Geneva, 5 March 2015

The European Association of Automotive Suppliers

- 109 Corporate members
- 23 Member Associations
- 18 billion € R&D per year
- 5 million employees
- 600 billion € sales
- Partner of the EU and the UN

Our vision is for the European Automotive Suppliers to be the leading provider of highly efficient and sustainable mobility worldwide

Our mission is to increase the competitiveness of the European automotive suppliers' industry and drive its sustainable growth while enhancing wealth and employment in Europe

Relevant Drivers for Mobility Systems

Relevant Drivers for Mobility System

Urbanization

- Within 2030 there will be more than 40 Mega-Cities
- A complete re-think of urban mobility will be required
- Smart-Cities and Smart Transportation Systems

Global Growth of Middle Class

- From 1998 to 2018 the Middle Class in Emerging Countries is growing by 255%
- The access to certain goods like cars will grow as well

Regulatory Framework: decarbonization of transport, Air Quality & Road Safety

- Severe legislation will drive the technology choices of Car Manufactures
- Governments will support the pioneering phase of zero emission vehicles by mean of heavy incentives
- Vision Zero will support both Autonomous and Cooperative Driving together with ADAS systems

Consumers attitude evolution

- Gen Y shows poor interest towards private cars and even driving license
- Car sharing will grow together with new business models offering services more than traditional goods
- Ageing society

Disruptive Technologies

- Internet of Things
- Cloud computing
- **Autonomous Driving**
- New materials
- Mobile Internet
- Automation of knowledge work
- Advanced robotics
- Next generation genomics
- Energy Storage
- 3D Printing
- Advanced oil and gas exploration and recovery
- Renewable Energy

Disruptive Technologies: Advances that will transform life, business, and the global economy

Source: (McKinsey Global Institute – May 2013 – Disruptive Technologies: Advances that will transform life, business and the global economy)

Benefits of autnomous driving

*The **Autonomus Driving impact** in USA*

Road accidents reduction
488 bn$/y

*Source: **Morgan Stanley***

Productivity Improvement
507 bn$/y

Total Saving

1302 bn$/y

Additional Productivity due to traffic avoidance
138 bn$/y

Fuel Economy
158 bn$/y

Additional fuel saving due to traffic avoidance
11 bn$/y

Automated Driving: enabling technologies

Perception

Radar
Camera (mono & stereo)
Lidar
Ultrasonics
….

Information

Vehicle 2 X Communication:
IEEE 802.11p
LTE Direct
BTLE
VLC (Visibile Light Communication)
Local Dynamic Map

Actuation
Path Planning
Vehicle Control

Positioning

Differential GPS (SBAS, GBAS, RTK,..)
Gyro, Accelerometer, Odometer fusion
Visual Odometry
SLAM (Simultaneous Localization and Mapping)
…

Data Fusion

Sensor Refinement (Sensor model, feature extraction)
Object Refinement (Data Alignement & Association)
Situation Refinement (Situation & Behaviour identificaiton, Relatioships, trajectories prediction)
Supervisor (risk assessment, action planning, decision making)

Vienna Convention - Europe

- The Vienna Convention stipulates that a vehicle needs a driver and that every driver shall at all times to be able to control his vehicle
- The governments of Germany, Italy, France, Belgium and Austria have submitted an amendment to the Convention

The amendment would allow a car to drive itself, as long as the system "can be overridden or switched off by the driver"

A driver must be present and able to take the wheel at any time

Final Step: integration between autonomous and cooperative driving

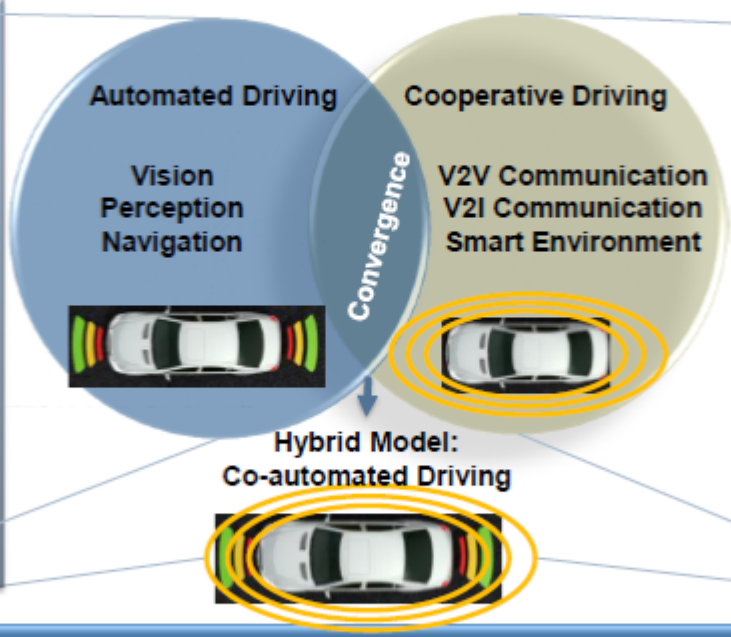
Convergence of ADAS and Connectivity

V2V and ADAS are expected to complement each other in their capabilities and shortcomings, neither being completely capable of enabling fully-automated driving; convergence can open up new business opportunities.

Automated Vehicle Market: Convergence of Automated and Cooperative Driving, Europe and North America, 2013

Vehicle Autonomy

- ADAS-based automated driving systems can significantly improve road safety.
- Limited perception range (due to line of sight obstructions or environmental conditions) can make the vehicles cautious and have a negative impact on traffic flow.
- There is a clear path for the technology development and deployment of ADAS-based automated driving systems.

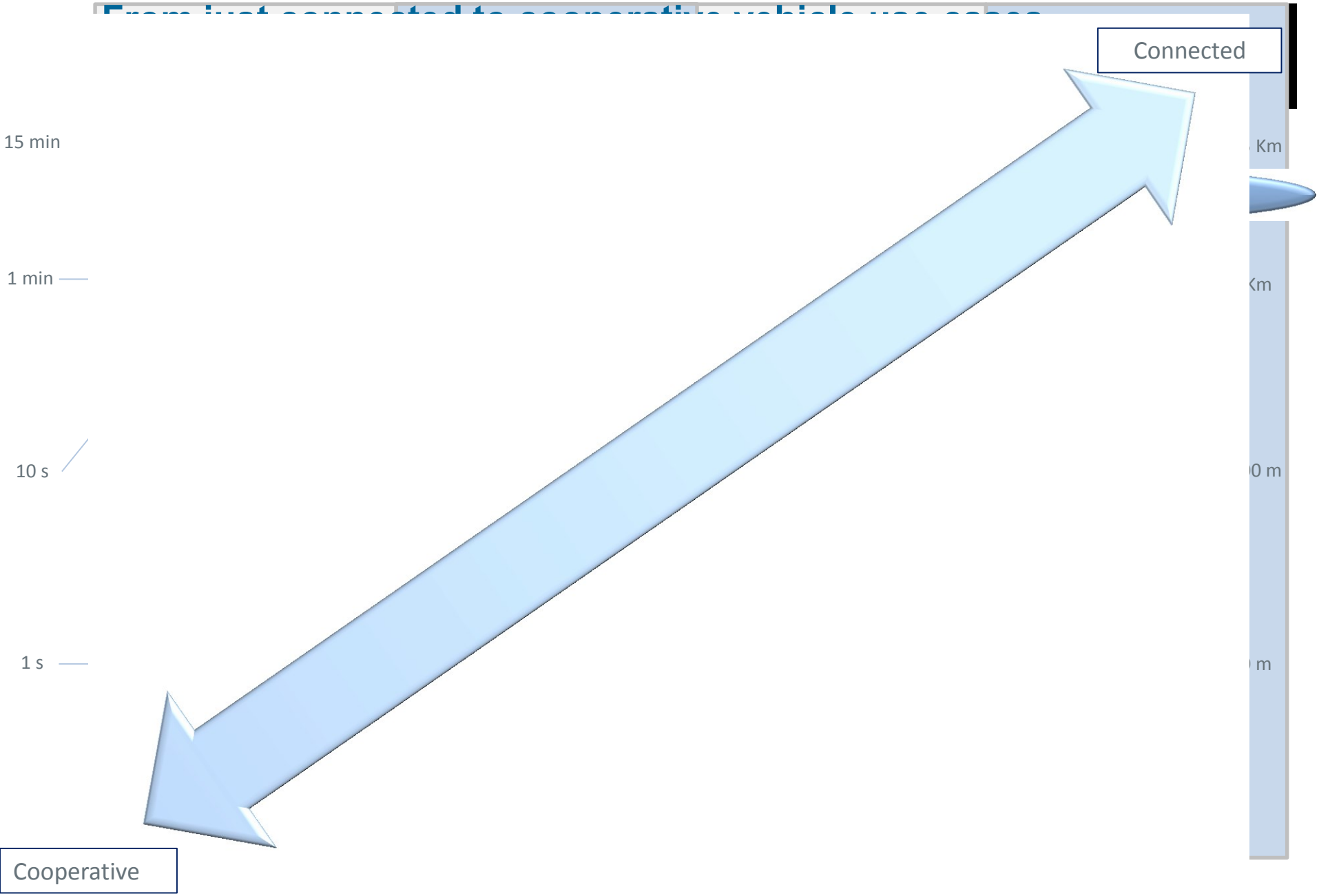


Cooperative Driving

- The use of V2x enables cooperative driving, which can enhance vehicle safety and information systems.
- Gathering data from further ahead, from obscured vehicles, and from potentially vulnerable road users (VRUs) enables optimization of vehicle control and of overall traffic flow.
- There are still significant challenges for deployment including standardization, legislation, and market penetration.

- V2V and ADAS are expected to complement each other in their capabilities and shortcomings.
- Generating driving-based Big Data for commercial use will become more systematic with large sample size.
- Telematics-based connectivity and V2X-based connectivity form necessary redundancies.
- V2I support still inevitable, but telematics can be used as a stop-gap option.

Source: Frost & Sullivan; MIRA Ltd



Current Situation in connectivity

- Today the automotive connectivity is dominated by aftermarket devices;
- Rolling out new infrastructure is expensive, slow, and incomplete in coverage;
- Regional differences may hinder interoperability;
- Accompanying measures to bridge the communication gap towards increased penetration of systems is required;

Objectives for connected vehicles

- Increase market penetration with interoperable communication (DSRC and 4G-LTE) units;
- Ensure safety, reliability, privacy and security;
- Enable realtime ITS service provision;
- Enable a vivid ecosystem of ITS services by third parties;
- Enable early deployment recognizing customer interest;
- Focus on functionalities build on solid business cases;
- Enable access to sensor data by appointed authorities.

Increase market share of connected and communicating vehicles
Open in-vehicle platform architecture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