

BASt topics

Information from the Federal Highway Research Institute

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ITS World Congress 2021 in Hamburg



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The world's biggest event on Intelligent Transport Systems (ITS) was held in October 2021 in Hamburg under the theme Experience Future Mobility now. A record-breaking number of 13,000 participants, 4,000 visitors at the Public Day, 400 exhibitors on 40,000 m² exhibition space illustrate the huge success of the World Congress return to Germany (after Berlin 1997).

The World Congress was a huge opportunity for BASt to present recent results on a large variety of research and innovation topics and to exchange findings and views with colleagues from all over the world. 15 colleagues from the BASt departments of Automotive and Traffic Engineering have participated in the

World Congress. They have (co-) authored and presented 10 technical papers in various Congress sessions. They have moderated several Special Interest and Technical Sessions from the overall program. They have contributed to the booth program of the former Federal Ministry of Transport and Digital Infrastructure. Moreover, they have also contributed to the Final Events of the projects L3Pilot and C-Roads Germany.

This edition of BASt topics provides a comprehensive insight into the BASt contributions to the ITS World Congress. More information on the congress is available at <https://itsworldcongress.com/>.

BASt contributions to the Federal Ministry's booth program

The Federal Ministry of Transport and Digital Infrastructure was present with a large booth in the exhibition space of the ITS World Congress. Representatives of the Ministry itself and of organisations working in its domain have run a small program with topic features.

Several BASt colleagues have taken the opportunity to present results of recent work, for example presenting what autonomous driving really means to users, what is behind the database of monitoring the Digital Test Beds, how different taxonomies on Connected Cooperative and Automated Mobility interact with each other and how emergency corridors can be formed automatically with the help of intelligent connectivity.

More information

www.bast.de/autonomous-driving,
www.testfeldmonitor.de and
www.aorta-projekt.de

Editing team

The editing team of the special consists of Lutz Rittershaus, Sandro Berndt-Tolzmann, Holger Drees, Torsten Geißler, Farzin Godarzi, Timo Hoffmann, Peter Lubrich, Tom Gasser, Roland Schindhelm, Alexander Zerbe, Rainer Lehmann, Jens Dierke, Peter Gusia and Jan Schappacher

NAPCORE – the National Access Point Coordination Organisation for Europe

NAPCORE is the name of the newly formed organisation to coordinate and harmonise more than 30 National Access Points (NAPs) for mobility data in Europe. The ITS Directive 2010/40/EU and its Delegated Regulations require that each European Member State must establish a NAP where mobility related data is published and made available for use e.g. in travel information services. However, it has become apparent, that the NAPs are quite different in their setup and data access interfaces. Also, the data published looks different throughout Europe from a data format and standard perspective.

Co-financed by a Programme Support Action under the European Commission's Connecting Europe

Facility, NAPCORE has been launched as coordination mechanism to improve interoperability of the National Access Points as backbone of European mobility data exchange. NAPCORE improves the interoperability of mobility related data in Europe with mobility data standard harmonisation and European alignment. Also, NAPCORE increases access and expands availability to mobility related data by coordinated data access and better harmonisation of the European NAPs. Furthermore, NAPCORE empowers National Access Points and National Bodies by defining and implementing common procedures and strategy, strengthening the position and the role of NAPs, supporting steps towards the creation of European-wide



solutions to better facilitate the use of EU-wide data. NAPCORE has been created in this spirit of cooperation and it includes 36 participants: 33 Beneficiaries covering 26 EU Member States and 3 associated partners. The initial runtime of the Programme Support Action is until the end of 2024, but the goal is to establish a long-lasting and future-oriented platform organisation. BAST is NAPCORE's project coordinator as well as leader of the working group on NAPCORE strategy and governance and the sub-working group on metadata.



L3Pilot Final Event at ITS World Congress

In conjunction with the ITS World Congress, the European four-year project L3Pilot held its Final Event in Hamburg and showcased automated driving functions in the City of Hamburg and on motorways nearby. The project, co-funded by the European Commission, ran from 2017 to 2021 and brought together stakeholders from the whole value chain of automated driving, e. g. car manufacturers, research institutes and user groups. At the L3Pilot exhibition booth in Hamburg, 13 of the L3Pilot test cars were displayed and featured an exhibition with videos, presentations and posters explaining the project results. In addition to that, driving demonstrations were offered for all ITS World Congress visitors: As passenger or driver, both motorway and urban functions could be experienced in public traffic. The centrepiece of the Final Event was a two-day conference as part of ITS World Congress at which numerous speakers from the project consortium presented the key results.

In L3Pilot, BAST performed a long-term study with a research vehicle

in real motorway traffic in order to investigate participants' trust, acceptance and non-driving related task engagement and their change over time. It is crucial to examine trust and acceptance with respect to automated driving: Too much trust can cause misuse, too little trust or acceptance can hinder the use of automated driving functions and thus their anticipated positive effects on road safety and efficiency. In the study, the participants were allowed to use for example their smartphone or read a magazine while the automated driving function was engaged, but had to stay vigilant to take-over manual vehicle control after being prompted to do so (for example when approaching construction sites).

The data was analysed in case-analyses. In general, most participants trusted and accepted the automated driving function right from the beginning. The engagement in non-driving related tasks differed widely between the participants: Some spent nearly the entire time in automated mode with for example their smartphone, others preferred to monitor the ADF. For some take-over scenarios, potentially safety-critical behaviour could be identified.

BAST also contributed to an extensive safety impact assessment for automated driving. With accident data from e. g. GIDAS or IGLAD, complex evaluations of traffic safety and the calculation of potentially reduced number of accident victims on motorways and in urban environments were performed for the project's mature automated driving systems.

In the sum of all considerations, with automated driving, a positive development for all accident severities and penetration rates can be expected, especially for urban use cases (www.l3pilot.eu). Safety, efficiency and user aspects of automated driving are further investigated by L3Pilot's follow-up project "Hi-Drive", co-funded by the European Commission (www.hi-drive.eu).



Mobility Data Space – First Implementation and Business Opportunities

Data spaces are open and decentral ecosystems, which ensure a trustworthy, safe and secure data exchange. Within the mobility sector, trusted data exchange and processing are emerging as key enablers of digitalization and new mobility offerings. Improved services and new business opportunities, such as more seamless travel with intermodal solutions, for example, require a willingness of stakeholders to share data, which, in turn, depends on harmonized and commonly accepted solutions to govern such data exchange. Participation in a secure data space is possible via a technical connector component that data providers and data users either host themselves or have hosted for them. The data space is established

across the networked connectors, meaning that it is not a centralized platform but rather an expandable network of decentralizes players (minimum of two). Before being transferred to the target connector, the data to be provided is extended by a set of rules, the so-called usage policy. The data remains in the target connector and is secure against direct access by the data user. If data users want to work with the data, e.g., for purposes of data analysis or fusion, they must access it within the connector via so-called data apps.

A first implementation, the Mobility Data Space, has adopted data space concepts from the International Data Spaces Association for business cases in the mobility sector. Core

components complement the decentral concept and foster discoverability, accessibility, interoperability, and trustworthiness. In a German project, a minimal viable demonstrator has been implemented, which includes core components, various data sources and first applications. It proves the feasibility of the data space concepts for the mobility sector and paves the way for its business evolution. BAST has contributed to this project as well as to a broader initiative with the same name, driven by the German government and acatech, which has set up an organization for longer-term operation of the Mobility Data Space. Several implemented use cases have been presented at various booths and presentations.

Integrating C-ITS into Road Operators' Day-to-Day Business

In order to support the deployment of Cooperative Intelligent Transport System (C-ITS) services into Road Operators' Day-to-Day Business, and to provide successful guidance for their deployment and testing, and to gradually move to regular operation after successful testing, a holistic view of all related technological developments, from ITS to C-ITS, has been created and processed in structured collaboration with the C-Roads Platform. The C-Roads platform is a joint initiative of the European member states for piloting

and initial implementation of C-ITS services including harmonization of services specifications, communication profiles, and interoperability testing between road operators and the automotive industry in the content of cross-border harmonization and interoperability. As one of the main results of this collaboration, an implementation guidance has been developed to serve as an initial starting point for road authorities and operators interested in integrating C-ITS services in their business area. The implementation guidance

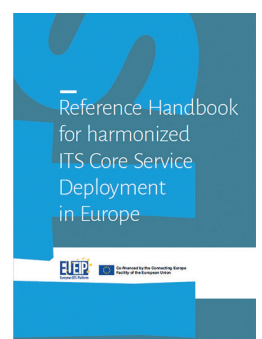
consolidates lessons learned from strategic challenges in technical, organizational, and legal issues, both from a national and cross-border perspective. The guidance offers a set of recommendations for the complexity of C-ITS-related decision-making processes with all the associated steps, from the preliminary aspects and decision-making, through design and planning, to implementation and operation, and the final step, evaluation, and monitoring of the whole process (www.its-platform.eu).

Reference Handbook for Harmonised ITS Core Service Deployment in Europe

After more than four years in development, the "Reference Handbook for Harmonised ITS Core Service Deployment in Europe" made its official debut at the ITS World Congress 2021 in Hamburg. This handbook, a major deliverable of the European ITS Platform, drafted under the coordination of BAST, provides a set of guidance and advice for Road Authorities and Operators to support them in their strategic approach, design development, deployment,

installation and operation of ITS services, ensuring compliance with the European Delegated Regulations under the ITS Directive. The Reference Handbook is based on the former "Deployment Guidelines", with their content updated and extended. It contains 14 ITS services, divided into three groups: Traveller Information Services, Traffic Management Services and Freight and Logistics Services. A detailed service profile is provided for each service, followed by a set of

requirements and advice organised in five categories. In each service the harmonised profiles of the European platform on Cooperative Intelligent Transport Systems - C-ITS (C-ROADS) are also incorporated, so that users of the



Qualification test procedure for systems detecting the occupancy of truck parking facilities

This Topic was presented in the “Technical / Research Paper Session – Traffic applications of sensor technology”. Truck parking guidance systems are a telematics approach to deal with overcrowded rest areas by optimizing their utilization. Currently a new concept for a truck parking guidance system is being developed in Germany. To set minimum requirements for detection systems which are able to detect available, blocked and occupied parking

possibilities for a whole parking facility in detail, functional criteria have been defined by a working group of experts from federal and state institutions led by BAST. A qualification test procedure was designed to be able to check whether a system can comply with these functional criteria. The qualification test consists of a confirmation by the system manufacturer for the compliance with certain criteria, a checklist for required configuration options, a

test series emulating the usage of a parking facility with predefined test situations and a long-term test during operation of the parking facility. A suitable test bed which can be used for the qualification test has already been set up at a rest area. Meanwhile the described test procedure has been introduced by the Federal Ministry of Transport (BMVI) to test new systems before their use on a motorway parking facility.

Intelligent Controlled Compact Parking – Pilot implementation of a new parking management for trucks

This topic was presented in the “Technical / Research Paper Session – Freight Transport Management”. The enormous increase in commercial freight transport on motorways in Germany leads at certain times to a lack of free truck parking spaces and overcrowded rest areas. Besides the considerable continuous construction and expansion of rest areas, intelligent solutions for a more efficient use of the existing parking capacities are developed, tested and implemented to counter the lack of parking capacities and unsafe parking. One approach is the control procedure “Intelligent Controlled Compact Parking” which was developed by BAST on behalf of the Federal Ministry

of Transport (BMDV). The aim of “Compact Parking” is to achieve an increase of parking capacity for trucks in rest areas by a time-sorted special positioning. The system generates an offer of departure times fully automated depending on occupancy and demand. With the help of VMS above the parking rows, arriving truck drivers receive the information which is necessary to choose the right parking row. Symbols are used instead of text and the information contains the offered departure time and the related parking duration. At the rest area Jura



West on the A3 motorway, the pilot installation of “Compact Parking” has been in fully automated operation since early 2016. The functionality was proven by an evaluation (www.bast.de/compakt-parking and www.kompaktparken.de/en).

Harmonised Metadata for Transportation Data Portals

Transportation data portals are considered important facilitators for data exchange between various actors in the transportation system. Such data exchange may, in return, foster innovative traffic management schemes, traveller information services, data-based research and other activities. A basic feature of such portals are metadata, making the data offerings discoverable and accessible by potential data users. However, there have been no efforts so far to find an agreement on the contents and structure of metadata specifically for transportation-related data portals,

as far as the authors can see. One first approach to harmonize the metadata structures in such portals is the “Coordinated Metadata Catalogue”, a recent work of the European ITS Platform (EU EIP). This work aims to provide a blueprint for metadata structures of National Access Points (NAPs), being digital data interfaces in each EU member state.

In this context, European NAP stakeholders have elaborated a common, structured metadata description for the various data offerings on NAPs. This elaboration

may be reused at any data portal with a transportation focus. A future step for metadata harmonization will deal with mechanisms for metadata interoperability between individual transportation-related and other (open) data portals. This will eventually contribute to an interoperable data ecosystem among the many data stakeholders in the mobility sector. BAST has been leading the metadata harmonization activity within EU EIP for many years. At the ITS Congress, an abstract and a presentation were provided, highlighting the concept, contents and the application of the “Coordinated Metadata Catalogue” (www.its-platform.eu).

Safety Related Traffic Information Ecosystem: Data for Road Safety

Significantly improving road safety across Europe for all road users using vehicle generated data requires the mass involvement of vehicle manufacturers, traffic information service providers, automotive suppliers and public authorities. Such a level of participation is necessary to ensure the pace and critical mass of safety data required for comprehensive safety related traffic information (SRTI) services. With the Data for Road Safety (DFRS) ecosystem, a scalable solution was created where any industry partner in the transportation, mobility and traffic data domain and public authorities in Europe can join and start sharing, improving and using safety related traffic data and information.

With a multi-party agreement, that was signed by the founding members at the end of 2020, the legal and organisational framework for the ecosystem was created. The Federal Ministry for Digital and Transport is one of the 19 partners of the partnership. Other partners currently include other EU Member States, vehicle manufacturers (BMW, Daimler, Ford, Volkswagen, Volvo) and data service providers (GeoTab, HERE, Inrix, NiraDynamics and TomTom).

In 2021, the DFRS ecosystem grew and further worked on establishing a joint technical understanding of the ecosystem's requirements for data access, data exchange, service creation and service provision of



vehicle-generated data and SRTI based upon it. With this, the first SRTI services to warn road users against temporary slippery roads, unprotected accident areas or exceptional weather conditions using DFRS data are operational in Europe.

BAST is, on behalf of the Ministry, BAST is involved and active mainly in the Technical Group of the ecosystem. Further growth, both in terms of participating partners and in number of services created and provided using DFRS data, is expected in the coming years (www.dataforroadsafety.eu).

C-Roads Germany on the AGORA host stage

The national project C-Roads Germany is one part of the European C-Roads Platform. Within the project, five pilot sites for the demonstration of C-ITS services in real operation are coordinated. A panel session with partners from the project was held in the exhibition area on the AGORA host stage. This open and accessible stage provided the opportunity to present the project to all interested visitors of the Congress, with a clear focus on the national stakeholders.

The topic of the panel session was C-ITS services in real operation. The moderation of the panel and an overview of the project C-Roads Germany was given by the project coordinator Steve Schneider from ITS mobility GmbH. The intention of the C-Roads platform to develop harmonized deployment profiles for C-ITS services in a bottom up approach based on the experience from the pilot sites was elaborated by Jan Schappacher from BAST. The

on motorways was contributed by Susanne Schulz from the Autobahn GmbH des Bundes. This reflected especially the emphasis of the first phase of C-Roads projects that were completed by the end of 2021. The second phase of C-Roads is still running until 2023 and focuses on urban deployments for C-ITS. The needs and challenges for cities were shown by Dr. Thorsten Miltner from the City of Kassel, as a representative for the three urban and interurban pilot sites in C-Roads Germany.

BAST is active as technical coordinator in the national project and also represents the national interests on the European platform level. The deployment and operation perspectives for C-ITS services



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