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WHITE PAPER:

# Reducing Crime with Wireless Video Surveillance Systems

## Executive Summary

Municipalities and police departments nationwide are searching for new and better ways to crack down on crime, and they often look for a "force multiplier" to help them accomplish that goal. One very effective solution is video surveillance.

Communications integrators are proving to be a key component of the video surveillance solution by providing IP wireless technology, a tool traditionally used for computer networks. Now, by adding digital IP cameras into the mix, surveillance systems have more flexibility and capability and are much more cost-effective. For example, a study provided by a leading mesh network provider has shown that one police officer partnered with a properly functioning video mesh network can equal the output of five police officers.

This white paper will help guide you through the different uses and benefits of wireless video surveillance, the trend toward video mesh networks, laws affecting video surveillance, and the pros and cons of wireless systems, as well as what other progressive public safety organizations are currently doing to fight crime with wireless technology.

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### Understanding the Challenge

Municipalities and police departments nationwide are searching for new and better ways to crack down on crime, and they often look for a "force multiplier" to help them accomplish that goal. One very effective solution is video surveillance.

As technology progresses, a number of law enforcement communications tools are becoming wireless. Daily routines are now dependent on cell phones, smart phones, and other wireless communications devices. Public safety officials will soon see how new innovations in video surveillance technology, primarily the broadband IP wireless video mesh networking systems, will not only save time and money, but can help lower crime rates as well.

The most common applications for wireless video surveillance systems include:

- Providing security
- Ensuring public safety
- Preventing theft
- Collecting evidence
- Observing solicitation
- Managing crowds
- Protecting public and private property
- Recording critical events for action or prosecution

### Defining the Wireless Components

A typical IP wireless video surveillance system contains the following primary components: digital cameras, mesh network nodes, gateway nodes, backhaul units, servers, and monitoring stations (equipped with surveillance software), as well as someone to monitor the cameras.

These components are generally connected in that same order: the cameras connect to the mesh nodes, the mesh nodes connect to the gateway nodes, the gateway nodes connect to the backhaul units, the backhaul units connect to the servers, and the servers allow the cameras to be viewed with the use of sophisticated monitoring software.

A typical solution would consist of the following components:

- *Digital cameras:* The most common options for cameras include fixed or pan-tilt-zoom (PTZ). While fixed cameras are generally more economical than PTZ units, a PTZ camera can cover a larger area with a 360-degree sweep, often enabling it to do the work of several fixed cameras.

### *Cutting the Wires*

*Traditional video surveillance systems employed wiring to send analog signals from cameras to recording devices and monitors. Surveillance and recording storage rooms had common characteristics, not the least of which were hundreds of wires running under the floor or in the ceiling, tacked to the walls, or dangerously spread across the ground. Having the ability to provide the same system without wires is now available. Removing wires from the equation opens the door to more options in terms of camera placement—mounting devices on rooftops and in moving vehicles is now possible. And costs are dramatically reduced by eliminating expensive cabling and trenching activities.*

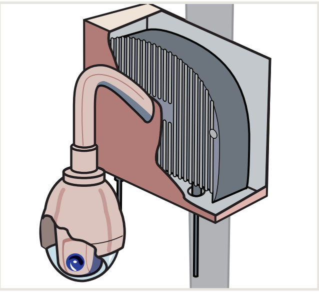
- *Mesh network nodes:* In a wireless mesh network, a node is a connection point. Nodes contain data and/or links to other nodes and use the network as a means of communication.
- *Gateway nodes:* A gateway node is a network point that acts as an entrance to another network. It generally connects two incompatible services.
- *Backhaul units:* In wireless network technology, a backhaul is used to transmit voice and/or data traffic from a cell site to a switch; for example, from a remote site to a central site.
- *Servers:* A server is a computer or device on a network that-manages network resources.
- *Monitoring stations:* A remote monitoring facility is generally established for the purpose of observing camera output, monitoring alarm status, and any other surveillance needs.
- *Software:* Video surveillance software will typically have a graphical user interface (GUI) that is user friendly and will easily adapt to a scalable video network system.

### Piecing Together the Puzzle

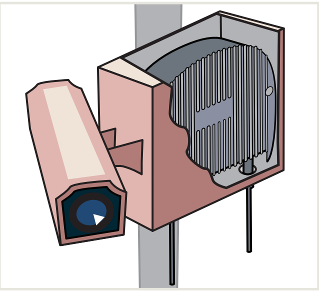
Mesh networks may sound complicated and confusing, but when the system is broken down into individual components, they are actually fairly simple. The main objective of a mesh network is to move data from point A to point B in the most efficient manner. In today's world, that data can be network data, Web access, voice over IP (VoIP), or digital video over IP (DVoIP).

The first step in creating a wireless video surveillance system is to select the cameras and their locations. The locations should provide the maximum amount of coverage over the most desirable area. Cameras can operate over the network by using mesh nodes. The mesh nodes link to each other wirelessly, eliminating the need to install video cabling to each camera location, which can be difficult and costly. The nodes form a video network that spans the entire area selected for surveillance, and the system is self-healing—should one link be blocked or lose power, the video signal will still go through without any interruption in service. The video traffic is aggregated and then backhauled to the monitoring stations using high-speed, secure wireless links.

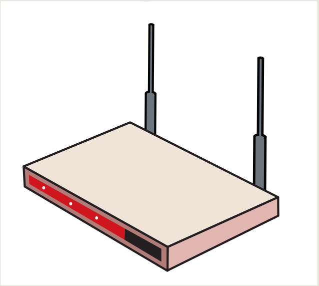
System components can easily be mounted inside protective, weatherproof enclosures, which can be installed on the exterior of buildings and on street light and traffic signal poles. The use of cameras with motorized controls enables officers or public safety staff sitting in a remote monitoring location to move the camera lens in any direction and zoom in for a closer look.



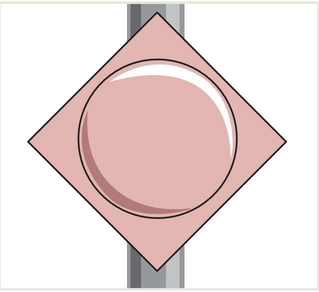
Pan-Tilt-Zoom Camera with Outdoor Mesh Network Node



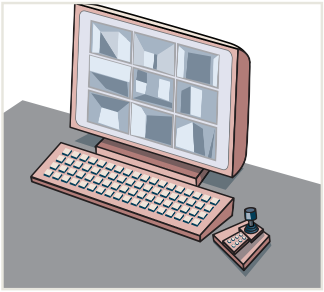
Fixed Camera with Outdoor Mesh Network Node



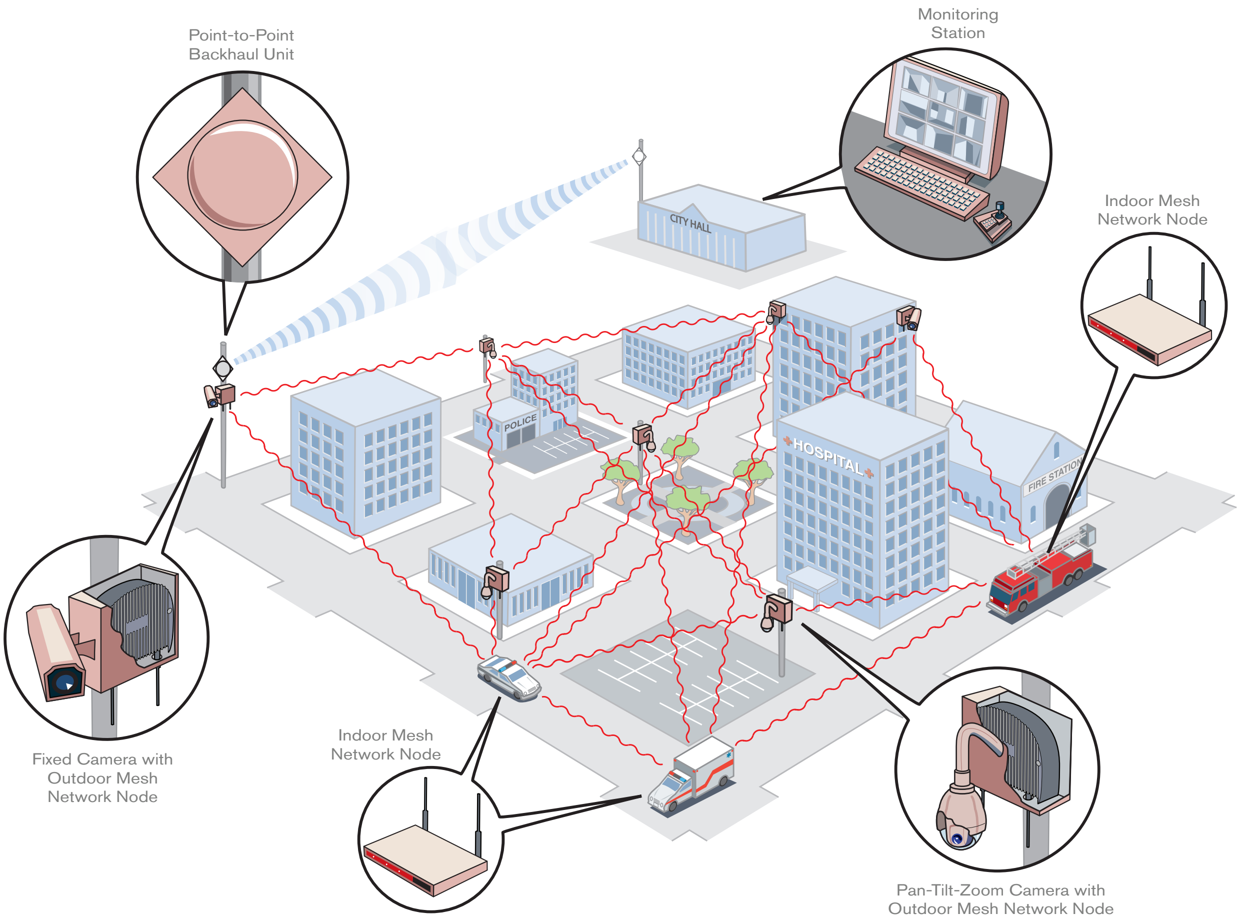
Indoor Mesh Network Node



Point-to-Point Backhaul Unit



Monitoring Station


Point-to-Point Backhaul Unit
Monitoring Station
Indoor Mesh Network Node
CITY HALL
POLICE
HOSPITAL
FIRE STATION
Fixed Camera with Outdoor Mesh Network Node
Indoor Mesh Network Node
Pan-Tilt-Zoom Camera with Outdoor Mesh Network Node

TYPICAL INSTALLATION OF A MUNICIPAL WIRELESS VIDEO SURVEILLANCE SYSTEM

A mesh node, the piece of hardware that enables this mesh network system, is light enough to carry. A node can be placed in a mobile unit or trailer, it can be mounted on a roof or pole, or it can even set up as a command post. These nodes project the broadband IP connection to other nodes, sharing the connection with each other. Once the system is installed and activated, the nodes will find each other and create the wireless network.

In addition to simple indoor installations, outdoor installations are really not a problem either. Weatherproof housings are readily available for exterior use.

Another benefit of the broadband IP wireless video mesh network is the ability to use different software to enhance the system. Cameras can be monitored from a personal computer

*"The clarity of digital video and its superior data processing have further cemented its dominance over analog video. Data on digital format is even admissible as evidence in courts of law."*

**Haritha Ramachandran**
Research Analyst
Frost & Sullivan

(remote access), digital records can be maintained online, alerts and bulletins can be broadcast, and situational awareness can be enhanced for first responders. Some surveillance software companies have even created programs for cell phones and smart phones. Uploading the software to a digital phone gives the user the ability to check cameras, rewind and view recorded footage, and even change frame rates while viewing any camera in the wireless network.

### Weighing the Pros and Cons

What are the advantages and disadvantages to implementing a wireless video surveillance system? The following points should provide some insight into the reasons why a wireless solution can be such a powerful tool, and at the same time, some potential pitfalls that you should avoid.

Some of the many pros include:

- *Lower cost:* Almost 80% of the expense of installing a wiredvideo surveillance system will come from expensive cabling and trenching. The use of wireless technology eliminates most of that cost.
- *Ease of installation:* Eliminating the use of wiring will typically cut the installation time down to weeks versus months for a traditional wired network.
- *Portability:* A mesh node—the piece of hardware enabling the mesh network system—is light enough to carry.
- *Self-healing:* If a mesh node ever fails, the nearest node will take over, and the network will instantly repair itself without outside help.
- *Existing network:* A mesh network will often be merged with an existing network.
- *Versatility:* Wireless networks dramatically expand mobility and flexibility, with easy access to voice, video, and data streams.

Some of the potential cons include:

- *IT/RF knowledge:* Most law enforcement agencies don't have expertise in this area, but wireless solutions integrators like BearCom can provide training in conjunction with system design, installation, and maintenance.
- *Insecure data:* This is a common myth about using a broadband IP system. In fact, today's technologically advanced mesh networks offer 256-bit AES encryption, which provides more security than you should ever need.

> *"It's the mesh networking, which allows cameras to link with each other via line-of-sight or by exploiting the digital signal's ability to bounce off reflective surfaces, that makes state-of-the-art wireless surveillance systems so much more powerful than even last year's models."*
>
> **Bob Davis**
> Contributing Writer
> *Police Magazine*

- *Lack of knowledge:* The most common reason people reject a mesh network system is because they do not understand the technology or they fear it may be too complex to learn. With the proper training, these networks can be—and already are—very easy to operate and maintain.

### The Bottom Line

Wireless IP mesh networks are becoming the most popular, cost-efficient, time-saving video surveillance option on the market for law enforcement applications. But a common concern is funding. Fortunately, there are a number of grants available to help offset the cost: federal funds, Department of Transportation funds, and even Homeland Security funds.

When contracting with a wireless integrator to help design and install a custom video surveillance system, it pays to make sure that the chosen company is experienced with all of the various technologies involved and has strong customer references.

For more information about reducing crime with wireless video surveillance systems, please contact BearCom at **800.527.1670** or **Solutions@BearCom.com.**

### *Is Big Brother Watching?*

*Big Brother may be able to see you, but he cannot always hear you. Oddly enough, the laws pertaining to recording suspicious activity are typically more restrictive with audio recording than with visual recording. States and municipalities may differ in their regulations on recording images and audio. When installing a surveillance system, keep in mind that the sounds or images recorded may be protected by right to privacy laws or other related regulations, so be sure to understand the law. Some people may feel that their rights have been violated when their activities in public are recorded, when in reality, anything they do on public property or outside of their homes is deemed as public-sanctioned, and therefore, not subject to privatized rights.*

SUCCESS STORY:

# Dallas Police Department

### The Customer

Created more than a century ago, the Dallas Police Department has a proud history of protecting the citizens of one of largest cities in the United States. With almost 3,000 sworn officers and another 500 in the civilian work force, the department can seemingly address almost any criminal challenge. In part, the Dallas PD's mission in serving the City of Dallas is to reduce crime, help people, and provide assistance at every opportunity with preventive, investigative, and enforcement services to increase citizens' overall satisfaction with public safety.

### The Challenge

Despite the size of the Dallas PD, it has and continues to be outnumbered by those who want to break the law. Until recently, the department had limited options to combat unseen crime, other than encouraging citizens to report any criminal activity they witnessed. Add to that the fact that an increasing number of people were moving into the downtown district, and officials knew they faced a perilous challenge. The Dallas PD's leadership recognized that video surveillance would not only help catch criminals in the act, but it could also deter them from committing crimes in the first place. However, for budgetary and logistical reasons, a traditional wired video surveillance system simply was not feasible.

*"This project would not have been possible were it not for the cooperation of our partners. Not only are Firetide, Sony, BridgeWave, and OnSSI innovators and leaders in the wireless industry, but more importantly, they worked closely with us to develop a custom solution that was a perfect fit for the needs of the Dallas Police Department and the City of Dallas. As a result, BearCom now has an integrated team that can offer similar solutions to other municipalities and public safety organizations that want to leverage wireless technology as an effective and efficient way to combat crime."*

**John Watson**
Chairman
BearCom

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### The Solution

The Dallas PD set out to find a single company that could create the best blended wireless technology solution in the industry. A competitive bidding process eventually led to BearCom. BearCom then tapped four of its partners—Sony Electronics for the wireless IP video cameras, Firetide for the wireless mesh network, BridgeWave Communications for the wireless backhaul system, and OnSSI for the monitoring software—to create a video surveillance network that is the envy of other police departments nationwide. It is a wireless solution that is scalable and portable, giving the department remarkable flexibility to fulfill its mission of fighting crime.

### The Results

“The wireless camera system from BearCom will dramatically improve our ability to monitor this area of the city. We can now provide our officers with critical, real-time information they can use to protect the public and themselves whenever an incident is detected,” said Deputy Chief Tom Lawrence of the Dallas PD. Following the success of the initial installation, Chief Lawrence is anxious to deploy the system in other areas of Dallas.

> *“The wireless camera system from BearCom will dramatically improve our ability to monitor this area of the city.”*
>
> **Tom Lawrence**
> Deputy Chief
> Dallas Police Department

SONY®

firetide®
instant mesh networks™

BridgeWave

OnSSI

**BearCom provides a broad line of high-performance wireless communications products, services, and complete mobility solutions. Founded in 1981, BearCom is America’s only nationwide dealer of wireless equipment, serves customers from 26 branch offices located throughout the U.S., has several affiliated offices around the world, and employs approximately 400 people. For more information, visit www.BearCom.com.**

BearCom Headquarters
P.O. Box 559001
Dallas, TX 75355

**800.527.1670**

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