Automated and Connected Driving – The Strategy of the Federal Government - Opportunities and Challenges

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www.bmvi.de
Levels of automation (functionalities)

Manual | Assisted | Partly automated | Highly automated | Fully automated | Autonomous
Connected driving

Vehicle-to-Vehicle (V2V)

Vehicle-to-Infrastructure (V2I)
Potential of automated and connected driving

- Increasing traffic efficiency
- Increasing road safety
- Reducing CO2 emissions from transport
- Making Germany a more competitive site for innovative businesses
Objectives

1. We want to remain a lead provider.

2. We want to become a lead market.

3. We want to put automated and connected vehicles on the roads.
### Fields of action/challenges for implementing the strategy

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Programme “Implementing the Automated and Connected Driving Strategy”

State Secretaries of BMVI, BMWi, BMBF, BMJV, BMI (BMVI)
strategic political guidance

Steering group (BMVI)
[Ministerial round table on automated driving]
Realization of strategic political targets & preparation of the subject-matters in the State Secretaries’ meeting

Lead responsibility for the programme (BMVI)
Programme office
Public relations

Infrastructure working group (BMVI)
Legislation working group (BMVI)
Innovation Working group (BMWi)
Inter-connectivity working group (BMVI)
Cyber security and data protection working group (BMVI)
Societal dialogue working group (BMVI)
Current national activities

- Organization of the programme is established
  - Working/sub-working groups have taken up activities
  - Milestones have been defined
  - First report end of 2016

- Draft ratifying law to transpose the amendment to the 1968 Convention on Road Traffic (Vienna Convention) into national law

- Preparation of a draft to adapt national legal regulations

- Establishment of an enquete commission
Current national activities

- Research programmes/funding guidelines of BMWi, BMBF, BMVI
- Digital Motorway Test Bed – Further work
- Financial support for the development of test fields in urban and suburban areas
Current international activities

- Evolution of the Vienna Convention
- Guidelines to ensure data protection and cyber security
- Technical regulations

- Cooperative ITS platform
- GEAR 2030
- Round table “Automated and connected driving”

- 2015 Declaration of the G7 Transport Ministers
- Working group of the G7 Transport Ministers
- 2016 Declaration of the G7 Transport Ministers

- Bilateral contacts and coordination (i. a. China, France, UK)
The “Digital Motorway Test Bed”

**Objectives**

- Promoting innovations
- Promoting research
- Creating public acceptance
- Designing infrastructure
1. Automated and connected driving
   - Testing and further developing new technologies of automotive industry, suppliers, telecommunications companies and research institutes
   - Tests carried out in a perfect environment in real traffic on the A9 motorway

2. Intelligent infrastructure
   - In order to tap the full potential of the digitalized road, different intelligent infrastructure measures are to be trialled and refined on the Digital Motorway Test Bed.

By combining modern road infrastructure with fast transmission technologies, a unique test facility for automated and connected driving is created on the Digital Test Bed.
Basic facilities (1 of 2)

In order to ensure ideal conditions on the Digital Test Bed, basic infrastructure facilities are provided for use by all companies and research establishments:

- **Complete high-speed mobile communications coverage**: Short transmission times with high speeds in an infrastructure-based network
- **Communication via vehicle Wi-Fi**: Direct communication between vehicles via Dedicated Short Range Communication (DSRC) networks
- **Fast LAN connection**: Direct transmission of large amounts of user information via a central point of contact at selected locations of the Digital Test Bed
- **Mobility Data Marketplace as standardized interface**: Providing up-to-the-minute and high-precision traffic information via a standardized interface
- **Highly precise map**: Providing a high-precision reference map of the area with an accuracy of +/- 2 cm and, in doing so, supporting users’ own quality assurance efforts related to map material
Basic facilities (2 of 2)

- **Road markings:** Precise positioning of vehicles on the road at any time, e.g. by means of markers on sign gantries and crash barriers

- **Adaptive traffic control systems:** Use of dynamic installations which, for example, warn of danger spots and weather-related restrictions, and, in addition, regulate the flow of traffic

Our Ministry, the VDA and the Free State of Bavaria (as agent for the Federal Government) closely coordinate efforts with regard to both the development of the basic facilities and their constant improvement.

Advanced basic facilities

Further requirements of the actors involved with regard to the infrastructure can be taken into account and made available in some parts of the Test Bed as “advanced basic facilities” for individual projects.
Examples of such measures on the Digital Motorway Test Bed

“Mobile Edge Computing” (Deutsche Telekom, Nokia, Continental and Fraunhofer ESK)

Trialling of technologies to upgrade the LTE mobile communications network with real-time technology for automated and connected driving

Platooning project (MAN Truck & Bus AG)

Trialling of a platooning system (electronically linked HGVs) under real-life conditions to prepare the European Truck Challenge at the beginning of April 2016

Measures on the Digital Motorway Test Bed contribute substantially to promoting the introduction of automated and connected driving.
Intelligent infrastructure (1 of 3)

*Interconnection and expansion of traffic data collection (iRoute):* Installing Bluetooth sensors for the detection of incidents and to calculate journey times

*Starting into cooperative systems (C2I):* Warning of road works and improved monitoring of the traffic situation by making use of vehicle data

*Telematics systems to warn of wrong-way drivers:* Automatic and reliable detection of wrong-way drivers as a result of the establishment of telematics systems

*Sustainable emergency telephone infrastructure:* Integrating traffic data collection prototypes in roadside telephone casings for an optimized collection of traffic data and detection of traffic disruptions
Intelligent infrastructure (2 of 3)

**Innovative HGV parking guidance and information system:** Making more efficient use of existing HGV parking capacities by means of telematics support

**Intelligent bridge:** Developing an adaptive system to continuously provide relevant information for the overall assessment of the condition of structures

**Intelligent road ice forecasting:** Developing a procedure that allows section-based road ice forecasts using weather data and sensors

**Road weather online:** Supplying and complementing information on the weather-related condition of roads via the Mobility Data Marketplace (MDM)
Intelligent infrastructure (3 of 3)

**Internet car parking:** Providing free Wi-Fi at parking spaces with toilet facilities

**Service stations and rest areas of the future:** Introducing innovative elements on rest areas, such as a parking guidance and information system, Wi-Fi, charging stations for electric and refuelling points for hydrogen vehicles as well as modern rest facilities and innovative building services

**Optimization of roadworks ("intelligent merge-in-turn"):** Trialling and evaluating traffic-based lane arrangements within roadwork areas to optimize traffic flows

**Safe pullover for stationary checks:** Developing and trialling an automated pullover method with camera technology, LED pullover display and operating station
Supporting additional test beds

- Establishing sustainable interaction of motorway, rural and urban traffic
- Insights from complex driving situations, e.g. Traffic lights, crossings, roundabouts, identifying obstacles
- Funding first projects on digital test fields in Berlin, Braunschweig, Dresden, Düsseldorf, Hamburg, Ingolstadt, Munich. More cities may be added.
Thank you!

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