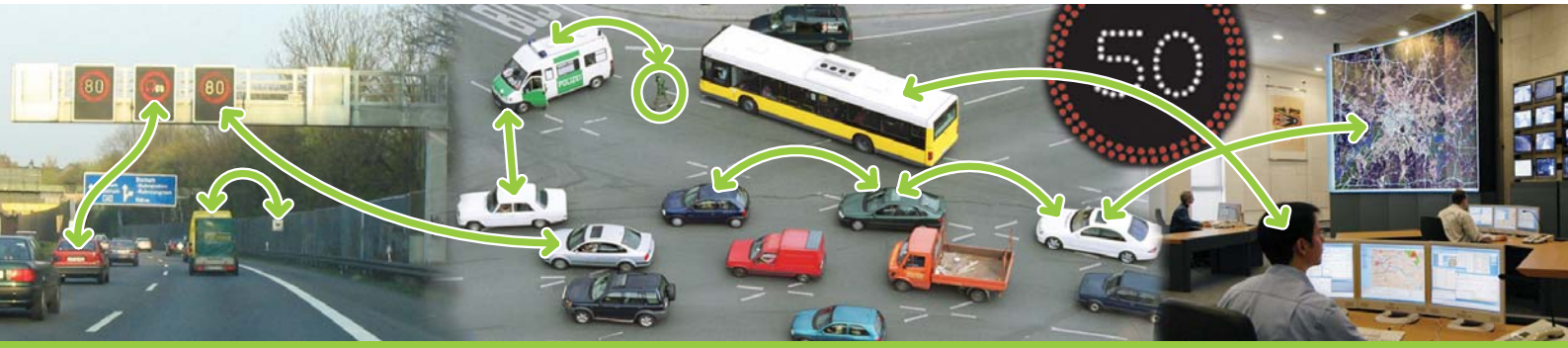
CVIS



Making the connection

Helping vehicles and transport infrastructure cooperate

The Cooperative Vehicle-Infrastructure Systems (CVIS) project aims to develop and test an innovative technology solution that will enable every vehicle to communicate – and cooperate – directly with the roadside infrastructure and with other vehicles in an effective and secure manner.

Cooperative systems promise to substantially increase road safety and efficiency, and to reduce the environmental impact of road transport. The CVIS project's ambition is to launch a revolution in mobility for travellers and goods, re-engineering how drivers, their vehicles, the goods they carry and the transport infrastructure interact.

With CVIS, vehicles will "talk" directly with the traffic management system. Road sign information such as speed limits, weather alerts, warnings of approaching emergency vehicles and other urgent messages, will be sent wirelessly to an in-vehicle display. As a result, traffic will be diverted away from incident areas and emergency services will reach accidents faster. Hazardous goods shipments will have priority along pre-selected safe routes and truck drivers will be able to book "slots" for parking, loading and unloading while they are on the road.

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However, for this cooperation to work, all makes of vehicle and different types of roadside equipment must be fitted with a common "universal communicator" unit. The CVIS project will develop a world exclusive: a standardised wireless router able to maintain continuous Internet connection, which can be fitted both in the vehicle and in roadside equipment.

Finally, to ensure no major issues prevent widespread adoption of cooperative systems, the CVIS project is addressing user acceptance, data privacy and security, system openness and interoperability, risk and liability, public policy needs, cost/benefit and business models, and roll-out plans for implementation.

Key CVIS innovations include:

- A standardised wireless network terminal for vehicle-to-vehicle and vehicle-to-infrastructure communication
- Techniques for enhancing vehicle positioning and improving local dynamic maps, using GPS and the latest methods for location referencing
- New systems for cooperative traffic and network monitoring for use both in vehicle and roadside equipment, to detect incidents instantly and anywhere
- A range of cooperative applications for driver assistance, traffic management, mobility services and commercial and freight transport
- A toolkit addressing key non-technical challenges to deployment

Developing the core technologies

To enable vehicles and infrastructure to talk to and understand each other, CVIS will use new mobile broadband technology similar to that used in a portable PC. The project is adapting such technology for mobile use, making it possible for the vehicle and its occupants to stay online while on the move.

Firstly, based on the world's first implementation of the emerging "CALM" standards for vehicle communications, the CVIS vehicle unit can provide a continuous Internet (IPv6) connection using whichever is the "best" available channel or network (choosing from mobile 2G/3G cellular, wireless Local Area Networks (LAN), short-range microwave (DSRC) or infra-red).

The CVIS unit also includes a hybrid location module with GPS and innovative positioning techniques, providing accuracy down to one metre. Another service will update and deliver to nearby users a "local dynamic map" with the real-time position of vehicles in the vicinity, relative to the local roadside infrastructure. Finally, a common solution will be developed for location referencing in all types of CVIS applications.

The third major component of the CVIS platform is a middleware layer with a runtime environment, core service modules such as security and authentication, and Application Programming Interfaces (APIs) for vehicle, roadside equipment and driver interfaces. These are based on open standards, as openness is essential to ensure that users can access CVIS services everywhere, and that service providers can address all vehicles and users.

Finally, the CVIS vehicle platform also includes a monitoring server, processing and delivering data collected from vehicle sensors, so called "floating vehicle data". When data from vehicles and from roadside sensors are fused, this provides information about the immediate traffic conditions throughout the road network as well as warnings of traffic incidents and hazards such as fog or ice.

The CVIS approach combines three core technologies into an integrated package:

COMM (Communication & Networking) is developing the communications and networking technologies that will ensure an 'always-on' connection between individual vehicles and between vehicles and the roadside infrastructure.

FOAM (Framework for Open Application Management) is developing specifications for a management framework that will make it possible to easily deploy, maintain and run CVIS applications.

POMA (Positioning and Maps) is developing specifications and prototypes for the positioning, mapping and location referencing technology that need to accompany communication in order to allow vehicles to cooperate with one another and with the infrastructure safely and efficiently.

COMO (Cooperative Monitoring) is developing specifications and prototypes for the collection, integration and delivery of real-time information on vehicle movements as well as on the state of the road network

Applying cooperative systems

Based on the CVIS core technology platform, project partners are developing a number of advanced applications that will enable a more efficient, safe and environmentally friendly use of the road network. The services fall under three main categories: urban, inter-urban and freight and fleet management.

With CVIS, urban congestion could be strongly reduced as each driver will be able to plan and send his or her destination, location and speed to the traffic management service. This information, combined with vehicle-based monitoring data transmitted to the roadside, will enable a traffic centre to set the best speed and recommend an optimised route for individual vehicles, taking into account traffic lights, accidents, weather conditions and so on. At local junction level, it will be possible to give "clusters" of vehicles more green time, helping to reduce both delay and vehicle emissions. Dynamic bus lanes that can temporarily "lend" spare capacity to non-priority vehicles will also help improve traffic flow.

"CVIS project partners are developing advanced applications and services that will enable a more efficient, safe and environment-friendly use of the road network"

On interurban highways, drivers will have an onboard display showing information sent directly from roadside equipment, providing current speed regulations, road and weather conditions in their immediate vicinity and giving them sign-based messages. Alerts and warnings about the road ahead will also be delivered, such as a traffic jam, an accident or a wrong-way driver.

CVIS freight and fleet applications will enable professional drivers to find and book a free parking or loading space while they are on the move on highways and in towns. Transport companies can monitor closely their shipments in real time, better synchronising the logistics chain. Hazardous goods shipments can receive priority on pre-selected safe routes, and any accidents can be instantly detected and safely managed.

There are three domains in the CVIS applications block:

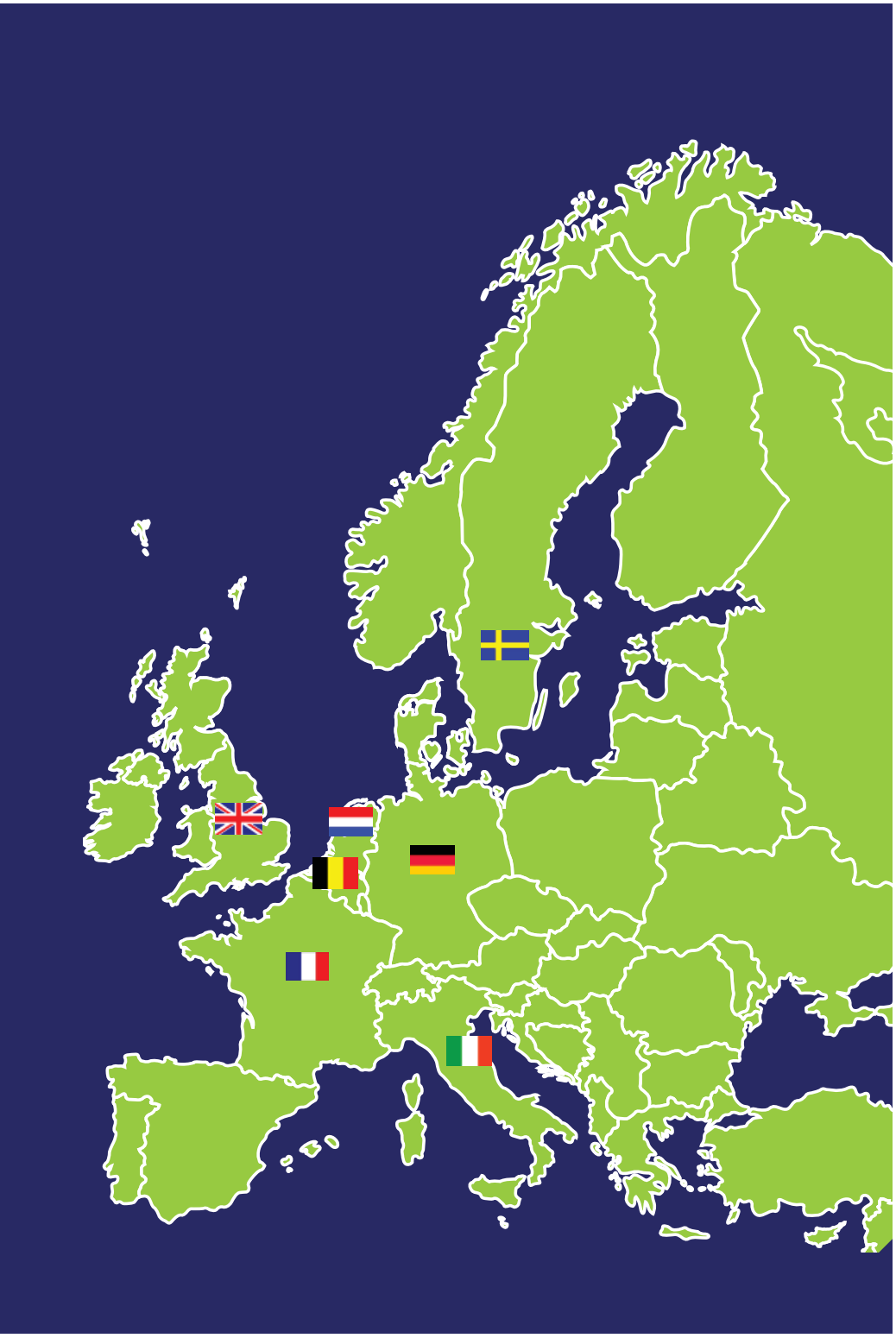
CURB (Cooperative Urban Applications) is improving the efficient use of the urban road network at both local junction and network level, and enhancing individual mobility.

CINT (Cooperative Inter-urban Applications) is enabling cooperation and communication between the vehicle and the infrastructure on inter-urban highways.

CF&F (Cooperative Freight and Fleet Applications) is increasing the safety of dangerous goods transport and optimising transport companies' delivery logistics.

Testing in the real world

CVIS applications and services will be built up and trialled at test sites across Europe, to ensure they function as intended and to demonstrate their ability to create benefits. At each site, key CVIS stakeholders will cooperate to realise the test installation and operations, including local road authorities and operators, system integrators, suppliers, vehicle manufacturers, users' organisations and service providers.



France: Fleet and freight applications to improve transport efficiency and traffic safety, as well as intelligent road signs will be demonstrated in both urban and motorway environments in the Lyon area. Another system will find truck drivers a free rest area parking space.

Germany: Inter-urban applications that allow drivers to receive information directly from the roadside infrastructure will be demonstrated in Frankfurt. In the city of Dortmund "cooperative intersections" will show new ideas for efficient and safe traffic control in urban areas.

Italy: Network management and area routing applications as well as cooperative monitoring and positioning functions will be demonstrated in Turin. Up to 100 vehicles will be involved. In Bologna, dynamic bus lanes will be demonstrated.

Netherlands/Belgium: In the area between Rotterdam and Antwerp, numerous CVIS inter-urban applications will be put to the test as well as urban applications in a medium-sized town in South Holland.

Sweden: Dangerous goods tracking and tracing will be the focus of tests in Gothenburg, and enhanced driver information in interurban traffic will also be trialled.

UK: Automatic detection of truck location, provision of dynamic parking/loading space booking facilities and links to in-vehicle routing systems will be demonstrated in one of London's busiest roads in Camden Town.

About CVIS

Project Facts
The Cooperative Vehicle-Infrastructure Systems (CVIS) Integrated Project began in February 2006 and will finish in January 2010. With over 60 partners working in 16 coordinated activities, the project has a total budget of over €41 million, and is supported by nearly €22 million of EU funding.

The CVIS Consortium
The project consortium brings together a critical mass of key actors committed to developing and implementing cooperative systems. It includes a balanced mix of organisations from the main sectors and countries that are leading Europe's effort to take forward mobility systems and services into the next generation.

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Department for Transport
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Provincie Noord - Brabant
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Swedish Road Administration
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To find out more
Visit the new CVIS project website where you can find out about the latest project developments, news and events, as well as access public project documents. You can also register as a member of the CVIS Forum, allowing you to follow the project's progress and take part in CVIS open events.

Go to the Project Website: **www.cvisproject.org**

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