Overview of the ITU CITS Expert Group on Communications Technology for Automated Driving – Working Group 1 (**EGComAD/WG1**)

Vehicular Communications For Merging Automatically Into Congested Lanes

Ganesh Jayaram
Chair, EGComAD/WG1

Recent Inspirations from FNC 2025

ITU and UNECE are both working on “vehicular communication” and in this regard - “ITU has coordinated its research activities, addressing a challenging use case, namely the insertion of autonomous vehicles onto highways. These efforts are expected to yield useful prescriptions that could serve the purpose of WP29 within the next five years, paving the way for market introduction of such functions by 2032.”

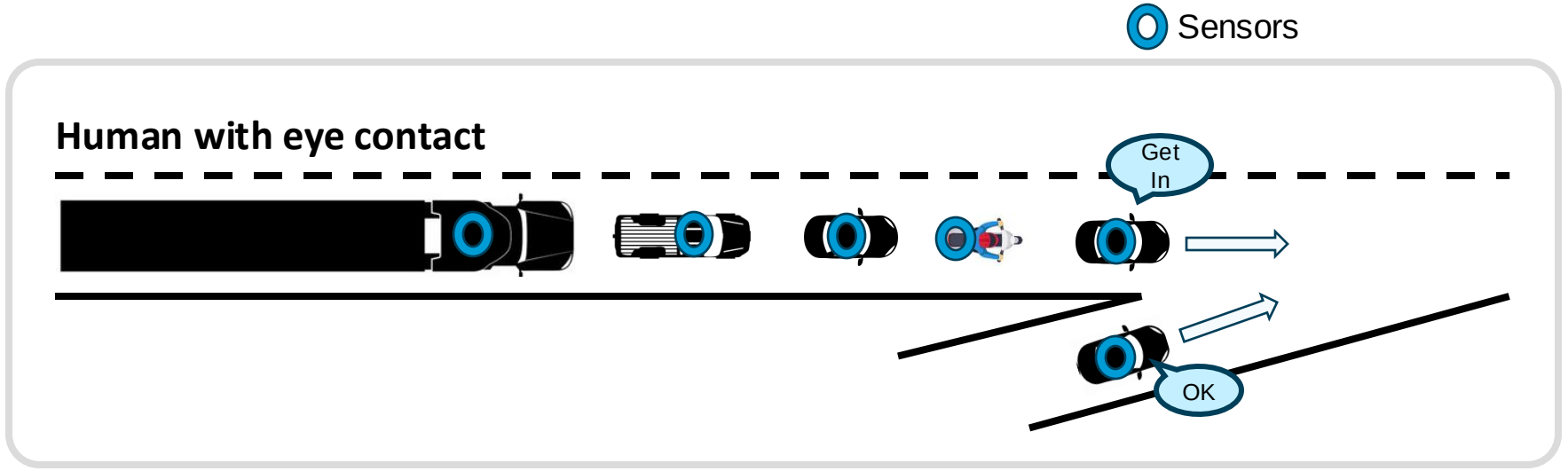
- Ms. **Tatiana Molcean,** UNECE Executive Secretary

“Now we have our new Expert Group initiated by the ITU that will define connectivity requirements for vehicles sold from 2032 onwards, and it is an essential development. But we need harmonized regulations, industry cooperation, and government commitment today, not in 7 years”

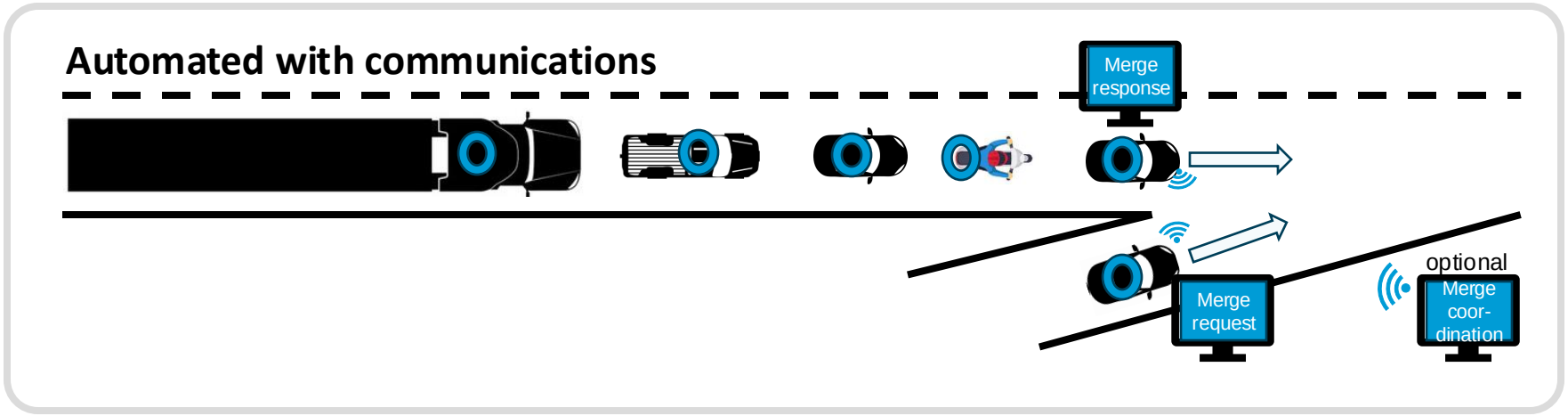
- Mr. **Jean Todt**, UN Special Envoy for Road Safety

Key Aspects to Focus in WG1

Sensors

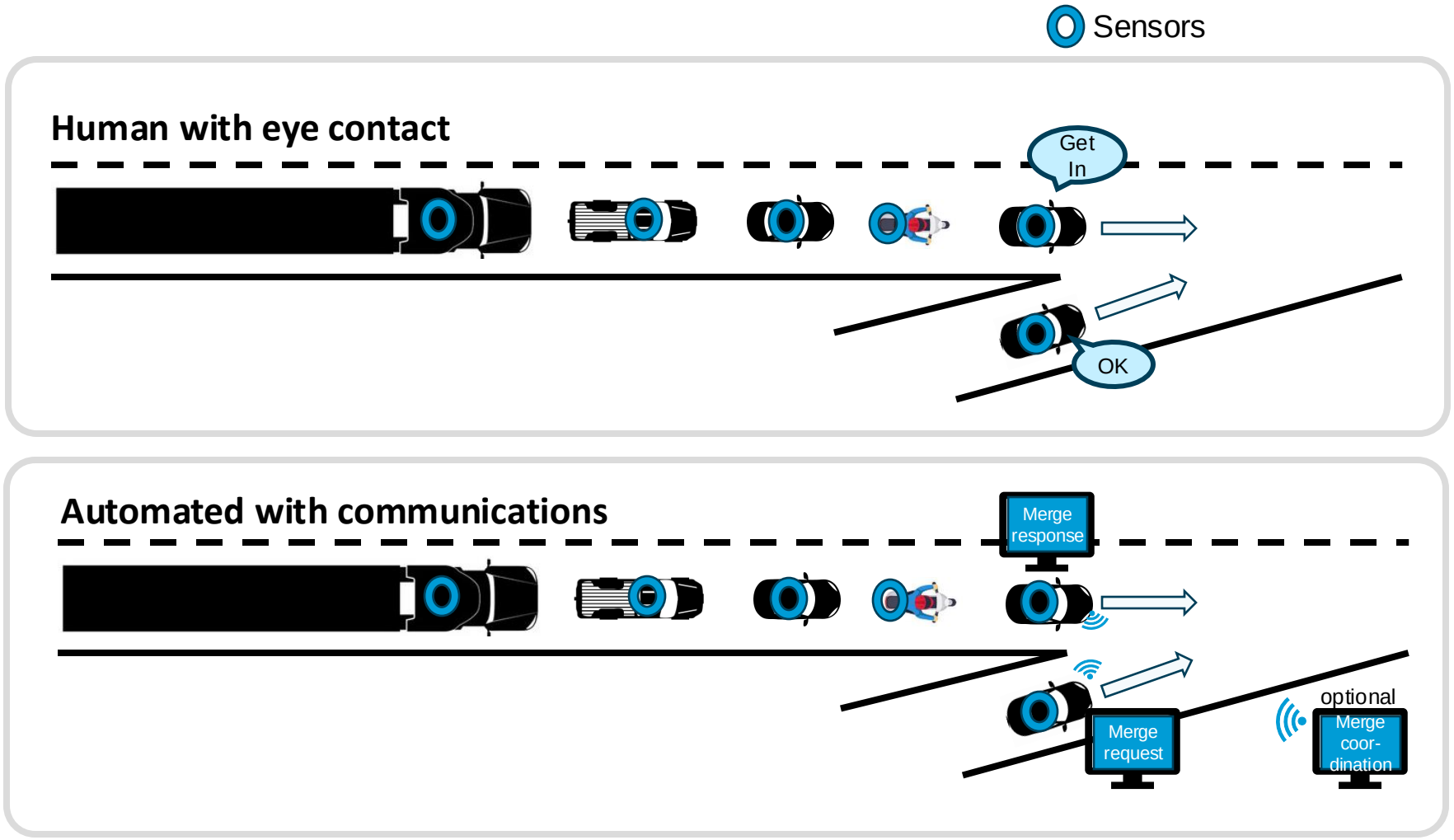


Merge coordination (optional)



Key Aspects to Focus in WG1

CALL FOR CONTRIBUTIONS



Use Case Requirements

Merging Scenarios

Valid Regulations

Spectrum Needs 2030-2060

Conditions and Legal Constraints in various jurisdictions

Key Aspects to Focus in WG1

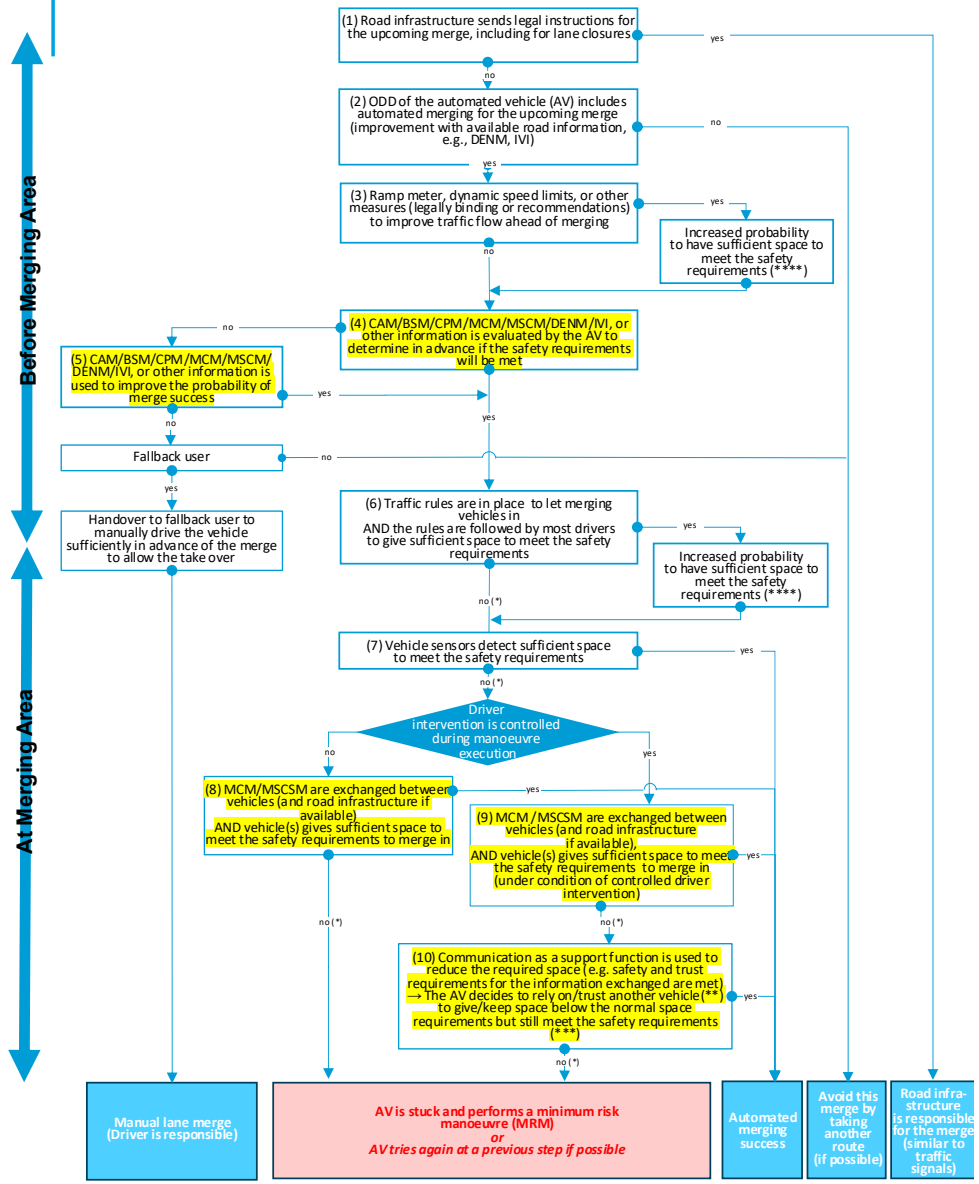
1. Use Case Requirements

- **Speed vs Distance**: Highlight the relationship between vehicle speed and the distance required for safe merging. Discuss how different speeds impact merging strategies.
- **Merging Area Flowing Traffic:** Explain the dynamics of traffic flow in merging areas and how automated vehicles handle these scenarios.
- **Handling ITS Messages:** Describe the role of Intelligent Transportation Systems (ITS) messages in facilitating lane merging, including communication protocols and message types.

DRAFT

Automated Lane Merge Systematics… Objective of EGComAD-WG1

(Requirements for automatically merging into congested lanes)



(*): A reason for "no" could be a cut-in vehicle which requires the AV to retry the step, or to go back to an earlier step.
(**): The vehicle giving space must prevent driver interventions (requires regulation updating).
(***): Regulation update necessary to allow the reduction of space.
(9) And (10) *should be carefully examined with respect to driver interventions and automotive status quo in reference to UNECE WP.29 ADS documents. More info in the Systematics document.*
(****): Safety requirements are according to the vehicle's safety case

CAM: Cooperative Awareness Message (ETSI EN 302 637-2)
BSM: Basic Safety Message (SAE J2735)
CPM: Collective Perception Message (ETSI TS 103 324)
MCM: Manoeuvre Coordination Message (according to MCS/Manoeuvre Coordination Service, ETSI TR 103 578)
MSCM: Manoeuvre Sharing Coordination Message (according to Manoeuvre Sharing and Coordination Service, SAE J3186)
DENM: Decentralized Environmental Notification Message (ETSI EN 302 637-3)
IVIM: Infrastructure to Vehicle Information Message (ETSI TS 103 301)

Key Aspects to Focus in WG1

2. Conditions and Legal Constraints in Various Jurisdictions

- **Legal Distance vs Practical Distance:** Compare the legal requirements for safe distances between vehicles in different countries (e.g., China, Japan, USA, Canada, Europe) and how these compare to practical distances used in real-world scenarios.
- **Jurisdictional Examples:** Provide specific examples of regulations from different jurisdictions to illustrate the diversity in legal constraints.

Key Aspects to Focus in WG1

3. Merging Scenarios and Valid Regulations in Different Legislations

- **Scenarios:** Discuss various merging scenarios such as tunnels, overheads, many-to-single lane merges, and conditions in bad weather.
- **Regulations:** Outline the regulations that apply to these scenarios in different legislations and the need for creating additional* documents if necessary.

- *additional document to provide detailed guidelines, best practices, supplementary information for specific scenarios and jurisdictions.

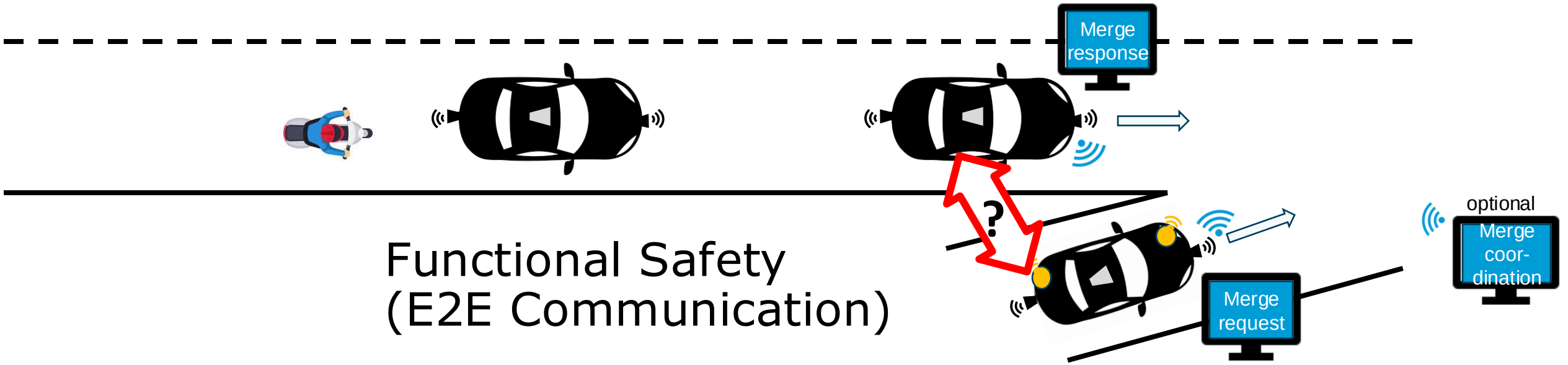
Key Aspects to Focus in WG1

5. Spectrum Needs for Automotive Needs 2030 - 2060

- **Current Spectrum:** Assess whether the current spectrum allocation is adequate for future automotive needs.
- **Future Requirements:** Discuss the projected spectrum needs for advanced driving use cases and connectivity technologies up to 2060.
- The advanced applications such as automated merging in congested lane might require increased bandwidth, ultra low latency etc.

Key Aspects to Focus in WG1

CALL FOR CONTRIBUTIONS



Functional Safety (E2E Communication)

SOTIF

Trustworthiness

Interworking of V2X messages

Security

Key Aspects to Focus in WG1

4. Safety and Security Aspects

- **Functional Safety:** Explain the importance of functional safety in automated lane merging, including standards like ISO 26262.
- **SOTIF** focuses on ensuring that the system performs safely under intended conditions, addressing potential hazards that arise from the intended functionality itself. Key aspects include:
- **Hazard Analysis:** Identifying and mitigating hazards that could occur during lane merging, such as misjudging the speed of other vehicles or incorrect gap selection.
- **Scenario Testing:** Conducting extensive testing in various scenarios to ensure the system can handle unexpected situations.

Key Aspects to Focus in WG1

6. Information from Previous and Existing Projects

- **Research Activities:** List the latest research activities related to automated lane merging, including studies from ETSI, China, C2C, SAE, and 5GAA.
- **Few Examples:** CEDR Paper, ETSI ITS-Maneuver Coordination Service, Decentral Negotiation, Safety Treatment, 5GAA Trust etc.

Acknowledgements

- We extend our sincere gratitude to all participants of the WG1 Meetings for their valuable contributions and engagement. Your dedication and insights have been instrumental in our progress.
- We look forward to your continued support and collaboration in the future.

Thank you all!