

Breaking Away: Using Wireless Communications to Reduce Cost, Increase Efficiency and Improve Service



With exceptional reliability and cost-effectiveness, wireless technologies are helping municipalities and other government organizations overcome challenges ranging from natural disasters to high crime rates to shrinking budgets



EDUCATION > *HEALTHCARE* > *TRANSPORTATION* > *PUBLIC SAFETY* > *GOVERNMENT*

Mission critical services are facing something of a crisis. Global crime rates continue to remain high, fueling a need for increased police and security services. Natural disasters ranging from hurricanes to earthquakes to tsunamis seem to be both increasing and intensifying. At the same time, financial shortfalls are causing significant budget challenges for first responder and other mission critical services. How are governments coping with delivering mission-critical services while dealing with fewer dollars and personnel? How are public service organizations ranging from medical centers to educational campuses to departments of transportation planning to increase service with decreased resources? Many are relying on the power and reliability of wireless communications technology from wireless pioneer and leader Motorola. Technology that is faster and less expensive to deploy than wired solutions, yet enables more efficient, more effective use of available resources to help protect property and save lives.

THE CASE FOR WIRELESS

In an analysis on U.S. federal funding for law enforcement assistance programs in the 2009 fiscal year, the International Association for Chiefs of Police (IACP) notes that, “funding levels for... programs that are designed to assist state, tribal and local law enforcement agencies in their efforts to combat crime and terrorism were reduced by nearly \$1.98 billion, or 60 percent, when compared to FY 2008.”

The report further notes that this reduction in funding comes at a time when, although crime levels tend to fluctuate from community to community, over ten million citizens are affected by crime in the United States each year. According to the report, the Federal Bureau of Investigation’s “Crime Clock” for 2006 states that one murder occurred every 30.9 minutes; one rape every 5.7 minutes; one robbery every 1.2 minutes; and one aggravated assault every 36.6 seconds. Property crimes are even more common. The “Crime Clock” reports that one burglary occurred every 14.4 seconds; one larceny or theft every 4.8 seconds and one car theft every 26.4 seconds.

Less Funding, Fewer Resources

Virtually everyone involved in public safety is dealing with a serious lack of funding for law enforcement. They also understand that the current global financial crisis only exacerbates the situation. Still, no matter how low the funding levels, mission-critical services can neither be abandoned nor significantly scaled down. Police, fire and other public safety services must be available round-the-clock to protect property and people. The question becomes how do you replace first responder feet on the street? How do you maximize public safety and public service efforts when budgets are decreasing?

A broad range of government departments—from infrastructure management to traffic control to municipal water districts and more—are also feeling the

strain of reduced resources. So are public universities and colleges, and city, county and state-run medical centers, facilities and services. At least in the near-term, the question isn’t how to find more resources and funding, but how to continue performing at a high level without them.

The Good News

The news is not all bleak, of course. Budget shortfalls can be made up by increasing efficiency; by helping all employees become more productive and more effective. For a growing number of communities and government agencies, one way to accomplish all this is by increasingly relying on today’s state-of-the-art communications networks and equipment. Significantly, more and more of these communities are moving away from wired only networks and are choosing wireless communications solutions.

They’re using them in the most basic of applications, like connecting a number of municipal buildings and agencies together. They’re using them to capture improved productivity from resources that are available. They’re using them for more innovative applications, like helping employees become more mobile. They’re using them for the most important of all applications: keeping first responders and the people they help stay safer.

Communications Lifelines

Communications are vital because they are lifelines that improve safety and productivity, not just for first responders but also for providers of virtually every important government service. Real-time broadband communications are crucial lifelines in intensive public safety efforts such as fighting a multiple-alarm fire, responding to Amber Alerts, coordinating rescue and relief efforts after an earthquake or tornado, transferring of a patient’s vital signs from an accident scene to the hospital and countless others. Communications solutions are also playing increasing roles in delivery of traditional government services such as

MOTOROLA'S WIRELESS POINT-TO-POINT SOLUTIONS

Motorola Point-to-Point solutions provide maximum reliability and performance in a wide range of environments. With technology operating in numerous frequency bands, Motorola Point-to-Point solutions deliver fully digital communications with availability up to 99.999 percent, especially crucial in public safety and other mission-critical applications. Motorola PTP solutions are also able to deliver exceptionally high data rates in high-interference, long-distance line of sight (LOS) and non-line-of-sight (NLOS) applications.



MOTOROLA'S WIRELESS POINT-TO-MULTIPOINT SOLUTIONS

Motorola Point-to-Multipoint solutions provide scalable, interference-resistant, high-speed connectivity to multiple locations such as police, fire and public works sites. Operating in a variety of frequency bands, point-to-multipoint solutions provide exceptionally reliable performance as well as high power, range and bandwidth, increasing user satisfaction and optimizing ROI.



traffic and roadway control and maintenance, municipal utility services, licensing and permitting, building and construction oversight, family service programs and many more.

Today, more and more government organizations are responding to the current realities of today's challenging environments by making these communications lifelines wireless. And a growing number of municipalities and public service departments are choosing wireless solutions from Motorola, an acknowledged and respected global leader in wireless reliability, performance and innovation.

Wireless Deployment Benefits

Public service, public works and other government professionals are often initially attracted to wireless technology because of its traditionally lower cost. Whenever a wired network needs to be extended or expanded or whenever a new communications network needs to be planned and deployed, wireless technology is normally considerably less expensive than wired systems. For one thing, with trenches to dig and wires to string, wired networks are expensive to deploy. Equally problematic, these traditional methods of wired network expansion can take months or longer to accomplish. Wireless is very different. Making use of existing structures such as light poles, communications towers and building tops, powerful wireless networks can normally be deployed in weeks or even days and at significantly lower cost than wired technologies.

Wireless On the Job

But time and cost savings are only the tip of the wireless benefit iceberg. The old myths that wireless systems would be unreliable, low on quality of service and insecure are being shattered every day. Motorola, for example, has thousands of wireless networks operating in more than 120 countries, in many cases providing safe, secure high-speed wireless public safety and public works services, and offering a host of significant benefits, including:

- **Force Multiplication.** When police, fire, public works and other departments are faced with smaller budgets that reduce the number of feet on the street, wireless technologies are proving especially effective as force multipliers. With applications such as video surveillance and mobile computing, wireless communications networks are helping police add eyes on the street that keep continuous watch on problem areas from a central location. When a problem arises, whether it's a broken water main or a potentially dangerous crowd gathering, the network helps to dispatch the nearest available officers to the scene. Wireless technology also provides the same enhanced productivity from fewer personnel in other areas of government, from public works to public service.
- **Instant Information.** Wireless broadband networks enable real-time mobile computing for first responders and other government personnel using handheld devices or laptop and built-in vehicle computers, even while traveling at highway speeds and higher. Now police and public safety officers, fire fighters and emergency medical personnel have instant access to crucial information ranging from real-time visuals of a fire or crime scenes to critical patient data. Other municipal employees also benefit. For example, a building inspector can instantly download floor plans or blueprints on a laptop or handheld computer, eliminating an additional trip to and from the office. Wireless also enables continuous connectivity no matter what the situation or how harsh the conditions. In addition, video applications such as remote video surveillance and monitoring deliver real-time information by supplementing feet on the ground with cameras that watch difficult or dangerous locations round-the-clock.
- **Cost Reduction and Time Savings.** Wireless broadband networks help municipalities and other government entities cope with reduced financing by cutting costs in a variety of ways. Providing secure hot spots throughout a community, for

example, can enable police officers, public works employees, medical personnel and others to access the network for report filing and data downloads without having to return to the central office. This helps eliminate the cost of employees making back and forth trips during the workday saving both time and money. It also helps significantly reduce overtime by eliminating the need for police officers and others to write reports after work hours. Other entities use wireless access lines to replace leased phone lines, eliminating costly monthly lease payments. Wireless networks' inherent lower deployment costs and lower total cost of ownership also help speed ROI.

- **Revenue Enhancement.** With budgets low and trending lower, municipalities cannot afford to miss out on revenue opportunities due to lack of resources and/or human error. Wireless networks are now being used in a growing number of automated applications that help maximize revenue generation. Remote parking meter monitoring, for example, helps assure tickets are never missed. In addition, video monitoring of busy intersections enables electronic recording and ticketing of traffic violations that are often overlooked due to the lack of constant surveillance by a patrol car.

The bottom line is simple and clear. Wireless broadband networks are capable of providing the bandwidth, speed, reliability and security required by public safety and other government service applications at a considerably lower cost than comparable wired solutions.

WIRELESS GOES PUBLIC

How are public safety, public works and other public service organizations around the world using wireless technology? Wireless government/public service applications are many and varied. Among the most exciting are the use of wireless video, true mobile

computing, versatile wireless network solutions, temporary high-speed installations and reliable and versatile backup/alternate networks.

Wireless Video Solutions

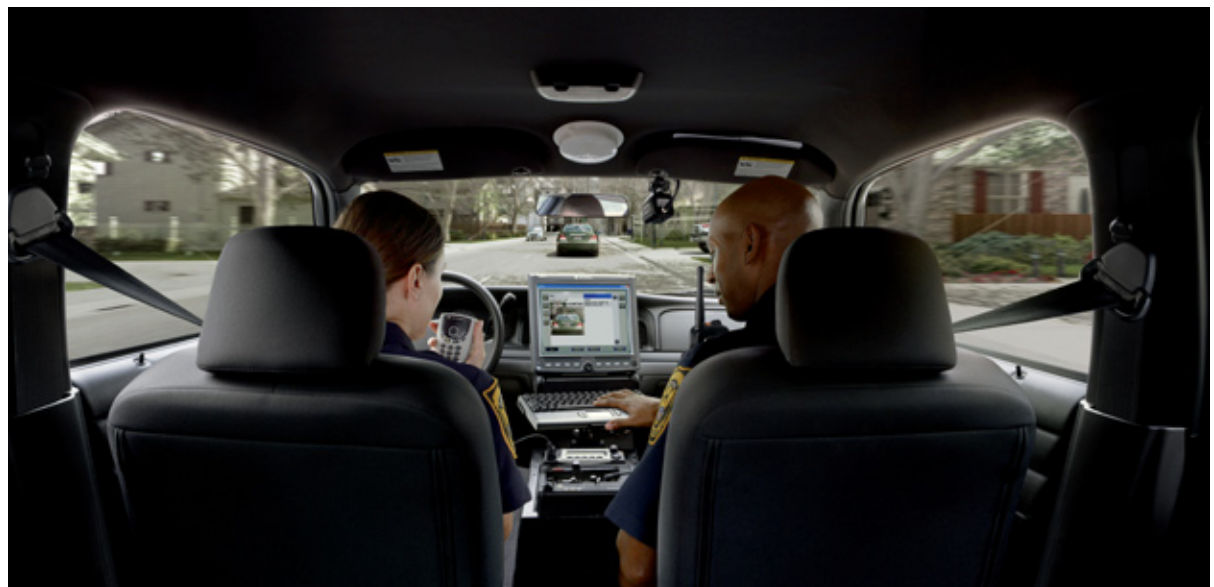
Wireless video surveillance networks are being used all over the world to enhance public safety in any number of ways. These range from 24/7 monitoring of high-crime neighborhoods and dangerous intersections to monitoring of remote locations such as a long-term airport parking lots, water department reservoirs in remote canyons, known border crossing areas and more. Streaming video applications enable first responders to view the scene of an incident before they actually get there.

- **Force Multiplication.** Faced with escalating public safety issues in Jordan Downs, a volatile public housing complex, the City of Los Angeles police department decided to address the situation in part with a Motorola MOTOMESH™ high-speed wireless broadband network combined with Motorola Point-to-Multipoint technology. The network provides police officers' in-car computers and hand-held devices with real-time visuals of the area from multiple wireless video cameras located throughout the complex. As a result, crime was reduced by 40 percent in the system's initial year of operation.

- **Traffic Control in Michigan.** Like many municipal transportation departments, the Road Commission for Oakland County, MI (RCOC) is facing a growing problem with traffic congestion. For help, RCOC turned to video surveillance technology that helps manage adaptive traffic signal systems that help reduce traffic tie-ups. RCOC found the costs of using traditional leased phone lines to send signal data to be problematic, and switched to a Motorola wireless network that is now transmitting images and data more efficiently and more cost effectively.

MOTOROLA'S WIRELESS MESH SOLUTIONS

Bringing unprecedented mobility, Motorola's MOTOMESH™ wireless broadband network solutions further extend fixed wireless networks by providing a connectivity umbrella over an entire location or area. The MOTOMESH portfolio includes three solution options. The dual-radio MOTOMESH Duo enables two different types of network. The single-radio MOTOMESH Solo is purpose-built for high interference locations. The MOTOMESH Quattro is a four-radio solution containing two standards-compliant WiFi radios and two proprietary Motorola's radios.



MOTOROLA'S WIRELESS LAN INDOOR SOLUTIONS

In addition to outdoor wireless broadband networks, Motorola offers a comprehensive portfolio of wireless LAN (WLAN) indoor infrastructure solutions that enable the truly wireless police facility, fire station or public works department. Wired LANs can be cost-intensive, often costing around \$250 to wire a single Ethernet port. A totally wireless LAN eliminates these high cabling costs during initial set-up and also during the inevitable reconfiguring of the LAN as needs change. WLANs also liberate personnel from being tethered to their desks by wired computers or phones, allowing them high-speed access everywhere in the facility, increasing collaboration and productivity.



Mobile Computing

With both high-speed laptop and vehicle-mounted computers, police officers, fire fighters and other first responders have access to a wide variety of information—security camera video, instant access to crucial information such as mug shots, license plate data, vital patient statistics, real-time connectivity with fellow first responders and other agencies and more—from their vehicles, even when moving at highway speeds. Tough handheld computers and other devices provide similar information while at the scene.

• Crime Control Through Automatic License Plate Recognition (ALPR).

Numerous municipalities are beginning to make use of Motorola's ALPR application that offers a faster and easier way to fight crime by improving productivity, generating necessary information and increasing police officer safety. With the ability to read and analyze a license plate every two seconds, ALPR continually scans plates and compares them to multiple databases as officers patrol, then alerts them when a suspect plate or vehicle is found. ALPR helps locate stolen vehicles and identify suspects in an instant, helping to improve safety for both police officers and the public they serve and protect. ALPR also helps gather revenues from previously unpaid tickets, licenses and permits.

• Capturing Lost Revenues with Electronic Ticketing.

A growing number of police forces and municipalities are beginning to see substantial increases in efficiency, productivity and revenue generation through the use of eCitations, or wireless electronic ticketing systems. Manual ticket writing can be fraught with error. Names are misspelled. Addresses are entered incorrectly. Handwriting is illegible. These and other issues can cause municipalities to lose thousands of dollars in unpaid fines. In addition, manual ticketing is inefficient and costly in terms of productivity. With

eCitation, an officer simply scans the barcode or magnetic stripe on a driver's license through a real-time wireless connection to the local and national databases, accomplishing in seconds what it would have taken five minutes or more to do manually. Results are exceptional both in terms of increased officer efficiency and in the capture of thousands—or millions—of dollars in previously lost revenue.

• Improving Response Times with Mobile Networking in Providence.

Responding to the crucial need for intelligent, real-time first responder communications in the wake of September 11, 2001, Providence, the capital city of Rhode Island, launched a system called MeshNet, based on a Motorola network. The system serves a population of more than 173,000 by creating a network that provides high-speed mobile communications for more than 1,000 police, fire and other first responders. Offering technology that delivers instant access to building plans, video surveillance cameras, criminal databases, Amber alerts and other crucial intelligence information, the MeshNet system is helping to make response to situations faster, better and more safely.

• Reducing Vote Counting Errors and Delays in Alameda County.

Alameda County, California, was experiencing delays in counting election results from its 810 polling places. The process used sealed bags containing three components: voting results scanned from paper ballots, a paper index of voters and a PCMCIA card holding touch screen voting results. To verify that each bag held the correct contents, workers had to open each manually, causing hours-long logjams and ultimately causing delays in posting official results. Working with a third party vendor, the county developed the innovative RFID-based SecureVote system using Motorola fixed and handheld RFID readers. The system allowed employees to quickly verify contents by reading tags both inside and outside

the bag without having to manually open the bags. During the “Super Tuesday” primary election in 2007, the solution reduced verification time by up to four hours, and allowing results to be published without unnecessary delay.

Wireless Network Solutions

By providing a wireless WiFi network in an area, on a university campus or in an entire community, a municipality makes it easier for police, public service and other workers to create and transmit reports from the field, eliminating multiple trips to and from headquarters, paring overtime and substantially reducing costs while increasing both efficiency and accuracy.

- **Hot Spots Increase Protection and Reduce Costs.** A mid-size city in the western United States is partnering with Motorola to deploy a cost-conscious network of secure wireless hotspots at public locations such as schools and parks. This allows police officers to write and transmit reports from their vehicles in the field, leading to enhanced accuracy and faster report transmission, in addition to eliminating unnecessary trips to the station and keeping more officers on the street helping prevent crime and positioned to provide faster response in emergency situations. Overtime costs have also been reduced substantially.

- **Rural County Improves Public Service.** Historic Orange County, Virginia an area of rolling hills in sight of the Blue Ridge Mountains in the eastern United States needed a communications solution that would allow all branches of public service—from courthouses to police facilities to public schools and emergency services—to share information quickly and efficiently. Using systems operating in the 5.8 GHz frequency band, the county deployed a wireless backbone network— based on Motorola’s Fixed Point-to-Point technology—that covered an area of more than 30 miles. The

network is proving itself extremely reliable as it delivers high-performance converged voice and data service to every government facility, enabling more efficient public services while increasing ROI.

- **California Fire Department Enables Distance Learning.** The City of Santa Barbara’s Fire Department needed to upgrade its T1 network for a number of important reasons. The department wished to provide VoIP applications and to add bandwidth that would enable distance learning and training through video conferencing. It also needed to overcome significant interference challenges and to enhance connectivity with city facilities around hilly terrain and tall buildings. Finally, the department needed to provide business continuity in the event of a natural disaster. The department deployed Motorola PTP 400 Ethernet bridges that upgraded performance to 22 Mbps throughput in six fire stations and 45 Mbps at the airport and headquarters stations. The city estimates annual savings at over \$100,000.

Temporary (Ad Hoc) Networks

In a natural disaster such as an earthquake or wild-fire, when real-time communications and coordination are critical, wired phone lines are usually among the first casualties. Ad hoc wireless networks can be created quickly and easily to provide essential communications that help optimize response and improve safety for both first responders and victims. Wireless technologies can also create temporary high-speed communications networks for environments such as disaster scenes, sports and entertainment events, county fairs and many more.

- **Wireless Protection at the Super Bowl.** When the city of Detroit hosted Super Bowl XL, it wanted to take no chances with the safety and security of the more than 65,000 fans attending the game. The city deployed a temporary Motorola

MOTOROLA’S HARDENED WIRELESS DEVICES

Motorola provides first responders and other public personnel with hardened handheld and in-vehicle wireless devices and computers that provide maximum reliability in the harshest of field conditions. Motorola tests this equipment to the world’s highest standards, including U.S. military standards, European Intrusion Penetration (IP) standards and more—to ensure that it will provide full functionality in the most difficult and dangerous situations.



MOTOROLA'S WORLDWIDE WIRELESS LEADERSHIP

With more than 80 years of wireless experience, leadership and technology innovation, Motorola is one of the world's most respected leaders in providing powerful wireless equipment and networks. Motorola delivers government-savvy wireless broadband solutions that bridge the gap between high performance and low cost of ownership. With Motorola as a partner, municipalities and government organizations have a strong portfolio of high-speed wireless technologies and solutions at their disposal.

MOTOMESH multi-radio mobile broadband system that delivered seamless video connectivity to law enforcement personnel and vehicles located around the stadium. The temporary network provided real-time access to the pre-emptive, mission-critical intelligence needed to maximize security while minimizing cost.

- **Restoring Connectivity after Hurricane Katrina.** After Hurricane Katrina devastated the city of New Orleans, one of the biggest obstacles to relief and rebuilding operations was a lack of communications capabilities. The city and a third party consultant were able to repurpose a recently built 130-camera WiFi wireless video surveillance network, quickly providing a robust wireless communications network in place of the city's devastated wired system. Based on Motorola's Point-to-Multi-point wireless broadband technology, the network was able to support thousands of residents as their primary means of high-speed Internet access and voice communications.

Redundant or Alternative Networks

Wireline networks based on physical telephone lines, cables or fiber lines are exceptionally vulnerable to outages caused by physical disasters, human error and equipment failure. Oftentimes, it can be days, weeks or even months until the damage can be repaired and the network back running normally. This kind of risk is unacceptable not just for emergency services but for virtually any kind of public service. Because they use wireless connectivity, wireless networks are not normally susceptible to the forces that can cripple a wired solution. They are also fast and relatively inexpensive to deploy, and are rapidly becoming the preferred choice for creation of redundant networks. These networks are designed to automatically take over when wired lines are down, assuring continuation of service in seconds or minutes. In addition, wireless networks are able to provide other services and applications while they are protecting against wired network breakdowns.

- **Redundant 9-1-1 Network on the Gulf Coast.**

A medium size city on the Gulf Coast of Texas, because of recurring weather-related outages in its emergency 9-1-1 wired network, needed to build a backup network to ensure 9-1-1 service at all times. The city deployed a Motorola wireless broadband redundant network based on licensed 4.9 GHz point-to-point technology. In its ultimate test, the network automatically took over operations when a glitch in the wired network occurred without anyone being aware of it. The backup network carried the entire 9-1-1 load for more than two weeks...without a single issue.

- **Midwestern University Connects Students & Faculty.**

Lewis University, a fast-growing Midwestern university, found that its initial wireless network, installed to supplement and extend the school's legacy wired system, had lost the confidence of students and faculty due to lack of coverage and reliability problems. With the help of a third party consultant, the school redesigned the network—based on Motorola's 802.11n WLAN indoor product portfolio, Mesh and Point-to-Point solutions—to provide connectivity wherever users wanted it in classrooms, in the library, in dormitory common areas, in faculty offices. Students and faculty responded enthusiastically, quadrupling network utilization in just a year.

In these and a great many other network installations, wireless solutions are proving an effective antidote to the current mission-critical financial crisis. Wireless networks continue to prove their reliability and effectiveness in virtually every public safety and public service application. In solutions ranging from video surveillance to mobile computing to exceptional reliability in disaster recovery and service continuity situation, Motorola wireless broadband solutions are helping government organizations of all types break away from wires by delivering the rugged reliability first responders need to protect property and save lives, and helping them accomplish these critical missions with exceptional cost-effectiveness.

Motorola's industry-leading portfolio of reliable and cost-effective wireless broadband solutions provide and extend coverage both indoors and outdoors. The Motorola Wireless Broadband portfolio offers high-speed connectivity systems that support data, voice and video communications, enabling a broad range of fixed and mobile applications for public and private networks. With Motorola's innovative software solutions, customers can design, deploy and manage broadband networks, maximizing up-time and reliability while lowering installation costs.



MOTOROLA

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