PROJECT

INTERACTION

Differences and similarities in driver INTERACTION with in-vehicle technologies

Funding: European (7th RTD Framework Programme)
Duration: Nov 2008 - Dec 2012
Status: Complete with results
Total project cost: €3,334,209
EU contribution: €2,499,963

Call for proposal: FP7-SST-2007-RTD-1
CORDIS RCN : 90097

Background & policy context:

The development of information and communication technologies (ICT) in the field of road transport provides drivers with access to various functions and services which, if designed ergonomically and used appropriately, have potential to significantly enhance driver safety, mobility, enjoyment and comfort.

However, little is known about how drivers actually interact with most of these In-Vehicle Technologies in everyday life, about the differences and similarities of drivers regarding their interactions with IVT, and about the long-term effects of IVT use on driver behaviour, performance and safety.

Objectives:

The project aimed to contribute in fulfilling this knowledge gap. Understanding driver interactions with In-Vehicle Technologies was the main objective of the INTERACTION project. Amongst all the available In-Vehicle Technologies, INTERACTION focussed on a limited set of mature technologies already available on a wide range of car models and already adopted by most European car drivers, such as communication or navigation systems, speed control or distance control systems.

For this selected set of In-Vehicle Technologies (IVT), the INTERACTION project aimed to tackle the following questions:

- Why, when, where and how do drivers use IVT?
- What are the patterns of IVT use in everyday driving?
- What are the individual factors that do or do not explain the adoption of IVT by drivers?
- What are the differences or similarities between countries and their reasons?
- What are the actual supports to the driving task given by the systems? Are there involuntary or voluntary misuses of systems?
- Can these systems induce unexpected unsafe behaviour and skills?

The objectives of the INTERACTION project were:

- to gain a better understanding of driver interactions with In-Vehicle Technologies;
- to focus on mature technologies already available on the market and adopted by European car drivers;
- to identify patterns of use of these systems by European drivers in everyday life;
- to analyse their effects on driver's behaviour and skills, in normal and emergency situations;
- to highlight individual and cross-country differences.

The target impacts were:

- the reduction of the risks of systems misuses;
- the reduction of the risks of driver's unsafe actions;
the increase of the global benefits of in-vehicle technology in enhancing road safety.

Methodology:

A comprehensive research framework to investigate In-Vehicle Technologies use was developed to achieve the INTERACTION objectives. This framework was based on an innovative combination of well-established research methodologies: focus groups, questionnaire survey, naturalistic observations, and in-depth observations.

The purpose of this combined approach was to gather self-reported and observed driver behaviour data and qualitative and quantitative analysis. Differences and similarities of drivers regarding human interaction with In-Vehicle Technologies was investigated both at individual and country level. Each research methodology contributed to a better understanding of driver interactions with In-Vehicle Technologies.

**Focus groups** - A set of focus groups to understand and highlight:
- the conditions for IVT use by drivers;
- their eventual misuses;
- the difficulties or critical situations potentially met;
- some individual differences in terms of technologies appropriation.

**Questionnaire survey** - A questionnaire survey with a representative sample of the European driver population:
- to identify the population of drivers that own and use IVT in a regular or irregular way;
- to study the individual and cross-country differences in terms of their adoption and use.

**Naturalistic driving study** - An instrumented naturalistic driving study:
- to observe a sample of drivers at the wheel of their own vehicle;
- to identify their patterns of IVT use in everyday life and their implication for safety.

**Experimental observation** - An in-depth analysis:
- by means of on-board observers of driver's behaviour during their interaction with IVT;
- to analyse the potential changes in driver's skills and behaviours in critical situations and in interactions with other road users.

In INTERACTION, 10 European partners from 8 countries and 2 Australian institutes combine their expertise and knowledge.

**Parent Programmes:**
**FP7-SST - Sustainable Surface Transport**

**Institute type:** Public institution

**Institute name:** European Commission

**Funding type:** Public (EU)

**Lead Organisation:**

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<td><strong>EU Contribution:</strong> €101,435</td>
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**Partner Organisations:**

<p>| Trl Limited |</p>
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United Kingdom | Organisation Website:  
http://www.trl.co.uk | **€318,597** |
| Factum Chaloupka & Risser Og | Danhausergasse  
1040 Wien  
Austria | Organisation Website:  
http://www.factum.at | **€99,856** |
| Stichting Wetenschappelijk Onderzoek Verkeersveiligheid | Bezuidenhoutseweg 62  
2594 AW Den Haag  
Netherlands | | **€379,503** |
| Fundacion Para La Promocion De La Innovacion, Investigacion Y Desarrollo Tecnologico En La Industria De La Automocion De Galicia | Poligono Industrial A Granxa 249  
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Spain | Organisation Website:  
http://www.ctag.com | **€264,910** |
| Associacao Para O Desenvolvimento Da Investigacao No Instituto Superior De Gestao | Rua Vitorino Nemesio 5  
1750 306 Lisboa  
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<td>Monash University</td>
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Organisation Website:  
http://www.isec.universitas.pt

EU Contribution: €87,960

Technologies:

| Safety systems |
| In-vehicle technologies for navigation and safety |

**Development phase:** Implementation

**Key Results:**

In order to analyse the effects of In-Vehicle Technologies on driver's behaviour and skill in both normal and emergency situations, four mature technologies have been investigated by the INTERACTION research team:

- Cruise control
- Speed limiter
- Navigation system
- Mobile phone

The functioning principles, displays, and controls of the selected technologies were investigated in detail to synthesise the knowledge about them and to provide relevant information for the rest of the project. Focus groups were implemented to identify individual differences regarding the use of IVT by different categories of drivers from different countries. Analysis of the interviews started. Accordingly, a structured web-based questionnaire was designed using the information issued from literature review and previous research as well as the results provided by WP1 (focus groups).

The preparation of the data collection platform was launched: it started with specification of the patterns of use to observe and of the parameters to record. Partners would look at how to derive specific research hypotheses from general research questions and then to derive accurate performance indicators.

The design of the data acquisition system started. From the hardware point of view, an 'event manager' was designed to handle the various sensors that would be connected to the software. This modular solution enabled the use of multiple sensors, and is easily configurable, permitting different versions of the data acquisition system with a specific set of sensors, according to the specificities of the car and systems that will be selected.

The preparation of the in-depth behaviour study started. The observation methodology (Wiener Fahrprobe) was adapted with an amendment of the variables that would describe driving behaviour. Partners established the characteristics of the test tracks for the observation rides, ensuring that they would allow comparison of results between countries.

**Other results**

The following eight Work Packages (WP) were identified and finalised during the project:

- Work package (WP)1 finalised D.1, a report containing an inventory of IVT uses and misuses self-reported by drivers;
- WP2 finalised the design of the structured Internet questionnaire (M.3) based on inputs from WP1;
- In WP3, the research hypotheses that would be addressed by the two behaviour observations were selected (M.4);
- In WP4, weekly phone conferences were held with all partners involved to share progress and discuss issues in the implementation of the pilot tests;
- In WP5, FACTUM visited the partners involved to verify the test route and the progress of the observers training. The training process and the establishment and description of the test tracks were reported in M.10;
- WP7 launched the first special session and first newsletter of the project. Four scientific papers were presented at conferences;
- In WP8, scientific quality of deliverables was verified through the peer review process. Partners finalised the 'Framework for experimentation', dealing with the ethical, legal and financial questions in the experimentations.
Strategy targets

Innovating for the future: technology and behaviour.
Promoting more integrated urban mobility and intelligent transport systems.

STRIA Roadmaps: Cooperative, connected and automated transport
Transport mode: Road transport
Transport sectors: Passenger transport
Transport policies: Digitalisation
Geo-spatial type: Other