

# ASECAP Road Safety Conference

## Attica Tollway – How to retain a safe road environment in a busy urban motorway

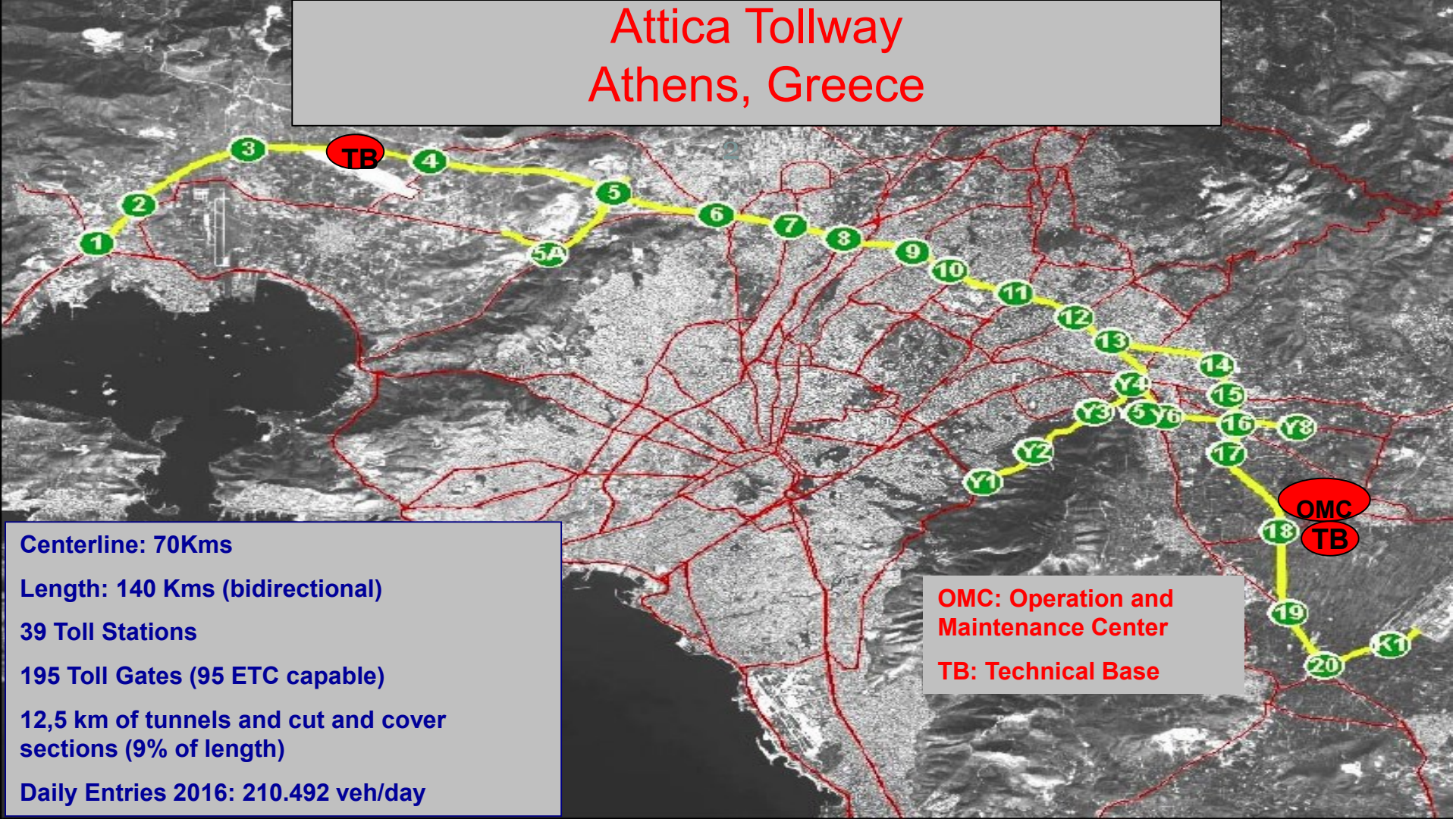
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# Attica Tollway Athens, Greece



Centerline: 70Kms

Length: 140 Kms (bidirectional)

39 Toll Stations

195 Toll Gates (95 ETC capable)

12,5 km of tunnels and cut and cover sections (9% of length)

Daily Entries 2016: 210.492 veh/day

OMC: Operation and  
Maintenance Center

TB: Technical Base





# Operational characteristics

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- Urban tollway. “Flat & open” toll system (manual & ETC)
- High traffic volumes, nearly at capacity levels during peak hours
- High speeds, frequently above limits, risky driver behaviour
- A “rich project” regarding infrastructure & equipment. Heavy workload for preventive & corrective maintenance.
- Suburban railway in the median. Interface & co-ordination needed for both operation & maintenance activities.
- High traffic volumes leave limited time windows for maintenance.
- Strict contractual obligations regarding response times (on accidents or damages & equipment failures) – response in 10’ after accident detection

**Road worker safety is always our first priority**



# Equipment

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- 22.000 lights (7.000 in open road + 15.000 in tunnels)
- 300 jet fans in tunnels
- 200 cameras for traffic + 200 for toll operations
- 100 Variable Message Signs
- 600 traffic counting stations (inductive loops)
- 600 Emergency Roadside Telephones
- 40 pumping stations for irrigation & fire protection
- 40 power stations (medium + low voltage)

# Attikes Diadromes: The O&M company

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- Concession contract up to 2024 under supervision of the Greek state
- O&M contract between Concessionaire & Operator
- Approx. 1000 employees (tolls / traffic / maintenance / administration)
- Approx. 250 employees working on traffic & maintenance
- A) Traffic Management
  - Incident Management
  - Control and observation of traffic operation
  - Management of planned events
- B) Maintenance (E&EM and Civil Works)
  - Preventive (periodic)
  - Corrective (damages + failures)
  - Inspections
  - Proposals for improvement and heavy maintenance

# Monitoring the Road

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## State-of-the-Art Traffic Management Center (TMC) that controls Operations

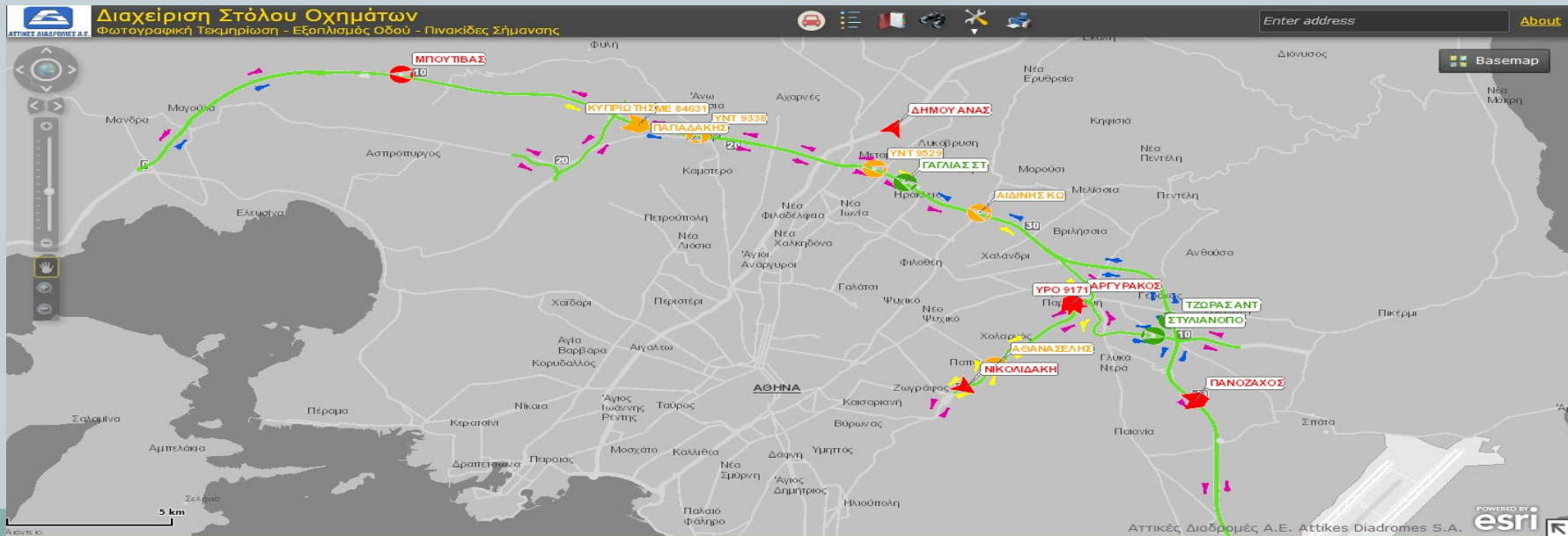
- Through CCTV
- Through patrol vehicles
- Through inductive loops detectors



# Driver & Vehicle Monitoring

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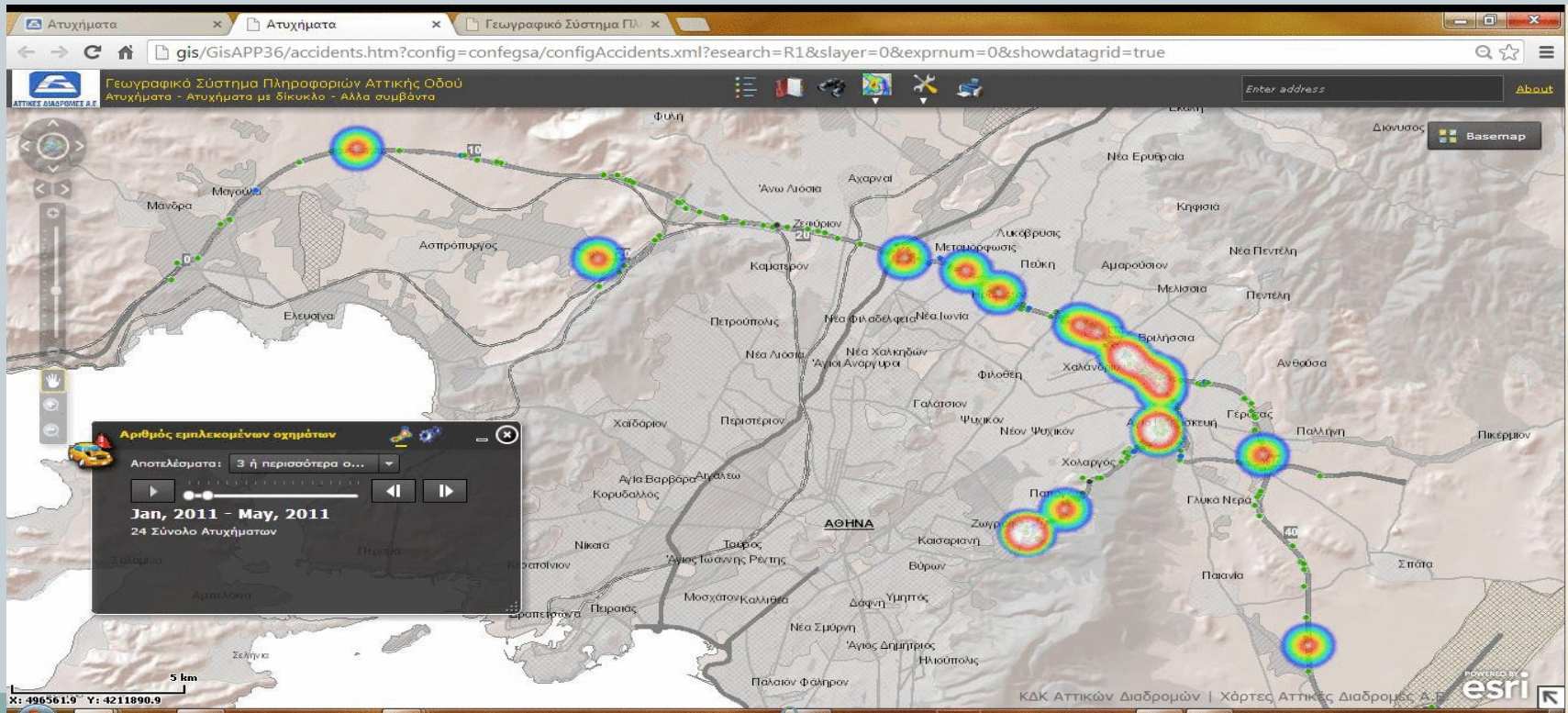
- Info on vehicle condition from CAN-bus (speed, temperature, engine condition etc.)
- Info on driver performance (over speeding, aggressive driving etc.)
- Database on GIS, accessible over the web





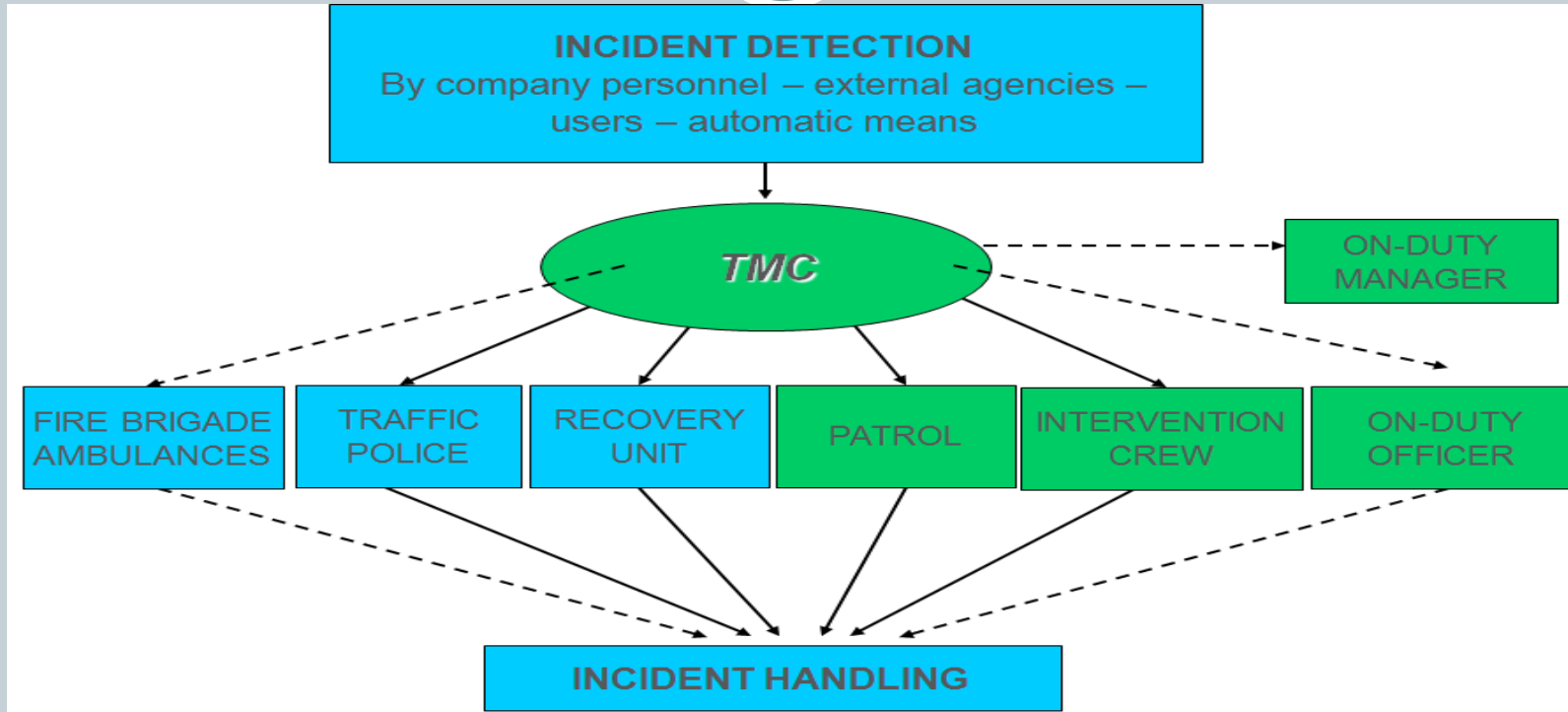
# Black spot analysis with GIS

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# Co-operation for Incident Management

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# Patrol & Maintenance crews: Duties

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- Patrolling on the road
- Maintenance works & temporary signage installation
- Detect and report to the TMC Operator any event detected on the motorway that endangers the safety of motorists
- Remove debris/obstacles detected on the carriageway
- Provide assistance to users with broken down vehicle
- Protect and sign the site of the incident to avoid further incident or secondary accident,
- Provide assistance to the Other Emergency Services (Police, Fire Brigade, Ambulance)
- Perform Inspections, detect, report to the TMC damages or anomalies on road infrastructure, furniture and equipment and provide, if possible, the first level repair actions

**First Priority: their own safety**



# Variety of incidents

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# Key figures 2016

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Traffic increase 4,3% compared to 2015

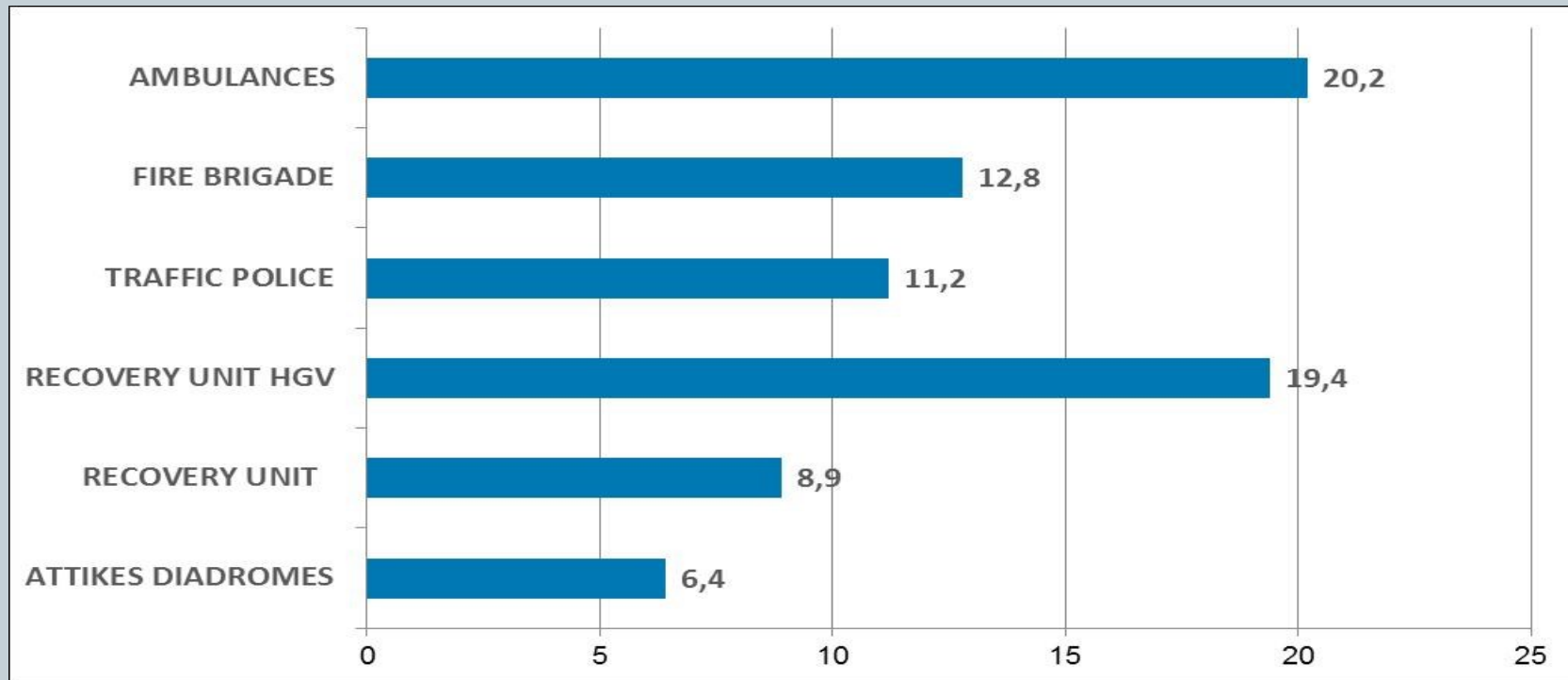
Traffic reduction 31% compared to 2009

- A total of 3.800.000 veh-kms travelled for patrolling
- Intervention in 22.124 incidents (average of 60 per day)
- Response time: 6,4 minutes on average
- Vehicle breakdowns 70% of total incidents (15.365 incidents)
  - ✦ Mechanical failure: 10.370 incidents
  - ✦ Flat tire: 3.056 incidents
  - ✦ Fuel: 1.939 incidents
- Accidents: 557 with damages only, 25 with injury, 2 fatal
- Debris: 2.842 obstacles collected
- Moving hazards: Mostly stray dogs (total of 660 cases) collected

**Traffic police involved only in 1.159 out of 22.124 incidents (5% of total incidents)**

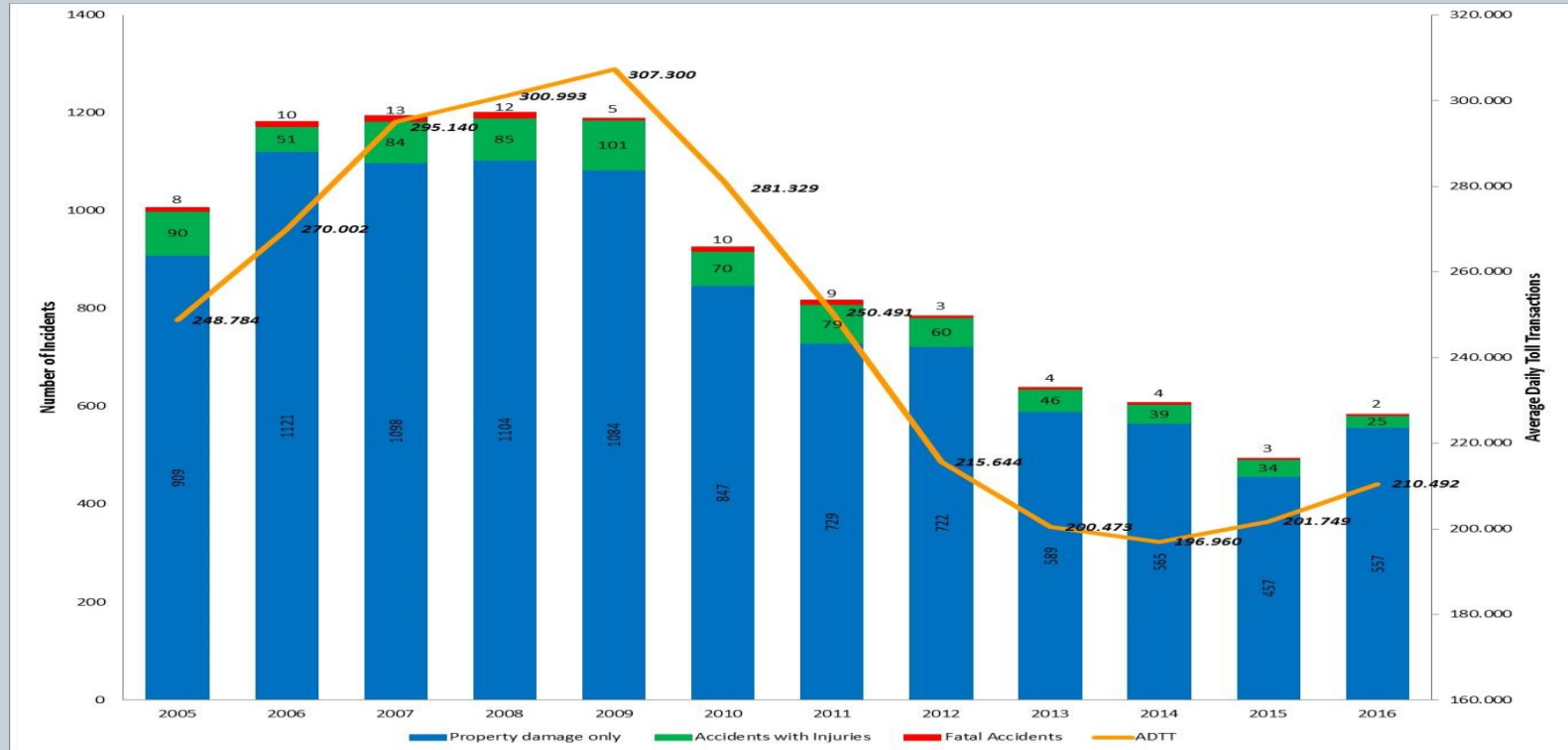
# Response Time (minutes) 2016

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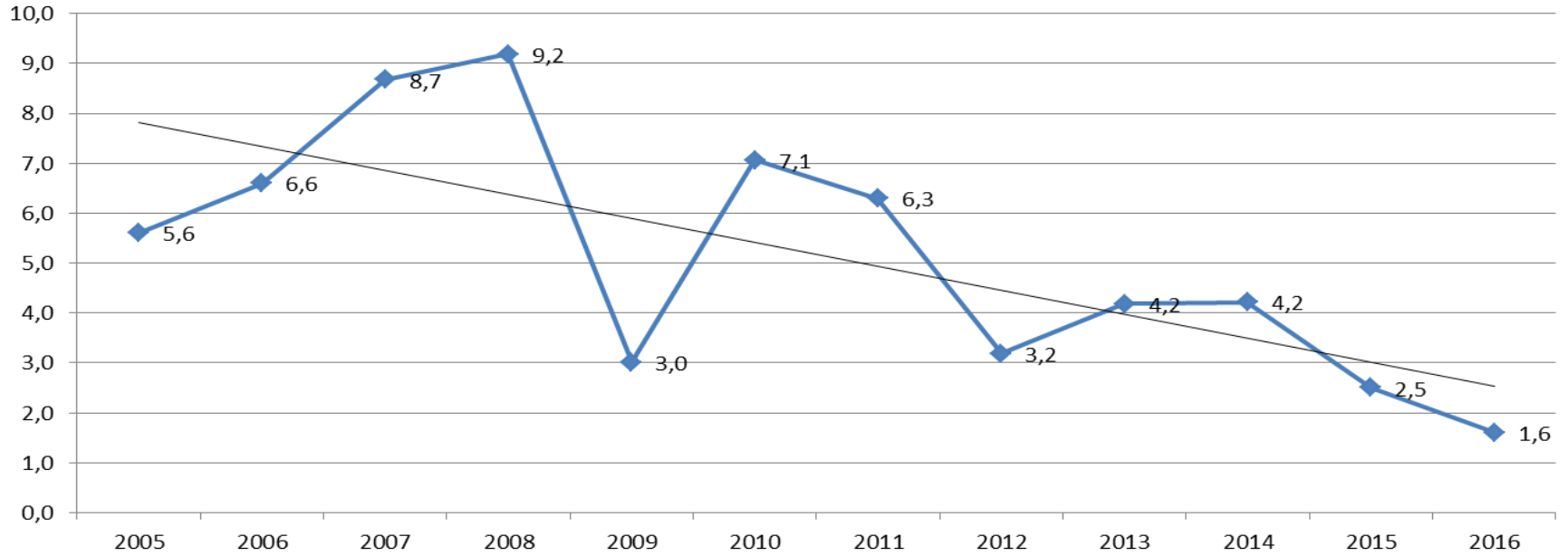
# Attica Tollway Accidents & Toll Traffic 2005-2016



# Fatality rate 2005-2016

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## Fatality rate (fatalities / billion veh-kms)

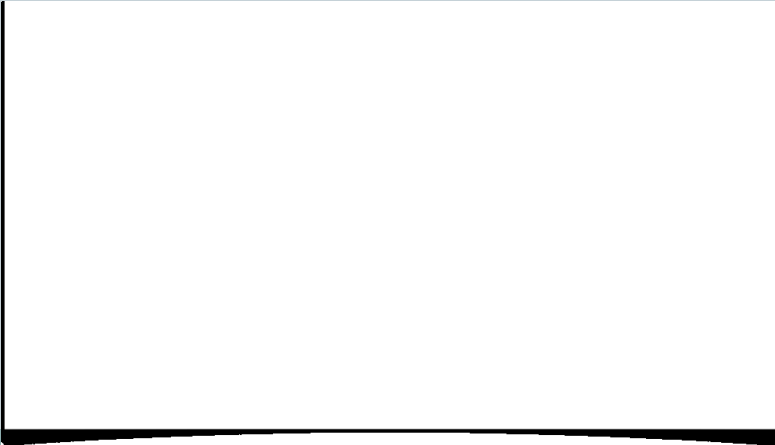


# Asset Management

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- Ageing infrastructure
- Need to plan heavy maintenance
- Need to formulate an effective & realistic traffic management plan during heavy maintenance activities

## Road Inventory through GIS



## Pavement Monitoring System





# Pavement Monitoring System

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- Laser Profiler : roughness – rutting - texture
- Grip Tester : skid
- Falling Weight Deflectometer (FWD) : structure
- Ground Penetrating Radar (GPR) : layer thickness



# Conclusions: Contribution to Road Safety

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Motorways under Concession contracts:

Positive and effective contribution in operations and road safety

- Continuous monitoring of road network & infrastructure
- Prompt response in case of damages / failures
- Faster detection and response time - prevention of secondary accidents
- Direct resolution of a large number of “routine” incidents before evolving and turning into major incidents
- Provision of new services to drivers (assistance, information)
- Improved coordination between the involved parties
- Exploitation and extensive use new technologies
- Saving resources and free up the state agencies and authorities to concentrate on their duties

# Awards & Certifications

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1<sup>st</sup> Prize European Road Safety Award 2005  
International Road Federation (IRF)



ISO 39001:2012 on Road Safety  
1<sup>st</sup> Greek Road Operator to Obtain ISO 39001 in 2014



# Thank you !

(21)



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