SinusNetworks, Kaposvár

Hungarian City of Kaposvár develops innovative wireless approach to crime prevention

Kaposvár is an historic city located in the south-west of Hungary, some 185km distance from Budapest, and is one of the principal cities of Transdanubia and the capital of Somogy County. With its close proximity to Lake Balaton, Central Europe's largest lake, its mediaeval architecture and wonderfully reborn downtown area, Kaposvár is fast becoming known as a leading tourist attraction and is known locally as the "City of Flowers". More recently, the establishment of a new University in the year of the millennium, and confirmation of its status as one of Hungary's National Cities of Sport, has meant the number of visitors and new residents to the city has increased dramatically.

With this growth in population and visitor numbers comes the constant need for increased security and crime prevention across the breadth of the city, and with this in mind the local council began planning how to implement a strategy that would help to discourage crime and reduce its occurrence in public areas as quickly as possible, with an ultimate aspirational goal to reduce the number of criminal acts to zero. Following a series of professional consultations, it was agreed that the most likely approach to achieving this goal - and the one that would have the maximum short-term impact on preventing and reducing crime as a whole - would be to design and implement a city-wide CCTV monitoring system, covering not only the limits of the city but in some cases extending out to key visitor hotspots, such as that of Lake Deseda, which lies around 8km North-west of the city.

First and foremost, the key requirement for the CCTV implementation was for a system that operated with 100% reliability – this is, of course, a necessity particularly when the system is to be used for crime recording and potentially crime prosecution, since anything less could undermine the production and legitimacy of evidence in a case. The police force also had its own technology requirements for the initial implementation phase – high resolution, 24x7 image and video capture (including both day and night vision operation and facial feature capture/recognition of offenders), ANPR/LPR (Automatic Number/Licence Plate Recognition), and a number of software-based analytical solutions that would help to automate video surveillance rather than having to depend upon a fully human-monitored system.

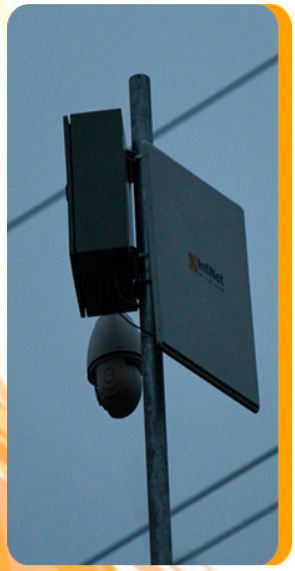
In addition, local council and traffic authorities would also use the system for the monitoring of a variety of non-criminal activities or occurrences – for example, to identify traffic patterns or bottlenecks in the city.

From these key requirements, an architecture for the city CCTV system was developed, and this essentially took the form of a 'redundant ring' architecture with local aggregation and collection points onto the ring from a number of point-to-multipoint CCTV collector units, where local CCTV traffic would be collected and passed on to the surveillance HQ. Innovatively, the redundant ring architecture was developed purely around wireless technologies - using both microwave broadband radio and free space optics (FSO) as transmission media - rather than the traditional copper or fibre backbone that is usually prevalent in these situations. This architecture was developed in order to provide speed to deployment, ease of adding new camera locations, and a flexible approach to adding capacity for future expandability to the project. The wireless implementation approach also was a means of ensuring that the system was free of any commercial carrier or ISP network dependence. Across the redundant ring, a VLAN architecture was provisioned to effectively segregate and optimise the transmission of different types of data traffic application – from CCTV image streaming to traffic management, ANPR and protected police data and of course camera management operations. This became a necessity not only for technical reasons, but also as a means of securing sensitive police data and adhering to the necessity data protection legislation.

The ring itself operates at a frequency of 24GHz, providing 900Mbps full duplex capacity around the separate ring circuits. Collector feeds into the ring operate at 5GHz frequencies, with a throughput of 200Mbps – each of the collector feeds are also fully duplicated to ensure full continuity in case of a single link failure – and these spurs provide connectivity to over 150 camera locations, each equipped with either PTZ dome or PTZ bullet-type cameras to monitor their capture area. The cameras operate at a minimum of 25 frames per second and with up to 5 megapixel resolution and 27x zoom resolution, allowing the authorities to zoom in and identify offenders' facial features up to 100m distance from the camera location, as well as providing accurate information on vehicle registration and make/model details of all traffic entering the city.

The aggregation of the camera streams is provided by InfiNet Wireless's InfiMan 2x2 series of P2MP (Point to Multipoint) broadband wireless base-stations, offering unparalleled reliability and throughput to fully meet the needs of the bandwidth-hungry imaging network. Once data traffic is aggregated onto the microwave backhaul rings, it is then fed into the surveillance centre directly from the ring over a Free-Space Optic (FSO) link running at 1Gb/s, which is also fully protected through a 70GHz, 1Gb/s broadband wireless link.

The project is now fully operational, with just over half of the planned camera sites installed and functioning. Cameras are not only located at the roadside and in the town centre plazas but across and beyond the city, covering vulnerable areas such as childrens' playgrounds and parks as well as the obvious tourist and city centre locations. All vehicles entering the city are automatically identified and checked against the police vehicle database for links to crime (e.g. stolen vehicles), and the totality of the camera coverage has given the police the ability to spot offenders not only when committing crimes, but to also subsequently track them across the city in real time as they attempt to apprehend them.



Overall, the investment into the system by the local authorities in Kaposvár has run into the millions of Forints, but the investment in the technology is seen as a great success, not only in tracking and preventing criminal behaviour but also adding to overall security and 'feel-good' factor of the residents and visitors to Kaposvár, as well.