EUCAR PERSPECTIVE ON CONNECTED AND AUTOMATED VEHICLES

Digitalisation and automation are both innovation drivers for the automotive industry and decisive factors for the future viability of automakers. Research and pre-deployment projects on Connected and Automated Vehicles (CAV) will advance the technological competitiveness of the automotive industry in the EU and maintain its position as a significant employer. We develop cutting-edge technologies which fulfil the regulatory requirements and our customers[1] demands while guaranteeing long-term competitiveness. We welcome the EU's ambition to ascertain global leadership for Europe in CCAM (Co-operative, Connected, Automated Mobility) deployment.

Key Statements for Connected and Automated Vehicles

EUCAR is committed to achieve safer, cleaner, smarter and more efficient transport solutions. Researching CAV technologies will play a vital role in it:

- CAV technologies will support the Vision Zero targets set for 2050 by decreasing the number of road fatalities and accidents.
- CAV contributes to reducing transport emissions and congestion, while ensuring inclusive mobility for persons and goods.
- CAV will provide individual mobility to all users; in particular elderly and people with disabilities.
- CAV will have a remarkable economic impact ensuring long-term European growth and jobs.
- CAV will enable new mobility concepts shifting design & development from a driver-centred to mobility-user-centred approach.

Thus, EUCAR members drive the development of these new technologies and services for CAV while ensuring the competitiveness of the industry.

Challenges

- Society´s acceptance is crucial to ensure the success of CAV. This depends on two key elements: trust in technology and added value. Customers' expectations regarding the digitalisation prospects of future automated vehicles are increasing.
- The technological and societal change in mindset creates space for novel services within existing and new ecosystems related to mobility and transportation. This opens up market opportunities for established and new players and accelerates the competition. The automotive industry is committed to drive this digital transformation.
- In the future, we expect a mix of automated and conventional traffic for a long time. Ensuring the smooth and safe coexistence of automated vehicles and all other road users will be a key challenge.

- Physical and digital infrastructure both play a crucial role in the mobility of the future. EUCAR is calling for co-operation between all stakeholders to pave the way for European interoperability and economies of scale.
- CAV may contribute in many ways to decarbonisation and transport efficiency. To fully understand and leverage this potential, we need to test and assess its impact.

Safety is key. CAV offers enormous potential to improve road safety by addressing human errors. We integrate safety by design. In practice, that means we consider safety aspects on each system level and every development stage, from design to testing and validation.

- We address safety in all stages of technology development, function and operation. We follow and enhance standardisation and best practices integrating concepts at an early stage. Further research shall lead to implementation of safety assessed CAV technologies that are continuously optimized for effectiveness and safety.
- We adapt and advance active safety functions so that CAV safely navigate both expected and un-expected scenarios. Therefore, we develop systems that aim to anticipate and minimize risks, avoiding collision and to reduce the consequences of unavoidable crashes.
- We develop advanced passive safety systems protecting passengers in new, non-traditional seating positions. These will allow users to safely engage in more productive or comfortable activities.
- As automated driving evolves, new types of crashes may occur. Consistent methods and assessment tools are required to fully understand the safety impact of CAV and derive safety requirements.
- All safety and automated driving functions need to be tested, validated, and verified. For this we develop specific methods, design guidelines, as well as real world and virtual testing techniques.

[1] EUROPE ON THE MOVE, Sustainable Mobility for Europe:
safe, connected, and clean; https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0293

Artificial Intelligence (AI) plays a major role not only in CAV but also in intelligent mobility services.

- We actively work on AI as a functionally competitive and affordable CAV technology in order to enable safe autonomous driving in a more complex and dense traffic environment.
- Specific automotive requirements such as safety, security and real-time functionality demand the reinvention of AI for CAV in the European context. This includes the development of an adequate and effective/consolidating framework, integrating the most promising approaches from all over the EU. Several countries within the EU have already started their national initiatives.
- Implementing AI in automotive products, in particular in automated driving, presents a variety of challenges, e.g. industrialisation, requirement-based development, continuous improvement of trained modules for application in safety critical domains.
- Verification and certification of AI for automated driving functions are essential for CAVs to operate in more complex urban traffic scenarios. Therefore, we need a robust and reliable European framework. Beyond European harmonisation we strive for alignment on a global (UN) level. EUCAR is committed to drive the necessary research and technology development as well as setting standards.

CAV technologies and new business models involve producing and communicating huge sets of data. For this, secure and trustful communication between the vehicles and infrastructure is essential

- The interoperability (EU/global) between vehicles and infrastructure is fundamental for its proper function while ensuring economies of scale. ICT technologies evolve at a different pace than vehicle development

and product lifecycles. This leads to the co-existence of different communication technologies for vehicles to share and use. Therefore, we need innovative compatibility and interoperable solutions for all technologies deployed.
- Security forms an essential pillar of CAV. As automotive industry we actively develop security and privacy functions/systems for safe, secure and trusted communication between vehicles and the digital infrastructure. Efficient security solutions are necessary from the beginning to ensure scalability.

The success of connected and automated vehicles depends on user adoption and social acceptance. We believe that a genuine user adoption will be the key enabler to the massive deployment of CAV and to the change of the mobility landscape.

- Human-CAV interaction (in-vehicle and outside vehicle) at different levels of automation needs to be self-explanatory, intuitive and inclusive for all road actors (e.g. vulnerable road users, other vehicles, etc.). We are working on design solutions and standards to evaluate human misuse, skill degradation, level of trust, motion sickness and measures to further compensate.
- For safe CAV the translation of technical complexity to humans (in- and outside the vehicle) is crucial to create trust and social acceptance. We set requirements for our "vehicle internal and external" Human Machine Interactions and Interfaces to be self-explanatory, intuitive and inclusive.
- EUCAR is committed to evolve from driver-centred to mobility-user-centred design and development.

ABOUT EUCAR

EUCAR (European Council for Automotive R&D, www.eucar.be) is the association for collaborative research and innovation of the major automobile manufacturers in Europe. These manufacturers contribute to sustainable mobility and a competitive European industry, investing more than €50bn per year in research and development. The industry's investments are leveraged by the collaborative work performed with support of the European Framework Programmes, currently Horizon 2020. The EUCAR Council comprises the heads of research and advanced development of the member companies.