STADIUM VIDEO SURVEILLANCE SOLUTION
Wherever tens of thousands of people show up at the same time, the security risk compounds. Whether it be a live performance of a superstar rock band or a popular sporting match, large crowds invite conflicts that can lead to riots, fights, arson, bottle throwing, or property damage. In more extreme situations, shootings, terrorist attacks or bombings could happen as well. The prevention of incidents and rapid reaction are key factors to ensuring the safety of all people in stadiums. The Logipix Stadium Video Surveillance solution was designed specifically with these challenges in mind.

STADIUM SECURITY CHALLENGES
The main components of the solution

- Virtual Panorama
- 20 MP Logipix ONE cameras in special camera enclosures
- Full HD and 6 MP PTZ cameras
- 3rd generation Network Video Recorders
- Logipix Control Center Professional with Stadium Feature

The features of this complete video surveillance solution are designed to deliver high-resolution images to recognize every individual in the stadium, help operators react quickly on suspicious situations, prevent or defuse outbursts, and efficiently investigate prior incidents. The system provides high-resolution and high fps panoramic video streams of all seats simultaneously, rendering faces recognizable for operators.
SYSTEM ARCHITECTURE

SEAT CAMERAS
LOGIPIX VIRTUAL PANORAMA:
- LOGIPIX ONE 20MP
- LOGIPIX 2MP PTZ
- LOGIPIX 6MP PTZ

CAMERA VLAN

LOGIPIX 4 – 20 MP CAMERAS
LOGIPIX PTZ CAMERAS

OUTSIDE THE SEATING AREA

LOGIPIX SERVER
SQL DATABASE

CONTROL CENTER
CLIENT 1

CONTROL CENTER
CLIENT 8
A carefully designed model of video coverage helps achieve the required image resolution in all venues, while keeping costs at bay. Stadium security professionals are able to get an early overview of the camera arrangement with respect to quality requirements. The final plan contains the exact 3D model of the stadium with accurate camera positions. Simulated views of all individual cameras facilitate accurate system installations.

Stadium lighting systems often cause extreme challenges for cameras facing reflectors. Logipix engineers consider the positions of all reflectors during the phase of video coverage modeling. Individual cameras of the Virtual Panorama are installed in state-of-the-art, air-conditioned camera enclosures with specially designed sunshields that effectively protect against disturbing lens flares.
Face recognition at every seat with panoramic images

The Logipix Virtual Panorama camera system ensures 250-400 ppm resolution, which means every face is recognizable at every single seat in the stadium. Watching large panoramic images, operators can better orientate within the space. They do not have to split their attention while observing dozens or hundreds of camera feeds. Both the high-resolution and the 20 fps speed of panoramic image stream help operators to make the best decision in escalating situations or during an investigation.

Panorama stitching

Stadium seats are covered by large panoramic images that provide 200-320 MP resolution. The panoramic images are constructed from multiple individual Logipix ONE cameras. Our engineers developed an advanced stitching technology, whereby images are not just overlapped at the image borders, but geometrically merged. The Logipix cameras capture their images synchronized, eliminating disturbing glitches like object duplication or disappearance. Logipix systems feature white balance correction at the image borders, providing a smooth color gradient between the frames.
Displaying 200-320 MP panoramic images during live monitoring or archive playback is no easy task. This amount of data can impose excessive burdens on the network infrastructure and client computers. Logipix Panoramic Technology stores the panoramic images at full resolution on the NVR, but transmits and displays only the necessary pixels. The basis of this technology is the JPEG2000 compression standard, which is able to scale image resolution, making it possible to handle low and high resolution versions of the same image simultaneously. Utilizing this feature, Logipix transmits the panoramic images at a resolution that fits existing screen resolution, and sends the high resolution images when operators request zoomed image details. Logipix Control Center allows for using multiple zoom windows on the Video Monitor interface at the same time. This way operators can observe certain areas in full resolution or track moving individuals in the stadium while they continuously see the entire area.

To complete the Logipix Stadium Video Surveillance solution, PTZ cameras may be added. Thanks to their optical zoom capabilities they are able to provide up to 1000 ppm resolution in stadiums. Higher resolution means higher image details which help operators handle situations more effectively. Controlling the PTZ cameras is simple and convenient in the Logipix system. Operators can use the mouse controlled joystick emulation or the Point-IT functions to move the cameras. Logipix engineers developed a worldwide unique function allowing PTZ cameras to be assigned to the Panorama cameras. This way operators can control the PTZs on the panoramic images by selecting the area of interest. Based on common measuring points, the PTZ camera can accurately locate and zoom on the selected image area.
PTZ bookmarks

In many large stadiums there are sections that host hardcore fans and therefore often attract aggressive behavior. The Logipix system allows operators to assign certain areas with special PTZ bookmarks. Using these marks they can navigate PTZ cameras to these sectors quickly.

Archive search

Logipix Control Center allows for versatile archive search functions. Both archive and live images can be observed in the Video Monitor at the same time. For example, the cause of an outburst incident can be investigated on the video monitor on the panoramic image, while the real-time situation is seen by the PTZ cameras.

Outside the seating area

The Logipix system not only monitors stadium seating areas, but can provide full-coverage of the entire venue, including its perimeter, utilizing a mix of individual 4-20 megapixel and PTZ cameras.

Stadium event management

The Control Center VMS allows for dual configuration of the cameras in the stadium. One setup can be used during the events and another can be configured with lower quality settings to use between events.
The Match Operation Center or MOC, is a centralized monitoring room, which can be installed when multiple stadiums use the Logipix Stadium Video Surveillance solution across cities or even a country. From this monitoring room all the stadiums are remotely accessible and fully manageable.
Let’s explore a potential incident. A prestigious football game attracted 80 thousand football fans and all the seats are taken in the stadium. The spectators’ excitement reaches fever pitch when the visiting team scores a goal. Watching the panoramic stream, an operator spots that something suspicious is going on in the sector of home fans. He zooms in on the 200 MP panoramic image and realizes that three people are grappling. Reacting to this situation he informs the closest security guards, describes all individuals in details and guides the guards to the exact spot. By the time they arrive and take control of the situation, one of the three fans have left the spot. But he doesn’t get far, as the operator continuously tracks his movement by a PTZ camera and instructs another guard to intercept the disorderly football fan. In just a few short minutes, all four individuals are removed from their seats and the escalation of the dangerous situation is prevented. After the match, operators review and analyze the archive to investigate what transpired and to retrieve high-quality images of the individual’s faces that can be used as irrefutable evidence in a legal proceeding. While stepping the archive frame-by-frame, the initial reason of the fight is revealed. The fan who tried to escape was intending to light a firework, but the two others prevented in this, and was the key moment that lead to the fight. Thanks to Logipix Stadium Video Surveillance solution operators can react quickly to defuse situations like this, investigate the case thoroughly, and make sure that disorderly individuals are handled expediently.

Wide range of stadium sizes:

- 5-10 thousand seats
- 10-40 thousand seats
- 40-120 thousand seats

IN CASE OF AN INCIDENT
STRENGTHS OF THE SOLUTION

- The Logipix Stadium Video Surveillance solution provides full-coverage of stadiums. Seating areas can be monitored with only a few panoramic images even in the largest stadiums.
- The Virtual Panorama delivers 200-320 MP images, allowing face recognition at all seats in the stadium. Additional PTZ cameras further extend the available resolution, providing 1000 ppm resolution in the seating area.
- The panoramic images are built from the images of individually installed cameras by a special stitching technology. Thanks to this solution, the panoramic system can be tailored to any stadium in any size, and easily restructured in case of future developments.
- The worldwide unique PTZ control function that allows operators to control the PTZ via the panoramic image makes monitoring more convenient. Operators can get fine details of all incidents in no time.
- Operators can react fast to any disorderly conduct and instruct the security staff to take necessary security measures to prevent the escalation of the situation.
- Thanks to the Logipix Match Operation Center multiple stadiums can be managed from a distant, centralized monitoring room.
- Dual configuration of the system makes it possible to operate in a bandwidth-effective way. The cameras work with full performance during the events, but with moderate settings in-between events.
The Logipix Stadium Video Surveillance solution increases security operational awareness by delivering 200-320 MP panoramic videos both during real-time and archive operations. With Logipix, the security staff is able to handle security incidents quickly, effectively and appropriately, and can also provide irrefutable video or still image evidence in court. Spectators know that the video surveillance system is able to identify them with unmatched accuracy. Deploying the Logipix system ensures that vandalism and critical incidents are kept at bay, creating a safe and welcoming stadium experience for everyone.
ABOUT LOGIPIX

Logipix Technical Development Ltd. is a privately held company established in 1996 in Budapest, Hungary. Since then, Logipix has grown into the international company that it is today – one of the most innovative, end-to-end video surveillance solution developers and manufacturers. Today the main profile of the company is to provide specially designed, high-end video surveillance solutions considering the various characteristics of different application areas.

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