INFORMATION SOCIETY TECHNOLOGIES (IST) PROGRAMME

AIDE

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Application of existing ADAS and IVIS Functions to Final DVE Model

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Activity No.	**A1.1.2**	Activity Title	**Identification and validation of a reference model of DVE**
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Executive Summary

The present deliverable concludes the research activity of WP 1 within Subproject 1 (SP 1) of the AIDE Integrated Project. In particular, the general objectives of this document are:

- To provide a basic description of how to account for Advanced Driver Assistance Systems (ADAS), and In-vehicle Information Systems (IVIS) within the framework of the whole Driver-Vehicle-Environment (DVE) model;

- To complete the driver model with the description of the overall Fuzzy Logic approach and Decision Making rules;

- To summarise the complete driver model to be included in the general DVE conceptual framework, with the definition of taxonomies for IVIS/ADAS functions; and

- To describe in detail some remaining aspects of behavioural effects, as resulting from the latest research findings from the other activities of the Project.

An important topic is the description of the ADAS application that will be implemented in the DVE simulator. It represents the *Vehicle* side and it is designed in order to investigate how this function can affect driver's behaviour. In our case, a Forward Collision Warning has been detailed. The reasons for this choice are twofold: from one side this function has a strong impact on traffic safety (as all accident analysis issues show); on the other side, it has been used in many experiments carried out by WP2 of SP 1, for short- and long-term studies.

The overall model of the DVE interaction has been developed and described in a set of AIDE Deliverables (D1.1.1/a and b; D1.1.2, D1.1.3 and D1.1.4). In all these deliverables, a particular attention was dedicated to the modelling of the driver, in order to provide a reliable user's model. In particular, the Fuzzy Logic (FL) approach has been adopted as general underlying numerical mechanism to describe human behaviour. The reason for this choice is that FL is very suitable to mimic human reasoning in an approximate rather than exact way. In addition, FL seems to be particularly appropriate for modelling cognitive aspects of driver, as it is requested in the DVE framework. The general approach of FL is described in this Deliverable, while the specific rules applied for modelling the driver have been discussed in a previous Deliverable (D1.1.4). In addition, a short summary of the driver model and the practical decision making rules for performing basic activities, such as "lane change", "increase speed" and "reduce speed", are also discussed. At present, the model is being implemented in a computer simulation for predicting normal DVE interactions as well as behavioural effects (WP3 activity).

The experimental work carried out in Work-Package 2 of Subproject 1 has identified a set of basic mechanisms and critical parameters underlying behavioural effects of driver assistance and information functions. The main focus of these studies was on the effects of behavioural adaptation to ADAS, as these are the research needs that need particular attention (AIDE 2004, pag. 29 etc.). The work involved simulator studies as well as field operational tests, and has been concluded with Deliverables D1.2.3 and D1.2.4, recently released. In this deliverable we revise the main conclusions of these experiments, mainly with respect to the feedback on the adopted driver modelling approach.

To sum up, the present Deliverable aims at illustrating the final "structure" of the DVE model in terms of theoretical formulations of the overall paradigm, final definition of parameters and variables, as well as feedbacks of the results and findings from field studies carried out on behavioural adaptation. In addition, the design of the ADAS application is described, to be included in DVE simulator.