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Keeping first responders safe

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Without the kick of adrenaline that situational stress brings, would first responders act as quickly or anticipate worst-case scenarios as well? Maybe not.[1] Yet, mission performance improves when first responders can manage that stress better because they:

- Know what they are up against.

- Are well trained for multiple scenarios.

- Collaborate on-site with ease.

On the job, situational knowledge and capabilities help first responders make strategic decisions expeditiously while under pressure. Tools that provide this knowledge can save first responders' lives and help protect their health.

Accessing mission-specific information

Consider a police officer answering a domestic disturbance call.

- Does the officer know whether the home has had previous disturbances?

A firefighter is managing suppression of a building fire.

- How can the firefighter best support the team inside without entering the building?

Emergency medical services personnel are en route to a riot where multiple injuries have been reported.

- How can they find the most direct path to people needing medical attention and keep themselves out of harm's way?

In each of these cases, the information may be available. Police may have drone surveillance of the riot and the surrounding area. Firefighters may be wearing cameras, biometrics or carbon monoxide sensors. Criminal justice databases and 911 records may have information about residents at that address. Useful data is abundant. The challenge isn't always the data. For first responders, the challenge often is accessing data remotely with precision, speed and even the added bonus of analysis.

In the above law enforcement example, "a police officer may not have 10 minutes to sit in his car, searching databases on his phone," Toni Isla said. A former Chicago police officer, Isla is the Executive Program Manager of Public Safety for Verizon Frontline, which supports first responders with dedicated communication and network solutions. With members of the Verizon First Responder Advisory Council,[2] Isla brainstorms monthly what agencies need from their communication solutions.

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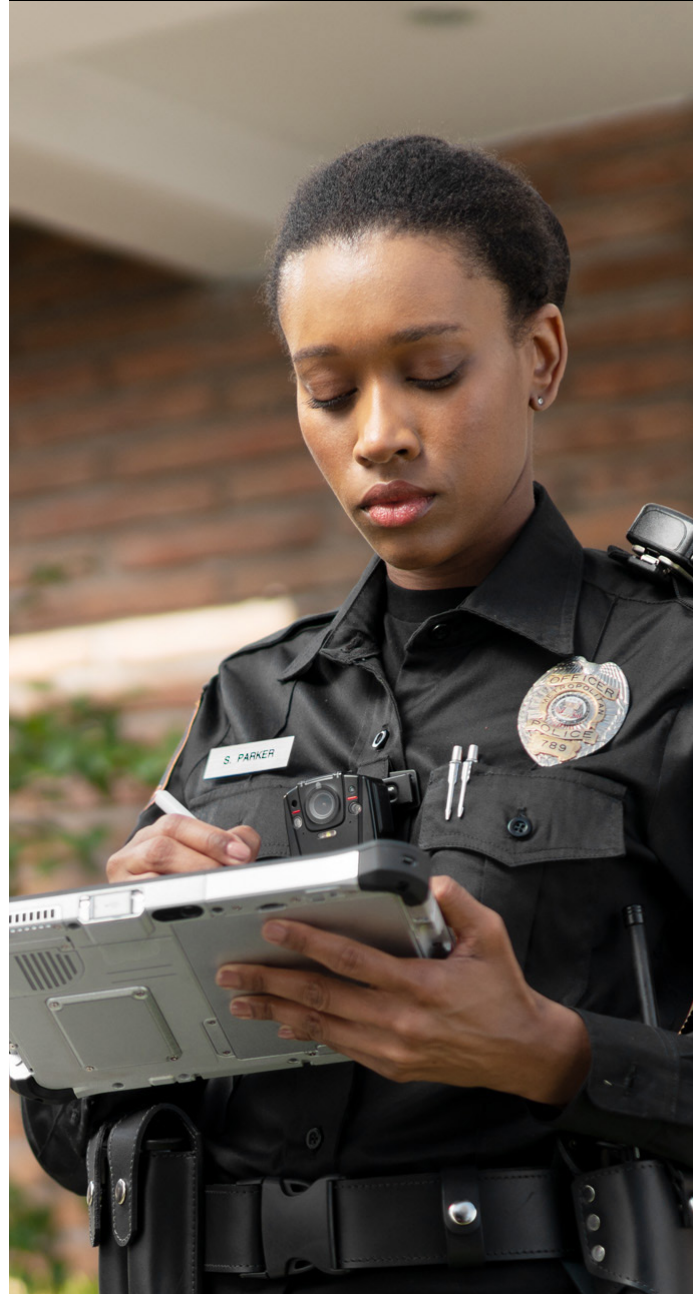
Have the tools: Video, sensors, 5G

The technology is maturing quickly. New, robust cellular and internet networks can support heavier data transmission, such as that for high-definition video, which is preferred for the most accurate threat detection and analysis. Use of video surveillance captured by stationary systems or by drones is one of the more exciting developments Isla foresees scaling and becoming standard for first responders.

Sensors can be added to many places, providing additional layers of information. For example, sensors have been added to firefighter masks with thermal imaging and augmented reality to better navigate smoke-filled rooms.[3] For several years, the number of internet of things sensors being used has grown by double digits, and that growth is expected to continue.[4]

"The goal is to support a density of IoT devices at 1 million devices per square kilometer, which is a lot of devices. It's probably realistically a year or two off, but the low latency of the 5G network certainly has been a game changer," said Tony Dolezal, Public Sector 5G and MEC Specialist at Verizon.

But an opportunity for greater situational awareness also is an opportunity for hackers.

"Every time you add a device to a network, you've added an attack vector. It's something else that can be exploited.

... 5G works in a philosophy that is similar to zero trust in that it assumes every device, every user, every aspect of the network is a potential threat. The network has been designed to be more secure," Dolezal said. "That kind of tight security is key in the field."

Adding specialists to the mission

Sometimes, it isn't the tech that's needed on a mission as much as a specific skill set. One job gaining importance in emergency response is that of a mental health clinician. Individuals with mental illness may harm first responders, themselves or others.

Imagine police officers answering a call in which the subject appears to be experiencing a mental health issue.

- What would help an officer effectively communicate with the person and resolve the issue, despite a lack of professional education in mental health?

In Harris County, Texas, sheriff's deputies pull out a designated tablet that connects to a mental health professional from a partnering organization. The clinician speaks virtually with the subject and helps assess the situation. Almost three-fourths of deputies report that the procedure helped de-escalate an incident.[5] It's almost packaged expertise, available if a case arises needing it.

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The same could be said for software algorithms that use machine learning and artificial intelligence to analyze surveillance video. Imagine a program that identifies that a package has been left in a crowded space unattended and then alerts authorities. Next Generation 911, in conjunction with other tools, may make that possible, and responders should have access to that analysis. Verizon is working on this and other public safety communication enhancements with the Internet2 Technology Evaluation Center (ITEC) at Texas A&M.

Have the tools: 5G Ultra Wideband

New capabilities require heavy files, but the latest networks are up to the task. Tablets used by the Harris County Sheriff's Office were set up on Verizon's 4G LTE network, which covers 99% of the US population.[6] Verizon's 4G LTE wireless broadband is 10 times faster than 3G. It handles download speeds between 5 megabits per second (Mbps) and 12 Mbps and upload speeds between 2 Mbps and 5 Mbps, with peak download speeds approaching 50 Mbps. Cable speeds vary, but 4 Mbps to 12 Mbps are common.[7]

However, sharing and downloading most data on 4G isn't practical. Alternatively, 5G supports edge computing capabilities and makes the system work better. To coordinate a mission, it's key to have "the ability to share ... real-time video, have a conversation about it and access the data records of that felon or of that building [simultaneously].

It's never been achievable before this technology," Dolezal said.

In anticipation of the impending tsunami of information coming to agencies and the growing need to access information faster, Verizon attained new bandwidth. Now, it offers low-band, mid-band and high-band frequencies, making data management more efficient.[8]

Preparing for every scenario

5G bandwidths make new things possible, such as when training first responders. Situational training might benefit from combining video coverage of an incident with an augmented reality overlay, as well as visualizing multiple possible scenarios, Isla said. By supplementing traditional training programs with virtual reality and AR, departments may be able to offer more training while saving money, Dolezal said. VR and AR also could help command centers compare possible strategy outcomes.

Have the tools: VR/AR, rugged devices

Preparing for any scenario means having reliable equipment. Purpose-built communication devices have rugged construction. Increasingly, networks must be robust enough to support machine learning, artificial intelligence and VR/AR capabilities. Connectivity must be reliable regardless of location, number of users vying for bandwidth, amount of content being shared and the network on which other agencies use.

Understanding the urgency for intel

That's because only part of an incident is predictable. Much of the danger of being a first responder lies in the unknown. First responder careers involve engaging in potentially dangerous situations, so many of the profession's risks are what might be expected.

Firearms-related incidents made up the second-leading line-of-duty cause of death for police officers in 2022.[9] Motor vehicle crashes came in third.[10] For firefighters, crashes were second.[11] Other fatality causes for firefighters include cardiac arrest and internal trauma.

Making it out alive from an incident doesn't guarantee good health, though. Almost 1 in 3 first responders experience mental health conditions such as depression and post-traumatic stress disorder, compared with 1 in 5 in the general public. In 2022, suicide was recognized legally as a line-of-duty death for first responders.[12]

Disease is another killer, though it takes longer to recognize. For EMS personnel and firefighters, occupational cancer is the leading cause of death. Their figures don't include COVID-related deaths, but police death records do. For three years running, COVID has been the leading cause of death for law enforcement.

Have the tools: Comprehensive, technically advanced communication vision

While not all dangers to first responders can be mitigated, some risks can be lessened.

With the right communication tools, first responders can do their jobs more adeptly, reducing risk to themselves and to teammates. First responders perform best when they are confident that they:

- Have relevant information about the situation.

- Can count on team members to look out for them.

- Understand and can meet mission responsibilities.

- Have tools and information in the field to help them evaluate dynamic situations on an ongoing basis.

- Know that additional resources can be available quickly.

"They need to update their systems and create a complete, ongoing security profile and communications profile of where they want to be. A road map," Dolezal said.

To learn more, visit verizon.com/frontline.

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