













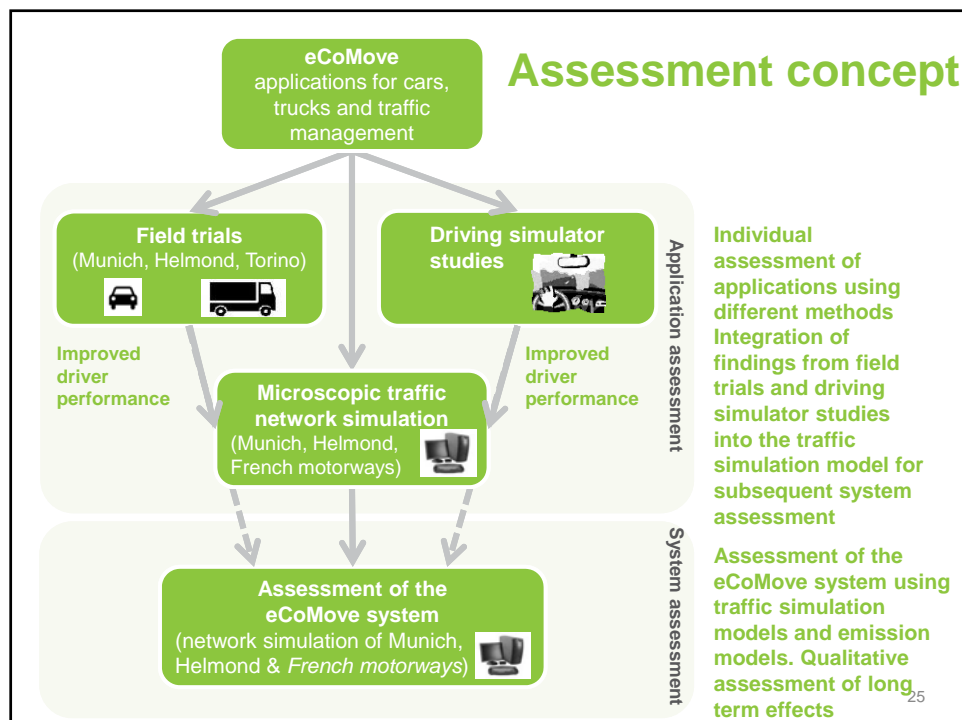






## Validation & Evaluation (SP6)

- **Conduct** a study on European level on driver motivation and behavioural change
- **Validate** that eCoMove technologies, applications and services meet the functional and non-functional requirements (e.g. data privacy and protection)
- **Demonstrate** that the eCoMove framework supports the interaction of the applications and services to meet the expectations of all stakeholders
- **Show** that eCoMove technologies, applications and services enable a more energy efficient land-based transport of passengers and goods



## Validation categories & performance indicators

- **Environment**
  - fuel consumption, CO<sub>2</sub> emissions (in total, per trip or per vehicle per km or tkm), other emissions (CO, NO<sub>x</sub>)
- **Mobility**
  - total/individual travel times, delays, number of stops, network speed, level of service
- **Driver behaviour**
  - **Safety:** times to collision, time headways, variations in speed, # hard braking events, speeding, distraction and workload
  - **Compliance:** following advices: on vehicle condition and on strategically, tactically and operational driving
  - **Driver performance:** gear changes, acceleration & deceleration performance, speed, idling
  - **User acceptance:** system on/off, usefulness, ease of use, satisfaction with the system



## eCoMove test sites

5 test sites with

- Different traffic conditions
- Different situations
- Different scenarios and possibilities to cover eCoMove use cases



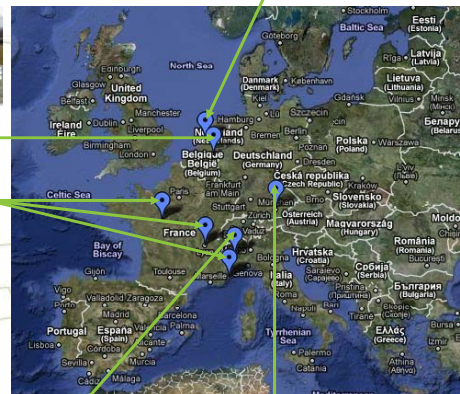
Motorway A9  
Badhoevedorp



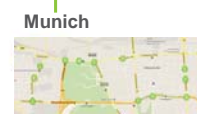
French  
Motorways



Helmond



Torino



Munich

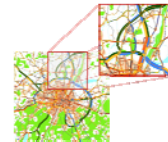
## Driving simulator studies

- Implementing and testing eCoMove applications in a controlled environment
- Three studies planned to cover different research questions (DLR, TUM, VOLVO)
- Testing different feedback and training strategies to improve driver performance:
  - Gear changes, acceleration & deceleration, compliance rate, HMI design, distraction



 eCoMove

## Traffic network simulation

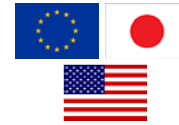


- VISSIM environments of Munich, Helmond and French motorways
- eCoMove traffic management apps run in real-time mode
- Changes in driver performance are modelled based on findings from field trials and driving simulator studies
- Assessing direct and indirect effects:
  - total/individual travel times, delays, number of stops, network speed, level of service,
  - fuel consumption, CO<sub>2</sub> emissions (in total, per trip or per vehicle per km or tkm), other emissions (CO, NO<sub>x</sub>)



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## International cooperation



- Main goals
  - common understanding about impact assessment of ITS measures for reducing CO<sub>2</sub> emission
  - input to standardisation
- eCoMove involved in the EU-METI Task Force
  - first joint meeting in Amsterdam (23.03.2010)
  - eCoMove responsible for "Validation methodology" to establish: *validation framework of both traffic simulation and CO<sub>2</sub> emission model*
- EU-US DoT RITA Cooperation
  - eCoMove contribution in the frame of the Implementation Agreement
- eCoMove partners involved in new EU project ECOSTAND coordinating EU input to both EU-METI and EU-US TF



## eCoMove IP Milestones

- ✓ 11/2010: Use cases & requirements
- ✓ 02/2011: Architecture & system specification
- ✓ 09/2011: eCoMove communication platform
- 04/2012: Applications ready for integration
- 07/2012: Applications and test vehicles ready for evaluation
- 10/2012: *ITS World Congress Vienna demonstration*
- 03/2013: Evaluation results
- 2013: *eCoMove final event*



## SP2 Communication platform

### Interoperability on European level (14-18/11/2011)



The goal was to test a complete V2V and V2I protocol stack including layer 1-7 according to ISO OSI 7-lags model:

- IEEE802.11p phy
- IEEE802.11p mac, including ETSI G5 additions
- Geonetworking network layer
- Geonetworking BTP, basic transport protocol (similar to UDP in internet)
- CAM and DENM messages as defined by ETSI TS

#### Participants:

- **NEC,**
  - **Q-Free,**
  - **Peek Traffic,**
- Cohda Wireless, CTAG, DENSO, Hitachi, HONDA R&D, ITRI, NORDSYS, NXP Semiconductors, Qatar University QSTP B, Siemens, Vector Informatik, VTT



SP2 partners (NEC, Peek, Q-Free) all tested their implementations between each other and all applicable tests were 100% successful



They also tested with other companies, including DriveC2X and Score@F partners, which ensures that eCoMove implementations are 100% compatible with both current ETSI partners and other European projects



## Beyond eCoMove

... First cooperative systems close to market

- Transfer eCoMove solutions to ElectroMobility
- Establish a deployment roadmap for Cooperative ITS for
  - political/regulatory framework
  - technology
  - prioritisation of applications/services
- FOT for cooperative sustainability solutions, demonstrate effectiveness and benefits of the proposed solutions (vs. safety, efficiency, etc)
- Further research on Cooperative ITS applications & tools for deployment (e.g. new applications, business/organisational models)



## General figures

- Total budget: 22.6 M€
- EC funding: 13.7 M€ (DG-INFOS)
- Duration: 36 Months
- Starting date: 01/04/2010
- Coordinator: ERTICO – ITS Europe
- 10 Countries: Austria, Belgium, France, Germany, Italy, Norway, Sweden, Spain, the Netherlands, United Kingdom



## The Consortium

Sector	Partner name
Vehicle manufacturer	
Automotive supplier	
Digital map supplier	
Communication system supplier	
Mobile and fixed network operator	
Traffic system supplier	
University or research institute	
System integrator	
Motorway operator	
Motoring association	
Eco-driving trainer	
ITS association	



## eCoMove Consortium



Thank you for your attention

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