Federal Ministry
of Education
and Research

HIGHTECH STRATEGIE 2025
Köpfe. Kompetenzen. Innovationen.

Research on autonomous driving in Germany

SIP-adus Workshop, 11.10.2022

Ms. Beate Müller, VDI/VDE Innovation und Technik GmbH

representing Federal Ministry of Education and Research

bmbf.de

Key facts on autonomous driving in Germany

- Strong automotive industry:
  - OEMs and supplier
  - with high investments in research
  - high number of patents
- Technology challenges of autonomous driving:
  - Germany is strong in sensors and sensor systems, but has weaknesses regarding processors suitable for autonomous driving
- Infrastructure:
  - 5G implementation ongoing; maps are essential: Google has dominant position
- Societal acceptance:
  - is rising with advancements in technology development
  - Ethic dilemmas are widely discussed, an „Ethics Commisison“ had been estbalished and reported in 2017

Action Plan: Research for Autonomous Driving in Germany

- BMBF, BMWK and BMDV collaborate to ensure that
  - autonomous driving is safe, secure, sustainable and suitable to the needs of all citizens.
  - Synergies are exploited in research and implementation for efficient and successful roll-out
- **Future Fund Automotive Industry:**
  - (1 bill. €) for medium and longterm transformation of the automotive industry:
    overall transfer concept, digitalization, sustainable value chains
  - Measures of Federal Ministry of Education and Research: **digitization of automobility especially in the field of autonomous driving**, sustainability through circular value creation, efficient and sustainable battery cell production with closed circular processes

BMDV - autonomous and connected driving in road traffic

Act on autonomous driving in force since July 2021

- Establishes a new set of rules for level 4 vehicles, going beyond experimenting with prototypes and enables commercialization of automated (driverless) transport
- Three step approval process
- Supplementary legal ordinance with detailed technical requirements in force since July 2022

New funding guideline "Autonomous and Connected Driving in Public Transport" released in September 2022

- Application-oriented research projects in public road transport
- Consideration of interfaces with other modes of transport
- New projects to start in spring 2023

Source: Senatsverwaltung für Umwelt, Mobilität, Verbraucher- & Klimaschutz

BMWK – R&D activities in the field of autonomous and connected driving

Around 50 projects are being funded with €423 million, with main focus on:

- **Verification and Validation:** Method-oriented projects for overall safety assurance for level 4/5 automation in urban environments (e.g. VVMethoden & SETLevel4to5 within PEGASUS family)
- **Artificial Intelligence:** Developing AI-based methods to improve software and accelerate the introduction of autonomous driving (e.g. KI-Absicherung, KI-DeltaLearning, KI-DataTooling, KI-Wissen within KI family)
- **Vehicle Operating Systems:** Addressing new hardware and software architectures in vehicles with corresponding operating systems and the connection to cloud solutions (e.g. SofDCar)
- **Driving Functions:** Development and application of innovative technical solutions for complex driving situations (e.g. @CITY, @CITY-AF)
- **Human-Machine-Interface:** Exploring innovative human-machine interaction concepts to improve public acceptance (e.g. KARLI, RUMBA)

BMBF – research on fundamental technologies for autonomous driving

The German Federal Government's Framework Programme for Research and Innovation 2021–2024

Microelectronics. Trustworthy and sustainable. For Germany und Europe.

- Safe electronic hardware and secure data exchange are necessary prerequisites for autonomous driving
- High-performance specialised processors and efficient electronic systems for AI, data processing and edge computing are key technologies to sustain technological sovereignty
- High requirements for automotive applications (performance, latency, reliability, certifications, i.e.)
- Sustainability is also key for the design of the functionalities: electronics and AI need to be high-performance and at the same time efficient

Funding initiative „MANNHEIM“

„Electronics and software development methods for the digitization of automobility“

6 strategic projects will be starting 12/2022, amongst these:

- **Development of automotive supercomputing platform** for highly automated and networked vehicles with a high-performance processor system utilizing 12 to 16 nm FinFET technology.
  (28 partners, project volume b/w 85-90 Mio.€)
- **Agile development of fusioned & standardized energy and data network architecture** with intelligent zone concepts for the vehicle network of the future.
  (22 partners, project volume b/w 40-45 Mio.€)

© Adobe Stock - Gorodenkoff

Joint electronics roadmap for innovation along the automobile value chain (GENIAL!)

- **Project Goal:** Substancially advance innovation processes from semiconductor industry to the automotive OEM with resilient supply chains
- Industry driven framework development: for efficient requirement management and enabling joint planning of automobile OEMs and suppliers of systems, components, technologies and semiconductor industry
- Exchange with relevant standardization working groups
- **Project details:** 12 partners and 15 associated partners coordinated by Infineon; project volume 19,5 Mio.€ (funding rate of 55%);
  01.10.2018 - 30.09.2024

Strategic cooperation on research topics in Europe

- Cooperation in R&D for interfaces, norms and standards in Europe and internationally

Key Digital Technologies Joint Undertaking:

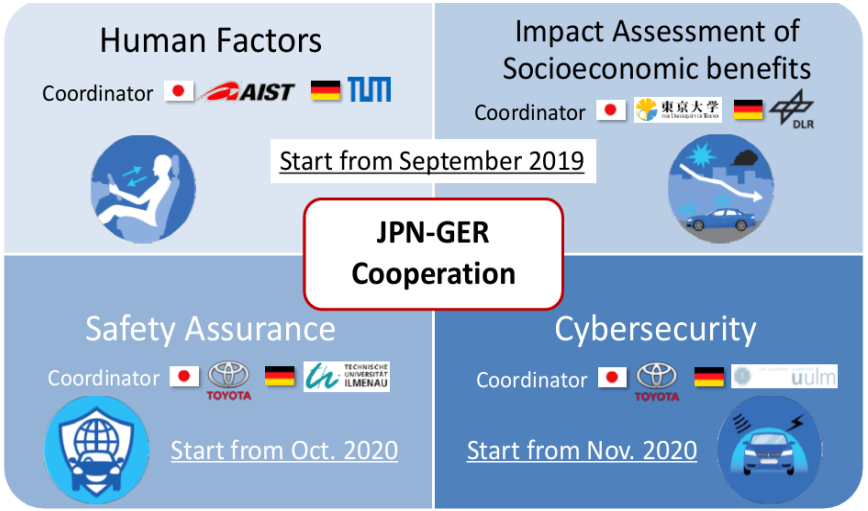
- trilateral funding between European Commission, EU member states and industry
- developing advanced semiconductors and applications that are critical to European society and contribute to the EU digital strategy and the European Green Deal.
- large industry-driven projects with partners along the entire value chain

EUREKA Cluster Xecs:

- EU member states driven clusters for R&D Cooperation on Electronic Components and Systems and Software innovations
- smaller, very application-oriented R&D projects with consortia of industry, research institutes and SME

Japanese - German research cooperation on connected and automated driving

- Strategic cooperation to build on and further the strong automobile industry in both countries since 2017
- Regular exchange in expert workshops between researchers, experts and government of both countries
- Projects in four research areas implemented within current programs in Germany and SIP-adus in Japan from 2019 to 2023
- German and Japanese projects strongly collaborate through exchange of researchers, data, results and regular discussions.



Look for presentations in plenary sessions!

National conference on research and technology for autonomous driving

- Yearly conference on 14./15. November 2022 in Berlin
- One focus in 2022 is enabling transformation of E/E-architecture
- Platform for exchange between publically funded R&D projects on autonomous driving
- Discussion of research and technology trends

6th Expert workshop of Japanese-German research cooperation on connected and automated driving

- 14 October 2022 following SIP-adus workshop
- Platform for exchange between projects funded in the research cooperation
- Participants from R&D and public authorities from Japan and Germany

Thank you for your attention!

Beate Müller, VDI/VDE Innovation und Technik GmbH

representing

Division for Electronic and Autonomous Driving; Supercomputing

Federal Ministry of Education and Research

Mail: beate.mueller@vdivde-it.de

www.bmbf.de and www.elektronikforschung.de