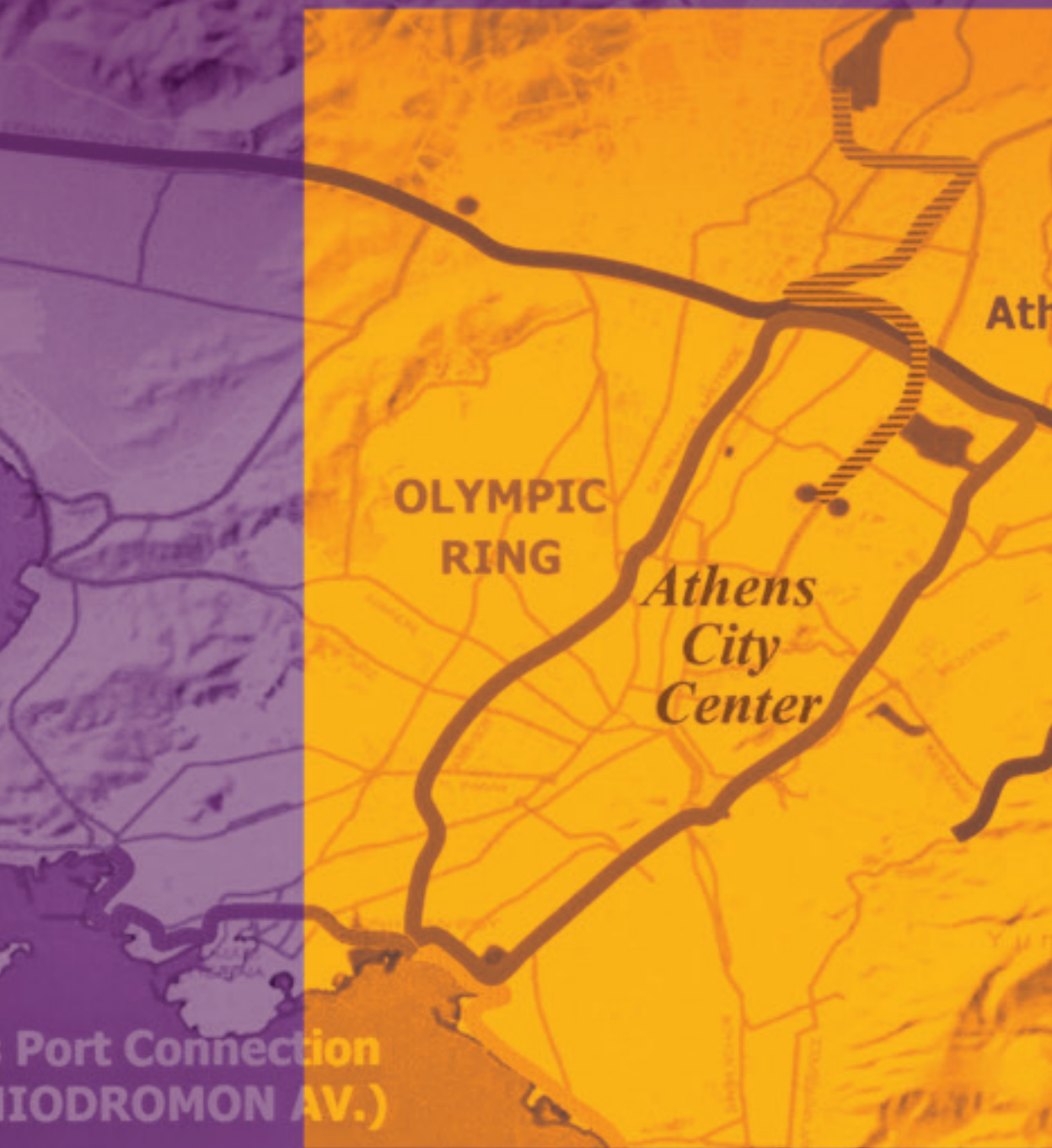


AOSC connection to OL. VII
(KIMIS AV.)



Port Connection
(IODROMON AV.)

Coastal Avenue

Addressing Olympic-Style Congestion in Athens

By Bill Halkias, Frank Thibaut and Dimitri Mandalozis

The return of the Olympic Games to Athens, Greece, in August 2004 was a historic event whose multiple activities and accompanying ceremony were highly anticipated months before. To ensure that everything would go smoothly for the two weeks of the Games, traffic in and around the city would have to move freely, with roads able to handle Olympic Family and spectator vehicles without embarrassing delays. To say the least, the challenge was set, but the city was prepared to meet it, with the opening just two months before of the last section of the new Attiki Odos Motorway.

The Backbone of Athens

Attiki Odos is a modern, 65-kilometer, fully access-controlled motorway constituting a ring road around Athens. It crosses through the Greek capital's northern suburbs and consists of two perpendicular sections forming a "T." The motorway, which was constructed on a concessionary basis, constitutes the largest co-financed road project in Greece and one of the largest in Europe. The concessionaire company Attiki Odos S.A., formed in 1996 by 14 of Greece's largest construction companies, co-financed the motorway with the Greek state and undertook the enormous task of designing, building, and operating the road.

The motorway opened to traffic in four stages, with the first section debuting in March 2001 and the last in June 2004. During the 2004 Olympic Games, the motorway (also known as Athens Peripherique or Attica



Figure 1 *The Kifisias Interchange*

Tollway) became the backbone of Athens's road network, a role it will continue to play in the years ahead.

Attiki Odos is directionally separated, with each direction comprising three lanes and an emergency lane (hard shoulder). Acceleration and deceleration lanes are provided at all motorway entrances and exits (see Figure 1), and the entry to the motorway is fully controlled by toll barriers (see Figure 2). With the exception of the entry toll plazas located at the motorway's extremities, all toll plazas are located at the side entry ramps to promote uninterrupted traffic flow and queue-free vehicle movement. Thus, drivers pay the toll only once, upon their entry to the road, with the fare being the same for all entry points.



Figure 2 *The Katechaki Toll Super Plaza*

The flat-fee and open-toll regime has been the Metropolitan Athens Region Planning Agency's principal means of securing the free-way role assigned to the Attiki Odos Motorway since the conceptual stages of the road's design in the 1960s. By ensuring free-flow operating conditions, the motorway offers a moving-traffic alternative around Athens's extensive metropolitan area while forming the foundation of the entire road network in the Attica region, which comprises greater Athens. The flat-toll fare deters users from making short-distance trips, thus relieving traffic congestion throughout the region as the road absorbs a significant percentage of the city's long-distance traffic.

Attiki Odos facilitates speedy connections between 30 municipalities in the greater Athens area, tying together all the major transportation means and infrastructure in Attica: Athens International Airport; metro, suburban, and railway stations; ports; major Olympic venues; and the two national roads (traveling toward the north and south mainland). The project's completion two months prior to the 2004 Olympic Games facilitated the major link for the majority of the Olympic venues (see Figure 3).

A Tall Order

The Olympics presented Attikes Diadromes (AD), the motorway's operating agency, with a once-in-a-lifetime challenge of maintaining efficient traffic management during the Games. The opening of Attiki Odos's last section only two months prior to the Games made that challenge even more complex.



Figure 3 Olympic Ring Transport Project

The Olympics presented Attikes Diadromes, the motorway's operating agency, with a once-in-a-lifetime challenge of maintaining efficient traffic management during the Games. The opening of Attiki Odos's last section only two months prior to the Games made that challenge even more complex.



Figure 4 *Imittos Western Peripheral Motorway*

The scale of the Attiki Odos project is best illustrated by the numbers involved: 39 toll stations totaling 195 toll lanes, 24 grade-separated interchanges, 100 overpasses, 25 underpasses, 38 railroad bridges, 12 pedestrian bridges, 4 major motorist service stations, and 9 customer service centers. Last but not least, 56 tunnels and cut-and-cover sections (a method of construction for shallow tunnels in which a trench is excavated and roofed over) 15.36 kilometers in length cover about 12 percent of the motorway (see Figure 4).

AD is in charge of the motorway's traffic management, road maintenance, and toll collection. The agency operates from a modern traffic management center (TMC) that coordinates all actions necessary to locate and deal with any kind of traffic incident. The TMC operates 24 hours a day, seven

days a week, and is equipped with an emergency telephone line. In addition, several maintenance units that house intervention units are spread out on the motorway. The latter patrol the motorway 24 hours a day to prevent and handle incidents. As a result, Attiki Odos can offer road assistance and quick and efficient intervention at all times, by trained personnel, free of charge.

The Olympic Games Traffic Scheme

The 2004 Olympic Games, held August 13–29, were the first summer Olympic Games of the post-9/11 era. Security, therefore, was obviously the most important issue and the primary challenge for the organizers as well as a major headache for the international community. Beyond that, the Athens Games broke many records, including hosting 11,099 athletes, the

largest number ever, and 202 participating countries, more than in any other worldwide sporting event. The Olympic flame traveled for the first time to all continents, and four billion viewers watched the Games all around the world.¹ All of these factors were of major concern to AD's road and traffic engineers and operational units, who prepared for the Games not only on the basis of figures and statistics but also on the basis of having the "world watching" and ready to criticize any level of traffic-related service that was "less than perfect."



Figure 5 Attiki Odos Motorway: The Link to the Olympic Complex³

Preparation for the Games had started well over 12 months prior to their start. During this time, AD personnel sought from authorities and the Athens Olympic Committee information, data, and solutions to help with the traffic management scheme that would be needed for the event. The Games would comprise 41 competition venues spread out from each other and from the Olympic Village within the greater Athens area (see Figure 5). Only four competition venues would be located in other cities. The Attiki Odos Motorway would serve as the link between the Olympic complexes.

About four million vehicles would need quick access to the area road network during the Games, with 3,581,080 million tickets to be distributed. About 200,000 people would be accredited and involved in the event, 78,000 of whom would be members of the Official Olympic Family, which consisted of athletes, team officials, VIPs, technical officers, sponsors, and accredited media.²

Central responsibility for and control of Olympic transportation was assigned to the Regional Traffic Monitoring & Control Center, which was under the supervision of the traffic police. The Olympic Games transportation concept was based on the creation of an Olympic Ring Road

¹Athens 2004 Web site, www.athens2004.gr.

²Ibid.

³Map and official logos have been downloaded from Athens 2004 website, www.athens2004.gr

Network (ORRN) in which Olympic Family fleet vehicles and a limited number of specially authorized vehicles, all exclusively marked by boards placed on their windshields, would have priority traveling to restricted “Olympic Lanes” in selected city and peripheral roads. Persuading spectators, volunteers, and commuters to use public transportation and abstain from using private vehicles was of major importance. To encourage such usage, the Greek state took measures to improve and strengthen all available public transportation means.

Heavy-goods vehicles were allowed to drive along the ORRN and to roads inside the ring only between certain hours. Attiki Odos was the most critical part of the ORRN and the only road not implementing the reserved dedicated Olympic Lane scheme. Instead, all lanes were to be free for all users, and the authorities requested that AD set in place a very active traffic management scheme to maintain order.



Figure 6 Attiki Odos Motorway: Preparing for the Games

AD's role was to plan and organize the motorway's traffic management to achieve a high standard of service and ensure quick and safe access to the Olympic venues. As part of this effort, AD created the Olympic Traffic Management Plan, which called for all Athens Olympic Committee member vehicles (those of the athletes and team officials, technical officials, media, sponsors, members of international and national Olympic committees and international federations, and so on) to use Attiki Odos.

The management plan proved successful in curbing traffic demand, as the 320,000 average daily spectators and the 80,000 average daily workers and volunteers mostly used public transportation during the Games. Many public vehicles, such as vans and buses, used the motorway, especially during peak hours, as 45 percent of the daily workforce and volunteers arrived at the Olympic venue sites before 8:00 a.m.

Planning and Preparation

The most vital part of running the transportation of an event such as the Olympics is preparation (see Figure 6). Understandably, there's no room for error after the Games have begun. At that point, millions of people are set in motion and nothing can be changed or delayed to cover any mistakes.

AD's preparation for the Games started, as mentioned above, almost a year in advance, mostly through cooperation and negotiation with local public service authorities, ministries, and other entities, including the following:

- The Ministry of Foreign Affairs, on managing the mass passage of VIPs and heads of state.
- The Motorway Traffic Police, on securing the passage of convoys through the toll station service lanes, achieved with uniformed officers standing by and managing VIP toll passage daily between 6:00 a.m. and midnight at the Olympic Toll Stations. This enabled the parties

The Olympic Games transportation concept was based on the creation of an Olympic Ring Road Network (ORRN) in which Olympic Family fleet vehicles and a limited number of specially authorized vehicles, all exclusively marked by boards placed on their windshields, would have priority traveling to restricted "Olympic Lanes" in selected city and peripheral roads.

involved to manage certain incidents more quickly and efficiently, as AD personnel's confidence levels increased by sharing this responsibility with the traffic police.

- The City of Athens, on traffic coordination issues.
- The Athens Organizing Committee (ATHOC), on opening special temporary prepaid ETC (electronic toll collection) accounts to facilitate quick passage of the Olympic Vehicles Fleet from the toll stations. The temporary accounts, for which 6,000 electronic devices were issued, 2,000 of them to buses, were opened in June and closed in September 2004. Large companies supporting, sponsoring, or covering the Games (such as General Electric, NBC, and France 2-3) also opened the special ETC accounts.

The most critical preparation issue was the Olympic Lane concept within the motorway, which also became the most sensitive issue AD had to discuss with the ministries, the traffic police, and ATHOC. Olympic Lane advocates were seeking fast, undisturbed, priority flow for ATHOC and VIP vehicles by having the left lane on the Olympic Ring roads reserved for the exclusive use of VIP and Olympic Family members. AD management and traffic engineering staff, however, were convinced such a system would cause problems in cases of incidents, accidents, and vehicle breakdowns. AD argued that the numerous toll entries and exits along the motorway would create serious flow discontinuity and transportation obstacles, leading to congestion during an accident and causing a security breach. This was especially problematic, because the strict security measures implemented at the Games would prevent Olympic Family vehicles (light vehicles and buses) from stopping during their journeys, as drivers had to strictly respect the travel times allotted for each trip.

AD took it upon itself to solve the problem by managing flow and diverting all Olympic Family vehicles through reserved ETC lanes. Since ETC crossing is prohibited for vehicles more than 2.7 meters high, removing the physical height barrier (see Figure 7) and agreeing with ATHOC to allow its buses to pass through the ETC lanes throughout the Games was the key to success. Nonetheless, the passage of Olympic Family vehicles during the opening and closing ceremonies created a challenge, because 450 to 500 vehicles traveling together as a convoy had to be moved through a single toll station in order for them to travel to the Olympic Stadium from the Olympic Village and back.



Figure 7 Removal of Height Barriers from ETC Lanes



To maintain the required travel times, AD organized convoy formations in restricted time schedules to allow vehicles to pass without any disturbance. Simultaneously, an incident-response team was standing by in case needed. In anticipation of higher ETC traffic, at all critical toll stations AD converted manual lanes to mixed lanes in advance, thereby permitting operation in both manual (through toll collectors) and automatic (through ETC) modes.

Recruitment and Training of Additional Staff

Lifting the ETC-lane height barriers to accommodate ATHOC buses led to additional control and surveillance needs, to ensure that only those buses would pass through the ETC lanes and that the incident-response team would be able to respond immediately to any incidents during such passage. AD hired and trained 200 more people to reinforce the approximately 850 already employed on a regular basis. Of these 200, 120 were recruited to support toll operations at the toll stations where Olympic traffic was

expected to pass, 30 were employed as vehicle patrols, and 50 worked as ETC lane officers controlling ATHOC bus passage and addressing special issues generated by Olympic Family vehicles.

The recruitment and selection process for the new hires started five months prior to the Games to allow for thorough training. In addition, AD's regular staff agreed to and complied with an "Alert on Duty Program," which imposed on them, among other regulations, extra shifts and duties, overtime, and no holiday breaks until the end of the Paralympic Games in mid-September 2004.

Crisis Management

AD's traffic planning and operation group prepared to face potential crises at the Games by undergoing crisis management training. All management team members participated in the courses and learned how to respond to several scenarios, including possible terrorist assaults on buses at toll stations and on metro and suburban trains traveling along tracks near the motorway. The scenarios even addressed the possible closure of the motorway, especially on crucial days such as August 20, when 25 of 30 Olympic venues would be hosting events.

The crisis management training led to initiatives for tighter cooperation and coordination with traffic police and fire brigade officials, who shared with AD management their knowledge about how to prepare for and handle crisis situations. In that respect, AD's Alert on Duty Program extended beyond alerting only AD staff for 24/7 surveillance to invite police officers, as well, to partake in round-the-clock shifts in the Traffic Monitoring & Control Center, which was linked to communicate with the Regional Traffic Monitoring & Control Center of Athens. This allowed for better coordination with other outside agencies and increased staff readiness. Moreover, under the program, all managers were present on site every day from 6:00 a.m. to 2:00 a.m. the next day, as activities such as road and toll-area cleaning were conducted more often than usual during the Games and strictly at night. For further support, the call center and help line operated daily from 6:00 a.m. to midnight for both Greek and foreign users.



Figure 8 Orange Olympic Signage

Agreements with External or Special Entities

In planning for the Games, AD encountered several other coordination and cooperation challenges in addition to those described above. The demand, for example, for free and priority passage for the NATO team, which was brought over to handle any chemical terrorist attack, required a liaison with the military. Additionally, the anticipated high number of foreign visitors who would be renting cars and possibly need assistance led to planning and cooperation with car rental companies at Athens International Airport.

Because the motorway installations (including the toll stations, tunnels under the toll platform, technical buildings, entrance and exit ramps, and the tops of cut-and-covers) and road infrastructure were critical to security, an expert security team carried out advanced surveys of the motorway to determine what additional measures might be needed. The team's suggestions included installing fences around each technical building on the motorway, placing additional staff in some of those buildings, installing access-control systems in every building at AD's headquarters, and organizing security patrols to patrol remaining key locations, all of which AD implemented.

Guiding foreign drivers to their destinations was of particular concern. Special orange Olympic signage was installed to help drivers, both Greek and foreign, find their way to the Olympic venues. Maps of the motorway and the entire area, with all Olympic venues indicated, were prepared in English and distributed from all toll stations and customer service centers.

Lastly, the motorway had to be decorated with Athens 2004 Olympic banners and insignia. This demanded careful attention and coordination to determine the proper positioning of the banners, as incorrectly installed signs could pose a potential traffic hazard.

During the Games, 10,000 to 15,000 Olympic vehicles passed through the ETC lanes, increasing the average percentage of ETC transactions for that period to 45 percent compared with the usual 25 percent before the Games.

The Results

Judging by the results, all the advanced preparation for the Games worked. Everyone involved gave his or her best effort and followed the recommended steps. Consequently, no serious incidents or crises occurred. To help keep matters under control, AD management team meetings were held daily at 2:00 p.m. to focus on the status of real versus anticipated traffic conditions and to set priorities for the next day.

From August 10 to August 31, as part of the Alert on Duty Program, a traffic police officer was present daily in the motorway's traffic management center, and ongoing communications were established with the Athens Police Traffic Center. The additional AD staff who were placed in several positions helped greatly, while the special orange Olympic signs, the operation of the telephone call center, and the maps for spectators and athletes all were a success.

The management of traffic, the coordination between all involved agencies, the coordinated implementation of Olympic action plans, and the management of unscheduled incidents affecting traffic were performed excellently, with no serious consequences from traffic incidents. The special ETC passage of ATHOC vehicles, along with the decision to eliminate the height restriction in ETC lanes and the effective management of convoy traffic during the opening and closing Olympic ceremonies, marked another success. During the Games, 10,000 to 15,000 Olympic vehicles passed through the ETC lanes, increasing the average percentage of ETC

transactions for that period to 45 percent compared with the usual 25 percent before the Games.

Post-Games Evaluation

AD felt that conducting a post-event evaluation of the entire Olympic Games traffic program was vital. In the end, we found that negotiations, cooperation, and daily meetings with other involved agencies and the Alert on Duty Program gave AD staff members the confidence to accomplish their tasks. We also found the procedure for securing VIP passage and traffic police at the toll stations so effective that we adopted it permanently. Allowing the use of mixed lanes during the Games as well relieved manual lanes of queuing and helped accelerate and secure the passage of ATHOC vehicles through the toll stations.

In conclusion, the staff of AD, including managers and employees, with the aid and support of external and special entities, succeeded in overcoming the difficulties of hosting such a major global event as the Olympics. Had medals for performance in traffic management been handed out, surely AD would have won gold for the manner in which it handled traffic while preventing any inconvenience to travelers.

The experience of managing traffic for such an important international event can only significantly strengthen any operating agency, as it most certainly did Attikes Diadromes. Truly, the unique knowledge we gained is an invaluable asset.

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