Recent Innovations in the General Survey System (GSS):

A Mobile Technologies System for Collecting and Managing Study Data

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Today's Presentation

- GSS Overview
- Technologies
- Point of Purchase Study (Vietnam)
- Recent Innovations
    - GPS
    - Enumeration and Selection
- Lessons Learned and Next Steps

General Survey System – GSS

– Developed by RTI for US surveys using mobile devices, now in use globally

– Components:
  • PC Developers Environment (IDE)
  • Handheld system

– Forms-based system that allows users to develop forms and logic to manage data capture process

– Extendable

GSS Survey Use

- In production for 5+ years

- Used to conduct 200,000+ interviews

- More than a dozen countries in 30 languages for numerous varied study applications

- Continues to evolve based on study requirements

GSS Study Use – various projects

- A Commercial Survey of Hispanic households
- ANES: American National Election Study
  - Time Series Election Study on voting behavior and public opinion
- Vietnam Point of Purchase
- Hatteras Visitor Intercept Survey
- PFILES (EPA)
  - Health Assessments and Food Diary
- Welcome to USA

GSS Study Use – various projects

- GATS: Global Adult Tobacco Survey

  - A partnership of CDC, CDCF, WHO, JHSPH, and RTI

  - Global survey of adult tobacco use (prevalence) – part of a larger GTSS surveillance system

  - Since 2008, surveys in Bangladesh, China, Egypt, India, Mexico, Philippines, Poland, Russian Federation, Turkey, Ukraine, Uruguay and Vietnam

Hardware and Software for Data Collection

- Hardware
  - Windows Mobile devices (Pocket PCs/PDAs)

  - PC (Windows): for software development and processing

- Software
  - RTI's General Survey System (Windows and Windows Mobile based)

HP iPAQ 210

GSS Software Development Features

PC based development software:

- Questionnaire programming ('Designer')

- Language support

- System configuration and setup – at data collection site(s)

- Data File construction for use in Analysis

GSS Use

Highly Mobile Data Capture system

•Household doorway screening and interviewing

•Vendor listing and vendor surveys

•Intercept surveys

•Hospitals surveys

•Inventories

WHO, Bangladesh

Capabilities

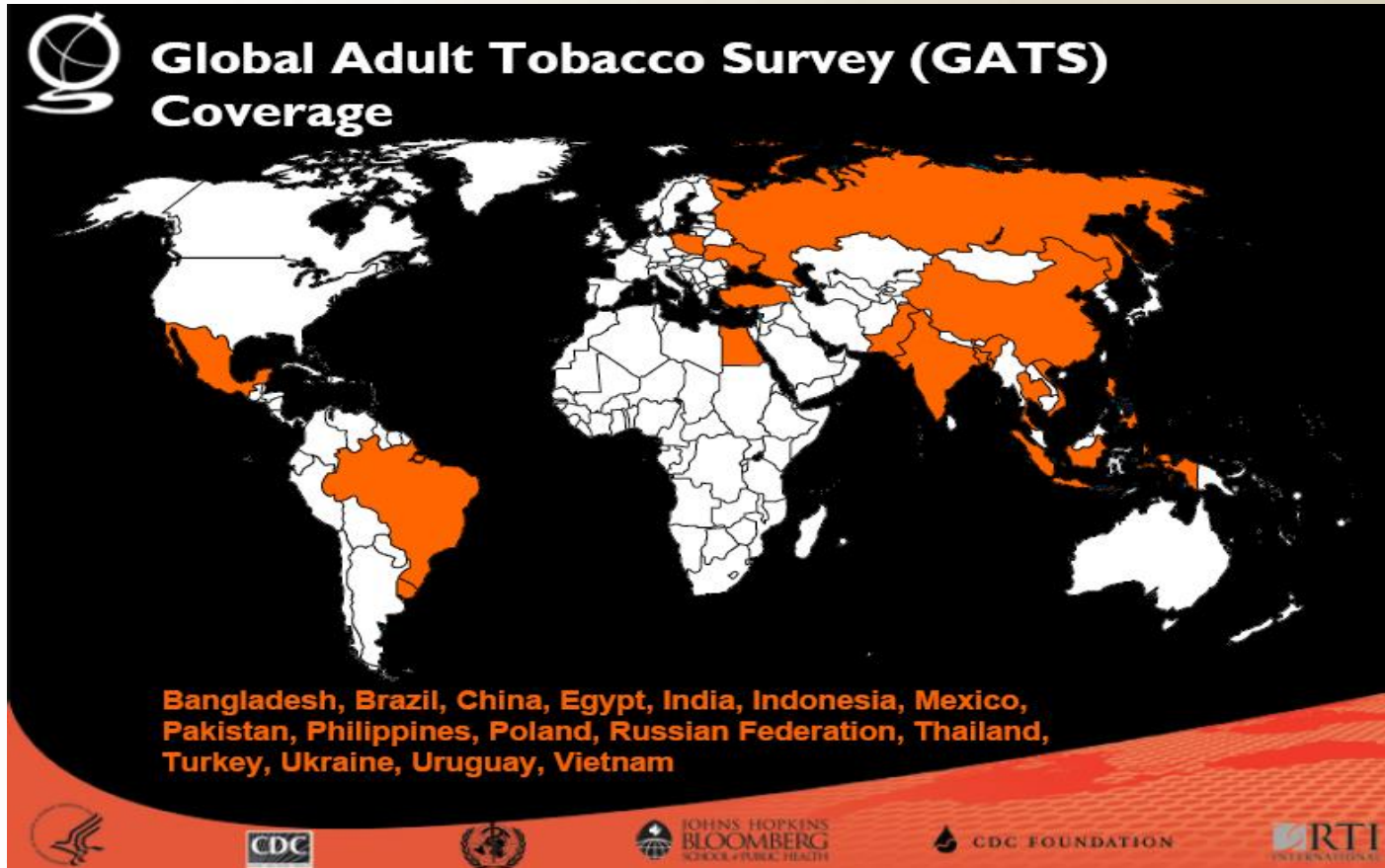Developed in Microsoft Visual Basic.net and supports

- a wide variety of data types, range and validity checking
- GPS capture
- dynamic sample selection in real time
- complex data capture logic and sequences
- case management and status recording
- large capacity data storage

Capabilities (cont)

- a PC-based developers environment: for instrument development and data processing

- data file generation: usable by statistical software

- internationalization: supports multiple languages and complex Unicode fonts (e.g., Arabic, Russian, Mandarin)

Global System Use

Vietnam Point of Purchase Project (VPOP)

- Purpose: Collect point of purchase sales baseline data for countries that have signed the WHO Framework Convention on Tobacco Control. Pilot in Vietnam.

- Collaboration between RTI, JHU School of Global Public Health, Hanoi Medical University, Vietnam General Statistical Office

- Key info/Research questions:
    - **Density of Sales, pricing, where and how much is being sold, industry presence, advertising**
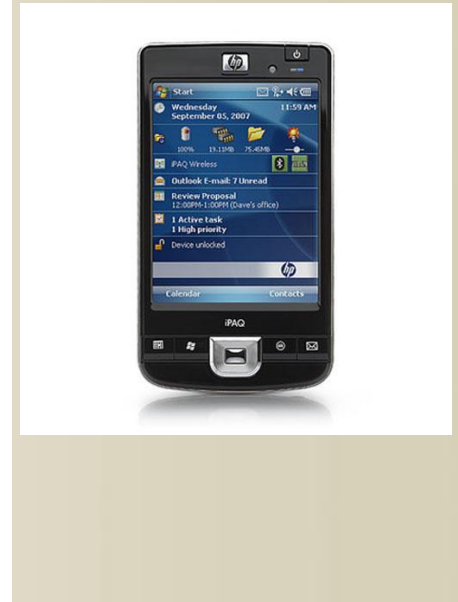
Handheld Equipment

- **HP iPAQ**—handheld computer

- **SD card**—inserted into the iPAQ and stores data

- **GPS Receiver**—connects to the iPAQ and used during enumeration

Survey System Implementation Steps

1. Questionnaire Design and Programming

2. Data Management (Transfer and Aggregation)

3. Data Processing

Questionnaire Design and Development

Development Environment

- PC Windows based development system
  - Uses MS Access databases to store metadata

- Visual developers environment for preparing questionnaire files

- Converts MS Access database files to the Windows CE compact SQL format (SDF) for use on the handheld

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GSS Developers (IDE) Main Menu

File   Survey | Up   Down   Next   GoTo   Copy   Add   Delete | Save   Refresh   Preview   Cancel   Gats Designer Tool Version: 1.3.3522.13210

Seq #	Quest ID
00010.0	Start
00020.0	Consent1
00030.0	Consent2
00040.0	Consent3
00050.0	Consent4
00060.0	Consent5
00070.0	Consent6
00080.0	IntLang
00090.0	A00
00100.0	A01
00110.0	A02a
00120.0	A02b
00130.0	A03
00140.0	ValidateAge
00150.0	A03a
00160.0	A04
00170.0	A05
00180.0	A05a
00190.0	A06a
00200.0	A06b
00210.0	A06c
00220.0	A06d
00230.0	A06e
00240.0	A06f

Question Properties   Ver.: 2009 08 27 011   C:\Gats_Folders\Survey_DBs\GATS_Survey1.mdb   Help

Sequence #   160   Question ID   A04   Roster #   0

Question Type   LIST   Next Question   A05   Roster Col.   0

Answer Set   EDUCATION   Low Range ___   Loop Start ___

                                       High Range ___   Loop End ___   Loop GoTo ___

Question Help Text _____

Question Text   Help

Language 0   English   Language 1   MANDARIN

What is the highest level of education you have completed?   您的最高学历是什么？

[SELECT ONLY ONE CATEGORY]   [仅仅选择一个类别]

Answer Texts   **EDUCATION**   Help

Seq.	Code	Text		Seq.	Code	Text
1	1	NO FORMAL SCHOOLING		1	1	文盲半文盲
2	2	LESS THAN PRIMARY SCHOOL COMPLETED		2	2	小学未毕业
3	3	PRIMARY SCHOOL COMPLETED		3	3	小学毕业
4	4	LESS THAN SECONDARY SCHOOL COMPLETE		4	4	初中未毕业
5	5	SECONDARY SCHOOL COMPLETED		5	5	初中毕业
6	6	HIGH SCHOOL COMPLETED/TECHNICAL SECO		6	6	高中/中专
7	COLLEGE/UNIVERSITY COMPLETED		7		大专及本科

Special Instructions   Help   **Skip or Compute Logic**   Help

TextFSize=(08,10);

File   Survey | Up   Down   Next   GoTo | Copy   Add   Delete | Save   Refresh   Preview   Cancel   Gats Designer Tool Version: 1.3.3522.13210

Seq #	Quest ID
00010.0	Start
00020.0	Consent1
00030.0	Consent2
00040.0	Consent3
00050.0	Consent4
00060.0	Consent5
00070.0	Consent6
00080.0	IntLang
00090.0	A00
00100.0	A01
00110.0	A02a
00120.0	A02b
00130.0	A03
00140.0	ValidateAge
00150.0	A03a
00160.0	A04
00170.0	A05
00180.0	A05a
00190.0	A06a
00200.0	A06b
00210.0	A06c
00220.0	A06d
00230.0	A06e
00240.0	A06f

Question Properties   Ver.: 2009 08 04 006   C:\Gats_Folders\Survey_DBs\GATS_Survey1.mdb   Help

Sequence #   120   Question ID   A02b   Roster #   0

Question Type   NUM   Next Question   A04   Roster Col.   0

Answer Set   NONE   Low Range   1900   Loop Start

High Range   2000   Loop End   Loop GoTo

Question Help Text

Question Text   Help

Language 0   English

What is the year of your date of birth?

[IF DON'T KNOW, ENTER 7777
IF REFUSED, ENTER 9999]

Language 1   MANDARIN

您的出生年份？

[如果不知道，输入"7777"
如果拒答，输入9999]

Answer Texts   NONE   Help

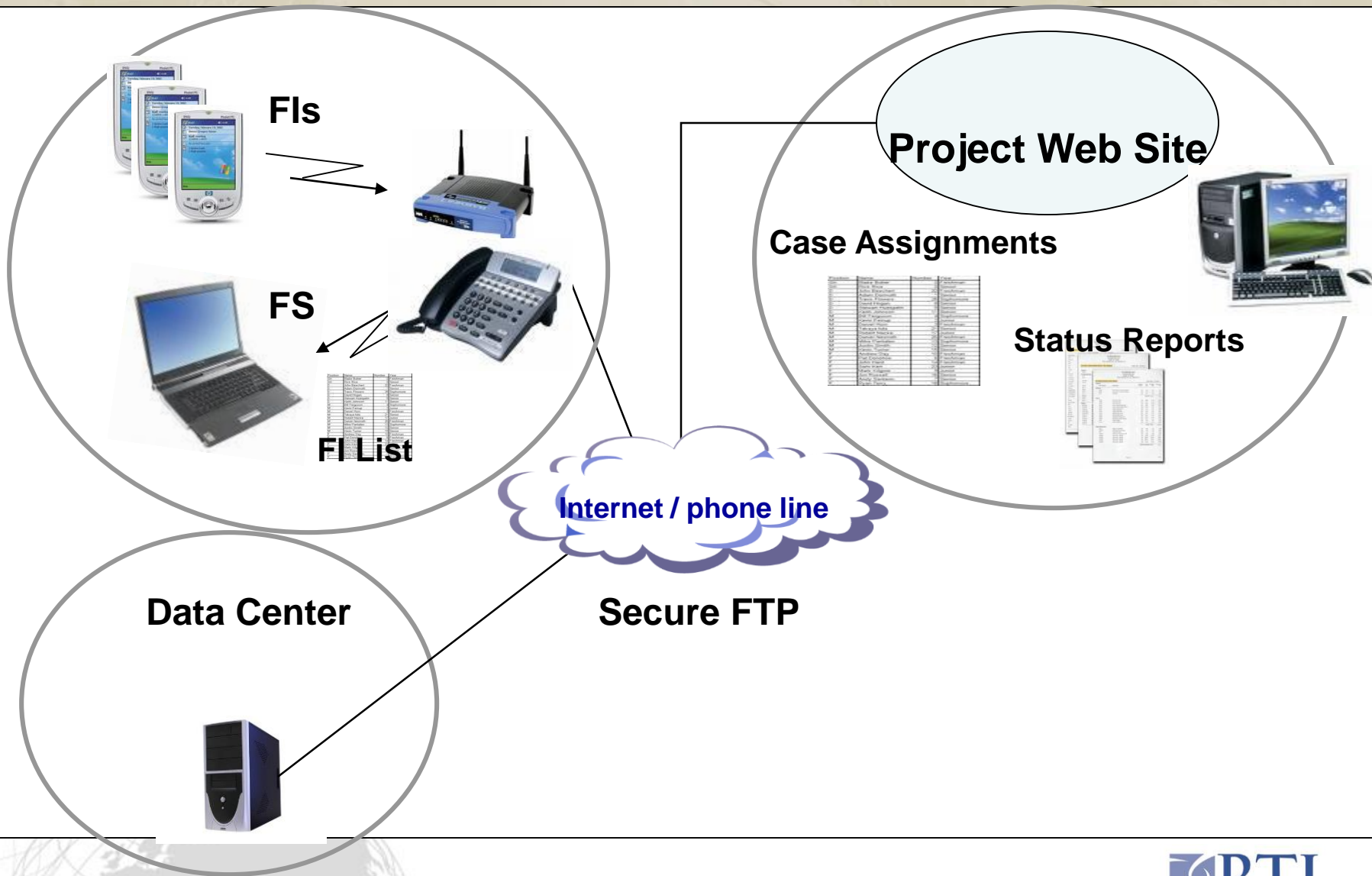**Special Instructions**   Help

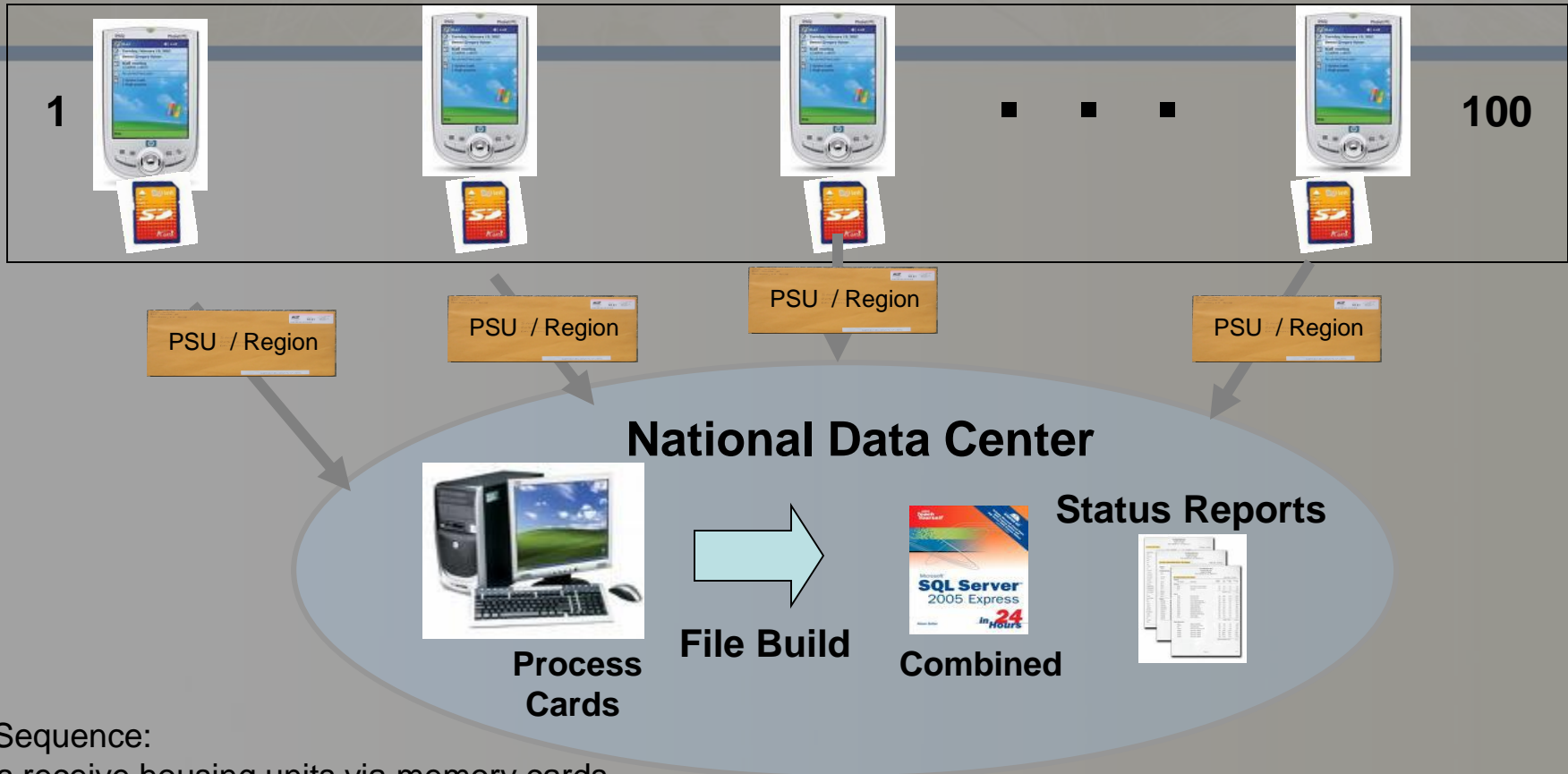DKRE,Integer,RngInclude=7777;9999;

Skip or Compute Logic   Help

if {A02a} = "77" or {#A02b} = 7777 or {A02a} = "99" or {#A02b} = 9999 then goto A03;
set {HH4c} = {A02a};
set {HH4cYear} = {A02b} ;
call ValidateBDay;

Data Management:
Transfer and Aggregation

Data Management: Web-based

FIs

FS

FI List

Project Web Site

Case Assignments

Status Reports

Data Center

Internet / phone line

Secure FTP

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Data Management: Memory card-based, no network or field internet

1 ▪ ▪ ▪ ▪ **100**

PSU / Region
PSU / Region
PSU / Region
PSU / Region

National Data Center

Status Reports

Process Cards → **File Build** → **Combined**

SQL Server 2005 Express in 24 Hours

Sequence:
FIs receive housing units via memory cards
FS collects memory cards, copies to PC at NDC
NDC merges all data, generates status reports

Case Management System - iPAQ

Select Case   5:23

Thu, Jun 25, 2009   Battery: 100%

101 Kenmore Road Apt 1
Chapel Hill, NC 27101

Case ID	Form #	Street Address
121001-00	0	101 Kenmore Road
121001-01	1	101 Kenmore Road
121002-00	0	102 Kenmore Road
121002-01	1	102 Kenmore Road
121003-00	0	103 Kenmore Road

Record of Calls   Kenmore Road

Start Interview   Kenmore Road

Edit Address   Kenmore Road

View Address Changes   Kenmore Road

Case Notes   Kenmore Road

Transmit

Action Admin View Sort Exit

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VPOP Technology Advancements

Relied on Technology:

GPS
- -Field staff area 'locator'
- -Recorded vendor location

Enumeration and Selection
- -Counting and listing of Vendors

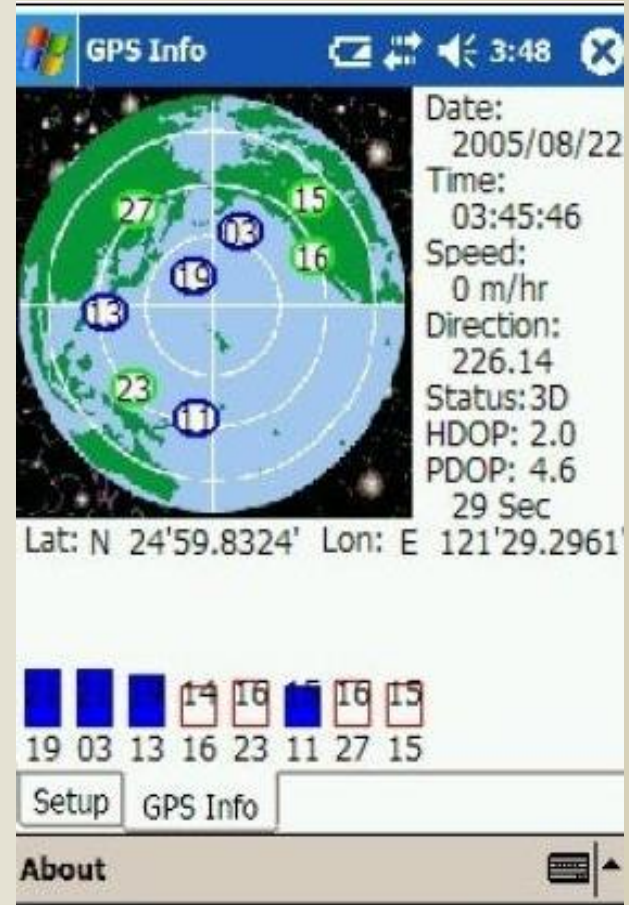- -Dynamic selection for purchases

Hanoi Medical U

GPS

- System outputs Coordinates such as
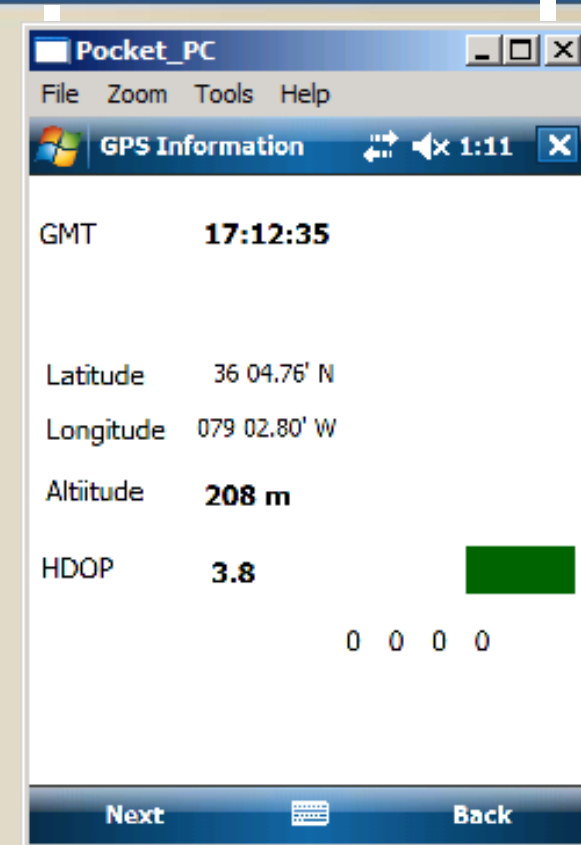 21 02.69' N 105 48.36' E

- For use in maps and analysis

GlobeSat GPS Receiver

GPS Info Program

GPS Capabilities

- GPS position accuracy: 10 meters

- Cold start time of GPS device: 42 seconds

- Warm start time of GPS device: 38 seconds

- Reacquisition time: .1 second

- Altitude can be captured

- HDOP: measure of signal quality: green with HDOP at <= 5

Lessons Learned

- Hardware choice is effective for this kind of survey
  - Good battery life
  - Works well in mobile environments
  - Well received by interviewing staff

- Visual Development Environment needed: Developers Software components was updated to IDE

- Software system is robust and can be taught to interviewers in a few days training

- Data File generation important for reporting and analysis Imports directly into SAS, SPSS, MS Access, etc
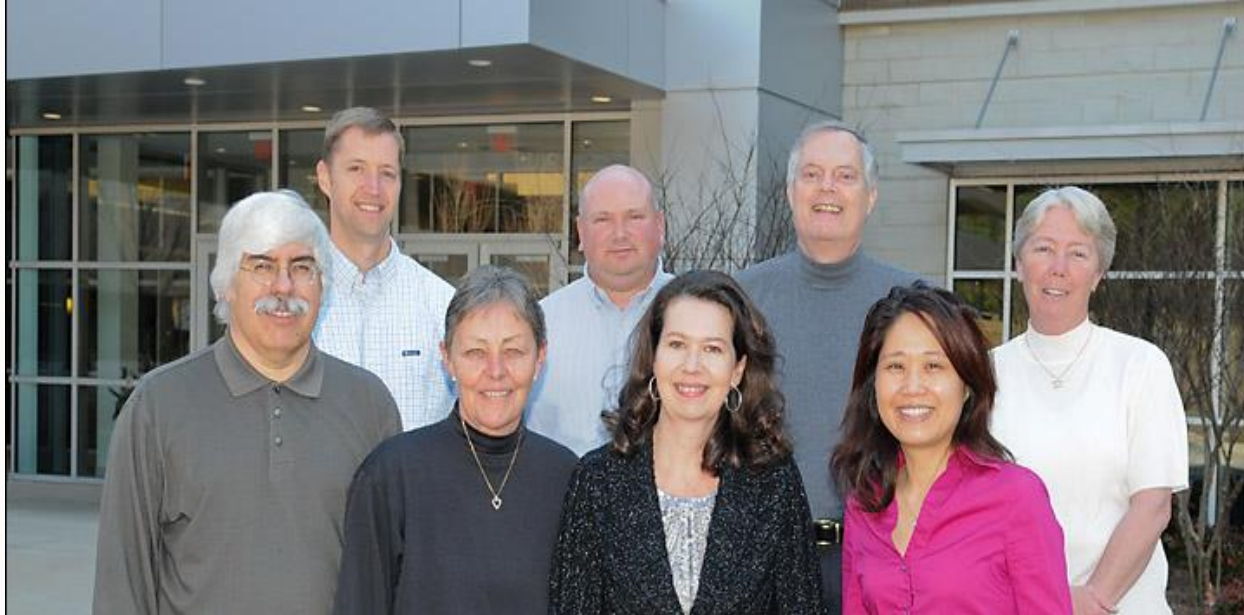
Next Steps

- Look to emerging platforms
  - Smart phones
    - Google Android
    - Apple
  - Cell based data transmission
  - Port to tablet based net books

- More Data Management and processing capability
  - Validations and QC reporting
  - Monitoring reports
  - Documentation

Acknowledgements

GSS Team

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Back Row, Left to Right: Rob Hughes, Steve Litavecz, Jay Levinsohn, Patricia Yost

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