

Public Safety Log

Esri • Summer 2011

GIS for Public Safety

Staying in the Game: Esri's Community Analyst



Lew Nelson, Law Enforcement Solutions Manager, Esri

Virtually every law enforcement agency in the world is faced with today's economic realities—less money, rising costs, fewer personnel, ever-increasing government mandates, and higher community expectations. At the same time, populations continue to grow, and those same factors contribute to the community's crime problems. In the face of all these issues, law enforcement has to respond both efficiently and effectively, and to do this, it must thoroughly understand the nature of community problems. Many agencies

feel that the new economic realities have forced them away from community-based policing and back to a more traditional mode.

Crime is not a one-dimensional issue but generally the result of a combination of factors that exist in a community that include, but are not limited to, school dropout rates, single-parent families, teen pregnancy, lack of employment, lack of recreational facilities, homelessness, and substandard housing. Understanding and assessing the risk in any community requires a holistic look at the nature of the community to develop a course of action to mitigate the identified problems. A more thorough or holistic understanding of the issues can help a law enforcement agency develop, customize, and articulate a community policing strategy for its community-based evidence rather than supposition.

Esri's Community Analyst is a web-based solution that can provide law enforcement, criminal justice, and community organizations with the ability to analyze their communities' data simply and easily. This new solution allows the user to combine thousands of data variables for analysis, combined with instant reports and interactive mapping, to develop a comprehensive understanding of a community. These data sources can include crime, demographic, health, education, and other data.

Esri's Community Analyst provides law enforcement with the ability to understand and address community issues while also focusing ever-scarcer resources through traditional crime analysis applications on serial offenders, problem locations, crime hot spots, and crime forecasting.

Redlands Police Deploy Mobile Apps on iPhones, iPads

Esri Technology Extends from the Command Center to the Street

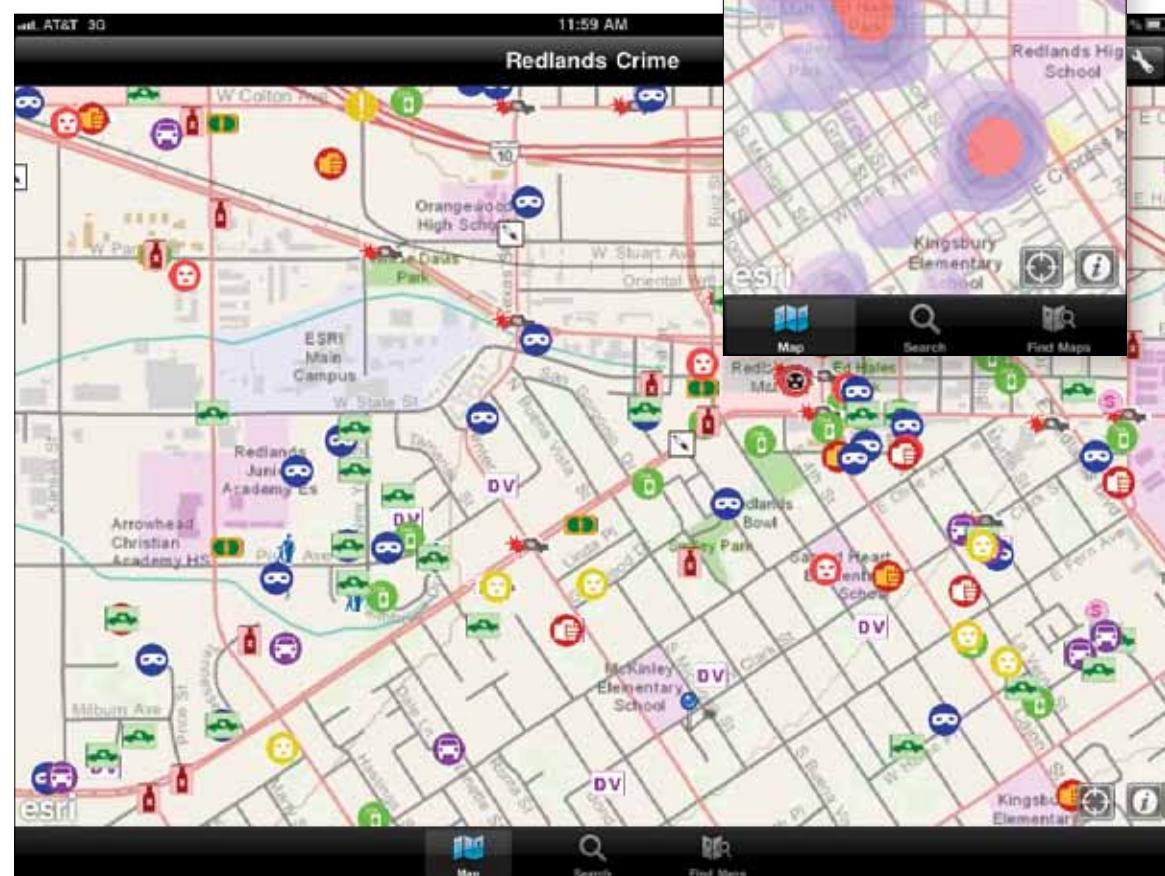
When away from the office, out of the car, and alone in the field, police officers' greatest assets rest on their belts, and it's not their handcuffs or sidearms. In the twenty-first century, that belt carries powerful technology for informed crime fighting.

The Redlands Police Department has extended the benefit of information technology to frontline officers and staff by deploying mobile geographic information systems (GIS) via iPhones and iPads. The department uses an Esri-based mobile phone application as part of its everyday workflow. Patrol officers, investigators, detectives, volunteers, and others, can easily access crime location and density maps directly from the iPhone.

"We're giving them the power to do analysis in the field," says Jim Bueermann, police chief, City of Redlands, California. "If you've stopped someone in a park to question them about a particular incident, you can instantly do a query to look at how many similar incidents have occurred in the area. You can act as a crime analyst in real time."

Redlands Police uses Esri's ArcGIS for iPhone application in all its smartphones and mobile devices.

This allows the agency, which uses the entire ArcGIS platform, to leverage its existing GIS investments by using the iPhone to access its data. The



Top: Redlands police officers can access valuable information right from their mobile phones. Bottom: Having accurate information in the field enables officers to make better decisions.

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 *Public Safety Log* online at esri.com/publicsafetylog.

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 esri.com/news.

Life Saving Maps

Life Saving Maps tells the story of a small, dedicated group of professional rescuers (career and volunteer) with the vision and initiative to develop an improved method of search and rescue (SAR). Through their collective experience on thousands of search and rescue missions, this group came to realize how vital GIS-driven technology, tools, and workflow are to speeding up the planning cycle of a search, getting teams out the door more quickly, and cataloging and analyzing clues to improve search results. Using ArcGIS 10, they have developed MapSAR, a set of tools to help accomplish these goals.

In this video, you will learn how the volunteer group is using ArcGIS Desktop, ArcGIS 10, and MapSAR to incorporate the use of modern geospatial information systems to plan for and manage



Discover how the volunteer MapSAR group uses GIS for search and rescue operations.

the search and rescue operation. Through this work, MapSAR users are making a difference—possibly the difference between life and death—for people lost in the wilderness.

To see this video, visit esri.com/publicsafety.

Situational Awareness for the Masses

Florida DEM Supplies Common Operating Picture for Responders and the Public

The state of Florida's Division of Emergency Management (DEM) developed an interactive web mapping application—the Geospatial Assessment Tool for Operations and Response (GATOR)—to overcome challenges with integrating real-time data with multiple disparate operational data sources into a single system.

GATOR displays a wealth of information using a single integrated web GIS interface. It supports emergency preparedness, operations, and response and provides better situational awareness.

GATOR is accessible to the public as well as members and partners of the State Emergency Response Team (SERT). During day-to-day operations, GATOR is displayed within the State Watch Office to allow monitoring of systems like Florida 511 incidents along major transportation routes, weather watches and warnings, and storm reports.

During activations of the State Emergency Operation Center (SEOC), GATOR is displayed on a touch screen panel as well as projected onto one of the main screens within the SEOC. This allows real-time monitoring of reconnaissance reports, flooding along rivers, earthquakes, tide and buoy observations, open shelters, other activated emergency operation centers, and additional hazards and response data specific to events.

DEM staff built GATOR using Adobe Flex web tools, including the Flex Viewer self-refreshing widgets that automatically bring the most recent and relevant information to a person's attention. GATOR was originally based on Esri sample code combined with enhancements from a similar solution used by the Virginia Department of Emergency Management.

Real-time data such as that on weather, storm reports, river conditions, traffic accidents, wildfire incidents, video feeds, and more, is displayed along with basemap data like roads, facilities, and aerial photographs and information from operations and response.



This can include contingency plans, critical facilities, and nuclear facility locations. The system displays data layers available as REST services, GeoRSS, and KML.

The platform was first tested and proved valuable in reconnaissance and recovery efforts during SERT's activation for Hurricane Ida in 2009.

"That morning, we were able to review reconnaissance reports along the entire Florida panhandle with photographs taken just shortly after sunrise," said Donald Kunish, SERT plans chief. "After a quick review, I knew that the damage was not extensive."

During Operation Haiti Relief, GATOR provided visual summaries of field operations and repatriation counts at Florida's airports.

The Deepwater Horizon oil spill response proved a watershed event for GATOR: it was used for a number of purposes, including to monitor NOAA oil trajectory models; assess the condition of the current within the

Gulf of Mexico that threatened transportation of oil toward the Straits of Florida, the Florida Keys, and beyond; track response vessels and task forces; and capture and update over 8,500 reports from the SERT reconnaissance team over the course of the response.

"This was a really large challenge, and the platform helped in a number of different areas," said Richard Butgereit, GIS administrator with DEM. "With each new emergency event, the system is refined and improved."

DEM continues to work with other southeastern states to further develop information-sharing capabilities for systems like GATOR. Plans call for integration of preliminary damage assessments, parcels, more recent aerial photographs, and power outage management.

To learn more about how GIS is used in emergency management, visit esri.com/emergency.

Web Portal Supports Public Needs, Agency Requirements

Orange County Fire Authority Uses Single Platform for Better Decision Making

Orange County Fire Authority (OCFA) operates a robust enterprise GIS capability for its fire service functions. Last year, as the agency began creating new wildfire mitigation programs, it recognized the opportunity to take advantage of GIS to build accurate mitigation information and share it with staff as well as the public.

Specifically, OCFA wanted to use technology to help propel its adoption of the national wildfire mitigation and education program called Ready, Set, Go. Considering the long history of wildfire disasters in Southern California and specifically in Orange County, OCFA was one of the original fire departments to develop and pilot this program.

As it began implementing the program, the agency used traditional methods of communicating to the public. Those methods—door-to-door and traditional media tools—had limited success and were expensive to implement. OCFA decided to try a new approach based on GIS. It was a natural fit to help meet wildfire mitigation program guidelines. The output of accurate, information-based digital maps provided a fast, intuitive method of understanding information gleaned from data capture and analysis. What OCFA wanted was to extend this data-crunching decision support tool to communicate with the public and provide intelligence for responders. The opportunity was to both meet program objectives and better serve citizens.

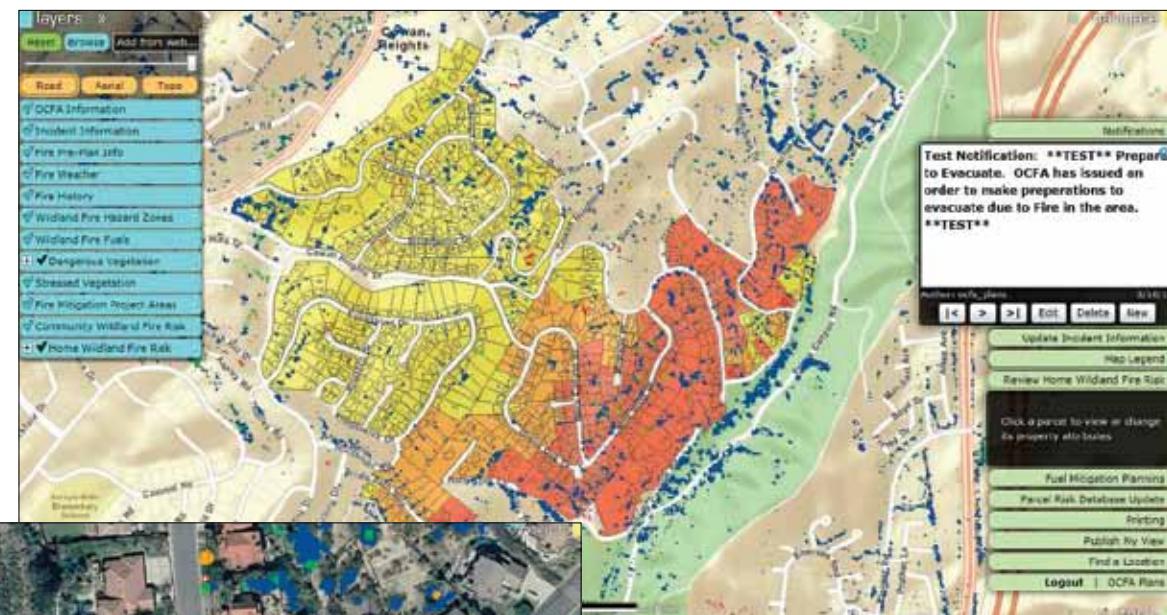
"This is the first time this type of wildfire risk assessment and direct public contact has been done," says Chief Laura Blaual, fire marshal for OCFA. "The common operational picture approach for planning, mitigation, response, public information, and education is also a first for us. It all revolves around the GIS web platform."

OCFA worked with Esri partner Intterra to assist with two key program goals: to support hyperspectral remote-sensing imagery collection with the provider company, SpecTIR, and to provide a GIS-based web portal that could support multiple user types.

The result was a web portal that leverages the ArcGIS API for Silverlight and ArcGIS geoprocessing tools from both OCFA and the Amazon cloud.

Intterra used its proprietary software, SituationAnalyst, to provide the geospatial framework for the Ready, Set, Go project. The concept was to link the planning and mitigation functions with the response operations and provide a public education tool that leveraged all the project data for wildfire mitigation, wildfire risk assessment, wildfire response information, and public information; this would be combined using the GIS platform. Using this approach, OCFA could rapidly prototype, scale, and deploy the application while both protecting critical data behind its own firewalls and taking advantage of cloud capabilities. The team found this approach ideal for handling security.

Key GIS data includes the locations of vegetation fire fuels around homes (provided by remote sensing and



This community-wide wildfire risk assessment view reflects wildfire hazards, building materials, vegetation, and response capability.

community preparedness," says OCFA fire chief Keith Richter. "Information gathered by the fire department during wildfire planning and mitigation can be used during response. This assists firefighters with detailed information for situational awareness. It also communicates to the public about fire conditions that may trigger evacuation orders."

Future plans include reviewing how to possibly expand web GIS portal capability to other users in Orange County. OCFA is also looking to expand the use of SituationAnalyst for emergency planning and mitigation for all other hazards.

To learn more about how GIS is used in the fire service, visit esri.com/fire.



Fire prevention officers, responders, and homeowners can all view the highest-risk vegetation near homes.

converted to GIS layers) and individual home assessment risk analysis including slope, building materials, defensible space, public safety infrastructure layers, and weather. These datasets are merged and analyzed to depict a specific home's risk. In addition, the response layers for the firefighters are incorporated so that information about routes, evacuation, and incident response plans can be used in a GIS format to better inform the emergency decisions made by responders. Other layers depict homeowner personal preparedness through a GIS-based survey and mapping and community risk layers demonstrating the value of fuelbreak projects through quantitative risk values. These map layers can be distributed internally between departments or publicly through the web portal.

This ultimately helps provide relevant information to homeowners regarding wildland fire risk. It encourages them to both address tangible risk reduction strategies that include vegetation management and ignition-resistant construction and consider the value of community preparedness.

Since OCFA already has an enterprise GIS platform in place, all data for the project could be represented or spatially enabled for the program. This allows dynamic generation of new data via OCFA staff, because the tools in the application allow direct editing of spatial data and attributes. The inputs from the staff are dynamically fed into the wildfire mitigation model and are updated on the fly in the display for both OCFA and the public. The model and results are truly living and real time.

The public and the fire department literally use the same website for understanding home wildfire risk and the need for both personal and

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extended mobility promotes collaboration and information sharing between multiple field staff. For example, field officers and volunteers can create and share status updates with others to communicate and work more efficiently. They can use their phones in the field to perform map navigation, as well as search and identify buildings, infrastructure, and other city assets.

Redlands Police Department is building a new mobile GIS application for law enforcement that makes available powerful capabilities in iPhones, iPads, and other smartphones. It is building the application using money awarded as part of a US Department of Justice grant. The application will then be available to other agencies as part of the grant requirements.

"The next phase will bring true GIS to the police officer's phone, which rests right on their belt," says Chief Bueermann. "The types of analysis and data available will significantly impact their day-to-day operations in the field."

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

On the Road

2011 All-Hazards/All-Stakeholders Summit

July 7, 2011

San Diego, California, USA

Esri Homeland Security Summit

July 9–12, 2011

San Diego, California, USA

Esri International User Conference

July 11–15, 2011

San Diego, California, USA

Association of Public Safety Communications

Officials (APCO) International

August 7–10, 2011

Philadelphia, Pennsylvania, USA

International Association of Fire Chiefs (IAFC)

Fire Rescue International

August 23–27, 2011

Atlanta, Georgia, USA

ASIS International

September 19–22, 2011

Orlando, Florida, USA

International Association of Crime Analysts

(IACA) Conference

September 19–23, 2011

Cape Cod, Massachusetts, USA

Online

esri.com/tsunami

On March 11, 2011, at 05:46:23 UTC, a magnitude 9.0 earthquake hit off the Oshika Peninsula of Japan.

This is the largest earthquake to hit Japan in recorded history and one of the largest in the world since records began. The earthquake triggered a tsunami that hit coastal areas of the country. This site provides several applications allowing you to visualize the latest news and feeds, analyze the nuclear impact, view how Japan shifted, and see the movement of the tsunami across the Pacific Ocean.

resources.arcgis.com/public-safety

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.



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Esri Assists Response to the Japan Earthquake and Tsunami

In reaction to the devastating Japan earthquake and tsunami, Esri provided assistance to organizations involved in the disaster response. The company worked closely with both domestic and international agencies to provide on-site personnel, GIS software expertise, and project services. Esri also supplied organizations with software, data, imagery, and technical support.

"It's a terrible disaster that has impacted millions," says Russ Johnson, director of public safety solutions for Esri. "We deployed emergency operational procedures to assist. This included sending staff to Japan to provide assistance. We worked hard to provide resources that can make a difference in saving lives and minimizing damage."

GIS solutions helped officials use critical information for making rapid, effective decisions. The technology assisted responders and emergency managers in conducting rescue operations, prioritizing medical needs, identifying severely damaged areas, measuring impacts to critical infrastructure, locating areas suitable for food and water distribution, and more.

Esri also provided several online applications that helped people around the world better understand the incident. A social media mapping application was made available for both the media and public. People can follow events in near real time using the application to gain a greater understanding of the situation. It includes links to news reports as well as Tweets, YouTube videos, and Flickr photos. It also gives people the ability to view streets, satellite imagery, and topographic maps as part of the map overlay.



The Social Media map application allows people to post and review all types of information, including Tweets, photos, and video.

used to make better decisions for relief and recovery efforts related to the disaster. EMT-produced maps are enhanced with information generated by disaster management experts that helps supply updated status reports on the overall situation.

EMT maps and services gave people information on shelters, highway and traffic conditions, infrastructure, and more. For example, EMT-produced resources have been used by the Japanese government to understand conditions on the ground, develop a list of recovery and relief priorities, and deploy personnel and equipment. These resources are available online as both static maps and dynamic map services available for mashup capability. As new maps and services are created, they are made available online at the EMT website.

Several organizations were involved with EMT: Esri, Esri Japan Corporation, Honda Motor, Pioneer, and more.

To learn more about how GIS is used in disaster management, visit esri.com/disaster.