

## C-ITS CORRIDOR: ON SCHEDULE

### Deployment of cooperative systems in the Netherlands, Germany and Austria

#### *Management Paper*

The Netherlands, Germany and Austria are on schedule for the operational roll-out of cooperative, intelligent transport systems (C-ITS) on a Rotterdam – Frankfurt – Vienna motorway corridor. The first, mature applications – roadworks warning and collection of vehicle information – have been successfully specified and tested during 2016/17, not only within all three corridor countries, but also cross-border. The emphasis is now on finalising and documenting the organisational and administrative aspects and on elaborating the operational and procurement procedures required for large scale procurement and roll-out in the corridor area. This schedule is aligned with the automotive industry's announcement that first volume models will be equipped with ITS-G5 from 2019 on. Now there is momentum for the actual joint realisation of cooperative systems, which are expected to improve traffic safety, traffic efficiency and reduce environmental impacts.

### READY FOR DEPLOYMENT

After four years of working on common specifications and technical solutions, all three corridor countries have performed comprehensive tests regarding the first two corridor-wide C-ITS services:

- Provide a **warning for roadworks** for vehicles approaching short term roadworks with closed lanes, including moving roadworks, via short range communication as well as cloud services and cellular networks (*hybrid* approach) about the exact location of the dangerous spot, in order to increase safety for road workers and vehicle drivers, as well as to improve roadworks management.
- Use roadside C-ITS stations – in particular those used for roadworks warning or similar applications on mobile safety trailers – to complement traffic monitoring information in the traffic management centres available from roadside sensors with **vehicle data** received via short-range communication from passing vehicles. This provides road operators with improved traffic management and incident detection / management information, independent from commercial providers.

The chosen **hybrid approach** (ITS G5 and cellular) ensures that the information is available on-site in real-time – in particular to increase road safety – but at the same time with minimum delay / latency also on the information backbone (often referred to as road operator cloud) for traffic information via cloud services. This will not only ensure faster take-up and market penetration of services using the data, but also allow using the data for traffic efficiency services, in particular where C-ITS information may lead to improved traffic management measures. The C-ITS Corridor partners have been engaged in harmonising the data profiles used for the backend communication towards service providers in order to ensure consistent and coherent hybrid service delivery.

As the work on the development of technical roadside components has reached the final stages and the deployment of vehicles is scheduled for 2019, there is a strong need to get into the discussion with system operators from the automotive side in order to reach agreements and specifications

regarding organisational issues and interfaces. Therefore a three phased approach (1. high level framework, 2. generic operational concept, 3. operator specific operational handbooks) for development and implementation of operational processes and interfaces is currently in the closing stage of phase two. The framework and the operational concept documents were harmonised by road operators and ministries of all three corridor states. After the harmonisation process was finalised, the documents were introduced to the automotive development partners in order to start discussions regarding the organisational interfaces between road operators and the OEMs. Further meetings between the stakeholders are scheduled for the near future.

The technical and organisational specifications that were developed and agreed within the C-ITS Corridor were an important input for the EU *C-Roads* platform. This platform has been established by currently 16 EU Member States and the European Commission to foster cooperation and harmonisation in specifying further Day 1 and Day 1.5 C-ITS services, in direct response to the recommendations from the European Commission's *C-ITS Deployment Platform*. The C-ITS Corridor provided the major input for the first version of the *C-ITS Infrastructure Functions and Specifications* document from C-Roads, together with a first draft of a *C-ITS Roadside ITS G5 Profile*, reflecting the specifications used in the C-ITS Corridor and thus stimulating a broader use of these specifications in the EU. The documents, focussing on infrastructure-to-vehicle services, are intended to complement the white papers and the *Basic System Profile* – created by the Car to Car Communication Consortium (C2C-CC) for vehicle-to-vehicle applications.

## FUTURE PERSPECTIVES, NEXT STEPS

The deployment of the two described services will provide an extensible platform that is capable of hosting further services in the future, as soon as they have been specified, implemented and tested/evaluated.

The technical and operational infrastructure profile documents extend the scope of *local hazard warnings* to cover other use cases beyond roadworks, including *collision risk warnings* where road operator vehicles provide a potential obstacle on the road. Other local information services include *in-vehicle signage* – which is also a strong contributor to road safety as it includes important dynamic traffic regulations (e.g. speed limits or overtaking bans) – as well as more traffic efficiency oriented services like the provision of *route guidance signage information* and the provision of information on topology, geography and current, real-time signal schedules for signalled junctions. The latter again allows for safety related services like *red light violation warnings* as well as traffic efficiency application like *green-light optimized speed advisory*.

The C-ITS services that will be iteratively prepared for roll-out in the C-ITS Corridor projects, based on the hybrid communication concept, are a first step towards the improved vehicle connectivity that forms one basic component of future cooperative and connected, automated mobility. C-ITS Day 1 services aim primarily at road safety and – although their information can and will be processed and used in advanced driver assistance systems on lower automation levels – target primarily the human driver. With increasing automation levels, the information provided into the vehicle will need to fulfil additional requirements, targeting environments up to fully automated driving. It can be assumed that fully automated driving in open environments will require at least two redundant information channels for safe operation, i.e. sensor and image processing will have to be complemented with digital information provided directly into the connected and automated vehicle (Day 2 Services).

During the ITS Europe conference on June 20<sup>th</sup> 2017, C-Roads and C2C-CC have signed a Memorandum of Understanding to cooperate in future steps towards large scale deployment. A joint expert group will review the Infrastructure Profile and ensure that it is on the level of granularity required for application developers to develop applications based on the provided infrastructure data. The three C-ITS Corridor countries will continue to coordinate their activities at the strategic level. An important role of the C-ITS Corridor is now to consider, prioritise and evaluate new use cases, to elaborate a suitable roll-out roadmap and to adapt service specifications to the concrete situation in the corridor.