Introduction

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I have the privilege to contribute to the research and advance engineering in the field of flight and driving simulation since the mid 80ths. First at Thales Training and Simulation, followed by Renault, but also at the CNRS, College de France and more recently at Arts et Métiers ParisTech. I also had the privilege to organize the Driving Simulation Conferences since 1995 and thus see the evolution of both simulation techniques and applications through these years. The new domain of automotive driving simulation was born in the 70ths and went through a dramatic mutation which today is entering in a new era: high performance real time motion and image rendering as well as the effective industrial use of driving simulation for automotive vehicle design.

The different sections of this book witness this evolution. As you can see, the main human factors session is providing data on the use of dynamic simulators, especially on the effect of motion on driving behavior, both for lateral and longitudinal accelerations. A more technical oriented session on Motion rendering, together with a Simulation design and architecture section give insight of the necessary rendering techniques to provide the necessary motion and environmental cues for correct driver perception.

Different types of applications in driving simulation, including economical and VE driving and fuel efficiency, subjects becoming of social importance these days, are sections in this book are Perception and human factors, Virtual prototyping and applications, this latter including a specific the application areas, Automotive Driver Aid Systems (ADAS), Motion rendering and Simulation design and architecture, completed with a Short summaries. All of these sections deal with the subjects of the paper and poster sessions of the last, 11th edition of the Driving Simulation Europe conferences, held on September 6 and 7 in Paris.

Virtual prototyping becomes a key area in vehicle engineering design, contributing to the zero physical prototype vehicle development. ADAS are the newest and progressively most visible part of this trend, as cars nowadays are proposing sophisticated driver aid systems. These are costly to develop and difficult to validate in realistic driving conditions with more and more sophisticated man machine interfaces which have to stay understandable and easy to use. These systems necessitate the use of high performance driving simulators as the behavior of the vehicle needs to be of high fidelity.

As the question of simulation validity is thus crucial, a particularly large Perception and presented in a well furnished Virtual prototyping and training session of full papers. An additional section of Short summary papers allow to learn more about high performance simulators, such as that of Renault, University of Stuttgart or University of Tongji, as well as other experiments and developments in driving simulation. These sections all together present the view of authors from the academic world and the simulation industry from more than 10 countries worldwide, including Europe, Israel, the USA, Japan and China.

I would like to thank my colleague, Frédéric Mérienne, from Arts et Métiers ParisTech, for his help in the organization of the DSC Europe 2012 conference, this year with a specific Exhibition area. I would also like to thank Stéphane Espié, from IFSTTAR, for his help in the publication of the conference proceedings under the form of this text book. I hope strongly that this book will help the readers to learn more about the latest technological and scientific advances in the domain of driving simulation and gain insight on the use driving simulators.