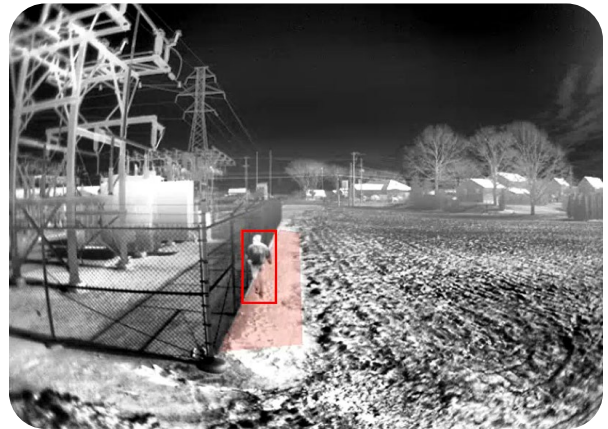




Outdoor Security You Can Count On

A How-To Guide for Detection Peace of Mind

Most security professionals agree: When you need to detect intrusions at perimeters and outdoor sites, thermal cameras with video analytics make an ideal “people detector” that catches bad guys with high dependability at outdoor areas – whether preventing sabotage at airports, refineries or substations, or stopping theft from cannabis farms, construction sites, or any business with valuable assets outdoors.



Achieving outdoor security you can count on often rests on one overarching requirement: You need to know the instant an intruder breaks into the perimeter – at night, during the day, in good or bad weather – no matter what.

But not all security deployments live up to expectations. In fact, putting together the right system - the right way - can be the most foundational challenge for achieving reliable performance and peace of mind.

This document is intended for organizations that need to prevent incursions leading to losses of high economic value, and addresses the following subjects:

- The differences between detection and verification
- Why thermal works well in the outdoors
- The value of thermal and visible together
- Best practices for reliable outdoor performance
- How extended ranges reduce cost

Do You Need Verification or Detection?

You may be thinking, “what’s the difference?” But it’s the most important question to ask when choosing an outdoor security system.

Video **verification** means people watching video screens to determine the source of an alert after a break-in has occurred.

Video **security** means detecting intruders at the perimeter, before a break-in, and sending credible alerts with real-time video as a situation unfolds.

When you’re protecting outdoor assets, you need early awareness and time to intervene. For these applications, “smart” cameras combine the strengths of machines and people, watching the scene automatically, and alerting remote guards with video evidence when a response is needed. This lets you tie the two applications together – detection and verification – to create an intruder detection **solution** you can count on.



Why Thermal for Detection?

Since security starts with detection, the alert must be accurate. Because thermal cameras “see” heat rather than light, they’re great human detectors in the outdoors, from zero light to bright sun, in rain, snow or humidity. They ignore things that cause nuisance alerts with visible light detection cameras, like headlights and reflections. Thermal cameras also eliminate the expense, power and difficulty of lighting large outdoor areas. And they cover huge areas with many fewer devices. Among their advantages, they provide:

- **Proactive Security** - Detects intruders the instant they breach or even approach the fence, and before they can reach your building
- **Intelligent Protection** - Smart thermal cameras work day and night, seeing through darkness, rain, wind or snow
- **Get more with less** – Long-range thermal cameras outperform - per square foot - most other detection technologies.
- **Detect and verify** – The sensor itself is video-based, giving you real-time visual awareness about the event as it happens
- **Greatly reduced nuisance alerts** – These systems are built to detect people, not animals, trash, or highway traffic
- **Faster security response** - Video-verified events are treated with higher priority to stop intruders in the act - reducing business loss

Combining Thermal with Video Analytics

Thermal cameras represent the detection source; the software that sets the security policies are *video analytics*. Not all thermal solutions employ these two systems in the same way, and how they work can impact detection reliability.

At one time, it was common practice to place video analytic software on devices outside of the camera; the camera would transmit its video over the network for video analytics elsewhere, such as a VMS or other device. But with advancements in processing capabilities - and after many years of disappointing outdoor performance results - some camera manufacturers now embed video analytic software directly within the camera itself, at the network edge. When combined with powerful video processors, these “smart thermal cameras” offer great improvement in detection accuracy and distance, while eliminating the nuisance alerts that once plagued earlier systems.

Combining Thermal and Visible for Better Security

Now that thermal sensors are available at commercial prices, they’ve become the standard for detecting intruders at sites where it matters most. But visible cameras still play an important role in perimeter security.

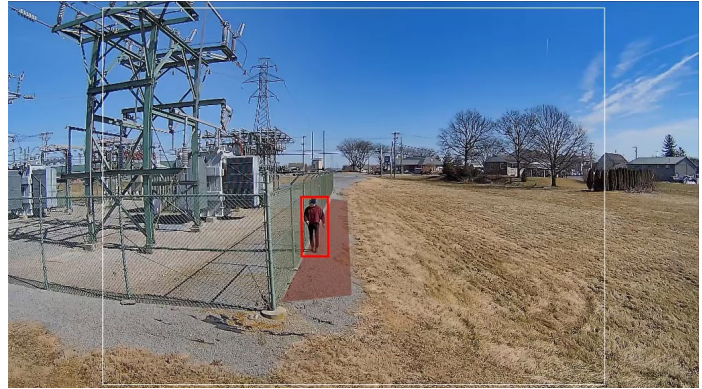
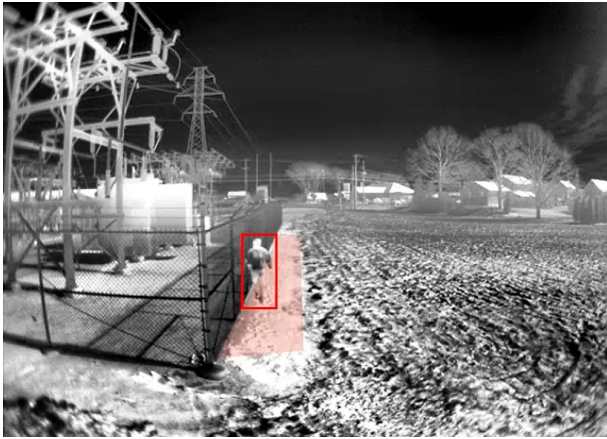
For one, visible cameras can be used for an up-close view to see color details about a thermal alarm. Some thermal solutions can automatically steer high-definition PTZ cameras to zoom and follow a target in real time, particularly helpful over the longer distances thermal cameras operate. By combining thermal detection with visible assessment, you gain comprehensive security awareness.



Long-range smart thermal cameras detect (left) and auto-zoom PTZs for assessment (right)

Dual-Sensor Video Analytics

Visible sensors also play an important role in **dual-sensor cameras** which have both thermal and visible cameras built in. Such “dual-sensor analytic” systems intelligently coordinate scene information from both thermal and visible simultaneously, using one for detection and the other for confirmation depending on scene conditions. This results in better detection accuracy in tough situations and can further reduce false alarms.



Dual-video smart camera detects with thermal...

...and shows color video for assessment, while confirming the thermal detection as a check on accuracy.

How Video Processing Increases Detection Performance

Smart thermal cameras with video analytics detect intruders with high reliability in darkness, heavy rain, fog, and snow because they can maximize the full dynamic range of the thermal imager. This lets them determine temperature differences down to 1/20th of degree, represented by over 16,000 shades of gray.

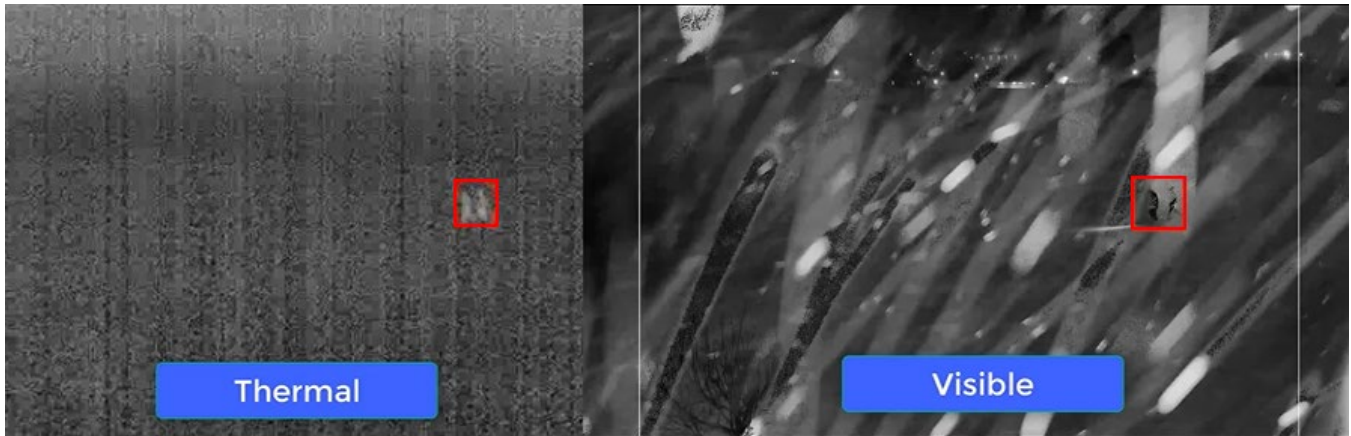
This is important, because by detecting very small temperature differences, they can recognize intruders over very large areas and perimeters, even under difficult weather conditions.

For example, the temperature of a background can “crossover” and match the temperature of a person under many common weather situations – on a really hot day, cold day, or even during a rain or snowstorm, when everything in the scene becomes saturated and closely matches in temperature.

This situation can effectively blind thermal cameras that lack the ability to discern these fine differences. The result – **totally missed intruders**, a massive security failure.

On the other hand, cameras with sufficient processing will detect the person even when they're close to the temperature of the backgrounds, giving you peace of mind under all conditions.

The example below shows a smart thermal/visible camera detecting intruders during a common snowstorm. On the visible feed (at right), the scene is so saturated with precipitation that it's hard to even see the presence of the intruders. Yet the thermal video (on the left) "sees" through the precipitation and detects with great precision.



Real-World Performance

This reliability is born out in real-world applications. A nine-month, multi-season smart thermal camera test conducted by the TSA at wintry Buffalo-Niagara International Airport concluding that after 900 attempts to defeat the system, "every alarm instance was accurately reported." (<https://www.sightlogix.com/airport-perimeter-security-systems/>).

At another site, the remote video services firm National Video Monitoring concluded: "The impact smart thermal cameras have had on weather or environmental-related alarms has been enormous....The false alarms have all but disappeared, but we are still able to detect even something as brief as a head poking around a corner in heavy rain, allowing us to mitigate risk immediately. Now we can confidently detect and deter in any condition and keep our customers protected at all times."

Best Practices for Reliable Detection Performance

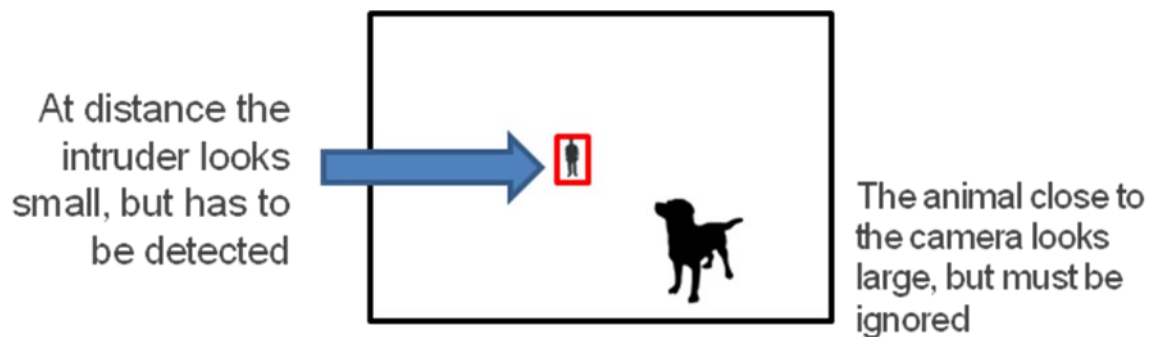
Consider these foundational elements when choosing and using a smart outdoor detection camera.

Geo-Registration – The Key for Accuracy Outdoors

Smart cameras are designed to detect movement, but outside, *everything moves*. While this can trigger excessive nuisance alerts for some systems, thermal cameras equipped with geo-registered capabilities can achieve high detection reliability even in the presence of overwhelming outdoor movement.

Geo-registration is used to determine the actual location and true size of all pixels in a camera’s field of view. Essentially, it gives a smart camera depth of perception to automatically know the difference between small animals or blowing debris that should be ignored and a human intruder that must be detected.

For example, an animal near the camera will look much larger than a man at 300 meters away, as you can see in the figure below.



Because of geo-registration, the camera will ignore the animal at right while alerting on the distant person, even though the animal will cover more of the camera’s field of view, increasing accuracy and lowering false alerts.

Geo-registration is the foundation for reliable performance outdoors, and every good smart camera should have this capability.

Auto-Stabilization - Overcoming Camera Shake from Wind

Video stabilization is another attribute to increase detection accuracy. Outdoor cameras are often deployed along open areas that are naturally impacted by high winds or vibrations. It is difficult for smart cameras to detect movement in a scene when the whole field of view is also moving from camera shake. Without stabilization, these applications can be overwhelmed by nuisance alarms or worse, outright missed intrusions.

For this reason, choose a thermal solution that automatically stabilizes the video before analytic rules are applied, and you can greatly improve your detection reliability.

Extended Range Lowers Cost

The same processing used for accurate detection can also give smart cameras extended coverage, detecting human-sized targets over hundreds of meters.



Longer-range Smart Thermal (at right) Lower Costs

As a result, these systems reduce the number of cameras typically required for large areas, lowering overall project costs.

Given their longer ranges, they can also be mounted right on a building and project a blanket of smart detection across an entire outdoor area, reducing infrastructure even further.

Long-range thermal cameras also excel in the role of early-warning detectors, triggering alarms when intruders approach a facility, creating ample warning of the threat and giving security personal time to intervene. Their wider coverage gives them a great advantage in anticipating the approach of an intruder.

You can also create zones of protection that extend outside the fence line, at the fence line, and even inside the fence using thermal buffer zones around internal assets where physical or man-made boundaries are unlikely to exist.

Summary: How Smart Thermal Solutions Solve Your Outdoor Security Challenges

- Unmatched detection performance, detects an intruder’s speed, bearing, and location in milliseconds – for the fastest preemptive response
 - Early warning of intruders over massive buffer zones – detecting outside, inside, and at the fence
 - Automatically zooms PTZ cameras to follow a detected target for real-time assessment
 - Intelligently combines thermal and visible analytics for the best detection under all conditions
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We’re Here to Help!

Need help with design support, product information, or applications? The team at SightLogix has a long and successful history helping organizations turn SightLogix’s systems into practical solutions.

- Visit <https://www.sightlogix.com/design-support/> and learn more.
- To request a meeting with a solution specialist, email info@sightlogix.com or call +1 609.951.0008.

About SightLogix

Packed with power and engineered for performance, SightLogix smart thermal cameras solve outdoor security problems at sites where detection matters. It’s our passion and our mission to deliver highly reliable and easy-to-deploy security systems with edge-based video analytics, long and wide area coverage, and geo-spatial target tracking, purpose-built to help you succeed. Learn more at www.sightlogix.com.