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Purpose

Minutes of the TFG Workshop On The Application Of New Technologies To Driver Training Brno, January 26-27, 2005

Deliverable G2 of Task Force G:
 Use of ITS to train and to educate drivers

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Annex 18: Drivers' training on ITS use through psychological methods: Importance and application in practice (Abstract). Turetschek C. (FACTUM)

Annex 19: Virtual Reality Driving Simulators for Drivers Training (Abstract). Lentziou Z AND Amditis A. (ICCS)

Annex 20: Novice drivers and new driver support technologies: Potentials of simulator-based training (Abstract). Sommer S. (Ifado)

Summary:

Driving simulators and e-learning communication technologies hold considerable promise for enhancing driver training, testing, and licensing and in consequence for improving driver performance and highway safety. One of Humanist TFG objectives is to assess the present state of the art in the application of new ITS technologies to driver training, and to identify what additional R&D effort is needed to achieve the potential effectiveness in using new ITS technologies to improve the driver training process at a European level with harmonized procedures.

As part of the process that is being developed to achieve these objectives, TFG organized a workshop on the Application of new technologies to driver training at CDV facilities in Brno (Czech Republic) on January 25-26, 2005. 30 researchers from Humanist partners and 2 invited speakers from the Traffic Academy of Bohemia attended the workshop. In total 20 papers were presented at the 8 sessions that were held during the workshop covering the following topics:

1. State of the art in driving simulators.
2. State of the art on e-learning applications. .
3. Driver simulators: Perspective of stake holders.
4. Framework for the application of simulators to driver training
5. Curriculum for driver training based in simulators and e-learning
6. Validation techniques: state of the art and research needs
7. Initial approach for the preparation of guidelines on the application of new technologies to driver education.
8. Application of simulators and other tools to driver training (This session was organized jointly with Humanist Task Force F to coordinate the activities of both groups.).

During the workshop the functional requirements and the research needs in the field of driver training tools were discussed, and the initial approach and workplan for the preparation of guidelines for the application of the new technologies to driver education was established.

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Workshop Agenda

Wednesday, January 26 2005

Session 1. **State of the art in simulators.** Coordinator: J. Pardillo, UPM

- State of the art in simulators: Humanist Driving Simulators Inventory. J. Pardillo, UPM. 9:00 – 9:20
- Driving Simulators for Initial Driver Training. B. Kappe, TNO. 9:20 –9:40
- Simulating Urban Traffic for Driver Training. J. Mera, UPM. 9:40-10:00
- Virtual Reality Devices In Driving Simulators: State of the Art and Ongoing Developments at UPM. J. Torres, UPM. 10:00-10:20
- Improved realism and improved utility of driving simulators: are they mutually exclusive? A. Parker, TRL. 10:20-10:40

Session 2. **State of the art on e-learning applications.** Coordinator: T. Troglauer, DTF

- TRUCKSIM; Preliminary results from cohort study in England. A. Parkes, TRL. 11:00-11:20
- State of the art on e-learning applications: Humanist e-learning applications inventory. T. Troglauer. DTF. 11:20-11:40
- Group discussion on future development needs in simulators and e-learning applications for driver training. Moderators: T. Troglauer, DTF and J. Pardillo, UPM. 11:40-12:00

Session 3. **Driver simulators: Perspective of stake holders.** Coordinator: I. Hanzlikova, CDV

- Introduction to TFG objectives and workplan. J. Pardillo, UPM. 13:00-13:30
- Historical overview of using driving simulators in Czech and Slovak driving schools. J. Pour, Traffic Academy of Bohemia. 13:30-14:00
- Development and using driving simulators after 1989. R. Kotál Traffic Academy of Bohemia. 14.00-14:30
- Debate on future research needs for application of driving simulators to driving schools. Moderator: I. Hanzlikova, CDV 14:30-15:00

Session 4. **Framework for the application of simulators to driver training: state of the art and research needs.** Coordinator: I. Hanzlikova. CDV

- Project TRAINER Survey of existing Training Methodologies and Driver Instructor Needs – results in the area of driving simulators. I. Hanzlikova, CDV. 15:30-16:00
- Czech legislation regarding driver training. V. Kelnar, CDV. 16:00-16:20
- Driver Training in the new Driving and Failures Simulator of Metro de Madrid (SICAMM) J. Mera UPM . 16:20-16:40
- Group Discussion on the development of a framework for the application of simulators to driver training. Moderator: I. Hanzlikova, CDV. 16:30-17:00

Thursday, January 27 2005

Session 5. **Curriculum for driver training based in simulators and e-learning.** Coordinator: W. Vlakveld, SWOV

- The Use of Simulators in basic Drivers Training. W. Vlakveld, SWOV. 9:00-9:20
- Virtual Instruction in Driving Simulators. B. Kappe, TNO 9:20-9:40
- Discussion on Curriculum for Driver Training. Moderator W. Vlakveld, SWOV 9:40-10:00

Session 6. **Validation techniques: state of the art and research needs.** Coordinators: M. Duraz,& S. Espié Inrets

- Validation techniques of driving simulators for training. M. Duraz, INRETS. 10:30-11:00
- Validation of driving simulators: state of the art and problems. S. Espie, Inrets. 11:00-11:30
- Discussion on Validation Techniques. Moderador M. Duraz,&SEspie Inrets. 11:30-12:00

Session 7. **Initial approach for the preparation of guidelines on the application of new technologies to driver education.** Coordinator: S. Sommer, IFADO. 13:00 to 14:00

- Introduction. S.Sommer., DTF. 13:00-13:15
- Group discussion on the conclusions of the workshop and TFG workplan for the preparation of guidelines on the application of new technologies to driver education. Moderators: S. Sommer, IFADO; J. Pardillo, UPM. 13:15-14:00

Session 8: **Application of simulators and other tools to driver training in the use of ITS devices** (Joint TFF-TFG session). Coordinators: S. Nikolau, CERT – J. Pardillo, UPM.

- Driver education by simulation and assessment of fitness to drive for learner drivers and people with disabilities" T. Falkmer (VTI) 14:00-14:20
- Drivers' training on ITS use through psychological methods: Importance and application in practice C. Turetschek (FACTUM) 14:20-14:40
- Virtual Reality Driving Simulators for Drivers Training V. Papakostopoulos (CERT) 14 :40-15 :00
- Novice drivers and new driver support technologies: Potentials of simulator-based training S. Sommer (Ifado) 15:00-15:20

Workshop minutes

Wednesday, January 26 2005

Welcome and introductions

On behalf of CDV, host of the workshop, K. Schmeidler (CDV) welcomed all the participants. He introduced Mr. V. Fencel, CDV Deputy Director for foreign cooperation, who described in detail CDV's organization, research activities and its involvement in European Research Projects, including SARTRE 1, 2 & 3 (European drivers' attitudes towards road traffic hazard), TRAINER (Driver training and testing system that makes use of interactive measuring technology and exact methodology), ESCAPE (Improving road safety by rendering the methods and procedures of traffic rule supervision more effective), and HUMANIST in the field of social and human aspects of transport.

Session 1: State of the art in simulators (Chair: J. M. Pardillo, UPM)

• PRESENTATIONS

J. Pardillo (UPM) introduced the objectives of the workshop to identify the functional requirements of driver education tools, to assess whether available tools are sufficiently mature for validation purposes, and to identify research needs to fill the gaps in existing simulators and multimedia tools and presented the results of TFG survey on existing simulation and multimedia tools for driver training and education.

- Wide variety of driving simulators is available already
- Used in driver training, both of novice drivers and of professional drivers, and research
- Few alternatives to cover the needs of disabled, elder drivers
- Present state of the technology makes it possible to implement different driver training applications with a growing level of complexity and fidelity to real driving conditions
- Lack of technical specifications at national and European level
 - Minimum conditions for use in the different levels of driver training
 - Framework for this specifications needs to be defined.
- Validation of simulators is also an area where there is still a need for further advance
 - Methodological approach to driver simulator validation for driver training is required

B. Kappe (TNO) described in his presentation different driving simulators, focusing specially on driving simulators applications for initial driver training and provided details on their implementation in the Netherlands.

J. M. Mera (UPM) presented the state of the art in modelling urban traffic and a traffic model in urban environments for its implementation in simulators, specially in professional drivers training. The models include different degrees of aggressiveness of simulated drivers and different types of vehicles. In addition, anomalous traffic situations as the presence of obstacles, abnormal manoeuvres of certain vehicles, etc. can be generated.

J. Torres (UPM) discussed on the use of virtual reality devices in driving simulators and described the work that is being conducted at UPM to develop a basic model of driving simulator which introduces a 3D virtual world using two video projectors, which provide a video signal for each eye, and a pair of polarized glasses to achieve a high level of interaction and a very immersive atmosphere, more similar to the reality than the rest of simulators. In the future, real video using stereo cameras could be inserted in this architecture

A. Parkes (TRL) presented some of the developments in driving simulators since the 1960's and gives examples of several current systems. A distinction is drawn between *degree of simulation* and *fidelity of simulation* and poses questions about the future direction of technological development. His paper drew attention to the need to develop visual databases and road traffic scenarios that are derived from an analysis of training needs, not from the starting point of recreation of real world scenes, and provided examples of alternative approaches.

- **DISCUSSION**

The results of the driving simulator survey shows that a wide variety of driving simulators is available nowadays. The technical characteristics of the simulators cover a wide range of specifications. The present state of the technology seems to make it possible to implement different driver training applications with a growing level of complexity and fidelity to real driving conditions. Nevertheless, there is a lack of common technical specifications both at national level and at European level that define the minimum conditions that a simulator should have to be suitable for use in the different levels of driver training applications. A framework for this specifications needs to be defined.

Simulators are already being used in driver training, both of novice drivers and of professional drivers, as well as for research, and other applications. On the contrary, there are few alternatives to cover the needs of disabled drivers. This is a field that requires further development. The validation of simulators is also an area where there is still a need for further advance. There have been some efforts in this field, but without a systematic approach that enables to compare results or to derive general conclusions. A methodological approach to driver simulator validation for driver training is required as a key step towards extended use of simulators as standard tools in the driver training process in Europe.

Session 2: State of the art on e-learning applications (Chair: J. M. Pardillo UPM representing T. Troglauer, DTF)

- **PRESENTATIONS**

J. Pardillo (UPM) presented a paper prepared by T. Troglauer (DTF), who could not attend the workshop. In general e-learning regarded as a for tool driver training denotes all kinds of techniques using electronic means or multimedia techniques to enhance traffic safety through improvement of drivers skills and knowledge. As such e-learning techniques can employ strategies, which ranges from theoretical knowledge of traffic rules and regulation to training of certain skills or techniques or improvements in awareness of special subjects. Compared to the driving simulator survey relatively few institutions were involved in e-learning applications. However, this should not be taken as an indication of less profound use of these applications. It is likely that e-learning applications are more widespread than the surveys would indicate. At present it seems as if the e-learning application have not moved beyond the existing spheres of driver training. Thus related to the Gadget-matrix the content of the training are still aimed at the control and manoeuvring tasks. Few applications in both Humanist and TRAINER surveys provided insight on the strategic and behavioural tasks e.g. through hazard perception training. However, it is likely that as the extent of the media of e-learning becomes more and more widespread so will the e-learning applications within the areas of driver training.

In general little scientifically validated knowledge exists on the transfer effects of e-learning in regards to driving behaviour, situation awareness or anticipatory behaviour. Elderly drivers, impaired drivers or drivers with special needs are not targeted in any of these applications though many of these driver groups could potentially benefit from certain elements of these applications. As a general notion it could be stated that e-learning applications potentially could have good chances of reaching these drivers as use of e-learning does not require physical presence of a driving instructor or that the drivers have to participate in traditional class-room teachings. On the other hand it could be argued that many of these groups are not familiar with these types of training tools meaning they would not necessarily be interested in this form of training. Finally it still needs to be established whether a transfer effect is actually obtained through e-learning tools

- **DISCUSSION**

E-learning applications can be considered as a cost effective training tool to use, both for development and running, for any purpose such as increase specific knowledge, raise awareness or simply illustrate certain traffic situations thus making it an attractive product for commercial developers of driver training. E-learning applications can be used in conjunction to other training courses or as activity in simulator courses. It is likely that a substantial amount of applications already exists on topics related to driver training or safety e.g. defensive driving, hazard perception or driving fuel efficiently.

Several questions still remains open in order to evaluate the potential learning benefit from e-learning scientifically especially when comparing it traditional theoretical driver training. As a general notion it can be stated that once training areas have been identified where e-learning could possible contribute to driver training a suitable scientific validation process should take place. Some research areas are:

- Differences in the didactical content and processes of e-learning applications compared to traditional learning as measured by driver performance outcomes
- Identification of areas in which theoretical driver training could benefit from e-learning applications.
- Differences in the didactical processes between traditional driver learning processes and e-learning.

Before these and related question have been addressed more systematically it remains an open question whether any of the applications used within driver training have accomplished an increasing learning effect.

Session 3: Driver simulators: Perspective of stakeholders (Chair: I. Hanzlíková, CDV)

- **PRESENTATIONS**

The session was opened by a presentation of the objectives and the workplan of Humanist TF G.

He was followed by two speakers from the Traffic Academy of Bohemia that had been invited to the workshop to provide the perspective Driver Training Centres.

J. Pour presented the history in using driving simulators in Czech and Slovak driving schools, showing that the tradition of simulators is quite extensive in these countries. The simple equipment with diaprojection was used in former driving schools Czechoslovakia. During the late sixties multi-cabined schoolrooms with a system of diaphone, shadow and film projection were introduced to every driving school. A video-program with using a simulator AT 80 within a multi-phase preparing of drivers was shown.

His colleague, R. Kotál, continued introducing the development and applications of simulators since 1989. According to R. Kotál, the practical usage of the simulators can be broken in two parts: Driver education (basic at driving schools or enhanced: defensive driving course, emergency vehicles drivers training, navigation systems handling etc.), but also in the field of research (for instance effect of alcohol on driving performance, impact of fatigue on driving, influence of diseases on driving). The computer technology is used for managing a work of driving simulators. The components of virtual reality support illusion of driving in real conditions. More sophisticated visualization and software equipment allow a service of simulators in basic driver's training, but also within an extra training (for instance an application of rules of defensive driving, training drivers with right of way, training of operating with navigation systems). A possibility to program different tasks then enable very effective using simulators in research, especially in the area of assessment of eligibility to drive motor vehicles with influence of alcohol, influence of somatic disease, or detecting the mental capacity of the driver.

The last presentation was about possibilities of application of Black Box to driver education. Black Box (Event Data Recorder) collect, record, store and export data related to motor vehicle pre-defined events. These devices induce drivers to drive more carefully, resulting in less collisions and less costs, cause it is known that people aware of being observed tend to modify their behaviour. Black box opens new possibilities of the research in the psychology area.

- **DISCUSSION**

From this session we may conclude that the aim of usage of driving simulators in driving school and research projects is not based only on saving money for petrol. The main reason for the increasing popularity of driving simulators is their high flexibility to the actual demands.

Session 4: Framework for the application of simulators to driver training: state of the art and research needs (Chair: I. Hanzlíková, CDV)

- **PRESENTATIONS**

The first contribution by I. Hanzlíková introduced the major findings of the TRAINER project – relating to driving simulators. The starting point of the author was the issue of education needs according to the framework of GDE-matrix. The conclusion was that driving simulators cannot simply substitute traditional driver training, but can well serve as an effective complement in training, used for specific tasks of driving.

I. Hanzlíková has also presented the paper by V. Kelnar, dealing with Czech legislation regarding driver training. His contribution described how the simulators were designed and verified before their massive application. The methods of work that have led to establishment of driving simulators in legislative norms were presented.

The last contribution in Session 4 by J. Mera has described the driver training in the new Driving and Failures Simulator of Metro de Madrid. A set of virtual simulators are integrated with the full scale simulator and able to interact with the cabin to make manoeuvres exercises, or to conduct independent training exercises. The simulated Command Post allows the training of drivers and Inspectors together. The control level on the simulator allows maintaining a centralized data base for the exercises made by each student, to prepare formation plans, as well as to visualize and manage the accomplishment of these training plans.

- **DISCUSSION**

The main questions, raised from the presented contributions, were:

How we can identify the crucial research needs?

To what area the research should be focused?

According to the discussion, it was rather clear that there is not urgent need to lead the research towards technology, but firstly research should focus on needs of different groups of drivers, but we should also consider the role of the trainer and his task in the process of simulator training.

The further research should also take more into account the psychological factors that influence the safe behaviour on roads, since it is clear that skilled driver does not mean safe driver. Many of attendees have agreed that the research should start from the driver and his/her needs.

There is a need of better training curricula as well, since there is a very little consensus on content of the curricula. We also should consider that not every driving task could be simulated. We should also more clearly answer the question: What do we have to simulate? And what kind of tasks should be done on simulators?

The emphasis should also be focused on validation, since it is difficult to prove the results of driver training in general.

The further research on motion sickness is needed.

In general both sessions have presented potential and drawbacks of simulator based training, and the further research needs were discussed.

There is quite wide scale of aspects in the area of driving simulators that deserve attention of researchers in future.

Thursday, January 27 2005

Session 5: Curriculum for driver training based in simulators and e-learning (Chair: W. Vlakveld, SWOV)

- **PRESENTATIONS**

In the first presentation Mr. Vlakveld stressed that a shift from emphasis the technical aspects to the didactical aspects is required. From various experiments can be deduced that if computer based training (e-learning) and simulator training are well integrated in the curriculum for basic driver training, the learning process will accelerate. However retention problems may occur and the simplified reality of the simulator world may at the end hamper the development of flexible schemata. This implicates that simulator training only to a very limited extend can replace behind the wheel training in the real world. Simulators can speed up the acquisition of basic driving skills, but so far there is no proof that they are useful for the acquisition of higher order skills such as risk perception. In particular the lack of higher order skills is responsible for the fact that novice drivers have such a high accident risk. More research is needed in order to develop successful simulator and e-learning training programs for the acquisition of higher order skills.

In the second presentation Mr. Kappé made clear that from a learner's point of view, driving is a complex and highly interactive task. The task of a driving instructor is even more complex, since it not only involves driving tasks, but instructional tasks as well. Driving simulators cannot fully simulate all aspects of driving and of driving instruction. They are best used for relatively simple driving and instrutional tasks. If used that way, driving simulators can be used succesfully basic driver training.

- **DISCUSSION**

In the discussion that followed the question of simulator sickness was raised. In the two presentations this was not mentioned and especially training elderly drivers in a simulator, simulator sickness is a problem. Also the advantages and disadvantages of the simplified reality in a simulator environment were discussed. What we need to find out is, the quality of recent simulators for training purposes given, which skills for which groups can best be trained on a simulator.

Session 6: Validation techniques: state of the art and research needs

Chairs: M. Duraz & S. Espié (INRETS)

• PRESENTATIONS

Three presentations followed by a discussion on research needs in validation techniques:

1 Validation techniques of driving simulators for training. M. Duraz, INRETS. Some techniques resulting from European projects such as TRAINER and RESPECT and from works conducted in universities will be exposed. Others validations techniques used in assessment of training or for the validation of driving simulators for the research can be adapted for some specific cases.

S. Espié's (INRETS) presentation dealt with the issue of transferability of results acquired on simulators. He started by reviewing the problems of driving simulators validation and the limits of simulators. Then he introduced a classification of simulator uses followed by a discussion problems of validation by use. Finally he stressed the necessity of ethics in simulator use. The advantages and disadvantages of both existing methods for assessing ITS, and state-of-the-art methods using new technology, will be considered. The application and effectiveness of these methods was discussed

A. Parkes (TRL) had previously presented his paper on the preliminary results from a cohort study in England. using a top-of-the-range truck simulator, that was used in preliminary evaluation trials involving over 1000 experienced truck drivers. He reported on results from the first stage of a subsequent detailed longitudinal cohort study that has sought to provide a detailed analysis of the benefits of synthetic training in the area of fuel efficiency improvement. 70 drivers have been recruited to visit the truck simulator on three separate occasions and receive training designed to improve driving style in a range of traffic situations. Fuel consumption figures are to be recorded during each simulator visit, and are to be compared to real world fuel consumption records for the same drivers. The framework for converting vehicle performance data into usable training feedback for the driver was explained.

• DISCUSSION

The subject of the discussion was to point out items missing in techniques of validation that require attention, or need research. Four points were mentioned:

- Assessment of the quality in pedagogical domain. The quality of training depends primarily on teaching skills (pedagogy). Several capabilities of simulators, such as replay, react, preview, drill, augmented cueing, adaptive training curricula, etc seems to be effective if there are well used. Is it possible to define criteria's to assess this quality?
- Questions on long terms effects of training Driving simulators allow to train driver to master complex and/or dangerous situations. It will be interesting to assess that this training will not result in negative effects like reducing risk awareness, more particularity for young drivers. These effects can be measured by longitudinal study over several months.
- Traffic model. Training on driving simulator seems to be effective in the high level of the hierarchical description of the driving task (i.e. strategical and tactical level of the GDE matrix). To acquire knowledge and skills concerning mastery of complex traffic situations such as anticipation of the development of situations, speed adjustment, distance to others/ safety margins, etc., it is necessary to have a "good" traffic model, able to produce a realistic traffic environment around the trainee. The traffic model is an essential component of a driving simulator dedicated to learning, it seems difficult to have tools to assess its global quality, a first step could be to determine its validity conditions.
- Need for an elaborate performance measurement To allow the driver's progress to be monitored, a real-time measurement system is required. Traditionally, performance measurement systems specify driving performance in terms of (standard deviation or standard error of) lateral or longitudinal position, speed, relative speed etc. These performance measurement systems deal with basic performance and mainly don't take the context of the driving situation into account. Furthermore, if road situations become complex, it is difficult to determine which parameters have to be monitored, and what their relation is with the desired outcome of the scenario. That is why a monitoring tool, also called "virtual instructor", will be required in order to be able to assess in real time if the driver's decisions and actions are correct in the driving context.

Session 7: Initial approach for the preparation of guidelines on the application of new technologies to driver education (Chairs: S. Sommer, IFADO & J. M. Pardillo, UPM)

S. Sommer (IFADO) introduced the following issues that need to be dealt with in the preparation of guidelines on the application of new technologies to driver training:

- Framework for guidelines: definition of objective – activities, proposed medium, instructional methodology, performance assessment and testing
- Training needs: Actual objectives for a specific target group
- Training curricula: Activities, sequence of activities, scenarios etc.
- Selection of training media for different activities: classroom, slide show, mechanical devices, computer, e-learning, simulation, the real thing etc.
- Performance measurement, assessment criteria
- Validating procedures

J. Pardillo (UPM) presented TFG workplan for the next months that includes the following actions:

- Study of functional requirements of driver education tools and identification of research needs to fill the gaps in existing simulator and multimedia tools (month 20)
- Analytical review of driver training and education process and identification of potential applications of e-learning (month 20)
- Preparation of a report on functional requirements of driver training and education tools, identification of research needs and potential applications of e-learning (month 22)
- Organization of a Conference on European guidelines for the application of new technologies for driver training and education (month 26)
- Preparation of Guidelines for the development of a European driver training and education tools (month 30)

• DISCUSSION

The following conclusions were drawn:

- Due to the lack of sufficient resources for actual empirical research the preparation of the Guidelines will be based on a review of current state-of-the-art in order to extract guidelines from available sources.
- Each guideline will be backed up with references to the work the guideline is based on (articles, project reports etc.).
- As we will not be able to do empirical research we should consider using the less strong term 'recommendations' instead of 'guidelines'.
- The Goals for Driver Education - framework will be applied for the specification of guidelines. Broad guidelines should be produced for each of the 12 cells, supplemented by more detailed guidelines whenever it is possible to be more specific.
- A focus should be on the media selection process: By comparing driver training with new technologies to traditional on-the-road training the pro and contra of training with new technologies will be elaborated.
- As we will not be able to do empirical research ourselves, the guidelines/recommendations should also include further research needs.

Partners furthermore pointed to previous work that should be considered during the development of guidelines:

- Willem Vlakfeld from SWOV mentioned the results of the BASIC project, which according to his point of view are relevant for the development of guidelines. He agreed to send further information about the project.
- TNO had the ELSTAR and MASTER projects, both related to the design of simulator-based training schemes. Bart Kappé agreed to send relevant information about the projects in order to discuss further how e.g. the MASTER methodology could be used for the formulation of guidelines.

- IFADO and VTI co-operated closely in the TRAINER project. Torbjörn Falkmer suggested to use the training scenarios developed in this project as case example to show how new technologies can respond to specific training needs. Sascha Sommer will send the relevant reports.

To comply with the Task Force objectives, the following decisions and action plan were adopted:

• DECISIONS

1. To prepare a report on functional requirements of driver training and education tools, identification of research needs and potential applications of e-learning by month 22
2. To organize a Conference on European guidelines for the application of new technologies for driver training and education to be hosted by UPM in Madrid on month 26
3. To prepare a set of guidelines for the development of a European driver training and education tools by month 30

• ACTIONS

	Responsible	Deadline
1. Study of functional requirements of driver education tools and identification of research needs to fill the gaps in existing simulator and multimedia tools Leader: UPM Contributors: CDV, CUT, INRETS, SWOV, VTI, BIVV	UPM	October 30, 2005
2. Analytical review of driver training and education process and identification of potential applications of e-learning Leader: DTF Contributors: BAST, IFADO, UTL	DTF	October 30, 2005
3. Preparation of report on functional requirements of driver training and education tools, identification of research needs and potential applications of e-learning Report writing: UPM, DTF Contributors: All	UPM, DTF	December 20, 2005
4. Organization of a Conference on European guidelines for the application of new technologies for driver training and education in Madrid (Spain) Organizer: UPM E-learning sessions leader: DTF Session coordinators: , INRETS, SWOV, CDV, CUT, IFADO Contributors: BAST, HIT, JRC, UTL, BIVV, VTI	UPM (organizer), DTF, INRETS, SWOV, CDV, CUT, IFADO, (session coordinators)	April 30, 2006
5. Definition of the research design to validate the use of simulation technology in driver training Leader: INRETS Contributors: BAST, CDV, CUT, DTF, IFADO, SWOV, UPM, VTI	INRETS	June 2006
6. Preparation of a set of Guidelines for the development of a European driver training and education tools Leaders: UPM, DTF Contributors: All	UPM, DTF	August 30, 2006

Session 8: Application of simulators and other tools to driver training in the use of ITS devices (Joint TFF-TFG session). (Chairs V. Papakostopoulos CERT & J. Pardillo, UPM)

- **PRESENTATIONS**

"Driver education by simulation and assessment of fitness to drive for learner drivers and people with disabilities" T. Falkmer (VTI) Despite the fact that driving has been an everyday activity for almost 100 years for many people, there is, however, no such general model. Not even the driving test itself is a valid and reliable predictor of who will drive safely and who will not. Different driving assessment screening tools are tested and used in several clinics on a regular basis. None of them has a sensitivity and specificity of 100%, respectively. This means that in a driving assessment situation, we will face the trade off problem of either reducing capable but wrongly categorized safe drivers' mobility or reducing the traffic safety for all road users by wrongly categorize unsafe drivers as safe. The TRAINER project developed a new cost-effective Pan-European driver training methodology, based on simulator technology, which paid significant attention not only to gain experience of driving and handling the vehicle, but also to the enhancement of risk awareness of learners drivers. A number of scenarios for application in simulators were developed. The scenarios addressed the most important needs of learner drivers, based on accident statistics and an extensive literature review. They have been structured in accordance with the four hierarchical levels of the GDE-matrix. The results from the project show that it is possible to improve driving behaviour by including simulator training in the driver education. Using the same strategy for re-training of disabled older drivers requires new scenarios to be developed, based on their particular needs. A first attempt in this direction, based the GDE matrix, was done within the AGILE project.

Drivers' training on ITS use through psychological methods: Importance and application in practice C. Turetschek (FACTUM) Discussed the possibility of integrating in a simulator some situations where for example the risk behaviour of a driver, e.g. related to a new ITS-equipment - is tested in order to talk about it afterwards and sensitise the driver on this phenomenon. But even if it is not possible to do so ("play" situations in the simulator), it is necessary to talk with drivers about the existing psychological phenomena. And it is also important to keep in mind what user group the training should address. For example young drivers might have other personality traits and attitudes than "normal grown ups", or professionals. In Austria we do have a "Driver Improvement" training where we try to use group dynamics to make drivers aware of their problematic behaviour like speeding as soon as they have the possibility. A technically well equipped car might enhance speeding. This reasoning brings us up to the idea to adapt this training for the use of ITS and the behaviour that could become problematic due to the reasons above.

Virtual Reality Driving Simulators for Drivers Training ¿? (ICCS) Virtual reality is a feasible solution to be used for the purposes of the driving task. VR can mainly have an impact on the driving procedure through the Virtual Reality Driving Simulators (VRDS). The VRDS are preferable to all the other types of driving simulators, since they can be used for assessing and training a "mean" driver, providing a novice driver with confidence, rehabilitating the disabled driver and re-training and educating the elderly and training for emergency vehicle operations and procedures, assessment, licensing, driver education, and research. The VRDS can achieve all the aforementioned due to a variety of potentials and functionalities. The main reason, however, is that VRDS provide a safe driving environment for the trainer as well as the trainee. While a VRDS is not a substitute for the real world, it can be considered as a tool to make the driver feel like driving into the real world's driving environment.

Novice drivers and new driver support technologies: Potentials of simulator-based training S. Sommer (Ifado) The number of cars equipped with new driver support technology is increasing so that skills to use these systems are becoming more important. As relevant skills are difficult to train on the road, simulator-based novice driver training comes into view as an option to train the use of driver support systems. A conceptual analysis elaborates the specific needs of novice drivers to train the use of driver support systems by applying the 'Goals for Driver Education' framework (Hatakka et al., 2002). The effects of new technologies on the different levels of the driving task are described in order to identify ways to use driving simulation to familiarize novice drivers with the corresponding changes of the driver-vehicle-environment system. The potential of simulator-based novice driver training to respond to the identified needs is discussed using the TRAINER project as case study.

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