

## **Dissemination of results - MaaS passengers and LaaS Services ULTIMO project**

The following summary aims to highlight the most significant elements of the intermediate report produced in September 2025. Among the relevant points are: the consolidation of MaaS for each site, the development of guidelines for the introduction of AVs into MaaS, and the development and implementation of value-added services for users. All these elements have a common goal, which is to improve the experience of users and operators using new mobility services such as on-demand transportation with autonomous vehicles without drivers on board.

### **Consolidation of the MaaS on ULTIMO sites - The place of AVs**

Each of the ULTIMO sites decided to manage its implementation using a different approach. The relevant points for each of them are presented below:

- *Geneva - Step-by-step approach*

The approach used by the site led by TPG is conservative, but one of the most recommended to ensure successful adoption. The step-by-step approach allows for the gradual integration of mobility services or technical developments, enabling better control of the various challenges that may arise. An example is the evolution of the AVs into MaaS vision, which begins with an open (*but controlled*) space, Belle-Idée, that allows for the validation of a large part of the elements to be developed. The next step is progressive expansion throughout the southwestern part of Greater Geneva as a service area to initiate the coexistence of HVs<sup>1</sup> and AVs.

In parallel, the integration of on-demand transport into the TPG MaaS system is being explored using a similar approach, moving from partial to full integration. The purpose of this site is to contribute the knowledge acquired in terms of planning to achieve the ultimate goal: on-demand transportation with AVs, intermodal, and multimodal, fully included in the MaaS offering.

- *Herford - Scalability approach*

The approach used by DB, the site leader, is scalability. Thanks to previous experiences such as Bad Birnbach (HEAL project), they achieved integration between a first orchestrator and their MaaS system called “Wohin-Du-Willst” (WDW). Now, with the ULTIMO project, they seek to replicate this expertise with a new orchestrator integration into WdW.

This opportunity opens the door to the possibility of using the MaaS interface as the main entry point and connecting with multiple orchestrators and autonomous vehicles. This allows for the scalability of AVs in MaaS, making the backend system or AV used to provide the service more and more imperceptible to users. This site aims to promote ‘best practices’ based on its

---

<sup>1</sup> Human-driving Vehicles

experiences of integrating multiple orchestrators to support other territories that have the same ambition.

- Oslo - New mobility service approach

In the case of Ruter, the site manager and public transport authority in the area, its approach was based on introducing a new mobility service via a Minimum Viable Product (MVP). In collaboration with players in the automated mobility ecosystem (*ADAS providers or operators*), they seek to test the introduction of a new mobility service via a prototype MaaS application. Their main objective is to separate the commercial service from the experimental service until the adoption phase is completely stabilized and achieved.

This approach allows Ruter to have greater control over its users in the early stages, identifying limits from a technological point of view without impacting its existing customer base. Once these elements are clear, the acquired knowledge (the new service in question) is merged into the existing MaaS system. The purpose of this site is to provide information related to the identified limitations, particularly in terms of intermodality, in order to ensure that on-demand transportation (autonomous or human-driven) truly complements the public transportation system.

### **Development and implementation of value-added services - Beyond driving.**

One of the objectives of the ULTIMO project is to achieve a high quality service with L4 vehicles without the need for an operator on board. This raised new questions about everything an operator does today that goes beyond driving, such as giving information or maintaining safety on board. With this in mind, a series of services were proposed and developed to ensure a smooth journey regardless of the type of driving:

- Accessible PUDO Database - The coexistence of physical and virtual stops

This service comes from a growing trend in the world of on-demand transportation: virtual stops. Currently, many services rely on digital tools such as mobile applications to ensure access to stops that lack infrastructure. There are currently various guidelines and laws that regulate accessibility for stops with physical infrastructure, but virtual stops are not yet formally covered.

However, this raises the main question: how to ensure that these virtual stops are accessible to all users?. This goes from how tech-friendly the user is to whether the virtual stop can be accessed by users with some type of disability (motor, visual, or hearing). With the arrival of autonomous vehicles, the need for answers becomes even more urgent, since without a driver on board who can see the passenger in the nearby area but not in the correct one, it will be impossible for the passenger to access the service. Even if the stop is temporarily unavailable, how can we ensure that the passenger is picked up or dropped off in complete safety?

Currently, the service is conceptual, as it is not yet known which is the best approach to integration: whether to filter from the MaaS scale or from the on-demand transport provider. However, work is underway to provide a first version of a database that is easy to maintain and ensures that PUDO adapts to user needs with as little information as possible.

- Two-way communication tool - New way to communicate with users

This service was born out of a need identified by the Ruter teams and confirmed by studies carried out by the consortium partners. Once the operator is no longer on board, how can we stay in touch with our end-users? What should we do if they need assistance?

Based on a dual communication channel approach, this tool allows users or supervisors to make a video call inside the vehicle. Thanks to the dual communication channel principle, both audio and video will be available for communication with users. This allows users with hearing or visual impairments to access remote assistance if needed.

Among the options currently available are asking a question or requesting assistance. The service, developed mainly by Mobile Thinking, a Swiss company that is part of the consortium, is available at two locations in two different countries (*Norway and Germany*).

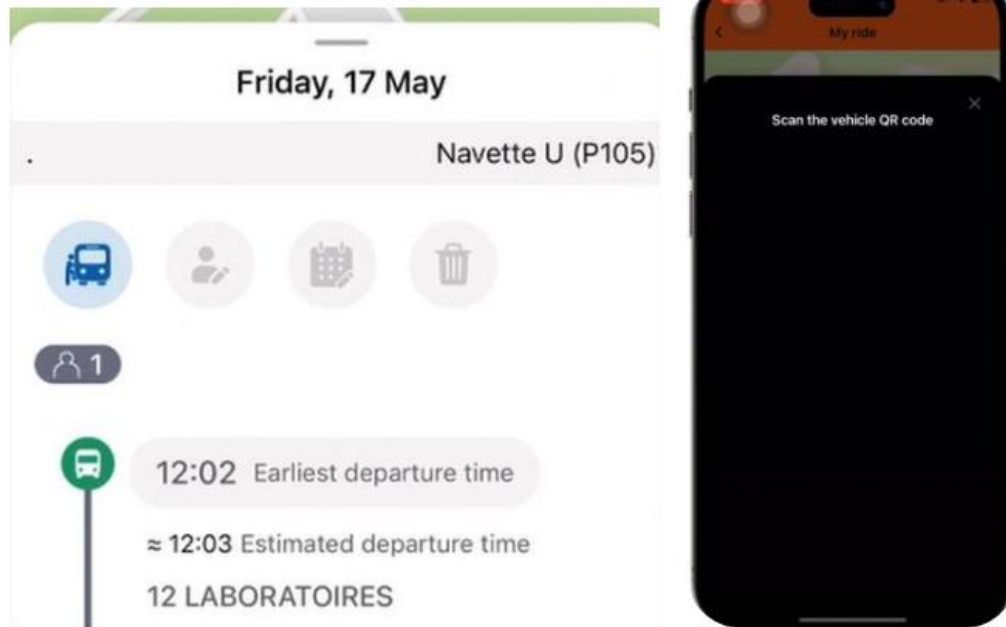
The goal will be to expand the deployment of this tool and add features that enable efficient and accessible communication for all users.



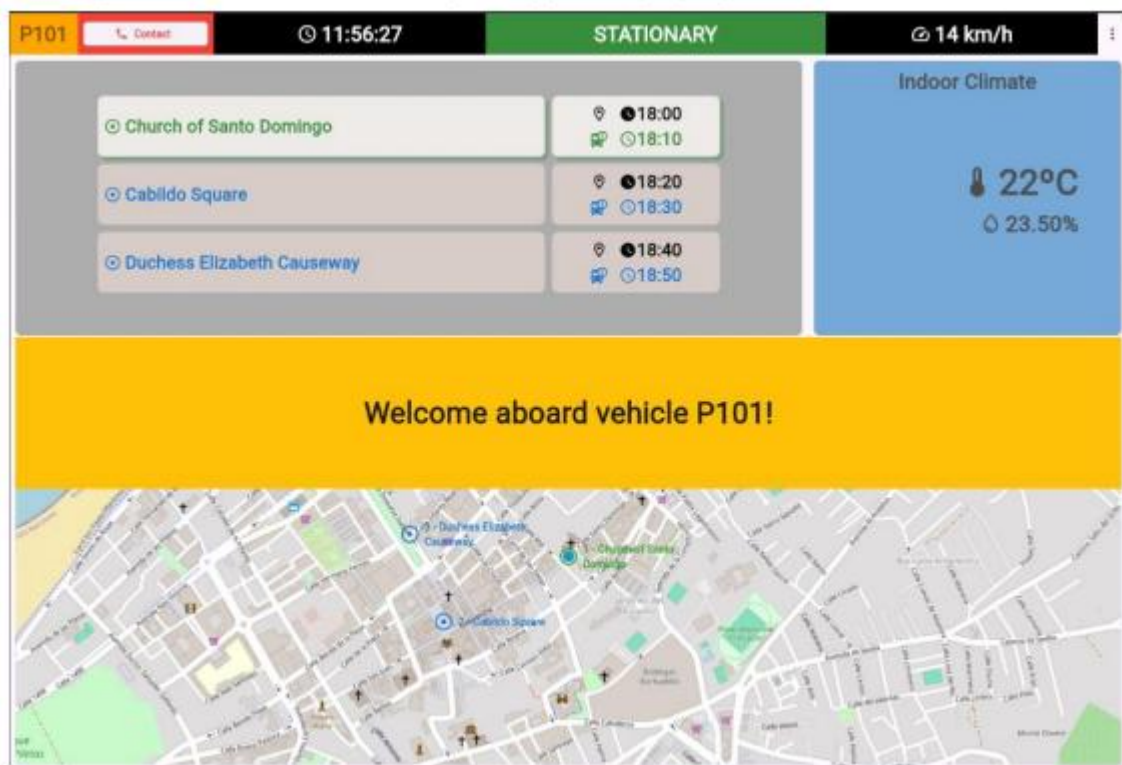
- Vehicle Identification - Connecting the passenger to the vehicle

As indicated in the introduction, today's onboard operator not only drives but also provides information. In on-demand transportation systems, access to the correct vehicle is essential to providing the service, since each vehicle's route is based on user demand. In the future, when multiple vehicles are in circulation, how will we know which one is assigned to the right user?

For this, it was proposed as a first iteration to maintain a dual channel principle. To do this, two ways were used for passengers to confirm that they are in the correct vehicle: via the mobile application or via a passenger information system. The first approach is based on a passenger-vehicle connection where each vehicle is assigned a unique identification code (static QR format), which, when scanned by the corresponding user, will automatically validate the pickup of that passenger. The identification number will also be visible in the vehicle and in the mobile app.



To ensure accessibility for visually impaired users, we propose the use of a passenger information system that also transmits the vehicle's unique identification number via loudspeakers. Thanks to screen readers, the app can help passengers verify that it is the same identification number. Subsequent validation is performed following the protocol described above.



New ideas for future iterations are in progress, such as the use of Bluetooth as a means of validation or even the possibility of validation via a unique code without the need for the mobile

app. However, the implementation of this service is currently on hold, but it is hoped that deployment in Geneva will begin in the coming months so that new features can continue to be developed.

- Passenger Information System - Keeping passengers informed every step of the way

As in the previous case, keeping passengers informed is key to ensuring a high quality service, especially in a dynamic and flexible system such as on-demand transport. That is why it was proposed to work on the co-construction of a passenger information system adapted to this context, with additional features as it is a service with autonomous vehicles.

Among the critical elements to be shared with the customer are: estimated time of arrival, stops to be made, estimated waiting time at each stop, safety announcements (e.g., fasten seat belts or remain seated), unique vehicle identification number, among others. Some other additional elements were the speed of the vehicle or the external environmental conditions (temperature/humidity).

This service works as a window for others such as the two-way communication tool or vehicle identification. In addition, it is expected that in future iterations more information will be added regarding points of interest or even connections with other modes of transport.

At the moment, the service has not been deployed, but it is expected that in the coming months the installation process will begin in order to obtain initial feedback on the UX/UI from end-users.

