



*In the eighth issue:*

<i>Editorial</i>	
<i>CAR 2 CAR – Ongoing</i>	1
<i>Consortium News</i>	
<i>Böblingen meeting summary</i>	2
<i>CAR 2 CAR members</i>	2
<i>CAR 2 CAR Forum 2011</i>	3
<i>Working Group News</i>	
<i>Communication</i>	4
<i>Communication</i>	5
<i>Roadmap for Deployment</i>	6
<i>Security</i>	7
<i>Simulation</i>	7
<i>Demonstration</i>	8
<i>Project environment</i>	
<i>ITS World Congress in Orlando</i>	9
<i>Imprint</i>	9

*CAR 2 CAR Communication Consortium – Ongoing*  
*by Søren Hess (General Manager, C2C-CC)*

*Development and deployment of cooperative ITS is the mission of the CAR 2 CAR Communication Consortium. During 2011 we managed to take a number of initiatives towards achieving this goal.*



*With the strong strategic interest of vehicle manufacturers and global suppliers we have influenced and lead the standardisation activities within ETSI TC ITS and CEN TC 278. The standardisation Mandate M/453 from the European Commission requires more than 65 standards to be developed as European Norms. Together with the strong support from the Working Groups of the CAR 2 CAR Communication Consortium and a number of other stakeholders we are achieving this result and a consistent set of standards are going to be adopted during 2012. The first interoperability tests took place in Helmond a couple of weeks ago and were very successful. More Plugtests are planned by ETSI CTI and its partners in April 2012*

*We initiated cooperation with the US and Japanese OEMs at a meeting in Böblingen in July to achieve a coordinated and harmonised approach on issues such as common hardware, including a common security approach, coordinated message sets such as the CAM/DENM and the BSM1/BSM2, congestion control, data quality and certification agreements. Together, the global vehicle manufacturers have agreed on an action plan and are taking the harmonisation initiatives forward, together with the regulators from the EU/US/JP.*

*We have agreed to initiate deployment of cooperative ITS very soon and a number of special task forces are now solving open issues towards deployment.*



We have started cooperation with the infrastructure organisations CEDR, ASECAP and POLIS in order to develop a joint roadmap for deployment and we are planning a demonstration of cooperative ITS together with the infrastructure operators and suppliers within the IT consortium in Vienna during the ITS World Congress from the 22th to the 26th of October 2012. This demonstration is a proof of concept for the cooperation between the vehicle manufacturers and the road operators and road authorities. The CAR2CAR Communication Consortium has a strong commitment in the ongoing

Field Operational Tests including the Drive C2X, SCORE@F, simTD and others and is, in general, a leading partner and stakeholder in preparation for deployment in Europe.

New stakeholders have joined the C2C-CC during 2011 and we are now 12 international vehicle manufacturers, 16 global suppliers including infrastructure suppliers and 24 development members from universities and development organisations. More stakeholders have already applied for membership in 2012 and agreements towards commitment to jointly imple-

ment and deploy cooperative ITS is in place with road operators and road authorities. This development is the result of the strong commitment and contributions from the CAR 2 CAR Communication Consortium members both in the standardisation and in the development of the technology and services.

The CAR 2 CAR Communication Consortium will continue to be a leading ITS partner in 2012. I thank you for your excellent cooperation in 2011 and look forward to working with you in 2012 towards the joint deployment of cooperative ITS.

## Consortium news: Böblingen meeting summary

by Karl-Oskar Proskawetz (Administrator, C2C-CC)

From the 11th to the 14th of July 2011, an EU-US-JP workshop on harmonisation was organised at Böblingen, supported and sponsored by the CAR 2 CAR Communication Consortium. More than 40 experts and representatives from European, American and Japanese vehicle manufacturers (OEMs) and government representatives from US DoT and EC DG INFSO participated in this four-day workshop.

US presentations on V2V/V2I crash avoidance, Basic Safety Message (BSM) and related performance requirements of the data elements, as well as the requirements for aftermarket and retrofit devices opened the floor for deepened discussions on global harmonisation. From the European side, the cooperative ITS concept and the CAM and DENM message sets were outlined. In addition, issues about the open vehicle platform, frequency spectrum, security and policy were addressed. The discussion between the OEMs was very open and constructive. The participants achieved the common expectation, that not everything needs to be, or can be, harmonised. However, all parties aimed at taking advantage of harmonising the right elements as much as possible with respect to timeliness in both regions and to conduct further harmonisation at future revisions, if necessary.

The OEMs unanimously agreed that common hardware (chip sets) for all regions needs to be achieved by further cooperation and harmonisation. This includes also the required security functionality. Furthermore, the data elements of message sets and related requirements of the different regions shall be analysed and globally aligned as much as necessary. The US approach of using aftermarket equipment for safety applications was identified as an interesting option for Europe, if vehicle data access is not necessarily required. Due to potential liability problems, the OEMs unanimously raised strong concerns about the idea of an open vehicle platform and remote management of ITS stations by unauthorised third parties.

Several task forces between the European and American OEMs have been established, which are working on the identified issues. For highlighting the use and outcome of the global harmonisation work, the US Department of Transportation (US DoT) and EC DG INFSO agreed to support a joint showcase on global harmonisation of cooperative ITS during the ITS World Congress 2012 at Vienna. All established task forces have been requested to reported the results they achieved at that point, in the next joint meeting during the ITS World Congress on

October 2011 at Orlando, so that a decision can be made, based on these results, on next steps that are necessary towards obtaining further global harmonisation.

During the last day of the workshop, real demonstrations of selected use-cases from the CAMP and simTD research and development projects, impressively demonstrated the state of the art and the added value of cooperative ITS to all participants. These demonstrations have been complemented by the latest status reports of the German simTD, the French SCORE@F and the European DRIVE C2X Field Operational Tests (FOTs), as well as the US Safety Pilot test and demonstration planning. The participants of the workshop agreed to also share their knowledge and experience in the fields of planning, organising, monitoring, data collecting and analysing, as well as assessing FOTs of cooperative ITS. This enables global learning from each other and enables the sophisticated transfer of experience and know-how between regions.

The cooperation between the US and European OEMs shall be continued to support the US, specifically, US task forces established by the European Commission and US DoT.

## Consortium news: CAR 2 CAR members

by Michael Nitsche (C2C-CC)



### Cohda Wireless

Type of member: Associate Member  
Type of business: Provider of communication hardware and prototypes



### MAN SE

Type of member: Partner  
Type of business: Automotive manufacturer



### Escrypt GmbH

Type of member: Associate Member  
Type of business: Research, consulting, software and hardware development



### NXP Semiconductors N.V.

Type of member: Associate Member  
Type of business: Research, manufacturing and services of semiconductors





**PSA (PEUGEOT CITROËN AUTOMOBILES SA)**

Type of member: Partner  
Type of business: Automotive manufacturer



**Renesas Electronics Corporation**

Type of member: Associate Member  
Type of business: Research, manufacturing and sales of semiconductor components



**Spirent Communications plc**

Type of member: Associate Member  
Type of business: Test tools, lab tests and service provider for communication



**SWARCO AG**

Type of member: Associate Member  
Type of business: Turnkey traffic solutions, products and services for traffic management and road safety



**Volvo Car Corporation**

Type of member: Partner  
Type of business: Automotive manufacturer

## Consortium news: CAR 2 CAR Forum 2011

by Karl-Oskar Proskawetz (C2C-CC)

### Focuses on the Path Towards Deployment

Since the first event in 2007, the number of participants of the yearly CAR 2 CAR Forum has been steadily increasing, from about 80 to more than 140 this year. This year, the number was limited by the capacity of the lecture room at the Honda Academy, Erlensee). According to the proven format, the CAR 2 CAR Forum was organised on two days. The first day provided plenary sessions on standardisation and harmonisation, interoperability, security and FOTs, as well as a panel discussion on cooperative ITS and its joint deployment in Europe. After the plenary sessions, the programme was divided into a general assembly for all active members and a visitation of the Honda Academy for the basic members and invited guests who could experienced the impressive technology covering all fields of mobility and beyond. The evening event at castle Ronneburg started with campfires and hot wine punch in the inner ward. Afterwards, the participants enjoyed a juggler performance, as well as dinner and networking in the old, but snuggish restaurant room of the castle. The second day was structured into 5 workshops, focusing in more detail on deployment, security solutions, wireless and application aspects of cooperative ITS, as well as on the demonstration during the ITS World Congress 2012 at Vienna. The pdf documents of all presentations shown are available and can be downloaded from the internal website [www.car-2-car.org](http://www.car-2-car.org).



Ronneburg (venue of the evening reception)

At the beginning of the plenary sessions, Juhani Jääskeläinen outlined the European transport challenges and the issues addressed within ICT. The international cooperation with US DoT in cooperative mobility is being extended to the Japanese MLIT and taking a global approach. The OEMs

clearly expressed their interest in achieving globally harmonised chip sets and hardware for cooperative ITS and software stacks being adaptable to the specific requirements and customer needs of the regional markets. The standardisation of ETSI TC ITS has progressed well, but signal phase and timing at CEN need to be initiated soon, in order to enable the deployment of the day one use-cases starting in 2015. First results



Honda Academy - Venue of the C2C Forum (picture by Honda Academy)

of Plugtests have been presented, but further work on conformance testing, interoperability and self-certification needs to be done. Results of national and European field tests are expected to be available starting from next year to further improve the standards. The concept for security and privacy of the Car2Car communication has been developed and is being standardised. In addition, the common minimum level of in-vehicle security for cooperative ITS and a set of assurance levels need to be defined next, based on ETSI TS 102 941. The cooperation of the C2C-CC with the road authorities and road operators is being organised in the "Amsterdam Group" involving ASECAP, CEDR and POLIS. The aim is to create a win-win situation by joint deployment of cooperative ITS starting in European "Hot Spot Areas" by front runners, followed by further areas and countries. During the coming ITS World Congress 2012 at Vienna, the C2C-CC and the Austrian TT consortium will offer a joint demonstration on cooperative ITS day-one use-cases for interested participants.

In the workshops, the technical experts appreciated the intensification of the cooperation with the road authorities, road operators and infrastructure suppliers. The C2C-CC has focused on safety and efficiency applications in the past, which will be complemented by mobility and intermodal applications, for which the road operators show strong interest. While the technical roadmap is on a good track, related legal issues need to be addressed in the future as well. The qualification of cooperative ITS components need to address the communication link as well as the applications for ensuring interoperability and might be documented by a quality label. The security and privacy issue has been pointed out as very important, as it affects all layers of the communication chain and the hardware performance, but has been underestimated in the past. The proposal and measurements for solving DSRC mitigation issues seem to



be very promising. For ensuring the required minimum level of wireless performance, not only the hardware and antenna, but the whole system including the applications need to be considered. Even the C2C-CC is in favour of starting with a day-one solution and the migration to following phases will be taken into account. The antenna, its positioning on the vehicle and its interference with surface mounted devices such as ski boxes, have been identified as critical issues. These issues require more measurement data and additional research in order to develop more accurate simulation models.

During the closing session, Soeren Hess highlighted the joint demonstration of cooperative ITS based on ITS G5 during the ITS World Congress 2012 at Vienna. He invited all experts to contribute to the success of this highly visible event on public roads involving all vehicle classes as well as road side units at gantries and traffic lights.



Panel discussion with road operators

### Working Group Communication: Standardisation and Testing of GeoNetworking

by Andreas Festag (NEC Laboratories Europe), Sebastian Müller (ETSI CTI)

ETSI TC ITS Working Group 3, namely Networking and Transport, is developing a series of standards for GeoNetworking that provide ad hoc communication in vehicular networks, based on short-range wireless radio. The work is carried out in close cooperation with the C2C-CC Working Group COM. Several R&D projects have also contributed, such as GEONET, INTERSAFE-2, PRE-DRIVE C2X, DRIVE C2X and simTD. After more than two years, the first versions of the basic standards for GeoNetworking have been established. Parallel to this, test specifications were developed and activities for the testing of the actual implementations have been started.

The basic standards for GeoNetworking are organised in a standard series, i.e. the multi-part standard TS 102 636. It covers specifications for requirements and scenarios as well as the network architecture. The core of the basic standards is the specification of the network protocol, which is divided into a media-independent and a media-dependent part. The media-dependent part is focused on ITS G5/IEEE 802.11p media, while the media-independent part can be applied to other short-range wireless access technologies in the future. Additional basic standards cover an UDP-like transport protocol named Basic Transport Protocol (BTP) and the transmission of IPv6 packets over GeoNetworking.

To enable interoperability, test specifications were developed in order to verify the conformance of implementations to the basic standards. In accordance with ETSI testing methodology, these conformance test specifications use the test specification language TTCN-3.

They also follow the scheme of test standards for Protocol Implementation Conformance Statements (PICS), the Test Suite Structure and Test Purposes (TSS&TP) and the Abstract Test Suite (ATS). The work was carried out by an ETSI Special Task Force (STF 405) and led by ETSI's Center for Testing and Interoperability (CTI). Another STF (STF 424), also coordinated by ETSI CTI, is currently developing a platform to conduct conformance tests in a real environment. STF 424 aims at the validation of the test specifications and the TS 102 636 standard family; thus supporting the ITS standardisation process. As a side-effect, vendors who join these projects have the opportunity to assess the level of compliance of their own equipment.

Conformance testing and interoperability testing are complementary to each other and together they can provide the best assurance that future products will interoperate. Subsequently, ETSI TC ITS and ERTICO decided to organise the 1st Cooperative Mobility Services Plugtests™ in November 2011 in Helmond, Netherlands. At this interoperability event, vendors will have



the opportunity to assess the level of interoperability and the correct understanding of the basic standard requirements by conducting face-to-face test sessions with other vendors. Various C2C-CC members intend to participate in this event.

It is planned to finalise the GeoNetworking standards series over the next time period, particularly the media-dependent part of GeoNetworking for ITS-G5/IEEE 802.11p supported by an ETSI STF. The basic standards published so far under ETSI Technical Specifications (TS) will be revised to harmonise them with the progressed standards in other ETSI working groups and change requests will be considered. Finally, the basic standards will be converted to ETSI European Norms (EN) in accordance with the EC Mandate M/453 to develop a minimum set of standards for the deployment of cooperative systems. As a consequence, test specifications need to be updated and a series of interoperability events organised.

Links:

Cooperative Mobility Services Plugtests™  
[http://www.etsi.org/plugtests/ITS\\_CMS/Home.htm](http://www.etsi.org/plugtests/ITS_CMS/Home.htm)

Conformance Test Platform  
[http://portal.etsi.org/STFs/STF\\_HomePages/STF424/STF424.asp](http://portal.etsi.org/STFs/STF_HomePages/STF424/STF424.asp)

DRIVE C2X project: <http://www.drive-c2x.eu>



Working Group Communication: C2XC Radio Range in Non-Line-Of-Sight Environments

by Frank Hofmann, Christian Skupin (Bosch)

The still ongoing discussions about the transmission range of ITS G5 show the complexity of achieving a comprehensive picture of this topic. Many papers about channel measurements have been published in recent years. We want to add a further view on the topic with our evaluation results, which are focused on Non-Line-Of-Sight (NLOS) scenarios. One main advantage of C2C-systems, in comparison with autonomous surround sensing systems such as radar and video, is the possibility of getting information from cars outside of their own visual range. This facilitates the realisation of new and improved traffic safety and efficiency applications. Two difficult, but typical scenarios under NLOS conditions are considered: In the first scenario, a car on a highway has to be warned about a traffic tail end caused by a traffic jam, because a vehicle in front of it is blocking its view. In this example, a vehicle speed of 130 km/h, a driver response time of 1 s and additional time due to the limited repetition rate of the warning message and the limited equipment rate are assumed. In order to enable the driver to adequately respond to the tail end of a traffic jam lying ahead, these assumptions lead to a minimum warning distance of around 230 m. The second scenario describes an intersection collision warning, in an inner-city area with dense constructions. Here, a necessary radio range of 58 m was calculated. Both examples are depicted in Figure 1. Higher radio ranges increase the reliability and comfort of applications, since warning messages alarm the driver earlier.

Two different methods were used for the evaluations: simulations and field measurements. For the simulations, a ray tracer was used which searches all possible transmissions paths between the transmitter and the receiver to determine the impulse response of the signal. Buildings, crash barriers and other vehicles influence the reflections and diffraction of the waves. We found, that the modeling of the environment has to be very precise in order to achieve accurate results. The main advantages of simulations are reproducible results and the possibility

main quality measure. Typically, a packet error rate of 10% was used as reference.

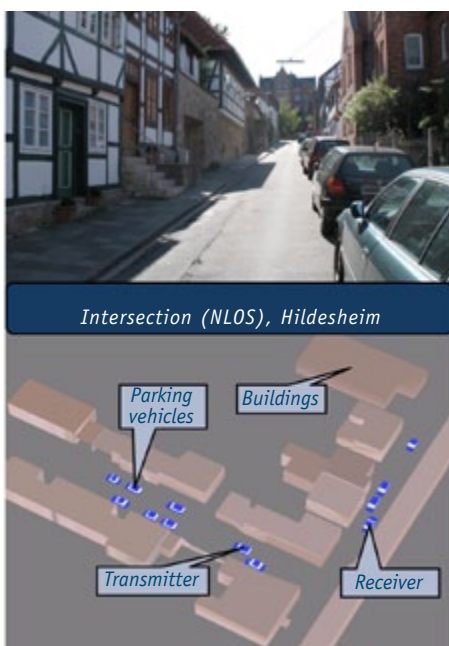
For field measurements, we developed a test bed with two transmitting and two receiving antennas to allow single antenna transmissions (SISO), in order to obtain receiving and transmitting diversity as well as full MIMO (multiple input multiple output) capability. Standard-compliant as well as more sophisticated algorithms were evaluated. In the receiver, an adaptive channel estimation was implemented to compensate for the effects of high Doppler. The test bed itself, as depicted in Figure 2, achieves a transmission power of 2 x 24 dBm. The field measurements were performed in the same environments as the two scenarios described earlier. The results are shown in Figure 3. For the highway scenario under NLOS conditions, the single antenna system had a range around 240 m for the single antenna system and 410 m for the



Figure 2: Test bed for field measurements

of defined changes in the environment. We used transmitter and receiver algorithms according to the physical layer of the IEEE 802.11p standard, but also extensions which are described further below, to evaluate improvements. This allows us to compare different algorithms according to their packet error rate, which is the

MIMO system. Regarding the inner-city NLOS intersection scenario, a range of 38 m was achieved with the single antenna system and a range of 58 m with the MIMO system. If one compared these measurement results with the collision warning application requirements for both scenarios that are stated above, one can see that by using the MIMO system the requirements for both scenarios are met, whereas the single antenna system fulfills only the requirement of the highway scenario.



Intersection (NLOS), Hildesheim



Highway (NLOS) Hannover <-> Hildesheim

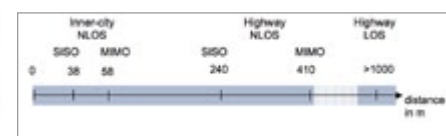


Figure 3: Results of radio range measurements

The experience from simulations and measurements shows that radio range is still a challenge in difficult NLOS environments. Multiple antennas can help to overcome the current limitations. However, a significant gain can already be achieved by means of standard compliant MIMO methods. A reliable radio link with high range has also a differentiation potential in the C2C-world.

Figure1: Two scenarios with NLOS conditions: highway and inner-city with dense constructions



Working Group Roadmap for Deployment: Milestones towards Deployment

by Christian Wewetzer (Volkswagen)

**Introduction**

The C2C-CC long-term vision has been presented in form of a four-phase deployment roadmap at the last forum and in the previous newsletter issue. The logical continuation is to break down the common long-term plan and strategy into a concrete work plan: C2C-CC effort has to be concentrated on core issues of the day-one deployment. In collaboration with the other C2C-CC Work Groups, WG Roadmap has collected the required milestones for enabling de-ployment phase one, and has assembled these together with other related issues into the first version of a "Pre-Deployment Roadmap".

**Pre-Deployment Roadmap**

The roadmap is divided roughly into the areas of "Standardisation", "Joint C2C-CC Activities", "Field Trials" and "Stakeholder-specific Activities". Dotted items indicate decisions that are either out of the hands of C2C-CC or still open.

The "Standardisation" area consists of the EC Standardisation Mandate M/453 on Intelligent Transport Systems. C2C-CC members are continuously and actively participating in the ongoing standardisation process with a strong focus on ETSI TC ITS.

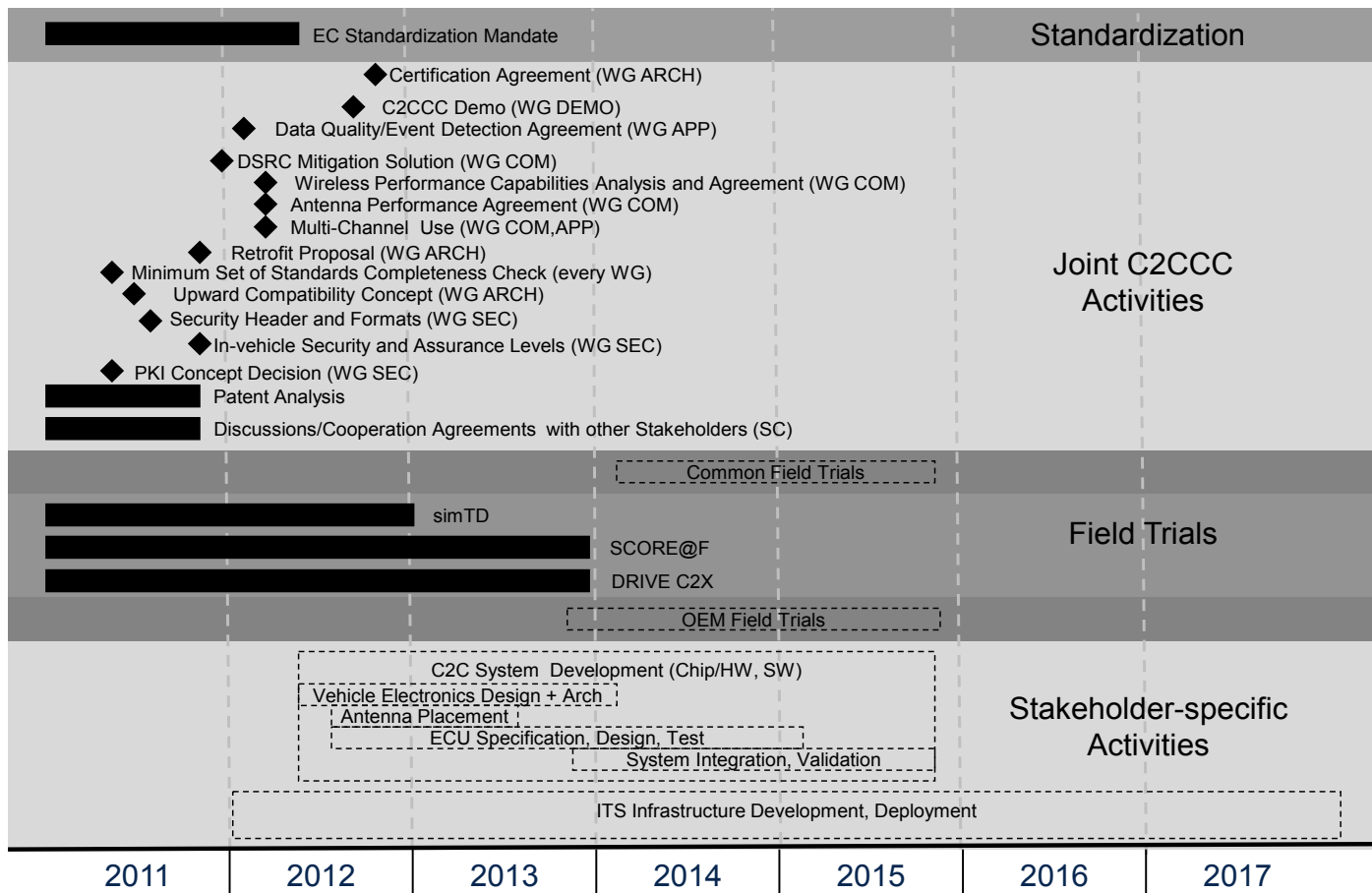
The "Joint C2C-CC Activities" area contains C2C-CC-internal milestones and activities that are considered to lead to essential system design decisions on the way towards deployment. These work items shall not be regarded as independent from the ongoing standardisation, since – many of these work items are likely to lead to new or to influence existing standards. The C2C-CC Steering Committee has asked the respectively listed C2C-CC Work Groups to address these work items in dedicated short-term technical task forces, which make up an important part of this year's C2C-CC work. A first cross-task force meeting has already taken place to discuss intermediate results and synchronise related activities. One special milestone in the roadmap is the demo at the ITS World Congress at Vienna in 2012, where both vehicle-to-vehicle- and vehicle-to-infrastructure applications will be shown.

National field trials have started already in Germany (simTD) and France (SCORE@F). The-se field trials are heavily related to C2C-CC work, as they rely on C2C-CC results and, vice versa, to deliver new results and insights that are then discussed in C2C-CC working groups. On the foun-

ation of this feedback, a common viewpoint is developed within the automotive industry and brought into standardisation bodies. The ongoing field trials are themselves, again, accompanied and supported by national and European projects such as EVITA and ITSSv6. Taking a look beyond current field trials, one could envision coordinated common field trials at a later development stage to ensure interoperability when first prototypes of mass production vehicles become available.

"Stakeholder-specific Activities" refers to internal processes within the respective stakeholders of vehicle-to-vehicle and vehicle-to-infrastructure communication. When first vehicles and roadside units become available, those components with impact on interoperability will be built on the basis of common standards and agreements. Thus, internal activities at all stakeholders must be aligned with C2C-CC work so that the required decisions and documents become available in time and fit the specific demands of all stakeholders.

For the future, WG Roadmap is looking forward to assess and incorporate any comments and change requests to this roadmap.





## Working Group Security: Major steps for privacy and security

Elmar Schoch (Volkswagen)

Security and privacy are major aspects for ITS, since message receivers have to trust senders even when they encounter each other for the first time. Workgroup Security has drafted solutions for security and privacy and actively collaborates with research projects as well as standardisation around the globe.

This year, the work was focused on specific topics. In order to address those topics in all details and to make faster progress, WG Security has formed task forces each consisting of a small number of experts. The first task force on the Public Key Infrastructure already started last year. Their initial report was completed in February 2011. Up to now, WG Security has teamed up for three more task forces. Their scopes and results are presented next.

### Taskforce PKI

According to the widely accepted approach of using a Public Key Infrastructure (PKI) that provides digital certificates for message signing, the C2C-CC security workgroup concentrates on the design of a flexible and scalable PKI solution. The PKI must adapt to automotive realities, for example infrequent backend connectivity and heterogeneous markets.

While a lot of work has already been completed, TF PKI has recently focused on a detailed

specification of a more privacy preserving certificate generation and distribution scheme. Particularly, solutions for realising anonymity also towards issuing authorities have been further addressed. The basic idea is to decouple the authentication step during a request for new pseudonyms from the actual issuing process of the pseudonyms. The authenticity of the requester is checked by the Long Term Certification Authority (LTCA), while the pseudonyms themselves are created by a Pseudonym Certification Authority (PCA), respectively. A mapping between real identity of the vehicle and the respective pseudonyms is only possible if both LTCA and PCA store the transaction and authorities approach both. However, this shall only be possible in exceptional cases.

### Taskforce Security Header and Certificate Format

The scope of the TF is mainly to define a minimum security header format that is attached to all messages. An important part is the certificate format, which must be efficient in order to consume the smallest possible amount of bandwidth and flexible in order to accommodate various sender authorisations and future extensions. Another goal is to keep the structures as simple as possible to allow fast processing. The TF is currently investigating the suitability of relevant parts of the IEEE 1609.2 draft stan-

dard. Proposed changes and extensions are being collected in a report and will be turned back to the IEEE group.

### Taskforce In-vehicle Security and Assurance Levels

Another important aspect of the security system is the protection of the ITS station and particularly the stored secret keys. The TF on in-vehicle security and assurance levels especially addresses the question of "secure hardware" in the cars. Yet, rather than fixing certain requirements on the onboard security, the goal is to define a number of distinct assurance levels. Each assurance level is comprised of a set of (hardware) security requirements. The selection of a minimum assurance level shall afterwards be a policy issue.

### Taskforce Hardware/Software Integration

Only recently, the TF on HW/SW integration has started its work. The focus of this task force is on the integration of security concepts and components into the communication pipe of the ITS station. More specifically, this TF takes into account the security requirements and proposals as provided by standardisation bodies (IEEE, ETSI), projects (PRESERVE/PRECIOSA), and the other C2C task forces and looks at the implementation aspects of these requirements.

## Working Group Simulation: Verification of the simulation approach described in the WG SIM Handbook

by Klaus Jaschke & Tobias Lorenz (DLR)

By the beginning of this year, the first version of the handbook for Vehicle-to-X cooperative systems simulation was released. In the previous newsletter of the CAR 2 CAR Communication Consortium the release was announced. All members of the CAR 2 CAR Communication Consortium are invited to use the handbook and to provide feedback on the described approach.

Within the WG Simulation the verification of the handbook approach will be performed next, in order to proof the whole concept. As outlined in the handbook, the three use-cases: "Green Light Optimal Speed Advisory (GLOSA)", "Intersection Collision Warning (ICW)" and "Hazardous Location Notification (HLN)" should be used for verification. These use-cases were chosen to be "first day applications" in the Car-2-Car domain and were discussed during the last CAR 2 CAR Forum in Paris. As a starting point, an implementation of the GLOSA applica-

tion developed by DLR will be integrated in various simulation environments by different partners involved in the WG Simulation. The focus of the simulations is to gain and to compare the results, considering an overall efficiency impact. Therefore, the interfaces necessary to integrate the GLOSA application in the different simulation environments will be defined within the working group during the next weeks.

Afterwards, the key performance indicators will be derived to achieve comparable results from the various simulations. The partners involved will then perform the simulations with respect to the approach described in the handbook. This procedure will lead, on the one hand, to a direct feedback which will be included to the handbook and, on the other hand, to the possibility of comparing and evaluating the different simulation results.

Additionally, this first verification of the handbook could also be seen as a common test specification work that might support the activities of the task force certification. The WG Simulation will learn how to describe use-cases and test-cases on a common base. Thus, independent simulations can be performed but comparable results can be achieved. This could also be a starting point for further discussions on how to design interoperability tests for Car-2-X systems in the near future.

The WG Simulation could also support you in understanding and using the approach. As a first step, OEM Volkswagen will investigate the handbook approach in an internal project that will be supported by a WG SIM partner. If you, as CAR 2 CAR CC member, are also interested to provide an application for further verifications of the handbook, please feel free to contribute and join the Working Group Simulation.



**Sustainable mobility in areas with dense traffic requires high quality information. This holds especially true if traffic information services of different transport modes are interconnected.**

Cooperative systems and services have the potential of contributing to well informed travelers' safe, efficient and environmentally friendly way of driving. Drivers need to have information presented on an adequate information interface of an appropriate end user device. In this way, also information on other transport options (co-modality) can induce modal change by means of cooperative information.

The research project "Testfeld Telematik" (called TT for short) was formed by a consortium of research institutions, industrial and public companies, to test how such cooperative services have to be designed and employed in the best possible way to serve the above mentioned goals. The 14 project partners cover all parts in the value chain of cooperative systems and services.

The project is co-funded by the Austrian Climate and Energy Fund (KliEn) and represents a cornerstone towards the nationwide implementation of cooperative ITS on the high level road network by 2015.

Geographically, the TT test route is located in the eastern part of Austria in the area of the motorway intersection A23-A4-S1 and has a length of about 45 km. It includes the metropolitan area of Vienna with its public means of transport network, Park & Ride facilities and the international airport of Vienna.

## TESTFELD TELEMATIK

To ensure scalability and to prepare the introduction of the services after the project, TT has been supporting a hybrid communication concept by means of a variety of end user devices. Next to ITS G5, also WAVE, CALM IR and 3G/4G communication lines are used in order to support travelers' needs for cooperative information. The multitude of end user devices, after-market navigation devices, mobile applications for smartphones, and on-board solutions represent the current state of play in the end user device variety.

Regardless of the used communication technology and line, and regardless of the end user device being used, information provided and displayed to the user in TT has to maintain an equal quality level. The first day cooperative applications in TT are:

- In-car display of all valid traffic signs
- Warning of dangerous situations and traffic congestion ahead
- Information on road construction
- Travel dates and times, status messages and routing updates
- Information on Park & Ride facilities including information on public means of transport
- Information on flight delays
- Weather information and warnings

Besides the technical validation of the cooperative system, an essential part of TT is the validation of the end user services with some 3000 end users. All test drives will continue over a period of approximately one year to obtain valid results for all seasons. An independent, international dedicated study team will verify the cooperative services' effects on road operators, cities and the end user.

The ITS World Conference 2012 in Vienna (October 22nd–26th, 2012) is a unique opportunity window to show results from this Field Operational Test to a wide number of experts and to educate the broad public on the latest status of cooperative ITS and the efforts to be taken towards an implementation by 2015. There is a mutual understanding of TT and the C2C CC to carry out the demonstration show case during this event as a joint effort.

The common demonstration will basically be divided into two parts: The safety related applications will be shown in a dedicated area not open to real world traffic, whereas the majority of the end user applications will be shown in the greater Vienna area under real traffic conditions. It is TT's and C2C's ambitious goal to build the technical solutions for the Viennese demo on the latest results from ETSI TC ITS. Therefore it is foreseen to integrate lessons learnt from ETSI IOP tests in Helmond and the planned event in spring 2012 in Vienna.

Marko Jandrisits , marko.jandrisits@asfinag.at

Further information: [www.testfeld-telematik.at](http://www.testfeld-telematik.at)







## ITS World Congress in Orlando

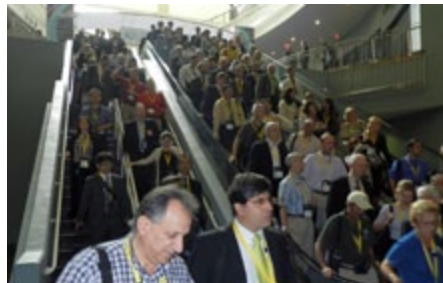
by Markus Bauer (BMW), Karl-Oskar Proskawetz (C2C-CC)

The ITS World Congress 2011 (ITS WC) was held in Orlando and addressed the latest developments in various areas such as cooperative mobility, freight and commercial vehicles, infrastructure and traffic congestion management, institutions and policy, mobility, public transport, safety, sustainability, vehicle systems and electronics. The massive amount of sessions running parallel and the very wide field of themes posted a big challenge. Since the session contributions came from all relevant stakeholders from fields including the industry, research, and regulation/policy making, some contributions also enabled one to learn about the different perspectives on ITS systems and their future development.

Furthermore, the ITS World Congress was complemented by show cases and driving demos. The show cases were focused on the aspects of safety, environment, pricing, and mobility. They ranged from individual rides in cars



to group presentations in buses in combination with target vehicles in the vicinity. Especially show cases in the safety village (GM's V2X smartphone integration, Denso/Econolite Intersection Safety and Mobility, US DoT/CAMP VSC3) and the mobility village (GEWI/BMW Local Hazard Warning) considered and showed applications similar to the ones within COMe-Safety and the CAR 2 CAR Communication Consortium's applications, as described in their memorandum of understanding.



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