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National Technical University of Athens
Road Safety Observatory

Online workshop
in the framework of

6TH UN GLOBAL ROAD SAFETY WEEK
17 - 23 May 2021

Streets for Life

UN

#Love30

DECADE OF ACTION FOR ROAD SAFETY
2021 - 2030

30
KM/H

Thursday
20 May
2021

Innovation in Road Safety Research

The NTUA Road Safety Observatory

George Yannis

Professor

Together with:
all the great nrso team

*Science and innovation
for safer roads everywhere and for all*

Presentation outline

1. The NTUA Road Safety **Observatory** (12)
2. Cooperations and **Partners** (5)
3. NRSO **Website** and Systems (4)
4. Road Safety **Research Areas** (7)
5. Road Safety Research **Perspectives** (4)



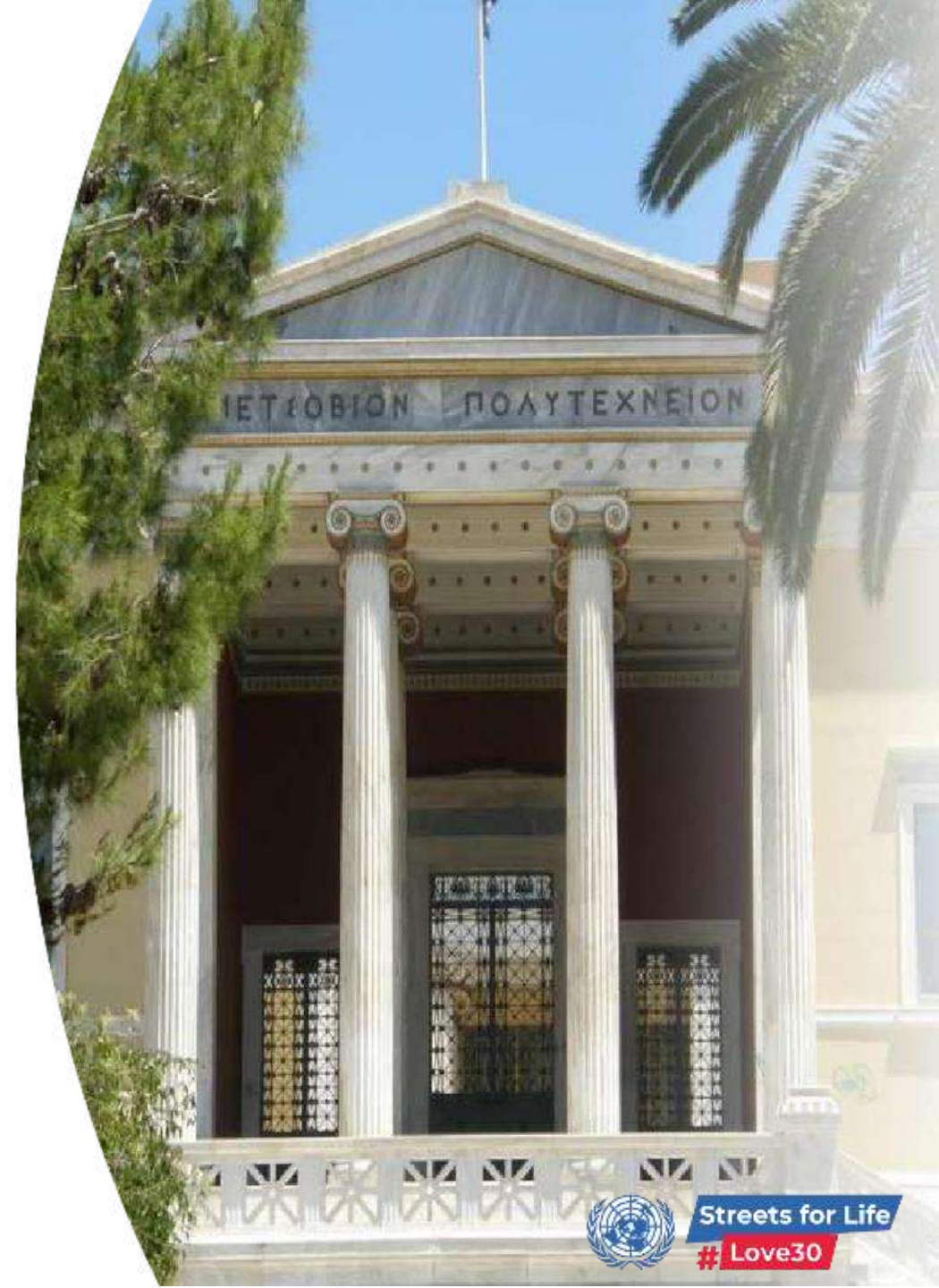
NTUA Road Safety Observatory

A Center of Research and Innovation Excellence



NTUA Road Safety Observatory

- A **Center of Research and Innovation Excellence on Road Safety**, with global recognition [ranked: 2nd in Europe and 6th worldwide (AAP 2018)]
- within the **Department of Transportation Planning and Engineering** [ranked: 9th in Europe and 39th worldwide (ShanghaiRanking's 2017), scientific citations: 3rd in Europe and 19th worldwide (Pulse 2017)]
- of the **School of Civil Engineering** [ranked: 3rd in Europe and 7th worldwide (ShanghaiRanking's 2020)]
- of the **National Technical University of Athens** [the oldest (since 1837) and most prestigious educational technical institution of Greece]



NRSO - Mission

The Mission of the NTUA Road Safety Observatory (www.nrsso.ntua.gr) is:

- to support the Greek and the International Road Safety Community with current **key road safety knowledge and data**
- gathered, analysed and organised within the **research activities** of the Department of Transportation Planning and Engineering of the School of Civil Engineering of the National Technical University of Athens
- as well as within **co-operations** with various national and international road safety organisations



NRSO - Vision

Science and innovation for safer roads everywhere and for all

The Vision of the NTUA Road Safety Observatory is:

- to contribute to the **significant reduction of the number of road crashes** and of the related casualties in Greece, in Europe and worldwide
- through the **scientific support of evidence** based decision making for the necessary road safety policies, programmes and measures



NRSO - a dedicated team of 35+ Scientists



NRSO - Dedicated team

- Internationally recognized Professors
- 10 Senior Transportation Engineers (6 PostDoc)
- 9 Transportation Engineers - PhD Candidates
- 6 Transportation Engineers - Research Assistants
- 2 Information Systems Engineers
- 3 Administrative Assistants

with high level scientific expertise in:

- **traffic safety**, mobility, transport and traffic planning and engineering
- **data science** and advanced statistical data analysis
- **intelligent transportation systems and automation**

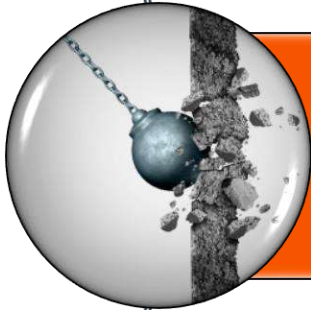


NRSO - Fundamental Research Principles



Excellence

Advanced and innovative technology concepts



Impact

Research with significant impact to society and economy



Implementation

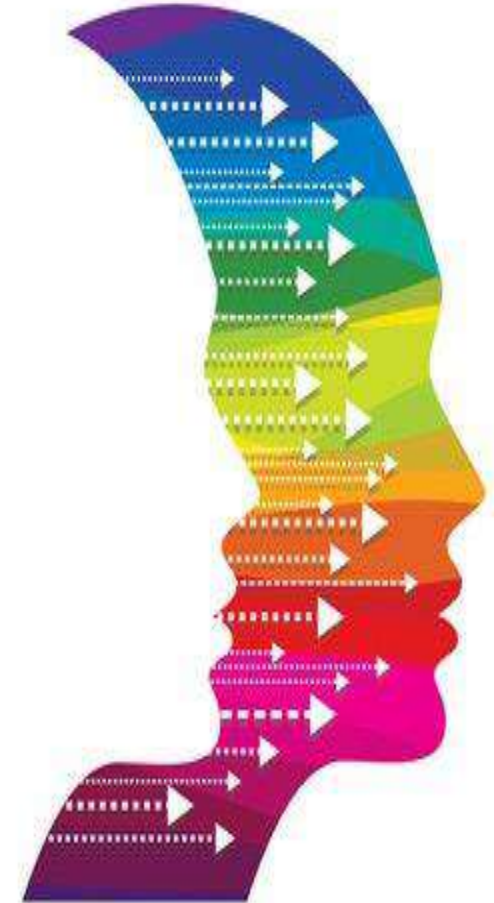
State-of-the-art organisation and management structures



NRSO - The Value of the Researcher

We are committed to the Value of the Researcher, which:

- starts with carrying out **excellent research**,
- is tested by publishing in high-level **peer review journals** and
- makes the difference when **awarded project grants** through highly competitive procedures



NRSO - Research Performance

- More than **120** road safety research projects since early '90s:
 - 55 Greek
 - 65 International
- **86** of these research projects were assigned through highly competitive (national or international) procedures:
 - Horizon 2020 - **11 projects** out of 46 proposals submitted



NRSO - Research Publications

- More than **650 road safety publications**:
 - in scientific journals (more than 200)
 - in scientific conference proceedings (more than 400)
 - with more than 6.000 citations
 - i10-index: google scholar: 131
 - h-index: google scholar: 37, scopus: 27

- More than **500 presentations** in scientific conferences:
 - more than 350 international and more than 150 national
 - after invitation in more than 220 of them

Most of them **available on-line** at:
<http://www.nrso.ntua.gr/geyannis/>



NRSO - Road Safety PhDs

- **Apostolos Ziakopoulos, 2020**
"Spatial analysis of road safety and traffic behaviour using high resolution multi-parametric data"
- **Dimitris Tselentis, 2018**
"Benchmarking Driving Efficiency using Data Science Techniques applied on Large-Scale Smartphone Data"
- **Dimosthenis Pavlou, 2016**
"Traffic and safety behaviour of drivers with neurological diseases affecting cognitive functions"
- **Akis Theofilatos, 2015**
"An advanced multi-faceted statistical analysis of accident probability and severity exploiting high resolution traffic and weather data"
- **Panagiotis Papantoniou, 2015**
"Risk factors, driver behaviour and accident probability - The case of distracted driving"
- **Eleonora Papadimitriou, 2010**
"Pedestrian behaviour and safety models in urban road networks"



NRSO - PhDs under preparation

- Virginia Petraki, 2020
"Big Data and New Urban Sustainable Mobility Forms"
- Eva Michelaraki, 2020
"Road accident risk factors and big data"
- Dimitris Nikolaou, 2019
"Big data in road safety decision support"
- Armira Kontaxi, 2019
"Integrated support of driver traffic behaviour and safety by smartphone data"
- Julia Roussou, 2019
"Impact assessment of connected and automated transport systems"
- Alexandra Laiou, 2019
"Measuring road safety culture"
- Eleni Chalkia, 2017
"Impact of route and transport mode choice on road safety"
- Foteini Orfanou, 2016
"Modelling automated traffic using high resolution data"
- Katerina Folla, 2015
"Advanced macroscopic models for the analysis of international road safety data"



NRSO - PhD & PostDoc Alumni Careers

Our **PhD and PostDoc Alumni** Engineers are pursuing excellent academic, engineering and consulting careers worldwide:

- Technical University of Munich (**TUM**)
- Technical University of Delft (**TUD**)
- Ecole Nationale des Ponts et Chaussées (**ENPC**)
- Ecole Polytechnique Fédérale de Lausanne (**EPFL**)
- Loughborough University (**UL**)
- National Technical University of Athens (**NTUA**)
- University of Patras (**UPatras**)
- University of West Attica (**UniWA**)
- Ernst & Young (**EY**)



Cooperations and Partners



Our Cooperations - Greece



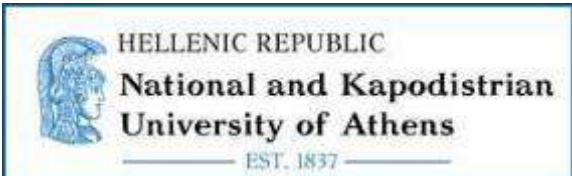
Our Cooperations - Europe



Our Cooperations - Worldwide



Partners - Universities



Partners - Research Institutes

 Institute of Transport Economics Norwegian Centre for Transport Research	 INSTITUTE FOR ROAD SAFETY RESEARCH		 Kuratorium für Verkehrssicherheit
 AUSTRIAN INSTITUTE OF TECHNOLOGY	 Údarás Um Shábháilteacht Ar Bhóithre Road Safety Authority		
		 THE FUTURE OF TRANSPORT	 Dirección General de Tráfico
 LABORATÓRIO NACIONAL DE ENGENHARIA CIVIL		 CENTRUM DOPRAVNÍHO VÝZKUMU	 Alapítva - Since 1938
 JAVNA AGENCIJA REPUBLIKE SLOVENIJE ZA VARNOST PROMETA		 ACCIDENTOLOGICAL HUMAN ASPECTS CONDUCTING RESEARCH	 CENTRE EUROPEEN D'ETUDES DE SECURITE ET D'ANALYSE DES RISQUES
 Alles im grünen Bereich.	 innovation for life		



NRSO Website and Systems



The NRSO website (1/2)

An international reference website
- information system since 2004, with
state-of-the art road safety data and knowledge

www.nrso.ntua.gr

- more than **3.000 visits per month**
- **113 electronic newsletters** since 2007
- **tens of social media posts** and tweets annually (with 5K - 50K views each)
- network of more than **4.000 road safety experts** in Greece (1.000+) and worldwide (3.000+)



The screenshot displays the NRSO website interface. At the top, there's a search bar and a navigation menu. The main content area is divided into several sections:

- Systems:** A large banner image showing a road curving along a river, with the text "European Commission - All time low for road fatalities in 2020, April 2021". Below it are logos for SafeFITS, European Road Safety Observatory, African Road Safety Observatory, pract-repository, and DaCoTA.
- Cooperations:** A section titled "Europe" listing various international organizations like UNECE, ETSC, CEUR, FEHRL, ectri, ERF, FORD, and FEVR. A "Worldwide" section lists the International Transport Forum and World Health Organization.
- Upcoming Events:** A section titled "Upcoming Events" featuring a grid of event posters, including "ISS 2021", "ETSC", "POLIS", and "RSS 2022".
- News/Articles:** A section titled "Road fatalities significant decrease in the EU - Greece achieved the decade target of 50% reduction, 2021" with a bar chart showing a 50% reduction. Another article mentions "European Commission - European sustainable mobility Awards, April 2021".
- Footer:** A newsletter subscription form with the text "subscribe to our newsletter" and "Enter your email address to subscribe:". Below it are logos for "Streets for Life" and "#Love30".

The NRSO website (2/2)

A dynamic website with a wealth of information:

www.nrso.ntua.gr

- since 2004 with more than **1.800 items**
- all important road safety **News** in Greece, in Europe and globally
- new **Reports** covering all modern road safety issues
- latest available road safety **Data** for Greece, the EU and the world
- exhaustive list of road safety **Conferences** in Greece and globally
- links to dozens road safety **Resources** globally



The screenshot displays the NRSO website interface. At the top, there are navigation tabs for 'Systems' and 'Road Safety Conferences'. The 'Road Safety Conferences' section features a large image of a speaker at a podium and a list of events for 2022 and 2021. The 'Cooperations' section is divided into 'Europe' and 'Worldwide', each with a vertical list of partner organizations and their logos, including UNECE, ETSC, CEUR, FEHRL, ectri, ERF, POLIS, and FEVR. On the right side, there are several promotional banners for 'Innovation in Road Safety Research 2021', 'RSS 2022', and 'Road Safety Update newsletters since 2007'. Below these is an 'Upcoming Events' section with a grid of event posters. At the bottom right, there is a 'Subscribe to our newsletter' form and a 'Streets for Life #Love30' banner.

NRSO Data and Knowledge Systems

Databases

- **SANTRA** - Greek Road Accident Database with disaggregated data (1985 - 2019, 1,2 million recordings)
- **CARE** - European Road Accident Database with disaggregated data (1991 - 2020, 40 million recordings)
- **IRTAD** - International Road Accident Database with aggregated data
- Databases of **International Organisations** (WHO, IRF, ERF, UITP)
- Databases with **Aggregated Data** (Vehicle fleet, veh-km, driver behavior, etc.)

Knowledge Systems

- Online Road Safety **Library** > 6.000 key Reports
- International **Bibliography** database (scopus, science direct)
- Analysis **tools** (traffic, simulation, statistics)



NRSO Research Infrastructure

- **Driving Simulator** (Foerst 1/4 cab, moving base) for driver behavior experiments
- Unmanned Aerial Vehicles (**Drones**) for traffic monitoring
- Smartphone **Telematics** application (powered by OSeven) for driver behaviour monitoring
- On-Board Diagnostics Devices (**OBD**) for driver behavior monitoring
- **Cameras** and other devices for traffic counts, speed monitoring, position monitoring (GPS)



Road Safety Research Areas



The Road Safety Research Areas



Road
Safety
Policy and
Data



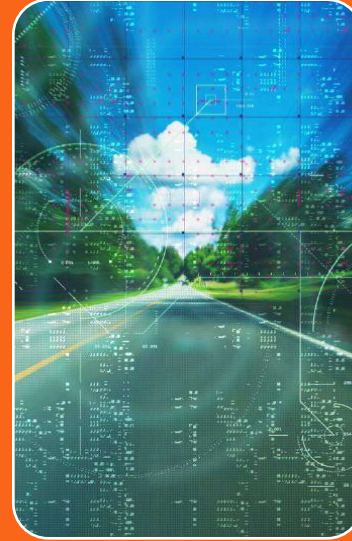
Traffic
Automation
and
Safety



Driver
Behaviour
Telematics



Driver
Safety
Behaviour



Road
Infrastructure
Safety



Mobility
and
Safety



Road Safety Policy and Data

- [Nrss2030](#) - Development of the Road Safety Strategic Plan in Greece 2021-2030
- [Baseline-G](#) - Collection of Road Safety KPIs in Greece
- [Baseline-I](#) - EU Methodology for Road Safety KPI Collection
- [BeOpen](#) - Open science in road safety

Optimize policy decisions and road user choices based on advanced analyses of reliable crash, exposure and KPI data



Traffic Automation and Safety

- [Drive2theFuture](#) - Driver needs and behaviour in automated traffic
- [Levitate](#) - Societal impacts of connected and automated vehicles
- [Show](#) - Shared Automation Operating Models for Worldwide Adoption
- [Hadrian](#) - Holistic Approach for Driver Role Integration into Automation

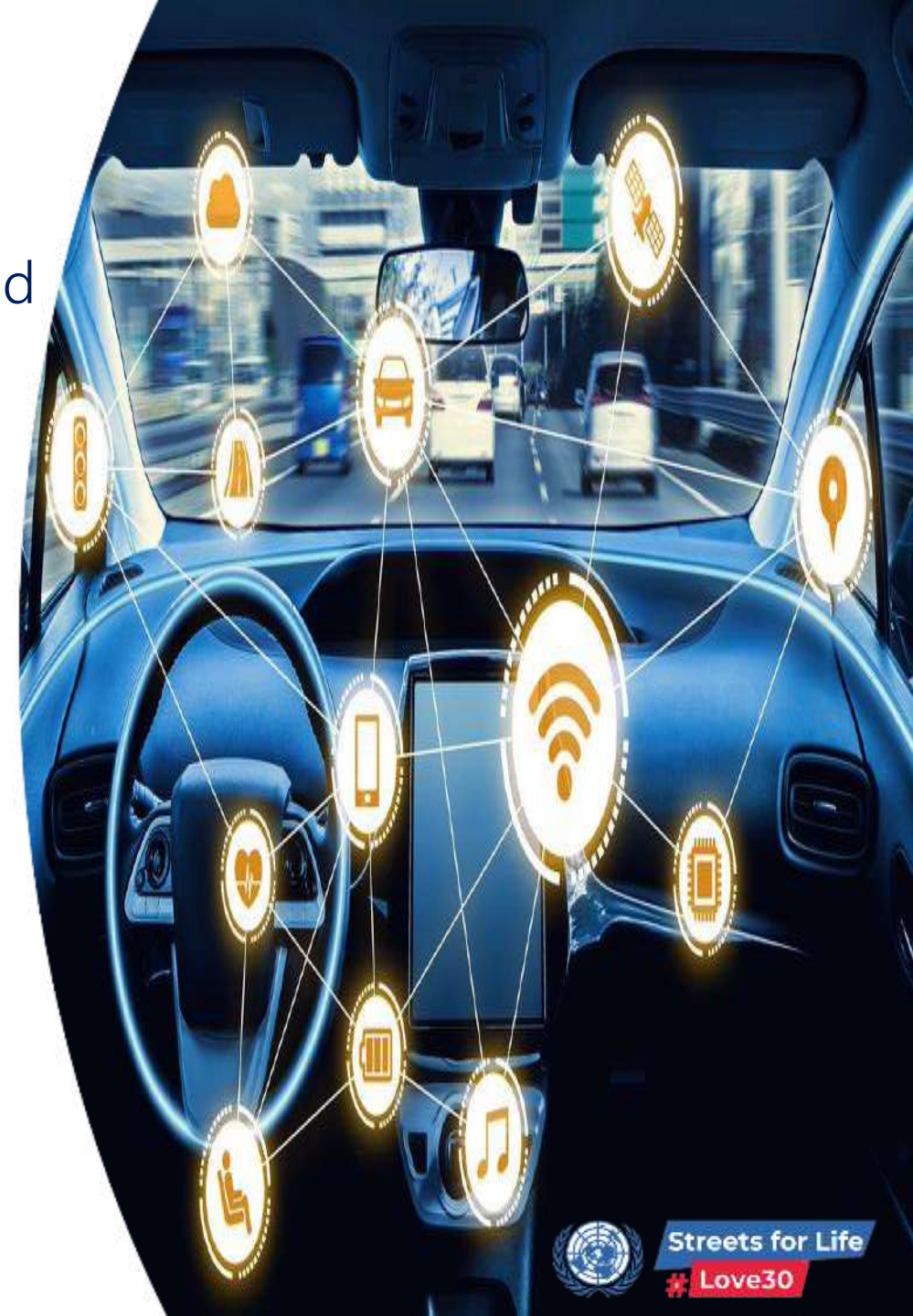
*Automation can boost safety
but safety issues during transition phases
require targeted multi-disciplinary research*



Driver Behaviour Telematics

- [i-Dreams](#) - Driver-vehicle-environment interactions and safety tolerance zone
- [SmartMaps](#) - Smart city mapping for safer and eco driver behaviour
- [BeSmart](#) - Smartphone applications for driver safety behaviour support

*Telematics is an excellent
easy-to-implement and massive solution
for immediate upgrade of driver safety behaviour*



Driver Safety Behaviour

- Esra2 - Monitoring road safety attitudes globally
- Distrapp - Investigation of driver distraction effect using big data from smartphones
- OldNat - Safety behaviour assessment of older drivers in real driving conditions
- Covid-19 impact on mobility and safety

Only a thorough understanding of road user behaviour and perceived risk can lead to targeted safety measures



Road Infrastructure Safety

- [NetSafety](#) - A Methodology for Network-wide Road Assessment
- [i-SafeModels](#) - Modelling crash modification factors globally
- [EIAudit](#) - Road Safety Audit of the Hellinikon Metropolitan Pole

*Under the safe system approach
a road environment without surprises and forgiving
can prevent and accommodate road user errors*



Mobility and Safety

- **AGW** - Model traffic and parking arrangements for the Athens Great Walk
- **e-Mopoli** - Electromobility as driver for sustainable mobility and safety
- **EcoCharge** - Socio-economic impact of environmental transport charging

Integration of safety needs into sustainable urban mobility plans is the key for high acceptance and great safety benefits



Road Safety Research Perspectives



Key Road Safety Considerations

- **Speed** is highly misunderstood by all
- **Vulnerable road users** are not accommodated
- We spend too much without effectiveness **monitoring**
- Unrealistic expectations of **technology** (especially of automated vehicles)
- Too much **data**, too little usage
- Need for more road safety **science and budgets**



Road Safety Policy Perspectives

- Focus on the **key road accident risk factors**:
 - Speed, Speed and Speed
 - Drink and Drive
 - Distracted Driving
 - Not use of seat belt and helmet
- Adapt **urban mobility management** to accommodate and balance current and future mobility and safety needs of the vulnerable road users (pedestrians, cyclists, motorcyclists): **Reduce Speed everywhere**
- Develop strong **road safety culture** of the Authorities and all Stakeholders (safe system approach) and the whole population



Road Safety Technology Perspectives (1/2)

- **Technology** can be the catalyst for road safety, through:
 - Public private partnerships
 - Clear problem analyses (well defined objectives)
 - Systematic effectiveness monitoring
- **Great** need for:
 - more data and knowledge
 - better exploitation of current and future data
 - broader geographical coverage
- **Data** focus on:
 - more accurate road accident data (LMIC Counties)
 - exposure data and performance indicators
 - measures and policies effectiveness evaluation



Road Safety Technology Perspectives (2/2)

- **Digitalization and Artificial Intelligence** open great new data possibilities for:
 - road user support and guidance
 - evidence based public and private road safety decision making at all levels
- New great potential for seamless **data driven performance** from safety problems identification to selection and implementation of optimal solutions
- Exploitation of the high **safety potential of vehicle and traffic automation**, with focused research on the transition phase and the vulnerable road users





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