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Enhance Video Surveillance Effectiveness with Perimeter and Open Area Intrusion Detection: Top 5 Technologies

Steve Chapman, a columnist and editorial writer for the Chicago Tribune said, “When it comes to preventing and solving crimes, cameras are about as useful as a pet rock.” This is an overstatement, since video cameras are the primary means of intrusion validation regardless of the intrusion detection used. To protect businesses and highly secure facilities against intrusions, an increasing number of automated security technologies are being used to augment current video camera security systems. Finding a solution that also addresses environmental factors that can cause false/nuisance alarms is essential.

When systems with video analytics provide inconclusive or incorrect alarm signals, advanced security technology solutions provide the needed additional capacity to alert personnel to possible security breaches to ensure property and people are protected. The ability of detection sensing methods to isolate the precise location of an intrusion and communicate that information to video management systems drives the need for using a variety of technologies, such as laser measurement, radar, microwave, and fiber-optic solutions.

The need for enhanced automated intrusion sensing security technologies

In the commercial and government property arena, the important context is avoiding unlawful entry to do damage, manipulation, or cause personal property damage. Traditional hard guarding and on-site security personnel methods alone are often insufficient. There are limited benefits of additional security personnel while the additional recurring personnel costs must be weighed and considered as part of a “system.”

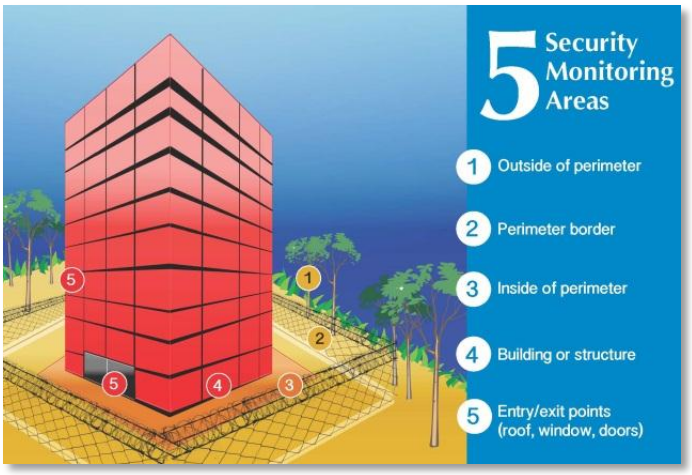
Even with advanced visual quality enhancers used to filter and enhance object visibility from foggy or blurred environment caused by bad weather such as rain, snow or fog, video analytics are not reliably accurate in outdoor environments, especially in bad weather or inconsistent outdoor environmental patterns. Lighting challenges can also have an adverse effect on the performance of video analytics.

Solutions that combine a variety of different technologies provide more in-depth data (ex. tracking and position information), which in-turn dramatically improves response times and eliminates false positives.

Considerations when choosing a technology

There are many issues that should be considered, including-

- Environmental immunity
- Complexity of installation
- Distance and type of coverage
- Cost of commissioning/ownership
- Defeat-ability
- Configurability (such as fixed versus definable zones)



Security guards posted at the facility are often first responders; police often a secondary response to an alarm. The vast majority of alarm calls, between 94 and 98 percent (higher in some jurisdictions), are false, according a study done by the Center for Problem-Oriented Policing (POP). The reliability of alarms measured by the rate of false activations, are generally between 2 and 6 percent. Nationwide, false alarms account for approximately a quarter of all calls to police; for many U.S. police agencies, false alarms constitute the highest-volume type of call for service. In the U.S. alone, solving the problem of false alarms would, by itself, relieve 35,000 officers from providing an essentially private service, claims POP.

Finding a solution that addresses environmental factors that can cause false/nuisance alarms is essential. Similarly, when choosing a technology, the type of access, such as running, crawling, and jumping must also be considered. The level of security access requirements are defined by the nature of the environment. A nuclear power plant will have different levels of security access limitations than a courthouse or shopping mall.

Any additional security technology must be part of an overall security plan/program, and therefore the ease of integration with other components (such as alarms and communications) must be carefully considered. Installation complexity is an equally important consideration.

Top 5 open space detection technologies: beyond a video camera security system

There are five primary technologies that can be used to enhance video surveillance effectiveness. Each of them is outlined as follows. A summary table is also provided below.

1. <u>Radar</u>

Radar works via transmitter and receiver in one housing when the detector sends electromagnetic waves and analyzes reflected echoes from target objects. Three dimensional volumetric sensors are used in a variety of applications including distance monitoring (fences) and area monitoring (such as roofs and parking lots). Radar technology has pros and cons. The benefits of radar security sensors include the ability to track speed, position, and direction of the objects detected up to 15 m high. Radar solutions are not suitable for tight detection zones (< 2 m). Nor is radar effective as line of sight technology since it lacks the capacity to determine what type or accurate size of object is detected. Since radars are affected by background or environmental noise data can be compromised.

2. <u>Microwave</u>

Microwave works with a separate transmitter and receiver units (or transmitter and receiver enclosed in a single housing). Microwave signals are transmitted and intrusion is detected through shifts in the received frequency. Like radar, microwave security is highly effective in distance monitoring (fences) as well as area monitoring (such as roofs and parking lots). Weather is always an issue, yet less with microwave technology and provides high sensitivity and monitoring up to 15 m high and long distances from the sensors. Also similar to radar,

microwave is not suitable for tight detection zones (< 2 m), and since any obstacle could cause a blind spot, line of sight is less effective.

3. Fiber-optic

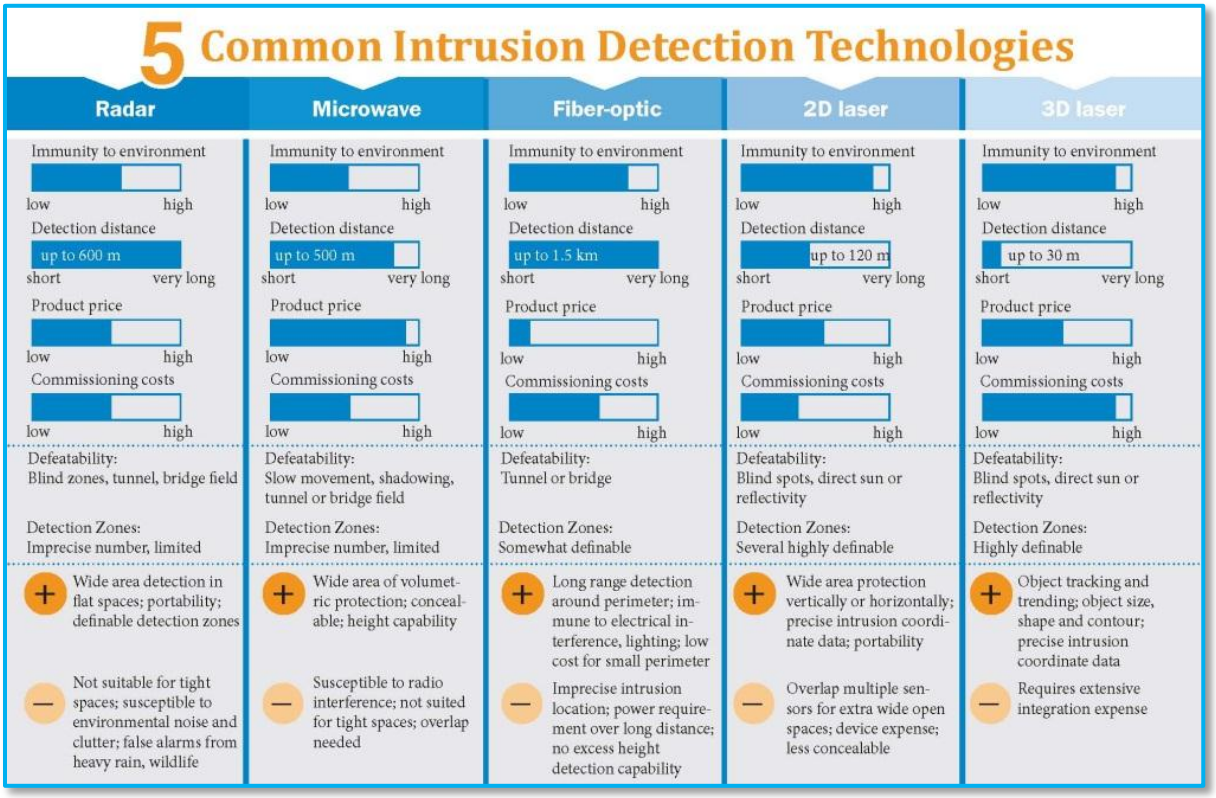
Fiber-optic technology works when light waves sent between a transmitter and receiver are evaluated to determine changes in the light properties. Fiber-optic technology is most often used in perimeter monitoring including fences, solar panel fields, and pipelines. With low procurement costs, immunity from environmental factors, and a simple installation process, fiber-optic technology is often an effective added security choice, however higher installation costs must be considered.

4. 2D Laser

Two-dimensional laser measurement devices monitor areas with a sweeping laser beam, using the time-of-flight principle to accurately measure distances throughout the field of view. This technology is used in open spaces and with curtain control, such as vertical and horizontal structures or walls. Because light waves are resistant to environmental factors, false alarms are reduced. Configurable ranges, concealed mounting, and up to 360° scanning range in real-time ensure highly accurate detection and position information. Two-dimensional laser measurement can provide trend and track data for accurately controlling video devices. Commissioning and maintenance for outdoor installations is more cost efficient compared with other solutions. Two-dimensional laser measurement has a longer range than three-dimensional laser measurement systems, yet lacks a third measurement dimension for detection. There is a moderate initial hardware cost (although total cost of ownership is low) and it is harder to conceal than buried cables.

5. 3D Laser

Three-dimensional laser measurement is similar to 2D laser measurement, but adjusts frequency phase-shift technology to measure distance from scanner. It is used in short-range distances (less than 3 m) and often at retail counters. This newer technology may give pause for inclusion as part of an overall security strategy, however the resistance to environmental factors and adjustable ranges and detection areas may bode well for the future of this modality. Because this is still a new technology there is often a greater integration expense involved.



A balanced approach to security video, plus….

SDM, a leading publication regarding security systems and integration, concluded that outdoor perimeter security installations can be some of the most challenging. Real-world experience frequently is the most valuable when dealing with the necessity of weather-tight, reliable installations that have to withstand everything from landslides to hurricanes. Video camera security solutions are an important part of the overall solution, not the entire story. Combining the right technologies in security solutions ensure that best-practices and all bases are covered. The balance of physical, personnel, and electronic/automated methods are the most effective total outdoor system. Cost, reliability, precision, and configurability are key points to position laser type solutions most favorably against alternatives.

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