Modernization of Field Operations for In Situ Data Collection

Linda Peters
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The Business of Official Statistics
Statistics published by government or other public agencies

- National Statistical Offices exist to provide information to the general public, government and the business community in the economic, demographic, social and environmental fields.

- This information is essential for development in these areas and for mutual knowledge and trade among the States and peoples of the world.

- Fundamental Goals include:
  - Protect confidentiality of responses
  - Minimize the burden on the people who provide the responses
  - Ensure accuracy, timeliness, relevance and credibility

Common Indicators:
- Population
- Housing
- Gender
- Employment
- GDP
- Consumer Price Index
- Purchasing Parity
- Trade
- Environmental
  - Energy

Society
Economy
Environment
Official Statistics

Why is GIS important?

- Fundamental Geospatial Infrastructure
- Geocoded Units
- Common Geographies
- Interoperable
- Usable
### Generic Statistical Business Process Model (GSBPM)

**Planning/Pre-enumeration**

<table>
<thead>
<tr>
<th>Specify Needs</th>
<th>Design</th>
<th>Build</th>
<th>Collect</th>
<th>Process</th>
<th>Analyse</th>
<th>Disseminate</th>
<th>Evaluate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Identify needs</td>
<td>2.1 Design outputs</td>
<td>3.1 Build collection instrument</td>
<td>4.1 Create frame &amp; select sample</td>
<td>5.1 Integrate data</td>
<td>6.1 Prepare draft outputs</td>
<td>7.1 Update output systems</td>
<td>8.1 Gather evaluation inputs</td>
</tr>
<tr>
<td>1.2 Consult &amp; confirm needs</td>
<td>2.2 Design variable descriptions</td>
<td>3.2 Build or enhance process components</td>
<td>4.2 Set up collection</td>
<td>5.2 Classify &amp; code</td>
<td>6.2 Validate outputs</td>
<td>7.2 Produce dissemination products</td>
<td>8.2 Conduct evaluation</td>
</tr>
<tr>
<td>1.3 Establish output objectives</td>
<td>2.3 Design collection</td>
<td>3.3 Build or enhance dissemination components</td>
<td>4.3 Run collection</td>
<td>5.3 Review &amp; validate</td>
<td>6.3 Interpret &amp; explain outputs</td>
<td>7.3 Manage release of dissemination products</td>
<td>8.3 Agree an action plan</td>
</tr>
<tr>
<td>1.4 Identify concepts</td>
<td>2.4 Design frame &amp; sample</td>
<td>3.4 Configure workflows</td>
<td>4.4 Finalise collection</td>
<td>5.4 Edit &amp; impute</td>
<td>6.4 Apply disclosure control</td>
<td>7.4 Promote dissemination products</td>
<td></td>
</tr>
<tr>
<td>1.5 Check data availability</td>
<td>2.5 Design processing &amp; analysis</td>
<td>3.5 Test production system</td>
<td>4.5 Finalise production system</td>
<td>5.5 Derive new variables &amp; units</td>
<td>6.5 Finalise outputs</td>
<td>7.5 Manage user support</td>
<td></td>
</tr>
<tr>
<td>1.6 Prepare business case</td>
<td>2.6 Design production systems &amp; workflow</td>
<td>3.6 Test statistical business process</td>
<td>3.7 Finalise production system</td>
<td>5.6 Calculate weights</td>
<td>5.7 Calculate aggregates</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Post-enumeration/Dissemination**

<table>
<thead>
<tr>
<th>Quality Management / Metadata Management</th>
<th>Analyse</th>
<th>Disseminate</th>
<th>Evaluate</th>
</tr>
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<tbody>
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<td>Analyse</td>
<td>Disseminate</td>
<td>Evaluate</td>
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**v.5.0 Released December 2013**
Workflows

Workflow definition derived from:
Business Process Management Center for Excellence Glossary, 2009
https://www.ftb.ca.gov/aboutFTB/Projects/ITSP/BPM_Glossary.pdf
Workflow

Creating Shared Information and Facilitating Collaboration
Why do we care?

Impact of good workflow design

LEAN
Maximize value

LEAN
Minimize waste

SIX SiGMA
Eliminate defects
Field Operations: In-Situ Data Collection

**Plan**
- Plan, organize, prioritize and assign work

**Coordinate**
- Receive assignments, communicate status and coordinate with others

**Navigate**
- Get where you need to be, optimize your travel routes, use your own data

**Capture**
- Conduct surveys, inspections, collect new information and document status

**Monitor**
- Monitor the progress and effectiveness of your field operations

**Understand & Communicate**
- Ensure data quality and integrity, make better decisions

ArcGIS
Considerations: In-Situ Field Data Collection

- People
- Hardware
- Software (Ease of Use)
- Connectivity (Access)
- Training
- Security
- Time Management
- Device Management
- Database Management

DATA QUALITY

Accurate & Authoritative
Collection | Lots of Devices
Collection | Lots of Apps
Considerations: In-Situ Field Data Collection

- Other Challenges…
  - Project accuracy requirements
  - Sample Size needed
  - Network availability
  - Desired basemap for collection
  - Datum transformations
  - …..
Field Operations
In Situ Data

Plan
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Field Staff Hierarchy

What are appropriate Staffing Ratios?

Local Supervisor to Field Manager: X:X

Enumerator to Local Supervisor: X:X

Field Enumerators

Local Supervisors

Area or Field Manager

Regional Manager
A Dive into Territory Planning with GIS (Geographic Information Systems)

By: Wolfgang Hall, whall@erc.com

Effective territory planning and optimization is critical for many businesses. Almost every organization that uses field crews for sales, services, or deliveries has a need for organizing field staff into territories or regions.

Well-defined territories increase efficiency, response time, and customer satisfaction while cutting costs.

Territories can be either loosely defined or based on fixed geographical areas, such as postal codes. Work within territories can be different every day or make use of pre-planned, repeating routes. Some of the customer locations may require recurring weekly or monthly visits.

This story map tutorial will explore how these different types of territories can be created and optimized using GIS. The typical process includes two main steps:

1. Territory Assignment: assigns customer locations to balanced territories
2. Territory Scheduling: schedules varying daily routes to customer locations
Apps for the Field

- Collector for ArcGIS
- Survey123 for ArcGIS
- Drone2Map for ArcGIS
- Navigator for ArcGIS
- Workforce for ArcGIS

(esri logo)
Apps for the Field

Coordinate

Workforce for ArcGIS
Navigator for ArcGIS
Collector for ArcGIS
Survey123 for ArcGIS
Drone2Map for ArcGIS
Apps for the Field

Navigate

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Apps for the Field

Capture

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- Survey123 for ArcGIS
- Drone2Map for ArcGIS
- Workforce for ArcGIS
- Navigator for ArcGIS
Coordinating field to office workflows

- Field workforce optimization
- Efficiently plan and assign work
- Receive assignments and report status from the field
Coordinate

- View and complete work assignments
- Organize your work list
- Receive notifications
- Set your working status
- Add and edit notes
- View referenced attachments
Create new work assignments
- By Geocode
- Using the Map
- From features
- Automatically

Assign, re-assign and cancel work
- Individually
- In bulk

Filter and sort assignments

View all mobile workers

Search the map
Work Assignments

• Properties of a Work Assignment
  - Status, Due Date, Priority, Assignee, Type

• States
  - Unassigned, Assigned, In Progress, Paused, Completed, Declined
  - Date/Time stamps

• Priorities
  - None, Low, Medium, High, Critical*

• Attachments
  - Documents, Pictures
Workers

- Dispatchers and Mobile Workers
- Worker Details
  - Contact Number, Title, Notes
- Worker Status
  - Working, On Break, Not Working
- Worker Location
  - Current Location, Location Tracks
Get to assigned work

- Integrated with ArcGIS Apps so you can:
  - Get to the location of work assignments using Navigator for ArcGIS

Open Navigator and create a route

Return to Workforce at destination
Collect at location

- Integrated with ArcGIS Apps so you can:
  - Get to the location of work assignments using Navigator for ArcGIS
  - Complete your work using:
    - Collector for ArcGIS

Open Collector and go to location

Return to Workforce when finished
Collector for ArcGIS

Map Centric Data Collection

High Precision

Works offline
Survey at location

- Integrated with ArcGIS Apps so you can:
  - Get to the location of work assignments using Navigator for ArcGIS
  - Complete your work using:
    - Collector for ArcGIS
    - Survey123

Return to Workforce when finished

Open Survey123
Survey123 for ArcGIS

Form-centric Data Collection

Smart Forms

Works Offline
Operations Dashboard

Real-time monitoring

Key Performance Indicators

Workforce
Location Platform Can Support All Phases…

- Enumerators
- Field Management
- Directorate Operations
- Communities & Partners
- Public Communications
- Research & Analysis
- GIS Analysts, Cartographers, Statisticians and Business Analysts
Collection of Apps

- Collector for ArcGIS
- ArcGIS Maps for Office
- Esri Story Maps
- GeoPlanner for ArcGIS
- Drone2Map for ArcGIS
- Esri CityEngine
- Esri Maps for SharePoint
- ArcGIS Pro
- Insights for ArcGIS
- Workforce for ArcGIS
- ArcGIS Maps for Adobe Creative Cloud
- Configurable Apps
- Esri Business Analyst
- ArcGIS Open Data
- Photo Survey
- Operations Dashboard for ArcGIS
- ArcGIS Earth
- Quick Report
- Esri Community Analyst
- Crowdsource Reporter
- AppStudio for ArcGIS
- Explorer for ArcGIS
- ArcMap
- Survey123 for ArcGIS
- Navigator for ArcGIS
- Web AppBuilder for ArcGIS
- Crowdsource Manager
- Crowdsource Polling
- More…
Understanding the World with Statistics

Applied: Ebola Outbreak Response
West Africa

Dissemination: Open Data
National

Applied: Potential Zika Virus Areas
US

Applied: Commuting Patterns & Pollution Levels
London

Applied: Green Infrastructure Planning
New Orleans

Applied: Access to Healthcare
Milwaukee

Applied: Poverty Levels
Denver, CO
Story Maps

Everyone has a story to tell. Harness the power of maps to tell yours.