

Efficiency Analysis through Geospatial Location Evaluation (EAGLE)

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Background

- Westat has been conducting studies with geospatial data since the 90's, initially focused on data collection
- Concentration on operations management and quality assurance began in 2003
- Technology refreshment has been constant, moving from GPS to broad-based location services
- Tools for data visualization and processing of large datasets have advanced

Historic Evolution

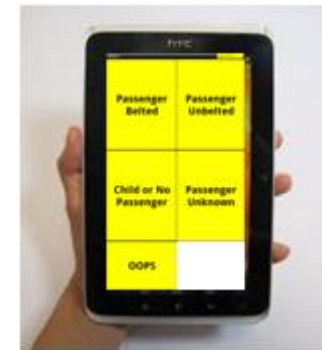


1999
Mobile Clipboard



2003

- GPS
- Data Card
- Spare Batteries
- etc.



2012
Integrated components

Westat Focus for use of GPS

Improvements in:

- Falsification Detection
 - Reduced time to discovery in field management and operations
 - Level of effort associated with identification and remediation
- Efficiency in field operations (in process)
 - Reduced level of effort for data collectors
 - Accuracy of time and expense capture tied to specific data collection activities
- Case Study: GPS offers a quick, inexpensive way to detect falsified interviews across 100% of the sample

Background on Detecting Falsified Interviews in Face-to-Face (FTF) Surveys

Approaches:

- Traditional: short telephone re-interview
 - May be supplemented with FTF re-interviews
- Paradata: identify “suspicious” cases
- CARI: increasingly used as first, least costly method

Recent Literature:

- Some evidence that falsification rates are increasing for new interviewers; very costly to “repair” falsification
- Report of one attempt to use GPS data to detect falsification in 2014

Methodologic Alternatives

- Incorporate GPS logging on interviewer laptops
 - Leverage GPS hardware on selected PC devices
Establish GPS logging rules that operated independently of field collection tools and instead worked based on detected movement by processing the collected GPS data
 - Piggy-back on existing data transfer services
 - Extend existing database used for field operations
- Use dedicated mobile application
 - Enables capture of key events, as well as travel
 - Can be integrated with online services for near real-time data updates

EAGLE System

- Web app built using modern design principles
 - Leverages open source components for mapping and spatial data handling
 - Aggregates data from multiple sources to support geospatial visualization and exploration

EAGLE Server Technology

- Database design to support GPS volume
 - GPS point data is summarized at the “file” level
Corresponds to data uploads from field devices
 - Summarization includes information about the spatial and temporal bounds of GPS data in “file”
- Server process to import GPS data and event log files into database
- Tool that monitors field operations database and updates the visualization database as, needed

Case Study: Falsification Detection

Identify suspect cases

- Through outlier reports

- Other quality control efforts (e.g., CARI review, phone, or review of data)

Review GPS Data

- Location of the GPS points in proximity of sampled address/person

- Time when data were collected compared to the GPS point at the same time

- Location of Data Collector's home

Results

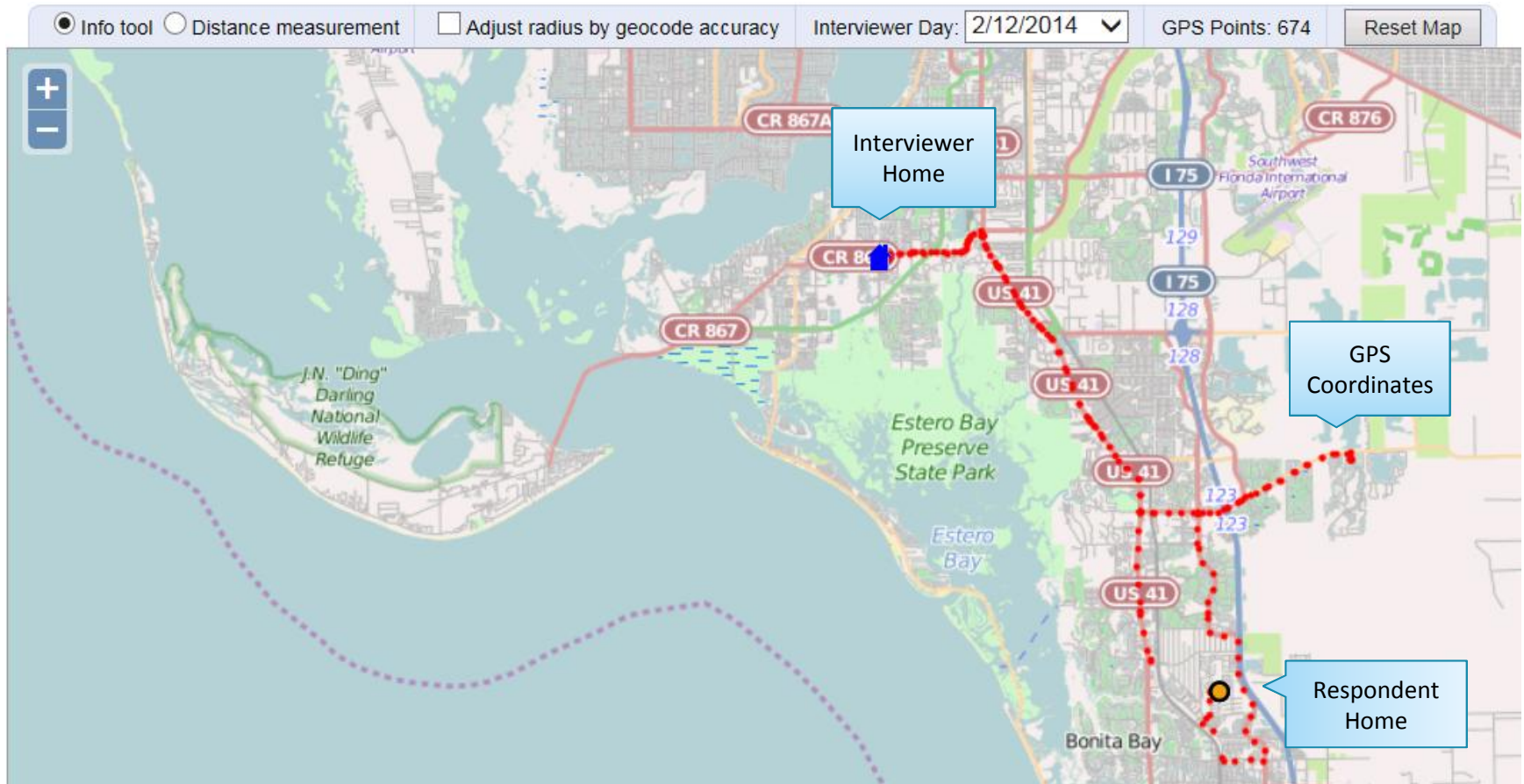
- Alert to the need for more labor-intensive verification efforts (e.g., CARI review, phone or in-person verification)

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- Results
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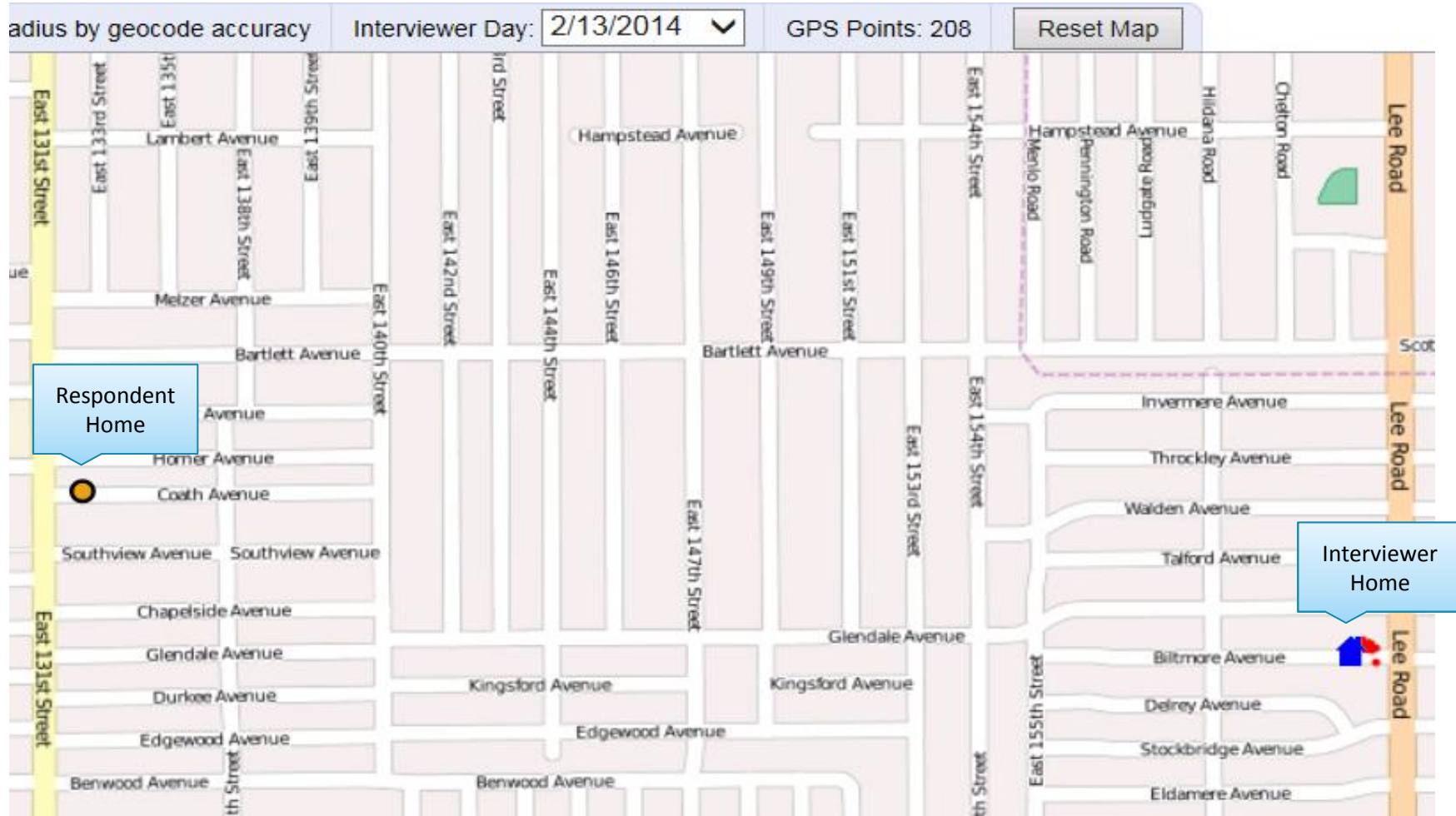
EAGLE Visualizer

Confirmed Route



EAGLE Visualizer

Falsification



Conclusions

- Use of geospatial information succeeded immediately in reducing the time to discovery and level of effort associated with falsification detection
- Evaluation of other goals (efficiency improvements) are now in progress, but are promising
- Our data exploration and visualization tool combining geospatial information and study activities is a valuable asset for projects