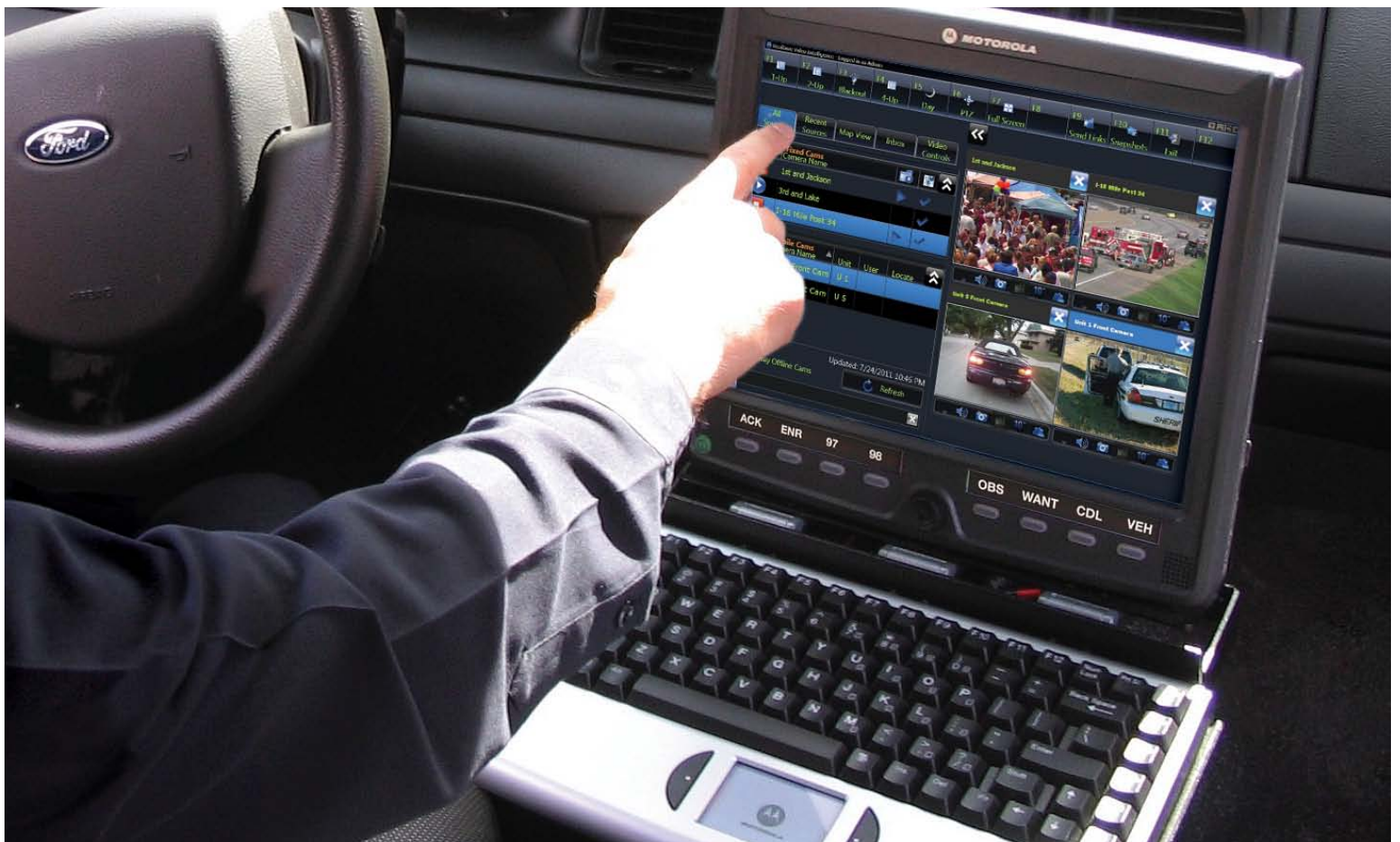# MOTOROLA
REAL-TIME VIDEO INTELLIGENCE

10:22 AM
ARMED ROBBERY IN PROGRESS...

AS TWO ARMED MEN enter a local bank, a fast-acting teller presses a panic button.

IMMEDIATELY, live video from the scene is sent to the command center and to the closest patrol car.

AS OFFICERS TRAVEL TO THE SCENE, they can all see exactly what's happening inside the bank on their in-vehicle computers.

BOTH SUSPECTS ARE IDENTIFIED AS CONVICTED VIOLENT FELONS, and the dispatcher informs the officers on the way to the scene that they should take extra precautions.

AS THE FIRST PATROL CAR ARRIVES AT THE SCENE, the car's in-vehicle video camera records video of the two suspects fleeing the building.

WITH A SINGLE CLICK, the officers on the scene share this video with backup and supervisors.

DISPATCHERS AND SUPERVISORS COORDINATE PURSUIT until the suspects are in custody.

THE TWO GUNMEN ARE APPREHENDED without putting citizens in any further danger.

THE SUSPECTS PLEAD GUILTY after seeing their crime captured on video.

PICTURE A NEW WAY OF FIGHTING CRIME: HARNESSING THE POWER OF REAL-TIME MOBILE VIDEO

In the world of public safety, what you don't know can hurt you. The more information public safety personnel have about a situation, the more effective they can be. That's one big reason why video is rapidly becoming one of the most important tools for enhancing the safety of first responders, citizens and the entire community.

Video cameras already extend the reach of law enforcement by monitoring public places like parks, stadiums and city malls. Dispatchers use video from traffic cameras to help determine what type of emergency vehicles to send to a multi-car accident. To redirect officers away from highway congestion. Or to assist with pursuits.

Police officers rely on the cameras in their vehicles to record arrest incidents. Or high-speed chases. Or to run license plate numbers.

Until recently, however, one critical element was still lacking from video solutions: The ability for law enforcement to easily access real-time video while mobile — and share it with others in the field, in the command center and in the patrol car.

Enter Motorola's Real-Time Video Intelligence (RTVI) system. Motorola RTVI is an innovative real-time video software solution designed for one purpose: To maximize the crime-fighting potential of video.

ONE SOLUTION, VIDEO AVAILABLE ANYWHERE, IN REAL TIME

When used in conjunction with a high-speed mobile broadband technology, such as Public Safety LTE or mesh, RTVI allows real-time mobile video to flow freely from camera to command center, out to mobile devices and everywhere in between.

RTVI provides delivery of high-quality video to and from the patrol car and the command center — and between officers in the field. It enables real-time access to video that helps fight crime, increase public safety and save lives.

BETTER INFORMATION, BETTER COMMUNICATION, BETTER RESULTS

Using our Real-Time Video Intelligence software, public safety officials can share information:

- **From Mobile Units in the Field to the Command Center**
  Real-Time Video Intelligence enables instant sharing of in-vehicle video. It allows a commander to observe a traffic stop of a suspect in real time. To get a firsthand view of a police chase to authorize a pursuit. Or to monitor and train a rookie officer on patrol. And he can do this from any location using a laptop computer or even a mobile device.

- **From Fixed Cameras to Mobile Units in the Field**
  RTVI allows a detective to pull up video from a nearby street camera on his handheld device. Or a patrol car traveling to the scene of a crime to access video to monitor a suspect as he flees. Or to view video in an instant from cameras in schools, banks or other businesses. The end result: Better situational awareness. So that commanders can make tactical decisions without being on the scene. And officers are better informed as they enter a scene.

- **Between Mobile Units**
  With RTVI, an officer in a patrol car can share his in-car video with a gang force detective across town to see if the detective recognizes anyone in the video. 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 and recognize a suspect in a group. That same investigator can then push the video feed to other team members for follow-up — or connect to a remote database for more information.

SOPHISTICATED REAL-TIME VIDEO DELIVERY
DESIGNED TO MEET THE UNIQUE NEEDS OF LAW ENFORCEMENT

When it comes to fighting crime, the loss of a video – or even a few seconds delay – can cost lives. That's why any real-time mobile video solution for public safety must meet a strict set of features and standards. Our Real-Time Video Intelligence System is unique in delivering:

UNPARALLELED ADAPTABILITY

In a mobile environment, bandwidth is constantly changing. It can be affected by the distance to the transmitting antenna. By weather conditions. By the topography. Or by the number of applications running on the network. And those are just a few examples.

For instance, a police officer may normally experience data speeds of 3 Mbps or more. With these data speeds, he gets high-quality video. But as conditions change, that throughput could drop considerably.

Many commercial video streaming systems are designed assuming a constant amount of bandwidth. If the available bandwidth drops below that level, these systems will simply stop delivering video. Or the video quality will become so degraded that the video becomes useless.

In the public safety arena – when access to video could mean the difference between life and death – the loss of video is simply not an option.

WHEN THE VIDEO ABSOLUTELY, POSITIVELY MUST GET THROUGH

That's why our Real-Time Video Intelligence system was designed to dynamically adapt to the variances in bandwidth that are regularly experienced by mobile broadband networks. If the bandwidth falls, the video transmission can be adjusted based on how law enforcement is using that video.

For example, if a camera is set up to read license plates or to identify suspects, the Real-Time Video Intelligence software can be programmed to reduce the video's frame rate when bandwidth drops but keep the resolution intact. This makes the video less smooth but keeps the picture sharp so that license plate letters and numbers can be seen clearly.

Conversely, if the video camera is set up to monitor unusual crowd activity or to monitor a high-speed chase, it is more important to capture movement than specific details. In this case, the resolution might be reduced slightly to keep the frame rate high so that an object thrown from a vehicle would still be easily detected on the video.

RTVI allows officers to easily configure the system to meet their unique quality requirements. RTVI can also use aggressive compression techniques when the available bandwidth is limited.

In fact, our Real-Time Video Intelligence software incorporates the most efficient compression technology available to help save bandwidth without sacrificing quality.

Many video compression systems still use MJPEG technology, which is inexpensive to implement but not the most efficient. In contrast, the Real-Time Video Intelligence system uses H.264 compression, the latest compression technology available today. This ensures that every bit of bandwidth is used to deliver the highest quality real-time video possible.

No matter what solution is used to solve bandwidth challenges, our Real-Time Video Intelligence software assures that quality video gets through without any delay.

LOW DELAY PAN-TILT-ZOOM

The ability to prioritize communications is particularly critical in the use of pan-tilt-zoom controls on video cameras. Any delay at all can make the operation of these cameras very difficult and result in the operator not being able to position the camera to view a precise location. That's why Motorola's RTVI system gives pan-tilt-zoom commands the very highest priority. This allows operators to easily position these cameras where needed.

OPTIMIZED VIDEO DELIVERY

Motorola's Real-Time Video Intelligence system is designed to optimize based on the available bandwidth and on the end client/mobile device. In many cases, multiple users – such as a supervisor in the command center as well as a fellow officer – may request to see video from the same patrol car. RTVI conserves bandwidth by streaming that video only once to the central RTVI server.

Once the video reaches the RTVI central server, the server then transcodes the video stream and optimizes it for the type of field device being used by the officer. If the officer is viewing video on a handheld, the server will automatically encode the data so that it will not exceed the device's screen resolution. Because the handheld receives the video at the right resolution, it doesn't need to scale it down. This reduces CPU load and preserves battery life and network bandwidth.

In contrast, if the video is also being sent to a supervisor at the command center to be viewed on a desktop computer, the server will send the highest quality video available.

WHEN SECONDS COUNT

Making life-saving decisions requires seeing what is happening now – not 60 seconds ago. Just imagine if your "shoot, no shoot" order was based on a video that was delayed even a few seconds.

That's why a common video delivery technique called "buffering", often used to help overcome bandwidth variability, is simply not acceptable in the world of public safety. Buffering involves storing a few seconds or minutes of streamed video before playing it from the beginning for the viewer.

This way, if a problem occurs during transmission, the system has time to recover and correct the problem. Meanwhile, 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.

That's why Motorola's Real-Time Video Intelligence solution uses sophisticated techniques that include video adaptation, prioritization and advanced data recovery algorithms to avoid delaying the video stream. This ensures that real-time video always gets through. With no delay. And no buffering required.

GIVING NEW VISION
TO LAW ENFORCEMENT

Today, when a crime is in progress inside a commercial building or a private campus, law enforcement officials can find themselves flying blind. They have no idea what is happening on the scene. That's no longer the case, thanks to Motorola's Real-Time Video Intelligence system.

RTVI accepts video from a wide range of fixed and mobile surveillance platforms — including video from both public and private cameras. That means that officers can access a video feed from inside a bank during a robbery — and even switch to a video feed from an outside public camera as the suspect flees the crime. Or access video from a stadium during a big sports event. Or from a local high school during a lockdown.

Plus RTVI integrates with a wide variety of cameras, including the video cameras that your department has been using for years. This saves you money by eliminating the need to swap out existing cameras. Plus, it makes it much easier and more cost-effective to expand your department's video footprint because you don't have to build out your entire infrastructure from scratch.

It's just one more example of how our Real-Time Video Intelligence system gives public safety officials unprecedented, cost-effective new ways to fight crime.

RTVI IN THE MVX1000 IN CAR VIDEO SYSTEM AND THE IMPORTANCE OF SECOND NATURE DESIGN

Any officer that has been involved in a high-speed chase, a shooting or any other high-stress incident knows that instinct immediately takes over. Complete focus is needed. And operations that require multiple steps or multiple buttons become almost impossible to complete.

Motorola has spent more than 80 years researching and designing products that support public safety operations. At Motorola, we know how to design products that help officers function effectively in the high-stress world of public safety. And we are dedicated to designing mission critical tools that are second nature for officers to operate.
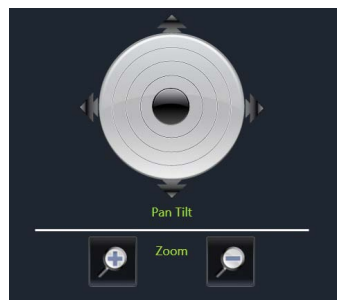
We've incorporated this design into our Real-Time Intelligence Video system — and into the hardware that supports RTVI. Our Real-Time Video Intelligence system works in conjunction with our MVX1000 in-Car Video System to support the most intuitive real-time video recording and mobile delivery system available today.

Without RTVI, Motorola's MVX1000 is a high-quality digital in-car video recorder, where the recorded video is accessible after the patrol car is taken back to the station. But when the Real-Time Video Intelligence system is incorporated into the MVX1000, it turns that digital recording device into a live source of mobile video. Video can now be streamed on the spot directly from in-car cameras.

The RTVI system is designed with security in mind. When officers send video, the video are sent as links, not attached files. Not only does this ensure that no extra bandwidth is used unnecessarily, it also ensures that the video doesn't get copied to a flash drive and end up in the wrong hands — or posted online.

INTUITIVE DESIGN MEANS NO BUTTON PUSHING IS REQUIRED

And here's the best part: The system doesn't require officers to push buttons at all. A supervisor can pull video from an in-car camera directly, leaving the officer to concentrate on the situation at hand.

Of course, even when officers are not in a high-stress situation, the ability to operate crime-fighting tools still helps makes their jobs much easier. That's why Motorola's RTVI system is designed with an intuitive interface that operates very much like a presence-based instant messenger application. This means that officers can see available cameras in a list or on a map. They can then access that video with one click or one touch.

REAL-TIME VIDEO: FROM NICE TO NECESSITY

When Motorola first introduced our two-way radios back in 1939, they began as "nice-to-have" devices. But times have changed. In fact, most public safety officers now say they would rather give up their guns than their two-way radios.

It's just a matter of time before public safety officials start relying on real-time video in much the same way. We haven't even begun to imagine the many ways that real-time mobile video can take law enforcement to a whole new level.

The bottom line is that Motorola's Real-Time Video Intelligence solution can give your officers the vision they need to fight crime, save money and save lives — beginning today.

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/videosolutions**.

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