Advances in Human Machine Interfaces (HMI)

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The challenge of HMI & Road Safety

- Increased complexity of Human/Machine Interaction inside the vehicle due to implementation of various informative and assistive functions provided by in-vehicle systems
- Increased needs to develop adequate methodologies to support the design and to evaluate the driver’s acceptability and usability of these functions
- Needs of criteria and recommendations to support the design process
Why a challenge? Various types of devices

- Integrated systems
- After market
- Nomadic devices
Why a challenge? Various types of functions

- In-Vehicle Information System (IVIS)
- Advanced Driver Assistance System (ADAS)
Why a challenge? Heterogeneity of drivers population

• **Elderly**
  e.g. Navigation problems, difficulties with gap evaluation

• **Novice**
  e.g. High reaction time, difficulties in detecting hazardous situations

• **Professionals**
  e.g. Additional constraints linked to the job
Why a challenge? Rapid evolution of the technology

Mobile phone: Evolution of interface design

Old generation

New generation

View
Menu
ICT: a chance to improve road safety

- White paper « European Transport Policy for 2010: time to decide », 50% reduction in road fatalities by 2010

Development of intelligent vehicle safety functions supports this goal
ICT: a potential worsening of road safety

Use of in-vehicle systems, especially functions not related to the driving task, increased **workload** and **distraction** for the driver.
Benefit / Risk of ITS for Road Safety

**ACTIONS**

- Guidelines for design and harmonized recommendations at the European level (ESoP)
- Identification driver’s needs and functional abilities to anticipate safety consequences and to support development of recommendations (e.g. Network of Excellence HUMANIST)
- Adequate and easy to apply methodology for safety evaluation (e.g. project AIDE & Network of Excellence HUMANIST)
- Functions integration (e.g. technical solutions, project AIDE)
- International exchanges (ISO, IHRA-ITS, JAMA & Alliance recommendations)
European Projects funded by the DG Information Society (2004-2008)
Incentive action eSafety Initiative

- A joint industry-public sector initiative led by the EC and international
- Accelerating development and deployment of I & C Technologies to enhance road safety

Report from HMI Working Group on European Statement of Principles (ESoP)

Recommendations for vehicle manufacturers, device manufacturers, Service providers, Member states …

- Harmonisation of HMI design
- Voluntary agreement process
Perspective for future design recommendations

Nomadic devices

Users want to use their mobile devices outside and inside the car

Performance of nomadic devices continue to improve very quickly
- Lot of memory for data storage
- Delivering massive computing performance
- Large communication throughput
- Access to many new mobility services

Nomadic devices will become an essential part of the IVIS (In-Vehicle Information System)
Perspective for future design recommendations

**Nomadic Devices**
- Integration of systems
- Company strategy for professional population

*Example of in-vehicle systems used by express delivery companies*
Perspective for future design recommendations

- Scope of ESoP: drivers and passengers of cars, trucks and buses but not motorcycles or other vehicles

**Safety of Powered Two Wheels Vehicle**
Perspective for future design recommendations

Advanced Driver Assistance System (ADAS)

- Lack of comprehensive research results linked to novelty of technologies and functions
- Need of better understanding about driver acceptability and use of these assistive functions
- Reference to conceptual knowledge of HMI in airspace domain to be transferred in automotive domain with important adaptation
- High impact for road safety but POSITIVE as well as NEGATIVE
Perspective for future design recommendations

**Elderly drivers and ICT functions**

- A chance to compensate functional deficiencies (perception, anticipatio, decision taking, action and control of the vehicle)
- A concern that systems are correctly designed for this population

*Increased ratio of elderly*

*High rate fatality*
The objective is to improve the quality of the living environment by supporting ICT solutions for **safer, smarter and cleaner mobility of people and good**.

In this context, the Commission proposes to launch a "quality of life" flagship ICT initiative on ...