



Introduction to the Symbology Standardization Support Project

Presentation for the Homeland Security Working Group

June 4, 2009

Alan M. MacEachren, Anthony Robinson, Rob Roth (Penn State University)

Kris Cook (Pacific Northwest National Laboratory)



GeoVISTA Center



PNNL-SA-66790





Today's Topics



- Project motivation and scope
- Project team
- Project plan and approach
- Enlisting your support
- Questions and feedback



Project Sponsorship: Department of Homeland Security



- DHS S&T Directorate's Command, Control, and Interoperability (CCI) Division
 - Information Sharing Capstone IPT
- Geospatial Management Office
 - Business representative for this project
 - Advocates for the needs of the component organizations.
- Advised by DHS S&T and subject matter experts from DHS' geospatial working group



Project Motivation



Goal – facilitate information sharing.

- Diverse DHS organizations produce or use maps daily
 - Audiences range from geospatial analysts to general public
- Individual organizations have map symbol standards and conventions, but there is no consistent set of symbols used across the Department.
- ANSI INCITS 415-2006 was developed to address a portion of the needs specifically related to mapping for emergency management
 - How widely has it been adopted?
 - Are there barriers to adoption?
 - What symbology needs are not currently being addressed?



Project Scope



Objective: Develop process and framework for extension of established symbology to support unaddressed needs.

1. Survey use of existing map symbols, symbol palettes, and map applications, as well as use of the existing standard, across tasks and components within DHS
 - Understand current state
 - Identify needs and opportunities for improvement
2. Develop repeatable process for adaption and expansion of the existing symbol standard to support domains and applications not currently supported
3. Test the process on a selected domain or application.



Focus Areas for this Study



- DHS missions of primary focus
 - FEMA – primarily Mapping and Analysis Center
 - Customs and Border Protection (CBP)
 - Coast Guard
 - National Protection and Programs Directorate
 - National Incident Management System (NIMS)
- Additional DHS missions may be included in the survey phase as schedule permits



Alan M. MacEachren



■ Education

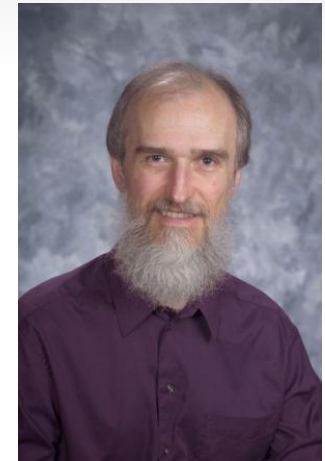
- PhD – Geography, Kansas, 1979
- MS – Geography, Kansas, 1976
- BS – Geography, Ohio University, 1974

■ Relevant Experience

- Professor of Geography (1992-present)
- Affiliate Professor of Information Sciences and Technology (2007-present)
- Director, Penn State Regional Visualization & Analytics Center, 2006-present
- Director, GeoVISTA Center, 1998-present
- A few relevant grants/contracts:
 - NSF: GeoCollaborative Crisis Management
 - NSF: Quality Graphics for Federal Statistical Summaries
 - NCHS: Visualizing Health Statistics
 - ARDA: Fundamental Approaches to Task-Oriented Visualization of Uncertainty

■ Research Interests

- Geographic information science: visual analytics, geovisualization, cartography, geocollaboration, spatial cognition, human-centered systems



■ Education

- PhD – Geography, Penn State 2008
- MS – Geography, Penn State 2005
- BS – Geography, East Carolina U 2002

■ Relevant Experience

- Research Associate, Penn State, GeoVISTA Center & John A. Dutton e-Education Institute, 2008 – Present
- Graduate Research Assistant, Penn State, GeoVISTA Center, 2003 - 2008

■ Research Interests

- Cartography, Geographic Visualization, Interface Design & Evaluation, Visual Analytics, Medical Geography, Crisis Management



■ Education

- MS – Cartography & GIS, UW-Madison (2007)
- BS – Cartography & GIS, UW-Madison (2005)

■ Relevant Experience

- Graduate Research Assistant – Penn State, GeoVISTA Center (2007-present)
- Cartographer – UW-Madison Cartography Lab (2006-2007)
- GIS Assistant – UW-Madison Sea Grant Institute (2004-2007)

■ Research Interests

- Cartography, geographic visualization, geovisual analytics, uncertainty visualization, map interaction & map-based interface design, decision-making support, usability engineering





Kris Cook



■ Education

- BS – Chemical Engineering, The Ohio State University

■ Relevant Experience

- Partnerships Coordinator, National Visualization and Analytics Center
- Regional Visualization and Analytics Center Coordinator
- Co-editor, *Illuminating the Path: The Research and Development Agenda for Visual Analytics*
- Project Manager, Lessons Learned and Best Practices in Technology Transition
- Project Manager, IN-SPIRE visual analysis software

■ Interests

- Applications of Visual Analytics, Technology Transition



Technical Approach



- Conduct literature survey of best practices in symbology standardization
- Survey current state of practice in the five identified domains
- Checkpoint: Review survey results with client to obtain priorities for piloting the new process to be developed
- Define the candidate process for development of new symbols.
- Pilot the symbol development process on the target problem selected in the checkpoint meeting.
 - Could be specific to a single domain / mission or could be driven based on a focused need that cross-cuts multiple domains.
 - Refine the process and define lessons learned for its application.



Survey / Interview / Focus Group Approach



- Collect map and symbol palette examples in all relevant formats
 - Ideally from products developed for real tasks, but artifacts from training exercises would also work
- Conduct online survey
 - Probe basic symbology issues to a broad group of DHS map users
- Webinar with interview participants
 - Introduce the project to a core set of users identified by DHS for this project
- In-depth interviews & focus group
 - Using map examples from each participant to prompt responses
 - Focus group immediately following interviews to explore common issues



Our Basic Goals



- Identify reasons for adoption/rejection/modification of the ANSI standard
- Identify “critical incidents” – times when symbol standards were particularly helpful/ not helpful
- Characterize technical and organizational issues associated with developing and implementing symbol standards
- Elicit ideas from mapmakers at DHS for new processes to develop symbol standards and extend/modify them over time as needed
- Determine whether we should “go deep” with one group or take a more general approach



Interview Topics



- Developing questions with input from DHS
- Major themes for interview questions:
 - Identify utility and usability issues with the current ANSI standard
 - Explore cross-cutting technical / organizational issues
 - Identify and explain critical failures / successes with map symbols
 - Using map examples, explore the use of symbol standards (or lack thereof)
 - Evaluate ideas for a single, all-encompassing standard or alternative strategies
 - Elicit ideas for processes that would lead to effective & adoptable symbol standards



Project Milestones



- Literature survey of best practices in symbology development – June 30, 2009
- Survey of use of existing symbol standards – August 31, 2009
- Draft process for symbology set expansion – October 30, 2009
- Outcomes of pilot effort and refined symbol development process – February, 2010



Enlisting the HSWG's Support



- Benefit from HSWG expertise
- Brief HSWG at key stages of project for advice and feedback
 - Survey approach
 - Draft symbology expansion process
- Enlist help in assembling representative set of example maps and relevant documents
 - Print and digital formats at a range of form factors
 - From real events or training exercises
 - From a wide range of scales and tasks
 - Documents of interest include: training materials (focused both on making maps and on tasks where maps are used); map symbol standards development and implementation

Questions and Feedback?

