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RESEARCH REPORT

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Francesca M. Favarò, PhD

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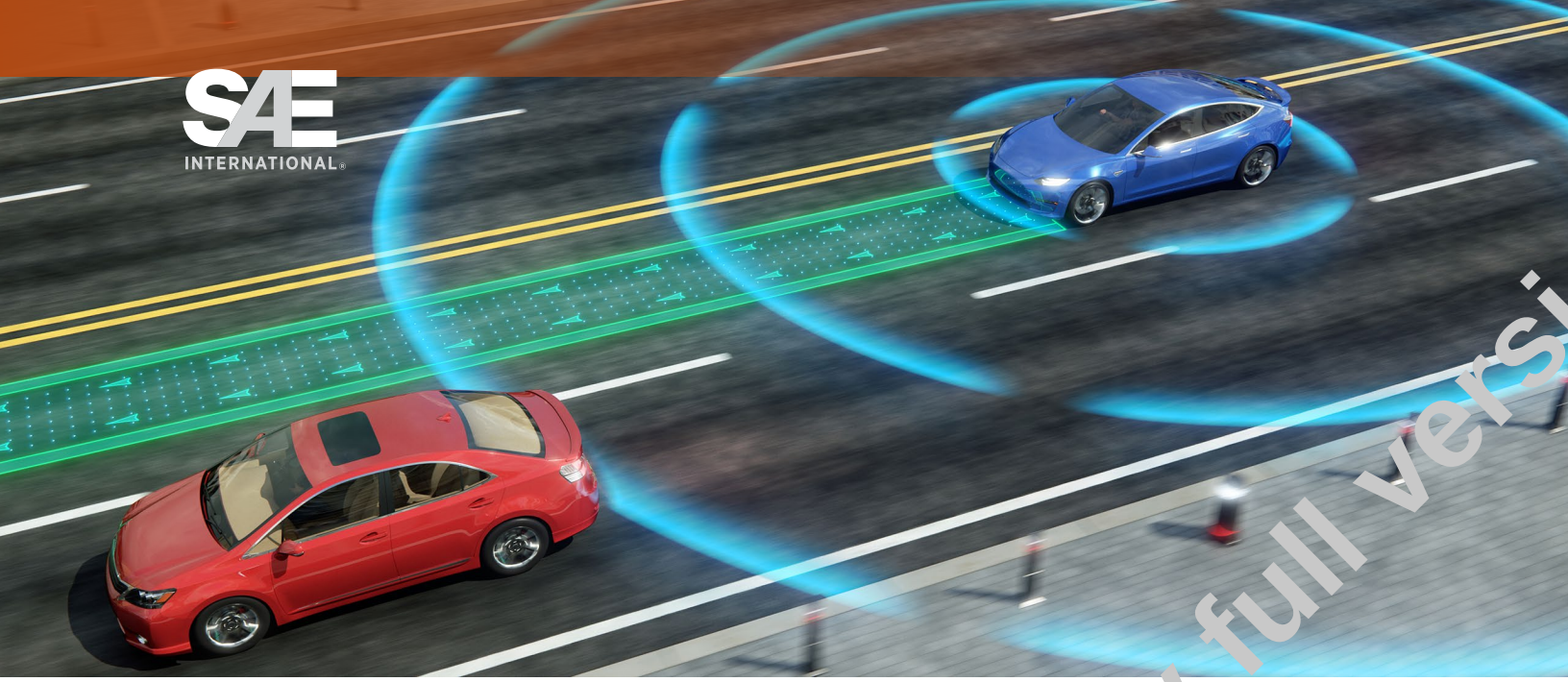
About the Editor

Dr. Favarò is an Assistant Professor in the Department of Aviation and Technology in the College of Engineering at San Jose State University (SJSU). Prior to joining SJSU, she earned a PhD and MS in Aerospace Engineering at the Georgia Institute of Technology, and MS and BS in Space Engineering at Politecnico di Milano, Italy. Dr. Favarò's research interests lie in the broad field of system safety and risk analysis, with an emphasis on system engineering concepts and the safe integration and embedding of new technologies and the consistent update of regulations and certification practices. In 2016, she funded the RSA^{2}S lab, which deals with Risk and Safety Assessment of Autonomous Systems such as unmanned aircraft systems (UAS) and self-driving vehicles. In 2017, she became a research associate of the Mineta Transportation Institute and started collaborating as expert in the realm of autonomous vehicles (AV). Her interests are currently focused on the safe integration of autonomous systems within U.S. public roads as well as the National Airspace. She particularly focuses on bridging the gap between the technology world and the current regulatory panorama. Dr. Favarò has authored several journal publications and conference proceedings on a variety of topics, ranging from UAS mishaps to risk assessment and regulatory compliance for nuclear power plants. Dr. Favarò serves on the Board of Directors of the Aero Club of Northern California and acts as Secretary for the Community and Airport Partnership for Safe Operations, an aviation interest group that safeguards safe and efficient operations at the local Reid-Hillview Airport, San Jose. She is an Federal Aviation Administration certified Advanced Ground Instructor, a certified Remote Pilot for UAS commercial operations, and a solo-endorsed pilot.

contents



Unsettled Issues Concerning Semi-Automated Vehicles: Safety and Human Interactions on the Road to Full Autonomy

Abstract

Across the span of the SAE International-defined levels of Driving Automation, human drivers occupy a diverse range of responsibilities and authority on the vehicle movement and the monitoring of the outside environment. From both a technological and a regulatory perspective, there is a gap that divides lower levels of automation (L1 through L3) and higher levels of automation (L4 and L5). For those vehicles that require the cooperation between a human driver and the autonomous technology, it is important to ascertain the safety consequences of such a design choice. It is also important to understand what the transition between automated driving and manual driving entails for the human driver, as well as for the surrounding traffic. This SAE EDGE™ Research Report investigates unsettled issues concerning what is commonly referred to as "semi-automated," including an overview of the role of human drivers, the quantification of the "transition-to-manual" problem, the role played by L3 toward full automation, and regulatory and moral considerations surrounding the deployment of these vehicles.

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.

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