DATA FUSION HAS ARRIVED

GIS technology helps data fusion centers reach a new level of sophistication for greater public safety.

Data fusion centers — where data is taken from disparate sources and fused into one complete picture — are a relatively new tool for law enforcement, emergency management and homeland security.

These high-tech facilities allow federal, state and local public safety agencies to work side by side, collecting and sharing data from a wide variety of sources. Comprehensive analysis of that data results in actionable intelligence that leads to safer communities. Homeland security, disaster preparedness and day-to-day crime-fighting are all stronger when a fusion center is at work.

Dynamic mapping capabilities are crucial to fusion centers. ESRI provides the geographic information system (GIS) tools needed to equip fusion centers with the best possible methods of displaying and analyzing data. The power of GIS technology is undeniable; those who use it in the fusion centers swear by it. And the success stories are growing as the centers rapidly come of age.

But fusion centers aren't all the same. One might focus harder on immigration or customs because of its proximity to a national border; another might pay more attention to hurricane preparedness. Some take an "all-crimes" approach. Others focus on "all hazards," preparing equally for all criminal, terrorist or natural threats.

Regardless of their specialty, fusion centers facilitate data sharing and collaboration among agencies. The centers often involve all levels of government working together in the same space, to leverage what everyone has to offer. This can include the fire department, local police, state police, FBI, Department of Homeland Security, Coast Guard and numerous others. This collaborative approach maximizes resources to a greater extent than ever before.

Speed and Power

Experts say it's important to recognize the difference between a basic map with colored dots, and the vastly superior benefits of a true GIS. A fusion center collects an immense amount of information from all possible sources — and analyzes it thoroughly. That analysis is vital to success.

Multi-Faceted Results

Data fusion center depends on GIS technology for criminal investigations, emergencies, huge public events and much more.

The Commonwealth Fusion Center (CFC) has been putting technology and data experts together for improved public safety in Massachusetts since October 2004. Approximately 20 agencies are represented at the CFC, including the state police, National Guard, Department of Homeland Security (DHS), FBI, Coast Guard and Bureau of Alcohol, Tobacco, Firearms and Explosives.

When creating the CFC, agencies had the opportunity to build a new type of public safety facility from the ground up. That involved getting the advanced equipment and tools they needed, including ESRI's

ArcGIS® software, said Brian Egnitz, GIS program manager of the Massachusetts State Police. He works in the CFC, where the GIS is used often. "We've made a tremendous investment in our GIS technology, and it's paid off," said Egnitz. "We use GIS in every product that we can."

The GIS is used for critical infrastructure analysis, plume modeling, troop assignments, crime analysis, tactical operations, incident response and much more. When an incident occurs within the state, information flows into the CFC very quickly, and the GIS helps analyze it.

"GIS is infectious. Once people see their data visualized on a map, they love it."

Brian Egnitz, GIS program manager, Massachusetts State Police

The CFC's success has led to better understanding of the importance of the work that goes on there. "I think fusion centers have heightened the awareness of intelligence and crime analysis, and the capabilities of professional analysts," Egnitz said. "We have a ton of analysts who assist in criminal cases. They link criminal activity, and it results in prosecutions. There is an impact, because people go to jail."

Groundbreaking Processes

Stronger inter-agency relationships have been built within the center, and that too benefits the public. "Citizens now have a centralized, technology-driven center where criminal intelligence and information is shared by law enforcement at the local, state and federal levels," said Egnitz. "We've never before had a unit of government that

included all of these levels assigned to work together on a daily basis. The relationships we've built have opened up channels of communication that didn't exist before."

In another key part of the process, the CFC pushes information out to law enforcement officers around the state. It plans to use the Web to share its resources with more officers in the future.

The technologies within the CFC — and the people who use them — have grown increasingly effective during the first four years of operation. Thanks to analysis performed by the CFC, two strings of burglaries in different parts of the state were found to be the work of one criminal organization. When a tunnel ceiling collapsed within the Big Dig project in Boston in 2006, the CFC's GIS maps were used to immediately display traffic and other issues for the governor and other policy- and decision-makers.
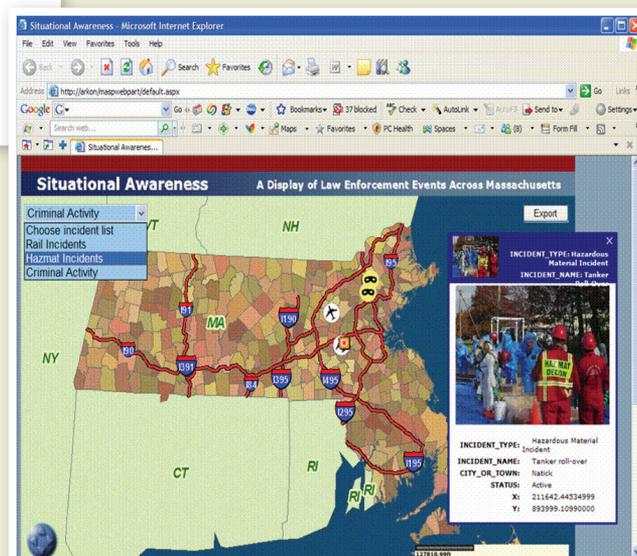
Collaboration among agencies was vital as the CFC prepared for the massive 2008 Fourth of July event in Boston. The event was predicted to draw 500,000 people, and the CFC wanted to have the latest aerial photos of the event site. The DHS had a satellite take new photos for the CFC. The photos were overlaid with GIS data, and numerous agencies benefited.

Massachusetts is a safer place thanks to the Commonwealth Fusion Center. And GIS technology is a big part of it. "GIS is infectious," said Egnitz. "Once people see their data visualized on a map, they love it. It's one of the only tools I can think of that allows so much data presented in such a simple and concise manner. Just about everything we do, we try to visualize it using GIS." ■

Mighty Maps

GIS software puts it all together for one of the country's largest data fusion centers.

The Arizona Counter Terrorism Information Center (AcTIC) became operational in October 2004, and it's one of the largest fusion centers in the United States. Forty agencies from federal, state and local governments are represented there by 240 workers. Staff members have access to more than 100 databases. It's a lot of information to decipher, but the center has the right tools, including ESRI's ArcGIS® software.

Tips and leads are collected from incoming calls. Then the information is routed to analysts, investigators, hazardous materials

impact our critical infrastructure? Having that real-time ability helps our analysts."

Lt. Lori Norris of the Arizona Department of Public Safety is watch center commander for AcTIC. She too knows the advantages of having data displayed instantly on maps. "We have analysts

and intelligence officers looking at that information," said Norris. "And you've got the right people looking at it. They're able to do something with it."

the highly coordinated efforts of officers on the scene and experts in the fusion center resulted in a peaceful end with no injuries.

The fusion center's terrorism liaison officer (TLO) program played a key part in the successful response. TLOs are individuals — mostly police officers — who can be the eyes and ears of the center in the field, relaying valuable intelligence back to the center's staff. During the hostage situation, a TLO provided photos and other information from the scene.
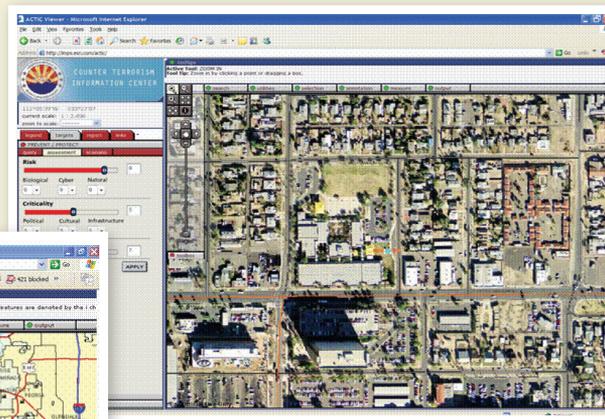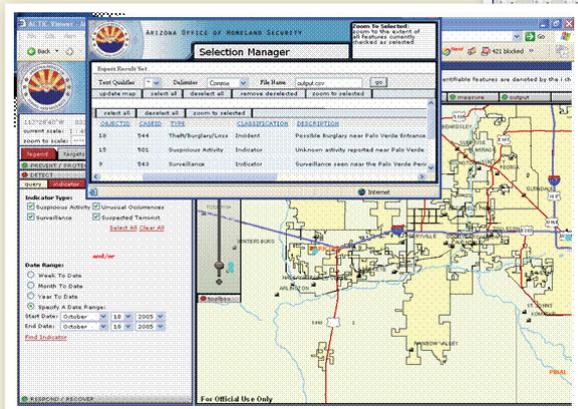
"They were feeding us information via their laptop and we were able to give them their intelligence back, and they could print out in color what they needed on-scene," said Nicholson. The information was invaluable to the SWAT team as it entered the building.

There were other advantages too. "First aid was able to stage one floor below," said Norris. "They've never been able to put first aid that close before. We could do it because we knew the schematics of the building."

The GIS enables the center to have data-rich maps displayed 24/7. The information comes from numerous agencies, and sharing it leads to greater collaboration among those agencies. "We're getting better information to all of the officers — and it's erasing jurisdictional boundaries," Nicholson said.

The power of GIS software helps the fusion center put it all together — the data, the analysis, and greater cooperation among agencies. It all adds up to improved safety for Arizona citizens. ■

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> **Sharon Nicholson**, GIS coordinator, Arizona Department of Public Safety

or other appropriate category. The data also is placed on GIS maps, making it easy to evaluate both day-to-day events and major emergencies. Is it a serious threat? Are there trends? Are there schools nearby that should be locked down? These and other questions can be answered quickly due in part to the GIS.

"We have a customized map that gives us almost real-time indicators as to what's going on, where it is, and whether it relates to anything else," said Sharon Nicholson, GIS coordinator for the Arizona Department of Public Safety, who is assigned to AcTIC. "Is it part of a pattern? Does it

Success Stories

The ability of GIS technology to interoperate with multiple data formats and information systems is vital to the center's success. "We don't expect to have one system out there, because everybody has a different mission," said Norris. "We need to be able to compare all of those, and that's where the interoperability comes in, to allow us to gather data from those different systems."

The center has been part of numerous success stories, including the resolution of a dangerous hostage situation on the 18th floor of a building in downtown Phoenix. The suspect took nine people hostage, but

GIS software is the glue that holds it all together. Powerful GIS technology brings data from numerous sources and presents it on maps, making it easily accessible and understandable. The map puts everyone on the same page instantly, so collaboration and communication occur most efficiently. In public safety, that's critical.

A GIS supports the complex workflow within a fusion center. It aids interoperability among technologies. And it enables better analysis. GIS software gives officials immediate access to reliable information and complete, real-time situational awareness. GIS technology leads to better decisions. It's a crucial part of the best possible response to any incident.

A fusion center's data analysts can identify patterns, trends and relationships no one could have seen before. That's a big enabler for public safety agencies. GIS software and other tools let analysts continually look at updated information; new data leads to investigation, which leads to more new data that is fed back into the system. The technology allows data to be constantly re-evaluated.

With limited budgets in the public sector, data fusion centers make sense. Combining resources maximizes their value, and it's more efficient and cost-effective. And as agencies begin to work together in fusion centers on a daily basis, they become better prepared to cooperate and coordinate during major emergencies.

Effective data fusion centers require the right tools. ESRI and its partners create powerful applications to meet any center's specific needs. It's all about enabling homeland security, law enforcement and other public safety agencies to best fulfill their missions — maintaining public safety at the highest level possible. ■
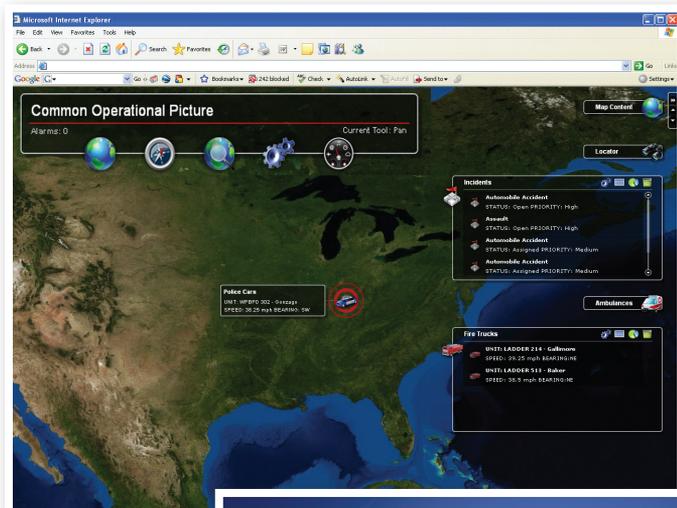

Common Operational Picture View

The ArcGIS® Situational Awareness Bundle

The ArcGIS® Situational Awareness Bundle provides a complete framework for geospatial intelligence and decision-making. It provides organizations with the capability to gain a timely and accurate understanding of their operations and events that impact them.

This bundle is delivered as a ready-to-operate hardware solution, a powerful data fusion and analysis engine, and a set of fully customizable clients for viewing data. In addition to the complete technology platform, the ArcGIS Situational Awareness Bundle also includes terabytes of prerendered nationwide and worldwide street and transportation data, place-names, administrative boundaries, raster imagery, topographic maps, shaded relief imagery and elevation data.

The ArcGIS Situational Awareness Bundle is optimized to reduce implementation time and easily integrates with your existing IT or geographic information system (GIS) enterprise environment. Because the ArcGIS Situational Awareness Bundle is hosted locally, your organization's critical business needs can be achieved through the unlimited and uninterrupted access to geographic data, services and solutions.

For more information, visit www.esri.com/sab.
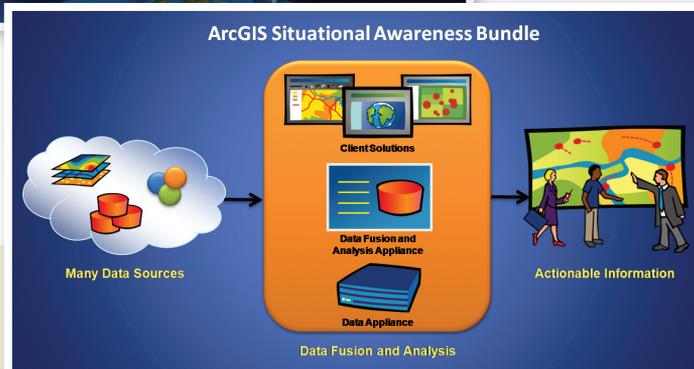
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