

THE FULLY NETWORKED CAR



Roberto Brignolo

The SAFESPOT Integrated Project: Overview of the architecture, technologies and applications



CENTRO RICERCHE FIAT

Geneva, 5-7 March 2008



Project type: Integrated Project (IP)

Co-funded by: the European Commission Information Society and Media in the 6th Framework Programme

Promoted by: EUCAR

IP coordinator : Roberto Brignolo Centro Ricerche FIAT (IT)

Consortium : 51 partners (from 12 European countries):

OEMs (cars, trucks, motorcycles)

ROAD OPERATORS

SUPPLIERS

RESEARCH INSTITUTES

UNIVERSITIES

Timeframe: Feb. 2006, Jan. 2010

Overall Cost Budget : 38 M€ (European Commission funding 20,5 M€)

The SAFESPOT concept 1/3

SAFESPOT is working to design cooperative systems for road safety based on vehicle to vehicle and vehicle to infrastructure communication.

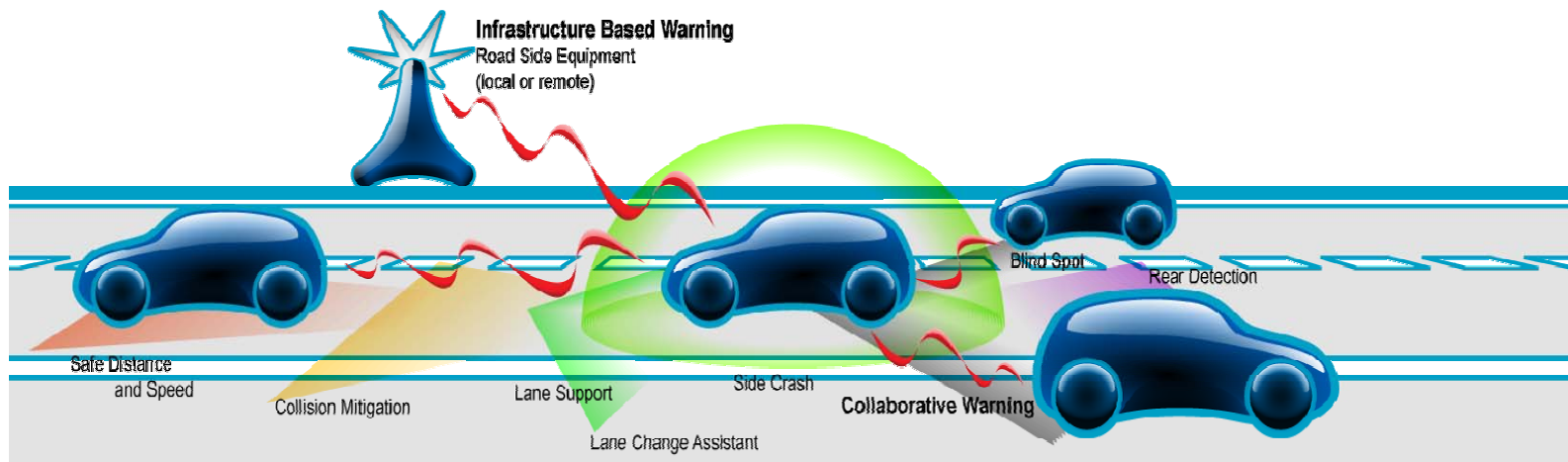
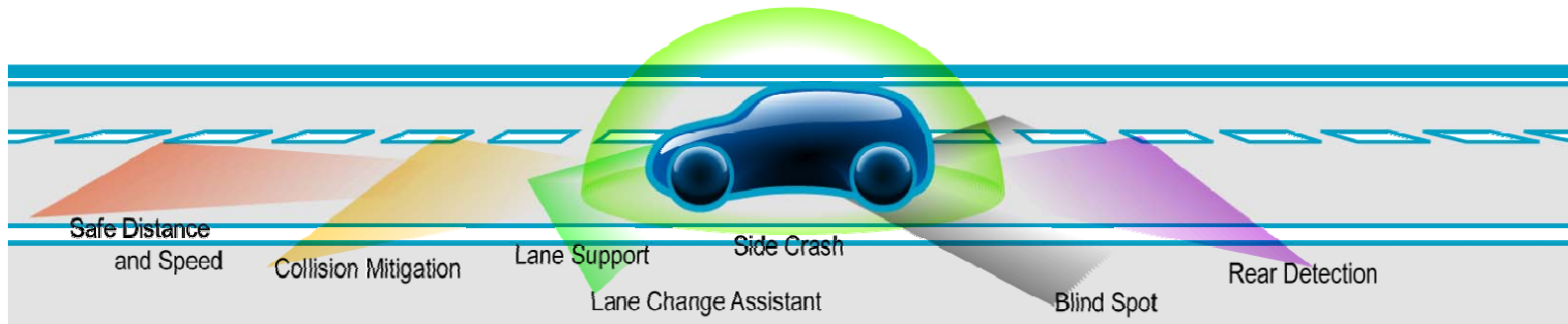
SAFESPOT will prevent road accidents developing a:

“SAFETY MARGIN ASSISTANT”

to detect in advance potentially dangerous situations and extend, in space and time, drivers' awareness of the surroundings.

The SAFESPOT Concept 2/3

...from autonomous intelligent vehicles to cooperative systems...

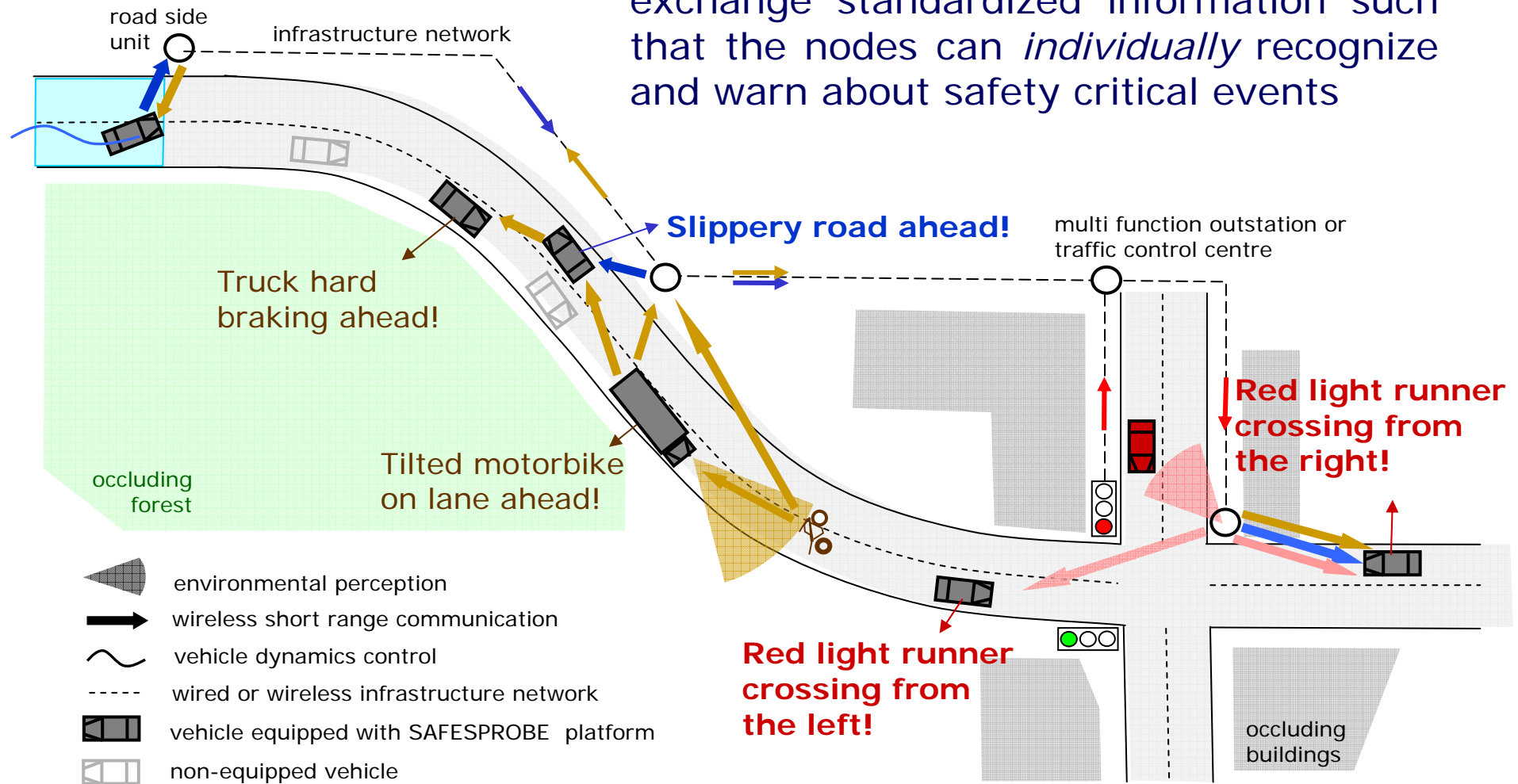


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The SAFESPOT concept 3/3

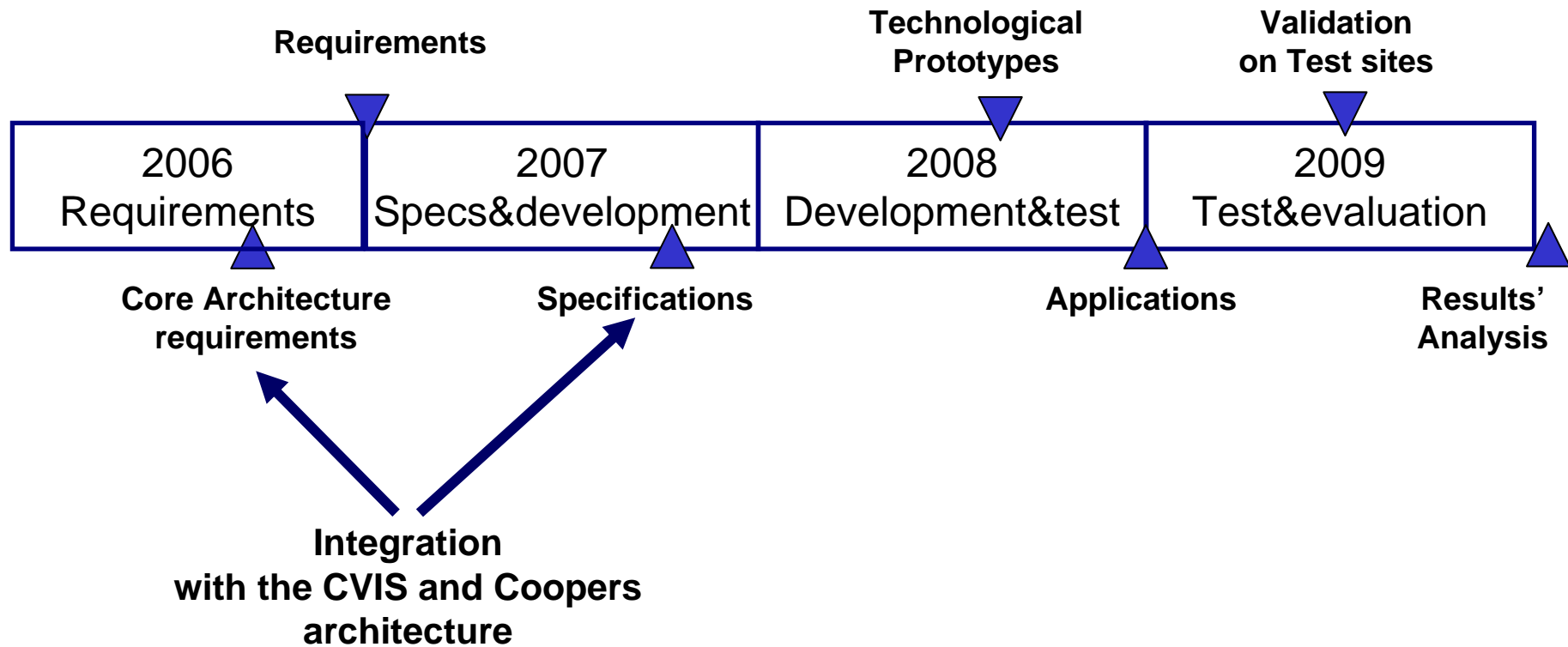
The node's platforms generate, store and exchange standardized information such that the nodes can *individually* recognize and warn about safety critical events



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The SAFESPOT Planning



The SAFESPOT enabling technologies

Reliable, fast, secure, potentially low cost protocols for local V2V and V2I **communication**

A reliable, very accurate, real-time **relative positioning**

A real time updateable **Local Dynamic Map**

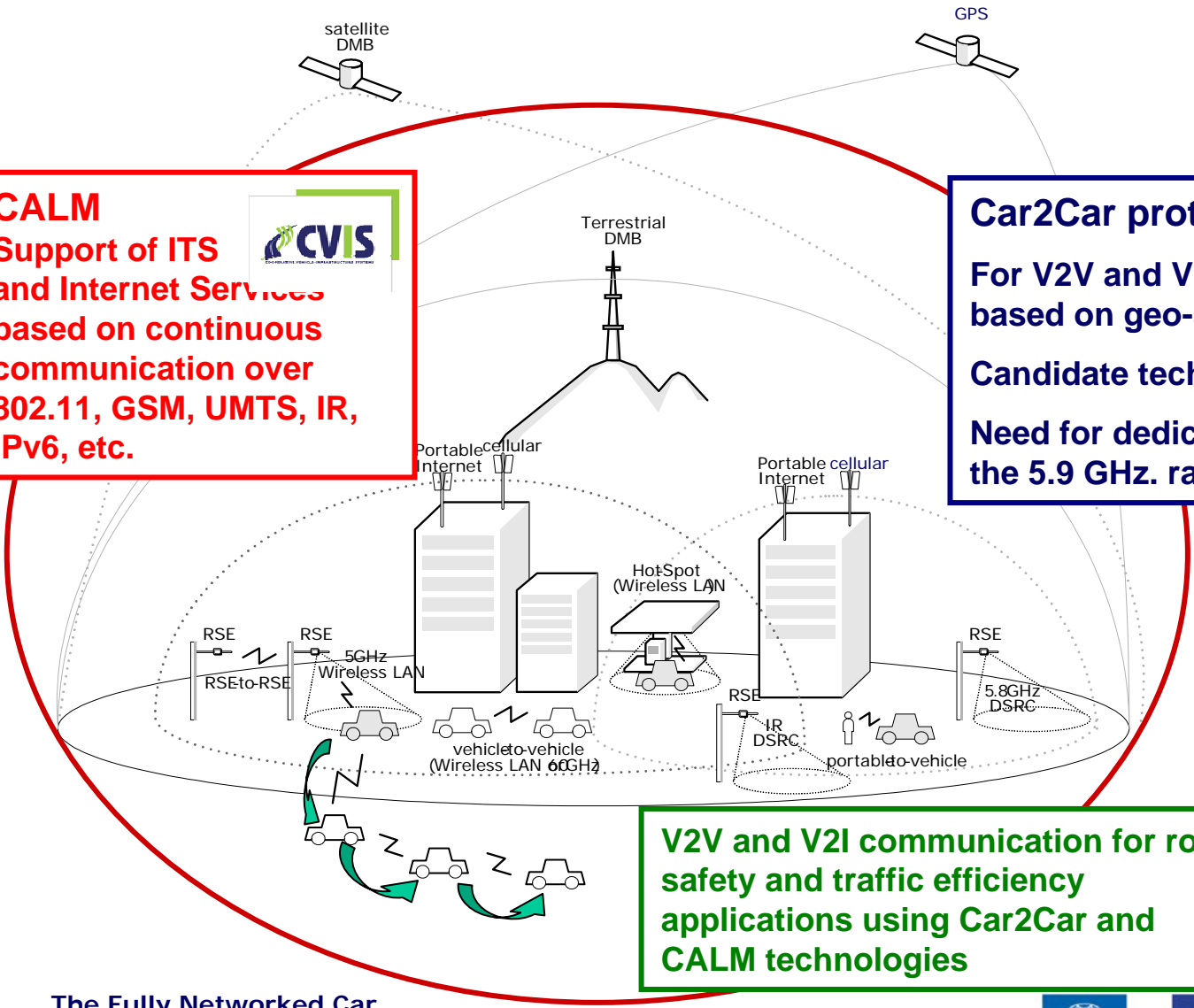


The SAFESPOT Enabling technologies: ad hoc communication network

CALM
Support of ITS
and Internet Services
based on continuous
communication over
802.11, GSM, UMTS, IR,
IPv6, etc.



Car2Car protocol
For V2V and V2I communication,
based on geo-aware multi-hop routing
Candidate technology: IEEE 802.11p
Need for dedicated frequency band in
the 5.9 GHz. range



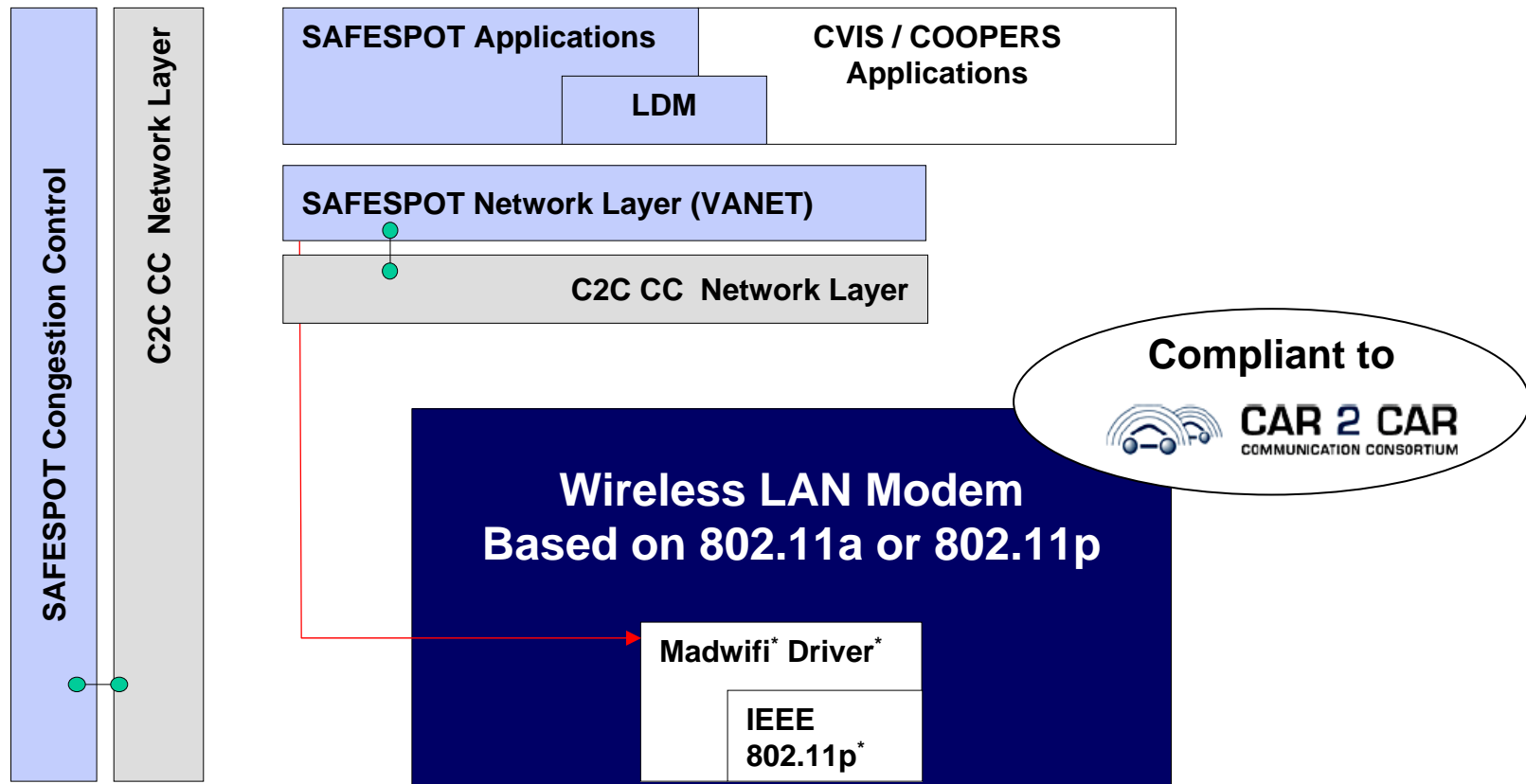
**V2V and V2I communication for road
safety and traffic efficiency
applications using Car2Car and
CALM technologies**

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The SAFESPOT Enabling technologies: ad hoc communication network

SAFESPOT, C2C-CC Layer Diagram



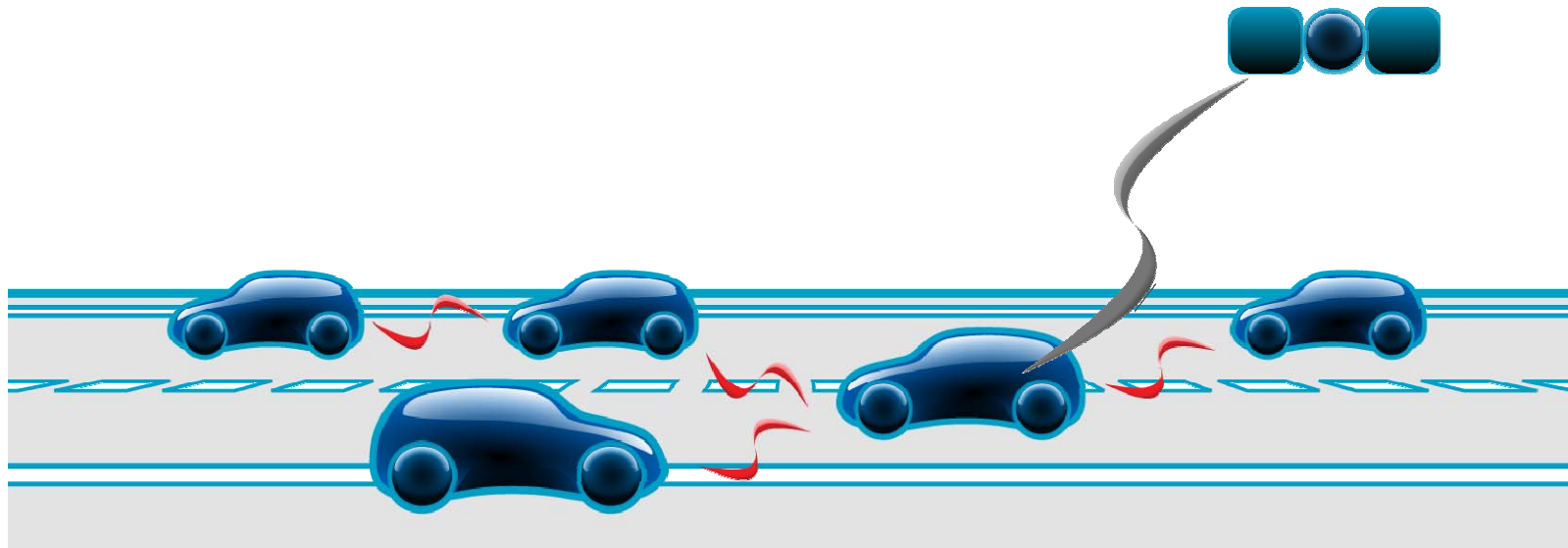
The C2C-CC and CALM harmonization is under discussion by the two working groups

The SAFESPOT Enabling technologies: relative positioning

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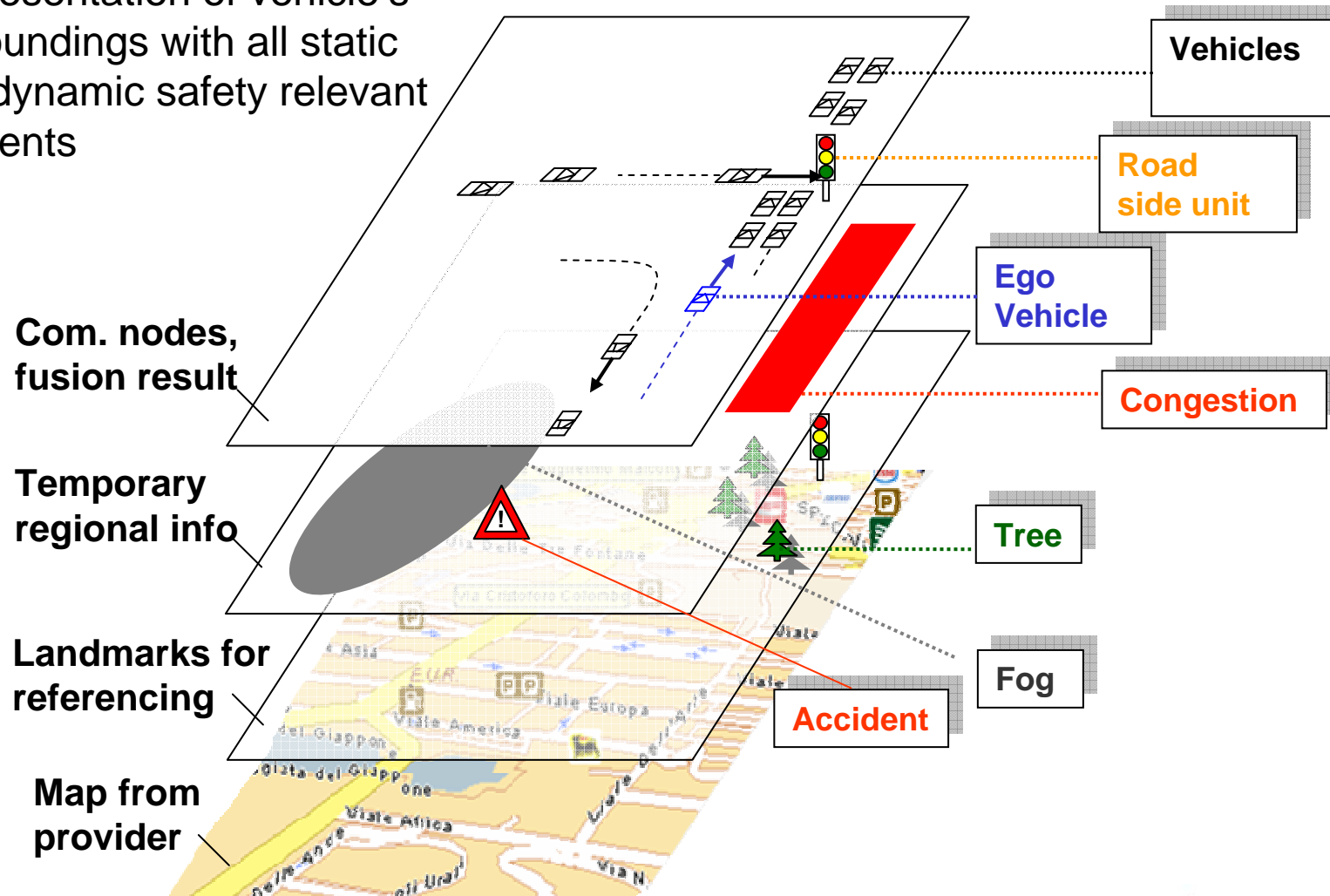
Reliable, very accurate, real-time relative positioning

- GNSS-based Positioning (GPS, Galileo)
- Communication-based Positioning (UWB, WLAN)
- Image-based Positioning (Landmarks recognition)

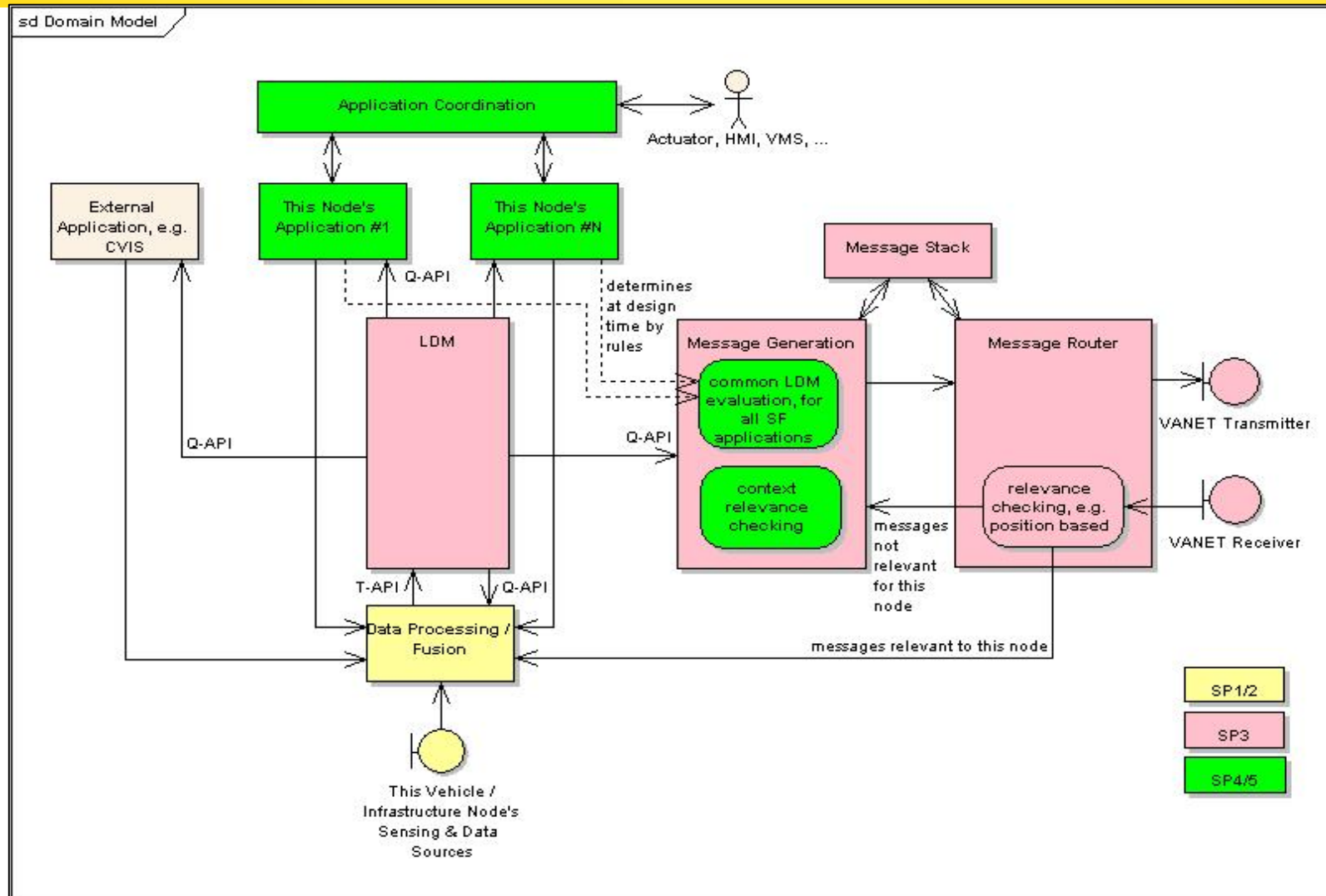


The SAFESPOT Enabling technologies: Local Dynamic Maps

Representation of vehicle's surroundings with all static and dynamic safety relevant elements



The SAFESPOT Architecture



The SAFESPOT Applications

Vehicle based

Lateral Collision

Longitudinal Collision

Road Departure

Vulnerable Users Protection

Infrastructure based

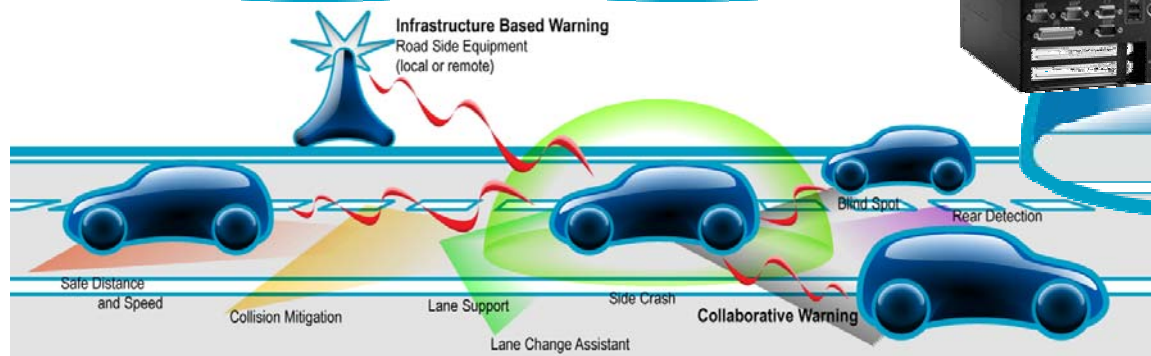
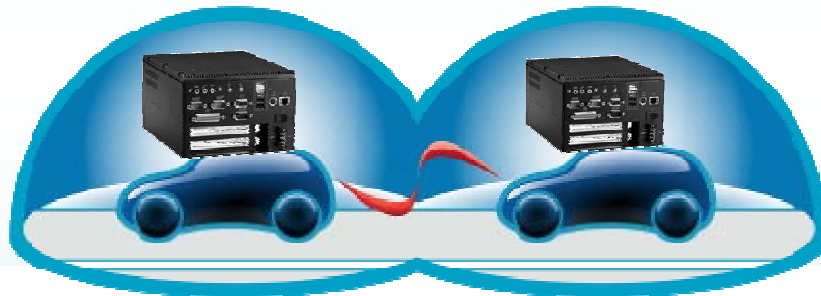
Speed Alert

Road Departure Prevention

Safety Margin for Assistance and
Emergency Vehicles

Co-operative Intersection Collision
Prevention System

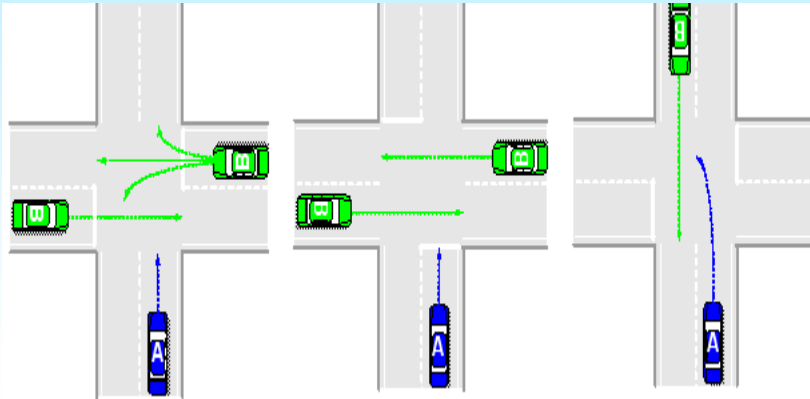
Hazard and Incident Warning



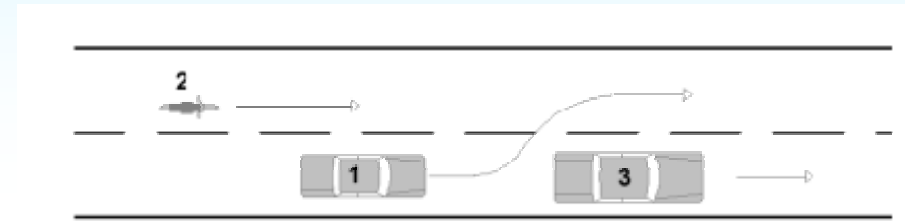
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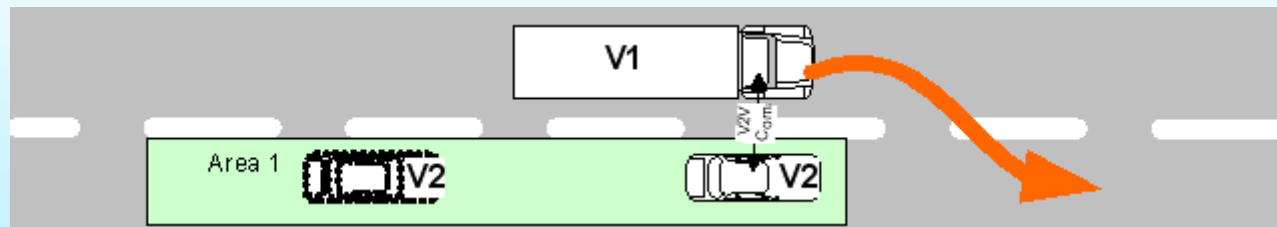
Lateral Collision Prevention



Road Intersection

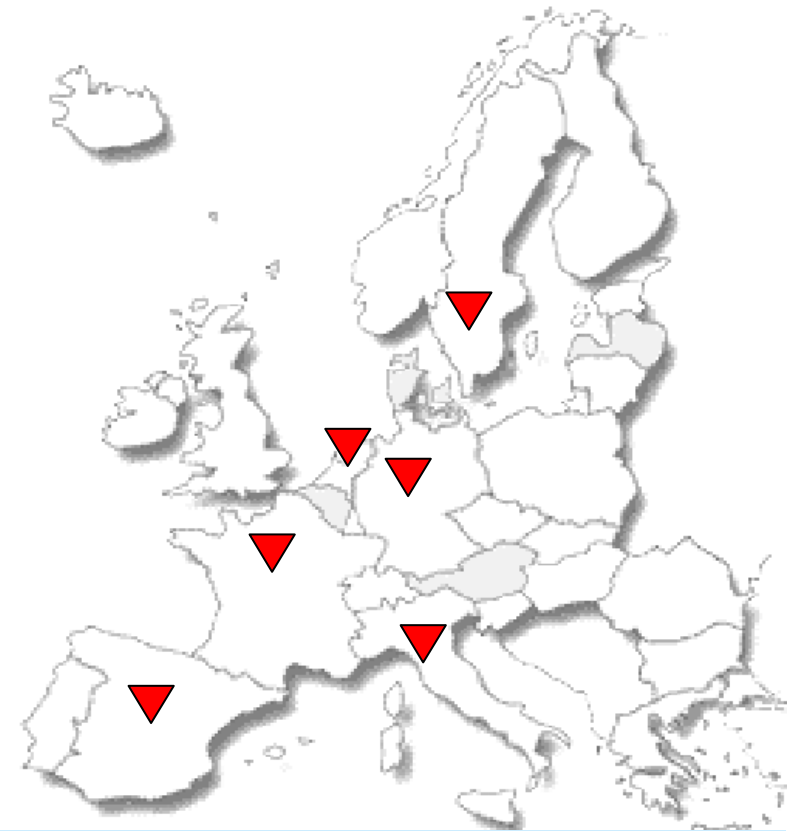


Safe Overtaking



Lane change manoeuvre

- Test sites are a set of activities aimed to demonstrate the applications and use cases developed in the different subprojects and to proof interoperability among different countries.
- Test sites will use existing infrastructures equipped with new SAFESPOT systems and equipped vehicles.
- As far as possible general public will be involved in the test activities in order to have a direct feedback.
- Five Test sites spread in six European countries were defined
 - IT – Italy
 - DE – Germany
 - WE - Western Europe (France & Spain)
 - NE – The Netherlands
 - SW – Sweden
- Four Test sites are shared with the CVIS IP



Demonstration Timeframe : 2009

THANK YOU

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