"An European viewpoint on Cooperative and Green Driver Assistance Systems Research"

European Commission
Directorate General Information Society and Media
ICT for Transport
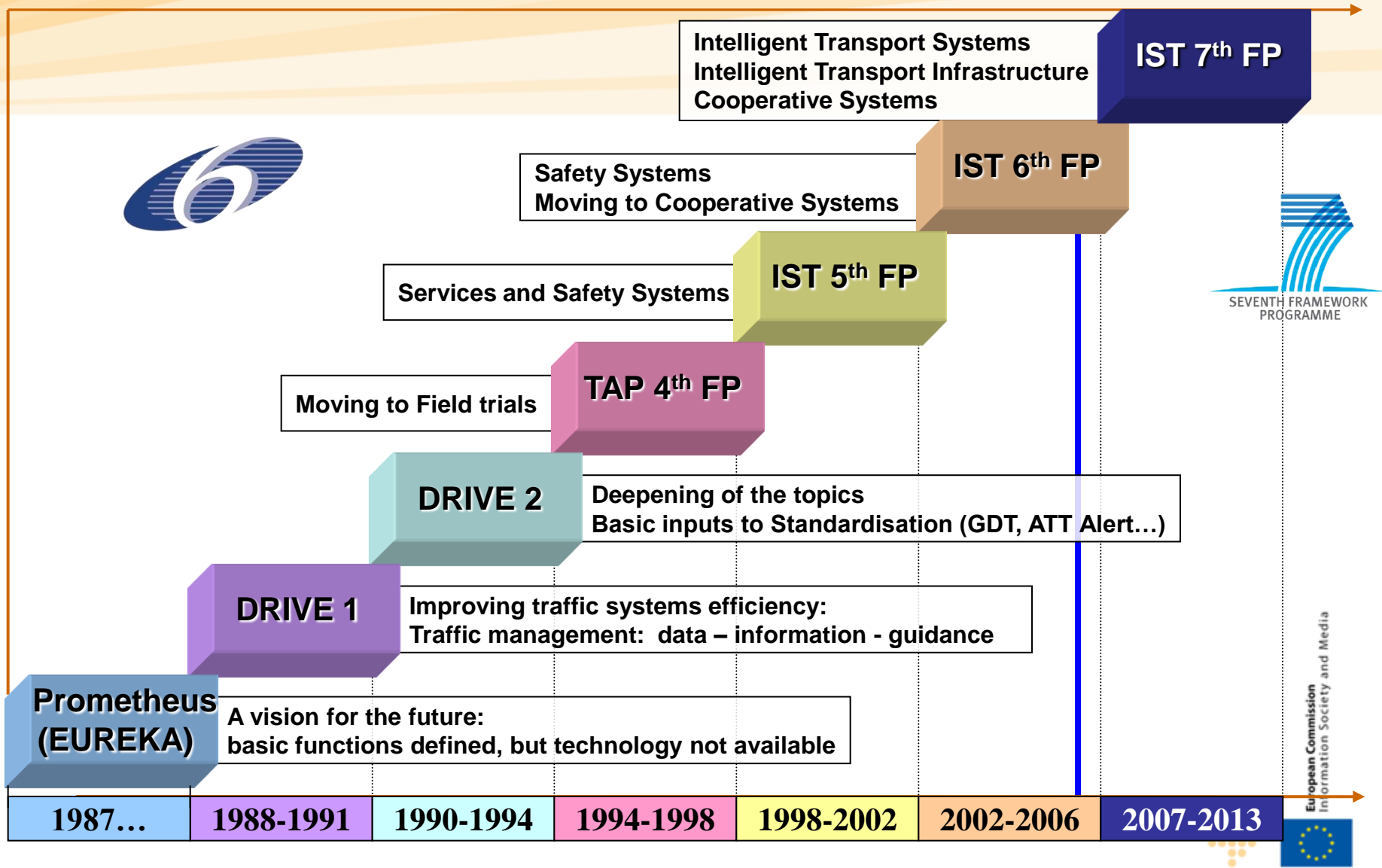
Dr. Irmgard Heiber

European Commission
Information Society and Media

- **Where do we come from**
- Projects under FP 7, the overview
- Some concrete examples
- Where do we go to
- What else to bring ITS forward
  - iMobility Forum
  - ITS action plan
  - International cooperation

ICT for transport: Towards cooperative systems

Intelligent Transport Systems
Intelligent Transport Infrastructure
Cooperative Systems

IST 7th FP

IST 6th FP

Safety Systems
Moving to Cooperative Systems

IST 5th FP

Services and Safety Systems

TAP 4th FP

Moving to Field trials

DRIVE 2

Deepening of the topics
Basic inputs to Standardisation (GDT, ATT Alert…)

DRIVE 1

Improving traffic systems efficiency:
Traffic management: data – information - guidance

Prometheus (EUREKA)

A vision for the future:
basic functions defined, but technology not available

SEVENTH FRAMEWORK PROGRAMME

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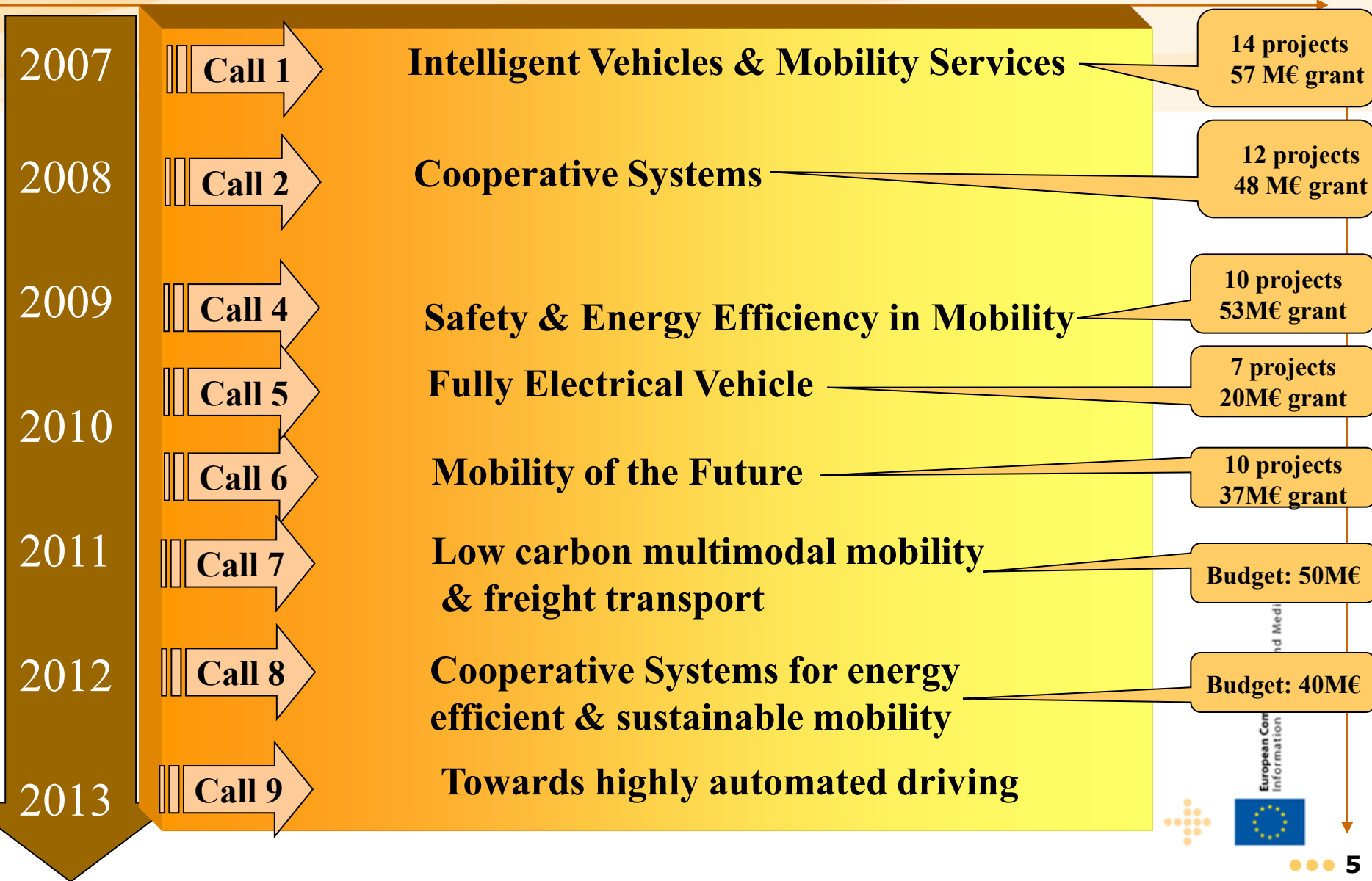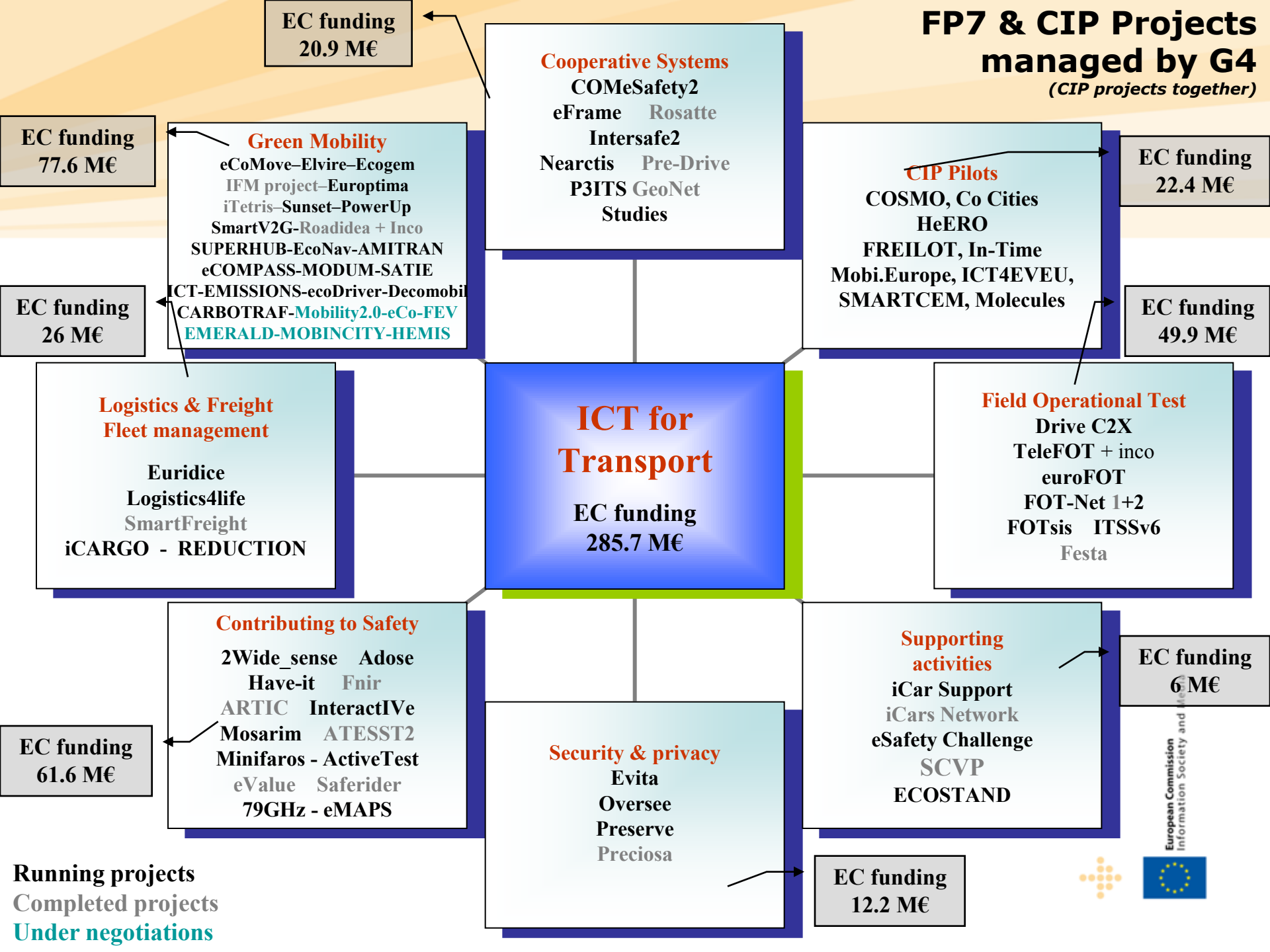| 1987… | 1988-1991 | 1990-1994 | 1994-1998 | 1998-2002 | 2002-2006 | 2007-2013 |

Content

- Where do we come from
- **Projects under FP 7, the overview**
- Some concrete examples
- Where do we go to
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  - iMobility Forum
  - ITS action plan
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Addressing the Challenges
Unit G4 - RTD in the 7th FP

Year	Call	Topic	Results
2007	Call 1	**Intelligent Vehicles & Mobility Services**	**14 projects 57 M€ grant**
2008	Call 2	**Cooperative Systems**	**12 projects 48 M€ grant**
2009	Call 4	**Safety & Energy Efficiency in Mobility**	**10 projects 53M€ grant**
2010	Call 5	**Fully Electrical Vehicle**	**7 projects 20M€ grant**
2010	Call 6	**Mobility of the Future**	**10 projects 37M€ grant**
2011	Call 7	**Low carbon multimodal mobility & freight transport**	**Budget: 50M€**
2012	Call 8	**Cooperative Systems for energy efficient & sustainable mobility**	**Budget: 40M€**
2013	Call 9	**Towards highly automated driving**	

European Com... and Medi... ...ation Information

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**FP7 & CIP Projects
managed by G4**
(CIP projects together)

**EC funding
20.9 M€**

Cooperative Systems
**COMeSafety2
eFrame** Rosatte
**Intersafe2
Nearctis** Pre-Drive
P3ITS GeoNet
Studies

**EC funding
77.6 M€**

Green Mobility
eCoMove–Elvire–Ecogem
IFM project–**Europtima**
iTetris–**Sunset–PowerUp**
SmartV2G-Roadidea + Inco
**SUPERHUB-EcoNav-AMITRAN
eCOMPASS-MODUM-SATIE
ICT-EMISSIONS-ecoDriver-Decomobil
CARBOTRAF-**Mobility2.0-eCo-FEV
EMERALD-MOBINCITY-HEMIS

CIP Pilots
**COSMO, Co Cities
HeERO
FREILOT, In-Time
Mobi.Europe, ICT4EVEU,
SMARTCEM, Molecules**

**EC funding
22.4 M€**

**EC funding
26 M€**

**EC funding
49.9 M€**

Logistics & Freight
Fleet management

**Euridice
Logistics4life**
SmartFreight
iCARGO - REDUCTION

ICT for
Transport

**EC funding
285.7 M€**

Field Operational Test
**Drive C2X
TeleFOT + inco
euroFOT
FOT-Net** 1+2
FOTsis   ITSSv6
Festa

Contributing to Safety
**2Wide_sense   Adose
Have-it** Fnir
ARTIC   **InteractIVe
Mosarim** ATESST2
Minifaros - ActiveTest
eValue   Saferider
79GHz - eMAPS

**EC funding
61.6 M€**

Security & privacy
**Evita
Oversee
Preserve**
Preciosa

Supporting
activities
iCar Support
iCars Network
eSafety Challenge
SCVP
ECOSTAND

**EC funding
6 M€**

**EC funding
12.2 M€**

Running projects
Completed projects
Under negotiations

HAVEit

Mission:

"First step towards the long-term vision of automated driving"

Focus:

➤ Progressive step-by-step approach to transfer the driving task from driver to 'co-pilot'

➤ Failure tolerant safe vehicle architecture incl. advanced redundancy management

➤ Develop & validate next ~~generation~~ ADAS

**Coordinator: Continental Automotive GmbH
Total costs: ± 28m€
EC contribution: 17m€
Start date: 1/02/2008
Duration: 42 months**

Research Topics:

• **Highly automated driving - applications**
   • Automated merging into traffic flow
   • Automated queue assistant (for trucks)
   • Temporary auto-pilot
   • Active green driving (for trucks)

• **Intelligent virtual co-pilot**
   • Sensors and algorithms for information collection
   • Driver assessment: state, intention, workload, situational awareness
   • Task repartition between the driver & co-pilot depending on the immediate driver capacity

• **HAVE-IT concept will be integrated, tested & validated in 5 prototype vehicles**

Driver

Automation

| Driver only | Assisted | Semi-autom. | Highly-autom. | Fully-autom. |

Joint system - task repartition - automation spectrum
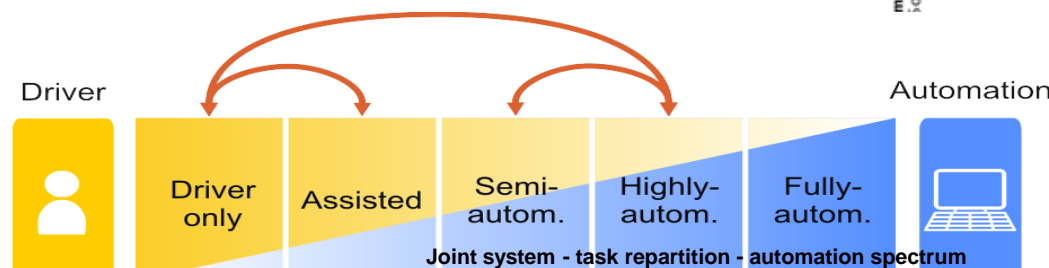
Results achieved

- Specification phase successfully completed (Jan 2009)
- Concept phase successfully completed (Apr 2009)
- Other project phases according to plan
  - Components available; many integrated in demo vehicles
  - Joint system development
    - First validation by simulation successfully completed
    - Three joint system integration weeks successfully finished
  - Application algorithms development ongoing
- Next milestones
  - Completion of generic development tasks (Jan 2010)
  - Vehicle integration complete, 1st functionality (Oct 2010)
  - System optimisation completed, final event (Jul 2011)
- HAVEit at ITS Stockholm 2009
  - Invited presentation on Automated Driving (SIS 43)
  - Several paper presentations on different technical matters
  - Exhibits, posters, presentations and demos at EC booth
  - Exhibits at Volvo booth
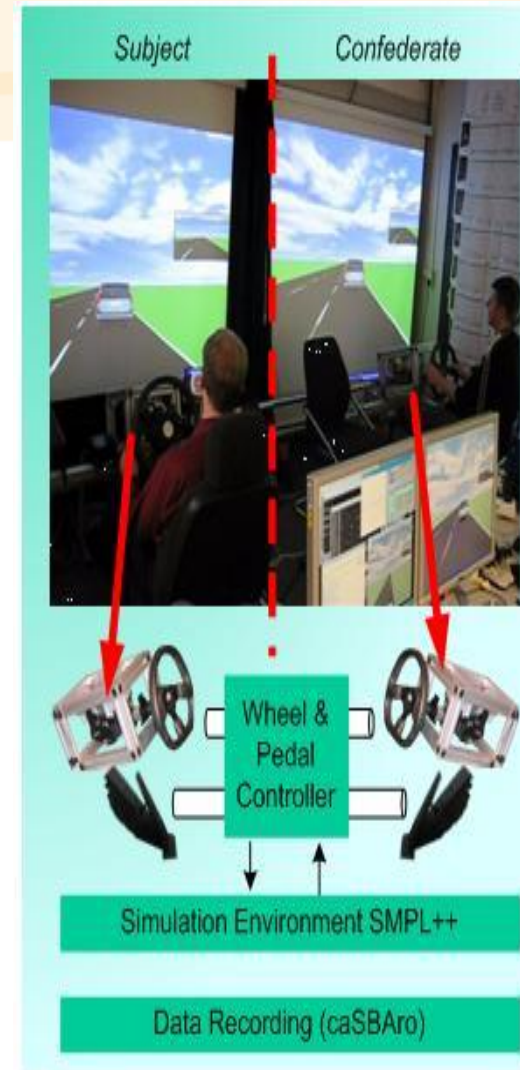
Mission:

PRE-DRIVE C2X prepares a large scale field trial with vehicular communication technology.

Based on the common European architecture for a vehicle to x communication system, defined by the task force on cooperative systems led by COMeSafety, the project develops a detailed specification for such a system and a functionally verified prototype robust enough to be used in future field operational tests.

Research Topics:

- All tools and methods necessary for functional verification and testing of cooperative systems in laboratory environment and on real roads in the framework of a field operational test will be developed.

- The developed methods and tools will be applied to the PRE-DRIVE C2X prototype system to verify its proper functioning and to do an impact assessment including a user acceptance test.

the result: improved response time by foresighted driving
communicate
see
feel

Coordinator: DAIMLER
Total costs: ± 8,5M€
EC contribution: 5 M€
Start date: 1/07/2008
Duration: 24 months

i2010 Intelligent Car Initiative

Safety

NETWORKING FOR FIELD OPERATIONAL TESTS

Mission:

Strategic networking of existing and future National, European and Global FOTs (e.g. US and Japan).

Focus:

- Public Authorities/ FOT funding organisations (EC, national, regional and cities)
- Industry: Vehicle Manufacturers; Automotive Suppliers; Service Providers (including telecom operators)
  - Research Institutes
  - Users

Research Topics:

Establish and operate a networking platform for FOT activities including all stakeholders from public and private sectors

- FOT Catalogue (Wiki)
- FOT Stakeholders workshops
- International FOT meetings

Promote the implementation of a common FOT methodology (FESTA) and discuss any further improvement

- Seminars on FOT methodology
- Online discussion forum

Coordinator: ERTICO
Total costs: 1.230M€
EC contribution: 1.230M€
Start date: 1/06/2008
Duration: 27 months

euroFOT (IP)

LDW & IW
MAN
Volvo Trucks
Volvo Cars
VW
Audi
Fiat

SRS
Renault

ACC
Ford
MAN
Volvo Trucks
Volvo Cars
VW
Audi

BLIS
Volvo Cars

SafeHMI
BMW
Mercedes

CSW
Ford

FCW
Ford
MAN
Volvo Trucks
Volvo Cars

FEA
Volvo Trucks

1500+ Vehicles

35 CAN + Video + Extra Sensors
150 CAN + Video
275 CAN only
460 Data Loggers in total

5000 questionnaires to **1000** vehicles with LDW

50+ FEA trucks auto-logging

Coordinator: Ford
Total costs: ± 22 M€
EC contribution: 14 M€
Start date: 1/05/2008
Duration: 40 months

Mission:

Assess the impact from the usage of Intelligent Vehicle Systems in real traffic for a safer, cleaner, and more efficient transport system in Europe

Research Topics:

■ Analysis of performance and capability of several IVSS

■ Assess the impact of eight intelligent vehicle systems for enhancing traffic safety and efficiency

■ Driver behavior and user acceptance

■ Support of the decision process in the deployment of ICT based systems for mobility

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TeleFOT
Field Operational Tests of Aftermarket and Nomadic Devices in Vehicles

SEVENTH FRAMEWORK PROGRAMME

Mission:

To assess the impacts of functions provided by aftermarket and nomadic devices in vehicles and raise awareness on their potential for improving road safety and efficiency

Nokia 330 Navigator

Nokia 6110 Phone/ navigator

TomTom Go 910 Navigator

Sony Eriksson Smart Phone P910i

i2010 Intelligent Car Initiative

Safety

Research Topics:

Analysis will be done on a large fleet (3000 drivers) for a number of functions promoting safety/ efficiency assessing:

• driver behaviour and user acceptance.

• impacts on safety, efficiency, and on the environment

• impact on the transport system

• attention will also be paid on negative effects

The project also aims to contribute to user awareness and speeding up deployment

Coordinator: VTT
Total costs: ± 14M€
EC contribution: 9,7 M€
Start date: 1/06/2008
Duration: 48 months

1st Year Advancement & Main Achievements:

After its first active year the project has achieved most of its objectives and technical goals for the period with minor deviations. Numerous TeleFOT key results can be recognised:

i. Major steps taken in defining the general framework for running this novel type of research project

ii. Selection of functions to be tested

  + the associated complex framework from the functions to the research hypothesis, through research questions and performance indicators up to the data logger specifications.

iii. Huge steps have been taken in the planning, practical preparations and ramping-up of the numerous national test sites.

  Correct implementation and success of these are in the absolute core of TeleFOT. This task includes strenuous negotiations not just within the project but also with third-party stakeholders external to the project consortium.

Finnish test site
Swedish test site
UK test site
German test site
Spanish test site
Italian test site
Greek test site

i2010
Intelligent Car Initiative

Safety
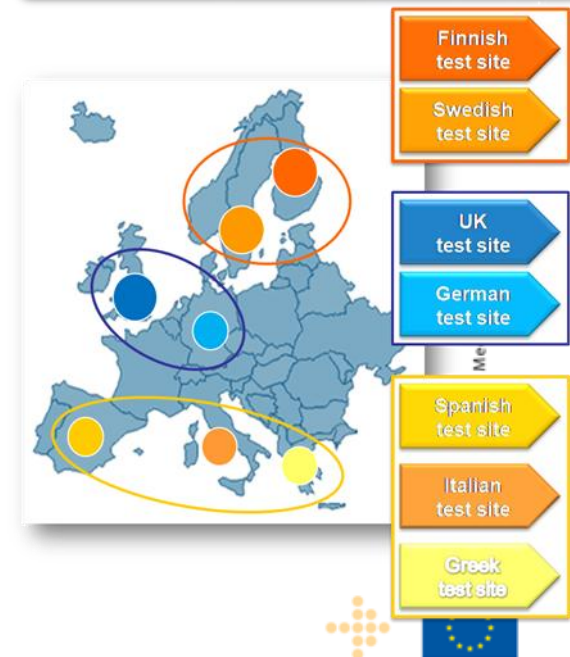
Mission:

"To develop a combination of cooperative systems and tools using vehicle-infrastructure communication to help drivers sustainably eliminate unnecessary fuel consumption, and road operators manage traffic in the most energy-efficient way."

Energy

eCoMove Solutions

Wasted energy due to:
- Ineff- **Inefficient deceleration**
- Wron- **Wrong gear & engine speed**
- Exce- **Excessive speed, acceleration**
- Poor- **Poor anticipation**
- Con- **Congestion**
- Poo- **Poorly synchronised signals**
- Choi- **Choice of inefficient route**
- Lack- **Lack of know-how, motivation**

ecoSmartDriving

ecoFreight & Logistics

ecoTrafficManagement + Control

eCoMove benefit ☺

Residual wasted energy

Energy consumption of "perfect eco-driver"

Energy consumption of "perfect eco-driver"

Situation today

The future

Time

Goals:

- Show that a combination of cooperative systems will reduce fuel consumption by 20%

- Develop eCoMove use cases, system concept and architecture

- Develop a common V2V & V2I platform based on CVIS project results

- Develop a strategic model of macroscopic energy consumption for an entire road network

- Develop, test and validate the applications: ecoSmartDriving, eco Freight & Logistics, and ecoTrafficManagement & Control

- Assess applications in 4 field trials (3 cities & 1 interurban motorway)

- Assess implementation issues, carry out a cost-benefit analysis, and propose an implementation roadmap

V2V & V2I = Vehicle to Vehicle &, Vehicle to Infrastructure communication
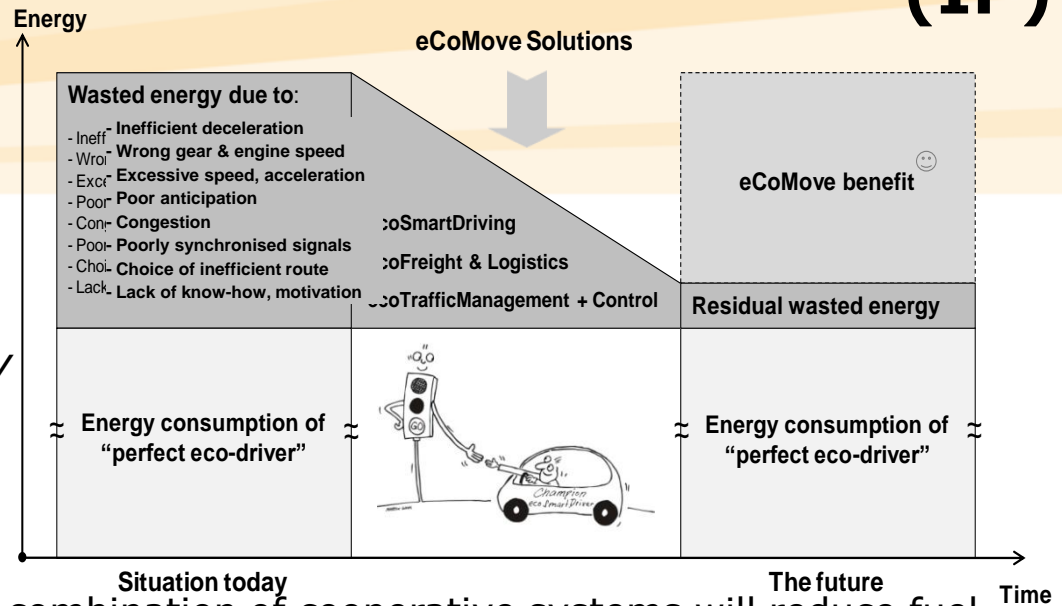
Coordinator:
ERTICO ITS Europe
Project in negotiation phase
Total costs: ±22.5 M€
EC contribution: ±13.7 M€
Start date: Q1/2010
Duration: 36 months

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Mission

To develop new high performance and integrated safety applications, enhancing the intelligence of vehicles and promoting safer and more efficient driving

Goals

1. Extend the range of possible scenarios and the usability of Active Safety Systems by multiple integrated functions and active interventions
2. Improve decision strategies for Active Safety and Driver-Vehicle-Interaction
3. Develop solutions for collision mitigation that are able to improve the market potential towards low segments
4. Create an innovative model and platform for enhancing the perception of the driving situation
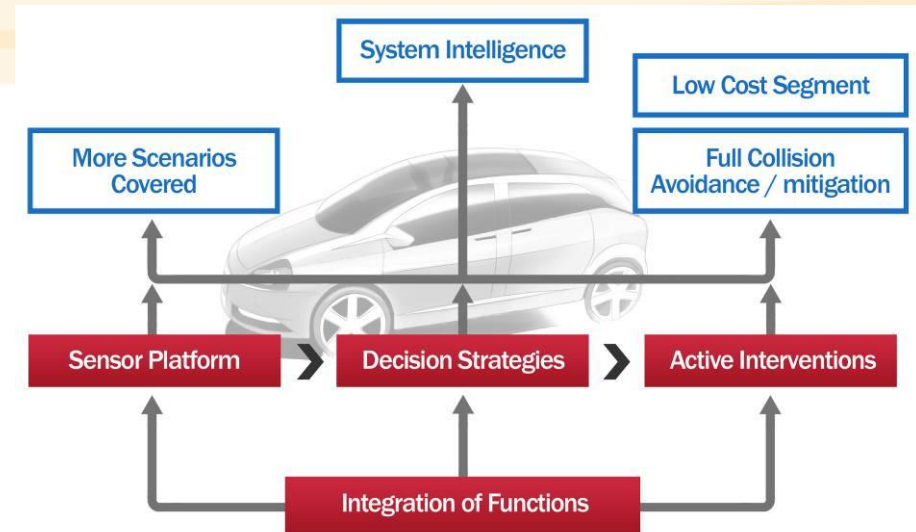
Coordinator: FORD

Total costs: 29 Mio €

EC contribution: 17 Mio €

Start date: January 2010

Duration: 42 months

EcoGem's approach:

- To render the FEV capable of reaching the desired destination(s) through the most **energy efficient route(s)** possible

- To render the FEV **fully aware of the surrounding recharging points/stations** while travelling

Coordinator: Temsa, Turkey
Duration: 30 months
Commencement date: 01-09-2010
EC funding: 2.044M€

EcoGem Solutions

- ✓ Continuous monitoring of the vehicle's battery level and energy consumption
- ✓ Autonomous optimised route planning
- ✓ Cooperative optimised route planning
- ✓ Continuous awareness of recharging points and optimised recharging strategy
- ✓ Online management of recharging points
- ✓ Holistic approach for energy efficiency and operational cost optimisation

COMeSafety (SSA)

Support the eSafety Forum with respect to all issues related to car to car/infrastructure communications. International Cooperation
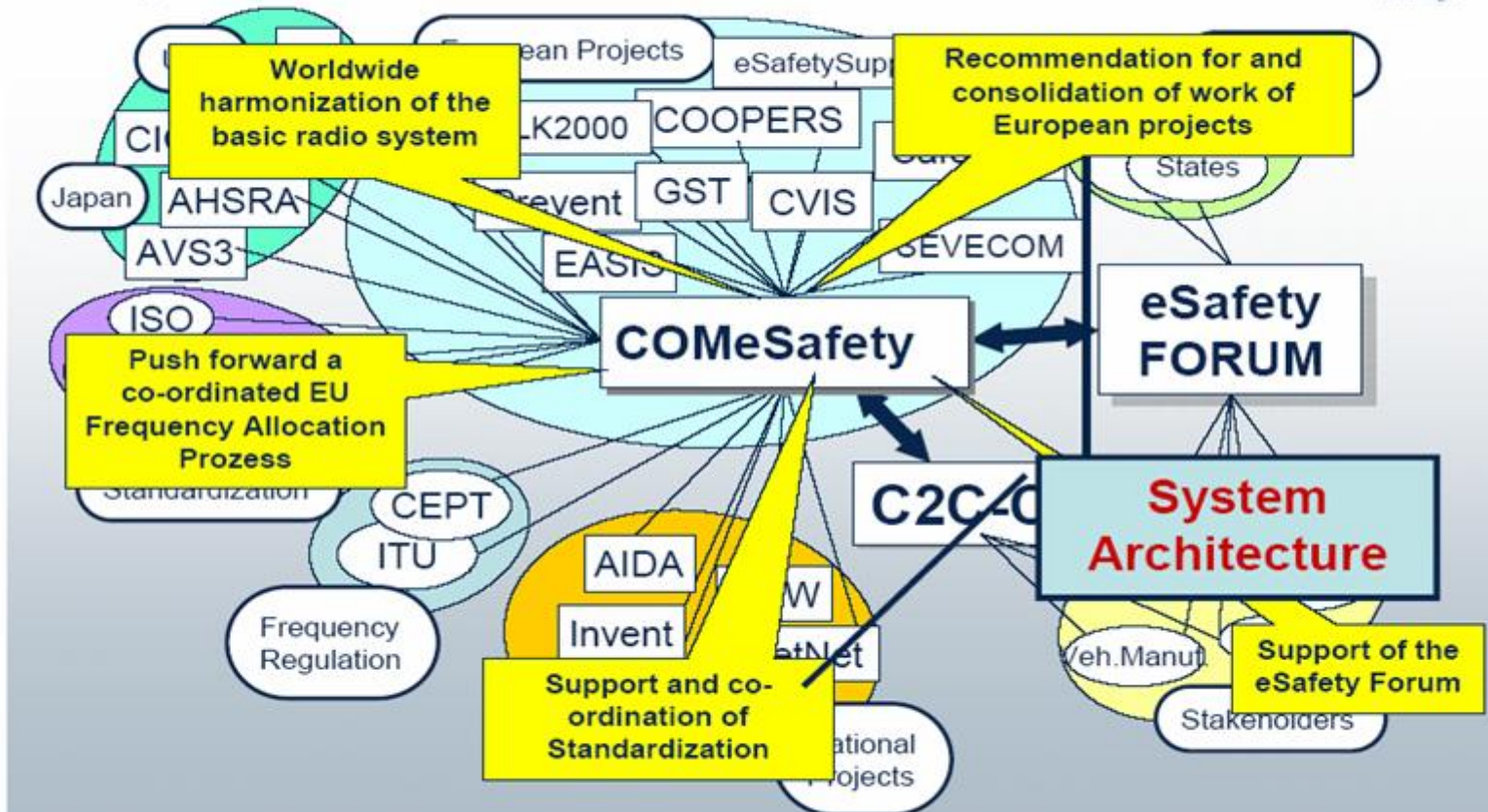
DRIVE C2X

Mission:

Carry out comprehensive assessments of cooperative systems through Field Operational Tests in various places in Europe in order to verify their benefits and to pave the way for market implementation.

Research objectives:

➤Create a harmonised Europe-wide testing environment for cooperative systems
➤Coordinate the tests with cooperative systems technology carried out in parallel by various national projects in Europe
➤Evaluate cooperative systems
➤Promote cooperative driving

Expected outcome: Propose a commonly agreed cooperative driving system for the whole of Europe that is interoperable and considers the needs of all stakeholders involved

Test sites:

NL (main)

FI, FR, DE, IT, SE, ES

Coordinator: Daimler AG
32 consortium partners
Total costs: 18.9 M€
EC contribution: 12.4 M€
Start date: 01/01/2011
Duration: 36 months

Objective: Prepare for the deployment of the necessary infrastructure in Europe for making the interoperable Pan-European in-vehicle emergency call service eCall a reality for all European citizens. HeERO will carry out pre-deployment pilots on eCall

Specific project objectives are:

- Define operational and functional requirements needed to upgrade eCall related service-chain parts to handle eCall
- Implement and test available Pan-European eCall related standards
- Implement and test needed technical and operational infrastructure upgrades
- Identify possible use of eCall system for public and or/private value-added services
- Produce the training material for the eCall operators
- Assess certification procedures related to the eCall services equipment
- Produce recommendations for future eCall pre-deployment and deployment activities in Europe
- Promote pilots results and best practices with other Member and Associated States non directly involved in the project
- Demonstrate interoperability and continuity of harmonised EU-wide eCall service

- Where do we come from
- Projects under FP 7, the overview
- Some concrete examples
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  - iMobility Forum
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Call 8: Objective 6.7

Cooperative Systems for
energy efficient
and sustainable mobility

Projects evaluated and under
negotiation

Call 8: Objective 6.7

Why?

Cooperative Systems (V2V + V2I / I2V) as enablers of decarbonised transport

- allow monitoring + control of transport networks
- direct communication with individual drivers in a given area
- simultaneously collecting traffic data + providing information to users

Broad approach is needed where cooperative systems

- will foster holistic, pro-active approach to urban + inter-urban traffic monitoring, control and management
- will enable proactive traffic management systems predicting traffic flow / volume, taking pre-emptive measures to avoid incidents

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Call 8: Objective 6.7

Target outcome:

Cooperative Systems for low-carbon multi-modal mobility for energy efficiency and eco-friendly mobility

European Wide Service Platform (EWSP) for cooperative system enabled services

Coordination and support actions: Dissemination of results, user awareness campaigns, assessments of socio-economic impact and training as well as international cooperation

European Wide Service Platform (EWSP) for cooperative system enabled services

Will provide to the drivers a large variety of energy efficiency, mobility, comfort and safety related services

Call 8 outcome in numbers:

Proposals received for an overall budget of 143 MEuro	N°
Streps	27
Integrated projects	5
Coordination and support actions	4

Proposals under negotiation for 40 MEuro	N°
Streps	5
Integrated projects	2
Coordination and support actions	2

Call 9 in 2013

Towards highly automated Driving :

- Focus is on supervised automated driving for improving both the energy efficiency and safety of individual and public transport; and on energy-efficient, safe and accessible services to enhance mobility of citizens

- Where do we come from
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  - iMobility Forum
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- iMobility Forum succeeds the eSafety Forum.
- includes ICT systems for resource-efficient and clean mobility
- in addition to the latter's focus on ICT-based safety technologies
- joint platform open for all road stakeholders interested in ICT-based systems and services

- Active Working Groups
  - Implementation Road Map
  - International Cooperation
  - Research and Innovation
  - ICT for Clean and Efficient Mobility
  - Digital Maps
  - Business Models
  - Legal Issues
  - Vulnerable Road Users
  - Automation

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- ITS can contribute to Cleaner, Safer and More efficient Transport

- But: deployment slow so far

- EU action plan to support the deployment of existing ITS solutions

- Joint action of DG TREN, DG INFSO, DG RTD, DG ENTR in order to develop coherent action plan

EU Policies on ITS

Action Plan for the Deployment of Intelligent Transport Systems (ITS) in Europe (Dec 2008

Directive 2010/40/EU: Framework for the Coordinated and Effective Deployment and Use of Intelligent Transport Systems

Road transport and interfaces with other modes

– coordinate and accelerate deployment of ITS

– make road transport more sustainable

ITS Action Plan

Action Plan for the Deployment of
Intelligent Transport Systems (ITS) in Europe (COM(2008) 886)

- Objectives
  - » coordinate and accelerate deployment of ITS
    in road transport and interfaces with other modes
- Measures
  - » 24 Actions in 6 Priority Areas

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ITS Action Plan : Priority Areas

Optimal Use of Road, Traffic and Travel Data

Continuity of Traffic and Freight Management

Road Safety and Security

Integration of Vehicle into Transport Infrastructure

Data Protection and Liability

European ITS Coordination

European Commission
Information Society and Media

in force since 26 Aug 2010

Framework for the Coordinated and Effective Deployment and Use of Intelligent Transport Systems

Objectives

- Establishing a framework for coordinated and effective deployment and use of ITS

- Setting common priorities

- <u>Development of specifications</u> and standards

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Optimal Use of Road, Traffic and Travel Data

Continuity of Traffic and Freight Management

Road Safety and Security

Linking Vehicle and Transport Infrastructure

▸ 6 Priority Actions > see next slides

▸ all defined in Annex I

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6 Priority Actions

- EU-wide Multi-Modal Travel Information
- EU-wide Real-Time Traffic Information
- Free Safety-Related Minimum Traffic Information
- Interoperable EU-wide eCall
- Information Services for Truck Parking
- Reservation Services for Truck Parking

International cooperation

Mail Boxes:

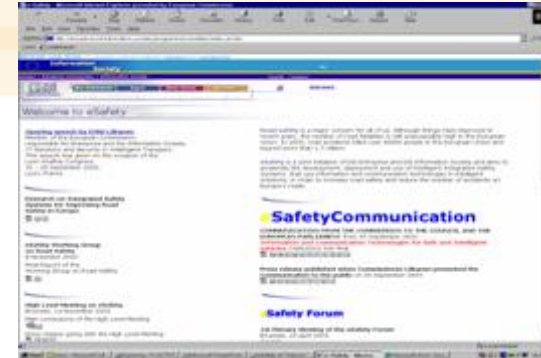INFSO- intelligent-car@ec.europa.eu

INFSO-eSafety@ec.europa.eu

eSafety Web-site:

http://ec.europa.eu/esafety

*e*Safety on CORDIS website:

http://cordis.europa.eu/ist/so/esafety/hom
   html

eSafetySupport web

www.eSafetySupport.org

Thank you
for your attention