

Hartford Fire Department: Fighting Fires With Wireless

Hartford, Conn., encompasses some 18 square miles, approximately 18,000 buildings and a population of 124,000 — all protected by the Hartford Fire Department. Working out of 12 fire houses, the department's 350 members respond to more than 22,000 calls a year in the city and surrounding areas, including providing specialized support statewide for certain emergencies. The Department is one of only two fire departments in all of New England to hold a Class 1 rating, a gauge of the Fire Department's overall fire protection capabilities as evaluated by insurance authorities.

The Department had long recognized that protecting public safety depends just as much on information and decision-making as it does on firefighting equipment and tactics. When responding to an incident, whether an auto accident, residential fire or major industrial fire, the more commanders know about the situation — and the sooner — the more safely and effectively they can decide on a course of action at the scene. Everything from construction of the building and interior floor plan to the contents, location of water hydrants and mains, and access to the site will influence tactics as well as the deployment of firefighters and equipment.

To put more relevant intelligence into firefighters' hands, the Department was the first department in the country to deploy an innovative geographic information system (GIS). Running over the AT&T 3G wireless network, the system allows commanders in the fire vehicles to access global positioning system (GPS)-enabled applications and databases that deliver an array of visual information about the building, its contents and inhabitants, the surroundings, and the location of other responding fire vehicles. Even before arriving at the scene, firefighting teams can make decisions about deploying equipment, attacking the fire and securing the area around the fire. This critical detail allows for a much faster response to emergencies, more effective management of the

scene, and improved safety for citizens and firefighters.

Paper Binders to Touchscreens

Of the 37,000 fire departments in the United States, slightly more than 30 — one in 1,000 — have earned a Class 1 Fire Suppression rating from the Insurance Services Office, an industry group providing analyses for property insurance companies. This rating — the highest of 10 — is based on detailed evaluations of a fire department's alarm and reporting systems, the quality of the department's staff and firefighting resources as well as hydrants and water supply. It is a measure of a department's general ability to protect the lives and property of its residents.



The Hartford Fire Department is understandably proud to be one of the two New England departments (the other is in Cambridge, Mass.) to carry a Class 1 rating. Though not among the largest departments, Hartford is one of the oldest in the country, and it's well known for being an exceptionally capable and forward-thinking firefighting organization.

Hartford, for example, was an early adopter of a GPS-based automatic vehicle location (AVL) system that allowed dispatchers and commanders to visually track their trucks and apparatus throughout the city on desktop computer displays. Based on the

system's success and the burgeoning use of computer imagery elsewhere, former Deputy Chief Eugene Cieri saw the potential in deploying laptops in the fire vehicles to hold critical firefighting information. At the time, Hartford fire trucks carried thick binders packed with fold-out maps of streets, hydrants and water mains; any available building floor plans; along with data sheets detailing chemicals or materials that might be stored in various buildings. It might be far easier to store the data on mobile computers.

"We recognized that the idea made sense but weren't sure how to implement it," said the Department's Chief Charles Teal. "Once we attended a seminar on GIS, we saw the potential for a much more comprehensive solution that could profoundly affect our overall command capabilities and our ability to make decisions at the scene. We were convinced right there."

For Hartford, the appeal of the GIS technology was in being able to layer in real-time GPS mapping and tracking, aerial photography and detailed building information into a fully mobile solution that could be taken right out to the scene — where it was most needed.

"This mobile technology gives our firefighters and commanders much more critical information, and delivers it far faster," said Teal. "It's the very information that can spell the difference between life and death for the people of Hartford and for our firefighters."

The system Hartford ultimately deployed — the first of its kind in any U.S. fire department — is based on integrated GIS technology provided by the Institute of Information Technology Inc., and AT&T wireless packet data networking. Over wireless modems, specially outfitted laptops in each fire vehicle can access the GIS platform running on dedicated servers at a central Fire Department facility, as well as regional servers supporting statewide emergency response. The system is fully integrated with the Department's computer-aided dispatch (CAD) capability, so as an incident is reported, the relevant

address and location is immediately captured for use by the GIS solution.

In addition, the same system is available to commanders at headquarters and other facilities, and on the road.

Faster Incident Response

The Department recognized early on that its system could support not only the officers on the scene, but also the Department's entire command structure. "We designed the solution to provide multiple levels of access so it can benefit everyone involved in managing an incident, whether on the scene or at a remote location," said Leandro Cieri, fire alarm communication technician. "That's especially critical for larger fires where several units must respond."

When a 911 call comes in to a dispatcher, the CAD system captures the address of the incident and other relevant information and automatically relays it to the GIS server, which transmits in real time an incident alert to the mobile laptop in the units that will respond.

"As the officer gets into the truck, virtually every bit of information he will need to handle that incident will be in his hands," Cieri said. "The officer has the street address, cross streets, description of the call, the units responding, the radio channel assigned to the incident. It's all right there."

Via wireless, the officer can quickly tap into aerial photos of the location, showing the layout and surroundings, access to the site, and the location of every nearby hydrant and water main, allowing the officer to quickly determine the best way to deploy

at the scene — often before arriving. The officer can even track his own arrival on the GPS aerial map to quickly orient himself and the equipment. "In a snowstorm, when all the hydrants are covered with snow drifts, officers can tell exactly where the hydrants are in relation to the truck — so they can be located much more quickly," said Cieri.

For many commercial buildings, the officer can also access street-level photos of all sides of the structure, as well as any available floor plans. "Our system can also alert us to the contents of the building," Teal said. "We don't want our firefighters deploying downwind of toxic smoke or walking through a cloud of explosive fumes. And if we have to evacuate the area, we need to know that right away. It's all information we need to ensure the safety of the community."

On larger incidents that involve two or more different fire companies, the district chief can use the mobile system to coordinate the joint efforts. In addition to the same building and site information, the district chief can track the location of all vehicles and units responding in real time to better organize the deployment. The same information is available at headquarters — even across multiple incidents at the same time.

"We have a much more integrated view of our incidents now," said Teal. "We've eliminated a lot of the uncertainty and miscommunication. We notice there is actually much less back-and-forth radio chatter now, in that everyone is always working with the same information, and good information."

Building on the Mobility

Perhaps the ultimate proof of the value of the Department's solution is the acceptance from the firefighters. "As a rule, firefighters generally don't like change and are sometimes reluctant to give up old ways of doing things," said Michael Natale, supervisor of fire alarm communication technology. "Now that they have experienced the mobile solution, they can't imagine going back to old paper maps and binders again. To them, responding to a fire without the computer is like showing up without your fire truck."

The officers and firefighters also help keep the systems and information accurate. "If they notice a discrepancy between the screen and the actual site, they let us know immediately, and we correct it. And they often suggest improvements and capabilities they feel would be helpful," Natale said. In addition, the Department has also launched a program where residents can provide information about their own homes and families — such as the location of children's bedrooms, or a resident who may have mobility or health issues.

The Department is further enhancing the overall solution by moving to 3G wireless capability to provide additional bandwidth. The Department is also looking into adding video capability to the units at the scene, to allow firefighters to transmit live pictures of the incident back to headquarters or to chiefs at a remote location — over the wireless network.

"As valuable as this system is now," Teal said, "I think we have only scratched the surface of what it can do."

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