)								
CM – Coverage Measurement						x	x	
SMaRCS - Sampling, Matching, Reviewing, and Coding System		x	x	x	x	x	x	

Table 21 Systems in the Data Editing, Imputation, and Estimation Segment

Data Editing, Imputation, and Estimation	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
CaRDS (Post) – Control and Response Data System		x		x	x	x	x	
Coding		x		x				Will transition to CaRDS at a date TBD.

Table 22 Systems in the Disseminate Segment

Disseminate	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
CEDSCI – Center for Enterprise Dissemination Services and Consumer Innovation						x	x	

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Disseminate	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
Tabulation						x	x	

Table 23 Systems in the Data Collection Segment

Data Collection	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
DSSD (ARMS) – Administrative Records Modeling System		x		Replaced by CAES in 2017 and beyond				
ATAC – Automated Tracking and Control	x	x		ATAC replaced by iCADE in 2017 and beyond	ATAC replaced by iCADE in 2017 and beyond	ATAC replaced by iCADE in 2017 and beyond	ATAC replaced by iCADE in 2017 and beyond	
CAES – Concurrent Analysis and Estimation System				x	x	x	x	
CEM – Customer Experience Management		x		x	x	x	x	Will eventually be replaced by CEDaR (TBD).
Centurion	x							
CIRA – Census Image retrieval				x	x	x	x	
COMPASS – Census Operations Mobile Platform for Adaptive Services and Solutions		x		Replaced by Enumeration	Replaced by Enumeration	Replaced by Enumeration	Replaced by Enumeration	
CQA – Census Questionnaire Assistance				Replaces Web TQA,	Replaces Web TQA,	Replaces Web TQA,	Replaces Web TQA,	

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Data Collection	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
				WebCATI beginning in 2017				
eCorrespondence				x	x	x	x	System introduced in Q3 FY2016 per CEDCaP Transition Plan,
Enumeration				Replaces COMPASS in 2017 and beyond				
Fulfillment							x	
Group Quarters (New System)						x	x	
iCADE - Integrated Computer Assisted Data Entry	x	x		Replaces ATAC for automated form checking				
IPTS - Intelligent Mail Barcode (IMB) Confirm Service® Postal Tracking System	x	x		x	x	x	x	
LiMA - Listing and Mapping Application			x Ported to smartphone/tablet	x	x	x	x	
MCM - Mobile Case Management			x	x	x	x	x	
MCS - Master Control System	x	x						Replaced by MOCS/MOJO per CEDCaP Transition Plan
MOCS - MultiMode Operational Control System		x		x	x	x	x	

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Data Collection	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
MOJO - MOJO OCS (Operational Control System)		x	x	x	x	x	x	
PhoneTree	x							
PRIMUS - Internet data Capture		Replaces Centurion for 2020 Census use		Replaces Centurion for 2020 Census use	Replaces Centurion for 2020 Census use	Replaces Centurion in 2016 and beyond	Replaces Centurion for 2020 Census use	
UCRM	x	Replaced by MOCS and CARDS in 2016 and beyond	Replaced by MOCS and CARDS in 2016 and beyond	Replaced by MOCS and CARDS in 2016 and beyond	Replaced by MOCS and CARDS in 2016 and beyond	Replaced by MOCS and CARDS in 2016 and beyond	Replaced by MOCS and CARDS in 2016 and beyond	
UTS - Unified Tracking System	x	x	x	x	x	x	x	Will eventually be replaced by CEDaR (TBD).
WebCATI	x	x		Replaced by CQA in 2017 and beyond				
WebTQA - Web Telephone Questionnaire Assistance	x	x		Replaced by CQA in 2017 and beyond				

Table 24 Systems in the Support Segment

Support	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
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	Support	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
CBS – Commerce Business System: Jeffersonville Activity Reporting System		X	X	X	X	X	X	X	
CENDOCS – Census Document System			X	X	X	X	X	X	
CHEC – Census Hiring and Employment Check System (Fingerprinting)			X	X	X	X	X	X	
CHRIS – Census Human Resources Information System		X	X	X	X	X	X	X	
Commercial Printing – Public Use Printing			X		X	X	X	X	Not necessarily a requirement to use a vendor rather than NPC; there are only requirements for printing. Whenever the workload exceeds a certain threshold, the effort has to be contracted out. 2017 Census Test printing may be done by NPC printing
C-SHaRPS - Census Schedule A Hiring, Recruiting and Payroll System						Planned to replace DAPPS, Replaces RAT&E	Planned to replace DAPPS, Replaces RAT&E		
DAPPS - Decennial Applicant, Personnel and Payroll Systems			X		X	Planned to be replaced by C-SHaRPS	Planned to be replaced by C-SHaRPS		

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	Support	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
ENS - Emergency Notification System		x	x	x	x	x	x	x	
ILMS - Integrated Logistics Management System			x	x	x	x	x	x	
LMS - Learning Management System			x	x	x	x	x	x	Need to monitor evolution of LMS towards the final solution. COMET is temporary due to a contract issue.
NPC Printing - Printing at the National Processing Center		x	x						Tests supported depends on commercial printing needs.
RAT&E - Recruiting Assistant Time and Expense					x	x	Replaced by C-SHaRPS in 2018 and beyond	Replaced by C-SHaRPS in 2018 and beyond	

Table 25 Systems in the Census IT Infrastructure Segment

Census IT Infrastructure	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
Decennial Service Center	x	x	x	x	x	x	x	
Desktop Services	x	x	x	x	x	x	x	
DMS - Data Management System	x	x		x	x	x	x	

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Census IT Infrastructure	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
ESB - Enterprise Service Bus Service Oriented Architecture		x	x	x	x	x	x	
IDMS - Account Management System		x	x	x	x	x	x	
Partnership Communications System						x	x	Verify when this system kicks in. There will be partnership activity as part of the 2016 Census Test, 2017 Census Test, Puerto Rico Test, and 2018 End-to-End Test. The Integrated Communications contract will be awarded in August 2016.
Partnership Emergency Notification						x	x	
Partnership Portal						x	x	
Remote Access to Devices		x	x	x	x	x	x	
Sunflower		x	x	x	x	x	x	

Table 26 Systems in an Unknown Segment

Unknown	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
Apportionment							x	

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	Unknown	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial	Notes
Count Review System								x	
Coverage Measurement							x	x	
CQR								x	
CR – Count Review								x	Is this different from the Count Review System?
DAD – Dangerous Address Database				x					Scheduled to be replaced by RCMS per CEDCaP Transition Plan
WebFRED				x					

Appendix K.3: Information Architecture

Table 27 Information Architecture

Information Architecture	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial
Information Architecture		Canonical format used in 2016	MOJO implementation with variable standardization	More MOJO implementation with variable standardization Machine Readable Specs to be available	Machine Readable Specs in place for this test Standardize non-id input for matching service to include Puerto Rico addresses		The following will be available: 1. Enterprise Data Registry 2. Enterprise Data Model 3. Machine Readable Specs

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Information Architecture	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial
Enterprise Data Model (EDM)		Conceptual Entities used within MOJO.	(1) Dictionary of terms defined for Content related concepts. (2) Establish a Logical Hierarchy of Terms.	(1) Dictionary of terms defined for Paradata and Operational related concepts. (2) Enterprise Data Flows documented.	(1) Serialize the model in an XML Schema to be used for Machine Validation (2) EDM proposed as NIEM Statistical Domain		
Machine Readable Specifications				(1) 2020 Cycle Specification defined in XML/XSD. (2) XML Validation of each mode/instrument specification.			
Enterprise Data Services		Variable Names based upon NIEM and 11179.	Prototype Metadata Registry Established.	Metadata Registry used for Content creation.			
Interface Control Documents				ICD's refactored to include EDM concepts.	ICD's rewritten as NIEM IEPD's.		

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Appendix K.4: Infrastructure Architecture

Table 28 Infrastructure Architecture

	2015 NCT	2016 Census Test	Address Canvassing Test	2017 Census Test	Puerto Rico Test	2018 End-to-End test	2020 Decennial
Cloud	All systems run on Bowie servers (no cloud)			Migration of existing cloud to final and installation of new systems in the cloud should be planned by 2017		All systems that will be in the cloud should be in place and tested in the final cloud service environment for 2020	
	RTNP in the cloud			RTNP in the cloud	RTNP in the cloud	RTNP in the cloud	RTNP in the cloud
	PRIMUS in the cloud			PRIMUS in the cloud	PRIMUS in the cloud		
	Adhere to a cloud first policy. DaaS from 2016 Census Test; The management of the mobile devices will be provided as SaaS.						
Field IT Infrastructure		TBD Info about field infrastructure for 16					
Performance		Moves to Primus design for high performance.					

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	2015 NCT	2016 Census Test	Address Canvassing Test	2017 Census Test	Puerto Rico Test	2018 End-to-End test	2020 Decennial
Platforms		Need to scale up the systems for performance, reliability, scalability as part of the Scale Up project: DAPPS, IDMS, LMS, CHEC.				By 18 will have a scalable architecture	
				Exadata shows up for the first time 2017		CEDSCI available	
				Possible frame updates in 2017 adcan			
	LiMA was only operated on a laptop		LiMA will be deployed on a hand held				
	UTS : SAS-Based		UTS will adopt a Tableau/SAS BI hybrid. Tableau as a solution depends on the results of the AoA.	Planning to use new architecture with UTS and CEM as components			
Reliability - Second Site/COOP				(TBD) Need to look into use of 2 nd site for MACS. (iCADE – which is being used in Jeffersonville currently – is going to be installed at a 2 nd site for redundancy. MACS – also at Jeffersonville – may want the same thing.)		iCADE in 2 nd site (TBD) Need to determine MOCS plan for High Availability/Reliability (TBD) Need to determine ESB plan for High Availability/Reliability	
Scalability				- Demand Models, Non-Functional requirements,		Solution Architecture Implemented and tested	Scalable Solution Built Out, Scalable Solution

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	2015 NCT	2016 Census Test	Address Canvassing Test	2017 Census Test	Puerto Rico Test	2018 End-to-End test	2020 Decennial
				- Scalable Logical Architecture Defined. - 17 Models including COMPASS, PRIMUS, MOJO, MOCS, UTS, ESB, RTNP, and iCADE.			Ready
	Centurion was used in 2015, then used Primus in 2016.	Moves to Primus design for scalability in the cloud.		Primus investigating use of Couch DB for scalability/ reliability/ performance.			
				CQA will only have enough sites to handle load for this test. Probably one.	CQA involved in this test	CQA will only have enough sites to handle load for this test.	Full complement of CQA sites.
	(TBD) Need to determine scalability plans for Decennial Services center (TBD) Need to determine scalability plans for Desktop services Take from Scale Up project			(TBD) CHEC will interface with multiple external interfaces, 3rd party vendors etc. Need to determine that plan.			
SOA/ Infrastructure	(TBD) May want to check on when/if FRAME apps plan to comply with ESB use. (i.e. API first policy.)						
	3 services: 1) Address matching 2) Address analyzing and 3) geo coding	MAF/TIGER exadata platform upgrade Start using web services in 2016					

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	2015 NCT	2016 Census Test	Address Canvassing Test	2017 Census Test	Puerto Rico Test	2018 End-to-End test	2020 Decennial
	NO ESB in 2015 CEDCaP owns ESB	Diagram on 2016 which we can extract Using ORACLE ESB ESB Vendor will be selected in September 2016	(TBD) Note which additional systems are on ESB and when.	Selected ESB should be available (AoA is ongoing to select the product for the ESB)			
Telecom	Web TQA run out of NPC			Introduce new CQA	Introduce new CQA		

Appendix K.5: Security Architecture

Table 29 Security Architecture

	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial
Security Architecture	Abides by Census Bureau and Department of Commerce applicable standards, policies, rules, and regulations.	Abides by Census Bureau and Department of Commerce applicable standards, policies, rules, and regulations.	Abides by Census Bureau and Department of Commerce applicable standards, policies, rules, and regulations.	Abides by Census Bureau and Department of Commerce applicable standards, policies, rules, and regulations.	Abides by Census Bureau and Department of Commerce applicable standards, policies, rules, and regulations.	Abides by Census Bureau and Department of Commerce applicable standards, policies, rules, and regulations.	Abides by Census Bureau and Department of Commerce applicable standards, policies, rules, and regulations.

Appendix K.6: Quality Architecture

Table 30 Quality Architecture

	2015 National Content Test	2016 Census Test	AdCan Test	2017 Census Test	Puerto Rico Test	2018 End-to-End	2020 Decennial
Quality Architecture						Census Coverage Measurement (CM) introduced	CM used

Appendix L: TRM Domains used in 2015 NCT

Table 31 TRM Domains used in 2015 NCT

ID	Decennial Application / System	Application Technology	Collaboration and Electronic Workplace	Data Management Technology	Networking and Telecommunications	Platforms and Storage	Security	Service Management
1	2015 Decennial Service Center	N/A	Relevant	N/A	Relevant	Relevant	Relevant	Relevant
2	2015 Field Deployment - AOSC	N/A	Relevant	N/A	Relevant	Relevant	Relevant	Relevant
3	2015 Field Deployment - LCO	N/A	Relevant	N/A	Relevant	Relevant	Relevant	Relevant
4	2015 Field Deployment - RCC	N/A	Relevant	N/A	Relevant	Relevant	Relevant	Relevant
5	2015 Field Device Deployment	TBD	TBD	TBD	Relevant	Relevant	Relevant	Relevant
6	ATAC - Automated Tracking and Control	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
7	CARRA	Relevant	N/A	Relevant	Relevant	Relevant	Relevant	N/A
8	CBS - Commerce Business Systems	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
9	Centurion	Relevant	N/A	Relevant	Relevant	Relevant	Relevant	Relevant
10	CHEC - Census Hiring and Employment System	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
11	COMPASS - Census Operations Mobile Platform for Adaptive Services	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
12	DAPPS - Decennial Application Personnel and Payroll System	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
13	DMS - Data Management System	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
14	Docutec	Relevant	Relevant	N/A	Relevant	Relevant	Relevant	N/A
15	DSSD - Cen\$M	N/A	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
16	DSSD - SAS Sampling	N/A	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
17	DSSD (ARMS) (Decennial Statistical Studies Division Administrative Records Modeling System)	N/A	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
18	GovDelivery Census Citizens Service Mgmt (CSM)	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
19	GovDelivery Communications Cloud	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant

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ID	Decennial Application / System	Application Technology	Collaboration and Electronic Workplace	Data Management Technology	Networking and Telecommunications	Platforms and Storage	Security	Service Management
20	GovDelivery Targeted Messaging	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
21	iCADE	Relevant	Relevant	N/A	Relevant	Relevant	Relevant	Relevant
22	IPTS - Intelligent Mail Barcode Postal Tracking System	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
23	MAF/TIGER - Master Address File/Topologically Integrated Geographic Encoding and Referencing System	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
24	ROCKIT Operations Control Center	N/A	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
25	ROCKIT/MOJO	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
26	RTNP GeoCoding Services	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
27	RTOCS - Research and Testing Operations Control System	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
28	TQA - Web Telephone Questionnaire Assistance	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
29	UCRM - Universe Control and Response Management	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant
30	UTS - Unified Tracking System	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Relevant