

Intelligent Urban Transport Systems

Car2X for public transport prioritization Large-scale case study

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Organisers





#ITTRANS

What is Car2X?

- "Vehicle-to-Everything" (V2X) or "Car-to-everything" (Car2X)
- Higher safety and effectivity of traffic
- Step towards autonomy









Advantages of Car2X

- In-time information about vehicles nearby
- Driver warning icy road, braking, emergency vehicle, ...
- In-vehicle signage speed limit, road configuration
- Textual information for the driver
- Signal plan of intersection speed advisory, …
- Vehicle priority public transport, emergency
- Traffic detection

European standards One technology Secured communication













Intelligent Urban Transport System

Deployment in Brno (Brünn) -2019



Largest deployment of Car2X in public transport in Europe





Project overview

- Complete fleet equipment:
 - 350 trams
 - 150 trolleybusses
 - 300 busses
- 80 RSUs at intersection
- 2 main requirements:
 - Uninterrupted prioritization
 - No need to change traffic controllers





Smooth transition phase (2018-2019)



Lessons learned

- Sufficient range (typically 250-350 m + forwarding)
- Suitable for production (in operation for more than 3 years) Highperformance (up to 1000 vehicles per day)
- Low latency and high accuracy
- Interoperability achieved
- Necessary cooperation with the board computer (by Herman)



Our other projects

- Ostrava (CZ) 650 vehicles full fleet
- Ludwigsburg (DE) 90 vehicles full fleet
- Havířov (CZ) 70 vehicles full fleet

Pilot projects

- Hamburg (DE) BiDiMoVe project
- Ulm (DE)
- Ústí nad Labem (CZ)





Outlook

What changes to public transport will Car2X bring?





Future benefits

- No configuration of "login points" relies on topology of the intersection – received from RSU
- Countdown to leave the stop
- Active cooperation between traffic controller and vehicle







Future requirements

- Data from the board computer
 - Necessary line, destination, door status, delay currently available
 - For future needs geographic route of the line
- Data to the board computer
 - Status of the priority request
 - Request or time to leave the stop







Display of warnings to driver



• Display on the board computer



Conclusion

- Ready-to-use technology with great possibilities in future
- Can smoothly replace and complement existing systems
- Enough experience from production deployments

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