



Exploring the value of AV in city logistics

4B Are cities ready for Vehicle Automation?

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Objective of the PAV project

The overall objective of the project is to **stimulate the up-take** of electric, shared autonomous vehicles by cities, by developing green **transport- and spatial planning strategies that incorporate autonomous vehicles.**

The PAV Partnership

Network associations/BSOs



Public authorities/Public transport provider



Region Hannover



VARBERGS
KOMMUN

Gemeente Almere

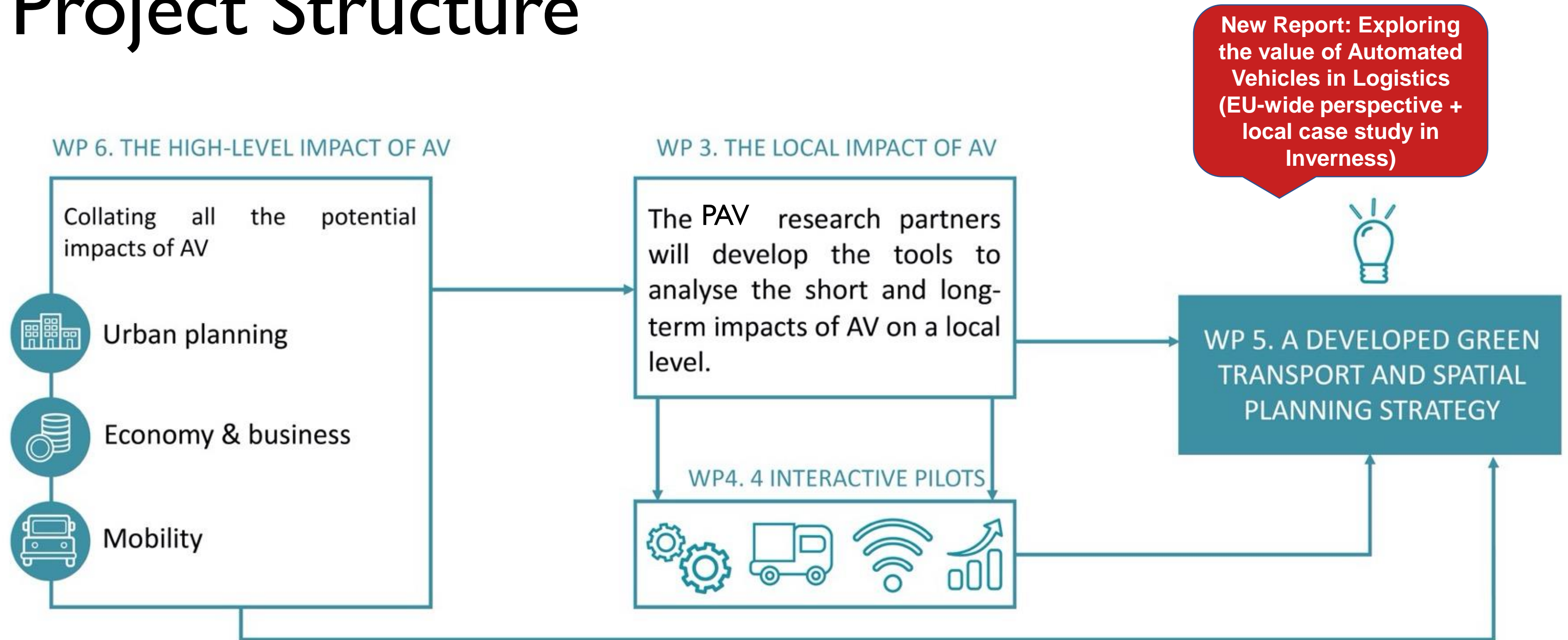


Knowledge Partners



Project Structure

Can we transfer what we learned about AVs in public transport to the field of city logistics?



What are the challenges in city logistics?

- ❖ **Congestion and curbside management**
- ❖ **Land use**
- ❖ **E-commerce + Increased consumption and production**
- ❖ **Workers' welfare, conditions, and lack of drivers**
- ❖ **Complex (and fragmented) regulations**
- ❖ **Green logistics**
- ❖ **Nature of the sector and lack of cooperation**



What is the solution? Is it AV?

The solution will most likely be...
a mix of solutions

Urban Consolidation Centers

Dynamic curbside management

Cargo e-bikes

Urban Vehicle Access Regulations

Maybe AVs?

**Pick-up points and parcel
lockers**

Maybe Drones?



Autonomous Urban Deliveries



Autonomous Delivery Vehicles

Autonomous Ground Delivery Vehicles

Sidewalk Robots

Semi-autonomous sidewalk robots

Follower sidewalk robots

Road Robots

Low speed road robots

High speed road robots

Autonomous Aerial Delivery Vehicles

Drones

Multicopter drones

Hybrid drones

Typology of Autonomous Vehicles for Urban Deliveries

Source: citygloballogistics.org

Images credits: Starship, Kiwibot Neolix and Nuro

Multipurpose Autonomous Vehicles

Shared Vehicles for goods and passengers

Modular vehicles



Image credit: UlaaDs Project, City of Mechelen.

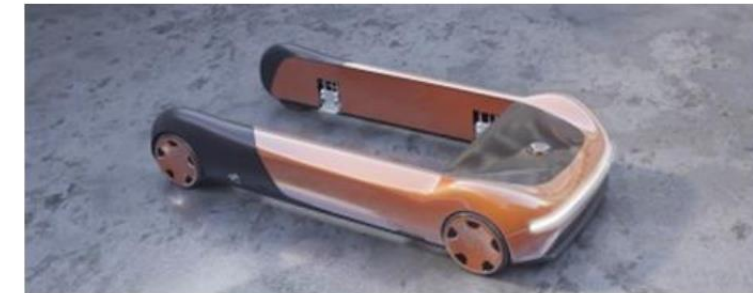


Image credit: German Aerospace Center (DLR e.V.), Ulrich et al, 2019



City-logistics



Public transport



Motorized Individual Transport



Image credit: Next Future Mobility



What benefits can AV bring in city logistics?

What problem/challenge are we solving?

What is promised...

- **efficient use of space**

First, Dynamic Curbside Management strategies need to be in place, AVs alone won't solve the problem

- **less energy consumption**

As compared to conventional vehicles, but not necessarily the most sustainable solution in city logistics

- **improved delivery times**

This will largely depend on the rest of the traffic system and the level of AV penetration + the unloading system at the receiver

- **reduced costs**

Eventually costs would be reduced from the lack of drivers alone, until then a significant investment is required

- **Increased road safety**

Depends on the size of the vehicle, on the infrastructure, on the other road users



**There are still a lot of barriers to widespread
— even narrowspread — deployment of AVs**



What do we need to consider?

- **Size of the vehicle** – should be standardized and regulated, different sizes different rules

- Infrastructure readiness

(sidewalk – people with disabilities, open road – instability mixed traffic, closed road – infrastructure investment // infrastructure quality and digitalization of data/infrastructure)

- Local regulations

(traffic regulation, privacy regulations, safety regulations, access regulations)

- Conflicts with other users

- **Dynamic curbside management**

- **Loading/unloading system**

- **Security of the vehicles and the goods**



Some useful lessons learned from the PAV pilots

- The technology is not there yet, but the potential is
- Policy needs to be aligned with technology development
- The conditions to test the vehicles need to be very controlled i.e speed limits, infrastructure maintenance, favorable weather conditions
- Stakeholders need to work together
- Awareness and education are still very much needed on the topic
- Integration is key to understand the real impact of AV in a network
- Larger schemes for longer period of times are needed



What's next?

- Many city logistics challenges need to be resolved before deploying AV
- City logistics are very diverse in different territories, different cases must be studied → PAV Inverness local case study to shed some light
- The implementation of AV in city logistics is more advanced than in Passenger transport, albeit not for all types of vehicles
- The regulation and coordination of city logistics needs to be better integrated in urban Mobility planning before thinking about implementing AVs
- Cooperation will continue to be essential, different stakeholders have different tasks but there is a need for an increased understanding in the field by all actors
- AVs can have a place in city logistics but they won't be the only solution – players need to determine the most meaningful use cases

Don't miss out on the PAV report at the beginning of 2023!!



Thank you for your attention!

For questions and interest in participating:

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