Vehicular Communication 2025:
An overview from OICA

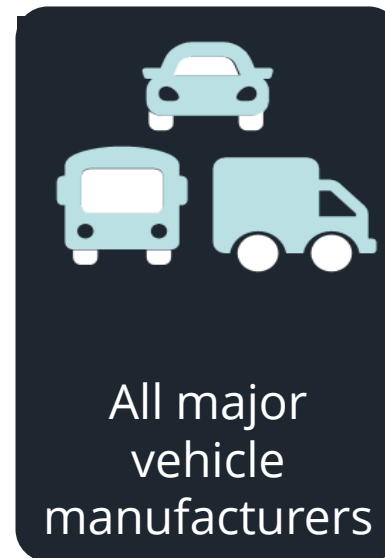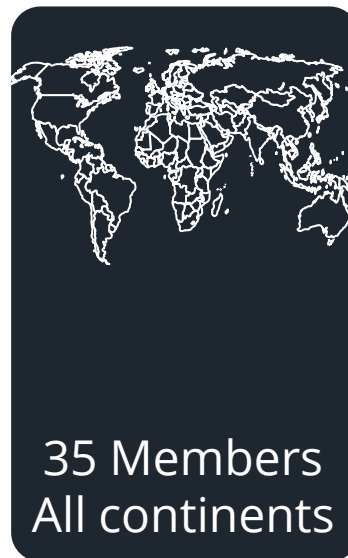Future Networked Car Symposium 2025

Jan Luehmann

27.03.2025

Who is OICA

Organisation Internationale des Constructeurs Automobiles – International Organization of Motor Vehicle Manufacturers

World Federation

Vehicle Manufacturer Associations

35 Members All continents

All major vehicle manufacturers

Officially UN accredited NGO since 1956

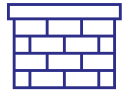OICA is the voice speaking on automotive issues in world forums

OICA main activities

- **Harmonisation** of technical vehicle regulations at United Nations level

    → OICA = sole officially accredited representative of the global auto industry

- **Statistics** (production, sales, vehicles in use)

- International **motor shows**: grants accreditations and manages calendar of auto shows

- Development of **position papers** and communication (decarbonization, OICA manifesto, etc.)

Targets reached to date

Passive Safety	Active Safety	Pollutant emissions	CO2 emissions	NEW: Connected vehicles
Seatbelt	ABS	WLTP	EVs	Cyber Security
Crashworthiness	ESC	More to come	Fuel Cells	Software updates
	AEBS			More to come
	LKAS			
	…			

➔Yet the advent and introduction of automated driving and connected vehicles is a challenge to the regulation community

Introduction

Vehicular communication plays a pivotal role in enhancing modern transportation systems, enabling vehicles to share information and data with each other and the surrounding infrastructure for improved safety, efficiency, and user experience. It brings added value as additional sensor data for enhanced monitoring of the surroundings of a vehicle and enables digital collaboration between those.

Vehicular Communication

The sixth sense for road safety
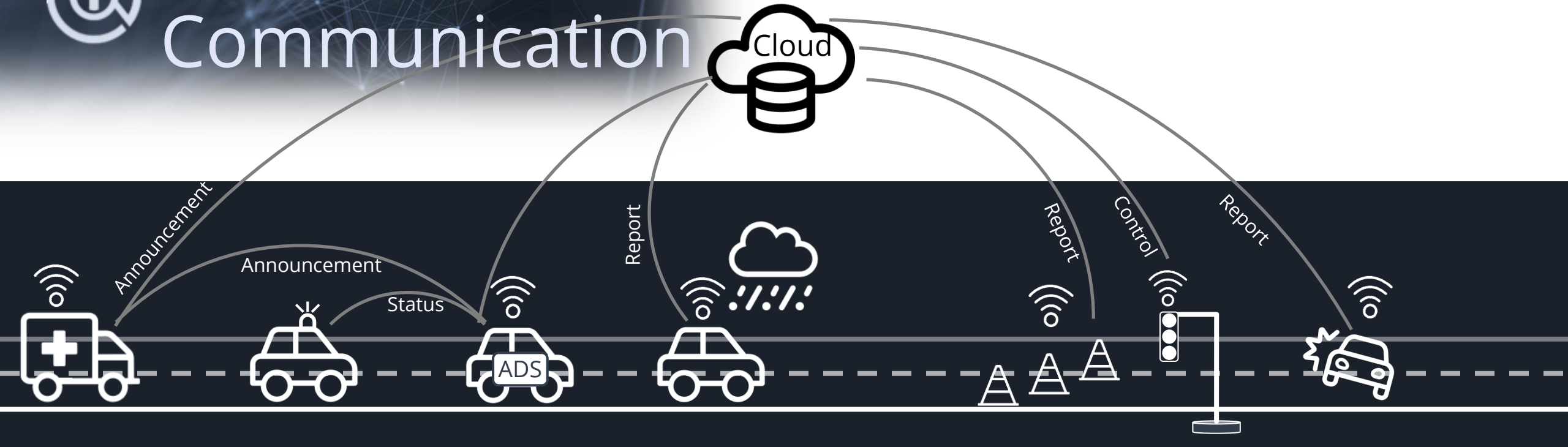
Vehicular Communication

Drivers, as well as assisted and automated driving functions today in particular still drive "on sight" in the truest sense of the word.
Road safety can be greatly increased by the additional information that is made available to them by Vehicular communication.
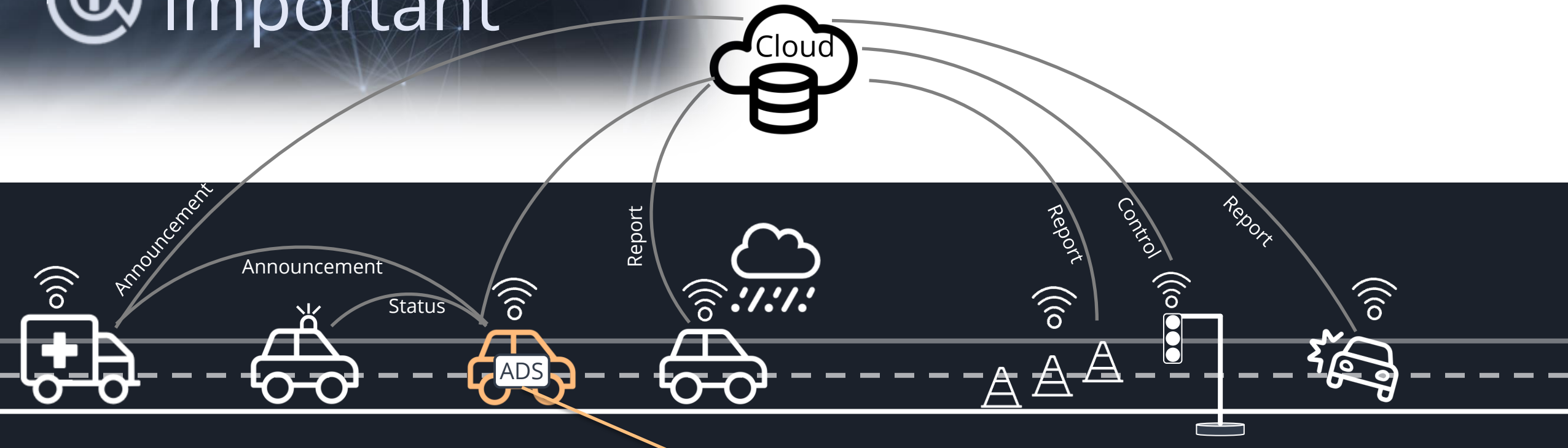
Vehicular Communication

With vehicular communication, road users are better connected, especially with regard to emergency vehicles. Safety and sustainability could be increased for each individual road user. The Vehicle Status Report (e.g. ADS Status) is available to selected and authorized parties.

Important

Cloud

Announcement
Announcement
Status
Report
Report
Control
Report

ADS

An automated vehicle is not necessarily connected,
just as a connected vehicle is not necessarily automated.

Vehicular communication should always be considered an additional sensor
that enables enhanced functionalities.

Vehicular Communication

Tackle everything that's needed

Vehicular Communication

Synchronisation of Industries

One of the biggest and crucial tasks is to find a way to synchronize the lifecycle of the two main Stakeholders: Communication- and Automotive Industry

Telecommunications Industry Development Cycles:
1. **5G and Future Networks**: Introduction and development of 5G, followed by 6G, with a cycle of about 10 years

2. **Cloud Computing and Edge Computing**: Rapid adoption and integration, typically within 3-5 years

Technology Lifespan:
1. **Mobile Technologies**: Each generation (e.g., 4G, 5G) has a lifespan of about 10-15 years

2. **Network Infrastructure**: Hardware and software upgrades every 5-7 years to keep up with new technologies
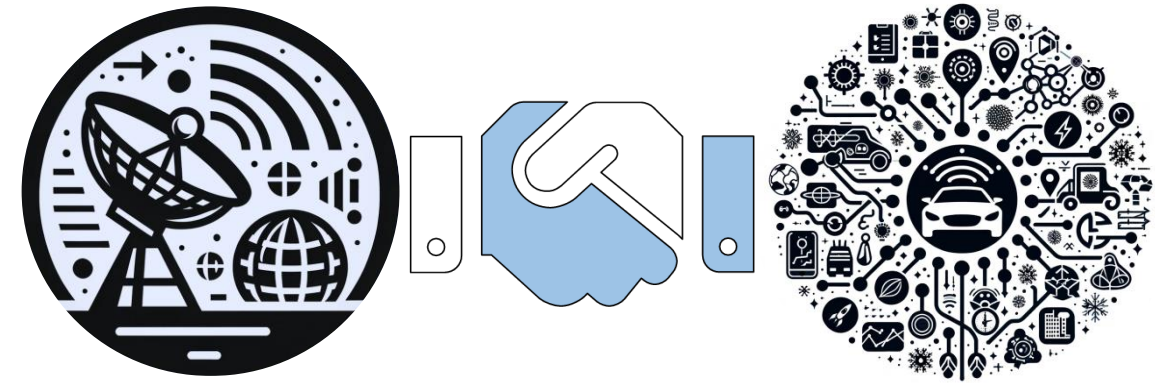
Automotive Industry Development Cycles:
1. **New Vehicle Models**: Development time for new models averages 24 - 54 months

2. **Electrification and Autonomous Driving**: Introduction of new technologies and models every 5-7 years

Technology Lifespan:
1. **Vehicle Platforms**: Lifespan of about 6-8 years before a new generation is introduced

2. **Powertrain Technologies**: Lifespan of about 10-15 years, depending on technological advancements and regulatory requirements

Vehicular Communication
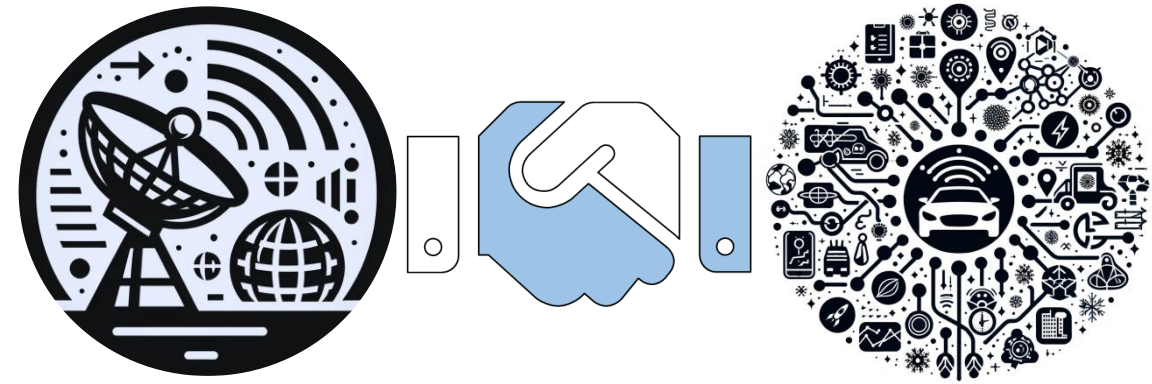
Synchronisation of Industries

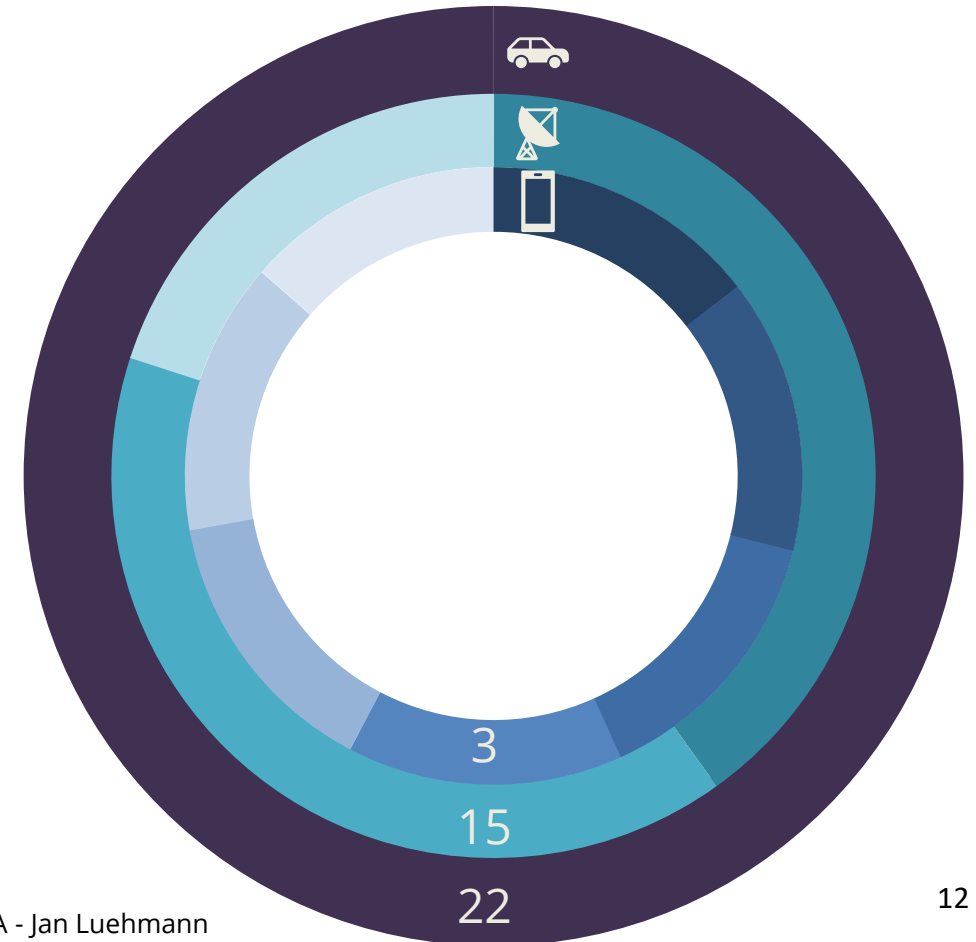The average product lifecycle of a **CAR** is about 15-22 years

The average product lifecycle of a **COMMUNICATION TECHNOLOGY** is about 15 years

The average product lifecycle of a **SMARTPHONE** is about 2.5 to 3 years

3

15

22

Overview

Definition
Referring to the technology that enables the exchange of information between vehicles and between vehicles and their surroundings, using both wired and wireless communications technologies.

Structure
Categorizing into wired communications (e.g., OBD port, vehicle charging equipment) and wireless communications (RFID, NFC, Bluetooth, Wi-Fi, Cellular, Satellite).

Value
Enhancing road safety, reducing transport costs, improving efficiency, elevating transport experience, and minimizing environmental impacts.

USECASES

Safety & Energy
Including vehicle operation safety, infrastructure operator information, emergency services, collision warning and avoidance, protecting vulnerable road users, and emergency alerts.

Traffic Management
Assisting in road transport infrastructure management, road works information, traffic signal optimization, real-time traffic updates, and event management.

In-Vehicle Experience
Improving the in-vehicle experience through infotainment, convenience applications, remote activations, charging support, and payment services.

AD Support
Supporting ADS deployment, providing real-time updates for road conditions, facilitating cooperative automated driving, and enhancing safety and efficiency.

Challenges
Including cybersecurity risks, privacy concerns, interference issues, false information propagation, and potential damage to infrastructure.

Mitigating Challenges
Adopting robust cybersecurity measures, ensuring privacy through data anonymization, managing interference, verifying data authenticity, and reinforcing infrastructure resilience.

Future
The ongoing advancements in vehicular communications technology promise to further enhance road safety, efficiency, and the overall driving experience, paving the way for fully automated and connected transportation systems.
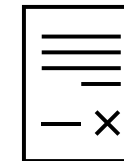
Achievement

Vehicular communications definition, types, value, uses, and considerations endorsed by WP.29

UNECE

| WP.29 |
| IWG ITS |
| TF Vehicular Communication |

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Contributors
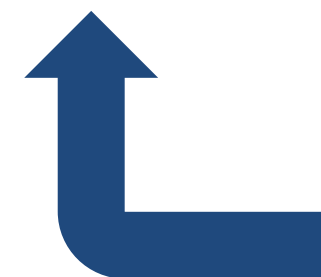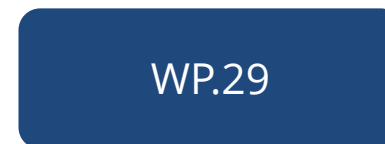
EGComAD

OICA

FISITA

CLEPA
European Association of Automotive Suppliers

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Vehicular communications definition, types, value, uses, and considerations endorsed by WP.29

WP.29

IWG ITS

TF Vehicular Communication

UNECE Contracting Parties

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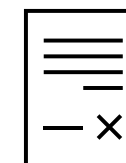
Focus of main contributing Countries regarding V2X Technologies in UNECE IWG ITS

Each country has distinct priorities in V2X development:

- **Japan** focuses on **long-term roadmaps and gradual implementation** through **demonstration projects**.

- **China** is leading in **large-scale pilot projects**, ensuring **nationwide cloud-based V2X integration**.

- **Turkey** prioritizes **C-ITS deployments**, aiming to align with **European regulatory frameworks**.

- **C2C Europe** promotes **functional safety and interoperability**, ensuring that all V2X technologies **coexist harmoniously**.

- **Germany** is leading in **high-automation and crash avoidance** scenarios while fully integrating **V2X into Euro NCAP safety standards**.

Status

Comparison of V2X Technologies Across Countries

Technology	Japan	China	Turkey	C2C Europe	Germany
Cellular V2X (C-V2X)	X	X	X	X	X
Dedicated Short-Range Communication (DSRC)	X			X	X
LTE-V2X	X	X	X	X	X
NR-V2X (5G-V2X)	X	X	X	X	X
High-Definition Mapping	X	X	X	X	X
Security Certificate System	X	X	X	X	X
Cooperative Intelligent Transport Systems (C-ITS)	X	X	X	X	X
AI-based Traffic Management	X	X	X	X	X
Roadside Unit (RSU) Integration	X	X	X	X	X
Vehicle-to-Infrastructure (V2I)	X	X	X	X	X
Vehicle-to-Vehicle (V2V)	X	X	X	X	X
Vehicle-to-Pedestrian (V2P)	X	X	X	X	X
Vehicle-to-Network (V2N)	X	X	X	X	X

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Comparison of V2X Technologies Across Countries

Use Case	Japan	China	Turkey	C2C Europe	Germany
Emergency Vehicle Approaching	X	X	X	X	X
Emergency Electronic Brake Light	X		X	X	X
Forward Collision Warning	X	X	X	X	X
Traffic Jam Ahead Warning	X	X	X	X	X
Animal or Person on the Road	X		X	X	X
Obstacle on the Road Warning	X		X	X	X
Road Works Warning	X		X	X	X
Hazardous Location Notification	X	X	X	X	X
Wrong Way Driving	X		X	X	X
Green Light Optimum Speed Advisory (GLOSA)	X	X	X	X	X
Off-Street Parking Information	X		X	X	X
Weather Conditions	X		X	X	X
Temporary Slippery Road	X		X	X	X
High-Speed Car-to-Car Rear Collision Avoidance		X			X
Car-to-Car Straight Crossing Path with Obstruction		X			X
Cooperative Adaptive Cruise Control		X	X	X	X
Autonomous Valet Parking		X	X	X	X
Intersection Collision Avoidance		X	X	X	X
Platooning		X	X	X	X
Emergency Vehicle Approaching	X	X	X	X	X

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Uniting industry for a Safer, Smoother Tomorrow

Together, as we align in standardization and regulatory efforts, every stakeholder becomes a key player in revolutionizing road safety and traffic management. Our collective action is paving the way for a future where journeys are not just safer, but smarter and more efficient.

Infrastructure

Automotive

Communication

Other Road User

Thank you

for being a part of this journey towards a safer and more efficient future.