

Public Safety Log

ESRI • Fall 2009

GIS for Public Safety

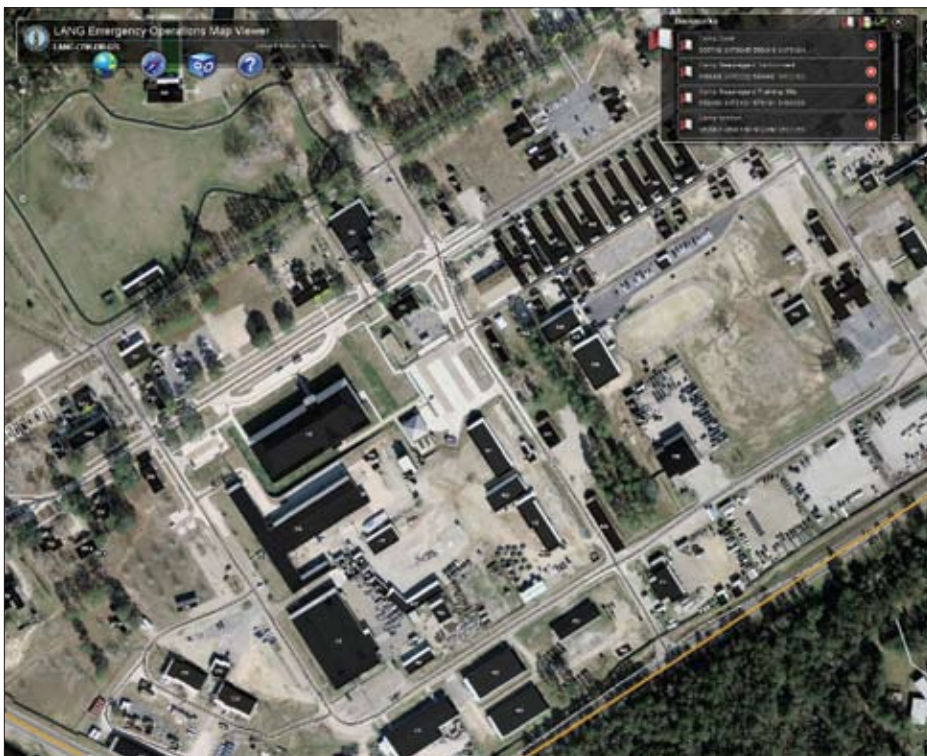
The Mission of Coordinating Safety Louisiana Army National Guard Deploys GIS to Make the Most of Its Data

The Louisiana Army National Guard (LANG) is an organization with multiple missions. The federal mission is to provide trained and ready soldiers, airmen, and units for deployment in support of national military objectives as designated by the president of the United States. The state mission is to preserve and protect life, property, peace, order, and public safety under state authority and as directed by the governor of Louisiana. At the community level, the mission is to focus on initiatives that enhance community relationships and provide mutually beneficial support.

In fall 2008, Hurricane Gustav struck the same area that had been pounded three years earlier by Hurricanes Katrina and Rita, destroying entire communities and displacing millions of people.

Before Gustav hit, federal, state, and local agencies worked around the clock to prepare for the worst. LANG, which had firsthand experience dealing with Katrina and Rita, did its part to prepare and assist, producing maps, performing analysis, and providing fundamental situational awareness.

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Web users can use a viewer that is based on Flex technology to access imagery that is quickly uploaded with the ArcGIS Server Image extension.

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Welcome to the Fall issue of *Public Safety Log*

This issue supplies more terrific examples of people like you doing amazing GIS work. From data management to planning and analysis to field operations and situational awareness, GIS offers value to both daily tactical work and long-term strategic planning.

Law enforcement, emergency management, fire, and other agencies are all benefiting from enterprise GIS adoption. By being able to bring together previously disparate information systems, GIS is unlocking the value of large, independent databases and diverse data types. The GIS-based common operating picture is making it easier for people to quickly understand what's happening on the ground and how to best respond to ever-changing conditions. The result is true situational awareness. Information is quickly consumed, updated, and available to everyone. This enterprise trend is changing the landscape of public safety.

Thank you for your support.

Russ Johnson—Public Safety and Homeland Security Manager

Lew Nelson—Law Enforcement and Homeland Security Manager

The Mission of Coordinating Safety

From the aftermath of Gustav and the previous hurricanes, LANG learned that future responses would require a more efficient method for processing vast quantities of imagery. Attaining the raw data wasn't the problem—quickly making it available in a usable format was. The State of Louisiana had been proactive in deploying a network of state and local government geographic information system (GIS) departments for capturing, maintaining, and sharing data. As a result, large volumes of imagery, elevation data, vector data, and other spatial layers throughout the state had been collected, but the need to quickly access and process imagery had become a critical issue.

A GIS for Federal, State, and Local Levels

In 1997, LANG hired Mike Liotta to develop a GIS that would assist with its missions at federal, state, and local levels. Liotta's sole responsibility was to develop a robust GIS for comprehensive decision support. Typically, the GIS section helps LANG administer its property, assets, and field deployments. It manages spatial data related to infrastructure, assets, and personnel, as well as produces field maps for training purposes. However, during emergency operations, its responsibilities broaden from a local to a statewide mission.

"Initially, we focused on mapping solutions

for managing our military properties," says Liotta, GIS manager, LANG. "As the state missions became more frequent, we had to look at mapping on a much larger scale."

Through the state GIS community, Liotta got word of a new GIS server platform that was available—ArcGIS Server with the Image extension.

From Hours to Minutes

Before implementing ArcGIS Server, Liotta and his staff built an accurate needs assessment. They worked with the Joint Operations Center, which coordinates LANG emergency operations, and the aviation units that conduct the emergency aerial operations to determine which GIS tools would improve their efficiency in emergency response.

Next, the LANG GIS section teamed with Geographic Information Services, Inc. (GISi), an ESRI business partner and GIS consulting firm headquartered in Birmingham, Alabama, to carry out implementation and development of applications and services.

"We didn't have the resources in-house to develop the tools," adds Liotta. "GISi had an excellent track record of quickly and effectively developing tools."

In October 2008, LANG deployed ArcGIS Server with the Image extension. Immediately,

raster datasets that had been deemed unusable because of their size were made readily accessible via image services.

"We had a 14 TB storage area network," says Liotta. "It was 70 percent raster data that was just waiting to get accessed by our users." In addition, LANG had more than 200 GB of newly acquired six-inch digital imagery of its installations.

What once involved many hours of manpower and computer processing had evolved into a sleek, effective process for delivering imagery. The ArcGIS Server Image extension fundamentally changed how LANG and its GIS section consumes and deploys large volumes of imagery.

"In the past, as new data came in—especially imagery—we traditionally could only distribute that data by printing maps," explains Liotta. "It was very time and resource intensive. But our new platform has changed all that. With our previous methods, it would have taken several days to get the imagery in a widely accessible format." Now, with ArcGIS Server in place, it takes just 30 minutes to turn the raw data into a readily available image service.

"The processing power and speed are amazing," says Liotta. "We can quickly make changes, add or update map and image services, and provide the same view to both Web and GIS desktop users."

Liotta and GISi also rolled out an application that allows Web users to locate coordinates on a map, whether by manual entry or a mouse click on a location. The application allows users to view the data in a variety of coordinate readout formats: DD, DMS, DDM, UTM, MGRS, and more. Users can also enter an address and have it automatically connect to ESRI's geocoding service, which locates it on the map and converts it to any of the above-mentioned formats.

"This conversion becomes mission critical when you are trying to get resources to an address location," stresses Liotta. "Whether it's in the air or on the ground, they need that address to translate into a coordinate."



During an emergency response, newly acquired imagery could only be used by the desktop ArcGIS users due to the time required to load the imagery. Now, with ArcGIS Server Image, not only are hours reduced to minutes, but it can also be effectively distributed to our Web users.

There are also sets of tools for creating graphics and text on the map and quickly measuring distances and areas. These tools allow Web users to create accurate situational overlay maps, which help them better plan their missions.

Another tool exports a digital GIS map to PDF based on in-house templates. The map can be exported at various sizes and include a military grid, graphics, text, and imagery. The user can then print or save the document or e-mail the PDF to those who need it.

“We now have the capability we need to effectively provide imagery for our day-to-day operations,” says Liotta. “More importantly, when the next large-scale emergency occurs, we’ll be able to quickly turn around newly acquired data and imagery to our command staff, soldiers, and first responders. This can make a big difference.”



The Louisiana Army National Guard Web application allows users to quickly pinpoint locations, translate to other formats, and identify sites on the map with the best imagery available.

More Information

For more information, contact Mike Liotta, GIS manager, Louisiana Army National Guard (e-mail: mike.liotta@us.army.mil, tel.: 318-641-5772), or Geographic Information

Services, Inc. (e-mail: gisinc@gis-services.com, tel.: 205-941-0442, Web: www.gis-services.com).

ESRI Tools of the Trade

ArcGIS Explorer Makes It Even Easier to Deliver GIS to Everyone

The new release of ArcGIS Explorer offers an enhanced user experience and expands how the software can be used to deliver geographic information to a broad audience. It connects directly to a variety of ready-to-use ArcGIS Online basemaps and layers and enables users to connect to their own map services or add local data. It can also be extended with a user's own tools to deliver geoprocessing and other capabilities to people who do not necessarily know anything about GIS.

ArcGIS Explorer includes intuitive, high-performance visualization and presentation tools that let users make information visually compelling. It is engineered to work directly with maps and layers authored using ArcGIS Desktop and published via ArcGIS Server, or shared as layer packages, and makes integration of other data easy.

New features in ArcGIS Explorer include

- Greater ease of use—A new ribbon-based user experience guides users to the appropriate tools, making ArcGIS Explorer more intuitive to use.
- Integrated 2D/3D display—With a single click, users can switch their display mode.
- Geographic presentation—Users can create dynamic presentations that integrate GIS and other content, including titles, pop-ups, documents, photos, and videos. ArcGIS Explorer also offers a full-screen display.
- ArcGIS sharing—It is now even easier to leverage data from ArcGIS Online, including data published by ESRI and other GIS users.
- Enhanced data support—ArcGIS Explorer supports the new ArcGIS 9.3.1 layer packages, which encapsulate ArcGIS Desktop cartography, along with data. ArcGIS Explorer

also supports layer files and offers improved support for KML/KMZ. In addition, users can change their basemaps on the fly while maintaining their operational layers.

- Multiple languages—The ArcGIS Explorer help tool, resource center, and user interface can be used in a variety of languages.

ArcGIS Explorer also includes a software development kit available as a free download, which provides a powerful object model and lets developers create new tools and add-ins.

More Information

For more information and to download ArcGIS Explorer, visit www.esri.com/arcgisexplorer.

Using ESRI's Production Line Tool Set for ArcGIS Solves Unique Challenges

Provide an efficient solution for GIS data development, cartography, and product distribution.

The need for additional efficiency in the overall disaster/emergency response and recovery process presents a unique opportunity to implement Production Line Tool Set (PLTS) for ArcGIS. This suite of tools allows public safety agencies to manage agency-specific GIS data models, perform quality control and quality assurance of their data, and facilitate high-volume map product generation. Familiarity with PLTS tools prior to an emergency or disaster can improve efficiencies during the mobilization and initial response, as well as during follow-up recovery activities.

Outlined below are some of the ways PLTS for ArcGIS can help solve the needs of public safety organizations:

Need: Define workflows and data management processes across the organization to ensure consistency and quality by standardizing the operating procedures of technical staff and first responders.

Solution: The Job Tracking for ArcGIS (JTX) application provides an integrated framework for ArcGIS multiuser geodatabase environments. It streamlines the workflow and provides tools for allocating resources, thereby creating a more

efficient system essential in public safety. For example, JTX can be used to streamline map requests where

- The emergency staff puts in a request for a hard-copy map with a defined spatial extent.
- The situation officer approves or denies the map creation.
- If approved, the GIS specialist creates the map product and prints the map.
- The emergency staff picks up the map based on the request number.

Need: Establish a custom editing environment to standardize data collection and maintenance and adhere to industry standards, such as the GIS standard operating procedures (GSTOP) developed by the Geospatial Task Group.

Solution: The PLTS Editing Environment offers a standardized production environment through tailored attribute display (using PLTS Target and Selection tabs in ArcMap), predefined favorites, on-the-fly validation, and single-click access to commonly used editing tools. It also provides integrated feature metadata and data quality check functionalities. These tools enable public safety organizations to produce industry-standard data and map products.

Need: During an emergency, response agencies and first responders have an immediate need for

information about the underlying data on which critical decisions are made. Accurate and current metadata that defines the quality, accuracy, and temporal origin of the data is important in assessing its appropriate use by first responders.

Solution: The PLTS Feature Metadata Tools manage feature-level metadata attribution. Geodatabase feature-level metadata attributes are used to describe relevant characteristics and information about the features including

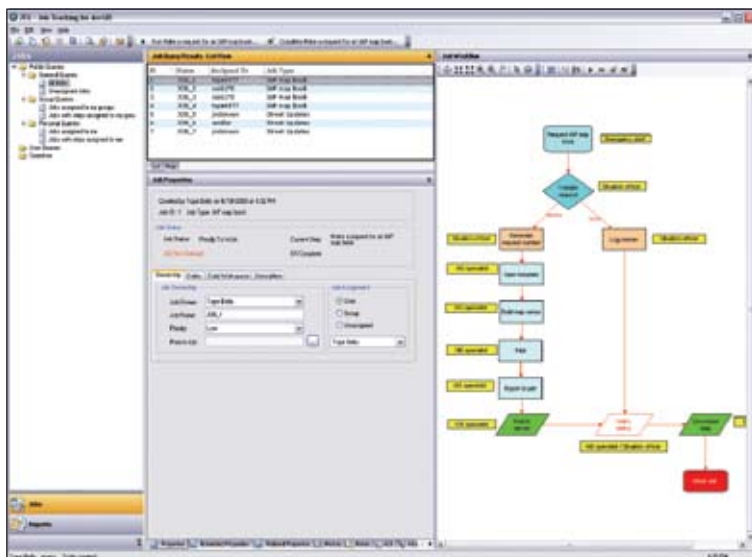
- Source data used to collect the features
- Date last modified and author
- Horizontal and vertical accuracy of the features
- The security clearance level of the features

Need: Centralized and accountable data quality assurance processes are needed to provide sound geospatial data for analysis and risk assessment.

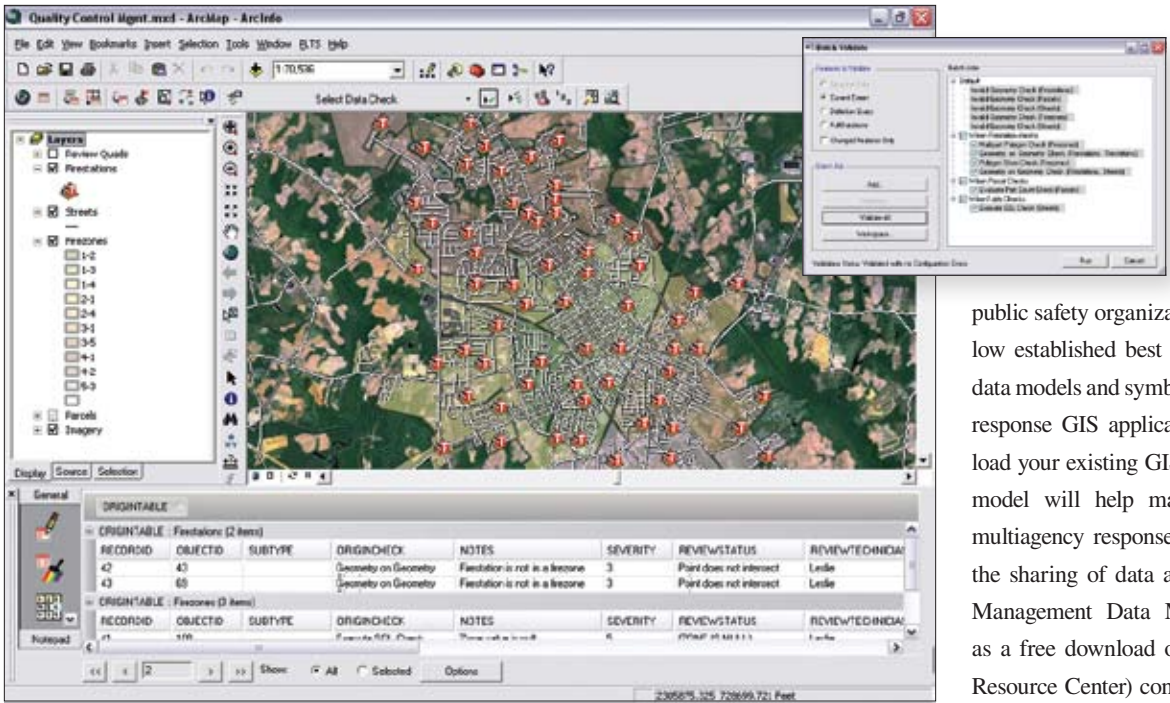
Solution: PLTS GIS Data ReViewer provides close to 40 out-of-the-box quality control checks with the option to develop additional custom checks. These checks can be saved as batch jobs and set to run at scheduled intervals, freeing up resources to perform other critical tasks. It also provides tools that aid in the visual review of data.

Need: Preconfigured basemaps consisting of ready-to-use and easy-to-read layouts are needed to support efficient production of map series and map books for emergency response.

Solution: PLTS Map Production System—Atlas (MPS-Atlas) allows consistent production of high-quality, high-volume map products; creation of dynamic surround elements; tools to manage your layout; and access to tools for cartographic editing and map output. The Emergency Management Maps template (available as a free download from the ESRI Public Safety Resource Center) contains a series of ArcGIS map documents (MXDs) that can be used as a starting point for generating standard emergency management maps for preparedness and response activities. Map templates include an incident action plan (IAP), an incident briefing



Establish standardized workflows for public safety staff using JTX.



Simplify the data review processes with tools to assess, document, correct, and verify the overall quality of public safety data.

map, and a hazards map. Several of these map templates follow the GSTOP on Incidents Project standards. Also included are sample PDF maps, sample geodatabases, style files, and documentation that help users start using the template.

Need: The central repository for the storage of business rules, data, map documents, generated output, and other information and resources must be easily accessible to all emergency response agencies involved.

Solution: The PLTS Product Library is a

cartographic document management system that supports the production life cycle, from source data collection and management to the production and storage of standard map products. It facilitates the organization and management of data models, image files, map document templates, data validation rules, and other cartographic information relevant to response activities.

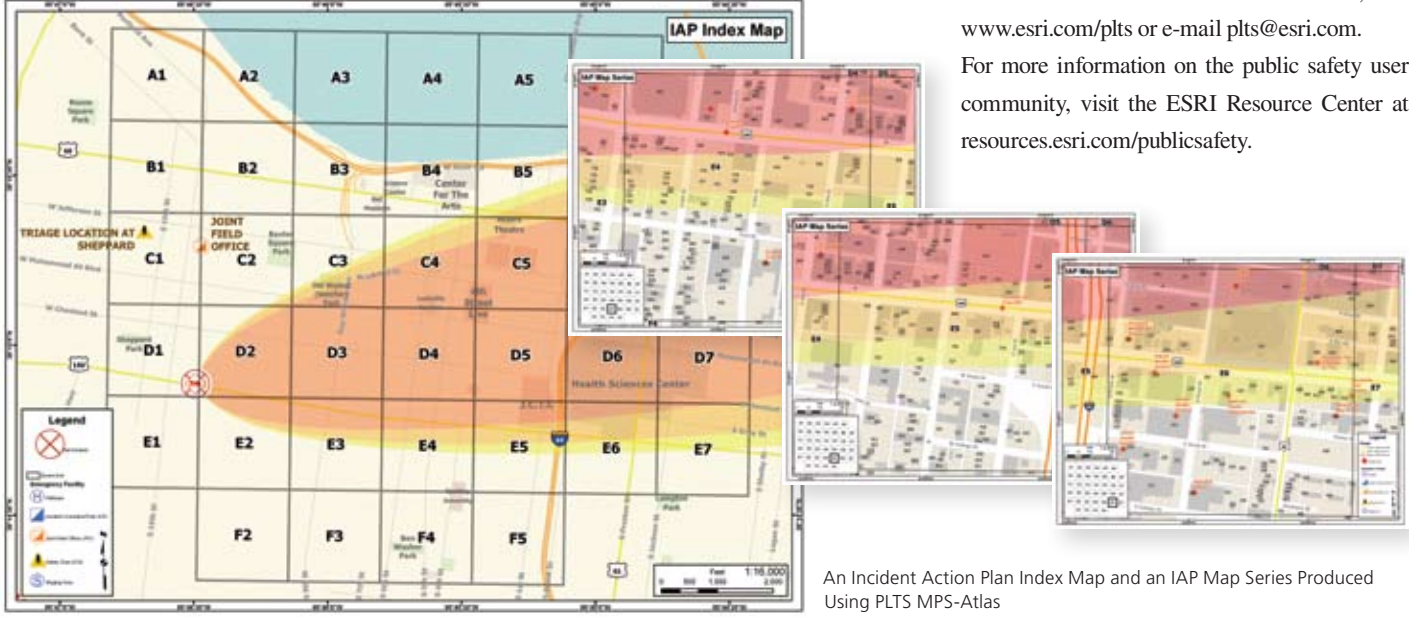
Need: Best practices in geodatabase design and cartographic symbolization should be adopted to support multiagency response efforts.

Solution: The PLTS Data Loader provides a mechanism for loading data from one geodatabase or set of shapefiles into another geodatabase that may or may not have the same schema. For

public safety organizations, it is important to follow established best practices when developing data models and symbology for use in emergency response GIS applications. The use of tools to load your existing GIS data into a common data model will help maintain interoperability in multiagency response efforts and will facilitate the sharing of data and maps. The Emergency Management Data Model template (available as a free download on the ESRI Public Safety Resource Center) contains a geodatabase model that can be used as a template for building a public safety geodatabase. It provides a good example of relevant feature classes and tables that can be used when designing and building public safety/emergency management applications. The PLTS Visual Specifications can be used to ensure standardized visualization of data and provide management and storage inside the geodatabase. The symbols and text created in accordance with the specification rules are also stored inside the geodatabase using feature class representations and calculated fields.

More Information

For more information on PLTS for ArcGIS, visit www.esri.com/plts or e-mail plts@esri.com. For more information on the public safety user community, visit the ESRI Resource Center at resources.esri.com/publicsafety.



An Incident Action Plan Index Map and an IAP Map Series Produced Using PLTS MPS-Atlas

ESRI on the Road

2009 Emergency Management Road Show Series

Los Angeles, CA—October 22, 2009
Miami, FL—November 17, 2009
Houston, TX—November 19, 2009
Boston, MA—December 9, 2009

International Association of Emergency Managers (IAEM) Annual Conference

Orlando, FL
October 31–November 5, 2009

Asia-Pacific Homeland Security (APHS) Summit

Honolulu, HI
November 8–11, 2009

Mipol Paris

Paris, France
November 17–20, 2009

NAPSG/ESRI Fire/EMS GIS User Group Meetings

Greensboro, NC—November 17–18, 2009
Westampton, NJ—November 19–20, 2009
Seattle, WA—November 23–24, 2009
Irvine, CA—December 2, 2009
Winter Park, FL—December 10–11, 2009
Centennial, CO—December 14–15, 2009

American Correctional Association

Tampa, FL
January 22–27, 2010

Fire House World

San Diego, CA
March 2–4, 2010

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ESRI Public Safety News

Homeland Security Summit and User Conference Feature Proven Solutions and Best Practices

This year's ESRI Homeland Security GIS Summit had a successful run as a preconference to the annual ESRI International User Conference. The summit was held July 11–14 at the San Diego Marriott Hotel.

The event featured public safety manager Russ Johnson discussing the importance of GIS for homeland security and emergency management. He detailed how data collection/intake, integration, analysis, and dissemination can be applied to the data fusion center workflow using GIS as an integration platform.

Keynote Addresses by Cindi Salas, manager of Business Solutions at CenterPoint Energy, and Dr. David Boyd, Department of Homeland Security, Science and Technology Directorate Command, supplied the audience with real-world best practices for both natural disasters and potential man-made threats.

Practical, informative, and engaging presentations by ESRI users and business partners gave attendees plenty of opportunity to focus on specialized areas. Attendees learned how modern GIS technologies and techniques can meet mission requirements.

ESRI International User Conference

Public Safety Showcase

The 2009 ESRI International User Conference, held July 13–17 at the San Diego Convention Center, once again featured the Public Safety Showcase. The showcase featured solutions for all aspects of public safety, including police, fire, disaster management, homeland security, emergency medical response, and computer-aided dispatch.

In addition to the numerous booths and GIS exhibits, a public safety demonstration theater supplied nonstop presentations showcasing the importance of enterprise GIS. ArcGIS Explorer 900, ArcGIS Situational Awareness, Microsoft Fusion Core Solution, Spatial Crime Analysis, and Australia Bushfire Response and Damage Assessment were just some of the high-lighted sessions.

In addition to the Public Safety Showcase area, the ESRI User Conference provided industry-focused sessions, technical workshops, Special Interest Group meetings, and moderated paper sessions for all things pertaining to public safety.

Public Safety GIS Goes Web 2.0

New Web Pages, Twitter Account, Blog, and Facebook Page Now Available

ESRI released a series of new Web resources that provide easier, more interactive methods to get the latest information possible. It also fosters greater communication and collaboration via the Internet.

ESRI launched updated and streamlined Web pages at esri.com/publicsafety. This public safety page allows you to quickly connect to the industry that's right for you. Gain access to industry information, ESRI software information, user stories, partners, and public safety organizations that can help you maximize success using GIS. Whether you're a new GIS user or seasoned enterprise GIS pro, there's something at the page for you.

ESRI also unveiled the new Public Safety Resource Center, a comprehensive technical Web site developed specifically for its user community. The Resource Center (resources.esri.com/publicsafety) provides valuable technical information, GIS application templates, best practices, and more. The Web site includes applications to perform planning and analysis,

assist in mitigation efforts, provide comprehensive situational awareness, and support response and recovery operations. As part of the resource center, a new public safety blog provides detailed information featuring the latest news in an interactive, community-oriented format. Learn the latest information and provide your own input as well.

In addition, you can now follow ESRI public safety using Twitter (twitter.com/GISPublicSafety).

Finally, a newly formed Homeland Security Summit Facebook page provides the ultimate community experience for homeland security professionals. This is a page for ESRI users to meet, exchange info, and collaborate. With the 2010 ESRI Homeland Security GIS Summit promising even bigger and better things, this is your chance to meet fellow GIS professionals with similar missions but unique perspectives.

Microsoft and ESRI Launch Fusion Core Solution

Integrated Capabilities for Intelligence and Fusion Centers

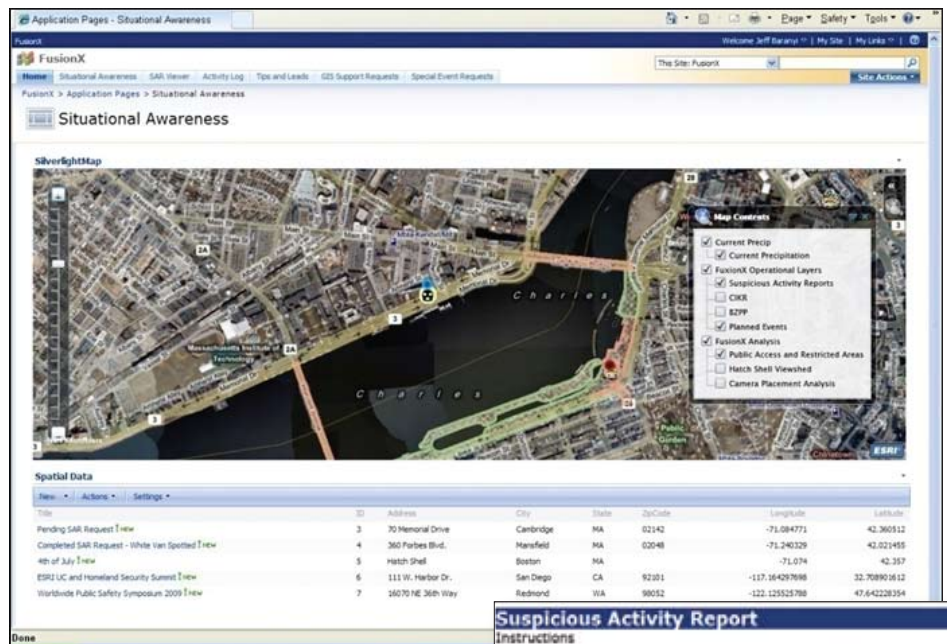
Microsoft Corporation and ESRI launched Fusion Core Solution, a public safety and homeland security solution architecture, at the ESRI International User Conference in San Diego, California. Formerly referred to as FusionX, Fusion Core Solution was designed by the two industry leaders to help public safety and homeland security professionals more effectively prevent today's evolving physical and virtual security threats. In addition, the solution strengthens the ability of government agencies to prepare, assess, and respond to natural disasters.

"Agencies need the ability to efficiently collect, manage, and disseminate vital intelligence from multiple sources to counter future threats and criminal activities," says Joe Rozek, executive director of Homeland Security and Counterterrorism for Microsoft's U.S. public sector business. "This technical architecture helps organizations at all levels collaborate, so the right people have the right information at the right place and time."

"Fusion Core Solution fully integrates GIS into public safety and homeland security workflows," says Paul Christin, homeland security specialist, ESRI. "This opens up the benefits of GIS throughout the organization. People can better collaborate and share knowledge for improved threat identification and vulnerability assessments."

The Fusion Core Solution capabilities include

- **Managed Intake**—Preloaded and fully customizable forms for processing, assigning, and satisfying many different types of intelligence and information service requests
- **Enterprise Search**—Provides tools to search across multiple data sources including file shares, Web sites, and databases
- **Robust Geodatabases**—The ability to easily capture, maintain, and disseminate



A Suspicious Activity Report is received and viewed on the map.

spatial data using the ArcGIS geodatabase

- **Integrated Analytics**—Powerful search and preconfigured geospatial analysis capabilities that are extendable to integrate new or existing applications
- **Analyst Collaboration**—Integrated capabilities to enable analyst and customer collaboration using Web sites, wikis, and blogs
- **Robust Security**—Can be integrated with existing authentication and auditing systems or provide these capabilities out of the box
- **Tools for Managing Operations**—Powerful management reporting capabilities for managing analyst staffing and monitoring center activities

Fusion Core Solution combines the robust capabilities of ESRI's ArcGIS Server Advanced Enterprise and Microsoft Office SharePoint Server 2007. The solution can be implemented by both users of SharePoint and ArcGIS Server as well as new users. Current

users of SharePoint and ArcGIS Server will be able to download the Fusion Core Solution Custom Code and build the solution with internal staff or choose to work with a system integrator.

Public-sector organizations that used initial components of Fusion Core Solution include the Massachusetts Commonwealth Fusion Center. The agency relies on the combination of SharePoint and ArcGIS for content management, spatial analytics, and information sharing functions that are vital to its law enforcement and counterterrorism mission.

For more information about Fusion Core Solution, visit www.microsoft.com/fusion or e-mail fusion@microsoft.com.

High-Tech Crime Mapping

Philadelphia Police Use a Myriad of GIS Tools

For the Philadelphia Police Department (PPD), GIS software provides an invaluable resource for meeting mission demands. The enterprise platform provides commanders and frontline staff with the ability to make sense of millions of historic incident records to accurately pinpoint crime rates and patterns.

Instead of dozens of individuals combing through thousands of pages of paper documents or volumes of spreadsheets and digital forms stored in multiple locations, PPD uses GIS to unlock its data stores and make better decisions. In addition, the PPD GIS allows officers of any rank and in any department to perform their own information analysis. They can quickly and easily perform a query, see the results, and share it with other staff.

GIS gives PPD an information-based resource for strategically placing field personnel and executing policing programs that deter crime, apprehend suspects, and quickly respond to emergencies. Information flows throughout the organization. The agency proactively stays ahead of the crime-fighting curve.

Today, PPD uses ESRI ArcGIS 9.3 software, Microsoft Visual Studio, Microsoft Access 2002, and Microsoft SQL Server 8.0.

The GIS can access more than 150 geographic data layers, with more than 50 of these being maintained by the unit. The unit geocodes more than 5,000 incidents each day and nearly 2.5

million incidents annually. The geocoded incidents have specific symbols based on crime type.

The types of services include printed maps, database reports, statistical graphs and charts, and intranet mapping services. Ad hoc requests are also done. The unit produces as many as 50 maps a week. This can include regularly updated incident maps such as weekly or monthly maps showing crime density, locations, police beats, arrests, calls for service, citations issued, and car accidents. Points of interest are also mapped such as liquor-licensed establishments, surveillance camera locations, hospitals, nightclubs, shelters, and halfway houses. In addition, data on buildings, railways, sidewalks, alleys, and open areas is integrated into the GIS.

Special divisions served by the crime analysis and mapping unit include homicide, narcotics, major crimes, highway patrol, and the crime scene unit. The mapping unit also serves the district attorney's office for court preparation by frequently providing court maps. Staff can fill out an online form, phone in a request, or go to the unit in person to ask for a map product.

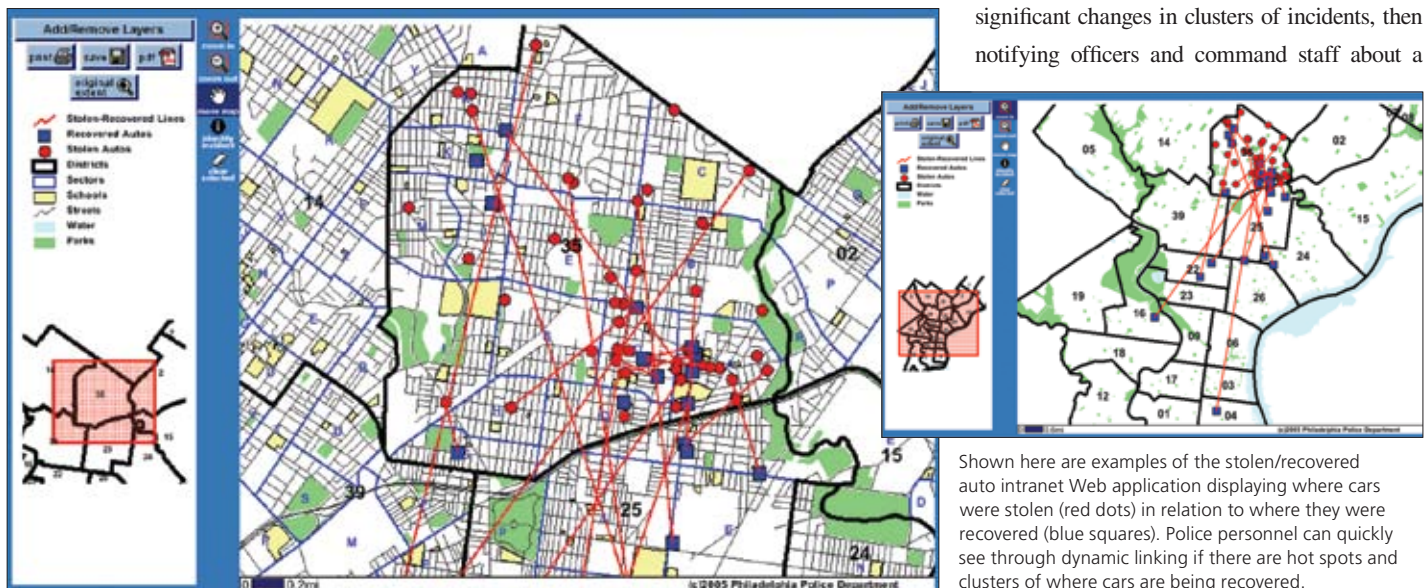
Senior ranking officials attend weekly computer statistics (COMPSTAT) meetings held at agency headquarters to review recent events, share work activities for each police district, and jointly plan future policing programs.

Crime in each police district is broken down by type and further analyzed to identify the

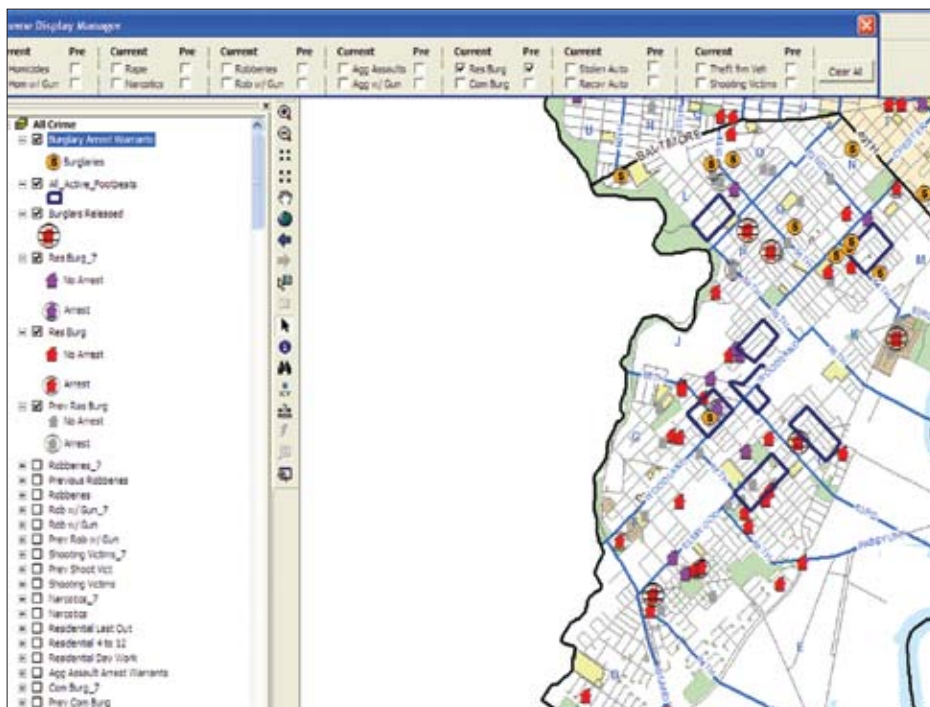
place of occurrence as well as the time of day, day of the week, and week and month of the year. Homicides, rapes, robberies, and aggravated assaults are divided into incidents committed with and without guns. Aggravated assaults are further classified as domestic or nondomestic. Burglaries are listed as residential or commercial. Thefts are classified as retail theft, theft from a person, theft from an auto, and auto theft. Data is also captured for incidents involving shootings and gun arrests and seizures.

The unit currently has several GIS applications available to police personnel from any desktop or laptop computer via the department's intranet. They consist of three major components:

- PhiCAMS—Web-based crime mapping software that supports analysis with tables, statistics, charts, and maps for incidents, arrests, and other datasets
- Firearms Analysis System (FAS)—A firearms system that accepts firearms trace requests from detectives; transmits an electronic request to the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF); then receives the electronic response and enables mapping and analysis of the results
- Spike Detector—A specialized data mining solution for automatically detecting statistically significant changes in clusters of incidents, then notifying officers and command staff about a



Shown here are examples of the stolen/recovered auto intranet Web application displaying where cars were stolen (red dots) in relation to where they were recovered (blue squares). Police personnel can quickly see through dynamic linking if there are hot spots and clusters of where cars are being recovered.



A custom ArcGIS 9.3 project displayed at COMPSTAT meetings shows residential burglaries that have occurred over the last week (purple), over the last 28 days (red), and in the 28 days previous (gray). Additionally, recently released burglars, as well as people with active warrants in the area for burglaries, are represented. Note the blue polygon outlines that represent current foot-beat patrols in this given police district.

newly detected cluster.

One of the more advanced uses of GIS involves sophisticated data mining techniques to extract useful information from large transactional databases. Staff performs hot-spot assessments where the relative density of incidents is examined and mapped using color-coded references to indicate high or low incident concentrations. Staff can quickly view the map to understand where crime is occurring with greater frequency.

The crime-tracking solution, known as Spike Detector, is an early warning system that puts crime parameters in place, and any deviation from the user-defined crime pattern is instantly and automatically sent to officials via an e-mail alert. The solution integrates incident information with location data, such as proximity of crime type to police units and facilities, as well as temporal data.

GIS software is used daily to comb through millions of records and search for recent, geographically clustered crime frequencies. The system automatically alerts police captains by e-mail when crime spikes occur and provides location and attribute data. Commanders view digital information-packed crime maps along with lists of reports and related incident information.

Instant notification means management officials receive accurate and timely intelligence when it's available; they can then more rapidly deploy response tactics and follow up and assess results.

Additional Applications for Greater Agency-Wide Effectiveness

The unit has also created a public school incident data application that supplies the most current information on crimes occurring within Philadelphia public schools in an intranet tabular format.

The agency's stolen/recovered vehicle tracking application displays links between where vehicles are stolen and their recovery locations. A map depicts the site where a vehicle has been stolen and where it is recovered, and a line connecting the two points is overlaid on city street data. This type of analysis and information helps agents see exactly where and when to increase policing efforts and to track down potential "chop shops" where stolen vehicles are taken.

A user can also access prisoner release information, such as the person's arrest record and current address as well as a photo ID. A simple query can locate where the released prisoner resides.

The same type of query can be done for persons wanted for various crimes throughout the city. In addition to a map depicting a suspect's last known address, the location of the incident, warrant information, and suspect information and picture ID, other details are also available.

"The map serves as an intuitive interface to access data," says Michael Urciuoli, GIS specialist, Philadelphia Police Headquarters. "GIS functionality provides a spatial component to visualize suspect data and link crime data by geography."

A GIS-enabled Part I crime search lets officers enter police report information into a form that can be viewed by others through the intranet. The user can search any number of fields in the form. The user can also specify a phrase or word within any field or narrative in the report. The form has a large number of fields for entering crime information.

PPD recently unveiled a public Web site where city residents can map the incidence of major crimes in Philadelphia. The site uses existing GIS software and data to provide the external city Web site (citymaps.phila.gov/CrimeMap) with crime information. Both the public site and the intranet mapping site were developed and are still maintained by Avencia (<http://www.Avencia.com>). The site provides citizens with a simple, accurate map display of crime across the city. Data is updated nightly from police department databases. A month's worth of crime data can be viewed and downloaded.

"GIS is changing the way we operate," says Urciuoli. "All police personnel, from the police commissioner down to the officer in the patrol car, can use maps as part of their daily work. Our online mapping applications needed to be fast and user-friendly because police officers don't have time to become computer experts. I think we've delivered on this goal, and it's transforming what we do and how we serve the community."

More Information

For more information, contact Michael Urciuoli, GIS Specialist, Crime Analysis and Mapping Unit, Philadelphia Police Headquarters (e-mail: Michael.Urciuoli@phila.gov).

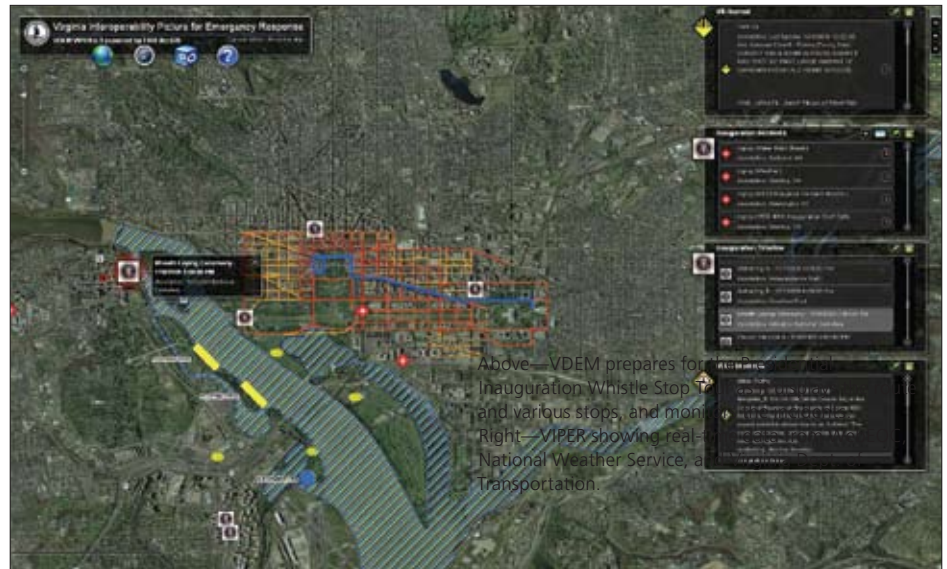
Virginia Deploys Emergency Management System

The Virginia Department of Emergency Management (VDEM) recently launched an emergency management system—the Virginia Interoperability Picture for Emergency Response (VIPER)—that has transformed how it prepares for emergencies and responds to disasters. The GIS-based enterprise platform integrates with numerous information systems and links with approximately 250 data feeds. It supplies a Web-based common operating picture and numerous analysis tools. Emergency commanders; first responders; and police, fire, and government officials can tap into a single information resource. People access the system to gain an accurate understanding of events on the ground, deploy the right personnel and equipment, and update data dynamically from the field or command center.

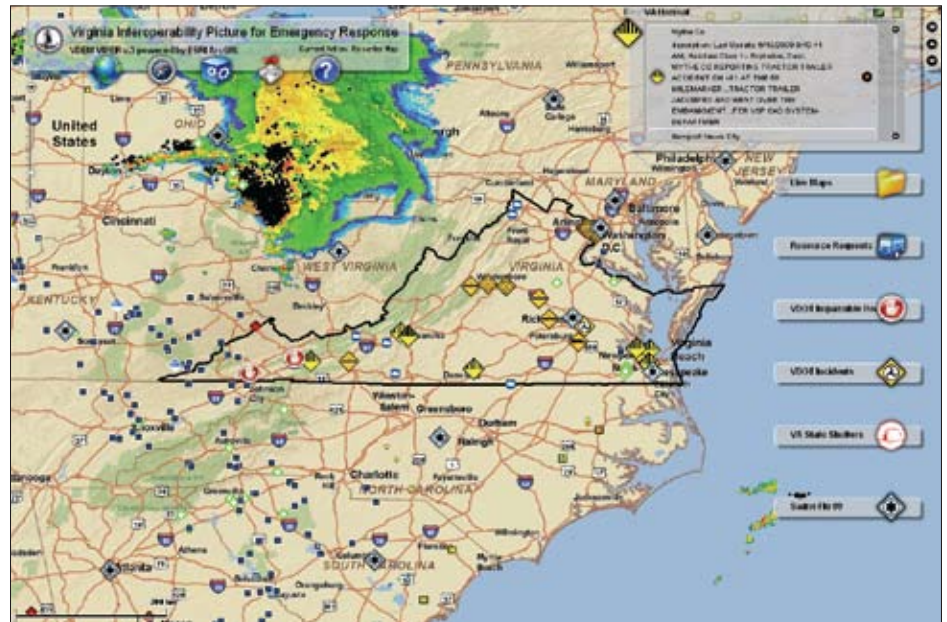
“What we needed was a method to avoid redundant work and improve our situational awareness,” says Bobbie Atristain, chief technology officer, VDEM. “VIPER achieves this. Now, we get the right information we need as soon as it’s available to make better decisions.”

VDEM implemented VIPER after an extensive needs assessment. The agency wanted to overhaul its existing situational awareness system. The goal of the new system was to enhance information sharing, communication, and analysis. It would provide a new level of connectivity and fully integrate multiple systems. The obstacle of wading through numerous information stores, databases, and other technologies would be removed. In addition, preconfigured processes could be put in place so that when an incident occurs, the right datasets and feeds will be activated, and responders can act immediately and monitor events in real time.

VDEM contracted with Professional Services consultants in ESRI’s Charlotte, North Carolina, office to help Atristain extend the capabilities of VIPER. Professional Services staff worked with Atristain to configure ESRI’s Flex Viewer, powered by ArcGIS Server, to monitor environmental sensors and gather data from VDEM’s crisis



VDEM prepares for the Presidential Inauguration Whistle Stop Tour by displaying the route and various stops, and monitors the incidents.



VIPER Showing Real-Time Data from WebEOC, National Weather Service, and Virginia Department of Transportation

management system and other resources, such as the National Weather Service.

The system was built using ArcGIS 9.3, including ArcGIS Server and ArcGIS Desktop software.

“I saw the first version of the Flex API and instantly knew that’s what we needed,” says Atristain. “I just thought that the Web was a much easier way for us to deploy something because everyone can get to it—it didn’t rely on any software on anyone’s machine.”

Bolstering the High-Tech Landscape of Emergency Management

Today, VIPER is available not only to local, state, and federal agencies but also to the public. Users can go online using the Web to view the real-time data and point or click their way to information they want. Street, satellite, and topographic maps provide a diverse set of basemap data. Feeds from multiple sources supply information related to air incidents, traffic accidents, civil disturbances, earthquakes, floods, terrorist threats, hazardous



This VIPER full-size image shows real-time data from systems such as the National Weather Service and the Virginia Department of Transportation.

material spills, hurricanes, reported public health concerns (such as swine flu), power outages, reported suspicious activities, wildfires, and more.

Since its launch, VIPER has had several successful deployments. During Tropical Storm Hanna, VDEM used the new platform for the first time. The system showed shelter status overlaid with the National Weather Service's

feeds. This helped staff prepare for the potential large-scale displacement of people.

During the 2008 presidential election, VDEM staff hosted geoprocessing models authored on its desktop and pushed them into its server environment. The result was a model that queried the statewide Hazmat 5-1-1 transportation and traffic telephone hotline and Virginia Department of Transportation

construction projects against the school and election polling location layers. During the election, staff working in the Virginia Emergency Operations Center (VEOC) viewed only polling places or schools that fell within a two-mile buffer zone of any obstructions. The benefit was that watch commanders could immediately identify polling places that had potential complications. They could then contact the staff at highlighted polling locations, such as those near a hazardous material spill or large traffic accident, to make sure the polling process was still running smoothly.

“There was a great concern about overcrowding at the polls,” says Atristain. “This is why we needed overall situational awareness for the entire state in preparation for the November election. We needed to be able to respond to something, if possible, before it became a serious problem.”

In addition, VIPER was used during President Barack Obama's inauguration ceremony, which was the largest in the nation's history. The system helped provide security for the 2.7 million people who attended. VIPER helped track multiple related events across Maryland, the District of Columbia, and Virginia. In the Multi Agency Command Center (MACC), local, state, and federal officials used VIPER to look for any anomaly that could have impacted the inauguration.

Indeed, the success of the system is catching the attention of the nation. Several local and state agencies have looked at the VIPER system as a model for something they can quickly build using their existing GIS resources and at a nominal cost. There have been congressional hearings where VIPER has been showcased as a model for a possible nationwide system.

“We're getting an amazing response, especially for all the system can do that's above what you might usually see,” says Atristain. “It's exciting.”

More Information

For more information, contact Bobbie Atristain, chief technology officer, Virginia Department of Emergency Management (e-mail: Bobbie.Atristain@vdem.virginia.gov).

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- Government Information Technology Agency, Arizona
- Orange County Fire Authority, Orange County, California
- State of California Resources Agency/State of California CalEMA/County of Los Angeles/County of San Diego OES—Golden Guardian Exercise, California
- Yosemite National Park, California
- Louisiana National Guard, Louisiana
- New York State Emergency Management Office, New York
- Commonwealth of Virginia/Department of Emergency Management, Virginia
- State and Private Forestry, U.S. Forest Service, Washington, D.C.
- Australian Capital Territory (ACT) Emergency Services Agency (ESA) and ACT ESA Mapping and Planning Support Group, Australia
- Victoria Police, Australia
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- Governo Civil de Santarém, Portugal
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