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# Handbook of Driver Assistance Systems



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Hermann Winner • Stephan Hakuli  
Felix Lotz • Christina Singer  
Editors

# Handbook of Driver Assistance Systems

Basic Information, Components and  
Systems for Active Safety and Comfort

With 737 Figures and 53 Tables



**Springer** Reference

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## Preface

*A Handbook of Driver Assistance Systems* is challenged by the requirement to compile all relevant activities on advanced driver assistance systems (ADAS) into a comprehensive, understandable, and structured way. This book not only explains components, features, and well-known standard systems, but it aims at giving a complete picture, always focusing on the entire system. It is designed as a standard work for ADAS developers, researchers, and decision-makers. The first edition of this book was published in German language in 2009 and had the objective to close the gap of standard ADAS books available at that time. It was well received by the market, and in 2012 the second, corrected version was published. However, the field of ADAS is moving fast, so in 2015 the third edition – still in German language – was released. Its contents were completely revised, and numerous additional topics were added. This first edition in English language is the result of an increasing demand to make the German version of this book accessible for international readers.

The resulting scope of this handbook starts with the fundamentals of the development of ADAS, including human factors, ergonomics, and social and legal aspects. Simulation and virtual system integration gain importance in modern automotive development processes and are covered in this edition, together with established real-world-based processes for system verification and validation. Environment sensor systems play a key role in every system architecture. Therefore, current sensor principles and technologies are discussed in detail alongside the state-of-the-art actuators for steering and braking. Any ADAS with driver interaction demands an appropriate human-machine interface (HMI). Different multi-modal HMI concepts are explained together with their individual requirements for a user-friendly design. ADAS are everywhere in today's passenger cars, commercial vehicles, motorcycles, tractors, and agricultural machinery. This book gives a comprehensive overview of state-of-the-art systems, including their functionality and particular requirements. Finally, the book closes with an outlook toward upcoming ADAS in research and development and concludes with the question "Quo vadis, ADAS?"

The editors of this book thank all the authors for their valuable contribution and a great collaboration. Thanks to the publisher for agreeing to create an international standard work on ADAS and especially to Daniela Graf and Andreas Maisch from

Springer for the reliable pleasant cooperation. Thanks to all lecturers for ensuring high quality and a good reading experience. Thanks to all supporters, especially from the Institute of Automotive Engineering at Technische Universität Darmstadt, and to our student assistant Yannick Ryma for his reliable and accurate work. And last but not least, thank you for deciding to work with this book and providing us with your valuable feedback.

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From left to right: Stephan Hakuli, Hermann Winner, Christina Singer, Felix Lotz

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