

SESSION 2

Road operator perspective: “German Perspective on C-ITS Deployment”

Farzin Godarzi, BASt

The future of C-V2X: “Commercial deployment of C-V2X vehicles”

Johannes Springer, T-Systems

Certification: “The importance of Certification for 5G Automotive”

Thomas Jaeger, DEKRA

Testing Network V2X platform: “Vodafone’s V2X Safer Transport for Europe Platform (STEP)”

Robert Banks, Vodafone



Farzin Godarzi,
Scientific Officer
BAST



Road operator perspective:

“German Perspective on C-ITS Deployment”

**5GAA Workshop:
C-V2X Interoperability and Deployment
31st March 2022**

Farzin Godarzi

BASt role and facilities

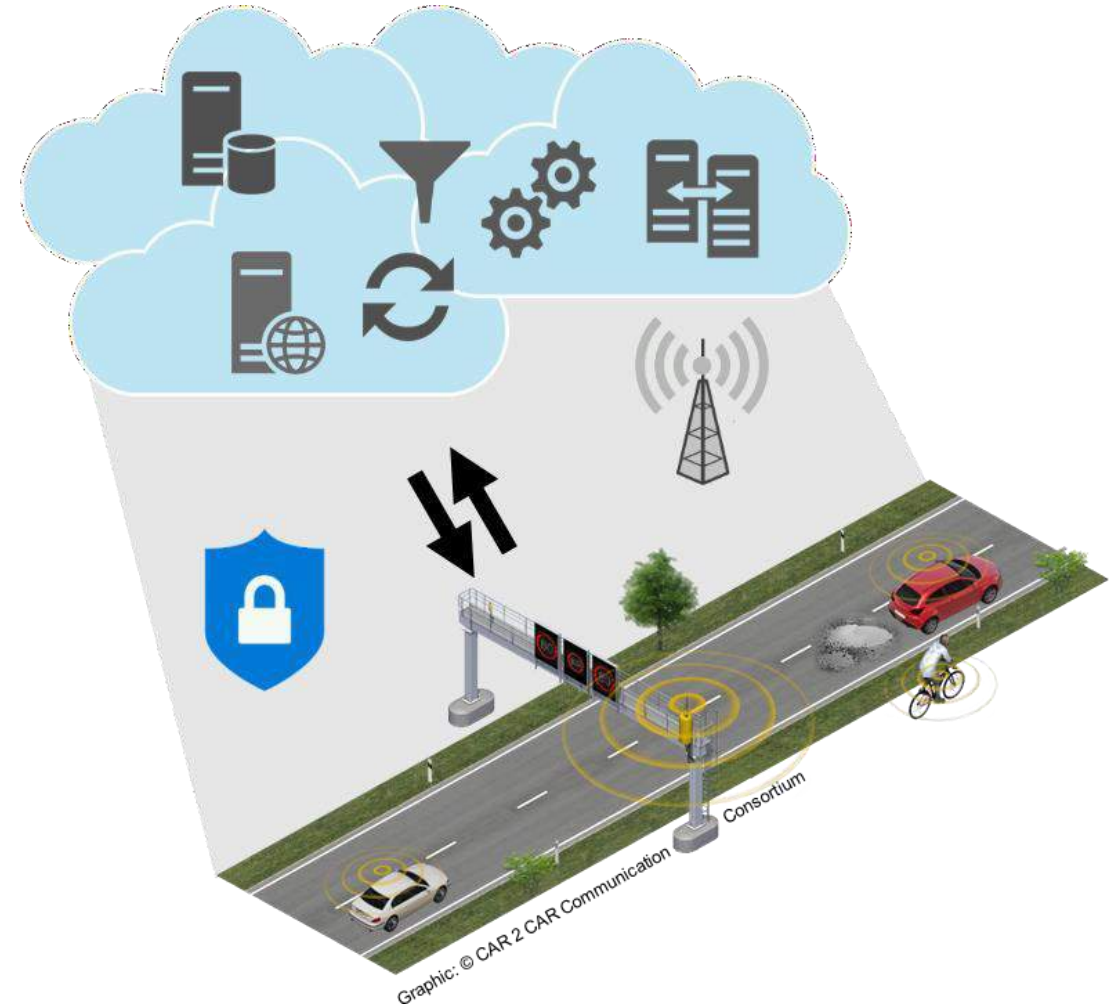
- BASt operates in the domain of the Federal Ministry for Digital and Transport
- Main activity fields: Research, (Policy) Advise, Testing and certification, Standardization
- Participates in almost 875 national and international committees
- Monitoring the implementation of national, European and international legislation and harmonization procedures



Located in Bergisch Gladbach (close to Cologne), Germany
Number of employees: 400
Annual budget: about 47 MEUR
More than 300 internal research projects and more than 300 research projects conducted by external scientists

Connected Mobility

- Non-discriminatory, secure and reliable data exchange
- Create framework conditions for cooperation
- Requirements for vehicles and infrastructure



Key challenges for road authorities and operators

- Cooperative ITS implementation has started and Level 3/4 automated vehicles are expected to be introduced
- Mixed fleet (automated and non-automated) for decades to come
- NRAs can and should take a leading role to ensure that the potential benefits of Connected Cooperative and Automated Mobility (CCAM) can be harvested
- Current infrastructure – physical as well as digital – is not necessarily well prepared to facilitate change of role and tasks
- NRAs face an investment bump to be managed



<http://www.cedr.eu/home/publications/>

CCAM Roadmap by 2050

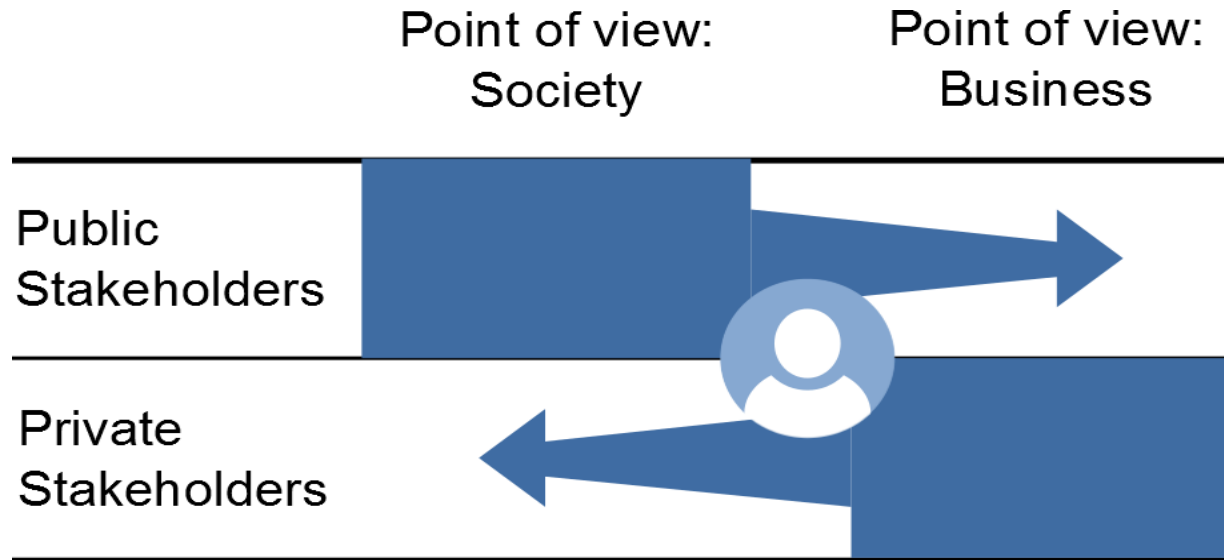
Key Challenges:

- Technological maturity
- Validation methods
- AI (Ethics, Data)
- Infrastructure
 - Investment on infrastructure
 - ODD / ISAD / Functional Safety
 - Connectivity



<https://www.ertrac.org/uploads/documentsearch/id75/Draft%20ERTRAC%20CCAM%20Roadmap%20V9%2030-09-2021.pdf>

Motivation for collaboration in the CCAM ecosystem



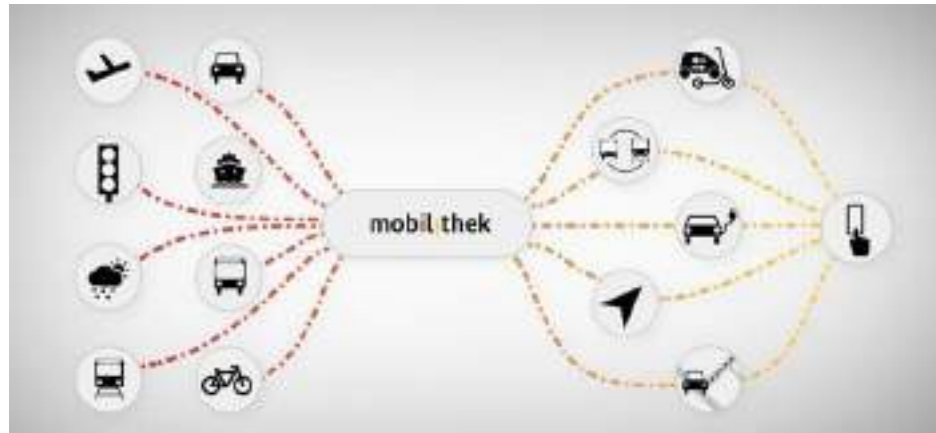
Sources: C-ITS Platform (2017), ERTRAC CCAM Roadmap (2021).

Leading behaviour: Coopetition
collaborate on the essential parts of the system whereas (they) compete in other elements of the value network

- Co-Awareness of Issues
- Co-Understanding of Business Models
- Co-Designing of Governance Mechanisms
- Co-Investment and Benefit Sharing

Harmonization, Regulations and Standardization

- Participates in almost 875 national and international committees to develop regulations and standards, as well as harmonization procedures





Key Results which BAST has funded/co-funded

- Infrastructure requirements for automated driving (Dierkes et al. 2019, Report F 130) – Highway Chauffeur, Commuter Chauffeur
- MANTRA (Kulmala et al. 2020), DIRIZON, STAPLE – Projects of CEDR Call 2017 Automation, www.cedr.eu
- DIGEST, Symul8, lex2vehicle – Projects of DACH Call 2020 Infrastructure for Automation, ongoing
- Monitoring of Digital Testbeds (Database), www.testfeldmonitor.de

Kategorie	Automobilverkehr		Reiseverkehr	
	Mittelklasse	Hochklasse	Mittelklasse	Hochklasse
1.1. Investition in digitale Mobilität	Multimodale und integrierte Verkehrssysteme zur autonomen Anbindung von Wohnorten Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X	Integration von Datenströmen, die von verschiedenen Verkehrsteilnehmern über V2X übertragen werden Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X	Integration von Datenströmen, die von verschiedenen Verkehrsteilnehmern über V2X übertragen werden Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X	Integration von Datenströmen, die von verschiedenen Verkehrsteilnehmern über V2X übertragen werden Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X
1.2. Integration von Datenströmen	Integration von Datenströmen, die von verschiedenen Verkehrsteilnehmern über V2X übertragen werden Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X	Integration von Datenströmen, die von verschiedenen Verkehrsteilnehmern über V2X übertragen werden Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X	Integration von Datenströmen, die von verschiedenen Verkehrsteilnehmern über V2X übertragen werden Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X	Integration von Datenströmen, die von verschiedenen Verkehrsteilnehmern über V2X übertragen werden Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X
1.3. Integration von Datenströmen	Integration von Datenströmen, die von verschiedenen Verkehrsteilnehmern über V2X übertragen werden Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X	Integration von Datenströmen, die von verschiedenen Verkehrsteilnehmern über V2X übertragen werden Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X	Integration von Datenströmen, die von verschiedenen Verkehrsteilnehmern über V2X übertragen werden Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X	Integration von Datenströmen, die von verschiedenen Verkehrsteilnehmern über V2X übertragen werden Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X Kommunikation der Datenströme über V2X

Tab. 1: Sachverhalte und Maßnahmen für die Integration von Datenströmen

CEDR Call 2017: Automation

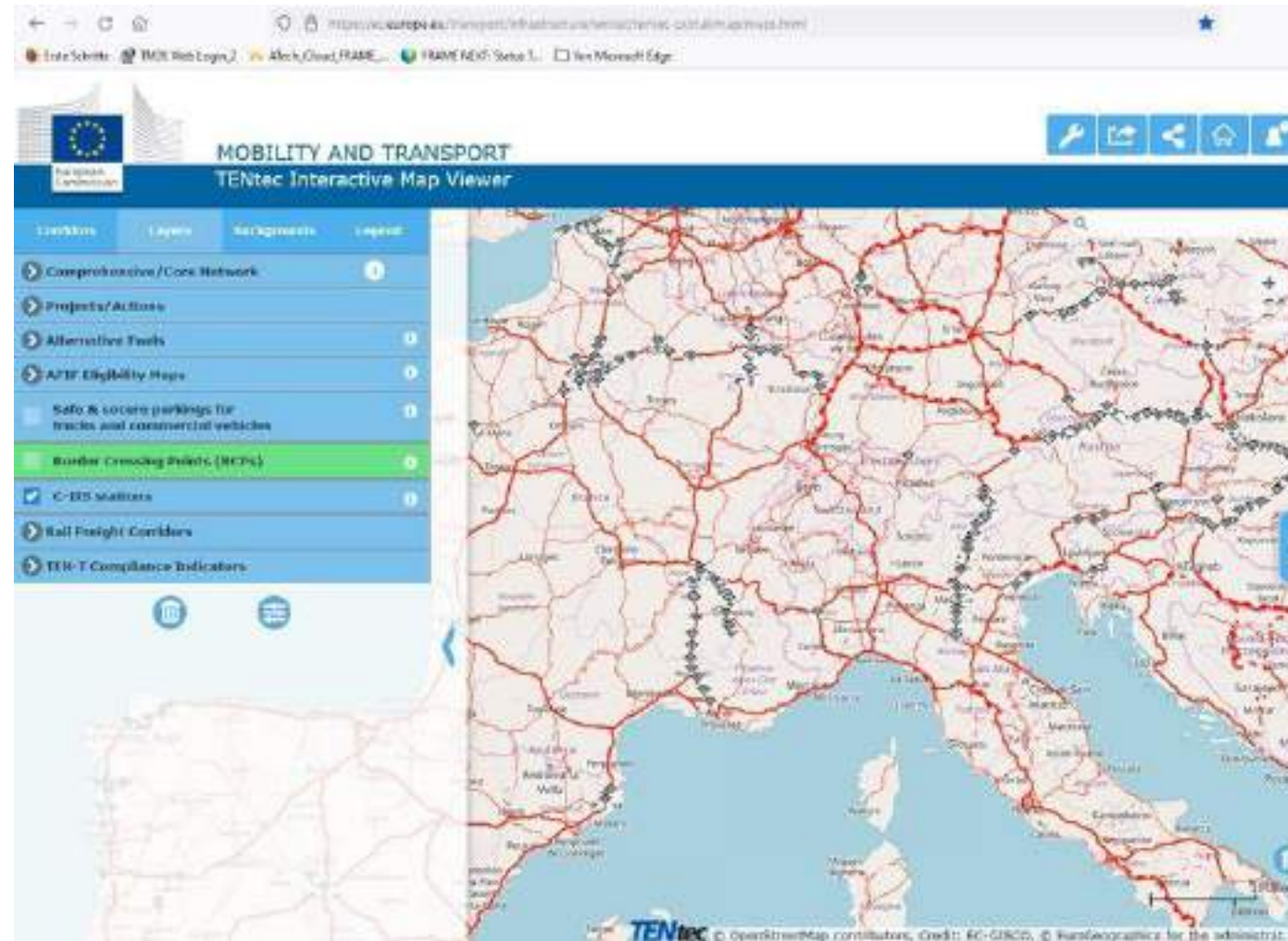


DOI	Ensuring up-to-date content of HD maps
Business area	Digital Infrastructure
Description of action	It is necessary to set up processes to produce HD maps with constantly updated content. The issues are global, and it is useful to utilize the experiences and findings in other parts of the world. A cornerstone in building up and especially maintaining the up-to-date content of HD maps is to establish an efficient process for HD map-related data exchange between the key stakeholders, i.e. the digital map providers, road authorities and operators, OEMs, fleet operators, and the connected and automated vehicles. The inclusion of the latter in a feedback loop is essential as they will likely be the first to detect by their sensors any anomalies between the HD map data and what is the case in real life on the road. Here on, such feedback loops need to be set up for maintaining HD map data quality. In addition, the necessary data elements for physical and digital infrastructure and other ODD-related data as well as digital traffic rules have to be included, and the HD maps localization quality needs to be mastered. A promising option is to utilize the data exchange concepts widely used in various business domains involving both public and private stakeholders, the International Data Spaces concept (IDSA 2022).
Timeline	2021-2022: Closely monitor process and achievements on global level, e.g. standardization activities in ISO. Agreement of the processes between stakeholders. Specification and setting up of related MAPs (National Access Points). Pilots on continuous update based on feedback from testing systems in connected and automated vehicles. Agree and start work on the standardization needed. 2023-2030: Deployment and use of the processes. Deployment of the updating process. Ethical impact of the processes to keep maintenance effort of HD maps within reasonable range in terms of personnel and financial resources.
Aspect of CAD affected	Sensing related to the positioning of the (ego) vehicle; all subtasks of the planning task
Stakeholders affected	Ministries of transport, digital map providers, road authorities and operators, cities, fleet operators and managers, OEMs, ADG providers, drivers and users of connected and automated vehicles.
Legal provisions	The legal framework needs to be set in place for ensuring the data quality and security in HD maps and the liabilities involved. Regulation could be needed for the OEMs, fleet managers and other stakeholders governing the data from connected and automated vehicles to provide feedback about the anomalies in HD maps detected by their onboard fields.
Responsibilities	Person/organization: Ministries of transport/European Commission; necessary stakeholders: digital map providers, road authorities and operators, cities, fleet operators and managers, OEMs, drivers and users of connected and automated vehicles, other stakeholders.
Role of CEDR/NRA	CEDR to safeguard the interests of NRAs in cross-sectoral discussions related to governance issues. NRAs act as active partners in maintaining the HD maps and deployment of the processes involved.
Risks involved	The main risk is that the institutional issues in setting up the processes delay the developments considerably. The governance of HD maps is a key strategic issue in a digital transport and mobility ecosystems. Road operators and the competent authorities within Member States should consider aligning their contribution to HD maps via a dedicated forum. There are also risks of too heavy HD map processes.
Other relevant documents	



Partly projects from own research program, partly on behalf of BMDV

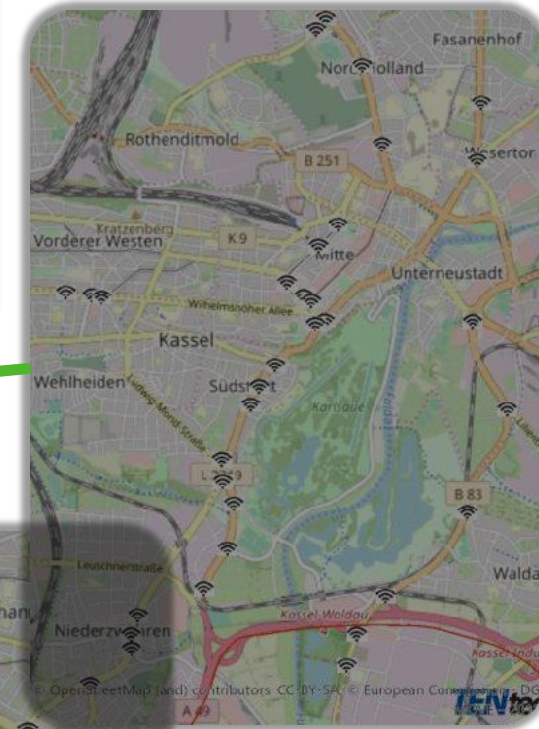
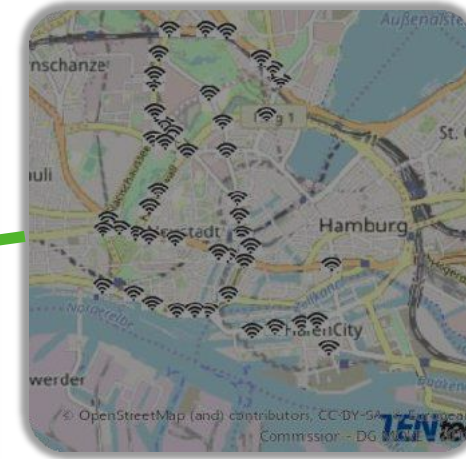
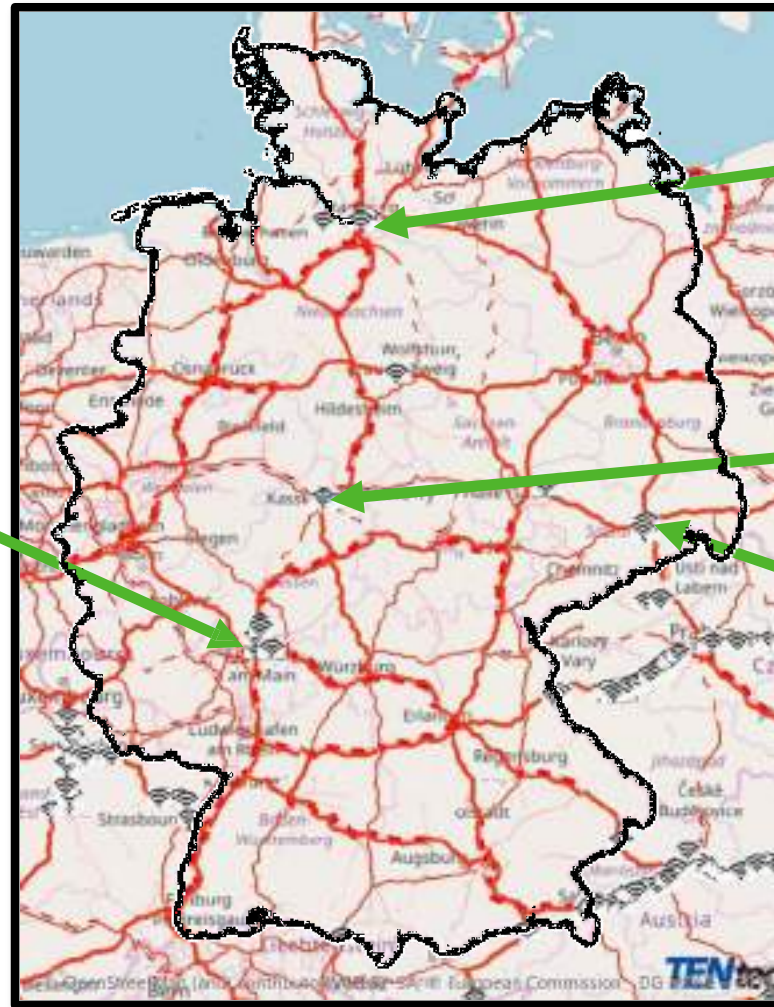
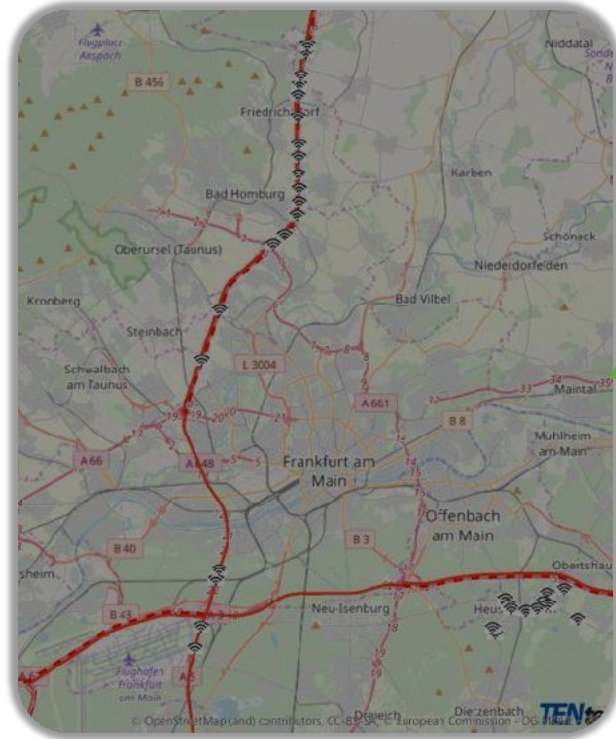
TEN-Tec Viewer



<https://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html>




TEN-Tec Viewer

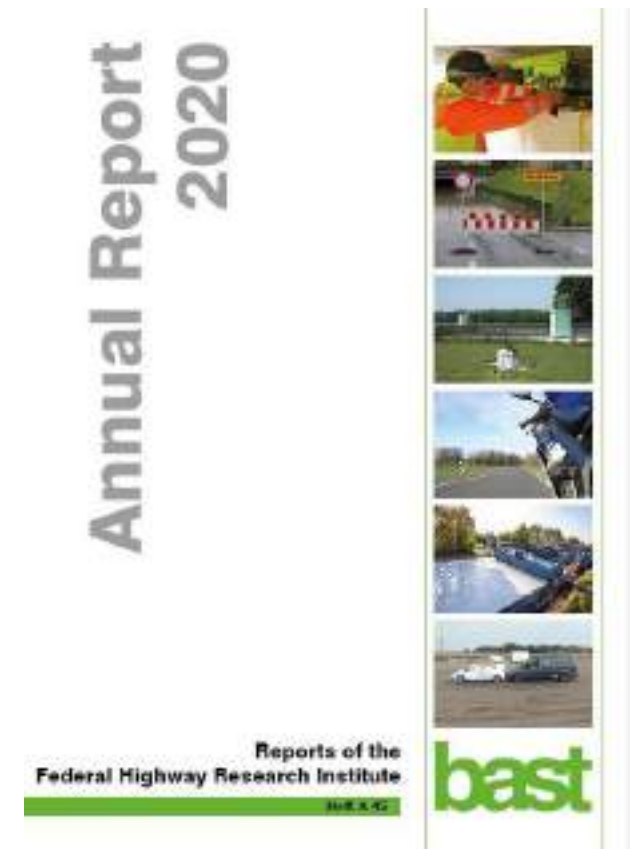


<https://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html>



Thank you for your attention

Federal Highway Research Institute	
M.Sc. Farzin Godarzi	Brüderstraße 53 D-51427 Bergisch Gladbach
Connected Mobility	Phone + 49 (0)2204 43 5507 Fax + 49 (0)2204 43 5550
	godarzi@bast.de



Bundesanstalt für Straßenwesen