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Can autonomous vehicles for local public transport be a game changer for the mobility of young people in rural areas?

YOUMOBIL-Conference 03/17/2022 in Weißenfels

Project AS-NaSA – Automated Shuttle Buses – Benefit Analysis Saxony Anhalt
Project AS-UrbanÖPNV – Automated Shuttle Buses – UrbaÖPNV



SACHSEN-ANHALT



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- 1 Autonomous Vehicles for Local Public Transport**
- 2 Smart Urban Mobility**
- 3 Autonomous Bike Sharing for the Mobility of Young People**

Advantages of Automated Driving

- + Lower fuel consumption
- + Lower emissions
- + Lower vehicle stock
- + Lower mileage
- + Less land consumption
- + Better traffic flow
- + Improved safety
- + Fewer traffic accidents
- + Increased mobility for all population groups
- + Travel time can be used differently
- + New jobs created
- + Lower mobility costs / delivery costs



Figure: Thyra Floh (Foto: Beckmann)

Disadvantages of Automated Driving

- Enormous effort for the legislator
- Errors in the system lead to accidents
- Possible attacks by hackers
- Ethical issues are not clarified
- Large investments in infrastructure are needed
- Jobs will be destroyed

Automated Shuttle Bus

- **Features:** Small vehicle size, electrically operated, shared use
- **Areas of Application:** Last Mile, Feeder to Main Axes, Rural Areas, Urban Peripherie, Small Towns, Business Parks, Tourist Destinations
→ Improving the overall public transport / Creating a "real" alternative to the car

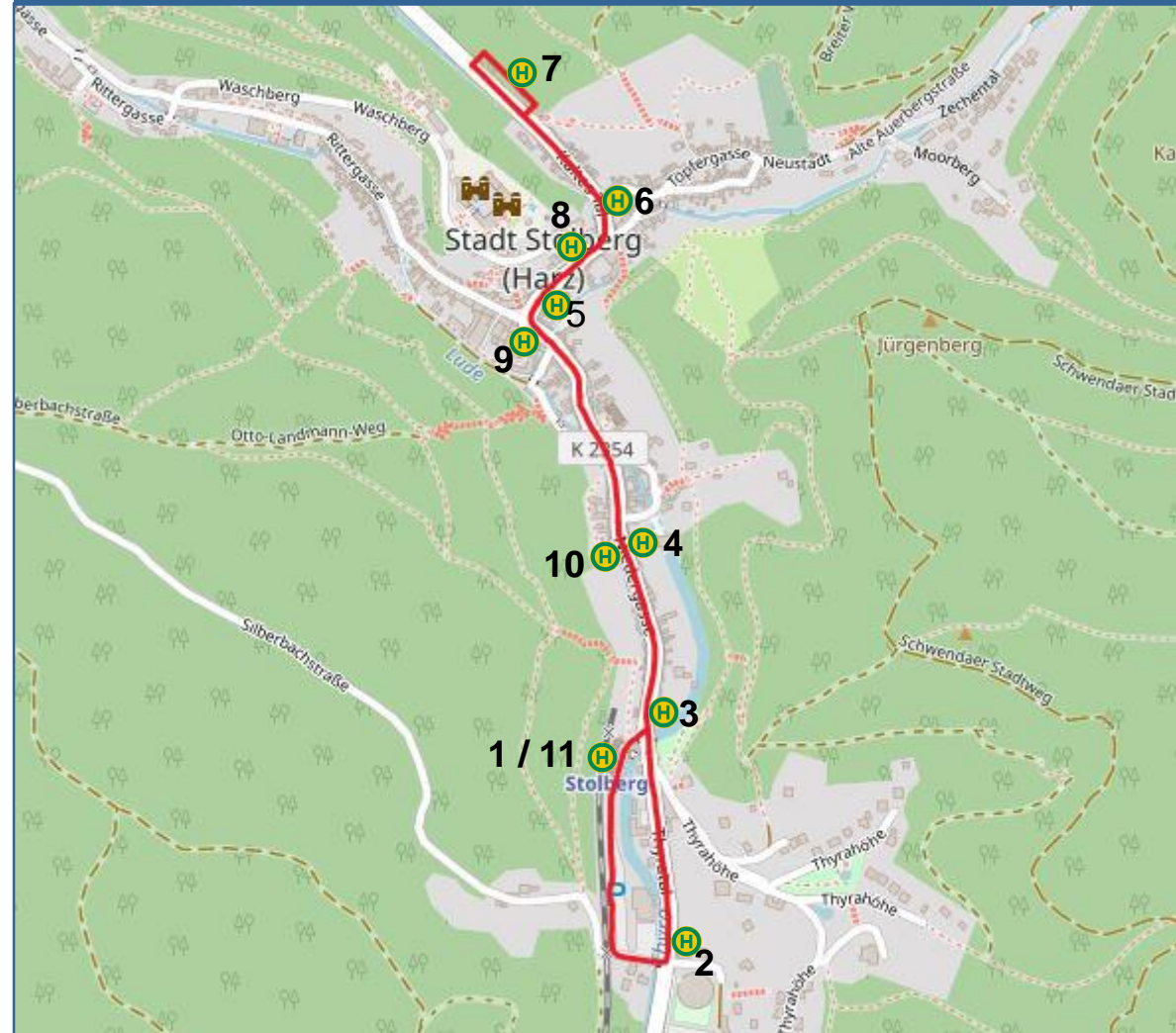
AS-NaSA

- **Aim:** Deployment of an automated shuttle bus in Stolberg (Mansfeld-Südharz) and determination of the benefits of automated shuttle buses in local public transport in Saxony-Anhalt.
- **Focus:** User acceptance, potential analysis, impact analysis and economic feasibility study



Figure: Thyra Floh (Foto: Beckmann)

Railway station – Kaltes Tal Car Park – Railway Station (3.2 km)



Savings in CO₂ emissions scaled up to Saxony-Anhalt

- ▶ If an estimated total demand is realised in major and medium-sized centres as well as cities with more than 5,000 inhabitants, more than 2,300 t CO₂/a will be saved.
- ▶ The use of autonomous shuttle buses is scalable and can be implemented according to demand.

Saxony Anhalt	Quantity	Shuttle buses per location	Demand Shuttle buses	t CO ₂ /a per shuttle bus	t CO ₂ /a total	t CO ₂ /a total cumulative
Upper Centres	3	10	30	15,9	477,0	477,0
Middle centres with upper-centre sub-functions	7	4	28	15,9	445,2	922,2
Middle centres	15	2	30	15,9	477,0	1399,2
Cities without middle/upper centre	59	1	59	15,9	938,1	2337,3
Cities (> 5.000 Inhabitants)	84	from 104 cities	147	<- Potential total demand shuttle buses SA		



Electric replaces Diesel



- ▶ Automated driving in public transport requires further development steps.
- ▶ Small automated shuttle buses will complement public transport well in the future.

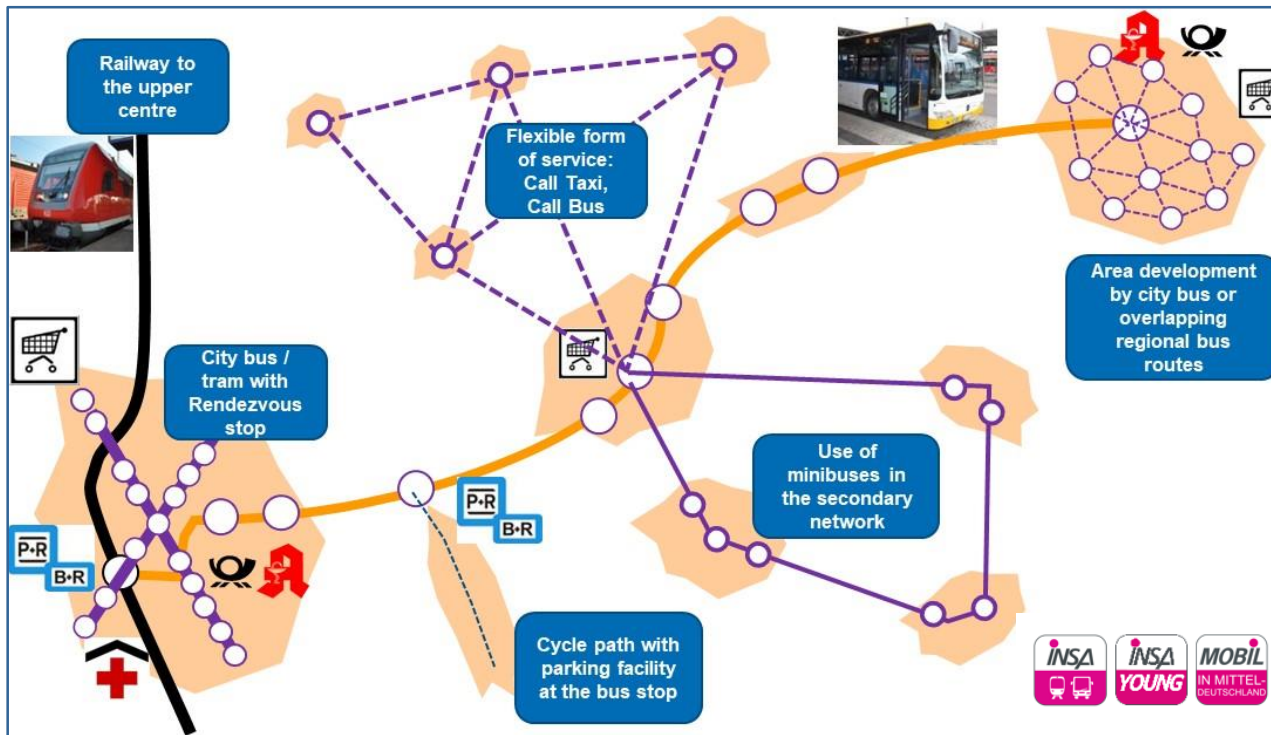


Figure: NASA GmbH

Key factors for acceptance among young people

- + Speeds required that are comparable to classic public transport
- + On-demand transport/ call-bus
- + Door-to-door transport or door-to-transfer point transport
- + Use travel time for other purposes
- + Lower mobility costs
- + Possibly new jobs
- + ...

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► The importance of local mobility will increase significantly due to small electric vehicles ...

Bajaboard



SEGWAY



PEDELEC



Trikke



Airwheel Q3



RYNO



SCUDDY



Figures: Segway, Scuddy, Ryno, Trikke, Bajaboard, Airwheel

► ... with more pleasure in mobility ...



Figures: www.scooser.com

Electric Vehicles for Local Mobility: Podbike Frikar as weather-protected Pedelec

► ... also for business people ...

... and vertically parking.



Figures: <https://www.podbike.com/>

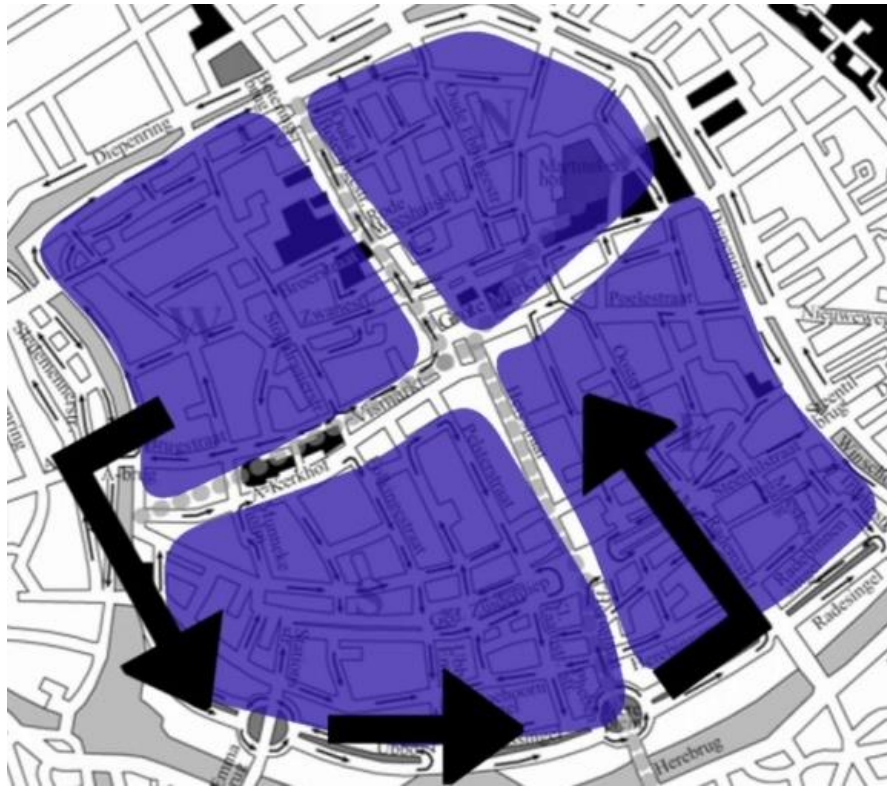
► Mobility station in Vienna: Linking public transport and micromobility for the last mile



Figure: Copyright by Qimby (<https://qimby.net/image/1038/wienmobilstation-simmering>)

Example Groningen (NL) - The true Cycling Capital (around 200,000 Inhabitants)

- ▶ Principle of "filtered permeability": direct connections between sectors no longer possible for private transport.
- ▶ Travel time as an incentive to switch to environmental transport.



Figures: Streetfilms

Reference: 14.10.2013 - <http://www.zukunft-mobilitaet.net/34091/urbane-mobilitaet/groningen-niederlande-radverkehr-dokumentation/>

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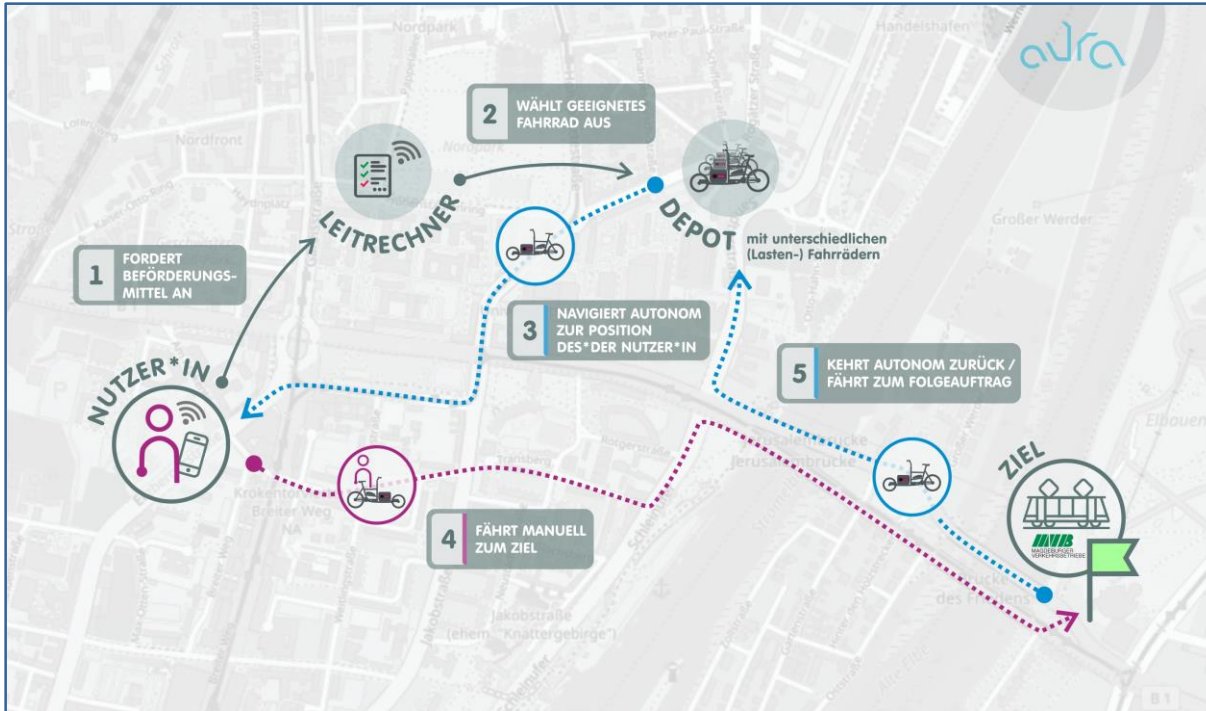
Overcoming the Challenges of Conventional Bike Sharing



Figures: Projekt AURA, Dr. Tom Assmann, 2022



Concept Autonomous Bike Sharing



Your Bike:

- called by app,
- where you need it,
- when you need it.

Enables:

- Seamless public transport integration
- Sustainable door-to-door mobility.
- New MaaS-offers
- For the entire city

Figure and Reference: Projekt AURA, Dr. Tom Assmann, 2022

Benefits Autonomous Bike Sharing



- Cost-efficient through autonomous rebalancing
- Predictive redistribution
- User-centric provision
- Possibility to transport goods and children

Benefits towards autonomous cars:

- Lower energy consumption
- Significant lower emissions and traffic

Figure and Reference: Projekt AURA, Dr. Tom Assmann, 2022



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and
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