

Jan Cedric Mertens, MAN Truck & Bus SE



IMAGinE

12 MAY 22

FINAL EVENT



Strategic Maneuver Coordination  
for Cooperative Truck Overtaking

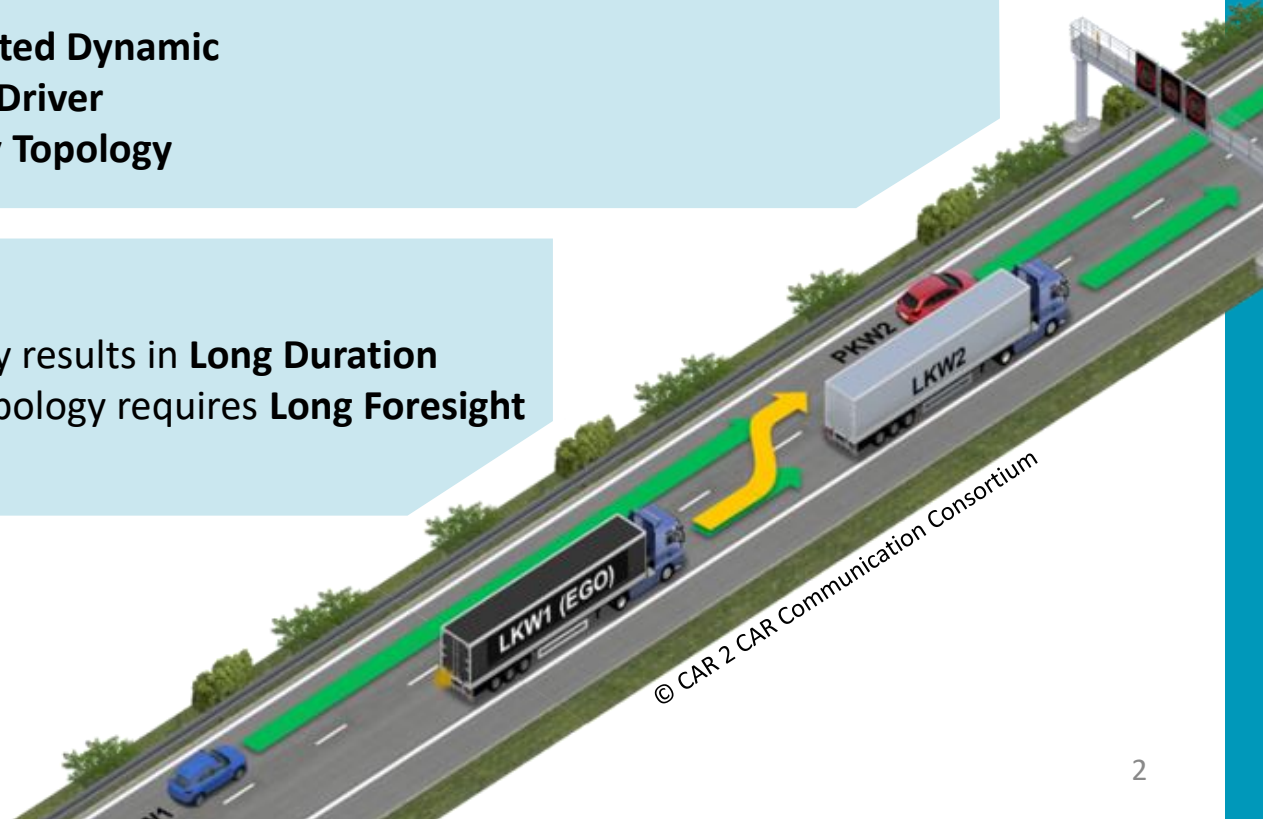
# Trucks present further challenges due to lower dynamic and longer foresight

## Truck

- Mass results in **Limited Dynamic**
- Cost factors **Fuel & Driver**
- Strongly affected by **Topology**

## Overtaking

- Low relative velocity results in **Long Duration**
- Consideration of topology requires **Long Foresight**



© CAR 2 CAR Communication Consortium

# A Strategic Maneuver Coordination is required to plan the maneuver in advance and supervise it



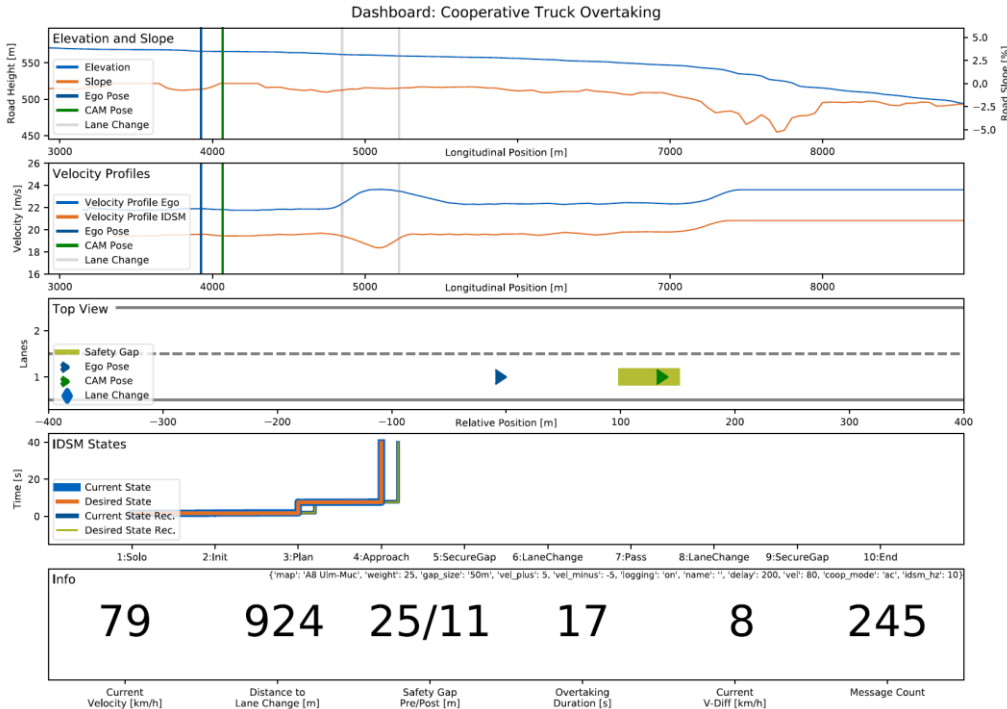
## Distributed State Machine

- IMAGinE Driving Strategy Message
- Synchronization of participants
- Concatenation of atomic maneuvers
- Low bandwidth

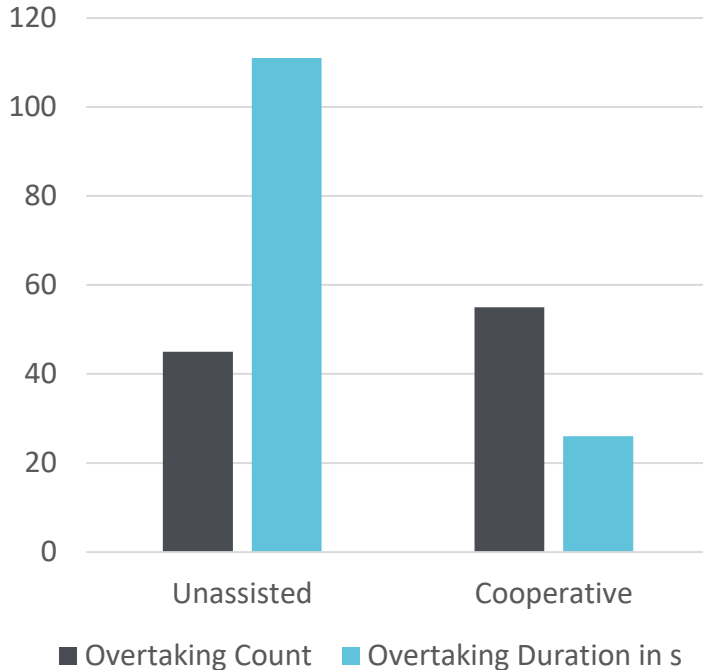
## Cooperative Maneuver

- Determine starting point
  - based on topology
- Reduce safety distance
  - similar to a platoon
- Increase relative velocity
  - efficient acceleration for overtaker
  - efficient rolling for overtaken

# Simulation and Field Test showed the feasibility of the implemented strategic maneuver coordination



# Cooperation reduces the overtaking duration by 75% while enabling more and safer overtaking maneuvers



- Overtaking duration is significantly reduced
- Cooperation is cost-neutral for overtaken
- Maneuver is safe during reduced gap

**Outperforms human cooperation and enables safe and efficient truck overtaking in the future.**

# THANK YOU

Jan Cedric Mertens

[www.imagine-online.de](http://www.imagine-online.de)

Images: IMAGinE, Unsplash, CAR 2 CAR Communication Consortium

Supported by:



Federal Ministry  
for Economic Affairs  
and Climate Action

on the basis of a decision  
by the German Bundestag