



**CAR 2 CAR**  
COMMUNICATION CONSORTIUM

*CAR 2 CAR Communication Consortium  
– towards deployment of ITS – by Søren Hess (General Manager)*

The focus of the CAR 2 CAR Communication Consortium (C2C-CC) originally based on research activities developing technical solutions with a strong support to the European and world wide standardisation for co-operative ITS also includes contributions to and active participation in field operational tests and pre-deployment of ITS.



We have tested and validated the vehicle to vehicle technology and roadmaps towards European deployment are under development. The automotive market, however, requires global solutions and we are therefore active in the world wide harmonisation activities between EU – USA – Japan and others in order to develop harmonised applications for deployment, coordinate and harmonised standards, assessment tools for Field Operational Tests (FOTs) and research studies on driver distraction and human factors. These activities contribute to regulatory initiatives for global implementation and deployment of ITS in several regions worldwide.

In particular the standardisation activities are currently in focus and the EC Standardisation Mandate M/453 requests the CEN and ETSI standardisation organisations to develop a coherent set of technical standards to allow interoperability as the basis for deployment of co-operative ITS. Mid April 2010 CEN and ETSI provided a comprehensive report to the European Commission in response of the Mandate outlining a list of more than 68 standards (ENs) to be developed over the next 2-3 years – the split of responsibility between CEN and ETSI on each of the standards and standard groups as well as the ongoing coordination in the standardisation activities and also including consultation with a variety of European stakeholders with particular interest in standardisation for co-operative ITS. The Mandate activities will dominate the standardisation activities for ITS over the next 2-3 years. The C2C-CC actively contributes to this work in order to ensure that technical standards meet our goals and objectives. Within the European Commission the ITS action plan has led to a number of activities including the development of a draft 'EU Directive on the ►

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► framework for deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport expected to be published in autumn 2010. The directive will be an important regulatory tool for deployment initiatives of ITS and the C2C-CC will cooperate with the European Commission to ensure that legislative initiatives are in line with the planned business deployment of ITS. The C2C-CC is currently developing deployment strategies for a European implementation of co-

operative systems. A true and effective deployment of co-operative ITS would, however, benefit strongly from a close co-operation between the automotive industry and equipment suppliers on the one hand and the road operators, road administrations, and traffic authorities on the other hand.

A private public-partnership towards deployment of ITS is a key prerequisite to achieve a smooth implementation and deployment of co-operative ITS in Europe and worldwide. Initia-

tives between these parties as well as further co-operation with telecom operators and service providers are underway and the C2C-CC is prepared for a wide partnership between the key stakeholders.

Soon decisions will be taken on implementation and deployment of co-operative ITS both in Europe and worldwide and the CAR 2 CAR Communication Consortium will play an essential role in this development.

## Membership News: CAR 2 CAR Forum 2010 by Gunnar Heyms (C2C-CC)

This year's CAR 2 CAR Forum will take place on 23 and 24 November 2010 at Renault, Square Com in Paris, France.

This will be the fourth event of the annually Forum for all active and basic members to provide and discuss the latest news of the CAR 2 CAR Communication Consortium. The highly interesting plenary sessions given during the first day of the Forum will comprise the following topics:

- European Focus on Co-operative ITS
- Towards Cross-Border Co-operative Transport
- Towards Co-operative System Deployment

Subsequently the participants split to join the General Assembly (active members only) or attend a guided tour of the Renault exhibition. The evening event in the Atelier Renault will

provide an opportunity for discussions and networking.

Supplemental workshop sessions on the second day are organised use case oriented. Based on the following use cases the related aspects and issues of the C2C-CC Working Groups will be discussed:

- Hazardous Location Warning
- Energy Efficient Intersection Control / Green-light optimal Speed Advisory
- Intersection Collision Warning

Parallel to the scientific programme an exhibition of C2C-CC members' state of the art developments complement the two-day event.

The registration for the Forum is mandatory. An online registration facility will be prepared with-



Entrance of the Square Com

in the next weeks. As a member of the CAR 2 CAR Communication Consortium you will receive an e-mail with a call for participation and all relevant information.

Please check the CAR 2 CAR website for further information occasionally:

[www.car-2-car.org/index.php?id=forum2010](http://www.car-2-car.org/index.php?id=forum2010) (to see all information login on the upper right hand side of the website required)

## Membership News: C2C-CC at the TRA in Brussels by Gunnar Heyms (C2C-CC)

the C2C-CC booth at the Transport Research Arena (TRA) Conference in Brussels from 7 to 10 June 2010 was a big success.

The biennial four-day event, last time held in Ljubljana (Slovenia), took place at the "SQUARE Meeting Centre" in the heart of Brussels.

The experts of the transportation and road construction sectors used the opportunity in the recently renovated venue to receive and discuss information about innovation and exchange results of current research projects themed "greener, smarter and safer".

This year's event focused on sustaining transport mobility through innovation, strategic and specific levels in 50 different sessions with 216 presentations. Some 900 participants attended the various sessions; the accompanying exhibition was also open to the general public on 9 June.

The C2C-CC exhibited a Honda Goldwing as part of a use case scenario which continued in a backlight poster panel (Figure 1). The booth situated vis-à-vis to the registration desk received high awareness and interest by the participants of the conference. A lot of contacts had been made. Several road authorities and staff members of the European Commission raised the question related to believing in the CAR 2 CAR system, to its usefulness and to its date of deployment.

### TRA

The mission of the TRA is to support the alignment of European, national, regional and private research and development actions on road transport by enhancing the networking and clustering of Europe's research



Figure1: C2C-CC booth at the TRA in Brussels

and development capacity based on a shared Strategic Research Agenda and Research Framework. TRA is supported by the Conference of European Road Directors members as the driving force to implement the ERA, the European Commission and ERTRAC – a body of crucial importance when creating and implementing a shared European Research Framework on Road Transport.

The TRA focuses on future problems and challenges facing road transport that require a multi-stakeholder and multi-disciplinary system approach.



## Membership News: Workshop on Vehicle Communications in Busan, South Korea

by Gunnar Heyms (C2C-CC)

Last year the Workshop on Vehicle Communications was successfully organised in Stockholm by the European COMeSafety project.

Due to the finalisation of the COMeSafety project by the end of 2009 the CAR 2 CAR Communication Consortium inherited the task to organise this year's workshop. As last year the workshop takes place a day before the ITS World Congress:

Details: Busan, South Korea  
Sunday, 24 October 2010  
10 a.m. - 4 p.m. local time  
Congress Centre (BEXCO).

Selected panellists from around the world will provide their views on the many issues that face the development standardisation and deployment of vehicle communications technologies and associated applications of co-operative systems. The workshop's goal is to facilitate global understanding about what needs to be done and how to move forward co-operative systems which are based on vehicle communications.

All stakeholders are invited to join this high level workshop to increase the understanding of



global research and identify key research areas that will facilitate the deployment of vehicle communications based on co-operative systems. As soon as all details are refined we will come up to you with the programme information and ask all interested experts for online registration.

## Workgroup Application: Joint workshops with WG COM and WG SEC

by Lan Lin (Hitachi Europe SAS)

This year the work of WG APP was highlighted by joint workshops with WG COM and WG SEC. Several aspects like Service Announcements, Local Dynamic Maps (LDM) and Traffic Classes were discussed with WG COM, while WG SEC was interested in the different security levels necessary for the varying set of use cases.

The discussions and progress of these two joint workshops are provided to ETSI TC ITS as feedback. The inputs are welcomed and fed to the currently ongoing ETSI TC ITS work: the service announcements and LDM work into the ETSI TC ITS WG1, the security requirements into the ETSI TC ITS WG5.

Furthermore, ETSI TC ITS WG1 is defining a detailed standard work programme for applications and facilities in response to the EU standardisation mandate 453 for the next two years. C2C-CC WG APP provides active inputs and will

integrate its future work to the programme.

### Use case oriented workshops

Starting with the Workshop Session of the CAR 2 CAR Forum WG APP will work-case oriented. Based on given use cases the related aspects and issues of the C2C-CC Working Groups will be discussed.

### Two examples are given here: Hazardous Location Warning

The hazardous location warning is a very powerful Car-2-Car Application supporting a broad spectrum of use cases. Starting from the application the facilities, components and interfaces of the co-operative ITS architecture are discussed more in detail as well as message sets and functions of the Car-2-Car Communication System. Furthermore related issues of security

and privacy, deployment, testing and certification are considered.

The inputs will be provided to ETSI TC ITS WG1 for the standardisation of V2V hazard location warning application.

### Energy Efficient Intersection Control / Green-light optimal Speed Advisory,

The high potential of co-operative ITS on increasing traffic efficiency is highlighted for these selected Car-2-X use cases. The involved facilities, components and interfaces of the ITS architecture, the message sets and message handling are discussed. In addition possible attacks, security and privacy concepts as well as issues on cost-benefit, validation and deployment are considered.

## Workgroup Communication

by Achim Brakemeier (Daimler)

An integrated approach for the Car-2-X Communication System as discussed in the joined workshops reveals interesting aspects that go far beyond the special topics of the individual working groups. Based on the definition of "application" as something that can be experienced by the driver and a "use case" as the scenario definition that is used to test the system it is seen that the same application can be realized by quite different implementations.

Furthermore the "applications" are not longer standalone. An application like "Green light speed advisory" smoothly turns into "red light and stop sign violation warning" or more general into "intersection support". A safety warning at an intersection could use the concepts of the hazardous location warning. An intersection support "application" could be with or without

support of the infrastructure. The application can be improved by downloading the special intersection geometry, i.e. via a service offered on the service channel.

Regarding the WG COM it is an interesting observation that many of the discussed "use cases" rely on the reception of the co-operative awareness messages (CAM) and the reception of the traffic light signal phase and timing information. From the communication's point of view it could be said, that all is possible already now, nevertheless still much effort is needed to make the system reliable and robust. Therefore the current focus of the WG COM is on the following topics:

- How does the system scale with increasing vehicle density ?

The decentralised congestion control (DCC) gives some basic hints

- How is the quality of service (QoS) handled?

The definition of the QoS parameters traffic class and access class defines how to propagate requirements regarding priority, latency and reliability through the communication layers including multipath communications

- What about coexistence with other systems?

Currently at ETSI the discussion of coexistence with the CEN-DSCR tolling system pops up

Many other WG COM issues pop up when coming closer to market introduction, e.g. security, antennae, system management, channel usage etc. These topics remain challenging.





## Workgroup Security: Security Whitepaper for CAM & DENM applications

by CAR 2 CAR Security & Privacy WG

Recently, the workgroup security has completed the first version of the security whitepaper. The idea of the whitepaper is to deliberately concentrate on a reduced set of Car-2-X Applications that make use of CAM and DENM, and to provide a complete sketch of the security and privacy solutions for them. The intention is to be as precise as possible and, at the same time, keep the whitepaper short and crisp. The following topics are addressed:

- Authentication and authorisation of vehicles and roadside units using digital signatures
- Discussions on flexible, international, cost-efficient and highly automated public-key infrastructure
- Strong privacy protection through changing pseudonym certificates
- Availability protection of the communication mechanisms
- Assurance levels that define degrees of protection in vehicles, e.g. by providing secure key storage

- Distinction between application-centric plausibility checks and coarse, generic plausibility checks performed by the security at lower layers

However, the whitepaper not only provides an overview on the agreed technical solutions. Another major concern is to incorporate transversal aspects and deployment considerations, which are of paramount importance to design feasible security and privacy measures. Therefore, the whitepaper pays special attention to

- Cost, feasibility and organisation of security. One example is to give answers on balancing fundamental tradeoffs, e.g. between revocation and short-lived certificates. Another question concerns the requirement of – intermittent – infrastructure connectivity for security purposes, such as management of certificates.
- Architectural considerations on how to integrate security mechanisms in the vehicle and processes to interact with infrastructure (e.g. pseudonym refill).

- Efficiency of security mechanisms, for example how to keep the security overhead in message and the computational footprint of cryptographic algorithms balanced.
- Flexibility for deployment by identifying a range of options, e.g. for the pseudonym change interval.
- Open issues that still have to be addressed in more detail.

In summary, the security whitepaper represents a core of security measures for Car-2-Car Communication, which is already harmonised and vividly discussed between members of the group. It has been a very productive work, and despite of the short length, the whitepaper addresses all most relevant questions of Car-2-Car Security and Privacy. The paper has already been promoted to ETSI ITS WG5, which is going to endorse the results and statements in upcoming new standards for ITS security.

## Workgroup Simulation: Glossary, selected use cases and work package definition by Tobias Lorenz (DLR)

The aim of the workgroup simulation (WG SIM) is to set up a handbook considering simulation issues which are relevant for the investigation and evaluation of co-operative systems. Within this handbook guidelines and codes of practice to set up and execute simulation tests will be provided.

Therefore the workgroup simulation defined work packages and chose leaders for these work packages at the beginning of this year. The outcome of these work packages will provide the basis of the planned topics of the handbook. A first draft of the handbook is intended to be available by the end of this year.

To avoid misunderstandings as certain terms in the area of co-operative systems are defined or used in a different context between different users a common glossary focusing on simulation terms and terms which are related to the research area of co-operative systems is provided by the WG SIM. By now the glossary includes about 100 terms and will be extended during the work of WG SIM. Referring to the standardisation efforts within the domain of co-operative systems this glossary could be a starting point

to set up a workgroup overlapping common and standardised terminology.

Before starting the work in the further work packages the WG SIM has collected the current state of the art in the area of simulation and information on how is testing done today by different partners. In another work package two use cases were chosen to exemplarily outline certain procedures and methods which are introduced and explained by the planned work packages. These two use cases are “Green Light Optimal Speed Advisory (GLOSA)” based on Vehicle-2-Infrastructure Communication and “Car Breakdown Warning” based on Vehicle-2-Vehicle Communication.

The following work package deals with the description of use cases and the investigated systems under test (SUT) which is derived from the use case description. Therefore a method or template to describe use cases will be outlined considering a general description, requirements of the use case, performance indicators (PI), effects of the use case, possible stakeholders, etc. From this use case description the SUT will be

derived including for example a possible modelling architecture, relevant components and models for the identified components. Parallel to this work package, requirements for PIs, e.g. how to set up PIs, what are the requirements of the measurement values (accuracy, sample time), etc will be defined. Out of these described work packages requirements for the simulators to be used to investigate and evaluate the system under test can be derived.

Another work package deals with the set up of test scenarios in the area of simulation tests. Therefore a scenario template will be defined for the description of test scenarios. Afterwards test scenarios for the two chosen use cases will be defined and described using the scenario description template.

Finally a first draft of the handbook will be available by the end of the year. This first draft will continuously be extended by further topics like the definition of reference scenarios, validation procedures for simulators and others.



## Workgroup Standardisation

by Dieter Seeberger (Daimler)

Standardisation of Co-operative ITS based on the inter-vehicle communication system is one of the main objectives of the consortium. This task received a strong momentum from the European Commission by issuing the standardisation mandate M/453 in October 2009. This mandate invites the European Standardisation Organizations ETSI, CEN and CENELEC to develop the necessary set of standards, specifications and guidelines to support the European community wide implementation and deployment of Co-operative ITS.

While ETSI and CEN appreciated the mandate, CENELEC did not accept because the systems concerned are out of the area covered by CENELEC. A small group with experts from ETSI and CEN, including some members of the C2C-CC, prepared a first report to the European Commission providing a list of necessary standards and other specifications e.g. for testing etc. In total 68 work items are identified. For each work item one of the two standardisation organisations is responsible, but both are invited to contribute.

Furthermore the mandate requests to invite representatives from different stakeholders to take part in the standardisation work. The C2C-CC is explicitly mentioned.

The schedule for the standardisation given by the mandate considers finalization of the documents until mid 2012. This is very challenging although there exist already several standards from CEN, ISO, ETSI, IEEE and SAE, which need to be evaluated in detail to decide, how much could be used for the set of standards required for Europe.

After the expiration of the first period for the chairmen in the ETSI TC ITS and its working groups elections took place at the beginning of this year. Sören Hess as chairman of the TC ITS and also all the working group chairmen were re-elected. For the security working group (WG5) Brigitte Lonc from Renault is appointed as vice chair. Co-operative ITS is well on the way. For several work items draft documents are available and some important standards like the ITS communication architecture and the European

profile standard for the 5 GHz radio are in the approval process for the European Norm (EN). Furthermore the standards for the two message types providing the basis for most of the safety applications, the Co-operative Awareness Message and the Decentralised Notification Message, are approved by the ETSI TC ITS.

In its Technical Committee TC 278 Road Transport and Traffic Telematics CEN has founded the new working group WG 16 Co-operative Systems as a response to the standardisation mandate. This working group established several preliminary work items, but sees itself more in the role of the coordinator of the all the standardisation work done in other related CEN and ISO working groups on the basis of the co-operation agreement between CEN and ISO, known as the Vienna Agreement. ISO Also founded a new working group on Co-operative Systems, which is WG 18 of the ISO TC 204 (ITS). Both are closely linked and chaired by Dr. Hans Joachim Schade, Germany.

## Announcement: The PRE-DRIVE C2X project's final event

by Matthias Schulze (Daimler)

### September 10th, 2010 Daimler Group Research and Advanced Engineering in Ulm.

Since July 2008, PRE-DRIVE C2X worked on an integrated approach to co-operative systems to prepare for a Europe-wide implementation of vehicular communication technology. PRE-DRIVE C2X has specified and prototyped a common European C2X communication system. Together with COMeSafety it transferred the common European architecture description into a mutually agreed specification. Based on this specification, a system prototype was realised and validated, which is now ready to be used in field operational trials to assess the impacts of co-operative driving systems.

PRE-DRIVE C2X has analysed all use cases realised by the various known projects in the area of co-operative systems worldwide for their suitability for Europe-wide deployment. The most

promising use cases in the areas of road safety, traffic efficiency, infotainment, and business and deployment were set up for live demonstrations.

They can be experienced at the event in real traffic scenarios in a number of demonstration vehicles of different brands equipped with the prototype system. In addition, PRE-DRIVE C2X has developed the necessary tools and methods for evaluating co-operative systems in field operational trials. Those methods and tools will be presented together with the results of their initial application to the PRE-DRIVE C2X use cases.

You can find details of the event as well as driving directions to Ulm and hotel recommendations on the project's website. The following link leads you to the registration form for the final event: [www.pre-drive-c2x.eu](http://www.pre-drive-c2x.eu)



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