

# Communication-aided platooning for improved traffic safety and efficiency

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CERES – Centre for Research on Embedded Systems



### Inter-vehicle communication

Vehicles share their status and their view of the current road and traffic conditions with other vehicles to improve traffic safety, efficiency and comfort

- Exchange of **periodic status information**
- Transmission of event-triggered **emergency warnings**

Copyright: Kapsch

### Platooning

- Fuel efficient driving
- Increased safety, comfort and efficiency
- First step towards autonomous driving

Recent advances in cooperative driving hold the potential to significantly improve safety, comfort and efficiency on our roads. An application of particular interest is platooning of vehicles on highways, where reduced inter-vehicle gaps lead to considerable reductions in fuel consumption. This, however, puts high requirements on timeliness and reliability of the underlying exchange of control data.

Copyright: Volvo Group

### Platooning of (heavy) vehicles

Vehicle gap < 5 m

- Large fuel savings
- Fast and reliable communication needed

Copyright: Scania

Sending out control messages

Collecting status updates

- Platoon leader
- Regular vehicle

### Challenges of wireless communication

1. A data packet cannot get access to the wireless channel due to competition with other packets → **Medium Access Control (MAC)** methods needed
2. A data packet is sent but not received (correctly) by the intended destinations → **retransmission** by the sender (or **relaying** by those who received a correct copy) needed

### Examples of current platooning research

- Evaluation of the current standard for inter-vehicle communication for the platooning application
- Medium Access Control (MAC) methods for fast and reliable inter-vehicle communication
- Increased reliability through retransmission and relaying of data
- Choice of relaying nodes for multi-hop communication

Contact: magnus.jonsson@hh.se