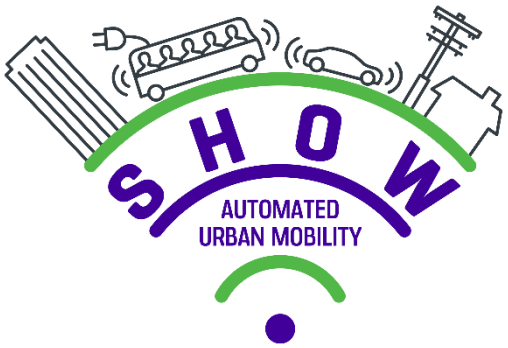

Shared automation Operating models for Worldwide adoption

SHOW

Grant Agreement Number: 875530

D12.8: Follower sites multiplication plans and actions

Legal Disclaimer

Executive Summary

This deliverable, *D12.8: Follower Sites Multiplication Plans and Actions*, outlines the objectives, actions, and achievements of the SHOW project with follower cities. One of the project's objective is to facilitate the transfer and replication of Cooperative, Connected, and Automated Mobility (CCAM) solutions by deploying automated vehicle fleets within public transport, Demand Responsive Transport (DRT), Mobility as a Service (MaaS), and Logistics as a Service (LaaS) systems across European cities.

The report details the process of engaging follower cities and developing tailored roadmaps for the replication of SHOW's technologies, business models, stakeholders' engagement, etc. Follower cities, which include **Thessaloniki**, **Geneva**, **Brussels**, **Helmond**, **Kadiköy**, **Sarajevo**, **Venice**, **Barcelona**, **Braga**, **Varna**, **Gdansk**, **Groningen**, **Paris**, and **Milan**, were selected based on their readiness and interest in adopting CCAM technologies. Each city's specific needs and capacities were assessed to create customised strategies for knowledge transfer and implementation.

The deliverable highlights key achievements, such as the successful onboarding of these follower cities through a formalised process, including Memorandums of Understanding (MoUs) and matchmaking exercises. The cities engaged with SHOW through site visits, workshops, and online exchanges, facilitating the transfer of knowledge from pilot sites to the follower cities. Notably, Thessaloniki, Geneva, and Brussels were selected as formal follower sites, contributing directly to the project with data and insights. Other cities, such as Helmond and Kadiköy, demonstrated significant progress in developing replication roadmaps and are now working towards implementing automated public transport solutions.

The document is structured into key sections, starting with an introduction that provides an overview of the SHOW project and its follower cities. The methodology section outlines the processes for selecting and engaging cities, including onboarding, site visits, and knowledge-sharing mechanisms. A detailed account of the transferability of SHOW solutions to cities like Thessaloniki and Geneva is provided, along with their contributions to the project. Furthermore, the replication strategies of cities like Helmond, Venice, and Kadiköy are shared, focusing on the actions they are taking or intend to take to integrate CCAM solutions from SHOW within their urban mobility frameworks.

The report concludes by summarising the success of SHOW's replication and multiplication strategies, which have enabled follower cities to adopt sustainable, automated mobility solutions. The project's achievements underscore the importance of collaborative knowledge-sharing, and the development of tailored roadmaps has ensured that each city can adapt these technologies to their local context, contributing to the broader goal of advancing sustainable urban transport across Europe.

Document Control Sheet

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1.0	18/09/2024	Version sent for internal peer review.	John McSweeney (UITP) and Maria Gkemou (CERTH)
2.0	15/10/2024	Peer-reviewed version sent for submission	Clarisse de Cerjat (Eurocities)

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Abbreviation List

Abbreviation	Definition
AVENUE	Autonomous Vehicles to Evolve to a New Urban Experience
BRT	Bus Rapid Transit
CCAM	Cooperative, Connected and Automated Mobility
CCAV	Cooperative, Connected and Automated Vehicles
CERTH	Centre for Research & Technology, Hellas
D	Deliverable
DRT	Demand Responsive Transport
GA	Grand Agreement
H	Half
LaaS	Logistics as a Service
MaaS	Mobility as a Service
MoU	Memorandum of Understanding
N/A	Not Applicable
NDA	Non-Disclosure Agreement
OEMs	Original Equipment Manufacturer
PT	Public Transport
SHOW	SHared automated Operating models for Worldwide adoption
STIB	Brussels Intercommunal Transport Company
SUMP	Sustainable Urban Mobility Plan
UC	Use Case
UITP	International Association of Public Transport
UNIGE	University of Geneva
VIF	Virtual Vehicle Research
WP	Work Package

1 Introduction

1.1 Purpose and structure of the document

SHOW aims to support the migration path towards effective and persuasive sustainable urban transport, through technical solutions, business models and priority scenarios for impact assessment, by deploying shared, connected, cooperative, electrified fleets of automated vehicles in coordinated Public Transport (PT), Demand Responsive Transport (DRT), Mobility as a Service (MaaS) and Logistics as a Service (LaaS) operational chains in real-life urban demonstrations.

Within the project, Eurocities has been responsible for delivering D12.8 which is a public report on the follower sites' multiplication plans and actions. This responds to SHOW's objective to transfer the learnings and other project outcomes to follower sites across Europe and beyond. Three formal sites were originally selected and partially funded as proof of concept for the multiplication and transferability strategies to be applied, namely Thessaloniki, Brussels and Geneva; each of them playing a different role in either providing requirements and early learning, feeding the architecture and security services, performing short demonstrations and sharing data with the project, and defining their replication plans - and in conjunction with the project achievements – with regard to business models and services, selected technologies, and tools from SHOW.

A12.7 also allows for cities that are often not mature enough for CCAM deployment to learn from the experiences in the project and be able to develop a plan in the coming years. In addition to the three formal follower sites that are partners in SHOW – namely Thessaloniki, Geneva, and Brussels - Eurocities developed a mechanism (e.g., process, training means and content, MoU) to involve additional and external to the project follower cities:

- Barcelona (Spain),
- Helmond (Netherlands),
- Kadiköy (Turkey),
- Sarajevo (Bosnia and Herzegovina),
- Venice (Italy),
- Braga (Portugal),
- Varna (Bulgaria),
- Gdansk (Poland),
- Paris (France),
- Groningen (Netherlands),
- Milan (Italy).

Half of them, including **Helmond**, **Kadiköy**, **Sarajevo**, and **Venice** expressed an early interest to develop an implementation roadmap to start implementing and deploying shared CCAM solutions with a specific replicability plan. This is mainly due to the readiness and familiarity they have with these solutions and others being interested in either exploring the topic or seeing how mechanisms can apply to other solutions. It is important to bear in mind that each follower site contributed voluntarily as no budget – except for the travel budget – was allocated to them directly.

This document is structured into several key sections. The methodology chapter describes the processes for selecting and engaging follower cities, detailing activities such as site visits,

matchmaking exercises, and knowledge exchanges. Following this, the document provides a detailed analysis of the transferability of solutions from follower sites to SHOW, with inputs from Thessaloniki, Geneva, and Brussels. It also outlines replication roadmaps for additional follower sites, including Helmond, Venice, Kadiköy, and Sarajevo. Finally, the conclusion summarises the outcomes and future actions related to the replication of CCAM solutions across European cities, while the annexes provide supporting data such as city profiles and replication plan templates.

1.2 Intended Audience

The deliverable will address the relevant SHOW project partners within the Consortium regarding the CCAM market covering development, evaluation, implementation and exploitation aspects during the whole duration. This document is also written to support all those – beyond the SHOW Consortium - who envision to use automated public transport as a game changer for future mobility services.

1.3 Interrelations

Internal:

- **WP2 Business / operating** models – Content of WP2 is shared with follower sites, especially relating to D2.5 on 'Scalability and transferability of business/operating models'.
- **WP3 Ethical and Legal Issues** – WP3 provides relevant information about legal regulations at European, national and regional level which influence the business environment for market introduction.
- **WP9 Pilot plans, tools & ecosystem** engagement – D9.3 specifically provides the full evaluation plans for the Mega and Satellite sites and delves into the definition of KPIs – which was also shared with the follower sites. The SHOW sites' leaders also shared knowledge relating to D9.4 on 'Users engagement and co-creation initiatives'.
- **WP12 Real-life demonstrations** – Pilot sites' leaders providing relevant input for implementing and deploying shared CCAM services.
- **WP13 Impact Assessment** – Many follower cities expressed an interest to learn about the impact assessment related to SHOW.
- **WP15 Dissemination, Training and Multiplication** – The follower sites have access to the training, replication and transferability activities (D15.7). There is a close relationship between the activities done for follower sites and regional replication in WP15. Regional replication activities can use the transferability mechanisms developed in WP12 to ensure the uptake of SHOW results in different cities and regions in Europe.
- **WP16 Exploitation and economic impact assessment** – WP16 provides the economic base for the market analyses (A16.1), impact assessment (A16.2) as well the partner-specific exploitation plans by benchmarking relevant, highly representative business and operating models enlarged by the relevant ecosystem and additional analyses.
- **WP17 – Decision support, Guidelines & Recommendations & Roadmap** – Interested follower sites are also considered in the activities for decision-making mechanisms and CCAV integration in SUMP.

External: External stakeholders that aim to deploy shared CCAM solutions locally or are interested in developing replication and transferability activities between cities.

2 Methodology

In the SHOW project, various work packages (WPs) interact to achieve the project's objectives through a collaborative framework. As mentioned, early in the project, three follower sites were selected to contribute data and other learnings (Thessaloniki, Geneva, Brussels) from their respective pilots, directly feeding valuable information into specific WPs and/or exposing how SHOW services can be replicated in other contexts. This data flow enhances the project's analytical capabilities and supports informed decision-making. Concurrently, another set of follower sites, currently in the early stages of deployment, have been chosen to engage as stakeholders. These sites are positioned to learn from the SHOW project and, in turn, provide feedback based on their evolving experiences (see **Figure 1**).

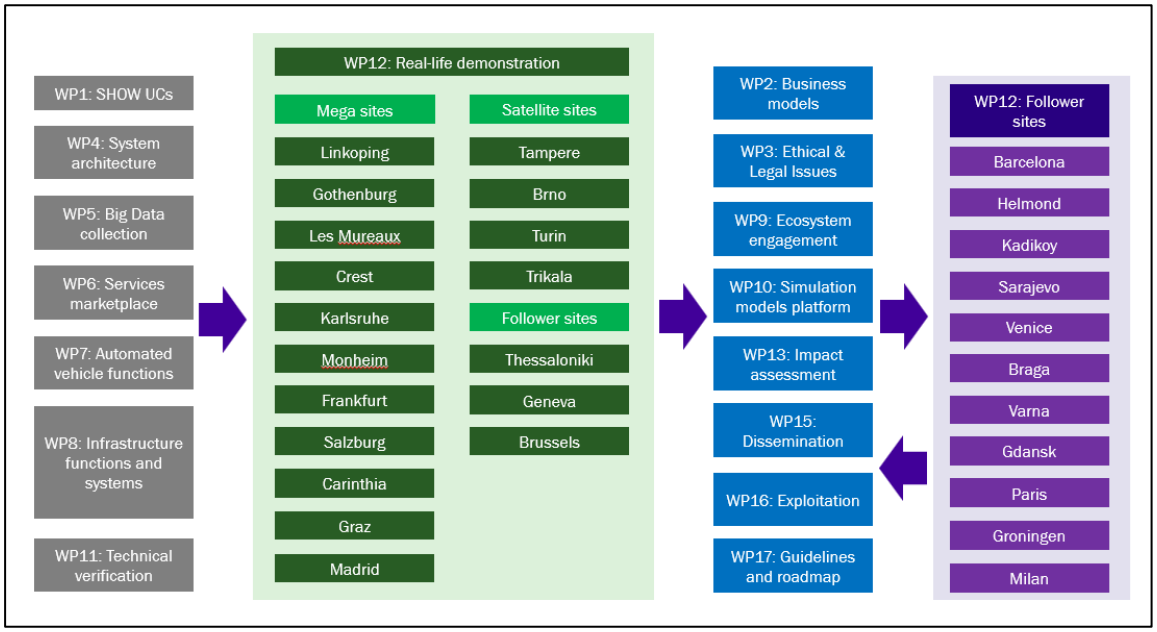


Figure 1: Interactions between the WPs in the SHOW project

This two-way interaction ensures that the SHOW project not only leverages external data effectively but also fosters an iterative learning environment where emerging sites can both benefit from and contribute to the project's continuous improvement.

2.1 SHOW internal follower sites

The follower sites played a pivotal role in maintaining transparency and facilitating communication by regularly sharing progress updates through the monthly status report. In this report, Thessaloniki, Geneva, and Brussels were expected to provide information on the status of the operations, expected date of operation launch & phase, vehicles, changes (if any) to the initial GA, blocking Points/Challenges & Mitigation Actions, UCs addressed, test users – Real Passengers/Cargo units so far transported, and major communication/dissemination event already or to be organised.

Additionally, they contributed to the SHOW Dashboard by integrating data from their respective pilots, enriching the platform with diverse insights and experiences. This consistent exchange of information ensured that stakeholders remained informed about the

advancements and challenges encountered across different sites, fostering a collaborative and informed approach towards sustainable urban mobility initiatives within the SHOW project.

2.2 Additional follower sites onboarding

2.2.1 MoU and NDA

On 16 December 2021, Eurocities opened a call for expression via the website of SHOW – which closed on 31 January 2022. The call outlined what SHOW could offer to the follower sites (i.e., on-site demonstrations, workshops, business models, etc.), the timeline, the selection criteria, and the application form. Through this process, Eurocities was able to engage with the follower sites early on in the project.

To facilitate the exchange of knowledge between the SHOW pilot sites and the follower sites (external to the project), Eurocities developed a template, in coordination with UITP, the MoU and NDA for each follower site to sign. The MoU also lays down the information concerning the budget allocated to each follower city and what they can expect from the exchanges within SHOW (MoUs are annexed in this report). Before starting the replication activities, each city filled in and signed the templates before the site visits during H2 2023.

2.2.2 City Profiles

At an early stage of the matchmaking process, Eurocities developed a template for each of the follower sites to provide information on their profile, status, expectations from SHOW, and learning needs. The template requested the following information from the follower site:

City Profile

Demographics, sustainable mobility, and SUMP priorities explain if and how SUMP addressed or is expected to address automated mobility in any sense and at which timeframe, link to SUMP.

City Status

Near/Future plans for shared CCAM deployment, which stage do you find yourself in concerning CCAM deployment (early, intermediate, advanced), etc?

Why SHOW

Why is engagement with SHOW important in the first place, and what is the need behind it?

Objectives of exchange with SHOW

Tick and explain

Objective	**Explanation**	
Services to replicate (or add, if CCAM deployment is on-going at site) & SHOW Use Cases of interest	☐	
Business synergies (OEMs – Vehicle	☐	
Best practices – Learnings – Advice on Technical / Legal / Operational Level	☐	
Other	☐	

2.2.3 Matchmaking Exercise

In March 2023, Eurocities organised an online matchmaking event combined with a general

presentation to the follower sites. First, Eurocities presented SHOW and the objectives of the projects as well as the purpose of having follower cities. Then, each site provided a brief description of the use cases they are implementing as well as the timeline (ANNEX I). Finally, the participants were able to learn from the different opportunities to liaise with SHOW to learn as much as possible (i.e., liaising with site leaders and OEMs, training developed in the context of SHOW, site visits, etc.). As a second part of the matchmaking session, the participants were asked to contribute to Miro and share which sites they found interesting to learn from. The follower cities were given a few days as well to add their preference on Miro (see **Table 1** for results).

Table 1: Results of matchmaking event

Follower Site	Interest in developing a roadmap	Site of interest 1	Site of interest 2
Barcelona	Yes	Linkoping	Turin
Helmond	Yes	Gothenburg	Tampere
Kadiköy	Yes	Turin	Madrid
Sarajevo	Yes	Turin	Madrid
Venice	Yes	Turin	Carinthia/Klagenfurt
Braga	No	Madrid	
Varna	No	Karlsruhe	Turin
Gdansk	No	Les Mureaux	Monheim
Paris	No	Linkoping	Turin

Groningen and Milan were added toward the end of the project and therefore could not participate in the matchmaking process. Through bilateral discussions, Groningen was able to express an interest in learning from the Madrid site – given the interest in the bus depot use case. Milan joined SHOW as a follower site three months before the end of the project and mainly expressed an interest in participating in the webinars to help with their ongoing projects.

2.2.4 Exchanges with SHOW project

Based upon the results arising from the matchmaking event and the template sent to each follower city, Eurocities was able to define a strategy for each of them based on their learning needs and preferences. A table summarising the activities performed by each follower site in SHOW can be found in Table 2. The regional replicators from WP15 were also invited to join based on their interests.

2.2.5 Site visits

The mapping process in SHOW is an ongoing tailored exercise to ensure that the knowledge gained in the project can be transferred to others, in their best interest. The application forms (filled out by the follower sites in 2022) detailed very early the interests of each city. Throughout the project, UITP updated the timeline of events happening at each Mega and Satellite site. This facilitated the knowledge of when each SHOW site would be able to host other cities as well as when they would be busy with other conferences. Moreover, each site leader provided a schedule for the public phase of their operations which was helpful to coordinate the site visits.

Figure 2: Representative of the City of Gdansk visit to the pilot site in Monheim, Germany

Before traveling, Eurocities sent the Travel and Reimbursement Rules and Procedures documents to the follower sites so that each volunteering city knows what to do ahead of the visit.

2.2.6 Online exchanges

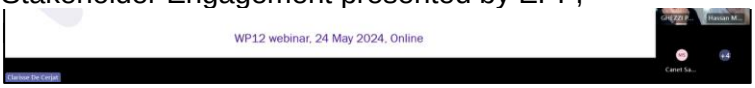
A swift strategy was imperative due to the dynamic nature of deploying the solutions in SHOW. The complexities inherent in such deployments often resulted in unforeseen challenges that could disrupt the physical visits of follower sites to the pilot locations. These challenges included technical glitches, regulatory hurdles, and adverse weather conditions, among others. Therefore, it became necessary to adapt quickly and provide alternative avenues for knowledge exchange. Eurocities recognised the importance of facilitating comprehensive discussions between sites, even if physical visits were not feasible. This led to the implementation of online meetings and discussions, which provided a convenient and efficient way for stakeholders to exchange insights, discuss business models, and share lessons learned (see Figure 3).

Figure 3: Online exchange between Gothenburg pilot site leader, Keolis, and the City of Helmond

By embracing virtual platforms, the project ensured that valuable knowledge transfer could continue uninterrupted, regardless of the obstacles encountered during physical visits. This agile approach not only addressed the immediate challenges but also fostered a more adaptable and resilient knowledge-sharing framework within the SHOW project.

2.2.7 Training

Several training opportunities were extended to the follower sites within the framework of SHOW. Based on the learning needs expressed by each follower site, Eurocities organised webinars and workshops focusing on:

- Stakeholder Engagement presented by EPF,
- 

by Vedecom (see Figure **4**),
- Policy support tool (PST) presented by NTUA,
- Integration of CCAM into Sustainable Urban Mobility Plans (SUMPs) by Eurocities.

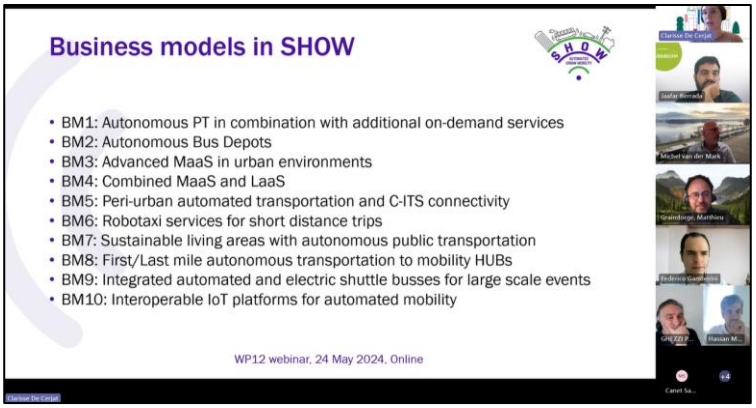


Figure 4: Webinar to present SHOW business models to follower sites and regional replicators

Additionally, the project promoted several e-courses among the follower sites to further enhance their knowledge and skills. Three e-courses have been developed and made available publicly in the context of SHOW, targeting the:

- General audience (developed by CERTH)
- PTOs/PTAs (developed by UITP)
- Experts (developed by IRF)

Follower sites were afforded the flexibility to attend the webinars and workshops at their convenience and access the training materials at any time they deemed suitable. This approach aimed to accommodate varying schedules and ensure that participants could engage with the content effectively, thereby maximising the opportunities for learning and knowledge dissemination within the SHOW project.

2.2.8 Summary of exchanges that happened in SHOW

Table 2 highlights the exchanges that happened in the context of the project.

Table 2: Follower Sites strategy in SHOW

Follower Sites	Level of CCAM readiness	Site of interest 1	Site of interest 2	Learning Needs (summary of city profile)	Attended the matchmaking event	Exchanges that happened in the context of SHOW	SHOW training shared with follower site	Replication roadmap
Thessaloniki	Advanced	N/A (although in close synergy with Trikala site, due to CERTH being common Partner)	N/A	N/A	N/A	Thessaloniki has been one of the three defined follower sites of the project, being part of the Grant Agreement. As it has been anticipated, Thessaloniki served as the follower site of the Satellite Trikala site in Greece in specific with the liaison Partner being CERTH and its automated fleet. More specifically and after an amendment taking place respectively, CERTH has retrofitted in collaboration with VIF, an L4 vehicle demonstrator (Ford Mustang Mach E) operating under a DRT scheme, also developed by CERTH. The same schema – with the necessary adjustments in the DRT app - has been operating, after Trikala in real traffic, in the Thessaloniki follower site in	N/A (not needed in reality as CERTH is the technical manager of the project as well)	Yes

Follower Sites	Level of CCAM readiness	Site of interest 1	Site of interest 2	Learning Needs (summary of city profile)	Attended the matchmaking event	Exchanges that happened in the context of SHOW	SHOW training shared with follower site	Replication roadmap
						the industrial premises of Technopolis where the DRT addressed Technopolis employees and visitors. The same remote supervision centre, having been developed by CERTH at CERTH premises in Thessaloniki, has been operating for fleet supervision in both Trikala and Thessaloniki pilot sites. Also, due to safety criticality of the platooning and VRU use cases of Trikala, those trials intended for Trikala were finally run in Thessaloniki.		
Geneva	Advanced	N/A	N/A	N/A	N/A	Geneva has been very invested in SHOW since the beginning, especially due to their ongoing pilot happening in the context of the AVENUE project. UNIGE regularly shared data and learnings with the partners in various WPs. They have been providing insights and guidelines from SHOW, have fed the security part in WP4 architectures whereas they have run short demonstration	N/A	Yes

Follower Sites	Level of CCAM readiness	Site of interest 1	Site of interest 2	Learning Needs (summary of city profile)	Attended the matchmaking event	Exchanges that happened in the context of SHOW	SHOW training shared with follower site	Replication roadmap
						of logistics cases in the context of SHOW.		
Brussels	Advanced	N/A	N/A	N/A	N/A	Brussels joined SHOW very early on as they were finalising pilots at the time in 2020. STIB could regularly provide feedback and lessons learned based on their experience with CCAM deployment. They have been sharing learnings and data from their operations (see more in following sections).	N/A	Yes
Barcelona	Advanced	Linkoping	Turin	Evaluate the passengers' comfort perception and bus behaviour, interaction with road and infrastructure, displacements route/depot, and specific bus maintenance for new equipment.	Yes	WP2 - webinar on SHOW business models WP9 - webinar on stakeholder engagement WP17 - SUMP exercise as already at an advanced stage	Training from IRF & UITP	Initially yes, but due to changing priorities, they have dropped it.
Helmond	Advanced	Gothenburg (online meeting)	Tampere (online meeting)	Scaling up CCAM services (both in number of vehicles and geographical	Yes	WP2 - webinar on SHOW business models WP9 - webinar on stakeholder engagement WP12 - online exchange with	Training from IRF & UITP	Yes

Follower Sites	Level of CCAM readiness	Site of interest 1	Site of interest 2	Learning Needs (summary of city profile)	Attended the matchmaking event	Exchanges that happened in the context of SHOW	SHOW training shared with follower site	Replication roadmap
				scope), relevant experience from other CCAM services in operations is welcome to help prepare for a tender.		the pilot site of Gothenburg WP17 - SUMP exercise as already at an advanced stage		
Kadikoy	Intermediate	Turin	Madrid (online meeting)	Replicate pilots of Turin (Variety and Capacity) and Madrid (Complexity), liaise with service providers willing to pilot their project in Kadikoy, and learn from other sites to understand which services apply to Kadikoy.	Yes	WP2 - webinar on SHOW business models WP9 - webinar on stakeholder engagement WP17 - SUMP exercise as already at an advanced stage	Training for general public from CERTH	Yes

Follower Sites	Level of CCAM readiness	Site of interest 1	Site of interest 2	Learning Needs (summary of city profile)	Attended the matchmaking event	Exchanges that happened in the context of SHOW	SHOW training shared with follower site	Replication roadmap
Sarajevo	Early stage	Turin	Madrid (online meeting)	Interested in replicating specific UCs, such as 1) Area-based service and feeder to PT station - Proximity service, area-based, dynamic routing, on-demand stops, and shared use. 2) Local bus service - Replacement of local PT in small cities, on-demand shared fleet-based service, dynamic routing, 24-hour operation. 3) Bus Rapid Transit (BRT) - high frequency fixed route, fixed stops, separated lane, shared use. 4) School bus - Door-to-point service, fixed route with fixed operational time. 5) Car-sharing - On-	Yes	WP2 - webinar on SHOW business models WP9 - webinar on stakeholder engagement WP17 - SUMP exercise as already at an advanced stage	Training for general public from CERTH	Yes

Follower Sites	Level of CCAM readiness	Site of interest 1	Site of interest 2	Learning Needs (summary of city profile)	Attended the matchmaking event	Exchanges that happened in the context of SHOW	SHOW training shared with follower site	Replication roadmap
				demand sequentially shared private service, reserved for a period of time, dynamic routing, extended operational times. 6) Depot - Automated and optimized fleet management in the bus depot (parking and charging management). Understand how CCAM services can decrease the number of transport accidents and achieve Vision Zero.				
Venice	Early stage	Turin	Carinthia (online meeting)	Learn from acknowledging best practices, and technical, legal and operational advice and be inspired by	Yes	WP2 - webinar on SHOW business models WP9 - webinar on stakeholder engagement WP12 - online exchange with the pilot site of Carinthia	Training for general public from CERTH	Yes

Follower Sites	Level of CCAM readiness	Site of interest 1	Site of interest 2	Learning Needs (summary of city profile)	Attended the matchmaking event	Exchanges that happened in the context of SHOW	SHOW training shared with follower site	Replication roadmap
				more advanced cities whose experience can support the migration path towards effective sustainable urban mobility and the implementation of automated vehicles.		WP17 - SUMP exercise as already at an advanced stage		
Paris	Advanced	N/A	N/A	Investigate business plans to re-invest in city infrastructure.	Yes	WP2 - webinar on SHOW business models WP9 - webinar on stakeholder engagement WP17 - SUMP exercise as already at an advanced stage	Training from IRF & UITP	No
Varna	Early stage	Karlsruhe	Turin	Seek an opportunity for eventual business models within SHOW and learn from the participatory approach. They would also like to learn from SHOW on what infrastructure improvements, in general, need to	Yes	WP2 - webinar on SHOW business models WP9 - webinar on stakeholder engagement WP12 - online exchange with the pilot site of Karlsruhe WP17 - SUMP exercise as already at an advanced stage	Training for general public from CERTH	No

Follower Sites	Level of CCAM readiness	Site of interest 1	Site of interest 2	Learning Needs (summary of city profile)	Attended the matchmaking event	Exchanges that happened in the context of SHOW	SHOW training shared with follower site	Replication roadmap
				be done to improve mobility within the city.				
Gdansk	Advanced	Mureaux	Monheim (physical meeting)	Learn from the experiences of the successful pilots in SHOW relating to automated last-mile public transport and keen to learn more about the technical aspects of implementing large-scale CCAM demonstrations.	Joined after the matchmaking event	WP2 - webinar on SHOW business models WP9 - webinar on stakeholder engagement WP12 - site visit of the pilot site in Monheim WP17 - SUMP exercise as already at an advanced stage	Training from IRF & UITP	No
Braga	Early stage	Madrid		Particularly interested in the SHOW use cases that showcase innovative and sustainable mobility solutions. Braga's engagement with the SHOW project	Yes	WP2 - webinar on SHOW business models WP9 - webinar on stakeholder engagement WP12 - online exchange with the pilot site of Madrid WP17 - SUMP exercise as already at an advanced stage	Training for general public from CERTH	No

Follower Sites	Level of CCAM readiness	Site of interest 1	Site of interest 2	Learning Needs (summary of city profile)	Attended the matchmaking event	Exchanges that happened in the context of SHOW	SHOW training shared with follower site	Replication roadmap
				in the field of aims to leverage best practices, gain valuable learnings, and receive advice on technical, legal, and operational aspects.				
Groningen	Advanced	Madrid (online meeting)		Interested in learning from the bus self-navigating in depots UCs to improve safety and productivity. Learn from best practices when it comes to understanding the regulatory framework in Europe and stakeholder engagement (e.g., public-private partnerships) to integrate CCAM technologies into the public transport infrastructure	Joined towards the end of the project	WP2 - webinar on SHOW business models WP9 - webinar on stakeholder engagement WP12 - online exchange with the pilot site of Madrid WP17 - SUMP exercise as already at an advanced stage	Training from IRF & UITP	No

Follower Sites	Level of CCAM readiness	Site of interest 1	Site of interest 2	Learning Needs (summary of city profile)	Attended the matchmaking event	Exchanges that happened in the context of SHOW	SHOW training shared with follower site	Replication roadmap
Milan	Early stage	Joined towards the end of the project					Training for general public from CERTH	No

3 Transferability from Follower Sites to SHOW (and vice versa)

3.1 Thessaloniki, Greece

3.1.1 Description of the pilot

Thessaloniki has implemented the SHOW pilots in a designated area within Technopolis of Thessaloniki. This area comprises four buildings that accommodate various private companies with numerous employees (see **Figure *5***).

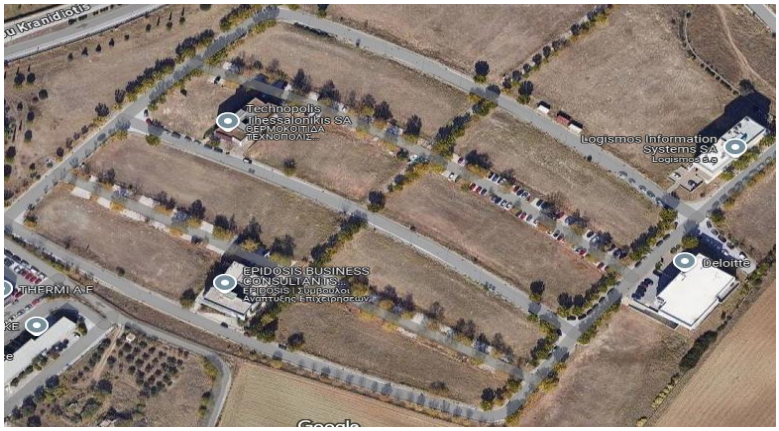


Figure 5: Satellite image of Technopolis pilot area.

In this context, CERTH's retrofitted automated vehicle, developed and funded by the project, facilitated transportation for employees exclusively within the premises of Technopolis, for awareness and familiarization with the AV, and recreational purposes and as a first step for the near future deployment in open traffic in the City (see **Figure *6***). The AV conducted safe trips within the area, transferring 47 passengers in total, with a maximum speed set at 20 km/h.

Figure 6: Technopolis follower site in Thessaloniki.

3.1.2 Link to SHOW

The Thessaloniki site has been a site fully developed in the SHOW project. The same is valid for the custom DRT service that operated there (being replicated from the Trikala site). The test ground of Technopolis apart from applying the DRT service that was intended for the premises, offered also the ground for testing the VRU and platooning use cases that were planned originally for the Trikala site but were decided not to be tested there as they were being considered safety critical (still, for consistency reasons, a full description is included in D12.7).

3.1.3 Main findings

The operation during passenger transfers was smooth, with no accidents or challenging situations that could have led to conflicts. It is worth noting that, since the area is private, traffic from other vehicles was minimal for the majority of the pilots. There were also no instances of illegal overtaking. Along the vehicle's route, there was a segment approximately 20 meters in length where low-hanging branches from trees obstructed the AV's normal and legal path. In such instances, the vehicle would come to a stop, and the safety driver would take over, manually navigating the vehicle partially into the opposite lane. Autonomous driving resumed immediately following the clearance of the obstruction. Aside from this, there were very few instances requiring the safety driver to take over, which were primarily necessary to manoeuvre around illegally parked vehicles obstructing turns. Overall AV's performance was satisfactory, with no unwanted or surprising reactions during the pilots. The low traffic from other vehicles, as already mentioned, certainly helped in this. Performance data have been shared with the project Data Management Platform and are visualised in the project Dashboard.

A digital survey, custom for Thessaloniki borrowing applicable questions from the Netigate surveys for Mega and Satellite sites, was conducted to gather insights from passengers regarding the autonomous vehicle (AV) service.

Figure 7: Passenger ready to get on-board the AV in Thessaloniki.

Nine (9) users participated in the survey, providing valuable feedback. The most significant results are as follows:

- Respondents indicated that they have never used autonomous vehicles (AVs) for their commutes and primarily rely on micromobility options (which is quite obvious as there 90% of them expressed satisfaction with the AV service and stated they would recommend this mode of commuting to other passengers.
- Almost all respondents believe that AVs can enhance safety for pedestrians and micromobility users, while also contributing to reduced traffic congestion.
- 78% of them stated they would be willing to use the service for short trips lasting between 5 to 10 minutes.
- 90% found it easy to interact with and use the AV, suggesting it could be a viable alternative specifically for tourists in the city, in selected routes.
- 53% indicated that the AV service meets their commuting needs and expressed a willingness to utilize similar services in the future.

3.1.4 Lessons learned

- Abrupt braking was frequently implemented for low-priority incidents, such as branches, requiring the safety driver to intervene and manually operate the vehicle.
- Instances necessitating safety driver takeovers were minimal and primarily occurred to navigate around illegally parked vehicles obstructing turns (which is also a common situation on the roads of Thessaloniki and it seems it was also reflected in the designated space of Technopolis).
- The comfort provided in terms of the overall service provided should be enhanced.

3.1.5 Beyond the project

CERTH, having operated and made known this first service in Tecnopolis and together with the large knowledge having acquired throughout the development of the automated vehicle demonstrator, is ready now to deploy in open traffic in Thessaloniki in future initiatives, but also beyond. The open vehicle demonstrator, in combination with the rest know-how of all CERTH teams in fleet and traffic management, V2X and cybersecurity, and of course the operation of CERTH being the technical manager of the project, provides now the full skillset required for any deployment planned in the future. In addition, the City near future investment in ThessINTEC, the iMile infrastructure of CERTH (offering controlled and open traffic ground for experimentation of novel technologies), the traffic management services operated and offered by CERTH to the City and the traditional strategic alliance CERTH has with the City administration, open up endless opportunities in replicating SHOW (and other affiliated initiatives) outcomes in near future (see more in chapter 4).

3.2 Geneva, Switzerland

3.2.1 Description of the pilot

Geneva was chosen at an early stage to showcase the transition between SHOW and the EU-funded project AVENUE. The pilot scheme features on-demand door-to-door automated shuttles operated by TPG through UNIGE for public transportation. Initially deployed at the Belle-Idee site under AVENUE, the project extends into ULTIMO, incorporating SHOW use cases.

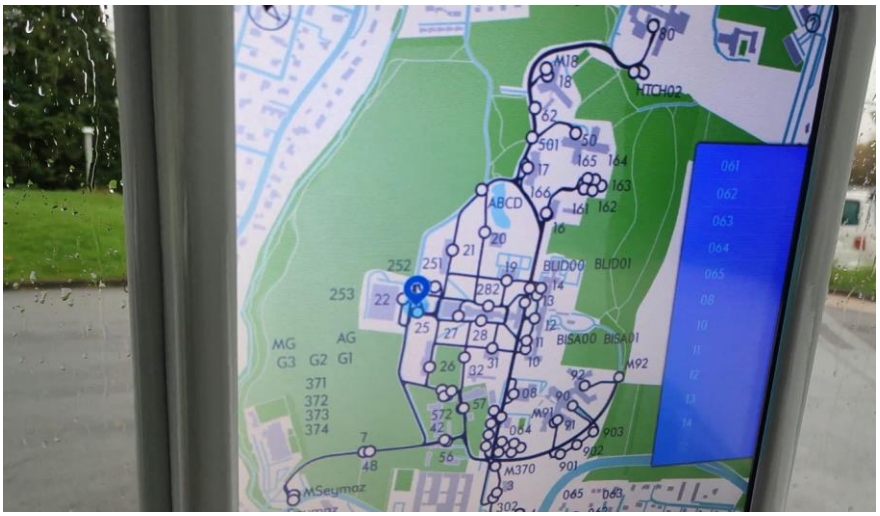


Figure 8: Route of the AVs for the Geneva pilot

It involves managing mixed traffic flows from both AVENUE and SHOW, addressing last-mile urban logistics concerns in mixed temporal mobility. Within the AVENUE project and in the test phase of ULTIMO and triggered by SHOW use cases, we developed and deployed catering to Belle-Idee Hospital's non-medical material transportation needs including documents and linens. Integration with TMC is contingent upon authorisation, a feature specific to SHOW.

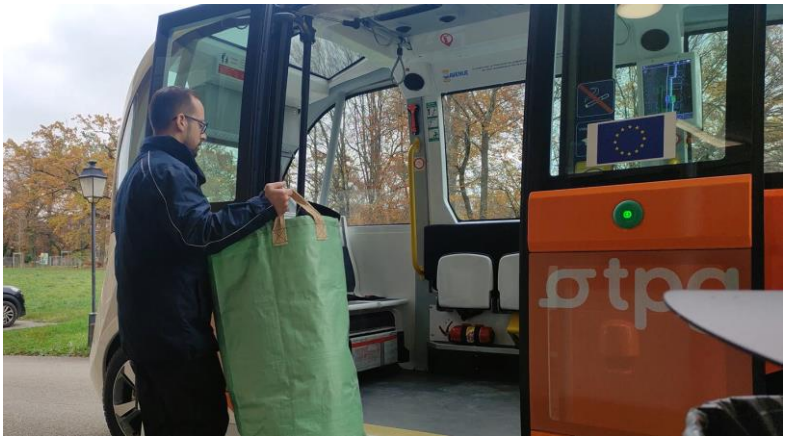


Figure 9: Care Unit

The use case for urban logistics has been integrated into the ULTIMO project, where a full-scale deployment will be organised (outside of the SHOW project but based on the use case identified in SHOW and tested with the AVENUE infrastructure where it was adapted accordingly).

3.2.2 Link to SHOW

The target of the AVENUE project was the deployment of public transportation services. Logistic services were not an objective of the AVENUE project. Using the same infrastructure (vehicles and the Belle-Idee site) in the context of the SHOW project we set up and organised the deployment of an experimental time-shared logistics service.

The primary interactions between Geneva and SHOW have revolved around several key areas. Firstly, Geneva's involvement in AVENUE operations, acting as a feeder to SHOW, has yielded valuable insights that are now incorporated into the application guidelines. Secondly, SHOW's role as a feeder back to AVENUE (and eventually to ULTIMO) has facilitated a reciprocal exchange of knowledge and experiences, and specifically the logistics use cases (which are now an integral part of the ULTIMO project). Lastly, efforts have been made to ensure alignment on architecture and cybersecurity, with these considerations reflected in the deliverables of WP4.

3.2.3 Main findings

The trial at Belle-Idee was operated from the beginning of October to the end of November 2023, providing logistic services for the hospital. Although initially transport of medical items (like biosamples) was also anticipated, we realised that this was not possible due to regulatory restrictions. They finally transported only non-medical items, like linens and small equipment.

The vehicles, although they had an in-vehicle safety operator, were operating without the intervention of the safety operator.

The key finding was that the replacement of the formal transport service (that is a truck with a driver) will require an important model and operation change for the hospital logistics. The most important issue identified was that the services provided by the driver cannot be fully replaced by the automated vehicle. Specifically, although the loading of heavy items (bedsheets) can be done by the persons working in the laundry, the unloading and transfer in the premises of the building cannot be done by the nurses. Either there must be a person unloading, or the building must be changed to have a discharge area.

Second, although the transportation of light items (like documents) was simpler and feasible, not requiring special physical conditions by the person handling them, the operational model was not adapted. Currently, the transport was delivering the documents to either the reception or the mailbox of the building. With the on-demand service, a person working in the reception or a nurse (for the building without reception) would need to go out and pick up the documents. This, however, is not always possible since the receptionist should leave their station and the nurse might not be available to exit the building to collect the documents from the vehicle, the moment the vehicle arrives.

A final finding concerned the reservation model of the trips. The current version of the trip reservation is fine-tuned for public transportation service, where a passenger will define a single destination. However, in a logistics service, the user (who is using the trip reservation app) will be required to define several destinations, one after the other. This functionality is not available today and needs to be programmed. In addition, the delivery order for the multiple destinations will need to be defined, with the loading user able to provide restrictions and preferences.

Following the trials, the hospital considered that the model does not fit their current operations model and the required changes are not, currently feasible. This service in this form will not be continued and a new model will need to be defined in the future.

3.2.4 Lessons learned

- A time-shared, public transportation-logistics service is possible and can be operated with adaptations of the user app.
- The absence of in-vehicle personnel will require a new workflow model for the employees, that will be required to pick up the goods.

- There are limitations in what can be transported in a medical establishment, and for some items, special installation in the vehicle might be required (like a cold container for medical samples).

3.2.5 Beyond the project

The concepts and experience gained will be used to deploy a full-scale time-shared logistics service in an industrial area (ZIMEYSA) in Geneva, within the ULTIMO project, by a local last-mile urban logistics partner (OVO Sarl). The service is aligned with the ULTIMO roadmap, for a full deployment in late 2025. The state of Geneva is also a full actor in this deployment, in the context of the ULTIMO project, setting the strategic directions and the required regulations.

3.3 Brussels, Belgium

3.3.1 Description of the pilot

Brussels was selected to illustrate the transfer of SHOW pilots to a city from a non-pilot country (Belgium). The pilot was led by the public transport operator of the capital, STIB-MIVB, and represented an on-demand automated shuttle interacting with public transport. The demonstrations successively took place in Brussels on three different sites – Woluwe Public Park (1.7 km length and max speed 12 km/h) (see **Figure *10***), Solvay Campus (1.7 km and max speed 14 km/h) (see **Figure *11***), and Brugman Hospital. Two Easy-Miles Shuttles ran for SHOW from 28 June 2019 until 30 March 2020.

Figure 10: Woluwe Public Park pilot

Figure 11: Solvay Campus pilot

3.3.2 Link to SHOW

As pioneers in the SHOW initiative, Brussels was among the first to contribute their experiences and set the groundwork for others. Their shared insights have already become integral to the guidelines issued. Furthermore, they are preparing a manuscript for publication in the Urban Planning Journal as part of SHOW, documenting lessons learned in collaboration with VTI[1]. Additionally, they shared data with the project Data Management Platform, finally visualised in the project Dashboard.

3.3.3 Main findings

On the first site, the Woluwe Public Park, the two shuttles were operated from 28 June 2019 until 22 September 2019, operations taking place on Friday, Saturday, and Sunday, from 1 pm until 7 pm. In total, the shuttles were operating with the public on board 6 hours a day for 32 days and a total of 5293 passengers transported and 1902 km driven. The maximum operational speed reached in the park was 12km/h, using 2 shuttles EasyMile EZ10 Gen 2. No road accidents at all but many “emergency breaking situations” mostly due to falling leaves from the trees and dust on the ground dust on the ground kicked up by the passage of the shuttle. This dust temporarily blinded the lidars, causing sudden braking. The rainy days were also causing problems, as during heavy rain episodes, the raindrops were detected as “obstacles” appearing and disappearing causing a reduction of speed at first and a total stop in some cases.

Nearly 444 people took part in the face-to-face survey organized by STIB on this site. Key findings include:

- The main reasons for participating in the autonomous shuttle test are "curiosity"/"discovery".
- 93% of respondents gave a positive opinion about the shuttle, including 32% a very positive opinion.

[1] Anund, A., Ludovic, R., Caroleo, B., Hardestam, H., Dahlman, A., Skogsmo, I., ... & Arnone, M. (2022). Lessons learned from setting up a demonstration site with autonomous shuttle operation–based on experience from three cities in Europe. Journal of Urban Mobility, 2, 100021.

- The majority (54%) of those surveyed – spontaneously – do not cite a reason for depreciation/dissatisfaction after they tested the autonomous shuttle. The least appreciated elements in this test are the (slow) speed of the shuttle and the size (spaces on board) of the shuttle. Waiting time and comfort on board (sudden braking, seat comfort, air conditioning, etc.) are other reasons for dissatisfaction cited by some of the testers.
- More than two-thirds of those interviewed face-to-face seem to believe that it is the role of STIB to "test new mobility/technology solutions to improve mobility in Brussels".
- 30% of respondents said they had "concerns about autonomous vehicles." The main concerns concern safety (obstacles, interaction in traffic) and loss of control (failures, computers, human absence).
- The statement "Autonomous shuttles will reduce the need to own a personal car" is the issue with the biggest divide: 34% of respondents seem to (strongly) agree, and 34% disagree (at all).

On the second test site, the Solvay Campus in Brussels, operations with passengers took place from 11 November until 14 February 2020. Operations were taking place from Monday until Friday, from 7:30 AM until 7:00 pm, for a total of 11:30 hours a day for 58 days. The two EasyMile EZ10 Gen 2 shuttles drove 1200 km on an “on demand” mode of operations, with 1143 passengers on board, at a maximum operational speed of 14km/h. It was a mixed traffic area, the shuttles having to deal also with cars and trucks in addition to bikes and pedestrians. Hard-breaking events were a problem here to maintain a good average speed. The shuttles encountered no road accidents, but 280 events of hard breaking, this number went down after the last software update made by EasyMile. On this site, close to the Brussels Canal, the morning fog sometimes prevented the shuttles from running for hours. This is because fog is perceived by lidars as a circular wall located a short distance away. It is therefore impossible to get the vehicles moving, even with 100 meters of visibility allowing a regular vehicle to drive normally.

The third chosen test site was the Brugmann Hospital in Brussels. It was chosen for being a large site, with mixed traffic between buildings, with a potential need for last-mile solutions for many patients. Operations were planned to start on March the 30th 2020. Unfortunately, the Covid-19 pandemic caused the closure of the hospital site. As a result, the operations could not take place there. In the absence of clarity on the possible end of the lockdown and given the one-year rental period planned for the 2 shuttles, we terminated the contract. There were no passenger journeys on this site.

3.3.4 Lessons learned

- Still too many “emergency breaks” occurring with the vehicles to use in regular services due to the major impact on commercial speed and the need for manual intervention of the safety driver to restart the shuttles.
- Announced capacity of 10 to 20 passengers was limited to 6 seated passengers with safety belts, for security reasons due to the jerk when emergency breaks occur.
- Commercial speed is too low, around 5 km/h, meaning passengers would be travelling at the same average speed as walking.
- The awaited availability rate of our current busses, tramways, and metros is expected to reach 95% while the shuttles could not reach this rate.
- We were expecting capabilities of automatically bypassing non-moving obstacles but for the test period, the shuttles were just keeping on their virtual tracks, only allowing manual driving to turn around unexpected obstacles.

- We were expecting automatic on-demand dynamic re-routing of the shuttles. Finally, it was only possible to do manual rerouting by the safety driver on board.

3.3.5 Beyond the project

STIB has shifted its focus to closely monitoring technological advancements aimed at achieving "no-op" operations, enhancing business cases, and exploring new testing prospects within the city of Brussels.

4 Replication from SHOW to Follower Sites

4.1 City Profiles

The city profiles were a very valuable tool in addition to the matchmaking exercise as it helped to assess the level of CCAM readiness in each follower site. The city profiles of the ten follower sites can be found in the **ANNEX III**.

4.2 Replication Roadmaps

The follower sites that have expressed interest in defining their replication roadmap were provided with a template towards the end of the project (the template can be found in **ANNEX II**). The replication roadmaps were not mandatory for each of the follower sites as many did not have the organisational capacity or expertise to draft these and others joined SHOW to explore the topic and the potential it has.

4.2.1 Thessaloniki

Replication outcome

Decision	Explanation
Launch the deployment	CERTH has already planned a series of replication activities in the CCAM domain in a vast number of European projects (currently under evaluation). The retrofitted vehicle of CERTH/HIT is the first L4 automated vehicle in Greece with a permit to operate in real traffic conditions. This turns it into an important legacy of CERTH/HIT and an inherent part of its future research and development activities. Real traffic field trials have been planned in Thessaloniki and beyond, Thess INTEC (https://www.thessintec.eu/) infrastructure that will be soon operational will allow for further, extended and open research, development, and validation activities in a fully equipped test bed. The L4 open retrofitted vehicle demonstrator along with the Thess INTEC test bed, aims to constitute, one of the key CERTH/HIT offerings in all relevant CCAM activities to follow.
Upgrade/enrichment/improvement of current deployment	There is an endless list of upgrades, enrichments, and improvements of current deployment in SHOW (anticipating also Trikala apart from Thessaloniki) that could and should be put in place. Exploiting the key advantage of the openness of the demonstrator s/w and the know-how of the HIT research and development team to optimise on all ends (s/w & h/w related) the demonstrator, HIT has already planned to work on AI-based solutions on the perception and decision-making end, whereas the additional cameras that are currently deployed for the control centre operation will be used in near future for an optimised perception of the vehicle. Through participation in initiatives dealing with remote

operations, the control centre functionalities will be extended to the limit allowed by the regulation. Also, HIT, exploiting its vast know-how in V2X and C-ITS, aims to continue offering complete solutions for real traffic, anticipating safe interaction with VRUs but also traffic lights and other infrastructure elements. Finally, as mentioned above, the Thess INTEC test bed will allow CERTH providing a full testing validation platform for novel solutions in CCAM.

Transferability

Element name	Transfer to local site description	Transferability potential (1 to 4)
Services to replicate	Pretty much all elements are replicable in Thessaloniki. One of the key reasons for that is that the Greek regulation – which was specifically adjusted to host the SHOW Trikala operation in the first place – is one of the most advanced and futuristic regulations in Europe, that allows for possible levels of automation (till teleoperated fully driverless operation). In addition, the openness of the CERTH retrofitted vehicle demonstrator allows a vast spectrum of further development on the vehicle's sense, plan, and act elements which makes it also able to assume almost any derived service on this end.	4
Business synergies (OEMs – Vehicles)	This transferability potential gets a low ranking in the Thessaloniki case. Thessaloniki (and Greece) lacks OEMs on automation, thus business synergies are rather cumbersome if they have to rely on and exploit local ecosystems. Still, considering the European market as one, and assuming the key industrial stakeholders (OEMs, Tier 1 suppliers) would derive from non-Greek territory, shared automation is considered quite challenging but not impossible to adopt paradigm in Greece. This is due to the small but intense field research and innovation activity, which has for a lot of years now prepared also the general public on what is coming (Trikala and Thessaloniki are some of the most renowned Cities in Europe in demonstrating novel concepts, in automation and beyond), the enabling regulation that has been mentioned above, and the interest of the Cities and transport authorities to innovate and reach the environmental goals.	1
Best practices – Learnings – Advice on Technical / Legal / Operational Level	CERTH being the lead (and only) SHOW beneficiary in Thessaloniki gives the advantage of transferring all the know-how gained in SHOW and the best practices recognised in all layers, in future operations. The recent procedure for the Trikala permit (for the same fleet) on behalf of CERTH is undoubtedly know-how for future permits for real traffic operations in Thessaloniki (and peripheral Cities). Technical competence gained, as	3

	explained above, is fully replicable and extendable, etc.	

Action plan

Measure 1: Services to replicate

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
Improved vehicle perception & decision making	Until the end of 2025	CERTH/HIT in collaboration with VIF	Via “4”
Improved cybersecurity	Until the end of 2025	CERTH/HIT	Via “4”
New V2X services	Until the end of 2025	CERTH/HIT & CERTH/ITI	Via “4”
Scenario-based validation activities	Until the end of 2027	CERTH/HIT & CERTH/ITI	Improved AV performance on all validated ends
New DRT and TMS services to be deployed	Until the end of 2027	CERTH/HIT	Field tests in real traffic

Measure 2: Best practices – Learnings – Advice on Technical / Legal / Operational Level

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
Field trials in Thessaloniki	Until the end of 2027	CERTH/HIT	Acceptance and vehicle performance indices
Improvement of current l4 vehicle demonstrator (see above table)	Until the end of 2027	CERTH/HIT in collaboration with VIF	See above table
The build-up of one more l4 vehicle demonstrator	Until the end of 2027	CERTH/HIT	N/A

Feedback

Input	Description
What are the broader lessons learned from these exchanges?	SHOW has enabled the operation in Thessaloniki in all layers, as described above. Thessaloniki, being one of the last sites in the row to deploy, was in a position to assume and deploy, even for a short period, all knowledge gained before that, on technical, operational, and service ends.
What was given back to SHOW?	Thessaloniki has collected data, vehicle performance and subjective both, following the paradigm of the SHOW mega and satellite pilot sites and has contributed in this way to the consolidated learnings base of SHOW. Has also served as the test ground for the VRU and platooning use cases of Trikala site (as it was considered safety critical to perform them in open traffic – see more in D12.7).

4.2.2 Geneva

Replication outcome

Decision	Explanation
Launch the deployment	Within the AVENUE project, we deployed and operated AVs for public transportation. Using the same vehicles, within the SHOW project, we developed and tested logistics services for the Belle-Idee hospital. Following a lengthy authorisation process, a 2 months validation was performed in fall 2023. We imported the results in the ULTIMO project and will deploy a full-scale time-shared logistics service in an industrial area (ZIMEYSA) in Geneva in late 2025.
Upgrade/enrichment/improvement of current deployment	The experimental deployment of Belle-Idee and the use cases from SHOW, allowed us to better define the full-scale deployment for the ULTIMO project in 2025

Transferability

Element name	Transfer to local site description	Transferability potential (1 to 4)
Services to replicate	Logistics as a Service (LaaS) in an urban environment	4
Business synergies (OEMs – Vehicles)	LaaS-oriented fleet management with ZV-CV, Urban Logistics provider OVO, public transportation provider TPG	4
Best practices – Learnings – Advice on Technical / Legal / Operational Level	With the Belle-Idee test deployment, we identified needs for fleet orchestration and the need for a regulatory framework (liability in logistics transport, SLA requirements (between LaaS and MaaS providers in the transfer of control of the vehicles), personnel needs for LaaS (delivery and pick up).	4

Action plan

Measure 1: Time-Sharing AVs between public transport and LaaS

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
Organise and deploy Urban LaaS using the excess vehicle capacity of public transport vehicles	first tests in mid-2025, full deployment in 2026 with 15 vehicles	TPG in Geneva	Within the ULTIMO project, a clear timeline has been set up

Feedback

Input	Description
What are the broader lessons learned from these exchanges?	Definition of the possible use uses for LaaS; regulatory constraints to consider
What was given back to SHOW?	Feedback on the issues regarding time-shared use of AVs in MaaS and LaaS; Promotion of the SHOW project (social media and conferences)

4.2.3 Brussels

Replication outcome

Decision	Explanation
Launch the deployment	When STIB in Brussels started with deployment, back in 2018-2019, we were the first movers in SHOW. However, contacting partners and potential partners helped us to identify some contacts of other public transport companies that already tested CCAM.
Upgrade/enrichment/improvement of current deployment	Those contacts made it easier for us to write our tender and to evaluate the answer we received. Subsequently, it helped us also to assess and compare the quality of the relationship we could establish with the chosen partner furnishing the shuttles.
Other	STIB decided to not focus on other thematic now due to high pressures to make its fleet carbon neutral. However, STIB continues to monitor the technological advancements related to CCAM in urban areas and therefore benefits of the SHOW experience.

Transferability

Element name	Transfer to local site description	Transferability potential (1 to 4)
Services to replicate	Last mile transport, focused in priority on clients with reduced mobility capabilities	3

Action plan

Measure 1: Last mile transport, focused in priority on clients with reduced mobility capabilities

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
We keep assessing possibilities in the city of Brussels	Since 2020, we have been assessing every year the	STIB - Department General Management – Division Strategy and Business Transformation	/

where such a last-mile coverage could be pertinent economically (hospital sites, industrial sites…).	possibilities and will keep doing it for the coming years.		

Feedback

Input	Description
What are the broader lessons learned from these exchanges?	We realised that the business cases are making the last mile transport of clients still have a high cost per passenger due to the cost of the technology and the cost of the remaining human actions needed (safety drivers, dispatching, engineering). That cost is now easier to assess and can be compared with the benefits expected from the offered service.
What was given back to SHOW?	STIB provided feedback to SHOW with the recommendations we gained for our experimentations on CCAM and shared data with SHOW (presented in Dashboard).

4.2.4 Helmond

Replication outcome

Decision	Explanation
Launch the deployment	The deployment of an Automated Public Transport Service in Helmond will start in 1st semester of 2025.
Upgrade/enrichment/improvement of current deployment	At the end of 2023, Helmond adopted a roadmap to develop automated public (last-mile) transport services in Helmond. It consists of a gradual approach. The first step is to implement an automated PT service in the industrial area of Bedrijventerrein Zuid Oost Brabant (a relatively easy ODD) The operation is planned to start in 2025. Helmond's roadmap identified further steps (to be implemented at a later stage) consisting of two other routes namely the Brainport Smart District/Automotive Campus and the City Centre. The learnings from SHOW will feed into the deployment of these services. The exchanges held with the operators and the cities of the pilots in Gothenburg and Tampere (notably on the supervision/operational aspects)
Other	/

Transferability

Element name	Transfer to local site description	Transferability potential (1 to 4)
CCAM in SUMP	SHOW's recommendation for including CCAM in the city's SUMP will be considered in the implementation of the new Mobility Vision. The City of Helmond already considers CCAM to achieve climate neutrality but needs to pick up certain elements defined in D17.4 to be able to implement a long-term automated public transport service (i.e., centralising data from different departments, adjusting existing and building new infrastructure, etc.).	3
Business models	The methodology developed in SHOW to evaluate several aspects of the business viability (economic, development of an ecosystem but also social) could serve as a basis and be adapted in the automated public transport projects deployed shortly by Helmond.	2
Stakeholder engagement	There have been some of the lessons learned by Helmond from the webinar on stakeholder engagement and following the Q&A session. For example, the hackathon and Multi-Actor Multi-Criteria Analysis (MAMCA) workshops organised within SHOW are interesting stakeholders' engagement activities that could be considered for implementation in Helmond. The field tests with specific targets like students, the elderly or disabled persons carried out in Carinthia could be transferred to Helmond.	3

Action plan

Measure 1: CCAM in SUMP

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
Integration of CCAM solutions for passengers and goods in the SUMP.	2025-2028	City of Helmond	Action plan related to the implementation of CCAM (last-mile) solutions in Helmond's SUMP.

Measure 2: Business models

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
Integrate KPIs developed in SHOW for the automated shuttle service	2026	The City of Helmond (together with an automated shuttle supplier)	KPIs in the assessment of the shuttle service implemented in

implemented in the BZOB industrial area			BZOB

Measure 3: Stakeholder engagement

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
Include Stakeholders' engagement activities in the future CCAM pilot at the BZOB industrial area	From 1st Semester 2025 to 2027	City of Helmond	Number of stakeholders involved in activities and surveys collected.

Feedback

Input	Description
What are the broader lessons learned from these exchanges?	The exchanges organised with Gothenburg helped identify potential issues (and solutions) when implementing an automated shuttle service in an urban environment, notably on what regards concrete operational aspects.
What was given back to SHOW?	Helmond participated in the WP17 workshops to provide recommendations to the PST and feedback during the CCAM in SUMP assessment workshops. TNO and the City of Helmond organized in January 2024 an event on Automated Mobility (Brainport Demo Site Event). The participants in the SHOW demo could have access to the demonstrations organised by the City of Helmond within the MOVE2CCAM project.

4.2.5 Kadiköy

Replication outcome

Decision	Explanation
Launch the deployment	/
Upgrade/enrichment/improvement of current deployment	/
Other	Adjust the existing and develop new infrastructure necessary for new mobility solutions for passengers and logistics.

Transferability

Element name	Transfer to local site description	Transferability potential (1 to 4)
CCAM in SUMP	Kadiköy joined SHOW as a follower site to learn about the SECAP and SUMP goals and how to implement them. The recommendations from WP17 on CCAM in SUMP will be transferred to the municipality, with special attention given to adjusting and developing the infrastructure needed for the deployment of CCAM services.	3
Business models	Re-use of the key performance indicators (KPIs) in selected business models. Next to this, Kadiköy will determine which services in SHOW apply to the different scenarios in the city. Initially, they joined SHOW to understand specific use cases to deal with specific use cases (mainly to learn about the deployment of shuttle services in an urban area).	2

Action plan

Measure 1: CCAM in SUMP

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
Integration of CCAM solutions for passengers in SUMP	2030	Kadiköy Municipality	Action plan

Measure 2: Business models

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
Integrating KPIs developed in SHOW for future CCAM pilots in Kadiköy	2030	Municipality of Kadiköy (together with technical partners)	KPIs in the assessment of the CCAM service to implement.

Feedback

Input	Description
What are the broader lessons learned from these exchanges?	Kadiköy recognised the value of Madrid's experiences, particularly the lessons learned from retrofitting older vehicles and the operational challenges of autonomous systems. The discussion highlighted the importance of careful planning, the need for collaboration with technology partners, and the potential cost savings through automation. The meeting with Madrid set the stage for future collaboration and knowledge sharing among the participants, each of whom is engaged in similar projects in their respective cities.

What was given back to SHOW?	Kadiköy participated in the WP17 workshops to provide feedback during the CCAM in SUMP assessment workshops.

4.2.6 Sarajevo

Replication outcome

Decision	Explanation
Launch the deployment	/
Upgrade/enrichment/improvement of current deployment	/
Other	Preparing the city's transport infrastructure for cleaner and smarter operations. Sarajevo is at a very early stage of CCAM deployment where the city authority recognises that CCAM solutions and multimodal transport system infrastructures can reduce road incidents but is still in an exploratory phase to understand the topic and which use cases are relevant to be able to implement their SUMP.

Transferability

Element name	Transfer to local site description	Transferability potential (1 to 4)
CCAM in SUMP	The involvement of Sarajevo in the SUMP discussions of WP17 enabled them to get more familiar with CCAM and understand which aspects could be re-used to address their mobility plans – especially linked to preparing the infrastructure for disruptive technologies.	3
Business models	Sarajevo was able to learn from Madrid about several use cases that they expressed being curious to hear more about (i.e., local bus services and depot management).	2

Action plan

Measure 1: CCAM in SUMP

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
New SUMP measure: Integration of CCAM in new ITS model	2026-2030	Traffic regulation and ITS department	Measuring the degree of networking, automation and coordination of vehicles

Measure 2: Business models

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
Introduction of basic information about CNet business model.	2026-2030	Traffic regulation and ITS department	Number of informed companies and companies that implemented innovation.

Feedback

Input	Description
What are the broader lessons learned from these exchanges?	Sarajevo recognised the value of Madrid's experiences, particularly the lessons learned from retrofitting older vehicles and the operational challenges of autonomous systems. The discussion highlighted the importance of careful planning, the need for collaboration with technology partners, and the potential cost savings through automation. The meeting with Madrid set the stage for future collaboration and knowledge sharing among the participants, each of whom is engaged in similar projects in their respective cities.
What was given back to SHOW?	Sarajevo participated in the WP17 workshops to provide feedback during the CCAM in SUMP assessment workshops.

4.2.7 Venice

Replication outcome

Decision	Explanation
Launch the deployment	SHOW proved that CCAM could be a solution to integrate and complement public transport services in the peripheral part of the city which lacks homogeneous connexions to the city centre. Venice is exploring deploying automated public transport and on-demand solutions around in areas with weak demand and predefined routes. During the application phase, one hypothesis was the application in the construction area of the new stadium, but no further developments have been made so far. Inter-modal hubs could be used in future CCAM projects
Upgrade/enrichment/improvement of current deployment	/
Other	/

Transferability

Element name	Transfer to local site description (max 10 lines)	Transferability potential (1 to 4)
Business models	One of the main findings for deploying automated	3

Element name	Transfer to local site description (max 10 lines)	Transferability potential (1 to 4)
	shuttles was that the city would need to pay a lot to integrate the C-ITS elements. Hence, it is important to match the C-ITS infrastructure in line with what the SUMP of the local authority wants to achieve to avoid extra costs from those already foreseen. On the shuttle side, Carinthia informed Venice's representative that you can find shuttles half the price of the new ones and this can be a solution when still testing CCAM solutions locally.	
Use cases	On-demand CCAM integrated with PT. It would be important to further explore automated passenger mobility in cities under complex traffic and real scenarios.	3
Stakeholder engagement	During the discussions with SURAAA, Carinthia's pilot site leader, the representative from the City of Venice understood that the acceptance rate is higher for shared CCAM services when people can experience it, and this is why field test works well.	4

Action plan

Measure 1: Business models

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
Monitor the market of shared AVs available for deployment in Italy	5 years	Public Transport/Public Works and Infrastructures	N/A

Measure 2: Use Cases

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
Align C-ITS infrastructure with SUMP (At least at analysis level/challenges)	5 years	Public Works and Infrastructures	Integration of CCAM in the next update of SUMP or other strategic documents.

Measure 3: Stakeholder engagement

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
Explore awareness, potentiality, and level of acceptance of citizens	5 years	Public Transport/Public Works and Infrastructures/EU Policies	Number of EU/national projects and research in cooperation with universities (quali-

(different targets)			quantitative analysis)

Feedback

Input	Description
What are the broader lessons learned from these exchanges?	Importance of stakeholder engagement; learn from other cities' experiences regarding challenges, technology and regulatory-related issues.
What was given back to SHOW?	Venice participated in the WP17 workshops to provide recommendations to the PST and feedback on the SUMP assessment workshop.

5 Conclusion

The SHOW project has effectively demonstrated the potential for sustainable urban transport through the deployment of shared, connected, cooperative, and electrified fleets of automated vehicles. Key findings from the project include the diverse engagement of follower sites, mechanisms for knowledge transfer, and the focus on replication and scalability. **Eleven follower cities actively participated**, contributing valuable data and insights without performing additional demonstrations, thus enriching the project's data pool and enhancing knowledge transfer. The project successfully developed mechanisms such as MoUs, NDAs, and various training sessions to facilitate the exchange of knowledge between SHOW pilot sites and follower cities. Specific follower cities expressed interest in developing roadmaps for CCAM deployment, highlighting the project's focus on scalability and replication of successful models across different urban contexts. Additionally, the iterative approach of the SHOW project allowed for continuous feedback and learning, ensuring that emerging sites could benefit from and contribute to the project's progress. A series of webinars, workshops, and e-courses provided targeted training to enhance the capacity of follower sites to implement and manage shared CCAM solutions.

The SHOW project has significant implications for the future deployment of CCAM solutions. By engaging a diverse range of cities, including those at different stages of CCAM deployment readiness, the project has prepared a broader base of urban areas for future implementations. The successful engagement and contribution of follower sites serve as a proof of concept for the replication strategies proposed by SHOW, validating the project's approach to scaling up CCAM solutions across Europe. The sharing of WP2 content on business and operating models has demonstrated the scalability and transferability of these models, encouraging cities to adopt sustainable and economically viable CCAM solutions. The project emphasized the importance of stakeholder engagement, both through direct interactions at site visits and virtual exchanges, fostering a collaborative approach to urban mobility challenges. Throughout the project, cities at different stages of readiness, such as Thessaloniki, Geneva, Brussels, Helmond, Kadiköy, Sarajevo, and Venice, made significant progress. Thessaloniki worked on applying retrofitted automated vehicle into future research and business cases for the City and beyond, providing key insights into vehicle operations and safety protocols. Geneva transitioned from passenger services to logistics services, testing innovative applications for automated transport in urban logistics. Brussels gained and in turn shared valuable lessons from its shuttle operations, identifying infrastructure and safety challenges that need to be addressed in future deployments.

Helmond developed a roadmap for scaling up its automated public transport services, drawing from the experiences of other cities in SHOW, while Kadiköy explored specific use cases to replicate automated shuttle services. Sarajevo focused on integrating CCAM into its SUMP, preparing its infrastructure for future deployment. Venice, meanwhile, examined how automated solutions could complement public transport in areas with weaker connections to the city center.

This collective learning process across different urban environments has not only enriched the SHOW project but has also enabled cities to develop tailored strategies for faster, more efficient CCAM deployment. Each city’s experience has contributed to a broader understanding of the challenges and solutions associated with implementing sustainable automated mobility in diverse European contexts.

Annex I: Matchmaking exercise

Table 3: Mapping of follower sites use cases before matchmaking

Follower sites	UCs interested in	Mega and Satellite Sites
Barcelona	UC1.1: Automated passengers/cargo mobility in Cities under normal traffic & environmental conditions	Crest Val de Drôme, Linköping, Gothenburg, Madrid, Carinthia, Karlsruhe, Monheim, Frankfurt Turin, Trikala, Tampere, Brno, Brainport Brussels, Thessaloniki
	UC1.2: Automated passengers/cargo mobility in Cities under complex traffic & environmental conditions	Crest Val de Drôme, Gothenburg, Madrid, Graz, Salzburg, Carinthia, Karlsruhe, Monheim Turin, Trikala, Tampere, Brno, Brainport Brussels, Thessaloniki
	UC1.3: Interfacing non automated vehicles and travellers (including VRUs)	Les Mureaux, Crest Val de Drôme, Linköping, Gothenburg, Madrid, Graz, Salzburg, Monheim Turin, Trikala, Brno, Brainport
	UC1.5: Actual integration to city TMC	Les Mureaux, Salzburg, Monheim Turin, Trikala, Thessaloniki
	UC1.6: Mixed traffic flows; AVs and non-AVs mixed in the same traffic flows	Les Mureaux, Linköping, Gothenburg, Madrid, Salzburg, Carinthia, Karlsruhe, Monheim, Frankfurt Turin, Trikala, Brno, Brainport
	UC1.7: Connection to Operation Centre for tele-operation and remote supervisio	Les Mureaux, Linköping, Gothenburg, Madrid, Karlsruhe Turin, Trikala, Tampere, Brno
	UC1.10: Seamless autonomous transport chains of Automated PT, DRT, MaaS, LaaS	Crest Val de Drôme, Madrid, Frankfurt Turin, Trikala
	UC3.1: Self-learning Demand Response Passengers/Cargo mobility	Linköping, Salzburg, Frankfurt Tampere Thessaloniki
	UC3.2: Big data/AI based added value services for Passengers/ Cargo mobility	Crest Val de Drôme, Linköping, Monheim, Frankfurt Thessaloniki
	UC3.3: Automated parking applications; namely AVs self-parking functions	Madrid
	UC3.4: Automated services at bus stops	Les Mureaux, Gothenburg, Graz, Monheim, Frankfurt

Follower sites	UCs interested in	Mega and Satellite Sites
		Brussels
	UC3.5: Depot management of automated buses	Madrid, Monheim Brussels
Helmond	UC1.1: Automated passengers/cargo mobility in Cities under normal traffic & environmental conditions	Crest Val de Drôme, Linköping, Gothenburg, Madrid, Carinthia, Karlsruhe, Monheim, Frankfurt Turin, Trikala, Tampere, Brno, Brainport Brussels, Thessaloniki
	UC1.2: Automated passengers/cargo mobility in Cities under complex traffic & environmental conditions	Crest Val de Drôme, Gothenburg, Madrid, Graz, Salzburg, Carinthia, Karlsruhe, Monheim Turin, Trikala, Tampere, Brno, Brainport Brussels, Thessaloniki
	UC1.3: Interfacing non automated vehicles and travellers (including VRUs)	Les Mureaux, Crest Val de Drôme, Linköping, Gothenburg, Madrid, Graz, Salzburg, Monheim Turin, Trikala, Brno, Brainport
	UC1.4: Energy sustainable automated passengers/cargo mobility in Cities	Les Mureaux, Crest Val de Drôme, Monheim, Frankfurt Tampere Brussels, Thessaloniki
	UC1.5: Actual integration to city TMC	Les Mureaux, Salzburg, Monheim Turin, Trikala, Thessaloniki
	UC1.6: Mixed traffic flows; AVs and non AVs mixed in the same traffic flows	Les Mureaux, Linköping, Gothenburg, Madrid, Salzburg, Carinthia, Karlsruhe, Monheim, Frankfurt Turin, Trikala, Brno, Brainport
	UC1.7: Connection to Operation Centre for tele-operation and remote supervision	Les Mureaux, Linköping, Gothenburg, Madrid, Karlsruhe Turin, Trikala, Tampere, Brno
	UC2.2: Automated mixed temporal mobility	Crest Val de Drôme, Karlsruhe Geneva
	UC3.1: Self-learning Demand Response Passengers/Cargo mobility	Linköping, Salzburg, Frankfurt Tampere Thessaloniki
Kadikoy	UC1.1: Automated passengers/cargo mobility in Cities under normal traffic & environmental conditions	Crest Val de Drôme, Linköping, Gothenburg, Madrid, Carinthia, Karlsruhe, Monheim, Frankfurt, Turin, Trikala, Tampere, Brno, Brainport Brussels, Thessaloniki

Follower sites	UCs interested in	Mega and Satellite Sites
	UC1.2: Automated passengers/cargo mobility in Cities under complex traffic & environmental conditions	Crest Val de Drôme, Gothenburg, Madrid, Graz, Salzburg, Carinthia, Karlsruhe, Monheim Turin, Trikala, Tampere, Brno, Brainport Brussels, Thessaloniki
	UC1.3: Interfacing non automated vehicles and travellers (including VRUs)	Les Mureaux, Crest Val de Drôme, Linköping, Gothenburg, Madrid, Graz, Salzburg, Monheim Turin, Trikala, Brno, Brainport
	UC1.4: Energy sustainable automated passengers/cargo mobility in Cities	Les Mureaux, Crest Val de Drôme, Monheim, Frankfurt Tampere Brussels, Thessaloniki
	UC1.6: Mixed traffic flows; AVs and non AVs mixed in the same traffic flows	Les Mureaux, Linköping, Gothenburg, Madrid, Salzburg, Carinthia, Karlsruhe, Monheim, Frankfurt Turin, Trikala, Brno, Brainport
	UC1.9: Cargo platooning for efficiency	Karlsruhe
	UC1.10: Seamless autonomous transport chains of Automated PT, DRT, MaaS, LaaS	Crest Val de Drôme, Madrid, Frankfurt Turin, Trikala
	UC2.1: Automated mixed spatial mobility	Crest Val de Drôme, Carinthia, Karlsruhe Brussels
	UC2.2: Automated mixed temporal mobility	Crest Val de Drôme, Karlsruhe Geneva
	UC3.1: Self-learning Demand Response Passengers/Cargo mobility	Linköping, Salzburg, Frankfurt Tampere Thessaloniki
	UC3.2: Big data/AI based added value services for Passengers/ Cargo mobility	Crest Val de Drôme, Linköping, Monheim, Frankfurt Thessaloniki
	UC3.3: Automated parking applications; namely AVs self-parking functions	Madrid
Sarajevo	UC1.2: Automated passengers/cargo mobility in Cities under complex traffic & environmental conditions	Crest Val de Drôme, Gothenburg, Madrid, Graz, Salzburg, Carinthia, Karlsruhe, Monheim Turin, Trikala, Tampere, Brno, Brainport Brussels, Thessaloniki
	UC1.3: Interfacing non automated vehicles and travellers (including VRUs)	Les Mureaux, Crest Val de Drôme, Linköping, Gothenburg, Madrid, Graz, Salzburg, Monheim Turin, Trikala, Brno, Brainport

Follower sites	UCs interested in	Mega and Satellite Sites
	UC1.4: Energy sustainable automated passengers/cargo mobility in Cities	Les Mureaux, Crest Val de Drôme, Monheim, Frankfurt Tampere Brussels, Thessaloniki
	UC1.5: Actual integration to city TMC	Les Mureaux, Salzburg, Monheim Turin, Trikala, Thessaloniki
	UC1.7: Connection to Operation Centre for tele-operation and remote supervision	Les Mureaux, Linköping, Gothenburg, Madrid, Karlsruhe Turin, Trikala, Tampere, Brno
	UC1.9: Cargo platooning for efficiency	Karlsruhe
	UC2.1: Automated mixed spatial mobility	Crest Val de Drôme, Carinthia, Karlsruhe Brussels
	UC3.3: Automated parking applications; namely AVs self-parking functions	Madrid
	UC3.4: Automated services at bus stops	Les Mureaux, Gothenburg, Graz, Monheim, Frankfurt Brussels
	UC3.5: Depot management of automated buses	Madrid, Monheim Brussels
	UC3.6: COVID-SAFE Transport	Carinthia, Monheim, Frankfurt
Varna	UC1.1: Automated passengers/cargo mobility in Cities under normal traffic & environmental conditions	Crest Val de Drôme, Linköping, Gothenburg, Madrid, Carinthia, Karlsruhe, Monheim, Frankfurt Turin, Trikala, Tampere, Brno, Brainport Brussels, Thessaloniki
	UC1.3: Interfacing non automated vehicles and travellers (including VRUs)	Les Mureaux, Crest Val de Drôme, Linköping, Gothenburg, Madrid, Graz, Salzburg, Monheim Turin, Trikala, Brno, Brainport
	UC1.4: Energy sustainable automated passengers/cargo mobility in Cities	Les Mureaux, Crest Val de Drôme, Monheim, Frankfurt Tampere Brussels, Thessaloniki
	UC1.6: Mixed traffic flows; AVs and non AVs mixed in the same traffic flows	Les Mureaux, Linköping, Gothenburg, Madrid, Salzburg, Carinthia, Karlsruhe, Monheim, Frankfurt Turin, Trikala, Brno, Brainport
	UC1.10: Seamless autonomous transport chains of Automated PT, DRT, MaaS, LaaS	Crest Val de Drôme, Madrid, Frankfurt Turin, Trikala

Follower sites	UCs interested in	Mega and Satellite Sites
	UC3.3: Automated parking applications; namely AVs self-parking functions	Madrid
	UC3.4: Automated services at bus stops	Les Mureaux, Gothenburg, Graz, Monheim, Frankfurt Brussels
	UC3.5: Depot management of automated buses	Madrid, Monheim Brussels
	UC3.6: COVID-SAFE Transport	Carinthia, Monheim, Frankfurt
Venice	UC1.1: Automated passengers/cargo mobility in Cities under normal traffic & environmental conditions	Crest Val de Drôme, Linköping, Gothenburg, Madrid, Carinthia, Karlsruhe, Monheim, Frankfurt Turin, Trikala, Tampere, Brno, Brainport Brussels, Thessaloniki
	UC1.2: Automated passengers/cargo mobility in Cities under complex traffic & environmental conditions	Crest Val de Drôme, Gothenburg, Madrid, Graz, Salzburg, Carinthia, Karlsruhe, Monheim Turin, Trikala, Tampere, Brno, Brainport Brussels, Thessaloniki
	UC1.3: Interfacing non automated vehicles and travellers (including VRUs)	Les Mureaux, Crest Val de Drôme, Linköping, Gothenburg, Madrid, Graz, Salzburg, Monheim Turin, Trikala, Brno, Brainport
	UC1.4: Energy sustainable automated passengers/cargo mobility in Cities	Les Mureaux, Crest Val de Drôme, Monheim, Frankfurt Tampere Brussels, Thessaloniki
	UC1.5: Actual integration to city TMC	Les Mureaux, Salzburg, Monheim Turin, Trikala, Thessaloniki
	UC1.6: Mixed traffic flows; AVs and non AVs mixed in the same traffic flows	Les Mureaux, Linköping, Gothenburg, Madrid, Salzburg, Carinthia, Karlsruhe, Monheim, Frankfurt Turin, Trikala, Brno, Brainport
	UC1.7: Connection to Operation Centre for tele-operation and remote supervision	Les Mureaux, Linköping, Gothenburg, Madrid, Karlsruhe Turin, Trikala, Tampere, Brno
	UC3.2: Big data/AI based added value services for Passengers/ Cargo mobility	Crest Val de Drôme, Linköping, Monheim, Frankfurt Thessaloniki
	UC3.3: Automated parking applications; namely AVs self-parking functions	Madrid
	UC3.4: Automated services at bus stops	Les Mureaux, Gothenburg, Graz, Monheim, Frankfurt

Follower sites	UCs interested in	Mega and Satellite Sites
		Brussels
	UC3.5: Depot management of automated buses	Madrid, Monheim Brussels
	UC3.6: COVID-SAFE Transport	Carinthia, Monheim, Frankfurt
StreetDrone	UC1.1: Automated passengers/cargo mobility in Cities under normal traffic & environmental conditions	Crest Val de Drôme, Linköping, Gothenburg, Madrid, Carinthia, Karlsruhe, Monheim, Frankfurt Turin, Trikala, Tampere, Brno, Brainport Brussels, Thessaloniki
	UC1.4: Energy sustainable automated passengers/cargo mobility in Cities	Les Mureaux, Crest Val de Drôme, Monheim, Frankfurt Tampere Brussels, Thessaloniki
	UC1.10: Seamless autonomous transport chains of Automated PT, DRT, MaaS, LaaS	Crest Val de Drôme, Madrid, Frankfurt Turin, Trikala
	UC3.1: Self-learning Demand Response Passengers/Cargo mobility	Linköping, Salzburg, Frankfurt Tampere Thessaloniki
	UC3.2: Big data/AI-based added value services for Passengers/ Cargo mobility	Crest Val de Drôme, Linköping, Monheim, Frankfurt Thessaloniki
	UC3.3: Automated parking applications; namely AVs self-parking functions	Madrid
	UC3.5: Depot management of automated buses	Madrid, Monheim Brussels
	UC3.6: COVID-SAFE Transport	Carinthia, Monheim, Frankfurt

Figure 12: Matchmaking exercise on Miro with follower sites

Annex II: Replication plan template for follower sites

Replication Plan

Name of the Follower City, Name of Participant

Replication outcome

Please **select** and explain what were the outcomes of the exchanges held with the partners in SHOW.

Decision	Explanation (max 10 lines)
Launch the deployment	Please try to be as specific on what, when, for how long and with whom.
Upgrade/enrichment/improvement of current deployment	Please try to explain in which sense and why.
Other	

Transferability

Please **list** which elements in SHOW (in any layer) can be replicable or not in your city and why. What challenges are perceived? What are the specific adaptations/ adjustments that SHOW elements have to undergo or already underwent to turn them applicable for your site – how do you endorse them? Please rate the one(s) with the highest potential to be transferred in your local context.

Element name	Transfer to local site description (max 10 lines)	Transferability potential (1 to 4)
Examples: use-case, co-creation, participatory approach, exploitation, etc.		

Action plan

Based on the analysis carried out above, please **indicate** an action plan for the element(s) with the highest transferability potential.

Measure 1: name of the element (please copy-paste this table for each selected measure)

Action	Timeline	Responsible department/organisation	Key indicators to be monitored
Action description	*Timeline description*	*The department or stakeholder in charge of the action*	*How do you intend to monitor progress?*

Feedback

Based on the analysis carried out above, please **indicate** an action plan for the element(s) with the highest transferability potential.

Input	Description (max 10 lines)
What are the broader lessons learned from these exchanges?	Please specify how SHOW helped you in any way.
What was given back to SHOW?	Data? Feedback to pilot sites? Promotion? Other?

Annex III: City Profiles

City Profile of Barcelona

City Profile

Barcelona is a Mediterranean city with a big metropolitan area with 36 municipalities and a population over 5,700,000 people. Public transport is managed in an integrated way with a public operator (TMB) and several private ones. The main operator is TMB (Transports Metropolitans de Barcelona) which operates Metro and Bus services with a fleet of more than 1.100 buses with different technologies (CNG, Electric, Hydrogen, etc.)

TMB bus fleet is moving towards a zero-emissions fleet with an objective of 2030. For this reason, we are involved in several projects to buy electric buses, electrify the infrastructures, buy hydrogen buses and participate in Biomethane investigation projects to decarbonise our fleet.

In the last years, Barcelona has been a demonstrator city in different UITP projects to improve our public transport grid (Zeeus, Assured, JIVE, Eliptic, Elena, etc.) and our next step is to incorporate autonomous buses in the next years.

The combination of Bus and Metro grids allows us the chance to identify interesting opportunities to improve the connection between two grids using autonomous vehicles and/or last-mile routes where no one of them is suitable to arrive. In this sense, TMB and Barcelona include all the possibilities that a big city can, beaches, mountains, cultural routes, tourist, pedestrian zones, etc. and always with maximum visibility and international projection.

Barcelona City Council's objective is to put autonomous vehicles into service to demonstrate the reliability of these technologies and, as the owner of TMB, encourage us to become part of them. For their part, they are willing to adapt the necessary infrastructures (streets, traffic lights, routes, spaces, etc.).

City Status

We are in transversal studies in our company to incorporate autonomous buses in the next two years at least as a test. These studies, hand in hand with the city council, will be finished this year and will consider aspects such as legal frame, development of the technology, impact on the operation, maintenance, connectivity, etc.).

Why SHOW

We need to receive feedback from operators who are using these technologies and see the buses in real operation to assess whether the level of service, performance and user perception is up to TMB's requirements. On the other hand, we are interested in discovering new foundational sources to make this project viable in our city.

Objectives of exchange with SHOW

Objective	Explanation	
Services to replicate (or add,	☒	Evaluating the passenger's comfort perception and bus

Objective	Explanation	
if CCAM deployment is on-going at site) & SHOW Use Cases of interest		behaviour is an important issue for us.
Business synergies (OEMs – Vehicle)	☒	Interaction with road and infrastructure
Best practices – Learnings – Advice on Technical / Legal / Operational Level	☒	displacements route/depot, specific bus maintenance for new equipment.
Other	☐	

City Profile of Helmond

City Profile

Helmond and it's challenges

Helmond is a medium-sized city with around 95.000 inhabitants. It has been testing and developing innovative and sustainable mobility technology and services for many years. It is well connected to the outside world with four train stations. Helmond's four train stations provide good public transport connections to the outside world. However, as in the case of many Small and Medium-sized Cities, efficient last-mile connections from/to these train stations (covering a big part of the city (see **Figure *13***)) are currently lacking. At train stations shared bike services and some regular public bus connections are offered, mainly connecting small towns in the surroundings of Helmond. Helmond's neighbourhoods and economically important locations are therefore difficult to reach by public transport. Commuters, students and visitors currently do not have any good alternative for private car use if they are not able or do not want to walk or cycle the last mile(s) (for comfort/weather/ability reasons).

In addition, Helmond will construct 10.000 extra houses by 2040, which represents an increase of 25% compared to the current situation (there are 42.000 houses in Helmond). Due to this growth (called "Schaalsprong") the need for mobility will dramatically increase and needs to be accommodated in the existing public space. This requires innovative (public) mobility solutions, which seamlessly need to be integrated with current public transport services

Figure 13: Area covered within the one-mile range from the four train stations in Helmond

Helmond's ambition for automated mobility

For many years, the City has aimed at avoiding building new road infrastructures, rather optimizing the use of the existing infrastructure by proactively testing and developing innovative and sustainable mobility technology and services, such as C- ITS (Cooperative Intelligent Transport Systems) and CCAM (Connected, Cooperative and Automated Mobility). To offer innovative flexible and affordable last/first mile connections from and to train stations, the City has identified the use of automated public transport services as an enabler for the last/first mile challenges (in addition to a very active policy promoting cycling), in particular for user groups with special needs (e.g. elderly, people with reduced mobility). These automated public transport services have to be well integrated with the other (public) transport modes like the train.

Helmond aims to offer new mobility last-mile transport services to users by operating on public roads a fleet of remotely supervised automated public transport vehicles from/ to mobility hubs/stations to Helmond's neighbourhoods and (economic) hotspots, like the hospital and the Automotive Campus. These remotely supervised automated last-mile public transport vehicles should provide a high frequency (5-10 minutes) service within an acceptable distance from people's homes and main mobility attractors (e.g. 450m / a 5-minute walk), should take users within 10 minutes to their next stop (e.g. train station or mobility hub) and the price for the service should not exceed the fare of current public transport tickets.

Planning perspective

Currently, Helmond's Mobility Vision (SUMP-like plan) is being updated and automated shared mobility will be included in the new Mobility Vision. Automated mobility was already mentioned in the old Mobility Vision, in the new one a stepwise approach will be included to be able to implement an automated public transport service in Helmond. This stepwise approach has been described in the "Roadmap automated public transport services in Helmond" (2023) and is going to the City Council in June for formal approval. The stepwise approach consists of three public transport routes, starting with an 'easy' route and ending with the most complex route in the City. The goal is to develop the automated public transport service in such a way that an on-board supervisor is not needed anymore.

Helmond also has existing planning documents considering automated mobility:

- Vision of shared mobility
- Brainport Smart District's Quality Book

The "Visie deelmobiliteit" (Vision on shared mobility) describes the transition from car ownership towards shared mobility. Shared automated vehicles are an important ingredient in achieving this transition. The "Visie deelmobiliteit" is publicly available in Dutch.

Brainport Smart District (BSD) has a quality book (Q-Book), which describes the aims, KPIs and specific objectives for mobility (and other topics). The Q-Book is publicly available in Dutch: https://brainportsmartdistrict.nl/wp- content/uploads/2020/06/Q-Book-2020-Brainport-Smart-District.pdf. Regarding mobility, the Q-Book describes that:

- BSD will be a zero-emission district (indicator 1),
- All trips in the district will be on foot, by bike or by shared mobility (indicator 3),
- Smart mobility hubs will be built at strategic locations on the edge of the area and will provide shared mobility, (mini-)bus facilities, goods delivery facilities, etc. (indicator 5)
- An automated (mini-)bus will be available, as soon as safely possible without a steward on board (indicator 6)
- Goods will be delivered by zero-emission vehicles (including cargo bikes and (mini-buses) (indicator 4).

BSD will be a smart and car-free living and working area in which residents play a central role in the development of their living environment. The development of BSD is a co-creation process involving residents, professionals and other stakeholders. The environment has been designed from the start in conjunction with new insights and technology in the areas of transport, health, energy generation and storage, and data. BSD is the perfect location to develop, with the residents and other stakeholders, and implement an automated (mini)bus service that suits the needs of the residents.

City Status

In the "Roadmap" three routes/areas are identified in Helmond for automated public transport services, which differ in complexity. These areas are (from easy route to complex route):

- Industrial area BZOB (Bedrijventerrein Zuid Oost Brabant)
- Brainport Smart District (BSD) & Automotive Campus area
- City centre of Helmond

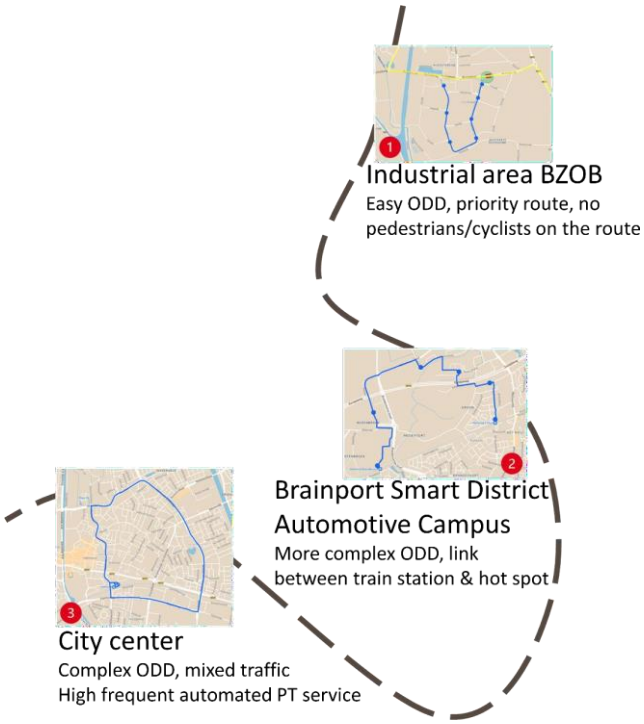


Figure 14: Three routes/areas identified for automated public transport services in Helmond

We are preparing the tender documents for an automated PT service in the BZOB area. We're aiming to publish the tender in the summer of 2023 and to start operations in 2024.

Besides two pilots (one in a private area and one on public roads), this would be the first permanent application in Helmond.

Why SHOW

As we're currently preparing a tender and starting with the operation of CCAM services in 2024, any relevant input/ experience from other CCAM service operations is welcome. In this respect, we're mainly interested in:

- Learning how SHOW cities (plan to) scale up the CCAM services (both in number of vehicles and geographical scope).
- Best practices on homologation/ legal exemption process and procedures for the service
- Learning about impact assessment and KPIs for CCAM services
- Learning about business models, services and technologies (i.e. remote supervision)

Objectives of exchange with SHOW

Objective	Explanation	
Services to replicate (or add, if CCAM deployment is on-going at site) & SHOW Use	☐	

Objective	Explanation	
Cases of interest		
Business synergies (OEMs – Vehicle)	☒	We're interested in learning how SHOW cities and their partners (plan to) scale up the CCAM services (both in number of vehicles and geographical scope).
Best practices – Learnings – Advice on Technical / Legal / Operational Level	☒	As we're currently preparing a tender and start with operation of CCAM services in 2024, any relevant input/ experience from other CCAM service operations are welcome.
Other	☐	

City Profile of Kadikoy

City Profile

Kadiköy,

- is located near the historical peninsula, on the Asian side of Istanbul,
- has a multi-cultural, multi-ethnic, multi-lingual, multi-religious society structure and urban sub-culture
- is considered the new urban activity centre; social, cultural and sports as well as entertainment, recreation and shopping, serving almost 2.5 million people each day.
- has multi-modal public transport systems such as ferry, bus, high-speed railway, subway access
- is considered to be the most walkable district in Istanbul
- has an increasing traffic congestion rate, even during and after the pandemic
- is a district municipality so it is dependent on the metropolitan municipality on large scale solutions

Kadiköy 483,064 Population [2022] – Estimate 25.12 km² Area 19,230/km² Population Density [2022] 1.4% Annual Population Change [2017 → 2022]

Chronology of Sustainable Mobility & Accessibility Efforts in Kadıköy

- 2008 Osmanağa Mahallesi Hasırcıbaşı Cd. and Surrounding Areas Accessibility Project
- 2009 Caferağa Esat Işık Cd. Surrounding Accessibility Applications
- 2012 Serasker Street and Its Surrounding Pedestrianization Meetings - Tradesmen Reaction/Impact Assessment
- 2012 Caferağa and Osmanağa Accessibility Projects
- 2012 Rasimpaşa Accessibility Project
- 2013 Cycling Workshop
- 2014 Kadiköy Bicycle Routes Master Plan
- 2014 Establishment of Accessibility Commission - Accessibility Studies Between Municipality and Pier Areas
- 2015 İnönü Street Bicycle Path Oriented Renewal Project
- 2017 Kadiköy Bicycle Routes Master Plan Update
- 2018 Municipality Environment / Metrobus Station - Söğütlüçeşme Mobility Hub Studies
- 2018 Municipality Environment / Kasdaş Car Park Arrangement – Smart Neighborhood Parking Project

- 2019 First ever regulation of e-scooters in Turkey
- 2021 SUMP-PLUS, ULaaDS, SHOW, DREEM & FastTrack Projects and New Urban Mobility Studies
- 2022 Preparation of Kadiköy's SUMP, EIT Urban Mobility & POLIS Network Memberships for 2023
- 2023 IMPETUS Accelerator Program (Accessible Kadiköy) and GDCI Street Transformation Program

As Kadiköy Municipality, we have been developing our SUMP and we have been working with mobility and smart-city start-ups in any scenario we can to utilize Kadiköy as best as we can as a testbed for all these services, where all stakeholders can experience innovation first-hand. We are also successful in sharing many of these innovations via networking, co-creation and co-design events with almost all other local governments. We continue, plan to do so and always try to take things a step further. This type of transparency is also essential for creating consensus, which is key to innovation.

We are very excited to apply as a follower city of the project, mostly because we would be able to learn much about the shuttle projects and create or help create our version. It would be a significant leap for the mobility of the elderly and the disabled population, which are considerably high in our focus area, the historical city centre. Making the service supported by our already planned alternative solutions such as the smart neighbourhood parking project and logistics hub would also reduce the need for fossil fuel cars & trucks to and from the city centre even further. These interventions would help us achieve our underlying motive: creating more space for pedestrians and alternative transportation modes.

City Status

Being home to nearly half a million inhabitants, Kadiköy is one of the central districts of the metropolitan city of Istanbul. By the end of 2019, Kadiköy had developed its 3rd Strategic Plan (2020-2024) based on SDGs and has adopted relevant street rehabilitation, prioritizing inclusivity and participation. Within the scope of our Strategic Plan, while putting all these into practice, Kadiköy prepared its SECAP in 2018. Kadiköy has determined its adaptation aims and actions include environmentally sensible new models and mobility vehicles. Besides, the people of Kadiköy are open to innovative projects and new ideas.

Kadiköy is also the district with the most elderly population in İstanbul and it is a partner of the World Health Organization Age-Friendly Cities Network. 93.151 people (19,3%) of the total population consists of senior (65+) individuals. Inclusivity, being the key factor in our work, drives us to engage the elderly and other disadvantaged groups with urban life, increasing these PRMs' mobility and their will to go outside, socialize and enjoy/utilize the urban environment by a DRT-AV shuttle system.

Kadiköy is a district municipality with limited jurisdiction in terms of traffic management, However, it has good relations and reputation with Istanbul Metropolitan Municipality, therefore it is relatively easy to implement any project that requires a rapid response in terms of regulation and legislation.

Correspondingly with CCAM goals; we aim;

- To enhance road and line safety and efficiency for e-vehicle users, bikers and pedestrians,
- To improve the bike and pedestrian infrastructure for vulnerable road users as well as all parts of the community,

- To reduce the negative impact of transport on the environment: due to being a transport hub, Kadiköy is exposed to an extreme impact in terms of traffic jams, noise and air pollution. This problem is only getting worse after the pandemic ended.

Kadiköy has also been a follower city in two important urban mobility projects; SUMP-PLUS and FastTrack, DREEM & ULaaDS. Recently, the shift towards sustainable mobility has gathered pace, with Sustainable Urban Mobility Plans (SUMPs) crucial to driving this development. SUMPs are an inseparable part of cities for reaching targets of climate neutrality. SUMP-PLUS, which is coordinated by ICLEI, helps towns and cities of all sizes and at varying stages of development to bridge the implementation gap and become accessible, green, and liveable places. Coordinated by Eurocities and ICLEI, FastTrack is Horizon 2020-funded project that seeks to foster the development of climate-resilient urban, peri-urban and rural areas. FastTrack helps cities accelerate the roll-out of sustainable mobility innovations through knowledge exchange and capacity building.

Being a follower of the newest and innovative technologic CCAM mobility models and solutions (especially shuttles) to learn and eventually realize the SECAP's and SUMP's goals is an objective of utmost importance for us.

We believe it is important to start locally: from individuals to the masses creates the greatest effect, improving the changes in users' behaviour and disseminating them in the progress of time. Pilot applications supported by good capacity-building programs are essential in this aspect.

Why SHOW

For elaborating we have expressed above further; we are particularly interested in the following UCs:

- UC 1.1, 1.2, 1.3(localization), **1.4 (Maas & LaaS with sustainable energy)**,1.9 (for solutions around our LTZs), 1.10 (around transport hub area)
- UC 2.1 & 2.2 (especially for our SUMP)
- UC 3.1, 3.2 & 3.3 (for achieving maximum efficiency of any multiplication plans)

As we have elaborated on previous questions, we have certain services/infrastructure currently developing with/without our control or cooperation. We maintain the flow of data with these service producers. However, we would like to define & learn the KPIs and make ourselves ready for any further innovations we will face or be a part of. AD is currently at its early stages in our country, but PRMs could use the life quality improvement that any of these services may provide, so from all of the services we are interested in learning about, **Shuttle services for PRMs** and linking them with the PT infrastructure will be our main focus. The secondary focus will be creating an "**Automated Neighbourhood Parking**" infrastructure for the residential area around the historical city centre. This is an important step in terms of creating more space on our streets for accessibility, walkability and bikeability. For solutions around LTZ, our tertiary focus would be **Logistics Hubs and LaaS** around the historical district.

All of these 3 focus areas are vital for all types of flow inside our historical city centre.

Objectives of exchange with SHOW

Objective	Explanation	
Services to replicate (or add, if CCAM deployment is on-going at site) & SHOW Use Cases of interest	☒	Madrid (Variety and Capacity) & Turin (Complexity)
Business synergies (OEMs – Vehicle)	☒	Any service provider willing to pilot their project in Kadiköy would be welcome. In the case that we meet with a scenario, we may replicate the operation or create our own. We already have shuttles & delivery services which can easily be converted to autonomous. We recently got involved in some electrification projects, which may also take our capacity further.
Best practices – Learnings – Advice on Technical / Legal / Operational Level	☒	As Kadiköy, while in interaction in our other projects, we've observed that many services are also applicable to various scenarios in our city.
Other	☐	

City Profile of Sarajevo

City Profile

Sarajevo is the capital, and the main political, economic, educational and cultural centre of the state of Bosnia and Herzegovina. Sarajevo Canton is a region with a surrounding area of just under 500,000 inhabitants.

In 2020, the Sarajevo Canton adopted its first SUMP - Sustainable Urban Mobility Plan for the period 2020-2025. The Sustainable Urban Mobility Plan is a strategic plan designed to meet the mobility needs of people and businesses in Sarajevo and the surrounding area for a better quality of life. New approaches to urban mobility planning include developing a strategy that can encourage a shift to cleaner and more sustainable modes of transport, such as walking, cycling, public transport, new patterns of car use and ownership, the use of new technologies, and the adoption of new sustainable urban logistics concepts. We work on improving traffic safety and traffic infrastructure, to enable accessible mobility for residents by their abilities and limitations, improving pedestrian and bicycle traffic, addressing public transport in urban areas and taking measures to improve air quality. We also want our city to keep pace with the times in terms of smart solutions and innovations to achieve sustainable development in all spheres. We are particularly interested in all the innovations that can contribute to better integration of vehicles into the transport system and increase the level of safety of all participants.

City Status

We are just in the early stages of CCAM mobility development. We hope that participating in this project will help us **to follow** trends in the automotive industry. One of our SUMP goals is to transition to connected and automated driving, which will ensure as integration, traffic safety and the best mobility environment for the public.

We are interested in learning about innovative, connected, cooperative and automated mobility (CCAM) technologies and systems, multimodal transport system infrastructures for smarter vehicles and operations and how they can help us decrease the number of transport

accidents, incidents and fatalities towards the EU's long-term goal of moving close to zero fatalities and serious injuries by 2050 even in road transportation (Vision Zero).

Why SHOW

In our SUMP Sarajevo (adopted 2020) one of our goals is the transformation of transport into safe, resilient and sustainable transport, white smart mobility services for passengers and goods.

Our ambition is to use innovative technologies which will help us to have safety, environmental, economic and social benefits by reducing accidents caused by human error, decreasing traffic congestion, and reducing energy consumption and emissions of vehicles.

Our transport infrastructure needs to be prepared to enable cleaner and smarter operations.

The development of new mobility concepts for passengers and goods enabled by CCAM will lead us to healthier, safer, more accessible, sustainable, cost-effective and demand-responsive transport.

Objectives of exchange with SHOW

Objective	**Explanation**	
Services to replicate (or add, if CCAM deployment is on-going at site) & SHOW Use Cases of interest	☒	We are especially interested in 1) Area-based service and feeder to PT station - Proximity service, area–based, dynamic routing, on-demand stops, and shared use. 2) Local bus service - Replacement of local PT in small cities, on-demand shared fleet-based service, dynamic routing, 24-hour operation. 3) Bus Rapid Transit (BRT) - high frequency fixed route, fixed stops, separated lane, shared use. 4) School bus - Door-to-point service, fixed route with fixed operational time. 5) Car-sharing - On-demand sequentially shared private service, reserved for a period, dynamic routing, extended operational times. 6) Depot - Automated and optimized fleet management in the bus depot (parking and charging management).
Business synergies (OEMs – Vehicle)	☒	
Best practices – Learnings – Advice on Technical / Legal / Operational Level	☒	We are interested in learning about innovative, connected, cooperative and automated mobility (CCAM) technologies and systems, multimodal transport system infrastructures for smarter vehicles and operations and how there can help us in decreasing the number of transport accidents, incidents and fatalities towards the EU's long-term goal of moving close to zero fatalities and serious injuries by 2050 even in road transportation (Vision Zero).
Other	☐	

City Profile of Venice

City Profile

The City of Venice has a population of ca 260.000 inhabitants, and it is articulated around five separate municipalities in the hinterland and Venice itself, at the centre of the homonymous lagoon. The flow of people moving through its territory is peculiar and it's characterized by flows of commuters who work or study in the historical centre of Venice (the island) but live on the mainland and those of tourists- around 12 million tourists overnight stays and 5 million arrivals. Venice is, in fact, a major Italian port and one of the world's oldest tourist and cultural centres. This means that the mobility system must be thought of from the perspective of both the peculiar Venetian territory (island-hinterland) and the type of users.

The City Government is taking different actions to shift into a vision of mobility which is more sustainable, accessible and inclusive; sustainable actions and proposals could be developed mostly in the mainland area since in the city historical centre you can either walk or use the "vaporetto", the typical water bus of the city.

Among them: to encourage the use of bicycles within the Venetian municipal area, the cycling infrastructures of the mainland have been improved and extended arriving at a length of safe and connected cycling path of 170 km with recently secured cycle crossings. The result is an urban network of bicycle paths capable of connecting all the arterial roads accessing the city and enabling citizens to reach its strategic points without a car.

The sharing mobility has been strengthened with a new bike-sharing service that provides 800 traditional bicycles and 200 e-bikes as well as a scooter-sharing service providing 400 scooters. Toyota Motors Italia and Kinto offer a sustainable car-sharing service throughout the territory.

Worth noting is that the city is receiving ca. 87 million from the Recovery and Resilience Facility to renew the bus fleet with low-emission vehicles; the estimation is to have by mid-2026 at least 123 hydrogen-powered buses running in the city. Moreover, different participatory actions took place and are taking place intending to change the attitude and behaviours of citizens towards sustainable mobility. For example, the Project "Venezia in Classe A", funded by the Ministry of Environment, aimed at changing the behaviour of commuters on home-to-school and home-to-work journeys. Between 2018 and 2023, the City of Venice organised participatory activities with 18 local primary schools and with 5 of the biggest local companies. The project included interventions to encourage more sustainable behaviour as well as interventions on physical infrastructures to secure the areas surrounding schools. Spaces in front of the schools were widened or marked with the installation of coloured bollards and/or new flower beds. Selected emerging artists were asked to interpret the values of child-friendly urban areas, and they were involved in the development of artistic projects and street art workshops to re-qualify the outdoor spaces. Inclusion and participation, sustainability and aesthetics have been the main drivers of their works. On the other hand, to promote the sustainable mobility of commuters, local companies were financially supported in their efforts to reduce their CO2 commuting prints by developing actions foreseen in the relevant home-to-work plans and by purchasing bicycles or subscriptions to local transportation services.

The City of Venice along with the consortium composed of Fondazione Links, University of Westminster, Western Norway University of Applied Sciences, London School of Economics and Political Science, Wageningen University, SLR Consulting Limited, Westminster City Council, FIAB Onlus, Stichting Managing Public Space, Gemeente Rotterdam and Make:

Good LTD is participating to the Driving Urban Transition (DUT) 2022 call with a project titled "COmmoning urban streets and public spaces for the 15 min city that CAREs (CO-CARE)". In the field of the 15 minutes cites CO-CARE project aims to tackle the challenges of a car-dominant narrative, of diminished human contact and social activities and of an inadequate understanding of the diverse and sometimes marginalised experiences, needs, and aspirations of communities by developing, contextualising and testing tools to involve local communities in the co-creation of new vibrant public spaces, while also fostering climate-neutral lifestyles. Within this process, CO-CARE will apply the concepts of 'commoning' and 'caring' to the realm of urban streets and public spaces by providing a comprehensive overview of existing and planned common spaces of care in Europe, by developing innovative participatory tools facilitating co-design methods and community-centred governance and by exploring the effects of common spaces of care on the sustainability and liveability of the 15-minute city. CO-CARE will examine, develop and apply research methods and tools in three testbed cities: London, Rotterdam and Venice. The City of Venice will set up a real-life scenario to engage stakeholders and citizens and to re-think the use of public space in an already selected urban area of the mainland.

The Sustainable Urban Mobility Plan (SUMP) of the City of Venice is inspired by and promotes the principles of active participation, integration, planning/coordination, monitoring and evaluation; these guiding principles make citizens and territory the main protagonists in the construction of the plan and its implementation. In this regard, the last SUMP approved introduces a fundamental innovation from the previous ones: it puts people rather than car traffic management at the centre; this is why it has been conceived for different targets and sectors of society: SUMP for students, SUMP for commuters, SUMP for transporters, SUMP for tourists, SUMP for families (https://www.comune.venezia.it/content/cos-il-pums).

City Status

As stated in the "Follower Sites application", Venice finds itself to be in an early stage of CCAM deployment: it is envisioning possible models for the future transport system and for a Mobility as a Service (MaaS) system that could integrate automated vehicles into the public transport.

In 2022 the City applied to a governmental call for the project "MaaS4Italy", financed with the resources of the Resilience and Recovery Fund with a proposal in the field of MaaS and a proposal of a Living Lab in the field of Connected and Automated Vehicles. Unfortunately, Venice was not one of the six (Bari, Florence, Milan, Naples, Rome and Turin) of fourteen Italian cities which were selected but we are waiting for the "follower city call" which allows the non-winning cities to "follow" the other urban areas in the implementation of MaaS services and CCAM services.

In any case, the administration aims to develop the project as it was presented to support a transition towards more efficient and effective mobility solutions. To be more precise, the objective is to implement a digital platform of intermediation that combines both public and private existing means of transport and which suggests users with different trip options. It should enable users to get from one destination to another by combining transports depending on users' preferred option based on cost, time, convenience and occupancy level, and to book them as one trip.

In this context, there is the ambition to test driverless shuttles as a solution to be subsequently deployed as fleets of shared vehicles which would integrate and complement the public transport. Self-driving vehicles could be tested both in the areas of the city where the

congestion level is particularly high but also in the areas that, being in the peripheral part of the city, lack homogeneous connections to the city centres and the fundamental services. Elevated roads can be another suitable ground where to try the benefits of electrified vehicles. Within all these routes, different micro stations can be disseminated starting from the proximities of current bus stops and train stations.

An idea for the new vehicles is that they can be equipped with sensors to detect their occupancy level, an element that assures safety in a pandemic period and comfort in regular circumstances. At the same time, the micro stations can be furnished with info-mobility panels which include information about the space occupancy of the means of transport. Their dimensions (probably with 6-10-15 seats) as well as their final routes can be evaluated in light of a participatory process where road users are expected to test the solutions in a real-life environment and express their preferences; this user-centred strategy should be meant to understand stakeholders' real needs.

Moreover, the Venetian public transport operator, AVM Spa, is still interested in the testing of the smart and autonomous tram which has to react quickly and correctly to road challenges. It can be tested in real-life road traffic in a section of the existing tramway network; the latter runs through the mainland territory of the City of Venice.

In this environment, to contribute to the diffusion and acceptance of automation technologies and services, it could be useful to set up spaces where to experience virtual reality (VR) and augmented reality (AR) about different forms of innovation in the field of mobility. These infrastructures could attract users help to develop trust in CCAM technologies and raise more awareness over socio-environmental questions. This should accelerate the innovation pace and adoption of CCAM solutions.

After the testing phase of the aforementioned automated solutions, they can be integrated with the existing public transport system and interact with the existing infrastructures. The idea is that both the electrified shuttles and the automated tram are to be immediately connected with the MaaS platform to be more accessible and to make it possible to monitor routes, safety and level occupancy. Moreover, they can easily connect areas or services that are not successfully provided. As a result, the system should decrease the dependency on the private car.

Moreover, a future scenario of the implementation of CCAM services can also relate to the water-based mobility in the lagoon of Venice since a current project of the city refers to the creation of a new, more effective and quicker water bus line to connect the mainland territory with the islands of Burano, Mazzorbo and Torcello in less than half an hour. Acquired notions and experiences of CAAM solutions, can be shifted into the development of automated and sustainable water buses which would represent an improvement from the environmental point of view i.e. to better control the intensity of waves generated by the boat engines.

Why SHOW

The City of Venice is in a phase where it is looking for insights, good practices and strategies to guide urban mobility policies and planning towards more and more sustainable approaches that can later integrate fleets of automated vehicles in public transport. In this regard, it is a unique opportunity to be one of SHOW's follower cities since this enables an engagement with a huge and prestigious initiative with strong partners, pilot and follower cities in Europe and international collaborators.

The advanced testing carried out during the project, under different weather and traffic

conditions and different physical and digital infrastructures enables an understanding of the better-suited technologies and tools to improve the functionalities and the safety of all vehicle types. The exchange of data captured at the different demonstration sites with the replication cities offers extremely valuable insights into the future of mobility, helping them to upskill and stay current on the latest sector's advancements.

More specifically, SHOW can offer a comprehensive framework to evaluate all layers of safety, energy and environmental impact, societal impact, logistics and user experience, awareness and acceptance.

SHOW has the resources and the potential to assess the impact shared automated and electric vehicles have at a city level and to develop business models and roles that can promote the transformation of the current urban traffic environment to a more sustainable one. This would help Venice to identify the priorities of urban automated mobility scenarios and to guarantee high user acceptance under realistic operation conditions. One of the main obstacles is making people understand and familiarise themselves with the concept of automated vehicles as part of public transport and as a great opportunity for a change in urban mobility.

The project is a great occasion to connect with other European cities with more advanced stages of CCAM and to experience real-life urban demonstrations taking place across Europe to the integration of fleets of automated vehicles in public transport.

Objectives of exchange with SHOW

Objective	**Explanation**	
Services to replicate (or add, if CCAM deployment is on-going at site) & SHOW Use Cases of interest	☐	
Business synergies (OEMs – Vehicle)	☐	
Best practices – Learnings – Advice on Technical / Legal / Operational Level	X	Considering the early phase of CCAM deployment, the City of Venice would like to learn from acknowledging best practices, and technical, legal and operational advice and to be inspired by more advanced cities whose experience can support the migration path towards effective sustainable urban mobility and the implementation of automated vehicles. The Carinthia site implements connections to the existing public transport terminals (bus, tram, train) with the integration of autonomous shuttles and bus booking for first/last mile in urban scenarios. This knowledge would be suitable considering that the territory of the City of Venice is crossed by three widely-attended train stations and two tram lines making it necessary to create connections to them. The Turin Satellite site is taking place in an urban area with normal/high traffic similar, even if wider and more complex, to the one of the Venetian hinterland. Turin is one of the biggest Italian cities and this would facilitate the shift of data, legislation and models to the City of

Objective	Explanation	
		Venice. Moreover, since the project involves autonomous shuttles to transport patients towards the hospital it can be extremely useful to acquire the expertise to upgrade the connections towards fundamental services for targeted people.
Other	☐	

City Profile of Braga

City Profile

Braga, located in northern Portugal, is a vibrant city with a population of approximately 200,000 residents. Known for its rich historical heritage and thriving cultural scene, Braga attracts both tourists and residents alike. The city is committed to sustainable development and is actively implementing various initiatives to promote environmentally friendly transportation solutions. Some of our most relevant Sustainable Mobility Initiatives are:

- e-BRT (Project): Braga is currently developing an electric Bus Rapid Transit (e-BRT) system. This project aims to introduce electric buses with dedicated lanes and well-planned stations. By leveraging advanced technologies such as GPS and real-time data through its Intelligent Transportation System (ITS), the e-BRT system will provide passengers with up-to-date information, reducing travel time and enhancing the quality of public transportation services. The implementation of electric buses aligns with Braga's goal of reducing carbon emissions and promoting sustainable mobility options.
- Decarbonized Last Mile Logistic Project: Braga is undertaking a project focused on decarbonizing the last mile logistics for goods transportation. This initiative incorporates sustainable vehicles, intelligent logistics planning, and optimized routes to reduce carbon emissions and enhance transportation efficiency. By gradually implementing this project, Braga aims to achieve a significant reduction in negative environmental impacts, particularly in terms of carbon emissions associated with freight transportation.
- Connected and Intelligent Traffic Management: Braga has implemented a state-of-the-art traffic management system, which includes adaptive traffic lights and a central control centre for real-time monitoring. By optimizing traffic flow and reducing congestion, this initiative improves road safety, enhances urban space utilization, and minimizes air pollution. The integration of technologies like Waze provides residents and visitors with timely traffic information, enabling informed decision-making and further reducing travel time.
- Testing Autonomous Vehicles: Braga plans to conduct a pilot test of autonomous buses in collaboration with the Municipal Public Transport Company (TUB). This initiative explores the potential of autonomous technology for enhancing public transport services in the city. By leveraging autonomous vehicles, Braga aims to improve the urban service and provide high-quality transportation options to its residents. While this project is in the early testing phase, it demonstrates Braga's commitment to embracing future mobility trends.

Addressing Automated Mobility in the SUMP

The SUMP of Braga, a comprehensive plan for sustainable urban mobility, considers the integration of automated mobility as part of its long-term vision. While the SUMP

acknowledges the potential benefits of automated mobility solutions, it emphasizes the importance of a phased approach to ensure safe and efficient implementation. However, the plan does not set a closed roadmap for the integration of autonomous vehicles within Braga's public transport system, as it have to take into account factors such as technology readiness, regulatory frameworks, and public acceptance. Through pilot projects, partnerships with industry stakeholders, and close collaboration with research institutions, Braga aims to gather valuable insights and establish a solid foundation for the future deployment of automated mobility in the city. The SUMP serves as a guiding document that aligns the city's sustainable mobility priorities with the European Union's goals, fostering a sustainable and forward-thinking transportation ecosystem.

City Status

Braga is at the initial stage of implementing shared Connected and Cooperative Automated Mobility (CCAM) solutions. The city understands the life-changing potential of CCAM and is taking steps to integrate it into its sustainable urban mobility strategy, also as an active member of the IN2CCAM consortium through the Quadrilátero Association,

Braga's near/future plans for shared CCAM implementation include raising awareness and building knowledge among stakeholders through workshops, seminars, and information campaigns. Engaging relevant stakeholders such as transport operators, technology providers, and the public is a priority for gathering input and insights. Additionally, a comprehensive assessment of existing infrastructure will be conducted to determine readiness for CCAM implementation and identify necessary upgrades.

The city acknowledges the importance of a supportive regulatory framework and will collaborate with national and European authorities/entities to develop regulations and policies addressing the safety, privacy, liability, and interoperability aspects of CCAM systems. Pilot projects and demonstrations are planned to test and validate CCAM technologies, allowing Braga to gather valuable data and insights for future implementation strategies.

Collaboration and knowledge exchange with industry partners, research institutions, and other cities in the consortium are emphasized. This will involve active participation in knowledge-sharing activities, workshops, and best practice sessions to leverage shared expertise and accelerate the learning process.

To support CCAM implementation, Braga will explore funding opportunities, including EU funding programs, private sector partnerships, and others. This funding shall be used to finance pilot projects, infrastructure upgrades, and capacity-building activities. Braga's commitment to engaging stakeholders, developing infrastructure, creating a supportive regulatory framework, and fostering collaborations within the consortium demonstrates its dedication to successful CCAM integration. By focusing on these areas, we aim to contribute to sustainable urban mobility and advancements in CCAM technology.

Through these efforts, Braga is trying to positioning itself at the forefront of shared CCAM implementation, actively working towards enhancing mobility efficiency, reducing congestion, and improving the overall quality of life for its residents.

Why SHOW

Why is the engagement with SHOW important in a first place, what is the need behind

Braga joins SHOW to advance sustainable mobility with cutting-edge tech. We want to:

- To learn how to best test and optimize automated vehicle solutions in real-life conditions.
- Show our innovation potential on a European and international stage.
- Collaborate and exchange knowledge with diverse stakeholders.
- Assess the impact of shared automated cooperative and electric fleets at the city level.
- Replicate and peer learning successful schemes and models in other cities.

Braga is committed to sustainable mobility, innovation, collaboration, evaluation, and replication. We aim to shape the future of urban mobility and become a leading city in advanced transportation.

Objectives of exchange with SHOW

Objective	Explanation	
Services to replicate (or add, if CCAM deployment is on-going at site) & SHOW Use Cases of interest	☒	Braga's collaboration with the SHOW project enables us to identify services to replicate or add to our early stage CCAM deployment. We are particularly interested in the SHOW use cases that showcase innovative and sustainable mobility solutions. This exchange of knowledge and experiences empowers us to enhance our urban transportation offerings and contribute to the advancement of connected and automated mobility.
Business synergies (OEMs – Vehicle)	☐	
Best practices – Learnings – Advice on Technical / Legal / Operational Level	☒	Braga's engagement with the SHOW project in the field of CCAM (Cooperative and Connected Automated Mobility) aims to leverage best practices, gain valuable learnings, and receive advice on technical, legal, and operational aspects. This exchange enhances our understanding and accelerates the implementation of advanced mobility solutions, contributing to a sustainable and efficient urban transportation system
Other	☐	

City Profile of Varna

City Profile

The structure of urban mobility is described by its modal split. The comparison of the modal split in Varna with other Bulgarian and European cities shows both the presence of problems (the dominance of private transport) and some positive traditions and trends in pedestrian traffic and the use of mass urban transit (MUT). In the past decade, transport and mobility policies aimed at the development of modern, healthy and sustainable urban environment have been up on the agenda, but still not among the main goals in the field of urban development. Such policies have been employed mainly for the development of the pedestrian

zone in the city centre and for the modernization and promotion of sustainable forms of mass transit. However, outside the city centre, pedestrian areas are still lagging far behind modern requirements in terms of the specification of construction and finishing works, landscaping and maintenance. Bicycle traffic, despite the construction of much needed routes of the cycling network in the 2013-2016 period, remains a significant potential, still to be used for improving the sustainability indicators of mobility and the urban environment.

We adopt a comprehensive approach to addressing urban mobility challenges, taking into consideration not only the technical aspects of zero-carbon and eco-friendly vehicles but also their wider social, economic, and environmental impacts. We are constantly exploring new technologies, methodologies, and best practices from around the world, which allows us to deliver cutting-edge solutions that support the adoption and integration of zero-carbon and eco-friendly vehicles in urban transport systems.

Strategic documents related to the improvement of the urban mobility:

- Action plan for management, prevention and reduction of noise in the environment on the territory of the Varna agglomeration;
- Strategy for the development of pedestrian traffic and other active forms of mobility in the city of Varna;
- Plan for integrated development of the Municipality of Varna 2021 – 2027;
- The investment program of the Municipality of Varna;
- Green City Action Plan (GCAP);
- Sustainable Urban Mobility Plan (SUMP) - start of preparation August 2023;
- Sustainable Urban Logistic Plan (SULP) – start the preparation of the specification until the end of 2023;
- Strategy and concept for cargo bike routes and micro-hub design

City Status

By far Municipality of Varna has some magnificent infrastructure related to the topic that can be built on and improved in the future in order more diverse and sophisticated services to the end users to be provided. In the table below, we give some examples.

Cargo Bikes	Sustainable, space-saving cargo bikes designed to revolutionize urban transport and improve the quality of urban life for both private and commercial users. Equipment: Fleet management software, GPS tracking devices, cargo bike maintenance tools.
TrafficVision	TrafficVision A smart camera system utilizing specialized software to count pedestrians and cyclists at busy intersections, aimed at informing traffic calming measures and promoting sustainable mobility. Equipment: High-resolution cameras, traffic counting software, dedicated servers, data storage devices, computer workstations.

UrbanMobilize	UrbanMobilize A collaborative initiative supporting the development of sustainable urban mobility plans, exchanging experiences, and promoting effective transport policies across European cities. Equipment: GIS software, data analysis tools, project management software, computers, video conferencing equipment.
CargoBikePathFinder	CargoBikePathFinder A comprehensive study identifying optimal cargo bike routes in Varna by analysing existing infrastructure and ensuring compliance with local and EU regulations. Equipment: GIS software, route optimization software, computers, data collection devices, and data storage devices.
“System for information of the passengers in real time”	provides information in real-time onboard the buses, at the bus stops along the BRT corridor, at strategic locations in the city and on an Internet website. It enhances the reliability and quality of the services offered to passengers in the Mass Public Transport (MPT). Subsequent improvements to the system have been made, where the information boards are already bilingual.
“System for coordinated management of traffic light controlled junctions (TLCJ) along the routes of the MPT”	is being installed at 20 key junctions in the city. The purpose is to collect data about the traffic flows through those TLCJ by mounting traffic detectors, processing (counting) them, and, respectively, controlling locally and in a flexible way the functioning of those junctions. Optimization of the traffic flows should be thus achieved, whereby avoiding delays in the MPT lines, as well as reducing the air and environment pollution by shortening motor vehicles’ waiting time at the traffic lights (respectively, the idling of the vehicles’ engines).
“Upgrading of Intelligent Transportation Systems”	The purpose is to provide information about the bus lines in the city of Varna and their real-time traffic schedule. Feeding cable lines have been established and preparatory construction-and-assembly works (building supporting foundation) at 90 bus stops have been carried out to date. The same is about to be done at another 10 bus stops. Installation of carrier posts and boxes is planned at the next stage, where the equipment will be fitted in, as well as some testing activities are envisaged.
“Management Centre for the Mass Public Transport (MPT)“	receives information in real-time from the vehicles (V) of MPT, processes the data, calculates the time for arrival at the bus stops and transfers the data to the respective terminals. It carries out the management of the vehicle

	fleet by monitoring the vehicle location, identifying any delays and collecting operative data, which are to be used for regulating the functioning of the system.
"Automated Ticketing System"	includes purchasing and installing Ticket vending machines (TVM) onboard the vehicles and on the bus stops, as well as ticket validators in the vehicles. A centre has been established for the sale of Electronic Cards (EC) and for the recharging of different tariff plans for their subsequent use when travelling within the public transport system. The smart cards enable the processing and storing of the performed transactions. Portable devices for the verification of smart cards and other transport documents have been put in place. The control centre, which manages all the transactions with tickets/cards, ensures control over the system and reports of the cash transactions.

Why SHOW

The goal of Varna's long-term strategy is to establish the main directions of the policies of the Municipality of Varna towards developing the urban environment, social and economic conditions and public attitudes stimulating pedestrian and other active forms of urban mobility and sustainable modes of transport, and on this basis also to offer guidance for initial actions implementing these policies. The strategy is generally aimed at creating a sustainable pedestrian system to ensure the safe mobility of Varna residents and visitors in a clean and healthy environment. With the project idea, we plan to transform urban mobility by bringing cutting-edge, safe-by-design self-driving technology and a complete, modular solution to the city.

Our objective is to offer new mobility services while creating an accessible, safe, environmentally friendly, and affordable experience for riders. Our goal is not only to get people from Point A to Point B in an autonomous vehicle but make mobility safer, smarter, more sustainable, and affordable for all.

The MAAS we have in mind features a superior self-driving system, best-in-class user experience, guaranteeing accessibility to all and specifically interaction with Vulnerable Road Users, and extensive mobility intelligence data to optimise fleet utilisation, on-demand deployment and interlink it with Public transport system and minimise traffic congestion. The turn-key self-driving system is ready for commercial deployment (TRL 7) at scale for Mobility-as-a-Service, delivery vehicles, and more. The Municipality of Varna is on the way to preparing for the establishment of LOZ (or ZEZ) in the coming years and this initiative will bring the efforts in advance.

The first LOZs will be in the historical part of Varna (Talyana district), and the Seaside Garden seaside road. It's a seaside alley, not a road and it should be closed for vehicles, except the AV shuttle serving both people and deliveries.

The pilot will serve as an example for social behaviour change and help the establishment of car free zones in the centre of the city. In the first year the Municipality will introduce the pilot AV shuttles, linked to the PT and the other mobility services. Incentives during this period will be given in the form of free parking and/or ride. The limits (time/or numbers) to be precise.

Gradually, in 3 years range the full fleet of vehicles and operations should be operational, based on income and local funding budget.

The Seaside Promenade is a 5 km road running along the beach in the central part of Varna. The strip in question connects the main city road with the pedestrian part of the Sea Garden and then reaches the port of Varna. Only 900 metres of it is car-free, and even that part has a vast number of exclusions (restaurants and other leisure places have special passes for guest vehicles for the car-free zone and those are often abused).

The idea is to make the Seaside Promenade car-free but to provide access to the seaside, the beach and the city Sea Garden for everybody.

Nowadays, the area is only accessible by car, by bicycle or by foot. The road is very steep and if not in proper physical condition, hiking up on foot or bicycle is a hard exercise.

The proposal is to create a car-free zone (A) where only AV shuttles for passengers and deliveries can operate, and a buffer zone (B) where only electric vehicles are allowed to the parking zone. All the remaining vehicles are not allowed in the zone. They can park in the designated parking (C) and use the AV shuttle to reach the beach and the Promenade.

The allowed speed even now is 20 km/h for a zone with mixed-use, but it is rarely observed and as a result, it is one of the zones with the most incidents reported in the past few years.

The idea is to make the space accessible, safe and pedestrian, thus improving the quality of the urban environment and reducing carbon emissions from traffic. This in turn will contribute to improving the purity of urban air and quality of life. The area should be furnished with seating options, greenery, lighting, sports areas, children's playgrounds and opportunities for outdoor events. Such measures would have a positive impact on people's health, their need for social life, keeping the necessary distance and would stimulate the development of outdoor cultural life.

To fully cover the current level of traffic a fleet of 10 vehicles for 12 seated passengers + 1 wheelchair + max 10 standing (part of them may be passenger/logistics uses), and 2 delivery vehicles to run in a predeterminate road. The deployment will be gradual as the AV shuttle fleet substitutes the private car traffic in 2 years. Despite we still cannot provide the name of the manufacturer yet, as public procurement needs to be done, they will be with SAE L4. Automation level L4/L5 compute based on EyeQ®5 SoCs with Full Sensing Suite, 13 Cameras, 3 Long-range LiDARs, 6 Short-range LiDARs, 6 Radars.

in the moment Micro mobility (e-scooters) is available and it will be included in the system as a continuation of the mobility as a service. PT stop, one car parking for mainstream vehicles and another for e-vehicles will be linked to the service. The most important issue served with this project is to provide access to all to the seaside promenade. In the moment it is accessible only to car users, bikers and by foot. By providing this service many elderly people, low income and other disadvantaged groups will benefit and will have access to the recreational and beach zone along the sea.

With this regard, the Municipality of Varna is working on the following strategic documents and policies related to the topic:

"A green, clean city promoting sustainable solutions and a healthy lifestyle"

This plan covers the period 2023-2027+. The Municipality of Varna aims to become a connected, modern and accessible city in terms of green spaces, providing a good quality of life to its citizens and equal opportunities for all. By investing in a greener future, Varna strives to secure energy from clean and sustainable energy sources that are used responsibly and ecologically, be it regarding drinking water, waste or the protection of the natural environment, local ecosystems and biodiversity. The strategy of the Municipality of Varna aims not only at a more sustainable environment but also at a better quality of life.

The municipal administration aims to ensure good quality of atmospheric air, meeting the regulatory requirements and:

- reduction/maintenance of the number of exceedances of the average day-night norm for the protection of human health to the legally permissible - 35 pieces/year;
- reducing the values of the maximum recorded concentrations of FFP10;
- not allowing exceedances of the average annual norm for the protection of human health.

The main goals in the field of environmental protection are:

- Research, design and construction of low-emission zones, by building municipal systems for video surveillance, management, control and regulation, to reduce greenhouse gas emissions from transport and domestic heating.
- Reduction of greenhouse gas emissions by building municipal systems for video surveillance, management, control and regulation of environmental components and factors, to reduce greenhouse gas emissions from transport and domestic heating.
- Replacement of old individual and multi-family inefficient heating devices in households, by introducing energy-saving household appliances, contributing to the reduction of greenhouse gas emissions.
- Design and construction of a municipal system of air monitoring points and a software system, connecting them to the National Automated System for Environmental Monitoring - to monitor, control and take follow-up actions to minimize greenhouse gas emissions.
- Conducting information campaigns on the effects of using standardized and/or low-emission fuels and combustion installations. Campaigns to explain the economic and environmental benefits of energy efficiency.
- Survey, design, and construction of infrastructure and power supply of public buildings, with the aim of efficient use of geothermal sources to provide heating and cooling of public buildings, including the development of recreational activities, through a public-private partnership.
- NOISE: Research, design and construction of noise protection shielding facilities (noise barriers), to optimally protect intense traffic and create favourable conditions for limiting the noise load on the environment on the territory of the municipality.
- WATER: Water supply with mineral water to public and multi-family residential buildings, to provide backup drinking-domestic water supply.
- Creation of recreation areas - construction of green belts, park spaces, recreation areas around water sources, etc., to restore the existing ecosystems and ensure equal access.
- Protection and efficient use of surface water, through the reconstruction and rehabilitation of the existing drainage system and the construction of a new one along the routes of the existing ravines in the city of Varna.
- Design and construction of a system for drainage of rainwater and surface water.

The Plan for Integrated Urban Development and the Green City Action Plan of Varna (GCAP) already include actions to decrease the noise from urban transportation. **Both will be supported by the policy instrument Regions in development OP - ERDF with local geographical scope.**

Objectives and priority measures:

- Installation of acoustic barriers for protection from noise from traffic. Budget of 2,7 mnl euro are foreseen for this activity in the residential areas in the municipality of Varna.
- Introduction of low emission zones:
- Anti-noise pavement
- Limitation for vehicles with lower class than Euro 5 in the beginning and after a test period only electric vehicle
- Specific street design lowering the speed and the noise of the passing cars (Zone 30)
- Preventing transit passing through the city centre zones
- The first LOZs will be in the historical part of Varna (Talyana district), and in the Seaside Garden seaside road.

Other measures related to decreasing the noise from traffic:

- Renewal of the car park and investment in electric vehicles (municipal fleet)
- Enlargement of the network of cycle paths
- Promotion of the use of public transport

The implementation of the **policy instrument** will be based on real-time management through a digital twin platform gathering real-time data from the traffic in the municipality and managing the traffic flow and allowance to the city zones accordingly.

Project results are expected to contribute to all of the following outcomes:

1. Mobility solutions that respond to people's and cities' needs, co-designed with local authorities, citizens and stakeholders, tested and implemented in cities to achieve climate neutrality by 2030.
2. Transferrable solutions for the mobility of people and goods exploiting the combined potential of electrification, automation and connectivity to significantly and measurably contribute to:
    - The Cities Mission's objective of climate neutrality by 2030;
    - Reduction of CO2 emissions supporting the 55% reduction goal for 2030;
    - Lower energy demand;
    - Improved air quality, less noise;
    - Reduced congestion, more reliable, predictive travel times and more efficient transport operations;
    - More effective use of urban space also considering the other transport modes and multimodal hubs;
    - Improved safety particularly for vulnerable road users;
    - Improved inclusiveness, especially by facilitating equitable and affordable access to mobility for all users, for people with reduced mobility.
3. Economically viable, modular and adaptable solutions that are transferrable among cities committed to achieving climate neutrality by 2030.
4. Capacity built among local authorities, users and mobility systems providers to

accelerate the take-up of shared, smart and zero-emission solutions and to implement their monitoring and evaluation.

5. Implementation plans for local and regional transport authorities to replicate the roll-out of innovative smart mobility solutions and related infrastructure (for charging and/or connectivity) in cities beyond those involved in the project.

Objectives of exchange with SHOW

Objective	Explanation	
Services to replicate (or add, if CCAM deployment is on-going at site) & SHOW Use Cases of interest	☒	**The development of a travel planning system** is planned to be designed, which will be made available for free use to the citizens and guests of Varna via web access or as a mobile application, which will be integrated with the mobile application used to pay for hourly parking in the blue zone (virtual parking meter), as well as linking it with the parking and ticketing software and provide a real unified mobility service. **Urban Micro Hub Concept and Benefits of the Urban Micro Hub:** • Reduced congestion: By limiting the entry of large trucks into the city centre and promoting sustainable last-mile delivery methods, the urban micro hub concept can significantly reduce traffic congestion in the area. • Lower emissions: The use of eco-friendly delivery methods, such as cargo bikes and electric handcarts, leads to a considerable reduction in carbon emissions and air pollution. • Increased efficiency: With the centralized micro hub, last-mile delivery providers can optimize their routes and reduce the time it takes to deliver packages to their final destinations, ultimately enhancing customer satisfaction. • Enhanced safety: As large trucks are kept out of the city centre, pedestrian and cyclist safety is improved. • Cost savings: The urban micro hub concept can lead to cost savings for logistics companies by optimizing resource utilization and reducing fuel consumption. **Developing a Bike sharing scheme** The implementation of bike sharing scheme aims to add an ecological and healthy alternative for movement in the city of Varna, which will also lead to the optimization of the use of the limited parking spaces in the city centre by stimulating travellers to use bicycles rented from the buffer parking lots for arrivals from other settlements, or from residential districts of the city. • Time-Saving

Objective	Explanation	
		• Eco-friendly Image • Cost Reduction • Reducing congestions • Improved Customer Satisfaction • What we are aiming by implementing the SHOW pilots is the following: • Reducing CO2 emissions within a five-year timeframe (measured in %) • Reducing the noise units in the central part of the city (measured in %) • Increasing the green deliveries in the central part of the city (number of deliveries by alternative transport modes – cargo bikes, etc.) • Shortening the delivery time (average delivery time) • Improving the safety in the central part of the city (number of accidents) • Changing the modal split (% for type of transport) • Using more sophisticated PUT platforms • Improving the multimodality in the transport system • Providing easier access to the more remote city areas by introducing shuttle services (last mile) • Linking the points of interest in the city (railway station, bus station, airport, sea resorts, etc.)
Business synergies (OEMs – Vehicle)	☒	At the local level, there is a company manufacturing cargo bikes and other light vehicles for cargo transportation. The stakeholders to be involved in the project will be companies dealing with mobility issues providing a wide range of services such as software, hardware, etc. for different purposes, which could be also in partnership with other companies building vehicles for shuttle services of people and freight. That reason for we seek an opportunity for eventual business models within the project activities.
Best practices – Learnings – Advice on Technical / Legal / Operational Level	☒	During the implementation of the pilots/activities, we will use the bottom-up approach. The participatory process will involve different stakeholders with engagement to achieve the main objectives of the pilots. Institutions will be brought together to join forces aiming at improving the transport ecosystem in the city by implementing and integrating green solutions and methods in line with the policies and strategies that are being implemented regarding green transport services for people and freight.
Other	☒	The aim is to achieve better comfort in travel, encourage the use of mass public transport through the upgrade of the project "Integrated Urban Transport Part I", the reduction of harmful emissions into the atmosphere, create an accessible environment for disabled persons and mothers with strollers, etc. We are putting effort into improving infrastructure: construction of pavements, pedestrian crossings, traffic

Objective	Explanation	
		lights, etc. Yet for the first time in the city, 50 smart hiking trails and pedestrian passages with funds provided by European programmes. Pending reconstruction of the pedestrian underpasses by providing an accessible environment and good lighting, and building of two new subway In Varna strategic documents - the Varna Municipal Development Plan (Varna MDP), the Varna Integrated Plan for Urban Reconstruction and Development (IPURD), Varna Master Plan provide measures for sustainable mobility. The results and achieved objectives of the implementation of the project will be considered in the development and implementation of the plan. The cycling strategy of the city of Varna is based on the implementation of the following four sub-components: 1) New cycling paths, 2) Parking facilities, 3) Cycling campaign and 4) Bike rental scheme. The total length of all new cycling paths is 16.344 km and the total length of the Varna cycling network together with the existing paths will reach about 20 km. In addition to new cycling paths construction, it is envisaged the installation of up to 50 bicycle parking facilities, each one with about 8-12 bicycle lots. The sub-component consists of parking facility design, identification of suitable locations and supply and installation of the parking facilities at the selected locations. The parking facilities will be used free of charge. It is envisaged upon completion of the cycling facilities construction a sound campaign promoting benefits arising from cycling as an environment-friendly transport mode and aiming at increased public awareness of cyclists' safety to be launched. The sub-component consists of campaign design, organization and carrying out. The campaign will be organised within the overall Project publicity activities. Reduction of car usage and car-dependency traffic optimisation (bus priority at intersections, avoiding congestions), modal shift of citizens to use alternative types of transport (e-cars, cycling, walking) all will result in a diminution of CO_2 emissions.

City Profile of Gdansk

City Profile

Located in the north of Poland, the city of Gdansk has a population of over 486,000. The main priorities of the city's mobility and transport operational programme are active mobility and public transport. The city was the first in Poland to organise a pilot of autonomous last-mile

public transport on a public road in 2019 and in 2021 in a closed area with the option of driving without an operator on board and with remote control. In 2018, the SUMP for Gdansk was approved and autonomous public transport of the last mile was included in this document as a way of making public transport more attractive.

City Status

Two CCAM small-scale pilots have already been carried out in the city and a larger-scale pilot in mixed traffic is desirable if external funding is obtained. The city is the first in Poland to be a member of the CCAM association.

Why SHOW

As a large-scale mixed traffic pilot has not yet taken place in the city, the exchange of experience in this area is desirable

Objectives of exchange with SHOW

Objective	**Explanation**	
Services to replicate (or add, if CCAM deployment is ongoing at site) & SHOW Use Cases of interest	☒	It is worth learning from the experiences of others to implement autonomous last-mile public transport without significant obstacles
Business synergies (OEMs – Vehicle)	☐	
Best practices – Learnings – Advice on Technical / Legal / Operational Level	☒	The city is not a research facility so would be keen to learn more about the technical aspects of implementing large-scale CCAM demonstrations
Other	☐	

City Profile of Paris

City Profile

Paris2Connect is a project whose main ambition is to offer a shared digital infrastructure to experiment and develop new solutions for the urban space.

This infrastructure is composed of ten smart poles, equipped with different elements (video cameras, thermal cam, sensors (noise, air quality, electromagnetic waves, images), OBU/RSU).

To meet the great ambitions of the city of Paris for the 2024 Olympic Games, our objectives are:

- To implement and optimise our use cases for vulnerable people (disabled people for example) to offer them safe access to urban space whatever their condition;
- To continue to deploy soft modes of transport, and to connect them to our shared infrastructure to manage the service and geolocate them. It is also a question of being able to organise travel on the territory in connection with an observatory of mobility already deployed;

- Running autonomous shuttles on the spot to ensure multimodal continuity and to help ease the flow of traffic in Paris;
- Optimise the development of last-mile flow logistics, in particular with the deployment of transport droids

This shared infrastructure relies on ITS-G5 to 5G communication to ensure a very high connection quality and very low latency. Communications will be carried by C-ITS and C-V2X to ensure V2I (vehicle to infrastructure) communication and thus secure the public space.

This infrastructure aims to accelerate the deployment of different forms of mobility in compliance with regulations (signalling, maximum speed) and the policy of the city of Paris.

Paris2Connect is also part of the Indid project, co-financed by the Connecting Europe Facility of the European Union. InDiD is a pilot project aiming to evaluate how connected infrastructures will bring enhanced perception to road users. With a mix of use cases and wide inclusion of pilot sites, this Action advocates for a massive acceptance of C-ITS toward a large-scale deployment.

Paris2Connect is also part of the PRISSMA project (« Plateforme de Recherche et d'Investissement pour la Sûreté et la Sécurité de la Mobilité Autonome » - « Research and Investment Platform for Safety and Security of Autonomous Mobility ») part of the new Transport Innovation Agency (department of transport).

To go further, you can take a look at our use case already implemented and ongoing on urban connected logistics, C-ITS and our several observatories.

- **Paris2Connect**: https://youtu.be/lSRItYz65Mw
- **Observatories**: https://youtu.be/Y1WpsKc_Bug
- **Logistics**: https://youtu.be/j-3ZXFLZxIM
- **C-ITS**: https://youtu.be/Y3tA__rkIbc

Paris2Connect is now a fully operational urban infrastructure on a 3.5-kilometre road in the 12th and 13th arrondissements of the capital (A dense urban area between 3 majors train stations & cultural centre).

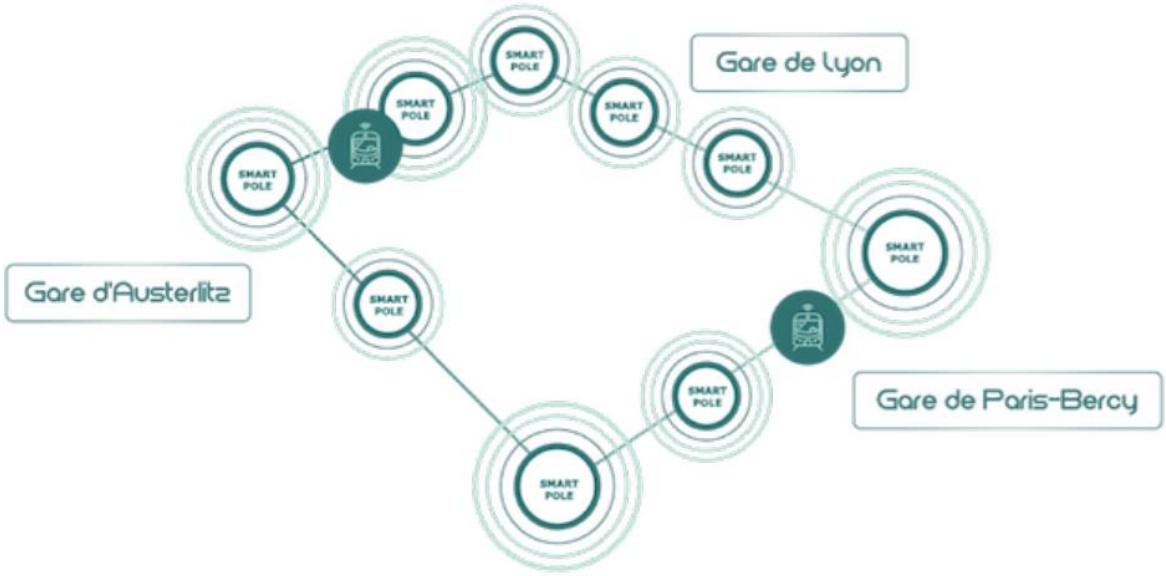


Figure 15: Paris2Connect Urban infrastructure in Paris

The essence of the Paris2Connect project is to offer a connected infrastructure that is as open as possible to experimentation to develop new services. Thus, the first use cases are already being worked on with the City of Paris. They were concerned with the management of the territory and connected mobility.

Solutions have already been tested to make public space more accessible to the visually impaired, to observe mobility. Soon, an autonomous mobility service will be running on the Paris2connect route. You will find examples of use cases below:

1/ Rationalization & optimization of public space

- Management of bus lane occupancy
- Management of inappropriate use of public space due to parking (delivery, scooters,
- vehicles, bicycles, ...)
- Management of obstacles on the tracks (garbage containers, waste, animals,
- scooters, ...)

2/ Pacification and security of public space

- Improving the pedestrian experience
- Management of priorities at traffic lights (emergency vehicles, soft modes, ...)
- Accessibility for disabled people

3/ Contributing to making public space more sober, more sustainable

- Smart Lighting
- Cleanliness management
- Reduction of noise pollution

4/ Contributing to a more service-oriented public space

- Innovative urban solutions (e.g. autonomous robot logistics)
- Autonomous public transport (experimentation in progress by the RATP)
- Information and participation services for users of public space

City Status

On a 3,5km inside Paris very dense area, we have implemented:

- 10 smart poles between Lyon Station, Austerlitz and Bercy.A private hybrid 4G / ITS
- G5 network that can be upgraded to 5G / C V2X in T3 2022
- The infrastructure includes private network coverage in LTE and scalable 5G in 2022.
- The LTE or 5G network is based on TDD technology on the 2600MHz frequency in
- B41 with 2x2 Downlink MIMO on a bandwidth of 20MHz for 4G and 40MHz for 5G.

Data likely to be made available:

- Personal data, subject to subcontracting agreement within the meaning of the RGPD
- (*) of the city of Paris, the data controller and co-responsible for this Call for
- Experiments:
- Videos from the cameras

Non-personal data, i.e. data from:

- Flux lidar,
- Thermal camera flow,
- JSON metadata feed,
- "raw "tracking list" (list of geolocated objects in real-time) or "metadata

Concerning CAV, we aim at SAE level 4. Through Indid Project, we are working to implement

GLOSA (G1/G2 use cases – see video (CITS)), CPM & DENM (all sorts of DENM – T2/3 2022)

By the end of the year, we will be developing new case studies for vulnerable people.

We will also set up tests on autonomous shuttles via vehicles of the local Parisian operator - RATP (end of 2022) as well as autonomous taxis (SAE level 4) with Valéo by the end of 2022 and beginning of 2023.

Lastly, we are still exchanging with other car manufacturers to push our experiments even further.

On the AI side, we are working on the AI performance of our infrastructure and its supervision/algorithm (via the national "AI Challenge" programme).

We are also finalising tests on all the C-ITS messages with the vehicles of the road manager (the City of Paris) and car manufacturers as part of the SCOOP / Indid programme.

Finally, we are developing a logistics observatory and have carried out initial tests on connected urban logistics via delivery droids (see videos), considering all the legal and communication schemes between CAV and local traffic management, communication and road infrastructure described below. We are working with Paris city, technical and traffic management services. RSU and OBU allow us to get communication and messages exchanged between CAV, infrastructure and traffic management *(you can see that in the prior C-ITS video link).*

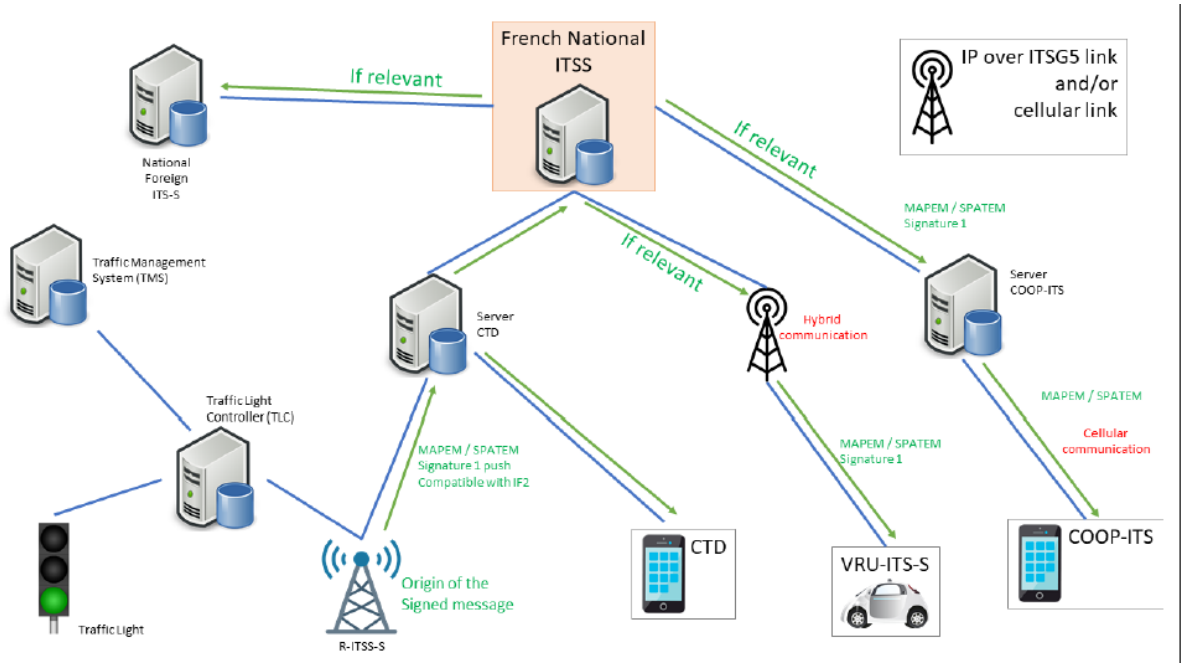


Figure 16: ITS in the context of Paris2Connect

Why SHOW

Paris2Connect is a project supported by public and private actors, in particular ATC France and the City of Paris.

As indicated, Paris is committed to a sustainable city, particularly in terms of mobility, with a view to the 2024 Olympic Games.

This shared infrastructure will allow all types of people to come to the site (disabled or not), allowing them to access the public space in complete safety and also allowing them to use soft means of transport by having perfect multimodal connection information.

We are working closely with Paris city technical services such as PC Lutèce as “road manager” and responsible for city traffic lights administration. All our use cases are based on national and local regulations (speed limits, equipment in public spaces, GDPR for data etc…)

Objectives of exchange with SHOW

Objective	Explanation	
Services to replicate (or add, if CCAM deployment is on-going at site) & SHOW Use Cases of interest	☐	
Business synergies (OEMs – Vehicle)	☒	We are looking for interesting business plans to re-invest in city infrastructures with monetization of services at different terms. The mutualization of assets and data sharing with standardization of interfaces should be important to set up that.
Best practices – Learnings – Advice on Technical / Legal / Operational Level	☐	
Other	☐	

City Profile of Groningen

City Profile

Demographics Groningen:

- Population in 2019: 230,000 (6th largest in the Netherlands)
- Projected Population in 2035: 250,000
- Daily Urban System: 500,000
- Jobs: 140,000
- Students: 60,000 (of which 8,000 are internationals)
- Average Age: 36.4 years

The SUMP for Groningen is underpinned by a vision to reduce the dominance of car traffic in public spaces and encourage a shift towards more space-efficient, clean, and healthy modes of transportation. The plan's priorities include:

- Choosing for Living Environment: Emphasizing the reduction of car traffic dominance in public spaces.
- Changing Travel Behaviour: Encouraging a transition to less space-demanding and more environmentally friendly modes of transport.

The SUMP of Groningen represents a forward-thinking approach to urban planning and mobility, with a clear focus on sustainability, environmental responsibility, and improving the quality of life for its residents. While it extensively covers traditional and innovative sustainable mobility solutions, the specifics of addressing automated mobility might be part of broader discussions on future mobility trends and technologies.

City Status

The Qbuzz depot in Groningen is the national pilot site for the autonomous depot. The near/future plans for shared CCAM deployment focus on exploring and developing applications like autonomous manoeuvring within depots, dedicated bus services on segregated lanes, and first- and last-mile passenger services. This effort is in the early to intermediate stage, with ongoing projects and planned tests indicating foundational steps toward broader CCAM integration. Collaborative efforts among governments, public transportation entities, and knowledge institutions aim to advance these technologies, emphasizing safety, efficiency, and inclusivity in public transport systems. The approach involves setting up developmental actions, training programs for personnel, and proactive community engagement to foster acceptance and integration of CCAM into existing transport infrastructures.

Why SHOW

Engagement with SHOW is crucial primarily due to the societal challenges and opportunities identified in the broader context of automated public transport development. The need behind this engagement includes addressing mobility transition, personnel shortages, high operational costs, and ensuring traffic safety, all while fostering economic value and improving the quality of living environments. Automated public transport, as exemplified by SHOW's initiatives, is not seen as a standalone solution but as a significant part of a holistic approach to these challenges. The involvement with SHOW is important to:

- Support the transition towards a more sustainable and efficient mobility system.
- Alleviate personnel shortages by supplementing the workforce with automated solutions.
- Manage high operational costs, making public transport more financially viable and reducing reliance on subsidies.
- Improve traffic safety by reducing accidents caused by human error.
- Enhance the economic value and attractiveness of regions by providing innovative and efficient transport solutions.

These factors collectively highlight the need for collaborative efforts in advancing automated public transport systems, where SHOW plays a pivotal role in aligning various stakeholders towards shared goals and actions for a sustainable and inclusive mobility future.

Objectives of exchange with SHOW

Objective	**Explanation**	
Services to replicate (or add, if CCAM deployment is on-going at site) & SHOW Use Cases of interest	☒	Bus self-navigating in depots to improve safety and productivity: This application focuses on automating the manoeuvring of buses within depots for tasks like parking, charging, or refuelling, and going through car washes. It aims to enhance safety by reducing the potential for accidents in the depot environment and to cut down on operational costs by automating tasks traditionally performed by personnel. This application is particularly valuable for improving the efficiency of depot operations and optimizing the use of space, which is increasingly important with the shift towards electric buses that require charging infrastructure.
Business synergies (OEMs – Vehicle	☐	

Objective	Explanation	
Best practices – Learnings – Advice on Technical / Legal / Operational Level	☒	For deploying Connected Cooperative and Automated Mobility (CCAM) technologies, it's crucial to focus on standardizing technical systems to ensure compatibility and efficiency across services. On the legal front, actively contributing to the development of European regulatory frameworks is essential to facilitate the testing and deployment of new automated vehicle types. Operationally, forging public-private partnerships and conducting continuous evaluations with all stakeholders are key strategies. These collaborative efforts, regulatory engagements, and adaptive learning processes are foundational for seamlessly integrating CCAM technologies into the public transport infrastructure.
Other	☐	