Intelligent Transport Solutions (ITS) for Safe and Green transport of people and goods

EU-China cooperation Workshop on ITS, Tokyo, Japan

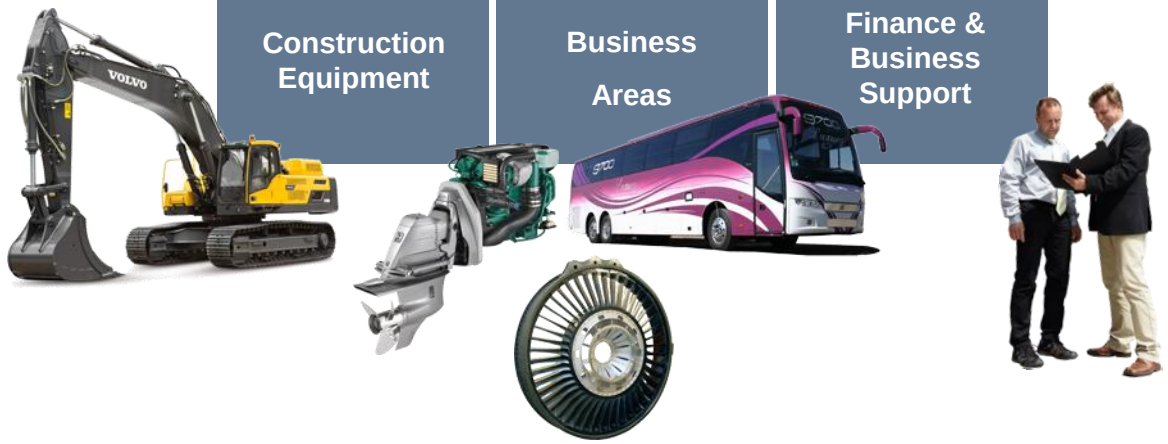
15 May 2012

Volvo Group, Advanced Technology & Research

Volvo Technology Japan Corporation

Volvo Group Organization

Group Trucks Sales & Marketing EMEA	Group Trucks Sales & Marketing Americas	Group Trucks Sales & Marketing APAC	Group Trucks Operations	Group Trucks Technology	Trucks Joint Ventures

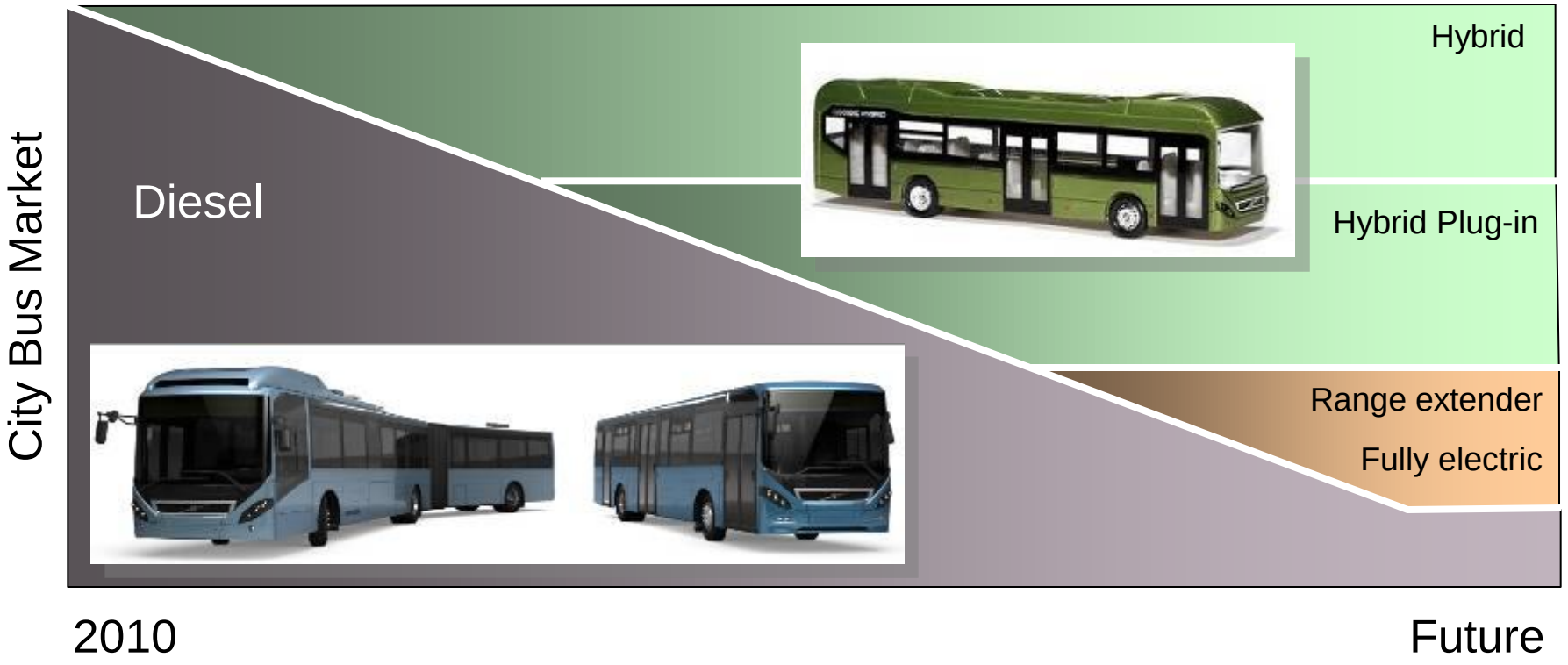


Construction Equipment	Business Areas	Finance & Business Support

Our brands


Corporate values
Safety
Environmental care
Quality

The path towards Green Efficiency



Electro mobility


Hybrid

Plug-in hybrid


Electrical

Driving distance with 5 l diesel (50 kWh)

- Diesel 10 Km
- Alt fuel 7,7 Km
- Hybrid 14.2 Km
- Plug-in Hybrid 25 Km
- **Full electric (Normal bus) 34 Km**

Sunwin “New Energy” buses in Shanghai

- 400 New Energy buses in operation.
- New JV to support a future leading position in New Energy buses in China and the emerging electro mobility markets around the world.

In the hands of the human factor

Volvo's Accident Research Team has been learning from real life accidents since 1969

10%

Vehicle-related

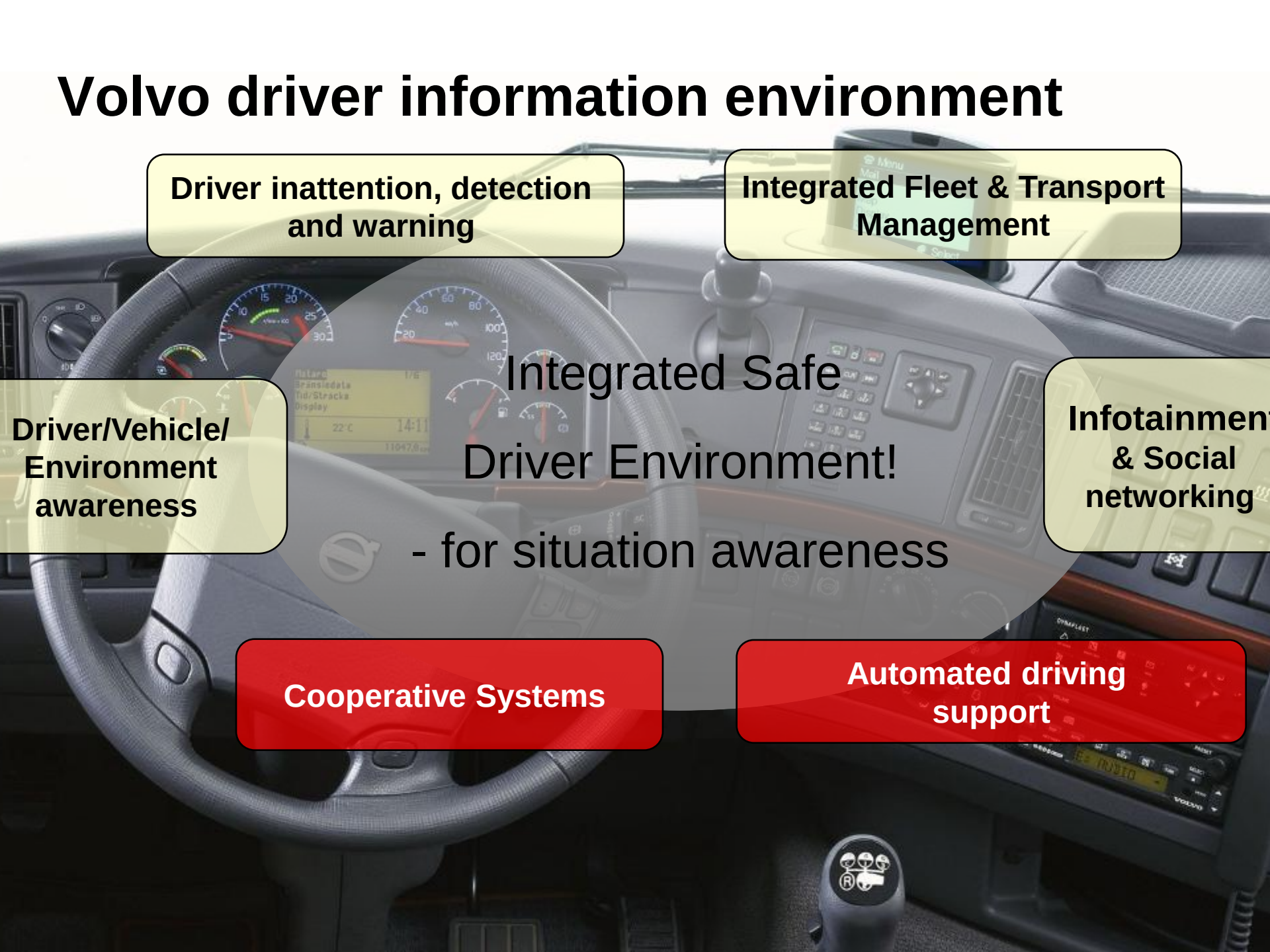
30%

Road environment

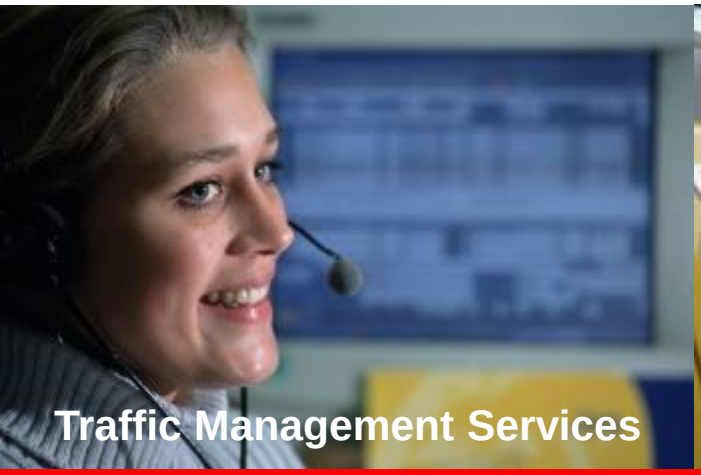
90%

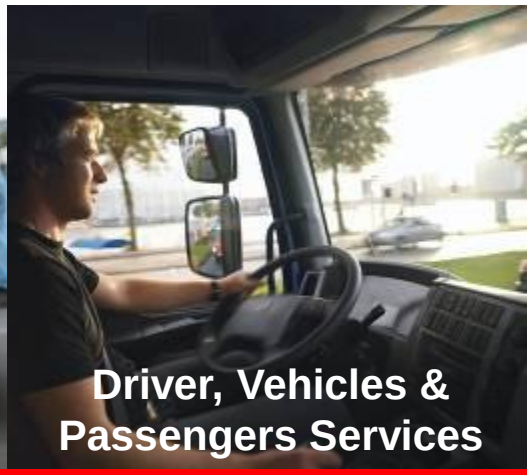
Driver-related

Volvo driver information environment



Future Intelligent Transport Services





Global ITS communication standards

EU research project contribution examples

COSMO

eCoMove

SARTRE
Safe Road Trains for the Environment

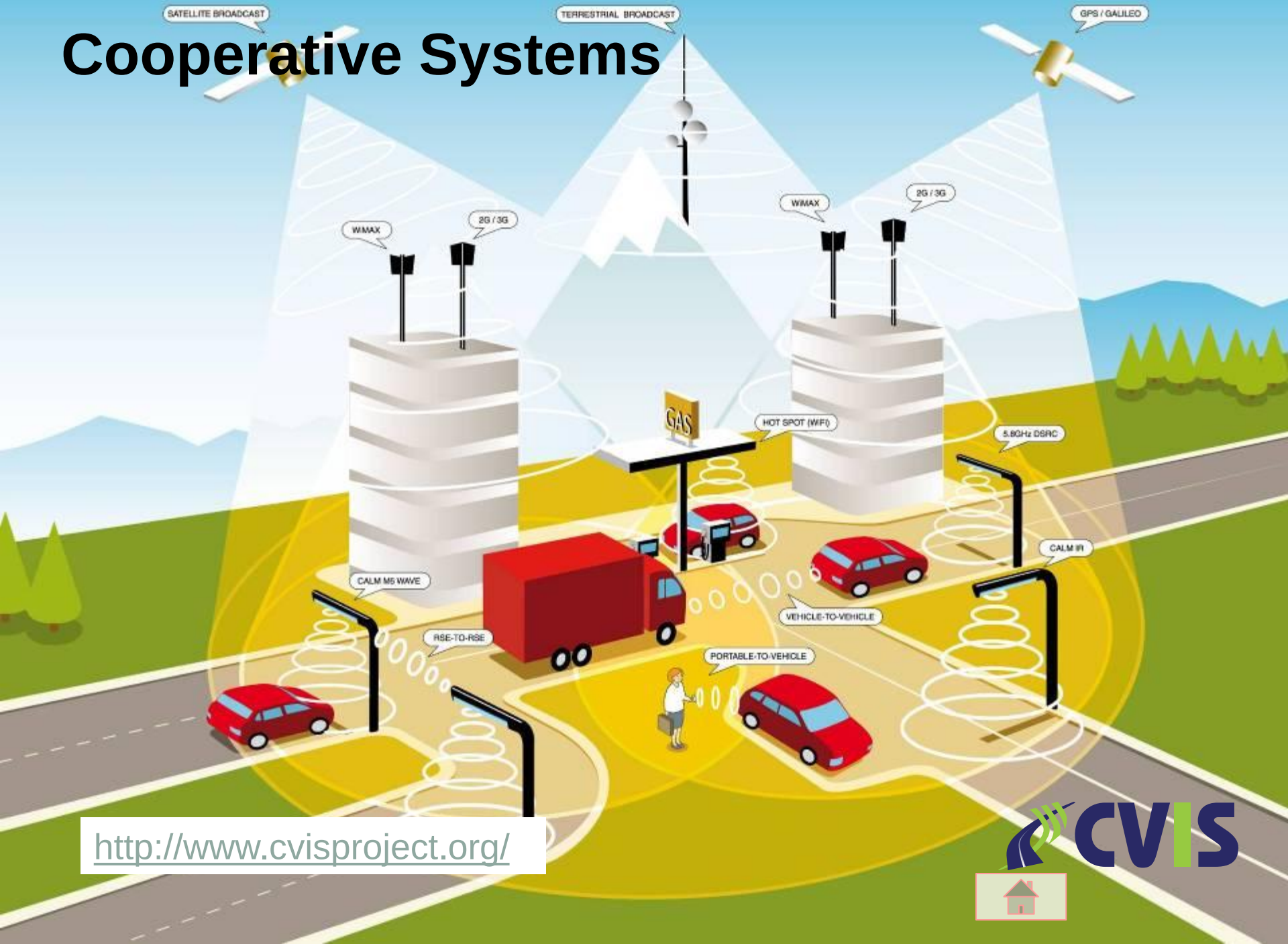
HAVEit

VEHICLE TRAFFIC DRIVER FLEET

CVIS

SAFESPOT
COOPERATIVE SYSTEMS FOR ROAD SAFETY

Cooperative Systems



http://www.cvisproject.org/

CVIS

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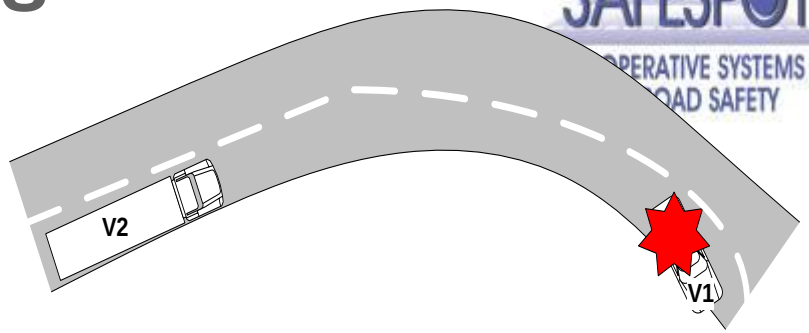
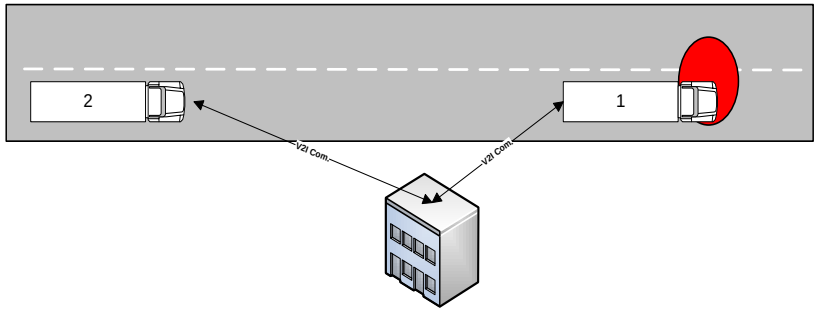
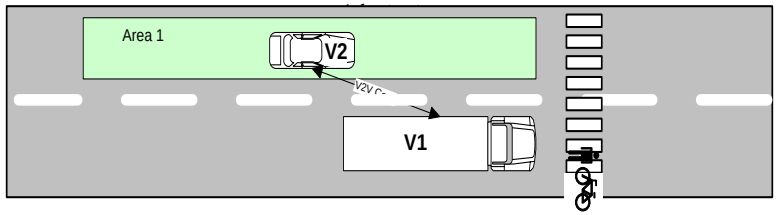
Road Safety Applications

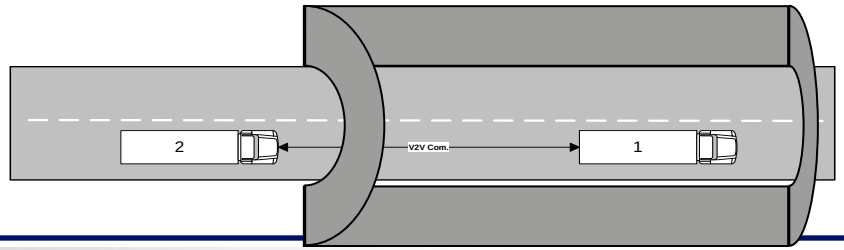
1. Frontal collision warnings V2V
2. Road Condition Status V2I
3. Vulnerable Road user detection
4. Speed Limitation and Safety Distance

http://www.safespot-eu.org/









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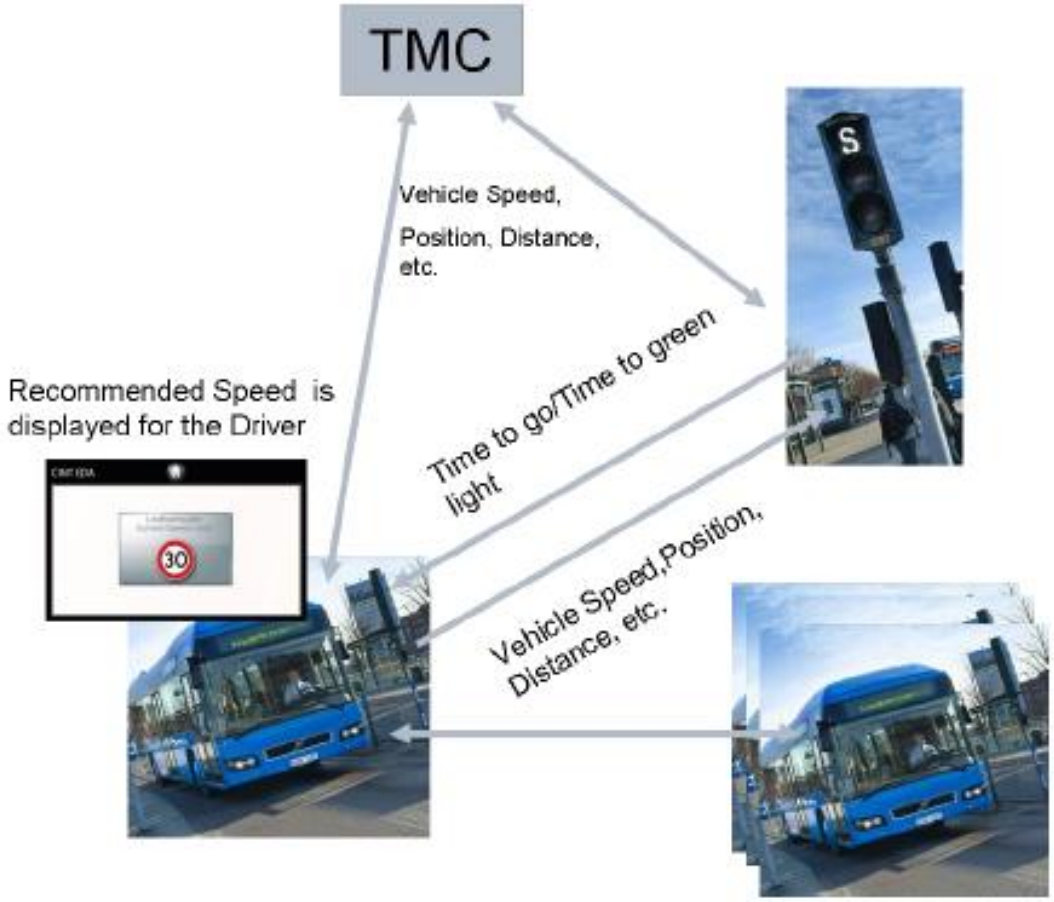
Green Applications



http://www.cosmo-project.eu/

COSMO

Cooperative Systems for Sustainable Mobility and Energy Efficiency

- Enhanced bus intersection logistics with eco driver support
  - Traffic light integration
- Congestion prevention with eco driver support
  - Bus stop integration
- ISA/Intelligent speed adaptation
  - Traffic management integration

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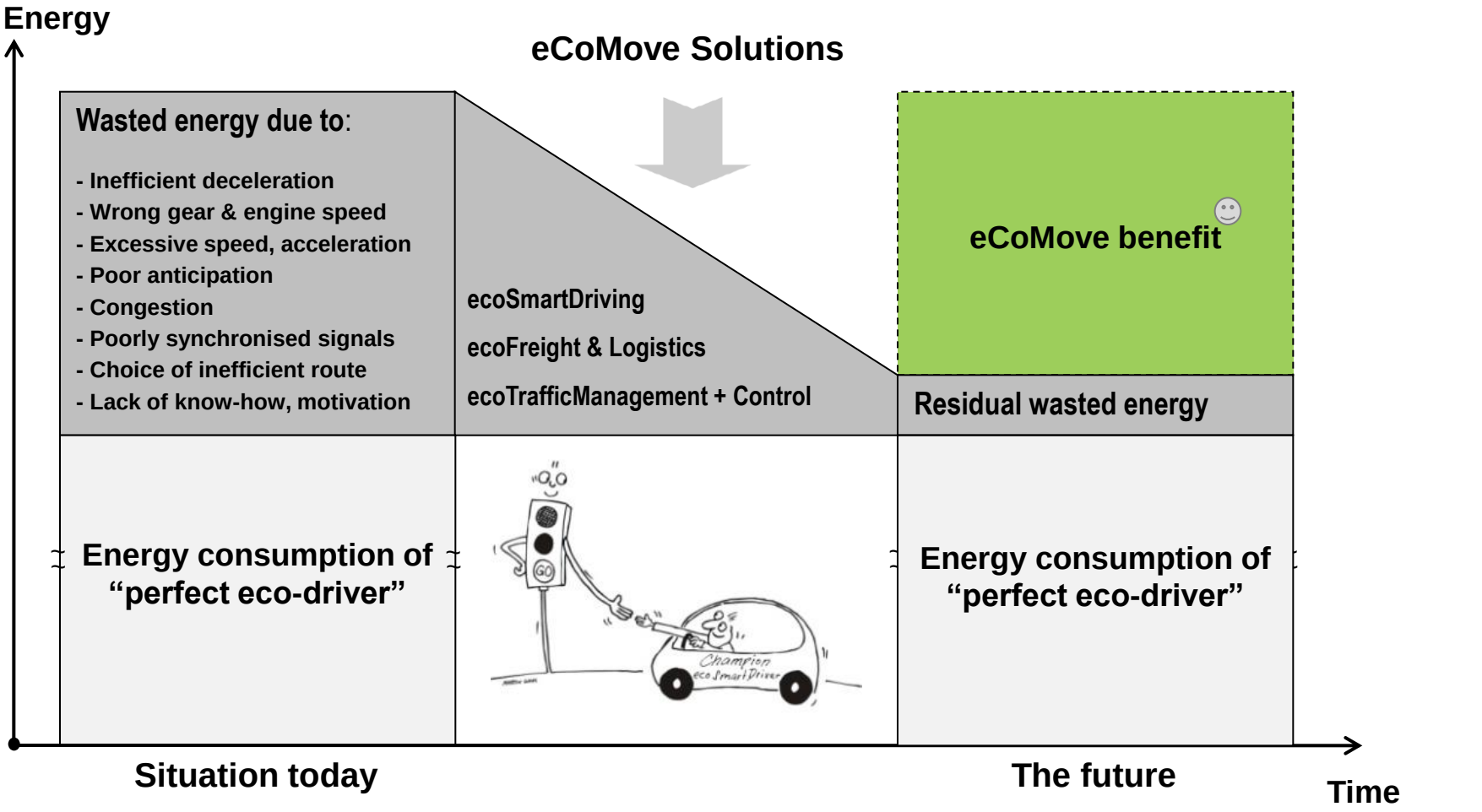
Vision and motivation



Project objectives

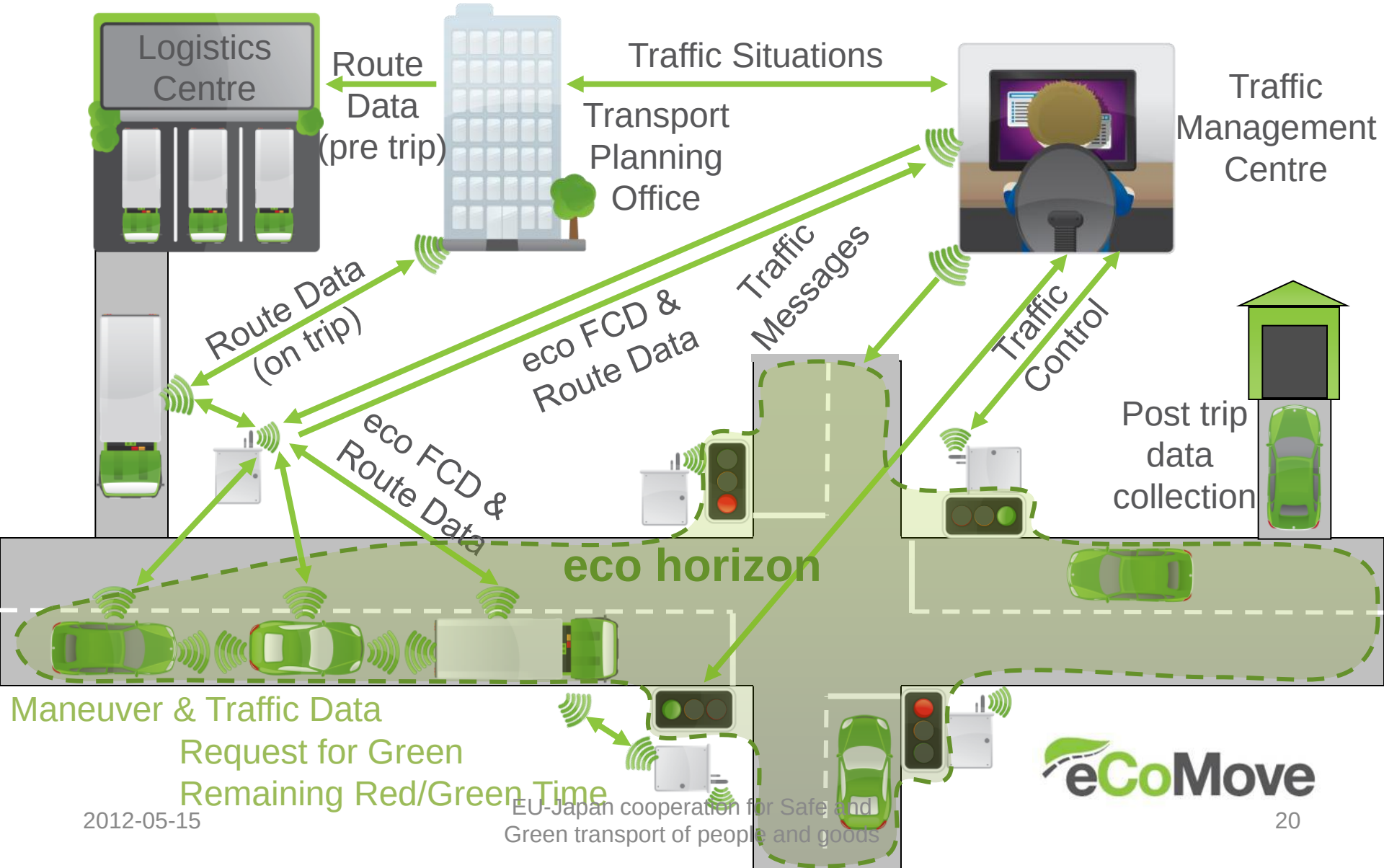
To develop a **combination of cooperative systems and tools** using V2V and V2I communication to help:

- drivers sustainably eliminate unnecessary fuel consumption;
- fleet managers manage their vehicles more economically and promote eco-driving through feedback & incentives;
- road operators balance traffic flows in the most energy efficient way.

Target is to reduce up to 20% fuel consumption and therefore CO_2 emission

eCoMove

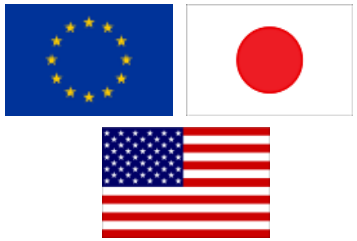
eCoMove System Concepts



Main activities

- Develop eCoMove core technologies (SP2)
  - V2V & V2I communication platform based on CVIS & SAFESPOT projects results
  - Standardised cooperative messages for energy efficiency-relevant information exchange
  - ecoMap (digital map database enhanced with eco-relevant attributes)
  - ecoModels to advise optimal driving and traffic control strategies (micro- and macroscopic levels)
- Develop eCoMove applications
  - **ecoSmartDriving applications** for fuel-efficient driving behaviour (SP3)
  - **eco Freight & Logistics applications** for green freight routing and fuel consumption- optimised logistics (SP4)
  - **ecoTrafficManagement & Control applications** for energy-efficient traffic control & management measures (SP5)
- Test and validate eCoMove system (SP6)
  - In 5 field trials and simulation environment
  - User acceptance and cost-benefit analysis

International cooperation



- Main goals
  - common understanding about impact assessment of ITS measures for reducing CO_2 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_2 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

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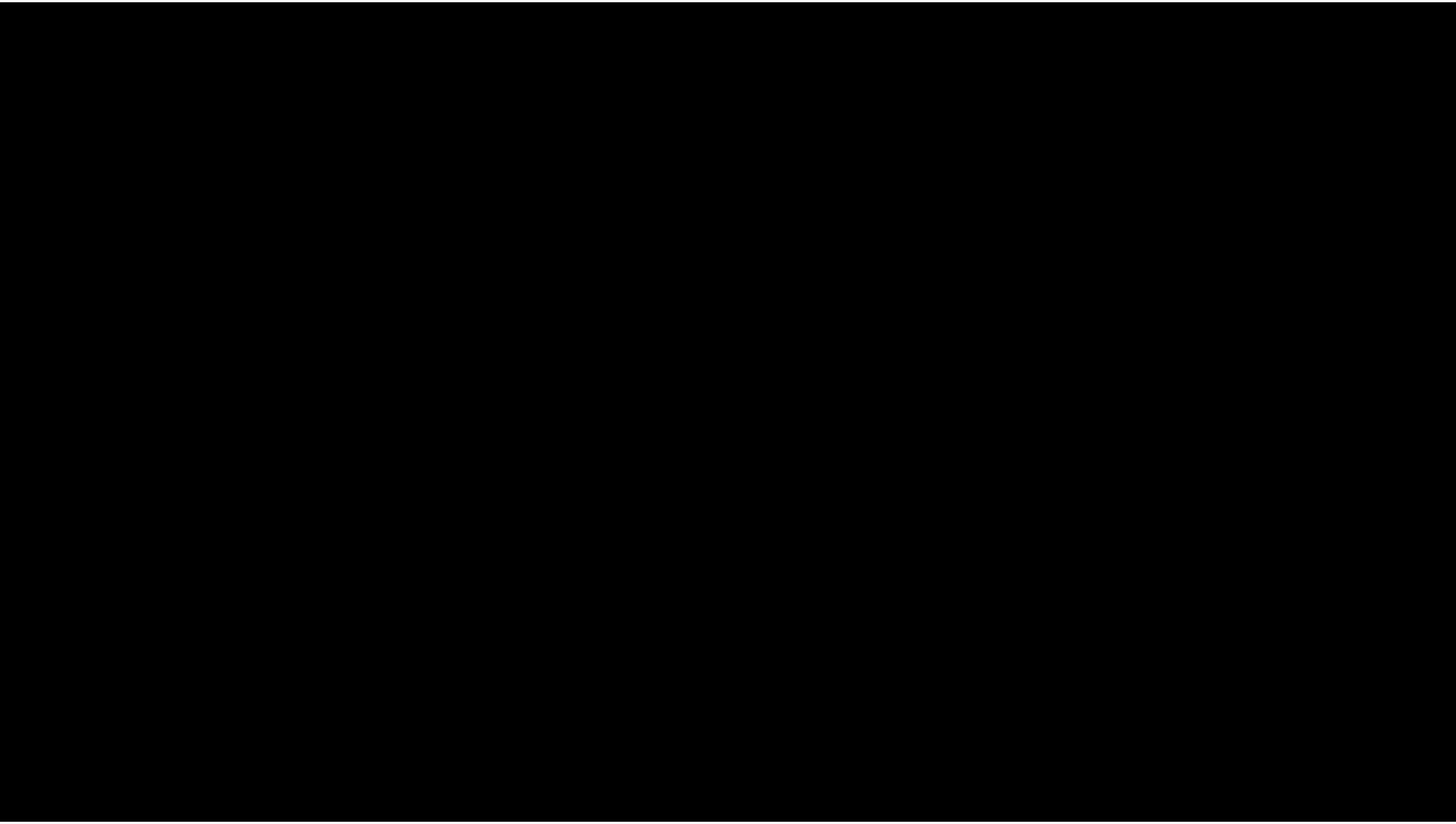
SARTRE – Safe Roadtrains for the Environment

- **Safe Road Trains for the Environment, funded by the European Commission**
- **The project aims to develop strategies and technologies to allow vehicle platoons to operate on normal public highways with significant environmental, safety and comfort benefits.**

SARTRE – Safe Roadtrains for the Environment



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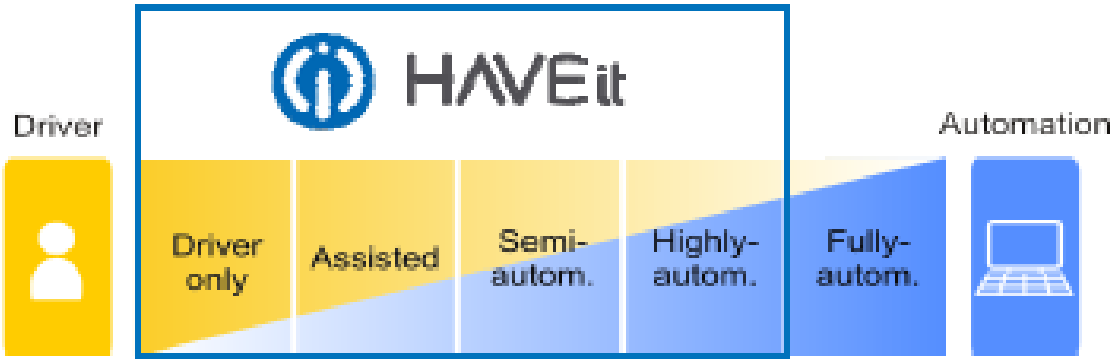
SAFESPOT
COOPERATIVE SYSTEMS FOR ROAD SAFETY

HAVEit - Highly Automated Vehicles for Intelligent Transport



- **Integrated project:** ICT 2007.6.1, project no. 212154
- **Start:** 01 February 2008
- **End:** 31 July 2011
- **Budget / funding:** 28 M€ / 17 M€
- **Consortium:**

http://www.haveit-eu.org/

Automated queue assistance (Volvo Technology)

Key features

- Main purpose of automated queue assistance is to relieve the driver from the monotonous tasks associated with driving a truck at low speeds and in congested traffic situations
- It is intended to improve traffic safety via supporting the driver when their workload is very low
- Steering, acceleration and braking will be controlled using a variety of external vehicle environment sensors
  - Front sensing by lidar, radar and camera
  - Side sensing by radar
  - Infrared vehicle-to-vehicle communication

Active green driving (Volvo Technology)

Key features

- In active green driving applications the fuel consumption and efficiency can be improved by using environmental information such as e-Horizon, forward looking sensors and dynamic traffic information
- With this information the power split between the combustion engine (ICE) and the electric motor can be adapted to use the energy storage in the most efficient way
- The function is intended to reduce the environmental impact of buses (and heavy duty vehicles)

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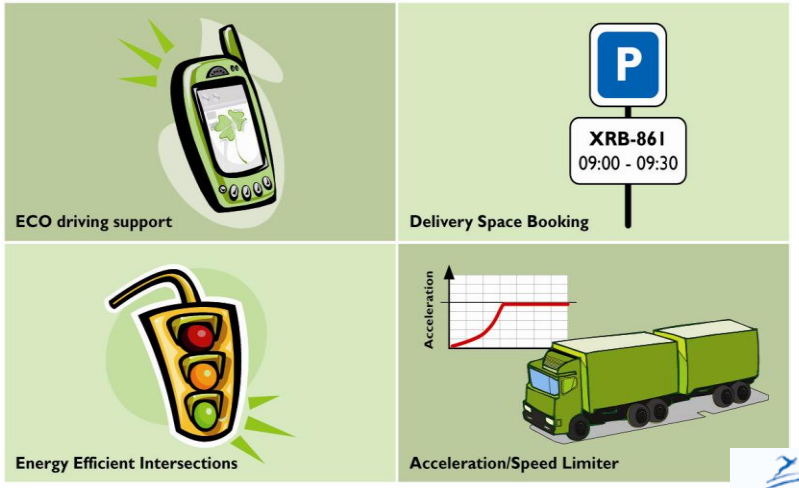
Freilot - Energy efficient urban freight

- Traffic control: Energy efficiency optimised intersections
- Vehicle: Adaptive acceleration/speed limiter
- Driver: Enhanced eco-driving support
- Fleet operator: Real-time delivery space booking



http://www.freilot.eu/en/home/

Potential future EU-Japan project collaboration

Future user needs and develop innovative concepts for user services

Develop Traffic and transport managemement applications

Field test available ITS standards from an operators perspective

Equip and test road & infrastructure

Develop and test driver and end-users services and applications

Field test available ITS Standards from an end-users perspective

Equip and test connected vehicles

Depoyment scenarios and roadmaps

Conclusions

- **Build on results from European and Japanese ITS research results**
- **Use available ITS standards**
- **Focus on commercial vehicles applications & services for early field trials and deployment**
- **Explore EU-Japan cooperation for ITS innovation for Safe and Green transportation of people and goods**