Powerwave | Case Study

Olympic Athletic Center of Athens

COVERAGE SYSTEMS

Distributed Antenna Systems and the Evolution of Wireless Network Architectures

Reduce Initial Investment & Lifetime Costs | Simple to Complex Environments | Speedy Implementation

Challenge
Provide both indoor and outdoor wireless coverage for multiple locations within the center, taking into account issues with limited space for equipment, aesthetics and obstructions.

Solution
The Powerwave fiber optic DAS (FODAS) solution overcame installation challenges as well as addressing RF attenuation issues caused by the extreme distance of the actual equipment room located on the outside of the complex.

Result
Centrally located base station equipment, trunking gain more easily achieved at the central site, dynamically allocated and optimized capacity for varying traffic needs and multiple operator network sharing.

Athletic Center

This year at the 2004 Summer Olympics, Vodaphone and TIM were selected to provide wireless coverage and capacity with 2G and 3G networks for the Olympic Athletic Center of Athens, also known as OAKA by its Greek letter acronym. Network sharing was mandated by the authorities for the most part, as was equipment location, antenna type, and the required guarantee of service (GoS) for the busiest quarter hour. Additionally, network installation and optimization had to occur within very tight time requirements due to construction delays.

The Olympic Center included both indoor and outdoor wireless coverage environments. The main stadium, the basketball court, and the aquatics center required a system that addressed interior coverage along with issues such as limited space for equipment, aesthetics and obstructions, not to mention difficult installation in respect to historical landmark restrictions. The tennis courts and the Velodrome called for a system designed to meet the unique challenges presented for outdoor coverage enhancement. The Powerwave fiber optic DAS (FODAS) solution fulfilled these requirements by overcoming additional installation challenges, such as pre-determined antenna locations and mast-pole heights dictated by the Olympic Center authorities. Ongoing system maintenance and remote monitoring was offered via OMSSM software already in place in both of the wireless network operators' existing networks. Plural SA of Athens installed the system and provided the ongoing system support throughout the duration of the events. The OMS support center was located in the Plural facility in Athens, and on-site support was supplied by Powerwave and Plural engineers.

The FODAS system was based upon proven fiber optic and amplifier technology and effectively addressed RF attenuation issues caused by the extreme distance posed by the equipment room placement on the outside perimeter of the Olympic complex. In addition, it provided a co-located, shared network that the two wireless network operators controlled independently.

- **Multi-operator GSM/DCS sites: 45**
- **Multi-operator UMTS sites: 15**
- **No of Repeaters: 108**
  - **18 GSM Cha. Selective**
  - **81 Dual band/Single band GSM/DCS Selective**
  - **9 UMTS**
- **No of TRx GSM/DCS 480**
- **No of TRx UMTS: 44**
- **No of Antennas: 67**
- **No of GSM/DCS BTSs 40**
- **No of UMTS Node Bs 8**

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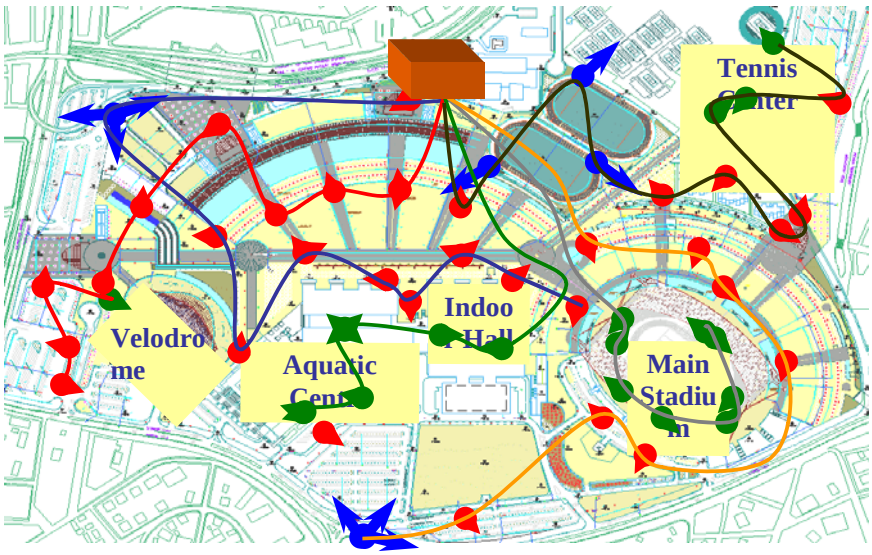
Powerwave's Coverage System Innovations Team are a team of RF-and system engineers within Powerwave who manage, or assist you in, your projects for cellular coverage worldwide.

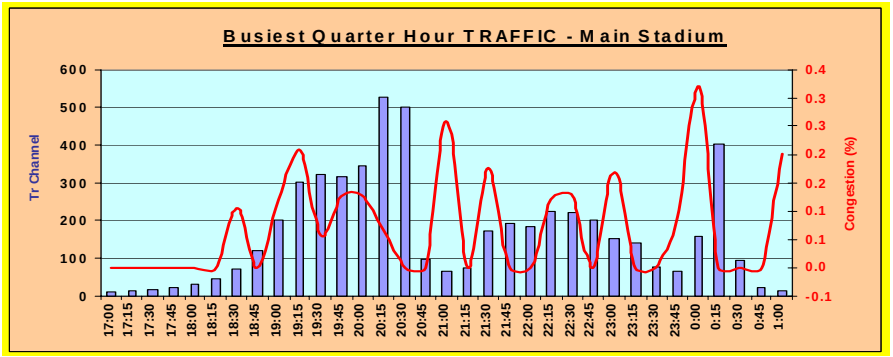
Increasing complexity of wireless systems today combines with regulatory restrictions and a variety of practical considerations to demand comprehensive experience and know-how for cost-efficient cellular coverage solutions. Based on Powerwave's outstanding track record of customer projects completed, and on our extensive experience and know-how in quality wireless communications, Powerwave offers novel solutions that are carefully tailored to your specific needs.

The system was interconnected using six fiber optic runs. The indicated blue markers are the outdoor "Microcell" locations (shown above) where antenna size and positioning was not as challenging as the indoor "Picocell" locations, where lower gain antennas were mandated.

The system was busiest on August 13th from 5 PM to 1 AM when there were 172,700 call completions. The dropped call rate was 0.39%, much better than the 1% measured in the center of Athens.

More significantly, the congestion level of the system during this period was 0.05%, which in effect is equivalent to landline quality! Beyond voice, the system handled approximately 47.6 and 28.4 Gbytes of data on the Uplink (users to system) and downlink (system to users) daily. Overall, the outstanding successful implementation of the FODAS system provides a model for future network deployments that satisfy stringent CAPEX/OPEX requirements and quality of service needs.





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