

Case Study: ALGOSYSTEMS

Systems Integrator Uses Ethernet Technologies to Help Maintain Greek Building, Highway, and Tunnel Infrastructure

Algosystems, SA was incorporated in Athens, Greece in 1986. With approximately 100 employees, the company has four divisions focused on IT, automation and control, research and development, and instrumentation calibration.

Much of Algosystems' business is centered on telecommunications and networking system integration, but the company also designs and deploys telematics, supervisory control and data acquisition (SCADA), and remote monitoring systems. In this capacity, ALGOSYSTEMS' expertise is in designing and implementing turnkey solutions and providing project management services from inception through commissioning. ALGOSYSTEMS also provides advanced customer training and ongoing after-sales hardware maintenance and software support.

ALGOSYSTEMS' more than 700 customers include numerous agencies of the Greek government, banks and other financial institutions, universities, public utilities, and transportation companies.

This diversified customer portfolio reflects ALGOSYSTEMS' versatility as a service provider and has allowed the company to play a key role in maintaining the buildings, highways and infrastructure of the Greek nation.

For example, ALGOSYSTEMS completed a comprehensive building automation project for the Greek Olympic Organizing Committee Complex (GOOCC.) Located in downtown Athens, the 34,000-square-meter complex includes seven buildings, which, among other things, housed the administration offices for the 2004 Athens Summer Olympic Games.

The project involved ALGOSYSTEMS' installation and automation of all of the GOOCC's building management systems, including the air conditioning, power distribution, and telephone data network. ALGOSYSTEMS accomplished this through the use of Opto 22 SNAP Ethernet-based controllers and SNAP B3000 Ethernet I/O systems.

The compactness and multiple serial port capabilities of the controller, combined with the analog, digital, and serial capabilities of the SNAP B3000, provided ALGOSYSTEMS with the flexibility it needed to connect to, monitor, and control all of the GOOCC's diverse building systems. Collectively, this involved more than 2500 I/O points.

"The B3000's Ethernet readiness was important because we were dealing with an office complex," says George Vagelatos, an engineer in the Automation and Controls Division of ALGOSYSTEMS. "In a setting like that, where an Ethernet network is already existing, it just makes sense to use it as the communications platform, as opposed to developing a more proprietary solution. It saves the customer a great deal of money, consolidates their resources, and speeds deployment."

Specifically, the critical GOOCC building and energy management systems being monitored and controlled by the Opto 22 hardware are medium & low voltage electrical distribution boards and components of the telephone data network. Also included: the Olympic Games' "ATHENS2004" Test Integration Laboratory, used for simulation of all IT network structures of the 2004 Olympic games. Sub-systems for this include air conditioning, power and low-voltage wiring, and network wiring—a total of more than 3000 I/O points.



A stretch of the Attiki Odos highway

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ALGOSYSTEMS was also enlisted to provide systems to help maintain a number of major highways in Greece. These include the Attiki Odos superhighway. Construction began on the highway in 1996, and it continues to expand to this day. Located in the Attiki region of Greece, the Attiki Odos highway is an approximately 70 km high-speed toll road that offers three traffic lanes and one emergency lane in both directions, 32 multi-level interchanges, dozens of tunnels, and hundreds of overpasses and underpasses. The highway connects more than 30 districts in the Attiki region and has successfully eased traffic congestion in the greater Athens area, particularly on the city's central arteries.

The Attiki Odos has more than 200 freestanding pillars that line the highway and house control panels for the road lighting. There are also 7 toll administration buildings, 41 power distribution substations, along with 11 pumping and drilling stations that bring underground water from the surrounding area to the surface for irrigation of the plant and tree life. All of these are controlled by a single unified Opto 22-based automation and supervisory control system located at a centralized traffic management operations center. Vagelatos says that more than 90 Opto 22 controllers are being used to monitor and control the building and energy management systems at the toll buildings, power equipment at the substations, and all of the more than 340 irrigation valves and pumps that deliver water to arid stretches of highway.

Additionally, Attiki Odos has some 25 tunnels that are monitored and controlled via the traffic management center. Each tunnel's high-pressure sodium lights and power distribution equipment, ventilating fans, video surveillance, and fiber optic-based fire detection systems are linked back to the Opto 22 controllers.



The Attiki Odos Traffic Management Operations Center

"The total number of I/O points in the Attiki Odos application numbers in the tens of thousands," explains Vagelatos. "For example, there are more than 200 lighting pillars, each with about 20 I/O points, and roughly 350 points in each of the 25 tunnels. This very high volume, plus the fact that there are so many remote locations and diverse electro-mechanical systems involved, is yet another reason that ALGOSYSTEMS chose Opto 22 hardware. The company's control system components are ideal for deployment in a distributed architecture, and the company is always developing new products—like a line of high-density I/O modules that are likely to prove invaluable as the Attiki Odos project continues to expand."

ALGOSYSTEMS has completed a similar project on Greece's Egnatia Odos Highway. First built by the ancient Romans, the Egnatia Odos, at nearly 900 km, is significantly longer than the Attiki Odos, cutting eastward across northern Greece from its starting point at Igoumenitsa to the village of Kipi on the Turkish border. The highway passes through the mountainous regions of Epirus and western Macedonia and therefore includes many bridges and tunnels.



Attiki Odos highway tunnels



Egnatia Odos highway tunnels are fully monitored by Opto 22 SNAP Ethernet Systems

Interestingly, fifty percent of the total €3.4 billion budget for construction of Egnatia Odos was set aside solely for these bridges and tunnels. Six of Egnatia Odos' two-lane, twin-tube tunnels are outfitted with automation and supervisory control systems from ALGOSYSTEMS. Opto 22 SNAP Ethernet systems are used to monitor and control operation of the tunnels' VOIP (voice-over-IP) emergency

phones. The Opto 22 systems also connect to and control tunnel lighting, power management, and HVAC systems. In the latter capacity, the SNAP Ethernet system performs advanced air quality sensing for CO₂, carbon monoxide, and other hazardous gases. By connecting these and other sensors to the SNAP system's analog input modules, operators can get real-time data on the health of the air in the tunnels. The Opto 22 systems also control the ventilation systems, which help maintain general air quality and extract smoke in the event of a fire.

"We've configured the Opto 22 systems to perform event-reactions," adds Vagelatos, "so that if, during the air quality monitoring, specific readings or thresholds are exceeded, the SNAP Ethernet [I/O units] will automatically activate the exhaust fans. And of course the system also allows operators to control the fans remotely."

Finally, ALGOSYSTEMS is using Opto 22 SNAP Ethernet systems to control operation of the Egnatia Odos tunnels' video surveillance cameras. These cameras span the entire length of each tunnel, providing images that indicate tunnel occupancy, accidents, vehicle breakdowns, etc. These cameras are connected to SNAP Ethernet systems via SNAP digital input and output modules. The input



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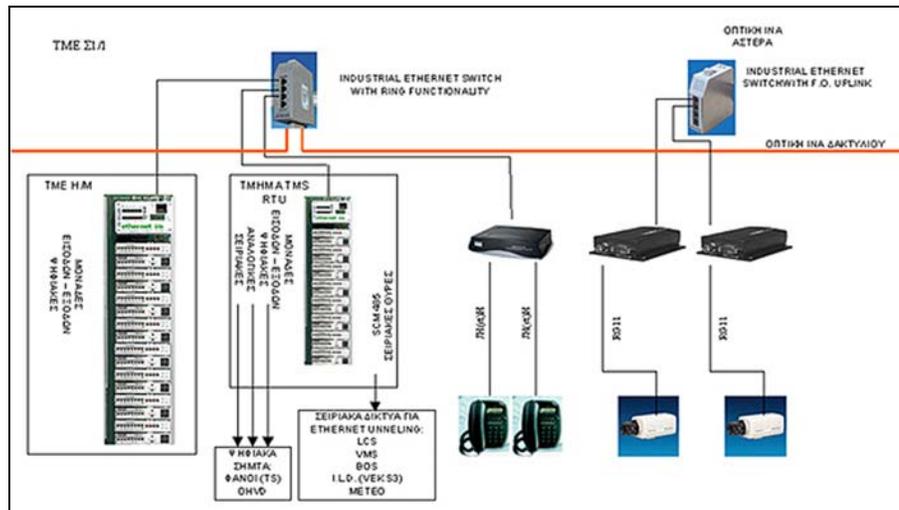
connections let operators know the individual cameras' on/off status, while the output connections enable on/off control. The I/O modules also feature manual/auto switches for local control and testing. Once again, SNAP Ethernet's IP capability is proving extremely valuable, as it allows all cameras to be linked backed to a video matrix console at a central operations center.

To support voice and video over IP, communication to more than 3000 I/O points, and other network traffic for the Egnatia Odos tunnels application, ALGOSYSTEMS designed and installed an extremely robust network architecture with a ring topology and dual backups.

"Besides being incredibly fast, this network has a very quick recovery rate—less than 500 ms—should there be a break or other interruption," says Vagelatos.

Both the Egnatia Odos and Attiki Odos are considered among the most modern and technologically advanced highways in all of Europe. It has been with the aid of ALGOSYSTEMS that these motorways have achieved these high standards, and in the process, helped Greece's infrastructure to become well respected and one to be emulated.

For more information on ALGOSYSTEMS, visit www.algosystems.gr



Part of the Egnatia Odos highway's network infrastructure

About Opto 22

Opto 22 manufactures and develops hardware and software products for applications in industrial automation, remote monitoring, and enterprise data acquisition.

Using standard, commercially available Internet, networking, and computer technologies, Opto 22's SNAP systems allow customers to monitor, control, and acquire data from all of the mechanical, electrical, or electronic assets that are key to their business operations.

Opto 22's products and services support automation end users, OEMs, and information technology and operations personnel. Founded in 1974 and with over 85 million Opto 22-connected devices deployed worldwide, the company has an established reputation for quality and reliability. Opto 22 products are sold through a worldwide network of distributors, partners, and system integrators. For more information, contact Opto 22 headquarters at 800-321-OPTO or visit our website at www.opto22.com.