

# ENHANCED SECURITY

in the Turkish football stadiums





## ENHANCED SECURITY IN THE TURKISH FOOTBALL STADIUMS

### Motivation

Association football took its roots in the early of the 20th century in Turkey and since then it has become the most popular sport in the country. Football matches attract tens of thousands of fans continuously from event to event. This enormous amount of crowd can generate a potential danger on itself and on the environment as well.

The Turkish Football Federation (TFF) decided to enhance the security of 31 football stadiums all over the country. In 2013 they issued a tender to which the world leader companies of the surveillance industry responded. TFF selected the LOGIPIX Stadium Surveillance System from among the candidates, as the features of the LOGIPIX end-to-end system best met their needs. The governing body of the Turkish football, TFF was seeking for a system that provides a resolution which is high enough for face recognition at every seat in the stadium. To staying within the available budget was also a critical requirement at a huge project like this.

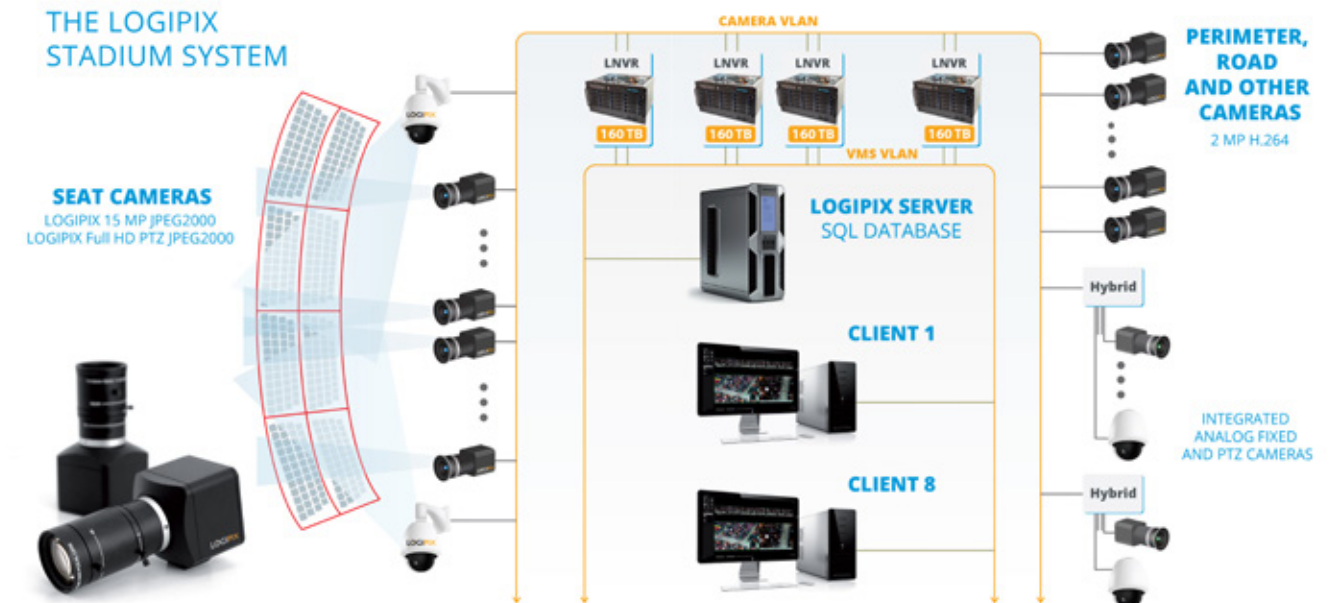
### Solution

The scalable LOGIPIX Stadium Surveillance System has been implemented in 31 Turkish football stadiums. The capacity of the smallest object is 5 thousand, the largest stadium can accommodate 76 thousand people. LOGIPIX provided an end-to-end solution as innovative IP cameras, Network Video Recorders and Control Center software are operating together. All of the seats are observed by LOGIPIX Virtual Panoramic Camera System which consists of several individual 15 Megapixel LOGIPIX cameras and additional LOGIPIX Full HD PTZ cameras which are working in cohesion with the panoramic system to get more visual information of the situations occurring. Full HD LOGIPIX cameras are permanently monitoring the inner corridors furthermore the areas between the stadium gates and the arena.

Enterprise type LOGIPIX Network Video Recorders have also been installed to record and store security footage. Police officers and the security operators of the stadiums are using the convenient Control Center software to effectively handle every disorderly conduct and emergency situation.



#### THE LOGIPIX STADIUM SYSTEM





## Products used in the project

- LOGIPIX Virtual Panoramic System with LOGIPIX 15 MP ABF cameras
- Control Center software package
- LOGIPIX NVR Enterprise
- LOGIPIX Hybrid Extension
- LOGIPIX Full HD PTZ camera
- LOGIPIX 2 MP camera



Using the multi-megapixel LOGIPIX panoramic camera system reduced the number of the required devices to cover entire stadiums beside maximizing the resolution. This action saved a significant amount of installation and maintenance cost.

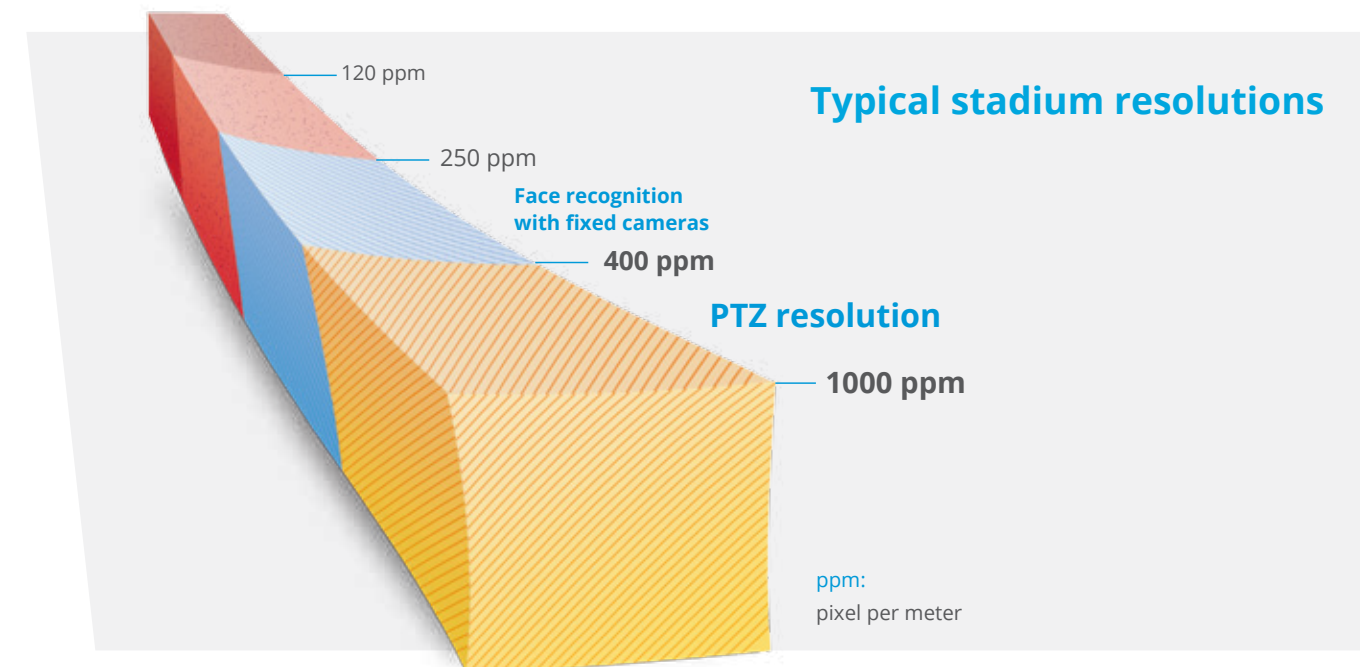
## Minute details and revolutionary PTZ control technology

Additional Full HD LOGIPIX PTZ cameras are scanning permanently the arena providing enormous resolutions up to 1000 pixel per meter. Having more detailed images from different angles help the operators to make the right decisions in an anxious situation. To accelerate and facilitate the control of the cameras and the everyday tasks of the operators, PTZ cameras are linked to the panoramic system by a specially developed feature. Owing to this application, the pan tilt and zoom functions of the PTZ can be controlled by selecting an exact area on the panoramic image.

## Detailed description

### Expanded panoramic view with hundreds of megapixels

As the images of the 15 Megapixel LOGIPIX cameras are stitched together by a unique software application, a permanent high quality footage can be seen live and stored of every visitor at the seating bowl. Several hundred megapixels of visual information provides a resolution which is suitable for face recognition during the entire event in both live and archive video streams. Owing to the stitching technology a few panoramic images are sufficient to cover the whole seating bowl with neither hidden nor redundant areas. As the panoramic system consists of individual cameras the structure of the whole system is excessively flexible, therefore it is able to serve all the stadiums in all sizes in Turkey.







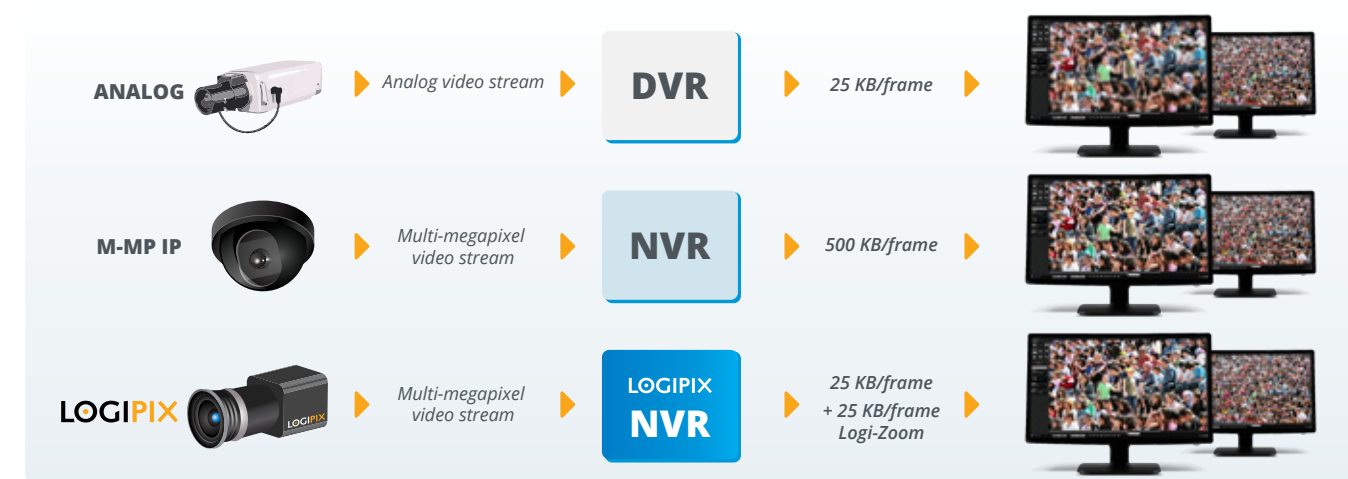
It has been noted that there are certain areas more prone to outbreaks of violence in the seating bowl. By a unique function these potential threat zones can be marked and saved as PTZ positions. Thus operators only need a single click on the video monitor surface to navigate the cameras to these areas.

### Appropriate compression standard for high-end quality

Seat cameras of the LOGIPIX Stadium System in Turkey use the visually lossless JPEG2000 standard for image compression. The JPEG2000 standard has been developed specially for high resolution images, where scalability is one of the key features.

Utilizing the embedded multi-stream of JPEG2000, LOGIPIX engineers developed a hardware driven zoom function, the Logi-Zoom that allows sending the currently required picture area in high resolution, with the rest of the image being sent in lower, screen optimized resolution.

In the JPEG2000 video stream every images are compressed individually, therefore each frame of the stream can be used as still photos also.



### No unmonitored areas

Additionally several H.264 Full HD LOGIPIX cameras and Full HD PTZ cameras were installed to monitor all the stadium gates and the areas between them and the seating bowl. Every football fan can be traced in the entire stadium area from the moment they approaching to the stadium till they leaving it.

### A prodigy in recording

In Turkish football stadiums the industry's fastest and most reliable Network Video Recorders, the LOGIPIX NVRs ensure the recording and long term storing of the high quality security footage. By default the devices store the last 3 football matches on their hard drives. Due to the reliable and intelligent storage system security footage cannot be lost in case of a single point of failure of either a Hard Disk Drive or an entire NVR. NVRs record the security footage with VRM fail-safe file system, which means if a single HDD failures the recording will be still available at a 25% lower frame rate. If an NVR stops working for any reason, a configured spare NVR takes over its duty.



### Ensuring a bridge between IP and analog

Many of the Turkish stadiums already had analog surveillance systems. LOGIPIX brought good news for TFF, as stadiums didn't have to put their analog cameras in vast. By using LOGIPIX Hybrid Extensions the existing analog cameras were easily integrated into the IP based system. They are permanently monitoring corridors, ticketing, e-kiosks, security rooms and parking garages. LOGIPIX Hybrid Extensions convert the analog signal into JPEG2000 video stream.





A storage effective solution

The LOGIPIX Stadium Surveillance System allows for a dual configuration of its cameras in the Turkish stadiums. One setup is used during the events and another with lower quality settings is started after the events for general monitoring. This function helps to effectively manage the storage system.

In the control rooms

Although the system is complex and has to satisfy numerous requirements, its configuration and management are really straightforward with the intuitive Control Center software. Operators are using this client program in the monitoring rooms at tens of workplaces. They can effectively respond to any disorderly conduct or accident immediately by analyzing the high resolution images on-site and take the best decision that helps solving the occurred situation. Any required image can be printed right away and desired archive video intervals can be downloaded and forwarded in no time.

An overall monitoring room

LOGIPIX Control Center operates in a distant head monitoring room as well in the Turkish stadium project from where all the stadiums are remotely accessible and fully manageable. This is the so called MOC, the Match Operation Center. Operators in that monitoring room can watch real-time images and retrieve archives from all the stadiums with the LOGIPIX Remote Control Center clients. They can follow multiple scenes from various stadiums simultaneously on a huge videowall when more than one football matches are on at the same time.



Four examples of Turkish stadiums equipped by LOGIPIX

	Türk Telekom Arena	Atatürk Olympic Stadium	Fenerbahçe Şükrü Saracoğlu Stadium	Kayseri Kadir Has Stadium
STADIUM SPECIFICATION				
Capacity (seats)	56,652	76,092	50,509	32,864
Monitoring room space	160 m²	110 m²	90 m²	60 m²
Operator workplaces	18	10	12	10
Full security staff	1000+ persons	1100+ persons	800+ persons	600+ persons
LOGIPIX DEVICES				
Network Video Recorder	44	35	27	23
15MP JPEG2000 cameras	408	335	271	179
2MP PTZ JPEG2000 cameras	19	39	22	12
2MP H.264 cameras	462	384	376	269
INTEGRATED EXISTING DEVICES				
Analog cameras	21	-	-	-
Analog PTZ cameras	38	-	-	-

Resulting safer entertainment events

Spectators know that the new security surveillance system can identify them with unmatched accuracy. Using the LOGIPIX Stadium Surveillance System in Turkish stadiums has ensured that vandalism and critical incidents have been kept at bay, ensuring a safe and welcoming stadium experience for everyone.





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