



**Collecting & Using
Geospatial Data in the Field**

A Digital Government Collaboration
ISU UCSB NSF Census BLS USDA USGS

Who is Ibn Battuta?



Why Project Battuta?

- Battuta was a traveller, contributed early, extensively to geography
- We seek to provide the initial foundations for a new paradigm for mobile computer-assisted data collection that broadens the types of data used as critical information resources & as objects of data collection

Research Vision

- To formulate, develop & test an extensible framework that
 - supports flexible & effective use of distributed digital geospatial information resources
 - applies to a broad range of field environments
 - takes full advantage of emerging information technologies

Interdisciplinary Team

- Computer-assisted data collection
Sarah Nusser, Iowa State U
- Digital geographic information resources
Mike Goodchild, U Calif, Santa Barbara
- Emerging technologies for geospatial data
Keith Clarke, UCSB
- Infrastructures for adaptive systems
Les Miller, ISU
- Testbed development
George Covert, ISU

Funding Agencies

- National Science Foundation
- Census Bureau
- Bureau of Labor Statistics
- US Dept of Agriculture
 - NASS, NRCS, USFS
- US Geological Survey

Collaborators

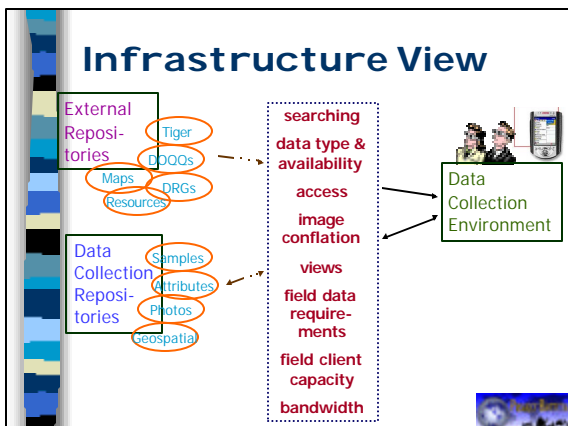
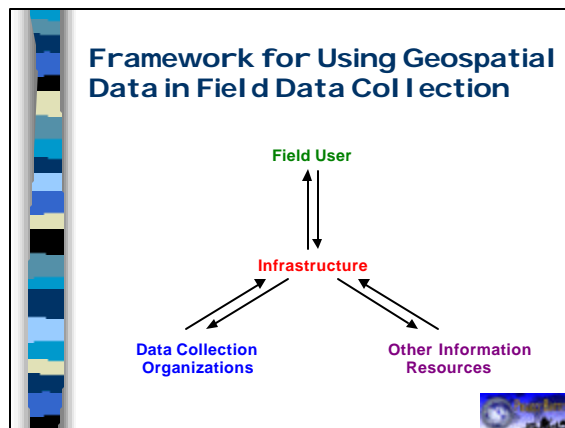
- Mediator technologies
 - San Diego Supercomputer Center
- Mobile computing industrial partners
 - Baker GeoResearch
 - Condor Earth
 - FieldWorker

Year 1 Research

- Initial framework development
- Agent-based infrastructure tools
- Conflation for multiple formats
- Field user perspectives for surveys
- Emerging field technologies
- Testbed development

Framework Developments

- Develop framework with cooperating agencies
 - Information technology environments
 - Data collection settings
 - Strategies for extensibility
- Create scenarios to illustrate strategies for different IT/field environments
- Identify integration areas among research components




Infrastructure Research

- Agent-based search & retrieval
- Views
 - Field adaptation of views
 - Extending object/XML views to support geospatial data
 - Integration of ontologies, views, & agent-based retrieval
- Object-based warehouses for geospatial data


Conflation Research

- To improve field data collection, use wireless technologies & digital libraries to:
 - Access what is already known about an area
 - Add new information
 - Upload the enhanced information to databases and archives, and make it available over the WWW


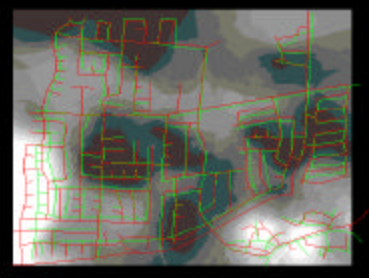


What is conflation?

- Geographic information from various sources must be merged & compared in the field
 - Very limited hardware & software environments
 - Registration problems
 - Merging any combination of raster and vector data




Vector Conflation





Towards a general approach to conflation

- Between all data types (raster and vector)
- Dealing with all types of disagreement (positional, semantic)
- Running in very small field devices
- Different objectives when combining
 - average, pick the best, remove differences





Using Geospatial Data in Mobile Survey Environments

- Geospatial information usage in mobile survey setting
 - Appropriate materials, interfaces, tools for a given task
- Geospatial information capture
 - Collecting geospatial information via annotation, GPS
- Extensions to emerging technology environments



Field Experiments

- Natural resource surveys
 - Locating unmarked field points
 - Orientation/route planning, navigation, identifying target
 - Role & effectiveness of alternative geospatial info resources (GPS, visual, text)
- Establishment & human pop surveys
 - Locating outlets & housing units
 - Screen interface, data format




Emerging Field Technologies


- Research & select appropriate technologies for the field
- Prototype development
 - ArcPad, HP Jornada Pocket PC, Garmin e-map GPS
 - Add Twiddler keyboard (one hand) & cell phone web link



Emerging Field Technologies




- Future prototype developments
 - Migrate to MicroDisplay in-glasses display
 - Accelerometer-based local positioning
- Conduct user interface experiments
- Experiment with interface
 - voice-in
 - sound and images-out




Testbed Development

- Research activities generate
 - Prototypes
 - Application scenarios
 - Knowledge
- Testbed goals
 - Integrate knowledge, prototypes
 - Demo & get feedback on framework & research via application scenarios



Cross-cutting Questions

- If computing can occur anywhere, where should it occur?
 - What functions should be performed in the field, the office, headquarters, etc.
- How can agencies exploit these new technologies?
 - What is the future of the field office?
- How can we work with the vendors to improve availability?



Contact Information

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PROJECT BATTUTA

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