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Abstract: This document relates to the tasks *T2.1 Public Safety Scenarios* and *T2.2 Enablers definition*. It contains information on the *Athens Scenario* (*T2.1.3*). It is a draft of the deliverable *D2.3, "Athens Public Safety Scenario"* and a contribution for the Deliverable *D2.8, "Specific Enablers on Public Safety in Smart Cities"*.

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Document History

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Glossary

Acronym	Meaning
AS	Ambulance Service
CC	Command Centre
CCTV	Closed Circuit TeleVision system
FBCC	Fire Brigades Command Centre
GAA	Greater Athens Area
HDPA	Hellenic Data Protection Authority
JOC	Joint Operations Centre
IC	Incident Commander
IPT	Internet Protocol Telephony
LLU	Local Loop Unbundling
LUZ	Larger Urban Zone
MCC	Mobile Command Centre
MOU	Mobile Operational Unit
NOA	National Observatory of Athens
OTE	Hellenic Telecommunications Organization
POC	Police Operations Centre
SC	Scene Commander
TCC	Traffic Control Centre
THEPEK	Operations Chamber for the Monitoring and Control of Traffic
UC	Use Case
VMS	Variable Message Screen

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Number	Reference
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1. Introduction

This deliverable presents information which was collected through organized meetings with representatives of Public Safety and Security services, interviews with end-users, personnel of these Services, questionnaires and surveys concerning ICT infrastructure and systems for safety and security installed in the city of Athens. According to the information collected, additional and relevant needs/functionalities have been identified and presented. For the purpose of this document, KEMEA, being technical advisor of the Greek Ministry of Citizen Protection concerning security issues, cooperated with Public administration entities and services in charge of Public Safety in the city of Athens. The results of this data collection procedure have been initially summarized in a consolidated Questionnaire, following the template provided by the SafeCity consortium, which is included at the end of this report as annex. The main findings and conclusions of this survey, concerning the safety and security related needs and requirements of the security services for the city of Athens, are presented here along a use case scenario which allows the linkage of such requirements with a particular though comprehensive and representative scenario.

1.1 Purpose of the document

The purpose of this document is to provide an overview of the current ICT infrastructure in the City of Athens. In particular data and information has focused to systems used or operated by the law enforcement services. The description summarizes mainly information, comments and suggestions provided by personnel of the Greek security services interviewed by KEMEA's personnel as well as direct contribution of collaborators of KEMEA. In the document are also included as results from interviews performed in context of SafeCity project and a use case scenario developed on purpose in order to unfold relevant needs and requirement associated with the management of an emergency incident.

1.2 Scope and structure

This document has the scope of summarizing the information and data collected for WP2 of the SafeCity project as regards the current situation and the requirements of end-users related to the Athens scenario of the project on safety and security issues.

The structure of the Deliverable follows as much as possible the respective template defined by the SafeCity project including:

- an overview with general information regarding the Athens Greater Area and main critical infrastructures, information regarding public and private ICT infrastructure (Chapter 2),
- public safety characterization according to the SafeCity classification (Chapter 3)
- Social, ethical and legal implications (Chapter 4)
- Challenges for Public Safety (Chapter 5) and
- Two (2) Annexes; one epitomizing and presenting the feedback of the interviewed persons using the SafeCity Questionnaire and the second describing user needs and requirements of security services based on a virtual incident scenario occurring in the City Athens

2. Athens general overview

2.1 Athens socio-economic data and demographics

The municipality of Athens (downtown) has an official population of 655,780 (2011) with a metropolitan population of 2.6 million (population in the Large Urban Zone of Athens). The actual population, however, is believed to be higher, because during census-taking some Athenian residents use to travel back to their birthplaces, and register as local citizens there. Reflecting this uncertainty about population figures, various sources refer to a population of around 5 million people for Athens, which corresponds approximately to half the inventoried population of the country.

Also unaccounted for are an undefined number of unregistered immigrants originating mainly from Albania, other Eastern European countries and Pakistan. Athens ever was a promising destination for foreign migrants. Some waves of migration took place in the 20's as well as the 80's of the 20th century, which fostered the emergence of illegal housing clusters on areas outside of the official city plan. The city still is a major destination for migrants, now from Eastern Europe, the former USSR, Africans and Asian countries. The inflow of foreign migrants, in conjunction with the recent economic restructuring, has brought challenges of social cohesion. The number of Muslims living in Athens was estimated to be approximately two hundred thousand (200,000) in 2001 while it is expected to have reached one million (1,000,000) in 2011.

The economic base of the city has undergone a sustained transformation, with the economy nowadays being mostly service-oriented. More than two out of three jobs, namely 66.59% in 1991, are in the tertiary sector, whereas only 13.5% of jobs belong to the secondary sector [1]. Finance/Banking Insurance and Real Estate (F.I.R.E.) have become the most dynamic sectors of the city's economy. However, the city has not been able to attract enough major foreign investment to sustain a continuous growth of these sectors. The GDP per capita accounted for 6674 € (1994, to 1998 prices). The unemployment rate in the city summed up to 5.09 % according to the statistics of 1991.

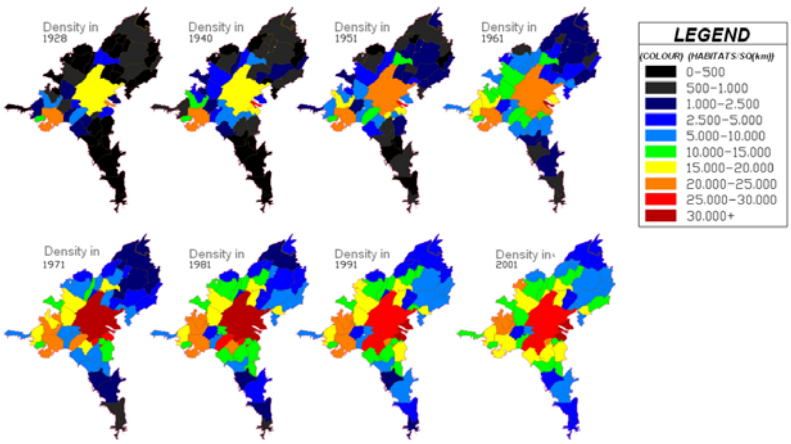

Figure 1 Evolution of population density in the large Urban Zone of Athens

Athens is an ageing city. Inhabitants under sixteen have decreased both in relative and absolute terms. On the other hand, the 'active' population is quite high in the Athens Metropolitan Area, mainly due to internal migration. Due to perennial migration Athens, the city is expanded and it has engulfed many former suburbs and villages in Attica, and continues to do so. Throughout its long history, Athens has experienced many different population levels as shown in Figure 1 for the last decades [2].

2.2 City areas

Athens sprawls across the central plain of the Attica Geographic Department that is often referred to as the Athens or Attica Basin and its administrative limits cover a land area of 39 km2. The Athens Basin is bounded by four large mountains: Mount Aegaleo to the west, Mount Parnitha to the north, Mount Penteli to the northeast and Mount Hymettus to the east.

Greater Athens Area consists of the Central municipality of Athens and thirty four more municipalities (Figure 2), which belong into five peripheral units of Attika Region (the Administrative Geographic Department in which Athens belongs) namely the North (NE and NW), West, Central and South areas.

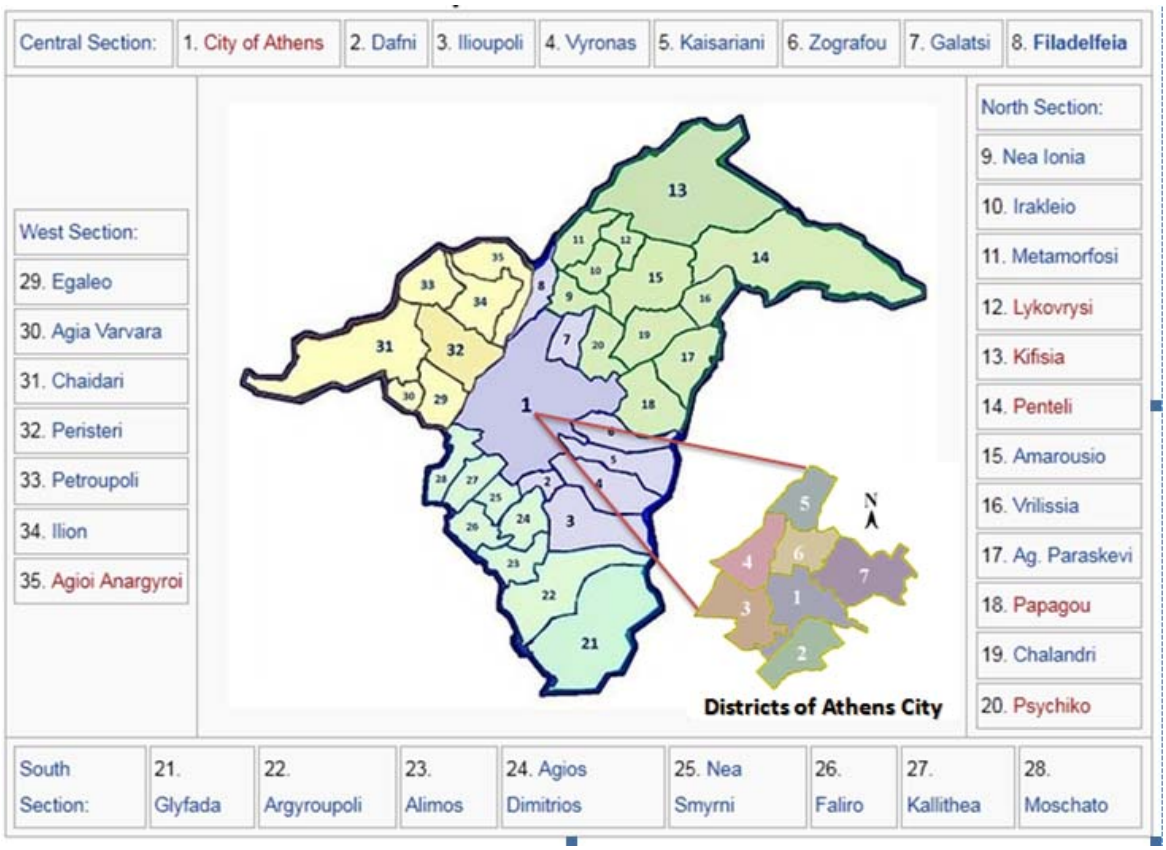

Figure 2 Municipalities of Greater Athens Area and Central Athens districts map

Central Athens (City of Athens) is divided into seven municipal districts as shown in Figure 2. The seven-district division is mainly used for administrative purposes. The most popular way of dividing the area of the City of Athens is through its neighbourhoods such as Pagkrati, Ambelokipi, Exarcheia, Patissia, Ilissia, Petralona, Koukaki and Kypseli, each with its own distinct history and characteristics.

The urban area of Athens (Greate Athens Area) together with the Greater Area of the City of Piraeus (continuation of Athens area towards south to the sea shoreline and the port of Piraeus) and some adjacent smaller municipalities extend beyond the administrative city limits of these municipalities and form the Large Urban Area (LUZ) of Athens (Figure 3). According to Eurostat, the Athens LUZ is the 7th most populous LUZ in the European Union.

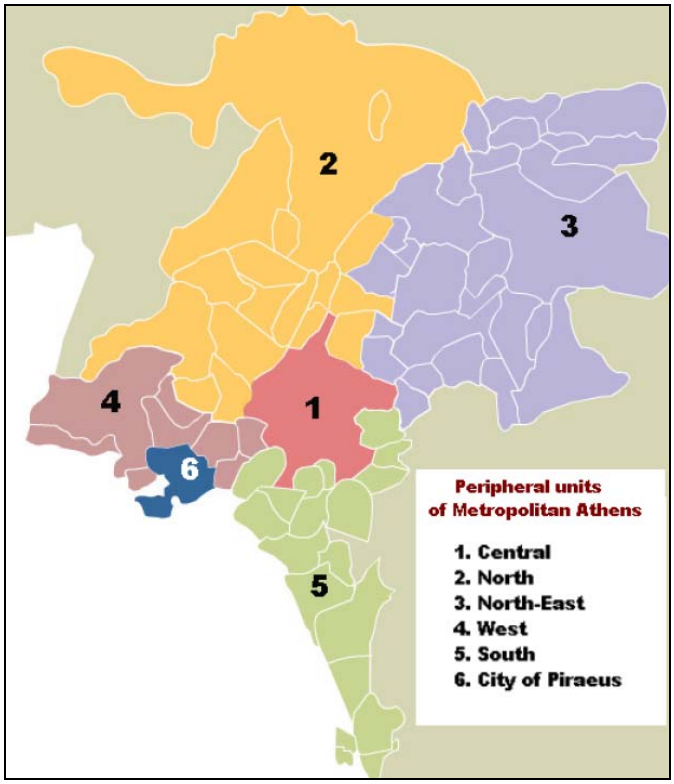

Figure 3 Peripheral units of the Metropolitan Athens Area

2.3 Climate

Athens, is a large metropolitan city surrounded by mountains, susceptible to air pollution episodes during periods of anticyclonic circulation, prone to heat waves in the summer and floods during heavy precipitation events in winter. Snowstorms are infrequent but can cause significant disruption when they occur. Summers can be particularly hot in Athens and at times prone to smog and pollution related conditions (admittedly, however, much less so compared to the past). A representative table of monthly values of meteorological measurements from the weather station of Nea Filadelfia (Athens northern suburb) are shown in Figure 4 [3]. Winters are mild and rainy, with a

January average of 8.9 °C in Nea Filadelfia and 10.3 °C in Hellenikon (Athens South-east suburb). The average summer daytime maximum temperature is approx. 32°C. Heat waves are not too common and mostly happen during the months of July and/or August, when hot air masses come to Greece from the south or the southwest (African continent). During such days the maximum temperature far overpasses 38°C. These situations (heat waves) cause very high thermal stress on people (in particular northern tourists not used to very high temperatures suffer sunstrokes and skin burns) and require increased preparedness from the civil protection and emergency agencies for addressing

Climate data for Athens [hide]													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average high °C (°F)	12.5 (54.5)	13.5 (56.3)	15.7 (60.3)	20.2 (68.4)	26.0 (78.8)	31.1 (88)	33.5 (92.3)	33.2 (91.8)	29.2 (84.6)	23.3 (73.9)	18.1 (64.6)	14.1 (57.4)	22.5 (72.5)
Daily mean °C (°F)	8.9 (48)	9.5 (49.1)	11.2 (52.2)	14.9 (58.8)	20.0 (68)	24.7 (76.5)	27.2 (81)	27.0 (80.6)	23.3 (73.9)	18.4 (65.1)	14.0 (57.2)	10.5 (50.9)	17.4 (63.3)
Average low °C (°F)	5.2 (41.4)	5.4 (41.7)	6.7 (44.1)	9.6 (49.3)	13.9 (57)	18.2 (64.8)	20.8 (69.4)	20.7 (69.3)	17.3 (63.1)	13.4 (56.1)	9.8 (49.6)	6.8 (44.2)	12.3 (54.1)
Precipitation mm (inches)	56.9 (2.24)	46.7 (1.839)	40.7 (1.602)	30.8 (1.213)	22.7 (0.894)	10.6 (0.417)	5.8 (0.228)	6.0 (0.236)	13.9 (0.547)	52.6 (2.071)	58.3 (2.295)	69.1 (2.72)	414.1 (16.303)
Avg. precipitation days	12.6	10.4	10.2	8.1	6.2	3.7	1.9	1.7	3.3	7.2	9.7	12.1	87.1
Sunshine hours	130.2	139.2	182.9	231.0	291.4	336.0	362.7	341.0	276.0	207.7	153.0	127.1	2,778.2

public health requirements. Even if the adverse health effects of heat waves are largely preventable, extreme cases can lead to doubling the normally expected mortality values.

Figure 4 Representative climatic data of the Large Urban Zone of Athens

2.4 Air pollution

In Athens, two types of air pollution are recognized: the first is characterized by high concentrations of particles. The second type - photochemical smog - is linked to an excess of nitrogen oxides, hydrocarbons, carbon monoxide (primary pollutants), ozone, and organic nitrates (secondary pollutant) and results from a series of chemical reactions driven by sunlight. Most probably linked with the high congestion but not exclusively, Athens also holds the unenviable top place in pollutant emissions, which is also linked with weather conditions and climate regimes such as temperature inversion layers during the summer period. In the event that meteorological conditions for the following day may lead to pollution concentration, full banning of traffic is applied in the centre of Athens.

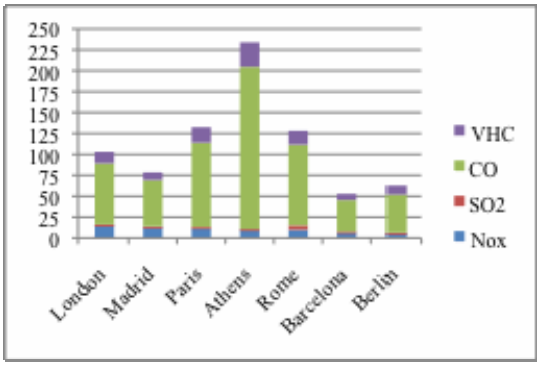

Figure 5 **Emission of pollutants from personal transport in seven EU cities**

Several measures have been taken or are in the process of implementation, in an effort to improve the existing air quality conditions in the city.

Since cars are considered a permanent and significant contributor to the levels of pollution in the center of Athens several legislative measures have been taken to improve the situation. Among these are

- The Athens ring (Daktylios), an area of central Athens controlled by an odd/even system for car circulation, originally designed and intermittently implemented from July 1979 to save fuel during the oil crisis. It was later imposed as a permanent solution to control traffic congestion and pollution in 1982 and
- A retirement plan for old vehicles which was introduced in 1991 in an effort to renew the motor vehicles fleet with new cars equipped with catalytic converters. A national inspection programme for the control of emissions from motor vehicles was initiated in 1994, consisting of regular inspections of all private vehicles once per year and taxis and light trucks twice per year.

The figures which are shown in Figure 5 present the level of pollutants compared to six other large EU cities and represent measurements after the extensive catalytic conversion drive mentioned above [2]. However it should be mentioned that as a result of the abatement practices, the level of sulphur dioxide, smoke, nitrogen dioxide and ozone exhibit a gradual decrease in later years.

2.5 Critical Infrastructures

2.5.1 Urban transportation

As of July 2011, the Athens Mass Transit System [4] which is part of the Mass Transit System of Attica consists of:

- A large bus fleet and a fleet of electric trolleybus operated by OSY S.A. which mainly serves the downtown area. The bus fleet is operated by Ethel (acronym of the Thermal Bus Company). Its network consists of about 300 bus lines which span the entire Attica Basin, with an operating staff of 5,327, and a fleet of 1,839 buses. Of those 1,839 buses 416 run on compressed natural gas, making up the largest fleet of natural gas-powered buses in Europe.
- Besides being served by a fleet of natural-gas and diesel buses, the Athens metropolitan area is also served by trolleybuses — or electric buses, as they are referred to in the name of the operating company. The network operated by Electric Buses of the Athens and Pireaus Region (known as ILPAP) consists of 22 lines with an operating staff of 1,137. All of the 366 trolleybuses are equipped to enable them to run on diesel in case of power failure.
- The Athens Metro system, commonly known as Attiko Metro, which is operated by STASY S.A. While its main purpose is transport, the Athens Metro also houses Greek artifacts found during the construction of the system. The Attiko Metro supports an operating staff of 387 and runs two of the three metro lines, which are entirely underground (Figure 6). The Blue line runs 16 km from the western to the north-eastern suburbs and is extended to the Suburban Railway for another 39km to Athens airport. The Red line runs 11.8 km from north-west to south-east of the Athens area. The metro network operates a fleet of 42 trains consisting of 252 cars, with a daily occupancy of approximately 550,000 passengers.
- The Athens-Piraeus Electric Railways, commonly called ISAP, which is also operated by STASY S.A. Actually this is the Green line of the Athens Metro, and unlike the red and blue routes running entirely underground, it runs either above-ground or below-ground at different sections of its journey. The (historic) Green Line connects the port of Piraeus to the northern suburb of Kifissia, and is set to be extended to Agios Stefanos, a suburb located 23 km to the north of the city centre, reaching to 36 km. It currently serves 24-stations, with a network length of 25.6 km. This branch is supported by an operating staff of 730 and a fleet of 44 trains and 243 cars with a daily occupancy rate of 600,000 passengers.

Figure 6 **Metro transportation map of Athens**

- The Athens tram system which is currently operated by STASY S.A. with a line connecting the southern suburbs to the city centre. The Athens Tram operates a fleet of 35 vehicles, which serve 48 stations, employ 345 people with an average daily occupancy of 65,000 passengers. The tram network spans a total length of 27 km and covers ten suburbs of the Athenian LUZ (Large Urban Zone). This network runs from Syntagma Square to the southwestern suburb of Palaio Faliro, where the line splits in two branches; the first runs along the Athens coastline toward the southern suburb of Voula, while the other heads toward the Piraeus district of Neo Faliro. The network covers the majority of the Saronic coastline. Further extensions are planned towards the major commercial port of Piraeus. The expansion to Piraeus shall include 12 new stations, increase the overall length of the tram by 5.4 km, and increase the overall transportation network and
- The Athens part of the Suburban Railway (Proastiakos) service linking the airport Eleftherios Venizelos with downdown. Actually Proastiakós connects Eleftherios Venizelos International Airport to the city of Corinth, 80 km west of Athens, via the central Athens train station (Stathmos Larissis) and the port of Piraeus, and is in a way considered the fourth line of the Athens Metro.

2.5.2 "Eleftherios Venizelos" International Airport of Athens (AIA)

Athens is served by the Athens International Airport (AIA) named "Eleftherios Venizelos", which is located near the town of Spata, in the eastern Messoghia plain, approximately 35 km east of Athens. The airport is within the thirty busiest airports in Europe (27th). Intended as an expandable hub for air travel in south-eastern Europe, it was constructed in a record period of fifty one (51) months costing 2.2 billion euros, and employing a staff of 14,000. An express bus service is provided, connecting the airport to the metro system, and two (2) express bus services connect the airport to the port at Piraeus and the Athens city centre (down-town) respectively. AIA accommodates 65 landings and take-offs per hour, with its 24 passenger boarding bridges, 144 check-in counters and broader 150,000 m^2 main terminal, and a commercial area of 7,000 m^2 which includes cafes, duty-free shops, and a small museum. The AIA handles approximately 15-16.000 passengers at a yearly basis. In 2010, the AIA handled 15,411,099 passengers, which is 5% less compared to the respective figure of 2009. The traffic downturn was driven by a series of unprecedented events, i.e. the international economic crisis, the tremendous upheaval caused to the European air transport sector by natural phenomena and harsh weather conditions, such as the volcanic ash during April 2010 and the heavy snowfalls occurred in December 2010 and last but not least the Greek carriers' consolidation of services. Of those passengers, approximately two thirds travelled through for international flights while the rests passed through the airport for domestic flights. Beyond the dimensions of its passenger capacity AIA handles approximately two hundred thousand flights per year which means an average of 550 flights per day [5].

2.5.3 Railways, highways and ferry connections

Athens is the hub of the country's national railway system (OSE), connecting the capital with major cities across Greece and abroad (Istanbul, Sofia, and Bucharest). Ferries departing from the major

port of Piraeus connect the city to the numerous Greek islands of the Aegean Sea. There are two main highways; one heading towards the western city of Patras in Peloponessus (GR-8A, E94) and the other heading to the north, towards Greece's second largest city, Thessaloniki (GR-1, E75). From 2001 to 2004, a ring road toll-motorway (Attiki Odos) was gradually completed, extending encompassing the Greater Athens Area from the north and linking the western industrial suburb of Elefsina all the way till the Athens International Airport. The Ymittos Periphery Highway is a separate section of Attiki Odos, connecting the eastern suburb of Kaisariani to the north-eastern town of Glyka Nera and this is where it meets the main part of the main ring road. The span of the Attiki Odos in all is 65 km.

2.5.4 Traffic Accidents

Since SAFECITY deals with the road track incidents management of the envisaged cities here next is provided some information regarding the traffic accidents in the city of Athens. It is true that Athens holds the top place in the set of EU countries for traffic deaths. In Athens, 8,200 accidents occur in average every year of which 300 are fatal [2]. These figures are mainly influenced by the street status, weather conditions and the drivers' culture. Interestingly, studies in densely populated cities in EU also have the high traffic accident incidence even though they have lower car ownership rates, compared to Athens, suggesting a potential correlation (Figure 7).

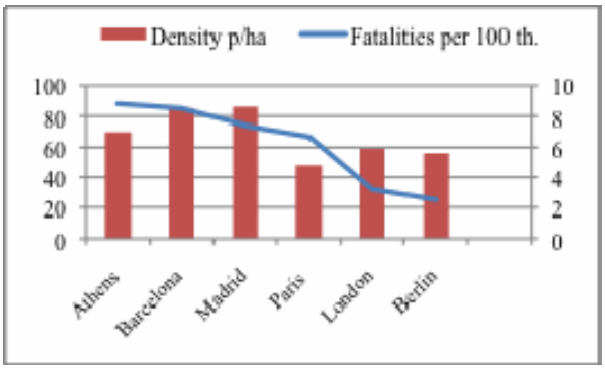

Figure 7 **Relation of Traffic Accident Fatalities in large EU Cities with population density**

Furthermore increase in the number of cars, which evidently was the case in Athens the last decades, may exacerbate the conditions and increase the toll, if not matched with proactive measures to improve parking and traffic conditions.

2.5.5 Parking

Athens as most of the large cities experiences a shortage of parking spaces. This fact makes often Athens to be, in effect, an immense parking lot form edge to edge. Three quarters of its streets offer free parking while the rest are frequently used for parking illegally. This is also true of sidewalks, where cars or powered two wheelers (PTW) in particular, find expedient temporary parking. The demand is so high that cars are often parked up to or into the street corner. It would seem that the available parking in structures is not used to capacity, presumably due to cost. A large percentage of parking (80%) occurs on the street. Of all street parking 45% is illegal.

Parking at this intensity uses up vital road network space that is already constrained due to the narrow width of pavements. A 1998 survey revealed that the daily demand within the city centre during the peak hours is for 66,000 parking stalls and the available supply is 58,000 stalls. It is logical to conjecture a potential link between the parking intrusion into circulation space and the high congestion that Athens experiences, notwithstanding that other factors can also be at play [2].

2.6 Organizational settings

Public Security, Safety and Emergency Agencies

The following agencies have jurisdiction over safety and security matters in the Athens area:

- Athens General Police Directorate (GADA), actually the Athens Police Headquarters, responsible for safety and security issues (Security Division) and road traffic management and control (Traffic Division) ;
- Hellenic National Centre for Emergency Assistance (EKAV);
- Athens Regional Department of the Fire Corp.;
- Hellenic Coast Guard service (LS-ELAKT) based in Piraeus and controlling with regional offices the ports of Piraeus, Rafina and Lavrio which serve Athens tourism to the Greek islands;
- The Athens Municipal Police service aiming to intervene for restoring the sense of security and to prevent criminality in the city centre and,

The 112 (Emergency Call) Service centre operated by OTE (Hellenic Telecommunications Organization. The centre contacts the nearest to the caller 100-Police/199-Fire Service/166-Ambulance centre (based on caller's localization data) and transfers the incoming emergency call, while staying on the line to help in case the caller does not speak Greek. In fact the centre has been conceived to serve mainly tourists. Calls are free and the service can be used for any life-threatening situation, including:

- Serious medical problems (such as accident, unconscious person, severe injuries, chest pain, seizure)
- Any type of fire (house, car)
- Life-threatening situations (crimes)

2.7 Command Centres

Command Centres related to safety and security issues are organized and operated by different Security services according to the type of emergency or the security issue to be addressed. These Centres are distributed around Athens area (Figure 8) and they include:

- The Situation Awareness Centre of the General Secretariat of Civil Protection which operates at the strategic level for coordinating the involved actors before and during crises and disasters;
- The Hellenic Police (Traffic Division) operates the Operational Chamber for Traffic Monitoring and Control (THEPEK). In addition Police has the possibility of dispatching mobile CCC in specific cases and for particular security missions;
- The Greek Fire Brigades operates the National Fire Coordination Centre for coordinating the dispatching of fire trucks to the incident place, as well as for monitoring the forest fire situation across the country during the fire season (May-October). The Fire Brigades can dispatch in case of emergency mobile CCC;

- The Hellenic Coast Guard operates the National Chamber of Border Operations which has the missions of the surveillance of the sea borders of the country, collecting information and images from fixed radars and Coast Guard Vessels patrolling for illegal immigration, smuggling, etc
- The Emergency Management Centre of the Greek Ministry of Health (KELPNO) that coordinates the operational actors involved in emergencies during disasters and in particular the public services and authorities providing health services i.e. hospitals, health centres, sanitation services etc.

In general terms each of the above centres is interfaced with the incident instance through its own, appropriate call centre. Any incoming call is registered and evaluated and then is characterized and assigned to an Incident Commander. Actuation procedure considers also information flow between the different public services (which means that one service can be activated by another, more pertinent, which is activated before) according to the type of the incident.

No sensors are used in fixed Command and Control Centres. However the centres are connected through the web to sources and relevant services (public or privates) which provide information and data concerning meteorological, traffic, air quality data etc... Sensors can be used in case a mobile CCC is dispatched for in-situ measurements. This is the case of specific missions and the sensors are related to the type of incident and the needs of monitoring. They can include chemical (CBRN), weather, acoustic and so on sensors.

Command Centres mainly collect and store data in data bases. For internal policy reasons, sensitive data and certain information used in the CCCs remain in most cases within the same Control Centre. Interaction and combination of data (in their digital form) is rare while inefficiencies are observed related to lack of interoperability between systems used by different services.

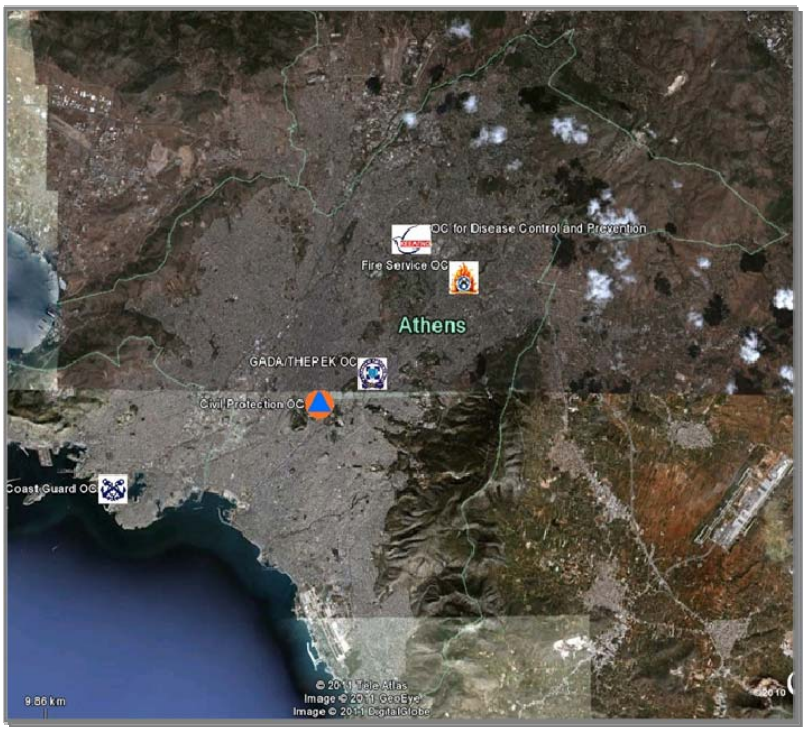

Figure 8 Location of CC and OC of Safety and Security Services in Athens

2.8 Communication Infrastructures

2.8.1 Public ICT Infrastructures

IT sector

Since there are no data available specifically for the area of Athens, the data provided here next refer to Greece in general. However these data are representative of the situation in the Athens LUZ and they can be used to figure out the context of the ICT infrastructure in the city of Athens, which is the objective of the deliverable.

Internet access in Greece relied on PSTN/ISDN modem dial-up until 2003, when ADSL was commercially launched in Greece by incumbent operator OTE (Hellenic Telecommunication Organization). ADSL is currently the main broadband standard. Greece also has 3G mobile broadband (HSPA) and a more expensive service based on Satellite Internet access. Mobile broadband was heavily marketed during 2008 by the private mobile telecommunications providers i.e. Vodafone, Cosmote and Wind, leading to a surge in mobile Internet usage in Greece, primarily with mobile professionals and young users.

With respect to Internet & Broadband, the relatively high cost of internet services to-date, as a result of the high OTE's access cost to its infrastructure, kept alternative operators from growing rapidly. This has also kept the internet penetration at the 25 percent range, despite the relative high fixed-line penetration. Apart from OTE, the main telecommunication service providers are currently the companies Forthnet, Wind Tellas, Hellas On Line, On Telecom, and Vivodi.

The above situation started changing in late 2007, as witnessed by broadband penetration reaching 12.7% by November 2008 (amounting to 1,430,000 connections, and holding the sixth position worldwide in broadband penetration increase). Despite the difficult economic conditions, increasing broadband penetration in Greece is moving at the highest rate in the European Union, according to data of the Greek Observatory for the Information Society. In early 2011, 19.9% of the population, of which two thirds approximately located in Athens, had fast Internet connections [6].

It is noteworthy that mobile broadband growth has surpassed the 10 percent rate of total broadband connections via fixed line. The main stimulant for this explosion is increasing competition among providers and decreasing mobile broadband connection prices. As such, further penetration in internet service provisioning and additional investment is expected in this area. OTE is already committed to WiMAX-based services in urban areas, with no fixed broadband infrastructure. Overall, with internet penetration on the rise, IT/Tel convergence & new broadband infrastructure, the road is paved for a new generation of content and application services. Telecoms providers will look for alliances and partnerships with IT vendors and content aggregators to offer complete IP telephony (IPT) solutions, establishing a challenging opportunity for players in this arena.

Typical download/upload speeds available over OTE's network are 2048/256, 4096/256, 8192/384 kbit/s and 24/1 Mbit/s. The latter three speeds were added in May 2007 and December 2007 (24/1 Mbit/s) and are available in the Large Urban Zone of Athens. Customers can either subscribe only to OTE's ADSL access service and then buy an ADSL subscription from an ISP separately, or choose their

preferred ISP and buy both services bundled (OTE bitstream wholesale, known as A.RY.S.). The latter is much less expensive, but the former offers the flexibility to change ISP more often (as frequently as every 2 months; a bundled package usually has a minimum contract length of 6 to 12 months).

OTE also offers its bundled service under the Conn-x brandname, but unlimited telephony service is only available within their network. In late May 2008, OTE announced an All-in-One package that combines ADSL access and local, national and mobile calls.

A variety of other companies (Vivodi, Wind, HOL, Forthnet, On) appeared since the liberalization of the market and Local Loop Unbundling (LLU). These operators typically offer higher speed service and lower prices than OTE, but their customer support is in most cases considered inferior.

The period from July 1, 2009 up to July 1, 2010, the growth of broadband connections in Greece was almost double the European average and brought Greece to the forefront of EU. Despite such increase, Greece still lags behind the EU average (Figure 9). It is estimated that broadband penetration in Greece will exceed 20.6% in the first quarter 2011 and 21.3% in the second quarter. The number of fixed broadband connections in Greece was at the beginning of 2011 at 2,252,653, an increase of 17.5% over the corresponding period last year and by 7% over the previous six months. The 76,3% of broadband connections in Greece are combination packages (double and triple play), versus 56.8% a year ago, indicating a clear preference of consumers.

Sharp increase recorded recently in the number of users connected to the Internet from mobile phones. Compared to the first half of 2010, the number of active subscribers increased by 117.7%, while subscribers using mobile Internet cards increased by 19.5%. Thus, the increase in total active mobile subscribers with access via 3G network reached 140% compared to the first half of 2010.

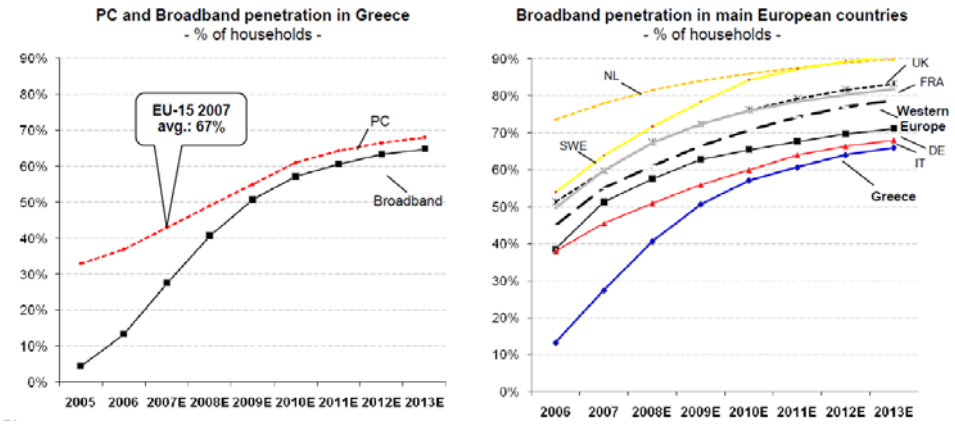

Figure 9 PC and Broadband penetration in Greece and comparison with other EU countries

Wi-Fi Spots

There are currently several Wi-Fi hotspot areas, increasing continuously, which provide access to internet at no charge in Athens. These hotspots are located primarily in the public places downtown, metro, airport, ports and railway stations, hotels and cafes. An indicative map of the

distribution of Wi-Fi zones providing free web access to the public in the Greater Athens Area is shown in Figure 10. The company Forthnet S,A. is the main provider of Public Wi-Fi zones in the areas around Athens.

Figure 10. Public freely available Wi-Fi hotspots in the Large Urban Zone of Athens

2.8.2 Private ICT Infrastructures

2.8.2.1 The Syzefxis project

The Greek "National Public Administration Network" called "SYZEFXIS[1]", is a project of the Greek Ministry of the Interior, Public Administration and Decentralization that implemented the current ICT infrastructure of the Greek public administration including all the law enforcement services and agencies. The objective of "SYZEFXIS" is the provision to the public organizations of Internet services without being obliged to develop and maintain complex ICT infrastructures. It applies the logic of providing services at the level of services with pre-agreed qualitative and quantitative characteristics (Service Level Agreement). The "SYZEFXIS" infrastructure provide services to all the bodies of the public sector (hospitals, social insurance funds, libraries and so on) allowing them to be connected between them as well as to any public administration or local authority through broadband networking. Local administration (municipalities) use these services for their internal communication and furthermore for providing citizens and enterprises access, via the Internet, to all the services of the public administration. "SYZEFXIS" currently provides voice, video and data communication infrastructure used by the Public Sector in Greece. The project has installed and maintain a stable and fast computer network based over the IP Protocol dedicated to the public

[1] http://www.syzefxis.gov.gr/en

sector organizations, ministries, municipalities, hospitals, social security foundations, schools and many other, counting in total about two thousand nodes. The network's architecture is based on the hub-and-spoke design. It is divided in six administrative areas, called "islets", Athens being the first (Islet 1) of these areas.

The “SYZEFXIS”network provides:

* Voice and data connectivity for 2,000 nodes;
* Broadband internet services and E-mail;
* A Website for each node supporting value added services, like directory services etc;
* Public key infrastructure for the users;
* Synchronous and asynchronous education;
* Teleconferencing services and
* Free telephony based on VoIP technology between all nodes.

2.8.2.2 The TETRA network

Normally all telecommunication platforms are used by the Greek Police including GSM/GPRS, radio, VHF and sitcom. WiFi networks are deployed ad hoc in specific cases while the main secure communication infrastructure is based on Motorola’s Dimetra system developed in frame of the Olympic Games 2004 that were organized in Athens. The Greek TETRA C4I network provides interconnected mobile radio services to specific user groups of Greek emergency and security services including Police, Fire Brigades, Hellenic Coast Guards and the Ambulances service.

The use of TETRA system supports secure communications required by the security services. However since TETRA uses also public infrastructures in some cases of natural disasters or a terrorist attack it can also fail. For this purpose modern terminals support both TETRA and VHF communication. Fire brigades and other services insist using VHF communication while Police prefers the use of TETRA.

The Motorola's Dimetra system which is used by the Greek law enforcement services is a **true IP-based TETRA system** and uses **Motorola's level-three encryption security**, which provides the highest level of secure TETRA communications technology commercially available today.

OTE (Hellenic Telecommunications Organization) is the first and till now the only provider of commercial TETRA services in Greece, using the frequency band of 410 – 430 MHz.

Law enforcement agencies in Athens use the TETRA system for supporting secure communication between the field actors and the operational or the incident command centre. The cutting-edge TETRA equipment in use by the Greek Police has significant capabilities for supporting voice and data communication. Main requirement in such conditions is the security of transmission of data (e.g. in case of terrorist attack) while in case of a natural disaster the transmission of video stream for monitoring the area (e.g. abandoned buildings following an earthquake to protect against thieves) would require increased bandwidth in order to have high resolution data (e.g. for face recognition). For example a Police Officer investigating a road accident or controlling a suspicious car will be able to relay image and sound simultaneously to the operational centre, thereby allowing, on their part,

for the simultaneous and rapid dispatch of the nearest and most capable required resources (Fire Brigades, Ambulances, and Police etc). **However due to maintenance problems data transmission via the TETRA network is not currently available.**

The Hellenic Police uses Motorola's TETRA system and handhelds for supporting such kind of applications. These devices are digitally programmed at a frequency that is impossible for any unauthorized parties to use and are equipped with a satellite reception system, a security alarm, and a location detector. The devices also have an internal communication capability and can function as telephones. The TETRA system used covers well the Attika region (Large Urban Zone of Athens and surrounding regions) for voice and data communication. TETRA devices are also installed in the police cars however they are used only for voice communication.

An advantage is considered the ubiquitous support of operational activity. TETRA devices used for secure communication during ad hoc missions are ruggedized for field use and accommodate GPS services, PTT, environmental noise filtering and DMO. Main problem mentioned already is the higher cost compared with other communication systems.

2.8.3 Telecommunications sector

The Mobile telecommunications market in Greece consists of three main players: Cosmote (part of OTE), Vodafone Greece, & Wind Hellas (single operator with Q-Telecom) and is currently experiencing maturity. Actual mobile penetration is estimated at 91 percent and despite market saturation during the last couple of years there was a 13 percent growth in subscriber numbers at least till 2010.

Mobile broadband is offered by all three national mobile phone operators. Speeds for both Wind Hellas and Cosmote providers are up to 28,8 Mbit/s download (HSDPA) and 5,72 Mbit/s upload, whilst Vodafon Greece offer broadband speed up to 42,2 Mbit/s download (HSDPA).

Satellite service for remote areas is offered through the Hellas Sat satellite PPP and under the "Hellas Sat Net" brand name. OTE, as one of the owners of Hellas Sat, offers Hellas Sat Net service through its own distribution channels (website, shops etc). The subscription packages either include a one-year commitment that is automatically renewed as unlimited time service after one year, or as a six-month limited subscription for "seasonal business" that is renewable on demand. The equipment is installed by Hellas Sat accredited engineers and it includes a Satnet S3020 DVB - RCS VSAT Terminal (Advantech) satellite modem and a 0,96 m Antenna (satellite dish with transmitter receiver). Hellas Sat Net connections are also used to interconnect public administration offices and schools in remote areas to the national administration network "SYZEFXIS" and to the Internet).

3. Public Safety Characterization

Hellenic police operates numerous applications relevant to safety issues. Generally these are data centric related applications which don't involve sensed data (at least not real time data from sensors). The normal procedures are to record incidents, dispatch and assign resources to each of them and filling report after action reports. In general the use of sensors by means of sensor networks providing information to the policemen for response purpose isn't included in the daily police activity. Normally police reacts to calls received through a phone-call centre, evaluating the call and dispatching the required resources. Specific missions requiring the use of sensor data are considered by specific divisions and for specific missions only.

What probably matches the SafeCity Area A' is the C4I systems of the 2004 Athens Olympic Games, which set the benchmark for the application of security technology. The centre piece of the Athens security apparatus was the surveillance and communications network designed to centralize all security-relevant information collected through various human and technological security channels and provided for a unified and integrated emergency response.

3.1 Area A: Citizens Behaviour

A network of traffic cameras was installed in Athens in context of the Athens 2004 public infrastructure. This network developed for regulating traffic conditions, certify traffic violations by vehicles, managing accidents, strengthen the protection of public buildings and sensitive areas, control and manage the operations of the Greek Police and recording data on criminal cases (which purpose is currently operated on a case basis).

Approximately 300 security cameras installed in the City of Athens since 2003-4 are currently in use. Their use has been though downgraded due to legal and ethical issues and a strong opposition from citizens and the Personal data protection authorities. A recent law (N.3917/2011) gives some flexibility regarding the future use of public surveillance systems for security purposes following extensive episodes downtown Athens in 2008 and 2011.

Typically there are two different CCTV networks in use in the Athens area. One includes the Security cameras and the other the Traffic Control cameras. These two networks are operated by two different operational centres (the Traffic management division and the General Police Direction of Athens), which are placed in the same building (different floors). Normally the resources of both networks are used for supporting traffic control tasks on a daily base while in extraordinary cases and based on specific permissions they can be also used for security tasks.

It should be emphasized that currently there is no software application in use associated to the operation of the Public CCTV network of Athens 2004 infrastructure and related to "Citizens Behaviour" monitoring tasks. Thus the system is currently used as a surveillance network for traffic monitoring which is monitored by operators (policemen) working in successive shifts.

Beyond the infrastructure of the public CCTV network of the C4I system there exist CCTV installations in shopping malls and streets are rather related with the private sector and are managed by the cameras' owners (or a security company working for him). There are strict legislative constraints regarding the use of the CCTV cameras and the data published or recorded. No direct use (data processing) is allowed by law. Data can be kept for a period of maximum 15 days. However

numerous security (alarm) systems (no cameras just sirens) are connected to the police district offices through telephone lines (other such systems are connected to the service centre of security service providers).

Local networks of CCTV cameras are used in critical buildings which are fitted in some cases (depending on the surveillance objective) with NIR sensors and motion detection s/w. Data are allowed to be recorded for a maximum period of forty five (45) days. In case of violation of the area data can be store for additional thirty (30) days and can be processed asking first for relative permission by the Prosecutor. The area under surveillance has to be marked obligatorily with proper signs (indicating the respective law and the purpose of monitoring of the area) in order to inform the people present that they are monitored.

CCTV cameras of Banks and other financial institutions are allowed to keep video records of their CCTV systems for forty five (45) days maximum in order to be used for the (off-line) analysis of cases of financial fraud or financial transaction dispute (+30 more days). The video data of the banks CCTV network are analyzed by expert people in case a specific case will appear. Further elaboration of data for creating human behaviour and normality patterns are out of the scope and the activity of Hellenic Police.

3.1.1 Security CCTV network of Athens 2004 system

3.1.1.1 General Description

Here next follows a description of the Security CCTV network implemented in context of the Athens 2004 OG since the respective C4I subsystem included infrastructure and applications quite relevant to the objectives and use cases of SafeCity. However it should be mentioned that nowadays only (part of) the infrastructure is used while automated applications aren't used at all due to legal and ethical issues raised repeatedly by relevant personal data protection authorities and organizations.

During the period of the Athens Olympic Games (2004) a complex C4I system has been developed. The Public Security CCTV subsystem included systems that were linked with a surveillance network of mobile terrestrial trunked radios (TETRAs), they received images and sound in real time being staffed by 22,160 security personnel and coordinated by a central operational centre. In addition to covering all of the sporting venues, the safety and security systems also had to monitor nearby harbours (Piraeus and Rafina) in addition to the traffic flow in Athens and the surrounding areas.

The system (Athens C4i) was composed of approximately 67 subsystems including 130 fixed and five mobile command centres, a secure digital trunk radio network with 23,000 terminals, a geographic information system, decision support applications, and the Standard Olympic Security Data Network. Biometric identification cards, 1,800 CCTV cameras, and an overhead surveillance blimp equipped with infrared surveillance and high-tech communications equipment surveyed and controlled access to all Olympic venues.

The main parts of the surveillance system included the following:

- **Camera PTZ**: Portable colour camera Pelco Esprit, ES31C22-2N-X PTZ model (Panoramic, optical Zoom) placed on the top of a pole 12m high (in five places, poles 8m high are used).

The camera has automatic focus with manually-operated predominance, automatic spectrum with manually-operated predominance and constant optic angle rotation of 360°.

- **Microphone**: The microphone Crown PZM-11LLWR is placed in 7m, on a pole 12m high, or in 5m, on a pole 8m high. It is weather proof and it operates during and after a rainfall. These microphones have been removed currently or are deactivated following the legal intervention of the Hellenic Data Protection Authority (HDPA).

- **Loudspeakers**: All the nodes have a loudspeakers installation.

The system gathered images and audio from an electronic web of over 1,000 high-resolution and infrared cameras, 12 patrol boats, 4,000 vehicles, nine helicopters, a sensor-laden blimp and four mobile command centres. Furthermore spoken words captured by sensors connected to the cameras were processed through speech-recognition software which transcribed voice into text that was then searched for patterns, as was other electronic communications entering and leaving the area—including e-mail and image files. It should be noticed that the integrated (Athens C4I) system including all the aforementioned components and capabilities didn't work properly during and not even after the end of the Olympic Games of 2004. No information is available regarding which applications and to what extent they were used during the period of the OG. No of the aforementioned applications is currently in use.

Apart from the applications, the infrastructure of the system is also not used for security purposes on a daily basis unless for specific cases concerning surveillance of specific areas for specific purpose and after getting permission to be used for such purpose.

3.1.1.2 Application Requirements

Currently there is no automated application in use. The safety and security applications considered within the C4I system of Athens 2004 OG aren't used officially for security purposes and thus there is no application which is operational nowadays. Any in-service elaboration of recorded data is based on human observation, experience and judgment. Requirements relative to potential such applications are mentioned in the annexes of this document.

3.1.1.3 System Architecture

No information is publicly available regarding the architecture of the systems mentioned above.

3.2 Area B: Road Track Incidents Management

Part of the CCTV network described before is devoted to road and traffic control and management. This infrastructure is managed by the Ministry of Public Works (nowadays Ministry of Transport and Communications) while its daily operation is performed by the Traffic Management Division of the Hellenic Police. It consists of **293 cameras (plus 49 others of the Ministry of the Environment) and is situated in the "General Police Department of Attica" (GADA) in a C3** facility called Operational Chamber for Traffic Monitoring and Control (THEPEK). The data are transferred over a private IP network. It should be mentioned that additional data coming from a network of inductive loops embedded in the surface of selected road paths is used as a complementary source of data for

supporting traffic management tasks of the Ministry of Transport. Furthermore traffic data are provided to interested parties for developing traffic-related applications available over the public internet (FEK 600/B'/15-5-06).

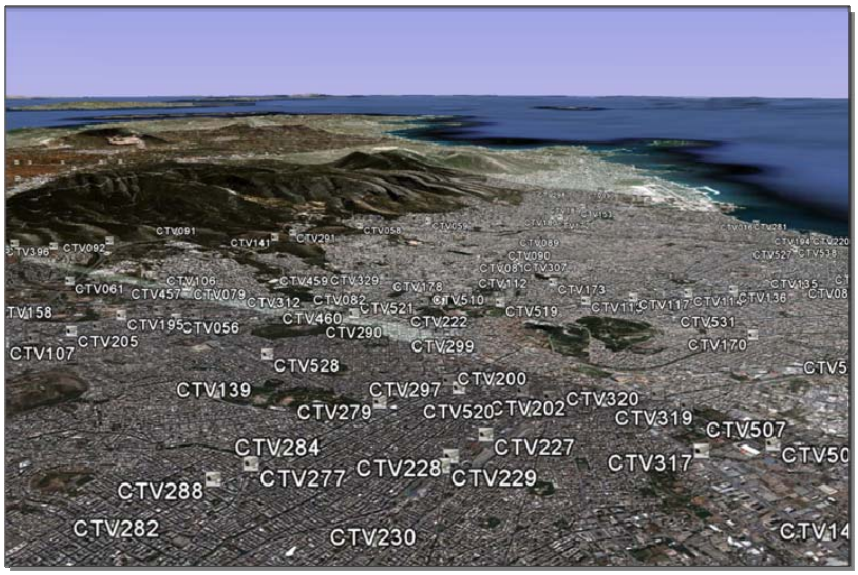

Figure 11. View of the distribution of traffic cameras in the LUZ of Athens

The cameras are positioned around the greater region of Athens as shown in Figure 11.

3.2.1 Intelligent Traffic System (ITS) Traficon module of Athens 2004 system

The ITS Traficon, is an automated traffic management module which was operated during the period of the Olympic Games 2004 in Athens. Although the module isn't operationally used nowadays the description that follows provides a comprehensive description of the requirements that a road track management application should address.

The ITS is based on video process units (detection cards), which transform image process algorithms into video signals, so as to define pre-arranged alarm conditions (traffic violations, traffic flow problems, accidents). As soon as an alarm situation is located, a unit transmits the alarm data, through the network, to the central ITS server of the Operations Room for the Monitoring and Control of Traffic (THEPEK), where the alarm signals from all units are collected and reported to, with the application of proper software. All the alarm signals are transferred a secure server.

The configuration of the ITS system includes the definition of areas of interest in the camera projection, with the "designing" of polygons or flow lines in these areas. In this way, circulation lanes, stop lanes and the no stop zones are defined.

For every camera PTZ that is moved from the pre-arranged ITS projection, the ITS function is de-activated by the software. During the move of the camera, the ITS adjustments are no longer in power, as they are applied in a certain projection and in a different scene they might create wrong alarm signals. De-activating ITS during the PTZ actions does not simply mean that the ITS alarm signals are not being recorded but also that they cannot be created in the first place, since the ITS unit enters a "zero situation", so that alarm signals are not created but also that wrong circulation

data are not received, too, which could lead to wrong alarm signals, even if the camera returned to its regular position.

The system has the potential to watch and evaluate the following categories of incidents that concern traffic circulation:

- Traffic congestion (applied to circulation lanes): Automatic distinction of up to 5 levels of traffic flow (service level), based on the speed of the flow and the occupation of the zone. Surveillance of the circulation flow speed is between 0 and 150 km/h for 8 lanes at the most. Traffic congestion corresponds with circulation flow alarm of the 4th level.
- Circulation load (applied to circulation lanes): Automatic distinction of up to 5 levels of traffic flow (service level), based on the speed of the flow and the occupation of the zone. Surveillance of the circulation flow speed is between 0 and 150 km/h for 8 lanes at the most. Circulation load corresponds with circulation flow alarm of the 3rd level.
- Circulation speed evaluation (applied to circulation lanes): Locating speed reduction, based on the speed of the flow.
- Locating an accident (applied to circulation lanes and cross-roads): Locating stopped vehicles in moving lanes.
- Unlawful stop and parking of a vehicle (applied to circulation lanes and cross-roads): Locating vehicles that have stopped unlawfully in pre-arranged location zones.
- Unlawful circulation of a vehicle (applied to circulation lanes and cross-roads): Locating vehicles moving to the wrong direction.
- Tailback on the traffic lights (applied to circulation lanes): In roads, where there is a traffic light ahead, to the direction of the circulation, the circulation flow is uneven. In these cases, the useful circulation data is the tailback on a traffic light.

The ITS supports the operations of the Centre to be organized in three levels i.e. Detection, Verification and Response.

The first level -Detection- provides the ability to locate and announce automatically to the operators the point of the road network, where traffic congestion occurs.

At the second level – Verification- the operators can check through images of the CCTV cameras and to determine the cause of the problem, which can be anything from a problematic stop or parking, an accident etc.

At the third level (Response) the necessary actions are made to address the problem. These can be:

- Appropriate setting of traffic lights according to the traffic conditions in the wider area and by selecting appropriate predefined programs or worst-cases programs
- Inform the drivers through variable message signs (VMS) to alter their itinerary, not to burden the problem and facilitate the move. The system is also equipped with microphones and loudspeakers for detecting abnormal events in the traffic zone (e.g. car crash) and provides instructions remotely. Alternatively location-based mass SMS messaging and internet could be used to spread this information.

- Send competent services in place to deal with (Mobile Investigation Unit, crane if necessary, Ambulance etc.).

3.2.2 Nowadays usage

3.2.2.1 General description

The Road track management system used in Athens uses a network of sensors which are represented by high-resolution Pelco Esprit ES31C22-2N-X auto-focus video cameras combining a receiver with embedded PTZ (Pan, Tilt, Zoom) module and appropriate enclosure in a single, easy-to-install system. Each unit includes an Integrated Optics Package (IOP) which contains an auto-focus camera and lens module (accuracy of few centimeters at a distance of up to 2 kilometers) with programmable features. The units are placed on top of poles 8 or 12m high and are equipped with ultrasensitive microphones (type Crown PZM-11LLWR) placed on 5m or 7m height in the poles of 8m or 12m respectively. Microphones can record sounds at distances up to 50 meters approximately, while units are also equipped with speakers, to allow giving voice commands and making announcements. Video data are in compressed mpeg format.

Nowadays the system is operated by the Traffic Management Division of the Hellenic Police. There are no applications for processing data available to the operators. The cameras are operated using the appropriate software of managing their positioning and movement (PTZ) in manual or automated manner.

In the Operations Chamber for the Monitoring and Control of Traffic (THEPEK) are available the following functions:

- Choosing any video source from a position of the Roads of Attica and projecting it at any CCTV screen.
- Choosing a video source from a position of the Roads of Attica and projecting the screen of the secure workstation managing the data.
- Transmission of phonetic signals from an authorized secure client of the Operations Chamber for the Monitoring and Control of Traffic to any sound box in position of the Roads of Attica.
- Optical angle/tilt/zoom control of any camera on the Roads of Attica, with control of the speed of optical angle/tilt/zoom.
- Manual control of the spectrum and focus of the camera.
- Manual control of the screen-wiper of the camera.

• Moving any camera of the Roads of Attica to a pre-arranged position – projection of a certain area with pre-arranged adjustments of optical angle, tilt and zoom. Every camera has pre-arranged position adjustments and also new ones can be created.

• Pre-arranging or activating the patrol function of a camera on the Roads of Attica.

A camera on a Road of Attica can move in a certain raw of positions, similar to a guard walking on a set route. Except for adjusting pre-arranged positions for every area in the patrol, intervals between the moves of the camera and the projecting raw of every area can be also defined.

• Defining or activating the sequence function of a camera on the Roads of Attica.

A screen can be adjusted so that it projects video from a lot of cameras of the Roads of Attica, one after another. In the sequence operation one or more pre-arranged positions are included for every camera. This allows for the periodic scanning of the whole perimeter of the multiple areas controlled, without the need for the user intervention.

• Local filing of video – video recording in the Secure-M workstation.

• Retrieving video and pictures in file and projecting them on the screen of the Secure-M workstation.

Figure 12 Operations Chamber for the Monitoring and Control of Traffic (THEPEK)

All data are transmitted to THEPEK (Figure 12) using optic fibre network infrastructure. The data are organized in ORACLE data base and are elaborated for a variety of purposes. Traffic data can be freely kept while video data have to be erased maximum eight days from the date they were recorded. Traffic data from the cameras and the network of inductive loops are integrated into the traffic management system which also includes the traffic lights control. Appropriate messages if needed are transmitted to VMS screens for the drivers while relevant authorities and services are asked to intervene (if necessary) according to the situation (fire brigades, ambulances, police etc).

The CCTV network (properly used, maintaining and updating its components) is advantageous for situation awareness operation, monitoring traffic conditions, identify problems and support the response measures required to address different kind of problems.

For the purpose of traffic monitoring and management the infrastructure of the system is considered almost complete. Additional applications on top of it making use of the data that can be collected and transmitted could improve its efficiency and performance.

The system uses wired fibber optics infrastructure and large database of information arranging events according to the following typology: accidents, marches, public works, damaged cars, weather and extraordinary events. Raw data of the system are publicly available on a charge basis.

A typical distribution of traffic events managed by the Operations Chamber of Traffic Monitoring and Control referring to 23620 events handled from 2004 till 2011 is shown in Figure 13.

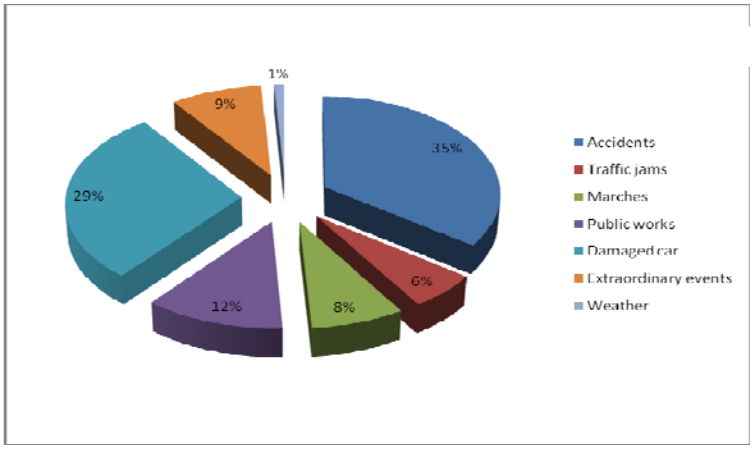

Figure 13. Distribution of the incidents managed by THEPEK
(Source: Ministry of Infrastructures, Transport and Networks, Gen.Secr. of Public Works)

Another graph here next (Figure 14) shows the average-monthly distribution of the event categories along the year.

Normally road-tracking information is collected from police patrols as well as from citizens contacting the Traffic Police call-centre to announce a problem. Appropriate resources are mobilized then. The CCTV network, information from radio-taxi associations and road assistance companies provide real time information in order to confirm previous announcements.

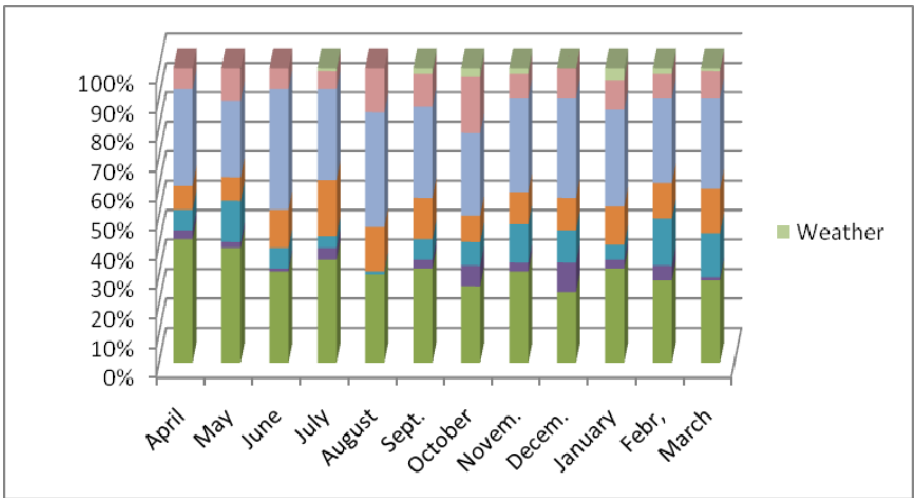

Figure 14 Distribution of events by type during the year duration
(Source: Ministry of Infrastructures, Transport and Networks, Gen.Secr. of Public Works)

3.2.2.2 *Application and Infrastructure Deployment*

In figure 15 is shown the coverage of the CCTV network dedicated to road track incidents management, delineated by a red line and overlaid to the Athens Large Urban Zone. The position of the two centres i.e. the Operations Chamber of Traffic Control and Monitoring of the Hellenic Police (THEPEK) and the CCTV network maintenance and management centre (MT-OC) are shown as well.

Figure 15 Delineation of the coverage of the CCTV network for road track incidents management (red line)

3.2.2.3 *Application Requirements*

Currently there is no automated application available for road track management and control. The requirements mentioned in section 3.2.1 concerning the ITS can be considered.

3.2.2.4 *System Architecture*

No available public information exists concerning the system architecture.

3.3 Area C: Environmental Monitoring

3.3.1 Meteorological data monitoring

There are several networks public and private supported by advanced modelling applications which provide weather related information for the area of Athens including information and alerts regarding severe and extreme weather. These networks include the Hellenic Meteorological Service [2](HNMS), the National Observatory of Athens (NOA[3]), the Physics Dept of the University of Athens (Skyron[4]) and the Poseidon system [5]of the Hellenic Centre for Marine Research operating a network of observation buoys for supporting forecasting of sea movement.

3.3.2 Air quality monitoring network

There is a network of measuring stations spread across the Greater Athens Area which is operated by the Greek Ministry of Environment and Climate change[6]. The network aims to monitor air quality level and to provide daily measurements and alerts through internet or dedicated data provision services to interested parties (Figure 16). The network consists of monitoring stations in 17 sites in the Greater Athens Area, measuring Sulfur dioxide (SO2), Nitrogen dioxide (NO2), Nitrogen oxide (NO), Carbon monoxide (CO), Lead (Pb), Benzene (C6H6), Particulate matters and Ozone as a secondary photochemical pollutant.

[2] http://www.hnms.gr/hnms/english/index_html?

[3] http://cirrus.meteo.noa.gr/forecast/bolam/index.htm

[4] http://forecast.uoa.gr/forecastnew.php

[5] http://www.poseidon.hcmr.gr/index.php

[6] http://www.ypeka.gr/Default.aspx?tabid=708&locale=en-US&language=el-GR

	Today on 30/08/2011 the levels until 13:00 varied:	Yesterday on 29/08/2011 the levels varied:
Ozone	• from 3 μg/m^3 at the **LIOSIA,** station • to **158** μg/m^3 at the **MAROUSI** station	• from **9** μg/m^3 at the **PATISION,** station • to **124** μg/m^3 at the **KOROPI** station
	Public information level **180 μg/m^3** -- Alarm level **240 μg/m^3** . Hourly mean values	
Nitrogen Dioxide	• from **1** μg/m^3 at the **THRAKOMAKEDONES,** station • to **174** μg/m^3 at the **PATISION** station	• from **1** μg/m^3 at the **LIKOBRISI,** station • to **146** μg/m^3 at the **PATISION** station
	Alarm Level **400 μg/m^3** Hourly mean values.	
Sulfur Dioxide	• from **2** μg/m^3 at the **PERISTERI,** station • to **12** μg/m^3 at the **PIREAUS** station	• from **2** μg/m^3 at the **PATISION,** station • to **18** μg/m^3 at the **PIREAUS** station
	Alarm Level **500 μg/m^3** Hourly mean values.	
Sulfur Dioxide		• from **2** μg/m^3 at the **PERISTERI,** station • to **8** μg/m^3 at the **PIREAUS** station
	Limit value **125 μg/m^3** -- Not to be exceeded more than 3 times per year. 24 hourly values.	
Carbon Monoxide	• from **0.3** mg/m^3 at the **PERISTERI,** station • to **2.2** mg/m^3 at the **PATISION** station	• from **0.2** mg/m^3 at the **PERISTERI,** station • to **1.6** mg/m^3 at the **PATISION** station
	Limit value **10 mg/m^3**. 8 hourly values	
PM-10 Particulate Matter		• from **18** μg/m^3 at the **LIKOBRISI,** station • to **35** μg/m^3 at the **PIREAUS** station
	Undefined Alarm level. Limit value **50 μg/m^3** -- not to be exceeded more than 35 time per year. 24 hourly values.	

Figure 16. **Published measurements from the air quality monitoring network of Athens**

3.3.3 Seismicity monitoring network

Greece is one of the world's most seismically active countries and thus this is considered a major safety issue and a high priority of civil protection in the country. Fortunately, most Greek earthquakes are relatively mild but there is always the potential for more severe seismic activity. Athens is situated in an area of high seismicity. This is the reasons that buildings are built using specific construction codes in order to be safe during earthquakes. Similar quakes often strike nearby Turkey and result in much more extensive damage and injuries due to less-strict building codes.

Greek seismicity is monitored mainly by the Institute of Geodynamics (IG), National Observatory of Athens, which is one of the oldest Institutes in Greece, operating continuously since 1893. The Institute operates a network of 42 digital telemetric stations (seismographs) installed in the areas of the Gulf of Corinth (south-west of Athens with earthquakes having impact in the Greater Athens Area), central Greece and around Athens in an area of 100km radius. In addition to this IG has developed a network of 27 stations in cooperation with “Attiko Metro” (the Athens Metro company) that are installed along the underground network of the Metro. Furthermore in cooperation with the Technical Services of the Local Authorities of the Region of Attika, IG installed 3 digital accelerographs in the Municipalities of Elefsis, Drapetsona and Acharnon in the Wests section of the Athens Greater Area. In Figure 17 is shown a map with the locations of the installed stations of the IG in the region of Attica.

In parallel the University of Athens (Faculty of Geology) operates a network of 32 stations, the "Athenet network" including seismographs installed in the region of Attika, surrounding the Athens Greater Area.

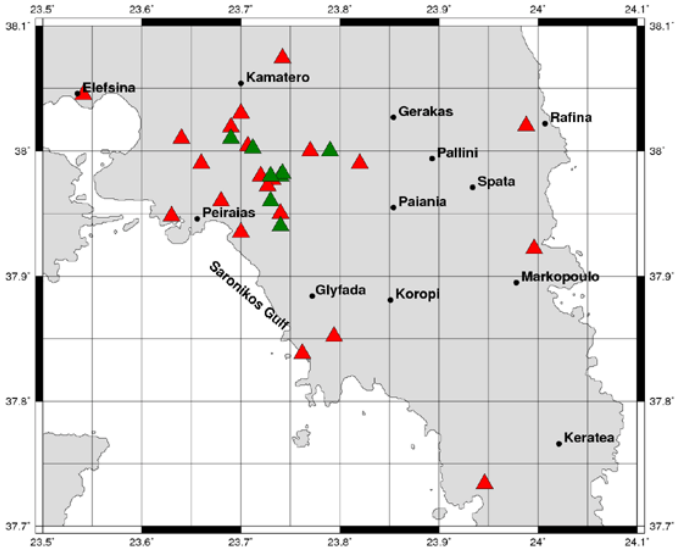

Figure 17. **Map of the seismological stations of the Institute of Geodynamics (IG) of NOA**

3.4 Area D: Alerting Citizens

There is national legislation regulating the transmission of security related information. Security alerts are made through the Public Relations Division of the Hellenic Police. Mass alerting is made using TV, radio and mass media channels. Internet, by means of the Hellenic Police web site is also used for non-urgent cases (slow type escalation crises) or ordinary information broadcasting (e.g. road blocked from traffic, manifestations in a certain area, etc).

Broadcasting of security related information to the public has different levels and different requirements of information management from the operational point of view. In most cases the communication node is the Public Relations and Communication Division of the Hellenic Police.

In any case mass alerting can't be trusted only to sensors but it should be confirmed and controlled by the security services in charge. Automatic alerting isn't practised at all by the Hellenic Police.

Extreme weather forecasts (floods, storms, heat waves and so on) are made available to the Athenians through the internet by the National Hellenic Meteorological Service (HNMS), National Observatory of Athens (NOA) and other private meteorological information providers. Alerts are issued by the General Secretariat of Civil Protection based on forecasts provided by HNMS.

3.5 Area E: Ad-hoc networks

Ad-hoc networks aren't used operationally by the Greek law enforcement services. For specific purposes ad-hoc measuring networks are installed in cooperation with public research institutes and university labs according to the needs of the operations.

4. Social, Ethical and Legal implications

There is an extended and strict legislative framework regarding the use of surveillance systems in public areas in Greece [7]. The legal basis includes the following:

- Article 8 of the European Treaty on Human Rights for the protection of private life;
- Convention 108/1981 of the Council of Europe for the protection of Individuals with regard to Automatic Processing of Personal Data (validated by the Greek Law L. 2068/1992);
- Articles 7 (protection of private life) and 8 (protection of personal data) of the Charter of Fundamental Rights of the European Union;
- Directive 95/46/EC of 24 October 1995 for the protection of natural persons with regard to the processing of personal data and also for the free circulation of these data;
- Articles 9 and 9^{A} of the Constitution;
- Recommendation No. R(87) 15 of the Council of Europe;
- L. 2472/97 on the protection of individuals with regard to the processing of personal data and
- L. 3917/2011 which excludes Hellenic Police from the application of the L.2472/97.

Several problems are addressed in relation to restrictions posed by the Hellenic Data Protection Authority (HDPA[7]) concerning the use and operation of the CCTV network installed in Athens for security purposes which also influence and limit the use of the network for traffic law enforcement. A detailed description of these restrictions is provided here next.

1. The system is allowed to operate exclusively for the purpose of regulating the traffic of vehicles. Using the system and utilizing the data, collected through the system and recorded on it for any other reason is forbidden, including discovering offences, other than those related to regulating circulation.

2. Those cameras set on road axes of heavy traffic, for the regulation of which the use of cameras is necessary, are allowed to operate. The operation of cameras set on low traffic roads, squares, parks, pedestrian zones and citizens' assembly places (i.e. theater entrances).

3. Cameras must operate in such a way that taking and recording pictures of the entrance or the interior of houses is not possible. Therefore, cameras must be adjusted so that either they are stable or projecting certain areas through proper restrictions of the optical angle, tilt or zoom is allowed.

4. Taking and recording sound is prohibited. Therefore, microphones must be taken off the poles, on which they are set.

5. The operation of cameras set on crossroads or road axes is prohibited, when the traffic of vehicles is interrupted on them, i.e. during manifestations, demonstrations etc.

[7] http://www.dpa.gr/portal/page?_pageid=33,40911&_dad=portal&_schema=PORTAL

6. The system must be supervised and controlled only by the Operations Room for the Monitoring and Control of Circulation of the Traffic Police Headquarters, where the database and the equipment, supporting the process, will be kept, and no other Department will have access to it or will it be available to, than the Traffic Police Headquarters.

7. Transmitting data to third parties is prohibited.

8. The data will be kept for seven days at the most, after the passage of which, the data will have to be deleted.

9. The processing system and data storage security measures are kept unswervingly.

10. For every one of the cameras, before the person enters its range, he/she is informed in an appropriate and express manner (adequate number of discernible signs in conspicuous positions), that he/she enters an area that is monitored, and also of the purpose of monitoring.

Furthermore the Controller must submit to the Authority the following for approval:

- The final setting positions of the equipment CCTV, as they will be determined after the application of the above. It is noted that the final setting positions of the cameras of the C4I project and the pre-existing and integrated in the system in question cameras of the Hellenic Police must be given.

- The final configuration of the system, which will at least include for each one of the setting positions of the equipment, the area of the camera's interest (polygon or flow lines in this area) and the restrictions of the camera's optical angle, tilt and zoom.

- Security Policy, which will at least include the suggested measures mentioned on the attached document.

- A Code of Ethics Text concerning the protection of personal data, kept for all the categories of staff having direct or indirect access to them (CCTV screen and Secure-M workstations users, Secure-M authorized clients, system managers etc.).

Recently there is a new law which allows a more extended use of data and information from CCTV networks.

Despite the great capabilities of the system its current use is limited by the legal restrictions related to the conflicts of use of the CCTV devices against the protection of personal data. The Hellenic Data Protection Authority (HDPA) has rejected any use of the system other than traffic monitoring. The DPA ruled that the use of the cameras is legitimate only for those installed in high-traffic roads. Cameras installed in low-traffic roads, parks, sidewalks, entrances of crowded buildings such as theaters etc are practically out of use and there is a legal decision that they have to be removed – actually Hellenic Police is terminated for not complying yet to this decision). Furthermore there is a restriction to operate the cameras for monitoring entrances or the internal of residences while any data recorded have to be deleted after the expiration of seven days.

Request of the Ministry for the Protection of the Citizen to use the CCTV network for securing manifestations, demonstrations, rallies and protest marches against episodes organized by troublemakers has been legally rejected by the court.

5. Challenges in Public Safety

5.1 Current Limitations and Gaps

As it is obvious from the description provided above the City of Athens has a quite modern public surveillance infrastructure in terms of hardware; however the law enforcement services address problems with legal restrictions for operating the system in an efficient manner for supporting security tasks. In addition problems of maintenance costs and lack of skilled personnel contribute to downgrading the use and operation of the existing infrastructure.

As regards the operations of CC Centres the main inefficiencies are related to lack of interoperability between systems used by different services. The information and data of the different CCs isn't fused and integrated and thus it is underutilized. Furthermore incompatibility of the format of the information used (in particular concerning spatial information) makes useless a significant amount of information.

It is quite common that much less of what has been developed in terms of systems is operational due to problems of interoperability and compatibility. An additional issue is that technology offered often surpasses the ability of the personnel while the design of the systems and the respective applications is in most cases technology- and not user-driven. Thus the systems are not used properly (or at all).

5.2 On-going innovative Initiatives

The recent approval of the law L. 3917/2011 which excludes Hellenic Police from the application of the L.2472/97 on the protection of individuals with regard to the processing of personal data and in general from the strict limitations of the Hellenic Data Protection Authority (HDPA) will contribute to using efficiently the existing infrastructure in the future and consider the possibility of including sophisticated s/w applications for exploiting its potential for security purposes.

5.3 Ideas for the future

During the first six months of the SafeCity project KEMEA organized several personal and joint meetings, interviews and presentations to representatives of all Greek law enforcement Services including Hellenic Police, Fire Brigades, Ambulance services, the General Secretariat of Civil Protection and the Hellenic Coast Guards. Although most of these meetings were related to filling the Questionnaire of SafeCity project this wasn't possible due to the variety of the background, specialization, role and involvement in public safety and security tasks of the interviewed persons. Thus KEMEA collected the feedback received in a single Questionnaire which is included in the Annex of this Deliverable (Annex A).

In this Questionnaire are included ideas for potential applications and use of the existing infrastructure in the future.

Furthermore in order to provide a use case scenario based on the experience and ideas of the people of the Security services with whom KEMEA collaborated for the SafeCity project a comprehensive

scenario of an eventual incident has been developed including a detailed list of needs, requirements and ideas for future elaboration. The description of this scenario can be found in Annex B.

5.4 Future Characterization

There are no spatial data or information available concerning potential future expansion of the infrastructure and the applications mentioned above. In any case potential operational use of the application relative to the Area A of SafeCity (Citizens behaviour) would be considered first for the centre of Athens (District 1), which is shown in Figure 18 together with the perimeter covered by the road track incidents management application (red line).

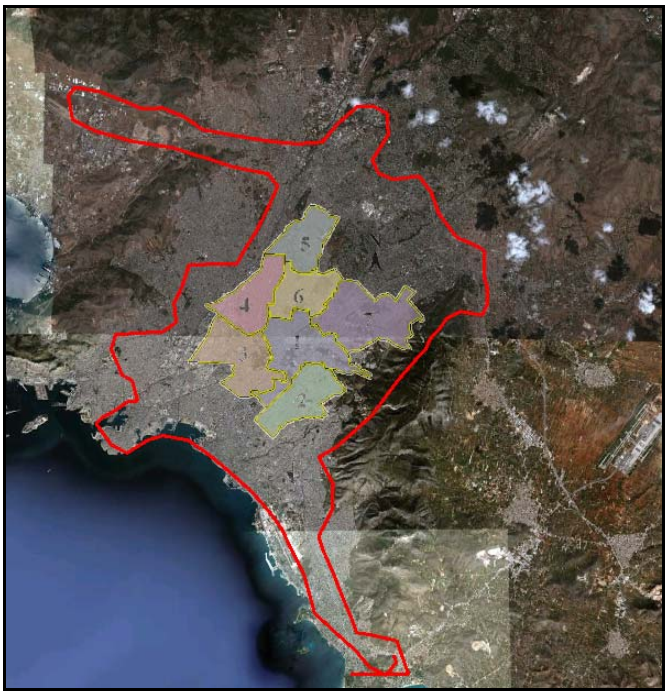

Figure 18. Athens District 1, candidate area for application of SafeCity Area A and red line closing the area of application of Area B

Annex A – "Minutes of personal interviews…"

The SafeCity Questionnaire

Current State of the Art (From the SafeCity Questionnaire)

Area A: Situational Awareness

Situational Awareness involves being aware of what is happening around you to understand how information, events and your own actions will impact your goals and objectives.

Based on SafeCity framework, depending on aspect to be monitored sensors could be classified into:

- *Citizen sensors enabling detection of alerting situations caused by pedestrians, citizens (e.g. visual monitorization with CCTV).*
- *Road-track sensors enabling detection of alerting situations cause by vehicles.*
- *Environmental sensors enabling detection of alerting situation caused by environmental conditions*
- *Mobile sensors enabling detection of alerting situations on the move (e.g. from patrol vehicles).*

The case of the OperationS Chamber of Traffic Monitoring and Control (called THEPEK) in Athens is used for providing the information related to AREA A of the SafeCity project (being the most relevant).

1. Within this area if you identify **applications** that you use in your daily operation, please list them including in each case:

    a. Concept of use.

    Hellenic police operates numerous applications relevant to safety issues. Generally these are data centric related applications which don't involve sensed data (at least not real time data from sensors). The normal procedures are to record incidents, dispatch and assign resources to each of them and report after action. In general the use of sensors by means of sensor networks providing information to the policemen for response purpose isn't the main dish of the daily police activity. Normally police reacts to calls received through a phone call centre, evaluation of the call and dispatching the required resources. Specific missions requiring the use of sensor data are considered by specific divisions.

    However what probably matches the SAFECITY Area A' concern is the 2004 Athens Games which set the benchmark for the application of security technology. The centrepiece of the Athens security apparatus was the surveillance and communications network designed to centralize all security-relevant information collected through various human and technological security channels and allow for a unified and integrated emergency response. It was composed of approximately 67 subsystems including 130 fixed and five mobile command centres, a secure digital trunk radio network with 23,000 terminals, a geographic information system, decision support applications, and the Standard Olympic Security Data Network. Biometric identification cards, 1,800 CCTV cameras, and an overhead surveillance blimp equipped with infrared surveillance and high-tech communications equipment surveyed and controlled access to all Olympic venues.

    As a legacy of the C4I system, Police (Traffic management division) has access to CCTV cameras (IP-based) for traffic control purposes. The network of the traffic cameras in Athens

was installed for regulating traffic conditions, certify traffic violations by vehicles, managing accidents, strengthen the protection of public buildings and sensitive areas, control and manage the operations of the Greek Police and recording data on criminal cases of crime. The system consists of 293 cameras (plus 49 others of the Ministry of the Environment) and is operated by the "General Police Department of Athens" (GADA) in a C3 facility called Operations Chamber for Traffic Monitoring and Control (THEPEK). During the period of the Olympic Games the CCTV systems were linked with a surveillance network of mobile terrestrial trunked radios (TETRAs), which received images and sound in real time and were staffed by 22,160 security personnel and coordinated by a central operational centre. The scope of these requirements was enormous. In addition to covering all of the sporting venues, the safety and security systems also had to monitor nearby harbors in addition to the traffic flow in Athens and the surrounding areas. The system gathered images and audio from an electronic web of over 1,000 high-resolution and infrared cameras, 12 patrol boats, 4,000 vehicles, nine helicopters, a sensor-laden blimp and four mobile command centres. Furthermore spoken words captured by sensors connected to the cameras were processed through speech-recognition software which transcribed voice into text that was then searched for patterns, as was other electronic communications entering and leaving the area—including e-mail and image files. It should be noticed that the integrated system of all these components didn't work properly during not even after the end of the OG.

The cameras are positioned around the greater region of Athens (actually the system includes cameras installed in other Greek Olympic cities) as shown in the figure below.

The Centre operations are organized in three levels i.e. Detection, Verification and Response.

The first level -Detection- provides the ability to locate and announce automatically to the operators the point of the road network, where traffic congestion occurs.

At the second level – Verification- the operators can check through images of the CCTV cameras and to determine the cause of the problem, which can be anything from a problematic stop or parking, an accident etc.

At the third level – Response- the necessary actions are made to address the problem. These can be:

- Appropriate setting of traffic lights according to the traffic conditions in the wider area and by selecting appropriate predefined programs or worst-cases programs

- Inform the drivers through variable message signs (VMS) to alter their itinerary, not to burden the problem and facilitate the move. The system is also equipped with microphones and loudspeakers for detecting abnormal events in the traffic zone (e.g. car crash) and provides instructions remotely. Alternatively location-based mass SMS messaging and internet could be used to spread this information.

- Send competent services in place to deal with (Mobile Investigation Unit, crane if necessary, Ambulance etc.).

Despite the great capabilities of the system its current use is limited by the legal restrictions related to the conflicts of use of the CCTV devices against the protection of personal data.

The Hellenic Data Protection Authority (HDPA) has rejected any use of the system other than traffic monitoring. The HDPA ruled that the use of the cameras is legitimate only for those installed in high-traffic roads. Cameras installed in low-traffic roads, parks, sidewalks, entrances of crowded buildings such as theaters etc are practically out of use and there is a legal decision that they have to be removed –actually Hellenic Police is terminated for not complying yet to this decision). Furthermore there is a restriction to operate the cameras for monitoring entrances or the internal of residences while any data recorded have to be deleted after the expiration of seven days.

Request of the Ministry for the Protection of the Citizen to use the CCTV network for securing manifestations, demonstrations, rallies and protest marches against episodes organized by troublemakers has been legally rejected by the court.

Normally road-tracking information is collected from police patrols as well as from citizens contacting the Traffic Police call centre to announce a problem. Appropriate resources are mobilized then. The system of electronic cameras, radio-taxi associations and road assistance companies provide real time information in order to confirm previous announcements.

CCTV installations in shopping malls and streets are rather related with the private sector and are managed by camera owner (or a security company working for him). There are strict legislative constraints regarding the use of the CCTV cameras and the data published or recorded. No direct use (data processing) is allowed. Data can be kept for a period of maximum 15 days. However numerous security (alarm) systems (no cameras just sirens) are connected to the police district offices through telephone lines (other such systems are connected to the service centre of security service providers).

CCTV cameras of Banks and other financial institutions are allowed to keep video records of their CCTV systems for 45 days maximum in order to be used for the (off-line) analysis of cases of financial fraud or financial transaction dispute (+30 more days). The video data of the banks CCTV network are analyzed by expert people in case a specific case will appear. Further elaboration of data for creating human behaviour and normality patterns are out of the scope and the activity of Hellenic Police.

b. Actuation procedure followed during the utilization of this application.

Most of the response is actuated by voice contacting to appropriate call centres of the different divisions of the Hellenic Police (Traffic police, Emergency Police etc). Currently all the response stage is recorded manually. Currently is in progress the application of a project (actually the results of an R&D project implemented by two Greek academic institutes) for e-ticketing (in Athens, Thessaloniki and the National road Athens-Patras) following road controls, exceeding speed limits and even illegal parking. The policeman fill the record using a proper device which sends the data to a central data base for checking and issuing the e-ticket which is consequently sent by mail to the car owner. It isn't foreseen although it could be interesting to assign photos proving the violation to the e-ticket. This is the case of the (92) fixed radars used in the national roads which are actuated by the breaching of the speed limit that further activates a camera with flash which send the data to the central data management centre for further processing. This procedure is applied only in national roads and not in the cities. A similar procedure is followed using the network of IP cameras

in Athens (although the network refers to the entire Attika region) for specific location-based traffic violations; however the only information recorded is the number of the car plate and the relative photo. Normally in the cities (high-speed roads) hand-held laser and RF radar devices are used by policemen for car speed control.

c. Related to your organization operations, indicate key requirements of this application. Paying special attention on ICT needs (e.g. BW, bps, latency, QoS, etc).

Current network capabilities aren't a problem for application of the technology of electronic traffic monitoring. Currently the image transmission isn't required in real time (thus BW and latency aren't a problem) although high resolution is needed for the number recognition in the plate. In case the system would be used for systematic control of traffic violations and situation awareness increased bandwidth and network speed would be required.

d. Which concrete sensors does your organization use for this application? What is the purpose of each of them? What is the format of the output data?.

The sensors are represented by high-resolution Pelco Esprit ES31C22-2N-X auto-focus video cameras which combine a receiver with embedded PTZ (Pan, Tilt, Zoom) module and appropriate enclosure in a single, easy-to-install system. Each unit includes an Integrated Optics Package (IOP) which contains an auto-focus camera and lens module (accuracy of few centimeters at a distance of up to 2 kilometers) with programmable features. The units are placed on top of poles 8 or 12m high and are equipped with ultrasensitive microphones (type Crown PZM-11LLWR) placed on 5m or 7m height in the poles of 8m or 12m respectively. Microphones can record sounds at distances up to 50 meters approximately, while units are also equipped with speakers, to allow giving voice commands and making announcements. Video data are in compressed mpeg format.

All data are transmitted to THEPEK using optic fiber network infrastructure. The data are organized in ORACLE data base and are elaborated for a variety of purposes. Traffic data can be freely kept while video data have to be erased maximum eight days from the date they were recorded. Traffic data from the cameras and the induction loops are also integrated into the traffic management system including the traffic lights control. Appropriate messages if needed are transmitted to VMS screens for the drivers while relevant authorities and services are asked to intervene according to the situation (fire brigades, ambulances, police etc).

e. Advantages.

The system (if properly used) is advantageous for situation awareness operation, monitoring traffic conditions, identify problems and support the response measures required to address different kind of problems. Despite this fact legal constraints prevent the full exploitation of the system's capabilities.

f. Gaps detected (e.g. additional info, inefficiencies, etc).

For the purpose of traffic monitoring and management the system is considered almost complete. Additional applications on top of it making use of the data that can be collected and transmitted could be associated to its complete use.

g. Infrastructure involved in this application (e.g. data bases, wired fibber connections, wireless standards, etc), private or public networks. Main constrains imposed by this infrastructure.

The system uses wired fibber optics infrastructure and large database of information arranging events according to the following typology accidents, marches, public works, damaged cars, weather and extraordinary events. Raw data are publicly available on a charge basis.

Main constrain remain the legal restrictions.

h. Is it Internet-based application?.

The application runs on a private IP network. However traffic data are provided to interested parties for developing traffic-related applications available over the public internet (FEK 600/B'/15-5-06).

i. Which information security policies do you use within this application?.

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j. Which ethical and legal policies do your organization satisfies in order to make use of this application?

Several problems are addressed in relation to restrictions posed by the Hellenic Data Protection Authority. A detailed description of these restrictions is provided here next.

1. The system is allowed to operate exclusively for the purpose of regulating the traffic of vehicles. Using the system and utilizing the data, collected through the system and recorded on it for any other reason is forbidden, including discovering offences, other than those related to regulating circulation.

2. Those cameras set on road axes of heavy traffic, for the regulation of which the use of cameras is necessary, are allowed to operate. The operation of cameras set on low traffic roads, squares, parks, pedestrian zones and citizens' assembly places (i.e. theatre entrances).

3. Cameras must operate in such a way that taking and recording pictures of the entrance or the interior of houses is not possible. Therefore, cameras must be adjusted so that either they are stable or projecting certain areas through proper restrictions of the optical angle, tilt or zoom is allowed.

4. Taking and recording sound is prohibited. Therefore, microphones must be taken off the poles, on which they are set.

5. The operation of cameras set on crossroads or road axes is prohibited, when the traffic of vehicles is interrupted on them, i.e. during manifestations, demonstrations etc.

6. The system must be supervised and controlled only by the Operations Room for the Monitoring and Control of Circulation of the Traffic Police Headquarters, where the database and the equipment, supporting the process, will be kept, and no other Department will have access to it or will it be available to, than the Traffic Police Headquarters.

7. Transmitting data to third parties is prohibited.

8. The data will be kept for seven days at the most, after the passage of which, the data will have to be deleted.

9. The processing system and data storage security measures are kept unswervingly.

10. For every one of the cameras, before the person enters its range, he/she is informed in an appropriate and express manner (adequate number of discernible signs in conspicuous positions), that he/she enters an area that is monitored, and also of the purpose of monitoring.

Furthermore the Controller must submit to the Authority the following for approval:

- The final setting positions of the equipment CCTV, as they will be determined after the application of the above. It is noted that the final setting positions of the cameras of the C4I project and the pre-existing and integrated in the system in question cameras of the Hellenic Police must be given.
- The final configuration of the system, which will at least include for each one of the setting positions of the equipment, the area of the camera's interest (polygon or flow lines in this area) and the restrictions of the camera's optical angle, tilt and zoom.
- Security Policy, which will at least include the suggested measures mentioned on the attached document.
- A Code of Ethics Text concerning the protection of personal data, kept for all the categories of staff having direct or indirect access to them (CCTV screen and Secure-M workstations users, Secure-M authorized clients, system managers etc.).

Recently there is a new law which allows a more extended use of data and information from CCTV networks.

2. Does your organization have different data sources (e.g. criminal data-base)? In that case, please list them.

THEPEK is associated with data bases related to traffic violation issues which are managed however by a different division.

Area B: Ad-hoc Network

SafeCity is researching to enable the introduction of far more devices and sensors, data management and storage devices. Moreover, it is design to include ad-hoc mobile communication networks that could be also deployed at strategic points where an incident occurs especially when communication infrastructures get damaged or a special event happens (strike, manifestation, special games, etc).

3. Within this area if you identify applications that you use in your daily operation, please list them including in each case:
    a. Concept of use.

Hellenic Police uses ad-hoc network creation for specific missions. This issue is related with mobile command centres (vehicle-mounted) which can be used in crisis management situations associated with natural disasters or terrorist acts. Normally within the city boundaries the communication requirements are covered by existing network infrastructure.

Thus no specific application is used. If needed a sitcom module can be used or a network of mesh modems can be established for ad hoc for transmitting video and other data. In ESS, a Security project in which KEMEA participates, ad-hoc networking is supported by an IMSI catcher device which creates a local communication node (cell) for serving the actors in the field of the incident while communication to the outside world is supported by a sitcom module. In some cases a solution for creating ad-hoc networks to support operations is to establish a network of mesh modems.

b. Actuation procedure followed during the utilization of this application.

The ad-hoc network is established in case of general failure of telecommunications as well as in case the area isn't covered by any kind of network.

As regards the use of TETRA system for supporting secure communication between the field actors and the operational or the incident command centre the cutting-edge TETRA equipment in use by the Greek Police have significant capabilities for supporting voice and data communication. For example a Police Officer investigating a road accident or controlling a suspicious car will be able to relay image and sound simultaneously to the operational centre, thereby allowing, on their part, for the simultaneous and rapid dispatch of the nearest and most capable required resources (Fire Brigades, Ambulances, Police aid etc).

c. Related to your organization operations, indicate key requirements of this application. Paying special attention on ICT needs (e.g. BW, bps, latency, QoS, etc).

Main requirement in such conditions is the security of transmission of data (e.g. in case of terrorist attack) while in case of a natural disaster the transmission of video stream for monitoring the area (e.g. abandoned buildings following an earthquake to protect against thieves) would require increased bandwidth in order to have high resolution data (e.g. for face recognition).

d. Advantages.

Main advantage is the ubiquitous support of operational activity. TETRA devices used for secure communication during ad hoc missions are ruggedized for field use and accommodate GPS services, PTT, environmental noise filtering and DMO.

e. Gaps detected (e.g. additional info, inefficiencies, etc).

Mainly the lack of specialized and trained personnel since this kind of solutions are required only once in long periods of time and this makes their application inefficient. From the other hand side the respective technology isn't so simple, mature and user friendly which males user to look for old fashioned approaches (e.g. voice communication). Security also using wireless communication is always a concern for law enforcement services.

The use of TETRA system supports secure communications required by the security services. However since tetra uses also public infrastructures in case of a natural disaster ot terrorist attack it can't be operated. For this purpose modern terminals support both TETRA and VHF communication. Fire brigades and other services use constantly VHF while Police supports the use of TETRA.

f. Infrastructure involved in this application. Main constrains imposed by this infrastructure.

The Hellenic Police uses Motorola's TETRA system and handhelds for supporting such kind of applications. These devices are digitally programmed at a frequency that is impossible for any unauthorized parties to use and are equipped with a satellite reception system, a security alarm, and a location detector. The devices also have an internal communication capability and can function as telephones. The TETRA system used covers well the Attika region (Greater Athens area and surrounding region) for voice and data communication. TETRA devices are also installed in the police cars however they are used there for voice communication.

Main problem mentioned is the higher cost compared with other communication systems.

g. Which information security policies do you use within this application?

4. Which communication networks are currently used between different bodies and among members of the same body (PMR, Radio TETRA, TETRAPOL, UHF, Radio, Satellite links, GSM/GPRS/UMTS, WiFi, WiMax, etc)?

Normally all telecommunication platforms are used by the Greek Police including GSM/GPRS, radio, VHF and sitcom. WiFi networks are deployed ad hoc in specific cases while the main secure communication infrastructure is based on Motorola's Dimetra system developed in frame of the Olympic Games 2004 that were organized in Athens. The Greek TETRA C4I network provides interconnected mobile radio services to specific user groups of Greek emergency and security services including Police, Fire Brigades, Hellenic Coast Guards and the Ambulances service. The Motorola's Dimetra system used by the Greek law enforcement services is a true IP-based TETRA system and uses Motorola's level-three encryption security, which provides the highest level of secure TETRA communications technology commercially available today.

5. Does your current communication network satisfy all the needs you require to perform an efficient work when a special event or an emergency happen? Have you ever deploy portable base stations to improve covertures or capacity of the cellular network you are using?

Using the legacy of the Athens Olympic Games of 2004 Hellenic Police has a quite modern communication infrastructure (mainly the TETRA system) to cover the operational needs. However problems of maintenance and upgrade of sophisticated and complex systems are present since the level of technology doesn't matches with the skill level of the personnel and continuous training is required.

Portable base stations have been used in some cases by the Greek Police forces but mainly in context of field exercises.

Area C: Alerting Citizens

Information processing centres help to reduce response time at first stages of an emergency response since they can act on subordinate actuators or alert Public Safety Command Centres in real time. SafeCity framework aims at providing mechanisms for writing and sending unique bushfire emergency messages centralized in a Command Centre, innovative service highly appreciated by end users. C2 centres will be able to deliver opportune information to population through

telecommunication networks including 3G, 4G, LTE, TV even internet. For that specific applications will be adapted and new ones will be developed

6. Within this area if you identify applications that you use in your daily operation, please list them including in each case:

    a. Concept of use

Alerting of citizens is made through the Public relations department of the police. Mass alerting is made using TV, radio and mass media. Internet is also used for non urgent cases (slow type of crises)

    b. Actuation procedure followed during the utilization of this application.

Broadcasting of security related information to the public has different levels and different information management from the operational point of view. In most cases the communication node is the public relations and communication division of the Hellenic Police

    c. Related to your organization operations, indicate key requirements of this application. Paying special attention on ICT needs (e.g. BW, bps, latency, QoS, etc).

N/A

    d. Which concrete sensors does your organization use for this application? What is the purpose of each of them? What is the format of the output data?.

N/A. In any case mass alerting can't be trusted only to sensors but it should be confirmed and controlled by the security services in charge.

    e. Advantages.

N/A

    f. Gaps detected (e.g. additional info, inefficiencies, etc.)

    g. N/A

    h. Infrastructure involved in this application. (E.g. data bases, wired fibber connections, wireless standards, etc), private or public networks. Main constrains imposed by this infrastructure.

    i. N/A

    j. Is it Internet-based application?

    Currently this is not applied by the Hellenic Police. However we received feedback stating that broadcasting of security information is normally characterized as urgent and thus only active and instant dissemination can be considered. This means that real-time video from web-cameras; emails and mass SMS messages to specific recipients can be considered.

    Extreme weather forecasts are made available to the citizens through the internet from the General Secretariat of Civil Protection as well as by private meteorological information providers.

    k. Which information security policies do you use within this application?

Security information is very sensitive and it has to be treated wisely. Only trained recipients can receive personally such information. Central management of the information flow through traditional communication channels (radio, TV) are preferred by the Security services. Even in this case TV spoke-persons have to be trained how to communicate such kind of information for avoiding wrong or unpredictable response from the citizen's part.

l. Which ethical and legal policies does your organization satisfies in order to make use of this application?

There is national legislation regulating the transmission of security related information

7. Which kind of incidents or situations do you consider important to be alerted of?

All kind of incidents requiring the citizens to react have a priority. Normally people need to be alerted concerning natural and technological disasters or extraordinary events in a specific area. There is experience in broadcasting such alerts or warnings through mass media. However it is quite different, from the human behavior point of view, to send massively personal messages to recipients through cellular phones. This approach can be effective associated to the prevention stage of a disaster however no previous experience exists when used in crises. In order to make an experience and train the citizens gradually, broadcasting information relevant to traffic problems and instructions to drivers on how to address specific traffic problems can be used.

Natural disasters, extreme weather, Industrial accidents and extraordinary events can be relevant for this issue.

8. How do you think it would be the best way to alert citizen about these incidents?

First radio (in large disasters) working on batteries even when all infrastructures and communication channels fail. Second TV because the people are used to consider as reality what is transmitted in the television and reacts more promptly. Cellular phones and SMS are more suitable if alerts refer to targeted groups or geographic area. Finally internet can be used according to the level of use of the web (in Greece currently the use of internet isn't so advanced to trust to use it for such purpose).

Area D: Command Centre Technologies

SafeCity framework is based on decision-making algorithms which enable the system to collect and process input data and take action in real time. It is able to detect anomalous behaviours of heterogeneous multi-format data and generate alerting ad-hoc information to certain users as Command Centres.

9. Within this area if you identify applications that you use in your daily operation, please list them including in each case:

a. Concept of use.

Command Centres are used by the different Security services in Greece and more in particular

- The Situation Awareness Centre of the General Secretariat of Civil Protection which operates at the strategic level for coordinating the involved actors before and during crises and disasters
- the Hellenic Police (Traffic Division) operates the THEPEK operational and command centre for traffic management and control. In addition Police has mobile CCC which however aren't used in a systematic basis due to organizational issues,
- the Greek Fire Brigades operates the National Fire Coordination Centre for coordinating the dispatching of fire trucks to the incident place, as well as for monitoring the forest fire situation across the country during the fire season (May-October). The Fire Brigades dispatch in case of emergency mobile CCC.
- the Hellenic Coast Guard operates the National Chamber of Border Operations which has the missions of the surveillance of the sea borders of the country, collecting information and images from fixed radars and Coast Guard Vessels patrolling for illegal immigration, smuggling etc and
- The Emergency management centre of the Ministry of Health that coordinates the operational actors involved in emergencies during disasters and in particular the public services and authorities providing health services i.e. hospitals, health centres, sanitation services etc.

b. Actuation procedure followed during the utilization of this application.

In general terms each of the above is interfaced with the incident instance through appropriate call centre. The call is evaluated, characterized and assigned to an Incident Commander. Actuation procedure includes also information flow between the different services (which means that one service can be activated by another, more pertinent, which is activated before) according to the type of the incident.

c. Related to your organization operations, indicate key requirements of this application. Paying special attention on ICT needs (e.g. BW, bps, latency, QoS, etc).

CCCs have increased bandwidth requirements for downloading video streams from the field and communications integrity (uninterrupted communication).

d. Which concrete sensors does your organization use for this application? What is the purpose of each of them? What is the format of the output data?.

No sensors are used in fixed CCC. In mobile CCCs sensors can be related to the type of incident and can include chemical (CBRN), weather, acoustic and so on sensors.

e. Advantages.

N/A

f. Gaps detected (e.g. additional info, inefficiencies, etc).

Main inefficiencies are related to lack of interoperability between systems used by different services. The information and data of the different CCs isn't fused and integrated and thus it is underutilized. Furthermore incompatibility of the format of the

information used (in particular concerning spatial information) makes useless a significant amount of information.

g. Infrastructure involved in this application. (e.g. data bases, wired fibber connections, wireless standards, etc), private or public networks. Main constrains imposed by this infrastructure.

CCs mainly collect and store data in data bases. Much less of what has been developed in terms of systems is operational due to problems of interoperability and compatibility. An additional issue is that technology offered often surpasses the ability of the personnel while the design of the systems and the respective applications is in most cases technology and not user driven. Thus the systems are not used properly (or at all).

h. Is it Internet-based application?

Internet is used for collecting information from existing web-based services e.g. weather date and forecasts.

i. Which information security policies do you use within this application?

For internal policy reasons the data and information used in the CCs remains in most cases within the same CC. Interaction and combination of data (in their digital form) is rare.

j. Which ethical and legal policies do your organization satisfies in order to make use of this application?

Personal data management is a generic issue to address even at the level of the CC according to the envisaged case.

10. What anomalous situations do you consider important to be alerted of in the Command Post (Citizen Behaviour, suspicious objects…)?

- Criminal activity level (in time and space including important robberies, car theft, prostitution etc)
- Citizens behaviour (Gatherings, marches, demonstrations, episodes etc)
- Abnormal events (bombing, attacks etc)
- Extreme weather (iced roads, fog, heavy rains etc)
- Natural disasters (earthquakes, forest fires, floods etc)
- Industrial/technological accidents (explosions, large fires, toxic gas release etc)
- Maritime situation awareness (ship accidents, oil spills, illegal immigrants etc)
- Border violation (illegal immigration in land borders, trafficking, smuggling etc)

Others Areas

11. Please indicate if there is other application that might not adjust to the previous defined areas. Do not forget that SafeCity is interested in collecting the state-of-art of Public Safety applications regarding prevention, including in each case:
    a. Concept of use.
    b. Actuation procedure followed during the utilization of this application.
    c. Related to your organization operations, indicate key requirements of this application. Paying special attention on ICT needs (e.g. BW, bps, latency, QoS, etc)
    a. Which concrete sensors does your organization use for this application? What is the purpose of each of them? What is the format of the output data?.
    d. Advantages.
    e. Gaps detected (e.g. additional info, inefficiencies, etc).
    f. Infrastructure involved in this application (e.g. data bases, wired fibber connections, wireless standards, etc), private or public networks. Main constrains imposed by this infrastructure.
    g. Is it Internet-based application?.
    h. Which information security policies do you use within this application?
    i. Which ethical and legal policies do your organization satisfies in order to make use of this application?

Annex B – "Use-case scenario for Athens"

The following use case scenario provide for identifying user needs and requirements related to law enforcement services involved in addressing a relevant incident in the city of Athens. The description isn't based in the currently existing infrastructure and capabilities but rather to what the users consider as nice-to-have from a sophisticated surveillance and emergency management system.

Introduction

- In late afternoon of a warm August day, a minivan crashes on a truck currying illegally a load of toxic chemicals on a crossroad in Athens. The truck tried to turn left and cross a two-lane road violating the red light. The old-fashioned truck gets on fire.
- The minivan falls following the crash with the truck on a car which is stopped in the road from which the truck came, waiting to turn green
- The driver of the truck is safe while the driver and co-driver of the minivan and the driver of the third car are injured and blocked inside the car
- Fortunately the two cars finish at a safe distance from the burning and they don't risk catching fire. However the risk of explosion isn't excluded since there is no information available for the substance carried by the truck.
- The road is blocked
- The traffic is blocked.

Questions and Needs

N.[8] Traffic lights that can self-detect violations and alert the Traffic Control Centre (TCC)

Phase 1. Announcement and checking

- Passing by drivers call the Police and the Fire Brigades call centre
- In the Traffic Control Centre (TCC) of Hellenic Police the operator identifies a slowdown of the traffic flow through the CCTV network. He reports to the chief officer
- The personnel in the TCC estimate the point of a potential emergency situation since the point of the crash isn't covered directly by the CCTV network
- TCC asks a near-by motorcyclist of the traffic police, since the traffic is becoming heavy, to go and check

Questions and Needs

Q.[9] What is the location of a potential traffic problem in areas not covered by the CCTV network and based on traffic flow variation?

[8] N. stands for "Needs" to be addressed

N. Assessment of the potential type of problem in such case (illegal parking, slow moving car, march etc)

N. See the position of the Police mobile resources (vehicles, patrols, policemen in service) on a map

Phase 2. Incident and Scene Command

- The traffic policeman confirms the accident and provides exact location details (address). He tries to redirect the cars from the blocked roads and keep open the access for the ambulances
- The incident is registered in the TCC and the relevant services to be involved are notified
- The TCC informs the Health Care Service to send an ambulance in place
- The TCC and the FBCC are coordinated among them for operational action
- A Police officer is assigned as Incident Commander and he moves to the Emergencies Operational Centre which is adjacent to the Traffic Control Centre (the two centres share the same information) and which will act as Joint Operations Centre (JOC)
- The Incident Commander takes over the coordination of the emergency in the JOC
- The IC communicates with the dispatch unit of the General Division of Police and the FBCC and asks binding the required Police and Fire Service resources to be sent in the place of the accident
- The IC asks TCC posting messages to the road messaging system (VMS) in the incoming roads to the accident place for alerting drivers to avoid entering in the area of the accident
- The IC inform the Traffic lights management service for the event since it will has impact to the traffic flow and asks to configure the lights properly in order to redirect traffic far from the accident area
- The IC asks Traffic Police to deploy motorcyclists in order to facilitate the emergency resources to reach the place in time
- A Scene Commander is assigned by the Fire Brigades and moves to the place of the accident with a closed FS van acting as local command post. The IC is informed accordingly.

Questions and Needs

N. Assessment of the potential type of problem in such case (illegal parking, slow moving car, march etc)

N. Traffic Police motos equipped with cameras for transmitting image from the accident scene to the TCC and to the JOC

N. Following registration of the event communication of its details to involved services and authorities in automatic way

N. Common action plan of Police, Fire Brigades and Health Emergency services for safety tasks

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[9] Q. stands for “Questions” to be answered

N. Equip all vehicles of law enforcement and security services with GPS trackers in order to monitor their distribution and activity (independently of the emergency)

N. Have mapped all the fixed traffic management infrastructure e.g. VMS

N. Having mapped all the vulnerable assets arranged by vulnerability level and type of incident

N. Activate and operate Traffic Announcement radio service

N. Integration of Traffic Management requirements with Traffic lights management which is a rather complex and complicated task

N. Information regarding the traffic in the adjacent roads for redirecting vehicles to the roads with the lesser traffic loads. Identification of alternative routing paths

N. Information regarding pedestrian traffic in the wider area in real time

N. Image and video from the scene of the accident

Q. What is the status of the victims?

Q. What is the population (inhabitants) distribution in the area? Are there vulnerable population groups in the area?

N. Having Mobile Command Post vehicle equipped with communication, imaging and computational facilities

Phase 3. Situation awareness

- Arrival of Police in the scene
- The driver of the truck left the burning vehicle and escaped. A driver took some pictures of him using his mobile phone. The images are sent to the JOC in order to check with criminal data bases
- Police forces report to the Police OC (POC) through the TETRA car console (truck driver escape, type of vehicles, plate number, number of injuries, situation description),
- Policemen send images of the incident scene using their smart phones
- Arrival in place of the Scene Commander who takes over the local coordination.
- Scene Commander asks the JOC for two additional ambulances to be sent in place
- Scene Commander establish the temporary incident zones (hot and warm)
- Police forces define a reception zone for the ambulances in the warm zone
- Police forces are asked by the Scene Commander to
    - block the Roads till the warm zone
    - redirect the traffic to adjacent roads
    - delineate and sign the incident zones and
    - ensure accessibility and reception zone for the emergency personnel
- The SC needs to

- Identify the type of the burning chemical and assess health impact
- Decide if a specific technological group should be deployed in place
- Decide if fire fighters and rescuers can work in the hot zone without wearing special uniforms

Questions and Needs

N. Tracking resources position and activity in the scene

N. Bidirectional Communication among actors

N. Communication channel per Service and Common Communication channel for the Incident management needs

N. Image and video analysis and cross-checking with data bases

Q. Which are the details of the involved vehicles (type, brand, plate numbers of the cars and truck)?

N. Check the legal status and details of the vehicles in relevant DBs

N. Checking if the truck was authorized to carry chemicals and if it had a relevant permission for the specific service

N. Inform drivers to avoid entering into the warm and hot zone

N. Inform public to avoid entering into the warm and hot zone

Q. What is the type of the burning chemical?

Q. Which are the impacts it may have to the population health and to the air quality?

Q. Is there a need for de-contamination of people exposed?

Q. Which are the closest hospitals for sending the injured people?

Phase 4. Scene Command activity

- Arrival of fire fighters/rescuers in place
- Arrival of the first ambulance in place
- SC allows only rescuers properly dressed to work for freeing the entrapped persons in the car
- SC order extinguishing the fire of the truck with jetting water from distance, since the risk of explosion still exists
- SC asks the JOC to dispatch a chemical expert group in the scene of the incident
- SC asks the JOC to dispatch a Mobile Operational Unit (MOU) for performing on-line measurements, risk assessment and establishing continuous contact between the incident scene and the JOC for better coordination
- SC asks JOC to alert drivers in the wider area to avoid certain roads (apart of the road blocked by the Police)
- SC asks Police to evacuate the roads within the hot zone

- Arrival of the two other ambulances
- Police forces accompany the ambulances in the reception zone in the warm zone
- Rescuers bring the injured people in the reception zone
- The ambulances depart to the hospital with the injured persons

Questions and Needs

N. Monitoring involved vehicles location and activity in the scene

N. Continuous monitoring of the personnel (individuals) position and activity in the scene

N. Thermal imaging of the burning scene

N. Create an ad-hoc private local communication network (voice, image, video, data ...) with all the involved actors and services covering the area of the incident, which will be managed by the JOC

Phase 5. Mobile Operational Unit deployment

- The IC identifies that the chemical load is illegally carried and the substance isn't known
- The IC sends a chemical expert group in place
- The IC dispatches in place a mobile unit equipped with a vehicle mounted video and infrared camera, chemical sensors, weather sensors and wireless communication module

Questions and Needs

N. Monitoring involved vehicles location and activity in the scene

N. In-situ chemical measurements

N. Ad-hoc network sensors deployment and communication

N. Integration of the MOU information in the action plan (through the JOC)

N. Store (and transmit) data recorded by the MOU for post processing

Phase 6. Risk assessment and alert messaging

- The chemical experts arrive in the scene and they estimate that the burning chemical can be toxic for high concentration in the air. They inform both SC and the IC and provide instructions to be broadcasted to concerned groups (firefighters, inhabitants, passing-by people etc)
- The chemical expert group suggests that the smoldering truck should be covered using foam in order to avoid further release of toxic gases
- SC asks firemen wearing suitable uniforms to reach and use foam for covering the burning truck
- The IC broadcast alert messages and instructions to the citizens
- The IC informs the Health Care Service about the chemical substance and the HCS inform the paramedics in the ambulances

- The IC updates the web information centre of the CC with incident data for Mass Media and broadcast news

Questions and Needs

Q. How can we know the number and distribution of the people living in the area?

Q. How can we know the number and distribution of the people in the streets in the surrounding area?

Q. How can we alert the people in the targeted area and provide them with instructions?

N. Broadcast information to public media in a way to help the action plan

Phase 7. Mobile Operational Unit operations

- Arrival of the mobile unit (video camera, infrared camera, chemical sensors, weather sensors ..).
- Meteorological data are downloaded from the web (National Weather Service or other)
- A simulation model run in the MOU provides assessment of the toxic plume dispersion in the area and the toxic concentration contours
- The hot, warm and cold zones boundaries are revised accordingly. The IC and SC are informed
- SC asks the police to update the signage of the respective incident zones
- The SC asks the Police to evacuate the pedestrians from the roads in the warm zone (avoid exposure to chemicals)
- Ad hoc chemical sensors network is installed in the area

Questions and Needs

N. Internet access for downloading and uploading data

N. MOU establishes a wireless link with the Mobile Command Post

Q. How can we have a map (based on measurements or alternatively on modeling) of the distribution of the toxic concentration in the area?

N. Overlay position of the involved resources on the toxic substance distribution map

Phase 7 Evacuation and area monitoring

- Due to weather conditions and the estimation of the experts that toxic gases can be trapped in the area close to the ground forced evacuation is decided for all people in the hot zone
- IC send SMS to all persons within the area
- IC send an appropriate announcement to the media
- IC dispatches buses to remove the residents
- IC makes arrangements for hosting the residents at least for the first night
- IC defines the collection points for removing the residents and informs SC

- SC asks police to receive the buses in the collection points and accompany residents to these points
- IC dispatches the Police helicopter equipped with video and infrared camera to monitor evacuation and ensure people absence from the sterilized zone
- IC provide press release to the media through the CC web information centre
- The chemical expert group extend the network of air monitoring with more sensors in the boundaries of the warm with the cold zones since it will be left there for some days

Questions and Needs

N. Alerting people in the targeted area and providing them with instructions

N. Identification and location of vulnerable cases (severely ill, bedridden, unable to move, decrepit etc)

N. Scan the area for ensuring it is completely cleaned-up of human presence

N. Continuous monitoring of the evacuation process

N. Continuous video monitoring the area for avoiding theft and looting following an evacuation

N. Continuous monitoring of the air quality till it returns within normal limits