Common Ground in Geocollaboration

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### Common Ground in Geocollaboration

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**Abstract**:

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**Subject Terms**:

Collaboration, Knowledge Management, Geocollaboration
Project Objectives

- Investigate a collaborative workspace that provides:
  - multiple role-specific views and team view
  - geo-spatial planning task

- Integrate research from Information Visualization and Computer-Supported Cooperative Work
- Prototype for geo-collaborative tactical operations planning; use our open-source collaborative infrastructure
- Define measures for evaluating common ground in experimental settings
- Articulate relationships between common ground and other computer-supported collaboration constructs
Research Question

• How can collaborative construction of a geo-spatial plan visualization ameliorate problems of too much and too little common ground?

• Approach:
  – Obtain and edit real/realistic map content
  – Design and implement experimental task
  – Implement collaborative map interactions
Outcomes


Common Ground Experiment

Role-specific map-views
Complementary knowledge
Team view is constructed jointly
Multiple views design

- Three users, each with specific role
- Each user sits at a separate computer
Multiple View Issues

• How do users share information using maps?
• How do they stay aware of others’ actions and references?
• What features are available with each view? (navigation, query, annotation)
• How do you coordinate actions across views?
Geocollaboration

- Geocollaboration: How can people collaborate with map software?
- Numerous design decisions
- Existing software tools make different choices
BRIDGE Collaborative Map

- Users add spots to map and link to other content
Toucan Navigate
(www.infopatterns.net)

- Navigation controls for working alone, following, or leading
Geocollaboration Architecture

• Geocollaboration Software Architecture
  – Based on a survey of existing map tools
  – Supports a variety of geocollaboration features

• Software offers:
  – Toolkit for developing geocollaboration applications
  – Support for using multiple features in combination
  – Sandbox for developing new features
Architecture Development

• Open-source development project
• Integrates two existing software toolkits:
  – CORK: collaborative infrastructure, replicated objects
  – GeoTools: GIS toolkit, standards compliant
• Focus on reusable and extensible objects
| Geocollaborative BRIDGE Tools |  |
|-------------------------------|  |
| **Shared User Activity** | **Shared Geographic Map** |
| Shared History (BRIDGE) | Shared Geospatial Data: Shapefiles, User-Created Data, Styles |
| Shared Cursors |  |
| Shared Viewpoints |  |
| Collaborative Infrastructure (CORK) | GIS Tookit (GeoTools) |
Reuseable Objects

• Same map data is useful for multiple applications
  – Centre county roads, rivers, and buildings:
    • Emergency management software
    • Underground Railroad research

• Applications require different rendering techniques
  – EM: different road types and lane markings
  – UGRR: major roads, historic building sites
Architecture Class Diagram

User-created content

Standard map data format

Map data paired with styles
Multiple Views Application

- Build views from existing map objects
- Share mouse cursors across maps
Emergency Management Scenario

• Emergency task: plan a rescue for a family stranded by flood

• Three, interdependent roles
  – *Public works* (utilities and roadway infrastructure)
  – *Environment* (floodplains and weather)
  – *Mass care* (shelters/rescuees’ needs and vehicles)

• Roles based on an emergency operations center
Demonstration
Other Features

• Draw annotations, pass across views
• Align viewports
• Synchronize team view navigation
Comments, Questions, Suggestions? Thanks!

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