THE POWER OF
REAL-TIME VIDEO
ANYTIME, ANYWHERE

You already understand the value of wireless video in protecting citizens and property. Cameras patrol public places such as parks, stadiums and city malls. Police officers have cameras in their vehicles to record arrest incidents and high-speed chases. And while these solutions have proven their value in reducing crime and multiplying manpower, they lack one critical element that can take public safety to a whole new level: real-time video that goes wherever you go.

Thanks to the latest mobile broadband technology, LTE or Long Term Evolution, which will be deployed by public safety agencies throughout North America, first responders will have access to a mobile high-speed network that is well-suited to transmit high-quality video wherever they go.

Today, video from public venues only makes it to the command center, not to officers and detectives out in the field. Officers in the field can't access live feeds to see, for instance, if known gang members are congregating in certain areas. Police dispatchers can be watching a crime happening when an officer is a block away but must give a detailed description of events because that officer can't access the video feed.

Many police cruisers include in-car video that feeds data to a VCR or DVR in the trunk, but that data isn't accessible until the vehicle returns to the station. So an officer in a high-speed chase must call out a play-by-play over the radio and a commander must determine if the officer should continue the pursuit. This need to describe his surroundings puts additional strain on the pursuing officer and forces his supervisor to depend on a verbal description to make crucial decisions impacting the safety of officers and the public.

Now imagine a real-time mobile video solution capable of flowing freely, from camera to command center, out to mobile clients and everywhere in between. In-vehicle video can be shared with dispatch instantly, allowing a commander to observe a traffic stop in real time when the officer pushes the video feed to him, or when the commander chooses to access in-car camera video. The commander can view firsthand a police chase and authorize a pursuit. And he can do this from any location via a mobile device.

New officers in the field can watch more experienced officers cruise an area and learn its idiosyncrasies. And supervisors can monitor new officers, particularly during traffic stops and other high-risk situations.

Teams of officers in the field can share video to coordinate the pursuit and apprehension of suspects. Investigators can pull video from a street camera, zoom in, recognize a suspect in a group and push the video feed to other team members and patrol officers for follow-up or connect to remote databases for more information.

With the right agreements in place, police can view video in real-time from cameras installed in businesses or schools, enabling commanders to make tactical decisions on the scene and giving officers an operational picture as they enter the building.

THE CHALLENGE OF
WIRELESS REAL-TIME VIDEO

The bandwidth of mobile networks is impacted by variables such as topography, weather conditions, the distance from an antenna, number of users in the sector and user priority.

Yet most video streaming technologies, adapted from the wired world, assume a constant amount of bandwidth. If available bandwidth doesn't match expectations, the result is errors and often total loss of available video.

Guessing how much bandwidth your personnel can expect in the field is fraught with problems. If you guess too high and the bandwidth drops below your limit, you will get severe degradation or loss of video. If you guess too low, you underutilize bandwidth and miss the opportunity to have higher quality video.

Agencies also have to make a trade-off between the numbers of video streams being transmitted and the resolution of each stream. When an incident occurs, controllers may need to increase the bandwidth available to an officer at the scene to provide a clear view of the incident, which may mean reducing the bandwidth available to others. Just like variable topography or other conditions, this can change a wireless client's bandwidth dramatically from one minute to the next.

OPTIMIZING FOR VIDEO

Many video systems overcome bandwidth variability with buffering: storing a few seconds or minutes of streamed video before playing it from the beginning for the viewer. This way, if there is a problem during transmission, the system has time to recover and correct the problem, and the viewer doesn't notice because the video is coming from the stored buffer rather than streamed live. Buffering is an acceptable solution for entertainment purposes and familiar to anyone who has used YouTube, but in public safety, it's crucial that video feeds not be delayed. Making tactical decisions requires seeing what is happening now – not 60 seconds ago.

Motorola has developed real-time intelligent video solutions to meet the challenges of deploying mobile video systems. By encoding a video stream to make the best use of available bandwidth and the capabilities of the end user's equipment, we can provide a true, real-time view. For example, if streamed video is to be viewed on a handheld device, it is encoded so it will not exceed the device's screen resolution, keeping it from overwhelming the device and wasting bandwidth. Because mobile devices receive video at the right resolution and don't need to scale it down, they conserve CPU power and battery life.

If bandwidth changes as the user moves or conditions change, the video stream is re-encoded to match available bandwidth and error correction is applied to account for the occasional lost data packet.

Bandwidth consumption is also impacted by multiple user requests from the same source. Each request to the same source can require a separate video stream, overwhelming bandwidth resources. With Motorola technology, the video source only needs to send one stream, which the system duplicates and re-encodes for each client device.

Using the most efficient compression technology available also saves bandwidth without sacrificing quality. While MJPEG is inexpensive to implement, it isn't as efficient as modern H.264 compression, used by Motorola, which ensures that every bit of bandwidth is used to bring you high quality real-time video.

INTUITIVE OPERATION

Efficient network and video technology aren't the only ingredients for a successful real-time mobile video offering. Mobile device interfaces must also be intuitive and quick. Police officers deal with a large amount of information when responding to an incident and can't be distracted by fiddling with buttons.

To minimize distractions for first responders, Motorola offers solutions that don't require them to push a button at all. A wide range of configurable options can automatically start the video transmission process without officers having to interrupt their thoughts and actions. These include tying automatic video transmission to activities such as activating the lights or siren, exceeding a set speed, opening the shotgun lock or other agency-defined triggers.
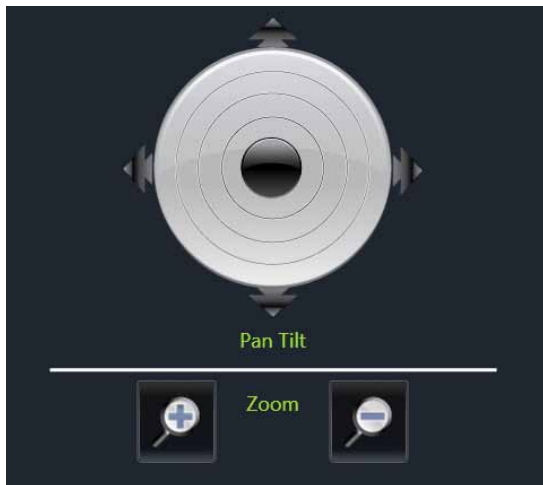
PROVEN VIDEO EXPERIENCE

The goal, of course, is equipping first responders with the best information in real time. It helps them be safe and efficient. Plus, it keeps command and control well-informed and able to make quick and correct decisions.

Combining advanced new technological capabilities with the reliability of the industry's most trusted mission critical solutions, Motorola provides real-time sharing of crucial voice, data and video communications where they're needed most. In fact, we've spent the last decade developing ways to deliver mission-critical video.

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 **motorolasolutions.com/nextgen**.

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