



The LEVITATE Policy Support Tool of Connected and Automated Transport Systems

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INTRODUCTION

Rapid technological advances leave limited margins for the preparation of cities to receive Connected, Cooperative and Automated Mobility (CCAM). The LEVITATE project developed an **open access web-based Policy Support Tool (PST)**, that will provide decision makers at all levels with access to LEVITATE methodologies and results. The aim of the PST is to consolidate the outputs of different methods into an overall framework for the assessment of impacts, benefits and costs of CCAM, for different automation and penetration levels and on different time horizons.

OBJECTIVES

The aim of this work is to provide an insight on the LEVITATE PST development, by presenting the considered automation use cases, critical parameters and impacts of CCAM as well as the applied methodologies. The PST comprises two modules: the **Knowledge** and the **Estimator Module**, which includes a forecasting and a backcasting sub-system.



FORECASTING

The forecasting module, with the accompanying CBA sub-system, provides quantified and/or monetized output on the expected impacts of automation and CATS related policies, featuring customizability of parameter quantities.



BACKCASTING

The backcasting module, with the accompanying CBA sub-system, enables users to identify the sequences of CATS measures that are expected to result in their desired policy objectives and monetize their implementation.



KNOWLEDGE

The Knowledge module contains the repository and recommendations of the LEVITATE project, including documentation of the project toolbox, results of the various methods, relevant literature from CATS guidelines.

Figure 1: LEVITATE PST online tool

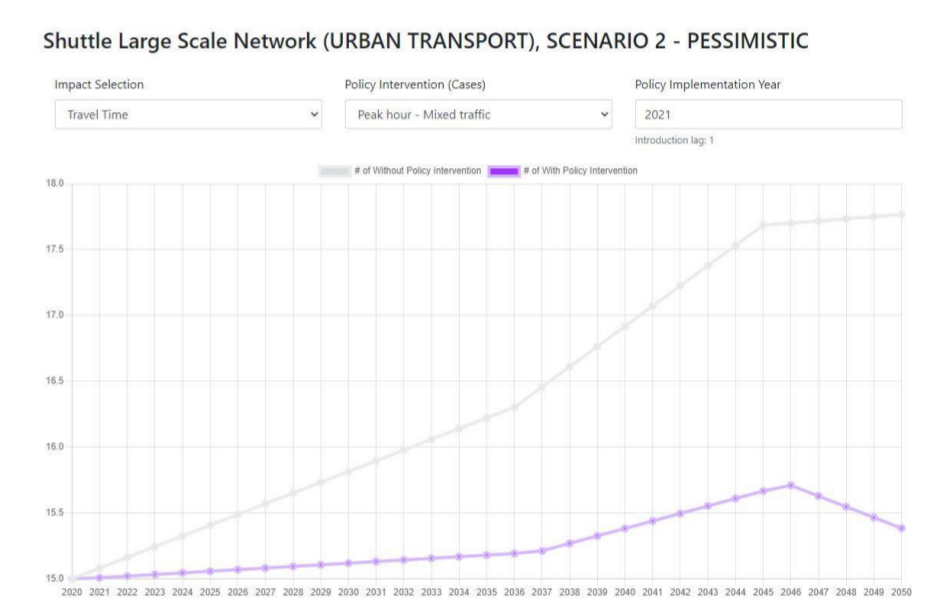
IMPACT ASSESSMENT METHODOLOGY

The LEVITATE PST provides estimates of the impacts of CCAM through a **multi-disciplinary impact assessment methodology**. Within the framework of LEVITATE, **three automation use cases** are considered: Passenger cars, Urban transport and Freight transport, as well as specific sub use-cases are investigated for each domain. In addition, **twenty distinct impacts** are examined, classified into three distinct categories: (i) Direct impacts, (ii) Systemic impacts and (iii) Wider impacts. In order to enable the impact assessments, **four predefined base scenarios** are also established, concerning the temporal distribution of the market penetration rates (MPRs) of Connected and Autonomous Vehicles (CAVs) throughout the study period (from 2020 to 2050) and are the following: No automation, Pessimistic, Neutral, Optimistic base scenario. Moreover, **four different methods** are used in order to provide and forecast the examined impacts, which are the microscopic simulation, mesoscopic simulation, system dynamics, operations research and the Delphi method.

FORECASTING SUB-SYSTEM

The main purpose and function of the forecasting sub-system is to **provide quantitative estimates** to users about the future impacts of policy interventions. In the forecasting sub-system, the user is able to select one or more policy interventions, define the required CCAM factors and the module provides quantified and/or monetized output on the expected impacts.

Figure 2: Forecasting sub-system results example



BACKCASTING SUB-SYSTEM

The backcasting sub-system enables cities to develop a clearer definition of its desired future and a more **realistic assessment of the feasibility of reaching multiple goals**. The user will define the desired policy vision described in terms of changes in the impacts (2-5 impacts). The PST then will control which interventions lead to this expected impact by running the forecasting estimator for all interventions.

BackCasting results for SCENARIO 2 - PESSIMISTIC (target year: 2030)

Impact	Use case	Sub-use case	Policy intervention	Start from base
Congestion	FREIGHT TRANSPORT	Automated Consolidation	Baseline	Yes
Congestion	FREIGHT TRANSPORT	Automated Consolidation	Manual consolidated delivery	Yes
Congestion	FREIGHT TRANSPORT	Automated Consolidation	Automated consolidated delivery	Yes
Congestion	PASSENGER CARS	Global	Baseline	Yes
Congestion	PASSENGER CARS	Global	GLISA on 1 Intersection	Yes
Congestion	PASSENGER CARS	Global	GLISA on 3 Intersections	Yes
Congestion	PASSENGER CARS	Global	GLISA on 2 Intersections	Yes
Congestion	FREIGHT TRANSPORT	Automated Delivery	Baseline	Yes
Congestion	FREIGHT TRANSPORT	Automated Delivery	Semi-automated delivery	Yes
Congestion	FREIGHT TRANSPORT	Automated Delivery	Fully automated right delivery	Yes

Figure 3: Backcasting sub-system results example

CONCLUSIONS

LEVITATE is the first project to develop a tool providing such an **extensive impact assessment on the impacts of CCAM** on safety, mobility, environment and society. It is intended that the LEVITATE PST will remain in operation long after the end of the project and it will gradually **become a reference information system**, in which more and more municipalities, cities, experts and organisations contribute their studies with quantitative results, using the LEVITATE protocol.

Acknowledgements

This research was carried out within the research project "LEVITATE - Societal Level Impacts of Connected and Automated Vehicles", which has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824361.

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