

evolution of safe and sustainable mobility

## 4. Tagung “Sicherheit durch Fahrerassistenz”, München

C2X Communication and potential strategies for market implementation

16.04.2010

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PRE-DRIVE




preparation for driving implementation and evaluation of C2X communication technology




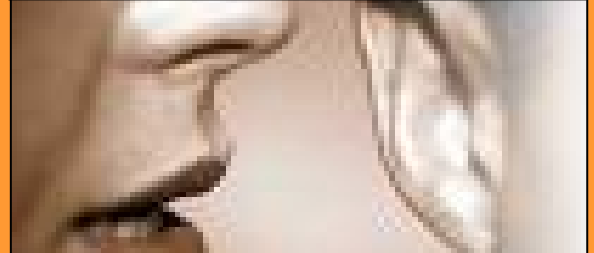
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# Evolution of vehicle safety

- Communications can provide active safety

<b>Phase I</b>
Monitor vehicle and driver behavior to assess danger

<b>“Feel”</b>

<b>Phase II</b>
Monitor immediate environment around the vehicle to detect hazardous situations

<b>“See”</b>

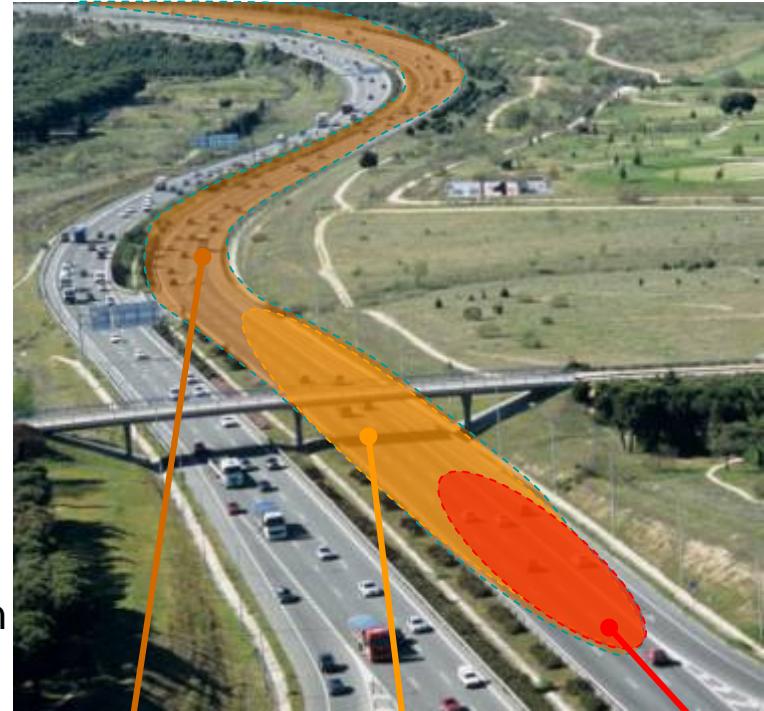
<b>Phase III</b>
Gather detailed information on surrounding environment (vehicles and infrastructure) to extend the driver's awareness of upcoming potential danger

<b>“Communicate”</b>





# Foresighted driving

- Communications provide information
  - Beyond autonomous sensor range
  - Beyond the driver's visual range
  - With enriched details and quality
- Creation of an information horizon
  - Pertinent to the driver
  - Extending safety time margin
  - Extending beyond the physical horizon
    - Non observable attributes
    - Traffic rules



Communications –  
better than the driver

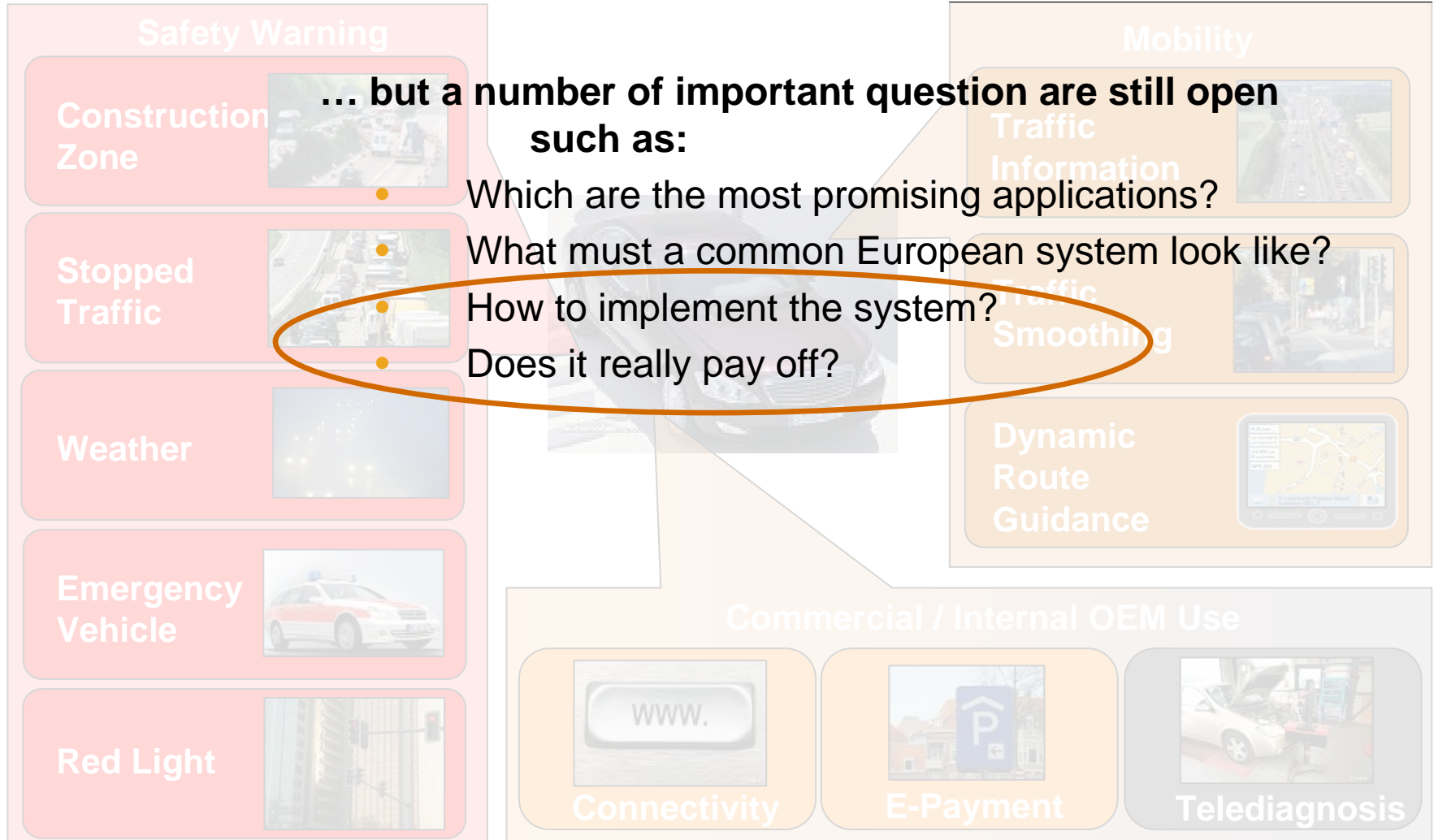
Complex sensors –  
as good as the driver

Simple sensors –  
worse than the driver

Improved response time by foresighted driving

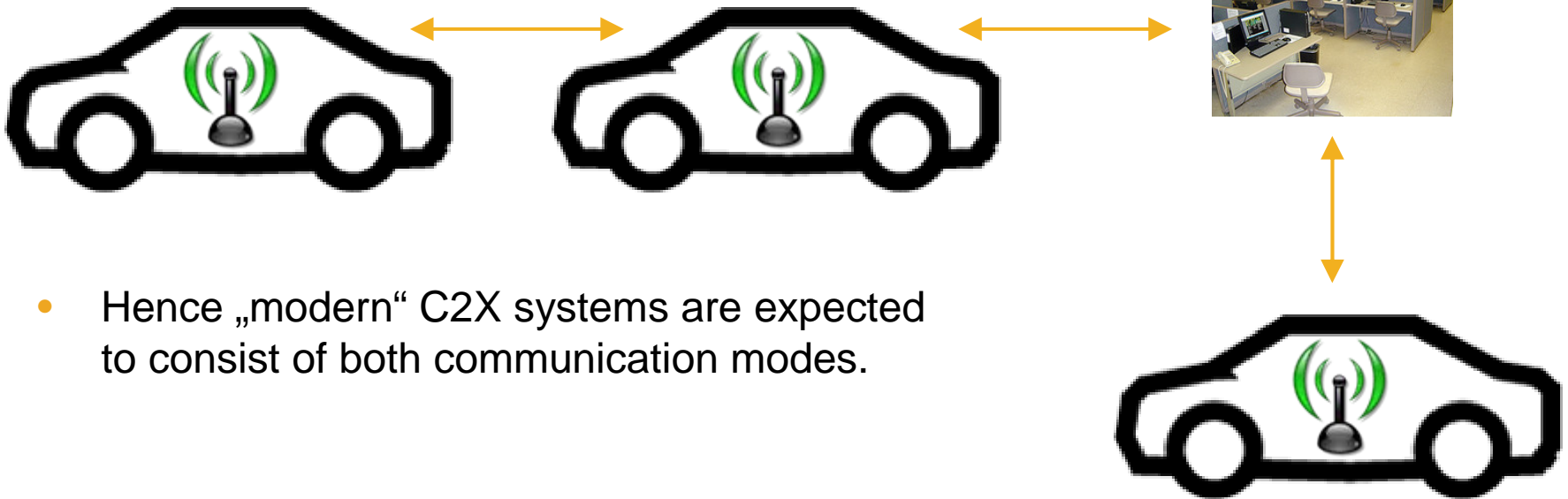


# There are lots of potential applications ...



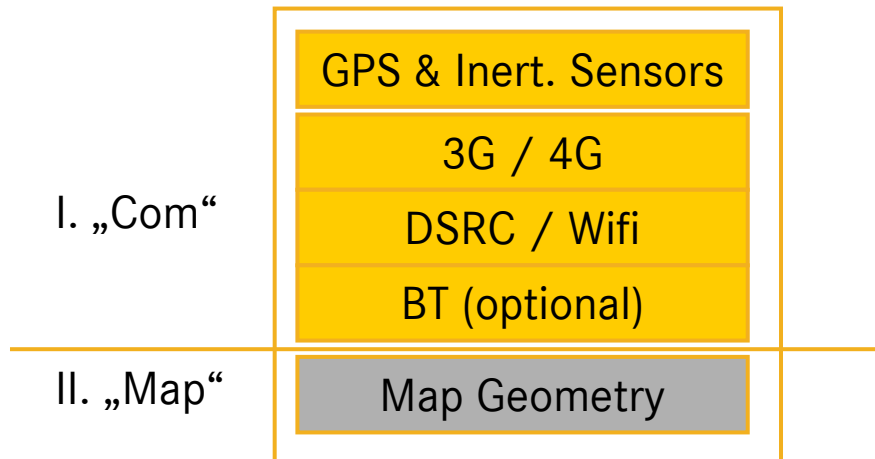
# „Modern“ Understanding of C2X Communication

- In the past C2X communication used to be seen as WLAN based **direct communication** between vehicles and/or infrastructure.
- Recent trials have shown that for various applications between vehicles an **indirect communication link** based on **mobile communication** via an Internet server can be a useful complement.



- Hence „modern“ C2X systems are expected to consist of both communication modes.

# Layout of the „Modern“ Onboard Unit



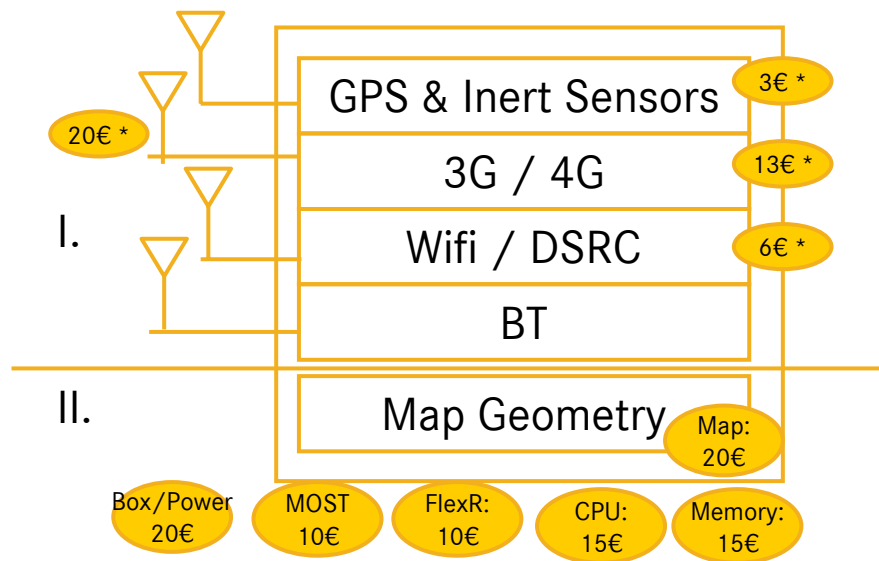
Detached solution implementing all necessary components into one ECU

Option for „**Retrofit-solutions**“

In production vehicles with OBUs as standard equipment distributed solutions might be found making use of already existing system components.



# Estimated System Costs



**Estimated bill of material: 150€**  
+ overheads for development costs,  
reserves for contingencies, costs of  
marketing, ...

**Estimated total costs: 400€**

**Please note: This is a rough  
estimate based on the costs of  
components for consumer  
devices!**

\* Consumer Market price, non-automotive grade

# Considerations for business models

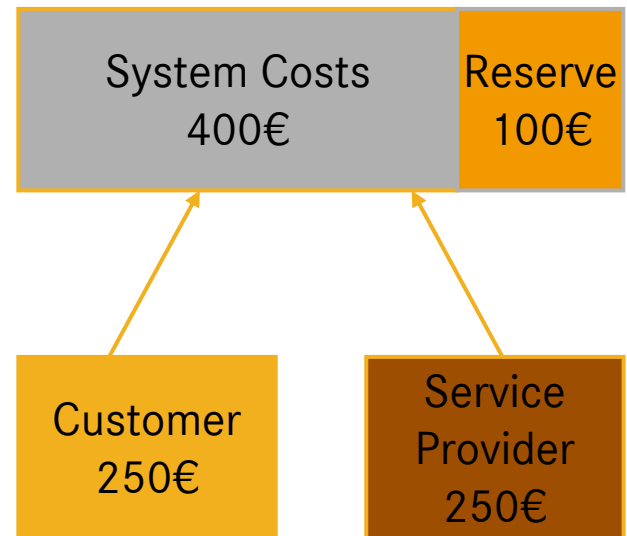
- Assumptions:
  - **Penetration problem** does not allow to sell communication based driver information and warning systems as optional equipment.
  - Customer is not willing to pay for communication based safety functions.
  - European OEMs decide jointly to implement C2X technology into all new vehicles at a given time.
  - Data generated by C2X communication can be used as basis for **attractive commercial services** if the vehicle owner agrees.
- Consequences:
  - C2X communication is **no unique selling proposition**.
  - Business models are needed to re-finance investment into C2X systems that include data sales.





# Potential Solution

- Functional split of the system
  - Use of safety applications and selected mobility applications based on DSRC and mobile communication free of charge
  - advanced mobility applications, commercial services, internet and telephony via mobile communication for a fee
- Provision of access to C2X data for commercial service providers for a fee:
  - Single payment of service provider to OEM
  - Fee depending on amount of data

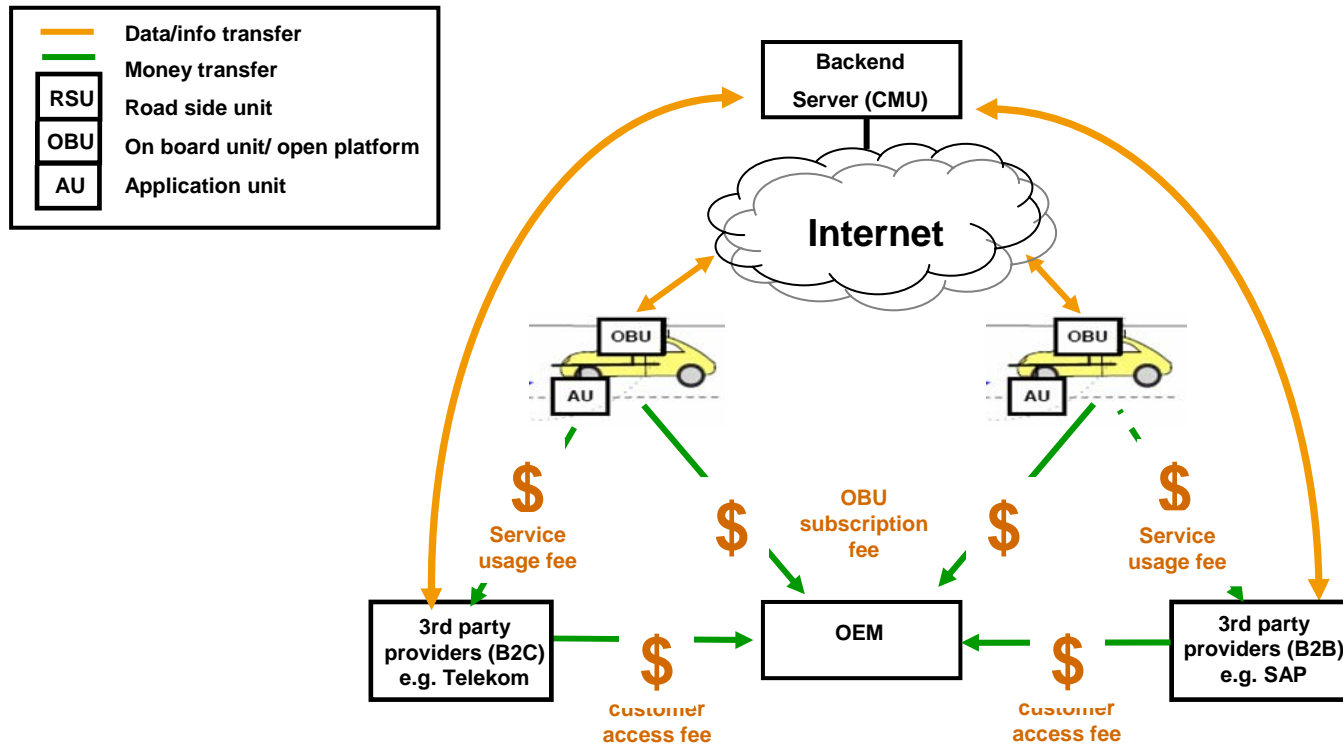


+100€ reserve to allow for customers, who do not want to use additional applications



# Cash Flow for Commercial Services

Idealized depiction



# Example: Improved Claim Management for Insurance Companies

- Problem addressed:
  - All German vehicle insurers lose every year up to 10 Million Euro through delays in claim management (Source: iLab at University of St. Gallen, Schweiz)
  - HDI, Zürich, Mercedes Benz Bank and GDV confirm this estimate

## Solutions:

- Dedicated data service for automated launch of claim management based on C2C data as soon as an accident happens.
  - Insurers willing to pay 10% of the savings as service fee
  - Software solutions already under preparation at various software houses



# Examples for Further Commercial Applications

- Financial Services
  - Pay as you Drive
  - New lease concepts
  - Payment services
    - Parking garages
    - Fuel stations
    - ...
- Fleet management
- Customer Relationship Management
  - Improved processes in workshops
  - Better contact with customers
- Media Download
- Social Networks
- ...



# Our Partners in business model development

- Vehicle insurers
  - HDI
  - Zürich
  - Mercedes Benz Bank
  - GDV
- Finance
  - Mercedes Benz Bank
- Software houses
  - SAP AG
- Operators of parking garages
  - APCOA
- Internet service providers
  - Google Germany





# Final Demonstration Event – Preparation for driving implementation and evaluation of C-2-X communication technology

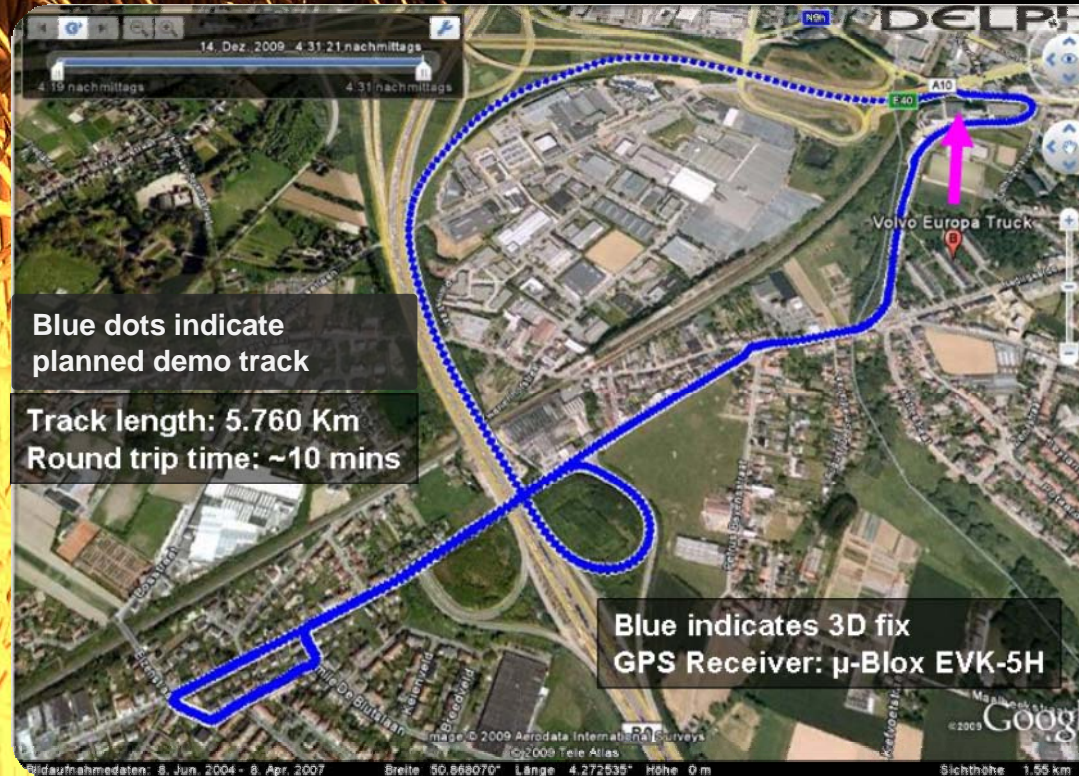
**When** 10<sup>th</sup>/11<sup>th</sup> June 2010

**Where** Volvo Technology premises  
Avenue du Hunderenveldlaan 10  
1082 Sint-Agatha-Berchem  
Brussels, Belgium

- What**
- Live demonstrations of several use cases in real traffic
  - Static demonstrations and poster sessions

&

2<sup>nd</sup> joint PRE-DRIVE C2X – EASYWAY  
workshop on  
perspectives of future mobility



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# • Questions?

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preparation for driving implementation and evaluation of C2X communication technology



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