



# Tutorial on Safety and Design of New Transport Technologies

21-22 June 2007, Lyon, France

<http://www.noehumanist.org>



## Purpose

The European Network of Excellence HUMANIST (Human Centred Design for Information Society Technologies) organises training courses and workshops for professionals in the area of safety in road transport. In the tutorial "Safety and Design of New Transport Technologies" six lecturers from European research centres will share their knowledge on safety and animate discussions on this important topic, as the development of the new technologies of information and communication (I&C) will, in the coming years, transform deeply the uses and the practices in transport. The current developments, in the field of road telematics and driver assistance systems, may constitute a real opportunity of help for mobility and road safety. They raise nevertheless, numerous questions about their effectiveness, possible positive and negative modifications of behaviour or attitudes and about their acceptability by drivers.

## Background of the HUMANIST Network

The aim of the HUMANIST Network of Excellence is to federate the research in the domain of user/system interactions and their applications on road telematics and driver assistance, with the purpose to improve road safety. This network brings together 24 partners from 15 European countries and is funded by the DGA Information Society of the European Commission.

## Who should participate

The tutorial is geared at the following participants: transportation and traffic professionals, engineers, system designers, researchers and specialists working in

- Automotive and related industries
- Departments of transport and communication
- Public bodies related to transport in the automotive industry, public authorities, etc.

## The tutorial

The programme consists of lectures and practical exercises. These exercises are performed in small groups and require active participation.

## Lecturers

**Dr. Yvonne Barnard**, EURISCO International, France

**Prof Dr Guy Boy**, EURISCO International, France

**Dr Christhard Gelau**, BAST, Germany

**Prof Dr Joseph Krems**, Chemnitz University of Technology, Germany

**Stella Nikolaou**, CERTH/HIT, Greece

**Dr Annie Pauzié**, INRETS, France

**Prof Dr Ralf Risser**, Factum, Austria

## Thursday 21 June 2007

9.30	Introduction to the HUMANIST network and the workshop	Yvonne Barnard, EURISCO
10.00	Lecture 1: Safety and new information & communication technologies in cars and their potential consequences on safety	Annie Pauzié, INRETS
11.00	Practical exercise on functions, drivers and safety	
12.30	lunch	
14.00	Lecture 2: Measurement methods and techniques for evaluating I&C technologies with respect to safety-relevant criteria Demonstration and try-out of different techniques, such as occlusion	Joseph Krems, CUT
15.30	Lecture 3: Design guidelines for human machine interaction for in-vehicle systems	Stella Nikolau
16.30	Practical exercise on applying design guidelines	
17.30	Lecture 4: Standards for Intelligent Transport Systems and their contribution to safety	Christhard Gelau, BAST
18.00	Plenary exercise on ISO standards	
18.30	End of the first day	

## Friday 22 June 2007

9.00	Lecture 5: Public impact of I&C technologies: non-equipped and vulnerable road users, and residents	Ralf Risser, FACTUM
10.00	Lecture 6: Automation, safety and human-centred design of safety-critical systems	Guy Boy, EURISCO
11.00	Practical exercise automation and safety	
12.00	Wrap-up	
12.30	lunch	

## Short content of the lectures

### **Annie Pauzié, INRETS: Safety and new information & communication technologies in cars and their potential consequences on safety**

This presentation aims to introduce the general principles of I&C functions in transport in relation to road safety. It will develop and overview of what types of functions can be included in the broad designation of « ITS », including functions in public transport or on motorway such as VMS, without too much detail but in such a way that relationships between implementation of I&C in transport and consequences on road safety can be established. It will focus in more detail on the safety issues raised by the implementation of some I&C functions in the vehicle such as functions related or not related to the driving task, good design / poor design consequences for the same function, cooperation between driver and system for assistance system, risk homeostasis and appropriation for assistance functions, ergonomic approach based upon user needs and requirements; inputs for systems design and safety evaluation. The current European position concerning this issue in relation with the publication of the European Statement of Principles will be briefly presented and broad outlines the I&C future functions perspectives will be touched on.

### **Joseph Krems, Chemnitz University of Technology: Measurement methods and techniques for evaluating I&C technologies with respect to safety-relevant criteria**

On-board Traffic Information and Control Systems (TICS) for drivers are becoming more and more common these days. While driving, these systems provide information about the status of the vehicle, the optimal route, traffic jams, etc. Despite the usefulness of such systems, one could be concerned about the potential distraction and the additional cognitive load these systems impose on the driver, leading to an increased risk of accidents. Thus, it becomes obvious that methods for assessing the HMI of in-vehicle information systems for safety are needed. One possibility is to investigate new systems on-board while driving in real traffic or a driving simulator. Because this approach is very demanding and expensive, looking for an easy-to-use method applicable in the very early stages of the system development would be worthwhile. Several techniques like the occlusion technique or the peripheral detection task have recently come under consideration as candidates for an assessment tool. The major aim of the talk is to give an overview over techniques available and to discuss the validity and usability of several techniques for HMI assessment of in-vehicle information systems.

### **Stella Nikolaou, CERTH/HIT: Design guidelines for human machine interaction for in-vehicle systems**

Design Principles are intended to help engineers develop HMI elements for a wide range of product users. It is intended that those products will be safe and easy to use; they will not cause accidents or distract people from driving and that information can be obtained quickly and without error. These products should be at least as usable and useful as existing in-vehicle information systems in the market. Finally, they should require no learning. A typical driver, without instruction and without referring to a manual, should be able to use them correctly the first time. The guidelines that are to be presented in this talk, are deriving from the relevant work conducted within the AWAKE FP5 Project, based on the European Statement of Principles on HMI (C1999/4786) and extended literature survey, which were reviewed during the validation phases of the project. AWAKE developed a driver monitoring system that detects in real-time driver hypovigilance and provides effective warning through innovative HMI elements (visual warning on rear-view mirror, seat-belt vibration, rumble strips sound emulation) aiming to prevent traffic accidents attributed to driver fatigue. In addition a simulation of the AWAKE HMI module will be presented as a support scenario for the reviewed topics.

### **Christhard Gelau, BAST: Standards for ITS and their contributions to safety**

In-Vehicle Information and communication Systems (IVIS) as well as Advanced Driver Assistance Systems (ADAS) are becoming more and more a standard equipment in modern cars. Despite of their

obvious benefits there are concerns about risks arising e.g. from potential distraction and the additional workload caused by these systems when used while driving. Thereby the human-centred design of the Human-Machine-Interface (HMI) is unequivocally acknowledged as the key factor in balancing the demands for increasing functionality with the already existing workload imposed on the driver by the primary task of driving. This development also constitutes a challenge for activities in the area of international standardisation where in recent years several endeavours have been made to support good design and thereby contributing to usability and safety of ITS in modern cars. The major aim of the talk is to give an overview over the basic principles of standardisation and to highlight some recent developments on the level of ISO (in particular ISO/TC 22/SC 13/WG 8) with a special focus on standards for HMI.

### **Ralf Risser, FACTUM: Public impact of ITS: non-equipped and vulnerable road users and residents**

It is an old discussion topic that systems meant to improve safety and comfort of drivers equipped with these systems could have non-planned for and in some cases adverse effects for other groups. These effects may be expected mainly in the frame of communication between road users. Two different types of aspects will play a role in this respect: one of behaviour diffusion (unequipped drivers imitate the behaviour of equipped ones) and one of interacting in areas that have to be shared among different groups (intersections, pedestrian crossings, driving through residential areas, etc.). There, effects could for instance be generated via changes in speed caused by a certain equipment, which would influence all communication with other road users. A systematic diagram (Equipment types) X (Possible effects) X (Road users/Residents) will be drawn and discussed, and empirical evidence will be reported where available.

### **Guy Boy, EURISCO: Safety and human-centered design of safety-critical systems**

Safety is freedom from accidents and human losses. Accidents are complex multi-causal events, most of the time impossible to predict. Therefore, it is hard to maintain safety. This talk will try to show how we can take into account safety in a human-centered approach to design. The lecturer uses his experience in the analysis, design and evaluation of aerospace systems. There are various issues that need to be discussed such as safety-driven usability and standards, toward a safety culture that enable the management of safety. Taking into account safety is a matter of developing and using methods and tools during the whole life cycle of a product. It starts with the analysis of the requirements and risks involved in the use of this (safety-critical) product. Both formative and summative evaluation play a significant role. We will see what kinds of human factors are essential to be taken into account such as workload, situation awareness and crew resource management. Finally, the lecture will cover experience feedback, in particular incident and accident investigation and reporting. We will discuss the relevance and possible adaptation of these concepts, methods and tools in the automotive sector.

## Location

The Humanist tutorial will take place at INRETS, Lyon/Bron, France. ([www.inrets.fr](http://www.inrets.fr))

## Fees and payment

The fee for the Humanist tutorial is

**300,- € early registration before 18 May 2007**

**380,- € registration after 18 May 2007**

This includes lectures, course materials, lunch and coffee breaks.

## Information, Organisation & Registration

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For your information: The Enhanced Safety of Vehicles (ESV) conference takes place from June 18-21, 2007, in Lyon

More information: [www-esv.nhtsa.dot.gov](http://www-esv.nhtsa.dot.gov)

