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LEARNINGS FROM AUTONOMOUS SHUTTLE TRIALS IN AUSTRIA

EU-SIS23 - Deployment of autonomous shuttles on public roads – Experiences from five different countries

Dr. Karl Rehrl | Salzburg Research
Johannes Liebermann, MSc | Wiener Linien

AUTOMATED DRIVING IN AUSTRIA

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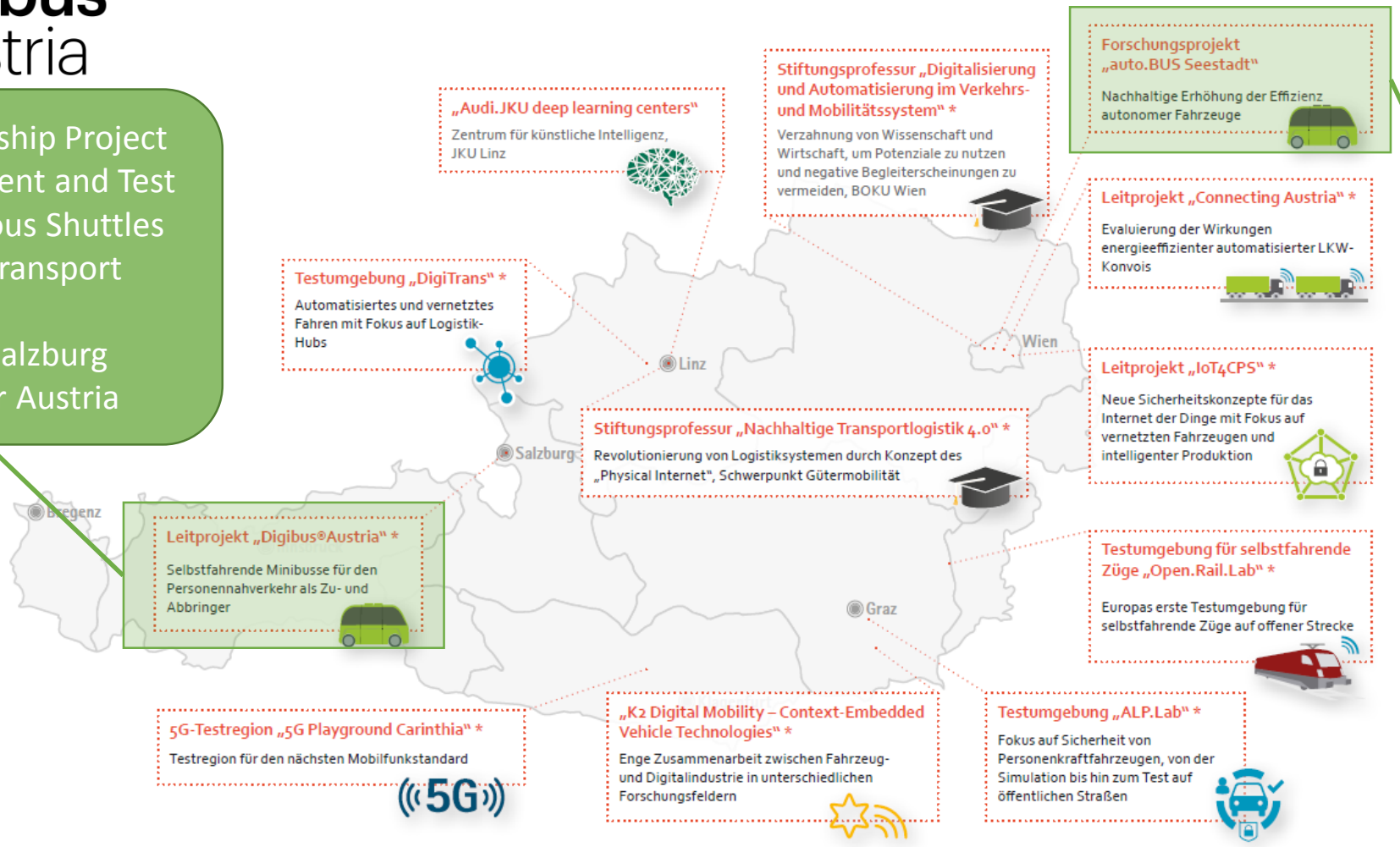
Digibus® Austria

Austrian Flagship Project for Development and Test of Autonomous Shuttles in Public Transport

Trials in Salzburg and Lower Austria



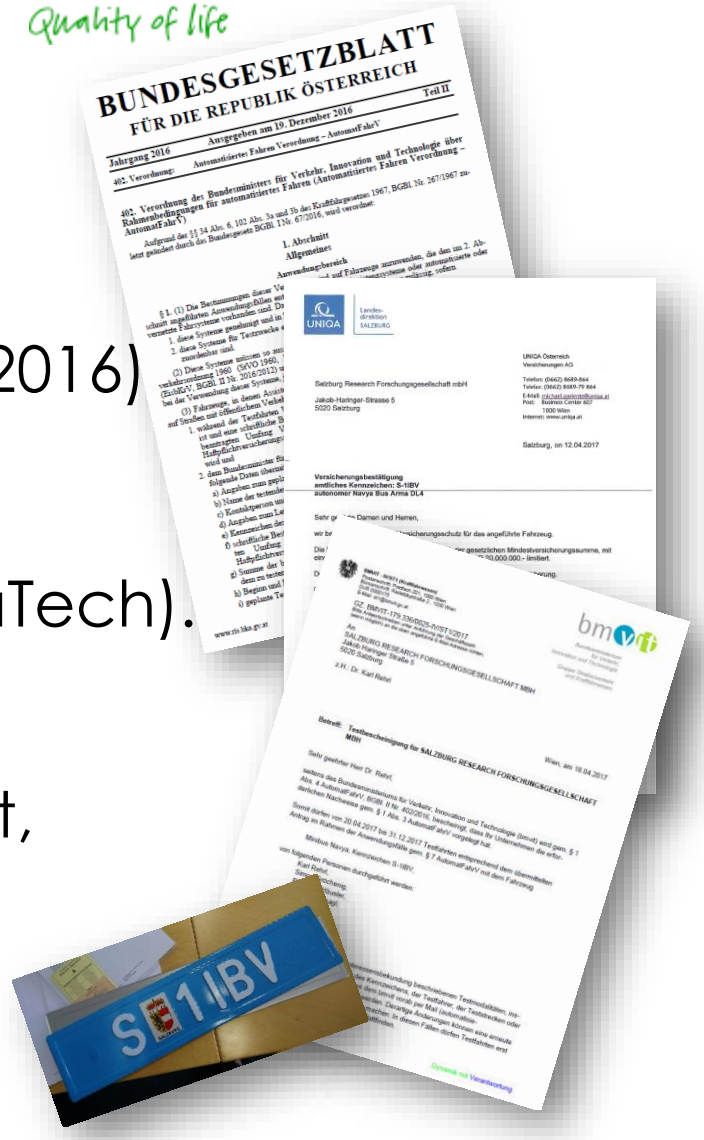
auto.Bus Seestadt

Research project auto.Bus Seestadt

Trials in Vienna

REGULATORY FRAMEWORK

- Testing on public roads
  - Code of Practice (general guidelines),
  - Amendment of the motor vehicle legislation and
  - Regulation on automated driving (December, 19, 2016)
- Process to run tests on public roads
  - Submission of a standardized test application to the contact point for automated driving (AustriaTech).
  - Initial assessment of permissibility. Advice by an independent Expert Council.
  - Temporary permit issued by the Ministry of Transport, Innovation and Technology.
  - Reporting every 6 months (or when the tests end).



SHUTTLE TRIALS IN SALZBURG

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2016

salzburgresearch LAND SALZBURG STADT : SALZBURG Salzburg Verkehr verbindet LEADER Region FUMO

3 days demonstration

2017

Digibus

7 months trial

2018 - 2021

Digibus® Austria

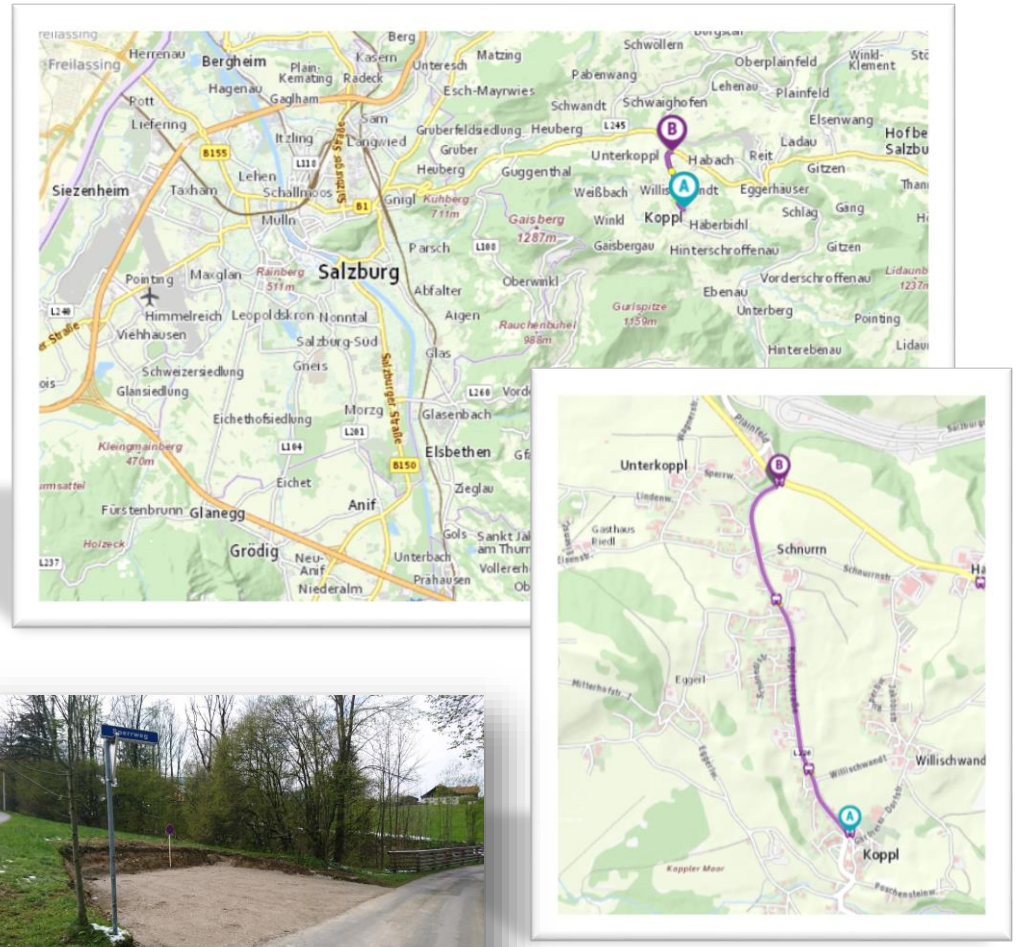
3 x 7 months trial

TEST TRACK KOPPL

- Village of Koppl
  - 3.305 inhabitants, 1.243 households

- Physical infrastructure of test track
  - 1,4 km (per direction)
  - Asphalted two-lane road
  - Maximum incline of 8% (65 meters height difference)
  - Slightly winding road, only partly road markings
  - Maximum allowed speed of 50 km/h
  - Adaptation: Safe turn place for bus

- Digital infrastructure
  - Digital map (pre-recorded and manually edited)
  - Mobile data connection (4G)
  - Internet-based service for GNSS correction data / local reference base for GNSS correction data



IMPRESSIONS FROM SALZBURG TRIALS

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Austria

SHUTTLE TRIALS IN VIENNA

auto.Bus Seestadt

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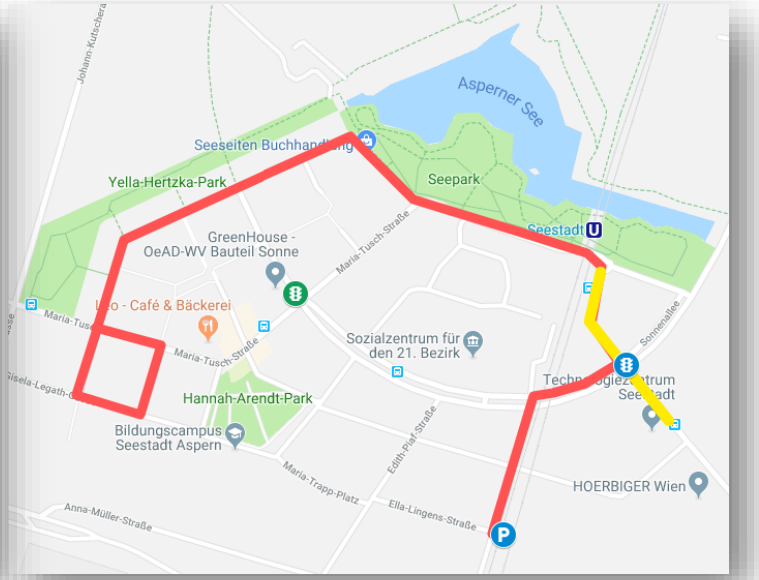
04/2018

TRA2018

07/2018

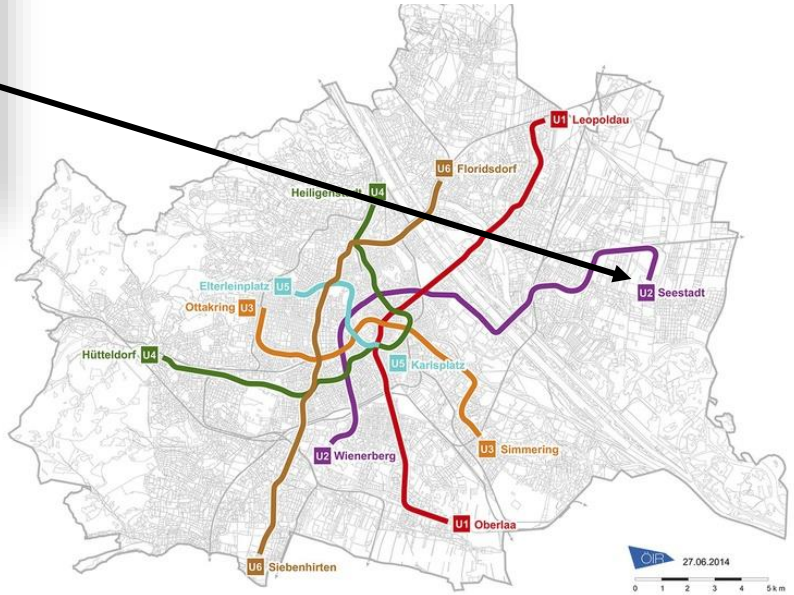
EU-Attaché Trip 2018

2019 - 2020



Line Operation Trial

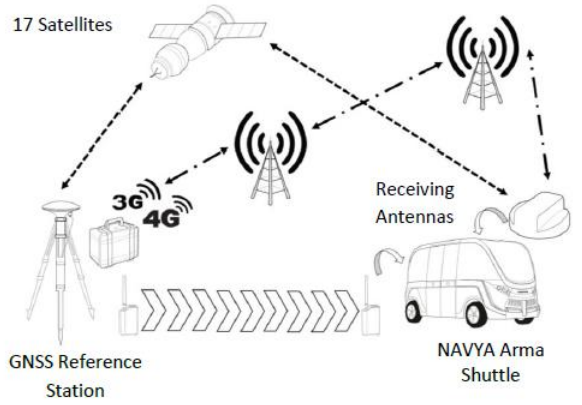
TEST TRACK VIENNA



- City of Vienna
  - 1.7 M inhabitants, ~40% PT

- Physical infrastructure of test track
  - 2,2 km (per direction)
  - Maximum allowed speed of 30 km/h
  - Adaptations: bus stop bays, GNSS reference station (via 3/4G and radio)

- Digital infrastructure
  - Digital map (pre-recorded and manually edited)
  - Mobile data connection (3/4G)



IMPRESSIONS FROM THE TRIALS IN VIENNA

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LEARNINGS FROM THE TRIALS

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Deployment

- Preparation
  - Defining goals
  - Finding suitable track(s)
  - Regulatory frame (e.g. public vs. non-public track)
- Risk assessment
  - Missing standardized procedures
  - How much risk is acceptable?
- Deployment process
  - Proprietary processes
  - Missing standards / interoperability
  - Low degree of automation
- Validation
  - Trial and error

Operation

- Operators
  - Suitable persons
  - Attention
  - Work place (e.g. seating)
  - Legal aspects
- Driving maneuvers
  - Validation procedures
  - More complex maneuvers
  - Dynamic path changes
  - Driving speed
  - Interaction with other road users
- Environment
  - Localization
  - Obstacles (e.g. plants)
  - Inclination
  - Weather conditions
  - Digital infrastructure
- Vehicle
  - Public transport ready?
  - Capacity
  - Passenger information
  - Development in small steps

→ *We are just at the beginning! SAE-Level 2*

CONTACT

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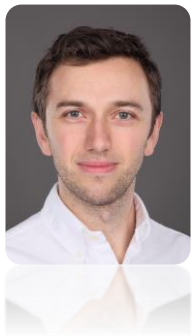

The projects receive funding from the Austrian Federal Ministry of Transport, Innovation and Technology.