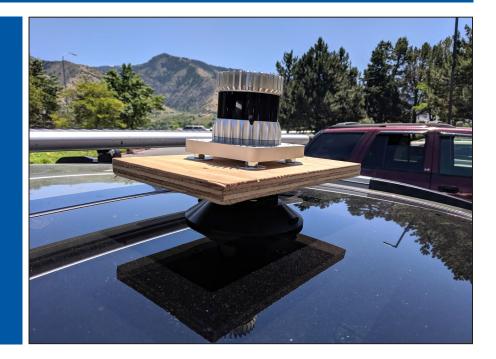# MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 21-427 (project 577) | March 2021

Uses and Challenges of Collecting LiDAR Data from a Growing Autonomous Vehicle Fleet: Implications for Infrastructure Planning and Inspection Practices

the ISSUE

Big data from autonomous vehicles are an imminent issue for transportation agencies. Agencies require adequate expectations of data size in order to make plans, policies, and budget decisions regarding data management. Agencies also require knowledge of existing and emerging uses and the potential challenges and limitations of using the data.

the RESEARCH

Researchers collected roadway geospatial data with a simple mobile LiDAR (Light Detection and Ranging) setup in order to generate conservative estimates of autonomous vehicle data sizes. This was done by driving along selected roadways at varying speeds and varying operating modes of the LiDAR unit. The data were analyzed both graphically and statistically to determine general data trends. In particular, simple linear regression models were developed to estimate the data size using inputs of data collection duration and LiDAR operating specifications. The model outputs were total data size, data size within the right-of-way, and data size within the travel lanes.

This research also included an extensive literature review of the uses of LiDAR for transportation purposes. Common uses, procedures, and challenges were summarized.

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Project Title

Uses and Challenges of
Collecting LiDAR Data from
a Growing Autonomous
Vehicle Fleet: Implications for
Infrastructure Planning and
Inspection Practices

the FINDINGS

This researchers found that, as expected, the data size decreases significantly (on the order of gigabytes to megabytes) after processing, filtering, and conversion to .las format, which is the industry-standard binary format for storing LiDAR data. In general, as vehicle speed increases, the data cloud density decreases. The most common challenges found in previous studies were the large data size, expertise required to process the data, and weather impacts and data efficacy.

the IMPACT

This research will primarily be used as a reference for transportation agencies preparing to make budgetary or policy decisions regarding autonomous vehicles and big data management. Ideally, agencies will gain a better understanding and expectation of the potential data and can negotiate better, or more targeted, deals with data providers based on their needs. Additionally, this research could act as a starting point for agencies looking to initiate the use of LiDAR in their operations.

For more information on this project, download the entire report at https://www.ugpti.org/resources/reports/details.php?id=1026