CVIS: First results from tests and validation

Peter Christ
ETSI ITS Workshop
5 February 2009
Project objective

Increase efficiency and safety through V2V and V2I cooperation enabled by:

- an open architecture and an universal platform prototype
- a wireless network amongst vehicles & infrastructure
- a framework for application management
- enhanced positioning and mapping solutions
- cooperative data management and sharing
- innovative cooperative applications
Project facts and figures

Coordinator: ERTICO
Budget/EC funding: M€41/22
Partners: 61 partners
Technology developments
(a few examples)
Tests and demonstration in Berlin
December 2008
Road site Equipment

DLR operates appr. 1.2 km of an Urban Road Research Laboratory (Test Track) with sensors, two gantries and high data rate access via control cabinets.

Control cabinets with air condition, power supply, data lines and free space for further equipment

DLR owned gantries with any time access for mounting sensors
Demonstration Vehicles

CVIS rented two transporters with 8 seats for the M5 demonstrations. Installation effort: 2 hours per car
CVIS Reference Platform

- The reference execution platform in CVIS consisting of a CVIS host and a CVIS router.
- The Router platform is controlling the 3G and M5 communication modules.
- The Host platform hosts the CVIS middleware and service provisioning application.
Service Provisioning

- Automatic service application provisioning
- Triggered by CALM M5 communication.
- Different provisioning concepts, i.e., automatic, operator driven, and end-user driven, and operator driven
CVIS Host

Service Applications

Core Technology Applications

Middleware

Basic Application Facilities
- Dangerous Goods
- Parking Reservation
- Dynamic Bus Lane
- Enhanced Driver Awareness
- ...

Domain Facilities
- Payment
- Traffic Mgmt
- Positioning
- Map
- Native app mgmt
- ...

Runtime environment (OSGi based)

FOAM

Operating System and Hardware (sensors, actuators etc)
Berlin – Test Site

31 August 2008
M5 Network in Berlin
M5 Vehicle Antenna

- 5 individual antennas
  - 1 DSRC system
  - 1 GPS antenna
  - 1 2G/3G antenna
  - 2 802.11p antennas
- Antenna aluminium base
- Specifications are met
- Vehicle Rooftop Antenna Unit has been designed, manufactured, electrically tested and delivered to CVIS and Safespot partners
CVIS Platform Performance
M5/802.11p

• Ranges:
  – V2V with omni-antenna on 5.9GHz: up to 400 meters
  – R2V with omni-antenna on 5.9GHz: up to 400 meters
  – R2V with directional antenna on 5.9 GHz: up to 600 meters

• Caveats:
  – 5.9GHz has a line-of-sight limitation, i.e. communication will NOT work around corners unless stations are very near each other (<20 meters)
  – The values above are best cases. 30-50% less performance nominal
  – When using the 5.4GHz WLAN band for high-capacity file transfer, 30-50% extra nominal reduction due to legal power limitations

• More Access Routers may be used to extend range of RSU
Infrared communications module

CALM Infrared On-board unit

- Two active CALM IR channels. Straight overhead and left + right overhead
- Communication Protocols: IPv6 and CALM Fast
- Communication range: 30m
- Used in CVIS
Infrared communications module

CALM Infrared Road-side Unit

- One channel active CALM IR with 2 Mbit/sec
- Communication Protocols: IPv6 and CALM Fast
- Communication range: 25m
- Used in CVIS and COOPERS
The CVIS Core Software toolkit offers

- vehicle-to-vehicle and vehicle-to-infrastructure communication protocol stack
- channel-switching (3G, 802.11p, IR)
- software provisioning and service announcement
- life cycle management of services and applications
- software freely available for other projects and users under the CVIS license agreement
- quick and easy application creation
Application Submission Contest

Phase 1

CVIS application idea (form)

Phase 2

Development based on CVIS reference platform

Phase 3

@ test site

Assessment 1
eligible applications

Assessment 2
finalists

Assessment 3
winners

Stockholm WC
1st prize
2nd prize
3rd prize

finalists
Standardisation

ETSI TC ITS
- WG1: User & Application Requirements
- WG2: Architecture and Cross Layer
- WG3: Transport & Network
- WG4: Media and Medium
- WG5: Security

Other projects/activities/bodies

Harmonised standard

• Radio Channel Recom. (ETSI EN 302 571)
Results on show

- CVIS Showcase 2009 (13 May 2009, Helmond)
- CVIS Demonstrators across Europe (June – Oct 2009, 7 countries)
- ITS World Congress (21-25 September 2009, Stockholm)

Cooperative Systems Showcase 2010
Thank you and welcome!

Cooperative Systems Workshop

13 May 2009, Helmond

For more information please:
email cvis@mail.ertico.com
or visit www.cvisproject.org