



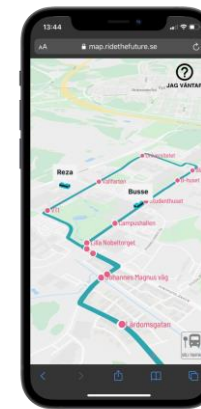
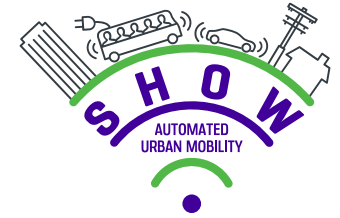
Linköping

Lessons learned

Anna Anund, VTI and the local demoboard



LINKÖPING DEMONSTRATION SITE



www.ridethefuture.se



vti

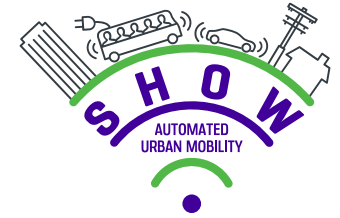
Technical aspects – External vehicle related



- Prio 1 is given to external safety
- Brakes for everything
- Maintenance of high importance
- Make sure moveable things are avoided.



TECHNICAL ASPECTS – INFRASTRUCTURE VEHICLE RELATED



- Prio 2 is given to internal safety
- Road width & the risk of entrances into the shuttle’s “safety bubble”: route planning & plans for handling
- Passengers
 - No standing passengers
 - Forward-facing need to buckle up
 - No wheel chairs if not mounted (Navya not possible to use)
- Safety operator - support to avoid falls



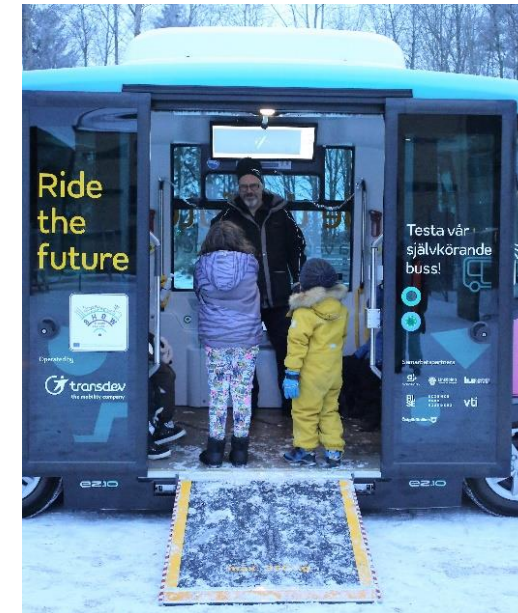
Technical aspects – information and communication with VRU



- No standards for sound and light communication
- No confirmation between shuttle and VRU communication
- No standard on how to mount and take on/ drop of passengers
- No clear design in relation to existing infrastructure

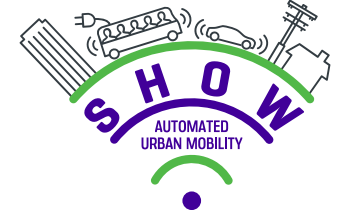


Safety operators - a different role – but still very important



Engage users - (stakeholders, safety operators, visitors, passengers and potential users)





DO NOT UNDERESTIMATE THE PREPARATION NEEDED

- The purpose of the operational operation must guide the choice of vehicle brand
- The balance between external and internal safety is important to secure both passengers and those outside, an improvement of the interaction and intention strategy is a must.



INCREASED FOCUS ON MEASURES TO AVOID HARD BRAKING AND STOPPING



- **Road width:** avoid other vehicles/objects entering the vehicle's "safety bubble".
- Prepare a plan for daily **maintenance** of the route: trimming grass/ trees, snow/gravel sweeping, etc.
- Passengers should **ride seated and seat belts** in forward-facing seats are recommended.
- Ensure that the **safety driver** has something to hold on to while driving, alt. safety arm.
- **Prepare passengers** and other road users for hard braking so they have realistic expectations.



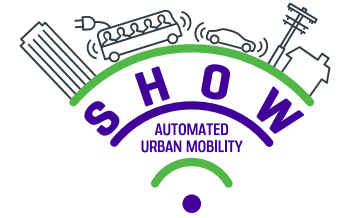
AN EXTRA FOCUS IS RECOMMENDED ON PASSENGERS WITH SPECIAL CONDITIONS



- **Avoid hard braking:** extra focus on vulnerable people, people who need predictability during the journey.
- Work for a **standard** around the use of sound: Hearing-impaired people in and outside the bus need special consideration both inside and outside the bus.
- The **driver's role** will be different: support during disembarkation and boarding, link to safe travel, etc. What knowledge is required, what type of personal conditions, etc.
- Fitting a **wheelchair** is not optimal. There is no backrest to mount against. Forward/backward should be investigated.



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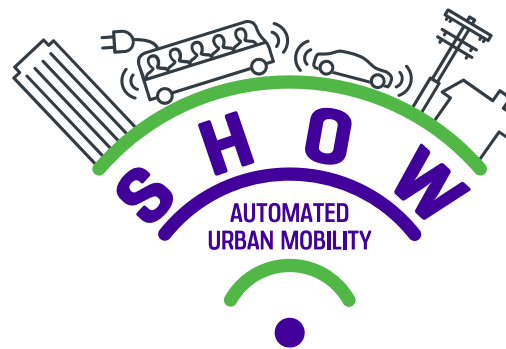
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Source:

<https://www.sciencedirect.com/science/article/pii/S2667091722000097>



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