

EUCAD 2024 session 3
Remote management
- Autonomous vehicles

KEOLIS

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Keolis' remote management activities

- Public transport operator,
- Operating autonomous vehicles since 2016 (L3) and 2022 (L4)
- 178 000 km and 40 000 h
- 55 deployments in 13 countries



**easy
MILE**



ADASTEC
Autonomous Shared Connected

KARSAN



auvetech



NAUYA **Gama**
GAUSSIN MACINCA MOBILITY



**local
motors**




Supervision /
Remote assistance



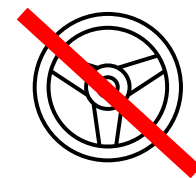
Monitoring / dispatch
/ Fleet management



Passenger
support



+ Cross-functional (remote) technical assistance



No remote driving for cybersecurity reasons

7 vehicles tried in our
Autonomous Mobility Test Site in Châteauroux (France)



Keolis' key lessons learned

- **Safety** is #1 priority – L4 vehicles are intensively trialled in our test site
Responsibility is in the remote manager's hands (*proper training, controlled latency...*)
- Remote management has to be adapted to **local regulations / laws**
ex : France : PACTE (experimentations, 1 manager per vehicle) / LOM (commercial operations, 1 for n)
- **Locally-based** remote management helps (*better assistance for passengers, knowledge of the surroundings, easier and more efficient relationships with field agents*)
- **Standards** need to be set to reach **interoperability** (API integration)
- **Mental overload** and **visual fatigue** should be taken into account in IHM interfaces design and tasks/system/process definition
- **Passenger information support** and reinsurance is essential, including adapted and high quality direct vocal relationship



Keolis' short term perspective / challenges

- **MACH2 project** : L4, 6m electrical and wheelchair-accessible buses, open road city-centre, regular line integrated in the public transport network of Châteauroux (France), operations in 2026-2027
 - ↪ **Connectivity with high priority vehicles**, traffic lights and infrastructure
 - ↪ **Integration of L4 Fleet Management System** functionalities in the current bus network
FMS-PIS software
- **New design for our remote management centre**
 - ↪ Integration of **multi-constructors/AD providers fleet** in L4 remote management
 - ↪ Capitalization on automated metro control centres expertise (ergonomics, process...) to better limit **cognitive overload** and improve **awareness**
- Enhance **user experience and acceptability** thanks to users workshops and feedback

