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DARPA PROJECT SUCCESS COULD BE A BOON TO PUBLIC SAFETY

Oct 7, 2008 11:12 AM, By Donny Jackson

Military and first-responder communications have a lot in common, the most notable being the fact that lives are at stake, so they must work. However, there is a key difference in the two sectors: No public-safety agency has access to budgets that even remotely approach those of any of the armed services.

As a result, many expensive technologies used by the military often are unrealistic for public safety until years of evolution make them affordable to first-responder agencies—mesh networks and software-defined radios are prime examples. But public safety may not have to wait much longer to take advantage of the latest defense communication advances being developed in the Wireless Network After Next (WNAN) program.

Part of the program calls for the development of a handheld cognitive radio—able to identify available spectrum in an appropriate band and use it automatically—that can be manufactured for \$500. Preston Marshall, program manager for the Defense Advanced Research Projects Agency (DARPA) strategic technology office, said these radios are probably **two years away from being ready for mass production**.

Given the fact that public safety is accustomed to spending 10 times that amount for the latest and greatest radios, \$500 is quite affordable for the flexibility and functionality envisioned for the WNAN cognitive radio. And the \$500 target is based on just 100,000 radios being purchased; if volumes can reach 500,000 or more, the economics of mass production could allow the price to drop substantially, Marshall said. In other words, the military has plenty of incentive to make the radios attractive to public safety, which can greatly increase the volume needed.

But handset price is just one aspect of the WNAN program that holds promise for the public-safety community. DARPA claims it already has demonstrated that its cognitive-radio solution is more reliable than conventional radios, even though Marshall acknowledges that the front ends of the new radios are not as robust as those found in conventional radio systems.

“Whereas the current radio tries to make one frequency and one receiver/transmitter absolutely reliable, we have four receiver/transmitters, and we share the traffic across all four,” he said. “So, if one channel gets jammed or fails, we’re running three others. Each channel is not life and death.”

This automatic flexibility also largely removes the need for spectrum to be managed, allowing for spectrum pooling that should make more efficient use of available frequencies, Marshall said.

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Moreover, the WMAN system is expected to include full peer-to-peer functionality—voice and data, including video—that largely removes the need for backhaul, which has become one of the greatest challenges in mission-critical communications today, Marshall said.

“We think part of the reason this technology has not taken off at the edge [of the network] is that you need backhaul,” he said. “You can buy a really good video camera for nothing. But it costs an awful lot to backhaul that back to some file server that might be at the dispatch center and then back out to the edge to someone who might only be a couple of hundred meters from me. This technology gets rid of the need to have to haul it back.”

Indeed, being able to communicate without backhaul is important to the military, which typically does not have time to erect towers in hostile environments. The same can be said for public safety, which needs to be able to communicate when responding to incidents—such as a hurricane—that may well have wiped out the network infrastructure it normally uses. An additional benefit is that such a system means lowered backhaul costs even when a network is available.

In short, the WMAN program promises more reliable communications, greater functionality and lower costs than existing communications. If these goals can be met as quickly as scheduled, the impact on public safety in a few years could be substantial.

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