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A room with a view

Public safety agencies grapple with loads of data flowing into command centers

BY Alan Joch
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Bob Griffin doesn't worry that emergency responders won't have enough information should terrorist attacks hit Arlington County, Va., or Washington, D.C., the county's high-profile neighbor directly across the Potomac River.

Command centers like the one in Arlington can pull in more raw data than ever thanks to an increasingly wired world that features surveillance cameras on highway overpasses, biosensors, countywide geographic information system (GIS) maps and instantaneous voice communications.


But that's a cause for new concerns. A data flood might slow response times for emergency operations center (EOC) managers. "We're struggling over how to consolidate masses of information into usable nuggets," said Griffin, the county's director of emergency management. "It's just too much information sometimes."

He's not alone with such fears. Emergency response officials throughout the national capital region and elsewhere are grappling with ways to build a cohesive, central view of their jurisdictions, especially under the pressure and time constraints of an unfolding crisis situation.

Bob Freeman, program manager for the EOC run by Montgomery County, Md., which borders Washington, D.C., believes that if all of today's high-tech surveillance and monitoring equipment produce a hodgepodge of data, "we'll just create more silos of information," he said.

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At the Washington, D.C., Metropolitan Police Department (MPD), the message is the same: Successful cross-departmental communication is a matter of officer safety, said Rai Howell, director of the Field Operations Support Unit.

New generations of technologies, including specialized Web portals and customized search engines, may ease data integration and bring order to incident responses.

Today's EOC

As technology evolves, command centers, the traditional headquarters of incident response, are also changing. Gone are the days of a basement room with a conference table, a collection of telephones and a few PCs.

Now, in the capital region and elsewhere, emergency-response commanders view information on computers supported by communications and networking technologies that combine to create a richer mix of data and promote agility.

"This isn't just a telephone world anymore," said Steve Hutchens, director of homeland security at systems integrator EDS. Instead, wireless phones, personal digital assistants, radio networks and video feeds facilitate emergency-response operations.

Several new commercial systems include:

- The Enterprise Virtual Operations Center, a Web portal product developed by EDS that creates a central interface for combining computer-aided police dispatch systems, traffic management video feeds, surveillance camera images, URLs and commercial TV feeds.
- Northrop Grumman's Virtual Integrated System of Systems Tool for Analysis, which uses custom software adapters and Web standards to aggregate and display data from separate databases. To help EOC officials understand data, the platform can represent information as 2-D or 3-D images on geospatial maps, said Milt Tulkoff, Northrop Grumman's research and technology manager.

"If sensors detect a chemical release around a city,

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When you're starting out

Emergency response experts and public officials who have battled data collaboration challenges say a number of technical and management factors help determine success. Here are a few of them:

- Include all important stakeholders on your development team. Members will likely include public safety officials who represent police, fire, EMS and citizen groups, and appropriate federal entities. Then, "develop a plan and a vision of where you want to go," said Steve Hutchens, director of homeland security for EDS, a systems integrator based in Herndon, Va. Guidelines within the National Response Plan at www.dhs.gov/nationalresponseplan or on the Federal Emergency Management Agency's [Web site](#) provide good starting points for developing such plans, Hutchens added.
- Make sure there is a technology foundation. Officials need to evaluate and perhaps upgrade their existing technology infrastructure to provide a sufficient PC and operating system platform to run intended collaboration technology, Hutchens said.
- Build success in smaller steps. If officials need custom applications to make collaboration possible, start small and grow incrementally rather than launching a massive development project. The Washington, D.C., Metropolitan Police Department's integration interface gradually grew from a modest search engine for case management files to encompass more than 20 databases. Rai Howell, director of the Field Operations Support Unit, said incremental growth in the software's capabilities gave the department a steady stream of quick-hit improvements. "Nobody spent a year to write a software spec," she said. "Instead, we said let's just treat this as an ongoing development project."

they would send the information to a command center where the release point would be represented geospatially and the notation 'chlorine detected' would appear," for example, Tulkoff said.

- The Columbo Criminal Intelligence System, data collaboration software developed by Yellow House Associates, a systems integrator. Named after the disheveled TV character, the system collects data from 20 databases to provide a unified view for MPD.

- Network gateways developed by Applied Innovation (AI) that correlate readings from sensors to detect chemical, biological, nuclear and radiological attacks. A provider of network performance technology for the telecommunications industry, AI has started applying its work to network gateways to convert sensor data to a standard data model, said Ron Whitt, AI's director of strategic marketing. He said the company is working with the Oak Ridge National Laboratory's SensorNet project to make sensor data understandable by the monitoring equipment used by local authorities.

Getting it together

For Arlington County, data assimilation begins with the standard IP network that officials launched last year. The network sends voice, data and video via a single communications pipeline. County officials also consolidated the 911 call center and EOC into a central emergency management department.

Now, if a homeland security emergency arises, the county can package disparate information for officials working at the tech-laden command center. Information includes GIS mapping data, surveillance camera video, feeds from commercial news organizations and voice communications from 911 dispatchers.

Griffin said the main tool for sorting information is the county's digital GIS maps. "We're trying to display the information as graphically as possible," he said. That ensures that people can use the data.

Fortunately, county officials haven't had to use their new EOC capabilities to respond to a terrorist attack. But they tested the gear in March when an anthrax

Mike Byrne, Microsoft's director of justice and public safety, agreed. "Don't go off to build a perfect system right away," he said. "Focus on integrating individual components into one picture so people can make smarter decisions."

— Alan Joch

Portal powers Anaheim's center

On the surface, the data integration project in Anaheim, Calif., wasn't the flashiest way to spend \$1 million of federal Urban Area Security Initiative (UASI) funding.

But "we weren't looking for more moon suits, or another fire truck," said Tom Wood, the city's assistant manager and chief operating officer. Instead, city officials sought to find an addition that would help them more efficiently use their tools and resources.

The answer was a data-integration Web portal that creates a single interface for combining computer-aided police dispatch systems, traffic management video cameras, surveillance cameras inside buildings and information from other Web sites. Wood said the portal maximizes the use of data and expertise that already exists but hasn't been fully used.

"We're very good at providing a variety of services, such as police, fire and public utilities," he said. "The trick comes from having those services collaborate when something goes bump in the night."

Authorized emergency officials can use the portal at any time — whether they're in their offices or gathered around PCs in an emergency operations center — to see an overview of life in Anaheim from any of the data feeds. Because the city can centralize information, all of the city's departments work as a single organization during an emergency, Wood said.

scare occurred at the Pentagon. Arlington's emergency officials linked to an emergency command center in nearby Fairfax County, other federal public health agents and the Defense Department.

"The value is being able to create a baseline of understanding that everyone is working from," Griffin said. "Everyone's level of information can vary widely. When we're on the same page, we can better coordinate services and start to speak collectively. We can ask ourselves, 'If this really is anthrax, what do we do in the next two hours? The next four hours?' We create a team approach."

Meanwhile, Montgomery County officials moved the EOC from a facility in a basement to a new 5,000-square-foot facility engineered for information assimilation. Now, 13 departments can collaborate using computer displays that show digital maps, news feeds and IP-based voice and data communications.

In the past, county officials ran an EOC "with no rhyme or reason as to the commonality of it all," Freeman said. His mandate was to gather and centrally present cross-jurisdictional information. "The idea is to achieve interoperability not only within the county but with any other entity around us," Freeman said.

Interoperability doesn't rely on "Star Wars" technology, he added. The biggest stumbling blocks were cultural. County organizations "bought equipment from different vendors supporting different standards," he said. "It's been hard to get everyone to agree to share information."

For example, the local high schools operated video cameras for surveillance, but because the cameras were analog and the schools lacked up-to-date encoders, county officials couldn't share the video streams, an ability that could be useful in a crisis.

Freeman said he builds interdepartmental relationships that can aid interoperability when everyone buys compatible equipment. "I took the approach of knocking on doors and saying to people, 'I've got these problems. Let's partner up for the sake of an efficiently running EOC that may help everyone,'" he said.

Anaheim's portal, which went live last fall, uses integration technology from EDS, which for a number of years has been providing IT services to the city. Known as the Enterprise Virtual Operations Center (EVOC), the portal allows commanders to see data and video feeds on the same screen. The rise of ubiquitous and economical broadband networking has been a boon in making EVOC possible in Anaheim. "This would have been much harder to do two years ago, when broadband wasn't as common," Wood said.

UASI grants were a make-or-break factor for Anaheim, Wood added. "Even considering how smart it is from a management standpoint [to integrate interagency data,] we probably wouldn't have done it without UASI funding," he said. A large portion of the implementation costs went to building software interfaces for the city's existing systems, such as building department and computer-aided police dispatch systems, so they could integrate with EVOC.

Now, for example, Anaheim's emergency officials can not only see live camera feeds and track police and fire department dispatches but also browse integrated electronic databases to find building plans, owner contact information and records of toxic materials that may be on site. That could be lifesaving information for first responders.

"How would we have gotten that information previously?" Wood asked. "If it was located in the building department and it was after-hours, we wouldn't have. Now, we're operating as a total organization."

The next step is to use another common technology, such as 802.11a wireless networking, to give first responders access to the same information available to command center officials. "Using a ruggedized laptop [computer], first responders will be able to look at the video feed from a building lobby before going into it," Wood said.

Database integration

— Alan Joch

In fall 2001, MPD officials contracted Yellow House to develop Columbo so detectives could more easily search internal case management databases. Now, officers can gather data from the case management system while also checking information such as mug shots and arrest records.

"Information is what drives us," Howell said. Columbo usage statistics prove that point. During a 30-day period, detectives used the system to conduct 11,000 searches, she said.

Michael Schader, Yellow House's president, said Columbo didn't spring from a grand integration plan but developed piece by piece as MPD officials sought to incorporate additional information into the application.

Columbo consists of several traditional database management tools, including a data warehouse that centralizes information from separate databases. It also has an extract, transform and load program that converts data into common formats and removes redundancies and inaccuracies. Detectives can then view the data within graphical charts or maps.

"We measure Columbo's success in how much time it saves," Howell said. "Four years ago, detectives would have had to do hand searches for a lot of this kind of information, and that could have taken a full day or two. Now, we can get the same data in a matter of minutes."

Even with a foundation for collaboration in place, emergency-response officials know that technology is only as good as the people running it. In the end, training and expertise are crucial.

"We have to be careful that we don't fall into a PlayStation mentality where people are just watching a video screen," Griffin said. "We don't want them to forget what they've learned."

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