CAR 2 CAR Journal

Issue 23 | October 2019

CAR 2 CAR COMMUNICATION CONSORTIUM

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by Niels Peter Skov Andersen
(General Manager, C2C-CC)

www.car-2-car.org

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Editorial

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

We are approaching the CAR 2 CAR Forum 2019, a yearly event where we as consortium present the current status of our work and look ahead. As you will discover from this version of the CAR 2 CAR Journal a lot has happened since the last year´s CAR 2 CAR Forum 2018.

In the press there has been much focus on the proposal for a Delegated Act on C-ITS and its failure. From a lot of the discussion and arguments it is clear that not everybody understands the difference between a short-range direct mode vehicular ad-hoc network and a cellular network. Many of our members have tried to help us explaining the difference, and it appears that more and more people are starting to understand that there is a difference. Nevertheless, we all need to continue this effort in the future.

One question in particular was being raised towards the Consortium over the summer: "What is the consequence when there is no Delegated Act?" – The answer is simple:

The CAR 2 CAR Communication Consortium is working intensively to provide an interoperable C-ITS system to improve road safety in Europe. Against this background, we cannot allow a political discussion on legal aspects to delay the improvement of road safety, which is why we will continue our plans for the Europe-wide implementation of C-ITS and strengthen our cooperation with the relevant actors on the infrastructure side to ensure that delays in the political process do not result in the avoidable loss of human lives.

What does this mean in practice? It means that we are working very closely with C-Roads to ensure that our expectations and technical profiles are aligned. This is done through regular calls between C-Roads and the CAR 2 CAR Communication Consortium, calls where both parties raise the issues they might have encountered and where we try to resolve them and come to a common understanding in order to ensure interoperability and correct functioning of C-ITS in the field. This close cooperation has shown to be very successful.

But this cooperation also means that a much larger responsibility is put on the Consortium as our Basic System Profile now is the guiding document for anybody implementing C-ITS. Not only we are responsible for the Basic System Profile, but we are also – together with C-Roads – responsible for solving any operational issues that might occur. To prepare this we have setup a task force operation, you can read about in this issues of our Journal.

It is important to stress that the Consortium has not only focused on the initial deployment and operational issues. Of course, we have updated our Basic System Profile to BSP 1.4 that assures alignment with C-Roads. More about BSP 1.4 can be found in the current Journal. We have also started the definition of the Basic System Profile for >>

>> phase 2 of our roadmap – BSP 2.0, this will include the requirements that need to introduce the related new services. More about the BSP 2.0 can also be found in this Journal.

Further our security experts have now successfully developed a Protection Profile for the HSM, which has been submitted for common criteria assessment.

Finally, I would like to stress that through the success with the introduction of the CAR 2 CAR Week we have managed to make our work more efficient and easier to plan for our members and allowed to reduce the amount of travelling. However, this is not the only way we try to limit travelling and reduce our CO2 footprint. We are also trying to use GoToMeeting for web-meetings as much as possible and even as a trial will use it to make our next CAR 2 CAR Week a virtual meeting. In the Journal you will find an article looking into the effect of our extensive use of electronic meetings.

With these words I invite you to read the current issue of the Car 2 CAR Journal. //

New CAR 2 CAR Members

TÜViT

Type of Member:
Associate Member

Type of Business:
TÜV Informationstechnik GmbH focuses solely on security in information technology and, as an independent testing service provider for IT security, is an international leader. Numerous corporations already benefit from the TÜViT-tested security. Its portfolio includes cyber security, software and hardware evaluation, IoT/Industry 4.0, data protection, ISMS, Smart Energy, mobile security, automotive security, eID and identity verification services as well as the testing and certification of data centres for physical security and high availability. TÜV Informationstechnik, founded in 1995 and head-quartered in Essen, Germany, is a member of the TÜV NORD GROUP, one of the world's largest technology service providers with over 10,000 employees and business activities in 70 countries worldwide. //

New CAR 2 CAR Members

RTB

Type of Member:
Associate Member

Type of Business:
The RTB's headquarter is based in Bad Lippspringe, Germany and is one of the leading international suppliers of road traffic technology. Founded in 1993 by owner and managing director Rudolf Broer, the company now employs 110 people, including 25 engineers.

On the basis of many years of experience RTB develops and distributes innovative solutions for street traffic. In addition to equipment for traffic light systems, radar and laser systems for speed reduction and traffic data acquisition, the product range also includes parking ticket machines and innovative systems for electric mobility as well as effective parking space management.

RTB places the greatest value on user-friendliness, quality and design of its products. A friendly, accommodating and customer-oriented service is combined with this. In continuing dialogue with our customers, new solutions of high practical value are constantly emerging. //

Integrated Web-Tooling – Improving Collaboration

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

By the end of 2019 the CAR 2 CAR Communication Consortium switches its web-services to the new integrated web-tooling. Consequent single-sign-on design allows easy access of all web-tools. New user-pages improve transparency of the Technical Organisation and enable maintaining the individual user-data and allocations to Competence Groups and Task-forces by the users themselves. The new Collaboration Area offers versioning of documents, user-friendly features like drag & drop and easy synchronisation of copied folder structures. You should update your user-data for becoming involved in the processes of interest.

In 2018 the CAR 2 CAR Communication Consortium changed the Technical Organisation and established a new work mode. The matrix structure of Competence Groups and Working Groups enables high flexibility in addressing new issues and setting-up new Work Items related to one of the Working Groups. During each CAR 2 CAR Week the list of >>

>> Work Items is revised resulting in periodic updates of the Work Items and the related Task-forces. Having established the new user-pages and integrated concept of expert roles now expert shall maintain his/her individual contact data and shall see the latest list of all established Work Items. By clicking on a selected Work Item, the user will be able to add himself to the Work Items of interest or to remove himself from a Work Item out of scope. The submitted changes will be considered on short-term and e-mail distribution lists will be updated automatically. All experts of active Consortium members are invited to update their user-data when having the integrated tooling in operation.

For enabling continuous work-flow, the new Collaboration Area offers the services of Calendar, Address Book and File Repository to all experts of active Consortium members as the former version before. However, performance and user-friendliness will be improved significantly by the new version. Among others versioning of documents, drag and drop for copying of documents and folders will make working processes more comfortable. Easy synchronisation of folders copied from the Collaboration Area will be supported. Already during the preparation phase the folder structure of the current File Repository was revised and restructured. When switching to the new integrated web-tooling this file structure and data will be copied to the new Collaboration Area and some scripts shall be in place for migrating former links on folders and documents.

The also planned integration of the currently used tools Bugzilla and TestLink initiated a discussion in the Technical Organisation on keeping the customised, mature software, or using updated versions of the tools or taking the opportunity to switch to other software solutions better additional fulfilling identified future needs. Thus the full integration of those tools will happen in a second phase considering the outcome of the ongoing discussion.

The new integrated web-tooling runs on a new web-server with virtual hosts for the website and each of the integrated tools to enable higher robustness of operation. Improved backup services and automated monitoring of all processes have been established for achieving high availability and limiting the risk of data loss. While developing the new integrated web-tooling a complementing Handbook has been created and will be provided for guiding the users to make use of the services and to find most important information easily. //

CAR 2 CAR Forum 2019

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

This year´s CAR 2 CAR Forum is organised on 29 and 30 October 2019 at Torino, Italy and sponsored by General Motors. An expert Workshop focussing on C-ITS usage by cities and road operators takes place on 31 October 2019 hosted by the city of Torino. The final draft programme of the event has been published on the website of the CAR 2 CAR Communication Consortium complemented by hotel & travel information and online registration.

The CAR 2 CAR Forum is organised on 29 and 30 October 2019 at the Environment Park in Torino. As usual during the first day plenary sessions highlight the status of C-ITS deployment and the next steps towards cooperative automated driving. Views of the different road users and vehicle categories address customised services and specific needs. R&D projects report their findings being relevant for the next innovation phases. The last session focuses on functional safety and test cases for ensuring interoperability of Car2X.

After the plenary sessions the CAR 2 CAR Communication Consortium organises its annual General Assembly. Basic Members, guests and experts not participating in the General Assembly have the chance for joining a guided city tour. The usual evening event fosters the networking and finalises the first day of the CAR 2 CAR Forum.

The second day of the CAR 2 CAR Forum is organised by the Technical Organisation. During the morning sessions the European C-ITS deployment and Day1 extensions and next C-ITS deployment phases will be discussed. In the afternoon the focus of the discussion is set on security for C-ITS and the technical evolution of C-ITS.

The day after the CAR 2 CAR Forum on 31 October 2019 the city of Torino hosts a complementing expert Workshop focussing on C-ITS usage by cities and road operators. Due to limited capacity preference is given to the participation of city representatives and C2C-CC chairs with proven experience in this scope. Free seats will be offered to interested experts on the first come first serve basis.

You will find the final draft programme, all complementing information and online registration following the link on the Event website of the CAR 2 CAR Communication Consortium. Your online registration has to be received by 22 October 2019.

https://www.car-2-car.org/news-events/car-2-car-events/

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CAR 2 CAR Weeks 2020

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

ETSI TC ITS scheduled its standardisation weeks in 2020 during April 2019. This allowed the Steering Committee to fix the planning of the related CAR 2 CAR Weeks in December 2019 and during 2020. Active members of the CAR 2 CAR Communication Consortium are invited to offer hosting of the CAR 2 CAR Weeks being organised during 2020.

During 2020 ETSI TC ITS has scheduled four standardisation weeks 13 to 17 January, 23 to 27 March, 29 June to 03 July and 19 to 23 October. The Steering Committee aimed on planning the CAR 2 CAR weeks at least two weeks before the ETSI TC ITS standardisation weeks considering bank holidays and the ITS World Congress 2020.

With respect to Christmas and winter holiday period the 8th CAR 2 CAR Week shall be organised already from 09 to 12 December 2019. For reducing conflicts with other scheduled dates this 8th CAR 2 CAR Week shall be organised using virtual web-meetings only.

The other three CAR 2 CAR Weeks in 2020 have been scheduled for the following periods: 09 to 12 March, 15 to 18 June and 28 September to 1 October. Active members of the Consortium have been invited to offer hosting of one of these CAR 2 CAR Weeks.

You will find the scheduled ETSI TC ITS standardisation weeks as well as the CAR 2 CAR Weeks 2020 and further scheduled dates in the Consortium calendar of the Collaboration Area.

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Announcement

8. CAR 2 CAR Week

09 to 12 December 2019

web-meetings only

Announcement

9. CAR 2 CAR Week

09 to 12 March 2020

Announcement

9. CAR 2 CAR Week

15 to 18 June 2020

Announcement

10. CAR 2 CAR Week

28 September to 1 October 2020

6th CAR 2 CAR Week

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

The 6th CAR 2 CAR Week took place from 1 to 4 July 2019 at Eurecom in Biot, France. More than 55 experts from the CAR 2 CAR Communication Consortium participated onsite in the parallel and joint working meetings of 12 Competence Groups and Taskforces during Monday to Wednesday. Further experts joint the complementing web-meetings of the sessions. The results of these meetings have been reported to the successive joint meetings of the three Working Groups DEPLOYMENT, FUNCTIONAL and TECHNICAL. In the final Closing Plenary session on Thursday afternoon, the main outcome was discussed, and related actions were agreed. The discussion of functions of the second phase of C-ITS deployment marks an important milestone and kicked-off detailed working on the BSP 2.0 and MCO.

The 6th CAR 2 CAR Week started on 1 July 2019 afternoon with parallel meetings of CG Security, CG Roadmap and PoTi Task-forces T0015 / D0012. The Opening Plenary was organised on Tuesday morning. Director Prof. Dr. Ulrich Finger welcomed all participants on behalf of Eurecom and took the opportunity for introducing Eurecom being one of the leading teaching and research institution in the fields of information and communication technologies in Europe. The session pitches of the chairs outlined the issues having been discussed during the sessions of the Technical Organisation during the week. The results from the parallel meetings of the Competence Groups and Task-forces have been reported to the subsequent joint meetings of the three working groups.

WG DEPLOYMENT received the reports on document and release management, long-term Road Works Warning and Cooperative Prioritisation, Operations, automotive requirements for SPaT and MAP, cooperation with Autosar, update of the protection profiles of the Hardware Security Module and Vehicle C-ITS Station and on a potential alternative assurance/certification approach.

During the WG FUNCTIONAL the working status on Collective Perception, considering VRUs, Connected and Cooperative Automated Driving and Road Mapping was discussed. Furthermore, the Working Group agreed to kick-off the development of the BSP 2.0 for specifying the second phase of C-ITS deployment.

The WG TECHNICAL discussed the reports on CAM granularity, Position and Timing as well as spectrum >>

>> and radio issues. In line with the BSP 2.0 activities the work on Multi-Channel issues like functions and channel usage will be intensified.

During 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.

All documents of the 6th CAR 2 CAR Week are found in the respective folders of the Collaboration Area. //

7th CAR 2 CAR Week

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

The 7th CAR 2 CAR Week was organised from 16 to 19 September 2019 at Burg Warberg, Germany. The Technical Organisation met during the first three days. More than 65 experts from the CAR 2 CAR Communication Consortium participated onsite in the parallel and joint working meetings of 10 Competence Groups and Taskforces on Monday and Tuesday and the joint meetings of the three Working Groups DEPLOYMENT, FUNCTIONAL and TECHNICAL on Wednesday. Further experts joint the complementing web-meetings of the sessions. For the first time also a Steering Committee meeting was organised during the last day of the CAR 2 CAR Week.

Task-force Operation took the opportunity to organise its meetings already on 16 September 2019 in the morning as well as in the afternoon. CG Security and CG APP-PTW scheduled their meetings during the 7th CAR 2 CAR Week starting after lunch. CG COM-COSP organised its first meeting during the last time slot on Monday.

The Opening Plenary was organised on Tuesday morning. As usual the Opening Plenary focuses on the discussion of organisational issues and the session pitches of the chairs. This was followed by a view of the German police "C-ITS for blue lights" having been presented by Ulf Mielinger. After the Opening Plenary CG SEC continued its sessions and further sessions on PoTi, MCO, SPaT / MAP, RD, CA, COM-COSP and "blue lights" discussion took place.

The three Working Groups WG DEPLOYMENT, WG FUNCTIONAL and WG TECHNICAL held their joint meetings on 18 September 2019 followed by the final Closing Plenary meeting summarising the results of the technical meetings and the changes of the Work Programme. All documents of the 7th CAR 2 CAR Week are found in the respective folders of the Collaboration Area as well as the updated Work Programme.

On 19 September 2019 the Steering Committee took the opportunity to organise its face-to-face meeting at Burg Warberg. //

The importance of position and time

by Andras Varadi | Commsignia Ltd.

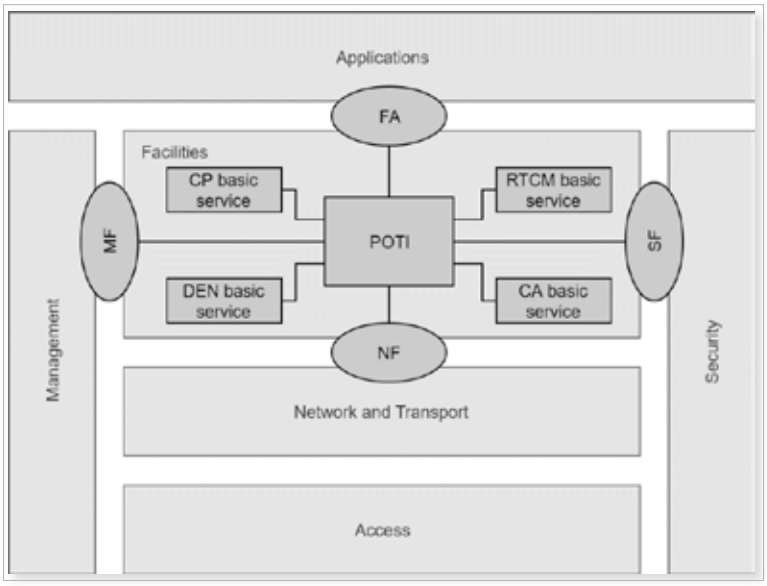
Reliable, high quality information tend to come at a cost, and there will always be performance differences between different ITS stations, depending on the used hardware and implementation approach. For instance, ITS stations with better components and sensors will have access to more precise and reliable information.

In a cooperative setting, this means that the information that one has access to from external third-party entities, might have a different quality, than the information from the own sensors. One of the main challenges in cooperative applications, is thus to ensure that the shared information can be trusted and used in an efficient manner.

To tackle this challenge, and to avoid having to rely on worst case assumptions, we first of all need to make sure that a common agreement is in place for minimum requirements on handling position and time information (e.g. confidence). In particular, for services like CAM or DENM (cooperative awareness and environmental notification), but later on also for emerging new service and applications, such as C-ACC (Cooperative Adaptive Cruise Control), CPM (Collective Perception) and Platooning, where the accuracy requirements might be more stringent.

Within the Car2Car Communication Consortium, two Competence Groups (CGs) deal with position and time topics: one being part of COM (COM-PoTi), which is responsible to define requirements and specifications, while the other group is part of the Compliance Assessment family (CA-PoTi) and develops verification methods for the requirements set by the former. Both groups are currently active, focusing on Day1 and Day2 topics as well. Activities range from increasing the quality of the Basic System Profile specification, extending support for the power two wheelers (PTW) or defining ITS station startup behavior. Among the main drivers of the work are Continental, U-Blox, Renault, Siemens (Tass) and Commsignia.

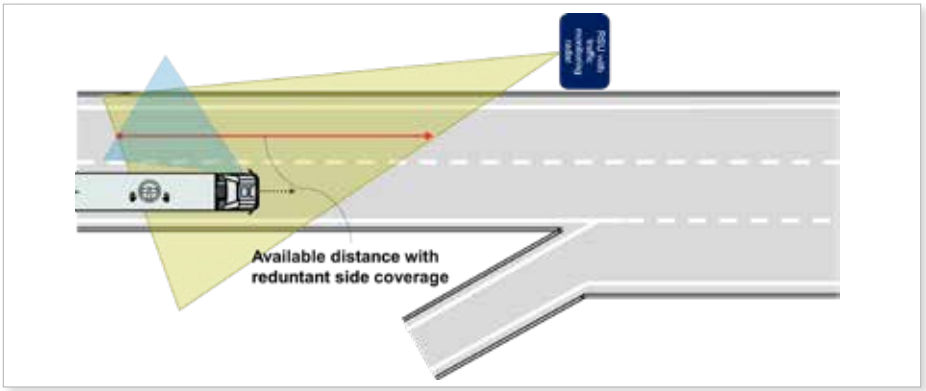
Meanwhile similar activities are in parallel performed at ETSI. STF558, Facility Position and Time management (PoTi) - lead by Paul Spaanderman (InnoMo Consulting) – is set out to handle the increasing need for high location and time >>



>> accuracy from a standardization point of view and develops the minimum set of PoTi requirements needed for ETSI's Release 1 separately from the beyond Release 1 set of services. The outcome, ETSI EN 302 890-2 is currently in draft state to be finalized by the end of 2019. It defines PoTi within the ITS Domain, specifies its main tasks and place in the ITS Station Architecture, also specifies and defines terms like PoTi Confidence or reference position and also handles augmentation information. The latest version is available from the portal at ETSI ITS WG1.

No advance in technology would be possible without industrial collaboration and trials. Countless European projects have built on PoTi information and showed the impact of reliable and precise PoTi data, however some, like HIGHTS (http://hights.eu) or the currently active PRoPART (http://propart-project.eu/) focuses on how to assemble it.

The main goal of PRoPART is to develop and enhance an RTK (Real Time Kinematic) software solution by both exploiting the distinguished features of Galileo signals as well as combining it with other positioning and sensor technologies. The project features a Roadside unit providing local correction services via V2X RTCM message, UWB (ultra-wideband) positioning and CPM services. They are perceived, processed and fused in the end by a heavy commercial vehicle which runs the so-called PRoPART Positioning Manager showcasing the latest features of Galileo (including security and correction services) and fuses reliable GNSS information with local position services to achieve a multi-source and reliable PoTi service providing high accuracy data under all circumstances for the vehicle ADAS. The project is currently in its final year performing field test validation of its result. //



PRoPART
Precise and Robust Positioning
for Automated Road Transports

The PRoPART project has received funding from the European GNSS Agency under the European Union's Horizon 2020 innovation programme under grant agreement No 776307.

Protection Profiles for Vehicle C-ITS Station and V2X HSM

by Tomasz Szuprycinski | NXP Semiconductors

C-ITS Platform formed by European Commission has specified two policies related to security: Certificate Policy (CP) and Security Policy (SP). They specify C-ITS trust model architecture and requirements for the participants. These policies identify the importance of maintaining the highest possible security level, *"...security certificates for [SP: C-ITS stations; CP: cryptographic module] shall be issued applying the Common Criteria certification scheme by a certification body recognised by the Management Committee within the framework of the "Mutual recognition Agreement of Information Technology Security Evaluation Certificates" of the Senior Officials Group on Information Systems Security (SOG-IS)."*

Given this, the Competence Group Security (CG SEC) of CAR 2 CAR Communication Consortium (C2C-CC) has identified the need to define the corresponding requirements which should be common for all manufacturers and implementation independent.

In a context of a Common Criteria (CC) certification, these requirements are identified in what is called a Protection Profile (PP). The Protection Profile is a document providing an implementation independent specification of security and assurance requirements. This generic document is later on instantiated by a developer in a specific product document called Security Target. Any product compliant to Protection Profile shall meet the security requirements provided in the PP. A PP defines also the level of assurance called Evaluation Assurance Level (EAL), which defines the depth and rigor of the security evaluation as well as the assumed attacker potential used for the vulnerability analysis.

In the Competence Group Security, two Protection Profiles are defined:

- One concerning the V2X Hardware Security Module (HSM) used for the secure cryptographic operations and the key management;
- One concerning the communication device in Cooperative Intelligent Transport System (C-ITS), named Vehicle C-ITS Station (VCS).

These components and connection between them are illustrated in Figure 1.

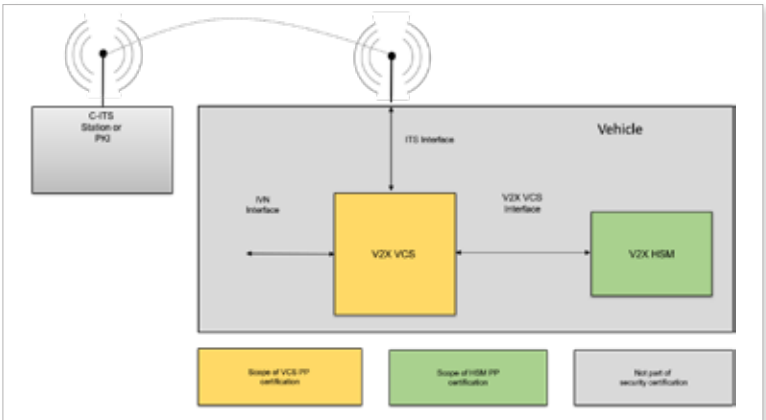


Figure 1: C-ITS Station with V2X HSM

The two components (HSM and VCS) for which we are defining PPs are to be integrated in a vehicle security architecture as presented in >>

>> Figure 2. The combination of both elements supports Day-1 applications and ITS functions. It does not address Day-2 use cases, e.g. (semi-)autonomous driving. It is expected that VCS is connected with Central Gateway providing isolation/firewalling from the rest of the vehicle, and therefore does not have direct impact on the dynamics of a vehicle.

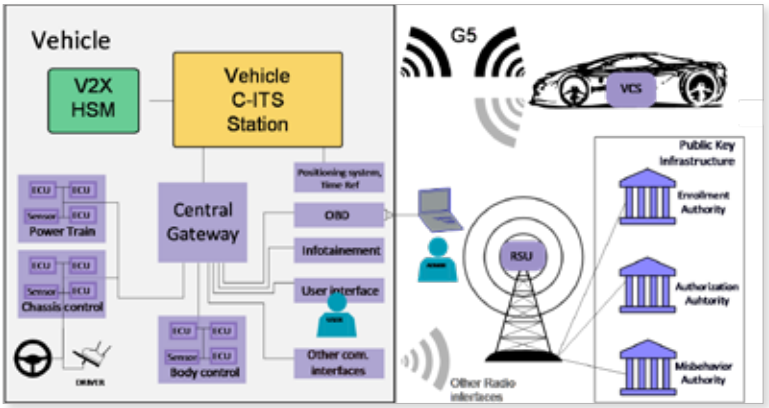


Figure 2 : C-ITS Architecture considered by C2C-CC Security Competence Group

In order to provide the adequate security functions, C-ITS Station has to be connected to the V2X HSM that provides support for the main cryptographic functions. Two cases were identified:

- HSM and VCS are integrated into the same hardware;
- HSM and VCS are independent hardware components.

Concerning the HSM PP, the following features were considered: V2X key management; digital signature generation of the ITS messages; generation of random numbers (e.g. used as keys); entity authentication in order to authenticate the Target of Evaluation (TOE) to the Certification Entities; user data encryption/decryption.

The functionality of VCS is much more complex, it includes: enrolment with the PKI system, authorisation management, security associations with other ITS stations, single message services, integrity services, replay protection services, accountability services, plausibility validation, remote management, misbehaviour detection, identity management, all described in ETSI TS 102 731.

The V2X HSM PP is aimed to be evaluated at an Evaluation Assurance Level 4, meaning the TOE is methodically designed, tested and reviewed. The evaluation is extended with basic flaw remediation; requiring developer to define a process of handling identified flaws; and Methodical Vulnerability Analysis (AVA_VAN.4), assuring resistance against attackers with moderate attack potential, including sophisticated attacks e.g. side channel analysis, fault injection.

As requested by the Certificate Policy, these PPs need to be evaluated by a recognised Certification Body. German certification body – BSI, has been chosen for the evaluation of the HSM PP. At the time of writing, the HSM PP is fully edited by the security Competence Group and reviewed by the C2C-CC members. The evaluation process for the HSM PP has been started by the accredited evaluation laboratory and the certification process is planned to be finished early 2020. The drafting of the VCS PP is ongoing, with an aim to be completed mid-2020, followed by evaluation and certification of that PP. //

References:

[ETSI TS 102 731] - Intelligent Transport Systems (ITS); Security; Security Services and Architecture

[CP]: https://ec.europa.eu/transport/sites/transport/files/c-its_certificate_policy-v1.1.pdf

[SP]: https://ec.europa.eu/transport/sites/transport/files/c-its_security_policy_release_1.pdf

Progress of activities for the release 2.0

by Michele Rondinone, PhD | Hyundai Motor Europe Technical Center GmbH

During the 3rd Car2Car week 2019 at Eurecom Sophia Antipolis, a group of Car2Car Communication Consortium experts started the activities for the generation of the Release 2.0 of the Basic System Profile (BSP). By defining objectives, features and requirements enabling Day2 use cases, the BSP 2.0 will provide continuity to the already published BSP 1.4 currently adopted by the C2C-CC as one of the basis for C-ITS deployment. The BSP 2.0 is based on already identified C2C-CC road-mapping definitions at both functional and technological level and will be iteratively extended following the releasing management specifications and processes already in place in the consortium: while new innovative features will be introduced by the BSP 2.0, the existing BSP 1.4 definitions will be kept in operation and maintained whenever needed.

With the clear intention to provide backwards compatibility to systems supporting the BSP 1.4, the main objectives of the BSP 2.0 will be enabling semi-automated functions like cooperative ACC, support for improved powered two wheelers applications and introduction of cooperative methods for consideration of non-cooperative road users (non-V2X equipped VRUs and vehicles). Following the ongoing C-Roads activities, the BSP2.0 will have compatibility with extended road infrastructure-based services as further objective. In addition to the previous ones, key targets will also be provision of measures for functional safety application at receiving stations as well as measures to detect and notify misbehaviour of transmitting stations.

Among the features that the release 2.0 will introduce, collective perception and extension of cooperative awareness services will be the first, due to their maturity in related standardization activities. Additional features like plausibility and confidence check of information exchanged by the newly introduced services are also in scope. Architectural extensions for application of functional safety aspects when running cooperative services are also envisioned, especially as V2X will support safety-related use cases with increasing level of automation.

First formal definitions of the aforementioned concepts have been elaborated during the past 4th Car-2Car week 2019, and included in the BSP 2.0 “Objectives” and “Features” draft documents available in the C2C-CC collaboration area. Functional and technical requirements for the implementation of the newly introduced features will be extracted by dedicated work item activities based on individual target features and will leverage the several R&D activities already performed by the C2C-CC members. //

C2C-CC Work Mode Reduces Environmental Footprint

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

In 2018 the CAR 2 CAR Communication Consortium established the new work mode of the Technical Organisation. Competence Groups, Taskforces and Working Groups organise their face-to-face meetings during four CAR 2 CAR Weeks per year. The face-to-face meetings are complemented by further web-meetings on demand. This work mode allows better long-term planning of required travelling, improves co-operation, networking, discussion and harmonisation between all groups and furthermore reduces in addition the C2C-CC environmental footprint significantly by scaling down the required number of individual business travels of the experts.

The CAR 2 CAR Communication Consortium focuses on improving road safety and efficiency as well as supporting digitalisation and automation by functions based on ad-hoc short-range communication. Speaking the same language and interoperability of the cooperative system are crucial for reaching the goals. Customising C-ITS and its services, guiding and pushing European / international standardisation and harmonisation as well as preparation of deployment in Europe and further regions is driven by cooperation within the automotive industry and with further stakeholders. The international cooperation results in the need of regular joint meetings of the manager and experts and their travelling causes higher costs and increased environmental impact compared to local cooperation.

During the past the C2C-CC working groups organised their meetings individually. Since 2018 the CAR 2 CAR Communication Consortium has established the CAR 2 CAR Weeks for bundling the work meetings of the Technical Organisation. The successive parallel meetings of the Competence Groups and Task-forces and joint meetings of the Working Groups and entire Technical Organisation foster co-operation and networking resulting in a better synchronisation of the manifold activities. For avoiding conflicts, the long-term planning of the CAR 2 CAR Weeks considers the meeting schedule of the ETSI TC ITS standardisation as well as known important international conferences. From 16 to 19 September 2019 already the 7th CAR 2 CAR Week has been organised. In average more than **65** experts participated in each CAR 2 CAR Week. About **20** parallel meeting slots per CAR 2 CAR Week have been used by the Competence Groups and Task-forces. Furthermore, each CAR 2 CAR Week hosted the meetings of the three Working Groups as well as Opening and Closing Plenary were organised as joint meetings. Looking on the number of meetings, individual experts have participated in, uncovers that a significant number of business trips has been avoided compared to the former work mode. >>

>> The face-to-face meetings of the experts are complemented by additional web-meetings on demand. During the past twelve months at least **467** web-sessions with **2625** participants have been organised. In average six experts participated in a web-meeting, but some web-meetings even attracted up to **56** participants. Management and Administration of the Consortium have organised **145** web-meetings. This number is outperformed by Document and Release Management with **200** web-meetings. Competence Group Security organised **71**, CG APP-INF **23**, CG RD **19** while WG Deployment and CG SIM organised **5** to **4** web-meetings. The figures of the web-meetings during the past 12 months show impressively the usage of web-based conference tools avoiding a lot of national and international business travels.

To my perception as Administrator of the CAR 2 CAR Communication Consortium the new work mode of the Technical Organisation has proven its advantages regarding improved international cooperation, networking and synchronisation of actions and work-flows. Furthermore, bundling of required face-to-face meetings and frequent usage of web-conferences results in significantly lowering the business travel efforts, reducing costs and the related environmental footprint. //

CAR 2 CAR Release 1.4.0 and beyond

by Mario Friedrich | C2C-CC Technical Management

300 changes, 100 new requirements, 2 new documents added – that are the raw numbers of release 1.4.0. The following article will give you an inside, what the release 1.4.0 actually stands for. Furthermore, an impression shall be provided, how the Change- and Release Management are going to address the upcoming challenges, like:

- **handling an additional release branch for day two specifications or**
- **further specification alignments with C-ROADS.**

Achievements

Generally spoken, R1.4.0 was another important step to consolidate the C2C-CC specifications, the basis for the day one deployment. The specification consolidation of recent years goes beyond the stabilization of the requirement number and requirements content. Consolidation means also to improve the requirement structure within the documents to support efficient maintenance of CAR 2 CAR specifications in the heterogeneous C-ITS standardization contexts. The CAR 2 CAR releases, also visualized in figure 1 with the statistical information, have addressed this consolidation consequently, besides the feature increase/detailing: >>

>>

- R1.1.0 (2015) was the first release in this row, which implemented the needed changes as suggested by the test specification development – an improvement of the requirement quality
- R1.2.0 (2016) focused on separating higher level requirements like objectives and features from the Profile and Triggering Conditions – to enable top-down requirement management
- R1.3.0 (2018) further detailing of requirements and agreement on versions of referenced standards – to provide a solid basis as input to the Delegated Act
- 1.4.0 (2019) alignment to infrastructure requirements – to improve the interoperability between vehicle and infrastructure C-ITS stations further

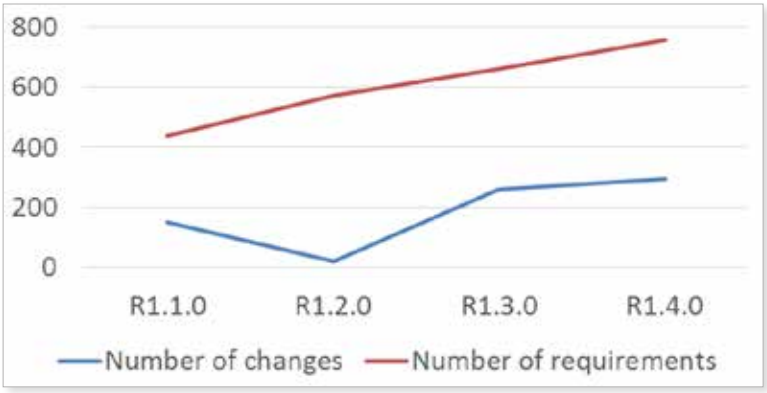


Figure 1: CAR 2 CAR CC Releases

Besides the alignment to infrastructure requirements in release 1.4.0, quite some effort has been put into:

- the two new specifications: Triggering Conditions and Data Quality Pre-Crash Information and ASN.1 extension for Pre-Crash;
- rework of Protection Profile V2X Hardware Security Module;
- improvement of position and timing requirements and
- introduction of PTW aspects in our specifications.

Many thanks indeed to all who made this release once more a success!

The following Release 1.5.0, which is planned for December 2019, will complement the results of R1.4.0. The work in 2019 is therefore targeting to fix the day one feature set with the releases 1.4.0 and 1.5.0. This settlement will enable C2C-CC to move the focus towards day two specifications.

Road ahead

In 2020 we will experience how the processes to elaborate and maintain the CAR 2 CAR specifications will be raised up one more level. As the first C-ITS stations are in the field, new topics need to be considered in the processes. There will be these two pillars supporting a seamless deployment:

1. **internal processes:** consideration of topics like "product life cycles" and "backward compatibility" or introduction of release branches for handling of day one and two specifications in parallel and
2. **inter-organizational processes:** for active cooperation with C-ROADS

A continuous process improvement is the key to build and to strengthen these pillars to support a seamless CAR 2 CAR specification development and by this a seamless deployment. The C2C Technical Management is doing such continuous

>>

>> process improvements together with the CCB or other dedicated expert groups.

Internal processes

This way, quite some topics have already been prepared especially for internal processes. One example is the definition of the term backward compatible (see also figure 2). This definition ensures an efficient discussion within the Change Management process now.

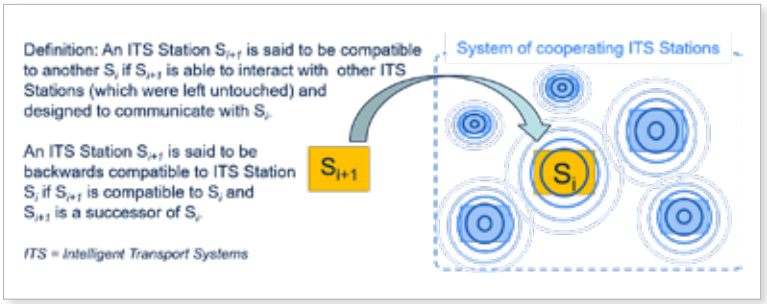


Figure 2: extract of C2C-CC's Backward Compatibility definition

Another example is the ramped-up Document Development process. This new process will be the basis for the quality assurance at the beginning of the day two specification development:

- on one hand, it provides more room/freedom for creativeness than the strict Change Management process and
- on the other hand, it ensures the document quality very well based on several review cycles.

The Document Development process comes along with a positive side effect. It ensures a high awareness of the new specification material by all partners. Yet, when the day two specifications have reached a critical mass, the Change Management will take over more and more the quality assurance instead of the review based quality assurance. Especially after the first day two branch release:

- The Change Management process will ensure a synchronized error correction in both branches then. To allow this, all RfCs will provide the solutions for day one and the day two specifications.

C2C CC has started to establish its specification development processes already in 2015, e.g. with the Change- and Release-Management processes. This has been complemented by the new Document Development process now, which has been prototypically and very successfully applied for the first three documents in 2019.

On this solid basis of internal processes the also needed inter-organizational processes can be robustly ramped-up.

Inter-organizational processes

The first steps have also been taken to build-up the second pillar to support a seamless deployment – the inter-organizational processes. The discussion has started, how to align the release schedules of CAR 2 CAR and C-ROADS with common synchronization milestones for a well-managed alignment. Such a top-down approach will be the first step towards an efficient requirement harmonization between both organizations and might be detailed as appropriate.

This topic is currently worked on. So, more details can be expected in the next newsletter and first positive effects should be noticeable at the beginning of 2020.

Talking so much about processes might not exclusively create positive emotions. But this is indeed unfounded for the CAR 2 CAR processes.

>>

>> Tailored processes ensure efficiency

The CAR 2 CAR processes, which are developed from scratch or are tailored e.g. based on processes of related organizations, are always intended to make:

- the daily work of the CAR 2 CAR experts more and more efficient and
- decision finding processes transparent and also reproducible in later project phases

I am always seeking for further improvements and would be very happy about any hints. So, do not hesitate contacting me if you see the possibility of enhancements.

I am looking forward tackling the future challenges together with you!

//

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Competence Group Powered Two Wheeler (PTW)

by Hennes Fischer | Yamaha Motor Europe N.V.

Triggering Conditions for several Day 1 use cases differ between Powered Two Wheelers and cars. The Competence Powered Two Wheeler (PTW) driven by the motorcycle OEM Honda, Yamaha, Kawasaki and KTM worked together with other C2C- CC members to include motorcycle specific requirements in the BSP 1.4. The actual Version now features several notes when Powered Two Wheels will trigger certain Use Cases, such as broken down or stationary vehicle. In future releases more of such requirements for PTW will be included.

PTW Group works with POTI Group

In addition, the group is working on solutions for CAM messages together with POTI Group, since some fields in those are not compatible for Powered Two Wheelers. Most problematic issue is Yaw rate. Unlike cars, motorcycles are leaning when cornering and there is no yaw rate as specified in the message set. The group will discuss solutions to be specified.

Localization requirements for PTW

Motorcycles are usually less than 1 metre wide and their position within their lane is an important information to determine critical situations. In other words, it makes quite a difference if a rider keeps left or right side of his lane.

Tests on public roads

As to be expected, currently used automotive systems do not provide enough accuracy on lane specific positioning. Furthermore it >>

>> turned out that 'Dead Reckoning' the calculation of the motorcycle trajectory under weak GPS signals is more demanding compared to cars. While for cars steering angle and differential speed of wheels are key information to calculate a trajectory, for motorcycles both key information is not available. The differential speed of both wheels of a motorcycle do not indicate and directional change only driven speed itself. In addition, even more: motorcycles do not have steering angle, which would allow a calculation of their trajectory, since motorcycles are steered by inertia. Leaning angle, speed and most important centre of gravity are key parameters. Particular centre of gravity is very difficult to measure, since the rider and his positioning on the bike have a massive influence to the centre of gravity.

Together with members of CMC (Connected Motorcycle Consortium), members of the Competence Group PTW conducted road tests involving specialists from POTI Group to verify if motorcycles can fulfil C2C-CC specifications for localization laid down in the Basic System Profile. The results of the road tests are currently analysed and are feedback for discussion in the POTI Group of C2C CC.

The motorcycle team during Antenna Testing on public roads (source: CMC)

Antenna tests for PTW and white paper issued

For cars, antenna performance criteria have already been discussed and developed since a long time. For motorcycles however, this is not so easy: due to their particular vehicle dynamics, size and layout, the antenna development poses quite a challenge. The OEM in the PTW Competence Group have conducted tests in the Connected Motorcycle Consortium in special measurement chambers and is also verifying the test results in real riding conditions on the road.

Best position for the antenna is front of motorcycle (source: CMC)

The ideal position of a motorcycle antenna is a location on the front of the motorcycle. Most critical situations occur along the direction of riding and this is when C-ITS communication is needed to inform other vehicles of a motorcycle in critical range. However, due to leaning angle of motorcycles while cornering, the antenna performance decreases with amount of lean angle. The corridor of antenna transmission becomes narrower. This results in a weaker transmission of signals to each side of the motorcycle. Accident scenarios based on studies carried out by academia and CMC will determine the threshold of such decreasing performance. >>

The localisation test took place on public roads to compare requirements for cars and motorcycles (source: CMC)

>> The requirements currently worked out by CMC experts will be handed over to C2C CC experts to commend. The White Paper describes standards for motorcycle ITS systems.

Synergies with electric bicycles

While the PTW group is concentrating on motorcycles and scooters , they believe, that in the future, also Speed Pedelecs (e-bikes) will requires attention. Their vehicle dynamics is comparable to mopeds or smaller motorcycles/scooters and they may face similar challenges like Powered Two Wheelers. //

IEEE 802.11bd – A seamless evolutionary access layer for ITS-G5 / DSRC

by Bettina Erdem | Continental

1. Introduction

In 2010, the IEEE took an important step to enable direct, short range vehicular communication, with the publication of the Wireless Access for Vehicular Environments (WAVE) amendment of the widely deployed IEEE 802.11 wireless local area network standard. The amendment, formally IEEE Std 802.11p-2010, introduced a new ad hoc type of communication called "outside the context of a BSS*" (OCB) that does not need the usual Access Point-based network. OCB is the key to enabling extremely low latency and high reliability communication for moving vehicles.

The C-ITS community, including ETSI and C2C-CC, have designed ITS G5 technology using IEEE 802.11p as an access layer foundation. Extensive testing in Europe, the U.S., and other regions, has demonstrated the ability of IEEE 802.11p-based systems to support a wide range of vehicle-to-everything (V2X) use cases for road safety, improved traffic efficiency, reduced emissions, and support of automated driving. These systems are now in deployment in Europe, the U.S., and Japan.

In March 2018, an IEEE Study Group named Next Generation Vehicular (NGV) was formed to work on an amendment to the IEEE standard for enhanced V2X communication technologies. In December 2018, the IEEE-SA approved this project creating a Task Group with the goal of producing IEEE 802.11bd, a seamless evolution path for IEEE-based V2X communications. >>

*BSS: Basic Service Set

>> This amendment targets higher spectral efficiency, increased reliability and extended range, while ensuring backwards compatibility with the existing deployed systems in the 5.9 GHz ITS band. The latter, is an essential element for IEEE 802.11bd to provide a seamless evolution path from IEEE 802.11p. The promise is that 802.11bd devices in the future will receive transmissions from any 802.11p device and will be capable of transmitting in a way that 802.11p devices can receive and decode. With this promise, today's investments in 802.11p technology are fully protected. IEEE 802.11p can continue to be deployed today; when IEEE 802.11bd is fully standardized and tested, implementations can seamlessly adopt the next generation technology.

IEEE has a proven track record of seamless evolution through their releases of key amendments like IEEE 802.11a/g/n/ac/ax. By contrast to the IEEE evolution approach, a disruptive evolution to a technology incompatible with 802.11p would undermine and discourage the investments that are needed today in order for society to realize the potential of direct V2X communication, and might permanently prevent interoperability among major automotive stakeholders (vehicle manufacturers and road authorities). A cornerstone of achieving the backward compatibility and interoperability goal is that IEEE 802.11bd will use OCB communication, frame formats, and channel access rules that are consistent with IEEE 802.11p.

The goal of faster and more reliable communication recognizes that IEEE has developed even more advanced capabilities in recent years, for example in the IEEE 802.11ac and IEEE 802.11ax amendments. Some of these advanced capabilities are not yet available for OCB communication or in the 10 MHz channels that have been chosen to optimize vehicular communication. IEEE 802.11bd will specify these capabilities for OCB and for 10 MHz channels, and will introduce additional improvements as well, such as a capability for localization.

Automotive stakeholders are joining forces with IEEE 802.11 wireless LAN experts to maximize the value that IEEE 802.11bd will provide to the automotive community.

2. Evolution of IEEE 802.11p to IEEE 802.11bd

2.1 Interoperability

IEEE 802.11bd allows a smooth transition from legacy (IEEE 802.11p-based) systems to the newer standard. It capitalizes on existing deployments and infrastructure investments throughout the world by using the same frequency channel without causing any disruption to legacy C-ITS stations. Interoperability in IEEE 802.11bd is achieved through the use of a compatible waveform structure as shown in the following figure. >>

IEEE 802.11bd packet format with legacy preamble, repeated SIG and new DATA symbols

>> Moreover, a common channel access mechanism is used where all messages are transmitted following the same "listen-before-talk" principle and use the same carrier sensing mechanism. The asynchronous and non-persistent type of V2X messages fit very well to typical V2X networks, where messages (such as ITS-G5 CAM) are very diverse and non-persistent in terms of message size and transmission rate, since the mechanisms triggering the message generation are tightly coupled to the dynamics of the vehicle (as change in position, speed and/or heading).

It is envisaged that when a next-generation C-ITS station detects the presence of legacy stations in its vicinity, all safety-related messages will be transmitted as per the IEEE 802.11p standard, so that the legacy stations can decode the content of the messages. When no legacy stations are detected, transmitted messages could use the full potential of IEEE 802.11bd and its increased performance. Even in this situation however, the new packets will always be detectable by the legacy stations due to the use of the same preamble. Finally, the upper layers of the ITS stack, for example the ITS-G5 GeoNetworking or DSRC, will still be able to function without any modifications.

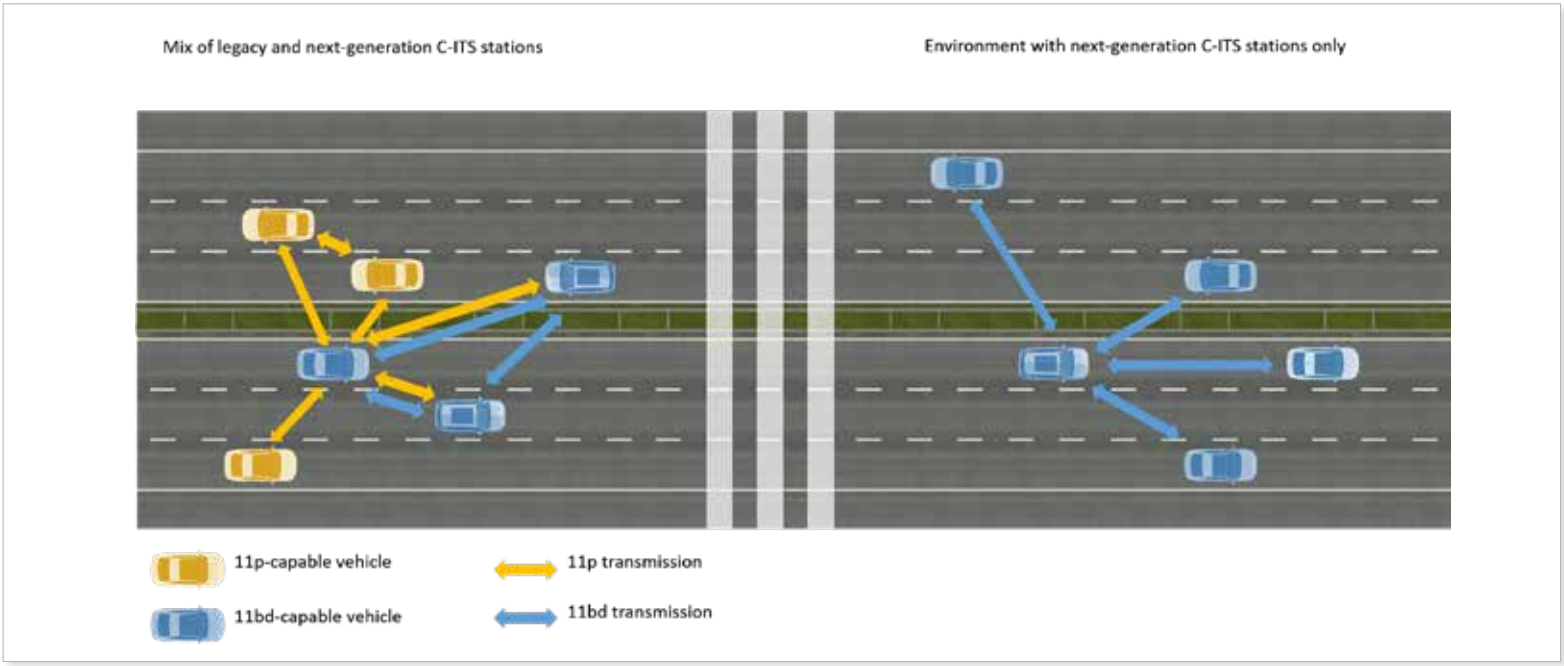
2.2 Technical advances of IEEE 802.11bd

2.2.1 Introduction

The IEEE 802.11bd task group has taken an evolutionary approach which leverages some of the technical advances successfully tested and standardized in recent wireless IEEE 802.11 standards, such as in IEEE 802.11n, IEEE 802.11ac or the upcoming 802.11ax. The obvious benefit of this approach is the reuse of existing work but also increased confidence which comes from the use of field-proven technologies.

2.2.2 Physical layer (PHY) improvements

A number of PHY improvements have been introduced, most of them pertaining to the IEEE 802.11bd mode of transmission >>



Interaction between legacy ITS-G5/DSRC based IEEE 802.11p vehicles and IEEE 802.11bd vehicles

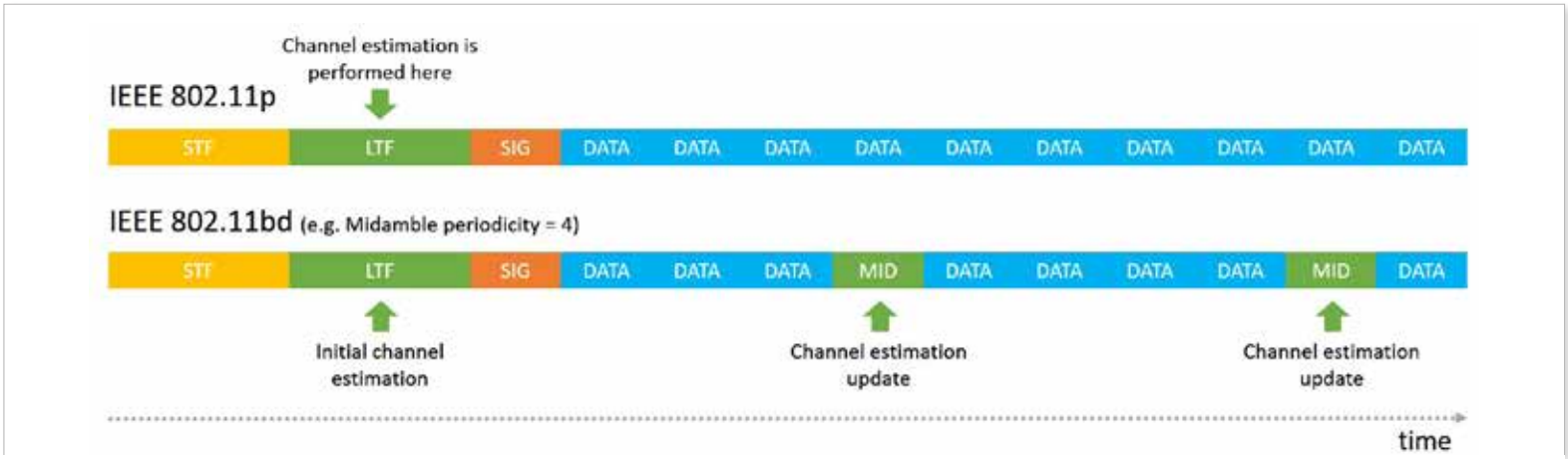
>> (when no legacy IEEE 802.11p stations are detected in range). Some however also apply to the IEEE 802.11p legacy mode. These include more stringent requirements on selectivity, sensitivity and out of band emissions, as well as the introduction of adaptive repetitions.

	IEEE 802.11p	IEEE 802.11bd	Benefits of IEEE 802.11bd
Modulation	BPSK, QPSK, 16-QAM, 64-QAM	BPSK, QPSK, 16-QAM, 64-QAM & 256-QAM	33% higher throughput
Error correction	BCC	BCC & LDPC	2-3 dB lower sensitivity => Range extension
Channel bandwidth	10 MHz or 20 MHz	Interoperable 10 MHz and 20 MHz	Improved interoperability
Data subcarriers	48	48 & 52	8% higher throughput
MIMO	N/A	2x2 MIMO	2x higher throughput
Frequency bands	5.9 GHz	5.9 GHz & 60 GHz	New applications
Adaptive Repetitions	N/A	1-3 repetitions, depending on CBR	Range extension
Localization	N/A	Supported	New applications
DCM mode	N/A	Supported	3 dB lower sensitivity => Range extension
Channel tracking	Proprietary	Proprietary & Midamble-based	Lower complexity receiver
Total Benefit: Range extension		DCM, repetitions and LDPC	up to 3 times longer range
Total Benefit: Throughput		256 QAM and MIMO	up to 3 times higher throughput

Toolbox of technical advances of IEEE 802.11bd compared to IEEE 802.11p

Error correction: One of the most important improvements in the PHY is the use of Low Density Parity Check (LDPC) forward error-correction coding. LDPC has been introduced in IEEE 802.11n and offers increased spectral efficiency compared to the Binary Convolutional Code (BCC) scheme used in IEEE 802.11p. As such, LDPC has also been chosen for 5G due to its favorable performance compared to Turbo codes employed by 4G systems.

Channel tracking: The main difference between a state-of-the-art IEEE 802.11p and a common Wi-Fi (IEEE 802.11a) receiver is the ability of the former to operate under high mobility conditions with speeds of 500 km/h or higher. This is nowadays possible through the use of proprietary technologies and involves complex signal processing algorithms for estimating the rapidly changing wireless channel conditions in mobile environments. In IEEE 802.11bd a new scheme is introduced which embeds known reference symbols (midambles) in-between the data symbols. The midamble symbols allow updating the estimate of the wireless channel conditions in mobile environments, simplifying the receiver design at a cost of lower efficiency. >>



Preamble-based vs midamble-based channel estimation

>> **Modulation:** Another improvement is the support of 256-QAM which allows for a potential throughput enhancement of 33% compared to 64-QAM as already defined in 802.11p.

Data subcarrier: An additional throughput gain of 8% comes in IEEE 802.11bd from the use of 52 data tones compared to just 48 in IEEE 802.11p.

MIMO: Support for MIMO technology is also specified in IEEE 802.11bd offering a potential gain in unicast transmissions of 2 times higher throughput.

Range extension: In addition to improvements in throughput, the need for supporting higher robustness and thus longer transmission ranges is also being addressed in IEEE 802.11bd. One of the methods chosen to achieve this goal was through the use of Dual Sub-Carrier Modulation (DCM) technology where each data symbol is transmitted in two subcarriers, therefore increasing the diversity gain which translates to 40% longer transmission range.

Adaptive retransmissions: Another method to increase robustness and operation range on IEEE 802.11bd is through the use of adaptive retransmissions which can improve performance for both legacy and next-generation receivers. In the former, retransmission of the same packet multiple times improves the probability of reception without requiring any special processing. In the latter however, signal processing methods can be applied to further increase this benefit by combining the received noisy signals.

2.2.3 MAC changes and improvement

IEEE 802.11bd also has a few changes at MAC level like the indication of next-generation capabilities (in the duration/ID field of the MAC header) and unicast communication in Outside the Context of a BSS (OCB) mode.

2.2.4 Localization improvement

The IEEE 802.11bd scope also involves the introduction of at least one mode of localization. The exact technical methods to achieve this are yet to be defined but round-trip-delay measurements have already been proposed.

2.2.5 mm-wave support

In addition to the PHY/MAC improvements introduced above, the IEEE 802.11bd group has decided to investigate the use of 60 GHz for V2X. The large amount of unlicensed bandwidth available in this frequency range opens the door to numerous interesting new applications which require ultra-high bandwidth.

2.2.6 Opportunities for new applications

The following applications are extended in their functionality with IEEE 802.11bd:

Sensor Sharing: Vehicles periodically broadcast all detected objects from all sensors and receive object information from surrounding vehicles.

Multi-Channel Operation: Enables concurrent multi-channel operation where one channel is used for safety messages whereas the second is used for non-safety messages.

>>

>> **Infrastructure Applications:** Transmission of messages from infrastructure to vehicles and from vehicles to infrastructure. These may involve high amount of data, e.g. Certificate Revocation List (CRL), databases or high-definition map data.

Vehicular Positioning & Location: Positioning of the vehicle with regard to other road-users to improve automotive radar or GNSS localization in areas of no or low service coverage.

Automated Driving Assistance: Coordinated vehicle manoeuvres where vehicle shares their future path and potentially adjusts it according to paths of vehicles in proximity.

Aerial Vehicle ITS: Aerial Vehicles provide road safety and traffic monitoring functions with LoS connectivity. These can be deployed flexibly and dynamically to control heavy traffic congestion.

Train-to-Train: For safety critical and efficient operation. Autonomous train protection & operation (ATP/ATO): collision avoidance, remote control, automatic coupling and train integrity; virtual coupling (platooning).

Vehicle-to-Train: For safety critical and efficient operation. Shared space at level crossings, shared spectrum for 5.9 GHz ITS band between V2X and urban rail communications.

V2V see-through: Vehicles share their own views to each other to construct see-through view. The views are used for safety and driver/passengers usage. Example scenarios include platooning and urban traffic monitoring.

2.3 Timeline

Currently, the BD Task Group is in the phase of receiving technical contributions, based on which, the first draft version (D0.1) of this amendment will be created. The target date for this is November 2019, whereas the final version is targeted for December 2021.

Projected timeline for IEEE 802.11bd

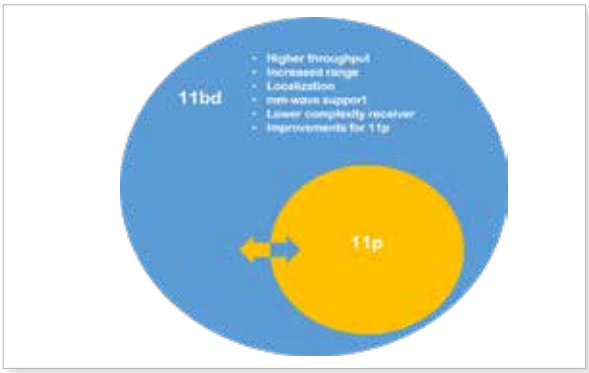
3. Conclusion

The IEEE 802.11bd standard is an evolutionary extension of the existing IEEE 802.11p (part of 802.11-16) standard. It adds significant building blocks to enhance the performance and flexibility of the access layer used in ETSI ITS-G5 and DSRC. It is fully backward compatible and interoperable with the existing implementations of IEEE 802.11p as part of ITS-G5 or DSRC WAVE. The extension can use the same channels without penalizing the performance of legacy IEEE 802.11p devices. It is worth mentioning that the legacy IEEE 802.11p communication is already supporting all the envisaged C-ITS applications of the C2C-CC roadmap up to highly automated driving, while the IEEE 802.11bd can further improve the capabilities of existing as well as future devices and applications.

The newly added building blocks in IEEE 802.11bd extend the existing toolbox of IEEE 802.11p by adding features that can increase the robustness, the range of the access layer and can increase the available data rates in support of >>

>> upcoming applications in co-operative ITS systems like Collective Perception Message (CPM) and Maneuver Cooperation Message (MCM) applications.

All investments performed today in deploying IEEE 802.11p will also be available for IEEE 802.11bd. As well as IEEE 802.11bd improvements might apply to the legacy 802.11p and benefit the already deployed stations. //



Functional advances of IEEE 802.11bd including the IEEE 802.11p functionalities

European harmonisation of C-ITS taken to the next level

by Martin Böhm | C-Roads Secretary General | AustriaTech

Since 2016, the C-Roads Platform has endeavoured to improve safety and efficiency of road transport by harmonising the European perspective for C-ITS deployment. In their commitment to C-ITS services being regarded a key enabling technology, the European Commission, Member State representatives, municipalities, OEMs and technology providers have aligned their efforts on implementing cooperative services within and across borders.

2019 has been a busy year for the C-Roads Platform on various levels. New collaborations were sealed, cross-site testing has progressed and new focus areas of C-ITS deployment were defined, especially when looking at the increased inclusion of urban areas. Most prominently, the C-Roads Platform was enlarged in summer 2019 by the two new core members Greece and Ireland, thus currently uniting 18 European States in coordinating their national pilots and cross-site testing activities. In this way, C-Roads will ensure European cohesion of C-ITS deployment and is currently preparing a sustainable roll-out of services. The new core members will support the piloting of Day 1 and Day 1.5 C-ITS services by using a balanced mixture of ETSI ITS G5 and cellular communication technologies.

With the collaboration sealed between DATEX II and the C-Roads Platform, two major European initiatives for harmonisation join forces against the background of C-ITS. Both of them have used various opportunities to demonstrate their technical and strategic importance in increasing the safety and efficiency of transport in Europe and beyond. With high potential for synergies, a cooperation between DATEX II and C-Roads was the logical next step. For this reason, it is sensible to adapt the DATEX II model with >>

>> regard to the developments of C-ITS services. Requirements will be harmonised and aligned in both C-ITS and DATEX II messages in order to guarantee an efficient exchange of information. The different requirements need to be considered for the future standardisation process of data exchange between road operators and C-ITS stations.

As of 2019, a new working group (WG4) was established in C-Roads that addresses city authorities and focuses specifically on urban deployment of C-ITS. With the support of the C-Roads Platform partners, cities can discuss their specific requirements for targeted C-ITS roll-out. More than 40 cities all over Europe have already started the work on designing use cases and implementing services. The next steps will include a reflection of the recent platform outcomes with a clear focus on necessary changes and adoptions in order to map them to urban areas as well. The main topics are C-ITS aspects of high relevance to cities like public transport priority at traffic lights. The benefit of WG4 will be to have one interface with the OEMs, thus facilitating support services delivered by city authorities.

In terms of technology, the latest release (v1.5) of the harmonised communication profile for Cooperative Intelligent Transport (C-ITS) services was published in August 2019 and is the first to include specifications for hybrid communication. As such, it defines a basic interface that facilitates IP-based information exchange and thus provides a basis for back-end exchange of C-ITS messages. In this way, the same C-ITS messages can be provided through different channels, mainly ITS-G5 and cellular. Based on proven standards, the basic interface is operational for common C-ITS messages and was fine-tuned with the automotive industry, represented by the C2C Communication Consortium. However, it will gradually be upgraded with additional message types. In parallel, C-Roads will now start investigating improved interface functionality to better support different national deployment models.

Building upon a strong joint vision for the harmonisation of C-ITS in Europe, the C-Roads Platform will continue to rely on the fruitful cooperation with the C2C Communication Consortium. //

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A brief update on SAFERtec's security assurance framework for connected vehicles

by Andras Varadi | Commsignia [on behalf of the SAFERtec consortium]

The SAFERtec project – as introduced in the 20th issue of the Car 2 Car Newsletter in May, 2018 – is an ongoing H2020 EC-funded research and innovation action introducing a cost-effective ITS security assurance framework. Currently the project is performing the experimental evaluation of the framework through V2I (Vehicle-to-Infrastructure) and V2C (Vehicle-to-Cloud) communication instances realized in carefully selected use cases that expose a large attack surface and/or trust-establishment processes among numerous involved entities. Investigation takes into account security, privacy and safety (reliability and trustworthiness) at all stages of the analysis; threat, vulnerability and risk assessment.

The latest achievement of the project is the launch of a modular, flexible and scalable protection profile (PP) for the V-ITS-Station as the Target-of-Evaluation (adopting a generic V-ITS-S architecture that can lend itself to a variety of real-world implementations)

The PPs (base and modules) that are subject to regular updates, may be downloaded from the following link:

https://www.safertec-project.eu/publications/modular-pp/

The approach taken by SAFERtec presents certain advantages of relevance:

- **Extensibility:** When considering another ToE such as the Road-side Unit, there is no need to study again the included communications units; the corresponding PP module of our solution can be used instead.
- **Upgradability:** New features or completely new modules can be attached to the PP without the need for a structural redefinition of the considered system.
- **Integration capability:** Existing and widely accepted PPs such as the one for the Hardware Security Module (HSM) can be seamlessly integrated as modules.

Based on the above contribution, the SAFERtec vision is to provide a reference for the standardization of the connected vehicles/ITS systems security evaluation.

We encourage interested partners to regularly check the SAFERtec website for updates and more information. **//**

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