CVIS welcomes you to the future of mobility!

On behalf of all our 62 CVIS project partners we are proud to welcome you to this final showcase where you can experience for yourself the fruits of their work over the last four years. Our goal was ambitious, nothing less than to prepare the foundations for a safer, more efficient and more sustainable mobility, enabled by innovative solutions for vehicle-infrastructure communication and cooperation. We hope you will come away with your own vision of how we can achieve a better future in the transport and travel domain, and with the intention to work together to realise that vision.

Paul Kompfner
CVIS Project Coordinator
ERTICO – ITS Europe

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What is CVIS?

The goal of the Cooperative Vehicle Infrastructure Systems (CVIS) project is to develop technologies allowing vehicles to communicate with roadside infrastructure and other vehicles, and to share data about the traffic status and the immediate road environment. This network-wide information, when processed and delivered to drivers, will lead to fewer traffic accidents, lower congestion delays, and reduced fuel consumption and pollutant emissions.

The project has created a standardised router for vehicle and roadside installation, providing continuous and seamless connectivity using network and "hot-spot" media such as 3G cellular, WLAN, DSRC and infrared. Innovative positioning techniques and software management for cooperative services complete the CVIS platform, which is non-proprietary. The deployment of such technologies promises to provide new services for drivers, road operators and fleet managers: e.g. synchronising vehicles with traffic lights; personalised route guidance, adapted to the time of day or other factors like congestion or road works; automatic parking/delivery zone booking for commercial vehicles in cities and motorway resting areas, etc.

The potential barriers to deployment of these systems are also addressed in CVIS: e.g. individuals' data privacy and security must be assured and CVIS proposes suitable safeguards to be built into the systems, namely for anonymising data collected from equipped vehicles.

This four-year initiative, coordinated by ERTICO - ITS Europe, is co-funded by the European Commission and is due to finish this year.

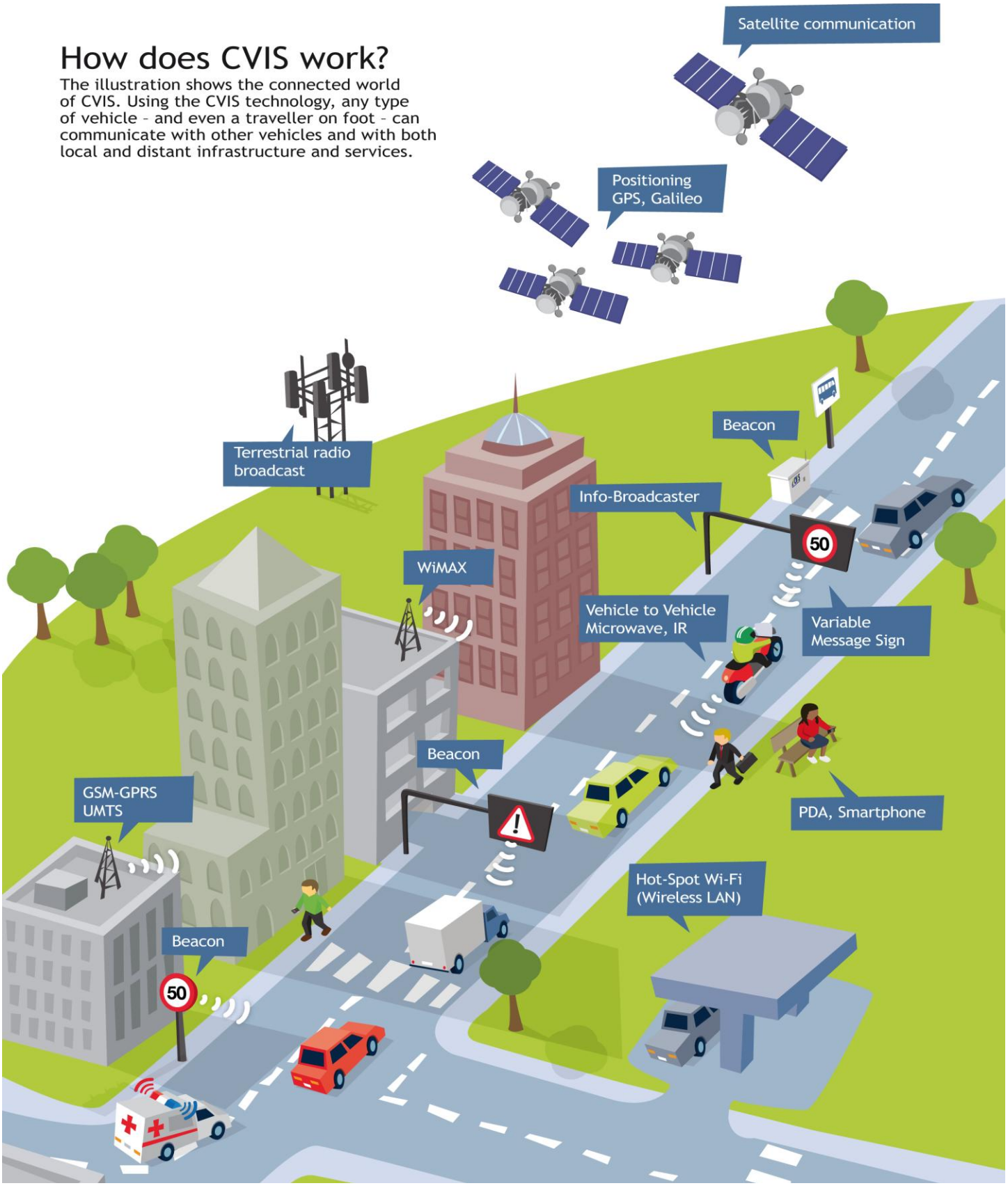
CVIS
COOPERATIVE VEHICLE-INFRASTRUCTURE SYSTEMS

Ministry of Transport, Public Works and Water Management

cooperative Showcase 2010 mobility

How does CVIS work?

The illustration shows the connected world of CVIS. Using the CVIS technology, any type of vehicle – and even a traveller on foot – can communicate with other vehicles and with both local and distant infrastructure and services.



coopers · CVIS Cooperative Vehicle-Infrastructure Systems · SAFESPOT Cooperative Systems for Road Safety · Ministry of Transport, Public Works and Water Management · AMSTERDAM RAI

To enable ubiquitous connectivity, CVIS has developed a versatile hardware and software platform that can keep online even when moving through areas of changing network coverage. For instance, it can use a 3G cellular link when in the countryside, a microwave or infra-red (IR) beam when passing under a tolling gantry and a wireless local area (WLAN) network connection in built-up areas or at equipped local facilities such as a car or truck park or service station.

Precise positioning is a necessity for many cooperative mobility applications, so CVIS has developed a solution that combines satellite with wireless network positioning and can deliver real-time lane-level positioning when combined with a high-resolution digital map.

Since an enormous variety of cooperative mobility services will in future be available to users directly via nearby roadside installations as well as from distant service centres, CVIS has defined an open application environment that is straightforward for developers while supporting both providers and users for service downloading and operation. All along their journey, users will be notified the moment when a new service becomes available, and can choose to use or pay for it. This opens the door for a future “Cooperative Mobility App-store” in the vehicle, as in today’s smart phones.

Cooperative systems are not just some flashy new technology. Their recent growth in popularity is a response to the limited success of island or proprietary solutions for connected vehicle services, and reflects the wish to create a family of much more immediate and local applications for driver safety and traffic efficiency. Until now connected vehicle systems tend to rely on wide-area communications, and to incorporate only a few, fixed services. This makes them relatively expensive to install and limits the coverage area and the potential source of revenue.

The CVIS approach has been to create a single open architecture and reference platform that integrates with both vehicle and roadside systems.

Second, the CVIS communication solution is medium agnostic, i.e. it provides both direct and networked connectivity using the most appropriate medium available in a given situation.

Lastly, the reference implementation allows different services and applications to be added with ease and work together collaboratively.

Where can you see CVIS in action?

At the Public Road Tour!

The Public Road Tour features cooperative safety and mobility applications developed by the CVIS, SAFESPOT and COOPERS projects in a live environment on the public road network.

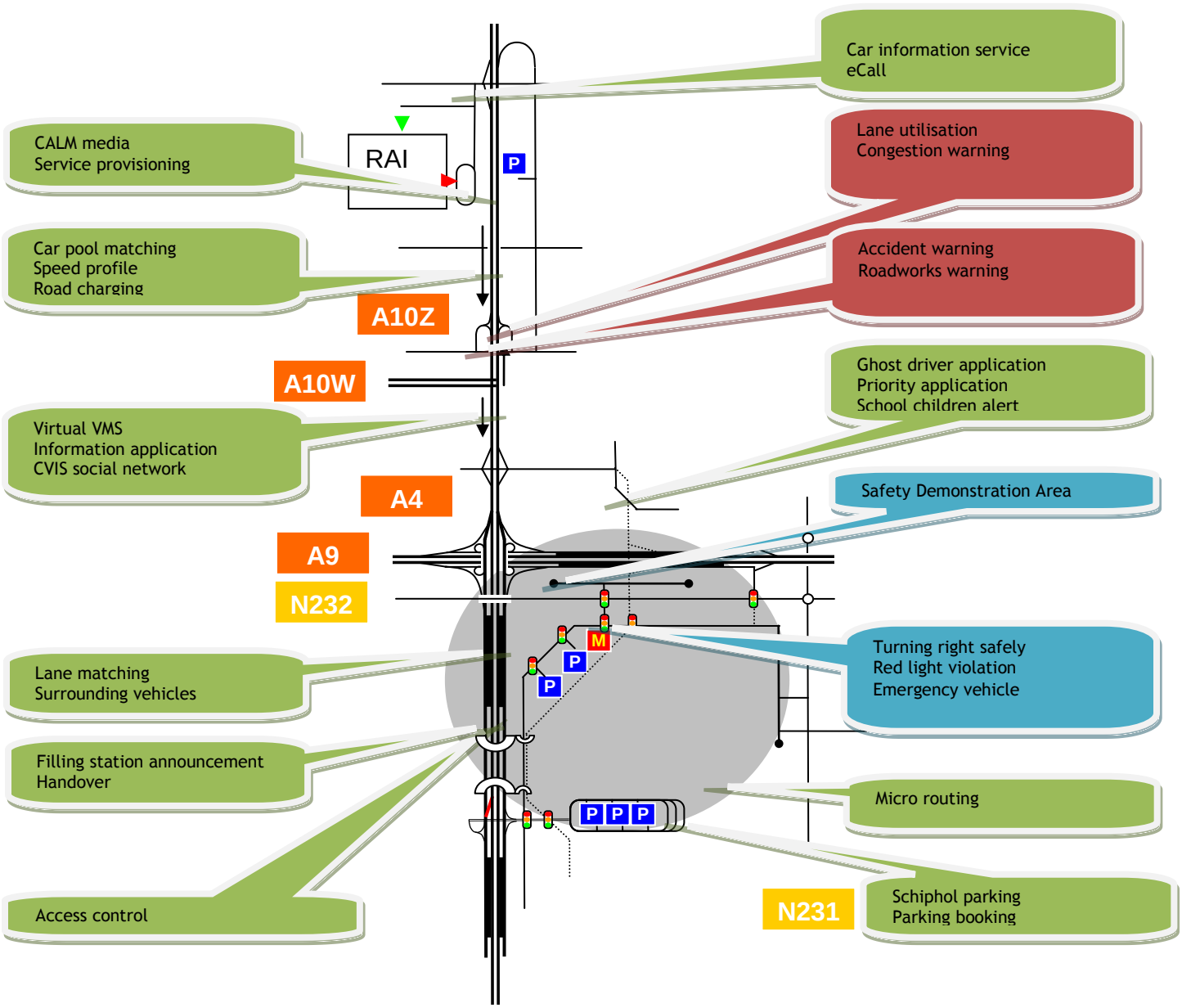
As you drive on the highway between Amsterdam RA I and Schiphol airport, and on minor roads nearby, you will experience cooperative system applications providing efficiency, safety, comfort and information benefits.

Special tours for journalists, complete with photo/filming opportunities, and just after the press conference, are scheduled for Wednesday 24 March at 13.20. CVIS Project experts will be on hand to answer any and all queries!

As a Tour visitor you will see:

- demonstrations of technology developed by the CVIS, SAFESPOT & COPERS projects;
- a wide range of valuable cooperative services and applications;
- how cooperative systems could improve on traditional technologies for efficiency, safety and environmental impact of mobility;
- the results of extensive public-private cooperation.

The Public Road Tour



In-vehicle units

Each minivan is fitted with a smart antenna, a car PC running the PRT applications and a display unit. All vehicles will show the same programme of applications during the tour.

CVIS applications

CALM media

A key CVIS achievement is the seamless handover between a variety of communications channels used for cooperative systems. The system switches readily between M5 (local microwave communication at 5.9GHz dedicated for ITS use), 3G (cellular wireless internet) and infrared (short range) communication media, depending on the specific application's need. This demonstration displays all the channels actively communicating with all the vehicles and road side infrastructure in range.

Bird's-eye view

Given the seamless handover between a variety of communications channels used for cooperative systems and the improved positioning technology, in-vehicle and road-side CVIS units can communicate precise information regarding their location and system type, and if applicable, vehicle heading and speed. Applications could access this information for specific purposes, ranging from social networking to safety related warnings. This demonstration shows a map of the surrounding area on which CVIS systems which are in communication range of the in-car system are plotted.

Service provisioning

The open nature of the CVIS platform makes the automatic downloading of applications smooth and easy, so that new services can be added to the car platform during the ride. In this demonstration the roadside unit announces that the CVIS application is mandatory for a specific area. Next, the application is downloaded from an Application Management Centre.

CALM handovers

The CVIS platform offers continuous communication for applications based on the ISO CALM standards. CALM manages available communication interfaces and automatically connects applications to the best interface. The handover between interfaces is fully transparent to the applications – all based on CVIS implementations of the latest standards. This application will demonstrate communication performance as the vehicle is moving in and out of coverage of the various interfaces; visualising the data throughput, handover performance, and the route (coloured) the data takes from a server to the vehicle.

Lane matching

Enhanced positioning provides a major step forward compared to the current technology. Enhanced positioning developed within CVIS creates opportunities for road efficiency, e.g. dynamic hard shoulder use or flexible use of a bus lane. The demonstration shows the car matched to the lane in which you are actually driving.

Virtual VMS

The Virtual VMS application enables the traffic management centre to provide drivers with routing or safety related information. The demo shows the live TMC messages as displayed on the VMS signs next to the highway in the vehicle. One of the added values is that the application adjusts the language of the message to the drivers' preferences. Another advantage is that messages can be broadcasted by a road side unit, which reduces cost on VMS signs and increases the availability.

Road user charging

The road user charging application implements kilometre based tolling according to the Dutch government proposal for truck tolling. It is based on a POMA based distance calculation with congestion zones (cities) and congestion corridors (road segments) with increased tariffs. It also supports rush-hour tariffs and geo-fence based charging points (virtual gantries). This part of the public road tour shows the information and tariffs for this part of the ride, and how fares are calculated in-vehicle for privacy. Aggregated distance is communicated periodically utilising CALM and IPv6 to the EETS compatible tolling back office in direct contact with the in-vehicle application.

Emergency call

The eCall application shows how the CVIS open platform can be used for incident management and in particular sending an eCall (emergency call) to the back office of the Dutch road administration (Rijkswaterstaat) The application shows how the driver will deal with an automatic eCall or one which is manually triggered. eCall is an European initiative to save lives on European roads by automatically calling the emergency number 112 . The message contains the position of the vehicle and the driving direction and extra relevant information for the emergency services.

Schiphol parking service

The Schiphol parking application, by the Dutch SPITS consortium, shows the CVIS concepts applied to existing systems. In this demonstration you see a consumer navigation device, enhanced with CVIS functionalities, guiding you to the right parking lot at Schiphol. Also shown is the CVIS roadside unit with integrated SPITS sensors, which detects the location of free parking spaces. You will be navigated to your free parking space.

Speed profile

The application provides speed advice to the driver based on current and future traffic signal stages. This application uses short range (CALM/ WAVE) communications to exchange information between the traffic controller and vehicles. The Traffic control strategy is communicated to the vehicle in order to give it a 'green window'. If the vehicle is stopped at a traffic light, the 'time to green' is shown on the control panel display. The demonstration shows how existing traffic control systems can benefit from a cooperative vehicle-infrastructure approach.

Priority application

Priority is requested for a vehicle approaching a traffic signal. In case no immediate priority is possible speed advice can be given so that the vehicle creates its own green wave. In practice this priority application can be used for public transport and heavy transport. Preventing heavy vehicles braking reduces CO2 emissions greatly. This will be demonstrated at two intersections along the "Loevensteinse randweg".

Micro routing

Equipped vehicles receive routing advice based on traffic light plans, the network, congestion, incidents or environmental constraints. The driver receives both the estimated best route to his destination, as well as a predicted trip time for the best alternative. The main innovative aspect of this application is the use of detailed traffic signal plans rather than average traffic flows to predict travel time

CVIS social network

This application provides a platform that allows governments or road authorities to enhance road safety by enabling a 'community' to report issues, enhance and validate its quality and be informed about those reported problems and their planned resolution. This application was developed for the CVIS application innovation contest 2009 and received the second prize. Lodgon is not partner in the CVIS project and showed how independent application developers can use the CVIS platform and create new applications.

City information services

This application demonstrates the type of information services which local governments can provide drivers. Based on on-line information services, a driver can be informed about parking locations, public transport alternatives, road construction, touristic sites and more. This demonstration shows how the local government of Amsterdam can provide a connection to its numerous autonomous online services.

Information application

The goal of the CVIS information application is to provide the driver with real-time traffic state, incident information and route options. The high quality traffic information that is required for this purpose is collected by continuously monitoring, analysing and predicting the road network state. The relevant information is broadcast to an on-board computer and presented to the driver. The relevance of the information is based on the driver's request and/or the location and direction of the vehicle. The demonstration shows a basic version of the information application: a visualisation of the local roadside signalling information.

Access control

The vehicle receives an announcement when it approaches the controlled area of the city of Amsterdam. Specific rules are downloaded relating to the actual local situation, e.g. a truck-free zone. When entering the sensitive area, the rules are applied and matched with the specific vehicle's information to allow or deny access. If no access is allowed navigation recommendations are provided that avoid the area and guarantee smooth continuation of the journey.

School children alert

The in-car system also allows for dynamic safety information to be provided to the car. In the tour, you will experience two examples of this safe drive application. First, a time-based warning for school children is sent to the car whenever appropriate, e.g. during school opening and closing times. The other warns of a dangerous crossing ahead, enabling the driver to adapt his speed in advance. The warning can be made dynamic, i.e. only given when a person is actually near the crossing.

Wrong way driver alert

This example shows how car-to-car communication is handled by the CVIS communication framework. In this demonstration, we receive a safety warning from another CVIS equipped car (driving the wrong way on a road) which sends warnings to all vehicles in the vicinity. The traffic control centre is also informed. The control centre can immediately inform approaching vehicles on the route for the hazard in advance before they actually encounter the vehicle coming in their direction.

Carpool matcher

Within the CVIS project, the applications team organised an open contest for designing new applications. The carpool matcher shows how to diminish traffic and the corresponding jams through ride sharing. The application suggests inviting passengers to join the same car, when potential passengers for the same destination are cooperatively detected. In addition to reducing traffic, this application saves fuel consumption and instantly creates opportunities to meet new people!

Petrol station announcement

While driving, it can be useful to be informed about various services along the road, either by subscription or for free. During the tour the system monitors the options for refuelling, matching in-car information of the remaining fuel with the offer from nearby petrol stations. Personal preferences for a brand of fuel (e.g. due to company fuel policies) can be included seamlessly.

Parking booking

This application arranges a reservation of the minivan parking space at the start and end points of the road tour. In this application, the minivan can make a reservation either automatically or when prompted. A central booking system processes the reservation and informs the vehicle of the parking location and time slot. If needed, due to e.g. traffic delays, an updated time or location will be suggested by the system.

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A Video News Release is also available on request.

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This initiative is proudly supported by its consortium partners. The CVIS project brought together an unprecedented mix of public authorities, software developers, system integrators, road operators, service providers, systems suppliers, vehicle manufacturers, research institutions and users' organisations:

ygomi, Renault, Province Noord-Brabant, Transport for London, Telecom Italia, Trialog, Sintef, RACC, Siemens, Thales Alenia Space, Efkon, Hessen, Telematics Technologies Transport Traffic Turin, Autoroutes du Sud de la France, Vodafone, Volvo, DLR, infoblu, mizar, atc, INRIA, Vägverket Swedish Road Administration, Thomas Miller, mm-lab, AMC, FEHRL, Intempora, mapflow, Tele Atlas, Technolution, BAE Systems, Imperial College London, NAVTEQ, Vialis, TNO, Bosch Invented for life, kapsch, Trafic Lacroix, PEEK traffic solutions, Ramsys, Mobiliteit en Openbare Werken, traffic mobility logistics, CIT Cork Institute of Technology, ERTICO ITS Europe, Highways Agency, LCPC, makewave, Thetis, Polis, CRF Centro Ricerche Fiat, HTW, logica, Daimler, Department for Transport, Grand Lyon, Q Free, Lindholmen Science Park, Rijkswaterstaat, Telecom Bretagne, MAT.Traffic Innovative solutions for traffic systems, Heudiasyc, utc, cnrs

CVIS Cooperative Vehicle-Infrastructure Systems

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