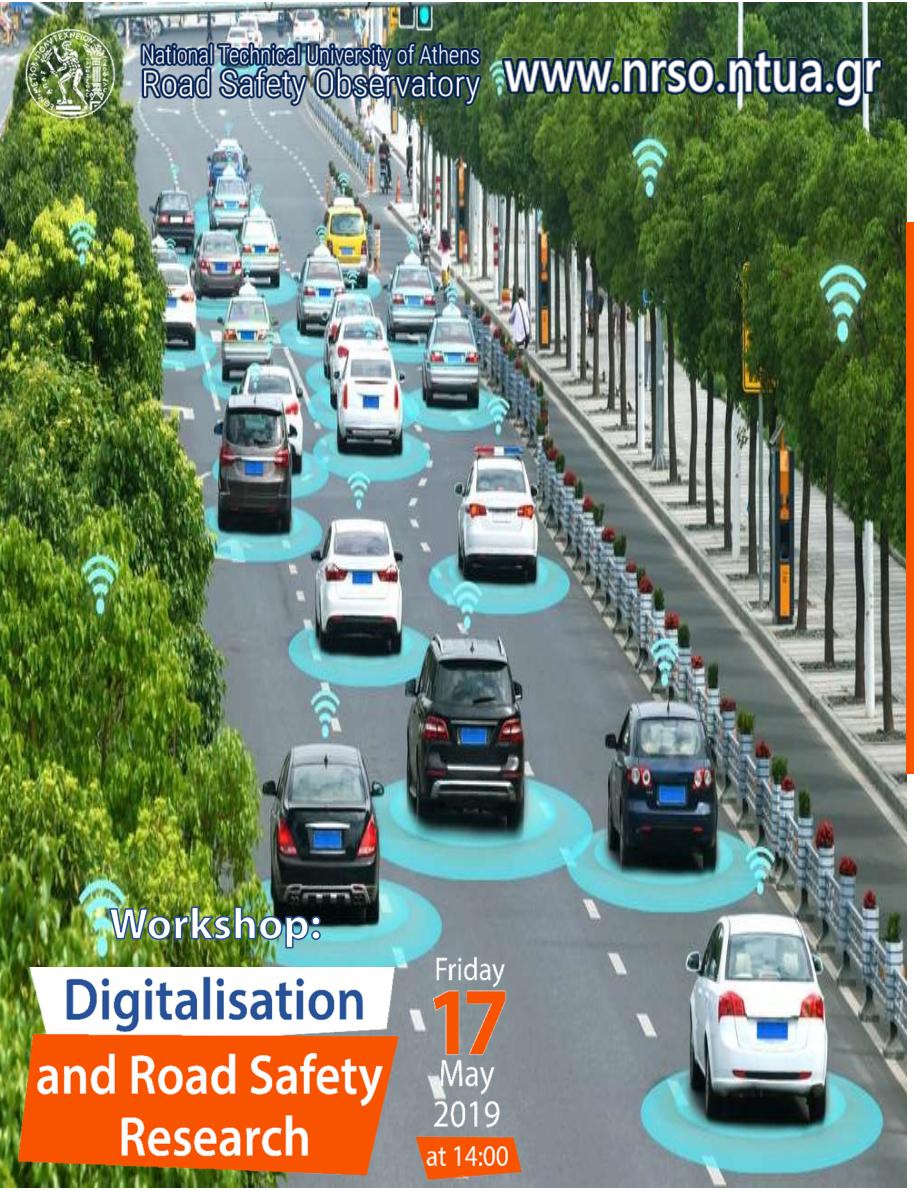


FIFTH UNITED NATIONS GLOBAL ROAD SAFETY WEEK

6-12 May 2019

Save Lives
#SpeakUp

Societal Level Impacts of Connected and Automated Vehicles

levitate

Julia Roussou

Transportation Engineer, Research Assistant

Together with:
Tassos Dragomanovits, George Yannis

The LEVITATE project

- **Project partners**:
  - LOUGH (UK), AIT (AT), AIMSUN (ES), NTUA (EL), POLIS (BE), SWOV (NL), TOI (NO), TfGM (UK), City of Vienna (AT), QUT (AU), TJU (CN), UMTRI (US)
- **Duration of the project**:
  - 36 months (December 2018 – December 2021)
- **Framework Program**:
  - Horizon 2020 - The EU Union Framework Programme for Research and Innovation – Mobility for Growth

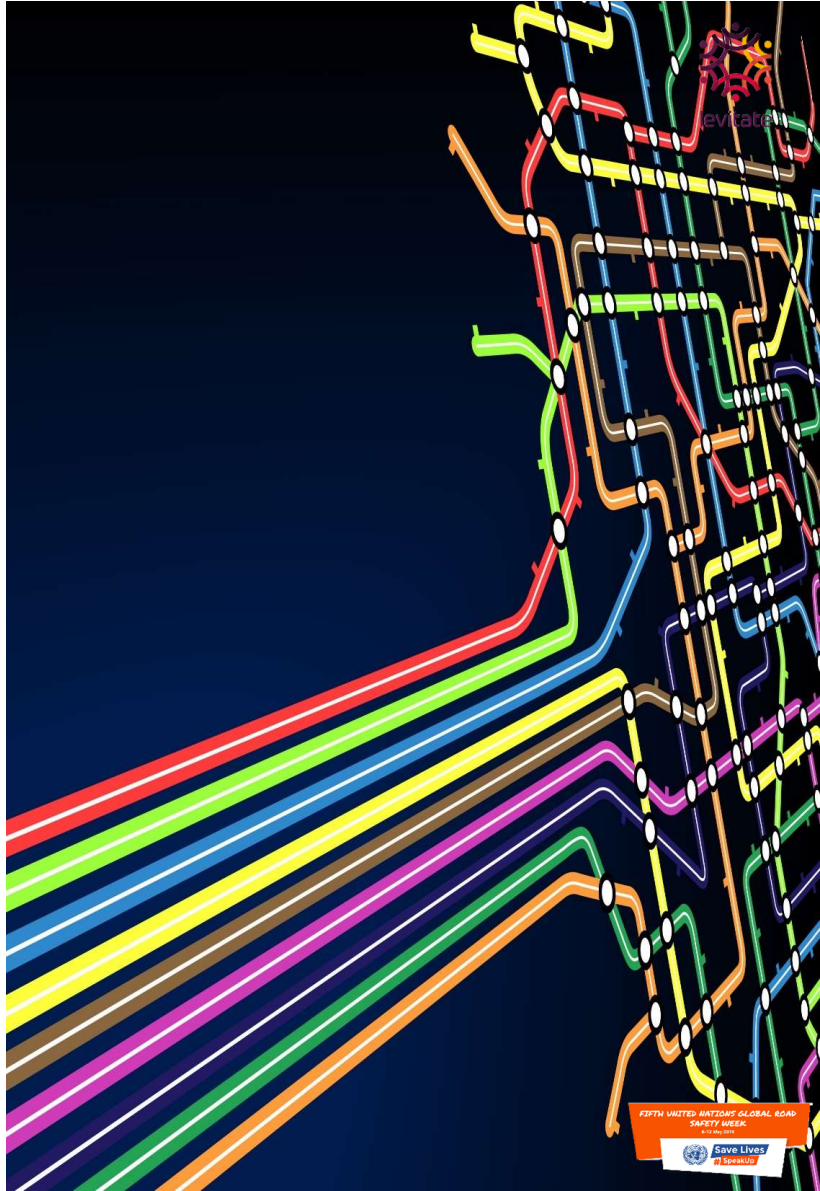
Scope

- LEVITATE focuses on the development of a new impact assessment framework, in order to enable policymakers to manage the introduction of connected and automated transport systems, maximise the benefits and utilise the technologies to achieve societal objectives

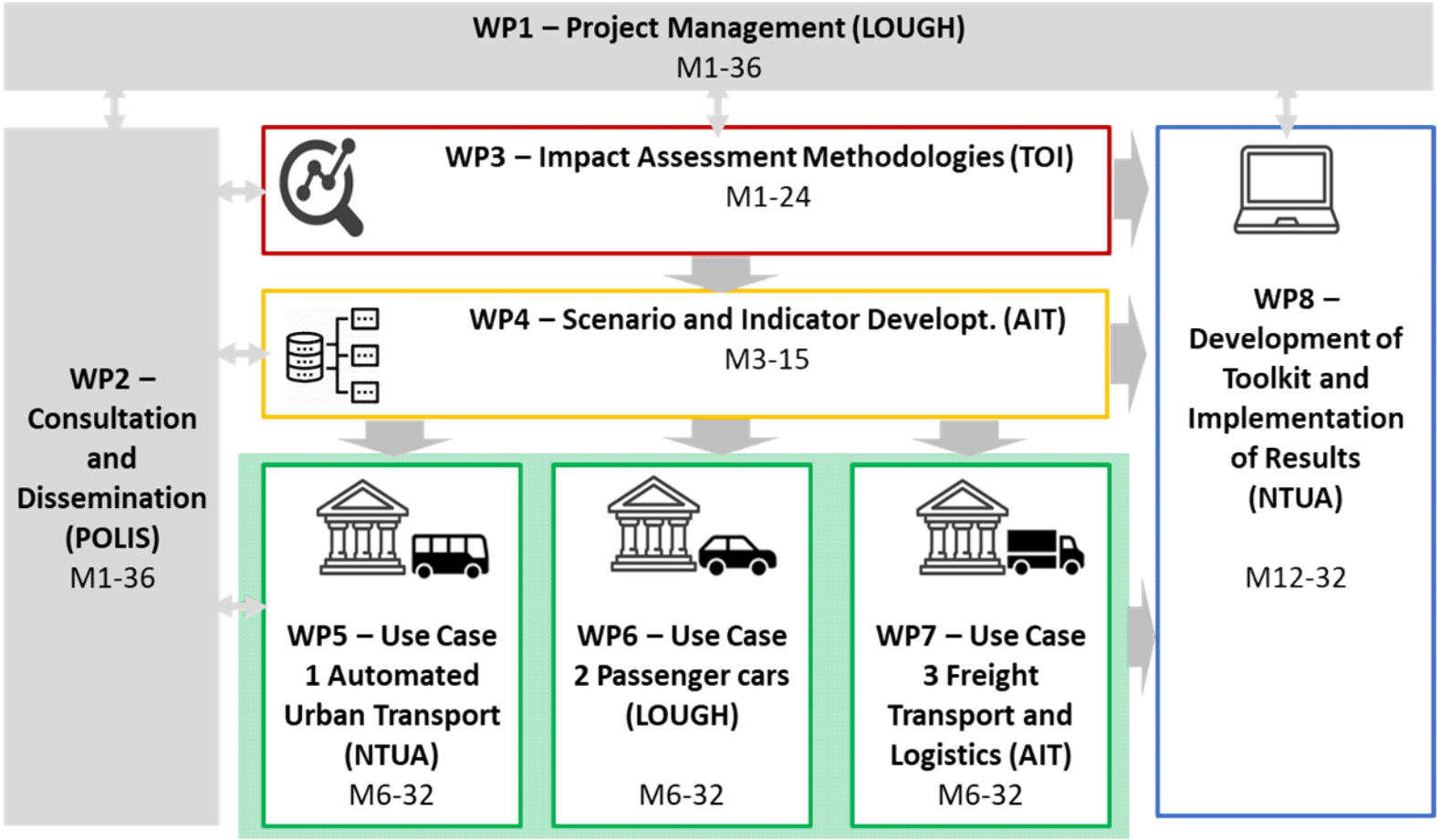
- Development of an open access web-based Policy Support Tool targeting Decision makers at all levels: Municipalities, Regional Authorities and National Governments

Objectives

- New web-based Policy Support Tool – Decision Support System
- Range of forecasting and backcasting scenarios: automated urban transport, passenger cars, freight services
- Multi-disciplinary methodology to assess short, medium and long term impacts
- Case studies: mobility, environment, safety, economic and societal indicators

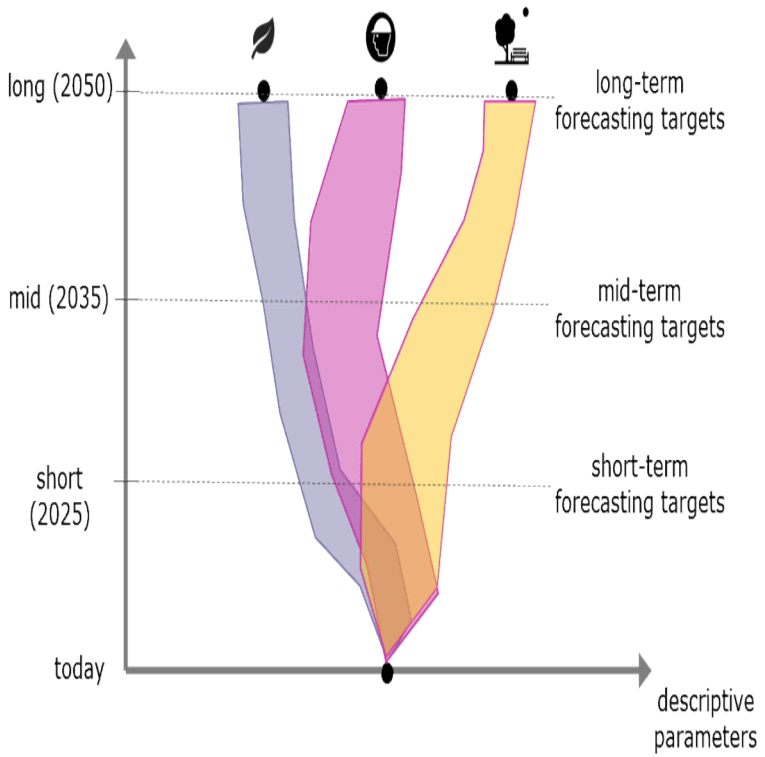


Structure

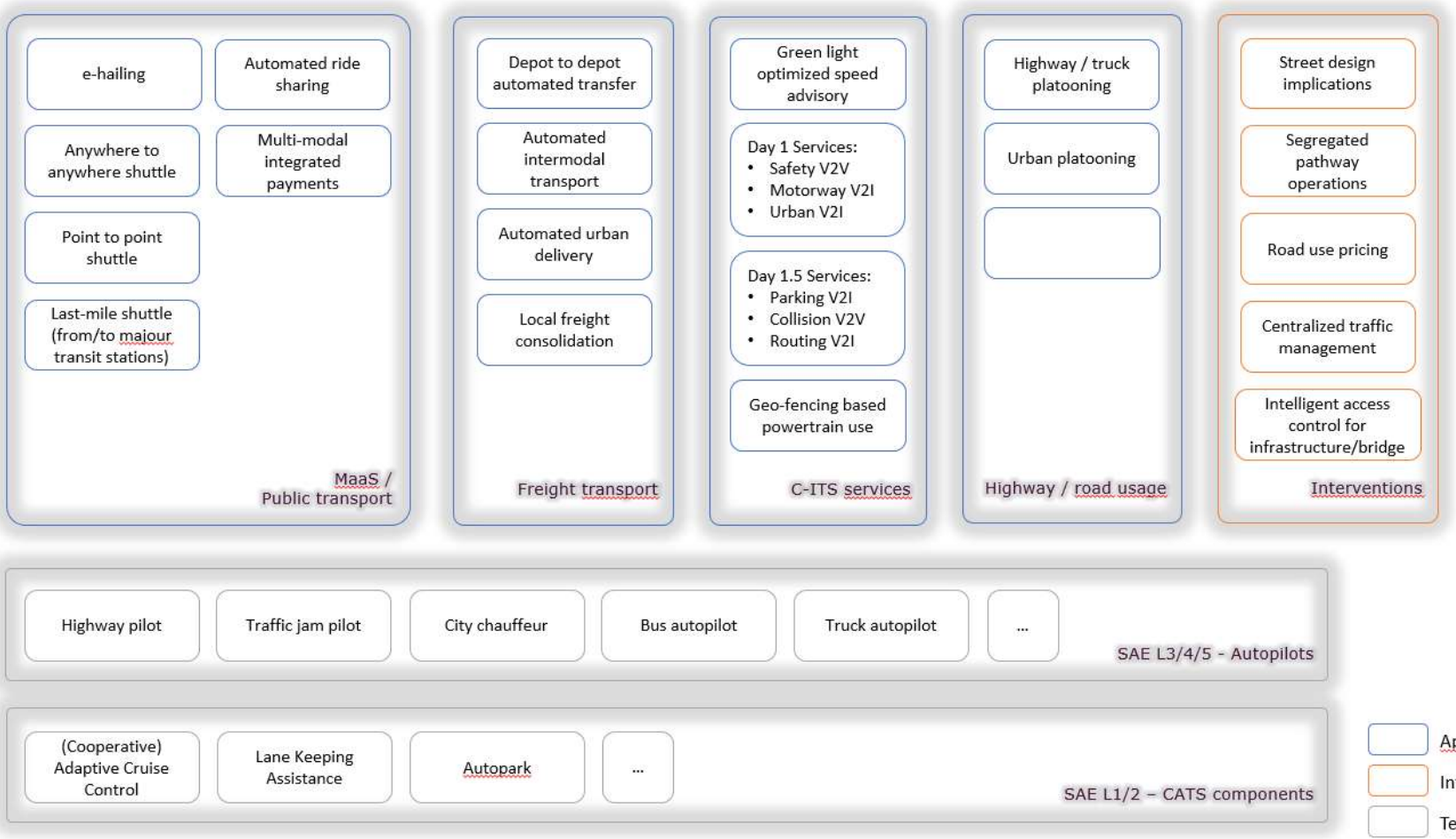

WP1 – Project Management (LOUGH)
M1-36
WP2 – Consultation and Dissemination (POLIS)
M1-36
WP3 – Impact Assessment Methodologies (TOI)
M1-24
WP4 – Scenario and Indicator Developt. (AIT)
M3-15
WP5 – Use Case 1 Automated Urban Transport (NTUA)
M6-32
WP6 – Use Case 2 Passenger cars (LOUGH)
M6-32
WP7 – Use Case 3 Freight Transport and Logistics (AIT)
M6-32
WP8 – Development of Toolkit and Implementation of Results (NTUA)
M12-32

Impacts and Scenarios

- Identification of potential impact areas:
  - Safety, Environment, Society, Economy
- Measuring and predicting impacts
- Data collection and backcasting
- Converting impacts to monetary terms
- Quantitative and qualitative indicators
- Scenario specification
- Specification of potential policy objectives
- Simulation modelling and classical statistical models
- Produce guidelines and recommendations



Use Cases


e-hailing
Automated ride sharing
Anywhere to anywhere shuttle
Multi-modal integrated payments
Point to point shuttle
Last-mile shuttle (from/to majour transit stations)
MaaS / Public transport
Depot to depot automated transfer
Automated intermodal transport
Automated urban delivery
Local freight consolidation
Freight transport
Green light optimized speed advisory
Day 1 Services:
• Safety V2V
• Motorway V2I
• Urban V2I
Day 1.5 Services:
• Parking V2I
• Collision V2V
• Routing V2I
Geo-fencing based powertrain use
C-ITS services
Highway / truck platooning
Urban platooning
Highway / road usage
Street design implications
Segregated pathway operations
Road use pricing
Centralized traffic management
Intelligent access control for infrastructure/bridge
Interventions
Highway pilot
Traffic jam pilot
City chauffeur
Bus autopilot
Truck autopilot
...
SAE L3/4/5 - Autopilots
(Cooperative) Adaptive Cruise Control
Lane Keeping Assistance
Autopark
...
SAE L1/2 – CATS components
Application
Intervention
Technology

Policy Support Tool

Knowledge Module

Bibliography

Levitate results

- use case results
- predefined impact assessment scenarios

Tools Documentation

Guidelines

Estimator Module

Forecasting sub-system

Policy Interventions

- introduction of a city toll for non-automated vehicles
- economic incentives for AV purchase
- provision of dedicated lanes for AVs
- introduction of tax on vehicle ownership, traffic restrictions for non-automated vehicles
- …. etc.

Links

Factors

- Vehicle type
- Area type
- GDP
- AV penetration rate (per SAE Level)
- Automation type
- Level of shared mobility
- Vehicle ownership rate
- Share of electric vehicles
- Share of pedestrians
- Share of cyclists
- Share of PTWs
- …. etc.

Inter-relations

Inter-relations

Impacts

- Crashes
- Fatalities
- Air Pollution
- Noise Pollution
- Energy efficiency
- Vehicle purchase cost
- Vehicle operating cost
- Vehicle maintenance cost
- Vehicle insurance cost
- Direct cost of travel
- Change in travel time
- Travel comfort
- Valuation of travel time
- Congestion
- Pavement wear
- …. etc.

Interrelations

Backcasting sub-system

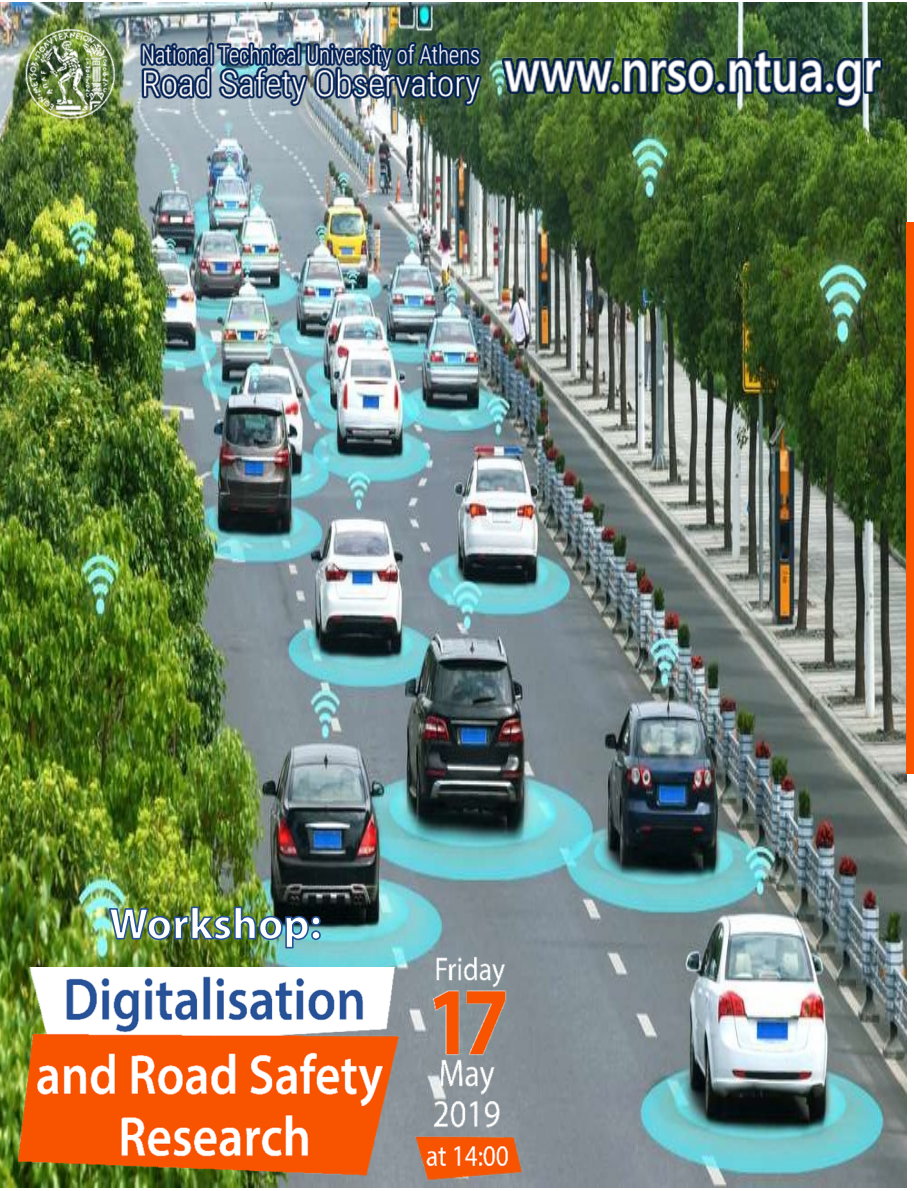
Utilization of forecasting in an iterative process ("goal seek"), testing alternative policy interventions until the desired impact(s) is obtained

Project Impact

- Flexible tool for diverse decision makers needs
- Backcasting system providing insight on measures to reach cities objectives
- Provide a multidisciplinary impact assessment methodology
- Identify significant impacts of CATS on safety, environment, mobility and society.
- Bridge the gap between technology and policy objectives
- Support cities with CATS implementation without the unwanted and unforeseen consequences and rebound effects

Future Challenges

- Accurate quantification of impacts
- Identification of multi-modal impact
- Measure combined effect of automation impacts
- Simulation of different automation levels
- Definition of links and interrelations between policy interventions, factors and impacts



FIFTH UNITED NATIONS GLOBAL ROAD SAFETY WEEK

6-12 May 2019

Save Lives
#SpeakUp

Societal Level Impacts of Connected and Automated Vehicles

levitate

Julia Roussou

Transportation Engineer, Research Assistant

Together with:
Tassos Dragomanovits, George Yannis