



National Technical University of Athens  
Road Safety Observatory

[www.nrso.ntua.gr](http://www.nrso.ntua.gr)



Workshop:  
**Digitalisation  
and Road Safety  
Research**

Friday  
**17**  
May  
2019  
at 14:00

**FIFTH UNITED NATIONS GLOBAL ROAD  
SAFETY WEEK**  
6-12 May 2019



**Save Lives**  
#SpeakUp

# Driver needs and behaviour in automated traffic



## Eleni I. Vlahogianni

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Together with:  
Foteini Orfanou, George Yannis

# The Drive2theFuture project

- **Full project name:**
  - Needs, wants and behaviour of “Drivers” and automated vehicle users today and into the future
  
- **31 Project partners from 13 countries:**
  - Universities, Research Institutes
  - Industries, SMEs
  
- **Duration of the project:**
  - 36 months (May 2019 – April 2022)
  
- **Framework Program:**
  - Horizon 2020 - The EU Union Framework Programme for Research and Innovation – Mobility for Growth



# Background

- Automation brings **revolution** to the transportation systems
- **All transport modes** are moving towards the era of automation
- **Penetration rate** of autonomous vehicles depends on:
  - **User acceptance**
  - **User willingness**
  - **Safety**
  - **Compliance**
  - **Sustainability**



# Research Questions

- Investigation of the **needs** and **wants** of the “Driver” and the potential user of AV
- **Transition** from driver behavioral models to behavioral models for autonomous driving
- Identification of the **factors** influencing **user acceptance**
  - Appropriate HMI
  - Training schemes
- Observation and **prediction** of user **acceptance**





# Methodological Challenges

- Development of the **first AV behavioral model**
  - Literature review and analysis of three driver behavioral models
    - Multiple comfort zone, Risk Allostasis model, Risk Monitor Model
- **Collection of data** from more than 20 relevant European projects
  - User behavior, acceptance, HMI, accident data
- Identification of data science techniques for **user acceptance prediction**
- **Pilots** for testing automated driving behavior
  - 12 Pilots in 8 European Countries
  - Training schemes for AVs
  - HMI development



# Simulation modelling

- Identification of the **interface** between drivers' behavior models and AV behavior models
- Identification of different type(s) of **simulated environments/tools** to study
  - the **acceptance of AVs**
  - their **critical components** for each transport modes
- Identification of the most **relevant KPIs** for **automation impacts** evaluation
- Integration of **different tools** (simulation, data driven techniques etc) in a **common operational platform**





# Pilots

- Development of **3 pilot phases**:
  - Phase I: Setting the scene
  - Phase II: Iterative development, verification and optimization, initial demonstrations
  - Phase III: Final, wide-scale demonstrations and training pilots across Europe
- **All transportation modes**
  - Road (passenger cars, shuttles, motorcycles)
  - Maritime
  - Aviation (drones)
- Interaction with **non equipped vehicles**
- Interaction with **vulnerable road users**
- **Different levels of automation**
- **Assessment** of AV's behavior and experience of the users and the participants



# Scientific and Social Impact

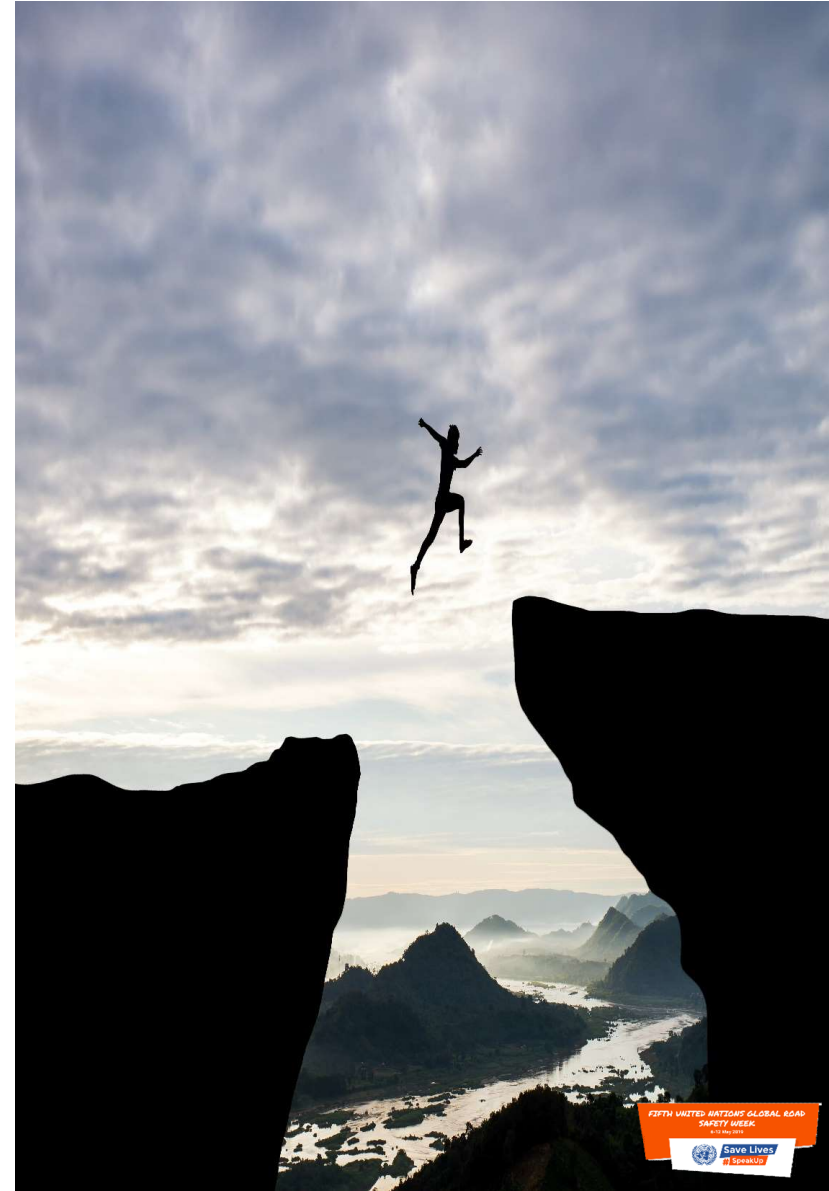
- **Improvement of safety levels** in all transport modes
- **Raise user acceptance** towards automated driving
- **Increase user awareness** through participation in the pilots
  - Various modes
  - Different traffic environments
- Development of the **first AV behavioral** model
- Creation of a **simulation suite** for designing and assessing AV functions and the estimated user acceptance





# Future Challenges

- **Extension** of the **AV behavioral models** from passenger cars to **other transport modes**
- Development of **HMI**s capable of handling any **emergency situation**
- More **pilot tests** for autonomous transportation modes besides passenger cars
  - Ships
  - Trains, etc
- Further **increase user acceptance** and trust in automation





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