Esri News for
Public Safety
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Situational Awareness—Where Do We Go From Here?


Russ Johnson, Public Safety Director, Esri

The evolution of the geospatially powered common operating picture (COP) has improved public safety organizations' capabilities to make better and more coordinated decisions. There are many examples: the State of Virginia's Virginia Interoperability Picture for Emergency Response (VIPER), Virtual Beverly Hills, and the State of Florida's Geospatial Assessment Tool for Operations and Response (GATOR), to name a few. As the common operating picture has continued to expand with workflow support, analytic tools, and dynamic operational data, it has become more powerful and perhaps at times cluttered. As the COP evolves, we will see many viewers focused on specific mission requirements as opposed to one viewer with everything. Each unit within an organization may have its own version of a common operating picture to support its primary role.

The common requirement is access to data, services, and tools. All personnel within a mission space should have access to the same base data; additional data, tools, and services would be prescriptive and based on mission needs. Fundamental requirements of mission-based viewers are ease of use and operational readiness.

The focus of a geographic information system (GIS)-based solution for situational awareness is rapidly becoming the platform as opposed to the viewer. Today, what's needed is a platform that can be quickly configured to provide specific viewers to support ever more complex missions. In an emergency management context, the platform may be serving and enabling several mission-specific viewers. They could align with National Incident Management System (NIMS) for operations, logistics, planning, public information, and command. The viewers could also be configured to support some or all of the Emergency Support Functions (ESFs 1 through 15, ranging from transportation to external affairs), enabling situational awareness for decision support and operational briefings. In addition, timely and accurate mission-based situational awareness requires access to information and data from the field as events are unfolding. The capability to acquire mobile data is key in providing time-sensitive situational awareness, whether it is supporting incident management, damage assessment, or other critical operations.

The GIS platform now provides public safety organizations with the capability to quickly configure and deploy multiple viewers that are windows into the common operating platform. It also enables more accurate and timely situational awareness through bidirectional data exchange with a variety of mobile devices. With ever-growing analytic tools and the ability to access data from internal and external systems, the common operating platform supplies more flexibility in achieving public safety situational awareness.

To learn more about GIS as a platform for public safety, visit esri.com/publicsafety.

How Disaster Ready Are You?

Esri Helps Central US States Participate in the Nation's Largest Emergency Exercise

On the morning of May 20, 2011, eight states, along with federal and local government agencies, volunteer organizations, and the private sector, participated in the 2011 National Level Exercise (NLE). The NLE drill helped assess organizations' emergency preparedness and how they would react if a 7.7 magnitude quake struck along the New Madrid Seismic Zone.

A key element in the exercise was GIS technology. GIS provided an integration platform that fused basemaps and imagery with live data feeds. Its analytic capability made actionable information available for agencies to effectively collaborate.

"The National Level Exercise presented a once-in-a-career opportunity to fully test and stress all the emergency management tools in a realistic response environment across eight states and the federal government," says Brigadier General John Heltzel, director of the Kentucky Division of Emergency Management and current chairman of the Central United States Earthquake Consortium (CUSEC). "Leveraging the capability of GIS allowed us to greatly extend our planning and preparedness for seeing what was needed and what was happening in the impact zone."

The CUSEC states of Alabama, Arkansas, Illinois, Indiana, Kentucky, Mississippi, Missouri, and Tennessee participated. The exercise allowed each state, in addition to federal and local government agencies, to validate communications, critical resource logistics and distribution, mass care (sheltering, feeding,

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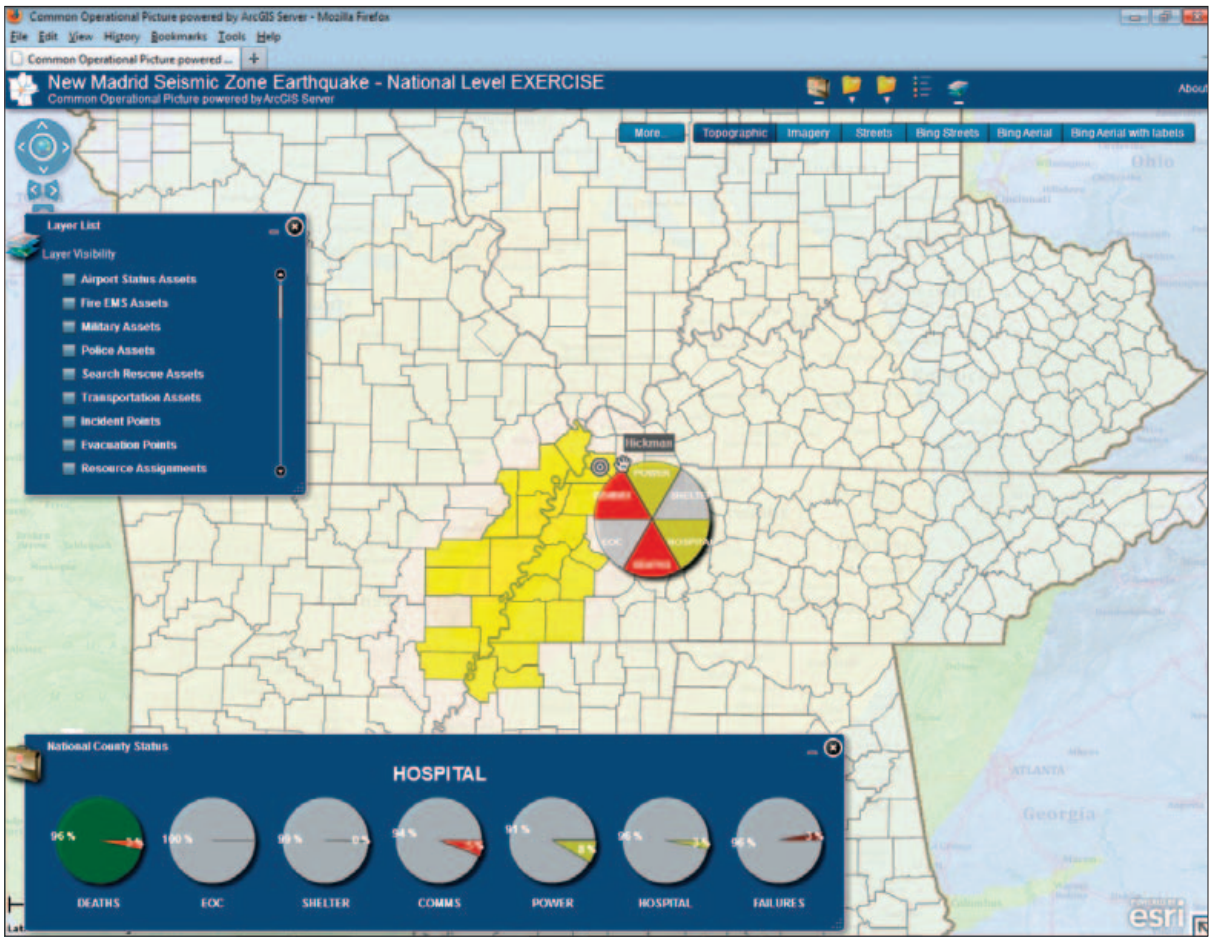


The customized common operating picture showed data for seven primary indicators the Central United States Earthquake Consortium wanted to display.

More Industry News

You will find more news and information specific to GIS for the public safety industry in *ArcNews*, a quarterly magazine for the Esri community. Visit esri.com/arcnews.

To learn more about GIS for public safety, visit esri.com/publicsafety.

To submit an article, subscribe, unsubscribe, or change your mailing address, visit *Esri News for Public Safety* at esri.com/publicsafetynews.

More GIS News

Keep up with breaking GIS news, watch the latest videos, access ArcGIS resources, and connect to social media outlets at the newly launched website esri.com/news.

Homeland Security Summit Provides Forum for Learning and Sharing

As a precursor to the 10th anniversary of the 9/11 terrorist attacks, the 2011 Esri Homeland Security Summit focused on where we have been, where we are now, and where we need to go to meet mission demands. It allowed attendees to collaborate and discuss past accomplishments and future direction.

The Public Safety Showcase area featured interrelated demos for different workflows.

The Esri Homeland Security Summit was held as a preconference to the Esri International User Conference (Esri UC). This year's event was held July 9–12 at the Hilton Bayfront in San Diego, California.

People from industries such as law enforcement, fire, homeland security, computer-aided dispatch, and emergency management were on hand. New this year, three tracks were offered—one for executives, one for technical staff, and one featuring Lightning Talks. The first catered to senior-level decision makers, the second was designed for public safety GIS practitioners, and the third featured short case studies from various public safety agencies.

The Esri UC once again featured the Public Safety Showcase area, including the renowned Operation SafetyNet series of interrelated demonstrations. Operation SafetyNet showed the effective use of GIS technology for the four public safety workflow patterns—data management, planning and analysis, field mobility, and situational awareness—within the context of law enforcement, emergency management, fire/rescue, and fusion center operations. The showcase also supplied firsthand demos from Esri's leading industry partners and users.

Planning for next year's event is already beginning. The 2012 Esri Homeland Security Summit will be held July 21–24 in San Diego.

To learn more about the Esri Homeland Security Summit, including next year's event, visit esri.com/hss.

Czech Republic at the Forefront of Protecting Citizens

New Integrated Safety Center Empowers Public Safety Agencies

The modern world of public safety relies on information as an invaluable resource, in many ways as important as physical tools such as a fire axe, ambulance, or police radio.

The Czech Republic understands this well. A recently launched regional operations hub—the Moravian-Silesian Region Integrated Safety Center (ISC)—is bringing together networks and supplying staff with robust software tools using Esri software.

Today, separate public safety units share a central control room. They access and use the same ArcGIS platform for efficiently deploying personnel and equipment. The ArcGIS system enables decision makers to access relevant information that is delivered through a geospatially driven common operating picture to provide better services through improved decision making.

"We cannot imagine doing this work without integrated GIS," says Petr Faster, fire officer, Operational Management Division, Moravian-Silesian Region Fire Department.

ISC, empowered with advanced information and communication technology, replaced 15 distinct operational dispatch centers. The benefits from moving this work to the ISC include elimination of both data redundancy and duplication of work and the synergy that results from operating a unified information system framework.

ISC today receives all emergency calls within the Moravian-Silesian region (MSR). Emergency medical services, the fire brigade of the MSR, police of the Czech Republic, municipal police of Ostrava, and crisis management personnel all operate out of ISC. Together, there are 31 dispatchers composed of 8 for fire/rescue, 10 for medical, 3 for municipal police, and 10 for the Czech Republic Police Department.

When an emergency call comes in, operators use ArcGIS to locate the caller's position for both landline and mobile phones.

"Integration through GIS makes the coordination of all the public safety units easier," says Faster. "We solve cases together from one place, using the same data through common visualization. GIS is essential for managing emergency situations in the region."

Once a call is located, operators can quickly dispatch the closest appropriate personnel and resources.

GIS is also used by operations staff and managers to analyze, visualize, and take action for major events such as a natural disaster. Once the emergency is visualized on the map, managers can quickly drill down and access more detailed information that is contained in local databases or other remote sites. Remote access can include web services such as real-time weather, traffic cameras, and other dynamic sensor-based data.

Proactive spatial planning and modeling enables proactive work before emergencies happen. For example, it's used for modeling response times and reviewing incident history based on time of day and day of the week; it also helps in positioning resources for efficient response. This helps establish staffing patterns by resource type and capability based on historic call volume patterns. Resource deployment becomes a science-based methodology.

Future applications include the deployment of in-vehicle navigation for emergency vehicles. This capability will also enable first responders to visualize geographic and other data from ISC databases to support first responder situational awareness and emergency location preplan data.

"Having map and data integration for all the safety units in one building is the key benefit for us," says Faster.

To learn more, visit esri.com/arcnewsisc.


The Moravian-Silesian Region Integrated Safety Center takes advantage of Esri software to meet mission requirements.


GIS helps with multiple public safety purposes. This map is used to assess large-scale flood risk areas.

Better Policing through Analysis

Ogden Police Takes Advantage of GIS Technology in its Real Time Crime Center

To better serve its community, Ogden Police Department (OPD) in Utah recently launched its multimission Real Time Crime Center (RTCC). The center provides 24/7 support to law enforcement. It deploys a host of advanced technologies including camera systems, crime databases, and vehicle tracking. Serving as its foundational integration platform, ArcGIS software provides a multimission common operating picture. The agency's use of GIS comes from nearly a decade's worth of previous work. GIS automatically links crime and other datasets maintained in different databases. OPD can perform advanced analysis and digitally map the results. These functions have allowed police staff to effectively deter crime and make arrests. Bringing those functions into the RTCC has helped extend these benefits to new levels and to more people.

"Having GIS available in our Real Time Crime Center allows us to operate more efficiently and work in a more proactive, integrated fashion," says Jon J. Greiner, chief of police, Ogden Police Department. "It helps us, each different bureau of the police department, make better decisions about how we should investigate crime. It reveals important new information that leads to better decision making and use of limited resources."

Ogden Police Department consists of 144 sworn officers serving a community of approximately 85,000 residents. The City of Ogden has used Esri software and services for more than a decade. The software helps with all types of city government duties—from maintaining land records to managing infrastructure and planning growth.

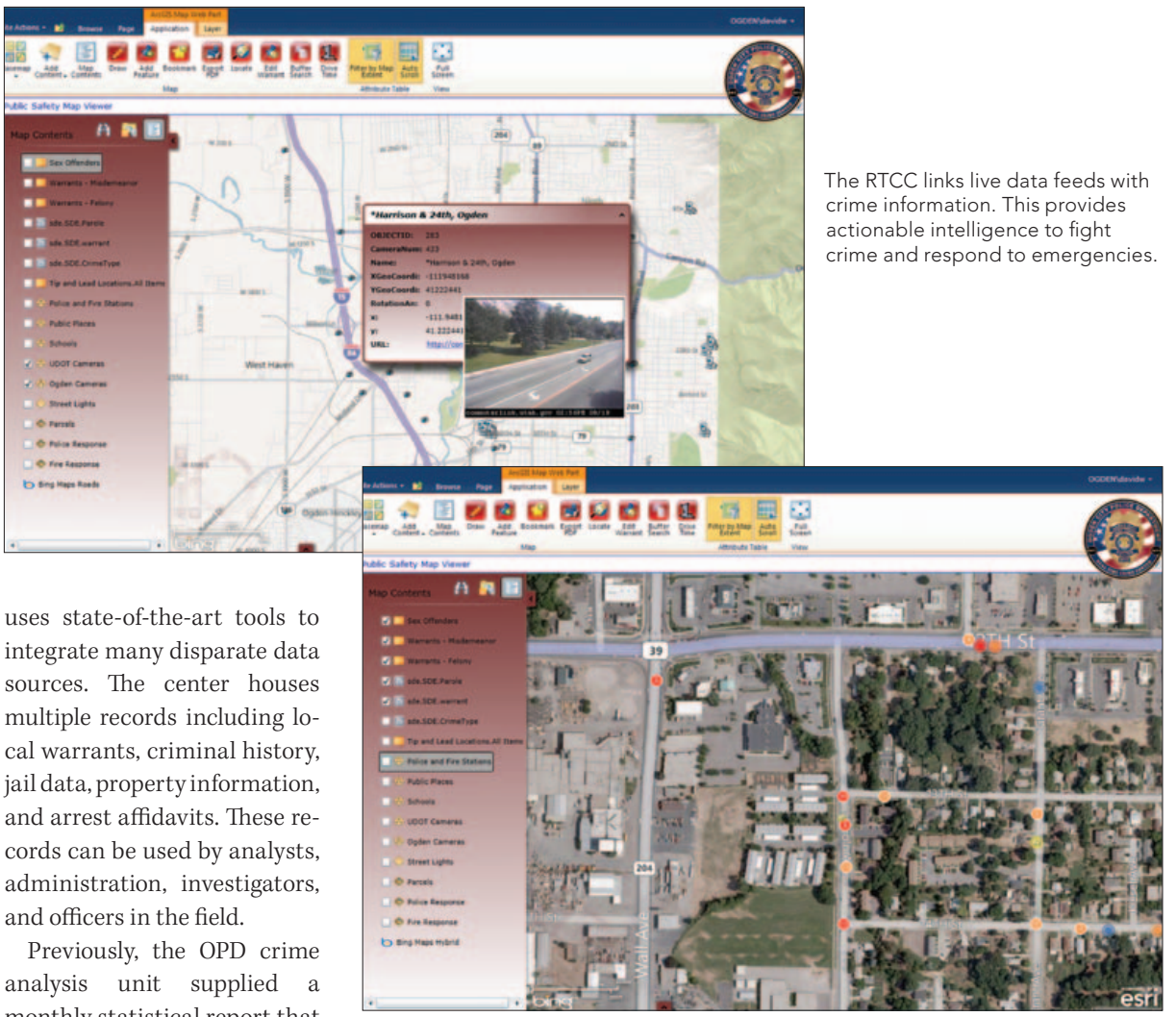
The OPD crime analysis unit first began using the full capabilities of Esri desktop software for its daily work nearly a decade ago. In 2008, there was a significant enhancement: A more powerful web-based analysis tool allowed people to identify patterns through dynamic hot spot mapping, which is simply analysis that shows areas of crime intensity. This opened up crime data to any OPD officer with web access. Just a few mouse clicks allowed officers to quickly view, analyze, and share crime trend maps. The intuitive solution helped officers get the information they needed without requesting it from the crime analysis unit, taking additional training, or installing additional software. Officers could do their jobs better without having to become GIS software experts. The agency also added automated vehicle location (AVL) capabilities to its GIS system.

"It was added so that we could track and analyze patrol patterns and their relationship to crime patterns," says Josh Jones, senior project coordinator—GIS, City of Ogden. "This tool has been helpful in monitoring criminal activity as well as planning crime-fighting activities and monitoring their success."

That same year, Ogden teamed with Esri partner Pictometry International Corp. to include detailed oblique aerial photography within its city databases. This data made its way to OPD. The Pictometry-supplied data allows easy computer viewing of city buildings and other structures from all sides and angles. Analysts can measure distances between windows, fences, streets, and other items of interest without going out to the site, which might risk compromising an operation.

A New Level of Success: The Real Time Crime Center

OPD reached its next technology milestone by opening the Real Time Crime Center in July 2011. The RTCC, formally named the Area Tactical Analysis Center, uses state-of-the-art tools to integrate many disparate data sources. The center houses multiple records including local warrants, criminal history, jail data, property information, and arrest affidavits. These records can be used by analysts, administration, investigators, and officers in the field.



The RTCC links live data feeds with crime information. This provides actionable intelligence to fight crime and respond to emergencies.

Integrated map views of aerial photography and public safety information help Ogden officials effectively allocate resources.

Previously, the OPD crime analysis unit supplied a monthly statistical report that included Esri software-derived maps. The information was given to the command staff and lieutenants to develop crime reduction plans and respond to issues of concern. The information was manually extracted from the record management system and CAD system and uploaded into GIS software for analysis.

The city uses the RTCC to perform these queries automatically through Esri ArcGIS software. The new workflow reduces the time analysts spend to extract, cleanse, and upload many disparate data sources.

In addition, the RTCC features a deployment of the Microsoft Fusion Core Solution (FCS). OPD will be the first department of its size to deploy this platform. FCS was developed as a result of collaboration between Microsoft and Esri. The powerful data management and collaboration tool Microsoft SharePoint is also fully integrated with the analysis tools found in ArcGIS software.

FCS provides a way to bring different data silos together in one place. In addition, it provides a National Information Exchange Model-compliant way to access and exchange data. It allows on-the-fly mapping of address and coordinate information linked to SharePoint. It will also aid in the intake, storage, archiving, dissemination, and search of OPD data. The FCS mapping capability will serve as the common operating picture for the RTCC. It will display events as they happen with real-time AVL data, weather data, plume modeling, and social media feeds.

"This technology truly allows us to improve our efficiency," says Greiner. "We can make connections and come up with solutions to problems that we might not have been able to do in any other way."

To learn more about how GIS is used in law enforcement, visit esri.com/lawenforcement.

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How Disaster Ready Are You?

and related services), medical surges, citizen evacuation and shelter in place, emergency public information and warning, Emergency Operations Center (EOC) management, and recovery. GIS helped the decision-making process in each of these areas.

Esri worked closely with staff from the US Department of Homeland Security (DHS) pilot program Virtual USA and Esri partner ESi Acquisition, Inc., in helping agencies access GIS data services and conduct briefings. When the exercise kicked off, Esri staff were present at multiple locations including Kentucky EOC; Federal Emergency Management Agency (FEMA) headquarters in Washington, D.C.; and remote field locations.

The common operating picture was supplied with information from WebEOC incident and event management software provided by ESi. Staff operating the COP successfully navigated through large volumes of incoming data, from simulated building damage assessments to downed roads, power, and water infrastructure; impacted populations; simulated injuries; available and incoming food and medical supplies; and much more.

"I couldn't be more satisfied with the results of the efforts of our GIS and technical partners in this exercise," says Heltzel. "We set the bar high, and through teamwork and a commitment to succeed, our Esri partners, along with ESi and Virtual USA, found solutions for every goal we set out for them."

To learn more, visit esri.com/arcnewsnle.

On the Road

Milipol 2011
Paris, France
October 18–21, 2011

California Crime and Intelligence Analysts' Association (CCIAA) Conference 2011
San Diego, California, USA
October 19–21, 2011

Major Cities Chiefs Fall Conference 2011
Chicago, Illinois, USA
October 21–25, 2011

International Association of Chiefs of Police (IACP) 2011
Chicago, Illinois, USA
October 22–26, 2011

Firewise Conference—Backyards and Beyond 2011
Denver, Colorado, USA
October 27–29, 2011

Interpol General Assembly 2011
Hanoi, Vietnam
October 31–November 3, 2011

International Association of Emergency Managers (IAEM) EMEX 2011
Las Vegas, Nevada, USA
November 14–16, 2011

Online

esri.com/psresources
This website is for the public safety user community. You can access templates, best practices, applications, and more. Discover better ways to perform planning and analysis, assist in mitigation efforts, provide comprehensive situational awareness, and support response and recovery operations.

esri.com/psfacebook
Connect with your fellow community members online and join the conversations. Follow us on Facebook at Esri—GIS for Public Safety.

esri.com/publicsafety/licensing
Esri launched a new enterprise licensing program designed to make acquiring Esri products easy and affordable for small public safety agencies. The Esri Small Public Safety Enterprise License Agreement (SPS-ELA) eliminates the cost barrier that can impede fully realizing the benefits of Esri technology.

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Lexington County EMS Saves Millions Using GIS

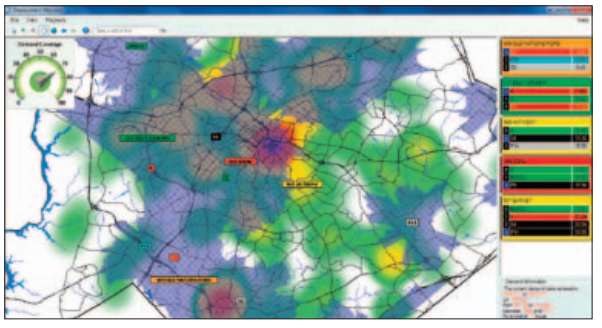
System Helps Staff Better Allocate Resources, Make Timely Decisions

Lexington County, South Carolina, now deploys an advanced GIS-based system for providing improved emergency medical services (EMS). The system, based on software from Esri partner Bradshaw Consulting Services (BCS), allows the agency to do more with less by efficiently allocating resources. It ultimately saved the county millions in proposed new staff and equipment purchases.

To meet increased service volume and maintain response times, Lexington County would have potentially needed to add one new ambulance annually over a four-year period, which was projected to cost $8.6 million for additional equipment and personnel. These projected expenses included $750,000 for ambulance crews each year along with $300,000 for each new ambulance vehicle. In addition, the county would have also needed an additional $2 million for ambulance station construction or renovation for each new vehicle, adding another $8 million in costs over the four-year period.

To avoid these expenses, county staff looked at available GIS applications and ultimately discovered the benefits of deploying the Mobile Area Routing and Vehicle Location Information System (MARVLIS) suite of applications from BCS. The use of MARVLIS in both the dispatch centers and vehicles would allow the county to meet service benchmarks despite the growth in its population and the unprecedented number of emergency 911 calls it was receiving.

"MARVLIS provides many capabilities for optimizing systems," says Lexington EMS director Brian Hood. "It serves as the integration platform to help create a high-performance emergency medical service. We pre-position emergency resources closer to the incoming requests by forecasting the location of emergency service demand."



Dispatchers use MARVLIS software to accurately preplace resources for faster response.

The MARVLIS system, which is built using Esri software, analyzes historic incident records from the computer-aided dispatch (CAD) system to forecast call locations for the next hour. Calls are represented as hot spots on the map based on the hour of the day, day of the week, and season of the year. The hot spots delineate a relatively small area, typically about 5 to 10 percent of the jurisdiction, where approximately 80 percent of the service calls are expected during the next hour.

When a call is received, an ambulance route is automatically calculated using travel speeds based on the time of day. This optimized route is overlaid on a map displayed on a mobile device for in-vehicle navigation and interaction through a touch screen display.

Dispatchers have a map that is updated every five minutes, forecasting where calls will likely be in that next hour. This type of forecast analysis allows them to strategically post ambulances in the best locations for responding to calls even before they are received.

"Previously, the procedure of posting and routing ambulances was based on extensive manual work by senior staff," says Hood. "With the new system, we avoid significant costs and planning time. And service response times have actually improved with existing resources, even though their demand has increased so dramatically, about 11 percent each year."

The next step will involve a Flex-based web viewer for incident management that combines vehicle and incident information with a variety of real-time data feeds including weather and even social media input. Plans also include dynamic management of nonemergency EMS transports that would otherwise consume emergency resources.

To learn more about how GIS supports computer-aided dispatch, visit esri.com/cad911.