

# For Our First Responders, In-building Public Safety DAS is a Lifeline

By Bob Butchko

Although it is not widely known, in-building distributed antenna systems have two basic components. The first and more widely recognized is the

commercial component, which brings full-bar cell-phone coverage or high-speed wireless Internet access to high-rise buildings. The second component consists of public safety radio systems (PSRS). These indoor distributed antenna systems provide guaran-

teed, 800 MHz, loud-and-clear first-responder communications in those same structures.

Since 9-11, the focus has been heightened on providing first responders with

garages or any areas where reception is weak or absent. The installation of a correctly engineered, designed and installed in-building public safety radio system resolves these issues.

Last year, the historic Virginia community that includes Albemarle County, Charlottesville and the University of Virginia augmented its 800-MHz public safety radio system with in-building amplification for selected county, city and university buildings and facilities.

## Updated radio system

The Emergency Communication Center's executive director, Tom Hanson, who represents this multijurisdictional public safety 9-1-1, police, fire and emergency medical service for that historic area explained, "While the recently updated ECC public safety radio system provides acceptable on-street coverage throughout the ECC service area, some buildings lack desired in-building coverage, and therefore require additional en-

hancement so first responders may have more reliable in-building radio communications. Unfortunately, regardless of how good the on-street coverage may be for your system,

there will be factors (e.g., budget constraints, zoning, topography, etc.) that affect your in-building coverage, resulting in the need to augment coverage through additional amplification."

Bill Gulbranson, president and chief technology officer of Lord & Company

Technologies, the systems integration company that designed and installed the in-building wireless communications systems for Charlottesville, commented, "Loud-and-clear radio communications during any emergency are indispensable. The last thing any firefighter wants to hear is that loud 'bonk' when your radio cannot get into the system. It's really frightening and can be life threatening. These in-building amplification systems are truly a first responder's lifeline."

More and more governmental entities around the nation are requiring these services to be provisioned and certified before new buildings can be occupied. In 2002, there were 11 U.S. jurisdictions with enacted or proposed signal-booster ordinances. Some sources put that number close to 200, and it is multiplying each year.

## Fire code template

The early-adopter municipalities broke ground for others to follow, and now there is nothing to stop cities and counties from making sure that public-safety officials have loud-and-clear communications anywhere inside of a building during an emergency. As an announcement issued in late 2008 said it would, the NFPA 1 Fire Code 2009 Edition offers a technically correct and legally sound in-building radio system regulation template for inclusion in local fire codes. The issuance of this template has been expected for some time, and the template should make it much easier to incorporate such regulation into local fire codes, accelerating an already rapid adoption in the United States. (See Annex O: In-Building



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completely reliable radio communications during emergencies regardless of the location or situation. First responders who rely solely on 3-watt handheld radios often lose signals in difficult signal-propagation environments, such as building elevator lobbies, basements,

Public Safety Radio Enhancement Systems.)

**What first responders say**

For first responders, in-building systems to enhance radio signals may make the difference between life and death. Police, fire and EMS personnel

Montgomery County, Md. “They will definitely save lives.”

**What real estate developers say**

However, the reality is that in the commercial development and construction world, someone must pay for the design and installation of these systems. In most cases, that burden falls on the real estate developer.

Mike Kearny, a senior vice president at The JBG Companies, one of metro D.C.’s largest and most respected developers, put things in perspective.

“As a commercial real estate developer, [I always make] safety a top priority,” he said. “These new in-building public safety radio requirements are like the advent of sprinkler systems several decades ago. Distributed antenna systems are now another part of the life-safety infrastructure of

any new commercial building. The JBG Companies are proud to do their part to ensure first responder communications in our projects.”

**What RF design engineers say**

As the rapid adoption of in-building public safety radio systems moves toward standard practice, there will be a groundswell of companies that desire to go after these projects. As a word of caution, these systems are not a matter of mounting antennas and pulling cable. These systems must be carefully designed to provide the correct signal coverage throughout the entire building. They must never degrade or interfere with the emergency communications system as a whole, and they must create an optimal “interference-free” in-building RF environment. For example, the careful planning of antenna positions allows for a low-attenuation radio link, thus greatly reducing fading effects. Excellent radio links are achieved with low

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are frequently called upon to respond to emergencies inside buildings and are often the first to know that a building has poor radio reception.

“We have been pushing for these in-building radio systems for some time,” said Mark Barrick, a fire inspector for



**Emerging from a basement, a firefighter holds a portable two-way radio up in the air in an effort to establish a signal connection with the radio communications system.**

downlink and uplink transmit power.

These in-building DAS systems should be engineered and installed by specialists who are competent and experienced in wireless communication, specifically those who have installed public safety systems in a variety of challenging or mission-critical environments. A valid FCC license should be made available if testing is to be done on frequencies other than police, fire or emergency medical frequencies. Many municipalities also require a professional engineering seal to complete the compliance paper-

work.

The challenge for CRE developers and government organizations is to find expert and experienced vendors that can design an in-building enterprise system to ensure that the building is not only first-responder ready to the letter and spirit of the regulations, but also able to create efficient designs with cost savings in mind.

Want to know more about public safety radio systems and codes? Visit [www.apco911.org/services/bulletin](http://www.apco911.org/services/bulletin) **agl**

Bob Butchko is a partner and executive vice president of Lord & Company Technologies, a turnkey systems integration company that designs, installs, tests, certifies and maintains in-building wireless communications systems for public safety radio and commercial wireless. He is a public speaker and advocate for the in-building public safety regulations. See his IWCE 2009 presentation at <http://ecbiz43.inmotionhosting.com/~lordco5/news.htm>. His email address is [b.butchko@lordcotech.com](mailto:b.butchko@lordcotech.com).