SAE INTERNATIONAL

SAE EDGE™
RESEARCH REPORT

Unsettled Issues in Balancing Virtual, Closed-Course, and Public-Road Testing of Automated Driving Systems

Sven Beiker, PhD

SAE EDGE™
RESEARCH REPORT

Unsettled Issues in Balancing Virtual, Closed-Course, and Public-Road Testing of Automated Driving Systems

Sven Beiker, PhD
Silicon Valley Mobility

SAE INTERNATIONAL®
Warrendale, Pennsylvania, USA

About the Publisher

SAE International® is a global association of more than 128,000 engineers and related technical experts in the aerospace, automotive, and commercial-vehicle industries. Our core competencies are lifelong learning and voluntary consensus standards development. Visit sae.org

SAE EDGE™ Research Report Disclaimer

SAE EDGE™ Research Reports focus on topics that are dynamic, in which knowledge is incomplete, and which have yet to be standardized. They represent the collective wisdom of a group of experts and serve as a practical guide to the reader in understanding unsettled subject matter. They are not meant to provide a recommended practice or protocol. The experts engaged have contributed their own thoughts and points of view and these are not the positions of the institutions or businesses with which they are affiliated. A professional writer has collectivized their input; there is no one contributor's perspective being advanced, but rather that of a community of practitioners. SAE EDGE™ Research Reports are the property of SAE International and SAE alone is responsible for their content.

About This Publication

SAE EDGE™ Research Reports provide state-of-the-art and state-of-the-industry examinations of the most significant topics in mobility engineering. SAE EDGE™ contributors are experts from research, academia, and industry who have come together to explore and define the most critical advancements, challenges, and future direction in areas such as vehicle automation, unmanned aircraft, internet of things, and connectivity, cybersecurity, advanced propulsion, and advanced manufacturing.

Related Resources

SAE MOBILUS® Automated & Connected Knowledge Hub
http://sae.org/Mobilus/Automated

SAE Team

Frank Menchaca, Chief Product Officer
Michael Thompson, Director, Standards, Information and Research Publications
Monica Nogueira, Acquisitions Director
Jill Leonard, Product Manager
William Kucinski, Managing Technical Editor

Printed in USA

ISSN 2640-3536
e-ISSN 2640-3544
ISBN 978-1-4868-0025-1

To purchase bulk quantities, please contact: SAE Customer Service

E-mail: CustomerService@sae.org
Phone: 877-606-7323 (*inside USA and Canada*)
724-776-4970 (*outside USA*)
Fax: 724-776-0790

Visit the SAE International Bookstore at books.sae.org

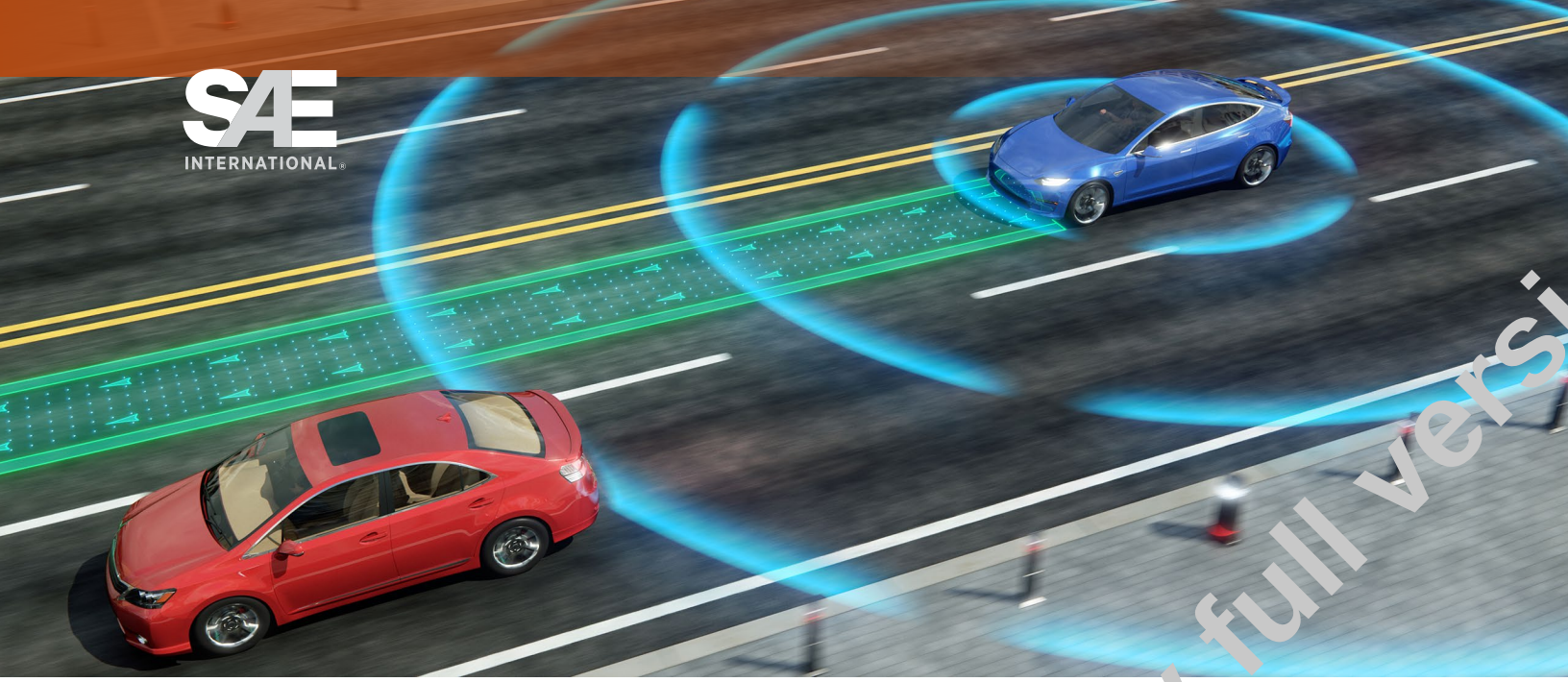
About the Editor

Sven Beiker, PhD, is the Founder and Managing Director of Silicon Valley Mobility, a mobility consulting and advisory firm that specializes in technical diligence, product roadmaps, and business models for mobility topics. The engagements span startups, investors, and corporations in the mobility and adjacent industries. In addition, Dr. Beiker is a Lecturer at the Graduate School of Business at Stanford University where he instructs students on strategies for startups and corporations in the field of automated, connected, electrified, and shared mobility.

With his well over 20 years of experience gained during his tenure at McKinsey & Company, Stanford University, and the BMW Group, Dr. Beiker is dedicated to the future of the automobile and personal mobility. His mission is to improve sustainability, safety, efficacy and convenience in how consumers use automobiles. He combines perspectives from technology, business, policy, and human factors.

Dr. Beiker also serves on advisory boards of several startups in the mobility space, as an advisor to the German American Chamber of Commerce in San Francisco, and as an advisor/co-editor to the Lecture Notes in Mobility of Springer Science+Business Media. He is a continuing contributor to the SAE EDGE™ Research Report series.

contents



Unsettled Issues in Balancing Virtual, Closed-Course, and Public-Road Testing of Automated Driving Systems

Abstract

This SAE EDGE™ Research Report identifies key unsettled issues of interest to the automotive industry regarding the challenges of determining the optimal balance for testing automated driving systems (ADS). Three main issues are outlined that merit immediate interest:

First, determining what kind of testing an ADS needs before it is ready to go on the road.

Second, the current, optimal, and realistic balance of simulation testing and real-world testing.

Third, the challenges of sharing data in the industry.

SAE EDGE™ Research Reports are preliminary investigations of new technologies. The three technical issues identified in this report should be discussed in greater depth with the aims of, first, clarifying the scope of the industry-wide alignment needed; second, prioritizing the issues requiring resolution; and, third, creating a plan to generate the necessary frameworks, practices, and protocols.

NOTE: SAE EDGE™ Research Reports are intended to identify and illuminate key issues in emerging, but still unsettled, technologies of interest to the mobility industry. The goal of SAE EDGE™ Research Reports is to stimulate discussion and work in the hope of promoting and speeding resolution of identified issues. SAE EDGE™ Research Reports are not intended to resolve the issues they identify or close any topic to further scrutiny.

SVEN BEIKER, PhD
Silicon Valley Mobility

Edge Development Team

Atul Acharya, *AAA/A3Ventures*
Michał Antkiewicz, *University of Waterloo*
David Barry, *Multek Technologies*
Thomas Bock, *Samsung*
Krzysztof Czarnecki, *University of Waterloo*
Eric Paul Dennis, PE, *Center for Automotive Research*
Cameron Gieda, *AutonomouStuff*
Peter-Nicholas Gronerth, *fka Silicon Valley*
Qiang Hong, PhD, *Center for Automotive Research*
Stefan Merkl, *TÜV SÜD America*
Chad Partridge, *Metamoto*
Robert Seidl, *Motus Ventures*
John Suh, *Hyundai CRADLE*
John Tintinalli, *SAE International*
Paul Wells, *AAA/A3Ventures*

ISSN 2640-3536