

Automated Vehicles and Infrastructure Enablers

Kelley Coyner, JD
Jason Bittner, MPA

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RESEARCH REPORT

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Kelley Coyner, JD
Innovation4Mobility

Jason Bittner, MPA
Applied Research Associates

EDGE DEVELOPMENT TEAM

Jeff Paniati, PE, *Institute of Transportation Engineers*

Carmine Dwyer, PE, *Applied Research Associates*

Finch Fulton, *Locomotion*

Darko Babić, PhD, *University of Zagreb*

Kristin White, JD, *Intelligent Transport Society of America*

Paul Carlson, PhD, *Automated Roads*

Brian Norris, PE, *Stantec*

Robert Dingess, *Mercer Strategic Alliance*

King Gee, *American Association of State Highway and Transportation Officials*

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About the Editors



Kelley Coyner, JD is a transportation practitioner and researcher with 30 years of experience in developing, deploying, funding, and evaluating accessible, automated, connected, electric, and shared mobility systems. The National Academies Press recently published her report on *Low-Speed Automated Vehicles (LSAVs) and Public Transportation*, and in 2020, she served as Principal Investigator for nine topical briefing papers for the Transportation Research Board Forum's collection on *Preparing for Autonomous Vehicles and Shared Mobility*.

In 2017, Kelley co-founded Mobility e3 to provide cities and campuses with the technical knowledge needed to deploy automated vehicles. A three-time Chief Executive Officer, Kelley served as the Senate-confirmed Head of Agency for the Research and Special Programs Administration at the US Department of Transportation, led homeland security and emergency planning programs in the National Capital Region, and served as Executive Director of the North Virginia Transportation Commission. Profiled in the recent book *Women Driven Mobility: Rethinking the Way the World Moves* for developing accessible, automated, connected, electric, and shared mobility systems, she has honed her expertise in transportation innovation at the Massachusetts Institute of Technology, Harvard Kennedy School, Volpe National Transportation Systems Center, and George Mason University.



Jason Bittner, MPA, a researcher and planner, specializes in transportation infrastructure asset management, connected and automated vehicle, and policy analysis. Recognized as a leader in planning for vehicle automation and connectivity, Jason coordinated the Transportation Research Board Conduct of Research Committee's Automated Vehicle Working Group and has lectured on connected and automated vehicle policy at national and regional research conferences and at the University of South Florida, University of Wisconsin, and National Highway Institute.

Additionally, Jason oversaw the completion of a series of policy documents related to vehicle automation for the Tampa Hillsborough Expressway Authority. He was a primary author on a recent National Cooperative Highway Research Program synthesis looking at infrastructure enablers and modeling tools for automated vehicles and shared mobility. Currently a principal and employee-owner at Applied Research Associates, Inc., Jason previously served as Executive Director of the Center for Urban Transportation Research at the University of South Florida.

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Automated Vehicles and Infrastructure Enablers

Abstract

The deployment of automated vehicles (AVs)—especially driverless cars—has fallen significantly short of expectations. Some specific use cases possess momentum; however, production numbers generally appear to be more hopeful than realistic. Even before the COVID-19 pandemic, automated freight applications gained greater traction. For the most part, currently deployed and planned AVs are limited to narrowly defined operational design domains (ODDs) and may require human intervention to exit a highway or interact with law enforcement officers and weigh stations. Remaining business cases are often built around the so-called structural AVs—or AVs that operate in relatively constrained environments. In these scenarios, a narrow use case may support an investor's requirements; however, this is not the case for infrastructure owners and operators (IOOs). The safety, efficiency, reliability, and accessibility benefits that IOOs seek depend on wide-scale deployment across multiple ODDs, state boundaries, and even international borders. Original equipment manufacturers (OEMs) and automated driving system (ADS) developers often maintain that no infrastructure enablers are needed to achieve full AV deployment, regardless of IOO infrastructure investments (e.g., connected traffic signals, designated stops, booking software, mobile applications, separated lanes).

At the same time, when asked what infrastructure is needed to put AVs on the road, OEMs and ADS developers alike respond that a state of good repair and clean markings are sufficient. What does that mean to IOOs? Much of the US receives poor grades when it comes to state of good repair and pavement markings. Additionally, signs and traffic signals are not included in those ratings. Could some paint and regularly refreshed markings help transition us to wider AV deployment? What do IOOs need to know about what constitute effective lane markings or what to prioritize in terms of safety and mobility? How do policy considerations affect these choices?

This latest SAE EDGE™ Research Report in a series on AVs and infrastructure will consider ways in which infrastructure can speed or delay deployment, capture benefits, and mitigate hazards related to AV rollout. The reports will review approaches being taken in the US, UK, and EU, as well as Canada, Singapore, and elsewhere. While future reports will address specific topics, this report will touch on the relationship between infrastructure and key factors related to operations and capture of benefits, including accessibility, safety, reduced climate impacts, and integrated supply chain logistics.

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. These reports are not intended to resolve the challenges they identify or close any topic to further scrutiny.

KELLEY COYNER, JD
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