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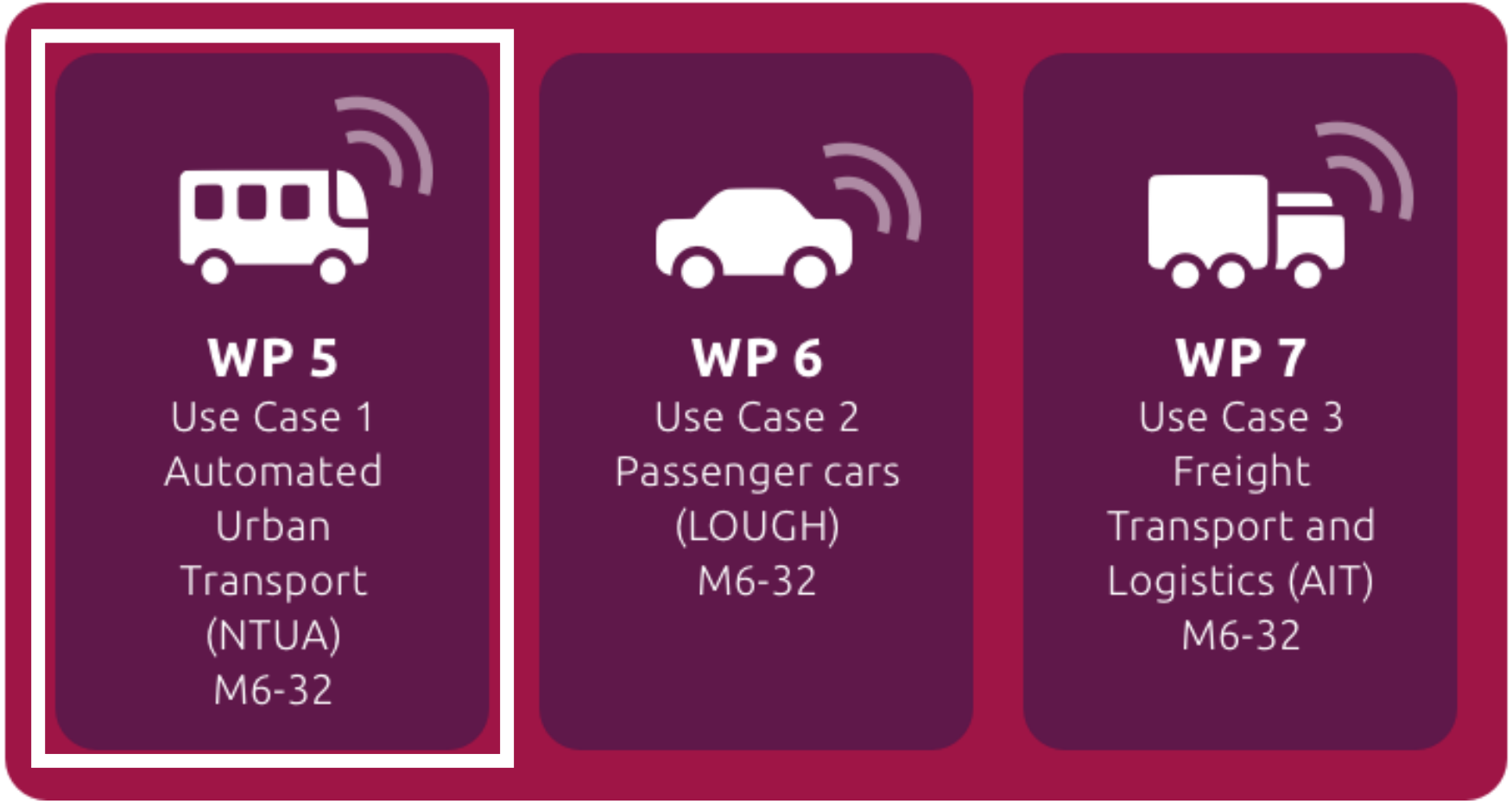
Automated Urban Transport Services

Event: LEVITATE Final Conference
Location: Brussels
Date: May 25, 2022

LEVITATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824361.

Use Cases



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WP5 steps in LEVITATE

Goal	Method	Explanation
1. Exploration for the sub-use cases to study and the impacts to quantify	Literature review	Existing literature on CCAM/CAVs/ADAS
	Stakeholder reference group (SRG) workshop	A group of key stakeholders – international/ twinning partners, international organisations, road user groups, actors from industry, insurances and health sector support the project and participated in workshops.
2. Quantification	Traffic microscopic simulation	AIMSUN microsimulation of traffic at the city-district level (based on modelling individual vehicles)
	Traffic mesoscopic simulation	MATsim modelling of behaviours and choices of individuals (based on groups or streams of vehicles) at the city level
	System dynamics	A modelling technique where the whole system is modelled at an abstract level by modelling the sub-systems at component level and aggregating the combined output.
	Delphi study	The Delphi method was used to determine those impacts that cannot be defined by the other quantitative methods
3. Synthesis & discussion	Synthesis	Major impacts summarized for the policy areas Environment, Mobility and Society/ Economy/ Safety
	Policy considerations	Recommendations & considerations for policymakers based on the wider literature

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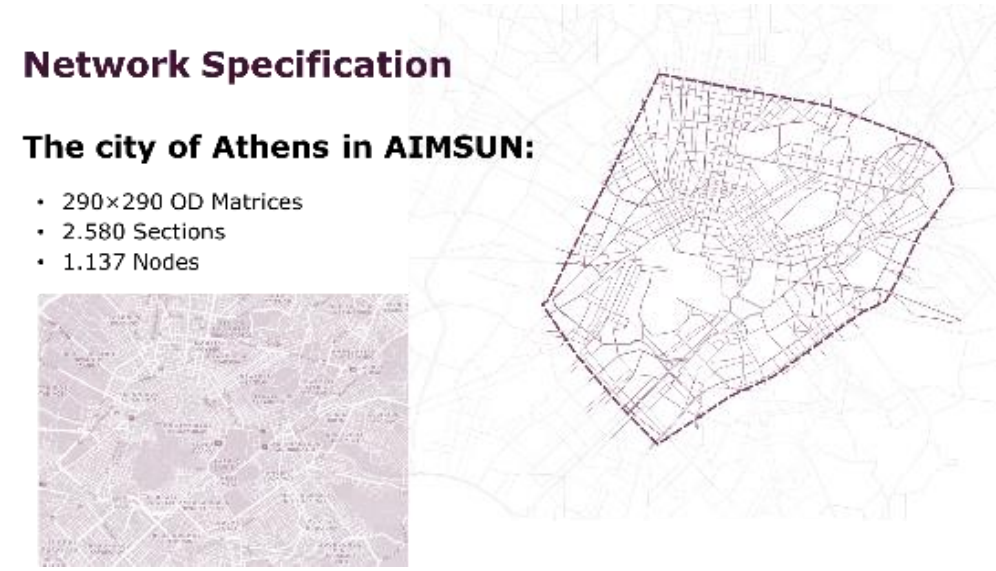
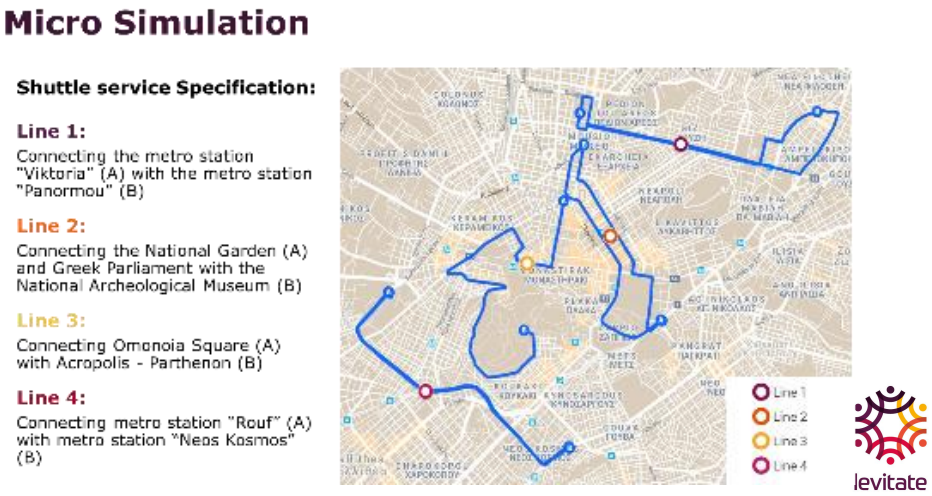
Automated Urban Transport Sub-use Cases

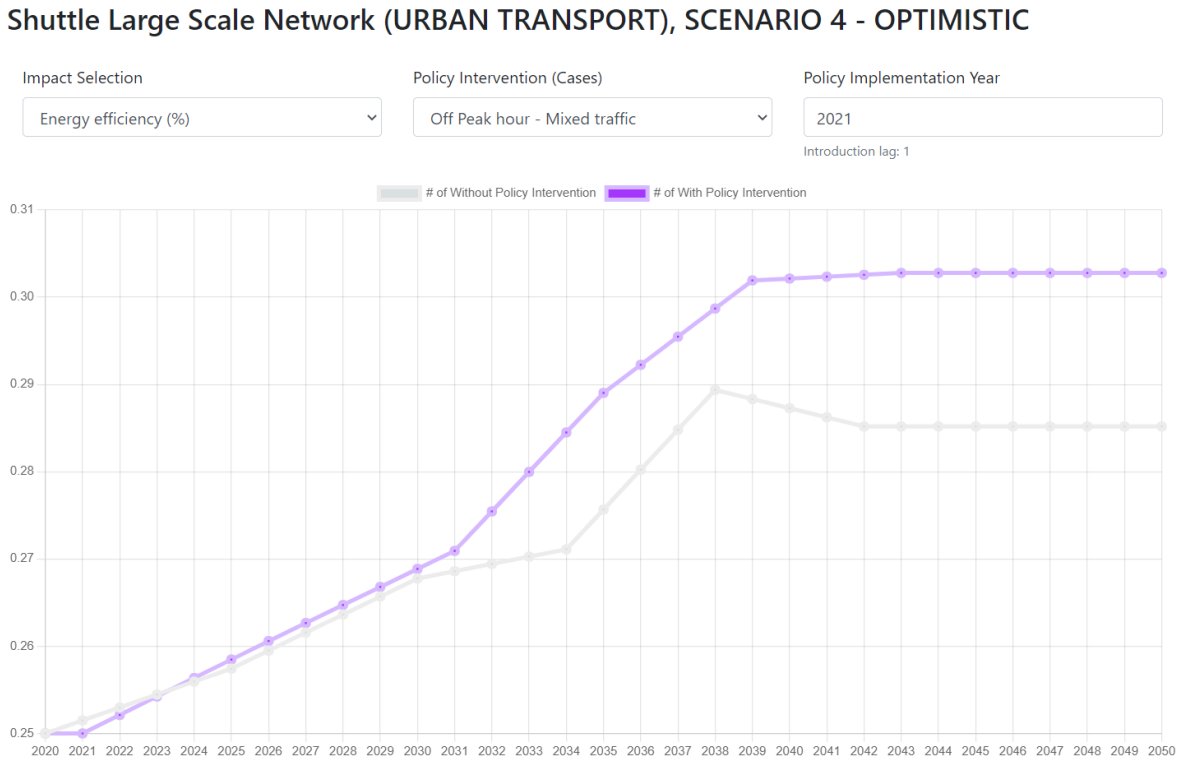
1. **Point to Point automated urban shuttle service (AUSS)**: automated urban shuttles travelling between fixed stations, complementing existing urban transport
   a) Point-to-point AUSS connecting two modes of transport
   b) Point-to-point AUSS in a large-scale network
2. **Autonomous mobility on-demand**: flexible on-demand automated shuttle bus service that includes anywhere-to-anywhere AUSS, last-mile AUSS and e-hailing, complementing existing urban transport





Impacts on the environment

- Microsimulation results indicated that the **introduction of AVs** in the urban environment will significantly **reduce CO2 emissions**
- The introduction of **Automated Urban Shuttle Services** will lead to a **similar emissions reduction** as the baseline scenario
- The Delphi results indicated that all sub-use cases will **increase energy efficiency**.
- **Point-to-point AUSS** will lead to the largest energy efficiency increase in the long-term



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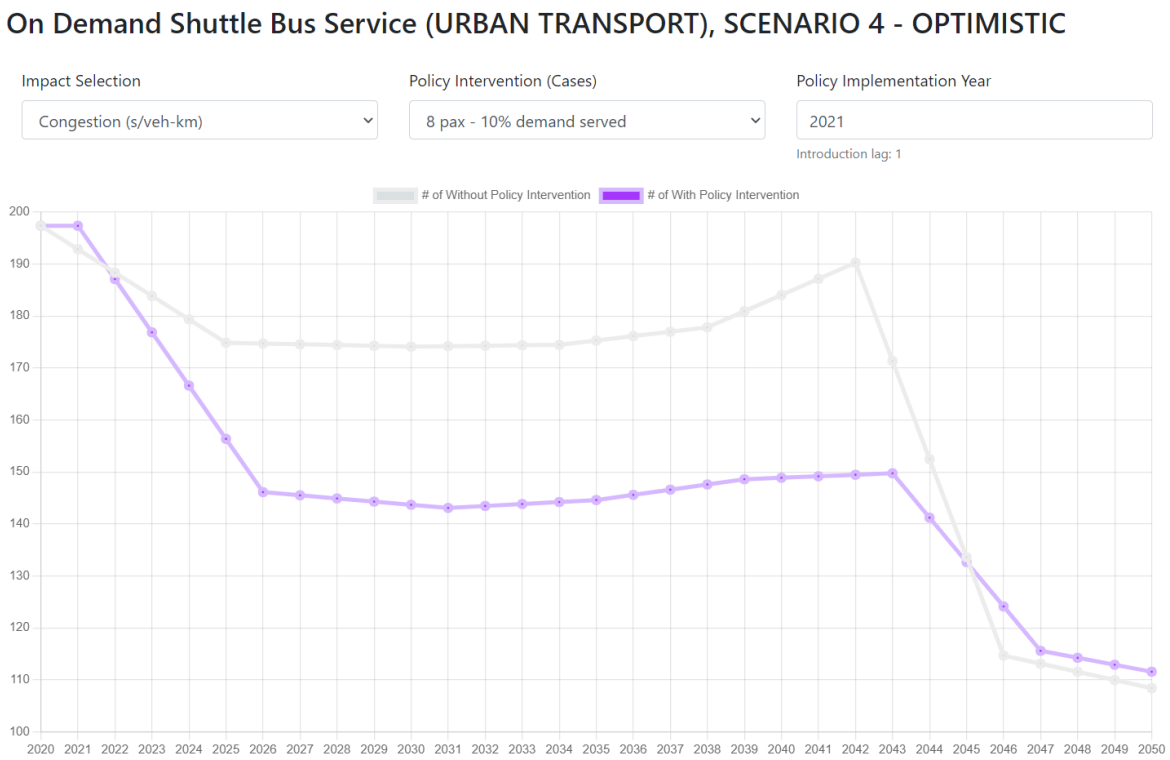
Impacts on mobility (1/2)

- According to experts **access to travel** will be **increased** by the introduction of all AUSSs.
- Kilometers travelled and congestion levels depend on the CAVs market penetration rates. During the **transition phase** when conventional and mixed levels of first and second-generation CAVs share the urban roads **congestion levels** are **increased**.
- **Anywhere-to-anywhere AUSS** lead to the largest **reduction in travel time**



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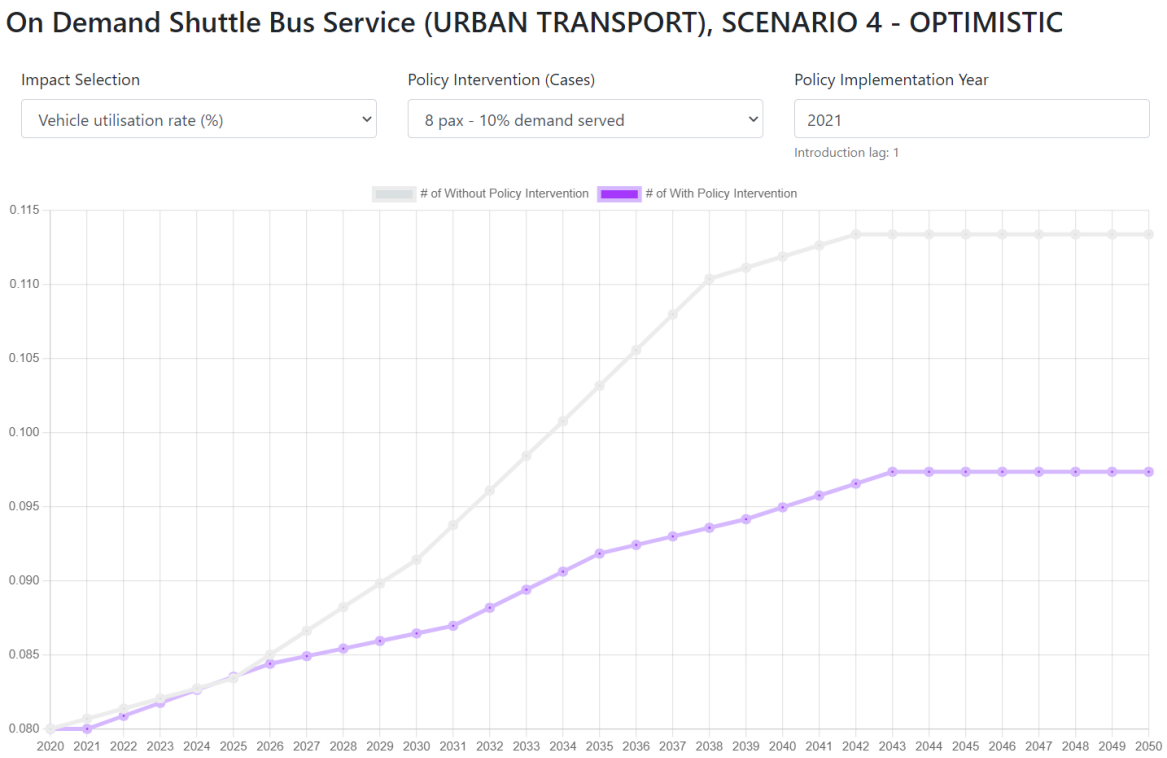
Impacts on mobility (2/2)

- **Modal split using public transport** will be mostly affected by the introduction of CAVs. **Modal split using active travel** will be less affected.

- **Vehicle utilization rate** will be **reduced** after the introduction of AUSS compared to the baseline scenario

- **Vehicle occupancy** will be **reduced** after the introduction of on-demand AUSS



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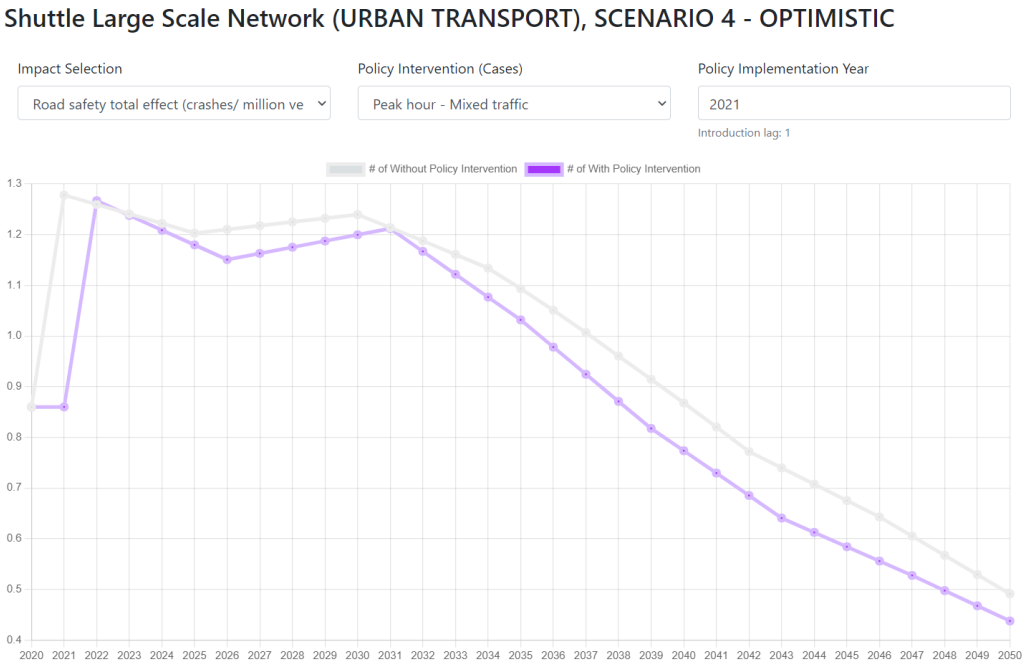
Impacts on society, safety and economy

- **Road safety** will be significantly **increased** after the introduction of CAVs and AUSSs in the urban environment. At larger shares of second generation vehicles (60-100%) the **crash rate** of urban transport vehicles can reach a **reduction** of up to 50%-69%.
- The Delphi results indicated that all AUSSs will **improve accessibility in transport**.
- **Point-to-point AUSS** is expected to deliver extra **benefits** for the city in terms of vehicle operating **costs**, less **parking** space required and better public **health**.



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Final remarks

- The **LEVITATE** impact assessment results for Automated Urban transport **confirm** the results of other studies
- **Positive impacts** on environment, economy, society and safety are to be expected with larger shares of first- and second-generation CCAM vehicles are introduced in the traffic system.
- **Benefits** (higher energy efficiency, better access to travel, improvement public health, and lower vehicle operating costs) have been estimated from the introduction of **point-to-point AUSS** and, to a lesser degree, from on-demand AUSS.
- After the **necessary transferability** studies, results have been integrated in the **LEVITATE PST**, providing findings to all interested parties

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