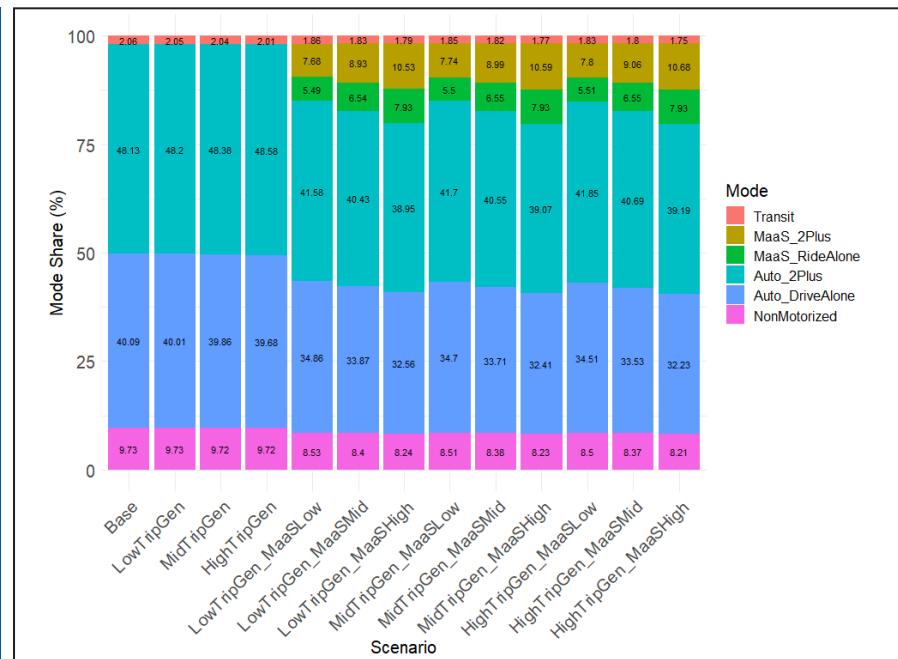


MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 22-452 (project 542) | March 2022

Exploratory Modeling and Analysis for Automated Vehicles in Utah



the ISSUE

Estimates of the long-term impact of shared autonomous vehicles (SAVs) on vehicle miles traveled (VMT) and travel patterns are needed to help transportation and mobility agencies plan investments and programming.

the RESEARCH

Given the growing interest in and promising market for SAVs, it is important for metropolitan planning organizations (MPOs) and departments of transportation (DOTs) to begin modeling how SAV technology would impact regional travel patterns and consider the special needs of automated vehicles in long-range cost estimates and programming processes. This research presents a framework for modeling SAVs that can be seamlessly integrated into existing four-step travel demand models. Using the Wasatch Front (WF) region in the State of Utah as a case study, we propose various modifications to the regional travel demand model to explore the impact of SAVs on travel behaviors. A scenario-based analysis is then utilized to predict a range of VMT increases based on the introduction of SAVs within the study region. The analysis forecasts VMT to the year 2040.



A University Transportation Center sponsored by the U.S. Department of Transportation serving the Mountain-Plains Region. Consortium members:

Colorado State University
North Dakota State University
South Dakota State University

University of Colorado Denver
University of Denver
University of Utah

Utah State University
University of Wyoming



the FINDINGS

A total of 12 scenarios were designed to investigate different combinations of trip growth rates and mobility as a service (MaaS) market attractiveness. This experimental design yielded an estimated increase in VMT ranging from 4% to 9% because of SAVs by the year 2040. Results revealed that SAVs could increase the total number of trips by 1% to 7% across the designed scenarios. Mode share comparison among scenarios showed that while MaaS can take market shares away from all conventional transportation modes, it competes most with personal automobiles. Reducing the generalized cost of MaaS makes the mode more appealing compared with conventional modes. Higher market shares were found for shared-ride MaaS due in part to the larger average household size in Utah. This finding, however, does not account for potential disadvantages of sharing a ride, such as discomfort in traveling with strangers.

Lead Investigator(s)

Xiaoyue Cathy Liu
University of Utah
cathy.liu@utah.edu

Research Assistant(s)

Nima Haghghi, GRA, PhD

Project Title

Exploratory Modeling and Analysis for Automated Vehicles in Utah

Sponsors | Partners

Utah Dept. of Transportation

USDOT, Research and Innovative Technology Administration

the IMPACT

While it is foreseen that SAVs could potentially be on the market in a decade or two, MPOs and DOTs are just beginning to estimate the impacts of SAVs on travel behavior. This research fills this gap by investigating the impact of SAVs on travel demand in Utah to the year 2040. The results will assist public agencies in understanding the impacts of SAVs on travel patterns to further consider the special needs of AV technology in long-range cost estimates and programming processes.

For more information on this project, download the Main report at <https://www.ugpti.org/resources/reports/details.php?id=1059>

For more information or additional copies, visit the Web site at www.mountain-plains.org, call (701) 231-7767 or write to Mountain-Plains Consortium, Upper Great Plains Transportation Institute, North Dakota State University, Dept. 2880, PO Box 6050, Fargo, ND 58108-6050.



This publication was produced by the Mountain-Plains Consortium at North Dakota State University. The contents of this brief reflect the views of the authors, who are responsible for facts and the accuracy of the information presented herein. This document is disseminated under the program management of the USDOT, Office of Research and Innovative Technology Administration in the interest of information exchange. The U.S. Government assumes no liability for the contents or use thereof.



NDSU does not discriminate in its programs and activities on the basis of age, color, gender expression/identity, genetic information, marital status, national origin, participation in lawful off-campus activity, physical or mental disability, pregnancy, public assistance status, race, religion, sex, sexual orientation, spousal relationship to current employee, or veteran status, as applicable. Direct inquiries to Vice Provost, Title IX/ADA Coordinator, Old Main 201, 701-231-7708, ndsu.eoaa@ndsu.edu.