



National Technical University of Athens
Road Safety Observatory

www.nrso.ntua.gr

FIFTH UNITED NATIONS GLOBAL ROAD
SAFETY WEEK

6-12 May 2019



Save Lives

SpeakUp

The NTUA Road Safety Observatory



www.nrso.ntua.gr

Workshop:

Digitalisation

**and Road Safety
Research**

Friday

17

May
2019

at 14:00

George Yannis

Professor

Together with:
all the great nrso team

Presentation outline

1. The NTUA Road Safety **Observatory** (10)
2. **Cooperations** and Partners (5)
3. NRSO **Website** and Systems (4)
4. Road Safety **Research Areas** (6)
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: 11th in Europe and 42nd worldwide (QS 2018)]
- of the **National Technical University of Athens** [the oldest (since 1837) and most prestigious Greek Technical University]



NRSO - Mission

The Mission of the NTUA Road Safety Observatory (www.nrso.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

The Vision of the NTUA Road Safety Observatory is:

- to contribute to the **significant reduction of the number of road accidents** 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

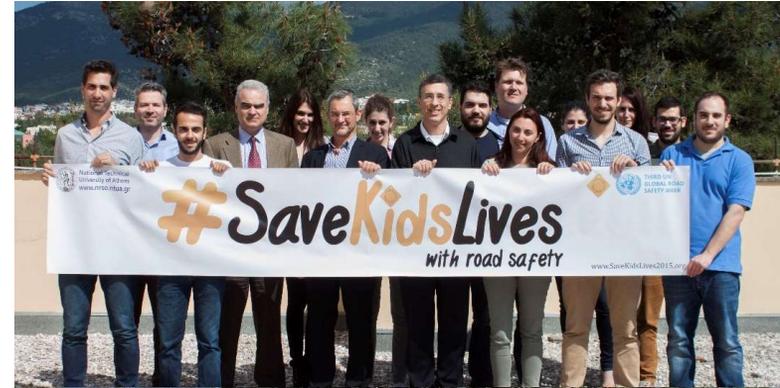


NRSO - The People

- Internationally recognized Professors
- 6 Senior Transportation Engineers (4 PostDoc)
- 6 Transportation Engineers - PhD Candidates
- 6 Transportation Engineers - Research Assistants
- 2 Information Systems Engineers
- 2 Administrative Assistants

with high level scientific expertise in:

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

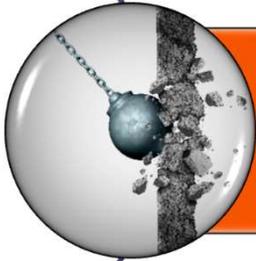


NRSO – Our Fundamental Research Principles



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 **100** road safety research projects since early '90s

- 40 Greek
- 60 International

➤ **71** of these research projects were assigned through **highly competitive** (national or international) procedures

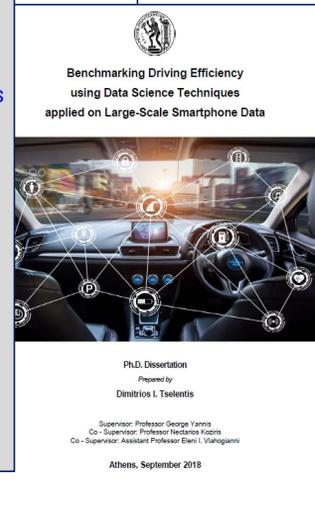
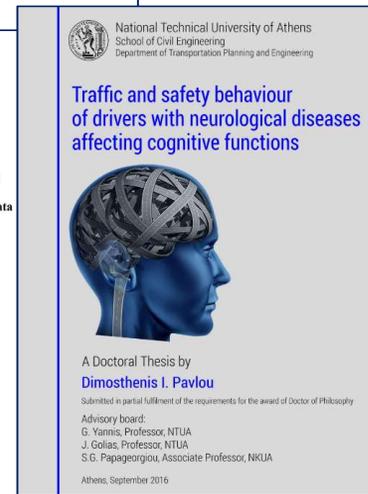
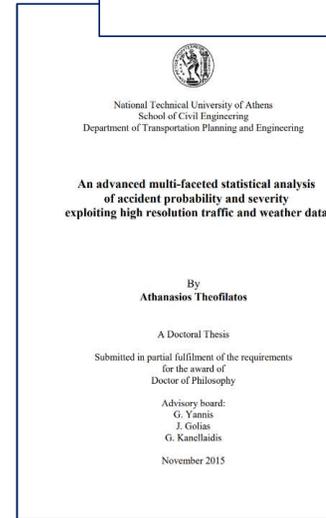
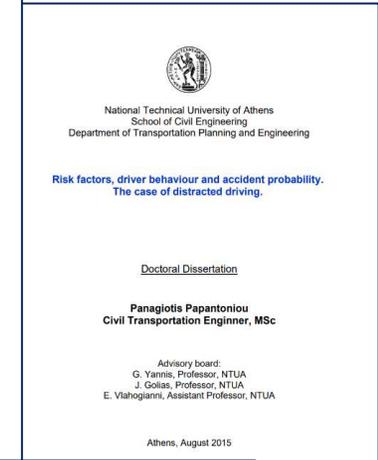
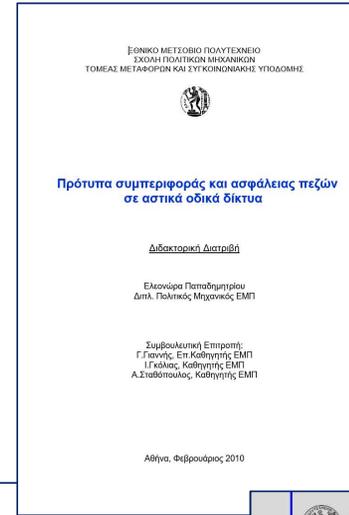
- Horizon 2020: **7 projects** out of 35 proposals submitted



NRSO - Road Safety PhDs

- **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"

➤ **9 more PhDs are in progress**



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**)
- Ernst & Young (**EY**)
- Salfo Engineering International (**Salfo**)



National Technical University of Athens



Cooperations and Partners



Our Cooperations - Greece



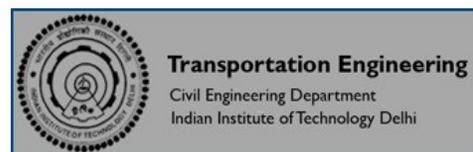
Our Cooperations - Europe



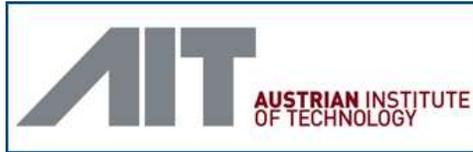
Our Cooperations - Worldwide



Our Partners - Universities



Our Partners - Research Institutes



NRSO Website and Systems



The NRSO website (1/2)

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

www.nrso.ntua.gr

- more than **3.000 visits per month**
- **95 electronic newsletters** since 2007
- **tens of tweets** and social media posts annually
- network of more than **3.000+ road safety experts** in Greece (800+) and worldwide (2.200+)



George Yannis, The NTUA Road Safety Observatory - NRSO

The screenshot displays the NRSO website interface. At the top, the NTUA logo and 'National Technical University of Athens Road Safety Observatory' are visible. The main navigation bar includes 'Home', 'About', 'Knowledge', 'Data', 'Conferences', 'News', and 'Links'. A search bar is located in the top right corner. The 'Systems' section on the left lists various tools and databases such as 'SafeFITS', 'European Road Safety Observatory', 'African Road Safety Observatory', 'pract-repository', and 'DaCoTA'. The 'Cooperations' section lists partners like 'MOBILITY AND TRANSPORT', 'RESEARCH & INNOVATION', 'International Transport Forum', 'UNECE', 'World Health Organization', 'THE WORLD BANK', 'European Investment Bank', and 'CEDR'. The main content area features a banner for 'Europe on the Move' with the headline 'New safety features in your car' and a list of features: 'Improved direct vision for trucks and detection of pedestrians and cyclists', 'Safety glass in case of a crash for pedestrians and cyclists', 'Drowsiness and distraction monitoring', and 'Event data recorder'. Below this is a featured article titled 'Safety assessment of control design parameters through vehicle dynamics model, 2019' by Stergios Mavromatis, Alexandra Laiou, and George Yannis. The article abstract states: 'A paper titled "Safety assessment of control design parameters through vehicle dynamics model" authored by Stergios Mavromatis, Alexandra Laiou, and George Yannis is now published in Accident Analysis and Prevention. An existing vehicle dynamics model was utilized to define design parameters up to which steady state cornering conditions apply and consequently lift the restrictions of the point mass model. Aiming to assess critical safety concerns in terms of vehicle skidding, the motion of a passenger car was examined over a range of design speed values paired with control design elements from AASHTO 2011 Design Guidelines as well as certain values of poor pavement friction coefficients. For full text just ask us by replying to this email.' Below the article is a section for the '28th Meeting of the International Traffic Safety Data and Analysis Group (IRTAD), Paris, 2019', mentioning that NTUA contributed actively with the following presentation: 'Outcome of the ITF-CPB Workshop on "New Directions for Data Driven Transport Safety"'. The right sidebar contains a 'Search' bar, a 'Workshop Digitalisation and Road Safety Research' announcement, a 'www.transport.ntua.gr' link, a 'www.nrso.ntua.gr in figures 2018' link, and 'newsletters since 2007'. At the bottom right, there is an 'Upcoming Events' section with 'Digitalisation and Road Safety Research' and 'SAFER ROADS SAFER CITIES' listed, and a 'Subscribe to our Newsletter' section for 'FIFTH UNITED NATIONS GLOBAL ROAD SAFETY WEEK'.

The NRSO website (2/2)

A dynamic website with a wealth of information
www.nrsso.ntua.gr

- since 2004 with more than **1.300 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 and the EU
- exhaustive list of road safety **Conferences** in Greece and globally
- links to dozens of road safety **Resources** globally



The screenshot shows the NRSO website interface. At the top, there is a navigation bar with 'Home', 'About', and 'Knowledge' links. The main content area is titled 'Road Safety Conferences' and includes a sub-header 'Road Safety Conferences' and a paragraph: 'Road Safety Conferences concern past and future Conferences, Congresses, Seminars and Workshops in the field of road safety in Greece, in Europe and worldwide, in which we participate or we are aware of through our cooperations.' Below this is a photograph of a speaker at a conference. A list of conferences follows, categorized by year: 2020 and 2019. The 2020 list includes: 7th ICTPT, VTI & SAFER, Gothenburg, 25-27 August; Symposium for Highway Geometric Design, Amsterdam, 28 June -01 July; Transport Research Arena (TRA) 2020, Helsinki, 26-30 April; 3rd Global High-Level Conference on Road Safety, Stockholm, 19-20 February. The 2019 list includes: New Horizons of Transport and Communications, Doboj, 29-30 November; Annual POLIS Conference, Brussels, 26-27 November; 8th International Cycling Safety Conference, CARRS-Q, Brisbane, 18-20 November; Road Safety in Local Communities, Banja Luka, 24-25 October; 32nd ICTCT Conference, Warsaw, 24-25 October; 9th ICTR, HITE/HIT, Thessaloniki 24-25 October; 26th ITS World Congress, Singapore, 21-25 October; International Conference on Road Safety & Simulation, NADS, Iowa, 14-17 October; 47th European Transport Conference, Dublin, 09-11 October; World Road Congress Abu Dhabi, PIARC, 6-10 October; EU-Safety 2019, EuroSafe, Luxembourg, 3-4 October; Prevention of Accidents at Work (WOS), Vienna, 23-26 September; 24th Living and Walking in Cities Conference, Brescia, 12-13 September; IRCOB Conference 2019, Florence, 11-13 September; Transportation Systems of the Future - Mobil.TUM, TUM, Munich, 11-12 September; 8th Symposium - hEART2019, Budapest, 4-6 September; 22nd International Council on Alcohol, Drugs, Traffic Safety, Ec; 8th Symposium on Naturalistic Driving Research, MUARC, Melbourne, 12-13 September. On the left side of the screenshot, there is a sidebar with 'Systems' and 'Cooperations' sections. The 'Systems' section includes SafeFiTS, European Road Safety Observatory, African Road Safety Observatory, pract - repository, and DaCoTA. The 'Cooperations' section includes Mobility and Transport, Research & Innovation, International Transport Forum, UNECE, World Health Organization, The World Bank, and European Investment Bank. At the bottom right, there is a banner for 'FIFTH UNITED NATIONS GLOBAL ROAD SAFETY WEEK' with a 'Save Lives' logo.

NRSO Data and Knowledge Systems

Databases

- **SANTRA** - Greek Road Accident Database with disaggregated data (1985 - 2017, 1,2 million recordings)
- **CARE** - European Road Accident Database with disaggregated data (1991 - 2017, 36 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.)

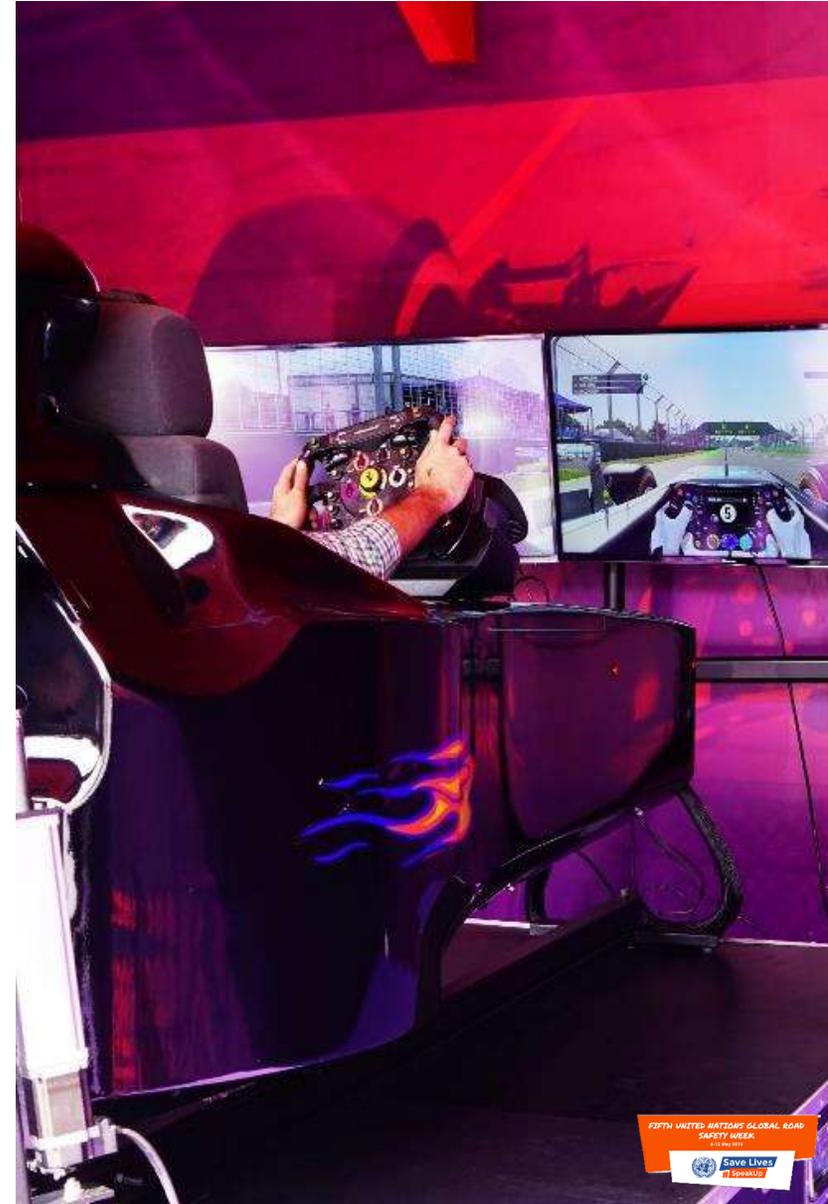
Knowledge Systems

- Digital Road Safety **Library** > 5.000 key Reports
- International **Bibliography** database (scopus, science direct)
- Analysis **tools** (traffic, simulation, statistics)

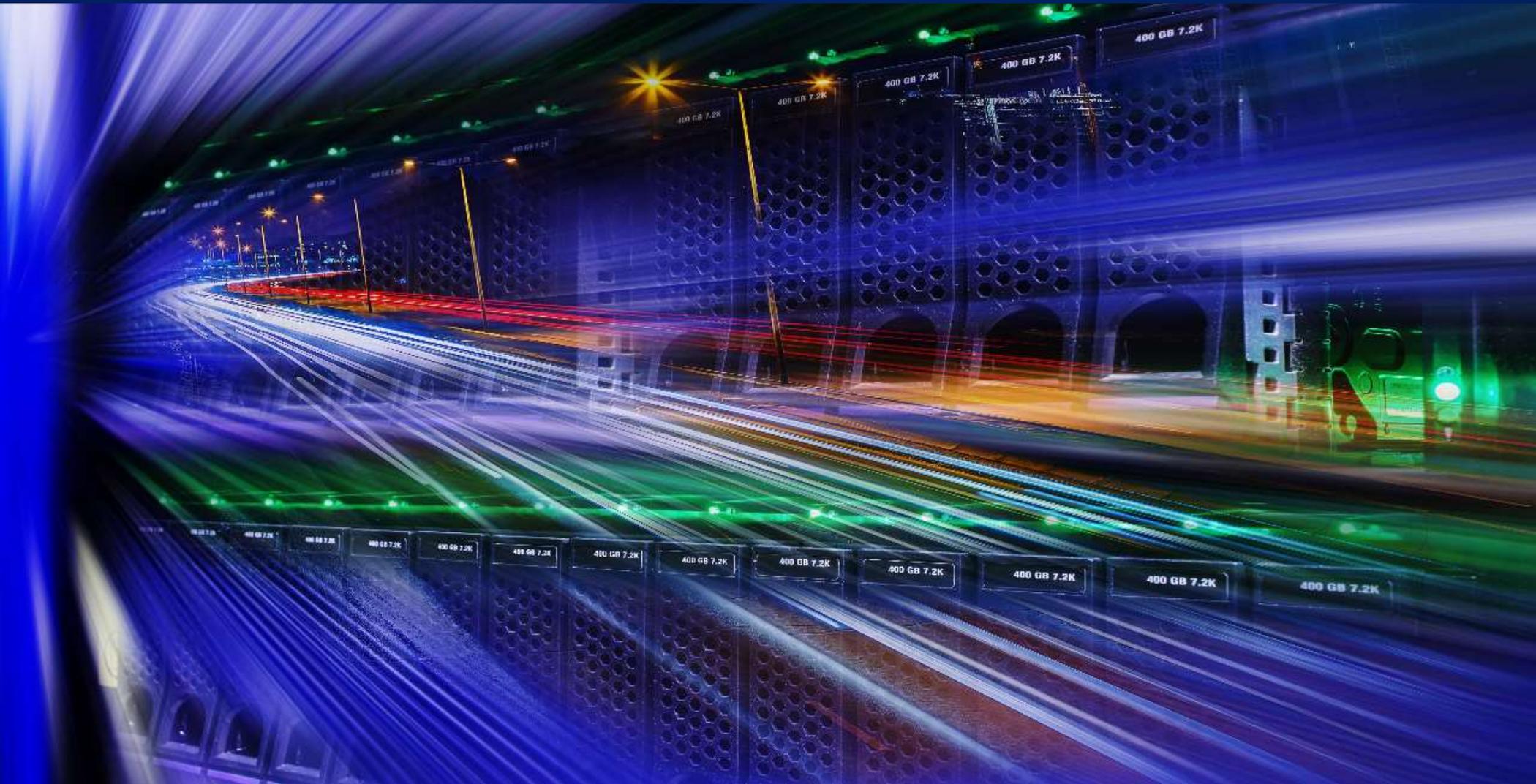


NRSO Research Infrastructure

- **Driving Simulator** (Foerst ¼ cab, moving base) for driver behavior experiments
- Unmanned Aerial Vehicles (**Drones**) for traffic monitoring
- On-Board Diagnostics Devices (**OBD**) for driver behavior monitoring
- **Cameras** for traffic monitoring
- **Other devices** for traffic counts, speed monitoring, position monitoring (GPS)



Road Safety Research Areas



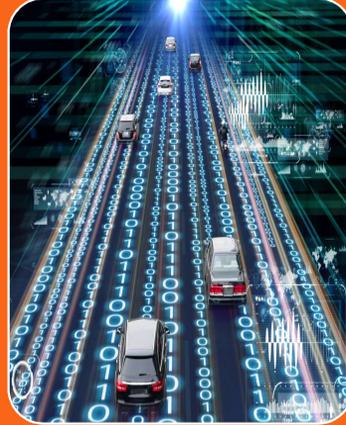
The Road Safety Research Areas



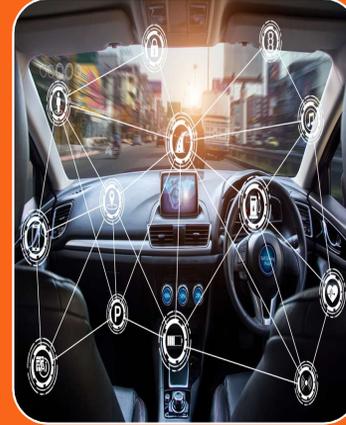
Road
Safety Data
&
Knowledge
Systems



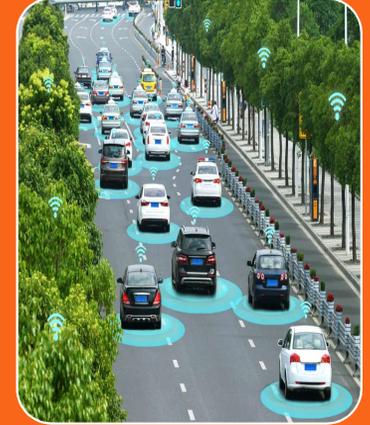
Driver
Safety
Behaviour



Road
Infrastructure
Safety



Driver
Behaviour
Telematics

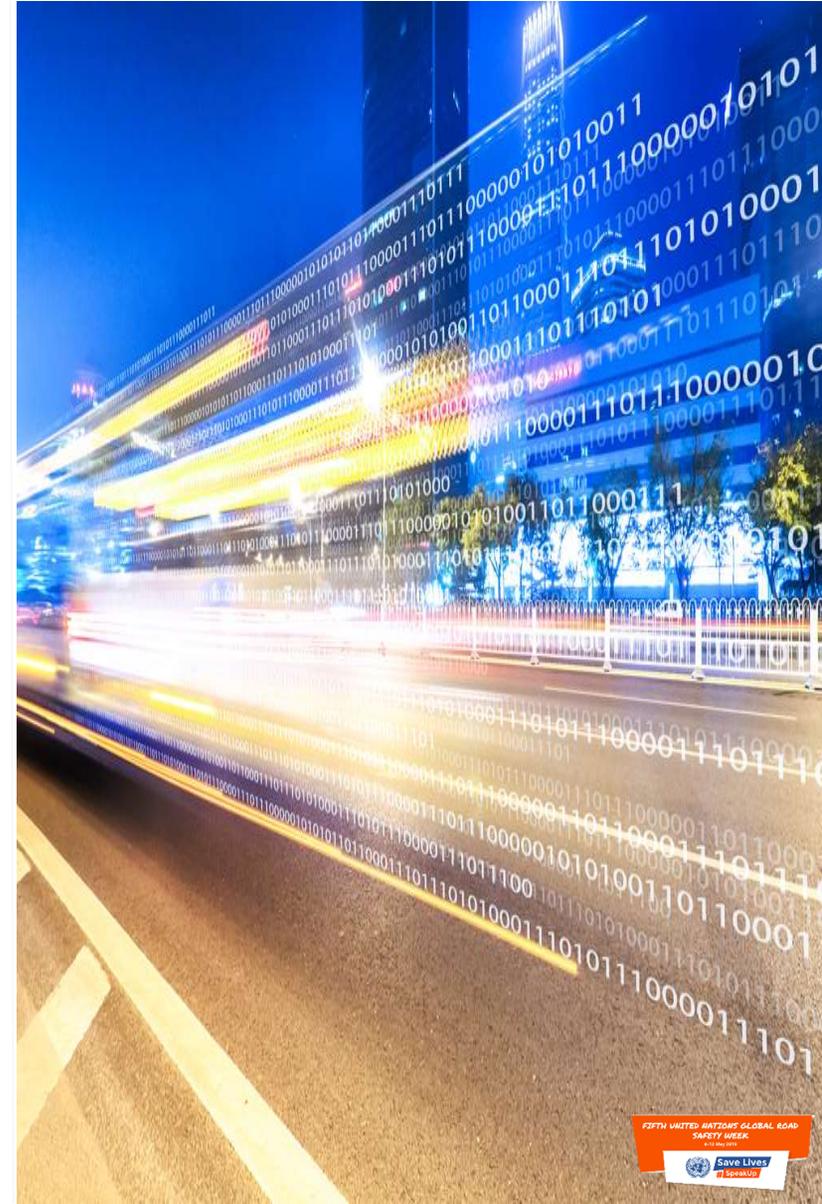


Traffic
Automation
and Safety



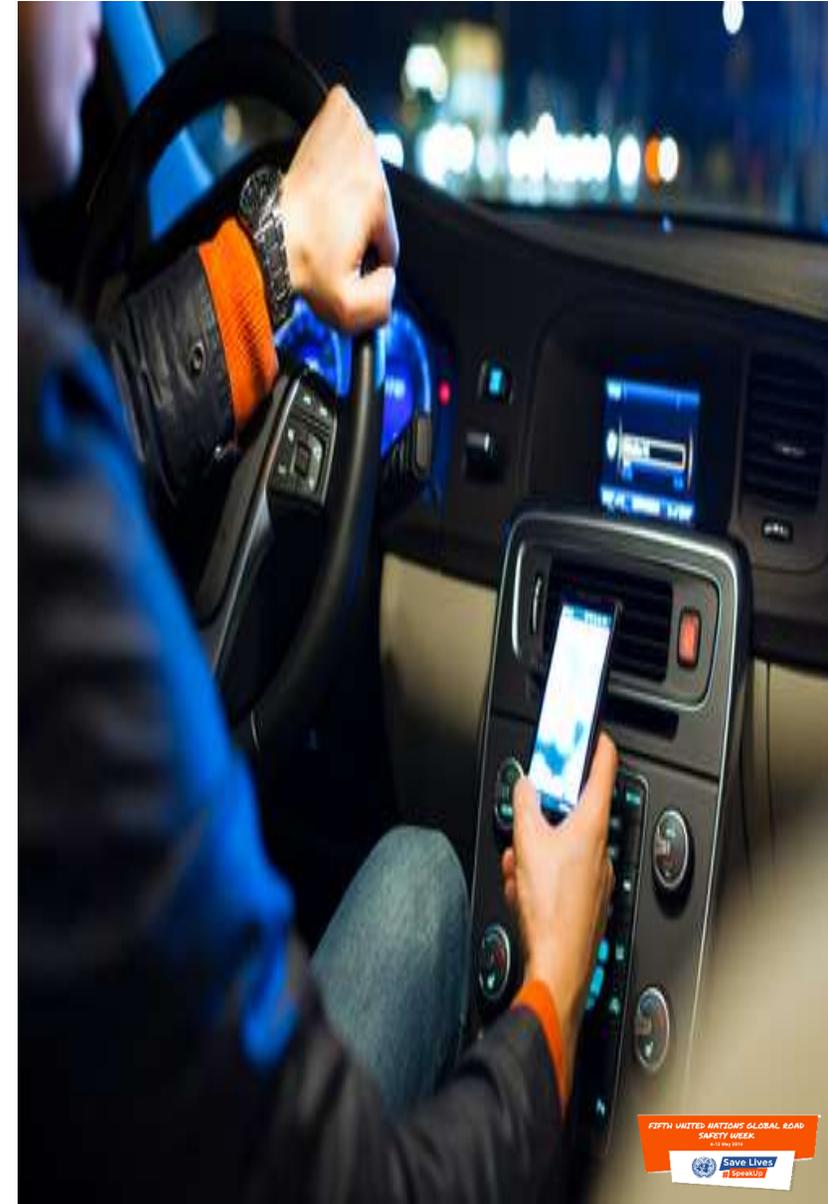
Road Safety Systems

- [Nrso - The NTUA Road Safety Observatory](#)
- [Erso+ - The European Road Safety Observatory](#)
- [SaferAfrica - The African Road Safety Observatory](#)
- [SafetyCube - European Road Safety Decision Support System](#)
- [SafeFITS - Global Road Safety Model](#)
- [Pract - The CEDR Road Safety APM and CMF Repository](#)
- [BeOpen - Open science in road safety](#)
- [RscKsa - The road safety data center of Saudi Arabia](#)



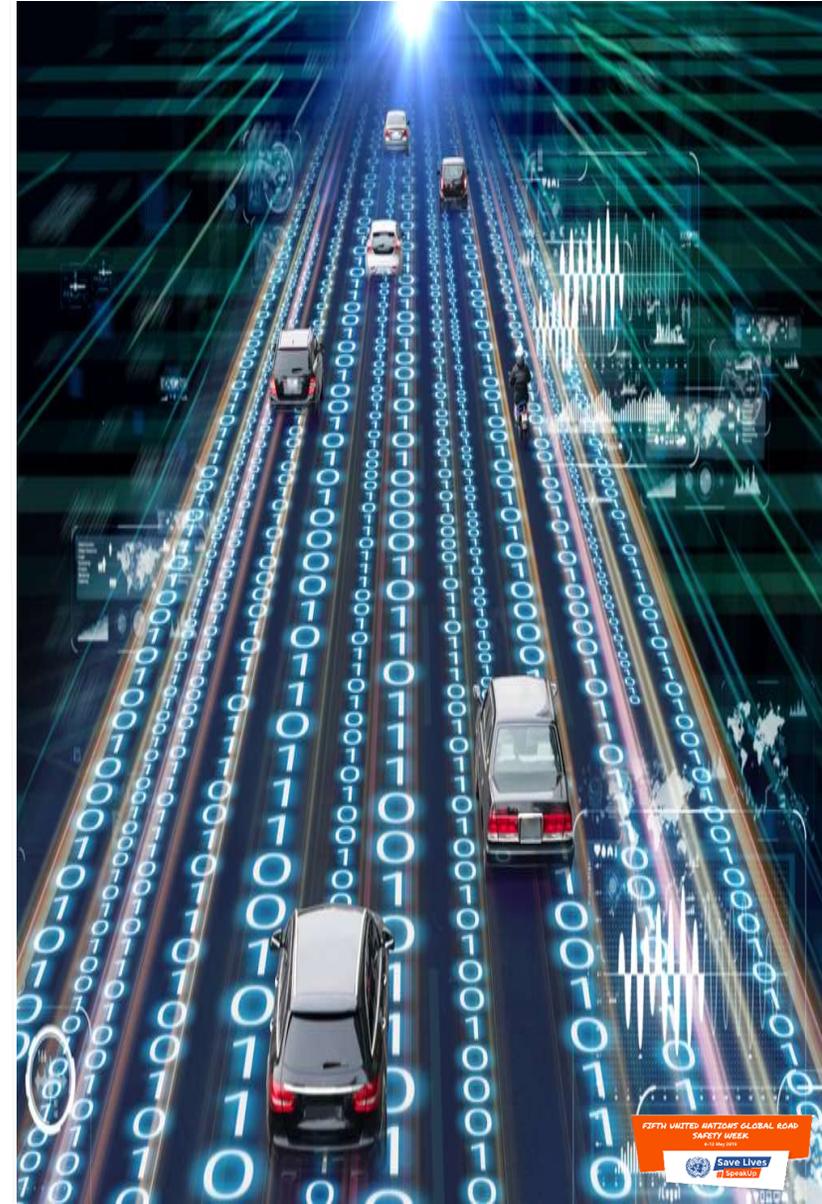
Driver Safety Behaviour

- [Esra - Road safety attitudes in Europe](#)
- [SafeCulture - Road safety culture in Greece and in Norway](#)
- [OSeven - Monitoring driver behaviour through mobile phones](#)
- [Velivr - Cycling under the influence of alcohol and drugs](#)
- [Skillful - Safety skills of future transportation professionals](#)
- [SafeBehave - Actions to improve drivers' safety behavior](#)



Road Infrastructure Safety

- [i-safemodels - Modelling crash modification factors globally](#)
- [EibCba - Economic analysis of road infrastructure safety projects](#)
- [Pract - The CEDR Road Safety APM and CMF Repository](#)
- [e-mopoli - Safety implications from electromobility](#)
- [CampSump - Mobility and safety in University Campuses](#)
- [WeatherSafe - Predicting road accidents with real time data](#)



Driver Behaviour Telematics

- [i-Dreams - Driver-vehicle-environment interactions and safety tolerance](#)
- [BeSmart - Smartphone applications for driver safety behaviour support](#)
- [Sesame - Smartphone exploitation for event spatial analysis & mapping](#)
- [OSeven - Data science techniques for benchmarking driving efficiency](#)



Traffic Automation and Safety

- Levitate - Societal impacts of connected and automated vehicles
- Drive2theFuture - Driver needs and behaviour in automated traffic
- Erso+ - Automated Traffic and Safety Synthesis



Overall Key Road Safety Remarks

- **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.



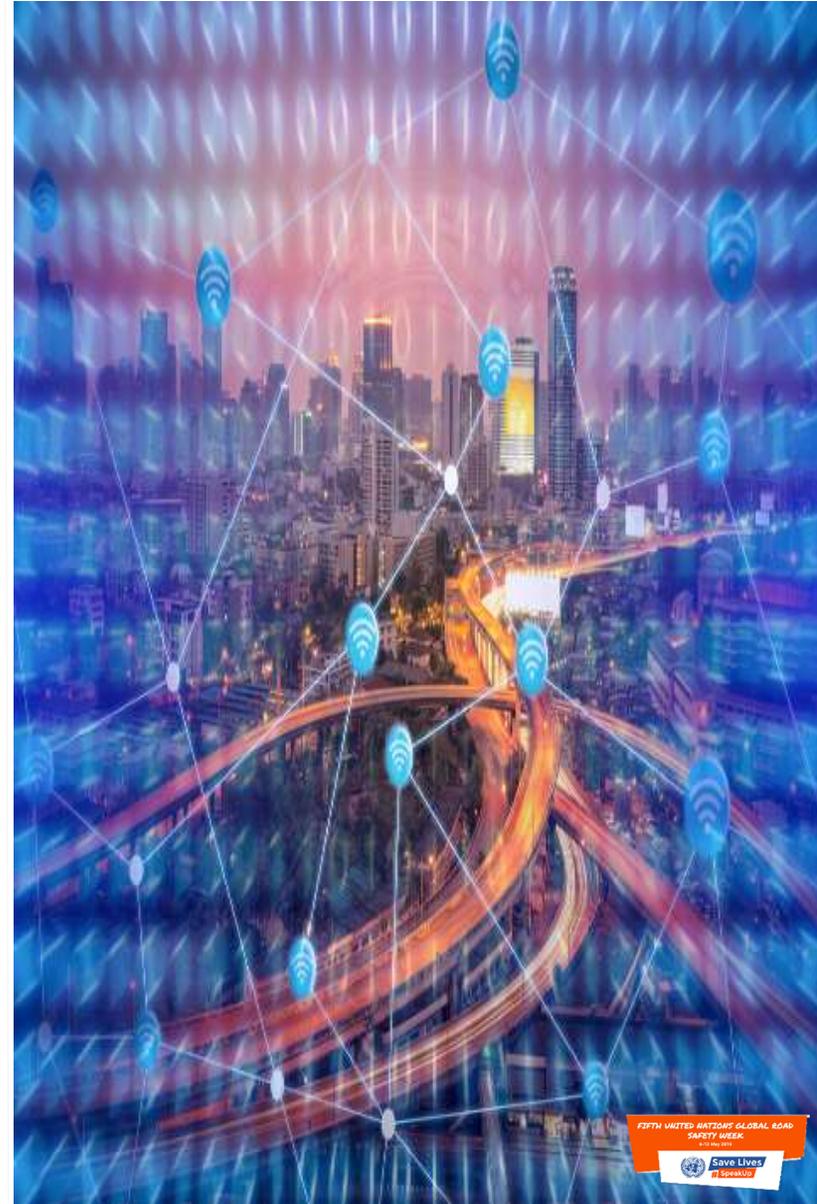
Road Safety Technology Perspectives

- **Technology** can be the new road safety driver, 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

- **Digitalization** opens 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 procedures** 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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