

Event management

Europe's CVIS project has been working to create an integrated technical platform for vehicle infrastructure communication. Now at the Beta test stage, the platform offers a solution for the better management of road networks and will be demonstrated in Berlin in December, as Ertico-ITS Europe's Paul Kompfner and Selma Neuber write



Gantries for the CVIS demonstrations at the Berlin workshop; a significant feature of CVIS is the development of a common communications unit for both vehicles and roadside infrastructure

Through a programme of EU-supported R&D projects, Europe has been working to develop the 'Intelligent Car', which supports the driver with a range of advanced (autonomous) safety systems, and the 'Intelligent Infrastructure', which helps the road operator better manage traffic and inform users. The two have been brought together in a number of cooperative mobility projects aimed at further increasing driver safety and comfort, and also fleet and network efficiency.

The Cooperative Vehicle-Infrastructure Systems (CVIS) project coordinated by ERTICO-ITS Europe lies at the heart of this new programme. Now in the third year (it is due to run for four), CVIS will shortly reach a key milestone – the unveiling of the integrated technical

platform for vehicle-infrastructure communication, to be incorporated in the onboard units and roadside units deployed next year at the project's test sites.

Project background

Although driver aids such as navigation systems have proven to be both reliable and increasingly popular – especially in their portable forms – even the most effective driver support system would be improved if more and better information were available. The CVIS project is founded on the assumption that vehicle-infrastructure communication opens the way to interaction, and thus to cooperation.

The cooperative monitoring module developed within the project integrates information sent by vehicles moving through the road network with that gathered from roadside sensors and other sources, and builds up a detailed picture of traffic conditions, incidents, hazards and so on. These are delivered to users in the form of a 'local dynamic map' where the most dynamic data, such as individual vehicle location and trajectory, are plotted in relation to features such as road lane markings, traffic lights, loading bays, parking spaces and so forth.

This monitoring information is made available to a range of cooperative applications and services, such as a 'smooth driving assistant'. This might: notify a driver of the speed he or she should maintain in order to arrive at a green light at the next junction; give personalised route guidance avoiding local traffic problems; offer dynamic loading bay booking slots for delivery trucks; or even warn of wrong-way driver detection. With CVIS, drivers can view on their in-vehicle displays traffic messages and route guidance advice, variable speed limits or even video alerts of traffic jams or weather alerts. And traffic managers can optimise traffic signal timings based on knowledge of each vehicle's location, movements and even intended destination.

With systems based on CVIS results, drivers will be able to influence the traffic control system directly, and road operators will be able to address individual vehicles. Both users and operators will be able to make choices on the basis of near-perfect information on the state of traffic and of the roads. The way will be open for service providers to offer an almost limitless range of innovative services to drivers, fleet owners and road managers. ➔

➔ But the benefits will only begin to flow once the technologies are standardised, and fully compatible and interoperable equipment is available in vehicles and in roadside units and back office systems.

Universal platform

By December 2008 the CVIS project will have achieved an important milestone – the release of its universal reference platform for cooperative systems. This open platform provides multiple communication interfaces, precise positioning information and software support for vehicle-to-vehicle and vehicle-to-roadside communication.

The multipurpose CVIS platform represents both a first for Europe, and a reference for a fully flexible core which will be available both for other projects and for future cooperative system activities. Its main features include: a multi-channel mobile router able to use UMTS (3G), infrared, WLAN and 5.9GHz DSRC communication interfaces; intelligent communication and network management, using the ISO CALM standards for continuous short- and medium-range communication, as well as IETF 'network mobility' and IPv6 technologies; a hybrid positioning and location referencing unit, integrating satellite- and infrastructure-based location techniques to deliver sub-metre precision; a cooperative monitoring platform which calculates local traffic states with vehicle and roadside unit gateways, a common API for all CVIS applications, and an API for the local dynamic map; and an open application framework, which is a middleware platform offering core services for service discovery, management and provisioning.

Static and mobile CVIS applications will be demonstrated at the event in Berlin, where the CVIS team will be offering its reference platform for use by other projects and cooperative system trials



The CVIS architecture allows the same basic communication unit to be installed both in the vehicle and in the infrastructure. Also, as a peer-to-peer design, it permits almost any configuration of service host and user client. To meet the needs of vehicle manufacturers and of roadside system operators, a service gateway is foreseen in the form of a 'host management centre' which supervises the secure provision of software and services to a specific group of customers. A number of other core components have been developed, for

example for service discovery and delivery, access control, communication control and remote management.

In the last few months all these components have been tested separately and are currently being brought together into the Beta-stage integrated prototype unit.

Cooperative system workshop

A workshop and product launch event will take place in Berlin on 10-11 December 2008 featuring a cooperative system technology workshop including an overview by European experts, as well as a presentation of the CVIS universal platform for vehicle-to-infrastructure communication and services. The event will also feature static and mobile demonstrations of CVIS technology and applications, with: short- and medium-range vehicle-infrastructure communication; advanced positioning techniques; and examples of cooperative mobility applications. At the event, the CVIS team will be offering its reference platform for use by other projects and cooperative system trials.

Participants will also be able to gain hands-on experience during a number of laboratory and outdoor demonstrations. The event will present some of the most important results from CVIS, national and other European FP6/7 project results in the area of cooperative systems.

The first day of the workshop will give participants an opportunity to learn about the latest developments in cooperative systems technologies. Following an opening keynote speech by Gerben Bootsma from the Dutch road operator Rijkswaterstaat, the programme includes a panel of speakers on short- and medium-range communications with presentations on the CVIS, SAFESPOT and COOPERS projects as well as the C2C-Communication Consortium and the German AKTIV Cooperative Cars project. A session on convergence and standardisation will follow, where COMeSafety will present the consolidated European architecture for cooperative systems as well as latest news from ETSI standardisation on ITS and the procedures to use the dedicated radio spectrum for ITS in Europe.

The afternoon session will be kicked off by Telefónica, presenting its 'In-Car Box', which enhances the driving experience with advanced services and always-on communications. Further presentations cover software for cooperative systems, including the Car2Car SDK, the CVIS embedded software, and positioning and mapping within the CVIS, COOPERS and SAFESPOT projects.

The session concludes with presentations of cooperative applications, such as traffic management and cooperative monitoring, from the AKTIV,

CVIS and COOPERS projects.

An evening networking event in Berlin will give participants another opportunity to discuss the mobility of the future.

Product launch and demonstrations

The second day opens with a session presenting the communication, networking and positioning components of the CVIS technology platform. This key result of over two years' work is available for CVIS test sites, where validation will take place around the middle of 2009. It is also offered to other current and future projects, where its flexible design and architecture can support a wide range of technical requirements.

In the afternoon, CVIS will demonstrate a handover between two fast-moving hotspots based on WLAN 802.11p and roadside infrastructure in the licensed ITS band of 5.9GHz (5.85-5.925GHz). For the demonstration two gantries will be equipped on a public motorway in Berlin Adlershof with a WLAN 802.11p antenna and communications module installed in the CVIS reference execution platform. For the first time in a public demonstration vertical handover between the GPRS/UMTS network and short- and medium-range communications based on WLAN 802.11p will be shown.

NAVTEQ together with CVIS partners will follow with a demonstration featuring enhanced positioning, real-time maps and location referencing. To finish, Mizar will show a traffic management application including a speed profile application.

To close the event, ERTICO will open the CVIS 'Application Submission Contest', in which software companies can provide ideas for the cooperative system applications. The best applications will be shown at one of the 10 CVIS test sites in Europe and will be awarded a prize at the ITS World Congress in Gothenburg.

What next for the CVIS platform?

The universal platform is a major step towards mature vehicle-to-vehicle and vehicle-to-infrastructure communication and services. ERTICO Director of Development & Deployment Vincent Blervaque explains, "The application of such technology is promising. It is expected to lead to the development of many new and enhanced in-vehicle and cooperative services for increased road safety, efficiency, and traveller convenience." ■

Online registration for the workshop & product launch is now open at: www.cvisproject.org. For more information contact the Coordinator, Paul Kompfner at ERTICO in Brussels. (p.kompfner@mail.ertico.com / Tel: +32 2 400 0732)