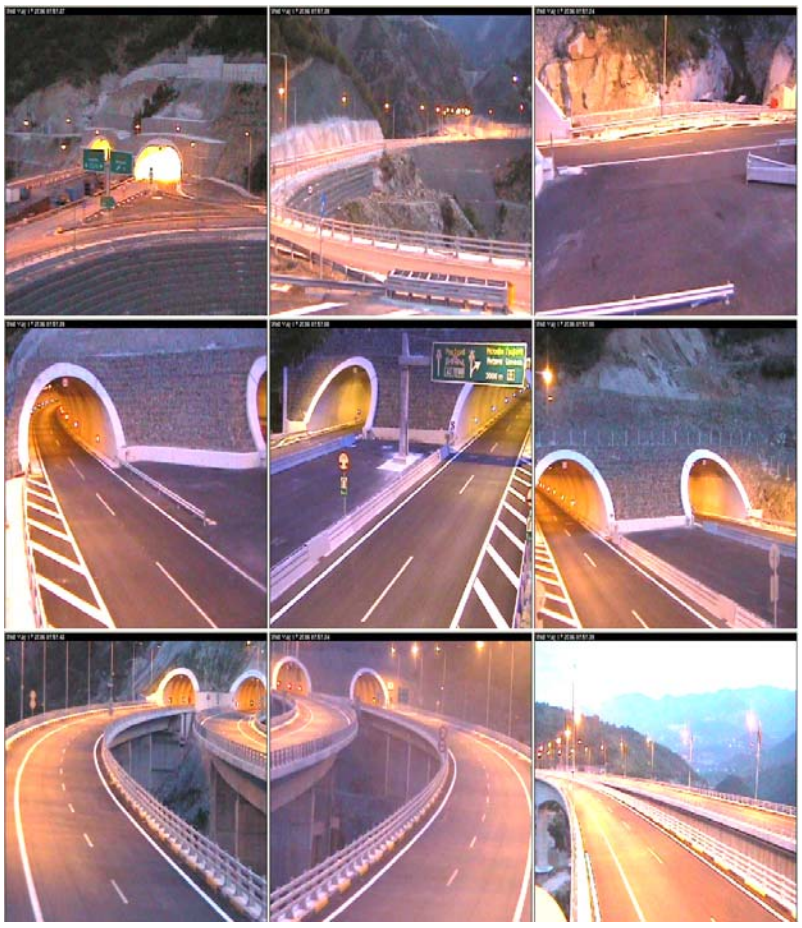
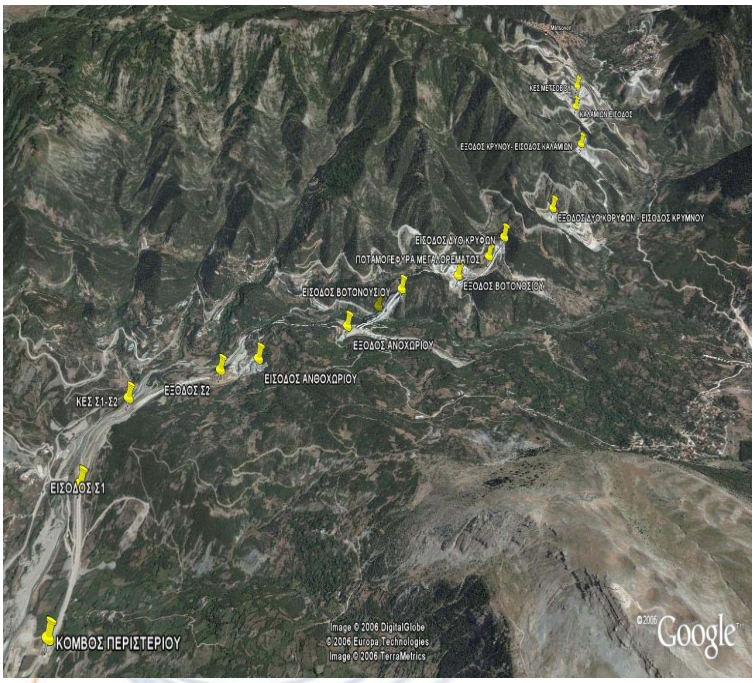
Roadside Surveillance Network



Tunnels in Metsovo region of Greece

Introduction

Egnatia Motorway is a modern, closed motorway 670 kilometres long and 24.5 metres wide over the greatest part of its length that runs across Epirus and Northern Greece from Igoumenitsa to Evros-Kipoi on the Turkish border (www.egnatia.gr/flash/en). The Egnatia Motorway is one of the largest road construction projects in Europe and it is of vital importance for the road links Greece with Europe in one direction and Asia in the other. The Egnatia Motorway has been designed to the specifications of the Trans-European road network.



Metsovo Region (Source: Google Maps)

Challenge

SAFENET SA won a contract to develop wireless traffic surveillance project of the Egnatia Motorway in the Metsovo region and Vayan Wireless undertook a study for the wireless network. The current described wireless network extends along nine km of the Egnatia Motorway, from the Metsovo interchange to the Peristeri interchange. Fourteen cameras were installed at the two interchanges, six tunnels and two bridges to monitor traffic flow and provide surveillance and security. Despite being only nine km in length, this route is characterized as being one of the most difficult and varied.

Solution

Wireless networking technology enables users to easily install and deploy network video products in areas where Ethernet cabling is not readily available, such as on bridges, in parking lots or across a multi-building site, enabling same day operation in most cases. In addition, transporting surveillance images is now possible for large areas, such as a high concentration of tunnels or mountains and allows quick deployment of an advanced IP-surveillance solution.

A complete study of the Egnatia wireless network was undertaken and in order to provide the best solution there were several factors which had to be considered, such as:

a. Point to multipoint topology could not be deployed due to the terrain. Point communication would be serial (cascade) with multiple point to point junctions. This means that the network load will gradually increase because of the cameras, peaking at the final point.

b. Thirteen junctions required installation along the length of the carriageway and six of them were out of visual contact because of tunnels and bends in the Egnatia Motorway.

c. The continuous functioning of the wireless equipment was a key requirement because of the adverse weather conditions which prevail in the area, such as continuous rainfall almost all year, very low temperatures, strong winds and a high snowfall during the winter.

d. The system output should not vary noticeably when large vehicles pass, especially between tunnels.

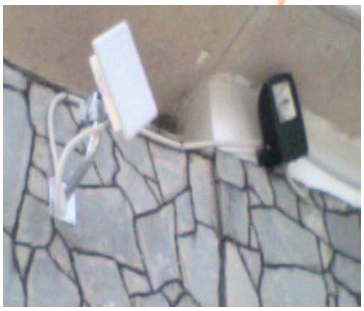
e. The wireless equipment should incorporate the most recent developments in the field of wireless data transfer and security.

In order to satisfy the key requirements mentioned above and provide a robust and secure video surveillance solution, Proxim's Tsunami MP.11 5054-R system was deployed. Not only does Proxim's Tsunami MP.11 5054-R address all the issues above, but these products can also be deployed in hours and days, not weeks.

Other important considerations for choosing Proxim's Tsunami MP.11 5054-R system were its high data throughput and rich security features using Wireless Outdoor Routing Protocol (WORP) that prevents snooping.

Solution Components

Proxim's Tsunami MP.11 product provided SAFENET SA & Vayan Wireless, a very cost effective, stable, reliable and easily manageable solution for their Egnatia motorway interchange with tunnels and bridges.



Tsunami MP.11 installed in the bridge

The project was successfully deployed, providing the region's control centre with full command over the fourteen Axis 213 PTZ cameras which were installed to monitor traffic flow. High bandwidth and low latencies of Tsunami MP.11 5054-R ensured high quality images. A complete solution enabling secure and remote management was thus deployed.

Proxim's Tsunami MP.11 units were mounted on poles along the Egnatia motorway from the Metsovo interchange to the Peristeri interchange. Specifically, major installations were done at::

Tsunami MP.11 mounted on poles

- Anthochori Twin-Bore tunnel, length 705 m each direction.
- Votonosi double bridge, (separate bridges for each carriageway) length 547 m each direction. This has one of the largest free-access (230 m) cantilever bridges in the world.
- Votonosi Twin-Bore tunnel, length 522 m each direction.
- Megalorema double bridge, (separate bridges for each carriageway) length 481 m each direction.
- Dio Korifon Twin-Bore tunnel, length 737 m each direction.
- Krimnos Twin-Bore tunnel, length 1082 m each direction.
- Kalamion Twin-Bore tunnel, length 839 m each direction.

Tsunami MP.11 installed on the bridge

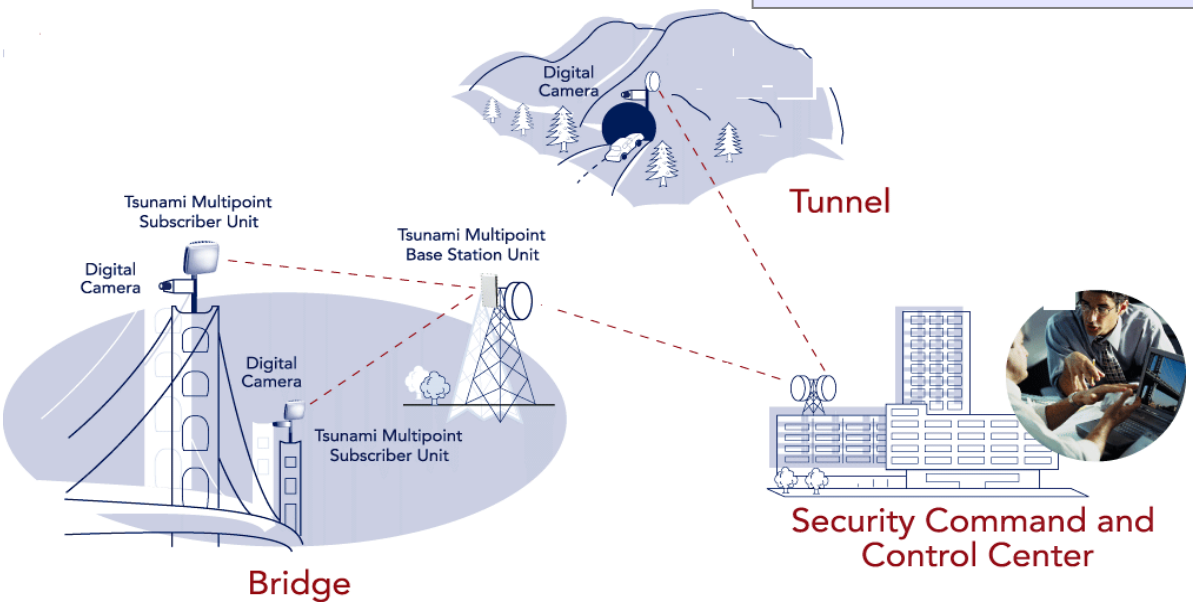
Proxim's Tsunami MP.11 Product Family

Proxim's Tsunami MP.11 is a secure, high performance OFDM (Orthogonal Frequency Division Multiplexing) broadband wireless solution enabling 54 Mbps connectivity. The MP.11 is ideal for data backhaul, last mile access, metropolitan area networking and security & surveillance. Tsunami MP.11 utilizes WORP (Wireless Outdoor Routing Protocol) for superior performance and scalability, access control and asymmetric bandwidth throttling.

Tsunami MP.11 networks dynamically adapt to the ever-changing network load for optimum performance. WORP adapts to avoid collisions and maximizes data content with each transmission. Dynamic data rate selection automatically compensates for temporary link degradation, maintaining robust connectivity and mitigating service calls.

Tsunami MP.11 5054-R Applications

- **Security and Surveillance:** Wireless solutions for bandwidth-intensive and high-definition IP-surveillance cameras located at important city and transportation infrastructure such as airports, bridges and trains
- **Emergency First Responders:** Critical information delivery such as medical data and video feeds during in-progress events
- **Enterprise Campus Connectivity:** Extend main network to remote branch offices, warehouses or other out buildings without leased line
- **Mobile Hot Spot:** On-demand entertainment and broadband access solutions for ferry, transit busses and railway system commuters
- **Business and Residential Last-Mile Access:** Competitive broadband service alternative to DSL or cable modems for residences and T1 or Ethernet for businesses
- **Metropolitan Area Networks:** Secure and reliable connectivity between city buildings



Schematic of Network Deployment

Security and Reliability

Tsunami MP.11 offers multiple security features that protect the operator. Tsunami MP.11 uses WORP, a unique proprietary protocol specifically designed for Proxim's Tsunami MP.11 systems that is very difficult to hack. This means that Wi-Fi systems, for example, cannot tap into the radio communication of the Tsunami MP.11 solutions.

Strong AES encryption and the WORP protocol assure data integrity and prevent intrusion from Wi-Fi systems. Additionally, all remote management methods are protected using passwords. Remote management is performed using the Command Line Interface (CLI), web interface and Simple Network Management Protocol (SNMP).

The overall performance or reliability of a communication system is predicted and verified in terms of its "availability." Proxim's Tsunami point to multipoint system offers 99.995% reliability. With this high level of availability, Tsunami system ensures transmission of real-time images without the dropped packets that could interrupt surveillance.

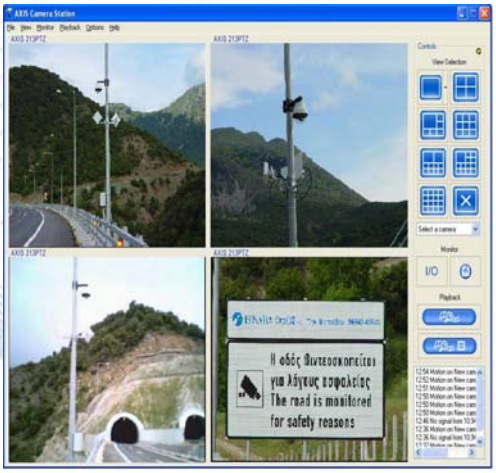
Monitoring using AXIS Camera

As mentioned earlier, adverse weather conditions which prevail in the Egnatia area were major concerns for this deployment.

Tsunami MP.11 systems are designed to perform in harsh outdoor environments. They are ideal for tough weather conditions and operate at temperatures between –33C to +60C degrees. Tsunami MP.11 offers high bandwidth up to 54 Mbps required for some video applications.

Axis Camera Station

The video system is handled with an AXIS Camera Station which is a comprehensive video management software that is specially designed for AXIS network cameras and video servers. From remote video monitoring and recording to advanced event man- agement, from superior image quality to effective evidence, AXIS Camera Station offers advanced capabilities for video surveillance needs.



Videos displayed by AXIS Cameras

Fourteen AXIS 213 PTZ cameras were installed to monitor the traffic flow. The AXIS 213 PTZ Network Camera enables advanced remote monitoring with pan, tilt and zoom through operator control from any PC connected to the local area network or the Internet.

AXIS 213 PTZ network cameras deliver video in both motion-JPEG and MPEG-4 compression formats, allowing optimized use of bandwidth. The cameras are equipped with a powerful 26x zoom and the capability to switch from day to night mode, ensuring high quality images at all times.

AXIS Camera Station installed on a Windows PC server, can monitor the cameras, and at the same time, record high quality, digital video either continuously or on schedule, alarm and/or motion detection. Digital recordings are saved directly onto the hard disk(s) of the local PC server running AXIS camera Station.

Summary

Using Proxim's Tsunami MP.11 system for high throughput, robust and cost effective wireless Wide Area Networking solution allows the security-conscious organization to economically deploy wireless wide-area security surveillance systems with very high levels of security and reliability. Deploying wireless solutions can save up to thousands of dollars since a wireless camera can be deployed virtually anywhere and without the costs associated with trenching for cables.

The Tsunami MP.11 systems can be set up within a few hours or days, allowing the system to be operational quickly. This would be either impossible or very cost-prohibitive with a comparable solution utilizing traditional, wired networking technology.

Background

Proxim Wireless Corporation is a wholly owned subsidiary of Terabeam, Inc. (NASDAQ: TRBM). Proxim Wireless is a global pioneer of end to end solutions for broadband wireless networks, with decades of experience in Wi-Fi® mesh, WiMAX, MeshMAX, Wi-Fi and Wireless backhaul. Our products are available through our extensive global channel network, backed by world-class support. Proxim is ISO-9001 certified. Information about Proxim and its products and support can be found at: www.proxim.com

SAFENET was founded in 1970 by Mr. K.Stamatiadis and it has developed through different corporal forms and co-operations into its present form under the trade name SAFENET N.K. STAMATIADIS TELECOMMUNICATIONS S.A. Being a pioneer in telephony networks, SAFENET extended its business in video surveillance and wireless networking. SAFENET has been involved in several major video surveillance and wireless project in Greece.

Vayan Wireless was founded in 2003 by a team of engineers with great experience in network design and implementation of wireless systems. Having a strong background in GSM network design, Vayan Wireless used this expertise in WiFi, mesh and Point to multipoint wireless networks, offering its services as a system integrator for wireless, VoIP and surveillance applications. Vayan Wireless is member of Proxim's extensive community of Wireless Partners.

Technical supervision of the project was done by Egnatia Odos S.A. – Operation Department – Electromechanical & Telematics Unit.

Proxim Corporation
2115 O'Nel Drive
San Jose, CA 95131

tel: 800.229.1630
tel: 408.731.2700
www.proxim.com