

SCOPE

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High Performance Built Environments

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PHYSICAL SECURITY: A LOOK TO THE FUTURE

THE PHYSICAL SECURITY INDUSTRY IS A RAPIDLY CHANGING AND

constantly evolving technology sector. Just in the past few years, we've witnessed the exciting implementation of imaginative wireless devices, dramatic improvements in the clarity of video images, and ever-larger displays for live camera monitoring. Lesser known, but perhaps more significant, developments include advanced video image searching, biometric devices, and multiple technology convergence that are driving the future of physical security. A growing base of sophisticated users is demanding integrated, comprehensive security systems. Architects, facility managers and consultants who stay abreast of these advances are clearly in demand.

VIDEO SYSTEMS

In our age of information overload, digital images are being generated at an explosive rate. A large facility with dozens of surveillance cameras can generate copious amounts of visual data. Just as Google helps us sift through the mountains of electronic documents, new video search engines allow pertinent and valuable information stored on digital video recorders to be found quickly. In

the past, the only way to search video files was in chronological order. New search engine software is beginning to revolutionize this process.

Security cameras are now better able to detect image detail with very little ambient light. The addition of infrared illumination and detection gives cameras the ability to greatly outperform the human eye when sensing images in the dark. The technology in night vision goggles - first used by the military in battlefield situations - can now be found in closed circuit video cameras. This not only provides the ability to 'see' better in the dark, it also reduces lighting requirements, saving up front and ongoing facility costs.



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ARCHITECTS/PLANNERS/
INTERIOR DESIGNERS/PROJECT MANAGERS

3441 Butler Street
Pittsburgh, PA 15201-1312

Tel: 412-252-1500

FAX: 412-252-1510

E-mail: d.knox@arctecon.com

Internet: www.arctecon.com



Imagine a purse being stolen in a public lobby while its owner is distracted talking on the phone. Knowing the theft took place between 10:15 and 10:30 am, the purse can be digitally tagged and tracked across the entire system of surveillance cameras by searching the video from a camera in the immediate vicinity prior to the theft. New search engine software will bring up potential video clips, called “candidates,” that might include shots of that particular purse. The user can then sift through these targeted clips, much like the selections given in today’s modern search engines. When video images are viewed from surveillance tapes, many times all that can be seen is a jumble of multiplexed images flashing by so quickly the user can’t make heads or tails of them.



Printing out these video frames can be futile – results can be too blurry to have much value. Enhancing video graphics using Video Evidence Clarification systems will reveal (expose and clarify) vital details in video images otherwise missed.¹



Help is on the way with tools that can:

- Isolate individual cameras from multi-camera surveillance tapes
- Dramatically enhance important details
- Define a specific region of an image like a license plate or a face and enlarge to any size
- Highlight a person or object and track it as it moves throughout the field of view
- Object Tracking features can even intentionally blur certain objects such as faces of undercover police officers or witnesses²

Other efficiencies are being achieved through new compression algorithms, greatly reducing video file sizes. Eliminating unused colors from the images, or comparing changes between image frames to only record the portions that change allow smaller file sizes, thus reducing the hard drive costs for recording and archiving video.

Video motion detection allows recording only when needed. Researchers are also developing methods to identify specific individuals using techniques such as body recognition or unique body movements. As the individual moves throughout a facility from one camera to another, security personnel can track a person’s path after an incident or predict where he is headed in real-time.

These advances allow guards to sit in their vehicles or view handheld devices to check images from any of the various cameras within a facility. In the near future these guards will even be able to control (pan-tilt-zoom) those cameras. In 2007, the Institute of Electrical and Electronics Engineers (IEEE) published Standards to address various wireless applications such as Wi-Fi and Bluetooth.³



An area that is making great strides is in the use of Radio Frequency Identification Devices (RFID) for article security and tracking. RFID systems can be used just about anywhere a unique identification system is needed, from clothing tags to pets to food. The tag carries information as simple as a pet owner's name and address or the cleaning instruction on a sweater, to more complex instructions, such as how to assemble a car. Auto manufacturers already use RFID systems to move cars through an assembly line. At each successive stage of production, the RFID tag informs the computers of the next assembly step. Since 2006, RFID systems have been employed on passports, highway toll systems (like Pennsylvania's EZ Pass), tracing baggage, credit cards and throughout many types of retail stores and industries. The technology, as it has evolved, has become more reliable and less expensive.⁴

BIOMETRICS

Biometrics refers to an automated method of verifying or recognizing the identity of a living person based on a physiological or behavioral characteristic. The market for biometrics is based on a variety of factors. Typically, different types of biometric devices are used depending on the security level. For example, voice recognition could be used as you enter a building, then as you enter a more secure area you'll need to pass through a hand geometry system, and finally as you enter a very high security area you'll need to verify your identity with the use of an iris or retinal scan.

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Roger L. Kingsland, AIA

Deborah Knox, *SCOPE* Editor

3441 Butler Street
Pittsburgh, PA 15201-1312

Tel: 412-252-1500

FAX: 412-252-1510

E-mail: d.knox@arctecon.com

Internet: www.arctecon.com

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Today's usage reflects not only the technical development but also the human acceptance of the particular type of device. Numerous devices like iris or retina recognition are currently considered too intrusive for medium security situations. However, much like the preboarding searches at airports, as the public becomes more comfortable with the technology, the use of these devices will increase. In an uncertain environment, feelings of greater security result when high security devices or tactics are employed.

Characteristic	Fingerprints	Hand Geometry	Retina	Iris	Face	Signature	Voice
Ease of Use	High	High	Low	Medium	Medium	High	High
Reasons for Errors	Dryness, Dirt, Age	Hand Injury, Age	Glasses	Poor Lighting	Lighting, Age, Hair, Glasses	Changing Signatures	Noise, Colds, Weather
Accuracy	High	High	Very High	Very High	High	High	High
User Acceptance	Medium	Medium	Medium	Medium	Medium	Medium	High
Required Security Level	High	Medium	High	Very High	Medium	Medium	Medium
Long-term Stability	High	Medium	High	High	Medium	Medium	Medium

A SECURE FUTURE

Demand for new physical security solutions will significantly impact the design of a building, and astute designers will strive to understand the techniques needed to deliver successful solutions. The educated selection of relevant technologies, proper location of security devices, the shape of spaces and associated people flow, and the infrastructure designed into the building will increasingly play a key role in the coming decades.

Article courtesy of Arctecon's technology Partner, The Sextant Group



¹ “Combining multiple evidence for video classification,” S. Vakkalanka, C. Krishna Mohan, , R. Kumaraswamy and B. Yegnanarayana, from Intelligent Sensing and Information Processing, Proceedings of the IEEE 2005 International Conference.

² “Moving Object Tracing for Video Surveillance in Compressed Videos,” Y-W. Chen, D-Y. Chen, and S-Y. Lee, From 2003 Internet and Multimedia Systems and Applications.

³ “Bluetooth and Wi-Fi wireless protocols: a survey and a comparison,” by E. Ferro and F. Portorti, of the Institute of National Resources Council, Pisa, Italy, IEEE Wireless Communications, Issue 1, February, 2005.

⁴ “Burgeoning RFID Applications” by George McClure, IEEE.USA Today’s Engineer, May 2008.

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