



Workshop: Safety Impact of Road Telematics and Driver Assistance Systems

**HUMANIST Network of Excellence
10 February 2005 - Brussels, Belgium**

Contact and organisation

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Location of the workshop

Belgian Road Safety Institute
Chaussée de Haecht 1405
B-1130 Brussels
<http://www.ibsr.be>

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 road transport. In the workshop "Safety Impact of Road Telematics and Driver Assistance Systems", five 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 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 human factors competencies on road transport exist in Europe, but are scattered. To obtain effective results, it is necessary to integrate the research capacities in Europe. The HUMANIST Network of Excellence brings together 22 Partners from 14 European countries.

The aim of the Network of Excellence HUMANIST is to federate the research in the domain of user/system interactions and their applications on road telematics and driver assistance.

For further information please visit <http://www.noehumanist.org/>

Who should participate

The workshop is geared at the following professionals:

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

Agenda

09:00–10:00	Introduction to safety and human-centred design of safety-critical systems- Guy Boy, EURISCO (France)
10:00–11:00	ITS functions and their potential consequences on safety, Annie Pautie INRETS, (France)
11:00–12:00	Discussion
12:00–14:00	Lunch
14:00–15:00	Measurement methods and techniques for evaluating IVIS with respect to safety-relevant criteria, Joseph Krems, CUT (Germany)
15:00–15:30	Design Guidelines for ADAS Systems - Stella Nikolaou, CERTH/HIT (Greece)
15.30-16.00	Classification of Driver Assistance Systems According to their Impact on Road Safety - Ioanna Spyropoulou, NTUA (Greece)
16:00–17:00	Discussion
17:00–18:00	Synthesis

(For more information about the topics and speakers see below.)

The Workshop is limited to 20 participants and is free of charge. Lunch will have to be paid by participants (approximately 30€). Hotel reservations can be made at the Hotel Mercure City Center at the preferential rate of 105€ per night, including breakfast. (has to be booked in advance)

If you are interested in attending this workshop, please fill out the registration form below and email it to Helen Wilson (wilson@onecert.fr) or Yvonne Barnard (barnard@onecert.fr) as soon as possible.



Registration Form

First Name _____ Last Name _____

Institution _____

Address _____

City _____ Postal Code _____

Country _____ Email _____

Tel _____ Fax _____

Need a hotel reservation? Hotel Mercure City Center 105 € per night including breakfast

Arrival date _____ Departure date _____

Credit card to guarantee reservation:

Credit card _____ Name _____

N° _____ Expiry date: _____

Content of lectures and CV of speakers

Introduction to Safety and Human-Centered Design of Safety-Critical Systems

Guy Boy, European Institute of Cognitive Sciences and Engineering, France

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. In my talk, I will try to show you how we can take into account safety in a human-centered approach to design. I will use my 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, I will talk about 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.

Guy Boy is President of the European Institute of Cognitive Sciences and Engineering (EURISCO International). Engineer and psychologist, he received his PhD in Automation and System Design from the Ecole Nationale Supérieure de l'Aéronautique et de l'Espace, his "Habilitation à Diriger des Recherches" (Paris VI), and his Full Professorship Qualification in Computer Science and Psychology. Researcher at ONERA from 1977 to 1988, he was seconded to NASA-Ames from 1984 to 1986 in the Aerospace Human Factors Research Division. He joined NASA-Ames as the Leader of the Advanced Interaction Media group from 1989 to 1991. His research is in human-centered design and automation, the study of safety-critical systems, electronic documentation and knowledge management. He is the author of three books: Intelligent Assistant Systems (Academic Press, 1991), Cognitive Function Analysis (Ablex/Greenwood, 1998) and Cognitive Engineering (Hermès-Lavoisier, 2003). He has been a legal expert in aircraft accident investigations.

EURISCO International (European Institute of Cognitive Sciences and Engineering) is an SME specialized in Human Factors Research. Its shareholders are Airbus, Thales-Avionics and Aeroconseil Groupe. The objectives of EURISCO International are to provide expertise and support for European industry in the following areas: Cognitive systems engineering of applications that depend on human-machine interaction; the idea of human reliability and security are central to this theme; Specification and development of training and documentation needed to use interactive systems in a cost-efficient way in sectors where cognitive interaction is vital; Research on new communication technologies, in particular human-machine communication or human-human communication by means of computer technology; the idea of computer supported cooperative work is an integral part of this theme; Acquisition and elicitation of expertise with the aim of assembling a body of knowledge and know-how; corporate memory, new organizations, formalization of knowledge for design (in particular for the design of human-machine systems). EURISCO International's team has a broad experience in specialized domains such as aeronautics, space engineering, car/automotive cockpit research, air traffic control, industrial processes and documentation.

ITS Functions and their Potential Consequences on Safety

Annie Pauzié, INRETS, France

This presentation aims to introduce the general principles of ITS functions in transport in relation to road safety. It will develop an 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 ITS 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 ITS 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 ITS future functions perspectives will be touched on.

Annie Pauzié is Research Director at INRETS/LESCOT. She has a PhD in Neurosciences and Ergonomics from the University of Sciences in Toulouse, France. She did a post doc at the University of California, Los Angeles from 1985 to 1987. Since 1988, she is a researcher at INRETS/LESCOT on ergonomics of telematic systems design in transport, with a focus on elderly users' needs and requirements. She has been involved in several European projects in the framework of the program DRIVE, such as STAMMI - Definition of Standards for the In-Vehicle Man-Machine Interface, 1989-1991; HARDIE - Harmonisation of ATT Roadside and Driver Information in Europe, 1992-1994; AIDE - Adaptive Integrated System Vehicle Environment, 2004-2007. Some European projects were also devoted to the ITS design from infrastructure such as TROPIC, 1997-1999, and ITS available in public transport for multimodal traveller information such as Infopolis 1 & 2, 1995-2000. She represents the French Ministry of Transport at the International Harmonised Research Activities -ITS working group. She has been involved as the French expert in the working group eSafety initiative on HMI, DG InfSo.

The French National Institute for Transport and Safety Research (INRETS) was created by interministerial decree on the 18th of September 1985. The INRETS is a state-financed scientific and technological body under the dual administrative supervision of the Ministry of Research and the Ministry of Transport. INRETS has the following main missions: To organize, execute and assess technological research and development concerned with the improvement of the means and systems of transport and of traffic from technical, economic and social viewpoints. To carry out evaluative and advisory studies within these domains. To promote the results of these research and study programmes, to contribute to the dissemination of scientific knowledge, and participate in training by and for transport research both in France and abroad. Staff at INRETS totals 400: 189 researchers, 157 technicians and assistants, and 54 administrative and management personnel. Two thirds of research have training in the physical sciences, and one third in the social sciences. The institute's activities involve such diverse fields as economics, sociology, psychology, physiology, ergonomics, biomechanics, acoustics, mechanics, mathematics, computer science electronics and electro-technical. The diversity of approach used to carry out the different research programmes gives a multidisciplinary characteristic to the INRETS research teams, which correspond to their methods.

Measurement Methods and Techniques for Evaluating IVIS with Respect to Safety-Relevant Criteria - Joseph Krems, Chemnitz University of Technology, Germany

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.

Josef F. Krems is Professor of Cognitive and Applied Psychology. He got his PhD in Psychology (Psycholinguistics), worked after that on expert systems (mainly diagnosis) and got a second PhD (Habilitation) for studies on expertise. He then moved to the US for a while as a visiting assistant professor at the Department of Medical Informatics at Columbus, Ohio. Back in Germany in 1994 he went to the University of Potsdam continuing his work on cognitive psychology. In 1995 he moved to Chemnitz University of Technology where he established a new department of applied psychology. He is still there as a professor of cognitive and industrial psychology. During the last 5 years traffic psychology has become one of his major topics of research.

Chemnitz University of Technology (CUT) is one of four Universities of Saxonia, Germany. As a university of technology it offers a wide variety of courses and research programs from engineering sciences such as microtechnology, process engineering, information technology. But there are also programs from the social and behavioural sciences like psychology and sociology, reflecting the fact that interdisciplinary qualifications are becoming more and more important. The department of psychology was founded in 2000 with a specific profile focussing on human-machine interaction. The department's main research emphasis is on "behaviour in complex systems: human-machine-interaction, management of resources, conflict resolution". Human behaviour is considered as goal oriented, but limited by resources of the processing system and therefore sensitive to conflicting actions in natural and artificial environments. This area concentrates on aspects that concern the development, use and evaluation of technical support and assistance systems by individuals or organisations. Beginning with the foundation of the department traffic psychology became a major topic of research as well as of teaching in the psychology master and PhD program. As part of the department the Laboratory of Applied Cognitive Sciences (Director: Prof. Dr. J. F. Krems) focuses on: diagnostic reasoning in technical domains, design and management of information, cognitive workload and divided attention, diver distraction, skill acquisition in highly complex domains.

Design Guidelines for ADAS Systems

Stella Nikolaou, CERTH/HIT, Greece

This talk will focus on design guidelines for ADAS systems developed in the European AWAKE project. The results of the literature survey, the AWAKE user needs survey and the AWAKE validation Pilots have been transformed into a set of precise and detailed guidelines as chapters to the Design Guidelines Handbook that include driver fatigue state detection parameters; driver warning on fatigue (what to do, what not to do, based upon traffic safety evaluations and user preferences); specificities of particular driver cohorts (young drivers, shift workers, people suffering from sleep disorders, professional drivers); proper evaluation practices and tools for drowsiness detectors validation and requirements for further sensors/detectors improvement for driver fatigue detection and for traffic risk estimation. These guidelines mainly target specialised audiences (i.e. car manufacturers, automotive system/ sensor developers, non-technical human factors experts, etc.). Furthermore, they will supplement / detail the “European Statement of principles on HMI” (C1999/4786) in relation to driver’s state emergency warnings. The guidelines that are to be presented in this talk, are both existing and new (from AWAKE) and have all been tested during the AWAKE project pilots. Design Principles intended to help engineers develop interfaces for a wide range of product users will be discussed.

Stella Nikolaou is a software programmer and she is involved in the research team of the Hellenic Institute of Transport dealing with driver behaviour monitoring and human factors impact on road safety. She has been involved in various national and European research projects, whereas her main research focus includes the monitoring of the driver behaviour for the enhancement of road safety through the use of Advanced Driver Assistance Systems (ADAS), studies of human sleep for safety enhancement in industrial applications and the reduction of accidents attributed to operator’s lack of alertness, and the development of high-end user interfaces for several industrial applications. She led the validation tests of the FP5 Project ‘AWAKE’, which developed a driver monitoring system for driver fatigue detection in real-time. She is the Task Force ‘F’ Leader in the FP6 European Network of Excellence ‘HUMANIST’ related to the theoretical and practical drivers’ training on ADAS use, and Leader of Subproject ‘4’ of ‘SENSATION” FP6 Integrated Project, dealing with the development of multi-sensorial systems for the reduction of industrial accidents that are attributed to operators’ lack of alertness.

HIT is the newly created National Institute for the promotion of Transport Research and Transport Policy support, the first of its kind in Greece. It focuses on applied research in all fields of Transport, with the aim to provide inputs for, among other fields, policy formulation, documentation of major trends and impacts in the field of Transport, formulation of operational rules and procedures, improvement of the operation and management in the various Transport modes, etc. HIT also promotes international relations and co-operation between Greek and foreign research bodies, in the field of Transport, and acts as advisor to Government bodies on issues of Transport policy formulation. HIT is organized into the following 5 sectors: Specialized research and analyses. Special emphasis is given to new technologies applications. Documentation and Databases. Dedicated to data collection, and the development, support, and maintenance of databases in the field of Transport in Greece. Dissemination of research results, research evaluation, and training programmes. Standards and standardization activities. Quality control, and safety promotion. Promotes and applies quality control procedures in the field of Transport in Greece, and also investigates and promotes road safety. HIT forms part of the Centre for Research and Technology Hellas (CERTH).

Classification of Driver Assistance Systems According to their Impact on Road Safety - Ioanna Spyropoulou, NTUA, Greece

This presentation involves the classification of intelligent transport systems and their potential impact on road safety. It is a general overview of the impact of such systems on road safety and comprises three main parts. First, intelligent transport systems will be classified into different categories according to their properties and capabilities. The reason for the need of such grouping arises from the great number of similar technologies available. This classification allows the description of these systems in an efficient way. The second part of the presentation involves the description of the potential and anticipated impact of the use of the systems in terms of road safety. In this way the importance of further developing certain systems in comparison to others – when the road safety is the main impact parameter – can be identified. Finally, examples of the impact of the use of such systems (ACC, ISA and VMS or in-vehicle information on weather conditions) on road safety will be described. The impact presented is estimated using traffic simulation models and vehicle simulators and are extracted from previous studies (ADVISORS and US study).

Ioanna Spyropoulou is a traffic engineer at NTUA. She obtained her Diploma in Civil Engineering, at the National Technical University of Athens (NTUA), GREECE and her PhD in Transport at the University College London, UK in 2003. Since then she has been a Research Associate at the department of Transport Planning and Engineering, National Technical University of Athens (NTUA), GREECE. She is involved in national and FP6 EU research projects related to traffic engineering, traffic management, traffic safety and Intelligent Transport Systems and is involved in National related project "Accident risk investigation of drivers with high participation in road accidents". European projects include IN-SAFETY - "*IN*frastructure and *SAFETY*", HUMANIST - "*HUMAN centred design for Information Society Technology*". She is a member of the Hellenic Institute of Transport, Committee for Traffic Engineering, Technical Chambers of Greece.

NTUA The educational and research programme of the Department of Transportation Planning and Engineering of the School of Civil Engineering of the National Technical University of Athens covers the transport of persons and goods by all transport modes, from the phase of surveys, general planning and feasibility study, up to the implementation studies and the construction. More precisely, the Department covers topics, which have been grouped in the three main areas of Railways and Transport, Highway Engineering and Traffic Engineering. A relevant Laboratory operates in each one of these three topics. NTUA disposes a comprehensive research infrastructure for the support of its research activities. More precisely, NTUA disposes a set of large data bases with data on traffic and road accidents in Greece and in Europe, as well as several statistical analysis tools (software, models), etc.) and traffic simulation and assignment models. The real-time traffic map of Athens, operational since 1996 (more than 70 million hits) and the related services (web, VMS, SMS, etc.) are commonly used for the various road traffic and accident analysis activities of NTUA. Additionally, NTUA is also equipped with technical instruments like measuring devices and items for on-road tests. International and national contract research is combined with the research conducted under Ph.D. and Engineering Diploma Theses, to cover selected topics of transportation planning, traffic and highway engineering. Over the last 20 years, the Department of Transportation Planning and Engineering of NTUA has been involved in more than 50 international and 80 national research projects, totalling a budget of more than 11 million euros.