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

100% toll financed
Automated driving brings many challenges for road operators

- 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

Example:

\[ v = 130 \text{ km/h} = 36 \text{ m/s} \]

Distance in 10 seconds: 360m

Level 3: lead time for takeover
Level 4: User experience/comfort

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

... and this will take time!
The first Austrian public test area 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 test area 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 test track
  - Videodetection integrated into traffic incident management
  - Virtual 3D-model of the test track
  - Integration of all static data related to the test track

- **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

Verlässlichkeit auf allen Wegen.
Radardetection will cover 1,6 km by end of 2017
Future use on the whole network is evaluated
Simulation model

- Mixed traffic automated/non-automated can be analysed
- Surrounding traffic
- Ego vehicle
The 3D-model is based on real traffic
ASFINAG offers various services for AD testing

- Infrastructure data (video detection, traffic data)
- Vehicle tracking (surrounding traffic, trajectories)
- 3D-model, mixed traffic simulation
- HD-map – live layer e.g. for roadworks
- C-ITS (Day1, Day2 use cases)

Infrastructure cloud
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