



On the radar

In an era where security concerns are escalating, high-security locations demand sophisticated and comprehensive surveillance solutions. As Tony Holloway discovers, the integration of surveillance cameras with bespoke radar technology has emerged as a formidable combination realising enhanced detection, real-time monitoring and a proactive response mechanism

SURVEILLANCE CAMERAS

have been a cornerstone of security systems for many decades. These cameras capture and transmit video footage to a centralised monitoring station, allowing security personnel to observe and analyse real-time activities. Modern security surveillance cameras, of course, incorporate advanced features such as HD imaging, PTZ capabilities and intelligent video analytics for enhanced functionality.

'Radio Detection and Ranging' (ie radar) employs radio frequency waves to detect and track objects within a designated area. It calculates the distance, speed and position of objects by analysing the time taken for the radio waves to be emitted, reflected and then returned. In

the context of security surveillance, radar technology provides a broader and more comprehensive situational awareness, most notably so when deployed within challenging environmental conditions.

The synergy between security surveillance cameras and radar technology facilitates comprehensive coverage for high-security locations. While security surveillance cameras excel in providing detailed visual information, radar extends the surveillance range by detecting objects, including those not within the line of sight of commissioned and operational cameras. This technology collaboration enhances the overall effectiveness of the security system.

Radar's ability to detect objects at a distance, even in adverse weather

conditions or low-light environments, complements the visual capabilities of security surveillance cameras. Early detection is crucial for identifying potential threats before they appear in the direct view of cameras, allowing security personnel to initiate pre-emptive measures and respond proactively.

The combination of radar and security surveillance cameras significantly reduces false alarms when compared to standalone systems. Radar's capability to filter and identify moving objects based on pre-defined criteria minimises the likelihood of false alerts. This feature is particularly valuable in high-security locations, where accurate threat assessment is paramount to avoid unnecessary disruptions and ensure an

efficient use of not just physical security resources, but also budgets.

Automated tracking

When a potential threat is detected by radar, the integrated system can automatically activate surveillance cameras to track and verify the identified object. This seamless co-ordination ensures that security personnel receive real-time visual confirmation, allowing for more accurate threat assessment and informed decision-making.

The combined use of radar and security surveillance cameras provides security operators with greatly enhanced situational awareness. Radar offers a wide-area perspective, detecting and tracking multiple objects simultaneously, while security surveillance cameras provide detailed close-up views. This comprehensive situational awareness empowers security personnel to make well-informed decisions in what are often dynamic and challenging scenarios.

The integration of radar and security surveillance camera technology allows for the incorporation of advanced video analytics. Video analytics algorithms can be applied to the visual data captured by surveillance cameras, further refining threat detection and classification. This integration enables the system to distinguish between different types of objects, such as humans or vehicles, thereby enhancing the precision of the security response.

Why deploy radar for wide-area surveillance monitoring? Radar technology is often thought to be exclusive to the realms of high-budget security installations. However, spearheading the latest developments in cost-effective combined radar, surveillance camera and analytics technology means that the benefits provided by highly effective radar wide-area detection can now be considered for a broader range of security surveillance-specific applications.

Traditionally, the use of radar systems has been considered the preserve of high-end installations, such as those deployed at airports or ports. However, using cost-effective 'all-in-one' devices, with integrated 360-degree rotational radar and integrated HD PTZ cameras, any open area can be secured using a single radar or by deploying multiple devices for coverage of very large open areas.

Versus deploying many traditional thermal or infrared cameras, Predator Radar could prove to be a far more effective and economical solution for covering the same area. In addition, the



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advanced detection capability on offer is such that target detection and alarm functionality are continuous, even within adverse weather conditions.

On detection of a target (or targets), a radar-equipped camera instructs its integrated PTZ camera (or cameras) to view the target(s) and provide instant visual verification. Additionally, as the targets move, they're automatically and continuously tracked by the cameras to maintain real-time visual coverage.

Alternative technologies

Up to four tracking PTZ surveillance cameras may be integrated with one single radar unit. The configuration of the cameras is flexible, too, with either one camera built-in to the radar device (and three further external surveillance cameras integrated for tracking) or two surveillance cameras physically integrated with the radar device and synced with up to two external cameras. This continuous scene analysis can provide system

operators with powerful and accurate object detection and also be combined with notifications via a real-time web page-based live radar display, TCP/IP serial data/event messaging plus local or IP remote physical alarm contact outputs. In practice, this yields a range of detection integrations in addition to bringing into play the ONVIF Protocol for video and control integration.

When considering the use of radar versus alternative technologies, there are many factors other than purchase price alone to consider, among them performance reliability, overall cost of installation and total cost of ownership.

It's important to consider that effective target identification is critical to high-security systems covering large areas, and that traditional detection methods – such as perimeter fence line detectors or camera analytics software – alone may fail to identify an object accurately enough. This will lead to false alarms and operators being needlessly alerted, in

turn generating an ineffective increase in workload for each member of the team resident in the Control Room.

Given their 360-degree surveillance capability, radar camera units are capable of scanning vast areas. Although it's possible to cover larger areas with traditional surveillance cameras, depending on the type of technology and implementation approach, far more video cameras will be required to cover the same area. This impacts on equipment, infrastructure and installation costs.

A radar system covering the same area, on the other hand, requires far less cabling, less power, less communication equipment and less manpower to install. In relation to a typical camera system, then, the total cost of installation and long-term ownership can be substantially lower for a radar system given the smaller number of radar devices required.

Effective threat detection

The combination of 360-degree radar detection and powerful analytics programming enables radar cameras to detect objects through smoke and fog. These cameras can be directed towards targets and the analytics primed to employ 'detect and follow' functionality, no matter the environmental conditions.

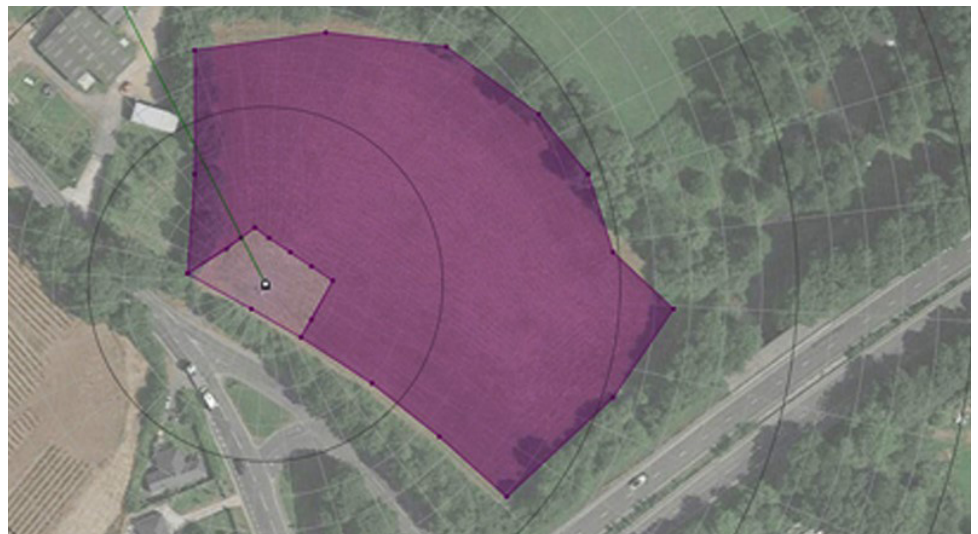
In short, using both radar and powerful analytics integrated into one camera unit can provide combined 'double knock' alarm verification and deliver the ultimate in alert accuracy for any given application.

Advanced radar wide-area PTZ cameras with sophisticated software analytics can identify targets and track them. This assists trained surveillance system operators in being alerted to a situation. They can identify where the target is and where it's going. The optimum level of incident information and evidential video is provided.

By applying the latest video analytics, once a target has been identified and tracked by the radar unit, that target can be instantly classified via camera analytical rules, such as automatically identifying persons or vehicles of interest, providing even greater target identification and accuracy.

Allied to this, advanced machine learning means that systems can learn to effectively ignore false alarms, such as those created by foliage, light casting or adverse weather events.

Today, traditional multi-surveillance camera solutions are being replaced by one single and simple-to-maintain radar unit. Such applications include large private houses, areas of natural



beauty, stately homes, works compounds and highways infrastructure (including tunnels, where they monitor traffic for stopped vehicles and incident detection).

Further real-world applications include Critical National Infrastructure and other high-security locations, among them power stations, transportation hubs and Government facilities.

For national borders, the integration of radar and surveillance technology enhances border surveillance capabilities, providing early detection of intruders and facilitating rapid response.

Airports are characterised by vast perimeters and complex environments. Electronic surveillance systems employed throughout these environments commonly feature surveillance cameras covering airfield perimeters, car parks, public areas and airside 'staff-only'/ baggage handling areas. They not only protect passengers, staff and infrastructure, but can also enforce site-wide Health and Safety procedures and assist general facilities management.

In today's world of heightened threat awareness and ever-tightening security policies, clear and high-quality camera images deliver an essential element of an airport's security portfolio. Airport security managers find great value in combined radar and surveillance cameras to efficiently cover large areas, detect unauthorised movements and strengthen against current threats.

Combined cameras can also be used to protect industrial complexes. The monitoring of expansive areas ensures the safety of personnel and assets alike. This is particularly relevant in sectors such as the petrochemical, manufacturing and research facility domains.

Extending the core applications for radar surveillance, for those locations where connection to hard-wired

infrastructure may be problematic – or to fulfil a rapidly deployable solution – radar cameras equipped with integrated wireless TX capability may be deployed. They require no fixed infrastructure and can provide optimal video surveillance performance, even within areas characterised by a poor mobile signal.

The addition of radar with TX capability – and, for total off-grid operation, equipped with solar panels – enables highly effective radar surveillance to be located in the most remote locations, streaming video via GPRS, 3G, 4GLTE, 5G Wi-Fi or satellite. For ease of installation, TX-equipped radar cameras can deliver their video, data and PTZ control, Full 1080p HD and edge recording/remote retrieval on demand. Importantly, they're easy to integrate into existing VMS via ONVIF compliance.

Technology in synergy

The combination of security surveillance cameras and radar technology represents something of a paradigm shift in the realm of security surveillance, and especially so in terms of protection regimes for high-security locations. Importantly, the synergy between these technologies creates an holistic and proactive security infrastructure that addresses the evolving challenges of the modern security landscape.

From early threat detection right through to automated tracking and verification, the benefit of this integrated approach extends across many sectors, duly safeguarding critical assets, infrastructure and personnel. The narrative here is a compelling one. ●

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