PUBLIC SAFETY IN THE 21ST CENTURY

ADVANCED COMMUNICATIONS TOOLS TO PROTECT FIRST RESPONDERS AND THE SECURITY OF OUR COMMUNITIES

The phrase "next generation public safety" has been interpreted in many different ways. But, as Motorola's Tom Quirke explains, next generation public safety is really an interaction of many different components – all designed to empower first responders with the information they need to better serve and protect their communities.

When it comes to "next generation public safety," opinions differ on what it is and how critical it is for public safety operations. Some public safety officials think that the technology is just "nice to have." Some think they can simply use the existing public cellular broadband networks for high-bandwidth applications like video – which means they do not need to build their own mobile broadband networks. Others believe that next generation public safety applications will only complicate their operations.

But once they talk to Tom Quirke, vice president of Product Marketing, Motorola Solutions business of Motorola, Inc., they end up asking: "How fast can I get this technology for my first responders?"
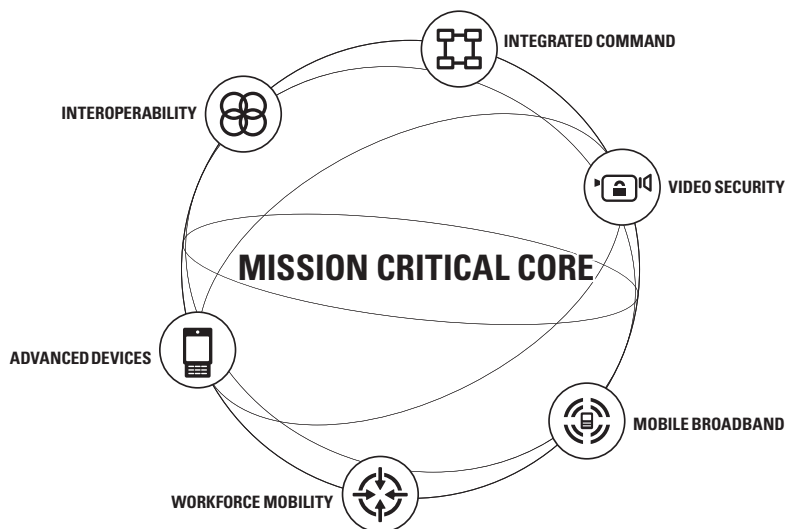
Why is Quirke so convincing? Quirke has seen first-hand what Motorola's next generation suite of products can do for public safety organizations. "When Motorola first started studying next generation technology, we uncovered many questions that needed to be answered, such as: How will multiple devices communicate? How can we avoid overwhelming command center personnel with too much information? How do I ensure next generation solutions support the necessary interoperability requirements among different networks, technologies and different jurisdictions?" Quirke says. "Motorola has devoted many years of research and development to answer questions like these so that we could provide public safety officials with the best next generation solutions possible."

In fact, Motorola has poured significant resources in terms of both time and money into developing next generation products that not only save lives and increase efficiencies but are also "second nature" to use.

> "First and foremost, we focused on developing next generation technology that is second nature to operate so that first responders and their command center counterparts can focus on the mission, not the technology," Quirke says. "Motorola has been creating public safety products that are second nature to operate for more than 80 years now, and that same "second nature" principle will continue to guide us in the future. So no matter what the latest technology allows us to do, each solution must be totally intuitive and instinctive to use. If it's not, it's just going to get in the way."

SIX AREAS OF INNOVATION – AND ONE MISSION-CRITICAL CORE

Earlier this year, Motorola unveiled its vision for next generation public safety and began demonstrating its suite of next generation solutions to thousands of customers around the globe. These products are centered around six areas of innovation, all of which interact to deliver a truly integrated next-generation solution to public safety organizations.

INTEGRATED COMMAND

INTEROPERABILITY

VIDEO SECURITY

MISSION CRITICAL CORE

ADVANCED DEVICES

MOBILE BROADBAND

WORKFORCE MOBILITY

"The six areas of innovation are not only integrated with each other, they also must be integrated with the existing mission critical core, which is the mission critical voice network," Quirke says. "All next generation solutions spring from the existing mission critical system, because that is today's reliable, instantaneous communications network, and it dictates how information flows." For instance, Quirke pointed out that today's first responders share information through talkgroups, in which one individual presses a button and can be heard immediately by everyone else in that same talkgroup. Today, Motorola is developing next generation solutions that allow images, data, or video to access and follow those same talkgroup flows.

Motorola's six areas of innovation then build upon the mission-critical voice core to dramatically enhance situational awareness, improve productivity, increase safety and heighten disaster preparedness for public safety organizations. These six areas of innovation are:

MOBILE BROADBAND

Mobile broadband represents the high speed network that will support next generation applications and services.

"Many industry players use 4G or LTE when they refer to the mobile broadband aspect of next generation public safety, but that's far too narrow of a definition from Motorola's perspective, and far too limiting from our customer's perspective," Quirke says. "Instead, next generation public safety networks will bridge the gap between the mission critical voice networks in use today and next generation applications."

Why will public safety organizations require more than just LTE networks to support their future public safety applications? One reason is that LTE will likely not support mission critical voice for years to come – if ever.

"Public safety officials place a lot of different requirements on their mission-critical voice. One of the simplest ones is direct mode or talkaround, which allows you to talk from one radio to another radio without a network in between," says Quirke. "Supporting that on a broadband LTE network would require a major change in the LTE standard. Given that public safety users represent less than one percent of all LTE users, the amount of leverage that public safety will have on the LTE standards is going to be minimal. So that kind of standard change is not likely anytime soon."

INTEGRATED COMMAND AND CONTROL

"The biggest challenge with command and control today is that it is highly fragmented," Quirke says. "You have a separate radio console, a separated computer aided dispatch system [CAD] and a separate records management system – just to name a few."

That's why Motorola built the PremierOne™ next generation command center communications system using the Microsoft .NET framework.

"Building an integrated command and control system running on the Microsoft.NET framework allows a seamless flow of applications – tailored applications written by both Motorola and third parties – running on just one architecture," says Quirke. "So the system allows you to key in data only once and populate it into several different records, which means fewer opportunities for mistakes. So that's a major step forward. It's important to streamline command center operations now because it's about to get a whole lot more complicated in command and control – in particular due to the emergence of video."

"Video can be overwhelming. You can have any number of feeds coming into the command and control, and you have to make sense of that very quickly," Quirke says. "That's why Motorola has already identified several ways to alleviate the video burden on command and control."

Motorola's integrated command and control system uses video analytics to support information filtering so that video feeds that require immediate attention are automatically flagged for the command center operator. The system also incorporates correlation capabilities that analyze different types of data such as location information and historical data and only displays the urgent information on the dispatch screen.

Motorola has also developed intelligent ways of storing data that will cut costs for its customers. These innovative storage solutions correlate all information – including any video – collected from an incident on a time stamp so public safety officials can easily reconstruct an incident even years after it occurs.

VIDEO SECURITY

The ability to effectively support video in the command center is critical because of the immense public safety benefits it provides.

Other Motorola customers are using video as evidence during trials. "Our customers tell us that video evidence turns the jury into the witness to the crime. So it really helps with getting successful prosecutions," Quirke says. "Video also provides a lot of officer safety too."

"Our customers also tell us that video is the new voice," Quirke says. "It really does give you situational awareness that you couldn't possibly get any other way."

WORKFORCE MOBILITY

No matter how much a mobile broadband network and a video security system might benefit public safety organizations, the reality is that these networks cost money to build. And municipal government budgets are tight right now.

That's where the concept of workforce mobility can help, because mobile broadband networks allow police organizations to increase operational efficiencies and thus cut costs in more "routine" law enforcement tasks.

For instance, California's Long Beach Police Department recovered 275 stolen vehicles and made 50 additional arrests in just six months after installing four mobile Automated License Plate Recognition (ALPR) systems – without hiring a single extra officer.

Police organizations can reap big savings from eCitation systems as well, because today many law enforcement organizations actually lose up to 35 percent of the revenue they could be collecting from parking and traffic citations thanks to human error. In fact, officials in one U.S. city told Motorola they lost nearly half a million dollars in potential revenue one year because a full one-third of the 25,000 tickets issued were automatically dismissed due to illegible handwriting or technical error.

Even a seemingly straightforward shoplifting incident can cost taxpayers $4,000 to $6,000. That's because in order to make sure there are no outstanding warrants on a suspect, officers today must take that shoplifting suspect back to the station to process them – which costs both time and money.

In contrast, a biometric-enabled mobile broadband device eliminates the need to travel back to the station to process the suspect. Instead, an officer can use that mobile device to scan the suspect's fingerprint at the location where the incident occurred to check for outstanding warrants – and can even immediately print off a court summons from that same device. The result: thousands of dollars in taxpayer money saved.

"With mobile broadband, we can quickly deliver enterprise efficiencies to government agencies," Quirke says. "The possibilities for costs savings are phenomenal."

ADVANCED DEVICES

Of course, a mobile broadband network is only as good as the devices that operate on it. For instance, in the shoplifting example above, if the officer did not have a fingerprint scanner on his mobile device, the shoplifting suspect would still need to be processed at the station.

This is why next generation device design is so important. "Our customers have told us not to change their two-way radios – they say 'Don't mess with the lifeline,'" says Quirke. "So Motorola has focused on creating many ancillary mobile data devices that public safety agencies can use in non-emergency situations."

Motorola has worked with many of its customers to determine the key requirements for these "secondary" mobile data devices. And it is no surprise that public safety customers still request rugged mobile devices that support highly secure encryption and are second nature to use.

But Motorola has also found that its customers want the option of transmitting the data from these secondary devices across many different networks. The solution: Motorola is creating devices that can "talk" to one another using a Motorola-developed, mission critical form of Bluetooth® technology.

"Motorola's next generation public safety devices will incorporate a higher level of Bluetooth that allows two public safety devices – for instance, the two-way radio and the data device – to talk to each other using a mission-critical Bluetooth link," Quirke says. "The mission critical Bluetooth will support highly secure encryption and very little delay, thus supporting instantaneous communications between devices. So that means if an officer is using a data application on a public broadband network and it fails during an emergency, he can send some of that data to the mission critical radio via Bluetooth. Then it can travel over the mission critical voice network. And vice versa. So this mission critical Bluetooth capability gives you multiple back-up systems."

INTEROPERABILITY SOLUTIONS

In public safety, interoperability is critical in many different areas. It is needed between the mission-critical broadband network and the mission-critical voice network so that information can flow through the talkgroup. It is needed across different agencies and jurisdictions. And it is needed between networks so that different applications can be sent across different networks – and prioritized accordingly.

For instance, to support interoperability between networks, Motorola is building a public safety interoperable gateway that allows a private mission critical mobile broadband network to talk to a public cellular network. This could allow a police department to work with a cellular carrier to prioritize its traffic using the gateway.

"Imagine a municipality that operates 1,000 video cameras and experiences a car crash on one of the interstates. Public safety officials might choose to immediately prioritize the traffic coming from the video cameras near the crash and deprioritize everything else on the broadband network to allow the essential video to arrive quickly," Quirke says. "That's a non-trivial task – and it requires a lot of interoperability between systems. It's just one of the key challenges in system design that Motorola has been working on for many years – and will continue to work on in the years to come."

WHEN MISSION CRITICAL REALLY COUNTS

So what exactly does Quirke say to public safety officials that makes them change their mind about the urgent need for next generation public safety solutions?

"When I first talk to public safety officials, they tell me that the applications sound great, but then they ask me: Do I really need a mission critical broadband network to do this? After all, they say, I can use a cellular network for most applications. Sure, they know that the cellular network might be overwhelmed in an emergency, so that even their prioritized data might not get through. But in an emergency, they think they'll only need their mission critical voice network," Quirke says. "But then I share with them one very specific example of a next generation mission critical application – and this one example convinces nearly every police chief that his organization needs its own mission critical mobile broadband network."

What changes their mind? Well, it all has to do with the "Man-Down" emergency button on Motorola's two-way radios.

"When an officer is attacked, the first thing he will do is hit his Man-Down button. And an alarm will go off in the command and control center," Quirke says. "Motorola was the first to introduce the Man-Down emergency button, and everyone else has copied it since. And we're glad they did, because it saves lives."

Quirke goes on to discuss how Motorola has added some critical capabilities to the Man-Down emergency button, including global positioning system (GPS) capabilities that automatically give the command center GPS-based location coordinates almost instantaneously when an officer goes down.

"When we first introduced GPS into our two-way radios, police chiefs thought it was just a 'nice to have' capability," Quirke says. "But when they saw the value of combining it with the Man-Down emergency button, that GPS capability went from a 'nice to have' technology to a 'this better work all the time' capability very quickly. It's now mandatory for many of our customers."

Then Quirke points out that Motorola is now adding a new next generation capability to its Man-Down emergency button. As those GPS coordinates travel to the command center, they are also fed into the mobile broadband network, and all the cameras in the vicinity of the fallen officer are told to pan tilt and zoom in based on those GPS coordinates.

"So thanks to next generation public safety, in just a few seconds, you can actually see the officer who is down," Quirke says. "If the officer is injured to the point that he can't speak, looking at that video feed is the only way you know what's going on. If the officer is being shot, that video can be quickly sent to the surrounding officers so they know where the shooter is and don't go into the line of fire trying to assist a fallen officer."

> "When I show this to police chiefs, they say: 'I get it. This is what we need to protect our officers.' And then they say: 'If this were installed, I would expect it to work every single time,'" Quirke says. "And I tell them that if you want it to work every single time, you need to control the network. That mobile broadband network has to be owned by your public safety organization. That's why – even if they rely on public networks for some of their applications – public safety organizations still need to build their own private next generation mobile broadband network."

NEXT GENERATION PUBLIC SAFETY

At the heart of every mission is the ability to communicate in an instant to coordinate response and protect lives. Today, Motorola is putting real-time information in the hands of mission critical users to provide better outcomes. Our powerful combination of next generation technologies is transforming public safety operations by strengthening the mission critical core with broadband connections, rich-media applications, collaborative devices and robust services. It's Technology That's Second Nature. To find out more, visit **motorola.com/nextgen**.

"Public Safety in the 21st Century" was originally published in the Motorola eZine for Government professionals, a quarterly online magazine that helps eZine subscribers stay up to date with market, industry and technology trends, as well as provides timely news, analysis and information.

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