

AUTOMATED DRIVING AND INFRASTRUCTURE – DREAMTEAM OR ALIEN TO EACH OTHER?

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ASFINAG – Austria's motorway operator



- 2.200 km network
 - 164 tunnels (383 km)
 - 5.192 bridges
- 30 billion vehicle km travelled per year
- 2.742 employees

3 priorities

linking
usefully

connecting
safely

operating
economically

3 key areas

construction

operation

toll

Automated driving brings many challenges for road operators

Technology readiness

Data protection / information security

Mixed traffic

Legal framework

Safety

Capacity/ efficiency

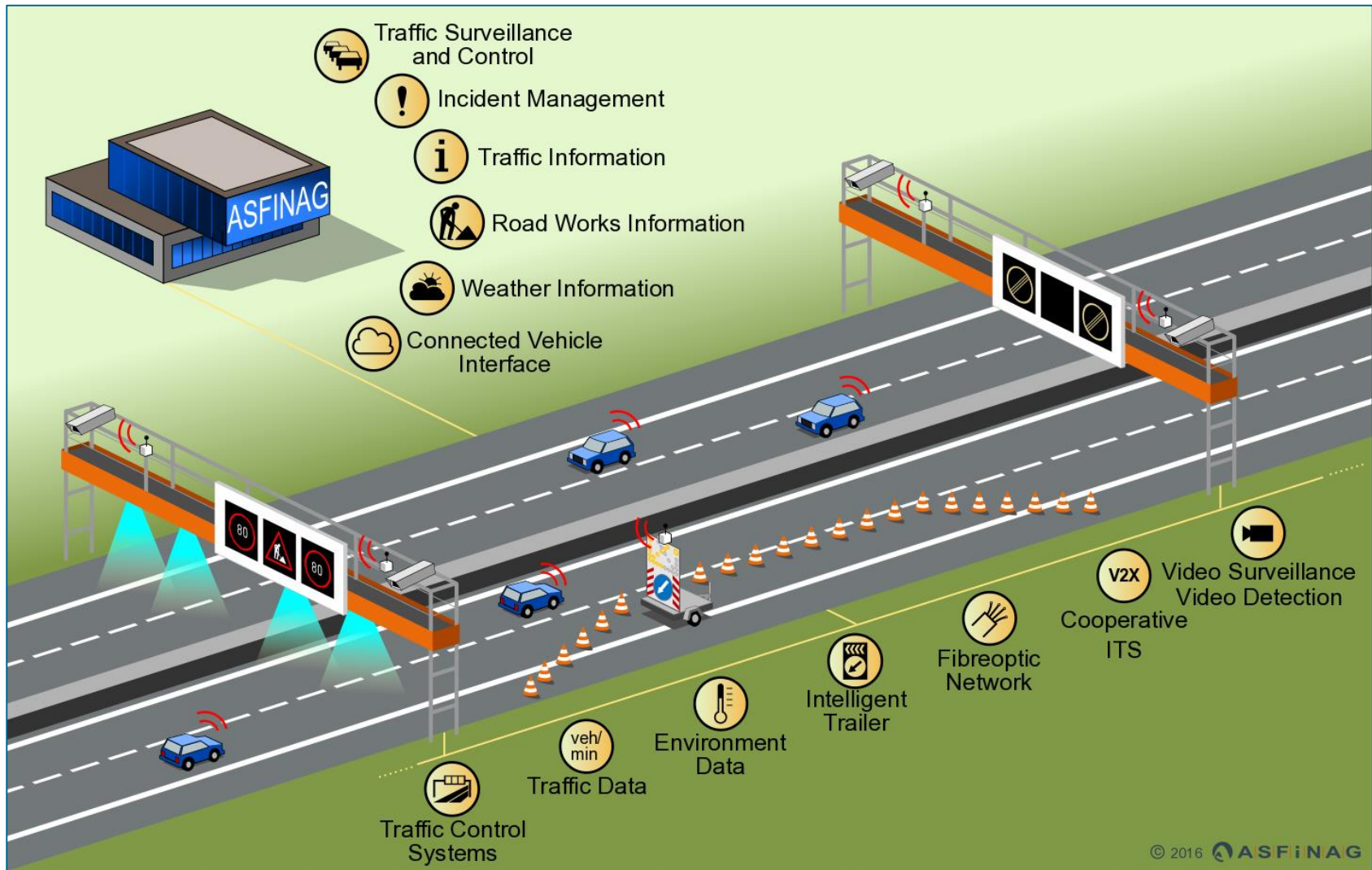
New Communication technologies

Digitalisation

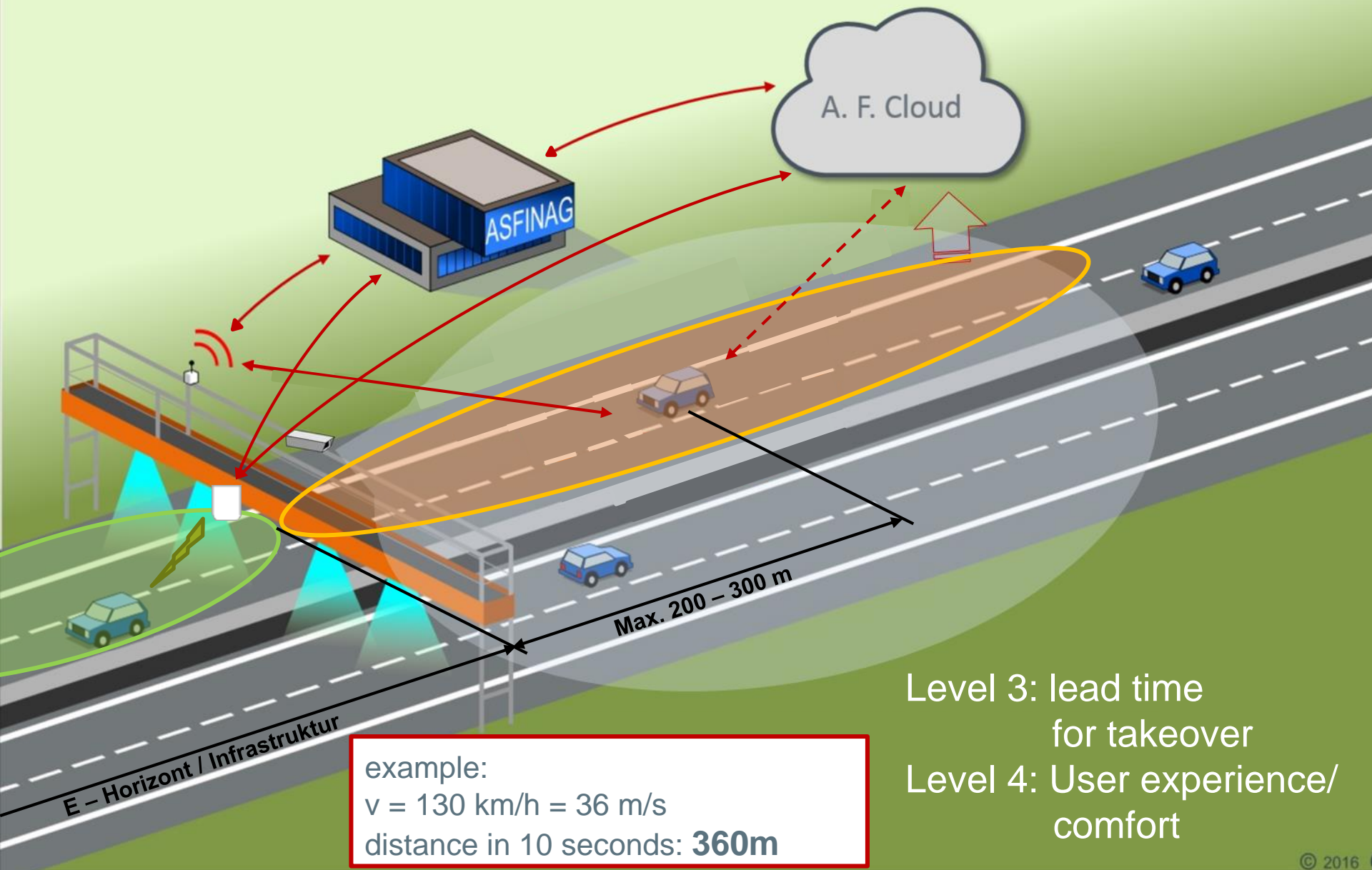
New traffic management procedures

- Road operators can/should contribute to development of AD to tackle challenges
- Public road testing complements other test methods

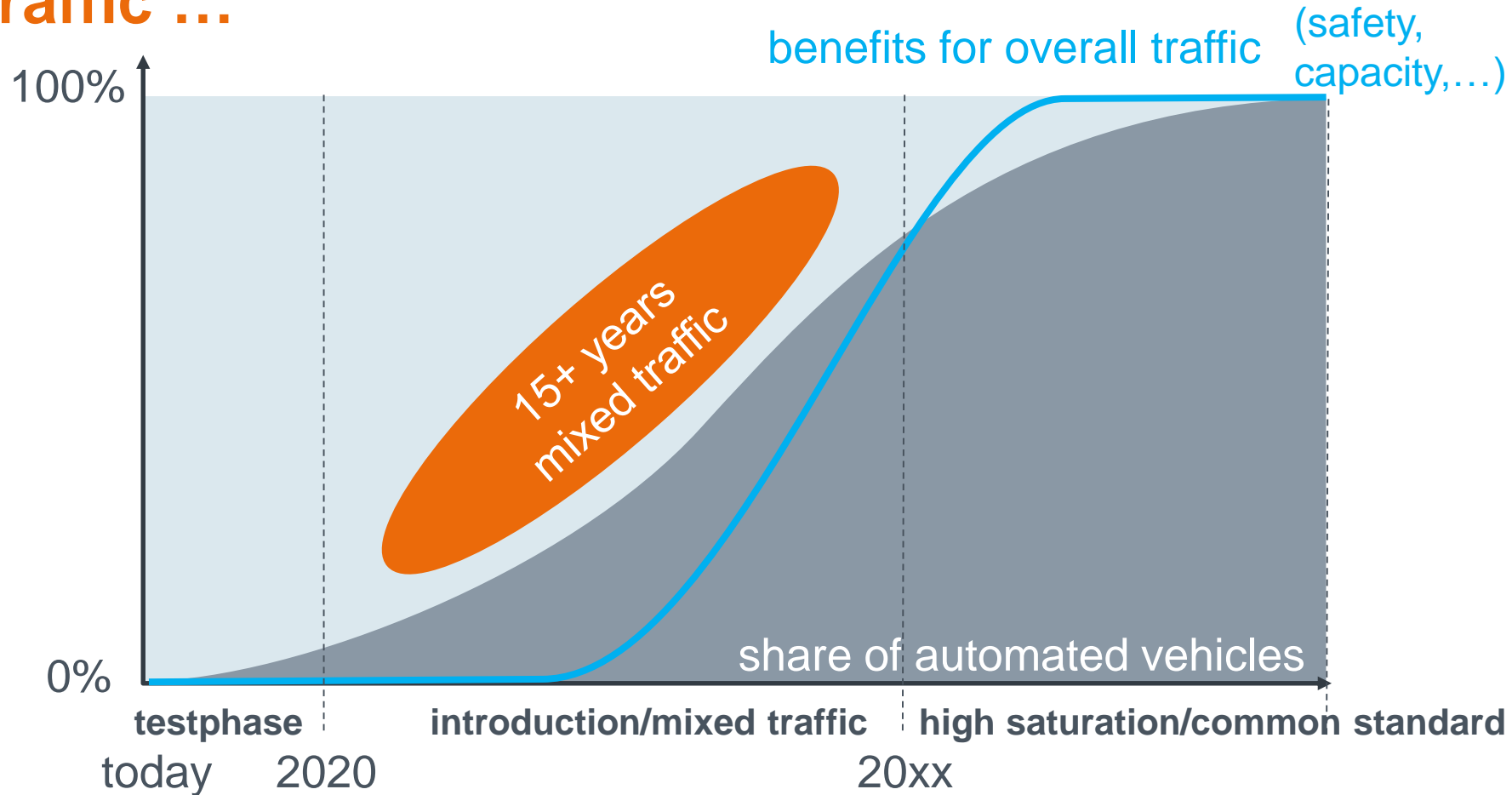
Digital infrastructure offers lots of real time data that can support automated driving



Level 3/level 4 could benefit from combined information horizon of infrastructure and vehicle



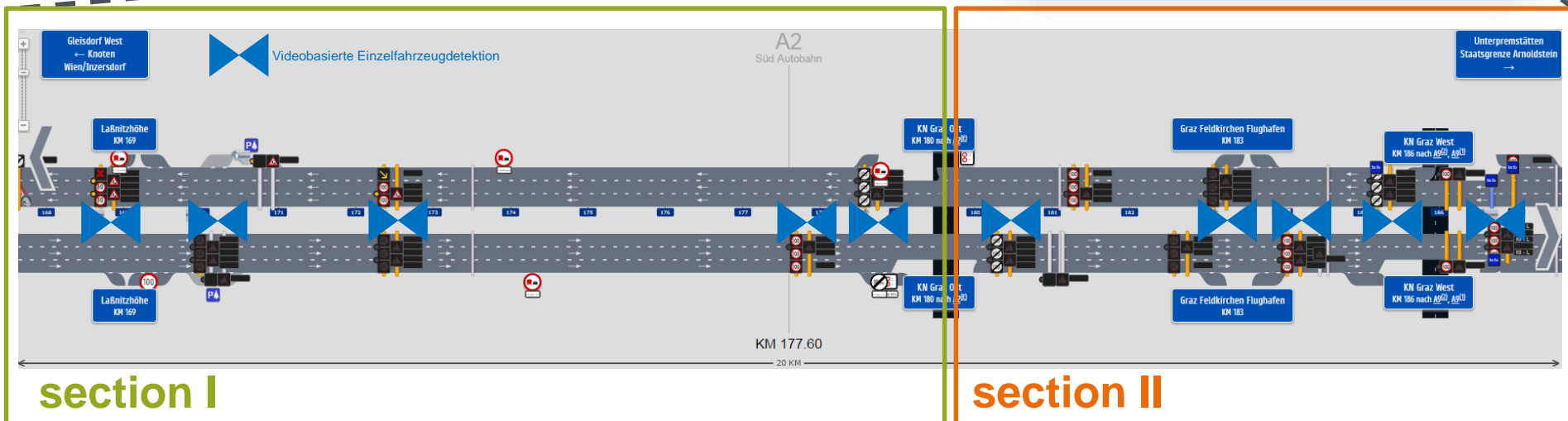
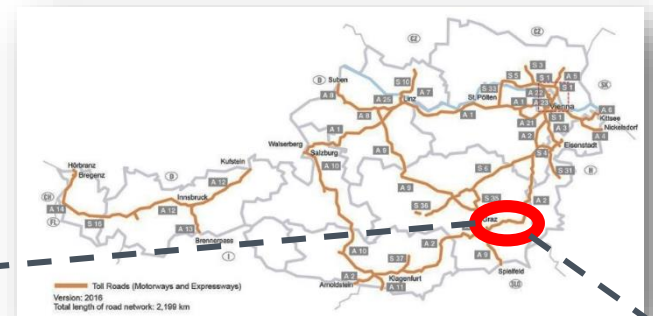
Automated driving functions need a high market penetration to show positive effects on overall traffic ...



... and this will take time!

The first Austrian public testarea covers 20 km of the highway A2 and offers many different traffic situations

- section I: Laßnitzhöhe - Graz Ost
- section II: Graz Ost – Graz West



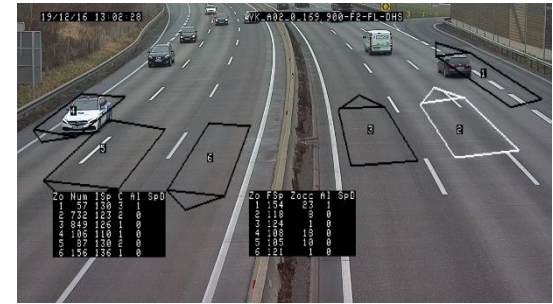
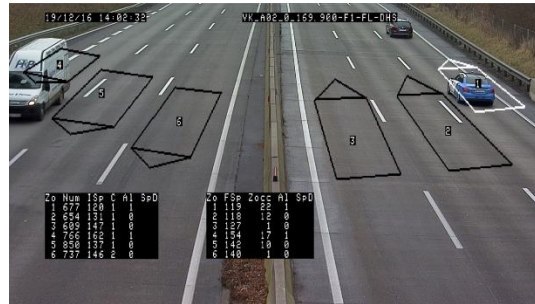
The Austrian testarea along the A2 is equipped with extensive digital infrastructure

- **Standard ASFINAG infrastructure**
 - fibre optics along the network + IP connectivity
 - traffic sensors, weather sensors, VMS,
- **Phase I:** 2016
 - HD-video covering the whole testtrack
 - Videodetection integrated into traffic incident management
 - Virtual 3D-model of the testtrack
 - Integration of all static data related to the testtrack
- **Phase II:** 2017
 - C2X-equipment on VMS-gantries and smart roadworks trailers
 - Integration of data from the traffic management center
 - Further developing the 3D-model to become an integrated analysis tool combining all dynamic data

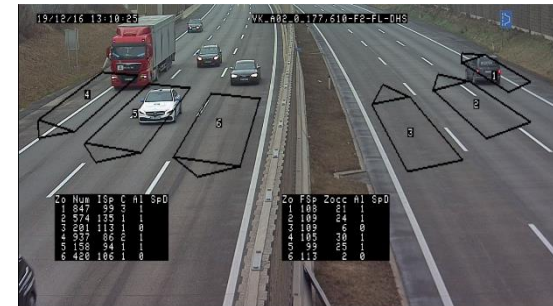
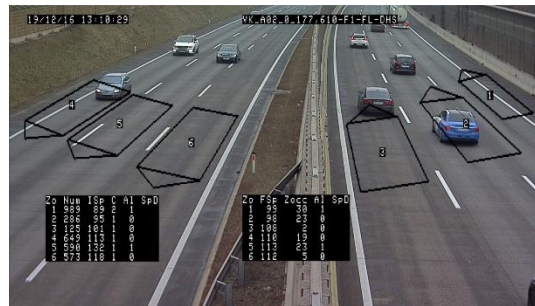
Vehicles can be tracked along the whole testtrack

Videodetection und data for individual vehicles

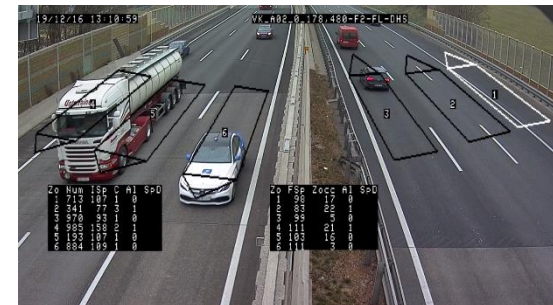
A2 km 169,900
 Class: PKW
 Velocity: 120 km/h



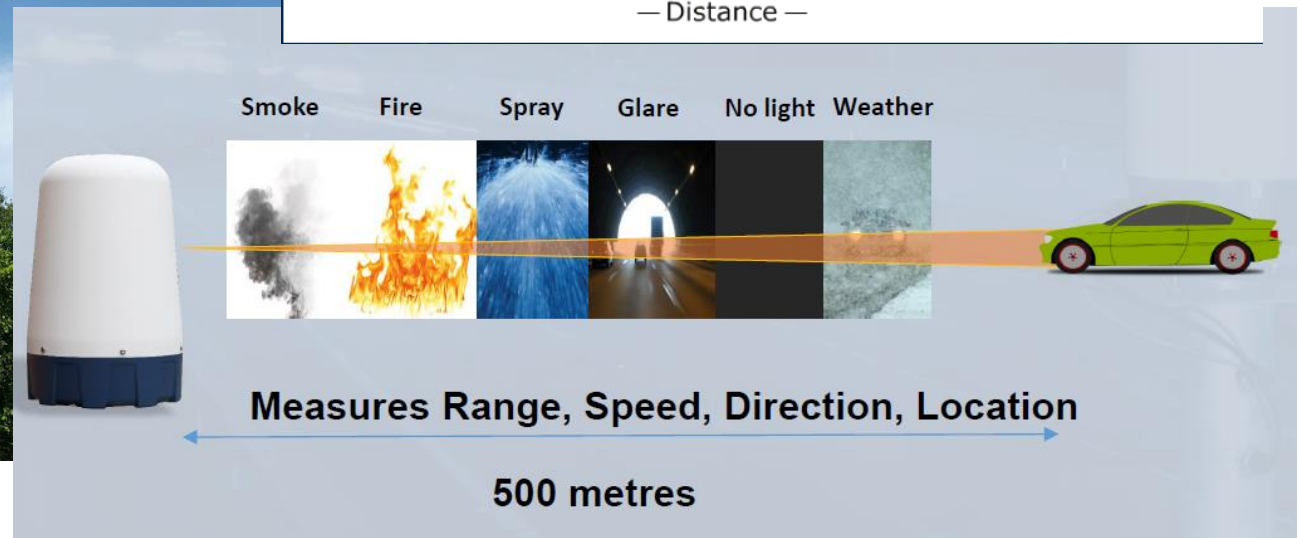
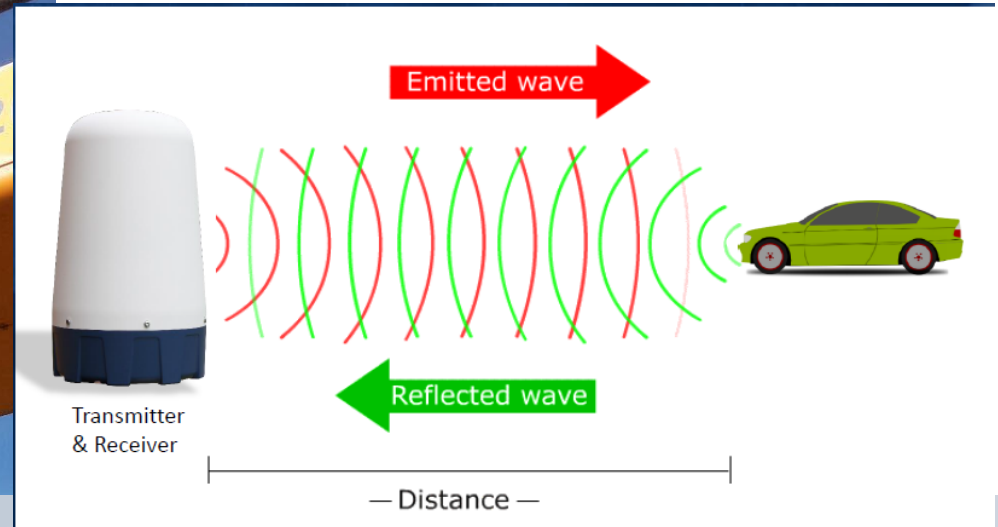
A2 km 177,610
 Class: PKW
 Velocity: 95 km/h



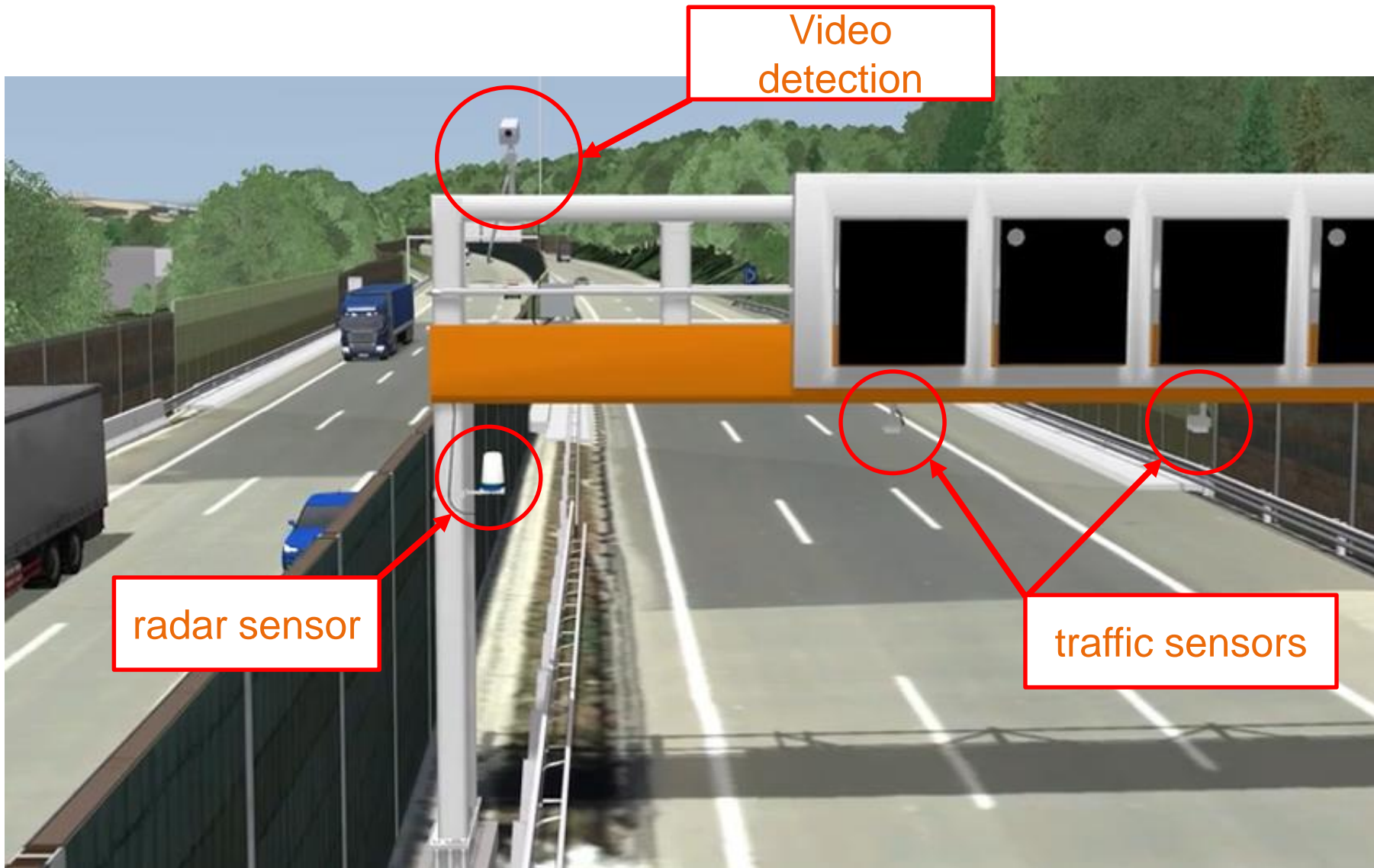
A2 km 178,480
 Class: PKW
 Velocity: 114 km/h



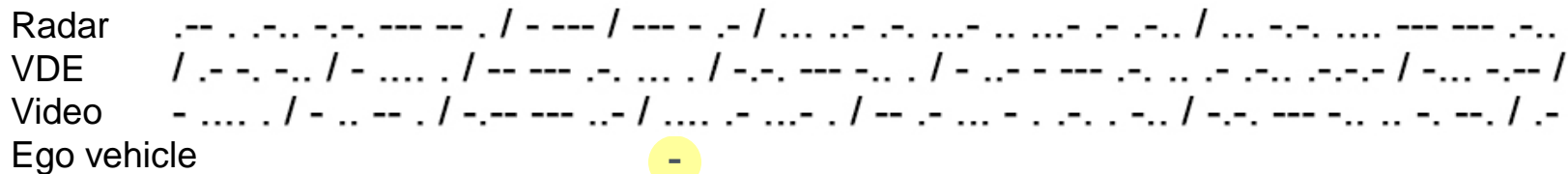
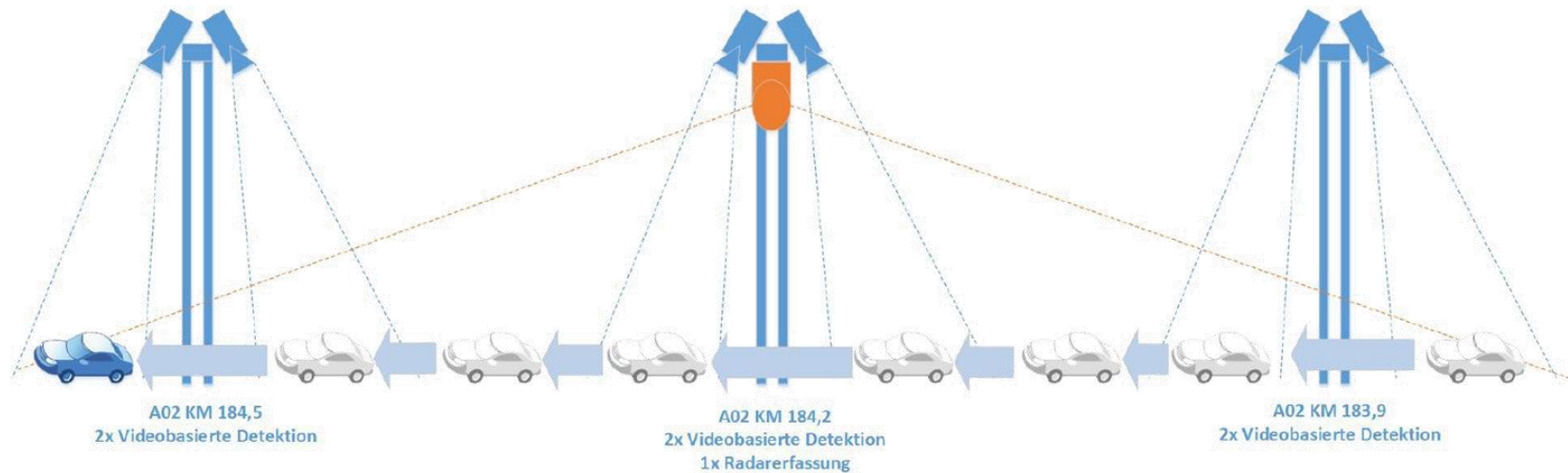
Radar detection lays the foundation for the calculation of vehicle trajectories



All sensors are fully integrated and gantry-based



Data fusion is the answer to get an accurate representation of the traffic



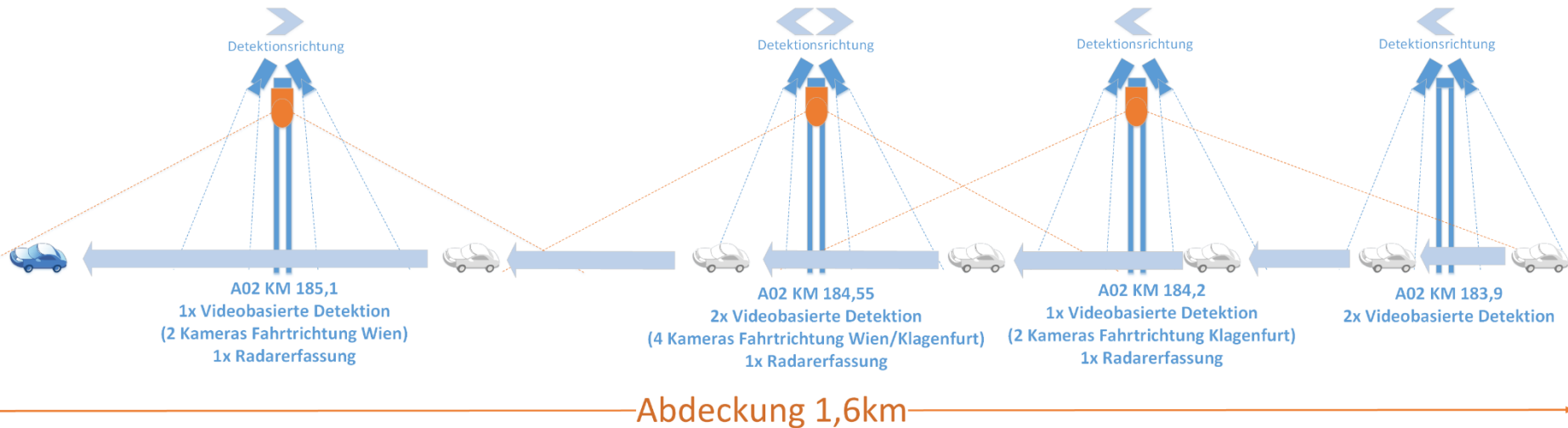
Development:
pattern detection
classification
vehicle trajectories



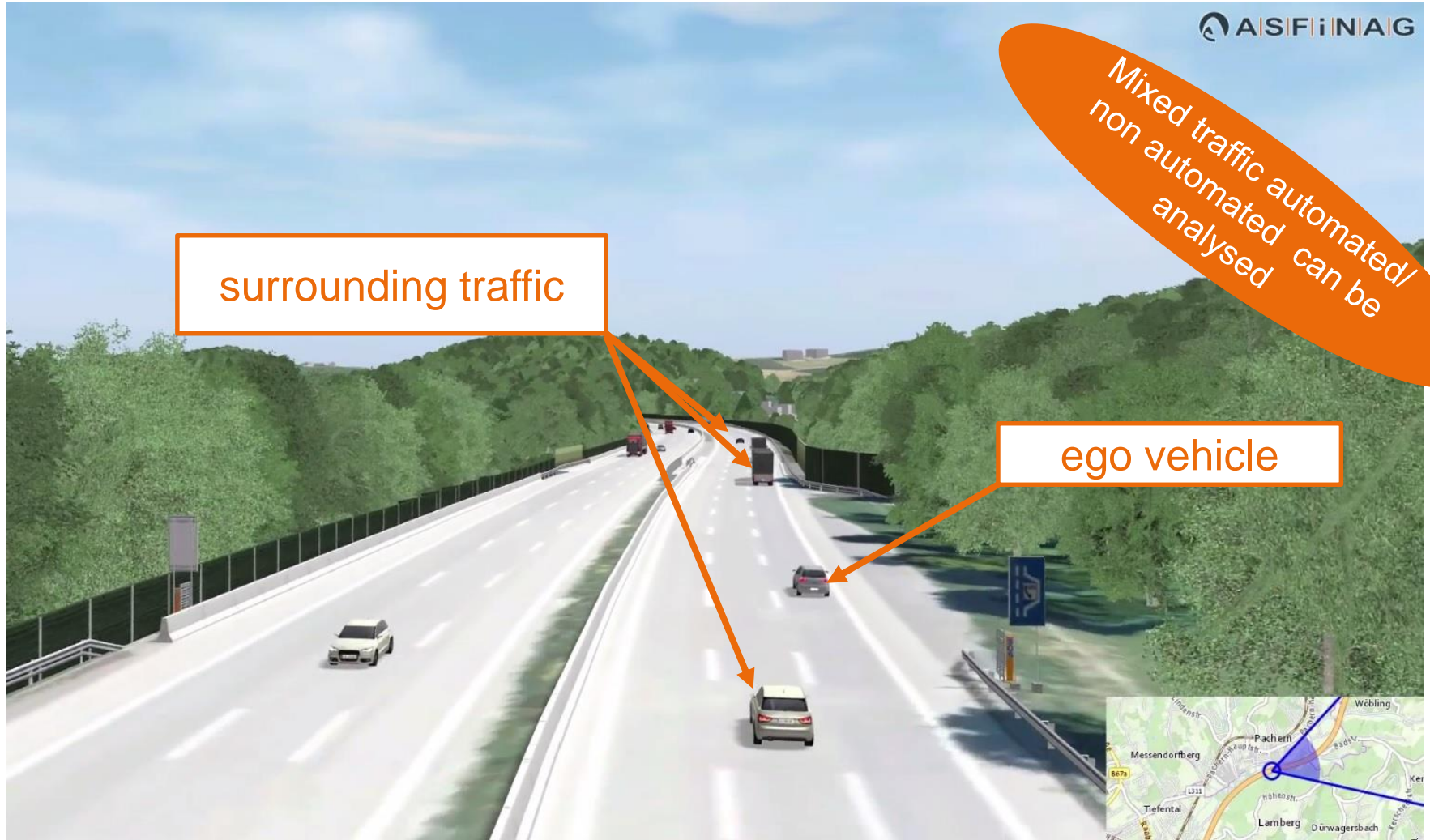
Goal:
Simulation of
surrounding traffic and
ego vehicle

Radardetection will cover 1,6 km by end of 2017

Future use on the whole network is evaluated



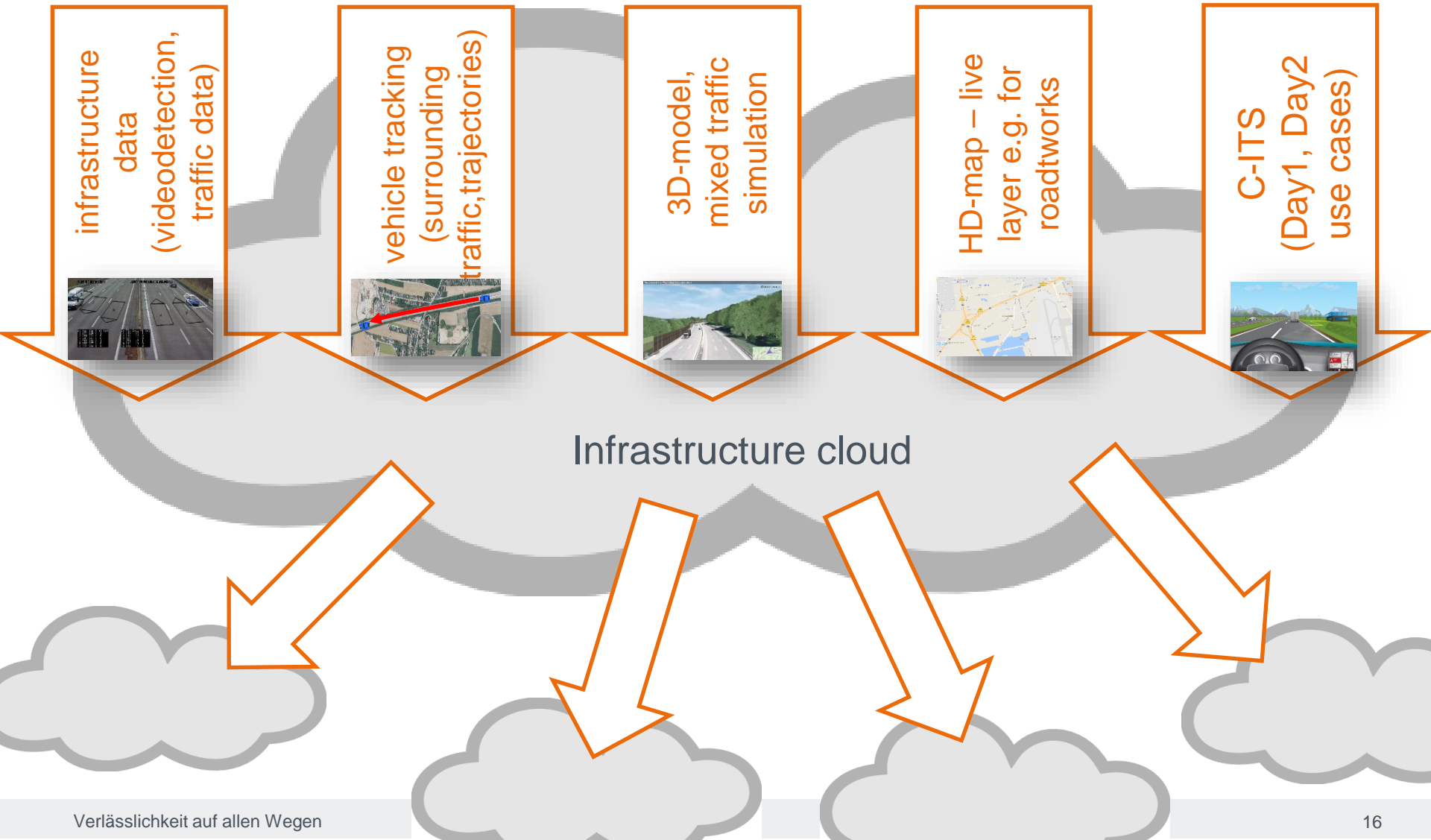
Simulation model



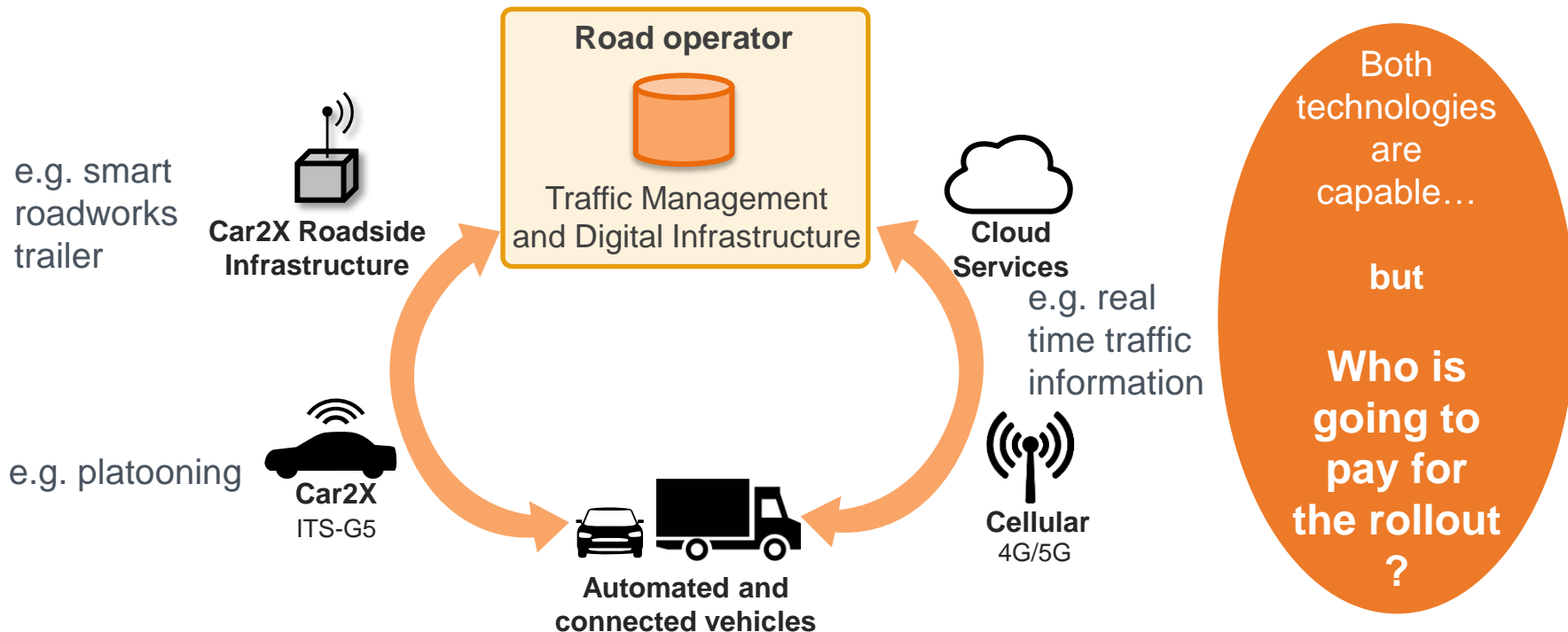
The 3D-model is based on real traffic ASFINAG



ASFINAG offers various services for AD testing



Connectivity of automated vehicles: It's neither 5G nor ITS-G5 – it's both!



Best user experience requires hybrid communication – dependent on situation and use case

Next steps – What does it mean in the long run?

- **Testing and analysis**

- Setting up additional testing areas along the highways
- Perform tests with various partners
- Analysis, Analysis, Analysis



- **Estimate future impacts for ASFINAG**

- Overall capacity in mixed/full AD traffic (different levels)
- Requirements for the physical/digital infrastructure
- Roadworks of the future
- Traffic safety in mixed/full AD traffic (different levels)
- Traffic management of the future
- New interactions with partners along the value chains



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