ASECAP DAYS

PARIS 2017

45TH ASECAP STUDY & INFORMATION DAYS 2017

The Concession model in the decarbonization era: preparing the infrastructure of the future

Pullman Paris Montparnasse Hotel
29-31 May 2017

www.asecapdays.com

Organized by

ASECAP

ASECAP DAYS
PARIS 2017

Technical session 2
Innovative challenges in the digitalized motorway sector: big data, cyber security, digitalization

Cyber Security, Data Management and Innovative Operation and Maintenance Tools deployed by Aegean Motorway S.A.

(Maliakos-Kleidi Motorway Concession Project)

AEGEAN MOTORWAY

Presented by:
Dimitrios Gatsonis, CEO

31/05/2017

The Company Aegean Motorway S.A.

Establishment : 13 June 2007.

On 28 June 2007 the company signed a Concession Agreement which was ratified by Law 3605/2007.

Concession Commencement Date: 05.03.2008

Duration of Concession: 30 years

Shareholders

HOCHTIEF Solutions AG	35.00%
AKTOR CONCESSIONS S.A.	20.00%
J&P – ΑΒΑΞ A.E.	16.25%
VINCI CONCESSIONS S.A.	13.75%
AEGEK GENERAL CONSTRUCTION COMPANY	10.00%
ATHENA TECHNICAL S.A.	5.00%

The Motorway

- Length:

  230 km from Raches (Fthiotida) to Kleidi (Imathia Prefecture)

- Existing Sections: 205km of motorway and 25km of old national road; more than 250 bridges over 6m, 500 culverts, 10,000 NaHP luminaries, one twin tunnel of 1km etc.

- New Sections (25km):
  - 3 twin tunnels, T1: 2km, T2: 6km, T3: 3km
  - 14km of open road
  - 3 big bridges
  - 5 new Interchanges
  - Motorway Management System
  - etc.


MANITOU
MANITOU
PDS 390

Objectives in relation to Data Management and Preservation of Assets

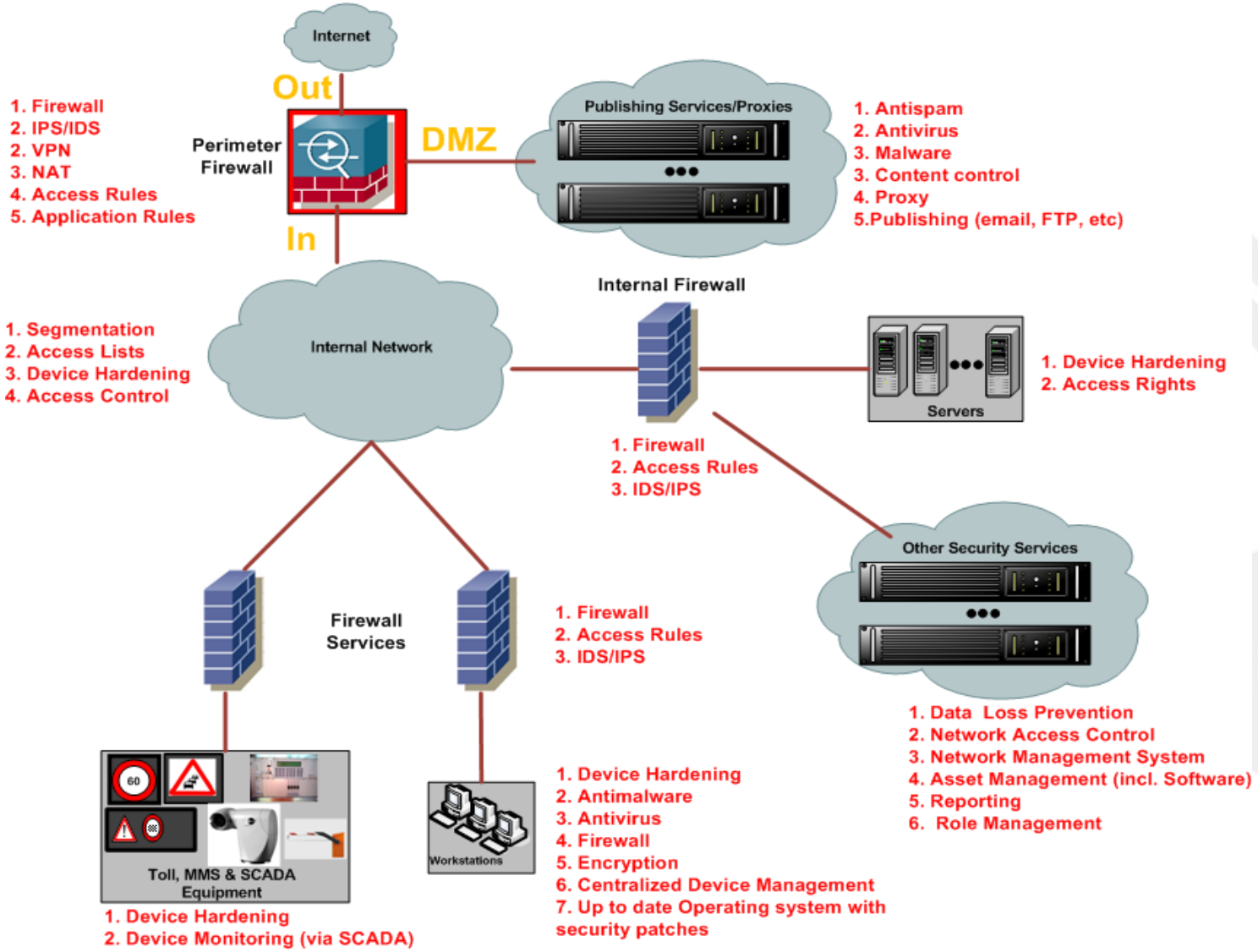
1. Business Continuity
2. Resilience and fast disaster recovery
3. Preserve Asset Condition in the long run in the most economic way
4. IT Risk Management and data protection
5. Comply with EU General Data Regulation 2016/679 which will become mandatory in May 2018

Cyber Security - Actions

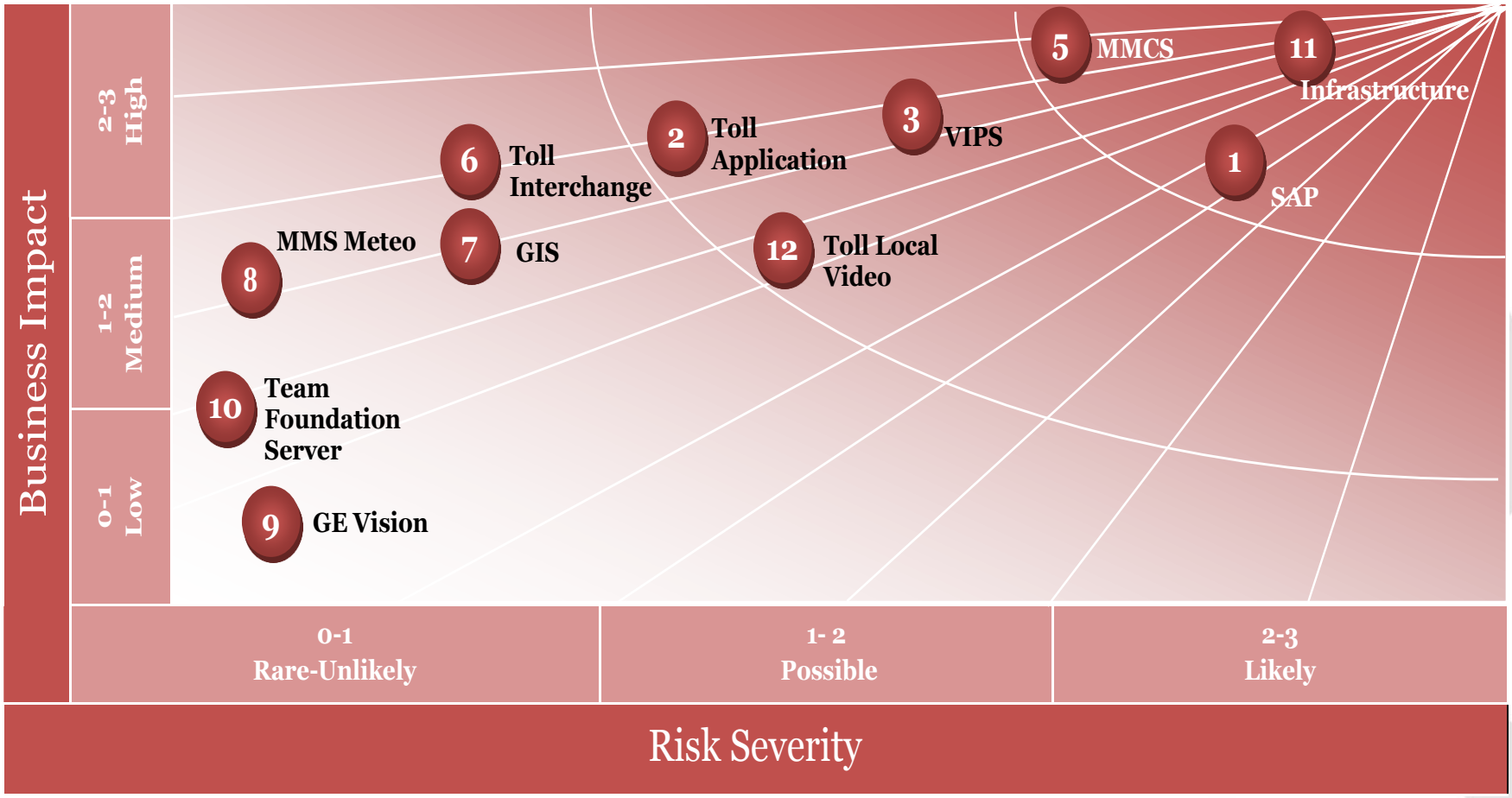
Physical Security	Device Hardening	Network Access Control (NAC)	Network Traffic Control
Guards	Mobile Devices	Ethernet(Layer-2)	Layer-3
Surveillance Cameras	Workstations	Wireless(Layer-2)	Layer 4
Building Access Control	Infrastructure		
Building Alarms	Electronic Equip.		
User Awareness (Training)	Servers/Databases		

Firewalls	Other Services	
Layer-3, 4, 5, 6, 7	Intrusion Detection (IDS)	Asset Management
Publishing	Intrusion Prevention (IPS)	User Management
Application Specific	Data loss Prevention (DLP)	
	Network Management (NMS)	

Cyber Security - Actions



IT Audit – Risk assessment



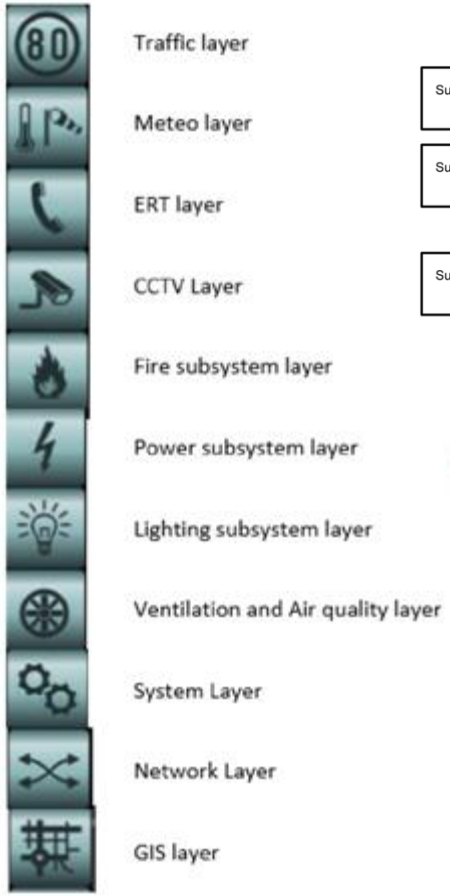
Integrated Motorway Management System (IMMS)

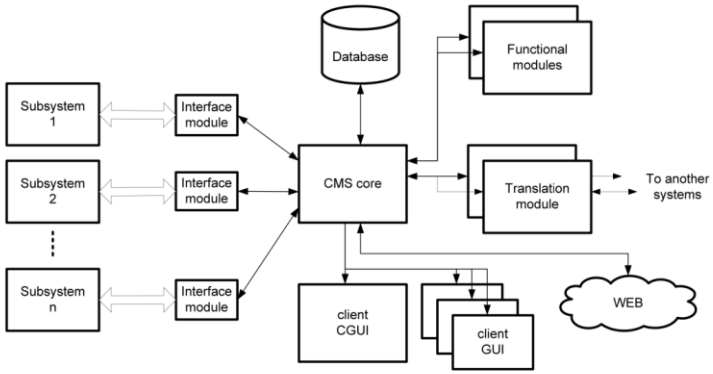
IMMS integrates:

1. 11,8 km of tunnels (12100 SCADA control points), including the following subsystems:
   a. Automatic Video Incident Detection
   b. Public Announcement
   c. Lighting
   d. Ventilation
   e. Fire Detection
   f. Driver Information (VMS, LCS, VSLS)
   g. E/M Management
   h. Emergency Response Telephones

2. Open Road Subsystems, including:
   a. Emergency Response Telephones
   b. Driver Information (VMS,LCS, VSLS)
   c. Light Management
   d. Meteo Stations
   e. OHVD
   f. Inductive loops

Integrated Motorway Management System (IMMS)





IMMS interfaces include:

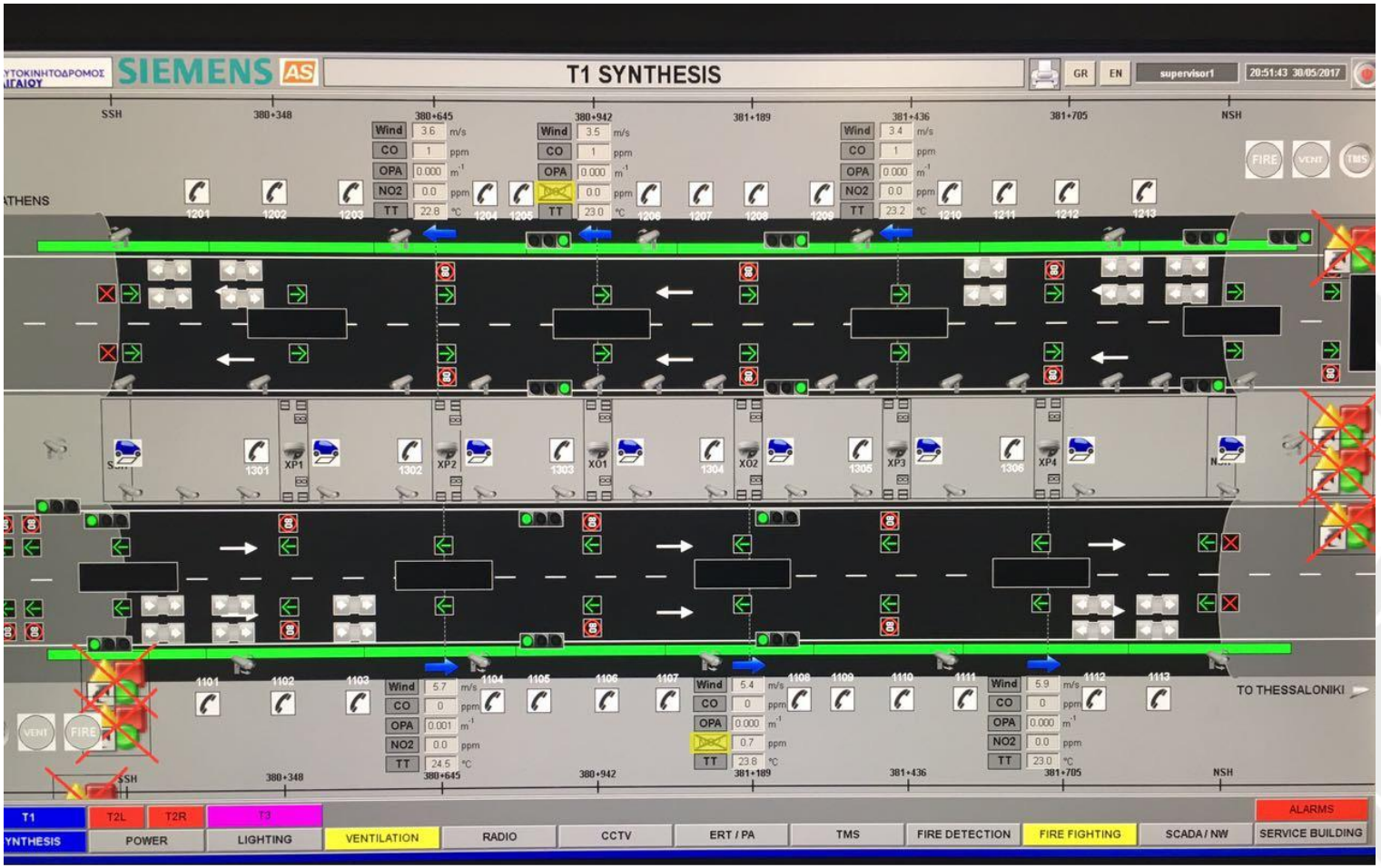
1. Toll System, performing ramp metering
2. Two Tunnel SCADA systems, controlling and enhancing tunnel safety
3. Asset Management System
4. Light Management System
5. E-Call System (112)
6. Common Data Exchange API for future Systems

IMMS collects data and provides the MMC operators with information on:

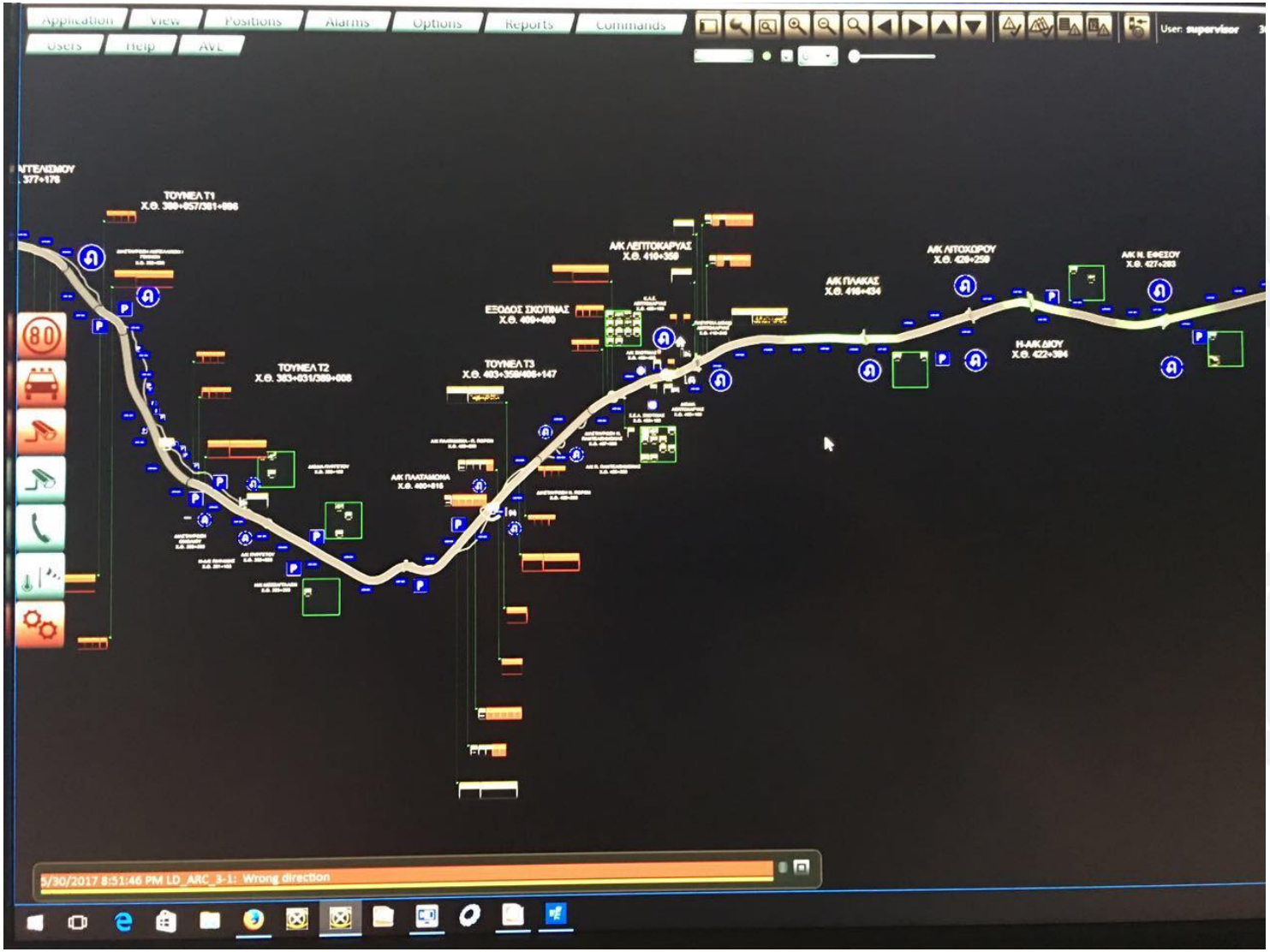
1. Incident impact on traffic and safety
2. Short term traffic forecast, in order to act proactively
3. Strategies to be followed (suggestions) according to the incident and the company's Operational Procedures
4. Simulated incidents (capability to simulate an incident for auditing and training purposes)
5. Asset performance and black spot analysis

IMMS implements Modular System Architecture and open protocols in order to enable expandability and interoperability

SCADA Development for the 3 new tunnels

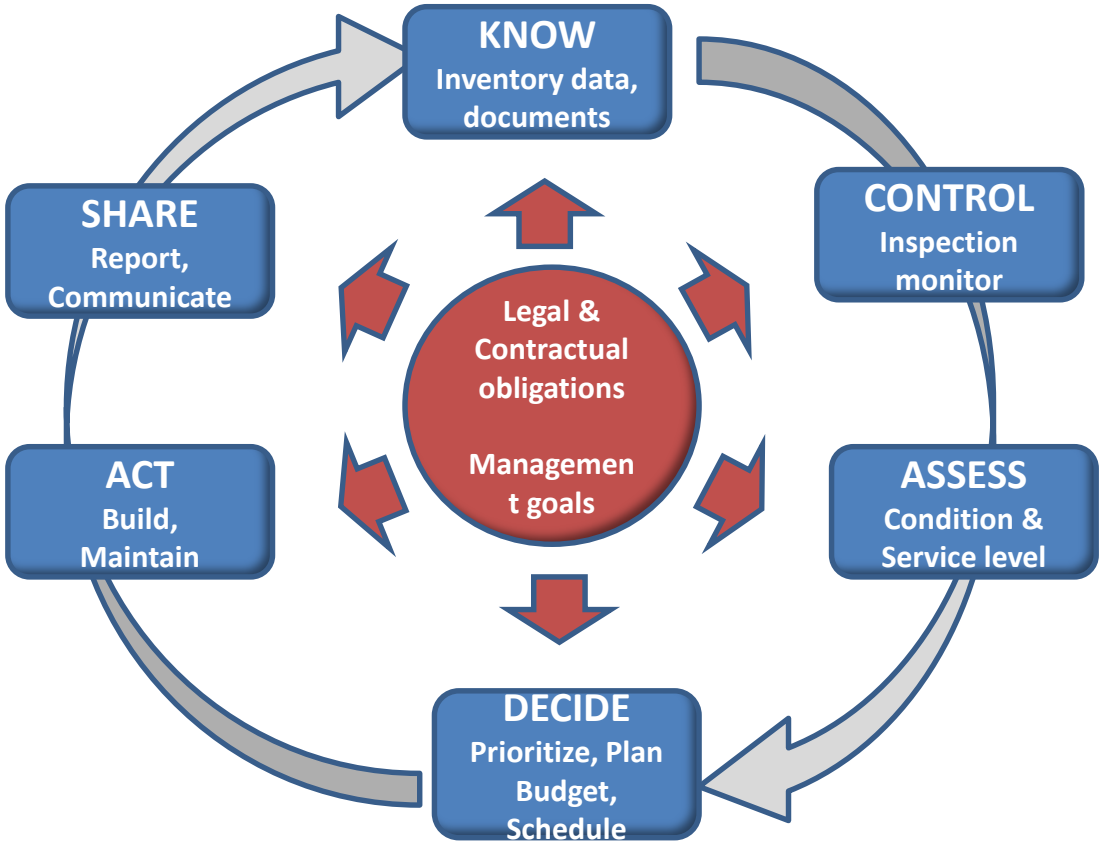


Open Road Management System



Motorway Management Centre

Innovative I & M Tools: Technical Asset Management



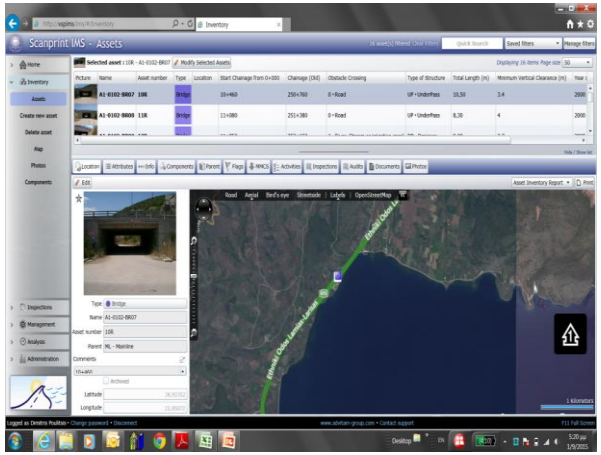
SCANPRINT Functionalities

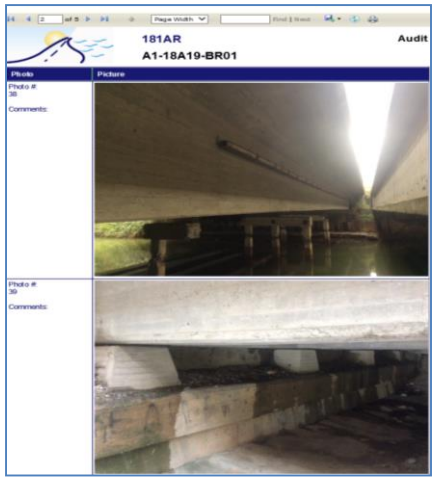
- Inventory
- Inspections
- Maintenance Activities & Cost
- Reporting
- Statistic Data
- Electronic Document Control System (EDMS)
- Information Sharing

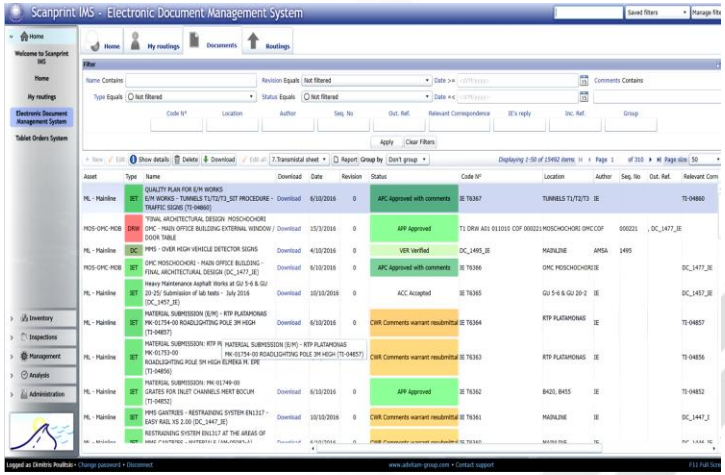
Visualization in one Central Tool to Support Management Decisions

Innovative I & M Tools: Technical Asset Management

Development of a modern **Structures Management System (SMS)** including Procedures, Inspection Manuals, Mapping, Defects library, 9 scale defect rating, Emergency Flags, Reporting, Statistics, Maintenance activities etc.







ScanPrint
Inspections with Tablet – GIS

Inspection Reporting
Automatically created report

Technical Documents

Control System
Designs, reports etc.

Art. 9.4.1 of CA: *"the Concessionaire is responsible for the necessary inspections, the keeping of a record of Management Maintenance of the structures…*

Innovative I & M Tools: Structures Fire Resistance

Tunnel structural assessment in fire resistance

Fire resistance assessment of a twin C&C tunnel with length of 1.1km. Assessment performed with a specific mobile furnace that was developed and constructed in order to simulate fire loads of 1200oC (RWS curve) - This methodology was applied for the first time in Greece

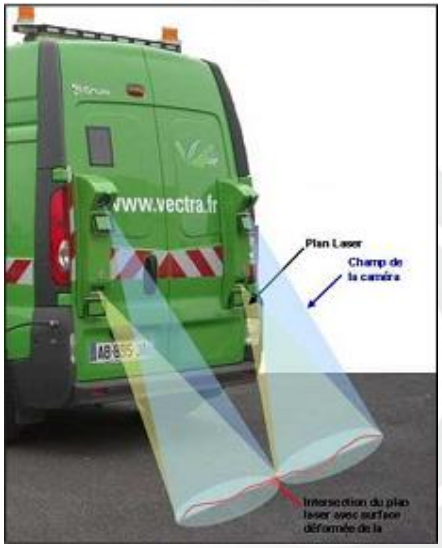
Innovative I & M Tools: Structures Inspection

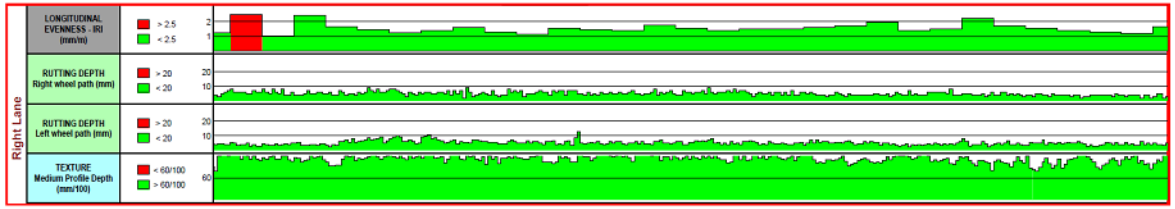
Innovative I & M Tools: Pavement Surface

Periodical measurement of pavement surface characteristics of all traffic lanes of the motorway & the interchanges by the use of **high speed devices** for road monitoring (e.g. VECTRA company)

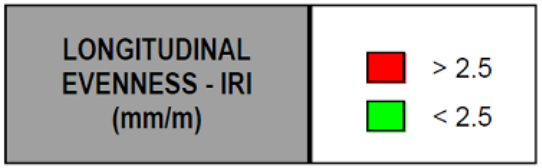
Measurement of:
- Transverse profile
- Longitudinal profile
- MPD (Texture)
- Grip measurement

Data collection (pictures of motorway, recording of distresses etc)





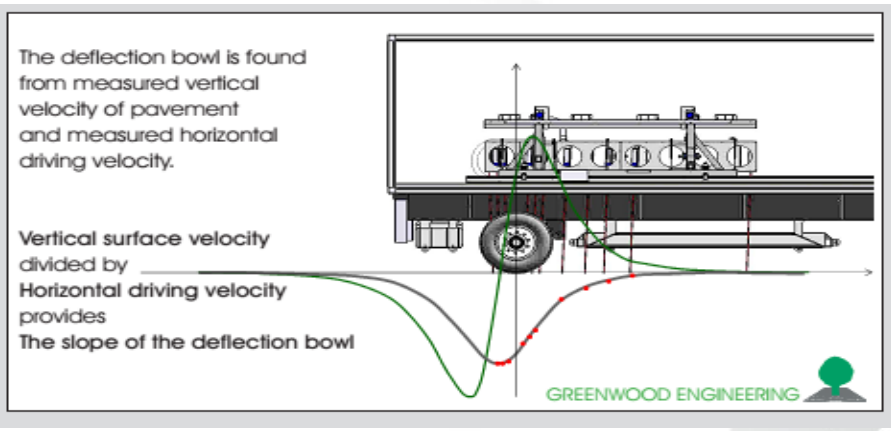
Example of synoptic made in order to check IRI threshold



Enlarged legend

Innovative I & M Tools: Pavement Condition

Measurement of structural condition of the pavement using the new method of the **Traffic Speed Deflectometer (TSD) -** This method is new and it was the first time applied in Greece



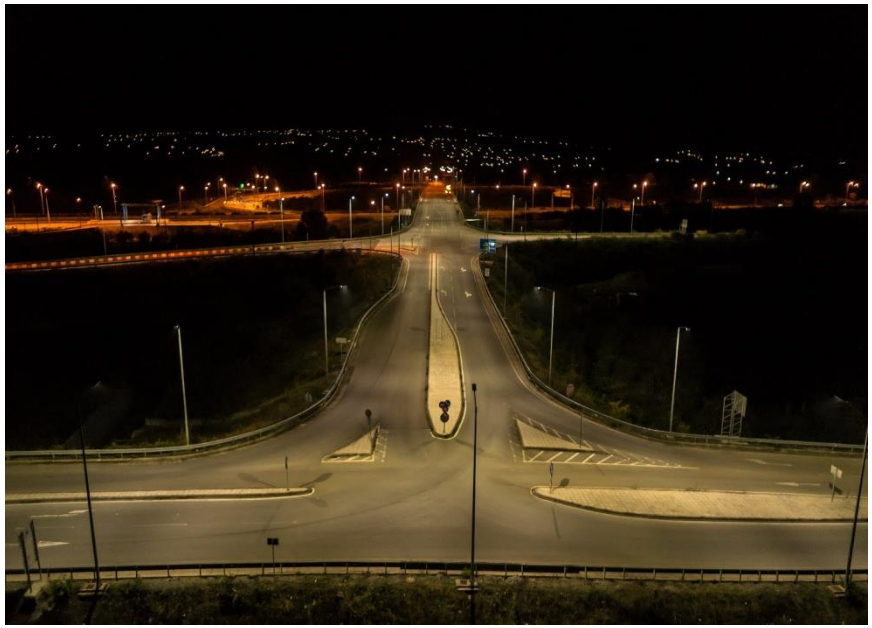
Development of Pavement Management Plan until the end of the concession period.
Efficient and cost effective management of the maintenance works.

Table H-1 Overview of Maintenance and rehabilitation works - Northbound direction

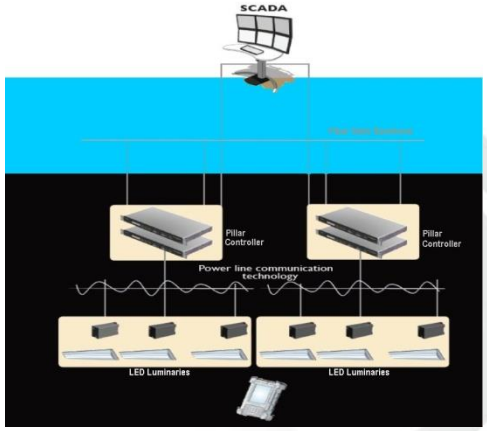
ID	GU	Chainage		Length	Remaining life (years)	Works carried out until 2015								Maintenance & rehabiltation works to be carried out until 2038														
		From	To			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
GU 1.1-N	1	240.300	241.400	1.100	>45 CF									A													A		
GU 1.2-N		241.400	242.200	0.800	23.5 F									A													A		
GU 1-3.1N		242.200	243.110	0.910	>45 CF									A													A		
GU 1-3.2N		243.110	243.450	0.340										Rh12+ grid 5.5m													A		
GU 1-3.3N		243.450	244.500	1.050										Rh9 A													A		
Sum				*4.200*																									

Innovative I & M Tools: Lighting

Replacement of 10.000 NaHP luminaries with LED and installation of a central control system



Connection of all luminaries with a central SCADA station



The central control system is an innovative I&M tool because it provides the status of each luminary in real time , i.e.:

- zero manpower, zero vehicle fuels, zero tire wear for site inspections
- higher service level for traffic due to real time detection of failures
- better deployment of maintenance team

ASECAP DAYS
PARIS 2017

Thank you for your attention!

dgatsonis@aegeanmotorway.gr