

Cities React Faster with Coordinated Emergency Response

Every second counts during an emergency. During times of crisis, delayed communication between different response agencies amounts to lost lives and property, and proper integration of all response systems facilitates help and places resources where they need to be.

BY MARIKO HIGASHIYAMA

Citizens require the assistance of government emergency responders on a daily basis. The fire department helps put out kitchen fires that can spread and threaten a whole community, and the police and medical responders are there when a distracted driver runs a red light and causes a crash. During such situations, time is of the essence since every second counts and could mean the difference between life and death.

Most emergency response departments have their own response systems. While this may work for small-scale emergencies, it usually cannot handle catastrophes because of the huge amount of information that needs to be disseminated in a short amount of time. Thus, governments are seeking to invest in citywide emergency response systems that can aid the distribution of information and better support agencies in their task

Image courtesy of Intergraph



of serving and protecting. "For an emergency response system, top priority goes to simplifying workflow so that the numerous government agencies or departments involved can respond quickly to save more lives and property," said Chee Mun Yuen, VP of Advanced Systems, ST Electronics (Info-Software Systems).

According to Bob Scott, Executive Director of Security Solutions Strategy for Intergraph, effective emergency management requires the assimilation and dissemination of preplanned, historical and real-time information to many sources. This information must be relayed and understood in the shortest amount of time possible in order to carry out the spate of required activities. Police agencies must communicate with fire departments, which in turn are required to notify emergency medical professionals. The channels of communications must be open at all times.

Such citywide integration does not come cheap, but governments believe it is a necessity. "Cost can range from one million to multimillion dollars, depending on the level of deployment and environment. These projects can take anywhere from 12 to 18 months to complete," Scott said.

Typical customizations for emergency response systems have to match the organization's objectives, performance pledges, as well as SOPs. As most services provided by emergency response organizations are intangible benefits to the general public, cost consideration is usually not the overriding concern, even in an unfavorable financial climate. "The cost to the city in terms of potential losses of lives, incomes and properties can be huge if emergency

services are not up to par," Yuen said.

SAVING TIME

Nowadays, emergency response systems are becoming more intelligent. For example, in the event of a traffic accident, normal routes to the site may be blocked by other vehicles, impeding responding resources from quickly getting to the location. Precious time is then wasted when resources need to be rerouted. "A more intelligent way is to dispatch dual or multiple response resources to the incident from different access routes. Resources responding to the accident will arrive faster by an unaffected route, and an integrated emergency system can help notify all responding parties at the same time," Yuen said.

For city emergencies that may require a citywide evacuation, contingency plans that are preprogrammed into the system can be activated. "Using these plans, actions will be automatically assigned to relevant operators with instructions on what resources have been deployed, which emergency organizations need to be informed, methods of evacuation, assembly points and transport deployment," Yuen said.

INTEROPERABILITY

Public-safety systems, which include applications like computer-aided dispatch, vehicle tracking and mobile devices; criminal databases that can handle open warrants and watches on series criminals; and systems that include cameras, sensors, alarms, life support and medical information, are all looking to be integrated at



▲ Chee Mun Yuen, VP of Advanced Systems, ST Electronics (Info-Software Systems)



▲ An integrated system can help dispatch resources quickly and accordingly.

various degrees, Scott said. In order for full integration to work, interoperability is required.

The integration of multiple solutions from different vendors poses a challenge against interoperability. "Each solution has its own uniqueness with differentiating strategic functions on top of the open standards. Also, every agency operates differently, and customization will erode the benefits of standardization and interoperability, especially for a more complex integration," Yuen said.

The scale of the project may be the biggest challenge against interoperability. "Too many large-scale integration projects have not been entirely successful due to complexity, lack of system engineering, proprietary systems, lack of clear operation concepts, overly high expectations and optimistic time frames. However, we are beginning to see the vendor community supporting and driving standards much more today than in the past," Scott said.

REDUNDANCY

Redundancy must be applied for an emergency response system. "To ensure an efficient and responsive system for citywide emergency services, agencies have to set very stringent reliability and redundancy requirements for their contractors. In the event of system failure, operations can fall back automatically to the hot-standby equipment to minimize any downtime and/or degradation of emergency services. For some of the crucial subsystems supporting critical workflows, the redundancy plan may have up to four levels in fallback arrangements," Yuen said. "Rigorous testing is done to ensure that the systems have sufficient spare capacity to handle sudden surges in load, and regular testing and maintenance are done after a system has gone into live operation to ensure the system is in a healthy state."

Most systems that support a life safety mission use dual or multidatabase replication with dual networks, separate communications paths, multiple communications systems,

disaster recovery sites and mutual-aid agreements among neighboring agencies or echelons of command to ensure adequate aid can be provided during an emergency, Scott said.

DATA SECURITY

Data security must be enforced when using a wireless system with thousands of emergency responders accessing information. "Encryption, key changes from time to time on the wireless communications layer, and user logins and passwords for mobile devices are used for security," Yuen said. "Security education and good work processes and controls are addressed, and security audits are conducted regularly to ensure compliance."

Many government organizations enforce information assurance through structured processes and procedures with a certification and accreditation process to document the level of security. "Along with applying industry best practices, government organizations perform vulnerability assessments, evaluate threats and mitigate security vulnerabilities," Scott said. However, threats from the inside remain a large vulnerability. "Identity management is currently being worked on, and background checks, proof of credentials and biometrics are used to ensure the user seeking access is both authorized and the actual person."

FUTURE

Currently, the challenge still lies in policy, organizational makeup and human nature's resistance to change. The technology that is integrated and the way in which it is deployed are typically influenced by national pressure and necessity driven by real-world events and/or government agencies. These factors show a need for integrated citywide emergency systems. Integration among agencies is beginning to happen around the world, with various systems adopting standards to do so; much work is being done to define concepts of operations and policy changes, Scott said.

Also, as the number of modern cities increases in the wake of rapid urbanization, "smart cities" differentiate themselves from the mass to compete for investments. Businesses and people will migrate toward such cities, and providing a safe and efficient living environment will become an integral part of any future urban planning, Yuen said.



Bob Scott, Executive Director of Security Solutions Strategy for Intergraph