Next Generation Integrated Mobility:
Driving Smart Cities

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TransAID – Effects of Transitions Related to Highly Automated Driving on Traffic Systems

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 723390
Project details

- **Transition Areas for Infrastructure-Assisted Driving**
- 7 partners from 6 European countries (technology providers, automotive industry, academia, research)
- 12 associated partners
- Coordinator: Julian Schindler, DLR (julian.schindler@dlr.de)
- Start: September 2017 (36M)
- Budget: 3.8 M€
Automated Driving

- Automated driving reaches the market
- Vehicle systems able to drive in SAE level 3 are now reaching series production

System Limits

• Independent of the SAE level, there will be situations where the system reaches its limit
  • Reaching end of supported use case/area
  • Hardware or software failure
  • Situation not understood

• Required action not possible
• Required action not allowed
• Required action not allowed without confirmation

...
Transition of Control to the “Driver”

Beep & Off

Take over request

- Steering wheel existing?
- Pedals?
- Other control device?
- Passengers able to drive?
Driver does not take over control...

- Stopping
- Emergency lights
- Go to emergency lane

Uncontrolled!

Reach safe state

→ “Graceful Exit”

→ Minimum Risk Maneuver
TransAID Research Questions

What happens…
• …if always happening on the same spot?
• …if penetration rate of systems increases?
Baseline Simulations

- Modelling of automated vehicles’ behavior
- Different SAE levels
- Different Minimum Risk Maneuvers
- Different penetration rates of each system
- Different road topologies

→ Leads to rough ideas of possible future problems
Finding solutions:
Hierarchical Traffic Management
Development of Traffic Management Measures

• For the transition performing connected automated vehicle:
  – Early advises
  – Advising stopping areas
  – Advising maneuvers
  – Maximizing safety

• For the others:
  – How to avoid problems
  – Maximizing safety and efficiency
  – Individual (V2X) vs. general advices (Traffic lights, Variable Message Signs)
Example Use Cases

- Vehicle sensor capabilities?
- Vehicle communication capabilities?
- Vehicle system capabilities?
- Available time to transition of control?
- Vehicles around?
- Penetration rate of different systems?
- Infrastructure sensor capabilities?
- Infrastructure communication capabilities?
- Infrastructure sensor communication capabilities?
- TMS capabilities?
- Traffic lights?
- Variable Message Signs?
- Number of Lanes?
- Special Minimum Risk Area available?
TransAID Procedure

Baseline Simulations

Development of Traffic Management Measures

Signalling to conventional vehicles

V2X message sets for connected vehicles

Vehicle automation development

System Simulation

Feasibility assessment in real world
Interaction with Stakeholders

Your input is very much appreciated!

- OEMs
- Cities
- Road Authorities
- Infrastructure Providers
- …
Thanks for your attention!

transaid.eu

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Questions? Inputs?

Traffic simulation SUMO: Visit Berlin-Brandenburg Pavilion @ Exhibition Booth 1924

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