



VIENNA 2018



A digital era for transport

solutions for society, economy and environment

Digibus: Results from the first Self-Driving Shuttle Trial on a Public Road in Austria

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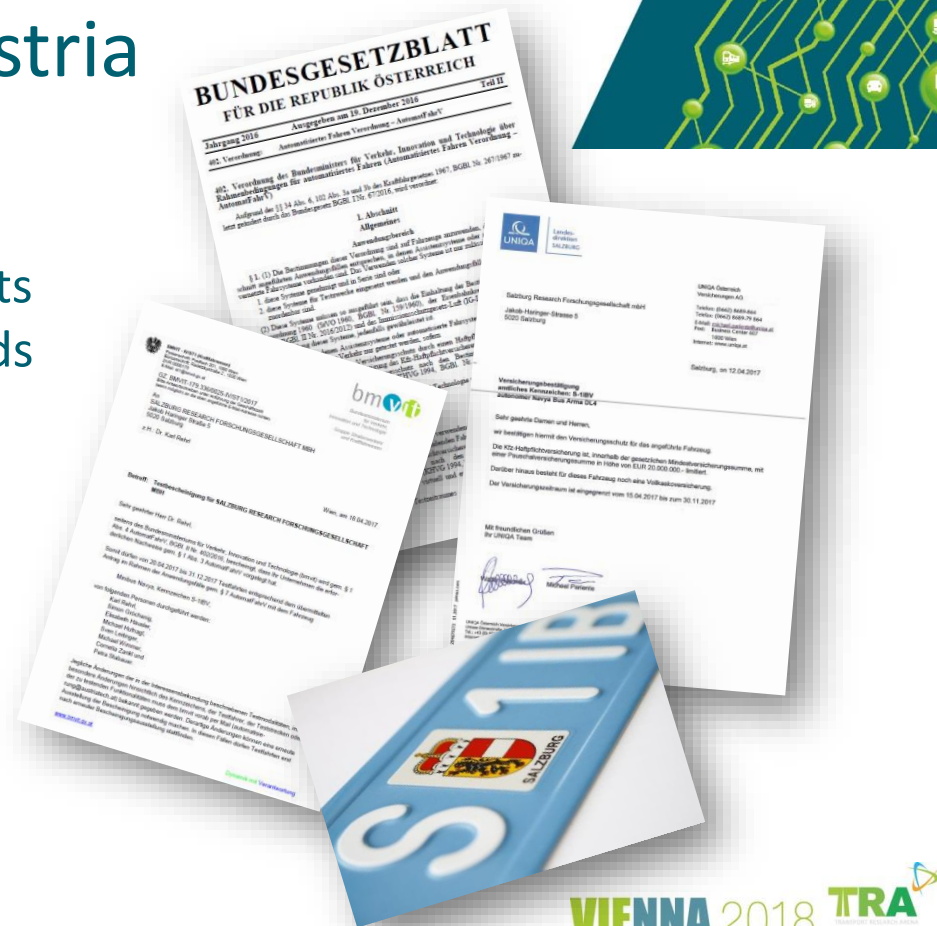


Together with:



Automated Driving in Austria

- Action Plan for Automated Driving
- **AutomatFahrV**: A legal frame for tests of automated vehicles on public roads
- Testing of an **autonomous minibus**
 - Driver on board at all times
 - 20 km/h maximal speed
 - Danger stop, accident recorder
 - Insurance, test drive number plates
- Test permission on April 18, 2017



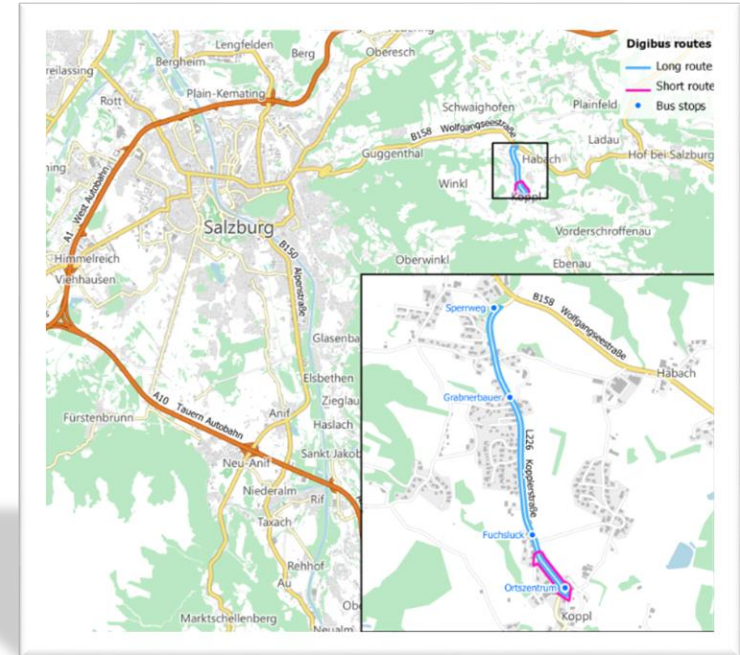
April 2017: Start of the 7-months trial



240 test drives

Trial setting

- Village of Koppl
 - 3.305 inhabitants, 1.243 households
- Physical infrastructure
 - Asphalted road, two lanes
 - 1,4 km length per direction
 - 65 m elevation, max. 8% incline
 - 4 stops per direction
 - First/last mile scenario
- Digital infrastructure
 - Digital map (pre-recorded and edited)
 - Mobile data connection (partly 3G/4G)
 - GNSS correction: APOS / local base



Results – Experiences 1/2

- Digital driving environment
 - Manual digitalization process, lack of automation / standards
- Positioning
 - LIDAR-Positioning works well only in urban settings
 - GNSS-RTK: Reliability issues, partly poor coverage
 - Lack of road markings in rural areas
- Environmental detection
 - Reliable detection of static obstacles
 - Poor detection of moving entities (speeds > 30 km/h)
 - Problems with dead angles, reflections,...
 - No object classification



Results – Experiences 2/2

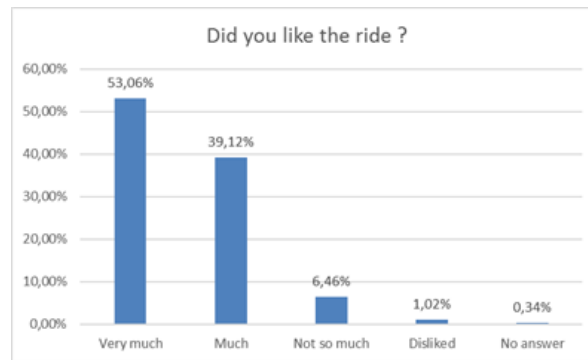
- Driving situations / maneuvers
 - Pre-defined, e.g. priority rules
 - Vehicle stops in front of obstacles, no dynamic maneuvers
 - High complexity of simple driving situations
 - Trial-and-error: Lack of systematic testing
 - Realistic, varying environmental conditions
- Interaction with other road users
 - Lack of proven interaction patterns
- Interaction with passengers
 - Confidence / feeling of safety?



Results – Passenger Survey

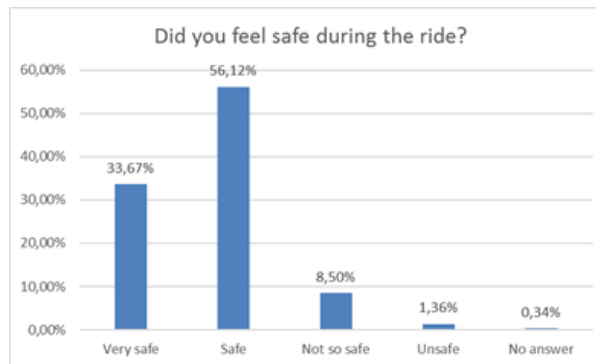
○ Over 92% liked the ride

- Reasons for likes
 - "good detection of obstacles"
 - "smooth and quiet driving behavior"
 - "advanced development of the technology"



○ Over 89% felt safe

- Reasons for unsafety
 - "abrupt or jerky braking"
 - "not enough confidence"
 - "lack of experience"
 - "poor sensor technology"



N = 294

Conclusions



- Self-driving shuttles are on the market and ready to test
- Legal frame for testing exists and should be used
- Tests on open roads are a necessity
- Need for systematic further development and testing

- Passengers' acceptance? -> Surprisingly good (bias!)
- Other traffic participants' acceptance? -> Mixed
- Operators' acceptance? -> Skeptical

Next steps: Digibus Austria

- Austrian **flagship project** for research and testing of automated driving in public transport
 - Started in April 2018
 - 3 years runtime
- **Meet us in the interactive zone and test the EasyMile EZ10 shuttle!**





Contact

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