

CAR 2 CAR Journal

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CAR 2 CAR
COMMUNICATION CONSORTIUM



Major steps for enabling the implementation of interoperable day one services in Europe

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Major steps for enabling the implementation of interoperable day one services in Europe

by Dr. Karl-Oskar Proskawetz | Administrator of the CAR 2 CAR Communication Consortium

During the last more than ten years the CAR 2 CAR Communication Consortium has developed the C-ITS concept, roadmap and use cases, contributed to European standardisation, comprehensive testing and international harmonisation, and engaged in the European C-ITS Deployment Platform for enabling the serial C-ITS market implementation as off 2019. Coming closer to the planned market introduction of Car2X, competition on ITS spectrum and business opportunities increased. For securing the investments from the past and for enabling making use of the full potential of the Car2X technology, the CAR 2 CAR Communication Consortium strongly engaged in public commenting activities on spectrum and C-ITS around the globe.

The Consortium provided comments on the public consultation on the delegated act in Europe as well as to US DOT on the V2X technologies, and to FCC on the waiver to use C-V2X technology in the 5.9 GHz Band.

In Europe the delegated act on C-ITS was forwarded to the European parliament on 13 March. The adoption of the delegated act is seen as major step for enabling the implementation of interoperable day one services in vehicles and road infrastructure cross-border in Europe. This year's ETSI ITS

Workshop recently held at the ETSI premises in Sophia Antipolis provides you more detailed information about the C-ITS developments around the globe.

Last year the CAR 2 CAR Weeks have been established to foster the work of the Taskforces and Competence Groups related to the C2C-CC Working Groups. Experience from the first five CAR 2 CAR Weeks show that the regular organisation of the C2C-CC work meeting is very appreciated and proved its worth. Being a living organisation, some further adaption of the processes is expected in future. Furthermore, for active C2C-CC members, the Consortium currently sets up an integrated tooling, a new Collaboration Area and is developing new websites for self-maintaining the address book information of appointed experts including their allocation to established Taskforces and Competence Groups.

One point I like to highlight from the last CAR 2 CAR Week organised at Renault is the detailed simulation results on comparing LTE-V2X and ETSI ITS G5 which have been presented and discussed. These results show that IEEE 802.11p fulfils all automotive requirements and provides comparable wireless performance to LTE-V2X being promoted by other stakeholders, even though cellular industry marks

it as outdated technology.

>>

During the last quarter of last year, the CAR 2 CAR Communication Consortium has contracted the development of a Pilot PKI being in line with the published standards, ETSI plugtests and the EU C-ITS Security Credential Management System. Since February 2019, this service for supporting C-ITS testing and demonstration is offered to all active C2C-CC members and first

companies already applied to make use of the Pilot PKI service.

For improving traffic safety and efficiency by C-ITS, achieving seamless user experience of the C-ITS services cross brands and borders is one of the major goals of the CAR 2 CAR Communication Consortium. As a consequence, the Steering Committee decided to publish released documents on the C2C-CC website in future free of charge for making them publically available.

New CAR 2 CAR Members



Epoche and Espirit

Type of Member: Associate Member

Type of Business: Epoche and Espri is an internationally recognized leading Common Criteria IT security evaluation facility and FIPS 140-2 testing laboratory for cryptographic modules. The company is accredited under the CCRA terms in the Spanish and Turkish schemes for Common Criteria and also by the USA NIST Cryptographic Module Validation Program (CMVP) and the Japanese Cryptographic Module Validation Program (JCMVP) for FIPS 140-2 and ISO 19790 testing, respectively. The lab is currently on the leading edge of the practical application of the security evaluation and testing, and our business model is based in long term investment with our customers and in the sharing and community progress of the application of the CC and FIPS 140-2.

CAR 2 CAR Forum 2018

by Dr. Karl-Oskar Proskawetz | Administrator of the CAR 2 CAR Communication Consortium

Kawasaki and Yamaha sponsored the CAR 2 CAR Forum 2018 which has been organised on 20 and 21 November 2018 at the Aviodrome in Lelystad, Netherlands. About 140 experts participated in the technical sessions and the evening event on 20 November. During the first day, invited speakers reported in four sessions about the latest developments in C-ITS deployment as off 2019, and about research activities on C-ITS functions for the C-ITS innovation phases beyond initial deployment. The second day was organised by the Technical Organisation. In four sessions, the experts gave more insight into the technical work for making C-ITS deployment and future developments happen. During the coffee and lunch breaks, lively discussions and networking between the participants and with the exhibitors could be recognised.

The CAR 2 CAR Forum 2018 followed the established structure of plenary sessions with invited speakers during the first day, and sessions of the Technical Organisation of the CAR 2 CAR Communication Consortium during the second day. Coffee and lunch breaks offered opportunities for networking and getting in discussion with the 13 exhibitors.

After the sessions of the first day, the representatives of the active C2C-CC members participated in the annual general assembly while all other participants had the chance to make use of guided tours through the Aviodrome museum.

This was followed by an evening event organised in the Aviodrome museum. Historical airplanes and vehicles created a pleasant technical atmosphere for further networking and discussions between all participants, speakers and exhibitors. Interested participants could expand their skills in flying a F104 in a flight simulator, and the singing stewardesses took care for complementing entertainment during the evening event.

Looking to the programme of the CAR 2 CAR Forum 2018 some selected presentations shall be highlighted in the following. >>



>> Guus van de Schouw (DG MOVE) reported about the activities of the European Commission towards cooperative, connected and automated mobility. In his presentation, he outlined the strategy on automated mobility addressing, technologies, infrastructures, legal framework and societal concerns. This was followed by a more detailed information on the objectives of the delegated act and its elements. Here, he highlighted the C-ITS services and stations, compliance assessment, operation, privacy & data protection as well as implementation. For guiding the initial deployment phase, an expert group shall be established as a transitional mechanism until a comprehensive governance framework is set up. In his conclusion, he highlighted that the delegated act favours an open C-ITS system. It will be reviewed and revised over the time for allowing the integration of new services and technological solutions into the interoperable C-ITS system once they become mature. >>

the trust list and trust list manager. The European root CA is aimed to be implemented by Q2/2020.

John Kenney (Toyota) in his presentation addressed the DSRC deployment in the US, standards and spectrum issues. He reported that US FCC requires DSRC in the 5.9 GHz band for enabling vehicle to everything (V2X) communication. In a global region V2X benefits can only be harvested if devices interoperate, i.e. "speak the same language". Toyota and Lexus announced to start deployment of DSRC in vehicles as off 2021. GM expanded its DSRC deployment in 2018. Most US states committed to DSRC for infrastructure and fleet vehicles. Today already more than 5,300 road side units in 26 states are in operation and tens of thousands of DSRC vehicles are driving on US roads. The DSRC standards are mature and expanding. Improved performance – especially range and reliability – shall be offered by the next generation V2X amendment. >>

Gerhard Menzel (DG JRC) reported about the European C-ITS security credential management system. Successive communication on security starting in 2016 and releases of the certificate and security policy built the basis for the single European trust domain ensuring authenticity and integrity. During the pilot phase of the first four years, the European C-ITS credential management system (PKI) will be implemented and operated by the European Commission. He outlined the architecture and emphasised the central entry point of contact,



>> In 2018, IEEE started working on the seamless evolution path for DSCR offering true backward compatibility by considering interference and interoperability requirements. He informed about the status of the interference issues related to the 2013 requested spectrum sharing with WiFi. Based on the results, NHTSA requested in October 2018 that the 5.9 GHz band shall be preserved for transportation communications being essential to public safety. Splitting the ITS spectrum is not supported as in this case, the entire suite of safety, mobility, environmental and automation applications can no longer be supported. Finally, he motivated to contribute to building momentum for DSRC towards mass deployment.

During the sessions of the Technical Organisation, Jérôme Härrä (EURECOM) addressed considerations and proposals on

decentralized congestion control for improving the efficiency of the radio channel usage. Starting with the DCC architecture, he reported about the main activities in 2018 and DCC mechanisms. He informed about investigations on introducing a scheduler for improving flow control and showed first results on the evaluation of DCC for LTE-V2X.

In his report Friedbert Berens (FBConsulting) raised some challenges for schedulers resulting from the ETSI CAM generation rules. He pointed out that Cooperative Awareness Messages (CAM) are non-deterministic in time and size. Depending on the generation rules based on speed, heading and acceleration CAMs will be generated between every second to up to ten times per second. This is also true for the size of CAMs which varies from around 200 bytes to up to more than 700 (1,000) Bytes depending on the environment and security content. He presented some examples from field tests showing the frequency of CAMs with respect to message size and sending time intervals. For the LTE-V2X scheduling operation he drew conclusions with respect to timing and size. He stated that a deterministic scheduler in time and size is not well suited for this kind of traffic and cannot handle CAM messages in a resource efficient manner. >>



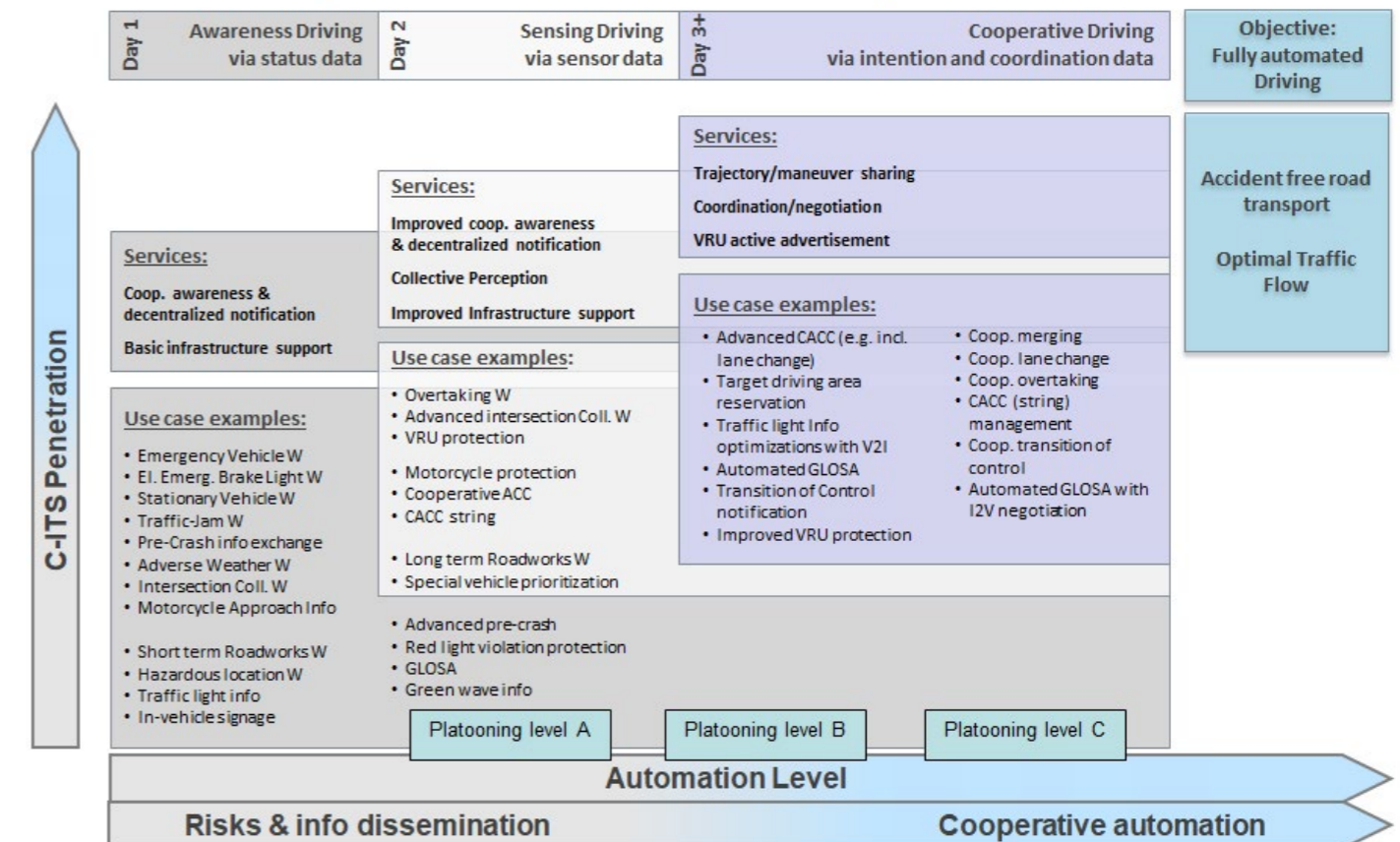
>> During his session Dr. Michele Rondinone (Hyundai) showed the further developed C-ITS roadmap of services and use cases towards fully automated driving. He highlighted that after starting initial C-ITS deployment next year (2019), each successive deployment phase will be built on the previous one(s) already in operation on the European roads for enabling the goals of improving road safety and traffic efficiency. The first three phases - awareness driving, sensing driving and cooperative driving - have been elaborated in some more detail as shown. He pointed out that in addition to this

general C-ITS roadmap, further stakeholder driven roadmaps, e. g. for powered two-wheelers, heavy vehicles or infrastructure might need to be considered as indicated for platooning with different levels.

The complete set of presentations given during the CAR 2 CAR Forum 2018 can be downloaded from the [CAR 2 CAR website](#)

The next CAR 2 CAR Forum is planned to be organised by October/November 2019. All C2C-CC members will be informed as soon as date and venue have been fixed. //

Roadmap: Services & sample use cases



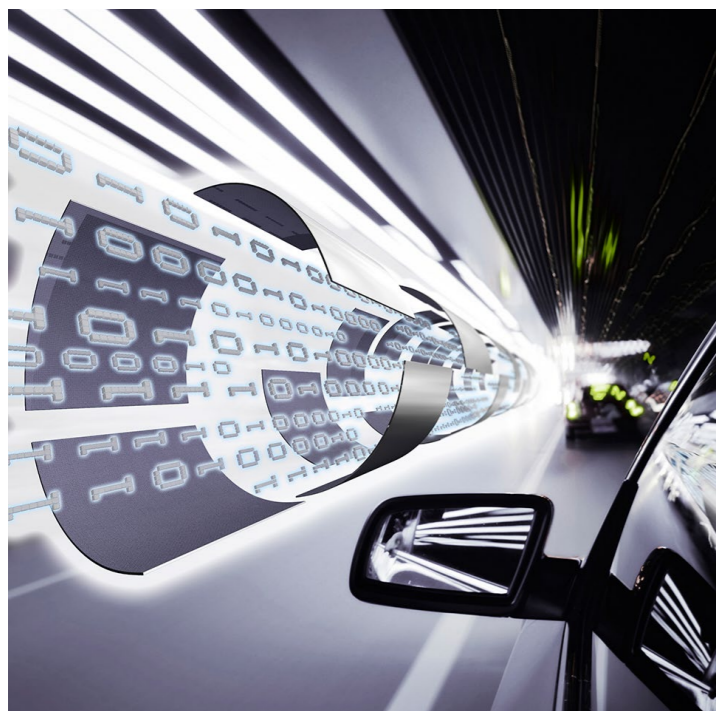
New pilot PKI complies with latest security standards

by Dr.-Ing. Norbert Bißmeyer | ESCRYP T GmbH

In V2X communication, security is essential for ensuring the reliable and trustworthy exchange of information between vehicles within the Cooperative Intelligent Transportation System (C ITS). In February 2019, the automotive security specialist ESCRYP T launched a new pilot public key infrastructure (PKI) for the CAR 2 CAR Communication Consortium (C2C-CC). This PKI issues certificates which can be used by C2C-CC members for testing and pilot operations based on the ETSI TS 103 097 v.1.3.1 security standard. This latest version of the security standard, a harmonisation of IEEE 1609.2 and ETSI, helps reducing the effort for onboard unit (OBU) vendors and operators.

Obtaining certificates from the new C2C-CC pilot PKI requires secure registration, based on a process that ESCRYP T developed together with the German Federal Office for Information Security (BSI). After an initial one-time registration of the end-entity manufacturer or operator, the V2X OBU is registered and subsequently enrolled with a long-term certificate and equipped with pseudonymous short-term certificates using the standardised ETSI TS 102 941 v1.3.1 protocol. By using this ETSI protocol, the pilot PKI issues a trust list (RCA-CTL) and a certificate revocation list (CRL). Both lists can be downloaded from a publicly available and standardised web interface provided by the PKI's distribution center (DC).

The CRL is used only to revoke CA certificates of that PKI and will not list long-term and short-term OBU certificates. As a result, the vehicles need to periodically update their pool of pseudonymous certificates, each of which has a short validity of one week maximum. However, the pool can be filled with pseudonymous certificates for up to three months in advance. Taking the next step towards productive V2X communication, the OBU should be equipped if possible with a hardware security module (HSM) to handle all secret keys inside a security element. >>



>> ESCRYP T supports the integration of OBUs into the PKI by providing various tools that help analyse the PKI protocol messages in detail, handle the initial registration of new OBUs, and create sample and test certificates.

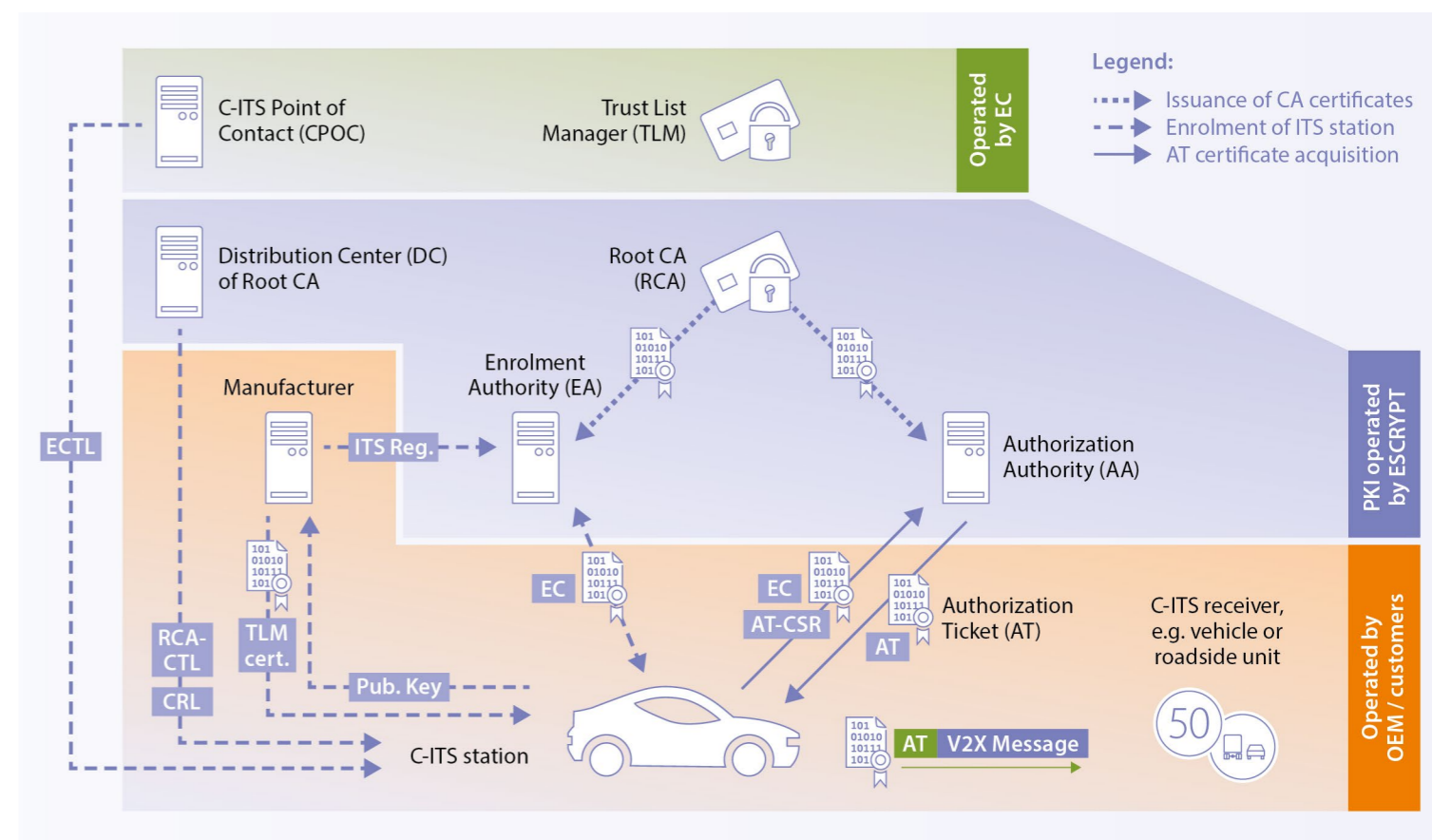
PROVEN CONFORMITY AND INTEROPERABILITY

With the new C2C-CC pilot PKI implementation, ESCRYP T meets the technical requirements as laid out in the European Certificate Policy (CP) release 1.1. It therefore handles all PKI secret keys in secure elements of smartcards and HSMs. The root CA private key is protected through technically restricted root key operations according to the four-eyes principle on a dedicated offline system without any network connection.

Interoperability with other European C-ITS pilot activities will be considered with the aim of adding the pilot PKI's root certificate to the European Certificate Trust List (ECTL) as soon as the former becomes available in 2019. The conformity and interoperability of PKI implementation has been proven as part of the [ITS Cooperative Mobility Services Event 6](#).

The current PKI with the old security formats will stay in operation until at least December 2019 to help ensure a smooth migration to the new PKI.

For more details and access information, [please click here](#). //



New C-ITS pilot PKI for the CAR 2 CAR Communication Consortium.

4th CAR 2 CAR Week

by Dr. Karl-Oskar Proskawetz | Administrator of the
 CAR 2 CAR Communication Consortium

BASSt – German Federal Highway Research Institute – hosted the 4th CAR 2 CAR Week from 14 to 17 January 2019 in Bergisch Gladbach. More than 80 experts from the CAR 2 CAR Communication Consortium and the C-Roads Platform took the opportunity for participating in the parallel and joint working meetings of 13 Competence Groups, Taskforces and new initiatives during the first 1.5 / 2 days. The results of these meetings have been reported to the successive joint meetings of the three Working Groups DEPLOYMENT, FUNCTIONAL and TECHNICAL during the following days. In the final Closing Plenary session the Working Groups reported the main outcome for discussion and common decision-making by the Technical Organisation on updating the Work Programme, releasing new documents, required consulter support and further initiatives of the Technical Organisation. The Work Programme has been updated accordingly.

During the Opening Plenary meeting Prof. Andre Seeck welcomed all participants on behalf of the BASSt – German Federal Highway Research Institute – as host of the 4th CAR 2 CAR Week. Due to deployment of C-ITS starting in 2019, the Competence Group Implementation and related Taskforces took the opportunity for arranging continuous meetings during the first two days. Joint meetings with other Competence Groups as well as with experts from the C-Roads Platform have been organised for discussing different subjects related to deployment and to updating and improving the system specification. The other Competence Groups and Taskforces met in parallel sessions for discussing their status of work and next actions to do.

During the last two days of the 4th CAR 2 CAR Week the experts reported their results and suggestions to the related Working Groups. In the joint Working Group meetings of DEPLOYMENT, FUNCTIONAL and TECHNICAL the reports have been discussed, harmonised and resulting actions noted. During the afternoon of the last day the summarised outcome of these three Working Group sessions has been reported in the Final Closing Plenary meeting for agreeing on the decisions of the Technical Organisation. All Working Groups reviewed the status of their Work Items. >>

>> Several Work Items have been closed or updated, eight new Work Items have been established, and experts of the active C2C-CC members have been encouraged to join the related Taskforces. For organisational reasons the naming of the e-mail distribution lists of (most of) the taskforces has been changed to use the related identifiers. The Work Programme has been updated accordingly.

Required support by consultants was also discussed and has been agreed for requesting reservation of related budgets by the Steering Committee. As a result of COM-COSP work, the whitepaper on Urban Rail was approved. Furthermore, the Technical Organisation supported to push forward

initiatives for establishing a new Competence Group on Commercial Vehicle and for improving the PR processes. Considering the trends of digitalisation and cooperative automated driving the Technical Organisation will additionally discuss and specify the communication needs for automated driving during its next meetings.

All documents of the 4th CAR 2 CAR Week can be found in the respective folder of the Collaboration Area. //

5th CAR 2 CAR Week

by Dr. Karl-Oskar Proskawetz | Administrator of the
 CAR 2 CAR Communication Consortium

The Renault Group hosted the 5th CAR 2 CAR Week from 11 to 14 March 2019 in the Renault TECHNOCENTRE at Guyancourt, France. More than 70 experts from the CAR 2 CAR Communication Consortium participated in the parallel and joint working meetings of 14 Competence Groups, Taskforces and new initiatives during the first 1.5 / 2 days. Following the established process, the results of these meetings have been reported to the successive joint meetings of the three Working Groups DEPLOYMENT, FUNCTIONAL and TECHNICAL during the following days. In the final Closing Plenary session, the Working Groups reported the main outcome for discussion and common decision-making by the Technical Organisation on updating the Work Programme, releasing new documents, required consulter support and further initiatives of the Technical Organisation. The Work Programme has been updated accordingly.

Already on 11 March 2019 the Competence Groups and Taskforces organised their first meetings. During the Opening Plenary on 12 March 2019 Nadine Leclair, Renault Expert fellow welcomed all participants on behalf of the Renault Group – as host of the 5th CAR 2 CAR Week. Following the discussion of the organisational and further issues of the 5th CAR 2 CAR Week, Philippe Favreau (Renault) presented an overview on the norm ISO 23132 – Road and Extended Vehicle Safety. The discussion pointed out that this norm will affect the work on C-ITS within the C2C-CC in future. After the Opening Plenary the experts split to further meetings of seven Competence Groups and Taskforces.

During the joint WG Meetings on 13 and 14 March 2019 the Competence Groups and Taskforces reported their outcome to the Working Groups. At the beginning of the WG DEPLOYMENT session the French

Gendarmerie Nationale presented their views on special vehicles and C-ITS use cases. This was followed by a presentation of the German project DiSoWa on digital warning of special operations. Both presentations were lively discussed. In future some follow-up activities are expected on the issues discussed. The presentations were followed by reports on configuration management, management relation between CAR 2 CAR specifications and the Delegated Act, and reports of TF Operations, CG Security and CG Compliance Assessment. Finally, the Work Programme was reviewed with respect to all Work Items related to WG DEPLOYMENT. Several Work Items were updated, and CG SEC established three new Work Items.

During the WG FUNCTIONAL session taskforce reports on guidance for Day 2 and beyond, App2Msg, connected and cooperative automated driving, collective perception, initial study on VRU >>

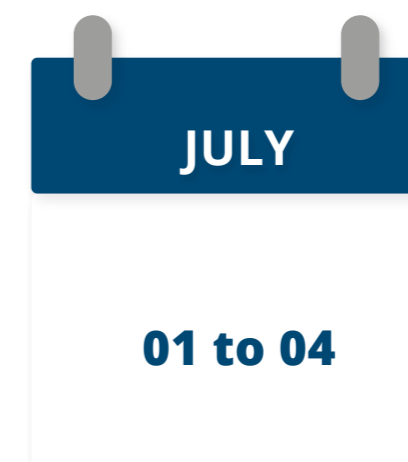
>> were received. The Work Programme was reviewed with respect to all Work Items related to WG FUNCTIONAL, and a brief status report on the Demonstration at Schengen in April was given. Two Work Items were updated.

The WG TECHNICAL received and discussed the reports of position and time services, multi-channel operation and of the CG COM-COSP and CG SEC. The Work Programme was reviewed with respect to all Work Items related to WG TECHNICAL. Several Work Items were updated, and CG SEC outlined detailed background on the proposed updates and new Work Items. Some of the proposed Work Items were questioned and discussed in more detail. CG COM-COSP reported the draft status of the liaison statement to ETSI on urban rail and CG SEC asked for sharing documents with CAMP, C-Roads and OmniAir.

In the final Closing Plenary meeting the reports of the three working groups were presented. The proposed updates of the Work Items and the Work Programme were approved as well as the drafted liaison statement to ETSI. Furthermore, received requests from the WGs on consulter support were collected and shall be considered for the oncoming joint budget planning 2019 by the chairs of the Technical Organisation and the Steering Committee. The request received for enabling more time for parallel TF and CG meetings at the beginning of a CAR 2 CAR Week shall be considered in the planning for the next 6th CAR 2 CAR Week at Eurecom.

All documents of the 5th CAR 2 CAR Week can be found in the respective folder of the Collaboration Area. //

Next CAR 2 CAR Week



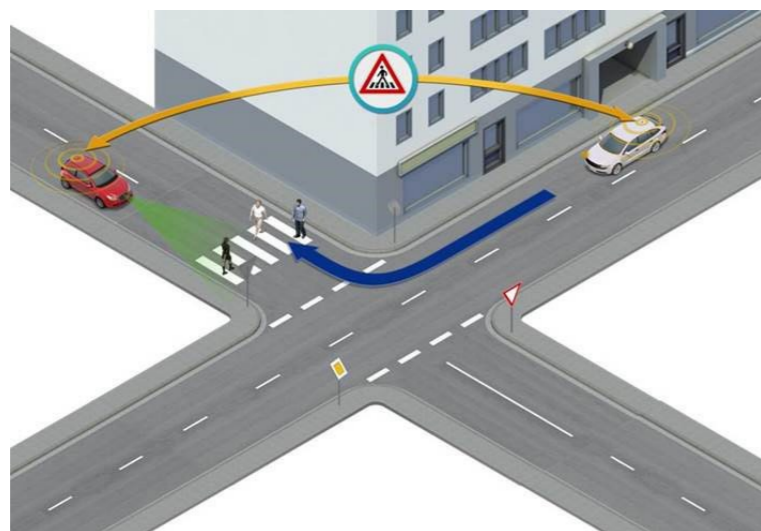
6th CAR 2 CAR Week,
 Sophia Antipolis
 (hosted by Eurecom)

Collective Perception

by Michele Rondinone | Hyundai

Collective Perception (CP) is the concept of V2X exchanging with other connected traffic participants information about objects detected by local sensors (see figure). As an emerging service, it is expected to drastically improve environmental awareness for next generation C-ITS applications as well as for future cooperative automated driving. At the moment, the (pre-) standardization activity at ETSI TC ITS is looking at CP message format definitions as well as at possible approaches for CP message channelization and DCC adaptation. However, for correct adoption of CP in future vehicular and infrastructure systems, common approaches for object representation and inclusion in transmitted messages are required. It is particularly important to define common specifications applicable to object confidence, accuracy, and more generally "quality" to be exchanged, because only based on harmonized definitions it will be possible to correctly interpret these values at the receiving side. Harmonized quality indicators applicable to sensors and sensor fusions from different vendors shall be used. Moreover, harmonized specifications for using such indicators when populating CP messages at the transmission side shall be adopted.

To achieve these objectives and fulfil these requirements, the C2C-CC has recently started a dedicated new work item. The work item will look at results achieved by past and ongoing related activities and, define new approaches and investigate their performance to select the most suitable ones.



Delegated Act – European Commission agreed on framework for C-ITS connecting vehicles and road infrastructure

by Dr. Karl-Oskar Proskawetz | Administrator of the CAR 2 CAR Communication Consortium

Road transport and road traffic shall become safer and cleaner all over Europe. On 13 March 2019 the European Commission adopted the delegated act on Cooperative Intelligent Transport Systems - C-ITS and forwarded it to the European Parliament. Following the European strategy towards cooperative connected automated driving this regulation shall enable implementation of initial C-ITS services starting this year.

Commissioner for transport Violeta Bulc highlighted that the delegated act based on the ITS Directive shall provide the long expected legal certainty to vehicle manufacturers and road operators required for serial roll-out of the seamless day one C-ITS services in Europe. This delegated act also shall set the scene for new technologies and adaptations to market developments in future. C-ITS and especially short-range communication is expected to significantly contribute to achieving the European ambitions on road safety and is assessed as an important step towards cooperative, connected and automated mobility. As of this year, short-range communication enables vehicles, traffic signs and motorways being equipped with technology to send

standardised messages to all traffic participants in the vicinity around them. The specifications establish the minimal legal requirements for interoperability between the different cooperative systems used. Interoperability will enable all equipped stations to exchange messages with any other station securely in an open network.

The cooperative element of the C-ITS Day One services – enabled by digital ad-hoc connectivity between vehicles, and between vehicles and the transport infrastructure – is expected to significantly improve road safety, traffic efficiency and comfort when driving, by helping the driver to make the right decisions and adapt to the traffic situation. The C-ITS strategy covers cars, trucks, buses, motorcycles, road infrastructure and further vulnerable road users like cyclists and pedestrians. The improvement of technological innovations shall be used to stepwise establish new and advanced safety features, such as emergency braking, intelligent speed assistance and enhanced pedestrian and cyclist protection as well as cooperative features as enabler of cooperative automated mobility for promising EU industry leadership in this important area. //

Why is a Delegated Regulation required?

by Niels Peter Skov Andersen | General Manager of the CAR 2 CAR Communication Consortium

Over the last months a lot of discussions of the Delegated Act (Delegated Regulation) for C-ITS have happened. A very frequently asked question or comment is why it is needed why not just let market decide.

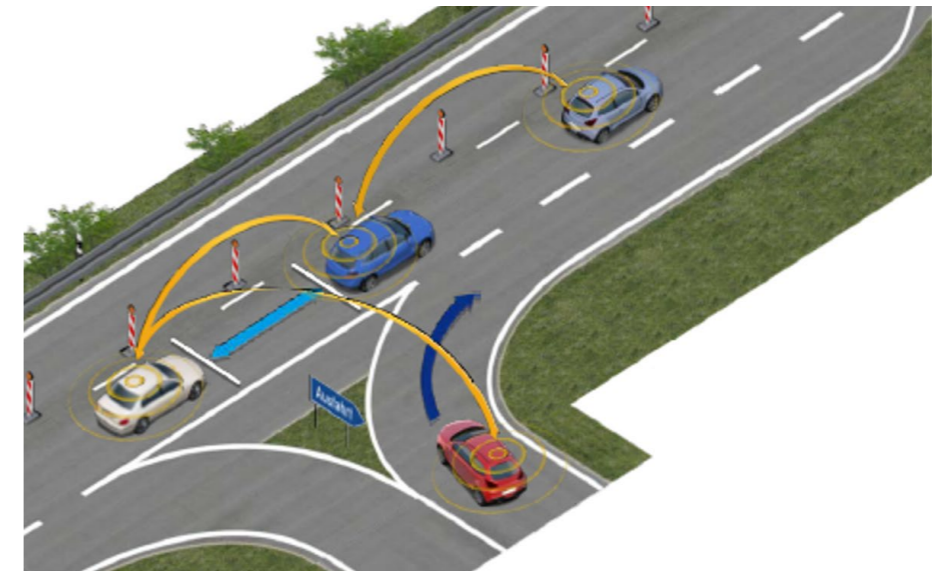
To understand this one has to understand the difference between the short-range communication ITS-G5 which CAR 2 CAR Communication Consortium together with ETSI and others have developed and traditional infrastructure-based systems such as mobile networks.

ITS-G5 is an ad-hoc sensor network aiming of filling the gap between traditional sensors like radars, cameras etc. and infrastructure-based communication networks – so it is not a competitor to cellular networks like 5G it is a complement. So first it is designed not to require presence of any infrastructure – just the presence of two equipped vehicles is enough to allow communication. This might sound great, but it does not come without a cost. For two parties to speak they need to speak a common language.

In a mobile network and similar networks, you have a master-slave relationship. So, if you want to speak you contact the network and tell which languages you speak and get to an agreement of what is the best choice. Then in principle

the network translates everything into Esperanto (a generic language) and sends it toward the network handling the partner you really want to speak to and there again there is an agreement between the partner and the serving network what is the best language to use and the destination network will then translate from Esperanto to the agreed language.

Now in the case of C-ITS short-range communication there is no network, there is no mobile network operator in the backstage, everything is ad-hoc. So, there is no one to assist negotiating what language to use. This means that when you want to communicate, you need to know what language to use. If all Renault cars speak French and all Volkswagen cars speak German and you try to speak English to them, it will not work. This is where the Delegated Act becomes important, some think the Delegated Act is too detailed, but in practice what it is aiming of is to define what is our common language as we do not have the possibility to negotiate the language. For safety purposes it is important that already the first message is understood. So the Delegated Act (Delegated Regulation), is basically there to define what is our common language.



Another way of understanding this is looking at our traffic code – It basically sets up some basic rules that ensure we can co-exist. The Delegated Act is aiming of doing the same. Let us just say every car manufacturer and driver could on their own choose if they wanted to drive on the left or the right side of the road – I think we all understand this would not work – that is why we have a regulation for that. This is not that different from C-ITS, if we take two steps back and ask our self what is C-ITS – the simplified answer is; it is just digitizing of traffic – so electronic headlights, taillights, breaking lights, indicators etc. Today we have rules in the traffic codes for those, so in reality the Delegated Act is just trying to ensure we have a similar situation in the digitized world.

All in all, the Delegated Act is important for CAR 2 CAR Communication Consortium and its members because it creates a legal certainty that we all will

speak the same language for short range communication. It allows us to deploy now and to start saving human life immediately, but at the same time has clear indications on how to incorporate future technologies, that will allow for accident free automated driving, based on a combination of the in-vehicle sensors, the short range communication and the wide area communication based on cellular communication – 4G, 5G, 6G,

CES in Las Vegas – A short overview

by Andreas Propp, Neusoft Automotives

Since more than 10 years the CES exhibition has a strong participation by automotive industry, this trend continued in Las Vegas and intensified further this year. Automotive OEMs and suppliers demonstrated their vision how car driving and mobility will experience in the future. We experienced the same trend also in Europe, when Neusoft exhibited their products during Mobile World Congress in Barcelona.

As a new member in C2C CC I don't intend to give a comprehensive commercial trend analysis, but want to share my personal impressions and observations gained during my business travel for my employer Neusoft Automotives.

Neusoft Automotives is well known in Asia, Europe and USA as a highly specialized supplier of navigation and ADAS solutions. Together with Neusoft Reach we showed our latest technologies and products in the fields of smart connectivity, autonomous driving, car sharing and electrification. The products are ranging from connected car solutions, ADAS, car infotainment, navigation, instrument cluster, car sharing, cloud service for connected vehicles, automotive cyber security, e-mobility to car sharing services.

CAR ITS HIGHLIGHTS NEUSOFT

Neusoft Reach has released two new products at the show: V-NeX and NeuSAR.

V-NeX – EXTENDED INTELLIGENT CONNECTIVITY

The V-NeX, released jointly with the leading commercial Chinese vehicle company Foton, is the first automotive-grade V2X terminal launched internationally in China. It is based on Neusoft proprietary VeTalk software platform and is AUTOSAR Adaptive capable and future feature extensions enabled, >>



Based on DSRC technology we demonstrated use-cases: Green Light Speed Advisory and Smart Engine Start-Stop function.

>> while satisfying requirements of real time, high computing capacity and high communication bandwidth. V-NeX has the product key technology and fully supports China, EU, US and Japan standards. It provides more than 30 applications of V2V, V2I and V2P in three categories of driving safety, driving efficiency and information service. Neusoft Reach participated and finished the first "Three Layers" Interoperability V2X Application Demonstration in Nov. 2018, realizing the world's first cross-communication module, cross-terminal, and cross-vehicle interconnection.

NEUSAR – BASIC SOFTWARE PLATFORM FOR NEXT GENERATION ICV

NeuSAR is an operating system software platform for intelligent connected vehicles. It is based on AUTOSAR Adaptive Platform, and consists of basic software modules and development tools suite to build the E/E architecture for next generation automobiles. ADAS/ADS Domain controller in collaboration with Xilinx provides autonomous-driving and automated parking features up to L3.

OTHER TRENDS AND OBSERVATIONS

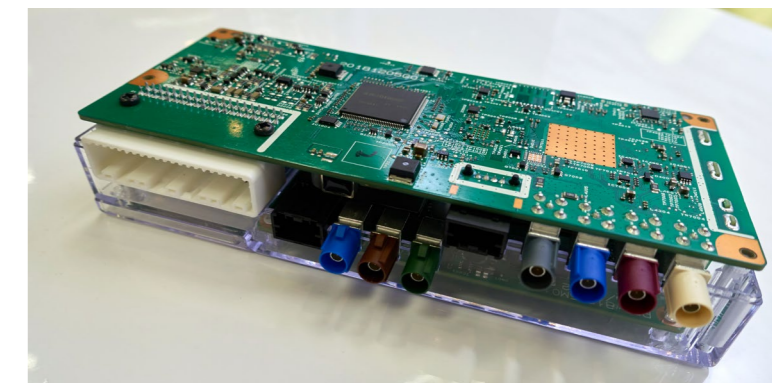
CONNECTED TO CLOUD, IOT

There is continuous interest to connect devices and services to cloud solutions. For example, a navigation system no longer is an embedded, encapsulated system in vehicle, but will connect with your mobile devices, combining different travel options to an intermodal transport experience, covering i.e.

public transportation, car sharing services and last-mile navigation. Neusoft Automotives has acknowledged ADAS, IVI, Navigation and V2X technologies more and more become inseparably linked systems, this trend is well reflected in the development roadmap of Neusoft.

SAMSUNG – SMART CITY

Samsung and HARMAN International presented their vehicle Digital Cockpit 2019 and emphasized their role as a driver of innovation in the connected automotive industry. The Digital Cockpit exhibit included an very nice and eye-catching >>



Neusoft exhibited the next-generation T-Box communication domain controller solution integrating a shark fin antenna and C-V2X/5G/Ethernet based on Quectel C-V2X Chipset.



Three generations with V2X communication hardware was presented: DSRC WLANp, C-V2X based on Quectel and 3rd generation based on Qualcomm chipset

>> diorama that allowed guests to experience in drivers perspective how Samsung's connected driving and C-V2X technologies allows to safely navigate in smart cities in the future.

Intelligent Intersection and intelligent pedestrian crossing, Intelligent street lamps, mobility as a service, shuttle service and smart parking.

HD MAPS - DIGITIZED INFRASTRUCTURE

Municipalities more and more acknowledge the need to own and maintain detailed maps enriched with infrastructure properties allowing autonomous driving and tracking their assets. Big Data companies like Google and Here demonstrated their competencies and technical solutions.

Here promoted an interesting product named "OLP", the Open Location Platform. The cloud based map service allows customers to ingest, transform, process and analyze data in order to tailor maps to their needs.

Continental was presenting City Data as a Service Platform, incorporating Continental Fleet Sharing, City Fleet Management,

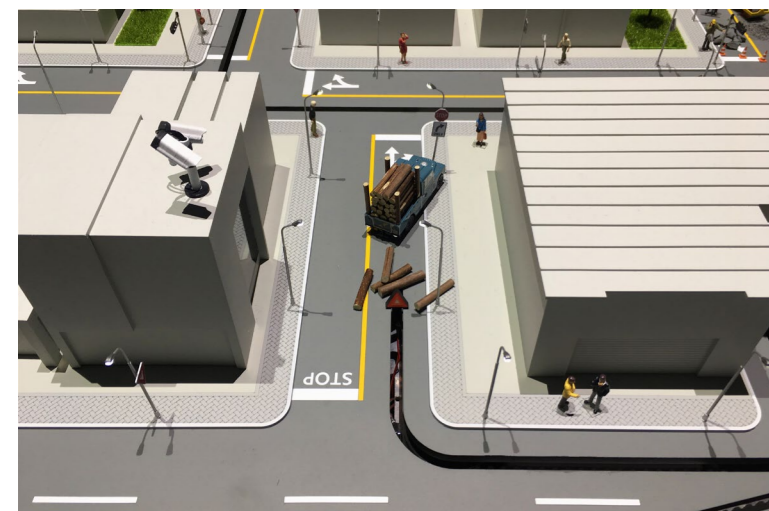
VULNERABLE ROAD USERS - V2X CRADLES, BIKERS EQUIPMENT

Finally the integration of vulnerable road users to V2X was paid attention to, I noticed at NXP Semiconductors pavilion, they had launched the first mobile App based V2X solution, based on a cellphone V2X dongle.

MOBILITY TRENDS - SOCIAL MOBILITY

Another remarkable trend was set to Car- and Ride-Sharing Services. Different automotive suppliers like Aptive, Continental or ZF demonstrated autonomously driving Robo-Shuttles which directly can be ordered by App.

One interesting approach was demonstrated from Here. Introducing SoMo (Social Mobility), an encompassing transportation app which gives full access to the >>



Numerous V2X use-cases had been demonstrated in an eye-catching scale city model.



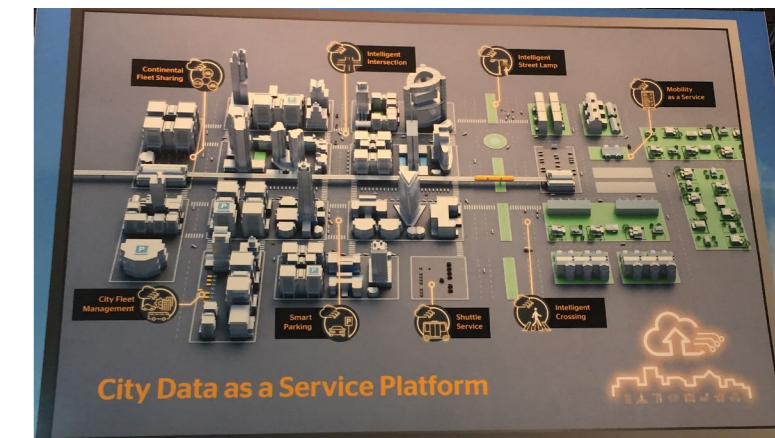
>> HERE Mobility Marketplace. SoMo is one solution to plan, book and coordinate your commute or carpool with family or friends via public transit, taxi, limo or car. Drive solo or share a ride with a friend to a one-time get together or a recurring event. With SoMo, you can invite friends to join a ride, share transportation and ride details, get real-time ETAs, plan and communicate easily for a smooth journey.

SHARED AIR RIDES WITH BELL FLYING TAXI

Bell, the storied aviation manufacturer, dropped a surprise at CES 2019 by unveiling its design for a full-scale vertical-takeoff-and-landing (VTOL) passenger vehicle - in other words, a self-flying taxi.

The air taxi is called Bell Nexus and it's powered by a hybrid-electric propulsion system that features Bell's signature powered lift concept, incorporating six tilting ducted fans

that are designed to safely redesign air travel. Bell has brought the Nexus concept to CES previously but this year Bell seemed to offer more specifics on engineering and design than previously expected. //



Continental presenting City Data as a Service Platform



Bell is building a self-flying air taxi, and it brought a prototype to CES 2019.



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Become a user of the test track for automated and connected driving in Hamburg

by Steve Schneider, TAVF coordination centre

When it comes to shaping the future mobility, the Free and Hanseatic City of Hamburg fully capitalizes on intelligent transport systems and services. With the ratification of the ITS-strategy by the Senate in April 2016, and the successful application as host city of the ITS World Congress 2021, important milestones have been reached to become a model city for digitalisation in traffic and transport. Hamburg is now making further great strides in implementing information and communication technology for a safer, cleaner, more efficient and comfortable urban mobility: Selected as one of eight German testbed cities for automated and connected driving by the German Federal Ministry of Transport and Digital Infrastructure, a test track for automated and connected driving (TAVF) is currently being built in Hamburg City.

On the test track of about nine kilometres, the Free and Hanseatic City of Hamburg is gradually upgrading traffic lights for the infrastructure-to-vehicle (I2V) and vehicle-to-infrastructure (V2I) communication. The test track will be fully equipped in 2020. Until then, 37 traffic lights and a bridge will be provided with roadside units which exchange data with passing vehicles wirelessly via WLAN based on the 802.11p standard (ETSI G5).

With these and further features, the test track offers an open, provider-independent platform for vehicle manufacturers, technology companies, and research institutions to trial innovative mobility services in real traffic conditions on public roads. As the Hamburg test track runs on heavily loaded city and district streets in the city centre of Hamburg, it allows testing e.g. automated driving functions, safety assistance systems, or environmental sensors under complex framework conditions in mixed traffic. >>

TAVF



>> Hamburg is seeking a strong collaboration with industry, research partners and associations in order to define the requirements for automated and connected driving in the urban metropolis. A special focus is on the requirements for the digital infrastructure supporting automation and connectivity independent of the vehicles, technology, provider or applications selected. Therefore, vehicle manufacturers, suppliers and research organisations are invited to become a user of TAVF, to bring in their ingenuity and expertise, and to gather important real-life experience in testing and operating innovative traffic solutions.

For supporting these users and coordinating the test track usage, a TAVF coordination centre has been established which is operated by ITS mobility, the neutral ITS association in Northern Germany. The coordination centre also fosters the exchange of experiences and knowledge between users, operators and other ITS experts. Interested companies and institutions can contact the TAVF coordination centre at any time: moin@tavf.hamburg For the description of the application proposed by a user, a special contact form is available.

Further information is also available on the website www.tavf.hamburg (English website will be launched by April 2019). //

10th ETSI Workshop on Intelligent Transport Systems

by Dr. Karl-Oskar Proskawetz | Administrator of the CAR 2 CAR Communication Consortium

Connected vehicles, 5G, G5, LTE V2X, C-V2X and Next Generation Vehicular Networks have been the buzzwords of the 10th ETSI Workshop on ITS at Sophia Antipolis. About 115 experts from all over the world discussed status and development of ITS in general and C-ITS in particular. Starting with the C-ITS status around the globe the other sessions focused on security and privacy, standardisation activities, application and use cases and offered a view towards accident free automated driving. While short-range physical layer technology was controversially discussed common views on hybrid communication, security and privacy and future use cases could be observed. C-ITS development is mainly driven by improving traffic safety and efficiency. Experts state that developing and proving the C-ITS applications requires 90 per cent of the efforts while issues related to the controversial discussed ad-hoc short-range communication layer plays a key role in getting access to the allocated ITS spectrum.

Looking to the regions of the world China has allocated a 20 MHz spectrum for C-ITS, pushes LTE-V2X and C-V2X testing in pilots and is expected to prefer this short-range technology. In USA GM already has more than twelve thousand Cadillacs equipped with DSRC (WAVE) in the marked and more than ten thousand of vehicles and infrastructure units equipped with DSRC (WAVE) are operational in several cities' and federal states' pilots. New pilots start for testing the C-V2X technology. In Japan DSRC services are offered since several years in the 700 MHz frequency

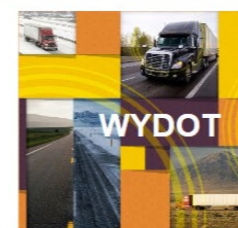
spectrum. Europe is on the way towards connected and automated mobility and is establishing a related single expert platform for CCAM. As basic step the current delegated act being published soon focuses on implementation of Day One services enabled by mature complementing cellular (3G/4G) and short-range (ETSI ITS G5) communication. The regulation foresees review & revision of the delegated act, to integrate new services and technological solutions into the interoperable C-ITS system once they become mature. During the World Radio Conference >>

>> 2019 the DSRC spectrum allocation shall be harmonised globally to 5.8 GHz - 5.9 GHz and 60 GHz frequency bands. The European deployment initiative C-Roads represents 17 European member states and the 8 associated members: Croatia, Greece, Ireland, Switzerland, Australia, Israel, New Zealand, and Russia. The infrastructure short-range profiling of the Day One use cases was performed in close cooperation with the CAR 2 CAR Communication Consortium and cross-site testing is ongoing for ensuring seamless interoperability. The C-ITS services will be transferred towards operation during 2019. C-Roads aims on implementing the road operators' services covering the complete road network based on complementary hybrid communication. Profiling the services via the complementary

cellular (3G, 4G) communication channel has started and will be developed in close cooperation with EATA. In a next step city related use cases shall receive higher focus as well as on-level railroad-crossings and use-cases beyond Day 1.5.

Another key aspect addressed security and privacy of C-ITS. Following the European policy on C-ITS security the European trust model is being setup. For the first four years the European C-ITS Credential Management System ("PKI") is implemented and operated by the European Commission. The Trust List Manager, C-ITS Point of Contact and the EU Root CA are being successively implemented and tested. C-ITS deployment in 2019 is ensured. Final implementation and operation of all modules is aimed by Q2/2020. Results of the >>

THE THREE PILOT SITES



WYDOT

- Reduce the number and severity of adverse weather-related incidents in the I-80 Corridor in order to improve safety and reduce incident-related delays.
- Focused on the needs of commercial vehicle operators in the State of Wyoming.



New York City DOT

- Improve safety and mobility of travelers in New York City through connected vehicle technologies.
- Vehicle to vehicle (V2V) technology installed in up to 8,000 vehicles in Midtown Manhattan, and vehicle to infrastructure (V2I) technology installed along high-accident rate arterials in Manhattan and Central Brooklyn.

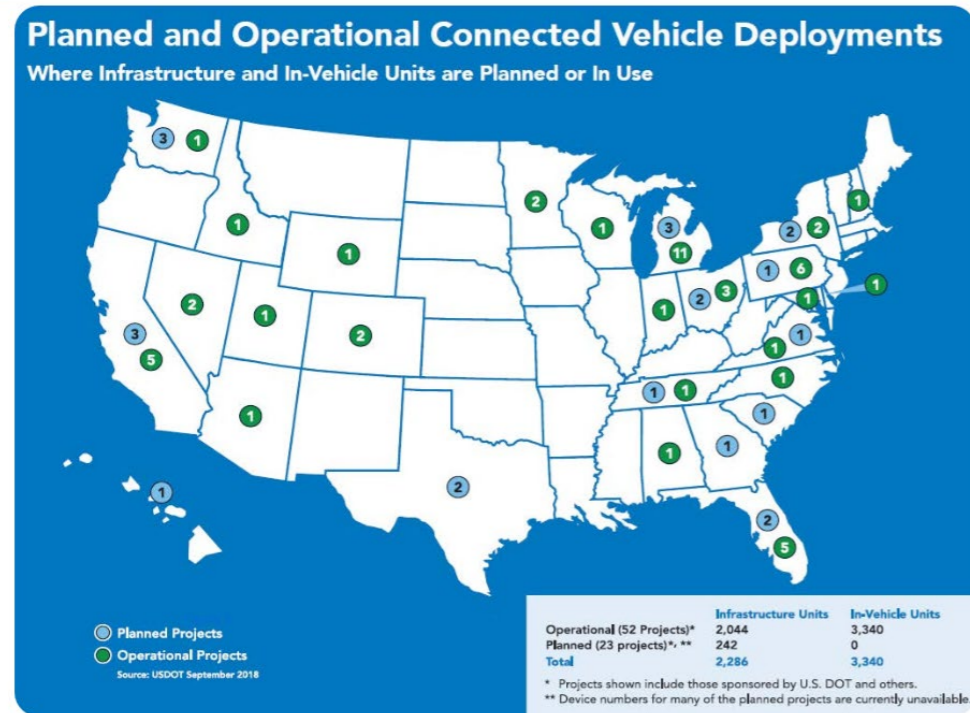


Tampa (THEA)
Tampa Hillsborough
Expressway Authority

EXPRESSWAY

- Alleviate congestion and improve safety during morning commuting hours.
- Deploy a variety of connected vehicle technologies on and in the vicinity of reversible express lanes and three major arterials in downtown Tampa to solve the transportation challenges.

Cooperative Automation and Connectivity



PREPARING FOR THE FUTURE OF TRANSPORTATION www.transportation.gov/av  U.S. Department of Transportation 29

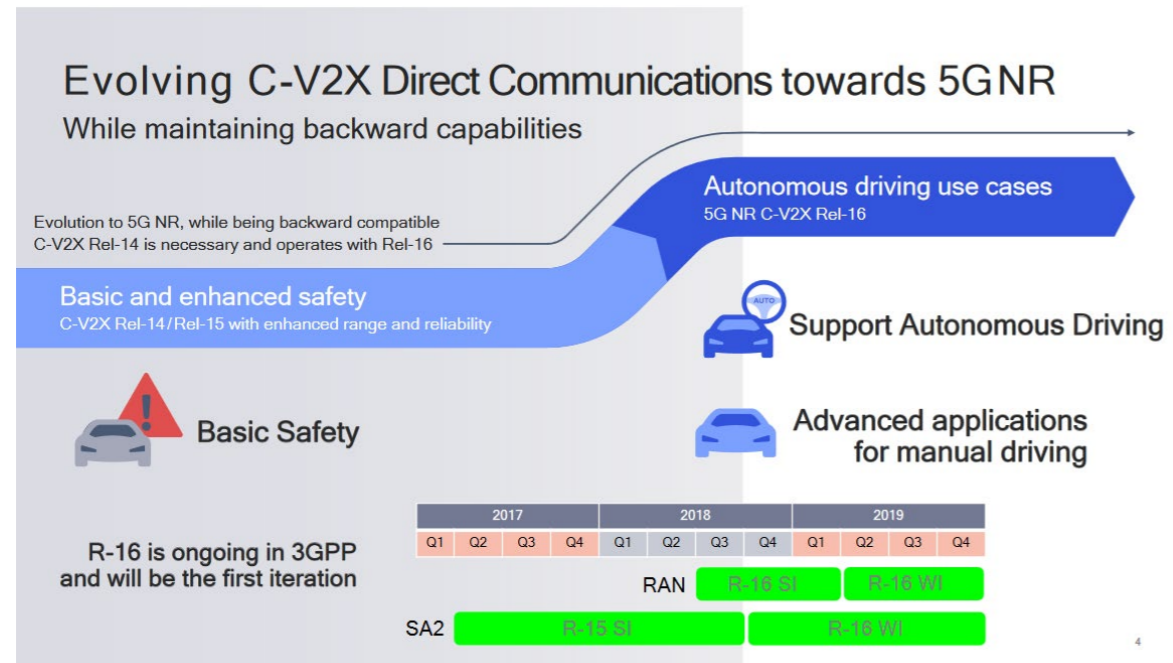
>> latest ITS security Plugtests show a reasonably good quality for starting operation, but another Plugtest event is highly requested for proofing further vendors. The issue of protecting private data is still not finally solved for C-ITS. Improving traffic safety and efficiency by short-range communication requires short term tracking of the road participants in the vicinity of a vehicle while long-term tracking has to be prevented for ensuring privacy of the drivers. The design of C-ITS uses local broadcasting of CAMs and DENMs only when and where required. The frequency and amount of content data of the message sets are highly dynamically adjusted depend on the individual driving situation. Furthermore, pseudonymisation

of the message sets is used and the pseudonyms change strategy takes especially care for the phases when starting and ending a trip for ensuring privacy of the drivers as much as possible. The limited communication range of the short-range communication turns out as an advantage for fulfilling the privacy requirements. Currently a comprehensive risk assessment is performed for developing a treatment plan improving the drivers' privacy further. In addition, research is performed on misbehaviour detection mechanisms for protecting C-ITS against cyber attacks and security and privacy issues are analysed arising from ITS integration with smart infrastructure. >>

>> The session on standardisation activities, application and use cases addressed the need for improving the positioning and timing information for enabling future C-ITS use cases e.g. to improve safety of VRUs. In October 2018 ETSI has setup STF558 for developing the required input to improve ETSI EN 302 890-2. NXP presented the study on comprehensive analysis of ITS-G5 CAM message traces collected in real drives in Europe during 2018. Due to the CAM generation triggers based on position, heading and speed changes real driving situations show randomly, hardly predictable variations of frequency and size of CAM messages.

These presentations were complemented by an update on the C-V2X standardisation in ETSI and global C-V2X developments. Being a hybrid system 5G aims on serving a comprehensive ecosystem covering automotive, transportation, Telecom and Internet/ cloud. Access layer specifications, i.e., TS 103 613 and TS 103 574 have been completed and common test specifications to ITS-G5 and LTE-V2X are being developed. The higher protocol layers have been revised and approved enabling the usage of different physical layers for short-range communication. Several pilot testing activities have been started and are ongoing. Advantages of

cellular V2X are seen to allow vehicles to communicate with other vehicles (V2V), pedestrians and cyclists via smartphones (V2P), road infrastructure (V2I), supported by the mobile network (V2N, P2N, I2N) to guarantee full coverage and continuity of services. Projects like 5GCAR address use cases like cooperative manoeuvre, cooperative perception, cooperative safety, autonomous navigation and remote driving. A study on LTE (R14) indicates the capability to support a high number of vehicle to everything (V2X) services by the hybrid approach of combining cellular and short-range communication technologies. 3GPP Release 16 offers a further complementation of the list of C-ITS services, e.g. cooperative manoeuvring. Unfortunately, some questions on availability of the LTE/5G technologies, the evolution path, interoperability and backwards compatibility of short-range direct communications (LTE-V2X PC5 and 5G-V2X PC5) as well as long range cellular network communications (LTE-V2X Uu and 5G-V2X Uu) and liability sharing have not been completely answered during the workshop. >>



>> The last session focused on the way towards accident free automated driving. DG Connect informed about the European CCAM strategy and 5G corridors as part of the 5G deployment roadmap. The German 5G NetMobil project (3/2017-2/2020) aims on demonstrating technological innovations and validation in several proof of concepts for the five use cases on high density (truck) platooning, parallel (tractor) platooning, city crossing assistance for vulnerable road user protection, city crossing by smart traffic lights and coexistence of automotive safety-related and consumer infotainment services. Latency of cellular services shall be reduced by agile mobile edge clouds. Network slicing shall improve the performance of the common shared physical infrastructure. Multi-brand truck platooning is

addressed in the ENSEMBLE project. The slipstream effect enables to reduce fuel consumption of the trucks by 5% to 20% depending on the position in the platoon. V2X communication is required for enabling string stability and safety of the platoon with headways of > 0,8 sec. Special message sets are required for joining, operating and leaving the platoon. The PCM messages are encrypted with a symmetric key and transmitted with 20 Hz. Standardisation of the new message sets will start during 2019. Multi-access edge computing as well as deep learning-added resource orchestration have been presented in addition to the new radio developments of 5G NR V-V2X and IEEE 802.11bd. The evolution path of 5G NR offers backward compatibility to C-V2X Rel-14 and operates with Rel-16. Compared to C-V2X Rel-14 the Rel-15 offers >>

enhanced range and reliability. 5G NR C-V2X Rel-16 is seen to support autonomous driving use cases. The new radio offers five times higher spectral efficiency and better handling of Doppler and frequency offset compared to LTE. HARQ feedback is used to achieve minimum coverage. 5G NR C-V2X is well on its way to being standardised.

A lot of work still needs to be done at upper layers, on security & regulations to achieve the outlined advantages of 5G NR. IEEE did set up a study group on next generation V2X in May 2018. In between a task group has been established and held its first meeting in January 2019. The IEEE evolution shall improve the performance of the short-range communication by reusing proven elements of the IEEE toolkit while offering interoperability, co-

existence, backwards-compatibility and fairness. As most building blocks are already available the effort of standardisation is expected to be limited. Some examples have been given to show the enhancement of the performance and flexibility in using this radio evolution.

This report about the ETSI workshop outlines the highlights and personal views of a participant being not a communication expert. The report does not cover all presentations and details discussed. You should feel encouraged to have a look on the published presentations for getting the complete picture.

Published presentations:
<https://www.etsi.org/ITSWORKSHOP>

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Imprint



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