

Update on the U.S. Census Bureau's GSS Initiative

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What is the GSS Initiative?

- An integrated program of improved address coverage, continual spatial feature updates, and enhanced quality assessment and measurement
 - All activities contribute to Master Address File (MAF) and TIGER database improvement
 - Builds on the accomplishments of this decade's MAF/TIGER Enhancement Program (MTEP)
- Supports the goal of a **targeted** (vs. nationwide) **address canvassing** for the 2020 Decennial Census
- Continual updates throughout the decade support current surveys (ex: American Community Survey)
- A budget increase over our base Geographic Support System funding for a 10-year lifecycle program



Why do we need the GSS Initiative?

- A response to stakeholder and oversight recommendations
 - The Government Accountability office, the Office of the Inspector General, and the National Academies of Science have reported deficiencies of the Geographic Support System in their evaluations
 - The lack of a comprehensive geographic update program between censuses
 - Associated negative impact on ongoing programs such as the American Community Survey, other current surveys, and small areas estimates programs
- A logical next step, building upon
 - The accomplishments of the MAF/TIGER Enhancement Program (MTEP); including the significant investment of the MAF/TIGER Accuracy Improvement Project (MTAIP) and the improved positional accuracy of TIGER
 - The contributions (GIS files & imagery) of our partners between 2003 to 2008 and their participation in the MTAIP in preparation for the 2010 Census



A Key Component of this Initiative is...

- An integrated program that utilizes partnerships for:
 - Improved address coverage
 - Continual spatial feature updates
 - Enhanced quality assessment and measurement



Who are the major players?

- US Census Bureau
- Federal partners
 - USPS, USGS, NOAA/NGS, DHS, EPA
- State partners
- Local partners
- Tribal partners
- Contractor partners
- Professional organizations



GSSI Impacts

- 2020
 - Targeted Address canvassing
 - Complete, accurate, and maintained MAF
 - Overall support for mobile computing
- Current Surveys and ACS
- National resource



Mission Need for the Data

- “The Census Bureau serves as the leading source of quality data about the nation's people and economy. “
- To fulfill this mission a complete and accurate MAF/TIGER db is necessary



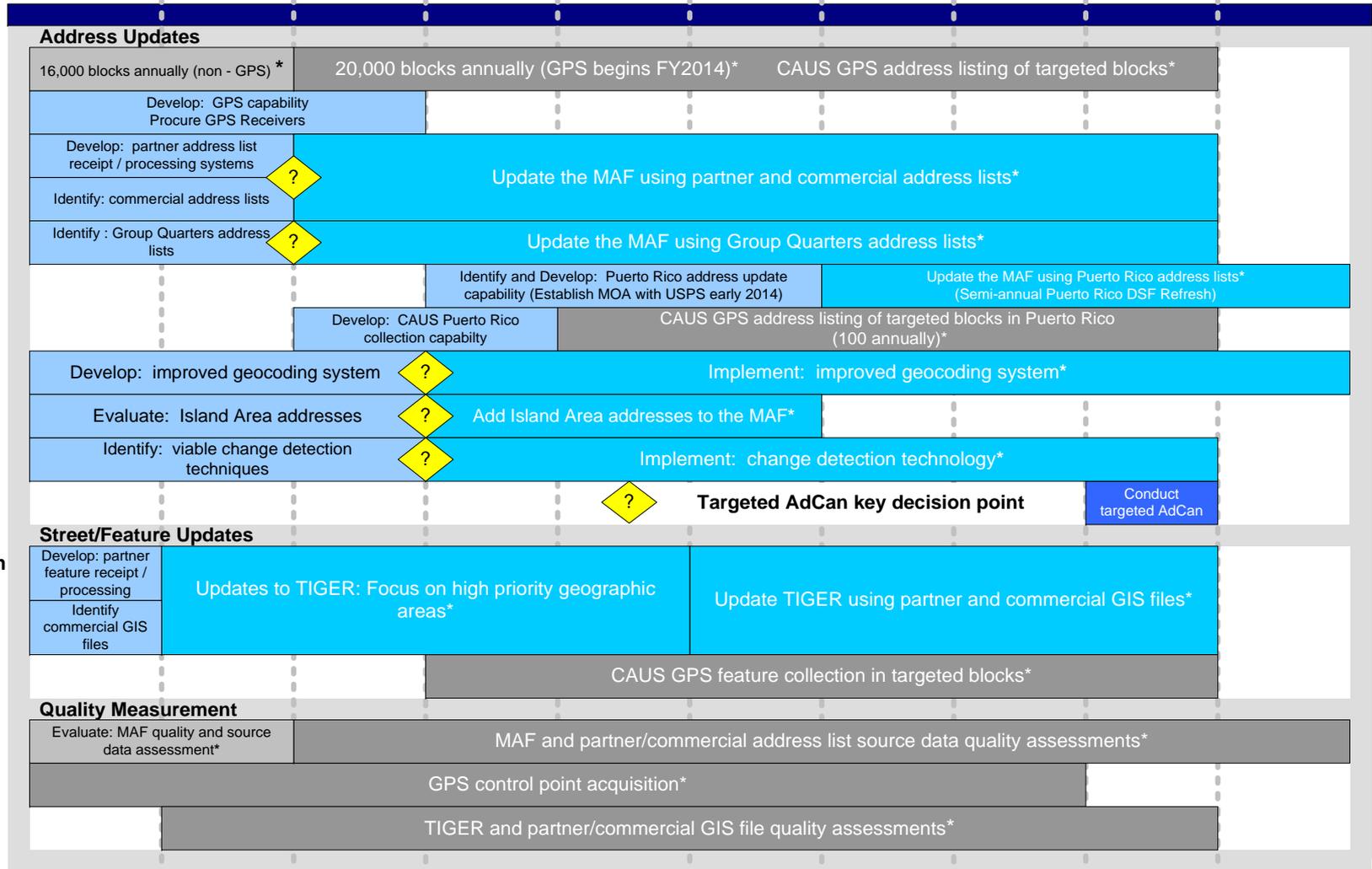
A Shift in Focus for the 2020 Census

- From a **complete** address canvassing to a **targeted** address canvassing
 - Hinges on establishing an acceptable address list for each level of government
- What defines “acceptable” will be a partnership collaboration between government partners and the Census Bureau



Program Overview

FY2011 FY2012 FY2013 FY2014 FY2015 FY2016 FY2017 FY2018 FY2019 FY2020



Key decision points

* Subject to Annual Assessment



Preparatory Steps

- The following GSS Initiative documents were developed as part of the budget approval process:
 - 10-year lifecycle budget
 - Program key decision points / milestones
 - Operational Plan
 - Risk Management Plan / Risk Register
 - FY11 Detailed Tasks Listing with cost estimates
 - Research & development, resulting in the following reports:
 - “Rural Structure Change Detection Report for the Census Bureau”
 - “Post 2010 MAF Maintenance: Final Environment Scan”
 - “Project Summary Work Breakdown Structure for: Post-2010 MAF Maintenance Recommendations”
 - Fact Sheet



Addresses

- Continuous update of the MAF
- Complete and current address coverage with emphasis in areas without city-style addresses
 - Focus on rural areas
 - Puerto Rico
 - Group Quarters
- Expanded address sources
 - Current primary sources for address updates are the USPS Delivery Sequence File (DSF) and field updates from censuses and surveys
 - FY11 and beyond will focus on identifying and using best available data from partnership and commercial files
- Beyond the annual ACS, current surveys will be using the MAF to support their statistical frames and surveys



Is the address...

- Mail-able
- Deliverable
- Locatable
- Geocode-able



MAF Challenges

- No national addressing system
- Lack of addressing standards – these are just now coming into place
- Data updates previously limited to:
 - US Postal Service Delivery Sequence File
 - Local of Census Addresses (LUCA)
 - Census field operations



MAF Challenges (continued)

- Not all addresses in the Census are in the USPS Delivery Sequence File (DSF):
 - 13% of the addresses in the final census universe have never appeared on any DSF since 1997
- Not all addresses in the DSF can be geocoded to the MAF



MAF Challenges (continued)

- Constraints in working with partners to build and maintain the MAF
 - Requires close collaboration with the U.S. Postal Service
 - Requires substantial partnership program with tribal, state, and local governments (approximately 40,000)
 - Two-way address sharing is difficult and tenuous under confidentiality constraints of Title 13



MAF Challenges (continued)

- MAF use under Title 13
 - Restricted access for viewing
 - Restricted access for updating
 - Sharing to review and improve address list significantly restricted
 - Requires Title 13 compliance by partner
 - Address information for census use only
 - Limited partner participation
 - Difficult to manage



Maintaining Our Feature Network

- Continuous update of street network and attributes
 - Sharing results with USGS and DOT
- Sources focus on best available data from government partners and commercial files
- Extensive use of imagery
 - Source for spatial data
 - Used for data verification
 - Used for data quality assurance



An Early Example of Collaborating on Transportation Data

- Proposed a meeting on Geospatial Transportation Data Needs for Federal Agencies in October 2009
- Coordinated with DOT and USGS
- Goal: To identify federal needs for roads and related transportation data
- 39 attendees from 15 agencies
- Results
 - Strawman for federal transportation data needs



Spatial Challenges

- Change Detection
 - Determining change detection options
 - Incorporating change detection techniques into our business process
- An annual MAF/TIGER db
 - How to maintain the data over time
- Inconsistent attributes
 - Feature codes
 - Feature names



Spatial Challenges (continued)

- Requirement for persistent topology
 - Direct impact on updating activities
- Web services
 - It is clear users want large data sets more quickly
 - Currently several efforts in development to provide web services
- User demands
 - Generalization
 - Combination
 - Simplification



Boundary improvements

- Continue to develop state and county level partnerships
- Improve our training and outreach for the annual Boundary and Annexation Survey (BAS)



Working with Parcels

- Learning the benefits and challenges of parcel data
- Initial stage of acquiring sample parcel data
 - Seeking King County, WA's parcel files
 - Evaluating CoreLogic's data



Quality

- Quality improvements apply to
 - Address and spatial data
 - IT processes
 - Geographic products
- Quantitative measures of address and spatial data quality are needed



Quality Challenges

- Source
 - Authoritative
 - Best available
 - Non-restricted
- Resolution
 - Address level?
 - Feature level?



Quality Challenges (continued)

- Completeness
 - Coverage
 - Comprehensive attribution
- Consistency
 - Value
 - Priority
- Accuracy
 - Positional
 - Actual vs. planned



Ongoing Work Research

- 5 reports by external geospatial experts
 - The State and Anticipated Future of Addresses and Addressing
 - Identifying the Current State and Anticipated Future Direction of Potentially Useful Developing Technologies
 - Measuring Data Quality
 - Use of Handheld Computers and the Display/Capture of Geospatial Data
 - Researching Address and Spatial Data Digital Exchange
- To download these reports:
 - <http://www2.census.gov/geo/research/>



Ongoing GSS Work

GEO-lead Census Bureau Teams

Teams comprised of Census Bureau staff and other federal agencies (USPS , USGS, NOAA/NGS) were formed to address specific aspects of the GSS Initiative

- Address Coverage and Sources
- Feature Coverage and Sources
- Quality, Assessments/Evaluations
- Partnerships
- Research and Development
- Geocoding
- MAF/TIGER Integration/Linkage
- Global Positioning Systems (GPS)
- Project and Contract Management
- Policy



FY11 High-Level Activities Summary

Component	Task
Address Updates	Develop GPS collection capability and enhance software functionality for the Community Address Update System (CAUS)
Address Updates	Develop functioning tracking, processing and reporting systems in support of receiving and processing partner-supplied address lists
Address Updates	Develop an improved geocoding system
Address Updates	Identify Group Quarters address data sources and develop acquisition methods
Street/Feature Updates	Develop functioning management, acquisition, distribution and reporting systems in support of receiving and processing partner-supplied feature updates
Street/Feature Updates	Identify a viable change detection technique; either acquire the software for in-house use or contract for services
Quality Measurement	Utilize inventory of GPS control points to assess the positional accuracy of street locations in a minimum of 1/8 of the United States counties



How We Are Evaluating Our Data

- Evaluating address updates made as a part of census and survey activities
- Evaluating inconsistencies and deficiencies of features within the MTDB and quantifying the potential impacts
- Evaluating GPS data collected during Census 2010 and current GPS collection procedures
- Defining a methodology to capture quality metrics for defined geographic units



How We Are Utilizing Partnerships

- Encouraging partners to update NSGIC's GIS Inventory – www.gisinventory.net
- Meeting with government officials and commercial vendors
 - Recently met with USPS, USGS, DHS, EPA, and others
- Planning an address symposium
- Taking a corporate view by coordinating address list review and development activities with other Census Bureau Divisions (sharing of sources and resources)



How We Are Exploiting Technology

- Researching and recommending a secure (web) exchange process for address and spatial data
- Researching improved ways to ingest address and address data from partners (the conflation conundrum)
- Recommending products and services that may facilitate the exchange of address and spatial data from Census to partners
- Working with Esri to stand up new web mapping and web feature services that will support our efforts on the GSS Initiative
- Initiated a system upgrade to Oracle 11G with topology manager, upgrade to Redhat Linux.
- Researching and testing performance improvements in hardware replacement



Industry

- Visits to industry leaders in spatial data and spatial data management
 - TeleAtlas
 - Navteq
 - Google
 - 1Spatial
 - Ordnance Survey, UK
- Future visits planned



GSSI Oversight

- Department of Commerce Office of the Inspector General (OIG)
- OMB
- GAO
- NAS panels
- Commerce IT Investment Review Board



For the Geographic Support System Initiative to be Successful

- Partners are important
 - Federal, state, local, and tribal governments
 - Commercial vendors (data and service providers)
 - Professional organizations
- Working relationships must be:
 - Least intrusive
 - Most efficient
 - Ensure complete and quality data



Questions?

