WHITE PAPER

MOTOROLA

Video Security

A bold new vision for public safety and services operations

"Wait a minute, can they really do that?"

When movies and television programs like Quantum of Solace, 24 and CSI show the heroes doing amazing things with video technology, is that real? In a few cases, some liberties may be taken for entertainment purposes. But the fact is, video technology is making quantum leaps in its capabilities, especially in the public safety and public services sectors. Video has come a long way from simply video surveillance monitoring.

Breakthrough video security solutions are fast emerging, and are prepared to help protect lives and property by being smarter, faster and more proactive.

The Changing World of Video

From Passive to Proactive

Video surveillance has been a powerful productivity tool in the public safety and public services arenas for more than a quarter century now. But video surveillance merely scratches the surface of what is possible with video today, and what will be possible in the very near future. Video surveillance is rapidly evolving into a much more comprehensive concept: video security. And the potential for video security to help improve public safety and public works, streamline services, fight and prosecute crime, increase efficiency, promote collaboration, reduce costs and save lives is virtually limitless.

Video systems are being driven by bold new ways of thinking about video. A new wave of advanced video technologies are transforming video systems from the relative passivity of simple video surveillance to more preemptive, more proactive, more intelligent video security solutions.

Breakthrough Capabilities

Video security encompasses a wide range of powerful new video-based capabilities, including:

- Streamlining video to vehicles and handheld devices to increase real-time situational awareness and enable first responders to assess events and circumstances *before* they arrive on the scene.
- Integrating disparate analog and digital video networks into a single video management system.
- Correlating voice, data and video information to create a more complete picture.
- Delivering analytical capabilities that allow video systems to recognize certain events that can help deter crime, reduce road congestion, capture suspects and improve efficiency.
- Identifying cameras based on geography or event brings up appropriate video(s) to the operator screen.

Video security systems also have a beneficial effect on community relations. Studies show that the visible presence of video cameras and equipment in high-crime areas or at dangerous intersections helps demonstrate that government is proactive in its commitment to maximize public safety and security.

Yesterday, Today and Tomorrow

For years, traditional video surveillance solutions have followed a simple, familiar path. It begins with analog video cameras recording activities in specific locations. Once the video is recorded, it is transported to a central command center where it is available for post-recording analysis. While proven effective over the years, this is essentially a passive methodology. Today, that's actively changing.

Expanded and Enhanced Functionalities

From its beginnings in relatively straightforward video surveillance applications, video has evolved into multi-faceted video security systems that deliver more proactive public safety and services capabilities. Video security includes three major functionalities, enabling you to:

- Capture and Transport. Video security encompasses the basic capture and transport of video surveillance images and data.
- Manage and Correlate. Video security includes breakthrough management capabilities such as intelligent video analytics and correlation of video to other data.
- Deploy and Act. Video security solutions enable proactive deployment, simplified personnel shifting and other ways of making video information more actionable.

Real-Time Video in More Places

The new proactive video security solutions of today and tomorrow are driven by the move to digital cameras and IP-based network connectivity. The power and flexibility of IP-based video technologies now give video applications the crucial ability to cost effectively distribute real-time video to many different places, providing immediate data and analysis that can dramatically improve the safety and effectiveness of police, fire, EMS, public works and other municipal and government personnel. At the same time, video security enables advanced new capabilities such as voice, video and data integration that consolidate and correlate all available data on a specific event, coordinating and delivering more and better information… all in real time.

PremierOne: SCALABLE PLATFORM HARMONIZATION FROM MOTOROLA

Motorola's PremierOne platform harmonization solution provides a single scalable video security platform, common interfaces and common storage that coordinates and integrates a wide range of powerful video-based solutions. PremierOne provides seamless, intuitive integration across applications and technologies, correlating solutions such as E-9-1-1 services, video-based jail and facility monitoring and management, CAD systems, automated records management and more.

Video Security Fundamentals

What's the definition of video security? Video security systems are end-to-end high-speed network architectures that deliver expanded and enhanced video-based functionalities driven by a variety of highly sophisticated technology tools. Video security solutions make video smarter, faster and more proactive. The fundamentals: the use of powerful analytic capabilities, automated intelligence throughout the network, seamless interoperability and common, intuitive end user interfaces.

Video Analytics

Advanced video analytics enable systems to not only capture what's happening at given locations, but also to automatically interpret the information the video is capturing. Analytics rules engines use pre-determined criteria to analyze event and parameter data from a variety of sources. Using combinations of sophisticated algorithms and communications protocols, analytics software makes it easy to customize video capture, recording and analysis. Public safety and other departments can configure the system to record and recognize specified content. Is there motion where there should be none, such as on the perimeter of a facility? Is there an object where no object should be, such as unattended luggage in an airport terminal? Is there no movement where there should be movement, such as a vehicle parked in a location for too long a period? Video analytics enables faster problem recognition, which leads to more efficient, more effective problem solving.

ADVANCED VIDEO ANALYTICS ENABLE SYSTEMS TO NOT ONLY CAPTURE WHAT'S HAPPENING AT GIVEN LOCATIONS, BUT ALSO TO AUTOMATICALLY INTERPRET THE INFORMATION THE VIDEO IS CAPTURING.

Intelligent Automation

Once live video has been analyzed and interpreted, intelligent automation systems can make decisions on the most appropriate response based on predefined rules. Automated responses include actions like alerting a dispatcher of specific situations such as large crowd or traffic buildups. They can also include commands to intelligent devices, such as directing video cameras to pan/tilt/zoom and begin recording in the direction of an event. For example, when a fire alarm sounds, cameras nearest the location can automatically send video to the control center, which can instantly stream the video to fire vehicles en route, enabling fire fighters to better assess the situation before they arrive. Or a police car's dashboard camera can be set to automatically begin recording when the vehicle's siren or lights are turned on. Expanding capabilities will allow intelligent digital cameras to work together in concert, enabling, for example, the automatic tracking of a suspect moving from camera to camera.

Collecting and Correlating

In public safety and security, crucial information can and does come from many different sources. Video images. 9-1-1 calls. Alarm systems. GPS data. Two-way radio communications. NG9-1-1 systems capable of receiving text, images and video from private cell phones. Correlation technology collects, consolidates and transmits text data on a specific incident or event, matching and integrating this input with corresponding video information. Crucial to correlation are sophisticated routing engines that provide automatic conversion of formats, allowing first responders to relate information from disparate systems—cameras, infrastructures, recorders, storage devices and more—to video of an incident. This enables first responders to receive more complete real-time information on an event, enabling them to better assess the situation and respond more appropriately and more successfully.

Integrating Different Systems

To empower public safety professionals with all available information on a specific situation, video security systems must seamlessly communicate with a variety of different networks, devices, applications and solutions… both in terms of technologies and manufacturers.

Different systems and resources that capture and collect important security data often use different technologies that do not talk or interface with one another, creating a de facto language barrier. This issue is being resolved in part by the move to open, standards-based IP connectivity that facilitates interoperability between other networks, other government entities, other communities and even some private enterprises. The language barrier is also being shattered through the use of innovative software systems within the physical security information management, or PSIM category. These software solutions allow video security command centers to easily access, track, integrate and manage video and other data captured by other systems regardless of whether the systems are public or private, analog or IP-based, or comprised of technologies and equipment from a variety of different manufacturers.

Friendly, Familiar Interfaces

Integral to fast, effective public safety communications are user-friendly interfaces that are familiar, easy to understand and intuitive in their usage. Today's advanced new video security systems enable end users to seamlessly connect to video whenever they need it, wherever they are. They can connect on their in-vehicle computers or handheld devices, receiving direct feeds from the communications center, via the Internet or on video walls and other installations. Equally important, whichever mode of connection they choose, they'll find a familiar, intuitive interface that is fast and easy to use, saving time and effort, eliminating frustration and improving effectiveness.

The Real World of Video Security

VIDEO IS ONE OF THE MOST POWERFUL AND EFFECTIVE TOOLS IN IMPROVING SAFETY, SECURITY AND SERVICE.

No matter how large or small the department or operation, video is one of the most powerful and effective tools in improving safety, security and service. What does advanced video security look like today? In most cases, video security solutions are active in three interrelated spheres of operation.

Where It All Comes Together

The hub of a video security system is the integrated centralized command center, where information from all video operations is collected, consolidated, coordinated, managed and distributed. Assisting the voice dispatchers, video professionals are in command of every segment of the video security systems, including gathering and integrating information from multiple sources and analyzing, distributing, storing and retrieving that data. When a problem is detected by network intelligence or other sources, the data is transported to the command center where it is coordinated, analyzed and distributed to personnel in the field… in real time. Using computer aided dispatch (CAD), center professionals quickly alert the nearest team of first responders, sending them integrated video, voice and data to help them better understand the problem before they arrive.

USE CASE SCENARIO

An E-9-1-1 call triggers the CAD system to locate all cameras near the call location. The system tells each camera to point in the direction of the call, and video streams from the cameras immediately pop up on the command center screen. Using these real-time images and information from the call itself, the video operator annotates the video and selects clips that can be transported to first responders, helping to maximize situational awareness.

Video on the Edge

For first responders, every call is potentially dangerous, and can often be life threatening. Today's video security systems push video out to the edge where first responders work. Video images and information can reduce danger dramatically by allowing first responders to improve their situational awareness with a wealth of real-time information at their fingertips. The command center can transmit streaming video of the incident and current images of the location to in-vehicle computers or handheld devices, all of which display a common, intuitive interface. Video can come from multiple cameras to provide better coverage of a location, and can be correlated with other information sources such as 9-1-1 calls and records. Because professionals on the edge have a clearer understanding of the situation, they can respond more appropriately and more effectively, significantly increasing safety and efficiency.

USE CASE SCENARIO

A dispatcher on a two-way radio call with first responders en route to a reported incident pulls video streams from nearby cameras. Reviewing the video streams, the dispatcher is able to identify relevant images and, using a simple drag-and-drop operation, send the video to all responders involved in responding to the incident.

Back Office Operations

Usually located in the video command center, back-office management operations consist of the video recording, analysis, storage and retrieval of information. They also include coordinated distribution of video to various applications and locations. Configurable network video recorders are used to record high-quality video streams that reflect strategic decisions defining exactly what, where and how to record.

Storage System Scalability

Because of the enormous amount of space needed to archive video, storage is a vital issue in the design and implementation of video security systems. Storage management includes short-term storage, usually of 30 days or less. There is a growing trend to localize short-term storage co-located at the camera site to make certain vital information is being recorded locally regardless of the network condition. Near-term storage of approximately 90 days with quick and easy access assists active investigations while longer-term archival storage of five years or more may be required for open cases. Tagging relevant video segments allows for fast retrieval of archived data.

Video uses large amounts of storage. A major back office issue is the fact that for law enforcement and legal uses, video may need to be archived and saved for five years or more. As more and more video is recorded and analyzed, storage capacity grows exponentially, especially with regard to the need to create back-up systems. For example, one year's worth of video from just two cameras can generate about 15 terabytes of data, which not only has to be stored once, but up to three times depending on how many backups are needed.

Innovative new storage techniques are aimed at lowering the cost of video storage. Information dispersal systems store slices of information on a network of servers, then reassemble them when needed; these systems can also restore files even if all the slices of data are not available. The cost savings are substantial. For large-scale storage, information dispersal techniques are about half the cost of traditional storage solutions, often even less. In addition, the system consumes much less power and uses considerably less bandwidth.

USE CASE SCENARIO

In a criminal case involving an incident two years ago, investigations identify the possibility that a fleeing suspect's image may have been captured by one or more traffic cameras installed at intersections near the location. Using sophisticated tagging and retrieval systems, video from all those cameras can be located and viewed in a matter of minutes, providing what may prove to be extremely valuable evidence.

Sharing Video

The sharing and distribution of video data is accomplished via an IP-based distributed infrastructure that facilitates the real-time delivery of video to a wide range of users in a variety of environments. The system allows users to send or access video to and from anywhere on the network. Interactive video—including touch-screen functionality—can be accessed on video wall matrices enabling real-time monitoring inside the command center and in other locations. Video can be displayed over the Internet in a web browser which prevents the need for a video client. Video can also be transmitted directly to first responders in the field through in-vehicle computers and increasingly more sophisticated handheld PDAs and computers.

USE CASE SCENARIO

Automated video cameras begin streaming video of a crowd buildup during a demonstration in a sometimes volatile neighborhood. As nearby cameras continue to track the crowd makeup and movement, the control center streams real-time video to first responders who have been dispatched to the scene to help them assess the situation and prepare for taking the most appropriate action on arrival.

The Vision of Video Security

Although they are exceptionally effective today, video security systems are on a fast track to the future. Today most video systems are unique and discrete systems with individual user interfaces, management and security services. As video technologies, applications and solutions continue to evolve at a rapid pace, future video systems will integrate with other systems such as NG9-1-1 and dispatch to create a single real-time view of the entire community. These systems will leverage a common platform. This "platform harmonization," will deliver simpler but more powerful control over multiple video streams—as well as voice and data streams—from a wide range of disparate networks and sources.

Platform harmonization is driven by a more efficient, more comprehensive, more integrated suite of applications for managing public safety and public services operations. A harmonized platform provides integrated command centers with access to common services—such as security and file sharing—across each application while utilizing a common user interface. The solution will permit enhanced information sharing of multiple media types, the ability to proactively and immediately shift resources, and to dramatically improve situational awareness in both the command center and in the field. It provides new capabilities for preemptive intelligence, and will transform the way you collaborate and share information to deliver more effective response. Applications built on a common platform benefit from seamless operation, and are scalable to adapt to your growing and changing requirements.

Video management will become more automated with sophisticated new intelligence built into devices and networks. There will be increased integration with public and private entities, incorporating private video installations such as security alarms and cameras with public technology to create comprehensive, seamless tracking of events and situations.

In addition, there will be increased integration of video with voice and data systems, providing more actionable information for analysts and first responders. Video analytics software solutions will continue to become more intuitive, more accurate and more customizable. All of these new capabilities will result in video security solutions that will be more interactive and more integrated, enabling enhanced communication and collaboration between a wide range of departments, entities and organizations. The result will be more comprehensive and more proactive public safety and services, with more property protected, more crimes solved and prevented, and more lives saved.

A Clear Vision

As comprehensive video security solutions become more powerful and more integrated, it's crucial to have your own vision of what your ideal system should be. Thinking about video in new ways will help you create a system that has the optimum technology, capabilities, applications and scalability. It's also critical to forge relationships with partners who share your vision and can help you make it come to life. The most successful public safety and services organizations will build comprehensive video security solutions for today, but with a clear vision for future enhancement and expansion.

MOTOROLA COLLABORATES WITH VIDEO SECURITY LEADERS

Motorola's video security solutions leverage Motorola's more than 2,200 broadcast video networks deployed as well as our 80 years of public safety experience. Our video security partners include:

- **VidSys.** A PSIM software provider enabling multi-media correlation, rules-based policy enforcement and integration of new digital and legacy analog cameras.
- **OnSSI.** Offers a comprehensive IP video surveillance control and management software solution, with user-intuitiveness, open architecture, and scalability.
- **Cleversafe.** Provider of high-performance dispersed storage and retrieval systems that deliver exceptional scalability, reliability, security and return on investment.

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