

District of Columbia Emergency Information Center (2004—Enterprise System)

System Summary

The Emergency Information Center (EIC) at <http://www.emergencycenter.dc.gov> was launched in September of 2003 to meet a critical need in the District of Columbia for a highly visible, comprehensive, easy-to-use, Americans with Disabilities Act (ADA)-compliant, location-based source of emergency information. Prominently displayed on the DC.Gov Web site, EIC delivers information and instructions to D.C.'s 570,000 residents, 500,000 commuters, and 19 million annual visitors.

The site is powered by sophisticated geographic information system (GIS) mapping technology, which is capable of detailing areas affected by emergency events and providing instructions based on one's location in the city. What makes EIC an exemplary system is the ease with which such maps can be created on the fly by non-GIS personnel, the site's ability to tailor emergency information to a specific area, and its user-friendly interface that makes searching for important public safety and medical information easy—even for visitors who do not know the city.

The site's public interface is deceptively simple. In nonemergency mode, it allows users to search for police, fire, and medical units by neighborhood, address, map, or landmark name (especially helpful to the city's large numbers of visitors). A member of the public may type in an address or select from a drop-down list to view maps that show nearby evacuation routes, fire stations, hospitals, Metro lines, police stations, schools, and landmarks.

In emergency mode, GIS maps can be created from more than 200 data sets to quickly convey location-based emergency services information such as open shelters; points of distribution for water, ice, food, clothing, and medication; volunteer training centers; field medical-care units; or centers for missing persons.

Many government portals in the United States have emergency information pages—some with GIS components. EIC's Web-based maintenance tools set it apart from other municipalities. These tools allow EIC to be updated outside of the D.C. government's wide area network, so access to government build-

ings or the D.C. Emergency Operations Center isn't necessary to create or update maps on the Web site. The maintenance tool is also simple to use, so persons with minimal GIS training can successfully create sophisticated maps.

EIC created a single source on the D.C. portal for official D.C. government emergency information and GIS-powered maps, and provided a number of other benefits:

- It improved the District's "one voice" approach to emergency management by consolidating information that had been scattered across numerous departmental Web sites.
- Its visibility on the DC.Gov portal brought more discipline to the public information release process.
- It has provided a medium for smaller District agencies to publish information on the DC.Gov Web site.
- The Web site development process exposed shortcomings in existing neighborhood plans that had been buried on numerous agency sites and were out-of-date.

Motivation for System Development

The District of Columbia needed a way to efficiently and effectively deliver official emergency information and instructions to D.C. residents, commuters, and visitors. The D.C. government was in the midst of an aggressive effort to move information and services to the Web when New York and Washington were attacked on September 11, 2001. The number of visitors to the DC.Gov Web site increased threefold that day, strongly indicating the public would go to the Web in large numbers for emergency-related information. Follow-up research conducted by the D.C. government confirmed this fact. When federal funds became available for homeland security initiatives, D.C. seized the opportunity to incorporate sophisticated GIS technology in the Web site and create a central location for emergency information that previously was scattered throughout the D.C. portal. The Emergency Information Center (EIC) is now the D.C. government's official source on the Web for emergency information.

System Benefits Achieved

The EIC produced a number of unexpected benefits:

- It highlighted shortcomings in existing neighborhood plans that were out-of-date and buried on numerous agency sites.
- It provided a medium for smaller District agencies to publish information on the DC.Gov Web site.
- Its visibility on the DC.Gov portal brought more discipline to the public information release process.
- Its prominence has improved the District's "one voice" approach to emergency management.

With regard to GIS deployment in the District, the EIC elevated the role of spatial planning and information release during training exercises. GIS professionals are now an integral part of any exercise of the Emergency Operations Center.

Additionally, with the site receiving recognition and use, public information officers for various D.C. agencies have increased their use of the Web as a vehicle to reach out to the public. This expansion has been encouraged by the eGovernment division of D.C.'s Office of the Chief Technology Officer (OCTO), which has been channeling emergency preparedness information to the site.

The EIC has also proven its worth as the D.C. government's official information source. During the Hurricane Isabel emergency of September of 2003, the media incorrectly published a list of shelters. In fact, only one shelter opened, creating confusion among the public. District officials were able to point to the EIC as the official source for both the media and the public to go to verify shelter information.

System Design Issues Encountered and Overcome

The system design challenges that the EIC faced can be divided into three main categories:

1. Compliance with eGovernment standards: Because of the prominence of the EIC on the DC.Gov portal, the site had to meet the design standards of the overall District Web portal, which until then had not included GIS. The spatial application had to be wrapped around the eGovernment content management system. This system had never been used in this manner and necessitated a number of modifications that made the EIC much more generic and thus easily maintained by a variety of eGovernment staff.
2. Compliance with federal government Section 508 standards: The Americans with Disabilities Act Section 508 has a number of requirements for Web applications. The key component is that all image information should be supported by text that can be accessed by specialized equipment. A location-based EIC had to be carefully designed to offer all significant map information in text format.

3. Online update requirements: The requirement that the severe emergency mode of the site be administrable via the Web challenged both the database and the GIS application. The Web-enabled tool had to be easy to use, and it had to update two physically independent server infrastructures. This meant that a novice user could log in to a secure framework, conduct a number of tasks, and post data. The server environment/location would have to be entirely transparent to the user, though because of the load balancing between the physical environments, any given command executed to a server could be directed to any one of the available servers.

In addition, the unknown nature of future emergencies meant that the spatial data could consist of a variety of content, including multiple dependent/independent emergencies requiring a variety of location-based instructions.

4. Location determination: Geocoding addresses in the District is similar to many large, older urban environments where addresses vary in quality. Additionally, the District has an unusually large number of known landmarks (e.g., the Lincoln Memorial and Jefferson Memorial) where addresses are almost meaningless. Thus, the EIC used a database in which xy coordinates were preassigned to points in the District. The task of keeping this data up-to-date is part of the OCTO-GIS standard operating procedure in which a combination of sources (including Dun & Bradstreet, tax assessment and planning databases) are processed monthly and posted to the database used by EIC and other OCTO applications.
5. What Differentiates This System from Other Similar Systems

In a typical local government Web implementation, technicians and government employees do most of the design work and determine content without significant public input. OCTO took a more comprehensive approach with the EIC. In addition to working with government agencies, OCTO conducted citizen focus groups and "street surveys" to learn the type and format of information District residents and visitors wanted to see. This investigation highlighted four key requirements:

- Citizens wanted a single place to go for information.
- Citizens wanted location-based information, i.e., "What is relevant to me and those I care for."
- The site should provide general preparedness information as well as information specific to an ongoing emergency event.
- The computing infrastructure would need to support a very high volume of users.

The public outreach result, along with the potential for an emergency in the District, convinced OCTO and the Deputy Mayor for Public Safety and Justice to designate funds to build an emergency information Web site. The conditions associated with the project were that it had to serve the public, be a multi-agency initiative, and be completed by September 30, 2003. It

had to become part of standard operating procedure, and it had to be well publicized.

OCTO reviewed a number of other local government emergency Web sites prior to building the EIC. Some were entirely dormant until an emergency took place, while others had the same look and feel at all times. Not many had location-based functionality and none had simple Web-administration tools.

The EIC is further differentiated from other similar sites by the following unique functions:

- The site operates in two modes: a basic, nonemergency mode with extensive graphics, and an emergency mode with minimal graphics to enhance response time.
- Both modes of the EIC have spatial capabilities and “train” the users on how to use the site when there is a real emergency.
- The site has a link to an organization that organizes and manages volunteers during an emergency on behalf of the District. This link is only active during an actual emergency.
- EIC has custom-made, highly robust Web tools with which District employees can rapidly post spatial and text data to the emergency mode of the site.

System Hardware, Software, and Data

Hardware

Common GIS Server

ODC 2 Detail Specifications

| Web Server 1 |
|--|
| - (1) Compaq DL 760- Maximum 8 CPU x 16 GB RAM |
| - (4) 900 MHz/2 MB Pentium III/Xeon |
| - (5) 1 GB SDRAM Module |
| - (1) Smart Array 5302/64 RAID Controller |
| - (4) 36 GB UltraSCSI 10,000 rpm Hard Drive |
| - (1) Internal SCSI Adapter Card |
| - (1) Windows 2000 Advance Server |
| - (1) ArcIMS 4.0 |
| - (1) RouteMap IMS Server 1.0 |
| - (1) Jrun 3.02 |
| - (1) Oracle Client Driver 9.2.0.1.0 |
| - (1) Oracle Data Provider for .NET 9.2.0.2.0 |
| - (1) Microsoft Oracle .NET Data Provider |
| - (1) Microsoft .NET Framework |
| - (1) Microsoft XML Parser and SDK |
| - (1) ArcServer 2000 Workgroup |
| - (1) McAfee Virus Shield 4.51 |

| Web Server 2 |
|--|
| - (1) Compaq DL 760- Maximum 8 CPU x 16 GB RAM |
| - (4) 900 MHz/2 MB Pentium III/Xeon |
| - (5) 1 GB SDRAM Module |
| - (1) Smart Array 5302/64 RAID Controller |
| - (4) 36 GB UltraSCSI 10,000 rpm Hard Drive |
| - (1) Windows 2000 Advance Server |
| - (1) ArcIMS 4.0 |
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| - (1) Microsoft Oracle .NET Data Provider |
| - (1) Microsoft .NET Framework |
| - (1) Microsoft XML Parser and SDK |
| - (1) ArcServer 2000 Client |
| - (1) McAfee Virus Shield 4.51 |

| Database Server 1 |
|--|
| - (1) Compaq DL 580 G2 Maximum 4 CPU x 32 GB RAM |
| - (2) 1600 MHz/1 MB Pentium III/Xeon |
| - (2) 2048 PC1600 ECC SDRAM Modules (4x512 MB) |
| - (1) Smart Array 5304/128 RAID Controller |
| - (11) 36 GB UltraSCSI 10,000 rpm Hard Drive |
| - (1) Model 4354R Smart Disk array |
| - (1) Windows 2000 Advance Server |

| Database Server 2 |
|--|
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Software

ESRI Products

- ArcSDE 8.3 (Windows)
- ArcIMS 4.0.1 (Windows 2000, IIS 5.0, and Servlet Exec 4.2)

Oracle Products

- Oracle Version 9i (Windows 2000)

PPT Solutions Products

- DSF and EEDP content management software

The nonemergency site is entirely built using Dynamic Site Framework (DSF) and Electronic Events Distribution Protocol (EEDP) products provided by PPT Solutions. The OCTO eGovernment staff worked with PPT Solutions to customize the products. This product enables users to edit and add content to the site. DSF and EEDP are run on OCTO servers based on a SQL Server database.

In nonemergencies, the DSF and EEDP products wrap around the ArcIMS engine where map images are rendered. ArcIMS was customized to access the ArcSDE general base map data layers used for mapping and the query Oracle database for xy coordinates that were assigned to sites in D.C.

All other site development, including the entire severe emergency site and the Web-enabled administration tool, were constructed using ASP.NET.

Data includes:

- Road centerlines
- Evacuation routes
- Schools
- Hospitals and other medical-care facilities
- Police and fire stations
- Metro stations
- Parks
- Major landmarks

The nonemergency Oracle database consists of a combination of sources listing all addresses in the District. As mentioned before, the data set includes Dun & Bradstreet, and various parcel- and tax-related databases in the District. The data are processed on a regular basis; xy coordinates, as well as administrative boundary designations including police service area, neighborhood, neighborhood clusters, voting districts, and school areas, are assigned to each point. This data set is stored entirely in Oracle. Thus, the query and display of these points are highly efficient and expedited.

The severe emergency mode of the site uses the Oracle database for navigation, but will also utilize additional data layers in ArcSDE to render an emergency or polygons related to multiple emergencies. Instructions per emergency polygon will be stored and tracked in Oracle.

Where Are We Now?/Future Directions

The following enhancements have been added to the Emergency Information Center:

1. Local facilities search results hyperlinked to D.C. Guide's "Get There" function: The Emergency Information Center provides a text list and a map of police, fire, and health-care facilities within the user's specified search area. Results are hyperlinked to the D.C. Guide's "Get There" function and will provide directions to a location from the user's address.

2. Enhanced Find My PSA function: The Police Service Area (PSA) data layer has been updated allowing the user to view facilities within a specific PSA. This is accomplished by clicking on a PSA map that initiates a spatial query similar to the neighborhood search functionality. The user may perform an address search if the appropriate PSA is not known. The application returns a map of the PSA and provides links to the Metropolitan Police Department (MPD) Web site for information about that PSA. In the future, additional links to MPD pages will provide crime reports and community policing plans.
3. Enhanced Text Alert: The existing Roam Secure™ text alert system has been enhanced, providing faster and more flexible message capabilities. The general public (both residents and nonresidents) may register to receive alert notification of events occurring in neighborhoods of their choice or city-wide. The system delivers important emergency alerts, notifications, and updates on a range of devices including:
 - E-mail account [work, home, other]
 - Cell phone
 - Pager, Blackberry
 - Wireless PDA (Palm, iPAQ, etc.)

When an incident or emergency occurs, authorized D.C. Emergency Management personnel can rapidly notify system participants using this community alert system. D.C. Text Alert provides participants with real-time updates, instructions on where to go, what to do, or what not to do, who to contact, and other important information.





4. Future directions: The emergency mode mapping and data-creation tool has been migrated to ArcGIS 9x and is being tested in the Emergency Management Agency's (EMA) GIS environment. The upgraded tool set will be deployed in the summer of 2005. Also, EMA is further improving its ability to share data with other Emergency Operations Centers throughout the national capital region using Web mapping services and a new Incident Management System.

DC Text Alert Registration

| | | |
|---|--|--|
| Name | First <input type="text" value="John"/> | Last <input type="text" value="Doe"/> |
| E-mail address (use this address to log in) | <input type="text" value="jdoe@isp.net"/> If you do not have an e-mail address, click here and you will be assigned a substitute username. Please remember this username. | |

Mobile Device / Additional E-mail Address to Receive alerts

If you do not have a mobile device, skip this section and alerts will be sent to your e-mail address entered above. You can always add your mobile devices later.

| | | |
|--|---|---|
| E-mail |  | Add More |
| <input type="text" value="E-mail account"/> | Enter your e-mail address <input type="text" value="jdoe@isp.net"/> | |
| Cell Phones |  | Add More |
| <input type="text" value="Select your cell carrier..."/> | Enter your mobile number <input type="text" value="999"/> <input type="text" value="999"/> <input type="text" value="9999"/> | |
| Pagers |  | Add More |
| <input type="text" value="Select your pager company..."/> | Enter your pager number, PIN, or alias <input type="text"/> | |
| BlackBerry |  | Help Add More |
| <input type="text" value="Select your BlackBerry carrier..."/> | Enter your BlackBerry mobile number... <input type="text"/> <input type="text"/> <input type="text"/> ... or the WebClient UserID <input type="text"/> | |

Account Password

| | |
|---|---|
| Create a case-sensitive password | <input type="password" value="....."/> (5 or more characters) |
| Confirm password | <input type="password" value="....."/> |

Communities/Neighborhoods

| | |
|--|--------------------------------|
| <input type="text" value="Fairlawn"/> | <input type="text" value="▲"/> |
| <input type="text" value="Foggy Bottom"/> | |
| <input type="text" value="Forest Hills"/> | |
| <input type="text" value="Fort Davis"/> | |
| <input type="text" value="Fort Davis Park"/> | |
| <input type="text" value="Fort Dupont"/> | |
| <input type="text" value="Fort Lincoln"/> | |
| <input type="text" value="Fort McNair"/> | <input type="text" value="▼"/> |

Elementary Schools

| | |
|---|--------------------------------|
| <input type="text" value="Montgomery Elementary School"/> | <input type="text" value="▲"/> |
| <input type="text" value="Moten Elementary School"/> | |
| <input type="text" value="Murch Elementary School"/> | |
| <input type="text" value="Nalle Elementary School"/> | |

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