

National Technical University of Athens
Road Safety Observatory

Friday
19 May
2023
13:00-17:00

Workshop
in the framework of
7th UN Global Road Safety Week

StreetsforLife
#RethinkMobility

WE DEMAND
SAFE AND SUSTAINABLE
MOBILITY

Road Safety Research Challenges

DECADE OF ACTION FOR
ROAD SAFETY
2021-2030

unroadsafetyweek.org

SHared automation Operating models for Worldwide adoption

Maria Oikonomou

Transportation Engineer, PhD Candidate

Together with:

Marios Sekadakis, Apostolos Ziakopoulos,
Christos Katrakazas, George Yannis

The SHOW project

- **Project partners**
70 partners from 13 EU-countries
- **Duration of the project**
48 months (January 2020 - January 2024)
- **Framework Programme**
Horizon 2020 - The EU Union Framework Programme for Research and Innovation - Mobility for Growth

show-project.eu



Objectives

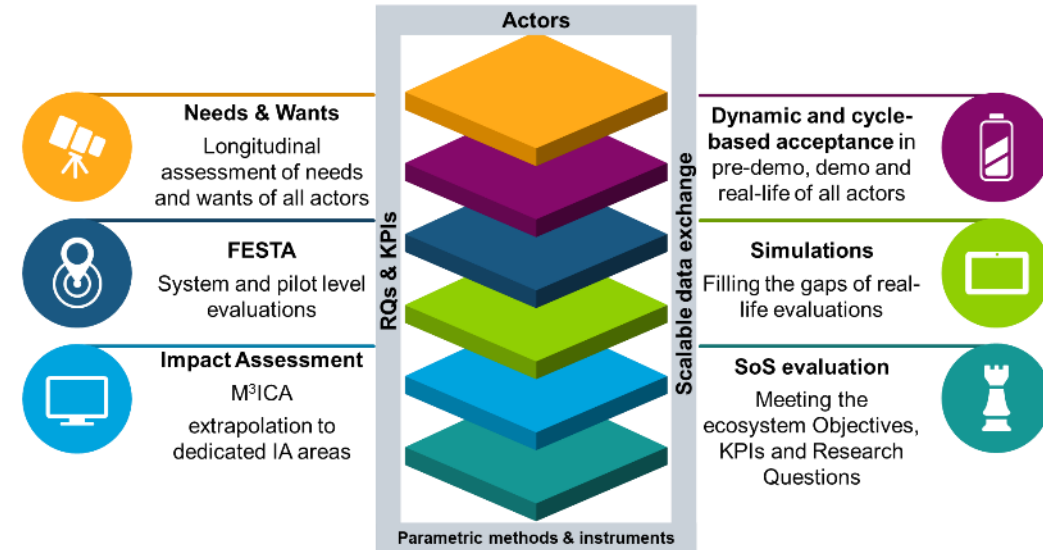
- Conduct **real-world urban demonstrations** taking place in 20 cities in Europe for 24 months.
- Develop **technical solutions and business models** to enhance traveler experience in cities.
- Deploy shared, connected, electrified **fleets of autonomous vehicles** for shared mobility.



Methodology



- The SHOW methodology encompasses several layers starting with the **investigation of the expectations of travellers and stakeholders** and completing with the **final evaluation of the ecosystem**.
- The results consist of findings from the **user tests**, **impact assessment** and **simulations**.
- The SHOW methodology includes four main pillars:
 - Use Cases and their actors
 - Research Questions (RQs) and Key Performance Indicators (KPIs)
 - Parametric methods and instruments
 - Scalable data exchange



Demonstration

- Fourteen **demo sites**
 - 5 Mega demo sites
 - 6 Satellite demo sites
 - 3 Follower demo sites
- Four **services**
 - Public Transport (PT)
 - Demand Responsive Transport (DRT)
 - Mobility as a Service (MaaS)
 - Logistics as a Service (Laas)
- Multiple **use cases** within services
- Numerous supportive **simulation tools**



MATSim
Multi-Agent Transport Simulation

PTV GROUP
the mind of movement



SUMO
SIMULATION OF URBAN MOBILITY



aimsun.



Maria Oikonomou, SHared automation Operating models for Worldwide adoption - SHOW

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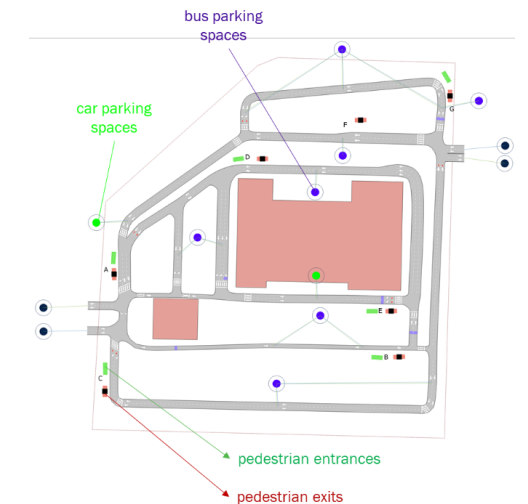
Madrid Demo site

- The **Madrid mega site** deploys real-world (i) automated driving shuttle service operation and (ii) automated driving vehicles operation in a bus depot.
- The **automated vehicles** operate in the Villaverde district and in a bus depot placed in the Carabanchel district of the city of Madrid.
- The **traffic simulation analysis** was performed using field data from the site demonstration to produce several measurements that quantified the effects of automated driving.

Villaverde district
(Madrid, Spain)



Carabanchel district
(Madrid, Spain)

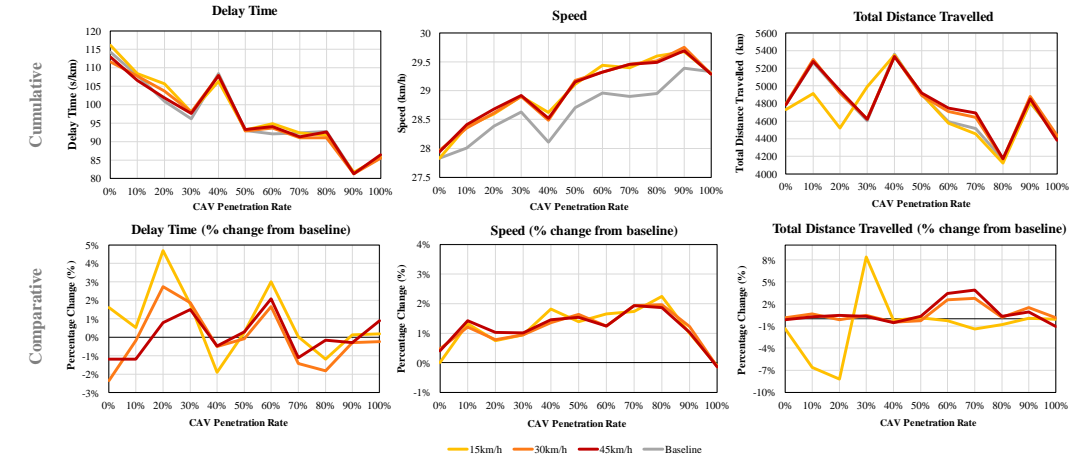


Results

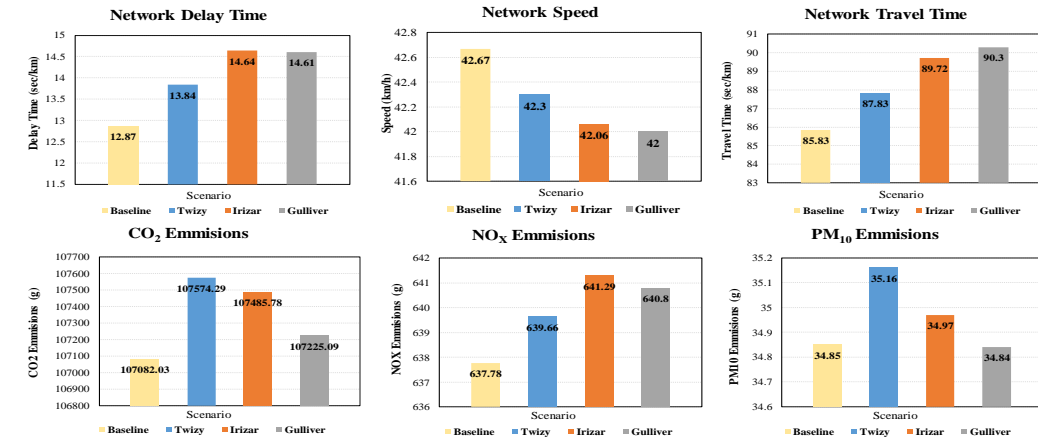


- Higher operational speeds of an automated shuttle service operates **more efficiently** for low market penetration rates of autonomous vehicles.
- It seems that shuttle bus speed **does not impact** traffic and environmental conditions in high penetration rates.
- The operation of autonomous vehicles increases bus depot **delay and travel time**, while decreases average speed as autonomous vehicles operate at lower speeds.

Villaverde district (Madrid, Spain)



Carabanchel district (Madrid, Spain)



Streets for Life

- Improve the necessary functionalities to all vehicle types, taking into account infrastructure, weather and traffic conditions, **safeguarding the safety of vulnerable road users**.
- Propose actions for integration of safe, acceptable and efficient **mixed transport services** for all road users.
- Provide **recommendations** on how to increase interactions among actors, with the aim to improve safety and network wide optimization.



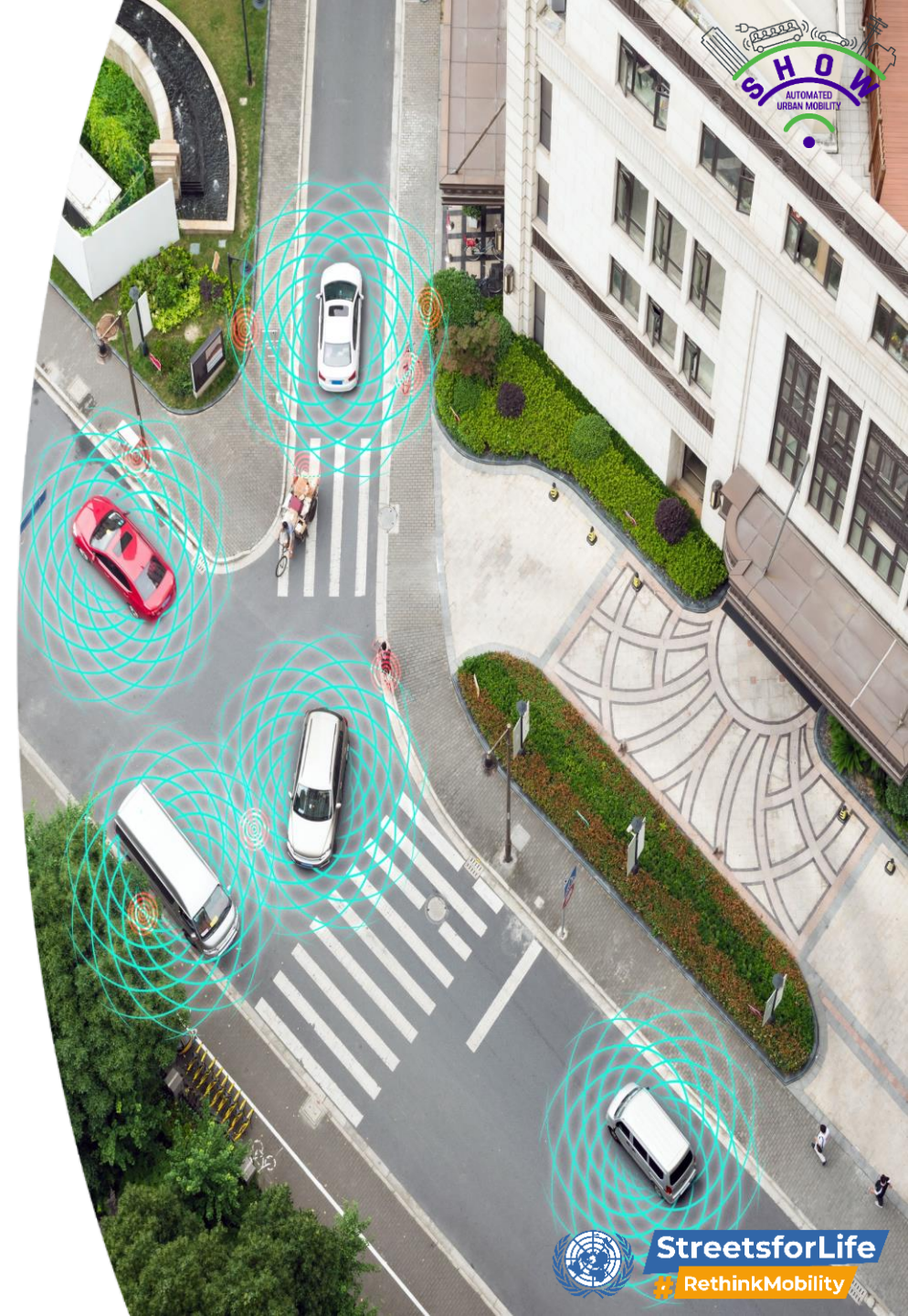
Scientific and Social Impact

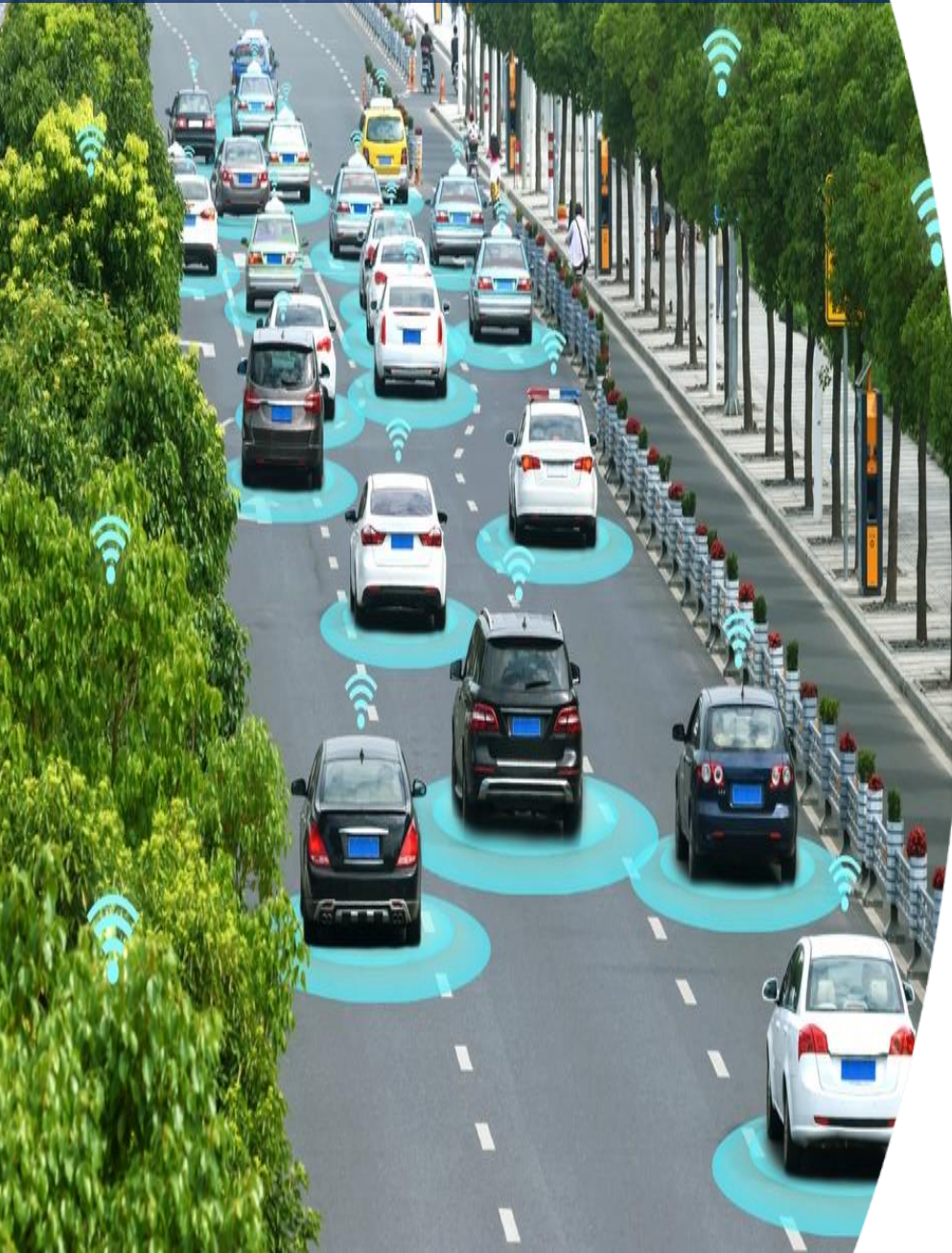
- Explore how shared mobility solutions using connected and cooperative automated vehicles can contribute to a more **sustainable, inclusive and safer mobility system**.
- **Improve market opportunities** and new-entrants by addressing and developing innovative cross-sector business models.
- **Monitor and assess** in an advanced manner for faster implementation.



Future Challenges

- Establish straight-forward techniques for the **safety and impact assessment** of autonomous vehicles.
- Integrate the KPIs and data analytics to form a **holistic road safety assessment protocol** for all conditions and user groups.
- Develop well-defined and concrete automation strategies for a **wider social adoption and road safety enhancement**.





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