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# A novel way of ad-hoc travel time measurement

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# Objective

- Sensor system allowing a traffic management on an ad-hoc basis
- Operating in exceptional (ad-hoc) circumstances on
  - motorways outside the well managed areas
  - hot-spot junctions of motorways with other roads
  - secondary roads or roads with less traffic volume not equipped with monitoring technology
  - roads with construction works that reduce the road capacity,...

# Functionality

- Determine the traffic statuses “free flow”, “tenacious traffic” or “congestion”
- Highly available
- Simply to operate
- Quickly to set-up and remove
- Not requiring a wired energy supply and data connectivity
- Functional blocks
  - Sensor systems (road side)
  - Central application

# Sensor system

- Handhelds in cars equipped with Bluetooth and/or WLAN leave their signature in the measurement system's receiver;
- Signature
  - recorded together with a time stamp
  - does not allow to identify the user
  - unique enough to recognize the same handheld later
- Sensor delivers vehicle count data at the measurement site (location spotted by a GPS-receiver)
- Recorded data transmitted to a central application through a wireless connection

# Travel time measurement system

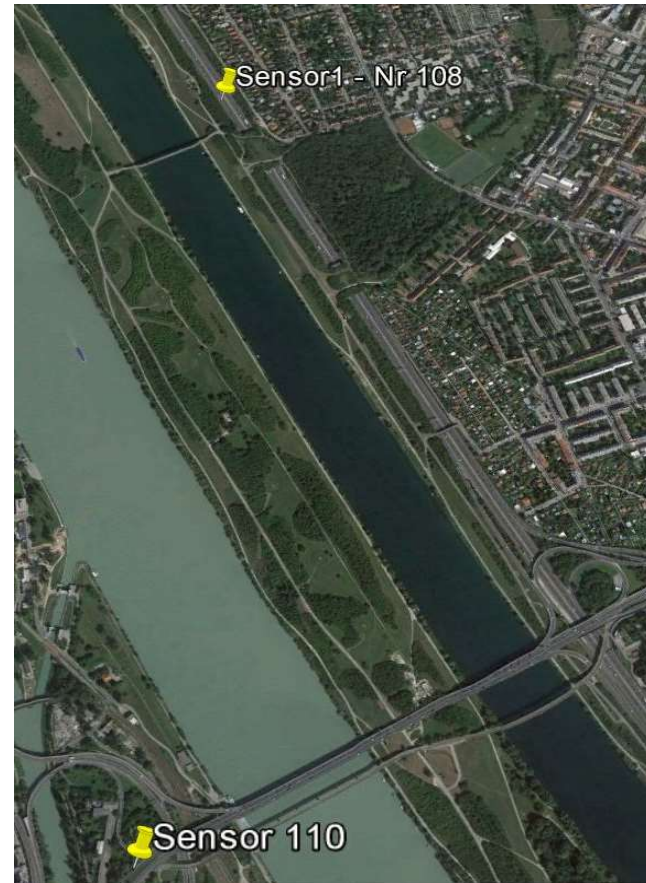
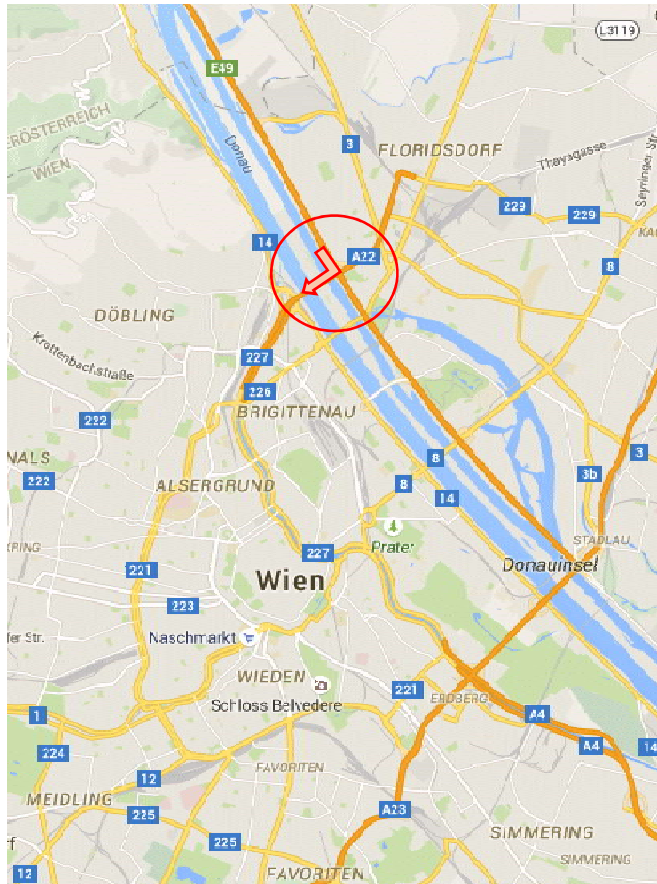


- Standalone variant
  - powered by a battery
  - operation > 1 week
- Non-stand-alone variant
  - powered from mains

# Central Application

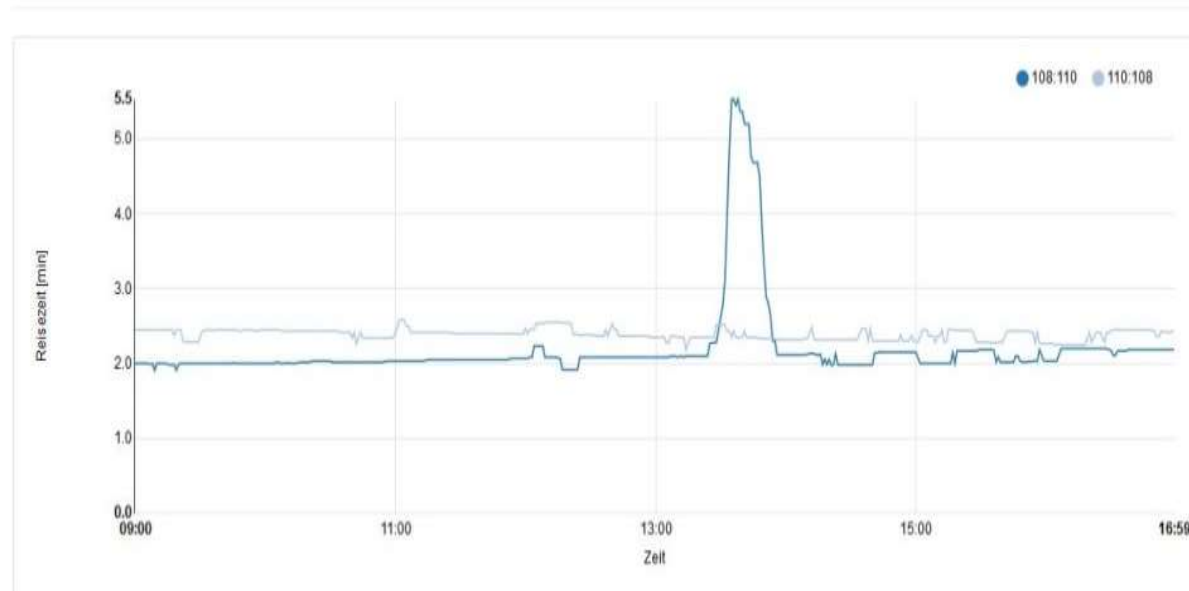
- Collects the gathered and transmitted data
- Calculates the travel times along the observed roads segments
- Source for further action (traveler information via VMS)
- Pairs of sensor systems along the road-side – set as parameters for the travel time calculation
- Central application
  - looking for Bluetooth- and WLAN-signature pairs that are recorded on each sensor system pair in real time
  - calculates the travel time by means of the GPS positioning data of the respective sensor systems
- Filters to avoid a distortion from single slow driving users

# Deployment example



Junction Management: Vienna A22 deployment (“Nordbrücke”)

# Travel time measurements



- Purpose – to display the travel time loss between the beginning of the off-ramp and the opposite river side
- VMS may show
  - The junction is overloaded and a timely changing to the off-ramp is strongly recommended
  - There is almost no travel time loss for those who behave well



# Conclusions

- Portable design of the system allows a rapid deployment particularly in situations that do not justify a stationary solution.
- Simple traffic management system based on real-time data can be deployed that does not only measure the travel time but is also in a position to recommend detours or display road closures.
- Timely adaption of the motorist's behaviour can be encouraged and detours can explicitly contribute to relieve congested routes

# Thank you for your attention

## Any questions...?

