

# To the next level... and beyond

**PAUL KOMPNER, ZELJKO JEFTIC and PETER CHRIST on how the CVIS project is helping to build the co-operative world**

In February 2006 a new project kicked off in Brussels. The “Cooperative Vehicle-Infrastructure Systems” (CVIS) project would bring together 61 partners from across Europe, with co-financing by the European Union’s Sixth Framework Programme of research and development into Information and Communication Technologies. Early progress has already been reported in several issues of *Thinking Highways*. After pausing for breath following a very busy period culminating in the ITS World Congress in Stockholm, we are glad to be back with exciting news.

The project consortium has been busy creating a blueprint and building blocks for the new world of co-operative mobility. CVIS has been working alongside other European initiatives, such as the COMeSafety support action, and developing a reference platform containing on-board and roadside units and necessary back-office systems to make cooperative systems really work. The goal was to develop a solution to enable vehicles to talk to each other and to roadside infrastructure (e.g. a traffic light or VMS), and to traffic management and business back-office centres. The CVIS solution needed to meet the diverse requirements from a complex mix of stakeholders, including public road authorities, road operators, commercial vehicle manufacturers, fleet operators and service providers.

Looking back we can see that we have achieved a lot. We have created a reference platform that supports the needs of our partners, the goals of the European Commission (EC) ITS Action Plan and that could underpin a future European Wide Service Platform (EWSP).

## Seeing is believing

The ITS World Congress in Stockholm was an important milestone for the project. The consortium made a huge effort to be visible in the congress, but here we highlight only the very successful demonstrations. The project offered congress visitors no less than four demonstration activities, many of them shared with SAFESPOT and COOPERS integrated projects.

- The public road tours were held inside our vans and there we showcased, in the best possible way, five technology and seven application demonstrations. The lucky visitors to get a seat were treated to a well-integrated presentation of the possibilities CVIS can bring in terms of increasing traffic efficiency (by bringing dynamic speed limits in the vehicle, dynamically allowing access to certain zones and managing infrastructure resources such as parking spaces), supporting intermodal traveller, enhancing the pleasure of travelling (by, for example, social-networking or local advertisement) and increasing road safety (such as pedestrian crossing or wrong way driver applications).

- The closed track demonstrations highlighted interoperability between CVIS, SAFESPOT and COOPERS, the three major EC-supported integrated projects on cooperative systems. In addition, congress sessions on cooperative safety and traffic efficiency were well visited.

- The Demonstration Theatre hosted the ultimate crash-course on cooperative systems, in the form of a play jointly prepared by CVIS and SAFESPOT. The play showcased, in an entertaining way, the benefits of the cooperative world, how it works and illustrating the



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action needed from different stakeholder groups to succeed in deployment. A link to the video can be found on the CVIS project website in the ‘News’ section.

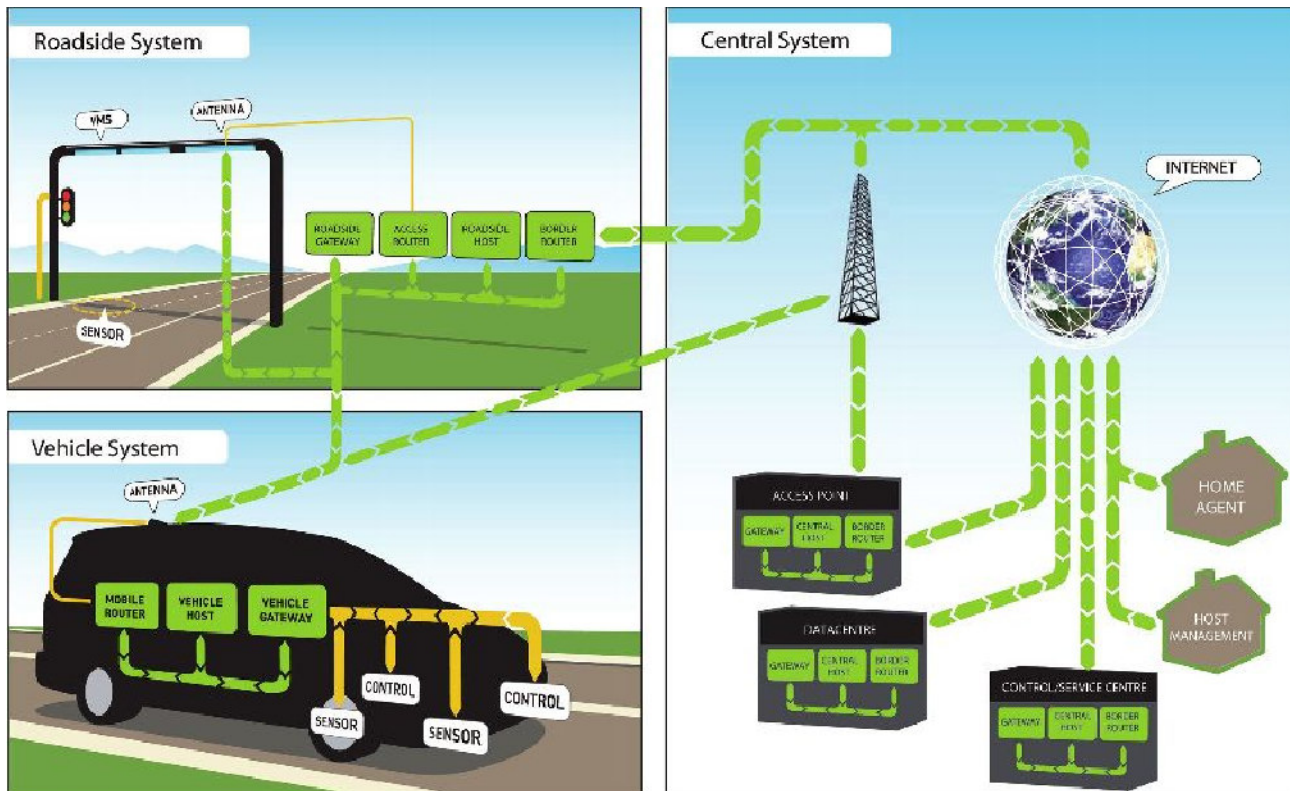
- The truck simulator with a cooperative video wall at the EC stand gave visitors an opportunity to test drive some of the key cooperative safety and traffic efficiency applications.

Whilst the ITS WC in Stockholm gave us an excellent opportunity to present cooperative systems to a wider range of stakeholders, both Stockholm and Gothenburg gave the project Partners the possibility in October to demonstrate the benefits of cooperative systems to the Ministers of Transport who united for a high-level conference under the Swedish EU presidency.

#### **A future iPhone killer?**

A modest title perhaps, but then, like the iPhone and its ‘app’ store, the CVIS platform was designed to encourage the creation and deployment of a wide range of applications to run in on-board and roadside systems. This is a key requirement for anyone who believes that Cooperative Systems will develop like the Internet. Recalling a well-worn comparison, the argument goes something like this: connecting two computers some 30 years ago gave us the unprecedented (for that time) ability to send simple text messages.

Today a smartphone or portable computer lets us watch videos, read newspapers, do our banking, search



Google and watch live video of our children on holiday in Mallorca. Today's R&D projects have shown some possibilities when vehicles and roadside systems are connected. Can we really imagine what kinds of transport-related applications and services there will be in 10, 20 or 30 years?

Whatever future we imagine, it is sure to be outdone by the reality. Therefore, we had better build a world of cooperative systems that is flexible, adaptable and, of course, always secure. The CVIS project has tried hard to create some long-lasting building-blocks to help realise that ideal vision.

This summer, in order to show how easy it is to create and deploy new applications, the project organised a CVIS Application Innovation Contest. Contestants submitted their concept ideas and those short-listed received the CVIS software developer's kit (SDK), developed their applications and deployed them using the CVIS reference platform.

Four finalists were selected by a jury of CVIS Partners and presented at the ITS World Congress in Stockholm. The winning applications were chosen by the Congress delegates, who awarded Halmstad University, Sweden, the first prize for a pedestrian safety system where the vehicle, on detecting unpredictable driver behaviour, informs the intelligent intersection.

The driver is then warned through the in-car display while the pedestrian receives an alert on his/her mobile phone. In addition, the traffic light phases can be altered to keep the pedestrian from crossing until the danger has passed.



LodgOn's second-prize winning Vehicle Social Networking (VSN) application is a community service where the vehicle interacts with the local environment and the public internet to exchange location relevant information (such as pot-holes or badly parked cars, which would be extremely useful in Brussels!) within a community of peers. Rather than checking all issues by hand, the community can participate in identifying, verifying and commenting on the reported issues.

The system would also allow for location-based advertising to be inserted with a relevant context.

Following the strong interest generated at Stockholm, LodgOn has recently decided to create a spin-off product. DaliReporter (cvis.dali-reporter.com) is CVIS compliant but will also be compatible with other currently available platforms, e.g. mobile phones. This shows the way forward:

deployment of cooperative systems aiming at evolution, not revolution.

**Smaller is more beautiful**

As a research project, CVIS chose function over form: the experimental hardware platform has enough processing power to run a medium size transport network. You need a trolley to carry around our first-generation "CVIS 1.0" units. Our kit is big, chunky, power-hungry and, we admit it, not cheap. Well into the project term the developer team started to dream of something sexier. Now plans are under discussion for a "CVIS 1.1" version, with smaller and well integrated on-board and roadside units.

Thanks to cooperation with Intel, these should be ready by mid-2010 when the project will finish.

So, what is inside 1.1? The router and communication management processor will be integrated into the smart antenna unit, that will also house the Wi-Fi, IEEE 802.11p, 3G, CEN-DSRC and GPS antennas. Several thick cables will be replaced by a single Ethernet cable providing access to the various radios. If needed the CVIS infra-red unit is available as a windshield solution, connecting through an Ethernet cable to both the antenna router and the CVIS host. The host computer running all the cooperative facilities and applications will be shrunk into an off-the-shelf touch-screen tablet PC. As the host software components are hardware independent, this step is fairly easy.

CVIS 1.1 will be around one-third of the cost of today's R&D equipment, power consumption will be slashed and there will still be room in the boot for your golf bags! OK, it's not yet market-ready, but CVIS 1.1 will be a reference platform ready to be used in pilot projects and field trials, in quantities up to several thousand units.

### Reaching out across Europe

The CVIS project has active test sites today in Belgium, France, Germany, Italy, Netherlands, Sweden and the UK (see Google map below). CVIS results will also be exploited in the EC-supported research project SMARTFREIGHT and the CIP-programme FREILOT pilot project. What is more, CVIS units have already been deployed at a national test site in Norway and a new test site will be equipped in Poland in 2010. Thanks to the popular CVIS demonstrations in Stockholm, several more candidate test sites are under discussion.



Of course, at this stage there are not thousands of units at these test sites but their importance lies in the possibility for local and national stakeholders to get early practical experience of the world of cooperative systems. Future deployment across Europe will be easier the more awareness, interest and experience are created through test and demonstration sites.

### Together towards deployment

The CVIS project started nearly four years ago. As the project begins to wind down early next year so a support network will start to grow that will promote, maintain and enhance the CVIS results. Many new projects will emerge that are ready to further refine the CVIS reference platform and begin the deployment of cooperative systems. To minimise the risks of divergence – that would kill

the cooperative mobility project stone dead - a number of CVIS Partners are looking at how to meet the requirements for maintaining and further enhancing the project's results.

The goal would be to have one neutral place where all stakeholders who believe in openness and cooperation come together and work jointly on cooperative solutions to meet their current challenges. More on this story in the next issues of *Thinking Highways...* **TH**

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The CVIS project's active test sites (left) and the new, smaller, CVIS 1.1 platform (above)