LOGIPIX

CASE STUDY

COMPLEX SECURITY SOLUTION TO PROTECT HUNGARIAN GSM-R NETWORK SYSTEM

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COMPLEX SECURITY SOLUTION TO PROTECT HUNGARIAN GSM-R NETWORK SYSTEM

Motivation

The National Info Communications Service Company Limited by Shares (NISZ) made a decision to modernize the communication system of Hungarian National Railways with GSM-R network, that complies with EU standards, thus Hungary can connect to the unified European Railway Traffic Management System. The investment increases the reliability of railway communication and ensures safer trips. LOGIPIX built up a complex system to protect sites of the GSM-R communication system's base points from any unauthorized intrusion and to sign every alarm, random errors or malfunctions that occur within the system infrastructure.

Solution

Complex LOGIPIX system maintains security and infrastructure kind signal management all along beside the main Hungarian railways at the base stations and central buildings of Hungarian GSM-R network.

The system is working at 150 radio towers, 200 indoor premises, in two redundant System Centers at two distant locations and in an isolated monitoring room. The complex, integrated solution provides overall security as it consists of LOGIPIX Access Control System,

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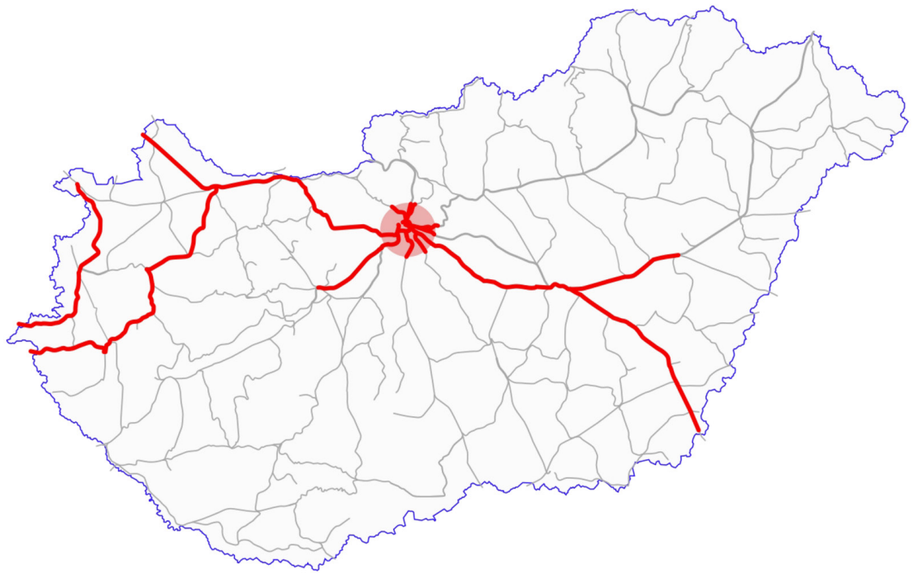
Burglar Alarm System and LOGIPIX Video Surveillance System, that are working in cohesion. An SC01-A controller belongs to every radio tower and indoor premise with a zone extender and a card reader. Besides, LOGIPIX Full HD PTZ cameras scan permanently the immediate environment of the towers. SC01-A controllers have been installed in the System Centers as well handling alarm and infrastructural signals. LOGIPIX Access Control System serves both central buildings with SK03-08 IP controllers and M05-08 card readers, furthermore LOGIPIX ensures the video surveillance task as well with 2 MP box and dome cameras. The system's camera pictures are recorded by 6-6 redundant LOGIPIX Network Video Recorders, that can substitute each other in case of any occurring problem.



Benefits

- **Different LOGIPIX systems work in cohesion – all in one solution**
- **Staying within the budget – Cost-effective system with smart developments**
- **Redundant operation – doubled LOGIPIX Control Center Servers and storage devices**
- **Contemporary video surveillance – minute details by state-of-the-art IP cameras**
- **Shortened training – user-friendly Control Center, intuitive software interface**
- **Speaking the same language – communication with the GSM-R network management software through SNMP module**

DETAILED DESCRIPTION

In the System Centers

The two System Centers in the distant central buildings are working redundantly in active-inactive status division, and if needed one can take over the duty of the other.

Both centers run the LOGIPIX Control Center Server package but in default case the servers are in standby status at the spare system center. Both centers' databases are copied automatically every night to each others' backup folders. Therefore switching between the two centers can be performed in a few minutes by manually activating the actual database.

Six LOGIPIX Network Video Recorders are installed at the main System Center that serve and record the footage of all the LOGIPIX IP cameras in the system, namely the Full HD PTZ cameras and the 2 MP box and mini dome cameras. Every LNVR has its own spare device at the secondary system center. As the spare LNVR is exactly equivalent with the original in performance and configuration, it can effectively substitute the original's tasks if any problem occurs with it.

An SC01-A controller has been installed with a zone extender at both system centers to perform multiple tasks. SC01-A gets the error signals from the power supply and generator rooms moreover from the server room. An alarm terminal is connected to the controller therefore it can receive the signals of all the sensors that cover the entire building. The SC01-A devices have been extended with a special fire alarm interface that is communicating with the matched NOTIFIER AM-2000 multi-area fire panel.

LOGIPIX Access Control System allows the employees and guests of MÁV Zrt. to enter the central buildings of the GSM-R network system only by using proper, authorized proximity cards. M05-08 card readers are connected to SK03-08 controllers.

At the sites

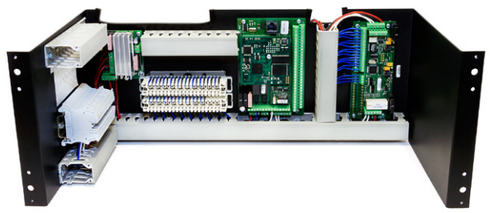
LOGIPIX System protects 150 radio tower sites and 200 indoor premises that belong to the system of GSM-R network all along the main Hungarian railways. The complex LOGIPIX System defend all the sites from unauthorized intrusion and therefore secure communication devices that ensure a safe rail transport. Nobody can enter the sites and approach the cabinets without permission neither at the tower sites nor in the indoor premises.

Each radio tower site is equipped with an SC01-A controller that receives and sends burglar alarm and infrastructure kind signals and control the connected card reader. Everyone who wants to open the security cabinets must hold an autho-

rized proximity card and must have physical keys. The proximity card deactivates the Passive Infra Red motion detectors (PIR) as well of which two pieces are working at each site and continuously sign every suspicious motion. The tower sites have a master and a slave cabinet protecting the GSM-R network devices. The cabinets contain smoke detectors, sensors for door opening and indoor thermometers. The master cabinet have a thermometer that measures the outer temperature as well. SC01-A also monitors infrastructure kind signals, like the error signs of the AC power supply and the UPS, the cabinet's air conditioner and the error sign of the tower's aircraft warning lights. The device controls the outdoor siren as well.

The eye of the tower is the LOGIPIX Full HD PTZ. The device ensures the clearest images with 1080p resolution and 25 FPS recording speed. The camera provides effective object tracking due to its accuracy and incredibly fast positioning. Full HD picture resolution compressed by bandwidth effective H.264 standard and 30X optical zoom capability enable LOGIPIX PTZ to deliver high resolution image details. The device has unique integrated IR illuminators with automatic cooperating focus system, therefore the camera provides stunning images of the monitored objects in the dark as well. It can be remotely controlled with joystick emulation technology, but it has configured prepositions as well. The camera turns to these positions getting the proper signals by the LNVR, which have been triggered by different alarms.

SC01-A controllers with zone extenders and card readers can be found in all indoor premises as well. The aim of these premises is to protect a rack cabinet in which GSM-R network devices can be found. Just like at the radio towers, the controller handles infrastructure kind signals and alarm signals. In addition the premises have glass break sensors and a sensor that sense the bar removing of the air conditioner's outdoor unit.



In the monitoring room

The monitoring room, the so called NOC is located in the main System Center in a separated premise. All the signals and the video footage are brought into this room and being displayed on the monitor panels. LOGIPIX Video Surveillance System is being managed by the user friendly Control Center. Two clients are running in the NOC, continuously providing indispensable visual information.

As LOGIPIX Control Center servers communicate with all parts of the complex LOGIPIX System it can realize smart connection between them. A few movements of LOGIPIX Full HD PTZ cameras have been previously configured in the Control Center. For the effects of some alarms at the outdoor sites the camera automatically turns to the specific position, therefore it greatly enhances the efficiency of the observation and significantly facilitates the work of the operators.

The true challenge was to transfer the information of the complex LOGIPIX System to the target CNMS. The answer laid on the technology of SNMP. The specially developed module allows the LOGIPIX System to easily transfer device signals and receives acknowledges from the Compaq Network Management Software (CNMS).

Summary

Hungarian National Railways has been modernized with the GSM-R network system all along the main rail routes, therefore now it complies with strict EU standards and able to connect to the unified European Railway Traffic Management System. LOGIPIX was committed to build up a complex security solution to protect the sites and central buildings of GSM-R network, based on the cooperation of different security systems. The end-to-end LOGIPIX Video Surveillance System, the LOGIPIX Access Control System and the Burglar Alarm System altogether highly contribute to increase the safety and reliability of the railway transport.

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