Choosing the Most Effective Emergency Communications System

Hazard-based procurement, the process of allowing emergency management challenges to define one's dispatch system, may be more likely to prepare communications centers to deal with the next "big one."

By Jon Samuels, Synergem Emergency Services

Few people buy Corvettes for family transportation. Piling little Johnny and his soccer team into the trunk might not sit well with the spouse or the police. Curvy, drop-nosed sports cars gave way to the minivan because most understand that capacity, reliability, and fuel economy usually trump styling, power, and pizzazz. *Need,* not *speed,* drives the purchase.

The same principle should govern the procurement of emergency communications systems. That process should not begin with communications managers searching for far-flung gems amidst the glitz and glitter of sales demonstrations. It should not begin with a disciplined technical review of system specs, or with the idea of duplicating Buddy's system over in the next county. How a system might perform is the *speed* part of the equation; the *need,* the true starting point, is a clear definition of the man-made and natural hazards a community must confront.

A Hazard-Based Procurement System

The hazard-based procurement system is the process of allowing emergency management challenges to define one's dispatch system. Because this approach molds system capabilities to fit the threat rather than trying to redefine hazards to fit neatly into CAD processes, hazard-based procurement is far more likely to prepare communications centers to deal with the next "big one," than using a product-centered strategy that focuses almost exclusively on the strengths and weaknesses of potential system choices. The hazards-based procurement system works in phases.

Step One

A recognized health and occupational sciences contractor prepares an assessment that contains drill-down menus addressing probable man-made and natural hazards within the jurisdiction and identifies conditions that will be present, protective requirements, immediate reaction recommendations, and other appropriate data.

Step Two

Three-dimensional simulation models are constructed that depict the conditions predicted in the hazard assessment. These models can be tied to real-time data sources and/or manipulated manually to reflect actual conditions. The hazard assessment and the simulation models define information and technical design parameters that drive development of procurement documents.

Step Three

A standard list of system specifications common to most RFPs are modified to reflect the needs identified in step two. Responding vendors are required to demonstrate how they will link their software to external databases, how interactive contacts will operate, and

redundancies that can be developed to provide for system survival. The procurement will seek to stretch inter-relationships by extending them to federal and state databases that are not commonly integrated in a PSAP network.

Step Four
Throughout the installation phase of the project—which commonly lasts six months to a year—an integrator independent of the principal vendors manages the project and develops and executes an acceptance test that affirms the ability of the new system to meet data needs established in the hazards assessment and the simulation models. The integrator then assists emergency communications and emergency management staffs in the preparation and administration of drills and exercises that test PSAP and first-responder abilities to employ the system effectively.

Step Five
Annually, or when major events warrant a review such as the opening of a new chemical plant, the jurisdiction or its vendors update the hazard assessment. They also provide continuing response training—at least quarterly for dispatchers and first responders, drills at least semi-annually, and one scripted and rated annual exercise.

Critical Decisions
As with most endeavors, a hazard-based assessment is no better than those who are hired to accomplish it. This is an area where technical expertise can make huge differences.

Vendors
Vendor choice, particularly in data development stages one and two, is critical to the success of a hazards-based procurement. It is recommended to use suppliers with documented abilities to produce the needed tools, even if they have not worked extensively in public safety.[1]

3-D Presentations
Three-dimensional simulations are new to public safety but will become common in the next five years. Using the hazard assessment, a simulation *maps* incident locations judged as most likely major event sites and will produce *3-D* representations of the location and its approaches. These programs weave sensors, surveillance devices, unconnected networks/databases maps, floor plans, shrink wrapped and specialized point solutions, and pre-planned response options into a visual simulation that resembles familiar video-game presentations. The simulation can be manipulated by a dispatcher to preview, for example, what a first responder will encounter as he/she approaches an incident. It will show what police officers can observe from any particular point near an incident scene. Will a wall block their view? Will a stream block their access? Using these data, both dispatchers and first responders can make more informed decisions.

Smart Zone Management
Smart zone management (SZM) integrates safety and security best practices with algorithms that visually represent a wide variety of buildings, facilities, infrastructure,

and other physical assets that are vulnerable to some form of disaster or disruption, whether caused by man or nature.

SZM is scalable for application to cities, counties, and even large geographic areas. By employing a systematic analysis of possible event scenarios and a detailed computer mapping of probable event sites, SZM has the capability to assist in better preparing for disasters and a more effective response to disruptions from storms, floods, power outages, chemical spills, human error, and acts of terror and violence.

With a complete hazard assessment and 3-D simulations driving the design of a community's procurement documents, the probability of obtaining the most effective and cost-efficient emergency communications system is enhanced immeasurably. Training and exercises based on the assessment and the simulations will help ensure that responses are standard, disciplined, coordinated and effective.

The **Hazard-Based Procurement in Action** sidebar**, page xx** is an example of how during the first minutes of an emergency, systems purchased under a *hazard-based procurement* strategy are far more likely to provide dispatchers and first responders the data they will need, than product-centered procurements that focus almost exclusively on the strengths and weaknesses of potential system choices.

Need* Not *Speed

When all things are considered, a hazard-based procurement system attempts to understand upfront why communications centers are buying a new system. For most of us, the why is simple: to protect the people we serve from the threats they face. With that simple principle in mind, defining those threats concisely is clearly the right place to start. Remember, *need* not *speed* is the key to an effective procurement.

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References

1. Two companies are particularly recommended. Dade Moeller and Associates (www.moellerinc.com) is an expert in risk assessments involving hazardous materials and natural disasters, health physics, chemical and radioactive waste management, and environmental protection. Ozonelink (www.ozonelink.com) is an international company that has extensive experience producing 3-D simulations for the public safety and counterterrorist sectors. The company addresses what it calls, "Smart Zone Management." This simulates what users might expect from various protective measures.

Pull quotes

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Sidebar
Hazard-Based Procurement in Action
County A is home to a large nuclear facility with a major bisecting highway. Trucks carrying different types of hazardous materials frequently use this interstate. There are several industrial sites throughout the county that also pose one type of threat or another. Trains transit the county with hazardous cargo. The principal natural threats are wind and rain spawned by thunderstorms, hurricanes, and tornadoes.

The county's 9-1-1 director previously invested in a Phase II CAD/RMS that met or exceeded all the standards at that time; an aggressive maintenance program has kept everything shipshape. Every appropriate plant has a hazardous material use plan on file with Emergency Management and that information was integrated into the CAD. Chemical releases and nuclear emergencies are the subject of frequent drills and exercises involving dispatchers and first responders.

Early one morning, the 9-1-1 center receives a panicked call reporting a nauseous cloud that may have come from a train derailment. "What should we do?" demands the caller. "Send help, fast!" 9-1-1 is soon flooded with confirming calls. Dispatchers jump into action, facing several serious questions:

- Had there been a train accident? What other probable causes could be behind these reports?
- What trains were in the area and what was being carried?
- What could be in that cloud?
- What immediate actions should be passed to the public and what pre-arrival instructions should be given to first responders?
- Who needed to be alerted?*

Advantages
Using a hazard-based strategy gives dispatchers several advantages:

- The reaction plan could be predicated on a careful analysis of the most probable emergencies the county might face, including train incidents. During system design, the CAD vendor linked the software to railroads operating in the county and a screen could be called up listing all transiting trains and identifying any

hazardous cargos. The CAD also provided an interactive link to railroad companies so that dispatchers could verify data displayed on this screen and request immediate assistance and recommendations.

- The CAD could be linked to the national chemical guide so dispatchers could offer authoritative guidance to all exposed individuals and first responders. If the chemical involved chlorine, dispatchers could tell callers to stay inside and cut off any circulation from the outside by closing all windows and covering any vents. People outside could be instructed to seek the highest point possible since chlorine is heavier than air and would sink. This last bit of information could save lives since most are taught to crawl when confronted with smoke or other substance that restricts breathing.
- The CAD could be linked directly to a plume prediction model and the national weather service. Once this link is informed that chlorine was involved, it uses real-time weather to predict a time-phased impact area.
- The plume prediction model could be tied to a 3D evacuation simulation program that recommends evacuation zones and routes and predicted choke points that should be manned by traffic control officers. The evacuation model prepares a reverse 9-1-1 tool for use in a mass notification.
- When the dispatcher informs the CAD that chlorine was involved, a notification list is immediately displayed that could be activated with one click.

**The scenario depicted is suggested by an actual incident.*