

Cooperative & automated road transport for enhanced traffic management

Dr. Meng Lu, Dynniq Nederland B.V.

Joint Workshop "Transport planning, traffic control and traffic safety - challenges and opportunities"
Zagreb, 12 July 2018

dynniq

energising
mobility



Sveučilište u Zagrebu
University of Zagreb

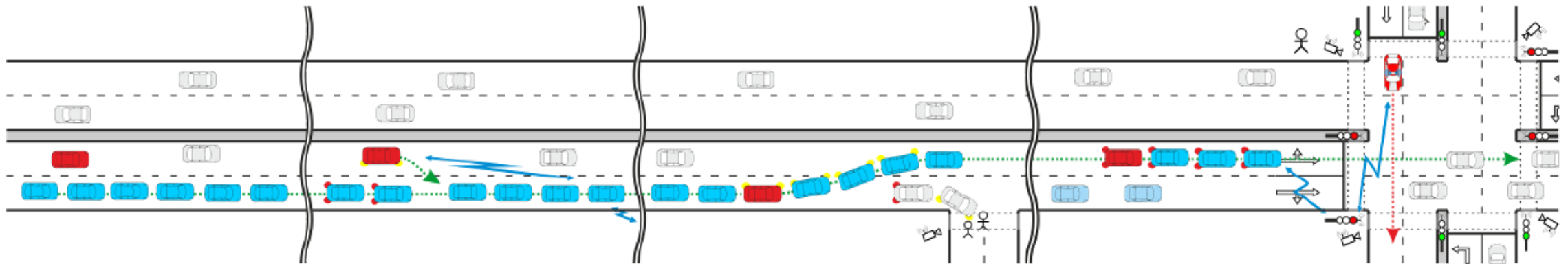
Fakultet prometnih znanosti
Faculty of Transport and Traffic Sciences



MAVEN objectives

Managing Automated Vehicles Enhances Network

- **Management regimes for automated driving in urban areas**
 - increase safety with collective perception (alternative: very slow driving)
 - increase efficiency by exploiting possibilities of automated driving
- **Monitoring, support and orchestration of movements of road users to guide vehicles at signalised intersections**
- **Further enhancement for ADAS and C-ITS applications**



Use cases and new data elements

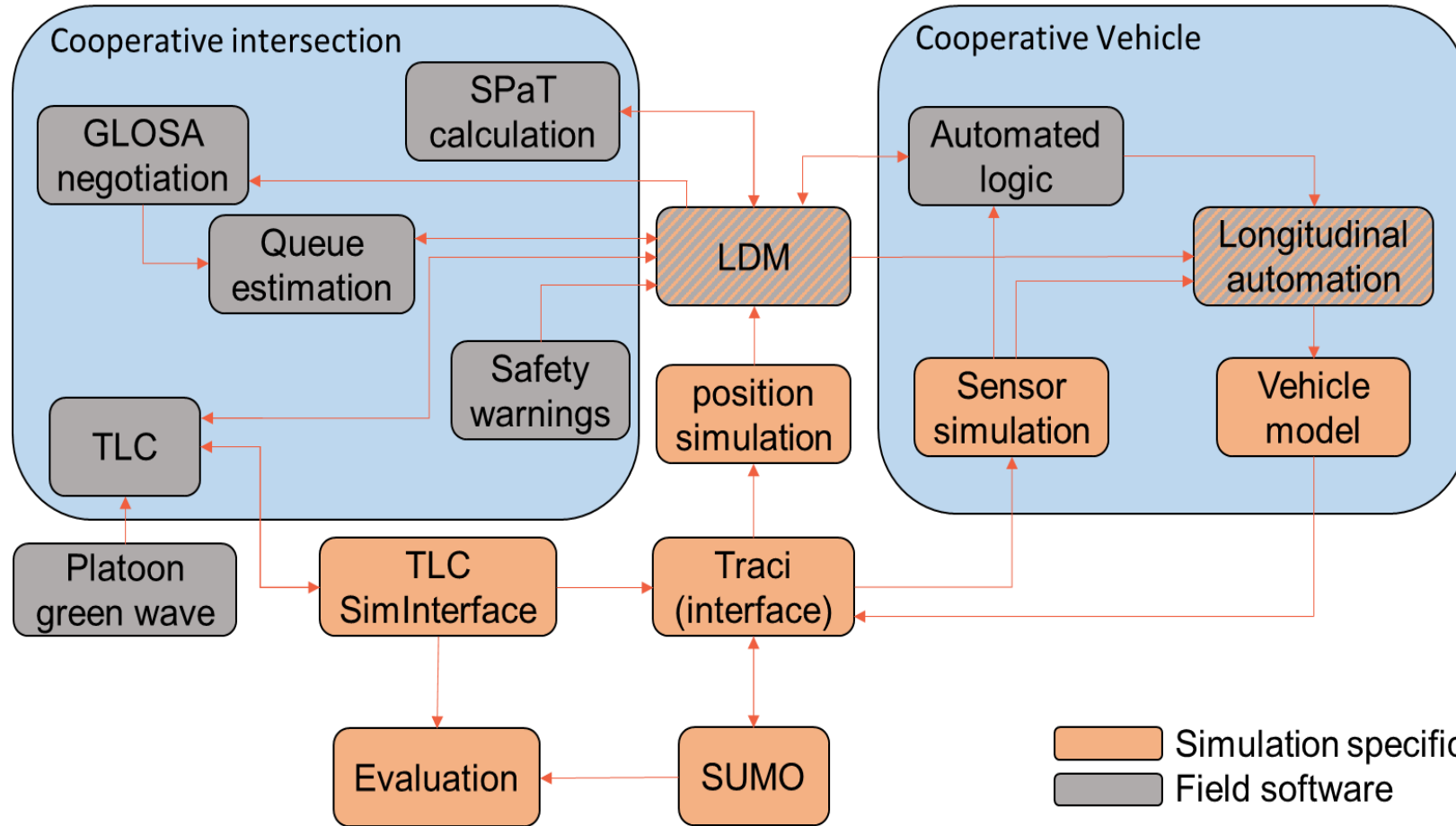
Managing Automated Vehicles Enhances Network

Cluster/platoon mgmt	Longitudinal / lateral mgmt	Signal optimisation	Intersection/other road user
UC1: Cluster/platoon initialisation UC2: Joining a cluster/platoon UC3: Travelling in a cluster/platoon UC4: Leaving a cluster/platoon UC5: Cluster/platoon break-up UC6: Cluster/platoon termination	UC7: Speed change advisory (GLOSA - Green Light Optimal Speed Advisory) UC8: Lane change advisory UC9: Emergency situations	UC10: Priority management UC11: Queue length estimation UC12: Local level routing UC13: Network coordination – green wave UC14: Signal optimisation	UC15: Intersection negotiation UC16: Detect non-cooperative road users

New data element	Applicable scenario
Number of occupants	Intersection priority management.
Distance to following vehicle	Queue estimation. This information can improve queue model accuracy, leading to more optimal solutions for GLOSA negotiation and signal timing
Distance to preceding vehicle	
Platooning state	Signal optimization and intersection priority
Desired speed	Queue estimation and GLOSA negotiation
Current lane	Lane advice, multiple lanes for a certain direction
Route information	Queue estimation, signal optimization and GLOSA

MAVEN architecture

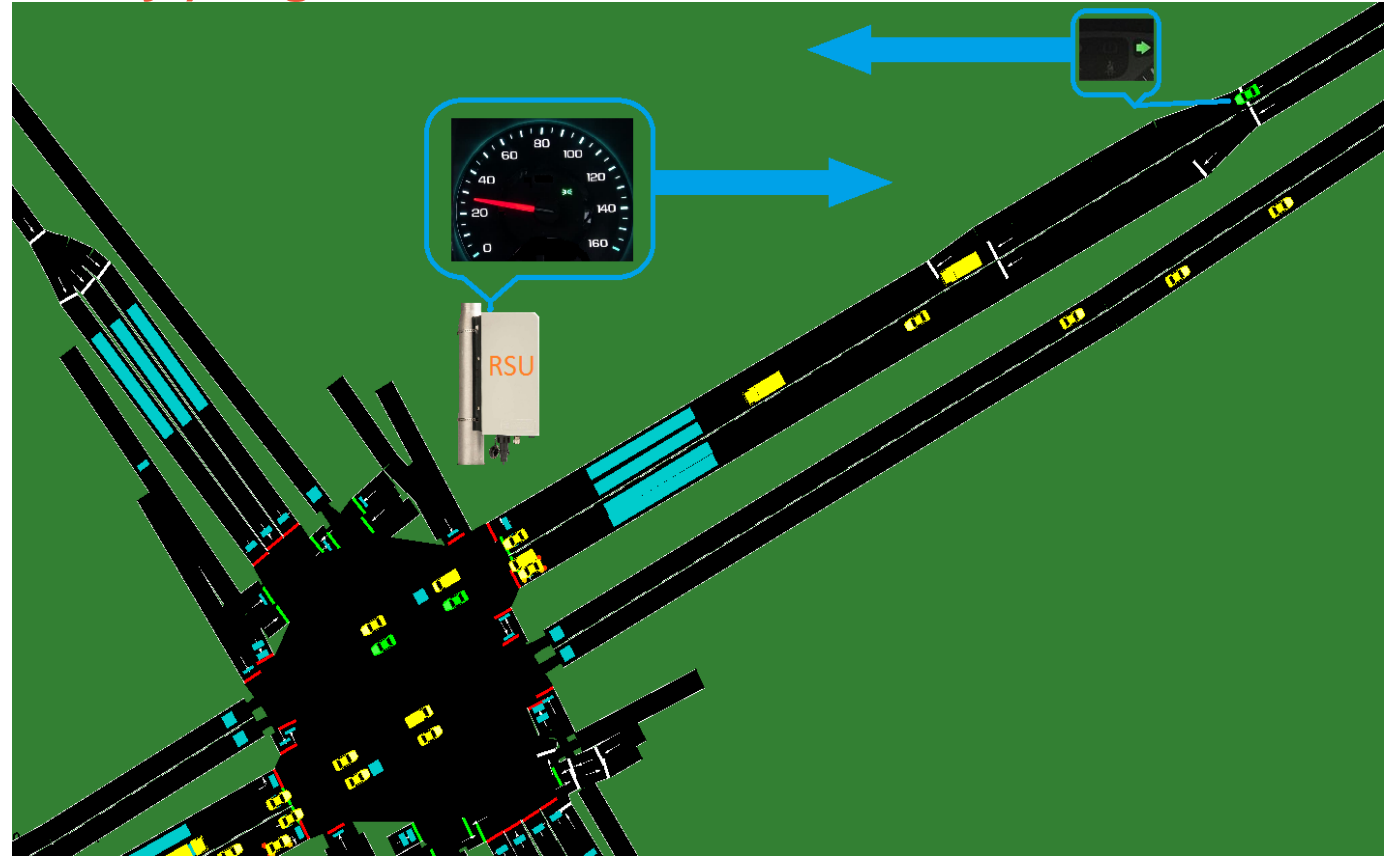
Managing Automated Vehicles Enhances Network



MAVEN application

GLOSA (Green Light Optimal Speed Advisory) negotiation

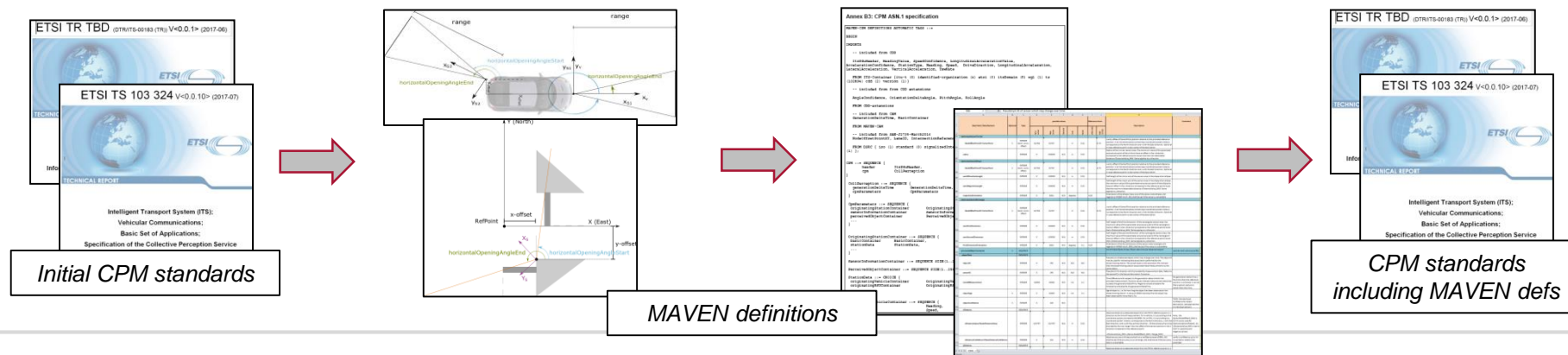
- **Intersection shares SPaT**
(Signal Phase and Timing)
- **Vehicle sends extended CAM**
(Cooperative Awareness Message / ETSI EN 302 637-2), e.g. speed, direction, platooning)
- **Intersection recalculates SPaT**
- **Vehicle acknowledges advice**
- **Intersection stabilises control plan**



Message sets

Managing Automated Vehicles Enhances Network

- Extended CAM for automation and negotiation
- Profiled MAP/SPaT for lane specific GLOSA
- New LAM (Lane Advice Message)
- Extension to CPM (Collective Perception Message)
 - RSU detections can be included
 - possibility to link to MAP message topology for efficiency



Contact

MAVEN - Managing Automated Vehicles Enhances Network

Technical Coordinator

Robbin Blokpoel (Dylnniq)

T. +31 33 454 1731

E. robbin.blokpoel@dylnniq.com

Web site

www.maven-its.eu

LinkedIn

www.linkedin.com/groups/8571587/profile

Twitter

@MAVEN_its



Gemeente Helmond



MAVEN is funded by the EC Horizon 2020 Research and Innovation Framework Programme, under Grant Agreement No. 690727



Thank you for your attention.

Dr. Meng Lu

Strategic Innovation Manager

Dynniq Nederland B.V.

Basicweg 16, 3821 BR Amersfoort, The Netherlands

Phone: +31 6 4505 4735

Email: meng.lu@dynniq.com

dynniq

energising
mobility

