



A Web-Based Symbol Store for Sharing Map Symbology

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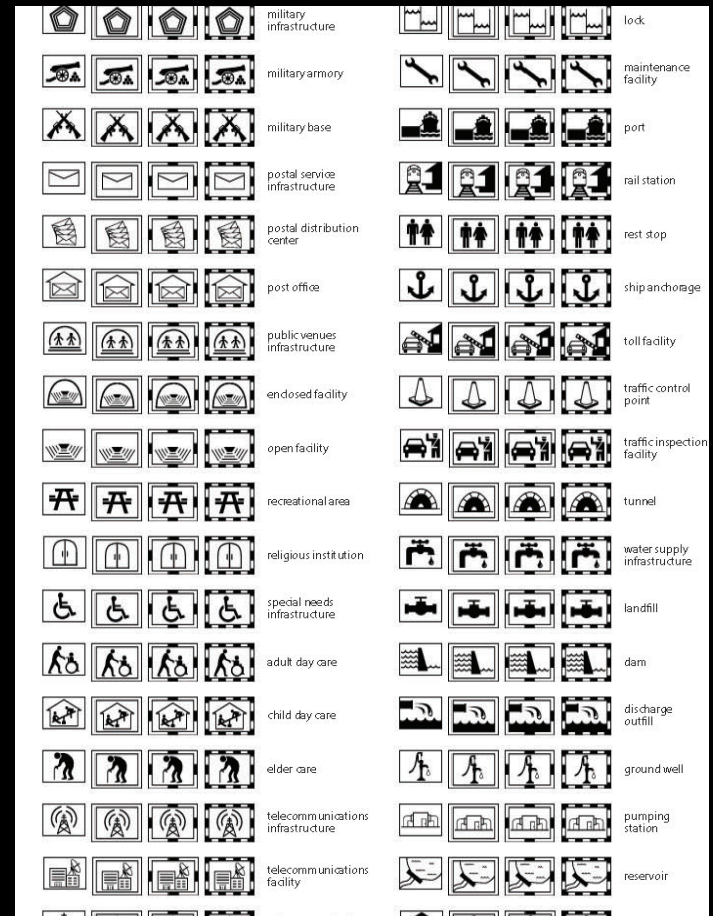
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Outline

- **Motivation & Approach**
- **Application Design**
- **Current Progress**
- **Next Steps**



Motivation & Approach



Motivation



- **Diverse DHS organizations produce and use maps**
 - Audiences range from geospatial analysts to general public
- **No consistent set of map symbols used across DHS**
 - Even if we just look at point symbols
- **ANSI INCITS 415-2006 intended for emergency management mapping**
 - Poorly adopted by practitioners
- **Initial Objective: Develop process for symbol standardization**
- **Secondary Objective: Develop mechanism for symbol interoperability**



ANSI Standard



- **Point symbol set designed for emergency response**
 - Goal was to facilitate common situational awareness, support point symbol interoperability
- **Federal/state/local stakeholders took part in the process**
- **Symbols designed to work in black & white**
 - Outline shapes used to distinguish between symbol types (incidents, natural events, operations, infrastructure)
- **Evaluation conducted online with first responders**
 - Made use of an “accept” or “reject” methodology, partially following the ANSI guidelines

Other Standards



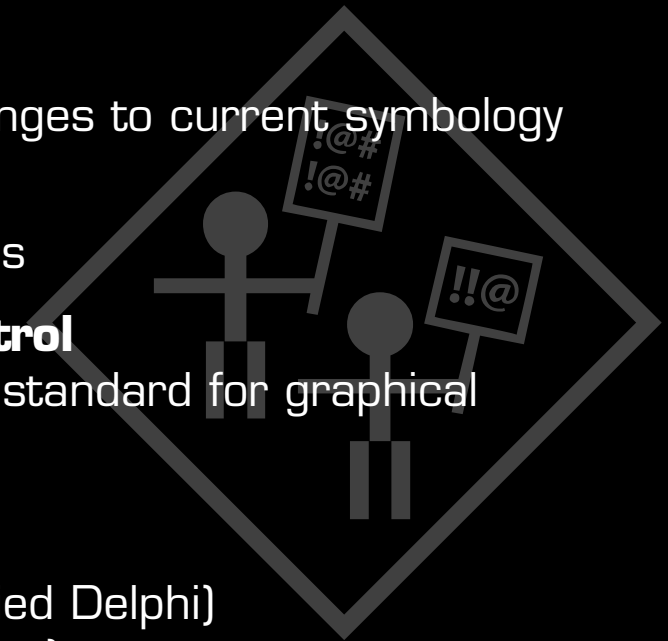
- **We discovered that most mission areas had their own, 'in house' standards**
- **These were developed on an ad hoc basis, usually by one cartographer**
- **Collections of ESRI markers and whatever else they could scrape together**
- **Such 'standards' are passed around to new employees and are promoted as default option**



Standardization Process



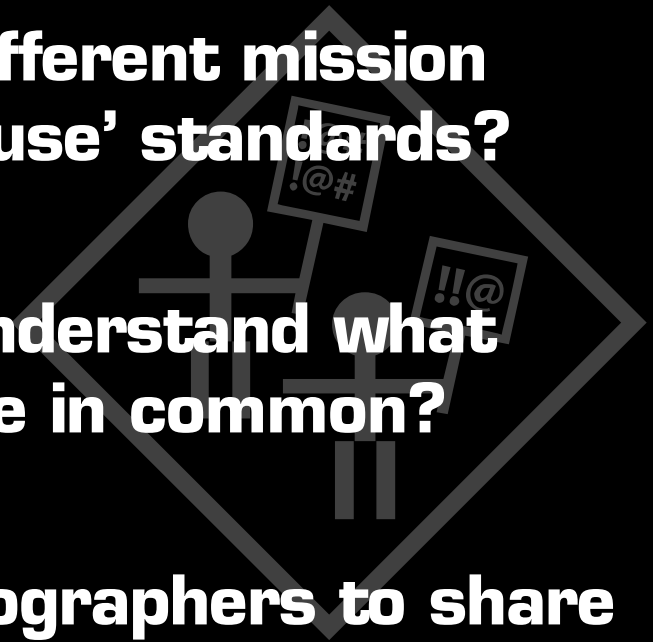
- **Distributed, web-based activities through a customized Drupal site**
- **Phase 1: Needs Assessment**
 - Review current symbology, identify new symbol needs, problems with current symbols
- **Phase 2: Initial Standard Development**
 - Develop symbol categories, vote on changes to current symbology
- **Phase 3: Standard Refinement**
 - Discuss, refine & vote on final categories
- **Phase 4: Implementation & Quality Control**
 - Test new symbology in exercise, submit standard for graphical refinement by cartographers
- **Methods feature**
 - Round-based discussion & voting (modified Delphi)
 - Card-sorting activities (using websort.com)
 - Anonymized participation



Motivating Questions



- **What happens once a group has completed the process?**
- **How can cartographers in different mission areas check out these 'in house' standards?**
- **What can we do to better understand what these various standards have in common?**
- **How can we encourage cartographers to share their symbols more widely?**



Approach



- **Develop web-based solution for sharing / browsing point symbols**
- **Simple design – aim to support one key task really well**
- **Symbols that have gone through our standards process can receive special tags**
- **Iterative development process -> static mockup, dynamic prototype, refined prototype, final version**



Application Design





search

browse by

sort by



<p>bomb threat</p> 	<p>definition A bomb threat or other threat involving explosives. ★★★★☆</p> <p>keywords bomb, threat, explosive, warning, hazard</p> <p>categories incident, event, people, attack, terrorism</p> <p>users FBI, NGA, USCG, DNDO</p> <p>set ANSI INCITS 415, MILSPEC 2525B</p> <p>creator r.roth@psu.edu uploaded May 21, 2010 at 10:32am add to cart ▶</p>
<p>fire</p> 	<p>definition A significant fire event to a natural or man-made entity ★☆☆☆☆</p> <p>keywords fire, flame, firefighting, wildfire, forest fire, arson</p> <p>categories incident, event, natural hazard, arson</p> <p>users CBP, FBI, NGA, USCG</p> <p>set ANSI INCITS 415, MILSPEC 2525B</p> <p>creator a.robinson@psu.edu uploaded July 2, 2010 at 4:35pm add to cart ▶</p>
<p>toxic release</p> 	<p>definition A significant release of toxic chemicals in gas, liquid, or solid form. ★★☆☆☆</p> <p>keywords spill, release, toxic, chemical, hazmat, cloud, gas, liquid, solid</p> <p>categories incident, event, people, hazard, hazmat</p> <p>users DNDO, FBI, NGA</p> <p>set ANSI INCITS 415, MILSPEC 2525B</p> <p>creator r.roth@psu.edu uploaded July 1, 2010 at 1:22pm add to cart ▶</p>
<p>civil disturbance</p> 	<p>definition A sizable and significant protest, riot, or other civil unrest incident. ★★★★☆</p> <p>keywords protest, unrest, disturbance, riot</p> <p>categories incident, event, people</p> <p>users CBP, FBI, NGA, USCG</p> <p>set ANSI INCITS 415, MILSPEC 2525B</p> <p>creator r.roth@psu.edu uploaded July 2, 2010 at 3:35pm add to cart ▶</p>
<p>major civil unrest</p> 	<p>definition A very large and significant protest, riot, or other civil unrest incident. ★★★★☆</p> <p>keywords protest, unrest, disturbance, riot</p> <p>categories incident, event, people</p> <p>users CBP, FBI, NGA, USCG</p>

symbol cart

	<p>civil disturbance</p> <p>protest, unrest, disturbance, riot CBP, FBI, NGA, USCG ★★★★☆ ×</p>
	<p>explosion</p> <p>bomb, blast, explosion FBI, NGA, USCG ★★★★☆ ×</p>
	<p>firearm</p> <p>gun, weapon, firearm, pistol CBP, FBI, USCG ★★★★☆ ×</p>
	<p>arrest</p> <p>arrest, criminal, capture, police CBP, DNDO, NGA ★★★★☆ ×</p>

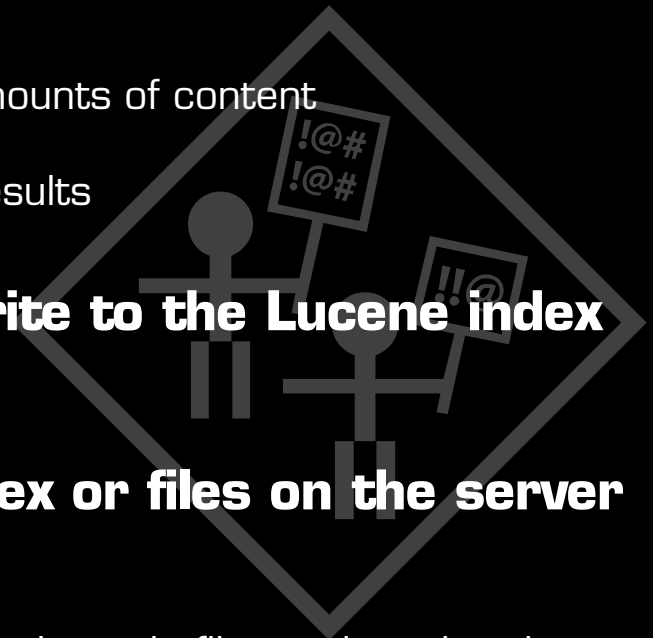
[map preview ▶](#)

[download ▶](#)

Back-end



- **ArcObjects is used to parse ESRI style files and generate preview images of the styles**
- **Lucene index for text content**
 - Quick text searching and retrieval of large amounts of content
 - Ranks hits based upon user searches
 - Weights search criteria to improve search results
- **.NET web service supports read/write to the Lucene index and read/write for .style files**
- **All content stored in the Lucene index or files on the server (style files and image preview files)**
 - This may be improved in the future by parsing the style files and storing that information in a RDBMS



Development Details



- **Interface built using Flash Catalyst (converts AI & other art into UI objects)**
- **Functionality connected to interface using Flash Builder 4 (formerly Flex)**
- **Flash Builder used to get results from the web service**
 - User function calls can be made through ActionScript and results are sent back to the client as text strings or JSON strings
- **Flash plugin required for web browsers, but otherwise works broadly across platforms**



Current Progress



Progress to date



- **Developed interactive prototype based on static mockup + sponsor feedback**
- **Prototype supports basic symbol search and browsing**
- **Successfully demonstrated that a .style file can be contributed, parsed, searched on, and constituted differently for download**



Progress to date



Demonstration



Next steps




Another Brewer?





SymbolStore Welcome, **Guest** [login](#) or [create a new account](#)

search browse by

map preview



symbol cart

	civil disturbance protest, unrest, disturbance, riot CBP, FBI, NGA, USCG ★★★★☆ <input type="checkbox"/>
	explosion bomb, blast, explosion FBI, NGA, USCG ★★★★☆ <input type="checkbox"/>
	firearm gun, weapon, firearm, pistol CBP, FBI, USCG ★★★★☆ <input type="checkbox"/>
	arrest arrest, criminal, capture, police CBP, DND, NGA ★★★★☆ <input type="checkbox"/>

map settings

map

color

labels

symbol size

map scale

feature density

label size

Evaluation Plans



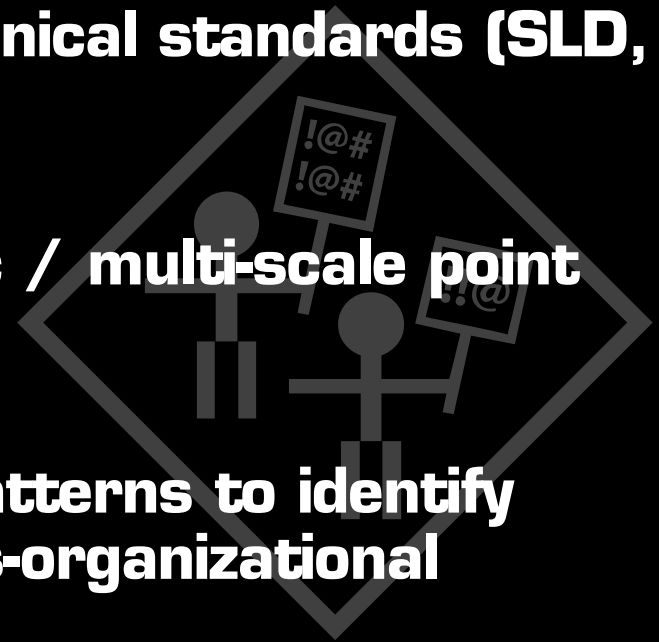
- **Presenting prototype to DHS mapmakers in late October for quick feedback**
- **Full version due mid-Winter, will evaluate using distributed methods with mapmakers**
- **Will be able to incorporate feedback before project ends in May 2011**
- **Wider dissemination? Hopefully...**



Next Steps



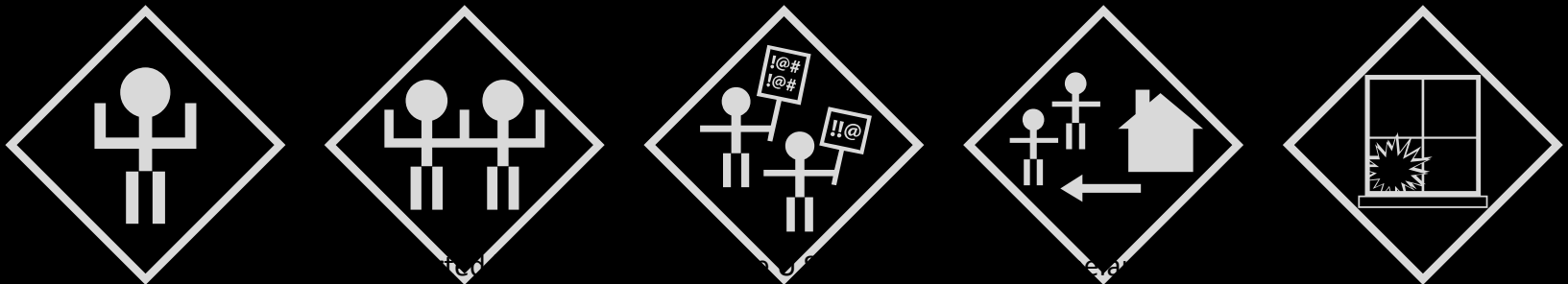
- **Integrate portions of our symbol standardization process into the Symbol Store**
- **Develop support for other technical standards (SLD, for example)**
- **Extend tools to handle dynamic / multi-scale point symbols**
- **Explore Symbol Store usage patterns to identify frequently used symbols, cross-organizational commonalities, etc...**



Thanks for your attention!

for more information:

<http://www.geovista.psu.edu/symbology/>



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