Enhanced Traffic Management Procedures of Connected and Autonomous Vehicles in Transition Areas

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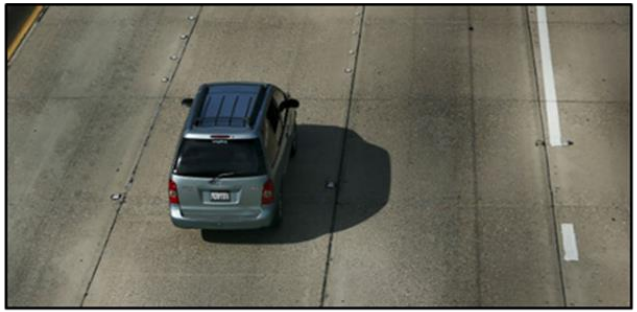
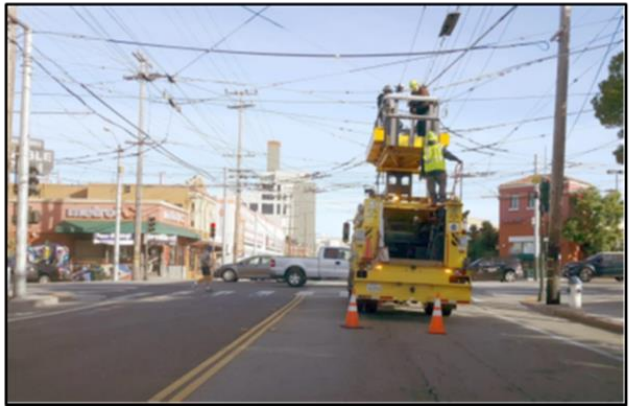
Situations in which (C)AVs may struggle





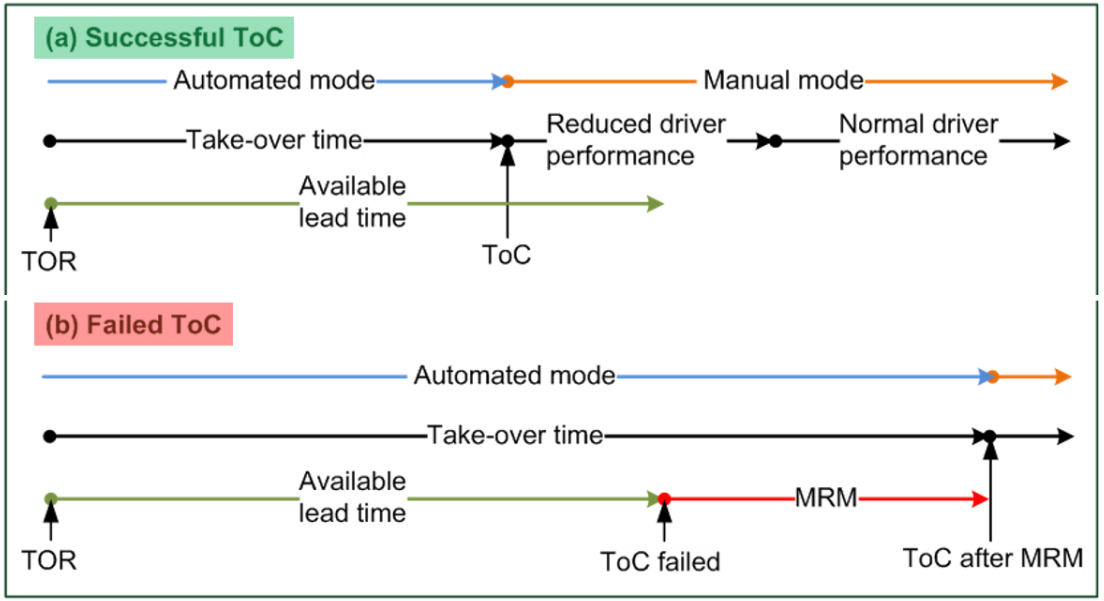
Main observations about state-of-the-art for traffic management

- General approaches
  - Coordinated network-wide traffic management
  - Using KPIs, hierarchical controls via layered architectures, TMaaS
- Cooperative systems
  - V2X / VANETs / C-ITS
- Machine learning techniques (AI)
  - Traffic light control and congestion / queue length predictions

- **Conclusion**
  - No (readily available) implementations of more advanced TM schemes
  - Focus on solving partial problems with specific measures

Sequence of events when AD disengages

- Take-over request (**TOR**) issued by the car
- Transition of Control (**ToC**) from car to driver
- Minimum-Risk Maneuver (**MRM**) by the car
- Driving at the boundary of the **ODD**

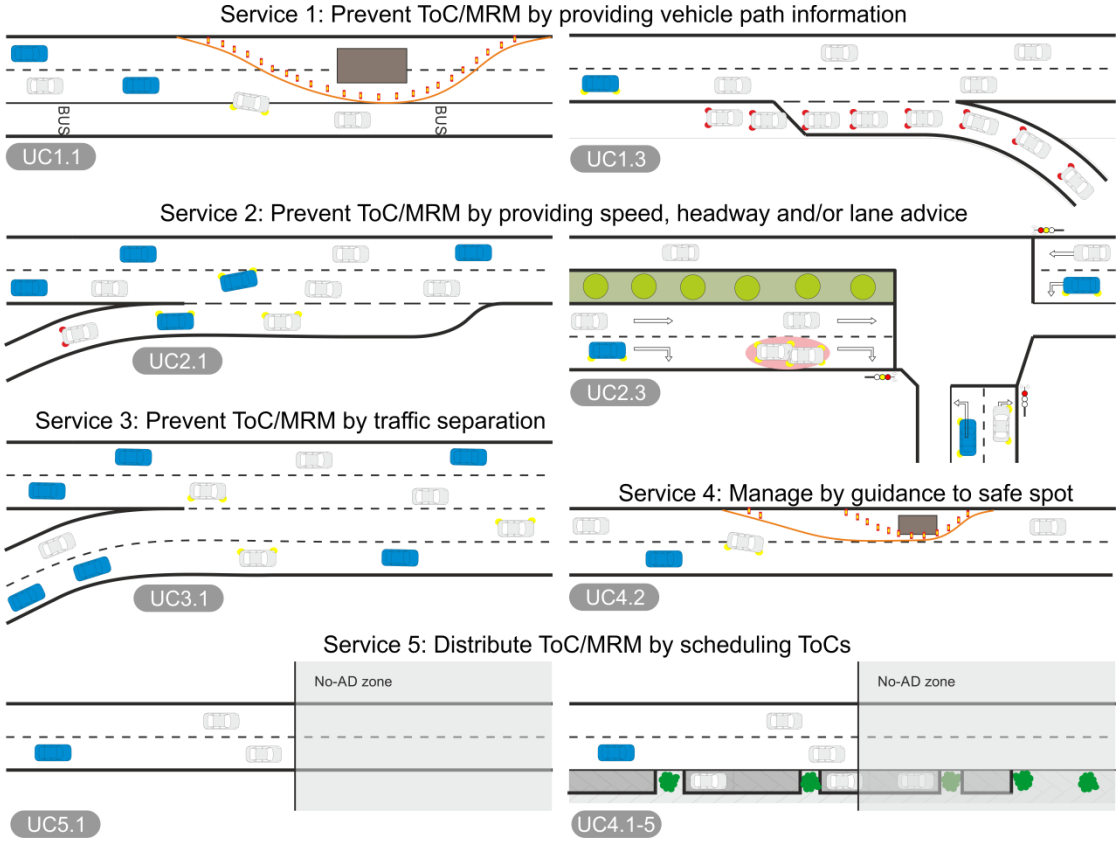


Developing TransAID's services for traffic management in transition areas

- Solutions take the form of these actions:
  - **Prevent** ToC/MRM
  - **Manage** or support ToC/MRM
  - **Distribute** (in time and space) ToC/MRM

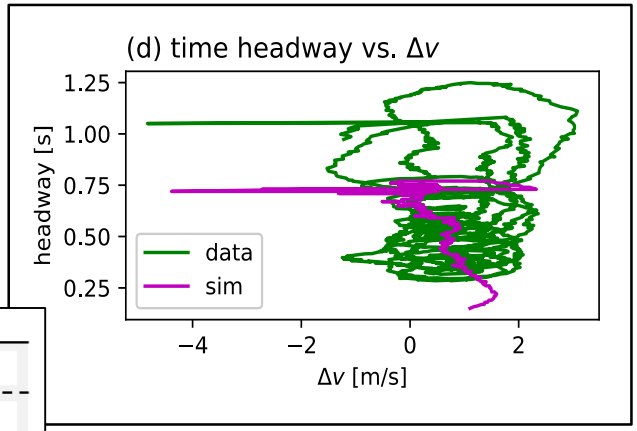
- Assess solutions based on impacts measured by **KPIs**:
  - **Traffic efficiency**
    - Network-wide: average speeds and throughput
    - Local: tempo-spatial diagrams
  - **Traffic safety**
    - Number of events with time-to-collision < 3 sec
  - **Environmental impact**
    - CO_2 emissions

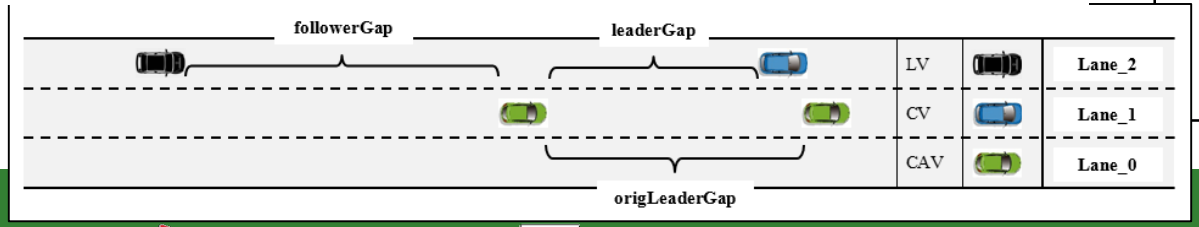
Services and use cases

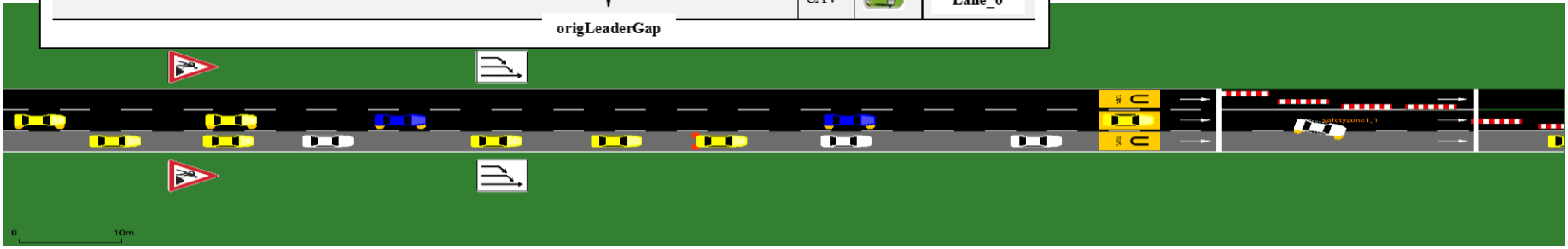


Simulating the impact of traffic management

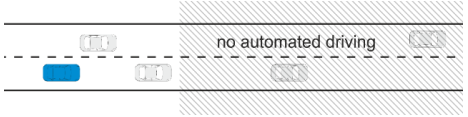
SUMO
SIMULATION OF URBAN MOBILITY



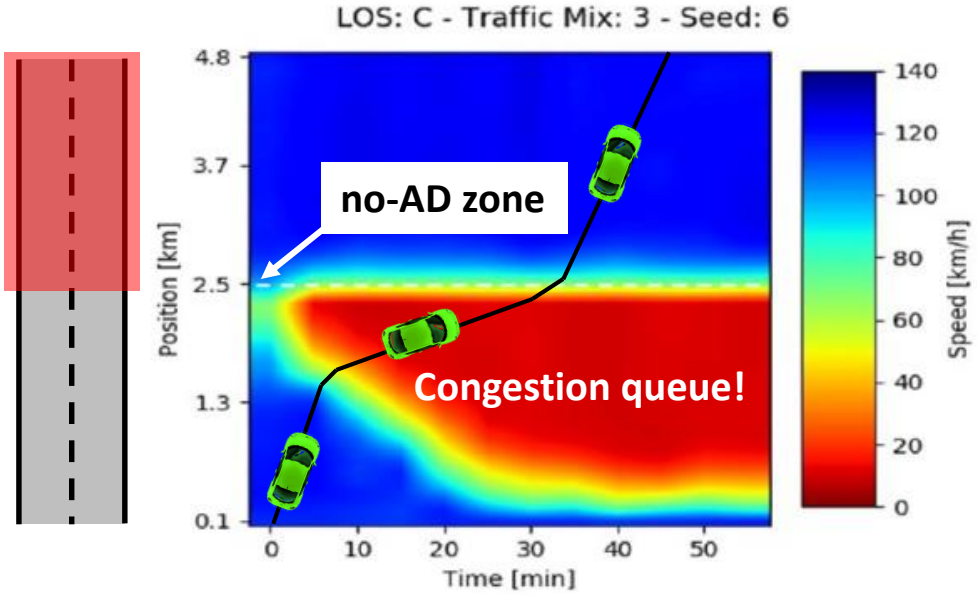




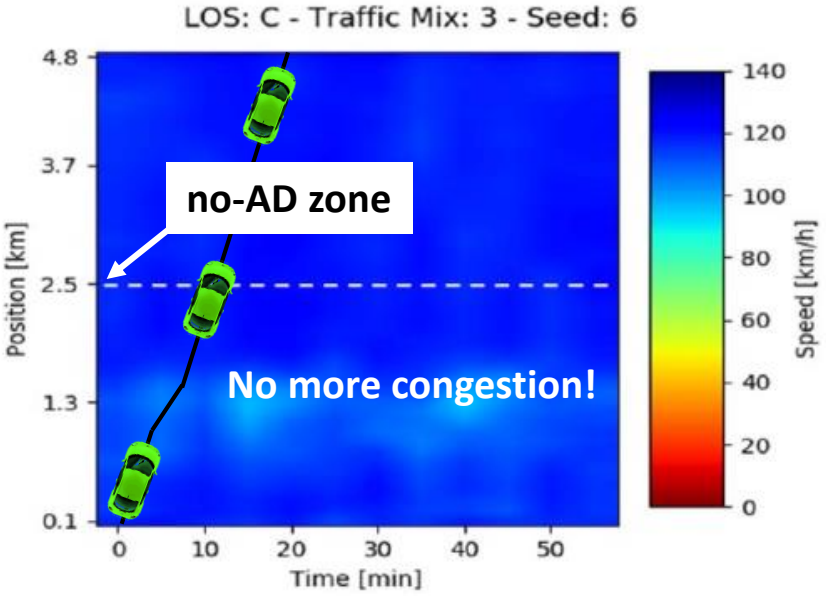
Example use case 5.1 (Distribute the TORs within a dedicated TOR area)



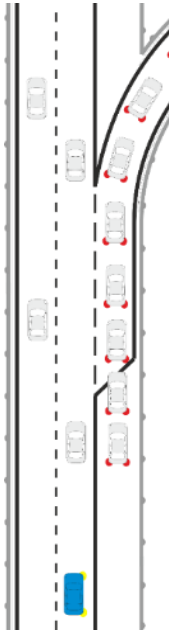
Without traffic management



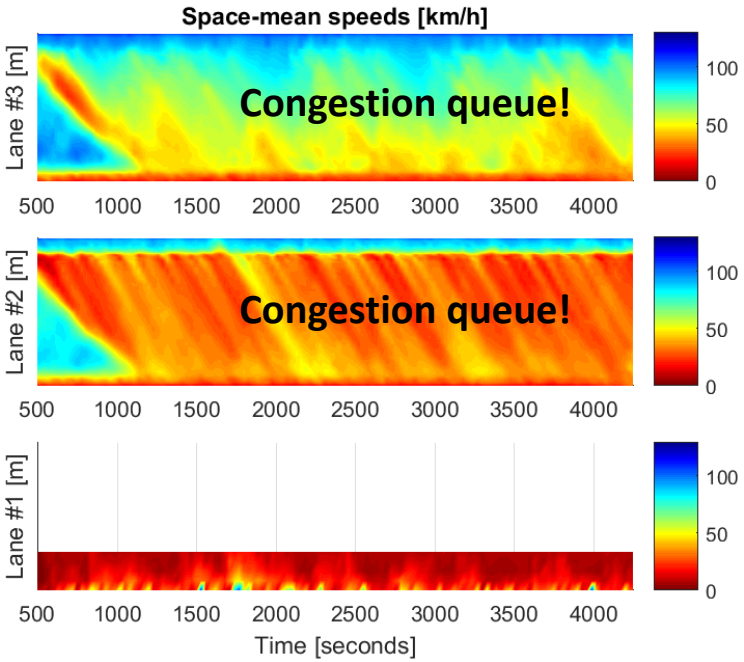
With traffic management



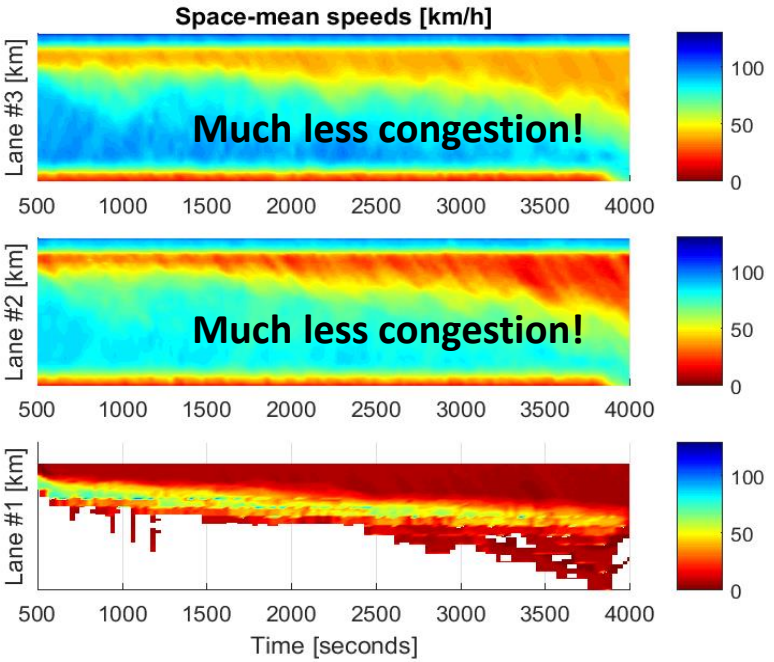
Example use case 1.3 (queue spillback at motorway exit ramp)



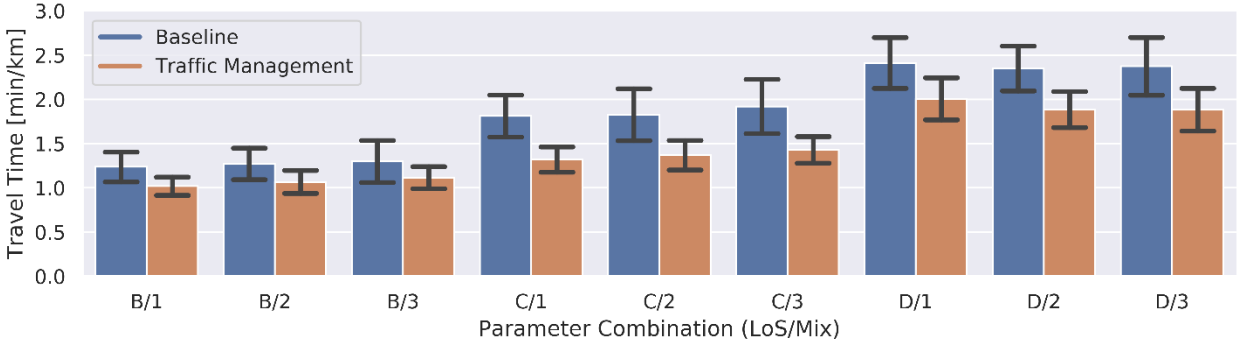
Without traffic management

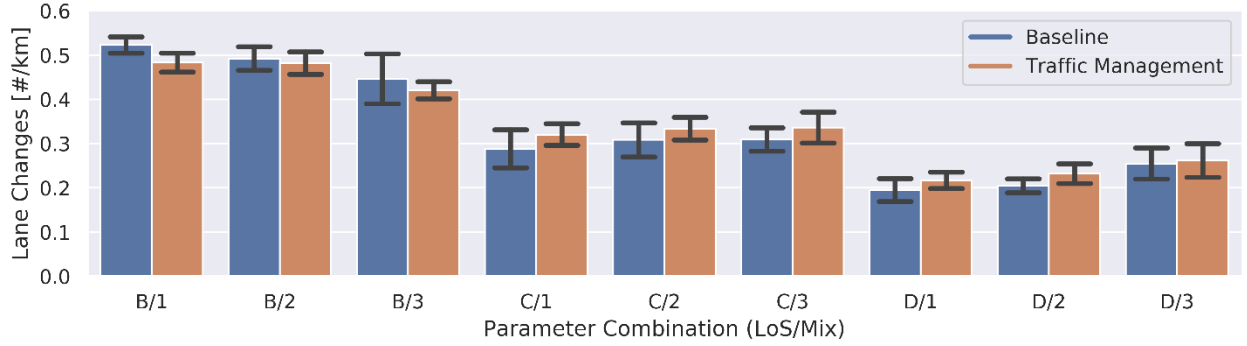


With traffic management



Measuring the impact (e.g., travel times, number of lane changes, …)





Questions? Let's stay in touch!

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