Current Trends in Mobile Technology for Survey Research

Presented by Nathan Sikes,
RTI International

History of Mobile Surveys at RTI

- RTI involved in projects domestically and internationally since 1999 using mobile devices
- Comprehensive experience in survey data collection using mobile devices conducting over 3 million mobile device interviews
- Collect individual and public health data
- Interface with remote sensors
- Administer surveys in multiple languages
  - Global Adult Tobacco Survey (GATS) supports 30 languages and multiple character sets

Industry Norms in Mobile Surveys

- Two Types of Data Collection in the Mobile Environment
  - Field Interviewer (FI)-based
  - Respondent-based

- Survey Data Collection – ***Mostly FI-based***
  - Forms-based systems
    - Data Stored on the Device with Periodic Collection
  - Web-based systems
    - Real-time/Immediate Data Collection with Wi-Fi or Cellular Connection
- Case Management Systems
- Informed Consent Administration

Extending the Mobile Survey Model

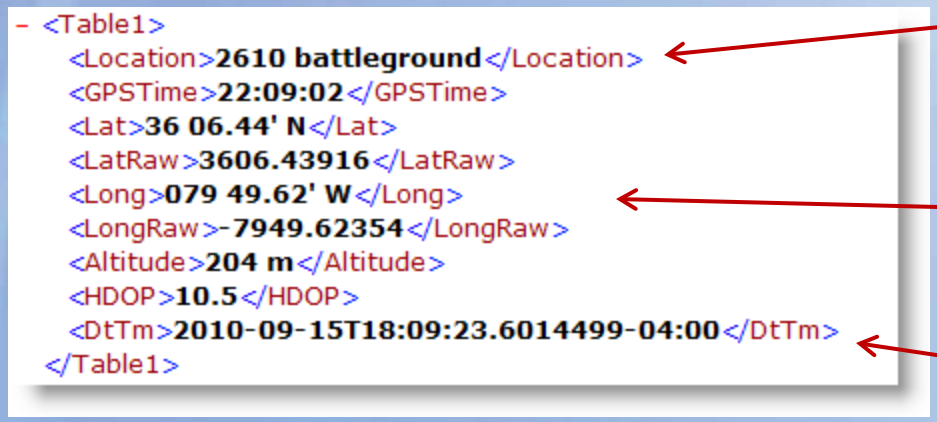
- GPS Navigation for FIs (Interacting with the Mobile CMS)
- GPS Tracking and/or Verification of Cases
- Environmental data collection
  - Sensors for temperature, humidity, particulates, chemicals
- Personal health data collection
  - Sensors for heart rate, respiration, blood glucose, stress
- Interactive Personal Diaries (text and voice)
  - Momentary logging of diet, activity, location, and stress
  - Sensors can trigger mobile devices to personally interact with respondents and record answers to questions.

Accessories Enhance Data Collection

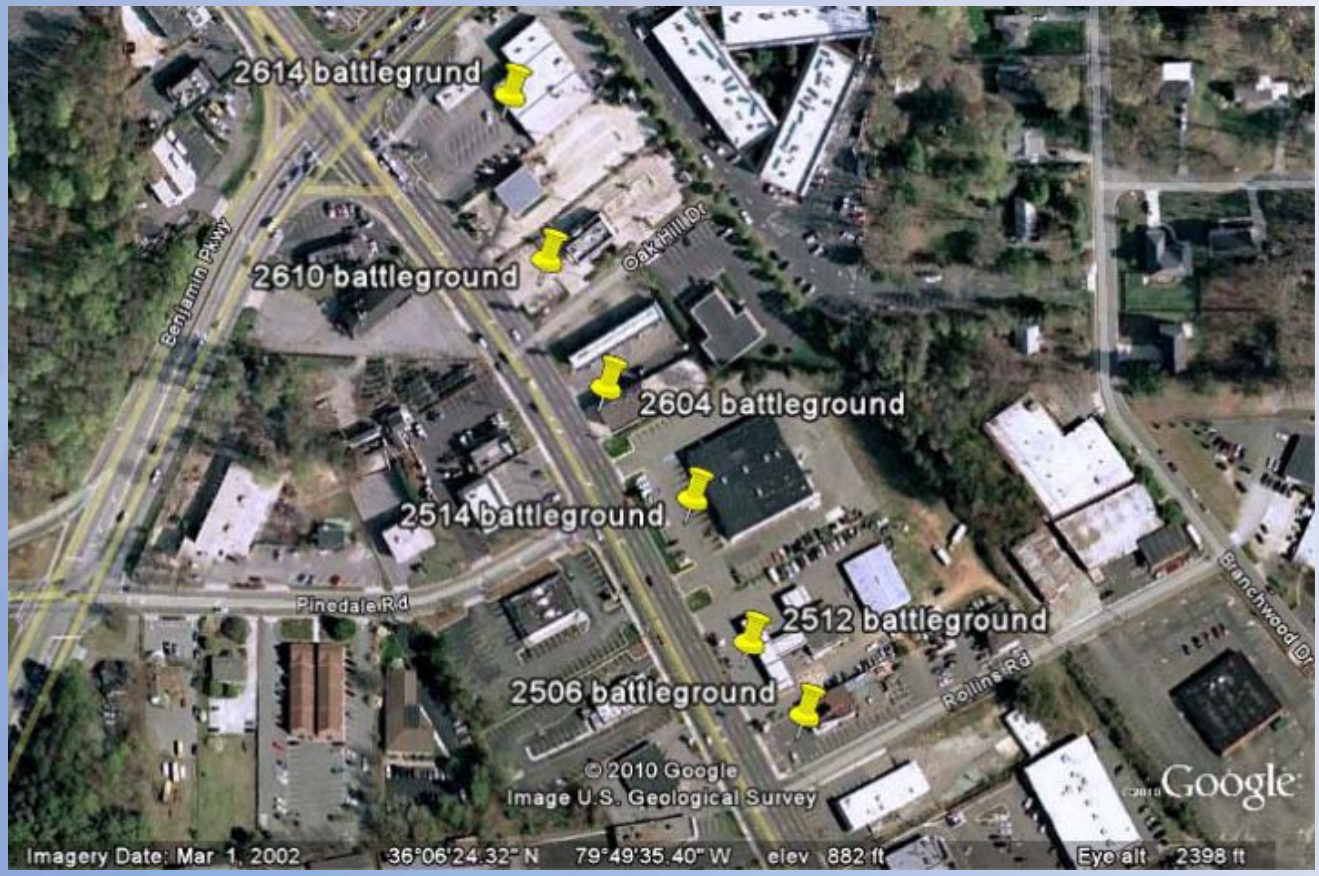
- A wide variety of sensors are available on the market and can interact with most any mobile device.
  - Cardiac pulse monitor
  - 3-Axis Accelerometer
- Bluetooth “beacon” devices
  - Room Monitors (Indoor Tracking)
  - Weight Scales
- Built-in components
  - GPS Device
  - Camera
  - Video Player

GPS Example: Interview Verification

- A GPS antenna attached to or inside a mobile device can be used to verify that an FI actually conducted the interview at the time and place they said they did.
- The GPS records on the mobile device:



Software Captures GPS Coordinates



GPS Points are captured and descriptions are entered by the Case Management System or Field Interviewer

Use of Google Earth for Comparison and Verification

GPS Point captured by the CMS or Field Interviewer

Google Earth Address entered by Case Verifier

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Potential Uses of GPS in Field Operations

- **Outliers Report**
  - Compares distance between GPS Coordinates captured by (FI) and the actual interview address.
  - Compares time of GPS Capture with the Interview Start Time.
- **Verify ABS-selected Dwelling Units are In-Segment**
  - Current non-GPS-related procedures are prone to FI locating abilities and human error.
  - GPS data would provide additional or certain confirmation that SDUs are within Census block.
- **Monitor FI movement** by passive receipt of GPS data.
  - (i.e., path of travel and efficiency of SDU contacting)

Challenges for Mobile Surveys

- **Multiple**
  - Platforms
  - Operating Systems
  - Devices
  - Formats
  - Development Environments
  - Programming Languages
- **Data Transfer Cost** (Monthly Cellular Plans)

Solutions to Consider

- One Study – One Device Type
  - Useful for FI-administered instruments
- Mobile Web Applications
  - Allow all web-enabled devices to access a website devoted to mobile devices
- Cross-Platform Development Software
  - Example:
    - **PhoneGap** (JavaScript, open source, free, runs on most platforms)
  - Some cross-platform development software addresses two or more platforms, not all.
- Connect to existing Wi-Fi or Broadband for Data Transfers

Leveraging Investments in Legacy Systems

The Lenovo Multi-Touch IdeaPad, as an example, folds and converts from a **Laptop PC to a Tablet with a Touchscreen**.

- Years of Legacy Software developed for your Field Operations in the Microsoft Windows Environment can be implemented on this type of device.
  - Blaise, Other Instrument Software, Field Management Systems, Case Management Systems, CARI, etc.

Software Platforms Compared

Vendor	Platform	Programming Language/ Development Environment	User Interface	Security	Distribution
Google	Android	Java / Windows, Mac, Linux, Android Devices	Very Good	Requires third-party tools	Easy
RIM/ Blackberry	Blackberry OS	Java / Web-based development	Very Good	Leads the industry	Easy
Apple	iOS	Objective–C / Mac	Excellent	Trying to catch up	Very Controlled
Microsoft	Windows Mobile 7	C# or VB / Windows	Very Good		Lack of Support

Mobile Device Spectrum Availability

Vendor	Smart Phones	Tablets	Laptops	Netbooks
Google	Many 	Many 	✕	Few 
RIM/ Blackberry	Few 	One 	✕	✕
Apple	One 	One 	One 	✕
Microsoft	Few 	Many 	Many 	Many 

Windows 7

2011 Smartphone Statistics*

- 65.8 million people in the U.S. own a Smartphone as of January 2011.
- For respondent-based instrument development consider the following:

Vendor	Market Share %
Google/Android	31.2
RIM/Blackberry	30.4
Apple	24.7
Microsoft	8.0
HP/Palm	3.2

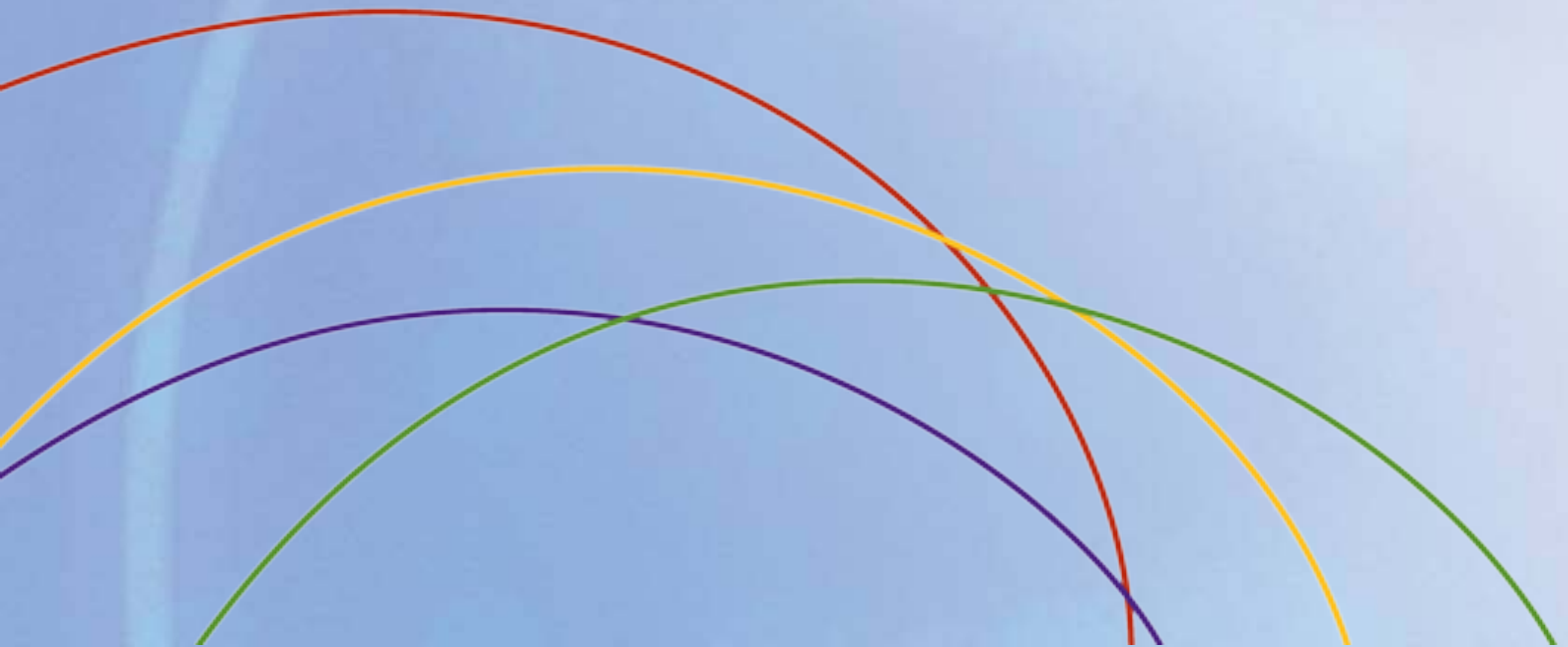
* Source – comScore, Inc. - **March 7, 2011**

Conclusions

- Google and Rim/Blackberry
  - Successful Open-Source environments
  - Android runs on multiple size devices
- Apple Platform
  - Not Open-Source and distribution is very controlled
- Windows Phone Platform
  - Not Open-Source and distribution is very controlled
- Windows-based Netbooks and Laptops
  - Allow Legacy software to be retained and reused

"What's going to happen and how technology is going to change our lives during the next 10 years is going to make the last 50 look like we were at a standstill."

- Robert Stephens, Best Buy, CTO and founder of Geek Squad



More Information

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