High Density Multibrand Truck - Platooning

CONCORDA

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Connected Corridor For Driving Automation

Organised by ERTICO
Co - Organised by ITS AMERICA, ITS
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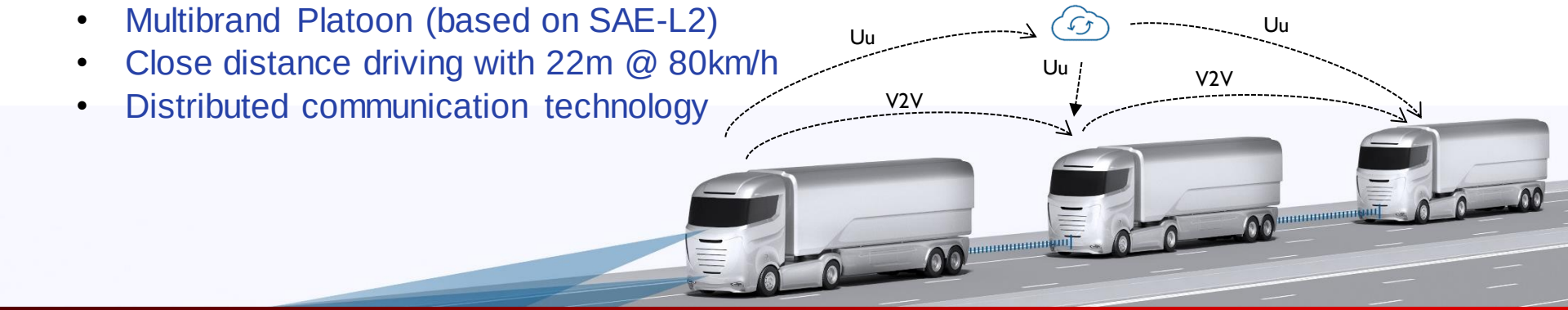
Motivation

- Preparation of the European motorways for high density truck platooning with adequate connected services and technologies.
- The main objective of the Action is to assess performances of hybrid communication systems under **real traffic situations**.

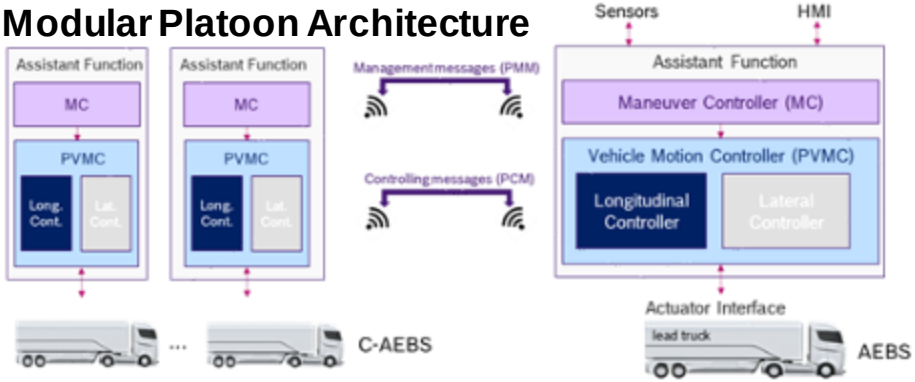
Platooning Tests performed with:

- Multibrand Platoon (based on SAE-L2)
- Close distance driving with 22m @ 80km/h
- Distributed communication technology



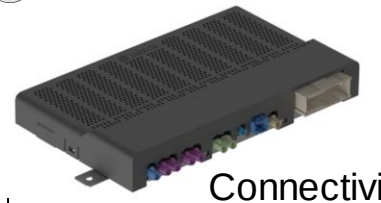
Architecture

Modular Platoon Architecture



BOSCH

BOSCH **Sensor set for Demonstrators:**



Connectivity Unit

Front Radar

Longitudinal Control

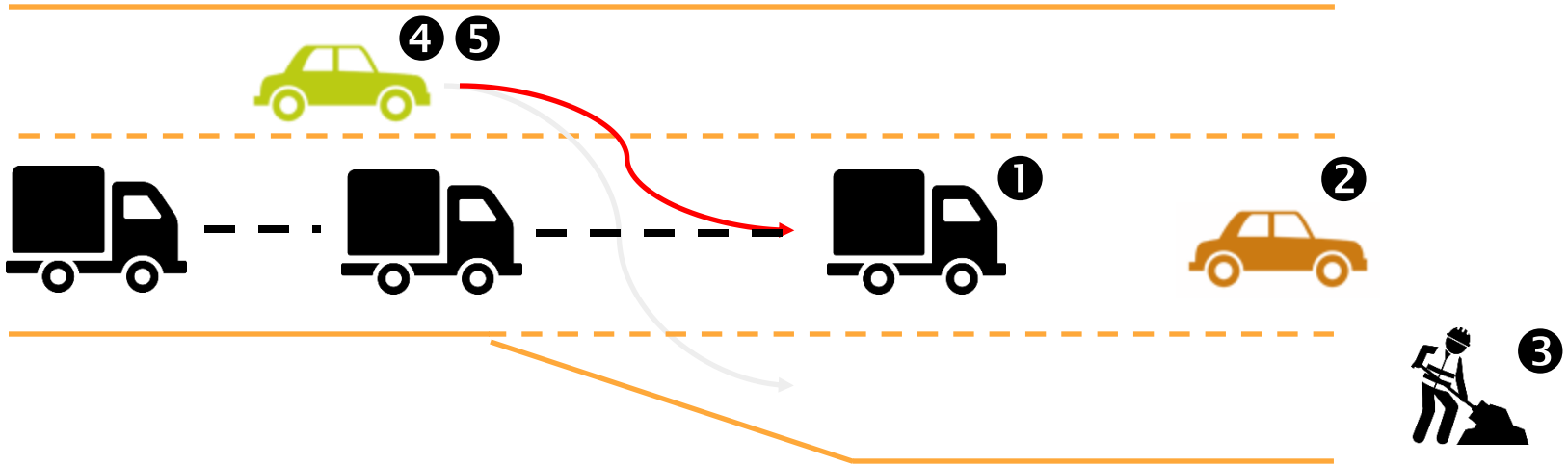
Front Camera

Steering Actuator

Lateral Control

Use-Cases

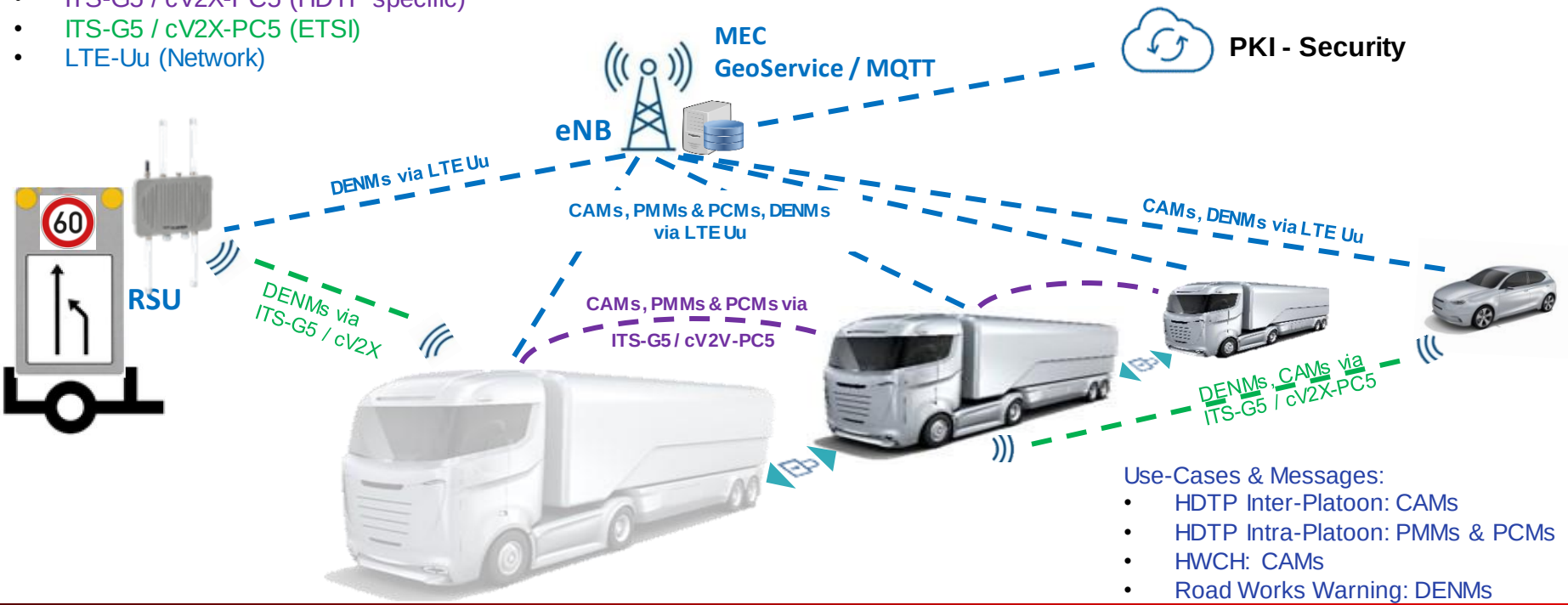
1. Platooning with max speed at digital test-sites (75…85kph)
2. Platooning by following a pass car without connectivity to the pass car
3. Construction Zone, Receiving a RSU warning with speed limit
4. Cut-In maneuver with pass car (w/ and w/o connectivity)
5. Cut out/through maneuver with pass car (w/ and w/o connectivity)



Use-Case tests will be shown in the video

Communication Technologies

- ITS-G5 / cV2X-PC5 (HDTP specific)
- ITS-G5 / cV2X-PC5 (ETSI)
- LTE-Uu (Network)



Use-Cases & Messages:

- HDTP Inter-Platoon: CAMs
- HDTP Intra-Platoon: PMMs & PCMs
- HWCH: CAMs
- Road Works Warning: DENMs

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High Density
Truck – Platooning
German Test-Site
CONCORDA
Co-financed by the Connecting Europe
Facility of the European Union
BOSCH
invented for life
460

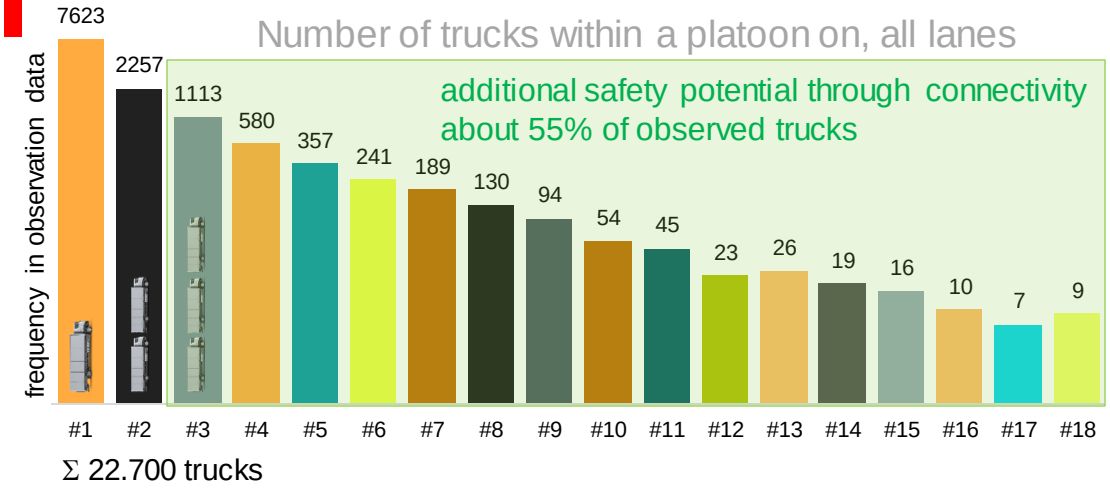
Conclusions: C-ITS technology works

- Short range – both G5 and PC5 provide reasonable performance beyond road safety for CAD (now CCAM).
- Long range over LTE enables Hybrid Communication – complementing short-range
  - LTE and MEC help extending the range of C-ITS, thus enabling a smoother and more energy-efficient ride (500m…5000m)
  - Optimization and evolution needed to enable mission critical communication (like cooperative maneuvering or HDTP) – here, 5G will help closing the gap mid-/long-term
- ITS cybersecurity (PKI) was successfully implemented according to the latest specifications

What next ?
Fruit for thought!

THW…time headway

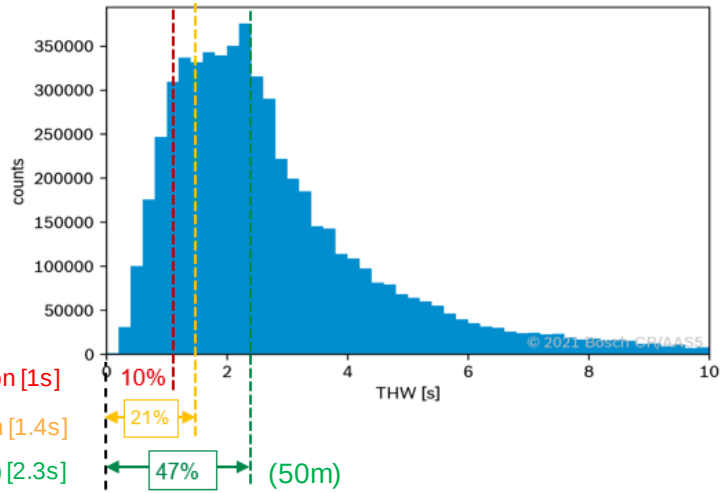
Traffic Situation



Σ 22.700 trucks

- Today, about 55% of trucks run in a convoy/platoon of more than three vehicles and beyond legal distance

Real world data observation



Source: BOSCH Accident Research; Road traffic observation data recorded by levelxdata.com/ on German motorway (highD 2019, highDEntry 2021); Total n=178.285 vehicles (32 hours)

Motivation

for connected ADAS functions

High density traffic causes more dangerous traffic situations

With Vehicle to Vehicle communication a faster reaction of all vehicles in a convoy/platoon is possible to prevent critical emergency situations.

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