EATA
European Automotive and Telecom Alliance
EATA members

Operational roll-out through companies: 38 members

- **Telco network operators**: Deutsche Telekom, Eurofiber, KPN, Orange, Play, Post Luxembourg, Proximus, Vodafone, Telefonica, Telecom Italia, Telenor
- **Telco suppliers**: Nokia, Huawei, Ericsson
- **Automotive OEMs**: BMW, DAF, Daimler, Fiat Chrysler, Ford, Hyundai, Iveco, Jaguar Land Rover, Opel, PSA, Renault, Toyota, Volkswagen Group, Volvo Cars, and Volvo Group
- **Automotive suppliers**: Autoliv, Bosch, Continental, Denso, Delphi, Hella, Valeo
- **Project management**: ERTICO

EATA Objectives

- Facilitate and accelerate the EU-wide deployment of connected and automated driving:
  - Remove potential roadblocks and highlight needed technical and regulatory measures
  - Identify the business models underlying connected and automated driving
  - Help make Europe a global leader in this field
  - Provide a platform for knowledge-sharing between the automotive and telecommunications sectors to develop a ‘common language’

- Create societal benefits by improving road safety and traffic efficiency

- Promote the European digital economy
EATA Connected Automated Driving

High way chauffeur L3 & L4

High Density truck platooning

Automated Valet parking
New challenges for automated driving

The connected data as additional car sensor:
- New messages and attributes to messages
- Safety relevant applications need redundancy via the hybrid communication channels.
- Network slicing, priority for AD vital messages
- Application of certain safety rules on digital infrastructure
- More accurate and safety relevant localization: GNSS correction
## 3 step approach

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<th>Use case</th>
<th>Technologies</th>
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<td><strong>STEP 1</strong></td>
<td><strong>Enabling services for</strong>&lt;br&gt;- Highway chauffeur (L2/3)&lt;br&gt;- High density truck platooning</td>
<td><strong>Pre Deployment:</strong>&lt;br&gt;- hybrid communication: LTE, ITS G5 + LTE V, Mobile Edge Computing applications&lt;br&gt;- Network slicing&lt;br&gt;- LTE Broadcast: GNSS offset, hazards and HD map updates&lt;br&gt;<strong>Studies:</strong> business models responsibilities, safety concepts, Quality of service, Security and data protection Regulation and standardization</td>
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<td><strong>STEP 2</strong></td>
<td>As step 1 + Valet parking</td>
<td>Application above technologies and studies</td>
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<td><strong>STEP 3</strong></td>
<td>As step 2 Automated driving</td>
<td>Industrialization</td>
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![Diagram showing the timeline of the 3 steps from 2017 to 2022]
Concorda system overview

Connected road sensors

V2V : 11p & LTE V

MEC V2V

LTE – 5G

Geoservices and low latency applications
GNSS corrections

Services
- Day 1
- Probe data
- Match making
- Etc.

V2x 5,9GHz channel
- Channel A : LTE V
- Channel B : space holder
- Channel C : 11p

LTE V
- M4 OTA configurable
- M3 multi OEM to be tested on A9

Truck platooning: Discussion ongoing for licenced spectrums with well defined SLA
Objective: increase the GNSS localization accuracy
• Satellite state space representation
• Broadcasting range 20...70km
• Broadcasting frequency = 1 sec.
• Cross MNO
MEC as back-up for CAM, DENM

Measures to increase the reliability/availability of the short range communication:

- Message repetition: (already in place)
- Redundant communication path:
  - e.g. 2 availabilities of 95% gives 99.75% in total
  - LTE station antenna are high positioned and thus better reachable

MEC: Mobile edge computing
CAM: cooperative awareness message
DENM: decentralised environmental notification message
MEC application evolutions

Step 1
- CAM-DENM are receive and transmitted by MEC
- Transmission according geogrids in single cast
- EPMs are generated, available on request

Step 2
- CAM-DENM “light” received by MEC
- CAM-DENM “Transmission according geogrids in single cast
- EPM V2 are generated, available on request

Step 3
- CAM-DENM “light” received by MEC
- EPM V2 are generated, available on request and in single cast according driving events

Objective or step approach:
- Learning by doing: not all events and possibilities are known at project start
- Allow OEM specific approaches
MEC EPM (Environment Perception Model): 360-degree awareness of nearby vehicles.

Inputs:
- Car CAMs and DEMNs, road sensors, 3 party services,
- HD (life) map.

Output:
tables with anonymized Vehicles, Hazards, Roadworks Etc.
Format to be optimized
- type of objects / vehicles, relative positions, time stamps
- Traffic speed vs. range. (only relevant cars)
- Road and traffic situation

Applications:
- Cooperative lane changing
- Cooperative insertion
- Decision making sudden hazards
- Etc.

Challenges:
- Lowest data volumes
- Lowest latency <100ms
MEC architecture

1. Real time road data
2. Statistics
MEC architecture

- CAM/DEMNs between MNOs
- CAM/DEMNs from overlapping and adjacent zones
STEP 1: MEC architecture

Apps:
- Generating (virtual) DENMs
- GNSS corrections
- Environmental perception models (EPM)
- Data aggregation for upper laying cloud structures
- Logging for evaluations

Geo-localized Transfer CAMs, DENMs
Network-slicing

It is planned to deploy the uRLLC (ultra-reliable low latency communication) for the MEC applications:

• Step 1 in Lab
• Step 2 in test network
• Step 3 in operational network by 2019

slicing level, min L2, possible L3 depends on the business model and associated costs.
**Valet parking proposal #1**

**Use case:** leaving the car at drop off area and calling the car via phone app to the pick-up area + additional parking services

APV service (Automated Valet Parking)

- Check in/out vehicles
- Interface with users, e.g. via smartphone App, for above mentioned services
- Send the 3D-HD parking map to the incoming vehicles
- Aggregate data: swarm based parking lot detection (using car sensors), register leaving cars, historical patterns, P-slot sensors, Cameras
- Attribute places and send route to attributed places
- Manage additional services: washing services, fuelling, in-car delivery, EV charging, etc.
- Manage the parking access rights via car connectivity and via tokens in the car as off-line back up.
- Traffic management: e.g. automated cars in puffer zones to give priority to manual cars
- Incident management + security (collision avoidance, e.g. with pedestrians)
Valet parking proposal

**Redundant communication with infra structure:**

Redundancy:
The infrastructure will be connected to internet, controlled via the AVP by the car through LTE
Backup via short range communication and embedded user right management.

**Communication slices:**
- NB lot for car wake up and batter driven parking sensor
- uRLLC for MEC applications and remote driving

**MAP & localization:**
- HD 3D maps optimized for relative localization. Graph maps (tbc)
- GNSS corrected localization
- Parking sensor based localization

**Inter parking communication:**
- Via datex II
Thank you for your attention

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