



SHared automation Operating models for Worldwide adoption

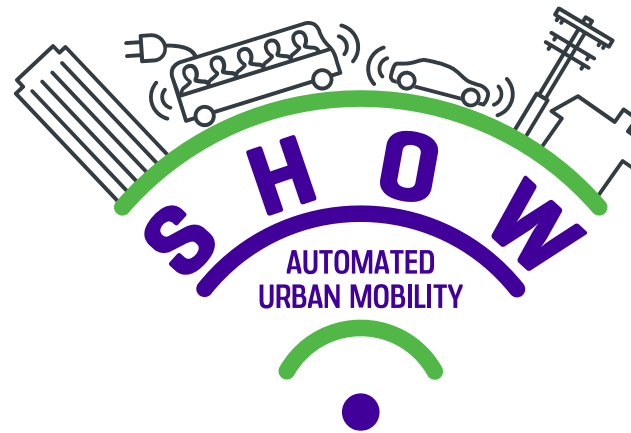
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Lessons learned from SHOW – Tampere site

Pekka Eloranta, Sitowise Oy 19.10.2022





Tampere Pilots in Hervanta Suburb



Where is Tampere?

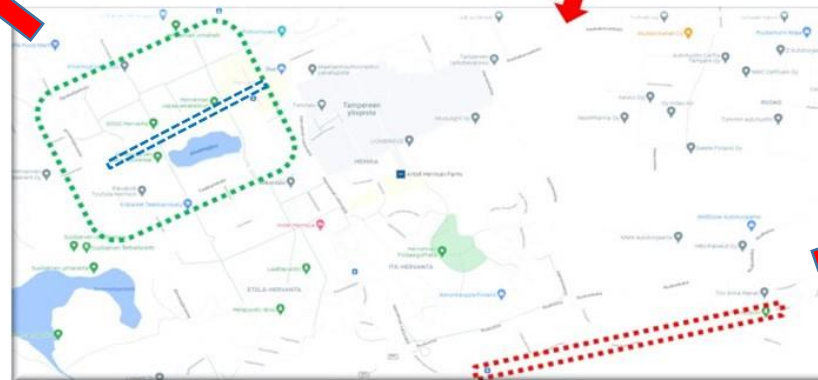
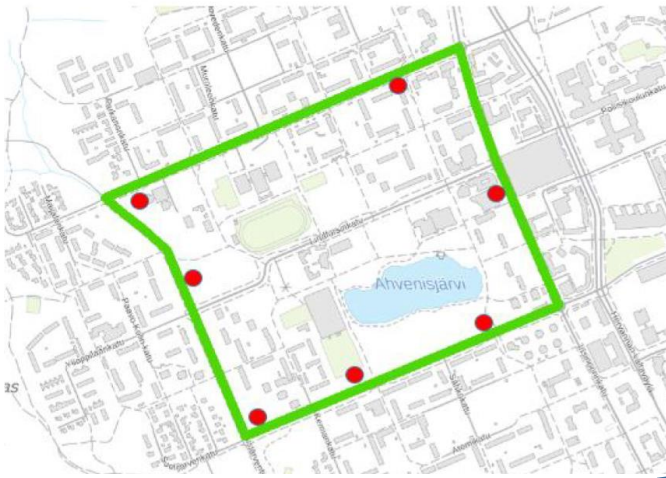


Background

- Tampere (www.tampere.fi/en) is the most populous inland city in the Nordic countries.
- Tampere Vision 2030 document aims to make the City a forerunner in the development of smart city and sustainable transport services.
- 10th SUMP Award was given to Tampere and the ambitious SUMP plan has focus on low-carbon mobility, road safety, vulnerable groups, smart mobility solutions, physical and mental well-being, accessibility and low pollution levels.
- Tampere has tested various pilot actions like active school trips by bicycle, on foot or by e-scooter, zebra crossing campaigns, also highlighting the fundamental role of mobility in the creation of quality urban spaces.



Hervanta pilot routes 2022 - 2023



Strategies

- Tampere strategies derive from the National Carbon Neutrality Roadmap and preparations for road traffic carbon/emission trading scheme (ETS).
- Focus in Tampere is the development of an integrated public transport system, where all the modes, also micro mobility, are essential elements.
- The strategic objective set in the 2017 – 2021 Mayor Programme was to have automated feeder transport services in use during 2021 as an integrated part of the Tampere City transport system.
- By the end of 2021, as part of the SHOW project activities, automated vehicle feeder transport pilot to the tram was deployed in the Hervanta suburb in Tampere and test runs with selected users took place. The actual piloting started in the beginning of 2022.



Objectives & Scopes

- Tampere Energy and Climate Roadmap 2030 includes 236 actions under six themes: urban planning, mobility, construction, energy, consumption and nature.
- The Roadmap states that the aim is to promote low-carbon, energy-efficient transport through various mobility service solutions, systems, and chains to be implemented during the coming years.
- Future backbone of the Tampere new smart mobility (public transportation) system is a 20 km long tramway, running between the City Centre and Hervanta suburb since 2021 and later between City Centre to and Lentävänniemi suburb by 2024.
- Thus, the new tram will be complementing the effective and electrifying areawide public transport services.
- There are plans for the future enhancement of the tram by 2040.
- This means that there will also be need for additional future feeder transport services.



Tampere Testbed

- A permanent test area/environment, where different organizations can test and develop various smart transport solutions is being developed in the Hervanta suburb.
- The development work is done together with local companies, research organizations, and educational institutions.
- The test area offers companies and research institutes with an excellent opportunity to develop and test new smart transport and automated mobility services in a real urban/suburban environment.
- The development work for the test area was started in the ERDF project “Smart City Test Area – Towards Level 4 Automated Transport” and continues
- In this permanent test area automated vehicles and micro mobility services can be integrated with the new tramline as an essential part of the sustainable public transport system.



Tampere Pilot(s)

- Especially the issues that are related to shared mobility, automated transport, feeder & first/last km services and seamless integrated public transport system are essential.
- City aims to offer sustainable and integrated mobility services and a transport system that will attract private car users voluntarily to start using more environmentally friendly public transport services, city bikes, e-scooters, and walking.
- The digital and physical infrastructure planning and development aims to support this modal shift.
- In wintertime the roads and streets are icy and slippery. Lane markings are covered with snow which may also be drifting causing poor visibility.
- Automation of services are expected to decrease the operational costs and reduce the number of incidents and accidents caused by the human factor.
- Access to mobility services and mobility information is essential.
- City makes efforts to develop “Smart Mobility Hubs” and utilize the possibilities of 5G networks to meet accessibility and mobility challenges.
- Automated transport services are planned to act as an essential part of the integrated public transport system, providing especially feeder transport and first/last km services for all users, including different special user categories.



Pilot(s) in Hervanta 1/2

- Hervanta, a suburb of some 30.000 inhabitants and 13.8 km² in southern Tampere is an ideal location for automated mobility service piloting with a lot of students, elderly, disabled & handicapped, immigrants, homemakers, commuters etc. which all are potential and targeted users of the automated service. Also, business travelers and tourists visit Hervanta frequently and are potential users.
- The Hervanta pilots can offer test service providing mobility solution for local inhabitants with cooperative connected and automated vehicles. The pilot phase 1 was launched in January 2022.
- The duration of the first piloting phase was set to mid-March 2022 with two Toyota Proace vehicles
- The first phase of the pilot service operated in spring 2022 on a circular route of some 3.5 km on public streets. One section of the route operated on a busy stretch of a street with the main tram and bus stops in front of a large Duo shopping mall.
- The phase 1 feeder services to tram operated at some 10 minute intervals between 8:30 – 15:30 on weekdays.



Pilot(s) in Hervanta 2/2

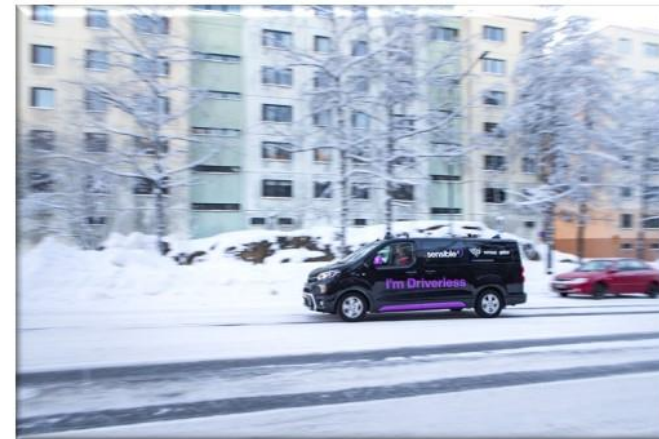
- In phase 2 one Auvetech shuttle bus by VTT (Technical Research Centre of Finland), was used in May-June 2022 on a different 1,5 km route in Hervanta.
- There was a safety driver in the vehicle, but the vehicles drove autonomously, and the safety drivers take control only if needed
- Three more electric shut buses (one EasyMile and two Auvetech shuttles) will used in the Tampere SHOW pilot phase 3 under supervision of a remote control centre. The pre-demo with the Auvetech shuttle is now running now from mid-October to mid-November.
- These vehicles and the control centre will be deployed in the autumn 2022 and the phase 3 piloting will last half a year until spring 2023.
- The number of vehicles is planned to be increased up to some 7 during 2023 in pilot phase 4. Also, geographical coverage will be expanded both in Hervanta and also elsewhere in Tampere.
- Additionally, there are plans to have one route operating in the City of Lahti, some 140 km east from Tampere, under supervision of the same control centre as the Tampere services.



Media Event in Hervanta 11th January 2022

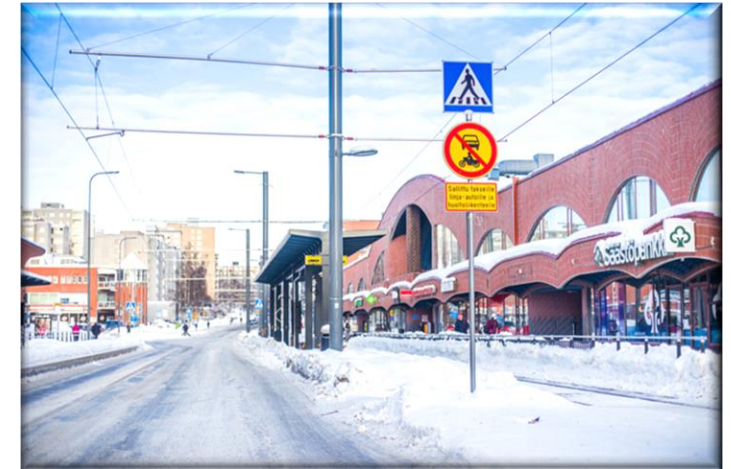


It was -18 Degrees Celcius



Feedback

- Feedback from the test runs that took place before the actual was mainly very positive.
- The Accessibility Working Group members liked and appreciated the automated service very much, but the vehicles were not (yet) as accessible as they should have been and will be. The main messages were:
 - ✓ Easy access, low floors and ramps are needed in the vehicles.
 - ✓ Proper lighting & interior with light colors are essential for the visually impaired users.
 - ✓ Also, vocal information for the visually impaired users is important (arrival to stops, etc.).
 - ✓ For hearing impaired people good signs are needed inside the vehicles.
 - ✓ Enough space for wheelchair and walking aids, etc. is important.
 - ✓ It is also important that the wheelchair users could see out from the bus windows (they are sitting rather low), and therefore big windows are also needed.
 - ✓ Smoothness of driving is essential (no fast movements or sudden braking) for people with impaired mobility using for instance walking sticks.
 - ✓ The vehicles do not have to be fancy and luxurious, but practical and easy to use.
 - ✓ The service as such is, however, very welcome and should be deployed.



Expansion pre-study

- A pre-study was made in February 2022 in a national project running in parallel with SHOW, supporting it and providing data for SHOW.
- The objective was to plan the expansion of the SHOW-pilot and to study the interest and readiness of the potential feeder transport service users in Lintuhytti area.
- The attitudes were very positive, and the users are really interest in the automated services as show in the following 2 slides.



Autonomisen liikkumisen operointi Operation of automated mobility

164 Vastaukset 11:19 Keskimääräinen vastaamisaika Aktiivinen Tila

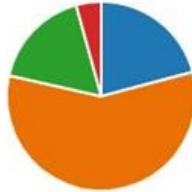
1. Sukupuoli Gender:

● Nainen Female	88
● Mies Male	75
● Muu Other	1



2. Ikäryhmä Age:

● 15-29	34
● 30-45	94
● 46-64	28
● yli 65	7



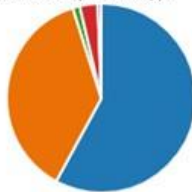
3. Talouden koko (henkilömäärä):

163
Vastaukset

Uusimmat vastaukset
"2"
"2"
"7"

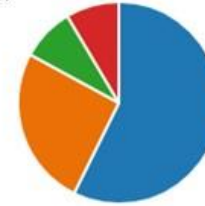
4. Millä kulkumuodolla pääosin kuljette arkisin (ma-pe) matkanne? Which mode of transport you are using on weekdays (Monday-Friday)?

● Omalla autolla Own car	95
● Joukkoliikenteellä Public transp.	61
● Polkupyörällä Bike.	2
● Kävellään Walking.	5
● Muu Other.	1



5. Mihin aikaan arki-aamuisin pääosin kuljette? At what time you normally travel on weekday mornings?

● Klo 7-8	94
● Klo 8-9	42
● Klo 9-10	14
● Muu	14



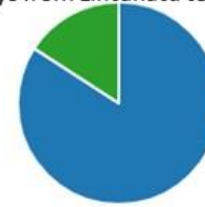
6. Mihin aikaan arki-iltapäivisin pääosin kuljette? At what time you normally travel on weekday afternoons?

● Klo 14-15	16
● Klo 15-16	39
● Klo 16-17	91
● Muu Other.	18



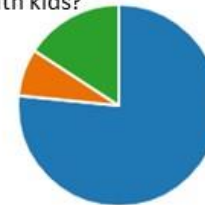
7. Käyttäisittekö automaattibussia, jos se alkaisi operoida arkisin Lintuhyttistä ratikan pysäkille ja takaisin? Would you use the automated bus to travel on weekdays from Lintuhutti to tram and back?

● Kyllä Yes	138
● Ei No	0
● Ehkä Maybe	26



8. Käyttäisittekö automaattibussia arjessa tapahtuvaan liikkumiseen myös lasten kanssa? Would you use the automated bus on weekdays also with kids?

● Kyllä Yes	121
● Ei No	12
● Ehkä Maybe	25



9. Mikä pitäisi olla automaattibussin vuorotarjonta, jotta käyttäisitte sitä?
Which should be the intervals of service to make you use automated bus?

● 7,5 min	58
● 15 min	91
● Tilattaessa On-demand	15



10. Kuinka monta kertaa viikossa käyttäisitte automaattibussia?
How many times would you use automated bus weekly?

153
Vastaukset

Uusimmat vastaukset
"3"
"6"

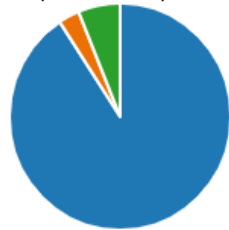
11. Käyttäisittekö automaattibussia viikonloppuisin?
Would you use automated bus on weekends?

● Kyllä Yes	113
● Ei No	9
● Ehkä Maybe	41



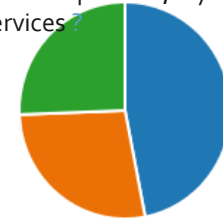
12. Oletteko valmis maksamaan automaattibussimatkasta Nyssen hinnaston mukaisesti, jos kyseessä on vaihdollinen matka (jatkatte esim. ratikalla keskustaan)?
Are you ready to pay for the service the normal public transport fee, if you are using feeder service (for instance connection to tram)?

● Kyllä Yes	148
● Ei No	5
● Ehkä Maybe	10



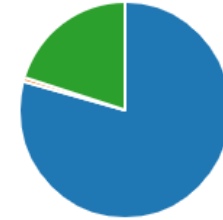
13. Oletteko valmis maksamaan pelkästä automaattibussimatkasta Nyssen hinnaston mukaisesti (käytte esim. Hervantajärven uimarannalla)?
Are you ready to pay for the service the normal public transport fee, if you are using automated bus only, with no connection to other public transport services?

● Kyllä Yes	77
● Ei No	45
● Ehkä Maybe	42



14. Arvioikaa mielikuvaan perustuen seuraava väittämä: automaattibussissa matkustaminen tuntuu turvalliselta
Do you agree with statement: "Traveling in automated bus feels safe".

● Kyllä Yes	130
● Ei No	1
● En osaa sanoa Do not know	33



Conclusions

- The development of automated electric buses continues and in Tampere the longer-term objective is to use only electric or even hydrogen buses as feeder means to the tramway in several geographical areas.
- Thanks to the long-term development objectives, the Tampere City strategy - Vision 2030 Tampere is in a very good position and committed, when it comes to development of automated feeder and first/last km services as part of the public transport concept that will be accessible, inclusive, integrated, seamless and environmentally friendly.
- The City of Tampere expects that all the planned measures in SHOW will support the strategic objectives of the City. As it has been stated in the Vision 2030 title, the City of Tampere wants to fulfil the promise “Tampere – Best for You”.



Thank You



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