

Border Security Solutions

Volume One - Enterprise Class Video Surveillance



Every industry has unique challenges. As part of TechSmart™, Wave Representatives is providing application specific recommendations to make it easier to deploy proven solutions.

Today there is an emerging need for more secure borders, so superior defensive technologies are required to augment physical barriers.

Below we'll review the Logipix Border Surveillance Solution and how this manufacturer can be utilized to increase border security and general perimeters.



Illegal border crossing has become a very common issue in modern society. A secure border is currently a top priority in the United States and many other countries. In some cases hundreds or even thousands of miles need to be protected around-the-clock, which imposes a heavy burden on operators and border patrol units.

Besides national borders, important facilities with large perimeter areas can be exposed to different risks. Modern technological innovations are essential for adequate protection. This includes the accurate detection of dangerous and suspicious activities such as; illegal crossing, human trafficking, and smuggling, during both daytime and nighttime hours.

Borders can be protected by walls and fences, but these are usually ineffective by themselves. It is also very common for areas to have no barriers at a border. In either case, reliable detection of threats is especially important for achieving secured environments.

The following will review the main features and benefits of the “Logipix Border Surveillance Solution” for organizations looking to significantly improve visibility and response.

200 Megapixel Panoramic

Monitoring several hundred miles of border without any automation is completely useless. In order to allow effective real-time reactions to illegal border crossings, Logipix developed a VCA-based detection method. Using the panoramic images, this computer vision technology is able to detect human presence from a distance of up to 1.86 miles. The Video Content Analysis relies on a Multidimensional Gaussian Background Model that continuously adapts to the background. This helps avoid any false alarms usually generated by the moving parts of the landscape, e.g. plants blown by the wind.



Multiple Target Tracking and Localization

Once individuals have been detected, the VCA can continuously track their movements. The system is able to track multiple targets simultaneously and thanks to the ePTZ function, can automatically display zoomed images of them in special zoom windows on the monitoring interface. The ePTZ function can be triggered by PID alarm signals as well.

Localization of targets can be very difficult within an area where several analogous objects are visible. The Logipix solution can easily overcome this issue by displaying the real-time GPS-coordinates and distance information, which move together with the VCA detected objects.

Ultra High Resolution Panoramic Advantages

The end-to-end solution was designed to overcome security challenges by providing a reliable virtual wall that automatically detects illegal activities and helps guide patrol units to the exact alarmed area.

The solution adapts to different environmental conditions. The system ensures a virtual wall using high-resolution Panorama cameras which are able to continuously monitor immense areas. As all potential threats have to be detected even after nightfall, the Logipix solution makes individuals visible regardless of the lighting conditions, even from miles away.



THE KEY COMPONENTS OF THE LOGIPIX SOLUTION

Logipix ONE Panoramic Camera

Thermal Camera

3D Microwave Radar

Logipix 6 MP PTZ Camera

Logipix Long Range PTZ 3 Miles

Logipix IR Laser Flash

Logipix Network Video Recorders

Logipix Control Center Ultimate Software Pack

LOGIPIX

Elements of the Logipix Solution

Logipix Panoramic

The Logipix Panoramic cameras cover long stretches of border and provide image quality that is suitable for automatic human detection from up to 3 kilometers away. This enormous resolution is paired with 20 FPS speed. The Long Range 5 km and the 6 MP PTZ cameras scan large areas and deliver informative images in any lighting and weather conditions with the help of their integrated IR Laser Illuminator. The Logipix PTZ cameras and the Panorama cameras work together with integrated Thermal cameras and 3D Microwave Radars. They send pre-alerts to operators when they detect any motion of proper sized objects.



200 MP Logipix Panorama camera



Perimeter Security

Recording and storing such a huge amount of data is always a significant challenge. The 3rd generation of Logipix NVRs are specially developed to accomplish this task. They are able to operate on-site and also in a centralized system structure.

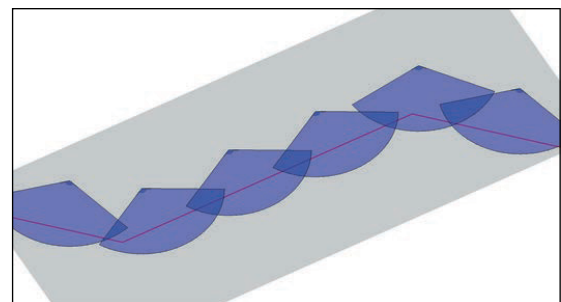
The components of the Logipix solution use the JPEG2000 image compression standard to provide the highest quality footage and still remain bandwidth-effective. Thanks to the scalability of the JPEG2000 images, the Control Center always displays the images and zoomed image details in the currently required resolution that adapts to the screen resolution.



6 MP Logipix PTZ camera

3D model of video coverage

An accurate design of camera arrangement is essential in every border area to achieve the required resolutions. Logipix creates 3D models that visualize the final installation points, fields of view and exact resolution-distance values.



LOGIPIX PROVIDES HIGHER PIXEL DENSITY AND FPS

Features and Functions

National borders stretch for many miles in various topographical conditions. The Logipix cameras can be arranged in a structure that provides full coverage of the border and surrounding areas.

A Panorama camera with 40° FOV effectively monitors an area of 8 km² from a single viewpoint. It delivers images with resolutions of several hundred megapixels, meaning a trespassing individual can be detected from a distance of 3 km within a 3 km long border section.



The above graphic provides a zoom window from the 200 megapixel panoramic camera with VCA providing distance to target and intrusion detection.

Panorama Stitching

The Logipix panoramic images consist of several individual images produced by the built-in camera-lens combinations of the Logipix Panoramic. They are geometrically stitched together and a white balance correction is performed to smooth the color gradient in the panoramic image. The individual CMOS sensors synchronize the images, which means there is no object duplication or hidden objects at the stitching borders. This could be crucial, for instance, to specify the exact number of trespassing individuals.

Logipix PTZ control functions

Integrated PTZ cameras are important components of the system. On the one hand they efficiently complement Panorama cameras, as they can function as optical zoom extensions for the panoramic view. A special function allows the two cameras to be assigned by registering common spatial points that are visible to both cameras within the monitored area. This allows operators to control the PTZ cameras by selecting the area of interest on the panoramic image.

PTZ Auto-tracking

On the other hand, PTZ cameras work together with motion detection systems and the Logipix VCA. An appropriate alarm signal triggers the PTZ camera, which turns to the exact spot and provides useful details on the situation. It can be used efficiently to avoid reaction to false alarms. Cooperating with the VCA function used on the panoramic images, the PTZ can automatically track the target, and it also continuously vary the focus to provide the sharpest images possible.



Integrated Thermal PTZ and Radar

The Logipix Border Surveillance solution can integrate high-performance Thermal PTZ cameras and 3D Microwave Radars to make illegal border crossing detection more effective. Radars are configured to provide pre-alarms of objects that seem to be illegal. Integrated Thermal PTZ cameras can act as the Logipix PTZs and automatically turn to areas where alarms come from. They can see in complete darkness, smoke and fog without any artificial illumination and provide accurate alarm verification. Combining the capabilities of Logipix Panorama cameras and integrated Thermal PTZs results in safer national borders, where all illegal activities are handled effectively.

Resistant housings

All Logipix cameras and NVRs are full metal constructions and are designed for long-term use. They can be equipped with passive and also active thermal constructions, alongside their own housings or third-party. This makes them resistant even to extreme weather and environmental conditions. Heat pipes, heat sinks with fans and Thermoelectric Peltier modules ensure the appropriate operating temperature within the devices.

Standard Panoramic: IP66 Protection Classification.

The 200 MP Panoramic Camera Details

Logipix engineers have developed multi-sensor Logipix Panoramic cameras with several hundred megapixels that are specifically designed to meet the surveillance requirements of wide areas. They can deliver 200 MP resolution panoramic images at 20 FPS.

The cameras can operate in extreme environments. They are equipped with a complex thermal control solution to perform well in high or low temperatures and both humid and dry conditions. The fans, heat pipes, glass heating, and the Peltier modules ensure that the cameras always stay at the required operational temperature. The panorama is available also in white design, which has been developed specifically to operate in extreme hot environments.



Self-maintenance

The all-metal construction of the camera housing, with quality glass windows and sunshields in front of each lens, results in a massive, robust, reliable construction so that the camera can always deliver quality footage.

All panoramic cameras can clean themselves, thanks to their water tank and wipers. The cleaning procedure can be scheduled and automatically started, so maintenance of the camera is easy, fast and effortless. The devices give warnings if their water tank needs to be refilled and can start the cleaning procedure automatically.

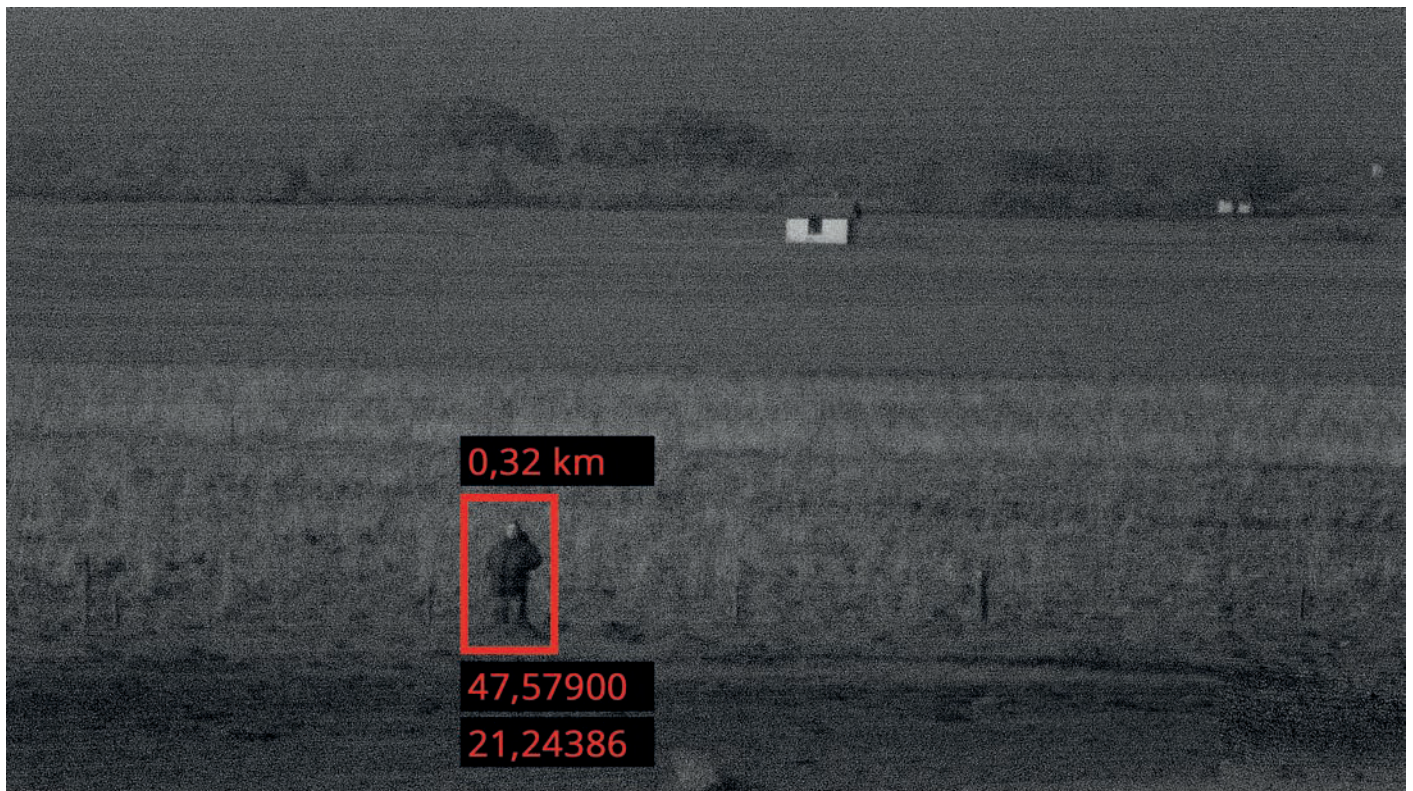
LOGIPIX ENTERPRISE FEATURE: SELF MAINTENANCE

Operators

Operators in the Command and Control Centers can easily scan through the entire monitored area watching live streams of Logipix cameras.

The panoramic images ensure better spatial awareness for operators, as they display large areas simultaneously and the relative positions of natural formations help operators in orientation. Additionally, the Video Monitor contains zoom windows for the panoramic images, as well as thermal and normal PTZ camera images and if needed, associated maps. If an alarm arrives from an area, the ePTZ function is activated on the panoramic images and the related zoomed areas are displayed in zoom windows. The archive view of the event can also be looped in special Capture camera windows.

The PTZ cameras automatically turn to the area of alarm and operators can check whether it is a real alarm, a false one or sabotage. They can track the VCA detected objects in the panoramic images and continuously receive real-time GPS coordinates of the target positions. This allows operators to effectively guide border patrol units to the exact spot, where they can take efficient actions to stop trespassing individuals.



200 Megapixel Panoramic Nighttime Performance



LOGIPIX ENTERPRISE FEATURE: LOW LIGHT

Operators

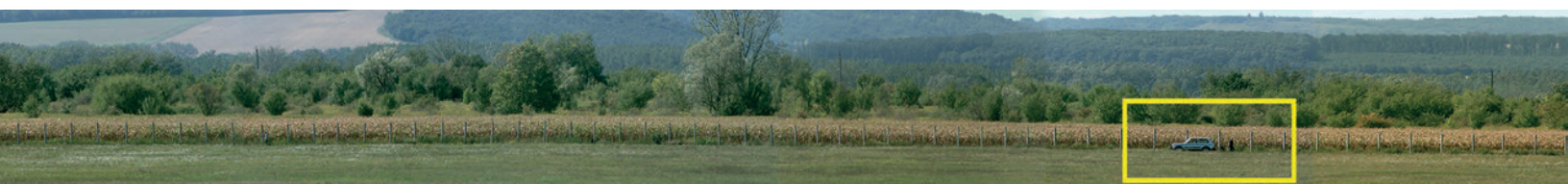
Operators in the Command and Control Centers can easily scan through the entire monitored area watching live streams of Logipix cameras.

The panoramic images ensure better spatial awareness for operators, as they display large areas simultaneously and the relative positions of natural formations help operators in orientation. Additionally, the Video Monitor contains zoom windows for the panoramic images, as well as thermal and normal PTZ camera images and, if needed, associated maps. If an alarm arrives from an area, the ePTZ function is activated on the panoramic images and the related zoomed areas are displayed in zoom windows. The archive view of the event can also be looped in special Capture camera windows.

The PTZ cameras automatically turn to the area of alarm and operators can check whether it is a real alarm, a false one or sabotage. They can track the VCA detected objects in the panoramic images and continuously receive real-time GPS coordinates of the target positions. This allows operators to effectively guide border patrol units to the exact spot, where they can take efficient actions to stop trespassing individuals.



200 Megapixel Panoramic Daylight Performance



LOGIPIX ENTERPRISE FEATURE: VCA

LOGIPIX

Logipix provides a complex solution that automatically detects trespassing individuals at borders even at far distances using high-resolution images and VCA.

The system helps prevent illegal border crossing, as individuals can be detected even before they cross the border.

Exact position of the detected objects can be tracked, as their current GPS coordinates are continuously displayed, providing border patrol units with easily to find targets, even if the border has few geographical formations as reference objects.

The solution minimizes false alarms. Operators can accurately filter alarms that are triggered accidentally or via sabotage.

The system can operate effectively in complete darkness.

The Logipix Border Surveillance solution guides the attention of operators to spots where the system automatically detects threats. This function is essential when immense areas have to be monitored.

Logipix components use the JPEG2000 compression standard. This allows for bandwidth-effective data transmission, and ensures the ability to display full resolution image details during live monitoring.

The quality Logipix footage can be used also as irrefutable evidence in later law enforcement procedures.

Logipix heralds a new era in border surveillance. The most secure walls are not built from concrete and steel, but from thousands of megapixels and advanced computer vision technologies. Logipix created an end-to-end solution with which all illegal border crossings can be detected automatically, while all false alarms are filtered. The end result is safer borders and, ultimately, more secure nations.



20 MP Logipix ONE



3 mile, 2 MP Logipix Long Range PTZ camera



200 MP Logipix Panorama camera



Logipix IR Laser Flash 500 W



6 MP Logipix PTZ camera



Logipix 3D microwave radar



Logipix Network Video Recorder

Conclusion

The Logipix Border Surveillance solution enables large expansive areas to be monitored effectively using high megapixel resolutions and advanced video content analysis technology providing support for intelligent decision making, make this a valuable tool.

Since their inception in 1996, Logipix has been engineer led and focused on enterprise, end-to-end solutions.

Over the last 5 years, they have experienced 12x revenue growth and continue to be privately held.

About Us

Wave Representatives specializes in embedded design and sales support for security manufacturers, ensuring end users and systems integrators have relevant product information and guidance.

Strategic partnerships with leading manufacturers combined with strong relationships with professional security integrators enables Wave Representatives to provide unmatched value to end users who want access to better solutions for their security and operational initiatives.

