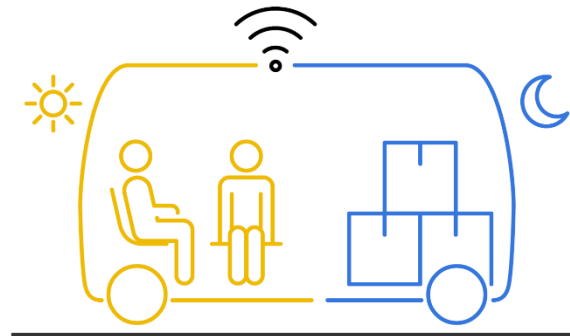




ULTIMO

Mobility with Automated Vehicles

DELIVERABLE

D7.5 Stakeholders' engagement activities & Exploitation plans First version



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Table of Contents

D7.5 Stakeholders' engagement activities & Exploitation plans First version.....	I
Disclaimer	II
Document Information.....	II
Document History	II
Table of Contents	III
List of Figures.....	V
List of Tables.....	V
Acronyms.....	VI
Executive Summary	VIII
1 Introduction.....	1
1.1 On-demand Mobility	1
1.1.1 Fully Automated Vehicles	2
1.2 The ULTIMO dream for public transportation.....	3
1.3 Preamble – Stakeholders' engagement activities & Exploitation plans	4
2 Stakeholders' Engagement Activities	5
2.1 Stakeholders' identification.....	5
2.2 Partner activities for stakeholder engagement.....	7
2.2.1 DB Regio.....	7
2.2.2 Hochschule Pforzheim University (HSPF).....	10
2.2.3 Ruter	16
2.2.4 GAMA Mobility	25
2.2.5 YoGoKo	27
2.2.6 Trapeze	27
2.2.7 UITP.....	28
2.2.8 PADAM.....	29
2.2.9 Capgemini Engineering	31
2.2.10 BAX.....	31
2.2.11 CERTH.....	32
2.2.12 SIEMENS.....	33
2.2.13 CS	33
2.2.14 Arthur's Legal	34
2.2.15 UniGe	34
2.2.16 TPG.....	35
2.2.17 MobileThinking	37
2.2.18 ArgYou	38
2.2.19 Etat De Geneve	39
2.2.20 SAAM	39



2.2.21 Open Geneva	39
2.2.22 ZF	41
3 Exploitation plans	41
3.1 DB Regio.....	43
3.2 HSPF	44
3.3 Ruter	45
3.3.1 Priorities and Objective Management in Ruter	45
3.3.2 Other Ruter Projects With Overlapping Goals and Exploitation Goals.....	46
3.3.3 Sustainable / Climate Goals	47
3.3.4 Transforming the Mobility System in the Greater Oslo Region	48
3.3.5 Near-Term Exploitation Plan Based on ULTIMO WP's.....	50
3.4 GAMA.....	53
3.4.1 Gama's Commitment to the ULTIMO Project for Autonomous and Sustainable Mobility.....	53
3.4.2 Gama Mobility's Advancement via ULTIMO Partnership	54
3.5 YoGoKo	55
3.6 Trapeze	55
3.7 UITP.....	56
3.8 PADAM.....	56
3.8.1 Opportunities and challenges of the ULTIMO partnership.....	56
3.8.2 Vision for a successful exploitation.....	57
3.9 Capgemini Engineering	58
3.10 BAX.....	59
3.11 CERTH	59
3.12 SIEMENS.....	60
3.13 CS	60
3.14 Arthur's Legal.....	62
3.15 UniGe	62
3.16 TPG.....	63
3.17 MobileThinking.....	64
3.18 ArgYou	65
3.19 Etat De Geneve	66
3.20 SAAM	67
3.21 Open Geneva	68
3.22 ZF	68
Shared Exploitation Ambition.....	69
4 Conclusions.....	70

List of Figures

Figure 1 Screenshot of the Automotive industries and manufacturers stakeholders' list excel.	7
Figure 2: Ruter stakeholder overview	20
Figure 3: Ruter - stakeholder analysis – local/operational level	21
Figure 4: Ruter - stakeholder analysis – Regional/national/international strategic level	23
Figure 5 Visit to A2Z facilities	36
Figure 6 Visit to Cruise facilities	36
Figure 7 Some pictures of the different activities solved in the Hackathons.	40
Figure 8 Different channels to disseminate the Hackathons.	41
Figure 9 Graphic image of the integrated mobility concepts.	43
Figure 10: Venn-digram of DRT pilot and AV pilot	47
Figure 11: Ruter's roadmap on DRT, AV driving, and paratransit	50

List of Tables

Table 1: List of acronyms	VII
Table 2: SAE Driving Automation levels (©2020 SAE International)	2
Table 3: Ruter's project goals and associated communication goals	18
Table 4: Ruter - stakeholder analysis – local/operationsl level	22
Table 5: Ruter - stakeholder analysis – Regional/national/international strategic level	24

Acronyms

ADS	Automated Driving Systems	IPR	Intellectual Property Rights
AI	Artificial Intelligence	IT	Information Technology
AM	Automated Mobility	ITU	International Telecommunications Union
AMB	Automated Minibus	LaaS	Logistics as a Service
API	Application Protocol Interface	LIDAR	Light Detection and Ranging
AV	Automated Vehicle	MaaS	Mobility as a Service
BMM	Business Modelling Manager	MEM	Monitoring and Evaluation Manager
CAV	Connected and Automated Vehicles	MT	MobileThinking
CB	Consortium Body	OCT	General Transport Directorate of the Canton of Geneva
CERN	European Organization for Nuclear Research	ODD	Operational Domain Design
D7.1	Deliverable 7.1	OEDR	Object and Event Detection and Response
DC	Demonstration Coordinator	PC	Project Coordinator
DI	The department of infrastructure (Swiss Canton of Geneva)	PEB	Project Executive Board
DMP	Data Management Plan	PGA	Project General Assembly
DTU test track	Technical University of Denmark test track	PRM	Persons with Reduced Mobility
EAB	External Advisory Board	PTA	Public Transport Authority
EC	European Commission	PTO	Public Transportation Operator
ECSEL	Electronic Components and Systems for European Leadership	PTS	Public Transportation Services
EM	Exploitation Manager	QRM	Quality and Risk Manager
EU	European Union	QRMB	Quality and Risk Management Board
EUCAD	European Conference on Connected and Automated Driving	RN	Risk Number
F2F	Face to face meeting	SA	Scientific Advisor
FEDRO	(Swiss) Federal Roads Office	SAE Level	Society of Automotive Engineers Level (Vehicle Autonomy Level)
FM	Fleet Management	SAN	(Swiss) Cantonal Vehicle Service
FOT	(Swiss) Federal Office of Transport	SDK	Software Development Kit
GDPR	General Data Protection Regulation	SLA	Sales Lentz Autocars
GIMS	Geneva International Motor Show	SMB	Site Management Board
GNSS	Global Navigation Satellite System	SoA	State of the Art
HARA	Hazard Analysis and Risk Assessment	SOTIF	Safety Of The Intended Functionality
		SWOT	Strengths, Weaknesses, Opportunities, and Threats.
		T7.1	Task 7.1
		TM	Technical Manager
		TPG	Transport Publics Genevois



UITP	Union Internationale des Transports Publics (International Transport Union)
V2I	Vehicle to Infrastructure communication
WP	Work Package
WPL	Work Package Leader

Table 1: List of acronyms

Executive Summary

The "Stakeholders' Engagement Activities & Exploitation Plans" document encapsulates the multifaceted approach undertaken by the ULTIMO project to establish the groundwork for large-scale, economically viable, on-demand, and passenger-oriented Automated Vehicle (AV) public transportation services. This summary provides a snapshot of our achievements, challenges, and future in stakeholder engagement and exploitation.

1 Introduction

During the past few years many projects and initiatives were undertaken deploying and testing Automated Vehicles (AVs) for public transportation and logistics. However in spite of their ambition, all of these projects stayed on the level of elaborated experimentation and never reached the level of a large-scale commercial deployment of transport services. The reasons for this are many, the most important being the lack of economically viable and commercially realistic models, the lack of scalability of the business and operating models, and the lack of user oriented services required for large end-user adoption of the solutions.

The ULTIMO project will create the very first economically feasible and sustainable integration of AVs for MaaS public transportation and LaaS urban goods transportation. ULTIMO aims to deploy in three sites in Europe 15 or more multi-vendor SAE L4 AVs per site. A user centric holistic approach, applied throughout the project, will ensure that all elements in a cross-sector business environment are incorporated to deliver large-scale on-demand, door-to-door, well-accepted, shared, seamless-integrated and economically viable CCAM services. We target the operation without safety driver on-board, in a fully automated and mission management mode with the support of innovative user centric passenger services.

ULTIMO's innovative transportation models are designed for a long-term sustainable impact on automated transportation in Europe, around the globe and on society. The composition of the consortium ensures the interoperability between multiple stakeholders by making adoption of new technology at minimum costs and maximum safety. The integration of the ongoing experiments of previous AV-demonstrator projects ensures highest possible technical and societal impacts from the very beginning of the project, as well as during the project lifetime and even long after its completion.

1.1 On-demand Mobility

Public transportation is a key element of a region's economic development and the quality of life of its citizens. Governments around the world are defining strategies for the development of efficient public transport based on different criteria of importance to their regions, such as topography, citizens' needs, social and economic barriers, environmental concerns, and historical development. However, new technologies, modes of transport and services are appearing, which seem very promising to the support of regional strategies for the development of public transport.

On-demand transport is a public transport service that only works when a reservation has been recorded and will be a relevant solution where the demand for transport is diffuse and regular transport is inefficient.

On-demand transport differs from other public transport services in that vehicles do not follow a fixed route and do not use a predefined timetable. Unlike taxis, on-demand public transport is usually also not individual. An operator or an automated system takes care of the booking, planning and organization.

It is recognized that the use and integration of on-demand Automated vehicles has the potential to significantly improve services and provide solutions to many of the problems encountered today in the development of sustainable and efficient public transport.

1.1.1 Fully Automated Vehicles

A self-driving car, referred in the ULTIMO project as a **Fully Automated Vehicle (AV)**, is a vehicle that can sense its environment and moving safely with no human input.

The terms *automated vehicles* and *autonomous vehicles* are often used together. The Regulation 2019/2144 of the European Parliament and of the Council of 27 November 2019 on type-approval requirements for motor vehicles defines "automated vehicle" and "fully automated vehicle" based on their autonomous capacity:

An "automated vehicle" means a motor vehicle designed and constructed to move autonomously for certain periods of time without continuous driver supervision but in respect of which driver intervention is still expected or required

"Fully automated vehicle" means a motor vehicle that has been designed and constructed to move autonomously without any driver supervision

In ULTIMO we operate **Fully Automated mini and micro shuttles for shared public transportation**. In relation to the SAE levels, the ULTIMO project will operate SAE Level 4 vehicles.



SAE J3016™ LEVELS OF DRIVING AUTOMATION

		SAE LEVEL 0	SAE LEVEL 1	SAE LEVEL 2	SAE LEVEL 3	SAE LEVEL 4	SAE LEVEL 5
What does the human in the driver's seat have to do?		You are driving whenever these driver support features are engaged – even if your feet are off the pedals and you are not steering			You are not driving when these automated driving features are engaged – even if you are seated in “the driver’s seat”		
		You must constantly supervise these support features; you must steer, brake or accelerate as needed to maintain safety			When the feature requests, you must drive	These automated driving features will not require you to take over driving	
		These are driver support features				These are automated driving features	
What do these features do?		These features are limited to providing warnings and momentary assistance	These features provide steering OR brake/acceleration support to the driver	These features provide steering AND brake/acceleration support to the driver	These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met	This feature can drive the vehicle under all conditions	
		• automatic emergency braking • blind spot warning • lane departure warning	• lane centering OR • adaptive cruise control	• lane centering AND • adaptive cruise control at the same time	• traffic jam chauffeur	• local driverless taxi • pedals/steering wheel may or may not be installed	• same as level 4, but feature can drive everywhere in all conditions
Example Features							

Table 2: SAE Driving Automation levels (©2020 SAE International)

1.2 The ULTIMO dream for public transportation

Our city has a population of 700.000, and the local PTO (Public Transport Operator) deploys 3.000 Km of public transportation services' routes, with 4 backbone tram lines, 8 backbone large bus/trolley lines, and 340 fully automated multi-manufacturer mini and micro-shuttles in an on-demand, door-to-door shared public transport service. The fleet of the 340 automated mini-busses is composed of different vehicle generations and models from different manufacturers, as it was purchased in different batches during the last 12 years (it all started with the first 15 bought by a European project in 2023/24). It is today composed of the first 15 twelve-years old vehicles from manufacturer A, 160 eight-years old vehicles from manufacturer B and 160 two-years old vehicles from manufacturer A, which are the new generation of manufacturer's A vehicles. These last 160 vehicles re-placed the last 70 old, driver based, thermic busses that reached the end of their life after 18 years in operation. The change from driver large busses to automated mini-buses and from fixed line service to on-demand, door-to-door, for the last area of the city, was decided 6 years ago, and was based to the great success of the already deployed AV-based services in the other parts of the city.

The integration of new vehicles in the PTO fleet was done within just a few days, thanks to the now standardised APIs of the automate vehicles' connection with the AV fleet management and orchestration service, that allows a plug-and-operate functionality, but also enables the combination of AVs with all other means of transport, offering a seamless citizen centric journey to the users. Similarly, the now standardized High Definition (HD) maps between the vehicle manufacturers, allowed us to reuse the maps created in the past for the 3.000 Kms of routes of the city, with small adaptations for the new vehicle capabilities. At the same time of the purchase of the last 160 AVs, we also switched to a new AV fleet management and orchestration service, from another provider, which offers more precise trip time estimations, considering also traffic jams in the city and weather conditions (that affect traffic in the city). The replacement was made within just two weeks, thanks to the new standardised interfaces between AV fleet management and PTO MaaS services.

Passengers are now able to reserve, via their mobile phone app, on the fly or with pre-reservation trips from one side of the city to another, using the optimal transport mode available for them, with a combination of different transport modes, and having the automated vehicle arriving next (or almost) to their door entrance and bringing them to their final destination or to a backbone transport connection. All trips are offered with highly reliable and accurate transport and arrival times, based on real time, dynamic route changes of the vehicles, responding to the passenger needs. Many passenger services are available in the AVs via a mobile phone app, adapted to all passengers' needs, from special needs passengers (visually impaired, wheel-chair users, pregnant women, elderly, children), to persons transporting suitcases or a baby-stroller, providing adapted information of their trip (where to get-off, PTO general information, and even infotainment, like city related information and historical facts and anecdotes, related to their current position).

With the full suppression of on-board operators, automated in-vehicle monitoring provides a multitude of passenger services, which were, and are developed with a continuous collaboration and innovation between users and the PTO. An on-board unit identifies locally (that is, in the bus) incidents and events, like aggressions, vandalism, forgotten objects, littering, accidents, etc., and raises incident alarms to the PTO back-office. The PTO officer at the back-office evaluates the incident and decides, based on the operator policies, what action



to take: dismiss the incident, or stop the vehicle and call one of the intervention teams to go to the vehicle and take the required action. The back-office operator, based on the number of incidents and intervention time legal obligations, can deploy any of the 15 intervention teams available in the city, ready to reach within a few minutes any AV. At the back-office, service operators are able, with one set of screens linked to the fleet management, to follow the vehicle status, trip reservations, routes chosen, open and closed road segments (due to works, accidents, etc. thus adapting dynamically the trip routings), while in a second set of screens, the back-office operators can follow the passenger services' incidents and the status and location of the intervention teams. The two systems, although independent, are linked so that the back-office operator can transfer incidents to intervention teams and turn-on, when possible and under the local legal restrictions, video connection to inspect the incident.

The public transport services are operating 24/7 with different active vehicles, depending on passenger transport demands. The PTO, being eco-sensible, has defined that the vehicle must have an average occupancy of at least 3 passengers. This of course has implications, especially in off-peak hours, in the transport delays, but it is fully justified for an optimal and eco-responsible operation. Exceptions are made for people with special needs or when the passenger is ready to pay an additional price.

While at peak-hours the full 340 strong fleet of AVs is in service for public transportation, in the off-peak and night hours, due to the reduced transportation needs, part of the fleet is not serving passenger transportation. However, because having a vehicle waiting idly is a waste of resources, the PTO has signed an agreement with Logistics as a Service (LaaS) Service providers. During the off-peak hours the unused vehicles are dynamically chartered by the different LaaS providers to be used for other types of incidental transport of goods or even non-public transportation of passengers. Local shops and enterprises use the service, on demand with dynamic reservation, to offer home delivery of on-line purchases, or B2B delivery of goods from an urban consolidation center to the distribution center (hub, many to one or one to many [7], or even transport their VIP customers directly to their offices or exposition centers. This way they can deliver the goods to their customers in the city, with a delay of just 60 minutes with affordable prices, as the last mile is the most inefficient part of the goods delivery chain. The goods sent can include books from local bookshops or libraries, supermarket bags or even documents exchanged between companies or waste. The local shops are even using the service in the early hours (5 o'clock in the morning) for re-provisioning their shops for the day. The so chartered AVs are "returned" to the PTO for public transport at the peak-hours automatically, at the end of the chartered time period..

1.3 Preamble – Stakeholders' engagement activities & Exploitation plans

WP7 is dedicated in the activities related to the overall project communication, dissemination, and exploitation activities. All partners participate in the WP, each being in its relative domain, be it academic, industrial or knowledge promotion and dissemination.

In the dynamic and interconnected realm of European Union (EU) initiatives, effective stakeholder engagement stands as a cornerstone for the successful realization of project objectives. The ULTIMO project has been at the forefront of integrating innovative approaches

and best practices in stakeholder engagement, underpinning the project's commitment to inclusivity, transparency, and collaboration. This deliverable, related to T7.2, aims to provide a detailed account of the activities undertaken by project partners to engage stakeholders across various stages of the project. This deliverable encapsulates the efforts of all partners to foster a participatory and stakeholder-driven project environment.

2 Stakeholders' Engagement Activities

The significance of stakeholder engagement in EU projects cannot be overstated. It ensures that the diverse perspectives and expertise of all relevant parties are considered, thereby enhancing the quality, relevance, and sustainability of project outcomes. In recognition of this, the ULTIMO project has endeavoured to establish robust stakeholder engagement aligned with the project's overarching goals.

Through the dedicated efforts of project partners, the ULTIMO project has achieved meaningful interactions with a wide range of stakeholders, including industry professionals, academic experts, policymakers and the end-users of project outputs. These interactions have not only enriched the project's work but have also paved the way for establishing lasting partnerships and networks that extend beyond the project's duration.

The final version of this deliverable will also highlight the challenges encountered, the lessons learned, and the best practices that have emerged from our efforts in stakeholder engagement.

2.1 Stakeholders' identification

In the ULTIMO project, the identification of stakeholders leveraged the foundational work conducted in prior European projects, namely SHOW and AVENUE. Recognizing the importance of building upon existing knowledge and networks, ULTIMO strategically opted not to reinvent the wheel by conducting a new stakeholder identification process. Instead, it drew upon the comprehensive stakeholder analyses and engagement frameworks developed through these preceding initiatives, which focused on autonomous vehicles and public transportation systems.

The decision to utilize the stakeholder identifications from SHOW and AVENUE was underpinned by the relevance and depth of the stakeholder mappings these projects had achieved. Both projects had successfully identified a wide range of stakeholders critical to the advancement of autonomous public transportation, including:

By integrating the stakeholder maps from SHOW and AVENUE, the ULTIMO project was able to efficiently align its engagement strategies with a well-defined and already engaged stakeholder ecosystem. This approach ensured continuity in dialogue and collaboration, fostering deeper relationships and leveraging existing insights and feedback mechanisms established by these projects.

This method also reflected a strategic and resource-efficient approach to stakeholder engagement, avoiding duplication of efforts and maximizing the utility of prior work. It allowed

the ULTIMO project to immediately focus on engaging with stakeholders in a meaningful way, tailoring strategies and communications to address the specific contexts and objectives of introducing autonomous public transportation services.

In deliverable D7.1 the different target groups to focus the communication were marked. An excel document (Figure 1) has been prepared for each partner to add the possible stakeholders in the project and they have been divided in the following way in order to focus the communication for each group:

- **Automotive industries and manufacturers:** They shape a major share-holder group that is directly interested in ULTIMO advances.
- **Policy makers on local, national and EU level:** Essential to unlock the exploitation of project results and the realisation of the long-term impact of ULTIMO.
- **Public transport operators:** Results on how to deploy and operate fleets of AVs will be of great interest to PTOs looking to advance on CCAM.
- **Transport authorities and transport service providers:** This target group includes transport authorities and service provider's enterprises willing of becoming future customers.
- **Logistic service providers:** This target group includes mainly the urban logistic transportation service providers willing to adopt the business models that ULTIMO suggests.
- **Research and academia:** This target group corresponds to research and academic organisations, scientific journals, committees and other working groups in research fields related to the ULTIMO work.
- **Smart cities and governments:** Residential and commercial end-users, including smart city's authorities can benefit of ULTIMO's results and insights.
- **Standardisation bodies:** ULTIMO outcomes aim to advance scalability through standardisation bodies.
- **Passengers/citizens/associations:** citizen engagement will be an essential part of the ULTIMO project, as citizens will be the ones ultimately using AV services.

	A	B	C	D	E
1	 ULTIMO Automotive industries and manufacturers -Stakeholders				
2	Country	Stakeholder	Interest	Contact	Linked partner
3	FRANCE	Easymile	Driverless vehicle solutions for people and goods		ULTIMO
4	SPAIN	SEAT	Spanish car manufacturer, which sells its vehicles under the SEAT and Cupra brands.		CAP
5	Sweden	ZEEKR	Collaborate with Waymo		SAAM
6	Germany	Holon	Accessible driverless vehicle solutions for people.		SAG
7	Germany	Schaeffler	Accessible driverless vehicle solutions for people.		DB
8	Germany	ARRAIV (ZF)	Accessible driverless vehicle solutions for people.		DB
9	Germany	MAN x Mobileye	Automated 12m bus.		DB
10	Spain	Basque CCAM			CAP

Figure 1 Screenshot of the Automotive industries and manufacturers stakeholders' list excel.

2.2 Partner activities for stakeholder engagement

The project partners, each at its own level and activities network, were able to promote the project concepts and ideas to the different stakeholders.

2.2.1 DB Regio

DB Regio has a dual role in the project being the project coordinator and a PTO. Under this dual role, DB Regio during the first period of the project was very active in promoting the project and its concepts to different stakeholders.

As the coordinator DB Regio presented ULTIMO in the following events:

Event/activity	Main target group
Different CCAM Multicluster meetings in Brussels.	CCAM community.
7 th VDV-Congress on Future Autonomous Driving within Public Transport, March 2023 Berlin, Germany; Presentation	Operators, authorities, industry, academia & research, associations.
EUCAD conference + Bilateral meeting with Japan and EU; May 2023, Brussels, Belgium; Meeting; Booth with Roll-up.	CCAM community, Operators, authorities, industry, academia & research, associations.

Podcast episode with FUTURE MOVES, released: 27. Juli 2023	General public, People who are interested in the mobility of the future.
Zukunft Nahverkehr, September 2023, Berlin, Germany; Booth and Panel discussion.	Operators, authorities, industry, academia & research, associations, press and the general public.
Mobility Innovation Week Japan, November 2023, Tokyo. MoU signed with Japanese Cool4 Initiative.	Scientific community.
Fachtagung Autonomes Fahren; Ministry of Transport, December 2023, Berlin, Germany.	Operators, authorities, industry, academia & research, associations and press.
RTR Conference + FAME Workshop, February 2024, Brussels. Belgium.	CCAM community, Operators, authorities, industry, academia & research, association.
8 th VDV-Congress on Future Autonomous Driving within Public Transport, March 2024 Berlin, Germany; Presentation	Operators, authorities, industry, academia & research, associations.

DB Regio were also involved in the publication of various newspaper articles, primarily aimed at the local population in Herford, to inform them about the project and its progress.

Date of publication	Message / topic	Published in
03.06.2023	Herford decided for driverless buses	the regional newspaper in Herford: Herforder Kreisblatt, Westfalen-Blatt
09.06.2023	Exciting project: ULTIMO will provide driverless buses for Herford and its citizens	a newspaper for Westphalia region called Neue Westfälische https://www.nw.de/lokal/kreis_herford/herford/23582800-Spannendes-Projekt-Ab-2024-sollen-in-Herford-selbstfahrende-Busse-unterwegs-sein.html
11.06.2023	Are driverless buses the right move? Or can we not yet rely on the	a newspaper for Westphalia region called Neue Westfälische https://www.nw.de/lokal/kreis_herford/herford/23585246-Fahrerlose-Busse-in-Herford-Ein-richtiger-Schritt-oder-nicht-zuverlaessig-genug.html

	technology behind?	
13.06.2023	Self-driving minibuses in Herford can travel at speeds of up to 60 km/h	a newspaper for Westphalia region called Neue Westfälische https://www.nw.de/lokal/kreis_herford/herford/23587748_Selbstfahrende-Kleinbusse-in-Herford-koennen-bis-60-km-h-fahren.html
16.06.2023	Politicians in Herford look for the self-driving buses with great enthusiasm	a newspaper for Westphalia region called Neue Westfälische https://www.nw.de/lokal/kreis_herford/herford/23588772_Viel-Begeisterung-fuer-selbstfahrende-Busse-von-Herforder-Politikern.html
29.08.2023	Start of the ULTIMO-pilot in Herford	Internal newsletter of Deutsche Bahn DB Regio aktuell Newsletter / Regio aktuell 3/2023
29.12.2023	Announcement that the ULTIMO-pilot in Herford will start in autumn 2024	a newspaper for Westphalia region called Neue Westfälische https://www.nw.de/lokal/kreis_herford/herford/23744078_Im-Herbst-2024-rollt-der-erste-selbstfahrende-Bus-durch-Herford.html

As the operator, several meetings were held on site in Herford with local politicians such as the mayor and representatives of the administration.

Event/activity	Main target group
Kick-off Press event, 13.06.2023, Herford, Germany.	Major, local politics and press.
Main and Finance Committee, 13.06.2023 Herford, Germany.	Major, local politics and press.
District Committee, 07.09.2023, Herford, Germany.	Major, local politics and press.

Kick-off project Ultimo Workshop with public authorities, 20.09.2023, Herford, Germany.	Local politics and administration.
Workshop on target groups and routes, 25.10.2023, Herford, Germany.	Local politics, interest representatives and administration.
Workshop finalising the route + next steps 19.02.2024, Herford, Germany.	Local politics, interest representatives and administration.
Meeting to evaluate the new regulations for Vehicle registration and operating approval for routes 05.03.2024, Online	Ministry of Transport and Environment of the State of North Rhine-Westphalia, Transport authority for the city and district of Herford, City of Herford
Co-Creation Workshop to evaluate needs and expectations of different user groups In planning for 2024	Local interest representatives of vulnerable groups, citizens in cooperation with Open Geneva
Public celebration to mark the start of trial operation In planning for autumn 2024	Local politics and administrations, interest representatives and citizens

2.2.2 Hochschule Pforzheim University (HSPF)

2.2.2.1 Background: Principles and vision of Pforzheim University

The guidelines of the Hochschule Pforzheim University (HSPF) emphasise sustainability as a process to be continuously promoted with the aim of ensuring intergenerational justice, conserving natural resources, considering and enabling ecological and economic performance globally. Through its role model function, the university aims to shape a sustainable society and drive social change towards sustainability. Sustainability is integrated into the areas of governance, research, teaching, transfer, student engagement and operations and is based on the recommendations of the HOCH^N criteria recommended throughout Germany. These guidelines serve as an orientation framework and emphasise the importance of sustainable development, transparency, continuous improvement of sustainability practices and, above all, our ongoing collaboration with key stakeholders in this area. One of the associated specialist topics is the design of future mobility ecosystems, which is also reflected in the specialisations of our degree programmes and in the countless theses that are completed every year.

This can be seen, for example, in the fact that the predecessor project AVENUE has a prominent position on the main page of the university (https://www.hs-pforzheim.de/das_nennen_wir_praxis/avenue). This section will be supplemented in April with the initial results of ULTIMO in order to get (potential) students interested in the topic and bring them into the project team, as we offer interdisciplinary projects on ULTIMO topics every semester. But the HSPF is also very involved with the topic of mobility in general, for example, it has been researching the topic of a cable car for Pforzheim for years and supports the city in the planning of cycle paths, bus routes, etc.

The university traditionally has many networks in the field of sustainability, be it through the in-house Sustainability Board, to which experts on sustainable mobility are regularly invited,



the Vice-Rector for Sustainability and Energy Management or our Institute for Consumer Research and Sustainable Consumption, in which many renowned scientists are active. Particularly noteworthy is our Institute for Industrial Ecology (INEC), where our team member Prof Dr Tobias Viere is Professor of Life Cycle Assessment and Sustainability Management and has many international contacts in the field of LCAs through this affiliation, which is important for ULTIMO and which we actively use. For example, we prepared a life cycle assessment for automated minibuses in the predecessor project AVENUE with the help of INEC employees. Tobias Viere likes to represent ULTIMO at scientific conferences, such as the FutureCar Forum in December, where he presented ULTIMO and AV in MaaS as a concept for "circular" mobility in the sense of sharing, etc.

What is important is HSPF's membership of CCAM (Connected, Cooperative & Automated Mobility), where it is represented by the project leader of the HSPF team and member of the ULTIMO Advisory Board Guy Fournier. To maintain an overview, we present the current activities of the HSPF core team in the table below.

2.2.2.2 Active stakeholder contacts of the HSPF core team

	Activities for stakeholder involvement/deeper networking			
Stakeholder activity/ event	Prof. Dr. Guy Fournier	Dr. Adrian Boos	Nicole van den Boom	Charly Beye
CCAM (Connected, Cooperative & Automated Mobility) Membership of the HSPF	Representative of the university and ULTIMO at CCAM	Preparatory work	Preparatory work	Preparatory work
Mobility Innovation Week in Japan, hosted by the Mobility Innovation Alliance Japan, ITS Japan, and UTmobl November 2023	One of the ULTIMO representatives at the signing ceremony on 14 November 2023 to sign a Memorandum of Understanding with the Japanese automated mobility initiative Cool4 (Cooperative Level 4 Automated Mobility Service in Mixed Environment). ULTIMO and Cool4 will exchange know-how, lessons learnt and best practices on the design, development and demonstration of automated mobility.			
Paris Working Paper Days Sep. 2023	Supervision of PhD students	Supervision of PhD students	Presentation of PhD topic and it's relation to ULTIMO in the laboratory (Laboratoire Genie Industriel) at Centralesupelec	Presentation of PhD topic and it's relation to ULTIMO in the laboratory (Laboratoire Genie Industriel) at Centralesupelec

			Topic: Environmental Impact Assessment for AV in MaaS	Topic: Sustainable business model innovation in the context of AV in MaaS
Collaborative Work on EU Deliverable with Centralesupelec Jan / Feb 2024	Supervision of Deliverables	Supervision of Deliverables	Collaborative Work on mid-term EU Deliverable with colleagues from Centralesupelec The collaborative work is related to the multivariate impact assessment of AV in Maas.	Collaborative Work on mid-term EU Deliverable with colleagues from Centralesupelec The collaborative work is related to the multivariate impact assessment of AV in Maas.
Paris Working Paper Days April 2024	Supervision of PhD students	Supervision of PhD students	Exchange with experts on PhD topic development and it's applicability for the ULTIMO project.	Exchange with experts on PhD topic development and it's applicability for the ULTIMO project.
Transport Research Arena in Dublin April 2024	Co-authorship of the presented and published papers Development of a poster for the ULTIMO stand to present the project	Co-authorship of the presented and published papers	Presentation of research paper with the title: <i>Driving Toward the Future: Assessing Electric Automated Vehicle Deployment Scenarios in Suburban Areas: A Case Study of Grorud Valley, Norway</i>	Presentation of research paper with the title: <i>Scenario-based Analysis of Automated Mobility Service Costs in Urban Areas: The Case of Oslo</i> Session details and Time slot: PS 2.1.9 Case studies of sustainable innovation Monday, Apr 16, 2024 2:30 PM – 3:45 PM

			Session details and Time slot: PS 1.3 Impact on Health & the Environment Monday, Apr 15, 2024 2:00 PM – 3:15 PM	
Workshop at KIT (Karlsruhe Institute of Technology) at “Frühlingsakademie” (DE) / “Spring Academy for Sustainability” (EN) 19 th and 20 th of March 2024	Supervision of Workshop	Supervision of Workshop	Objective: Conducting a workshop on the topic of AV in MaaS from a theoretical and practical perspective in the framework of ULTIMO Further Details: The program “ Frühlingsakademie Nachhaltigkeit ” (DE) / “ Spring Academy for Sustainability ” (EN) is aimed at students and external participants who are interested in sustainable development. The public portions of the event are open to interested individuals without prior registration. The academy kicks off with a public keynote speech and a sustainability forum, followed by four days of over 30 workshops, 20 excursions, and a public panel discussion. The main questions of the program is: What is sustainable mobility?	
Scientific paper on "Changes in the European labour	Co-authorship	Main author of the paper with processing in	Co-authorship	Co-authorship

markets, especially in the regions of Geneva, Herford and Oslo due to automated mobility"		deliverables, publication in a scientific journal, but above all presentation at scientific conferences		
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2.2.3 Ruter

2.2.3.1 Background: Why Ruter is Piloting Autonomous Vehicles

Ruter believes autonomous vehicles will be an important and attractive part of the future transportation system, offering:

- Improved mobility services: A more intricate network, opportunities in new geographic areas, new types of services, more flexibility.
- Greater mobility freedom for children, the elderly, disabled, and other groups who cannot drive themselves.
- Improved traffic safety through the use of automated systems that prevent accidents.
- Increased efficiency in mobility services by having vehicles available on demand instead of following fixed routes/timetables.
- Reduced operational costs through greater automation of transport.
- Better traffic flow in heavily trafficked areas (better utilization of the road network).

There is a risk for Ruter, as a public transport company, to adopt a passive approach to the emergence of this technology.

The Oslo study¹ concludes that the introduction of autonomous vehicles in the Oslo region could have various outcomes, depending on how the introduction is handled. In the worst case, it could have very negative consequences for traffic/road networks.

Remaining passive could result in a scenario where private actors control the introduction of autonomous vehicles on our roads, thus acquiring a dominant role in the further development of the transport system in our region. These actors might not necessarily operate on principles of sustainability, democratic participation, or consideration of the region's unique needs.

Ruter should choose a proactive approach to the introduction of autonomous driving technology to ensure that autonomous vehicles are introduced to our transport network in a sustainable manner, for the best of our region and its residents.

2.2.3.2 Main Message

The most important precondition for effective communication with all our stakeholders is that they possess a basic understanding of why Ruter is experimenting with autonomous vehicles. Without this knowledge, meaningful further communication is difficult.

¹ COWI, «The Oslo Study - How Autonomous Cars May Change Transport in Cities» (Oslo, 24. april 2019), <https://www.cowi.com/about/news-and-press/new-report-how-self-driving-transport-will-affect-the-oslo-region>.

Therefore, the overarching main message in the project's general communication should be the explanation of why we are experimenting with autonomous vehicles, namely the underlying motivation and the project's three specific purposes:

Piloting and implementing autonomous vehicles is crucial for Ruter to be able to offer the region's residents sustainable mobility freedom. In the future, the mobility offering in the Oslo region will be optimized by having a fine-meshed network of autonomous vehicles that can be ordered throughout Oslo and Viken, and which will transport people from where they are to where they need to go.

The purpose of Ruter's autonomous driving project is:

1. We will introduce the technology to our customers and surroundings.
2. We will explore how the technology can be used to create a better public transport service.
3. We will prepare ourselves, our partners, and our suppliers for the emergence of autonomous driving technology.

2.2.3.3 Project Goals and Associated Communication Goals

Goals	Communication Goals
On a local/operational level , the project will operate an attractive autonomous transport service to systematically learn and build competence.	• Maintain close dialogue with stakeholders affecting practical implementation/operation of the transport service. • Achieve high usage of the service through targeted marketing and trust-building communication with residents in the pilot area. • Ensure continuous sharing of learning outcomes among project partners for continuous improvement of the service.
On a higher/strategic level , the project will • ensure that Ruter is considered Europe's most attractive and competent development partner for innovative autonomous driving suppliers. • attract the best minds within self-driving technology.	• Make the project visible in relevant forums within our sector, nationally and internationally. • Generate positive publicity about the autonomous driving project in regional/national/international media. • Ensure good internal communication that maintains status and focus internally, and that enables Ruter's leaders and

• share acquired knowledge in a way that ensures innovation among partners/suppliers and support from the facilitative agencies in Norway and Europe. • create a willingness among regulatory authorities to quickly facilitate innovation.	spokespersons to discuss the project in relevant contexts/forums.
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Table 3: Ruter's project goals and associated communication goals

2.2.3.4 Principles and Responsibility

The project management has the formal overall responsibility for the project's communication, supported by Ruter's Communications Department and associated stakeholders like the R&D-partner / operator.

The following principles apply:

- Information should be easily accessible.
- Information should be simple to understand.
- Information should be relevant and concise.
- Information should be adapted to the target audience. What we communicate should be consistent with what we do.
- Communication with the outside world should be two-way and symmetrical, where Ruter is also listening to its stakeholders.
- The communication should be according to Ruter's values: Reliable, open, innovative, collaborative.

2.2.3.5 Communication Channels

External channels:

- Ruter.no – Project web pages.
- Ruter.no – Journey planner.
- Ruter's press room (MyNewsDesk) Ruter's app(s).
- Ruter's social media channels (Facebook, Twitter, etc.).
- Email (selvkjorende@ruter.no).
- Media (local, regional, national, international, industry-specific).
- Information meetings.
- Political briefing forums.
- Lectures/conferences/breakfast meetings.
- Posters at stops.
- Information on the outside and inside of vehicles.
- Paid advertisements.

- Information letters.
- Communication channels of associated actors.

Internal channels:

- Workplace (Ruter's intranett).
- Monthly company info-meeting.
- Lunch talks, breakfast talks.
- Fixed and ad hoc meetings.
- Digital collaboration platforms (Teams, Slack, etc.).
- E-mail.

2.2.3.6 Opportunities and Challenges Related to Project Communication

Opportunities:

- **Generally high media interest** in autonomous vehicles in Norway – often possible to get media to cover Ruter's project
- **Testing of autonomous driving technology under winter conditions** gives our project a unique distinction internationally
- **Many actors involved in the project** means many potential spokespersons/channels to spread the message
- **A college of communication resources** from all involved actors (ULTIMO partners, the City Environment Agency, the Norwegian Public Roads Administration, etc.) together form a competent forum for sparring and quality assurance of communication measures
- **Social media** can be used for effective target group adapted communication, from residents (Facebook, etc.) to potential partners (LinkedIn, etc.)

Challenges:

- **A complex stakeholder landscape** with many different and ongoing information needs.
- **A pilot project means unpredictability** related to progress, dates, operational stability, etc. This can make it challenging to plan and implement communication measures.
- **Many associated actors** with their own priorities and messages can make it challenging to coordinate a unified communication.
- **The environment can at any time request insight** into the project's documents. This sets the standard for our internal communication and documentation.
- **Autonomous vehicles are a popular topic** in technology. Many opinions, many discussions. Ruter could be drawn into issues/debates and asked to comment.
- **Communication tasks at the local/operational level take a lot of time**, which can mean that communication measures at the higher/strategic level are deprioritized.
- **Many in the population know little about autonomous driving technology**, are skeptical, and associate it with uncertainty in traffic.

- **More difficult to get international attention** – Many similar projects compete for column space, with a lot of sensationalism.
- **It requires substantial resources and continuous follow-up** if we are to use and/or create our own pages on social media to a greater extent.

2.2.3.7 Stakeholder Identification, Analysis and Strategies

Ruter is surrounded by a complex environment of stakeholders, which we engage with in various ways depending on what we are trying to accomplish:

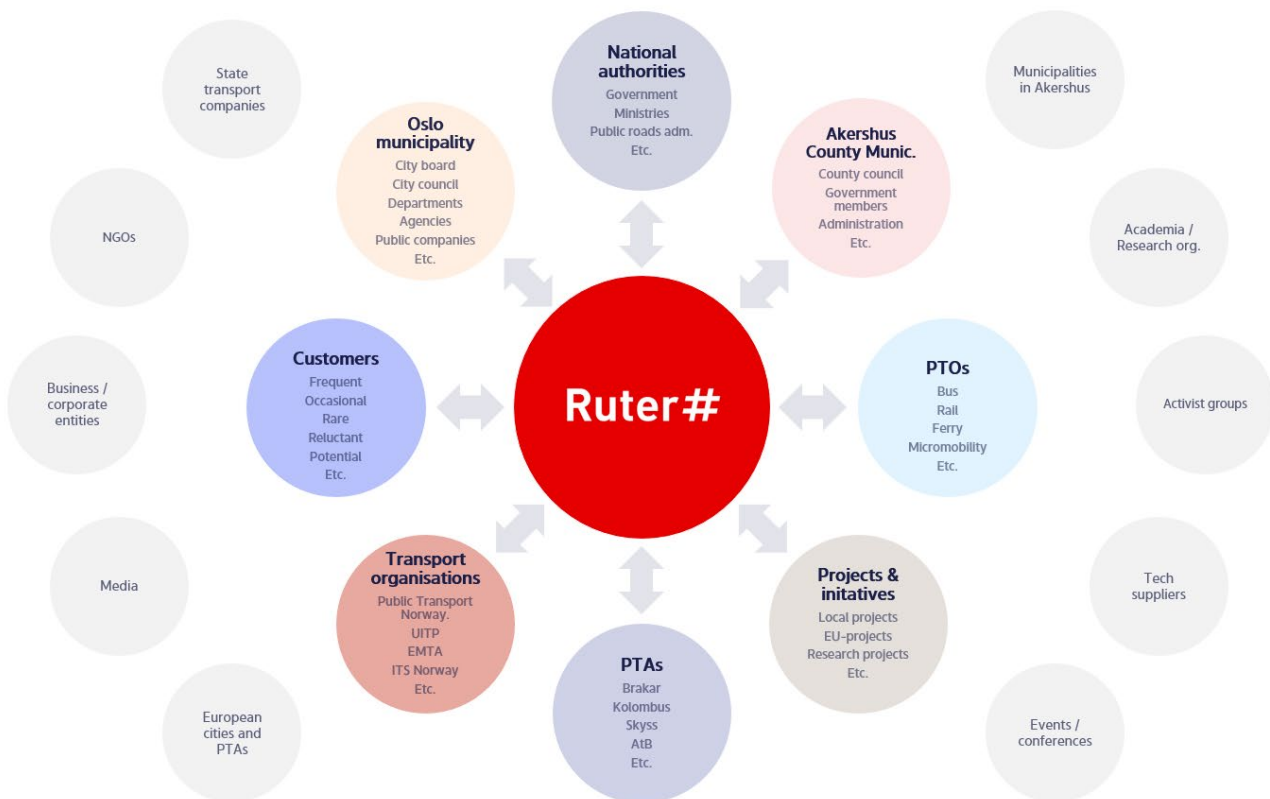


Figure 2: Ruter stakeholder overview

The Gorrudalen project's stakeholders are determined by the project's local (operational) goals and regional/national/international (strategic) goals:

Locally:

A successful trial of a self-driving DRT service



A successful pilot project is critical if we want to be able to offer self-driving services to the public.

Locally / regionally / nationally / internationally:

Widespread understanding of why shared self-driving mobility will benefit people and society



We depend on widespread understanding to secure the necessary political, economic and legal framework/conditions for further development.

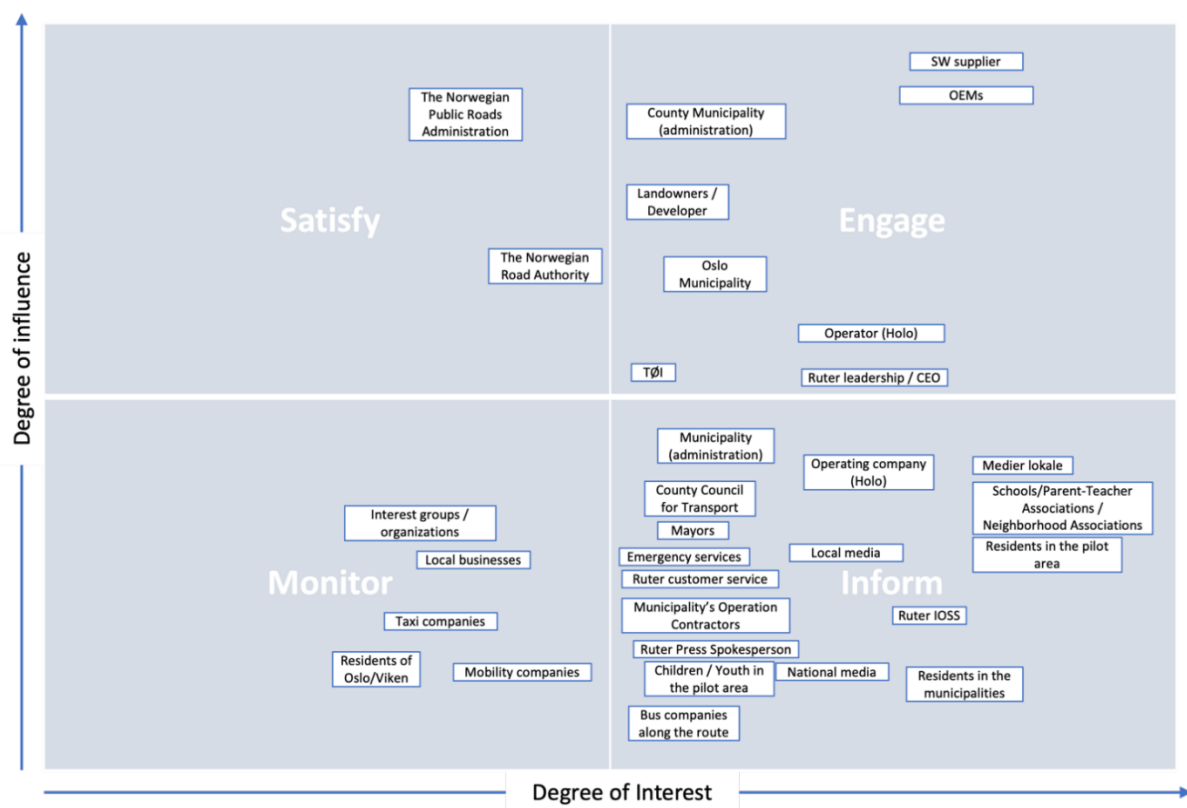
2.2.3.7.1 Local (operational) level

Figure 3: Ruter - stakeholder analysis – local/operational level

Stakeholder management, local/operational level			
Stakeholder	Category	Desired attitude/actions	Activities to achieve desired attitude/actions
SW supplier	Engage		
OEMs	Engage		
County municipality	Engage		
Landowners/developer	Engage		
Oslo municipality	Engage		
Operator (Holo)	Engage		

TØI	Engage		
Ruter leadership / CEO	Engage		
Norwegian Public Roads Administration	Satisfy		
The Norwegian Road Authority	Satisfy		
Municipal administration	Inform		
Local media	Inform		
Country council for transport	Inform		
Schools, teacher associations, etc.	Inform		
Mayors	Inform		
Emergency services	Inform		
Residents in the pilot area	Inform		
Ruter customer service	Inform		
Municipality's operation contractors	Inform		
Ruter IOSS	Inform		
Ruter press office	Inform		
Children/youth in the pilot area	Inform		
National media	Inform		
Bus operators in the area	Inform		
Interest groups	Monitor		
Local businesses	Monitor		
Taxi companies	Monitor		
Residents of Oslo/Viken	Monitor		
Mobility companies	Monitor		

Table 4: Ruter - stakeholder analysis – local/operations/ level

2.2.3.7.2 Regional/national/international (strategic) level

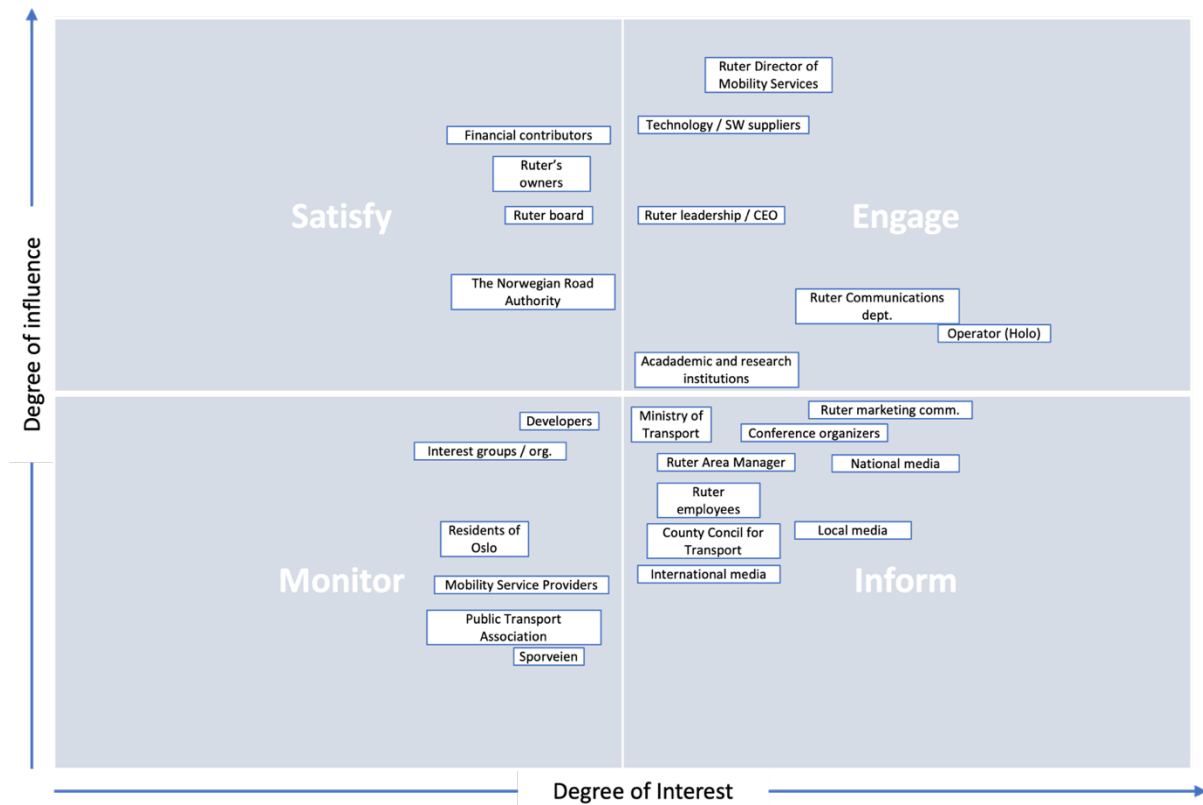


Figure 4: Ruter - stakeholder analysis – Regional/national/international strategic level

Stakeholder management, Regional/national/international strategic level			
Stakeholder	Category	Desired attitude/actions	Activities
Ruter Director of Mobility services	Engage		
Technology SW suppliers	Engage		
Ruter leadership / CEO	Engage		
Ruter comms. dept.	Engage		
Operator (Holo)	Engage		
Academic/Researchers	Engage		
Financial contributors	Satisfy		
Ruter's owners	Satisfy		
Ruter board	Satisfy		
The Norwegian Road Authority	Satisfy		
Ministry of transport	Inform		
Conference organizers	Inform		
Ruter area manager	Inform		
National media	Inform		
Ruter employees	Inform		
County council for transport	Inform		
Local media	Inform		

International media	Inform		
Developers	Monitor		
Interest groups	Monitor		
Residents of Oslo	Monitor		
Mobility service providers	Monitor		
Public transport association	Monitor		
Sporveien	Monitor		

Table 5: Ruter - stakeholder analysis – Regional/national/international strategic level

2.2.4 GAMA Mobility

2.2.4.1 The Drive Towards Autonomous Mobility with Gama

Gama is at the forefront of transforming urban mobility, recognizing the pivotal role autonomous vehicles play in sculpting the transportation landscape of the future. With an eye on innovation, Gama is pioneering the integration of autonomous vehicles to enhance urban transit by offering:

- **Expanded Service Network:** Introducing a denser network that reaches underserved areas, providing new service models and greater flexibility.
- **Accessibility for All:** Enhancing mobility for individuals unable to drive, such as children, the elderly, and people with disabilities.
- **Safety First:** Utilizing advanced automated systems to significantly reduce the likelihood of accidents.
- **Cost Reduction through Automation:** Decreasing operational expenses by integrating autonomous technology, making public transport more sustainable.

Acknowledging the transformative potential and the challenges of autonomous technology, Gama Mobility is committed to a proactive strategy. This approach ensures that the introduction and integration of autonomous vehicles are aligned with the community's needs, prioritizing sustainability, inclusivity, and efficiency.

2.2.4.2 The Vision of Gama

Understanding the motives behind Gama's venture into autonomous mobility is essential for all stakeholders. The initiative is not just about adopting new technology; it's about reimagining urban mobility to make it more sustainable, accessible, and efficient for everyone. The core objectives of Gama's autonomous solutions initiative are to:

- 1- Familiarize our users and the broader community with autonomous technology.
- 2- Explore and implement ways this technology can revolutionize public transport.
- 3- Equip Gama, along with our partners and suppliers, for a future dominated by autonomous mobility solutions.

2.2.4.3 Strategic Objectives and Communication Aims

2.2.4.3.1 Operational Excellence:

Deploying an autonomous transport service that is both appealing and instructive, to foster an environment of continuous learning and adaptation.

2.2.4.3.2 Strategic Ambition:

Elevate Gama as the most innovative and sought-after partner in the autonomous mobility sector, attracting top talent and pioneering advancements in the field.

2.2.4.3.3 Communication Strategy:

- Engage effectively with our stakeholders, ensuring transparency and collaboration.
- Promote the autonomous service to maximize user adoption and trust.
- Share insights and learnings to refine and improve the autonomous transport experience continuously.

2.2.4.4 Guiding Principles for Communication:

Gama is dedicated to maintaining an open, transparent, and interactive dialogue with all stakeholders. Our communication strategy is built on making information accessible, understandable, relevant, and tailored to our diverse audience, ensuring consistency between our actions and our words.

2.2.4.4.1 Channels of Communication:

Gama will utilize various channels to promote the ULTIMO project

External:

- **Social Networks:** Use LinkedIn, Twitter, and Facebook to share articles, videos, infographics, and other content relevant to the project.
- **YouTube:** Share explanatory videos and expert testimonials to showcase our technological advancements within the ULTIMO project.
- **Website:** Publish detailed articles and case studies.
- **Conferences/Webinars:** Collaborate with other consortium members to host events that raise awareness about the project.
- **Paid Media:** Distribute thematic articles on autonomous mobility and transportation technology.

Internal:

- Intranet updates, regular staff meetings, and informal knowledge-sharing sessions.
- Leveraging digital tools for seamless internal collaboration.

2.2.4.4.2 Navigating Opportunities and Challenges:

Opportunities:

- Capitalize on the high interest in autonomous mobility to engage with the community and stakeholders.
- Unique positioning of Gama's projects, especially in challenging environments, to showcase our innovation and resilience.

Challenges:

- Addressing the diverse needs of our stakeholders and managing the unpredictability inherent in pilot projects.



- Ensuring cohesive messaging across various platforms and partners, balancing between operational needs and strategic communication efforts.

In embracing autonomous vehicle technology, Gama is not just preparing for the future; we are actively shaping it. Our approach is holistic, considering not only the technological advancements but also the societal, economic, and environmental impacts. By fostering open communication and collaboration, we aim to navigate the complexities of this transition smoothly, ensuring that the benefits of autonomous mobility are realized by all members of our community.

2.2.5 YoGoKo

YoGoKo is a leading company developing cart to car and car to infrastructure solution, also called V2X for Vehicle to everything communication. This technology allows vehicle and other road user integration to improve road safety, CO2 emission reduction, and road usage optimisation.

YoGoKo has several deployments in Europe and in other countries in the world supporting public transportation and automated vehicle deployment. YoGoKo members are also member of ETSI and ISO group to write and promote this technology with several stakeholders from public transportation and automotive industry. After years spend on public transportation and road operation, YoGoKo is now focusing his company development on connecting vulnerable road users. This double prism allows YoGoKo to developed adapted solution for ULTIMO project scope from the infrastructure to the end user.

2.2.6 Trapeze

The Voyagerr brand participates in the ULTIMO project under the name of Trapeze and Modaxo. Voyagerr was created in 2023, as the rebranded Scandinavian and North European Trapeze Demand Response Transport activities.

Voyagerr has actively addressed and engaged stakeholders through a variety of initiatives during the different phases of the ULTIMO project.

At the outset of the ULTIMO project, an [introductory article](#) was published on the trapezegroup.dk website, available in both Danish and English. [This article](#) was later shared on the Voyagerr website in late 2023 and was also promoted on LinkedIn.

During routine customer meetings, Voyagerr's on-demand mobility experts frequently highlighted the project. Additionally, the ULTIMO project was featured as a distinct topic at Trapeze customer gatherings, including the [annual Trapeze Forum](#), which last time took place from June 26 to 28, 2023, in Düsseldorf, Germany.

Voyagerr representatives also emphasized the project's potential during discussions with industry stakeholders at various events and platforms, such as '[Information Technology for Public Transport \(ITxPT\)](#)' and DTP (Dansk Person Transport).

2.2.7 UITP

UITP (the International Association of Public Transport) is the only worldwide network to bring together all public transport stakeholders and all sustainable transport modes. Among its 1900 members are authorities, operators, supply and industry, policy-decision makers, associations, research & academia. Because of its extensive network, UITP is the dedicated partner in ULTIMO to involve and engage a wide array of stakeholders through 1) raising awareness 2) disseminating results/progress and 3) exploiting results among its network and various bodies.

Liaison and cross-fertilisation

UITP fully recognises the potential of automated mobility and is involved in various research projects in the field of CCAM, including FAME, AI4CCAM and SHOW, in which it acts as coordinator. Because of its involvement in these initiatives, UITP regularly organises joint events and activities in liaison with other projects, such as webinars and conference sessions, joining forces of CCAM projects and increasing impact in the sector. Finally UITP has access to the various platforms/channels of these projects, hereby creating a collaboration in the exchange of content, knowledge and results.

Working bodies and partnerships

UITP is comprised of various working bodies that have, and will, disseminate and exploit project results, including its Automated Mobility Working Group (bringing around the table stakeholders from the entire transport sector to work on knowledge and roadmaps around the technology of AVs and how to integrate them effectively into the public transport network), Shared Mobility Division, IT Committees, among many others. Developments and progress from the ULTIMO project will be shared with the members of those bodies, who will then bring this information to their dedicated organisations.

UITP is also a member of the European CCAM partnership, which hosts key sector players to identify the gaps and future needs for R&I in CCAM.

Events

UITP organises flagship events through which it can disseminate ULTIMO results e.g. through panel sessions, workshops, side-events, poster-sessions, among others. Its biggest event, the UITP Summit, will as of 2025 become an annual event which will allow for ULTIMO to engage with a great number of stakeholders. Apart from acting in events as organiser, UITP also frequently speaks at other events where it will disseminate ULTIMO results.

Communications

Apart from initiatives, bodies, partnerships and events UITP has a strong (online) presence and brand with multiple channels through which ULTIMO activities have been disseminated. This includes the website, social media channels (LinkedIn, Threads), a series of newsletters and a large press network.

Stakeholder engagement activities

As Dissemination leader, UITP has, and will, leverage all of its channels and activities to lead and contribute to ULTIMO dissemination. Below is a selection of the stakeholder engagement

activities UITP has conducted in the framework of ULTIMO, including the reached target groups:

Event/activity	Main target group
Launch campaign with press release, news article, social media actions (October 2022)	All sector, press, general public
Panel discussion during JTA Autonomous Vehicle Network Technical Tour (Feb 2023)	Policy makers/cities
Multiple meetings/UITP working group meetings.	Operators, authorities, industry, academia & research, associations
Presentation for UITP members with monthly updates. ULTIMO news included often	Operators, authorities, industry, academia & research, associations
Various sessions/workshops + materials disseminated on stand at UITP Summit, June 2023, Barcelona.	Entire public transport sector including PTOs/PTAs, press, research & academia, associations
Utilisation of UITP's network to disseminate ULTIMO project: UITP.org, social media channels, newsletters	All sector, press, general public
Mobility Innovation Week Japan, November 2023, Tokyo. MoU signed with Japanese Cool4 Initiative.	Scientific community

2.2.8 PADAM

2.2.8.1 Background: Padam Mobility as AV Fleet Orchestrator

Thanks to its central positioning between the driving technologies and the final services provided to the final users by the PTOs/PTAs, Padam Mobility is a key actor of the ULTIMO consortium as well as the AV ecosystem.

With a strong background in public transport, they have been providing software solutions for on-demand, shared, dynamic and optimized mobility with drivers since their foundation in 2014. Having experienced an exponential growth these past years, they've become a global leader in providing this kind of solutions and one of the biggest in terms of deployed services. Besides their core product and business for driver-based Demand-Responsive Transport (DRT), some years ago they decided to start working on an additional product and team that would allow to apply all this DRT potential to Autonomous Vehicles. Serving as a connector between the different solutions required to effectively operate Level 4, both internal developed ones or externally integrated; they are now also providing a dedicated, agnostic and modular product for AV Fleet Orchestration: Padam AV.

Both products (DRT and AV) are available and part of the ULTIMO project and have already been deployed in the Geneva site since beginning of 2023. The following information regarding stakeholder engagement, dissemination activities and communication plan will refer to both indistinctly.

2.2.8.2 Commitment to stakeholder engagement

Since the beginning of the project, Padam Mobility has been very active in terms of stakeholder engagement, having proved its commitment by participating in different types of events or permanently communicating about ULTIMO when describing its own AV DRT offer.

The ULTIMO project has been regularly promoted, directly or indirectly, as part of their own communication and dissemination activities on the topic of Automated Mobility. Speaking slots, demonstrations in event booths or meeting with international AV actors, are examples of this activities. Padam Mobility was present and somehow communicating about the ULTIMO project in the following events:

Event/activity	Main target group
7 th VDV-Congress on Future Autonomous Driving within Public Transport, March 2023, Berlin, Germany – Attending	Operators, authorities, industry, academia & research, associations.
Mobility Mission by Reciprocity, March 2023, Linz, Austria – Speaking Online	Operators, authorities, industry, academia & research, associations.
Mobility Summit by Siemens, May 2023, Hannover, Germany – Speaking	Operators, authorities and industry from the Siemens Mobility network.
UITP Global Public Transport Summit, June 2023, Barcelona, Spain – Booth, side events and UITP's AV Working Group.	Operators, authorities, industry, academia & research, associations, press.
Zukunft Nahverkehr by DB, September 2023, Berlin, Germany – Booth	Operators, authorities, industry, academia & research, associations, press and the general public.
Forming the Future at Forum! by Drive Sweden, September 2023, Goteborg, Sweden – Booth	Operators, authorities and industry from the Driven Sweden network.
World Passenger Festival, October 2023, Wien, Austria – Booth	Operators, authorities, industry, academia & research, associations.
Urban Mobility Days by CIVITAS – October 2023, Sevilla, Spain – Representing ULTIMO, speaking and attending side events	Operators, authorities, industry, academia & research, associations, press.
SHOW 4th Pan-European Workshop, October 2023, Dusseldorf, Germany – Attending	Operators, authorities, industry, academia & research and associations from the SHOW network.
Smart City Congress / Tomorrow.Mobility, November 2023, Barcelona, Spain – Speaking	Operators, authorities, industry, academia & research, associations, press.
POLIS Annual Conference, November 2023, Leuven, Belgium – Booth	Operators, authorities, industry, academia & research, associations.
ULTIMO's hackathon "Smart City Xperience" by Open Geneva, November 2023, Geneva, Switzerland – Organizing and speaking	Co-Creation Workshop to evaluate needs and expectations of different local interest representatives and citizens.

Autonomy Mobility World Expo, March 2024, Paris, France – Speaking	Operators, authorities, industry, academia & research, associations.
Multiple meetings / Memberships / Working Groups	Operators, authorities, industry, academia & research, associations, press.
Utilisation of Padam Mobility's network to disseminate ULTIMO project: website, social media channels, newsletters, etc	All sector, press, general public

2.2.9 Capgemini Engineering

In the ULTIMO project, Capgemini has the leading role of technology integrator. It integrates the different passenger services developed in an on-board unit to provide the necessary services to the passengers of autonomous driverless shuttles. This OBU is an asset on development that will be shown to automotive partners such as SEAT, IVECO, VW, RENAULT (as big brands) to help them build solutions for the new requirements of the Automotive Industry where software, data and AI are the key technologies to adapt vehicles to user needs.

In addition, communications and 5G/6G networks are a key focus when developing solutions for connected autonomous shuttles and we look forward to showcasing the project to telecom customers such as Telefonica.

Furthermore, a whitepaper and webinar are planned for 2024 explaining Capgemini's work on ULTIMO focusing on the OBU architecture, the integration of sensors and communications, and AI algorithms to provide users with a quality service. Both, the whitepaper and the webinar, will be public but the main goal is to show the capabilities learnt to our automotive partners.

2.2.10 BAX

Bax & Company has engaged with stakeholders to raise awareness and share insights from the ULTIMO project. Our stakeholders primarily consist of transport and public authorities who are at the forefront of long-term public transport planning and are interested in understanding how to prepare for CCAM, often through concession contracts.

Events Bax has attended to share ULTIMO insights and engage with stakeholders:

- EcoMobility World Expo, Valencia: Showcased ULTIMO project's contributions to sustainable urban mobility.
- Autonomy Paris event: Engaged with experts and discussed CCAM trends and the ULTIMO project's role.
- European Conference for Autonomous Driving (EUCAD): Participated in keynotes and exchanged insights with leading CCAM professionals.
- PolisMobility 2023: Presented the CCAM study and joined discussions on the integration of AV in public transport.
- UITP Global Public Transport Summit, Barcelona: Demonstrated ULTIMO's findings and contributed to a side event on AV in Europe.

- Connekt event (19-06-2023), Netherlands: Presented ULTIMO's work and interacted with CCAM stakeholders.
- IAA Mobility Munich, September 2023: Displayed project progress and connected with an international CCAM audience.

2.2.11 CERTH

CERTH is a leading research institution having strong experience with EU funded projects related to CCAM having been member of Avenue, SHOW and coordinating nloVe. Within the ULTIMO project, CERTH is responsible for the development of AI leveraged services and toward the direction of disseminating the importance and value of these services for the CCAM community has specific plans. In the following paragraph, the work having been carried out toward the dissemination of the ULTIMO AI leveraged services along with the dissemination plan are described.

During the previous period, CERTH has participated in the ***SHOW – 4th Pan-European Automated Vehicles Workshop, Düsseldorf, October 2023***, having the chance to make fruitful discussions with related CCAM stakeholders operating in Monheim region related to the AI leveraged services, which are being developed within the ULTIMO context. Moreover, in order to disseminate the work having been conducted during the previous months in the ULTIMO project related to the AI services, CERTH plans to participate in ***“2024, Transport Research Arena (TRA), Dublin, Ireland 15-18 April”*** containing a diverse audience of the CCAM community, from PTOs and Industry stakeholders to research and academic institutions. Finally, CERTH will intensify its efforts to disseminate the work related to the AI services, such as the algorithm and methodology development and the corresponding experimentation, in academic and research audiences by participating in leading conferences of the field such as ***Euro Working Group Transportation*** and by publishing in high reputed journals of the field such as ***IEEE Transactions on Intelligent Transportation Systems***.



2.2.12 SIEMENS

In the project ULTIMO, Siemens has the role of user advocate and strategic business concept designer.

The Siemens Accessibility Competence Center (ACC) is cooperating with various user organizations representing older persons or persons with disabilities since many years, giving us direct access to user expectations, requirements, wishes and enables co-creation of ideas together with these users. Through these contacts with PRM associations, Siemens introduced the idea of autonomous shuttle buses in public transport to persons with reduced mobility (PRMs), such as blind and partially sighted people or wheelchair users and asked about their needs and requirements when using automated shuttle buses.

User requirements and expectations of autonomous systems have been presented Siemens internally for different business units.

Siemens contacted manufacturers [Holon](#) and [Cubonic](#) to learn about their vehicles and to find out how important the accessibility aspect is in the design of the buses.

Siemens is in contact with the local initiative [NeMO](#) in Paderborn region, which sees itself as an *“application centre for linking the transport and energy transition. They promote the development and realisation of a swarm-like mobility system. Hubs are set up at central hubs as mobility-energy interfaces. Journeys are made individually as required, without interruptions and without changing vehicles from the starting point to the destination”*.

Siemens continuously contributes to relevant standardization activities, e.g. to the revision of the German norm DIN 32974 "Akustische Signale im öffentlichen Bereich - Anforderungen" (Acoustic signals in public areas – Requirements).

Requirements for new acoustic signals and their specification supporting the accessibility and safety of self-driving shuttles will be added. These acoustic signals are essential for blind passengers and passengers with low vision when using self-driving shuttles.

Information exchange with EU commissioners and integration planning of ULTIMO data and related AI loops for optimizing the AV in MaaS/LaaS with ITS/CCAM ecosystem developed in the project to create value for the stakeholders of Automated Vehicles integrated in a MaaS. Focus is the insight that AVs integrated in a MaaS/ITS could be game changer for a new sustainable mobility.

The task is to discuss which existing data categories on European Commission level is relevant for business and for the general interest and what should be shared or not. Goal is to get insights and identify concepts, standards and interfaces and integrate with the actual status of the EU Data Act to align the data based ULTIMO activities and deliverables with this. The plan is to do the same with the MaaS alliance, GAIA X and CATENA X.

2.2.13 CS

CS leads Task 6.1 in WP6 focusing on the impact evaluation and transformation towards an AV in the ITS/CCAM ecosystem. Specifically, Task 6.1 is the technical, social, economic, environmental and governance evaluation of seamless transport of persons and goods. We contribute to the key objectives 6 and 8 of the ULTIMO project.

CS is actively promoting ULTIMO among our industrial, research and community networks. We are actively engaging the scientific world with research findings from ULTIMO. We have and will continue publishing our research findings from the ULTIMO project in open-source international scientific journals, conference proceedings and books. We also disseminate our research findings in seminars, workshops, and conferences. We will present some of our research findings at the TRA2024 conference in April 2024 in Dublin.

2.2.14 Arthur's Legal

Arthur's Legal has been active to promote the project, its mission and objectives, and discuss the various challenges at hand, locally, nationally, within the EU, EEA, UK and the like. These including discussing with various stakeholders such as potential public sector customer/user-side, with various international industry players as well as relevant policy makers why is the uptake of autonomous transportation, logistics and operations including the related societal multi- and intermodal ecosystems (public, private or public-private) is so slow, how to shape a serious market, both for manufacturers, integrators investors, procurers, operators, customers, users and society at large, and who to kick-start or otherwise expedite these.

These also including discussing the opportunities regarding trusted data sharing, both voluntary and mandatory, also in the spirit of the intertwinedness of relevant societal challenges, the EU Data Strategy, EU Cybersecurity Strategy, Digital Decade 2030, the Common European Data Spaces concept as well as industrial data and cloud-edge computing continuum, AI on the Edge, trust principles, and related policy instruments, and potential value, co-creation, business, financial contribution and distribution models thereto.

It obviously aims to continue doing the above during the project, including the expected take-aways and lessons-learned from the project regarding strategy, ethics, policy, legal, trustworthy and otherwise serious technology, application and market uptake thereof in Europe.

2.2.15 UniGe

The University of Geneva has played a pivotal role in engaging a wide array of stakeholders, both locally and internationally, to promote awareness about the benefits, opportunities, and challenges associated with the development and adoption of autonomous vehicles. This initiative serves as a cornerstone for fostering informed discussions and actions regarding the deployment of such technology. Additionally, as an academic entity, the university incorporates this valuable knowledge into its educational offerings, including courses, seminars, and supporting PhD research in relevant fields.

From the inception of the project—and even prior to its official launch—the University of Geneva has actively promoted the objectives and principles of the ULTIMO project to key stakeholders across Switzerland and the European Union. The university has established a robust collaboration with the State of Geneva, contributing significantly to the canton's mobility strategy by integrating aspects of Connected and Automated Mobility (CCAM) into the Geneva Mobility Roadmap, which is currently under review. Presentations about the

project have been made to members of the Geneva Government and key parliamentary figures.

In the broader context of the Geneva area, the issue of mobility has sparked two key initiatives—the Nomads Foundation and the ArchParc Platform—of which we are an integral part. Both initiatives aim to develop a transnational, integrated mobility strategy for the Greater Geneva Area, bringing together all local mobility stakeholders. We have conducted several presentations tailored to the specific interests of these organizations.

Given Geneva's status as a hub for numerous international organizations, we have had the opportunity to introduce the project's goals to this global community. Notably, we participate in the 2050Today initiative, led by the Geneva international community, which focuses on creating a sustainable future through the deployment of sustainable and ecological mobility solutions.

Additionally, we have discussed the concept of Urban Logistics within the project framework with the Geneva Association of Transport Companies, exploring the potential and future logistics models enabled by automated vehicles. It's important to note that we have also introduced the MODI project to the Geneva Transporters Association and have facilitated the organization of site visits.

Extending our reach to the international stage, we have presented the project's concepts and ideas to several governments and organizations worldwide, including discussions with various Japanese companies (e.g., Toyota, KPMG-Japan) and the French Paris public transportation agency (Ile-de-France Mobilités).

2.2.16 TPG

TPG was very active to promote the project and its targets to industrial partners around the world, with a special focus to the international vehicle manufacturers, automated solutions as well as fleet orchestrators and any other many other technology providers that have the interesting elements that could be used in terms of public transportation, DRT, automation, worldwide authorities, research institutes, and more.

Here are a few renowned companies that that were visited and with whom dialogue, and connections were established worldwide sorted by country.

- USA: Waymo, Cruise, Motional,
- China: Apollo, WeRide, Pony.ai,
- Israel: Mobileye
- South Korea: A2Z, 42dot, KAR,
- UK: Wayve, OXA,
- Europe: Auvetech, Easymile, Navya,
- Japan & Taiwan: Honda, Toyota,
- Turkey: Karsan



Figure 5 Visit to A2Z facilities



Figure 6 Visit to Cruise facilities

Many more were also visited and are actively exploring AVs but are only at the first stages of automation or were more focused on vehicle that were not destined for public transport.

The vehicle capabilities that were searched were the following:

- Enthesis on vehicles destined for public transport and not on robot taxis,
- Technologically mature,
- Legally allowed to operate within Europe and Switzerland,
- Level 4 or close to reaching level 4.

Furthermore, TPG was very active in the engagement of public authorities in Switzerland, being active member of the commission that developed the new Swiss Federal law for autonomous vehicles, to facilitate the coming of automated vehicles on the Swiss roads.

To have an economically viable DRT environment self-driving vehicle that require low maintenance and have close to 100% availability is key for a successful service.

For the DRT services to be known and used by most of the population it must be integrated into a MaaS simplifying its use by making it available through one app making its use commonly spread and simple.

TPG for the project has been focusing on achievable goals within the coming scope of these vehicles with focuses on the following elements:

- V2X promotion with a heavy focus on infrastructure and integration in the ecosystem,
- Onboard systems to monitor the wellbeing of passengers,
- Accessibility through the app or vehicle access,
- Realtime supervision center to monitor operations and detect any anomalies forwarded by systems destined to promote the wellbeing of onboard passengers,
- Being able to communicate with the passengers onboard with different means (app, microphone and speakers) as well as assess the situation remotely looking and listening live into the vehicles, when necessary,
- Promoting intersystem communications and data exchanges,

The above elements are not systematic features integrated into vehicles and can also be integrated into the existing non automated fleet as they are features that enhance the user experience.

TPG is actively testing new grounds with different types of vehicles and with LaaS been used with the existing DRT services, this shared load is another way to lower the costs of such vehicles promoting even more their coming to the Swiss and European markets.

All the above are ambitious, but TPG has been slowly working to reach the goals of completely integrating autonomous vehicle in the world of public transport and on the roads since its beginning with the AVENUE project and will put as much efforts as required to reach this goal within Ultimo.

2.2.17 MobileThinking

In the rapidly evolving landscape of autonomous vehicle technology, MobileThinking has positioned itself as a catalyst for innovation and user-centric solutions. A significant part of our strategy focuses on engaging two critical personas: Public Transport Operators (PTOs) and their clients, the end-users. MobileThinking actively involves these key stakeholders in the development and refinement of our services, particularly through our Supervision Dashboard and Operator application. Our engagement practices are designed to foster collaboration, enhance user experience, and drive the adoption of autonomous mobility solutions.

Engaging Public Transport Operators (PTOs)

MobileThinking prioritizes collaboration with Public Transport Operators (PTOs) to ensure our Supervision Dashboard directly addresses their needs for managing autonomous fleets. Our engagement strategy includes:

- Co-Development: We work closely with PTOs from the early stages of our product development, ensuring the Supervision Dashboard is tailored to their operational requirements.

- Training and Support: Offering comprehensive training and technical support, we empower PTOs to maximize the benefits of autonomous vehicles, enhancing efficiency and passenger service.

Engaging End-Users (PTO's Clients)

The acceptance of autonomous vehicle services by end-users is critical. Our efforts to engage PTO clients focus on:

- User-Centric Research: Through surveys and focus groups (through Open Geneva), we gather insights into end-user preferences and expectations, ensuring our products enhance the passenger experience.
- Improved Passenger Services: The Supervision Dashboard facilitates real-time communication between PTOs and passengers through the fleet orchestrators, improving service reliability and trust.

Enhancing Accessibility with Siemens

In our commitment to inclusivity, MobileThinking collaborates closely with Siemens Accessibility Competence Center (ACC) to ensure our solutions are accessible to all users, including those with disabilities. This partnership allows us to leverage Siemens Accessibility Competence Center (ACC)'s expertise in accessible technology.

2.2.18 ArgYou

ArgYou.com was very active as an “impact first partner” to promote the project in the media, Public Relations, Web, and on Social Media and to promote its targets to governments scientific and industrial partners around Europe especially in Switzerland and Austria, with a special focus to the digital communication impact KPI's and to the project KPI's, it's evaluation plans and digital market analysis.

ArgYou is discussing and developing KPI's for ULTIMO and discussing them with all partners in order to know how partners measure own KPI's (in figures baseline and towards the end of the project and beyond) or how they define or describe their own success in the project.

ArgYou was and is very active in the engagement of public administrations and vehicle testing in Switzerland and in Austria (AlpLab in Graz). ArgYou has presented ULTIMO in keynotes at several international conferences in Vienna and for EEN in Dublin, being actively involved disseminating ULTIMO project in EEN and in other comparable European autonomous mobility projects. And ArgYou is actively involved in measuring impact oriented success-factors and in market research on mobility topics which are highly relevant on the demand side of the users and passengers. ArgYou is a translator for ULTIMO between politics, media, science, new technologies, society and users/passengers.

2.2.19 Etat De Geneve

Mobility stands as a pivotal focus area for the state of Geneva over the forthcoming five years. Since May 2023, under the stewardship of the new Geneva government, an ambitious initiative has been set in motion to overhaul Geneva's Mobility strategic planning, integrating cutting-edge technologies and novel mobility solutions into its framework.

The inaugural stride in this endeavor occurred in the fall of 2023 through a comprehensive two-day workshop. This gathering convened over 170 delegates representing diverse stakeholders ranging from mobility operators to technology providers, and transport users. Together, they delineated the prevailing deficiencies and obstacles hampering the enhancement of Geneva's mobility landscape. Within this forum, two paramount issues, closely aligned with the targets of the ULTIMO project, emerged as critical: the enhancement of public transportation and the optimization of urban logistics.

Regarding public transportation, there arose a pressing need for a more efficient and enticing service that would sway citizens towards choosing public transit over private vehicles. Concurrently, in the realm of urban logistics, there was a resounding call to abandon the reliance on oversized vehicles for the transportation of smaller goods.

These identified challenges stand as integral components within the purview of the ULTIMO project's mission and anticipated outcomes. Consequently, the ULTIMO project assumes a pivotal role as a cornerstone research initiative for the state of Geneva, poised to address and rectify these pressing concerns.

2.2.20 SAAM

SAAM stands as the premier platform for automated driving in Switzerland, acknowledged for its significance by both federal entities and operators alike. This recognition underscores the project's pivotal role in shaping the future of transportation within the country. Our commitment to keeping stakeholders informed is unwavering, with monthly updates disseminated across Switzerland. These updates take various forms, including newsletters, LinkedIn posts, blogs on our website, and our hallmark SAAM DAYS, ensuring a broad and engaging reach. Additionally, the Ultimo project receives spotlight attention at these monthly SAAM DAYS, a testament to its importance within the realm of automated driving. SAAM Days typically have around 30 Swiss organizations attending, encompassing public transport operators, universities, startups, government agencies and more. They also attract interest from external participants across Europe. This diverse attendance highlights the collaborative spirit and wide-ranging impact of our initiatives, fostering a rich exchange of ideas and advancements in the field of automated driving. Through these efforts, we are not just promoting innovation but are actively participating in the shaping of a future where automated driving plays a central role in our daily lives.

2.2.21 Open Geneva

Open Geneva, through its innovative activities (hackathons, workshops), has played a crucial role in raising citizen awareness about the challenges of future mobility, particularly autonomous mobility. Acting as the first point of contact for future users with the ULTIMO



project, Open Geneva not only introduced the concept of autonomous vehicles to a wider audience but also actively involved citizens in the process of creating and developing this innovative mobility service. Through the organization of hackathons and co-creation events, Open Geneva enabled participants to make concrete contributions to the construction of the future of mobility and created neutral, judgment-free spaces for the exchange of ideas, debate, and the proposal of concrete solutions concerning the implications and expectations related to the adoption of autonomous mobility. These initiatives have thus facilitated a better understanding and acceptance of these emerging technologies among the general public, while promoting a participatory approach in the development of more sustainable and inclusive mobility solutions.



Figure 7 Some pictures of the different activities solved in the Hackathons.

To maximize the impact and reach of its initiatives, Open Geneva deploys a dynamic and multidimensional communication strategy for each event related to the future of mobility, notably the ULTIMO project. Extensive communication is conducted on Open Geneva's social media platforms, instantly reaching a connected and diverse audience. Simultaneously, public display campaigns are orchestrated, aiming to capture the attention of the general public in their daily lives. This combined approach not only ensures good visibility of the activities and objectives of the ULTIMO project but also contributes to disseminating information to a varied audience, ranging from technology enthusiasts to citizens less engaged in digital spheres. Thus, Open Geneva succeeds in engaging a broad community in reflection and co-creation around autonomous mobility, skilfully using contemporary communication tools to raise awareness and actively involve citizens in building a more inclusive and innovative future of mobility.

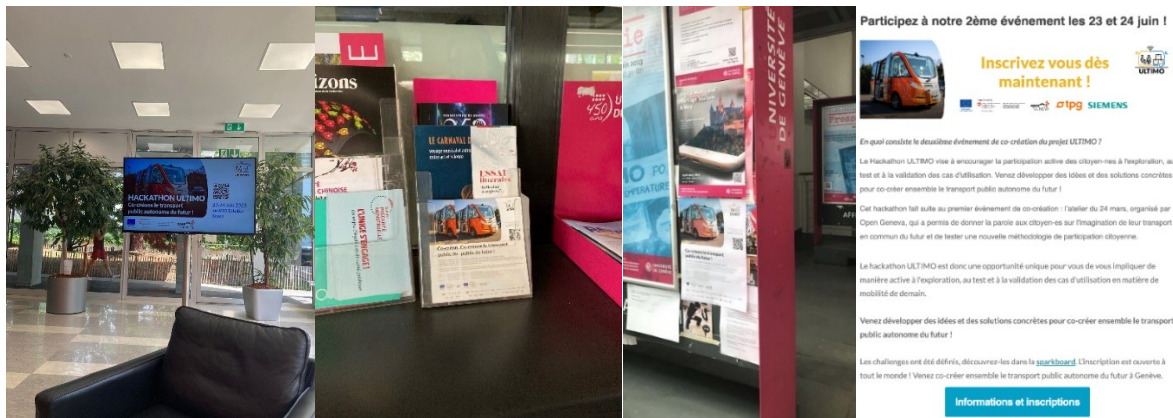


Figure 8 Different channels to disseminate the Hackathons.

Different channels have been used to disseminate the hackathons and encourage citizen engagement. For instance, we transferred the [press release](#) toward local and various media in Geneva as well as that published on the website of Open Geneva. To further engage the Open Geneva's community and in addition to promotion on social media, the ULTIMO hackathon was also promoted via a newsletter entirely dedicated to the event and the ULTIMO project (newsletter 1 & newsletter 2). Flyers were also produced to reach out to our target population who are less present on social media channels, such as elderly people, or some part of the students' population. We dropped the flyers off at various locations around the city, including universities, community centers and retirement homes. Early January 2023, we informed our community about our participation in this ULTIMO Project thanks to our website creating a dedicated page: <https://opengeneva.org/ultimo/>. To maximize our reach to a broad audience, the workshop has been strategically integrated into the vibrant Open Geneva Open Innovation Festival, in Geneva, slated to take place from March 16th to 26th, 2023. This alignment ensures the workshop's dissemination in a key event dedicated to innovation and citizen engagement, enhancing the visibility and impact of the workshop.

2.2.22 ZF

ZF is participating in the ULTIMO project providing its SCALAR fleet orchestration platform for on-demand public transport services and last mile logistics. ZF has been actively, since the start of the project, using social media and [SCALAR website](#) to raise awareness about and spread information on ULTIMO progress among our partners and business contacts.

3 Exploitation plans

As the ULTIMO project progresses towards revolutionizing public transportation through the deployment of autonomous vehicles, understanding and articulating the exploitation plans of our diverse consortium members becomes crucial. This section of the deliverable outlines the strategic approaches that industry partners, Public Transportation Operators (PTOs), academic institutions, and associations intend to adopt to ensure the project's outcomes are effectively utilized and integrated into existing and future operational, research, and policy frameworks. Each partner brings unique strengths, perspectives, and objectives to the table,

contributing to a rich tapestry of exploitation opportunities that extend beyond the project's lifespan.

Industry Partners

Our industry partners, comprising leading innovators in autonomous vehicle technology and related services, plan to leverage the project's advancements to enhance their product offerings, enter new markets, and strengthen their competitive edge. Their exploitation strategies focus on commercialization opportunities, scaling up successful pilots, and fostering partnerships that can extend the application of autonomous transportation solutions across Europe and beyond.

Public Transportation Operators (PTOs) and Public Transportation Authorities (PTAs)

PTOs and PTAs are at the heart of the project's end-user interface, directly impacting public transportation services. Their exploitation plans are centered on integrating autonomous vehicle technology into their existing fleets, optimizing route efficiency, and enhancing passenger experience. By doing so, they aim to increase public acceptance and trust in autonomous transportation, ensuring a seamless transition towards more sustainable, efficient, and user-centric services.

Academic Institutions

Academic partners play a pivotal role in pushing the boundaries of knowledge and innovation within the project. Their exploitation strategies involve disseminating research findings through publications, conferences, and educational programs, thereby contributing to the academic and professional development of the next generation of engineers, planners, and policymakers. Furthermore, they aim to use the project's outcomes as a foundation for future research initiatives, securing funding and partnerships that can explore new frontiers in autonomous vehicle technology and public transportation systems.

Associations

Associations within the ULTIMO consortium, representing a wide range of stakeholders from the public and private sectors, aim to use their exploitation plans to advocate for policy changes, standardization, and best practices that support the adoption of autonomous vehicles in public transportation. By organizing forums, workshops, and awareness campaigns, they seek to bridge the gap between technology and policy, facilitating a conducive environment for innovation and ensuring that the benefits of autonomous public transportation are realized at a societal level.

Synergy and Collaboration

The exploitation plans of our partners are not isolated strategies but interwoven efforts that create a synergistic effect, amplifying the project's impact. This section delves into how each partner's plans align with the collective goals of the ULTIMO project, ensuring that the path to commercial viability and societal acceptance of autonomous public transportation services is pursued with a unified vision and collaborative spirit.

3.1 DB Regio

As the largest German bus company, we are facing a critical challenge: the severe shortage of bus drivers. Already today, we struggle to maintain our services due to driver shortages, and this situation exacerbates during waves of illnesses or other unforeseen events. Looking ahead, the forecast is even more concerning: by the end of this decade, we anticipate a staggering shortfall of over 90,000 bus drivers.

Germany's political agenda emphasizes the expansion of public transportation (ÖPNV) as a response to climate change. However, the reality on the ground is that we cannot maintain the current status quo. The demand for public transport continues to grow, but our ability to meet it is hampered by the scarcity of qualified drivers.

In light of these challenges, we recognize the urgent need for innovative solutions. Autonomous driving has become a focal point for our company. By embracing this technology, we aim to provide our customers with a reliable and satisfactory transportation experience, even in the face of the driver shortage. Our commitment to expanding public transport remains unwavering, and autonomous driving holds enormous promise in achieving that goal.

Concept

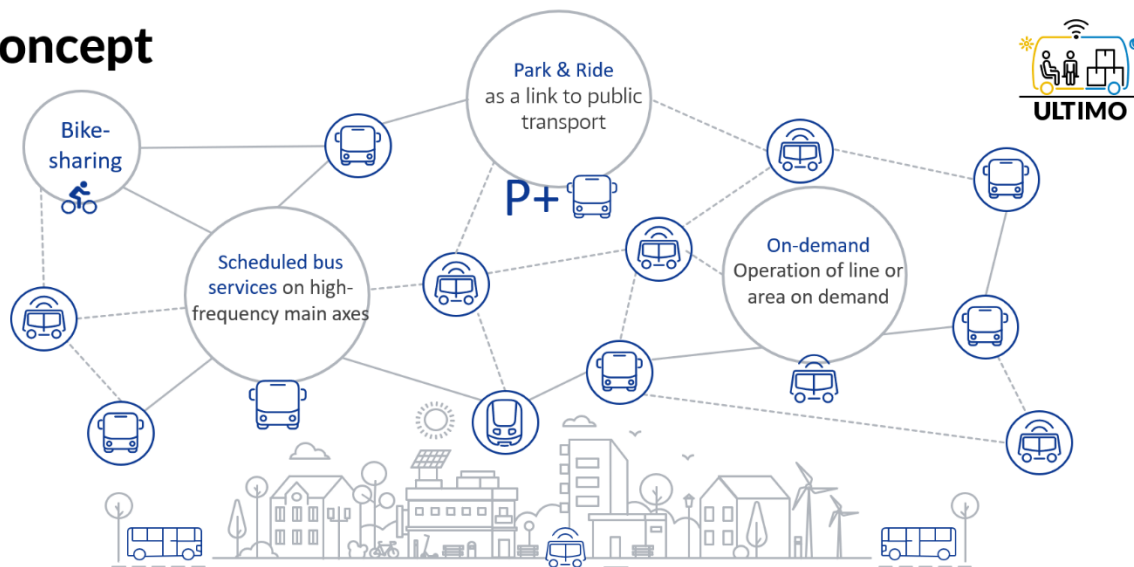


Figure 9 Graphic image of the integrated mobility concepts.

As demonstrated in the graphic above, integrated mobility concepts are vital for the future of public transportation as they aim to create a seamless and efficient travel experience for users. By incorporating various modes of transport such as bike-sharing, scheduled bus services, park and ride facilities, and on-demand transit options, these concepts cater to the diverse needs and preferences of commuters. This integration encourages the use of public transport by making it more convenient and accessible, thereby reducing reliance on private vehicles and contributing to environmental sustainability.

The integration of regular rail traffic on high-demand routes is combined with tightly scheduled buses on main axes within and between cities and comprehensive on-demand shuttles. The on-demand shuttles are used for fine distribution, acting as feeders and during off-peak times. This is where autonomous driving plays a critical role, particularly in Herford,

by providing autonomous buses and shuttles for on-demand services. These can offer efficient distribution in suburban and rural areas and at times when regular services are less frequent.

The concept is built on three pillars of integration:

- Operational integration: Overarching traffic concepts.
- Contractual integration: Continuous booking capability.
- Tariff integration: Overarching fare systems.

Autonomous driving is a key element in the evolution of integrated mobility. It promises to enhance the efficiency of public transportation systems. Furthermore, autonomous buses and shuttles can be deployed to provide on-demand services in areas with lower demand, ensuring that all regions have access to public transport. This technology also has the potential to optimize route planning and reduce operational costs, making public transportation a more attractive and sustainable option in the long term.

Autonomous driving enhances the service by providing flexible, efficient transport solutions that can adapt in real-time to the needs of passengers, thus supporting the overarching goal of integrated mobility services. Such services will significantly improve the attractiveness and functionality of public transport in Herford, catering to a range of mobility needs while also addressing concerns such as environmental impact and accessibility.

The ULTIMO project holds significant importance because its results are essential for our company to transition from research and development projects to regular operations. By establishing standards in APIs, we facilitate seamless integration into our existing fleet. The insights gained from our project in Herford will serve as a blueprint for other regions and branches, accelerating the nationwide rollout of autonomous transportation. Herford's project area closely resembles most service areas in Germany, especially in terms of the weak connection between rural and urban areas via public transport vehicles. Autonomous on-demand services can address these challenges, providing round-the-clock operation without the need for personnel. Additionally, the project's user-centric and barrier-free goals are crucial for ensuring convenient and safe transport for all our customers, even with autonomous vehicles.

3.2 HSPF

HSPF is particularly interested in automated minibuses (AMs) within a Mobility-as-a-Service (MaaS) or Intelligent Transport System (ITS) framework. They view AMs as transformative tools that can enhance the city's mobility ecosystem, improving services for citizens, enhancing the efficiency of transportation providers, and making the entire system more flexible, efficient, and sustainable. They emphasize that this transformation can be achieved without coercive policies, simply by enhancing the offering of mobility services where AMs play a pivotal role. HSPF sees this as aligned with the objectives of ULTIMO and aims to contribute to its further development.

In terms of project results, HSPF primarily focuses on work package 6, conducting a comprehensive evaluation of technical, social, economic, ecological, and governance aspects related to seamless passenger and freight transport. Additionally, they work on developing a vision for future mobility and outlining the transformation path toward it.

For ULTIMO exploitation, HSPF emphasizes the importance of sound project results to persuade populations to transition from private vehicle usage to utilizing AMs within a MaaS context.

HSPF aims to institutionalize ULTIMO results by continuing their research into future mobility ecosystems and automated driving, building on their longstanding tradition in this field.

Their overarching message regarding the project is that successful transformation towards sustainable and resilient mobility can be facilitated by autonomous vehicles (AVs) as game-changers, combined with an Intelligent Transport System, thereby avoiding the need for coercive policies.

To share learnings from the project, HSPF plans to leverage its extensive network of scientific institutions, including partners such as Fraunhofer ISI in Karlsruhe, CS in Paris, CCAM in Brussels, and TRA, among others.

3.3 Ruter

3.3.1 Priorities and Objective Management in Ruter

Together with customers, owners, operators, and other partners, Ruter works to reduce private car use and make green mobility forms the preferred mode of travel for customers. We call it sustainable mobility freedom. It's about facilitating a good life, social justice, and positive urban and regional development within the Earth's capacity.

Collectively, the joint owner strategy of Oslo municipality and Viken county municipality, Ruter's statutes, sustainability strategy, and the Vision for sustainable mobility freedom form the basis for the company's sustainability efforts.

Ruter's sustainability strategy was launched in 2018. In 2019, Ruter established a goal management hierarchy that included both Ruter's sustainability goals and business goals, which was put into use from January 2020 onwards. In 2020, Ruter's long-term strategy "Vision for sustainable mobility freedom" was adopted.

The framework used by Ruter is OKR (Objectives and Key Results), and it's a central method for the company's operational management. OKR is about testing, learning, and adjusting along the way. Each year, overarching OKRs are decided. These represent Ruter's most important priorities for the year.

For 2024, Ruter has decided on three overarching OKRs, one of which is "Demand-Responsive Transport":

Objective: We have launched demand-responsive transport services that are adapted for autonomous driving, and Ruter is equipped for scaling the service to be perceived as a real alternative to private cars.

Why: Demand-responsive transport plays an important role in Ruter's service offering. To ensure a sustainable and scalable demand service, an iterative approach is required, focusing

on developing the service based on actual customer data, in-depth market insights, and robust technology.

Key Results:

1. 70% of customers who have used the demand service in the Hovinby area (see below) have made repeat purchases.
2. Ruter decides on a binding plan for how the organization will be able to operationalize an autonomous demand service with sufficient volume to take market shares from cars.
3. Our digital ecosystem is adapted for today's and tomorrow's demand-responsive transport service.

3.3.2 Other Ruter Projects With Overlapping Goals and Exploitation Goals

When designing an exploitation plan, we must focus, among other things, on what the pilot in Groruddalen *explicitly* aims to explore. Ruter has several initiatives and projects that overall work towards the same goal as described above. "MVP Hovinbyen" has the mandate to investigate cost frameworks and risk assessments for the choice of driving contract for the launch of an attractive and integrated demand-responsive transport service to meet future customer needs by 2024. The service will use one of Ruter's existing contracts for minibuses and/or passenger cars.

The area for the MVP is located southwest of Groruddalen Valley, with a population of 121k. The number of vehicles considered is about 10.

The service is part of the roadmap (see Figure 3: Ruter's roadmap on DRT, AV driving, and paratransit) to achieve our overarching goals and works closely with the autonomous driving team on overlapping services and concepts. Many of these also coincide with what is to be explored in ULTIMO. In addition, a number of elements have been identified that will be unique to the autonomous driving project. This is quite obvious: as we remove the safety operator during the ULTIMO project period, the travel experience and operation of this fundamentally change. These points will be particularly high on the agenda when we are to define an exploitation plan in the context of ULTIMO.

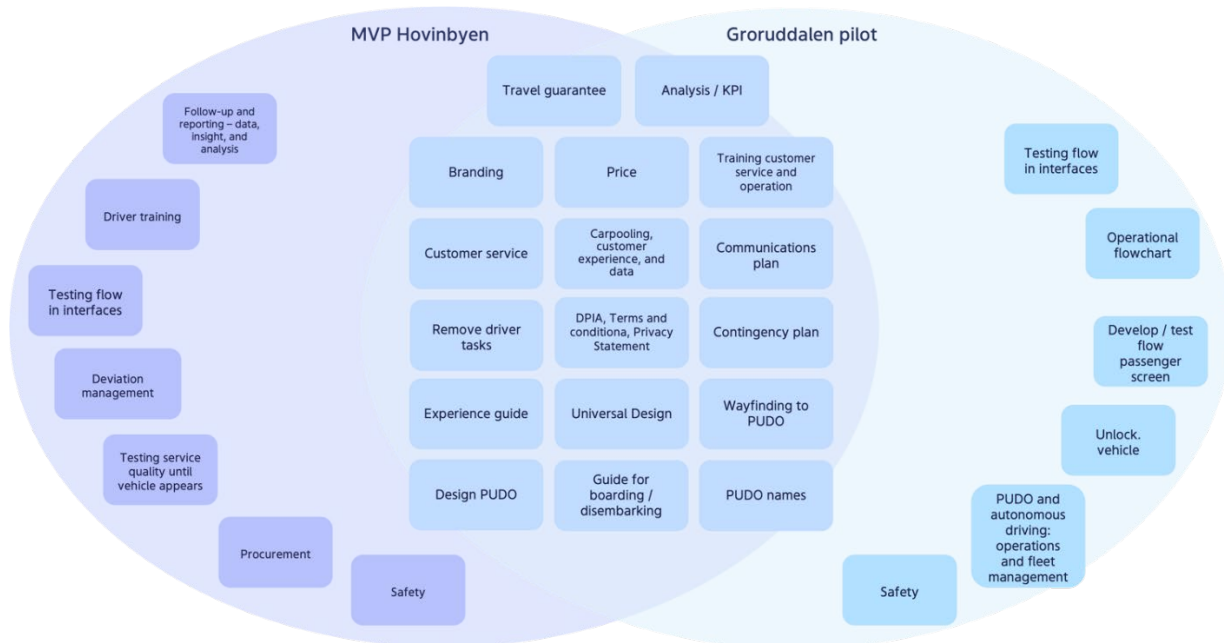


Figure 10: Venn-diagram of DRT pilot and AV pilot

3.3.3 Sustainable / Climate Goals

The Groruddalen Pilot / ULTIMO and lessons learned from this project are intended to broadly support the sustainability goals set by Ruter and also align with the climate strategy of the City of Oslo.

At Ruter, we are specifically working with eight of the UN's Sustainable Development Goals:

- Goal 11: Sustainable Cities and Communities
- Goal 3: Good Health and Well-being
- Goal 8: Decent Work and Economic Growth
- Goal 10: Reduced Inequalities
- Goal 13: Climate Action
- Goal 9: Industry, Innovation and Infrastructure
- Goal 12: Responsible Consumption and Production
- Goal 17: Partnerships for the Goals.

Climate strategy of Oslo and Viken municipality

- 61% of Norway's CO₂ emissions stem from transportation, 4% are produced by public transport
- The city of Oslo aims to reduce greenhouse gas emissions by 95% within 2030
- Viken County Municipality aims to reduce greenhouse gas emissions by 55% within 2030, and 85-90% by 2050
- Vehicle traffic will be reduced by 20 per cent by 2023 and by one-third by 2030 compared to 2015

How we develop public transportation in our area positively affects all these goals, and the overarching objectives for the Groruddalen Pilot and ULTIMO are important contributions. All goals for exploitation should be viewed in light of these overarching principles for sustainable development of our society.

3.3.4 Transforming the Mobility System in the Greater Oslo Region

A journey towards becoming a global model for sustainable urban mobility for the greater region of Oslo, Norway. Through the establishment of a comprehensive shared autonomous vehicles (SAV) network, the development of a user-friendly platform, and the emphasis on clean energy solutions, Oslo aims to lead the path towards cities designed with people in mind, rather than cars. This transformation promises not only environmental benefits but also improvements in public health, the enhancement of quality of life, and the cultivation of a more dynamic and fair city environment for all residents. It's important to note that this plan serves as a starting point, and it will need to be adjusted and refined as we encounter challenges and opportunities throughout the process.

To implement a comprehensive transformation of Oslo's urban mobility by leveraging a large fleet of shared autonomous vehicles, advanced technologies, and sustainable practices, the following tangible eras will be a part of the exploitation plan:

3.3.4.1 Stakeholder Engagement and Collaboration:

- Establish a cross-sector working group comprising government representatives, leading technology firms, and environmental experts.
- Foster collaboration and knowledge sharing to ensure a holistic approach to urban mobility transformation.

3.3.4.2 Infrastructure Development:

- Implement a network of intelligent charging stations to support the electric autonomous vehicle fleet.
- Implement a network of intelligent interior and exterior robotized SAV cleaning facilities.
- Acquire the usage right for a large number of overnight parking, temporary regulation parking areas and large scale depots for SAV's
- Invest in the development of a robust autonomous vehicle infrastructure, including smart traffic management systems and real-time coordination platforms.

3.3.4.3 Autonomous Vehicle Fleet Expansion:

- Collaborate with technology partners to scale up the fleet of shared autonomous vehicles.
- Ensure the integration of user-friendly interfaces and seamless connectivity through an intuitive mobile application.

3.3.4.4 Public Awareness and Adoption:

- Launch an extensive public awareness campaign highlighting the benefits of shared autonomous vehicles, reduced traffic congestion, and the positive environmental impact.
- Provide incentives for early adopters and collaborate with local communities to address any concerns or challenges.

3.3.4.5 Smart City Integration:

- Implement advanced traffic management systems to optimize the flow of autonomous vehicles in real-time.
- Integrate autonomous vehicle data into a city-wide smart grid, enabling efficient energy consumption and reducing environmental impact.

3.3.4.6 Innovative Sharing Models:

- Expand and promote Ruter As' innovative sharing model, allowing residents to share rides and vehicles during idle times.
- Encourage community participation and foster a sense of shared responsibility towards sustainable urban mobility.

3.3.4.7 Green Urban Spaces Creation:

- Redevelop former parking spaces and roadways into green areas, public squares, and art installations.
- Enhance the quality of urban life by creating vibrant and pedestrian-friendly zones.

3.3.4.8 Continuous Monitoring and Improvement:

- Establish key performance indicators (KPIs) to monitor the impact of the transformation on traffic congestion, environmental sustainability, and citizen satisfaction.
- Regularly assess the effectiveness of the autonomous vehicle system and make necessary adjustments based on feedback and data analysis.

3.3.4.9 Global Best Practices Sharing:

- Actively participate in international forums to share Oslo's success story and learn from other cities implementing similar transformations.
- Contribute to the global discourse on sustainable urban mobility and collaborate with cities facing similar challenges.

3.3.4.10 Regulatory Framework Enhancement:

- Work closely with regulatory bodies to update and adapt regulations to accommodate autonomous vehicles and shared mobility models.

- Ensure a legal framework that supports innovation while maintaining safety and ethical standards.

3.3.5 Near-Term Exploitation Plan Based on ULTIMO WP's

Currently Ruter's divisions and initiatives are separated in three different streams. This separation is to keep focus on current business, but also enable parallel activities expediting the progress toward the end-state transformation outcome.

1. Demand-Responsive Transport (DRT) Services division is a specialized unit within Ruter that focuses on providing flexible and responsive transportation solutions tailored to the needs of passengers. DRT services typically operate in areas or during times where traditional fixed-route public transportation might be less efficient or unavailable.
2. AV driving initiative for a Ruter represents a strategic investment in innovative transportation solutions based on SAV's that have the potential to revolutionize the way people move within cities and communities.
3. Paratransit division is a specialized branch within a Ruter that provides door-to-door or curb-to-curb transportation services for individuals with disabilities or other mobility limitations. Paratransit services are designed to ensure that people who cannot use conventional public transportation due to physical, cognitive, or other disabilities still have access to essential services, employment, education, and community participation.

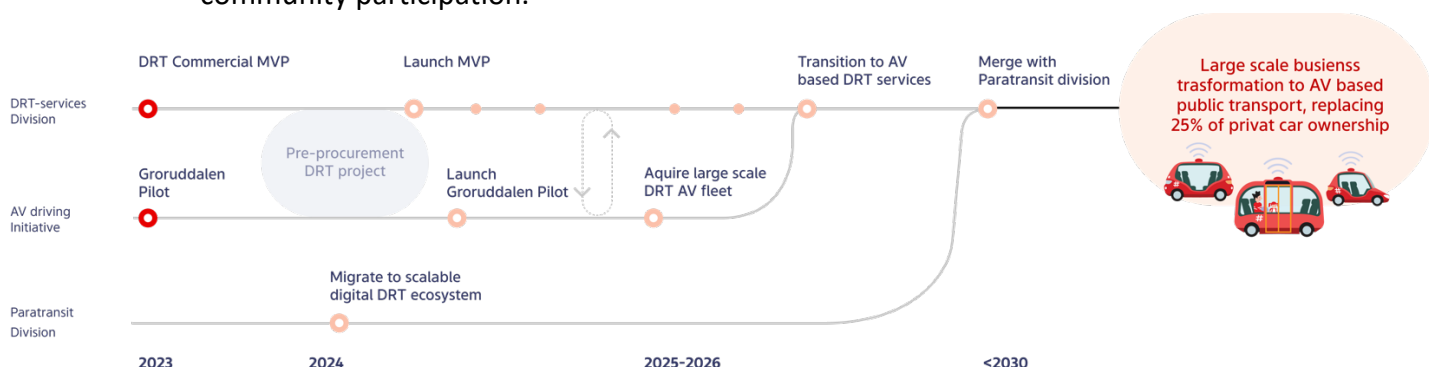


Figure 11: Ruter's roadmap on DRT, AV driving, and paratransit

Ruter's DRT division presently runs a service catering to elderly individuals, which has seen a steady increase in its customer base. The upcoming phase involves the introduction of a Minimum Viable Product (MVP) for an open DRT service covering a broader area within Oslo. Initially, this service will utilize standard minibuses with drivers. (See 3.3.2 Other Ruter Projects With Overlapping Goals and Exploitation Goals)

Ruter's AV driving initiative is primarily focused on preparing Ruter, the supplier market, and associated public partners for the integration of Shared Autonomous Vehicles (SAVs) into DRT fleets. The ULTIMO and Groruddalen pilot projects serve as hands-on initiatives aimed at realizing a driverless Level-4 concept. Once the driverless operation is perfected, ensuring a user-centric experience viable for DRT division, the AV driving initiative will initiate a

procurement process for a larger scale deployment of SAVs. This transition will evolve the MVP into a fully driverless service.

Following the complete transition of the DRT division to a fully driverless fleet, Ruter will proceed with transitioning the paratransit services to a (partially) driverless fleet. During this phase, drivers will be replaced by specialized driverless paratransit vehicles equipped with a specially trained caretaker onboard. This initiative aims to establish a highly specialized and exceptional service tailored to meet the needs of the vulnerable segment of our society.

In line with the three main routes delineated in the roadmap, Ruter aspires to replace around 25% of private car ownership in our region. To garner substantial progress in each pathway, it is imperative to enhance both internal and external expertise. Additionally, leveraging outcomes from each work package (WP) in ULTIMO is crucial. Ruter's approach to capitalize on these results is detailed below.

3.3.5.1 WP2– Passenger use cases and vehicle ODDs for ITS/CCAM

The outcomes derived from ULTIMO's work packages WP2 offer valuable insights to enhance the introduction of Shared Autonomous Vehicles (SAVs). Understanding passenger and Public Transport Operator (PTO) needs and diverse use cases, considering factors like profiles, personas, and weather, allows for a nuanced approach to SAV implementation. The definition of vehicle capabilities and Operational Design Domain (ODD) becomes more precise, ensuring a tailored alignment with mobility needs. By correlating vehicle capabilities with specific mobility requirements, the integration of SAVs can be optimized.

Additionally, prioritizing the inclusion and accessibility of passengers, while adhering to safety requirements, becomes a foundational aspect of SAV deployment. The outcomes guide the development of SAVs that are not only technologically advanced but also considerate of diverse user needs.

Furthermore, the co-creation and citizen involvement aspects highlight the importance of community engagement in shaping the SAV introduction. Involving citizens in decision-making processes fosters a sense of ownership and ensures that the deployment aligns with the local community's values and preferences. Overall, leveraging these outcomes contributes to a more informed and inclusive introduction of Shared Autonomous Vehicles.

3.3.5.2 WP3 Vehicle and AV fleet management open APIs

The development of open Application Programming Interfaces (APIs) for vehicle and Autonomous Vehicle (AV) fleet management offers a foundation for seamless integration and interoperability. This facilitates efficient communication between different components of the transportation ecosystem, promoting a more cohesive and adaptable SAV operation.

Moreover, the emphasis on open common vehicle APIs, both for development and within the vehicle itself, establishes a standardized platform. This standardization not only streamlines the integration of value-added services but also promotes innovation within the SAV framework.

The pursuit of a Common open High-Definition (HD) map serves as a unifying initiative, endorsing a shared platform for hosting and integrating various mapping initiatives. This

collaborative approach contributes to a more comprehensive and accurate mapping system, fundamental for the optimal functioning of SAVs.

3.3.5.3 WP4 AI leveraged Services for MaaS passengers, LaaS users, Vehicles and Infrastructure, ITS/CCAM Management.

The incorporation of Artificial Intelligence (AI) in Services for Mobility as a Service (MaaS) passengers and across Vehicles and Infrastructure is pivotal. By leveraging AI, services can be tailored to the specific needs of passengers, ensuring a citizen-centric user interface and intuitive applications for various stakeholders, including passengers, Public Transport Authorities (PTA), and more.

Moreover, the outcomes emphasize the importance of AI in services for Intelligent Transportation System (ITS) management. This includes cybersecurity measures, quality assurance through licensing from PTA, and establishing trusted Autonomous Mobility (AM) frameworks. The integration of AI in these services enhances efficiency, reliability, and security, contributing to the seamless integration of SAVs into the broader transportation ecosystem.

3.3.5.4 WP5 Deployment of a citizen centric AM in ITS (CCAM) (M1-M48) collection and decisions through data included.

Implementing Real Environment Site deployment in Oslo presents a strategic opportunity to expedite and enhance the introduction of Shared Autonomous Vehicles (SAVs) within Ruter's responsibility area. The deployment provides a tangible testing ground, allowing for the practical evaluation of SAV performance in real-world conditions specific to Oslo's urban environment. This direct experience enables Ruter to fine-tune and optimize SAV operations based on the unique challenges and dynamics of the local transportation landscape.

Furthermore, the deployment facilitates crucial insights into user behavior, traffic patterns, and environmental factors, enabling a more nuanced understanding of the region's mobility needs. This data-driven approach enhances Ruter's ability to tailor SAV services to meet specific demands and preferences within its operational area.

Incorporating Real Environment Site deployment aligns with a proactive strategy, fostering a collaborative ecosystem involving local stakeholders, residents, and city authorities. This engagement ensures a seamless integration of SAVs into the existing transportation infrastructure while addressing any regulatory or community-specific considerations.

Ultimately, the Real Environment Site deployment in Oslo serves as a practical catalyst, allowing Ruter to gather essential knowledge, optimize operations, and create a more effective and well-received introduction of Shared Autonomous Vehicles across its responsibility area.

3.3.5.5 WP6 All impact evaluation and transformation towards an AV in ITS/CCAM (MaaS / LaaS or integrated) ecosystem

The outcomes from ULTIMO's impact evaluation and transformation efforts in Intelligent Transport Systems (ITS) and Cooperative, Connected, and Automated Mobility (CCAM) provide a crucial foundation for enhancing the introduction of Shared Autonomous Vehicles (SAVs). Comprehensive evaluations across technical, social, environmental, economic, and governance aspects offer a holistic understanding of the status quo in seamless transport of persons (and goods).

These insights are instrumental in envisioning cross-sectoral business plans, business models, and partnerships for a future intelligent, citizen-centric transport ecosystem in ITS/CCAM. By analysing the current landscape and anticipating future needs, the outcomes guide the development of strategies that align with the evolving dynamics of the transport sector. This forward-thinking approach ensures that the introduction of SAVs is not only technically sound but also socially, economically, and environmentally sustainable within an integrated and citizen-centric transport ecosystem.

3.4 GAMA

3.4.1 Gama's Commitment to the ULTIMO Project for Autonomous and Sustainable Mobility

Gama, a pioneer in the automation of electric vehicles for public transport, commits to the ULTIMO project to promote harmonized, sustainable mobility with safety as a core priority. As part of the ULTIMO project, Gama, formerly known as Navya and a historical entity since 2014, is both a pioneer and emblematic of the future of automated mobility. Its technological expertise and ecosystem are rooted in solid experience. However, it is Gama's ability to innovate in response to a world where autonomous mobility is essential for a shift towards a more equitable and sustainable future that truly sets it apart.

Working closely with consortium partners and aligning with the ULTIMO project's vision, Gama pledges to leverage its expertise and knowledge for the efficient and economically viable integration of autonomous vehicles in public transport and urban logistics. This integration follows the "Mobility as a Service" (MaaS) and "Logistics as a Service" (LaaS) models.

Moreover, ULTIMO's holistic, user-centered approach aligns perfectly with Gama's philosophy. By focusing on user experience and integrating innovative, passenger-centric services, Gama aids in developing mobility solutions that cater to the needs and expectations of citizens across Europe and globally.

Gama's dedication to continuous innovation and technical excellence ensures the long-term sustainability of the innovative transport models developed within ULTIMO, impacting automated transport in Europe and worldwide. By incorporating best practices and insights from previous AV demonstrator projects, Gama guarantees that ULTIMO's solutions will be cutting-edge and meet society's evolving needs.

ULTIMO's mission is to establish the industry standard for fully automated vehicles and operations management, aiming to make autonomous mobility safer, simpler, and more efficient. Our focus encompasses several key areas:

- **Definition of Vehicle Capabilities and ODD (Operational Design Domain):** We diligently work to outline the capabilities of autonomous vehicles, considering the specific requirements of the environment.
- **Vehicle Function Adaptation:** Our experts push technological boundaries to ensure smooth, safe operations. Through advancements in object recognition and vehicle-environment interaction, we prioritize road safety.
- **Testing Complex Scenarios on the Operating Site:** This task tests the effectiveness of operational mitigations and infrastructure on designated route portions to validate safety concepts and facilitate operations launch without an onboard operator.

At Gama, we don't just follow progress; we drive it. With ULTIMO, we're forging a new era of mobility, where every journey is fluid and seamless, pushing automation limits for safer autonomous mobility at the intersection of human and technological progress.

Jean-Claude Bailly's quote reinforces this vision:

"I'm proud that Gama is involved in the ULTIMO project, driving forward sustainable mobility focused on the user, with automated vehicles deployed on a large scale. This innovation project not only allows stakeholders to advance their technology and offer common solutions and interfaces for public transport operators but also marks the first time such a significant autonomous mobility deployment project has united major players in service of the common good."

3.4.2 Gama Mobility's Advancement via ULTIMO Partnership

Involvement in the ULTIMO project has provided Gama Mobility with an invaluable collaborative network, illuminating the crucial role of standardization in refining and evolving current technology for the future.

This endeavor has significantly enhanced our understanding of the operational challenges faced in autonomous vehicle deployment. Furthermore, the ULTIMO project will enable Gama Mobility to gain deeper insights into PTO & PTA needs, fostering a closer collaboration with them to develop a more fitting ecosystem for autonomous driving.

Additionally, the project's practical applications will serve as a beacon, steering the creation of technologies that are fundamentally aligned with user requirements. This strategic partnership signifies a pivotal step towards realizing the full potential of autonomous mobility solutions, tailored to meet the dynamic needs of public transportation systems and their users.

3.5 YoGoKo

YoGoKo is a strong actor on non-automated and automated mobility from micro mobility to public transportation. Working on ULTIMO will support v2X technology introduction and usage for more sustainable and safe operation. V2X stands for Vehicle to everything communication and use standardized messages to inform driver about road events or support public transportation mobility with the next traffic light phase and finally giving the green light every time needed. Multiple use cases are available with this technology and useful for all mobility users from the pedestrian to the driver of any vehicle.

YoGoKo will use ULTIMO results to promote all benefits of using V2V and I2V communication like reducing server size needed for data collection or demonstrating the safe Automated Vehicle operation thanks to V2X global solutions.

V2X is based on multi-radio technology. In ULTIMO project, 4G network for indirect and long-range communication will be use in addition of direct communication such as ITS-G5 between traffic light and Automated vehicle. Direct communication will be mainly needed for the last “ms” before crossing an intersection ensuring a high level of functional safety. ULTIMO will be also used to demonstrate and promote the benefit of radio hybrid communication.

V2X technology was planned to be deployed in 2019 since Volkswagen electric car have already this feature available. Since years, this technology is mature and can support public transportation with several pilot in the world. So, taking ULTIMO plan, 2024 must show and demonstrate capability and precise requirements of using V2X and 2025 with a real-world application and with real user of automated vehicle in complete operation.

YOGOKO will give a strong message to his network claiming the needs of V2X solution to safely operate AV in the world and start to interconnect vulnerable users or disable people with the other road user.

The main network to share learnings from the project will be LinkedIn mainly and AV or smart city events where YoGoKo will be present with its main partners GAMA, TPG, DB and Ruter.

3.6 Trapeze

The Voyagerr brand participates in the ULTIMO project under the name of Trapeze and Modaxo. Voyagerr was created in 2023, as the rebranded Scandinavian and North European Trapeze Demand Response Transport activities.

Engagement in the ULTIMO project has enriched Voyagerr with a collaborative network and has shed light on the benefits of standardization in modernizing and advancing existing technology for the future.

The initiative has also deepened understanding of the operational challenges associated with autonomous vehicles.

Moreover, the project's use cases will be an inspiration in guiding the development of technologies centered around user needs.



3.7 UITP

UITP is a worldwide network that brings together all public transport stakeholders and all sustainable transport modes. It can reach out to the following stakeholders: public transport operators, public transport authorities, academia, industry players (e.g., manufacturers, IT-providers, consultants). Furthermore, UITP is also involved in other relevant EU and international initiatives on CCAM, including research projects (SHOW, FAME, AI4CCAM) and the CCAM association.

UITP actively supports public transport operators, authorities, and various stakeholders interested in implementing automated/autonomous public transport solutions. The association provides valuable knowledge, best practices, and recommendations to facilitate the integration of these advanced technologies. UITP is particularly interested in acquiring comprehensive information related to automated public transport demonstrations, including regulatory, technical, ethical, and governance aspects.

A key focus of ULTIMO outcomes for UITP is the validation of results concerning integration of AVs with other modes of public transport, highlighting the benefits to the community and sustainable mobility. UITP plans to exploit these results and share use cases with its members, aiming to encourage the market adoption of automated mobility solutions. Furthermore, UITP will integrate ULTIMO project results into its support contributions to the UITP Automated Mobility Working Group. This integration will assist members in the development and deployment of large-scale automated public transport solutions. ULTIMO learnings will be also integrated in a UITP publication to further disseminate the knowledge among its networks.

UITP positions ULTIMO as a project that can truly unlock the deployment of economically sustainable large-scale, on-demand, and user-centric autonomous vehicle (AV) public transportation services. The project fits well into other AV mobility initiatives in which UITP is involved and complements its other ongoing projects, such as SHOW. It supports the continuity of research and innovation development.

3.8 PADAM

3.8.1 Opportunities and challenges of the ULTIMO partnership

Padam Mobility is an official partner of the ULTIMO project, providing Demand-Responsive Transport and AV Fleet Orchestration software-solutions for on-demand autonomous mobility services for passengers. Due to our central role between the driving technologies and the final mobility services provided, we see ourselves as a key partner for the success of ULTIMO and for achieving our common goals. But if we have an important impact for ULTIMO, so has this big European project in our vision and business plan. However, we need to see the impact of this partnership both from an opportunities and challenges perspective.

ULTIMO gives us a very interesting opportunity for understanding the European AV ecosystem and keeping ourselves updated on the topic. Working closely with international leaders on their respective sectors applied to automated mobility is surely one of the best ways to understand what's needed today, consolidate a mature vision on what's coming next and learn from what was good enough in the past. Also, it serves as a solid platform for networking, synergies evaluation and transversal alignment, both among the internal and external stakeholders. This being said, there is no need to mention on the importance of receiving public funding to help boosting and keep working in an innovative topic as Automated Mobility, that still requires some time to be mature enough for a standalone approach.

In terms of challenges, ULTIMO is a big consortium with diverse partners aimed at working together on only 3 sites. Different partners implies differences in its kind (universities, operators, authorities, industrial, research, etc) but also on their technical and corporate maturity levels. The main challenge, besides the difficulties that might be found on a daily basis during the project phase, is reaching visions and working in plans for further exploitation that are compatible with the project objectives and with each of our individual interests. Also knowing that the market is in permanent evolution and that what was defined at the beginning might not be what is pertinent at the end of the project.

Understanding this opportunities and challenges, you'll find below some ideas on further exploitation, with the detail level that seems relevant at this stage.

3.8.2 Vision for a successful exploitation

It's clear that participating in a project like ULTIMO boosts our individual business and adds value to our Fleet Orchestration platform, Padam AV. Not so evident is detailing a plan for the long term and in a market that has not yet reached an acceptable level of maturity. In any case, you'll find below some initial thoughts on this regard.

As a technological provider of on-demand and fleet orchestration, the automated mobility solutions developed within the consortium that are mainly interesting for us beyond the project, are the ones related to our own AV DRT product and the real-live operations. Padam AV, our fleet orchestrator, will be in permanent evolution during the whole project, both with internal developments and integrating solutions provided by other partners (onboard supervision, alerts management, driving capabilities, etc). Also, its potential will be properly tested when implemented for providing the final services.

All this knowledge, solutions and, globally, a dedicated product to AVs, will be much mature at the end of the project that when it started. Also, we don't plan to stop Padam AV after ULTIMO and would keep providing it to the AV ecosystem as part our Padam product offer and knowledge.

This being said, we can summarize our exploitation vision in the following way:

- Being technology providers our main role, any technical development related to the deployment of on-demand services with autonomous vehicles can be of interest.

- If directly integrated or related to our fleet orchestrator and if justified by the future AV market, most of our own developments should be maintained and used for further projects with AVs.
- As part of our consulting offering, any project result, statement, knowledge, experience, etc can be of interest to our future operations and KPIs validations.
- We plan to add both, the technology developed and the experience acquired as part of our offer to the mobility ecosystem, capitalising on the work performed in ULTIMO.
- Failed technologies, uninteresting solutions or unused developments that might be achieved during the project should also be considered in our future roadmap definition. On the other hand, integration standards or protocols that might have been agreed between the partners should serve as reference and path the way we approach similar topics in the future.
- Indirectly, ULTIMO should have an impact in the future European legislation on Automated Mobility, including topics like homologation, mapping, data management or service levels, defining how we would work in the future.
- Finally, we are permanently communicating about ULTIMO, internally and externally, before as a future project, now as an ongoing work and in the future as successful collaboration. Any results gathered during this 4 years should be properly shared with the other Padam teams, within the Siemens group and as part of our future communications on the topic of AV.

Keeping in mind the market immaturity and the recent changes in the European AV ecosystem, it seems early for defining a detailed exploitation plan. This will be done in a later stage, based on the previously shared vision, and when both the AV market and the ULTIMO project will reach the stabilisation phase.

3.9 Capgemini Engineering

Interest lies within Capgemini's pursuit of developing solutions for autonomous vehicles and connected car technologies. In its capacity as a consultant company, it extends software development services encompassing autonomous driving algorithms, connectivity solutions, and cybersecurity measures, all geared towards ensuring the safety and security of automated and connected mobility systems.

Beyond these core contributions, Capgemini, as a global entity, maintains an interest in leveraging data analytics and artificial intelligence to optimize route planning, predict maintenance needs, and enhance overall transportation system efficiency. Additionally, it finds solutions pertaining to Mobility-as-a-Service (MaaS) compelling, aiming to design and implement MaaS platforms integrating various transportation modes, including public transit, ride-sharing, and micro-mobility options. Furthermore, Capgemini focuses on the development of mobile applications to facilitate seamless user experiences and efficient journey planning.

Capgemini's primary strategy involves capitalizing on the knowledge acquired from this project, particularly concerning the Passenger Service On-Board Unit, to showcase its technical prowess to customers and sustain collaborative efforts in automotive industry solutions development. Central to this strategy is demonstrating the integration of algorithms for

passenger services and essential communications within autonomous shuttles and associated systems.

Moreover, Capgemini aligns its objectives with initiatives such as CCAM, aimed at fostering a more user-centered and inclusive mobility system while concurrently enhancing road safety and reducing congestion and environmental impact. The company plans to engage in collaborative research, testing, and demonstration projects to accelerate innovation and the implementation of automated mobility solutions.

For the exploitation of assets in ULTIMO, Capgemini Engineering relies on the global R&D strategy pillar “Future of Mobility” and Capgemini’s brands like Capgemini Invent, to bring smart mobility solutions to market.

Capgemini routinely disseminates the outcomes of its research and development projects to customers through various events and exhibitions. The company takes pride in its involvement in this project, envisioning it as a potential turning point for the deployment of autonomous shuttles.

3.10 BAX

We plan to incorporate the business case outputs from ULTIMO in our support to public-transport authorities to plan for long-term Cooperative, Connected, and Automated Mobility (CCAM), often through concession contracts. We are also considering the relevant policies and agendas for the ULTIMO project's exploitation. The main message we are conveying about the project is the potential enhancement of business and value through the integration of logistics and people transport. To share the project's findings, we plan to use our connections with Transport and Public Authorities in the Netherlands, Germany, and Spain. These authorities are involved in the long-term planning of public transport.

3.11 CERTH

CERTH has been involved in various EU funded projects in the past related to CCAM gaining valuable know-how and developing a variety of software solutions. Within the ULTIMO project, CERTH plans to grow its relative expertise and enhance its solutions in the field of services for CCAM with new features and functionalities, having as final target the respective exploitation of them accordingly.

CERTH is the WP4 leader of ULTIMO, being responsible for the development of AI leveraged services, thus it aspires to develop, along with the corresponding partners, a complete ecosystem of services for CCAM and more specifically, services for passengers, vehicles, infrastructure and intelligent management. CERTH has a dual goal concerning the services exploitation, on the one hand, to reach the highest possible TRL for its services being able for them to be considered commercial and ready to use and on the other hand, to develop advanced and novel methodologies and components that can be also valuable in other domains, but also needing further research and development that can be funded by other future research projects.



The main message CETH tries to convey concerning the ULTIMO project through the activities taking place in the ULTIMO context is that the community of CCAM can benefit in terms of security, trust, easiness, and better management by Information and Communication Technology solutions incorporating Artificial Intelligence and thus, gaining from its undeniable prowess. Finally, regarding the exploitation of the aforementioned solutions, CETH can also benefit by corresponding networks able to multiply publicity in respective audiences such as ***ERTICO – ITS Europe is a public-private partnership organisation.***

3.12 SIEMENS

Siemens does not build autonomous minibuses. However, ULTIMO provides important insights and knowledge for most of our businesses:

- Our further national and international standardisation activities are directly influenced by the results of the user requirements.
- Siemens supports compliance with the BFGS and drives forward the implementation of the European Accessibility Act (EAA)
- Improving the UX of autonomous systems in general
- Improve acceptance of (autonomous) Siemens products e.g. the automated/ autonomous (metro) trains.
- Mobility (MaaS/LaaS) Ecosystem, Business, Solutions/Products/Services Requirements, Concept Design/Development & Transformation from traditional/centralized (Status Quo) to a fully digitalized/federated (Future) AM in MaaS/LaaS with ITS/CCAM ecosystem.
- Application of Mobility (MaaS/LaaS) Ecosystem, Business, Solutions/Products/ Services Requirements, Concept Design/Development & Transformation experiences, and learnings for Siemens (Mobility) businesses
- The detailed elaboration of future scenarios relevant for ULTIMO and an ULTIMO vision for Automated Minibuses in MaaS/LaaS and ITS/CCAM is represented within big picture promotion materials for conferences, workshops and interviews. This is important as AMs are accelerators and gap fillers for the intermodal MaaS/LaaS transportation system which serves the general interest and especially supports the mass transportation modalities, which are served by Siemens Mobility businesses (like trains, trams, roadside infrastructure, etc.).

3.13 CS

CS anticipates that AV will have positive and negative impacts on the public transport system. On one hand, AV can reduce vehicle ownership, fleet size requirements, parking demand, labour costs, and cold-start emissions, thereby contributing to safety, congestion reduction and environmental sustainability. On the other hand, if not carefully managed, AV may have adverse environmental impacts such as sprawling land use, increased vehicle miles travelled associated with congestion, and increased travel time consequences.

Therefore, our purpose for exploiting ULTIMO is to contribute insightful research findings on maximising the positive impacts and mitigating the negative impacts of integrating AV in MaaS in the public transport system.

Our deliverables on impact assessment will provide stakeholders with the following insights:

Governance impact assessment.

Context-specific recommendations for PTA/PTOs on collaborative governance to foster the integration of all transport modes that contribute to safer, sustainable, inclusive, and efficient mobility in the public transport system.

Data governance

Guidelines for policymakers to design adaptable and fit-for-purpose regulatory governance to support AV and MaaS innovations.

Insights on how to align regulations with industry requirements to meet the needs of local and national innovators, build mutually beneficial partnerships and preserve the private sector and general interests.

Economic impact assessment

Design costs assessment for a service (AV in MaaS). Total Cost of Mobility design.

Design of optimal pricing strategies for public transport operators and authorities (PTAs and PTOs) integrating AV in MaaS.

Commercially viable and sustainable solution when AVs are integrated in MaaS.

Understanding the relationship between user demand and price changes (elasticity).

Environmental impact assessment

A comprehensive assessment encompassing environmental, social, and economic impacts to promote a holistic sustainability-based approach.

Guidelines to support an inclusive, and environmentally responsible mobility solutions.

Total life cycle emissions and impacts with monetary values with insights to support policymaking.

Social Acceptance of AV

The significant and relevant behavioural determinants that could influence the behavioural intention to use AV integrated in MaaS.

Translating potential AV users into regular, intensive users of AV integrated in a MaaS innovation. Constructs to predict the adoption of AV integrated in MaaS.

The conditions to improve to increase the usability of the proposed AV service and satisfy the users' need to facilitate a shift from private cars to AV services.

Appropriate public policies to facilitate acceptance of AV in MaaS.

Technical Assessment

We aim to use advanced data analysis techniques to process and interpret data from AVs at the ULTIMO pilot sites to support the PTA/PTO decision-making process to offer AV services. We will provide stakeholders with the following insights:

Improve safety, reliability, and technical performance with the overall goal of achieving a cost-optimised integration of AV in MaaS in a public transport system.

Support PTA/PTOs with predictive models to forecast when specific components or systems may require maintenance.

In sum, our deliverables D6.1 will provide holistic insights into the governance, economic, social, environmental, and technical impact assessments for stakeholders and contribute to ULTIMO project goals.

3.14 Arthur's Legal

Next to further adding to and sustaining its continuous state of the art in knowledge regarding the relevant domains and dimensions in this Digital Age to support the challenges that the project is aiming to address with the appropriate technical, organisational and operational capabilities as mentioned in the project proposal.

- A. Arthur's Legal aims to advocate and where appropriate market the innovative outcomes, including lessons learned and good practices in how to both design and develop both multi- and intermodal ecosystems as well as related data sharing ecosystems in an interoperable, trustworthy and future-proof manner, how to organise these, how to collaborate based on evidence-based trust, as well as how to pre-procure and procure the above, in order to help develop and shape the relevant market(s) throughout its vast network in the EU, EEA, UK and its periphery, allies and friends.
- B. Arthur's Legal aims to use the outcomes to bottom up and other policy shaping in the EU, its Member States, EEA, UK and its periphery, allies and friends.
- C. Increasing engagement with policy makers, public procurers, authorities, business, Industry and other stakeholders, and the identification, mapping, promotion and economic exploitation of project outcomes and related matters.

3.15 UniGe

The University of Geneva, with its long-standing tradition of academic excellence and research innovation, recognizes the significant potential that automated mobility solutions hold for the future of urban transportation. As a research institution deeply engaged in exploring the nuances of Mobility as a Service (MaaS), sustainable urban practices, and energy efficiency, the university views the advent of Autonomous Vehicles (AVs) not just as a technological leap but as a gateway to new areas of scholarly inquiry and societal benefit.

In the realm of AV deployment, a critical area of focus for the University of Geneva is the enhancement of IT security within smart infrastructure. Acknowledging the intricate challenges this presents, the university is committed to advancing research that contributes to the secure and reliable integration of Connected, Cooperative, and Automated Mobility (CCAM) into urban ecosystems. This research is vital, aiming to fortify the fabric of future mobility systems against evolving cyber threats, thereby ensuring the safety and privacy of users.

The University of Geneva aims to thoughtfully leverage the insights and outcomes of the ULTIMO project. By advocating for the integration of in-vehicle services across public transportation and recognizing the importance of economic roadmaps and standardized APIs, the university supports the notion that these elements are foundational for the strategic and sustainable deployment of AVs in urban settings. These efforts reflect a broader vision for a future where technology serves as a catalyst for enhancing urban mobility while promoting competition and innovation.

Integral to the university's approach to the ULTIMO project is the commitment to embedding its findings within the academic ecosystem. Through the thoughtful integration of these results into course curriculums and the offering of PhD topics inspired by the project, the University of Geneva aspires to inspire and educate the next generation of researchers, policymakers, and technologists. This educational philosophy is rooted in the belief that a deep understanding of automated mobility and its implications is crucial for shaping a future that is both innovative and inclusive.

In conveying its involvement with the ULTIMO project, the University of Geneva humbly acknowledges the complexity and long-term nature of deploying AVs in public settings. It emphasizes the importance of building a supportive local ecosystem, crafting a sustainable roadmap for vehicle replacement, and fostering robust engagement among all stakeholders.

To share the learnings and achievements of the ULTIMO project, the University of Geneva leverages its membership in networks such as Nomads, SAAAM, and ArchParc, and its participation in ERTICO. Additionally, it engages with the broader Geneva public authorities and local actors, embracing a collaborative spirit that underscores the university's role not just as a center of learning but as a committed partner in the pursuit of a more sustainable and connected future.

3.16 TPG

As the main actors on the Geneva area, TPG is now extending the covered territory as much as possible to provide access to public transport to all close to Geneva. This extension will come at a high price, and for this to be affordable and sustainable, the AVs will be crucial. For now, the DRT is man driven in some areas and we hope to have some road ready vehicles that can go at speeds up to 90km/h.

For this to happen, TPG has been looking for non-robot-taxis that have minibus capacities for the countryside and small towns crossing. The minibus objective makes the most sense for TPG since the low density of population mostly needs to be brought to the transport hubs (tram and bus lines as well as train stations).

Like all public transport company, operators are in high demand and recruitment has never been as low. It is thus important and urgent to have autonomous vehicles operating to cover the growing demand for transport.

TPG as a major actor in autonomous vehicle advocate has been working hand in hand with the Swiss authorities and associations to facilitate laws for these vehicles to be allowed and promoted on the roads.

The DRT used to this day has shown us the high interest in this flexible way of operating, for passengers where only low frequency lines can be afforded. This elegant DRT solution will also be combined with logistics during low attendance hours in order to maximize vehicle exploitation.

DRT for the countryside are only the first steps of automation, but we hope by showing the efficiency of such systems to be followed and encouraged by the city and authorities to be applied in the city as it will be needed.

Ultimo is the perfect project to work on elements that can be integrated into AVs and tested on different sites, integrating multiple orchestrators, promoting and integrating MaaS and much more.

3.17 MobileThinking

In the context of the ULTIMO project's key objective to remove operators from shuttles, MobileThinking is developing essential tools— the Supervision Dashboard and the Intervention Application. These innovations are not just enhancements but requirements for the successful operation of autonomous vehicles. They address critical challenges in safety, compliance, and operational efficiency for Public Transport Operators (PTOs), paving the way for the realization of driverless public transportation systems.

Supervision Dashboard

Security and Supervision: Our Supervision Dashboard offers real-time monitoring capabilities, enabling PTOs to oversee their autonomous fleets with an emphasis on safety and regulatory compliance.

Market Expansion: We aim to extend our reach to PTOs across the project, showcasing our Dashboard as a vital tool for addressing their operational challenges.

Strategic Partnerships and Collaboration: Enhancing the Dashboard's safety features through partnerships with industry leaders and regulatory bodies is a key objective, ensuring our solution remains at the forefront of technology and compliance.

Intervention Application

Rapid Response and Efficiency: The Intervention Application complements our Supervision Dashboard by allowing PTOs to dispatch intervention teams quickly to the site when necessary. This capability is crucial for addressing emergencies or operational issues, enhancing overall service reliability.



Integration and Usability: Designed for seamless integration with the Supervision Dashboard, the Intervention Application provides a user-friendly interface for efficient management of on-ground operations, further streamlining the response process.

Combined Strategy for Market Expansion

Holistic Solution Offering: By offering both the Supervision Dashboard and the Intervention Application, MobileThinking presents a comprehensive solution for autonomous vehicle management, addressing both monitoring and rapid response needs.

Demonstration Through Pilots: Showcasing the combined effectiveness of our products in pilot sites will highlight their value in enhancing safety, efficiency, and compliance in autonomous vehicle operations.

Continuous Innovation and Development: Our commitment to research and development ensures that both the Supervision Dashboard and the Intervention Application evolve to meet future challenges and regulatory requirements.

Conclusion

The development and deployment of MobileThinking's Supervision Dashboard and Intervention Application are crucial for achieving the ULTIMO project's objective of operating shuttles without onboard operators. These tools address the foundational requirements for safety, compliance, and efficient operation of autonomous public transport systems. Our strategic exploitation plan is designed to not only advance these tools but also to support the project's broader vision for autonomous vehicle technology. Through market expansion, strategic partnerships, and continuous improvement, we are committed to contributing significantly to the future of public transportation.

3.18 ArgYou

ArgYou.com is a globally active digital market researcher measuring and validating success on 14'103 digital channels including search engines, social media, e-shops and directories or media platforms. In ULTIMO ArgYou supports all partners with impact data during the project and supports with new market perspectives and scalability topics for PTO's and producers of AV's.

- ArgYou is already supporting numerous mobility service providers, companies and commercial customers, as well as NGO's NPO's and government with real time data on the user interests when it comes to mobility topics.
- Everybody is talking about human-centric, user-centricity, customer centricity – ArgYou is measuring that.
- ArgYou is constantly developing new API's and new interfaces for gathering independent and reliable data for it's market partners

In ULTIMO ArgYou is the “impact partner” for everything digital, for monitorings on the pilots and for translating things in an understandable impact-oriented way to the end users. Its role is a trans-, and multidisciplinary translator for explaining new trends - risks and chances – and all the advantages of new technologies to the people. All communication means of the communications and dissemination team for ULTIMO, including videos contents, website, folders, promotions are preliminary measured by ArgYou for a better and more direct, clear, more understood and more efficient digital “reach” of users to generate mor impact on the stakeholder, user and passenger side.

3.19 Etat De Geneve

The State of Geneva, as a pioneering public authority, is embarking on a transformative journey to redefine its urban mobility and logistics landscape through the strategic implementation of the ULTIMO project results. This endeavor represents a pivotal shift towards integrating advanced automated mobility solutions into the city’s infrastructure, with a keen focus on enhancing efficiency, sustainability, and accessibility across all modes of transportation.

At the core of Geneva's strategic vision is the development of a comprehensive strategy plan for mobility and logistics. This plan is informed by the insights and findings of the ULTIMO project, enabling the integration of Cooperative, Connected, and Automated Mobility (CCAM) considerations and innovative modes of urban logistics into future urban planning efforts. The ambition is not merely to adopt new technologies but to weave them into the very fabric of Geneva's transportation ecosystem, thereby setting a benchmark for future urban mobility frameworks.

The deployment roadmap, a critical output of the ULTIMO project, serves as a foundational pillar for this vision. It provides a detailed blueprint for the budgeting and financial planning required over the next decade, ensuring that the necessary resources are allocated to bring this vision to fruition. This roadmap will guide the definition of state budgets, which are subject to parliamentary approval, reflecting a transparent and democratic process in the advancement of urban mobility solutions.

Policy-making and legislative action form the backbone of Geneva's approach to leveraging the ULTIMO project results. The knowledge gained from the project will enable Geneva to craft targeted policies and legislative frameworks that govern the deployment of autonomous vehicles (AVs) and the development of CCAM-based mobility and urban logistics infrastructure. This proactive stance ensures that Geneva remains at the forefront of technological advancements while safeguarding the public interest and promoting sustainable urban development.

Institutionalization of the ULTIMO project findings is a key objective for Geneva, with plans to incorporate these results into cantonal legislation. This includes the establishment of ULTIMO rules for public transportation and urban logistics, ensuring that the principles of electrified and autonomous on-demand mobility are seamlessly integrated into the city's legal and regulatory framework. Such integration signifies Geneva's commitment to adopting a structured and methodical approach to transforming its urban mobility landscape.

Geneva's message regarding the ULTIMO project is clear and visionary: electrified and autonomous on-demand mobility presents a promising solution to the city's escalating mobility challenges. By offering high-quality, on-demand services, Geneva aims to significantly reduce the reliance on private vehicles, thereby alleviating traffic congestion, enhancing air quality, and promoting a more livable urban environment.

To disseminate the learnings and successes of the ULTIMO project, Geneva is actively engaging with national and inter-cantonal mobility commissions, as well as international organizations based in the city. These platforms provide valuable opportunities for Geneva to share its experiences, influence broader policy discussions, and advocate for the adoption of innovative mobility solutions beyond its borders.

Through its strategic exploitation of the ULTIMO project results, the State of Geneva is setting a new standard for urban mobility and logistics. This forward-looking approach not only underscores Geneva's role as a leader in innovative transportation solutions but also exemplifies its commitment to creating a sustainable, efficient, and inclusive urban future.

3.20 SAAM

The Swiss Association of Autonomous Mobility is interested in a range of automation solutions that enhance safety, efficiency, and sustainability within the transportation ecosystem. These could include:

- Fully Autonomous Vehicles: Focus on Level 4 and Level 5 autonomous vehicles that can operate without human intervention within certain conditions or universally, respectively.
- Connected Vehicle Technologies: Systems that enable vehicles to communicate with each other and with infrastructure to improve traffic flow and safety.
- Mobility-as-a-Service (MaaS): Platforms that integrate various forms of transport services into a single accessible service on demand.

Ultimo offers an excellent holistic approach in relation to the points mentioned above. One can get a good understanding of how the points need to interact with each other.

We use and share all the developed marketing materials on our social media accounts but also at our SAAM DAYS to build up knowledge on a broader level to also educate the public about safety, efficiency and sustainability.

As SAAM we work with policymakers to incorporate findings and technologies from Ultimo into transportation policies and standards. A person from Astra also sits on Ultimo's Advisory Board, which accelerates the transfer of expertise to Switzerland. However, the FOT, the Federal Office of Transport and therefore responsible for public transport operators in Switzerland, is not part of Ultimo and is therefore informed about the respective project progress via SAAM.

With the information being prepared in Ultimo, we develop educational and training programs for stakeholders at various levels, from policymakers to the general public, about the benefits and implications of autonomous mobility.

3.21 Open Geneva

What particularly captivates Open Geneva is the co-creation process with citizens in developing innovative solutions for the future of mobility. The organization aims to explore how collaborative events between citizens, engineers, and policymakers can enrich and guide innovation in autonomous mobility. To achieve this, Open Geneva organizes workshops and hackathons aimed at encouraging the emergence of solutions that reflect the community's needs and aspirations.

Rather than directly exploiting the results of the hackathons, Open Geneva focuses on exploiting the co-creation methodology experienced through these hackathons. The organization sees immense value in the process itself, which fosters innovation and collaboration between citizens and project engineers. This methodology, which engages diverse stakeholders in the design and development of mobility solutions, offers a replicable model for innovation in general. Open Geneva plans to make ULTIMO's impact sustainable by integrating the co-creation methodologies experienced in other projects where innovation is at the interface between society and technology.

The key message of Open Geneva around the ULTIMO project highlights the value of co-creation and citizen participation in technological innovation. The organization emphasizes how these approaches allow for the development of mobility solutions that are not only technologically advanced but also socially inclusive and aligned with the real needs of communities.

To disseminate the lessons learned, Open Geneva could rely on academic and professional networks specializing in social innovation and citizen participation, as well as online platforms dedicated to sustainable mobility. Social networks and traditional media would also play a key role in communicating the project's successes and discoveries, highlighting the importance of citizen engagement in the design of future technologies.

3.22 ZF

ZF is providing the ULTIMO project with fleet orchestration solutions for on-demand mobility and last mile logistics. The participation in ULTIMO offers ZF the opportunity to better understand the needs and challenges of mobility and logistics providers in planning and implementing their on-demand services in the era of autonomous vehicles. This knowledge adds value to ZF's fleet orchestration platform SCALAR with respect to

- Adaptation to emerging business models and use cases
- Expanding integration capabilities and contribution to the development and adoption of new protocols and standards
- Developing new features to further improve traveler experience, with focus on accessibility and inclusion and
- Developing new functionalities to enhance a flexible planning, execution and a detailed follow-up of transport operations.

Shared Exploitation Ambition

In conclusion, after the delineation of exploitation plans by each partner, the shared objective remains the implementation of their respective solutions, studies or technological breakthroughs, whether they come from a non-profit association, a research institution or a corporate entity.

The ULTIMO consortium aims to collaboratively establish a comprehensive and sustainable urban mobility ecosystem, integrating Shared Autonomous Vehicles (SAVs) and advanced technologies. This aligns with their objectives of enhancing public transportation efficiency, optimizing route planning, and improving passenger experience.

Leveraging cross-sector collaboration, stakeholder engagement, and innovative infrastructure development, the partners aspire to create a model for sustainable urban mobility prioritizing environmental benefits, public health, and societal well-being.

Through a unified vision and collaborative spirit, the ULTIMO consortium works to lead the way in transforming urban transportation towards a more dynamic, efficient, and user-centric future.

4 Conclusions

In conclusion, the ULTIMO project is an example of innovation and collaboration in the field of automated public transport. Through the various activities and stakeholder engagement, a diverse ecosystem of knowledge, perspectives and resources has been cultivated and is being pursued, ensuring that project outcomes are based on real-world needs and aspirations.

Stakeholder engagement, encompassing industry leaders, policy makers, academia and end-users, seeks to enrich the understanding and forge lasting partnerships that transcend the duration of the project.

In addition, the exploitation plan outlines strategic approaches tailored to the strengths and objectives of each consortium member. Whether they are industrial partners leveraging commercialisation opportunities, public transport operators optimising services, academic institutions advancing knowledge or associations advocating for policy change, these collective efforts converge towards a common goal: to revolutionise public transport for a sustainable, accessible and inclusive future.

Ultimately, by aligning each partner's exploitation plans with the overall objectives of the ULTIMO project, it ensures that the path to commercial viability and social acceptance of autonomous public transport services is characterised by unity of purpose and a spirit of collaboration.